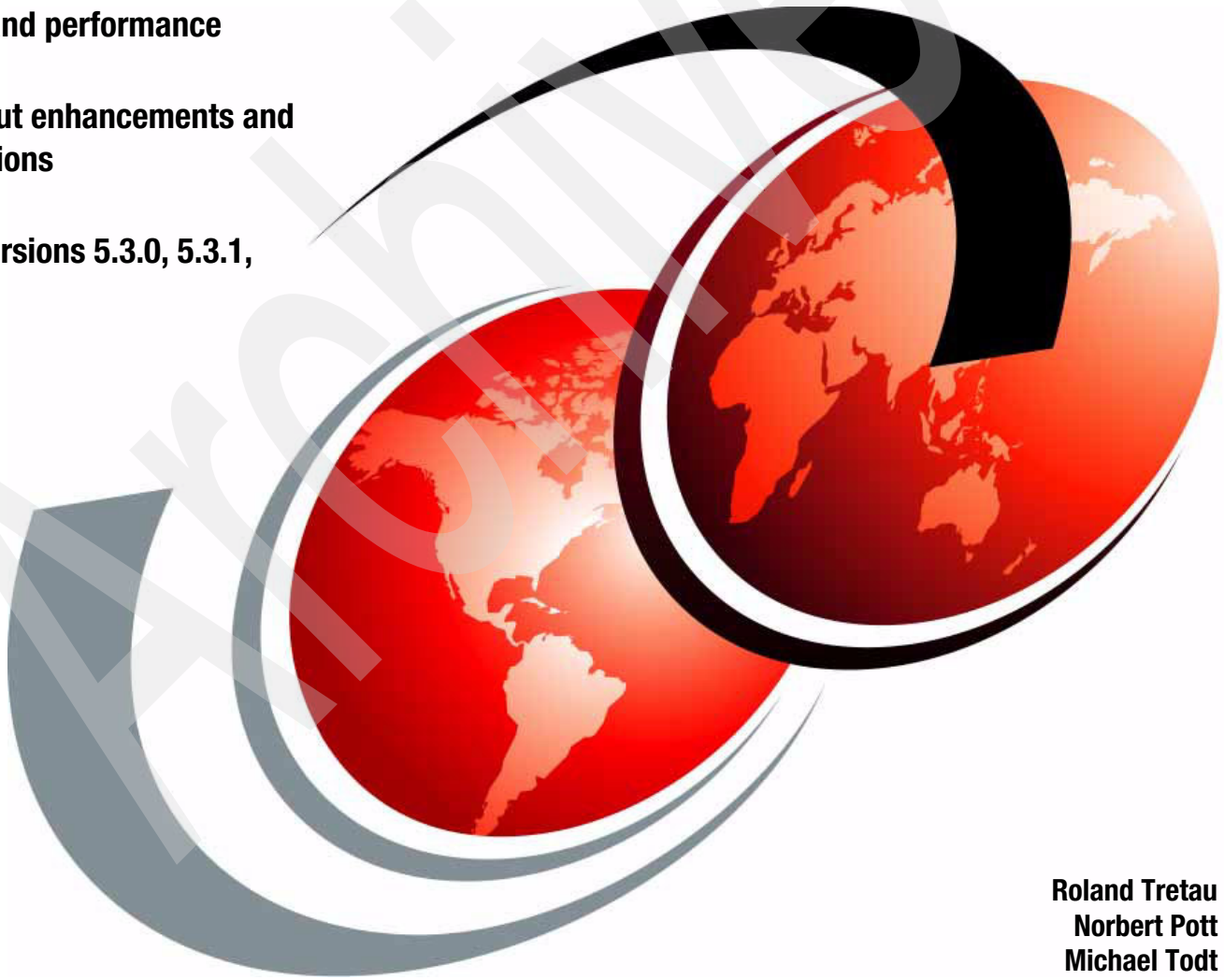
Tivoli software

IBM

# 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



Roland Tretau
Norbert Pott
Michael Todt

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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.



**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.

**Roland Tretau** is a Project Leader with the ITSO, San Jose Center. Before joining the ITSO in April 2001, Roland worked in Germany as an IT Architect with a major focus on open systems solutions and Microsoft® technologies. He holds a master degree in electrical engineering with an emphasis in telecommunications. He is a Red Hat Certified Engineer (RHCE) and a Microsoft Certified Systems Engineer (MCSE). He holds a Masters Certificate in Project Management from The George Washington University School of Business and Public Management.

**Norbert Pott** is an IBM Tivoli Storage Manager Support Specialist in Germany. He works for the Tivoli Storage Manager back-end support team and provides support to customers worldwide. He has 24 years of experience with IBM, over 15 years of experience in IT, and more than 10 years of experience in the Tivoli Storage Manager product, starting with then ADSM Version 2.1.5. His areas of expertise include Tivoli Storage Manager client development skill and in-depth knowledge when it comes to problem determination.

**Michael Todt** is a Senior Consultant at Mount10 GmbH, an IBM Business Partner in Germany. He has 14 years of experience in the storage systems field. He holds a degree in semiconductor physics. His areas of expertise include Tivoli Storage Management and Disaster Recovery Planning.

*The team from left to right: Norbert Pott, Roland Tretau, and Michael Todt*

Many thanks to the following people for their contributions to this project:

Charlotte Brooks
Emma Jacobs
Leslie Parham
Deanna Polm
ITSO, San Jose

Matt Anglin
Kai Asher
Ed Barton
Kevin Dang
Jennifer Davis
Colin Dawson
David Derk
Mike Dile
Rob Edwards
Eduardo Esteban
Barry Fruchtman
Ken Hannigan
Glen Hattrup
Mark Haye
Avishai Hochberg
Henry Hom
Yu-mei Hsiao
Naomi Iseri
Donna Jee

Tricia Jiang
Erick Kissel
Alexei Kojenov
Bob La Brie
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Himanshu Madhani
David Minch
Kathy Mitton
Doug Noddings
Carol Nylund
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Isabelle Poueriet
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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


*Figure 1-1 Introduction*

## 1.1 Workshop overview

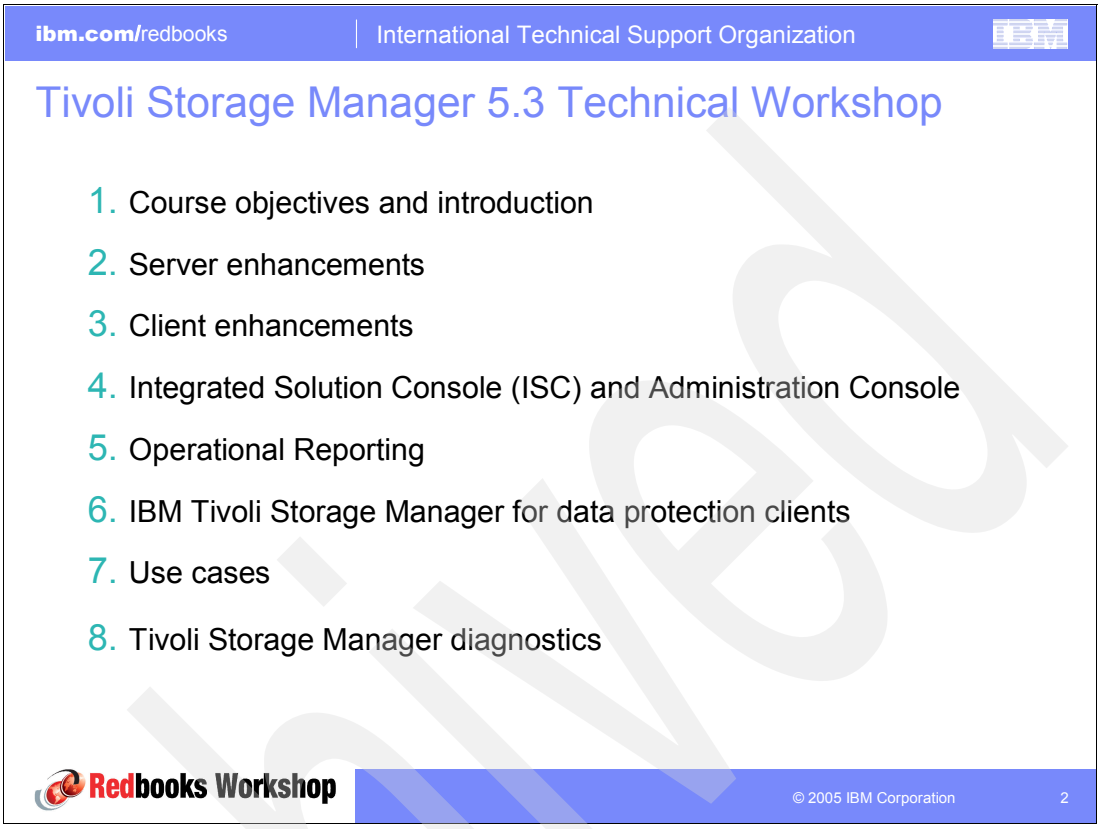



*Figure 1-2 Workshop overview*

## 1.2 Course objectives


*Figure 1-3 Course objectives*

## 1.3 Introduction to Tivoli Storage Manager 5.3

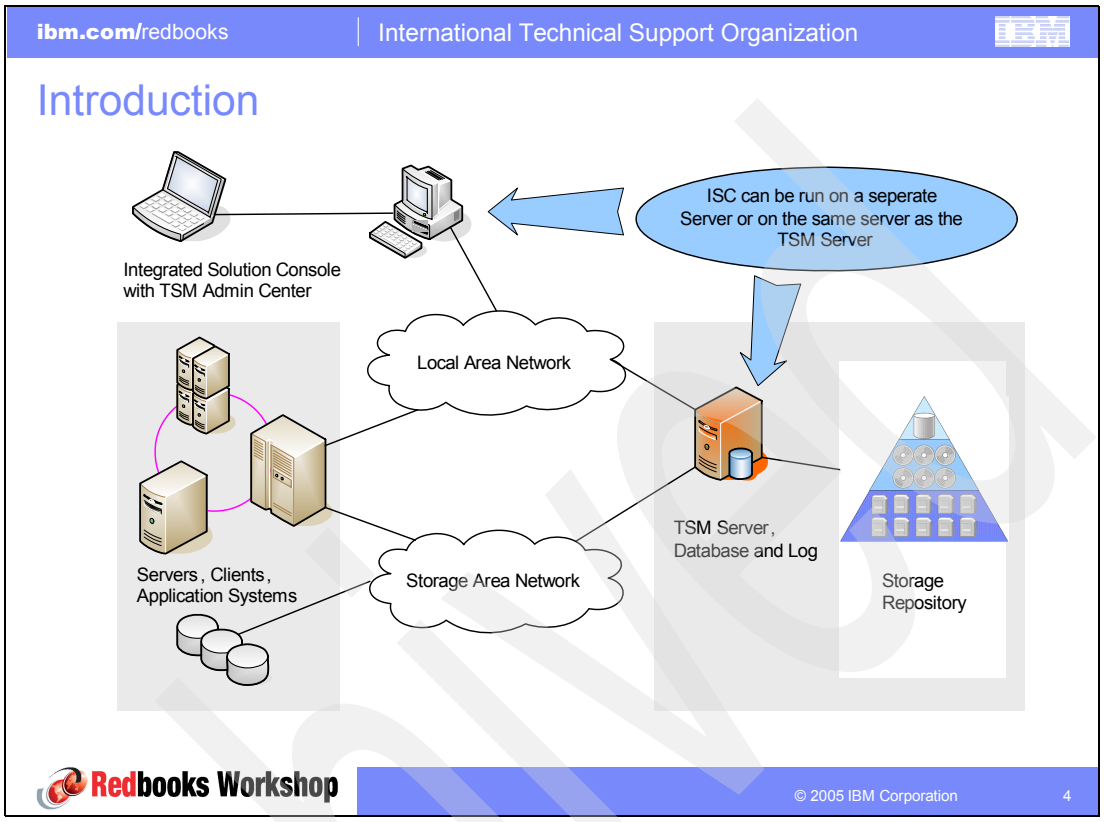



*Figure 1-4 Tivoli Storage Manager components*

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.

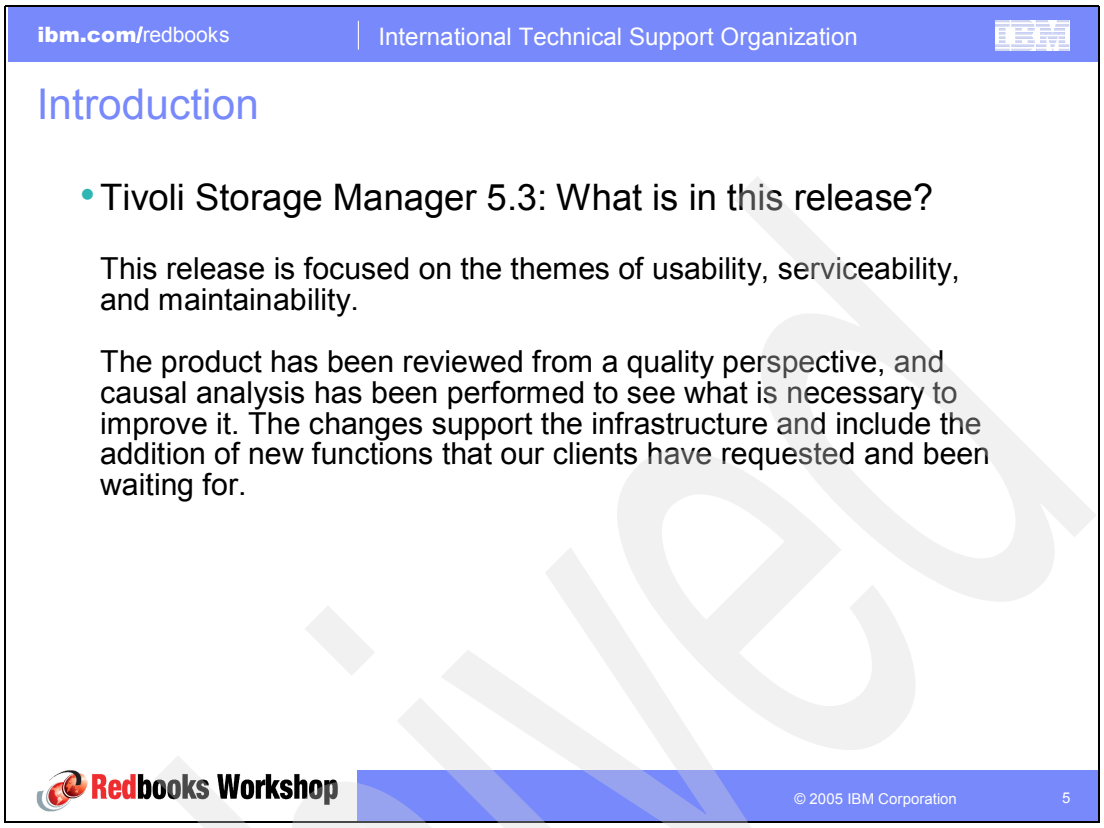



*Figure 1-5 Tivoli Storage Manager 5.3 release focus*

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.

