

IBM Tivoli Storage Productivity Center
Version 5.2

Installation and Configuration Guide



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Version 5.2

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Note:

Before using this information and the product it supports, read the information in "Notices" on page 463.

This edition applies to version 5, release 2, modification 0 of IBM Tivoli Storage Productivity Center (product numbers 5725-F92, 5725-F93 and 5725-G33) and to all subsequent releases and modifications until otherwise indicated in new editions. This edition replaces SC27-4058-00.

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Preface

Who should read this guide

This publication is intended for administrators or users who are installing and using Tivoli® Storage Productivity Center and IBM® Tivoli Storage Productivity Center for Replication. It also describes the hardware and software requirements for installing the products and provides an overview of the installation procedures.

Administrators and installers should be familiar with the following topics:

- General procedures for installing software on Microsoft Windows, AIX®, Linux, HP-UX, and Oracle Solaris.
- Storage Area Network (SAN) concepts
- Tivoli Storage Productivity Center concepts
- Tivoli Storage Productivity Center for Replication concepts
- DB2® Database for Linux, UNIX, and Windows
- Simple Network Management Protocol (SNMP) concepts
- IBM Tivoli Enterprise Console

This installation and configuration guide includes information for the Tivoli Storage Productivity Center family of products which includes the following programs:

- Tivoli Storage Productivity Center
- IBM Tivoli Storage Productivity Center for Replication

Publications

You are provided with a list of publications in the Tivoli Storage Productivity Center and Tivoli Storage Productivity Center for Replication libraries and other related publications. The following section also describes how to access publications online, how to order publications, and how to submit comments about publications.

The publications are available from the IBM Publications Center at <http://www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss>.

Accessing publications online

Publications for this product and other related products are available online.

Information about installing, configuring, upgrading, and uninstalling Tivoli Storage Productivity Center and related products is available online. Use Table 1 on page xii to view and download these publications. Translated documents are available for some products.

IBM Tivoli Documentation Central also provides links to the information centers for all Tivoli products. For information about referenced Tivoli products, such as Tivoli Storage Manager and Tivoli Enterprise Console®, go to the home page for Tivoli Documentation Central.

Table 1. Locations of publications for Tivoli Storage Productivity Center and related products

Product	Online location
IBM Tivoli Storage Productivity Center and IBM Tivoli Storage Productivity Center for Replication	<p>Tivoli Storage Productivity Center Information Center. In the navigation pane, click IBM Tivoli Storage Productivity Center.</p> <p>To obtain PDF documents, click IBM Tivoli Storage Productivity Center > Printable documentation.</p> <p>To view previous versions of the IBM Tivoli Storage Productivity Center Information Center, go to the Tivoli Storage Productivity Center page in Tivoli Documentation Central.</p>
IBM Tivoli Storage Productivity Center for Replication for System z®	<p>Tivoli Storage Productivity Center Information Center. In the navigation pane, click IBM Tivoli Storage Productivity Center for Replication for System z.</p> <p>To obtain PDF documents, click IBM Tivoli Storage Productivity Center for Replication for System z > Printable documentation.</p> <p>To view previous versions of the IBM Tivoli Storage Productivity Center for Replication Information Center, go to the Tivoli Storage Productivity Center page in Tivoli Documentation Central.</p>
IBM WebSphere® Application Server	http://publib.boulder.ibm.com/infocenter/wasinfo/v8r0/index.jsp
Jazz™ for Service Management	http://pic.dhe.ibm.com/infocenter/tivihelp/v3r1/topic/com.ibm.psc.doc_1.1.0/psc_ic-homepage.html
IBM System Storage® DS3000, IBM System Storage DS4000®, or IBM System Storage DS5000	http://www.ibm.com/support/entry/portal/
IBM System Storage DS6000™	http://publib.boulder.ibm.com/infocenter/dsichelp/ds6000ic/index.jsp
IBM System Storage DS8000®	http://publib.boulder.ibm.com/infocenter/dsichelp/ds8000ic/index.jsp
IBM System Storage DS® Open Application Programming Interface publications	<p>http://www.ibm.com/support/entry/portal/Troubleshooting/Hardware/System_Storage/Storage_software/Other_software_products/CIM_Agent_for_DS_Open_(API)/</p> <p>Use these publications for information about how to install, configure, and use the CIM agent.</p>
IBM System Storage SAN Volume Controller	http://pic.dhe.ibm.com/infocenter/svc/ic/index.jsp
IBM Storwize® V3500	http://pic.dhe.ibm.com/infocenter/storwize/v3500_ic/index.jsp
IBM Storwize V3700	http://pic.dhe.ibm.com/infocenter/storwize/v3700_ic/index.jsp
IBM Storwize V7000	http://pic.dhe.ibm.com/infocenter/storwize/ic/index.jsp
IBM Storwize V7000 Unified	http://pic.dhe.ibm.com/infocenter/storwize/unified_ic/index.jsp

Table 1. Locations of publications for Tivoli Storage Productivity Center and related products (continued)

Product	Online location
IBM Scale Out Network Attached Storage (IBM SONAS)	http://pic.dhe.ibm.com/infocenter/sonasic/sonas1ic/index.jsp
IBM XIV® Storage System	http://publib.boulder.ibm.com/infocenter/ibmxiv/r2/index.jsp
IBM DB2 Database for Linux, AIX, and Windows	http://publib.boulder.ibm.com/infocenter/db2luw/v10r1/index.jsp
IBM System Storage N series	http://www.ibm.com/systems/storage/network/redbooks.html For more information about IBM System Storage N series, see http://www.ibm.com/systems/storage/network/software/ .
IBM Systems Director	http://www.ibm.com/systems/software/director/index.html
VMware vSphere	http://www.vmware.com/support/pubs/vsphere-esxi-vcenter-server-pubs.html

IBM Redbooks

The IBM Redbooks® are publications about specialized topics.

You can order publications through your IBM representative or the IBM branch office serving your locality. You can also search for and order books of interest to you by visiting the IBM Redbooks home page at <http://www.redbooks.ibm.com>.

Translation

Translated publications are available from the information center which is available in certain translated languages. It is displayed in the language that is appropriate for the browser locale setting.

When a locale does not have a translated version, the information center is displayed in English, which is the default language. Translations of the PDFs are available when the information center is translated.

Contact your service representative for more information about the translated publications and whether translations are available in your language.

Downloading publications

IBM publications are available in electronic format to be viewed or downloaded free of charge.

You can download IBM publications from <http://www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss>.

Providing feedback about publications

Your feedback is important to help IBM provide the highest quality information. You can provide comments or suggestions about the documentation from the IBM Tivoli Storage Productivity Center Information Center.

Go to the information center at <http://publib.boulder.ibm.com/infocenter/tivihelp/v59r1/index.jsp> and click **Feedback** on the information center Welcome page or at the bottom of the individual topic pages.

Tivoli Storage Productivity Center Service Management Connect community

Connect, learn, and share with Service Management professionals: product support technical experts who provide their perspectives and expertise.

Access Service Management Connect at <https://www.ibm.com/developerworks/servicemanagement/>. Use Service Management Connect in the following ways:

- Become involved with transparent development, an ongoing, open engagement between other users and IBM developers of Tivoli products. You can access early designs, sprint demonstrations, product roadmaps, and prerelease code.
- Connect one-on-one with the experts to collaborate and network about Tivoli and the Storage Management community.
- Read blogs to benefit from the expertise and experience of others.
- Use wikis and forums to collaborate with the broader user community.

Contacting IBM Software Support

You can contact IBM Software Support by phone, and you can register for support notifications at the technical support website.

- Go to the IBM Tivoli Storage Productivity Center technical support website at http://www.ibm.com/support/entry/portal/Overview/Software/Tivoli/Tivoli_Storage_Productivity_Center.

To receive future support notifications, sign in under **Notifications**. You are required to enter your IBM ID and password. After you are authenticated, you can configure your subscription for Tivoli Storage Productivity Center technical support website updates.

- Customers in the United States can call 1-800-IBM-SERV (1-800-426-7378).
- For international customers, go to the Tivoli Storage Productivity Center technical support website to find support by country. Expand **Contact support** and click **Directory of worldwide contacts**.

You can also review the *IBM Software Support Handbook*, which is available at <http://www14.software.ibm.com/webapp/set2/sas/f/handbook/home.html>.

The support website offers extensive information, including a guide to support services; frequently asked questions (FAQs); and documentation for all IBM Software products, including Redbooks and white papers. Translated documents are also available for some products.

When you contact IBM Software Support, be prepared to provide identification information for your company so that support personnel can readily assist you. Company identification information might also be needed to access various online services available on the website. See “Reporting a problem.”

Reporting a problem

Provide the IBM Support Center with information about the problems that you report.

Have the following information ready when you report a problem:

- The IBM Tivoli Storage Productivity Center version, release, modification, and service level number.
- The communication protocol (for example, TCP/IP), version, and release number that you are using.
- The activity that you were doing when the problem occurred, listing the steps that you followed before the problem occurred.
- The exact text of any error messages.

Conventions used in this guide

Information is given about the conventions that are used in this publication.

This publication uses several conventions for special terms and actions, and for operating system-dependent commands and paths.

The following typeface conventions are used in this publication:

Bold

- Flags that display with text
- Graphical user interface (GUI) elements (except for titles of windows and dialogs)
- Names of keys

Italic

- Variables
- Values that you must provide
- New terms
- Words and phrases that are emphasized
- Titles of documents

monospace

- Commands and command options
- Flags that display on a separate line
- Code examples and output
- Message text
- Names of files and directories
- Text strings that you must type, when they display within text
- Names of Oracle Java™ methods and classes
- HTML and XML tags that display like this, in monospace type

For syntax notations, remember the following details.

- In AIX, the prompt for the root user is #.
- In AIX and Linux, the commands are case-sensitive, so you must type commands exactly as they are shown.

Chapter 1. Planning

The following sections provide information to help plan your Tivoli Storage Productivity Center environment before you install the product. In a complex environment, good planning helps you avoid delays and problems in getting your system up and running.

Planning for installation

Before installing Tivoli Storage Productivity Center for the first time, be familiar with your operating systems, storage devices, communication protocols, and system configurations.

The Tivoli Storage Productivity Center server must be a dedicated system for Tivoli Storage Productivity Center operations and not shared with other applications.

Important: Some antivirus software can interfere with the Tivoli Storage Productivity Center installation process. To avoid this, disable all antivirus software on the target system and restart the system before you install Tivoli Storage Productivity Center. For more information, see this IBM Software Support technote: <http://www-01.ibm.com/support/docview.wss?uid=swg21633867>.

Product licenses

Product licenses are available for IBM Tivoli Storage Productivity Center. Each license determines the functions that are accessible in the stand-alone GUI, web-based GUI, command-line interface, and the API. You can review the functions that are included with each license and determine which license meets your storage management needs.

Restriction: When you upgrade your license, all of the servers, except the web server are recycled. After you upgrade your license, to access the functionality in the license, you must stop and restart the web server.

IBM Tivoli Storage Productivity Center

This license contains the following functions:

Data management

A file and capacity management solution for heterogeneous storage environments. Data management includes enterprise-wide reporting and monitoring, and automated capacity provisioning for Direct Attached Storage (DAS), network-attached storage (NAS), and Storage Area Network (SAN) environments.

Disk management

Disk management helps you manage SANs and heterogeneous storage from one console.

Fabric management

Fabric management helps you manage the SAN fabric that connects the host systems and applications to the storage devices. This feature is a comprehensive management solution for multi-vendor SANs and includes automatic resource and topology discovery, monitoring, and alerts.

Tivoli Storage Productivity Center for Replication

This license includes all the Tivoli Storage Productivity Center for Replication functions.

Performance management

Disk and Fabric performance management functions.

Device support

You can see a complete list of devices that can be used with Tivoli Storage Productivity Center at <https://www.ibm.com/support/docview.wss?uid=swg21386446>. Click the appropriate release under **Storage**.

IBM Tivoli Storage Productivity Center Select Edition

This license contains all the functions of the IBM Tivoli Storage Productivity Center license. This license is priced by enclosure rather than by capacity.

IBM SmartCloud® Virtual Storage Center Storage Analytics Engine

This license contains everything that is in the IBM Tivoli Storage Productivity Center license, and also includes advanced analytical functions. This license was previously called IBM Tivoli Storage Productivity Center Advanced. The user interfaces and messages still refer to this license as IBM Tivoli Storage Productivity Center Advanced.

In the web-based GUI, the following advanced analytical functions are available:

- Optimize storage tiering by using the Analyze Tiering wizard
- Distribute the workload of volumes across pools on the same tier by using the Balance Pools wizard
- Provision block storage by using the Provision Storage wizard.
- Enable automatic zoning to create zones during block storage provisioning to connect a server to a storage system

In the stand-alone GUI, the following advanced analytical functions are available:

- Configuration analysis
- Configuration history
- Scans
- Policy management
- Server probes
- Scans
- Profiles
- Data Manager for databases
- Data Manager for Chargeback

This license is only available as part of the IBM SmartCloud Virtual Storage Center (VSC). The complete VSC solution bundles Tivoli Storage Productivity Center with IBM System Storage SAN Volume Controller and Tivoli Storage FlashCopy® Manager. In the VSC solution, System Storage SAN Volume Controller provides a virtualization platform and remote replication functions, and the Tivoli Storage FlashCopy Manager provides data backup and restore capabilities. For more information about IBM SmartCloud Virtual Storage Center, see <http://www.ibm.com/software/products/us/en/vsc/>.

If you purchased a license for IBM Tivoli Storage Productivity Center Version 4.2, when you upgrade to Version 5.2, you can upgrade to the appropriate license. Table 2 shows the parallel functions in Version 5.2.

Table 2. Tivoli Storage Productivity Center licenses when you upgrade from Version 4.2 to Version 5.2

If you have this Tivoli Storage Productivity Center Version 4.2 license	You are entitled to this Tivoli Storage Productivity Center Version 5.2 license
Basic	When you upgrade to Version 5.2, you get the same functionality that you had with the Version 4 Basic Edition license.
Disk Select	IBM Tivoli Storage Productivity Center Select Edition
Data	Not applicable.
Disk	IBM Tivoli Storage Productivity Center
Standard Select	Not applicable.
Standard	Not applicable.

Planning for a 64-bit environment

This section provides information for running Tivoli Storage Productivity Center in a 64-bit environment.

The following conditions apply when you run Tivoli Storage Productivity Center in a 64-bit environment:

- All Tivoli Storage Productivity Center programs that run in a 64-bit environment are run in 32-bit compatibility mode for Tivoli Storage Productivity Center.
- The Tivoli Storage Productivity Center agents must be running in a 32-bit native mode or 32-bit compatibility mode environment.
- The databases to be monitored by Tivoli Storage Productivity Center must be in a 32-bit native mode or 32-bit compatibility mode environment.
- Tivoli Storage Productivity Center can monitor DB2 in 64-bit native mode on Windows and AIX as long as the DB instance is created in 32-bit mode.

Planning to install Tivoli Storage Productivity Center in a Windows domain

Before you can install Tivoli Storage Productivity Center on a Windows domain, you must determine which installation method is appropriate, based on your environment.

Installation methods

Install DB2 and Tivoli Storage Productivity Center in one of the following ways:

- Use local user accounts to install both DB2 and Tivoli Storage Productivity Center.
- Use a local user account to install DB2 and a domain user account to install Tivoli Storage Productivity Center.
- Use domain user accounts to install both DB2 and Tivoli Storage Productivity Center.

Windows domain and local user accounts

When a computer is a member of a Windows domain, you can install IBM DB2 on the local computer or on a computer that is a member of a Windows domain. The installation process creates a local DB2 user account or a domain DB2 user account.

User accounts

Windows domain user accounts are used to manage multiple computers, and local user accounts can be used to manage one computer.

Restriction: Before you install Tivoli Storage Productivity Center by using a Windows domain or a local user account as the common user name, you must add the Windows domain user account or local user account to the local administrators group. The Tivoli Storage Productivity Center installation software recognizes only Windows domain or local user accounts (and not Windows domain or local groups) that are added to the local administrators group.

domain DB2 user account is an example of a Windows domain user account, and *local DB2 user account* is an example of a local user account.

Naming conventions for user accounts

You can install Tivoli Storage Productivity Center by using the same user account that is defined in both the local and Windows domain registries. The Windows operating system resolves this naming collision on computers that belong to a Windows domain by prefixing the user name with the host name or domain name. This user name is also called a *fully qualified user name*.

You must use the following naming conventions for each user account:

- *domain_name\administrator*
- *domain_name\user 1, domain_name\user2, domain_name\userN.*
- *host_name\administrator*
- *host_name\user1, host_name\user2, host_name\userN.*

For example, if the domain name is TPC51, and the user name is db2admin, the Windows domain user account is TPC51\db2admin. The naming convention for a local user account is *host_name\user name*. For example, if the host name is machine2, and the user name is db2admin, the user account is machine2\db2admin. You must enter the fully qualified user names in the common user name field when you install Tivoli Storage Productivity Center on computers that are members of a Windows domain.

Installation considerations

As part of your planning process, you must determine which user accounts to use when you install Tivoli Storage Productivity Center and DB2, consider the environment and security requirements.

Tivoli Storage Productivity Center uses IBM WebSphere Application Server to authenticate the users for local and domain user accounts. When the computer that hosts WebSphere Application Server process is a member of a Windows domain, by default local and domain user registries are used, but the Windows domain user registry takes precedence. For more information about WebSphere Application Server authentication, see Local operating system registries.

Related reference:

“Adding a computer to the Windows domain”

Before you can install Tivoli Storage Productivity Center in a Windows domain, you must first add the computer on which you plan to install Tivoli Storage Productivity Center to the domain.

“Verifying that the Computer Browser service is running” on page 6

Tivoli Storage Productivity Center uses WebSphere Application Server to authenticate domain users. WebSphere Application Server requires that the Microsoft Computer Browser Service is enabled and running to authenticate these users.

“Installing DB2 by using a Windows domain user account” on page 6

Before you install Tivoli Storage Productivity Center in a Windows domain, you must install DB2 and register the DB2 license key. You do not need to complete this task if you are planning to install DB2 by using a local user account.

“Creating a Windows domain common user account for Tivoli Storage Productivity Center” on page 7

You must create a Windows domain common user account before you can install Tivoli Storage Productivity Center in a Windows domain.

“Granting DB2 SYSADM authority to a Windows domain user account” on page 8

If a Windows domain user account is used to install Tivoli Storage Productivity Center, the user account may not have the DB2 SYSADM authority, because DB2 goes to the domain controller computer to list the groups. Before you install Tivoli Storage Productivity Center, you must grant the Windows domain user accounts the DB2 SYSADM authority.

“Installing Tivoli Storage Productivity Center on a Windows domain” on page 124

You can install Tivoli Storage Productivity Center and DB2 by using a Windows domain or a local user account.

Adding a computer to the Windows domain

Before you can install Tivoli Storage Productivity Center in a Windows domain, you must first add the computer on which you plan to install Tivoli Storage Productivity Center to the domain.

You can log on to a computer that is a member of a Windows domain by entering a user name that is prefixed with the domain name. For example, you can enter TPC52\Administrator if you are the domain administrator of the TPC52 domain.

To add a computer to a Windows domain, complete the following steps:

1. Click **Start > Control Panel > Network and Internet > Network and Sharing Center**.
2. On the Network and Sharing Center window, click the left mouse button on your local area connection and click **Properties**.
3. Select the **Internet Protocol Version 4 (TCP/IP4)** check box, and click **Properties**.

Tip: If you are using Windows Server 2012, ensure that the **Client for Microsoft Networks** check box is selected.

4. On the **General** tab, select **Use the following DNS server addresses**.
5. In the **Preferred DNS server** field, enter the IP address of the domain controller computer.
6. In the **Alternate DNS server** field, enter the IP address of the alternate DNS server.

7. Click **Advanced**.
8. On the **DNS** tab, review the list of IP addresses.
9. In **DNS suffix for this connection** field, enter the fully qualified domain name.
10. Click **OK**.
11. Right-click **Computer** and select **Properties**.
12. In the Computer name, domain, and workgroup settings section, click **Change settings**.
13. Click **Change**.
14. On the Computer Name/Domain Changes window, select **Domain**, enter the fully qualified domain name, and click **OK**.
15. Enter the user name and password for the domain controller computer.

Important: The user name and password that you enter must be a domain administrator user name and password.
16. Click **OK** for the changes to take effect and to start the computer again.

Verifying that the Computer Browser service is running

Tivoli Storage Productivity Center uses WebSphere Application Server to authenticate domain users. WebSphere Application Server requires that the Microsoft Computer Browser Service is enabled and running to authenticate these users.

When Tivoli Storage Productivity Center is installed by using a Windows domain user account, if the Computer Browser Service is not running, error message BPCIN0219E is displayed. For more information about using Microsoft Active Directory for authentication, see Using Microsoft Active Directory for authentication.

To verify that the **Computer Browser** service is running on the domain controller computer and the computer that is a member of a domain, complete the following steps:

1. Right-click **Computer** and select **Manage**.
2. In the navigation tree, click **Server Manager > Configuration > Services**.
3. Verify that the **Computer Browser** service is started.

If the service has a **Stopped/Disabled** status on the domain controller computer, you must also restart the computer that is a member of a Windows domain after you start the service on the domain controller computer.

4. In a Command Prompt window, enter the following command:
`net view`

If there are no errors, the domain is correctly configured and the computer browser is working.

Installing DB2 by using a Windows domain user account

Before you install Tivoli Storage Productivity Center in a Windows domain, you must install DB2 and register the DB2 license key. You do not need to complete this task if you are planning to install DB2 by using a local user account.

For more information about installing DB2 as a domain user, see “Planning to install Tivoli Storage Productivity Center in a Windows domain” on page 3.

To install DB2 by using a domain user account, complete the following steps:

1. Log on to Windows by using a domain administrator user account (for example, TPC51\Administrator).
2. In a command prompt window, go to the directory where the **db2schex.exe** command is located and run the following command:

```
runas /USER:domain name\Administrator db2schex.exe
```

where *domain name* is the name of your domain, for example, **TPC**.
3. In the window that is displayed, enter a password and click **OK**.
4. In Windows Explorer, go to the directory where DB2 installation image is located.
5. Right-click **setup.exe** and select **Run as administrator**.
6. Complete the DB2 setup wizard.
7. On the Set user information for the DB2 Administration Server page, in the User Information panel, select your domain.
8. Enter a domain user name and password.

Tip: You can reuse an existing domain user name or create one during the installation.

9. On the Enable operating system security for DB2 objects page, complete the following steps:
 - a. Verify that **Enable operating system security** check box is selected.
 - b. In the DB2 administrators group and DB2 users group sections, select the domain.

Note: Before you install Tivoli Storage Productivity Center, you must create the DB2 administrative and DB2 users group manually on the domain controller computer. If the DB2 installation program cannot create the DB2 administrators group on the domain, the installation can fail.

For more information about creating users in DB2, go to the DB2 information center and search for *Creating databases and users for DB2*.

Creating a Windows domain common user account for Tivoli Storage Productivity Center

You must create a Windows domain common user account before you can install Tivoli Storage Productivity Center in a Windows domain.

To create a domain common user account for Tivoli Storage Productivity Center, complete the following steps:

1. Log on to the domain controller computer by using a domain administrator user account.
2. Click **Start > Administrative Tools > Active Directory Users and Computers**.
3. Right-click on the Users folder and select **New > User**.
4. On the domain controller computer, click **Start > All Programs > Administrative Tools > Active Directory Users and Computers**.
5. Right-click on the domain user you created and click **Properties > Member Of**.
6. On the Member of tab, click **Add** and add Domain Administrators.
7. Click **Check Names**.
8. If the name you entered is located, click **OK**.

9. Repeat steps 4 - 8 and add the following groups:

- Administrators
- DB2ADMNS
- DB2USERS

Tip: The Domain Users group exists.

10. Follow the prompts in the wizard to create the domain common user account for Tivoli Storage Productivity Center.
11. Log on to the domain client computer on which you want to install Tivoli Storage Productivity Center by using a domain administrator user account.
When you log in to computer that is a member of a Windows domain by using the domain administrator user account, and you encounter the 'DB2 UDB SQL5005C System Error' message, complete the following steps:
 - a. Log in to the computer that is a member of a domain by using the local user name.
 - b. Click **Server Manager > Configuration > Local Users and Groups > Groups > DB2ADMNS > Properties > Add.**
 - c. Add *domain\domain user name*.
 - d. Click **Check Names**.
 - e. If the user name that you checked for is underlined, click **Apply**.
12. Open **Server Manager**.
13. In the navigation tree, click **Server Manager > Configuration > Local Users and Groups > Groups**.
14. Add the domain common user name that you created in step 3 (commonid) to the local administrator group.

Restriction: When you install Tivoli Storage Productivity Center by using a Windows domain user account, the *sAMAccountName* and *userPrincipalName* (the User login name) Active Directory attributes in the Windows domain user account cannot contain spaces. The *sAMAccountName* must have the same value as the part of the *userPrincipalName* Active Directory attribute that precedes the @ character.

Granting DB2 SYSADM authority to a Windows domain user account

If a Windows domain user account is used to install Tivoli Storage Productivity Center, the user account may not have the DB2 SYSADM authority, because DB2 goes to the domain controller computer to list the groups. Before you install Tivoli Storage Productivity Center, you must grant the Windows domain user accounts the DB2 SYSADM authority.

To enter the commands, and DB2 SYSADM authority, complete the following steps:

1. Click **Start > Command Prompt**.
2. Right-click **Command Prompt** and select **Run as administrator**.
3. Enter these commands:

```
db2cmd
db2set -g DB2_GRP_LOOKUP=local,TOKENLOCAL
db2 force application all
db2stop
db2start
db2set -all
```


After you run the commands, you can log in to Tivoli Storage Productivity Center by using a user account that has DB2 SYSADM authority.

If you are logged in by using your Windows domain user account, you may not have the authorization to run the `db2 force application all` command.

Important: When you grant DB2 SYSADM authority, and the **db2 force application all** command does not work, you can enter the **db2stop** command instead of the **db2 force application all** command.

For more information about acquiring user group information in the Windows operating system, see the IBM DB2 Version 10.1 Information Center.

For more information about the `sysadmin_group` parameter, see System administration authority (SYSADM).

Related reference:

“Installing Tivoli Storage Productivity Center on a Windows domain” on page 124
You can install Tivoli Storage Productivity Center and DB2 by using a Windows domain or a local user account.

Planning for Tivoli Storage Productivity Center for Replication

When you plan for disaster recovery, ensure that you plan that the Tivoli Storage Productivity Center for Replication server is accessible if a disaster occurs. Even if you have a Tivoli Storage Productivity Center for Replication standby server, this server still requires authentication.

For more information about planning for replication, see “Planning for Open HyperSwap replication” on page 11.

Planning for HyperSwap replication

HyperSwap® replication is a special Metro Mirror replication method for storage systems that are connected to an IBM z/OS® system. HyperSwap automates the failover of I/O from the primary logical devices to the secondary logical devices in the event of a primary disk storage system failure. This function can be done with minimal disruption to the applications that are using the logical devices.

Overview

HyperSwap replication applies to both planned and unplanned replication sessions. When a session has HyperSwap enabled, an I/O error on the primary site automatically causes the I/O to switch to the secondary site without any user interaction and with minimal application impact. In addition, while HyperSwap is enabled, the Metro Mirror session supports disaster recovery. If a write is successful on the primary site, but cannot be replicated on the secondary site, Tivoli Storage Productivity Center for Replication suspends every pair in the session to create a consistent set of data. This action ensures that a consistent copy of the data exists on the secondary site. If the system fails, the data might not be the latest data, but the data is consistent and you can manually switch host servers to the secondary site.

You can manage HyperSwap from any operating system that is running IBM Tivoli Storage Productivity Center for Replication. For example, you can manage HyperSwap from Tivoli Storage Productivity Center for Replication that is running on Windows, Linux, or AIX. In addition, Tivoli Storage Productivity Center for

Replication that is running on z/OS can manage HyperSwap instances that are running in different z/OS systems and sysplexes.

Sessions that can enable HyperSwap

The following session types can enable HyperSwap processing:

- Basic HyperSwap
- Metro Mirror with Failover/Failback
- Metro Global Mirror
- Metro Global Mirror with Practice

Supported storage systems

HyperSwap is available for TotalStorage Enterprise Storage Server[®], System Storage DS8000, and DS6000 systems

Requirements and general tasks

To enable HyperSwap processing, the following conditions must exist:

- The HSIB and IOSHSAPI address spaces are started on the IBM z/OS system to which the storage systems are connected.
- All reserve volumes are converted to global enqueues (ENQs).
- The storage system volumes are count key data (CKD) volumes that are attached to a z/OS system. The volumes can be attached to the same z/OS system or different systems.
- If the storage system is not connected to a z/OS system on which Tivoli Storage Productivity Center for Replication is installed, the required Resource Access Control Facility (RACF[®]) settings are set on the z/OS system and the **SOCKPORT** parameter is defined for the HyperSwap management address space IOSHMCTL. This set up enables Tivoli Storage Productivity Center for Replication to connect to the z/OS system by using a host name or IP address. For the required settings, see the *IBM Tivoli Storage Productivity Center for Replication for System z Installation and Configuration Guide*.

Complete the following tasks to set up an environment in which you can run HyperSwap processing:

1. Add a connection for each z/OS system in the Tivoli Storage Productivity Center for Replication GUI. To add a connection, open the Host Systems page and click **Add Host Connection**.
If the z/OS system is the system on which Tivoli Storage Productivity Center for Replication is installed, a native connection is automatically added in the GUI. If the z/OS system does not have Tivoli Storage Productivity Center for Replication installed, you must use a host name or IP address to connect to the z/OS system.
2. Add a connection to the storage systems that are attached to the z/OS systems. To add a connection, open the Storage Systems page and click **Add Storage Connection**. You can connect to a storage system by using a Hardware Management Console (HMC), direct, or z/OS connection.
3. Create Basic HyperSwap, Metro Mirror with Failover/Failback, Metro Global Mirror, or Metro Global Mirror with Practice sessions and enable HyperSwap. To create a session, open the Sessions page and click **Create Session**.

Planning for Open HyperSwap replication

Open HyperSwap replication is a special Metro Mirror replication method designed to automatically failover I/O from the primary logical devices to the secondary logical devices in the event of a primary disk storage system failure. This function can be done with minimal disruption to the applications that are using the logical devices.

Overview

Open HyperSwap replication applies to both planned and unplanned replication sessions. When a session has Open HyperSwap enabled, an I/O error on the primary site automatically causes the I/O to switch to the secondary site without any user interaction and with minimal application impact. In addition, while Open HyperSwap is enabled, the Metro Mirror session supports disaster recovery. If a write is successful on the primary site but is unable to get replicated on the secondary site, IBM Tivoli Storage Productivity Center for Replication suspends the entire set of data consistency checking, thus ensuring that a consistent copy of the data exists on the secondary site. If the system fails, this data might not be the latest data, but the data should be consistent and allow the user to manually switch host servers to the secondary site.

You can control Open HyperSwap from any system running IBM Tivoli Storage Productivity Center for Replication (AIX, Windows, Linux, or z/OS). However, the volumes that are involved with Open HyperSwap must be attached to an AIX system. The AIX system is then connected to Tivoli Storage Productivity Center for Replication.

Software and hardware requirements

There are several requirements for Open HyperSwap support:

AIX requirements

Open HyperSwap support requires AIX version 5.3 or 6.1. (You can find the supported AIX version for each Tivoli Storage Productivity Center for Replication release in the support matrix at http://www.ibm.com/support/docview.wss?rs=40&context=SSBSEX&context=SSMN28&context=SSMMUP&context=SS8JB5&context=SS8JFM&uid=swg21386446&loc=en_US&cs=utf-8&lang=en. Click the link for the applicable release under Agents, Servers and GUI.)

You must have the following AIX modules installed:

- Subsystem Device Driver Path Control Module (SDDPCM) version 3.0.0.0 or later
- Multi-Path Input/Output (MPIO) module (the version that is provided with AIX version 5.3 or 6.1)

DS8000 hardware requirements

Only DS8000 storage systems are supported. Open HyperSwap requires DS8000 5.1 or later.

Note: Open HyperSwap does not support PowerHA® SystemMirror for AIX.

General tasks

Before you can use Open HyperSwap, you must set up your environment for this function. The general steps are:

1. Prepare the AIX system for Open HyperSwap. Use the AIX configuration manager (**cfgmgr**) to identify all volumes that are involved with the Open HyperSwap session.
2. Set up the host connection of Tivoli Storage Productivity Center for Replication to the AIX system. Use the Tivoli Storage Productivity Center for Replication user interface to manually set up the connection to the AIX system. Use the Host Systems page to enter the IP address and port number for the AIX system.
3. Set up the Tivoli Storage Productivity Center for Replication Metro Mirror Failover/Failback session, selecting the function **Manage H1-H2 with Open HyperSwap**.
4. Add the copy sets to the session where all the volumes in the copy sets are volumes that are on the AIX system that is connected to Tivoli Storage Productivity Center for Replication.
5. You can now start your Open HyperSwap session the same as other sessions.

Planning for configuration

Use this information to plan your IBM Tivoli Storage Productivity Center environment. The information includes general configuration guidelines, TCP/IP ports used, user names and user rights, and SMI-S support.

Planning for capacity

These guidelines can help you determine the capacity for Tivoli Storage Productivity Center.

For information about capacity for Tivoli Storage Productivity Center, see the capacity guidelines at <http://www.ibm.com/support/docview.wss?uid=swg21424912>.

Consider the following guidelines when you determine your capacity requirements:

Database repository

For best performance, install the database repository across multiple physical disks, either through operating system striping or hardware RAID. You must have a minimum of three disks that are separate from the location of the Tivoli Storage Productivity Center host server's operating system and the directory of the Tivoli Storage Productivity Center product installation.

Tivoli Storage Productivity Center server

The Tivoli Storage Productivity Center server must meet the following requirements:

- The Tivoli Storage Productivity Center server must have dual 3.2 GHz processors with a minimum of 8 GB of random access memory (RAM).
- The Tivoli Storage Productivity Center server must be a dedicated computer for Tivoli Storage Productivity Center operations and not shared with other applications.
- Paging space: On the AIX operating system, the paging space must be at least half or, if possible, the same amount as the physical memory. You must periodically monitor paging space usage by running the `lspcs -s` command and increasing the space if the percentage used is higher than 50%.

Stand-alone GUI

For a stand-alone GUI, a minimum of a 2 GHz processor (single), a 1 GB RAM workstation for the GUI, and up to 2 GB of RAM is required for a large server.

An environment is considered large if you have 50% or more of the maximum for any stand-alone GUI recommended maximums. For example, an environment is considered large if you have 500 or more disk volumes.

Storage subsystems

When you probe storage subsystems that are registered with the same Storage Resource agent, do not probe more than three storage subsystems within the same probe job. The increased load on the agent would increase the likelihood of timeouts. Instead, spread the storage subsystems across multiple probe jobs with different starting times.

LSI SMI-S Provider

Tivoli Storage Productivity Center supports up to five storage systems with the LSI SMI-S Provider 1.3 or later.

Planning for Tivoli Storage Productivity Center authentication and authorization

An operating system user name is required to install and log on to Tivoli Storage Productivity Center for the first time. After you install Tivoli Storage Productivity Center, you can assign roles to users. Roles determine the product functions that are available to users.

User requirements for installing Tivoli Storage Productivity Center

The user name that you use when you run the Tivoli Storage Productivity Center installation program must belong to the following operating system groups. The user that you define as the common user during the Tivoli Storage Productivity Center installation must also belong to these groups. The Tivoli Storage Productivity Center installation program automatically maps these groups to the Tivoli Storage Productivity Center Administrator role.

Table 3. Operating system groups that are mapped to the Administrator role

Operating System	Group
Windows	Administrators
AIX	system
Linux	root

The user name that is used to install the database repository must belong to one of the following DB2 groups. The user name that is used to install the database repository depends on your installation configuration. For example, if you installed Tivoli Storage Productivity Center on a single server and you did not enter separate user information for DB2, the database repository is installed by using the common user name. Therefore, the common user must have these DB2 privileges.

Table 4. DB2 groups that are required to install the database repository

Operating System	Group
Windows	DB2ADMNS
AIX and Linux	db2iadm1

The Tivoli Storage Productivity Center installation program establishes a default authentication configuration by using the federated repositories feature of the WebSphere Application Server. If you want to change the user authentication configuration, go to the Tivoli Storage Productivity Center information center at <http://publib.boulder.ibm.com/infocenter/tivihelp/v59r1/index.jsp>. Search for *Changing the user authentication configuration*.

For more information about installing Tivoli Storage Productivity Center on a Windows domain, see “Planning to install Tivoli Storage Productivity Center in a Windows domain” on page 3 and “Installing Tivoli Storage Productivity Center on a Windows domain” on page 124.

Defining roles for Tivoli Storage Productivity Center

After you install Tivoli Storage Productivity Center, you can assign roles for Tivoli Storage Productivity Center users. These roles are predefined in Tivoli Storage Productivity Center and are assigned at the group level. The role determines the authorization level for the users who are in the group. The authorization level determines the functions in Tivoli Storage Productivity Center that the user can access.

For example, if a user is in a group that is assigned to the Administrator role, the user has full access to all Tivoli Storage Productivity Center functions. However, if a user is in a group that is assigned to the Monitor role, the user has access to only a limited set of functions.

For more information about roles and groups, see “Role-based authorization” on page 272.

Defining roles for Tivoli Storage Productivity Center for Replication

You can assign roles for Tivoli Storage Productivity Center for Replication users at the user or group level. The roles are predefined in Tivoli Storage Productivity Center for Replication and determine the authorization level for individual users or all users who are in a group.

For example, if a user or a user group is assigned to the Administrator role, the user has full access to all Tivoli Storage Productivity Center for Replication functions. However, if a user or group is assigned to the Monitor role, the user can view the health and status of the Tivoli Storage Productivity Center for Replication components, but cannot complete any commands or actions.

For more information about roles and how to assign a role to a group, see the topic about Tivoli Storage Productivity Center for Replication security in the IBM Tivoli Storage Productivity Center User's Guide.

User names and passwords

Several user names and passwords are required to install, configure, and use IBM Tivoli Storage Productivity Center. There are also some requirements and limitations that you must understand before you install Tivoli Storage Productivity Center.

A worksheet is also provided to help you plan and document the user names and passwords that you use with Tivoli Storage Productivity Center. Keep the completed worksheet in a safe, secure place. Before you install Tivoli Storage Productivity Center, you must understand your local security policies and requirements. These policies can impose certain standards that you must consider when you create user names and passwords to comply with requirements.

Related reference:

“User name and password requirements”

This information helps you create valid user names and passwords for Tivoli Storage Productivity Center.

“DB2 user names and passwords” on page 17

This topic lists rules for DB2 user names and passwords.

“Worksheet for user names and passwords” on page 18

Use this worksheet to document the user names and passwords that you create when you install and administer Tivoli Storage Productivity Center. Space is provided for you to list more user names and passwords that you create when you configure more devices in Tivoli Storage Productivity Center.

User name and password requirements

This information helps you create valid user names and passwords for Tivoli Storage Productivity Center.

Table 1 lists the user names and passwords that are used with Tivoli Storage Productivity Center and specifies the following criteria:

- User names must be local or a Windows domain account, or an LDAP account

Restriction: If you use LDAP, Tivoli Storage Productivity Center must be configured for LDAP authentication.

- Valid user name characters and minimum and maximum length requirements
- Valid password characters and minimum and maximum length requirements

Restriction: If the Tivoli Storage Productivity Center common user name is the same as the Tivoli Storage Productivity Center DB2 user name (for example, if you did not use a custom DB2 user name to install Tivoli Storage Productivity Center), the corresponding password must be valid as a DB2 password and as a WebSphere password. For more information about valid DB2 and WebSphere passwords, see Table 5. This restriction applies during a Tivoli Storage Productivity Center installation and when you use the Tivoli Storage Productivity Center change password tool.

For more information about setting passwords on the Windows operating system, see the SAM-Account-Name attribute at [http://msdn.microsoft.com/en-us/library/windows/desktop/ms679635\(v=vs.85\).aspx](http://msdn.microsoft.com/en-us/library/windows/desktop/ms679635(v=vs.85).aspx).

Table 5. Valid characters for user names and passwords

User name and password for	Windows domain OK?	LDAP OK?	Valid characters
Tivoli Storage Productivity Center installation	Yes	No	Not applicable

Table 5. Valid characters for user names and passwords (continued)

User name and password for	Windows domain OK?	LDAP OK?	Valid characters
DB2 administrator, DB2 user	Yes Restriction: You must follow these naming conventions: <ul style="list-style-type: none"> Windows domain user name: <i>domain_name\user_name format</i> Local user name: <i>machine_name\username format</i> 	Yes	<ul style="list-style-type: none"> A through Z (uppercase characters) a through z (lowercase characters) 0 through 9 (numeric characters) Special characters: ~, @, #, %, ^, (), -, _ { } Restriction: User names and passwords cannot contain spaces, must have at least 1 character and must not start with a number or underscore.
DB2 passwords	Yes	Yes	'\$', '~', '@', '#', '(', ')', '-', '_', '{', '}', and '.' <ul style="list-style-type: none"> A through Z (uppercase characters) 0 through 9 (numeric characters)
WebSphere administrator	Yes Restriction: You must follow these naming conventions: <ul style="list-style-type: none"> Windows domain user name: <i>domain_name\user_name format</i> Local user name: <i>machine_name\username format</i> 	Yes	<ul style="list-style-type: none"> A through Z (uppercase characters) a through z (lowercase characters) 0 through 9 (numeric characters) Special characters: -, _,, '\', and '~'
WebSphere passwords	Yes	Yes	'[', ']', '?', '\', '~', '!', '(', ')', '-', '_', and '.' Tip: The dash character {-} is not supported as the first character in a password. <ul style="list-style-type: none"> A through Z (uppercase characters) a through z (lowercase characters) 0 through 9 (numeric characters)

Table 5. Valid characters for user names and passwords (continued)

User name and password for	Windows domain OK?	LDAP OK?	Valid characters
NAS Filer user name	No	No	<ul style="list-style-type: none"> • A through Z (uppercase characters) • a through z (lowercase characters) • 0 through 9 (numeric characters) • Special characters: ` ~ # % ^ & () - _ { } ' . <p>Restriction: User names and passwords cannot contain spaces and must have at least 1 character.</p>
NAS Filer password	No	No	<ul style="list-style-type: none"> • A through Z (uppercase characters) • a through z (lowercase characters) • 0 through 9 (numeric characters) • Special characters: ` ~ @ # % ^ & * () - _ = + [] { } \ ; : ' " , . < > / ? <p>Restriction: User names and passwords cannot contain spaces and must have at least 1 character.</p>

DB2 user names and passwords

This topic lists rules for DB2 user names and passwords.

DB2 user names and passwords must follow these rules:

- UNIX user names and passwords cannot be more than eight characters long. They cannot begin with a numeric digit or end with \$.
- Windows 32-bit user names and passwords can contain 1 to 20 characters.
- Group and instance names can contain 1 to 8 characters.
- Names cannot be any of the following:
 - USERS
 - ADMINS
 - GUESTS
 - PUBLIC
 - LOCAL
- Names cannot begin with:
 - IBM
 - SQL
 - SYS
- Names cannot include accented characters.
- UNIX users, groups, and instance names must be lowercase.
- Windows 32-bit users, groups, or instance names can be any case.

Worksheet for user names and passwords

Use this worksheet to document the user names and passwords that you create when you install and administer Tivoli Storage Productivity Center. Space is provided for you to list more user names and passwords that you create when you configure more devices in Tivoli Storage Productivity Center.

Table 6. User names and passwords for a Tivoli Storage Productivity Center installation

Item	Description	Your input
Tivoli Storage Productivity Center and DB2 installation user <ul style="list-style-type: none"> Windows: local administrator UNIX: root 		
DB2 administrator user name and password	<p>The DB2 administrator user name and password are created when you install DB2 and is required to install Tivoli Storage Productivity Center.</p> <p>On the Windows operating system, this user name must be a member of the DB2ADMNS group and Administrators group. On UNIX, the user name must be the instance owner of the instance you want to use. This user name and password are created when you install DB2.</p>	
Tivoli Storage Productivity Center Device server host authentication password	This password is used by services that must connect to the Tivoli Storage Productivity Center Device server, such as the Storage Resource agent for SAN fabric functions.	
WebSphere administrator user name and password ³	<p>The WebSphere administrator user name and password are required to communicate with embedded WebSphere. This user name and password is created by any component that has an embedded WebSphere instance. If this user name and password are not explicitly created, the default is the DB2 administrator user name and password.</p> <p>Embedded WebSphere runs as a Windows Service, which runs under the authority of this user name and password.</p> <p>This user name and password are only used when you install the Device server.</p>	
Jazz for Service Management user name	For more information about the Jazz for Service Management user name, go to the Jazz for Service Management information center. Search for <i>Managing Jazz for Service Management users and groups</i>	

Table 6. User names and passwords for a Tivoli Storage Productivity Center installation (continued)

Item	Description	Your input
Jazz for Service Management administrator user name	For more information about the Jazz for Service Management administrator user name, go to the Jazz for Service Management information center. Search for <i>Managing Jazz for Service Management users and groups</i>	
LDAP bind user name	This user name has the authority to log in and connect to the LDAP server for authentication. It is not needed if the LDAP server allows anonymous bind. This user name and password must be provided to you by your LDAP administrator.	
Storage subsystem user name for access from Tivoli Storage Productivity Center	This user name is the user name that Tivoli Storage Productivity Center uses to log in to a storage device.	
CIMOM or SMI provider login name	This user name has log in access to the CIMOM or SMI provider software that interfaces with a storage device or a switch in a fabric.	
NAS filer user name and password	Tivoli Storage Productivity Center uses this user name to log in to a NAS device.	

Related reference:

“User name and password requirements” on page 15

This information helps you create valid user names and passwords for Tivoli Storage Productivity Center.

TCP/IP ports used by Tivoli Storage Productivity Center

When you install Tivoli Storage Productivity Center, default ports must be opened through the firewall. You must disable the firewall program or open the ports to allow incoming requests to the Tivoli Storage Productivity Center ports. Review these ports before you install Tivoli Storage Productivity Center.

TCP/IP ports used by Tivoli Storage Productivity Center

Table 7 lists the Tivoli Storage Productivity Center default ports.

Table 7. TCP/IP ports used by Tivoli Storage Productivity Center for incoming communication

Component	Default ports
Data server	9549 This value is in the <code>TPC_installation_directory/data/config/server.config</code> file.

Table 7. TCP/IP ports used by Tivoli Storage Productivity Center for incoming communication (continued)

Component	Default ports
Device server	9550, 9551 The value of the WC_defaulthost and WC_defaulthost_secure properties are in the <i>TPC_installation_directory/device/portdef.props</i> file.
Replication server	9558 - 9561 The values of the WC_defaulthost, WC_defaulthost_secure, communication.port, and communication.haPort properties are in the portdef.props and rmserver.properties files that are in the <i>TPC_installation_directory/wlp/usr/servers/replicationServer/properties</i> directory.
Storage Resource agent	9567 The value of the Portnumber property is in the <i>TPC_installation_directory/agent/config/Agent.config</i> file
Web graphical user interface (GUI)	9568, 9569 The value of the WC_defaulthost and WC_defaulthost_secure properties are in the <i>TPC_installation_directory/web/conf/portdef.props</i> file.
Web Server Admin Console	9562, 9563 The value of the WC_adminhost and WC_adminhost_secure properties are in the <i>TPC_installation_directory/web/conf/portdef.props</i> file.

Other TCP/IP ports used by Tivoli Storage Productivity Center

Table 8. Other TCP/IP ports used by Tivoli Storage Productivity Center

Component or resource	Default port
DB2	50000
Jazz for Service Management	16310 to 16324 The values of the ports used by Jazz for Service Management are in the <i>JazzSM_installation_directory/profile/properties/portdef.props</i> file.
SAN Volume Controller or IBM Storwize V7000	For native interface for SAN Volume Controller or IBM Storwize V7000 cluster: <ul style="list-style-type: none"> • 22 for SSH (outbound). This port is used to upload the SSH keys. This action is done once at setup time. • 5989 (outbound). Optionally, an SSH key can be uploaded once at setup time using this port.

Table 8. Other TCP/IP ports used by Tivoli Storage Productivity Center (continued)

Component or resource	Default port
CIM agent for IBM TotalStorage Enterprise Storage Server (ESS)	5989
DS8000	For native interface: Inbound for events: 1750 Outbound (on HMC): 1750 Inbound and outbound on HMC for offloading logs: 1755
IBM XIV Storage System	For native interface: Inbound: none Outbound (on XIV storage system): 7777, 7778
IBM Tivoli Storage Productivity Center with DS8000 GUI	8451 8452
Tivoli Storage Productivity Center	162 (default SNMP listening port)
All monitored resources	Before you can discover resources, ensure that port 7 (ECHO port) is open on the resources, and Internet Control Message Protocol (ICMP) is available.

Restriction: The Tivoli Storage Productivity Center Version 4 ports are reused when you migrate from Tivoli Storage Productivity Center Version 4 to Version 5.1 (or later).

The Tivoli Storage Productivity Center Version 5.1 (or later) ports listed here apply only to the Tivoli Storage Productivity Center Version 5.1 (or later) installations that were not migrated or upgraded from Tivoli Storage Productivity Center Version 4. For more information about Tivoli Storage Productivity Center Version 4 ports, see TCP/IP ports used by the Tivoli Storage Productivity Center family

TCP/IP ports used by Tivoli Storage Productivity Center for Replication

Table 9 show the ports used for incoming communication. Table 10 on page 22 show the ports used for outgoing communication.

Table 9. TCP/IP ports used by Tivoli Storage Productivity Center for Replication for incoming communication

Port	Description
9558 and 9559	A web browser typically communicates with the Tivoli Storage Productivity Center for Replication GUI using HTTP ports 9558 and 9559.
9560	The Tivoli Storage Productivity Center for Replication command line and GUI typically communicate with the Tivoli Storage Productivity Center for Replication server using port 9560.
9561	Tivoli Storage Productivity Center for Replication uses port 9561 for communication with other Tivoli Storage Productivity Center for Replication servers for high-availability purposes.
Note: If you changed ports 9558 or 9559 during the installation or changed other port settings, note the values to which these settings were changed.	

Table 10. TCP/IP ports used by Tivoli Storage Productivity Center for Replication for outgoing communication

Port	Description
2433	For communication with ESS/DS (direct connection).
1750	For communication with DS8000 (HMC connection).
443 and 22	For communication with SAN Volume Controller or Storwize V7000 clusters.
9930	For communication with the AIX host for the Open HyperSwap.
Note: <ul style="list-style-type: none"> • If you changed the port configuration of your storage controller, the ports would be different. • Your network configuration must allow for Tivoli Storage Productivity Center for Replication to send outgoing TCP/IP packets to the storage controllers. It is possible when adding the storage controllers to Tivoli Storage Productivity Center for Replication to set a specific port number for your storage controller. • Because there are typically multiple applications running on a server, it is possible that port conflicts might arise if other applications attempt to use the same ports that Tivoli Storage Productivity Center for Replication is using. You can find the port numbers used on your system by running the following command: <pre>netstat -an</pre> • If firewalls are being used in your configuration, make sure that none of these ports is being blocked. Ensure that not only is the Tivoli Storage Productivity Center for Replication server granted access to reach the other components, but that the other components are granted access to reach the Tivoli Storage Productivity Center for Replication server. • If you are running Windows Server 2008, you must configure the inbound and outbound rules for Tivoli Storage Productivity Center for Replication. To create an outbound rule, launch the New Outbound Rule wizard from the Windows Firewall with Advanced Security menu. • If you are installing or deploying Storage Resource agents on a system, you must first disable the firewall on that system before installing or deploying an agent. 	

Planning for Resources, file systems, databases, and switches

Information about the file system formats, storage systems, switches, and databases that are supported by Tivoli Storage Productivity Center can help you set up and configure your environment.

Planning for the native interface

Tivoli Storage Productivity Center communicates with DS8000, the , SAN Volume Controller, or Storwize V7000 storage systems through their native interfaces. You do not need to install and maintain Common Information Model (CIM) agents to collect data from these storage systems.

Support for the native interfaces

For the DS8000, Tivoli Storage Productivity Center communication with the storage system is through the ESSNI interface. Through this interface, Tivoli Storage Productivity Center collects device information, performance information, and can detect changes and complete provisioning operations. This support simplifies the Tivoli Storage Productivity Center configuration and the launch in context configuration required to manage the storage system. Tivoli Storage Productivity Center also supports dual HMC environments.

For the SAN Volume Controller or Storwize V7000, Tivoli Storage Productivity Center uses the CLI interface to communicate with the storage system. Through this interface, Tivoli Storage Productivity Center collects device information, performance information, and can detect changes and complete provisioning operations. This support simplifies the Tivoli Storage Productivity Center configuration and the launch in context configuration required to manage the storage system.

For the XIV system, Tivoli Storage Productivity Center uses the XIV system XML API interface to communicate with the storage system. The Tivoli Storage Productivity Center server communicates directly with the XIV system using XML over an SSL socket. Through this interface, Tivoli Storage Productivity Center collects device information, performance information, and can detect changes and complete provisioning operations. This support simplifies the Tivoli Storage Productivity Center configuration and the launch in context configuration required to manage the storage system.

Use the Configure Devices wizard to define native interface connection information for these storage systems as described in *Adding resources* in the Tivoli Storage Productivity Center information center.

You can access the wizard in one of the following ways:

- In the navigation tree, click **Administrative Services > Data Sources > Storage Subsystems** and click **Add** on the Storage Subsystems panel.
- In the navigation tree, click **Disk Manager > Storage Subsystems** and click **Add Storage Subsystem** on the Storage Subsystems page.
- Click the **Configure Devices** wizard icon in the toolbar.

Switches

Tivoli Storage Productivity Center supports IBM and independent switch vendor switches that are Storage Management Interface Specification (SMI-S) compatible.

Tivoli Storage Productivity Center supports the following switches:

- Brocade

Note: The Brocade 8000 switch is supported in toleration mode only. Tivoli Storage Productivity Center does not support the Converged Enhanced Ethernet (CEE) or Fibre Channel over Ethernet (FCoE) connectivity functions for the Brocade 8000 switch. Only WWN zoning is supported with the internal FCoE ports. The domain-port zoning for Brocade 8000 switch is limited to the eight FC ports. Tivoli Storage Productivity Center displays both the FCoE and FC ports in the switch port lists.

- Cisco

Note: The Cisco Nexus 5000 switch is supported in toleration mode only. Tivoli Storage Productivity Center does not support the Converged Enhanced Ethernet (CEE) or Fibre Channel over Ethernet (FCoE) connectivity functions for the Cisco Nexus 5000 switch. Tivoli Storage Productivity Center also does not support domain-port zoning for Cisco Nexus switches. Tivoli Storage Productivity Center displays the FCoE and FC ports in the switch port lists.

- IBM
- QLogic

For the most current information about switches and directors supported, see the Tivoli Storage Productivity Center support website at <https://www.ibm.com/support/docview.wss?uid=swg21386446>.

Databases for monitoring

This section lists the databases that the Data Manager can monitor.

The Data Manager can monitor these databases:

- DB2 version 10.1
- DB2 version 9.1 (32-bit and 64-bit)
- DB2 version 9.5 (32-bit and 64-bit)
- DB2 version 9.7 (32-bit and 64-bit, fix pack 1 and fix pack 2 are not supported)
- Microsoft SQL Server 8
- Microsoft SQL Server 2005 (32-bit and 64-bit)

Note: There are some configuration steps required before you can monitor the Microsoft SQL Server 2005 database. For information about configuration, see “Configuring Microsoft SQL Server 2008 or Microsoft SQL Server 2008 R2” on page 281.

- Microsoft SQL Server 2008 (32-bit and 64-bit)

Note: There are some configuration steps required before you can monitor the Microsoft SQL Server 2008 database. For information about configuration, see “Configuring Microsoft SQL Server 2008 or Microsoft SQL Server 2008 R2” on page 281.

- Oracle 10g (32-bit and 64-bit)
- Oracle 10.1 and 10.2 (32-bit and 64-bit)
- Oracle 11g (32-bit and 64-bit)
- Oracle 11.1 and 11.2 (32-bit and 64-bit)
- Sybase Adaptive Server version 15 (32-bit and 64-bit)

Note: Databases installed on clustered servers or clustered database servers (for example, Microsoft Cluster Service (MSCS), IBM PowerHA SystemMirror® for AIX , Veritas clusters, Oracle Real Application Cluster (RAC) environment) are not supported for monitoring.

Use the **Data Manager for Databases** node in the Tivoli Storage Productivity Center user interface to help you monitor the databases within RDBMS instances. The Storage Resource agents are used to monitor the Relational Database Management System (RDBMS) instances.

You can monitor the storage assets associated with Oracle, Sybase, SQL Server, and DB2 throughout your enterprise, watching for predefined events to occur and alerting you to potential situations before they occur.

For example, it can notify you when an Oracle tablespace is reaching a critical shortage of free space or when a Sybase table is dropped. By alerting you to these and other issues related to your stored data for the databases within your environment, it enables you to prevent unnecessary system and application downtime.

Before you can use the Storage Resource agents to manage the storage for your instances, you must do the following steps:

1. Assign Data Manager and Data Manager for Databases licenses to the agents that are monitoring RDBMS instances.
2. Register the instances on the machines that contain licensed agents.

You can do these steps by expanding **Administrative Services > Configuration > License Keys** in the navigation tree. For more information about this topic, see the online help or “License Keys” on page 277.

For information about the operating systems supported for the agent, see “Software requirements for operating systems” on page 108.

See the online help for more information about the **Data Manager for Databases** node.

File systems

The file systems that are supported for monitoring and reporting by Tivoli Storage Productivity Center are listed.

The Data Server supports monitoring and reporting of the following file systems:

- AIX JFS, JFS2
- Data ONTAP V7 for Network Appliance, including flexible volumes (FlexVol).
With Flexvol, you can create multiple flexible volumes on a large pool of disks.
- EXT2, EXT3, EXT4
- FAT, FAT32
- General Parallel File System (GPFS) 3.2, 3.3
- HP_HFS
- NTFS4, NTFS5
- REISERFS
- SAN File System (SANFS)
- Temporary File System (TMPFS)
- UFS
- VMFS
- Veritas File System (VxFS) r4.5 and 5 (all releases) on the following operating systems:
 - AIX
 - HP-UX
 - Linux
 - Oracle Solaris

Tip: You can use Tivoli Storage Productivity Center with file systems and volumes that are created by using Veritas File System (VxFS) and Veritas Volume Manager (VxVM) Version 4 (all releases) and Version 5 (all releases). The file systems and volumes must be created with Version 3 (all releases) of VxFS and VxVM. Tivoli Storage Productivity Center cannot work with volumes and files systems with new features that were introduced with VxFS and VxVM Version 4 (all releases) and version 5 (all releases).

- WAFL
- Tivoli Storage Productivity Center SAN File System

Networked file systems

This section describes support for IBM General Parallel File System.

When using the Data server, you can use the monitoring and reporting of the IBM General Parallel File System (GPFS™) Version 3.2 on AIX.

- The Tivoli Storage Productivity Center Storage Resource agent must be installed on one node within a GPFS *nodeset*. A nodeset is a collection of computers that see the same file system. If multiple agents are installed per GPFS nodeset, the first agent that sees the file system owns the file system. You cannot change the owning (or scanning) agent. If the agent is deleted, another agent takes ownership.

Because only one agent owns the file system and a file system cannot be scanned by more than one agent, there is no benefit to having more than one agent.

If more than one agent is installed, the last agent that runs a probe job takes ownership of the volume group. If a GPFS file system exists in that volume group and the agent that owns the volume group is not the agent that owns the file system, the file system information is not displayed in the volume group. The volume group is part of the asset tree. However, when the agent that owns the file system probes again, the data is corrected.

There must be physical access to the GPFS disk for IBM Tivoli Storage Productivity Center to gather hardware disk information.

Volume managers

This section lists the volume managers supported for monitoring by IBM Tivoli Storage Productivity Center.

The Data Server supports the monitoring of the following volume managers:

- Veritas Volume Manager is supported on the following operating systems:
 - AIX
 - HP-UX
 - Linux
 - Oracle Solaris
- AIX Logical Volume Manager (LVM)
- HP-UX Logical Volume Manager

Using these volume managers, you can create groups of logical volumes and disks. You can generate various reports for these disk and volume groups.

Planning for multipath subsystem device drivers

The subsystem device driver (SDD) is a software solution for multiple configuration environments in supported storage resources.

The subsystem device driver is installed on a host system with the native disk-device driver and provides the following functions:

- Enhanced data availability
- Dynamic input/output (I/O) load balancing across multiple paths
- Automatic path failover protection
- You can download licensed machine code at the same time that applications are running

For the most current support for multipath subsystem device drivers, see the following website: Supported Products and Platforms. Select the appropriate version for Agents, Servers, and GUI.

With Tivoli Storage Productivity Center, you can use the subsystem device drivers (SDD) shown in Table 11.

Table 11. Multipath subsystem device drivers supported by Tivoli Storage Productivity Center

Multipath product	Platform	Supported features in Tivoli Storage Productivity Center
SDD	AIX	Full support
	Red Hat 4	Full support
	SUSE Linux Enterprise Server 9	Full support
	Oracle Solaris	Full support
SDDDSM	Windows	Full support
SDDPCM	AIX	Full support
DM_Multipath	Red Hat 5 and 6	Full support
	SUSE Linux Enterprise Server 10 and 11	Full support
EMC PowerPath	AIX	Probe
	Linux	Probe
	Windows	Probe

Full support means that Tivoli Storage Productivity Center can:

- Report on the disks accessed using the multipath subsystem device driver (probe).
- Display multiple paths in the Data Manager asset tree (Data Manager Asset Tree).
- Report on the multiple paths in the Data Path Explorer.

Note:

1. The AIX SDD cannot coexist with SDDPCM on the same system.
2. The Linux SDD driver is no longer available. Starting with Red Hat Enterprise Linux Version 5 and SUSE Linux Enterprise Server Version 10, only the DM_Multipath is available.
3. The SDD driver is no longer supported on HP, starting with HP-UX 11i v3 with Itanium®.

For more information about multipath subsystem device drivers, see http://www.ibm.com/support/docview.wss?rs=540&context=ST52G7&dc=DA400&uid=s5g1S7001350&loc=en_US&cs=utf-8&lang=en.

For more information about how to install, configure, and use the subsystem device drivers, see <http://www.ibm.com/support/docview.wss?rs=540&context=ST52G7&uid=s5g1S7000303>.

Upgrading subsystem device drivers

SDD drivers cannot coexist on the same host with the SDDPCM, SDDDSM, or DM_Multipath drivers. You must upgrade from the existing SDD drivers to the SDDPCM or SDDDSM driver. Part of the upgrade process is to unconfigure and remove all SDD vpath devices. After the upgrade and configuration of the devices, the device names might differ from the previous names. Each device is detected by

Tivoli Storage Productivity Center as a new device. For information about how to upgrade SDD, see <http://www.ibm.com/support/docview.wss?rs=540&context=ST52G7&uid=ssg1S7000303>.

EMC PowerPath Multipathing

EMC PowerPath Multipathing supports a wide range of servers including cluster servers connected to EMC storage systems. It tunes your storage area network and selects alternate paths for your data if necessary. It also integrates multiple path I/O capabilities, automatic load balancing, and path failover functions. For more information about EMC PowerPath Multipathing, see <http://www.emc.com>. Search for **EMC PowerPath**.

Disks provided by the EMC PowerPath driver are detected by the Storage Resource agents. The disks are visible in the topology viewer and in Data Manager asset reports. The correlation of EMC PowerPath provided hdisks to EMC storage systems is supported and the relation is visible in the topology viewer. Multipathing information is not available for those disks. The data reports are accurate because they do not double-count capacities. The Data Path Explorer does not show multipathing.

Planning for Storage Resource agents

Storage Resource agents collect asset information, file and file system attributes, and other information that is needed from the computer system.

Storage Resource agents can also gather information about database managers installed on the server, and NAS device information. You can create ping, probe, and scan jobs to run against the servers that have Storage Resource agents installed.

The Storage Resource agents perform fabric functions by collecting information from the system they are installed on. The Storage Resource agents use scanners to collect information. The scanners communicate through the host bus adapter (HBA) to collect fabric topology information, port state information, and zoning information. They also can identify other SAN-attached devices (if they are in the same zone).

You can deploy the Storage Resource agent through the stand-alone GUI user interface rather than an installation wizard. You must have administrative privileges to deploy the Storage Resource agent. The first time you deploy a Storage Resource agent to a computer system, the information collected by that agent is added to the logs on that computer system. That information also displays in the Tivoli Storage Productivity Center GUI after the next default system scan completes.

To deploy a Storage Resource agent, expand **Administrative Services > Configuration**. Right-click **Storage Resource Agent Deployments**. Click **Create Storage Resource Agent Deployments**. In the topic pane, the “Create Storage Resource Agent Deployments” window opens. From this window, you can enter host names from a Microsoft directory, enter host names manually, or import a host list file. You can schedule a job to add the Storage Resource agents at a time that is convenient for you. You can also specify the type of alerts to generate if a job fails. After you enter information for the Storage Resource agent, you can

optionally validate the connection to the Data server. This step helps eliminate most of the possible failure cases after you submit the job for Storage Resource agent deployment.

For more information about Storage Resource agents, see “Deployment guidelines and limitations for Storage Resource agents” on page 290.

Storage Resource agents and fabrics

Storage Resource agents

Storage Resource agent are designed to reduce the load of management calls on the fabric. Consider some improvements that Storage Resource agents offer: :

- Storage Resource agents do not monitor HBAs for fabric events and do not notify the server regarding fabric events. The HBA event monitoring and event scanner function is not supported by the Storage Resource agents. Instead, SNMP traps and CIM indications are used for reporting fabric events (and later an automatic fabric probe if the fabric is being monitored by the Storage Resource agent). This action reduces the number of event notifications while still monitoring fabrics using other mechanisms.
- An agent assignment algorithm is used to reduce the number of Storage Resource agents that are used to probe a fabric. Depending on the mix of agents capable of reporting on a fabric, fewer Storage Resource agents might be used if multiple agents can collect similar information. For example, if Storage Resource agents are deployed on many systems that are connected to the same fabrics, then the algorithm automatically determines the number of agents to be used or not used to probe the fabric.
- Tivoli Storage Productivity Center can selectively probe specific fabrics after an event notification if there is sufficient information to determine which fabrics triggered the events. Because Tivoli Storage Productivity Center can determine the likelihood of which fabrics triggered the events, the number of fabrics being probed can be reduced.
- For Storage Resource agents, there is an option to selectively disable fabric functions for one or more Storage Resource agents. If a Storage Resource agent is disabled for fabric functions, no management calls are made to the fabric. You can use this option to complement agent assignment to control the number of agents being used for fabric functions.
- Storage Resource agents only probe fabrics that you are interested in monitoring (fabrics that are part of a probe definition).
- If there are many calls that are made by the Storage Resource agents, Tivoli Storage Productivity Center can reduce the number of fabric probes being performed within a time window to reduce the probe activity.
- Tivoli Storage Productivity Center monitors the Device server filters for SNMP traps. Tivoli Storage Productivity Center filters out traps that are not related to fabric events so that fabric probes are not automatically triggered as a result of SNMP traps received.

Storage Resource agent protocol support

When installing the Storage Resource agent, Tivoli Storage Productivity Center uses specific protocols for connectivity between the server and agent.

When installing the Storage Resource agent, Tivoli Storage Productivity Center uses the following protocol for connectivity between the server and agent (listed in order):

1. Secure Shell protocol (SSH).
2. Windows server message block protocol (SMB protocol).
3. Remote execution protocol (REXEC).
4. Remote shell protocol (RSH).

At run time, the connectivity used between the server and agent is dependent on the type of service that is running: On-Demand service (non-daemon service) or run as a service (daemon service).

On-Demand service (non-daemon service)

In this case, connectivity between the server and agent is established using the same protocols as for installation of the agent: SSH, SMB, REXEC, or RSH.

run as a service (daemon service)

In this case, connectivity between the server and agent is established using the secured socket connection. The server and agent have their respective certificates and no additional information is needed besides the certificates and the security provided by the SSH protocol.

Note: Running the Storage Resource agent in daemon mode requires only one socket connection to be open and thus simplifies any firewall rules that might be in place. However, the daemon mode always consumes resources (although a very small amount) when idle. In non-daemon mode, the Storage Resource agent only consumes resources when actively working for the Tivoli Storage Productivity Center server. Because the non-daemon mode uses the RXA protocol, additional firewall ports and security configuration are required.

The information required for these protocols are as follows:

SSH protocol

There are two cases where you can use the SSH protocol:

- You supply the user ID and password to connect to the server using the SSH protocol. This user ID must have administrative privileges.
- You supply a user ID, certificate, and passphrase. You create the certificate and use that certificate when you connect to the agent. This certificate must be accessible from the server.

For information about how to create a certificate for SSH protocol connectivity, see “Creating a certificate for SSH protocol” on page 295. This information uses Cygwin for the Storage Resource agent.

Windows SMB protocol

You supply the user ID and password. The user ID must have administrative privileges. You must also enable **File & Printer Sharing for Microsoft Windows** under **Network Properties** for the connected network adapter. Make sure that the Server service is running on the system.

RExec protocol

You supply the user ID and password. The user ID must have administrative privileges. The system must be enabled for remote execution of commands.

RSH protocol

You supply the user ID with administrative privileges. The system must be enabled for the user to be able to run commands through the remote shell.

To enable RSH, edit the `.rhosts` file in the login directory of the user. The `rhosts` file provides access for the user to connect from a remote system.

If you elect to use a Microsoft directory, you can also get a list of domain computers. You are required to enter the domain controller, user ID, password, and certificate location. After the list is displayed, you can select a list of computers on which to deploy the agent.

After the agent has been deployed, a probe job is automatically run.

The agent deployed on a Windows system has its registry information in the Windows registry. For UNIX or Linux, the registry information is stored in the following file: `/etc/Tivoli/TSRM/registryNA`.

For more information about setting up the environment for installing Storage Resource agents, see "Deployment guidelines and limitations for Storage Resource agents" on page 290.

Planning for the Storage Resource agents on Oracle Solaris

You can skip automount maps (automaps) for a discovery job on Solaris. To skip automount maps, specify the **skipAutoFS=1** parameter in the server section of the `TPCD.config` file. The change globally affects all Solaris Storage Resource agents managed by the Data server.

To change the `TPCD.config` file, follow these steps:

1. Stop the Data server.
2. Modify the `TPCD.config` file in this directory:

TPC_Data_Server_install_directory/config

The default directory for Windows is:

`C:\Program Files\IBM\TPC\data\config`

The default directory for UNIX or Linux is:

`/usr_or_opt/IBM/TPC/data/config`

3. Modify the `TPCD.config` file with the **skipAutoFS=1** parameter added:

```
[server]
threadPoolSize=3
abbreviatedProbe=1
maxThreads=8
pingReceiveTimeout=10
skipAutoFS=1    <== Set to 1 for Discovery
                  on Solaris Storage Resource agent to skip AutoMounts
                  process.By default, discovery will always
                  process AutoMounts on the Solaris Storage Resource agent.

[gui]
threadPoolSize=3
maxThreads=10
reportRowLimit=5000
keepCachedReport=120
```

Save the file.

4. Restart the Data server.

Planning for Internet Protocol Version 6

IBM Tivoli Storage Productivity Center supports Internet Protocol Version 6 (IPv6) for communication between its components. The key IPv6 enhancement is the expansion of IP address spaces from 32 bits (up to 15 characters in length) to 128 bits (up to 45 characters in length).

Overview

You can install and run Tivoli Storage Productivity Center on systems that are enabled for IPv4, IPv6, or dual stack. *Dual stack* indicates that a machine has both the IPv4 and IPv6 stacks enabled and both addresses configured.

Tivoli Storage Productivity Center can communicate with the following external components over IPv6:

- SMI-S CIM agents
- SLP directory agents
- Out of band SNMP agents
- Storage devices
- SMTP server

Note: These external components must be IPv6 enabled to communicate with Tivoli Storage Productivity Center using the IPv6 protocol.

Not all components and their related functions of Tivoli Storage Productivity Center are enabled for IPv6. Any functions that are not enabled for IPv6 are unavailable through the user interface when you install Tivoli Storage Productivity Center on an IPv6-only system.

IPv6 when installing Tivoli Storage Productivity Center

Tivoli Storage Productivity Center accepts both IPv4 and IPv6 addresses. If you have a system that is configured for dual stack networking, Tivoli Storage Productivity Center defaults to IPv4 addressing.

The preferred IPv6 address representation is written as eight groups of four hexadecimal digits `xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx`, where each *x* is a hexadecimal digit representing 4 bits. You can also specify IPv6 addresses by using shortened formats that omit leading zeros or use double colons in place of a series of zeros. You can specify only one double colon (::) in an IPv6 address.

You can use IPv6 addresses if one of the following conditions are met:

- The system where Tivoli Storage Productivity Center is installed is IPv6.
- Dual stack (IPv4 and IPv6) is enabled.

The following examples show an IPv6 address in the long form and in the short form:

Long form: 2001:DB8:0:0:0:0:0:0

Short form: 2001:DB8::

If you are installing Tivoli Storage Productivity Center in an IPv6-only environment, the following requirements apply:

- For Windows operating systems, the IPv4 loopback interface is enabled.

- For AIX or Linux operating systems, the localhost option resolves to the IPv4 address 127.0.0.1, instead of the IPv6 address ::1. This value is specified in the /etc/hosts file.

For Windows operating systems, the localhost option is specified in the C:\Windows\system32\drivers\etc\hosts directory and file.

Table 12. IPv4 and IPv6 configurations in a multiple-servers environment

If the database repository server is configured for...	The Tivoli Storage Productivity Center server is configured for...
IPv4	IPv4
IPv4	Dual stack
Dual stack	IPv4
Dual stack	Dual stack
Dual stack	IPv6
IPv6	IPv6

Using IPv6 addresses in the user interface

Support for IPv6 enables you to enter IPv6 addresses anywhere in the installation process and user interface that supports the entering of IP addresses. For example, you can enter and display 128-bit IP address spaces on the following panels in the user interface:

Enter the host name (or IPv6 address) and port number of an Tivoli Storage Productivity Center server to which you want to connect.

Administrative Services > Data Sources >

Specify IPv4 or IPv6 addresses for the CIMOMs that are located on an IPv6 or dual stack machine.

Administrative Services > Discovery >

Specify IPv6 addresses when you run a discovery with SLP DA running on an IPv6-only or dual stack machine.

Administrative Services > Data Sources >

Specify IPv6 addresses for the Out of Band Fabric agents that are located on an IPv6 or dual stack machine.

Administrative Services > Data Sources >

Specify the names or IPv6 addresses of other Tivoli Storage Productivity Center servers that you want to add as subordinate servers for roll up probes and reports.

Administrative Services > Discovery >

Specify a range of IPv6 addresses for an SNMP discovery on an IPv6-only or dual stack machine against IPv6-enabled target machines.

Administrative Services > Configuration >

If the Tivoli Storage Productivity Center servers are running on an IPv6-only or dual stack machine enter the following information:

- Specify an IPv6 address for the target machine of SNMP traps that are generated as a result of triggered alerts.
- Specify an IPv6 address for a mail server that receives e-mail notifications that are generated as a result of triggered alerts.

IBM Tivoli Storage Productivity Center > Configuration Utility >

Use an IPv4 or IPv6 address when you specify the URL for an external tool that you want to start from Tivoli Storage Productivity Center.

IPv6 considerations in Tivoli Storage Productivity Center

Tivoli Storage Productivity Center provides limited support of some functions when using Internet Protocol Version 6 (IPv6) communication.

Keep in mind the following considerations when installing the product on computers configured for IPv6 only:

Starting the Tivoli Storage Productivity Center user interface by using Java Web

Start You cannot use Java Web Start to start the Tivoli Storage Productivity Center user interface on a Windows system if both of the following conditions are true:

- An IPv6 address or a host name that resolves to an IPv6 address is specified as the target host in the Java Web Start URL.
- Java Runtime Environment (JRE) is installed on the same system as the Tivoli Storage Productivity Center user interface.

Using IPv6 communication between master and subordinate servers (for roll up reporting)

If the master server is on an IPv6-only computer, it can communicate with existing subordinate servers under the following conditions: the subordinate servers are upgraded to Tivoli Storage Productivity Center v3.3.2 or later and the IPv6 protocol is enabled on the computers where the servers are located.

Defining Tivoli Enterprise Console events as triggered actions

You cannot use IBM Tivoli Enterprise Console events as triggered actions when defining alerts for Tivoli Storage Productivity Center jobs.

Selecting files for archive and backup

You cannot select files for Tivoli Storage Manager archive and delete jobs. For example, you cannot use the alerting function of a constraint to automatically start a Tivoli Storage Manager archive or backup job to run against the files that violate that constraint.

Gathering data from XIV system

Tivoli Storage Productivity Center does not support the version of IBM XIV Storage System that supports IPV6.

Planning to use LDAP

The Lightweight Directory Access Protocol (LDAP) is an application protocol that you can use to query and modify directory services running over TCP/IP. The Tivoli Storage Productivity Center installation program establishes a default authentication configuration using the federated repositories feature of the WebSphere Application Server. You can add an LDAP repository to this authentication configuration as a post-install activity.

A *directory* is a set of objects with similar attributes that are organized in a logical and hierarchical manner. An LDAP directory tree often reflects various political, geographic, and organizational boundaries, depending on the model chosen. The directory might contain entries representing people, organizational units, printers, documents, groups of people, or anything else that represents a tree entry (or multiple entries).

In the federated repositories framework, the Tivoli Storage Productivity Center installation program creates the following repositories:

File-based user repository

This repository contains the user ID "tpcFileRegistryUser". This user password is the same as the common user password that you enter during the Tivoli Storage Productivity Center installation.

Operating system repository

This repository is referred to as the localOS repository. This repository contains the users and groups managed by the local operating system.

With this default authentication configuration, you cannot use the Tivoli Storage Productivity Center single sign-on feature. Storage system element managers do not support the localOS repository or the file-based repository for single sign-on, even if the element manager is installed on the same system as Tivoli Storage Productivity Center.

To change the user authentication configuration, add or remove an LDAP repository in the federated repositories framework. After you add an LDAP repository to the Tivoli Storage Productivity Center user authentication configuration, back up the WebSphere configuration files in case you want to later change the LDAP settings.

To authenticate user names on the Tivoli Storage Productivity Center by using an instance of Microsoft Active Directory, complete one of the following options:

Authenticate User names: Method one

1. Install Tivoli Storage Productivity Center on an AIX, Linux, or Windows operating system.
2. Configure Tivoli Storage Productivity Center for LDAP authentication.

The target LDAP repository is an instance of Active Directory running on Windows 2003 or later. This method provides the following benefits:

- The Tivoli Storage Productivity Center target system does not have to be a Windows system.
- The Tivoli Storage Productivity Center target system does not have to be a member of a Windows domain.
- There are fewer configuration steps for Tivoli Storage Productivity Center or Windows.
- The Tivoli Storage Productivity Center user names and group names do not have to include the Windows Domain Name.
- You can use the single-sign on feature between Tivoli Storage Productivity Center and storage system element managers.

Authenticate User names: Method two

1. Install Tivoli Storage Productivity Center on a Windows system that is a member of a Windows domain or on the Windows Domain Controller.
2. Configure Tivoli Storage Productivity Center for operating system authentication.

Planning for rollup reports

Tivoli Storage Productivity Center enables you to use a single interface to generate reports based on data collected by multiple Tivoli Storage Productivity Center servers.

You can perform the following actions:

- View the storage information that is gathered by other servers from a single Tivoli Storage Productivity Center user interface using enterprise-wide rollup reports. These rollup reports enable you to have a network-wide perspective of storage usage in an environment where multiple Tivoli Storage Productivity Center servers are deployed and collecting storage metrics.

Note: Performance-related reports are not rolled up.

- Partition many agents across multiple Data servers. This action alleviates performance issues when running aggregation reports and scan jobs for multiple agents on one Data server.

To get rollup reports, select one Tivoli Storage Productivity Center server to act as the "master" server that gathers enterprise-wide data for the reports. You can then associate other Tivoli Storage Productivity Center servers to that master server as "subordinate" servers. These subordinate servers provide data to the master server about the entities they manage.

It is possible set-up a rollup-reporting environment where fragmentation occurs. Fragmentation occurs when related entities are being monitored by different subordinate Tivoli Storage Productivity Center servers.

Note: Keep in mind the following information when working with master and subordinate servers:

- The master and subordinate servers can change over time.
- A master server can also manage entities just like any other server and report on these entities.
- We recommend that the master server monitor no more than 500 unique data sources. This number includes subordinate servers, Storage Resource agents, CIMOM agents, and VM servers (VMWare).
- We recommend that each subordinate server monitors no more than 1200 unique data sources. This number includes Storage Resource agents, CIMOM agents, and VM servers (VMWare). After this threshold is met for a server, a new server is deployed and all new agents point to it.
- You must have Tivoli Storage Productivity Center superuser or Tivoli Storage Productivity Center administrator authority to perform administrative operations such as adding a subordinate server to the master server list to monitor.
- After upgrading to Tivoli Storage Productivity Center 5.1, you must run probes against the monitored storage assets for the master server to have information about those assets displayed in **Tivoli Storage Productivity Center > Reporting > Rollup Reports**.
- When you add a subordinate server to the master server list, you must provide the host authentication password of the subordinate server to the master server. The host authentication password is checked each time the master server is probed. This host authentication password is entered when installing Tivoli Storage Productivity Center. Contact your system administrator or the person who installed Tivoli Storage Productivity Center to determine this password.

Planning for the SAN configuration tools

This topic provides information about planning for the SAN configuration tools.

System administrators can identify potential problems with storage area network (SAN) configurations by using the Configuration Analysis and Configuration History tools.

Configuration Analysis

This tool allows the system administrators to check whether existing configurations violate defined best practices and policies. The user selects a set of best practices (policies) and specifies the name of a target SAN (or zone set) through the GUI, and then the tool checks to see whether the selected best practices are being violated in the specified SAN. The policy violations are displayed as IBM Tivoli Storage Productivity Center alerts. The topology viewer displays these policy violations and the affected SAN entities involved in each violation.

Configuration History

This tool displays the changes that have occurred in the SAN environment over time. Using this tool, the user can periodically or on-demand take snapshots of the SAN configuration managed by Tivoli Storage Productivity Center. Using the configuration history viewer, the user can select any two snapshots and view the changes that have occurred in the SAN environment between those two time periods when snapshots were taken. Changes occur when SAN entities are added, removed, or modified.

To create and schedule jobs using these tools, you must have Tivoli Storage Productivity Center superuser or Tivoli Storage Productivity Center administrator authority.

You must have the IBM SmartCloud Virtual Storage Center Storage Analytics Engine license to use these tools.

Planning for configuration analysis

Use the configuration analysis tool so that you can determine whether an existing SAN configuration complies with predefined best practices (policies).

The configuration analysis feature allows a system administrator to select up to 16 policies and to specify the name of a target SAN (or zone set) for the analysis. The analysis tool reads the specified SAN data and the policy information for the specified policies from the IBM Tivoli Storage Productivity Center database. The policy violations are displayed as Tivoli Storage Productivity Center alerts.

System administrators can use configuration analysis to learn of any best-practices violations their actions might have caused. For example, in provisioning a new storage subsystem, an administrator might inadvertently violate a zoning-related policy. If the zoning-related configuration changes persist in the database, configuration analysis can detect this policy violation.

Note: The configuration analysis feature is available only with the IBM SmartCloud Virtual Storage Center Storage Analytics Engine license.

The policies used by the configuration analysis tool are as follows:

1. Each connected computer and storage system port must be in at least one zone in the specified zone sets.
2. Each host bus adapter (HBA) accesses storage system ports or tape ports, but not both.
3. Each volume can be accessed only by computers running the same type and version of operating system.

4. Each zone contains only HBAs from a single vendor.
5. Each zone contains only a single model of storage subsystem.
6. Each zone is part of a zone set.
7. Each host must be zoned so that it can access all of its assigned volumes.
8. Each computer has only HBAs of the same model and firmware version.
9. For each host type and operating system, every HBA of a given model must have the same firmware version.
10. Every SAN switch of a given model must have the same firmware version.
11. Every storage subsystem of a given model must have the same firmware version.
12. Each fabric can have a maximum of x zones.
13. Each zone can have a maximum of x zone members.
14. Replication plan is intact with respect to the storage resource groups (SRGs) and the replication session associated during planning through the SAN Planner (for replication planning).
15. All the source volumes involved in Metro Mirror Failover/Failback sessions are conforming to 1:4 primary to secondary LSS for a failback direction scenario (for replication planning).
16. Inter/intra site connectivity is valid for replication plan deployments (for replication planning).

To use the configuration analysis tool, follow these general steps:

1. Ensure that you have previously run discovery and probe jobs for the computers, fabrics, switches, storage, and other objects of interest.
2. Ensure that the Device server and Data server are up and running.
3. Ensure that the Tivoli Storage Productivity Center agents are installed and configured.
4. Go to **IBM Tivoli Storage Productivity Center > Analytics**. Right-click **Configuration Analysis**. Use the Create Analyzer window to select the scope and policies for the configuration analysis.
5. Schedule how often you want the job to run and how to handle time zones.
6. Save and run the job.
7. After the configuration analysis job has run, you can view the alerts generated by IBM Tivoli Storage Productivity Center. In the navigation tree, expand **IBM Tivoli Storage Productivity Center > Alerting > Alert Log > Configuration Analysis**.

For more information about using the configuration analysis tool, see the Information Center. Search for **Using configuration analysis**. You can also find this information in the *IBM Tivoli Storage Productivity Center User's Guide*.

Planning for the Configuration History tool

The Configuration History view is a variation of the topology viewer. The Configuration History view shows the current configuration as well as what the configuration looked like in the past.

Use the snapshot selection panel in the Configuration History page to view changes that occurred in your storage environment between two or more points in time. After you define the configuration history settings, the system takes snapshots of your configuration so that you can compare the configuration at different points in time. The comparison can help you analyze system performance,

as well as enhance the quality of provisioning and planning tasks. The Configuration History tool does *not* show the *current* configuration.

To use the Configuration History tool, follow these general steps:

1. You must have run discovery and probe jobs for the computers, fabrics, switches, storage, and other objects of interest. For computers, you must also have run scan jobs.
2. Make sure that the Device server and Data server are up and running.
3. In the GUI, go to **Administrative Services > Configuration > Configuration History Settings**. Enable the periodic scheduling of configuration history snapshot creation or create some on-demand configuration history snapshots.
4. In the GUI, go to **IBM Tivoli Storage Productivity Center > Analytics > Configuration History** for the following:
 - Computers
 - Fabrics
 - Switches
 - Storage
 - Storage resource groups
 - Other

A Configuration History topology view is displayed of the item you selected.

5. Select the time range for the snapshots and click **Apply**.
6. You can view the SAN configuration changes in the configuration history view for the two time periods you selected.

For more information about how to use this tool, see *IBM Tivoli Storage Productivity Center Users Guide*.

Planning for Data Path Explorer

The Data Path Explorer is a type of view in the topology viewer. Data path explorer combines several of the typical topology views into a visualization that allows users to follow connectivity from one end point in the topology view to another. Storage administrators can use this view to debug connectivity and performance problems in the storage environment.

Data Path Explorer displays the different data paths (SAN access paths or I/O paths) for each host disk. This action allows you to use the Data Path Explorer to check the health and performance statistics of the storage components along the I/O path.

Different agents play different roles when discovering information and what can be shown in the topology viewer. The Data Path Explorer view is also subject to those limitations. Different amounts of information can be shown by the Data Path Explorer view depending on the agents deployed throughout the fabric.

To display data paths from a host to a subsystem in this view, it is necessary to have the following conditions:

- CIM agent installed to monitor the storage subsystem (CIM agents are not required for DS8000, the XIV system, SAN Volume Controller, Storwize V7000 Unified, or Storwize V7000)
- Storage Resource agent installed to monitor the host or fabric

The Data Path Explorer view does not display the data path from a host to a subsystem if any one of these conditions is not met.

To show the host disk assignment from a given storage subsystem, it is necessary for the IBM Tivoli Storage Productivity Center Data server to have access to the CIM agent (SMI-S agent) or native interface for the subsystem. For the subsystem, the data path is defined by the host masking or mapping information maintained by the CIM agent or native interface.

Analysis on data paths involving SAN Volume Controller, Storwize V7000 Unified, or Storwize V7000 would require the native interface pointing to the SAN Volume Controller, Storwize V7000 Unified, or Storwize V7000 and the disk drives for the storage system.

To show accurate information, it is important to have the most current information from the CIM agents, native interface, or Storage Resource agents. You must probe all the components within the data path (or a set of agents strategically placed throughout the fabric).

To show physical fabric connectivity, you must have a Storage Resource agent, out-of-band Fabric agent, or a CIM agent for the fabric. (CIM agents are not required for DS8000, the XIV system, SAN Volume Controller, Storwize V7000 Unified, or Storwize V7000.)

To show performance overlay in the Data Path Explorer view, you must first create and run performance monitors on the switches and storage subsystems of interest. To see the overlays you must also go to the topology viewer. Right-click on the topology viewer. Click **Global Settings**. On the Settings window under Active Overlays, click the **Performance** check box.

To show the zone overlay, you need a Storage Resource agent connected to the fabric along the data paths defined or a CIM agent or Storage Resource agent for the fabric. To see the overlays you must also go to the topology viewer. Right-click on the topology viewer. Click **Global Settings** and check the **Show zone tab** check box. Click **OK**.

If you want to start the Data Path Explorer view for a host, that host must have a Storage Resource agent running on it.

These are the general steps to follow to display the data path explorer view:

1. Install and configure the SMI-S agents (CIM agents) for the subsystems to collect subsystem data. CIM agents are not required for DS8000, the XIV system, SAN Volume Controller, Storwize V7000 Unified, or Storwize V7000 to collect subsystem data. Install and configure the CIM agents for the fabric to collect fabric data. Contact your vendor for information about installing and configuring the CIM agent for the subsystem or fabric.
2. Install and configure the out-of-band Fabric agent to monitor a fabric.
3. Install the Storage Resource agent on the hosts.
4. Run a discovery job for the CIM agents, Storage Resource agents, and storage systems.
5. Run a probe job for the subsystem, fabric, and Storage Resource agents.
6. Run a performance monitoring job for the subsystem and switches if you want to see performance information.

7. You can now see the data paths from a host to a storage subsystem in the Data Path Explorer view.

Planning for storage systems

To effectively plan your storage subsystems, you must understand the terminology.

Tivoli Storage Productivity Center uses abstract terminology such as pools, volumes, and so on to help you view and manage your heterogeneous storage systems. Most of these terms are derived from SMI-S, which already provides a common model for storage subsystems.

storage pool

A collection of storage capacity that provides the capacity requirements for a volume. A pool has certain storage capabilities, which indicate the range of quality of service requirements that can be applied to objects created from the pool.

primordial pool

A type of storage pool. This pool might contain unformatted or unprepared capacity. This type of pool might simply contain unassigned capacity. Storage capacity is drawn from the primordial storage pool to create concrete storage pools. The primordial storage pool aggregates storage capacity that has not been assigned to a concrete storage pool. Storage volumes are allocated from concrete storage pools. For the TotalStorage Enterprise Storage Server, DS8000, and DS6000, the primordial pool is the disk groups or array sites which are installed in the machine but have not yet been configured into RAID arrays. Primordial pools for SAN Volume Controller or Storwize V7000 are those MDisk which are available, but have not yet been configured to any MDisk Group (one primordial pool per back-end controller). The Primordial pool for the XIV system is a virtual concept that represents the aggregation of system-wide deallocated storage capacity which is available but unassigned to the XIV system storage pools.

storage volumes

Allocations of storage capacity that is exposed from a system through an external interface. In SCSI terms, they are logical units.

The following table shows the mapping of the Tivoli Storage Productivity Center terms to the device-specific terms.

Tivoli Storage Productivity Center terms:	Storage pool	Primordial pool	Storage volume	Disk
Device terms				
DS6000, DS8000, TotalStorage Enterprise Storage Server	Extent pool	Unconfigured disk groups or array sites	Volume	Disk drive module (DDM)
DS4000	Volume group	not applicable	Volume	Disk
DS5000	Volume group	not applicable	Volume	Disk
SAN Volume Controller or Storwize V7000	MDisk group	Managed disks	Volume	MDisk
the XIV system	Storage pool	not applicable	Volume	Disk

Many disk arrays provide an interface for the administrator to specify which initiators can access what volumes through which target ports. The effect is that the given volume is only visible to SCSI commands that originate from the specified initiators through specific sets of target ports. There might also be a capability to select the SCSI Logical Unit Number as seen by an initiator through a specific set of ports. The ability to limit access is called *device masking*. The ability to specify the device address seen by particular initiators is called device mapping. For SCSI systems, these terms are known as LUN masking and LUN mapping. In Tivoli Storage Productivity Center, masking and mapping is handled through host assignment.

Note:

- For DS6000 and DS8000: The DS6000 and DS8000 tracks the number of spares still available after a spare disk has been used to replace a failing disk drive in the device by marking the failing drive with an operational status of "Predictive Failure." If there are not enough spare disks remaining for a rank, then the operational status of the disk also shows a status of "Error."
If the DS6000 or DS8000 marks a disk drive with a status of "Predictive Failure" but not "Error", then Tivoli Storage Productivity Center shows a green icon with a consolidated status of "OK" in the health overlay, and does not create an alert. The topology viewer does show the real status of the disk drive as "Predictive Error" in the Operational Status column of the tabular view. The topology viewer lets you see the changed status.
- For EMC storage systems: The data that Tivoli Storage Productivity Center collects about EMC storage systems is based on SMI-S standards. Within SMI-S model different types of StoragePools are defined and several subsystem attributes can be modeled as special pool types. Beside the pools that are available for volume creation, additional storage space from the EMC storage system might be represented as a pool within the SMI-S model. Because of this, Tivoli Storage Productivity Center reports and CLI commands might display more pools for EMC storage systems than what is reported through the EMC Navisphere agent.

Tivoli Storage Productivity Center supports IBM and independent storage vendor systems through the native interfaces or with Storage Management Interface Specification (SMI-S) compatible interfaces. This support includes storage provisioning, asset reporting, and capacity reporting.

You can use the following IBM storage systems:

- SAN Volume Controller (with native interface)
- IBM TotalStorage Enterprise Storage Server
- IBM storage systems (DS3000, DS4000, DS5000, DS6000 series)
- DS8000 series (with native interface)
- FASTT
- The XIV system (with native interface)
- Storwize V7000 (with native interface)
- Storwize V7000 Unified (with native interface)
- IBM SONAS (with native interface)
- SMI-S certified storage systems. For information about SMI-S certified storage systems, see <http://www.snia.org/ctp/conformingproviders#10provider>.

For the Storage Optimizer, the DS4000 supports up to four Fibre Channel host connections and up to 112 SATA drives. SMI-S agents are not required for DS8000, the XIV system, SAN Volume Controller, Storwize V7000, Storwize V7000 Unified, and IBM SONAS storage systems.

Restriction:

- A specific SAN Volume Controller must not be managed by more than one Tivoli Storage Productivity Center server at the same time.

For the most current information about storage systems supported, firmware and provider levels, see the Tivoli Storage Productivity Center support website at <https://www.ibm.com/support/docview.wss?uid=swg21386446>.

Planning for CIM agents

CIM agents are provided by the vendor of certain types of storage systems and switches. Tivoli Storage Productivity Center communicates with a CIM agent to collect information about the resources that the agent manages.

For some storage systems, CIM agents are required for collecting storage asset information, provisioning, alerting, and performance monitoring. CIM agents must conform to the SNIA SMI-S specification to provide a communication transport between IBM Tivoli Storage Productivity Center and storage resources.

Note: For DS8000, the XIV system, SAN Volume Controller, Storwize V7000 Unified, and Storwize V7000 storage subsystems, you do not need a CIM agent.

The CIM agents can be referred to by various names, such as CIMOM (CIM Object Manager) or SMIS agent. A CIM agent consists of a CIMOM and an SMI-S provider for the managed device. The CIM agent can be a separate agent installation or can be embedded in the device itself, as is the case with Cisco fabric switches. In this case, there is no proxy agent to install and Tivoli Storage Productivity Center is configured to point to the managed device itself.


Once the CIM agent is installed and configured, Tivoli Storage Productivity Center can be configured to communicate with it.

Note:

- Do not use different CIM Agent releases (for example 5.1, 5.2.1, 5.3, and 5.4) to manage the same DS6000 or TotalStorage Enterprise Storage Server with IBM Tivoli Storage Productivity Center. Each CIM Agent release reports some information in a different way so this reporting can cause a reporting failure. Use the same release of CIM Agent for all CIMOMs managing the same device.
- If an Engenio or LSI SMI-S provider is being used by the Tivoli Storage Productivity Center server, then no other SMIS-enabled application should be using that Engenio or LSI SMI-S provider. This controlled environment is required to ensure that the Engenio provider receives synchronized CIM Client requests.
- For the TotalStorage Enterprise Storage Server 2105, disk drive information could be displayed twice after an upgrade. The first half of the information is new and is displayed online. The second half of information is no longer detectable. The second half of information is impossible to correlate.

CIM agents are not required for storage systems that Tivoli Storage Productivity Center communicates with using the native interface, such as DS8000, IBM XIV

Storage System, SAN Volume Controller, and IBM Storwize V7000. For those devices that require CIM agents to be set up, review the CIM agent documentation understand how many devices the CIM agent can be configured to manage. The memory that is consumed by the CIM agent includes the memory that is required for Tivoli Storage Productivity Center to probe a device through the CIM agent. The CIM agent is typically affected by the number of devices that the CIM agent manages. If no guidelines are available in the disk array subsystem CIM agent documentation, you should limit it to three storage systems per CIM agent.

For information about the latest CIM agent support for Tivoli Storage Productivity Center, see the  Tivoli Storage Productivity Center Interoperability Matrix site and go to the *Switches and Directors* and *Storage* sections.

For information about certified SMI-S devices, see <http://www.snia.org/ctp/conformingproviders#10provider>.

For information about how to install and configure the CIM agent, see <http://www.ibm.com/servers/storage/support/software/cimdsapi/>.

Planning for TagmaStore CIM agents

The TagmaStore CIM agents are provided by Hitachi Data Systems for the TagmaStore storage subsystem. The TagmaStore CIM agent collects information from the TagmaStore storage system.

IBM Tivoli Storage Productivity Center supports the Hitachi Data Systems TagmaStore CIM Agent 5.8. This version of the CIM Agent supports only the Array Profile and not the Storage Virtualizer Profile. However, Tivoli Storage Productivity Center supports the TagmaStore as a Storage Virtualizer. Tivoli Storage Productivity Center displays information for virtual disks and local disks.

Tivoli Storage Productivity Center cannot provide correlation information between the virtual storage used by TagmaStore and the volumes created on the storage due to an existing limitation of the CIM agent 5.8 from Hitachi Data Systems. However, Tivoli Storage Productivity Center reports correctly display the correlation between volumes created on the local storage and the local disks. This limitation has no impact on the topology but it does affect several reports that show the correlation:

- **Data Manager > Reporting > Asset > By Storage Subsystem > HDS_device > Managed Disks > LUN** (does not show the relation between the disk and LUN or volume in the tree)
- **Disk Manager > Reporting > Storage Subsystem > Volume to Backend Volume**
- **Disk Manager > Reporting > Storage Subsystem > Computer Views** (because Tivoli Storage Productivity Center cannot populate the information for volumes created on the virtual disks)

All volumes are created from a storage pool that is allocated from a primordial storage pool and an imported primordial pool. A volume cannot be created over both local and virtual extents.

For LUN and volume correlation, the host machine must have the Storage Resource agent installed and the TagmaStore device must be in the same SAN fabric. You must also have a zone configured in the active zone set between the

ports of the host machine and the ports of the TagmaStore device. The Fabric agent or Storage Resource agent needs to be configured for the fabric to which the host is connected.

For back-end correlation, the TagmaStore device ports and back-end subsystem ports must be in the same zone and the back-end subsystem has assigned storage volumes to all ports of the TagmaStore device.

Before you can use the CIM agent 5.8, you must uninstall pre-version 5.8 CIM agents. You cannot have a mixture of CIM agent 5.8 and pre-version 5.8 CIM agents. A mixture of CIM agents can cause failures.

The events returned by the CIM agent are:

- Generation of a volume
- Deletion of a volume
- Allocation of a path
- Cancellation of a path

When you delete a volume, you can only delete the latest created volume. For example, if you create five volumes, you need to delete the volumes in reverse order from the creation order.


General procedure

The general steps to follow to use the TagmaStore CIM agents are:

1. Install or upgrade Tivoli Storage Productivity Center.
2. Remove the pre-5.8 CIM agent from Tivoli Storage Productivity Center as a data source before adding the 5.8 CIM agent. You must add the CIM agent before running a discovery job.
3. Run a discovery job for the TagmaStore CIM agent.
4. Run probe jobs, scan jobs, and ping jobs for the TagmaStore CIM agent.
5. View the storage information gathered by the monitoring jobs through the topology viewer and reports that you can generate through the Fabric Manager, Data Manager, and Disk Manager.

Planning for monitoring storage systems

Plan for monitoring the storage systems in your environment.

1. Prepare for collecting data about storage systems. For storage systems that require CIM agents, ensure that the following conditions are met before you add the CIM agent to Tivoli Storage Productivity Center:
 - The version of CIM agent and firmware for the storage system is supported. For information about the CIM agent and firmware that is supported, see  <http://www.ibm.com/support/docview.wss?uid=swg21386446> and go to the *Storage* section.
 - A CIM agent is installed on a different server than the Tivoli Storage Productivity Center server.
 - For storage systems on a private network, ensure that the CIM agent is installed on a gateway machine so that the Tivoli Storage Productivity Center server can communicate with that agent.
 - The CIM agent is configured to manage the intended storage system.

For information about how to install and configure the CIM agent, contact your CIM agent provider.

2. Add storage systems for monitoring. To add an IBM SONAS system, use the stand-alone GUI. To add all other storage systems, use the web-based GUI.

When you add storage systems for monitoring in the web-based GUI, you can automatically schedule the following data collection jobs:

- Probes are data collection jobs that to collect asset, status, and storage data about storage systems.
- Performance monitors are data collection jobs that collect performance information about storage systems.

Restriction: For IBM SONAS systems, you must manually schedule data collection in the web-based GUI.

For more information about adding resources, go to the [Tivoli Storage Productivity Center Information Center](#) and search for *adding resources*.

Tips for probes and CIM agents: Running a probe puts additional workload on the Tivoli Storage Productivity Center server, the repository database, and the CIM agents. For probes, the additional workload is especially important if multiple devices are managed by the same CIM agent and are probed concurrently. As a result, the probe completion time is impacted by the number of devices that are probed in parallel. This fact is especially important if the CIM agent machines are lower-end machines of the hardware prerequisites.

To help keep the workload low, run probes at a time when Tivoli Storage Productivity Center and the network are not used heavily, which is typically at night. To allow this workload distribution, schedule probes for each storage system to run one after the other.

The following example shows how you might schedule probes. This environment assumes that you have four storage systems (SS1, SS2, SS3, and SS4), with three of them having a probe duration of less than 30 minutes and one (SS3) taking 90 minutes to complete. You can schedule the probes according to the following table:

Probe	Probe 1	Probe 2	Probe 3	Probe 4
Storage system	SS1	SS2	SS3	SS4
Start time	0:30	1:30	2:30	4:30

Probes collect detailed information about the configuration of the storage systems and the properties that describe those configuration elements.

Information about the following elements is gathered:

- Component computer systems (for SAN Volume Controller or Storwize V7000 nodes)
- Pools
- Volumes
- Fibre Channel ports
- Disks
- Host-to-volume assignments
- Relationships among the internal resources (for example, pool-to-volume relationships)

Probe storage systems once every one or two days. The following factors can influence this schedule:

- Is the storage system managed by Tivoli Storage Productivity Center or is a different tool used (for example, a device-specific CLI)?
 - How extensively are Tivoli Storage Productivity Center alerts used?
3. Create alerts to determine when and how you are alerted to conditions or violations on storage systems. Alerts are triggered by conditions that are detected during data collection and event processing. For a SAN Volume Controller, Storwize V7000, Storwize V7000 Unified, or XIV system, events are polled every minute from the resource. For other resources, events are subscription-based, where the resource itself or a data source such as a CIM agent sends the events to Tivoli Storage Productivity Center when conditions change on the resource.
 4. Configure data retention. In the stand-alone GUI, configure how long to retain data that Tivoli Storage Productivity Center collects about storage systems. By configuring data retention, you can control the amount of data that is retained and available for historical analysis and charting. The longer you keep the data, the more informative your analysis.

Planning for TotalStorage Enterprise Storage Server FlashCopy reports

You can plan for displaying TotalStorage Enterprise Storage Server FlashCopy reports in IBM Tivoli Storage Productivity Center.

If you want to display TotalStorage Enterprise Storage Server FlashCopy relationships in addition to the general information in Tivoli Storage Productivity Center, there are two general steps that must be performed. For example:

1. Add the following types to the CIM agent:

```
dscimcli mkdev 10.10.10.100 -type ess -user user_ID  
-password password  
dscimcli mkdev 10.10.10.100 -type esscs -user user_ID  
-password password
```
2. You must also have a specific level of microcode. Before installing IBM Tivoli Storage Productivity Center, check the IBM Tivoli Storage Productivity Center support site for the latest microcode level. Go to the Tivoli Storage Productivity Center support Web site at <http://www.ibm.com/support/docview.wss?rs=40&uid=swg21386446>.

Note: These steps are only required for the ESS and not the DS8000.

Storage capacity of volumes

IBM Tivoli Storage Productivity Center displays the storage capacity of volumes.

The disk storage that IBM Tivoli Storage Productivity Center supports is expressed in powers of two:

```
1 KB = 2 to the power of 10 bytes (1024)  
1 MB = 2 to the power of 20 bytes (1 048 576)  
1 GB = 2 to the power of 30 bytes (1 073 741 824)  
1 TB = 2 to the power of 40 bytes (1.09951E+12)  
1 PB = 2 to the power of 50 bytes (1.1259E+15)
```

This matches the convention of many storage systems but does not match the behavior of the TotalStorage Enterprise Storage Server server family of devices and the IBM XIV Storage System. Therefore, a volume created using the TotalStorage

Enterprise Storage Server Specialist or the XIV GUI with a size of 17 GB might be displayed by Tivoli Storage Productivity Center as 16 GB in size. The DS6000 and DS8000 storage system GUIs display the storage as powers of two.

Planning for DS8000

Use this information to plan for using the IBM DS8000 storage system with Tivoli Storage Productivity Center.

IBM System Storage DS8000 series is a high-performance, high-capacity series of disk storage that is designed to support continuous operations.

For more information about the DS8000, see the DS8000 Information Center at <http://publib.boulder.ibm.com/infocenter/dsichelp/ds8000ic/index.jsp>.

Tivoli Storage Productivity Center support

The DS8000 uses the Tivoli Storage Productivity Center native interface for connecting to the device. CIM agents are no longer required for the DS8000. After you add the DS8000 to Tivoli Storage Productivity Center, an automatic discovery and probe jobs are run.

General procedure

To view the reports and topology for the DS8000, complete the following steps:

1. Open the Tivoli Storage Productivity Center user interface and add the DS8000 to Tivoli Storage Productivity Center. Click **Administrative Services > Data Sources > Storage Subsystems**. Click **Add**. This action opens the Configure Devices wizard. For information about adding the storage system, go to the Tivoli Storage Productivity Center information center. Search for *Configure storage subsystem connections* pages.
2. After you add the DS8000, an automatic discovery and probe are performed.
3. View the reports and topology for the DS8000 in Tivoli Storage Productivity Center.

Planning for DS8000 performance

You can plan for DS8000 performance.

Space-efficient volumes are not fully allocated when they are created, unlike the "normal" type of volumes. Their actual allocated space grows as the volume is used, until it has reached the full size of the volume. After the full size of the volume is reached, the allocated size does not change further. For performance management, the current size of the volume is unknown at any given point in time. Because the current size of the volume is unknown, it is impossible to know how the segments (extents) for the volume are distributed among the various ranks in a multi-rank extent pool. It is therefore impossible to accurately compute the performance statistics for the arrays associated with a multi-rank extent pool that contains one or more space-efficient volumes.

Planning for SAN Volume Controller

Use this information to plan for using the SAN Volume Controller with Tivoli Storage Productivity Center.

You can view reports and the topology for your SAN Volume Controller environment. Use this information to understand the configuration that is required to use SAN Volume Controller with Tivoli Storage Productivity Center.

By using Tivoli Storage Productivity Center, you can view SAN Volume Controller performance statistics for the following reports:

- **Disk Manager > Reporting > Storage Subsystem Performance > By Storage Subsystem**
- **Disk Manager > Reporting > Storage Subsystem Performance > By I/O Group**
- **Disk Manager > Reporting > Storage Subsystem Performance > By Node**

You can also view the SAN Volume Controller environment through the topology viewer.

When you have hosts connected to storage subsystems which have multi-pathing enabled, you must have the multi-pathing subsystem device drivers (SDD) installed on the hosts. For more information, see the SAN Volume Controller Information Center and search for **multipath support**.

SAN Volume Controller Version 6.1 or later

SAN Volume Controller includes IBM System Storage Easy Tier[®], a function that responds to the presence of solid-state drives (SSDs) in a storage pool that also contains hard disk drives (HDDs). The system automatically and nondisruptively moves frequently accessed data from HDD MDisks to SSD MDisks, thus placing such data in a faster tier of storage.

Easy Tier eliminates manual intervention when assigning highly active data on volumes to faster responding storage. In this dynamically tiered environment, data movement is seamless to the host application regardless of the storage tier in which the data resides.

SAN Volume Controller supports these tiers:

Generic SSD tier

The SSD tier exists when SSDs are in the storage pool. The SSDs provide greater performance than hard disk drives (HDDs).

Generic HDD tier

The HDD tier exists when HDDs are in the storage pool.

All MDisks belong to one tier or the other, which includes MDisks that are not yet part of a storage pool.

If you create a storage pool (managed disk group) with both generic SSD MDisks and generic HDD MDisks, Easy Tier is automatically turned on for pools with both SSD MDisks and HDD MDisks. SAN Volume Controller does not automatically identify external SSD MDisks; all external MDisks are put into the HDD tier by default. You must manually identify external SSD MDisks and change their tiers.

Note:

- The terminology for this release of SAN Volume Controller has changed:
 - Error is now event
 - MDisk is now storage pool
 - Space-efficient is now thin provisioning

- VDisk is now volume

However, the terms have not been changed in Tivoli Storage Productivity Center reports and views.

- In SAN Volume Controller 5.1 or earlier, there was a one-to-one mapping between MDisks and internal SSD drives. For SAN Volume Controller 6.1 or later, there are now one-to-many mapping between MDisks and drives.
- For this release of Tivoli Storage Productivity Center, performance monitors do not support Easy Tier.

In addition to information already available for SAN Volume Controller, Tivoli Storage Productivity Center reports and topology views also provide information about the tier, tier capacity, and tier free capacity.

Tivoli Storage Productivity Center also supports launch in context for SAN Volume Controller.

Tivoli Storage Productivity Center for Replication also supports SAN Volume Controller Version 6.1.

Upgrading SAN Volume Controller Version 5.1

Currently SAN Volume Controller Version 6.1 does not support the solid-state drives. This support will be added in a future fix pack.

If you are upgrading SAN Volume Controller Version 5.1 to Version 6.1, you have the following options:

- Do not upgrade SAN Volume Controller Version 5.1 to Version 6.1 until the solid-state drive support is available.
- Follow these steps to upgrade SAN Volume Controller Version 5.1:
 1. Migrate data off the solid-state drive MDisks.
 2. Unconfigure (unmanage) the solid-state drive MDisks.
 3. Run a Tivoli Storage Productivity Center for Replication probe for the SAN Volume Controller.
 4. Upgrade the SAN Volume Controller Version 5.1 to Version 6.1.

Note: SAN Volume Controller does not permit an upgrade of SAN Volume Controller Version 5.1 to Version 6.1 while there are managed solid-state drive MDisks. After the upgrade, the unmanaged solid-state drive MDisk objects are marked as unused drive objects. You cannot configure these drive objects into RAID arrays.

Planning for Storwize V7000

Storwize V7000 is a hardware and software solution that provides unmatched performance, availability, advanced functions, and highly scalable capacity.

General concepts

Storwize V7000 offers IBM storage virtualization, SSD optimization and “thin provisioning” technologies built in to improve storage utilization. The storage system can be reconfigured to meet changing needs quickly and easily. This solution helps to reduce costs without performance degradation.

The Storwize V7000 hardware consists of a set of drive enclosures. Control enclosures contain disk drives and two node canisters. The two nodes within the canisters make an I/O group that is attached to the SAN fabric. A single pair of nodes is responsible for serving I/O on a given volume. Because a volume is served by two nodes, there is no loss of availability if one node fails or is taken offline.

Storwize V7000 can be used as a traditional RAID storage system where the internal drives are configured into arrays, and volumes are created from those arrays. Storwize V7000 can also be used to virtualize other storage systems.

Storwize V7000 supports both regular and solid-state drives (SSDs). A Storwize V7000 system without any internal drives can be used as a storage virtualization solution.

Each Storwize V7000 node has two Ethernet ports that can be used for management. Ethernet port 1 must be configured with a management IP address and must be connected on all nodes in the system. The use of Ethernet port 2 is optional. At any point in time, only one node in the system can operate as the focal point for configuration and monitoring requests. This node is called the configuration node and is the only node that activates the management IP addresses.

Each Storwize V7000 can have zero to four management IP addresses. You can assign up to two IPv4 addresses and up to two IPv6 addresses.

All configuration, monitoring, and service tasks are performed at the cluster level (a cluster is a Storwize V7000 system that consists of two nodes).

Storwize V7000 includes IBM System Storage Easy Tier, a function that supports solid-state drives (SSDs) in a storage pool that also contains hard disk drives (HDDs). The system automatically and nondisruptively moves frequently accessed data from HDD MDisks to SSD MDisks, thus placing such data in a faster tier of storage.

Easy Tier eliminates manual intervention when assigning highly active data on volumes to faster responding storage. In this dynamically tiered environment, data movement is seamless to the host application regardless of the storage tier in which the data resides. Manual controls exist so that you can change the default behavior, for example, such as turning off Easy Tier on storage pools that have both types of MDisks.

Using Tivoli Storage Productivity Center to monitor Storwize V7000

Tivoli Storage Productivity Center communicates with Storwize V7000 storage systems through a native interface. No CIM agents are required.

Use Tivoli Storage Productivity Center to monitor Storwize V7000 systems, including discovery, data collection (probes), performance monitoring, trending, storage optimization, and provisioning. Tivoli Storage Productivity Center reports and topology views also provide information about the tier, tier capacity, and tier free capacity for Storwize V7000.

Note: For this release of Tivoli Storage Productivity Center, performance monitors do not support Easy Tier.

Similar to other systems, Storwize V7000 appears as an entity within data sources, reports, data collection schedules, the topology viewer, and so on. Tivoli Storage Productivity Center also supports launch in context for Storwize V7000.

Planning for Storwize V7000 Unified

The IBM Storwize V7000 Unified system is a virtualizing redundant array of independent disks (RAID) storage system that supports both block protocols and file protocols. This unified system includes Storwize V7000 File Module and the Storwize V7000 storage system.

Using Tivoli Storage Productivity Center to monitor Storwize V7000 Unified

Tivoli Storage Productivity Center communicates with Storwize V7000 Unified storage systems through a native interface. No CIM agents are required.

Use Tivoli Storage Productivity Center to monitor Storwize V7000 Unified systems, including discovery, data collection (probes), performance monitoring, and trending. Tivoli Storage Productivity Center reports and topology views also provide information about the tier, tier capacity, and tier free capacity for Storwize V7000 Unified.

Similar to other systems, Storwize V7000 Unified appears as an entity within data sources, reports, data collection schedules, the topology viewer, and so on. Tivoli Storage Productivity Center also supports launch in context for Storwize V7000 Unified.

Identifying Storwize V7000 Unified devices in the user interface

The way you configure a Storwize V7000 Unified device determines how the Storwize V7000 Unified device is represented in the Tivoli Storage Productivity Center stand-alone GUI, as follows:

- Storwize V7000 File Module generally appears as a "computer" in the user interface. In **Data Manager > Alerting > Other NAS Alerts > NAS**, it appears as a "NAS cluster."
- Storwize V7000 storage system appears as a "subsystem" in the user interface.

Planning for the XIV system

Use this information to plan for using the XIV Storage System with Tivoli Storage Productivity Center.

IBM XIV Storage System is a disk storage architecture designed to eliminate the complexity of administration and management of storage. The XIV system parallelized architecture of the system, optimal exploitation of all system components (including disks, CPUs, and switches), and unique caching architecture all translate into excellent performance.

The unique balancing of all data across system components prevents the occurrence of hot spots. With all components working under the same load, performance and reliability are exceptional.

The XIV system uses large capacity Serial Advanced Technology Attachment (SATA) disk drives which optimizes the use of disk capacity, resulting in outstanding power consumption without compromising performance.

The XIV system is designed to be scalable in storage, interfaces, cache, CPU power, and internal bandwidth. The architecture supports each aspect to grow independently, resulting in a scalable system in both capacity and performance.

The XIV system provides data protection and availability. All disk drives, modules, switches, and uninterruptible power supply units are fully redundant, ensuring high reliability and excellent performance.

The built-in thin provisioning of the XIV system helps reduce direct and indirect costs by allowing users to install capacity only for data written. You can grow your data capacity over time with minimal management effort.

For more information about XIV system, see the XIV system Information Center.

Tivoli Storage Productivity Center support

Tivoli Storage Productivity Center uses the native interface for the XIV system to run discovery and probe jobs. Because of the dynamic XIV architecture, where volume data is spread over all disks, no data that describes the space allocation from volumes to a specific physical disk is available.

The XIV system includes a graphical user interface (GUI) for configuration and administration (XIV Storage Manager). XIV Storage Manager is the element manager for the XIV system. XIV Storage Manager version 4.2 or later must be installed on the same computer as the Tivoli Storage Productivity Center GUI. If XIV Storage Manager is not installed on the same computer as the Tivoli Storage Productivity Center GUI or is configured incorrectly, an error message is displayed when you attempt to start XIV Storage Manager from Tivoli Storage Productivity Center.

The XIV systems have the capability of defining up to three administrative nodes, each with their own IP address. In Tivoli Storage Productivity Center 4.2.1 or later, if an XIV system is configured with multiple administrative nodes, Tivoli Storage Productivity Center detects the IP addresses for these nodes. If Tivoli Storage Productivity Center fails to connect to one of the IP addresses, then an attempt is made to connect to the XIV system using one of the other IP addresses.

Restriction: You cannot use IPv6 addresses when monitoring XIV systems.

Data collection for XIV systems

The following considerations apply to values shown in the XIV system and Tivoli Storage Productivity Center GUIs.

- The XIV Storage System GUI and the XIV Storage System command-line interface (CLI) report sizes in GB of disks, volumes, pools, and so on, based on 10^9 . Tivoli Storage Productivity Center reports sizes in GB based on 2^{30} . For example, a volume showing a size of 17 GB in the XIV Storage System GUI is reported as 16 GB ($\text{XIV GB size} * 1000 * 1000 * 1000 / 1024 / 1024 / 1024$ rounded to the nearest GB) in Tivoli Storage Productivity Center.
- The XIV system differentiates thin provisioned pools from non-thin provisioned (regular) pools and volumes in a thin provisioned pool and a non-thin

provisioned pool. When hard size is equal to soft size, the pool is represented as a regular pool, otherwise the pool is represented as thin provisioned. However, the XIV system CLI and CIM do not distinguish between regular and thin provisioned pools and all pool volume names in Tivoli Storage Productivity Center are prefixed with an asterisk (*) to indicate that the volume is thin provisioned.

General procedure

To view the reports and topology for the XIV system environment, complete the following steps:

1. Open the Tivoli Storage Productivity Center user interface and add the XIV system to Tivoli Storage Productivity Center. In the navigation tree, expand **IBM Tivoli Storage Productivity Center > Configure Devices**. This opens the Configure Devices wizard. For information about adding the storage system, see the Tivoli Storage Productivity Center information center. Search for *Configure storage subsystem connections page*.
2. After you add the XIV system, an automatic discovery and probe are performed.
3. View the reports and topology for the XIV system in Tivoli Storage Productivity Center.

Planning for fabrics

Use Tivoli Storage Productivity Center to help manage the SAN fabric that connects host systems and applications to storage resources. Functions in the web-based GUI and stand-alone GUI provide solutions for managing multi-vendor SANs, and include automatic resource, topology discovery, monitoring, and alerts.

The main Tivoli Storage Productivity Center functions for managing fabrics are shown in the following table.

Table 13. Main features of the Fabric Manager

Feature	Advantages	Benefit
Automatic device discovery	View the path of data from servers to switches to storage systems	Easily manage your SANs from a single console
Real-time monitoring and alerts	Monitor SAN events and alerts administrators of problems	Helps maintain the availability of your SAN
SAN reporting	Generate reports on the SAN devices	Quickly provides reports and inventories of your SAN
Enterprise scalability	Scale from SAN islands to enterprise SANs	Accommodates new and ever changing business needs
Monitoring performance	Monitor the performance of switches by defining performance thresholds and alerts, and viewing performance reports. The performance reporting is at the switch and port levels.	Helps you maintain high SAN availability

Note:

1. Tivoli Storage Productivity Center provides predictive fault analytics for the SAN infrastructure through reporting, monitoring, and alerting of link failure rates and error frame rates. These transient errors are indicative of potential pending SAN link failures.
2. Tivoli Storage Productivity Center does not support heterogeneous fabrics in versions 5.1 and later.

Planning for Brocade management agents

IBM Tivoli Storage Productivity Center uses a Storage Management Initiative (SMI) agent to manage Brocade switches.

Supported Brocade models

If you are using Brocade Data Center Fabric Manager (DCFM) 10.4 or later, the Storage Management Initiative (SMI) agent used by Tivoli Storage Productivity Center is embedded in the DCFM. If you are using Brocade Network Advisor (BNA) 11.1 or later, the SMI agent is embedded in the BNA. If you are not using Brocade DCFM 10.4 or later, and not using BNA 11.1 or later, you must use external SMI agents for Brocade switches.

For the Brocade models, firmware versions, and SMI agents that are used by Tivoli Storage Productivity Center, see the support matrix at <http://www.ibm.com/support/docview.wss?uid=swg21386446>.

Discovering fabrics and switches that use CIM agent

When you add fabrics and switches for monitoring, you can specify the CIM agent (embedded or external) that manages them. Tivoli Storage Productivity Center connects to the CIM agent and automatically discovers the fabrics and switches that it manages. You can add the discovered fabrics and switches and configure data collection:

- A probe job collects data about a fabric, including its topology, the properties of the hardware that make up the fabric, zoning information, and the endpoint devices.
- A performance monitor job collects information about the performance of a fabric or switch.

Using other agents for discovery: out-of-band SNMP agents or Storage Resource agents

SMI agents provide the following benefits for fabric management:

- Probes do not occur in the data path.
- Propagation of alerts for real-time SAN events is not degraded by using fabric SMI agents.

Using multiple agent types allows the redundant collection of information if one type of agent fails. Also, some types of agents provide certain features the other agents do not. However, using multiple agent types can increase network traffic and the management load on the switches.

The following table outlines the fabric management functions that are supported by agent type. Where multiple agents can be used, the preferred agent type is noted.

Table 14. Supported and preferred interfaces for fabric management

Function	Brocade
Performance monitoring	Fabric SMI agent
Topology information collected	Preferred: Fabric SMI agent Still supported: Storage Resource agent Out-of-band SNMP agent
Zone information collected	Fabric SMI agent
Switch and switch port information collected (for running performance monitor)	Preferred: Fabric SMI agent
Fabric and switch events (see table note)	Preferred: Fabric SMI agent Switch SNMP trap configuration
Launch of switch and fabric element managers	Preferred: Fabric SMI agent Still supported: Storage Resource agent Out-of-band SNMP agent
Hosts, endpoint devices, device-centric and host-centric information collected	Storage Resource agent
Switch sensors and events	Out-of-band SNMP agent
Note: <ul style="list-style-type: none"> The Storage Resource agent runs the following jobs: <ul style="list-style-type: none"> Discovery When a discovery job is run, Tivoli Storage Productivity Center gathers information about the fabrics, fabric to switch relationships, and other key attributes about the switches in the fabrics. Probe When a probe job is run, Tivoli Storage Productivity Center gathers additional details for topology and zoning information. If you deploy a Storage Resource agent, and a fabric probe job has not been run, the connections from the Storage Resource agents to the switches are not displayed, and all the fibre channel (FC) ports are reported as unused. Collected zone information indicates that the active zone set and the inactive zoning library information is collected during a fabric probe. Tivoli Storage Productivity Center does not get a transaction lock on the switch while making zone changes on the fabric. For fabric and switch events, the Storage Resource agent relies on both SNMP traps and CIM indications for event notification and automatic fabric discovery and probe, if needed. <p>The preferred method includes both SMI agent and switch SNMP trap configuration. An out-of-band SNMP agent is not necessary for getting SNMP traps. You can configure the switch to send SNMP traps to the Device server. However, you can configure the out-of-band SNMP agent for other reasons.</p>	

Planning to use the embedded SMI agent

A software-embedded Storage Management Initiative (SMI) agent is provided in Brocade Data Center Fabric Manager (DCFM) 10.4 or later, or Brocade Network Advisor 11.1 or later. DCFM and Brocade Network Advisor manage multiple fabrics within and across data centers. When you configure DCFM or Brocade Network Advisor, you set up one switch to be the *seed* or master switch that interconnects to all the other switches in the fabric.

Configuring the Brocade switch

Before Tivoli Storage Productivity Center can discover the switches in a fabric through the software-embedded SMI agent, you must configure the Brocade DCFM or Brocade Network Advisor to manage the fabric. Use a seed switch to configure the Brocade DCFM or Brocade network advisor. This configuration is done through the seed switch. For heterogeneous Fabric OS (FOS) fabrics, the seed switch must be one of the FOS switches. There are special requirements for the seed switch:

- For pure FOS fabrics, the seed switch must have a firmware of 5.3 or later.
- For heterogeneous FOS fabrics, the seed switch must have a firmware of 6.0 or later.

Migrating from a legacy agent to an SMI agent

You can configure Tivoli Storage Productivity Center to use the software-embedded SMI agent instead of the out-of-band Fabric agent for the FOS fabric.

Limitations

These are some limitations using the software-embedded SMI agent:

- The software-embedded SMI agent has asset collection period logic for handling fabric events. If anything in the fabric topology changes and is restored within the asset collection period, the SMI agent does not send a CIM indication. In this situation, you must run a fabric probe to collect the most updated fabric topology information. For more information about the asset collection period, including the value for the collection period, refer to the DCFM or Brocade Network Advisor documentation.
- The software-embedded SMI agent is not supported on IBM AIX.
- DCFM Professional Edition does not have the software-embedded SMI agent.
- You can use either the HTTPS or HTTP protocol at one time with DCF or Brocade Network Advisor. You cannot use both protocols at the same time.
- Empty zones, zone sets, and zone aliases are not supported through FOS fabrics through the SMI agent.
- When you set up the seed switch, if the switch link is broken anywhere along the connection line, Tivoli Storage Productivity Center will not be able to report on the switches past the broken link.
- When a Brocade i10000 switch has a faulty control processor card, the SMI agent managing the switch can hang indefinitely. This issue causes time-outs and probe failures from the Tivoli Storage Productivity Center server.

