

IBM Tivoli Storage Manager Version 5.3

Technical Workshop Presentation Guide

Explore significant improvements in usability and performance

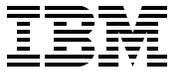
Learn about enhancements and new functions

Review Versions 5.3.0, 5.3.1, and 5.3.2



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**IBM Tivoli Storage Manager Version 5.3
Technical Workshop Presentation Guide**

August 2005

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Note: Before using this information and the product it supports, read the information in “Notices” on page xv.

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First Edition (August 2005)

This edition applies to IBM Tivoli Storage Manager Version 5.3.0, IBM Tivoli Storage Manager Version 5.3.1, and IBM Tivoli Storage Manager Version 5.3.2.

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Preface

This IBM® Redbook presents an overview of IBM Tivoli® Storage Manager Version 5.3. It is designed as a workshop presentation guide, and therefore uses presentation slides to provide descriptions about the changes made in the new release. This format enables you to easily gain a comprehensive overview and to quickly understand the new features of Tivoli Storage Manager.

This book is intended for IBM Clients, Business Partners, consultants, and IBM and Tivoli staff who are familiar with earlier releases of Tivoli Storage Manager and who want to understand what is new in Version 5.3.0, 5.3.1, and 5.3.2. We recommend that you use this book in conjunction with the ITSO workshop, the IBM Redbook *IBM Tivoli Storage Manager Version 5.3 Technical Guide*, SG24-6638, manuals and readme files that are provided with the products. This redbook is not intended to replace any information contained therein.

The team that wrote this redbook

This redbook was produced by a team of specialists from around the world working at the International Technical Support Organization (ITSO), San Jose Center.

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Workshop course objectives and introduction

This chapter contains the course objectives of, and an introduction to, the IBM Tivoli Storage Manager (TSM) 5.3 Technical Workshop. The target audience for this Tivoli Storage Manager 5.3 upgrade workshop is *experienced* administrators of Tivoli Storage Manager. Prior to reading this redbook, you must have a full understanding of the concepts related to Tivoli Storage Manager that are available in previous versions of IBM Tivoli Storage Manager.

If you are new to Tivoli Storage Management, we recommend that novice administrators and users visit the following Web site for the education roadmap.

http://www.ibm.com/software/tivoli/education/eduroad_prod.html



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Tivoli Storage Manager 5.3 Technical Workshop

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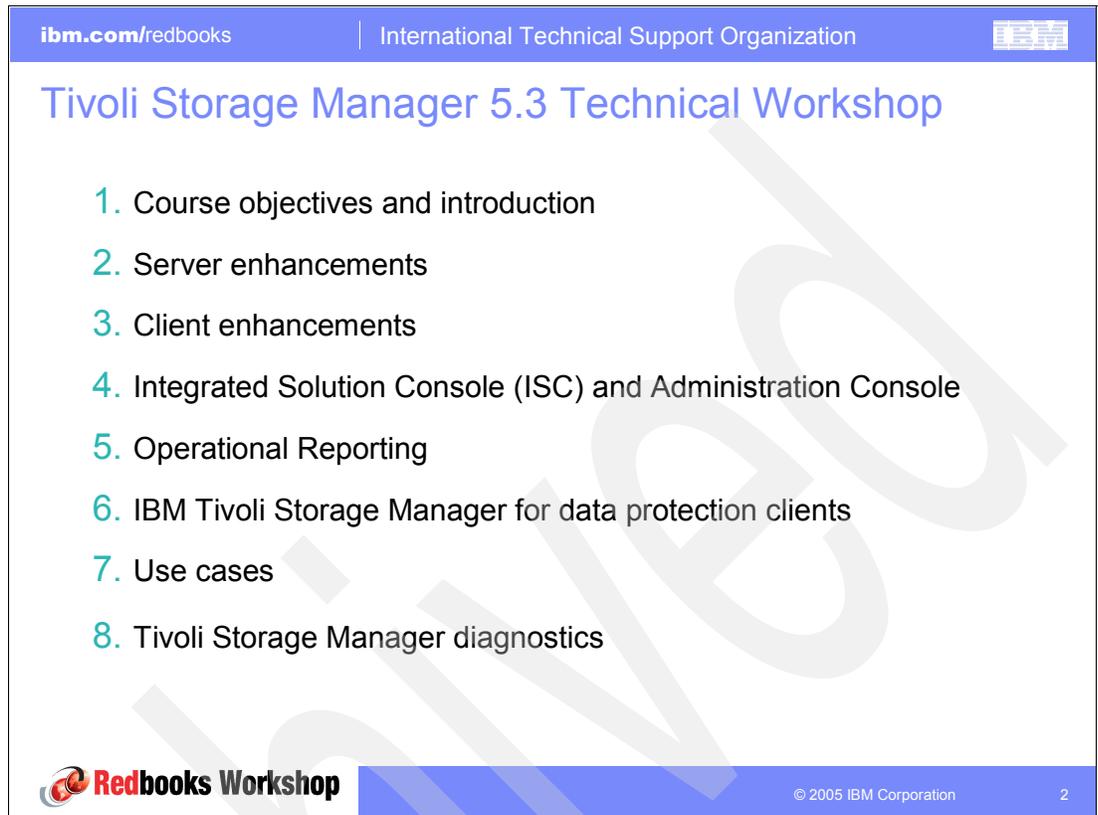
Redbooks Workshop

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Figure 1-1 Introduction

1.1 Workshop overview



The screenshot shows a slide from an IBM Redbooks workshop. The slide has a blue header with the text 'ibm.com/redbooks' and 'International Technical Support Organization'. The main title is 'Tivoli Storage Manager 5.3 Technical Workshop'. Below the title is a numbered list of eight topics. At the bottom left is the 'Redbooks Workshop' logo, and at the bottom right is the copyright notice '© 2005 IBM Corporation' and the page number '2'.

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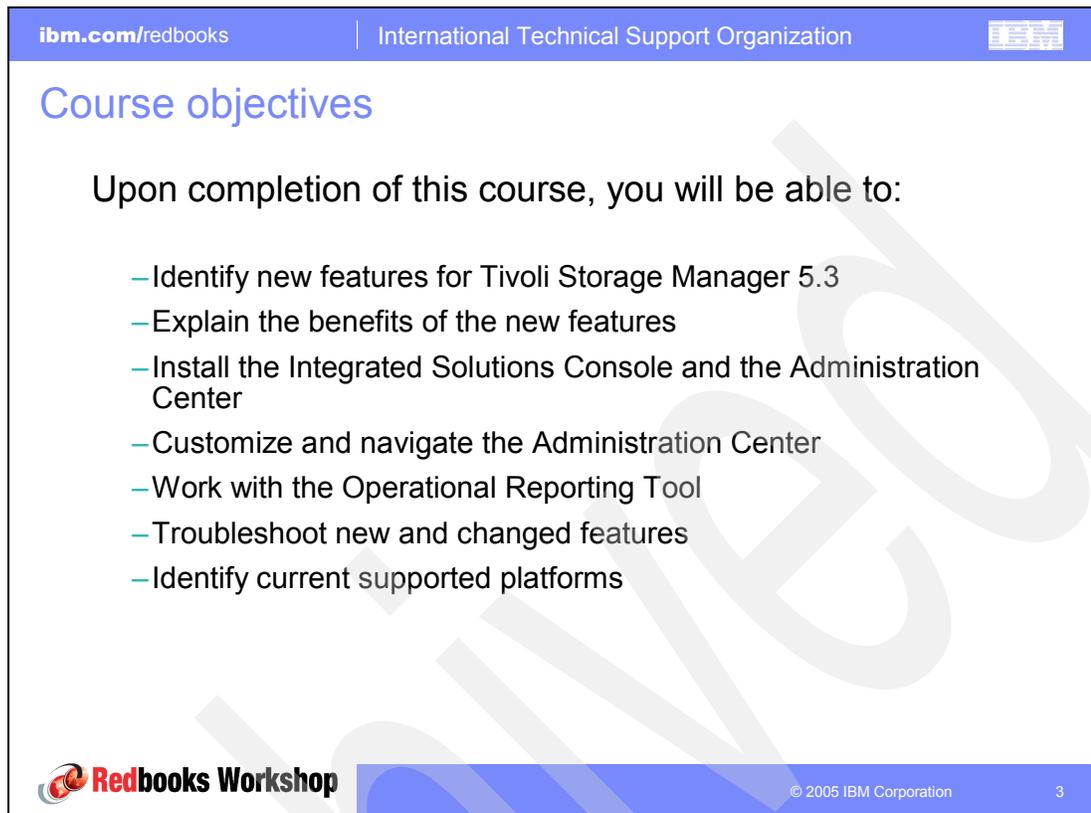
Tivoli Storage Manager 5.3 Technical Workshop

1. Course objectives and introduction
2. Server enhancements
3. Client enhancements
4. Integrated Solution Console (ISC) and Administration Console
5. Operational Reporting
6. IBM Tivoli Storage Manager for data protection clients
7. Use cases
8. Tivoli Storage Manager diagnostics

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Figure 1-2 Workshop overview

1.2 Course objectives



The screenshot shows a slide from a Redbooks Workshop presentation. The slide has a blue header bar with the text 'ibm.com/redbooks' on the left, 'International Technical Support Organization' in the center, and a small IBM logo on the right. Below the header, the title 'Course objectives' is displayed in blue. The main content area contains the text 'Upon completion of this course, you will be able to:' followed by a bulleted list of seven objectives. At the bottom of the slide, there is a blue footer bar with the 'Redbooks Workshop' logo on the left, '© 2005 IBM Corporation' in the center, and the number '3' on the right.

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Course objectives

Upon completion of this course, you will be able to:

- Identify new features for Tivoli Storage Manager 5.3
- Explain the benefits of the new features
- Install the Integrated Solutions Console and the Administration Center
- Customize and navigate the Administration Center
- Work with the Operational Reporting Tool
- Troubleshoot new and changed features
- Identify current supported platforms

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Figure 1-3 Course objectives

1.3 Introduction to Tivoli Storage Manager 5.3

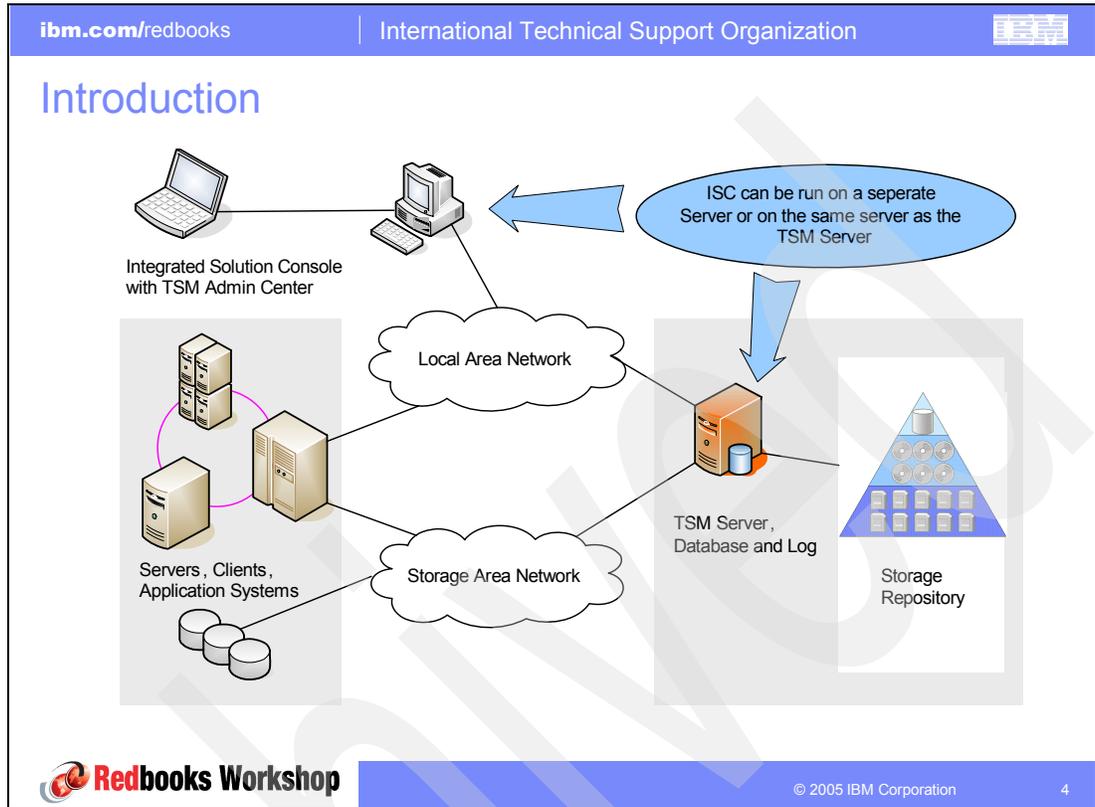


Figure 1-4 Tivoli Storage Manager components

This slide shows a complete overview of all Tivoli Storage Manager components. It includes the new Integrated Solution Console with the Tivoli Storage Manager Administration Center. Throughout this workshop, we present this slide at the beginning of each new section to identify the area under discussion.



Introduction

- Tivoli Storage Manager 5.3: What is in this release?

This release is focused on the themes of usability, serviceability, and maintainability.

The product has been reviewed from a quality perspective, and causal analysis has been performed to see what is necessary to improve it. The changes support the infrastructure and include the addition of new functions that our clients have requested and been waiting for.



Figure 1-5 Tivoli Storage Manager 5.3 release focus

Tivoli Storage Manager Version 5.3 is designed to provide significant improvements to ease of use, and ease of administration and serviceability characteristics. These enhancements can help users improve administrative productivity and their ability to use Tivoli Storage Manager. In addition, the product is designed to be easier for new administrators and users to use.



Introduction

- Improved application availability
- Optimized storage resource utilization
- Enhanced storage personnel productivity



Figure 1-6 Features overview

The features of Tivoli Storage Manager 5.3 include:

- ▶ Improved application availability
 - IBM Tivoli Storage Manager for space management
 - Hierarchical storage management (HSM) for AIX® journaled file system 2 (JFS2), enhancements to HSM for AIX, and Linux® General Parallel File System (GPFS)
 - IBM Tivoli Storage Manager for application products update
- ▶ Optimized storage resource utilization
 - Improved device management, storage area network (SAN)-attached device dynamic mapping, native STK ACSLS drive sharing, local area network (LAN)-free operations, improved tape checkin and checkout, label operations, and new device support
 - Disk storage pool enhancements, collocation groups, proxy node support, improved defaults, reduced LAN-free CPU utilization, parallel reclamation, and migration

- ▶ Enhanced storage personnel productivity
 - New Administrator Web graphical user interface
 - Task-oriented interface with wizards to simplify such tasks as scheduling, managing server maintenance operations (storage pool backup, migration, reclamation), and configuring devices
 - Health Monitor which shows status of scheduled events, the database and recovery log, storage devices, and activity log messages
 - Calendar-based scheduling for increased flexibility of client and administrative schedules
 - Operational reporting for increased ability to monitor server operation

Server enhancements

This chapter discusses the new features and enhancements delivered in IBM Tivoli Storage Manager Version 5.3 server, which are common to all server platforms.

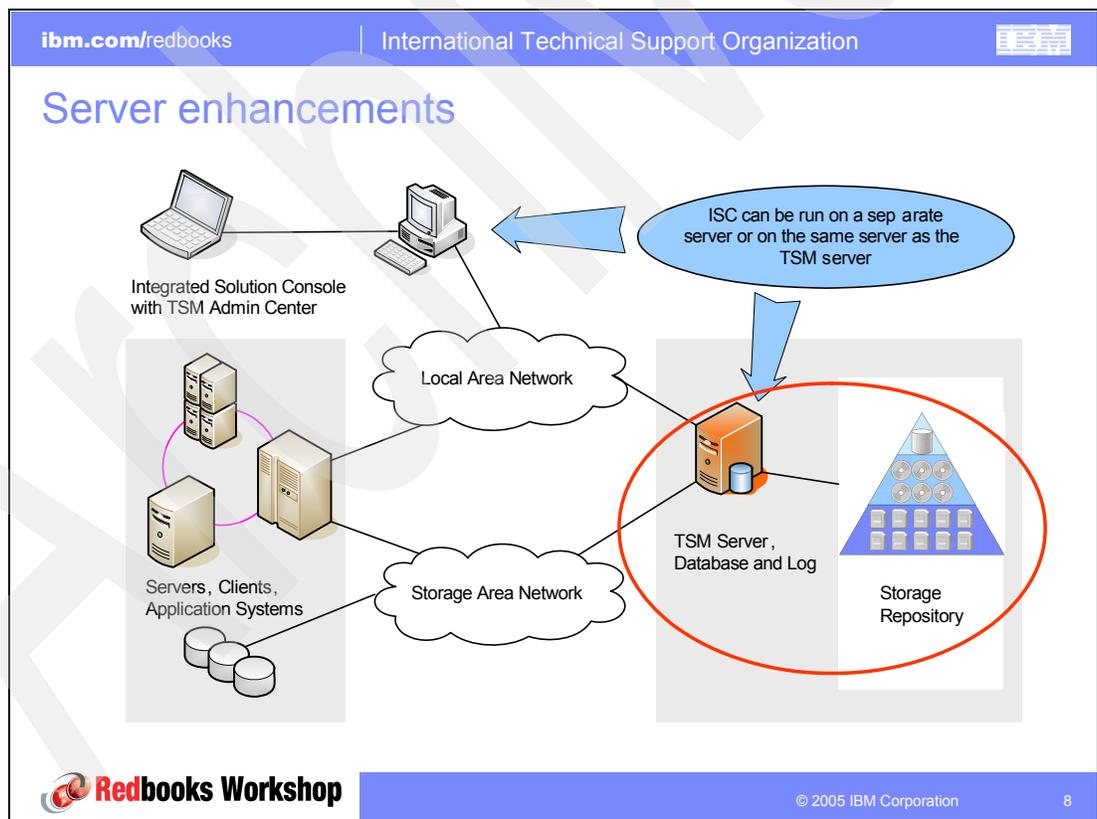
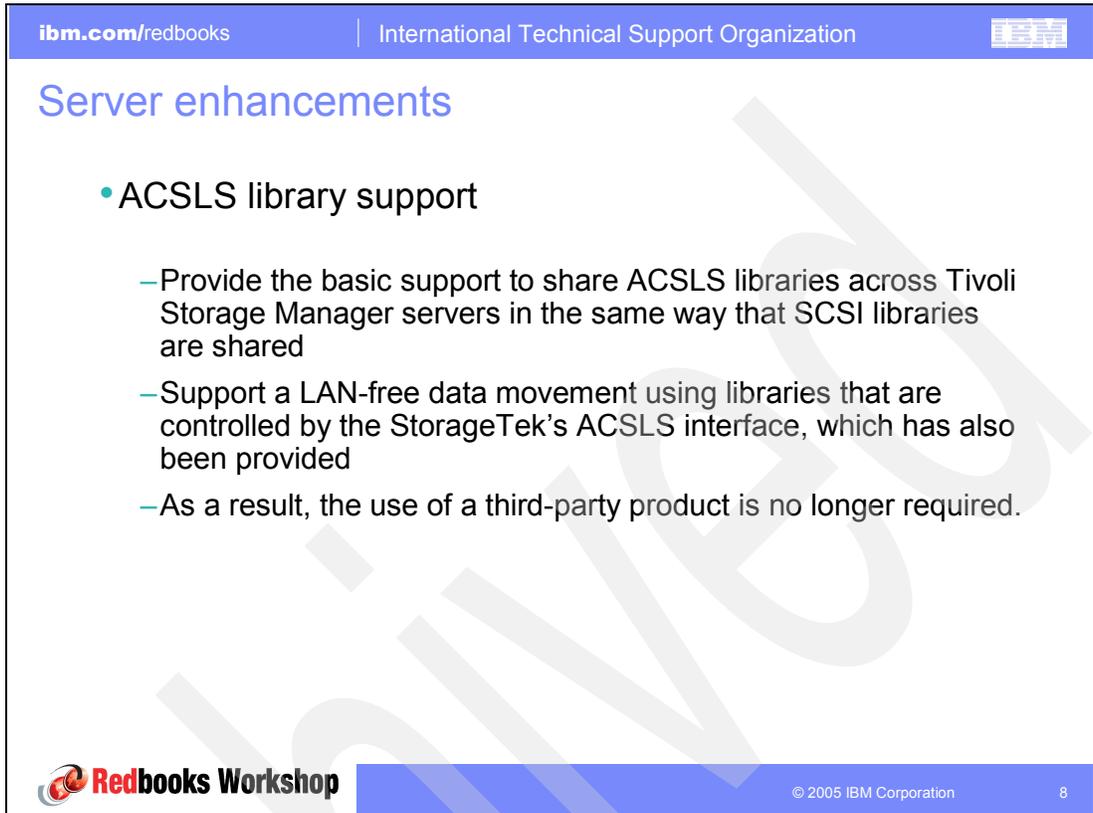


Figure 2-1 Server enhancements

Note: For details about platform-specific changes or new features see the *IBM Tivoli Storage Manager Install Guide* and the *IBM Tivoli Storage Manager Administrator's Guide* for your supported server platform. Also refer to the *Tivoli Storage Manager V5.3 Install Guides* and the *Tivoli Storage Manager V5.3 Administrator's Guides* in “Related publications” on page 159.

2.1 ACSLS support



The screenshot shows a slide from an IBM Redbooks Workshop. The slide title is "Server enhancements". The main content is a bulleted list under the heading "• ACSLS library support". The list contains three items: "– Provide the basic support to share ACSLS libraries across Tivoli Storage Manager servers in the same way that SCSI libraries are shared", "– Support a LAN-free data movement using libraries that are controlled by the StorageTek's ACSLS interface, which has also been provided", and "– As a result, the use of a third-party product is no longer required." The slide footer includes the Redbooks Workshop logo, the text "© 2005 IBM Corporation", and the number "8".

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Server enhancements

- ACSLS library support
 - Provide the basic support to share ACSLS libraries across Tivoli Storage Manager servers in the same way that SCSI libraries are shared
 - Support a LAN-free data movement using libraries that are controlled by the StorageTek's ACSLS interface, which has also been provided
 - As a result, the use of a third-party product is no longer required.

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Figure 2-2 ACSLS enhancements

IBM Tivoli Storage Manager supports tape libraries that are controlled by StorageTek's Automated Cartridge System Library Software (ACSL). The ACSLS library server manages the physical aspects of tape cartridge storage and retrieval. The ACSLS client application communicates with the ACSLS library server to access tape cartridges in an automated library. Tivoli Storage Manager is one of the applications that gains access to tape cartridges by interacting with ACSLS through its client, which is known as the *control path*.

The Tivoli Storage Manager server reads and writes data on tape cartridges by interacting directly with tape drives through the data path. The control path and the data path are two different paths. The ACSLS client daemon must be initialized before starting the server. See the `/usr/tivoli/tsm/devices/bin/rc.acs_ssi` path for the client daemon invocation. For detailed installation, configuration, and system administration of ACSLS, refer to the appropriate StorageTek documentation.

The following commands have changed:

- ▶ DEFINE LIBRARY
- ▶ UPDATE LIBRARY



Server enhancements

- ACSLS library support

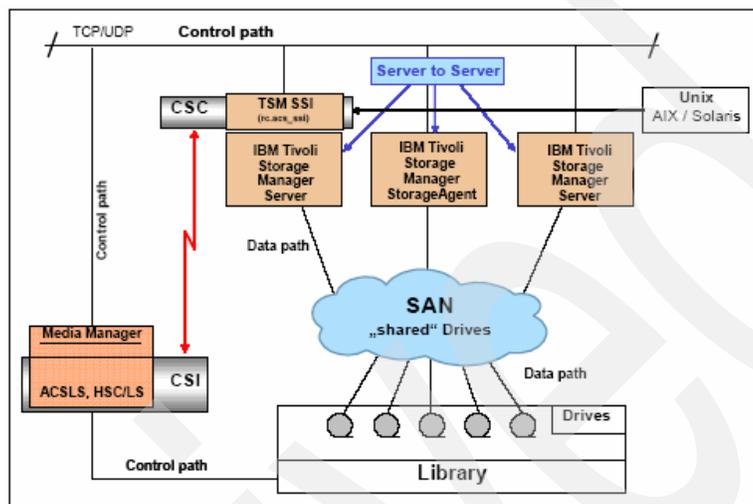


Figure 2-3 ACSLS implementation example

This slide helps to give you a better understanding of how a shared Tivoli Storage Manager and ACSLS environment might look. Refer to the following explanation of the abbreviations that are used in this slide:

- ▶ Client System Component (CSC)
- ▶ Client System Interface (CSI)
- ▶ Automated Cartridge System Library Software (ACSL)
- ▶ Tivoli Storage Manager Subsystem Interface (TSM SSI)

Beginning with version 5.3, Tivoli Storage Manager supports ACSLS library sharing among multiple Tivoli Storage Manager servers using native Tivoli Storage Manager library sharing. When configured to use library sharing, one Tivoli Storage Manager server acts as the library manager, and the rest act as library clients.

Such Tivoli Storage Manager library operations as checkin, checkout, label, mount and dismount are controlled by the library manager. When library clients need tape resources, they contact the Tivoli Storage Manager library manager via TCP/IP to make the request. With ACSLS, the Tivoli Storage Manager library manager contacts ACSLS via TCP/IP which ultimately fulfills the request.

The following example demonstrates how to set up Tivoli Storage Manager library sharing with ACSLS. The ACSLS software is installed on a separate server running Solaris™, and the ACSID is set to 0.

Set up the library manager, library client, and shared library. In the following sequence, the first line indicates the action to perform and the command that follows is what you enter at the command line.

```
# set password for the library manager (san_server1)
set serverpassword password1

# set password for the library client (san_server2)
set serverpassword password2

# define the lib client to the lib manager
define server san_server2 serverpassword=password2 hla=9.11.232.143 lla=1501

# define the lib manager to the lib client
define server san_server1 serverpassword=password1 hla=9.11.232.143 lla=1500

# define the lib manager library on the lib master
define library 9710lib libtype=acsls accsid=0 shared=yes

# define the paths to the drives for the lib manager on the lib manager
define path san_server1 drive1 srctype=server desttype=drive library=9710lib
device=mt1.4.0.7
define path san_server1 drive2 srctype=server desttype=drive library=9710lib
device=mt1.5.0.7

# define the lib client library on the lib client
define library 9710lib libtype=shared primarylibmanager=sannt5_server1

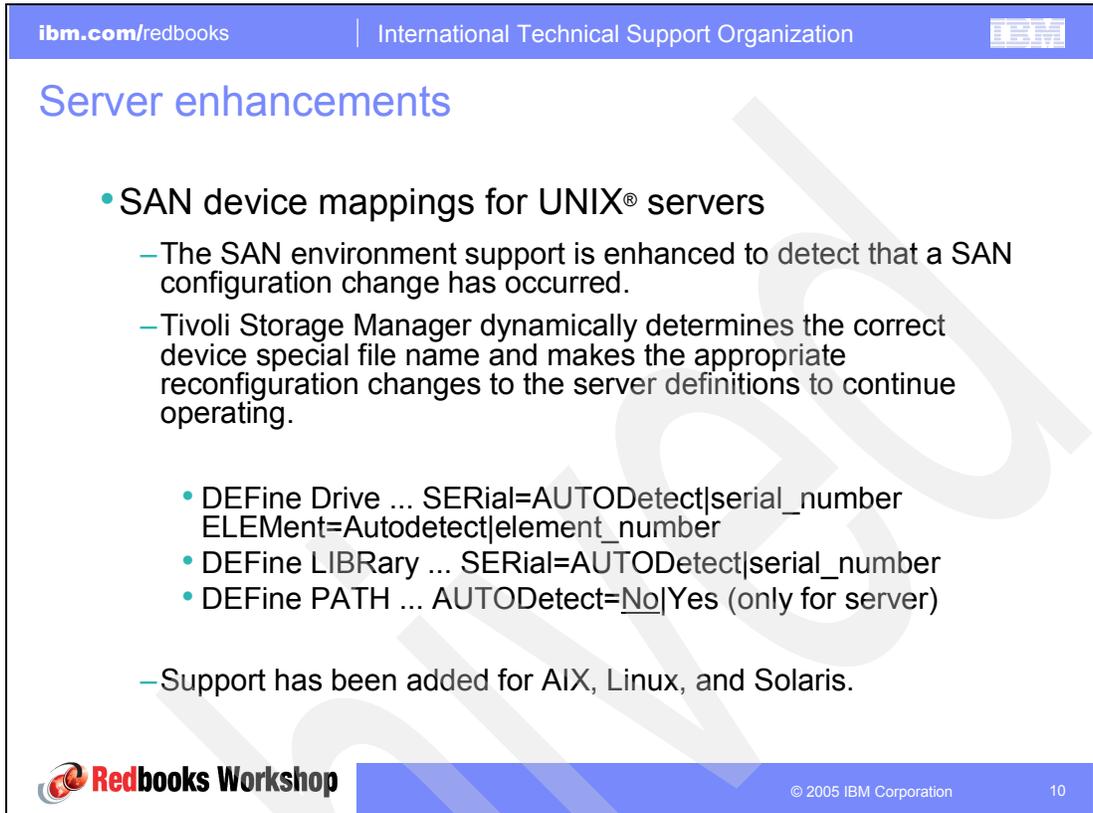
# define the paths to the drives for the lib client on the lib manager
define path san_server2 drive1 srctype=server desttype=drive library=9710lib
device=mt1.4.0.7
define path san_server2 drive2 srctype=server desttype=drive library=9710lib
device=mt1.5.0.7

# define the device class and storage pool on the library master
define devclass 9840class library=9710lib devtype=ecartridge
define stg 9710pool_master 9840class maxscratch=100

# define the device class and storage pool on the library client
define devclass 9840class library=9710lib devtype=ecartridge
define stg 9710pool_client 9840class maxscratch=50
```

The library sharing is now set up. You can use the defined device class and defined storage pools to start the backups.

2.2 SAN device mappings for UNIX servers



The screenshot shows a presentation slide with a blue header bar containing 'ibm.com/redbooks' and 'International Technical Support Organization'. The slide title is 'Server enhancements'. The main content is a bulleted list of SAN device mappings for UNIX servers. The footer includes the 'Redbooks Workshop' logo, '© 2005 IBM Corporation', and the page number '10'.

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Server enhancements

- SAN device mappings for UNIX® servers
 - The SAN environment support is enhanced to detect that a SAN configuration change has occurred.
 - Tivoli Storage Manager dynamically determines the correct device special file name and makes the appropriate reconfiguration changes to the server definitions to continue operating.
 - DEFine Drive ... SERIAL=AUTODetect|serial_number
ELEMENT=Autodetect|element_number
 - DEFine LIBRARY ... SERIAL=AUTODetect|serial_number
 - DEFine PATH ... AUTODetect=No|Yes (only for server)
 - Support has been added for AIX, Linux, and Solaris.

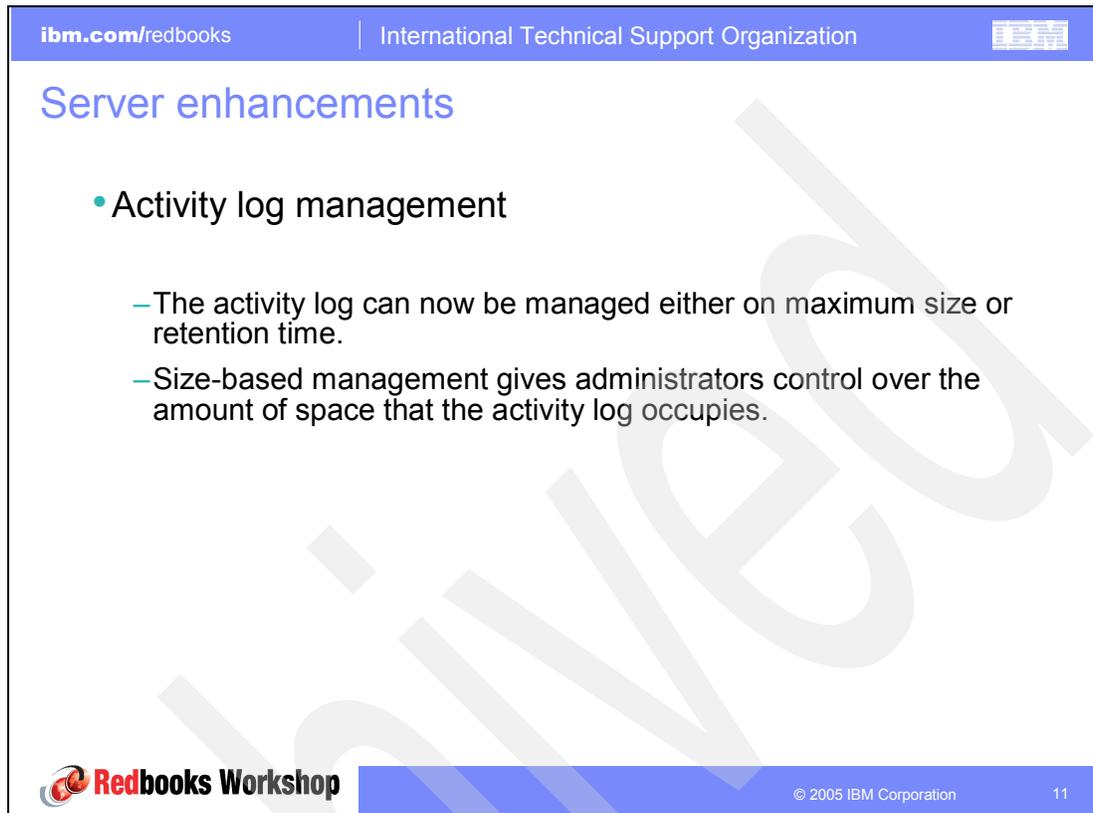
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Figure 2-4 SAN device mappings

Device IDs within a storage area network (SAN) environment change when a reset or other environmental changes occur. With accurate SAN device mapping, Tivoli Storage Manager can now detect SAN changes and automatically make the appropriate processing changes to the server definitions. If a device's path is altered due to bus resets or other environmental changes to the SAN, Tivoli Storage Manager performs SAN discovery using the host bus adapter (HBA) application programming interface (API) to find the correct path to the desired target device. Manual updates to the path information are no longer required.

You can use the new QUERY SAN command to obtain information about devices that can be detected on a SAN.

2.3 Activity log management



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Server enhancements

- Activity log management
 - The activity log can now be managed either on maximum size or retention time.
 - Size-based management gives administrators control over the amount of space that the activity log occupies.

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Figure 2-5 Activity log management

You can use the `SET ACTLOGRETENTION` command to specify how long activity log information is kept in the database. Activity log management is retention-based when the optional parameter `MGMTSTYLE` is set to its default value, `DATE`.

You can use size-based activity log management as an alternative to retention-based management. Size-based activity log management allows greater control over the amount of space that the activity log occupies. The server periodically removes the oldest activity log records until the activity log size no longer exceeds the configured maximum size that is allowed.



Server enhancements

- Activity log management

```
tsm: KANAGA_1>q stat
```

```
Storage Management Server for AIX-RS/6000 - Version 5, Release 3, Level 1.0
```

```
Server Name: KANAGA_1
```

```
Server host name or IP address: kanaga.almaden.ibm.com
```

```
Server TCP/IP port number: 1500
```

```
Crossdefine: Off
```

```
Server Password Set: No
```

```
Server Installation Date/Time: 02/28/05 11:46:51
```

```
Server Restart Date/Time: 04/25/05 13:35:39
```

```
:
```

```
:
```

```
Activity Log Retention: 30 M
```

```
Activity Log Number of Records: 2607
```

```
Activity Log Size: <1 M
```

```
Activity Summary Retention Period: 30 Day(s)
```

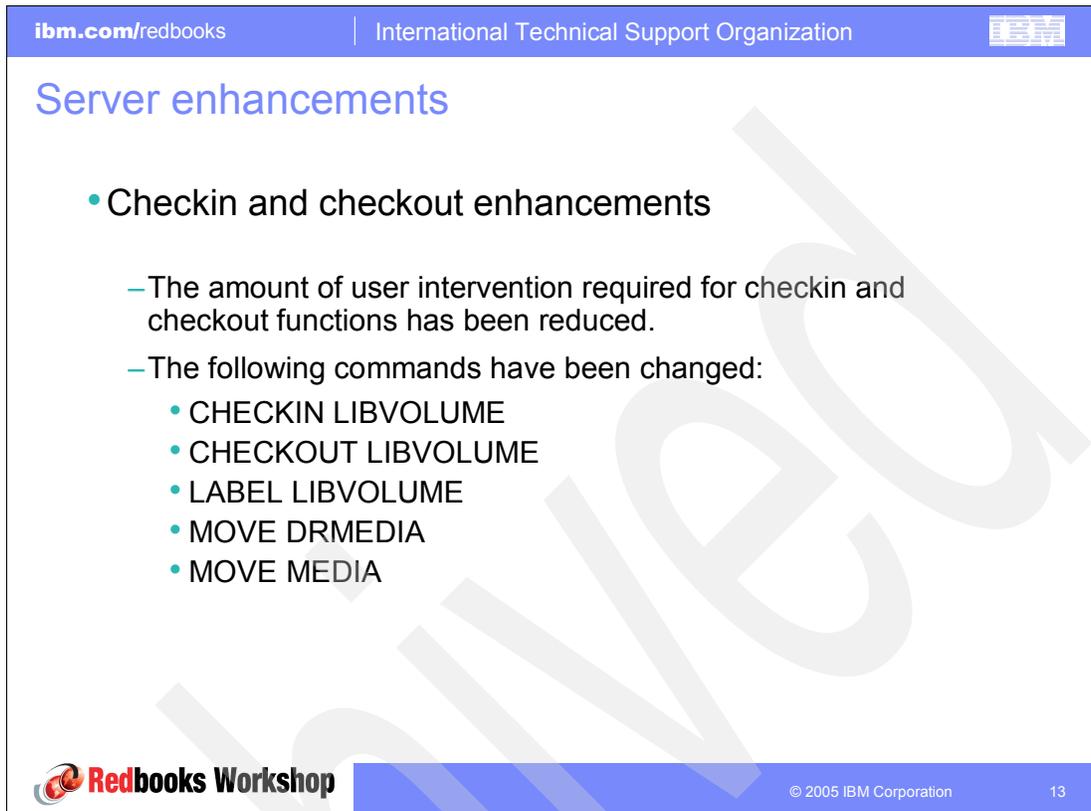


Figure 2-6 Activity log management example

As you can see in this example, Activity Log Retention is set to 30 MB instead of 30 days. You can set this by using the following command:

```
SET ACTLOGRETENTION 30 MGMTSTYLE=SIZE
```

2.4 Checkin and checkout enhancements



The screenshot shows a web page from the IBM Redbooks Workshop. The header includes the URL 'ibm.com/redbooks' and the text 'International Technical Support Organization'. The main heading is 'Server enhancements'. Below this, there is a bulleted list:

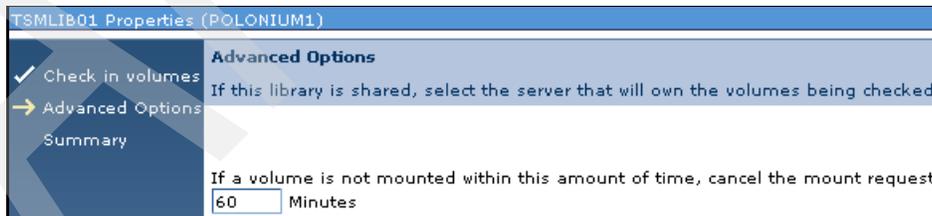
- Checkin and checkout enhancements
 - The amount of user intervention required for checkin and checkout functions has been reduced.
 - The following commands have been changed:
 - CHECKIN LIBVOLUME
 - CHECKOUT LIBVOLUME
 - LABEL LIBVOLUME
 - MOVE DRMEDIA
 - MOVE MEDIA

The footer of the page contains the 'Redbooks Workshop' logo, the copyright notice '© 2005 IBM Corporation', and the page number '13'.

Figure 2-7 Checkin and checkout enhancements

A REPLY command is no longer required if you specify a wait time of zero using the optional WAITTIME parameter on the CHECKIN LIBVOLUME or LABEL LIBVOLUME command. The default wait time is 60 minutes.

In the Administration Center, when adding volumes, the WAITTIME parameter is the value provided in the Advanced Options window for If a volume is not mounted within this amount of time, cancel the mount request in [0] Minutes.



The screenshot shows a window titled 'TSMLIB01 Properties (POLONIUM1)'. On the left, there is a navigation pane with 'Check in volumes' selected, 'Advanced Options' highlighted, and 'Summary' below it. The main area is titled 'Advanced Options' and contains the text: 'If this library is shared, select the server that will own the volumes being checked in'. Below this, there is a label 'If a volume is not mounted within this amount of time, cancel the mount request' followed by a text input field containing '60' and the word 'Minutes'.

Figure 2-8 Checkin wait time

For the CHECKOUT LIBVOLUME, MOVE DRMEDIA, and MOVE MEDIA commands, the new default value of the REMOVE option is now REMOVE=BULK. This means that a REPLY is not requested. Additionally, the server waits for a port to be made available if it is full.

You can run the following command from a library client in a shared library environment:

```
MOVE DRMEDIA * WHERESTATE=MOUNTABLE TOSTATE=VAULT REMOVE=UNTILEEFULL
```

When you run this command, the following actions occur:

1. The library client requests the library master to eject the volumes from the library (move the volumes to EE-port of the library).
2. The library master deletes the volumes from the master library inventory.
3. The library client updates the drmedia status from *mountable* to *vault*.
4. Figure 2-9 shows how the volumes are assigned to their owners in a library sharing environment. You see KANAGA_1 acting as a library manager for ATLANTIC_1.

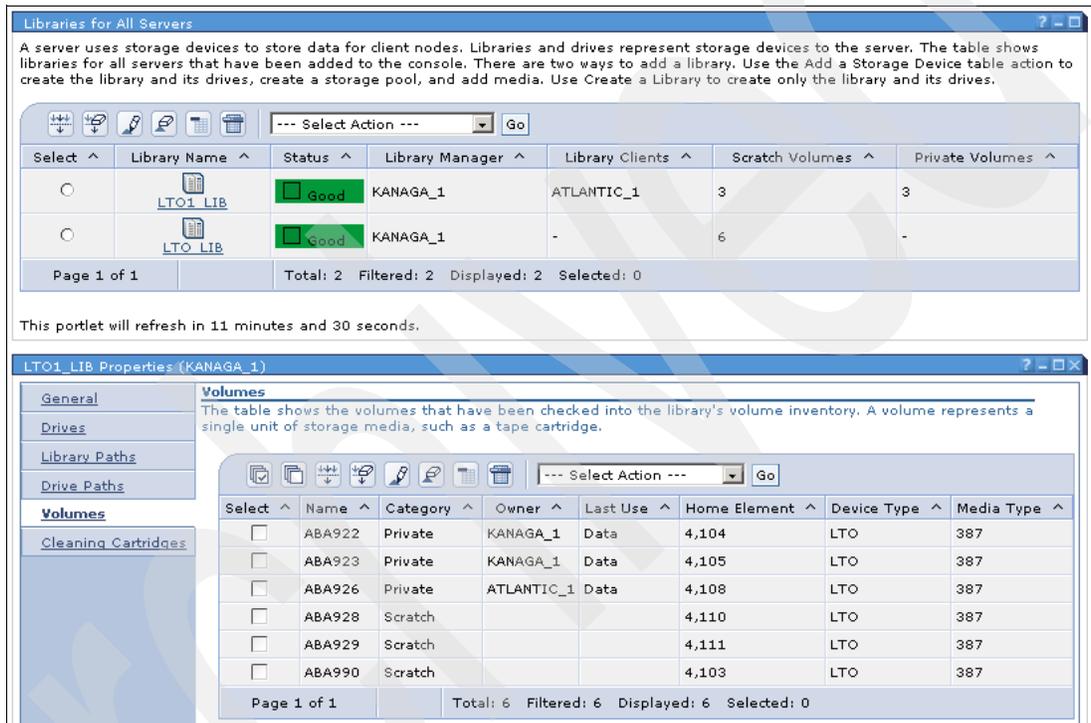


Figure 2-9 Example output for a shared library environment

2.5 Collocation by group

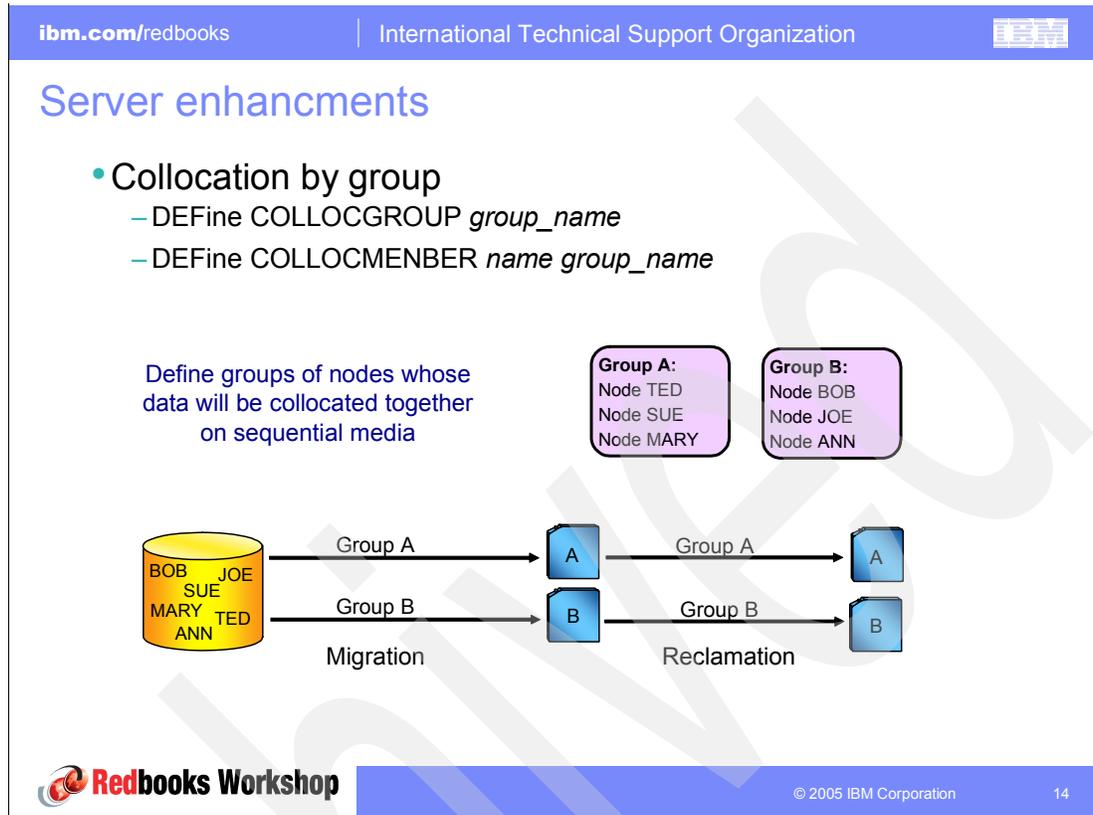


Figure 2-10 Collocation by group

The benefits of collocation groups are:

- ▶ Collocation of small nodes without requiring that a tape and library slot be dedicated to each node
- ▶ Optimal recovery
 - Efficient collocation of small nodes
 - Possible increased efficiency for multisession restore by spreading data for a node over multiple volumes
 - Possible collocation of copy storage pools for off-site storage
- ▶ Improved efficiency for internal data-transfer operations by transferring all nodes in the group together
 - Minimizes mounts of target volumes
 - For sequential-to-sequential transfer (such as reclamation), minimizes database scanning and reduces tape passes

The following new commands are available for collocation by group:

- ▶ DEFINE COLLOGROUP
- ▶ DEFINE COLLOCMEMBER
- ▶ DELETE COLLOGROUP
- ▶ DELETE COLLOCMEMBER
- ▶ QUERY COLLOGROUP

- ▶ QUERY NODEDATA
- ▶ UPDATE COLLOCGROUP

The following commands have changed:

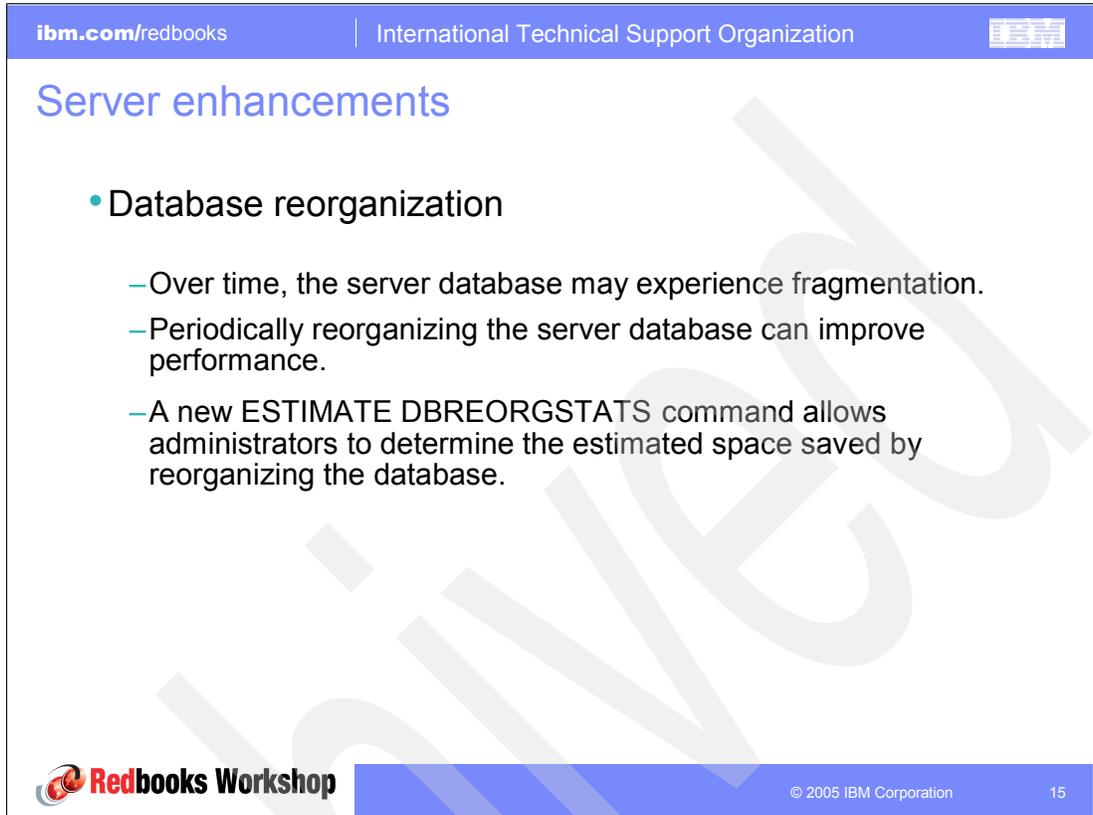
- ▶ DEFINE STGPOOL
- ▶ MOVE NODEDATA
- ▶ QUERY NODE
- ▶ QUERY STGPOOL
- ▶ REMOVE NODE
- ▶ UPDATE STGPOOL

Table 2-1 lists the dependencies between collocation groups and storage pool collocation.