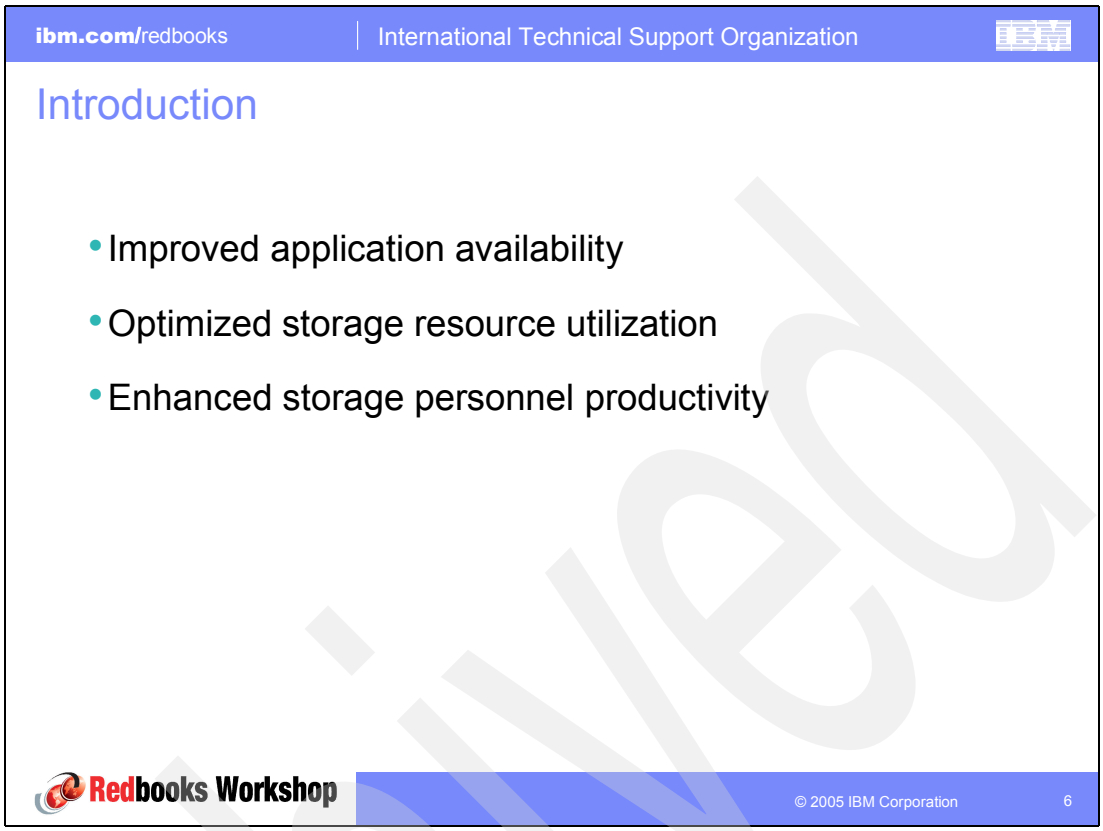



*Figure 1-6 Features overview*

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

# 2

# 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.

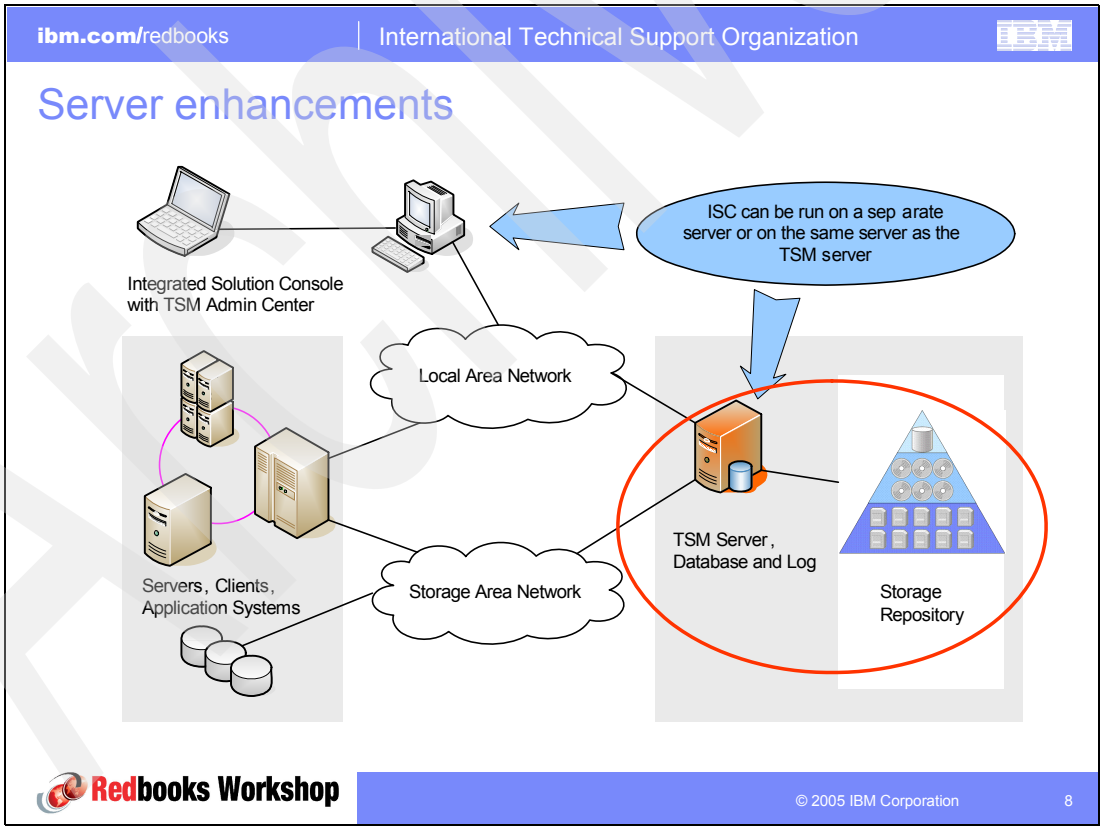



*Figure 2-1 Server enhancements*

**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

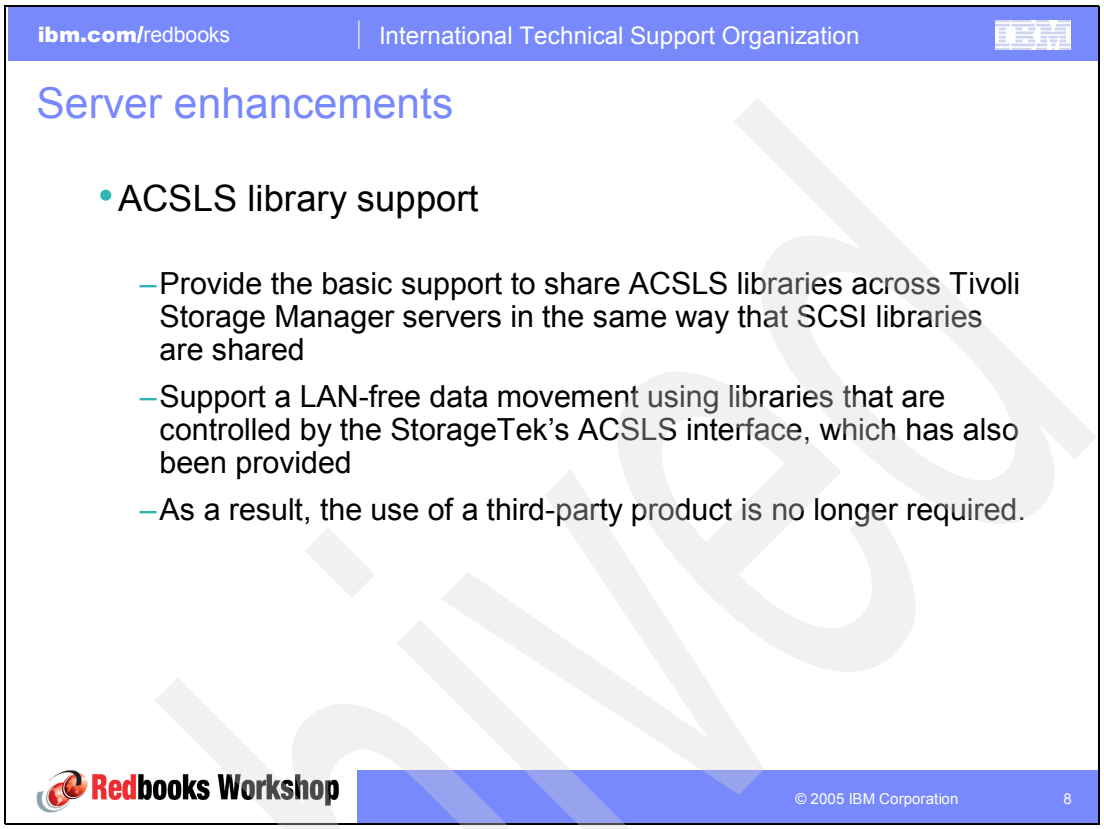



*Figure 2-2 ACSLS enhancements*

IBM Tivoli Storage Manager supports tape libraries that are controlled by StorageTek's Automated Cartridge System Library Software (ACSLS). 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

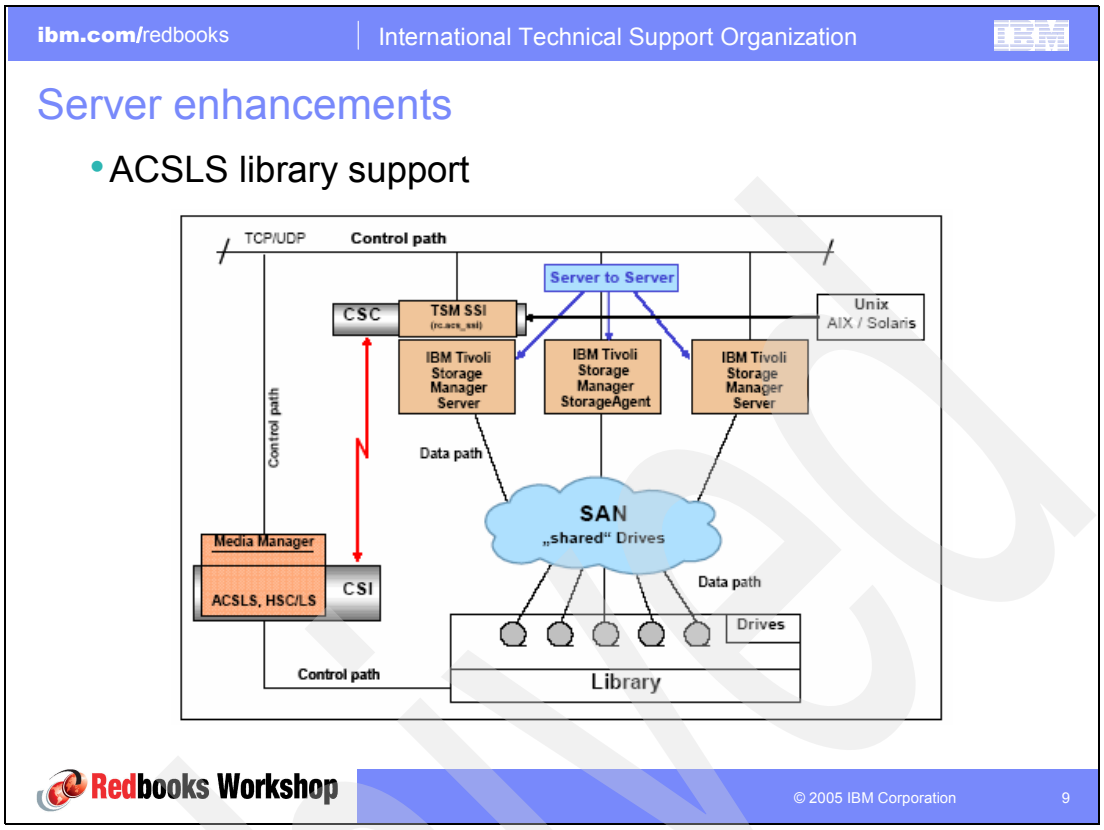



*Figure 2-3 ACSLS implementation example*

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 (ACSLS)
- 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 acsid=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