Planning for external SMI agent support

Brocade fabrics that are not managed by Brocade Data Center Fabric Manager (DCFM) 10.4.0 or later and are not managed by Brocade Network Advisor 11.1 or later require a separate external Storage Management Initiative (SMI) agent for the Brocade hardware. The external SMI agents must be installed on separate hosts and can manage one or more switches.

Installing and Configuring external SMI agents

You need to install and configure the external SMI agents before adding the SMI agents to Tivoli Storage Productivity Center.

For more information about configuring the external SMI agents for Brocade switches, refer to the documentation for the switch.

Considerations

Consider these items when using external SMI agents:

- If Brocade fabrics are not laid out as a *mesh*, and one inter-switch link (ISL) break can segment the fabric, manage the fabric with both a fabric SMI agent and an out-of-band Fabric agent (SNMP). The reason for this is that Brocade SMI agents do not automatically manage newly created fabrics in the event of a fabric segmentation.
- Brocade SMI agents do not correctly report whether switches and fabrics are running in Interop Mode or Native Mode. Because of this limitation, Tivoli Storage Productivity Center is unable to determine whether a fabric or switch is in Interop Mode or Native Mode. For homogeneous Brocade fabrics that are configured in Interop Mode, creating zone aliases from Tivoli Storage Productivity Center fails.

Planning for Brocade, QLogic, or Cisco fabric management agents

Depending on the function that you want to perform, such as topology discovery, zone discovery, and performance monitoring, Tivoli Storage Productivity Center uses a Storage Management Initiative (SMI) agent, out-of-band Simple Network Management Protocol (SNMP) agent, or Storage Resource agent to manage Brocade, QLogic, and Cisco switches.

Supported Brocade, QLogic, and Cisco models

For more information about the Brocade, QLogic, and Cisco models, firmware versions, and agents that are supported by Tivoli Storage Productivity Center, see the support matrix at <http://www.ibm.com/support/docview.wss?uid=swg27019378>.

The following table outlines the fabric management functions that are supported by agent type.

Table 15. Supported and preferred interfaces for fabric management

Function	Brocade	QLogic	Cisco
Performance monitoring	Fabric SMI agent	Fabric SMI agent	Fabric SMI agent
Topology information collected	Preferred: <ul style="list-style-type: none">• Fabric SMI agent Supported: <ul style="list-style-type: none">• Storage Resource agent• Out-of-band SNMP agent	<ul style="list-style-type: none">• Storage Resource agent• Out-of-band SNMP agent	<ul style="list-style-type: none">• Storage Resource agent• Out-of-band SNMP agent

Table 15. Supported and preferred interfaces for fabric management (continued)

Function	Brocade	QLogic	Cisco
Zone information collected (see note 2 on page 60)	Fabric SMI agent	Storage Resource agent	Storage Resource agent
Switch and switch port information collected (for running the performance monitor)	Fabric SMI agent	Fabric SMI agent	Fabric SMI agent
Fabric and switch events (see note 5 on page 60)	<ul style="list-style-type: none"> Preferred: <ul style="list-style-type: none"> – Fabric SMI agent Switch SNMP trap configuration 	Switch SNMP trap configuration	Switch SNMP trap configuration
Switch and fabric element managers launching	<ul style="list-style-type: none"> Preferred: <ul style="list-style-type: none"> – Fabric SMI agent Supported: <ul style="list-style-type: none"> – Storage Resource agent – Out-of-band SNMP agent 	<ul style="list-style-type: none"> Preferred: <ul style="list-style-type: none"> – Fabric SMI agent Supported: <ul style="list-style-type: none"> – Storage Resource agent – Out-of-band SNMP agent 	<ul style="list-style-type: none"> Preferred: <ul style="list-style-type: none"> – Fabric SMI agent Supported: <ul style="list-style-type: none"> – Storage Resource agent – Out-of-band SNMP agent
Hosts, endpoint devices, device-centric, and host-centric information collected	Storage Resource agent	Storage Resource agent	Storage Resource agent
Switch sensors and events	Out-of-band SNMP agent	Storage Resource agent	Storage Resource agent

Table 15. Supported and preferred interfaces for fabric management (continued)

Function	Brocade	QLogic	Cisco
<p>Note:</p> <ol style="list-style-type: none"> The Storage Resource agent has the following functions: <ul style="list-style-type: none"> Discovery When a discovery job is run, Tivoli Storage Productivity Center gathers information about the fabrics, fabric to switch relationships, and other key attributes about the switches in the fabrics. Probe When a probe job is run, Tivoli Storage Productivity Center gathers additional details for topology and zoning information. If you deploy a Storage Resource agent and a fabric probe job is not run, the connections from the Storage Resource agents to the switches are not displayed, and all the Fibre Channel (FC) ports are reported as unused. Zone information collected indicates that the active zone set and the inactive zoning library information is collected during a fabric probe. Tivoli Storage Productivity Center does not get a transaction lock on the switch while making zone changes on the fabric. The following notes are specific to Cisco: <ul style="list-style-type: none"> Each virtual storage area network (VSAN) is viewed as an individual storage area network (SAN). The out-of-band SNMP agent and SMI agent gets the physical fabric information and can correlate the VSAN information to a physical infrastructure. The out-of-band SNMP agent also collects some VSAN information. The GS-4 function is not supported by the Storage Resource agent for Cisco. For many Cisco proprietary zone members, the values are displayed as zeros. If a zoning configuration has Cisco proprietary zones, then you cannot modify the zoning for that configuration through Tivoli Storage Productivity Center. You must use the element manager to remove proprietary zone members or to perform zoning. No aliases for Cisco are reported. Orphan Cisco zones and aliases are not reported. For fabric and switch events, the Storage Resource agent relies on both SNMP traps and CIM indications for event notification and automatic fabric discovery and probe, if needed. The preferred method includes both SMI agent and switch SNMP trap configuration. An out-of-band SNMP agent is not necessary for getting SNMP traps. You can configure the switch to send SNMP traps to the Device server. However, you can configure the out-of-band SNMP agent for other reasons. 			

Fabrics and switches

The type of discovery that is performed for fabrics and switches depends on the agent that you are using. For information about discovery by agent type, see the Tivoli Storage Productivity Center information center. Search for *Discovering storage resources*.

Collecting data with the Fabric Manager

Tivoli Storage Productivity Center uses different types of agents to gather data about switches. Different combinations of these agents are required to effectively enable the functions of Fabric Manager. In addition, the topology viewer is greatly affected by the discovery of all the managed entities in the management scope of Tivoli Storage Productivity Center.

The following table shows the actions that trigger data collection and the data that is collected depending on the type of agent that is used.

Table 16. Information collected by agent

Action that triggers data collection	Storage Resource agent	Out-of-band fabric agent (SNMP)	SMI agent (Brocade)	SMI agent (Cisco and QLogic)
Administrative Services > Discovery > Out of Band Fabric	–	<ul style="list-style-type: none"> • Discovers switches and connections for switches with IP addresses in a specified range (if you selected this option) • Discovers switches and connections for switches that were previously added as out-of-band agents (either manually or switches with IP addresses in a specified range for which an out-of-band discovery was previously run) • Retrieves Cisco VSAN and physical infrastructure and correlates VSAN to physical infrastructure (see note 2 on page 63) 	–	
Administrative Services > Discovery > CIMOM	–	–	<ul style="list-style-type: none"> • Discovers Storage Management Initiative (SMI) agents through Service Location Protocol (SLP) • Retrieves switch information • Retrieves fabric information 	<ul style="list-style-type: none"> • Discovers SMI agents through SLP • Retrieves switch information • Retrieves fabric information
IBM Tivoli Storage Productivity Center > Probe (including fabric) (see notes 3 on page 63 and 9 on page 63)	<ul style="list-style-type: none"> • Retrieves zoning information, excluding zone alias information, for QLogic and Cisco • Retrieves switch and topology information • Retrieves attribute information for hosts and devices connected to the fabric 	<ul style="list-style-type: none"> • Retrieves switch and topology information • Retrieves Cisco VSAN and physical infrastructure and correlates VSAN to physical infrastructure (see note 2 on page 63) 	<ul style="list-style-type: none"> • Retrieves detailed fabric, switch, switch port, and blade information • Retrieves zoning information, including zone aliases for Brocade devices • Retrieves fabric topology connectivity information • Subscribes to CIM indications 	<ul style="list-style-type: none"> • Retrieves detailed fabric, switch, switch port, and blade information

Table 16. Information collected by agent (continued)

Action that triggers data collection	Storage Resource agent	Out-of-band fabric agent (SNMP)	SMI agent (Brocade)	SMI agent (Cisco and QLogic)
Action of Storage Resource agent (see note 1): <ul style="list-style-type: none"> • Turns on • Connectivity changes • Change event detected 	<ul style="list-style-type: none"> • Retrieves zoning information, excluding zone alias information • Retrieves switch and topology information • Retrieves attribute information for hosts and devices connected to the fabric 	<ul style="list-style-type: none"> • Retrieves switch and topology information • Retrieves Cisco VSAN and physical infrastructure and correlates VSAN to physical infrastructure (see note 2 on page 63) 		
SNMP trap received from switch (see note 6 on page 63)	<ul style="list-style-type: none"> • Retrieves zoning information, excluding zone alias information • Retrieves switch and topology information • Retrieves attribute information for hosts and devices connected to the fabric 	<ul style="list-style-type: none"> • Retrieves switch and topology information • Retrieves Cisco VSAN and physical infrastructure and correlates VSAN to physical infrastructure (see note 2 on page 63) 		
CIM indication received from fabric SMI agent (see note 7 on page 63)			Performs a mini-probe to collect information that is relevant to the indication received, or sets entities as missing. Might do one of the following actions: <ul style="list-style-type: none"> • Retrieves switches and fabrics, or • Retrieves zoning data, or • Retrieves switch port status and connection to node, or • Retrieves switch blade status and all port connections for the blade, or • Sets fabric, switch, blades, connections, or nodes as missing 	

Table notes:

1. The Storage Resource agent has two distinct functions:
 - **Discovery**

When a discovery job is run, Tivoli Storage Productivity Center gathers information about the fabrics, fabric to switch relationships, and other key attributes about the switches in the fabrics.

- **Probe**

When a probe job is run, Tivoli Storage Productivity Center gathers additional details for topology and zoning information.

If you deploy a Storage Resource agent and a fabric probe job is not run, the connections from the Storage Resource agents to the switches are not displayed, and all the Fibre Channel (FC) ports are reported as unused

2. SNMP traps received result in a fabric probe of fabrics for the switches (for which traps were received). Agent assignment determines the agents that need to be used for that probe. Event notifications from the event agent could result in any of the agent types to be used (Storage Resource agent, SNMP agent, and SMI agent) for the probe.
3. A fabric probe always results in a fabric discovery using Storage Resource agents and SMIS agents that can report on fabrics been probed.
4. With agent assignment, all Storage Resource agents that are capable of reporting on a specific fabric might not be run if Tivoli Storage Productivity Center does not deem it necessary to do so.
5. The following information applies to Storage Resource agents:
 - Starting a Storage Resource agent results in a fabric discovery that uses the Storage Resource agent. If the fabrics that are discovered are part of some fabric probe definition, a fabric probe is also done. Agent assignment is used to determine the actual agents that are needed for that fabric probe.
 - Stopping a Storage Resource agent does not cause any data collection.
6. SNMP traps result in a fabric probe of fabrics for which the traps were received. Agent assignment determines the agents that must be used for that probe. SNMP traps can result in any of the agent types being used (Storage Resource agent, SNMP agent, and SMIS agent).
7. A CIM indication results in a Storage Resource agent fabric discovery for Storage Resource agents that can report on fabrics for which CIM indications were received. Also, if a mini-probe fails and a Storage Resource agent can report on the fabric for which the indication is received, the Storage Resource agent is run to collect fabric information.
8. Starting or restarting a device or the Data server or both can result in a fabric probe of fabrics which are part of some probe definition defined by the user. Agent assignment determines the agents that must be used for that probe. This action might result in any of the agent types being used (Storage Resource agent, SNMP agent, and SMIS agent).

Deleting or uninstalling a Storage Resource agent can result in agent assignment attempting to use an alternative agent to probe fabrics that the uninstalled Storage Resource agent might report on if such fabrics were part of a probe definition defined by the user.
9. If a fabric is in the process of rebuilding itself, a fabric probe job might fail. The fabric rebuilds itself if you add or remove a switch, or if you change the principal switch. If you experience a fabric probe job failure, suspect recent changes to the fabric which might have caused the fabric to rebuild. After the fabric rebuilds itself, the fabric probe job will likely succeed. Consider implementing a change-control process for the storage environment so that the previously mentioned changes are planned, approved, and recorded.
10. Your fabric probe can fail on the AIX operating system with error message: AGT0430I.

AIX has a constraint wherein the size of the response buffer passed in for GS-3 commands made to the switch cannot exceed 4 K. The Storage Resource agent passes 4-K buffer sizes for AIX.

If the zone configuration for a fabric probe exceeds the 4-K limitation for AIX, Tivoli Storage Productivity Center flags this condition. The fabric probe operation fails under this condition with error message AGT0430I.

Consider using Storage Resource agents deployed on another platform that is connected to the same fabric. Use this Storage Resource agent for collecting zone information and for performing zone changes. In this case, the fabric functions for the Storage Resource agent that is failing can be disabled.

If the fabric probe fails with the error message, and you try to make zone changes for the fabric, then you might get a warning message indicating that the zone changed.

For information about the supported agent types by switch vendor, see “Planning for Brocade management agents” on page 55 or “Planning for Brocade, QLogic, or Cisco fabric management agents” on page 58.

Storage Resource agent

The Storage Resource agent collects information about the SAN and sends that information to the Tivoli Storage Productivity Center Device server. The Storage Resource agent can gather topology information for the entire fabric. To gather host-level and detailed Host Bus Adapter (HBA) information, the agent must be installed on each host where that information is wanted.

The Storage Resource agent performs the following functions:

- Gathers information about the SAN by querying switches and devices for topology and identification information.
- Gathers host-level information for the local system.
- Gathers information about the zoning of the fabric.
- Gathers information about the HBAs installed on the local system, including make, model, and driver versions.
- Gathers event information detected by the HBAs and forwards it to the Device server.

Before you use Storage Resource agents, consider the following limitations:

- Can gather only host-level and HBA information about the host containing the Storage Resource agent.
- Can provide only detailed identification for devices that are in the same zone as the Storage Resource agent. The Storage Resource agent identifies the device by worldwide name (WWN) if the Storage Resource agent is not in the same zone as the device rather than being able to uniquely identify the device by device type (for example, host, and subsystem).
- Can identify endpoint devices based on the endpoint device that is responding to RNID or other queries.
- Can gather only a subset of the switch attributes. There are some switch attributes that can be collected only by using out-of-band Fabric agents.
- Tivoli Storage Productivity Center does not collect information about aliases through the Storage Resource agents.

Out-of-band Fabric agent

IBM Tivoli Storage Productivity Center uses SNMP queries to discover information about the SAN. Management Information Base (MIB) information is collected from the switches and directors by the out-of-band Fabric agent. Switches and directors are added as out-of-band Fabric agents and contacted from the Tivoli Storage Productivity Center Device server by SNMP.

The out-of-band Fabric agent performs the following functions:

- Gathers information about the fabric by querying the switch or director for topology information.
- Gathers virtual SAN information for Cisco switches.

Limitations to note are:

- Topology information is only gathered for the switch added as an out-of-band Fabric agent. The agent cannot gather the topology information for any connected switches unless they are also defined as out-of-band Fabric agents. If you are performing out-of-band discovery only on a fabric with several switches, you must install an out-of-band Fabric agent for each switch in the fabric to discover the whole fabric.
- Device information is limited; most devices are unknown with a type equal to "Other" and identified by their WWN.
- There must be a TCP/IP connection between the switch and the Tivoli Storage Productivity Center Device server.
- To enable events from the switch to the Device server, the switch must be configured to send SNMP traps to the Device server. The SNMP traps are synonymous to the events that are received by the in-band Fabric agent.

Configuration guidelines for agent placement

The configuration guidelines can help you understand the various agent types that are required for fabric functions.

The placement of out-of-band agents, Storage Resource agents, and CIM agents determines the information displayed in the topology. Switches must be configured to send SNMP traps to the server for fabric event notification. Follow these guidelines to determine the best agent placement strategy for these agent types.

- For a topology map, if no CIM agents are present, you must define Storage Resource agents and out-of-band agents to discover all of your topology. If CIM agents are present for Brocade fabrics, Storage Resource agents are still required to collect detailed information about endpoints and HBA information. If no CIM agents are present, switch zoning and LUN masking might restrict access to some devices.
- For a complete topology map, including correct device icons, you must define Storage Resource agents and out-of-band agents, or Storage Resource agents and CIM agents (for Brocade), on all servers and switches.
- For information about Brocade zoning, you must configure CIM agents for the Brocade fabric.
- For complete device centric and host centric views, you must place Storage Resource agents on all servers you want displayed.
- Cisco requires an out-of-band discovery for VSAN information.

Before implementing out-of-band agents, Storage Resource agents, and CIM agents, formulate a clear plan of your environment and the information you want to collect.

For more information about what the agents collect and for the supported agent types for switch performance management and fabric zone configuration, see “Collecting data with the Fabric Manager” on page 60.

Planning for Fabric Manager configuration

You must configure the main SAN devices properly before using IBM Tivoli Storage Productivity Center.

There are two main components to setting up Tivoli Storage Productivity Center:

- SAN environment setup
- Tivoli Storage Productivity Center setup

The essential elements of the SAN environment needed for Tivoli Storage Productivity Center are:

- Switches and directors
- Host Bus Adapters (HBAs)
- CIM agents for switches

The Storage Resource agent collects the full zone database information from the same switch in the fabric during a fabric probe. This condition assumes that there are no topology changes.

When there are topology changes and the agent state changes, Tivoli Storage Productivity Center might switch to reporting on the full zone database from a different switch in the fabric.

This function is similar to selecting a data source for zoning for CIM agents. For CIM agents, the agent managing the principal switch in the fabric is the default data source for zoning. You have the option of specifying an alternative data source for zoning using the Tivoli Storage Productivity Center user interface.

For any fabric, the active configuration information is the same regardless of which switch in the fabric is queried by Tivoli Storage Productivity Center. However, zoning entities in the inactive configuration (also referred to as full zone database) can be different depending on the switch in the fabric that was queried.

Switches have a configuration parameter that controls propagation of inactive zoning entities to all switches in the fabric. If the parameter is set to propagate inactive zoning entities to every switch in the fabric, then any time an inactive zone entity changes, this change is propagated to all switches in the fabric so all switches have the same full zone database.

For Storage Resource agents, the selected data source is automatically determined by Tivoli Storage Productivity Center. If the Storage Resource agent is connected to multiple switches in the fabric, then the agent collects zoning information using only one switch (so that redundant fabric information is not collected from multiple switches). Not all Storage Resource agents connected to a fabric is used to collect zoning information (only one switch is used).

You might see different inactive zone sets displayed because of the following conditions for the Storage Resource agent:

- A different Storage Resource agent is used to collect information
- There was a topology change
- The Storage Resource agent was stopped
- The Storage Resource agent was uninstalled
- A new Storage Resource agent was deployed

You might see different inactive zone sets displayed because of the following conditions for the switch:

- A different CIM agent is used
- The switch is not configured to propagate inactive zoning entities

If the switch configuration parameter is not set to propagate the information, then it is possible for switches in the fabric that have full zone database to have different zoning entities (active configuration is always the same for all switches in the fabric).

To configure the fabric, complete the following steps:

1. Install and configure the SMI-S agent (CIM agent) for the switch. Contact your switch vendor for instructions on how to install and configure the SMI-S agent.
2. For every fabric you want to monitor, configure one or more switches in the fabric to send SNMP traps to the Device server. This action causes SNMP traps to be sent to Tivoli Storage Productivity Center whenever there are changes in the fabric. Tivoli Storage Productivity Center can then perform automatic fabric discoveries and probes in response to these traps.
3. For each fabric you want to monitor, install a Storage Resource agent on each host that is connected to the fabric of interest.
4. Run a CIMOM discovery job for the CIM agents. Wait for the job to complete successfully for the CIM agents.
5. Run a fabric probe job. Wait for the job to complete successfully for the fabric.
6. You can now view information for the fabric and create a switch performance monitor job.

These are limitations for switches:

SNMP V1 protocol

Switches that are being managed out-of-band such as SNMP agents must be configured to use the SNMP V1 protocol. Some switches use SNMP V2 or V3 by default and must be reconfigured before they can work correctly with Tivoli Storage Productivity Center. Refer to the switch vendor documentation for specific configuration information.

HBA API for HP-UX

The HBA API for the HP-UX platform does not support the API function that is required for the in-band Fabric agent to support the collection of SAN events through the HBA. If there are no other Fabric agents (out-of-band or in-band agent) that is covering a particular SAN, or no switch in the fabric is configured to send SNMP traps to the Device server, an automatic discovery that would have normally been triggered due to reporting of such events will not occur.

Users might still be able to have a Tivoli Storage Productivity Center agent report SAN events for a particular SAN and have automatic triggering of discovery if one of the following conditions is true:

- Installing a Storage Resource agent on another supported host (non-HP-UX platform) that is connected to the same SAN that the HP-UX Fabric agent or Storage Resource agent is connected to.
- Defining out-of-band agents that are configured to get SNMP traps from switches in that SAN. You must consider this option carefully because there can be performance implications for this option.

Performance statistics

Some switch vendors do not return all the performance statistics required by Tivoli Storage Productivity Center. In these cases, some performance statistics might report as zero.

Note: A CIMOM discovery and fabric probe are required for all switch vendors supporting SMIS 1.1 and higher.

In the Storage Management Initiative Specification (SMI-S), peak data rates for a port are reported in the CIM_FcPortRateStatistics class. For SMI-S Version 1.1, this class is an optional class, meaning that it might not be supported by a given vendor. This can be the case if the Tivoli Storage Productivity Center user interface shows zero values for the peak rates, even when there is non-zero traffic flowing through the port. When a vendor does support this class, the peak data rate represents the peak value of the associated metric counter (as reported by the CIMOM used to access the device) over a recent, vendor-defined measurement window (for example, 20 milliseconds) of the Tivoli Storage Productivity Center measurement window (for example, 15 minutes).

Index number of a fiber channel port on a blade

Currently there is no SMI-S standard property that holds the index value number of a fiber channel port on a blade. For this reason, the Tivoli Storage Productivity Center SMIS Fabric Topology Table Mappers must have vendor-specific code for calculating the index. At this time, only Cisco and Brocade implement the Blades Subprofile, so index calculations are done only for Cisco and Brocade.

Switch blade port index values

The switch blade port index values might be incorrect for Brocade switches where one of the following scenarios apply:

- When a port swap operation is performed
- When the Extended Edge PID mode has been enabled on the director. For more information about the Extended Edge PID mode, see the Brocade document *Fabric OS Administrator's Guide*.

Planning for Fabric Manager switches and directors

For the Fabric Manager to gather and display information about switches and directors, the switches and directors must be configured correctly. The configuration varies between vendors. Incorrect switch configuration can lead to missing information and misconceptions about the Tivoli Storage Productivity Center product not working properly with certain switches.

For the switch to successfully receive and respond to queries, there are some basic requirements:

- The FC Management MIB and FE MIB must be enabled on the switch.

- The switch must be configured to receive SNMPv1 queries and respond in SNMPv1. Some switches are configured to use SNMPv2 or SNMPv3 by default.
- The community string configured in Tivoli Storage Productivity Center must match one of the community strings configured on the switch with read access. Cisco switches must additionally have a community string match for write access. The default community strings in Tivoli Storage Productivity Center are "public" for read access and "private" for write access. Additional community strings can be defined on the switches, but are not used.
- SNMP access control lists need to include the Tivoli Storage Productivity Center Device Server. Some automatically include all hosts while others exclude all hosts by default.

Another aspect of the SNMP configuration includes trap notification. SNMP traps are generated by the switch and directed to the Tivoli Storage Productivity Center Device Server as an indication that something in the fabric has changed and that a discovery must occur to identify changes. The default configuration for handling switch traps is to send them from the switch to port 162 on the Tivoli Storage Productivity Center Device Server. For the successful generation and reception of traps, there are some configuration requirements:

- The trap destination must be set. The trap destination is typically the Tivoli Storage Productivity Center Device server, but it can also be an intermediary SNMP manager that receives the trap and sends it to Tivoli Storage Productivity Center. The trap destination is set on the switch.
- The destination port must be set on the switch. Tivoli Storage Productivity Center listens on port 162 by default.
- The traps must be sent as SNMPv1. The SNMPv1 designation is set on the switch.
- The trap severity level must be set to generate traps for change conditions. The trap severity level indicates that error level traps and anything more severe are sent. The trap severity level is set on the switch.

Note:

- Storage Resource agents do not collect HBA events.
- If you want to monitor the fabric, you should have one or more switches configured to send SNMP traps to the server.

Configuring these settings differs between switch vendors and models. For information about configuring supported switches, see <http://www.ibm.com/developerworks>. Use the search field provided to search for "configure switches." Open the article "Configure switches successfully for Tivoli Storage Productivity Center."

Planning for host bus adapters (HBAs)

Proper installation of the HBA driver is an essential element for enabling data collection and is one of the most common problems when an agent appears to be healthy, but is not discovering any data other than the host information. Some HBA vendors require a separate installation of the HBA API package while others include it with the driver.

For the switches to successfully receive and respond to queries, the switch must support the FC-GS-3 standard interface for discovery:

- Name server
- Configuration server

- Unzoned name server

There are some basic requirements on the HBA for proper agent operation:

- The HBA driver must be installed.
- The HBA API package must be installed. Some vendors include the HBA API package as part of their driver.
- HBA firmware is at a level that IBM Tivoli Storage Productivity Center supports.
- The current state of the HBA as reported by the operating system is good.
- The HBA has a good connection to the fabric.

Fabric events are automatically sent from the agent to the Tivoli Storage Productivity Center Device server. There is no need for configuration.

Note: This item applies only to the in-band Fabric agents. Storage Resource agents do not send fabric events to the server.

Planning for private switch networks

Some switch vendors recommend a private IP network for the fiber channel switches. It is important to understand that the IBM Tivoli Storage Productivity Center Device server cannot communicate with the switches if they are on a private IP network. It is important to note that the out-of-band Fabric agents require a TCP/IP connection from the the Device server to the switch. Also, SNMP traps from the switches cannot travel directly from the switches to the the Device server.

If you are using a private switch IP network you must rely on Storage Resource agents to gather your SAN information and to forward SAN events to the Device server.

Another option that is sometimes used with a private switch network is to allow the Tivoli Storage Productivity Center Device server to communicate on the private switch network using a second network interface card (NIC).

Planning for performance monitoring

IBM Tivoli Storage Productivity Center can collect performance data for devices that use the native interfaces (DS8000, XIV system, SAN Volume Controller, Storwize V7000 Unified, or Storwize V7000 storage systems), or for storage systems and fiber channel switches that use CIM agents. The devices that use CIM agents must be SMI-S 1.1 compliant.

There are three main functions for Tivoli Storage Productivity Center performance management:

- Performance data collection (performance monitoring)
- Performance thresholds and alerts
- Performance reports

You can define how long performance data is stored in the database. Tivoli Storage Productivity Center can set thresholds for important performance metrics. When any boundary condition is crossed, Tivoli Storage Productivity Center can notify the user through email, SNMP, or other alerting mechanisms. Tivoli Storage Productivity Center can generate reports, historic trend charts, and help analyze

the bottleneck of a performance congestion by drilling down to threshold violated components and the affected hosts. A combination of these functions can be used to:

- Monitor a complicated storage network environment
- Predict warning signs of system failure
- Do capacity planning as overall workload grows

For more information about performance planning, see <http://www.ibm.com/support/docview.wss?uid=swg27017573>.

Performance metrics

IBM Tivoli Storage Productivity Center can report on many different performance metrics, which indicate the particular performance characteristics of the monitored devices.

Two important metrics for storage systems are throughput in I/O per second, and the response time in milliseconds. Throughput is measured and reported in several different ways:

- Throughput of an entire box (subsystem)
- Each cluster (TotalStorage Enterprise Storage Server)
- Each controller (DS6000 or DS8000)
- Each I/O Group (SAN Volume Controller or Storwize V7000)

Throughputs are measured for:

- Each volume (or LUN)
- At the Fibre Channel interfaces (ports) on some of the storage boxes
- On fiber channel switches
- At the RAID array after cache hits have been filtered out

For storage systems, the performance statistics are separated into frontend I/O metrics and backend I/O metrics. Frontend I/O metrics are a measure of the traffic between the servers and storage systems. Backend I/O metrics are a measure of all traffic between the storage system cache and the disks in the RAID arrays in the backend of the subsystem. Most storage systems give metrics for both kinds of I/O operations: frontend and backend operations. It is important to know whether the throughput and response times are at the frontend (close to the system level response time as measured from a server) or backend (between the cache and disk).

Note: A CIMOM discovery and fabric probe are required for all switch vendors supporting SMIS 1.1 and higher.

The main frontend throughput metrics are:

- Total IO rate (overall)
- Read IO rate (overall)
- Write IO rate (overall)

The corresponding frontend response time metrics are:

- Overall response time
- Read response time
- Write response time

The main backend throughput metrics are:

- Total backend IO rate (overall)
- Backend read IO rate (overall)
- Backend write IO rate (overall)

The corresponding backend response time metrics are:

- Overall backend response time
- Backend read response time
- Backend write response time

It is desirable to track any growth or change in the rates and response times. It frequently happens that I/O rate grows over time, and that response time increases as the I/O rates increase. This relationship is what "capacity planning" is all about. As I/O rates increase, and as response times increase, you can use these trends to project when additional storage performance (as well as capacity) is required.

Depending on the particular storage environment, it might be that throughput or response time times change drastically from hour to hour or day to day. There might be periods when the values fall outside the expected range of values. In that case, other performance metrics can be used to understand what is happening. Here are some additional metrics that can be used to make sense of throughput and response times:

- Total cache hit percentage
- Read cache hit percentage
- Write-cache delay percentage (previously known as NVS full percentage)
- Read transfer size (KB/operation)
- Write transfer size (KB/operation)

Low cache hit percentages can drive up response times, because a cache miss requires access to backend storage. Low hit percentages also tend to increase the utilization percentage of the backend storage, which might adversely affect the backend throughput and response times. High write-cache delay percentage (previously known as NVS full percentage) can drive up the write response times. High transfer sizes typically indicate more of a batch workload, in which case the overall data rates are more important than the I/O rates and the response times.

All these metrics can be monitored through reports or graphs in the Tivoli Storage Productivity Center GUI. Some examples of supported thresholds are:

- Total I/O rate and total data rate thresholds
- Total backend I/O rate and total backend data rate thresholds
- Read backend response time and write backend response time thresholds
- Total port I/O rate (packet rate) and data rate thresholds
- Overall port response time threshold
- Port send utilization percentage and port receive utilization percentage thresholds
- Port send bandwidth percentage and port receive bandwidth percentage thresholds

For fiber channel switches, the important metrics are total port packet rate and total port data rate, which provide the traffic pattern over a particular switch port. Port bandwidth percentage metrics are also important to provide an indicator of

bandwidth usage based on port speeds. When there are lost frames from the host to the switch port, or from the switch port to a storage device, the dumped frame rate on the port can be monitored.

The important things are:

- Monitor the throughput and response time patterns over time for your environment
- Develop an understanding of expected behaviors
- Investigate the deviations from normal patterns of behavior to get warning signs of abnormal behavior
- Generate the trend of workload changes

Performance configuration

Performance data can be collected from resources that are managed through the native interfaces or from resources that are managed by a CIM agent. Resources that use a CIM agent must be SMI-S compliant.

To monitor the performance of resources, you must complete the following tasks:

1. Prepare for performance monitoring. For resources that require CIM agent, ensure that the following conditions are met before you add the CIM agent to Tivoli Storage Productivity Center:
 - The version of CIM agent and firmware for the device is supported. For information about the CIM agent and firmware that is supported, see <http://www.ibm.com/support/docview.wss?uid=swg21386446> and go to the *Storage* section.
 - A CIM agent is installed on a different server than the Tivoli Storage Productivity Center server. For some switch vendors, the switch comes with an embedded CIM agent, so a CIM agent does not need to be installed.
 - For storage systems or switches on a private network, ensure that the CIM agent is installed on a gateway machine so that the Tivoli Storage Productivity Center server can communicate with that agent.
 - The CIM agent is configured to manage the intended resource.
2. Add resources for monitoring. Before you can view the performance of a resource, you must add it to Tivoli Storage Productivity Center for monitoring. To add an IBM SONAS system, use the stand-alone GUI. To add all other resources, use the web-based GUI.

When you add resources for monitoring in the web-based GUI, you can automatically schedule a performance monitor during that process. Performance monitors are data collection jobs that collect performance information about resources. For IBM SONAS systems, you must manually schedule a performance monitor in the web-based GUI.

3. Create threshold alerts in the stand-alone GUI. To be notified when the performance of a resource might represent a potential problem, define a threshold alert to monitor a specific metric. In a threshold alert, you can specify one or more boundary values for a metric. When the performance of a resource falls outside these boundaries, an alert is generated. For example, you can define an alert threshold that notifies you when the total I/O port rate for a storage system falls outside a specified range. Chronologically, you must define a threshold alert before a performance monitor starts collecting data.

Alerts are triggered by conditions and violations of performance thresholds that are detected during data collection and event processing. For a SAN Volume Controller, Storwize V7000, Storwize V7000 Unified, or XIV system, events are

polled every minute from the resource. For other resources, events are subscription-based, where the resource itself or a data source such as a CIM agent sends the events to Tivoli Storage Productivity Center when conditions change on the resource.

Tip: Alerts can be created, deleted, or modified at any time, even if the performance monitor is already running. Changes are applied dynamically to the running performance monitor and take effect the next time that data is collected.

4. Check the status of a performance monitor. When a performance monitor starts to run, Tivoli Storage Productivity Center begins to collect performance data for the specified resource. To check the status of the performance monitor to ensure that it is running or completed successfully, complete the following steps:
 - a. Log in to the web-based GUI.
 - b. In the navigation pane, go to **Home > Performance Monitors**.
 - c. In the **Name** column, locate the name of the resource that was included in the performance monitor.
 - d. In the **Status** column, check the status of the performance monitor.
5. Specify how long performance data is retained. In the stand-alone GUI, configure how long to retain performance data that Tivoli Storage Productivity Center collects about resources. You can specify a retention period for collected sample data, for aggregated hourly data, and for daily data. The retention period applies to all performance monitors. The longer that you keep data, the more informative your analysis.

Sample data is the data that is collected at the specified interval length of the performance monitor. For example, data is collected every 5 minutes. For storage systems, the most numerous components are usually volumes, therefore the largest amount of performance data is collected for volumes.

For more information about the specifying the retention period, see “Resource History Retention” on page 309.

Planning for VMware

Tivoli Storage Productivity Center supports the VMware vSphere components ESXi and vCenter Server.

Overview

VMware ESXi is a true hypervisor product that can host multiple virtual machines that run independently of each other while sharing hardware resources. The vCenter Server is the management application that is the central entry point for the management and monitoring of the ESXi hosts for a data center. A Storage Resource agent must be installed on each virtual machine that is hosted by ESXi.

For more information about ESXi or vCenter Server, see <http://www.vmware.com>.

For information about permissions required by Tivoli Storage Productivity Center to access information from VMware, go to the information center and search for “Checking permissions to browse data stores”.

The storage systems and platforms supported on VMware are shown in Table 17 on page 75.

Table 17. Supported platforms and storage systems for VMware

Supported platform	Supported storage systems	Supported function
ESX Server 3.0.x	<ul style="list-style-type: none"> • 3PAR • EMC CLARiiON • EMC Symmetrix • Hitachi Data Systems 9000 series • Hewlett Packard Enterprise Virtual Arrays (EVA) • IBM DS4000 • IBM DS6000 • IBM DS8000 • IBM ESS • IBM SAN Volume Controller • IBM Storwize V7000 • IBM XIV Storage System 	Monitoring LUN correlation
ESX Server 3.5.x		
ESX Server 3.5i		
ESX Server 4.0.x		
ESX Server 4.1.x		
ESXi		
VirtualCenter 2.0.1		
VirtualCenter 2.5		
vCenter Server		

For full function, both the Storage Resource agent and the ESXi host must be up and running. If one of the items is not present in a given environment, only a limited picture is presented to the user. Some virtual machines might not be recognized.

The hierarchical mapping of storage allocated to the virtual machine is available for the virtual machines on the ESXi host.

Note: Tivoli Storage Productivity Center now supports the mapping of storage from the ESX Server to the disk drives for the ESX Server 3.5.

When working with virtual machines, remember the following limitations:

- HBA virtualization is not available for the VMware virtual machines.
- Data path explorer is not supported for VMware ESXi and virtual machines.

Tivoli Storage Productivity Center for Replication in a VMware environment

Use Tivoli Storage Productivity Center for Replication to maintain a consistent copy of customer data. You can install Tivoli Storage Productivity Center for Replication under a VMware image. However, if a disaster occurs, there are some aspects of running in a virtualized environment that can interfere with the ability of the software to function correctly. Remember the following issues:

- Virtual machines in a VMware environment can be moved from one physical server to another using VMotion or other tools. If you move your virtual machine with Tivoli Storage Productivity Center for Replication on it, unpredictable results can occur during the processing of certain critical operations. This action might prevent Tivoli Storage Productivity Center for Replication from maintaining data consistency or prevent you from being able to quickly recover your data at the remote site.
- If the VMware image resides on the same storage that is managed by Tivoli Storage Productivity Center for Replication, Tivoli Storage Productivity Center for Replication might attempt to "freeze" I/O on the storage system. This

freezing of I/O on the storage system can cause Tivoli Storage Productivity Center for Replication to stop responding. If this freeze occurs, the I/O is not released until the storage system freeze timeout occurs. Any applications running against that storage system might be affected by a delay, which can prevent Tivoli Storage Productivity Center for Replication from maintaining data consistency.

- Virtual images are controlled and managed by the ESX server. You must ensure that the internal VM network is set up correctly so users can access Tivoli Storage Productivity Center for Replication. Correctly setting up the network ensures that:
 - Tivoli Storage Productivity Center for Replication can access the storage systems that it is managing
 - Helps users quickly recover data on the remote storage systems if a disaster occurs

Also ensure that the virtual environment is secure and that it is monitored to maintain data consistency.

- Because virtual environments can vary, ensure that you thoroughly test your environment with Tivoli Storage Productivity Center for Replication, and ensure that you test disaster recovery-related steps.

Software requirements

For information about the software requirements for your VMware ESXi or vCenter Server environment, see “Software requirements for operating systems” on page 108.

The Tivoli Storage Productivity Center server on a virtual machine

You can install the Tivoli Storage Productivity Center server on a virtual machine on VMware ESX server 3.5.x. The hardware and operating system requirements are the same requirements as for a physical machine.

In addition, the following requirements must be met:

- CPU** For the ESX server, do not have more virtual processors than there are physical cores in the system. Plan your system so that no processor scheduling is required by the VM kernel for the virtual machine.
- RAM** Ensure that you have enough RAM in the ESX server to service all the virtual machines with a maximum RAM usage. Plan your system so that the ESX server does not need to swap RAM for the virtual machine.
- Disk** Use the SAN-attached RDM with SCSI pass-through for DB2 data and log storage.

For more information about VMware, see the following publications:

- “Using VMware ESX Server with IBM WebSphere Application Server” at http://www.vmware.com/partners/vmware/ESX_WAS_WP.pdf.
- “Scaling IBM DB2 9 in a VMware Infrastructure 3 Environment” at http://www.vmware.com/pdf/db2_scalability_wp_vi3.pdf.

Configuring VMware in a Tivoli Storage Productivity Center environment

Before you can view information about VMware hypervisors and clusters, you must ensure that the VMware data sources are configured in Tivoli Storage Productivity Center.

To configure the VMware data sources in Tivoli Storage Productivity Center, complete the following steps:

1. In the web-based GUI, add the VMware vSphere data source. For example, add a vCenter Server, ESX, or ESXi hypervisor. When you add a vCenter Server, each of the hypervisors that it manages are discovered and probed, as well as any clusters.
2. Schedule a probe to collect asset and status data about a hypervisor. You must collect data before you can view and manage a hypervisor.
3. Configure alerts for VMware in the stand-alone GUI. You can create alerts for the following alert conditions:
 - Hypervisor discovered
 - Hypervisor missing
 - Cluster discovered
 - Cluster removed

To test the Cluster removed alert, remove the vCenter Server in the **Hypervisors** page and then refresh the screen. The **Alerts** tab is populated with the alert notifications for Cluster removed, and the other alerts that were set up.

VMware capacity reports

You must probe both the ESX Server and the Storage Resource agent on the virtual machines before you can generate accurate reports for disk and file system capacity.

The TOTAL row in the capacity report shows the capacity for the file system or the disk capacity. The total includes virtualized disks, virtual machines, non-virtualized disks, and non-virtualized machines.

For example, you have an ESX Server that has a capacity of 100 GB and 60 GB is allocated to the virtual machine. The virtual machine uses 5 GB of space. Both the ESX Server (H1) and the virtual machine (VC1) are probed. You also have a physical machine (PC1) that is probed. The capacity is shown in the report, as follows:

Column heading	Capacity	Used space (calculated as Capacity minus Free Space)	Free space
TOTAL	130 GB	25 GB	105 GB
H1	100 GB	60 GB	40 GB
VC1	60 GB	5 GB	55 GB
PC1	30 GB	20 GB	10 GB

If you probed the physical machine (PC1) and the virtual machine (VC1) but did not probe the ESX Server (hypervisor), the capacity is shown as follows:

Column heading	Capacity	Used Space (calculated as Capacity minus Free Space; negative values are shown as 0)	Free Space
TOTAL	30 GB	0 GB	65 GB
PC1	30 GB	20 GB	10 GB
VC1	60 GB	5 GB	55 GB

If you probed the hypervisor (H1) and the physical machine (PC1) but did not probe the virtual machine (VC1), the capacity is shown as follows:

Column heading	Capacity	Used Space (calculated as Capacity minus Free Space)	Free Space
TOTAL	130 GB	80 GB	50 GB
H1	100 GB	60 GB	40 GB
PC1	30 GB	20 GB	10 GB

If you have an ESX Server that has devices that are directly attached to the virtual machine, the file system capacity created on the virtual machine is not added in the TOTAL row.

For example, the file system capacity shown in the table is based on the following factors:

- The file system (FS1) created on the hypervisor has a capacity of 100 GB and uses 60 GB of space.
- The file system (FS1) created from internal storage on the hypervisor (H1) has a capacity of 60 GB and uses 5 GB of space.
- The file system (FS2) on the device that is directly attached to the virtual machine (VC1) has a capacity of 5 GB and uses 4 GB of space.
- The file system created on the physical machine (PC1) has a capacity of 30 GB and uses 20 GB of space.

Column heading	Capacity	Used Space (calculated as Capacity minus Free Space)	Free Space
TOTAL	130 GB	24 GB	106 GB
H1 FS1	100 GB	60 GB	40 GB
VC1 FS1	60 GB	5 GB	55 GB
VC1 FS2	5 GB	4 GB	1 GB
PC1 FS1	30 GB	20 GB	10 GB

Planning for VMware vSphere

Before you can use VMware vSphere with Tivoli Storage Productivity Center, you must ensure that your system meets the requirements for both Tivoli Storage Productivity Center and vSphere.

You can use the vSphere Web Client extension for Tivoli Storage Productivity Center to complete provisioning tasks and to view information about storage resources in the vSphere Web Client.

Tivoli Storage Productivity Center uses the vSphere API for Storage Awareness (VASA) to connect to vSphere. When you register Tivoli Storage Productivity Center as a VASA provider, you can view block and file storage information from Tivoli Storage Productivity Center in vSphere reports.

Before you deploy the vSphere Web Client extension or register Tivoli Storage Productivity Center as a VASA provider, ensure that your system meets the hardware and software requirements, the license requirements, and the role requirements for both Tivoli Storage Productivity Center and vSphere.

Planning for the vSphere Web Client extension for Tivoli Storage Productivity Center

Before you deploy the vSphere Web Client extension for Tivoli Storage Productivity Center, be familiar with the hardware and software requirements, the license requirements, and the required roles.

Hardware and software requirements

For more information about hardware and software requirements for Tivoli Storage Productivity Center, go to the Tivoli Storage Productivity Center information center and search for *Hardware requirements* and *Software requirements*.

The vSphere Web Client extension requires vSphere Version 5.1. This version includes vCenter Server V5.1, vSphere Client V5.1, vSphere Web Client V5.1, and VMware ESXi servers. The vSphere Web Client extension supports both VMware ESX V5.0 and VMware ESX V5.1. For information about hardware and software requirements for vSphere V5.1, go to the vSphere information center and search for *vSphere Installation and Setup*.

License requirements for Tivoli Storage Productivity Center

To download the plug-in package and register the vSphere Web Client extension, you can use any of the product licenses for Tivoli Storage Productivity Center.

To view reports in the vSphere Web Client extension, you can use any of the product licenses for Tivoli Storage Productivity Center.

To provision file storage in the vSphere Web Client extension, you can use any of the product licenses for Tivoli Storage Productivity Center.

To provision block storage in the vSphere Web Client extension, you must have IBM SmartCloud Virtual Storage Center Storage Analytics Engine license.

Role requirements for Tivoli Storage Productivity Center

To register and use the features of the vSphere Web Client extension for Tivoli Storage Productivity Center, you must have the following roles.

- To register the extension and to save the Tivoli Storage Productivity Center server configuration information, you can use any of the Tivoli Storage Productivity Center roles: Administrator, Monitor, or External Application.
- To view reports in the vSphere Web Client extension, you can use any Tivoli Storage Productivity Center role.
- To provision storage by using any available service class, you must have the Administrator role. If you have Monitor or External Application roles, you can use only the service class that you have authorization for. Only an Administrator can grant authorization for service classes.

Role requirements for the vSphere Web Client extension

You must have the system-defined privileges **System.Anonymous**, **System.View**, and **System.Read**. These privileges are always present for any user-defined roles.

To register Tivoli Storage Productivity Center, you must have the **Permissions.Modify Permission** privilege.

To register, unregister and scan the VASA provider by using the vSphere Web Client extension, you must have the **Storage views.Configure service** privilege.

To view reports in the vSphere Web Client extension, you must ensure that the following privileges are assigned to your vCenter Server system role.

- To view data store objects, assign the **Datastore.Browse datastore** privilege on data store objects.
- To view storage view objects, assign the **Storage views.View** privilege on the root vCenter Server.

To provision storage in the vSphere Web Client extension, you must ensure that the following privileges are assigned to your vCenter Server system role:

- To start provisioning, you must have the **Host.Configuration.Storage partition configuration** privilege.
- To create and update tasks, assign the **Tasks.Create task** and **Tasks.Update task** privileges on the root vCenter Server.
- To view information about events, you must have the **Global.LogEvent** privilege.
- To configure storage partitions, assign the **Host.Configuration.Storage partition configuration** privilege on host objects.
- To configure data stores, assign the **Datastore.Configure datastore** privilege on data store objects.

Planning for the VASA provider for Tivoli Storage Productivity Center

Before you deploy the Tivoli Storage Productivity Center VASA provider, be familiar with the hardware and software requirements, the license requirements, and the roles that are required.

Hardware and software requirements

Follow the hardware and software requirements for

1. Tivoli Storage Productivity Center 5.2
2. vSphere 5.1 which includes ESXi servers, vCenter and WebClient.

For more information about hardware and software requirements for Tivoli Storage Productivity Center, go to the Tivoli Storage Productivity Center information center and search for *Hardware requirements* and *Software requirements*.

The Tivoli Storage Productivity Center VASA provider requires vSphere Version 5.1. This version includes vCenter Server V5.1, vSphere Client V5.1, vSphere Web Client V5.1, and ESXi servers. ESX V5.0 and ESX V5.1 are supported. For information about hardware and software requirements for vSphere 5.1, go to the vSphere information center and search for *vSphere Installation and Setup*.

License requirements for VASA provider

To view alarms and storage capabilities using the Tivoli Storage Productivity Center VASA provider, you can use any of the product licenses for Tivoli Storage Productivity Center.

Role requirements for VASA provider

Registering and using the features of the Tivoli Storage Productivity Center VASA provider requires the following roles:

- Administrator
- Monitor
- External Application

Role requirements for vSphere

To view alarms and storage capabilities in the Tivoli Storage Productivity Center VASA provider, you must have the following privileges for vSphere:

- To view Datastore objects, you must have the Browse Datastore privilege.
- To view Storage View objects, you must have the View privilege.

Excluding subsystems to avoid conflicts

Multiple VASA providers targeting the same subsystems can:

- return inconsistent data, because they probe the same subsystem at different times
- cause problems with SDRS deployment

To avoid these scenarios, you can exclude subsystems from the reporting generated by the Tivoli Storage Productivity Center VASA provider: see “Filter storage and file systems” on page 323.

Planning for PowerHASystemMirror for AIX

Tivoli Storage Productivity Center supports Storage Resource agents that are installed on IBM PowerHA SystemMirror for AIX nodes. Use this information to configure the PowerHA SystemMirror for AIX environment before you use it with Tivoli Storage Productivity Center.

Cluster resource groups

A *cluster resource group* represents a PowerHA SystemMirror for AIX entity.

You can configure PowerHA SystemMirror for AIX into cluster resource groups so that they can be highly available. You can define resource group policies and attributes that dictate how PowerHA SystemMirror for AIX manages resources to keep them highly available at different stages of cluster operation (startup, failover, and fallback). You can put the following types of resources into clustered resource groups.

Volume groups

A set of physical volumes that AIX treats as a contiguous, addressable disk region.

Logical volumes

A set of logical partitions that AIX makes available as a single storage unit. The logical volume is the “logical view” of a physical disk.

File system

A file system is written to a single logical volume. Typically, you organize a set of files as a file system for convenience and speed in managing data.

Shared file systems

A journaled file system that is entirely in a shared logical volume.

Applications

Critical services that are accessible to users.

Service IP labels or addresses

A way to establish communication between client nodes and the server node. Services, such as a database application, are provided by using the connection mode over the service IP label.

Tape resources

You can configure a SCSI or a Fiber Channel tape drive as a cluster resource in a non-concurrent resource group, making it highly available to two nodes in a cluster.

Communication links

You can define communication links as resources in a PowerHA SystemMirror for AIX resource group.

Planning for PowerHA SystemMirror for AIX support

With PowerHA SystemMirror for AIX, you can use the following types of configurations:

- PowerHA SystemMirror for AIX with cluster resources groups that are nonconcurrent. Concurrent cluster resource groups are not supported.
- The following volume groups in a PowerHA SystemMirror for AIX environment:
 - Standard volume groups
 - Enhanced concurrent-mode volume groups
 - Scalable volume groups

When you create a Tivoli Storage Productivity Center configuration, include the Storage Resource agent. A Storage Resource agent must be installed on each node of the cluster. All agents in a cluster must be configured to use the same listening port. You must also have a cluster resource group (CRG) with at least one IP address that is accessible from the Tivoli Storage Productivity Center server if you

plan to run scans on the cluster resource group. Each Storage Resource agent collects information about the local node and the clustered resources that are currently hosted on the node.

The following operations are not supported.

- Probing and scanning of clustered databases
- Reporting on cluster information when the cluster is configured to have concurrent cluster resource groups

Note:

- Cluster resource group scanning is only supported by IBM SmartCloud Virtual Storage Center Storage Analytics Engine license.
- If the Storage Resource agent port is behind a firewall, that port must be opened for all virtual server and cluster resource group addresses.

Reports

The asset reporting navigation tree includes a By Cluster report that shows the nodes and cluster resource groups in each cluster. The disks, volume groups, and file systems that are shared as clustered resources are associated with the cluster resource group and not with the node where they are hosted.

When generating reports, you can use the By Cluster report subtype wherever the By Computer subtype is available. The By Cluster report summarizes the results of the nodes and the cluster resource groups in the cluster.

Monitoring groups

When you create a monitoring group or create a data collection schedule, you can select individual nodes and cluster resource groups. You can create a file system monitoring group that includes clustered and non-clustered resources.

Computer alerts

You can register for cluster-specific alerts that notify you that your cluster went through a configuration change. A cluster resource that is being added or removed is an example of such changes. You can also register for an alert that is triggered when a cluster resource group is moved. The same alert is used for a cluster resource group failover, cluster resource group fallback, and when the cluster resource group is manually moved to a new node.

Cluster alerts will not be triggered until the next time the cluster is probed.

Installing PowerHA SystemMirror for AIX support

To install PowerHA SystemMirror for AIX support, complete the following steps:

1. Ensure that your PowerHA SystemMirror for AIX environment is configured for Tivoli Storage Productivity Center support.
2. Create a service IP label for the CRG with an IP address that can be contacted from the Tivoli Storage Productivity Center server.
3. Install a Storage Resource agent on each node of the cluster. All agents in the cluster must be configured to use the same listening port.
4. Run a discovery job for the agent.
5. Run a probe job on the agents.

6. Run a scan job on the agents.
7. Run a scan job on the cluster resource groups.
8. View reports for the PowerHA SystemMirror for AIX entities.
9. View the PowerHA SystemMirror for AIX environment in the topology viewer.

PowerHA SystemMirror for AIX environment

This topic provides information about Tivoli Storage Productivity Center support in an IBM PowerHA SystemMirror for AIX environment.

Tivoli Storage Productivity Center supports Storage Resource agents installed on PowerHA SystemMirror for AIX nodes. The Storage Resource agent must be installed on every node in the cluster. You cannot configure the Storage Resource agent as a clustered application.

The Storage Resource agent collects information from the cluster when the node is probed. The information that is collected is available in the Data Manager and Disk Manager reports and the topology viewer. Resources that are not clustered are reported under the node. The resources that are associated with a cluster resource group are reported under a computer entity that represents the cluster resource group. For example, if a single node cluster that has one cluster resource group is probed it produces two computer entities in the Data Manager and Disk Manager reports and the topology viewer.

The following entities are reported under the associated clustered resource group and not the node:

- Volume groups
- NFS shares
- Service IP labels

Physical volumes, logical volumes, and file systems for clustered volume groups are also reported under the cluster resource group. Scan and ping jobs can be created for a cluster resource group and these jobs work regardless of which node is hosting the cluster resource group. Scan and ping requests for a cluster resource group are sent to the service IP label defined for the cluster resource group. Therefore, in order for these jobs to succeed the service IP label must be accessible from the Data server and the CRG must be online.

Restriction: You can use PowerHA SystemMirror for AIX only with cluster resource groups that are nonconcurrent. You cannot use PowerHA SystemMirror for AIX with concurrent cluster resource groups.

The following information lists the support requirements for a PowerHA SystemMirror for AIX cluster environment.

Agent requirement

Each node in a PowerHA SystemMirror for AIX cluster must have a Storage Resource agent installed. The Data Manager can only monitor and report on nodes that have a daemon Storage Resource agent installed. If you are using daemon Storage Resource agents, all agents installed in a cluster must listen on the same port number. Agents in other clusters can be configured with a different port address. However, all agents in the cluster must use the port address used by the other agents in that cluster.

You can use Storage Resource agents on each node. You can have a mixed configuration when migrating agents to Storage Resource agents, but scan jobs of clustered file systems will fail until all the nodes in the cluster have the same type of agent.

Probe requirements

Probes are not automatically executed in response to cluster events. Schedule probes to run as appropriate for the needs of the environment.

Scan requirements

To perform scans on a cluster resource group, the cluster resource group must be configured with an IP address that the Tivoli Storage Productivity Center server can communicate with. This IP address is displayed in reports associated with PowerHA clusters. If the server cannot contact this address once it has been configured, the server tries the next known address for the cluster resource group until it successfully contacts an IP address.

Note: Cluster resource groups are now listed as computers in scan job results, and now have log files specific to the cluster resource group.

NAS support

You can use the information to plan your Network Attached Storage (NAS) support.

Network Attached Storage system requirements

This section provides information about the requirements for installing and running the Data Manager within a NAS environment.

IBM Tivoli Storage Productivity Center supports the monitoring of the NetApp Data ONTAP.

To be supported, NAS devices other than Network Appliance Filers must meet the following criteria:

- If scanned from a UNIX agent, a NAS device must support Network File System (NFS) queries.
- If scanned from a Windows agent, a NAS device must support Common Internet File System (CIFS) queries.
- A NAS device must support SNMP queries (sysName and sysOID).
- A NAS device must supply a unique sysName.
- If a NAS device hosts both Windows and UNIX file systems, you need at least two proxy Storage Resource agents to monitor the device. At least one Windows proxy Storage Resource agent is required to probe and scan the Windows CIFS shares. At least one UNIX proxy Storage Resource agent is required to probe and scan UNIX NFS shares.

For detailed information about configuring NAS and Tivoli Storage Productivity Center, see <http://www.redbooks.ibm.com/>. Search for **sg247490**.

Here are the requirements for installing and running the Data Manager within a NAS environment.

Server requirement

Not applicable. You cannot install the server on a NAS filer.

Agent requirements

You must install the agent on a machine that has access to the NAS filers within your environment that you want to monitor.

Windows

The agent that is logging in to and scanning the NAS filer is not required to be in the same domain as the user or the NAS filer. If you install the agent on a different domain from the NAS filer, the agent scans the NAS filer *if* the domain of the agent computer is a "trusted domain" by the domain of the NAS filer.

UNIX and Linux

The agent computer must import the NAS filer export files as NFS mounts (or automounts on Oracle Solaris).

Note:

- You do not install agents to the NAS filers themselves.
- For Tivoli Storage Productivity Center 5196 Network Attached Storage 300 G machines only, install the agent directly on those machines. If the 300 G is clustered, you need to install an agent on each local node.

Client requirements

Not applicable. You cannot install the client component to a NAS filer.

NAS requirements

The NAS filers within your environment must be visible to the machines where you install the agent or agents. If you want to monitor NAS filers from Windows, you must configure those NAS filers to be members of a Windows domain.

Planning for NetApp device support

NetApp devices provide unified storage for organizations with Network Attached Storage or storage area network environments that have file and block-level services. IBM Tivoli Storage Productivity Center provides the same file and block-level support for NetApp devices as is provided for other filers and storage subsystem devices.

Overview

Tivoli Storage Productivity Center provides the following support for NetApp devices:

- NetApp Data ONTAP SMI-S Agent 3.0
- The SMI-S 1.2 Array profile implemented by the NetApp SMI-S agent
- All filer models running NetApp Data ONTAP version 7.2 and 7.3

NAS Gateway and V Series are not supported with the Array profile.

The following licenses are required:

- For performance monitoring, a Tivoli Storage Productivity Center license is required.
- For SNMP discovery, an IBM SmartCloud Virtual Storage Center Storage Analytics Engine license is required.

Configuration considerations

The way you use Tivoli Storage Productivity Center to interact with NetApp devices, and the data you can collect for NetApp devices, depends on how you configure your NetApp devices. For example:

- If you configure a Storage Resource agent to be a Scan/Proxy agent, you use Data Manager to work with NetApp devices. The Data Manager user interface displays a NetApp filer as a "computer". For NetApp devices configured this way, Tivoli Storage Productivity Center collects file storage information.
- If you configure a NetApp SMI-S agent (CIMOM), you use Disk Manager to work with NetApp devices. The Disk Manager user interface displays a NetApp device as a "subsystem". For NetApp devices configured this way, Tivoli Storage Productivity Center collects block storage information.
- If you configure a NetApp device as both a filer and a subsystem, Tivoli Storage Productivity Center collects both file and block storage information. You can use Disk Manager and Data Manager to work with the NetApp device. Keep in mind the following considerations for the user interface:
 - In Data Manager, a NetApp filer is shown as a "computer".
 - In Disk Manager, a NetApp device is shown as a "subsystem" and a Fibre Channel (FC) LUN as a "volume".
- If multiple Storage Resource agents are set up to probe or scan the same NetApp filer, the Storage Resource agent that was added to Tivoli Storage Productivity Center first is used for the probe or scan. Therefore, only data that is gathered by the first Storage Resource agent is shown. For example, if you add a Storage Resource Agent for the Windows operating system and then you add a Storage Resource Agent for the UNIX operating system, Windows operating system related data such as shares are shown, but not exports.

If you initially configure a NetApp device using a Storage Resource agent, you do not lose any function if you later decide to also configure the NetApp device using a CIM agent.

General procedure to install and configure NetApp devices

To install and configure a NetApp device to enable the Data Manager feature, complete the following steps:

1. Select a machine to act as the Storage Resource agent that meets the auto-discovery requirements for Tivoli Storage Productivity Center to auto-discover the NetApp filers.
2. Install a Storage Resource agent on that machine.
3. Set the license for the NetApp filers that are discovered.
4. Set the Scan/Proxy agent for the discovered filers.
5. Create and run a probe job for each of the filers to collect Data Manager information.

To install and configure a NetApp device to enable Disk Manager functionality, complete the following steps:

1. Install Tivoli Storage Productivity Center or upgrade to version 4.2 or later.
2. Install the NetApp SMI-S agent and add filers to its configuration using the NetApp SMI-S agent utility

3. Add the NetApp CIMOM by using **Administrative Services > Data Sources > CIMOM Agents**. In the content pane, click **Add CIMOM**. To automatically discover the NetApp SMI-S agent using SLP, skip this step.
4. Run a CIMOM discovery.
5. If you want to use SLP to discover the NetApp SMI-S agent, make sure that your SLP directory agents are configured or the **Scan local subnet** box is checked on the **Administrative Services > Discovery > CIMOM**. In the content pane, go to the Options page to enter the IP addresses or host names for the SLP directory agents to be used before you run the CIMOM discovery.
6. Create and run a probe job for the configured filers to collect Disk Manager information.
7. If wanted, use the command-line interface (CLI) **tpctool** command to view information for NetApp storage systems.

Refer to the *IBM Tivoli Storage Productivity Center User's Guide* for more information about how to collect and view information gathered by NetApp devices. Refer to the *IBM Tivoli Storage Productivity Center Command-Line Interface Reference* for information about using the **tpctool** command.

Removing a NetApp device

If you later decide to remove a NetApp device, the steps to remove it depend on how you configured it. For example, if the NetApp device is configured only as a filer, you can remove it using the **Administrative Services > Configuration > Scan/Probe Agent Administration** page. If the NetApp device is configured only as a subsystem, you can remove it using the **Disk Manager > Storage Subsystems** page. If the NetApp device is configured as both a filer and a subsystem, then you must perform both of the preceding steps.

Limitations of NetApp support

Keep in mind the following limitations for NetApp support:

- The NetApp Data ONTAP SMI-S Agent 3.0 or later implements the Block Server Performance subprofile. It provides volume performance data but, for now, does not provide performance data at the storage subsystem level.
- Tivoli Storage Productivity Center supports only the SMI-S Array profile of the NetApp Data ONTAP SMI-S Agent. Other SMI-S profiles, including the self-contained NAS profile and the NAS Head profile, are not supported.
- For the Data ONTAP SMI-S 3.0 agent or later, if a volume is offline, the performance monitor might fail with the message: PM HWNPM2132W Performance data could not be collected for device *device*.
- To work with Network Appliance quotas (using **Data Manager > Policy Management > Network Appliance Quotas**), the NetApp device must be configured as a filer. This function is not available if the NetApp device is configured only as a CIMOM.

Identifying NetApp devices in the user interface

The way you configure a NetApp device determines how the NetApp device is represented in the Tivoli Storage Productivity Center user interface, as follows:

- NetApp device configured as a filer: the NetApp device appears as a "computer" in the user interface.

- NetApp device configured as a storage subsystem using a CIMOM: the NetApp device appears as a "subsystem" in the user interface.
- NetApp device configured as both a filer and storage subsystem: the NetApp device appears as either a "computer" or a "subsystem" in different places in the user interface. For example, some reports under My Reports refer to the NetApp filer as a "computer" while others refer to the NetApp device as a "subsystem".

The NetApp device is represented either as a "computer" or a "subsystem", or both, depending on how you have configured the NetApp device, are:

- Dashboard
- My Reports
- Topology viewer
- Alerting
- Data Manager
- Disk Manager

For example:

- **Data Manager > Reporting > Asset > By Storage Subsystem** lists a NetApp device as a storage subsystem if the device was probed by the NetApp Data ONTAP SMI-S agent.
- **System Reports > Data > Disk Defects** displays a NetApp device name as either a "computer" or a "subsystem", depending on whether the device information was collected by the Storage Resource agent or the SMI-S agent.

In the topology viewer, the NetApp device appears as follows:

- If a Storage Resource agent is configured to probe the NetApp device, the NetApp device is displayed as a "computer"
- If a CIM agent is configured to probe the NetApp device, the NetApp device is displayed as a "storage subsystem"

Microsoft Cluster Server

Data Manager can monitor and report on Microsoft Cluster Server (MSCS) clustered nodes and cluster resource groups.

Microsoft Cluster Server (MSCS) is a built-in feature of the Windows operating system. It is software that supports the connection of up to eight servers into a "cluster" for higher availability and easier manageability of data and applications. MSCS can automatically detect and recover from server or application failures. It can be used to move server workload to balance utilization and to provide for planned maintenance without downtime.

As with standard Windows clusters, you perform most of the configuration tasks, and also the management tasks, associated with Exchange clusters using the Cluster Administrator. Cluster Administrator is installed by default on servers that have Cluster Service installed.

You can also use Cluster Administrator to remotely administer a server cluster. Computers that are used to administer a server cluster remotely must be secure and restricted to trusted personnel.

When a cluster node is probed, there are normal errors in the logs for the disks belonging to the cluster resource groups that are not currently hosted on this node.

When looking at an MSCS cluster problem, the current state of the clustering environment is often needed. Microsoft provides a tool to dump the MSCS cluster configuration into a set of files.

Note: The term "virtual servers" is replaced with "cluster resource groups" in Tivoli Storage Productivity Center. Microsoft still refers to "virtual servers."

Microsoft Cluster Server environment

This topic provides information about Tivoli Storage Productivity Center support in an MSCS environment.

Report information can include local resources for a clustered node and the resources in a cluster resource group. The Storage Resource agent is not cluster aware so the Storage Resource agent cannot run in the cluster resource group and fail over from one node to another. The Storage Resource agent supports failover of a clustered file system so that Tivoli Storage Productivity Center scan jobs can continue to work when the clustered file system is moved from one node to another. The Storage Resource agent running on the node hosting the cluster resource group discovers the resources on that cluster resource group. The Storage Resource agents must be installed on every node in the cluster.

The following information lists the requirements for using the Data server in an MSCS cluster environment.

Server requirement

Not applicable. The server component can be installed on a node in an MSCS cluster, but the Data Manager can monitor and report only on nodes that have an agent installed.

agent requirements

Each node in an MSCS cluster must have a Storage Resource agent installed. The Data Manager can monitor and report only on nodes that have a daemon Storage Resource agent installed. All agents installed in a cluster must use the same port number to communicate with the Tivoli Storage Productivity Center server. Agents in other clusters can be configured with a different port address. However, all agents in the cluster must use the port address used by the other agents in that cluster.

client requirements

Not applicable. The client component can be installed on a node in an MSCS cluster, but the Data Manager can monitor and report on only the nodes with an agent installed.

Note: The Data server does not currently support the monitoring of clustered database application.

If the Storage Resource agent port is behind a firewall, that port needs to be opened for all virtual server and cluster resource group addresses.

Microsoft Cluster Server support

Use this information to plan for running IBM Tivoli Storage Productivity Center with MSCS.

Cluster resource groups

A cluster resource group represents an MSCS entity.

You can configure MSCS into cluster resource groups. You can define resource group policies and attributes that dictate how MSCS manages resources to keep them highly available at different stages of cluster operation (startup, failover, and fallback). You can put the following types of resources into clustered resource groups.

Logical volumes

A set of logical partitions that MSCS makes available as a single storage unit. The logical volume is the “logical view” of a physical disk.

File system

A file system is written to a single logical volume. Typically, you organize a set of files as a file system for convenience and speed in managing data.

Shared file systems

A file system that is entirely in a shared logical volume.

Physical disk

A physical disk.

Network name

A network name.

IP address

An IP address.

Reports

The asset reporting navigation tree includes a By Cluster report that shows the nodes and cluster resource groups in each cluster. The disks and file systems that are shared as clustered resources are associated with the cluster resource group and not with the node where they are hosted.

When you generate reports, you can use the By Cluster report subtype wherever the By Computer subtype is available. The By Cluster report summarizes the results of the nodes and the cluster resource groups in the cluster.

Monitoring groups

When you create a monitoring group or create a data collection schedule, you can select individual nodes and cluster resource groups. You can create a file system monitoring group that includes clustered and non-clustered resources.

Computer alerts

You can register for cluster-specific alerts that notify you when the cluster goes through a configuration change. A cluster resource that is added or removed is an example. You can also register for an alert that is triggered when a cluster resource group is moved. The same alert is used for a cluster resource group failover, cluster resource group fallback, and when the cluster resource group is manually moved to a new node.

Cluster alerts are not triggered until the next time the cluster is probed.

Upgrading agents in an MSCS cluster

Take the following steps when you upgrade the Tivoli Storage Productivity Center agents in an MSCS cluster:

- Make sure that all agents in the cluster are configured to use the same port address.
- Use either the Tivoli Storage Productivity Center installation program or the graphical user interface to perform the agent upgrades.
- Do not probe or scan the agents in the cluster while the agent upgrade is in progress.
- When all agents in the cluster are upgraded successfully, create and run a new probe job on the cluster.

For more information about upgrading Tivoli Storage Productivity Center agents, see the Tivoli Storage Productivity Center information center. Search for *Upgrading Storage Resource agents*.

Installing MSCS support

To install MSCS support, complete the following steps:

1. Ensure that your MSCS environment is configured for Tivoli Storage Productivity Center support.
2. Install a Storage Resource agent on each node of the cluster. All agents in the cluster must be configured to use the same listening port.
3. Run a discovery job for the agent.
4. Add a Network Name resource with an IP address that can be contacted from the Tivoli Storage Productivity Center server.
5. Run a scan job for the agent.
6. Run a probe job for the agent.
7. View reports for the MSCS entities.
8. View the MSCS environment in the topology viewer.

Planning for System Storage N Series Gateway servers

Tivoli Storage Productivity Center supports the System Storage N Series Gateway servers as the **Other NAS** node.

Upgrade information

If you are upgrading Tivoli Storage Productivity Center from TotalStorage Productivity Center 3.3.x, there are specific steps to follow. You must delete and unlicense existing N Series Gateway servers first before adding the N Series Gateway servers. For information about upgrading Tivoli Storage Productivity Center with N Series Gateway servers, see “Upgrading System Storage N Series Gateway servers” on page 415.

New installation

If you are installing Tivoli Storage Productivity Center as a new installation, the N Series Gateway servers can be automatically discovered after the Storage Resource agent is installed. If the N Series Gateway servers are automatically discovered, they are listed under **Administrative Services > Configuration > License Keys**. In the content pane, click the magnifying glass icon for the product to display the **Licensing** page. The **Licensing** page displays the OS Type as **NetApp Data ONTAP** with the Licensed box cleared.

To manually add the N Series Gateway servers as **Other NAS**, the Licensed box must be cleared. The OS Type and Licensed fields are updated after the N Series Gateway Server is manually added as **Other NAS**. For more information, see “Manually adding an N Series Gateway server ” on page 416.

Planning for the Virtual I/O Server

You can use the Storage Resource agent to gather information about Virtual I/O Servers. Before you can monitor Virtual I/O Servers, you must plan on how to install the agents in your environment.

Overview

The Virtual I/O Server is part of the IBM PowerVM® hardware feature. The Virtual I/O Server allows the sharing of physical resources between LPARs including Virtual SCSI and virtual networking. Sharing of physical resources allows more efficient utilization of physical resources through sharing between LPARs and facilitates server consolidation.

Support for Virtual SCSI environment

The Virtual SCSI environment consists of a Virtual SCSI Server Adapter or Adapters that are created on the Virtual I/O Server and mapped to a Virtual I/O Client. If you have a Virtual SCSI environment and the virtual target device has a one to one mapping to a storage volume, Tivoli Storage Productivity Center can extract the storage system serial number and correlate the Virtual SCSI disk on the LPAR to a corresponding storage volume. This function means that the Storage Resource agent installed on the Virtual I/O Client (LPAR), can collect this information. The Linux system must be running on the IBM Power® System.

Note:

- Tivoli Storage Productivity Center performs the correlation only if the virtual target device is a one to one mapping to a single storage system volume.

The storage systems supported are:

- DS8000
- SAN Volume Controller
- Storwize V7000
- Storwize V7000 Unified
- DS3000,
- DS4000
- DS5000

After the Storage Resource agent is installed on the Virtual I/O Server, you can see the following information:

- Storage system serial number
- Virtual SCSI Client Adapter
- Virtual SCSI disk
- Volume groups, logical volumes, and file system

Note:

- Currently, the correlation of Virtual SCSI disks that originate from the XIV system is not performed.

- Tivoli Storage Productivity Center can perform the correlation of Virtual SCSI disks only if AIX Multiple Path I/O (MPIO) or SDDPCM multipath driver is used on the Virtual I/O Server.
- If there is one or more Virtual SCSI disks present on an LPAR, Tivoli Storage Productivity Center considers the LPAR as a virtual machine. In this case, Tivoli Storage Productivity Center does not include disk space for this LPAR in the TOTAL disk space reports.

Disks that are assigned directly through the physical Fibre Channel adapter to the LPAR in a Virtual SCSI environment are listed as virtual disks in Tivoli Storage Productivity Center.

Login requirements

Use the **padmin** user ID when logging in to a Virtual I/O Server, **padmin** is the main administrator ID for Virtual I/O Servers. Upon login, a password change is required. There is no default password to remember.

The Virtual I/O Server does not support users logging in as root to install or configure Tivoli Storage Productivity Center agents. However, you can debug errors generated by agents as a root user. For example, you can run the `service.sh` script to gather debugging information.

Upon logging in to the Virtual I/O Server, you are placed into a restricted Korn shell. The restricted Korn shell works the same way as a regular Korn shell, except you cannot:

- Change the current working directory.
- Set the value of the SHELL, ENV, or PATH variable.
- Specify the path name of the command that contains a redirect output of a command with a `>`, `>|`, `<>`, or `>.`

As a result of these restrictions, you cannot run commands that are in locations not defined in your PATH variable. These restrictions prevent you from directly sending the output of the command to a file, instead requiring you to pipe the output to the **tee** command.

Installation requirements

You must use the **padmin** user ID to perform the following actions:

- Install the Storage Resource agent. See “Installing Storage Resource agents on the Virtual I/O Server” on page 218.
- Run the commands to configure, start, and stop the agent. Go to the information center. Search for **managing the daemon**.
- For information about disk space requirements for the Storage Resource agent, see “Hardware requirements” on page 105 (Hardware requirements for the Tivoli Storage Productivity Center agents).

The installation requirements are:

- Tivoli Storage Productivity Center supports Virtual I/O Server version 1.5.2 or later.
- The Virtual I/O Server for POWER5 processor-based systems, must have a minimum of 512 MB of memory.
- The Virtual I/O Server for POWER6® processor-based systems, must have a minimum of 768 MB of memory.

General procedure to install and configure agents

To install and configure the agents on the Virtual I/O Server, complete the following steps:

1. Install Tivoli Storage Productivity Center.
2. Install and configure the agents on the Virtual I/O Server.
3. When you install the agents, they are automatically started
4. Run a discovery job for the agents on the Virtual I/O Server.
5. Collect information about a Virtual I/O Server by running probe, scan, and ping jobs.
6. View the storage information gathered by the monitoring jobs through the topology viewer and reports that you can generate through the Fabric Manager and Data Manager.

See the *IBM Tivoli Storage Productivity Center User's Guide* for more information about how to use the Tivoli Storage Productivity Center user interface to collect and view information gathered by agents on the Virtual I/O Servers.

Planning for SQL access to views on Tivoli Storage Productivity Center

Use this topic for planning to retrieve storage information that is stored in the Tivoli Storage Productivity Center database repository.

Tivoli Storage Productivity Center stores the information that is collected by data collection jobs in the DB2 database repository. The information in the database repository is organized into a set of tables. A *view* is a way of describing data that exists in one or more of these tables.

You can use the Structured Query Language (SQL) to retrieve the information from these views. Then use that information in reports and applications outside of Tivoli Storage Productivity Center, such as Business Intelligence and Reporting Tools (BIRT), Microsoft Excel, and Crystal Reports. Other applications can also use these views to gather and import information that is collected by Tivoli Storage Productivity Center.

The views are created within a DB2 schema when you install the Tivoli Storage Productivity Center server. A *schema* defines the views and the fields within each view. The name of the schema containing the views for Tivoli Storage Productivity Center is TPCREPORT.

To view this schema by using Data Studio, complete the following steps:

1. Start Data Studio.
2. Expand **All Databases** > *database_server_name* > **DB2** > **TPCDB**.
3. Select **Schemas** > **TPCREPORT**. Right-click on **TPCREPORT** > **Show** > **View**.

Before you can work with the data stored in views, keep in mind the following planning considerations:

- A view is a logical table that consists of data that is generated by a query. A view is based on an underlying set of base tables in the database repository, and the data in a view is determined by a SELECT statement that is run on the base tables.

- The views are available in Tivoli Storage Productivity Center version 4.1 or higher. If you want to retrieve data from the database repositories of previous versions of the product, you must first upgrade to version 4.1 or later. See Chapter 4, “Upgrading and migrating,” on page 369 for information about how to upgrade Tivoli Storage Productivity Center.
- You must run data collection jobs to collect data about the storage resources in your environment before you can retrieve data from views. The data collected by probes, scans, pings, switch performance monitors, and subsystem performance monitors populates those views.
- You must have proper authority to access and retrieve data from the views. The views can be accessed by the following users:
 - DB2 administrator
 - The DB2 user that Tivoli Storage Productivity Center uses to store and retrieve information in the database repository
 - A view-only user that uses the operating system credentials associated to DB2 (for example, db2admin/password).
- For information about performing the following tasks, go to the information center. Search for *Accessing views in the database repository*.
 - Use the Business Intelligence and Reporting Tools (BIRT) report designer to create a report based on the information that is available in Tivoli Storage Productivity Center's exposed views.
 - View the report you created in BIRT through the Tivoli Common Reporting v1.2 feature of Tivoli Enterprise Portal. See the following website for more information about Tivoli Common Reporting: <http://www.ibm.com/developerworks/spaces/tcr>.
- See the following page on Tivoli Storage Productivity Center's support website for detailed information about the views provided with Tivoli Storage Productivity Center: <http://www.ibm.com/systems/support/storage/software/tpc>. Search for *Views Documentation*.

Setting up a user id with view-only privileges on Windows

Set up a user id with view-only privileges for the exposed views in the TPCREPORT schema. This procedure is for Windows only.

To set up a user id with view-only privileges on Windows, complete these steps:

1. Create a new user id on Windows. For example, create a user named TPCRPT.
 - a. Click **Start > Control Panel > Administrative Tools > Computer Management**.
 - b. From the **Action** menu, click **New User**.
 - c. Enter information about the new user and click **Create**.
 - d. Click **Close**.
2. Add the new user id to the DB2USERS group. When you add the new user to the DB2USERS group, it automatically provides that user with only SQL connect authority.
 - a. Click **Start > Control Panel > User Accounts**.
 - b. From the **Users for this computer** menu, click the **Users** tab, select the user account name and click **Properties**.
 - c. On the **Group Membership** tab, select the DB2USERS group and then **OK**.
3. Use Data Studio to set authority to the new user.
 - a. Start Data Studio.

- b. In the Administration Explorer navigation tree, expand **TPCDB > Users and Groups > Users**.
- c. Select the user id that you created in step 1.
- d. Select **Privileges** from the **Properties** window.
- e. Click the **View** tab.
- f. Accept the default settings that restrict the new user from performing actions against the views.

Restriction:

Do not change the privileges for the views in the TPCREPORT schema. The default settings for the views in the TPCREPORT schema indicate that the new user cannot perform the following SQL commands against those views: INSERT, UPDATE, DELETE, CONTROL.

- g. Click the **Schema** tab.
- h. Ensure that the user id does not have **CREATEIN**, **DROPIN**, or **ALTERIN** privileges. This check ensures that the user id has read-only access to the exposed Tivoli Storage Productivity Center views.

Monitoring your DB2 environment

It is a good practice to monitor your DB2 environment to better understand what is happening inside your DB2 data server. DB2 9.7 includes a new monitoring infrastructure that you can access through new event monitors.

This infrastructure is a superior alternative to the existing system monitor, event monitors, snapshot commands, and snapshot SQL interfaces.

For more information about monitoring your DB2 environment, see <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/index.jsp?topic=/com.ibm.db2.luw.wn.doc/doc/c0055019.html>.

Planning for the Discovery Library Adapter

Use this topic to plan for using the Discovery Library Adapter.

IBM Tivoli Storage Productivity Center provides a Discovery Library Adapter which can be used in a multiple IBM Tivoli products environment to exchange data with other Tivoli products. The data gathered by IBM Tivoli Storage Productivity Center is put into a common data model format and written to a file using the Identification Markup Language. This file can be loaded into the change and configuration management database (CCMDB) so that other Tivoli products such as Tivoli Application Dependency Discovery Manager or Tivoli Business Service Manager can use that data.

The Discovery Library Adapter also enables Tivoli Application Dependency Discovery Manager to be able to perform a launch in context operation to the IBM Tivoli Storage Productivity Center server. The following IBM Tivoli Storage Productivity Center panels are accessible:

- Topology view for computers
- Topology view for fabrics
- Topology view for switches
- Topology view for storage systems

Tivoli Storage Productivity Center Monitoring Agent

The Tivoli Storage Productivity Center Monitoring Agent can be used by the IBM Tivoli Enterprise Monitoring Server to monitor systems in your enterprise. This agent is an optional program you can install and use in your enterprise.

IBM Tivoli Monitoring monitors and manages system and network applications on a variety of operating systems, tracks the availability and performance of your enterprise system, and provides reports to track trends and troubleshoot problems. The Tivoli Storage Productivity Center Monitoring Agent participates in that environment.

For performance reasons, install the Tivoli Storage Productivity Center server on a separate system from the IBM Tivoli Monitoring server. You will be installing the Tivoli Storage Productivity Center Monitoring Agent in the Tivoli Storage Productivity Center environment. You will also be installing the Tivoli Storage Productivity Center Monitoring Agent support files in the IBM Tivoli Monitoring server environment.

Before using the Tivoli Storage Productivity Center Monitoring Agent, you must have IBM Tivoli Enterprise Monitoring Server installed. For information about the IBM Tivoli Enterprise Monitoring Server, see http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/index.jsp?topic=/com.ibm.itm.doc_6.2.2/welcome.htm.

For information about installing IBM Tivoli Monitoring, see the Quick Start Guide at http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/index.jsp?topic=/com.ibm.itm.doc_6.2.2fp2/itm622fp2_qsg_en.htm.

This agent is on the installation media disk 2.

Hardware and software requirements

You must install Tivoli Agent Management Services version 6.2 or later on Windows, AIX or Linux. The following Tivoli Monitoring components are required:

Tivoli Enterprise Monitoring Agent Framework - TEMA

- Tivoli Enterprise Monitoring Agent Framework
- Warehouse Proxy
- Summarization and Pruning Agent
- Tivoli Enterprise Services User Interface Extensions

Tivoli Enterprise Monitoring Server - TEMS

- Tivoli Enterprise Monitoring Server
- Warehouse Proxy
- Summarization and Pruning Agent
- Monitoring Agent support for the corresponding operating system on which the agent is installed

Tivoli Enterprise Portal Server - TEPS

- Tivoli Enterprise Portal Server
- Warehouse proxy
- Monitoring Agent support for the operating system on which the agent is installed
- Summarization and Pruning Agent

Tivoli Enterprise Desktop Client - TEPD

- Tivoli Enterprise Desktop Client
- Warehouse Proxy
- Monitoring Agent support for the operating system on which the agent is installed
- Summarization and Pruning Agent

Tivoli Enterprise Portal Browser Client

IBM Eclipse Help Server

Note: IBM Tivoli Monitor does not support the Tivoli Enterprise Portal Desktop Client (TEPDC) on AIX.

The following disk space is required:

Memory

Approximately 100 MB of RAM per agent instance.

Disk space

Approximately 300 MB of disk space for the IBM Tivoli Storage Productivity Center Monitoring Agent. For information about disk space required for historical data, see the *IBM Tivoli Monitoring Administrator's Guide* at http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/index.jsp?topic=/com.ibm.itm.doc_6.2.2/itm_admin.htm.

To install the IBM Tivoli Storage Productivity Center Monitoring Agent, you must have Administrator authority on Windows and root authority on AIX and Linux.

For information about installing the IBM Tivoli Enterprise Monitoring Server, see http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/index.jsp?topic=/com.ibm.itm.doc_6.2.2/itm_install86.htm.

Tivoli Agent Management Services

The Tivoli Agent Management Services extension of IBM Tivoli Monitoring monitors the health and availability of Storage Resource agents that are run as daemon processes.

The purpose of Agent Management Services is to provide customers with a central view of various Tivoli agents, and to perform the following functions:

- Monitors the health of Storage Resource agents
- Starts, stops, and manages agents

Through these functions, Tivoli Agent Management Services provides the following benefits for agent management:

- Adds a dimension of fault tolerance to agents by keeping a deployed Storage Resource agent up and running.
- Reduces the mean time to recovery of failed agents to seconds, limiting the number of situations that need to be configured to those reported as unrecoverable faults.
- Reduces the number of events flowing to your event managers to those reported by Tivoli Agent Management Services.

For information about Tivoli Monitoring, see http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/index.jsp?topic=/com.ibm.itm.doc_6.2.2fp2/itm622fp2_qsg_en.htm .

A Tivoli Monitoring Agent for OS must be installed on every computer that you want to monitor with a Storage Resource agent. The Tivoli Monitoring Agent for OS monitors all agents that have CAP files located in the CAP file directories. The Tivoli Agent Management Services can stop, start, and check the status of agents listed in the CAP file. The CAP file is created when a daemon Storage Resource agent is installed on a system.

For more information about the Tivoli Agent Management Services, see http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/topic/com.ibm.itm.doc_6.2.2fp2/agentmgmtsvcs_intro_tema.htm .

For information about Tivoli Monitoring supported platforms, see http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/topic/com.ibm.itm.doc_6.2.2fp2/ch2.4.htm#ch2.4.

On Windows, the status, start, and stop functions are handled through the Windows services.

The CAP file is installed in the following directories:

Windows

%ALLUSERSPROFILE%\Application Data\IBM\CAP

For example:

Windows 2008: C:\Program Data\IBM\CAP

Windows 2003: C:\Documents and Settings\All Users\Application Data\IBM\CAP

Non-Windows

/opt/IBM/CAP

CAP files are not configurable. You cannot change the location of these directories.

If the creation of the CAP file fails, you receive an error message in the installation log file and trace log file. If the CAP is not created, the lack of a CAP file does not affect the function of the Storage Resource agent. You can reinstall the agent with the **-force** option to create the CAP file.

For more information about the CAP file or Tivoli Agent Management Services, see http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/topic/com.ibm.itm.doc_6.2.2fp2/agentmgmtsvcs_intro_tema.htm .

Chapter 2. Installing

Before you install IBM Tivoli Storage Productivity Center, you must install IBM DB2 because DB2 is required for the Tivoli Storage Productivity Center database repository.

Planning to install Tivoli Storage Productivity Center

Install Tivoli Storage Productivity Center on the system to manage storage resources, storage system management, fabric management, replication management, alerting, and analytical functions. Install Storage Resource agents on each computer to collect information about the hosts, applications, storage systems, and SAN fabrics. The Storage Resource agents transfer that data to the Tivoli Storage Productivity Center server.

Hardware and software requirements

Tivoli Storage Productivity Center can require a large amount of memory, disk space, network bandwidth, and processor resources.

Tip: Use a dedicated server that is not running other applications when you install Tivoli Storage Productivity Center. A dedicated server improves performance.

For more information about hardware and software requirements, go to the Tivoli Storage Productivity Center information center. Search for *Hardware requirements* and *Software requirements*. For more information about updates to product and operating system support, see <https://www.ibm.com/support/docview.wss?uid=swg21386446>.

Read the *Readme for IBM Tivoli Storage Productivity Center Version 5.2* on http://www.ibm.com/support/entry/portal/Overview/Software/Tivoli/Tivoli_Storage_Productivity_Center. The readme file contains last-minute information that could not be included in the documentation.

Choosing the installation method

You can install Tivoli Storage Productivity Center by using the installation wizard or the command-line interface in silent mode. When you use silent mode, you run a command and provide the installation values in a response file.

To use the installation wizard on operating systems such as UNIX and Linux, you must have X Window System software. For more information about the installation wizard, see “Installing Tivoli Storage Productivity Center in a single-server environment by using the wizard” on page 143.

The installation wizard helps you install Tivoli Storage Productivity Center with minimal user interaction. The silent-mode installation is useful if your system is running from a terminal that cannot display graphics. For more information about using the installation wizard, see “Installing Tivoli Storage Productivity Center in a single-server environment by using the wizard” on page 143. For more information about installing the product in silent mode, see “Installing Tivoli Storage

Productivity Center in a single-server environment by using silent mode” on page 145 or “Installing Tivoli Storage Productivity Center with a remote database by using silent mode” on page 163.

The installation procedures use the following directory to indicate where Tivoli Storage Productivity Center is installed:

TPC_installation_directory

where the default directory for Windows operating systems is C:\Program Files\IBM\TPC, and the default directory for AIX or Linux operating systems is /opt/IBM/TPC.

In Tivoli Storage Productivity Center, servers can include any of the following types:

- Data server
- Device server
- Replication server
- Web server

Tivoli Storage Productivity Center reports

To run Tivoli Storage Productivity Center reports, you must install Jazz for Service Management Version 1.1.0.1 and Tivoli Common Reporting Version 3.1.0.1 from the Tivoli Storage Productivity Center installation program. For more information about installing Tivoli Storage Productivity Center reports, see “Installing Tivoli Storage Productivity Center in a single-server environment” on page 143 or “Installing Tivoli Storage Productivity Center in a multiple-server environment” on page 156.

Choosing a GUI


After Tivoli Storage Productivity Center is installed, the storage management tasks that you want to complete determines which GUI to use:

Web-based GUI

This interface runs in a web browser and includes the ability to monitor, manage, and troubleshoot storage resources. You can also report on the condition, capacity, and performance resources in the Tivoli Common Reporting interface. In 5.2 and later, the web-based GUI includes many of the functions for managing storage, disks, and fabrics. You can access this interface from anywhere that you have a web browser and connectivity to a network.

Stand-alone GUI

The stand-alone GUI is the same, Java based interface that was available in Tivoli Storage Productivity Center v4.2.2.x and earlier. In version 5.2 and later, many of the functions for monitoring and managing storage in this interface were moved to the web-based GUI.

For a complete list of functions that are available in each GUI, go to the  Tivoli Storage Productivity Center Information Center and search for *Available functions in the interfaces*.

For more information about the functions that were moved from the stand-alone GUI to the web-based GUI in V5.2, go to the [Tivoli Storage Productivity Center Information Center](#) and search for *Functions that were moved*.

Languages

When you install Tivoli Storage Productivity Center, you must select one of the following languages:

- English
- Czech
- French
- German
- Hungarian
- Italian
- Japanese
- Korean
- Polish
- Brazilian Portuguese
- Russian
- Spanish
- Chinese (Simplified)
- Chinese (Traditional)

For more information about changing the operating system for the user interfaces, go to “Changing the operating system language” on page 212.

Messages, online help, and text are displayed in the language that you select. You are not required to install a language pack after installation. When you use Tivoli Storage Productivity Center, the language that is displayed is the language setting of the operating system.

To install Tivoli Storage Productivity Center on a Windows domain, see “Planning to install Tivoli Storage Productivity Center in a Windows domain” on page 3 and “Installing Tivoli Storage Productivity Center on a Windows domain” on page 124.

Installation restrictions

Before you install Tivoli Storage Productivity Center, ensure that you are familiar with following issues:

Installation images on AIX

When you extract installation images, use the GNU tar program instead of the AIX tar program. The AIX tar program might truncate long file names, which can cause installation errors in Tivoli Storage Productivity Center.

Go to <http://www.ibm.com/systems/power/software/aix/linux/toolbox/alpha.html> and install GNU 1.14 or later. You need to specify this program as the default tar program in the PATH environment variable.

Cygwin software

When you install Tivoli Storage Productivity Center on a Windows operating system and have Cygwin software on the same server, do not include Cygwin software as a path-related environment variable, for example, the PATH variable.

DB2 on AIX or Linux

When you install DB2 on operating systems such as AIX or Linux, by default DB2 is not configured to start when the server restarts. To ensure that DB2 starts when the server starts, after you install DB2 on AIX or Linux, restart DB2, and run the following command:

```
DB2_installation_directory/bin/db2iauto -on instance_name
```

where *DB2_installation_directory* is the location of DB2 and *instance_name* is db2inst1.

Related tasks:

“Installing Tivoli Storage Productivity Center with a remote database by using the installation wizard” on page 156

You can install Tivoli Storage Productivity Center in a multiple-server environment by using the installation wizard.

“Installing Tivoli Storage Productivity Center with remote reports by using the installation wizard” on page 160

You can install Tivoli Storage Productivity Center reports in a multiple-server environment by using the installation wizard.

Tivoli Storage Productivity Center components

You can install Tivoli Storage Productivity Center in single-server or multiple-server environments. In a single-server environment, all components are installed on one server.

In single-server or multiple-server environments, when you install Tivoli Storage Productivity Center, the following components are installed:

- Database repository
- Tivoli Storage Productivity Center servers, which comprise the following components:
 - Data server
 - Device server
 - Replication server
 - Stand-alone GUI
 - Web-based GUI
 - Command-line interface (CLI)
 - Storage Resource agent
- Tivoli Storage Productivity Center reports

This table provides information about where the components are installed in single-server and multiple-server environments.

Table 18. Locations of Tivoli Storage Productivity Center components

If Server A includes...	Then Server B includes...
Database repository, Tivoli Storage Productivity Center servers, and Tivoli Storage Productivity Center reports	This scenario applies to a single-server environment. There is no server B.
Database repository and Tivoli Storage Productivity Center servers	Tivoli Storage Productivity Center reports
Database repository	Tivoli Storage Productivity Center servers

Table 18. Locations of Tivoli Storage Productivity Center components (continued)

If Server A includes...	Then Server B includes...
Database repository	Tivoli Storage Productivity Center servers and Tivoli Storage Productivity Center reports

Tivoli Storage Productivity Center in an IPv4 or IPv6 environment

Tivoli Storage Productivity Center can use both IPv4 and IPv6 addresses for communication between its components.

If you have a system that is configured for dual-stack networking (with both IPv4 and IPv6 addresses), Tivoli Storage Productivity Center defaults to IPv4 addressing.

For information about using IPv4 and IPv6, see “Planning for Internet Protocol Version 6” on page 32.

Hardware requirements

The Tivoli Storage Productivity Center server can require a large amount of memory, disk space, network bandwidth, and processor resources. In many cases, the server performs best when other applications are not installed on the same system.

Table 19 shows information about the minimum hardware requirements that are needed for the Tivoli Storage Productivity Center servers.

Table 19. Hardware requirements for the Tivoli Storage Productivity Center servers

Item	Hardware requirements
Processor	<p>On Windows and Linux operating systems:</p> <ul style="list-style-type: none"> • Intel Xeon 4 processor cores with 2.5 GHz or greater • 2 Intel Xeon L5520 8 processor cores with 2.27 GHz or greater <p>On AIX operating systems, POWER5, POWER6, POWER7® or later systems with 4 or 8 processor cores</p>
Memory	12 GB of RAM

Table 19. Hardware requirements for the Tivoli Storage Productivity Center servers (continued)

Item	Hardware requirements
Disk space	<p>Single-server installations</p> <ul style="list-style-type: none"> On Windows operating systems: 15 GB of free disk space is required. On Linux operating systems: 15 GB of free disk space is required. These are the values for disk space distribution for the AIX operating system: <ul style="list-style-type: none"> /usr - 220 MB /var - 1 MB /home - 2.75 GB /tmp - 700 MB /opt - 18 GB <p>Note: After you install Tivoli Storage Productivity Center and start collecting data, a large amount of disk space is required. The amount of data that is collected depends on many factors:</p> <ul style="list-style-type: none"> How many devices you have How long you keep the data How frequently you collect data <p>Some users experienced disk space usage of about 40 - 80 GB.</p>
	<p>Multiple-server installation</p> <p>DB2 requires the following:</p> <ul style="list-style-type: none"> /home - 2G /opt - 300 GB <p>IBM Tivoli Common Reporting requires the following:</p> <ul style="list-style-type: none"> /usr - 220 MB /var - 1 MB /home - 750 MB /tmp - 700 MB /opt - 14.7 GB <p>Tivoli Storage Productivity Center requires the following:</p> <ul style="list-style-type: none"> /opt - 3 GB
Network interface card (NIC)	If you have multiple NIC cards on the Tivoli Storage Productivity Center server, see "Installing and configuring the Tivoli Storage Productivity Center server with multiple NIC cards" on page 363 for special considerations.
Console	For AIX or Linux operating systems, a console or remote-connectivity application such as KDE, Remote Desktop, or VNC is required when you install Tivoli Storage Productivity Center.

Restriction: On AIX or Linux operating systems, when you use a Virtual Network Computing (VNC) client that is connected to a VNC server, do not use the following key combinations:

- Alt + H to start the Help page
- Alt + N to proceed to next page
- Alt + P to return to the previous page
- Alt + I to start an installation action on the Summary page

You must press Tab and then press Enter or the spacebar when the button you want to press is selected. For example, to start the Help, press Tab until the Help button is highlighted and then press Enter or the spacebar.

Table 20 shows the storage system requirements for the Replication server.

Table 20. Storage system requirements for the Replication server

Storage system	Hardware requirements
IBM Storage System DS8000	<ul style="list-style-type: none"> • Release 2 minimum firmware level 6.2.410.30 or Release 3 minimum firmware level 63.1.32.0 • Advanced Copy services licenses • Optional Ethernet adapters for Tivoli Storage Productivity Center for Replication <ul style="list-style-type: none"> – Single image - feature code 1801 – Dual image - feature code 1802 and 1803
IBM System Storage DS6000	<ul style="list-style-type: none"> • Minimum firmware level 6.2.2.64 • Advanced Copy services licenses
IBM Enterprise Storage Server (ESS) 2105-800	<ul style="list-style-type: none"> • Minimum firmware level 2.4.4.72 • Feature codes 240 - PRC and 2240 - PRC
<ul style="list-style-type: none"> • IBM System Storage SAN Volume Controller 4.2.1, 4.3.0, 5.1.0, and 6.1 • IBM Storwize V7000 	Copy services licenses
Host adapter feature codes	One or more of the following host adapter feature codes: <ul style="list-style-type: none"> • 3021 - Fibre Channel/FICON Host Adapter • 3023 - Fibre Channel/FICON Host Adapter • 3024 - 2 Gb Fibre Channel/FICON Host Adapter • 3025 - 2 Gb Fibre Channel/FICON Host Adapter

Table 21 shows the minimum hardware requirements for Storage Resource agents.

Table 21. Hardware requirements for Storage Resource agents.

Operating System	Item	Hardware requirements
<ul style="list-style-type: none"> • Windows and Linux on Intel • UNIX • AIX on IBM Power Systems™ 	Processor	Pentium 400® MHz processor, or higher
	Disk space and RAM	Minimum memory and space requirements to run: <ul style="list-style-type: none"> • 256 MB of RAM • Approximately 350 MB of hard disk space

Table 21. Hardware requirements for Storage Resource agents. (continued)

Operating System	Item	Hardware requirements
All	Network interface card (NIC)	<p>Tivoli Storage Productivity Center supports multiple NIC cards. When you install an agent on a computer locally or remotely and the computer has more than one NIC card, the Tivoli Storage Productivity Center agent installation program determines the NIC card to use. If there are no NIC cards that can be used for two-way communication, the installation program returns an error message.</p> <p>For more information about multiple NIC cards, see “Installing and configuring the Tivoli Storage Productivity Center server with multiple NIC cards” on page 363.</p>

Table 22 shows information about the minimum hardware requirements that are needed for the Tivoli Storage Productivity Center command-line interface.

Table 22. Hardware requirements for the Tivoli Storage Productivity Center command-line interface

Operating system	Item	Hardware requirements
Windows	Processor	At least PII 500 MHz processor or higher
	Disk space and RAM	<ul style="list-style-type: none"> • 256 MB of RAM • Approximately 525 MB of hard disk space
	Console	1024 x 768 console or higher
UNIX or Linux	Disk space and RAM	<ul style="list-style-type: none"> • 256 MB of RAM • Approximately 525 MB of hard disk space
	Console	1024 x 768 console or higher

Related information:

<http://www-01.ibm.com/support/docview.wss?uid=swg27027303>

Software requirements

This section describes the software that is required to install and run your system. This section includes operating systems supported, browsers supported, databases supported, and other software required such as DB2.

Software requirements for operating systems

The IBM Tivoli Storage Productivity Center family supports a variety of operating systems.

Tip: Tivoli Storage Productivity Center software is bundled with its own IBM Java JRE. You must use IBM Java with Tivoli Storage Productivity Center for Replication when you use the Java Web Start method of remotely accessing the Tivoli Storage Productivity Center for Replication GUI.

Before you install Tivoli Storage Productivity Center for Replication, check the Tivoli Storage Productivity Center for Replication support site for the latest operating system support. Go to the Tivoli Storage Productivity Center for Replication support website at <https://www.ibm.com/support/docview.wss?uid=swg21386446>.

Table 23. Operating system support for Tivoli Storage Productivity Center for Replication server, Tivoli Storage Productivity Center for Replication server, GUI, and Jazz for Service Management

Operating system or platform		Tivoli Storage Productivity Center server and Tivoli Storage Productivity Center for Replication server	Tivoli Storage Productivity Center stand-alone GUI and command-line interface (CLI)
AIX, see “Notes for AIX operating systems”	IBM AIX 6.1 (64-bit) <ul style="list-style-type: none"> POWER5 POWER6 	Yes	Yes
	IBM AIX 7.1 (64-bit) <ul style="list-style-type: none"> POWER5 POWER6 POWER7 or later 	Yes	Yes
Linux, see “Notes for Linux operating systems”	Red Hat Enterprise Linux Base Server and Advanced Platform 5.6 (x86-64)	Yes	Yes
	Red Hat Linux Base Server and Advanced Platform 6 (x86-64)	Yes	Yes
Windows, see “Notes for Windows operating systems”	Windows 2012 (x86-64) <ul style="list-style-type: none"> Standard Edition 	Yes (This operating system is supported in a multiple-server environment where DB2 and Tivoli Storage Productivity Center servers are installed on Windows. You can install DB2 or DB2 and Tivoli Storage Productivity Center on this operating system.)	Yes
	Windows 2008 (x86, x86-64) <ul style="list-style-type: none"> Standard Edition Enterprise Edition 	Yes, only for x86-64	Yes
	Windows 2008 R2 (x86, x86-64) <ul style="list-style-type: none"> Standard Edition Enterprise Edition 	Yes, only for x86-64	Yes
	Windows XP (x86)	No	Yes
	Windows Vista (x86)	No	Yes
	Windows Vista SP2 (x86)	No	Yes
	Windows 7 (x86)	No	Yes

Table 23. Operating system support for Tivoli Storage Productivity Center for Replication server, Tivoli Storage Productivity Center for Replication server, GUI, and Jazz for Service Management (continued)

Operating system or platform		Tivoli Storage Productivity Center server and Tivoli Storage Productivity Center for Replication server	Tivoli Storage Productivity Center stand-alone GUI and command-line interface (CLI)
VM on VMware	VMware ESX and ESXi 3.0.x, 3.5.x, 4.0.x, 4.1.x, and 5.x <ul style="list-style-type: none"> • Red Hat Enterprise Linux 5.6 • Red Hat Enterprise Linux 6 • Windows 2008 • Windows 2008 R2 • Windows 2012 	Refer to the corresponding operating system above for Tivoli Storage Productivity Center support in that operating system.	Refer to the corresponding operating system above for Tivoli Storage Productivity Center support in that operating system.
Important: z/OS Versions 1.10, 1.11, and 1.12 (31-bit) are supported only on the Tivoli Storage Productivity Center for Replication server.			
Note: For AIX operating systems <ol style="list-style-type: none"> For AIX 6.1, the minimum maintenance level that is required is Technology Level 6100-04 Service Pack 5. You can determine the Technology Level and Service Pack that are installed by running the following command: <pre>oslevel -s</pre> <p>You can download the package from http://www.ibm.com/eserver/support/fixes/fixcentral/pfixpacks/61.</p> AIX 6.1.0.4 or later comes with IBM Systems Director. IBM Systems Director has a common agent service that can use port 9510. The Storage Resource agent also uses port 9510. If you do not need IBM Systems Director, you can uninstall IBM Systems Director before you install Tivoli Storage Productivity Center. If you install Tivoli Storage Productivity Center and require IBM Systems Director, specify a different port for the Storage Resource agent. For information about the ports IBM Systems Director uses, go to http://publib.boulder.ibm.com/infocenter/director/v6r2x/index.jsp?topic=/com.ibm.director.plan.helps.doc/fqm0_r_ports_for_the_management_server.html. AIX 6.1 comes with Lightweight Infrastructure (LWI). If this package is enabled, the package can cause Tivoli Storage Productivity Center installation issues: <ul style="list-style-type: none"> • Create a port conflict with Tivoli Storage Productivity Center at port 9510. • Cause the Storage Resource agent installation to fail on hosts where only the agent is installed. Use the GNU tar program version 1.14 or later rather than the native AIX tar program to extract files from Tivoli Storage Productivity Center installation images. The AIX tar program truncates long file names, which can cause errors in Tivoli Storage Productivity Center installation. The GNU tar file archiving program can be found from the following link. http://www.ibm.com/systems/power/software/aix/linux/toolbox/alpha.html. 			
Note: For Windows operating systems <p>Use the Windows setting for "Windows Classic" when you install the Tivoli Storage Productivity Center GUI on Windows Vista.</p> <p>For more information, see "Installing Tivoli Storage Productivity Center client components on a separate computer" on page 206.</p>			
Note: For Linux operating systems <ol style="list-style-type: none"> If you are planning to install Tivoli Storage Productivity Center Version 5.2 on 64-bit Red Hat Enterprise Linux Version 5.6 or 6, you must ensure that you have the complete X Window System package group that is installed on your 64-bit Red Hat Enterprise Linux system. For more information about the required libraries, see "Required packages for Red Hat Enterprise Linux" on page 111. Before you install Tivoli Storage Productivity Center on Red Hat Enterprise Linux Version 5.2 or later, ensure that the shadow utility requirements are met. For information about the shadow utility, go to the Tivoli Storage Productivity Center information center and search for <i>shadow password</i>. 			

Required packages for Red Hat Enterprise Linux

Before you can install Tivoli Storage Productivity Center on Red Hat Enterprise Linux Version 5 or 6, you must install the complete **X Window System** package group.

Tip: The .rpm file versions on your installation media might differ from the versions that are mentioned in this section.

For 64-bit Red Hat Enterprise Linux Version 5, Tivoli Storage Productivity Center requires the following packages (libraries) for Tivoli Common Reporting:

- compat-libstdc++-33-3.2.3-61.i386 or later
- compat-glibc-2.3.4-2.26.i386 or later
- openmotif22-2.2.3-18.i386 or later

Because Tivoli Common Reporting installs 32-bit binary files, you must install the 32-bit versions of these prerequisite packages (libraries), even on a 64-bit Red Hat Linux Version 5 system. Otherwise, the installation fails.

In addition to the listed packages (libraries), Tivoli Storage Productivity Center also requires the following packages (libraries) for Red Hat Enterprise Linux Version 6:

- libXtst-1.0.99.2-3.el6.i686.rpm or later
- 32-bit version of pam_krb5 (required on 32-bit and 64-bit system)

To determine whether the 32-bit (i386) package is installed and which version is installed, use the `--queryformat` option for the `rpm` command:

```
# rpm -q --queryformat='%{N}-%{V}-%{R}.%{arch}\n' compat-libstdc++-33-3.2.3-61
compat-glibc-2.3.4-2.26 openmotif22-2.2.3-18 | grep -v x86_64

compat-libstdc++-33-3.2.3-61.i386
compat-glibc-2.3.4-2.26.i386
openmotif22-2.2.3-18.i386
#
```

To install the required packages (libraries), search the Red Hat Enterprise Linux installation media for these .rpm files:

```
# find <Red Hat Enterprise Linux install media location>
-name compat-libstdc++-*.i386.rpm
# find <Red Hat Enterprise Linux install media location>
-name compat-glibc-*.i386.rpm
# find <Red Hat Enterprise Linux install media location>
-name openmotif22-*.i386.rpm
```

After you locate the directory that contains the .rpm files, install or update these files to the required version. Use the `-U` option for the `rpm` command, for example:

```
# rpm -U compat-libstdc++-33-3.2.3-61.i386.rpm compat-glibc-2.3.4-2.26.i386.rpm
openmotif22-2.2.3-18.i386.rpm
```

To verify that you have the .rpm files installed, use the `--queryformat` option for the `rpm` command to see the architecture of the .rpm files that were installed:

```
# rpm -q --queryformat='%{N}-%{V}-%{R}.%{arch}\n' compat-libstdc++-33-3.2.3-61
compat-glibc-2.3.4-2.26 openmotif22-2.2.3-18 | grep -v x86_64
```

```

compat-libstdc++-33-3.2.3-61.i386
compat-glibc-2.3.4-2.26.i386
openmotif22-2.2.3-18.i386
#

```

By default, Red Hat Enterprise Linux Versions 5 and 6 only install 64-bit runtime support libraries. The Tivoli Storage Productivity Center Version 5.2 installation program and various applications that are required by Tivoli Storage Productivity Center also require the 32-bit runtime support libraries.

You can install the required 32-bit packages by using one of the following methods:

- Customizing the packages when you install Red Hat Enterprise Linux.
- Installing the packages later by running the **rpm** or **yum** commands.

If you decide to install the packages later, run the **yum** command to ensure that all of the supporting dependencies are also properly installed.

The following platforms that support both 32-bit and 64-bit applications require both the 32-bit and 64-bit versions (or later) of the following packages:

- compat-libstdc++-33-3.2.3-61
- compat-db-4.2.52-5.1
- libXp-1.0.0-8
- libXmu-1.0.2-5
- libXtst-1.0.1-3.1
- pam-0.99.6.2-3
- libXft-2.1.10-1.1

The 32-bit and 64-bit versions (or later) of the following packages are also required for Red Hat Enterprise Linux Version 6:

- gtk2-2.18.9-4
- gtk2-engines-2.18.4-5

Software requirements for Storage Resource agents

Storage Resource agents can be used by Tivoli Storage Productivity Center in a variety of operating systems.

Table 24. Operating system support for the Storage Resource agents

Operating system		Storage Resource agent	File systems	Volume managers
AIX	AIX 6.1 (64-bit)	Yes	<ul style="list-style-type: none"> • JFS • JFS2 • GPFS 3.2 • NFS • Veritas File System (VxFS) r4 or later and r5 or later 	Veritas Volume Manager (VxVM) r4 or later and r5 or later
	AIX 7.1 (64-bit)	Yes		
	<ul style="list-style-type: none"> • POWER5 • POWER6 • POWER7 or later • POWER7HA 	Yes		
	<ul style="list-style-type: none"> • AIX Virtual I/O server 2.2.1.0 or later 	Yes		

Table 24. Operating system support for the Storage Resource agents (continued)

Operating system		Storage Resource agent	File systems	Volume managers
HP-UX	HP-UX 11i v3 <ul style="list-style-type: none"> • Itanium 64-bit 	Yes	<ul style="list-style-type: none"> • HP_HFS • NFS • Veritas File System (VxFS) r4 or later and r5 or later 	<ul style="list-style-type: none"> • HP-UX Logical Volume Manager • Veritas Volume Manager (VxVM) r4 or later and r5 or later
Red Hat Enterprise Linux	<ul style="list-style-type: none"> • POWER5 (32-bit, 64-bit) • POWER6 (32-bit, 64-bit) • zSeries (31-bit, 64-bit) 	Yes	<ul style="list-style-type: none"> • EXT2 • EXT3 • NFS • TMPFS • Veritas File System (VxFS) r4 or later and r5 or later 	Veritas Volume Manager (VxVM) r4 or later and r5 or later
	Red Hat Enterprise Linux Base Server and Advanced Platform 5 (x86, x86-64) <ul style="list-style-type: none"> • POWER5 (32-bit, 64-bit) • POWER6 (32-bit, 64-bit) • zSeries (64-bit) 	Yes		
	Red Hat Enterprise Linux Base Server and Advanced Platform 6 (x86, x86-64) <ul style="list-style-type: none"> • POWER5 (32-bit, 64-bit) • POWER6 (32-bit, 64-bit) • POWER7 • zSeries (64-bit) 	Yes		
SUSE Linux Enterprise Server	SUSE Linux Enterprise Server 11(x86, x86-64) <ul style="list-style-type: none"> • POWER5 (32-bit, 64-bit) • POWER6 (32-bit, 64-bit) • POWER7 • zSeries (64-bit) 	Yes	<ul style="list-style-type: none"> • EXT2 • EXT3 • NFS • REISERFS • TMPFS • Veritas File System (VxFS) r4.x and 5.x 	Veritas Volume Manager (VxVM) 4.x and 5.x

Table 24. Operating system support for the Storage Resource agents (continued)

Operating system		Storage Resource agent	File systems	Volume managers
Oracle Solaris	Solaris 9 <ul style="list-style-type: none"> • SPARC architecture • 32-bit, 64-bit 	Yes Patches are required. For more information, see <i>Solaris operating systems</i> in the <i>Notes</i> section.	<ul style="list-style-type: none"> • NFS • TMPFS • UFS • Veritas File System (VxFS) r4 or later and r5 or later 	Veritas Volume Manager (VxVM) r4 or later and r5 or later
	Solaris 10 <ul style="list-style-type: none"> • SPARC architecture • 32-bit, 64-bit 	Yes For more information, see <i>Solaris operating systems</i> in the <i>Notes</i> section.		
Windows	Windows 2003 (x86, x86-64) <ul style="list-style-type: none"> • Data Center Edition • Enterprise Edition • Standard Edition 	Yes	<ul style="list-style-type: none"> • FAT • FAT32 • NTFS 	
	Windows 2003 R2 (x86, x86-64) <ul style="list-style-type: none"> • Data Center Edition • Enterprise Edition • Standard Edition 	Yes		
	Windows 2008 (x86, x86-64) <ul style="list-style-type: none"> • Data Center Edition • Enterprise Edition • Standard Edition 	Yes		
	Windows 2008 R2 (x86, x86-64) <ul style="list-style-type: none"> • Data Center Edition • Enterprise Edition • Standard Edition 	Yes		
	Windows 2012 <ul style="list-style-type: none"> • Data Center Edition • Enterprise Edition • Standard Edition 	Yes		
	Windows 7 <ul style="list-style-type: none"> • Enterprise Edition 	Yes		

Table 24. Operating system support for the Storage Resource agents (continued)

Operating system		Storage Resource agent	File systems	Volume managers
VM on VMware	VMware ESX 3.0.x, 3.5.x, 4.0.x, 4.1.x, and 5.x (guest operating system) <ul style="list-style-type: none"> • Red Hat Enterprise Linux 5 (x86) • SUSE Linux Enterprise Server 11 (x86) • Windows 2003 (x86) • Windows 2008 (x86) • Windows 2012 • Windows 7 			

Table 24. Operating system support for the Storage Resource agents (continued)

Operating system	Storage Resource agent	File systems	Volume managers
<p>On AIX operating systems:</p> <ol style="list-style-type: none"> For AIX 6.1, the minimum maintenance level required are: <ul style="list-style-type: none"> Technology Level 6100-04 Service Pack 5 Technology Level 6100-05 Service Pack 1 Technology Level 6100-06 <p>To determine the Technology Level and Service Pack that is installed, run the following command:</p> <pre>oslevel -s</pre> <p>You can download the package from http://www.ibm.com/eserver/support/fixes/fixcentral/pfixpacks/61.</p> Use the GNU tar program version 1.14 or later, not the native AIX tar program, to extract files from Tivoli Storage Productivity Center installation images. The AIX tar program truncates long file names, which can cause errors during the Tivoli Storage Productivity Center installation. <p>The GNU tar file archiving program can be downloaded from http://www.ibm.com/systems/power/software/aix/linux/toolbox/alpha.html.</p> <p>IBM Systems Director is included with AIX 6.1.0.4 and has a common agent service that can use port 9510. The Storage Resource agent also uses port 9510. If you do not need IBM Systems Director, you can uninstall IBM Systems Director before you install Tivoli Storage Productivity Center. If you install Tivoli Storage Productivity Center and require IBM Systems Director, specify a different port for the Storage Resource agent. For information about the ports that IBM Systems Director uses, go to Ports for IBM Systems Director Server.</p> Lightweight Infrastructure (LWI) is included with AIX 6.1. If this package is enabled, the package can cause Tivoli Storage Productivity Center installation issues: <ul style="list-style-type: none"> There can be a port conflict with Tivoli Storage Productivity Center at port 9510. LWI can cause the Storage Resource agent installation to fail on hosts where only the agent is installed. Tivoli Storage Productivity Center also supports PowerHA SystemMirror for AIX software on AIX for the following versions: <ul style="list-style-type: none"> 5.5.x 5.4.0.1 (APAR IY87447) or later 5.3.0.4 (APAR IY87534) or later <p>Also check the PowerHA SystemMirror for AIX version compatibility matrix on the support site at PowerHA for AIX Version Compatibility Matrix.</p> Your fabric probe can fail on AIX with error message AGT0430I. <p>AIX has a constraint where the size of the response buffer passed in for GS-3 commands made to the switch cannot exceed 4000. The Storage Resource agent passes 4000 buffer sizes for AIX.</p> <p>If the zone configuration for a fabric probe exceeds the 4K limitation for AIX, Tivoli Storage Productivity Center flags this condition. The fabric probe fails under this condition with error message AGT0430I.</p> <p>Consider using Storage Resource agents that are deployed on another platform that is connected to the same fabric. Use this Storage Resource agent to collect zone information and to perform zone changes. In this case, the fabric functions for the Storage Resource agent that is failing can be disabled.</p> <p>If the fabric probe fails with the error message, and you try to make zone changes for the fabric, then you might get a warning message that the zoning has changed.</p> 			

Table 24. Operating system support for the Storage Resource agents (continued)

Operating system	Storage Resource agent	File systems	Volume managers
<p>On Linux operating systems:</p> <ul style="list-style-type: none"> If you install the Storage Resource agent on Red Hat Enterprise Linux 4 Update 5 or later, RedHat Enterprise Linux 5, or RedHat Enterprise Linux 6, these RedHat Package Manager (RPM) packages must be installed on the computer: <ul style="list-style-type: none"> For Intel architecture: compat-libstdc++-33-3.2.3-47.3.i386.rpm For Power Systems architecture: compat-libstdc++-33-3.2.3-47.3.ppc.rpm For zSeries architecture: compat-libstdc++-33-3.2.3-47.3.s390.rpm For Storage Resource agents that are installed on Red Hat Enterprise Linux 5, the following packages must be installed: <ul style="list-style-type: none"> For Intel architecture: compat-libstdc++-33-3.2.3-61.i386.rpm For Power Systems architecture: compat-libstdc++-33-3.2.3-61.ppc.rpm For zSeries architecture: compat-libstdc++-33-3.2.3-61.s390.rpm For Storage Resource agents that are installed on Red Hat Enterprise Linux 6, the following packages must be installed: <ul style="list-style-type: none"> For Intel architecture: compat-libstdc++-33-3.2.3-69.el6.i686.rpm For Power Systems architecture: compat-libstdc++-33-3.2.3-69.el6.ppc.rpm For zSeries architecture: compat-libstdc++-33-3.2.3-69.el6.s390.rpm For Storage Resource agents for fabrics that are connected to hosts that are running on Linux IBM Power Systems, or zSeries hardware, there are the following limitations: <ul style="list-style-type: none"> – Zone configuration changes are not allowed. – No reports on HBA, fabric topology, or zoning information are generated. <p>These limitations also apply to Storage Resource agents on all guest operating systems for VMware configurations.</p> Tivoli Storage Productivity Center does not support software RAID on Linux systems. A Storage Resource agent does not install and run on Linux systems with software RAID. <p>On HP-UX operating systems: The Tivoli Storage Productivity Center agents that are running on HP-UX must have the HP libc cumulative patch PHC_34275 installed on those computers. To download the patch, go to https://www1.itrc.hp.com/service/home/home.do.</p> <p>On Solaris operating systems:</p> <ul style="list-style-type: none"> To install Storage Resource agents on Solaris 9, you must download patches 111711 and 111712. For more information about downloading the patches, go to http://www.oracle.com. For Solaris 10, only Global Zone is supported for the Tivoli Storage Productivity Center agents. Local or non-global zones are not supported. If you upgrade from Solaris 9 to Solaris 10, reinstall all of the agents. <p>On VMware: The Storage Resource agent supports the VMware ESX environment in tolerance mode only. No fabric functions are available with the Storage Resource agent for any guest operating systems.</p>			

Software requirements for the database repository

Use this information to understand what the software requirements are for the database repository. For the most current information about the database versions, go to the IBM Support Portal. Search for *Find the Supported Products and Platforms Interoperability Matrix Links*.

Tivoli Storage Productivity Center uses DB2 as the database repository.

DB2 database

You can use the following 64-bit versions of DB2 with Tivoli Storage Productivity Center Version 5.2:

- DB2 Enterprise Server Edition Version 10.1 Fix Pack 2
DB2 Version 10.1 Fix Pack 2 is shipped with Tivoli Storage Productivity Center Version 5.2.
Tivoli Storage Productivity Center Version 5.2 does not support DB2 Version 10.1 or Version 10.1 Fix Pack 1.
- DB2 Enterprise Server Edition Version 9.7 Fix Pack 8
- DB2 Enterprise Server Edition Version 9.7 Fix Pack 7
- DB2 Enterprise Server Edition Version 9.7 Fix Pack 6
Tivoli Storage Productivity Center Version 5.2 does not support DB2 Version 9.7 Fix Pack 5.
- DB2 Enterprise Server Edition Version 9.7 Fix Pack 4

Note: For more information about using DB2 Version 9.7 Fix Pack 4, see APAR IC76118.

If you install Tivoli Storage Productivity Center on the Russian version of the Windows operating system, only DB2 Version 9.7 Fix Pack 4 is supported. For more information, see APAR IC87668..

Important: You must use a 64-bit version of DB2 with Tivoli Storage Productivity Center Version 5.2. For more information about upgrading DB2 to 64-Bit DB2 Version 10.1 Fix Pack 2, see “Upgrading from 32-bit DB2 Version 9.7 to 64-bit DB2 Version 10.1” on page 372.

When you install Tivoli Storage Productivity Center, one shared database instance is created on DB2. The default name of this database is TPCDB.

IBM Data Studio

IBM Data Studio Version 3.2 or later provides the tools that you can use to administer databases.

Web browser support

IBM Tivoli Storage Productivity Center starts a web browser when you access web pages from items in the **Help** menu or start another application by using its launch-in-context feature.

Note: The Tivoli Storage Productivity Center software is bundled with its own IBM Java JRE. When you use the Java Web Start method of remotely accessing the stand-alone GUI, you must use the IBM Java.

Before you start Tivoli Storage Productivity Center, ensure that you are using a supported web browser. For a list of web browsers that you can use with Tivoli Storage Productivity Center, see the support matrix at <http://www.ibm.com/support/docview.wss?uid=swg21386446>. In the **Agents, Servers and GUI** column,

click the version of Tivoli Storage Productivity Center that you are installing. On the next page, click **Web Browsers** to find the web browsers that you can use.

If you do not have a web browser that is configured for use with Tivoli Storage Productivity Center when you access a web page from its user interface, the opens. Use this window to configure a web browser for use with the product.

Tip: For information about the web browsers that you can use with the DS8000, see the DS8000 Information Center at <http://publib.boulder.ibm.com/infocenter/dsichelp/ds8000ic/index.jsp>. Search for **Internet browser support**.

Note: The web GUI requires the use of cookies to manage user preferences, such as table customization and frequently viewed charts. Ensure that cookies are enabled to use these features.

The software to block pop-up windows must be turned off in Windows Internet Explorer for any application to start the graphical user interface (GUI) for the following storage systems:

- SAN Volume Controller
- Storwize V3500
- Storwize V3700
- Storwize V7000
- Storwize V7000 Unified
- IBM SONAS

For example, if you are in Tivoli Storage Productivity Center and you want to start the Element Manager of the SAN Volume Controller GUI, you must configure Internet Explorer with the following settings.

1. Open Internet Explorer.
2. From the Internet Explorer toolbar, click **Tools > Pop-up Blocker > Turn Off Pop-up Blocker**.

If the Internet Explorer **Information Bar** displays a message that content is blocked because it was not signed by a valid security certificate, click the **Information Bar** and select **Show blocked content**.

Web browser support for Help menu items

Tivoli Storage Productivity Center provides a number of items in its **Help** menu that you can click to learn more about how to use the product. When you click one of these items, Tivoli Storage Productivity Center starts a web browser and displays the appropriate web page. You must have an internet connection on the system where you are running the Tivoli Storage Productivity Center user interface. You must also have a default browser that is configured to successfully access these web pages.

Software requirements for LDAP servers

LDAP repositories, that are available on Windows, Linux and AIX operating systems, can be used with Tivoli Storage Productivity Center. For more information about the LDAP repositories supported, see one of the following topics, and search for *LDAP Servers using Federated Repository Configuration*.

- For the Windows operating system: <http://www.ibm.com/support/docview.wss?rs=180&uid=swg27012421> .

- For the AIX operating system: <http://www.ibm.com/support/docview.wss?rs=180&uid=swg27012389>.
- For the Linux operating system: <http://www.ibm.com/support/docview.wss?rs=180&uid=swg27012415>.

Software requirements for CIM agents

Tivoli Storage Productivity Center requires CIM agents for some IBM storage devices such as the DS3000, DS4000, DS5000, DS6000.

CIM agents for DS3000, DS4000, DS5000, DS6000

For information about installing and configuring the CIM agent for the DS3000, DS4000, and DS5000, contact your CIM agent (LSI SMI Provider) at http://www.lsi.com/storage_home/products_home/external_raid/management_software/smis_provider/index.html.

The LSI CIM agent must be installed and configured before you can collect data for the DS3000, DS4000, and DS5000 through Tivoli Storage Productivity Center. When you configure Tivoli Storage Productivity Center to connect to the CIM agent, you must provide the interoperability namespace for the device.

For information about the LSI CIM agent level that is required for each device and the namespace, see <http://www.ibm.com/support/docview.wss?uid=swg21386446>.

Also, see TPC Hints and Tips document at this website <http://www.ibm.com/support/docview.wss?uid=swg27008254> for some useful information about installing the LSI CIM agent.

Also, note the following information about the CIM agents from LSI:

- Do not install the CIM agent on the same server as the Tivoli Storage Productivity Center server.
- Do not have the CIM agent monitor more than five storage systems.
- Use the LSI SMI-S Provider V10.06.GG.33 or later for the DS4000 and DS5000 MC level V7.60.x. Otherwise, performance monitoring does not work.
- Do not use the LSI SMI-S agent for the DS4000 and DS5000 with an MC level earlier than V7.50.x. Lower-level microcode can cause a reboot of the controller device.