Table 2-1 Collocation dependencies

Storage pool collocation attributes	Node not defined in a collocation group	Node defined in a collocation group
NO	No collocation	No collocation
GROUP	Collocation by node	Collocation by group of nodes
NODE	Collocation by node	Collocation by node
FILESPEC	Collocation by file space	Collocation by file space

2.6 Database reorganization



The screenshot shows a slide from an IBM Redbooks Workshop. The slide has a blue header with the text 'ibm.com/redbooks' and 'International Technical Support Organization'. The main title is 'Server enhancements' in blue. Below it, there is a section titled 'Database reorganization' with a bullet point. The bullet point contains three sub-points: '-Over time, the server database may experience fragmentation.', '-Periodically reorganizing the server database can improve performance.', and '-A new ESTIMATE DBREORGSTATS command allows administrators to determine the estimated space saved by reorganizing the database.' The slide footer includes the 'Redbooks Workshop' logo, the copyright notice '© 2005 IBM Corporation', and the page number '15'.

Figure 2-11 Database reorganization

You can use the `ESTIMATE DBREORGSTATS` command to estimate how much space can be recovered if a reorganization is performed. This allows you to determine if a reorganization will offer any space savings.

A complete reorganization of the database requires you to:

- ▶ Unload the database
- ▶ Format the database and recovery log volumes to prepare for loading
- ▶ Load the database again

The operations read device information from the device configuration file, not from the server's database.

For more information, see Chapter 19, "Managing the Database and Recovery Log," of the *Administrator's Guide* for your server platform.



Server enhancements

- Database reorganization

```
tsm: POLONIUM1>ESTIMATE DBREORGSTATS  
ANS8003I Process number 9 started.
```

```
tsm: POLONIUM1>q db f=d  
          Available Space (MB): 1,024  
          Assigned Capacity (MB): 1,024  
          Maximum Extension (MB): 0  
          :  
          Changed Since Last Backup (MB): 41.25  
          Percentage Changed: 65.00  
          Last Complete Backup Date/Time: 12/03/2004 14:19:30  
          Estimate of Recoverable Space (MB): 12  
          Last Estimate of Recoverable Space (MB): 12/09/2004 10:56:48
```



Figure 2-12 Database reorganization example

The following commands have changed:

- ▶ CANCEL PROCESS
- ▶ QUERY DB
- ▶ QUERY PROCESS

2.7 Disk device enhancements

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Server enhancements

- Disk device enhancements
 - Less expensive disk and longer disk retention requirements are driving large disk storage pools at many installations.
 - Device types DISK and FILE are capable of providing space triggers for automatic allocation of storage pool space, which can result in increased efficiency of disk storage pools.

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Figure 2-13 Disk device enhancements

Disk-only backup has been enhanced to take advantage of the inexpensive disk storage currently available on the market. These improvements to sequential-access FILE device type and random-access DISK device class storage include:

- ▶ The ability to create large, sequential-access FILE-type storage pools using a single FILE device-class definition that specifies two or more directories
- ▶ The ability to create and format FILE device type or DISK device type volumes in a single step
- ▶ The ability to use enhanced space trigger functionality to automatically allocate space for private volumes in sequential-access FILE device type and random-access DISK device class storage pools

This reduces the potential for disk fragmentation and maintenance overhead.



Server enhancements

- Enhancements for sequential-access disk pools
 - Allow storage pools to span multiple file systems
 - Support parallel migration from sequential-access pools
 - Minimize fragmentation of file volumes to improve performance
 - Exploit direct I/O on supported platforms
 - Remove mount point limitations



Figure 2-14 Enhancements for sequential-access disk storage pools

The following commands have changed:

- ▶ DEFINE DBCOPY
- ▶ DEFINE DEVCLASS—FILE
- ▶ DEFINE LOGCOPY
- ▶ DEFINE PATH (when the destination is a drive)
- ▶ DEFINE SPACETRIGGER
- ▶ DEFINE VOLUME
- ▶ UPDATE DEVCLASS—FILE
- ▶ UPDATE PATH (when the destination is a drive)

There are several other new or changed options for the DEFINE DEVCLASS—FILE command. One is the DIRECTORY option, which now enables you to define several directories for the files used in this device class. Since the files are created as needed, they are created in the directories that are defined.



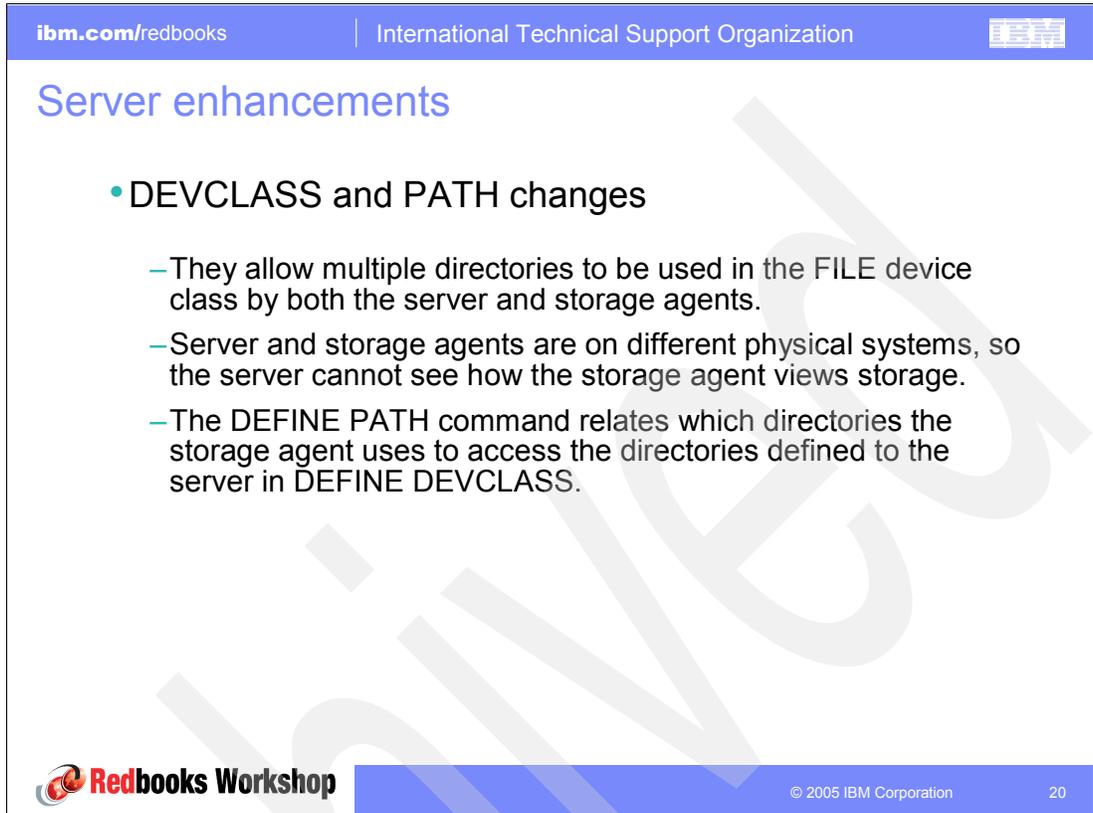
Server enhancements

Disk device enhancements overview

	Random-access	Sequential-access
Space allocation/tracking	Random 4 KB blocks	Sequential within file volume
TSM caching	Optional (backup overhead)	Not supported
Space recovery (no cache)	When file is deleted/moved	When volume is reclaimed
Recovery of cache space	When space is needed	Not applicable
Aggregate reconstruction	Not supported	During volume reclamation
Concurrent volume access	Yes	Not supported
Multi-session client restore	One session for all volumes	One session per volume
Target for LAN-free backup	Not supported	Yes, via SANergy
Can be used for copy pools	No	Yes
Migration/stg pool backup	By node and file space	By volume
Parallel migration processes	Yes	Yes (beginning in 5.3)
Storage pool backup	Must check every file	Optimized for efficiency
Pools can span file systems	Yes	Yes (beginning in 5.3)
Database regression	Must audit all volumes	Reuse delay avoids audit

Figure 2-15 Disk device enhancements overview

2.8 DEVCLASS and PATH changes



The screenshot shows a slide from an IBM Redbooks Workshop presentation. The slide title is "Server enhancements". A bullet point is listed: "• DEVCLASS and PATH changes". Under this bullet point, there are three sub-points: "– They allow multiple directories to be used in the FILE device class by both the server and storage agents.", "– Server and storage agents are on different physical systems, so the server cannot see how the storage agent views storage.", and "– The DEFINE PATH command relates which directories the storage agent uses to access the directories defined to the server in DEFINE DEVCLASS." The slide footer includes the Redbooks Workshop logo, the text "© 2005 IBM Corporation", and the page number "20".

Figure 2-16 DEVCLASS and PATH changes

You must ensure that storage agents can access newly created FILE volumes. To access FILE volumes, storage agents replace names from the directory list in the device-class definition with the names in the directory list for the associated path definition. The following example illustrates the importance of matching device classes and paths to ensure that storage agents can access newly created FILE volumes.

Suppose that you want to use these three directories for a FILE library:

- ▶ /usr/tivoli1
- ▶ /usr/tivoli2
- ▶ /usr/tivoli3

In this scenario, you take the following actions:

1. You use the following command to set up a FILE library named CLASSA with one drive named CLASSA1 on SERVER1:

```
define devclass classa devtype=file directory="/usr/tivoli1,/usr/tivoli2,/usr/tivoli3"  
shared=yes mountlimit=1
```

2. You want the storage agent STA1 to use the FILE library, so you define the following path for storage agent STA1:

```
define path server1 sta1 srctype=server desttype=drive device=file  
directory="/usr/ibm1,/usr/ibm2,/usr/ibm3" library=classa
```

In this scenario, the storage agent, STA1, replaces the directory name /usr/tivoli1 with the directory name /usr/ibm1 to access FILE volumes that are in the /usr/tivoli1 directory on the server.

3. Consider that the file volume /usr/tivoli1/file1.dsm is created on SERVER1, and you enter the following command:

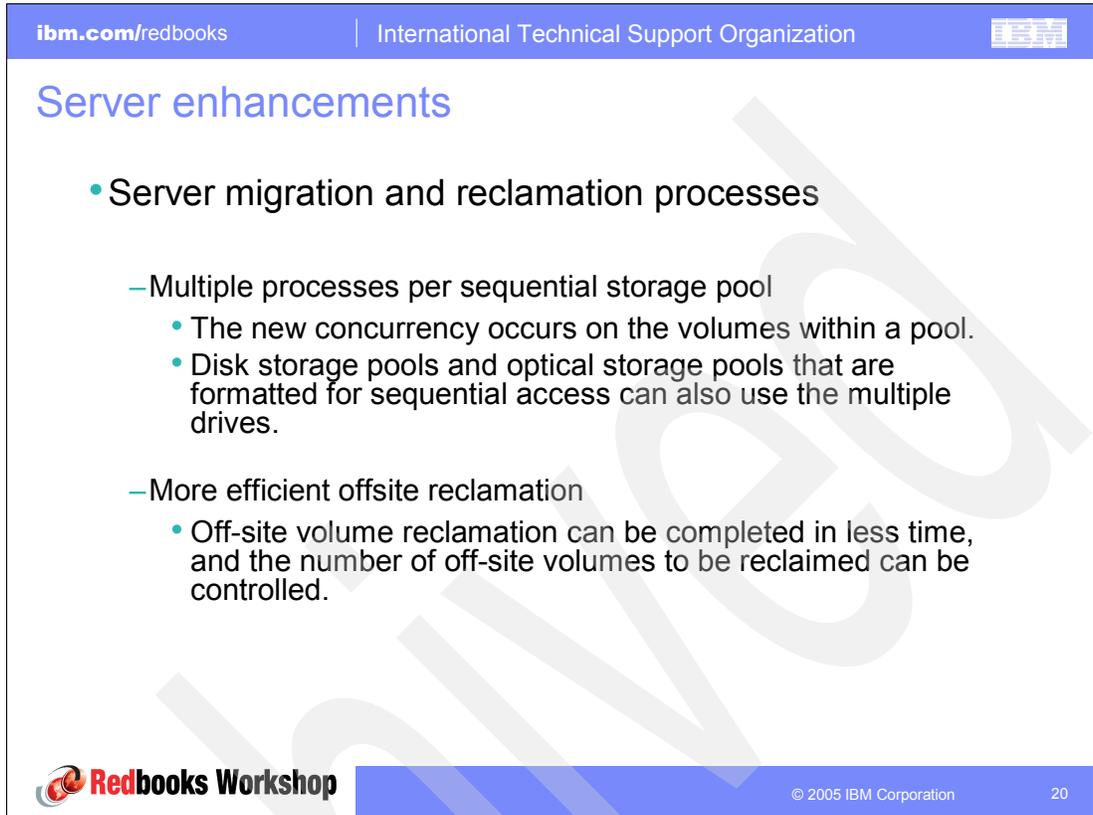
```
update devclass classa directory="/usr/otherdir,/usr/tivoli2, /usr/tivoli3"
```

In this case, SERVER1 can still access file volume /usr/tivoli1/file1.dsm. However, the storage agent STA1 cannot access it because a matching directory name in the PATH directory list no longer exists. If a directory name is not available in the directory list associated with the device class, the storage agent can lose access to a FILE volume in that directory. Although the volume is still accessible from the Tivoli Storage Manager server for reading, failure of the storage agent to access the FILE volume can cause operations to be retried on a LAN-only path or to fail.

Important: Tivoli Storage Manager supports the use of remote file systems, such as SANergy®, for reading and writing storage pool data, database backups, and other data operations. Disk subsystems and file systems must not report successful write operations when they can fail after a successful write report to Tivoli Storage Manager.

A write failure after a successful notification constitutes a data integrity problem because the data that was reported as successfully written is unavailable for retrieval. In this situation, all data subsequently written is also at risk due to positioning mismatches within the target file. To avoid these problems, ensure that disk subsystems and file systems, regardless of the implementation you use, can always return data when it is requested.

2.9 Server migration and reclamation processes



The screenshot shows a slide from an IBM Redbooks Workshop. The slide has a blue header with the text 'ibm.com/redbooks' and 'International Technical Support Organization'. The main title is 'Server enhancements'. The content is a bulleted list of server migration and reclamation processes. The footer includes the 'Redbooks Workshop' logo, the copyright notice '© 2005 IBM Corporation', and the page number '20'.

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Server enhancements

- Server migration and reclamation processes
 - Multiple processes per sequential storage pool
 - The new concurrency occurs on the volumes within a pool.
 - Disk storage pools and optical storage pools that are formatted for sequential access can also use the multiple drives.
 - More efficient offsite reclamation
 - Off-site volume reclamation can be completed in less time, and the number of off-site volumes to be reclaimed can be controlled.

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Figure 2-17 Server migration and reclamation processes

Administrators can now control and schedule routine server operations by scheduling the migration or reclamation command to run during convenient server activity times. The number of processes for migration and reclamation is also enhanced to allow multiple processes for the operations. These new features allow for better utilization of available tape drives and FILE volumes.



Server enhancements

- New commands and parameters
 - MIGRATE STGPOOL
Enables the user to manually drive migration for a random-access or sequential-access primary storage pool

 - RECLAIM STGPOOL
Enables the user to manually drive reclamation for a sequential-access primary or copy storage pool

 - RECLAIMPROCESS, OFFSITERECLAIMLIMIT, MIGPROCESS



Figure 2-18 New commands and parameters

The MIGRATE STGPOOL command ignores the value of the HIGHMIG parameter of the storage pool definition. Migration occurs regardless of the value of the HIGHMIG parameter.

The LOWMIG threshold must be lower than the percentage of the amount of data currently in the storage pool when using the MIGRATE STGPOOL command. Otherwise migration is not started.

2.10 3592 WORM support

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Server enhancements

- 3592 WORM support
 - Tivoli Storage Manager now supports the 3592 drive using WORM tape.
 - DEFINE DEVClass ...
DEVType=3592 WORM=yes



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Figure 2-19 3592 WORM support

To use 3592 write once, read many (WORM) support in 3584 libraries, you must specify the WORM parameter. The Tivoli Storage Manager server distinguishes between WORM and non-WORM scratch volumes. However, to use 3592 WORM support in 349X libraries, you also need to set the WORMSCRATCHCATEGORY in the DEFINE LIBRARY command.

When WORM=YES, the only valid value for the SCALECAPACITY parameter is 100.

A WORM scratch volume is similar to a conventional scratch volume. However, WORM volumes cannot be reclaimed by Tivoli Storage Manager reclamation processing. WORM volumes can be returned to scratch status only if they have empty space in which data can be written. Empty space is space that does not contain valid, expired, or deleted data. (Deleted and expired data on WORM volumes cannot be overwritten.) If a WORM volume does not have any empty space in which data can be written (for example, if the volume is entirely full of deleted or expired data), the volume remains private.

To receive the full benefit of using WORM media with Tivoli Storage Manager, consider the following points:

- ▶ Potential mount failures

If WORM tape media is loaded into a drive for a RW device-class mount, it causes a mount failure. Similarly, if RW tape media is loaded into a drive for a WORM device-class mount, the mount fails.

- ▶ Loading the correct media

External and manual libraries use separate logical libraries to segregate their media. Ensuring that the correct media is loaded is the responsibility of the operator and the library manager software.

- ▶ Composition of a storage pool

A storage pool can consist of either WORM or RW media, but not both.

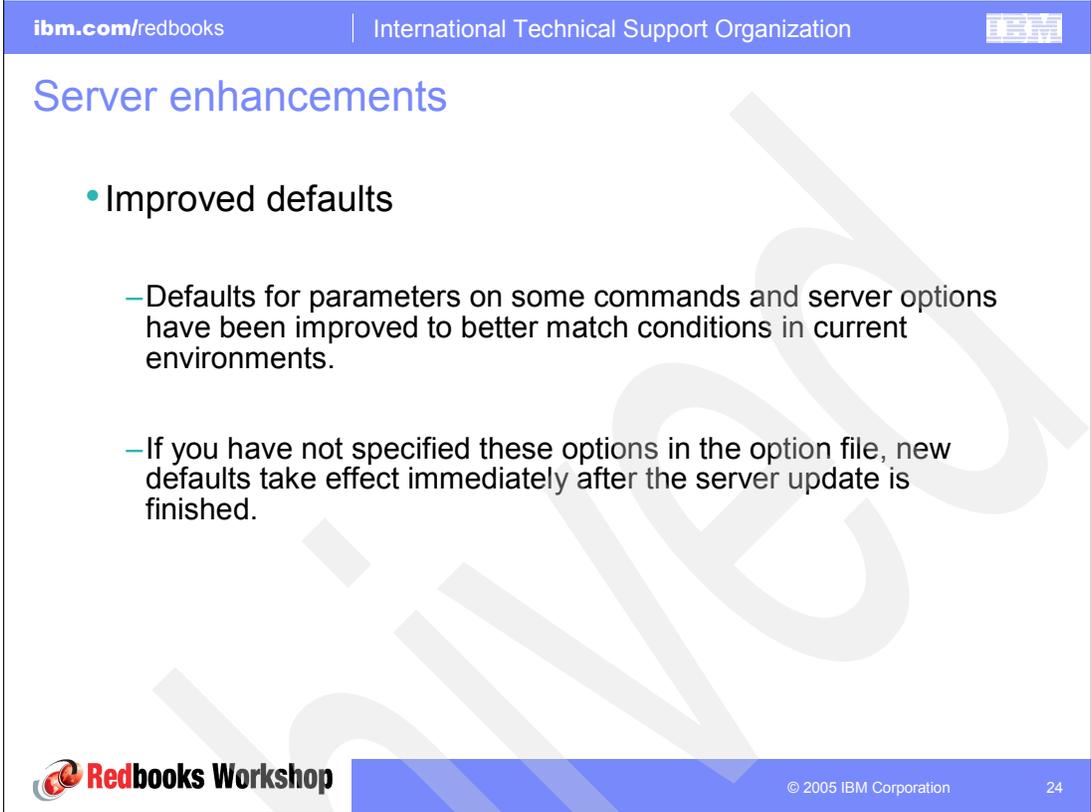
- ▶ Database backup and export operations

Do not use WORM tapes for database backup or export operations. Doing so wastes tape following a restore or import operation.

- ▶ Support for short and normal 3592 WORM tapes

Tivoli Storage Manager supports both short and normal 3592 WORM tapes. For best results, define them in separate storage pools.

2.11 Improved defaults



The screenshot shows a slide from a presentation. At the top, there is a blue header bar with the text 'ibm.com/redbooks' on the left, 'International Technical Support Organization' in the center, and an IBM logo on the right. Below the header, the slide title 'Server enhancements' is displayed in blue. The main content area is white and contains a bulleted list. The first bullet point is 'Improved defaults', which is further detailed by two sub-bullets: '- Defaults for parameters on some commands and server options have been improved to better match conditions in current environments.' and '- If you have not specified these options in the option file, new defaults take effect immediately after the server update is finished.' At the bottom of the slide, there is a blue footer bar containing the 'Redbooks Workshop' logo on the left, the copyright notice '© 2005 IBM Corporation' in the center, and the page number '24' on the right.

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Server enhancements

- Improved defaults
 - Defaults for parameters on some commands and server options have been improved to better match conditions in current environments.
 - If you have not specified these options in the option file, new defaults take effect immediately after the server update is finished.

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Figure 2-20 Improved defaults



Server enhancements

Improved defaults comparison

Option	Old default	New default
BUFPoolsize	2048 (KB)	32768 (KB)
MOVEBatchsize	40 (objects)	1000 (objects)
MOVESizethresh	500 (MB)	2048 (MB)
SELFTUNETXNsize	No	Removed
TCPBusize (AIX)	16 (KB)	32 (KB)
TCPWindowSize	No	63 (KB)
TXNGroupmax	40 (objects)	256 (objects)
USELARGEBuffers	Yes	Yes always set
TCPNodelay	No	Yes
AIXDIRECTIO	Yes	Yes always set
TCPADMINPORT	1500	Value of TCPPORT
ADMINONClientport	N/A	Yes



Figure 2-21 Improved defaults comparison

Note the explanation of the following options:

- ▶ **SELTUNETXNSIZE:** With the proposed changes to MOVEBatchsize and MOVESizethreshold above, this option is unnecessary.
- ▶ **TCPWINDOWSIZE:** The 63 KB size does not require RFC1323 support to be enabled (64 KB and up do) on either the client or server.
- ▶ **ADMINONCLIENTPORT:** Defines whether the TCPPORT can be used by administrative sessions. If it is set to NO and the TCPADMINPORT value is different than the TCPPORT value, then administrative sessions cannot use the TCPPORT. If it is set to YES, or the TCPPORT and TCPADMINPORT are the same (the default), then administrative sessions can use the TCPPORT.
- ▶ **TCPADMINPORT:** Using different port numbers for the options TCPPORT and TCPADMINPORT enables you to create one set of firewall rules for client sessions and another set for the other session types in this list. By using the SESSIONINITIATION parameter of REGISTER and UPDATE NODE, you can close the port specified by TCPPORT at the firewall. You can also specify nodes whose scheduled sessions will be started from the server. If the two port numbers are different, separate threads will be used to service client sessions and the session types.

2.12 Validating LAN-free environment configuration



The screenshot shows a slide from an IBM Redbooks Workshop. The slide has a blue header with the text 'ibm.com/redbooks' on the left and 'International Technical Support Organization' on the right. Below the header, the title 'Server enhancements' is displayed in blue. The main content area contains a bulleted list:

- Validating a LANFREE environment configuration
 - Enhancements have been made to allow you to quickly determine if your LAN-free environment has been configured correctly.
 - You can request validation for one client node and one storage agent.
 - VALIDATE LANFREE

At the bottom of the slide, there is a 'Redbooks Workshop' logo on the left, and the text '© 2005 IBM Corporation' and the number '26' on the right.

Figure 2-22 Validating LAN-free environment configuration

When validation is requested, a detailed report is generated explaining why the storage pool is or is not LAN-free capable. As a result, you can determine if there is a setting or configuration issue on the server preventing LANFREE data movement.

Note: This new command replaces the unsupported command SHOW LANFREE, which was introduced in Version 5.2.2.



Server enhancements

Validate LAN-free output

```

tsm: POLONIUM1>validate lanfree create sa_create
ANR0387I Evaluating node CRETE using storage agent SA_CREATE for LAN-free data
movement.

Node Storage Operation Mgmt Class Destination LAN-Free Explanation
Name Agent          Name      Name          Name          capable?
-----
CRETE SA_CREATE BACKUP  MC_FS_LAN-  BACKUPLANFR-  Yes
      SA_CREATE          FREE        EE
CRETE SA_CREATE BACKUP  STANDARD    BACKUPPOOL    No      Destination storage
                                         pool is DISK.
CRETE SA_CREATE ARCHIVE MC_FS_LAN-  ARCHIVELANF-  Yes
      SA_CREATE          FREE        REE
CRETE SA_CREATE ARCHIVE STANDARD    ARCHIVEPOOL    No      Destination storage
                                         pool is DISK.

ANR1706I Ping for server 'SA_CREATE' was able to establish a connection.
ANR0388I Node CRETE using storage agent SA_CREATE has 2 storage pools capable of
LAN-free data movement and 2 storage pools not capable of LAN-free data
movement.

```

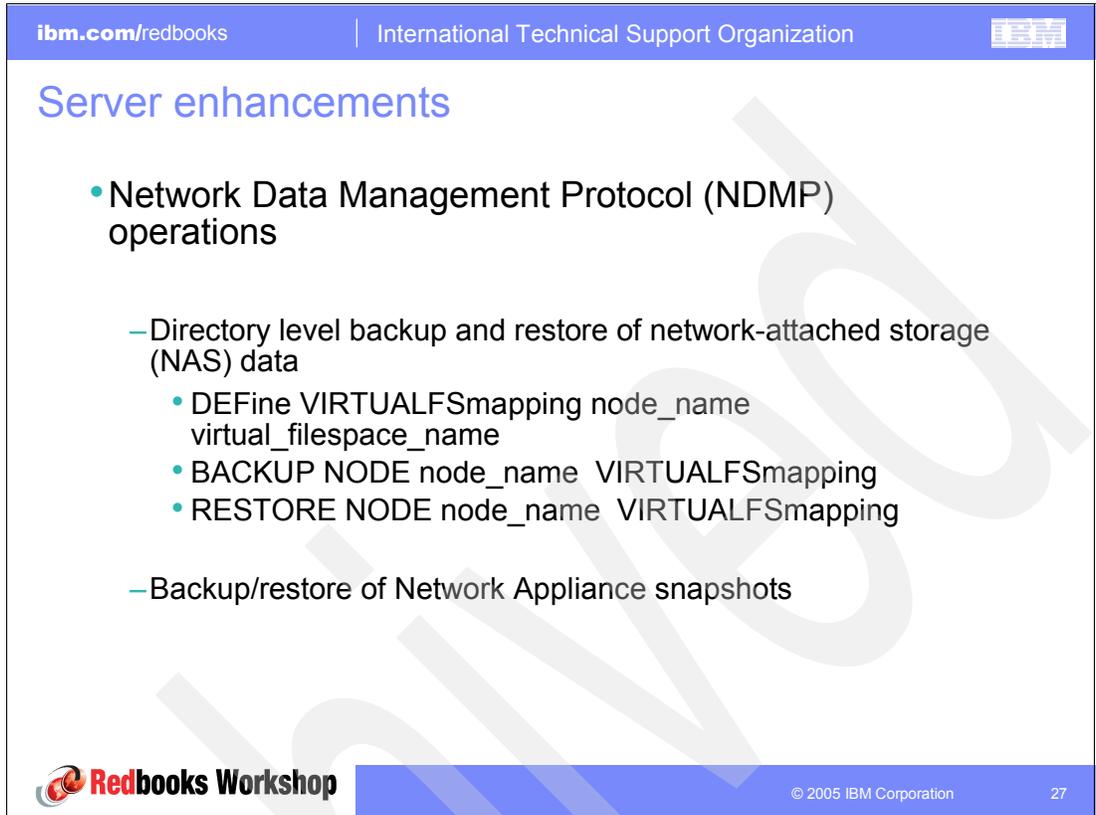


Figure 2-23 Validate LAN-free output

The output allows you to see which management class destinations for a given operation type are not LAN-free capable. It provides a brief explanation about why. It also reports the total number of LAN-free destinations. See the `VALIDATE LANFREE` command in the *Administrator's Reference* and "Validating your LAN-free Configuration" in the *IBM Tivoli Storage Manager Administrator's Guide* for more information.

See the *Tivoli Storage Manager V5.3 Administrator's References* and *Tivoli Storage Manager V5.3 Administrator's Guides* listed in "Related publications" on page 159.

2.13 NDMP operations



The screenshot shows a slide from an IBM Redbooks Workshop presentation. The slide title is 'Server enhancements'. The main content is a bulleted list of NDMP operations. The list includes: 'Network Data Management Protocol (NDMP) operations', 'Directory level backup and restore of network-attached storage (NAS) data' (with sub-bullets for 'DEFINE VIRTUALFSmapping', 'BACKUP NODE', and 'RESTORE NODE'), and 'Backup/restore of Network Appliance snapshots'. The slide footer contains the 'Redbooks Workshop' logo, the copyright notice '© 2005 IBM Corporation', and the page number '27'.

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Server enhancements

- Network Data Management Protocol (NDMP) operations
 - Directory level backup and restore of network-attached storage (NAS) data
 - DEFINE VIRTUALFSmapping node_name virtual_filespace_name
 - BACKUP NODE node_name VIRTUALFSmapping
 - RESTORE NODE node_name VIRTUALFSmapping
 - Backup/restore of Network Appliance snapshots

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Figure 2-24 NDMP operations

If you have a large NAS file system, initiating a backup at a directory level reduces backup and restore times and provides more flexibility in configuring your NAS backups. By defining virtual file spaces, a file system backup can be partitioned among several NDMP backup operations and multiple tape drives. You can also use different backup schedules to back up subtrees of a file system.

The virtual file space name cannot be identical to any file system on the NAS node. If a file system is created on the NAS device with the same name as a virtual file system, a name conflict will occur on the Tivoli Storage Manager server when the new file space is backed up. See the *Administrator's Reference* for more information about virtual file space mapping commands.

Note: Virtual file space mappings are supported only for NAS nodes.

2.14 NetApp SnapLock support

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Server enhancements

- NetApp SnapLock support
 - The SnapLock feature can be used by Tivoli Storage Manager servers which have data retention protection enabled.
 - The SnapLock feature allows you to set a retention date for files and commit a file to a WORM state.
 - At the end of a write transaction, a retention date is set for the TSM FILE volume, via the SnapLock interface, to a date in the future.

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Figure 2-25 NetApp SnapLock support

The Network Appliance SnapLock licensed feature helps meet federal regulatory requirements for archived data. The SnapLock feature allows an application, such as Tivoli Storage Manager, to set a retention date for files and commit a file to a WORM state. Data stored with a retention date cannot be deleted from the file system until the retention period has expired.

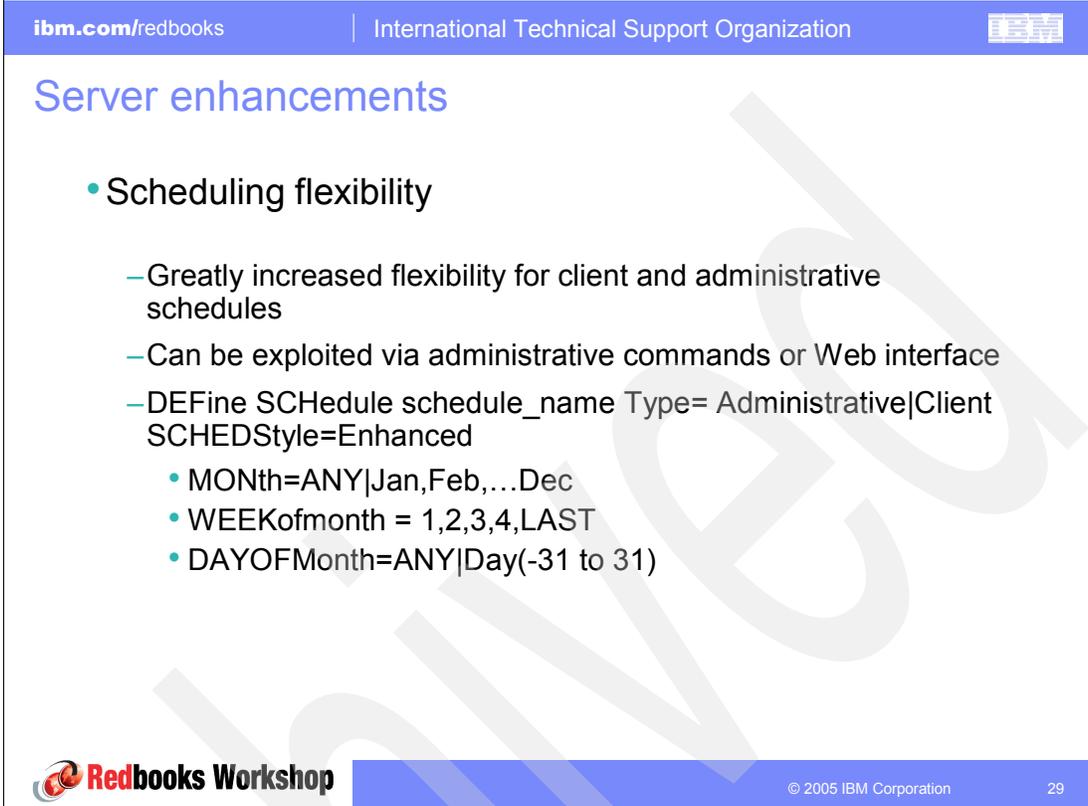
Data archived in data retention protection servers and stored to Network Appliance NAS file servers is stored as Tivoli Storage Manager FILE volumes. At the end of a write transaction, a retention date is set for the Tivoli Storage Manager FILE volume, via the SnapLock interface, to a date in the future. This date is calculated by using the retention parameters (RETVER and RETMIN) of the archive copy group used when archiving the data. Having a retention date associated with the FILE volume gives it a characteristic of WORM media by not allowing the data to be destroyed or overwritten until the retention date has passed. These Tivoli Storage Manager FILE volumes are referred to as *WORM FILE volumes*. Tivoli Storage Manager for data retention protection combined with WORM FILE volume reclamation ensures protection for the life of the data.

Tivoli Storage Manager servers which have data retention protection enabled and have access to a Network Appliance filer with the SnapLock licensed feature can define a storage pool with RECLAMATIONTYPE set to SNAPLOCK. This means that data created on volumes in this storage pool are managed by a retention date.

Perform the following steps to set up a SnapLock volume for use as a Tivoli Storage Manager WORM FILE volume:

1. Install and set up SnapLock on the Network Appliance filer. See Network Appliance documentation for more information.
2. Properly configure the minimum, maximum, and default retention periods. If these retention periods are not configured properly, Tivoli Storage Manager cannot properly manage the data and volumes.
3. Install and configure a Tivoli Storage Manager server with data retention protection. Ensure that the SET ARCHIVERETENTIONPROTECTION command is activated.
4. Set up a policy by using the DEFINE COPYGROUP command. Select the RETVER and RETMIN values in the archive copy group which meet your requirements for protecting this data in WORM storage. If the RETVER or RETMIN values are not set, the default management classes values are used.
5. Set up storage by using the DEFINE DEVCLASS command. Use the FILE device class and specify the DIRECTORY parameter to point to the directory or directories on the SnapLock volumes.
6. Define a storage pool using the device class you defined earlier. Specify RECLAMATIONTYPE=SNAPLOCK.
7. Update the copy group to point to the storage pool that you just defined.
8. Use the Tivoli Storage Manager API to archive your objects into the SnapLock storage pool. This feature is not available on standard Tivoli Storage Manager backup-archive clients.

2.15 Scheduling flexibility



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Server enhancements

- Scheduling flexibility
 - Greatly increased flexibility for client and administrative schedules
 - Can be exploited via administrative commands or Web interface
 - DEFINE SCHEDULE schedule_name Type= Administrative|Client SCHEDULEStyle=Enhanced
 - MONTH=ANY|Jan, Feb, ... Dec
 - WEEKofmonth = 1, 2, 3, 4, LAST
 - DAYOFMonth=ANY|Day(-31 to 31)

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Figure 2-26 Scheduling flexibility

Tivoli Storage Manager schedule capability allows for more useful calendar-type administrative and client scheduling. There is now the flexibility to schedule the most repetitive items and even some holidays, such as:

- ▶ Run on the last Friday of every month
- ▶ Run on the first Sunday of every quarter
- ▶ Run on every day in the last week of the year



Server enhancements

Schedule configuration window

Create Schedule

- ✓ General
- ✓ Select Action Options
- Select Repetition Options
- Select Advanced Options
- Associate Client Nodes
- Summary

Repeat the Schedule - Day of the Week
Specify how frequently to run the schedule.

Run on every day of the week

Runs during the selected weeks of the month on either Saturday or Sunday

Runs during the selected weeks of the month on any single day except Saturday or Sunday

Run on the following days

Monday Tuesday Wednesday Thursday

Friday Saturday Sunday

The schedule will run on the days you have specified. You can further refine the frequency of the schedule.

Select the weeks in which the schedule runs.

Select the months in which the schedule runs.

< Back Next > Finish Cancel

Figure 2-27 Schedule configuration window

Client enhancements

This chapter presents the new features and enhancements delivered in each of the platforms for which a current version of the IBM Tivoli Storage Manager client is available.

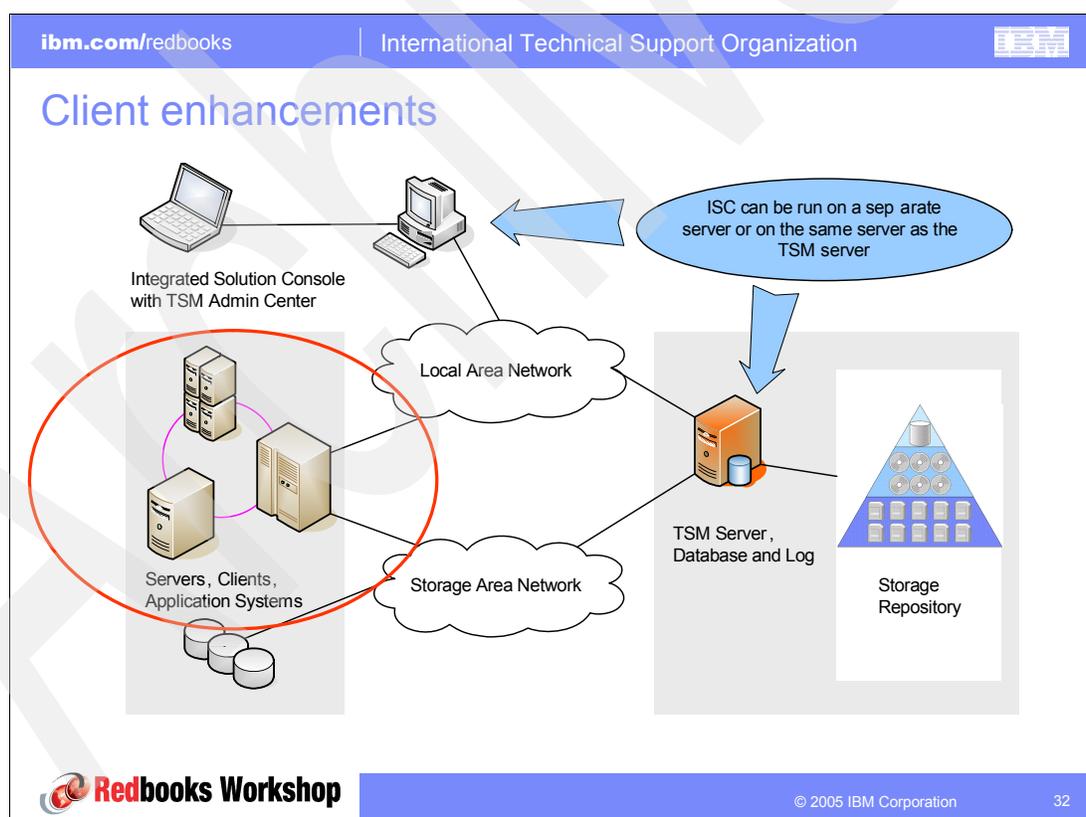
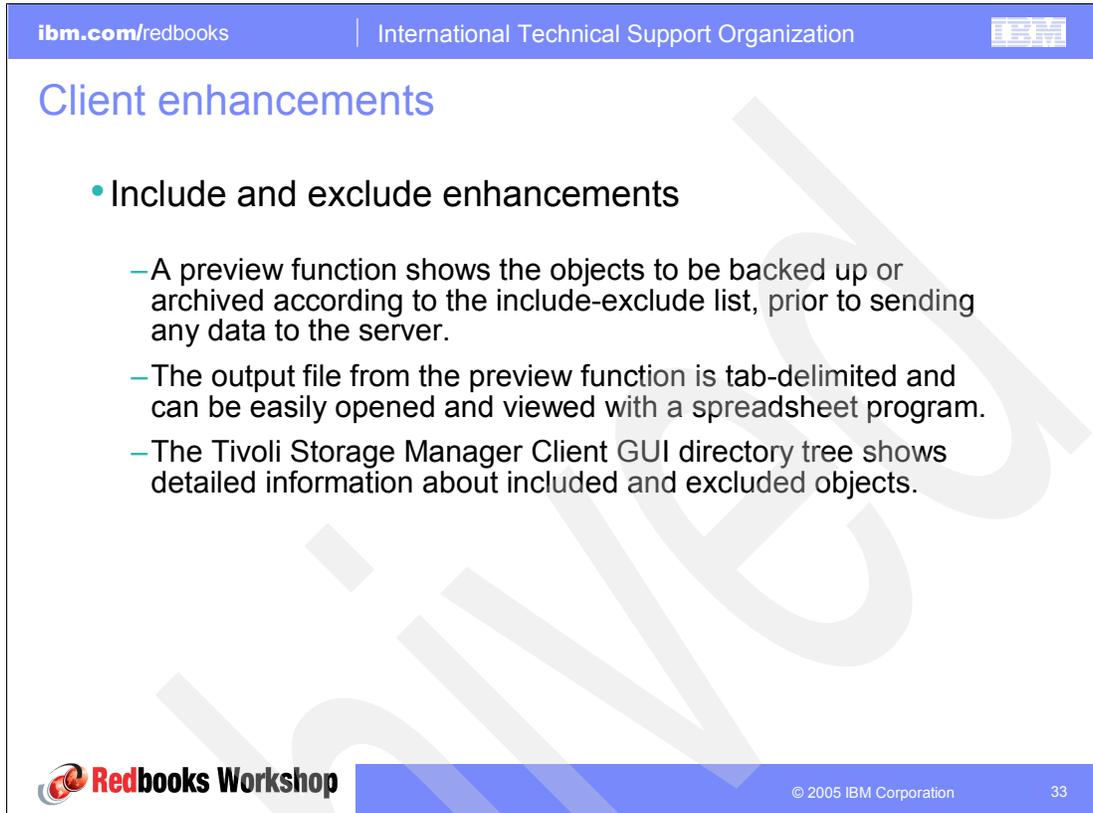


Figure 3-1 Tivoli Storage Manager components

Note: See the *Tivoli Storage Manager V5.3 Install Guides* in “Related publications” on page 159 for supported client platforms and platform-specific changes or new features.

3.1 Include and exclude enhancements



The screenshot shows a slide from a Redbooks Workshop presentation. The slide has a blue header with the text 'ibm.com/redbooks' on the left and 'International Technical Support Organization' on the right. Below the header, the title 'Client enhancements' is displayed in blue. The main content area contains a bulleted list under the heading '• Include and exclude enhancements'. The list includes three items: a preview function showing objects to be backed up or archived, a tab-delimited output file, and a GUI directory tree showing detailed information. The slide footer features the Redbooks Workshop logo on the left, and the text '© 2005 IBM Corporation' and the page number '33' on the right.

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Client enhancements

- Include and exclude enhancements
 - A preview function shows the objects to be backed up or archived according to the include-exclude list, prior to sending any data to the server.
 - The output file from the preview function is tab-delimited and can be easily opened and viewed with a spreadsheet program.
 - The Tivoli Storage Manager Client GUI directory tree shows detailed information about included and excluded objects.