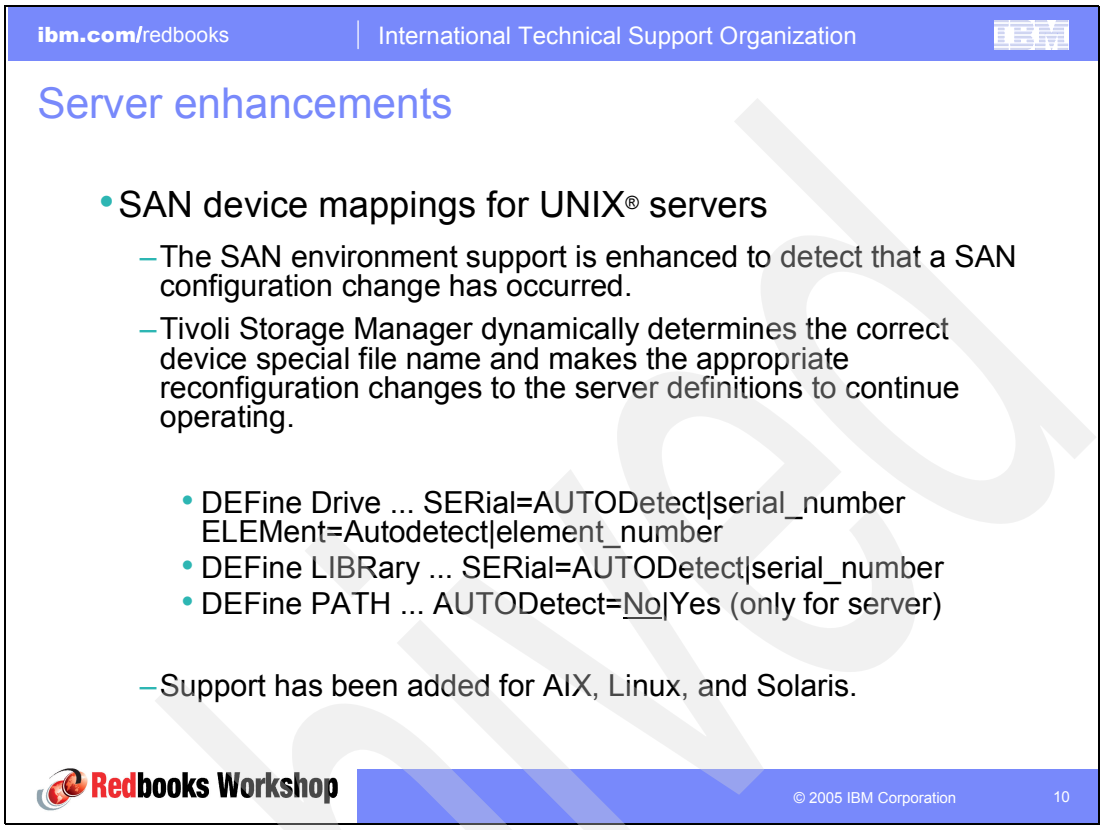



*Figure 2-4 SAN device mappings*

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

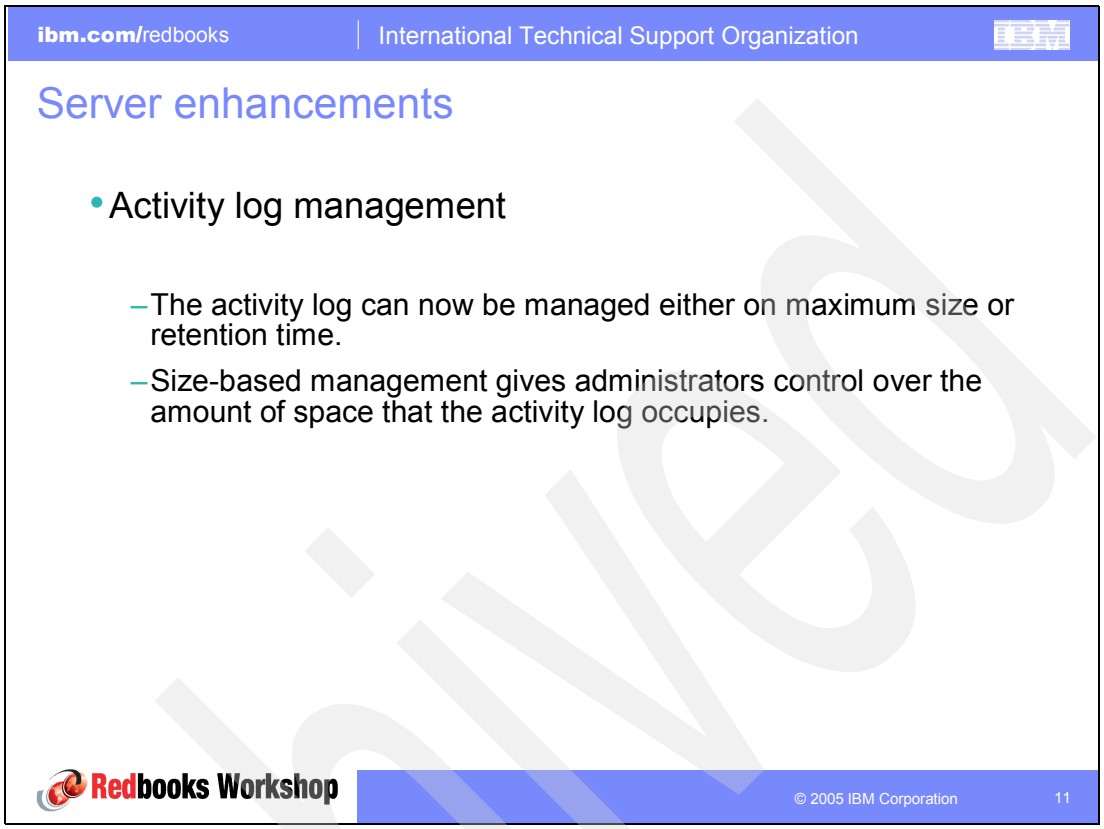



*Figure 2-5 Activity log management*

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.

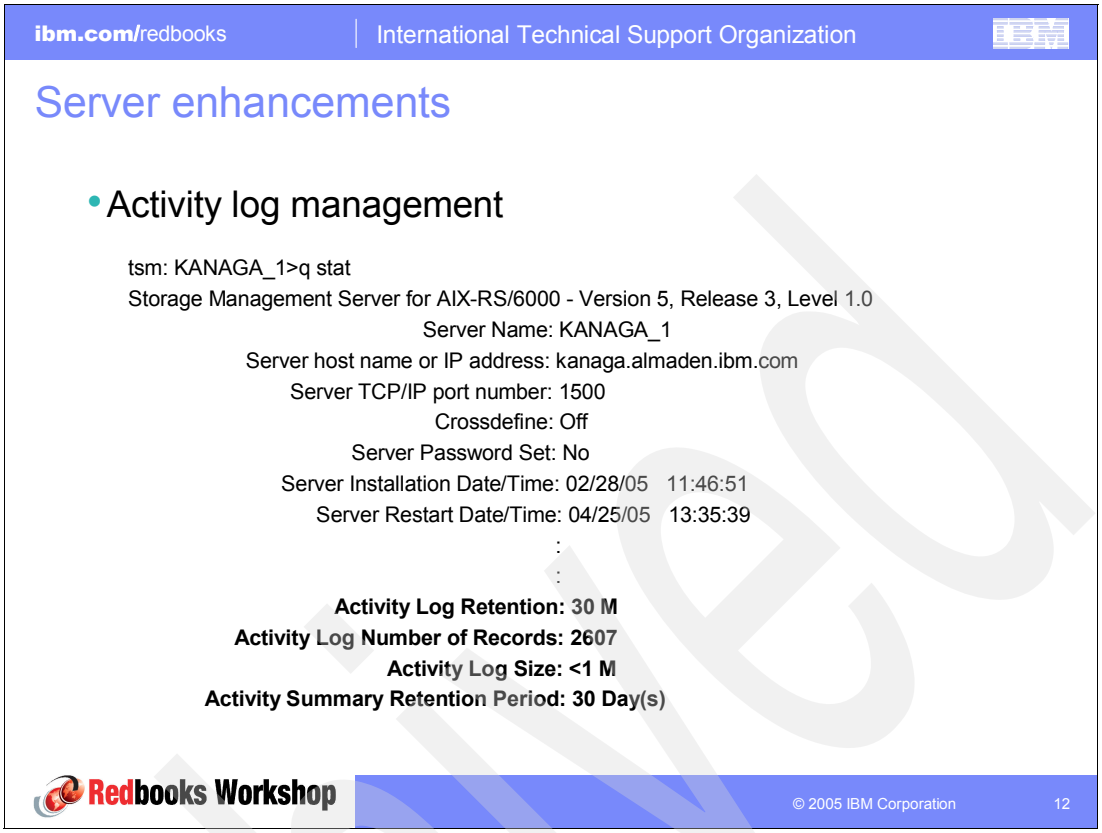



*Figure 2-6 Activity log management example*

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

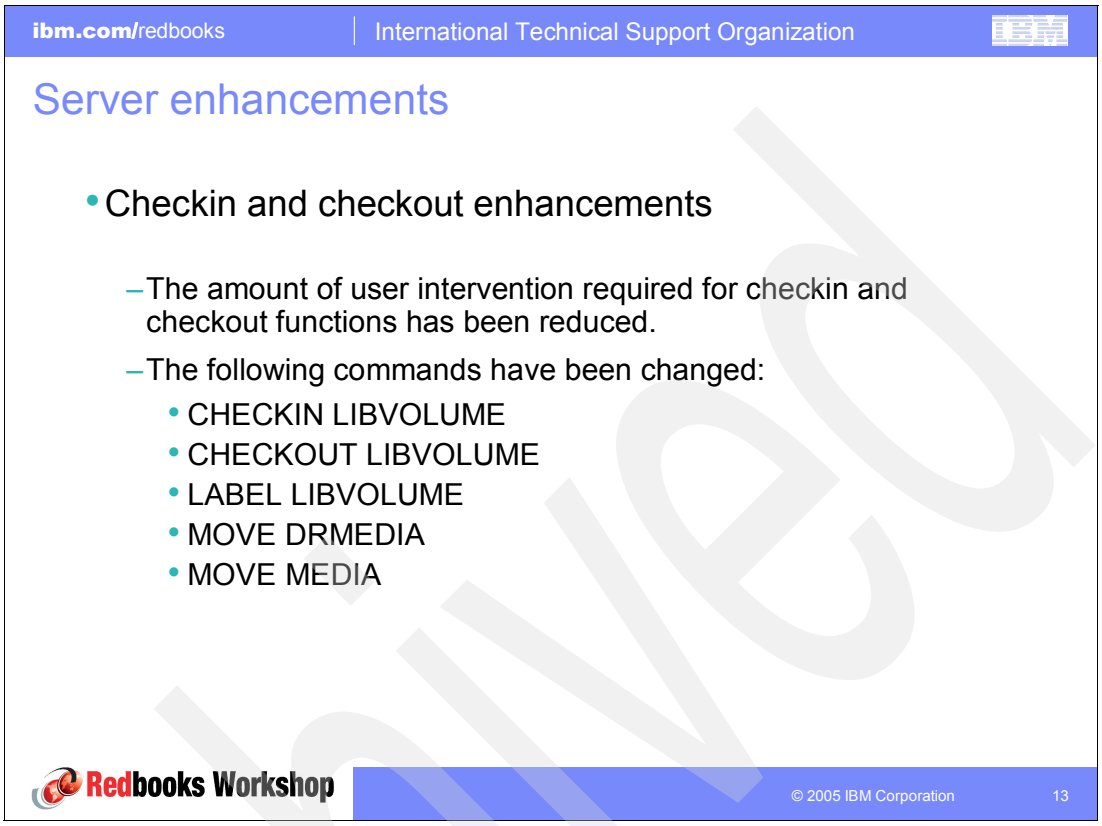



*Figure 2-7 Checkin and checkout enhancements*

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.`

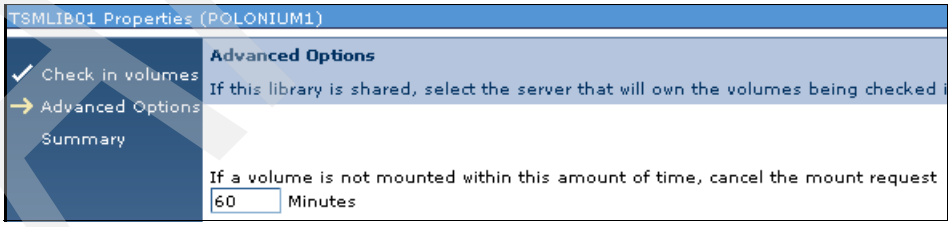



*Figure 2-8 Checkin wait time*

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.

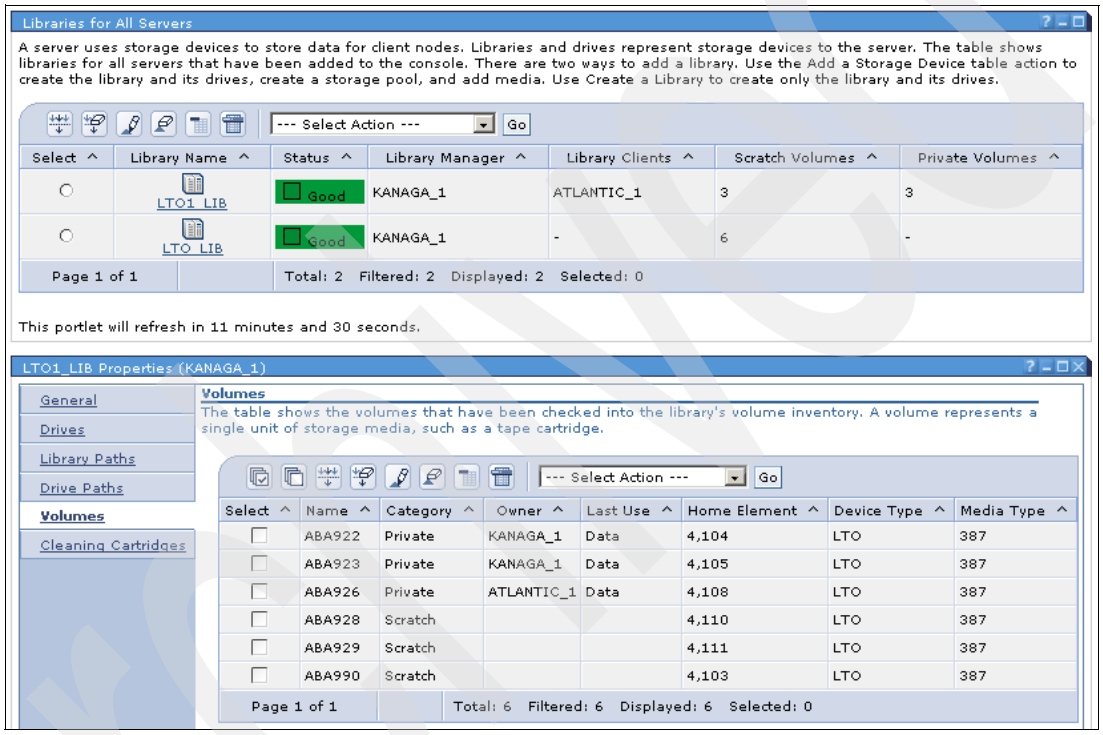



*Figure 2-9 Example output for a shared library environment*

## 2.5 Collocation by group

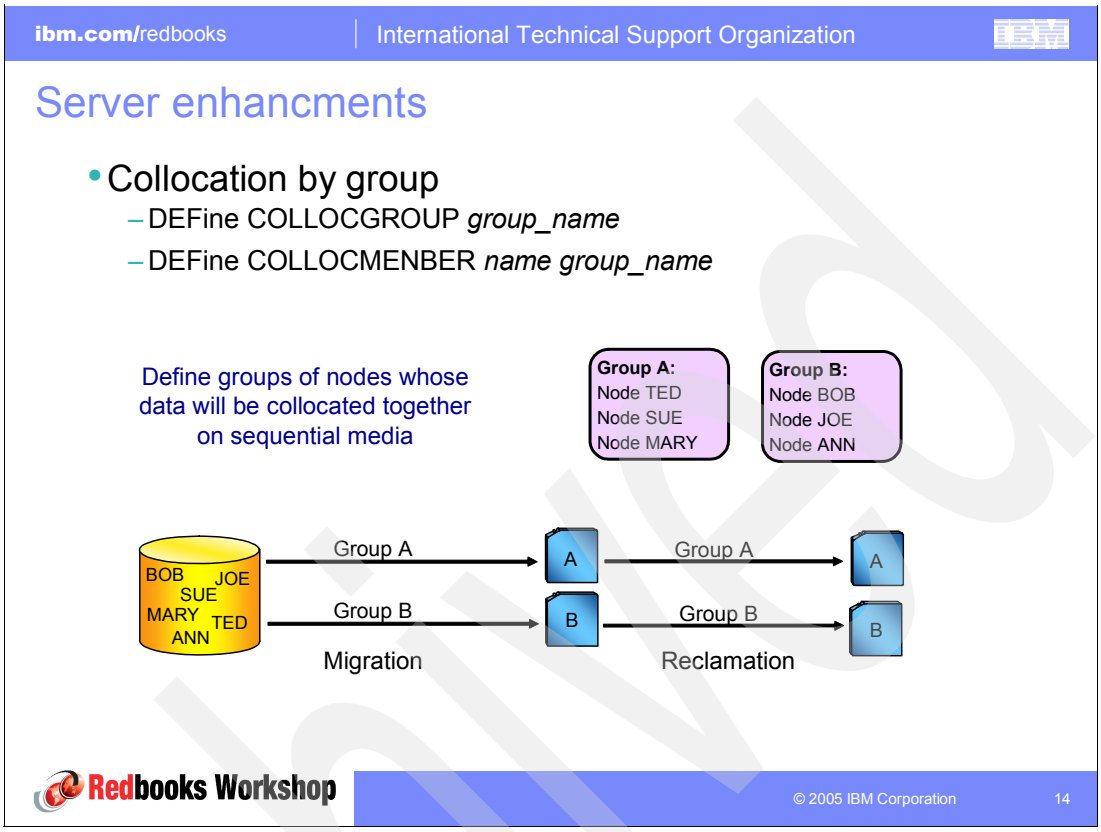



*Figure 2-10 Collocation by group*

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 COLLOCGROUP
- DEFINE COLLOCMEMBER
- DELETE COLLOCGROUP
- DELETE COLLOCMEMBER
- QUERY COLLOCGROUP