CIM agents for switches and directors

CIM agents (SMI-S Providers) are also required for switches and directors. For a complete list of switches and directors that are supported and the level of CIM agents that are required for each device, see <http://www.ibm.com/support/docview.wss?uid=swg21386446>.

CIM agents for non-IBM storage systems

Tivoli Storage Productivity Center also supports some non-IBM storage systems. For example, Tivoli Storage Productivity Center supports HP, TagmaStore, CLARiiON, Symmetrix, and other storage systems.

For a complete list of storage systems that are supported and the level of CIM agents that are required for each device, see <http://www.ibm.com/support/docview.wss?uid=swg21386446>.

Requirements for Jazz for Service Management and Tivoli Common Reporting

If you plan to use Tivoli Storage Productivity Center reports, you must install Jazz for Service Management Version 1.1.0.1 and IBM Tivoli Common Reporting Version 3.1.0.1. The requirements apply to a single-server installation of Jazz for Service Management and Tivoli Common Reporting.

For more information about the requirements to install Jazz for Service Management Version 1.1.0.1 and IBM Tivoli Common Reporting Version 3.1.0.1, see Jazz for Service Management Detailed System Requirements.

Attention: You must install Jazz for Service Management from the Tivoli Storage Productivity Center installation program. For more information about installing Tivoli Storage Productivity Center, see “Installing Tivoli Storage Productivity Center in a single-server environment” on page 143 or “Installing Tivoli Storage Productivity Center in a multiple-server environment” on page 156.

Installing Tivoli Storage Productivity Center

Tivoli Storage Productivity Center provides an installation program that guides you through the installation process. You can use the installation wizard or the command line in silent mode.

Tivoli Storage Productivity Center installation

You can install Tivoli Storage Productivity Center by using the installation wizard or the command-line in silent mode. Installing Tivoli Storage Productivity Center by using console mode is not supported.

Overview

Consider this information to help you prepare for your Tivoli Storage Productivity Center installation.

Fully qualified host names

Some systems might be configured to return a short host name such as `server22`, instead of a fully qualified host name such as `server22.myorg.mycompany.com`. Tivoli Storage Productivity Center requires fully qualified host names, so you must install the product on a computer that has a fully qualified host name.

Installation methods

You can install Tivoli Storage Productivity Center by using the installation wizard or the command-line in silent mode. In silent mode, a command is provided with the values in a response file.

Use the installation wizard to install Tivoli Storage Productivity Center with minimal user interaction. Use the silent-mode installation if your system is running from a terminal that cannot display graphics.

Important: On UNIX operating systems (for example, AIX or Linux) you must have X Window System support to display the installation wizard graphical user interface (GUI).

Tivoli Storage Productivity Center reports

Important: If you plan to run Tivoli Storage Productivity Center reports, you must verify that your environment can support the installation of the Tivoli Storage Productivity Center reports. For more information about verifying your environment, see *Verify the environment*.

You must install Jazz for Service Management 1.1.0.1 before you install Tivoli Storage Productivity Center reports. The Tivoli Storage Productivity Center installation program guides you to starting the Jazz for Service Management installation program and also checks whether Jazz for Service Management is installed and running. You can install Tivoli Storage Productivity Center without reports and then later install Jazz for Service Management and the Tivoli Storage Productivity Center reports. For more information about installing Jazz for Service Management in a single-server environment, see “Installing Tivoli Storage Productivity Center in a single-server environment by using the wizard” on page 143. For more information about installing Tivoli Storage Productivity Center in a multiple-server environment, see “Installing Tivoli Storage Productivity Center with a remote database by using the installation wizard” on page 156 or “Installing Tivoli Storage Productivity Center with remote reports by using the installation wizard” on page 160.

Tivoli Storage Productivity Center Installation images

The following installation images are included with Tivoli Storage Productivity Center:

- Tivoli Storage Productivity Center for AIX
- Tivoli Storage Productivity Center for Linux
- Tivoli Storage Productivity Center for Windows
- Tivoli Storage Productivity Center Storage Resource agent, which includes the following files:
 - SRA.zip
 - SRA.tar

The Tivoli Storage Productivity Center installation image has the following disks:

Disk 1

Disk 1, Part 1 contains the following components:

- The Tivoli Storage Productivity Center installation program
- Base Tivoli Storage Productivity Center components
- Database repository
- Data server
- Storage Resource agent
- stand-alone GUI
- Command-line interface

Disk 1, Part 2 contains the following components:

- Device server
- Embedded IBM WebSphere Application Server

Disk 1, Part 3 contains the following components:

- Web server
 - The web-based GUI

- The TPC_VMWareVSpHEREPlugin folder

The contents of the TPC_VMWareVSpHEREPlugin folder, which is in the web folder, include the Tivoli Storage Productivity Center plug-in deployment utility, supporting libraries, plug-in client, and service packages.

- Replication server
- WebSphere Application Server Liberty Profile

Download each of the **Disk 1** compressed image files to the same directory (for example, c:\tpcdownload). After you download the files, extract each file into the same target directory (for example, c:\tpcinstall) in order. For example, extract the **Disk 1 - part 1** files first, then the **Disk 1 - part 2** files, and so on. During the extraction, if you are prompted to merge (or replace) folders or files with the same name, click **Merge/Replace**.

Disk 2

Disk 2 comprises the following parts:

- **Disk 2, itm_unix1 and itm_unix2** contains the Tivoli Storage Productivity Center Monitoring Agent installation program for IBM Tivoli Monitoring on the UNIX operating system.
- **Disk 2, itm_windows** contains the Tivoli Storage Productivity Center Monitoring Agent installation program for IBM Tivoli Monitoring on the Windows operating system.
- **Disk 2, sde_unix** is the IBM System Discovery Engine on the UNIX operating system.
- **Disk 2, sde_windows** is the IBM System Discovery Engine on the Windows operating system.

Jazz for Service Management installation package

This is the list of installation packages for Jazz for Service Management:

- Jazz for Service Management
- Tivoli Common Reporting
- IBM WebSphere Application Server

Tivoli Storage Productivity Center installation package

The following software is included with Tivoli Storage Productivity Center:

- DB2 10.1 Fix Pack 2 for Windows (64-bit)
- DB2 10.1 Fix Pack 2 for Linux (64-bit)
- DB2 10.1 Fix Pack 2 for AIX (64-bit)

Tivoli Monitoring server and DB2 installation images are included with Tivoli Storage Productivity Center.

The Tivoli Monitoring server that is included with Tivoli Storage Productivity Center has a limited license and that can be used to manage or monitor your Tivoli Storage Productivity Center environment. The product license defines the specific entitlements.

The following software is included with the Tivoli Monitoring server installation images:

- IBM Tivoli Monitoring 6.3 Server for Windows.

- IBM Tivoli Monitoring 6.3 Server for Linux.
- IBM Tivoli Monitoring 6.3 Server for UNIX.
- IBM Tivoli Monitoring 6.3 Agent. This agent is the Tivoli Monitoring Agent for the operating system.
- IBM Tivoli Monitoring 6.3 National Language Support.

For information about installing these components, see http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/index.jsp?topic=/com.ibm.itm.doc_6.2.2fp2/installation.htm .

For information about the supported operating systems for Tivoli Monitoring, see http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/topic/com.ibm.itm.doc_6.2.2fp2/ch2.4.htm#ch2.4.

Installing Tivoli Storage Productivity Center on a Windows domain

You can install Tivoli Storage Productivity Center and DB2 by using a Windows domain or a local user account.

Installing Microsoft .NET Framework

Before you install Tivoli Storage Productivity Center on a Windows domain, you must install Microsoft .NET Framework Version 3.5 or later.

Important: The steps in this procedure apply only if you are installing Microsoft .NET Framework Version 3.5 or later in a Windows 2008 R2 (64-bit) environment. If you are using a Windows 2008 R2 32-bit environment, you must manually download and install Microsoft .NET Framework Version 3.5 or later, as described in error message BPCIN0216E. For more information about this message, go to the Tivoli Storage Productivity Center information center. In the *IBM Tivoli Storage Productivity Center Messages Guide*, search for **BPCIN0216E** .

Prerequisite: You cannot run the commands to install Microsoft .NET Framework Version 3.5 or later on a Windows PowerShell (x86).

To install Microsoft .NET Framework Version 3.5 or later, complete the following steps:

1. Click **Start > All Programs > Accessories > Window PowerShell**, right-click **Window PowerShell**, and select **Run as administrator**.
2. To install the software, in the Windows PowerShell window, run the following commands:

```
Import-Module ServerManager
Add-WindowsFeature as-net-framework
```

Installing DB2 and Tivoli Storage Productivity Center by using local user accounts

Prerequisite: If the local user account is used to install the database repository, this account must be a member of the DB2 administrator (DB2ADMNS) group.

To install Tivoli Storage Productivity Center and DB2 by using local user account, complete the following steps:

1. Install DB2 by using a local user account.

For more information about installing DB2 on a Windows domain, see “Installing DB2 by using a Windows domain user account” on page 6.

2. Log on to Tivoli Storage Productivity Center by using a local user account that is a member of the local administrator and the local DB2 administrator (DB2ADMNS) groups.
3. In the Single Server Installation Information window, in the **Common User Name and Password** field, enter a local user account that is a member of local administrator group.

Installing DB2 by using a local user account and Tivoli Storage Productivity Center by using a domain user account

Prerequisite: If the local user account is used to install the database repository, this account must be a member of the DB2 administrator (DB2ADMNS) group.

To install DB2 with a local user account and Tivoli Storage Productivity Center with a domain user account, complete the following steps:

1. Install DB2 by using a local user account.
For more information about installing DB2 on a Windows domain, see “Installing DB2 by using a Windows domain user account” on page 6.
2. Log on to Tivoli Storage Productivity Center by using a domain user account that is a member of the local administrator and the local DB2 administrator (DB2ADMNS) groups.
This user must have the **Act as part of the operating system** and **Login as a service** permissions set in the security policy.
3. In the Single Server Installation Information window, in the **Common User Name and Password** field, enter a domain user account that is a member of local administrators group.

Restriction: If the domain security policy overrides the local security policy, you must set the indicators on the domain controller computer.

Installing DB2 and Tivoli Storage Productivity Center by using domain user accounts

Prerequisite: If the domain user account is used to install the database repository, this user account must have DB2 SYSADM authority.

To install Tivoli Storage Productivity Center and DB2 by using domain user accounts complete the following steps:

1. Install DB2 by using a domain user account.
For more information about installing DB2 on a Windows domain, see “Installing DB2 by using a Windows domain user account” on page 6.
2. Log on to the Windows domain computer on which you plan to install Tivoli Storage Productivity Center by using a domain user account that has domain administrator rights and is a member of the local administrator group.
3. In the Single Server Installation Information window, in the **Common User Name and Password** field, enter a domain user account that is a member of local administrators group.

Important: On the DB2 authentication information page, **do not** enter the domain controller prefix with your user name. You must enter the prefix to authenticate when you install the other Tivoli Storage Productivity Center components

For more information about granting a domain user account DB2 SYSADM authority, see “Granting DB2 SYSADM authority to a Windows domain user account” on page 8.

Resolving Windows domain prevalidation errors

Adding Windows domain user accounts to a local group, such as Administrator or DB2ADMNS, and later deleting these user accounts from the domain controller computer can cause an error when the account is validated.

When you delete user accounts from the domain controller computer, a reference to the user account is created as a security ID on the computer that is a member of a Windows domain. If these references are not removed, the Tivoli Storage Productivity Center installation can fail.

To locate the references that have a security ID, complete these steps:

1. On the domain member computer, click **Start > Control Panel > Administrative Tools > Computer Management**. If you are prompted by a User Account Control window, click **Yes**.
2. In the Computer Management navigation tree view, expand the **Local Users and Groups** node and select **Groups**.
3. In the Name column, look for a security ID like the following example:
S-1-5-21-337177553-1671989427-887411491-500
4. To remove a reference, select the security ID and click **Delete**.
 - a. To add the user account back to the group, click **Add**. The user account now belongs to the group.

When a prevalidation error occurs, depending on the type of user account and the group, one of the following error messages might be displayed:

- BPCIN0109E An unexpected error occurred. Tivoli Storage Productivity Center cannot resolve this error. For more information, see the Tivoli Storage Productivity Center information center and search on the message code.

To resolve this situation, use these steps:

1. On the domain controller computer, open **Users and Groups** on the Active Directory.
2. Delete all groups from the user account, and then add the groups again.
3. Log on to the computer again that is the member of the domain.

You have to add the DB2ADMNS rights to the user account again.

Locate the installation log files, lax*-out.txt and lax*-err.txt, for more details about the root cause of the error message. For example,

```
name=DB2ADMNS An error occurred while enumerating the groups.  
The group could be found.
```

- BPCIN0244E An error occurred while enumerating the local administrator group membership. On the current computer, on the Properties page of this group, remove the user names that are displayed with a security ID (SID). An example of a SID is S-1-5-21-337177553-1671989427-887411491-500 and is used instead of a user name.

- BPCIN0245E An error occurred while enumerating the local DB2 administrator group membership. On the current computer, on the Properties page of this group, remove the user names that are displayed with a security ID (SID). An example of a SID is S-1-5-21-337177553-1671989427-887411491-500 and is used instead of a user name.

For more information about these messages, go to the Tivoli Storage Productivity Center information center and search for the message number in the *IBM Tivoli Storage Productivity Center Messages Guide*.

In the error message window, click **OK** to resume the installation program or **Quit** to restart the Tivoli Storage Productivity Center.

If you cannot log on to stand-alone GUI or web-based GUI by using a Windows domain user account, see Unable to log on to the stand-alone GUI or the web-based GUI when using a Windows domain user account.

For more information about the installation log files, see the Tivoli Storage Productivity Center information center. Search for *Installation log files for Tivoli Storage Productivity Center*.

Related reference:

“Windows domain and local user accounts” on page 4

When a computer is a member of a Windows domain, you can install IBM DB2 on the local computer or on a computer that is a member of a Windows domain. The installation process creates a local DB2 user account or a domain DB2 user account.

“Adding a computer to the Windows domain” on page 5

Before you can install Tivoli Storage Productivity Center in a Windows domain, you must first add the computer on which you plan to install Tivoli Storage Productivity Center to the domain.

“Installing DB2 by using a Windows domain user account” on page 6

Before you install Tivoli Storage Productivity Center in a Windows domain, you must install DB2 and register the DB2 license key. You do not need to complete this task if you are planning to install DB2 by using a local user account.

“Verifying that the Computer Browser service is running” on page 6

Tivoli Storage Productivity Center uses WebSphere Application Server to authenticate domain users. WebSphere Application Server requires that the Microsoft Computer Browser Service is enabled and running to authenticate these users.

“Creating a Windows domain common user account for Tivoli Storage Productivity Center” on page 7

You must create a Windows domain common user account before you can install Tivoli Storage Productivity Center in a Windows domain.

“Granting DB2 SYSADM authority to a Windows domain user account” on page 8

If a Windows domain user account is used to install Tivoli Storage Productivity Center, the user account may not have the DB2 SYSADM authority, because DB2 goes to the domain controller computer to list the groups. Before you install Tivoli Storage Productivity Center, you must grant the Windows domain user accounts the DB2 SYSADM authority.

Verifying the connection to the domain controller computer by using the Dcdiag tool

Use the Dcdiag command-line tool to help you determine whether the domain controller computer is registered with the domain name server (DNS), whether the controller can be pinged, and whether the controller has Lightweight Directory Access Protocol (LDAP) connectivity.

To install and use the Dcdiag tool, complete the following steps:

1. On a computer that is a member of a Windows domain, go to <http://www.microsoft.com/en-us/download/details.aspx?id=15326>.
2. Download the following files to the same location:
 - support.cab
 - suptools.msi
3. Run the suptools.msi file.
4. Proceed through the installation software and click **Finish** to install the tool.
5. In a command prompt window, to run the tool, enter the following command:

```
DCDIAG /TEST:DNS /V /E /S:domaincontroller
```

Where *domaincontroller* is the name of the domain controller computer, for example, tb326-wi.

Important: You can run the command only if you are logged in with a Windows domain user name. If you try to run the command when you are logged in with a local user name, the following error message is displayed:

```
Connecting to directory service on server 9.11.91.70. [9.11.91.70]  
LDAP bind failed with error 1326,  
Logon failure: unknown user name or bad password.
```

When you run the **DCDIAG** command, and you connect to the domain controller computer, the output contains text such as passed test Connectivity. This text is displayed even if text such as tpcserver1.srm.tpc.example.com failed test DNS": Testing server: Default-First-Site-Name\TB326-WI is displayed at the end of the output.

The following output shows that the connection was successful:

```
Starting test: Connectivity  
* Active Directory LDAP Services Check  
*** Warning: could not confirm the identity  
of this server in the directory versus  
the names returned by DNS servers. If  
there are problems accessing this directory  
server then you may need to check that this  
server is correctly registered with DNS  
* Active Directory RPC Services Check  
..... TB326-WI passed test Connectivity
```

Start the installation program

There are various methods to start the Tivoli Storage Productivity Center installation programs and on various operating systems.

Installation images

If you are using electronic images, you must select an installation image. For a list of installation images, see "Tivoli Storage Productivity Center installation" on page 121.

Storage Resource agent

Contains the files to run local Storage Resource agent installations. You must download the file for the system on which you want the agent to be in.

- The Storage Resource agent location and operating system file name is the same as the disk 1 image.
- The Storage Resource agent image is in *DVD/data/sra/operating_system_name*.

The operating systems that are supported are listed in the following table.

Table 25. Operating system for Storage Resource agents.

Operating system	Operating system name
AIX	aix_power
HP-UX	hp-ux_itanium
Linux x86	linux_ix86
Linux for Power Systems Servers	linux_power
Linux s390	linux_s390
Oracle Solaris	solaris_spark
Windows	windows

Note:

- If you are using Tivoli Storage Productivity Center electronic installation images that been decompressed in a directory that has spaces in the name, Tivoli Storage Productivity Center does not install correctly.

For example, if you have the following directory name:

- On Windows operating systems:
C:\tpc 52 edition\disk1\TPC
- On AIX and Linux operating systems:
/temp/tpc 52 edition/disk1/TPC

Tivoli Storage Productivity Center does not install correctly.

When you remove the spaces, and rename the directory, for example:

- On Windows operating systems:
C:\tpc52edition\disk1\TPC
- On AIX and Linux operating systems:
/temp/tpc52edition/disk1/TPC

Tivoli Storage Productivity Center installs correctly.

- If you are using Tivoli Storage Productivity Center electronic installation images for Linux or AIX operating systems and you download the images to a directory, ensure that your folder name *does not* contain a . at the end of the folder name.

For example, if you have a directory name

C:\tpc52edition\disk1\TPC.

When you rename the folder and remove the . at the end of the name, for example:

C:\tpc52\disk1\TPC.August3

Tivoli Storage Productivity Center installs correctly.

- If you are deploying the Storage Resource agent on the UNIX or Linux operating system, you must use root as the user name.

Starting the installation program on the Windows operating system

To start the Tivoli Storage Productivity Center installation program by using an electronic image, complete the following steps.

1. Download the image into a directory.
2. Extract the file.
3. At the command prompt, enter `cd source_installation_directory\TPC` and then enter **setup.bat**.

To start the Tivoli Storage Productivity Center installation program by using the disk 1 DVD, complete the following steps.

1. Open Windows Explorer and go to the Tivoli Storage Productivity Center DVD drive or directory.
2. In Windows Explorer, go to the TPC directory on the Tivoli Storage Productivity Center DVD.
3. Double-click the setup.bat file.

Starting the installation program on the Linux operating system

To start the Tivoli Storage Productivity Center installation program from the electronic image (disk 1), complete the following steps.

1. Enter the following to create a directory:
`mkdir /tpcinst`
2. Enter `cd tpcinst`.
3. Enter `ftp filename.tar` to transfer the Tivoli Storage Productivity Center installation tar file into a directory.
4. Enter this command:
`tar -xvf filename.tar`
5. Set up your shell environment to point to the instance where the database repository is installed. Source the db2profile for the wanted instance. For example, if the DB2 instance is db2inst1, source the db2profile by entering:
`. /home/db2inst1/sqllib/db2profile`

Remember: There is a space between `.` and `/home`.

6. Add the user name that you plan to use as the Tivoli Storage Productivity Center Version 5.2 common user (for example, db2inst1) to the root group.
7. Start the installation program from the TPC directory (for example, `/tpcinst/TPC`).
8. Start the installation program by running the **./setup.bin** command.

To start the Tivoli Storage Productivity Center installation program from the disk 1 DVD, complete the following steps:

1. At the command prompt, enter `mkdir /cdrom` to create a mount point.
2. Insert the DVD into the DVD drive.
3. Mount the DVD file system at the appropriate mount point. For example, to mount a DVD into a DVD drive known as `/dev/cd0` at mount point `/cdrom`, enter the following command:
`mount -o ro /dev/cdrom /cdrom`

4. Enter `cd /cdrom` to go to the directory where the DVD is mounted.
5. Set up your shell environment to point to the instance where the database repository is installed. Source the `db2profile` for the appropriate instance. For example, if the DB2 instance is `db2inst1`, source the file by entering:
`. /home/db2inst1/sqllib/db2profile`

Remember: There is a space between `.` and `/home`.

6. Add the user name that you plan to use as the Tivoli Storage Productivity Center Version 5.2 common user (for example, `db2inst1`) to the root group.
7. Start the installation program from the TPC directory (for example, `/cdrom/TPC`).
8. Start the installation program by running the `./setup.bin` command. If `setup.bin` exits prematurely because the media (DVD) is not ready, run the `./setup.bin` command again until the installation wizard is displayed.

Starting the installation program on the AIX operating system

To start the Tivoli Storage Productivity Center installation program from the electronic image (disk 1), complete the following steps:

1. Enter the following to create a directory:
`mkdir /tpcinst`
2. Enter `cd tpcinst`.
3. Enter `ftp filename.tar` to transfer the Tivoli Storage Productivity Center installation tar file into a directory.
4. Enter this command:
`tar -xvf filename.tar`
5. Set up your shell environment to point to the instance where the database repository is installed. Source the `db2profile` for the wanted instance. For example, if the DB2 instance is `db2inst1`, source the file by entering:
`. /home/db2inst1/sqllib/db2profile`

Remember: There is a space between `.` and `/home`.

6. Add the user name that you plan to use as the Tivoli Storage Productivity Center Version 5.2 common user (for example, `db2inst1`) to the system group.
7. Start the installation program from the TPC directory (for example, `/tpcinst/TPC`).
8. Start the installation program by running the `./setup.bin` command.

To start the Tivoli Storage Productivity Center installation program from the disk 1 DVD, complete the following steps:

1. Insert the DVD into the DVD drive and mount the DVD file system at the wanted mount point. On the AIX operating system, you can use the `crfs` command to add an entry to `/etc/filesystems` for the mount point. Enter the following commands:

```
/usr/sbin/crfs -v cdrfs -p ro -d'cd0' -m'/cdrom' -A'no'
mount /cdrom
```

The `crfs` command must be run once for a mount point. After that you can use **mount** and **umount** for each DVD you insert, for example, **mount /cdrom** and **umount /cdrom**.

2. Enter `cd /cdrom` to go to the directory where the DVD is mounted.
3. Set up your shell environment to point to the instance where the database repository is installed. Source the `db2profile` for the appropriate instance.

For example, if the DB2 instance is db2inst1, source the file by entering:
.
./home/db2inst1/sqllib/db2profile

Remember: There is a space between . and /home.

4. Add the user name that you plan to use as the Tivoli Storage Productivity Center Version 5.2 common user (for example, db2inst1) to the system group.
5. Start the installation program from the TPC directory (for example, /cdrom/TPC).
6. Run the **./setup.bin** command. If the **setup.bin** command exits prematurely because the media (DVD) is not ready, run the **./setup.bin** command again until the installation wizard is displayed.

Installing DB2

You can install DB2 Enterprise Server Edition Version 10.1 Fix Pack 2 on the Linux, AIX, or Windows operating systems.

For more information about the supported versions, see “Software requirements for the database repository” on page 118.

Preparing to install DB2

Before you install DB2 Enterprise Server Edition Version 10.1 Fix Pack 2, a default user name and groups are created. This default user name and password are used to install Tivoli Storage Productivity Center. You can use the default user name and password or provide your own.

Note: Windows operating systems do not support systems that are configured only for IPv6. (Windows is enabled for IPv6 and IPv4.)

Preparing to install DB2 on Windows:

If you have an administrator user ID that you want to use to install DB2 and Tivoli Storage Productivity Center, this user ID must be a member of the DB2ADMNS and the Administrator groups.

When you install DB2, these groups are created:

- DB2ADMNS, which has all the required user rights that are assigned for administrative authority
- DB2USERS, which has user rights that are assigned to DB2 users

Assign users who need administrative authority to the DB2ADMNS group and DB2 users to the DB2USERS group. When you assign a user ID to either group, the user ID has all the user rights required for that group. You do not have to assign individual user rights to each user ID.

Important: The Windows Administrator user ID does not have the authority to create the Tivoli Storage Productivity Center database TPCDB. The DB2 administrator user ID that you need when you install Tivoli Storage Productivity Center must have DB2 administrative rights. The user ID that you need to install Tivoli Storage Productivity Center must be a member of the DB2ADMNS and Administrator groups. The DB2 user ID db2admin, which was created when you installed DB2, has the authority for Tivoli Storage Productivity Center. For valid DB2 user IDs and passwords, see User, user ID and group naming rules.

When you assign the Windows Administrator user ID to the DB2ADMNS group, this authority is active the next time the Administrator user ID logs in.

Short file names

If DB2 is installed on a drive on which 8.3 file names are disabled, and the DB2 installation directory name has spaces in it, DB2 must be reinstalled on a drive that has 8.3 file names enabled, or in a directory that does not have spaces in the name.

To check the current 8.3 file name settings for a drive, in a DB2 command window, run the **'fsutil.exe behavior query disable8dot3'** command.

These are the values when you run the command:

- 0 = Create 8.3 short file names (default)
- 1 = Do not create 8.3 file names
- 2 = Set 8.3 file names on a per volume basis
- 3 = Disable 8.3 file names on all volumes, except the system volume

The registry state of `NtfsDisable8dot3NameCreation` is 0 , which means that 8.3 file names are enabled on all volumes.

To enable 8.3 file names on a global basis, run the **fsutil.exe behavior set disable8dot3 0** command.

Preparing to install DB2 on UNIX or Linux:

To operate DB2 on operating systems such as UNIX or Linux, the instance owner, the fenced user, and the DB2 administration server user are required. These users and groups are automatically created when DB2 is installed.

The user ID you need to install Tivoli Storage Productivity Center must be the owner of the instance that you want to use. This user ID and password are created when you install DB2.

Table Table 26 provides a list of the default user and group names.

Table 26. DB2 Setup wizard default user and group names

Required user	Default user name	Default group name	Description
instance owner	db2inst1	db2iadm1	Created in the instance owner home directory. This user ID controls all DB2 processes and owns all file systems and devices used by the databases contained within the instance.
fenced user	db2fenc1	db2fadm1	Used to run user-defined functions and stored procedures that are separate from the address space that is used by the DB2 database.

Table 26. DB2 Setup wizard default user and group names (continued)

Required user	Default user name	Default group name	Description
DB2 administration server user	dasusr1	dasadm1	Used to run the DB2 administration server on your system and by the DB2 GUI tools to perform administration tasks. This server does not contain databases, and there is only one administration server for each computer.

Note: For valid DB2 user IDs and passwords, see <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/index.jsp?topic=/com.ibm.db2.luw.admin.dbobj.doc/doc/c0007248.html>.

Installing DB2 on a Windows operating system

Before you can install Tivoli Storage Productivity Center, you must install DB2 Enterprise Server Edition Version 10.1 Fix Pack 2.

To install DB2 on a Windows operating system, complete the following steps:

1. Log on with a user ID that has Administrator authority on Windows.
2. Insert the DB2 product DVD into the DVD drive or use the extracted DB2 installation image. Windows Autorun starts the launchpad.

If you are using Windows Autorun, the installation program should start in 15-30 seconds. If the installation program does not start, complete one of the following steps:

- In a command prompt, to start the DB2 set up page, go to the DVD-ROM\server directory or the *web image extraction*\server folder and run the **setup.exe** command.
 - In Windows Explorer, go to the DVD-ROM\server directory or the *web image extraction*\server folder, and double-click the setup.exe file.
3. On the DB2 Setup Launchpad page, click **Install a Product**.
 4. Click **Install New** for **DB2 Enterprise Server Edition Version 10.1**.
 5. On the Welcome to the DB2 Setup wizard for DB2 Enterprise Server Edition, Version 10.1 panel, click **Next**.
 6. On the Software License Agreement page, read, accept the license agreement, and click **Next**.
 7. On the Select the installation type page, select **Typical** and click **Next**.
 8. On Select installation, response file creation, or both page, select **Install DB2 Enterprise Server Edition on this computer and save my settings in a response file**.
 9. Enter a response file name or accept the default and click **Next**.
 10. On the Select the installation folder page, enter a directory or use the default and click **Next**.
 11. On the Select the IBM SSH server installation folder and startup option page, review the default directory path (or enter a new path), and click **Next**.
 12. On the Set user information for the DB2 Administration Server page, enter the following information for User information:

- a. Leave **Domain** blank.
 - b. In **User name**, type a user name of the DB2 user account that you want to use.
DB2 adds this user ID to the DB2ADMNS group.
 - c. Type your password and retype to confirm it.
13. Select the **Use the same account for the remaining DB2 services** check box and click **Next**.
The user ID and password are used to install Tivoli Storage Productivity Center.
 14. On the Configure DB2 instances page, click **Next**.
For information installing DB2 by using a Windows domain user account, see "Installing DB2 by using a Windows domain user account" on page 6.
 15. On the Prepare the DB2 tools catalog page, accept the defaults, click **Next**.
The default is to not prepare the DB2 tools catalog.
 16. On the Set up notifications page, clear the **Set up your DB2 server to send notifications** check box, and click **Next**.
 17. On the Enable operating system security for DB2 objects page, accept the defaults, and click **Next**.
The default is to enable operating system security.

Note: If you installed DB2 before on this system, and the DB2ADMS group exists, when you click **Next** in the security page, the following message is displayed: :

Warning
The group; name "DB2ADMS" already exists
in the system and will be granted complete
access to the DB2 folders and objects through
the operating system.
Click OK to continue installation, or click
Cancel to input another group name.

18. On the Start copying files and create response file page, review the summary information, and click **Finish**.
19. Read the information about the page and click **Next**.
20. On the Install additional products page, do not install more products, and click **Finish**.
21. The setup wizard closes and returns you to the DB2 Welcome screen that now has **Welcome to First Steps** in the left pane. Click **Product Updates** to see whether there are any product updates.
22. Click **Product Updates** and install the necessary updates and click **Exit**.
Attention: In the dialog box that is displayed, do not upgrade to DB2 9.5 fix pack 6 or DB2 9.7 fix pack 5. Tivoli Storage Productivity Center does not support DB2 9.5 fix pack 6 or DB2 9.7 fix pack 5 and installing these versions can create installation errors.
23. Restart the system.

Installing DB2 on UNIX or Linux - GUI installation

You can install DB2 Enterprise Server Edition Version 10.1 Fix Pack 2 on operating systems such as UNIX or Linux by using a graphic user interface (GUI) installation program.

Note: Before you install DB2 by using the GUI, install the X11 graphic capability.

To install DB2 on an operating system such as UNIX or Linux, complete the following steps.

1. Log in as a user ID with root authority.
2. Select one of the following options:
 - If you are not using a DVD, skip to step 6 and run **db2setup** from the directory where you have the DB2 source installation program.
 - If you are installing a DVD, create a mount point that is called /cdrom by entering **mkdir /cdrom**.

Note: If the installation program is compressed, you must use an extraction tool to decompress the downloaded file. See step 6 and run db2setup that is in the server directory.

You can also select an existing mount point.

3. Insert the DB2 DVD and mount the DVD file system at the wanted mount point.
4. Run one of the following commands to add an entry to /etc/filesystems for the DVD mount point.

AIX

```
/usr/sbin/crfs -v cdrfs -p ro -d'cd0' -m'/cdrom' -A'no'
mount /cdrom
```

Linux

```
mkdir /cdrom
mount -o ro /dev/cdrom /cdrom
```

The **crfs** command must be run only one time for a mount point. For each DVD you insert later, you can use **mount** and **umount**, for example, **mount /cdrom** and **umount /cdrom**.

5. Enter **cd /cdrom** to access the directory where the DVD is mounted.
6. Enter **./db2setup** to start the DB2 Setup wizard.
7. Enter **cd /cdrom/server** and then **./db2setup** to start the DB2 Setup wizard.
8. On the DB2 Setup Launchpad page, click **Install a Product**.
9. On the content page, click **Install New** for **DB2 Enterprise Server Edition Version 10.1 Fix Pack 2..**
10. On the Welcome to the DB2 Setup wizard page, click **Next**.
11. On the Software License Agreement page, read, click **Accept**, and click **Next**.
12. On the Select the installation type page, select **Typical** and click **Next**.
13. On the Select installation, response file creation, or both page, select **Install DB2 Enterprise Server Edition on this computer and save my settings in a response file**.
14. Enter a response file name, or accept the default, and click **Next**.
15. On the Select the installation directory page, enter a directory or use the default and click **Next**.
16. On the Install the IBM Tivoli System Automation for Multiplatforms (SA MP) page, select **Do not install SA MP**, and click **Next**.
17. On the Set user information for the DB2 Administration Server page, select **New user**, and enter the following information.
 - a. User name and password of the DB2 user account that you want to use.
DB2 adds this user ID to the DB2ADMNS group, and if this user ID does not exist, DB2 creates it.
 - b. Group name

- c. Password
 - d. Home directory
18. Select **Use default UID** and **Use default GID** and click **Next**. The DAS user is used to administer the DB2 database.
 19. On the Set up a DB2 instance page, select **Create a DB2 instance**, and click **Next**.
 20. On the Set up partitioning options for the DB2 instance page, select **Single partition instance**, and click **Next**.
 21. On the Set user information for the DB2 instance owner page, select **New user**, and enter the following information. The DB2 instance owner user is the user that you enter when you install Tivoli Storage Productivity Center.
 - User name
 - Group name
 - Password
 - Home directory
 22. Select **Use default UID** and **Use default GID**, and click **Next**.
 23. On the Set user information for the fenced user page, select **New user**, and enter the following information.
 - User name
 - Group name
 - Password and confirm password
 - Home directory
 24. Select **Use default UID** and **Use default GID**, and click **Next**.
 25. On the Prepare the DB2 tools catalog page, select **Do not prepare the DB2 tools catalog** and click **Next**.
 26. On the Set up notifications page, select **Do not set up your DB2 server to send notifications at this time**, and click **Next**.
 27. On the Start copying files and create response file page, review the summary information, and click **Finish**.
 28. Read the information about the panel and click **Finish**.

After you install DB2, edit the `/etc/group` file, add root to the `db2iadm1` group. The `db2iadm1` line in `/etc/group` looks like the following line.

```
db2iadm1:x:102:root
```

You must edit the `/etc/group` file and add `db2inst1` to the group root. After you add `db2inst1`, the line looks like the following line:

```
root:x:0:root,db2inst1
```

Installing DB2 on AIX by using the command-line

You can install DB2 Enterprise Server Edition Version 10.1 Fix Pack 2 on AIX operating systems such by using commands.

Ensure that you have:

- 2 - 3 GB of hard disk drive space for the DB2 installation tar file and extracted files.
- Chosen a file system with at least 30 GB for the Tivoli Storage Productivity Center repository.

To install DB2 Enterprise Server Edition Version 10.1 on the AIX operating system by using the command-line, complete the following steps.

1. Log in with a user ID that has root authority.
2. Do one of the following steps.
 - If you are not using a DVD, skip to step 5 and work from the directory where you have the DB2 source installation program.
 - If you are using a DVD, create a mount point that is called /cdrom by entering `mkdir /cdrom`.
3. Insert the DB2 DVD into the DVD drive and mount the file system at the mount point. On AIX, you can use the **crfs** command to add an entry to /etc/filesystems for the mount point.
4. Run the following commands:

```
/usr/sbin/crfs -v cdrfs -p ro -d'cd0' -m'/cdrom' -A'no'
mount /cdrom
```

The **crfs** command must be run only one time for a mount point. For each DVD you insert after that, you can use **mount** and **umount**, for example, **mount /cdrom** and **umount /cdrom**.

5. Enter `cd /cdrom` and go to the directory where the DVD-ROM is mounted.
6. Install the DB2 Manager.
 - a. Create a temporary directory (for example, db2temp) to hold the DB2 installer tar file and extracted files.
 - b. Copy or download the DB2 installer into db2temp. The name of the file varies depending on the location from where the file is downloaded or copied and the language to which it is associated.
 - c. Optional: If the DB2 installer file is compressed, use the appropriate extracting tool. For example, if the name of the file is `v10.1fp2_aix64_server.tar.gz`, enter **gunzip v10.1fp2_aix64_server.tar.gz**. In this example, `v10.1fp2_aix64_server.tar.gz` is displayed in the db2temp directory.
 - d. Create an installation directory by entering, for example, `mkdir install`.
 - e. Enter `cd install` to change to the new installation directory.
 - f. Extract the DB2 installation file. For example, if the name of the installation file is `v10.1fp2_aix64_server.tar`, enter `tar xvf ../v10.1fp2_aix64_server.tar`.
 - g. Enter `cd /db2temp/installer/ese/disk1` and go to the directory that contains the DB2 installation program `db2_install`.
 - h. Enter `./db2_install` to run the command-line installation program.
 - i. Select **DB2.ESE**. The Installation Summary is displayed, which indicates a successful installation. DB2 is installed in `/opt/ibm/db2`.
7. Create users and groups for use with DB2.
 - a. Enter `mkgroup id=999 db2iadml`.
 - b. Enter `mkgroup id=998 db2fadm1`.
 - c. Enter `mkgroup id=997 dasadm1`.
 - d. Enter `mkuser id=1004 pgrp=db2iadml groups=db2iadml home=/home/db2inst1 db2inst1`.
 - e. Enter `mkuser id=1003 pgrp=db2fadm1 groups=db2fadm1 home=/home/db2fenc1 db2fenc1`.
 - f. Enter `mkuser id=1002 pgrp=dasadm1 groups=dasadm1 home=/home/dasusr1 dasusr1`.

- g. Verify the owner of the directories by entering `ls -ld /home/db2inst1`. The directory ownership is displayed as follows:
 - `/home/db2inst1` shows group `db2iadml` and user `db2inst1`
 - `/home/db2fenc1` shows group `db2fadml` and user `db2fenc1`
 - `/home/dasusr1` shows group `dasadm1` and user `dasusr1`

If the directory ownership is not correct, run the following commands as appropriate:

```
chown -R db2inst1:db2iadml /home/db2inst1
chown -R db2fenc1:db2fadml /home/db2fenc1
chown -R dasusr1:dasadm1 /home/dasusr1
```
- h. Enter `passwd db2inst1 password`, where *password* represents the password you want to use for the DB2 instance.
- i. Enter `pwdadm -f NOCHECK db2inst1`.
- j. Enter `passwd db2fenc1 password`, where *password* represents the password you want to use for the fenced user.
- k. Enter `pwdadm -f NOCHECK db2fenc1`.
- l. Enter `passwd dasusr1 password`, where *password* represents the password you want to use for the DB2 administration server (DAS) user.
- m. Enter `pwdadm -f NOCHECK dasusr1`.
- n. Enter `chgroup users=db2inst1,root db2iadml`.
8. Create a DB2 Administrative Server (DAS) and enter `/opt/db2/V9.5/instance/dascrt -u dasusr1`.
9. Create a DB2 instance:
 - a. Enter `/opt/db2/V9.5/instance/db2icrt -a server -u db2fenc1 db2inst1`.
 - b. Enter `./home/db2inst1/sqlllib/db2profile`.
10. Change the default location for database repositories. By default, this location is `/home/db2inst1`. `/home` is typically not large enough for database repositories.
11. To change the default location:
 - a. Enter `db2 update dbm cfg using DFTDBPATH new_repository_path IMMEDIATE`, where *new_repository_path* represents the new location for the repository.
 - b. Enter `chown -R db2inst1:db2iadml new_repository_path` to assign ownership to `db2inst1` and permission to anyone in `db2iadml` (same as the ownership for `/home/db2inst1`).
12. Configure DB2 communication:
 - a. Edit `/etc/services` and verify or add the following line at the end of the file: `db2c_db2inst1 50000/tcp`
 - b. Enter `db2 update dbm cfg using svcename db2c_db2inst1`.
 - c. Enter `db2set`. An example of the output is `DB2COMM=tcPIP`.
13. In a command window, do the following to test your DB2 instance:
 - a. Enter `./home/db2inst1/sqlllib/db2profile` to source the environment.
 - b. Enter `db2level` to get information about the instance and DB2.
 - c. Enter `db2 create db test` to create a test database.
 - d. Enter `db2 list db directory` to list information about all the databases that are created for this instance.
 - e. Enter `db2 connect` to test user `db2inst1` using *password* to connect to the test database, where *password* is the password you defined in step 7 for the DB2 instance.

- f. Enter `db2 disconnect test` to disconnect from the test database.
- g. Enter `db2 drop db test` to drop the test database.

Installing DB2 on AIX 6.1 POWER7 Systems

How to install DB2 on AIX 6.1 POWER7 Systems is described here.

Ensure that you run `export JAVA_COMPILER=none` from a command window. This command is necessary as a result of APAR IC63450.

To install DB2, complete the following steps:

For more information about installing DB2, see <http://publib.boulder.ibm.com/infocenter/db2luw/v9r7/index.jsp?topic=/com.ibm.db2.luw.qb.server.doc/doc/t0006833.html>.

1. Log on using a user ID with root authority.
2. Do one of the following choices.
 - If you are not using a CD, you can skip to step 5 and run **db2setup** from the directory where you have the DB2 source installation program.
 - If you are using the CD, enter, for example, `mkdir /cdrom` to create a mount point that is called `/cdrom`.
3. Insert the DB2 CD into the CD drive.

On AIX, you can use the **crfs** command to add an entry to `/etc/filesystems` for the CD mount point.

4. Mount the CD file system at the wanted mount point.
5. Run the following commands:

```
/usr/sbin/crfs -v cdrfs -p ro -d'cd0' -m'/cdrom' -A'no' mount /cdrom
```

The **crfs** command must be run only one time for a specific mount point. For each CD or DVD you insert after that, you can use **mount** and **umount**, for example, `mount /cdrom` and `umount /cdrom`.

6. Enter `cd /cdrom` and change to the directory where the CD is mounted.
7. Run the following command from the installation image:

```
./db2_install
```

Enter the necessary information.

Note: If the following message is displayed:

```
WARNING: A minor error occurred while installing
```

Check the installation log for errors. If you do not see any errors, ignore this warning message.

8. Create DB2 groups, users, and instances.
 - a. For the DB2 groups, run the following commands.

```
mkgroup id=999 db2iadml
mkgroup id=998 db2fadml
mkgroup id=997 dasadm1
```

- b. For the DB2 users, run the following commands.

```
mkuser id=1004 pgrp=db2iadml groups=db2iadml
  home=/home/db2inst1 db2inst1
mkuser id=1003 pgrp=db2fadml groups=db2fadml
  home=/home/db2fenc1 db2fenc1
mkuser id=1002 pgrp=dasadm1 groups=dasadm1
  home=/home/dasusr1 dasusr1
```

- c. Set the password for db2inst1, db2fenc1, and dasusr1 by running the following commands:


```
passwd db2inst1
passwd db2fenc1
passwd dasusr1
```
- d. Setting the new passwords might require that you log in one time to change the initial password.


```
login db2inst1
```

 Change the initial password and replace with a new password. Repeat this step for db2fenc1 and dasusr1 users.
- e. Create the db2inst1 instance by running the following command:


```
/opt/IBM/db2/V9.7/instance/db2icrt -a server -u db2fenc1 db2inst1
```
- f. Create the dasusr1 instance by running the following command:


```
/opt/IBM/db2/V9.7/instance/dascrt dasusr1
```
9. Assign a communication port for the DB2 instance in the `/etc/services` file.
 - a. Select a name that is related to the instance name.
 - b. Select a free port, for example, 50000. Add the following line to the `/etc/services` file:


```
db2inst1c 50000/tcp
```
10. Configure the communication port in the database manager configuration for the instance:


```
db2 update dbm cfg using SVCENAME db2inst1c
```
11. Enable TCP/IP for the instance:


```
db2set DB2COMM=TCPIP
```

Note: After you install DB2, edit the file `/etc/group` and add root to the db2iadm1 group. The db2iadm1 line in `/etc/group` looks like the following line.

```
db2iadm1:x:102:root
```

Installing Data Studio by using the DB2 setup wizard

IBM Data Studio installation is included with the DB2 version 10.1 product installation. The DB2 Setup wizard provides an option to install Data Studio components.

Use the DB2 Setup wizard to define your installation preferences and to install Data Studio full client component.

1. Start the DB2 Setup wizard.
2. Select **Install Data Studio Components**.
3. Select **Install Data Studio full client component**.
4. Follow the instructions in the wizard to install Data Studio.

Verifying that DB2 is installed correctly

You can verify that DB2 Enterprise Server Edition Version 10.1 Fix Pack 2 has been installed properly by using the command-line processor (CLP) or the First Steps GUI.

To verify that DB2 has been installed, complete the following steps:

1. Create the SAMPLE database.
2. Connect to the SAMPLE database.
3. Run a query against the SAMPLE database.
4. Drop the SAMPLE database.

Verifying DB2 installation using the command-line processor (CLP):

You can verify that DB2 Enterprise Server Edition Version 10.1 Fix Pack 2 has been successfully installed using the command-line processor (CLP).

To verify that DB2 is installed using the command line processor, complete the following steps:

1. Log on to the system as a user with SYSADM authority.
2. Enter `db2start` to start the database manager.

Note: In operating systems such as UNIX and Linux, you must source the `db2profile` before you run the **db2start** command. For more information sourcing the profile, go to the Tivoli Storage Productivity Center information center and search for **Using the command line on UNIX and Linux**.

3. Enter the **db2sample** command to create the SAMPLE database. This command might take a few minutes to process. There is no completion message. When the command prompt returns, the process is complete. The SAMPLE database is automatically cataloged with the database alias SAMPLE when it is created.
4. Enter the following commands in a DB2 command window to connect to the SAMPLE database, retrieve a list of all the employees who work in Department 20, and reset the database connection:

```
db2 connect to sample
db2 "select * from staff where dept = 20"
db2 connect reset
```

5. After verifying the installation, remove the SAMPLE database to free up disk space. For more information about verifying DB2 installation, refer to the DB2 documentation for your operating system.
6. Enter `db2 drop database sample` to drop the SAMPLE database.

Verifying DB2 installation by using the First Steps tool:

You can verify that DB2 Enterprise Server Edition Version 10.1 Fix Pack 2 is installed successfully, by using the First Steps tool.

- Ensure that the domain user account that you use to create the sample database has SYSADM or SYSCTRL authority.
- Install IBM Data Studio and the First Steps component.

The First Steps tool is part of the getting started component grouping in the DB2 setup wizard. It is installed as part of a typical installation or you can select the First Steps tool during a custom installation.

To verify the DB2 Enterprise Server Edition Version 10.1 installation by using the First Steps tool, complete the following steps:

1. Log on to the system with the user account that you want to use to verify the installation.
2. Start First Steps by completing one of the following steps:
 - On operating systems such as UNIX or Linux, run the `db2fs` command.
 - On Windows, run the `db2fs.bat` command.
3. On the First Steps window, select **Create Sample Databases**.
4. On the Create Sample Databases page, select the databases that you want to create and click **OK**. By default, the SAMPLE database is created on the computer where DB2 is installed.

5. Click **OK**.
6. Open Data Studio.
7. Expand the navigation tree to view the SAMPLE database and SAMPLE database objects.
8. Select the Tables object to view the SAMPLE database tables.
9. After you verify the installation, remove the SAMPLE database to free disk space.
10. Enter the **db2 drop database sample** command to drop the SAMPLE database.

Installing Tivoli Storage Productivity Center in a single-server environment

Install Tivoli Storage Productivity Center by using the installation wizard or the command line in silent mode.

Installing Tivoli Storage Productivity Center in a single-server environment is a simple process and can be completed successfully by most Tivoli Storage Productivity Center customers.

Attention: You must install Jazz for Service Management from the Tivoli Storage Productivity Center installation program.

Installing Tivoli Storage Productivity Center in a single-server environment by using the wizard

You can use the Tivoli Storage Productivity Center installation wizard to install Tivoli Storage Productivity Center and to start the Jazz for Service Management Version 1.1.0.1 installation program in a single-server environment. You need Jazz for Service Management Version 1.1.0.1 to run Tivoli Storage Productivity Center reports.

Before you start the Tivoli Storage Productivity Center installation wizard on the AIX or Linux operating systems, you must source the user profile (db2profile) for the instance owner of the DB2 database. For example:

```
. /home/db2inst1/sqllib/db2profile
```

To install Tivoli Storage Productivity Center in a single-server environment by using the wizard, complete the following steps:

1. Log on to the computer where you want to install Tivoli Storage Productivity Center. Ensure that you have the administrator privileges to install applications on the computer.
2. Install DB2 Enterprise Server Edition. For more information about installing DB2, see “Installing DB2” on page 132.

Tip: If you are installing DB2 on a Windows operating system, log out and then log on again before you install Tivoli Storage Productivity Center.

When you install Tivoli Storage Productivity Center, a database that is called TPCDB is created. In this repository, the Tivoli Storage Productivity Center database schema is created, which describes the structure of the database repository. If you already have the TPCDB database on your system, Tivoli Storage Productivity Center assigns a new default database repository name with a number as a suffix, for example, TPCDB1.

3. If Jazz for Service Management is not installed, and you plan to run Tivoli Storage Productivity Center reports, download, and extract the compressed installation files in the same temporary directory.

For more information about the installation files, see Setting up a local file system for a custom installation.

Important: You must install Jazz for Service Management from the Tivoli Storage Productivity Center installation program.

4. Start the Tivoli Storage Productivity Center installation program.
5. Review the Welcome page and make one of the following decisions:
 - If Jazz for Service Management is installed on your computer, the Welcome page displays a green check mark. Click **Next** to proceed to the next page in the Tivoli Storage Productivity Center installation program and install Tivoli Storage Productivity Center with reports.
 - If Jazz for Service Management is not installed on your computer, the Welcome page displays an **Install Now** button.
 - If you do not want to install Jazz for Service Management on your computer, click **Next** to proceed to the next page in the Tivoli Storage Productivity Center installation program and install Tivoli Storage Productivity Center without reports.
6. If Jazz for Service Management is not installed, and you want to install it on your computer, you can install it now:
 - a. On the Welcome page, click **Install Now**.
 - b. On the Install Jazz for Service Management page, complete the following steps:
 - 1) Provide the location where the Jazz for Service Management and Tivoli Common Reporting installation files were extracted.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.
 - 2) If there is a port conflict, specify a new starting value for a 15 port range, and click the **Verify Port Availability** link to ensure that the port range is usable.
 - 3) Click **Install Now**.

The Tivoli Storage Productivity Center installation program pauses and the Jazz for Service Management launchpad starts.
 - c. When you exit the Jazz for Service Management launchpad, you are returned to the Install Jazz for Service Management page in the Tivoli Storage Productivity Center installation program. Click **OK**.
 - d. If the installation of Jazz for Service Management was successful, you are returned to the Welcome page, which now displays a green check mark. If the installation of Jazz for Service Management was not successful, a message is displayed, and you can click one of the following options:
 - **Install Now**, which starts the Jazz for Service Management launchpad again.
 - **Continue**, which returns you to the Welcome page.
 - e. On the Welcome page, click **Next**.
 - f. On the Choose Installation Location and Type page, select **Single Server**, and click **Next**.
7. If the installation of Jazz for Service Management was successful and you clicked **Next** on the Welcome page to install Tivoli Storage Productivity Center Version 5.2 with reports, on the Configure Jazz for Service Management and Tivoli Common Reporting page, enter the following information, and click **OK**:

- The user name that is used to log on to the Jazz for Service Management WebSphere profile.
- The password that is associated with the user name.
- The path for the Jazz for Service Management installation directory.

Jazz for Service Management starts. After Jazz for Service Management starts, it might take some time before all components, including Tivoli Common Reporting, are running.

If the Tivoli Storage Productivity Center Version 5.2 installation program is unable to communicate with Jazz for Service Management, you can select the **Install Tivoli Storage Productivity Center reports later** check box, click **OK**, and continue installing Tivoli Storage Productivity Center without reports. After you install Tivoli Storage Productivity Center without reports, and resolve any problems with Jazz for Service Management, start the Tivoli Storage Productivity Center installation program again to install Tivoli Storage Productivity Center reports.

Important: If the installation of Jazz for Service Management was not successful and you clicked **Next** on the Welcome page to install Tivoli Storage Productivity Center Version 5.2 without reports, the Configure Jazz for Service Management and Tivoli Common Reporting page does not display.

8. Follow the prompts in the installation wizard to install Tivoli Storage Productivity Center.

If an error occurred during the Tivoli Storage Productivity Center installation process, review the Tivoli Storage Productivity Center installation log files to find details about the error. If you installed Tivoli Storage Productivity Center without installing Tivoli Storage Productivity Center reports, see “Installing Tivoli Storage Productivity Center reports later in a single-server environment by using the wizard” on page 152 to install Tivoli Storage Productivity Center reports.

Related reference:

“Reviewing the log files to resolve installation issues” on page 212

If an error occurs during Tivoli Storage Productivity Center installation, you can review the error log files to resolve issues and continue the installation.

Installing Tivoli Storage Productivity Center in a single-server environment by using silent mode

You can install Tivoli Storage Productivity Center by using silent mode. If you want to install Tivoli Storage Productivity Center with reports by using silent mode, you first must install Jazz for Service Management. You can also install Tivoli Storage Productivity Center without reports by using silent mode.

Before you start the Tivoli Storage Productivity Center installation program on AIX or Linux operating system, you must source the user profile (db2profile) for the instance owner of the DB2 database. For example:

```
. /home/db2inst1/sqllib/db2profile
```

To install Tivoli Storage Productivity Center in a single-server environment by using silent mode, complete the following steps:

1. Log on to the computer where you want to install Tivoli Storage Productivity Center. Ensure that you have the administrator privileges to install applications on the computer.
2. Install DB2 Enterprise Server Edition.

For more information about installing DB2, see “Installing DB2” on page 132.

Tip: If you are installing DB2 on a Windows operating system, log out and then log on again before you install Tivoli Storage Productivity Center.

When you install Tivoli Storage Productivity Center, a database that is called TPCDB is created. In this repository, the Tivoli Storage Productivity Center database schema is created, which describes the structure of the database repository. If you already have the TPCDB database on your system, Tivoli Storage Productivity Center assigns a new default database repository name with a number as a suffix, for example, TPCDB1.

3. If Jazz for Service Management is not installed, and you plan to run Tivoli Storage Productivity Center reports, download and extract the Jazz for Service Management and Tivoli Common Reporting compressed installation files to the same temporary directory.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`. For more information about the installation files, see *Setting up a local file system for a custom installation*.

For more information about installing Jazz for Service Management by using silent mode, see *Custom installations by using silent mode*.

4. Edit and save the appropriate response file.

For more information about editing the response file, see “Editing the response file” on page 147.

5. Run the silent mode installation program.

- For Windows operating systems, run the following command:
`setup.bat -l language -i silent -f absolute_path_to_response_file`
where *language* can be one of the following values:

- Czech - cs
- English - en
- French - fr
- German - de
- Hungarian - hu
- Italian - it
- Japanese - ja
- Korean - ko
- Polish - pl
- Brazilian Portuguese - pt_BR
- Russian - ru
- Spanish - es
- Chinese (Simplified) - zh_CN
- Chinese (Traditional) - zh_TW

absolute_path_to_response_file is the absolute path to the response file. For example, the following command specifies the language and the path:

```
setup.bat -l fr -i silent -f
c:\TPC52\silent_SingleServerTypical.properties
```

- For AIX or Linux operating systems, run the following command:
`./setup.bin -l language -i silent -f /absolute_path_to_response_file`

For example, the following command specifies the language and the path:
`./setup.bin -l de -i silent -f /TPC52/silent_SingleServerTypical.properties`

If you do not specify a language or if the language is not specified correctly, the installation program uses the English language as the default.

6. Optional: Monitor the progress of the installation.

- To view the progress of the silent mode installation on Windows operating systems, check the trace log in the following path:

TPC_installation_directory\logs\traceTPCInstall.log

- To view the progress of the silent mode installation on AIX or Linux operating systems, check the trace log in the following path:

TPC_installation_directory/logs/traceTPCInstall.log

If you installed Tivoli Storage Productivity Center without installing Tivoli Storage Productivity Center reports by using silent mode, see “Installing Tivoli Storage Productivity Center reports later in a single-server environment by using silent mode” on page 154 to install Tivoli Storage Productivity Center reports.

Editing the response file

You must edit and save the appropriate response file when you install Tivoli Storage Productivity Center by using silent mode. The silent mode installation option for the response file is `-f absolute_path_to_response_file`. For example, in the Windows operating system, you enter `-f C:\installimage\silent_SingleServerTypical.properties`.

Use the following response files during a silent mode installation:

silent_SingleServerTypical.properties

This file specifies that all the Tivoli Storage Productivity Center components are installed on one server. There are no customization options.

silent_SingleServerCustom.properties

This file specifies that all the Tivoli Storage Productivity Center components are installed on one server with the following customization options:

- Change the user name and password to install the database repository.
- Change the name of the database repository.
- Change the paths for the database repository.
- Change the path for the database repository log.
- Change the ports for the Data server, Device server, Replication server, web server, and Storage Resource agent.

silent_MultipleServer.properties

This file specifies the information that is required for a multiple-server environment. You can have these configurations:

- The database repository on a remote server and the other Tivoli Storage Productivity Center components on a local server.
- Tivoli Storage Productivity Center reports on a remote server and the other Tivoli Storage Productivity Center components on a local server.

Common response file parameters

These installation parameters are valid for all the response files.

CHOSEN_INSTALL_TYPE="option"

Specifies the installation type. Not all options are available in all the response files. Table 27 on page 148 provides the options that you can specify.

Table 27. Options for the *CHOSEN_INSTALL_TYPE* parameter

Properties file	Valid options
<code>silent_SingleServerTypical</code>	<ul style="list-style-type: none"> • Single Server Install • License Upgrade
<code>silent_SingleServerCustom</code>	<ul style="list-style-type: none"> • Single Server Install • License Upgrade
<code>silent_MultipleServer</code>	<ul style="list-style-type: none"> • Multiple Server Install • License Upgrade

For example:

```
CHOSEN_INSTALL_TYPE="Single Server Install"
```

LICENSE_ACCEPTED=false

Specifies whether the user accepts the Tivoli Storage Productivity Center license agreement. The options are:

true

The user accepts all the terms and conditions of the Tivoli Storage Productivity Center license agreement.

false or any other value

The user does not accept the Tivoli Storage Productivity Center license agreement. The installation program will exit.

USER_INSTALL_DIR=option

Specifies the location where you want to install Tivoli Storage Productivity Center.

On Windows operating systems, you must use double backslashes. For example:

```
USER_INSTALL_DIR=C:\\Program Files\\IBM\\TPC
```

The default value for Windows operating systems is `C:\\Program Files\\IBM\\TPC`.

The default value for AIX or Linux operating systems is `/opt/IBM/TPC`.

varSrvName=option

Specifies the fully qualified host name of the server.

If your system is configured for dual stack networking (with both IPv4 and IPv6 addresses), Tivoli Storage Productivity Center defaults to IPv4 addressing.

Ensure that DNS is configured correctly on your server and verify that these files exist on your target server:

- For Windows operating systems, `C:\\Windows\\system32\\drivers\\etc\\hosts`.
- For AIX or Linux operating systems, `/etc/hosts`.

These files must have an entry similar to the following example:

```
myserver.example.mycompany.com myserver
```

varTPCPortRangeSP=port

Specifies the first port in a range of ports. The default beginning port is 9549. These ports are used by the Tivoli Storage Productivity Center servers, and the Storage Resource agent.

varCommonUsrID=user_name

Specifies the user name to install Tivoli Storage Productivity Center. The

default user name for Windows operating system is db2admin. The default user name for AIX or Linux operating system is db2inst1.

The user name that you select must have the following operating system privileges:

- For Windows operating systems, the user name must be in the administrators group.
- For Linux operating systems, the user name must be in the root group.
- For AIX operating systems, the user name must be in the system group.

If you are using the common user name to also install the database repository, the user name must have these DB2 privileges:

- For Windows operating systems, the user name must be in the DB2ADMNS group.
- For AIX or Linux operating systems, the user name must be in the db2iadm1 group.

varCommonUsrPw=password

Specifies the password for the common user name.

varFullRollback=value

Specifies whether a full rollback or partial rollback is done when an installation failure occurs. The value is:

- 0** Specifies that a partial rollback occurs. This value is the default.
- 1** Specifies that a full rollback occurs.

varUseLicenseKeyOnImage=value

Specifies whether to use the license key file that is present on the installation image. The value can be:

- 0** Uses the license key that is present on the installation image (default value)
- 1** Provides the location of the license key file

Depending on the license package you purchased, one of these license files is included with Tivoli Storage Productivity Center in the root installation directory and is on disk 1, part 1 of the DVD or electronic image:

node lock

Tivoli Storage Productivity Center license

node lock.SEL

Tivoli Storage Productivity Center Select license

node lock.AE

Tivoli Storage Productivity Center Advanced license

node lock.EE

Tivoli Storage Productivity Center product included with IBM Systems Director

varLicenseKeyFile=location_of_license_key_file

Specifies the path for the license key file. This value must be set if the **varUseLicenseKeyOnImage=1** parameter is specified.

On the Windows operating system, you must use double backslashes. For example:

varLicenseKeyFile=C:\license\key\node lock.SEL

varInstallReportingLater=*value*

Specifies whether you want to install Tivoli Storage Productivity Center reports now or later. The values are:

- **false**
Install the Tivoli Storage Productivity Center reports now (default value)
- **true**
Install the Tivoli Storage Productivity Center reports later.

Jazz for Service Management must be installed on the computer before you install Tivoli Storage Productivity Center reports.

JAZZSM_INSTALL_DIR=*Location_of_JazzSM_installation_directory*

Specifies the expected default directory where Jazz for Service Management has been installed.

- For the Windows operating system, the expected default directory is C:\\Program Files\\IBM\\JAZZSM.
- For the UNIX operating system, the expected default directory is /opt/IBM/JazzSM.

varJazzSMUsrID=*user_name*

Specifies the Jazz for Service Management user name. This user name was used to install Jazz for Service Management.

varJazzSMUsrPW=*password*

Specifies the valid password that has been used with the Jazz for Service Management user name.

Response file parameter to customize Tivoli Storage Productivity Center ports

This parameter is used for the `silent_SingleServerCustom.properties` and `silent_MultipleServer.properties` response files to configure the ports.

varTPCServersPortRangeSP=*port*

Specifies the first port in a range of ports for the Tivoli Storage Productivity Center servers, and Storage Resource agent. The default beginning port is 9549.

This value overrides the value that is specified in the **varTPCPortRangeSP** parameter.

Response file parameters for advanced customization of the database repository

These parameters are used for the `silent_SingleServerCustom.properties` and `silent_MultipleServer.properties` response files to configure the database repository.

varDBAdmUsr=*user_name*

Specifies the user name that you must use to install the Tivoli Storage Productivity Center database. The user who logs in with this user name must be the owner of the DB2 instance where the database is created.

This user name must have these DB2 privileges:

- For Windows operating systems, the user name must be in the DB2ADMNS group. The default user name is db2admin.
- For AIX or Linux operating systems, the user name must be in the db2iadm1 group. The default user name is db2inst1.

varDBAdmPW=password

Specifies the password that is associated with the DB2 user name.

varDBName=database_name

Specifies the name of the Tivoli Storage Productivity Center database. The default database name is TPCDB.

Specify the database name by using the following rules:

- The name can contain the following characters:
 - a - z
 - A - Z
 - 0 - 9
- The name must be 1 - 8 characters long.

Restriction: The database name cannot have the following conditions:

- Contain a space or a blank.
- Begin with SYS, DBM, or IBM.
- Be the name of an existing database.

varDBPath=database_location, database_location, ...

Specifies the absolute paths for the database.

The database path must follow these rules:

- The path cannot be longer than 242 bytes.
- The path must be an absolute path and not a relative path, for example, C:\

You can specify a maximum of 10 database paths and separate them with commas. For example, in the Windows operating system, you would specify C:,D:. In the AIX or Linux operating system, you would specify /home/db2inst1,/testPath.

- For example, on the Windows operating system, if the database is on the C drive, you can add a D drive, an E drive.

On Windows operating systems, you must use double backslashes. For example:

```
varDBPath=C:\DB2\TPCDB,D:\TPCDB,E:\TPCDB
```

- For example, on the AIX operating system:

```
/home/db2inst1,/testPath
```

varDBLogPath=log_location

Specifies the absolute path where the database log files are stored. The default value of the variable is set to <dftdbpath>/<instance name>/<varDBName>/SQLLOG.

For example:

- On Windows operating systems, c:\DB2\TPCDB\SQLLOG
- On AIX operating systems, /home/db2inst1/db2inst1/TPCDB/SQLLOG

Response file parameter for the multiple-server environment

This parameter is valid for the silent_MultipleServer.properties file.

varMultipleServerComponentList=components

Specifies the Tivoli Storage Productivity Center components to install. Separate the components with commas:

database

Installs the Tivoli Storage Productivity Center database repository.

servers

Installs the Data server, Device server, Replication server, web server, the Storage Resource agent, CLI, the web-based GUI, and the stand-alone GUI.

tcr

Installs Tivoli Storage Productivity Center reports.

Response file parameters for the remote database

The following parameters are used only in the `silent_MultipleServer.properties` response file to access the Tivoli Storage Productivity Center database on a remote server.

Remember: The DB2 database must be installed before you can use these parameters to access the database.

varRemoteDBSrvName=*host_name*

Specifies the fully qualified host name or IP address of the remote server where the Tivoli Storage Productivity Center database repository is installed.

Tivoli Storage Productivity Center accepts both IPv4 and IPv6 addresses. If you have a system that is configured for dual stack networking (with both IPv4 and IPv6 addresses), Tivoli Storage Productivity Center defaults to IPv4 addressing.

For example, an IPv6 address in long form can be 2001:DB8:0:0:0:0:0:0. An IPv6 address in short form can be 2001:DB8:: or 2001:DB8:0.0.0.0.0.0.

varRemoteDBPort=*port*

Specifies the DB2 port on the remote server. The default port is 50000.

varRemoteDBAdmUsr=*user_name*

Specifies the administrative user name to connect to the remote database. The default user name for the Windows operating system is db2admin. The default user name for the AIX or Linux operating system is db2inst1.

varRemoteDBAdmPW=*password*

Specifies the password for the user name.

varRemoteDBName=*database_name*

Specifies the Tivoli Storage Productivity Center database on the remote server. The default name is TPCDB.

Related reference:

“TCP/IP ports used by Tivoli Storage Productivity Center” on page 19

When you install Tivoli Storage Productivity Center, default ports must be opened through the firewall. You must disable the firewall program or open the ports to allow incoming requests to the Tivoli Storage Productivity Center ports. Review these ports before you install Tivoli Storage Productivity Center.

Installing Tivoli Storage Productivity Center reports later in a single-server environment by using the wizard

In a single-server environment, you can install Tivoli Storage Productivity Center reports after you install Tivoli Storage Productivity Center.

Ensure that you have completed the steps in “Installing Tivoli Storage Productivity Center in a single-server environment by using the wizard” on page 143.

You can install Tivoli Storage Productivity Center reports after you install Tivoli Storage Productivity Center Version 5.2 for one of the following reasons:

- You chose not to install Jazz for Service Management the first time you ran the Tivoli Storage Productivity Center Version 5.2 installation program. Tivoli Storage Productivity Center was installed without Tivoli Storage Productivity Center reports.
- You attempted to install Jazz for Service Management the first time you ran the Tivoli Storage Productivity Center Version 5.2 installation program, but the Jazz for Service Management installation did not succeed. Tivoli Storage Productivity Center was installed without Tivoli Storage Productivity Center reports.
- You successfully installed Jazz for Service Management the first time you ran the Tivoli Storage Productivity Center Version 5.2 installation program, but there was an issue when the installation program attempted to communicate with Jazz for Service Management. Tivoli Storage Productivity Center was installed without Tivoli Storage Productivity Center reports.

This procedure assumes one of the following conditions:

- You have not yet installed Jazz for Service Management.
- You resolved any issues that you experienced during the initial attempt to install Jazz for Service Management.

To install Tivoli Storage Productivity Center reports later in a single-server environment, complete the following steps:

1. Log on to the Tivoli Storage Productivity Center computer with the appropriate user privileges.
2. If Jazz for Service Management is not installed, and you plan to run Tivoli Storage Productivity Center reports, download and extract the Jazz for Service Management and Tivoli Common Reporting compressed installation files to the same temporary directory.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

For more information about the installation files, see *Setting up a local file system for a custom installation*.

3. Start the Tivoli Storage Productivity Center installation program again.
4. If Jazz for Service Management is not installed, and you want to install it on your computer, you can install it now:
 - a. On the Welcome page, click **Install Now**.
 - b. On the Install Jazz for Service Management page, complete the following steps:
 - 1) Provide the location where the Jazz for Service Management and Tivoli Common Reporting installation files were extracted.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.
 - 2) If there is a port conflict, specify a new starting value for a 15 port range, and click the **Verify Port Availability** link to ensure that the port range is usable.
 - 3) Click **Install Now**.

The Tivoli Storage Productivity Center installation program pauses and the Jazz for Service Management launchpad starts.

- c. When you exit the Jazz for Service Management launchpad, you are returned to the Install Jazz for Service Management page in the Tivoli Storage Productivity Center installation program. Click **OK**.
- d. If the installation of Jazz for Service Management was successful, you are returned to the Welcome page, which now displays a green check mark. If the installation of Jazz for Service Management was not successful, a message is displayed, and you can click one of the following options:
 - **Install Now** to restart the Jazz for Service Management launchpad.
 - **Continue** to return to the Welcome page.

You must install Jazz for Service Management successfully to continue installing Tivoli Storage Productivity Center reports.

- e. If the installation of Jazz for Service Management was successful and a green check mark is displayed on the Welcome page, click **Next**.
5. On the Configure Jazz for Service Management and Tivoli Common Reporting page, enter the following information and click **Next**:
 - The user name that is used to log on to the Jazz for Service Management WebSphere profile.
 - The password that is associated with the user name.
 - The path for the Jazz for Service Management installation directory.

If the Tivoli Storage Productivity Center Version 5.2 installation program is unable to communicate with Jazz for Service Management, you must resolve this problem to continue installing Tivoli Storage Productivity Center reports.

6. Follow the prompts in the installation wizard to install Tivoli Storage Productivity Center reports.

Installing Tivoli Storage Productivity Center reports later in a single-server environment by using silent mode

In a single-server environment, you can install Tivoli Storage Productivity Center reports by using silent mode after you install Tivoli Storage Productivity Center.

It is expected that you have completed the steps in “Installing Tivoli Storage Productivity Center in a single-server environment by using silent mode” on page 145.

You can install Tivoli Storage Productivity Center reports after you install Tivoli Storage Productivity Center Version 5.2 by using silent mode for one of the following reasons:

- You chose not to install Jazz for Service Management before you installed Tivoli Storage Productivity Center by using silent mode.
- You encountered issues when attempting to install Jazz for Service Management before you installed Tivoli Storage Productivity Center by using silent mode.

This procedure assumes one of the following conditions:

- You have successfully installed Jazz for Service Management.
- You resolved any issues that you experienced during the initial attempt to install Jazz for Service Management.

To install Tivoli Storage Productivity Center reports later by using silent mode, complete the following steps:

1. Log on to the Tivoli Storage Productivity Center computer with the appropriate user privileges.
2. Edit the same response file that you used when you installed Tivoli Storage Productivity Center without reports by using silent mode. For information about editing the response file, see “Editing the response file” on page 147.
3. Set the `varInstallReportingLater` parameter to the following value:
false
4. Ensure that the following parameters have the correct values:
 - `JAZZSM_INSTALL_DIR`, which is the directory where Jazz for Service Management is installed.
 - `varJazzSMUsrID`, which is the user ID that was used to install Jazz for Service Management
 - `varJazzSMUsrPW`, which is the password that is valid for the Jazz for Service Management user ID.
5. Run the silent mode installation program to install only Tivoli Storage Productivity Center reports.
 - For Windows operating systems, run the following command:
`setup.bat -l language -i silent -f absolute_path_to_response_file`
 where *language* can be one of the following values:
 - Czech - cs
 - English - en
 - French - fr
 - German - de
 - Hungarian - hu
 - Italian - it
 - Japanese - ja
 - Korean - ko
 - Polish - pl
 - Brazilian Portuguese - pt_BR
 - Russian - ru
 - Spanish - es
 - Chinese (Simplified) - zh_CN
 - Chinese (Traditional) - zh_TW

`absolute_path_to_response_file` is the absolute path to the response file. For example, the following command specifies the language and the path:

```
setup.bat -l fr -i silent -f
c:\TPC52\silent_SingleServerTypical.properties
```

- For AIX or Linux operating systems, run the following command:
`./setup.bin -l language -i silent -f /absolute_path_to_response_file`

For example, the following command specifies the language and the path:
`./setup.bin -l de -i silent -f /TPC52/silent_SingleServerTypical.properties`

If you do not specify a language or if the language is not specified correctly, the installation program uses the English language as the default.

Installing Tivoli Storage Productivity Center in a multiple-server environment

You can install Tivoli Storage Productivity Center by using the installation wizard or by using silent mode from the command line. Installing Tivoli Storage Productivity Center by using console mode is not supported.

A multiple-server environment is ideal if you are monitoring large storage environments, where one server is not sufficient to manage the Tivoli Storage Productivity Center components. In this environment, Jazz for Service Management and Tivoli Common Reporting can run on a separate server.

This environment facilitates the integration with other Tivoli products that are using Jazz for Service Management and Tivoli Common Reporting components and allows the sharing of components that are installed on a separate server. If you have different administrators for DB2 and Tivoli Storage Productivity Center, this environment allows the database repository and DB2 to be installed and managed on a separate server.

Related tasks:

“Installing Tivoli Storage Productivity Center with a remote database by using the installation wizard”

You can install Tivoli Storage Productivity Center in a multiple-server environment by using the installation wizard.

“Installing Tivoli Storage Productivity Center with remote reports by using the installation wizard” on page 160

You can install Tivoli Storage Productivity Center reports in a multiple-server environment by using the installation wizard.

“Installing Tivoli Storage Productivity Center with a remote database by using silent mode” on page 163

You can install Tivoli Storage Productivity Center in a multiple-server environment by using silent mode.

“Installing Tivoli Storage Productivity Center with remote reports by using silent mode” on page 166

You can install Tivoli Storage Productivity Center in a multiple-server environment by using silent mode.

Installing Tivoli Storage Productivity Center with a remote database by using the installation wizard

You can install Tivoli Storage Productivity Center in a multiple-server environment by using the installation wizard.

Before you start the Tivoli Storage Productivity Center installation program on AIX or Linux operating system, you must source the user profile, `db2profile`, for the instance owner of the DB2 database. For example:

```
. /home/db2inst1/sqllib/db2profile
```

When you install Tivoli Storage Productivity Center, a database that is called TPCDB is created. In this repository, the Tivoli Storage Productivity Center database schema is created, which describes the structure of the database repository. If you already have the TPCDB on your system, Tivoli Storage Productivity Center assigns a new default database repository name with a number as a suffix for example, TPCDB1.

For this procedure, the terms *Server A* and *Server B* denote the two servers. Server A will have DB2 Enterprise Server Edition and the Tivoli Storage Productivity

Center database repository installed. Server B will have DB2 Enterprise Server Edition, Jazz for Service Management (which includes TCRDB, the database for Tivoli Common Reporting), the Tivoli Storage Productivity Center servers, and Tivoli Storage Productivity Center reports installed.

To install Tivoli Storage Productivity Center with a remote database by using the installation wizard, complete the following steps:

1. Complete the following steps on Server A:
 - a. Log on to Server A. Ensure that you have the administrator privileges to install applications on the computer.
 - b. Install DB2 Enterprise Server Edition on Server A. For more information about installing DB2, see “Installing DB2” on page 132.
 - c. If you are installing DB2 on a Windows operating system, log out and log on again before you install Tivoli Storage Productivity Center.
 - d. Start the Tivoli Storage Productivity Center installation wizard on Server A.
 - e. On the Welcome page, because only the Tivoli Storage Productivity Center database repository will be installed on Server A, click **Next**.
 - f. On the Choose Installation Location and Type page, select **Multiple servers** and click **Next**.
 - g. On the Multiple Server Option: Select the Components page, select **Database repository** and click **Next**.
 - h. Follow the prompts in the installation wizard to install the Tivoli Storage Productivity Center database repository on Server A.
 - i. After the installation is finished, review the message log on Server A to ensure that no errors occurred.
2. Complete the following steps on Server B:
 - a. Log on to Server B. Ensure that you have the administrator privileges to install applications on the computer.
 - b. Install DB2 Enterprise Server Edition on Server B.

Important: DB2 Enterprise Server Edition is installed on Server A and on Server B because even though you are installing Tivoli Storage Productivity Center in a multiple-server environment, it is expected that you are installing Jazz for Service Management in a single-server environment.

If you plan to install Jazz for Service Management in a multiple-server environment, and TCRDB is remote, go to the following topics:

- Custom installation, two server topology
 - Installing Tivoli Common Reporting from launchpad tools
- c. If Jazz for Service Management is not installed, and you plan to run Tivoli Storage Productivity Center reports, download and extract the Jazz for Service Management and Tivoli Common Reporting compressed installation files to the same temporary directory.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

For more information about the installation files, see Setting up a local file system for a custom installation.

Important: You must install Jazz for Service Management from the Tivoli Storage Productivity Center installation program.

- d. Start the Tivoli Storage Productivity Center installation wizard on Server B.
- e. Review the Welcome page and make one of the following decisions:
 - If Jazz for Service Management is installed on Server B, the Welcome page displays a green check mark. Click **Next** to proceed to the next page in the Tivoli Storage Productivity Center installation program and install Tivoli Storage Productivity Center with reports on Server B.
 - If Jazz for Service Management is not installed on Server B, the Welcome page displays an **Install Now** button.
 - If you do not want to install Jazz for Service Management on Server B, click **Next** to proceed to the next page in the Tivoli Storage Productivity Center installation program and install Tivoli Storage Productivity Center without reports on Server B.
- f. If Jazz for Service Management is not installed on Server B, and you want to install on Server B, you can install it now:
 - 1) On the Welcome page, click **Install Now**.
 - 2) On the Install Jazz for Service Management page, provide the location where the Jazz for Service Management and Tivoli Common Reporting installation files were extracted.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.
 - 3) If there is a port conflict, specify a new starting value for a 15 port range, and click the **Verify Port Availability** link to ensure that the port range is usable.
 - 4) Click **Install Now**.

The Tivoli Storage Productivity Center installation program pauses and the Jazz for Service Management launchpad starts.

When you exit the Jazz for Service Management launchpad, you are returned to the Install Jazz for Service Management page in the Tivoli Storage Productivity Center installation program. Click **OK**. If the installation of Jazz for Service Management was successful on Server B, you are returned to the Welcome page, which now displays a green check mark.

If the installation of Jazz for Service Management was not successful on Server B, a message is displayed, and you can click one of the following options:

 - **Install Now**, which starts the Jazz for Service Management launchpad again.
 - **Continue**, which returns you to the Welcome page.

On the Welcome page, click **Next**.
- g. On the Choose Installation Location and Type page, select **Multiple servers** and click **Next**.
- h. On the Multiple Server Options: Select the Components page, select one of the following options:
 - If the installation of Jazz for Service Management was successful on Server B, select **Tivoli Storage Productivity Center Servers and Tivoli Storage Productivity Center reports** and click **Next**.
 - If the installation of Jazz for Service Management was not successful on Server B, select **Tivoli Storage Productivity Center Servers** and click **Next**.

Attention: Tivoli Storage Productivity Center servers includes the following components:

- web-based GUI
 - stand-alone GUI
 - CLI
 - Storage Resource agent
- i. If the installation of Jazz for Service Management was successful on Server B, and you clicked **Next** on the Welcome page to install Tivoli Storage Productivity Center Version 5.2 with reports, on the Configure Jazz for Service Management and Tivoli Common Reporting page, enter the following information, and click **OK**:
- The user name that is used to log on to the Jazz for Service Management WebSphere profile.
 - The password that is associated with the user name.
 - The path for the Jazz for Service Management installation directory.

Jazz for Service Management starts. After Jazz for Service Management starts, it might take some time before all components, including Tivoli Common Reporting, are running.

If the Tivoli Storage Productivity Center Version 5.2 installation program is unable to communicate with Jazz for Service Management on Server B, you can select the **Install Tivoli Storage Productivity Center reports later** check box, click **OK**, and continue installing Tivoli Storage Productivity Center without reports on Server B. After you install Tivoli Storage Productivity Center without reports, and resolve any problems with Jazz for Service Management, start the Tivoli Storage Productivity Center installation program again on Server B to install Tivoli Storage Productivity Center reports.

Attention: If the installation of Jazz for Service Management was not successful on Server B, and you clicked **Next** on the Welcome page to install Tivoli Storage Productivity Center Version 5.2 without reports, the Configure Jazz for Service Management and Tivoli Common Reporting page does not display.

- j. Follow the prompts in the installation wizard to install the Tivoli Storage Productivity Center components on Server B.
- k. After the installation is finished, review the message log on Server B to ensure that no errors occurred.

If you installed Tivoli Storage Productivity Center without installing Tivoli Storage Productivity Center reports on Server B, see “Installing Tivoli Storage Productivity Center reports later in a multiple-server environment by using the wizard” on page 170 to install Tivoli Storage Productivity Center reports on Server B.

Related tasks:

“Installing DB2” on page 132

You can install DB2 Enterprise Server Edition Version 10.1 Fix Pack 2 on the Linux, AIX, or Windows operating systems.

Related reference:

“Planning for Tivoli Storage Productivity Center authentication and authorization” on page 13

An operating system user name is required to install and log on to Tivoli Storage Productivity Center for the first time. After you install Tivoli Storage Productivity Center, you can assign roles to users. Roles determine the product functions that are available to users.

“Start the installation program” on page 128

There are various methods to start the Tivoli Storage Productivity Center installation programs and on various operating systems.

“Tivoli Storage Productivity Center components” on page 104

You can install Tivoli Storage Productivity Center in single-server or multiple-server environments. In a single-server environment, all components are installed on one server.

“Verifying the installation” on page 208

After you install Tivoli Storage Productivity Center, you can verify whether the installation was successful.

“Reviewing the log files to resolve installation issues” on page 212

If an error occurs during Tivoli Storage Productivity Center installation, you can review the error log files to resolve issues and continue the installation.

Installing Tivoli Storage Productivity Center with remote reports by using the installation wizard

You can install Tivoli Storage Productivity Center reports in a multiple-server environment by using the installation wizard.

If you plan to install Tivoli Storage Productivity Center on the AIX or Linux operating systems, source the user profile, `db2profile`, for the instance owner of the DB2 database. For example:

```
. /home/db2inst1/sqllib/db2profile
```

When you install Tivoli Storage Productivity Center, a database that is called TPCDB is created. In this repository, the Tivoli Storage Productivity Center database schema is created, which describes the structure of the database repository. If you already have the TPCDB on your system, Tivoli Storage Productivity Center assigns a new default database repository name with a number as a suffix for example, TPCDB1.

For this procedure, the terms *Server A* and *Server B* denote the two servers. Server A will have DB2 Enterprise Server Edition, the Tivoli Storage Productivity Center database repository, and the Tivoli Storage Productivity Center servers installed. Server B will have DB2 Enterprise Server Edition, Jazz for Service Management (which includes TCRDB, the database for Tivoli Common Reporting), and the Tivoli Storage Productivity Center reports installed.

To install Tivoli Storage Productivity Center with remote reports by using the installation wizard, complete the following steps:

1. Complete the following steps on Server A:
 - a. Log on to Server A. Ensure that you have the administrator privileges to install applications on the computer.
 - b. Install DB2 Enterprise Server Edition on Server A. For more information about installing DB2, see “Installing DB2” on page 132.
 - c. If you are installing DB2 on a Windows operating system, log out and log on again before you install Tivoli Storage Productivity Center.
 - d. Start the Tivoli Storage Productivity Center installation wizard on Server A.
 - e. On the Welcome page, because only the Tivoli Storage Productivity Center database repository and the Tivoli Storage Productivity Center servers will be installed on Server A, click **Next**.
 - f. On the Choose Installation Location and Type page, select **Multiple servers** and click **Next**.

- g. On the Multiple Server Option: Select the Components page, select **Database repository and Tivoli Storage Productivity Center servers** and click **Next**.

Important: Tivoli Storage Productivity Center servers include the following components:

- web-based GUI
 - stand-alone GUI
 - CLI
 - Storage Resource agent
- h. Follow the prompts in the installation wizard to install the Tivoli Storage Productivity Center database repository and the Tivoli Storage Productivity Center servers on Server A.
 - i. After the installation is finished, review the message log on Server A to ensure that no errors occurred.
2. Complete the following steps on Server B:
 - a. Log on to Server B. Ensure that you have the administrator privileges to install applications on the computer.
 - b. Install DB2 Enterprise Server Edition on Server B.

Important: DB2 Enterprise Server Edition is installed on Server A and on Server B because even though you are installing Tivoli Storage Productivity Center in a multiple-server environment, it is expected that you are installing Jazz for Service Management in a single-server environment.

- c. If Jazz for Service Management is not installed, and you plan to run Tivoli Storage Productivity Center reports, download and extract the Jazz for Service Management and Tivoli Common Reporting compressed installation files to the same temporary directory.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

For more information about the installation files, see Setting up a local file system for a custom installation.

- d. Start the Tivoli Storage Productivity Center installation wizard on Server B.
- e. If Jazz for Service Management is installed on Server B, the Welcome page displays a green check mark. Click **Next** to proceed to the next page in the Tivoli Storage Productivity Center installation program.
- f. If Jazz for Service Management is not installed on Server B, and you want to install it on Server B, you can install it now:

- 1) On the Welcome page, click **Install Now**.
- 2) On the Install Jazz for Service Management page, provide the location where the Jazz for Service Management and Tivoli Common Reporting installation files were extracted.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

- 3) If there is a port conflict, specify a new starting value for a 15 port range, and click the **Verify Port Availability** link to ensure that the port range is usable.

4) Click **Install Now**.

The Tivoli Storage Productivity Center installation program pauses and the Jazz for Service Management launchpad starts.

When you exit the Jazz for Service Management launchpad, you are returned to the Install Jazz for Service Management page in the Tivoli Storage Productivity Center installation program. Click **OK**.

If the installation of Jazz for Service Management was successful on Server B, you are returned to the Welcome page, which now displays a green check mark.

If the installation of Jazz for Service Management was not successful on Server B, a message is displayed, and you can click one of the following options:

- **Install Now**, which starts the Jazz for Service Management launchpad again.
- **Continue**, which returns you to the Welcome page.

You must install Jazz for Service Management successfully on Server B to continue installing Tivoli Storage Productivity Center reports on Server B.

If the installation of Jazz for Service Management was successful on Server B, and a green check mark is displayed on the Welcome page, click **Next**.

- g. On the Choose Installation Location and Type page, select **Multiple servers** and click **Next**.
 - h. On the Multiple Server Options: Select the Components page, select **Tivoli Storage Productivity Center reports** and click **Next**.
 - i. On the Configure Jazz for Service Management and Tivoli Common Reporting page, enter the following information and click **Next**:
 - The user name that is used to log on to the Jazz for Service Management WebSphere profile.
 - The password that is associated with the user name.
 - The path for the Jazz for Service Management installation directory.
- If the Tivoli Storage Productivity Center Version 5.2 installation program is unable to communicate with Jazz for Service Management, you must resolve this problem to continue installing Tivoli Storage Productivity Center reports.
- j. Follow the prompts in the installation wizard to install Tivoli Storage Productivity Center reports on Server B.

Related concepts:

“Jazz for Service Management and Tivoli Common Reporting” on page 172

If you plan to use Tivoli Storage Productivity Center reports, you must install Jazz for Service Management 1.1.0.1 and Tivoli Common Reporting 3.1.0.1. You can install these components now or after you install Tivoli Storage Productivity Center.

Related reference:

“Planning for Tivoli Storage Productivity Center authentication and authorization” on page 13

An operating system user name is required to install and log on to Tivoli Storage Productivity Center for the first time. After you install Tivoli Storage Productivity Center, you can assign roles to users. Roles determine the product functions that are available to users.

“Start the installation program” on page 128

There are various methods to start the Tivoli Storage Productivity Center installation programs and on various operating systems.

“Verifying the installation” on page 208

After you install Tivoli Storage Productivity Center, you can verify whether the installation was successful.

Installing Tivoli Storage Productivity Center with a remote database by using silent mode

You can install Tivoli Storage Productivity Center in a multiple-server environment by using silent mode.

Before you start the Tivoli Storage Productivity Center installation wizard on the AIX® or Linux operating systems, you must source the user profile (db2profile) for the instance owner of the DB2 database. For example:

```
. /home/db2inst1/sqllib/db2profile
```

When you install Tivoli Storage Productivity Center, a database that is called TPCDB is created. In this repository, the Tivoli Storage Productivity Center database schema is created, which describes the structure of the database repository. If you already have the TPCDB on your system, Tivoli Storage Productivity Center assigns a new default database repository name with a number as a suffix for example, TPCDB1.

For this procedure, the terms Server A and Server B denote the two servers. Server A will have DB2 Enterprise Server Edition and the Tivoli Storage Productivity Center database repository installed. Server B will have DB2 Enterprise Server Edition, Jazz for Service Management (which includes TCRDB, the database for Tivoli Common Reporting), the Tivoli Storage Productivity Center servers, and Tivoli Storage Productivity Center reports installed.

To install Tivoli Storage Productivity Center in a multiple-server environment by using silent mode, complete the following steps:

1. Complete the following steps on Server A:
 - a. Log on to Server A. Ensure that you have the administrator privileges to install applications on the computer.
 - b. Install DB2 Enterprise Server Edition on Server A. For more information about installing DB2, see “Installing DB2” on page 132
 - c. If you are installing DB2 on a Windows operating system, log out and log on again before you install Tivoli Storage Productivity Center.
 - d. On Server A, edit the `silent_MultipleServer.properties` file, and set the following parameters to install the remote database repository:
 - **LICENSE_ACCEPTED=true**
 - **CHOSEN_INSTALL_TYPE="Multiple Server Install"**
 - **varMultipleServerComponentList=database**
 - **USER_INSTALL_DIR=option**
 - **varSrvName=option**
 - **varDBAdmUsr=user_name**
 - **varDBAdmPW=password**
 - **varDBName=database_name**
 - **varDBPath=database_location**
 - **varDBLogPath=log_location**
 - e. Save the response file.

For more information about editing the response file, see “Editing the response file” on page 147.

f. Run the silent mode installation program on Server A.

- For Windows operating systems, run the following command:
`setup.bat -l language -i silent -f absolute_path_to_response_file`
where *language* can be one of the following values:

- Czech - cs
- English - en
- French - fr
- German - de
- Hungarian - hu
- Italian - it
- Japanese - ja
- Korean - ko
- Polish - pl
- Brazilian Portuguese - pt_BR
- Russian - ru
- Spanish - es
- Chinese (Simplified) - zh_CN
- Chinese (Traditional) - zh_TW

absolute_path_to_response_file is the absolute path to the response file.
For example, the following command specifies the language and the path:

```
setup.bat -l fr -i silent -f  
c:\TPC52\silent_MultipleServer.properties
```

- For AIX or Linux operating systems, run the following command:
`./setup.bin -l language -i silent -f /absolute_path_to_response_file`

For example, the following command specifies the language and the path:
`./setup.bin -l de -i silent -f /TPC52/silent_MultipleServer.properties`

If you do not specify a language or if the language is not specified correctly, the installation program uses the English language as the default.

g. Optional: Monitor the progress of the installation.

- To view the progress of the silent mode installation on Windows operating systems, check the trace log in the following path:
`TPC_installation_directory\logs\traceTPCInstall.log`
- To view the progress of the silent mode installation on AIX or Linux operating systems, check the trace log in the following path:
`TPC_installation_directory/logs/traceTPCInstall.log`

Tip: If there are preinstallation errors, you can review the `lax*out.txt` and `lax*err.txt` files that are in the `/tmp` and `%TEMP%` directories.

2. Complete the following steps on Server B:

- a. Log on to Server B. Ensure that you have the administrator privileges to install applications on the computer.
- b. Install DB2 Enterprise Server Edition on Server B.

Important: DB2 Enterprise Server Edition is installed on Server A and on Server B because even though you are installing Tivoli Storage Productivity Center in a multiple-server environment, it is expected that you are installing Jazz for Service Management in a single-server environment.

- c. If Jazz for Service Management is not installed on Server B, download and extract the Jazz for Service Management and Tivoli Common Reporting compressed installation files to the same temporary directory.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

For more information about the installation files, see *Setting up a local file system for a custom installation*.

For more information about installing Jazz for Service Management by using silent mode, see *Custom installations by using silent mode*.

- d. Edit and save the `silent_MultipleServer.properties` file on Server B and set the following parameters:

Restriction: When you install Tivoli Storage Productivity Center in this multiple-server environment by using silent mode, you must install the Tivoli Storage Productivity Center servers and Tivoli Storage Productivity Center reports on Server B at the same time.

- `LICENSE_ACCEPTED=true`
- `CHOSEN_INSTALL_TYPE="Multiple Server Install"`
- `varMultipleServerComponentList=servers,tcr`
- `USER_INSTALL_DIR=option`
- `varSrvName=option`
- `varCommonUsrID=user_name`
- `varCommonUsrPw=password`
- `varRemoteDBSrvName=host_name`
- `varRemoteDBPort=port`
- `varRemoteDBAdmUsr=user_name`
- `varRemoteDBAdmPW=password`
- `varRemoteDBName=database_name`
- `varTPCServersPortRangeSP=port`
- `JAZZSM_INSTALL_DIR=location_of_JazzSM_installation_directory`
- `varJazzSMUsrID=user_name`
- `varJazzSMUsrPW=password`

For more information about editing the response file, see “Editing the response file” on page 147.

- e. Run the silent mode installation program on Server B.
- For Windows operating systems, run the following command:
`setup.bat -l language -i silent -f absolute_path_to_response_file`
where *language* can be one of the following values:
 - Czech - cs
 - English - en
 - French - fr
 - German - de
 - Hungarian - hu
 - Italian - it
 - Japanese - ja
 - Korean - ko

- Polish - pl
- Brazilian Portuguese - pt_BR
- Russian - ru
- Spanish - es
- Chinese (Simplified) - zh_CN
- Chinese (Traditional) - zh_TW

`absolute_path_to_response_file` is the absolute path to the response file. For example, the following command specifies the language and the path:

```
setup.bat -l fr -i silent -f
c:\TPC52\silent_MultipleServer.properties
```

- For AIX or Linux operating systems, run the following command:
`./setup.bin -l language -i silent -f /absolute_path_to_response_file`

For example, the following command specifies the language and the path:
`./setup.bin -l de -i silent -f /TPC52/silent_MultipleServer.properties`

If you do not specify a language or if the language is not specified correctly, the installation program uses the English language as the default.

- f. Optional: Monitor the progress of the installation.
 - To view the progress of the silent mode installation on Windows operating systems, check the trace log in the following path:
`TPC_installation_directory\logs\traceTPCInstall.log`
 - To view the progress of the silent mode installation on AIX or Linux operating systems, check the trace log in the following path:
`TPC_installation_directory/logs/traceTPCInstall.log`

Note: If there are preinstallation errors, you can review the `lax*out.txt` and `lax*err.txt` files that are in the `/tmp` and `%TEMP%` directories.

Installing Tivoli Storage Productivity Center with remote reports by using silent mode

You can install Tivoli Storage Productivity Center in a multiple-server environment by using silent mode.

Before you start the Tivoli Storage Productivity Center installation wizard on AIX or Linux operating systems, you must source the user profile (`db2profile`) for the instance owner of the DB2 database. For example:

```
. /home/db2inst1/sqllib/db2profile
```

When you install Tivoli Storage Productivity Center, a database that is called TPCDB is created. In this repository, the Tivoli Storage Productivity Center database schema is created, which describes the structure of the database repository. If you already have the TPCDB on your system, Tivoli Storage Productivity Center assigns a new default database repository name with a number as a suffix for example, TPCDB1.

For this procedure, the terms *Server A* and *Server B* denote two servers. *Server A* will have DB2 Enterprise Server Edition, the Tivoli Storage Productivity Center database repository and the Tivoli Storage Productivity Center servers installed. *Server B* will have DB2 Enterprise Server Edition, Jazz™ for Service Management Version 1.1.0.1 (which includes TCRDB, the database for Tivoli Common Reporting Version 3.1.0.1) and the Tivoli Storage Productivity Center reports installed.

To install Tivoli Storage Productivity Center in a multiple-server environment by using silent-mode, complete the following steps:

1. Complete the following steps on Server A:
 - a. Log on to Server A. Ensure that you have the administrator privileges to install applications on the computer.
 - b. Install DB2 Enterprise Server Edition on Server A. For more information about installing DB2, see “Installing DB2” on page 132
 - c. If you are installing DB2 on a Windows operating system, log out and log on again before you install Tivoli Storage Productivity Center.
 - d. On Server A, edit the `silent_MultipleServer.properties` file, and set the following parameters to install the database repository and servers:
 - `LICENSE_ACCEPTED=true`
 - `CHOSEN_INSTALL_TYPE="Multiple Server Install"`
 - `varMultipleServerComponentList=database,servers`
 - `USER_INSTALL_DIR=option`
 - `varSrvName=option`
 - `varCommonUsrID=user_name`
 - `varCommonUsrPW=password`
 - `varDBAdmUsr=user_name`
 - `varDBAdmPW=`
 - `varDBName=database_name`
 - `varDBPath=database_path`
 - `varDBLogPath=log_location`
 - `varTPCServersPortRangeSP=port`For more information about editing the response file, see “Editing the response file” on page 147.
 - e. Save the response file.
 - f. Run the silent mode installation program on Server A.
 - For Windows operating systems, run the following command:
`setup.bat -l language -i silent -f absolute_path_to_response_file`
where *language* can be one of the following values:
 - Czech - cs
 - English - en
 - French - fr
 - German - de
 - Hungarian - hu
 - Italian - it
 - Japanese - ja
 - Korean - ko
 - Polish - pl
 - Brazilian Portuguese - pt_BR
 - Russian - ru
 - Spanish - es
 - Chinese (Simplified) - zh_CN
 - Chinese (Traditional) - zh_TW

absolute_path_to_response_file is the absolute path to the response file.
For example, the following command specifies the language and the path:

```
setup.bat -l fr -i silent -f  
c:\TPC52\silent_MultipleServer.properties
```

- For AIX or Linux operating systems, run the following command:
`./setup.bin -l language -i silent -f /absolute_path_to_response_file`

For example, the following command specifies the language and the path:
`./setup.bin -l de -i silent -f /TPC52/silent_MultipleServer.properties`

If you do not specify a language or if the language is not specified correctly, the installation program uses the English language as the default.

- g. Optional: Monitor the progress of the installation.
 - To view the progress of the silent mode installation on Windows operating systems, check the trace log in the following path:
`TPC_installation_directory\logs\traceTPCInstall.log`
 - To view the progress of the silent mode installation on AIX or Linux operating systems, check the trace log in the following path:
`TPC_installation_directory/logs/traceTPCInstall.log`

Tip: If there are preinstallation errors, you can review the lax*out.txt and lax*err.txt files that are in the /tmp and %TEMP% directories.

2. Complete the following steps on Server B:
 - a. Log on to Server B. Ensure that you have the administrator privileges to install applications on the computer.
 - b. Install DB2 Enterprise Server Edition on Server B.

Important: DB2 Enterprise Server Edition is installed on Server A and on Server B because even though you are installing Tivoli Storage Productivity Center in a multiple-server environment, it is expected that you are installing Jazz for Service Management in a single-server environment.

- c. If Jazz for Service Management is not installed on Server B, download and extract the Jazz for Service Management and Tivoli Common Reporting compressed installation files to the same temporary directory.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

For more information about the installation files, see Setting up a local file system for a custom installation.

For more information about installing Jazz for Service Management by using silent mode, see Custom installations by using silent mode.

- d. Edit and save the `silent_MultipleServer.properties` file on Server B and set the following parameters:
 - `LICENSE_ACCEPTED=true`
 - `CHOSEN_INSTALL_TYPE="Multiple Server Install"`
 - `varMultipleServerComponentList=tcr`
 - `USER_INSTALL_DIR=option`
 - `varSrvName=option`
 - `varRemoteDBSrvName=host_name`
 - `varRemoteDBPort=port`

- `varRemoteDBAdmUsr=user_name`
- `varRemoteDBAdmPW=password`
- `varRemoteDBName=database_name`
- `JAZZSM_INSTALL_DIR=Location_of_JazzSM_installation_directory`
- `varJazzSMUsrID=user_name`
- `varJazzSMUsrPW=password`

For more information about editing the response file, see “Editing the response file” on page 147.

e. Run the silent mode installation program on Server B.

- For Windows operating systems, run the following command:

```
setup.bat -l language -i silent -f absolute_path_to_response_file
```

where *language* can be one of the following values:

- Czech - cs
- English - en
- French - fr
- German - de
- Hungarian - hu
- Italian - it
- Japanese - ja
- Korean - ko
- Polish - pl
- Brazilian Portuguese - pt_BR
- Russian - ru
- Spanish - es
- Chinese (Simplified) - zh_CN
- Chinese (Traditional) - zh_TW

`absolute_path_to_response_file` is the absolute path to the response file. For example, the following command specifies the language and the path:

```
setup.bat -l fr -i silent -f
c:\TPC52\silent_MultipleServer.properties
```

- For AIX or Linux operating systems, run the following command:

```
./setup.bin -l language -i silent -f /absolute_path_to_response_file
```

For example, the following command specifies the language and the path:

```
./setup.bin -l de -i silent -f /TPC52/silent_MultipleServer.properties
```

If you do not specify a language or if the language is not specified correctly, the installation program uses the English language as the default.

f. Optional: Monitor the progress of the installation.

- To view the progress of the silent mode installation on Windows operating systems, check the trace log in the following path:

```
TPC_installation_directory\logs\traceTPCInstall.log
```

- To view the progress of the silent mode installation on AIX or Linux operating systems, check the trace log in the following path:

```
TPC_installation_directory/logs/traceTPCInstall.log
```

Tip: If there are preinstallation errors, you can review the `lax*out.txt` and `lax*err.txt` files that are in the `/tmp` and `%TEMP%` directories.

Related tasks:

“Installing Tivoli Storage Productivity Center with a remote database by using silent mode” on page 163

You can install Tivoli Storage Productivity Center in a multiple-server environment by using silent mode.

Related reference:

“Planning for Tivoli Storage Productivity Center authentication and authorization” on page 13

An operating system user name is required to install and log on to Tivoli Storage Productivity Center for the first time. After you install Tivoli Storage Productivity Center, you can assign roles to users. Roles determine the product functions that are available to users.

“Start the installation program” on page 128

There are various methods to start the Tivoli Storage Productivity Center installation programs and on various operating systems.

“Verifying the installation” on page 208

After you install Tivoli Storage Productivity Center, you can verify whether the installation was successful.

“Reviewing the log files to resolve installation issues” on page 212

If an error occurs during Tivoli Storage Productivity Center installation, you can review the error log files to resolve issues and continue the installation.

Installing Tivoli Storage Productivity Center reports later in a multiple-server environment by using the wizard

When you install Tivoli Storage Productivity Center in a multiple-server environment, you can install Tivoli Storage Productivity Center reports after you install Tivoli Storage Productivity Center.

Download and extract the Jazz for Service Management compressed files in to the same temporary directory before you install Tivoli Storage Productivity Center reports.

Ensure that you have completed the steps in “Installing Tivoli Storage Productivity Center with a remote database by using the installation wizard” on page 156.

For this procedure, the terms *Server A* and *Server B* denote the two servers. Server A has DB2 Enterprise Server Edition and the Tivoli Storage Productivity Center database repository installed. Server B has DB2 Enterprise Server Edition, and the Tivoli Storage Productivity Center servers installed.

After you install Tivoli Storage Productivity Center Version 5.2, you can install Tivoli Storage Productivity Center reports on Server B for one of the following reasons:

- You chose not to install Jazz for Service Management on Server B the first time you ran the Tivoli Storage Productivity Center Version 5.2 installation program on Server B. Tivoli Storage Productivity Center was installed without Tivoli Storage Productivity Center reports.
- You attempted to install Jazz for Service Management on Server B the first time you ran the Tivoli Storage Productivity Center Version 5.2 installation program on Server B, but the Jazz for Service Management installation did not succeed. Tivoli Storage Productivity Center was installed without Tivoli Storage Productivity Center reports.
- You successfully installed Jazz for Service Management on Server B the first time you ran the Tivoli Storage Productivity Center Version 5.2 installation program

on Server B, but there was an issue when the installation program attempted to communicate with Jazz for Service Management. Tivoli Storage Productivity Center was installed without Tivoli Storage Productivity Center reports.

This procedure assumes one of the following conditions:

- You have not yet installed Jazz for Service Management on Server B.
- You resolved any issues that you experienced during the initial attempt to install Jazz for Service Management on Server B.

Restriction: You cannot install Tivoli Storage Productivity Center reports on Server A, where you already installed the Tivoli Storage Productivity Center database repository.

To install Tivoli Storage Productivity Center reports later in a multiple-server environment, complete the following steps on Server B:

1. Log on to Server B with the appropriate user privileges.
2. If Jazz for Service Management is not installed, and you plan to run Tivoli Storage Productivity Center reports, download and extract the Jazz for Service Management and Tivoli Common Reporting compressed installation files to the same temporary directory.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

For more information about the installation files, see Setting up a local file system for a custom installation.

3. Start the Tivoli Storage Productivity Center installation program again on Server B.
4. If Jazz for Service Management is not installed on Server B, and you want to install it on Server B, you can install it now.
 - a. On the Welcome page, click **Install Now**, and complete the following steps:
 - 1) On the Install Jazz for Service Management page, provide the location where the Jazz for Service Management and Tivoli Common Reporting installation files were extracted.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.
 - 2) If there is a port conflict, specify a new starting value for a 15 port range, and click the **Verify Port Availability** link to ensure that the port range is usable.
 - 3) Click **Install Now**.

The Tivoli Storage Productivity Center installation program pauses and the Jazz for Service Management launchpad starts.

- b. When you exit the Jazz for Service Management launchpad, you are returned to the Install Jazz for Service Management page in the Tivoli Storage Productivity Center installation program. Click **OK**.
- c. If the installation of Jazz for Service Management was successful on Server B, you are returned to the Welcome page, which now displays a green check mark.

If the installation of Jazz for Service Management was not successful on Server B, a message is displayed, and you can click one of the following options:

- **Install Now**, which starts the Jazz for Service Management launchpad again.
- **Continue**, which returns to the Welcome page.

You must install Jazz for Service Management successfully on Server B to continue installing Tivoli Storage Productivity Center reports on Server B.

- d. If the installation of Jazz for Service Management was successful on Server B, and a green check mark is displayed on the Welcome page, click **Next**.
 5. On the Configure Jazz for Service Management and Tivoli Common Reporting page, enter the following information, and click **Next**:
 - The user name that is used to log on to the Jazz for Service Management WebSphere profile.
 - The password that is associated with the user name.
 - The path for the Jazz for Service Management installation directory.
- If the Tivoli Storage Productivity Center Version 5.2 installation program is unable to communicate with Jazz for Service Management on Server B, you must resolve this problem to continue installing Tivoli Storage Productivity Center reports.
6. Follow the prompts in the installation wizard to install Tivoli Storage Productivity Center reports on Server B.

Jazz for Service Management and Tivoli Common Reporting

If you plan to use Tivoli Storage Productivity Center reports, you must install Jazz for Service Management 1.1.0.1 and Tivoli Common Reporting 3.1.0.1. You can install these components now or after you install Tivoli Storage Productivity Center.

Before you begin: DB2 was installed as part of Tivoli Storage Productivity Center installation process. You do not need to install DB2 as part of the Jazz for Service Management installation process.

Installing the components

When you install Jazz for Service Management and Tivoli Common Reporting, you can run Tivoli Storage Productivity Center reports.

Attention: You must install Jazz for Service Management from the Tivoli Storage Productivity Center installation program. For more information about installing Tivoli Storage Productivity Center, see “Installing Tivoli Storage Productivity Center in a single-server environment” on page 143 or “Installing Tivoli Storage Productivity Center in a multiple-server environment” on page 156.

If you do not use the Tivoli Storage Productivity Center installation program to install Jazz for Service Management, you may experience the following types of issues:

- The Jazz for Service Management Windows service will not get created. As a result, the Jazz for Service Management server will not automatically restart when you restart the computer, which causes Tivoli Storage Productivity Center

reports to fail. You must manually restart Jazz for Service Management server every time you restart the computer on which Jazz for Service Management is installed.

- Jazz for Service Management launchpad uses the same default ports as IBM Tivoli Integrated Portal Version 1.1. When you upgrade from Tivoli Storage Productivity Center Version 4.2 (or later) to Tivoli Storage Productivity Center Version 5.2, there is a port conflict, the Jazz for Service Management launchpad does not provide an option to use non-default ports. The Jazz for Service Management launchpad also does not detect the port conflict if the Tivoli Integrated Portal Version 1.1 server is down.
- When you use a Windows domain user account to install Jazz for Service Management, you must right-click the `launchpad64.exe` file and select **Run as Administrator**. If you do select **Run as Administrator**, the stand-alone Jazz for Service Management installation will fail.

If you installed DB2 on a computer that is a member of a Windows domain, and your DB2 user name is a domain user name (for example, *db2admin*), remember the following issues:

- Ensure that the DB2 user name (for example, *db2admin*) is not also a local user name.
- During the Jazz for Service Management installation, on the Specify Credentials page, when you enter the DB2 user name, enter only the user name (for example, *db2admin*) and not the domain name. For example, if the user name is *db2admin* and the domain is *TPC52*, only enter *db2admin*. Do not include *TPC52*.

Resolve port conflicts

To successfully install Jazz for Service Management, you must resolve port conflicts.

Resolving a port conflict before you install Jazz for Service Management

Before you install Jazz for Service Management as part of upgrading to Tivoli Storage Productivity Center Version 5.2, start all of the servers for the older version of Tivoli Storage Productivity Center. Ensure that you also start the Tivoli Integrated Portal server. The Jazz for Service Management launchpad can identify port conflicts.

When you upgrade from Tivoli Storage Productivity Center Version 5.1 (or later) to Version 5.2, and you select **Do not uninstall Tivoli Integrated Portal 2.2 and Tivoli Common Reporting 2.1.1** in the installation program (or the `varPreserveTIP2x=1` parameter in the `silent_Upgrade5x.properties` file), a port conflict can occur between Tivoli Common Reporting Version 2.1.1 and Version 3.1.0.1 for port 9362.

To resolve this port conflict, complete the following steps:

1. In a command-line window, go to one of the following directories:
 - `C:\Program Files\IBM\tipv2Components\TCRComponent\cognos\bin\tcr_cogconfig.bat`
 - `/opt/IBM/tipv2Components/TCRComponent/cognos/bin/tcr_cogconfig.sh`

Tip: On Windows operating systems, to access the IBM Cognos Configuration page, click **Start > Programs > Tivoli Common Reporting 2.1.1 > IBM Cognos Configuration**.

2. In the navigation tree, select **Environment > Logging**.

3. In the Logging - Command Properties window, specify the **Local log server port number value**.
Specify a port value that is not currently used and that will not be used after you upgrade Tivoli Storage Productivity Center.
4. Click **Save**.
5. Click **File > Exit**.
6. Stop and start Tivoli Common Reporting Version 2.1.1.

Resolving a port conflict when you want to uninstall Tivoli Integrated Portal Version 2.2 and Tivoli Common Reporting Version 2.1.1

Port conflicts can occur when you want to uninstall Tivoli Integrated Portal Version 2.2 and Tivoli Common Reporting Version 2.1.1 during an upgrade from Tivoli Storage Productivity Center Version 5.1 (or later) to Version 5.2. If a port conflict occurs during the Jazz for Service Management installation, a warning message is displayed for the **Check system prerequisites** option on the Review Results page.

To prevent this port conflict, stop Tivoli Integrated Portal **before** you install Jazz for Service Management. After you install Jazz for Service Management, start Tivoli Integrated Portal and continue to upgrade Tivoli Storage Productivity Center.

Related concepts:

“Jazz for Service Management and Tivoli Common Reporting” on page 172
If you plan to use Tivoli Storage Productivity Center reports, you must install Jazz for Service Management 1.1.0.1 and Tivoli Common Reporting 3.1.0.1. You can install these components now or after you install Tivoli Storage Productivity Center.

Installing Jazz for Service Management and Tivoli Common Reporting by using launchpad on Windows

You can install Jazz for Service Management and Tivoli Common Reporting in a Custom workflow on the Windows operating system by using a web browser.

DB2 was installed as part of Tivoli Storage Productivity Center installation process. You do not need to install DB2 as part of the Jazz for Service Management installation process.

Edit the hosts file by completing the following steps:

1. Go to the following directory:
C:\Windows\System32\drivers\etc
2. Open the hosts file and delete the number sign from the line with the localhost information.

To install Jazz for Service Management and Tivoli Common Reporting on Windows by using launchpad, complete the following steps:

1. Download the compressed files for the following components into a temporary directory:
 - Jazz for Service Management
 - Tivoli Common Reporting
 - WebSphere Application Server
2. Verify whether you need to unblock some security settings by completing the following steps:

- a. Right-click one of the compressed installation files.
 - b. Examine the **General** tab and determine whether the **Unblock** button is displayed.
 - c. Complete one of the following steps:
 - If the **Unblock** button is displayed, continue to step 3.
 - If the **Unblock** button is not displayed, continue to step 4.
3. Complete the following steps for each compressed file:
 - a. Right-click the compressed file and click **Properties**.
 - b. On the General tab, next to **Security**, click **Unblock**.

Restriction: Failure to complete this procedure for each compressed file can result in instability in the launchpad.

4. Extract each compressed file into the same temporary directory.
5. Go to the directory where you extracted the compressed files in the previous step and double-click the `launchpad64.exe` file to start launchpad.
6. On the Welcome page for Jazz for Service Management Version 1.1.0.1, click **Custom**.

Remember: Ensure that you click only **Custom**, not **Full**.

7. On the Custom workflow page, click **Next**.
8. On the Specify Jazz for Service Management Home Location page, click **Next**.

Tip: if you have an existing Jazz for Service Management installation, launchpad provides the path to the existing installation.

If you do not have an existing Jazz for Service Management installation, the field is blank.

9. On the Specify Source Locations page, enter the directory path where the Jazz for Service Management installation images are located. The directory path is the same path that you used to extract the compressed files.

Tip: If you installed a supported version of DB2, you may experience the following issues:

- The **IBM DB2 10.1 or later, Enterprise Server Edition installation image** field is empty, but you can continue through the launchpad. For more information about the supported versions of DB2, see “Software requirements for the database repository” on page 118.
- If an informational message is displayed, you can close the message, and continue with the installation.

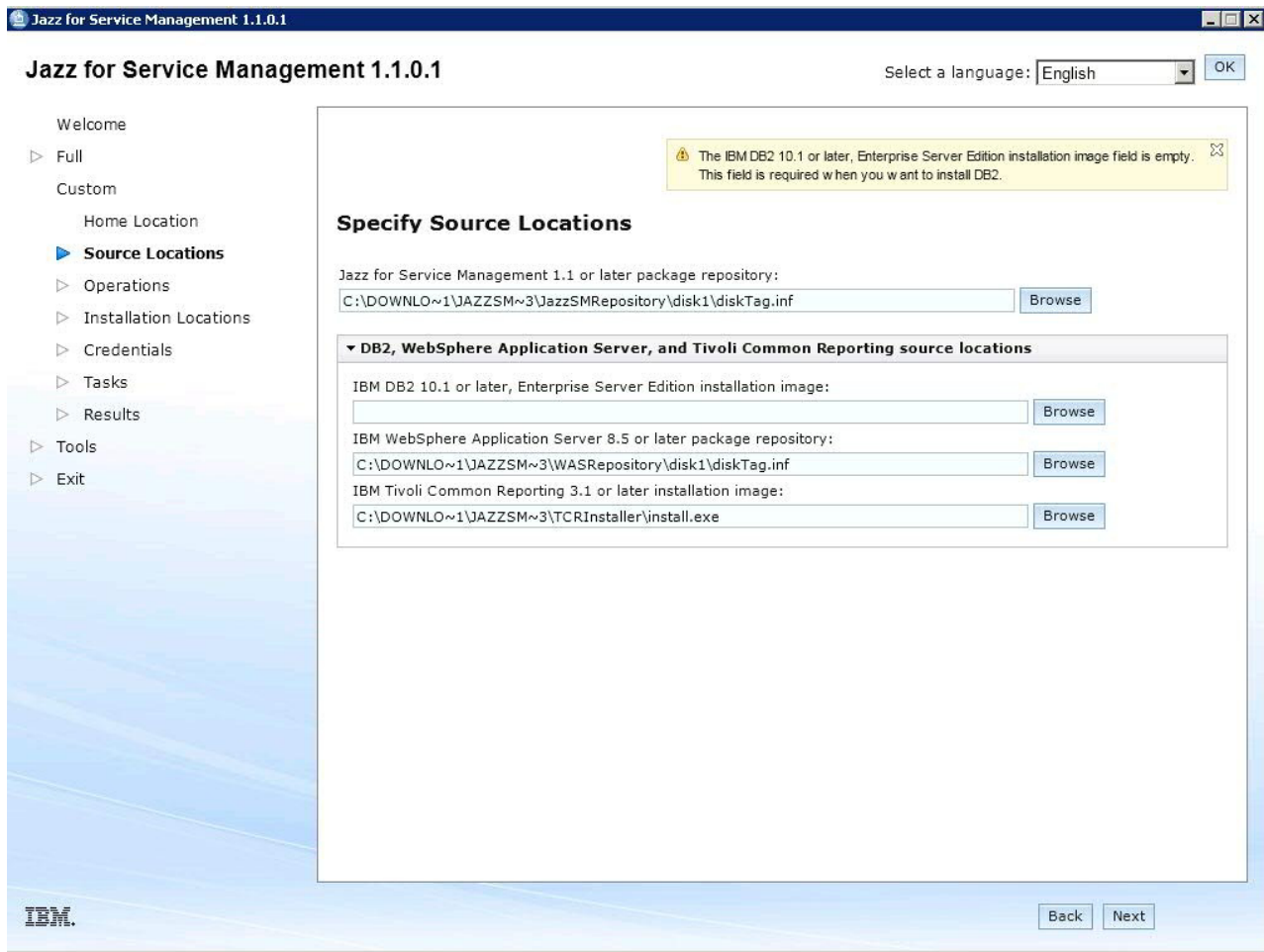


Figure 1. Specify Source Locations

10. On the Select Operations page, select **Install** for the following components:

- **Reporting services**
- **IBM WebSphere Application Server**

By default, the **Install** option is selected. You must select **None** for the components that you do not want to install. If you accept the default option for all of the components, and install the components, you can experience a performance issue.

Important: If you plan to implement LDAP authentication for IBM System Storage DS8000 Storage Manager or IBM System Storage SAN Volume Controller by using Jazz for Service Management, you must install the **Security Services** option.

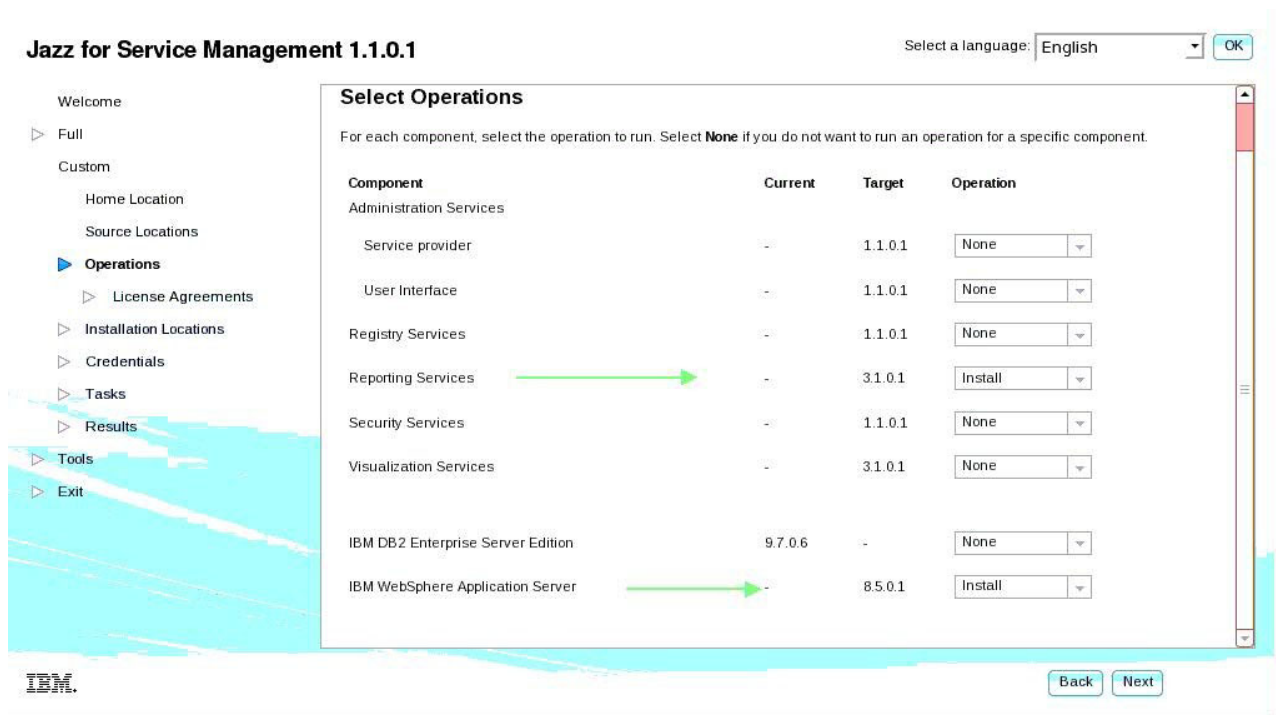


Figure 2. Selecting the components to install

11. On the License agreement page, read, accept the license agreement, and click **Next**.
12. On the Specify Installation Locations page, specify the installation locations for the following components, and click **Next**.
 - Jazz for Service Management (for example, c:\Program Files\IBM\JazzSM)
 - WebSphere Application Server (for example, c:\Program Files\IBM\WebSphere\AppServer)

If DB2 is installed on your computer, the field to enter the DB2 installation location is disabled.

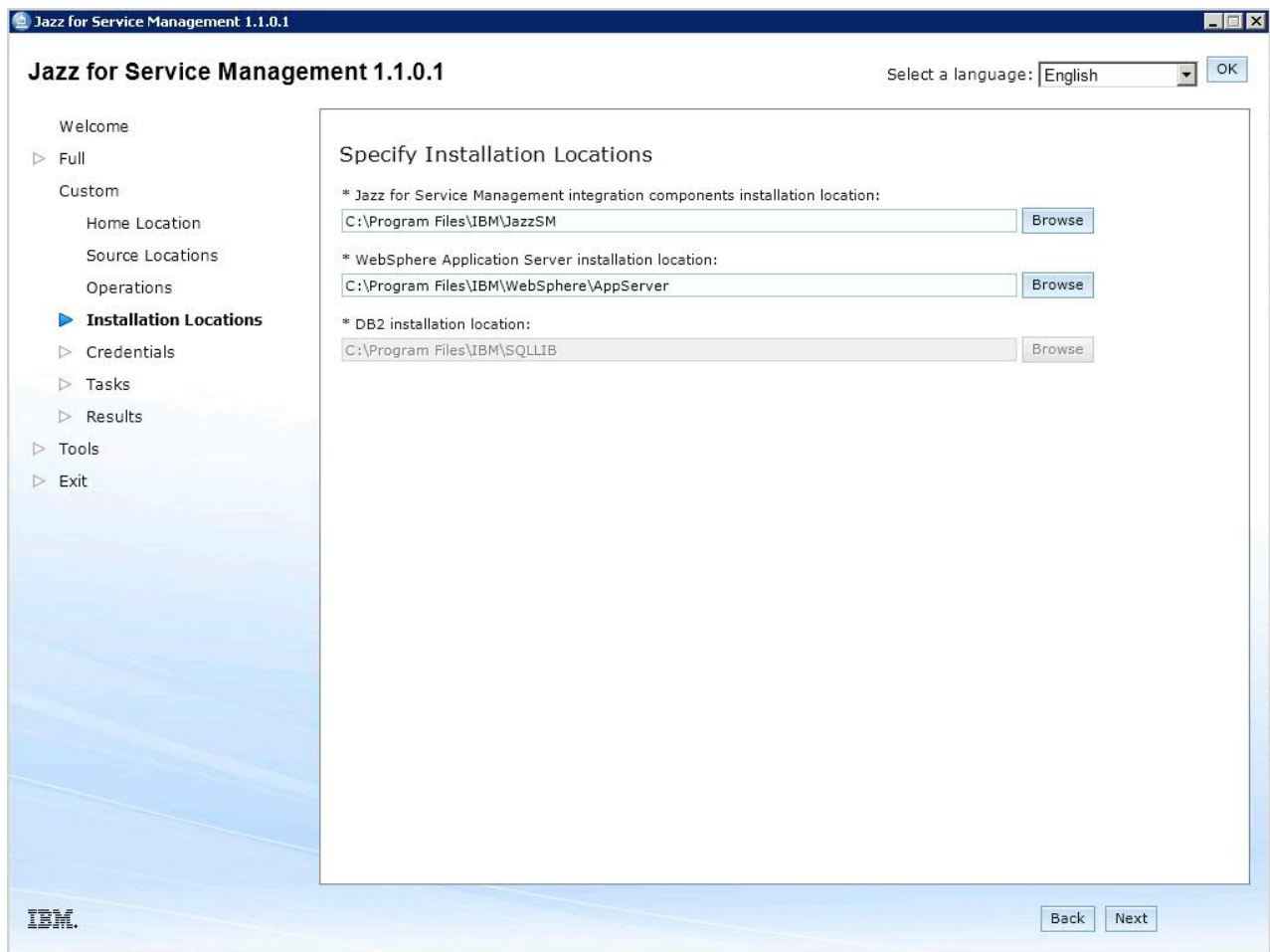


Figure 3. Specifying the installation locations

13. On the Specify Credentials page, enter the following information:
 - a. New WebSphere Application Server credentials.
The user name and password that you enter are used to create your WebSphere Application Server profile.
 - b. Existing DB2 credentials
The credentials are used to connect to DB2 and create the Cognos Content Store database.
The **Confirm instance user password** field is disabled.