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Figure 3-2 Include and exclude enhancements



Client enhancements

Include and exclude list viewed with a spreadsheet

	A	B	C	D	E	F	G
1	Preview generated on 12/01/2004 11:05:36.						
2	Name:	Size:	Type:	Status:	Pattern:	Source:	Mgmt Class:
6002	C:\otus\123\ssdn04en.123	6.92 KB	0.123	Excluded	C:\otus\123\ssdn04en.123	dsm.opt	DEFAULT
6003	C:\otus\123\ssdn05en.123	8.69 KB	0.123	Excluded	C:\otus\123\ssdn05en.123	dsm.opt	DEFAULT
6004	C:\otus\123\ssdn06en.123	5.83 KB	0.123	Excluded	C:\otus\123\ssdn06en.123	dsm.opt	DEFAULT
6005	C:\otus\123\ssdn07en.123	3.20 KB	0.123	Excluded	C:\otus\123\ssdn07en.123	dsm.opt	DEFAULT
6006	C:\otus\123\ssdn08en.123	3.31 KB	0.123	Excluded	C:\otus\123\ssdn08en.123	dsm.opt	DEFAULT
6007	C:\otus\123\ssdn09en.123	4.43 KB	0.123	Excluded	C:\otus\123\ssdn09en.123	dsm.opt	DEFAULT
6008	C:\otus\123\ssdn10en.123	5.08 KB	0.123	Excluded	C:\otus\123\ssdn10en.123	dsm.opt	DEFAULT
6009	C:\otus\123\ssdn11en.123	6.13 KB	0.123	Excluded	C:\otus\123\ssdn11en.123	dsm.opt	DEFAULT
6010	C:\otus\123\ssdn12en.123	5.98 KB	0.123	Excluded	C:\otus\123\ssdn12en.123	dsm.opt	DEFAULT
6011	C:\otus\123\ssdn13en.123	4.94 KB	0.123	Excluded	C:\otus\123\ssdn13en.123	dsm.opt	DEFAULT
6012	C:\otus\123\ssdn14en.123	11.64 KB	0.123	Excluded	C:\otus\123\ssdn14en.123	dsm.opt	DEFAULT
6013	C:\otus\123\ssdn15en.123	11.73 KB	0.123	Included	C:\otus\123\ssdn15en.123	dsm.opt	DEFAULT
6014	C:\otus\123\ssdn16en.123	8.46 KB	0.123	Included	C:\otus\123\ssdn16en.123	dsm.opt	DEFAULT
6015	C:\otus\123\ssdn17en.123	10.24 KB	0.123	Included	C:\otus\123\ssdn17en.123	dsm.opt	DEFAULT
6016	C:\otus\123\ssdn18en.123	13.67 KB	0.123	Included	C:\otus\123\ssdn18en.123	dsm.opt	DEFAULT
6017	C:\otus\123\ssfn70en.cnt	16.58 KB	cnt	Excluded	*\...*	dsm.opt	DEFAULT
6018	C:\otus\123\ssfn70en.hlp	368.18 KB	hlp	Excluded	*\...*	dsm.opt	DEFAULT
6019	C:\otus\123\ssmn70en.cnt	14.67 KB	cnt	Excluded	*\...*	dsm.opt	DEFAULT
6020	C:\otus\123\ssmn70en.hlp	274.47 KB	hlp	Excluded	*\...*	dsm.opt	DEFAULT
6021	C:\otus\123\sssn70en.cnt	3.34 KB	cnt	Excluded	*\...*	dsm.opt	DEFAULT
6022	C:\otus\123\sssn70en.hlp	1.41 MB	hlp	Excluded	*\...*	dsm.opt	DEFAULT
6023	C:\otus\123\ttablelib.t32	48.08 KB	t32	Excluded	*\...*	dsm.opt	DEFAULT
6024	C:\otus\123\tcur10en.dll	50.50 KB	dll	Excluded	*\...*	dsm.opt	DEFAULT



Figure 3-3 Include and exclude list viewed with a spreadsheet

You can start the preview of the objects to be backed up or archived according to the include-exclude list by selecting **Utilities** → **Preview Include-Exclude** from the client interface. This opens the Preview Include-Exclude dialog box.

The output file from the preview function is tab-delimited. You can easily open and view it with a spreadsheet program.



Client enhancements

Client GUI directory tree detailed information

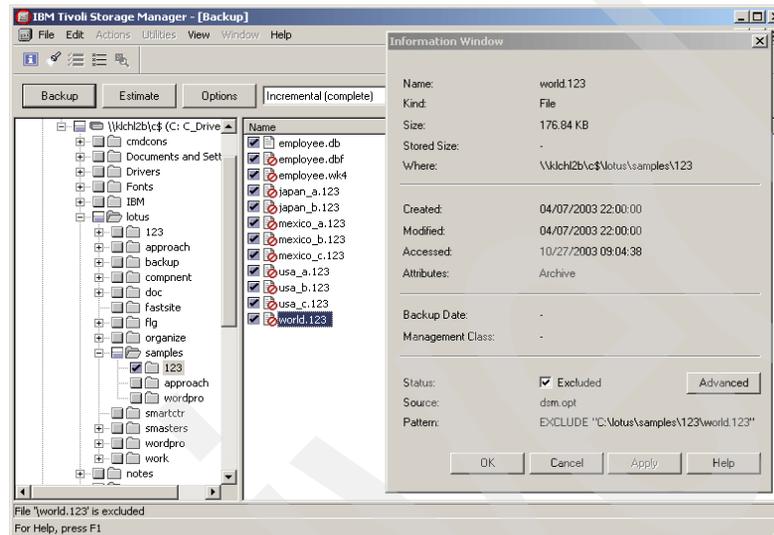
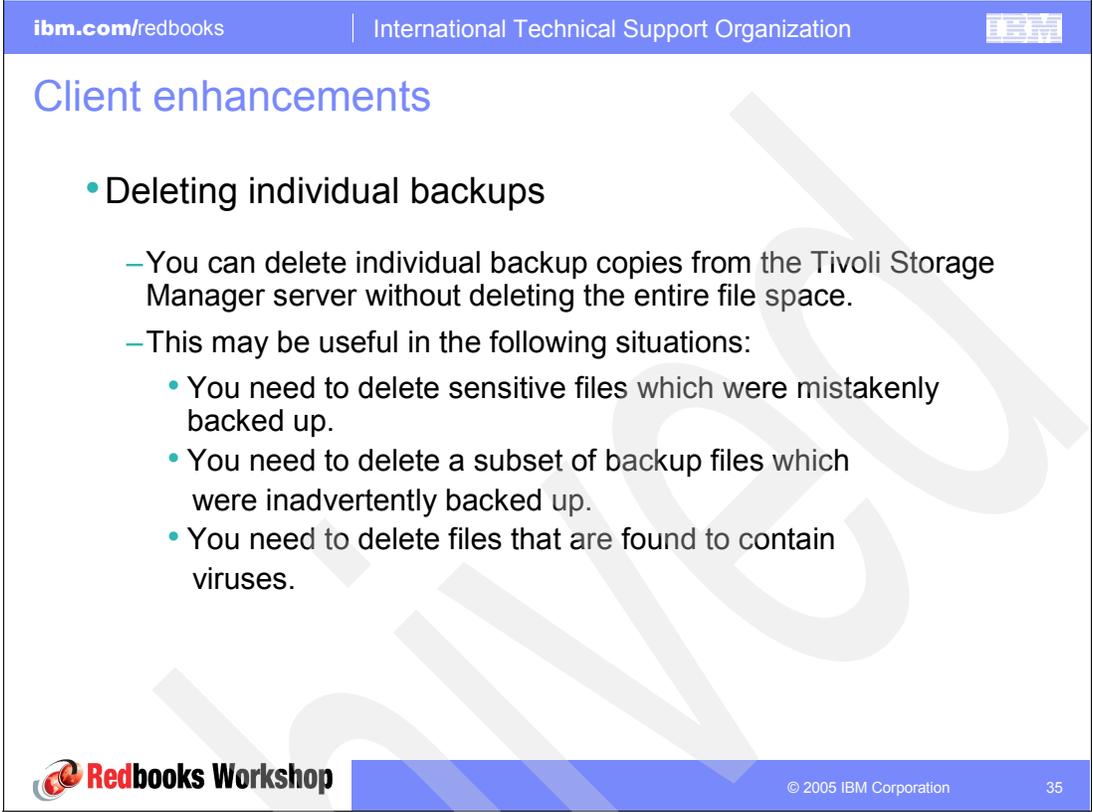


Figure 3-4 Client GUI directory detailed information

The Tivoli Storage Manager Client graphic user interface (GUI) directory tree shows detailed information about the included and excluded objects. To view this information, select **View** → **File details...** from the Web or Java™ client interface. This opens the Information window shown in Figure 3-4.

3.2 Deleting individual backups



The screenshot shows a web page from the IBM Redbooks Workshop. The header includes 'ibm.com/redbooks' and 'International Technical Support Organization'. The main heading is 'Client enhancements'. The sub-section is 'Deleting individual backups'. The content lists two main points: that individual backup copies can be deleted from the Tivoli Storage Manager server without deleting the entire file space, and that this is useful in three situations: deleting sensitive files mistakenly backed up, deleting a subset of backup files inadvertently backed up, and deleting files found to contain viruses. The footer contains the Redbooks Workshop logo, copyright information for 2005 IBM Corporation, and the page number 35.

ibm.com/redbooks | International Technical Support Organization

Client enhancements

- Deleting individual backups
 - You can delete individual backup copies from the Tivoli Storage Manager server without deleting the entire file space.
 - This may be useful in the following situations:
 - You need to delete sensitive files which were mistakenly backed up.
 - You need to delete a subset of backup files which were inadvertently backed up.
 - You need to delete files that are found to contain viruses.

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Figure 3-5 Deleting individual backups

If your administrator has given you authority, you can delete individual backup copies from the Tivoli Storage Manager server without deleting the entire file space.

If you use the client command-line interface (CLI), you can choose whether to delete active or inactive versions of files and images. A variety of options also support this task. Using *filelist*, you can specify the *fromdate* and *fromtime*. With the *pick* option, you can select the files that you want to delete.



Client enhancements

Delete individual backup copies

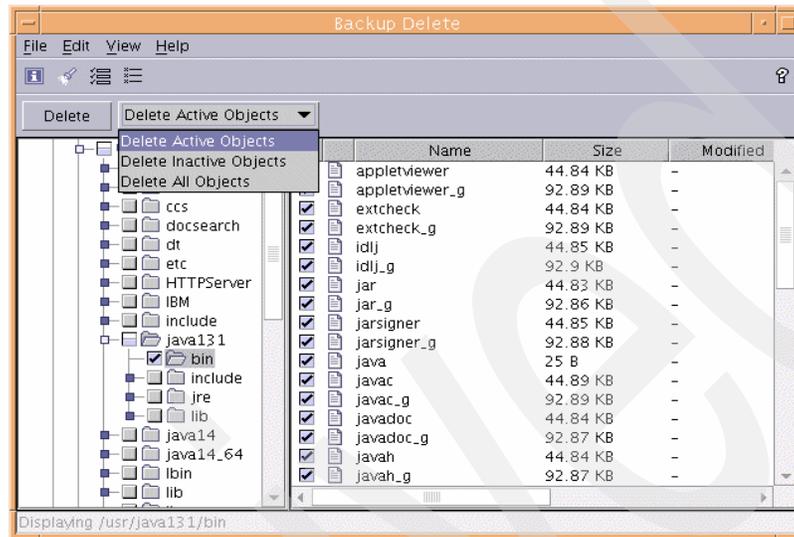


Figure 3-6 Window to delete individual backup copies

3.3 Optimized option default values

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Client enhancements

- Optimized option default values

Option	Old default	New default
diskbuffsize	N/A	Yes
largecommbuffers	Yes	Replaced by diskbuffsize
tcpadminport	N/A	Separate TCP port for admin session
tcpbuffsize	31 (KB)	32 (KB)
tcpnodelay	No	Yes
tcpwindowsize	32 (KB)	63 (KB)

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Figure 3-7 Optimized option default values

The options are explained in the following list:

- ▶ **DISKBUFSIZE:** Allows you to specify the I/O buffer size (in KB) that the client may use to optimize backup, archive, or hierarchical storage management (HSM) client performance.

Recommendation: Use the default value instead of specifying the *diskbuffsize* option.

- ▶ **LARGECOMMBUFFERS:** This option has been replaced by the *diskbuffsize* option. At this time, *largecommbuffers* continue to be accepted by the Tivoli Storage Manager client to ease the transition to the new option. However, the value specified by *largecommbuffers* is ignored in favor of the *diskbuffsize* setting.

Recommendation: Discontinue the use of *largecommbuffers* because future releases of Tivoli Storage Manager might not accept this option.

- ▶ **TCPADMINPORT:** Specifies a separate TCP/IP port number on which the server is waiting for requests for administrative client sessions, allowing secure administrative sessions within a private network. If this option is not specified, the default value is the value of the *tcpport* option.

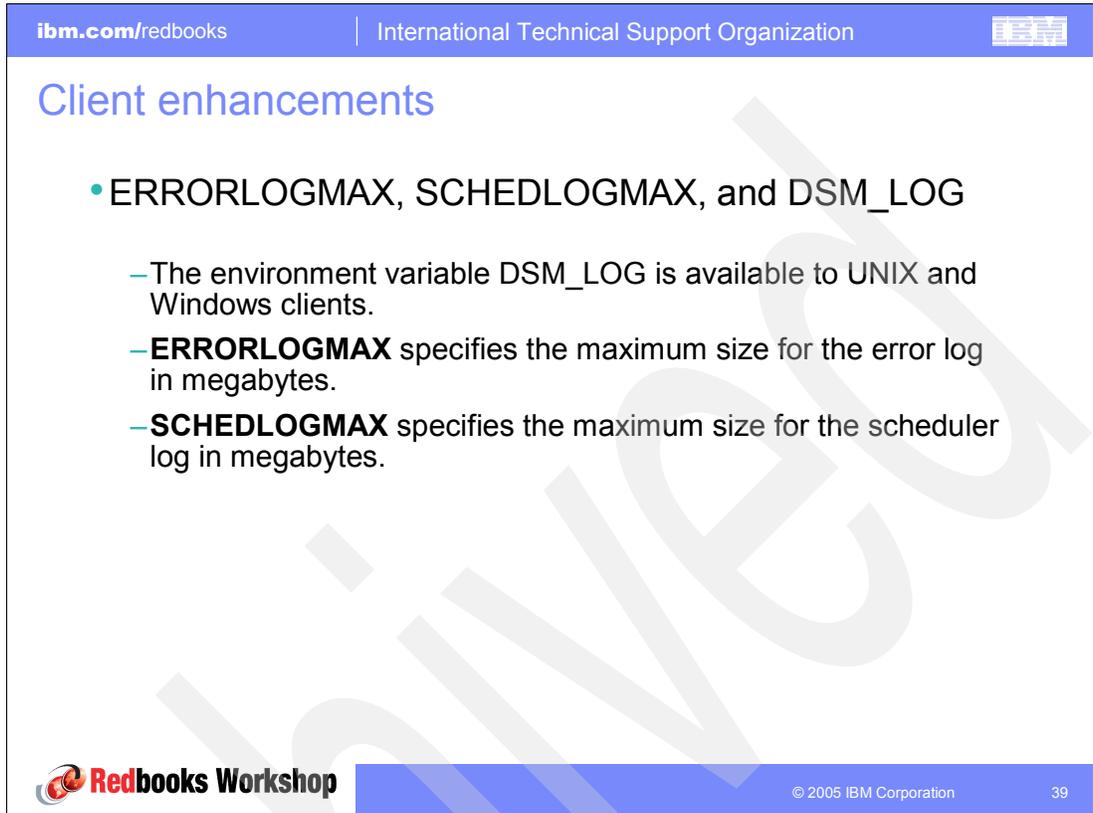
Note: This option does not apply to NetWare clients.

- ▶ **TCPBUFFSIZE:** The default value was changed from 31 KB to 32 KB.
- ▶ **TCPNODELAY:** The default value was changed from no to *yes*. *tcpnodelay yes* disables the TCP/IP Nagle algorithm. This algorithm is used to reduce the number of small segments sent across the network. However, in some environments, this might negatively impact Tivoli Storage Manager performance.

Recommendation: Use the default of *yes*, unless you fully understand the effects of the TCP/IP Nagle algorithm on network transmissions and how its use affects the performance of Tivoli Storage Manager in your environment.

- ▶ **TCPWINDOWSIZE:** The default value was changed from 32 KB to 63 KB.

3.4 ERRORLOGMAX, SCHEDLOGMAX, and DSM_LOG options



The screenshot shows a slide from an IBM Redbooks Workshop. The slide title is "Client enhancements". The main content is a bulleted list:

- **ERRORLOGMAX, SCHEDLOGMAX, and DSM_LOG**
 - The environment variable **DSM_LOG** is available to UNIX and Windows clients.
 - **ERRORLOGMAX** specifies the maximum size for the error log in megabytes.
 - **SCHEDLOGMAX** specifies the maximum size for the scheduler log in megabytes.

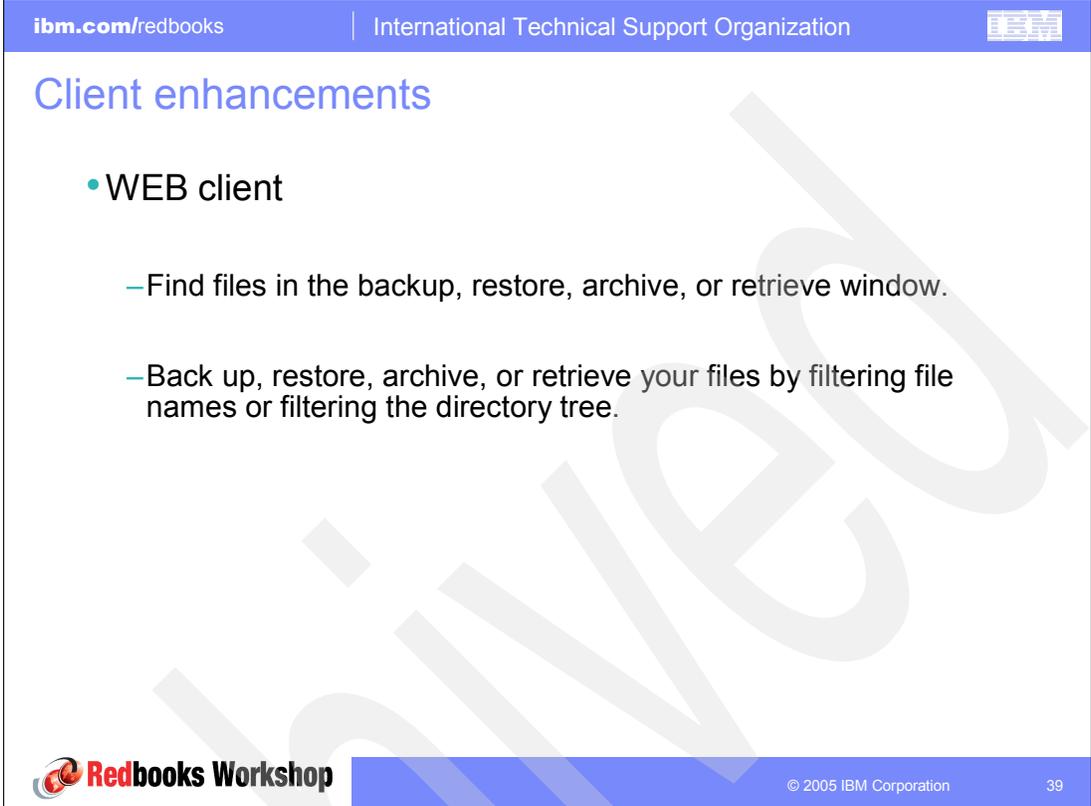
The slide footer includes the Redbooks Workshop logo, the text "© 2005 IBM Corporation", and the page number "39".

Figure 3-8 *ERRORLOGMAX, SCHEDLOGMAX, DSM_LOG*

DSM_LOG environment variable changes have been made to prevent a security or data integrity problem. Logs are no longer created in the installation directory. In addition, if the client is unable to open a required log for writing, the client process terminates. The Tivoli Storage Manager command line client, the Web client acceptor, and the agent do not run without a writable `dsmerror.log`.

Note: The environment variable `DSM_LOG` does not apply to NetWare clients.

3.5 WEB client



The screenshot shows a web page with a blue header containing the URL 'ibm.com/redbooks' and the text 'International Technical Support Organization'. The main content area is white and features the heading 'Client enhancements' in blue. Below this heading is a bulleted list of enhancements for the WEB client. The footer of the page is blue and contains the 'Redbooks Workshop' logo, the copyright notice '© 2005 IBM Corporation', and the page number '39'. A large, light gray watermark reading 'ARCHIVED' is overlaid diagonally across the page.

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Client enhancements

- WEB client
 - Find files in the backup, restore, archive, or retrieve window.
 - Back up, restore, archive, or retrieve your files by filtering file names or filtering the directory tree.

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Figure 3-9 WEB client enhancements



Client enhancements

Enhanced WEB client GUI

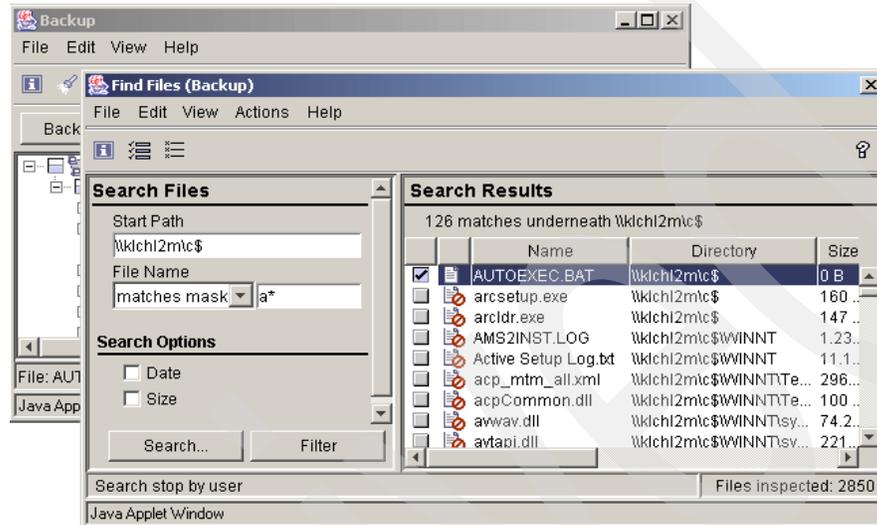
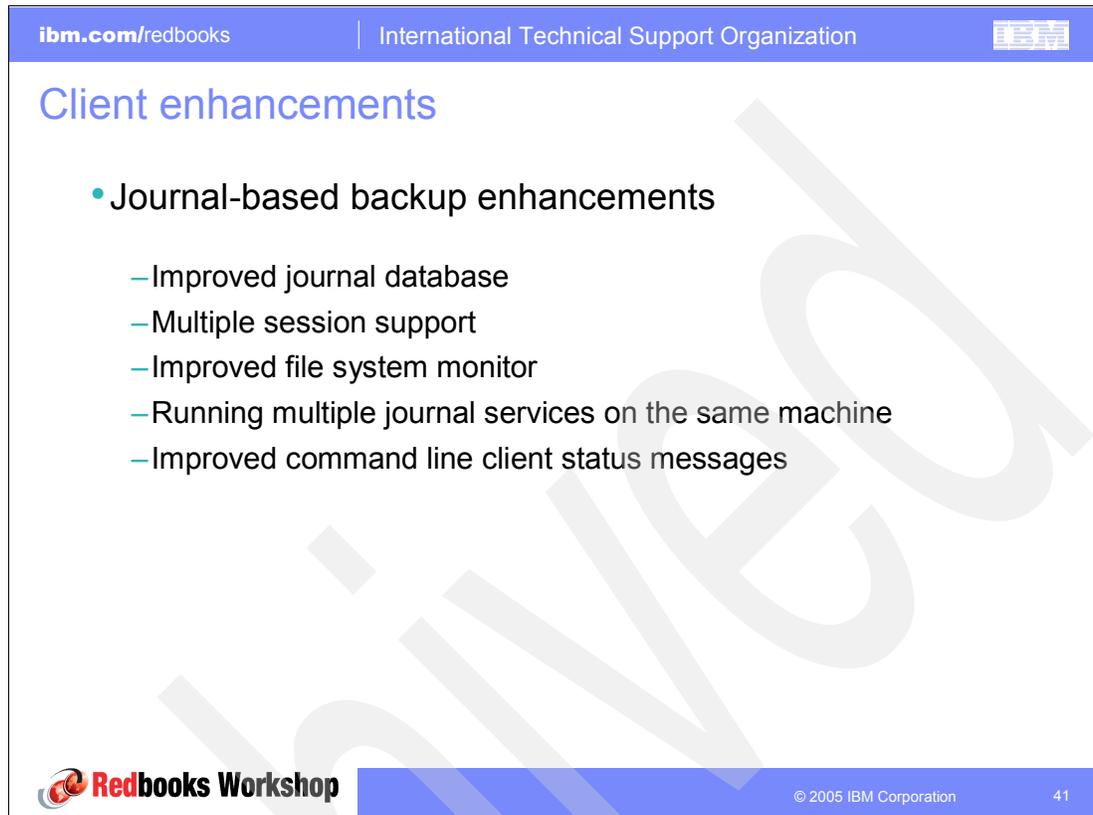


Figure 3-10 WEB client GUI example

Back up, restore, archive, or retrieve your files by filtering file names or filtering the directory tree. This is done in the same window as the search but by clicking Filter instead of Search.

3.6 Journal-based backup enhancements



The screenshot shows a presentation slide with a blue header bar containing 'ibm.com/redbooks' and 'International Technical Support Organization'. The main title is 'Client enhancements'. A bulleted list highlights 'Journal-based backup enhancements' with sub-points: 'Improved journal database', 'Multiple session support', 'Improved file system monitor', 'Running multiple journal services on the same machine', and 'Improved command line client status messages'. The footer includes the 'Redbooks Workshop' logo, '© 2005 IBM Corporation', and the page number '41'.

- Journal-based backup enhancements
 - Improved journal database
 - Multiple session support
 - Improved file system monitor
 - Running multiple journal services on the same machine
 - Improved command line client status messages

Figure 3-11 Journal-based backup enhancements

There are several significant improvements to journal-based backup, which come with Version 5.3.

Improved journal database

A BTREE-based journal database has been implemented in this release to replace the previous ISAM based database. The new database removes the 2 GB database size limitation and is more reliable than the previous database.

Each entry in the new database is approximately 4 KB so the size of journal databases may be easily estimated for file systems with a known amount of change activity. The new database also has the advantage of reclaiming occupied disk space when all entries in the database have been deleted, as is done during a full incremental or journal-based backup.

Multiple session support

Multiple concurrent journal-based backup sessions are supported in this release. Multiple backup sessions are created by a single backup client via the ResourceUtilization option, or by running multiple instances of a backup client.

Improved file system monitor

The journal daemon file system monitor has been rewritten to fix problems described in APAR IC40140 and to better accommodate high levels of file system change activity. The new file system monitor should significantly reduce the likelihood of notification buffer overflows generated as a result of high file system activity.

The new default aggregate size of the notifications buffers for each journal file system is 3 MB. This should be sufficient for most environments.

Running multiple journal services on the same machine

Multiple journal services may be installed on the same machine by using the new `JournalPipe` client option and `Journal` service configuration setting.

Note: Journaling the same file system with multiple journal services may produce unpredictable results. Each journal service should be configured to journal different file systems.

Improved command line client status messages

The command-line client status messages have been improved to provide additional information.

JournalPipe

The `JournalPipe` option is used in conjunction with the `backup` client option of the same name to specify the pipe name of the journal daemon session manager which backup the client initially connect to when establishing a journal based backup session.

Note: The same pipename must be specified for the client *JournalPipe* option.

This setting allows you to run multiple instances of the journal daemon. Each journal daemon must specify a different pipename. The default pipename is `\\.\pipe\jnlServer`.

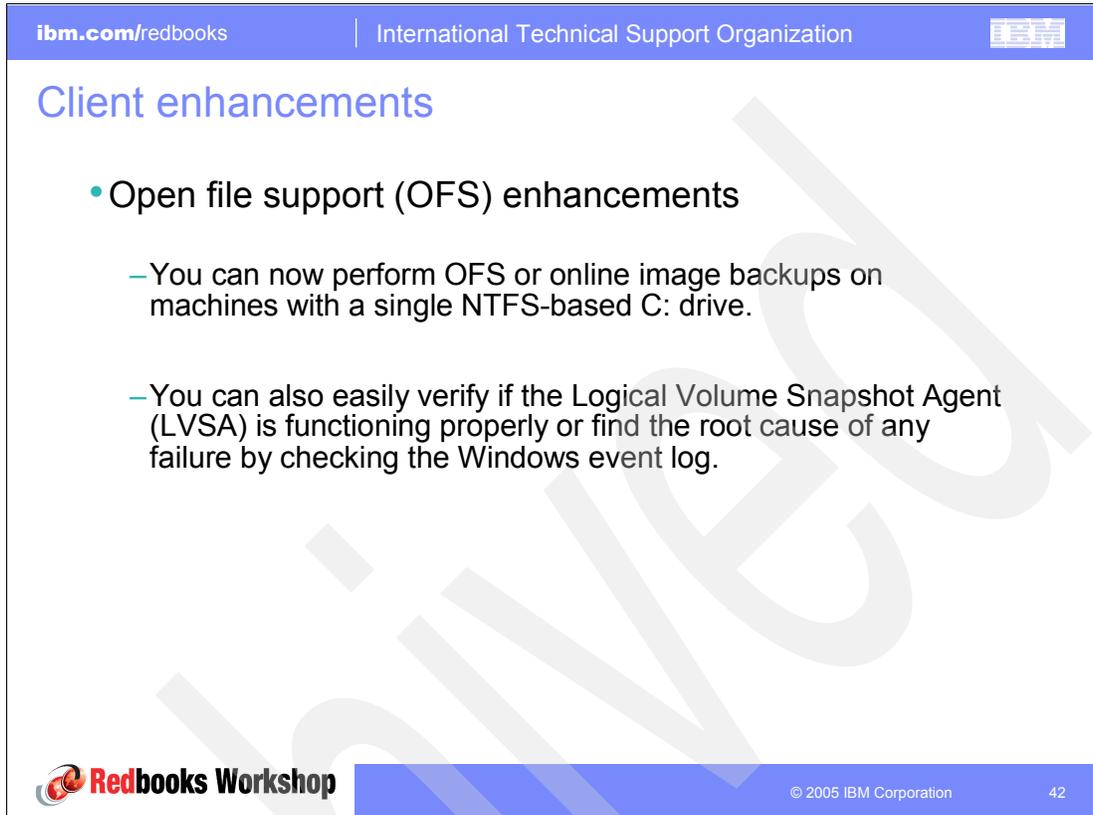
For example in `tsmjbdd.ini`, you might write:

```
[JournalSettings]
JournalPipe= \\.\pipe\jnlServer1
```

In another example for `dsm.opt`, you might use:

```
JournalPipe \\.\pipe\jnlServer1
```

3.7 Open file support enhancements



The screenshot shows a slide from an IBM Redbooks Workshop. The slide has a blue header with the text 'ibm.com/redbooks' on the left and 'International Technical Support Organization' on the right. Below the header, the title 'Client enhancements' is displayed in blue. The main content area is white and contains a bulleted list of enhancements. At the bottom of the slide, there is a blue footer with the 'Redbooks Workshop' logo on the left, the copyright notice '© 2005 IBM Corporation' in the center, and the page number '42' on the right.

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Client enhancements

- Open file support (OFS) enhancements
 - You can now perform OFS or online image backups on machines with a single NTFS-based C: drive.
 - You can also easily verify if the Logical Volume Snapshot Agent (LVSA) is functioning properly or find the root cause of any failure by checking the Windows event log.

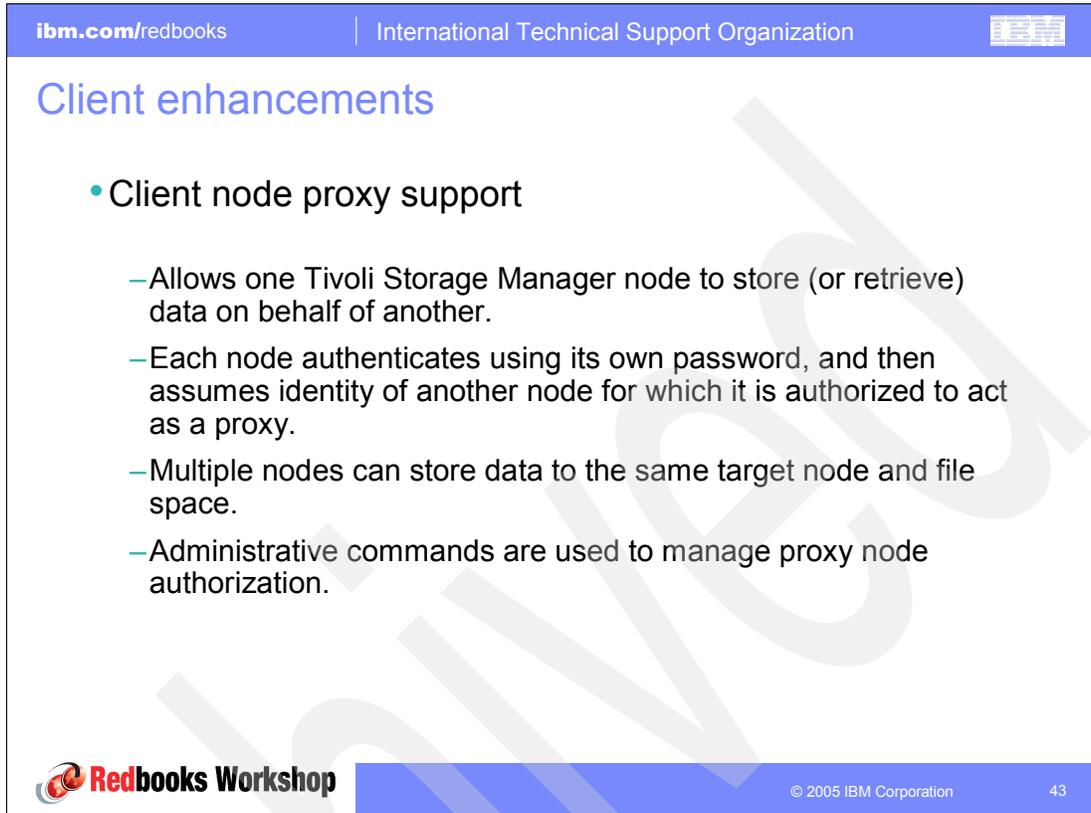
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Figure 3-12 Open file support enhancements

Logical Volume Snapshot Agent (LVSA), Tivoli Storage Manager's snapshot solution, is used for online image backup and OFS on a Microsoft Windows® client.

- ▶ Files on Windows are no longer skipped from backup when locked from backup or archive.
- ▶ Users have the ability to use pre-snapshot and post-snapshot commands that allow them to quiesce any application prior to the start of the backup.
- ▶ OFS works with both the subfile and the journal-based backup.

3.8 Client node proxy support



The screenshot shows a slide from an IBM Redbooks Workshop. The slide title is 'Client enhancements' and the sub-section is 'Client node proxy support'. The slide contains a bulleted list of four points describing the proxy support feature. The slide footer includes the Redbooks Workshop logo, the copyright notice '© 2005 IBM Corporation', and the page number '43'.

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Client enhancements

- Client node proxy support
 - Allows one Tivoli Storage Manager node to store (or retrieve) data on behalf of another.
 - Each node authenticates using its own password, and then assumes identity of another node for which it is authorized to act as a proxy.
 - Multiple nodes can store data to the same target node and file space.
 - Administrative commands are used to manage proxy node authorization.

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Figure 3-13 Client node proxy support

Backup time can be reduced, and clustered configurations can store data with client node proxy support. Tivoli Storage Manager nodes, when authorized (**grant proxynode**) as agent nodes, can be directed to back up or restore data on behalf of another node (the target node). This enables concurrent operations from multiple nodes to store data to the same target node and file space in parallel.

Use the **asnodename** option with the appropriate command to back up, archive, restore, and retrieve data under the target node name on the Tivoli Storage Manager server. This support is available only with the Tivoli Storage Manager Version 5.3 or later server and client. To enable this option, follow these steps:

1. Install the backup-archive client on all nodes in a shared data environment.
2. Register each node with the Tivoli Storage Manager server, if it does not exist. Register the common target node name to be shared by each agent node used in your shared data environment.
3. Register each of the nodes in the shared data environment with the Tivoli Storage Manager server. This is the agent node name which is used for authentication purposes. Data is not stored using the node name when the **asnodename** option is used.
4. The Tivoli Storage Manager administrator must grant proxy authority to all nodes in the shared environment to access the target node name on the Tivoli Storage Manager server, using the **grant proxynode** command.
5. Use the **query proxynode** administrative client command to display the authorized user's client nodes, granted by the **grant proxynode** command.

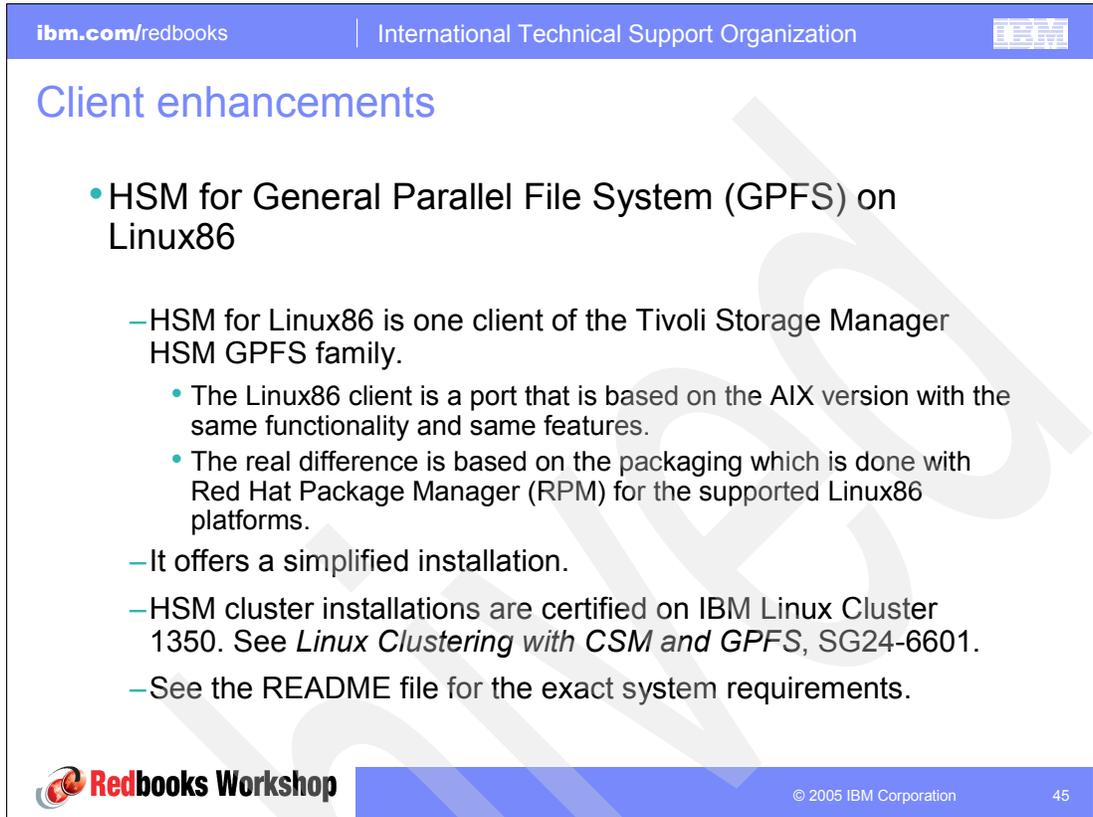
Consider these suggestions:

- ▶ All agent nodes in the multiple node environment should be of the same platform type.
- ▶ Do not use target nodes as traditional nodes. Use them only for multiple node processing.

The following restrictions are enforced within a proxied session:

- ▶ You cannot access another node (either from the GUI drop-down or use of the *fromnode* option).
- ▶ You cannot use the *clusternode* option.
- ▶ You cannot use the *enableserverfree* option.
- ▶ You cannot perform network-attached storage (NAS) backup or restore.

3.9 HSM for GPFS on Linux86



The screenshot shows a slide from an IBM Redbooks Workshop. The slide title is "Client enhancements". The main bullet point is "HSM for General Parallel File System (GPFS) on Linux86". Below this, there are several sub-bullets: "HSM for Linux86 is one client of the Tivoli Storage Manager HSM GPFS family.", "The Linux86 client is a port that is based on the AIX version with the same functionality and same features.", "The real difference is based on the packaging which is done with Red Hat Package Manager (RPM) for the supported Linux86 platforms.", "It offers a simplified installation.", "HSM cluster installations are certified on IBM Linux Cluster 1350. See *Linux Clustering with CSM and GPFS*, SG24-6601.", and "See the README file for the exact system requirements." The slide footer includes the Redbooks Workshop logo, the copyright notice "© 2005 IBM Corporation", and the page number "45".

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Client enhancements

- HSM for General Parallel File System (GPFS) on Linux86
 - HSM for Linux86 is one client of the Tivoli Storage Manager HSM GPFS family.
 - The Linux86 client is a port that is based on the AIX version with the same functionality and same features.
 - The real difference is based on the packaging which is done with Red Hat Package Manager (RPM) for the supported Linux86 platforms.
 - It offers a simplified installation.
 - HSM cluster installations are certified on IBM Linux Cluster 1350. See *Linux Clustering with CSM and GPFS*, SG24-6601.
 - See the README file for the exact system requirements.

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Figure 3-14 HSM for GPFS on Linux86

Now there is not only one `dsmmigfstab` file in `/etc/adsm/SpaceMan/config` for all file systems, but one for each file system in `</fs>/SpaceMan`. The old one remains unchanged.

In addition, the failover mechanism has been improved in the area of eliminating single points of failures. HSM failover information is now stored in the GPFS repository. And - `dsmls` has been improved in regard to memory consumption when traversing deep file structures.

Installing the HSM client

Enter the following command to install the HSM client.

```
rpm -i TIVsm-HSM.i386.rpm
```

This command installs the command line and the IBM Tivoli Enterprise™ Space Management Console.

Note: The Tivoli Storage Manager application programming interface (API) and backup-archive packages are prerequisites of the HSM client package and must be installed prior to the HSM GPFS package.

Simplified installation

For an initial installation, perform the following the steps in the order shown.

1. Install Tivoli SpaceManager on each HSM node.
2. Define your Tivoli Storage Manager server and Tivoli Storage Manager client configuration in `dsm.sys` and `dsm.opt`.
3. Restart the HSM daemons using `dsmmigfs restart`.
4. After the installation, make sure that the `dsmreca1ld` daemon is up on at least one node.
5. Unmount all GPFS file systems on all nodes within the GPFS nodeset, that will be HSM managed.
6. Activate DMAPI management for these GPFS file systems:

```
mmchfs <device> -z yes
```
7. Remount all GPFS file systems on all nodes within the GPFS nodeset.
8. On the HSM session nodes, add HSM management to all desired GPFS file systems (`dsmmigfs add <fs>`). The installation process creates the following HSM-specific files for each GPFS node set and stores them in the GPFS internal repository:
 - DSMNodeset
 - DSMSDRVersionIt also starts the space management daemons.

For an upgrade from Tivoli SpaceManager 5.2.x, perform the following steps:

1. Ensure that all HSM nodes (session and backup) are in a consistent state and that all HSM-managed file systems are mounted on all HSM nodes.
2. Globally deactivate HSM on every node using:

```
dsmmigfs globaldeactivate
```
3. Disable failover on every node using:

```
dsmmigfs disablefailover
```
4. To know which node is a session node for which file system, save the output of the following command on one node.

```
dsmmigfs q -f'
```
5. Remove the Tivoli SpaceManager from all nodes following the instruction in the README file.
6. Install Tivoli SpaceManager on all nodes as explained earlier.
7. Globally reactivate HSM on every node using this command:

```
dsmmigfs globalreactivate
```
8. Enable failover on every node using the command:

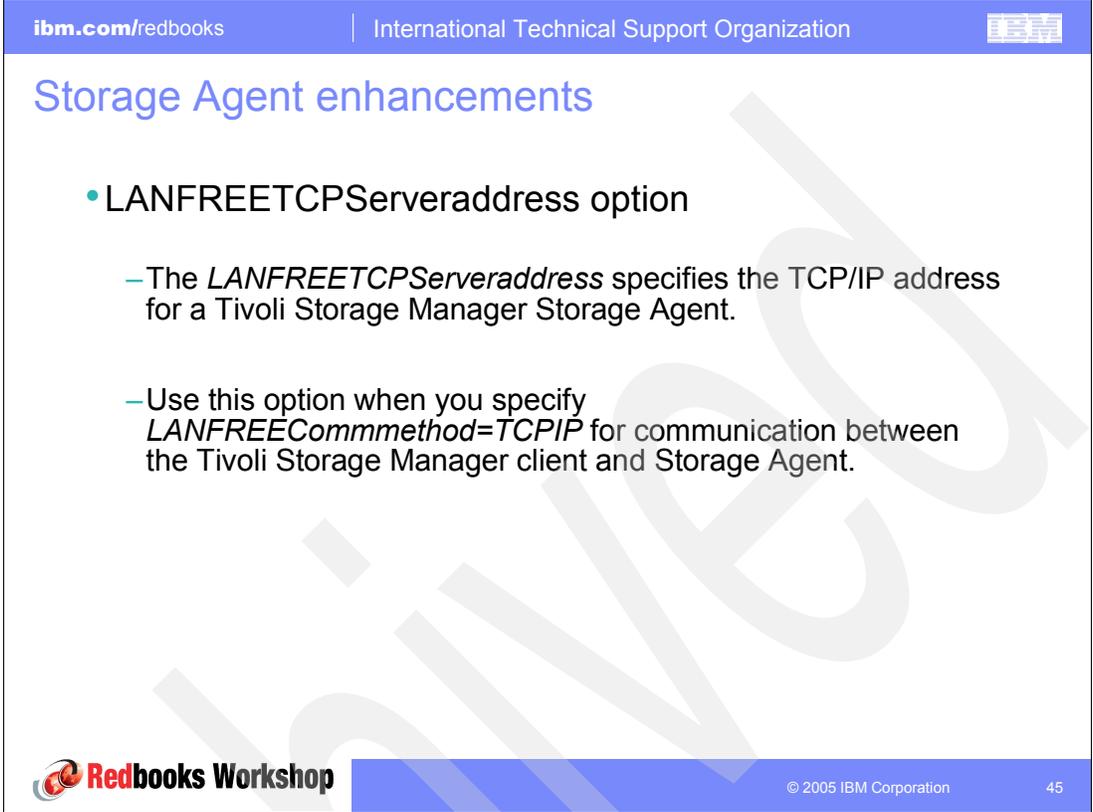
```
dsmmigfs enablefailover
```
9. Take over each file system on its session node as it is known in step 4.

To start, stop, or restart daemons (for example to let them update the configuration set in `dsm.opt` and `dsm.sys`), perform the following command, specifying the correct start, stop, or restart function:

```
dsmmigfs start/stop/restart
```

Note: The daemons are started with the same environment as `dsmwatchd`, meaning that `dsm.opt` and `dsm.sys` in the default installation path `/opt/tivoli/tsm/client/ba/bin` are used.

3.10 Storage agent enhancements



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Storage Agent enhancements

- LANFREETCPServeraddress option
 - The *LANFREETCPServeraddress* specifies the TCP/IP address for a Tivoli Storage Manager Storage Agent.
 - Use this option when you specify *LANFREECommmethod=TCPIP* for communication between the Tivoli Storage Manager client and Storage Agent.

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Figure 3-15 LANFREETCPServeraddress option

The *LANFREETCPServeraddress* is a new client option that specifies the TCP/IP address for a IBM Tivoli Storage Manager Storage Agent. Use this option when you specify *LANFREECommmethod=TCPIP* for communication between the Tivoli Storage Manager client and Storage Agent. Overriding the default for this option is useful when configuring LAN-free in an environment where the client and storage agent are running on different systems. You can obtain this Storage Agent address from your administrator.