- 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 |
| FILESPACE | Collocation by file space | Collocation by file space |

## 2.6 Database reorganization

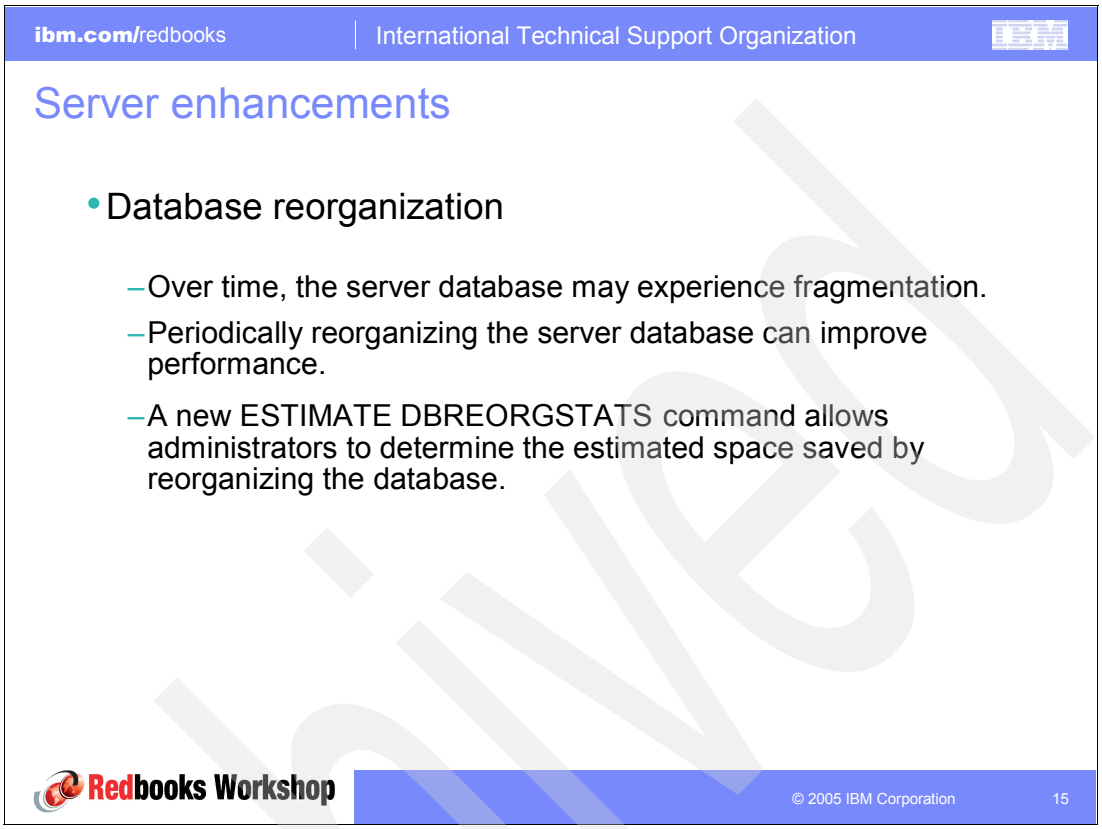



*Figure 2-11 Database reorganization*

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.

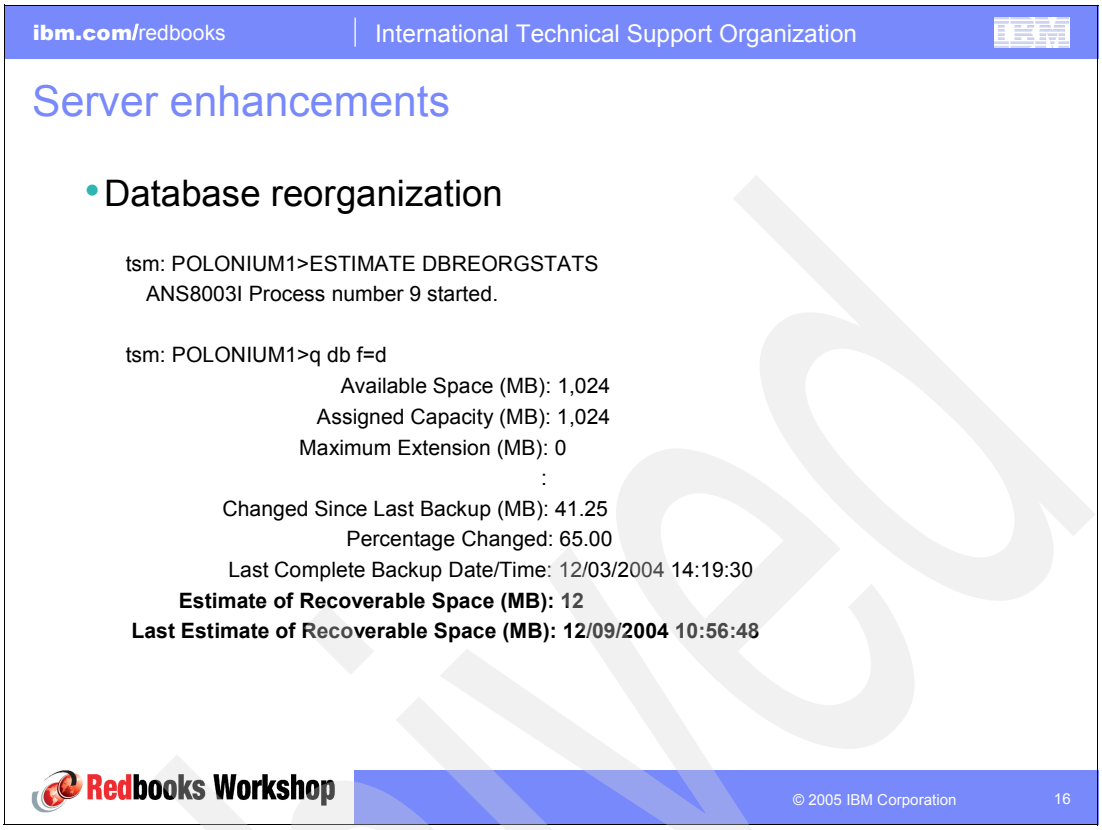



*Figure 2-12 Database reorganization example*

The following commands have changed:

- CANCEL PROCESS
- QUERY DB
- QUERY PROCESS

## 2.7 Disk device enhancements

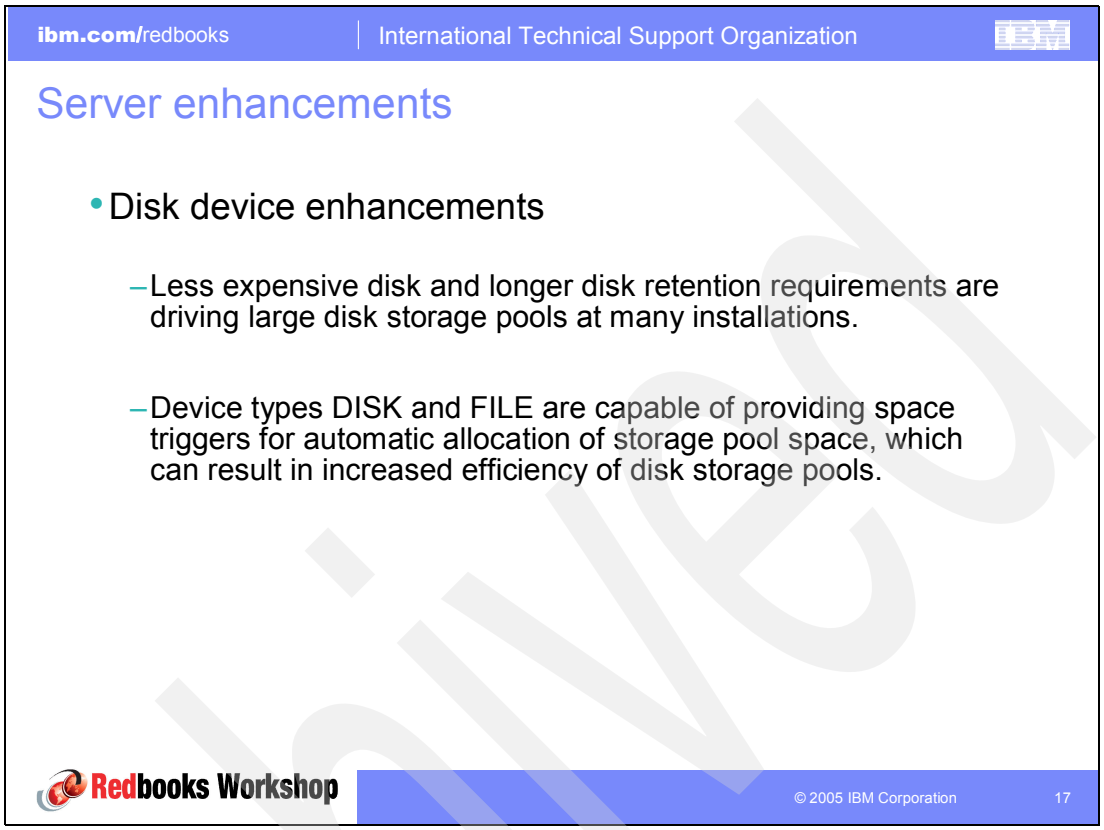



*Figure 2-13 Disk device enhancements*

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.

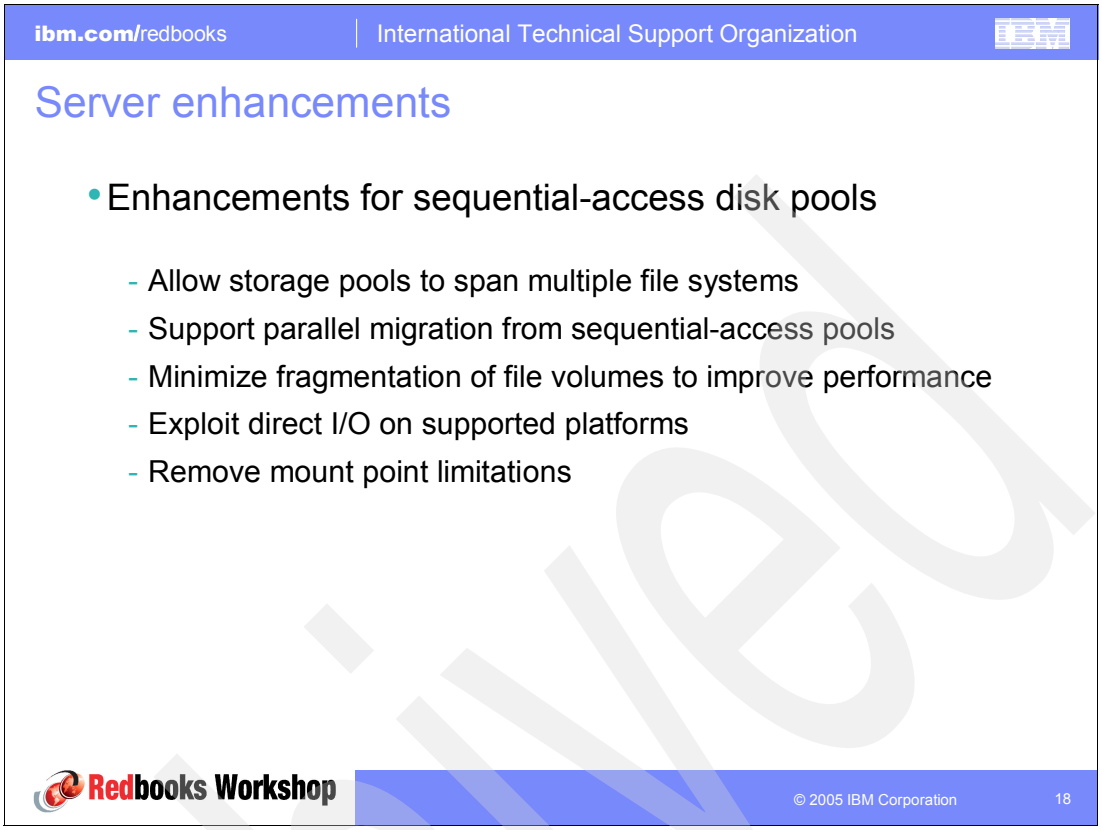
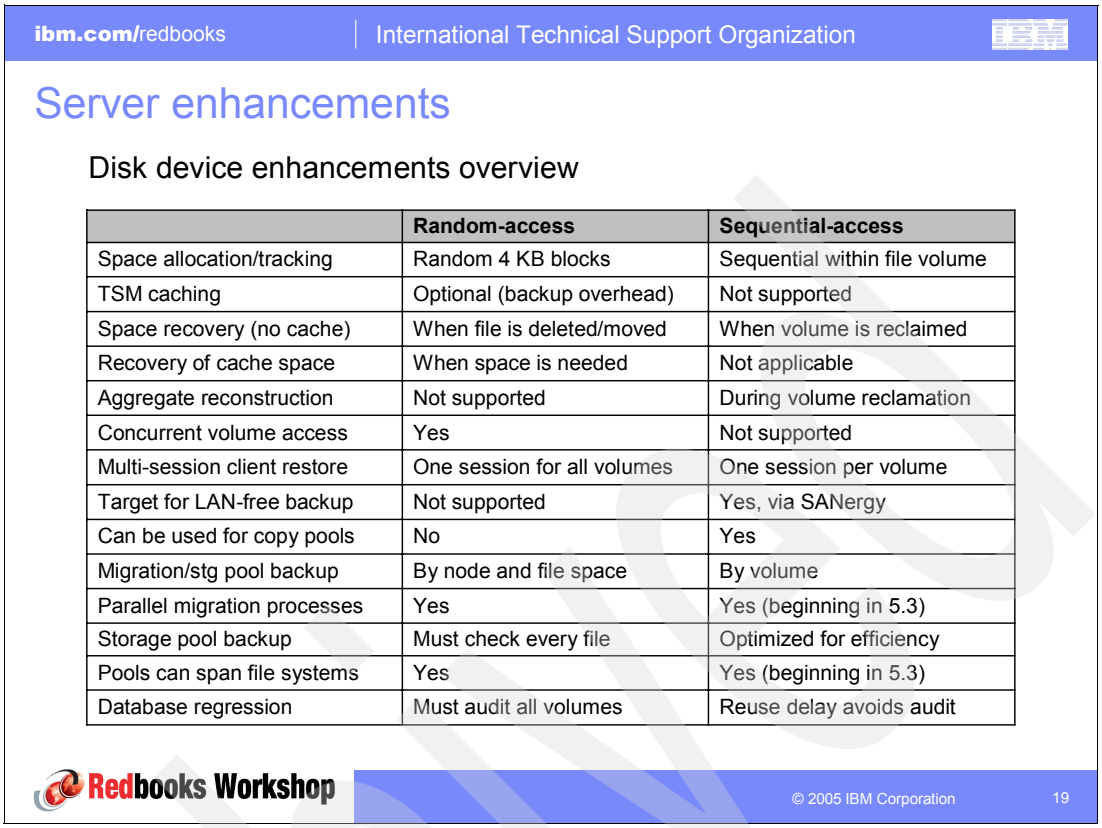