Restriction: Before you enter DB2 admin credentials, ensure that you follow these rules:

- Enter only existing DB2 admin credentials. If you use the default or any other credentials, the Jazz for Service Management installation will fail.
- If you are installing Jazz for Service Management on a computer that is a member of a Windows domain, and you installed DB2 on that computer so that the DB2 instance user is domain user, enter only the DB2 instance user name (for example, db2admin). Do not enter the Windows domain name as a prefix to the DB2 instance user name. For example, do not enter mydomain\db2admin). The **Instance user name** field does not accept this format.

If you have an existing DB2 installation and that installation has multiple DB2 instances, the Jazz for Service Management launchpad uses the last DB2 instance that is returned by the `db2ilist` command.

Jazz for Service Management 1.1.0.1

Select a language: English OK

Welcome

Full

Custom

Home Location

Source Locations

Operations

Installation Locations

Credentials

Tasks

Results

Tools

Exit

Specify Credentials

WebSphere Application Server Profile

Administrator name: smadmin

Administrator password:

Confirm administrator password:

DB2

Instance user name: db2admin

Instance user password:

Confirm instance user password:

Back Next

IBM

Figure 4. Specifying your credentials

14. On the Run Tasks page, review the list of components to be installed, and click **Run**.

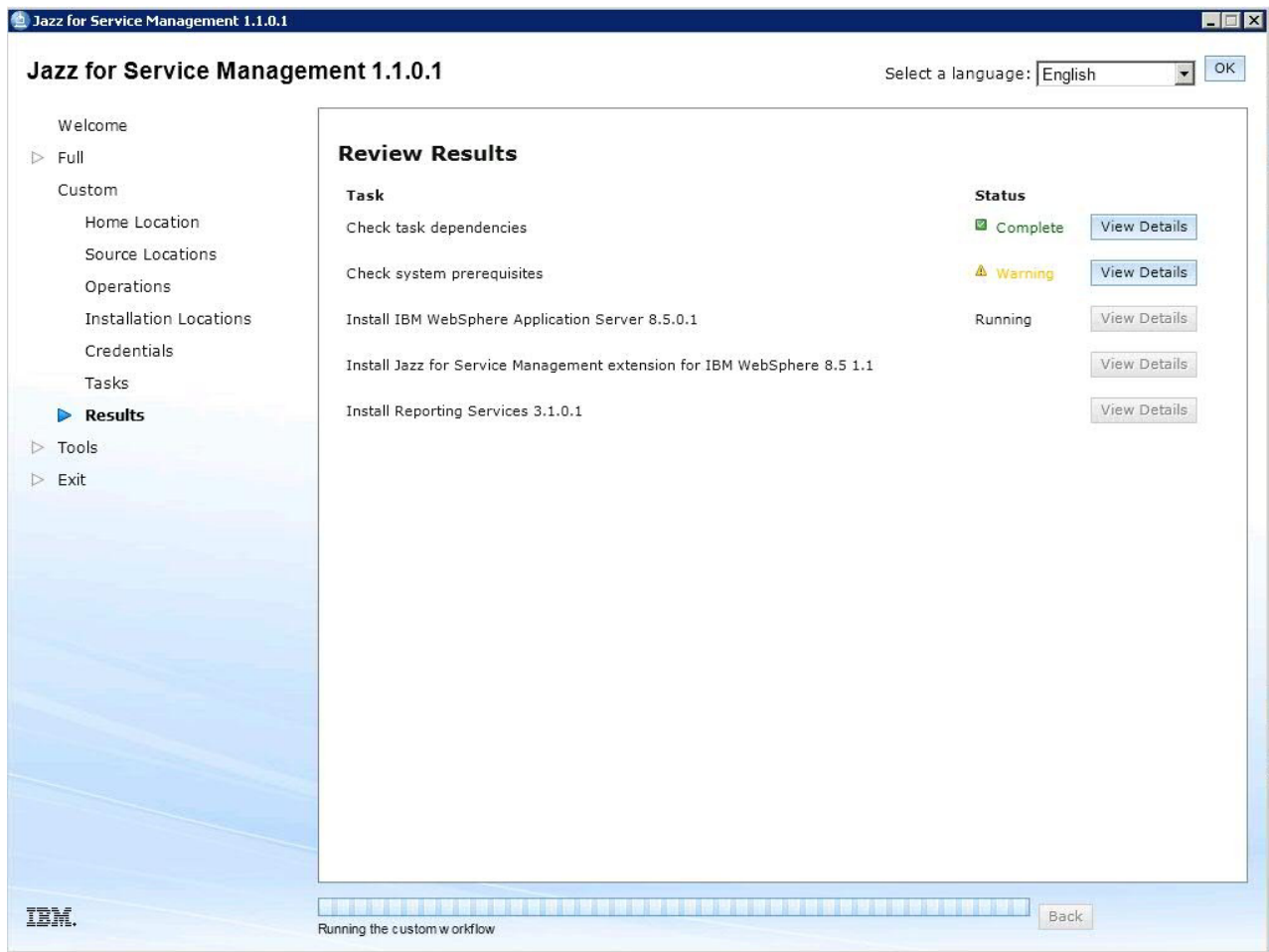


Figure 5. Running the tasks to install the components

To resolve the port conflict, see “Resolve port conflicts” on page 173.

Important: After you click **Run**, the installation can take 30 minutes or more minutes to install the components.

15. Close the browser window to exit the Jazz for Service Management launchpad.

To verify the installation, enter the following web address in a browser:

`https://host_name:16311/tarf/servlet/dispatch`

Where *host_name* is the fully qualified host name or IP address.

You can also verify the installation by clicking **Start > Programs (All Programs)**. Tivoli Common Reporting Version 3.1.0.1 is displayed in the list of installed programs.

For more information about starting or stopping Jazz for Service Management, see “Starting and stopping the Tivoli Storage Productivity Center servers” on page 234.

For more information about installing Jazz for Service Management, see Installing Jazz for Service Management.

Installing Jazz for Service Management and Tivoli Common Reporting by using launchpad on Linux

You can install Jazz for Service Management and Tivoli Common Reporting on the Linux operating system by using a web browser.

DB2 was installed as part of Tivoli Storage Productivity Center installation process. You do not need to install DB2 as part of the Jazz for Service Management installation process.

You set the ulimit value for open files to at least 2048 by running the following command:

```
ulimit -n 2048
```

To display all of the ulimit values, run the **ulimit -a** command. To set the system ulimit to 2048, add **ulimit -n 2048** to the `/etc/profile` file and save.

To install Jazz for Service Management and Tivoli Common Reporting on the Linux operating system, complete the following steps:

1. In a terminal window, go to the directory where you extracted the compressed files, and run the following command to start launchpad:

```
./launchpad.sh
```

Note: The `launchpad.sh` file starts in the default browser for your computer.

2. On the Welcome page for Jazz for Service Management Management Version 1.1.0.1, click **Custom**.

Attention: Ensure that you click **Custom**, not **Full**.

3. On the Custom workflow page, click **Next**.
4. On the Specify Jazz for Service Management Home Location page, click **Next**.

Tip: If you have an existing Jazz for Service Management installation, launchpad provides the path to the existing installation.

5. On the Specify Source Locations page, enter the directory path where the Jazz for Service Management, WebSphere Application Server, and Tivoli Common Reporting installation images are located.

Important: Since DB2 is already installed, you do not need to enter a directory path for DB2.

The directory path is the same directory path in which you extracted the compressed files.

Tip: If you installed a supported version of DB2, you may experience the following issues:

- The **IBM DB2 10.1 or later, Enterprise Server Edition installation image** field is empty, but you can continue through the launchpad. For more information about the supported versions of DB2, see “Software requirements for the database repository” on page 118.
- If an informational message is displayed, you can close the message, and continue with the installation.

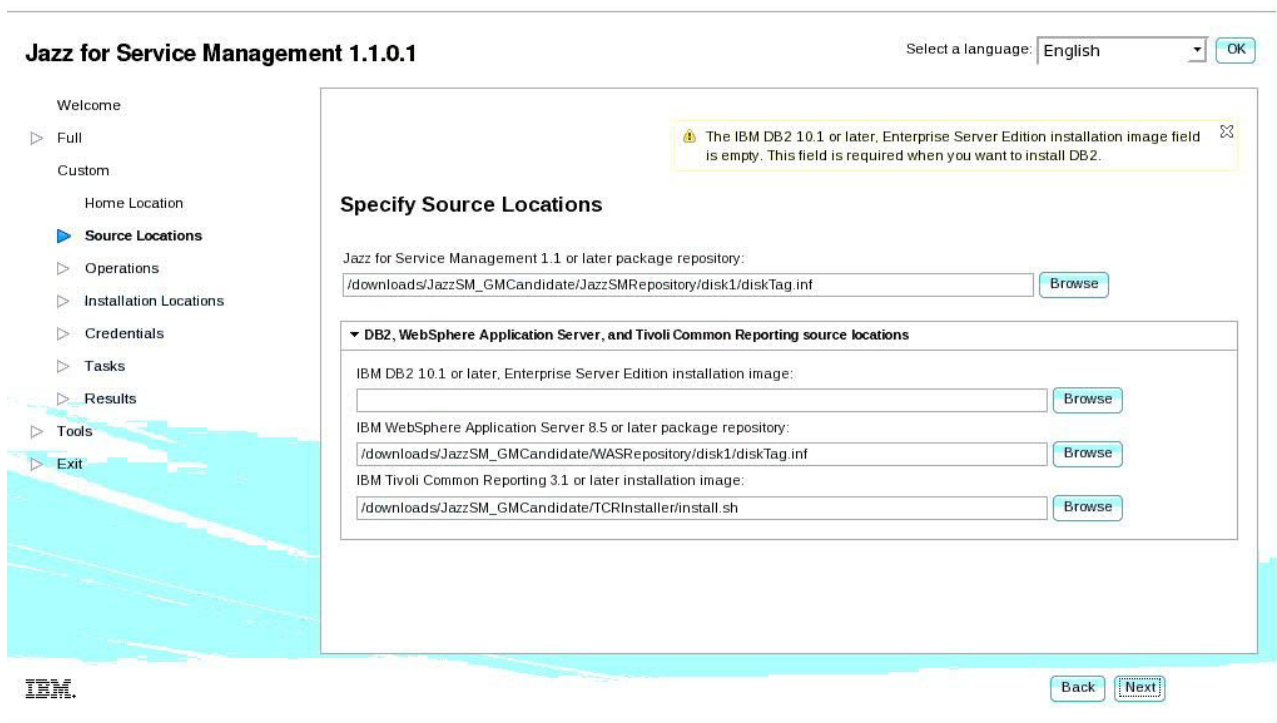


Figure 6. Specifying the Source Locations

6. On the Select Operations page, select **Install** for the following components:

- **Reporting services**
- **IBM WebSphere Application Server**

By default, the **Install** option is selected. You must select **None** for the components that you do not want to install. If you accept the default option for all of the components, and install the components, you can experience a performance issue.

Important: If you plan to implement LDAP authentication for IBM System Storage DS8000 Storage Manager or IBM System Storage SAN Volume Controller by using Jazz for Service Management, you must install the **Security Services** option.

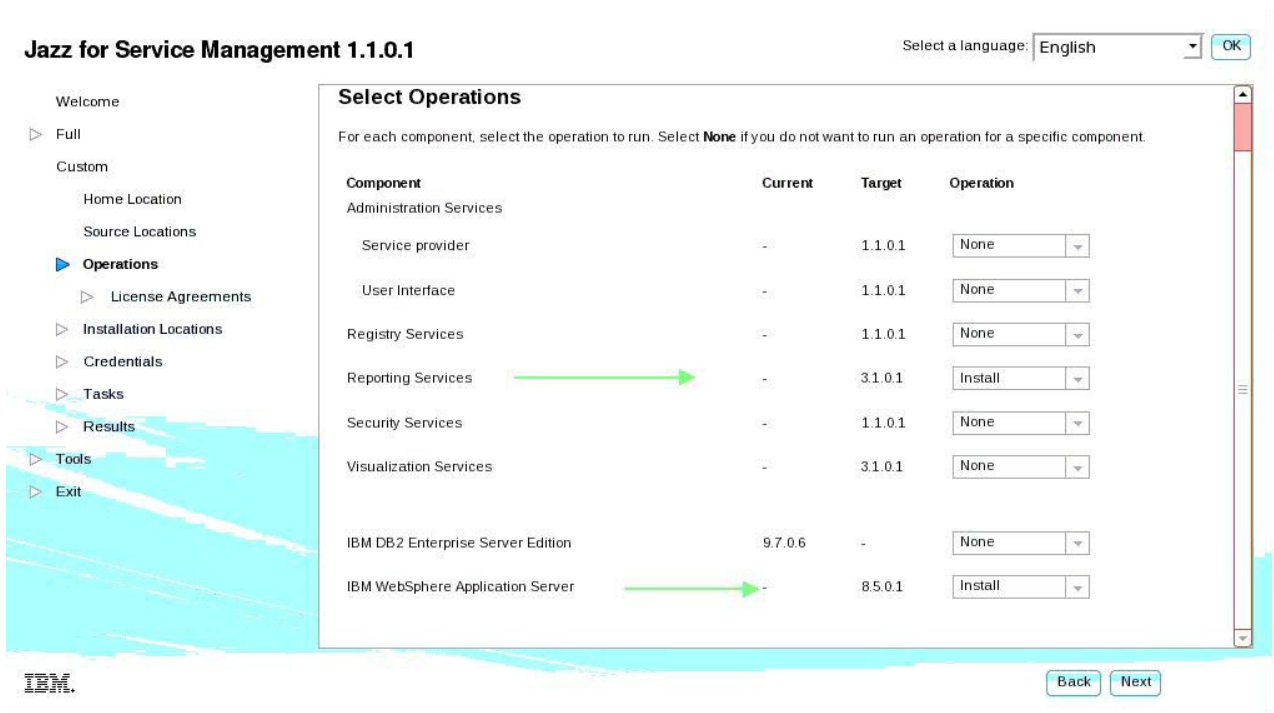


Figure 7. Selecting the components to install

7. On the License agreement page, read and accept the license agreement, and click **Next**.
8. On the Specify Installation Locations page, specify the installation locations for the following components, and click **Next**:
 - Jazz for Service Management (for example, /opt/IBM/JazzSM)
 - WebSphere Application Server (/opt/IBM/WebSphere/AppServer)

If DB2 is already installed on your system, the DB2 installation location field is disabled.

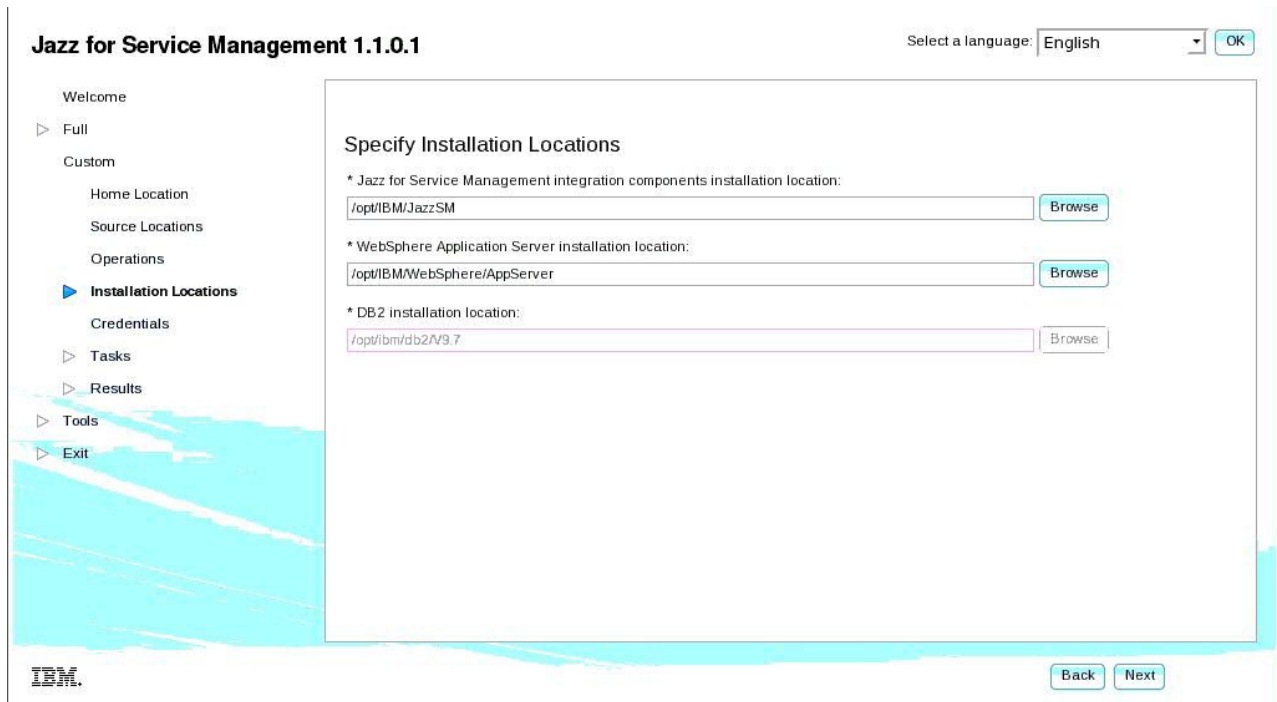


Figure 8. Entering the installation locations

9. On the Specify Credentials page, enter the following information:
 - a. New WebSphere Application Server credentials.
The user name and password that you enter are used to create your WebSphere Application Server profile.
 - b. Existing DB2 credentials.
The **Confirm instance user password** field is disabled.
The credentials are used to connect to DB2 and create the Cognos® Content Store database.

Restriction: On the DB2 panel, only enter your existing DB2 administrator credentials. If you use the default (or any other) credentials, the Jazz for Service Management installation will fail.

If you have an existing DB2 installation and that installation has multiple DB2 instances, the Jazz for Service Management launchpad uses the last DB2 instance that is returned by the **db2ilist** command.

Jazz for Service Management 1.1.0.1 Select a language: English OK

Welcome

- Full
- Custom
 - Home Location
 - Source Locations
 - Operations
 - Installation Locations
 - Credentials**
 - Tasks
 - Results
 - Tools
 - Exit

Specify Credentials

WebSphere Application Server Profile
Administrator name: smadmin
Administrator password: *****
Confirm administrator password: *****

DB2
Instance user name: db2inst1
Instance user password: *****
Confirm instance user password:

Back Next

IBM

Figure 9. Specifying your credentials

- On the Run Tasks page, review the list of components that will be installed and click **Run**.

Important: After you click **Run**, the installation can take 30 minutes or more to install the components.

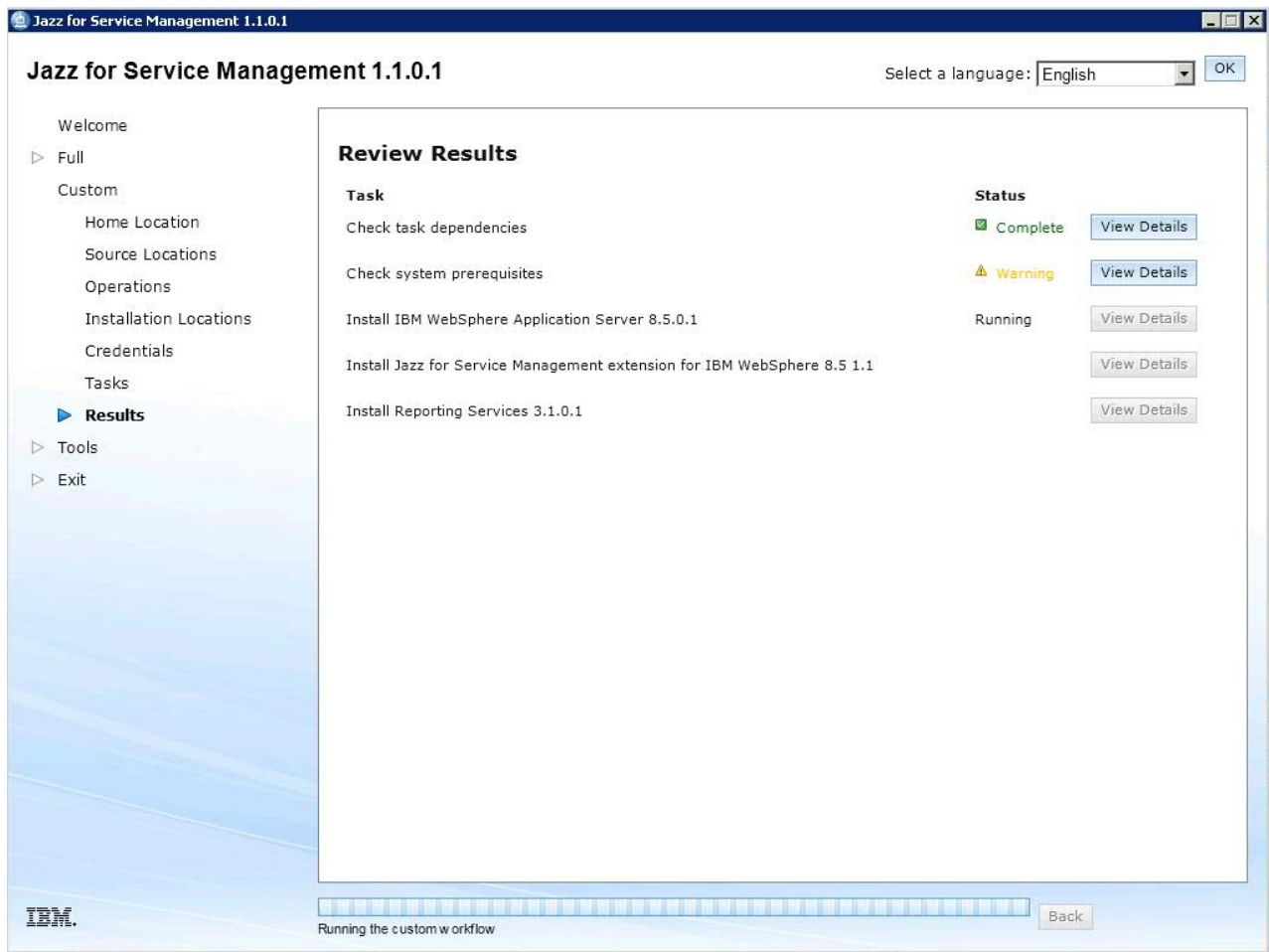


Figure 10. Running the tasks to install the components

To resolve the port conflict, see “Resolve port conflicts” on page 173.

11. Close the browser window to exit the Jazz for Service Management launchpad.

To verify the installation, enter the following web address in a browser:

`https://host_name:16311/tarf/servlet/dispatch`

Where *host_name* is the fully qualified host name or IP address.

Important: If you restart your computer, you must manually restart Jazz for Service Management and Tivoli Common Reporting.

To restart Jazz for Service Management and Tivoli Common Reporting on the Linux operating system, complete the following steps:

1. Go to the `/opt/IBM/JazzSM/profile/bin` directory.
2. Run the following command:

```
./startServer.sh server1
```

For more information about starting or stopping Jazz for Service Management, see “Starting and stopping the Tivoli Storage Productivity Center servers” on page 234.

For more information about installing Jazz for Service Management, see Installing Jazz for Service Management.

Related concepts:

“Jazz for Service Management and Tivoli Common Reporting” on page 172

If you plan to use Tivoli Storage Productivity Center reports, you must install Jazz for Service Management 1.1.0.1 and Tivoli Common Reporting 3.1.0.1. You can install these components now or after you install Tivoli Storage Productivity Center.

Related reference:

“Requirements for Jazz for Service Management and Tivoli Common Reporting” on page 121

If you plan to use Tivoli Storage Productivity Center reports, you must install Jazz for Service Management Version 1.1.0.1 and IBM Tivoli Common Reporting Version 3.1.0.1. The requirements apply to a single-server installation of Jazz for Service Management and Tivoli Common Reporting.

Installing Jazz for Service Management and Tivoli Common Reporting by using launchpad on AIX

You can install Jazz for Service Management and Tivoli Common Reporting on the AIX operating system by using a web browser.

DB2 was installed as part of Tivoli Storage Productivity Center installation process. You do not need to install DB2 as part of the Jazz for Service Management installation process.

To install Jazz for Service Management and Tivoli Common Reporting on the AIX operating system, complete the following steps:

1. In a terminal window, go to the directory where you extracted the compressed files, and run the following command to start launchpad:
`./launchpad.sh`

Note: The `launchpad.sh` file starts in the default browser for your computer.

2. On the Welcome page for Jazz for Service Management Management Version 1.1.0.1, click **Custom**.

Attention: Ensure that you click **Custom**, not **Full**.

3. On the Custom workflow page, click **Next**.
4. On the Specify Jazz for Service Management Home Location page, click **Next**.

Tip: If you have an existing Jazz for Service Management installation, launchpad provides the path to the existing installation.

5. On the Specify Source Locations page, enter the directory path where the Jazz for Service Management, WebSphere Application Server, and Tivoli Common Reporting installation images are located.

Important: Since DB2 is already installed, you do not need to enter a directory path for DB2.

The directory path is the same directory path in which you extracted the compressed files in step 1.

Tip: If you installed a supported version of DB2, you may experience the following issues:

- The **IBM DB2 10.1 or later, Enterprise Server Edition installation image** field is empty, but you can continue through the launchpad. For more

information about the supported versions of DB2, see “Software requirements for the database repository” on page 118.

- If an informational message is displayed, you can close the message, and continue with the installation.

The screenshot shows the 'Specify Source Locations' page of the 'Jazz for Service Management 1.1.0.1' installation wizard. The interface includes a left-hand navigation pane with options like 'Welcome', 'Full', 'Custom', 'Home Location', 'Source Locations' (highlighted), 'Operations', 'Installation Locations', 'Credentials', 'Tasks', 'Results', 'Tools', and 'Exit'. The main content area features a warning message at the top: 'The IBM DB2 10.1 or later, Enterprise Server Edition installation image field is empty. This field is required when you want to install DB2.' Below this, the 'Specify Source Locations' section contains three input fields, each with a 'Browse' button: 'Jazz for Service Management 1.1 or later package repository' (with path /downloads/JazzSM_GMCandidate/JazzSMRepository/disk1/diskTag.inf), 'DB2, WebSphere Application Server, and Tivoli Common Reporting source locations' (with a sub-field for 'IBM DB2 10.1 or later, Enterprise Server Edition installation image'), 'IBM WebSphere Application Server 8.5 or later package repository' (with path /downloads/JazzSM_GMCandidate/WASRepository/disk1/diskTag.inf), and 'IBM Tivoli Common Reporting 3.1 or later installation image' (with path /downloads/JazzSM_GMCandidate/TCRInstaller/install.sh). The IBM logo is in the bottom left, and 'Back' and 'Next' buttons are in the bottom right.

Figure 11. Specifying the Source Locations

6. On the Select Operations page, select **Install** for the following components:

- **Reporting services**
- **IBM WebSphere Application Server**

By default, the **Install** option is selected. You must select **None** for the components that you do not want to install. If you accept the default option for all of the components, and install the components, you can experience a performance issue.

Important: If you plan to implement LDAP authentication for IBM System Storage DS8000 Storage Manager or IBM System Storage SAN Volume Controller by using Jazz for Service Management, you must install the **Security Services** option.

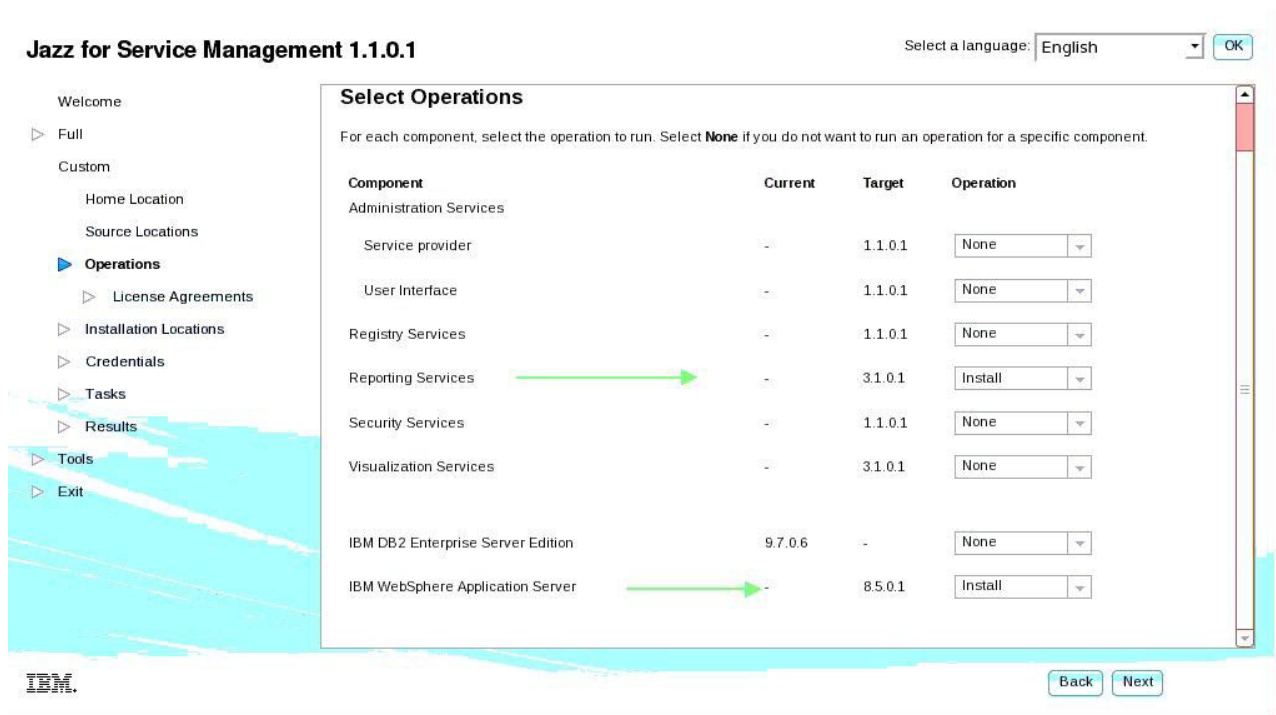


Figure 12. Selecting the components to install

7. On the License agreement page, read and accept the license agreement, and click **Next**.
8. On the Specify Installation Locations page, specify the installation locations for the following components, and click **Next**:
 - Jazz for Service Management (for example, /opt/IBM/JazzSM)
 - WebSphere Application Server (for example, /opt/IBM/WebSphere/AppServer)

If DB2 is already installed on your system, the DB2 installation location field is disabled.

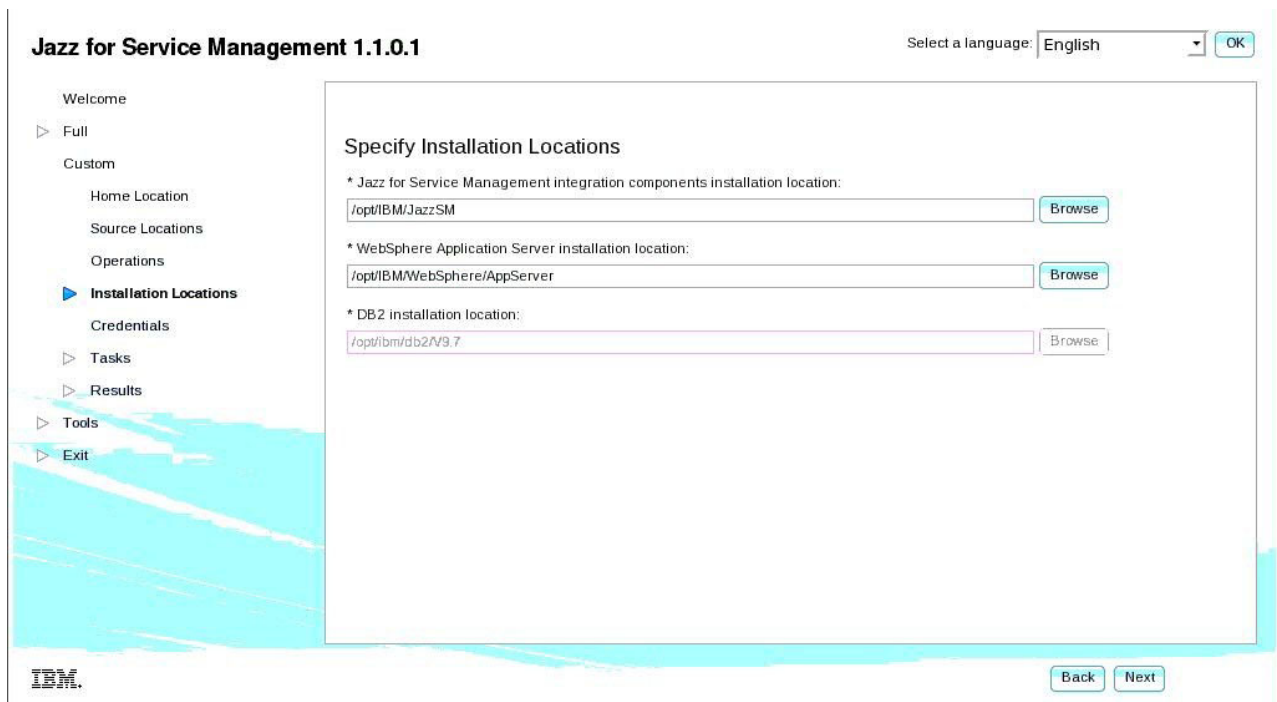


Figure 13. Entering the installation locations

9. On the Specify Credentials page, enter the following information:
 - a. New WebSphere Application Server credentials.
The user name and password that you enter are used to create your WebSphere Application Server profile.
 - b. Existing DB2 credentials.
The **Confirm instance user password** field is disabled.
The credentials are used to connect to DB2 and create the Cognos Content Store database.

Restriction: On the DB2 panel, only enter your existing DB2 administrator credentials. If you use the default or any other credentials, the Jazz for Service Management installation will fail.

If you have an existing DB2 installation and that installation has multiple DB2 instances, the Jazz for Service Management launchpad uses the last DB2 instance that is returned by the **db2ilist** command.

Jazz for Service Management 1.1.0.1 Select a language: English OK

Welcome

- Full
- Custom
 - Home Location
 - Source Locations
 - Operations
 - Installation Locations
 - Credentials**
 - Tasks
 - Results
 - Tools
 - Exit

Specify Credentials

WebSphere Application Server Profile	
Administrator name:	smadmin
Administrator password:	*****
Confirm administrator password:	*****

DB2	
Instance user name:	db2inst1
Instance user password:	*****
Confirm instance user password:	

IBM Back Next

Figure 14. Specifying your credentials

10. On the Run Tasks page, review the list of components that will be installed and click **Run**.

Important: After you click **Run**, the installation can take 30 minutes or more to install the components.

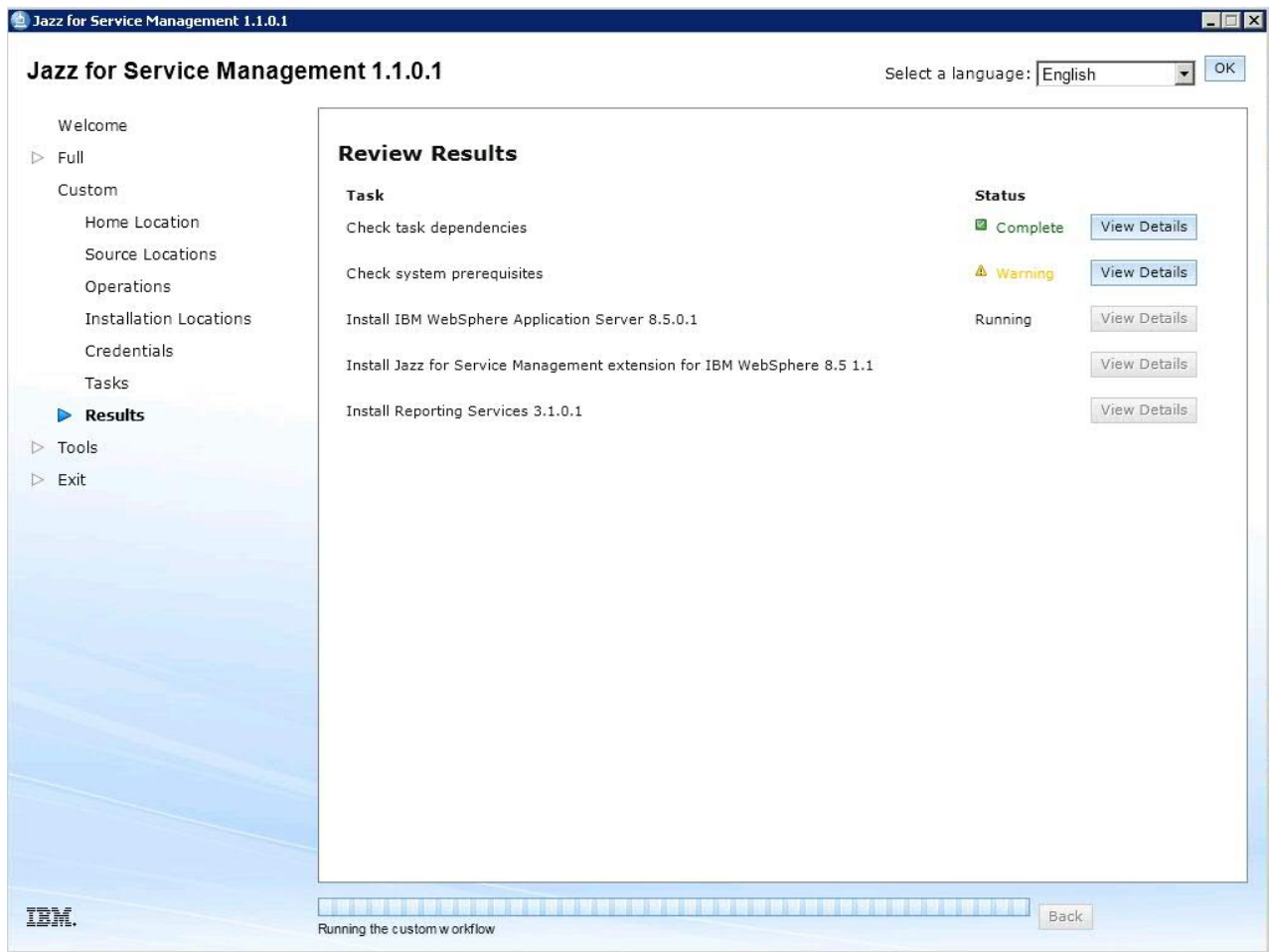


Figure 15. Running the tasks to install the components

To resolve the port conflict, see “Resolve port conflicts” on page 173.

11. Close the browser window to exit the Jazz for Service Management launchpad.

To verify the installation, enter the following web address in a browser:

`https://host_name:16311/tarf/servlet/dispatch`

Where *host_name* is the fully qualified host name or IP address.

Important: If you restart your computer, you must manually restart Jazz for Service Management and Tivoli Common Reporting.

To restart Jazz for Service Management and Tivoli Common Reporting on the AIX operating system, complete the following steps:

1. Go to the `/opt/IBM/JazzSM/profile/bin` directory.
2. Run the following command:
`./startServer.sh server1`

For more information about starting or stopping Jazz for Service Management, see “Starting and stopping the Tivoli Storage Productivity Center servers” on page 234.

For more information about installing Jazz for Service Management, see *Installing Jazz for Service Management*.

Related concepts:

“Jazz for Service Management and Tivoli Common Reporting” on page 172

If you plan to use Tivoli Storage Productivity Center reports, you must install Jazz for Service Management 1.1.0.1 and Tivoli Common Reporting 3.1.0.1. You can install these components now or after you install Tivoli Storage Productivity Center.

Related reference:

“Requirements for Jazz for Service Management and Tivoli Common Reporting” on page 121

If you plan to use Tivoli Storage Productivity Center reports, you must install Jazz for Service Management Version 1.1.0.1 and IBM Tivoli Common Reporting Version 3.1.0.1. The requirements apply to a single-server installation of Jazz for Service Management and Tivoli Common Reporting.

Installing Jazz for Service Management and Tivoli Common Reporting on AIX without a web browser

If your target computer does not have a browser, or if your browser is incompatible with the Jazz for Service Management launchpad, you can install Jazz for Service Management by using IBM Installation Manager and Tivoli Common Reporting on the AIX operating system.

Installing Installation Manager

Before you install Jazz for Service Management and Tivoli Common Reporting, you must first install Installation Manager.

Important: If you cannot install Installation Manager by using the GUI mode, you can also install Installation Manager by using the silent mode. For more information about installing Installation Manager by using silent mode, see *Silently installing Installation Manager*. For more information about custom installations by using silent mode, see *Custom installations by using silent mode*.

To install Installation Manager on AIX operating systems, complete the following steps:

1. Download and extract the following compressed files into the same temporary directory:
 - Jazz for Service Management
 - Tivoli Common Reporting
 - IBM WebSphere Application Server
2. Go to the following directory:
`JazzSM_install_directory/im.aix`

where *JazzSM_install_directory* is where you extracted the Jazz for Service Management launchpad compressed files.

3. Run the following command to install Installation Manager:
`./install`
4. On the Install Packages page, verify that only the check box for **IBM Installation Manager** is selected and click **Next**.

Important: You must install Installation Manager **only** when you run the installation program the first time. After you install Installation Manager and

run the installation program again, you can select the packages that are necessary to install Jazz for Service Management.

5. On the License agreement page, read, accept the license agreement, and click **Next**.
6. On the page where you can select a location for Installation Manager, click **Next**.
7. Enter the shared resources directory location and click **Next**.

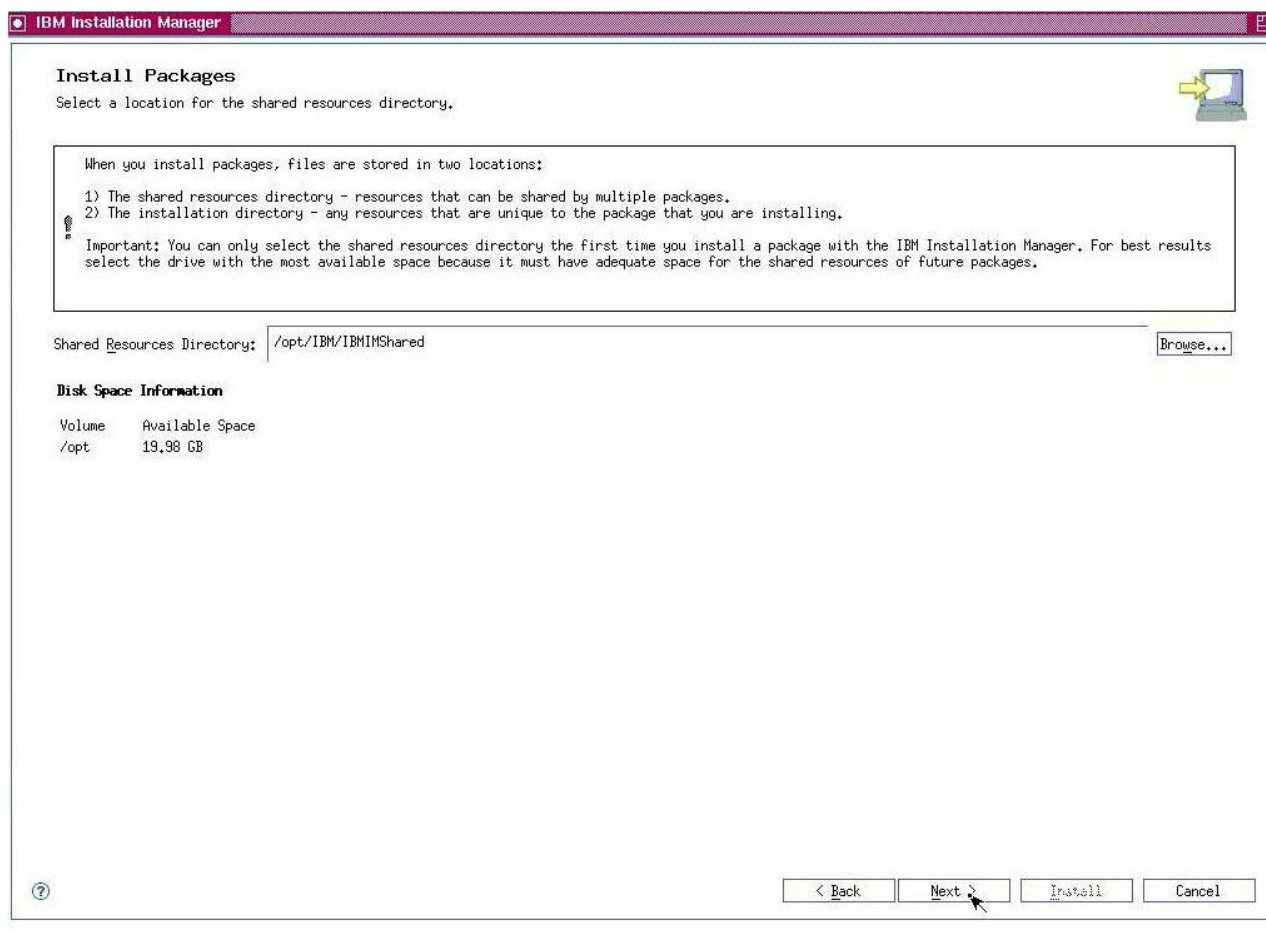


Figure 16. Specifying your installation location

8. Review the summary information and click **Install**.
9. Click **Restart Installation Manager**.

Tip: If you are planning to install Jazz for Service Management, after you complete step 9, skip to step 2 in the next procedure.

Installing Jazz for Service Management by using Installation Manager

You can install Jazz for Service Management after you install Installation Manager Version 1.6.1.

To install Jazz for Service Management by using Installation Manager, complete the following steps:

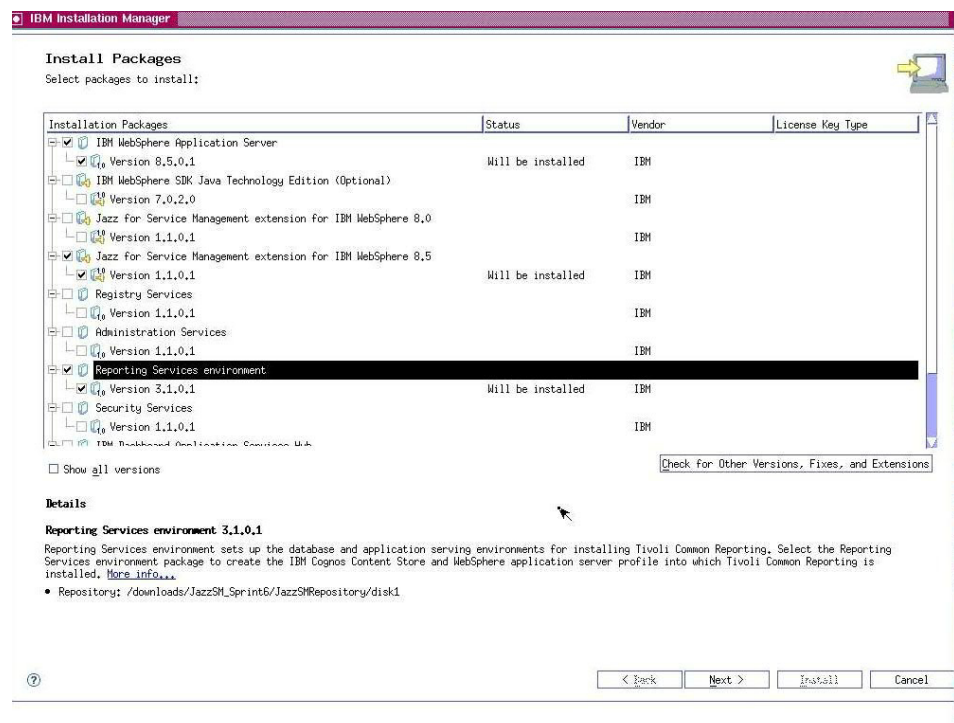
1. Run this command to start Installation Manager:

/opt/IBM/InstallationManager/eclipse/IBMIM

2. On the Installation Manager Home page, click **File > Preferences**.
3. Click **Add Repository**.
4. To add the Jazz for Service Management repository, browse to the following directory path:
JazzSM_image_folder/JazzSMRepository/disk1/
5. Select the diskTag.inf file and click **OK**.
6. Click **Add Repository**.
7. To add the IBM WebSphere Application Server repository, browse to the following directory path:
JazzSM_image_folder/WASRepository/disk1/
where *JazzSM_image_folder* is where you extracted the Jazz for Service Management launchpad compressed files.
8. Select the diskTag.inf file and click **OK**.

Tip: After you select the .inf files for Jazz for Service Management and WebSphere Application Server, the Preferences window can disappear behind the Installation Manager Home page. Ensure that the Preferences screen remains active.

9. On the Installation Manager Home page, click **Install**.
10. On the Install Packages page, ensure that **only** the following packages are selected, and click **OK**:
 - **IBM WebSphere Application Server 8.5.0.1**
 - **Jazz for Service Management extension for WebSphere 8.5**
 - **Reporting Services environment**
11. **Attention:** If you plan to configure LDAP authentication by using IBM System Storage DS8000 Storage Manager or IBM System Storage SAN Volume Controller, you must install **Security Services**.



12. On the License agreement page, read and accept the license agreement, and click **Next**.
13. Review the location of the shared directory and click **Next**.

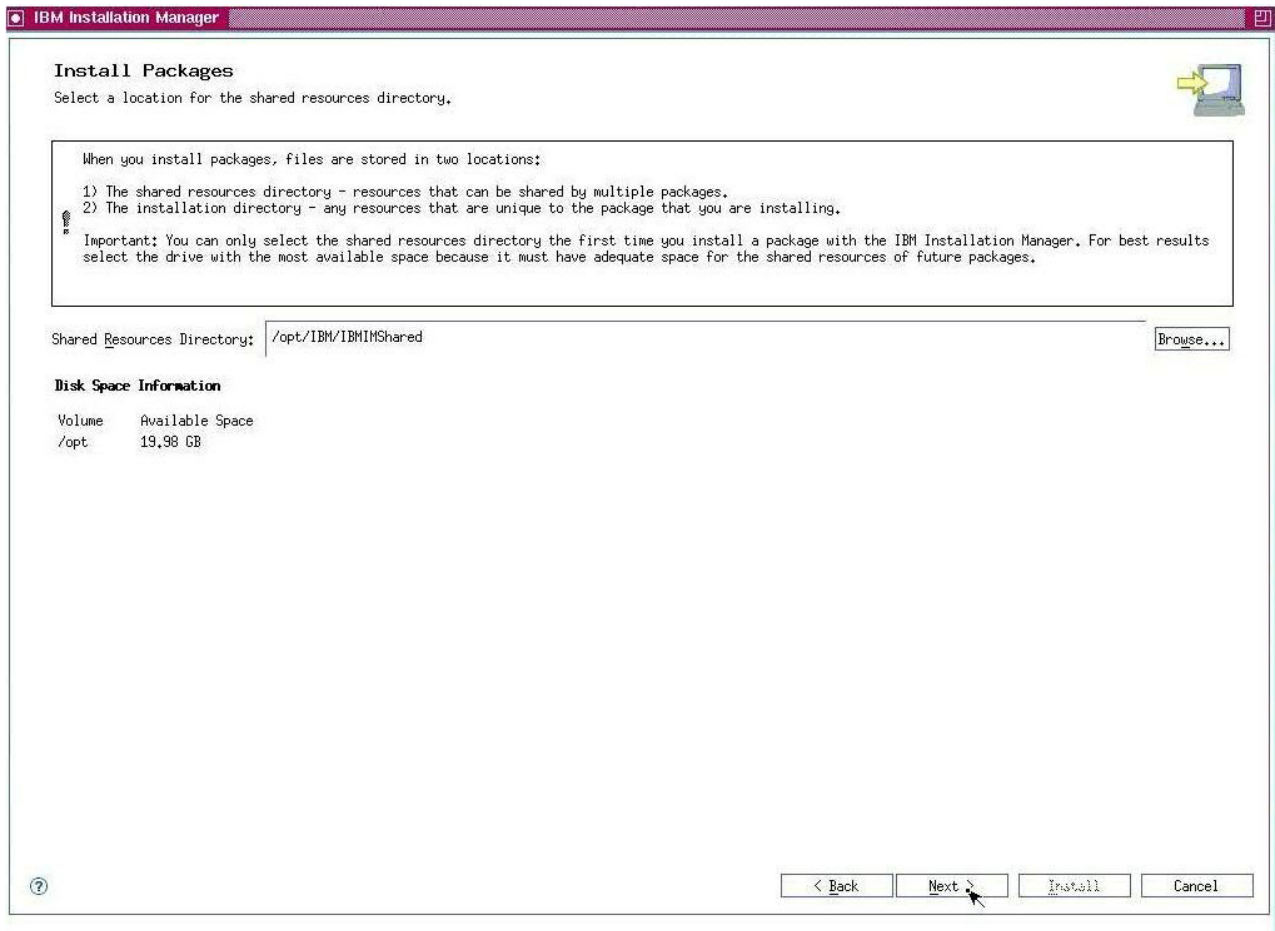


Figure 17. Specifying your installation location

14. Review the location of the installation directory and click **Next**.
15. Select the language that you want to use to install Jazz for Service Management and click **Next**.

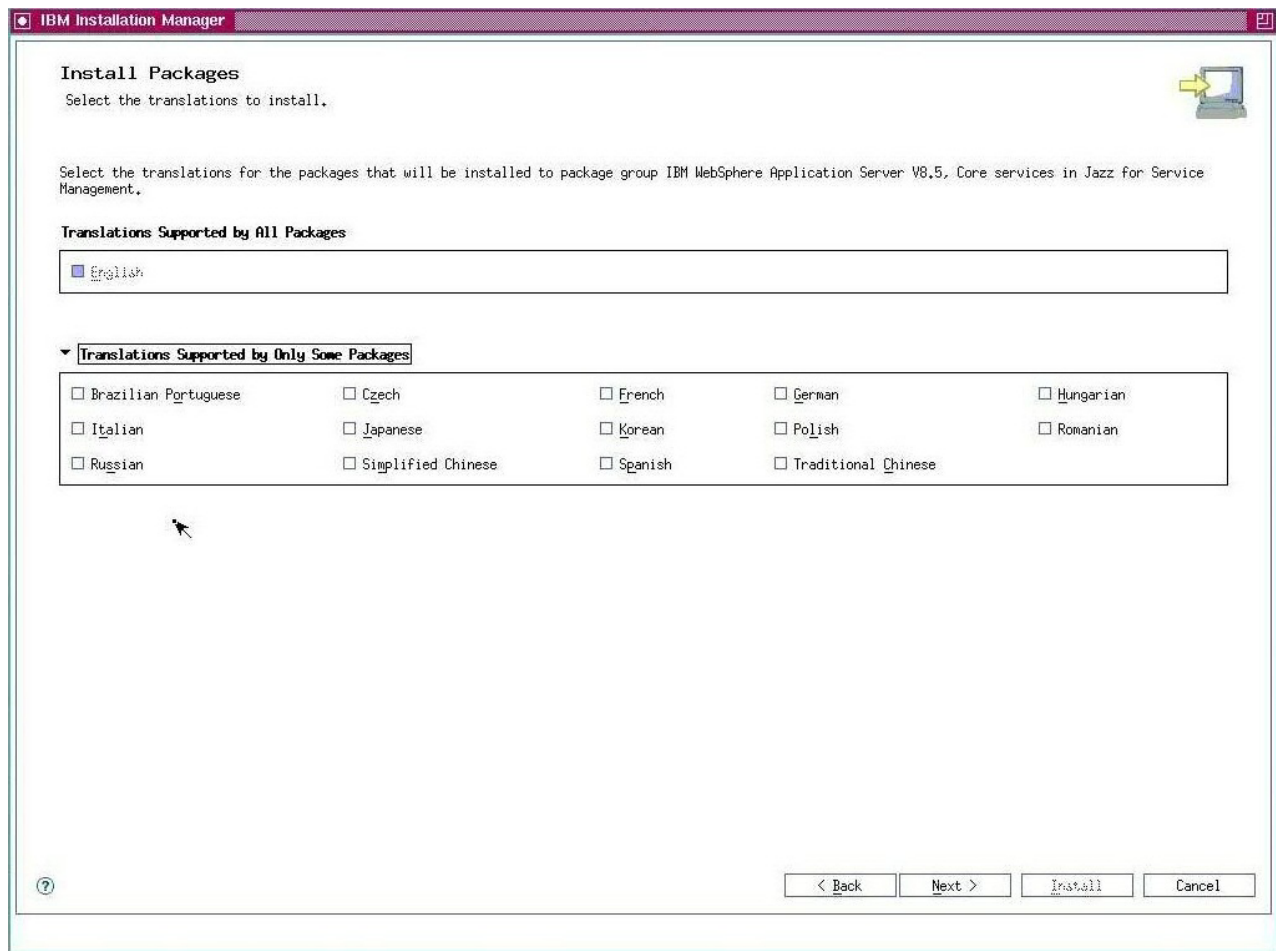


Figure 18. Selecting your installation language

16. Review the packages that will be installed and click **Next**.
17. Enter the user name and password for the Jazz for Service Management WebSphere Application Server profile.
The user name and password that you enter are used to create your WebSphere Application Server profile.

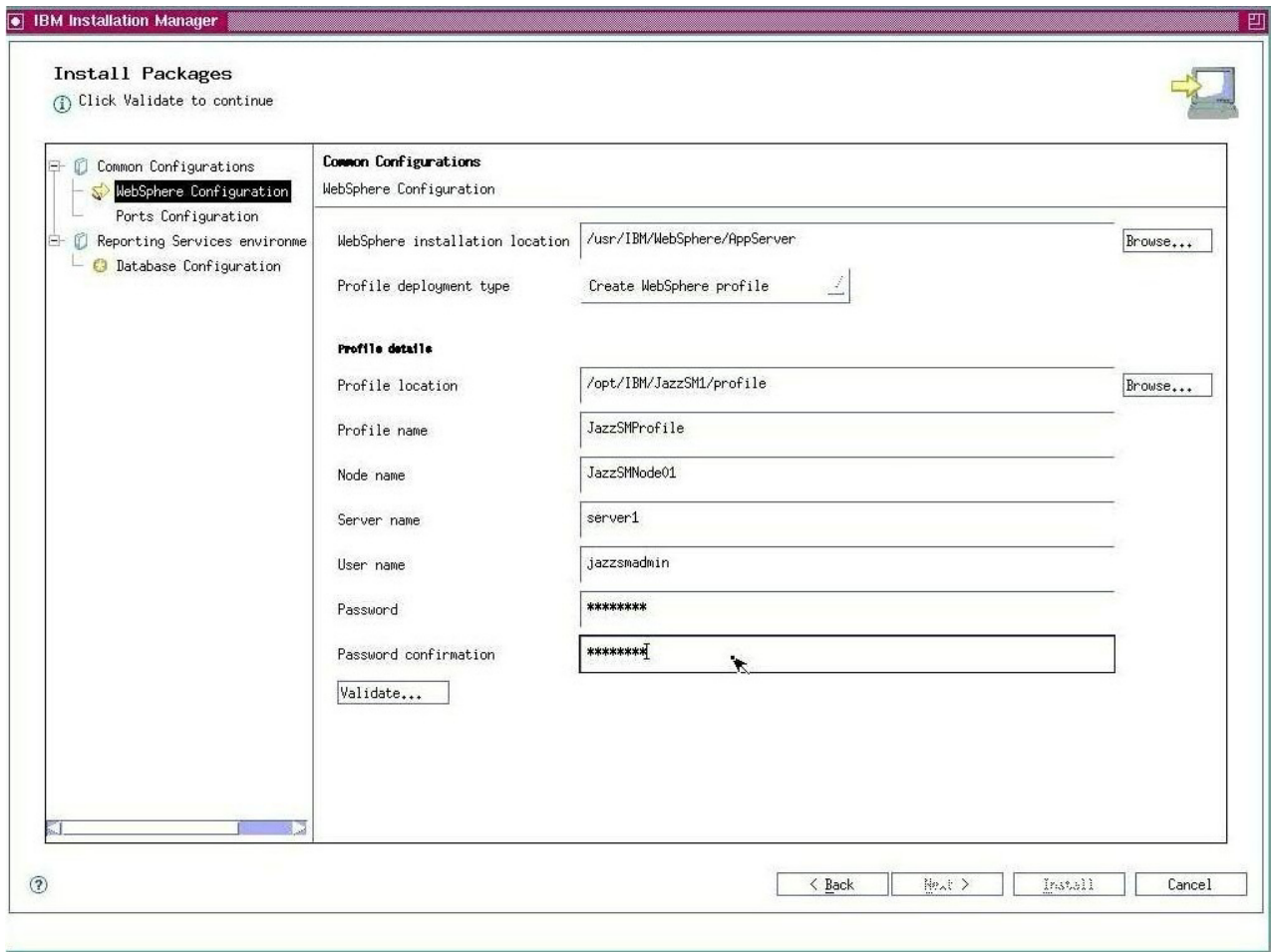


Figure 19. WebSphere Application Server Configuration

Important: Do not use Administrator as the user name. If you add a Microsoft Windows Active Directory (MSAD) LDAP repository to Jazz for Service Management later, issues with duplicate user names can prevent you from logging in to WebSphere Integrated Solutions Console that is associated with Jazz for Service Management.

18. Click **Validate** and click **Next**.

Note: When the profile is valid, the **Next** button is active.

19. Review your port configuration and click **Next**.

Attention: If you are upgrading from Tivoli Storage Productivity Center Version 4.2.2 to Version 5.2, Jazz for Service Management and IBM Tivoli Integrated Portal can use port 16310. If there is a port conflict, you must change the value of the HTTP transport port.

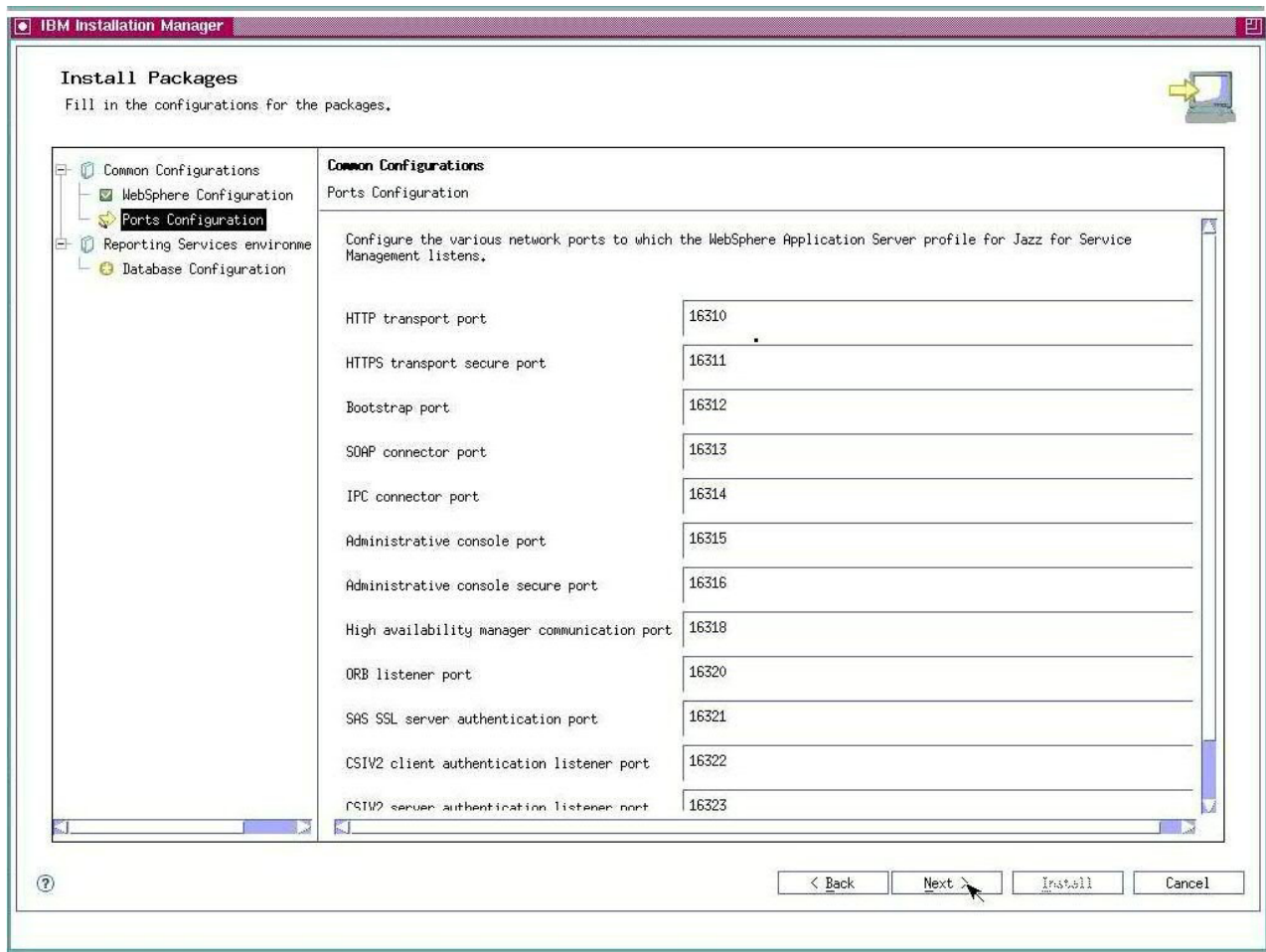


Figure 20. Configuring your ports

20. Enter your existing DB2 credentials, click **Test Connection**, and click **Next**. An informational message appears verifying that the connection is successful. The DB2 credentials are used to connect to DB2 and create the Cognos Content Store database.

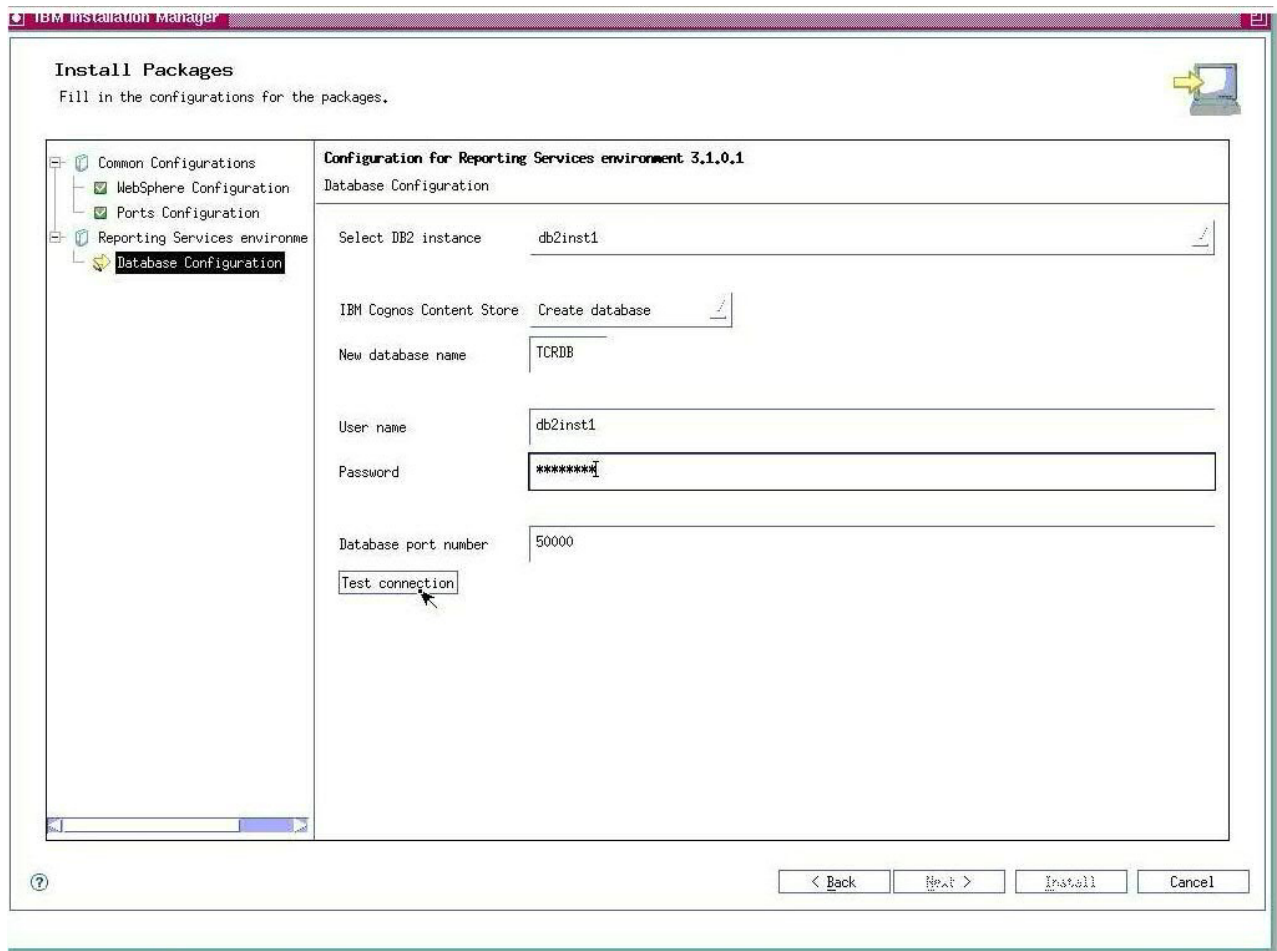


Figure 21. Creating the database

21. Review the list of packages that will be installed and click **Install**.

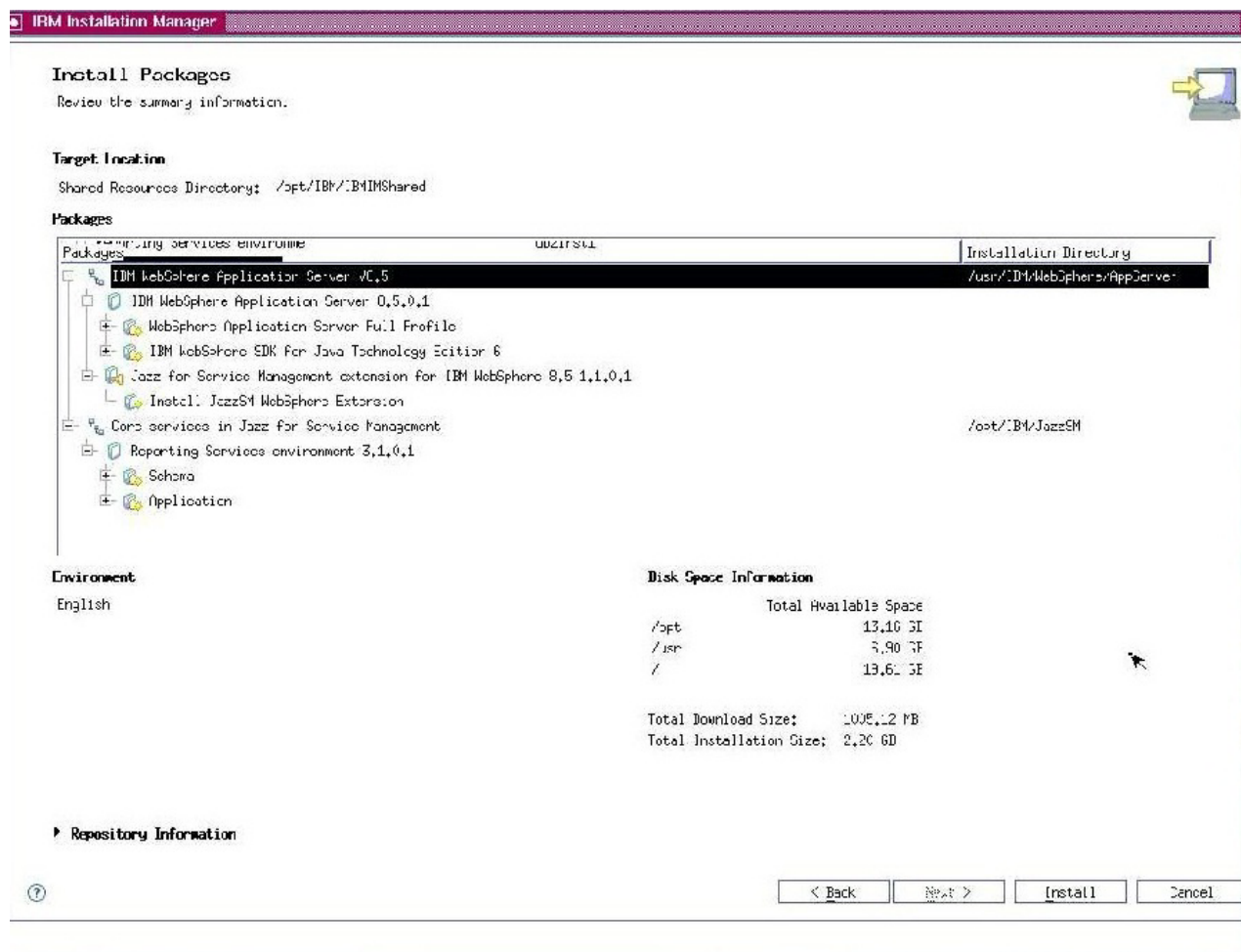


Figure 22. Installation summary

22. Select **None** and click **Finish**.
23. Exit from the Installation Manager Home page.

Important: If you restart your computer, you must manually restart Jazz for Service Management and Tivoli Common Reporting.

To restart Jazz for Service Management and Tivoli Common Reporting on the AIX operating system, complete the following steps:

1. Go to the /opt/IBM/JazzSM/profile/bin directory.
2. Run the following command:
./startServer.sh server1

For more information about starting or stopping Jazz for Service Management, see “Starting and stopping the Tivoli Storage Productivity Center servers” on page 234.

For more information about installing Jazz for Service Management, see Installing Jazz for Service Management.

Installing Tivoli Common Reporting

You must install Tivoli Common Reporting after you install Jazz for Service Management. Tivoli Common Reporting is installed by using InstallAnywhere.

To install Tivoli Common Reporting, complete the following steps:

1. Go to the directory in which you extracted the Tivoli Common Reporting installation files (for example, /tmp/TCR/).
2. Go to the TCRInstaller directory.
3. To start the installation process, run the following command:
`./install.sh`
4. Select a language, accept the license agreement, follow the prompts in the installation wizard, and click **Next**.
5. On the IBM Jazz for Service Management Installation Directory Selection page, specify the location of the Jazz for Service Management installation directory and click **Next**. In the warning dialog about IBM Dashboard Application Services Hub not being installed, click **Next**.



Figure 23. IBM Dashboard Application Services Hub warning

6. On the IBM Jazz for Service Management Details page, verify the information, and click **Next**.

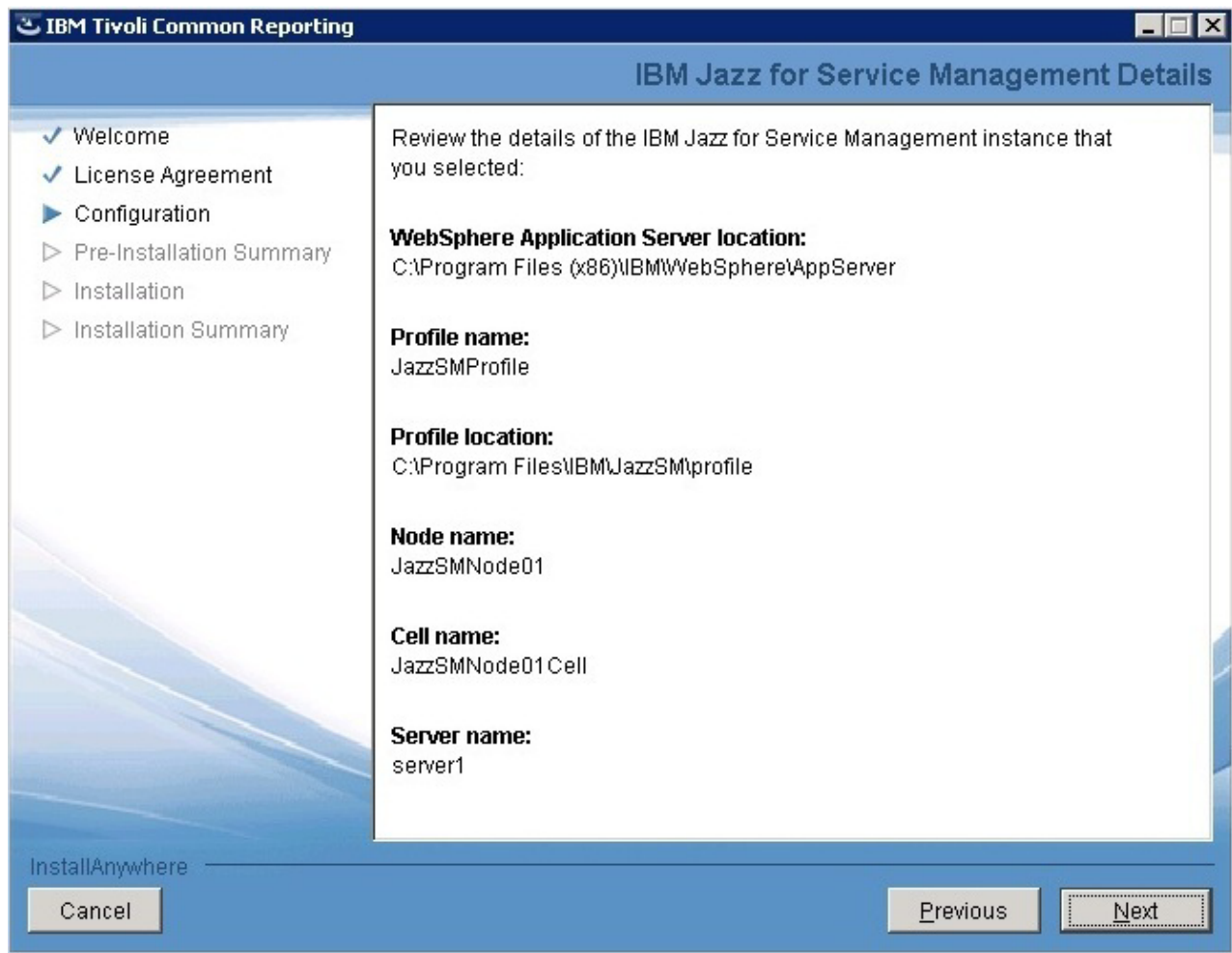


Figure 24. Installation details for Jazz for Service Management

7. On the WebSphere Information page, enter the user name and password that you used to install WebSphere Application Server during the Jazz for Service Management installation, and click **Next**.
8. On the Content Store configuration page, specify the following information about the Cognos Content Store database you created earlier in this procedure, and click **Next**:
 - **Hostname/IP.**
 - In the **Port** field, enter 50000.
Use port 50000 if you completed a typical DB2 installation. For custom DB2 installations, enter the custom port value that you specified during your DB2 installation.
 - In the **Database name** field, enter TCRDB.
 - **Database owner.**
 - **Database owner password.**
9. On the Pre-Installation Summary page, verify the information, and click **Install**.
10. On the Installation Summary page, click **Done** to complete the installation.

For more information about installing Tivoli Common Reporting, see *Installing Tivoli Common Reporting*.

Related concepts:

“Jazz for Service Management and Tivoli Common Reporting” on page 172

If you plan to use Tivoli Storage Productivity Center reports, you must install Jazz for Service Management 1.1.0.1 and Tivoli Common Reporting 3.1.0.1. You can install these components now or after you install Tivoli Storage Productivity Center.

Related reference:

“Requirements for Jazz for Service Management and Tivoli Common Reporting” on page 121

If you plan to use Tivoli Storage Productivity Center reports, you must install Jazz for Service Management Version 1.1.0.1 and IBM Tivoli Common Reporting Version 3.1.0.1. The requirements apply to a single-server installation of Jazz for Service Management and Tivoli Common Reporting.

Upgrading Installation Manager

If you try to install Jazz for Service Management by using a version of IBM Installation Manager that is lower than Version 1.6.1, the Jazz for Service Management installation will fail. To complete the Jazz for Service Management installation, you must upgrade Installation Manager to Version 1.6.1 or later.

To upgrade Installation Manager to Version 1.6.1 or later, complete the following steps:

1. Click **Start > All Programs > IBM Installation Manager > IBM Installation Manager**.
2. Click **File > Preferences**.
3. In the navigation tree, click the **Updates** node.
4. Select the **Search for Installation Manager updates** check box and click **OK**.
5. On the Installation Manager Home screen, click **Update**.
6. If a newer version of Installation Manager is detected, and you want to upgrade, click **Yes**.
7. Click **OK** to restart Installation Manager.
8. Continue the Jazz for Service Management installation.

Installing Jazz for Service Management and Tivoli Common Reporting by using DVDs

You can install Jazz for Service Management and Tivoli Common Reporting on the Windows, Linux, or AIX operating systems by using DVDs.

Each of the following Jazz for Service Management components is provided on a separate DVD:

- Tivoli Common Reporting
- IBM WebSphere Application Server
- Jazz for Service Management launchpad

To install Jazz for Service Management and Tivoli Common Reporting by using DVDs, complete the following steps:

1. On the computer on which you want to install Jazz for Service Management, create a temporary folder.

Restriction: You cannot install Jazz for Service Management directly from the DVDs.

2. Insert each disk and copy the files into the temporary folder.

Table 28. Approximate times to copy installation files from the DVD to a local directory

Installation file	Minutes to copy
Tivoli Common Reporting	8
WebSphere Application Server	10
Jazz for Service Management launchpad	5

3. Insert the Tivoli Storage Productivity Center Version 5.2 installation disk.
4. Start the Tivoli Storage Productivity Center Version 5.2 installation program.
5. On the Welcome page, click **Install Now**.
6. On the Install Jazz for Service Management and Tivoli Common Reporting page, browse for the temporary folder that you created in step 1 on page 204, and click **Install Now**.
7. Complete the Jazz for Service Management installation.

Related tasks:

“Installing Tivoli Storage Productivity Center in a single-server environment by using the wizard” on page 143

You can use the Tivoli Storage Productivity Center installation wizard to install Tivoli Storage Productivity Center and to start the Jazz for Service Management Version 1.1.0.1 installation program in a single-server environment. You need Jazz for Service Management Version 1.1.0.1 to run Tivoli Storage Productivity Center reports.

“Installing Tivoli Storage Productivity Center with a remote database by using the installation wizard” on page 156

You can install Tivoli Storage Productivity Center in a multiple-server environment by using the installation wizard.

Creating more users for Jazz for Service Management and Tivoli Common Reporting

You can add users for Jazz for Service Management and Tivoli Common Reporting to the file-based user repository after you install Jazz for Service Management. You create the users in the WebSphere Integrated Solutions Console.

1. To access the WebSphere Integrated Solutions Console, open a web browser, and open one of the following web addresses:
 - `http://hostname:port/ibm/console/logon.jsp`
 - `https://hostname:port/ibm/console/logon.jsp`

The host name is the server name or IP address for the server that is running WebSphere Application Server. The port is the port number for the same server. The port number differs depending on which protocol you used (http or https) and the options that you selected when you installed Tivoli Storage Productivity Center.

To determine the port number, complete the following steps:

- a. Open the `JAZZSM_INSTALL_DIR/profile/properties/portdef.props` file.
- b. The port number is the value that is assigned to one of the following keys:
 - For `http://` protocols:
`WC_adminhost`
 - For `https://` protocols:

WC_adminhost_secure

2. Log in to the WebSphere Integrated Solutions Console with your administrator user ID and password for Jazz for Service Management.
3. In the WebSphere Integrated Solutions Console navigation tree, click **Users and Groups > Manage Users**.
4. Click **Create**.
5. Enter information for the user, and then click **Create**.

Installing Tivoli Storage Productivity Center client components on a separate computer

You can install IBM Tivoli Storage Productivity Center client components on a computer other than the Tivoli Storage Productivity Center Server.

To install Tivoli Storage Productivity Center client components on a separate computer, complete the following steps:

1. Install the Tivoli Storage Productivity Center server.
2. Navigate to the `client_images` subdirectory in the Tivoli Storage Productivity Center installation directory. In the Windows operating system, for example, the path is `C:\Program Files\IBM\TPC\client_images`.
3. Locate the appropriate compressed file for the operating system of your computer where you want to install the stand-alone GUI and command-line interface (CLI). Examples of compressed bundles include `TPC_CLIENT_AIX.tar`, `TPC_CLIENT_LINUX.zip`, or `TPC_CLIENT_WIN.zip`.

Restriction: You must use only the client images from the Tivoli Storage Productivity Center installation directory. The client images in the Tivoli Storage Productivity Center image or download directory must not be used, because they are updated by the installation program.

4. Extract the appropriate compressed file on another computer. For example, in the AIX operating system, you must extract the `TPC_CLIENT_AIX.tar` file in to the `/opt/IBM/TPCCClient` folder and run the `/opt/IBM/TPCCClient/gui/TPCD.sh` command to start the stand-alone GUI.

Tivoli Storage Productivity Center GUI and CLI components are now installed on a separate computer. You can issue Tivoli Storage Productivity Center commands and run the stand-alone GUI from that computer.

Installing Tivoli Common Reporting on a remote server

Use this procedure to install and configure Tivoli Common Reporting on a remote server.

To install Tivoli Common Reporting on a remote server, complete these steps:

1. Install the DB2 client on the remote server. For information about installing the DB2 client, see the DB2 information center. For more information about setting up multiple connections to the TPCDB data source, go to the Tivoli Storage Productivity information center and search for *Setting up multiple connections to the TPCDB data source in Tivoli Common Reporting*.
2. Install Tivoli Common Reporting on the remote server.
3. Create the data source in DB2 for the remote server by completing the following steps:
 - a. Catalog the DB2 TCP/IP node:

Run the following command:

```
CATALOG TCPIP NODE db2_node_name
REMOTE host_name
SERVER port_number
REMOTE_INSTANCE db2_instance_name
SYSTEM system_name
OSTYPE operating_system_type
```

In the preceding command, specify the following values:

CATALOG TCPIP NODE *db2_node_name*

This value specifies the node name of the DB2 server.

REMOTE *host_name*

This value specifies the host name or IP address of the DB2 server.

SERVER *port_number*

This value specifies the port number of the DB2 server. The default port is 50000.

REMOTE_INSTANCE *db2_instance_name*

This value specifies the DB2 instance name on the remote server.

SYSTEM *system_name*

This value specifies the DB2 system name that is used to identify the server system.

OSTYPE *operating_system_type*

This value specifies the operating system type of the server system.

Valid values for Tivoli Common Reporting are: AIX, WIN, and LINUX.

An example for this command is:

```
CATALOG TCPIP NODE db2node
REMOTE system53.ibm.com
SERVER 50000
REMOTE_INSTANCE db2 system53
SYSTEM system53
OSTYPE win
```

b. Catalog the Tivoli Storage Productivity Center database.

Run the following command:

```
CATALOG DATABASE tpc_database_name AS tpc_database_alias_name
AT NODE db2_node_name AUTHENTICATION SERVER
```

In the preceding command, specify the following values:

CATALOG DATABASE *tpc_database_name*

This value specifies the name of the remote database to catalog.

AS *tpc_database_alias_name*

This value specifies the alias for the remote database that is being cataloged. If you do not specify an alias, the database manager uses the name of the remote database as the alias.

AT NODE *db2_node_name*

This value specifies the name of the node that you previously cataloged.

AUTHENTICATION SERVER

This value specifies that authentication takes place on the DB2 data source node.

An example for this command is:

```
CATALOG DATABASE tpc_database_name AS tpc_database_alias_name
AT NODE db2node AUTHENTICATION SERVER
```

4. Type the following command on the client to connect to the remote database:
`CONNECT TO tpc_database_alias_name USER userid`
5. When prompted, enter your password.
6. If the connection is successful, move to step 7. If not, verify that step 3 was done correctly.
7. Configure Tivoli Common Reporting. For information about configuring Tivoli Common Reporting, go to the Tivoli Common Reporting information center and search for *Configuring IBM Tivoli Common Reporting*.

Related tasks:

“Installing Tivoli Storage Productivity Center with remote reports by using the installation wizard” on page 160

You can install Tivoli Storage Productivity Center reports in a multiple-server environment by using the installation wizard.

“Installing Tivoli Storage Productivity Center with remote reports by using silent mode” on page 166

You can install Tivoli Storage Productivity Center in a multiple-server environment by using silent mode.

Verifying the installation

After you install Tivoli Storage Productivity Center, you can verify whether the installation was successful.

Use the following questions to guide you through the verification process.

Note: Remember the following when you are verifying the installation:

- You must use a user name with DB2 administrative privileges to run any DB2 commands.
- You must run any DB2 commands on the DB2 command line.

Was the TPCDB database created?

Run the following DB2 command:

```
db2 list db directory
```

This command should return information about the TPCDB database.

Are the tables and views present in the TPCDB database?

Run the following DB2 commands:

```
db2 connect to TPCDB
db2 list tables for schema TPC
db2 disconnect TPCDB
```

These commands indicate that you can connect to and disconnect from the Tivoli Storage Productivity Center database repository and should list the tables and views in the TPCDB database.

Are the Tivoli Storage Productivity Center reports deployed in Tivoli Common Reporting?

Note: This verification applies only if you did not select the **Install Tivoli Storage Productivity Center reports later** check box when you installed Tivoli Storage Productivity Center.

On the Windows operating system:

1. In a Windows command window, go to the following directory:
`JazzSM_installation_directory\reporting\bin\`

where *JazzSM_installation_directory* is the top-level directory in which you installed Jazz for Service Management (for example, C:\Program Files\IBM\JazzSM\).

2. Run the following command:

```
trcmd.bat -user JazzSM_user_ID  
-password JazzSM_User_Password  
-list -dataSources
```

where *JazzSM_user_ID* and *JazzSM_User_Password* are the user name and password that you used when you created the WebSphere Application Server profile during the Jazz for Service Management installation.

This command should return a list of the Tivoli Common Reporting data sources and the list should contain an entry for TPCDB.

3. Run the following command:

```
trcmd.bat -user JazzSM_User_ID  
-password JazzSM_User_Password -list -reportSets
```

where *JazzSM_user_ID* and *JazzSM_User_Password* are the user name and password that you used when you created the WebSphere Application Server profile during the Jazz for Service Management installation.

This command should return a list of the report sets that are deployed in Tivoli Common Reporting and the list should contain numerous entries for Tivoli Storage Productivity Center reports

On the AIX or Linux operating system:

1. In a command-line window, go to the following directory:

JazzSM_installation_directory/reporting/bin/

where *JazzSM_installation_directory* is the top-level directory in which you installed Jazz for Service Management (for example, /opt/IBM/JazzSM/).

2. Run the following command:

```
./trcmd.sh -user JazzSM_user_ID  
-password JazzSM_user_password  
-list -dataSources
```

where *JazzSM_user_name* and *JazzSM_user_password* are the user name and password that you used when you created the WebSphere Application Server profile during the Jazz for Service Management installation.

This command should return a list of the Tivoli Common Reporting data sources and the list should contain an entry for TPCDB.

3. Run the following command:

```
./trcmd.sh -user JazzSM_user_ID  
-password JazzSM_user_password  
-list -reportSets
```

where *JazzSM_user_ID* and *JazzSM_user_password* are the user name and password that you used when you created the WebSphere Application Server profile during the Jazz for Service Management installation.

This command should return a list of the report sets that are deployed in Tivoli Common Reporting, and the list should contain numerous entries for Tivoli Storage Productivity Center reports.

Is the Data server running?

On the Windows operating system:

Go to the Services listing and find **IBM Tivoli Storage Productivity Center - Data Server**.

On the AIX or Linux operating system:

Run the following command:

```
ps -eaf | grep DataServer.jar
```

This command should return a list of the Data server processes in the process table.

Is the Device server started?

On the Windows operating system:

1. In a Windows command window, go to the following directory:

```
TPC_installation_directory\wlp\bin\
```

where *TPC_installation_directory* is the top-level directory in which you installed Tivoli Storage Productivity Center (for example, C:\Program Files\IBM\TPC\).

2. Run the following command:

```
server.bat status deviceServer
```

This command should return a status of running.

On the AIX or Linux operating system:

1. In a command-line window, go to the following directory:

```
TPC_installation_directory/wlp/bin/
```

where *TPC_installation_directory* is the top-level directory in which you installed Tivoli Storage Productivity Center (for example, /opt/IBM/TPC/).

2. Run the following command:

```
./server status deviceServer
```

This command should return a status of running.

Note: It can take several minutes after the Device server starts for all services to be running.

Are all Device server services running?

Go to

```
http://localhost:9550/ITSRM/ServiceManager
```

where the port number is the value of the WC_defaultHost key in the *TPC_installation_directory/device/portdef.props* file.

Is the Replication server running?

On the Windows operating system:

1. In a Windows command window, go to the following directory:

```
TPC_installation_directory\wlp\bin\
```

where *TPC_installation_directory* is the top-level directory where you installed Tivoli Storage Productivity Center (for example, C:\Program Files\IBM\TPC\).

2. Run the following command:

```
server.bat status replicationServer
```

This command should return a status of running.

On the AIX or Linux operating system:

1. In a command-line window, go to the following directory:

TPC_installation_directory/wlp/bin/

where *TPC_installation_directory* is the top-level directory where you installed Tivoli Storage Productivity Center (for example, /opt/IBM/TPC/).

2. Run the following command:

```
./server status replicationServer
```

This command should return a status of running.

Note: It can take several minutes after the Replication server starts for all services to be running.

Important: On the Windows operating system, the Device server and the Replication server use scheduled tasks to start the servers when the Windows computer is started again. To view the scheduled tasks for the Device server and the Replication server on Windows, start the Windows Task Scheduler by clicking **Start > Administrative Tools > Task Scheduler**. In the Task Scheduler navigation tree, click **Task Scheduler Library**. The scheduled task for the Device server is called **startDevServer**, and the scheduled task for the Replication server is called **startRepServer**.

Is the Storage Resource agent running?

On the Windows operating system:

Go to the Services window and find **IBM Tivoli Storage Resource Agent**.

On the AIX or Linux operating system:

Run the following command:

```
ps -eaf | grep Agent
```

This command should return a list of the Storage Resource agent processes in the process table.

Is the web server running?

On the Windows operating system:

Go to the **Services** window and find **IBM WebSphere Application Server V8.0 - TPCWebServer**.

On the AIX or Linux operating system:

Run the following command:

```
ps -eaf | grep webServer
```

This command should return a list of the web server processes in the process table.

Can I log on to the web-based GUI ?

Open a web browser and enter the following web address:

`http://host_name:port/srm`

where *host_name* is the fully qualified host name where the web-based GUI is installed, and *port* is the value of the `WC_defaulthost` key in the *TPC_installation_directory*/ewas/profiles/WebServerProfile/properties/portdef.props file. The default port is 9568.

Reviewing the log files to resolve installation issues

If an error occurs during Tivoli Storage Productivity Center installation, you can review the error log files to resolve issues and continue the installation.

To resolve errors that occur during the preinstall steps in the Tivoli Storage Productivity Center installation program, complete the following steps:

1. Navigate to one of the following directories:
 - For the Windows operating system, go to %TEMP% directory
 - For the AIX or Linux operating system, go to /tmp directory
2. Review the following log files:
 - lax-xxxxx-out.txt
 - lax-xxxxx-err.txt

Tip: The files are InstallAnywhere log files and are automatically generated. The *xxxxx* are numeric characters that are assigned by the InstallAnywhere software.

To resolve errors after the Tivoli Storage Productivity Center installation starts, complete the following steps:

1. Navigate to one of the following default directories:
 - For the Windows operating system, go to C:\Program Files\IBM\TPC\logs
 - For the AIX or Linux operating system, go to /opt/IBM/TPC/logs
2. Review these log files:
 - msgTPCInstall.log
 - traceTPCInstall.log
 - sra\install\agent.trace
 - sra\install\agent_*number*.log
3. For agent log files, navigate to one of the following default directories:
 - For the Windows operating system, go to *SRA_location*\log
 - For the AIX or Linux operating system, go to *SRA_location*/logwhere *SRA_location* is where the Storage Resource agent is installed.

If an installation error occurred and you decide to do a partial rollback, the msgTPCInstall.log and traceTPCInstall.log files are updated with additional information when you resume the installation.

Changing the operating system language

You can change the operating system language that determines the language in which Tivoli Storage Productivity Center services, the stand-alone GUI, and the web-based GUI are displayed.

To change the Windows operating system language for the stand-alone GUI, complete the following steps:

1. Click **Start > Control Panel**.
2. Click **Clock, Language, and Region > Region and Language**.
3. On the **Format** tab, select a language and click **OK**.
4. Restart all Tivoli Storage Productivity Center services or restart the system.

To change the language for the web-based GUI, see Displaying information in your preferred language.

To change the AIX operating system language, for example from English to German (de_DE), complete the following steps:

1. At the command prompt, run the following commands:

```
chlang -m de_DE de_DE  
export LANG=de_DE
```
2. Restart all Tivoli Storage Productivity Center services or restart the system.

Adding an installation license

If you installed Tivoli Storage Productivity Center and want to add a Tivoli Storage Productivity Center license to use additional functions of the software, you can use the installation wizard or silent-mode installation.

To determine the type of license you have, find these files in the `TPC_installation_directory/properties/version` directory: :

Tivoli_Storage_Productivity_Center.5.2.0.swtag

Indicates that you have a Tivoli Storage Productivity Center license.

Tivoli_Storage_Productivity_Center_Advanced.5.2.0.swtag

Indicates that you have IBM SmartCloud Virtual Storage Center Storage Analytics Engine license. Previously, this license was called the Tivoli Storage Productivity Center Advanced license.

Tivoli_Storage_Productivity_Center_Select.5.2.0.swtag

Indicates that you have a Storage Productivity Center Select license.

Tivoli_Storage_Productivity_Center_Embedded.5.2.0.swtag

Indicates that you have a license for the Tivoli Storage Productivity Center product included with IBM Systems Director.

Depending on the license you purchased, one of the following license key files can be found in the `license\key` sub-directory, on disk1, part1 of the DVD, or electronic image:

node1ock

Tivoli Storage Productivity Center license

node1ock.SEL

Storage Productivity Center Select license

node1ock.AE

IBM SmartCloud Virtual Storage Center Storage Analytics Engine license

Adding an installation license using the installation wizard

If you installed Tivoli Storage Productivity Center and want to add a Tivoli Storage Productivity Center license for additional function, you can do so by using the installation wizard.

To add the license to your system using the installation wizard, complete the following steps:

1. If you are adding a license on the AIX or Linux operating system, source the `db2profile`.
2. Log on to your Tivoli Storage Productivity Center system with the appropriate user privileges.
3. Start the Tivoli Storage Productivity Center installation wizard from the DVD or from the license image you want to add.
4. On the installation wizard page, select a language and click **OK**. The language you select is used to install the license.

5. On the Choose Installation Location and Type page, select **License upgrade**.
6. On the successfully installed page, click **Finish**.
7. Stop and restart the Tivoli Storage Productivity Center GUI.

Related reference:

“Planning for Tivoli Storage Productivity Center authentication and authorization” on page 13

An operating system user name is required to install and log on to Tivoli Storage Productivity Center for the first time. After you install Tivoli Storage Productivity Center, you can assign roles to users. Roles determine the product functions that are available to users.

Adding an installation license using silent mode

If you installed Tivoli Storage Productivity Center and want to add a Tivoli Storage Productivity Center license to access additional function, you can do so by using silent-mode installation.

To add the license to your system using silent mode, complete the following steps:

1. If you are adding a license on the AIX or Linux operating system, source the `db2profile`.
2. Log on to your Tivoli Storage Productivity Center system with the appropriate user privileges.
3. Start the Tivoli Storage Productivity Center installation wizard from the DVD or from the license image you want to add.
4. Modify the following parameters in the `silent_SingleServerTypical.properties`, `silent_SingleServerCustom.properties`, or `silent_MultipleServer.properties` file:
 - `CHOSEN_INSTALL_TYPE="License Upgrade"`
 - `varUseLicenseKeyOnImage=`
 - `varLicenseKeyFile=`
5. Save the appropriate response file.
6. Stop and restart the Tivoli Storage Productivity Center GUI.

Related reference:

“Planning for Tivoli Storage Productivity Center authentication and authorization” on page 13

An operating system user name is required to install and log on to Tivoli Storage Productivity Center for the first time. After you install Tivoli Storage Productivity Center, you can assign roles to users. Roles determine the product functions that are available to users.

“Editing the response file” on page 147

You must edit and save the appropriate response file when you install Tivoli Storage Productivity Center by using silent mode. The silent mode installation option for the response file is `-f absolute_path_to_response_file`. For example, in the Windows operating system, you enter `-f C:\installimage\silent_SingleServerTypical.properties`.

Installing Storage Resource agents

You can install Storage Resource agents by using the Tivoli Storage Productivity Center user interface or a command.

You can select one of the following agent installation scenarios:

- To deploy the Storage Resource agent using the GUI, see “Storage Resource agent Deployments” on page 290.
- To install the agent using a command, see “Installing Storage Resource agents by using a command.”
- To install the agent on a Virtual I/O Server, see “Installing Storage Resource agents on the Virtual I/O Server” on page 218.
- To deploy the agent remotely on the Virtual I/O Server, see “Deploying Storage Resource agents remotely” on page 218.

Restriction:

- Before you install or deploy the Storage Resource agent on a system, you must disable the firewall on that system.
- If you are using IBM PowerHA SystemMirror for AIX, a Storage Resource agent must be installed on each node of the cluster and all agents in a cluster must be configured to use the same listening port.
- To scan a cluster resource group, you must configure the cluster resource group to have at least one IP address that is accessible from the Tivoli Storage Productivity Center server.

To install the Storage Resource agents, you must log in as a user with the following authority:

On Windows operating systems

You must have Windows Administrator authority.

On UNIX or Linux operating systems

You must be logged in as the root user.

Preparing to install Storage Resource agents

This section provides information on preparing to install the Storage Resource agents.

General information

For information about deploying Storage Resource agents, see “Deployment guidelines and limitations for Storage Resource agents” on page 290.

Installing Storage Resource agents by using a command

You can install Storage Resource agents by using a command.

You typically install Storage Resource agents by using the Tivoli Storage Productivity Center GUI. However, if you must install Storage Resource agents locally, you can do so with limited support.

During this installation method, a return code of zero means that a successful installation occurred and a nonzero return code means that an unsuccessful installation occurred. If you have an unsuccessful installation, you must review the log files to determine the problem.

The **-force** option can be used when you have a Storage Resource agent pointing to multiple servers. If one server has installed an agent, and another server wants to install an agent in the same location, the second server can use the **-force** option to install the agent.

If you use this installation method, when you enter a directory to install the Storage Resource agent, **do not** add an ending slash mark (\). For example, do not specify C:\agent1\. This action causes the installation to fail.

If you run the agent as a non-daemon service (On-Demand service), you must make sure that at least one protocol is valid for a successful connection from the server to the agent. See Table 29 for the required parameters for each protocol.

Table 29. Parameters required for each protocol

Protocol	Description
SSH	Requires the user ID and password or user ID, certificate, and passphrase.
Windows (SMB)	Requires the user ID and password.
REXEC	Requires user ID and password.
RSH	Requires the user ID.

The Storage Resource Agent image contains the installation images for the Storage Resource agents in the following directory:

DVD_installation_image_location/data/sra/operating_system

See Table 30 for the Storage Resource agent installation images.

Table 30. Storage Resource agent installation images

Operating system	Operating system name
AIX	aix_power
HP-UX	hp-ux_itanium
Linux x86	linux_ix86
Linux for Power Systems Servers	linux_power
Linux s390	linux_s390
Oracle Solaris	solaris_sparc
Windows	windows

To install the Storage Resource agents locally, complete the following steps:

1. Go to the installation image location:

```
cd DVD_installation_image_location
```

2. Run the following command:

```

▶ bin/Agent -install [ -force ] -serverPort server_secure_port
▶ -serverIP server_IP_address -installLoc Agent_install_location [ -debug MAX ]
▶ -agentPort agent_port -commtyp daemon (1)
▶ -userID user_ID -password password -certFile certificate_file (2)
▶ -passphrase passphrase (3)

```

Notes:

- 1 Parameters when the agent is run as a daemon service.
- 2 Parameters when the agent is run as a non-daemon service. See Table 29 on page 216 to determine which parameter is required for each protocol.
- 3 Parameters when the agent is run as a non-daemon service. See Table 29 on page 216 to determine which parameter is required for each protocol.

The parameters are as follows:

-install

Installs the Storage Resource agent.

-force

This forces the agent to be installed. There are two different situations in which this parameter must be specified:

- If an earlier installation failed and there is residue on the system which causes further installations to fail. You must make sure that all the parameters provided are valid, such as the installation location, port, and so on.
- If the agent is already installed from one server and you now must install the agent pointing to another server.

-serverPort *server_secure_port*

The default port for the Data server is 9549.

-serverIP *server_IP_address*

The IP address of the server. If the server can be reached through multiple IP addresses, then multiple IP addresses can be specified with IP addresses separated with a comma.

-installLoc "*Agent_install_location*"

Location where the agent is installed. Enclose the directory name in quotation marks, for example, "C:\Program Files\IBM\TPC_SRA".

-debug *MAX*

Optional parameter for debugging purposes.

-agentPort *agent_port*

If the agent is run as a daemon service, the agent port must be specified. The default agent port is 9510.

-commtype *daemon*

If the agent is run as a daemon service, then this parameter must be specified.

-userID *user_ID*

For non-daemon service. The user ID defined on the agent system. This user ID is used by the server to connect to the agent system.

-password *password*

For non-daemon service. Password for the user ID.

-certFile "*certificate_file*"

For non-daemon service. The certificate that is used for SSH communication between the server and agent. This certificate must be stored on the server system. Enclose the directory name in quotation marks, for example, "c:\keys\id_sra".

For information about SSH protocol and SSL protocol certificates, see "Creating a certificate for SSH protocol" on page 295 and "Replacing a custom certificate for SSL protocol" on page 300.

-passphrase *passphrase*

For non-daemon service. The passphrase that is defined for the certificate that is used in SSH communication.

Installing Storage Resource agents on the Virtual I/O Server

You can install Storage Resource agents on the Virtual I/O Server.

Local installation

To install the Storage Resource agent on the Virtual I/O Server, complete the following steps:

1. Log in to the Virtual I/O Server using the **padmin** user ID.
2. Run the following command to set up the AIX environment:
`oem_setup_env`
3. Change to the directory where the Storage Resource agent installation image is located.

Note: You can either mount the Storage Resource agent installation DVD or FTP to the Storage Resource agent installation image to the padmin home directory.

4. Run the Storage Resource agent installation command. For information about the Storage Resource agent installation command, see “Installing Storage Resource agents by using a command” on page 215.

Deploying Storage Resource agents remotely

You can deploy Storage Resource agents remotely for the Virtual I/O Server from your local workstation.

Remote deployment

To deploy the Storage Resource agent remotely, complete the following steps:

1. Enable remote access for the **root** user ID. Follow these steps:
 - a. Connect to the Virtual I/O Server using ssh/telnet with the padmin user ID.
 - b. Run the following command to set up the AIX environment:
`oem_setup_env`
 - c. Run the following command:
`smitty login_user`
 - d. In the **User NAME** field, type **root** and press **Enter**.
 - e. In the **User can LOGIN REMOTELY(rsh,tn,rlogin)?** field, set the value to **true**.
2. Click **Save**.
3. Create an SSH certificate for the **root** user ID. For information about creating the SSH certificate for the **root** user, see “Creating an SSH certificate for the root user ID” on page 365.
4. Start the remote deployment.

Installing the Tivoli Storage Productivity Center Monitoring Agent

The Tivoli Storage Productivity Center Monitoring Agent can be used by the IBM Tivoli Enterprise Monitoring Server to monitor systems in your enterprise. This

agent is an optional program you can install and use in your enterprise. The Monitoring Agent uses an existing Tivoli Storage Productivity Center server in the environment to obtain information.

You will be installing the Tivoli Storage Productivity Center Monitoring Agent in the Tivoli Storage Productivity Center environment. You will also be installing the agent-specific support files needed by the Tivoli Enterprise Monitoring Server.

Installing and configuring the Tivoli Storage Productivity Center Monitoring Agent on Windows:

This topic describes how to install the Tivoli Storage Productivity Center Monitoring agent on Windows.

Installing the Monitoring Agent in the Tivoli Storage Productivity Center environment

This procedure describes how to install the Monitoring Agent in the Tivoli Storage Productivity Center environment. You can install the agent on the Tivoli Storage Productivity Center server or on another computer. This example assumes the following:

- The Tivoli Monitoring Server environment is installed and running.
- You are installing the agent on a computer that is different from the server on which Tivoli Storage Productivity Center is installed.

To install the Tivoli Storage Productivity Center Monitoring Agent on Windows:

1. Gather information required by the Tivoli Storage Productivity Center Monitoring agent installation wizard. You will need to know the host name and authentication password of the Tivoli Storage Productivity Center server.
2. Log on to the system with administrator authority on Windows.
If you are using the installation DVD, the files are located in the itm folder. If you are using the installation image, use the Disk 2 image.
3. In the installation directory and run **setup.exe**.
4. Proceed through the wizard.
5. On the User Data Encryption Key page, enter a data encryption key for encrypted communication.
The Tivoli Enterprise Monitoring server uses a data encryption key for Secure Socket (SSL) communication between the agent and server.
6. Write down the key so that you can configure the Tivoli Monitoring Enterprise server with the encryption key and click **Next** when you have specified the key.

Note: For information about the data encryption key, see **Step 4: Define the node's security environment** in http://publib.boulder.ibm.com/infocenter/tivihelp/v24r1/index.jsp?topic=%2Fcom.ibm.itcamfad.doc_7.1%2FABD003%2Fsection1.html.

7. On the Select Program Folder page, enter a Program Folder name or select a folder from the Existing Folders list, and click **Next**.
8. On the Start Copying Files page, review your current setting, and click **Next**. Wait for the installation to complete.
9. On the Tivoli Storage Productivity Center Agent Configuration page, in the navigation tree, you see these configuration steps:
 - For **Log Configuration**, enter the following information, and click **Next**:

Log File

Directory and file name where the Monitoring Agent log file is created. The default is \$ITM_INSTALL_DIR/tmaitm6/logs/TPCAgent.log..

Log Level

Specify the debugging level for the log file.

- For **TPC Configuration** , enter this information, and click **Next**:

Address

IP address or host name of the Device server.

TPC Device Server Port

Port for connecting to the Device server. The default port is 9550.

TPC Host Authentication Password

Password to use to connect to the Device server.

Confirm TPC Host Authentication Password

Enter the password again.

- For the optional **Server and Data Sources Node**, click **New**, enter a node name, and click **Next**. This node name is internal to Tivoli Storage Productivity Center and will not be displayed in the Tivoli Storage Productivity Center user interface.
- For the optional **Computers and Hypervisors Node**, click **New**, enter a node name, and click **Next**. This node name is internal to Tivoli Storage Productivity Center and will not be displayed in the Tivoli Storage Productivity Center user interface.
- For the optional **Storage Systems Node**, click **New**, enter a node name, and click **Next**. This node name is internal to Tivoli Storage Productivity Center and will not be displayed in the Tivoli Storage Productivity Center user interface.
- For the optional **Fabrics and Switches Node**, click **New** to add a new data node, and enter a node name, and click **OK**. This node name is internal to Tivoli Storage Productivity Center will not be displayed in the Tivoli Storage Productivity Center user interface.

Note: You can specify information for the optional nodes if you want Tivoli Storage Productivity Center to collect information about those nodes.

Note: If you configure more than one Monitoring Agent to collect information for these optional nodes, use unique node names for the different Monitoring Agents. Using identical names for the same node on more than one agent can result in Tivoli Monitoring Server displaying information for only the nodes on the most recently refreshed Monitoring Agent. For example, do not use the same node name for **Server and Data Sources Node** on more than one Monitoring Agent.

10. If the TEMS connection panel is not displayed, open the Manage Tivoli Enterprise Monitoring Services page.
11. Select **Monitoring Agent for TPC**, right-click **Monitoring Agent for TPC**, and click **Reconfigure**.
12. On the Configure Monitoring Agent for TPC, for the TEMS Connection page, enter this information for the Protocol 1 tab:

TEMS Hostname

Host name of the Tivoli Enterprise Monitoring Server.

Port Number

The default port is 1918.

Protocol

Enter the protocol type. For IP.PIPE settings, enter the port number.

For information about the TEMS connection parameters, see <http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/index.jsp?topic=/com.ibm.omegamon.mes.doc/zosconfigguide601263.htm>. Your configuration is now complete.

13. To enable the Eclipse Help Server for Tivoli Monitoring Services, configure the Eclipse Help Server.
14. Specify port 80 and restart TEMS and TEPS if necessary.

Installing the Monitoring Agent support files in the IBM Tivoli Monitoring Server environment

Tivoli Storage Productivity Center has support files that are installed on each of these Tivoli Monitoring components:

- Tivoli Enterprise Monitoring Server (TEMS)
- Tivoli Enterprise Portal Server (TEPS)
- Tivoli Enterprise Portal Desktop Client (TEPDC)

To install the Monitoring Agent in the IBM Tivoli Monitoring Server environment:

1. Log on to the IBM Tivoli Monitoring system with administrator authority on Windows.
 - If you are using the installation DVD, the files are located in the itm folder.
 - If you are using the installation image, use the Disk 2 image.
2. Go to the installation directory and run **setup.exe**.
3. Proceed through the wizard.
4. On the Select Features page, select the features you want to install:
 - a. Expand **Tivoli Enterprise Monitoring Agents - TEMA**, ensuring that you expand all nodes and select all checkboxes.

Tivoli Enterprise Monitoring Server - TEMS
TPC

Tivoli Enterprise Portal Server - TEPS
TPC

TEP Desktop Client - TEPD
TPC

b. Click **Next**

5. In the IBM Tivoli Productivity Center Monitoring - InstallShield Wizard, select all the components related to Tivoli Storage Productivity Center:

Note: This panel is displayed when the Monitoring Agent is installed on the Tivoli Monitoring Server.

```

Tivoli Enterprise Monitoring Agents - TEMA
  Tivoli Enterprise Monitoring Agent Framework
  TPC
  Tivoli Enterprise Services User Interface Extensions
Tivoli Enterprise Monitoring Server - TEMS
  TPC
Tivoli Enterprise Portal Server - TEPS
  TPC
TEP Desktop Client - TEPD
  TPC

```

6. Ensure that you expand all the nodes and select all the checkboxes and click **Next**.
7. Select the appropriate program folder in which the agent will be installed and click **Next**.
8. On the summary page, review the summary information and click **Next**.
9. After installation is complete, on the Configuration Defaults for Connecting to a TEMS page, you can enter connection information for the Tivoli Monitoring server and the Tivoli Storage Productivity Center Device server.

Note: This panel is displayed when the Monitoring Agent is installed on the Tivoli Monitoring server.

10. Enter this information for the Protocol 1 tab and click **OK**:

TEMS Hostname

Host name of the Tivoli Enterprise Monitoring Server.

Protocol

Enter the protocol type. For IP.PIPE settings, enter the port number.

For information about the TEMS connection parameters, go to <http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/index.jsp?topic=/com.ibm.omegamon.mes.doc/zosconfigguide601263.htm>

Your configuration is now complete. To see the reports that were generated, go to the Tivoli Storage Productivity Center Information Center and search for **monitoring agent reports**.

Installing and configuring the Tivoli Storage Productivity Center Monitoring Agent on AIX or Linux:

This topic describes how to install the Tivoli Storage Productivity Center Monitoring Agent on AIX or Linux.

Installing the Monitoring Agent and support files in the Tivoli Storage Productivity Center environment

This example assumes that the Tivoli Monitoring environment is installed and running and that you are installing the agent in the Tivoli Storage Productivity Center environment.

Tivoli Storage Productivity Center install support files on each of these Tivoli Monitoring components:

- Tivoli Enterprise Monitoring Server (TEMS)
- Tivoli Enterprise Portal Server (TEPS)
- Tivoli Enterprise Portal Desktop Client (TEPDC)

Note:

- IBM Tivoli Monitor does not support the Tivoli Enterprise Portal Desktop Client (TEPDC) on AIX.
- If you have the Tivoli Enterprise Portal Browser Client installed, you must also install the Monitoring Agent support files on the Browser Client.

To install the Tivoli Storage Productivity Center Monitoring agent on AIX or Linux:

1. Gather the following information required by the Tivoli Storage Productivity Center Monitoring agent installation wizard, such as the host name and IP address of the Tivoli Enterprise Monitoring server.
2. Log on to the system with the root user ID or a user ID that has root access rights.
 - If you are using the installation DVD, the files are located in the itm folder.
 - If you are using the installation image, use the Disk 2 image.
3. Go to the installation directory and run **./install.sh**.
4. Here is an example of the prompts and responses you will see. This example assumes that you do not have a directory and are creating a directory and are installing the agent on a local host.

```
UPGRADE

Enter the name of the IBM Tivoli Monitoring directory
[ default = /opt/IBM/ITM ]:

"/opt/IBM/ITM" does not exist
Try to create it [ 1=yes, 2=no; "1" is default ]? 1

Select one of the following:

1) Install products to the local host.
2) Install products to depot for remote deployment (requires TEMS).
3) Install TEMS support for remote seeding
4) Exit install.

Please enter a valid number: 1
```

5. This example is a continuation from the previous step and lets you read the license agreement.

```
International Program License Agreement

...
...
```

6. Read and agree with the license agreement, make a selection, and press **Enter**.
7. This example is a continuation from the previous step and lets you enter an encryption key for a secure connection between the monitoring agent and the Tivoli Enterprise Monitoring Server.

```
Enter a 32-character encryption key, or just press Enter to use the default
Default = IBMTivoliMonitoringEncryptionKey

GSKit encryptin key has been set.
Key File directory: /opt/IBM/ITM/keyfiles
```

Note: For information about the encryption key, go to http://publib.boulder.ibm.com/infocenter/tivihelp/v24r1/index.jsp?topic=%2Fcom.ibm.itcamfad.doc_7.1%2FABD003%2Finstall_unix.html and see **Step 5: Provide an encryption key.**

8. Enter the encryption key and press **Enter**.
9. Use the default key or enter a new key.
10. Write down and save the key so that you can configure the Tivoli Enterprise Monitoring Server later and press **Enter**.
11. This example is a continuation from the previous step and lets you select the product packages to install. Make a selection and press **Enter**. For an agent only installation, select 1.

Product packages are available for this operating system and component support categories:

- 1) IBM Tivoli Monitoring components for this operating system
- 2) Tivoli Enterprise Portal Browser Client support
- 3) Tivoli Enterprise Portal Desktop Client support
- 4) Tivoli Enterprise Portal Server support
- 5) Tivoli Enterprise Monitoring Server support
- 6) Other operating systems

12. This example is a continuation from the previous step and lets you select the product to install:

- a. Enter **3** (for Tivoli Enterprise Portal Desktop Client support) on the Product packages panel and press **Enter**.

The following products are available for installation:

- 1) Monitoring Agent for TPC V06.22.00.00
- 2) All of the above

Select **2** and press **Enter**. Wait for this step to complete.

- b. Enter **4** (for Tivoli Enterprise Portal Server support) on the Product packages panel and press **Enter**.

The following products are available for installation:

- 1) Monitoring Agent for TPC V06.22.00.00
- 2) All of the above

Select **2** and press **Enter**. Wait for this step to complete.

- c. Enter **5** (for Tivoli Enterprise Monitoring Server support) on the Product packages panel and press **Enter**.

The following products are available for installation:

- 1) Monitoring Agent for TPC V06.22.00.00
- 2) All of the above

Select **2** and press **Enter**. Wait for this step to complete.

13. You see this prompt. Enter **2** and press **Enter**.

Do you want to install additional products or product support packages?

You see the following message:

Installation step complete.

14. You see this prompt.

You may now configure any locally installed IBM Tivoli Monitoring product via the "/opt/IBM/ITM/bin/itmcmd config" command.

Go to the following directory:

```
cd /opt/IBM/ITM/bin
```

Run this command:

```
./itmcmd manage &
```

15. The Manage Tivoli Enterprise Monitoring Services window is displayed. Select **Monitoring Agent for TPC**. Right-click **Monitoring Agent for TPC** and click **Configure**.
16. The Tivoli Storage Productivity Center Agent Configuration panel is displayed. In the navigation tree, you see these configuration steps:
 - For Log Configuration, enter the following information, and click **Next**:

Log File

Directory and file name where the Monitoring Agent log file is created. The default is \$ITM_INSTALL/li6263/p1/bin/logs/TPCAgent.log.

Log Level

Specify the debugging level for the log file.

- TPC Configuration, enter this information, and click **Next**:

Address

IP address or host name of the Device server.

TPC Device Server Port

Port for connecting to the Device server.

TPC Host Authentication Password

Password to use to connect to the Device server.

Confirm TPC Host Authentication Password

Enter the password again.

- For the optional **Server and Data Sources Node**, click **New**, enter a node name, and click **Next**. This internal Tivoli Storage Productivity Center node name will not be displayed in the Tivoli Storage Productivity Center user interface.
- For the optional **Computers and Hypervisors Node**, click **New**, enter a node name, and click **Next**. This internal Tivoli Storage Productivity Center node name will not be displayed in the Tivoli Storage Productivity Center user interface.
- For the optional **Storage Systems Node**, click **New**, enter a node name, and click **Next**. This internal Tivoli Storage Productivity Center node name will not be displayed in the Tivoli Storage Productivity Center user interface.
- For the optional **Fabrics and Switches Node**, click **New**, enter a node name, and click **OK**. This internal Tivoli Storage Productivity Center node name will not be displayed in the Tivoli Storage Productivity Center user interface.

Note: You can specify information for the optional nodes if you want Tivoli Storage Productivity Center to collect information about those nodes.

Note: If you configure more than one Monitoring Agent to collect information for these optional nodes, use unique node names for the different Monitoring Agents. Using identical names for the same node on more than one agent can result in Tivoli Monitoring Server displaying information for only the nodes on the most recently refreshed Monitoring Agent. For example, do not use the same node name for **Server and Data Sources Node** on more than one Monitoring Agent.

17. Open the Manage Tivoli Enterprise Monitoring Services window and select **Monitoring Agent for TPC**.
18. Right-click **Monitoring Agent for TPC** and click **Configure**.
19. On the Configure Monitoring Agent for TPC page, for the TEMS Connection page, enter this information for the Protocol 1 tab:

TEMS Hostname

Host name of the Tivoli Enterprise Monitoring Server.

Protocol

Enter the protocol type. For IP.PIPE settings, enter the port number.

For information about the TEMS connection parameters, go to <http://publib.boulder.ibm.com/infocenter/tivihelp/v15r1/index.jsp?topic=/com.ibm.omegamon.mes.doc/zosconfigguide601263.htm>.

Your configuration is now complete.

Note: If you need to reconfigure the **Tivoli Enterprise Portal Server**, **Tivoli Enterprise Monitoring Server**, and **Tivoli Enterprise Portal Desktop Client**, do the following:

- a. Open the Manage Tivoli Enterprise Monitoring Services console by running the command:
`itmcmd manage`
 - b. Right-click **Tivoli Enterprise Portal Server** and click **Rebuild Configuration**.
 - c. Right-click **Tivoli Enterprise Monitoring Server** and click **Rebuild Configuration**.
 - d. Right-click **Tivoli Enterprise Portal Desktop Client** and click **Rebuild Configuration**.
20. To enable the Eclipse Help Server for Tivoli Monitoring Services, open Manage Tivoli Monitoring Services and configure the Eclipse Help Server.
 21. Specify port 80 be used and restart TEMS and TEPS if necessary.

Reinstalling the software if a failure occurs

If an installation failure occurs, you do not have to uninstall components that were successfully installed. Tivoli Storage Productivity Center provides an option to partially, or fully, roll back the installation.

A full rollback uninstalls all the components (even if they were installed successfully), and a partial rollback uninstalls only the components that were not successfully installed. The partial rollback option helps you resolve the problems that are causing the installation failure. After you resolve the problem, you can install the remaining components. For example, if the correct libraries were not installed for the Linux operating system, and the installation stops. You can install the correct libraries and resume the installation.

If you install Tivoli Storage Productivity Center on the Windows operating system and select **Full Rollback**, you must restart the server after the rollback is complete.

If you originally selected a partial rollback, but decided to completely uninstall, you must run the uninstallation program before you reinstall Tivoli Storage Productivity Center.

The following table shows the results from a partial rollback. The components are listed in the order in which they were installed.

Table 31. Results from a partial rollback


If an installation failure occurs when you install this component...	Partial rollback results are...
Tivoli Storage Productivity Center common files and Java Runtime Environment	There is no partial rollback. The installation program completes a full rollback.
Database repository	The database repository is uninstalled.
Data server	The Data server is uninstalled.
Embedded IBM WebSphere Application Server	The embedded WebSphere Application Server is uninstalled.
WebSphere Application Server Liberty profile	WebSphere Application Server Liberty profile is uninstalled.
Device server	The Device server is uninstalled.
Replication server	The Replication server is uninstalled.
Storage Resource agent	The Storage Resource agent is uninstalled.
stand-alone GUI	The stand-alone GUI is uninstalled.
web-based GUI	The web-based GUI is uninstalled.
Tivoli Storage Productivity Center reports	Tivoli Storage Productivity Center reports are uninstalled.
CLI	The command-line interface is uninstalled.

Taking the first steps after installation

After Tivoli Storage Productivity Center is installed, configure it to monitor the resources in your environment.

Access the Tivoli Storage Productivity Center GUIs

To configure Tivoli Storage Productivity Center for your environment, access the web-based GUI and the stand-alone GUI. Each GUI provides a different set of functions for getting started with managing a storage environment.

For information about how to start the Tivoli Storage Productivity Center GUIs, go to the  Tivoli Storage Productivity Center Information Center and search for *Starting Tivoli Storage Productivity Center*.

To set up Tivoli Storage Productivity Center for monitoring and managing resources, complete the following tasks:

Add resources for monitoring

In the web-based GUI, you can add the following resources for monitoring:

- Storage systems and CIM agents
- Servers (agentless)
- Hypervisors
- Switches
- Fabrics

In the stand-alone GUI, you can add the following resources for monitoring:

- IBM Scale Out Network Attached Storage systems
- Servers (with Storage Resource agents)
- NAS filers and SAN File System clusters
- Tivoli Storage Productivity Center servers as subordinate servers

Configure the retention of data in the database repository

Determine how long that Tivoli Storage Productivity Center stores data about the resources that are being monitored.

Configure alert notifications for conditions that are detected on monitored resources

Use alerts to be notified when certain conditions or violations are detected on storage resources that are monitored by Tivoli Storage Productivity Center. Many conditions can trigger alerts. You can set up Tivoli Storage Productivity Center so that it examines the data about your resources for the conditions that you specify.

Specify the users that can access the product and the functions that are available to them

Assign roles to groups of users to determine which functions are available in Tivoli Storage Productivity Center. When a user ID is authenticated to Tivoli Storage Productivity Center through the GUI, CLI, or APIs, membership in an operating system or LDAP group determines the authorization level of the user.

Deploy Storage Resource agents to set up data features

Deploy Storage Resource agents on servers to enable the data and policy-based management functions that are available in the stand-alone GUI.

Monitor and manage resources

Access the Tivoli Storage Productivity Center GUIs to monitor and manage your storage, including the following tasks:

- Monitor the status of resources
- View capacity and asset information about resources
- Troubleshoot the performance of resources
- Set performance thresholds and alerts
- View the relationships between resources
- Optimize storage
- Configure for the cloud and storage provisioning
- Generate detailed reports about resources
- Access the vSphere Web Client extension to manage your virtual environment

For more information about these tasks and how to manage and monitor your resources with Tivoli Storage Productivity Center, see the *Tivoli Storage Productivity Center Information Center*.