Storage Agent enhancements

Using the LANFREETCPServeraddress option

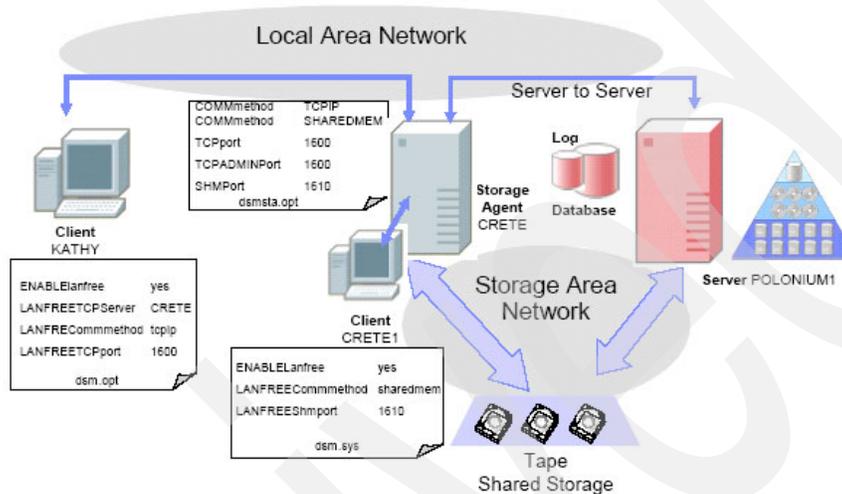


Figure 3-16 Using LANFREETCPServeraddress option

In our example, the two client nodes, KATHY and CRETE1, are registered on server POLONIUM1. The Storage Agent CRETE is defined as a server on the POLONIUM1 server. Tivoli Storage Manager client CRETE1 and Storage Agent CRETE are running on the same system and are connected via shared memory. Storage Agent CRETE has a storage area network (SAN) connection to the tape drives. The client CRETE1 can send its data LAN-free via the Storage Agent to the attached tape drives.

There is no longer a requirement for the client node and the storage agent to run on the same system. They can run on different systems, connected via a LAN with the Storage Agent acting as a remote storage agent for the node. In this case, it is possible for the node KATHY to send its data via a LAN to the Storage Agent, which then sends the data via a SAN to the storage device. The advantage of this setup is that it is possible to balance the workload between the server and storage agent.

Integrated Solutions Console and Administration Center

This chapter provides detailed information about the new Web interface for administrators, called the *Administration Center*. This new interface replaces the WEB Admin interface distributed with previous Tivoli Storage Manager servers.

The Administration Center is enhanced to help:

- ▶ Provide easier deployment and administration
- ▶ Improve personnel productivity
- ▶ Support the ability for you to use resources more efficiently

This chapter describes the Integrated Solutions Console (ISC) and the integration of the Tivoli Storage Manager Administration Center. By reading this chapter, you will learn about the benefits and underlying architecture of the new technology introduced with the ISC. In addition, you can follow the installation instructions and learn tips for interface navigation and problem determination. You will also learn how to back up and restore the Administration Center on UNIX and Windows platforms using Tivoli Storage Manager client functionality.

At the end of this chapter, you can review the current outlook on enhancements that are already planned for the Tivoli Storage Manager Administration Center. You will also see an overview about other products that are planning to become integrated into the ISC.

Note: The Tivoli Storage Manager Version 5.2 Administrative Web Interface has been made available for a limited time to support clients' migration activities to Tivoli Storage Manager Version 5.3. See the following links for details about the transition version of the Tivoli Storage Manager Administrative WEB Interface:

- ▶ UNIX, Linux, and Windows
<http://www.ibm.com/support/docview.wss?uid=swg24009569>
- ▶ z/OS®
<http://www.ibm.com/support/docview.wss?uid=swg24009574>



ISC and Administration Center

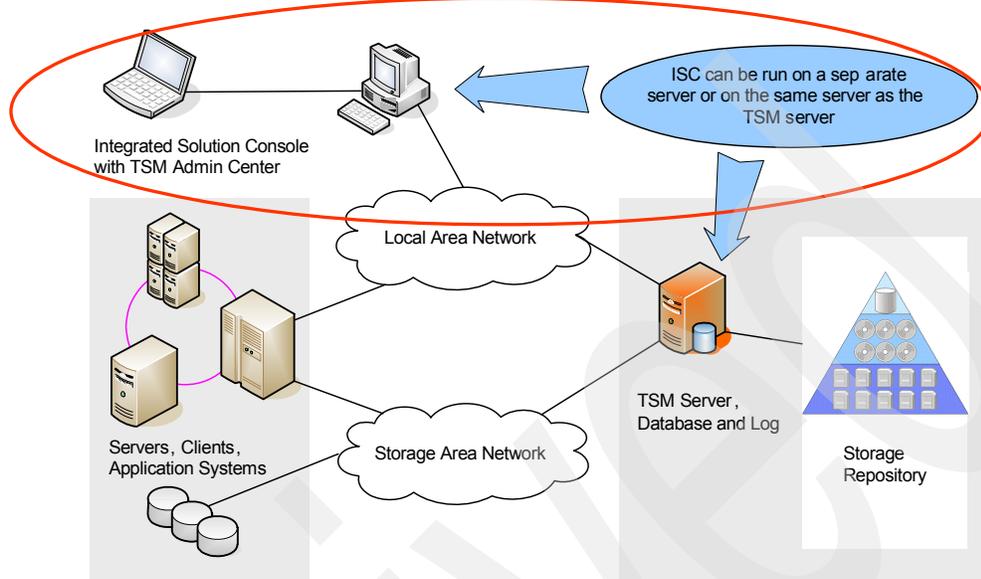


Figure 4-1 Tivoli Storage Manager components

4.1 The Integrated Solutions Console

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Integrated Solutions Console



- Paradigm shift
 - Object-oriented UI -> Task-oriented UI
 - Makes using and learning Tivoli Storage Manager easier than ever
 - Better, more modern look and feel
 - Provides a common look and feel across Tivoli products
 - Allows for future integration with other IBM, Tivoli, and Tivoli storage products
 - Uses the centralized WebSphere and ISC credential vault

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Figure 4-2 Paradigm shift for the administrative GUI

Improved ease of use has been the top requirement of our clients. In responding to this requirement, IBM conducted extensive user interviews to develop an interface that better supports common configuration and administration tasks. Moving to the Integrated Solutions Console provides a framework that allows for further improvements in the future and better integration with other Tivoli and IBM products

The ISC framework is an autonomic computing technology that helps IT administrators by aggregating various user interfaces into a single console or “dashboard”. The implementation of ISC accelerates software deployment, reduces the cost of ownership, and simplifies product usability by establishing a consistent look, feel, and behavior across administrative functions.

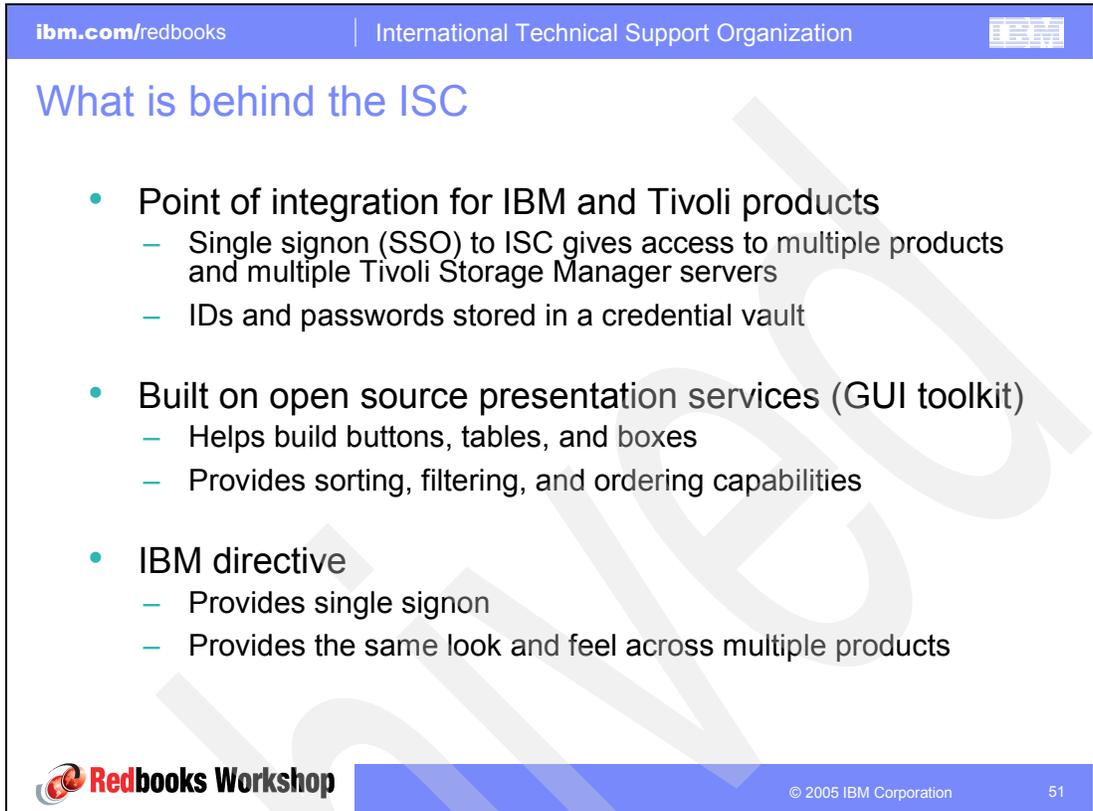
The ISC framework provides:

- ▶ Built-in user case scenarios that facilitate the creation of plug-ins of real-life systems
- ▶ A framework for easy instrumentation of non-IBM products into the ISC console
- ▶ A framework for building monitors on the fly for both Java-enabled and non-Java enabled applications
- ▶ Easy ways to roll up information and widgets that make it easy to display information
- ▶ Ease of use functionality by non-technical personnel, since the navigation is Information Technology Infrastructure Library (ITIL) based, which is a process and a standard that most people understand

The Administration Center replaces completely the administrative Web interface. The administrative Web interface is no longer supported and an error message is displayed if you try to access it. Keep in mind that you cannot use the Administration Center to manage Tivoli Storage Manager servers prior to version 5.3.

You can install the ISC, along with the Administration Center, on the same system as a Tivoli Storage Manager server if the system meets the combined requirements for both applications. If you plan to use the Administration Center to manage an environment with a large number of servers or administrators, consider installing the Administration Center on a separate system.

4.2 What is behind the ISC



The screenshot shows a slide from an IBM Redbooks Workshop. The slide has a blue header with the text 'ibm.com/redbooks' on the left, 'International Technical Support Organization' in the center, and a small IBM logo on the right. Below the header, the title 'What is behind the ISC' is displayed in blue. The main content consists of three bullet points, each with a sub-bullet. At the bottom of the slide, there is a blue footer containing the 'Redbooks Workshop' logo on the left, the copyright notice '© 2005 IBM Corporation' in the center, and the page number '51' on the right.

- Point of integration for IBM and Tivoli products
 - Single signon (SSO) to ISC gives access to multiple products and multiple Tivoli Storage Manager servers
 - IDs and passwords stored in a credential vault
- Built on open source presentation services (GUI toolkit)
 - Helps build buttons, tables, and boxes
 - Provides sorting, filtering, and ordering capabilities
- IBM directive
 - Provides single signon
 - Provides the same look and feel across multiple products

Figure 4-3 What is behind the ISC

The Integrated Solutions Console is a component framework that allows you to install components provided by multiple IBM applications and access them from a single Web interface. For example, the Administration Center is installed as an ISC component.

When you install the Integrated Solutions Console, you are prompted to create a user ID and password. These credentials allow you to log into the Integrated Solutions Console and access the Administration Center. In the Administration Center, Tivoli Storage Manager administrator credentials are used only when adding server connections. After server connections are added, you can access all of these servers by logging into the Integrated Solutions Console.

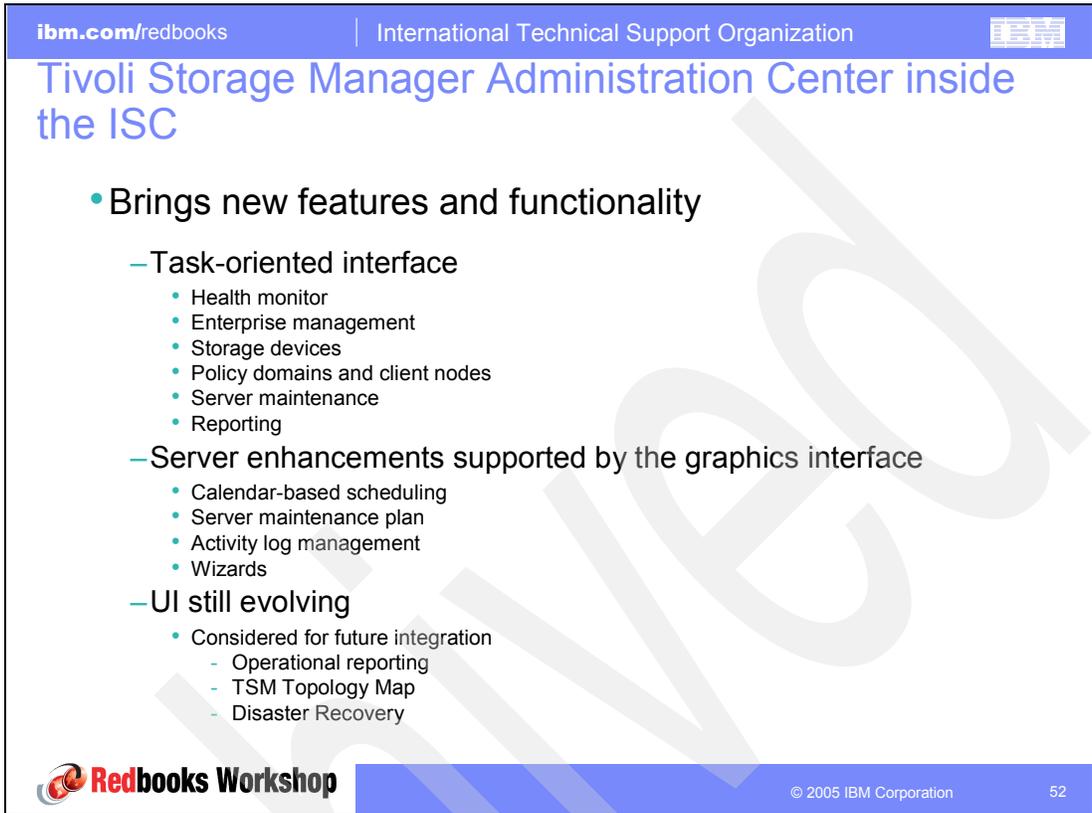
As a best practice, create a separate Integrated Solutions Console user ID for each Tivoli Storage Manager administrator. If you add a new user ID to the Tivoli Storage Manager Administration Center group, the user has access to all Administration Center functions, but is not authorized to add other users to the Integrated Solutions Console. After logging into the Integrated Solutions Console, each administrator must use their own Tivoli Storage Manager administrator credentials to add connections for the servers they will manage. In effect, this provides each administrator with a custom interface, which contains only the servers for which they have authority. It also allows them to perform only the tasks allowed by their privilege class.

Any administrator with an Integrated Solutions Console user ID can log in and use their Tivoli Storage Manager administrator credentials to add connections for the servers they manage. The administrator credentials used to add a server connection determine the privilege class that applies for the tasks performed on that server. As a best practice, create a separate Integrated Solutions Console user ID for each Tivoli Storage Manager administrator.

The Administration Center requires unique Tivoli Storage Manager server names. We recommend that you use unique names for your Tivoli Storage Manager servers as a best practice. The Administration Center enforces this practice for the following reasons:

- ▶ Several Administration Center features rely on server-to-server communications, which requires unique server names.
- ▶ Because the Administration Center allows you to work with multiple servers from a single interface, using unique names helps to avoid confusion.

4.3 Administration Center within the ISC



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Tivoli Storage Manager Administration Center inside the ISC

- Brings new features and functionality
 - Task-oriented interface
 - Health monitor
 - Enterprise management
 - Storage devices
 - Policy domains and client nodes
 - Server maintenance
 - Reporting
 - Server enhancements supported by the graphics interface
 - Calendar-based scheduling
 - Server maintenance plan
 - Activity log management
 - Wizards
 - UI still evolving
 - Considered for future integration
 - Operational reporting
 - TSM Topology Map
 - Disaster Recovery

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Figure 4-4 ISC and the Administration Center

You only need to log in once to access multiple Tivoli Storage Manager servers from a single interface.

You can easily monitor the health of your storage environment. Regular status updates are provided for:

- ▶ Scheduled events
- ▶ The server database and recovery log (using rules based on best practices)
- ▶ Storage devices, including information about offline drives and paths, and mounted volumes

You can filter and sort storage objects, such as client nodes and library volumes. And you can use wizards to perform complex tasks more easily, such as:

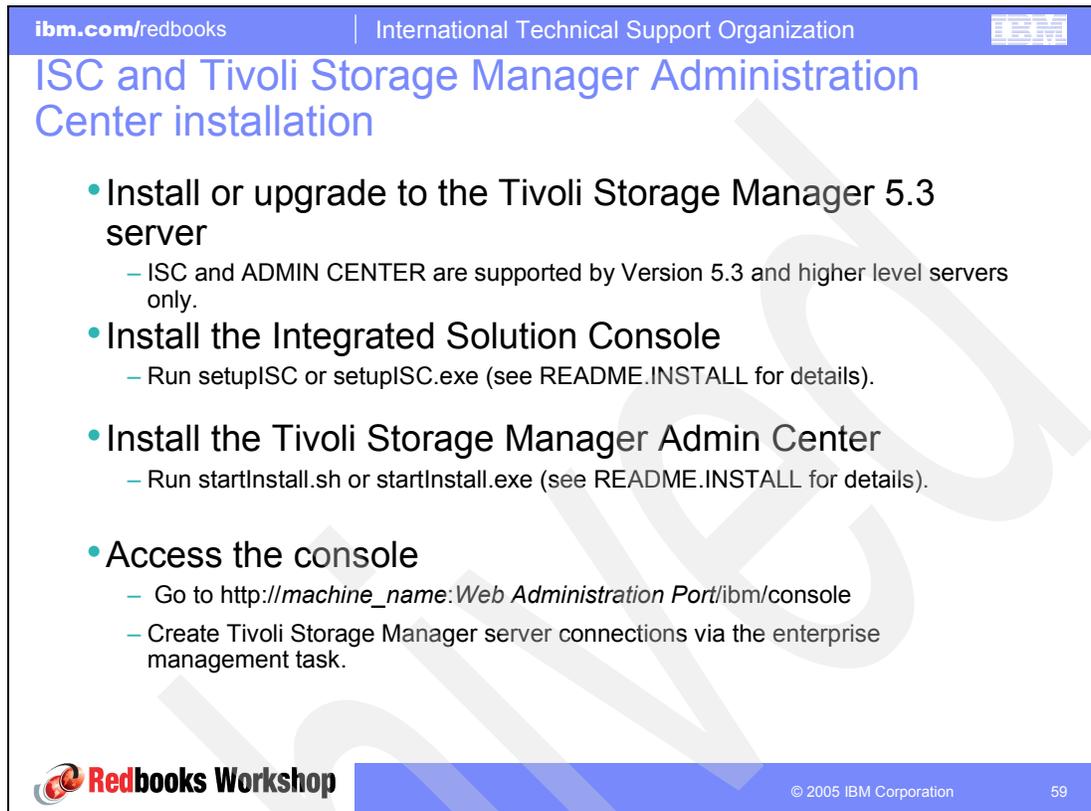
- ▶ Creating schedules to perform client node and administrative operations
- ▶ Creating a server maintenance script to perform database and storage pool backup, migration, expiration, and reclamation
- ▶ Configuring storage devices

A comprehensive wizard helps you create a library, add drives, check in media volumes, and create storage pools.

Consider the following example of simplifying the process of configuring and managing policies has been approached. The Administration Center does not expose policy sets. Instead, you always work with the active policy set. Any changes that you make to management classes are immediately activated, without additional effort on your part.

The Administration Center supports most of the functions provided by the current product version. However, there are some exceptions. For example, Disaster Recovery Management is not supported with the Tivoli Storage Manager Version 5.3.0. It had to be configured and managed as today using the command-line interface (CLI). The Disaster Recovery Management support becomes available with Version 5.3.2 of Administration Center. The Administration Center enhancements will be changed to implement new or missing functions with successive versions.

4.4 ISC and Administration Center installation



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ISC and Tivoli Storage Manager Administration Center installation

- Install or upgrade to the Tivoli Storage Manager 5.3 server
 - ISC and ADMIN CENTER are supported by Version 5.3 and higher level servers only.
- Install the Integrated Solution Console
 - Run setupISC or setupISC.exe (see README.INSTALL for details).
- Install the Tivoli Storage Manager Admin Center
 - Run startInstall.sh or startInstall.exe (see README.INSTALL for details).
- Access the console
 - Go to `http://machine_name:Web Administration Port/ibm/console`
 - Create Tivoli Storage Manager server connections via the enterprise management task.

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Figure 4-5 ISC and Administration Center installation

Tivoli Storage Manager Server 5.3 ships with three CDs:

- ▶ One CD with the Tivoli Storage Manager server code
- ▶ One CD with the Integrated Solutions Console code
- ▶ One CD with the Tivoli Storage Manager Administration Center

The server must have the `dsmscmd.xml` file installed. Some platforms, such as AIX, place this file into a separate install package. In addition, UTF-8 support is available for the code page that the server is running. Otherwise you see conversion problems on the server and a crashing Web interface. For the most current information about Administration Center requirements, see the Tivoli Storage Manager Version 5.3 support site at:

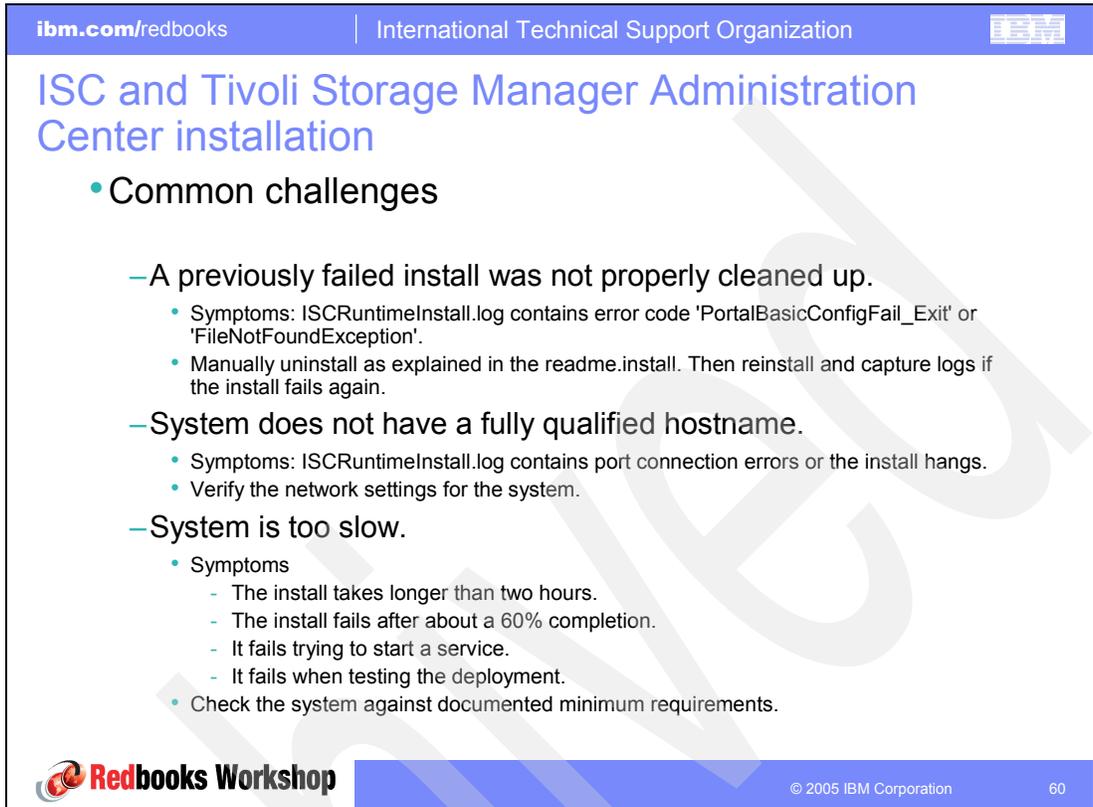
<http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManagerVersionRelease.html>

During installation of the ISC, be prepared to provide the following information:

- ▶ Password for the ISC administrative user: `adminPass`
- ▶ Verification password for the ISC administrative user: `verifyPass`
- ▶ Web Administration Port: `webAdminPort`
- ▶ Secure Web Administration Port: `secureAdminPort`
- ▶ Location of the Installation Media: `installMediaLocation`
- ▶ Installation Target Location: `installLocation`

For an explanation of the installation steps, see *IBM Tivoli Storage Management Version 5.3 Technical Guide*, SG24-6638.

4.5 ISC and Administration Center installation challenges



The slide is a presentation slide from IBM Redbooks. It has a blue header bar with the text 'ibm.com/redbooks' on the left, 'International Technical Support Organization' in the center, and a small IBM logo on the right. The main title is 'ISC and Tivoli Storage Manager Administration Center installation' in blue. Below the title is a section header 'Common challenges' with a red bullet point. There are three main bullet points, each starting with a red dash: 'A previously failed install was not properly cleaned up.', 'System does not have a fully qualified hostname.', and 'System is too slow.'. Each of these has sub-bullet points. The bottom of the slide features a blue footer bar with the 'Redbooks Workshop' logo on the left, '© 2005 IBM Corporation' in the center, and the number '60' on the right.

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ISC and Tivoli Storage Manager Administration Center installation

- Common challenges
 - A previously failed install was not properly cleaned up.
 - Symptoms: ISCRuntimeInstall.log contains error code 'PortalBasicConfigFail_Exit' or 'FileNotFoundException'.
 - Manually uninstall as explained in the readme.install. Then reinstall and capture logs if the install fails again.
 - System does not have a fully qualified hostname.
 - Symptoms: ISCRuntimeInstall.log contains port connection errors or the install hangs.
 - Verify the network settings for the system.
 - System is too slow.
 - Symptoms
 - The install takes longer than two hours.
 - The install fails after about a 60% completion.
 - It fails trying to start a service.
 - It fails when testing the deployment.
 - Check the system against documented minimum requirements.

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Figure 4-6 ISC and Administration Center installation challenges

After you review the recommendations on this slide, if you find that they don't apply to your case or you still have installation problems, contact IBM Support. The following slides provide information about the documentation that is available for further assistance.

4.6 ISC installation logs

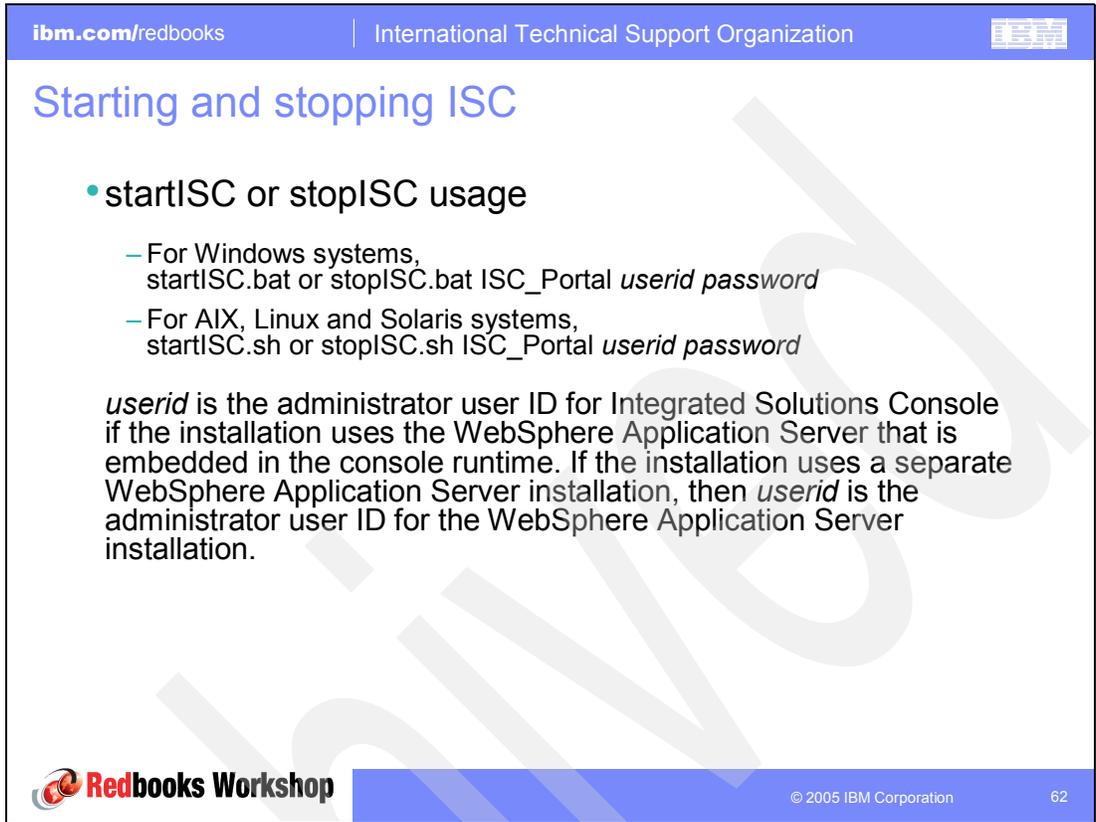
Filename	Description	Symptoms	Location
ISCRuntimeInstall.log	Contains messages for the ISC Runtime installation.	Check this log if the ISC Runtime installation failed.	These logs are located in the operating system temporary directory. For Windows, this is the value of the %TEMP% system variable. For all other systems, this is the /tmp directory.
ISCRuntimeUninstall.log	Contains trace output for the runtime uninstall program.	Check this log if the runtime uninstall failed. Look for messages that indicate that a command failed.	
EWASE.rsp	Contains the settings specified for the ISC Runtime installation.	Check this log and verify that the settings are correct if the installation was not successful.	
ac_install.log	Contains output from the ISC Runtime installation and Administration Center installation.	Check this log if the Administration Center installation failed or when the ISCRuntimeInstall.log does not exist.	This log is located in the isc_runtime_root/Tivoli/dsm/logs directory.
log.txt	Contains error messages for the ISMP installation wizards for both the ISC and the Administration Center.	Check this file to determine the value of the exception thrown. The exception error thrown helps to determine where the install failed.	This log is located in the installation root directory (isc_runtime_root).
vpd.properties	Contains information about previous installations of the ISC.	Open the file and search for the "PortalServer" section. It is preceded by the installation directory of the ISC.	See README.INSTALL for details about manipulating the vpd properties on Windows and UNIX systems.

Figure 4-7 ISC installation logs

For complete instructions about problem determination tips and documentation to collect before opening a call with IBM Software Support, see *IBM Tivoli Storage Manager Problem Determination Guide*, SC32-9103-01. Refer to the section about Administration Center. It includes information about:

- ▶ Tracing information
- ▶ Health Monitor internals
- ▶ Common failure points and solutions
- ▶ Integrating the publications CD with ISC

4.7 Starting and stopping the ISC



The screenshot shows a slide from an IBM Redbooks Workshop. The slide has a blue header with the text 'ibm.com/redbooks' and 'International Technical Support Organization'. The main title is 'Starting and stopping ISC'. Below the title, there is a bulleted list with two main items: 'startISC or stopISC usage'. Each item has a sub-bullet for Windows and AIX/Linux/Solaris systems, providing command syntax. A paragraph explains the 'userid' parameter. The footer includes the 'Redbooks Workshop' logo, copyright information '© 2005 IBM Corporation', and the page number '62'.

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Starting and stopping ISC

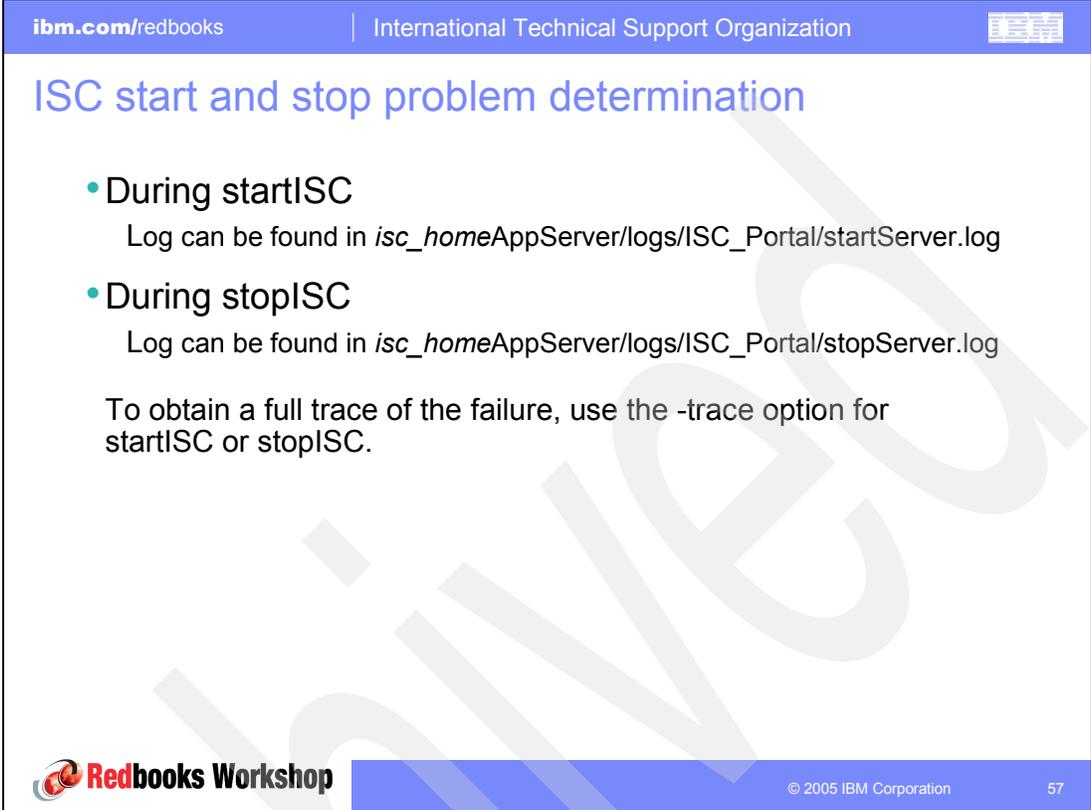
- startISC or stopISC usage
 - For Windows systems, startISC.bat or stopISC.bat ISC_Portal *userid password*
 - For AIX, Linux and Solaris systems, startISC.sh or stopISC.sh ISC_Portal *userid password*

userid is the administrator user ID for Integrated Solutions Console if the installation uses the WebSphere Application Server that is embedded in the console runtime. If the installation uses a separate WebSphere Application Server installation, then *userid* is the administrator user ID for the WebSphere Application Server installation.

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Figure 4-8 Starting and stopping ISC

4.8 ISC start and stop problem determination



The screenshot shows a web page with a blue header containing 'ibm.com/redbooks' and 'International Technical Support Organization'. The main content area has a blue title 'ISC start and stop problem determination'. Below the title, there are two bullet points: 'During startISC' with a sub-point 'Log can be found in `isc_homeAppServer/logs/ISC_Portal/startServer.log`' and 'During stopISC' with a sub-point 'Log can be found in `isc_homeAppServer/logs/ISC_Portal/stopServer.log`'. A paragraph follows: 'To obtain a full trace of the failure, use the `-trace` option for `startISC` or `stopISC`.' The footer includes the 'Redbooks Workshop' logo, '© 2005 IBM Corporation', and the page number '57'.

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ISC start and stop problem determination

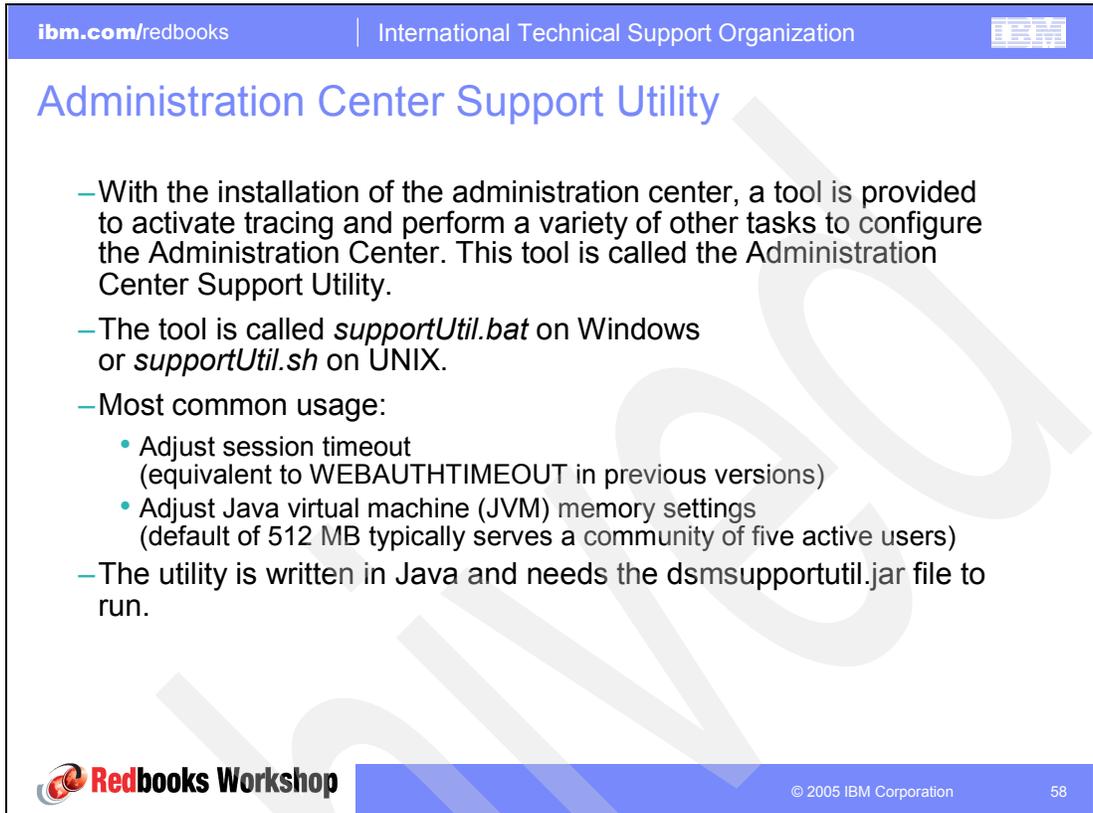
- During startISC
 - Log can be found in `isc_homeAppServer/logs/ISC_Portal/startServer.log`
- During stopISC
 - Log can be found in `isc_homeAppServer/logs/ISC_Portal/stopServer.log`

To obtain a full trace of the failure, use the `-trace` option for `startISC` or `stopISC`.

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Figure 4-9 ISC start and stop problem determination

4.9 Administration Center Support Utility



The screenshot shows a web page titled "Administration Center Support Utility" from the IBM Redbooks Workshop. The page header includes "ibm.com/redbooks" and "International Technical Support Organization". The main content is a list of bullet points describing the utility. The footer contains the "Redbooks Workshop" logo, "© 2005 IBM Corporation", and the page number "58".

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Administration Center Support Utility

- With the installation of the administration center, a tool is provided to activate tracing and perform a variety of other tasks to configure the Administration Center. This tool is called the Administration Center Support Utility.
- The tool is called *supportUtil.bat* on Windows or *supportUtil.sh* on UNIX.
- Most common usage:
 - Adjust session timeout (equivalent to WEBAUTHTIMEOUT in previous versions)
 - Adjust Java virtual machine (JVM) memory settings (default of 512 MB typically serves a community of five active users)
- The utility is written in Java and needs the *dsmsupportutil.jar* file to run.

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Figure 4-10 Invoking the Administration Center Support Utility

You can find the tool and the *dsmsupportutil.jar* file in *isc_homeTivoli/dsm/bin*.

In addition to setting the time out and memory size options, you can use the utility to activate traces and collect documentation for problem determination related to the Administration Center. Use this feature *only* on request by IBM Support.



Administration Center Support Utility

```
C:\Program Files\IBM\ISC\Tivoli\dsm\bin>supportUtil.bat

Administration Center Support Utility - Main Menu
=====

1. Turn all tracing on
2. Turn all tracing off
3. Turn a single trace class on
4. Update the maximum memory size Administration Center can use
5. Update the Administration Center session timeout setting
6. Collect trace files, logs and system information to send to support
7. View the log file for this utility

9. Exit

Enter Selection:
```



Figure 4-11 Common tasks with the Administration Center Support Utility

In the Administration Center Support Utility Main menu, options 4 and 5 are further explained here:

► **Maximum Memory Size Setting**

ISC (WebSphere® Application Server) is Java based. The amount of heap size is based on some command parameters when the server starts. You can adjust the maximum size of the heap if necessary.

The default setting of 512 MB typically serves a community of five active users. Larger communities of users may want a larger heap size, such as 1 GB. Do not set the heap size below 512 MB. This can cause the JVM™ to crash and take a heap dump.

Another factor is the number of other IBM products installed (deployed) to that ISC server.

► **Session Time-out Setting**

The session time out is the amount of idle time that the server waits before forcing the administrator to login again. The default is 30 minutes.

This is the replacement to SET WEBTIMEOUT on the old interface.

4.10 ISC and Administration Center: Security concept

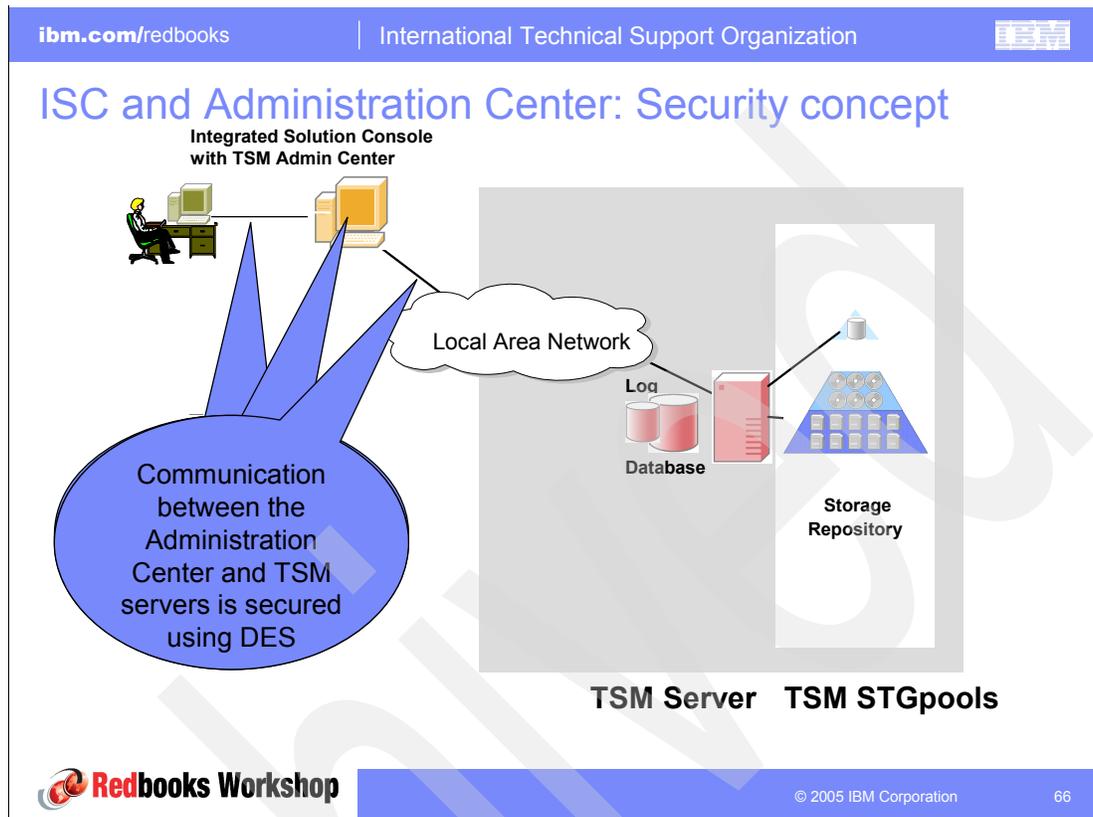


Figure 4-12 ISC and Administration Center: Security concept

To secure communications between the Web browser and the Administration Center, you can configure the Integrated Solutions Console to use Secure Sockets Layer (SSL). This provides certificate-based 128-bit encryption. (Instructions for configuring SSL are provided in the *Administrator's Guide*). If the Web browser and Administration Center are behind a firewall, this might not be necessary.

The Integrated Solutions Console user credentials and Tivoli Storage Manager administrator credentials that are stored in the WebSphere database are fully encrypted. Since the Administration Center is used to manage Tivoli Storage Manager servers across a network, communications between the Administration Center and Tivoli Storage Manager servers are secured using Data Encryption Standard (DES) encryption.

4.11 ISC layout and Tivoli Storage Manager integration

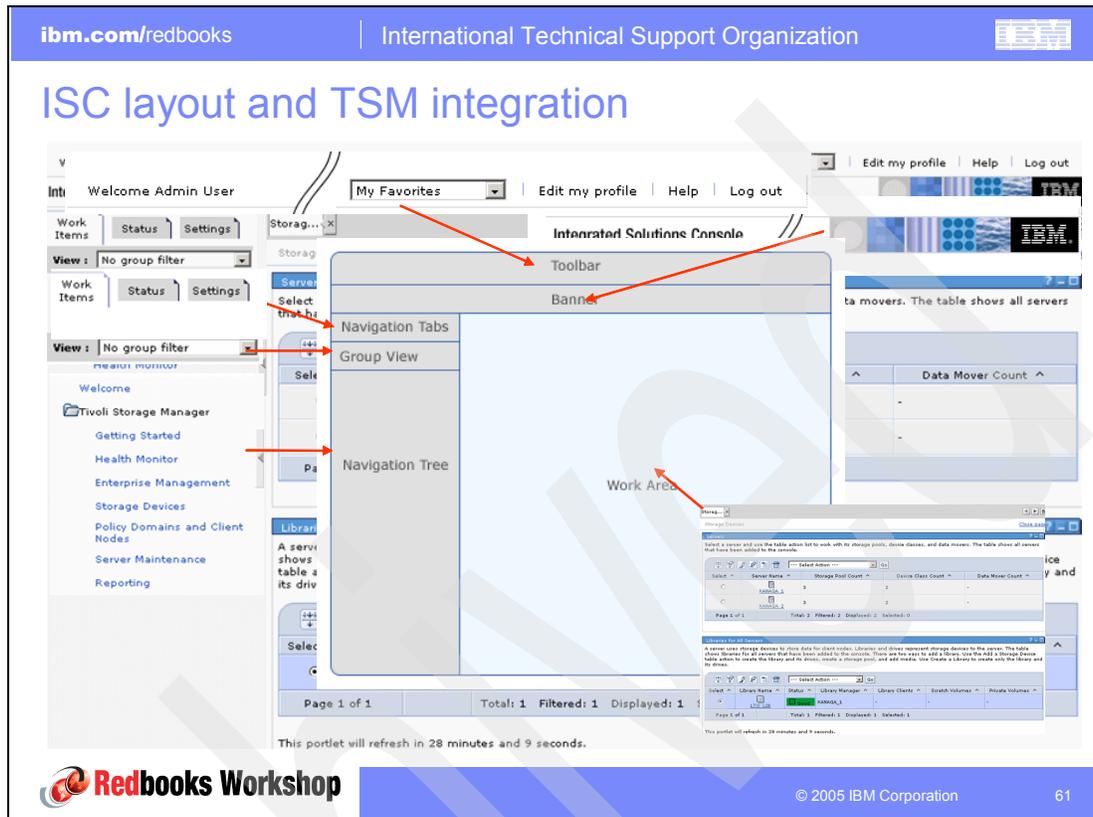


Figure 4-13 ISC layout and Tivoli Storage Manager integration

This slide illustrates how the Tivoli Storage Manager Administration Center integrates in the ISC framework. The framework provides the following frames:

- ▶ Toolbar
- ▶ Banner
- ▶ Navigation Tabs
- ▶ Group View
- ▶ Navigation Tree
- ▶ Workarea

The workarea itself is divided into:

- Page Bar
- Page Title
- Application

Important: Do not use the Back, Forward, and Refresh buttons in your browser. Doing so can cause unexpected results. Using your keyboard's Enter key can also cause unexpected results. Use the controls of the Administration Center instead. Support for the Enter key is being examined and is planned to be provided with a future version of the Administration Center.