*Figure 2-14 Enhancements for sequential-access disk storage pools*

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.




| | 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

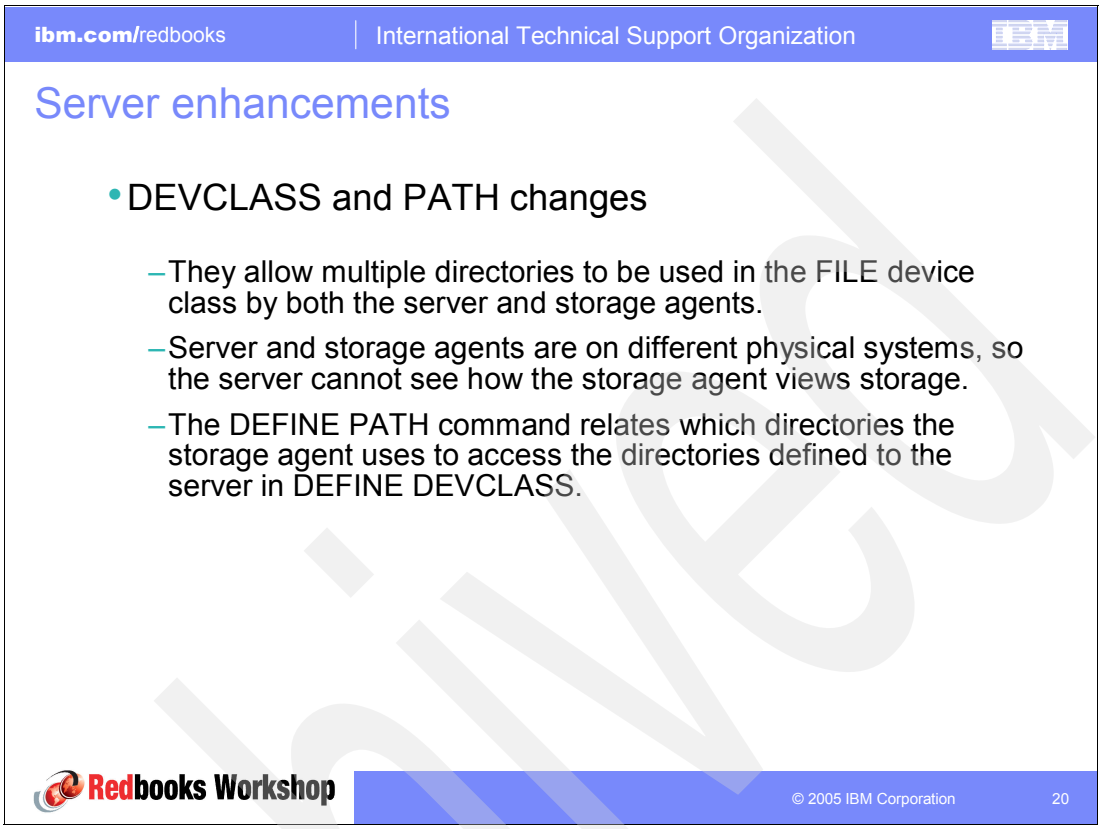



*Figure 2-16 DEVCLASS and PATH changes*

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

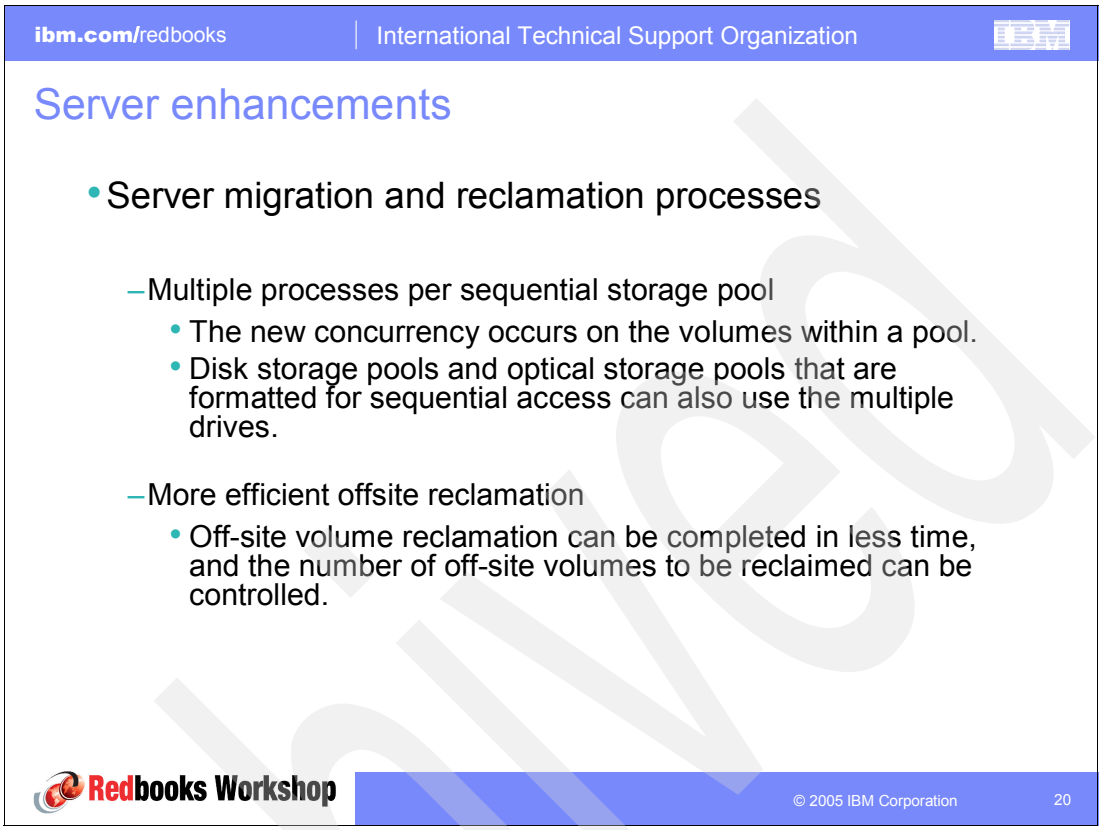



*Figure 2-17 Server migration and reclamation processes*

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.