Chapter 3. Configuring

After you installed IBM Tivoli Storage Productivity Center, you must configure it. You can use the Configuration Utility to learn how to configure and use Tivoli Storage Productivity Center. This section also describes each node under **Administrative Services > Configuration**.

The Data server hosts the control points for product scheduling functions, configuration, event information, reporting, and graphical user interface support. The Data server coordinates communication with the agents for data collection. The agents scan file systems and databases to gather storage demographics and populate the database with results. Automated actions can be defined to drive functions like data deletion, IBM Tivoli Storage Manager backup or archiving, or event reporting when defined thresholds are encountered. The Data server is the primary contact point for all user interface functions. The user interface functions also include actions that schedule data collection and discovery for the Device server.

The Device server discovers objects, gathers information from, analyzes performance of, and controls storage subsystems and SAN fabrics. The Device server coordinates communication with the agents to collect data about the SAN fabrics.

Starting Tivoli Storage Productivity Center

Tivoli Storage Productivity Center provides two graphical user interface (GUI) applications for managing and monitoring the resources in a storage environment: a web-based GUI and a stand-alone GUI. You can start these GUIs on the Tivoli Storage Productivity Center server or on a remote system.

Each GUI provides different functions for working with monitored resources. To view a comparison of the functions that are available in each GUI, see the Tivoli Storage Productivity Center information center. Search for *Available functions in the interfaces*.

Starting the Tivoli Storage Productivity Center stand-alone GUI

The stand-alone GUI contains functions for monitoring the condition of storage resources, and all the tools for managing data, disk, fabric, and replication.

How you start the stand-alone GUI depends on whether the stand-alone GUI component is installed on your system.

- On the Tivoli Storage Productivity Center server, or on a remote system where the stand-alone GUI component is installed, you start the stand-alone GUI by running a batch file or a shell script. For Windows operating systems, you run the batch file `tpc.bat`, which you can run from the **Start** menu. For AIX or Linux operating systems, you run the shell script `TPCD.sh`.
- If the stand-alone GUI component is not installed on a remote system, you use a Java Web Start application to download and start the stand-alone GUI.

Starting the Tivoli Storage Productivity Center stand-alone GUI by using Java Web Start

Start the stand-alone Tivoli Storage Productivity Center GUI by using Java Web Start to interact remotely with Tivoli Storage Productivity Center running on the server.

Before you start Tivoli Storage Productivity Center, ensure that you are using a supported web browser. For a list of web browsers that you can use with Tivoli Storage Productivity Center, see the support matrix at <http://www.ibm.com/support/docview.wss?uid=swg21386446>. In the **Agents, Servers and Browser** column, click the version of Tivoli Storage Productivity Center that is installed on your system. On the next page, click **Web Browsers** to find the web browsers that you can use.

On remote systems where the stand-alone GUI component is not installed, you can start the stand-alone Tivoli Storage Productivity Center GUI using Java Web Start. To start the stand-alone GUI by using Java Web Start, you click a web link that downloads a Java Network Launching Protocol (JNLP) file from the server. The JNLP file specifies all the files needed by the application. The Java Web Start Launcher on the remote system opens the JNLP file, downloads and caches all the required files, and starts the stand-alone GUI in a new window.

1. Start a web browser, and type the following address for the Java Web Start page.

`http://hostname:port/ITSRM/app/welcome.html`

In the preceding address, specify the following values:

hostname

The Tivoli Storage Productivity Center server. You can specify the *hostname* as an IP address or a Domain Name System (DNS) name. To verify your host name, ask your Tivoli Storage Productivity Center administrator.

port

The port number for the Device server. The default port number for connecting to the Device server using the HTTP protocol is 9550. However, this port number might be different for your site. For example, the port number might be different if the default port range was not accepted during installation. If the default port number does not work, ask your Tivoli Storage Productivity Center administrator for the correct port number.

2. The Tivoli Storage Productivity Center GUI requires an IBM Java Runtime Environment 1.6.0. Links are provided on the Java Web start page for you to download the IBM Java Runtime Environment 1.6.0 for Windows, Linux, or AIX. If an IBM Java Runtime Environment 1.6.0 is not already installed on the system, click the link to download the IBM Java Runtime Environment 1.6.0 for your operating system. On Windows, download a self-extracting executable. On Linux, download an RPM file. On AIX, download an executable JAR file. Install the JRE from the file that you downloaded before you start the stand-alone GUI. If you are prompted to install the JRE as the system JRE or to overwrite the current system JRE, click **No**.
3. From the Java Web Start page, click **TPC GUI (Java Web Start)**
The JNLP file is downloaded.

Important: Depending on your browser and operating system and their default settings for your browser and operating system) you might need to:

- Verify to your browser that the `tpcgui.jnlp` file is safe to download
- Indicate that JNLP files are to be opened by the Java Web Start Launcher

For more information, go to the Tivoli Storage Productivity Center information center at <http://publib.boulder.ibm.com/infocenter/tivihelp/v59r1/index.jsp> and search for *Cannot start the Tivoli Storage Productivity Center stand-alone GUI remotely*.

4. The stand-alone Tivoli Storage Productivity Center GUI opens in a separate window. To log on to Tivoli Storage Productivity Center, enter the following information and click **OK**.
 - a. Enter your user ID and password.

Important: If you are logging on immediately after installation and, see “Overview of required user names for initial logon to the Tivoli Storage Productivity Center family of products” on page 238 for information on the user ID you must use.

- b. If the server field does not contain the address and port number of for the server, specify the following values for the *hostname* and *port*.

hostname

The Tivoli Storage Productivity Center server. You can specify the *hostname* as an IP address or a Domain Name System (DNS) name. To verify your host name, ask your Tivoli Storage Productivity Center administrator.

port

The port number for the Data server. The default port number for connecting to the Data server is 9549. However, this port number might be different for your site. For example, the port number might be different if the default port range was not accepted during installation.

Starting the Tivoli Storage Productivity Center stand-alone GUI on a system where the GUI component is installed

On the Tivoli Storage Productivity Center server, or on a remote system where the stand-alone GUI component is installed, you start the Tivoli Storage Productivity Center stand-alone GUI using the batch file `tpc.bat` on a Windows operating system or the shell script `TPCD.sh` on an AIX and Linux operating system.

A typical installation of Tivoli Storage Productivity Center on the server includes the stand-alone GUI component. A remote system can also have the stand-alone GUI component installed. On a system where the stand-alone GUI component is installed, use the following instructions for starting the stand-alone GUI. If you are on a remote system where the stand-alone GUI component is not installed, start the stand-alone GUI by using Java Web Start instead.

1. Start the Tivoli Storage Productivity Center GUI on Windows operating systems.
 - Open the Tivoli Storage Productivity Center stand-alone GUI. . If you are on a remote system, the **Start** menu or Start page for the stand-alone GUI might not be available. In this case, run the `tpc.bat` file directly. The default location for the batch file is `C:\Program Files\IBM\TPC\gui\tpc.bat`.
 - On AIX or Linux, type the following path and command at the command line.
`/opt/IBM/TPC/gui/TPCD.sh`
2. From the Tivoli Storage Productivity Center GUI logon window, log on to Tivoli Storage Productivity Center.

- a. Enter your user ID and password.
- b. If the server field does not contain the address of the server, enter the information in the format *hostname:port*. Specify the following values for the *hostname* and *port*:

hostname

The Tivoli Storage Productivity Center server. You can specify the *hostname* as an IP address or a Domain Name System (DNS) name.

port

The port number for the Data server. The default port number for connecting to the Data server is 9549. However, this port number might be different for your site. For example, the port number might be different if the default port range was not accepted during installation.

- c. Click **OK**.

Starting the Tivoli Storage Productivity Center web-based GUI

You can start the web-based Tivoli Storage Productivity Center GUI by opening a web browser and entering a web address for the Tivoli Storage Productivity Center logon page. For example, you might enter `http://storage.example.com:9568/srm`.

Before you start IBM Tivoli Storage Productivity Center, ensure that you are using a supported web browser. For a list of web browsers that you can use with Tivoli Storage Productivity Center, see the support matrix at <http://www.ibm.com/support/docview.wss?uid=swg21386446>. In the **Agents, Servers and Browser** column, click the version of Tivoli Storage Productivity Center that is installed on your system. On the next page, click **Web Browsers** to find the web browsers that you can use.

The web-based GUI provides quick access to pages that you can use to monitor the condition, capacity, and relationships of the resources within your storage environment. Start the web-based GUI if you are interested in monitoring your storage environment, but do not need the full set of administrative tools available in the stand-alone GUI.

1. On a server running the Windows operating system, start **TPC Web-based GUI**. If you are not on a server running the Windows operating system, start a web browser and enter the following address in the address field:

`http://hostname:port/srm`

In the preceding address, specify the following values:

hostname

The Tivoli Storage Productivity Center server. You can specify the host name as an IP address or a Domain Name System (DNS) name.

port

The port number for Tivoli Storage Productivity Center. The default port number for connecting to Tivoli Storage Productivity Center by using the HTTP protocol is 9568. However, this port number might be different for your site. For example, the port number might be different if the default port range was not accepted during installation. If the default port number does not work, ask your Tivoli Storage Productivity Center administrator for the correct port number.

Tip: If you have a non-default port, check the value of the `WC_defaulthost` property in `TPC_installation_directory/web/conf/portdef.props` file.

You might be redirected from the address that you enter to another address and port that provides secure access using the HTTPS protocol. This page is the Tivoli Storage Productivity Center logon page.

2. From the Tivoli Storage Productivity Center logon page, type your user name and password and click **Log in**. The web-based Tivoli Storage Productivity Center GUI opens in the browser.

Starting Tivoli Storage Productivity Center for Replication

You can start the IBM Tivoli Storage Productivity Center for Replication GUI by opening a web browser and entering a web address for the Tivoli Storage Productivity Center for Replication logon page.

Before you start Tivoli Storage Productivity Center for Replication, ensure that you are using a supported web browser. For a list of web browsers that you can use with Tivoli Storage Productivity Center, see the support matrix at <http://www.ibm.com/support/docview.wss?uid=swg21386446>. In the **Agents, Servers and Browser** column, click the version of Tivoli Storage Productivity Center that is installed on your system. On the next page, click **Web Browsers** to find the web browsers that you can use.

The Tivoli Storage Productivity Center for Replication GUI provides a single point of control to configure, manage, and monitor copy services. Whether you start it on the server or on a remote system, the GUI is web-based and is displayed in a browser.

1. On a server that is running on the Windows operating system, click **Start > Programs > IBM Tivoli Storage Productivity Center > TPC Replication Manager GUI** to open a browser to the correct address. If you are not using a server that is running on the Windows operating system, start a web browser and enter the following address in the address field. The address is case-sensitive.

`https://hostname:port/CSM`

In the preceding address, specify the following values:

hostname

The Tivoli Storage Productivity Center for Replication server. You can specify the host name as an IP address or a Domain Name System (DNS) name.

port

The port number for Tivoli Storage Productivity Center for Replication. The default port number for connecting to Tivoli Storage Productivity Center for Replication using the HTTPS protocol is 9559. However, this port number might be different for your site. For example:

- If you upgraded from Tivoli Storage Productivity Center for Replication version 3.3 or earlier, the default HTTPS port is 9443.
- If you upgraded from Tivoli Storage Productivity Center for Replication version 3.4 or later, the default HTTPS port is 3443.
- If you are using IBM WebSphere Application Server for z/OS, the default HTTPS port is 9443.
- If you are using IBM WebSphere Application Server OEM Edition for z/OS, the default HTTPS port is 32209.

You can find the port number for the Replication server in the `install_root/wlp/usr/servers/replicationServer/properties/`

portdef.props file. The default port for the HTTP protocol is defined by the **WC_defaulthost_secure property** in the file.

You can find the port number for the web-based GUI in the *install_root/eWAS/profiles/webServerProfile/properties/portdef.props* file. The default port for the HTTP protocol is defined by the **WC_defaulthost** property in the file.

2. From the Tivoli Storage Productivity Center for Replication logon page, type your user name and password and click **Login**. The web-based Tivoli Storage Productivity Center for Replication GUI opens in the browser.

Starting and stopping the Tivoli Storage Productivity Center servers

This section provides information about how to start and stop the Tivoli Storage Productivity Center services.

Tip: On AIX and Linux operating systems, the Jazz for Service Management server does not start automatically. You must manually start the server.

Stopping the Tivoli Storage Productivity Center servers

You can run scripts to stop the servers on the Windows, Linux, or AIX operating systems.

Stopping the servers on Windows

Tip: The default *TPC_install_directory* is C:\Program Files\IBM\TPC.

To stop the servers on the Windows operating system, enter the following commands in a Windows command prompt window in the following order:

Storage Resource agent

To stop the **Storage Resource Agent** service on Windows, complete the following steps:

1. Open Windows Services.
2. Stop the **IBM Storage Resource Agent - *directory*** service where *directory* is where the Storage Resource agent is installed.

Web server

```
TPC_install_directory\scripts\stopTPCWeb.bat
```

Data server

```
TPC_install_directory\scripts\stopTPCData.bat
```

Device server

```
TPC_install_directory\scripts\stopTPCDevice.bat
```

Replication server

```
TPC_install_directory\scripts\stopTPCReplication.bat
```

Jazz for Service Management and Tivoli Common Reporting

```
JazzSM_install_directory\profile\bin\stopServer.bat server_name  
-username JazzSM_username -password JazzSM_password
```

JazzSM_install_directory, *server_name*, *JazzSM_username*, and *JazzSM_password* were specified when you installed Jazz for Service Management. The default *JazzSM_install_directory* is C:\Program Files\IBM\JazzSM, and the default *server_name* is server1. You can also

return the name and status of the server by entering the following WebSphere Application Server command:

```
serverStatus -All
```

Stopping the servers on Linux or AIX

Tip: The default *TPC_install_directory* is */opt/IBM/TPC*.

To stop the servers on Linux or AIX operating systems, enter the following commands in a command prompt window in the following order:

Storage Resource Agent

```
/SRA_install_directory/agent/bin/agent.sh stop
```

Web server

```
/TPC_install_directory/scripts/stopTPCWeb.sh
```

Data server

```
/TPC_install_directory/scripts/stopTPCData.sh.
```

Device server

```
/TPC_install_directory/scripts/stopTPCDevice.sh
```

Replication server

```
/TPC_install_directory/scripts/stopTPCReplication.sh
```

Jazz for Service Management and Tivoli Common Reporting

```
/JazzSM_install_directory/profile/bin/stopServer.sh server_name  
-username JazzSM_username -password JazzSM_password
```

JazzSM_install_directory, *server_name*, *JazzSM_username*, and *JazzSM_password* were specified when you installed Jazz for Service Management. The default *JazzSM_install_directory* is */opt/IBM/JazzSM*, and the default *server_name* is *server1*. You can also return the name and status of the server by entering the following WebSphere Application Server command:

```
serverStatus -All
```

Starting the Tivoli Storage Productivity Center servers

You can run scripts to start the servers on the Windows, Linux, or AIX operating systems.

Starting the servers on Windows

Tip: The default *TPC_install_directory* is *C:\Program Files\IBM\TPC*.

To start the servers on the Windows operating system, enter the following commands in a Windows command prompt window in the following order:

Device server

```
TPC_install_directory\scripts\startTPCDevice.bat
```

Data server

```
TPC_install_directory\scripts\startTPCData.bat
```

Replication server

```
TPC_install_directory\scripts\startTPCReplication.bat
```

Web server

```
TPC_install_directory\scripts\startTPCWeb.bat
```

Storage Resource Agent - *directory*

Tip: The **Storage Resource Agent service** is started on the Windows operating system by using Windows Services.

To start the **Storage Resource Agent** service on Windows, complete the following steps:

1. Open Windows Services.
2. Start the **IBM Storage Resource Agent - *directory*** service where *directory* is where the Storage Resource agent is installed.

Jazz for Service Management and Tivoli Common Reporting

JazzSM_install_directory\profile\bin\startServer.bat server_name

JazzSM_install_directory and *server_name* were specified when you installed Jazz for Service Management. The default *JazzSM_install_directory* is C:\Program Files\IBM\JazzSM, and the default *server_name* is server1. You can also return the name and status of the server by entering the following WebSphere Application Server command:

`serverStatus -All`

Important: If you have not installed Jazz for Service Management by using Tivoli Storage Productivity Center, you must manually restart Jazz for Service Management each time you restart the computer or log in to the computer. When you restart Jazz for Service Management manually, Tivoli Common Reporting is also restarted. After you restart Jazz for Service Management, it might take some time before all components, including Tivoli Common Reporting, are running.

Starting the servers on Linux or AIX

Note: The default *TPC_install_directory* is /opt/IBM/TPC.

To start the servers on the Linux or AIX operating systems, enter the following commands in a command prompt window in the following order:

Device server

/TPC_install_directory/scripts/startTPCDevice.sh

Data server

/TPC_install_directory/scripts/startTPCData.sh

Replication server

/TPC_install_directory/scripts/startTPCReplication.sh

Web server

/TPC_install_directory/scripts/startTPCWeb.sh

Storage Resource Agent

/SRA_install_directory/agent/bin/agent.sh start

Jazz for Service Management and Tivoli Common Reporting

/JazzSM_install_directory/profile/bin/startServer.sh server_name

JazzSM_install_directory and *server_name* were specified when you installed Jazz for Service Management. The default *JazzSM_install_directory* is /opt/IBM/JazzSM, and the default *server_name* is server1. You can also return the name and status of the server by entering the following WebSphere Application Server command:

`serverStatus -All`

Important: If you restart your computer, you must manually restart Jazz for Service Management. When you restart Jazz for Service Management manually, Tivoli Common Reporting is also restarted. After you restart Jazz for Service Management, it might take some time before all components, including Tivoli Common Reporting, are running.

Default locations of log files

Check log files to view detailed information about Tivoli Storage Productivity Center processing and to troubleshoot problems.

The following list shows the default log file locations for Tivoli Storage Productivity Center and other components.

Device server:

The Liberty Profile logs are in the following directories:

Windows operating systems

TPC_installation_directory\wlp\usr\servers\deviceServer\logs

Linux or AIX operating systems:

TPC_installation_directory/wlp/usr/servers/deviceServer/logs

The operational logs are in the following directories:

Windows operating systems:

TPC_installation_directory\device\log

Linux or AIX operating systems:

TPC_installation_directory/device/log

Data server:

Windows operating systems:

TPC_installation_directory\data\log

Linux or AIX operating systems:

TPC_installation_directory/data/log

Web server log files:

Windows operating systems:

TPC_installation_directory\ewas\profiles\WebServerProfile\logs\webServer

Linux or AIX operating systems:

TPC_installation_directory/ewas/profiles/WebServerProfile/logs/webServer

Web-based GUI:

Windows operating systems:

TPC_INSTALL_DIR\web\log

Linux or AIX operating systems:

TPC_INSTALL_DIR/web/log

Storage Resource agents:

*TPC_installation_directory/agent/log/
name_of_server_SRA_communicates_with*

Tips:

- For Windows operating systems, the default *TPC_installation_directory* is *C:\Program Files\IBM\TPC*.

- For Linux or AIX operating systems, the default *TPC_installation_directory* is */opt/IBM/TPC*.

Overview of required user names for initial logon to the Tivoli Storage Productivity Center family of products

All the graphical user interfaces (GUIs) in the Tivoli Storage Productivity Center family require a user ID and password. If you are logging on to a GUI immediately after you installed the software, the user ID that you must use differs depending on the type of installation and the GUI interface.

Immediately after you install the software, you must use the user name as described in the following tables. After you log on, you can assign roles for users in Tivoli Storage Productivity Center and Tivoli Storage Productivity Center for Replication. When users log on, their user roles determine their authorization level and the components that they can view in each GUI.

Required user name for initial logon after installation on a single server when only the common user is defined

After you install Tivoli Storage Productivity Center in a single-server environment, the required user name for the initial logon is the common user name that was defined for the Tivoli Storage Productivity Center installation.

You must use this user name to log on to the stand-alone GUI, the web-based GUI, the Tivoli Storage Productivity Center for Replication web-based GUI, and the Tivoli Storage Productivity Center command-line interface.

Required user name for initial logon after installation on multiple servers with a remote database schema

After you install the software on multiple servers with a remote database schema, you must use the user name as described in the following table.

Table 32. Required user name for initial logon after installation on multiple servers with a remote database schema

To log on to:	Use this user name:
Tivoli Storage Productivity Center stand-alone GUI	The user name that was defined for the installation of Tivoli Storage Productivity Center server.
Tivoli Storage Productivity Center web-based GUI	The user name that was defined for the installation of Tivoli Storage Productivity Center server.
Tivoli Storage Productivity Center for Replication web-based GUI	The user name that was defined for the installation of Tivoli Storage Productivity Center server.

Required user name for initial logon after installation on multiple servers and Tivoli Storage Productivity Center reports are remote

After you install the software on multiple servers, and Tivoli Storage Productivity Center reports are remote, you must use the user name as described in the following table.

Table 33. Required user name for initial logon after installation on multiple servers and Tivoli Storage Productivity Center reports are remote

To log on to:	Use this user name:
Tivoli Storage Productivity Center stand-alone GUI	The user name that was defined for the installation of Tivoli Storage Productivity Center server.
Tivoli Storage Productivity Center web-based GUI	The user name that was defined for the installation of Tivoli Storage Productivity Center server.
Tivoli Storage Productivity Center for Replication web-based GUI	The user name that was defined for the installation of Tivoli Storage Productivity Center server.

Changing the user authentication configuration

The Tivoli Storage Productivity Center installation program establishes a default authentication configuration by using the federated repositories feature of the IBM WebSphere Application Server. You can change this authentication configuration.

In the federated repositories framework, the Tivoli Storage Productivity Center installation program creates the following repositories:

File-based user repository

This repository contains the user `tpcFileRegistryUser`. This user password is the same as the common user password that was entered during the Tivoli Storage Productivity Center installation.

Operating system repository

In the federated repositories framework, the Tivoli Storage Productivity Center installation program creates two repositories on the Tivoli Storage Productivity Center WebSphere Application Server web server. This server, which is located in the `TPC_INSTALL_DIR/ewas/profiles/WebServerProfile` directory, is used as the primary WebSphere Application Server for user authentication in Tivoli Storage Productivity Center.

The Device and Replication servers run on the WebSphere Application Server Liberty Profile, and these servers are only configured with File-based user repository. If the web server is down, the Device server and Replication server are used as the backup servers to perform the user authentication and allow the user name that was provided during the Tivoli Storage Productivity Center installation and the `tpcFileRegistryUser` to log in to the Tivoli Storage Productivity Center stand-alone GUI and Tivoli Storage Productivity Center web-based GUIs.

You can add an LDAP repository after you install Tivoli Storage Productivity Center. This configuration is completed on the WebSphere Integrated Solutions Console server. The LDAP repository configuration settings are not propagated to the Device and Replication servers. Therefore, if the web server is down, the authorized LDAP users cannot log in to Tivoli Storage Productivity Center stand-alone GUI and the Tivoli Storage Productivity Center for Replication web-based GUI. The backup user authentication mechanism that is based on Device and Replication servers allows the user name that was provided during the Tivoli Storage Productivity Center installation and the `tpcFileRegistryUser` to log in to the Tivoli Storage Productivity Center stand-alone GUI and the Tivoli Storage Productivity Center web-based GUIs.

On computers that are members of a Windows domain, the local OS repository also contains the domain users and groups that are managed by the Windows domain, if the computer is correctly configured with the Windows domain.

The LDAP repositories that are supported by Tivoli Storage Productivity Center depend on the WebSphere Application Server support. For more information about the supported LDAP repositories, see the relevant topic for your operating system and search for *LDAP Servers using Federated Repository Configuration*:

- For the Windows operating system, see <http://www.ibm.com/support/docview.wss?rs=180&uid=swg27012421>.
- For the AIX operating system, see <http://www.ibm.com/support/docview.wss?rs=180&uid=swg27012389>.
- For the Linux operating system, see <http://www.ibm.com/support/docview.wss?rs=180&uid=swg27012415>.

When you change the user authentication configuration by adding or removing an LDAP repository in the federated repositories framework, you must first back up the existing WebSphere Application Server configuration files. You must also back up the WebSphere configuration files after you add an LDAP repository to the user authentication configuration and want to later change the LDAP authentication settings. You also need to backup, and then restore the `isc.ear` file in the `TIP_installation_directory`.

If these users or groups are present in more than one repository in the federated repositories framework, the WebSphere Application Server cannot resolve duplicated users or groups. An example of a duplicated user is, for example, when an Administrator user exists in both the local OS and LDAP repository. You must ensure that the duplicated users (or groups) are not used during the configuration or to manage Tivoli Storage Productivity Center.

Adding an LDAP repository to the federated repositories

You can configure Tivoli Storage Productivity Center and Jazz for Service Management to communicate with an external Lightweight Directory Access Protocol (LDAP) repository, such as IBM Tivoli Directory Server or Microsoft Active Directory. When you change the authentication configuration, Tivoli Storage Productivity Center is available to users and groups in other repositories.

Important: When you install Tivoli Storage Productivity Center on a computer that is a member of a Windows domain, Active Directory users and groups also exist in the local OS repository. To determine whether the Active Directory users exist in the local OS repository, log in to the WebSphere Integrated Solutions Console and click **Users and Groups > Manage users**. If the Active Directory users exist in the local OS repository, you should not add that same Active Directory as an LDAP repository to the federated repositories in Tivoli Storage Productivity Center Version 5.2.

Important: The IBM WebSphere Application Server cannot resolve duplicated users or groups when these users or groups are present in more than one repository in the federated repositories framework. For example, an Administrator user can exist in both the local OS and LDAP repository. You must ensure that the duplicated users (or groups) are not used during the configuration or to manage Tivoli Storage Productivity Center.

Tivoli Storage Productivity Center and Jazz for Service Management each have their own WebSphere Application Server instance. You must configure both of these WebSphere instances to communicate with the LDAP repository. The procedure to configure these instances are almost identical, so the steps are provided only once. You must repeat the steps to configure both of these WebSphere Application Server instances with the LDAP repository. The WebSphere Application Server instance in Tivoli Storage Productivity Center is also called the web server.

This procedure uses the variable name *WebSphere_Directory* to indicate where WebSphere Application Server is located.

The location of the WebSphere Application Server directory is different for each instance:

- The Jazz for Service Management WebSphere Application Server directory:
JAZZSM_INSTALL_DIR/profile
- The Tivoli Productivity WebSphere Application Server or web server directory:
TPC_INSTALL_DIR/ewas/profiles/WebServerProfile

Important: Some of the field names can be different between the Tivoli Storage Productivity Center WebSphere instance and the Jazz for Service Management WebSphere instance.

To add an LDAP repository to the federated repositories in Tivoli Storage Productivity Center or Jazz for Service Management, complete the following steps:

Tip: If you need assistance, contact your LDAP server administrator.

1. Before you add an LDAP repository to the federated repositories, complete the following steps:

Important: If you log in by using a Windows domain user name, before you run the backup commands, click **Start > Command Prompt** and select **Run as administrator**.

- a. Back up the WebSphere Application Server configuration for the Tivoli Storage Productivity Center instance of WebSphere Application Server and back up the WebSphere Application Server configuration for the Jazz for Service Management instance of WebSphere Application Server.

- On Windows operating systems, run the following command:

```
WebSphere_Directory\bin\backupConfig.bat -username  
adminuser -password adminpassword -nostop
```

In the WebSphere Application Server configurations for Tivoli Storage Productivity Center and Jazz for Service Management, *adminuser* is the user name that was used to install Tivoli Storage Productivity Center (for example, db2admin) or Jazz for Service Management (for example smadmin), and *adminpassword* is the password that is associated with *adminuser*.

Tip: If you completed a default installation on the Windows operating system:

- The Tivoli Storage Productivity Center WebSphere Application Server directory is located here:

```
C:\Program Files\IBM\TPC\ewas\profiles\  
WebServerProfile\
```

- The Jazz for Service Management WebSphere Application Server directory is located here:

C:\Program Files\IBM\JazzSM\profile\

- On AIX or Linux operating systems, run the following command:

```
WebSphere_Directory/bin/backupConfig.sh -username
adminuser -password adminpassword -nostop
```

In the WebSphere Application Server configurations for Tivoli Storage Productivity Center and Jazz for Service Management, *adminuser* is the user name that was used to install Tivoli Storage Productivity Center (for example, db2inst1) or Jazz for Service Management (for example smadmin), and *adminpassword* is the password that is associated with *adminuser*.

Tip: If you completed a default installation on the AIX or Linux operating system:

- The Tivoli Storage Productivity Center WebSphere Application Server directory is located here:

/opt/IBM/TPC/ewas/profiles/WebServerProfile/

- Jazz for Service Management WebSphere Application Server directory is located here:

/opt/IBM/JazzSM/profile/

- b. Back up the soap.client.props file for the Tivoli Storage Productivity Center instance of WebSphere Application Server.

- On the Windows operating system, run the **copy** command to back up this file:

WebSphere_Directory\properties\soap.client.props

Tip: If you completed a default installation on the Windows operating system, the Tivoli Storage Productivity Center Version 5.2 soap.client.props file is in this directory:

C:\Program Files\IBM\TPC\ewas\profiles\WebServerProfile\properties\

- On the AIX or Linux operating systems, run the **cp** command to back up this file:

WebSphere_Directory/properties/soap.client.props

Tip: If you completed a default installation on the AIX or Linux operating systems, the Tivoli Storage Productivity Center Version 5.2 soap.client.props file is in this directory:

/opt/IBM/TPC/ewas/profiles/WebServerProfile/properties

- c. Back up the IBM Cognos.ear directory for the Jazz for Service Management WebSphere Application Server.

- On the Windows operating system, run the **xcopy** command to back up this directory:

WebSphere_Directory\installedApps\JazzSMNode01Cell\IBM Cognos.ear

Tip: If you completed a default installation on the Windows operating system, the Jazz for Service Management WebSphere Application Server directory is located here:

C:\Program Files\IBM\JazzSM\profile\

- On the AIX or Linux operating systems, run the **cp** command to back up this directory:

```
WebSphere_Directory/installedApps/JazzSMNode01Cell
/IBM Cognos.ear
```

Tip: If you completed a default installation on the AIX or Linux operating systems, the Jazz for Service Management WebSphere Application Server directory is located here:

```
/opt/IBM/JazzSM/profile/
```

Tip: The default cell name JazzSMNode01Cell is used in the sample commands. If you did not use the default cell name when you installed Jazz for Service Management, you must specify the correct cell name in this step.

2. In the event of a problem when you add an LDAP repository, complete the following steps to restore the items you backed up in step 1:
 - a. Run the `restoreConfig.sh` or the `restoreConfig.bat` command to restore the WebSphere Application Server configuration for the Tivoli Storage Productivity Center instance of WebSphere Application Server and restore the WebSphere Application Server configuration for the Jazz for Service Management instance of WebSphere Application Server. The **restoreConfig** command is in one of the following directories:

- On the Windows operating system, go to this directory:

```
WebSphere_directory/bin/restoreConfig.bat
```

Tip: If you completed a default installation on the Windows operating system:

- The Tivoli Storage Productivity Center WebSphere Application Server directory is located here:

```
C:\Program Files\IBM\TPC\ewas\profiles\WebServerProfile\
```

- The Jazz for Service Management WebSphere Application Server directory is located here:

```
C:\Program Files\IBM\JazzSM\profile\
```

- On the AIX or Linux operating system, go to this directory:

```
WebSphere_directory/bin/restoreConfig.sh
```

Tip: If you completed a default installation on the AIX or Linux operating system, the Tivoli Storage Productivity Center Version 5.2 `soap.client.props` in this directory:

```
/opt/IBM/TPC/ewas/profiles/WebServerProfile/properties
```

- b. Restore the `soap.client.props` file for the Tivoli Storage Productivity Center instance of WebSphere Application Server.

- On the Windows operating system, run the **copy** command to restore this file:

```
WebSphere_Directory\properties\soap.client.props
```

Tip: If you completed a default installation on the Windows operating system, the Tivoli Storage Productivity Center Version 5.2 `soap.client.props` is in this directory:

```
C:\Program Files\IBM\TPC\ewas\profiles\WebServerProfile\properties\
```

- On the AIX or Linux operating system, run the **cp** command to restore this file:

WebSphere_Directory/properties/soap.client.props

Tip: If you completed a default installation on the AIX or Linux operating systems, the Tivoli Storage Productivity Center Version 5.2 *soap.client.props* is in this directory:

/opt/IBM/TPC/ewas/profiles/WebServerProfile/

- c. Restore the *IBM Cognos.ear* directory for the Jazz for Service Management WebSphere Application Server.

- On the Windows operating system, run the **xcopy** command to restore this directory:

WebSphere_Directory\installedApps\JazzSMNode01Cell\IBM Cognos.ear

Tip: If you completed a default installation on the Windows operating system, the Jazz for Service Management WebSphere Application Server directory is located here:

C:\Program Files\IBM\JazzSM\profile

- On the AIX or Linux operating systems, run the **cp** command to restore this directory:

WebSphere_Directory/installedApps/JazzSMNode01Cell/IBM Cognos.ear

Note: The default cell name *JazzSMNode01Cell* is used in the sample commands. If you did not use the default cell name when you installed Jazz for Service Management, you must specify the correct cell name in this step.

Tip: If you completed a default installation on the AIX or Linux operating systems, the Jazz for Service Management WebSphere Application Server directory is located here:

/opt/IBM/JazzSM/profile/

- d. Restart the Tivoli Storage Productivity Center web server and the Jazz for Service Management server. The execution of the **restoreConfig** command stops those WebSphere Application Server instances.

For information about starting the Tivoli Storage Productivity Center web server or Jazz for Service Management server, see the Tivoli Storage Productivity Center information center. Search for *Starting the Tivoli Storage Productivity Center services*.

3. To access the WebSphere Integrated Solutions Console, open a web browser and enter one of the following web addresses in the address field:

- <http://hostname:port/ibm/console/logon.jsp>
- <https://hostname:port/ibm/console/logon.jsp>

The hostname is the server that is running WebSphere Application Server, such as the server name or IP address, and port is the port number for the WebSphere Application Server. The port number differs depending on which protocol you used (http or https) and the options that you selected when you installed Tivoli Storage Productivity Center.

To determine the port number, complete the following steps:

- a. Open the *WebSphere_Directory/properties/portdef.props* file.
- b. The port number is the value that is assigned to one of the following keys:

- For protocols that are not secure (for example, <http://>):

WC_adminhost

- For protocols that are secure (for example, <https://>):

WC_adminhost_secure

4. Log in to the WebSphere Integrated Solutions Console. To complete this procedure, your user name must have Administrator authorization in the WebSphere Integrated Solutions Console.

Important: For new installations of Tivoli Storage Productivity Center, *Administrator* is the Tivoli Storage Productivity Center common user name. You can log in to the Tivoli Storage Productivity Center GUI by using most of the user names in the Administrator group, but you can only use the Tivoli Storage Productivity Center common user name to log in to the WebSphere Integrated Solutions Console.

5. In the WebSphere Integrated Solutions Console navigation tree, click **Security** > **Global security**.
6. On the Global security page, in the User account repository section, click **Configure** next to the **Available realm definitions** menu.

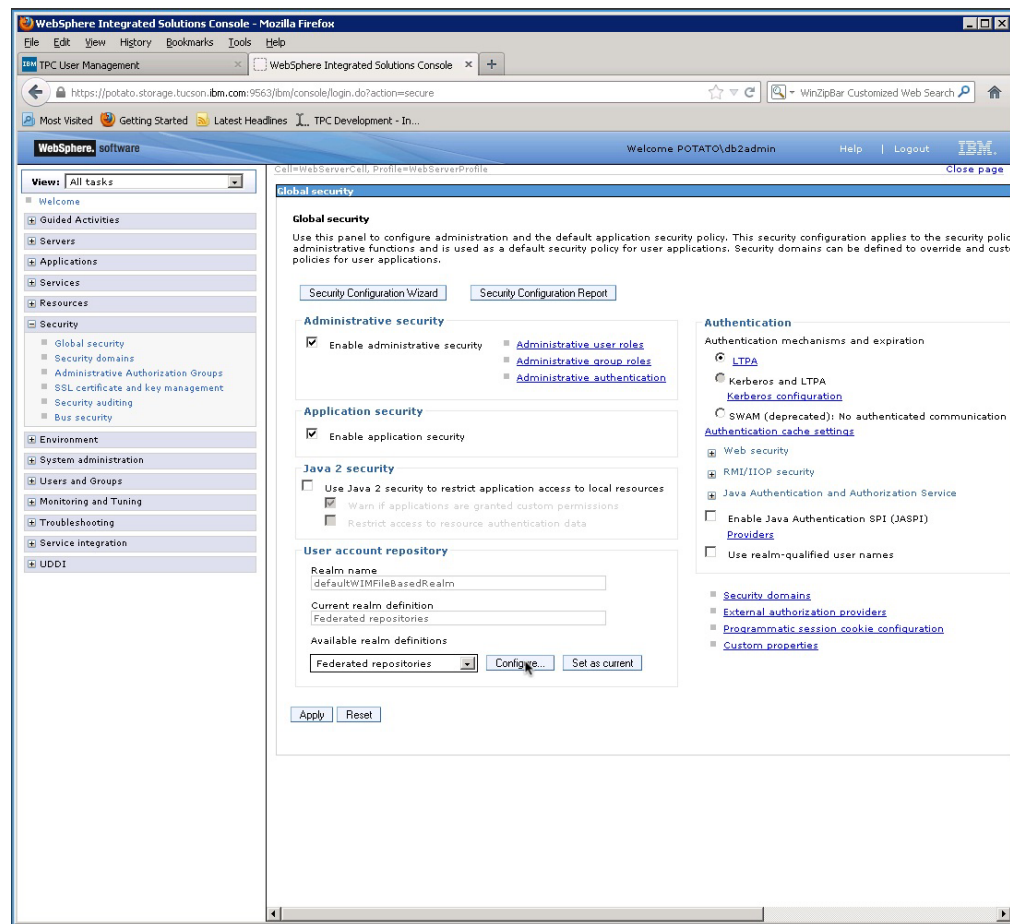


Figure 25. Global security page, configure federated repositories

7. On the **Global security** > **Federated repositories** page, under **Related Items**, click the **Manage repositories** link.

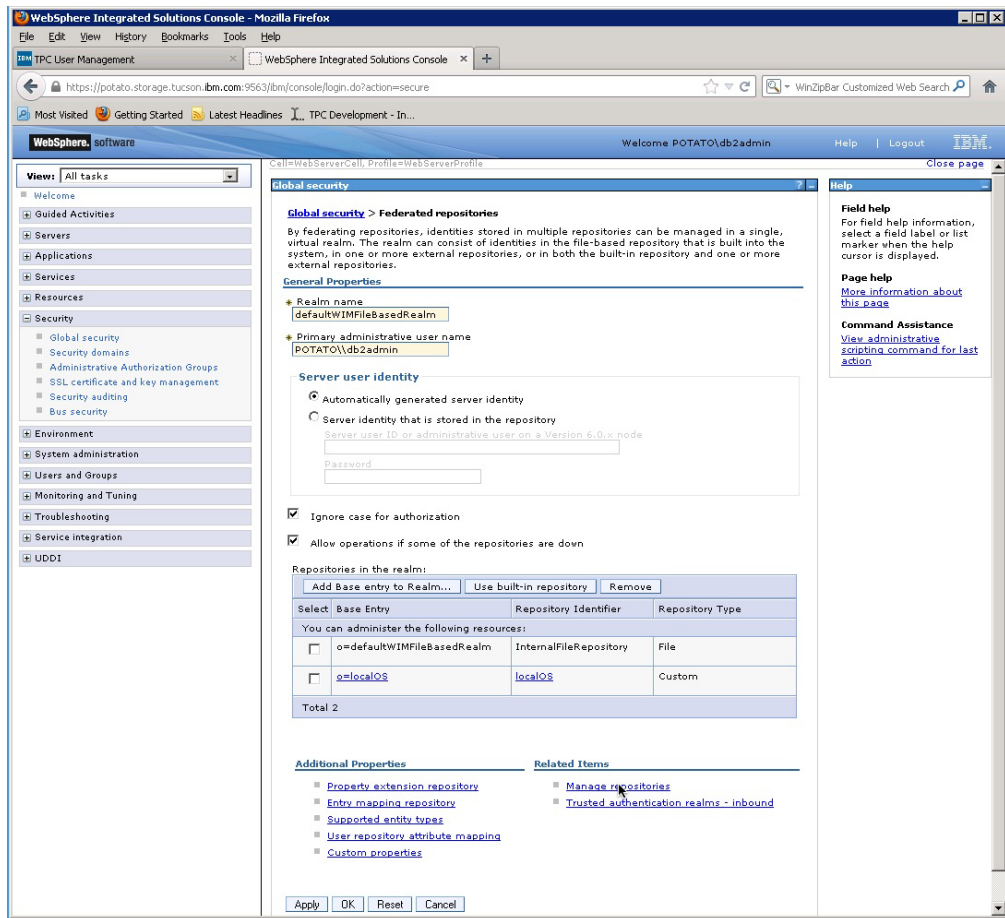


Figure 26. Federated repositories page, Manage repositories

8. On the **Global security > Federated repositories > Manage repositories** page, add the LDAP repository that you want to use for authentication.
To add the LDAP repository, complete these steps:
 - a. Click **Add > LDAP repository** to add a new repository.

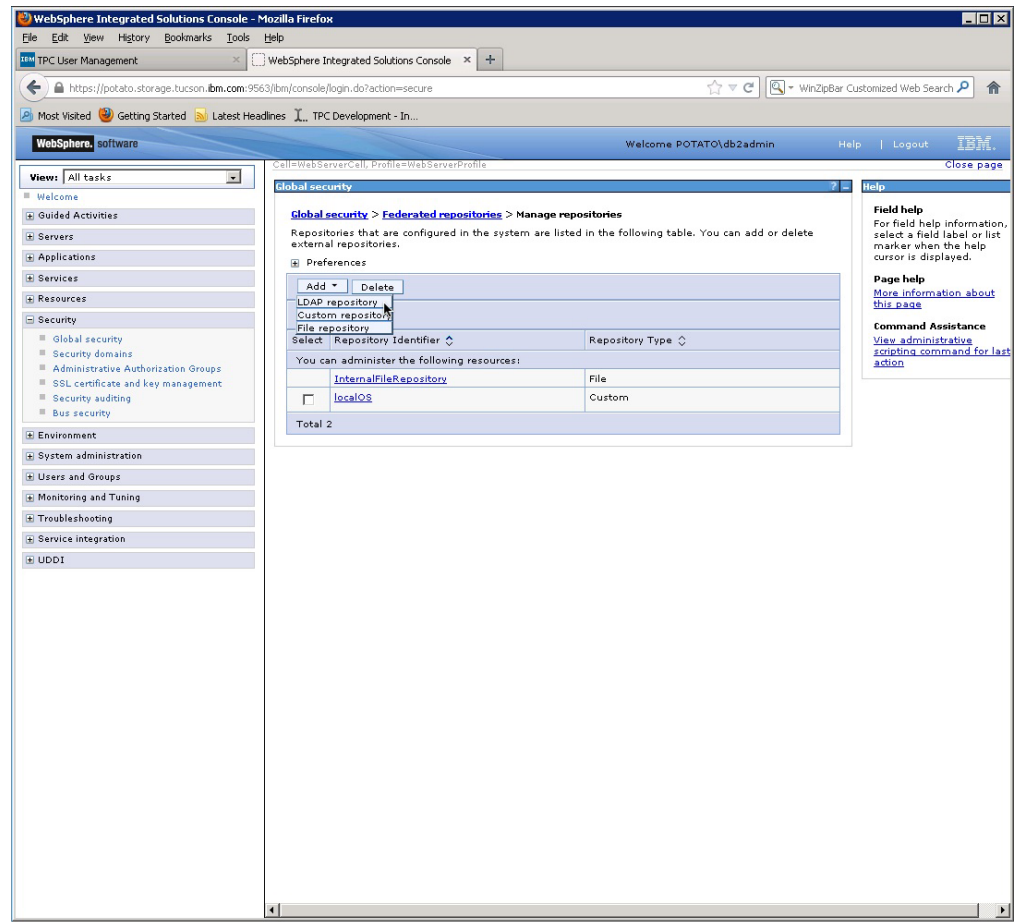


Figure 27. Manage repositories page, Add a new repository

- b. Enter the values for the following fields:

Repository identifier

A unique identifier for the LDAP repository, which identifies the repository in the realm, for example, LDAP1.

Directory type

The type of LDAP server to which you want to connect.

Primary host name

The host name of the primary LDAP server. This host name is either an IP address or a domain name service (DNS) name.

Port

The LDAP server port. The default value is 389. Depending on your LDAP server configuration, you can specify a different port. If you do not know which port to use, contact your LDAP server administrator.

Bind distinguished name

The distinguished name (DN) for WebSphere Application Server to use when it binds to the LDAP repository. If no name is specified, WebSphere Application Server binds anonymously to the LDAP repository. In most cases, bind DN and bind password are required. However, when an anonymous bind can satisfy all of the required functions, bind DN and bind password are not required.

If you are not sure whether an anonymous bind has satisfied the required functions, contact your LDAP server administrator.

Attention: There is no single value for the **Bind distinguished name** field that is correct for every Active Directory Server or for every LDAP server. The correct value for the **Bind distinguished name** field depends on the configuration of your Active Directory Server or your LDAP server. If you are unsure about the correct value to use for the **Bind distinguished name** field, contact your LDAP server administrator.

Bind password

The password for WebSphere Application Server to use when you bind to the LDAP repository.

Login properties

The authentication properties that are used to log on to WebSphere Application Server. Type uid;cn in this field. This value enables WebSphere Application Server to use the property that is required for the directory type.

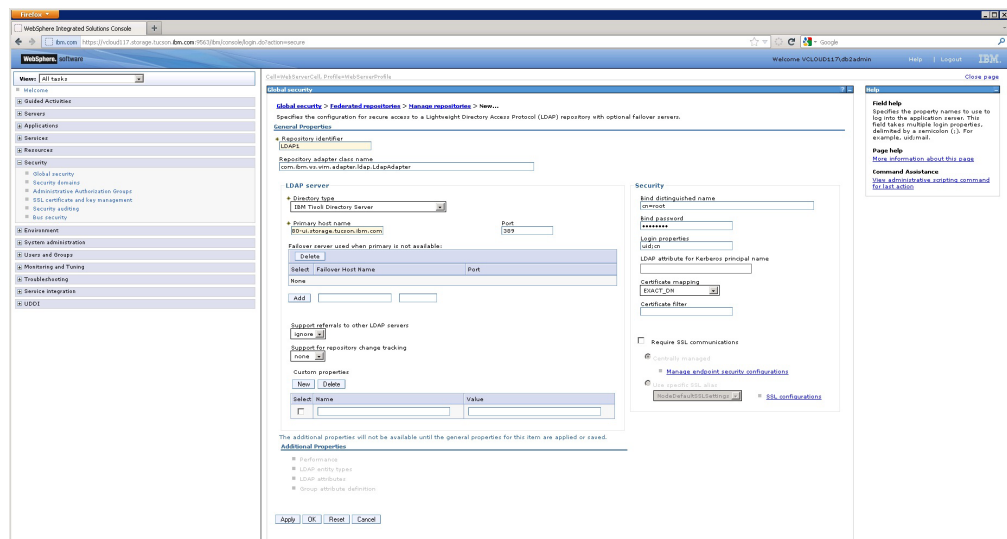


Figure 28. Manage repositories > New page

- c. Click **OK**.
- d. In the messages dialog box that is displayed on the Manage repositories page, click the **Save** link in **Save directly to the master configuration**.

Important: On the **Global security > Federated repositories > Manage repositories** page, do not delete the local OS repository.

9. From the Manage repositories page, return to the **Global security > Federated repositories** page.
10. In the **Repositories in the realm** panel, click **Add Base entry to Realm**.

In the Jazz for Service Management WebSphere Integrated Solutions Console, the label for this button is **Add repositories (LDAP, custom, etc)**.

Important: Do not change the Primary Administrator user name.

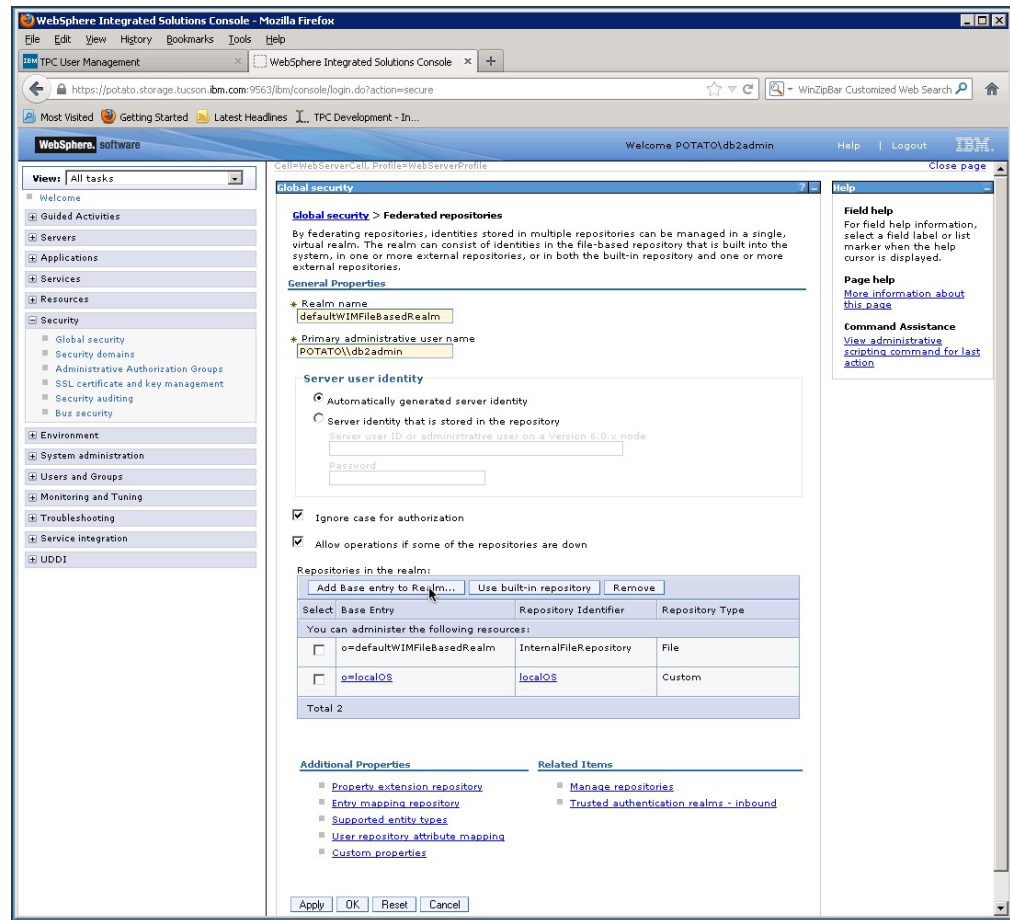


Figure 29. Global security > Federated repositories page, Add base entry to realm

11. If the Messages dialog box is displayed on the Repository reference page, click the **Save** link in **Save directly to the master configuration**.
12. On the Repository reference page, configure the following items:
 - a. In the **Repository list**, select the repository that you created in step 8 on page 246.
 - b. In the **Distinguished name of a base entry that uniquely identifies this set of entries in the realm** field, enter a DN for the repository. This DN maps to the DN of the base entry in the LDAP repository that you entered in the **Distinguished name of a base entry in this repository** field.

Tip: In Jazz for Service Management WebSphere Integrated Solutions Console, the label for this field is **Unique distinguished name of the base (or parent) entry in federated repositories**.

To avoid duplicate results during searches, the DN must uniquely identify the base entry in the repository. If multiple repositories are included in the realm and the repositories have the same base entry, use this field to define a DN that uniquely identifies each base entry. For example, repositories LDAP1 and LDAP2 might both use `o=ibm,c=us` as the base entry in the repository. Enter a DN in this field that distinguishes the base entries for each repository. For example: `o=ibm,c=us` for LDAP1 and `o=ibm2,c=us` for LDAP2.

- c. In the **Distinguished name of a base entry in this repository** field, enter the DN of the base entry in the LDAP repository that you want to map to

the DN that you entered in the **Distinguished name of a base entry that uniquely identifies this set of entries in the realm** field. In most instances, the value is the same in both fields.

The value in this field indicates the starting point for searches in the LDAP directory server. For example, for a user with a DN of cn=John Doe, ou=rochester, o=ibm, c=us, you can specify the LDAP base entry as any of the following options:

- ou=rochester, o=ibm, c=us
- o=ibm, c=us
- c=us

Important: The DN value that is entered in this field must be broad enough to include both users and the groups to which the users belong. For example, if a user in ou=rochester, o=ibm, c=us is also a member of groups that are in dc=stategroups, ou=rochester, o=ibm, c=us, enter o=ibm, c=us in this field.

In the Jazz for Service Management WebSphere Integrated Solutions Console, the label for this field is **Distinguished name of a subtree in the main repository**. You must first select the **Distinguished name in the repository is different** check box and then enter a value in the **Distinguished name of a subtree in the main repository** field. In most instances, you will enter the same value in the **Unique distinguished name of the base (or parent) entry in federated repositories** field and the **Distinguished name of a subtree in the main repository** field.

- d. Click OK.

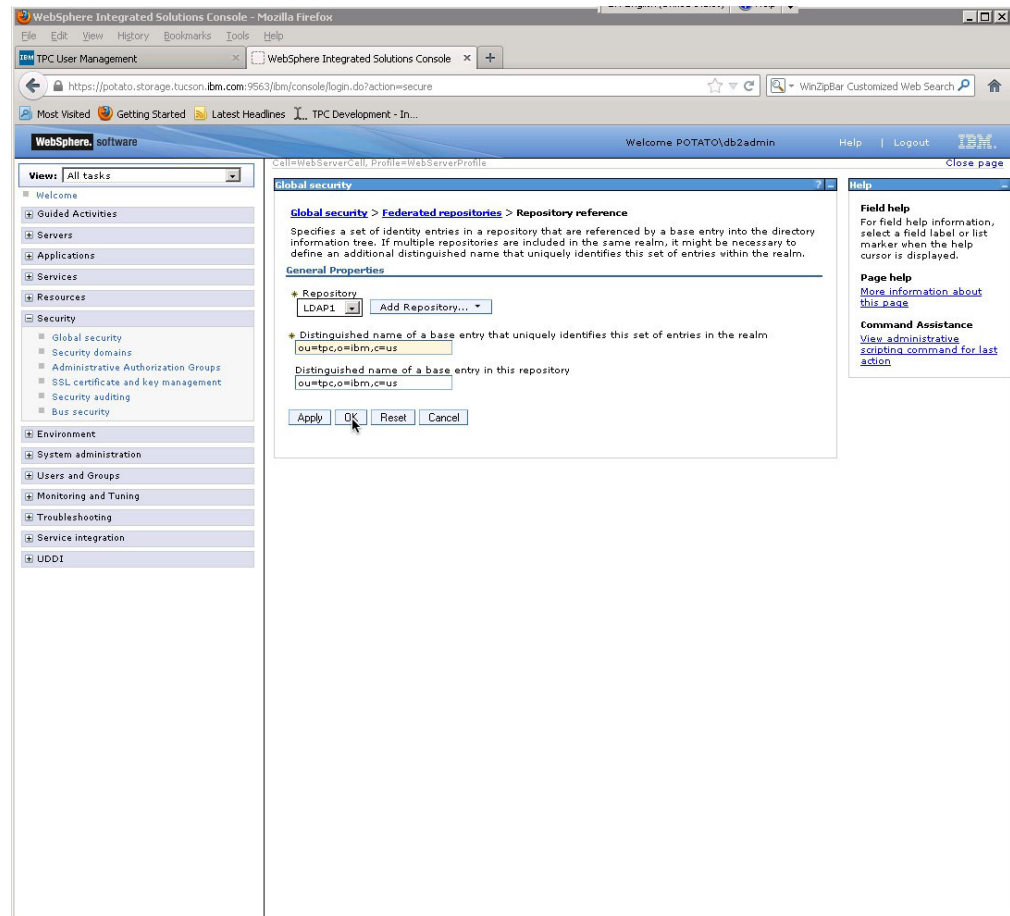


Figure 30. Global security > Federated repositories > Repository reference page, Add base entry to realm

- e. In the messages dialog box that is displayed, click the **Save** link in **Save directly to the master configuration**.

Important: In the Repositories in the realm table, do not remove the **localOS** entry or the **InternalFileRepository** entry.

13. Log out of the WebSphere Integrated Solutions Console.
14. Log out of the web-based GUI.
15. Stop and restart Tivoli Storage Productivity Center web server or Jazz for Service Management server.

For information about stopping and starting the Tivoli Storage Productivity Center web server or Jazz for Service Management server, see the Tivoli Storage Productivity Center information center. Search for *Starting and stopping the Tivoli Storage Productivity Center services*.

To determine the port number for Jazz for Service Management, complete the following steps:

- a. Open the `JazzSM_install_dir/profile/properties/portdef.props` file.
- b. Review the value for one of the following parameters:
 - `WC_adminhost` (for ports that are not secure)
 - `WC_adminhost_secure` (for secure ports)
- c. Configure Jazz for Service Management with LDAP:

- 1) Open a browser window and start the Jazz for Service Management server.
- 2) Specify the http or https port from step b to access Jazz for Service Management.

Note: You must repeat steps 5-15 to configure the Jazz for Service Management instance of WebSphere Application Server.

- d. Stop and start the Jazz for Service Management server.

Note: If you installed Jazz for Service Management in the default installation location (for example, C:\Program Files\IBM\JazzSM\profile\bin), you can run the following commands to stop and start the Jazz for Service Management server:

To stop the Jazz for Service Management:

```
stopServer.bat server1 -username user_name -password password
```

To start the Jazz for Service Management server again:

```
startServer.bat server1
```

- e. After the Jazz for Service Management server is restarted, wait 15 minutes before you log in to the Jazz for Service Management server.

To verify that the LDAP federated repository is configured correctly, complete the following steps:

1. Log in to the WebSphere Integrated Solutions Console by using the same user name and password from step 5 on page 245.

Tip: If you try to log in to the WebSphere Integrated Solutions Console by using a local OS user name or a domain user name, an error message states that the user name or password is invalid. This error may occur because the user name that you are using to log in to the WebSphere Integrated Solutions Console exists in the LDAP federated repository that you just added.

To resolve this issue, complete one of the following tasks:

- For local OS user names, add the computer name as a prefix to the user name
 - For domain user names, add the domain name as a prefix to the user name
2. In the WebSphere Integrated Solutions Console navigation tree, click **Users and Groups > Manage Users**.
 3. In the Search by list, select **User ID**.
 4. Click **Search** to search for users in the federated repositories. The list of users includes users from the local file repository, the operating system repository, and the LDAP repository.
 5. In the WebSphere Integrated Solutions Console navigation tree, click **Users and Groups > Manage Groups**.
 6. In the Search by list, select **Group name**.
 7. Click **Search** to search for groups in the federated repositories. The list of groups includes groups from the operating system repository and the LDAP repository.

Important: Before you establish the authorization configuration for Jazz for Service Management, Tivoli Storage Productivity Center, and Tivoli Storage

Productivity Center for Replication, ensure that there are no duplicated user names or group names in the local file repository, the operating system repository, and the LDAP repository.

You should also assign Tivoli Storage Productivity Center for Replication roles, such as Monitor or Administrator, to the user groups in your operating system repository or your LDAP repository. In the Tivoli Storage Productivity Center web-based GUI, click **Settings > User Management** to assign the roles to the user groups. For more information about assigning these roles to groups, see the Tivoli Storage Productivity Center information center. Search for *Role-based authorization*.

For information about assigning roles to users and roles to groups for Tivoli Storage Productivity Center for Replication, go to the Tivoli Storage Productivity Center information center. Search for *Managing replication*. On the Managing replication page, click **Security**.

Removing an LDAP repository from the federated repositories

To remove an LDAP repository from the federated repositories, you must use the IBM WebSphere Integrated Solutions Console.

If removing an LDAP repository from the federated repositories in Tivoli Storage Productivity Center leaves only the local OS repository and the file-based repository, the use of the Tivoli Storage Productivity Center single sign-on feature is limited. Storage system element managers do not support the local OS repository for single sign-on, even if the element manager is installed on the same system as Tivoli Storage Productivity Center.

The location of the WebSphere Application Server directory is different for each instance:

- The Jazz for Service Management WebSphere Application Server directory:
`JAZZSM_INSTALL_DIR/profile`
- The Tivoli Storage Productivity Center WebSphere Application Server or web server directory:
`TPC_INSTALL_DIR/ewas/profiles/WebServerProfile`

To remove an LDAP repository to the federated repositories in Tivoli Storage Productivity Center or Jazz for Service Management, complete the following steps:

1. Before you remove an LDAP repository to the federated repositories, complete the following steps:

Important: If you log in by using a Windows domain user name, before you run the backup commands, click **Start > Command Prompt** and select **Run as administrator**.

- a. Back up the WebSphere Application Server configuration for the Tivoli Storage Productivity Center instance of WebSphere Application Server and back up the WebSphere Application Server configuration for the Jazz for Service Management instance of WebSphere Application Server.
 - On Windows operating systems, run the following command:

```
WebSphere_Directory\bin\backupConfig.bat -username  
adminuser -password adminpassword -nostop
```

In the WebSphere Application Server configurations for Tivoli Storage Productivity Center and Jazz for Service Management, *adminuser* is the user name that was used to install Tivoli Storage Productivity Center

(for example, db2admin) or Jazz for Service Management (for example smadmin), and *adminpassword* is the password that is associated with *adminuser*.

Tip: If you completed a default installation on the Windows operating system:

- The Tivoli Storage Productivity Center WebSphere Application Server directory is located here:

C:\Program Files\IBM\TPC\ewas\profiles\
WebServerProfile\

- The Jazz for Service Management WebSphere Application Server directory is located here:

C:\Program Files\IBM\JazzSM\profile\

- On AIX or Linux operating systems, run the following command:

```
WebSphere_Directory/bin/backupConfig.sh -username  
adminuser -password adminpassword -nostop
```

In the WebSphere Application Server configurations for Tivoli Storage Productivity Center and Jazz for Service Management, *adminuser* is the user name that was used to install Tivoli Storage Productivity Center (for example, db2inst1) or Jazz for Service Management (for example smadmin), and *adminpassword* is the password that is associated with *adminuser*.

Tip: If you completed a default installation on the AIX or Linux operating system:

- The Tivoli Storage Productivity Center WebSphere Application Server directory is located here:

/opt/IBM/TPC/ewas/profiles/WebServerProfile/

- Jazz for Service Management WebSphere Application Server directory is located here:

/opt/IBM/JazzSM/profile/

- b. Back up the soap.client.props file for the Tivoli Storage Productivity Center instance of WebSphere Application Server.

- On the Windows operating system, run the **copy** command to back up this file:

WebSphere_Directory\properties\soap.client.props

Tip: If you completed a default installation on the Windows operating system, the Tivoli Storage Productivity Center Version 5.2 soap.client.props file is in this directory:

C:\Program Files\IBM\TPC\ewas\profiles\WebServerProfile
\properties\

- On the AIX or Linux operating systems, run the **cp** command to back up this file:

WebSphere_Directory/properties/soap.client.props

Tip: If you completed a default installation on the AIX or Linux operating systems, the Tivoli Storage Productivity Center Version 5.2 soap.client.props file is in this directory:

/opt/IBM/TPC/ewas/profiles/WebServerProfile/properties

- c. Back up the IBM Cognos.ear directory for the Jazz for Service Management WebSphere Application Server.

- On the Windows operating system, run the **xcopy** command to back up this directory:

```
WebSphere_Directory\installedApps\JazzSMNode01Cell
\IBM Cognos.ear
```

Tip: If you completed a default installation on the Windows operating system, the Jazz for Service Management WebSphere Application Server directory is located here:

```
C:\Program Files\IBM\JazzSM\profile\
```

- On the AIX or Linux operating systems, run the **cp** command to back up this directory:

```
WebSphere_Directory/installedApps/JazzSMNode01Cell
/IBM Cognos.ear
```

Tip: If you completed a default installation on the AIX or Linux operating systems, the Jazz for Service Management WebSphere Application Server directory is located here:

```
/opt/IBM/JazzSM/profile/
```

Tip: The default cell name JazzSMNode01Cell is used in the sample commands. If you did not use the default cell name when you installed Jazz for Service Management, you must specify the correct cell name in this step.

2. In the event of a problem when you remove an LDAP repository, complete the following steps to restore the items you backed up in step 1:

- a. Run the `restoreConfig.sh` or the `restoreConfig.bat` command to restore the WebSphere Application Server configuration for the Tivoli Storage Productivity Center instance of WebSphere Application Server and restore the WebSphere Application Server configuration for the Jazz for Service Management instance of WebSphere Application Server. The **restoreConfig** command is in one of the following directories:

- On the Windows operating system, go to this directory:

```
WebSphere_directory/bin/restoreConfig.bat
```

Tip: If you completed a default installation on the Windows operating system:

- The Tivoli Storage Productivity Center WebSphere Application Server directory is located here:

```
C:\Program Files\IBM\TPC\ewas\profiles\WebServerProfile\
```

- The Jazz for Service Management WebSphere Application Server directory is located here:

```
C:\Program Files\IBM\JazzSM\profile\
```

- On the AIX or Linux operating system, go to this directory:

```
WebSphere_directory/bin/restoreConfig.sh
```

Tip: If you completed a default installation on the AIX or Linux operating system, the Tivoli Storage Productivity Center Version 5.2 `soap.client.props` in this directory:

```
/opt/IBM/TPC/ewas/profiles/WebServerProfile/properties
```

- b. Restore the `soap.client.props` file for the Tivoli Storage Productivity Center instance of WebSphere Application Server.

- On the Windows operating system, run the **copy** command to restore this file:

WebSphere_Directory\properties\soap.client.props

Tip: If you completed a default installation on the Windows operating system, the Tivoli Storage Productivity Center Version 5.2 *soap.client.props* is in this directory:

C:\Program Files\IBM\TPC\ewas\profiles\WebServerProfile\properties

- On the AIX or Linux operating system, run the **cp** command to restore this file:

WebSphere_Directory/properties/soap.client.props

Tip: If you completed a default installation on the AIX or Linux operating systems, the Tivoli Storage Productivity Center Version 5.2 *soap.client.props* is in this directory:

/opt/IBM/TPC/ewas/profiles/WebServerProfile/

- c. Restore the IBM Cognos.ear directory for the Jazz for Service Management WebSphere Application Server.

- On the Windows operating system, run the **xcopy** command to restore this directory:

WebSphere_Directory\installedApps\JazzSMNode01Cell\IBM Cognos.ear

Tip: If you completed a default installation on the Windows operating system, the Jazz for Service Management WebSphere Application Server directory is located here:

C:\Program Files\IBM\JazzSM\profile

- On the AIX or Linux operating systems, run the **cp** command to restore this directory:

WebSphere_Directory/installedApps/JazzSMNode01Cell/IBM Cognos.ear

Note: The default cell name *JazzSMNode01Cell* is used in the sample commands. If you did not use the default cell name when you installed Jazz for Service Management, you must specify the correct cell name in this step.

Tip: If you completed a default installation on the AIX or Linux operating systems, the Jazz for Service Management WebSphere Application Server directory is located here:

/opt/IBM/JazzSM/profile/

- d. Restart the Tivoli Storage Productivity Center web server and the Jazz for Service Management server. The execution of the **restoreConfig** command stops those WebSphere Application Server instances.

For information about starting the Tivoli Storage Productivity Center web server or Jazz for Service Management server, see the Tivoli Storage Productivity Center information center. Search for *Starting the Tivoli Storage Productivity Center services*.

3. To open the WebSphere Integrated Solutions Console, open a web browser and enter one of the following addresses in the address field:

- <http://hostname:port/ibm/console/logon.jsp>
- <http://hostname:port/ibm/console/logon.jsp>

The hostname is the server that is running WebSphere Application Server, such as the server name or IP address, and port is the port number for the WebSphere Application Server. The port number differs depending on which

protocol you used (http or https) and the options that you selected when you installed Tivoli Storage Productivity Center.

To determine the port number, complete the following steps:

- a. Open the `WebSphere_directory/properties/portdef.props` file.
 - b. Determine the port number by looking for the value that is assigned to one of the following keys:
 - For http:// protocols, search for the `WC_adminhost` key
 - For https:// protocols, search for the `WC_adminhost_secure` key
4. On the WebSphere Integrated Solutions Console navigation tree, click **Security** > **Global Security**.

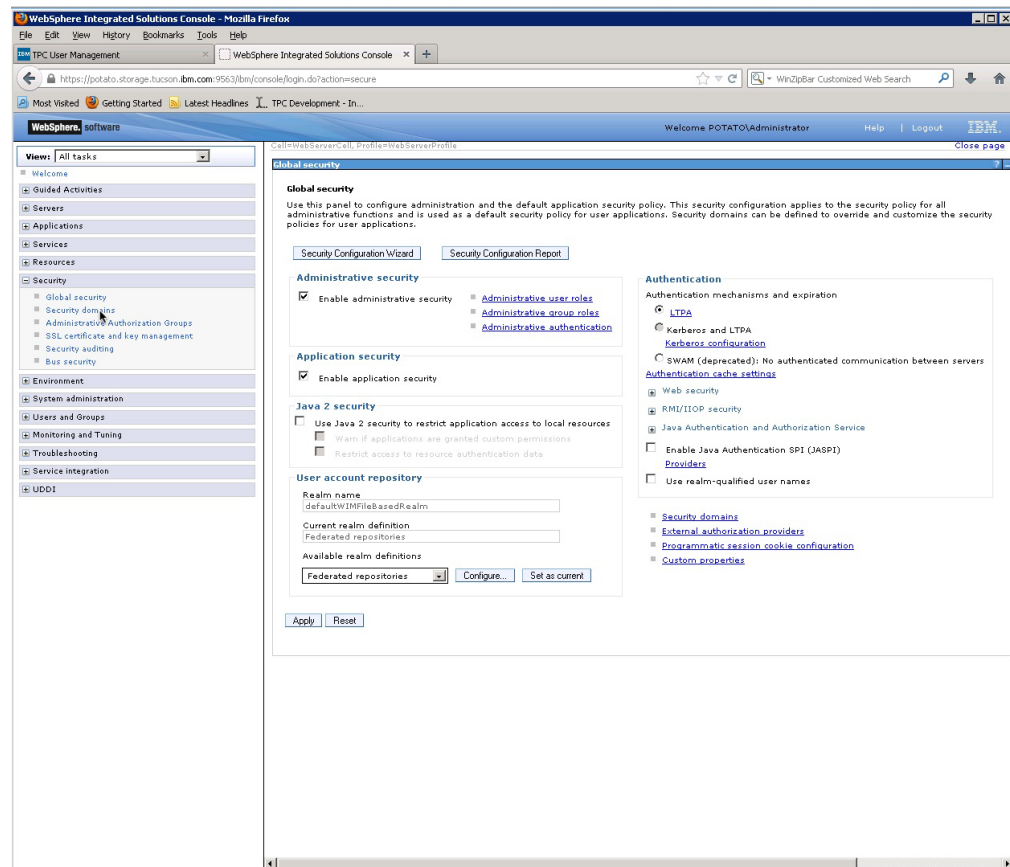


Figure 31. Opening the Global security page

5. On the Global security page, in the **User account repository** section, click **Configure** next to the **Available realm definitions** menu.

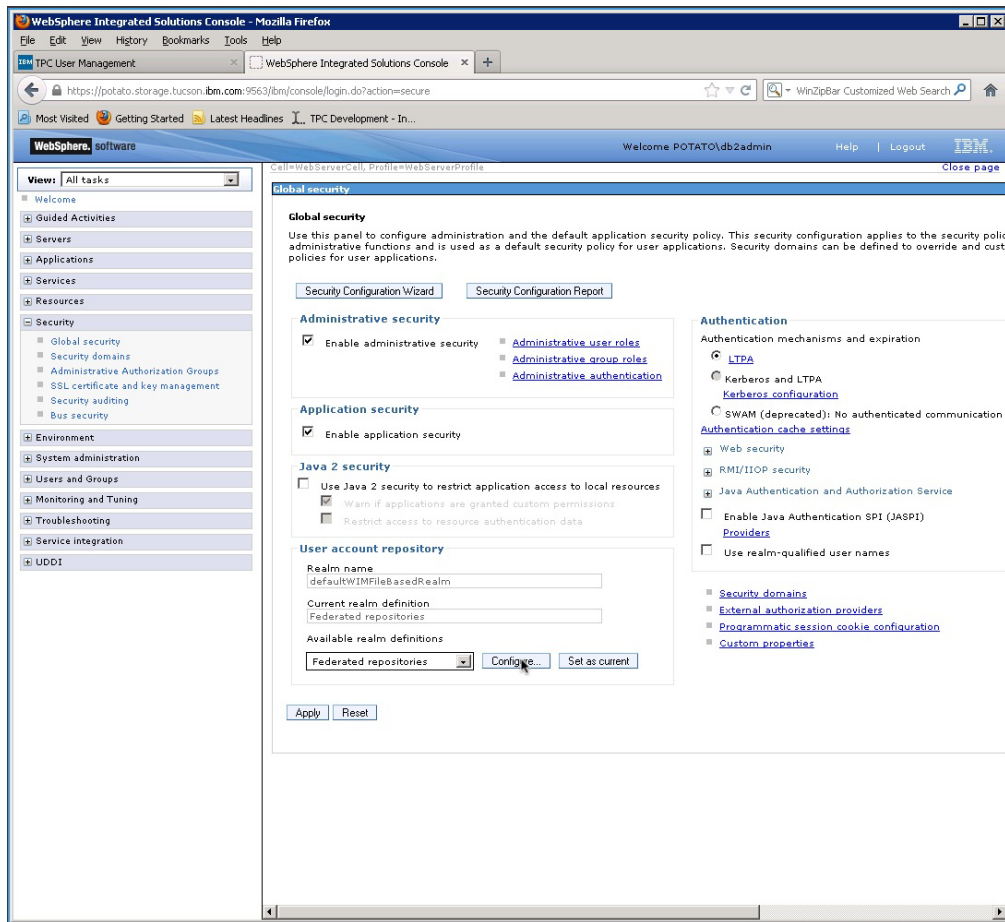


Figure 32. Configuring the available realm definitions

6. On the **Global security > Federated repositories** page, in the **Repositories in the realm** table, select the entry for the LDAP repository you previously added, and click **Remove**.

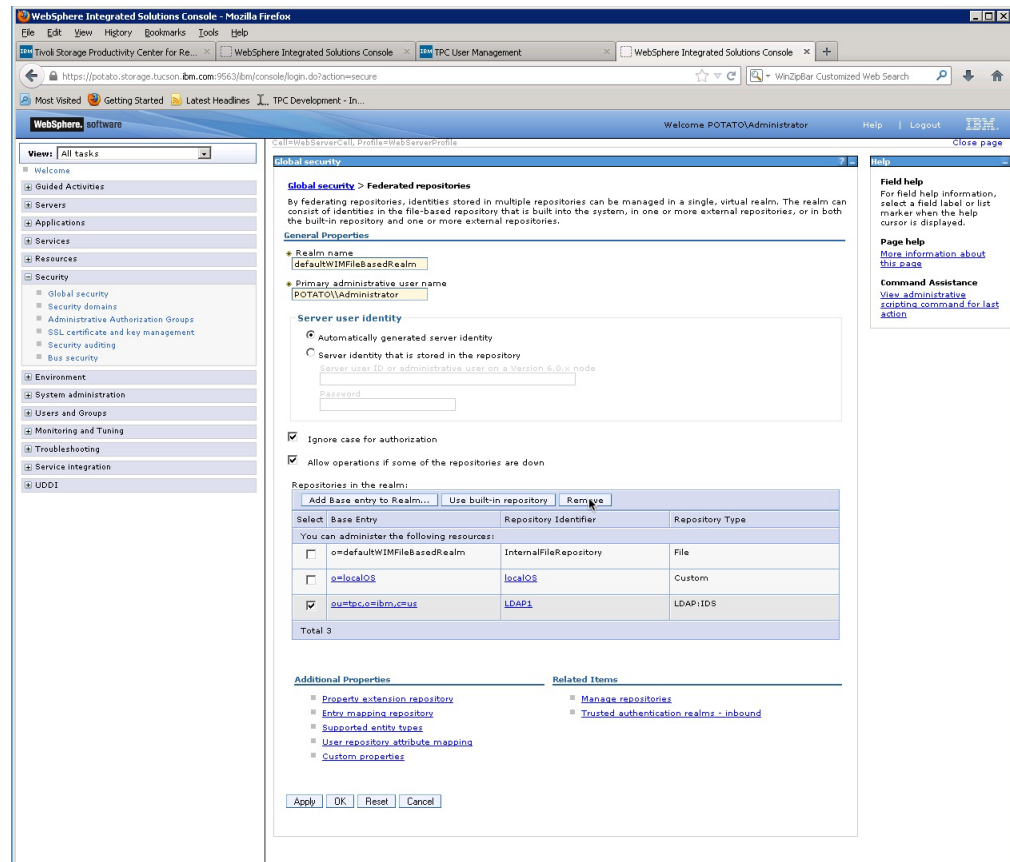


Figure 33. Removing the LDAP repository

7. In the message dialog box that is displayed on the Federated repositories page, click the **Save** link in **Save directly to the master configuration**.
8. On the **Global security > Federated repositories** page, under **Related items**, click **Manage repositories**.

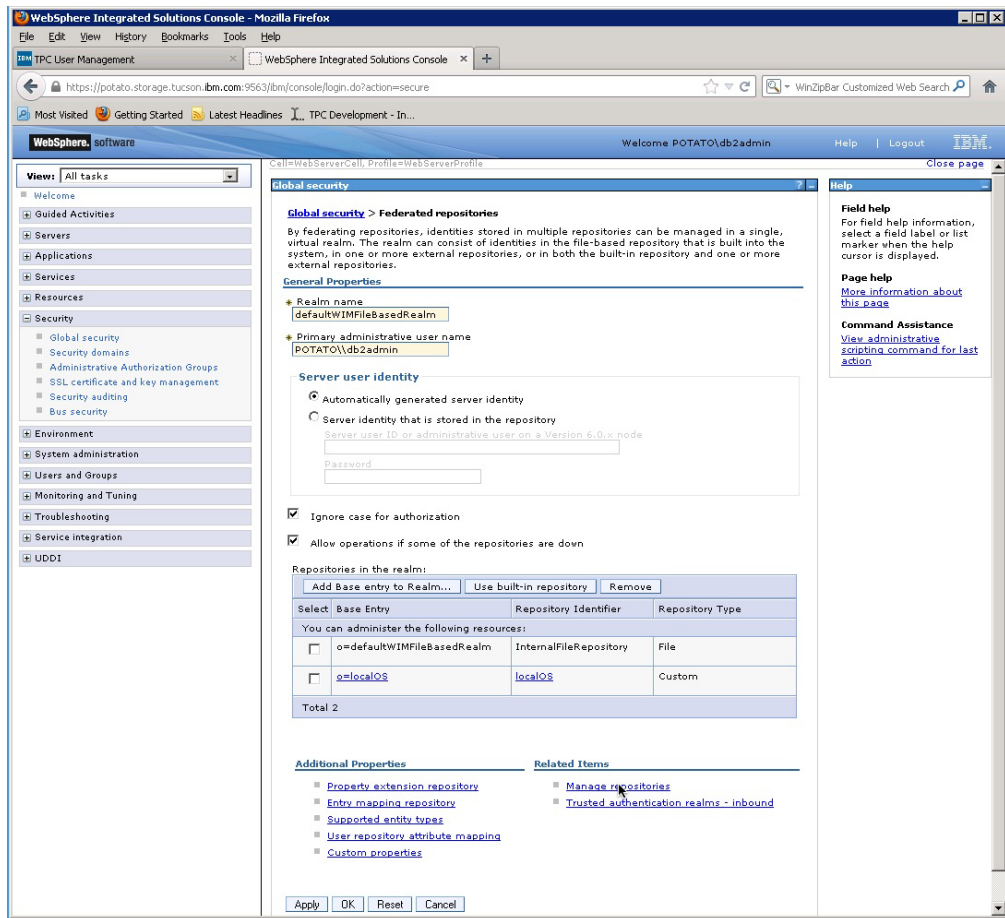


Figure 34. Managing the repositories

9. On the **Global security > Federated repositories > Manage repositories** page, select the entry for the LDAP repository that you previously added and click **Delete**.

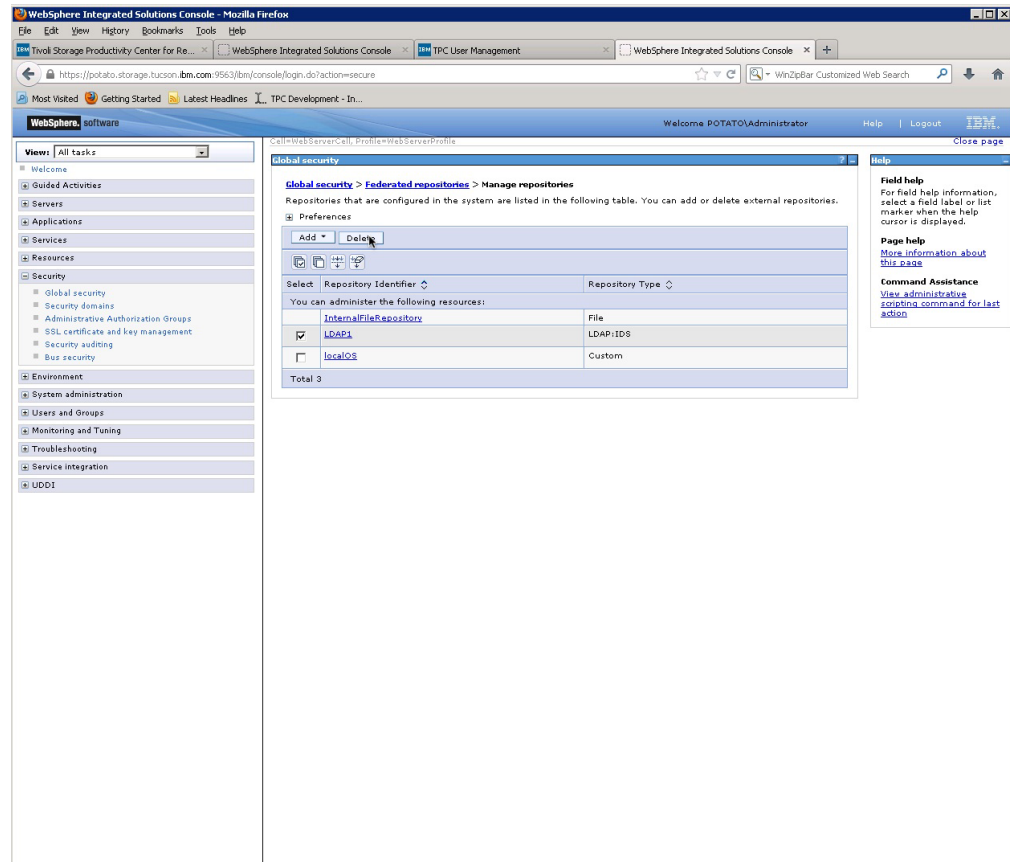


Figure 35. Deleting the LDAP repository

10. In the message dialog box that is displayed on the Manage repositories page, click the **Save** link in **Save directly to the master configuration**.
11. Log out from the WebSphere Integrated Solutions Console.
12. Log out of the web-based GUI.
13. Stop and restart the Tivoli Storage Productivity Center web server or Jazz for Service Management server. For information about stopping and starting the server, go to the Tivoli Storage Productivity Center information center. Search for *Starting and stopping Tivoli Storage Productivity Center services*.

Important: Before you establish the authorization configuration for the WebSphere Integrated Solutions Console, Tivoli Storage Productivity Center, and Tivoli Storage Productivity Center for Replication, you must ensure that there are no duplicated user names or group names in the local file-based repository and the localOS repository.

After you remove the LDAP repository from the Tivoli Storage Productivity Center federated repositories authentication configuration, you must establish the authorization configuration for the WebSphere Integrated Solutions Console.

You should also assign Tivoli Storage Productivity Center roles to groups by using the **Role-to-Group Mapping** node in the stand-alone GUI.

For information about assigning roles to users and roles to groups for Tivoli Storage Productivity Center for Replication, go to the Tivoli Storage Productivity Center information center. Search for *Managing replication*. On the Managing replication page, click **Security**.

Tivoli Common Reporting roles

This topic provides a list of the predefined roles in IBM Tivoli Common Reporting.

Table 34. Roles in Tivoli Common Reporting.

Role	Description
administrator	During installation of Tivoli Common Reporting an administrator role is created by default. Logging in with this role allows you to access the user and group administration and report set authorizations features. .

Changing passwords by using the password tool

Use the password tool to change the passwords for DB2, Tivoli Storage Productivity Center, and Jazz for Service Management so that they can continue to authenticate to one another whenever you change a password.

If you are logged on to Tivoli Storage Productivity Center by using a domain user account, which is also a member of the local administrator group, when you run the change password tool, passwords are not updated. If you run the tool by using a local OS user account, and an error occurs, complete these steps.

To run the password tool when you log in by using a domain user account, choose one of the following steps:

- Right-click the `changepasswords.bat` file and select **Run as administrator**.
- Complete the following steps:
 1. Click **Start > All Programs > Open Administrative Tools > Local Security Policy**.
 2. On the Local Security Policy window, disable **User Account Control: Run all administrators in Admin Approval Mode**.
 3. Restart your computer.

Single server installation where components use the same logon credentials

Use the password tool to change the password for DB2, Tivoli Storage Productivity Center, and Jazz for Service Management when these products are installed on the same server and use the same user name and password.

Before you use the password tool, ensure that you know the existing password or passwords that you want to change.

1. Complete the following steps:

For Windows operating systems where Tivoli Storage Productivity Center is configured for OS authentication:

- a. Open the Control Panel.
- b. Double-click **User Accounts**.
- c. Click **Change your password**.
- d. Enter the current password, enter, and confirm the new password.
- e. Click **Change password** and close the User Accounts window.

For AIX or Linux operating systems where Tivoli Storage Productivity Center is configured for OS authentication:

Log in with the DB2 user ID, and run the **passwd** command.

Tip: To change other user credentials, run the **passwd username** command.

If you need to change the LDAP user password, see your LDAP server documentation.

2. Open a command prompt window and change the directory to the following default directory:

On Windows operating systems:

C:\Program Files\IBM\TPC\service

On Linux or UNIX operating systems:

/opt/IBM/TPC/service

3. Start the password tool by running the following program:

On Windows operating systems:

changepasswords.bat

On Linux or AIX operating systems:

changepasswords.sh

4. In the “Choose the password to change” window, click **Change Jazz for Service Management password** and, click **OK**.
5. Complete the following steps:
 - a. Enter and confirm the new password, ensuring that it is the same as the new password that you entered in step 1 on page 262.
 - b. In response to the following message, click **Yes**:
Are you sure you want to change the password?
 - c. When the process is completed, click **Back to Main**.
6. To change the password for Tivoli Storage Productivity Center, click **Change Tivoli Storage Productivity Center server and DB2 passwords** and click **OK**.
 - a. Enter and confirm the new password, ensuring that it is the same as the new password that you entered in step 1 on page 262. Click **OK**.
 - b. In response to the following message, click **Yes**:
Are you sure you want to change the password?

Tip: After you click **Yes**, if the DB2 servers are already started, the following messages might be displayed in a command prompt window. Ignore them and continue with the procedure.

Changing DB2 User password for Data Server...

Changing DB2 User password for Device Server...

- c. When the process is completed, click **Back to Main**.

Tip: To verify that the password changes were completed successfully, review the PWTool.log file that is in the *TPC_installation_directory*\service directory, where *TPC_installation_directory* is the directory where Tivoli Storage Productivity Center is installed.

7. Exit the password tool.

Related tasks:

“Single-server installation where components use different logon credentials”

Use the password tool to change the passwords for DB2, Tivoli Storage Productivity Center, and Jazz for Service Management when these components are installed on the same server but use different user names and passwords.

“Multiple-server installation where Tivoli Storage Productivity Center reports are remote” on page 266

You can change the passwords for DB2, Tivoli Storage Productivity Center, and Tivoli Storage Productivity Center reports when these components are installed on two servers. Tivoli Storage Productivity Center reports are installed on *Server A*, and DB2 and the Tivoli Storage Productivity Center server are installed on *Server B*.

“Multiple-server installation where DB2 is remote” on page 268

Change the passwords for DB2, Tivoli Storage Productivity Center, and Jazz for Service Management when these components are installed on servers. Jazz for Service Management and Tivoli Storage Productivity Center are on *Server A* and DB2 is on *Server B*.

Single-server installation where components use different logon credentials

Use the password tool to change the passwords for DB2, Tivoli Storage Productivity Center, and Jazz for Service Management when these components are installed on the same server but use different user names and passwords.

Before you use the password tool, ensure that you know the existing password or passwords that you want to change.

1. Complete the following steps:

For Windows operating systems where Tivoli Storage Productivity Center is configured for OS authentication:

- a. Open the Control Panel.
- b. Double-click **User Accounts**.
- c. Click **Change your password**.
- d. Enter the current password, enter, and confirm the new password.
- e. Click **Change password** and close the User Accounts window.

For AIX or Linux operating systems where Tivoli Storage Productivity Center is configured for OS authentication:

When you log in by using DB2 user ID, run the **passwd** command. To change other user credentials, run the **passwd username** command.

Tip: If you need to change the LDAP user password, see your LDAP server documentation.

2. Open a command prompt window and change the directory to the following default directory:

On Windows operating systems:

C:\Program Files\IBM\TPC\service

On Linux or UNIX operating systems:

/opt/IBM/TPC/service

3. Start the password tool by running the following program:

On Windows operating systems:

changepasswords.bat

On Linux or AIX operating systems:

`changepasswords.sh`

4. On the “Choose the password to change” window, click **Change Jazz for Service Management password** and, click **OK**.
5. To change the password, complete the following steps:
 - a. Enter, confirm the new password, and click **OK**.
 - b. In response to the following message, click **Yes**:
Are you sure you want to change the password?
 - c. When the process is completed, click **Back to Main**.
6. To change the password for Tivoli Storage Productivity Center, click **Change Tivoli Storage Productivity Center server passwords** and click **OK**.
7. Complete the following steps:
 - a. Enter and confirm the new password and click **OK**.
 - b. In response to the following message, click **Yes**:
Are you sure you want to change the password?
 - c. When the process is completed, click **Back to Main**.
8. To change the password for DB2, click **Change DB2 password** and click **OK**.
9. Complete the following steps:
 - a. Enter and confirm the new password.
 - b. Ensure that the **Restart servers** check box is selected and click **OK**.
 - c. In response to the following message, click **Yes**:
Are you sure you want to change the password?

Tip: After you click **Yes**, if the DB2 servers are already started, the following errors might be displayed in a command prompt window. Ignore them and continue with the procedure.

Changing DB2 User password for Data Server...
Changing DB2 User password for Device Server...

- d. When the process is completed, click **Back to Main**.

Tip: To verify that the password changes were completed successfully, review the `PWTool.log` file that is in the `TPC_installation_directory\service` directory, where `TPC_installation_directory` is the directory where Tivoli Storage Productivity Center is installed.

Related tasks:

“Single server installation where components use the same logon credentials” on page 262

Use the password tool to change the password for DB2, Tivoli Storage Productivity Center, and Jazz for Service Management when these products are installed on the same server and use the same user name and password.

“Multiple-server installation where Tivoli Storage Productivity Center reports are remote” on page 266

You can change the passwords for DB2, Tivoli Storage Productivity Center, and Tivoli Storage Productivity Center reports when these components are installed on two servers. Tivoli Storage Productivity Center reports are installed on *Server A*, and DB2 and the Tivoli Storage Productivity Center server are installed on *Server B*.

"Multiple-server installation where DB2 is remote" on page 268

Change the passwords for DB2, Tivoli Storage Productivity Center, and Jazz for Service Management when these components are installed on servers. Jazz for Service Management and Tivoli Storage Productivity Center are on *Server A* and DB2 is on *Server B*.

Multiple-server installation where Tivoli Storage Productivity Center reports are remote

You can change the passwords for DB2, Tivoli Storage Productivity Center, and Tivoli Storage Productivity Center reports when these components are installed on two servers. Tivoli Storage Productivity Center reports are installed on *Server A*, and DB2 and the Tivoli Storage Productivity Center server are installed on *Server B*.

Before you use the password tool, ensure that you know the existing password or passwords that you want to change.

Important: You might need to update the Tivoli Common Reporting Cognos Content Store database password, in a multiple-server installation, where the Cognos Content Store database is installed on the different DB2 server instance to the Tivoli Storage Productivity Center database repository. Use the IBM Cognos Configuration tool to update the Cognos Content Store database password. This tool is found in the following directory:

- On Windows operating systems:
`JazzSM_INST_DIR\reporting\cognos\bin64\tcr_cogconfig.bat`
- On AIX or Linux operating systems:
`JazzSM_INST_DIR/reporting/cognos/bin64/tcr_cogconfig.sh`

After you start the tool, on the "IBM DB2 Content Store - Database - Resource Properties" window, click the pencil icon to change the password and then click **Save**.

After you run this tool, you must restart Jazz for Service Management.

Tivoli Storage Productivity Center is configured for OS authentication.

1. On the server where DB2 and Tivoli Storage Productivity Center are installed, complete the following steps:

On Windows operating systems:

- a. Click **Start > Control Panel**.
- b. Double-click **User Accounts**.
- c. Click **Change your password**.
- d. Enter the current password, and enter the password again to confirm it.
- e. Click **Change password**.
- f. Close the User Accounts window.

On AIX or Linux operating systems, if you logged in with the DB2 user ID, to change the DB2 and Tivoli Storage Productivity Center passwords, run the following command:

```
passwd username
```

To change other user credentials, run the `passwd username` command.

Tip: If you need to change the LDAP user password, see your LDAP server documentation.

2. On *Server A* and *Server B*, open a command prompt window and go to the following default directory:
 - On Windows operating systems:
C:\Program Files\IBM\TPC\service
 - On AIX or Linux operating systems:
/opt/IBM/TPC/service
3. On *Server A* and *Server B*, start the password tool by running the following program:
 - On Windows operating systems:
changepasswords.bat
 - On the AIX or Linux operating systems:
changepasswords.sh
4. On *Server B*, where Tivoli Storage Productivity Center and DB2 are installed, in the “Choose the password to change” window, click **Change Tivoli Storage Productivity Center server passwords** and click **OK**.
5. Complete the following steps:
 - a. Enter and confirm the new password, ensuring that it is the same as the new password that you entered in step 1 on page 266 and, click **OK**.
 - b. In response to the following message, click **Yes**:
Are you sure you want to change the password?
 - c. When the process is completed, click **Back to Main**.
6. On *Server B*, click **Change DB2 password**, click **OK**.
7. Complete the following steps:
 - a. Enter and confirm the new password, ensuring that it is the same as the new password that you entered in step 1 on page 266, click **OK**.
 - b. In response to the following message, click **Yes**:
Are you sure you want to change the password?

Tip: After you click **Yes**, if the DB2 servers are already started, the following messages might be displayed in a command prompt window.

```
Changing DB2 User password for Data Server...
Changing DB2 User password for Device Server...
```

You can ignore these messages and continue with the procedure.

- c. When the process is completed, click **Back to Main**.
- d. Exit the password tool.

Tip: To verify that the password changes were completed successfully, review the PWTool.log file that is in the *TPC_installation_directory*\service directory, where *TPC_installation_directory* is the directory in which Tivoli Storage Productivity Center is installed.

8. On *Server A*, in the “Choose the password to change” window, click **Change Jazz for Service Management password**, and click **OK**.
9. Complete the following steps:
 - a. Enter and confirm the new password and click **OK**.
 - b. In response to the following message, click **Yes**:
Are you sure you want to change the password?
 - c. When the process is completed, click **Back to Main**.

10. On *Server A*, in the “Choose the password to change” window, click **Change DB2 password** and click **OK**. Complete the following steps:

- a. Enter and confirm the new password, ensuring that it is the same as the new password that you entered in step 1 on page 266.
- b. Ensure that the **Restart servers** check box is selected and click **OK**.
- c. In response to the following message, click **Yes**:

Are you sure you want to change the password?

Tip: After you click **Yes**, if the DB2 servers are already started, the following messages might be displayed in a command prompt window. Ignore them and continue with the procedure.

```
Updating Tivoli Storage Productivity Center Reports
configuration...
Restarting the Jazz for Service Management
server...
```

- d. When the process is completed, click **Back to Main**.

Related tasks:

“Single server installation where components use the same logon credentials” on page 262

Use the password tool to change the password for DB2, Tivoli Storage Productivity Center, and Jazz for Service Management when these products are installed on the same server and use the same user name and password.

“Single-server installation where components use different logon credentials” on page 264

Use the password tool to change the passwords for DB2, Tivoli Storage Productivity Center, and Jazz for Service Management when these components are installed on the same server but use different user names and passwords.

“Multiple-server installation where DB2 is remote”

Change the passwords for DB2, Tivoli Storage Productivity Center, and Jazz for Service Management when these components are installed on servers. Jazz for Service Management and Tivoli Storage Productivity Center are on *Server A* and DB2 is on *Server B*.

Multiple-server installation where DB2 is remote

Change the passwords for DB2, Tivoli Storage Productivity Center, and Jazz for Service Management when these components are installed on servers. Jazz for Service Management and Tivoli Storage Productivity Center are on *Server A* and DB2 is on *Server B*.

Before you use the password tool, ensure that you know the existing password or passwords that you want to change.

Important: You might need to update the Tivoli Common Reporting Cognos Content Store database password, in a multiple-server installation, where the Cognos Content Store database is installed on the different DB2 server instance to the Tivoli Storage Productivity Center database repository. Use the IBM Cognos Configuration tool to update the Cognos Content Store database password. This tool is found in the following directory:

- On Windows operating systems:
`JazzSM_INST_DIR\reporting\cognos\bin64\tcr_cogconfig.bat`
- On AIX or Linux operating systems:
`JazzSM_INST_DIR/reporting/cognos/bin64/tcr_cogconfig.sh`

After you start the tool, on the "IBM DB2 Content Store - Database - Resource Properties" window, click the pencil icon to change the password and then click **Save**.

After you run this tool, you must restart Jazz for Service Management.

Tivoli Storage Productivity Center is configured for OS authentication.

1. On *Server B*, where DB2 is installed, complete the following steps:

For Windows operating system:

- a. Open the Control Panel.
- b. Double-click **User Accounts**.
- c. Click **Change your password**.
- d. Enter the current password, and enter and confirm the new password.
- e. Click **Change password**.
- f. Close the User Accounts window.

For AIX or Linux operating system: when you are logged in with the DB2 user ID, run the **passwd** command. To change other user credentials, run the **passwd username** command.

Tip: If you need to change the LDAP user password, see your LDAP server documentation.

2. On *Server A*, where Tivoli Storage Productivity Center and Jazz for Service Management are installed, complete the following steps:

For Windows operating system:

- a. Open the Control Panel.
- b. Double-click **User Accounts**.
- c. Click **Change your password**.
- d. Enter the current password, and enter the password again to confirm it. The new password can be different from the password that you created in step 1.
- e. Click **Change password** and close the User Accounts window.

For AIX or Linux operating systems, when you are logged in with the DB2 user ID, run the **passwd** command. To change other user credentials, run the **passwd username** command.

3. On *Server A* and *Server B*, open a command prompt window and go to the following default directory:

- For Windows operating system:
C:\Program Files\IBM\TPC\service
- For Linux or AIX operating system:
/opt/IBM/TPC/service

4. On *Server A* and *Server B*, start the password tool by running the following program:

- For Windows operating systems:
changepasswords.sh
- For Linux or AIX operating system:
changepasswords.bat

5. On *Server B*, where DB2 is installed, in the "Choose the password to change" window, click Change DB2 password, and click **OK**. Complete the following steps:

- a. Enter and confirm the new password, ensuring that it is the same as the new password that you entered in step 1 on page 269.
- b. Ensure that the **Restart servers** check box is selected and click **OK**.
- c. In response to the following message, click **Yes**:
Are you sure you want to change the password?

Tip: After you click **Yes**, if the DB2 servers are already started, the following messages might be displayed in a command prompt window:

```
Change DB2 user password for Data server...
Changing DB2 user password for Device server...
```

You can ignore these messages and continue with the procedure.

- d. When the process is completed, click **Back to Main**.
6. On Server B, click **Exit program** to exit the password tool.
7. On *Server A*, in the “Choose the password to change” window, click **Change Jazz for Service Management** and click **OK**. Complete the following steps:
 - a. Enter and confirm the new password, ensure that it is the same as the new password that you entered in step 2 on page 269, and click **OK**.
 - b. In response to the following message, click **Yes**:
Are you sure you want to change the password?
 - c. When the process is completed, click **Back to Main**.
8. On *Server A*, where Jazz for Service Management and Tivoli Storage Productivity Center are installed, in the “Choose the password to change” window, click **Change DB2 password** and click **OK**. Complete the following steps:
 - a. Enter and confirm the new password, ensuring that it is the same as the new password that you entered in step 1 on page 269.
 - b. Ensure that the **Restart servers** check box is selected and click **OK**.
 - c. In response to the following message, click **Yes**:
Are you sure you want to change the password?

Tip: After you click **Yes**, if the DB2 servers are already started, the following errors might be displayed in a command prompt window:

```
Changing DB2 User password for Data Server...
Changing DB2 User password for Device Server...
```

You can ignore these messages and continue with the procedure.

- d. When the process is completed, click **Back to Main**.
9. On *Server A*, click **Exit program** to exit the password tool.

Important: For the changes to take effect, you may need to manually restart the Tivoli Storage Productivity Center servers, Jazz for Service Management, or both of these components.

Tip: To verify that the password changes were completed successfully, review the `PWTool.log` file that is generated on *Server A* and *Server B*. For each server, this log file is in the `TPC_installation_directory\service` directory, where `TPC_installation_directory` is the directory in which Tivoli Storage Productivity Center is installed.

Related tasks:

“Single server installation where components use the same logon credentials” on page 262

Use the password tool to change the password for DB2, Tivoli Storage Productivity Center, and Jazz for Service Management when these products are installed on the same server and use the same user name and password.

“Single-server installation where components use different logon credentials” on page 264

Use the password tool to change the passwords for DB2, Tivoli Storage Productivity Center, and Jazz for Service Management when these components are installed on the same server but use different user names and passwords.

“Multiple-server installation where Tivoli Storage Productivity Center reports are remote” on page 266

You can change the passwords for DB2, Tivoli Storage Productivity Center, and Tivoli Storage Productivity Center reports when these components are installed on two servers. Tivoli Storage Productivity Center reports are installed on *Server A*, and DB2 and the Tivoli Storage Productivity Center server are installed on *Server B*.

Authorizing users

After IBM Tivoli Storage Productivity Center is installed, you can assign roles to the user groups that are contained in the authentication repository. The authentication repository can be a local operating system or an LDAP-compliant directory. Roles determine the product functions that are available to users in a group.

Configuring role to group mappings

After you determine to which groups a user belongs, you can configure role-to-group mapping in the Tivoli Storage Productivity Center web-based GUI and log on to the Tivoli Storage Productivity Center stand-alone GUI. The mapping applies to Windows domains, LDAP, and local OS accounts.

Determining the group to which a user name belongs

To determine to which groups a user belongs, complete the following steps:

1. In a web browser, log in as a Windows domain user to the WebSphere Integrated Solutions Console.
2. In the navigation tree, click **Users and Groups > Manage Users**.
3. In the **Search by** list, search for the user name.
For example, search for janedvc\loud321.

4. Click the user name link.
For example, you can click TPC\janedvc\loud321.

Tip: If there are multiple user names in the search results, select the check box for a user and click the user name link.

5. On the User Properties page, click the **Groups** tab to see the groups to which the user belongs.
6. Note the groups to which the user name belongs.

Configuring role-to-group mappings

To configure role-to-group mappings, complete the following steps:

1. Log on to Tivoli Storage Productivity Center web-based GUI.

If you used the common user name when you installed Tivoli Storage Productivity Center, you can use this user name to log on to the web-based GUI.

2. Click **Settings > User Management**.
3. On the User Management window, click **Add Group**.
4. On the Add Group window, enter the group names enter the names of the groups to which the user belongs.
5. Click **Search**.
6. Select the group and the role that you want to assign to the group.
7. Click **OK**.

Role-based authorization

Roles determine the functions that are available to users of Tivoli Storage Productivity Center. When a user ID is authenticated to Tivoli Storage Productivity Center through the GUI, CLI, or APIs, membership in an operating system or LDAP group determines the authorization level of the user.

In Version 5.2, the roles that were previously defined in Tivoli Storage Productivity Center were consolidated into a smaller set of roles. The following table shows how the roles in versions earlier than 5.2 are mapped to the current set of roles:

Table 35. How roles in previous versions of Tivoli Storage Productivity Center are mapped to the roles in version 5.2 and later

Roles in previous versions	Roles in version 5.2 and later	Authorization level
Superuser Productivity Center administrator Disk administrator Fabric administrator Data administrator Tape administrator	Administrator	This role has full access to all monitoring and administrative functions. At least one group must have the Administrator role. Note: When Tivoli Storage Productivity Center is first installed, the following operating system groups are assigned the Administrator role: <ul style="list-style-type: none">• Windows: Administrators• UNIX and Linux: root• AIX: system

Table 35. How roles in previous versions of Tivoli Storage Productivity Center are mapped to the roles in version 5.2 and later (continued)

Roles in previous versions	Roles in version 5.2 and later	Authorization level
Disk operator Fabric operator Data operator Tape operator	Monitor	<p>In the web-based GUI, this role has access to the following read-only functions:</p> <ul style="list-style-type: none"> • Viewing and exporting information about monitored resources • Viewing and acknowledging alerts • Viewing tasks and data collection jobs • Viewing data paths • Opening management GUIs • Opening logs • Tiering storage <p>In the stand-alone GUI, this role has access to the following functions:</p> <ul style="list-style-type: none"> • Viewing data that is collected by Tivoli Storage Productivity Center • Creating, generating, and saving reports
This role did not exist in versions 5.1 or earlier.	External Application	<p>This role enables users of other applications to use the provisioning capability of Tivoli Storage Productivity Center to provision storage. For example, a VMware user with this role can provision storage in the vSphere GUI by using the vSphere Web Client extension for Tivoli Storage Productivity Center.</p> <p>If you assign the External Application role to the user, you must also assign one or more service classes to the user.</p> <p>This role does not enable users to log in to the Tivoli Storage Productivity Center GUIs.</p>

Tips:

- If a user belongs to multiple groups and the groups have different roles, the role with the highest level of authorization is granted to the user. For example, if a user belongs to a group that is assigned the Administrator role and also belongs to a group that is assigned a Monitor role, the user is granted the authorization of the Administrator role.
- If a user is not a member of a group that is assigned a Tivoli Storage Productivity Center role, no access is granted to that user.
- For rollup reports, you need Administrator authority to do the following actions:
 - Add, remove, or modify the Tivoli Storage Productivity Center subordinate server that the master server is monitoring.
 - Create or run probe jobs that include Tivoli Storage Productivity Center subordinate servers.

Any Tivoli Storage Productivity Center role can generate rollup reports.

- The Tivoli Storage Productivity Center installation program adds the administrator, external application, and monitor roles to the Tivoli Storage Productivity Center installation user.

Assigning a role

Assign a Tivoli Storage Productivity Center role to one or more user groups. The role that is assigned to a group determines the product functions that are available to the users in that group.

To assign a role to a user group, complete the following steps:

1. Open the web-based GUI .
2. In the navigation tree, go to **Settings > User Management**.
3. Click **Add Group** to search for groups that are defined in the authentication repository. You can type the name of a group if you know its name, or specify a filter to search for existing groups in the authentication repository. For filters, use an asterisk (*) to represent unknown characters. You must enter at least one character in addition to an *. For example, type tpc* to search for groups that begin with the letters "tpc" or "TPC". Type *t to search for groups that begin with or contain the letter "t" or "T".
4. In the list of groups, select one or more groups to which you want to assign a role.
5. In the **Role** field, select the role to assign to the group.
6. Click **OK** to assign the role. The role that you select is applied to all the groups that you are adding. You can change the role assignments at any time after the group is added.

Related reference:

"Role-based authorization" on page 272

Roles determine the functions that are available to users of Tivoli Storage Productivity Center. When a user ID is authenticated to Tivoli Storage Productivity Center through the GUI, CLI, or APIs, membership in an operating system or LDAP group determines the authorization level of the user.

Modifying the authentication mechanism

To modify how Tivoli Storage Productivity Center authenticates users and user groups, configure the authentication repository.

You must be assigned the Administrator role to modify the authentication repository and manage role and group assignments.

The authentication mechanism determines how Tivoli Storage Productivity Center authenticates users and the user groups that are available to be assigned roles. During the installation process, the WebSphere Application Server is configured with a federated repository. By default, authentication is configured in the federated repository with a file repository and a local operating system repository. The file repository is tpcFileRegistryUser and the local operating system repository is localOS. The localOS repository includes the operating system groups that are defined on the server where Tivoli Storage Productivity Center is installed. For a server that is a member of a Windows domain, the localOS repository also includes the groups in that domain.

1. Open the Tivoli Storage Productivity Center web-based GUI.
2. In the navigation tree, go to **Settings > User Management**

3. On the User Management page, click **Modify authentication mechanism**. The WebSphere Integrated Solutions Console is displayed in a separate tab on the web browser.
4. In the navigation tree, go to **Security > Global security**.
5. Make your changes, and then click **Apply**.

Related concepts:

“Changing the user authentication configuration” on page 239

The Tivoli Storage Productivity Center installation program establishes a default authentication configuration by using the federated repositories feature of the IBM WebSphere Application Server. You can change this authentication configuration.

Adding resources

You must add resources for monitoring before you can collect data, generate reports, and manage storage that is related to those resources.

Tivoli Storage Productivity Center provides wizards in the web-based GUI and stand-alone GUI that guide you through the steps for discovering the resources in your environment, adding the resources as data sources, and scheduling data collection. The GUI that you use determines which resources can be added:

Web-based GUI

- Storage systems (other than IBM SONAS storage systems)
- Servers (without a Storage Resource agent)
- Hypervisors
- Fabrics
- Switches

Stand-alone GUI

- IBM SONAS storage systems
- Servers with Storage Resource agents
- Tivoli Storage Productivity Center servers as subordinate servers

Restriction: You cannot add resources that are already being monitored by Tivoli Storage Productivity Center. A resource is considered to be monitored if it is included in a data collection job such as a probe, performance monitor, or scan.

Adding resources in the stand-alone GUI

Add IBM SONAS systems for monitoring in the stand-alone GUI.

To add IBM SONAS systems for monitoring in the stand-alone GUI, complete the following steps:

1. In the navigation tree, expand **Disk Manager > Storage Subsystems** and click **Add Storage Subsystem**.
2. Specify connection properties for the IBM SONAS system that you want to add.
3. Click **Add** to verify the connection information. When verified, the storage system is displayed at the bottom of the page.
4. Optional: Repeat steps 2 and 3 to add more IBM SONAS systems at the same time.
5. Click **Next** after you define the connection properties for all the storage systems that you want to add.
6. On the summary page of the wizard, review the selections that you made.

After you add an IBM SONAS system for monitoring, you can complete the following tasks:

- In the stand-alone GUI, add the storage system to a monitoring group. Use monitoring groups to manage a collection of storage systems in the same manner. Tivoli Storage Productivity Center provides predefined monitoring groups that are associated with an existing set of alerts. When you add a storage system to a predefined group, the set of alerts is automatically applied to the storage system.
- In the web-based GUI, schedule probes and performance monitors to collect data about the storage system. Probes collect status, asset, and storage information about storage systems. Performance monitors collect metrics that measure the performance of storage systems.
- In the stand-alone GUI or web-based GUI, view detailed information about the storage system.

You can also add the following resources in the stand-alone GUI:

Servers

For information about adding servers for monitoring and deploying Storage Resource agents, see “Storage Resource agent Deployments” on page 290.


Tivoli Storage Productivity Center servers as subordinate servers

For more information about adding Tivoli Storage Productivity Center servers as subordinate servers, see *Adding a Tivoli Storage Productivity Center server as a subordinate server* in the *Tivoli Storage Productivity Center Information Center* and *User's Guide*.

Adding resources in the web-based GUI

Use the *Add resource* wizards to add resources for monitoring before you can collect data, generate reports, and manage storage that is related to those resources. The web-based GUI guides you through the steps for discovering the resources in your environment, adding the resources as data sources, and scheduling data collection.

1. In the navigation pane, select the type of resource that you want to add. For example, if you want to add a storage system, select **Storage Resources > Storage Systems**.
2. On the list page for the resource, click the **Add resource** button. For example, on the Storage Systems page, click **Add Storage System**.
3. Enter information about the resource. The type of resource determines the information that you must enter. For certain types resources, Tivoli Storage Productivity Center uses this information to discover the related resources in your environment. For example, when you enter information about a CIM agent, Tivoli Storage Productivity Center discovers the storage systems that it manages.

Help tips in the GUI: To view descriptions of the information that you must enter for a resource, hover the mouse pointer over the related help icons  in the wizard.

Discovery restriction: During the discovery process, you can click **Close** to exit the wizard. When you click **Close**, the discovery process continues in the background, but any discovered resources are not configured for data collection. Before you can manage and view information about the discovered resources, you must schedule data collection.

4. Schedule data collection for the resource. For all resources, you can schedule probes to collect asset and status information. For storage systems and switches, you can also schedule performance monitors to collect metrics that measure performance.
5. Complete the wizard. For more information about adding resources in the web-based GUI, see the *Managing resources in the web-based GUI* section in the *Tivoli Storage Productivity Center Information Center and User's Guide*.

After a resource is added, data collection jobs gather information about that resource. You can view detailed information about the resource in the web-based GUI and stand-alone GUI.

Configuration nodes

This section is organized to help you associate the information in the Tivoli Storage Productivity Center GUI with an explanation of each node.

To display the nodes, click **Administrative Services > Configuration**.

License Keys

You must set database permissions to monitor databases with the Data Manager.

You must have the following permissions that are set to monitor the databases with Data Manager:

Table 36. Database permissions

Database	Permissions
DB2	db2admin
Microsoft SQL Server	public
Oracle	DBA
Sybase	SA level

To monitor Oracle databases with Tivoli Storage Productivity Center, the Oracle user needs DBA authority. A non-DBA Oracle user with “create session”, “select any dictionary”, “analyze any”, and “analyze any dictionary” roles can still monitor the Oracle database through Tivoli Storage Productivity Center. However, Tivoli Storage Productivity Center is not able to obtain free space information for database objects. During the database registration, when a non-DBA Oracle user is used with the roles mentioned in the preceding list, the following warning message displays.

RDBMS login does not have dba privilege. Freespace will not be calculated for system objects.

Clicking **OK** continues with the registration process. This message is also displayed in the scan logs when scan jobs are run.

Through the License Keys node, you can administer the license keys for Data Manager for Databases.

- Assign Data Manager for Databases licenses to your Storage Resource agents.
- Edit, add, and delete the instances within your organization that you want to monitor.
- View the number of Data Manager for Databases licenses.

- View the number of Data Manager for Databases licenses that are not currently assigned (unused) to agents.

Before you can use Storage Resource agents to manage the storage for your instances, you must do the following steps.

1. Assign Data Manager and Data Manager for Databases licenses to the agents that are monitoring RDBMS instances.
2. Register the instances on the systems that contain licensed agents.

Assigning Data Manager database licenses to installed agents

This topic describes how to assign Data Manager database licenses to an agent.

To assign a Data Manager database license to an agent, complete the following steps:

1. Expand **Administrative Services > Configuration > License Keys**. The License Editor window is displayed.
2. Click the icon for the **IBM Tivoli Storage Productivity Center for Data - Databases** row. The Tivoli Storage Productivity Center for Data - Databases License Editor window is displayed. The field and button descriptions for the Licensing tab are:

Select All

Selects all the **Licensed** boxes.

Deselect All

Removes all the licenses for Data Manager - Databases.

Computer

Displays all the computers on which a Data Manager agent is installed.

OS Type

Displays the operating system of the computer where the agent is installed.

Domain

Displays the domain of a computer where the agent is installed.

Tree Name

For NetWare devices that are managed by Storage Resource agents from previous releases.

Licensed

Contains a check box that indicates whether a computer is licensed for use with Data Manager - Databases.

If you have unused Data Manager - Databases licenses, continue to the next step. To unassign licenses from agents, see “Unassigning Data Manager - Databases license” on page 282.

3. Click the check box in the **Licensed** column next to the computer with the instance you want to monitor.
4. Click **File > Save** to save the updated license settings. If an instance is registered on the machine where you licensed the agent, you are ready to set up your Data Manager - Databases jobs to monitor its storage. If an instance is not registered on the machine where you licensed the agent, see “Registering instances on machines that contain licensed agents.”

Registering instances on machines that contain licensed agents

This topic describes how to register instances on machines that contain licensed agents.

1. Click the **RDBMS Logins** tab on the IBM Tivoli Storage Productivity Center for Data - Databases License Editor window.
2. The RDBMS Logins window is displayed. Use this window to edit, add, and delete the instances within your organization that you want to monitor. The field and button descriptions for the RDBMS Logins tab are:

Edit Highlight a row and click this button to edit the login information for the corresponding instance. The RDBMS Login Editor window is displayed.

Add New

Click this button to add login information for a new instance. The RDBMS Login Editor window is displayed.

Delete Highlight a row for an instance and click this button to delete that instance from Data Manager - Databases. Once you delete an instance, all the previously gathered statistics for that instance are automatically deleted from the database repository and that instance is no longer available for selection in the reporting section of the navigation tree.

3. Click **Add New** to add a new instance. The RDBMS Login Editor window is displayed. Use this window to enter information about the instance that you want Data Manager - Databases to monitor.

Note: In an Oracle Parallel Server (OPS) environment, you only need to register one of the instances within that environment. OPS is a resource-sharing system that increases availability and performance by partitioning the workload across multiple servers of a cluster (nodes). Databases installed on clustered servers or clustered database servers (for example, Oracle Real Application Cluster (RAC) environment) are not supported for monitoring.

4. Select the name of the machine where the instance is running from the **Host Name** list box.

Note: You can only register instances on machines that contain licensed agents.

5. Enter the following information in the next field:

For Oracle

Enter the Oracle SID and host for the instance.

For Microsoft SQL/Server

Enter the name of the instance you want to register in the **Instance** field.

Note: When you use the Storage Resource agent to monitor the RDBMS, the JDBC field is not shown. The Storage Resource agent does not require this field.

For Sybase

Enter the server name in the **Server** field.

For IBM UDB

Enter the name of the instance you want to register in the **Instance** field.

6. Enter a user ID that has the appropriate database privileges within the instance in the **User** field. See “License Keys” on page 277.

For Oracle

The following privileges are required for this user ID:

- CREATE SESSION

- SELECT ANY DICTIONARY
- ANALYZE ANY

Note: For Oracle 9i or 10g, specify ANALYZE ANY DICTIONARY

For Microsoft SQL Server

The login ID that Data Manager uses to log in to Microsoft SQL Server instances that you want to probe must have "permit" access.

7. Enter a password for the user ID in the **Password** field.
8. Enter the port on which the instance is listening in the **Port** field.

For Oracle

The default port is 1521.

For Microsoft SQL/Server

The default port is 1433. You must also provide the fully qualified path to the JDBC driver in the **JDBC Driver** field.

Note: When you use the Storage Resource agent to monitor the RDBMS, the JDBC field is not shown. The Storage Resource agent does not require this field.

For Sybase

The default port is 5000.

For IBM UDB

When monitoring multiple UDB instances within your environment, you must ensure that the port numbers you choose are open (unique for each instance) for JDBC and Java connections to those instances. To open up a port, run the following DB2 command on the machine where the instance is located:

```
db2jstrt
```

The default port number is 6789. You can change this default by indicating the port number you want to use when running the **db2jstrt** command. For example:

```
db2jstrt 6790
```

If you enter an incorrect port number, an error occurs. To verify the port number for an instance, complete one of the following tasks:

UNIX or Linux

View the etc/services file to confirm the correct port number.

AIX

Run the following command:

```
ps -ef | grep db2jd
```

The output from this command indicates the port on which the instance is listening. Use this port number when running the **db2jstrt** command.

Windows

Use the information in the IBM DB2 configuration tools to confirm the port number.

9. Click **File > Save** to save the instance configuration information. You can now run a probe job against the registered instances. You must run a probe job against an instance before you can select any databases or table spaces against which you want to run a scan job.

Configuring Microsoft SQL Server 2008 or Microsoft SQL Server 2008 R2:

Before you can monitor a Microsoft SQL Server 2008 or Microsoft SQL Server 2008 R2 database, you must make some configuration changes to the Microsoft SQL Server.

Note: Before registering an instance of Microsoft SQL Server 2008 or Microsoft SQL Server 2008 R2 to be monitored by a Storage Resource agent, make sure that the directory containing the sqlcmd utility (sqlcmd.exe) is in the system PATH environment variable on the Microsoft SQL Server system. The default location of sqlcmd is C:\Program Files\Microsoft SQL Server\<version>\Tools\Binn.

Before monitoring the Microsoft SQL Server database, follow these steps:

1. Install the Microsoft SQL Server and provide the required information about the installation panels. See the Microsoft SQL Server 2008 or 2008 R2 Installation and Configuration Guide for detailed information. For the installation and configuration guides, see [http://msdn.microsoft.com/en-us/library/ms143219\(v=SQL.105\).aspx](http://msdn.microsoft.com/en-us/library/ms143219(v=SQL.105).aspx).
2. Make sure that the Microsoft SQL Server is using Mixed Mode authentication.
3. After the installation, go to the SQL Server Configuration Manager and make sure that you set the Dynamic TCP/IP port to the default port 1433. (See the Microsoft SQL Server 2008 or 2008 R2 Installation and Configuration Guide for detailed information.) To configure the Microsoft SQL Server, follow these steps:
 - a. Open the SQL Server Configuration Manager.
 - b. Go to SQL Server Network Configuration.
 - c. Select **Protocols for MSSQLINST** (name of the instance).
 - d. Right-click **TCP/IP**.
 - e. Select **Enable: Yes**.
 - f. Go to the **IP Addresses / IP All** and add **TCP Dynamic Ports : 1433** (default port).
4. Launch the Microsoft SQL Server setup.exe.
5. Go to **Installation/Search** for product updates. You are redirected to the Microsoft update Web site that scans the computer for the components that need to be updated.
6. When finished, select **Express Install** to install the components found.
7. Install the Storage Resource agent on the Microsoft SQL Server system.
8. Open the RDBMS Login Editor. Expand **Administrative Services > Configuration > License Keys**. In the content pane, click **RDBMS Logins** tab.
9. Click **Add New**. The RDBMS Login Editor opens. Enter the following information:

Database

Microsoft SQL/Server.

Instance name

Name of the instance (mssqlinst).

User User ID to logon to the Microsoft SQL Server.

Password

Password for the user ID.

Port 1433

10. Click **Save**.

Unassigning Data Manager - Databases license

This topic describes how to unassign a Data Manager - Databases license.

To unassign a license, complete the following steps:

1. Expand **Administrative Services > Configuration > License Keys**.
2. The License Editor window is displayed.
3. Click the icon for the **IBM Tivoli Storage Productivity Center for Data - Databases** row. The IBM Tivoli Storage Productivity Center for Data - Databases License Editor window is displayed. Use the **Licensed** column in this window to view the agents to which licenses are currently assigned.
4. Clear the **Licensed** check box next to a machine to remove the license for the agent on that machine.
5. Click **File > Save**. When you remove the license for an agent, the following actions occur:
 - All the data gathered by that agent for the instance it monitors is removed from the database repository.
 - You can no longer run monitoring, alerting, or policy management jobs against the instance on the machine where the agent was located.
 - The number of unused licenses increases by one.

Alert disposition

You can configure IBM Tivoli Storage Productivity Center so that SNMP traps and Tivoli Enterprise Console events can be sent to other consoles.

Configure Tivoli Storage Productivity Center to send SNMP traps and Tivoli Enterprise Console events

The following information shows how to configure Tivoli Storage Productivity Center to send SNMP traps, IBM Tivoli Enterprise Console events, or email notifications. These actions are taken when an event specified in an alert is detected. From this node, you can also specify the number of days after which records in the alert log are deleted.

To enable SNMP traps and Tivoli Enterprise Console event alert notifications, consider the following information:

SNMP traps

System administrators must set up their SNMP trap ringer with the provided MIB files to receive SNMP traps from Tivoli Storage Productivity Center.

TEC events

Send an alert to the Tivoli Enterprise Console. The Tivoli Enterprise Console administrator can write correlation and automation rules to analyze Tivoli Storage Productivity Center events. The event definitions are specified in the `tivoliSRM.baroc` and `fabric.baroc` files. It also performs responses such as sending further notification, creating or updating trouble tickets, running programs.

The `tivoliSRM.baroc` and `fabric.baroc` files must be loaded into the current active rule base of the Tivoli Enterprise Console server. This action allows Tivoli Enterprise Console events that are sent by Tivoli Storage Productivity Center to show on the console.

Table 37 provides information about the location of MIB and Baroc files.

Table 37. Location of MIB and Baroc files

Component	MIB file location	Baroc file location
Data Manager and Disk Manager	<ul style="list-style-type: none"> Installation media, disk1, part 1 Data server: data\snmp\tivoliSRM.mib 	<ul style="list-style-type: none"> Installation media, disk1, part 1 Data server: data\tec\tivoliSRM.baroc
Fabric Manager	<ul style="list-style-type: none"> Installation media, disk1, part 1 Device server: device\snmp\fabric.mib 	<ul style="list-style-type: none"> Installation media, disk1, part 1 Device server: device\tec\fabric.baroc
Tivoli Storage Productivity Center for Replication	<ul style="list-style-type: none"> Installation media, disk1, part 2 tpcr\TPCRM\CSM-Client\etc\ibm-TPC-Replication.mib 	<ul style="list-style-type: none"> Installation media, disk1, part 2 tpcr\TPCRM\CSM-Client\etc\ibm-TPC-Replication.baroc
<p>Tip: Some alerts are generated by Tivoli Storage Productivity Center about Tivoli Storage Productivity Center. Examples of these alerts are communication failures between Tivoli Storage Productivity Center and Tivoli Storage Productivity Center for Replication. Other alerts that are generated are Tivoli Storage Productivity Center for Replication configuration changes. These alerts can be forwarded by Tivoli Storage Productivity Center as SNMP traps or through e-mail. These alerts are generated directly by Tivoli Storage Productivity Center and not by SNMP traps from Tivoli Storage Productivity Center. If Tivoli Storage Productivity Center and Tivoli Storage Productivity Center for Replication are running on the same system, only one program can listen on the SNMP default port. All traps that are received on the default port are forwarded to the other server process by using a different port number.</p>		

Port 162

Tivoli Storage Productivity Center uses port 162 to listen for SNMP traps. This port is the default port. To receive SNMP traps from switches, you must configure the switch to send SNMP traps to the Device server's IP address and port.

Tip: Port 162 is also used by the Windows SNMP Trap service. If the Windows SNMP Trap service is running, stop the service or change the default port that Tivoli Storage Productivity Center uses to listen for SNMP traps. If you must change the Device server's default port number, use the **setdscfg** command. The attribute to set is *SNMPTrapPort*.