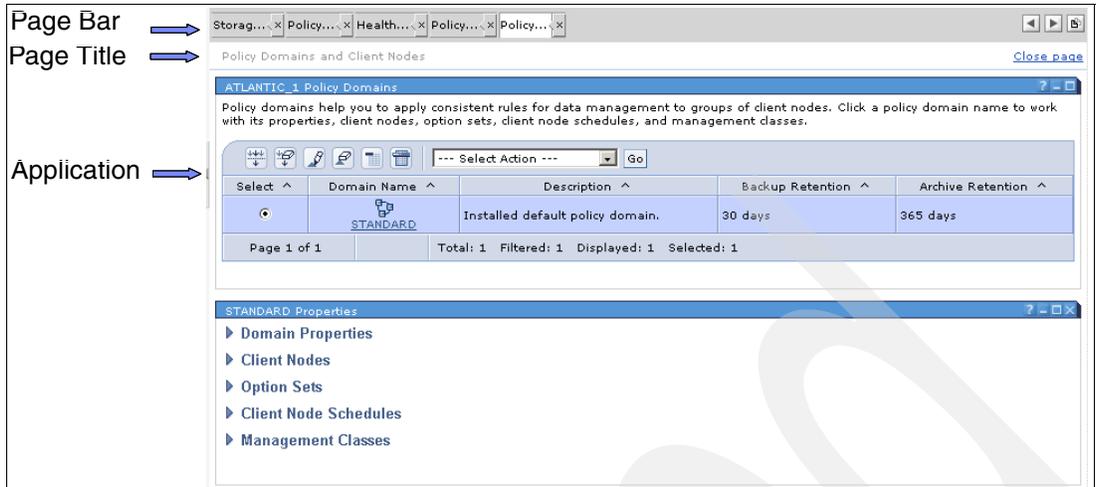


Figure 4-14 ISC application workarea

4.12 Task oriented interface

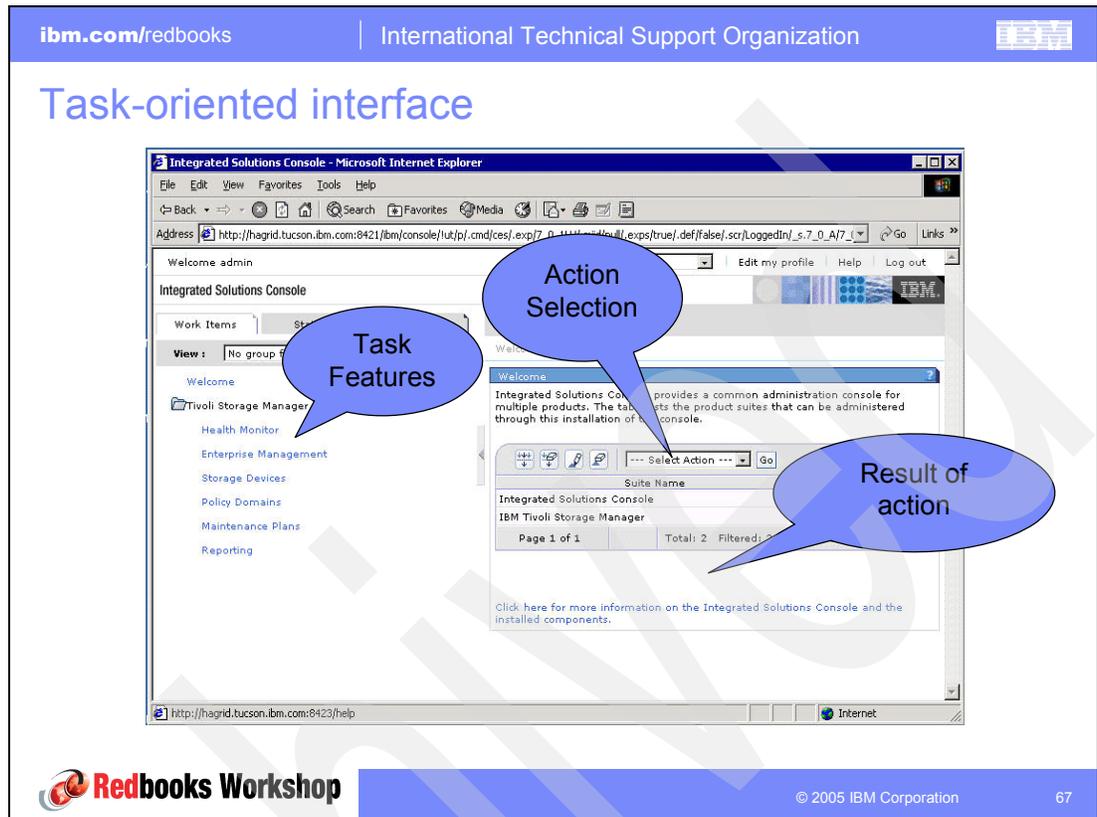


Figure 4-15 Task-oriented interface

The task features are separated in:

- ▶ Health Monitor
 - Schedule Information
 - Database and Recovery Log information, with rules based on best practices
 - Activity log
 - Storage Device Status
- ▶ Enterprise Management
 - Manage multiple servers from one console
- ▶ Storage Devices
 - End-to-end coverage of device configuration
 - Create a library
 - Add drives
 - Discover volumes
 - Create storage pools
- ▶ Policy Domain and Client Nodes
 - Domain Properties
 - Client Nodes
 - Option Sets
 - Client Node Schedules
 - Management Classes

- ▶ Server Maintenance
 - Storage pool backup
 - Database backup
 - Migration
 - Expiration
 - Reclamation
- ▶ Reporting
 - Usage Report
 - Security Report

Archived

4.13 Task example: Adding a file device class

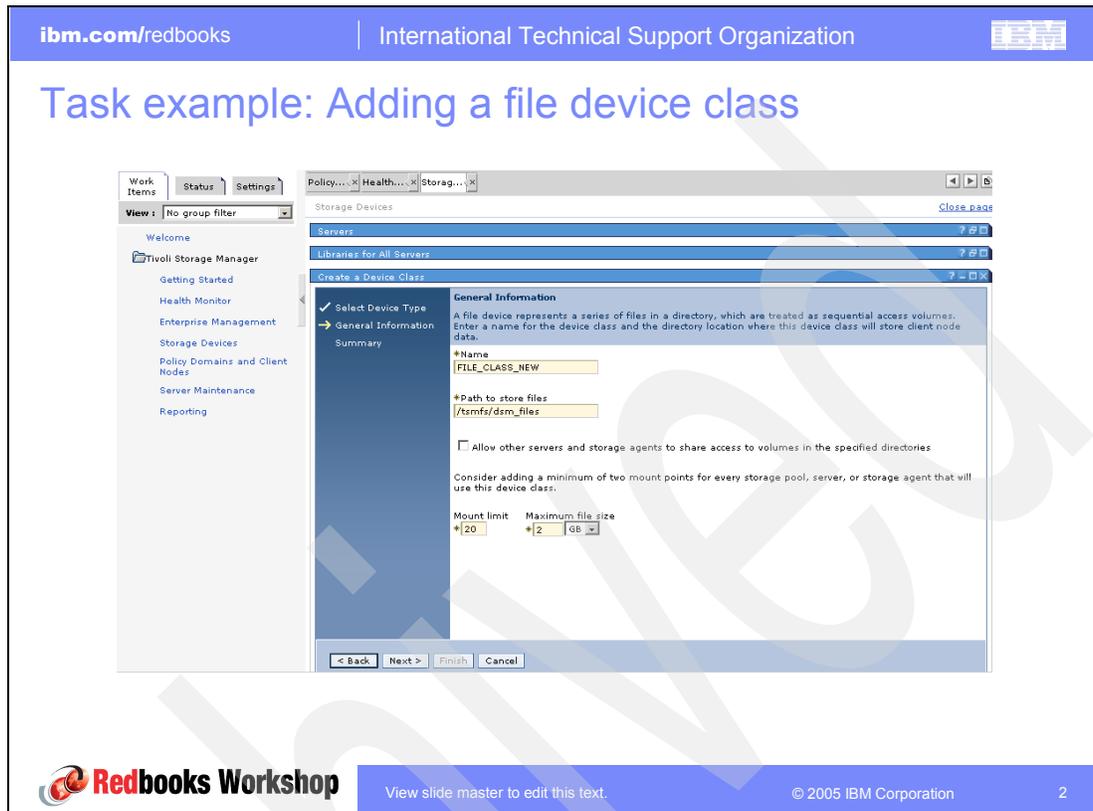


Figure 4-16 Task example: Adding a file device class

This slide shows how to define a file device class to your server. The action chosen here was kept simple since the intent is to focus on the user interface areas.

Again the steps are:

1. Select the **task** in the navigation tree.
2. Select a **server** in the workarea.
3. Select an **action** in the workarea.

After you complete these steps, you are guided by the wizard for the specified task. The wizard prompts you for the required information and instructs you until the action chosen is confirmed and completed.

4.14 Administration Center: Health Monitor

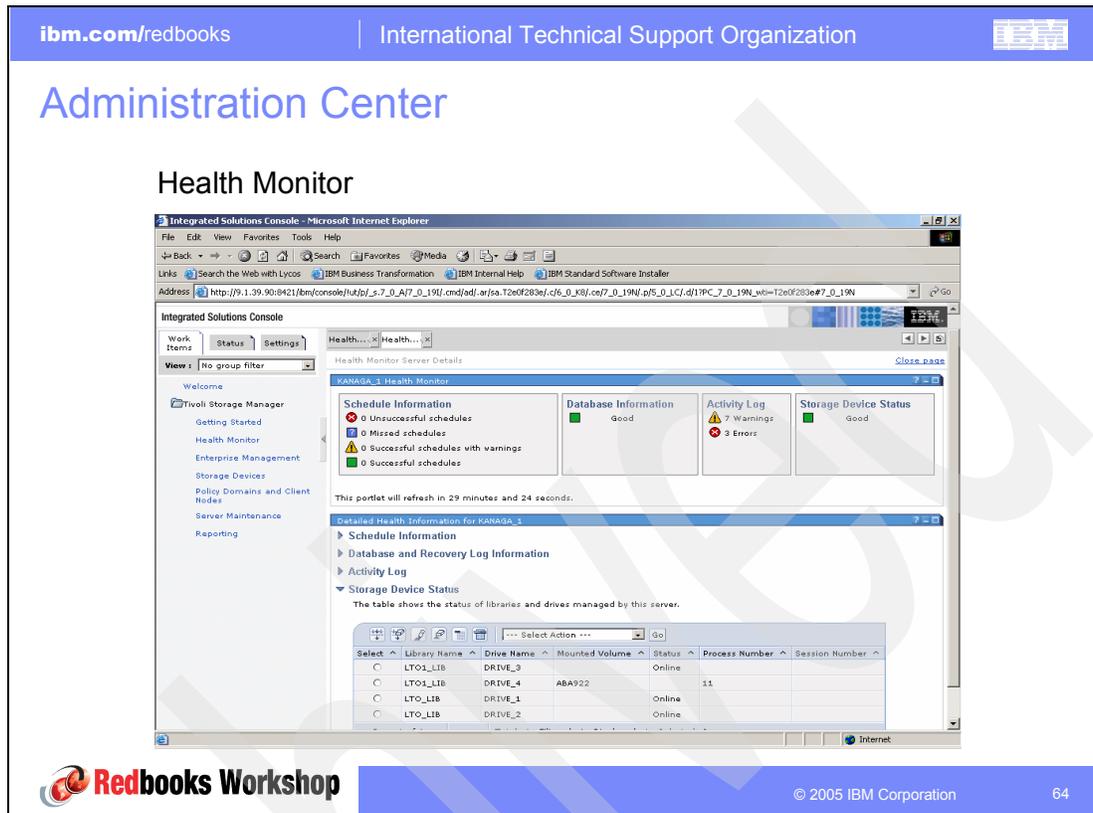


Figure 4-17 Administration Center: Health Monitor

The Administration Center includes a Health Monitor, which presents a view of the overall status of multiple servers and their storage devices. From the Health Monitor, you can link to details for a server, including the results of client schedules and a summary of the availability of storage devices.

Use the Health Monitor to look for:

- ▶ Schedule information
- ▶ Database and recovery log information, with rules based on best practices
- ▶ Activity log
- ▶ Storage device status
 - How many drives or paths are offline
 - How many storage volumes are left in the storage pool
 - How many scratch volumes are left in the library

Refer to the section “Quick paths to performing tasks” in *IBM Tivoli Storage Manager Problem Determination Guide*, SC32-9103-01. There you can find examples on how to use the Health Monitor to query the server for specific health information. This same guide provides information about how the Health Monitor works and the conditions that result in warning or critical status for database or storage.

4.15 Administration Center: Reporting panel

The screenshot displays the IBM Administration Center Reporting panel. The page title is "Administration Center" and the sub-page title is "Reporting panel". The main content area shows a "Usage Report for KANAGA-1" with three sections: "Client nodes backup usage", "Client nodes archive usage", and "Client nodes space management usage". Each section contains a table with columns for Name, Physical (MB), Logical (MB), and Number of Files. The "Client nodes backup usage" table shows data for KLOHL2B and KANAGA. The "Client nodes archive usage" table shows data for KLOHL2B. The "Client nodes space management usage" table shows "None Found".

Name	Physical (MB)	Logical (MB)	Number of Files
KLOHL2B	57.83	57.83	67
KANAGA	62.59	62.59	785

Name	Physical (MB)	Logical (MB)	Number of Files
KLOHL2B	68.39	68.39	74

Name	Physical (MB)	Logical (MB)	Number of Files
None Found			

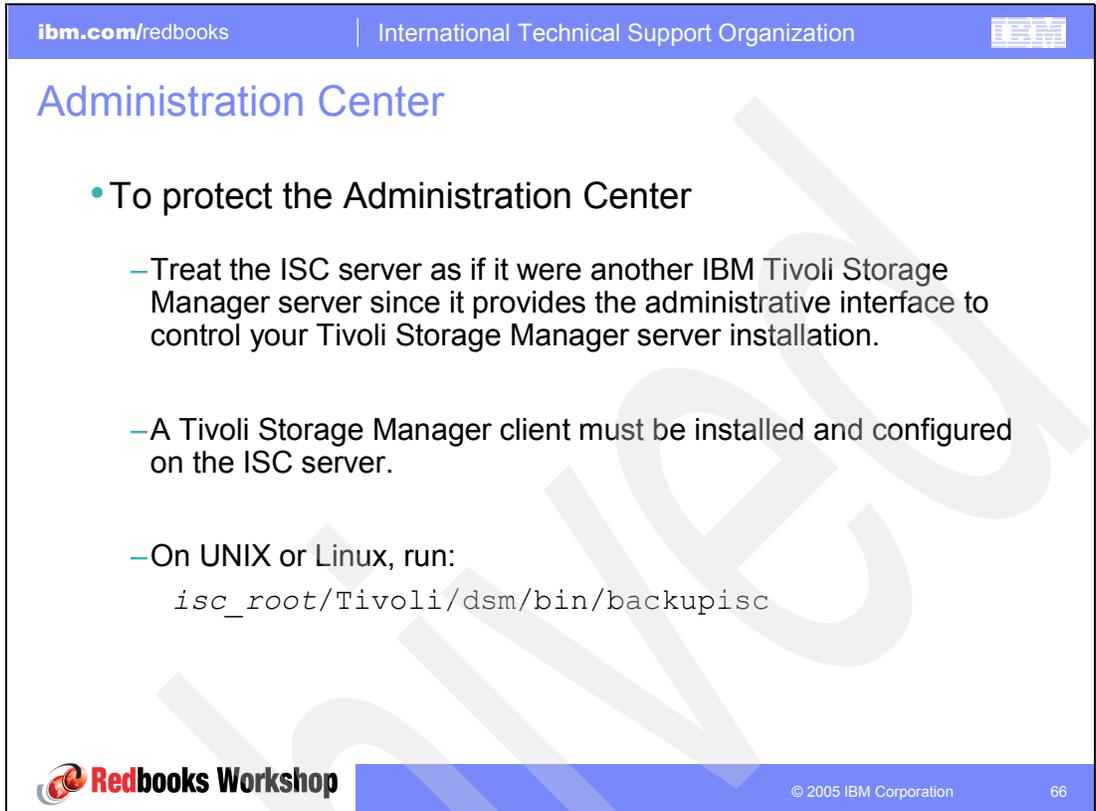
Figure 4-18 Administration Center: Reporting panel

With the Reporting task, you have access to a set of predefined reports. Currently the interface provides access to:

- ▶ Usage reports
- ▶ Security reports

You can easily adjust the report output by defining filters to a filter row. You can access the filter rows for each individual report. In addition, you can easily sort the report by selecting a sort tab provided for each reported column.

4.16 Protecting the Administration Center



The screenshot shows a slide from an IBM Redbooks Workshop. The slide has a blue header with the text 'ibm.com/redbooks' and 'International Technical Support Organization'. The main title is 'Administration Center'. The content includes a bulleted list of instructions for protecting the Administration Center, followed by a code block for a command on UNIX or Linux. The footer contains the 'Redbooks Workshop' logo, the copyright notice '© 2005 IBM Corporation', and the page number '66'.

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Administration Center

- To protect the Administration Center
 - Treat the ISC server as if it were another IBM Tivoli Storage Manager server since it provides the administrative interface to control your Tivoli Storage Manager server installation.
 - A Tivoli Storage Manager client must be installed and configured on the ISC server.
 - On UNIX or Linux, run:

```
isc_root/Tivoli/dsm/bin/backupisc
```

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Figure 4-19 Protecting the Administration Center

The ISC and the Administrative Center require access to credential and configuration data that is stored in the PortalServer database and WebSphere Application Server configuration file.

Important: As with every other application, make sure that you are protected from data loss. This task as important as backing up your Tivoli Storage Manager server.

Starting with Version 5.3.1 of the Administration Center, on UNIX platforms, scripts are available that completely handle backing up and restoring ISC and Administration Center. The scripts require that you define a Tivoli Storage Manager client node for the ISC server machine because the objects are backed up on a Tivoli Storage Manager server.

4.17 ISC Administration Center: Backup log



```
isc_root/Tivoli/dsm/logs/isc_backup.log:

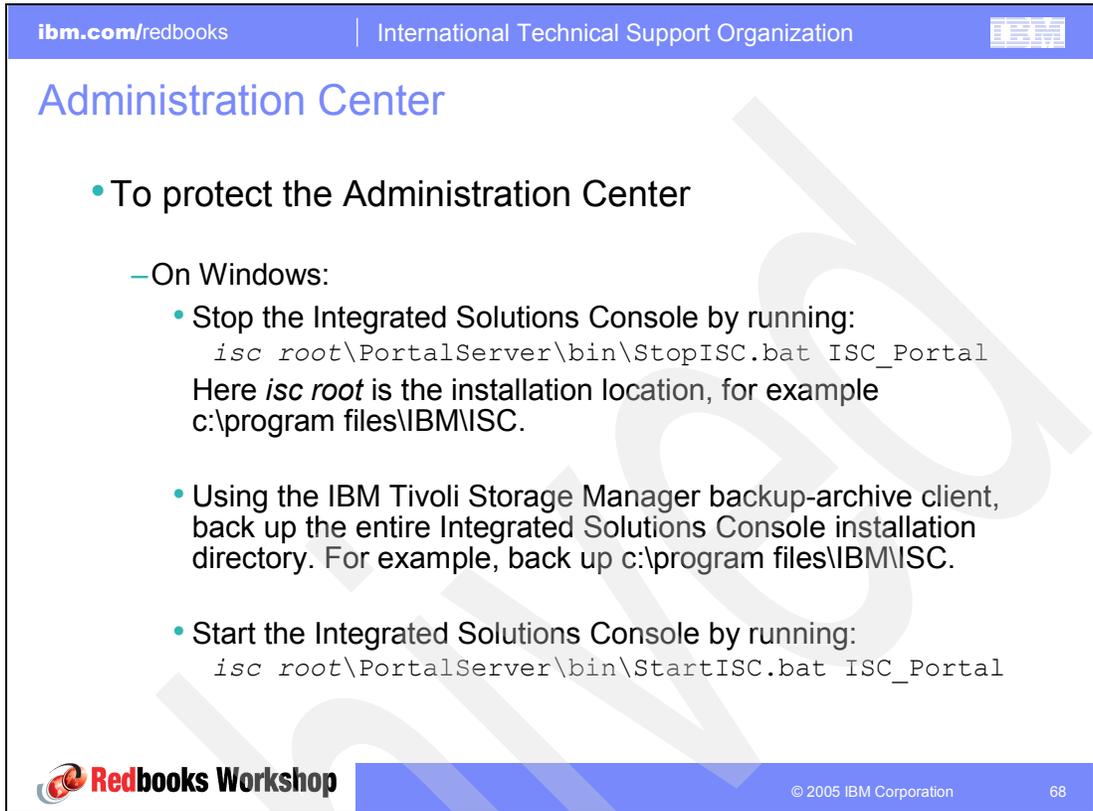
ANW000001: Logging to file /opt/IBM/ISC/Tivoli/dsm/logs/isc_backup.log
ANW000001: Backup starting at Mon Apr 25 11:57:55 PDT 2005
ANW000001: Stopping ISC Portal
ANW000001: Copying PortalServer DB files to staging directory
ANW000001: Backing up WAS Configuration
ANW000001: Copying TSM configuration information to staging directory
ANW000001: Restarting ISC Portal
ANW000001: Backing up staging directory to TSM
ANW000001: IBM Tivoli Storage Manager
ANW000001: Command Line Backup/Archive Client Interface
ANW000001: Client Version 5, Release 3, Level 0.0
ANW000001: Client date/time: 04/25/05 11:59:46
ANW000001: Node Name: KANAGA
ANW000001: Session established with server KANAGA_1: AIX-RS/6000
ANW000001: Server Version 5, Release 3, Level 0.0
ANW000001: Server date/time: 04/25/05 11:59:46 Last access: 04/25/05 11:55:33
ANW000001: Backup GROUP function invoked mode= FULL.
ANW000001: Backup processing of 'ISCTSM' finished without failure.
ANW000001: Total number of objects inspected: 472
ANW000001: Total number of objects backed up: 472
.
ANW000001: ISC Backup completed successfully
```

Figure 4-20 Administration Center: Backup log

See the log file for the steps it takes to complete the backup of the ISC.

1. Set the `ISC_HOME` environment variable.
2. The script creates a staging directory (`isc_homeTivoli/stage`) that is used to temporarily hold the data to back up.
3. The ISC Portal Server is stopped so you have a consistent view of the cloudscape database.
4. The database information is copied to the staging directory.
5. The WebSphere Application Server configuration is backed up to the staging directory.
6. The Tivoli Storage Manager configuration is copied to the staging directory.
7. The ISC Portal is restarted.
8. The objects from the staging directory are backed up to Tivoli Storage Manager using the backup group function with the following parameters:
`-virtualfsname=/ISCBackup -groupname=ISCTSM -mode=full`

4.18 Protecting the Administration Center on Windows



The screenshot shows a slide from an IBM Redbooks Workshop presentation. The slide title is "Administration Center". The content is as follows:

- To protect the Administration Center
 - On Windows:
 - Stop the Integrated Solutions Console by running:

```
isc root\PortalServer\bin\StopISC.bat ISC_Portal
```

Here *isc root* is the installation location, for example `c:\program files\IBM\ISC`.
 - Using the IBM Tivoli Storage Manager backup-archive client, back up the entire Integrated Solutions Console installation directory. For example, back up `c:\program files\IBM\ISC`.
 - Start the Integrated Solutions Console by running:

```
isc root\PortalServer\bin\StartISC.bat ISC_Portal
```

The slide footer includes the Redbooks Workshop logo, the text "© 2005 IBM Corporation", and the page number "68".

Figure 4-21 Protecting the Administration Center: Windows

To back up ISC and Administration Center on a Windows platform, use these steps:

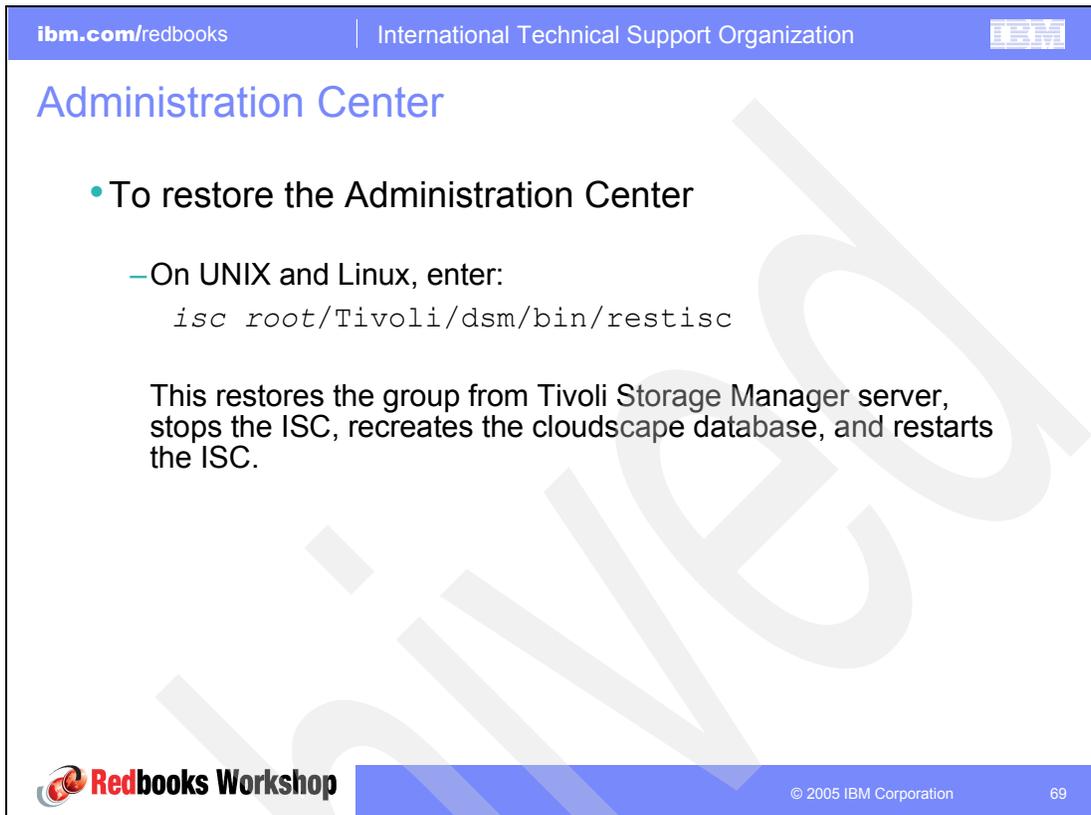
1. Stop the Integrated Solutions Console.

```
isc root\PortalServer\bin\StopISC.bat ISC_Portal
```

Here *isc root* is the installation location, for example `C:\program files\IBM\ISC`.

2. Using the IBM Tivoli Storage Manager backup-archive client, back up the entire Integrated Solutions Console installation directory. For example, back up `C:\program files\IBM\ISC`.

4.19 Restoring the Administration Center on UNIX or Linux



The screenshot shows a web page from the IBM Redbooks Workshop. The page title is "Administration Center". It contains a list of instructions for restoring the Administration Center on UNIX or Linux. The instructions include a command to run from the root directory of the Tivoli Storage Manager bin directory. Below the command, there is a paragraph explaining that this process restores the group from the Tivoli Storage Manager server, stops the ISC, recreates the cloudscape database, and restarts the ISC. The page footer includes the Redbooks Workshop logo, the copyright notice "© 2005 IBM Corporation", and the page number "69".

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Administration Center

- To restore the Administration Center
 - On UNIX and Linux, enter:

```
isc root/Tivoli/dsm/bin/restisc
```

This restores the group from Tivoli Storage Manager server, stops the ISC, recreates the cloudscape database, and restarts the ISC.

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Figure 4-22 Restoring the Administration Center on UNIX or Linux

To restore the ISC and the Tivoli Storage Manager Administration Center, follow these steps:

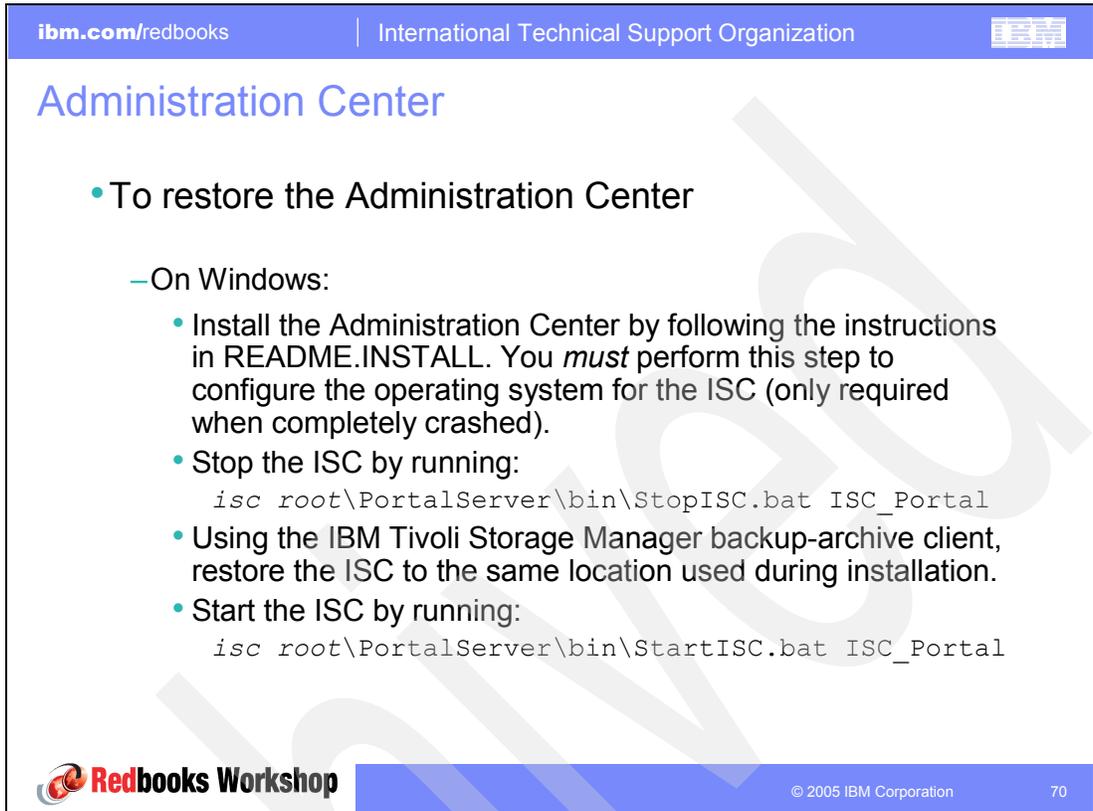
1. Set the ISC_HOME environment variable.
2. The script creates a staging directory (*isc_homeTivoli/stage*) that is used to temporarily hold the data to restore.
3. The /ISCBakup/ISCTSM group is restored from Tivoli Storage Manager.
4. The ISC Portal Server is stopped.
5. The current cloudscape db directory is renamed.
6. The objects from the staging directory are copied, recreating the old database.
7. The Tivoli Storage Manager configuration is applied.
8. The WebSphere Application Server configuration is restored.
9. The ISC Portal is restarted.

Example 4-1 shows how to restore the Administration Center on a UNIX system.

Example 4-1 Restoring the Administration Center on a UNIX system

```
ANW00000I: Logging to file /opt/IBM/ISC/Tivoli/dsm/logs/isc_restore.log
ANW00000I: Restore starting at Tue May 3 16:55:44 PDT 2005
ANW00001I: IBM Tivoli Storage Manager
ANW00001I: Command Line Backup/Archive Client Interface
ANW00001I: Client Version 5, Release 3, Level 0.0
ANW00001I: Client date/time: 05/03/05 16:55:47
ANW00001I: (c) Copyright by IBM Corporation and other(s) 1990, 2004. All Rights Reserved.
ANW00001I: Restore function invoked.
ANW00001I: Node Name: KANAGA
ANW00001I: Session established with server KANAGA_1: AIX-RS/6000
ANW00001I: Server Version 5, Release 3, Level 1.0
ANW00001I: Server date/time: 05/03/05 16:55:47 Last access: 05/03/05 16:36:35
ANW00001I: Restore processing finished.
ANW00001I: Total number of objects restored: 456
ANW00001I: Total number of objects failed: 0
ANW00001I: Total number of bytes transferred: 25.22 MB
ANW00001I: Data transfer time: 1.81 sec
ANW00001I: Network data transfer rate: 14,228.32 KB/sec
ANW00001I: Aggregate data transfer rate: 691.74 KB/sec
ANW00001I: Elapsed processing time: 00:00:37
ANW00000I: Restore from TSM to staging directory completed successfully
ANW00000I: Stopping ISC Portal
ADMU0116I: Tool information is being logged in file
/opt/IBM/ISC/AppServer/logs/ISC_Portal/stopServer.log
ADMU3100I: Reading configuration for server: ISC_Portal
ADMU3201I: Server stop request issued. Waiting for stop status.
ADMU4000I: Server ISC_Portal stop completed.
ANW00000I: Copying files from staging directory
ANW00000I: Restoring WAS configuration
ADMU0116I: Tool information is being logged in file
/opt/IBM/ISC/AppServer/logs/restoreConfig.log
ADMU0505I: Servers found in configuration:
ADMU0506I: Server name: server1
ADMU0506I: Server name: ISC_Portal
ADMU2010I: Stopping all server processes for node DefaultNode
ADMU0512I: Server server1 cannot be reached. It appears to be stopped.
ADMU0512I: Server ISC_Portal cannot be reached. It appears to be stopped.
ADMU5502I: The directory /opt/IBM/ISC/AppServer/config already exists; renaming
to /opt/IBM/ISC/AppServer/config.old_1
ADMU5504I: Restore location successfully renamed
ADMU5505I: Restoring file
/opt/IBM/ISC/Tivoli/stage/WebSphereConfig_2005-04-25.zip to location
/opt/IBM/ISC/AppServer/config
ADMU5506I: 219 files successfully restored
ADMU6001I: Begin App Preparation -
ADMU6009I: Processing complete.
ANW00000I: Copy complete...restarting ISC Portal
ADMU0116I: Tool information is being logged in file
/opt/IBM/ISC/AppServer/logs/ISC_Portal/startServer.log
ADMU3100I: Reading configuration for server: ISC_Portal
ADMU3200I: Server launched. Waiting for initialization status.
ADMU3000I: Server ISC_Portal open for e-business; process id is 66032
ANW00000I: ISC Restore completed successfully
```

4.20 Restoring the Administration Center on Windows



The screenshot shows a web page from the IBM Redbooks Workshop. The page title is "Administration Center". The main content is a list of steps for restoring the Administration Center on Windows. The steps include installing the Administration Center, stopping the ISC, restoring the ISC using the IBM Tivoli Storage Manager backup-archive client, and starting the ISC. The page also includes a footer with the Redbooks Workshop logo, the copyright notice "© 2005 IBM Corporation", and the page number "70".

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Administration Center

- To restore the Administration Center
 - On Windows:
 - Install the Administration Center by following the instructions in README.INSTALL. You *must* perform this step to configure the operating system for the ISC (only required when completely crashed).
 - Stop the ISC by running:

```
isc root\PortalServer\bin\StopISC.bat ISC_Portal
```
 - Using the IBM Tivoli Storage Manager backup-archive client, restore the ISC to the same location used during installation.
 - Start the ISC by running:

```
isc root\PortalServer\bin\StartISC.bat ISC_Portal
```

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Figure 4-23 Restoring the Administration Center on Windows

Use the following steps to restore the ISC and Administration Center on a Windows system:

1. Restore the operating system first.
2. Install the Administration Center following the instructions from the README.INSTALL coming with the package. You must perform this step to configure the operating system for the Integrated Solutions Console.

3. Stop the Integrated Solutions Console by running:

```
isc root\PortalServer\bin\StopISC.bat ISC_Portal
```

Here *isc root* is the installation location, for example C:\program files\IBMISC.

4. Using the IBM Tivoli Storage Manager backup-archive client, restore the Integrated Solutions Console to the same location that was used during installation.

5. Start the Integrated Solutions Console.

```
isc root\PortalServer\bin\StartISC.bat ISC_Portal
```

Here *isc root* is the installation location, for example C:\program files\IBMISC.

4.21 Administration Center changes with 5.3.1

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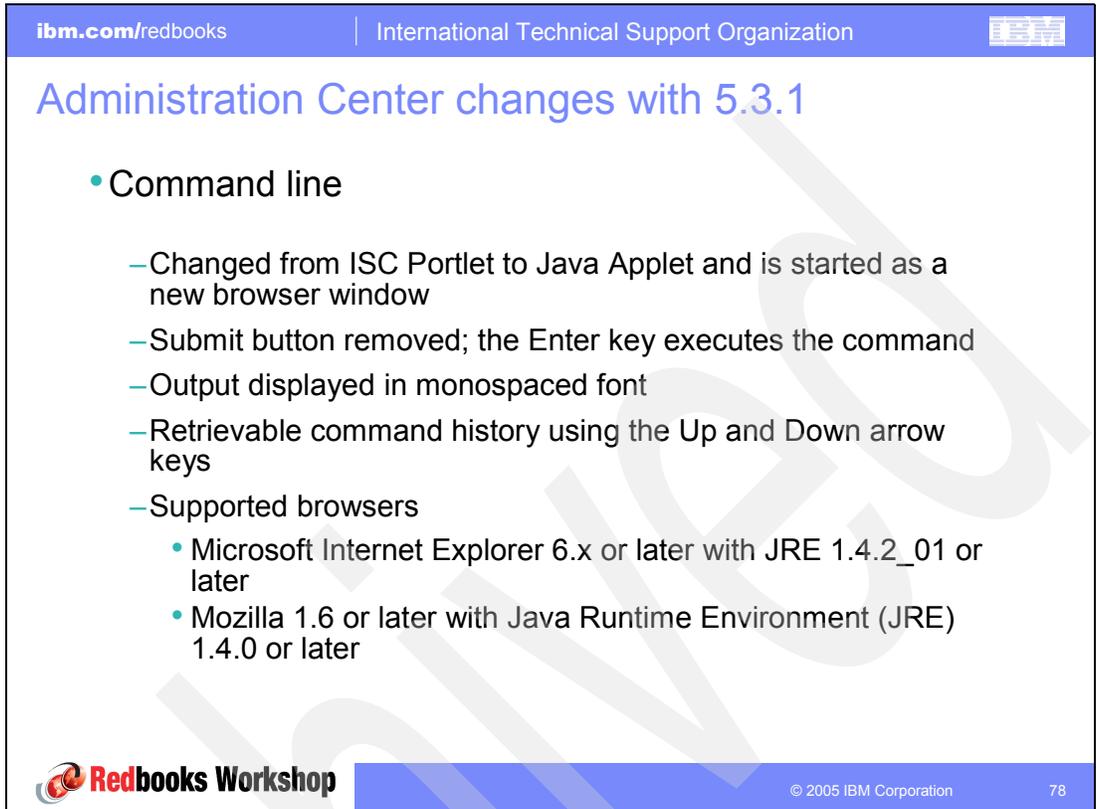
Administration Center changes with 5.3.1

- APAR fixes
 - Usability
 - Reliability
 - Performance
- Activity log query
 - Now permits you to select a start time and end time for the query.
 - By default, the last hour of activity is reported if no start or end time is selected.
Previously as much as 24 hours were reported.

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Figure 4-24 Administration Center changes with 5.3.1

4.22 Administration Center changes with 5.3.1: Command line



The image is a screenshot of a presentation slide. At the top, there is a blue header bar with the text 'ibm.com/redbooks' on the left, 'International Technical Support Organization' in the center, and a small IBM logo on the right. Below the header, the slide title 'Administration Center changes with 5.3.1' is displayed in blue. The main content area is white and contains a bulleted list of changes. The list starts with a blue bullet point for 'Command line', followed by several grey hyphenated items. The final item is 'Supported browsers', which has two sub-bullets. At the bottom of the slide, there is a blue footer bar with the 'Redbooks Workshop' logo on the left, '© 2005 IBM Corporation' in the center, and the page number '78' on the right.

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Administration Center changes with 5.3.1

- Command line
 - Changed from ISC Portlet to Java Applet and is started as a new browser window
 - Submit button removed; the Enter key executes the command
 - Output displayed in monospaced font
 - Retrievable command history using the Up and Down arrow keys
 - Supported browsers
 - Microsoft Internet Explorer 6.x or later with JRE 1.4.2_01 or later
 - Mozilla 1.6 or later with Java Runtime Environment (JRE) 1.4.0 or later

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Figure 4-25 Administration Center changes with 5.3.1: Command line

4.23 Administration Center changes with 5.3.2

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Administration Center changes with 5.3.2

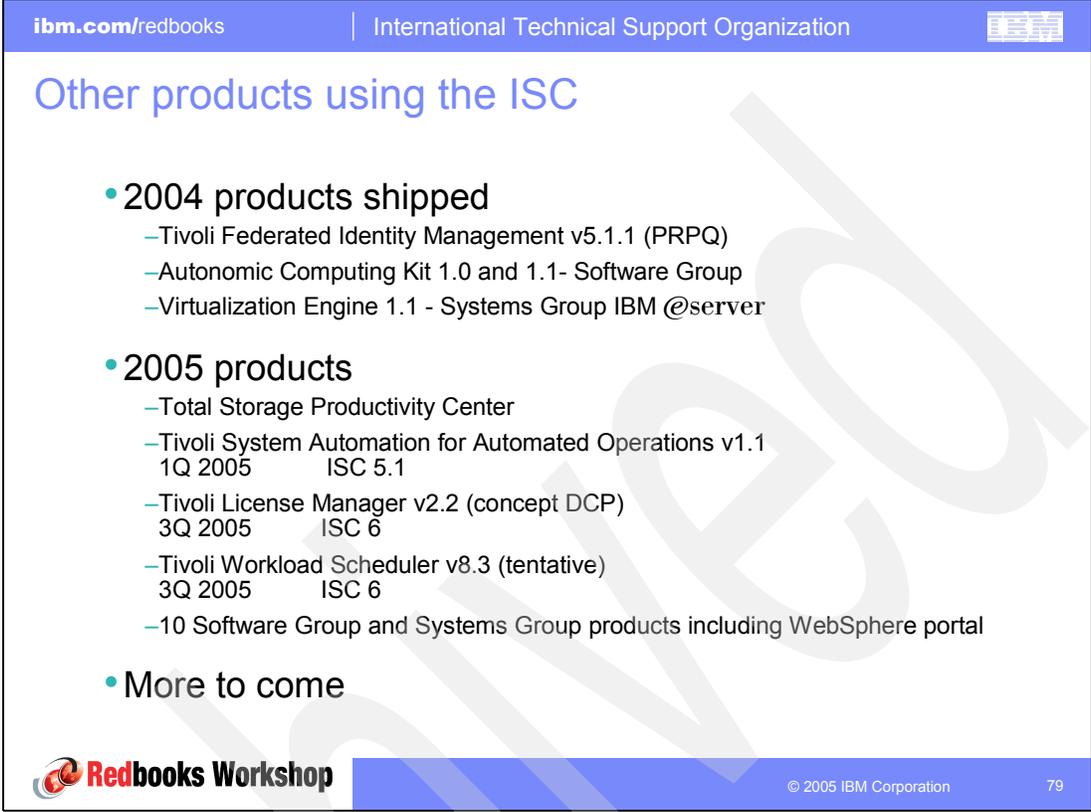
- User interface provides support for:
 - Disaster Recovery Manager (DRM)
 - EXPIRE INVENTORY command
 - Storage pool space triggers
 - Disk-to-disk backup
 - MIGRATE and RECLAIM Storage Pool commands
 - ENABLE and DISABLE SESSIONS commands
- Usability and performance
 - General performance improvements
 - Eliminate the GO button requirement from table navigation
 - Support ISC Bookmarks (Favorites)

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Figure 4-26 Administration Center changes with 5.3.2

The Tivoli Storage Manager Administration Center still evolves and future functions will be introduced via the maintenance stream. The functions listed on this slide are scheduled to become available with the 5.3.2 Tivoli Storage Manager Administration Center.

4.24 Other products using the ISC



The screenshot shows a slide from an IBM Redbooks Workshop. The slide has a blue header with the text 'ibm.com/redbooks' on the left and 'International Technical Support Organization' on the right. The main title of the slide is 'Other products using the ISC'. The content is organized into three bullet points: '2004 products shipped', '2005 products', and 'More to come'. The '2005 products' section includes a list of products with their release dates and ISC versions. The footer of the slide features the 'Redbooks Workshop' logo on the left, the copyright notice '© 2005 IBM Corporation' in the center, and the page number '79' on the right.

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Other products using the ISC

- 2004 products shipped
 - Tivoli Federated Identity Management v5.1.1 (PRPQ)
 - Autonomic Computing Kit 1.0 and 1.1- Software Group
 - Virtualization Engine 1.1 - Systems Group IBM @server
- 2005 products
 - Total Storage Productivity Center
 - Tivoli System Automation for Automated Operations v1.1
1Q 2005 ISC 5.1
 - Tivoli License Manager v2.2 (concept DCP)
3Q 2005 ISC 6
 - Tivoli Workload Scheduler v8.3 (tentative)
3Q 2005 ISC 6
 - 10 Software Group and Systems Group products including WebSphere portal
- More to come

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Figure 4-27 Other products using the ISC

Archived

Operational Reporting

This chapter describes Operational Reporting. It was introduced with the IBM Tivoli Storage Manager 5.2.2 server code and was enhanced with the release of 5.3.