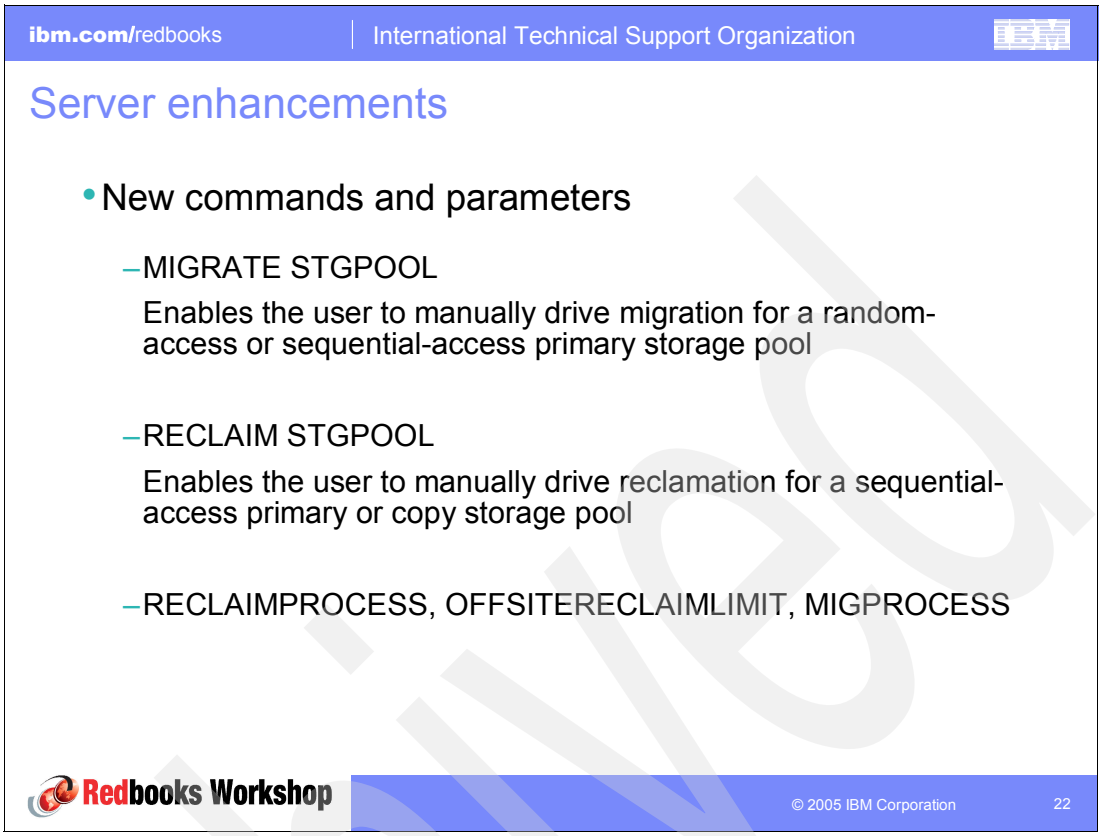



*Figure 2-18 New commands and parameters*

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

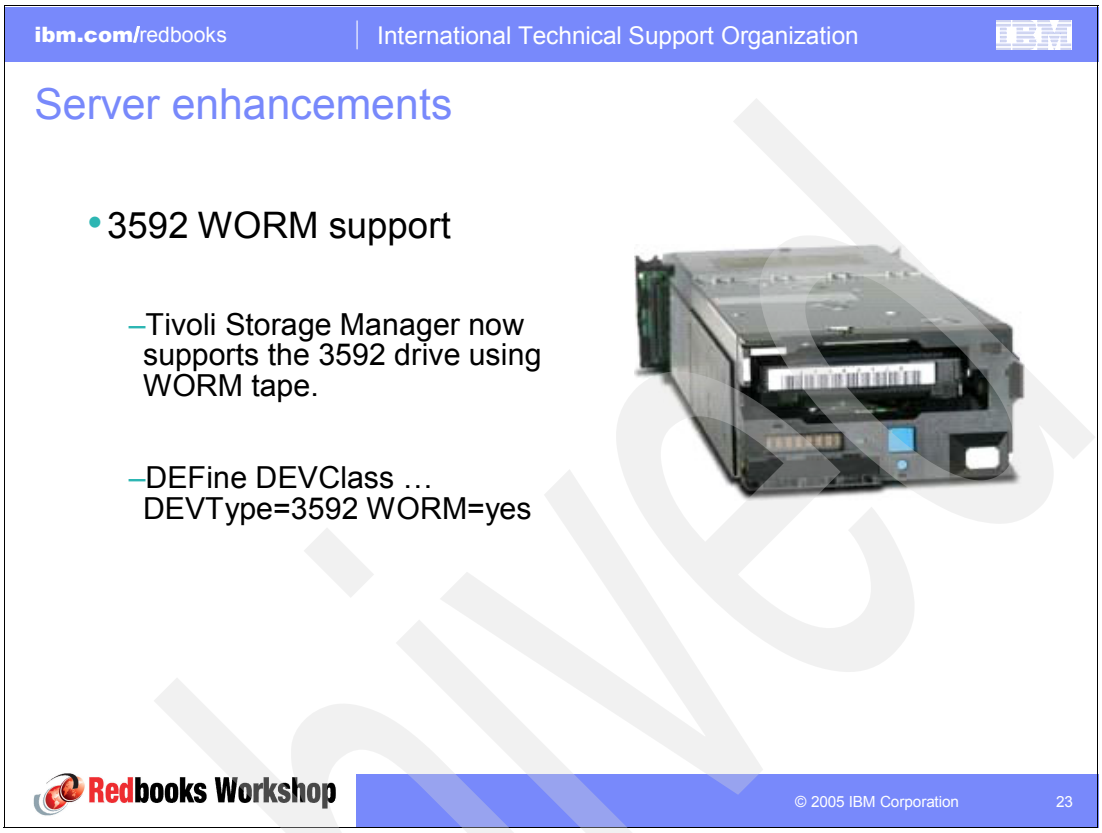



*Figure 2-19 3592 WORM support*

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

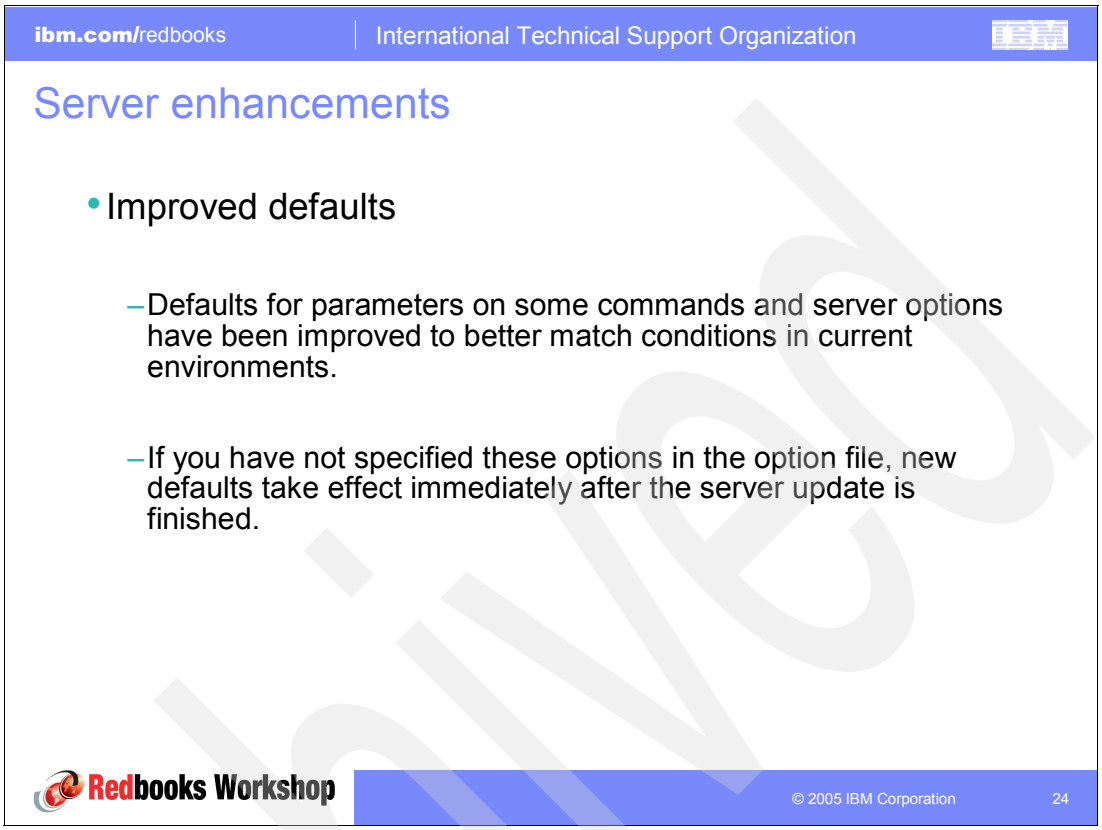



*Figure 2-20 Improved defaults*

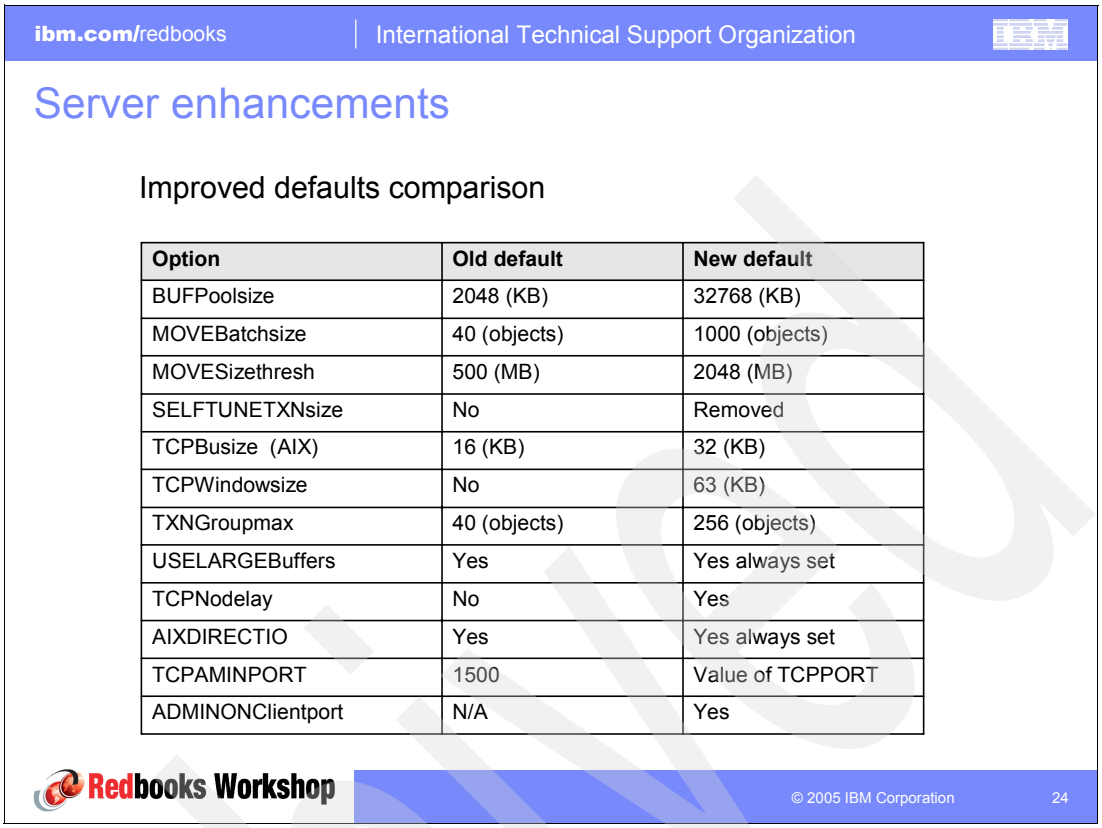



*Figure 2-21 Improved defaults comparison*

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 TCP-ADMINPORT 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


*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.