To configure Tivoli Storage Productivity Center to send traps and Tivoli Enterprise Console events, follow these steps:

1. Open the Tivoli Storage Productivity Center GUI.
2. Go to **Administrative Services > Configuration > Alert Disposition**.
3. On the topic pane, you can enter information for two SNMP destinations and one Tivoli Enterprise Console event destination. For the SNMP destination, enter the community name, host, and port information. For the Tivoli Enterprise Console event destination, enter the server and port information. You can also enter information for e-mail information. Click **File -> Save**.

Log file and Cached Batch Report Retention

You can set the retention period for log files.

You can specify the number of runs and the length of time to maintain the log files that are generated by Tivoli Storage Productivity Center. Set the value for **Maximum number of runs to keep of each schedule** to be less than or equal to the value in the **Maximum number of days' worth of log files to keep (regardless of schedule)** field. This setting helps avoid the situation where entries for schedule runs are displayed in the user interface, but the corresponding log files are deleted.

Note: By default, job log files for schedules are retained for 90 days, but you can change that value on the Log File and Cached Batch Report Retention panel. However, for CLI and Event Driven Jobs schedules, job log files are automatically retained for 90 days.

To set the retention period, complete the following steps:

1. Go to **Administrative Services > Configuration > Log file and Cached Batch Report Retention**.
2. In the **Maximum number of runs to keep of each schedule** field, enter the maximum number of runs for a schedule that you want to display in the user interface. The default is five runs per schedule. For example, if you enter 10 in this field and run a probe schedule 11 times, job log and job information entries for the first run are deleted from the database repository.
3. In the **Maximum number of days' worth of log files to keep (regardless of schedule)** field, enter the maximum number of days to keep a log file for a run. A log file is generated for each job in a run and is stored in the appropriate log directory. Every log file that is older than the number of days you specify here is deleted. The default is 90 days.
4. In the **Cached Batch Report Retention** field, enter the maximum number of days to keep a batch report. The default is 90 days.

Tip: When the batch report is created on the Tivoli Storage Productivity Center server and copied to the Storage Resource agent, the copying of the report to the agent might fail. If a failure occurs, no attempt is made to send the report again. Instead, the report remains cached on the Tivoli Storage Productivity Center server. You can configure the time that the report remains cached on the Tivoli Storage Productivity Center server.

Quota and Constraint email Address Rules

You can specify rules for generating email addresses of users who break the quota and constraint email address rules that are based on their user ID, given name, or family name as they are registered in the operating system.

The user names are obtained as follows:

- On Windows operating systems: Full name field, from LDAP.
- On UNIX or Linux operating systems: User description from the Password file.

To set the rules, complete the following steps:

1. Expand **Administrative Services > Configuration > Quota and Constraint e-mail Address Rules**.
2. Click **Add After** or **Add Before** to include elements in an email address template. An email address template describes how to build the user ID. The user ID is notified in the event of a quota violation. This user ID represents the actual user who breaks the quota rules.
3. Select **USERNAME**, **FIRSTNAME**, **LASTNAME**, **Text**, or **Substring** from the menu to include as an element in the email address rule:

- **USERNAME:** the login ID of the user who breaks the quota or constraint rules.
- **FIRSTNAME:** the given name of the user who breaks the quota or constraint rules.
- **LASTNAME:** the family name of the user who breaks the quota or constraint rules.
- **Text:** free form text that you want to appear in the email address.
- **Substring:** an element in the email address that is a substring of **USERNAME**, **LASTNAME**, or **FIRSTNAME**. For example, `LASTNAME + SUBSTRING(USERNAME, 0, 3)`

You must include the first three characters of the **USERNAME**. For example, if the family name is Smith and **USERNAME** (as defined by file owner information) is 9A0723, then this substring example is equal to SMITH9A0.

To define a substring, complete the following steps:

- a. Select **Substring** after you click **Add After** or **Add Before**.
- b. Select the substring variable: **USERNAME**, **LASTNAME**, or **FIRSTNAME**.
- c. Highlight the range for the substring.
- d. Click **OK**. That substring appears in the email address template.
- e. Click **File > Save** to save the email address rule.

Scan/Probe Agent Administration

You can assign Storage Resource agents to run scan and probe jobs.

Assign the Storage Resource agents to perform scans against the following objects:

- File systems within NAS filers
- IBM Tivoli Storage SAN File Systems

The window associated with this node provides a complete listing of the NAS filers and SAN File System discovered by Data Manager.

Manual NAS Server Entry

Use the Manual NAS Server Entry node to enter, and view information about Network Attached Storage (NAS) servers.

In the manual NAS Server Entry node, you can complete the following tasks:

- Enter information about Network Attached Storage (NAS) servers that you want to monitor in your environment. After you enter information about the NAS servers, you can assign agents to the servers in the Scan/Probe Agent window.
- View a list of NAS filers. The NAS filers that were registered using the Data Manager are shown in the list.
- Delete NAS filers. The NAS filers that were registered using the Data Manager are deleted.

You can set up individual NAS servers for monitoring by Data Manager using this window, or you can use a discovery method to automatically add multiple servers simultaneously.

When you want to add multiple NAS Filers for monitoring, use the discovery method. When you want to add individual NAS Filers for monitoring, use the Manual NAS Server Entry window.

For more information about configuring NAS, see <http://www.redbooks.ibm.com/>. Search for **sg247490**.

Manually adding a NAS filer or gateway

You can manually add a NAS filer or gateway.

To manually add a NAS filer or gateway, complete the following steps:

1. Expand **Administrative Services > Configuration > Manual NAS Server Entry**.
2. Click **Add NAS Server**. The Add NAS Server window is displayed.
3. Enter the following information:

Network name

Enter the network name of the NAS server you want to add.

When manually adding a NAS Gateway or Filer that is monitored by a Storage Resource agent on a UNIX system, you must add the NAS by using the same name that was used when file systems were mounted on that UNIX system. You can mount file systems by using the short name, fully qualified name, or IP address of a NAS.

For example, if the file systems from a NAS Gateway were mounted to a UNIX computer (where the Storage Resource agent is installed) by using the short name of the NAS Gateway, you must add the NAS Gateway in Tivoli Storage Productivity Center by using the short name of the NAS Gateway. If the file systems from a NAS Gateway are mounted by using an IP address, you must add the NAS Gateway in Tivoli Storage Productivity Center by using the IP address as its name.

Consider the following example:

- a. The NAS filer named "oxide" was mounted on the UNIX system where a Storage Resource agent is located. The following commands used the short name and IP address to identify the NAS filer during a file system mount:
 - `oxide:/vol/john1 81920 22108 74% 123 5% /n3700_john1`
 - `192.168.1.65:/vol/vol0 47566060 28715228 40% 1016085 52% /n3700_vol0`
- b. To add this NAS filer to Tivoli Storage Productivity Center, enter the following values in the **Network Name** field:
 - oxide
 - 192.168.1.65

If file systems from a NAS Gateway or Filer is mounted on a UNIX system in different ways, you must add that NAS to Tivoli Storage Productivity Center with the names used in both methods. For example, if one file system is mounted by using the fully qualified name of a NAS Gateway and the other file system is mounted by using the IP address, you must add that NAS Gateway to Tivoli Storage Productivity Center twice: once with the fully qualified name and once with the IP address. Only one row is displayed for this NAS on Manual NAS Server Entry panel, but both file systems are listed on the Scan/Probe Agent Administration panel.

Data Manager Agent OS Type

Select the operating system of the computer that contains the agent that gathers information about the NAS filer.

Accessible from

Select the agent that you want to use to "discover" the NAS filer. This list box displays agents that are:

- Running under the operating system that is selected in the **Data Manager Agent OS Type** field.
- Found on Windows or UNIX operating systems that are accessible to the NAS filers (Data Manager's agents are not found on the NAS filers themselves):
 - Windows: agents are found on Windows operating systems within the same domain as the NAS filers.
 - UNIX: agents are found on UNIX or Linux operating systems that have NFS imports for the file systems within the NAS filers.

SNMP Community

Enter the name of the SNMP communities that Data Manager uses when it communicates with systems in your environment. If you do not enter the name of an SNMP community, the default community **public** is used. Data Manager uses the SNMP protocol to contact and identify NAS filers. This field is optional.

Login ID

(Windows operating systems only.) Enter the Administrator user ID for the Storage Resource Agent service it runs on when you log in to the NAS filer.

Password

(Windows operating systems only.) Enter the password that Data Manager uses when you log in to the NAS filer.

Add as Other NAS

Select this check box to add a NAS server as **Other NAS** filer. With this option, you can monitor and report on file system information about the NAS filer or gateway through Windows CIFS or UNIX NFS shares accessible to the scan or probe job for the agent. No controllers, disks, and logical volumes information are collected or reported.

NAS Server Vendor Name

Enter the vendor name (or manufacturer) hosting the file system of the NAS server. The default vendor is Network Appliance.

4. Click **OK** to have the Data Manager verify the filer for which you entered information. During this verification, Data Manager completes the following tasks:
 - Log in to the NAS filer.
 - Gather information about the file systems visible on those filers to the agent. For the UNIX or Linux operating system, it gathers information about the file systems that it can actually see (for example, file systems that are mounted to the UNIX operating systems). By default, file systems are discovered at the root. For the Windows operating system, it finds all the NAS filers that are visible through CIFS.
 - Determine which file systems are visible to which agents.
 - Enter the NAS server information into the repository.

5. Expand **Administrative Services > Configuration > Scan/Probe Agent Administration**. This window helps you to assign agents to each file system of the NAS server.

Note: At any time, you can change the login ID and password for a NAS filer on the **Administrative Services > Configuration > License Keys > Filer Logins** window.

Deleting a manually added NAS filer

You can manually delete a NAS filer that you added.

To delete a NAS filer whose information was manually entered into Data Manager, complete the following steps:

1. Expand **Administrative Services > Configuration > Manual NAS Server Entry**.
2. Highlight a row that represents the device you want to delete.
3. Click **Delete**.

Tip: When you delete a device from this window, all information about that device is removed from the repository.

Editing Data Manager configuration files

Tivoli Storage Productivity Center provides you with the ability to edit Data Manager configuration files to further customize the settings for a component according to the standards at your site.

Data Manager has configuration files for customizing the operation of the server and agent components within your environment. These files are located in the *TPC_installation_directory/config/* directory, where *TPC_installation_directory* represents the directory where you installed the product.

The configuration file for the Tivoli Storage Productivity Center server is located in the following default installation directory:

Windows operating system

C:\Program files\IBM\TPC\Data\config\

UNIX or Linux operating system

/opt/IBM/TPC/Data/config

The agent configuration file for the Storage Resource agent is located in the following default installation directory:

Windows operating system

C:\Program Files\IBM\TPC\agent\config

UNIX or Linux operating system

/opt/IBM/TPC/agent/config/

When you change the configuration files for the server component on the UNIX or Linux operating system, you must stop and start the server before those changes take effect.

Edit the *agent.config* file to configure the Data Manager agents in your environment. This file is located in the agent installation directory on every computer where an agent is installed. For information about the *agent.config* file, go to the information center. Search for *agent.config* file.

Edit the `nas.config` file to configure the Data Manager NAS feature for your environment.

The `nas.config` file contains the following information:

- On each line not beginning with #, the first blank-delimited field must contain the SNMP Enterprise code of a NAS filer that the agent discovers, probes, or scans.
- The second field contains identifying information about the filer.

Any remote host that cannot be reached by SNMP or whose enterprise code does not match one of these values is ignored.

For information about the server files to configure, go to the information center. Search for *server.config file*, *scheduler.config file*, and *TPCD.config file*.

For information about the `agent.config` file, go to the information center. Search for *agent.config file*.

Editing the NAS configuration file

This topic provides information about editing the `nas.config` file for the Data Manager NAS feature.

Edit the `nas.config` file to configure the Data Manager NAS feature for your environment.

The `nas.config` file contains the following information:

- On each line not beginning with #, the first blank-delimited field must contain the SNMP Enterprise code of a NAS filer that the agent discovers, probes, or scans.
- The second field contains identifying information about the filer.

Any remote host that cannot be reached by SNMP or whose enterprise code does not match one of these values are ignored.

History Aggregator

You can configure reports for data aggregation.

The History Aggregator in IBM Tivoli Storage Productivity Center defines and runs jobs to sum data in the database repository for historical reporting purposes. For example, you can view the sum of usage across multiple storage resources, by file system. With trending, you can see patterns of your historical data across your entire network.

You have the option of turning aggregation off, although this action is not advised. To turn off aggregation, access the History Aggregator window, clear the **Enabled** check box, and select **File > Save**.

To configure reports for data aggregation, complete the following steps.

1. Expand **Administrative Services > Configuration > History Aggregator**.
2. The Edit History Aggregator panel is displayed in the topic pane. You can specify the following information.
 - How often to run the job
 - How to handle time zones

- Triggering conditions
- Triggered actions

Storage Resource agent Deployments

You can manage your Storage Resource agent deployments.

Deploying Storage Resource agents

Deploy Storage Resource agents through the user interface rather than a separate installation wizard. You can have only one agent per host that points to the same server.

Before you begin: Before you deploy Storage Resource agents, see “Deployment guidelines and limitations for Storage Resource agents” for a list of considerations.

You can enter host names from a Microsoft directory, enter host names manually, or import a host list file. You can define a schedule to add the Storage Resource agents at a time that is convenient for you. You can also specify the type of alerts to generate if a schedule fails. After you enter information for the Storage Resource agent, you can optionally validate the connection to the Data server. This step helps to eliminate most of the possible failure cases after you submit the deployment schedule.

You can define a deployment schedule to include multiple computers on which to install Storage Resource agents. The computers that you include in a deployment must share the administrative user ID and password. Tivoli Storage Productivity Center uses these user credentials to log in to the computers when you install Storage Resource agents. If the computers in a deployment do not share the administrative user credentials, you must create separate deployment schedule for them.

To deploy Storage Resource agents, complete the following steps:

1. If you deploy Storage Resource agents on UNIX or Linux operating systems, you must use root as the user ID.
2. Open the Tivoli Storage Productivity Center user interface.
3. In the navigation tree, expand **Administrative Services > Configuration > Storage Resource agent Deployments**.
4. Click **Storage Resource agent Deployments** and click **Create Storage Resource agent Deployments**.
5. On the Create Storage Resource agent Deployment window, enter information for the **Computers** tab.
6. Enter information for the **When to run** tab.
7. Enter information for the **Alert** tab.
8. Click **File > Save**.

Deployment guidelines and limitations for Storage Resource agents

There are a number of guidelines and limitations that you must consider when managing the Storage Resource agents in your environment.

Capacity guidelines for Storage Resource agents: For the capacity guidelines for Storage Resource agents by Tivoli Storage Productivity Center version, see <http://www.ibm.com/support/docview.wss?uid=swg21424912>.

Use the following information when you deploy Storage Resource agents:

Multiple Storage Resource agents that are probing or scanning the same storage resources


If multiple Storage Resource agents are set up to probe or scan the same storage resources, the Storage Resource agent that was added to Tivoli Storage Productivity Center first is used for the probe or scan. Therefore, only data that is gathered by the first Storage Resource agent is shown.

Platforms that support the deployment of Storage Resource agents

For a list of platforms on which you can deploy Storage Resource agents, go to the Tivoli Storage Productivity Center support site at <http://www.ibm.com/support/ctgibook.nsf/docid/57141>, click the **Documentation** link, and enter Platform Support: Agents, Servers and Browsers in the **Search** box. Click the link to the document for the appropriate release.

Product functions that are unavailable for resources that are monitored by Storage Resource agents

Before you deploy a Storage Resource agent, make sure that the product functions you want to use on the monitored devices are available for those agents. The following functions are not available for resources that are monitored by Storage Resource agents:

- Certain relational database monitoring. For list of relational databases that can be monitored by Storage Resource agents, go to the  Tivoli Storage Productivity Center Interoperability Matrix and click the link for *Agents, Servers and Browsers*.
- The reporting of HBA, fabric topology, or zoning information for fabrics that are connected to hosts that are running Linux on IBM System z hardware. These limitations also apply to Storage Resource agents on all guest operating systems for VMware configurations.

Required authorities for deploying and running Storage Resource agents

Before you can create deployment schedules and deploy Storage Resource agents on target computers, you must meet the following requirements:

- To create deployment schedules, you must be logged in to Tivoli Storage Productivity Center with a user ID that has the **Administrator** role. For information about user roles, see “Authorizing users” on page 271.
- To deploy Storage Resource agents on target computers, you must provide a user ID that has administrative rights on those computers. You enter this ID when you create a deployment schedule. Tivoli Storage Productivity Center uses this ID to log on to the target computers and install and configure the necessary runtime files for the agents.

The user under which a Storage Resource agent (daemon or non-daemon) runs must have the following authorities on the target computers:

- On the Linux or AIX operating systems, the user must have root authority. By default, an agent runs under the user 'root'.
- On the Windows operating systems, the user must have Administrator authority and be a member of the Administrators group. By default, a Storage Resource agent runs under the 'Local System' account.

Orphan zones

Storage Resource agents do not collect information about orphan zones. An orphan zone is a zone that does not belong to at least one zoneset.

Firewalls and Storage Resource agent deployments

Before you can deploy a Storage Resource agent on a computer, you must turn off the firewall on that computer. If you do not turn off the firewall, the deployment fails.

To turn off the firewall on a Windows 2008 computer, complete the following steps:

1. Open Administrative Tools.
2. Click **Windows Firewall with Advanced Security**.
3. Click **Windows Firewall Properties**.
4. Change the **Firewall state** field to **Off** on the following tabs:
 - **Domain Profile**
 - **Private Profile**
 - **Public Profile**
5. Click **OK** to accept the changes and exit.
6. Deploy a Storage Resource agent to the Windows 2008 computer.

Multiple computers in a deployment

You can define a deployment schedule to include multiple computers on which to install Storage Resource agents. The computers that you include in a deployment schedule must share administrative user ID and password. Tivoli Storage Productivity Center uses these user credentials to log on to the computers when you installing Storage Resource agents. If the computers in a deployment schedule do not share administrative user credentials, you must create separate deployment jobs for them.

Tip: When you deploy a Storage Resource agent to multiple computers, a globally unique identifier (GUID) is created for each computer (if one does not exist).

Communication between the Tivoli Storage Productivity Center server and a Storage Resource agent

The Tivoli Storage Productivity Center server connects to a monitored computer when a Storage Resource agent is deployed and whenever a data collection schedule runs against that agent.

During deployment, the server communicates with the target computer by using one of the following protocols:

- Windows server message block protocol (SMB)
- Secure Shell protocol (SSH)
- Remote execution protocol (REXEC)
- Remote shell protocol (RSH)

After deployment, the type of communication between the server and agent on that computer depends on whether you deployed the agent as daemon service or non-daemon service. See the *IBM Tivoli Storage Productivity Center and IBM Tivoli Storage Productivity Center for Replication Installation and Configuration Guide* for more information about these protocols.

Daemon and non-daemon services

You can deploy a Storage Resource agent as a daemon or non-daemon service:

- A Storage Resource agent that is deployed as a daemon service runs in the background on the monitored computer and listens for requests from

the Tivoli Storage Productivity Center server. Connectivity between the server and agent is established by using SSL. The server and agent have their respective certificates and no additional information is required besides those certificates and the security that is provided by the SSL protocol.

- A Storage Resource agent deployed as a service on demand (non-daemon service) runs as a stand-alone executable file on the monitored computer. Communication from the server to the agent uses the same protocol that was used during the deployment of the agent. Communication from the agent to the server uses SSL.

Authentication between the Tivoli Storage Productivity Center server and a Storage Resource agent

Tivoli Storage Productivity Center requires the correct authentication information (user name, password, port, certificate location, or passphrase) for monitored computers each time it communicates with Storage Resource agents on those computers. If the authentication information changes for a host computer on which a Storage Resource agent is deployed, the authentication information for that agent must be updated by using the **Modify Agents > Update Credentials** action on the Servers page in the web-based GUI.

Storage Resource agents on the same computer

You cannot deploy a Storage Resource agent on a computer where a Storage Resource agent is already installed *and* pointing to the same Data server. You can deploy a Storage Resource agent on the same computer as another Storage Resource agent if those agents communicate with different Data servers and use different ports when you listen for requests.

Time zones for computers that are monitored by Storage Resource agents

The time zones of computers that are monitored by Storage Resource agents are shown as Greenwich Mean Time (GMT) offsets in Tivoli Storage Productivity Center reports. For example, a computer in Los Angeles shows the following time zones in the By Computer report in Asset reporting:

(GMT-8:00) GMT-8:00

Linux and AIX operating systems by using Remote Shell protocol (RSH)

If RSH is configured to use a user ID and password, the connection fails. To successfully connect to a system by using RSH, you must set up the `.rhosts` file (in the home directory of the account). RSH must be configured to accept a login from the system that is running your application.

Deployments on Windows operating systems - NetBIOS setting

If you want to install a Storage Resource agent on Windows targets, the **Enable NetBIOS over TCP/IP** option must be selected in the Control Panel settings for the computer's network connections properties. To set this option, complete the following steps:

1. Open Windows Control Panel.
2. Select **Network and Dial-Up Connections > some_connection > Properties > Internet Protocol (TCP/IP) > Advanced > WINS > Enable NetBIOS over TCP/IP**.

See the documentation for your firewall to determine if these ports are not blocked for inbound requests.

To determine if security policies are blocking the connection ports, open Administrative Tools.

Depending on whether your policies are stored locally or in Active Directory, follow these directions:

Locally stored policies

For locally stored policies, complete the following steps:

1. Open Windows Administrative Services.
2. Click **Local Security Policy > IP Security Policies on Local Computer**.

Policies stored in Active Directory

For policies stored in Active Directory, examine the IP security policies and edit or remove filters that block the ports:

- Click **Administrative Tools > Default Domain Security Settings > IP Security Policies on Active Directory**.
- Click **Administrative Tools > Default Domain Controller Security Settings > IP Security Policies on Active Directory**.

For all Windows systems, the Server service must be running to connect to a Windows system by using the Windows protocol.

The following table lists the ports reserved for NetBIOS. Ensure that these ports are not blocked.

Port	Description
135	NetBIOS Remote procedure call. (Not currently used.)
137	NetBIOS name service.
138	NetBIOS datagram. (Not currently used.)
139	NetBIOS session (for file and print sharing).
445	CIFS (on Windows XP).

For Windows Server 2008, shares must be shared for the Guest or Everyone accounts, and password protected sharing must be disabled. To disable password protected sharing, follow these steps:

1. Click **Control Panel > Networking and Sharing Center**.
2. Click the down arrow next to **Password protected sharing**.
3. Click **Turn off password protected sharing**.
4. Click **Apply**.
5. Exit from the Control Panel.

Deployments on Windows 2008 - User Account Control (UAC) remote restrictions

If you are planning to install Storage Resource agents remotely on a Windows 2008 operating system, you must disable the User Account Control (UAC) remote restrictions on the Windows operating system. User Account Control is a security component on Windows operating systems.

Tip: This task contains steps that tell you how to modify the registry. Serious problems might occur if you modify the registry incorrectly. Therefore, make sure that you follow these steps carefully. For added protection, back up the registry before you modify it. Then you can restore the registry if problems occur. For information about how to back up and restore the registry, see .

To disable UAC remote restrictions, follow these steps:

1. Open the Windows Run window.

2. Enter **regedit** and click **OK**.
3. Locate and click the following registry subkey:
`HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\
Policies\System`
4. If the LocalAccountTokenFilterPolicy registry entry does not exist, follow these steps:
 - a. On the **Edit** menu, click **New > DWORD Value**.
 - b. Enter LocalAccountTokenFilterPolicy as the name for the DWORD value in the content pane.
 - c. Click **Enter**.
 - d. Click **LocalAccountTokenFilterPolicy**, and click **Modify**.
 - e. In the Edit DWORD Value window, enter **1**, then click **OK**.
This value can be 0 or 1:

0	This value builds a filtered token. This value is the default value. The administrator credentials are removed.
1	This value builds an elevated token.
 - f. Exit the registry editor.

Additional information about Storage Resource agents

See “Planning for Storage Resource agents” on page 28 for more information about Storage Resource agents.

Creating a certificate for SSH protocol

Before you install the Storage Resource agents by using the SSH protocol, you can optionally create a certificate.

Note: The Storage Resource agent only supports either DES-EDE3-CBC encryption or no encryption for the private key used in SSH protocol communication between the server and agent. The default encryption that is used in the **ssh-keygen** command on UNIX is always DES-EDE3-CBC. However, with Windows Cygwin, the **ssh-keygen** command generates a key with AES-128-CBC encryption if a passphrase is specified. If there is no passphrase, the private key is generated without encryption. For more information about encryption, see <http://www.openssl.org/docs/apps/enc.html>.

Creating a certificate for SSH protocol (non-Windows)

The Storage Resource agent only supports either DES-EDE3-CBC encryption or no encryption for the private key used in SSH protocol communication between the server and agent. The default encryption used in **ssh-keygen** command on UNIX is always DES-EDE3-CBC but with Windows Cygwin, it is using AES-128-CBC encryption if a passphrase is specified. If there is no passphrase, the private key is generated without encryption.

To create a certificate for SSH protocol, complete the following steps:

1. Telnet to the remote machine using the root user ID.
2. To create an SSH certificate on AIX, you must first install the following packages (if not already installed):
`openssl.base.openssh.base.client`
`openssh.base.server`
3. Go to the directory where you want to create the certificate:
`cd to ~/.ssh`

4. Enter **ssh-keygen**. Accept the default names (for example, **id_rsa**).
5. Enter the passphrase.
6. Two files are created:
 - id_rsa** The private key.
 - id_rsa.pub** The public key.
7. Create an **authorized_key** file in the same location as **id_rsa.pub** by entering the following command:


```
cat id_rsa.pub >> authorized_keys
```
8. Copy the **id_rsa** (private key) to your server machine. For example, to copy the **id_rsa** file to **:\keys\id_rsa** on the IBM Tivoli Storage Productivity Center server (user responses are in boldface type):

```
# ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (//.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been save in //.ssh/id_rsa.
Your public key has been save in //.ssh/id_rsa.pub.
The key fingerprint is:
xx:xx:xx:xx:xx:xx:xx:xx:xx:xx:xx:xx:xx:xx:xx:xx root@server
# cat id_rsa >> authorized_keys
# ls -l
total 24
-rw-r--r-- 1 root system 1743 Oct 15 09:40 authorized_keys
-rw---- 1 root system 1743 Oct 15 09:39 id_rsa
-rw-r--r-- 1 root system 399 Oct 15 09:39 id_rsa.pub
#
```

Note: You must copy the file in binary mode.

9. To connect to the remote system using the private key, the following information needs to be entered on the Remote Agent Machines panel when you install the Storage Resource agent:
 - User
 - Certificate Location (c:\keys\id_rsa)
 - Passphrase

Setting up an SSH daemon on Windows

On Windows Server 2003, Windows XP, Windows Server 2008, or Windows Vista, you must run the **ssh-host-config** command.

Note: Cygwin is not a prerequisite for the Storage Resource agent on Windows. To use the SSH protocol on Windows, an SSH software program must be used because Windows does not come with an SSH service. Cygwin is a free software program providing SSH access to a Windows server. Cygwin can be used if you want to run the Storage Resource agent by using the SSH protocol.

You must be in a Cygwin window or be an X term user to create the **sshd** service. In most cases, you click the **cygwin.bat** file to start the Bash shell.

Complete the following steps:

1. Install Cygwin.
2. Set up your **sshd** service in Cygwin.

3. Create the certificate (this step is optional).

Installing Cygwin

To install Cygwin, go to <http://cygwin.com>. This page contains a link that displays help for the setup program and a link to download the setup program. Read the help before running the setup program. Then download the Cygwin program by clicking the **Install Cygwin now** link. Start the setup program on your computer by running the **setup.exe** program. Select the appropriate download option (**Install from Internet**, **Download from Internet**, or **Install from Local Directory**) as described in the help files.

If you are upgrading from an older version of Cygwin to a newer version, you need to remove the **sshd** service before installing the new version of Cygwin.

Accept the default installation options as they are presented to you (Root Directory, Install For, Default Text File Type, and so on). Select a download mirror that is geographically close to your location. Some sites require an FTP account before you can install Cygwin. You can either request an account or simply select another mirror.

During the installation process, a Select Packages list is displayed. Expand the plus sign (+) next to the Admin category and select **cygrunsrv** and the **Bin** check box. Expand the plus sign (+) next to the Net category and select **openssh**. Expand the plus sign (+) next to the Util category and select **diffutils**. Click **Next** to resume the setup program. The time required to download the packages depends on how busy the mirror is, and on the speed of your internet connection. With **openssh** and **cygrunsrv**, the downloaded files require approximately 70 MB of disk space. Allow 20 minutes to 30 minutes for the download and installation to complete.

Setting up your sshd service in Cygwin

Here is an example of the sequence of steps and responses. The responses to the prompts are in boldfaced type.

1. Run the **ssh-host-config** command.

Note: With Cygwin, you might experience permission problems when running the **ssh-host-config** command. If you have permission problems, run these commands:

```
chmod +r /etc/passwd
chmod +r /etc/group
chmod 777 /var
```

```

$ ssh-host-config
Generating /etc/ssh_host_key
Generating /etc/ssh_host_rsa_key
Generating /etc/ssh_host_dsa_key
Generating /etc/ssh_config file
Should privilege separation be used? (yes/no) no

Generating /etc/ssh_config file

Warning: The following functions require administrator privileges!

Do you want to install sshd as service? yes (If sshd is already
installed as a service, answer no.)

You appear to be running Windows 2003 Server or later. On 2003 and
later systems, it's not possible to use the LocalSystem account, if
sshd should allow passwordless logon (e. g. public key
authentication).

If you want to enable that functionality, it's required to create a
new account 'sshd_server' with special privileges, which is then used
to run the sshd service under.

Should this script create a new local account 'sshd_server' which
has the required privileges? (yes/no) yes

Please enter a password for new user 'sshd_server'. Please be sure
that this password matches the password rules given on your system.

Entering no password will exit the configuration.
PASSWORD=password (Specify a password for the sshd_server
account.)

User 'sshd_server' has been created with password 'password'.

If you change the password, please keep in mind to change the
password for the sshd service, too.

Also keep in mind that the user sshd_server needs read permissions
on all users' .ssh/authorized_keys file to allow public key
authentication for these users. (Re-)running ssh-user-config
for each user will set the required permissions correctly.

Which value should the environment variable CYGWIN have when sshd
starts? It's recommended to set at least "ntsec" to be able to
change user context without password.

Default is "ntsec".

CYGWIN=ntsec

The service has been installed under sshd_server account.

To start the service, call 'net start sshd' or 'cygrunsrv -S sshd'.

Note! If the service doesn't start because of a login failure

Host configuration finished. Have fun!

```

2. Start the **sshd** service:
 - a. Open a command prompt window.
 - b. Enter **net start sshd** or in a Bash prompt, enter **cygrunsrv -start sshd**.
 - c. Verify that the daemon is running.
 - d. Enter **ps -a**. Examine the output to see if `/usr/sbin/sshd` is contained in the list of running processes.

To stop the service from a Windows command prompt, enter **net stop sshd**. Alternatively, you can change to the C:\cygwin\bin directory (or open a Bash shell) and enter **cygrunsrv -stop sshd**.

3. When you have started the **sshd** service, test it by entering the following command from a Bash shell prompt:

```
ssh localhost -l user_ID
or
ssh host_name -l user_ID
```

If **localhost** does not work, use the short host name. If you receive a message indicating that the authenticity of localhost cannot be established, answer **Yes** to the question "Are you sure you want to continue connecting?" When prompted for your account password on **localhost**, enter the password you use when logging in to the computer.

4. Create the accounts that can log in to the computer:
 - a. Create the Windows accounts. Click **Start > Settings > Control Panel > User Accounts**. Make each user a member of the Administrators group. Perform this operation for each user you want to add before you create the corresponding Cygwin accounts.
 - b. Make a backup copy of the /etc/passwd file.
 - c. To create the Cygwin user accounts, run the following command:

```
mkpasswd -l>/etc/passwd
```
 - d. Verify that a home directory has been created for each account that you have added. Change the ownership of the home directory to its owner (run the **chown** command). If a home directory for the user does not exist, create one. For example, enter the following command:

```
mkdir home/account_name;chown account_name/home/account_name
```
 - e. When you add users, you need to stop and start **sshd** before that account is recognized because **sshd** only reads the file /etc/passwd when the service starts.
 - f. If you need to create groups of accounts, create the Windows groups first, then create the Cygwin groups. After creating the Windows groups, run the following command:

```
mkgroup -l>/etc/passwd
```

When you add groups, you also need to stop and start **sshd** before the new group is recognized.

5. Set the TEMP environment variable. For information about setting the environment variable, see <http://www.cygwin.com/cygwin-ug-net/setup-env.html>.

Here is an example of setting the environment variable:

- a. Click **My Computer > Properties > Advanced > Environment Variables**.
- b. Under **System variables**, find out the value of TEMP. For example, "C:\WINNT\TEMP"
- c. Set the TEMP environment variable to point to the Cygwin format of TEMP in the ~/.bashrc file. For example run the following command:

```
export TEMP=/cygdrive/c/WINNT/temp
```

Uncomment and modify this line in the ~/.bashrc file from the default:

```
# export TEMP=/tmp
to
export TEMP=/cygdrive/c/WINNT/temp
```

The Cygwin **sshd** service must be added as a service that starts automatically. To verify this step, click **Start > Settings > Control Panel > Administrative Tools > Services**. Look for **CYGWIN sshd** in the name list. Verify that it is started and configured to start automatically.

Creating the certificate

To create a certificate for SSH protocol, complete the following steps:

1. Run this command:

```
cd to ~/.ssh
```

2. Generate the public and private keys with a passphrase. From the Bash shell prompt, here is an example of the input and output (user responses are in boldface type):

```
Administrator:
~/.ssh
$ openssl genrsa -des3 -out key 1024

Response:

Generating RSA private key, 1024 bit long modulus
...
...
e is 65537 (0x10001)
Enter pass phrase for key: (enter pass phrase for key)
Verifying - Enter pass phrase for key: (enter pass phrase for key again)

Administrator:
~/.ssh
$ chmod 600 ~/.ssh/key

~/.ssh
$ ssh-keygen -y -f ~/.ssh/key > key.pub

Response:

Enter passphrase: (enter passphrase)

Administrator:
~/.ssh
$ cat key.pub >> authorized_keys
```

3. Once the key.pub file has been added to the authorized_keys directory, copy the private key **key** to the IBM Tivoli Storage Productivity Center server.

Replacing a custom certificate for SSL protocol

IBM Tivoli Storage Productivity Center provides default SSL certificates for communication between the Data server and Storage Resource agent. You can replace your custom certificates with the default certificates.

Overview of replacing a custom certificate for SSL protocol

Tivoli Storage Productivity Center uses SSL certificates for communication between the Data server and Storage Resource agent (daemon service). Tivoli Storage

Productivity Center provides default SSL certificates for this communication. If you want to use your own certificates, you can replace the default certificates with your custom certificates.

Server certificate

The Tivoli Storage Productivity Center Data server uses the `TPCDataServer.jks` and `server.pwd` files for communication with the Storage Resource agents. If you are using custom certificates, you must replace these files.

There are two ways you can replace these certificates:

- Before installation of the Data server
- After installation of the Data server

Storage Resource agent certificate

The Storage Resource agent uses the certificate files `sra.pem` and `sra.pwd` for communication with the Data server. These two files are compressed into the `certs.zip` file on the server system for deployment purposes. If you are using custom certificates, you must replace these files.

There are two ways you can replace the certificates:

- Before deployment of the agent
- After deployment of the agent

The general steps for replacing custom certificates are:

1. Generate the custom certificates.
2. Stop the Data server (and the Storage Resource agent, if the agent is already deployed).
3. Replace the custom certificates on the Data server and Storage Resource agent or on the disk 1 or Storage Resource Agent installation image.
4. Start the Data server (and the Storage Resource agent, if the agent is already deployed).

Note: When you generate custom SSL certificates, the certificates have a start date, end date, and time when they are valid. These dates and times are related to the system where these custom certificates were generated (which is usually the server system). When you install a Storage Resource agent on a remote system, you must check the date and time on the Storage Resource agent system. If the server and agent systems are in the same time zone, they must have the same date and time. Otherwise, the time zone difference should be set.

For example, if the server system is 8:00 PM, the agent system should also be 8:00 PM. If the agent system is set at a different time (for example, 6:00 PM) at the time the SSL custom certificates are generated on the server system with a time of 8:00 PM, the deployment of the Storage Resource agent fails.

How to generate custom certificates

The script file `createSRACerts.sh` (for Linux or UNIX) or `createSRACerts.bat` (for Windows) is in the following directory:

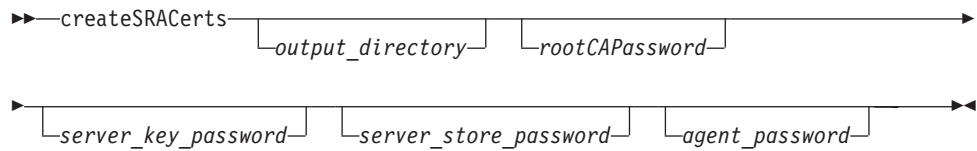
`TPC_install_directory/data/sra/tools/certs`

`TPC_install_directory` is where the IBM Tivoli Storage Productivity Center servers are installed. The default directory is `/opt/IBM/TPC` for Linux or UNIX or `C:\Program Files\IBM\TPC` for Windows.

To generate custom certificates, follow these steps:

1. Create the custom certificates.

The createSRACerts script creates the custom certificates. The syntax is:



output_directory

Directory where the certificates are created.

rootCAPassword

Root CA password (root common authority password). The default non-encrypted password is: s5umEvApR6cafruhustu.

server_key_password

Server key password. The default non-encrypted password is: drUtaxahaswefraf9uth.

server_store_password

Server store password. The default non-encrypted password is: wr4d5Xekaqafehet5u2a.

agent_password

Agent password. The default non-encrypted password is: jawUchezuthew6azEjef.

Note: You are prompted for the password when the script is run. Provide the value of the rootCAPassword on the command line (if specified on the command line). Otherwise, use the default values in the createSRACerts.sh or createSRACerts.bat script when prompted for the password (twice). The following example creates the SSL certificate by using the default output directory and default passwords.

```
createSRACerts
```

The following examples create the SSL certificates by using the directory /tmp on UNIX and C:\temp on Windows. These examples use the default passwords. The certificate files are created in the following directory:

Windows

```
C:\temp\sra_certs_out
```

Here is an example:

```
createSRACerts C:\temp
```

UNIX or Linux

```
/tmp/sra_certs_out
```

Here is an example:

```
./createSRACerts.sh /tmp
```

The following examples create SSL certificates in the directory /tmp on UNIX and C:\temp on Windows. These examples use non-default passwords for root CA and server key. The certificate files are created in the following directory:

Windows

```
C:\temp\sra_certs_out
```

Here is an example of creating a non-default password for the root CA password and server key password:

```
createSRACerts C:\temp newpasswordforrootCA newpasswordforserver
```

UNIX or Linux

```
/tmp/sra_certs_out
```

Here is an example of creating a non-default password for the root CA password and server key password:

```
createSRACerts.sh /tmp newpasswordforrootCA newpasswordforserver
```

2. Regenerate the certificates again if you have a failure. Delete the files in the output directory before you rerun the createSRACerts script.
3. Stop the Storage Resource Agents (if any are deployed and running) and the Data Server. To remotely stop agents from the Data or Storage Resource agents table, complete one of the following steps:
 - For Storage Resource agents that are running as a daemon service, in the **Select Action** menu, select **Shutdown**. For Storage Resource agents that are running as non-daemon agents, you do not need to stop the agent. Non-daemon processes do not need to be started or stopped.

Note: For Storage Resource agents that are running as a non-daemon service, search the Tivoli Storage Productivity Center information center for *agent.sh command*.

- At the command prompt, enter the following command:
"Storage_Resource_Agent_installation_directory/agent/bin/agent.[sh|bat] stop"

This command must be run locally on each system where an agent is running. On the Linux and UNIX operating systems, enter the *agent.sh* command, and on the Windows operating system, enter the *agent.bat* command.

For more information about starting or stopping Tivoli Storage Productivity Center services, go to the Tivoli Storage Productivity Center information center and search for *Starting and stopping the Tivoli Storage Productivity Center services*.

4. Replace the certificates. There are four scenarios:
 - Replacing the certificates after the server is installed.
 - Replacing the certificates before the server is installed.
 - Replacing the certificates after the agent is installed.
 - Replacing the certificates before the agent is locally.

Replacing the certificates after the server is installed

The new server certificates are created in the following directory:

```
output_directory/sra_certs_out/server
```

By default *output_directory* is the directory where the createSRACerts script is run:

```
TPC_install_directory/data/sra/tools/certs
```

These files are the server certificate files:

```
TPCDataServer.jks  
server.pwd
```

For the server certificate, copy the server certificate files to the following directory:

```
TPC_install_directory/data/sra/certs
```


The server certificate files are created in the `certs.zip` file in the following directory:

`output_directory/sra_certs_out/agent`

Copy the `certs.zip` file into each agent directory:

`TPC_install_directory/data/sra/agent_operating_system`

`TPC_install_directory/data/sra/server_operating_system`

Extract the `certs.zip` file into the following directory:

`TPC_install_directory/data/sra/server_operating_system`

`agent_operating_system` is the operating system of an agent that is remotely deployed. `server_operating_system` is the operating system on which the Data server is installed.

Replacing the certificates before the server is installed

By default, the output directory is the directory where the **createSRACerts** script is run.

The `createSRACerts` script is extracted in the `disk1` image in the following directory:

`disk1_image_install_directory/data/sra/tools/certs`

Restriction: The following process applies to only extracted images. If you are installing by using a DVD, see the **Replacing the certificates after the server is installed** procedure.

The new server certificate files are created in the following directory:

`output_directory/sra_certs_out/server`

By default, `output_directory` is the directory where the `createSRACerts` script is run:

`disk1_install_image_directory/data/sra/tools/certs/`

The following files are the server certificate files:

`TPCDataServer.jks`

`server.pwd`

The `disk1` image is in the `disk1_image_install_directory` directory.

Copy the server certificate files into the following directory:

`disk1_image_install_directory/data/sra/certs`

The agent certificates are created in the `certs.zip` file in the following directory:

`output_directory/sra_certs_out/agent`

Copy the `certs.zip` file into each agent directory:

`disk1_image_install_directory/data/sra/agent_operating_system`

Extract the `certs.zip` file into the following directory:

`disk1_image_install_directory/data/sra/server_operating_system`

`server_operating_system` is the operating system on which the Data server is installed.

Replacing the certificates after the agent is installed

The new agent certificates were created on the server in the following directory:

output_directory/sra_certs_out/agent

By default, *output_directory* is:

TPC_install_directory/data/sra/tools/certs

You must copy the *certs.zip* file to the agent system before you extract it in the *storage_resource_agent_install_directory/certs* directory. The Storage Resource agent is installed in the *storage_resource_agent_install_directory* directory.

Replacing the certificates before the agent is installed locally

Restriction: This process assumes that the Storage Resource agent disk image can be modified. If you are installing from a DVD, you must copy the installation files to a writable location before proceeding.

Before the agent can be installed locally, the custom certificate must be copied to the agent system. Copy the *certs.zip* Storage Resource agent certificate file from the *output_directory/sra_certs_out/agent* directory on the Tivoli Storage Productivity Center server to the agent system.

By default, the *output_directory* is where the *createSRACerts* script was run. An example of this directory path is:

TPC_installation_directory/data/sra/tools/certs/

- a. On the agent system, extract the Storage Resource agent installation image in the *SRA_image_install_directory*.
- b. Extract the custom *certs.zip* file in the following directory:
storage_resource_agent_install_directory/agent/certs

directory.

Note: *SRA_image_install_directory* is the directory where the Storage Resource agent image was extracted. *agent_operating_system* is the directory that is named for the operating system where the agent is installed.

- c. Install the Storage Resource agent with the wanted option.
5. Start the Data server and the Storage Resource agent. If the Data server is stopped for replacement of the certificates, start the Data server after the replacement of the certificates.

If the Storage Resource agent is stopped for replacement of certificates, start the Storage Resource agent after the replacement of the certificates.

Related tasks:

“Installing Storage Resource agents” on page 214

You can install Storage Resource agents by using the Tivoli Storage Productivity Center user interface or a command.

“Installing Storage Resource agents by using a command” on page 215

You can install Storage Resource agents by using a command.

Update Storage Subsystem Credentials

If you have a System Storage DS8000, XIV system, or SAN Volume Controller storage system, you must update your storage system credentials to use the Tivoli Storage Productivity Center native interfaces.

To enter the storage subsystem credentials, follow these steps:

1. Start the Tivoli Storage Productivity Center migration tool to enter storage subsystem credentials. You can start the migration tool in one of the following ways:
 - Use the migration tool from the Tivoli Storage Productivity Center DVD. Use the DVD or download the migration tool: MigrateUserInfo.bat (for Windows) or MigrateUserInfo.sh (for UNIX or Linux). Run the migration tool from the directory UserMigrationTool.
 - Run the Tivoli Storage Productivity Center upgrade installation program. When Tivoli Storage Productivity Center detects the storage system, use the panel that is displayed to run the migration tool. Run the migration tool.
 - After you upgrade Tivoli Storage Productivity Center, open the GUI. In the navigation tree, expand **Administrative Services > Configuration > Update Storage Subsystem Credentials**. This node is visible only when Tivoli Storage Productivity Center detects that you have a System Storage DS8000, XIV system, or SAN Volume Controller storage system.
2. Review the Update Storage Subsystem Credentials panel.

The table lists the subsystems with credentials that can be updated automatically. Click the update button to update the selected subsystems.

Update Update All

Subsystem	Device Type	Name

The table lists the subsystems that can have their credentials manually updated. Click the update button to migrate the selected subsystem.

Update

Subsystem	Device Type	Name
xxxx xxxx xxxx	IBM DS8000	2107.1300241

Figure 36. Update Storage Subsystem Credentials panel

Top table

If Tivoli Storage Productivity Center can use the existing CIM agent user ID and password to connect to the HMC, all System Storage DS8000 storage systems are displayed. If you want to use the existing credentials, click **Update** or **Update All** (if you have more than one System Storage DS8000). Tivoli Storage Productivity Center updates the credentials and removes the System Storage DS8000 from the table.

Bottom table

All XIV system and SAN Volume Controller storage systems are displayed in this table. If the other System Storage DS8000 storage systems are not listed in the other table, they are displayed in this table. All XIV system and SAN Volume Controller storage systems must have the storage system credentials migrated manually.

If you want to manually update the credentials for the System Storage DS8000, select a storage system and click **Update**. The Update Subsystem Credentials window is displayed. Enter the following information:

Username

Enter the user ID for the System Storage DS8000 element manager.

Password

Enter the password for the user name.

HMC2 Address (Optional)

You can enter a second HMC address. This parameter is optional.

Click **Save**. The System Storage DS8000 is removed from the table after you update the credentials.

To update the credentials for the XIV system, complete the following steps:

- a. select a storage system and click **Update**. The Update Subsystems Credentials window is displayed.
- b. Enter the following information:

Username

Enter the user ID for the XIV system.

Password

Enter the password for the user name.

- c. Click **Save**. The XIV system is removed from the table after you update the credentials.

If you want to update the credentials for IBM SAN Volume Controller, select a storage system and click **Update**. The Update Subsystem Credentials window is displayed. Enter the following information:

Software Version

Enter the version of the SAN Volume Controller software that you want to configure.

IP address

Enter the IP address or host name of the SAN Volume Controller. You can enter an IPv4 or IPv6 address, for example:

- 9.47.97.128
- [2001:DB8::1234:0000:0000:5678:ABCD]

Select Key

Select one of the following actions for the Secure Shell (SSH) key:

- **Use existing uploaded key:** Select this option if you want to use a public key that has been uploaded by using a method other than through Tivoli Storage Productivity Center, such as the SAN Volume Controller web console. Enter the location of the private key file that corresponds to the public key in the **Private SSH Key** field. If you select this option, the **Admin Username** and **Admin Password** fields are not required.
- **Upload new key:** Select this option to upload a new key. Public key content is extracted from the private key that is provided in the **Private SSH Key** field and is uploaded to the SAN Volume Controller cluster. If you select this action, the **Admin Username** and **Admin Password** fields are required.

Admin Username

If you selected **Upload new key** in the **Select Key** list, enter the name

of a user that has the Security Administrator role for the SAN Volume Controller cluster that contains the device. Tivoli Storage Productivity Center uses this value during the setup process to contact the cluster and configure the SSH keys for the user. This user name must have privileges to modify other user accounts (Security Administrator role), otherwise Tivoli Storage Productivity Center cannot configure the SSH keys.

If you selected **Use existing uploaded key**, this field is optional.

Note: The **Admin Username** only applies to **SVC5.x+**; it does not apply to **SVC 4.x**.

Admin Password

Enter the password for the user that you entered in the **Admin Username** field.

Username

Enter an authorized user for the device. Tivoli Storage Productivity Center uses this value when you monitor and configure the storage system. If the user name does not exist, it is created. This user name must have the Administrator role.

This field is active if you selected **Upload new key** in the **Select Key** list and entered a user name and password in the **Admin Username** and **Admin Password** fields.

Important: If you upload a new key for the existing SAN Volume Controller user by using Tivoli Storage Productivity Center, that new key overrides the existing key for the user. If you have another application by using that SAN Volume Controller user (for example Tivoli Storage Productivity Center for Replication), the application cannot log on to SAN Volume Controller because the key associated with the user is overwritten.

If you have this situation, create a user ID specifically for Tivoli Storage Productivity Center or Tivoli Storage Productivity Center for Replication on the SAN Volume Controller cluster. Add the SAN Volume Controller to Tivoli Storage Productivity Center for Replication by using the new user ID and password (or change the user ID and password while in the disconnected state).

Select User

Click this button to select from a list of existing users that are defined on the SAN Volume Controller.

Private SSH Key

By default, the private key entry includes `${device.conf}\tpc_svc.pem`, which represents the Tivoli Storage Productivity Center default key `tpc_svc.pem`. The `tpc_svc.pem` key is in the `conf` directory where the Device server is installed. If you want to use your own key, the key must exist on the system where you are running the Tivoli Storage Productivity Center user interface. The key is uploaded to the Tivoli Storage Productivity Center server system. To identify a new key, click **Browse**.

The private SSH key must be in OpenSSH format or in PuTTY (.ppk) format that is not password protected. If you have a password

protected PuTTY .ppk key, use the PuTTYgen utility on a Windows operating system to convert that key to OpenSSH format by following these steps:

- a. Start the PuTTYgen utility.
- b. Load the .ppk file by clicking **File > Load private key**.
- c. From the menu bar, click **Conversion > Export OpenSSH key conversion**.

This action saves the key in OpenSSH format.

Passphrase (Optional)

Enter the passphrase for the SSH key pair. The passphrase protects your private SSH key file. If you do not have a passphrase, leave this field blank.

3. Click **Save**. The SAN Volume Controller is removed from the table after you update the credentials.

After a successful migration of System Storage DS8000, XIV system, or SAN Volume Controller credentials, the CIMOMs that previously managed these devices must be removed from the Tivoli Storage Productivity Center configuration. The migration process tries to determine and remove these CIMOMs automatically, but if there are CIMOMs remaining, they must be deleted manually. For DS CIMOMs managing DS6000 or ESS devices and additional System Storage DS8000 devices, the System Storage DS8000 devices must be removed from the CIMOM, if possible.

Resource History Retention

Specify how long to keep a history of the data that is collected by Tivoli Storage Productivity Center.

By specifying a number for days, weeks, or months for each element, you can control the amount of data that is retained and available for historical analysis and charting. The longer you keep the data, the more informative your analysis.

You can set retention periods for:

- Directories
- File systems
- Pings
- Computer Uptime
- Disks
- Storage subsystems
- Performance Monitors

When you specify how long to retain historical data, remember the following issues:

- If you do not select a check box, the data that is related to that check box is retained permanently. This action might cause a large amount of data to accumulate in the database repository over time.
- If you select a check box and enter a value of 0, Tivoli Storage Productivity Center stops collecting history data for the related element.

Note: If you enter 0 for the items under Performance Monitors, the data that is already collected by performance monitors is deleted and no more data is collected.

When you set the retention period for Performance Monitors, remember the following restrictions:

- The hourly and daily values for Performance Monitors can be set to 0 only if the per performance monitoring task is also set to 0.
- The hourly and daily values for Performance Monitors cannot be set lower than the per performance monitoring task value.

To set the retention periods, complete the following steps:

1. Expand **Administrative Services > Configuration > Resource History Retention**.
2. The Retain History panel is displayed in the content pane. Enter the information for the retention periods.

Note: Some default profiles have Accumulate history settings. If set, these settings dictate the number of days, weeks, or months to be retained. If a scan includes any of these profiles, then the history data is persisted and appears in the corresponding reports. The following default profiles have Accumulate history settings:

- TPCUser.By Access
- TPCUser.By Creation
- TPCUser.By Mod Not Backed Up
- TPCUser.Summary By File Type
- TPCUser.Summary By Filesystem/Directory
- TPCUser.Summary By Group
- TPCUser.Summary By Owner
- TPCUser.Temporary Files
- TPCUser.Wasted Space

Removed Resource Retention

You can specify the number of days to keep information about directories, file systems, disks, and so on, that have been removed from the system and can no longer be found.

Information is kept in the database repository. To clear the history record for a resource and activate a new period for resource retention, perform a discovery or probe job on the resource.

You can set the retention period for the following:

- Directories
- File systems
- Disks
- Filers
- Subsystems
- Fabric
- Tape
- Hypervisors
- Virtual Machines
- Tivoli Storage Productivity Center Servers

When you remove a data source (agent) from a subordinate server or a storage entity that it monitors, the master server continues displaying information about that agent or storage entity in roll up reports for a specified amount of time. You can specify how quickly that information is removed by changing this setting.

If the check box for a storage resource is not selected, the data related to the resource is retained permanently. This action might cause a large amount of data to accumulate in the database repository over time. If you select a check box and enter a value of 0, the data related to that check box is removed immediately from the database repository.

The retention time for cluster resource groups that are monitored by Tivoli Storage Productivity Center is determined by the values that you enter in the **Filers** and **Filesystems** fields. If the values in the **Filesystems** and **Filers** fields are different, the field with the higher value (longer retention period) is applied to cluster resource groups.

The following list shows the fields that determine the retention period for Storwize V7000 File Module storage resources:

- **Filers:** Storage systems, storage pools, and nodes.
- **Disks:** Network Shared Disks (NSDs).
- **Filesystems:** File systems, exports, file sets, and quotas.

To set the retention period, complete the following steps:

1. Expand **Administrative Services > Configuration > Removed Resource Retention**.
2. In the Retain Removed panel, select the resource and enter the number of days to keep.

Resource History Retention for Databases

You can specify how long to keep a history of the database-related statistical elements collected by the system.

By specifying a number of days, weeks, or months for each element, you can control the amount of data that is retained and is available for historical analysis and charting. The longer you keep the data, the more informative your analysis.

You can retain the histories for:

- Databases-Tablespaces
- Tables

Note: If you do not select a check box, the data related to that check box is retained permanently. This action might cause a large amount of data to accumulate in the database repository over time. If you select a check box and enter a value of 0, the data related to that check box is removed immediately from the database repository.

To set the retention period, complete the following steps:

1. Expand **Administrative Services > Configuration > Resource History Retention for Databases**.
2. The Retain History panel is displayed in the content pane. Enter the retention period information.

Removed Resource Retention for Databases

You can specify how long to keep information in the enterprise repository that is related to a database entity that has been removed from the system and can no longer be found.

By specifying a number for days, you can indicate how long to keep information for table spaces and tables that have been removed from the system.

Note: If you do not select a check box, the data related to that check box is retained permanently. This action might cause a large amount of data to accumulate in the database repository over time. If you select a check box and enter a value of 0, the data related to that check box is removed immediately from the database repository.

To specify a retention period, complete the following steps:

1. Expand **Administrative Services > Configuration > Removed Resource Retention for Databases**.
2. The Retain Removed panel is displayed in the content pane. Enter the information for the retention period.

Configuration History Settings

You can specify how often the system captures snapshots of your configuration and when to delete them. In addition to displaying the number of snapshots in the database and determining when the last snapshot was taken, you can also create and enter a title for a snapshot on demand.

You must configure and save the settings on this page before you can use the Configuration History function.

To specify the configuration history settings, complete the following steps:

1. In the **Create snapshot every** field, type how often (in hours) you want the system to take snapshot views of the configuration.
2. To automatically delete snapshots, select the check box to place a check mark before **Delete snapshots older than**. In the box that follows that field, type how long you want to keep the snapshots (in days) before they are automatically deleted.
3. To optionally refresh the date and time of when the latest snapshot was created, click **Update**.
4. To optionally create a snapshot on demand, click **Create Snapshot now**. If you choose, you might want to type a name for the snapshot in the box **Title this snapshot** (optional).
5. To change your settings to the default, click **Reset** to defaults. The defaults are create snapshots every 12 hours and delete snapshots older than 14 days.
6. Click **File > Save** to save the configuration history settings.

Configuration: Device server specific

This configuration information is specific to the Device server.

Configuring switches

This section provides configuration information for switches.

IBM Tivoli Storage Productivity Center is a storage area network (SAN) management application that discovers devices in the SAN and displays a topology of the SAN environment. Tivoli Storage Productivity Center is designed to operate using industry-based standards for communicating with Fibre Channel switches and other SAN devices. This communication can be done using the simple network management protocol (SNMP) interface for out-of-band agents, the FC-GS-3 interface for Storage Resource agents, Storage Management Initiative (SMI) agents, or a combination of these agent types.

FC-GS-3 refers to the Fibre Channel Generic Services 3 standard. To gather and display the information as expected, the switches must be configured correctly. The configuration varies by vendor and the type or types of agents that are used. The supported switch vendors are Brocade, Cisco, and QLogic. Other vendors such as IBM, often sell these switches under their own labels.

Determining the agent type or types to use with a switch

For Brocade fabrics, the preferred type of agent is the SMI agent. The SMI agent provides most fabric functions and the other agent types can be added for redundancy. However, Storage Resource agents are required to gather host bus adapter (HBA) information.

For QLogic and Cisco fabrics, a combination of different agent types is required to enable all functions.

For information about information that is gathered by each agent type, see the topic about discovering storage resources in the IBM Tivoli Storage Productivity Center User's Guide.

Using Storage Resource agents

With Tivoli Storage Productivity Center Storage Resource agent discovery, the Tivoli Storage Productivity Center for agent software is installed on SAN-attached hosts. The Storage Resource agents collect information about the fabric across the Fibre Channel network by querying the switch and the attached devices through the host bus adapter (HBA) in the system. For the switches to successfully receive and respond to the queries, the switch must support the FC-GS-3 standard interface for discovery.

- Name server
- Configuration server
- Unzoned name server

For Storage Resource agent discovery, fabric events are automatically sent from the agent to Tivoli Storage Productivity Center. There is no need for configuration.

For Storage Resource agent discovery, you must configure SNMP traps to be sent from the switches in your fabric to the Tivoli Storage Productivity Center Device server.

Using out-of-band SNMP agents

Out-of-band SNMP agent discovery collects some of the same information that can be obtained by Storage Resource agents, but out-of-band agent discovery is performed differently. In out-of-band discovery, Tivoli Storage Productivity Center queries the switch directly rather than going through a Storage Resource agent and

the Fibre Channel network. Tivoli Storage Productivity Center uses the SNMP protocol to send queries across the IP network to management information bases (MIBs) supported on the switch. Tivoli Storage Productivity Center uses the FC Management MIB (sometimes referred to as the FA MIB) and the FE MIB. The queries are sent only to switches that were added to Tivoli Storage Productivity Center for use as SNMP agents. SNMP information is collected for a single switch. The out-of-band discovery registers each switch.

The following list shows the basic requirements for the switch to successfully receive and respond to the query:

- The FC Management MIB and FE MIB must be enabled on the switch.
- The switch must be configured to receive SNMPv1 queries and respond in SNMPv1. Some switches are configured to use SNMPv2 or SNMPv3 by default.
- The community string configured in Tivoli Storage Productivity Center must match one of the community strings configured on the switch with read access. Cisco switches must additionally have a community string match for write access. The default community strings in Tivoli Storage Productivity Center are "public" for read access and "private" for write access. Additional community strings can be defined on the switches, but are not used.
- SNMP access control lists must include the Tivoli Storage Productivity Center system. Some lists automatically include all hosts while others exclude all by default.

Another aspect of the SNMP configuration includes trap notification. SNMP traps are generated by the switch and directed to Tivoli Storage Productivity Center as an indication that something in the fabric changed and that a discovery must occur to identify the changes. The default configuration for handling switch traps is to send them from the switch to port 162 on the Tivoli Storage Productivity Center system. To successfully generate and receive traps, there are some configuration requirements:

- The trap destination parameter on the switch must be set. This parameter is the host that receives the trap and sends it to Tivoli Storage Productivity Center. The parameter is set on the switch.
- The destination port parameter on the switch must be set. Tivoli Storage Productivity Center listens on port 162 by default. The parameter is set on the host.
- The traps must be sent as SNMPv1. This parameter is set on the switch.
- The trap severity level must be set to generate traps for change conditions. This level typically means to send error level traps and anything more severe. This parameter is set in Tivoli Storage Productivity Center.

Using SMI agents

You must install or enable an SMI agent for to perform the following tasks:

- Gather fabric performance data.
- Collect and configuring Brocade zone aliases.

For information about installing or enabling a SMI agent for the switch, contact your switch vendor.

Configuring the inactive zone sets for a fabric data source

Some fabrics have multiple locations to retrieve a database for inactive zone sets. In some scenarios, and for some switch vendors, these definitions for inactive zone sets are not synchronized.

For fabrics composed of Brocade switches, IBM Tivoli Storage Productivity Center allows you to choose which CIM agent to use to retrieve inactive zone sets and when configuring zoning. To set the inactive zone sets for **Data Source**, go to **Fabric Manager > Fabrics**, select the fabric, and click **Select Inactive Zone Sets Data Source**.

Managing a SAN without agents

You can manage a SAN when there are no agents.

In the following situations, there might not be any agents on the SAN:

- The hosts do not currently have a Storage Resource agent or Fabric agent installed.
- The host operating system is not supported by the Storage Resource agent or Fabric agent.
- The customer requirements do not require the deployment of a Storage Resource agent or Fabric agent.

In these cases, it is recommended that an agent is installed on the Device server itself. This action allows the Device server to use advanced features like Remote Node Identification, which requires an agent.

Normally the Device server does not have a Fibre Channel host bus adapter. In this configuration, the following steps are taken:

1. A Fibre Channel host bus adapter is added to the manager.
2. An agent is installed on the Device server(the Device server is installed first).
3. All storage devices are verified to ensure that they use LUN masking techniques. The LUN masking techniques prevent the Device server from accessing the disks used by the host systems.
4. The Fibre Channel host bus adapter is attached to the SAN to be managed. This host is added to each zone that is intended to be managed by the Device server.

Setting timeout values for the Device server

If a probe or discovery of a storage subsystem times out before the operation completes, you can increase the timeout values for the Device server.

If a probe or discovery of a storage subsystem times out before the operation completes, you receive the following error message:

```
HWN021650E Encountered timeout while connecting to CIMOM IP:port.  
Check the CIMOM or increase timeout value.
```

where *IP* is the IP address, and *port* is the port number. If you determine that the Common Information Model Object Manager (CIMOM) is not the cause of the problem, you can use the command-line interface (CLI) to increase the timeout values for the Device server.

For those storage systems that use native interfaces to connect to Tivoli Storage Productivity Center you see this error message:

HWN020103E The external process exceeded the timeout limit and was cancelled.

The following storage systems use native interfaces to connect to Tivoli Storage Productivity Center:

- System Storage DS8000
- SAN Volume Controller
- The XIV system
- Storwize V3500
- Storwize V3700
- Storwize V7000
- Storwize V7000 Unified
- IBM SONAS

1. Run the **getdscfg** command to determine the current values of the timeout properties. From the command prompt, enter the following command:

```
cli>tpctool getdscfg -user user -pwd password -url host:port
-property timeout_property
```

where:

- *user* is an IBM Tivoli Storage Productivity Center user ID.
- *password* is the password for the Tivoli Storage Productivity Center user ID.
- *host* is the host name or IP address, and *port* is a valid port number for the HTTP service of the Device server. The default value for *port* is typically 9550.
- *timeout_property* is one of the following strings:
 - http.timeout
 - CIMClientWrapper.Timeout
 - Probe.Timeout.Array
 - Probe.Timeout.LMM
 - Discovery.Timeout
 - CIMOMManager.TestConnectionTimeout

Important: Timeout properties are displayed in milliseconds. If the value is 0 (zero), it means that there is no timeout.

For the storage systems that use the native interface, the *timeout_property* strings are:

- NAPI.Timeout.TestConnection
 - NAPI.Timeout.Probe
 - NAPI.Timeout.EventPoll
2. Run the **setdscfg** command to increase the timeout value. Run the following command:

```
cli>tpctool setdscfg -user user -pwd password -url host:port
-property timeout_property timeout_value
```

For more information about **tpctool**, see the *Tivoli Storage Productivity Center Command-Line Interface Reference*. You also can view help from the command line by issuing the command with the **-help** option.

Service Location Protocol configuration considerations

You can enable Tivoli Storage Productivity Center to discover a larger set of storage devices through Service Location Protocol (SLP). In addition to some of the

more common SLP configuration issues, there is also information about router configuration, SLP directory agent configuration, and environment configuration.

For additional information about SLP, see the **Service Location Protocol Request for Comments** website at <http://www.ietf.org/rfc/rfc2165.txt>.

Note: The storage systems that use the native interfaces (DS8000, XIV system, SAN Volume Controller, and Storwize V7000) do not use SLP discovery.

Router configuration

Configure the routers in the network to enable general multicasting or to allow multicasting for the SLP multicast address and port, 239.255.255.253, port 427. The routers of interest are the ones associated with subnets that contain one or more storage devices that are to be discovered and managed by Tivoli Storage Productivity Center.

To configure your router hardware and software, refer to your router and configuration documentation.

SLP directory agent configuration

Review these suggestions when you configure the SLP directory agent.

Configure the SLP directory agents (DAs) to circumvent the multicast limitations. With statically configured DAs, all service requests are unicast by the user agent. Therefore, it is possible to configure one DA for each subnet that contains storage devices that are to be discovered by Tivoli Storage Productivity Center. One DA is sufficient for each of the subnets. Each of these DAs can discover all services within its own subnet, but no other services outside its own subnet. To allow Tivoli Storage Productivity Center to discover all the devices, it needs to be statically configured with the addresses of each of these DAs. This operation can be accomplished by using the Tivoli Storage Productivity Center Discovery Preference panel.

You can use this panel to enter a list of DA addresses. Tivoli Storage Productivity Center sends unicast service requests to each of these statically configured DAs, and sends multicast service requests on the local subnet on which Tivoli Storage Productivity Center is installed. Configure an SLP DA by changing the configuration of the SLP service agent (SA) that is included as part of an existing CIM Agent installation. This action causes the program that normally runs as an SLP SA to run as an SLP DA.

Note: The change from SA to DA does not affect the CIMOM service of the subject CIM Agent, which continues to function normally, sending registration and deregistration commands to the DA directly.

Environment configuration

This section provides information about the configuration of your environment.

It might be advantageous to configure SLP DAs in the following environments:

- In environments where there are other non-Disk Manager SLP UAs that frequently perform discovery on the available services, an SLP DA must be configured. This action ensures that the existing SAs are not overwhelmed by too many service requests.
- In environments where there are many SLP SAs, a DA helps decrease network traffic that is generated by the multitude of service replies. It also ensures that

all registered services can be discovered by a given UA. The configuration of an SLP DA is recommended when there are more than 60 SAs that need to respond to any given multicast service request.

SLP registration and slptool

Tivoli Storage Productivity Center uses Service Location Protocol (SLP) discovery, which requires that all the CIMOMs that Disk Manager discovers are registered by using the SLP.

In a non-multicast network environment, SLP can only discover CIMOMs that are registered in its IP subnet. For CIMOMs outside of the IP subnet, you need to use an SLP DA and register the CIMOM by using **slptool**. Ensure that the **CIM_InteropSchemaNamespace** and **Namespace** attributes are specified.

For example, enter the following command:

```
slptool register service:wbem:https://myhost.com:port
```

Where *myhost.com* is the name of the server that is hosting the CIMOM, and *port* is the port number of the service, for example 5989.

Note: **slptool** is installed with a CIMOM. Run the command from the computer that is hosting the CIMOM.

SLP discovery

A common problem with SLP discovery is due to IP multicasting being disabled on the network router. Communication between the SLP SA and UA is done with IP multicasting. Follow these recovery procedures when there are SLP discovery problems and IP multicasting is disabled on the network router.

Note: The storage systems that use native interfaces (DS8000, XIV system, SAN Volume Controller, and Storwize V7000) do not use SLP discovery.

There are two recovery procedures when there are SLP discovery problems and IP multicasting is disabled on the network router:

1. Configure one DA for each subnet within the environment.
2. Enable IP multicasting on the router which is disabled by default. Here is a list of common router configurations for multicasting:
 - Internet Group Management Protocol (IGMP) is used to register individual hosts in particular multicast groups and to query group membership on particular subnets.
 - Distance Vector Multicast Routing Protocol (DVMRP) is a set of routing algorithms that use a technique called reverse path forwarding. These algorithms provide the best solution for how multicast packets are to be routed in the network.
 - Protocol-Independent Multicast (PIM) comes in two varieties: dense mode (PIM-DM) and sparse mode (PIM-SM). The dense mode and sparse mode routines are optimized for networks where either a large percentage of nodes requires multicast traffic (dense) or a small percentage of nodes requires the sparse traffic.
 - Multicast Open Shortest Path First (MOSPF) is an extension of OSPF. It is a link-state unicast routing protocol that attempts to find the shortest path between any two networks or subnets to provide the most optimal packet routing.

To properly configure the routers for multicasting, see the reference and configuration documentation from the router manufacturer.

Configuring IP addressing

This section provides information about configuring IP addressing.

Configuring Tivoli Storage Productivity Center with multiple IP addresses

If the system where IBM Tivoli Storage Productivity Center is to be installed has multiple IP addresses, then a configuration value must be set manually as a post-installation task by using the **tpctool setdscfg** command. The value to be set is for the local IP address, which must be used for subscription for CIM Indications for CIM agents.

Restriction: This task does not apply to storage systems that use the native interfaces (DS8000, XIV system, SAN Volume Controller, and Storwize V7000).

If you are using IPv6 computers, see “Planning for Internet Protocol Version 6” on page 32.

For multiple IPv6 addresses, the IPv6 address to use for CIM indication subscription by Tivoli Storage Productivity Center can be specified by setting the property `System.LocalIPv6Address` as described.

With dual stack IPv4 and IPv6 Tivoli Storage Productivity Center servers, two IP addresses are required to subscribe to IPv4 CIMOMs and IPv6 CIMOMs. The configuration property `System.LocalIPv6Address` is used for IPv6 CIMOMs and the property `System.LocalIPAddress` is used for IPv4 CIMOMs.

To change the IP address, follow these steps:

1. Open a command prompt window on the server system.
2. Change to the following directory:

```
cd TPC_installation_directory\cli
```

3. Enter the following command:

```
tpctool setdscfg -user user_ID -pwd password -url  
host:port -property System.LocalIPv6Address value
```

Where:

user_ID

Is the user ID.

password

Is the password for the user.

host

Is either the host name or IP address of the system that is running Tivoli Storage Productivity Center.

port

Is a valid port number for the HTTP service of the Device server (the default is 9550).

value

Is the local IP address, which must be used for subscription for CIM Indications for CIM agents.

4. Verify that the command was successful by entering this command:

```
tpctool getdscfg -user user_ID -pwd password
-url host:port -property System.LocalIPv6Address
```

Changing the HOSTS file

When you install Tivoli Storage Productivity Center on your Windows operating systems, you must follow these steps to avoid addressing problems with the systems you want to manage. These problems are caused by the address resolution protocol that returns the host short name rather than the fully qualified host name. You can avoid this by modifying the entries in the corresponding host tables on the DNS server and on the local computer system. The fully qualified host name must be listed before the short name in each entry that is associated with systems managed by Tivoli Storage Productivity Center.

The **HOSTS** file is in the %SystemRoot%\system32\drivers\etc\ directory. To change the HOSTS file, follow these steps:

1. Open the HOSTS file in a text editor.
2. Add, remove, or modify the host entries. In the following example of a HOSTS file, the short name is incorrectly listed before the fully qualified host name. This can cause address resolution problems in IBM Tivoli Storage Productivity Center.

```
# Copyright (c) 1993-1995 Microsoft Corp.
#
# This is a sample HOSTS file used by Microsoft TCP/IP for Windows NT.
#
# This file contains the mappings of IP addresses to host names. Each
# entry should be kept on an individual line. The IP address should
# be placed in the first column followed by the corresponding host name.
# The IP address and the host name should be separated by at least one
# space.
#
# Additionally, comments (such as these) may be
# inserted on individual
# lines or following the machine name denoted by a '#' symbol.
#
# For example:
#
#       102.54.94.97       rhino.acme.com   # source server
#       38.25.63.10       x.acme.com      # x client host
#
192.168.123.146          jason           jason.groupa.mycompany.com
```

3. In the following example, the order of the host names has been changed so that the fully qualified host name is placed before the short name. The host names must be entered in the order that is shown so IBM Tivoli Storage Productivity Center can locate the host. Use this format for any hosts that are associated with IBM Tivoli Storage Productivity Center.

```
# For example:
#
#       102.54.94.97       rhino.acme.com   # source server
#       38.25.63.10       x.acme.com      # x client host
#
192.168.123.146          jason.groupa.mycompany.com      jason
```

Note: Host names are case-sensitive. This is a WebSphere requirement. For example, if your computer shows the name as JASON (uppercase), then you must enter JASON in the HOSTS file.

Configuring the VASA provider

You need to register a Tivoli Storage Productivity Center server as a VASA provider to view Tivoli Storage Productivity Center data in vCenter reports and views, to export alarms, and to filter which storage and file systems share Tivoli Storage Productivity Center data with vCenter.

Registering a Tivoli Storage Productivity Center VASA provider

Use the vSphere Client or the vSphere Web Client to register Tivoli Storage Productivity Center as a VASA provider.

The Tivoli Storage Productivity Center VASA provider is automatically deployed and running after a Tivoli Storage Productivity Center installation.

To register Tivoli Storage Productivity Center as a VASA provider for a vCenter, follow these steps:

1. Start the vSphere Client or the vSphere Web Client.
2. If you are using vSphere Client: Under **Home**, click **Administration** and then **Storage Providers**. To add a VASA provider, click **Add**.
3. If you are using vSphere Web Client: Under **Home**, click **Hosts and Clusters** and then select the vCenter server. In the **Manage** tab, click **Storage Providers**. To add a VASA provider, click the plus (+) sign.
4. For **Name**, specify the display name you want to assign to the provider.
5. For **URL**, enter the address, `https://<TPCServer>:<port>/vasa/services/tpc`, where **<TPCServer>** is the name of the Tivoli Storage Productivity Center host and **<port>** is the port that is used for registering the VASA provider. The default port is 9569.
6. For **Login**, specify a valid Tivoli Storage Productivity Center user name.
7. For **Password**, specify the associated password.
8. If you are using the Tivoli Storage Productivity Center Storage Provider certificate, see “Using a Tivoli Storage Productivity Center Storage Provider certificate” on page 322.
9. Click **OK**. You may see a pop up dialog asking you if you trust the host. If so, click **Yes**.

When the registration completes, the status of the provider remains Unknown for some minutes. vCenter collects data from the VASA provider as part of its synchronization process. When synchronization is completed, provider status changes to `Online`.

vCenter must update its reports before users can see the VASA data collected by vCenter reflected in reports and views. The time required to complete this task depends on the number of assigned volumes, shares and existing data stores in the target ESX environment. The task can take some time.

When this process completes, you can view Tivoli Storage Productivity Center information in VASA provider reports and views.

VMware does not support scenarios where multiple VASA providers manage the same storage.

Note: VMware vCenter does not refresh VASA provider information after a Tivoli Storage Productivity Center upgrade. This can result in some information, including VASA version information, not being up to date. With vCenter events and alarms, information may be displayed in an older format, if a newer VASA version contains any new formats, events or alarms. When you upgrade Tivoli Storage Productivity Center, you must manually unregister and register the VASA provider again if you want to see updated VASA provider information.

Using a Tivoli Storage Productivity Center Storage Provider certificate

Specify a Tivoli Storage Productivity Center storage provider certificate when registering manually on vSphere Web Client.

When registering a Tivoli Storage Productivity Center VASA provider, the Use storage provider certificate is optional. By default, it is not selected.

If you want the vCenter Server to add the VASA provider certificate to its truststore during the VASA provider registration, select this option. Otherwise, it is not required.

Before selecting this option, you need to save the certificate from Tivoli Storage Productivity Center VASA provider as a file.

To save a Tivoli Storage Productivity Center storage provider certificate for use during registration, follow these steps in Firefox, or their equivalent in another browser:

1. In a web browser, enter the address, `https://<TPCServer>:<port>/vasa/services/tpc`, where **<TPCServer>** is the name of the Tivoli Storage Productivity Center host and **<port>** is the port that is used for registering the VASA provider. The default port is 9569.
2. Click the lock icon to display the security information for this page. Click on More Information.
3. Click View Certificate. Click the Details tab under Security and select the certificate you require from the certificate hierarchy.
4. Click Export, and save the certificate as a **.crt** file.

If you decide to select the Use storage provider certificate option during VASA registration, click on Browse..."" to select the **.crt** file that you saved. After selecting the Use storage provider certificate option, you will not be presented with a pop up dialog confirming that you trust the certificate.

Note: The VASA provider certificate is removed from the vCenter truststore when the VASA provider is removed from the vCenter. This is the case whether or not you selected the Use storage provider certificate option.

Unregistering a Tivoli Storage Productivity Center VASA provider

Use the vSphere Client or the vSphere Web Client to unregister Tivoli Storage Productivity Center as a VASA storage provider.

To unregister a Tivoli Storage Productivity Center VASA provider, follow these steps:

1. With the vSphere Client. Under **Home**, click **Storage Providers**. Select the provider and click **Remove**.
2. With the vSphere Web Client. Click **Hosts and Clusters**. In the **Manage** tab, click **Storage Providers**. Select the provider and click the delete (X) sign.

Verify that Tivoli Storage Productivity Center is unregistered as a VASA provider by inspecting the list of providers.

Note: VMware vCenter does not refresh VASA provider information after a Tivoli Storage Productivity Center upgrade. When you upgrade Tivoli Storage Productivity Center, you must manually unregister and register the VASA provider again to see updated VASA provider information.

Filter storage and file systems

You can exclude certain types of storage and file systems from the data Tivoli Storage Productivity Center VASA provider shares with vCenter.

If you are using multiple VASA providers, you can exclude certain system types from the information Tivoli Storage Productivity Center VASA provider shares with vCenter.

To exclude system types, use the filter properties file `vasa_filter.properties` in `<TPC_installation_directory>/web/conf/`.

`vasa_filter.properties` is created when Tivoli Storage Productivity Center VASA provider is added to a vCenter.

The `vasa_filter.properties` file lists supported system types, together with the associated include/exclude setting. By default, all system types are included:

```
DS3000/DS4000=include
DS5000=include
IBM_ESS=include
IBM_DS6000=include
IBM_DS8000=include
IBM_SONAS=include
IBM_Storwize_V7000=include
IBM_Storwize_V7000U=include
IBM_SVC=include
IBM_XIV=include
EMC=include
Hitachi=include
HP=include
HP_XP=include
NetApp/IBM_N_Series=include
Other_NAS=include
Sun=include
Unknown=include
```

Use a text editor to modify this file. Set a system type to **include** or **exclude** all systems of that type from the information that is shared with vCenter.

The `vasa_filter.properties` file is refreshed when you synchronise the Tivoli Storage Productivity Center VASA provider from vCenter.

The refresh maintains any changes in the file at the time of the refresh.

Note: If an excluded system is deleted, the refresh adds it back to `vasa_filter.properties`, set to include.

Note: If the `vasa_filter.properties` file is deleted before a refresh, Tivoli Storage Productivity Center VASA provider re-creates the file with all supported systems set to include, even if some were set to exclude before deletion.

When Tivoli Storage Productivity Center is upgraded, the `vasa_filter.properties` file remains in its last known state.

When the VASA provider is synchronized from vCenter, the `vasa_filter.properties` file is refreshed, and retains existing system settings.

After synchronizing, inspect the information in the vCenter reports to verify that excluded systems are no longer visible.

Creating custom VM Storage Profiles

Use the VMware Web Client to create custom VM Storage Profiles based on system-defined capabilities provided by VASA.

You can use the VMware Web Client to view system-defined capabilities, or to create user-defined capabilities.

It is also possible to create VM Storage Profiles based on system-defined capabilities provided by VASA. When you create a new VM Storage Profile, the capabilities of VASA are listed. You can either create a new user defined capability, or select one or more capabilities as the basis for custom user-defined capabilities.

To create VM Storage Profiles based on system-defined capabilities provided by VASA:

1. Use the vSphere Web Client to navigate to **Home**.
2. Click **Rules and Profiles** and select **VM Storage Profiles**.
3. Click **Create a new VM Storage Profile**.
4. Select one or more system-defined capabilities provided by VASA.

Configuring the vSphere Web Client extension for Tivoli Storage Productivity Center

Before you can use the vSphere Web Client extension for Tivoli Storage Productivity Center to provision storage or view reports, you must register the extension.

When you first log in to the vSphere Web Client extension, you must save the server credentials and connection information for the Tivoli Storage Productivity Center server.

Registering the vSphere Web Client extension for Tivoli Storage Productivity Center

You can deploy the vSphere Web Client extension for Tivoli Storage Productivity Center on a vCenter Server so that you can use Tivoli Storage Productivity Center with a vCenter Server.

Ensure that Tivoli Storage Productivity Center is installed. You must also complete the planning activities. For more information about planning, see the Tivoli Storage Productivity Center information center. Search for *Planning for vSphere Web Client extension*.

To deploy the extension for Tivoli Storage Productivity Center, you must download and register the package to the vCenter Server.

When the package is registered with a vCenter Server, you can use Tivoli Storage Productivity Center on any vSphere Web Client that connects to the same vCenter Server.

1. Go to the plug-in installation folder in the Tivoli Storage Productivity Center web folder, *TPC_installation_directory\web\TPCVmwareVspherePlugin*. For example, go to *C:\Program Files\IBM\TPC\web\TPCVmwareVspherePlugin*.
2. Copy the contents of the folder to the vCenter Server host machine, into a folder of your choice. Use binary mode for the transfer.
3. From the command line on the vCenter Server host machine, change the directory to the folder where you copied the TPCVmwareVspherePlugin content.
4. To start the registration process, run the deployment utility by using one of the following methods:

- Run the deployment utility in command-line mode by issuing the **setup** command with the following parameters:

```
Plugin directory>setup register -password password
```

This method registers the plug-in package by using the default values for the command parameters.

- Run the deployment utility in read-from-file mode by issuing the **setup** command with the **-file** option to accept the parameters from a properties file. For example, enter the following command:

```
Plugin directory>setup -file filename
```

where *filename* contains the name of the properties file that contains the parameters for the **setup** command, including the path and the extension if necessary. For more information about creating a properties file, see the Tivoli Storage Productivity Center information center. Search for *Creating setup command properties file*.

- Run the deployment utility in interactive mode by issuing the **setup** command and entering values when you are prompted.
5. Optional: To run the deployment utility in silent mode, use the **-silent** option. In silent mode, any output that is generated is saved to the log file on the disk. The log file, *TPCDeploymentUtility.log*, is in one of the following locations:

%ALLUSERSPROFILE%\IBM\TPC

For example, *C:\Documents and Settings\All Users\IBM\TPC*

%PROGRAMDATA%\IBM\TPC

For example, *C:\ProgramData\IBM\TPC*

Save the configuration information for the Tivoli Storage Productivity Center server in the vSphere Web Client extension. When you save the configuration information, the Tivoli Storage Productivity Center server credentials and connection information persist.

Related tasks:

“Saving the Tivoli Storage Productivity Center server configuration information” on page 332

You can save the configuration information for the Tivoli Storage Productivity Center server in the vSphere Web Client extension. The information includes the server credentials and connection information, which enable the vSphere Web Client extension to connect to Tivoli Storage Productivity Center. When you save

the configuration information, it persists for subsequent sessions.

Related reference:

“vSphere Web Client extension setup command”

Use the **setup** command from the command line to install and register the vSphere Web Client extension for Tivoli Storage Productivity Center on the vCenter Server. You can also use this command to unregister the package on the vCenter Server.

“Sample properties files for the vSphere Web Client extension” on page 331

You can use a properties file to register or unregister the vSphere Web Client extension for Tivoli Storage Productivity Center by using the **setup** command in read-from-file mode. You can run the **setup** command with the option to accept the parameters from the properties file.

“Tivoli Storage Productivity Center installation” on page 121

You can install Tivoli Storage Productivity Center by using the installation wizard or the command-line in silent mode. Installing Tivoli Storage Productivity Center by using console mode is not supported.

vSphere Web Client extension setup command

Use the **setup** command from the command line to install and register the vSphere Web Client extension for Tivoli Storage Productivity Center on the vCenter Server. You can also use this command to unregister the package on the vCenter Server.

To check the command usage, you can run the command and specify the **-help** parameter.

You can run the command in command-line, interactive, or read-from-file mode. You must provide all the required parameters when you are using command-line mode. The password value is not hidden and is displayed in clear text in command-line mode. If you do not invoke command-line mode, the command output prompts you to enter the parameters or accept the defaults.

You must have Administrator authority to use this command.

Before you issue the **setup** command, ensure that you complete the following activities:

- Complete the planning activities. For more information about planning, see the Tivoli Storage Productivity Center information center. Search for *Planning for vSphere Web Client extension*.
- You must also copy the contents of the plug-in installation folder, which is in the Tivoli Storage Productivity Center web folder, to a folder of your choice on the vCenter Server host machine
- Create a properties file to store command parameters, if you plan to run the command in read-from-file mode.

Run the command from the TPCVmwareVspherePlugin folder on the vCenter Server.

You can check the command log file, TPCDeploymentUtility.log, to see the status of the command. The log file is in one of the following locations:

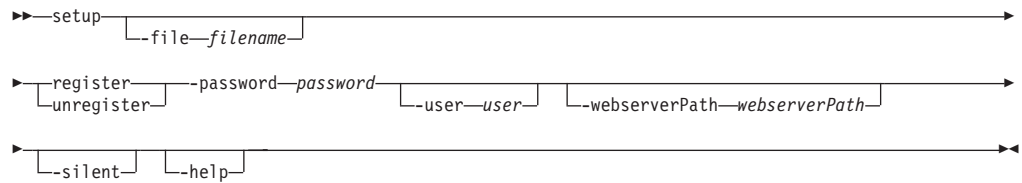
%ALLUSERSPROFILE%\IBM\TPC

For example, C:\Documents and Settings\All Users\IBM\TPC\

%PROGRAMDATA%\IBM\TPC

For example, C:\ProgramData\IBM\TPC\

Syntax



Parameters

-file *filename*

Specifies the name and location of the properties file that contains the parameters. The parameters are specified in key-value pairs. You can create a properties file if you plan to run the command in read-from-file mode.

register | unregister

Specifies the action that the command is to complete. You can specify one of the following actions:

register

Register the Tivoli Storage Productivity Center plug-in package as an extension on the vCenter Server.

Tip: If the Tivoli Storage Productivity Center plug-in package is already registered with the vCenter Server, the extension information is updated on the vCenter Server. The `TPC_VmPlug.zip` package is also updated.

unregister

Remove the Tivoli Storage Productivity Center plug-in package as a vCenter Server extension.

-password *password*

Specifies the password that is used to authenticate with the vCenter Server.

-user *user*

Specifies a vCenter Server user ID. If you do not specify a user ID, the default value is the administrator ID.

-webserverPath *webserverPath*

Specifies the vCenter Server web server installation path. If you do not specify a path, the default value is copied from the Windows registry.

-silent

Specifies that any output that is generated is redirected to the command log file and not to the console. By default the output is generated on the console and to the log file.

-help

Lists help information for the command.

Example: Register the Tivoli Storage Productivity Center plug-in package in read-from-file mode with the silent option

Register the Tivoli Storage Productivity Center plug-in package as a vCenter Server extension in read-from-file mode.

```
C:\Program Files\IBM\TPC\web\TPCVmwareVspherePlugin>setup -file register_file
-silent
```

The command output is written to the command log file.

Example: Register the Tivoli Storage Productivity Center plug-in package in command-line mode

Register the Tivoli Storage Productivity Center plug-in package as a vCenter Server extension in command-line mode.

```
C:\Program Files\IBM\TPC\web\TPCVmwareVspherePlugin>setup register  
-password password
```

The following output is returned:

```
INFO: 07/12/2013 05:43:05 Performing deployment in command line mode...  
INFO: 07/12/2013 05:43:05 Attempting to communicate with the vCenter server...  
INFO: 07/12/2013 05:43:06 Successfully authenticated with the vCenter server...  
INFO: 07/12/2013 05:43:06 Fetching vCenter web server port from registry...  
INFO: 07/12/2013 05:43:06 Successfully fetched vCenter web server port from  
registry as 8443.  
INFO: 07/12/2013 05:43:06 Mode: register  
INFO: 07/12/2013 05:43:06 vCenter server address: <host IP>  
INFO: 07/12/2013 05:43:06 vCenter server user id: Administrator  
INFO: 07/12/2013 05:43:06 vCenter web server port: 8443  
INFO: 07/12/2013 05:43:06 TPC Plugin package location: C:\Program Files\  
VMware\Infrastructure\tomcat\webapps\ROOT  
INFO: 07/12/2013 05:43:06 Registering TPC Plugin package TPC_VmPlug.zip  
with vCenter server.  
INFO: 07/12/2013 05:43:06 Extension URL: https://<host IP>/TPC_VmPlug.zip  
INFO: 07/12/2013 05:43:06 Creating TPC Plugin extension com.ibm.tpc.Tpc ...  
INFO: 07/12/2013 05:43:06 Copying TPC plugin package TPC_VmPlug.zip onto  
vCenter web server root location C:\Program Files\VMware\Infrastructure\tomcat\  
webapps\ROOT.  
#####  
INFO: 07/12/2013 05:44:21 Successfully copied TPC plugin package TPC_VmPlug.zip  
onto vCenter web server root location.  
INFO: 07/12/2013 05:44:21 Successfully registered TPC Plugin package  
TPC_VmPlug.zip with vCenter server.  
INFO: 07/12/2013 05:44:21 TPC deployment utility finished execution.  
Log information generated in C:\ProgramData\IBM\TPC\TPCDeploymentUtility.log.
```

Example: Register the Tivoli Storage Productivity Center plug-in package in interactive mode

Register the Tivoli Storage Productivity Center plug-in package as a vCenter Server extension in interactive mode.

```
C:\Program Files\IBM\TPC\web\TPCVmwareVspherePlugin>setup
```

In interactive mode, you are prompted to enter the parameters or accept the defaults.

```
Enter the mode [register or unregister]: register  
Enter the vCenter Server user id [Administrator]. Press Enter for default:  
Enter the vCenter Server password:  
INFO: 05/02/2013 10:57:50 Attempting to communicate with the vCenter server...  
INFO: 05/02/2013 10:57:51 Successfully authenticated with the vCenter server...  
INFO: 05/02/2013 10:57:51 Fetching vCenter web server port from registry...  
INFO: 05/02/2013 10:57:51 Successfully fetched vCenter web server port from  
registry as 8443.  
INFO: 05/02/2013 10:57:51 Mode: register  
INFO: 05/02/2013 10:57:51 vCenter server address: <host IP>  
INFO: 05/02/2013 10:57:51 vCenter server user id: Administrator  
INFO: 05/02/2013 10:57:51 vCenter web server port: 8443  
INFO: 05/02/2013 10:57:51 TPC Plugin package location: C:\Program Files\  
VMware\Infrastructure\tomcat\webapps\ROOT  
INFO: 05/02/2013 10:57:51 Registering TPC Plugin package TPC_VmPlug.zip  
with vCenter server.  
INFO: 05/02/2013 10:57:51 Extension URL: https://<host IP>:8443/TPC_VmPlug.zip  
INFO: 05/02/2013 10:57:51 Creating TPC Plugin extension com.ibm.tpc.Tpc ...
```

```

INFO: 05/02/2013 10:57:51 Copying TPC plugin package TPC_VmPlug.zip onto
vCenter web server root location C:\Program Files\VMware\Infrastructure\
tomcat\webapps\ROOT.
#####
INFO: 05/02/2013 10:59:08 Successfully copied TPC plugin package
TPC_VmPlug.zip onto vCenter web server root location.
INFO: 05/02/2013 10:59:08 Successfully registered TPC Plugin package
TPC_VmPlug.zip with vCenter server.
INFO: 05/02/2013 10:59:08 TPC deployment utility finished execution.
Log information generated in C:\ProgramData\IBM\TPC\TPCDeploymentUtility.log.

```

Example: Unregister the Tivoli Storage Productivity Center plug-in package in read-from-file mode with silent option

Unregister the Tivoli Storage Productivity Center plug-in package as a vCenter Server extension in read-from-file mode.

```

C:\Program Files\IBM\TPC\web\TPCVMwareVspherePlugin>setup -file unregister_file
-silent

```

The command output is written to the command log file.

Example: Unregister the Tivoli Storage Productivity Center plug-in package in command-line mode

Unregister the Tivoli Storage Productivity Center plug-in package as a vCenter Server extension.

```

C:\Program Files\IBM\TPC\web\TPCVMwareVspherePlugin>setup unregister
-password password

INFO: 05/02/2013 09:21:41 Performing deployment in command line mode...
INFO: 05/02/2013 09:21:41 Attempting to communicate with the vCenter server...
INFO: 05/02/2013 09:21:41 Successfully authenticated with the vCenter server...
INFO: 05/02/2013 09:21:41 Mode: unregister
INFO: 05/02/2013 09:21:41 vCenter server address: <host IP>
INFO: 05/02/2013 09:21:41 vCenter server user id: Administrator
INFO: 05/02/2013 09:21:41 Unregistering TPC Plugin package TPC_VmPlug.zip
from vCenter server.
INFO: 05/02/2013 09:21:41 Extension com.ibm.tpc.Tpc found to be registered
with vCenter server.
INFO: 05/02/2013 09:21:42 Removing TPC plugin package TPC_VmPlug.zip from
vCenter web server root location C:\Program Files\VMware\Infrastructure\
tomcat\webapps\ROOT.
INFO: 05/02/2013 09:21:42 Successfully deleted TPC plugin package
TPC_VmPlug.zip from vCenter web server root location.
INFO: 05/02/2013 09:21:42 Successfully unregistered TPC Plugin package
TPC_VmPlug.zip from vCenter server.
INFO: 05/02/2013 09:21:42 TPC deployment utility finished execution.
Log information generated in C:\ProgramData\IBM\TPC\TPCDeploymentUtility.log.

```

Example: Unregister the Tivoli Storage Productivity Center plug-in package in interactive mode

Unregister the Tivoli Storage Productivity Center plug-in package as a vCenter Server extension in interactive mode.

```

C:\Program Files\IBM\TPC\web\TPCVMwareVspherePlugin>setup

```

In interactive mode, you are prompted to enter the parameters or accept the defaults.

```

Enter the mode [register or unregister]: unregister
Enter the vCenter Server user id [Administrator]. Press Enter for default:
Enter the vCenter Server password:
INFO: 05/02/2013 09:26:44 Attempting to communicate with the vCenter server...

```

```

INFO: 05/02/2013 09:26:44 Successfully authenticated with the vCenter server...
INFO: 05/02/2013 09:26:44 Mode: unregister
INFO: 05/02/2013 09:26:44 vCenter server address: <host IP>
INFO: 05/02/2013 09:26:44 vCenter server user id: Administrator
INFO: 05/02/2013 09:26:44 Unregistering TPC Plugin package TPC_VmPlug.zip
from vCenter server.
INFO: 05/02/2013 09:26:44 Extension com.ibm.tpc.Tpc found to be registered
with vCenter server.
INFO: 05/02/2013 09:26:44 Removing TPC plugin package TPC_VmPlug.zip from
vCenter web server root location C:\Program Files\VMware\Infrastructure\
tomcat\webapps\ROOT.
INFO: 05/02/2013 09:26:44 Successfully deleted TPC plugin package
TPC_VmPlug.zip from vCenter web server root location.
INFO: 05/02/2013 09:26:44 Successfully unregistered TPC Plugin package
TPC_VmPlug.zip from vCenter server.
INFO: 05/02/2013 09:26:44 TPC deployment utility finished execution.
Log information generated in C:\ProgramData\IBM\TPC\TPCDeploymentUtility.log.

```

Related tasks:

“Creating the **setup** command properties file”

You can create a properties file to use for registering or unregistering the vSphere Web Client extension for Tivoli Storage Productivity Center in read-from-file mode.

“Registering the vSphere Web Client extension for Tivoli Storage Productivity Center” on page 324

You can deploy the vSphere Web Client extension for Tivoli Storage Productivity Center on a vCenter Server so that you can use Tivoli Storage Productivity Center with a vCenter Server.

“Saving the Tivoli Storage Productivity Center server configuration information” on page 332

You can save the configuration information for the Tivoli Storage Productivity Center server in the vSphere Web Client extension. The information includes the server credentials and connection information, which enable the vSphere Web Client extension to connect to Tivoli Storage Productivity Center. When you save the configuration information, it persists for subsequent sessions.

“Unregistering the vSphere Web Client extension for Tivoli Storage Productivity Center” on page 334

You can remove the Tivoli Storage Productivity Center plug-in package as an extension on the vSphere Web Client if you no longer want to use Tivoli Storage Productivity Center with a vCenter Server.

Related reference:

“Sample properties files for the vSphere Web Client extension” on page 331

You can use a properties file to register or unregister the vSphere Web Client extension for Tivoli Storage Productivity Center by using the **setup** command in read-from-file mode. You can run the **setup** command with the option to accept the parameters from the properties file.

Creating the setup command properties file

You can create a properties file to use for registering or unregistering the vSphere Web Client extension for Tivoli Storage Productivity Center in read-from-file mode.

You can run the **setup** command with the **-file** option to register or unregister the vSphere Web Client extension by accepting the parameters from a properties file. You use key-value pairs to specify the parameters when you create the properties file.

1. Create a properties file that contains the following key-value pairs:

-mode=register

The **-mode** parameter is mandatory. Enter the register value if you are creating a properties file to use in registration mode. When you register the vSphere Web Client extension for Tivoli Storage Productivity Center, you can use Tivoli Storage Productivity Center with a vCenter Server. Enter the unregister value if you are creating a properties file to use when you unregister the vSphere Web Client extension.

-password=password

The **-password** parameter is mandatory. Enter the value in clear text.

-user=user

The **-user** parameter is optional. If you do not specify a user ID, the administrator ID is used.

-webserverPath=webserverPath

The **-webserverPath** parameter is optional. If you specify a path, you must use "\" as an escape character for the file path separator. For example, if the path is C:\Program Files\VMware\Infrastructure\tomcat, you must enter C:\\Program Files\\VMware\\Infrastructure\\tomcat. If you do not specify a path, the value from the Windows registry is used.

2. Specify a file name, and save the file to a location of your choice.

Register the vSphere Web Client extension for Tivoli Storage Productivity Center on a vCenter Server.

Related tasks:

“Unregistering the vSphere Web Client extension for Tivoli Storage Productivity Center” on page 334

You can remove the Tivoli Storage Productivity Center plug-in package as an extension on the vSphere Web Client if you no longer want to use Tivoli Storage Productivity Center with a vCenter Server.

Related reference:

“vSphere Web Client extension setup command” on page 326

Use the **setup** command from the command line to install and register the vSphere Web Client extension for Tivoli Storage Productivity Center on the vCenter Server. You can also use this command to unregister the package on the vCenter Server.

“Sample properties files for the vSphere Web Client extension”

You can use a properties file to register or unregister the vSphere Web Client extension for Tivoli Storage Productivity Center by using the **setup** command in read-from-file mode. You can run the **setup** command with the option to accept the parameters from the properties file.

Sample properties files for the vSphere Web Client extension

You can use a properties file to register or unregister the vSphere Web Client extension for Tivoli Storage Productivity Center by using the **setup** command in read-from-file mode. You can run the **setup** command with the option to accept the parameters from the properties file.

Use the following sample properties files to register and unregister the vSphere Web Client extension for Tivoli Storage Productivity Center by using the **setup** command in read-from-file mode.

To register the vSphere Web Client extension by using the **setup** command in read-from-file mode, create a properties file that contains the following parameters in key-value pairs:

```
-mode=register  
-password=password in clear text  
-user=administrator  
-webserverPath=C:\\Program Files\\VMware\\Infrastructure\\tomcat
```

To unregister the vSphere Web Client extension by using the **setup** command in read-from-file mode, create a properties file that contains the following parameters in key-value pairs:

```
-mode=unregister  
-password=password in clear text  
-user=administrator  
-webserverPath=C:\\Program Files\\VMware\\Infrastructure\\tomcat
```

Related tasks:

“Creating the **setup** command properties file” on page 330

You can create a properties file to use for registering or unregistering the vSphere Web Client extension for Tivoli Storage Productivity Center in read-from-file mode.

“Registering the vSphere Web Client extension for Tivoli Storage Productivity Center” on page 324

You can deploy the vSphere Web Client extension for Tivoli Storage Productivity Center on a vCenter Server so that you can use Tivoli Storage Productivity Center with a vCenter Server.

“Unregistering the vSphere Web Client extension for Tivoli Storage Productivity Center” on page 334

You can remove the Tivoli Storage Productivity Center plug-in package as an extension on the vSphere Web Client if you no longer want to use Tivoli Storage Productivity Center with a vCenter Server.

Related reference:

“vSphere Web Client extension setup command” on page 326

Use the **setup** command from the command line to install and register the vSphere Web Client extension for Tivoli Storage Productivity Center on the vCenter Server. You can also use this command to unregister the package on the vCenter Server.

Saving the Tivoli Storage Productivity Center server configuration information

You can save the configuration information for the Tivoli Storage Productivity Center server in the vSphere Web Client extension. The information includes the server credentials and connection information, which enable the vSphere Web Client extension to connect to Tivoli Storage Productivity Center. When you save the configuration information, it persists for subsequent sessions.

Ensure that you complete the task to register the vSphere Web Client extension for Tivoli Storage Productivity Center.

To access the vSphere Web Client extension for Tivoli Storage Productivity Center, you must be assigned the Administrator, Monitor, or External Application role.

Complete this task when you want to save Tivoli Storage Productivity Center configuration information for the first time.

When you use the vSphere Web Client extension for Tivoli Storage Productivity Center, you can provision storage and view information about resources that are monitored by Tivoli Storage Productivity Center. When you save the configuration information, the Tivoli Storage Productivity Center server can also be automatically registered as a VASA provider for the vCenter Server. To view Tivoli Storage Productivity Center storage data in the existing vCenter Server reports and views, you must ensure that the VASA provider registration process is completed.

1. Start the vSphere Web Client, and log on to the vCenter Server system.
2. From the vSphere Web Client Home tab, in the Administration section, click the **IBM Tivoli Storage Productivity Center** icon.
3. In the **Host name** field on the Tivoli Storage Productivity Center page, enter the host name of the system that is running Tivoli Storage Productivity Center.
4. In the **Port** field, enter the HTTPS port of the Tivoli Storage Productivity Center web server or accept the default port, 9569.
5. Enter an authorized user name and password.
6. Click **Save**. The `TPCServerConfiguration.properties` file is saved in either of the following locations:

%ALLUSERSPROFILE%\IBM\TPC

For example, `C:\Documents and Settings\All Users\IBM\TPC\`

%PROGRAMDATA%\IBM\TPC

For example, `C:\ProgramData\IBM\TPC\`

7. Optional: If the registration process for the VASA provider displays an error message at the top of the window, you must manually register the VASA provider. Complete the manual registration process only if you want to view Tivoli Storage Productivity Center storage data in the existing vCenter Server reports and views.

Related tasks:

“Registering the vSphere Web Client extension for Tivoli Storage Productivity Center” on page 324

You can deploy the vSphere Web Client extension for Tivoli Storage Productivity Center on a vCenter Server so that you can use Tivoli Storage Productivity Center with a vCenter Server.

“Registering a Tivoli Storage Productivity Center VASA provider” on page 321

Use the vSphere Client or the vSphere Web Client to register Tivoli Storage Productivity Center as a VASA provider.

Related reference:

“Registration of Tivoli Storage Productivity Center as a VASA provider”

You must complete the VASA provider registration process so that you can view Tivoli Storage Productivity Center storage data in the existing vCenter Server reports and views. When you save the credentials and connection information for the Tivoli Storage Productivity Center server in the vSphere Web Client, Tivoli Storage Productivity Center can also be registered automatically as a VASA provider for the vCenter Server.

Registration of Tivoli Storage Productivity Center as a VASA provider

You must complete the VASA provider registration process so that you can view Tivoli Storage Productivity Center storage data in the existing vCenter Server reports and views. When you save the credentials and connection information for the Tivoli Storage Productivity Center server in the vSphere Web Client, Tivoli Storage Productivity Center can also be registered automatically as a VASA provider for the vCenter Server.

Automatic registration

The registration process completes automatically in the following situations:

- No VASA providers are registered.
- VASA providers are registered. The Tivoli Storage Productivity Center VASA provider is registered, but it is not registered for the same Tivoli Storage Productivity Center server.

Manual registration

You must complete the registration process manually in the following situations:

- Only non-IBM VASA providers are registered.
- Tivoli Storage Productivity Center is already registered as a VASA provider for the same Tivoli Storage Productivity Center server.

Related tasks:

“Registering a Tivoli Storage Productivity Center VASA provider” on page 321
Use the vSphere Client or the vSphere Web Client to register Tivoli Storage Productivity Center as a VASA provider.

“Registering the vSphere Web Client extension for Tivoli Storage Productivity Center” on page 324

You can deploy the vSphere Web Client extension for Tivoli Storage Productivity Center on a vCenter Server so that you can use Tivoli Storage Productivity Center with a vCenter Server.

“Saving the Tivoli Storage Productivity Center server configuration information” on page 332

You can save the configuration information for the Tivoli Storage Productivity Center server in the vSphere Web Client extension. The information includes the server credentials and connection information, which enable the vSphere Web Client extension to connect to Tivoli Storage Productivity Center. When you save the configuration information, it persists for subsequent sessions.

Unregistering the vSphere Web Client extension for Tivoli Storage Productivity Center

You can remove the Tivoli Storage Productivity Center plug-in package as an extension on the vSphere Web Client if you no longer want to use Tivoli Storage Productivity Center with a vCenter Server.

When the package is unregistered, you can no longer use Tivoli Storage Productivity Center on any vSphere Web Client that connects to the same vCenter Server. When you unregister the package, the Tivoli Storage Productivity Center VASA provider is not removed from the vCenter Server. If you want to remove the VASA provider, you must remove it manually.

Attention: When you run the **setup** command to unregister the package, all of the folders and files that are associated with the vSphere Web Client extension are deleted.

1. From the command line on the vCenter Server host machine, change the directory to the folder where you copied the TPCVmwareVspherePlugin content.
2. To start the process to unregister the plug-in package, run the deployment utility in the unregister mode by using one of the following methods:
 - Run the deployment utility in command-line mode by issuing the **setup** command with the following parameters:

```
C:\Program Files\IBM\TPC\web\TPCVMwareVspherePlugin>setup unregister  
-password password
```

This method unregisters the plug-in package by using the default values for the command parameters.

- Run the deployment utility in read-from-file mode by issuing the **setup** command with the **-file** option to accept the parameters from a properties file. For example, enter the following command:

```
C:\Program Files\IBM\TPC\web\TPCVMwareVspherePlugin>setup -file filename
```

where *filename* contains the name of the properties file that contains the parameters for the **setup** command, including the path and the extension if necessary. For more information about creating a properties file, see the Tivoli Storage Productivity Center information center. Search for *Creating setup command properties file*.

- Run the deployment utility in interactive mode by issuing the **setup** command and entering values when you are prompted.
3. Optional: To run the deployment utility in silent mode, use the **-silent** option. In silent mode, any output that is generated is saved to the log file on the disk. The log file, `TPCDeploymentUtility.log`, is in one of the following locations:

%ALLUSERSPROFILE%\IBM\TPC

For example, `C:\Documents and Settings\All Users\IBM\TPC\`

%PROGRAMDATA%\IBM\TPC

For example, `C:\ProgramData\IBM\TPC\`

Related tasks:

“Registering the vSphere Web Client extension for Tivoli Storage Productivity Center” on page 324

You can deploy the vSphere Web Client extension for Tivoli Storage Productivity Center on a vCenter Server so that you can use Tivoli Storage Productivity Center with a vCenter Server.

Related reference:

“vSphere Web Client extension setup command” on page 326

Use the **setup** command from the command line to install and register the vSphere Web Client extension for Tivoli Storage Productivity Center on the vCenter Server. You can also use this command to unregister the package on the vCenter Server.

“Sample properties files for the vSphere Web Client extension” on page 331

You can use a properties file to register or unregister the vSphere Web Client extension for Tivoli Storage Productivity Center by using the **setup** command in read-from-file mode. You can run the **setup** command with the option to accept the parameters from the properties file.

Reinstalling the vSphere Web Client extension for Tivoli Storage Productivity Center

You can reinstall the vSphere Web Client extension for Tivoli Storage Productivity Center without first unregistering the existing registration.

To reinstall the vSphere Web Client extension for Tivoli Storage Productivity Center, you must download and register the new package to the vCenter Server.

1. Run the deployment utility to register the vSphere Web Client extension without first unregistering the existing registration. To run the deployment utility, follow the instructions in “Registering the vSphere Web Client extension

for Tivoli Storage Productivity Center” on page 324. Any Tivoli Storage Productivity Center registration information is updated.

2. To automatically download the new vSphere Web Client extension, log on to the vSphere Web Client.

Tip: When you log on to the vSphere Web Client for the first time, the vSphere Web Client extension for Tivoli Storage Productivity Center is downloaded to the vSphere Web Client computer. As a result, there is some delay in the completion of the logon process.

The new vSphere Web Client extension is downloaded to the vSphere Web Client packages location on the vSphere Web Client computer, for example, %ProgramData%\VMware\vsphere Web Client\vc-packages\vsphere-client-serenity.

Tip: An alternative to reinstalling the vSphere Web Client extension for Tivoli Storage Productivity Center is to unregister the existing registration, and then register the new vSphere Web Client extension.

Related tasks:

“Unregistering the vSphere Web Client extension for Tivoli Storage Productivity Center” on page 334

You can remove the Tivoli Storage Productivity Center plug-in package as an extension on the vSphere Web Client if you no longer want to use Tivoli Storage Productivity Center with a vCenter Server.

“Saving the Tivoli Storage Productivity Center server configuration information” on page 332

You can save the configuration information for the Tivoli Storage Productivity Center server in the vSphere Web Client extension. The information includes the server credentials and connection information, which enable the vSphere Web Client extension to connect to Tivoli Storage Productivity Center. When you save the configuration information, it persists for subsequent sessions.

Related reference:

“vSphere Web Client extension setup command” on page 326

Use the **setup** command from the command line to install and register the vSphere Web Client extension for Tivoli Storage Productivity Center on the vCenter Server. You can also use this command to unregister the package on the vCenter Server.

“Sample properties files for the vSphere Web Client extension” on page 331

You can use a properties file to register or unregister the vSphere Web Client extension for Tivoli Storage Productivity Center by using the **setup** command in read-from-file mode. You can run the **setup** command with the option to accept the parameters from the properties file.

Configuration guidelines for 500 or more agents

You can use this information to help you manage 500 or more agents in Tivoli Storage Productivity Center.

If you have 500 or more agents for the Data Server, complete the following steps:

1. Probe the machines at least once a day or more, depending on when you want to test for alert conditions. This action applies to alert conditions other than directory alerts, quotas, or constraints.
2. If you use anything but the "ALL" groups (ALL file systems, ALL computers), you need to manually populate the groups.

3. Always run a probe before a scan. Set the following parameters in the `server.config` file:

MaxConnections=1200

The default is 500. Agents can have multiple connections to the server.

routerThreads=3 (max)

Incoming connections need to be routed to the correct Data Manager "service" queue and can stack up behind this thread. You can watch this behavior by watching the connections in the "server service" and the "agent service" in the GUI. The server service runs the router and the agent service is where the connections are queued once routed and saved by any of three threads here to the repository.

4. Set the following parameter in the `Scheduler.config` file:

MaxSubmitthreads=8

Tells how many threads are used to tell the agents to start a job. Agent connections can queue up the scheduler service. After a job is run, the agent makes a connection to communicate with this thread to give it the job status.

Including a Storage Resource agent with a server master image

If you use a master operating system image to deploy new servers in your environment, you can include the Storage Resource agent on that master image. The master image enables the agents to start and register with the Tivoli Storage Productivity Center server automatically upon deployment. This support applies only to Storage Resource agents running in daemon mode.

The default agent directory is:

- For Windows: `C:\Program Files\IBM\TPC\agent`
- For UNIX: `/opt/IBM/TPC/agent`
- For AIX: `/usr/IBM/TPC/agent`

Follow these instructions to include the Tivoli Storage Productivity Center agent on a master image.

1. Install the Storage Resource agent in daemon mode on the master image system.
2. Stop the Storage Resource agent on the master image system.
For the Windows system: Click **Start > Settings > Control Panel > Administrative Tools > Services**. Stop the following service: **IBM Tivoli Storage Resource Agent - directory**. *directory* is where the Storage Resource agent is installed. The default directory is `TPC_installation_directory\agent`.
For the UNIX or Linux system, run the following commands:

```
cd /opt/IBM/TPC/agent/bin/  
./agent.sh stop
```
3. Create one of the following files in the root directory for the agent. These files can be empty. Any content in these files is ignored.

REGISTERSRA

The file name must be uppercase with no file extension. This file causes the agent to run a probe and then register with the server. This file will use the existing Globally Unique Identifier (GUID).

REGISTERSRA_REGENGUID

The file name must be uppercase with no file extension. This file causes

the agent to regenerate a new Globally Unique Identifier (GUID), run a probe, and then register with the server.

4. Delete the contents of the *agent_installation_directory/logs* directory. This clears any existing log messages so that you can view new messages that are logged.
5. Create the master image copies of this system.
6. When a new system is preinstalled from this image and then started, the REGISTERSRA or REGISTERSRA_REGENGUID file is run. The Storage Resource agent automatically registers with the new Tivoli Storage Productivity Center server. You can then use the GUI to manage the Storage Resource agent. For example, you can check for the new agent in the stand-alone GUI by clicking **Administrative Services > Storage Resource Agents**. You might need to refresh the table to see the new Storage Resource agent.

Configuring LUN provisioning for Oracle Solaris

Tivoli Storage Productivity Center for Data provides a file system extension feature that can be used to automatically increase file system capacity for managed hosts when utilization reaches a specified level. This function allows for the automatic provisioning of (TotalStorage Enterprise Storage Server, DS6000, DS8000) LUNs when there is not enough space available in a volume group to extend a file system. There is also information about LUN provisioning for Solaris.

LUNs can be provisioned for file system hosts that run Solaris, but you must configure the hosts must to avoid a restart after provisioning. Before you install the Storage Resource agent, complete the following steps:

1. Assign TotalStorage Enterprise Storage Server, DS6000, or DS8000 LUNs to Solaris Host Bus Adapters (HBAs).
2. Modify the HBA configuration file to include persistent name binding.
3. Modify the SCSI Disk configuration file to allow the maximum number of LUNs.
4. If you are using multipathing, ensure that TotalStorage Enterprise Storage Server, DS6000, or DS8000 multipaths are detected by the Veritas Dynamic Multipathing (VxDMP) utility.

This section provides basic instructions for performing these configuration steps. For detailed information, see the HBA and VxDMP documentation.

Assigning TotalStorage Enterprise Storage Server, DS6000, or DS8000 LUNs to Oracle Solaris HBAs

This section provides information about assigning TotalStorage Enterprise Storage Server, DS6000, or DS8000 LUNs to Solaris HBAs.

You must assign at least one TotalStorage Enterprise Storage Server, DS6000, or DS8000 LUN to each HBA on the Solaris host.

If you are using multipathing, there are different ways to configure either the host and TotalStorage Enterprise Storage Server, DS6000, or DS8000. For example:

- For an TotalStorage Enterprise Storage Server, DS6000, or DS8000 without internal multipath configuration, assign the same LUNs to the World Wide Port Node (WWPN) of each HBA.

- For an TotalStorage Enterprise Storage Server, DS6000, or DS8000 with internal multipath configuration, assign the LUNs to the WWPN of one HBA or assign the same LUNs to the WWPNs of two or more HBAs.

Modifying the HBA configuration file

The HBA configuration file must be modified to include Persistent Name Binding on HBAs and targets so that both the controller and target numbers remain the same across system reboots. This section provides information about what to modify in the configuration file.

The HBA configuration file (for example, `qla2200.conf`) must be modified to include Persistent Name Binding on HBAs and targets so that both the controller and target numbers remain the same across system reboots. You must reboot the system with the new configuration for the changes to take effect.

QLogic QLA2200 and QLA2300 HBAs have been tested for use with IBM Tivoli Storage Productivity Center. You can use the QLogic SANblade Control FX (**scfx**) application to modify the configuration file for these HBAs. The **scfx** application is included as part of the device driver installation package. The **scfx** application is installed in the `/opt/QLogic_Corporation/SANblade_Control_FX` directory.

Setting Persistent Name Binding for QLA2200 and QLA2300 HBAs by using the **scfx** command

This section describes how to set Persistent Name Binding in the HBAs by using the **scfx** command for LUN provisioning under Oracle Solaris.

Follow these steps:

1. Install the QLogic HBA Driver, Common API Library, and QLogic SANblade Control FX (**scfx**) application if you have not already done so. For installation instructions, see the *SANblade 2200 Series User's Guide* or *SANblade 2300 Series User's Guide*. After these packages are installed successfully, restart and reconfigure the system by using the **reboot -- -rv** command.
2. After the system is rebooted, use **scfx** to configure Persistent Bind on HBAs and Targets in the `/kernel/drv/qla2xxx.conf` file.

- a. Start the **scfx** application. For example:

```
# /opt/QLogic_Corporation/SANblade_Control_FX/scfx
```

The main window of the **scfx** application consists of three sections:

Menu Bar

The menu bar provides three options: **File**, **Tools**, and **Help**.

HBA Tree

The HBA Tree displays the host with its connected adapters (HBAs), devices and LUNs. The HBAs are displayed with a model name and instance number. For example, Adapter 2200 (Instance #0). If a device is connected to an HBA, it has a plus sign (+) by the HBA, which can be expanded to view the list of attached devices. The devices are listed with their World Wide Port Names (WWPN).

Click the plus sign next to a device to expand the tree to show all the LUNs in that device. For a RAID device, such as an TotalStorage Enterprise Storage Server, DS6000, or DS8000, there are multiple LUNs per device.

Note: Expand all the devices to search the TotalStorage Enterprise Storage Server, DS6000, or DS8000 LUNs assigned to the system and note the WWPN of the target device. This information is required to identify the SCSI Target ID assigned or specified for the Persistent Bind Targets Setting.

Tabbed Pages

The contents of the Tabbed Pages changes depending on what is currently selected in the HBA Tree.

- b. Select an HBA.

Select an adapter in the HBA Tree. The Tabbed Pages show the **HBA Information, HBA Options, Target Settings, Boot Device, Diagnostics, and Utilities** tabs.

- c. Select the Persistent Bind HBA Setting.

Click the **HBA Options** tab. In the **Select Parameter Section** drop-down list, select **Advanced Host Parameters**. Select the check box for **Persistent Bind HBA**. Click **Save**.

- d. Select the Persistent Bind Target Setting.

Click the **Target Settings** tab. Select the check box for each target in the **Bind** column. If the check boxes are already checked and disabled, proceed to the next step. In the **Target ID** column, you can either accept the pre-selected SCSI Target ID or change to a different value. Each SCSI target ID must be unique and range from 0 to 255.

Note: Write down the selected Target ID for each TotalStorage Enterprise Storage Server subsystem device.

Click **Save**.

- e. Repeat Steps b through d for the next HBA.

- f. Exit the **scfx** application.

From the **Menu Bar**, select **File | Exit**. A Reboot Reminder dialog is displayed. Click **OK** to exit.

3. Restart and reconfigure the system by using the **reboot -- -rv** command.

Modifying the SCSI disk configuration file

You must configure the SCSI disk configuration file for the maximum number of LUNs per target for LUN provisioning for Oracle Solaris.

You must configure the SCSI disk (**sd.conf**) configuration file for the maximum number of LUNs (256) per target. The system must then be rebooted with the new configuration for the changes to take effect. Follow these steps:

1. Identify the SCSI Target ID assigned to the TotalStorage Enterprise Storage Server.
2. Edit the **/kernel/drv/sd.conf** file to include all the possible target and LUN mappings for the RAID device. For example, assume the SCSI Target ID assigned for an TotalStorage Enterprise Storage Server is 2. You can allow up to 256 LUNs (0 - 255) for this target:

```
name="sd" class="scsi" target=0 lun=0;
name="sd" class="scsi" target=1 lun=0;
name="sd" class="scsi" target=2 lun=0;
name="sd" class="scsi" target=2 lun=1;
name="sd" class="scsi" target=2 lun=2;
:
:
name="sd" class="scsi" target=2 lun=253;
```

```

name="sd" class="scsi" target=2 lun=254;
name="sd" class="scsi" target=2 lun=255;
name="sd" class="scsi" target=3 lun=0;
name="sd" class="scsi" target=4 lun=0;
:
:
name="sd" class="scsi" target=253 lun=0;
name="sd" class="scsi" target=254 lun=0;
name="sd" class="scsi" target=255 lun=0;

```

In this example, the system can detect up to 256 targets with 1 LUN (for example, multiple RAID devices with a total of 256 LUNs) and up to 256 LUNs for target 2 (for example, a RAID device with a total of 256 LUNs).

- Restart and reconfigure the system by using the **reboot -- -rv** command.

Checking for TotalStorage Enterprise Storage Server, DS6000, or DS8000 multipaths in VxDMP

If you are using IBM TotalStorage Enterprise Storage Server, DS6000, or DS8000 LUNs with multipaths, you must ensure that all the paths are detected by Veritas Dynamic Multipathing (VxDMP) utility. This section provides information about how to check for multipathing in the VxDMP utility.

The VxDMP utility is an administrative interface to the Veritas Volume Manager (VxVM) Dynamic Multipathing (DMP) facility. It lists the paths under a DMP device, gets the DMP device corresponding to a path, lists all the disk controllers on the system, lists all the paths through a host disk controller, lists all the DMP nodes through a disk array, and enables or disables a host disk controller on the system. For more information, and detailed instructions, see the VxDMP documentation.

To list all disk controllers on the system, enter the following command:

```
# vxdmpadm listctlr all
```

The following sample output shows that controllers c3 and c4 are connected to the IBM TotalStorage Enterprise Storage Server with an Enclosure Type of IBM_SHARK and an Enclosure Name of IBM_SHARK0.

CTLR-NAME	ENCLR-TYPE	STATE	ENCLR-NAME
c1	Disk	ENABLED	Disk
c3	IBM_SHARK	ENABLED	IBM_SHARK0
c4	IBM_SHARK	ENABLED	IBM_SHARK0

To list all subpaths for controller c3, enter the following command:

```
# vxdmpadm getsubpaths ctlr=c3
```

The following sample output shows that the **DMPNODENAME** is the same as the device name for each TotalStorage Enterprise Storage Server LUN:

NAME	STATE	PATH-TYPE	DMPNODENAME	ENCLR-TYPE	ENCLR-NAME
c3t4d0s2	ENABLED	-	c3t4d0s2	IBM_SHARK	IBM_SHARK0
c3t4d1s2	ENABLED	-	c3t4d1s2	IBM_SHARK	IBM_SHARK0

To list all subpaths for controller c4, enter the following command:

```
# vxdmpadm getsubpaths ctlr=c4
```

The following sample output shows that the **DMPNODENAME** for each TotalStorage Enterprise Storage Server LUN is from controller c3. This means that

VxDMP refers to the TotalStorage Enterprise Storage Server, DS6000 or DS8000 LUNs as devices from controller c3 and mask devices on controller c4 from VxVM:

NAME	STATE	PATH-TYPE	DMPNODENAME	ENCLR-TYPE	ENCLR-NAME
=====	=====	=====	=====	=====	=====
c4t4d0s2	ENABLED	-	c3t4d0s2	IBM_SHARK	IBM_SHARK0
c4t4d1s2	ENABLED	-	c3t4d1s2	IBM_SHARK	IBM_SHARK0

Importing authentication information for a Storage Resource agent

The Storage Resource agent is installed as a non-daemon or daemon process. Tivoli Storage Productivity Center stores the authentication information to connect to the host on which the Storage Resource agent has installed for the non-daemon agent. This authentication information can be changed depending on the environment.

To change a Storage Resource agent's authentication information (for non-daemon service), follow these steps:

1. Export the authentication information for a Storage Resource agent.
2. The data file exported contains information such as the host name, user ID, password, certificate location, and passphrase for every agent selected. The information is separated by the pipe character (|). For example,

```
agent_host|user|password|certificate|passphrase
```

You can update the password or passphrase in encrypted format or plain text format. If you want to update the password or passphrase in encrypted format, then you can use the **tpctool**. For example, go to this directory and run the **tpctool**:

```
cd TPC_install_directory/cli
tpctool encrypt string_to_be_encrypted
```

This generates an encrypted string. Place this string in the data file to be imported and add @ENC@ to the end of the encrypted string. For example,

```
agent_host|usera|encrypted_password@ENC@|certificate|
encrypted_passphrase@ENC@
```

encrypted_password is the encrypted string for the password and
encrypted_passphrase is the encrypted string for the passphrase.

3. Import the data file.

Configuring Jazz for Service Management for DS8000 LDAP authentication

You must configure Jazz for Service Management for LDAP authentication for IBM System Storage DS8000 R4.2. You must also configure Tivoli Storage Productivity Center to use LDAP for single sign-on support for the DS8000 R4.2.

Overview

Configuring Jazz for Service Management and DS8000 for LDAP authentication involves this process:

For Jazz for Service Management

1. Extract the certificate. This certificate is used for securing communication between the Authentication Client on the Hardware Management Console (HMC) and the Authentication Service (server component) on Jazz for Service Management.

2. Create a truststore that includes the certificate from step 1.
3. Know the Authentication Service web address.

For DS8000

1. Create a Storage Authentication Service (SAS) policy with information that is collected from Jazz for Service Management and the LDAP server.
2. Test the Storage Authentication Service policy by using a valid LDAP user that is mapped to a DS8000 user role in the policy.
3. Activate the Storage Authentication Service policy by using a valid LDAP user that is mapped to the DS8000 administrative user role in the policy.

Determining port numbers for the Authentication Service web address

To determine the port numbers for the Authentication Service web address and the IBM console:

1. Open the *JazzSM_directory/profile/properties/portdef.props* file.
2. The port number is the value that is assigned to one of the following keys:
 - For the `http://` protocol:
 - `WC_defaulthost` used for the authentication service web address
 - `WC_adminhost` used for IBM console
 - For the `https://` protocol:
 - `WC_defaulthost_secure` used for authentication service web address
 - `WC_adminhost_secure` used for IBM console

Configuring Jazz for Service Management

This procedure assumes that Jazz for Service Management is configured with an LDAP repository for authentication.