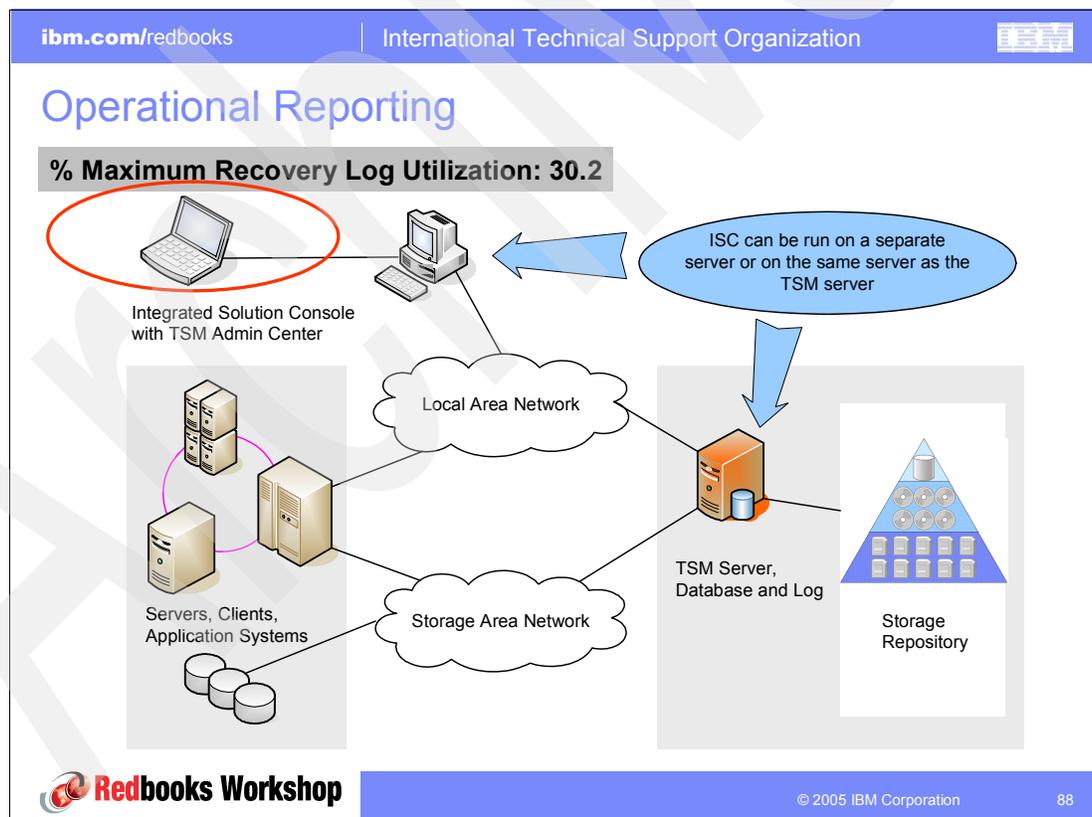
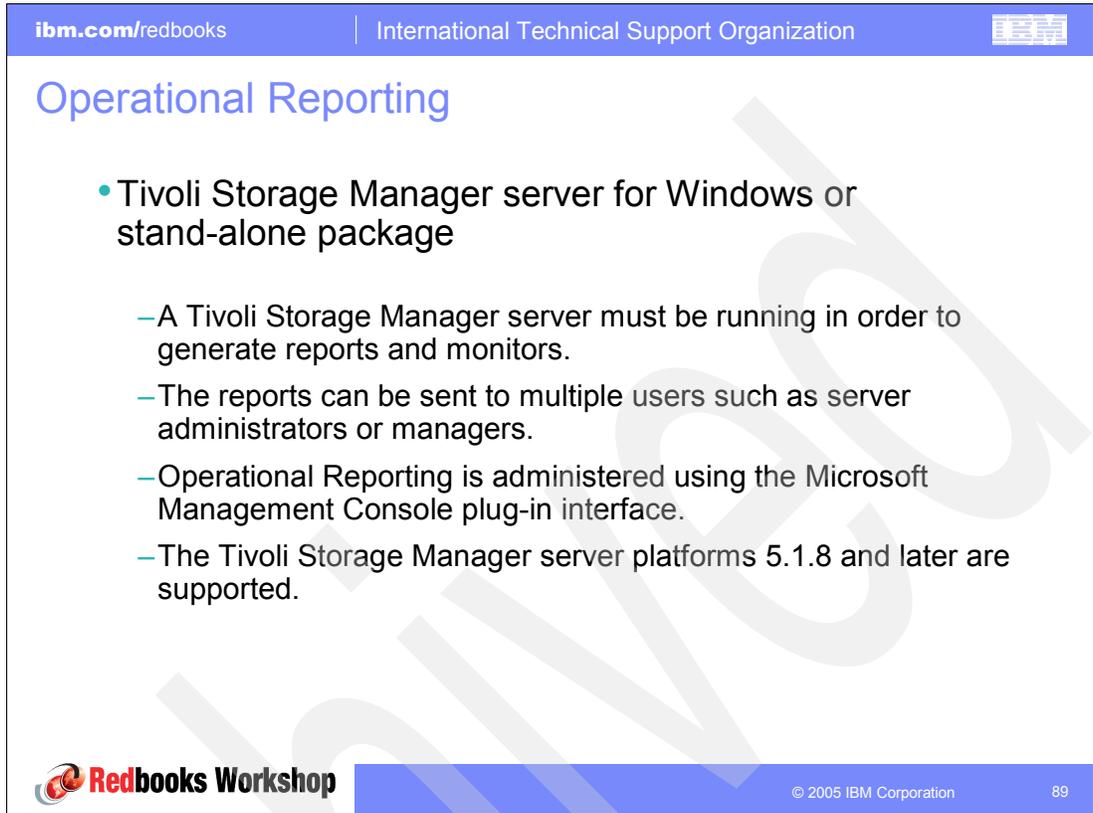


Figure 5-1 Tivoli Storage Manager components

5.1 Basics of the Operational Reporting feature



The screenshot shows a web page from the IBM Redbooks Workshop. The header includes the URL 'ibm.com/redbooks' and the text 'International Technical Support Organization'. The main title is 'Operational Reporting'. The content consists of a bulleted list of key points and a list of details. The footer contains the 'Redbooks Workshop' logo, the copyright notice '© 2005 IBM Corporation', and the page number '89'.

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Operational Reporting

- Tivoli Storage Manager server for Windows or stand-alone package
 - A Tivoli Storage Manager server must be running in order to generate reports and monitors.
 - The reports can be sent to multiple users such as server administrators or managers.
 - Operational Reporting is administered using the Microsoft Management Console plug-in interface.
 - The Tivoli Storage Manager server platforms 5.1.8 and later are supported.

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Figure 5-2 Operational Reporting basics

The IBM Tivoli Storage Manager Operational Reporting feature automates some of the monitoring tasks that you typically perform manually. By generating reports and monitors, Operational Reporting notifies you if a server requires attention.

Operational reports can be scheduled to run daily and are generated even if there are no problems. Operational monitors are special types of reports, and can be scheduled to run hourly. The monitors send you a notification only if there are issues. Operational Reporting does not maintain a separate database of information and is not a trending tool.

Note: For more granularity on your reporting monitor schedule, see Appendix A, “Using the Windows scheduler with Tivoli Storage Manager Operational Reporting” on page 127.

Operational Reporting is included as part of the Tivoli Storage Manager for Windows server™ and is available as a stand-alone package for a Windows server. For information about installing the stand-alone package, see “Installing the IBM Tivoli Storage Manager Operational Reporting Stand-alone Package” in the *TSM V5.3 for Windows Administrator's Guide*, GC32-0782-03.

5.2 Hourly monitor

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Operational Reporting

Hourly monitor

tsmw2k - [Storage Management\Tivoli Storage Manager\KANAGA (UNIX)\kanaga_1\Reports\Operational Monitors\Hourly Monitor]

Hourly Monitor - TSM 1 hour Monitor for kanaga generated at 2005-04-22 11:52:39 on KLCHL2B covering 2005-04-22 10:30:39 to 2005-04-22 11:30:38

Server name: KANAGA_1, platform: AIX-RS/6000, version: 5.3.0.0, date/time: 04/22/2005 12:33:28

Custom Summary	
Item	Results
Client Schedules Missed:	0
% Database Utilization:	9.2
% Maximum Recovery Log Utilization:	29.4
% Disk Pool Utilization:	11.5
Number of offline drives:	0
Number of scratch volumes:	6

Timing Information		
Section	Query Time	Processing Time
Server Information	00:41:11	00:00:00
Custom Summary	00:00:04	00:00:00
Additional Processing	00:00:00	00:00:00
Total Time	00:00:00	00:41:15

TSM Operational Reporting - Version 5, Release 3, Level 0.0

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Figure 5-3 Microsoft Management Console view showing operational reporting elements

Operational reporting is administered through the Microsoft Management Console (MMC) on a Windows machine. All platforms of IBM Tivoli Storage Manager servers, Version 5.1.8, Version 5.2.2, and later, are supported. Operational Reporting runs as a service and supports multiple Tivoli Storage Manager servers running on a single machine.

An operational report consists of the following parts:

- ▶ A standard report
- ▶ A customized summary
- ▶ Optional extensions that you can create

You can select which sections to include in the report. The Operational Reporting installation package contains two default custom summary templates: one for a report and one for a monitor.

Reports and monitors include a timing section, which can help you determine performance problems. For example, if a report or monitor seems to be running slowly, you can use the timing section to identify where the time is being spent. You can also eliminate or optimize a section accordingly.

5.3 Daily report

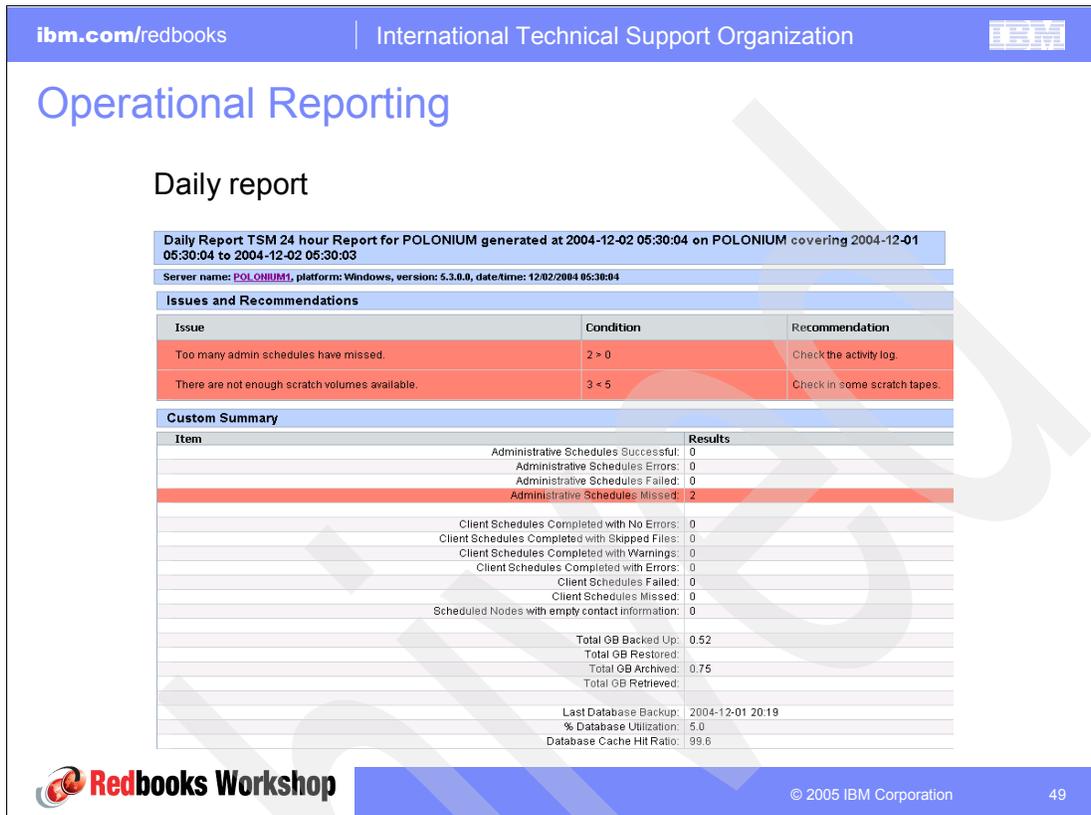


Figure 5-4 Operational Reporting: Daily report

Operational Reporting provides the following benefits:

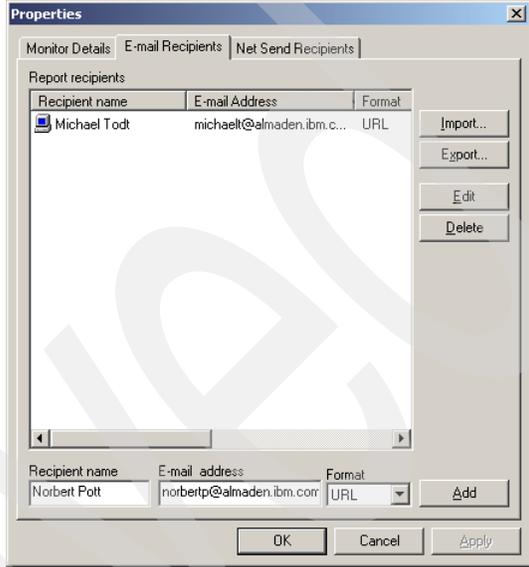
- ▶ It is easy to install and use.
- ▶ It minimizes the amount of time needed to administer Tivoli Storage Manager.
- ▶ Reports and monitors can be viewed interactively from a Web site or in e-mail.
- ▶ Reports and monitors can be customized and extended.
- ▶ Custom reports and monitor templates can be shared.
- ▶ It automatically notifies clients of missed or failed schedules by e-mail.

5.4 Configuring notification

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Operational Reporting

- Administrators or node owners can be notified by desktop message, e-mail or text message paging when a scheduled backup did not complete.
- This feature is enabled in the Microsoft Management Console (MMC).



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Figure 5-5 Configuring e-mail notification

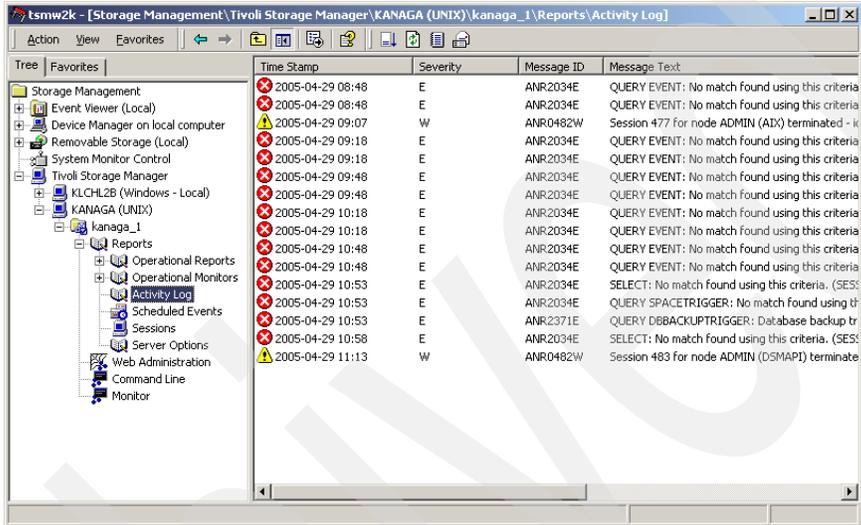
Default e-mail messages notify you if the server is running smoothly or if there are issues, such as failed or missed schedules. You can also link to a Web summary page to check operational reports about your server. An operational monitor notifies you by sending either an e-mail message to you or an instant message to your Windows desktop. Operational Reporting can write data to a file which can be read by a Tivoli Enterprise Console® log file adapter. The log file adapter reads the information and forwards it to the Tivoli Enterprise Console.

5.5 Activity log

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Operational Reporting

- Activity log report



Time Stamp	Severity	Message ID	Message Text
2005-04-29 08:48	E	ANR2034E	QUERY EVENT: No match found using this criteria
2005-04-29 08:48	E	ANR2034E	QUERY EVENT: No match found using this criteria
2005-04-29 09:07	W	ANR0482W	Session 477 for node ADMIN (AIX) terminated - k
2005-04-29 09:18	E	ANR2034E	QUERY EVENT: No match found using this criteria
2005-04-29 09:18	E	ANR2034E	QUERY EVENT: No match found using this criteria
2005-04-29 09:48	E	ANR2034E	QUERY EVENT: No match found using this criteria
2005-04-29 09:48	E	ANR2034E	QUERY EVENT: No match found using this criteria
2005-04-29 10:18	E	ANR2034E	QUERY EVENT: No match found using this criteria
2005-04-29 10:18	E	ANR2034E	QUERY EVENT: No match found using this criteria
2005-04-29 10:48	E	ANR2034E	QUERY EVENT: No match found using this criteria
2005-04-29 10:48	E	ANR2034E	QUERY EVENT: No match found using this criteria
2005-04-29 10:53	E	ANR2034E	SELECT: No match found using this criteria, (SES:
2005-04-29 10:53	E	ANR2034E	QUERY SPACETRIGGER: No match found using th
2005-04-29 10:53	E	ANR2371E	QUERY DBBACKUPTRIGGER: Database backup tr
2005-04-29 10:58	E	ANR2034E	SELECT: No match found using this criteria, (SES:
2005-04-29 11:13	W	ANR0482W	Session 483 for node ADMIN (DSMAPJ) terminate

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Figure 5-6 Activity log report

You can customize the Activity Log report by using the Search and Filter tabs:

- ▶ **Search tab:** You can enable pattern matching to search for a specific message number, search string, originator (all, client, or server), session, node name, client owner or schedule name.
- ▶ **Filter tab:** This tab allows you to enable message filtering. You can add messages that you do not want displayed in your activity log query by either typing the actual message or the message name. You can also narrow down messages by category, choosing not to display information, warning, or error messages.

IBM Tivoli Storage Manager data protection clients

This chapter explains the changes and new functionality that is available with the Tivoli Data Protection clients. The enhancements that are available with Version 5.3 are for:

- ▶ Tivoli Storage Manager for Hardware
- ▶ Tivoli Storage Manager for ERP
- ▶ Data Protection for mySAP
- ▶ Data Protection for Domino®

This chapter discusses the multiple backup support with Tivoli Data Protection for ESS mySAP and MMAPi support. It explains how to configure the data protection client for optimized CPU consumption and how to use DB2® Universal Database™ (UDB) log support. Plus it introduces new functionality that was made available to optimize for performance.



Data protection enhancements

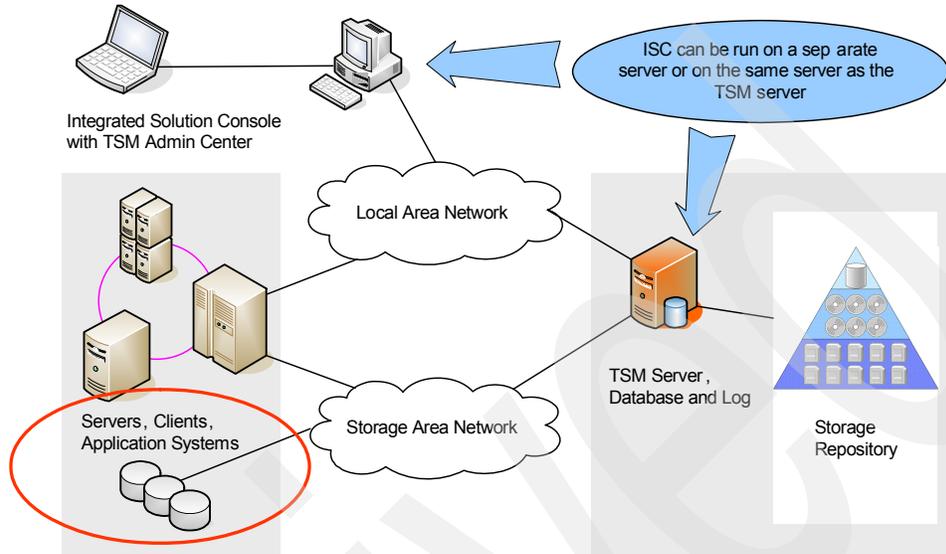


Figure 6-1 Tivoli Storage Manager components

6.1 Tivoli Storage Manager for Hardware: Multiple backup generations on disk

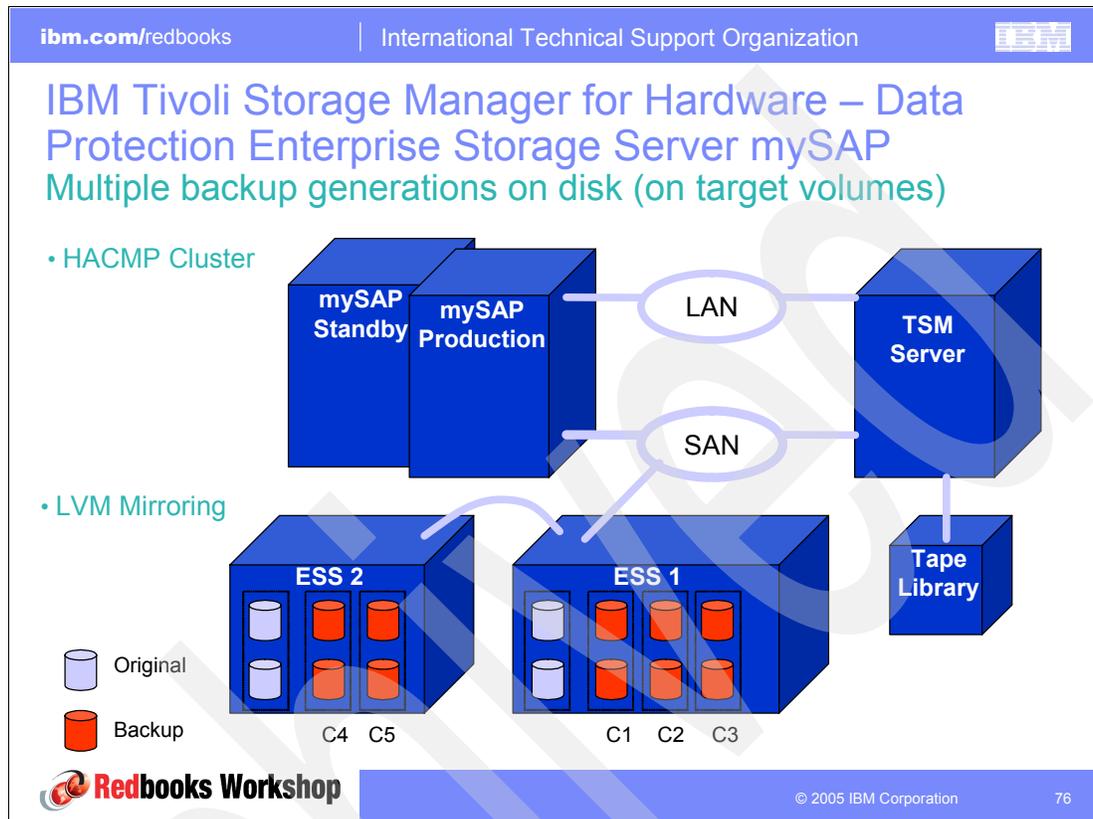


Figure 6-2 DP ESS mySAP: Multiple backup generations on disk

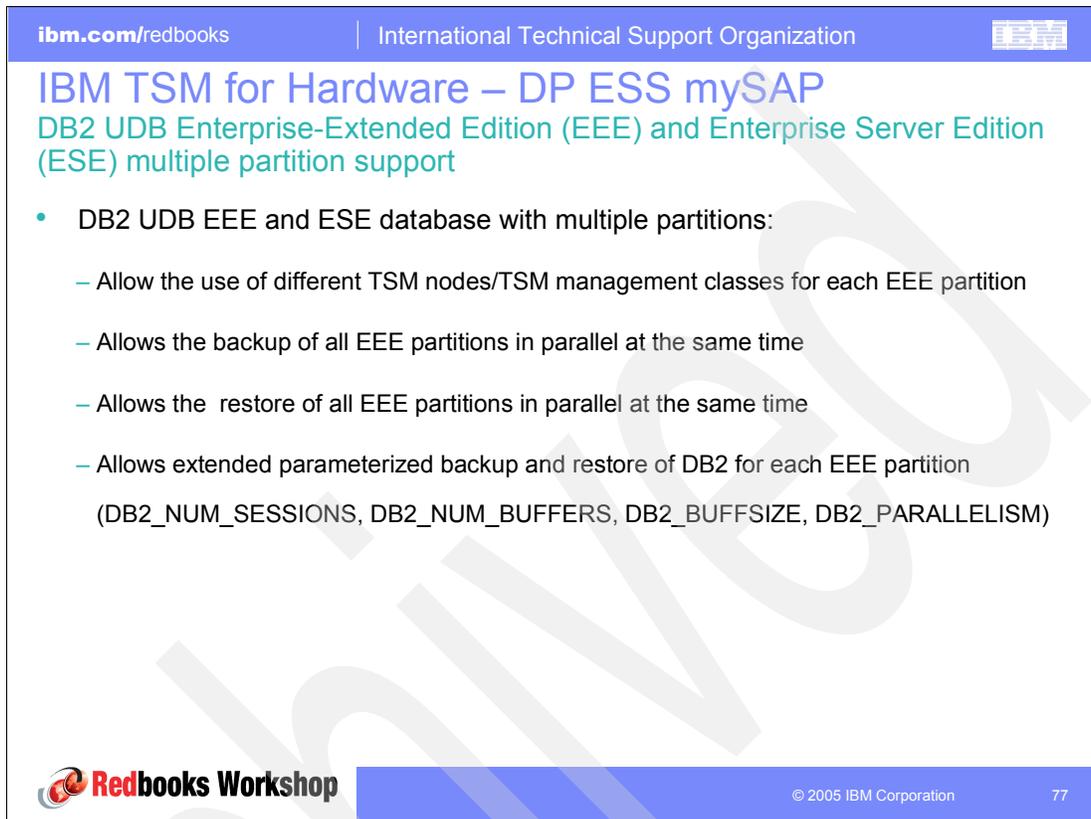
Starting with Tivoli Storage Manager for Hardware 5.3 — DP ESS mySAP 5.3, you can save more than one backup within the IBM TotalStorage® Enterprise Storage Server® (ESS) for faster FlashCopy® Restore. This slide shows a symbolic representation for the backups C1, C2, and C3 in ESS #1 and the backups C4 and C5 in ESS #2.

- ▶ The objectives are to have:
 - The shortest possible recovery from logical errors during online operation
 - A reduction of tape load time for Tivoli Storage Manager backups
- ▶ A sample backup schedule (without Logical Volume Manager (LVM) Mirroring to ESS 2) looks like this example:
 - Target C1: FlashCopy to disk only (incremental), scheduled every day at 8 a.m., 12 p.m., and 4 p.m.
 - Target C2: FlashCopy to disk only (copy), scheduled every odd night at 2 a.m.
 - Target C3: FlashCopy to disk (copy), backup to tape, scheduled every even night at 2 a.m.

When FlashCopy is used in conjunction with LVM Mirroring, it improves the solution to alternate copy 1 on both ESSs (C1 and C4).

- ▶ The features that are available with Tivoli Storage Manager for HW DP mySAP prior to 5.3 include:
 - High-Availability Cluster Multi-Processing (HACMP™) reduces single point of failure for the host.
 - Takeover must not run on a backup server.
 - LVM Mirroring reduces single point of failure for a disk subsystem.
 - LVM maintains copy sets of the production database on the source volumes of ESS #1 and ESS #2.
 - If one ESS is not available, production continues on other.
 - A copy backup can be performed on ESS #1 or ESS #2 (selectable).

6.2 Tivoli Storage Manager for Hardware: Multiple partition support for DB2 UDB EEE and ESE



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IBM TSM for Hardware – DP ESS mySAP

DB2 UDB Enterprise-Extended Edition (EEE) and Enterprise Server Edition (ESE) multiple partition support

- DB2 UDB EEE and ESE database with multiple partitions:
 - Allow the use of different TSM nodes/TSM management classes for each EEE partition
 - Allows the backup of all EEE partitions in parallel at the same time
 - Allows the restore of all EEE partitions in parallel at the same time
 - Allows extended parameterized backup and restore of DB2 for each EEE partition (DB2_NUM_SESSIONS, DB2_NUM_BUFFERS, DB2_BUFFSIZE, DB2_PARALLELISM)

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Figure 6-3 DP ESS mySAP: DB2 UDB EEE/ESE multiple partition support

Separate configuration parameters are allowed per DB2 EEE partition. This enables the administrator to select unique backup and restore parameters per partition.

When sending the backup images to Tivoli Storage Manager after a FlashCopy, the DB2 EEE partitions may be backed up and restored in parallel.

6.3 Tivoli Storage Manager ERP — DP for mySAP

The following sections look at the newly introduced Data Protection features for mySAP.

6.3.1 MMAPI 2.0 support

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IBM Tivoli Storage Manager ERP – DP for mySAP Oracle RMAN – MMAPI 2.0 Support (currency)

- MMAPI 2.0 was introduced with Oracle 8.1
- DP mySAP now supports both MMAPI versions (1.1 and 2.0)
- Oracle decides which version is used, usually 2.0

Advantages:

- Better error logging: Tivoli Storage Manager error messages can be and are logged at the RMAN console.
- More consistent interfaces allow better error handling: Windows platforms especially benefit from cleaner interfaces with design considerations on parallelism.
- Proxy Copy is not supported.

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Figure 6-4 TSM ERP — DP for mySAP: MMAPI 2.0 support

TSM ERP — DP for mySAP now supports Version 2.0 of the Media Management application programming interface (API) that was made available with Oracle 8.1 as the interface to Recovery Manager (RMAN), the Oracle Backup and Restore Interface Application.

6.3.2 Performance: Reduced CPU consumption

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BUFFCOPY PREVENT: CPU reduction for LANFREE

- Version 5.3 significantly reduces the client CPU consumption in LANFREE environments. This requires you to upgrade DP mySAP, TSM server, TSM API, and TSM StorageAgent.
- The CPU consumption for LANFREE backups will decrease with the update. However, for the full CPU reduction benefit, the BUFFCOPY PREVENT option has to be enabled in the utl-file.

It is not guaranteed that the option will reduce CPU consumption.

Benchmark Results

parallel sessions	previous (% CPU Load)	new (% CPU Load)
1	~15	~10
2	~35	~25
3	~55	~45
4	~75	~65

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Figure 6-5 Tivoli Storage Manager ERP — DP for mySAP: Reduced CPU consumption

A new efficient data transfer model between API and Storage Agent is exploited.

In addition, the following BUFFCOPY options are available with Tivoli Storage Manager ERP 5.3:

► BUFFCOPY PREVENT

This option is new and reduces CPU for backups where possible.

BKI5016I: Time: 12/01/04 11:50:58 New TSM session created: MGMNT-CLASS: FILE, TSM-Server: PONG, type: PREVENT

We recommend that you use this option in LANFREE environments. However, if client compression, client encryption, or both are activated in the Tivoli Storage Manager options file (dsm.sys or dsm.opt on UNIX or Linux or <server.opt> on Windows) or a BUFFSIZE greater than 900 KB is specified in the utl file, buffer copies cannot be prevented.

► BUFFCOPY SIMPLE

Use this option as the traditional approach is used today.

BKI5016I: Time: 12/01/04 11:50:58 New TSM session created: MGMNT-CLASS: FILE, TSM-Server: PONG, type: SIMPLE

This is the default option. Enable it as a workaround for problems where backups frequently fail and BKI5016I indicates sessions of type PREVENT.

► **BUFFCOPY AUTO**

This is a new option, but if possible, use BUFFCOPY PREVENT.

```
BKI5016I: Time: 12/01/04 11:50:58 New TSM session created: MGMNT-CLASS: FILE,
TSM-Server: PONG, type: PREVENT
BKI5016I: Time: 12/01/04 11:50:58 New TSM session created: MGMNT-CLASS: FILE,
TSM-Server: PONG, type: SIMPLE
```

This option is the same as PREVENT if this is possible. Otherwise it switches to SIMPLE.

6.3.3 DB2 UDB log management with DP for mySAP

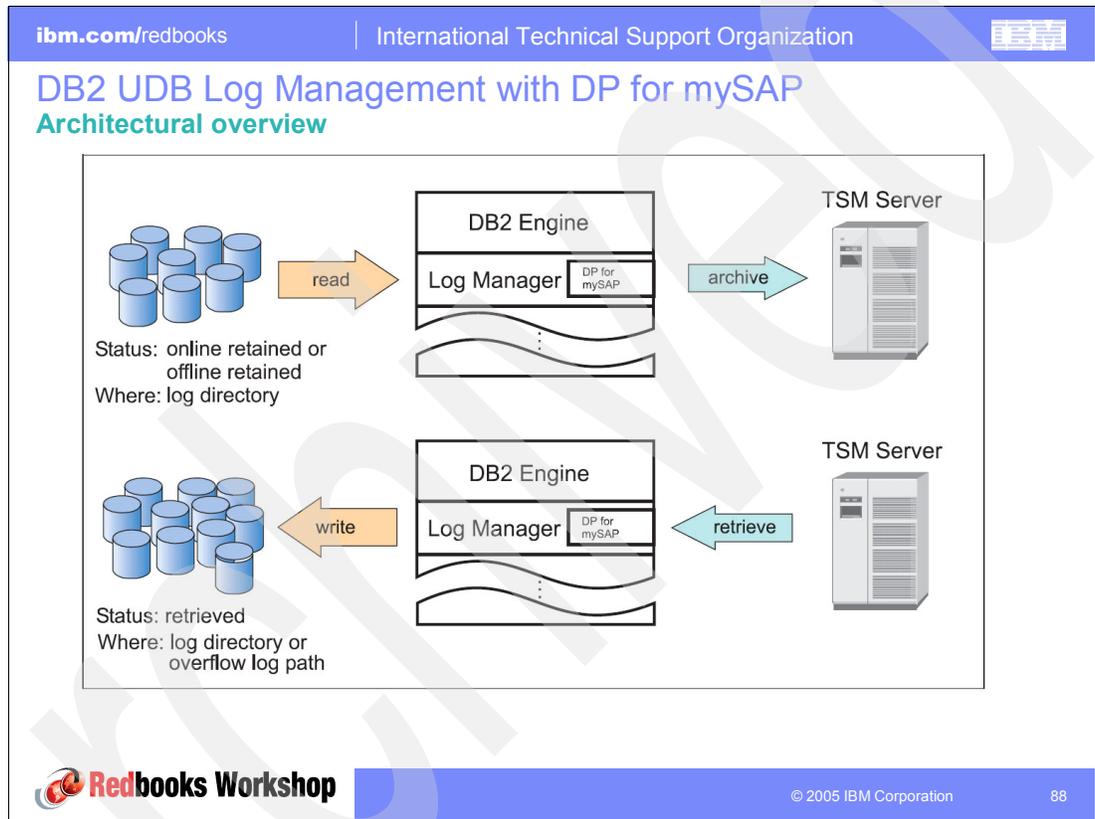


Figure 6-6 DP for mySAP: DB2 UDB Log management architectural overview

Enhanced log file management via a new built-in log manager became available with DB2 UDB 8.2. Previous to that version, the log manager did not meet requirements for log management requested by SAP. It made the usage of external log management tools (BRARCHIVE, BRRESTORE, userexit) necessary. DP for mySAP supports the usage of the new log manager, obsoleting usage of the external tools.

The usage of the DB2 Log Manager in combination with Data Protection for mySAP is highly optimized for R/3 systems when looking at High Availability Disaster Recovery (HADR) scenarios:

- Multiple log copies
- Selectable management classes
- Alternate Tivoli Storage Manager server
- Multiple Tivoli Storage Manager servers
- Backup versioning (full database backups with corresponding log files)

Data Protection for mySAP is loaded dynamically as a shared library on UNIX or a dynamic link library (DLL) on Windows by the DB2 Log Manager and runs as part of the DB2 engine. When a log file is ready to be archived, the DB2 Log Manager starts to archive this file by passing it to DP for mySAP. DP for mySAP passes this data to Tivoli Storage Manager.

In case of a database rollforward recovery, the DB2 Log Manager checks to see whether the corresponding log files are already located in either the log path or an overflow log path specified with the DB2 **rollforward** command. If the log files are not found at one of these locations, the DB2 Log Manager checks with DP for mySAP to see if the corresponding log images can be found on Tivoli Storage Manager. If they are, DP for mySAP retrieves the data from Tivoli Storage Manager and passes it to the DB2 Log Manager. The DB2 Log Manager then writes the log files to the file system. Then, these log files are applied to the database.

The following options are new for Data Protection for mySAP:

- ▶ BRARCHIVEMGTCLASS
- ▶ MAX_SESSIONS
- ▶ REDOLOG_COPIES
- ▶ SESSIONS

These options are new in DB2 UDB v8.2:

- ▶ LOGARCHMETH (VENDOR:<shared vendor library>)
- ▶ LOGARCHOPT (DP for mySAP env. File)

If the SAP tools (BRARCHIVE, BRRESTORE) were used before to archive or retrieve log files, the setup of DP for mySAP can be retained as is. The parameters listed previously are also suitable for archive and retrieve with DP for mySAP and the DB2 Log Manager.

With DB2 UDB v8.2, the following new database configuration parameters are available to set up the DB2 log file management:

- ▶ **LOGARCHMETH1**: Media type of primary destination for archived log files. With DP for mySAP, the full qualified name of the shared library transferring the data is provided.
- ▶ **LOGARCHOPT1**: Options field for the primary destination for archived log files. With DP for mySAP, a file containing the environment settings is provided.
- ▶ **LOGARCHMETH2**: Media type of the secondary destination for archived log files. If this path is specified, log files are archived to both this destination and the destination specified by LOGARCHMETH1.
- ▶ **LOGARCHOPT2**: The options field for the secondary destination for archived log files.
- ▶ **FAILARCHPATH**: If DB2 is unable to archive log files to both the primary and secondary (if set) archive destinations due to a media problem, then DB2 tries to archive log files to this path. This path must be to a disk.
- ▶ **NUMARCHRETRY**: The number of retries to archive a log file to the primary or secondary archive destination before trying to archive log files to a failover directory. This is used only if FAILARCHPATH is set. If NUMARCHRETRY is not set, DB2 continuously retries archiving to the primary or secondary log archive destination.
- ▶ **ARCHRETRYDELAY**: The number of seconds to wait after a failed archive attempt before trying to archive the log file again. Subsequent retries take affect only if NUMARCHRETRY is at least set to 1.

At least one of the two archive destinations (LOGARCHMETH1, LOGARCHMETH2) with its corresponding options field (LOGARCHOPT1, LOGARCHOPT2) has to be adapted. Example 6-1 shows how to update DB2 running on an AIX system for using the new log management.

Example 6-1 Updating DB2 on AIX system for using the new log management

```
db2 update db cfg for <dbname> using LOGARCHMETH1
VENDOR:/usr/tivoli/tsm/tdp_r3/db264/libtdpdb264.a
db2 update db cfg for <dbname> using LOGARCHOPT1 /db2/<dbname>/tdpr3/vendor.env
```

When updating the LOGARCHMETH database configuration parameters, the change takes effect on the next log file to be archived.

6.3.4 DP for mySAP: Redirected restore

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Redirected restore

Ease of DB cloning

- Create new directory structure
- Restore the DB to new directories
- Protocol file for each restore

BACKINT-Filemanager V1.7. Copyright IBM 2004

Backu-
|-----|
TST_A1
12 BID1

Please enter the following information

OLD SID: TST
NEW SID: NEW
Create directories if they don't exist? Y/N _

TAB change windows F2 Restore F3 Mark all F4 Unmark all F5 refresh
F6 fileInfo F7 redirected F8 Delete F10 exit ENTER mark file

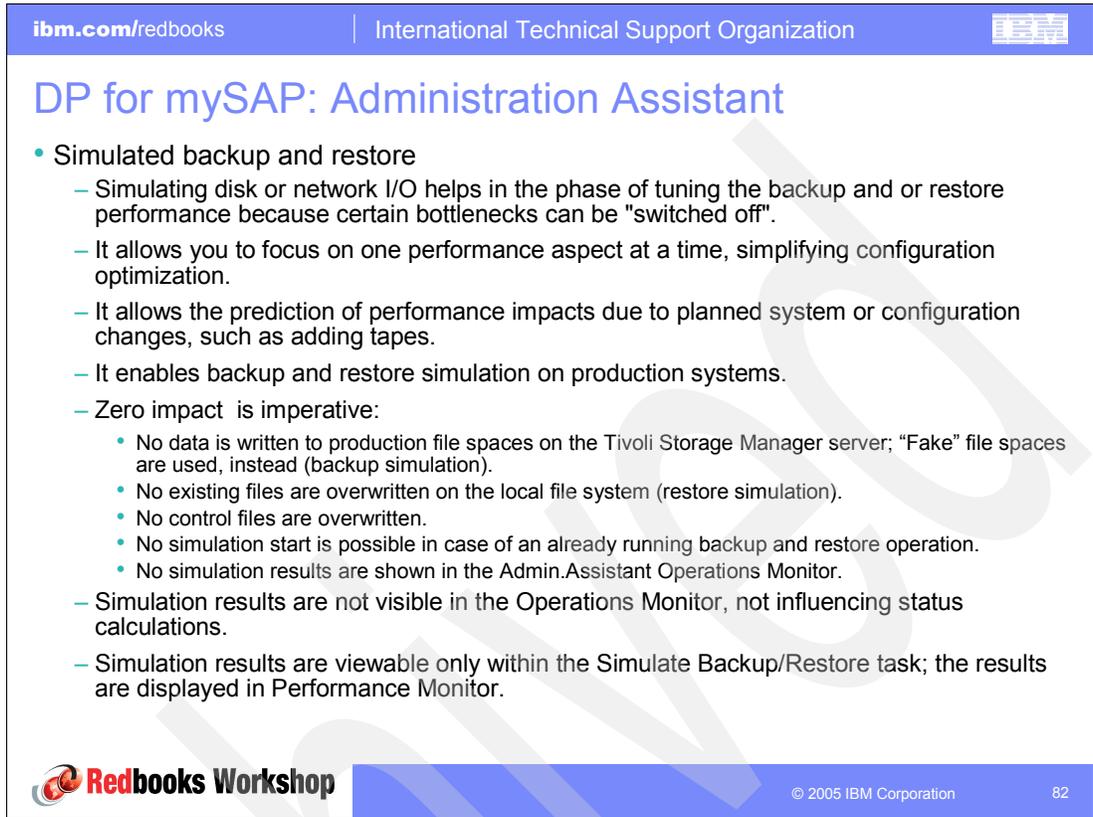
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Figure 6-7 DP for mySAP: Redirected restore

Redirect restore provides a simplified cloning of mySAP databases through restore by enhancements in BACKFM.

- ▶ Why cloning?
 - It copies the database instances for testing, development, education and more.
 - It restores the original DB and switch to a different security identifier (SID).
- ▶ Redirected restore works similarly to a regular backfm restore.
 - a. Select the files.
 - b. Press F7 for a redirected restore.
 - c. Enter the old SID and a new SID.
 - d. backfm creates a new directory structure if desired.
- ▶ Each restore writes a logfile.
 - The default location is in `$SAPDATA_HOME/sapbackup/backfm_time.log`.
 - Overwrite the default directory with the `-o` parameter of backfm.

6.3.5 DP for mySAP: Administration Assistant changes



The screenshot shows a slide from an IBM Redbooks Workshop. The slide has a blue header with the text 'ibm.com/redbooks' on the left, 'International Technical Support Organization' in the center, and a small IBM logo on the right. The main title of the slide is 'DP for mySAP: Administration Assistant' in a large blue font. Below the title is a bulleted list of features and benefits of simulated backup and restore. At the bottom of the slide, there is a 'Redbooks Workshop' logo on the left, and copyright information '© 2005 IBM Corporation' and the page number '82' on the right.

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DP for mySAP: Administration Assistant

- Simulated backup and restore
 - Simulating disk or network I/O helps in the phase of tuning the backup and or restore performance because certain bottlenecks can be "switched off".
 - It allows you to focus on one performance aspect at a time, simplifying configuration optimization.
 - It allows the prediction of performance impacts due to planned system or configuration changes, such as adding tapes.
 - It enables backup and restore simulation on production systems.
 - Zero impact is imperative:
 - No data is written to production file spaces on the Tivoli Storage Manager server; "Fake" file spaces are used, instead (backup simulation).
 - No existing files are overwritten on the local file system (restore simulation).
 - No control files are overwritten.
 - No simulation start is possible in case of an already running backup and restore operation.
 - No simulation results are shown in the Admin.Assistant Operations Monitor.
 - Simulation results are not visible in the Operations Monitor, not influencing status calculations.
 - Simulation results are viewable only within the Simulate Backup/Restore task; the results are displayed in Performance Monitor.

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Figure 6-8 DP for mySAP: Simulated backup and restore

The Administration Assistant now provides the functionality to simulate a backup or restore without affecting the productive system. This makes it much easier to identify performance bottlenecks. It also allows you to verify the effects of changes made to the system configuration.



DP for mySAP: Bottleneck detection

- It is difficult to identify the root cause for a backup and restore performance bottleneck.
 - Client disk I/O
 - Network
 - Server tape I/O
- A new Performance Monitor user interface is available.
 - Summary Panel
 - File Details and Messages
 - Replay Panel
 - Real time Panel
- Graphical representation of throughput analysis allows for easy identification of bottlenecks.

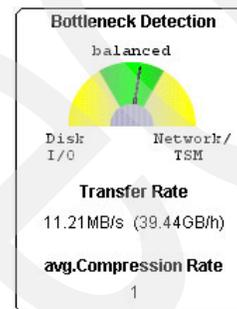


Figure 6-9 DP for mySAP: Bottleneck detection

The Administration Assistant now provides a feature rich performance monitor to check for possible bottlenecks within the system configuration. Usage of the monitor makes it much easier to verify whether the problem is with either of the following types of information:

- ▶ Local disk I/O
- ▶ Network
- ▶ Server or server tape I/O

With previous versions, this task was difficult to accomplish and required heavy testing and tracing.

6.4 Data Protection for Lotus Domino 5.3.0

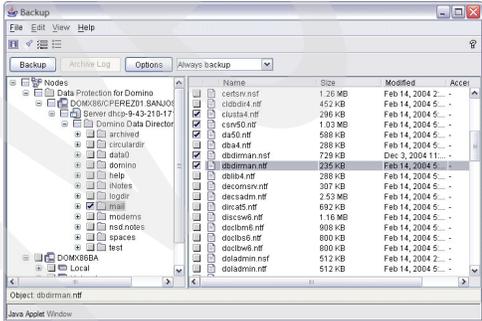
The following sections look at the newly introduced Data Protection features for Lotus Domino 5.3.0.

6.4.1 New and updated functionality

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Data Protection for Lotus® Domino 5.3.0

- Tivoli Storage Manager Web Client and Java GUI support
 - Backup and restore of Domino databases and transaction log extents.
 - Supported on Windows, AIX, Solaris, OS/390 and Linux86/390
 - Implemented as a B/A client plug-in
- Enhanced logger error messages to Tivoli Storage Manager Server
- Support for Central European Languages
- Windows Native GUI – Performance enhancements
- User's Guide Enhancements to SC32-9056-02
- AES 128-bit data encryption



The new WEB GUI (Backup Panel)

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Figure 6-10 DP for Lotus Domino 5.3.0: New and updated functions

- ▶ The introduction of the new Web Client and Java support improves the usability of DP for Domino. The following slides provide configuration information and an overview of the modules involved.
- ▶ Error logging has been enhanced to Tivoli Storage Manager server, with the new message:
“ACD5241E Data Protection for Domino error: DPDmessage”
This message is sent only when a Tivoli Storage Manager session exists, during backup and restore.
- ▶ Memory management has been improved for better performance and scalability on the Windows platform.
- ▶ The User's Guide has been enhanced for ease of use and better understanding.
- ▶ Encryption has been uplifted to 128 bits.

6.4.2 Web client option and configuration files

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Data Protection for Lotus Domino 5.3.0

- Web Client option and configuration files

dsm.sys (shared by B/A dsmagent & TSM API)

```

Servername cperez01ba
COMMethod TCPip
TCPPort 1500
TCPServeraddress cperez01.sanjose.ibm.com
NODENAME domx86ba
PASSWORDACCESS generate
PASSWORDDIR /opt/tivoli/tsm/client/ba/bin
DOMNODE /home/notes/domdsmc_notes/domdsm.cfg
-----
Servername cperez01
COMMethod TCPip
TCPPort 1500
TCPServeraddress cperez01.sanjose.ibm.com
NODENAME domx86
PASSWORDACCESS generate
PASSWORDDIR /home/notes/domdsmc_notes
    
```

domdsm.cfg

```

ADSMOPTFILE /home/notes/domdsmc_notes/dsm.opt
..
    
```

dsm.opt - B/A dsmagent

```

Servername cperez01ba
    
```

dsm.opt - TSM API (Domino plugin)

```

Servername cperez01
    
```

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Figure 6-11 DP for Lotus Domino: Option and configuration files

The **dominstall** program has been updated to configure Web Client. When you run **dominstall** to upgrade or to reconfigure a partition, the **domdsm.cfg** and **dsm.opt** files may already exist. You have the option to overwrite these files or create new ones.

If you decide to create new files, the **notes.profile** is updated as follows:

```

export DSMI_LOG=/opt/tivoli/tsm/client/domino/bin/domdsmc_notes
export DOMI_DIR=/opt/tivoli/tsm/client/domino/bin
export DOMI_LOG=/opt/tivoli/tsm/client/domino/bin/domdsmc_notes
export DOMI_CONFIG=/opt/tivoli/tsm/client/domino/bin/domdsmc_notes/domdsm.cfg2
alias domdsmc=domdsmc_notes
export PATH=/opt/lotus/bin:/databases/domino/domnote1data:$PATH
    
```

Note: In this example, you need to source the **notes.profile** to update the environment. If you do not, the environment continues to point to **domdsm.cfg** instead of **domdsm.cfg2**.

The **domdsm.cfg** file is created by **dominstall**:

```

ADSMLOGDIR=/opt/tivoli/tsm/client/domino/bin/domdsmc_notes
ADSMOPTFILE=/opt/tivoli/tsm/client/domino/bin/domdsmc_notes/dsm.opt
DOMI_DIR=/opt/tivoli/tsm/client/domino/bin
LOGFILE=/opt/tivoli/tsm/client/domino/bin/domdsmc_notes/domdsm.log
NOTESINIPATH=/opt/lotus/notesdata
DOMINSTALLPATH=/opt/lotus/bin
    
```

Note the following points regarding the `dsm.sys.changed_entries` and `dsm.sys.additions` files:

- ▶ A real `dsm.sys` file is not modified.
- ▶ `dsm.sys.changed_entries` contain selected server stanza updated with the `DOMNODE` option.

`DOMNODE` specifies the DP for Domino API library configuration file `domdsm.cfg`, defined Backup/Archive `dsmagent` options file.