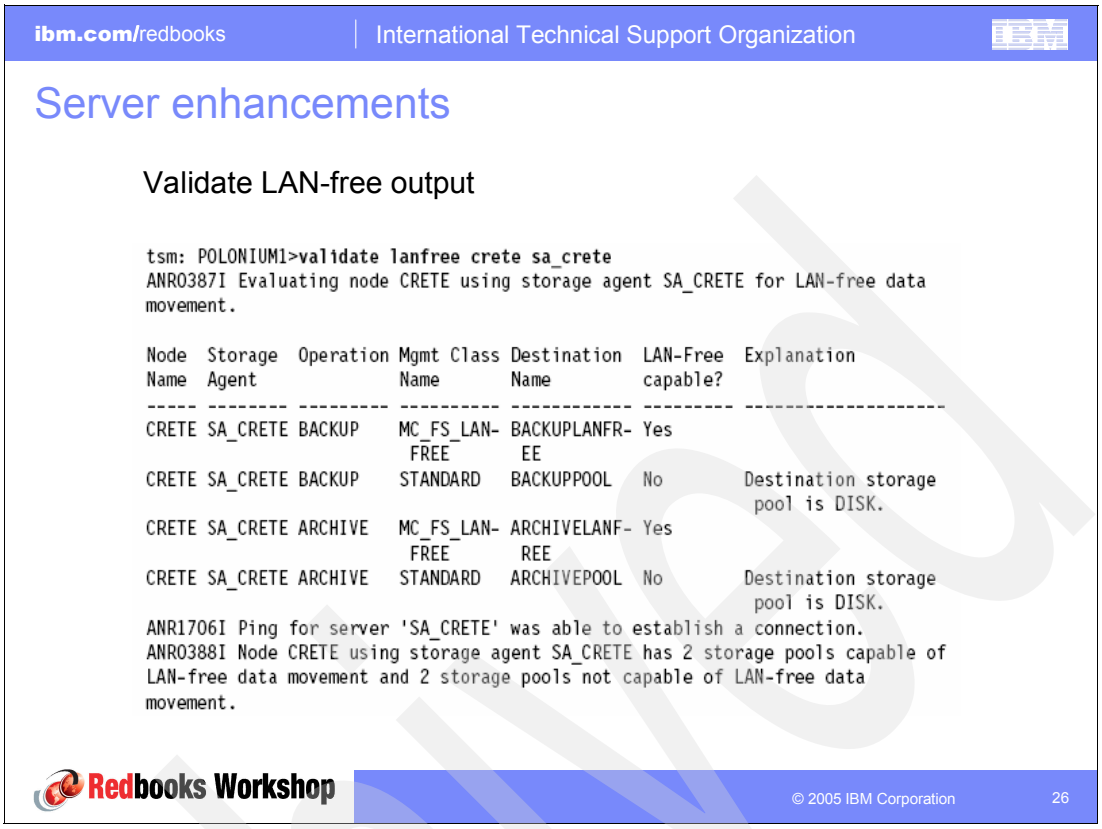



*Figure 2-23 Validate LAN-free output*

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

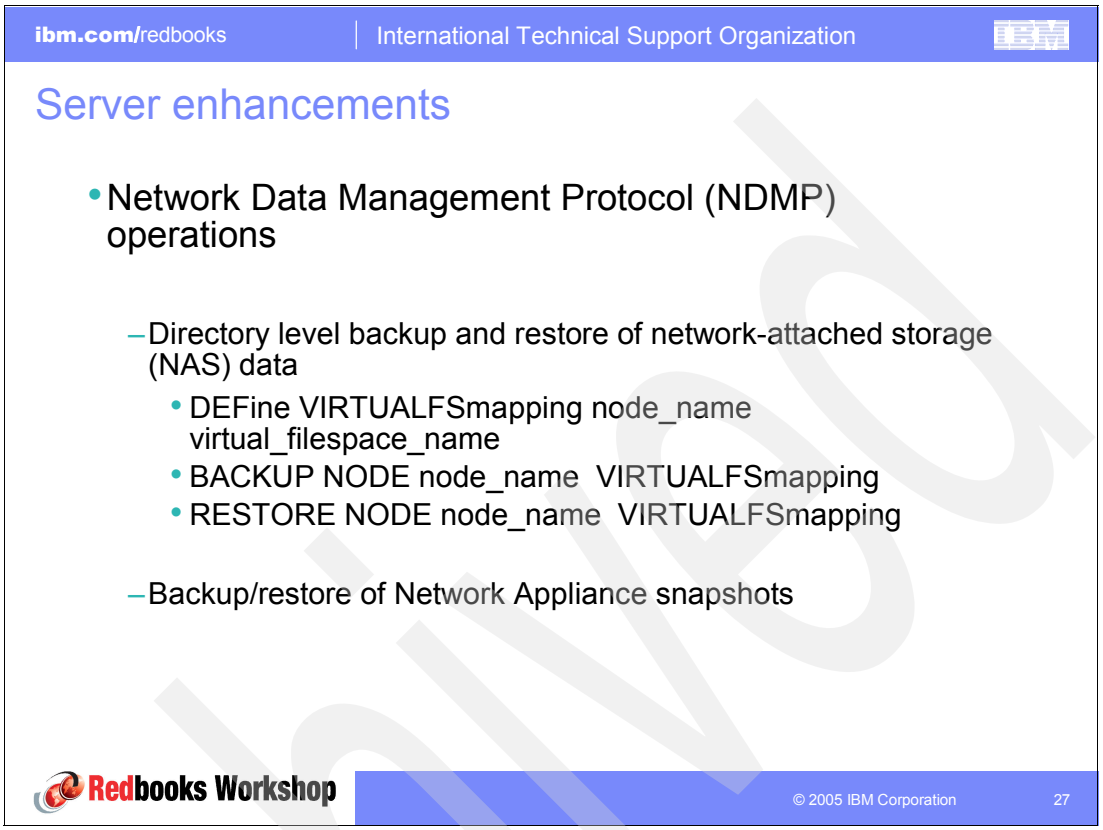



*Figure 2-24 NDMP operations*

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

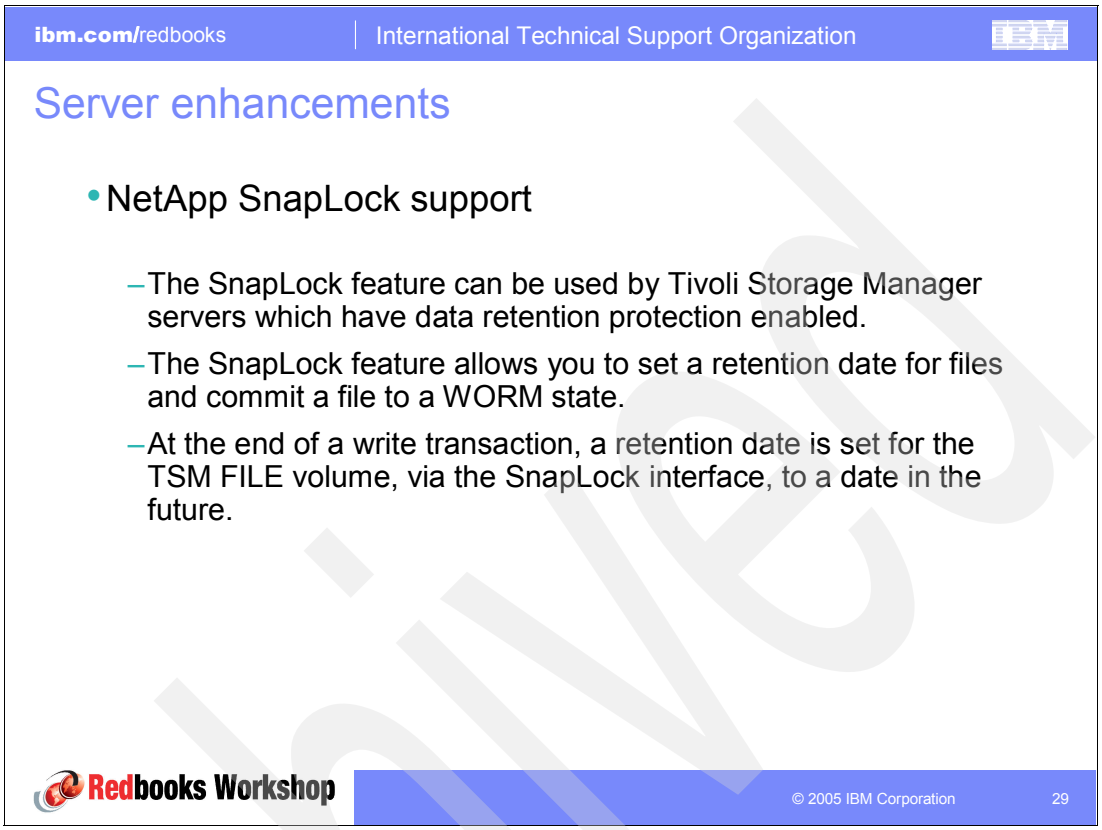



*Figure 2-25 NetApp SnapLock support*

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

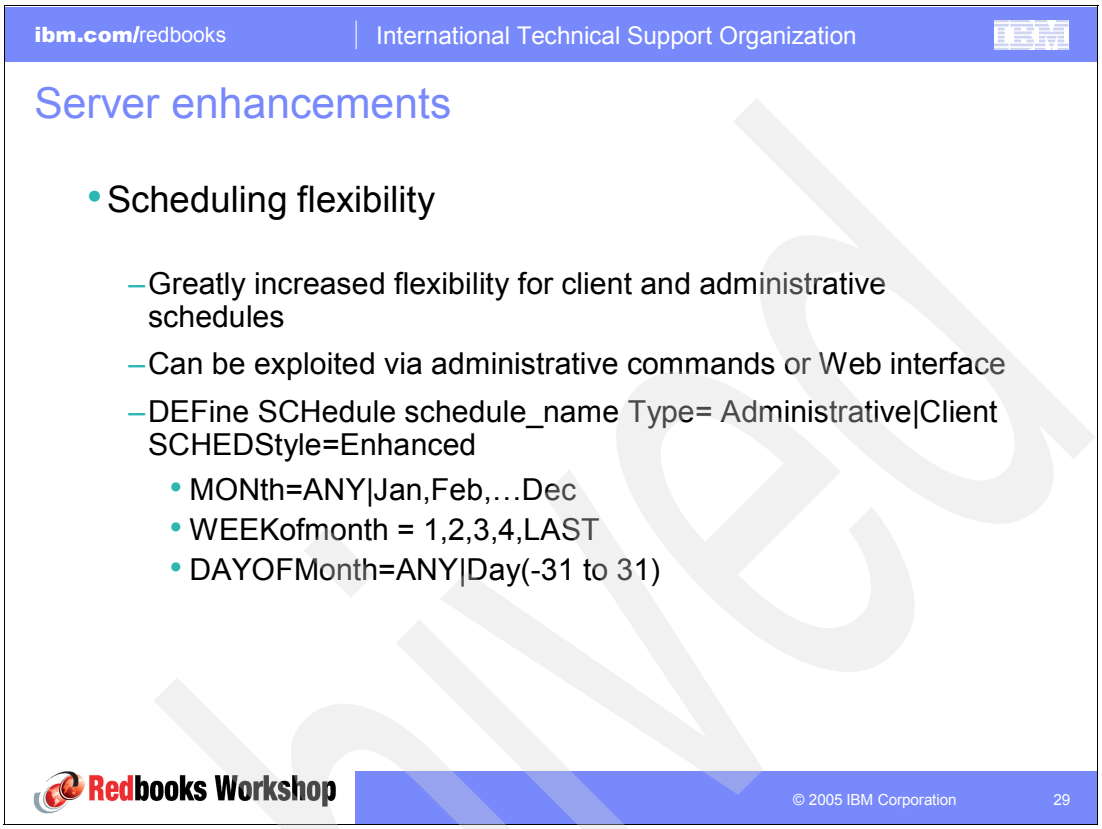



*Figure 2-26 Scheduling flexibility*

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

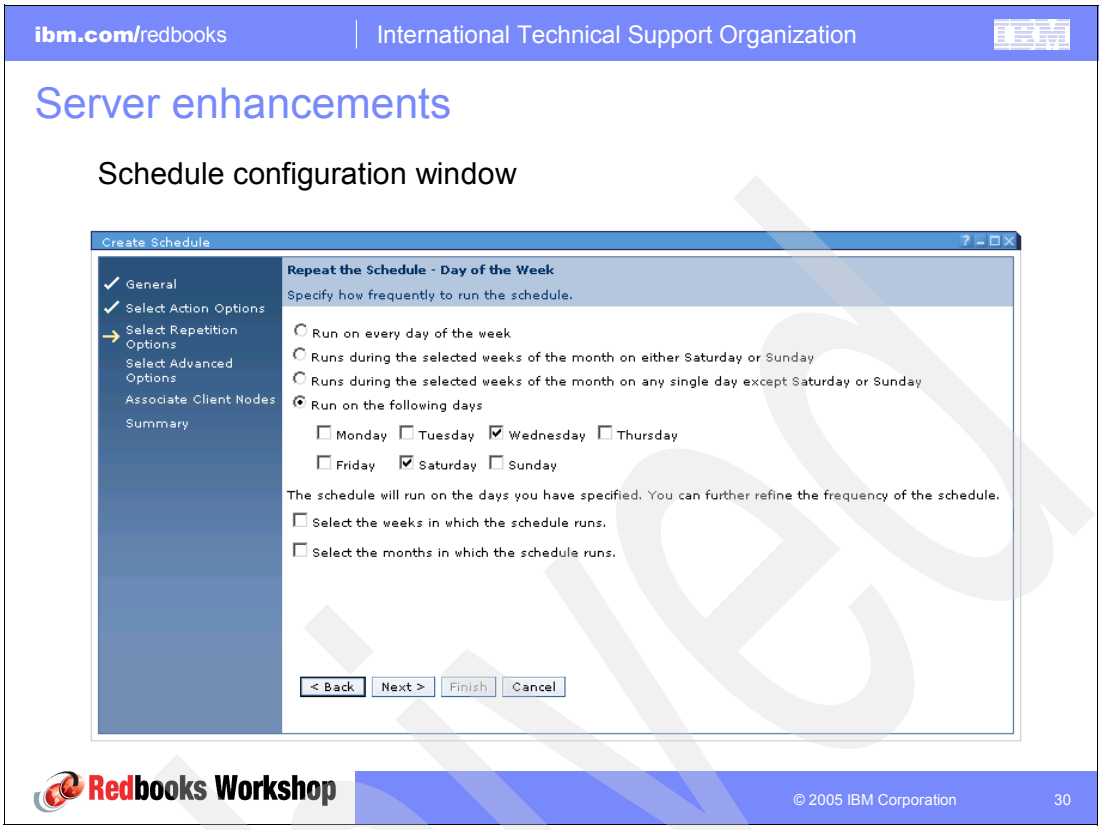



*Figure 2-27 Schedule configuration window*

3

# 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.

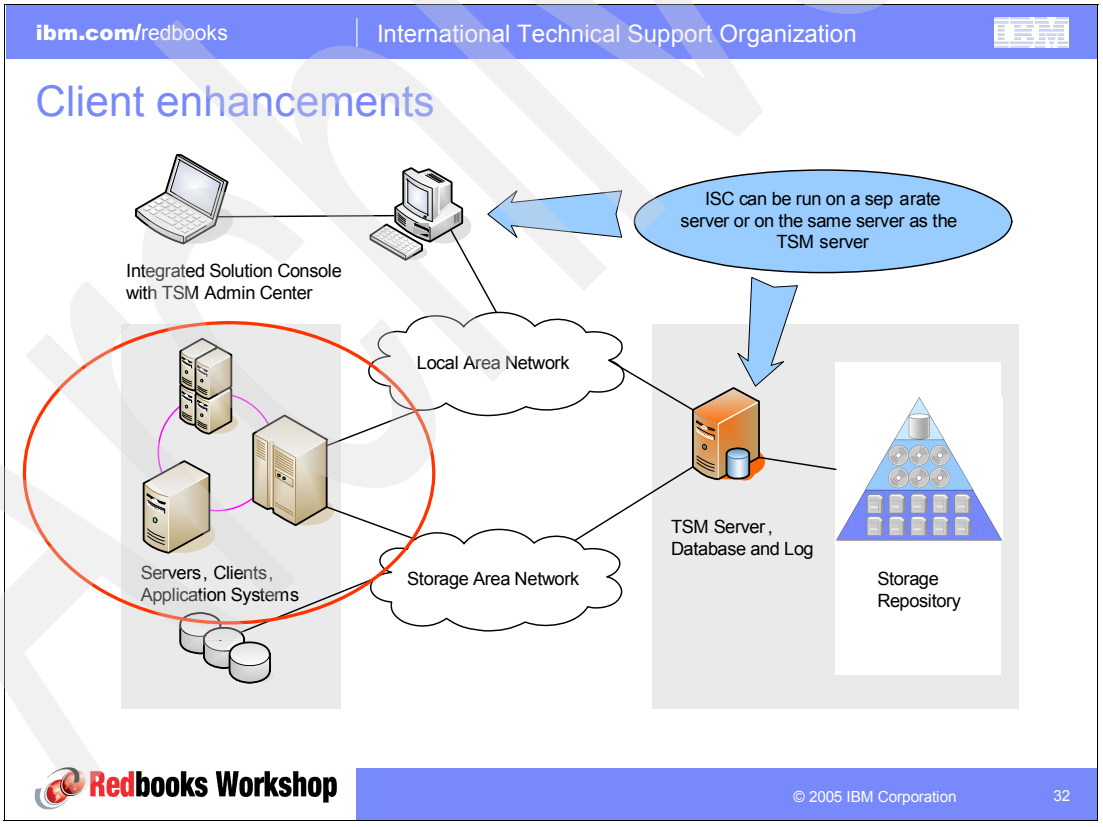



*Figure 3-1 Tivoli Storage Manager components*

**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

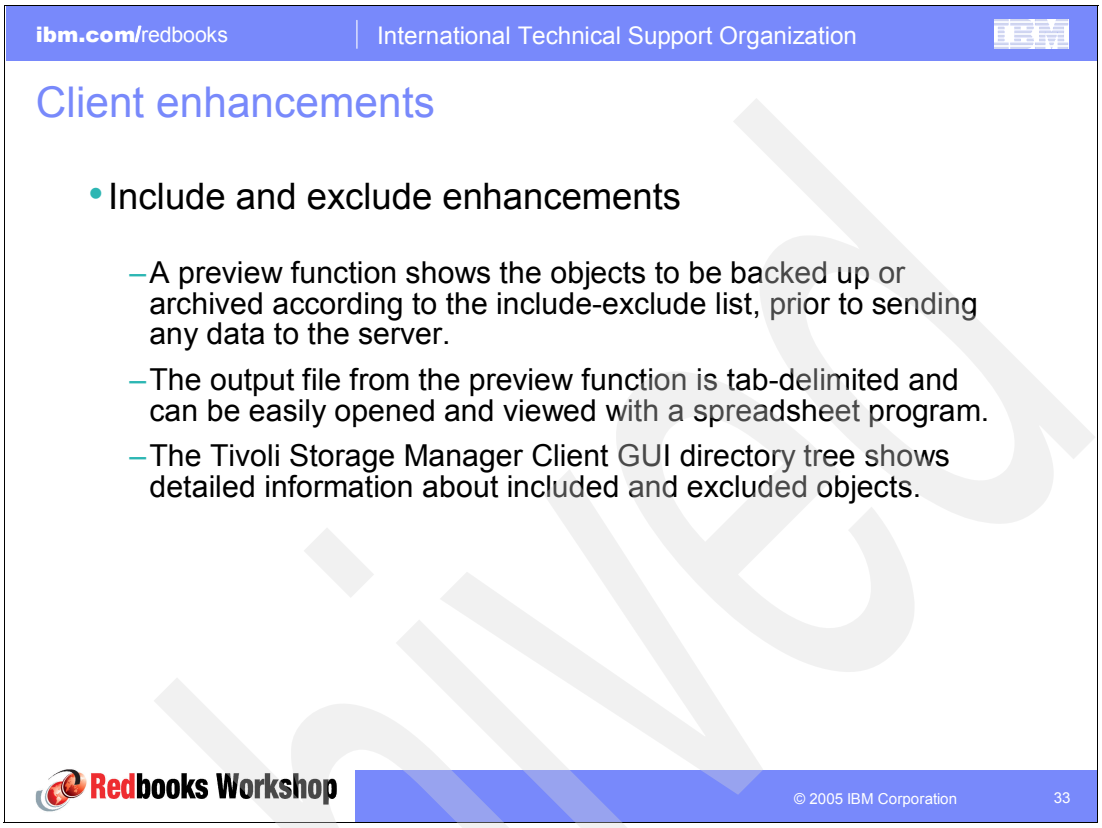
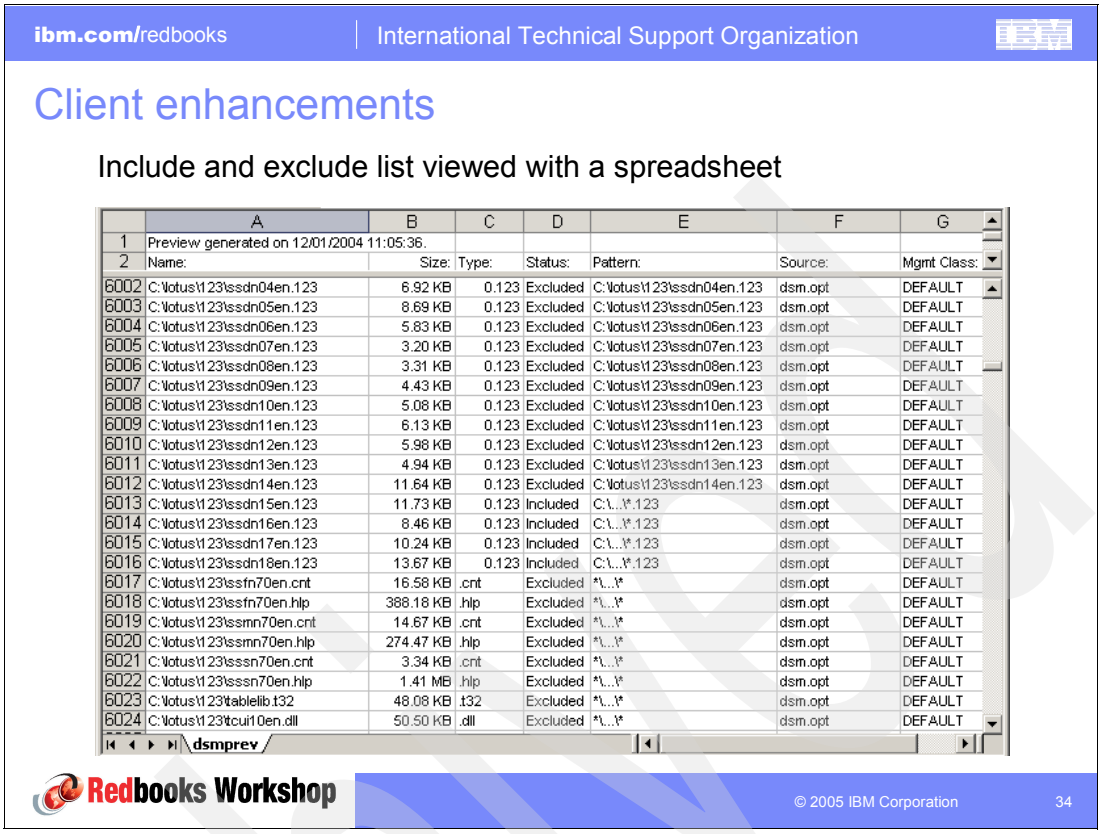