To configure Jazz for Service Management, complete the following steps:

1. Know the Authentication Service web address.

Tip: The following text is an example of the Authentication Service web address:

`https://JazzSM_server_host:WC_defaulthost_secure/TokenService/services/Trust`

The following text is an example of the web address that you enter:

`https://JazzSMServer.storage.mycompany.com:16311/TokenService/services/Trust`

The port for the Authentication Service is one plus the default Jazz for Service Management port. The port numbers for Jazz for Service Management can vary. Contact your Tivoli Storage Productivity Center administrator to verify the Jazz for Service Management port. For more information about determining the ports, see 2.

2. Open a web browser and enter one of the following addresses in the **Address** field to access the WebSphere Integrated Solutions Console:
 - `http://hostname:port(WC_adminhost)/ibm/console`
 - `https://hostname:port(WC_adminhost_secure)/ibm/console`

where *hostname* is the server that is running IBM WebSphere Application Server such as the server name or IP address and port is the port number for WebSphere Application Server. The port number differs depending on the protocol that you use (http or https) and the options that you selected during the installation of Jazz for Service Management. On the WebSphere Integrated Solutions Console, log on using the appropriate user ID and password.

3. Create the truststore in WebSphere Integrated Solutions Console. In the WebSphere Integrated Solutions Console navigation tree, click **Security > SSL certificate and key management > Key stores and certificates > NodeDefaultKeyStore > Personal Certificates**. Select the default certificate and click **Extract**. On the next page, enter the following information:

Certificate file name

Enter a file name for the extracted certificate. This file automatically is created in the *JazzSM_Directory/profile/etc/* directory.

On the Windows operating system, the default directory is *C:\JazzSM_Directory\profile\etc*.

Accept and select the default data type and click **OK**.

4. Create the truststore file and import the certificate into the truststore file by using the **ikeyMan** tool.
 - a. Start the **ikeyMan** tool.

For example, on the Windows operating system, run the following command:

```
C:\Program Files\IBM\WebSphere\AppServer\java\jre\bin
```

- b. Click **Key Database File > New**. On the New panel, enter the following information and click **OK**:

Key database type

Select **JKS**.

File Name

Enter a file name. For example, enter *tpc_ess.jks*.

Location

Enter a location. For example, enter *C:\tpc* and click **OK**.

Tip: The default location is *C:\Program Files\IBM\WebSphere\AppServer\java\jre\bin*.

- c. When prompted to specify a password for this truststore, enter a password that you can remember, and click **OK**.
 - d. On the main Key database information panel, in the Key database content section, select **Signer Certificates** and click **Add**. On the Open page, click **Browse** and select the certificate file that you created in step 3. Click **Open** and **OK**.

Note: Look for the certificate file, change the **Files of Type** to **All files** and click **Open**.

- e. When prompted to specify a label, enter a label, and click **OK**. For example, you can enter *ESS_Cert*.
 - f. The **ESS_Cert** is now one of the listed Signer Certificates.
 - g. Exit the **ikeyMan** tool and locate the truststore file that you created in step 4b (for this example, *tpc_ess.jks*). You need this truststore file and the password to configure the LDAP-based policy on the DS8000 system.

- h. You are now finished with WebSphere Integrated Solutions Console and the truststore setup.
5. Find the user ID and password that is used in LDAP and that will also be used on the DS8000 Storage Authentication Service policy configuration page.
This user ID is used for authenticating with the Authentication Service. It can be any user ID in LDAP, or a user ID that is also used by Jazz for Service Management. This user ID is used as the *Application Client User ID* for a Storage Authentication Service policy on DS8000.
6. Find the name of a group in LDAP with which you can log on to Jazz for Service Management and DS8000. You use this LDAP group on DS8000 to map to DS8000 roles.
To find the LDAP group name, open the WebSphere Integrated Solutions Console for Jazz for Service Management and click **Users and Groups > Manage Groups**.
The information that is gathered in steps 1, 3, 4, 5, and 6 is used on the DS8000 Storage Authentication Service policy creation page.
7. Configure DS8000 R 4.2.

Configuring DS8000 for LDAP authentication

To configure DS8000 for LDAP authentication, complete these steps:

1. Add the IP address of the DS8000 Hardware Management Console to the Internet Explorer list of trusted sites by completing the following steps:
 - a. Open the Internet Explorer by clicking the **Internet Explorer** icon on the Quick Launch toolbar.
 - b. From the Internet Explorer toolbar, click **Tools > Internet options**.
 - c. Click the **Security** tab, click the **Trusted sites** icon, and click **Sites**.
 - d. In the **Add this web site to the zone** field, type the IP address of the DS8000 HMC. Click **Add** to add the IP address to the **Websites** field.
 - e. Click **Close** and click **OK** to exit the Internet Options window, and close the Internet Explorer.
2. To access the DS8000 GUI, complete the following steps:
 - a. In the Tivoli Storage Productivity Center web-based GUI, click **Storage Resources > Storage Systems**.
 - b. Click **Add Storage System**.
 - c. In **Type**, select DS8000.
 - d. On the Discover page, enter the following information:
 - Primary HMC host name or IP address
 - User name
 - Password
 - e. Click **Next** and wait for the discovery to finish.
 - f. Click **Configure**, and when the configured dialog has finished, click **Close**.
 - g. Select the DS8000 system that you just added.
 - h. Right-click on DS8000 and select **Open Storage System GUI**.
3. On the DS8000Storage Manager Welcome page, click **Access > Remote Authentication manager**.
4. On the User and Authentication Policy Administration Summary page, select a Complex Name. Under the **Select action** menu, select **Create Storage Authentication Service Policy**.

5. On the Authentication Service Configuration page, enter the following information:
 - Policy Name
 - Authentication Service URL (primary)
 - Authentication Service Client User ID
 - Authentication Service Client Password
 - Confirm Authentication Service Client Password

Click **Next**.

Tip: The following text is an example of an authentication web address:

`https://JazzSM_server_host:WC_adminhost_secure/TokenService/services/Trust`

The following text is an example of the web address you enter:

`https://JazzSMServer.storage.mycompnay.com:16311/TokenService/services/Trust`

The port for the Authentication Service is one plus the default Jazz for Service Management port. The port numbers for Jazz for Service Management can vary. Contact your Tivoli Storage Productivity Center administrator if you need to verify the Jazz for Service Management port. For more information about determining the ports, see *Determining port numbers for the Authentication Service web address*.

6. On the Truststore file Information page, enter the following information:
 - Truststore File Location
 - Truststore File Password
 - Confirm Truststore File Password
7. On the Map External Users and User Groups to DS8000 User Roles page, enter the following information:
 - External Entity Name
 - External Entity Type
 - DS8000 User Role

Click **Add**. The entry is entered in the table on this page. Select the entry that you created and click **Next**.

8. On the Verification page, verify the information and click **Next**.
9. On the Summary page, to activate the policy immediately, click **Activate the Policy**. To test the policy before activating it, do not select **Activate the Policy** and click **Finish** to create the policy. This scenario assumes that you want to test the policy before activating it. A message indicates whether the policy was successfully created. If the policy was successfully created, you can close the message dialog.
10. On the Manage Authorization Policy page, select a policy. Under the **Select action** menu, click **Test Authentication Policy**.
11. On the Test Storage Authentication Service Policy page, enter the following information:
 - External User Name
 - External User Password

Provide an LDAP user ID and password for External User Name and External User Password. The user ID must already be mapped to a valid DS8000 user role in the Storage Authentication Service policy. This user ID does not have to be in the Administrator group. Click **OK**.

12. On the Manage Authentication Policy page, select a policy. Under the **Select action** menu, click **Activate Authentication Policy**.
13. On the Activate Storage Authentication Service Policy page, enter the following information, and click **OK**:
 - External User Name
 - External User Password

Provide an LDAP user ID and password for External User Name and External User Password. The user ID must already be mapped to a valid DS8000 user role in the Storage Authentication Service policy. This user ID must be in the Administrator group. The policy is now activated.

14. To access the DS8000 GUI again from Tivoli Storage Productivity Center, update the user name and password:
 - a. In the web-based GUI, click **Storage Resources > Storage Systems**.
 - b. Click **DS8000**.
 - c. In the content panel, select DS8000 that you configured.
 - d. Right-click on DS8000 and click **Connections > Update Credentials**.
 - e. Change the user name and password to the External User Name and External User Password that were previously used to configure DS8000.

Configuring multiple Jazz for Service Management servers with one DS8000 R4.2

You can configure multiple Jazz for Service Management servers to use LDAP authentication for the IBM System Storage DS8000 R4.2.

Configuring multiple Jazz for Service Management servers

To configure multiple Jazz for Service Management servers, complete the following steps:

1. Configure one server as described in “Configuring Jazz for Service Management for DS8000 LDAP authentication” on page 342. This server is called JazzSM_server1.
2. Install a second Jazz for Service Management server and configure it with the same LDAP repository information as the first Jazz for Service Management server. The second server is called JazzSM_server2.
3. Open a command prompt window on JazzSM_server2.
4. Run the **wsadmin** command to export LTPA keys from JazzSM_server1 into a file on JazzSM_server2.

```
wsadmin -user Jazz_admin_ID -password Jazz_admin_password -lang jython
-port Jazz_SOAP_port -host JazzSM_server1_hostname_or_IP_address
-f "TPC_install_image_on_JazzSM_server2/scripts/tip/exportLTPAKeys.py"
"LTPA_keys_file_name" LTPA_keys_password
```

The following text is an example of this command:

```
C:\Program Files\IBM\Jazzsm\profile\bin>wsadmin -user tpccsuperuser
-password tpccsuperuser -lang jython
-port 9571 -host 9.56.98.41
-f "c:/tpc52installImage/scripts/tip/exportLTPAKeys.py"
"c:/share/ltpaKeys_serv1" ltpa123
```

This creates a file on JazzSM_server2 named ltpaKeys_serv1 that contains the LTPA keys of JazzSM_server1.

Note: Use forward slashes.

5. In the same command window, run the following command to import the LTPA keys into Jazz for Service Management on JazzSM_server2.

```
wsadmin -user JazzSM_admin_ID -password JazzSM_admin_password -lang jython
-f "TPC_install_image_on_JazzSM_server2/tscripts/tip/importLTPAKeys.py"
"LTPA_keys_file_name" LTPA_keys_password.
```

The following text is an example of this command:

```
C:\Program Files\IBM\JazzSM\profile\bin>wsadmin -user tpccsuperuser
-password tpccsuperuser -lang jython
-f "c:/tpc52installImage/scripts/tip/importLTPAKeys.py"
"c:/share/ltpaKeys_serv1" ltpa123
```

Note: Use forward slashes.

6. The LTPA keys in JazzSM_server1 and JazzSM_server2 are now synchronized. You can complete a successful single sign-on launch from JazzSM_server2 to DS8000 R4.2. DS8000 uses the same policy that was set up when you set up JazzSM_server1.

The same steps can be used to start the same DS8000 from any number of Tivoli Storage Productivity Center servers. This setup is not a high-availability setup because the policy in DS8000 still points to the Embedded Security Service in JazzSM_server1.

Note: Use forward slashes.

Setting up dual Jazz for Service Management servers for high availability

Set up dual Jazz for Service Management servers to provide high availability of LDAP authentication and single sign-on authentication for Tivoli Storage Productivity Center.

Procedure

Follow these steps:

1. Configure one Jazz for Service Management server as described in “Configuring Jazz for Service Management for DS8000 LDAP authentication” on page 342. In this example, this server is called JazzSM_server1.
2. Install a second Jazz for Service Management server with the same LDAP information as the first server. In this example, this server is called JazzSM_server2.
3. Open a command prompt window and go to the following directory:
JazzSM_install_directory/bin
4. On JazzSM_Server2, run the following WebSphere command to export the LTPA keys from JazzSM_server1 into a file on JazzSM_server2:

```
wsadmin -user JazzSM_admin_ID -password JazzSM_admin_password
-lang jython
-port JazzSM_SOAP_port
-host JazzSM_server1_hostname_or_IP_address
-f "TPC_install_image_on_JazzSM_server2/scripts/tip/exportLTPAKeys.py"
"LTPA_keys_file_name" LTPA_keys_password
```

Here is an example on a Windows system that uses the default Tivoli Storage Productivity Center installation file path:

```
C:\Program Files\IBM\JazzSM\profile\bin>wsadmin -user tpccsuperuser
-password tpccsuperuserpassword
-lang jython
-port 9571
-host 9.54.91.40
-f "c:/tpc52installImage/scripts/tip/exportTPAKeys.py"
"c:/share/ltpakeys_serv1" ltpa123
```

This step creates a file named `ltpakeys_serv1` that contains the LTPA keys of JazzSM_server1. The LTPA keys are imported into JazzSM_server2.

Note: Use forward slashes with the `-f` parameter.

5. In the same command window, run the following WebSphere command to import the LTPA keys into Jazz for Service Management:

```
wsadmin -user JazzSM_admin_ID -password JazzSM_admin_password
-lang jython
-f "TPC_install_directory_on_JazzSM_server2/scripts/tip/importTPAKeys.py"
"LTPA_keys_file_name" LTPA_keys_password
```

Here is an example on a Windows system by using the default Jazz for Service Management installation file path:

```
C:\Program Files\IBM\JazzSM\profile\bin>wsadmin -user tpccsuperuser
-password tpccsuperuserpassword
-lang jython
-f "c:/tpc52installImage/scripts/tip/importTPAKeys.py"
"c:/share/ltpakeys_serv1" ltpa123
```

Note: Use forward slashes with the `-f` parameter.

6. Synchronize the second authentication service (on JazzSM_server2) with the correct LTPA keys:

```
C:\Program Files\IBM\JazzSM\profile\bin>wsadmin -user tpccsuperuser
-password tpccsuperuserpassword
-lang jython
-c "AdminTask.importESSLTPAKeys
(['-pathname c:/share/ltpakeys_serv1 -password ltpa123'])"
```

Restart the second Jazz for Service Management server (on JazzSM_server2).

The LTPA keys in JazzSM_server1 and JazzSM_server2 are now synchronized.

7. If you are using the Java client, add the SSL certificates for all servers to the truststore file:
 - a. Log on to Jazz for Service Management on JazzSM_server1 and extract the certificate.
In this example, the certificate is named `cert1.cer`.
 - b. Log on to Jazz for Service Management on JazzSM_server2 and extract the certificate.
In this example, the certificate is named `cert2.cer`.
 - c. On JazzSM_server1, take the `cert1.cer` and `cert2.cer` certificates at one location and use the Java `keytool` command to create a truststore.
 - d. Go to `C:\Program Files\IBM\JazzSM\profile\java\bin` and add these two certificates:

```
keytool -import -alias JazzSMserver1
-file c:\cert1.cer
-keystore c:\ess.truststore.jks
-storetype jks
-storepass password
```

```
keytool -import -alias JazzSMServer2
-file c:\cert2.cer
-keystore c:\ess.truststore.jks
-storetype jks
-storepass password
```

- e. Verify that the two certificates exist in the keystore by running this command:

```
keytool -list
-keystore c:\ess.truststore.jks
-storepass password
```

This command must list the two aliases (JazzSMServer1 and JazzSMServer2) in the keystore.

- f. Copy the `ess.truststore.jks` keystore to `c:\Program Files\IBM\TPC\device\conf` on `JazzSM_server1` and `JazzSM_server2`.

Configuring SAN Volume Controller or Storwize V7000 with LDAP authentication

To use one user ID and password to access multiple applications, which is also called single sign-on, configure Tivoli Storage Productivity Center and SAN Volume Controller or Storwize V7000 for LDAP authentication.

Overview

Configuring Tivoli Storage Productivity Center and SAN Volume Controller or Storwize V7000 for LDAP authentication involves these general steps:

Tivoli Storage Productivity Center

Know the web address for the Authentication Service and the HTTP basic authentication user name and password.

SAN Volume Controller or Storwize V7000

Configure the remote authentication service of the cluster.

Configuring Tivoli Storage Productivity Center and Jazz for Service Management for LDAP authentication

To configure LDAP authentication for Tivoli Storage Productivity Center, Jazz for Service Management must be configured with LDAP. For more information about configuring Tivoli Storage Productivity Center with LDAP, see “Adding an LDAP repository to the federated repositories” on page 240.

The location of the IBM WebSphere Application Server directory is different for each instance:

- The Jazz for Service Management WebSphere Application Server directory:
`JAZZSM_INSTALL_DIR/profile`
- The Tivoli Productivity WebSphere Application Server or web server directory:
`TPC_INSTALL_DIR/ewas/profiles/WebServerProfile`

To configure Tivoli Storage Productivity Center and Jazz for Service Management for LDAP authentication, complete the following steps:

1. To access the WebSphere Integrated Solutions Console, open a web browser and enter one of the following web addresses in the address field:
 - `http://hostname:port/ibm/console/logon.jsp`

- `https://hostname:port/ibm/console/logon.jsp`

Where the hostname is the server that is running WebSphere Application Server, such as the server name or IP address, and port is the port number for the WebSphere Application Server. The port number differs depending on which protocol you used (http or https) and the options that you selected when you installed Tivoli Storage Productivity Center.

To determine the port number, complete the following steps:

- a. Open the `WebSphere_Directory/properties/portdef.props` file.
 - b. The port number is the value that is assigned to one of the following keys:
 - For http:// protocols:
`WC_adminhost`
 - For https:// protocols:
`WC_adminhost_secure`
2. Configure the Jazz for Service Management WebSphere Application Server and the Tivoli Storage Productivity Center WebSphere Application Server to use LDAP.

For more information about using LDAP, see “Adding an LDAP repository to the federated repositories” on page 240.
 3. Log in to Jazz for Service Management.
 4. Click **Settings > WebSphere Administrative Console**.
 5. Click **Launch WebSphere Administrative Console**.
 6. On the WebSphere Application Server Administration Console, click **Security > SSL Certificates and Key management**.

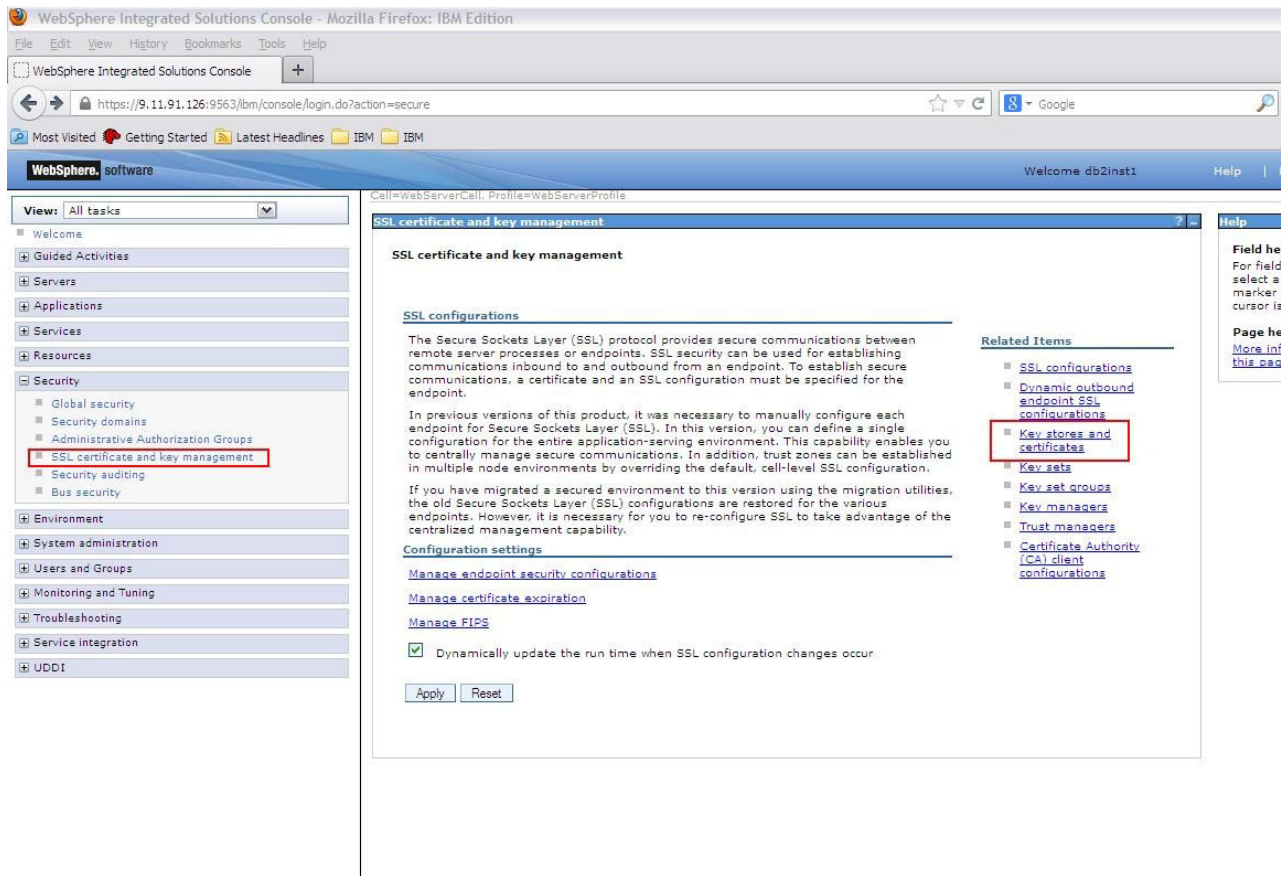


Figure 37. Clicking "SSL certificate and key management" from Security page

7. Click **KeyStores and Certificates** > **NodeDefaultKeystore**.
8. Click **Personal Certificates**.

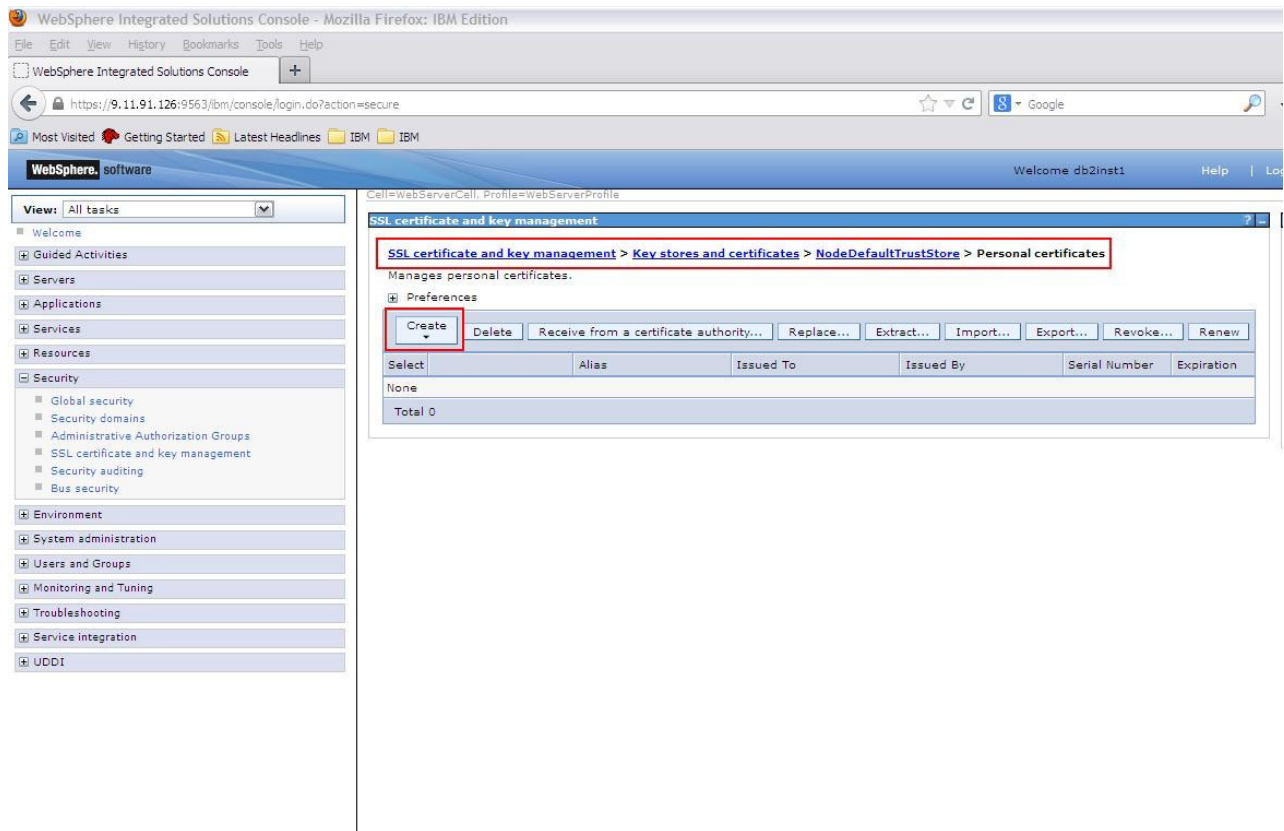


Figure 38. Clicking Create certificate from Personal certificate page

9. Click **Create**, select **Self-Signed Certificate**, and enter the appropriate details for this new certificate.

Note: The **Common name** field should be set to the IP address of the Tivoli Integrated Portal or the Jazz for Service Management server.

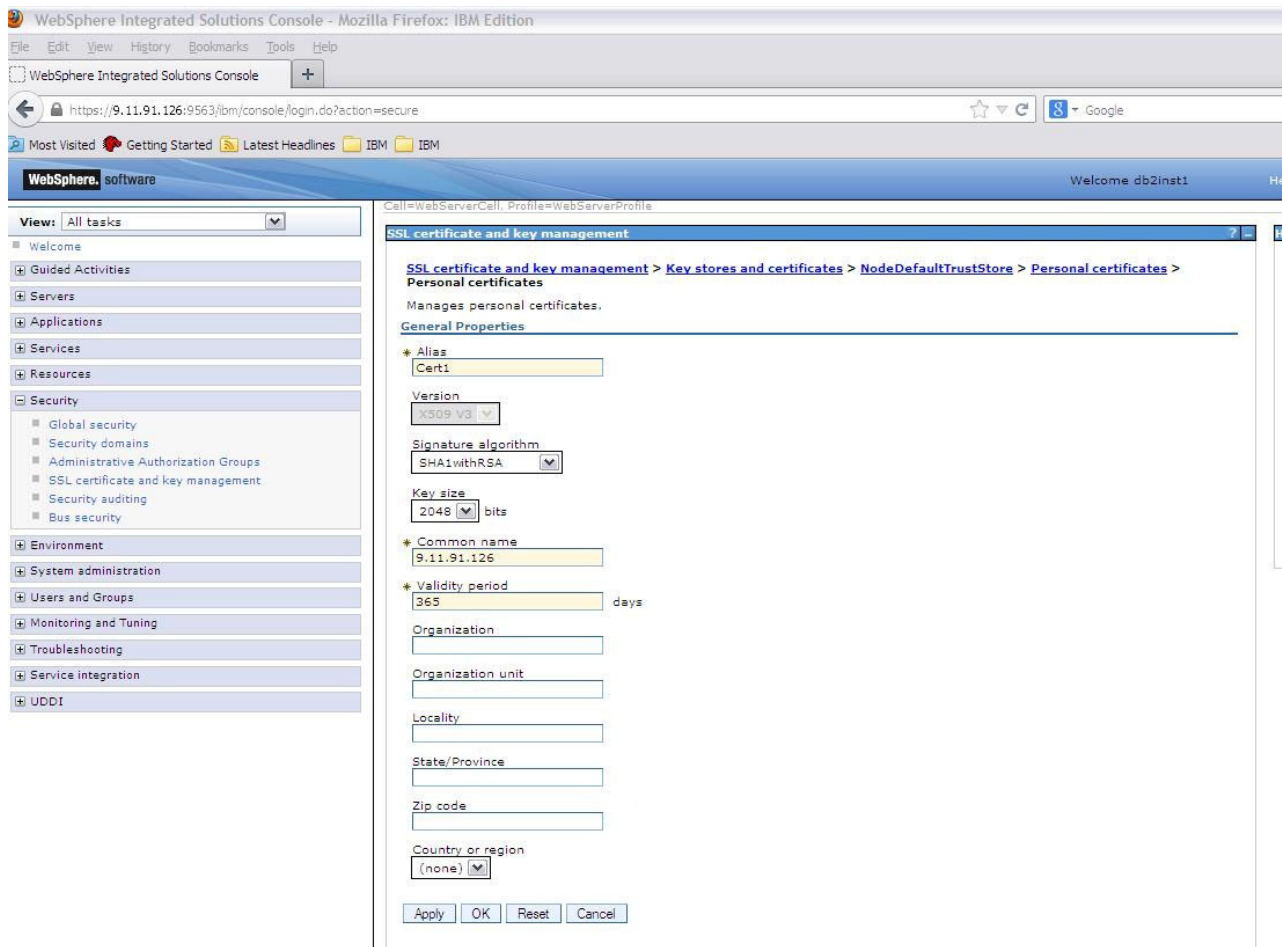


Figure 39. Create self-certificate

10. Click **Save**.

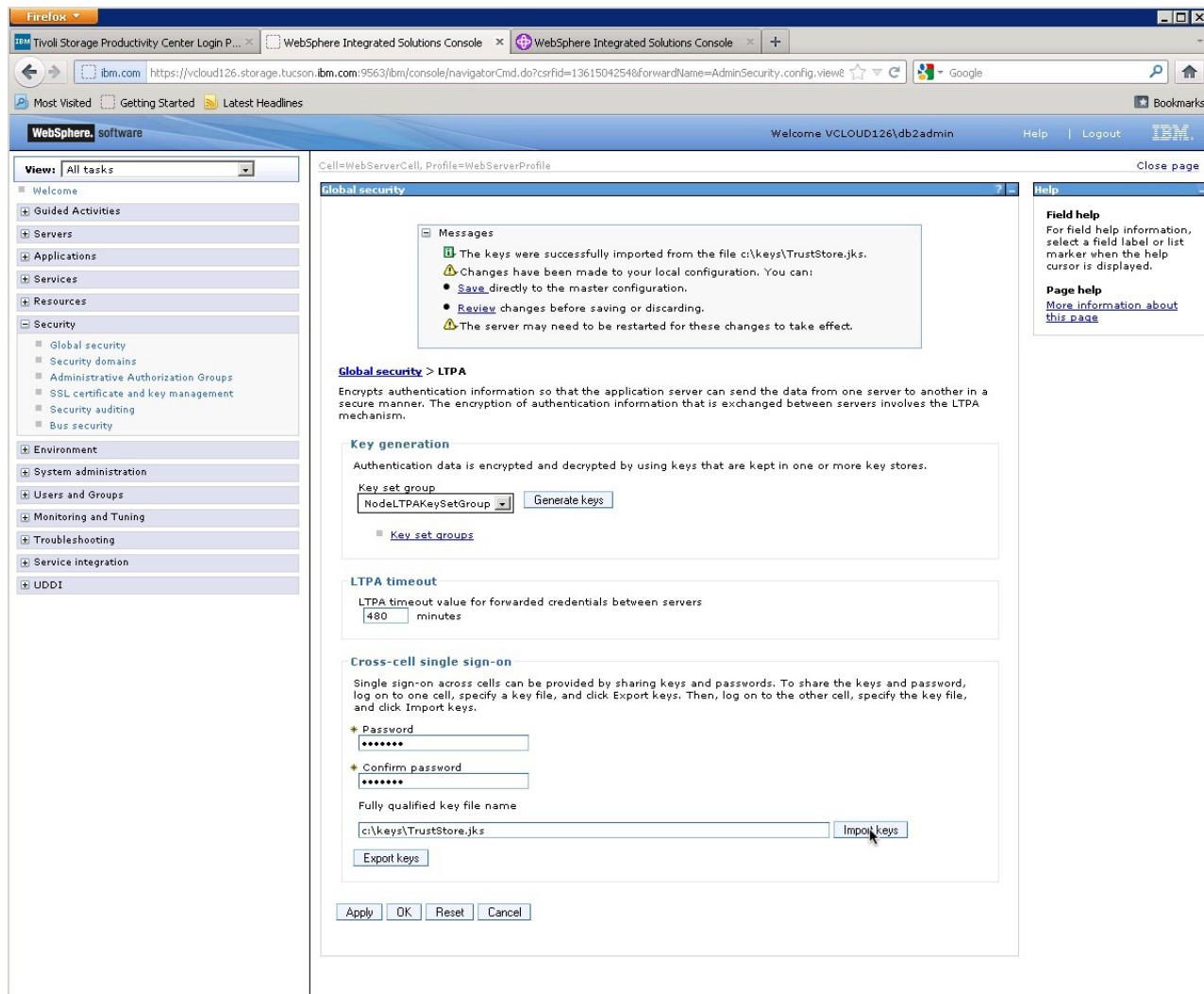


Figure 40. Clicking Save in the Global Security page

11. After the newly created certificate is displayed in the list, select the check box next to the **Default** certificate.
12. Select **Replace** to replace the default certificate with the newly created certificate:
 - a. In the WebSphere Application Server Administration Console, click **Security > SSL certificate and key management > SSL configurations > NodeDefaultSSLSettings**.
 - b. Set **Default server certificate alias** to the new certificate that you created.
13. Click **Save**.
14. Start Jazz for Service Management again.
15. Export the key from Jazz for Service Management WebSphere Application Server by using an LTPA key.
16. Import the new key in Tivoli Storage Productivity Center WebSphere Application Server.

Configuring SAN Volume Controller or Storwize V7000 for remote authentication service

You can use either the SAN Volume Controller or Storwize V7000 Management GUI or the command-line interface (CLI) to configure the remote authentication of a cluster. To configure remote authentication service on SAN Volume Controller or Storwize V7000, you must have the Security Administrator role.

To use the SAN Volume Controller Console Version 5.1 (or later) to configure remote authentication of a cluster:

1. Log on to the SAN Volume Controller Management GUI and select **Launch the SAN Volume Controller Console** for the particular cluster.
2. From the main menu, select **Manage Authentication > Remote Authentication**.
3. Check **Enabled** to enable remote authentication.
4. Enter the following information:
 - **Remote service user name**
 - **Remote service password**
 - **Protocol:**
 - HTTP
 - HTTPS
 - **Remote service web address**
5. Click **OK**.
6. From the main menu, click **Manage Authentication > User Groups**.
7. Select **Create a Group** and then click **Go**.
8. Enter a **Name**.

The name of the group you create in the SAN Volume Controller GUI must be identical to the name of a group in the LDAP repository, which is also used by Jazz for Service Management. The members of this LDAP group must be the LDAP users who use single sign-on between Jazz for Service Management and the SAN Volume Controller cluster.

9. Select a **Role**.
10. Select the **Enable this user group to be visible to the remote authentication service** check box.
11. Click **OK**.
12. Repeat steps 6 - 11 to create another group in the SAN Volume Controller Management GUI that corresponds to another group in the LDAP repository that is also used by Jazz for Service Management.

To use the SAN Volume Controller Management GUI Version 6.1 or later or Storwize V7000 Management GUI to configure remote authentication of a cluster, follow these steps:

1. In a browser, enter the following IP address for the Management GUI:
`https://cluster_domain_name or IP_address`
2. Log on to the Management GUI with your user name and password.
3. In the navigation portion of the Management GUI, click **Settings > Directory Services**.
4. On the Directory Services panel click **Global Actions > Enable Remote Authentication**.

5. After successfully enabling remote authentication, click **Global Actions > Configure Remote Authentication**.
6. Select **IBM Tivoli Integrated Portal** and click **Next**.
7. Enter information in the following fields:
 - **Remote Service Credentials Name**
 - **Remote Service Credentials Password**
 - **Web address for the remote authentication service**
8. Click **OK**.
9. If you are using the encrypted authentication service (HTTPS), you see a message that the SSL certificate is automatically retrieved from the web address.
10. Click **OK**.
11. In the navigation portion of the Management GUI, click **Access > Users**.
12. Click **New User Group**.
13. Enter a **Group Name**.

The name of the group that you create in the Management GUI must be identical to the name of a group in the LDAP repository that is also used by Jazz for Service Management. The members of this LDAP group must be the LDAP users that use single sign-on between Jazz for Service Management and the cluster.
14. Select a **Role**.
15. Under **Remote Authentication (IBM Tivoli Integrated Portal)**, select the **Enable for this group** check box.
16. Click **Create**.
17. Repeat steps 11-16 to create another group in the Management GUI that corresponds to another group in the LDAP repository that is also used by Jazz for Service Management.

Configuring Tivoli Storage Productivity Center and Jazz for Service Management for single sign-on

To configure single sign-on, both Tivoli Storage Productivity Center and Jazz for Service Management must be configured with Lightweight Directory Access Protocol (LDAP). These additional steps must be completed in multiple-server environments where Tivoli Storage Productivity Center and Jazz for Service Management servers are installed on separate computers.

The location of the IBM WebSphere Application Server directory is different for Tivoli Storage Productivity Center and Jazz for Service Management.

- The WebSphere Application Server directory for Jazz for Service Management is in JAZZSM_INSTALL_DIR/profile.
- The WebSphere Application Server directory for Tivoli Storage Productivity Center is in TPC_INSTALL_DIR/ewas/profiles/WebServerProfile.

To configure Tivoli Storage Productivity Center and Jazz for Service Management for single sign-on, complete the following steps:

1. To access the WebSphere Integrated Solutions Console, open a web browser and enter one of the following web addresses:
 - `http://hostname:port/ibm/console/logon.jsp`
 - `https://hostname:port/ibm/console/logon.jsp`

The hostname is the server that is running WebSphere Application Server, such as the server name or IP address, and port is the port number for the WebSphere Application Server. The port number can differ, depending on which protocol you used (http or https) and the options that you selected when you installed Tivoli Storage Productivity Center.

To determine the port number, complete the following steps:

- a. Open the WebSphere_Directory/properties/portdef.props file.
- b. The port number is the value that is assigned to one of the following keys:
 - For http:// protocols, WC_adminhost.
 - For https:// protocols, WC_adminhost_secure.
2. Log in to the WebSphere Integrated Solutions Console for Jazz for Service Management. To complete this procedure, your user name must have Administrator authorization in the WebSphere Integrated Solutions Console.
3. In the WebSphere Integrated Solutions Console navigation tree, click **Security** > **Global security**.
4. On the Global security page, in the User account repository section, click **LTPA** under **Authentication mechanisms and expiration**.

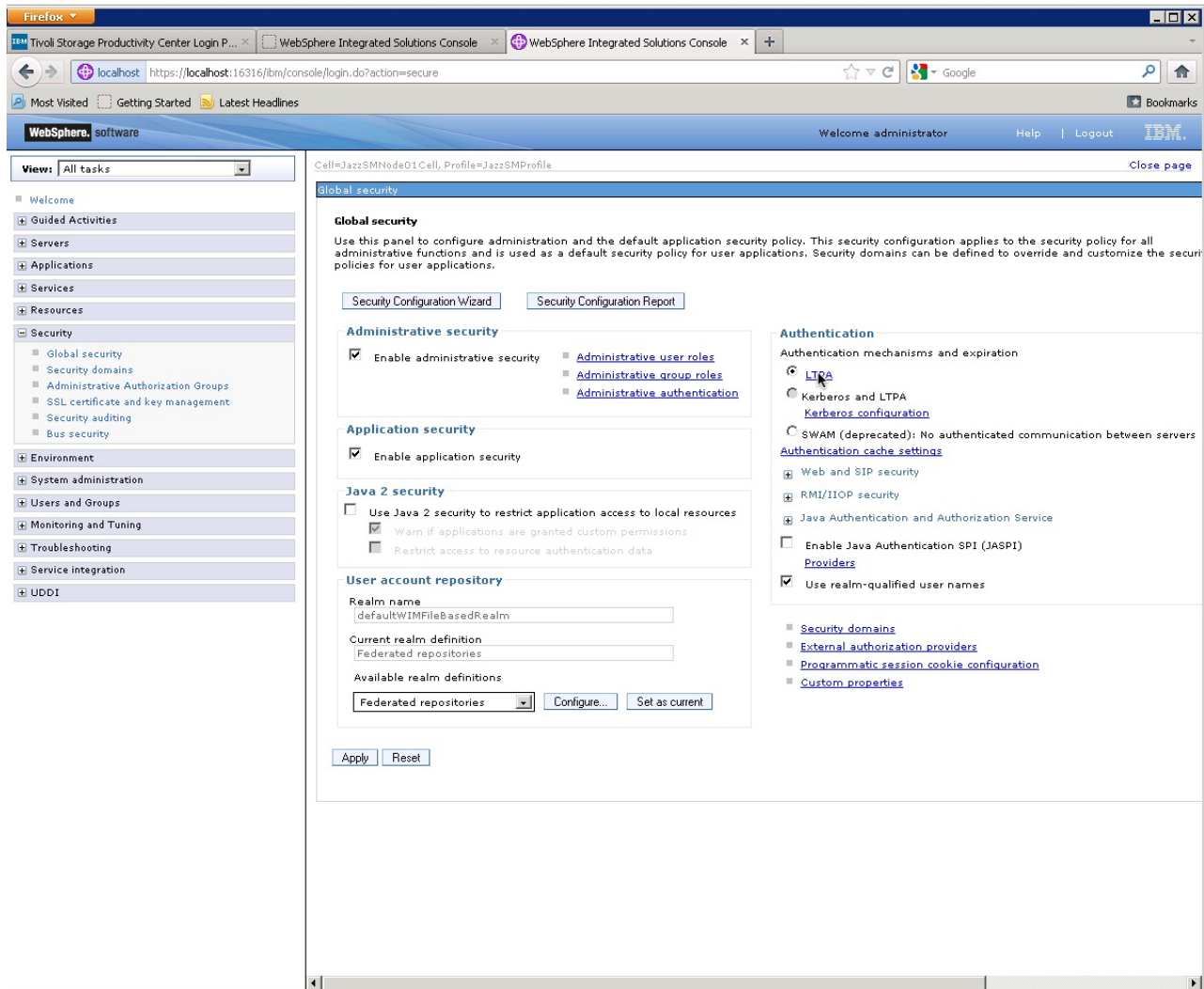


Figure 41. Global Security page

5. Under **Cross-cell single sign-on**, enter a new password (for example, ltpa123) for the certificate and the fully qualified key file name.
6. Click **Export Key**.

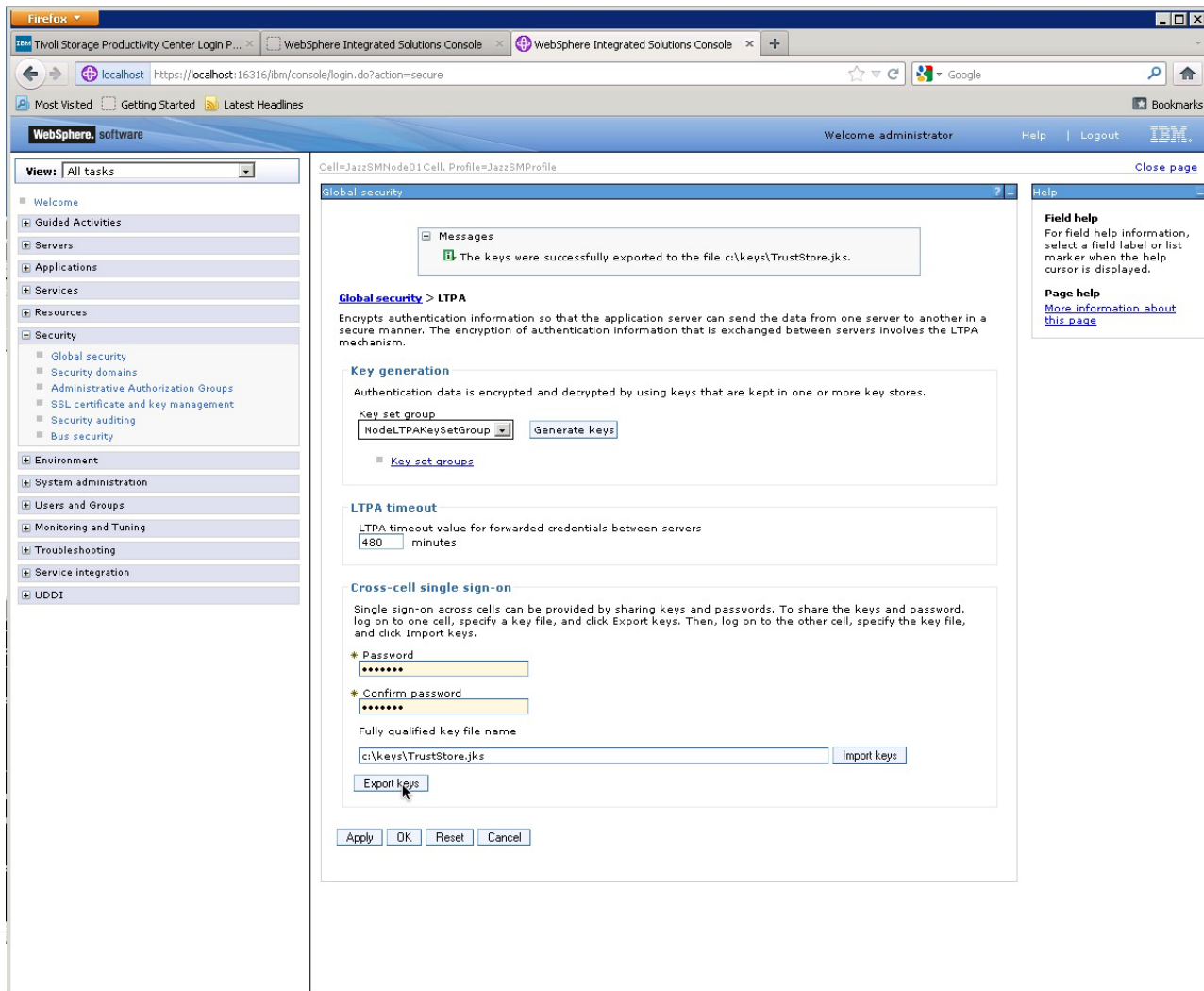


Figure 42. Exporting the LTPA key

7. Log in to the WebSphere Integrated Solutions Console for Tivoli Storage Productivity Center. To complete this procedure, your user name must have Administrator authorization in the WebSphere Integrated Solutions Console.
8. On the Global security page, in the User account repository section, click **LTPA** under **Authentication mechanisms and expiration**.

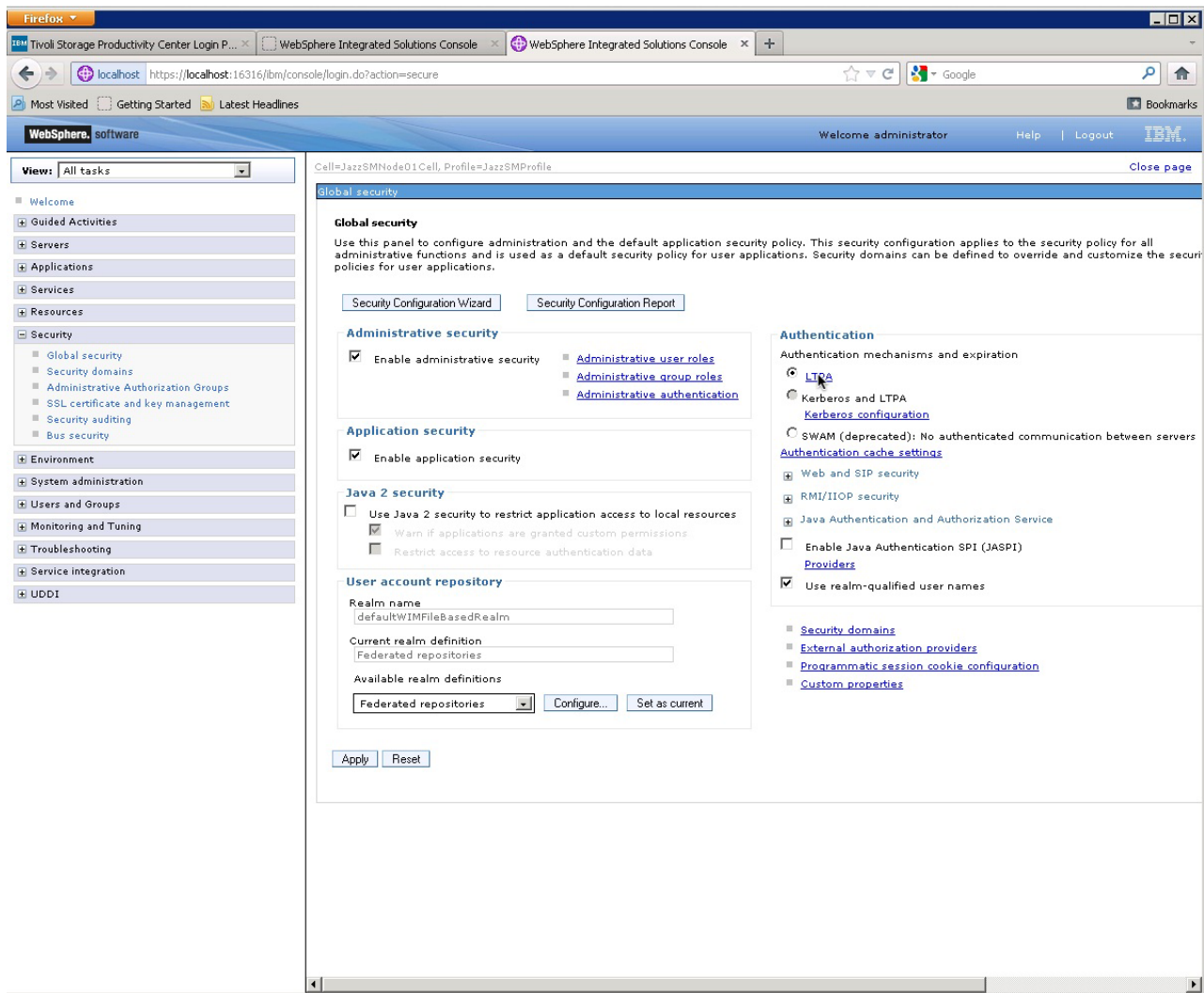


Figure 43. Global Security page

9. Under **Cross-cell single sign-on**, enter the password that you used to create the certificate in step 5 and the fully qualified key file name.
10. Click **Import Key**.

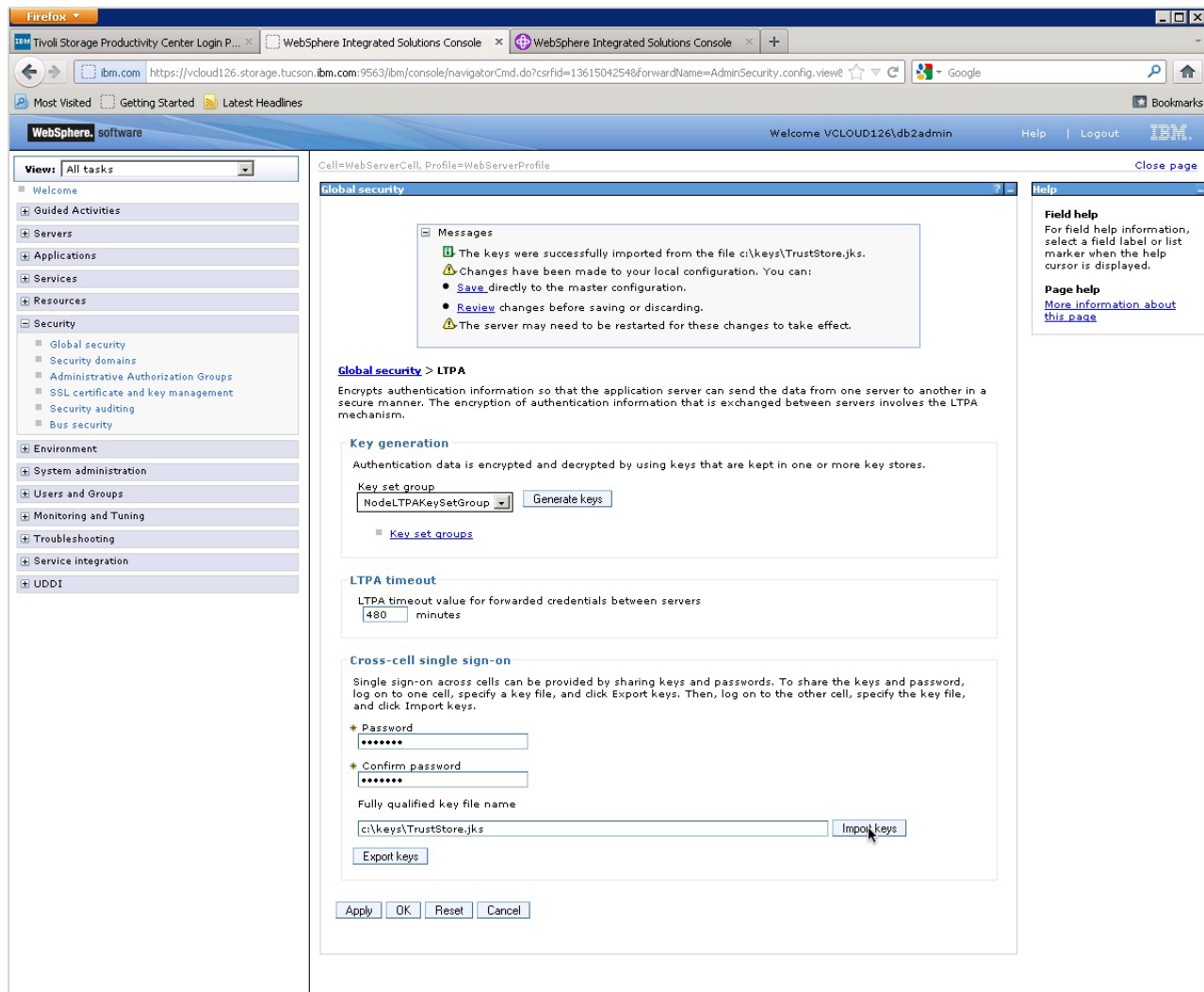


Figure 44. Importing the LTPA key

11. In the Messages section at the top of the Global security page, click **Save**.

Related tasks:

“Adding an LDAP repository to the federated repositories” on page 240

You can configure Tivoli Storage Productivity Center and Jazz for Service Management to communicate with an external Lightweight Directory Access Protocol (LDAP) repository, such as IBM Tivoli Directory Server or Microsoft Active Directory. When you change the authentication configuration, Tivoli Storage Productivity Center is available to users and groups in other repositories.

Configuring and controlling the Tivoli Storage Productivity Center Monitoring Agent

You can configure the Tivoli Storage Productivity Center Monitoring Agent to change the Tivoli Enterprise Monitoring Services connection, log path, or authentication parameters. You can also start and stop the Tivoli Storage Productivity Center Monitoring Agent.

Configuring the Tivoli Storage Productivity Center Monitoring Agent on Windows

You can configure the Tivoli Storage Productivity Center Monitoring agent on the Windows operating system.

To configure the Tivoli Storage Productivity Center Monitoring agent on Windows, complete the following steps:

1. Log on to the system with administrator authority on Windows.
2. Open the Tivoli Enterprise Monitoring Services Console. Click **Start > All Programs > IBM Tivoli Monitoring > Manage Tivoli Monitoring Services**.

Tip: Depending on how you have your Tivoli Monitoring Services components distributed across your enterprise, you will see different types of Tivoli Enterprise Monitoring Services components displayed.

3. On the Manage Tivoli Enterprise Monitoring Services window, select **Monitoring Agent for TPC**.
4. Click **Monitoring Agent for TPC** and click **Reconfigure**.
5. For information about the different parameters to change, see “Installing and configuring the Tivoli Storage Productivity Center Monitoring Agent on Windows” on page 219.

Configuring the Tivoli Storage Productivity Center Monitoring Agent on AIX or Linux

You can configure the Tivoli Storage Productivity Center Monitoring Agent on the AIX or Linux operating systems.

To configure the Tivoli Storage Productivity Center Monitoring agent on the AIX or Linux operating systems, complete the following steps:

1. Log on to the system with the root user ID or a user ID that has root access rights.
2. Open the Tivoli Enterprise Monitoring Services Console.
3. Open a terminal session window and go to the Tivoli Monitoring Services bin installation directory.

The default directory is:

`/opt/IBM/ITM/bin`

4. Run the following command:
`./itmcmd manage`

Tip: Depending on how you have your Tivoli Monitoring Services components distributed across your enterprise, you will see different types of Tivoli Enterprise Monitoring Services components displayed.

5. On the Manage Tivoli Enterprise Monitoring Services window, select **Monitoring Agent for TPC**.
6. Click **Monitoring Agent for TPC** and click **Configure**.
7. For information about the different parameters to change, see “Installing and configuring the Tivoli Storage Productivity Center Monitoring Agent on AIX or Linux” on page 222.

Starting and stopping the Tivoli Storage Productivity Center Monitoring Agent

You can start and stop the Tivoli Storage Productivity Center Monitoring Agent.

To start or stop the Tivoli Storage Productivity Center Monitoring agent on the Windows operating systems, complete the following steps:

1. Open the Tivoli Enterprise Monitoring Services Console. Click **Start > All Programs > IBM Tivoli Monitoring > Manage Tivoli Monitoring Services**.
2. On the Manage Tivoli Enterprise Monitoring Services window, select **Monitoring Agent for TPC**.
3. Click **Monitoring Agent for TPC**.
4. Click **Start** to start the agent, **Stop** to stop the agent, or **Recycle** to recycle the agent.
5. Wait for the agent to start, stop, or recycle.

To start or stop the Tivoli Storage Productivity Center Monitoring agent on the AIX or Linux operating systems, complete the following steps:

1. Open the Tivoli Enterprise Monitoring Services Console.
2. Open a terminal session window and go to the Tivoli Monitoring Services bin installation directory.
The default directory is:
`/opt/IBM/ITM/bin`
3. Run the following command:
`./itmcmd manage`
4. On the Manage Tivoli Enterprise Monitoring Services window, select **Monitoring Agent for TPC**.
5. Click **Monitoring Agent for TPC**.
6. Click **Start Service** to start the agent, **Stop Service** to stop the agent, or **Recycle Service** to recycle the agent.
7. Wait for the agent to start, stop, or recycle.

Installing and configuring the Tivoli Storage Productivity Center server with multiple NIC cards

If your Tivoli Storage Productivity Center server has multiple network interface cards (NIC), install the Tivoli Storage Productivity Center server using a fully qualified hostname that resolves to the IP address of NIC card you want to use. After you install the Tivoli Storage Productivity Center server, all incoming and outgoing communication are successfully handled.

Installing Tivoli Storage Productivity Center for a multiple network configuration

If the Tivoli Storage Productivity Center server you are installing has multiple NIC, and is configured to use multiple network addresses, ensure that you use the fully qualified hostname that resolves to the appropriate IP address during installation. You can either setup the HOSTS file or the DNS to resolve the fully qualified host names to appropriate IP addresses.

Outgoing communication initiated by the Tivoli Storage Productivity Center server

All the outgoing communication that is initiated by the Tivoli Storage Productivity Center server is not affected if the server is configured for a multiple network environment.

For example, if you have a Tivoli Storage Productivity Center server with two IP addresses: 10.10.10.11 and 9.9.9.10, and 10.10.10.11 is used during installation, all outgoing transmissions can be sent to the devices and agents in both networks.

The following list includes examples of outgoing communication that is initiated by the Tivoli Storage Productivity Center server:

Storage systems using native interfaces

Run probe, performance management, and provisioning jobs, and collect data events (SAN Volume Controller, Storwize V7000 Unified, Storwize V7000, and XIV Systems)

Switches (SNMP)

Run SNMP discovery and probe jobs

CIM agents

Run discovery, probe, and performance management jobs, and provisioning jobs

VMware vSphere or vCenter

Run discovery and probe jobs

Agents (Storage Resource agents)

Deploy agents, run probe, discovery, scan, and batch report jobs, and run scripts

Tivoli Storage Productivity Center servers

Run probe jobs

Incoming communication that is initiated by the devices, agents, and GUI

Incoming communication that is initiated by the devices or agents can work with only the IP address that is specified during the installation with the exception of DS8000 events.

For DS8000 events, the Tivoli Storage Productivity Center server must initiate and establish a socket connection directly with the Hardware Management Console (HMC) to receive events. The DS8000 HMC uses that socket connection to send events. As long as the Tivoli Storage Productivity Center server can initiate the communication to the HMC, DS8000 events can be received.

Tivoli Storage Productivity Center informs devices and agents to initiate communication to the IP address provided during the installation. This example uses the IP address 10.10.10.11. However, depending on the communication, you might be able to change the IP address. For example, Tivoli Storage Productivity Center does not configure SAN switches to send SNMP traps to Tivoli Storage Productivity Center, so you can use either 9.9.9.10 or 10.10.10.11.

The following list includes examples of incoming communication that are initiated by the devices, agents, and the GUI:

DS8000 events

Events sent by the HMC to the Tivoli Storage Productivity Center server

SNMP trap notifications

SNMP traps sent from the switches and other devices

CIM indications

Indications sent by the CIM agents

Servers (agents)

Job results and registration

Tivoli Storage Productivity Center GUI

Any request.

CIM indications

A CIM indication is an event that occurs on a managed object, for example, the completion or failure of an operation. The CIM indications are managed by the CIM object manager. Tivoli Storage Productivity Center uses the CIM agents for the managed objects to gather information about the device.

Manually customize CIM indications on a Tivoli Storage Productivity Center system that has multiple IP addresses. To configure Tivoli Storage Productivity Center to receive CIM indications in an IPv4, IPv6, and dual stack (IPv4 and IPv6) environment, see “Configuring Tivoli Storage Productivity Center with multiple IP addresses” on page 319.

The manual customization task does not apply to storage devices that use the native interfaces.

Creating an SSH certificate for the root user ID

You can create a Secure Shell (SSH) certificate for authentication for the Virtual I/O Server. Follow the certificate-generation instructions. However, if you want to use Telnet to connect to the Virtual I/O Server using the padmin user ID, you must follow this procedure.

To create an SSH certificate using the padmin user ID, follow these steps:

1. Telnet to the remote system using the padmin user ID.
2. Set up the AIX environment. Run the following command:
`oem_setup_env`
3. Change to the following `/.ssh` directory.
4. Enter **ssh-keygen**. Accept the default names (for example, `id_rsa`).
5. Enter the passphrase. Two new files are created:
id_rsa This is the private key.
id_rsa.pub
This is the public key.
6. Create an `authorized_key` file in the same location as the `id_rsa.pub` file. Enter the following command:
`cat >> id_rsa.pub >> authorized_keys`
The following example shows the command input and output (the commands are in bold):

```
# ssh-keygen

Generating public/private rsa key pair.
Enter file in which to save the key (//.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
You identification has been save in //.ssh/id_rsa.
Your public key has been save in //.ssh/id_rsa.pub.
The key fingerprint is:
xx:xx:xx:xx:xx:xx:xx:xx:xx:xx:xx:xx:xx:xx:xx:xx root@<server>

# cat id_rsa >> authorized_keys
# ls -l

-rw-r--r-- 1 root system 1743 Oct 15 09:40 authorized_keys
-rw---- 1 root system 1743 Oct 15 09:39 id_rsa
-rw-r--r-- 1 root system 399 Oct 15 09:39 id_rsa.pub
```

7. Copy the id_rsa (private key) to your server machine.

Note: You must copy the file in binary mode.

8. To connect to the remote system using the private key, enter the following information in the Remote Agent Machines window when you install the Storage Resource agent:
 - User
 - Certificate Location (c:\keys\id_rsa)
 - Passphrase

Configuring DB2, AIX, and Linux for IPv6-only environment

Use this information to configure DB2, AIX, and Linux for an IPv6-only environment.

Configuring the AIX system for IPv6 only

For IPv6 support, the AIX operating system must have level TL 5300-06 installed.

To configure the AIX operating system for IPv6, complete the following steps:

1. Obtain the most recent versions of **openssh** and **openssl** packages for AIX and install them. Some older version of **openssh** does not work in an IPv6-only environment.
2. Change **sshd** (Secure Shell Daemon) on AIX system to accept IPv6 connections.
 - a. In the /etc/ssh/sshd_config file, uncomment the line "ListenAddress:".
 - b. Restart **sshd** with the following commands:


```
stopsrc -g ssh
startsrc -g ssh
```
 - c. From another IPv6 system, verify that you contact AIX over IPv6 (by using ssh).
3. In SMIT, set the IPv4 address to 0.0.0.0 for all interfaces. Save the file.
4. Edit the /etc/resolv.conf file to use IPv6 DNS server or servers.

Configuring DB2 on AIX for IPv6 systems

To get DB2 on AIX operating systems to work on IPv6 systems, complete the following steps:

1. Identify the host name that is used by DB2 in the db2nodes.cfg file:


```
# cat ~db2inst1/sqllib/db2nodes.cfg
0 myhost 0
#
```

2. Edit the `/etc/hosts` file and make sure that the host name found in the `db2nodes.cfg` file resolves to an IPv6 address. Use the `vi` editor to verify that the host name is not on any line with an IPv4 address. In particular, ensure that the host name is not listed as an alias for the IPv4 loopback address 127.0.0.1.

```
# vi /etc/hosts
127.0.0.1 loopback localhost
::1 localhost
2001:db8:0:0:209:6bff:fe09:63fa myhost.mydomain myhost
```

3. Stop DB2 and set DB2 to use IPv6 addressing. Restart DB2.

- a. Source the DB2 profile:


```
. ~db2inst1/sqllib/db2profile
```

- b. Stop DB2:

```
db2stop
```

- c. Configure DB2 to use IPv6.

```
db2set
```

An example of the output is: `DB2FCMCOMM=TCPIP6`.

- d. Start DB2.

```
db2start
```

In some installations, the AIX server does not have a graphical console that is attached to the server. In this situation, you can select another system with an X11 server to display the Tivoli Storage Productivity Center installation and Tivoli Storage Productivity Center application. The X11 server must have IPv6 configured and an SSH client installed. Open an SSH connection from a shell on the X11 server desktop with the `-X` option to permit forwarding of X11 applications from the remote AIX server. Start the Tivoli Storage Productivity Center installation program or application from the SSH shell.

```
ssh -X my_IPv6_host
/opt/IBM/TPC/gui/TPCD.sh
```

Configuring DB2 on Linux for IPv6-only systems

To get DB2 on Red Hat Enterprise Linux Version 5 and 6 systems to work in an IPv6-only environment, follow these steps:

1. Install DB2 in dual-stack configuration.
2. Stop DB2 and set DB2 to use IPv6 addressing:
 - a. As the root user from the UNIX command-line, run this command:

```
su - db2inst1
```

- b. Stop DB2 by running this command:

```
db2stop
```

- c. Configure DB2 to use IPv6 by running this command:

```
db2set
```

An example of the output is: `DB2FCMCOMM=TCPIP6`.

The host name in the `db2nodes.cfg` file resolves to an IPv6 address. This action can require you to change the domain or search directive in the `/etc/resolv.conf` file to specify a domain in which the host name can resolve to IPv6. You can also edit the `/etc/hosts` file so that the host name resolves to an IPv6 address.

- d. Start DB2 by running this command:
`db2start`

Chapter 4. Upgrading and migrating

You can upgrade from Tivoli Storage Productivity Center Version 4.2.2 (or later) or Version 5.1 (or later) to Tivoli Storage Productivity Center Version 5.2.

Review this list of upgrade issues before you upgrade to Tivoli Storage Productivity Center Version 5.2:

- Tivoli Storage Productivity Center Version 5.2 does not use the Fabric agent, so you must migrate the Fabric agents to Storage Resource agents.
- You must decide whether you want to migrate performance and configuration history data. Depending on how much data you have, it can take from one to several hours or more to migrate the data. If you do not migrate the data, this information is deleted from the database repository.
- If the upgrade process fails and a Tivoli Storage Productivity Center component cannot be upgraded, the upgrade process ends and the status of the component is shown as failed. When you restart the upgrade process, the installation program resumes upgrading the failed component.
- Ports from the previous releases of Tivoli Storage Productivity Center are reused in Tivoli Storage Productivity Center Version 5.2.

Complete the following tasks before you upgrade Tivoli Storage Productivity Center:

- Ensure that your system meets the hardware and software requirements for upgrading. For more information, see “Hardware requirements” on page 105 and “Software requirements” on page 108.
- Back up your Tivoli Storage Productivity Center environment, including the database repository. For more information, see “Backups” on page 371.
- Migrate any Fabric agents to a Storage Resource agent.

Restriction: To migrate Fabric agents before the upgrade, use the Tivoli Storage Productivity Center Version 4.2.2 (or later) GUI or use the command-line interface. To migrate Fabric agents after the upgrade, use the Tivoli Storage Productivity Center 5.1 (or later) GUI or the migration command in the command-line interface.

- You must manually migrate Business Intelligence and Reporting Tools (BIRT) reports. These reports must be exported from Tivoli Integrated Portal Version 1.1 or Version 2.2 before you upgrade Tivoli Storage Productivity Center. For more information about migrating BIRT reports, see “Migrating BIRT reports” on page 413.

Prerequisites: On Windows operating systems, before you upgrade Tivoli Storage Productivity Center, complete the following tasks:

- If you installed the Monitoring Agent service, stop the **Monitoring Agent for Windows OS - Primary** and **Monitoring Agent for Windows OS - Watchdog** services.
- If the **Windows Search** service is enabled, disable and stop the service.

After the upgrade is complete, you can enable and restart these services.

Tivoli Storage Productivity Center reports

Tivoli Storage Productivity Center Version 5.2 uses Jazz for Service Management instead of Tivoli Integrated Portal. For more information about Jazz for Service Management, see *Jazz for Service Management overview*.

In Tivoli Storage Productivity Center Version 5.2, you can run predefined Tivoli Storage Productivity Center reports, which can be installed during (or after) you upgrade Tivoli Storage Productivity Center. To run and use these reports, you must install Jazz for Service Management Version 1.1.0.1 and Tivoli Common Reporting Version 3.1.0.1.

The web-based GUI

The Tivoli Storage Productivity Center web-based GUI uses Tivoli Storage Productivity Center servers and runs on embedded IBM WebSphere Application Server instead of Tivoli Integrated Portal. For more information about the web-based GUI, go to the Tivoli Storage Productivity Center information center. Search for *User interfaces to Tivoli Storage Productivity Center*.

Upgrading Tivoli Storage Productivity Center

Before you upgrade from Tivoli Storage Productivity Center Version 4.2.2 (or later) or Version 5.1 (or later) to Tivoli Storage Productivity Center Version 5.2, you must first migrate BIRT reports. For more information about migrating BIRT reports, see “Migrating BIRT reports” on page 413.

During an upgrade, you can determine whether you want to uninstall Tivoli Integrated Portal or preserve it. Uninstall Tivoli Integrated Portal Version 1.1 if it is not being used by other installed products. Keep Tivoli Integrated Portal Version 1.1 installed if you have another product that uses Version 1.1.

Restriction: If you are upgrading from Tivoli Storage Productivity Center Version 4.2.2 (or later) or Version 5.1 (or later) to Version 5.2, Tivoli Integrated Portal Version 1.1 or Version 2.2 must be running before you can uninstall Tivoli Integrated Portal.

Related concepts:

“Upgrading Tivoli Storage Productivity Center in a single-server environment” on page 378

You can upgrade Tivoli Storage Productivity Center by using the upgrade wizard or silent mode.

“Upgrading Tivoli Storage Productivity Center in a multiple-server environment” on page 387

You can upgrade Tivoli Storage Productivity Center by using the upgrade wizard or by silent mode.

Related tasks:

“Preparing for an upgrade” on page 371

To upgrade to Tivoli Storage Productivity Center Version 5.2, run the Tivoli Storage Productivity Center installation program. The installation wizard pages that you see depend on the components that you install.

“Installing Tivoli Storage Productivity Center reports later in a single-server environment after an upgrade” on page 385

In a single-server environment, you can install Tivoli Storage Productivity Center reports by using the installation wizard after you upgrade to Tivoli Storage

Productivity Center Version 5.2.

“Installing Tivoli Storage Productivity Center reports later in a multiple-server environment after an upgrade” on page 405

In a multiple-server environment with a remote database, you can choose to install Tivoli Storage Productivity Center Version 5.2 reports by using the installation program after you upgrade to Tivoli Storage Productivity Center Version 5.2.

Preparing for an upgrade

To upgrade to Tivoli Storage Productivity Center Version 5.2, run the Tivoli Storage Productivity Center installation program. The installation wizard pages that you see depend on the components that you install.

Before you upgrade, you must review the following information:

- “Hardware requirements” on page 105
- “Software requirements” on page 108

For a complete list of installation images that you need during an upgrade, see “Tivoli Storage Productivity Center installation” on page 121.

Prerequisite:

Review the following list of issues before you upgrade Tivoli Storage Productivity Center:

- If you are deploying the Storage Resource agent on UNIX or Linux systems, you must use root as the user ID.
- You cannot install the Storage Resource agent from the disk 1 image on computers that do not have a Data server installed. To install a Storage Resource agent on a computer where the Data server is not installed, you must use the separate Storage Resource agent electronic image or DVD.
- After you upgrade Tivoli Storage Productivity Center, all trace settings are reset to the default values. If you changed the trace settings, you must reset the trace settings after an upgrade.

Upgrading Tivoli Storage Productivity Center can be disruptive to Tivoli Storage Productivity Center for Replication services. For Tivoli Storage Productivity Center for Replication, you can complete a takeover to a standby server to ensure that consistency can be maintained for any active servers.

Backups

Before you migrate, you must back up the entire Tivoli Storage Productivity Center system.

The process involves backing up the following parts:

- Tivoli Storage Productivity Center database by using DB2 backup utilities.
For more information about backing up your database, see Tivoli Storage Productivity Center Information Center. Search for *Backing up the Tivoli Storage Productivity Center database*.
- The entire Tivoli Storage Productivity Center server by using software such as IBM Tivoli Storage Manager.

Tip: The frequency of backups depends on the data protection policies of your company, the Tivoli Storage Productivity Center work load, and the size of the

Tivoli Storage Productivity Center environment. Your backup plan must include documentation with the user names and passwords for DB2, Tivoli Storage Productivity Center, and Tivoli Integrated Portal.

If you experience problems during the migration, use these backups to restore your original Tivoli Storage Productivity Center system and try to migrate again. For more information about restoring the Tivoli Storage Productivity Center database, see Restore overview.

Choosing the upgrade method

You can upgrade Tivoli Storage Productivity Center in a single- or multiple-server environment by using the upgrade wizard or silent mode. In silent mode, a command is provided with the values in a response file.

Important: On UNIX and Linux operating systems, you must have an X Window system program to display the installation wizard.

A silent-mode upgrade is useful if your system is running from a terminal that cannot display graphics.

Related tasks:

“Upgrading Tivoli Storage Productivity Center in a single-server environment by using the wizard” on page 379

You can use the Tivoli Storage Productivity Center installation program to upgrade to Tivoli Storage Productivity Center Version 5.2.

“Upgrading Tivoli Storage Productivity Center in a single-server environment by using silent mode” on page 381

You can upgrade to Tivoli Storage Productivity Center Version 5.2 by using silent mode. This upgrade method is useful if your computer cannot display graphics.

Fix packs and patches

All fix packs and patches use the upgrade procedure to upgrade Tivoli Storage Productivity Center.

You must have a valid Tivoli Storage Productivity Center license to use the upgrade procedure. For information about fix packs and patches, go to <http://www.ibm.com/support/docview.wss?uid=swg21320822>.

Upgrading from 32-bit DB2 Version 9.7 to 64-bit DB2 Version 10.1

If you are running an earlier version of Tivoli Storage Productivity Center that uses a 32-bit DB2, and you want to upgrade to Tivoli Storage Productivity Center Version 5.2, you must upgrade to 64-bit DB2 Version 10.1 Fix Pack 2.

For example, if you are using 32-bit DB2 Enterprise Server Edition Version 9.7 Fix Pack 4, you must first upgrade to 64-bit DB2 Version 9.7 Fix Pack 4 and then upgrade to 64-bit DB2 Version 10.1 Fix Pack 2 before you upgrade to Tivoli Storage Productivity Center Version 5.2.

Important: These steps are an example of one way to upgrade from 32-bit DB2 Version 9.7 Fix Pack 4 to 64-bit DB2 Version 10.1 Fix Pack 2 on 64-bit Windows 2008 R2.

For more information about upgrading from 32-bit DB2 Version 9.7 to 64-bit DB2 Version 9.7 on Windows operating systems, see Upgrading DB2 32-bit servers to

64-bit systems (Windows). For more information about upgrading to 64-Bit DB2 Version 10.1 on Linux and UNIX operating systems, see *Upgrading a DB2 server (Linux and UNIX)*. For more information about upgrading to 64-bit DB2 Version 10.1, see *Upgrade to DB2 Version 10.1*.

To upgrade from 32-bit DB2 Enterprise Server Edition Version 9.7 Fix Pack 4 to 64-bit DB2 Enterprise Server Edition Version 10.1 Fix Pack 2 on 64-bit Windows 2008 R2, complete the following steps:

1. Stop all of the Windows services for the Tivoli Storage Productivity Center servers, including Tivoli Integrated Portal.
2. In a DB2 command window, run the following commands to force all users or applications to disconnect from DB2:

```
db2 force application all
db2 terminate
```
3. In a DB2 command window, run the following command to ensure that no applications are accessing DB2:

```
db2 list applications
```
4. Create a directory to back up the Tivoli Storage Productivity Center database (for example, C:\downloads\db2_backup).
5. In a DB2 command window, run the following command to back up the Tivoli Storage Productivity Center database:

```
db2 BACKUP DATABASE database to C:\downloads\db2_backup
```

where *database* is the name of the Tivoli Storage Productivity Center database (usually TPCDB).

6. Stop all DB2 Windows services and exit DB2 in the Windows System Tray.
7. To upgrade DB2 to 64-bit DB2 Version 9.7 Fix Pack 4, complete the following steps:
 - a. In Windows Explorer, navigate to the following directory:

```
c:\64bit_DB2_9.7_fixpack4_download_directory\SERVER
```

where *64bit_DB2_9.7_fixpack4_download_directory* is where you downloaded the DB2 installation files.
 - b. Double-click the setup.exe file.
 - c. On the **DB2 Setup Launchpad** navigation tree, click **Install a Product**.
 - d. On the Install a Product page, in the **DB2 Enterprise Server Edition Version 9.7 Fix Pack 4** section, click **Work with Existing**.
 - e. On the Work with an Existing DB2 Copy window, select the DB2 copy for DB2 Version 9.7 Fix Pack 4.
 - f. Click **Launch DB2 Setup wizard**.
 - g. On the Warning window about upgrading DB2, click **OK**.
 - h. On the Warning window that states that 32-bit DB2 Version 9.7 Fix Pack 4 is detected is displayed, click **Yes**.
 - i. In the **DB2 Setup wizard**, complete the following steps:
 - 1) On the Welcome page, click **Next**.
 - 2) On the Software License Agreement page, review and accept the license agreement, and click **Next**.
 - 3) On the Select the installation type page, select **Typical**, and click **Next**.
 - 4) On the Select the installation, response file creation, or both page, keep the default selection, and click **Next**.

- 5) On the Installation folder page, click **Next**.
 - 6) On the Set the DB2 copy name page, click **Next**.
 - 7) On the Set user information for the default DB2 instance page, enter the correct user name and password values for the existing 32-bit DB2 Version 9.7 Fix Pack 4 installation, and click **Next**.
 - 8) On the Enable operating system security for DB2 objects page, ensure that the settings and values are correct for the existing 32-bit DB2 Version 9.7 Fix Pack 4 installation, and click **Next**.
 - 9) If the Warning window about existing group names is displayed, click **OK**.
 - 10) On the Start copying the files and create response file page, click **Finish**.
 - 11) On the Setup is complete page, click **Next**.
 - 12) On the Install additional products page, click **Finish**.
8. Restart your computer.
 9. Close the DB2 First Steps window.
 10. Stop all of the Windows services for the Tivoli Storage Productivity Center servers, including Tivoli Integrated Portal.
 11. To upgrade the Tivoli Storage Productivity Center database to 64-bit DB2 Version 9.7 Fix Pack 4, complete the following steps:
 - a. In a DB2 command window, run the following command to force all users or applications to disconnect from DB2:


```
db2 force application all
db2 terminate
```
 - b. In a DB2 command window, run the following command to ensure that no applications are accessing DB2:


```
db2 list applications
```
 - c. In a DB2 command window, run the following command to upgrade the Tivoli Storage Productivity Center database to 64-bit DB2 Version 9.7 Fix Pack 4:


```
db2 UPGRADE DATABASE database USER user_name USING password
```

where *database* is the name of the Tivoli Storage Productivity Center database (usually TPCDB), *user_name* is the user who owns the DB2 instance where the Tivoli Storage Productivity Center database is located (usually db2admin), and *password* is the password that is associated with that user name.
 12. To update the Windows registry, complete the following steps:
 - a. Open a Windows command window.
 - b. Run the following command to back up the keys that will be deleted:


```
reg export HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\IBM\DB2 IBMDB2.reg
```
 - c. Run the following command to delete the keys:


```
reg delete HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\IBM\DB2
```

Information: Updating the Windows registry is a workaround for DB2 APAR IC76221.

13. In a DB2 command window, run the following command to back up the Tivoli Storage Productivity Center database:


```
db2 BACKUP DATABASE database to C:\downloads\db2_backup
```

where *database* is the name of the Tivoli Storage Productivity Center database (usually TPCDB).

14. Stop all DB2 Windows services and exit DB2 in the Windows System Tray.
15. To upgrade DB2 to DB2 Version 10.1 Fix Pack 2, complete the following steps:
 - a. In Windows Explorer, navigate to the following directory:
`c:\64bit_DB2_10.1_fixpack2_download_directory\SERVER`

where *64bit_DB2_10.1_fixpack2_download_directory* is where you downloaded the DB2 installation files
 - b. Double-click the setup.exe file.
 - c. On the **DB2 Setup Launchpad** navigation tree, click **Install a Product**.
 - d. On the Install a Product page, in the **DB2 Enterprise Server Edition Version 10.1 Fix Pack 2** section, click **Work with Existing**.
 - e. On the "Work with an Existing DB2 Copy" window, select the DB2 copy for DB2 Version 9.7 Fix Pack 4.
 - f. Click **Launch DB2 Setup wizard**.
 - g. On the Warning window about upgrading DB2, click **OK**.
 - h. Complete the following steps in the **DB2 Setup wizard**:
 - 1) On the Welcome page, click **Next**.
 - 2) On the Software License Agreement page, read and accept the terms of the license agreement, and click **Next**.
 - 3) On the "Select the installation type" page, select **Typical**, and click **Next**.
 - 4) On the "Select the installation, response file creation, or both" page, keep the default selection and click **Next**.
 - 5) On the "Installation folder" page, click **Next**.
 - 6) On the "Select the IBM SSH server installation folder and startup option" page, enter the values and settings that are appropriate for your environment, and click **Next**.
 - 7) On the Set the DB2 copy name page, click **Next**.
 - 8) On the Set user information for the default DB2 instance page, enter the correct user name and password for the existing 64-bit DB2 Version 9.7 Fix Pack 4 installation, and click **Next**.
 - 9) On the "Enable operating system security for DB2 objects" page, ensure that the settings and values are correct for the existing 64-bit DB2 Version 9.7 Fix Pack 4 installation, and click **Next**.
 - 10) If the Warning window about existing group names is displayed, click **OK**.
 - 11) On the "Start copying files and create response file" page, click **Finish**.
 - 12) If a Warning window is displayed about a restart being required to complete the setup, click **OK**.
 - 13) On the "Setup is complete" page, click **Next**.
 - 14) On the "Install additional products" page, click **Finish**.
 - i. Close the DB2 First Steps window.
16. Restart your computer.
17. Stop the all of the Windows services for the Tivoli Storage Productivity Center servers, including Tivoli Integrated Portal.
18. If you experience problems when you start DB2 after you upgrade to 64-bit DB2 Version 10.1 Fix Pack 2, examine the Windows Application Log in the

Windows Event Viewer. For example, when you run the **db2start** command in a DB2 command window, the SQL1042C message might be displayed.

If you find a SideBySide error in the Windows Application Log that contains content similar to the following message:

```
Activation context generation failed for
"c:\program files\ibm\gsk8\lib64\gsk8sys_64.dll".
Dependent Assembly Microsoft.VC90.CRT,processorArchitecture="amd64",
publicKeyToken="1fc8b3b9a1e18e3b",type="win32",version="9.0.21022.8"
could not be found. Please use sxstrace.exe for detailed diagnosis.
```

To resolve the SideBySide error in the Windows Application Log, complete the following steps:

- a. Download and install the *Microsoft Visual C++ 2008 Redistributable Package (x64)* from the Microsoft website: <http://www.microsoft.com/en-us/download/details.aspx?id=15336>.
 - b. After you install the Microsoft package, complete the following steps:
 - 1) Restart your computer.
 - 2) Verify that 64-bit DB2 Version 10.1 Fix Pack 2 starts properly.
 - 3) Stop all Tivoli Storage Productivity Center servers and Windows services, including Tivoli Integrated Portal.
19. To upgrade the Tivoli Storage Productivity Center database to 64-bit DB2 Version 10.1 Fix Pack 2, complete the following steps:
- a. In a DB2 command window, run the following command:

```
db2 force application all
db2 terminate
```
 - b. In a DB2 command window, run the following command to ensure that no applications are accessing DB2:

```
db2 list applications
```
 - c. In a DB2 command window, run the following command to upgrade the Tivoli Storage Productivity Center database to 64-bit DB2 Version 10.1 Fix Pack 2:

```
db2 UPGRADE DATABASE database USER user_name USING password
```

where *database* is the name of the Tivoli Storage Productivity Center database (usually TPCDB), *user_name* is the user who owns the DB2 instance where the Tivoli Storage Productivity Center database is located (usually db2admin), and *password* is the password that is associated with that user name.
20. Start all of the servers and services for Tivoli Storage Productivity Center, including Tivoli Integrated Portal.

What to do next: You can upgrade to Version 5.2. For more information about upgrading Tivoli Storage Productivity Center in a single-server environment, see “Upgrading Tivoli Storage Productivity Center in a single-server environment” on page 378. For more information about upgrading Tivoli Storage Productivity Center in a multiple-server environment, see “Uninstalling Tivoli Storage Productivity Center in a multiple-server environment by using the wizard” on page 428.

Tivoli Storage Productivity Center reports during an upgrade

Before you upgrade from Tivoli Storage Productivity Center Version 5.1 or Version 5.1.1 to Version 5.2, there are some issues to consider about Tivoli Storage Productivity Center reports.

Migrating reports and data

The following data is not migrated when you upgrade Tivoli Storage Productivity Center:

- Tivoli Integrated Portal, for example, the roles that were assigned to different users
- Tivoli Storage Productivity Center custom reports and other reporting data that is created in Tivoli Common Reporting
- Business Intelligence and Reporting Tools (BIRT) reports

When you upgrade Tivoli Storage Productivity Center, only the LDAP configuration settings are migrated from Tivoli Integrated Portal to the web-based GUI on the embedded IBM WebSphere Application Server.

To manually migrate your Tivoli Storage Productivity Center reports, complete one of the following tasks:

- If you did not configure Tivoli Common Reporting Version 2.1.1 by using an external content store, see Upgrading from Tivoli Common Reporting 2.1 and 2.1.1.
- If you configured Tivoli Common Reporting Version 2.1.1 by using an external content store such as DB2 or Oracle, see Upgrading Tivoli Common Reporting 2.1 and 2.1.1 with external Content Store.

When you upgrade predefined Tivoli Storage Productivity Center reports from Tivoli Storage Productivity Center Version 5.1 or Version 5.1.1, these reports are overwritten by the predefined reports with the same name in Tivoli Storage Productivity Center Version 5.2. Custom reports are migrated without any changes.

Before you upgrade Tivoli Storage Productivity Center reports

Before you manually upgrade Tivoli Storage Productivity Center reports and upgrade to Tivoli Storage Productivity Center Version 5.2, verify the following criteria:

- Tivoli Integrated Portal Version 2.2 and Tivoli Common Reporting Version 2.1.1 are running.
- The Tivoli Integrated Portal Version 2.2 and Tivoli Common Reporting Version 2.1.1 credentials that are stored by Tivoli Storage Productivity Center Version 5.1 or Version 5.1.1 are valid.

During the upgrade to Version 5.2, the installation settings from Tivoli Storage Productivity Center Version 5.1 or Version 5.1.1 are used. If the credentials for Tivoli Integrated Portal Version 2.2 and Tivoli Common Reporting 2.1.1 are not correct, the Tivoli Storage Productivity Center Version 5.2 installation program prompts you to enter the correct credentials.

If these credentials are correct, then the installation program verifies whether Jazz for Service Management and Tivoli Common Reporting Version 3.1.0.1 use these same credentials. If these credentials are not used by Jazz for Service Management and Tivoli Common Reporting Version 3.1.0.1, the installation program prompts you to enter the correct credentials and the installation location for Jazz for Service Management.

- On Windows operating systems, after you upgrade to Tivoli Common Reporting Version 3.1.0.1 by using the `trcmd -upgrade` script, you must exit the Windows command window where you ran that script.

The following text is an example of this script:

```
trcmd.bat -upgrade -importPackage C:\Progra~1\IBM\tipv2\profiles\TIPProfile\
upgrade\data\upgradeData.zip -username user_name
-password password
```

You can start the Tivoli Storage Productivity Center installation program (setup.bat script) to upgrade the Tivoli Storage Productivity Center reports from Version 5.1 or Version 5.1.1 to Version 5.2.

Uninstall or preserve Tivoli Integrated Portal and Tivoli Common Reporting

During the upgrade to Tivoli Storage Productivity Center Version 5.2, depending on your environment, you must determine whether you want to retain or uninstall Tivoli Integrated Portal Version 2.2 and Tivoli Common Reporting Version 2.1.1.

To determine whether to uninstall or preserve these components, consider the following issues:

- Retaining Tivoli Integrated Portal Version 2.2 and Tivoli Common Reporting Version 2.1.1 means that resources such as disk space, memory, and processors are used. If you are concerned about resource usage, you must uninstall these products.
- Uninstalling Tivoli Integrated Portal Version 2.2 and Tivoli Common Reporting Version 2.1.1 means that you cannot use other products that use these products.

Upgrading Tivoli Storage Productivity Center in a single-server environment

You can upgrade Tivoli Storage Productivity Center by using the upgrade wizard or silent mode.

In a single-server environment, to upgrade Tivoli Storage Productivity Center, see the following topics:

- “Upgrading Tivoli Storage Productivity Center in a single-server environment by using the wizard” on page 379
- “Upgrading Tivoli Storage Productivity Center in a single-server environment by using silent mode” on page 381

Migrating from an older version of Tivoli Storage Productivity Center to Tivoli Storage Productivity Center Version 5.2

To migrate from Version 3 to Tivoli Storage Productivity Center Version 5.2, you must first migrate from Version 3 to Version 4.2 (or later). For more information about migrating from Version 3 to Version 4.2 (or later), see Upgrading TotalStorage Productivity Center 3.3.2 or later to Tivoli Storage Productivity Center 4.2.2.1 or later. You can use your Version 3 license to migrate from Tivoli Storage Productivity Center Version 3 to Tivoli Storage Productivity Center Version 4.2 (or later).

Initially, Tivoli Storage Productivity Center Version 5.2 will be available for download through IBM Passport Advantage. If your license maintenance is current, you can download Tivoli Storage Productivity Center Version 5.2 from IBM Passport Advantage or access the physical media.

Upgrading Tivoli Storage Productivity Center in a single-server environment by using the wizard

You can use the Tivoli Storage Productivity Center installation program to upgrade to Tivoli Storage Productivity Center Version 5.2.

Before you start the Tivoli Storage Productivity Center installation wizard on the AIX or Linux operating systems, you must source the user profile (db2profile) for the instance owner of the DB2 database. The following text is an example of the command you run to source the user profile:

```
. /home/db2inst1/sqllib/db2profile
```

To upgrade Tivoli Storage Productivity Center in a single-server environment by using the wizard, complete the following steps:

1. Log on to the Tivoli Storage Productivity Center computer with the appropriate user privileges.
2. Back up Tivoli Storage Productivity Center. For more information about backing up Tivoli Storage Productivity Center, see “Backups” on page 371.
3. If Jazz for Service Management is not installed, and you plan to run Tivoli Storage Productivity Center reports, download and extract the Jazz for Service Management compressed installation files to the same temporary directory.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

For more information about the installation files, see Setting up a local file system for a custom installation.

4. Start the Tivoli Storage Productivity Center installation program.
5. Review the Welcome page:
 - If Jazz for Service Management is not installed on your computer, the Welcome page displays an **Install Now** button.
 - If you do not want to install Jazz for Service Management on your computer, click **Next** to proceed to the next page in the Tivoli Storage Productivity Center installation program and upgrade Tivoli Storage Productivity Center without reports.
6. If Jazz for Service Management is not installed, and you want to install it on your computer, you can install it now:
 - a. On the Welcome page, click **Install Now**.
 - b. On the Install Jazz for Service Management page, complete the following steps:
 - 1) Provide the location where the Jazz for Service Management and Tivoli Common Reporting installation files were extracted.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.
 - 2) If there is a port conflict, specify a new starting value for a 15 port range, and click the **Verify Port Availability** link to ensure that the port range is usable.
 - 3) Click **Install Now**.

The Tivoli Storage Productivity Center installation program pauses and the Jazz for Service Management launchpad starts.

- c. When you exit the Jazz for Service Management launchpad, you are returned to the Install Jazz for Service Management page in the Tivoli Storage Productivity Center installation program. Click **OK**.
 - d. If the installation of Jazz for Service Management was successful, you are returned to the Welcome page, which now displays a green check mark. If the installation of Jazz for Service Management was not successful, a message is displayed, and you can click one of the following options:
 - **Install Now**, which starts the Jazz for Service Management launchpad again.
 - **Continue**, which returns you to the Welcome page.
 - e. On the Welcome page, click **Next**.
7. If the installation of Jazz for Service Management was successful and you clicked **Next** on the Welcome page to upgrade Tivoli Storage Productivity Center with reports, on the Configure Jazz for Service Management and Tivoli Common Reporting page, enter the following information, and click **OK**:
- The user name that is used to log on to the Jazz for Service Management WebSphere profile.
 - The password that is associated with the user name.
 - The path for the Jazz for Service Management installation directory.
- Jazz for Service Management starts. After Jazz for Service Management starts, it might take some time before all components, including Tivoli Common Reporting, are running.

If the Tivoli Storage Productivity Center Version 5.2 installation program is unable to communicate with Jazz for Service Management, you can select the **Install Tivoli Storage Productivity Center reports later** check box, click **OK**, and continue upgrading Tivoli Storage Productivity Center without reports. After you upgrade Tivoli Storage Productivity Center without reports, and resolve any problems with Jazz for Service Management, start the Tivoli Storage Productivity Center installation program again to install Tivoli Storage Productivity Center reports.

Important: If the installation of Jazz for Service Management was not successful and you clicked **Next** on the Welcome page to upgrade Tivoli Storage Productivity Center without reports, the Configure Jazz for Service Management and Tivoli Common Reporting page does not display.

8. Follow the prompts in the installation wizard to upgrade Tivoli Storage Productivity Center.
9. After the upgrade is finished, review the message log to ensure that no errors occurred.

If you upgraded Tivoli Storage Productivity Center without installing Tivoli Storage Productivity Center reports, see “Installing Tivoli Storage Productivity Center reports later in a single-server environment after an upgrade” on page 385 to install Tivoli Storage Productivity Center reports.

Related concepts:

“Backups” on page 371

Before you migrate, you must back up the entire Tivoli Storage Productivity Center system.

Related tasks:

“Preparing for an upgrade” on page 371

To upgrade to Tivoli Storage Productivity Center Version 5.2, run the Tivoli Storage Productivity Center installation program. The installation wizard pages that you

see depend on the components that you install.

Related reference:

“Planning for Tivoli Storage Productivity Center authentication and authorization” on page 13

An operating system user name is required to install and log on to Tivoli Storage Productivity Center for the first time. After you install Tivoli Storage Productivity Center, you can assign roles to users. Roles determine the product functions that are available to users.

“Reviewing the log files to resolve installation issues” on page 212

If an error occurs during Tivoli Storage Productivity Center installation, you can review the error log files to resolve issues and continue the installation.

Upgrading Tivoli Storage Productivity Center in a single-server environment by using silent mode

You can upgrade to Tivoli Storage Productivity Center Version 5.2 by using silent mode. This upgrade method is useful if your computer cannot display graphics.

You must complete the following tasks before you upgrade Tivoli Storage Productivity Center:

- On the AIX or Linux operating system, you must source the DB2 profile, `db2profile`, for the instance owner of the DB2 database. The following text is an example of the command you run to source the user profile:
`./home/db2inst1/sqllib/db2profile`
- Install Jazz for Service Management

When you upgrade to Tivoli Storage Productivity Center Version 5.2 by using silent mode, you cannot install Tivoli Storage Productivity Center reports later. For more information about installing Jazz for Service Management, see “Jazz for Service Management and Tivoli Common Reporting” on page 172.

To upgrade Tivoli Storage Productivity Center in a single-server environment by using silent mode, complete the following steps:

1. Log on to the Tivoli Storage Productivity Center computer with the appropriate user privileges.
2. Back up Tivoli Storage Productivity Center. For more information about backing up Tivoli Storage Productivity Center, see the “Backups” on page 371.
3. If Jazz for Service Management is not installed, download and extract the Jazz for Service Management and Tivoli Common Reporting compressed installation files to the same temporary directory.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

For more information about the installation files, see Setting up a local file system for a custom installation.

For more information about installing Jazz for Service Management by using silent mode, see Custom installations by using silent mode.

4. Edit and save the appropriate response file.
 - If you are upgrading from Tivoli Storage Productivity Center Version 4.2, edit the `silent_Upgrade4x.properties` file and set the following parameters:
 - `LICENSE_ACCEPTED=true`
 - `CHOSEN_INSTALL_TYPE="4.x Upgrade"`

- varMigrateCASAgentsLater=*value*
- varMigratePerfAndConfigHistoryData=*value*
- varPreserveTIP1x=*value*
- varJazzSMUsrID=*user_name*
- varJazzSMUsrPW=*password*
- JAZZSM_INSTALL_DIR=*Location_of_JazzSM_installation_directory*
- If you are upgrading from Tivoli Storage Productivity Center Version 5.1, edit the `silent_Upgrade5x.properties` file and set the following parameters:
 - LICENSE_ACCEPTED=true
 - CHOSEN_INSTALL_TYPE="5.x Upgrade"
 - varPreserveTIP2x=*value*
 - varJazzSMUsrID=*user_name*
 - varJazzSMUsrPW=*password*
 - JAZZSM_INSTALL_DIR=*Location_of_JazzSM_installation_directory*

For more information about editing the response file, see “Editing the upgrade response file” on page 383.

5. Run the silent mode installation program.

- On Windows operating systems, run the following command:
`setup.bat -l language -i silent -f absolute_path_to_response_file`
 where *language* can be one of the following values:
 - Czech - cs
 - English - en
 - French - fr
 - German - de
 - Hungarian - hu
 - Italian - it
 - Japanese - ja
 - Korean - ko
 - Polish - pl
 - Brazilian Portuguese - pt_BR
 - Russian - ru
 - Spanish - es
 - Chinese (Simplified) - zh_CN
 - Chinese (Traditional) - zh_TW

`absolute_path_to_response_file` is the absolute path to the response file. For example, the following command specifies the language and the path:

```
setup.bat -l fr -i silent -f
c:\TPC52\silent_Upgrade4x.properties
```

The `silent_Upgrade4x.properties` is used to upgrade from Tivoli Storage Productivity Center Version 4.2 (or later) to Version 5.2.

- On AIX or Linux operating systems, run the following command:
`./setup.bin -l language -i silent -f absolute_path_to_response_file`

`absolute_path_to_response_file` is the absolute path to the response file. For example, the following command specifies the language and the path:

```
./setup.bin -l de -i silent -f /TPC52/silent_Upgrade5x.properties
```

The `silent_Upgrade5x.properties` is used to upgrade from Tivoli Storage Productivity Center Version 5.1 (or later) to Version 5.2.

If you do not specify a language or if the language is not specified correctly, the installation program uses the English language as the default.

6. Optional: Monitor the progress of the upgrade.

- To view the progress of the silent mode installation on Windows operating systems, check the trace log in the following path:

`TPC_installation_directory\logs\traceTPCInstall.log`

- To view the progress of the silent mode installation on AIX or Linux operating systems, check the trace log in the following path:

`TPC_installation_directory/logs/traceTPCInstall.log`

Related reference:

“Planning for Tivoli Storage Productivity Center authentication and authorization” on page 13

An operating system user name is required to install and log on to Tivoli Storage Productivity Center for the first time. After you install Tivoli Storage Productivity Center, you can assign roles to users. Roles determine the product functions that are available to users.

“Editing the upgrade response file”

When you upgrade Tivoli Storage Productivity Center from Version 4.2 to Version 5.2 by using silent mode, use the `silent_Upgrade4x.properties` file. When you upgrade from Tivoli Storage Productivity Center Version 5.1 to Version 5.2 by using silent mode, use the `silent_Upgrade5x.properties` file.

“Reviewing the log files to resolve installation issues” on page 212

If an error occurs during Tivoli Storage Productivity Center installation, you can review the error log files to resolve issues and continue the installation.

Editing the upgrade response file

When you upgrade Tivoli Storage Productivity Center from Version 4.2 to Version 5.2 by using silent mode, use the `silent_Upgrade4x.properties` file. When you upgrade from Tivoli Storage Productivity Center Version 5.1 to Version 5.2 by using silent mode, use the `silent_Upgrade5x.properties` file.

Parameters in the `silent_Upgrade4x.properties` file

The `silent_Upgrade4x.properties` file contains the following parameters:

`LICENSE_ACCEPTED=false`

Specifies whether you accept the Tivoli Storage Productivity Center license agreement. The options are:

`true`

You accept all the terms and conditions of the Tivoli Storage Productivity Center license agreement.

`false` or any other value

You do not accept the Tivoli Storage Productivity Center license agreement. The installation program will exit.

`CHOSEN_INSTALL_TYPE="4.x Upgrade"`

Specifies the upgrade type. This parameter only supports upgrading from Version 4.2 to Version 5.2.

Important: Do not change the value for this parameter.

varMigrateCASAgentsLater=option

Specify whether you want to migrate the Common Agent Services agents to Storage Resource agents manually before or after you migrate from Tivoli Storage Productivity Center Version 4.2 to Version 5.2. The options are:

false

You manually migrated all Common Agent Services agents to Storage Resource agents before you upgrade to Tivoli Storage Productivity Center Version 5.2 (default).

true

You plan to manually migrate Common Agent Services agents to Storage Resource agents after you upgrade to Tivoli Storage Productivity Center Version 5.2.

varMigratePerfAndConfigHistoryData=option

Specify whether the performance and configuration history data should be migrated. The options are:

true

Migrate the performance and configuration history data (default).

false

Drop the performance and configuration history data from the database repository.

varPreserveTIP1x=value

Specify whether to remove or preserve Tivoli Integrated Portal Version 1.1 when you upgrade from Tivoli Storage Productivity Center Version 4.2 to Tivoli Storage Productivity Center Version 5.2. The options are:

0 Remove Tivoli Integrated Portal Version 1.1 (default)

1 Preserve Tivoli Integrated Portal Version 1.1

varJazzSMUsrID=

Specifies the Jazz for Service Management user name. This user name was used to install Jazz for Service Management.

varJazzSMUsrPW=

Specifies the valid password that has been used with the Jazz for Service Management user name.

JAZZSM_INSTALL_DIR=

Specifies the expected default directory where Jazz for Service Management has been installed.

- For the Windows operating system, the expected default directory is C:\Program Files\IBM\JAZZSM.
- For the UNIX operating system, the expected default directory is /opt/IBM/JazzSM.

Parameters in the silent_Upgrade5x.properties file

The silent_Upgrade5x.properties file contains the following parameters:

LICENSE_ACCEPTED=false

Specifies whether you accept the Tivoli Storage Productivity Center license agreement. The options are:

true

You accept all the terms and conditions of the Tivoli Storage Productivity Center license agreement.

false or any other value

You do not accept the Tivoli Storage Productivity Center license agreement.
The installation program will exit.

CHOSEN_INSTALL_TYPE="5.x Upgrade"

Specifies the upgrade type. This parameter only supports upgrading from Version 5.1 to Version 5.2.

Important: Do not change the value for this parameter.

varPreserveTIP2x

Specify whether to remove or preserve Tivoli Integrated Portal 2.x during the Tivoli Storage Productivity Center 5.1 to Tivoli Storage Productivity Center 5.2 upgrade.

The options are:

- 0** Remove Tivoli Integrated Portal Version 2.2 (default)
- 1** Preserve Tivoli Integrated Portal Version 2.2

varJazzSMUsrID=

Specifies the Jazz for Service Management user name. This user name was used to install Jazz for Service Management.

varJazzSMUsrPW=

Specifies the valid password that has been used with the Jazz for Service Management user name.

JAZZSM_INSTALL_DIR=

Specifies the expected default directory where Jazz for Service Management has been installed.

- For the Windows operating system, the expected default directory is C:\Program Files\IBM\JAZZSM.
- For the UNIX operating system, the expected default directory is /opt/IBM/JazzSM.

Related tasks:

“Upgrading Tivoli Storage Productivity Center in a single-server environment by using silent mode” on page 381

You can upgrade to Tivoli Storage Productivity Center Version 5.2 by using silent mode. This upgrade method is useful if your computer cannot display graphics.

Installing Tivoli Storage Productivity Center reports later in a single-server environment after an upgrade

In a single-server environment, you can install Tivoli Storage Productivity Center reports by using the installation wizard after you upgrade to Tivoli Storage Productivity Center Version 5.2.

Ensure that you have completed the steps in “Upgrading Tivoli Storage Productivity Center in a single-server environment by using the wizard” on page 379.

You can install Tivoli Storage Productivity Center reports after you upgrade to Tivoli Storage Productivity Center Version 5.2 for one of the following reasons:

- You chose not to install Jazz for Service Management the first time you ran the Tivoli Storage Productivity Center Version 5.2 installation program. Tivoli Storage Productivity Center was upgraded without Tivoli Storage Productivity Center reports.

- You attempted to install Jazz for Service Management the first time you ran the Tivoli Storage Productivity Center Version 5.2 installation program, but the Jazz for Service Management installation did not succeed. Tivoli Storage Productivity Center was upgraded without Tivoli Storage Productivity Center reports.
- You successfully installed Jazz for Service Management the first time you ran the Tivoli Storage Productivity Center Version 5.2 installation program, but there was an issue when the installation program attempted to communicate with Jazz for Service Management. Tivoli Storage Productivity Center was upgraded without Tivoli Storage Productivity Center reports.

This procedure assumes one of the following conditions:

- You have not yet installed Jazz for Service Management.
- You resolved any issues that you experienced during the initial attempt to install Jazz for Service Management.

To install Tivoli Storage Productivity Center reports later in a single-server environment, complete the following steps:

1. Log on to the Tivoli Storage Productivity Center computer with the appropriate user privileges.
2. If Jazz for Service Management is not installed, and you plan to run Tivoli Storage Productivity Center reports, download and extract the Jazz for Service Management compressed installation files to the same temporary directory.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

For more information about the installation files, see *Setting up a local file system for a custom installation*.

3. Start the Tivoli Storage Productivity Center installation program again.
4. If Jazz for Service Management is not installed, and you want to install it on your computer, you can install it now:
 - a. On the Welcome page click **Install Now**.
 - b. On the Install Jazz for Service Management page, complete the following steps:
 - 1) Provide the location where the Jazz for Service Management and Tivoli Common Reporting installation files were extracted.
For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.
 - 2) If there is a port conflict, specify a new starting value for a 15 port range, and click the **Verify Port Availability** link to ensure that the port range is usable.
 - 3) Click **Install Now**.

The Tivoli Storage Productivity Center installation program pauses and the Jazz for Service Management launchpad starts.

- c. When you exit the Jazz for Service Management launchpad, you are returned to the Install Jazz for Service Management page in the Tivoli Storage Productivity Center installation program. Click **OK**.
- d. If the installation of Jazz for Service Management was successful, you are returned to the Welcome page, which now displays a green check mark.

If the installation of Jazz for Service Management was not successful, a message is displayed, and you can click one of the following options:

- **Install Now**, which restarts the Jazz for Service Management launchpad.
- **Continue**, which returns to the Welcome page.

You must install Jazz for Service Management successfully to continue installing Tivoli Storage Productivity Center reports.

- e. If the installation of Jazz for Service Management was successful and a green check mark is displayed on the Welcome page, click **Next**.
5. On the Configure Jazz for Service Management and Tivoli Common Reporting page, enter the following information, and click **Next**:
 - The user name that is used to log on to the Jazz for Service Management WebSphere profile
 - The password that is associated with the user name
 - The path for the Jazz for Service Management installation directoryJazz for Service Management starts. After Jazz for Service Management starts, it might take some time before all components, including Tivoli Common Reporting, are running.

If the Tivoli Storage Productivity Center Version 5.2 installation program is unable to communicate with Jazz for Service Management, you must resolve this problem to continue installing Tivoli Storage Productivity Center reports.
6. Follow the prompts in the installation wizard to install Tivoli Storage Productivity Center reports.

Upgrading Tivoli Storage Productivity Center in a multiple-server environment

You can upgrade Tivoli Storage Productivity Center by using the upgrade wizard or by silent mode.

Note: To upgrade Tivoli Storage Productivity Center in a multiple-server environment, first start the installation program on the server on which the database schema is installed. After you start the installation program on this server, you can start the start the installation program on all of the other servers.

In a multiple-server environment, to upgrade Tivoli Storage Productivity Center, see the following topics:

- “Upgrading Tivoli Storage Productivity Center with a remote database by using the wizard” on page 388
- “Upgrading Tivoli Storage Productivity Center with remote Tivoli Integrated Portal by using the wizard” on page 392

Migrating from an older version of Tivoli Storage Productivity Center to Tivoli Storage Productivity Center Version 5.2

To migrate from Version 3 to Tivoli Storage Productivity Center Version 5.2, you must first migrate from Version 3 to Version 4.2 (or later). For more information about migrating from Version 3 to Version 4.2 (or later), see Upgrading TotalStorage Productivity Center 3.3.2 or later to Tivoli Storage Productivity Center 4.2.2.1 or later. You can use your Version 3 license to migrate from Tivoli Storage Productivity Center Version 3 to Tivoli Storage Productivity Center Version 4.2 (or later).

Initially, Tivoli Storage Productivity Center Version 5.2 will be available for download through IBM Passport Advantage. If your license maintenance is current, you can download Tivoli Storage Productivity Center Version 5.2 from IBM Passport Advantage or access the physical media.

Upgrading Tivoli Storage Productivity Center with a remote database by using the wizard

You can upgrade Tivoli Storage Productivity Center in a multiple-server environment by using the installation wizard.

Before you can source the user profile for the instance owner of the DB2 database, complete the following tasks:

- Install DB2.
- Ensure that a DB2 instance is created when DB2 is installed.

Before you start the Tivoli Storage Productivity Center installation wizard on the AIX or Linux operating systems, you must source the user profile (db2profile) for the instance owner of the DB2 database. The following text is an example of the command to source the user profile:

```
. /home/db2inst1/sqllib/db2profile
```

For this procedure, the terms *Server A* and *Server B* denote the two servers. Server A has DB2 Enterprise Server Edition and the Tivoli Storage Productivity Center database repository installed. Server B has all of the other Tivoli Storage Productivity Center components installed.

To upgrade Tivoli Storage Productivity Center by using the installation wizard, complete the following steps:

1. Complete the following steps on Server B:
 - a. Log on to Server B with the appropriate user privileges.
 - b. On Server B, stop all of the Tivoli Storage Productivity Center services, including Tivoli Integrated Portal.

If you are upgrading from Tivoli Storage Productivity Center Version 4.2 (or later), to stop Tivoli Storage Productivity Center services, see [Stopping the Tivoli Storage Productivity Center services](#).

If you are upgrading from Tivoli Storage Productivity Center Version 5.1 (or later), to stop Tivoli Storage Productivity Center services, see [Stopping Tivoli Storage Productivity Center services](#).
2. Complete the following steps on Server A:
 - a. Log on to Server A with the appropriate user privileges.
 - b. Back up Tivoli Storage Productivity Center. For more information about backing up Tivoli Storage Productivity Center, see [“Backups”](#) on page 371.
 - c. If necessary, upgrade DB2 on Server A to a version that is supported by Tivoli Storage Productivity Center Version 5.2. For more information about upgrading DB2, see [“Upgrading from 32-bit DB2 Version 9.7 to 64-bit DB2 Version 10.1”](#) on page 372.
 - d. Start the Tivoli Storage Productivity Center Version 5.2 installation program on Server A.
 - e. Follow the prompts in the installation wizard to upgrade the Tivoli Storage Productivity Center database repository on Server A.

- f. After the upgrade is finished on Server A, review the message log to ensure that no errors occurred.
3. Complete the following steps on Server B:
 - a. Log on to Server B with the appropriate user privileges.
 - b. Back up Tivoli Storage Productivity Center on Server B. For more information about backing up Tivoli Storage Productivity Center, see “Backups” on page 371.
 - c. Install DB2 Enterprise Server Edition on Server B.

Important: DB2 Enterprise Server Edition is installed on Server A and on Server B. Although you are upgrading Tivoli Storage Productivity Center in a multiple-server environment, it is expected that you are installing Jazz for Service Management in a single-server environment.

- d. On Server B, start all of the Tivoli Storage Productivity Center services, including Tivoli Integrated Portal.

If you are upgrading from Tivoli Storage Productivity Center Version 4.2 (or later), to start Tivoli Storage Productivity Center services, see Starting Tivoli Storage Productivity Center services.

If you are upgrading from Tivoli Storage Productivity Center Version 5.1 (or later), to start Tivoli Storage Productivity Center services, see Starting Tivoli Storage Productivity Center services.

- e. If Jazz for Service Management is not installed, and you plan to run Tivoli Storage Productivity Center reports, download and extract the Jazz for Service Management compressed installation files to the same temporary directory.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

For more information about the installation files, see Setting up a local file system for a custom installation.

- f. Start the Tivoli Storage Productivity Center installation wizard on Server B.
- g. Review the Welcome page:
 - If Jazz for Service Management is not installed on Server B, the Welcome page displays an **Install Now** button.
 - If you do not want to install Jazz for Service Management on Server B, click **Next**, and upgrade Tivoli Storage Productivity Center without reports on Server B.
- h. If Jazz for Service Management is not installed on Server B, and you want to install it on Server B, you can install it now.
- i. On the Welcome page, click **Install Now**.
- j. On the Install Jazz for Service Management page, complete the following steps:

- 1) Provide the location where the Jazz for Service Management and Tivoli Common Reporting installation files were extracted.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

- 2) If there is a port conflict, specify a new starting value for a 15 port range, and click the **Verify Port Availability** link to ensure that the port range is usable.

- 3) Click **Install Now**.

The Tivoli Storage Productivity Center installation program pauses and the Jazz for Service Management launchpad starts.

When you exit the Jazz for Service Management launchpad, you are returned to the Install Jazz for Service Management page in the Tivoli Storage Productivity Center installation program. Click **OK**.

If the installation of Jazz for Service Management was successful on Server B, you are returned to the Welcome page, which now displays a green check mark.

If the installation of Jazz for Service Management was not successful on Server B, a message is displayed, click one of the following options:

- **Install Now**, which starts the Jazz for Service Management launchpad again.
- **Continue**, which returns you to the Welcome page.

On the Welcome page, click **Next**.

- k. If the installation of Jazz for Service Management was successful on Server B, and you clicked **Next** on the Welcome page to upgrade Tivoli Storage Productivity Center Version 5.2 with reports, on the Configure Jazz for Service Management and Tivoli Common Reporting page, enter the following information, and click **OK**:

- The user name that is used to log on to the Jazz for Service Management WebSphere profile
- The password that is associated with the user name
- The path for the Jazz for Service Management installation directory

Jazz for Service Management starts. After Jazz for Service Management starts, it might take some time before all components, including Tivoli Common Reporting, are running.

If the Tivoli Storage Productivity Center Version 5.2 installation program is unable to communicate with Jazz for Service Management on Server B, you can select the **Install Tivoli Storage Productivity Center reports later** check box, click **OK**, and continue upgrading Tivoli Storage Productivity Center without reports on Server B. After you upgrade Tivoli Storage Productivity Center without reports, and resolve any problems with Jazz for Service Management, start the Tivoli Storage Productivity Center installation program again on Server B to install Tivoli Storage Productivity Center reports.

Important: If the installation of Jazz for Service Management was not successful on Server B, and you clicked **Next** on the Welcome page to upgrade Tivoli Storage Productivity Center Version 5.2 without reports, the Configure Jazz for Service Management and Tivoli Common Reporting page does not display.

- l. Follow the prompts in the installation wizard to upgrade the Tivoli Storage Productivity Center components on Server B.
 - m. After the upgrade is finished, review the message log file on Server B to ensure that no errors occurred.
4. Optional: If you upgraded a multiple-server Tivoli Storage Productivity Center Version 4.2 (or later) environment on the Windows operating system that is configured for LDAP authentication, complete the following steps on Server B

so that the Windows Scheduled Tasks for the Device server and the Replication server run successfully at system startup:

- a. Click **Start > Administrative Tools > Task Scheduler**.
- b. In the navigation tree, select **Task Scheduler Library**.
- c. Double-click the **startDevServer** task.
- d. On the startDevServer Properties page, on the **General** tab, in the **Security options** section, complete the following steps:
 - 1) Select **Run whether user is logged on or not**.
 - 2) Click **Change User or Group**.
 - 3) In the Select User or Group window, enter a Windows user name that belongs to the Administrators group, and click **OK**.
- e. Click **OK**.
- f. In the Task Scheduler window, enter the password for the Windows user name, and click **OK**.
- g. Double-click the **startRepServer** task.
- h. On the startRepServer Properties page, on the **General** tab, in the **Security options** section, complete the following steps:
 - 1) Select **Run whether user is logged on or not**.
 - 2) Click **Change User or Group**.
 - 3) In the Select User or Group window, enter a Windows user name that belongs to the Administrators group, and click **OK**.
- i. Click **OK**.
- j. In the Task Scheduler window, enter the password for the Windows user name and click **OK**.
- k. Close the Task Scheduler.

If you upgraded Tivoli Storage Productivity Center without installing Tivoli Storage Productivity Center reports on Server B, see “Installing Tivoli Storage Productivity Center reports later in a multiple-server environment after an upgrade” on page 405 to install Tivoli Storage Productivity Center reports on Server B.

Related concepts:

“Backups” on page 371

Before you migrate, you must back up the entire Tivoli Storage Productivity Center system.

Related tasks:

“Preparing for an upgrade” on page 371

To upgrade to Tivoli Storage Productivity Center Version 5.2, run the Tivoli Storage Productivity Center installation program. The installation wizard pages that you see depend on the components that you install.

Related reference:

“Planning for Tivoli Storage Productivity Center authentication and authorization” on page 13

An operating system user name is required to install and log on to Tivoli Storage Productivity Center for the first time. After you install Tivoli Storage Productivity Center, you can assign roles to users. Roles determine the product functions that are available to users.

“Reviewing the log files to resolve installation issues” on page 212

If an error occurs during Tivoli Storage Productivity Center installation, you can review the error log files to resolve issues and continue the installation.

Upgrading Tivoli Storage Productivity Center with remote Tivoli Integrated Portal by using the wizard

You can upgrade Tivoli Storage Productivity Center in a multiple-server environment by using the installation wizard.

Before you start the Tivoli Storage Productivity Center installation wizard on the AIX or Linux operating systems, you must source the user profile (db2profile) for the instance owner of the DB2 database. The following text is an example of the command to source the user profile:

```
. /home/db2inst1/sqllib/db2profile
```

For this procedure, the terms *Server A* and *Server B* denote the two servers. Server A has DB2 Enterprise Server Edition, the Tivoli Storage Productivity Center database repository and the Tivoli Storage Productivity Center servers installed. Server B has Tivoli Integrated Portal, Tivoli Common Reporting, TCRDB, and the Tivoli Storage Productivity Center web-based GUI installed.

Important: This procedure applies only when you are upgrading from Tivoli Storage Productivity Center Version 5.1 (or later) to Version 5.2.

To upgrade Tivoli Storage Productivity Center by using the installation wizard, complete the following steps:

1. Complete the following steps on Server B:
 - a. Log on to Server B with the appropriate user privileges.
 - b. On Server B, stop all of the Tivoli Storage Productivity Center services, including Tivoli Integrated Portal.
To stop Tivoli Storage Productivity Center services, see *Stopping Tivoli Storage Productivity Center services*.
2. On Server A, complete the following steps:
 - a. Log on to Server A with the appropriate user privileges.
 - b. On Server A, back up Tivoli Storage Productivity Center. For more information about backing up Tivoli Storage Productivity Center, see “Backups” on page 371.
 - c. If necessary, upgrade DB2 on Server A to a version that is supported by Tivoli Storage Productivity Center Version 5.2. For more information about upgrading DB2, see “Upgrading from 32-bit DB2 Version 9.7 to 64-bit DB2 Version 10.1” on page 372.
 - d. On Server A, start the Tivoli Storage Productivity Center Version 5.2 installation program.
 - e. If Jazz for Service Management is not installed on Server A, the Welcome page displays an **Install Now** button.

Important: Because you are upgrading the Tivoli Storage Productivity Center database repository and the Tivoli Storage Productivity Center servers on Server A, do not click **Install Now** on the Welcome page.

Click **Next** on the Welcome page to proceed to the next page in the Tivoli Storage Productivity Center installation program.

- f. Follow the prompts in the installation wizard to upgrade the Tivoli Storage Productivity Center database repository and the Tivoli Storage Productivity Center servers on Server A.
- g. After the upgrade is finished on Server A, review the message log on Server A to ensure that no errors occurred.

3. Determine which option is most appropriate for your environment:
 - To convert your multiple-server Tivoli Storage Productivity Center environment (Server A and Server B) to a single server environment (Server A), see step 4.
 - To maintain your multiple-server Tivoli Storage Productivity Center environment, see step 5 on page 395.
4. To convert your multiple-server Tivoli Storage Productivity Center environment (Server A and Server B) to a single server Tivoli Storage Productivity Center environment (Server A), complete the following steps:
 - a. On Server B, complete the following steps:
 - 1) Log on to Server B with the appropriate user privileges.
 - 2) On Server B, back up Tivoli Storage Productivity Center.
For more information about backing up Tivoli Storage Productivity Center, see, “Backups” on page 371.
 - 3) On Server B, start all of the Tivoli Storage Productivity Center services, including Tivoli Integrated Portal.
To start Tivoli Storage Productivity Center services, see Starting Tivoli Storage Productivity Center services.
 - 4) Start the Tivoli Storage Productivity Center uninstallation wizard.
On Windows operating systems, click **Start > Control Panel > Programs > Programs and Features**. Highlight **Tivoli Storage Productivity Center** and click **Uninstall/Change**.
On AIX or Linux operating systems, run the following command from the root directory:
`TPC_installation_directory/_uninst/uninstall`

where *TPC_installation_directory* is the location where Tivoli Storage Productivity Center is installed.
A window is displayed that indicates that all Tivoli Storage Productivity Center components installed on the system will be uninstalled.
 - 5) Click **Uninstall**. A confirmation is displayed.
 - 6) Click **Next** to start the uninstallation process.
Remember the following for your operating system:
 - On Windows operating systems, when the uninstallation process is finished, a window is displayed so you can choose to start your system now or later. You must restart the system before you can reinstall Tivoli Storage Productivity Center.
 - On AIX or Linux operating systems, you do not have to restart your system.
 - b. On Server A, complete the following steps:
 - 1) Log on to Server A with the appropriate user privileges.
 - 2) If Jazz for Service Management is not installed, and you plan to run Tivoli Storage Productivity Center reports, complete following steps:
 - Download and extract the Jazz for Service Management compressed installation files to the same temporary directory.
For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

For more information about the installation files, see Setting up a local file system for a custom installation.

- 3) On Server A, start the Tivoli Storage Productivity Center installation program again.
- 4) If Jazz for Service Management is not installed on Server A, and you want to install it on Server A, you can install it now:

- On the Welcome page, click **Install Now**.
- On the Install Jazz for Service Management page, provide the location where the Jazz for Service Management and Tivoli Common Reporting installation files were extracted.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

- If there is a port conflict, specify a new starting value for a 15 port range, and click the **Verify Port Availability** link to ensure that the port range is usable.
- Click **Install Now**.

The Tivoli Storage Productivity Center installation program pauses and the Jazz for Service Management launchpad starts.

When you exit the Jazz for Service Management launchpad, you are returned to the Install Jazz for Service Management page in the Tivoli Storage Productivity Center installation program. Click **OK**.

If the installation of Jazz for Service Management was successful on Server A, you are returned to the Welcome page, which now displays a green check mark.

If the installation of Jazz for Service Management was not successful on Server A, a message is displayed, and you can click one of the following options:

- **Install Now**, which starts the Jazz for Service Management launchpad again.
- **Continue**, which returns to the Welcome page.

You must install Jazz for Service Management successfully on Server A to continue installing Tivoli Storage Productivity Center reports on Server A.

If the installation of Jazz for Service Management was successful on Server A, and a green check mark is displayed on the Welcome page, click **Next**.

- 5) In the dialog about converting a multiple server installation to a single server installation, click **Yes**.
- 6) On the Configure Jazz for Service Management and Tivoli Common Reporting page, enter the following information, and click **Next**:
 - The user name that is used to log on to the Jazz for Service Management WebSphere profile
 - The password that is associated with the user name
 - The path for the Jazz for Service Management installation directoryJazz for Service Management starts. After Jazz for Service Management starts, it might take some time before all components, including Tivoli Common Reporting, are running.

If the Tivoli Storage Productivity Center Version 5.2 installation program is unable to communicate with Jazz for Service Management on Server A, you must resolve this problem to continue installing Tivoli Storage Productivity Center reports.

- 7) Follow the prompts in the installation wizard to install Tivoli Storage Productivity Center reports on Server A.
5. On Server B, if you are planning to maintain your multiple-server Tivoli Storage Productivity Center environment, complete the following steps:
 - a. Log on to Server B with the appropriate user privileges.
 - b. Back up Tivoli Storage Productivity Center on Server B. For more information about backing up Tivoli Storage Productivity Center, see “Backups” on page 371.
 - c. Install DB2 Enterprise Server Edition on Server B.

Important: DB2 Enterprise Server Edition is installed on Server A and on Server B because even though you are upgrading Tivoli Storage Productivity Center in a multiple-server environment, it is expected that you are installing Jazz for Service Management in a single-server environment.

- d. On Server B, start all of the Tivoli Storage Productivity Center services, including Tivoli Integrated Portal. For more information about starting Tivoli Storage Productivity Center services, see Starting Tivoli Storage Productivity Center services.
- e. If Jazz for Service Management is not installed, and you plan to run Tivoli Storage Productivity Center reports, complete following steps:
 - Download and extract the Jazz for Service Management compressed installation files to the same temporary directory.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

For more information about the installation files, see Setting up a local file system for a custom installation.
- f. On Server B, start the Tivoli Storage Productivity Center installation wizard.
- g. If Jazz for Service Management is not installed on Server B, and you want to install it on Server B, you can install it now:
 - 1) On the Welcome page, click **Install Now**.
 - 2) On the Install Jazz for Service Management page, provide the location where the Jazz for Service Management and Tivoli Common Reporting installation files that were extracted.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.
 - 3) If there is a port conflict, specify a new starting value for a 15 port range, and click the **Verify Port Availability** link to ensure that the port range is usable.
 - 4) Click **Install Now**.

The Tivoli Storage Productivity Center installation program pauses and the Jazz for Service Management launchpad starts.