The following options are new in `domdsm.cfg`:

- ▶ **DOMINSTALLPATH**: Specifies Domino's installation directory
This option is needed by the Domino UNIX plug-in option to locate Domino's startup script.
- ▶ **ADSMOPTFILE**: Specifies the TSM API options file; needed by plug-in.
- ▶ **ADSMLOGDIR**: Specifies the location of the Tivoli Storage Manager API logfile, `dsmerror.log`

6.4.3 Windows components

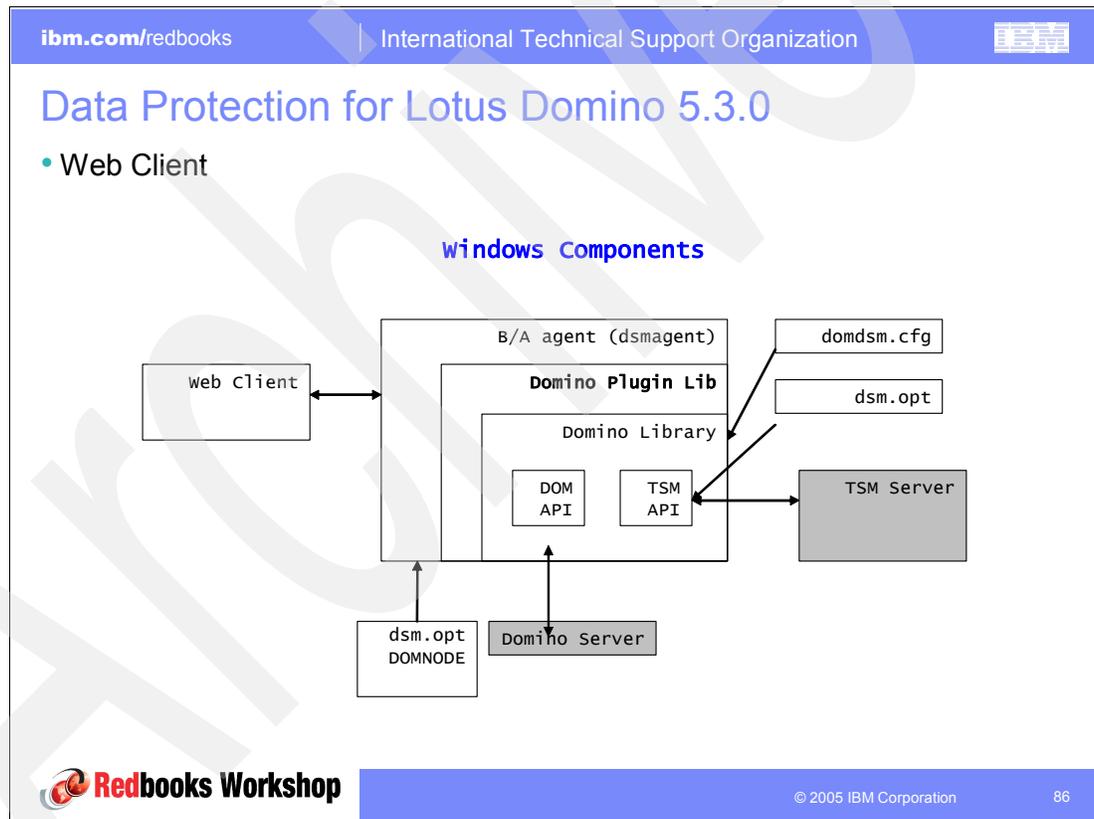


Figure 6-12 DP for Lotus Domino: Windows components

Domino databases are backed up using the Tivoli Storage Manager API and are not shared by Backup/Archive common code. Therefore, there can be one `dsm.opt` file for a Backup/Archive client and one for the DP for Domino plug-in.

On Windows everything is executed inside a single `dsmagent` process. The `DOMNODE` option is specified in the Backup/Archive `dsmagent` options file.

6.4.4 UNIX components

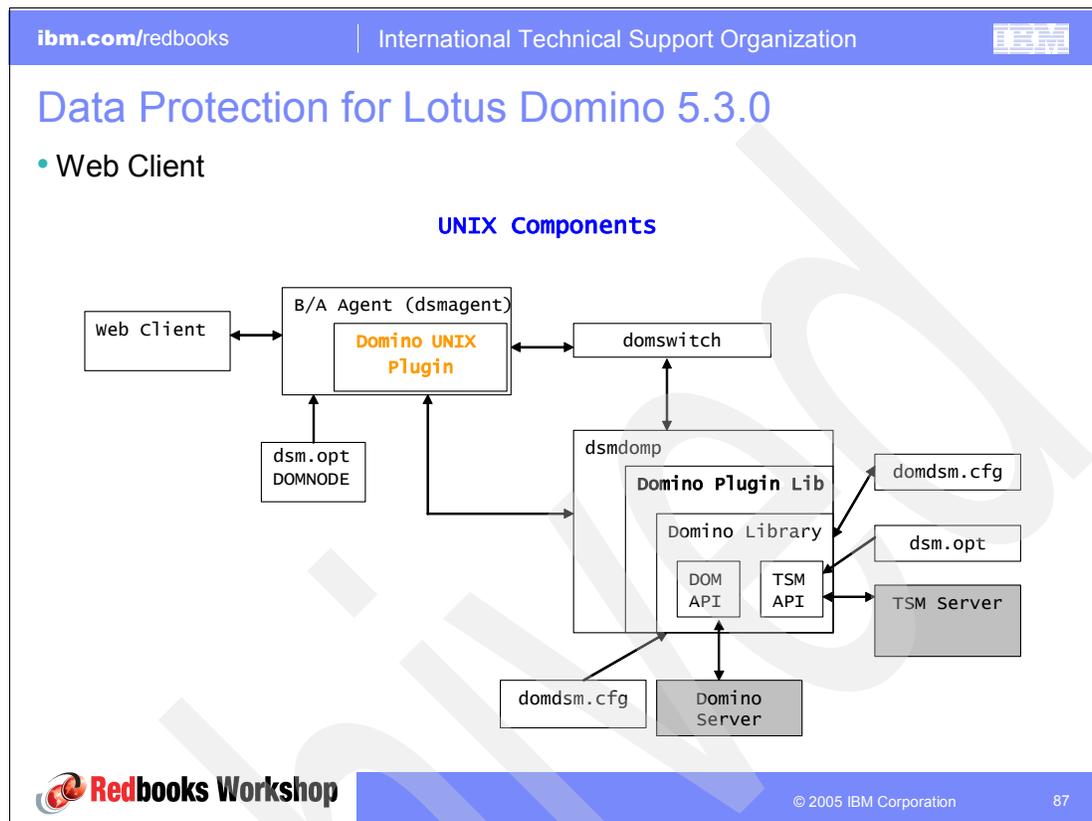


Figure 6-13 DP for Lotus Domino: UNIX components

The components work together in the following manner:

1. Backup/Archive dsmagent initializes the Domino plug-in UNIX library as requested by the Web Client operation.
2. domswitch launches dsmdomp running as a notes user and exits.
3. dsmdomp communicates with Domino plug-in through a socket using verbs.

The following sequence of events occurs:

1. A request comes from a Web client.
2. dsmagent initializes the Domino plug-in; that is domswitch is launched.
3. domswitch launches dsmdomp and exists.
4. dsmdomp waits for a "setup" request and a specific operation request from dsmagent through the socket.
5. dsmdomp receives a request and performs the operation.
6. dsmdomp sends data and status information to dsmagent through the socket using verbs.
7. dsmdomp completes the operation.
8. dsmagent tells dsmdomp to close the connection.
9. dsmdomp exits.

Note: domswitch and dsmdomp are launched for each operation.

Use cases

This chapter provides use cases to demonstrate some of the new functions of IBM Tivoli Storage Manager Version 5.3.

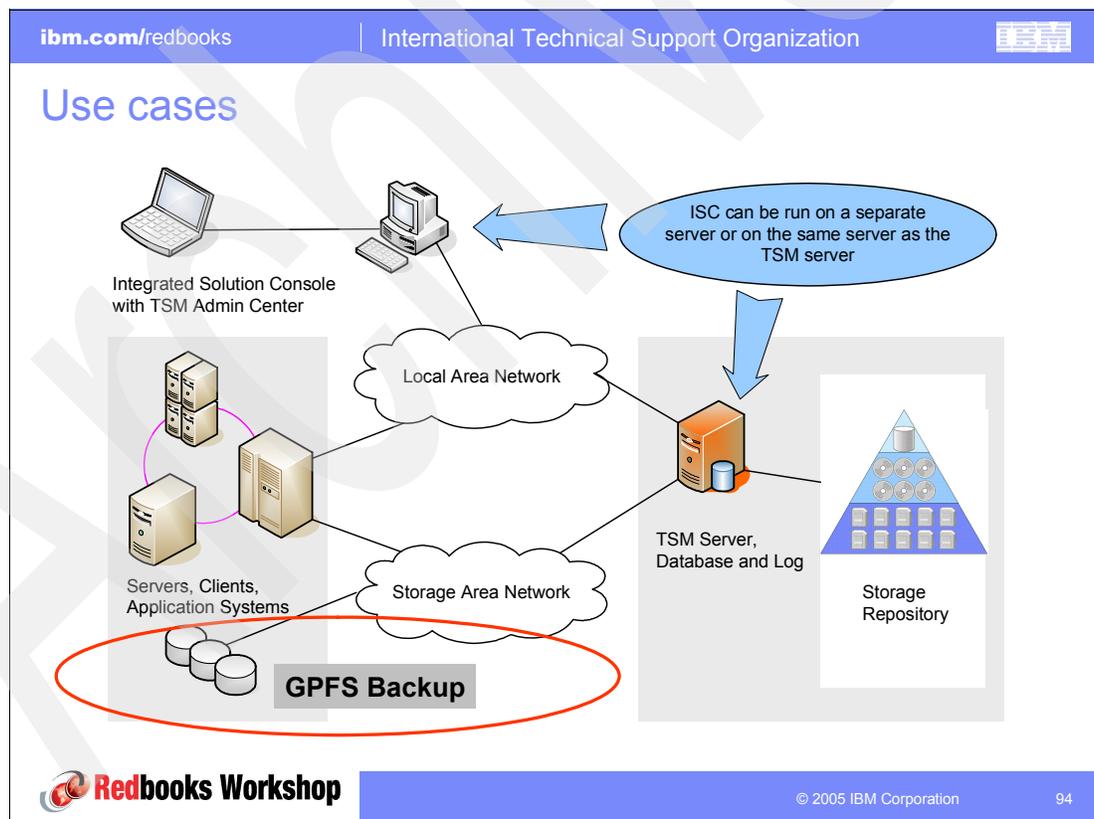
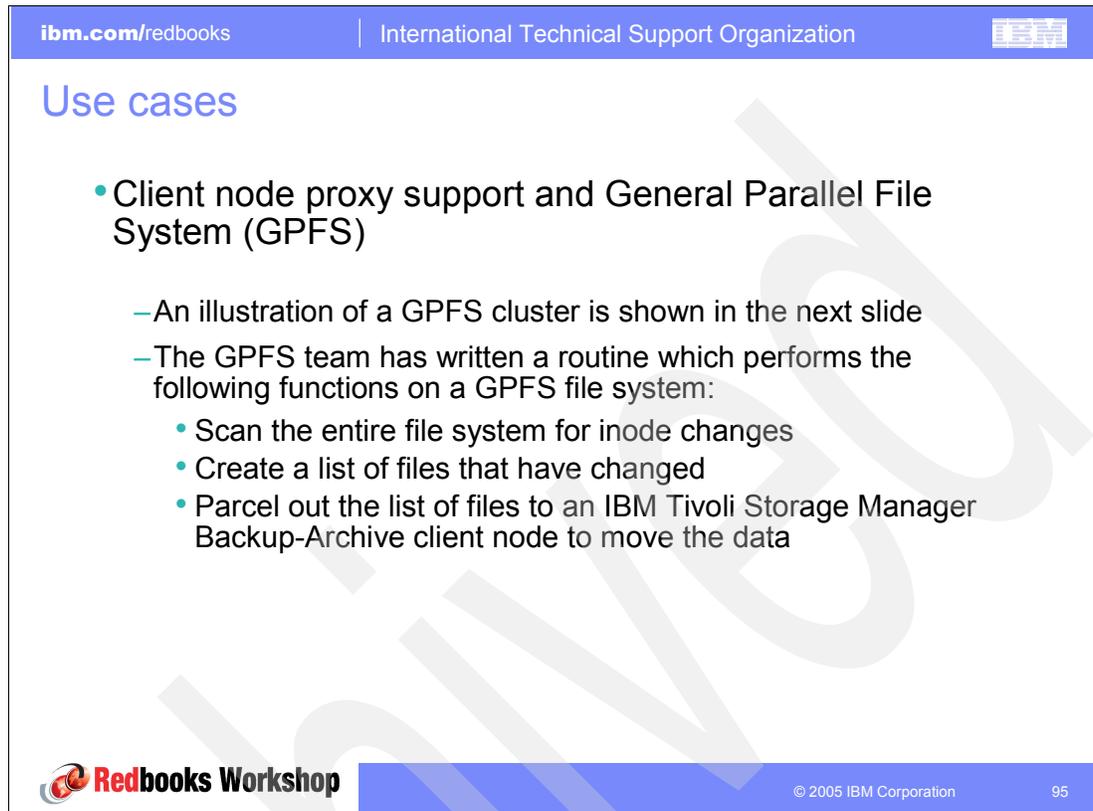


Figure 7-1 Tivoli Storage Manager components

7.1 Client node proxy support and GPFS



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Use cases

- Client node proxy support and General Parallel File System (GPFS)
 - An illustration of a GPFS cluster is shown in the next slide
 - The GPFS team has written a routine which performs the following functions on a GPFS file system:
 - Scan the entire file system for inode changes
 - Create a list of files that have changed
 - Parcel out the list of files to an IBM Tivoli Storage Manager Backup-Archive client node to move the data

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Figure 7-2 Client node proxy support and GPFS

Backups of multiple nodes which share storage can be consolidated to a common target node name on the Tivoli Storage Manager server. This is useful when the machine responsible for performing the backup may change over time, such as with a cluster. The `asnodename` option also allows data to be restored from a different system than the one which performed the backup.

- ▶ An *agent node* is a client node which has been granted authority to perform client operations on behalf of a target node.
- ▶ A *target node* is a client node which grants authority to one or more agent nodes to perform client operations on its behalf.

Use cases

Backing up a GPFS cluster

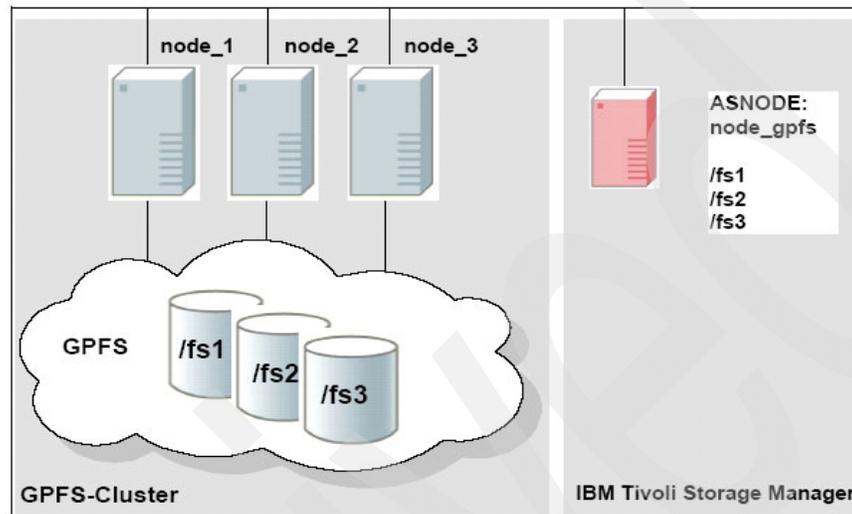


Figure 7-3 Backing up a GPFS cluster

Scheduling example for backing up a GPFS file system

Each client node authenticates with the server as the same node name, for example, `node_gpfs`. This is done by having a `dsm.sys` file on each machine with an entry:

```
nodename node_gpfs
```

The problem with this solution is that the password expiration cannot be managed automatically. If there are three nodes in the GPFS cluster, each node knows the password to `node_gpfs`. If the server expires the password, then one node resets the password and the other two can no longer authenticate. The only solution is to either turn off node authentication at the Tivoli Storage Manager server or to manually reset the password and update all three nodes with the new password.

The Tivoli Storage Manager scheduler is not currently used in this solution. However you can set up a schedule for `node_gpfs`, via a macro, to execute the file system scan or workload created from one client machine. Then this schedule is associated with one of the three nodes such as `node_1`.

A better solution is available through multinode support. Using the example of three nodes in the GPFS cluster, which would participate in the backup, follow these steps:

1. Define four nodes on the Tivoli Storage Manager server: `node_1`, `node_2`, `node_3`, and `node_gpfs`. `node_1`, `node_2`, and `node_3` are used only for authentication. All filesystems are stored with `node_gpfs`.

```
REGISTER NODE node_1 mysecretpw
REGISTER NODE node_2 mysecretpw
REGISTER NODE node_3 mysecretpw
REGISTER NODE node_gpfs mysecretpw
```

2. Define a proxynode relationship between the nodes:

```
GRANT PROXYNODE TARGET=node_gpfs AGENT=node_1, node_2, node_3
```

3. Define the node name and `asnode` name for each of the machines in their respective `dsm.sys` files:

```
nodename node_1
asnodename node_gpfs
```

4. Optionally define a schedule for only `node_1` to do the work:

```
DEFINE SCHEDULE STANDARD GPFS_SCHEDULE ACTION=MACRO OBJECTS="gpfs_script"
DEFINE ASSOCIATION STANDARD GPFS node_gpfs
```

5. On the `node_gpfs` node, run the schedule:

```
DSMC SCHED
```

Note: The multiple node design, as described previously, can be exploited only in a UNIX environment and not on Windows and NetWare Systems. The `asnodename` option is available on Windows systems. However, there is not as much benefit in using this option because of the filesystem naming limitations that are inherent in Windows systems.

7.2 CHECKOUT LIBVOL enhancements

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Use cases

- CHECKOUT LIBVOLUME

TSMLIB01 Properties (POLONIUM1)

Checkout Option

You must check out a volume before removing it from a library. You can check out one or more volumes ensure that the correct volume is removed by having its label read before it is checked out.

Eject volume

No

Yes

Yes, and move volume to bulk input-output station (requires operator reply)

The amount of user intervention required for checkin and checkout functions has been reduced.

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Figure 7-4 CHECKOUT LIBVOL enhancements

The following commands have changed:

- ▶ CHECKIN LIBVOLUME
- ▶ CHECKOUT LIBVOLUME
- ▶ LABEL LIBVOLUME
- ▶ MOVE DRMEDIA
- ▶ MOVE MEDIA

A REPLY command is no longer required if you specify a wait time of zero using the optional WAITTIME parameter on the CHECKIN LIBVOLUME or LABEL LIBVOLUME command. The default wait time is 60 minutes.

For the CHECKOUT LIBVOLUME, MOVE DRMEDIA, and MOVE MEDIA commands, the new default value of the REMOVE option is now REMOVE=BULK. This means that a REPLY is not requested. In addition, the server waits for a port to be made available if it is full.



Use cases: CHECKOUT LIBVOL

If a SCSI library . . .	And REMOVE=YES, then...	And REMOVE=BULK, then...	And REMOVE=NO, then...
Has entry or exit ports and an entry or exit port is available	The server moves the cartridge to the available entry or exit port and specifies the port address in a message. The server then prompts you to remove the cartridge from the slot and to issue a REPLY command.	The server moves the cartridge to the available entry or exit port and specifies the port address in a message. The server does not prompt you to remove the cartridge and does not request a REPLY command.	The server leaves the cartridge in its current slot within the library and specifies the slot address in a message. The server does not prompt you to remove the cartridge and does not require a REPLY command.
Has entry or exit ports, but no ports are available	The server leaves the cartridge in its current slot within the library and specifies the slot address in a message. The server then prompts you to remove the cartridge from the slot and to issue a REPLY command.	The server waits for an entry or exit port to be made available.	The server leaves the cartridge in its current slot within the library and specifies the slot address in a message. The server does not prompt you to remove the cartridge and does not require a REPLY command.

Figure 7-5 REMOVE options overview

Note: If you are using MOVE DRMEDIA on a library client in a shared library environment and you specify REMOVE=YES, REMOVE=BULK, or REMOVE=UNTILEEFULL, the following actions occur:

1. The library client requests the library manager to eject the volume from the library.
2. The library manager then deletes the volume entry from the library inventory.
3. The library client then changes the status of the ejected drmedia from *mountable* to *vault*.

IBM Tivoli Storage Manager diagnostics

This chapter explains where to look for problem determination for the Tivoli Storage Manager (TSM) client and server installation and for the different data protection clients. It also directs you where to look for hints and tips and which documentation to consult before you report a problem to IBM Support.

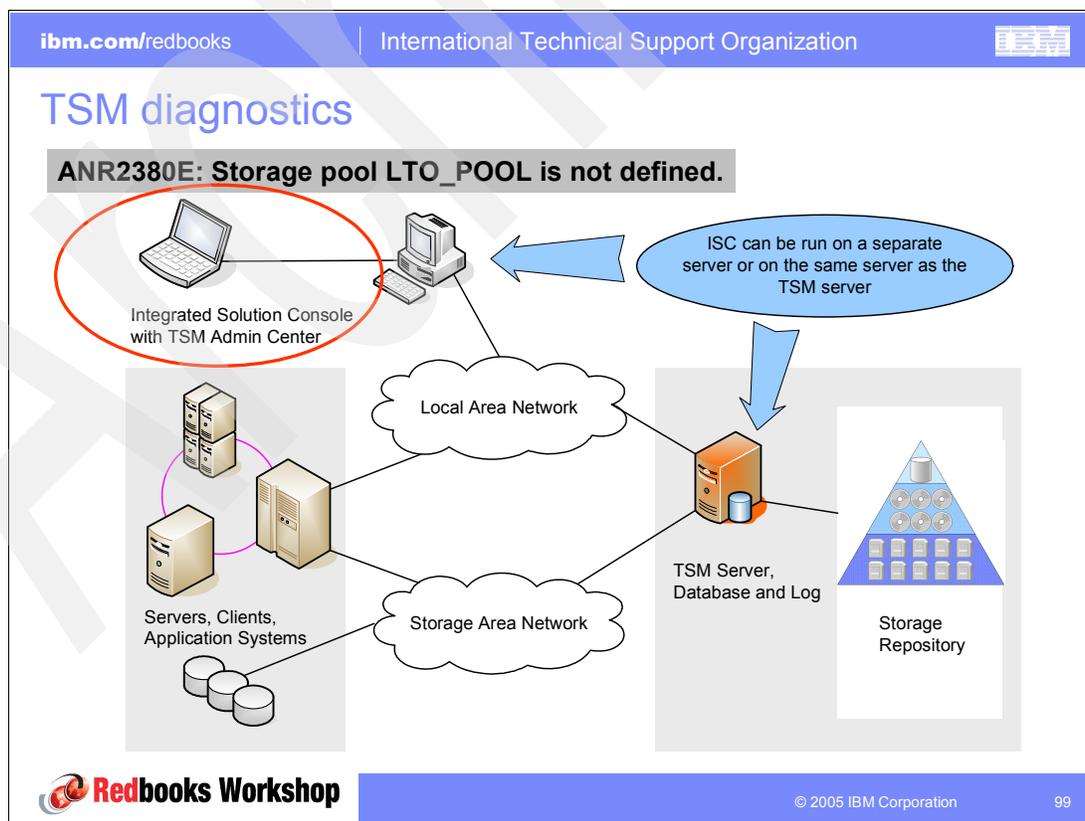


Figure 8-1 Tivoli Storage Manager components

8.1 Problem determination guide

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Tivoli Storage Manager troubleshooting

- Problem determination guide
 - Intended for anyone administering, managing or supporting Tivoli Storage Manager
 - References error logs, trace facilities, and other diagnostic information
 - A quick reference section to key topics relating to problem determination
 - Hints and tips
 - Answers “how do I diagnose...?” type questions
 - Already available with a previous version of Tivoli Storage Manager, but usage should be enforced
 - Official document name is *IBM Tivoli Storage Manager Problem Determination Guide*, SC32-9103-01

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Figure 8-2 Problem Determination Guide

The *IBM Tivoli Storage Manager Problem Determination Guide*, SC32-9103-01, became available earlier with the Version 5.2. This guide is the first place to search for information when there are problems with the Tivoli Storage Manager installation. The guide is intended for anyone who is administering or managing Tivoli Storage Manager.

The problem determination guide includes the following sections:

- ▶ Information section: This section provides a quick reference to key topics relating to problem determination. It covers such topics as tracing and other diagnostic tools available for Tivoli Storage Manager, as well as how to contact IBM to report a problem.
- ▶ Hints and tips: This section provides hints and tips for tuning and diagnosing aspects of your Tivoli Storage Manager environment that are external to Tivoli Storage Manager.
- ▶ How do I diagnose?: This section provides diagnosis and troubleshooting recommendations and tips for Tivoli Storage Manager. It also discusses common problems that users encounter.

Note: Information referenced within the problem determination guide may not be supported or applicable to all versions or releases of the product. This information can include technical inaccuracies or typographical errors. Changes are periodically made to the information therein. IBM may make improvements and changes in the products and the programs described in the publication at any time without notice.

8.2 Server utility

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Tivoli Storage Manager troubleshooting

- Server utility
 - The purpose of the TSM diagnostic utility (`tsmddiag`) is to simplify and speed up the process for gathering data that is considered valuable to assist in diagnosing a problem caused by a Tivoli Storage Manager component.
 - The `tsmddiag` utility is installed with supported TSM components, under the component's install directory `tsm_home/server/bin/tsmddiag/tsmddiag`.
 - When `tsmddiag` has completed execution, a file is created that is called `tsmddiag_results.tar` for UNIX environments and `tsmddiag_results.zip` for Windows environments. Clients need to submit this file with the PMR.

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Figure 8-3 Troubleshooting: `tsmddiag`

When IBM Service receives a Problem Management Record (PMR) from the field, there is a specific set of data that service needs immediately to start working on diagnosing the problem. A small application, called the `tsmddiag` utility, is now available for the Tivoli Storage Manager Server and Storage Agents. This utility simplifies and speeds up the process of gathering this data. We strongly recommend that you run `tsmddiag` and submit the data that is collected by this tool with the PMR.

When you report a problem, you must have the following information ready:

- ▶ The data collected by `tsmddiag` on the server, storage agent, or both
- ▶ The Tivoli Storage Manager client version, release, modification, and service level number
You can obtain this information by entering `dsmc` at the command line.
- ▶ The activity that you were doing when the problem occurred, including a listing of the steps that you followed before the problem occurred
- ▶ A description of the symptom or error that you encountered
- ▶ The exact text of any error messages relating to the symptom or error that you encountered
- ▶ Any error logs or other related documentation for the problem

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Using the Windows scheduler with Tivoli Storage Manager Operational Reporting

This appendix provides instructions to help you set up Tivoli Storage Manager Operational Reporting using the Windows scheduler mechanism. You can use the Windows scheduler service to obtain more granularity over what is provided by the Operational Reporting service itself.

Scheduling operational reports

In this scenario, we create a monitor with a custom summary that uses SQL time parameters. The reports are collected every 15 minutes. Follow these steps.

1. From the MMC console (see Figure A-1), expand **Reports**. Select **Operational Monitors**, right-click it, and select **New**.

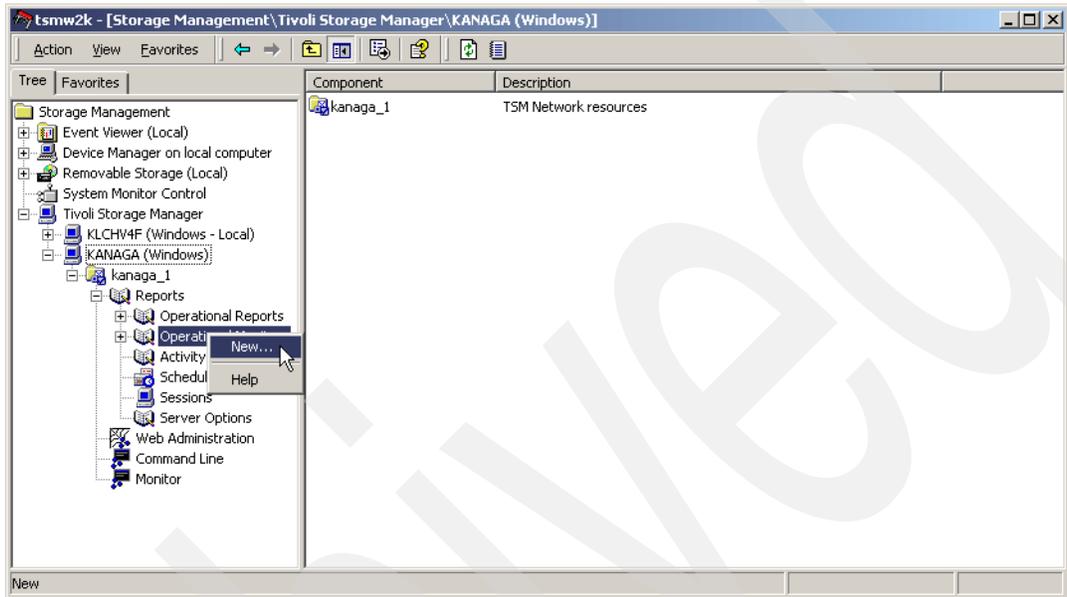


Figure A-1 Operational Reporting: Creating a monitor

2. Name the monitor. In this scenario, we name the monitor 15 Minute Monitor as shown in Figure A-2. Click **OK**.

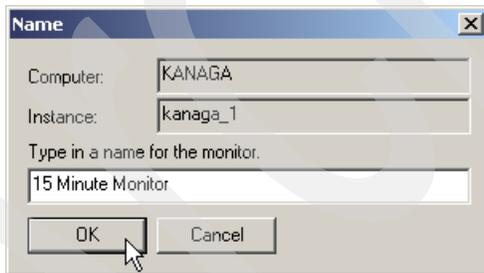


Figure A-2 Operational Reporting: 15 minute monitor

3. In the Properties window (Figure A-3), complete these steps:
 - a. Deselect the **Activate monitor** check box.
 - b. Select the **Use Collapsible sections** check box.
 - c. You can increase the number of **Web versions** if you want the monitor results to display in the Web summary.
 - d. Click **Settings**.

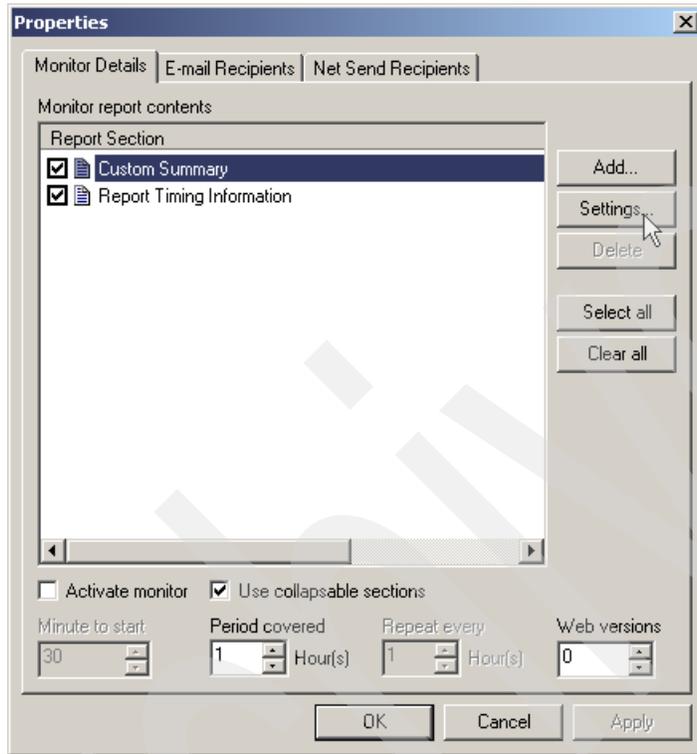


Figure A-3 Operational Reporting: Monitor properties

4. You see the Advanced Customization window (Figure A-4).
 - a. Click **Save As** to create a new custom summary template based on the default template.

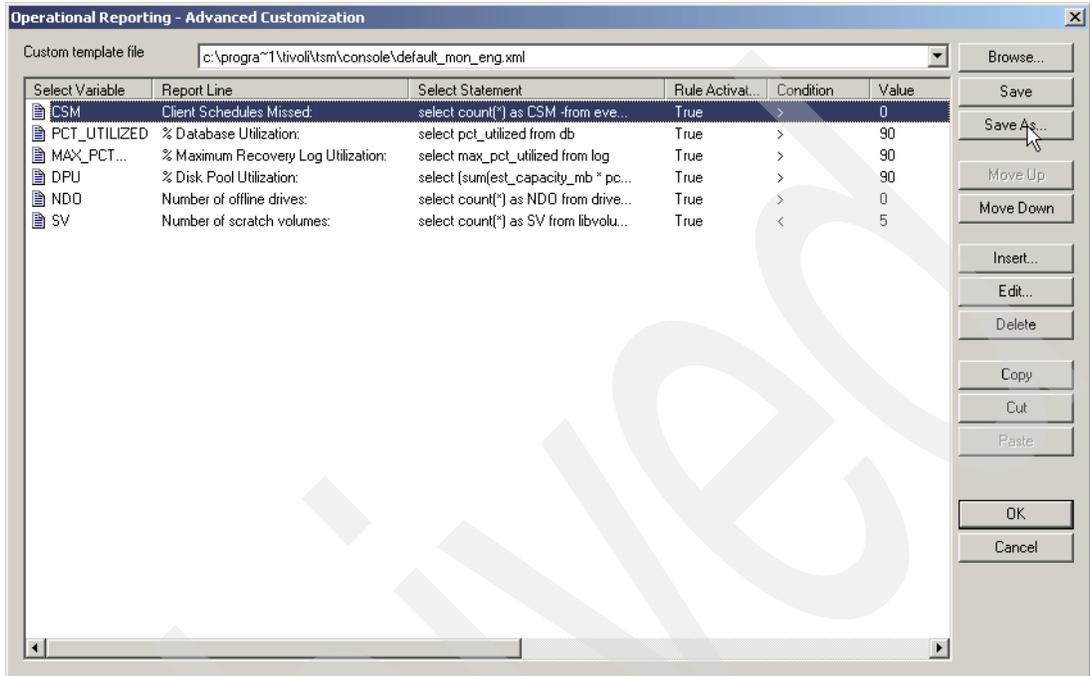


Figure A-4 Operational Reporting: Advanced customization

- b. In the Save As window (Figure A-5), save the template with a meaningful name. In this case, we chose 15minmon.xml. Click **Save**.

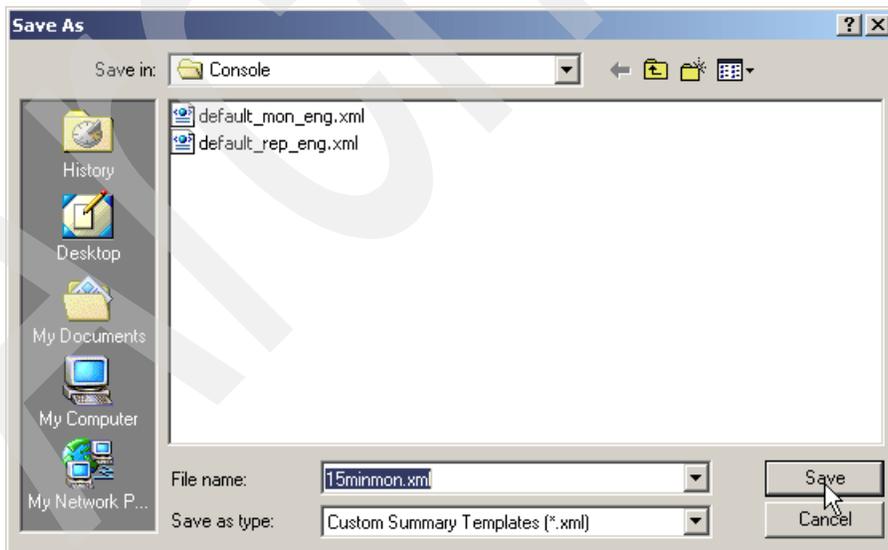


Figure A-5 Operational Reporting: Save as 15minmon.xml

5. Customize the default template.
 - a. As shown in Figure A-6, select the first report and click **Edit**.

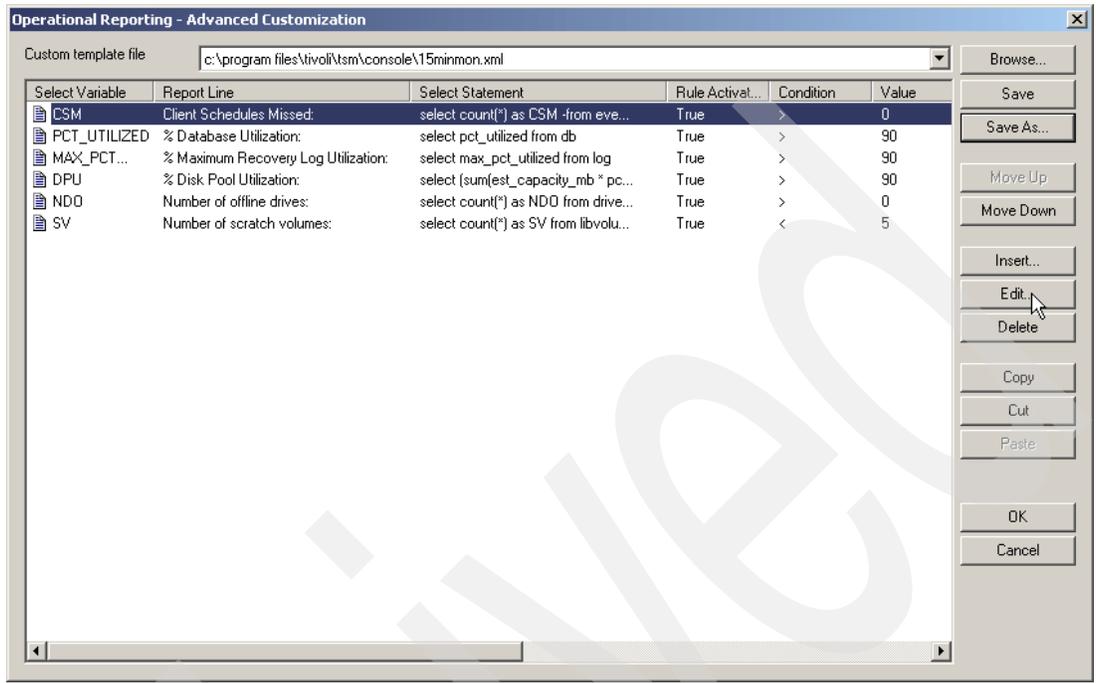


Figure A-6 Operational Reporting: Edit

- b. Change the SQL statement from the default as shown in the following example and in Figure A-7:

```
select count(*) as CSM -
from events where LENGTH(domain_name) IS NOT NULL and scheduled_start between '%s'
and '%s' and status='Missed'
```

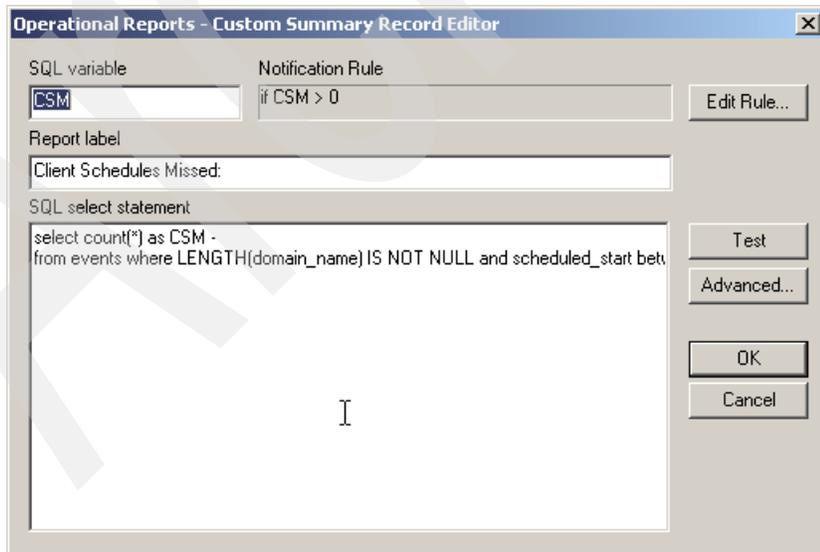


Figure A-7 Operational Reporting: Custom summary reports editor

Change it as shown in the following example and in Figure A-8 to reflect our requirement, which is to count the client schedules missed.

```
select count(*) as CSM -  
from actlog -  
where msgno=2578 and -  
date_time>current_timestamp - 10 minutes
```

Important: Do not leave any spaces before or after the angle bracket (>) between date_time and current_timestamp.

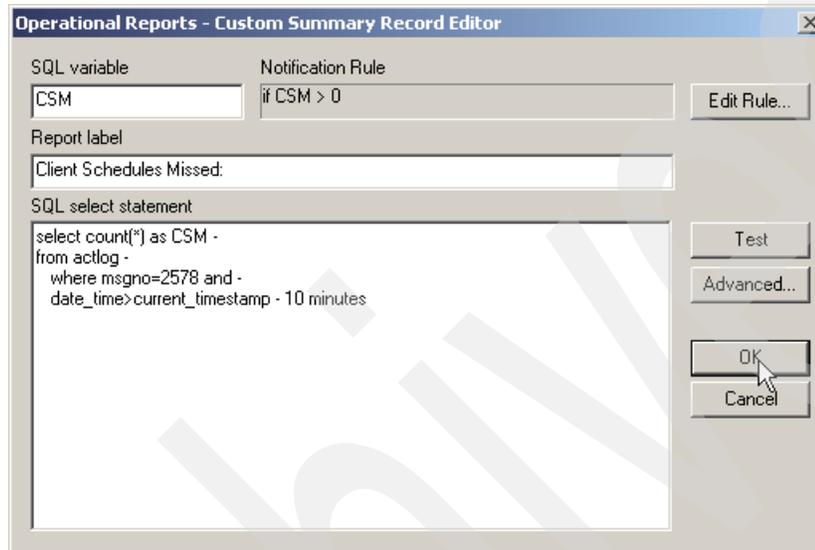


Figure A-8 Operational Reporting: Custom summary reports editor

- c. Confirm by clicking **OK**.

6. As shown in Figure A-9, select the summary record. Click **Copy** and then click **Paste**.

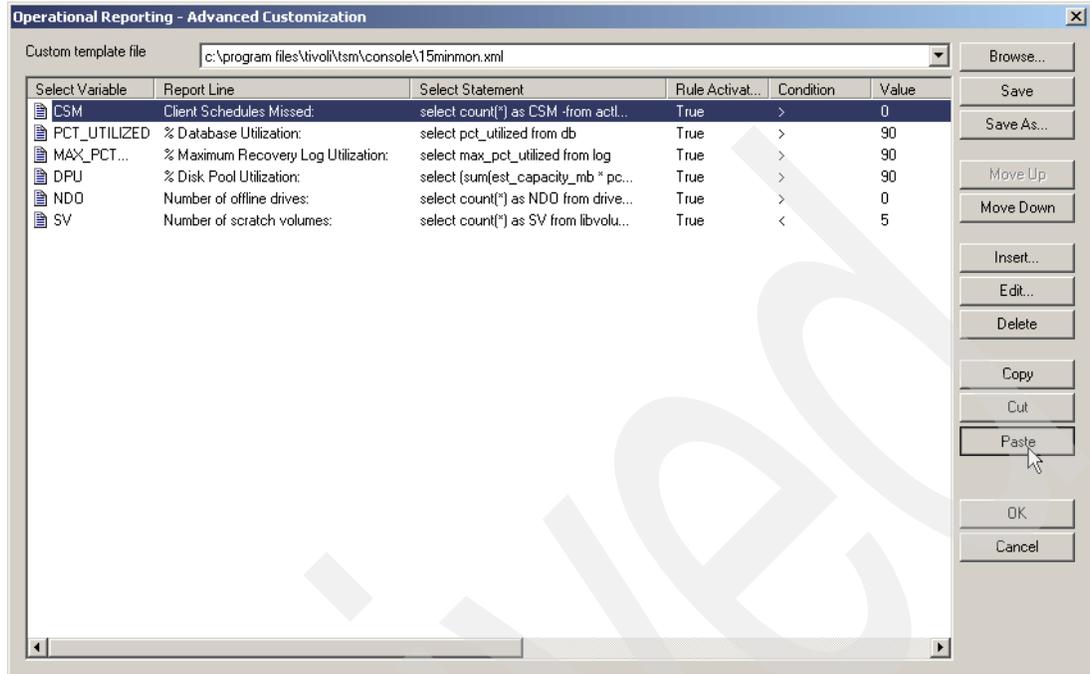


Figure A-9 Operational Reporting: Advanced customization: Copy/paste of summary record

7. Update the newly created summary report as shown in Figure A-10.
 - a. Select the record and click **Edit**.

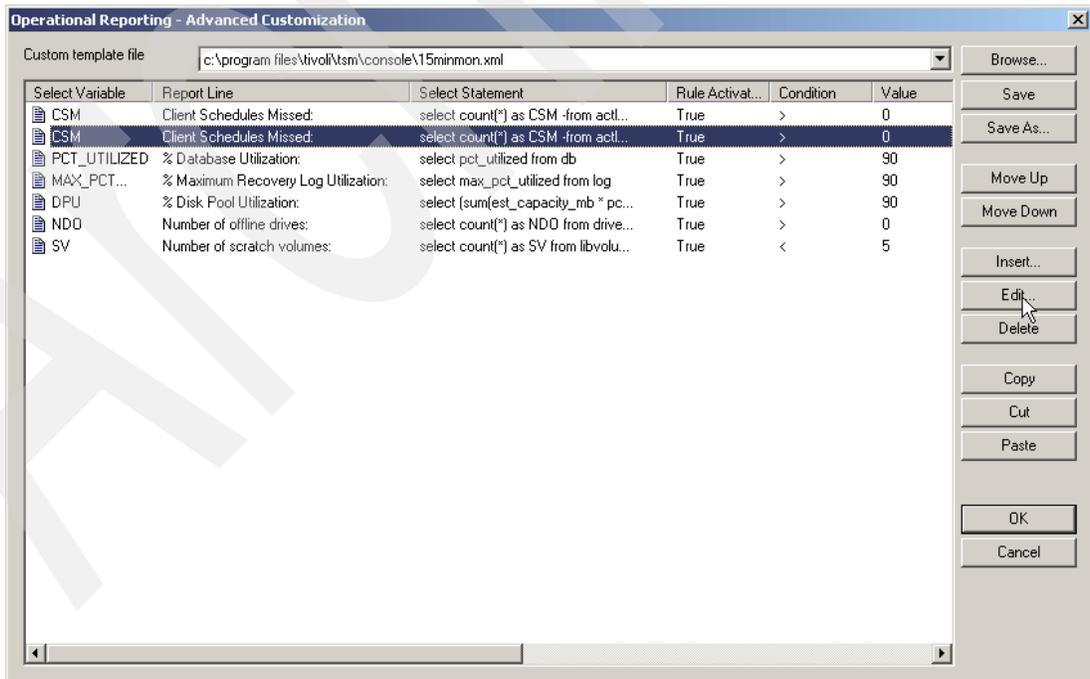


Figure A-10 Operational Reporting: Advanced customization: Editing the report

- b. Update the SQL variable name, the report label, and then select the statement as shown in Figure A-11. Click **Edit Rule**. Update the rule as shown in Figure A-11 and Figure A-12.
- c. Click **OK** to confirm it.