When you exit the Jazz for Service Management launchpad, you are returned to the Install Jazz for Service Management page in the Tivoli Storage Productivity Center installation program. Click **OK**.

If the installation of Jazz for Service Management was successful on Server B, you are returned to the Welcome page, which now displays a green check mark.

If the installation of Jazz for Service Management was not successful on Server B, a message is displayed, and you can click one of the following options:

- **Install Now**, which starts the Jazz for Service Management launchpad again.
- **Continue**, which returns you to the Welcome page.

You must install Jazz for Service Management successfully on Server B to continue installing Tivoli Storage Productivity Center reports on Server B.

If the installation of Jazz for Service Management was successful on Server B, and a green check mark is displayed on the Welcome page, click **Next**.

- h. On the Configure Jazz for Service Management and Tivoli Common Reporting page, enter the following information, and click **Next**:
 - The user name that is used to log on to the Jazz for Service Management WebSphere profile
 - The password that is associated with the user name
 - The path for the Jazz for Service Management installation directoryJazz for Service Management starts. After Jazz for Service Management starts, it might take some time before all components, including Tivoli Common Reporting, are running.
- If the Tivoli Storage Productivity Center Version 5.2 installation program is unable to communicate with Jazz for Service Management, you must resolve this problem to continue installing Tivoli Storage Productivity Center reports.
- i. Follow the prompts in the installation wizard to install Tivoli Storage Productivity Center reports on Server B.
- j. After the upgrade is finished on Server B, review the message log to ensure that no errors occurred.

Related concepts:

“Backups” on page 371

Before you migrate, you must back up the entire Tivoli Storage Productivity Center system.

“Jazz for Service Management and Tivoli Common Reporting” on page 172

If you plan to use Tivoli Storage Productivity Center reports, you must install Jazz for Service Management 1.1.0.1 and Tivoli Common Reporting 3.1.0.1. You can install these components now or after you install Tivoli Storage Productivity Center.

Related tasks:

“Installing DB2” on page 132

You can install DB2 Enterprise Server Edition Version 10.1 Fix Pack 2 on the Linux, AIX, or Windows operating systems.

“Preparing for an upgrade” on page 371

To upgrade to Tivoli Storage Productivity Center Version 5.2, run the Tivoli Storage Productivity Center installation program. The installation wizard pages that you see depend on the components that you install.

Related reference:

“Planning for Tivoli Storage Productivity Center authentication and authorization” on page 13

An operating system user name is required to install and log on to Tivoli Storage Productivity Center for the first time. After you install Tivoli Storage Productivity Center, you can assign roles to users. Roles determine the product functions that are available to users.

“Reviewing the log files to resolve installation issues” on page 212

If an error occurs during Tivoli Storage Productivity Center installation, you can review the error log files to resolve issues and continue the installation.

Upgrading Tivoli Storage Productivity Center with a remote database by using silent mode

You can upgrade Tivoli Storage Productivity Center in a multiple-server environment by using silent mode.

Before you can source the user profile for the instance owner of the DB2 database, complete the following tasks:

- Install DB2.
- Ensure that a DB2 instance is created when DB2 is installed.

Before you upgrade Tivoli Storage Productivity Center by using silent mode on the AIX or Linux operating systems, you must source the user profile (`db2profile`) for the instance owner of the DB2 database. For example:

```
. /home/db2inst1/sqllib/db2profile
```

For this procedure, the terms *Server A* and *Server B* denote the two servers. Server A has DB2 Enterprise Server Edition and the Tivoli Storage Productivity Center database repository installed. Server B has all of the other Tivoli Storage Productivity Center components installed.

To upgrade Tivoli Storage Productivity Center by using silent mode, complete the following steps:

1. Complete the following steps on Server B:
 - a. Log on to Server B with the appropriate user privileges.
 - b. On Server B, stop all of the Tivoli Storage Productivity Center services, including Tivoli Integrated Portal.

If you are upgrading from Tivoli Storage Productivity Center Version 4.2 (or later), for more information about stopping Tivoli Storage Productivity Center services, see *Stopping the Tivoli Storage Productivity Center services*.

If you are upgrading from Tivoli Storage Productivity Center Version 5.1 (or later), or more information about stopping Tivoli Storage Productivity Center services, see *Stopping Tivoli Storage Productivity Center services*.
2. Complete the following steps on Server A:
 - a. Log on to Server A with the appropriate user privileges.
 - b. Back up Tivoli Storage Productivity Center. For more information about backing up Tivoli Storage Productivity Center, see “Backups” on page 371.
 - c. If necessary, upgrade DB2 on Server A to a version that is supported by Tivoli Storage Productivity Center Version 5.2. For more information about upgrading DB2, see “Upgrading from 32-bit DB2 Version 9.7 to 64-bit DB2 Version 10.1” on page 372.
 - d. Edit and save the appropriate response file on Server A.

- If you are upgrading from Tivoli Storage Productivity Center Version 4.2, edit the `silent_Upgrade4x.properties` file and set the following parameters:
 - `LICENSE_ACCEPTED=true`
 - `CHOSEN_INSTALL_TYPE="4.x Upgrade"`
 - `varMigrateCASAgentsLater=value`
 - `varMigratePerfAndConfigHistoryData=value`
- If you are upgrading from Tivoli Storage Productivity Center Version 5.1, edit the `silent_Upgrade5x.properties` file and set the following parameters:
 - `LICENSE_ACCEPTED=true`
 - `CHOSEN_INSTALL_TYPE="5.x Upgrade"`

For more information about editing the response file, see “Editing the upgrade response file” on page 383.

e. Run the silent mode installation program on Server A.

- For Windows operating systems, run the following command:


```
setup.bat -l language -i silent -f absolute_path_to_response_file
```

 where *language* can be one of the following values:
 - Czech - cs
 - English - en
 - French - fr
 - German - de
 - Hungarian - hu
 - Italian - it
 - Japanese - ja
 - Korean - ko
 - Polish - pl
 - Brazilian Portuguese - pt_BR
 - Russian - ru
 - Spanish - es
 - Chinese (Simplified) - zh_CN
 - Chinese (Traditional) - zh_TW

`absolute_path_to_response_file` is the absolute path to the response file. For example, the following command specifies the language and the path:

```
setup.bat -l fr -i silent -f
c:\TPC52\silent_Upgrade4x.properties.properties
```

- For AIX or Linux operating systems, run the following command:


```
./setup.bin -l language -i silent -f /absolute_path_to_response_file
```

For example, the following command specifies the language and the path:

```
./setup.bin -l de -i silent -f /TPC52/silent_Upgrade5x.properties
```

If you do not specify a language or if the language is not specified correctly, the installation program uses the English language as the default.

f. Optional: Monitor the progress of the upgrade on Server A.

- To view the progress of the silent mode installation on Windows operating systems, check the trace log in the following path:


```
TPC_installation_directory\logs\traceTPCInstall.log
```

- To view the progress of the silent mode installation on AIX or Linux operating systems, check the trace log in the following path:

TPC_installation_directory/logs/traceTPCInstall.log

3. Complete the following steps on Server B:

- Log on to Server B with the appropriate user privileges.
- Back up Tivoli Storage Productivity Center on Server B. For more information about backing up Tivoli Storage Productivity Center, see “Backups” on page 371.
- Install DB2 Enterprise Server Edition on Server B.
Attention: DB2 Enterprise Server Edition is installed on Server A and on Server B because even though you are upgrading Tivoli Storage Productivity Center in a multiple-server environment, it is expected that you are installing Jazz for Service Management in a single-server environment.
- On Server B, start all of the Tivoli Storage Productivity Center services, including Tivoli Integrated Portal.

If you are upgrading from Tivoli Storage Productivity Center Version 4.2 (or later), for more information about starting Tivoli Storage Productivity Center services, see Starting Tivoli Storage Productivity Center services.

If you are upgrading from Tivoli Storage Productivity Center Version 5.1 (or later), For more information about starting Tivoli Storage Productivity Center services, see Starting Tivoli Storage Productivity Center services.

- If Jazz for Service Management is not installed on Server B, download and extract the Jazz for Service Management compressed installation files to the same temporary directory.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

For more information about the installation files, see Setting up a local file system for a custom installation.

For more information about installing Jazz for Service Management by using silent mode, see Custom installations by using silent mode.

- Edit and save the appropriate response file on Server B.
 - If you are upgrading from Tivoli Storage Productivity Center Version 4.2, edit the `silent_Upgrade4x.properties` file and set the following parameters:
 - `LICENSE_ACCEPTED=true`
 - `CHOSEN_INSTALL_TYPE="4.x Upgrade"`
 - `varMigrateCASAgentsLater=value`
 - `varMigratePerfAndConfigHistoryData=value`
 - `varPreserveTIP1x=value`
 - `varJazzSMUsrID=user_name`
 - `varJazzSMUsrPW=password`
 - `JAZZSM_INSTALL_DIR=Location_of_JazzSM_installation_directory`
 - If you are upgrading from Tivoli Storage Productivity Center Version 5.1, edit the `silent_Upgrade5x.properties` file and set the following parameters:
 - `LICENSE_ACCEPTED=true`
 - `CHOSEN_INSTALL_TYPE="5.x Upgrade"`

- varPreserveTIP2x=*value*
- varJazzSMUsrID=*user_name*
- varJazzSMUsrPW=*password*
- JAZZSM_INSTALL_DIR=*Location_of_JazzSM_installation_directory*

For more information about editing the response file, see “Editing the upgrade response file” on page 383.

g. Run the silent mode installation program on Server B.

- For Windows operating systems, run the following command:
`setup.bat -l language -i silent -f absolute_path_to_response_file`

where *language* can be one of the following values:

- Czech - cs
- English - en
- French - fr
- German - de
- Hungarian - hu
- Italian - it
- Japanese - ja
- Korean - ko
- Polish - pl
- Brazilian Portuguese - pt_BR
- Russian - ru
- Spanish - es
- Chinese (Simplified) - zh_CN
- Chinese (Traditional) - zh_TW

absolute_path_to_response_file is the absolute path to the response file. For example, the following command specifies the language and the path:

```
setup.bat -l fr -i silent -f
c:\TPC52\silent_Upgrade4x.properties.properties
```

- For AIX or Linux operating systems, run the following command:
`./setup.bin -l language -i silent -f absolute_path_to_response_file`

For example, the following command specifies the language and the path:

```
./setup.bin -l de -i silent -f /TPC52/silent_Upgrade5x.properties
```

If you do not specify a language or if the language is not specified correctly, the installation program uses the English language as the default.

h. Monitor the progress of the upgrade on Server B.

- To view the progress of the silent mode installation on Windows operating systems, check the trace log in the following path:
`TPC_installation_directory\logs\traceTPCInstall.log`
- To view the progress of the silent mode installation on AIX or Linux operating systems, check the trace log in the following path:
`TPC_installation_directory/logs/traceTPCInstall.log`

4. If you upgraded a multiple-server Tivoli Storage Productivity Center Version 4.2 (or later) environment on the Windows operating system that is configured for LDAP authentication, complete the following steps on Server B so that the Windows Scheduled Tasks for the Tivoli Storage Productivity Center Version 5.2 Device server and the Tivoli Storage Productivity Center Version 5.2 Replication server run successfully at system startup:

- a. Click **Start > Administrative Tools > Task Scheduler**.
- b. In the navigation tree, select **Task Scheduler Library**.
- c. Double-click the **startDevServer** task.
- d. On the startDevServer Properties page, on the **General** tab, in the **Security options** section, complete the following steps:
 - 1) Select **Run whether user is logged on or not**.
 - 2) Click **Change User or Group**.
 - 3) In the Select User or Group window, enter a Windows user name that belongs to the Administrators group and click **OK**.
- e. Click **OK**.
- f. In the Task Scheduler window, enter the password for the Windows user name and click **OK**.
- g. Double-click the **startRepServer** task.
- h. On the startRepServer Properties page, on the **General** tab, in the **Security options** section, complete the following steps:
 - 1) Select **Run whether user is logged on or not**.
 - 2) Click **Change User or Group**.
 - 3) In the Select User or Group window, enter a Windows user name that belongs to the Administrators group and click **OK**.
- i. Click **OK**.
- j. In the Task Scheduler window, enter the password for the Windows user name and click **OK**.
- k. Close the Task Scheduler.

Related concepts:

“Backups” on page 371

Before you migrate, you must back up the entire Tivoli Storage Productivity Center system.

Related tasks:

“Preparing for an upgrade” on page 371

To upgrade to Tivoli Storage Productivity Center Version 5.2, run the Tivoli Storage Productivity Center installation program. The installation wizard pages that you see depend on the components that you install.

Related reference:

“Planning for Tivoli Storage Productivity Center authentication and authorization” on page 13

An operating system user name is required to install and log on to Tivoli Storage Productivity Center for the first time. After you install Tivoli Storage Productivity Center, you can assign roles to users. Roles determine the product functions that are available to users.

“Reviewing the log files to resolve installation issues” on page 212

If an error occurs during Tivoli Storage Productivity Center installation, you can review the error log files to resolve issues and continue the installation.

Upgrading Tivoli Storage Productivity Center with remote Tivoli Integrated Portal by using silent mode

You can upgrade Tivoli Storage Productivity Center in a multiple-server environment by using silent mode.

Before you upgrade Tivoli Storage Productivity Center by using silent mode on the AIX or Linux operating systems, you must source the user profile (db2profile) for the instance owner of the DB2 database. For example:

```
. /home/db2inst1/sqllib/db2profile
```

For this procedure, the terms *Server A* and *Server B* denote the two servers. Server A has DB2 Enterprise Server Edition, the Tivoli Storage Productivity Center database repository and the Tivoli Storage Productivity Center servers installed. Server B has IBM Tivoli Integrated Portal, IBM Tivoli Common Reporting, TCRDB, and the Tivoli Storage Productivity Center web-based GUI installed.

Important: This procedure applies only when you are upgrading from Tivoli Storage Productivity Center Version 5.1 (or later) to Version 5.2.

To upgrade Tivoli Storage Productivity Center by using silent mode, complete the following steps:

1. Complete the following steps on Server B:
 - a. Log on to Server B with the appropriate user privileges.
 - b. On Server B, stop all of the Tivoli Storage Productivity Center services, including Tivoli Integrated Portal.
For more information about stopping Tivoli Storage Productivity Center services, see *Stopping Tivoli Storage Productivity Center services*.
2. Complete the following steps on Server A:
 - a. Log on to Server A with the appropriate user privileges.
 - b. Back up Tivoli Storage Productivity Center on Server A. For more information about backing up Tivoli Storage Productivity Center, see *"Backups"* on page 371.
 - c. If necessary, upgrade DB2 on Server A to a version that is supported by Tivoli Storage Productivity Center Version 5.2. For more information about upgrading DB2, see *"Upgrading from 32-bit DB2 Version 9.7 to 64-bit DB2 Version 10.1"* on page 372.
 - d. Edit and save the response file on Server A.
Since you are upgrading from Tivoli Storage Productivity Center Version 5.1, edit the `silent_Upgrade5x.properties` file and set the following parameters:
 - `LICENSE_ACCEPTED=true`
 - `CHOSEN_INSTALL_TYPE="5.x Upgrade"`For more information about editing the response file, see *"Editing the upgrade response file"* on page 383.
 - e. Run the silent mode installation program on Server A.
 - For Windows operating systems, run the following command:
`setup.bat -l language -i silent -f absolute_path_to_response_file`
where *language* can be one of the following values:
 - Czech - cs
 - English - en
 - French - fr
 - German - de
 - Hungarian - hu
 - Italian - it
 - Japanese - ja

- Korean - ko
- Polish - pl
- Brazilian Portuguese - pt_BR
- Russian - ru
- Spanish - es
- Chinese (Simplified) - zh_CN
- Chinese (Traditional) - zh_TW

`absolute_path_to_response_file` is the absolute path to the response file. For example, the following command specifies the language and the path:

```
setup.bat -l fr -i silent -f
c:\TPC52\silent_Upgrade5x.properties
```

- For AIX or Linux operating systems, run the following command:
`./setup.bin -l language -i silent -f /absolute_path_to_response_file`

For example, the following command specifies the language and the path:
`./setup.bin -l de -i silent -f /TPC52/silent_Upgrade5x.properties`

If you do not specify a language or if the language is not specified correctly, the installation program uses the English language as the default.

- f. Optional: Monitor the progress of the upgrade on Server A.
 - To view the progress of the silent mode installation on Windows operating systems, check the trace log in the following path:
`TPC_installation_directory\logs\traceTPCInstall.log`
 - To view the progress of the silent mode installation on AIX or Linux operating systems, check the trace log in the following path:
`TPC_installation_directory/logs/traceTPCInstall.log`

3. Complete the following steps on Server B:

- a. Log on to Server B with the appropriate user privileges.
- b. Back up Tivoli Storage Productivity Center on Server B. For more information about backing up Tivoli Storage Productivity Center, see “Backups” on page 371.
- c. Install DB2 Enterprise Server Edition on Server B.

Important: DB2 Enterprise Server Edition is installed on Server A and on Server B because even though you are upgrading Tivoli Storage Productivity Center in a multiple-server environment, it is expected that you are installing Jazz for Service Management in a single-server environment.

- d. On Server B, start all of the Tivoli Storage Productivity Center services, including Tivoli Integrated Portal.

For more information about starting Tivoli Storage Productivity Center services, see Starting Tivoli Storage Productivity Center services.

- e. If Jazz for Service Management is not installed on Server B, download and extract the Jazz for Service Management and Tivoli Common Reporting compressed installation files to the same temporary directory.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

For more information about the installation files, see Setting up a local file system for a custom installation.

For more information about installing Jazz for Service Management by using silent mode, see Custom installations by using silent mode.

- f. Edit and save the appropriate response file on Server B.

Since you are upgrading from Tivoli Storage Productivity Center Version 5.1, edit the `silent_Upgrade5x.properties` file and set the following parameters:

- `LICENSE_ACCEPTED=true`
- `CHOSEN_INSTALL_TYPE="5.x Upgrade"`
- `varPreserveTIP2x=value`
- `varJazzSMUsrID=user_name`
- `varJazzSMUsrPW=password`
- `JAZZSM_INSTALL_DIR=Location_of_JazzSM_installation_directory`

For more information about editing the response file, see “Editing the upgrade response file” on page 383.

- g. Run the silent mode installation program on Server B.

- For Windows operating systems, run the following command:
`setup.bat -l language -i silent -f absolute_path_to_response_file`
where *language* can be one of the following values:

- Czech - cs
- English - en
- French - fr
- German - de
- Hungarian - hu
- Italian - it
- Japanese - ja
- Korean - ko
- Polish - pl
- Brazilian Portuguese - pt_BR
- Russian - ru
- Spanish - es
- Chinese (Simplified) - zh_CN
- Chinese (Traditional) - zh_TW

`absolute_path_to_response_file` is the absolute path to the response file. For example, the following command specifies the language and the path:

```
setup.bat -l fr -i silent -f  
c:\TPC52\silent_Upgrade5x.properties
```

- For AIX or Linux operating systems, run the following command:
`./setup.bin -l language -i silent -f /absolute_path_to_response_file`

For example, the following command specifies the language and the path:
`./setup.bin -l de -i silent -f /TPC52/silent_Upgrade5x.properties`

If you do not specify a language or if the language is not specified correctly, the installation program uses the English language as the default.

- h. Optional: Monitor the progress of the upgrade on Server B.

- To view the progress of the silent mode installation on Windows operating systems, check the trace log in the following path:
`TPC_installation_directory\logs\traceTPCInstall.log`

- To view the progress of the silent mode installation on AIX or Linux operating systems, check the trace log in the following path:

`TPC_installation_directory/logs/traceTPCInstall.log`

Related concepts:

“Backups” on page 371

Before you migrate, you must back up the entire Tivoli Storage Productivity Center system.

“Jazz for Service Management and Tivoli Common Reporting” on page 172

If you plan to use Tivoli Storage Productivity Center reports, you must install Jazz for Service Management 1.1.0.1 and Tivoli Common Reporting 3.1.0.1. You can install these components now or after you install Tivoli Storage Productivity Center.

Related tasks:

“Installing DB2” on page 132

You can install DB2 Enterprise Server Edition Version 10.1 Fix Pack 2 on the Linux, AIX, or Windows operating systems.

“Preparing for an upgrade” on page 371

To upgrade to Tivoli Storage Productivity Center Version 5.2, run the Tivoli Storage Productivity Center installation program. The installation wizard pages that you see depend on the components that you install.

Related reference:

“Planning for Tivoli Storage Productivity Center authentication and authorization” on page 13

An operating system user name is required to install and log on to Tivoli Storage Productivity Center for the first time. After you install Tivoli Storage Productivity Center, you can assign roles to users. Roles determine the product functions that are available to users.

“Reviewing the log files to resolve installation issues” on page 212

If an error occurs during Tivoli Storage Productivity Center installation, you can review the error log files to resolve issues and continue the installation.

Installing Tivoli Storage Productivity Center reports later in a multiple-server environment after an upgrade

In a multiple-server environment with a remote database, you can choose to install Tivoli Storage Productivity Center Version 5.2 reports by using the installation program after you upgrade to Tivoli Storage Productivity Center Version 5.2.

Download and extract the Jazz for Service Management compressed files in to the same temporary directory before you install Tivoli Storage Productivity Center reports.

For this procedure, the terms *Server A* and *Server B* denote the two servers. Ensure that you have completed the steps in “Upgrading Tivoli Storage Productivity Center with a remote database by using the wizard” on page 388. Server A has DB2 Enterprise Server Edition and the Tivoli Storage Productivity Center database repository installed. Server B has DB2 Enterprise Server Edition, and the Tivoli Storage Productivity Center servers installed.

After you upgrade to Tivoli Storage Productivity Center Version 5.2, you can install Tivoli Storage Productivity Center reports on Server B for one of the following reasons:

- You chose not to install Jazz for Service Management on Server B the first time you ran the Tivoli Storage Productivity Center Version 5.2 installation program on Server B. Tivoli Storage Productivity Center was upgraded without Tivoli Storage Productivity Center reports.
- You attempted to install Jazz for Service Management on Server B the first time you ran the Tivoli Storage Productivity Center Version 5.2 installation program on Server B, but the Jazz for Service Management installation did not succeed. Tivoli Storage Productivity Center was upgraded without Tivoli Storage Productivity Center reports.
- You successfully installed Jazz for Service Management on Server B the first time you ran the Tivoli Storage Productivity Center Version 5.2 installation program on Server B. However, there was an issue when the installation program attempted to communicate with Jazz for Service Management. Tivoli Storage Productivity Center was upgraded without Tivoli Storage Productivity Center reports.

This procedure assumes one of the following conditions:

- You have not yet installed Jazz for Service Management on Server B.
- You resolved any issues that you experienced during the initial attempt to install Jazz for Service Management on Server B.

Restriction: You cannot install Tivoli Storage Productivity Center reports on Server A, where you already upgraded the Tivoli Storage Productivity Center database repository.

To install Tivoli Storage Productivity Center reports later in a multiple-server environment, complete the following steps on Server B:

1. Log on to Server B with the appropriate user privileges.
2. If Jazz for Service Management is not installed, and you plan to run Tivoli Storage Productivity Center reports, download and extract the Jazz for Service Management compressed installation files to the same temporary directory.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

For more information about the installation files, see *Setting up a local file system for a custom installation*.
3. Start the Tivoli Storage Productivity Center installation program again on Server B.
4. If Jazz for Service Management is not installed on Server B, and you want to install it on Server B, you can install it now:
 - a. On the Welcome page, click **Install Now**.
 - b. On the Install Jazz for Service Management page, complete the following steps:
 - 1) Provide the location where the Jazz for Service Management and Tivoli Common Reporting installation files were extracted.

For example, if you are installing Jazz for Service Management on the Windows operating system, enter `c:\downloads\jazzSM`. If you are installing Jazz for Service Management on the AIX or Linux operating systems, enter `/downloads/JazzSM`.

- 2) If there is a port conflict, specify a new starting value for a 15 port range, and click the **Verify Port Availability** link to ensure that the port range is usable.
- 3) Click **Install Now**.

The Tivoli Storage Productivity Center installation program pauses and the Jazz for Service Management launchpad starts.

- c. When you exit the Jazz for Service Management launchpad, you are returned to the Install Jazz for Service Management page in the Tivoli Storage Productivity Center installation program. Click **OK**.
- d. If the installation of Jazz for Service Management was successful on Server B, you are returned to the Welcome page, which now displays a green check mark.

If the installation of Jazz for Service Management was not successful on Server B, a message is displayed, and you can click one of the following options:

- **Install Now**, which starts the Jazz for Service Management launchpad again.
- **Continue**, which returns to the Welcome page.

You must install Jazz for Service Management successfully on Server B to continue installing Tivoli Storage Productivity Center reports on Server B.

- e. If the installation of Jazz for Service Management was successful on Server B, and a green check mark is displayed on the Welcome page, click **Next**.
5. On the Configure Jazz for Service Management and Tivoli Common Reporting page, enter the following information, and click **Next**:
 - The user name that is used to log on to the Jazz for Service Management WebSphere profile
 - The password that is associated with the user name
 - The path for the Jazz for Service Management installation directory

Jazz for Service Management starts. After Jazz for Service Management starts, it might take some time before all components, including Tivoli Common Reporting, are running.

If the Tivoli Storage Productivity Center Version 5.2 installation program is unable to communicate with Jazz for Service Management on Server B, you must resolve this problem to continue installing Tivoli Storage Productivity Center reports.

6. Follow the prompts in the installation wizard to install Tivoli Storage Productivity Center reports on Server B.

Upgrading Tivoli Storage Productivity Center when Tivoli Integrated Portal is remote

After you upgrade to Tivoli Storage Productivity Center Version 5.2, you can migrate LDAP information in a multiple-server environment where Tivoli Integrated Portal is remote.

Before you begin this procedure, ensure that you have upgraded to Tivoli Storage Productivity Center Version 5.2. For more information about upgrading, see Chapter 4, “Upgrading and migrating,” on page 369.

In a single-server environment, LDAP information is automatically migrated from Tivoli Integrated Portal to the Tivoli Storage Productivity Center web server. In a

multiple-server environment, where Tivoli Integrated Portal is remote, you must complete some additional steps after you upgrade to Tivoli Storage Productivity Center Version 5.2.

To migrate LDAP information when Tivoli Integrated Portal is remote, complete the following steps:

1. After you upgrade from Tivoli Integrated Portal to Jazz for Service Management, the `ldap.conf` file is created. The `ldap.conf` file contains LDAP data and is in one of the following directories:
 - On Windows operating systems:
`c:\Program files\ibm\tpc\config`
 - On AIX or Linux operating systems:
`/opt/IBM/TPC/config`
2. Copy the `ldap.conf` file to one of the following directories on the Tivoli Storage Productivity Center server:
 - `c:\program files\ibm\tpc\config`
 - `/opt/IBM/TPC/config`
3. Ensure that the Tivoli Storage Productivity Center common user ID does not exist in the LDAP repository that is being imported.

Restriction: The WebSphere Application Server cannot resolve duplicated users or groups when these users or groups are present in more than one repository in the federated repositories framework.

For example, an Administrator user can exist in both the localOS and LDAP repository. You must ensure that the duplicated users (or groups) are not used during the configuration or to manage Tivoli Storage Productivity Center.

4. To avoid issues when you add an LDAP directory, you must back up and restore the WebSphere Application Server configuration for the Tivoli Storage Productivity Center instance of WebSphere Application Server:

- a. To back up the configuration, run the following command:

On Windows operating systems:

```
WebSphere_Directory\bin\backupConfig.bat -username  
adminuser -password adminpassword -nostop
```

On AIX or Linux operating systems:

```
WebSphere_Directory/bin/backupConfig.sh -username  
adminuser -password adminpassword -nostop
```

- b. To restore the configuration, run the following command:

- On Windows operating systems:

```
restoreConfig.bat
```

- On AIX or Linux operating systems:

```
restoreConfig.sh
```

The **restoreConfig** command restores the WebSphere Application Server configuration for the WebSphere Application Server. The **restoreConfig** command is in one of the following directories:

- On Windows operating systems, go to this directory:

```
WebSphere_directory/bin/restoreConfig.bat
```

- On AIX or Linux operating systems, go to this directory:

```
WebSphere_directory/bin/restoreConfig.sh
```


5. To import the LDAP data (ldap.conf) into the embedded WebSphere Application Server that is on the Tivoli Storage Productivity Center server, run the following command;

```
ImportLDAPRepositories.bat location of ewas -user  
wasAdminUser -password wasAdminUserPassword  
fully qualified path of ldap.conf file
```

The following text is an example of this command on the Windows operating system:

```
importLDAPRepositories.bat  
"c:\Program Files\IBM\TPC\ewas\profiles\WebServerProfile" -user wasAdminUser  
-password wasAdminpass "c:\Program Files\IBM\TPC\config\ldap.conf"
```

The following text is an example of this command on the AIX or Linux operating systems:

```
./importLDAPRepositories.sh  
"/opt/IBMTPC/ewas/profiles/WebServerProfile" -user wasAdminUser  
-password wasAdminpass "/opt/IBM/TPC/config/ldap.conf"
```

Tip: The web server must be up and running.

6. Stop and start the Tivoli Storage Productivity Center web server. For more information about stopping or starting Tivoli Storage Productivity Center services, see “Starting and stopping the Tivoli Storage Productivity Center servers” on page 234.
7. To determine whether the LDAP information has been imported correctly, log in to the WebSphere Integrated Solutions Console by entering one of the following web addresses in a browser:
 - `http://hostname:port/ibm/console/logon.jsp`
 - `https://hostname:port/ibm/console/logon.jsp`

Where the *hostname* is the server name or IP address that is running WebSphere Application Server, and *port* is the port number for the WebSphere Application Server. The port number might differ depending on which protocol you used (http or https) and the options that you selected when you installed Tivoli Storage Productivity Center.

To determine the port number, complete the following steps:

- a. Open the *WebSphere_Directory/properties/portdef.props* file.
- b. The port number is the value that is assigned to one of the following keys:
 - For protocols that are not secure (for example, `http://`):
`WC_adminhost`
 - For protocols that are secure (for example, `https://`):
`WC_adminhost_secure`
8. In the WebSphere Integrated Solutions Console navigation tree, click **Users and Groups** > **Manage Groups**, and check whether the LDAP groups are listed.

Log in to the Tivoli Storage Productivity Center web-based GUI by using the Administrator LDAP user.

Upgrading Tivoli Storage Productivity Center for Replication

You can upgrade Tivoli Storage Productivity Center for Replication, which is provided with the installation of Tivoli Storage Productivity Center.

To upgrade to the current version of Tivoli Storage Productivity Center for Replication, depending on your environment, follow the instructions that are provided in “Upgrading Tivoli Storage Productivity Center in a single-server

environment” on page 378 or “Upgrading Tivoli Storage Productivity Center in a multiple-server environment” on page 387.

Upgrading Tivoli Storage Productivity Center for Replication management servers in a high-availability relationship

If you are upgrading Tivoli Storage Productivity Center for Replication management servers that are in a high-availability relationship, you can upgrade the active and standby server in any order.

For a typical upgrade, the following procedure is a commonly used. In the following steps, *Server 1* refers to the original active server and *Server 2* refers to the original standby server.

Important: If possible, avoid making any configuration changes to Server 1 or Server 2 until after the upgrade process is complete. Because the two servers are not synchronized during the upgrade process, configuration changes can be lost.

1. Issue the takeover command to Server 2. This action makes both Server 1 and Server 2 active.
2. Upgrade Server 2 and ensure that the upgrade was successful.
3. Upgrade Server 1 and ensure that the upgrade was successful.
4. If no changes were made to the configuration of Server 2, re-establish the high-availability function from Server 1 to Server 2.
5. If configuration changes were made to Server 2, synchronize the high-availability function from Server 2 to Server 1. Then, complete a takeover operation on Server 1 and re-establish the high-availability function from Server 1 to Server 2.

Upgrading Storage Resource agents

Upgrade Storage Resource agents to ensure that they are at the same release level as the Tivoli Storage Productivity Center server.

When you apply maintenance to Tivoli Storage Productivity Center, you can upgrade Storage Resource agents immediately or at a later time. To ensure that all your agents are at the current release level and to manage your network load, schedule upgrades regularly.

If a Storage Resource agent is not at the same level as the Tivoli Storage Productivity Center server, the following limitations occur:

- New functions in the current release might not be available for the resources that are monitored by the agent.
- Problem fixes are not applied to the agent.

You can upgrade Storage Resource agents by using the following methods:

- Use the **Modify Agents > Upgrade** action on the Servers page in the web-based GUI.
- Use a Storage Resource agent command.

To determine if a Storage Resource agent must be upgraded, complete the following steps:

1. In the navigation pane of the web-based GUI, go to **Server Resources > Servers**.

2. View the values in the Agent State column. If the state of the agent is **Upgraded needed**, the Storage Resource agent for the related server must be upgraded.

Starting agent upgrades

Upgrade a Storage Resource agent to the same release level as the Tivoli Storage Productivity Center server.

The ability to start the upgrade process for a Storage Resource agent is available when the following conditions are met:

- A Storage Resource agent must be deployed on the server that you want Tivoli Storage Productivity Center to monitor.
- An agent upgrade is not currently running for the server.
- The version of the agent that is deployed on the server is earlier than the Tivoli Storage Productivity Center server version.

To upgrade a Storage Resource agent that was not upgraded at maintenance time, complete the following steps:

1. In the navigation pane of the web-based GUI, go to **Server Resources > Servers**.
2. On the Servers page, right-click the server that contains the Storage Resource agent to upgrade and select **Modify Agents > Upgrade**.
3. Select **Immediate** from the **Agent Upgrade** list on the Upgrade Agent window.
4. Click **Upgrade** to start the upgrade process.

Scheduling agent upgrades

Schedule the upgrade process for a Storage Resource agent.

You can schedule the upgrade process for a Storage Resource agent when the following conditions are met:

- A Storage Resource agent must be deployed on the server that you want Tivoli Storage Productivity Center to monitor.
- An agent upgrade is not currently running for the server.
- The version of the agent that is deployed on the server is earlier than the Tivoli Storage Productivity Center server version.

Tips:

- To manage the workload for a server and the network, schedule the agent upgrade for a time when the server and network are not busy.
- The scheduled time for an agent upgrade is based on the time zone of the Tivoli Storage Productivity Center server, not the time zone of the server where the Storage Resource agent is installed. For example, if an agent is installed on a server in the Central (CST) time zone, but the Tivoli Storage Productivity Center server is in the Pacific (PST) time zone, the time that is shown in the web-based GUI when you schedule the upgrade is PST.

To schedule the upgrade of a Storage Resource agent that was not upgraded at maintenance time, complete the following steps:

1. In the navigation pane of the web-based GUI, go to **Server Resources > Servers**.

2. On the Servers page, right-click the server that contains the Storage Resource agent to upgrade and select **Modify Agents > Upgrade**.
3. Select **Specific** from the **Agent Upgrade** list on the Upgrade Agent window.
4. Select the date and time and click **Upgrade** to schedule the agent upgrade.

Upgrading Storage Resource agents by using a command

You can manually upgrade Storage Resource agents.

To manually upgrade the Storage Resource agent, complete the following steps:

1. Go to the DVD location of the installation program (by using the Storage Resource Agent image) and go to the bin directory:

```
cd DVD_image_location/data/sra/operating_system_name
```

Where *DVD_image_location* is the location of the installation image for the Storage Resource agent.

2. Run the upgrade command:

```
► bin/Agent -upgrade -installLoc agent_install_directory ►
(1)
► -commType Daemon ►
```

Notes:

- 1 Parameter when the agent is run as a daemon service.

The parameters are:

-installLoc "agent_install_directory"

Location where the agent is installed. Enclose the directory name in quotation marks, for example, "C:\Program Files\IBM\TPC_SRA\".

-commType Daemon

If the agent is run as a daemon service, then this parameter must be specified.

Here is an example for a daemon-based service by using the default location:

```
bin/Agent -upgrade
-installLoc "/opt/IBM/TPC/"
-commType Daemon
```

Here is an example for a non-daemon service by using a non-default location:

```
bin/Agent
-upgrade -installLoc "C:\Program Files\IBM\TPC_SRA\"
```

Tip: If you run the upgrade program outside of the *DVD_image_location* installation directory, then you must specify the full path.

If the upgrade fails, see the return codes in the Tivoli Storage Productivity Center Information Center. Search for *Return codes used by Storage Resource agent*.

Upgrading CIM agents for storage systems

Before you upgrade a Common Information Model (CIM) agent, ensure that Tivoli Storage Productivity Center supports the CIM agent that you want and that the agent is compatible with the firmware versions of your storage systems.

To ensure that a CIM agent is supported, review the supported products list for the current release of Tivoli Storage Productivity Center. For more information about the products that are supported by Tivoli Storage Productivity Center Version 5.2, see http://www.ibm.com/support/docview.wss?rs=40&context=SWJ50&q1=matrix&uid=swg21386446&loc=en_US&cs=utf-8&lang=en. Under Storage, click the link for the appropriate release. If you are uncertain about the CIM agent support, contact IBM customer support to help you with your upgrade plans.

Upgrading CIM agents

To upgrade a Common Information Model (CIM) agent, you must have the upgrade instructions that are supplied by the provider of the agent.

To upgrade the CIM agent, follow these steps:

1. Stop all Tivoli Storage Productivity Center server activity that might be dependent on the CIM agent (for example, performance monitor jobs, and discovery or probe jobs).
2. Stop the Tivoli Storage Productivity Center server services.
3. If any Tivoli Storage Productivity Center server processes remain, shut down the Tivoli Storage Productivity Center server for the duration of the CIM agent upgrade. If it is not possible to shut down the Tivoli Storage Productivity Center server, stop or kill the running processes.
4. Upgrade the CIM agent.
 - a. Refer to the instructions supplied by the CIM agent to perform the upgrade.
 - b. Verify that the CIM agent configuration is intact after the upgrade. Make sure that user accounts and passwords used with Tivoli Storage Productivity Center are still in place, and that all devices managed by the CIM agent are still listed.
5. Restart the Tivoli Storage Productivity Center server and Tivoli Storage Productivity Center server services.
6. Open the Tivoli Storage Productivity Center web-based GUI
7. Run a CIM object manager (CIMOM) discovery job.
8. Run a probe job for each storage system that is managed by the CIM agent.

Migrating BIRT reports

You must migrate Business Intelligence and Reporting Tools (BIRT) reports before you upgrade Tivoli Storage Productivity Center.

Before you upgrade from Tivoli Storage Productivity Center Version 4.2.2 to Version 5.2, you must manually export BIRT reports from IBM Tivoli Common Reporting Version 2.1 and import them into Tivoli Common Reporting Version 3.1.0.1. This migration does not occur as part of the Tivoli Storage Productivity Center upgrade process.

Exporting BIRT reports from Tivoli Common Reporting Version 2.1

To export BIRT reports from Tivoli Common Reporting Version 2.1, complete the following steps:

1. Export the complete Cognos® Content Store from the Tivoli Common Reporting web GUI.
 - a. Select **Launch > Administration**.
 - b. On the Configuration tab, select **Content Administration**.
 - c. Create a package to export by clicking **New Export**.
 - d. Follow the wizard to export the archive.

The exported archive is displayed on the Administration page.

2. Archive the *TCR_component_dir\data* directory in which all BIRT objects are stored.
3. Archive the directory where the report images are stored.

For more information about migrating BIRT reports, see Upgrading from Tivoli Common Reporting 2.1 and 2.1.1.

Tip: The exported package is installed in the directory that you specified in the Cognos® Content Manager.

Importing BIRT reports into Tivoli Common Reporting Version 3.1.0.1

To import BIRT reports into Tivoli Common Reporting Version 3.1.0.1, complete one of the following procedures:

- On Windows operating systems:

1. Go to the following directory:
JAZZSM_INSTALL_DIR\reporting\bin

where *JAZZSM_INSTALL_DIR* is the directory in which you installed Jazz for Service Management.

2. Run the following command:
`trcmd.bat -import -bulk name_file_reports.zip -username user
-password passwd`

- On AIX or Linux operating systems:

1. Go to the following directory:
JAZZSM_INSTALL_DIR/reporting/bin/

where *JAZZSM_INSTALL_DIR* is the directory in which you installed Jazz for Service Management.

2. Run the following command:
`./trcmd.sh -import -bulk name_file_reports.zip -username user
-password passwd`

where *user* and *passwd* are the user name and password that you used to install IBM WebSphere Application Server during the Jazz for Service Management installation.

Upgrading System Storage N Series Gateway servers

You must upgrade Tivoli Storage Productivity Center before you add N Series Gateway servers by using the **Other NAS** node.

Deleting and unlicensing existing N Series Gateway servers

If you are upgrading Tivoli Storage Productivity Center from TotalStorage Productivity Center Version 3.3 (or later), you must first delete and unlicense existing N Series Gateway servers before adding the N Series Gateway servers.

To delete and unlicense existing N Series Gateway servers, complete the following steps:

1. Stop all Tivoli Storage Productivity Center services.
2. Make a backup copy of the Tivoli Storage Productivity Center database.
3. Open the Tivoli Storage Productivity Center GUI.
4. Manually delete all N Series Gateway servers.
 - a. Expand **Administrative Services > Configuration > Manual NAS Server Entry**.
 - b. Select a NAS gateway server (for example, ratbert1) from the Manual NAS Server table.
 - c. Click **Delete**.
 - d. Click **Yes** to **Delete Manual NAS Server Entry** prompt.
 - e. Repeat steps b through d for other manually added NAS gateway servers.
5. Unlicense all NAS gateway servers that were automatically discovered
 - a. Click **Administrative Services > Configuration > License Keys**.
 - b. Expand **IBM TPC for Data** under the Licensing tab.
 - c. Clear the **Licensed** check box for all automatically discovered NAS gateway servers (for example, zinc).
 - d. Click the disk icon to save the changes.
 - e. Click **Yes** to the Save Confirmation prompt.

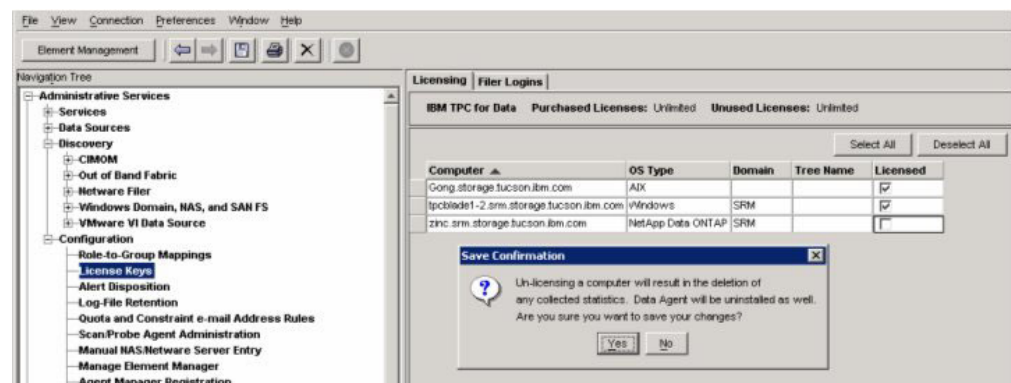


Figure 45. Save Confirmation prompt

Tip: The OS Type and Licensed fields of existing NAS gateway servers are updated after it is manually added with the **Other NAS** option. For more information about manually adding NAS gateway servers, see “Manually adding an N Series Gateway server ” on page 416.

6. Exit the Tivoli Storage Productivity Center GUI.

7. Make another backup of the Tivoli Storage Productivity Center database after the N Series Gateway servers are deleted and unlicensed.
Ensure that all of the Tivoli Storage Productivity Center services are stopped.
8. Restart all the Tivoli Storage Productivity Center services.
9. Go to “Manually adding an N Series Gateway server .”

Manually adding an N Series Gateway server

After you delete and unlicense the existing N Series Gateway servers, you can manually add these servers.

To manually add an N Series Gateway server, complete the following steps:

1. Start the Tivoli Storage Productivity Center GUI.
2. Manually add the N Series Gateway server as **Other NAS**.
 - a. Click **Administrative Services > Configuration > Manual NAS Server Entry**.
 - b. Click **Add NAS Server**.
 - c. Enter information in the following fields for the for an N Series Gateway server (for example, ratbert1):
 - **Network Name**
 - **Accessible from**
 - **SNMP Community**
 - **Login ID**
 - **Password**
 - d. Select the **Add as Other NAS** check box.
 - e. Enter the NAS Server Vendor Name or accept the Network Appliance as the default.
 - f. Click **OK** to save the input. This action enables Tivoli Storage Productivity Center to verify the NAS gateway server information and discover CIFS or NFS shares that are accessible to the selected Storage Resource agent.

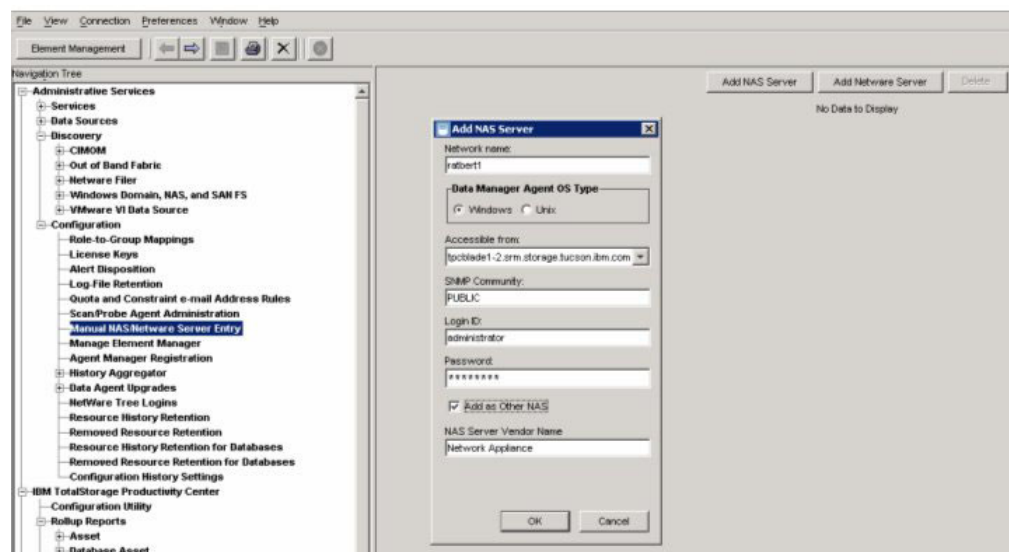


Figure 46. Add NAS Server panel

- g. Verify that the N Series Gateway server is added and listed with the **Other NAS** option selected as the **OS Type**.

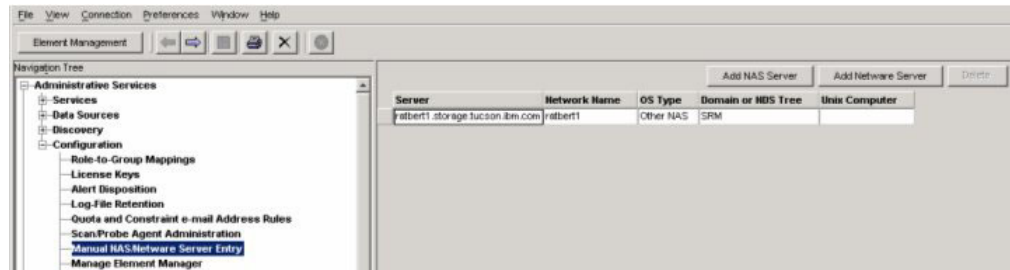


Figure 47. Verify that the N Series Gateway server is added

- h. Repeat steps b to g for other N Series Gateway servers.
3. To assign a Scan/Probe agent or agents to the exported CIFS or NFS shares accessible to the selected Storage Resource agent, complete the following steps:
 - a. Click **Administrative Services > Configuration > Scan/Probe Agent Administration**.
 - b. Select one or more file systems (for example, /vol/tpc1, /vol/tpc2, and /vol/vol0 for ratbert1) and assign the Storage Resource agent by clicking **Set agent per row** or **Set agent for all the selected rows**.

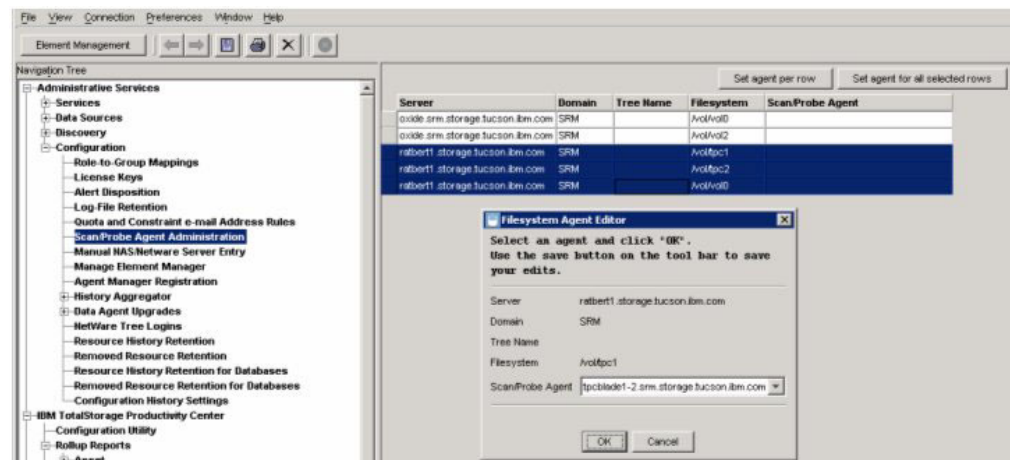


Figure 48. File system Agent Editor panel

- c. Click **OK** to save the assignment.

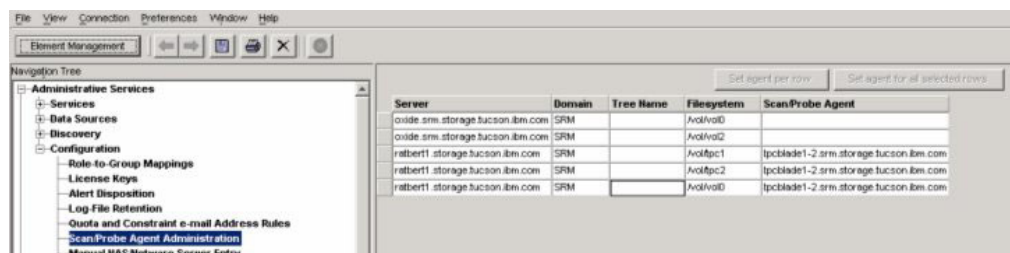


Figure 49. Scan/Probe Agent Administration panel

- d. Repeat steps b and c for other file systems (for example, /vol/vol0 and /vol/vol2 for oxide).
- e. Click the disk icon to save the **Scan/Probe Agent assignment**.
The N Series Gateway servers and their file systems can be displayed when a probe or scan job is run.
4. To probe one or more N Series Gateway servers, create a probe job .
5. To scan one or more file systems from the N Series Gateway servers, create a scan job.
6. To view an asset report on a NAS gateway server and its file systems as **Other NAS**, complete the following steps:
 - a. Click **Data Manager > Reporting > Asset > By OS Type > Other NAS**.
 - b. To view information for the server, click an N Series Gateway server (for example, ratbert1) .

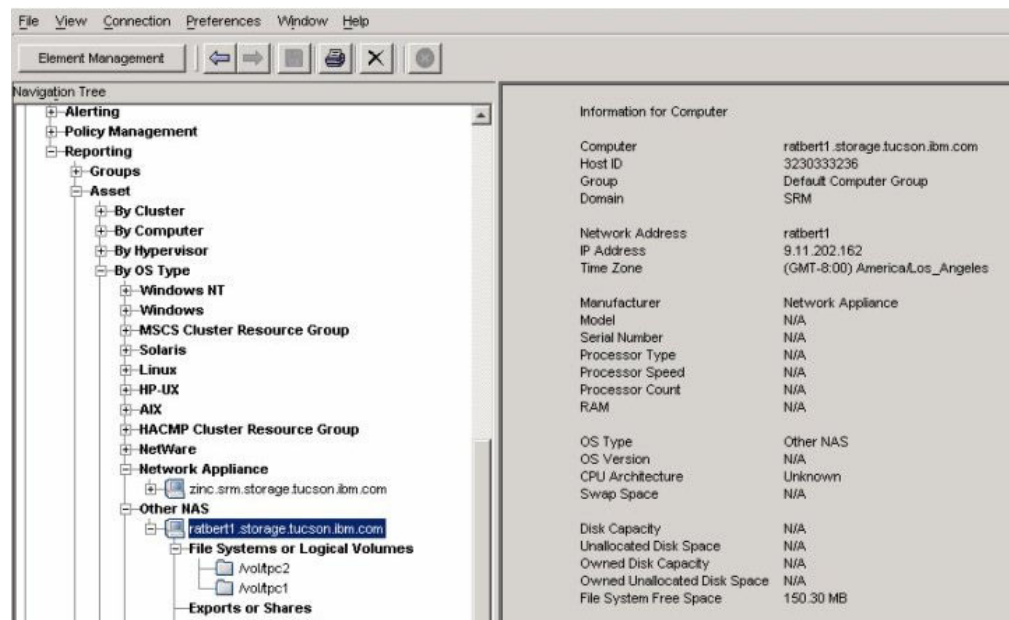


Figure 50. View information for N Series Gateway server

- c. To view file system information, click a file system (for example, /vol/tpc2)

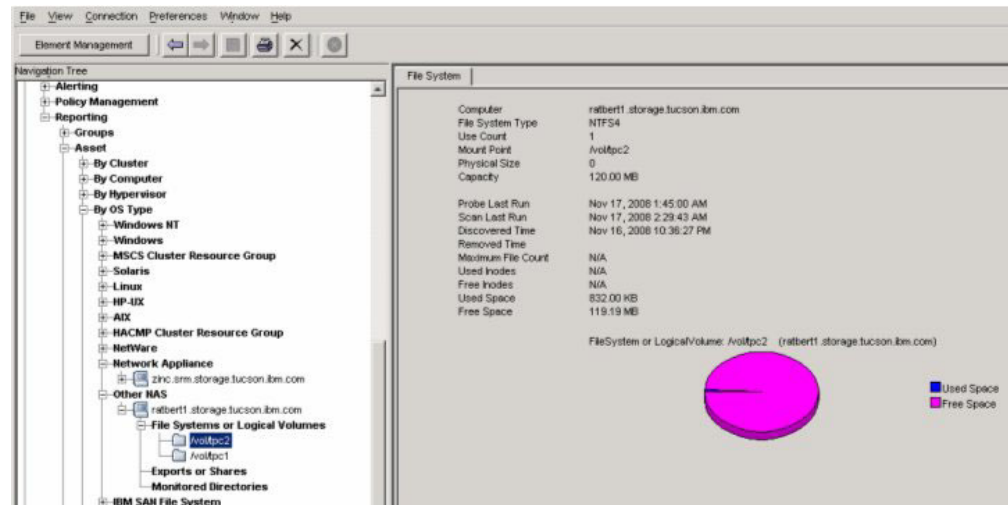


Figure 51. View information for a file system

7. Display the following information and reports for the **Other NAS** node:
 - a. Dashboard
 - b. System reports
 - c. Batch reports
 - d. Asset reports
 - e. Capacity reports, which includes Capacity reports - Charting
 - f. Usage reports
 - Usage reports - Filesystem Quota Violation
 - Capacity reports - Charting
8. Monitor the N Series Gateway servers and create and monitor alerts for the **Other NAS** node:
 - Monitoring
 - Monitoring - Assign a Scan agent to a Filesystem
 - Monitoring - Grouping
 - Monitoring - Scan job
 - Monitoring - Filesystem Quotas
 - Alerting
 - Filesystem Alert definition
 - Alerting - Directory Alerts
 - Alerting - Alert Log
 - Alerting - Alerts shown on the topology

Upgrading System Storage Productivity Center to Tivoli Storage Productivity Center Version 5.2

If you are using IBM System Storage Productivity Center, you must first upgrade to Tivoli Storage Productivity Center Version 4.2.2 and then upgrade to Tivoli Storage Productivity Center Version 5.2.

Before you begin this procedure, ensure you have upgraded System Storage Productivity Center to Tivoli Storage Productivity Center Version 4.2.2 or later, and you are using DB2 Version 9.7 or later.

To upgrade from System Storage Productivity Center to Tivoli Storage Productivity Center Version 4.2.2 or later, see Upgrading Tivoli Storage Productivity Center.

You are running System Storage Productivity Center under one of the following conditions:

- On a Windows operating system that Tivoli Storage Productivity Center Version 5.2 does not support (for example, Windows 2003 or 32-bit Windows 2008)
- On older hardware that cannot support 64-bit Windows 2008 or 64-bit Windows 2008 R2 or Tivoli Storage Productivity Center Version 5.2

If you want to upgrade to Tivoli Storage Productivity Center Version 5.2, you must first migrate to newer hardware that is running 64-bit Windows 2008 or 64-bit Windows 2008 R2.

For this procedure, the terms *Server A* and *Server B* denote the two servers. Server A has System Storage Productivity Center with DB2 Version 9.7 or later installed on it. You duplicate Server A on Server B, which is running 64-bit Windows 2008 or 64-bit Windows 2008 R2. Then you upgrade to 64-bit DB2 Version 10.1 Fix Pack 2 and Tivoli Storage Productivity Center Version 5.2.

Restriction: These steps do not include the instructions to migrate Tivoli Storage Productivity Center for Replication data from Server A to Server B.

To upgrade from System Storage Productivity Center to Tivoli Storage Productivity Center Version 5.2, complete the following steps:

1. For Server A, record the computer name information and the networking configuration.
2. On Server A, record the following information about the DB2 that is installed:
 - DB2 installation location
 - DB2 version
 - DB2 user name
 - DB2 user password
3. On Server A, record the following information about System Storage Productivity Center:
 - Tivoli Storage Productivity Center installation location
 - Tivoli Storage Productivity Center version
 - Tivoli Integrated Portal installation location
 - Tivoli Storage Productivity Center for Replication installation location
4. On Server A, to record other information about Tivoli Storage Productivity Center, complete the following steps:
 - a. Go to the following directory:
`C:\TPC_installation_location\IBM\TPC\config\`
TPC_installation_location is where Tivoli Storage Productivity Center is installed on Server A.
 - b. In the `InstallVariable.properties` file, record the values for the following parameters:
 - `varCommonUsrID`
Note the password that is associated with this user ID.
 - `varSrvName`

5. On Server A, if you changed the authentication method for System Storage Productivity Center from local operating system to LDAP federated repositories, to record the LDAP repository information, complete the following steps on Server A:
 - a. Start a web browser and enter the following address in the address field:
`http://hostname:16310`
hostname is the fully qualified server name or IP address of Server A.
 - b. Log in to Tivoli Integrated Portal by using the appropriate user ID and password. Your user ID must have administrator permissions.
 - c. In Tivoli Integrated Portal, click **Security > Secure administration, applications, infrastructure**.
 - d. Verify that **Federated repositories** is selected as the **Current realm definition** value, and click **Configure**.
 - e. On the "Federated repositories" page, record the following information:
 - **Primary administrative user name**
 - **Server user ID or administrative user on a Version 6.0.x node**
 This value is the same as the **Primary administrative user name** value.

Important: Record the password that is associated with this user name

 - The **Base entry** value in the **Repositories in the realm** table for your LDAP repository
 - f. On the "Federated repositories" page, under **Related Items**, click **Manage repositories**.
 - g. On the "Manage repositories" page, click the **Repository identifier** for your LDAP repository.
 - h. On the Configuration page for your LDAP repository, record the following information:
 - **Repository identifier**
 - **Directory Type**
 - **Primary host name**
 - **Port**
 - The **Support referrals to other LDAP servers** setting
 - **Bind distinguished name**
 Record the password that is associated with the **Bind distinguished name**.
 - **Login properties**
 - i. Log out of Tivoli Integrated Portal.
6. On Server A, stop all running Tivoli Storage Productivity Center jobs or allow all of the Tivoli Storage Productivity Center jobs to complete.
7. On Server A, stop all Tivoli Storage Productivity Center servers and Windows services, including Tivoli Integrated Portal.
8. On Server A, complete the following steps to record the Tivoli GUID value for Server A:
 - a. Open a Windows command window.
 - b. Go to the following directory:
`C:\Program Files (x86)\Tivoli\guid\`
 - c. Run the **tivguid.exe -show** command and record the output value.

9. Create a directory on Server A to back up the Tivoli Storage Productivity Center database. For example, you can create the following directory:
C:\Downloads\db2_backup
10. On Server A, to back up the Tivoli Storage Productivity Center database, complete the following steps:
 - a. To force all users or applications to disconnect from DB2, in a DB2 command window, run the following commands:
db2 force application all
db2 terminate
 - b. In the DB2 command window, run the following command to back up the Tivoli Storage Productivity Center database:
db2 BACKUP DATABASE TPCDB USER *user_name* USING *password* TO C:\Downloads\db2_backup COMPRESS
user_name is the user ID that owns the DB2 instance where the Tivoli Storage Productivity Center database is located and *password* is the password that is associated with that user name.
11. On Server A, copy the backup of the Tivoli Storage Productivity Center database from the following directory to an external location:
C:\Downloads\db2_backup\
12. To back up the Tivoli Storage Productivity Center keys and certificates for storage subsystems and Storage Resource agents, complete the following steps:
 - a. In a Windows command window, go to the following directory:
C:\TPC_installation_location\device\cert\
TPC_installation_location is where Tivoli Storage Productivity Center is installed on Server A.
 - b. Copy all the files in the following directory on Server A to an external location:
C:\TPC_installation_location\device\cert\
 - c. Go to the following directory:
C:\TPC_installation_location\data\sra\windows\certs
TPC_installation_location is where Tivoli Storage Productivity Center is installed on Server A.
 - d. Copy all the files in the following directory on Server A to an external location: For example, you can copy the files to the following external directory:
C:\TPC_installation_location\data\sra\windows\certs
13. Shut down Server A.
14. On Server B, ensure that 64-bit Windows 2008 or 64-bit Windows 2008 R2 is installed, and that this computer is a duplicate of Server A. Server B must have the identical computer name information and networking configuration as Server A. You recorded the computer name information and networking configuration for Server A in step 1 on page 420.
15. On Server B, install the version of DB2 that is identical to the version that is installed on Server A, and complete the following steps in the DB2 installation program:
 - a. Enter the identical DB2 installation location, DB2 user name, and DB2 password that you used on Server A.
 - b. Accept the default settings on the "Enable operating system security" page. You recorded this information for Server A in step 2 on page 420.

16. On Server B, install the version of Tivoli Storage Productivity Center that is identical to the version that is installed on Server A. When you install Tivoli Storage Productivity Center on Server B, complete a typical installation. Enter values for the following fields that are identical to the values that are used by Tivoli Storage Productivity Center on Server A:
 - **TPC Installation Location**
You recorded this information in step 3 on page 420.
 - **User ID and Password**
You recorded this information in step 4 on page 420.
 - **Server name**
You recorded this information in step 4 on page 420.
 - Keep the default values for the **Server port** and the **Agent port**.
 - Tivoli Integrated Portal installation location.
You recorded this information in step 3 on page 420.
 - Keep the default value for the Tivoli Integrated Portal **Port**.
 - **OS authentication**
 - Tivoli Storage Productivity Center for Replication **Directory Name**
This information was recorded in step 3 on page 420.
 - Keep the default value for **Tivoli Storage Productivity Center for Replication Administrator User Name** and enter the associated password
 - Keep the default values for the following Tivoli Storage Productivity Center for Replication fields:
 - **Default Host Port**
 - **Default Host Secure Port**
 - **Default Client Port**
 - **Default Standby Server Port**
17. On Server A, if you changed the authentication method for System Storage Productivity Center from local operating system to LDAP federated repositories, to record the LDAP repository information, complete the following steps on Server B:

To change the authentication method, see Changing the authentication method from local operating system to LDAP federated repositories.

You recorded the information for Server A in step 5 on page 421.
18. On Server B, after you install and configure Tivoli Storage Productivity Center so that it is identical to the Tivoli Storage Productivity Center installation on Server A, stop all Tivoli Storage Productivity Center servers and Windows services, including Tivoli Integrated Portal, on Server B.
19. On Server B, complete the following steps to change the Tivoli GUID value for Server B to match the Tivoli GUID value for Server A:
 - a. In a command window, go to the following directory:
C:\Program Files (x86)\Tivoli\guid\
 - b. Run the following command:
tivguid.exe -Write -Guid=
Tivoli_GUID_value_that_you_recorded_for_Server_A_in_Step_8
20. On Server B, create a directory to store the backup of the Tivoli Storage Productivity Center database from Server A. For example, you can create the following directory:
C:\Downloads\db2_restore

21. On Server A, copy the backup of the Tivoli Storage Productivity Center database from the external location to the following directory on Server B:
C:\Downloads\db2_restore\
22. On Server B, to restore the Tivoli Storage Productivity Center database from Server A, complete the following steps:
 - a. In a DB2 command window, run the following commands to force all users or applications to disconnect from DB2:
db2 force application all
db2 terminate
 - b. In the DB2 command window, run the following command to restore the Tivoli Storage Productivity Center database:
db2 RESTORE DATABASE TPCDB USER *user_name* USING *password*
FROM C:\Downloads\db2_restore INTO TPCDB REPLACE
EXISTING WITHOUT ROLLING FORWARD

user_name is the user who owns the DB2 instance where the Tivoli Storage Productivity Center database is located, and *password* is the password that is associated with that user name.
 - c. In the DB2 command window, run the following commands to stop and restart DB2:
db2stop
db2start
23. Copy the files that you backed up in step 10 on page 422 from the external location to the following directory on Server B:
C:\TPC_installation_location\device\cert\
TPC_installation_location is where Tivoli Storage Productivity Center is installed on Server B.
24. Copy the files that you backed up in step 10 on page 422 from the external location to the following directory on Server B:
C:\TPC_installation_location\data\sra\windows\certs\
TPC_installation_location is where Tivoli Storage Productivity Center is installed on Server B.
25. On Server B, start all Tivoli Storage Productivity Center servers and Windows services, including Tivoli Integrated Portal.
26. Verify that the Tivoli Storage Productivity Center system on Server B operates as expected.
27. On Server B, log in to the Tivoli Storage Productivity Center stand-alone GUI, and complete the following steps:
 - a. In the navigation tree, click **IBM Tivoli Storage Productivity Center > Job Management**.
 - b. Select the **Probe the Default Computer Group** job, click **Run Now**, and allow the job to run to completion.
28. On Server B, stop all Tivoli Storage Productivity Center servers and Windows services, including Tivoli Integrated Portal.
29. On Server B, upgrade DB2 to 64-bit DB2 Version 10.1 Fix Pack 2.
30. On Server B, start all Tivoli Storage Productivity Center servers and Windows services, including Tivoli Integrated Portal.
31. On Server B, upgrade Tivoli Storage Productivity Center to Version 5.2. For more information about upgrading to Tivoli Storage Productivity Center to Version 5.2, see Chapter 4, "Upgrading and migrating," on page 369.

Related reference:

“Verifying the installation” on page 208

After you install Tivoli Storage Productivity Center, you can verify whether the installation was successful.

“Upgrading from 32-bit DB2 Version 9.7 to 64-bit DB2 Version 10.1” on page 372

If you are running an earlier version of Tivoli Storage Productivity Center that uses a 32-bit DB2, and you want to upgrade to Tivoli Storage Productivity Center Version 5.2, you must upgrade to 64-bit DB2 Version 10.1 Fix Pack 2.

Migrating jobs

When you upgrade Tivoli Storage Productivity Center from a version that is earlier than Version 5.2, the existing probe and performance monitor jobs are automatically migrated. When the migration completes, each resource is included in a maximum of one data collection job of each job type.

During the migration, if a job definition includes multiple resources, individual data collection jobs are created for each resource in that job. For example, if a probe collects data about three storage systems in Version 4.2.2, three separate probes are created in Version 5.2, one for each storage system.

Tip: After you upgrade Tivoli Storage Productivity Center to Version 5.2, you can view the status of the most recent probe run for a resource in the web-based GUI. However, if the probe ran before the V5.2 upgrade, you cannot view the probe logs in the web-based GUI. After the first run of the migrated probe, you can view the probe logs in the web-based GUI.

Job migration rules

The following rules are used to determine which jobs are migrated:

- Only probe and performance monitor jobs are migrated.
- Only jobs that are scheduled to run in the future are migrated. Jobs that are defined with the **Run Once** option and that have not run yet are migrated. Jobs that are completed are not migrated.
- If monitoring groups are used for scheduling, after the migration, each resource will be included in its own job schedule. For example, in Version 5.1, if a monitoring group that consists of many servers is used for a probe definition, after the migration, in Version 5.2, each server will have its own probe job.
- In all versions of Tivoli Storage Productivity Center before Version 5.2, a resource can be included in multiple jobs of the same job type. However, after the migration to Version 5.2, each resource can be included in a maximum of one job of each job type. For example, in Version 4.2.2, a server can be included in multiple probes. After the migration to Version 5.2, a server can be included in only one probe.
- If a resource is included in multiple jobs of the same job type, the following priority rules are used to determine which job is migrated:
 - A job that runs repeatedly has the highest priority.
 - If there is more than one job that runs repeatedly, the job that is closest to repeating daily is migrated. For example, if a job runs on Monday, Wednesday, and Friday, and another job runs daily, the daily job is migrated.
 - If there is more than one job that has the same frequency, the job that is scheduled to run closest to the migration time has the highest priority. For example, a resource is included in two probe jobs that run daily. The Probe_a

job is scheduled to run at 9:00 am and the Probe_b job is scheduled to run at 11:00 am. If the migration occurs at 10:30 am, the Probe_b job has the highest priority and is migrated.

- A job that is defined with the **Run Once** option has the lowest priority.
- Jobs that are disabled are not migrated, with the following exceptions:
 - The disabled job is the only job of that job type for the resource. For example, if only one probe job is defined for a resource and the probe job is disabled, the disabled job is migrated.
 - A disabled job that runs repeatedly has a higher priority for migration than a job that is defined with the **Run Once** option. For example, a resource is included in two probe jobs. The Probe_a job runs repeatedly but is disabled. The Probe_b job is defined with the **Run Once** option and is scheduled to run at a future date. The Probe_a job is migrated.

When a disabled job is migrated, the job is also disabled after the migration completes.

Resolving a display issue in the web-based GUI after an upgrade

When you upgrade Tivoli Storage Productivity Center from Version 4.2 (or later) to Version 5.2, some columns on the Storage Systems page might display incorrect values. When you run a probe for the storage system after the upgrade, the correct values are displayed.

After the upgrade, columns on the Storage Systems page, such as the Raw Disk Capacity column, the Disks column, and the Volumes column might display a value of 0. To resolve this issue, you must run a probe for the storage system.

1. From the navigation pane in the web-based GUI, click **Storage Resources > Storage Systems**.
2. Locate the storage system that you want to probe.
3. Right-click the storage system row, and select **Data Collection > Start Probe**.

When you start a probe, Tivoli Storage Productivity Center begins the immediate collection of status and asset information about the storage system. When the probe successfully completes, the columns on the Storage Systems page display the correct values.

Chapter 5. Uninstalling

You can uninstall Tivoli Storage Productivity Center by using the uninstallation wizard or by using silent mode from the command line.

To uninstall Tivoli Storage Productivity Center, uninstall the components and related software in the following order:

1. If you installed a Storage Resource agent on many systems, uninstall those agents before you uninstall the stand-alone GUI.
2. If all Tivoli Storage Productivity Center components are installed on one server, uninstall all components.
3. If Tivoli Common Reporting is installed on a separate server, uninstall it before you uninstall the Tivoli Storage Productivity Center components on the first server.
4. If the database repository is installed on a separate server, uninstall the Tivoli Storage Productivity Center components on the first server, and then uninstall the database repository on the second server.
5. Uninstall Jazz for Service Management and then uninstall DB2.

Note: On the Windows operating system, before you uninstall Tivoli Storage Productivity Center, if you installed the Monitoring Agent service, stop the **Monitoring Agent for Windows OS - Primary** and **Monitoring Agent for Windows OS - Watchdog** services.

Uninstalling Tivoli Storage Productivity Center in a single-server environment by using the wizard

In a single-server environment, you can uninstall Tivoli Storage Productivity Center by using a wizard. With the wizard, the uninstallation process requires minimal user interaction.

Before you start the Tivoli Storage Productivity Center uninstallation program, on the UNIX operating system, you must source the DB2 profile db2profile for the instance owner of the DB2 database. For example:

```
. /home/db2inst1/sqllib/db2profile
```

To uninstall the software in a single-server environment:

1. Log on to the Tivoli Storage Productivity Center system with the appropriate user privileges.
2. Start the Tivoli Storage Productivity Center uninstallation wizard in one of the following operating systems:
 - For the Windows operating system:
 - a. Click **Start > Control Panel > Programs > Programs and Features**.
 - b. Highlight **Tivoli Storage Productivity Center** and click **Uninstall/Change**.
 - For the AIX or Linux operating systems:

Run the following command from the root directory:

```
TPC_installation_directory/_uninst/uninstall
```

where *TPC_installation_directory* is where Tivoli Storage Productivity Center is installed.

3. Review the message that indicates that all installed Tivoli Storage Productivity Center components is uninstalled.
4. Click **Uninstall** and click **Next**. You cannot cancel the uninstallation process after it starts.
5. Restart the system if needed.
 - For the AIX or Linux operating system, you do not have to restart the system.
 - For the Windows operating system, you can restart the system now or later. You must restart the system to reinstall Tivoli Storage Productivity Center.
6. If an error occurred during the installation process, review the installation log files.

Related reference:

“Planning for Tivoli Storage Productivity Center authentication and authorization” on page 13

An operating system user name is required to install and log on to Tivoli Storage Productivity Center for the first time. After you install Tivoli Storage Productivity Center, you can assign roles to users. Roles determine the product functions that are available to users.

“Reviewing the log files to resolve installation issues” on page 212

If an error occurs during Tivoli Storage Productivity Center installation, you can review the error log files to resolve issues and continue the installation.

Uninstalling Tivoli Storage Productivity Center in a multiple-server environment by using the wizard

You can uninstall Tivoli Storage Productivity Center by using the uninstallation wizard. This uninstallation process requires minimal user interaction.

For *Configuration A* and *Configuration B*, for the AIX or Linux operating systems, you must source the DB2 profile `db2profile` for the instance owner of the DB2 database. The following example sources the DB2 profile:

```
. /home/db2inst1/sqllib/db2profile
```

For this procedure, the terms *Server A* and *Server B* denote the two servers.

- *Configuration A*: The Tivoli Storage Productivity Center database repository is installed on Server A, and Tivoli Storage Productivity Center servers and (or) Tivoli Storage Productivity Center reports are installed on Server B.
- *Configuration B*: The Tivoli Storage Productivity Center database repository and Tivoli Storage Productivity Center servers on Server A and Tivoli Storage Productivity Center reports on Server B.

To uninstall the software in a multiple-server environment, complete the following steps:

1. Complete the following steps for *Configuration A*:
 - a. Complete these steps on Server B for *Configuration A*:
 - 1) Log on to Server B with the appropriate user privileges to uninstall the Tivoli Storage Productivity Center components.
 - 2) Start the Tivoli Storage Productivity Center uninstallation wizard.

For the Windows operating system, click **Start > Control Panel > Programs > Programs and Features**. Highlight **Tivoli Storage Productivity Center** and click **Uninstall/Change**.

For the AIX or Linux operating system, run the following command from the root directory:

```
TPC_installation_directory/_uninst/uninstall
```

where *TPC_installation_directory* is the location where Tivoli Storage Productivity Center is installed.

A window is displayed that indicates that all Tivoli Storage Productivity Center components installed on the system will be uninstalled.

- 3) Click **Uninstall**. A confirmation is displayed.
- 4) Click **Next** to start the uninstallation process.

Tip:

Remember the following for your operating system:

- For the Windows operating system, when the uninstallation process is finished, a window is displayed so you can choose to start your system now or later. You must restart the system before you can reinstall Tivoli Storage Productivity Center.
- For the AIX or Linux operating system, you do not have to restart your system.

b. Complete the following steps on Server A:

- 1) Log on to Server A with the appropriate user privileges to uninstall the Tivoli Storage Productivity Center database repository.
- 2) Start the Tivoli Storage Productivity Center uninstallation wizard.
- 3) Follow the instructions in the wizard to uninstall the database repository.

2. Complete these steps for *Configuration B*:

a. Complete the following steps on Server B:

- 1) Log on to Server B with the appropriate user privileges to uninstall Tivoli Storage Productivity Center reports.
- 2) Start the Tivoli Storage Productivity Center uninstallation wizard.
- 3) Proceed through the wizard to uninstall Tivoli Storage Productivity Center reports.

b. Complete the following steps on Server A:

- 1) Log on to Server A with the appropriate user privileges to uninstall the Tivoli Storage Productivity Center components.
- 2) Start the Tivoli Storage Productivity Center uninstallation wizard.
 - For the Windows operating system, click **Start > Control Panel > Programs > Programs and Features**. Highlight **Tivoli Storage Productivity Center** and click **Uninstall/Change**.
 - For the AIX or Linux operating systems, run the following command from the root directory:

```
TPC_installation_directory/_uninst/uninstall
```

where *TPC_installation_directory* is the location where Tivoli Storage Productivity Center is installed.

A window is displayed that indicates that all Tivoli Storage Productivity Center components installed on the system will be uninstalled.

- 3) Click **Uninstall**. A confirmation is displayed.
 - 4) Click **Next** to start the uninstallation process.
 - 5) Follow the instructions in the wizard to uninstall Tivoli Storage Productivity Center.
3. If an error occurred during the installation process, review the installation log files.

Related reference:

“Planning for Tivoli Storage Productivity Center authentication and authorization” on page 13

An operating system user name is required to install and log on to Tivoli Storage Productivity Center for the first time. After you install Tivoli Storage Productivity Center, you can assign roles to users. Roles determine the product functions that are available to users.

“Reviewing the log files to resolve installation issues” on page 212

If an error occurs during Tivoli Storage Productivity Center installation, you can review the error log files to resolve issues and continue the installation.

Uninstalling Tivoli Storage Productivity Center by using silent mode

You can uninstall Tivoli Storage Productivity Center by using silent mode. This mode is useful if your system is running from a terminal that cannot display graphics.

In silent mode, the following server configurations are possible:

Tip: The terms *Server A* and *Server B* denote the two servers in a multiserver environment.

Option 1

All Tivoli Storage Productivity Center components are installed on one server (single-server environment).

Option 2

The Tivoli Storage Productivity Center database repository is installed on Server A and all other Tivoli Storage Productivity Center components are installed on Server B.

Option 3

Tivoli Storage Productivity Center reports is installed on Server B, and the other Tivoli Storage Productivity Center components are installed on Server A.

To uninstall Tivoli Storage Productivity Center by using silent mode, complete the following steps:

1. Complete the following steps for option 1:
 - a. Log on to the Tivoli Storage Productivity Center system with the appropriate user privileges.
 - b. Start the uninstallation program.
 - For the Windows operating system, run the following in the C:\ directory:
`TPC_installation_directory_uninst\uninstall.bat -i silent`

- For the AIX or Linux operating systems, source the DB2 profile, and run the following command from the root directory:

```
TPC_installation_directory/_uninst/uninstall -i silent
```

where *TPC_installation_directory* is where Tivoli Storage Productivity Center is installed.

- c. Restart the system, if needed.
 - For the Windows operating systems, restart the system after the uninstallation process is complete.
 - For the AIX or Linux operating systems, you do not have to restart your system.
2. Complete the following steps for option 2:
 - a. Log on to Server B with the appropriate user privileges to uninstall Tivoli Storage Productivity Center.
 - b. Start the uninstallation program.
 - For the Windows operating system, run the following from the C:\ directory:


```
TPC_installation_directory\_uninst\uninstall.bat -i silent
```
 - For the AIX or Linux operating system, source the DB2 profile, and run the following command from the root directory:


```
TPC_installation_directory/_uninst/uninstall -i silent
```
 - c. Restart the system, if needed.
 - For the Windows operating systems, restart the system after the uninstallation process is complete.
 - For the AIX or Linux operating systems, you do not have to restart your system.
 - d. Log on to Server A with the appropriate user privileges to uninstall the Tivoli Storage Productivity Center database repository.
 - e. Start the uninstallation program.
 - For the Windows operating system, run the following command from the C:\ directory:


```
TPC_installation_directory\_uninst\uninstall.bat -i silent
```
 - f. Restart the system, if needed.
 - For the Windows operating systems, restart the system after the uninstallation process is complete.
 - For the AIX or Linux operating systems, you do not have to restart your system.
3. Complete the following steps for option 3:
 - a. Log on to Server B with the appropriate user privileges to uninstall Tivoli Storage Productivity Center reports.
 - b. Start the uninstallation program.
 - For the Windows operating system, run the following from the C:\ directory:


```
TPC_installation_directory\_uninst\uninstall.bat -i silent
```
 - For the AIX or Linux operating system, source the DB2 profile, and run the following from the root directory:


```
TPC_installation_directory/_uninst/uninstall -i silent
```

where *TPC_installation_directory* is where Tivoli Storage Productivity Center is installed.

- c. Restart the system, if needed.
 - For the Windows operating systems, restart the system after the uninstallation process is complete.
 - For the AIX or Linux operating systems, you do not have to restart your system.
- d. Log on to Server A with the appropriate user privileges to uninstall the Tivoli Storage Productivity Center components (including the database repository).
- e. Start the uninstallation program.
 - For the Windows operating system, run the following from the C:\ directory:
`TPC_installation_directory_uninst\uninstall.bat -i silent`

Remember: For the Windows operating system, you must restart the system after the uninstallation process is finished. There is no automatic reboot.

- For the AIX or Linux operating system, source the DB2 profile, and run the following from the root directory:
`TPC_installation_directory/_uninst/uninstall -i silent`
where *TPC_installation_directory* is where Tivoli Storage Productivity Center is installed.

Tip: For the AIX or Linux operating system, you do not have to restart your system.

- f. If an error occurred during the installation process, review the installation log files.

Related tasks:

“Manually uninstalling Tivoli Storage Productivity Center components on Windows” on page 440

If the Tivoli Storage Productivity Center uninstallation process fails, you must manually uninstall the components.

“Manually uninstalling Tivoli Storage Productivity Center components on AIX or Linux” on page 439

If the Tivoli Storage Productivity Center uninstallation process fails, you must manually uninstall the components.

Related reference:

“Planning for Tivoli Storage Productivity Center authentication and authorization” on page 13

An operating system user name is required to install and log on to Tivoli Storage Productivity Center for the first time. After you install Tivoli Storage Productivity Center, you can assign roles to users. Roles determine the product functions that are available to users.

“Reviewing the log files to resolve installation issues” on page 212

If an error occurs during Tivoli Storage Productivity Center installation, you can review the error log files to resolve issues and continue the installation.

Uninstalling Tivoli Storage Productivity Center reports

If you experienced issues with the Tivoli Common Reporting installation and had to uninstall and install Tivoli Common Reporting again, you can uninstall and install Tivoli Storage Productivity Center reports again.

To uninstall Tivoli Storage Productivity Center reports, complete the following steps:

1. Go to the *TPC_installation_directory/_uninst* directory.
2. Run one of the following commands to uninstall Tivoli Storage Productivity Center reports:
 - On the Windows operating system:
`uninstall_tpc_reports.bat`
 - On the AIX or Linux operating systems:
`uninstall_tpc_reports.sh`

To install Tivoli Storage Productivity Center reports again, complete the following steps:

1. Install Tivoli Common Reporting.
2. Run the Tivoli Storage Productivity Center installation program again to install Tivoli Storage Productivity Center reports.

Related tasks:

“Installing Tivoli Storage Productivity Center reports later in a single-server environment by using the wizard” on page 152

In a single-server environment, you can install Tivoli Storage Productivity Center reports after you install Tivoli Storage Productivity Center.

“Installing Tivoli Storage Productivity Center with a remote database by using the installation wizard” on page 156

You can install Tivoli Storage Productivity Center in a multiple-server environment by using the installation wizard.

Uninstalling Storage Resource agents

You can uninstall locally or remotely installed Storage Resource agents.

To uninstall a Storage Resource agent, use the web-based GUI to remove the server that the agent is deployed on.

Removing servers

Remove servers that you no longer want to monitor with Tivoli Storage Productivity Center.

You can use the web-based GUI to remove servers. If a Storage Resource agent is deployed to the server, the agent is uninstalled.

When the server is removed, it is no longer monitored by Tivoli Storage Productivity Center. All the data that was collected about the server is removed from the database repository.

Tip: When you remove a server, it is only removed from Tivoli Storage Productivity Center. The server is not physically deleted from the storage environment.

To remove a server, complete the following steps:

1. From the navigation pane in the web-based GUI, click **Server Resources > Servers**.
2. On the Servers page, right-click the server where the agent is deployed and select **Remove**.
3. Click **Remove** to confirm that you want to remove the server.

Uninstalling Storage Resource agents manually

You can manually uninstall Storage Resource agents.

To uninstall a Storage Resource agent, complete the following steps:

1. If the Storage Resource agent is on the Virtual I/O system, complete the following steps:
 - a. Log in with the **padmin** user ID.
 - b. Run the following command to set up the AIX environment:
`oem_setup_env`
2. Go to the directory where the agent is installed:
`agent_install_location`

where *agent_install_location* is where the Storage Resource agent is installed.

3. Run the uninstallation command:

Restriction: Do not delete the Storage Resource agent component from the Tivoli Storage Productivity Center server by using the web-based GUI or the command-line interface. This component must exist on the server to complete the uninstall process.

```
►► bin/Agent--uninstall [-force] --serverName=TPC_server_name [-debug MAX] ►►
```

Where:

-uninstall

Uninstalls the agent.

-force

This optional parameter forces an uninstallation. If you use this parameter, do not provide the `serverName` parameter.

-serverName *TPC_server_name*

TPC_server_name is the Data server name as defined in IBM Tivoli Storage Productivity Center. You can check the configuration file for the server name:

`agent_install_location/config/Agent.config`

where *agent_install_location* is where the agent is installed.

-debug MAX

This optional parameter is for debugging purposes. If you set the **-debug** parameter, then some files are not deleted.

Tip: If you run the uninstallation program from the bin directory, the bin directory is not deleted.

If you run the uninstallation program outside of the agent installation directory, then you must specify the full path.

If the uninstallation fails, you must look at the return codes. For more information about return codes, see <http://publib.boulder.ibm.com/infocenter/tivihelp/v59r1/index.jsp>. Search for *Return codes used by Storage Resource agent*.

Uninstalling the Tivoli Storage Productivity Center Monitoring Agent

You can uninstall the Tivoli Storage Productivity Center Monitoring Agent.

Uninstalling the Tivoli Storage Productivity Center Monitoring Agent on Windows

You can uninstall the IBM Tivoli Storage Productivity Center Monitoring Agent on Windows.

To uninstall the Tivoli Storage Productivity Center Monitoring Agent on Windows:

1. Stop the IBM Tivoli Monitoring agent before you uninstall the agent. For more information about stopping the Windows agent, go to [Stopping the agents](#).
2. Log on to the Windows system as a local administrator with administrative authority.
3. Exit the Tivoli Enterprise Portal Desktop Application if it is open.
4. Click **Start > Settings > Control Panel > Add/Remove Programs**.
5. Select **IBM Tivoli Monitoring** and click **Uninstall**.
6. On the IBM Tivoli Monitoring - InstallShield Wizard Welcome page, select **Modify** and then click **Next**.
7. On the Add or Remove Features page, clear the **Monitoring Agent for TPC** check box and click **Next**.
8. On the **Summary Information** page, review the information and click **Uninstall**.
9. Clear all the check boxes on the **Setup Type** page.
10. Click **Finish**.

Uninstalling the Tivoli Storage Productivity Center Monitoring Agent on UNIX or Linux

You can uninstall the Tivoli Storage Productivity Center Monitoring Agent on UNIX or Linux.

To uninstall the Tivoli Storage Productivity Center Monitoring Agent on UNIX or Linux, complete the following steps:

1. Stop the IBM Tivoli Monitoring agent before you uninstall the agent. For information about stopping the agent on UNIX or Linux operating systems, go to [Starting or stopping an agent on UNIX and Linux systems](#).
2. For UNIX and Linux, ensure that you have root authority.

Tip: On UNIX and Linux systems, you must source the DB2 profile before you uninstall the Tivoli Storage Productivity Center Monitoring Agent.

3. Open a terminal session and go to the Tivoli Monitoring Services installation directory.
4. Run the uninstallation program from this default directory:
`/opt/IBM/ITM/bin/uninstall.sh`
5. On the Manage Tivoli Enterprise Monitoring Services window, select **Monitoring Agent for TPC** and press **Enter**.

6. Confirm your selection by entering 1 and pressing **Enter** again.
7. Wait for the uninstallation program to complete.

For more information about uninstalling an agent from Tivoli Monitoring Services, see Uninstalling an individual IBM Tivoli Monitoring agent or component.

Uninstalling DB2

Uninstall DB2 after you uninstall IBM Tivoli Storage Productivity Center. You must use the DB2 uninstallation program to uninstall DB2.

For information about uninstalling DB2 Version 9.7 on the Windows operating system, go to Uninstalling your DB2 product (Windows).

For information about uninstalling DB2 Version 10.1 on the Windows operating system, go to Uninstalling your DB2 database product (Windows).

Uninstalling DB2 on UNIX or Linux

You can uninstall DB2 on UNIX or Linux systems.

Note: This example applies to DB2 Version 9.7 and DB2 Version 10.1 Fix Pack 2.

To uninstall DB2 on UNIX and Linux, complete the following steps:

1. As the DB2 instance user (typically db2inst1), drop the databases, and stop DB2.
 - a. If you are the user with root authority, run the **su - db2inst1** command to switch the user to the DB2 instance user. Otherwise, log in as the DB2 instance user.
 - b. Run the **db2 list db directory** command to list the databases that might not have been removed by the Tivoli Storage Productivity Center uninstallation program.
 - c. For each database name listed by the command in the previous step, run the *database_name* command. For example:
Command:
\$ db2 drop db tcpdb
Response:
DB20000I The DROP DATABASE command completed successfully.
\$ db2 drop db ibmcdb
Response:
DB20000I The DROP DATABASE command completed successfully.
 - d. Run the **db2stop force** command. The following messages are displayed:
08/10/2010 21:46:13 0 0 SQL1064N DB2STOP processing was successful.
SQL1064N DB2STOP processing was successful.
 - e. Run **db2 terminate**. The following message is displayed:
DB20000I The TERMINATE command completed successfully.
 - f. Run the **exit** command to close the su shell or log out.
2. Drop the DB2 instance.

Note: This step must be performed as a user with root authority and run in a shell that has not had the db2profile sourced.

- a. Log in as a user with root authority.
- b. Change to the DB2 instance directory. The default path depends on your operating system.

On AIX, run the **cd /opt/IBM/db2/V9.7/instance** command.

On Linux, run the **cd /opt/ibm/db2/V9.7/instance** command.

- c. Run the **./db2ilist** command to list the db2instance name (typically db2inst1).
- d. Run the **./db2idrop -f db2inst1** command where "db2inst1" is the instance name reported by the **db2ilist** command in the previous step. The following messages are displayed:
DBI1324W Support of the -f command is deprecated. For more information, see the DB2 Information Center.
DBI1070I Program db2idrop completed successfully.
3. As the DB2 administration server (DAS) user (typically dasusr1), stop DAS.
 - a. If you are the user with root authority, run **su - dasusr1** to switch user to the DAS user. Otherwise, log in as the DAS user.
 - b. Run the **db2admin stop** command. The following message is displayed:
SQL4407W The DB2 Administration Server was stopped successfully.
 - c. Run the **exit** command to close the su shell or log out.
4. Remove the DB2 administration server. You must remove the DB2 administration server before you remove the DB2 product.
 - a. Log in as a user with **root** authority.
 - b. Change to the DB2 instance directory. The default path depends on your operating system.
On AIX, run the **cd /opt/IBM/db2/V9.7/instance**.
On Linux, run the **cd /opt/ibm/db2/V9.7/instance**.
 - c. Run the **./dasdrop** command. The following messages are displayed:
SQL4410W The DB2 Administration Server is not active.
DBI1070I Program dasdrop completed successfully.
5. Uninstall DB2. Use the **db2_deinstall** command to remove DB2 products or DB2 components. The **db2_deinstall** command removes all DB2 products from your system.
 - a. Change to the DB2 installation directory. The default path depends on your operating system.
On AIX, run **cd /opt/IBM/db2/V9.7/install**.
On Linux, run **cd /opt/IBM/db2/V9.7/install**.
 - b. Run the **./db2_deinstall -a** command. The following messages are displayed:
DBI1016I Program db2_deinstall is performing uninstallation.
Please wait.
The execution completed successfully.
For more information see the DB2 uninstallation log at
"/tmp/db2_deinstall.log.pid".
6. Delete DB2 users and groups. The default user and group names are shown in the following commands.
 - a. Run the following commands to remove the users:
userdel -r dasusr1
userdel -r db2inst1
userdel -r db2fenc1
 - b. Run the appropriate commands for your operating system to remove the groups.
On AIX run the following commands:
rmgroup dasadm1
rmgroup db2iadm1
rmgroup db2fadm1

On Linux run the following commands:

```
groupdel dasadm1
groupdel db2iadm1
groupdel db2fadm1
```

7. Remove the DB2 directory.
 - a. Run the **cd** command.
 - b. Run the command to remove the DB2 directory on your operating system:
On AIX, run the **rm -r /opt/IBM/db2** command.
On Linux, run **rm -r /opt/ibm/db2** command.
8. Remove any DB2 definitions from `/etc/services`.

Deleting Storage Resource agent registry entries after a failed installation or uninstallation

If your Tivoli Storage Productivity Center Version 5.2 installation or uninstallation fails, you must find and manually delete the Storage Resource agent registry entries that remain.

Deleting registry files in the Windows operating system

To delete registry entries after a failed installation or uninstallation in the Windows operating system:

1. In Windows Registry Editor, navigate to `HKEY_LOCAL_MACHINE > SOFTWARE > IBM > TPCAGENT > NUMBER` or `HKEY_LOCAL_MACHINE > SOFTWARE > Wow6432Node > IBM > TPCAGENT > NUMBER`.
2. Delete this entry:
`[HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\IBM\TPCAGENT\1]`
`"Home"="C:\Program Files\IBM\TPC"`
`"Port"="9510"`
3. If the Storage Resource agent is running as a daemon service, delete the service.
For example, `sc delete AgentX`, where `AgentX` is the name of the Storage Resource agent.
4. Delete the folder in which the agent was installed.
Display the agent name and folder by running `services.msc` and right-click the service to see the properties.
5. For daemon agents, verify that the associated CAP file was deleted.
The CAP file is located in the `%ALLUSERSPROFILE%\Application Data\IBM\CAP` folder. The naming convention for this file is `srainstance_default.xml`.

Remember: After uninstalling a daemon agent, you must restart your system.

Deleting registry files on the UNIX or Linux operating systems

To delete registry entries after a failed installation or uninstallation on the UNIX or Linux operating systems:

1. Delete the Storage Resource agent entry that is associated with the Tivoli Storage Productivity Center installation on the local server.
The terms *Server A* and *Server B* are used in this procedure to denote the different servers.
When you install Tivoli Storage Productivity Center on Server A, a Storage Resource agent is also installed on Server A. When you deploy another Storage Resource agent from Tivoli Storage Productivity Center Server B to Server A, an

entry is added to the file `/etc/Tivoli/TSRM/registryNA` on Server A. This entry is associated with the Storage Resource agent deployed from Server B.

If a failure occurs when you install or uninstall the Storage Resource agent from Server A, you must delete the entry from the `/etc/Tivoli/TSRM/registryNA` file that is associated with the agent on Server A. For example, you would delete these lines from the file:

```
Instance=1
Home=/opt/IBM/TPC
Port=9567
```

2. If the agent was a daemon, verify that the process is running and stop it.

- To list all the running processes, run the following command:

```
ps -ef
```

- To stop a process, run the following command:

```
kill -9 process_number
```

3. For daemon agents, verify that the associated CAP File was deleted.

The CAP file is located in the `/opt/IBM/CAP` directory. The naming convention for this file is `srainstance_default.xml`.

Manually uninstalling Tivoli Storage Productivity Center components on AIX or Linux

If the Tivoli Storage Productivity Center uninstallation process fails, you must manually uninstall the components.

This procedure assumes the following conditions:

- You installed Tivoli Storage Productivity Center in the default directory.
- You used default ports.
- The Storage Resource agent service name is *Agent1*.
- You used the default Tivoli Storage Productivity Center database repository named TPCDB.

To manually uninstall Tivoli Storage Productivity Center components, complete the following steps:

1. Run the following command to stop the Storage Resource agent:

```
kill -9 `ps -aef | grep /opt/IBM/TPC/agent|
grep -v grep | awk '{ print $2 }'` 2> /dev/null
```

2. Run the following command to stop the Data server:

```
kill -9 `ps -aef | grep data | grep -v grep
| awk '{ print $2 }'` 2> /dev/null
```

3. Run the following command to stop the Device server:

```
.kill -9 `ps -aef | grep deviceServer | grep -v grep
| awk '{ print $2 }'` 2> /dev/null
```

4. Run the following command to stop the Replication server:

```
kill -9 `ps -aef | grep replicationServer | grep -v grep
| awk '{ print $2 }'` 2> /dev/null
```

5. Run the following command to stop the web-based GUI:

```
kill -9 `ps -aef | grep webServer | grep -v grep |
awk '{ print $2 }'` 2> /dev/null
```

6. Delete the following files and folders:

- `rm -fr `find . -name *tpcdsrv* -print``
- `rm -fr `find . -name *itsanm* -print``

- `rm -fr /etc/Tivoli/TSRM/registry`
 - `rm -fr /etc/Tivoli/TSRM/registryNA`
 - `rm -fr /etc/Tivoli/TSRM/lock`
 - `rm -fr /opt/IBM/TPC`
7. Drop the database by completing the following steps:
 - a. Source the `db2profile`.
 - b. Enter `db2 drop db TPCDB`.
 8. Go to the `/db2_admin_home/db2_instance_name/` directory and ensure that the database directory is deleted.

Manually uninstalling Tivoli Storage Productivity Center components on Windows

If the Tivoli Storage Productivity Center uninstallation process fails, you must manually uninstall the components.

This procedure assumes that the following conditions have been met:

- You installed Tivoli Storage Productivity Center in the default directory.
- You used default ports.
- The Storage Resource agent service name is *Agent1*.
- You used the default Tivoli Storage Productivity Center database repository name *TPCDB*.

To manually uninstall Tivoli Storage Productivity Center components, complete the following steps in a Windows command window:

1. Run the following command to uninstall the Storage Resource agent:


```
sc stop Agent1
sc delete Agent1
```
2. Run the following command to remove the Storage Resource agent registry entries:


```
reg delete HKLM\SOFTWARE\Wow6432Node\IBM\TPCAGENT\1
```

where 1 is the instance of the Agent.

If you do not have multiple agents, you can also run the following command:

```
reg delete HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\IBM\TPCAGENT
```

Important: If you have multiple agents and you run this command, all of the agents are deleted.

3. Run the following commands to uninstall the Data server:


```
sc stop TSRMsrv1
sc delete TSRMsrv1
```
4. Run the following commands to stop the Device server:


```
cd C:\Program Files\IBM\TPC\scripts
StopTPCdevice.bat
```
5. Run the following commands to delete the Device server:


```
cd C:\Program Files\IBM\TPC\wlp\usr\servers
del deviceServer
```
6. Click **Start > Administrative tools > Task Scheduler > Task Scheduler Library** and delete the entry for the Device server.
7. Run the following commands to stop the Replication server:

- ```
cd C:\Program Files\IBM\TPC\scripts
StopTPCReplication.bat
```
8. Delete the webtpcrlink.vbs file from the following directories:  
C:\Program Files\IBM\TPC\wlp\usr\servers\replicationServer\scripts  
C:\Program Files\IBM\TPC\replication\Scripts
  9. Run the following commands to delete the following file:  
cd C:\Program Files\IBM\TPC\wlp\usr\servers  
del replicationServer
  10. Run the following commands to uninstall the web server:  
sc stop "IBM WAS80Service - TPCWebServer"  
sc delete "IBM WAS80Service - TPCWebServer"
  11. Run the following commands to delete the ewas and wlp directories:  
cd C:\Program Files\IBM\TPC  
del ewas  
del wlp
  12. Click **Start > Administrative tools > Task Scheduler > Task Scheduler Library** and delete the Replication server entry.
  13. Open Windows Task Manager, search for, and kill any Java processes that are connected to ewas.
  14. Run the following command to remove the Tivoli Storage Productivity Center directories:  
rmdir /s/q "C:\Program Files\IBM\TPC"
  15. Restart your computer.

---

## Uninstalling and Tivoli Common Reporting and Jazz for Service Management

You can uninstall Jazz for Service Management Version 1.1.0.1 and Tivoli Common Reporting Version 3.1.0.1.

1. Uninstall Tivoli Common Reporting by using the console. For more information about uninstalling Tivoli Common Reporting by using the console, see [Uninstalling Tivoli Common Reporting by using console mode](#).
2. Verify that Tivoli Common Reporting is uninstalled. For information about verifying that Tivoli Common Reporting is uninstalled, see [Verifying the Tivoli Common Reporting uninstallation](#).
3. Remove the Cognos Content Store database by entering one of the following commands:
  - db2cmd /c /i db2 drop db TCRDB
  - su - db2inst1 -c "db2 drop db TCRDB"

**Tip:** If after you complete steps 2 and 3, Tivoli Common Reporting is not uninstalled, see [Uninstalling Tivoli Common Reporting manually](#).

4. Uninstall Jazz for Service Management.
  - a. Start Jazz for Service Management.
    - On Windows operating systems:
      - 1) Go to the C:\Program Files\IBM\JazzSM\profile\bin directory.
      - 2) Run the following command:  
startServer.bat server\_name
    - On AIX or Linux operating systems:
      - 1) Go to the /opt/IBM/JazzSM/profile/bin directory.
      - 2) Run the following command:

- `./startServer.sh server_name`
- b. Start Installation Manager.
    - On Windows operating systems:
      - 1) Go to the C:\Program Files (x86)\IBM\Installation Manager\eclipse directory.
      - 2) Double-click the IBMIM file.
    - On AIX or Linux operating systems:
      - 1) In a command window, go to the /opt/IBM/InstallationManager/eclipse directory.
      - 2) Run the following command:  
`./IBMIM`
  - c. On the Installation Manager main page, click **Uninstall**.
  - d. Select **Uninstall Packages > Select packages to uninstall**.
  - e. Select the **Core services for Jazz for Service Management** check box and click **Next**.
  - f. Select **Uninstall Packages > Common Configuration**.
  - g. Enter the administrator user name and password for the WebSphere Application Server profile and click **Validate**.
  - h. After the user credentials are validated, click **Next**.
  - i. Select **Uninstall Packages > Uninstall summary** and click **Uninstall**.
  - j. After **Security Services** and **Reporting Services environment** is uninstalled, click **Finish**.
  - k. On the Installation Manager main menu, click **Uninstall**.
  - l. Select **Uninstall Packages > Select packages to uninstall**.
  - m. Select the **WebSphere Application Server v8.5** check box and click **Next**. The **Validation Results** page indicates that WebSphere Application Server is running and must be stopped before you can continue.
  - n. Stop the Jazz for Service Management server.
    - On Windows operating systems:
      - 1) Go to the C:\Program Files\IBM\JazzSM\profile\bin directory.
      - 2) To stop the software, run the following command:  
`stopServer.bat server_name -username JazzSM_user_name -password JazzSM_user_password`
    - On AIX or Linux operating systems:
      - 1) Go to the /opt/IBM/JazzSM/profile/bin directory.
      - 2) To stop the software, run the following command:  
`stopServer.sh server_name -username JazzSM_user_name -password JazzSM_user_password`

For a default installation, the value of *server\_name* is *server1*, and the values for *JazzSM\_user\_name* and *JazzSM\_user\_password* are the user name and password that are specified during the Jazz for Service Management installation.
  - o. When the Jazz for Service Management server is stopped, return to the **Validation Results** window, and click **Recheck Status**.
  - p. Verify that all of the prerequisites are met and click **Next**.
  - q. Select **Uninstall Packages > Uninstall summary** and click **Uninstall**.
  - r. After WebSphere Application Server is uninstalled, click **Finish**.
  - s. From the Installation Manager main menu, click **File > Exit** to exit.

5. Manually clean up your operating system environment by completing the following steps:
  - a. Remove the Jazz for Service Management home directory:
    - On Windows operating systems:  
C:\Program Files\IBM\JazzSM
    - On AIX operating systems:  
/opt/IBM/JazzSM
    - On Linux operating systems:  
/opt/IBM/JazzSM
  - b. Remove the WebSphere home directory:
    - On Windows operating systems:  
C:\Program Files\IBM\WebSphere
    - On AIX operating systems:  
/usr/IBM/WebSphere
    - On Linux operating systems:  
/opt/IBM/WebSphere
  - c. On the Windows operating system, remove WebSphere Application Server V8.5.
    - 1) Select **Start > All Programs**(or **Start > Programs**).
    - 2) Click **IBM WebSphere**, and select **Delete**.
    - 3) On the Add or Remove Programs window, remove **WebSphere Application Server V8.5**.
6. Optional: Complete the following steps only if Installation Manager is partially removed from an unsuccessful uninstallation and can no longer be started or uninstalled:
  - a. Remove the Installation Manager directories.
    - On Windows operating systems:
      - 1) Open a DOS command window.
      - 2) To remove the Installation Manager directories, run the following commands:
 

```

rmdir /s /q "C:\Program Files (x86)\IBM\Installation Manager"
rmdir /s /q "C:\Program Files (x86)\IBM\IMShared"
rmdir /s /q "C:\ProgramData\IBM\Installation Manager"

```
    - On AIX operating systems:
      - 1) Open a command window.
      - 2) To remove the Installation Manager directories, run the following commands:
 

```

rm -fr /opt/IBM/InstallationManager/
rm -fr /usr/IBM/IMShared/
rm -fr /var/ibm/InstallationManager/

```
    - On Linux operating systems:
      - 1) Open a command window.
      - 2) To remove the Installation Manager directories, run the following commands:
 

```

rm -fr /opt/IBM/InstallationManager/
rm -fr /opt/IBM/IMShared/
rm -fr /var/ibm/InstallationManager/

```
  - b. Click **Start > All Programs**.



- c. On the Add or Remove Program window, click **IBM Installation Manager** and select **Delete**.
7. Prepare your operating system environment for a custom installation of Jazz for Service Management and Tivoli Common Reporting. For more information about preparing your operating system environment for a custom installation of Jazz for Service Management, see [Preparing your environment for custom installation](#).

---

## Chapter 6. Reference

---

### agent.sh command

The **agent.sh** command lets you start, stop, and restart the Storage Resource agent. You can also display the status and version of the Storage Resource agent.

**Note:**

- You must have root authority to run this command.
- For Windows, the status, stop, and start functions are handled through the Windows Services panel.

```
►—agent.sh—┐ status ┘┐ start ┘┐ stop ┘┐ restart ┘┐ version ┘┐ versionall ┘┐◄
```

Parameters:

**status**

Displays the current status of the Storage Resource agent. The status is returned is running or not running.

**start**

Starts the Storage Resource agent.

**stop**

Stops the Storage Resource agent.

**restart**

Stop and then start the Storage Resource agent.

**version**

Displays the current version of the Storage Resource agent.

**versionall**

Displays the version of the Storage Resource agent and its related components.



---

## Appendix A. Accessibility features for Tivoli Storage Productivity Center

Accessibility features help users who have a disability, such as restricted mobility or limited vision, to use information technology products successfully.

### Accessibility features

The following list includes the major accessibility features in IBM Tivoli Storage Productivity Center:

- Keyboard-only operation in the stand-alone GUI and the web-based GUI.  
Restriction: In the stand-alone GUI, you must use the mouse to navigate the Topology Viewer and report graphs.
- Interfaces that are commonly used by screen readers.
- An information center that includes the following accessibility features:
  - The information center is provided in XHTML 1.0 format, which is viewable in most web browsers. With XHTML, you can view documentation according to the display preferences that are set in your browser. XHTML supports screen readers and other assistive technologies.
  - All documentation for Tivoli Storage Productivity Center is available in Adobe Portable Document Format (PDF) by using the Adobe Acrobat Reader. You can access the PDFs from the Printable PDFs topic in the information center at <http://publib.boulder.ibm.com/infocenter/tivihelp/v59r1/index.jsp>.
  - All images in the information center are provided with alternative text, so that visually impaired users can understand the contents of the images.

### Keyboard navigation in the stand-alone GUI

The stand-alone GUI uses standard Microsoft Windows navigation keys. However, you must use the mouse to navigate the Topology Viewer and report graphs. Standard operating system keystrokes are used for standard operating system operations.

### Keyboard navigation in the web-based GUI

Most of the features of the web-based GUI are accessible by using the keyboard. For those features that are not accessible, equivalent function is available by using the command-line interface (CLI), except as noted in the product release notes.

You can use keys or key combinations to perform operations and initiate many menu actions that can also be done through mouse actions. The following sections describe the keys or key combinations for different parts of the web-based GUI:

#### For navigating the web-based GUI and the context-sensitive help system:

- To navigate to the next link, button, or topic within a panel, press Tab.
- To move to the previous link, button, or topic within a panel, press Shift+Tab.
- To select an object, when the object is in focus, press Enter.

#### For actions menus:

- To navigate to the grid header, press Tab.

- To reach the drop-down field, press the Left Arrow or Right Arrow key.
- To open the drop-down menu, press Enter.
- To select the menu items, press the Up Arrow or Down Arrow key.
- To start the action, press Enter.

**For filters:**

To specify a filter option and text:

1. Press Tab to navigate to the magnifying glass icon.
2. Press the Up Arrow or Down Arrow key to navigate the filtering list.
3. Press Enter to select a filtering option.
4. When a filtering option is selected, the cursor moves to the filter text box. Type the filter text and press Enter. To reset a filter, press Enter.

**For text fields:**

- To navigate to text fields, press Tab.
- To navigate to the fields that are available for editing, press Tab.
- To navigate to the next field or to the **Submit** button, press Tab.

**For tables or lists:**

- To navigate between column headers, focus on a column header and use the Left Arrow and Right Arrow keys to move to other column headers.
- To navigate between data cells, focus on a data cell and use the Left, Right, Up, Down, Pageup, and Pagedown Arrow keys.
- To sort a column, focus on a column header and press Enter. The focus remains on the column header after the sort occurs.
- To change the size of a column, focus on the column header, hold Shift+Control, and press the Left or Right Arrow keys.
- To follow a link in a data cell, focus on a data cell and press Shift+F9.
- To open a menu for a table row, focus on the row and press Shift+F10.
- To select consecutive rows, select the first row and hold Shift, press the Up or Down Arrow keys to go to the last row in the range, and press the Space bar to add the new rows to the selection.
- To select non-consecutive rows, select a row and hold Control, press the Up or Down Arrow keys, and press the Space bar to add the new row to the selection.

**Restriction:** For Chinese languages, the keyboard combination Control+Space bar is not enabled for selecting multiple rows at the same time.

## **IBM and accessibility**

For more information about IBM's commitment to accessibility, see the IBM Human Ability and Accessibility Center website at <http://www.ibm.com/able/>.

---

## Appendix B. Accessibility features for Tivoli Storage Productivity Center for Replication

Accessibility features help users who have a disability, such as restricted mobility or limited vision, to use information technology products successfully.

The following list includes the major accessibility features in Tivoli Storage Productivity Center for Replication:

- Keyboard-only operation
- Interfaces that are commonly used by screen readers
- Keys that are discernible by touch but do not activate just by touching them
- Industry-standard devices for ports and connectors
- The attachment of alternative input and output devices

For more information about the commitment that IBM has for accessibility, see the IBM Human Ability and Accessibility Center website at [www.ibm.com/able](http://www.ibm.com/able).

### Accessibility and keyboard shortcuts in the information center

Accessibility features help users with physical disabilities, such as restricted mobility or limited vision, to use software products successfully. Using the major accessibility features in this product, users can perform these tasks:

- Use assistive technologies, such as screen-reader software and digital speech synthesizer, to hear what is displayed on the screen. Consult the product documentation of the assistive technology for details on using those technologies with this product.
- Operate specific or equivalent features by using only the keyboard.
- Magnify what is displayed on the screen.

In addition, the documentation was modified to include the following features to aid accessibility:

- All documentation is available in HTML formats to give the maximum opportunity for users to apply screen-reader software technology.
- All images in the documentation are provided with alternative text so that users with vision impairments can understand the contents of the images.

Use the following key combinations to navigate the interface by keyboard:

- To go directly to the Topic pane, press Alt+K, and then press Tab.
- In the Topic pane, to go to the next link, press Tab.
- To go directly to the Search Results view, press Alt+R, and then press the Enter or Up-Arrow key to enter the view.
- To go directly to the Navigation (Table of Contents) view, press Alt+C, and then press the Enter or Up-Arrow key to enter the view.
- To expand and collapse a node in the navigation tree, press the Right and Left-Arrow keys.
- To move to the next topic node, press the Down-Arrow or Tab key.
- To move to the previous topic node, press the Up-Arrow key or Shift+Tab.
- To go to the next link, button, or topic node from inside on of the views, press Tab.

- To scroll all the way up or down in a pane, press Home or End.
- To go back, press Alt+Left Arrow; to go forward, press Alt+Right Arrow.
- To go to the next pane, press F6.
- To move to the previous pane, press Shift+F6.
- To print the active pane, press Ctrl+P.

## **Related accessibility information for sight-impaired users**

The following list contains hints and tips that can help you more fully use the graphical user interface:

**Drop-down lists are positioned directly over or before the radio button that activates it.**

If you use a screen reader, you should be aware that there are radio buttons to activate drop-down lists for several GUI pages. The way to activate the drop-down list is by selecting the associated radio button. The drop-down list is positioned directly over or before the radio button that activates it. When you use a screen reader that processes the fields and controls of a page sequentially, you might select the radio button, but not know that the associated drop-down list has been activated. The screen reader processes inactive drop-down lists first, and then processes the next radio button. The drop-down list is activated if you select the radio button.

On the following pages, keep in mind that radio buttons activate a drop-down list:

- Administration
- ESS/DS Paths
- Sessions
- Session Details
- Storage Systems

**Tables are best understood by reviewing the surrounding text and the table row and column number of the table.**

On some graphical user pages, tables use the header or row ID attributes when reading a single cell. The screen reader reads the table row and column number, along with cell data. Therefore, you can infer the column header and row ID.

**Experiment with and fine-tune the way your screen reader pronounces some of the product abbreviations.**

Your screen reader might pronounce abbreviations as if they were words. For example, the common abbreviation for Enterprise Storage Server is ESS. Your screen reader might read ESS as the word "ess". With some screen readers you can hear alternate pronunciations. If you frequently use the software you might prefer to fine-tune such associations in your settings. When an association is created, the screen reader can recognize the abbreviation as a word. If you can add dictionary words with your screen reader, replace the capitalized character sequence with the sequence E space S space S.

Typically, this abbreviation is used in the combination form of ESS/DS. This term refers to the Enterprise Storage Server 800, the DS6000, or the DS8000.

**Some decorative artifacts might persist if the cascading style sheet is disabled.**



Enable cascading style sheets when possible; otherwise, some decorative elements might persist in the web browser GUI. These artifacts do not affect performance. If they become too distracting, consider using the command-line interface instead.

**For efficiency, confirmation dialogs place initial focus on the Yes button.**

When a confirmation dialog box is displayed, focus is given to the **Yes** button. Therefore, the screen reader reads “Yes” but does not read the confirmation text. The software processes the information in this way when you do the following types of tasks:

- Perform an action on a session
- Remove a connection to a storage system
- Click the **About** link
- Create a high-availability connection

To read the confirmation text before clicking the **Yes**, **No**, or **OK** button, view the previous heading before the button.

**Dojo components are not read by all screen readers.**

The Job Access for Windows and Speech (JAWS) screen reader does not read some Dojo components on Windows Internet Explorer. Use the command-line interface instead of the GUI with JAWS on Windows Internet Explorer.

**Firefox is the preferred browser for use with a screen reader.**

Use Firefox as the screen reader because other browsers might not fully expose assistive technology content to the screen reader.



---

## Glossary

This glossary includes terms and definitions for IBM Tivoli Storage Productivity Center.

The following cross-references are used in this glossary:

- See refers you from a term to a preferred synonym, or from an acronym or abbreviation to the defined full form.
- See also refers you to a related or contrasting term.

To view glossaries for other IBM products, go to [www.ibm.com/software/globalization/terminology](http://www.ibm.com/software/globalization/terminology) (opens in new window).

---

### A

#### **active management server**

A management server from which the storage environment can be monitored and managed. The active management server replicates its database to the standby server.

---

### B

#### **business continuity**

The capability of a business to withstand outages and to operate mission-critical services normally and without interruption in accordance with predefined service-level agreements.

---

### C

**CIM** See Common Information Model.

#### **CIM agent**

The code that consists of common building blocks that can be used instead of proprietary software or device-specific programming interfaces to manage devices that are compliant with the Common Information Model (CIM).

**CKD** See count key data.

#### **cluster**

1. In Storwize® V7000, a pair of nodes that provides a single configuration and service interface.

2. A loosely coupled collection of independent systems (or nodes) organized into a network for the purpose of sharing resources and communicating with each other.
3. A collection of complete systems that work together to provide a single, unified computing capability.
4. In IBM System Storage DS8000, a partition capable of performing all DS8000 series functions. With two clusters in the DS8000 storage unit, any operational cluster can take over the processing of a failing cluster.

#### **Common Information Model (CIM)**

An implementation-neutral, object-oriented schema for describing network management or systems management information. The Distributed Management Task Force (DMTF) develops and maintains CIM specifications.

#### **community name**

The part of an SNMP message that represents a password-like name and that is used to authenticate the SNMP message.

#### **consistency group**

A group of copy relationships between virtual volumes or data sets that are maintained with the same time reference so that all copies are consistent in time.

#### **copy set**

The set of source volumes or target volumes involved in a FlashCopy operation.

#### **count key data (CKD)**

In mainframe computing, a data-record format employing self-defining record formats in which each record is represented by up to three fields: a count field identifying the record and specifying its format, an optional key field that can be used to identify the data area contents, and an optional data field that typically contains the user data.

---

## D

### data collection

The process of obtaining performance and availability monitoring data and providing that data to a metric evaluator. Examples of data collectors include Domain Name System (DNS) probes, web page analyzers, or database analyzers. See also discovery.

### data source

A storage resource or agent that provides data about a storage environment.

### discovery

The process of finding resources within an enterprise, including finding the new location of monitored resources that were moved. See also data collection.

---

## E

**ECKD** See extended count key data.

### enterprise repository

A component of the data server that records and stores all information about the monitored computers' storage assets and their usage over time. The repository is organized into relational database tables and is accessed by the data server using Java Database Connectivity (JDBC).

**event** An occurrence of significance to a task or system. Events can include completion or failure of an operation, a user action, or the change in state of a process.

### extended count key data (ECKD)

An extension of the count-key-data (CKD) architecture. It includes additional commands that can be used to improve performance.

---

## F

### FlashCopy

An optional feature of the Storage System DS family that can make an instant copy of data, that is, a point-in-time copy of a volume.

**freeze** An operation in which a storage system blocks I/O from the host system to the affected volumes on the primary site. A freeze operation stops mirroring between

the primary and secondary volumes to ensure data consistency at the secondary site. See also thaw.

---

## G

**GB** See gigabyte.

**GiB** See gibibyte.

### gibibyte (GiB)

In digital information storage, a base-2 unit of measurement equal to 1,073,741,824 bytes (2 to the 30th power). See also gigabyte.

### gigabyte (GB)

For processor storage, real and virtual storage, and channel volume, 10 to the power of nine or 1,073,741,824 bytes. For disk storage capacity and communications volume, 1,000,000,000 bytes. See also gibibyte.

### Global Copy

A non-synchronous long-distance copy option for data migration and backup. See also Global Mirror, Metro Mirror, remote mirror and copy.

### Globally Unique Identifier (GUID)

An algorithmically determined number that uniquely identifies an entity within a system.

### Global Mirror

An optional capability of the remote mirror and copy feature that provides a two-site extended-distance remote copy. Data that is written by the host to the storage unit at the local site is automatically maintained at the remote site. See also Global Copy, Metro Mirror, remote mirror and copy.

### grain size

The unit size for allocating space on thin-provisioned volumes, such as 32, 64, 128, and 256 kibibyte. The grain size is defined when a volume is created.

**GUID** See Globally Unique Identifier.

---

## H

### Hardware Management Console (HMC)

In a system storage environment, a system that acts as the focal point for configuration, management of Copy Services functions, and maintenance.

**heat map**

A color-coded data chart in which colors are used to differentiate values in a data set.

**HMC** See Hardware Management Console.

**host volume**

A volume that represents the volume functional role from an application point of view. The host volume can be connected to a host or server. It receives read, write, and update application I/O, depending on the site to which the application is writing.

**hypervisor**

Software or a physical device that enables multiple instances of operating systems to run simultaneously on the same hardware.

---

**I****in-band discovery**

The process of discovering information about the storage area network (SAN), including topology and attribute data, through the Fibre Channel data paths. See also out-of-band discovery.

---

**J****journal volume**

A volume that holds a consistent copy of data until a new consistent copy is formed. The journal volume restores the last consistent point during a recovery.

---

**K**

**KB** See kilobyte.

**KiB** See kibibyte.

**kibibyte (KiB)**

A base-2 unit of measurement that is equal to 1,024 bytes (2 to the 10th power). See also kilobyte.

**kilobyte (KB)**

For processor storage, real and virtual storage, and channel volume, 2 to the power of 10 or 1,024 bytes. For disk storage capacity and communications volume, 1,000 bytes. See also kibibyte.

---

**L****launch-in-context**

An operation in which a user starts a secondary application from a primary application to perform a specific task. Using the parameters, navigation instructions, and user credentials that are supplied by the primary application, the secondary application opens to the specific place in which to complete the task.

**logical unit number (LUN)**

In the Small Computer System Interface (SCSI) standard, a unique identifier used to differentiate devices, each of which is a logical unit (LU).

**LUN** See logical unit number.

---

**M****Management Information Base (MIB)**

In the Simple Network Management Protocol (SNMP), a database of objects that can be queried or set by a network management system.

**management server**

A system that provides a central point of control for managing data replication.

**management server relationship**

A connection between two replication servers, where one server acts as the active server and replicates the data that is necessary for the standby server to take control of the replication environment.

**MB** See megabyte.

**mebibyte (MiB)**

A base-2 unit of measurement that is equal to 1,048,576 bytes (2 to the 20th power). See also megabyte.

**megabyte (MB)**

For processor storage, real and virtual storage, and channel volume, 2 to the 20th power or 1,048,576 bytes. For disk storage capacity and communications volume, 1,000,000 bytes. See also mebibyte.

**Metro Global Mirror**

A three-site, high availability, disaster recovery solution. Metro Global Mirror uses synchronous replication to mirror data between a local site and an

intermediate site, and asynchronous replication to mirror data from an intermediate site to a remote site.

### **Metro Mirror**

A function of the remote mirror and copy feature that constantly updates a secondary copy of a volume to match changes made to a source volume. See also Global Copy, Global Mirror, remote mirror and copy.

**MiB** See mebibyte.

**MIB** See Management Information Base.

---

## **N**

### **namespace**

The scope within which a Common Information Model (CIM) schema applies.

### **native interface**

An interface that is specific to a system or subsystem.

---

## **O**

### **out-of-band discovery**

The process of discovering storage area network (SAN) information, including topology and device data, without using the Fibre Channel data paths. A common mechanism for out-of-band discovery is the use of SNMP Management Information Base (MIB) queries, which are invoked over an IP network. See also in-band discovery.

---

## **P**

### **ping**

1. The command that sends an Internet Control Message Protocol (ICMP) echo-request packet to a gateway, router, or host with the expectation of receiving a reply.
2. A job that tracks the availability of assets and that is performed by an agent. Several ping jobs can be used to monitor the availability of any computer or subset of computers in the network.

**pool** A grouping of storage space that consists of volumes, logical unit numbers (LUNs),

or addresses that share a common set of administrative characteristics.

### **practice volume**

A volume that can be used to test disaster-recovery actions while maintaining disaster-recovery capability.

### **primordial pool**

Storage capacity that is unallocated on a storage device. Storage pools are created by allocating storage capacity from primordial pools.

**probe** A data collection job that itemizes and creates an inventory of assets, such as computers, controllers, disk drives, file systems, and logical units.

---

## **R**

### **recovery point objective**

The maximum amount of data loss that can be tolerated during a service interruption.

### **remote mirror and copy**

A feature of a storage server that constantly updates a secondary copy of a logical volume to match changes made to a primary logical volume. The primary and secondary volumes can be on the same storage server or on separate storage servers. See also Global Copy, Global Mirror, Metro Mirror.

### **resource**

In a storage environment, an entity that is monitored. Resources can include fabrics, switches, computers, and storage systems.

**role** A job function that identifies the tasks that a user can perform and the resources to which a user has access. A user can be assigned one or more roles.

### **role pair**

The association of two volume roles in a session that take part in a copy relationship. For example, in a Metro Mirror session, the role pair can be the association between host volumes at the primary site and host volumes at the secondary site (H1-H2).

---

## S

**scan** A data collection job that monitors storage usage and file statistics on the resources in an environment.

**session**  
A collection of source and target volumes that are managed to create consistent copies of data. The type of data replication that is associated with the session determines the actions that can be conducted for the volumes.

**site awareness**  
The association of a location with each storage system in a session. Site awareness ensures that a volume can only be selected for a session if it matches the location of the site. Site awareness helps to prevent both reversing a hardware relationship and selecting volumes at the wrong location.

**SMI-S** See Storage Management Initiative Specification.

**standby management server**  
A management server that is a backup for the active server. The replication environment cannot be monitored or managed from the standby server.

**Storage Management Initiative Specification (SMI-S)**  
A design specification developed by the Storage Networking Industry Association (SNIA) that specifies a secure and reliable interface with which storage management systems (SMSs) can identify, classify, monitor, and control physical and logical resources in a storage area network (SAN). The interface integrates the various devices to be managed in a SAN and the tools used to manage them.

**storage pod**  
A logical entity of components of a system consisting of two storage nodes, and one or two storage subsystems directly connected with these storage nodes.

**storage resource group**  
A named collection of logically related resources that are monitored by Tivoli Storage Productivity Center. Monitored resources can include fabrics, switches,

computers, storage systems, and other storage resource groups.

---

## T

**target volume**  
A volume that receives data from a host volume or another intermediate volume.

**thaw** An operation in which a storage system releases the block of the I/O from the host system to the affected volumes on the primary site. A thaw operation can occur after a freeze operation ends and consistency is formed on the secondary site. See also freeze.

**track space-efficient volume (TSE volume)**  
A volume in which storage space is allocated on an as-needed basis by using space on the target volume only when tracks are copied from the source volume to the target volume.

**TSE volume**  
See track space-efficient volume.

---

## V

**virtualization**  
The substitution of virtual resources for actual resources, where the virtual resources have the same functions and external interfaces as their counterparts, but differ in attributes, such as size, performance, and cost. Virtualization is commonly applied to physical hardware resources by combining multiple physical resources into shared pools from which users receive virtual resources.

**virtual storage area network (VSAN)**  
A fabric within the storage area network (SAN).

**VSAN** See virtual storage area network.

---

## Z

**zone** A logical grouping of switches, switch ports, and their attached devices in a fabric.

**zone alias**  
A name that is given to a collection of one or more zone members to be managed together.



**zone set**

A group of zones that function together on a fabric.

---

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