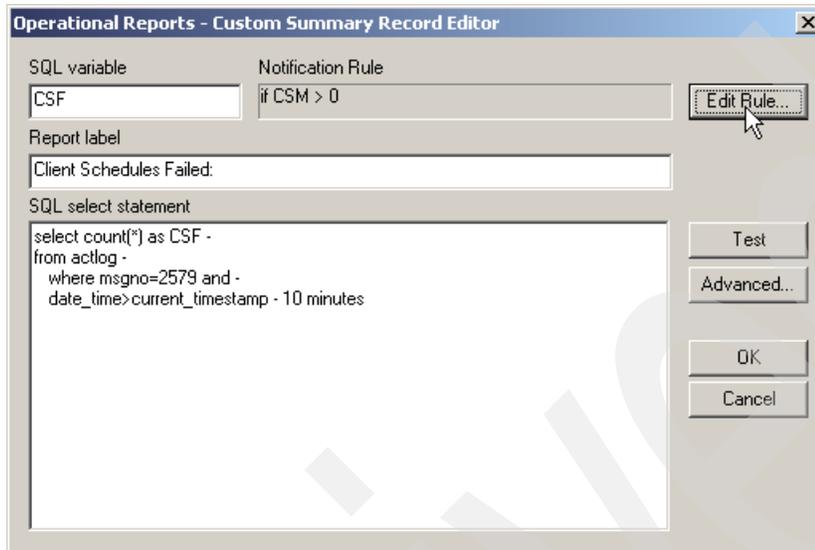


Figure A-11 Operational Reporting: Editing the custom summary

Figure A-12 shows the updated Notification rule.

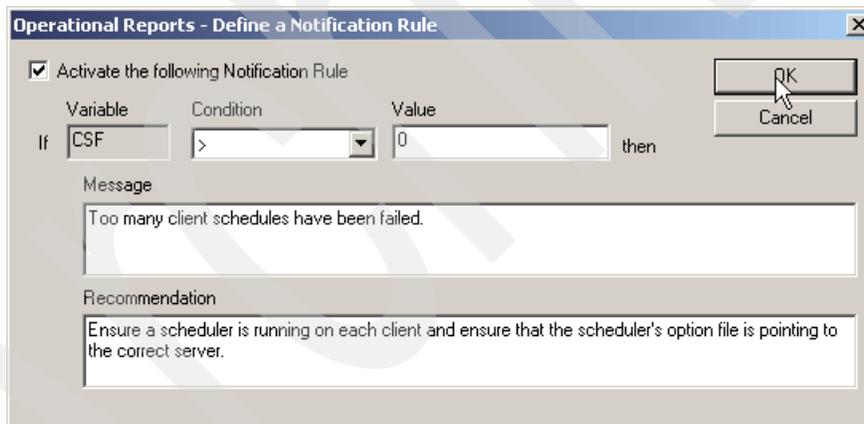


Figure A-12 Operational Reporting: Defining a notification rule

- Select the summary reports that you are not interested in for this monitor (see Figure A-13) and click **Delete**. From here, you can make changes to the summary reports according your requirements. For this example, we only want what we have defined so far.

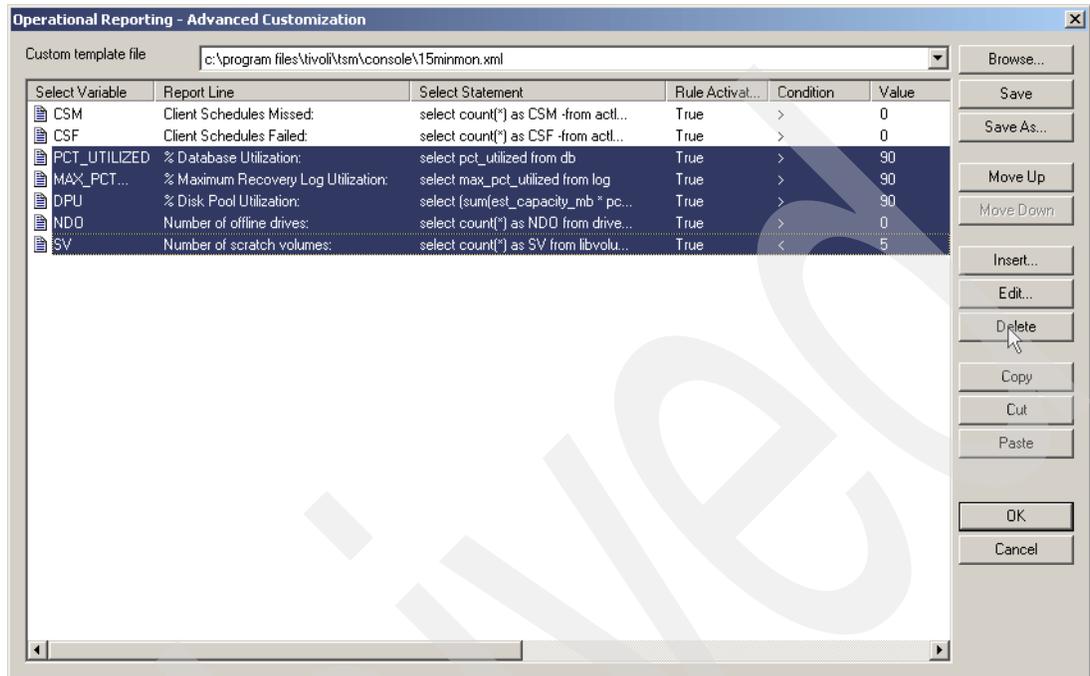


Figure A-13 Operational Reporting: Deleting reports

Figure A-14 shows how to update the recipient list to include the e-mail addresses of everyone who is to receive this notification. This completes the monitor definition.

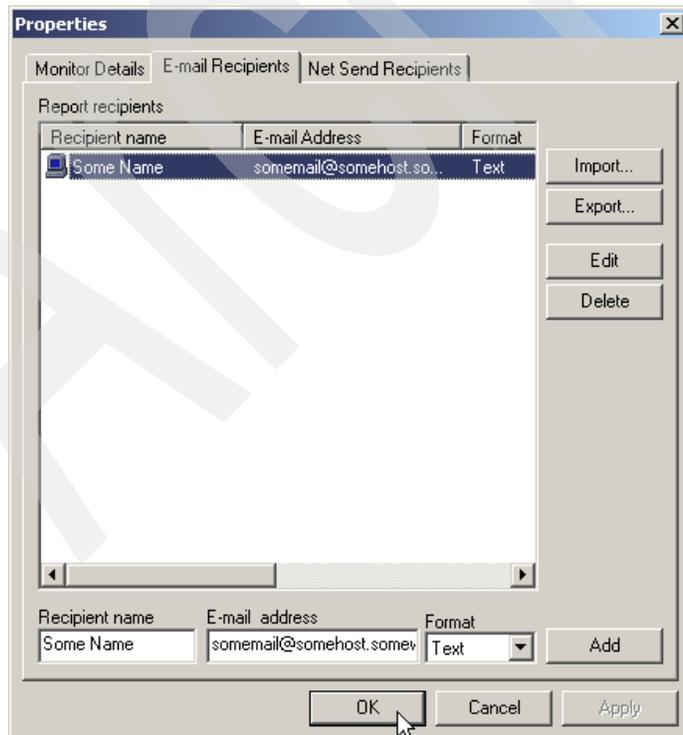


Figure A-14 Operational Reporting: Defining the e-mail recipients

We now create a Windows command file to run this monitor. The command file is required because the Windows scheduler does not allow command line parameters. Instead, we include the command line parameters from the script using the following steps.

1. Collect a list of defined reports and monitors. To do this, change to the directory where the console is installed.
2. From that directory, type the command:

```
tsmrept -type=list
```

The command line parameters for the monitor we want are the first ones listed as shown in Figure A-15. The first one is the 15 minute monitor that we just created.

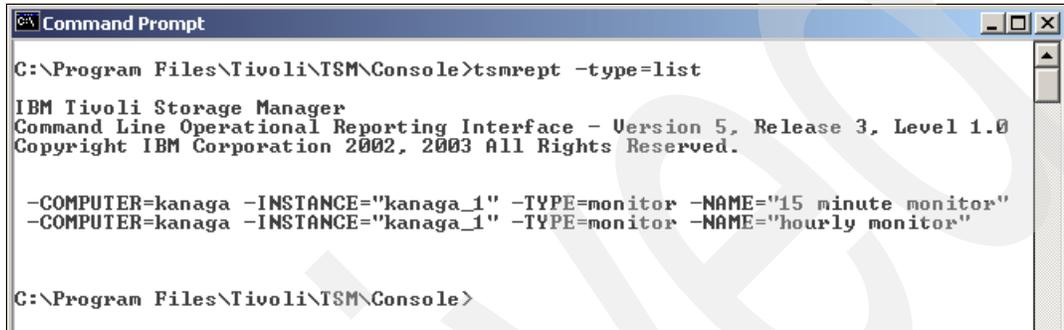


Figure A-15 Operational Reporting: `tsmrept -type=list`

3. Start notepad and create the command file. When completed, save it in normal ANSI encoding.



Figure A-16 Operational Reporting: Defining a .cmd file

Now set up the Windows scheduler to run this command file. In this scenario, we set it to run every 15 minutes as we define with our requirements.

1. Select **Start** → **Settings** → **Control Panel** to open the Windows Control Panel.
2. Click **Scheduled Tasks** to start the Wizard.
3. In the Scheduled Task Wizard window (Figure A-17), click **Next** to reach the first input window.



Figure A-17 Scheduled task wizard

4. Click the **Browse** button (Figure A-18) and navigate through the file system. Select the **15_minute_monitor.cmd** as the program to schedule.



Figure A-18 Scheduled Task Wizard: Assign program

5. As shown in Figure A-19, name the scheduled task, select **Daily** and click **Next**.



Figure A-19 Scheduled Task Wizard: Name task

6. In the next window (Figure A-20), define the start time, select **Every Day** and provide a start date. Click **Next**.

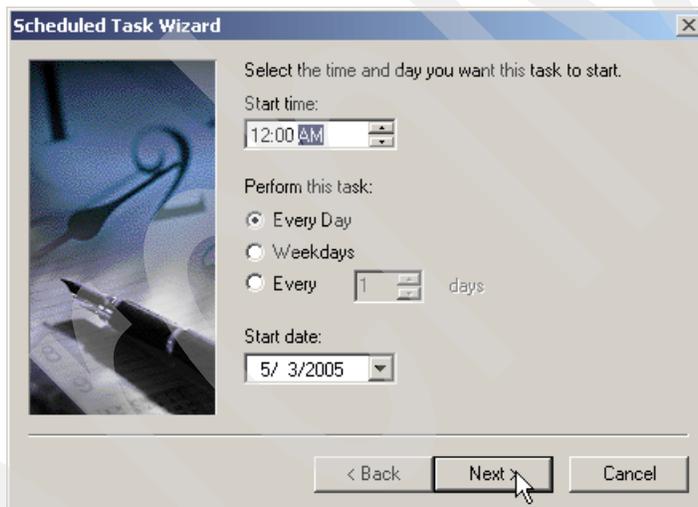


Figure A-20 Scheduled task wizard: Scheduling details

7. As shown in Figure A-21, provide the account information and click **Next**.

Note: If you use the account into which you are currently logged, you see the command line version of Operational Reporting appear each time the scheduler runs. To avoid this, use an account such as the administrator account that is not logged in. The schedule continues but you do not see any command prompts being displayed.



Figure A-21 Scheduled Task Wizard: User definitions

8. As you can see in Figure A-22, select the **Open advanced properties for this task when I click Finish** check box, and click **Finish** to complete the definition of the scheduled task.



Figure A-22 Scheduled Task Wizard: Finish configuration

9. Back in the Scheduled Tasks folder, right-click the newly created scheduled task and select the **Properties** tag.

10. On the **Task** tab (Figure A-23), you can add comments, and enable or disable the scheduled task.

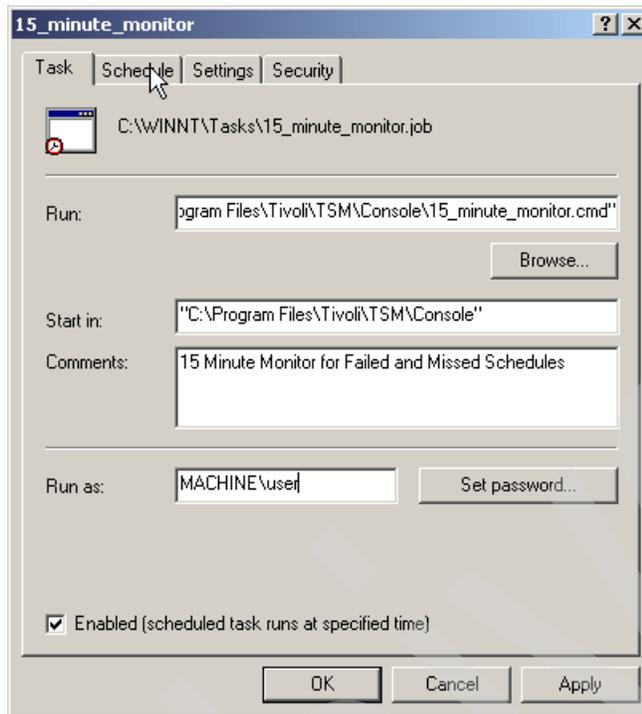


Figure A-23 Scheduled tasks: Task definitions

11. Select the **Schedule** tab. Here you can update the schedule to run every 15 minutes. See Figure A-24.

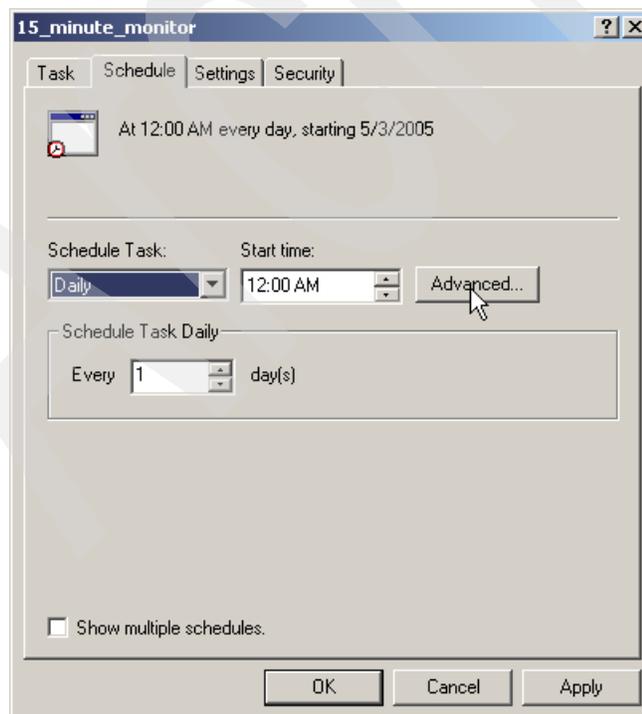


Figure A-24 Scheduled tasks: Schedule details

12. Click the **Advanced** tab. As shown in Figure A-25, select the **Repeat task** check box and indicate that the task should run every 15 minutes. Specify the duration of 24 hours. Other scheduling and security options are available. Leave these at their defaults. Click **OK**.

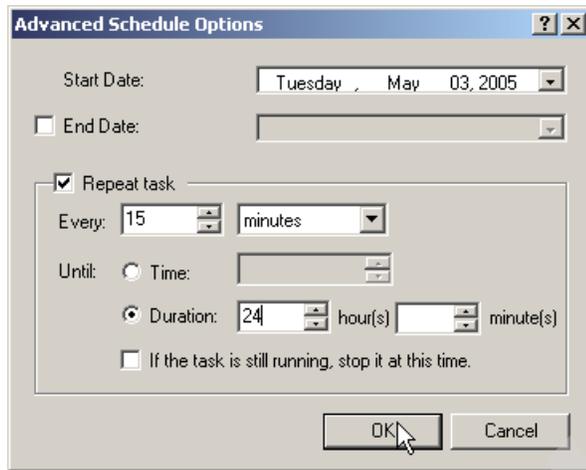


Figure A-25 Scheduled tasks: Advanced schedule options

If you want to see the status of the schedules, select **Scheduled Tasks** from the control panel. There you select the schedule you want to verify and select **Advanced** → **View Log** as shown in Figure A-26.



Figure A-26 Scheduled tasks: View log

You have now finished configuring a monitor to run every 15 minutes.

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Tables of the changes and enhancements by platform

This appendix contains tables that give you an overview of the changes or enhancements for a given platform.

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Supported platforms							
• Server							
A=AIX, H=HP-UX, L=Linux, S=Solaris, W=Windows, O=OS/400 PASE, Z=z/OS							
Changes	A	H	L	S	W	O	Z
ACSLs Library Support Enhancements	x		x	x	x		
Accurate SAN Device Mapping	x		x	x			
Activity Log Management	x	x	x	x	x	x	x
Check-In and Check-Out Enhancements	x	x	x	x	x		
Collocation by Group	x	x	x	x	x	x	x
Communications Options			x		x		
Database Reorganization	x	x	x	x	x	x	x
Disk-only Backup	x	x	x	x	x	x	x
Enhancements for Server Migration and Reclamation Processes	x	x	x	x	x	x	x
IBM 3592 WORM Support	x	x	x	x	x	x	x
Improved Defaults	x	x	x	x	x	x	x
Increased Block Size for Writing to Tape					x		
LAN-free Environment Configuration	x	x	x	x	x	x	x

Figure B-1 Supported platforms: Server



Supported platforms

- Server (continued)

A=AIX, H=HP-UX, L=Linux, S=Solaris, W=Windows, O=OS/400 PASE, Z=z/OS

Changes	A	H	L	S	W	O	Z
NDMP Operations	x	x	x	x	x		
Net Appliance SnapLock Support	x	x	x	x	x		
New Interface to Manage Servers: Administration Center	x	x	x	x	x	x	x
Server Processing Control in Scripts	x	x	x	x	x	x	x
Simultaneous Write Inheritance Improvements	x	x	x	x	x	x	x
Space Triggers for Mirrored Volumes	x	x	x	x	x	x	x
Storage Agent and Library Sharing Failover	x						
Support for Multiple Tivoli Storage Manager Client Nodes	x	x	x	x	x	x	x
Tivoli Storage Manager Scheduling Flexibility	x	x	x	x	x	x	x

Figure B-2 Supported platforms: Server (continued)



Supported platforms

- Client

A=AIX, H=HP-UX, L=Linux, S=Solaris, W=Windows, N=Netware, M=Mac OS X

Changes	A	H	L	S	W	N	M
Dynamic client tracing	x	x	x	x	x		N/A
Enhanced encryption	x	x	x	x	x		N/A
Enhancements to query schedule command	x	x	x	x	x	x	N/A
Include-exclude enhancements	x	x	x	x	x	x	N/A
New links from the backup-archive client Java GUI to the Tivoli Storage Manager and Tivoli Home Pages	x	x	x	x	x		N/A
New options, ERRORLOGMAX, SCHEDLOGMAX, and DSM_LOG environment variable changes	x	x	x	x	x		N/A
Optimized option default values	x	x	x	x	x	x	N/A
Support for deleting individual backups from a server file space	x	x	x	x	x	x	N/A

Figure B-3 Supported platforms: Client



Supported platforms

- Client (continued)

A=AIX, H=HP-UX, L=Linux, S=Solaris, W=Windows, O=OS/400 PASE, Z=z/OS

Changes	A	H	L	S	W	N	M
Tivoli Storage Manager Administration Center	x	x	x	x	x	x	N/A
Web client enhancements (and Java GUI in UNIX)	x	x	x	x	x	x	N/A
Client node proxy support [asnodename]	x	x	x	x			N/A
Tivoli Storage Manager backup-archive client for HP-UX Itanium 2		x					N/A
Linux for zSeries offline image backup			x				N/A
Journal-based backup enhancements					x		N/A
Single drive support for Open File Support (OFS) for online image backups					x		N/A
New options, Errorlogmax and Schedlogmax						x	N/A

Figure B-4 Supported platforms: Client (continued)



Supported platforms

- Storage Agent

A=AIX, H=HP-UX, L=Linux, S=Solaris, W=Windows, O=OS/400 PASE, Z=z/OS

Changes	A	H	L	S	W	O	Z
LAN-free Environment Configuration (VALIDATE LANFREE)	x	x	x	x	x		x
Considerations when using LAN free and simultaneous write	x	x	x	x	x		x
Multiple file system support for FILE device types	x	x	x	x	x		x
Multi-session No-Query Restore for LAN-free Path	x	x	x	x	x		x
LANFREETCPServeraddress	x	x	x	x	x		x
Shared Memory Protocol Support			x		x		
Supported Linux Platforms and Kernel Dependencies			x				
Shared Library Enhancement for z/OS							x

Figure B-5 Supported platform: Storage Agent

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Abbreviations and acronyms

ABI	Application Binary Interface	DCOM	Distributed Component Object Model
ACE	Access Control Entries	DDE	Dynamic Data Exchange
ACL	Access Control List	DDNS	Dynamic Domain Name System
AD	Microsoft Active Directory	DES	Data Encryption Standard
ADSM	ADSTAR Distributed Storage Manager	DFS™	Distributed File System
AFS®	Andrew File System	DHCP	Dynamic Host Configuration Protocol
AIX	Advanced Interactive eXecutive	DLC	Data Link Control
ANSI	American National Standards Institute	DRM	Disaster REcovery Manager
API	application programming interface	DSA	Directory Service Agent
APPC	Advanced Program-to-Program Communication	DNS	Domain Name System
APPN	Advanced Peer-to-Peer Networking®	EFS	Encrypting File Systems
ARPA	Advanced Research Projects Agency	EGID	Effective Group Identifier
ASCII	American National Standard Code for Information Interchange	EMS	Event Management Services
ASR	Automated System Recovery	ERP	Enterprise Resources Planning
ATM	asynchronous transfer mode	ERRM	Event Response Resource Manager
BDC	Backup Domain Controller	ESCON®	Enterprise System Connection
BIND	Berkeley Internet Name Domain	ESP	Encapsulating Security Payload
BSD	Berkeley Software Distribution	ESS	Enterprise Storage Server
C-SPOC	cluster single point of control	EUID	Effective User Identifier
CA	Certification Authorities	FAT	File Allocation Table
CAL	Client Access License	FC	Fibre Channel
CDE	Common Desktop Environment	FDDIFEC	Fiber Distributed Data Interface
CGI	Common Gateway Interface	FEC	Fast EtherChannel technology
CIFS	Common Internet File System	FIFO	first in/first out
CIM	Common Information Model	FQDN	fully qualified domain name
CPI-C	Common Programming Interface for Communications	FSF	file storage facility
CPU	central processing unit	FtDisk	fault-tolerant disk
CSR	client/server runtime	FTP	File Transfer Protocol
DAC	Discretionary Access Controls	GC	global catalog
DARPA	Defense Advanced Research Projects Agency	GDA	Global Directory Agent
DASD	Direct Access Storage Device	GDI	Graphical Device Interface
DBM	database management	GDS	Global Directory Service
DCE	Distributed Computing Environment	GID	group identifier
		GL	graphics library
		GPFS	General Parallel File System
		GUI	graphical user interface
		HA	High Availability

HACMP	High Availability Cluster Multiprocessing	MOCL	Managed Object Class Library
HAL	hardware abstraction layer	MSCS	Microsoft Cluster Server
HBA	host bus adapter	MSS	Modular Storage Server
HCL	hardware compatibility list	MWC	Mirror Write Consistency
HSM	hierarchical storage management	NAS	Network Attached Storage
HTTP	Hypertext Transfer Protocol	NBC	Network Buffer Cache
IBM	International Business Machines Corporation	NBPI	Number of Bytes per I-node
IDE	Integrated Drive Electronics	NDMP	Network Data Management Protocol
IDS	Intelligent Disk Subsystem	NFS	Network File System
IIS	Internet Information Server	NIM	Network Installation Management
I/O	input/output	NIS	Network Information System
IP	Internet Protocol	NTFS	NT File System
IPC™	Interprocess Communication	NVRAM	nonvolatile random access memory
IPL	Initial Program Load	NetDDE	Network Dynamic Data Exchange
IPsec	Internet Protocol Security	ODBC	Open Database Connectivity
ISA	Industry Standard Architecture	ODM	Object Data Manager
iSCSI	SCSI over IP	OM	Object Manager
ISDN	Integrated Services Digital Network	OPAL	IBM Orchestration and Provisioning Automation Library
ISNO	Interface-specific Network Options	OS	operating system
ISO	International Standards Organization	OSF	Open Software Foundation
ISV	independent software vendor	PAM	Pluggable Authentication Module
ITSO	International Technical Support Organization	PCI	Peripheral Component Interconnect
JBOD	Just a Bunch of Disks	PCMCIA	Personal Computer Memory Card International Association
JFS	Journaled File System	PDC	Primary Domain Controller
JVM	Java virtual machine	PDF	Portable Document Format
LAN	local area network	PFS	Physical File System
LCN	logical cluster number	PHB	Per Hop Behavior
LDAP	Lightweight Directory Access Protocol	PMR	Problem Management Record
LFS	Logical File System (AIX)	POSIX	Portable Operating System Interface for Computer Environment
LP	logical partition	PP	physical partition
LPC	Local Procedure Call	PReP	PowerPC® Reference Platform®
LUN	logical unit number	PSM	Persistent Storage Manager
LVCB	Logical Volume Control Block	PSN	Program Sector Number
LVDD	Logical Volume Device Driver	PV	Physical Volume
LVM	Logical Volume Manager	PVID	Physical Volume Identifier
MBR	Master Boot Record	QoS	quality of service
MDC	Meta Data Controller	RAID	Redundant Array of Independent Disks
MDM	Multiple Device Manager	RAS	Remote Access Service
MFT	Master File Table		
MIB	Management Information Base		
MMC	Microsoft Management Console		

RDBMS	relational database management system	VGDA	Volume Group Descriptor Area
RISC	Reduced Instruction Set Computer	VGID	Volume Group Identifier
RMC	Resource Monitoring and Control	VGSA	Volume Group Status Area
RMSS	Reduced-Memory System Simulator	VIPA	virtual IP address
ROLTP	Relative OnLine Transaction Processing	VP	virtual processor
ROS	read-only storage	VPD	Vital Product Data
RPC	Remote Procedure Call	VPN	virtual private network
RSM™	Removable Storage Management	VSM	Virtual System Management
RSVP	Resource Reservation Protocol	W3C	World Wide Web Consortium
SAM	Security Account Manager	WAN	wide area network
SAN	Storage Area Network	WLM	Workload Manager
SCSI	Small Computer System Interface	WWN	World Wide Name
SDK	Software Developer's Kit	WWW	World Wide Web
SFS	SAN File System		
SID	Security Identifier		
SMB	Server Message Block		
SMIT	System Management Interface Tool		
SMP	symmetric multiprocessor		
SMS	Systems Management Server		
SNA	Systems Network Architecture		
SNMP	Simple Network Management Protocol		
SP	system parallel		
SQL	Structured Query Language		
SRM	Storage Resource Manager		
SSA	Serial Storage Architecture		
SSL	Secure Sockets Layer		
SVC	SAN Volume Controller		
TCP/IP	Transmission Control Protocol/Internet Protocol		
TDP	Tivoli Data Protection		
TEC	Tivoli Enterprise Console		
TOS	Type of Service		
TSM	IBM Tivoli Storage Manager		
UDB	Universal Database		
UDF	Universal Disk Format		
UFS	UNIX File System		
UID	User Identifier		
UNC	Universal Naming Convention		
URL	Universal Resource Locator		
VCN	Virtual Cluster Name		
VFS	Virtual File System		
VG	Volume Group		

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Glossary

A

ACSLs See *Automated Cartridge System Library Software*.

agent A software entity that runs on endpoints and provides management capability for other hardware or software. An example is an Simple Network Mail Protocol (SNMP) agent. An agent has the ability to spawn other processes.

AL See *arbitrated loop*.

allocated storage The space that is allocated to volumes, but not assigned.

allocation The process of obtaining a volume and unit of external storage, and setting aside space on that storage for a data set.

arbitrated loop (AL) A Fibre Channel interconnection technology that allows up to 126 participating node ports and one participating fabric port to communicate. See also *Fibre Channel Arbitrated Loop* and *loop topology*.

array An arrangement of related disk drive modules that have been assigned to a group.

Automated Cartridge System Library Software (ACSLs) Functions as a central service provider for StorageTek library operations in heterogeneous environments. It allows you to collapse disparate, application-dedicated libraries to one centralized library or string of libraries accessed via a single point of control.

B

bandwidth A measure of the data transfer rate of a transmission channel.

bridge Facilitates communication with LANs, SANs, and networks with dissimilar protocols.

C

CIM See *Common Information Model*.

CIM agent The code that is comprised of common building blocks that can be used instead of proprietary software or device-specific programming interfaces to manage Common Information Model (CIM)-compliant devices. A CIM agent is made up of agent code, a CIM object manager (CIMOM), client application device, device provider, and Service Location Protocol.

CIM object manager (CIMOM) The common conceptual framework for data management that receives, validates, and authenticates the CIM requests from the client application. It then directs the requests to the appropriate component or service provider.

CIMOM See *CIM object manager*.

client A function that requests services from a server and makes them available to the user. A term used in an environment to identify a machine that uses the resources of the network.

client application A storage management program that initiates CIM requests to the CIM agent for the device.

client authentication The verification of a client in secure communications where the identity of a server or browser (client) with whom you want to communicate is discovered. A sender's authenticity is demonstrated by the digital certificate issued to the sender.

client-server relationship Any process that provides resources to other processes on a network is a *server*. Any process that employs these resources is a *client*. A machine can run client and server processes at the same time.

Client System Component (CSC) A term used in a STK ACSLS environment. It provides a seamless connection between backup applications and ACSLS manager software.

Client System Interface (CSI) A term used in a STK ACSLS environment. The interface to the CSC on an ACSLS server.

Common Information Model (CIM) A set of standards developed by the Distributed Management Task Force (DMTF). CIM provides a conceptual framework for storage management and an open approach to the design and implementation of storage systems, applications, databases, networks, and devices.

console A user interface to a server.

CSC See *Client System Component*.

CSI See *Client System Interface*.

D

Data Center Model (DCM) The IBM Tivoli Provisioning Manager data store and data schema. It includes a representation of all physical and logical assets.

DB2 Universal Database An IBM program product that helps leverage information by delivering the performance, scalability, reliability, and availability needed for the most demanding applications.

DCM See *Data Center Model*.

device driver A program that enables a computer to communicate with a specific device, for example, a disk drive.

Device Manager One of three components that make up the IBM TotalStorage Multiple Device Manager. IBM TotalStorage Multiple Device Manager uses the Service Location Protocol (SLP) on the IBM Director to discover storage devices, creates managed objects to represent these discovered devices, and provides the user with access to device configuration functionality.

discovery The process of finding resources within an enterprise, including finding the new location of monitored resources that were moved.

disk group A set of disk drives that have been configured into one or more logical unit numbers. This term is used with RAID devices.

E

enterprise network A geographically dispersed network under the backing of one organization.

ESS See *IBM TotalStorage Enterprise Storage Server*.

event In the Tivoli environment, any significant change in the state of a system resource, network resource, or network application. An event can be generated for a problem, for the resolution of a problem, or for the successful completion of a task. Examples of events are the normal starting and stopping of a process, the abnormal termination of a process, and the malfunctioning of a server.

F

fabric The Fibre Channel employs a fabric to connect devices. A fabric can be as simple as a single cable connecting two devices. The term is often used to describe a more complex network using hubs, switches, and gateways.

FAST Storage Server A RAID controller device that contains Fibre Channel interfaces that connect the host systems and the disk drive enclosures. The FAST Storage Server provides high system availability through use of hot-swappable and redundant components.

FC See *Fibre Channel*.

FCS See *Fibre Channel standard*.

fiber optic The medium and the technology associated with the transmission of information along a glass or plastic wire or fiber.

Fibre Channel (FC) A technology for transmitting data between computer devices at a data rate of up to 1 Gb. It is especially suited for connecting computer servers to shared storage devices and for interconnecting storage controllers and drives.

Fibre Channel Arbitrated Loop A reference to the FC-AL standard, a shared gigabit media for up to 127 nodes, one of which can be attached to a switch fabric. See also *arbitrated loop* and *loop topology*. Refer to American National Standards Institute (ANSI) X3T11/93-275.

Fibre Channel standard (FCS) An ANSI standard for a computer peripheral interface. The input/output (I/O) interface defines a protocol for communication over a serial interface that configures attached units to a communication fabric. Refer to ANSI X3.230-199x.

file system An individual file system on a host. This is the smallest unit that can monitor and extend. Policy values defined at this level override those that might be defined at higher levels.

G

gateway In the SAN environment, a gateway connects two or more different remote SANs with each other. A gateway can also be a server on which a gateway component runs.

H

hardware zoning Based on physical ports. The members of a zone are physical ports on the fabric switch. It can be implemented in one-to-one, one-to-many, and many-to-many configurations.

HBA See *host bus adapter*.

host Any system that has at least one Internet address associated with it. A host with multiple network interfaces can have multiple Internet addresses associated with it. This is also referred to as a server.

host bus adapter (HBA) A Fibre Channel HBA connection that allows a workstation to attach to the SAN network.

hub A Fibre Channel device that connects up to 126 nodes into a logical loop. All connected nodes share the bandwidth of this one logical loop. Hubs automatically recognize an active node and insert the node into the loop. A node that fails or is powered off is automatically removed from the loop.

I

IBM Director A suite of tools and utilities that automates many of the processes required to manage systems, including capacity planning, asset tracking, preventive maintenance, diagnostic monitoring, and troubleshooting. It uses a graphical interface that provides easy access to both local and remote systems.

IBM TotalStorage Enterprise Storage Server (ESS) Provides an intelligent disk storage subsystem for systems across the enterprise.

IP Internet Protocol.

J

Java A programming language that enables application developers to create object-oriented programs that are very secure, portable across different machine and operating system platforms, and dynamic enough to allow expandability.

Java plug-in A simple workflow that invokes only a single action. Java plug-ins provide workflow access to basic storage functions and can be combined into more complex workflows.

Java runtime environment (JRE) The underlying, invisible system on your computer that runs applets the browser passes to it.

Java virtual machine (JVM) The execution environment within which Java programs run. The Java virtual machine is described by the Java Machine Specification which is published by Sun™ Microsystems. Because the Tivoli Kernel Services is based on Java, nearly all ORB and component functions execute in a Java virtual machine.

JBOD Just a Bunch Of Disks.

JRE See *Java runtime environment*.

JVM See *Java virtual machine*.

L

logical device operation A logical device operation (also logical operation) is an abstraction of an operation against a device in the Data Center Model.

logical unit number (LUN) Are provided by the storage devices attached to the SAN. This number provides a volume identifier that is unique among all storage servers. The LUN is synonymous with a physical disk drive or a SCSI device. For disk subsystems, such as the IBM Enterprise Storage Server, a LUN is a logical disk drive. This is a unit of storage on the SAN which is available for assignment or unassignment to a host server.

Logical Volume Snapshot Agent (LVSA) If installed, allows Tivoli Storage Manager to perform an online image backup, during which the volume is available for other system applications. The LVSA maintains a consistent image of a volume during online image backup.

loop topology The available bandwidth is shared with all the nodes connected to the loop. If a node fails or is not powered on, the loop is out of operation. This can be corrected using a hub. A hub opens the loop when a new node is connected and closes it when a node disconnects. See also *Fibre Channel Arbitrated Loop* and *arbitrated loop*.

LUN See *logical unit number*.

LUN assignment criteria The combination of a set of LUN types, a minimum size, and a maximum size used for selecting a LUN for automatic assignment.

LUN masking This allows or blocks access to the storage devices on the SAN. Such intelligent disk subsystems as the IBM Enterprise Storage Server provide this kind of masking.

LVSA See *Logical Volume Snapshot Agent*.

M

managed object A managed resource.

managed resource A physical element to be managed.

Management Information Base (MIB) A logical database residing in the managed system which defines a set of MIB objects. A MIB is considered a logical database because actual data is not stored in it, but rather provides a view of the data that can be accessed on a managed system.

MIB See *Management Information Base*.

MIB object A unit of managed information that specifically describes an aspect of a system. Examples are CPU utilization, software name, and hardware type. A collection of related MIB objects is defined as a MIB.

N

network topology A physical arrangement of nodes and interconnecting communications links in networks based on application requirements and geographical distribution of users.

N_Port node port A Fibre Channel-defined hardware entity at the end of a link which provides the mechanisms necessary to transport information units to or from another node.

NL_Port node loop port A node port that supports arbitrated loop devices.

node An addressable entity connected to an I/O bus or network. Used primarily to refer to computers, storage devices, and storage subsystems. The component of a node that connects to the bus or network is a port.

O

open system A system whose characteristics comply with standards made available throughout the industry, and can be connected to other systems that comply with the same standards.

P

point-to-point topology Consists of a single connection between two nodes. All the bandwidth is dedicated for these two nodes.

port An endpoint for communication between applications, generally referring to a logical connection. A port provides queues for sending and receiving data. Each port has a port number for identification. When the port number is combined with an Internet address, it is called a *socket address*.

port zoning In Fibre Channel environments, the grouping together of multiple ports to form a virtual private storage network. Ports that are members of a group or zone can communicate with each other but are isolated from ports in other zones. See also *LUN masking* and *subsystem masking*.

protocol The set of rules governing the operation of functional units of a communication system if communication is to take place. Protocols can determine low-level details of machine-to-machine interfaces, such as the order in which bits from a byte are sent. They can also determine high-level exchanges between application programs, such as file transfer.

R

RAID See *Redundant Array Of Inexpensive or Independent Disks*.

Redundant Array Of Inexpensive or Independent Disks (RAID) A method of configuring multiple disk drives in a storage subsystem for high availability and high performance.

S

SAN See *storage area network*.

SAN agent A software program that communicates with the manager and controls the subagents. This component is largely platform independent. See also *subagent*.

SCSI See *Small Computer System Interface*.

server A program running on a mainframe, workstation, or file server that provides shared services. This is also referred to as a *host*.

shared storage Storage within a storage facility that is configured such that multiple homogeneous or divergent hosts can concurrently access the storage. The storage has a uniform appearance to all hosts. The host programs that access the storage must have a common model for the information on a storage device. You need to design the programs to handle the effects of concurrent access.

Simple Network Management Protocol (SNMP) A protocol designed to give a user the capability to remotely manage a computer network by polling and setting terminal values and monitoring network events.

Small Computer System Interface (SCSI) An ANSI standard for a logical interface to computer peripherals and for a computer peripheral interface. The interface uses a SCSI logical protocol over an I/O interface that configures attached targets and initiators in a multi-drop bus topology.

SMI-S See *Storage Management Initiative Specification*.

SNMP See *Simple Network Management Protocol*.

SNMP agent An implementation of a network management application which is resident on a managed system. Each node that is to be monitored or managed by an SNMP manager in a TCP/IP network, must have an SNMP agent resident. The agent receives requests to either retrieve or modify management information by referencing MIB objects. MIB objects are referenced by the agent whenever a valid request from an SNMP manager is received.

SNMP manager A managing system that executes a managing application or suite of applications. These applications depend on MIB objects for information that resides on the managed system.

SNMP trap A message that is originated by an agent application to alert a managing application of the occurrence of an event.

software zoning Implemented within the Simple Name Server (SNS) running inside the fabric switch. When using software zoning, the members of the zone can be defined with node WWN, port WWN, or physical port number. Usually the zoning software also allows you to create symbolic names for the zone members and for the zones.

SQL Structured Query Language.

storage administrator A person in the data processing center who is responsible for defining, implementing, and maintaining storage management policies.

storage area network (SAN) A managed, high-speed network that enables any-to-any interconnection of heterogeneous servers and storage systems.

Storage Management Initiative Specification (SMI-S) A design specification developed by the Storage Networking Industry Association (SNIA). It specifies a secure and reliable interface that allows storage management systems to identify, classify, monitor, and control physical and logical resources in a storage area network. The interface is intended as a solution that integrates the various devices to be managed in a SAN and the tools used to manage them.

storage pool A collection of storage resources on a SAN that have been set aside for a particular purpose.

subagent A software component of SAN products which provides the actual remote query and control function, such as gathering host information and communicating with other components. This component is platform dependent. See also *SAN agent*.

subsystem masking The support provided by intelligent disk storage subsystems such as the Enterprise Storage Server. See also *LUN masking* and *port zoning*.

switch A component with multiple entry and exit points or ports that provides dynamic connection between any two of these points.

switch topology A switch allows multiple concurrent connections between nodes. There can be two types of switches: circuit switches and frame switches. *Circuit switches* establish a dedicated connection between two nodes. *Frame switches* route frames between nodes and establish the connection only when needed. A switch can handle all protocols.

T

TCP See *Transmission Control Protocol*.

TCP/IP Transmission Control Protocol/Internet Protocol.

topology The physical and logical arrangement of devices in a SAN. Topology can be displayed graphically, showing devices and their interconnections.

Transmission Control Protocol (TCP) A reliable, full duplex, connection-oriented, end-to-end transport protocol running on an IP.

W

WAN wide area network.

workflow A sequenced set of operations that can be large and complex, or can be as simple as a single command. A workflow itself can be included as a step in other workflows.

Z

zone A segment of a SAN fabric composed of selected storage devices nodes and server nodes. Only the members of a zone have access to one another.

zone member A device in a zone.

zone set A group of zones that function together on the fabric. All devices in a zone see only devices assigned to that zone, but any device in that zone can be a member of other zones in the zone set.

zoning In Fibre Channel environments, zoning allows for finer segmentation of the switched fabric. Zoning can be used to instigate a barrier between different environments. Ports that are members of a zone can communicate with each other but are isolated from ports in other zones. Zoning can be implemented in two ways: hardware zoning and software zoning.

Other glossaries

For more information about IBM terminology, see the IBM Storage Glossary of Terms at:

<http://www.ibm.com/software/globalization/terminology/>

For more information about Tivoli terminology, see the Tivoli Glossary at:

<http://publib.boulder.ibm.com/tividd/glossary/tivoglossarymst.htm>

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this redbook.

IBM Redbooks

For information about ordering these publications, see “How to get IBM Redbooks” on page 161. Note that some of the documents referenced here may be available in softcopy only.

- ▶ *ADSM Version 3 Technical Guide*, SG24-2236
- ▶ *IBM Tivoli Storage Management Concepts*, SG24-4877
- ▶ *IBM Tivoli Storage Manager Implementation Guide*, SG24-5416
- ▶ *Tivoli Storage Manager Version 3.7: Technical Guide*, SG24-5477
- ▶ *Tivoli Storage Manager Version 3.7.3 & 4.1: Technical Guide*, SG24-6110
- ▶ *Tivoli Storage Manager Version 4.2 Technical Guide*, SG24-6277
- ▶ *Exploring Storage Management Efficiencies and Provisioning - Understanding IBM TotalStorage Productivity Center and IBM TotalStorage Productivity Center with Advanced Provisioning*, SG24-6373
- ▶ *Tivoli Storage Manager Version 5.1 Technical Guide*, SG24-6554
- ▶ *IBM Tivoli Storage Management Version 5.3 Technical Guide*, SG24-6638
- ▶ *Understanding the IBM TotalStorage Open Software Family*, SG24-7098
- ▶ *Integrating IBM Tivoli Storage Manager Operational Reporting with Event Management*, REDP-3850
- ▶ *VMware Backup Considerations with IBM Tivoli Storage Manager*, TIPS0398
- ▶ *3592 Media Types*, TIPS0419

Other publications

These publications are also relevant as further information sources:

Tivoli Storage Manager V5.3 Administrator's Guides

- ▶ *TSM V5.3 for HP-UX Administrator's Guide*, GC32-0772-03
- ▶ *TSM V5.3 for Windows Administrator's Guide*, GC32-0782-03
- ▶ *TSM V5.3 for Sun Solaris Administrator's Guide*, GC32-0778-03
- ▶ *TSM V5.3 for Linux Administrator's Guide*, GC23-4690-03
- ▶ *TSM V5.3 for z/OS Administrator's Guide*, GC32-0775-03
- ▶ *TSM V5.3 for AIX Administrator's Guide*, GC32-0768-03

Tivoli Storage Manager V5.3 Administrator's References

- ▶ *TSM V5.3 for HP-UX Administrator's Reference*, GC32-0773-03
- ▶ *TSM V5.3 for Sun Administrator's Reference*, GC32-0779-03
- ▶ *TSM V5.3 for AIX Administrator's Reference*, GC32-0769-03
- ▶ *TSM V5.3 for z/OS Administrator's Reference*, GC32-0776-03
- ▶ *TSM V5.3 for Linux Administrator's Reference*, GC23-4691-03
- ▶ *TSM V5.3 for Windows Administrator's Reference*, GC32-0783-03

Tivoli Storage Manager V5.3 Data Protection Publications

- ▶ *ITSM for Mail 5.3: Data Protection for Lotus Domino for UNIX, Linux, and OS/400 Installation and User's Guide*, SC32-9056-02
- ▶ *ITSM for Mail 5.3: Data Protection for Lotus Domino for Windows Installation and User's Guide*, SC32-9057-01

Tivoli Storage Manager V5.3 Install Guide

- ▶ *TSM V5.3 for AIX Installation Guide*, GC32-1597
- ▶ *TSM V5.3 for Sun Solaris Installation Guide*, GC32-1601
- ▶ *TSM V5.3 for Linux Installation Guide*, GC32-1599
- ▶ *TSM V5.3 for z/OS Installation Guide*, GC32-1603
- ▶ *TSM V5.3 for Windows Installation Guide*, GC32-1602
- ▶ *TSM V5.3 for HP-UX Installation Guide*, GC32-1598

Various Tivoli Storage Manager V5.3 and problem determination guides

- ▶ *TSM V5.3 Messages*, SC32-9090-02
- ▶ *TSM V5.3 Performance Tuning Guide*, SC32-9101-02
- ▶ *TSM V5.3 Read This First*, GI11-0866-06
- ▶ *IBM Tivoli Storage Manager Problem Determination Guide*, SC32-9103-01

Tivoli Storage Manager V5.3 Storage Agent User's Guides

- ▶ *TSM V5.3 for SAN for AIX Storage Agent User's Guide*, GC32-0771-03
- ▶ *TSM V5.3 for SAN for HP-UX Storage Agent User's Guide*, GC32-0727-03
- ▶ *TSM V5.3 for SAN for Linux Storage Agent User's Guide*, GC23-4693-03
- ▶ *TSM V5.3 for SAN for Sun Solaris Storage Agent User's Guide*, GC32-0781-03
- ▶ *TSM V5.3 for SAN for Windows Storage Agent User's Guide*, GC32-0785-03

Tivoli Storage Manager V5.3.0 Backup-Archive Clients

- ▶ *TSM 5.3 Using the Application Program Interface*, GC32-0793-03
- ▶ *TSM 5.3 NetWare Backup-Archive Clients Installation and User's Guide*, GC32-0786-05
- ▶ *TSM 5.3 UNIX and Linux Backup-Archive Clients Installation and User's Guide*, GC32-0789-05
- ▶ *TSM 5.3 Windows Backup-Archive Client Installation and User's Guide*, GC32-0788-05
- ▶ *TSM 5.3 for Space Management for UNIX and Linux User's Guide*, GC32-0794-03

Online resources

These Web sites and URLs are also relevant as further information sources:

- ▶ IBM Tivoli Storage Manager product page
<http://www.ibm.com/software/tivoli/products/storage-mgr/>
- ▶ IBM Tivoli Storage Manager information center
<http://publib.boulder.ibm.com/infocenter/tivihelp/index.jsp>
- ▶ IBM Tivoli Storage Manager product support
<http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html>
- ▶ IBM Tivoli Support
<http://www.ibm.com/software/sysmgmt/products/support>
- ▶ IBM Tivoli Storage Manager Administrative WEB Interface (transition version)
<http://www.ibm.com/support/docview.wss?uid=swg24009569>
- ▶ IBM Tivoli Support - Tivoli support life cycle
<http://www.ibm.com/software/sysmgmt/products/support/eos.html>
- ▶ IBM Software Support Life Cycle - Tivoli Product lifecycle dates
<http://www.ibm.com/software/info/supportlifecycle/list/t.html>
- ▶ Tivoli Support - IBM Tivoli Storage Manager Supported Devices for AIX HPUX SUN WIN
http://www.ibm.com/software/sysmgmt/products/support/IBM_TSM_Supported_Devices_for_AIXHP_SUNWIN.html
- ▶ Tivoli Support - IBM Tivoli Storage Manager Version Release Information
<http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManagerVersionRelease.html>

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