*Figure 3-2 Include and exclude enhancements*




| | 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:\lotus\123\ssdn04en.123 | 6.92 KB | 0.123 | Excluded | C:\lotus\123\ssdn04en.123 | dsm.opt | DEFAULT |
| 6003 | C:\lotus\123\ssdn05en.123 | 8.69 KB | 0.123 | Excluded | C:\lotus\123\ssdn05en.123 | dsm.opt | DEFAULT |
| 6004 | C:\lotus\123\ssdn06en.123 | 5.83 KB | 0.123 | Excluded | C:\lotus\123\ssdn06en.123 | dsm.opt | DEFAULT |
| 6005 | C:\lotus\123\ssdn07en.123 | 3.20 KB | 0.123 | Excluded | C:\lotus\123\ssdn07en.123 | dsm.opt | DEFAULT |
| 6006 | C:\lotus\123\ssdn08en.123 | 3.31 KB | 0.123 | Excluded | C:\lotus\123\ssdn08en.123 | dsm.opt | DEFAULT |
| 6007 | C:\lotus\123\ssdn09en.123 | 4.43 KB | 0.123 | Excluded | C:\lotus\123\ssdn09en.123 | dsm.opt | DEFAULT |
| 6008 | C:\lotus\123\ssdn10en.123 | 5.08 KB | 0.123 | Excluded | C:\lotus\123\ssdn10en.123 | dsm.opt | DEFAULT |
| 6009 | C:\lotus\123\ssdn11en.123 | 6.13 KB | 0.123 | Excluded | C:\lotus\123\ssdn11en.123 | dsm.opt | DEFAULT |
| 6010 | C:\lotus\123\ssdn12en.123 | 5.98 KB | 0.123 | Excluded | C:\lotus\123\ssdn12en.123 | dsm.opt | DEFAULT |
| 6011 | C:\lotus\123\ssdn13en.123 | 4.94 KB | 0.123 | Excluded | C:\lotus\123\ssdn13en.123 | dsm.opt | DEFAULT |
| 6012 | C:\lotus\123\ssdn14en.123 | 11.64 KB | 0.123 | Excluded | C:\lotus\123\ssdn14en.123 | dsm.opt | DEFAULT |
| 6013 | C:\lotus\123\ssdn15en.123 | 11.73 KB | 0.123 | Included | C:\...*.123 | dsm.opt | DEFAULT |
| 6014 | C:\lotus\123\ssdn16en.123 | 8.46 KB | 0.123 | Included | C:\...*.123 | dsm.opt | DEFAULT |
| 6015 | C:\lotus\123\ssdn17en.123 | 10.24 KB | 0.123 | Included | C:\...*.123 | dsm.opt | DEFAULT |
| 6016 | C:\lotus\123\ssdn18en.123 | 13.67 KB | 0.123 | Included | C:\...*.123 | dsm.opt | DEFAULT |
| 6017 | C:\lotus\123\ssfn70en.cnt | 16.58 KB | .cnt | Excluded | *\...* | dsm.opt | DEFAULT |
| 6018 | C:\lotus\123\ssfn70en.hlp | 388.18 KB | .hlp | Excluded | *\...* | dsm.opt | DEFAULT |
| 6019 | C:\lotus\123\ssmn70en.cnt | 14.67 KB | .cnt | Excluded | *\...* | dsm.opt | DEFAULT |
| 6020 | C:\lotus\123\ssmn70en.hlp | 274.47 KB | .hlp | Excluded | *\...* | dsm.opt | DEFAULT |
| 6021 | C:\lotus\123\sssn70en.cnt | 3.34 KB | .cnt | Excluded | *\...* | dsm.opt | DEFAULT |
| 6022 | C:\lotus\123\sssn70en.hlp | 1.41 MB | .hlp | Excluded | *\...* | dsm.opt | DEFAULT |
| 6023 | C:\lotus\123\tablelib.t32 | 48.08 KB | .t32 | Excluded | *\...* | dsm.opt | DEFAULT |
| 6024 | C:\lotus\123\tcui10en.dll | 50.50 KB | .dll | Excluded | *\...* | dsm.opt | DEFAULT |

dsmprev

*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

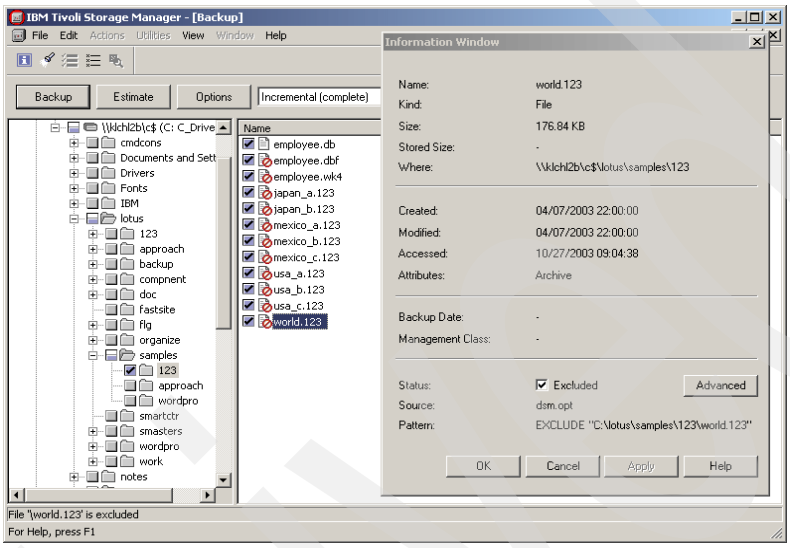







*Figure 3-4 Client GUI directory detailed information*

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

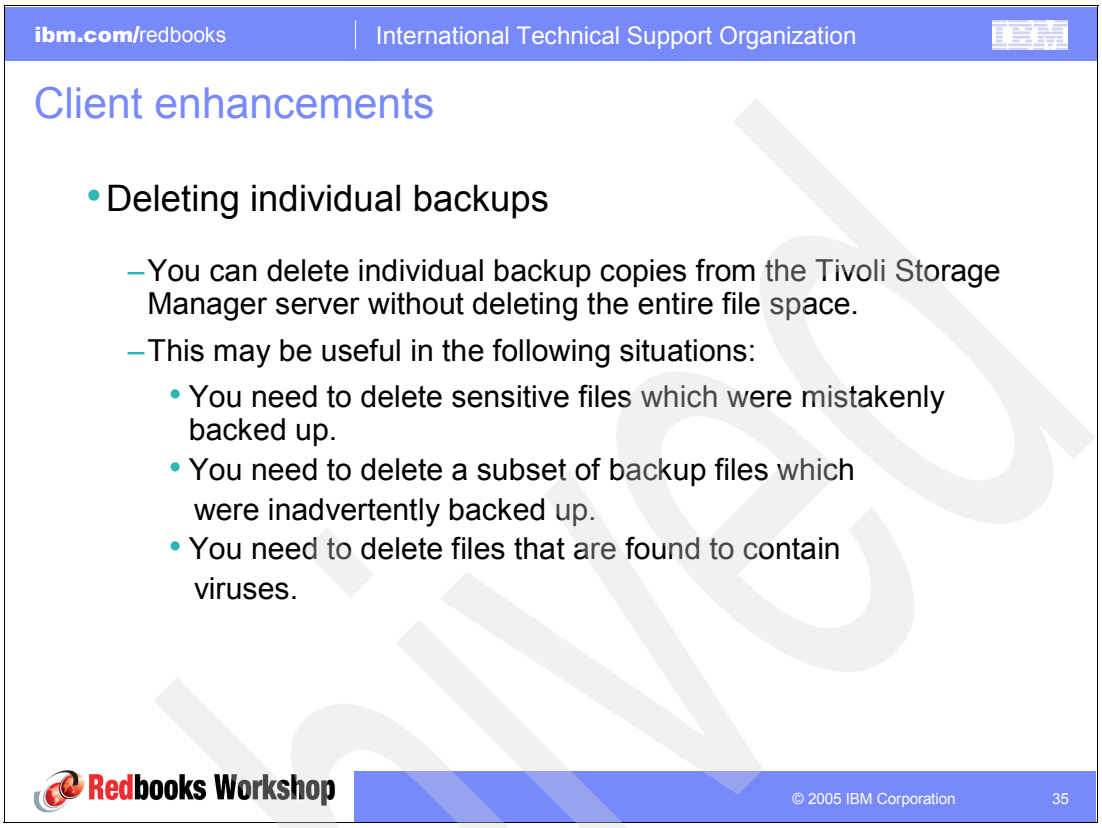



*Figure 3-5 Deleting individual backups*

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

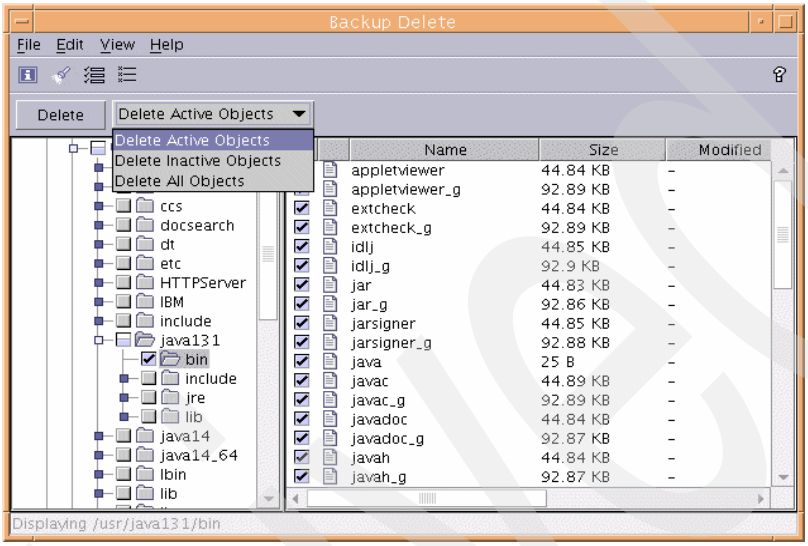







*Figure 3-6 Window to delete individual backup copies*

## 3.3 Optimized option default values

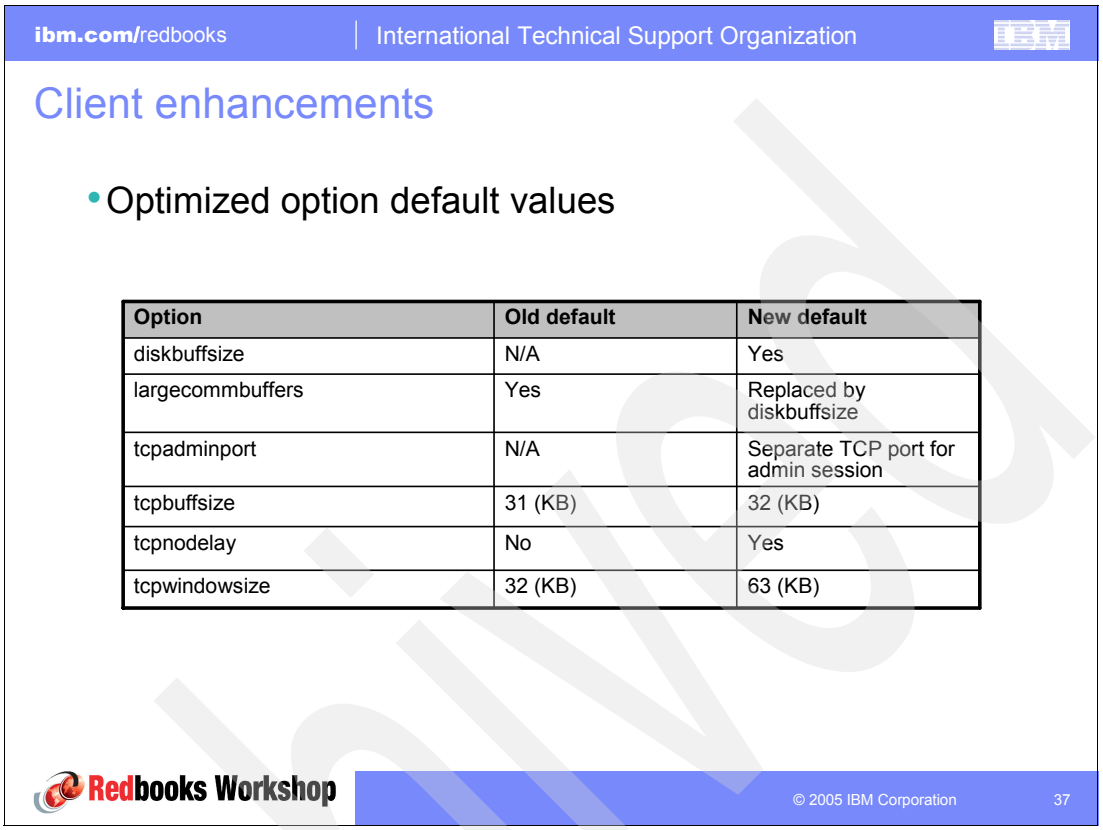



*Figure 3-7 Optimized option default values*

The options are explained in the following list:

- **DISKBUFFSIZE**: 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

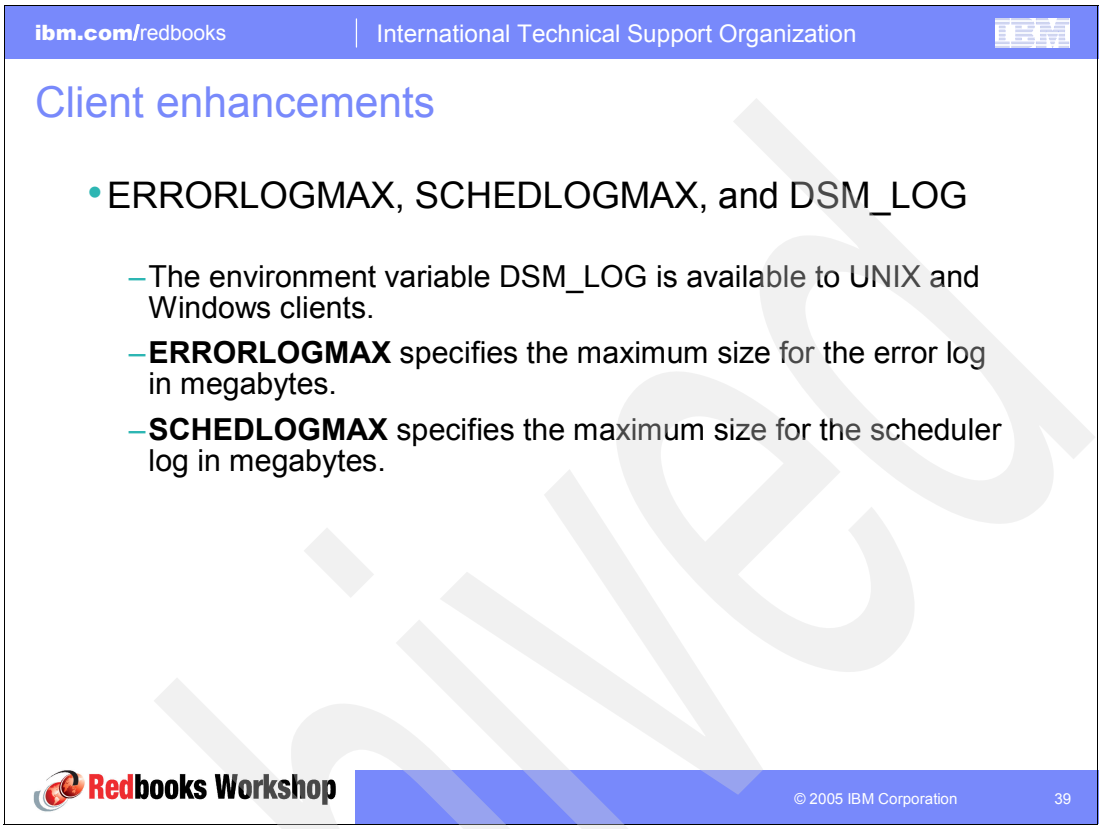



*Figure 3-8 ERRORLOGMAX, SCHEDLOGMAX, DSM_LOG*

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

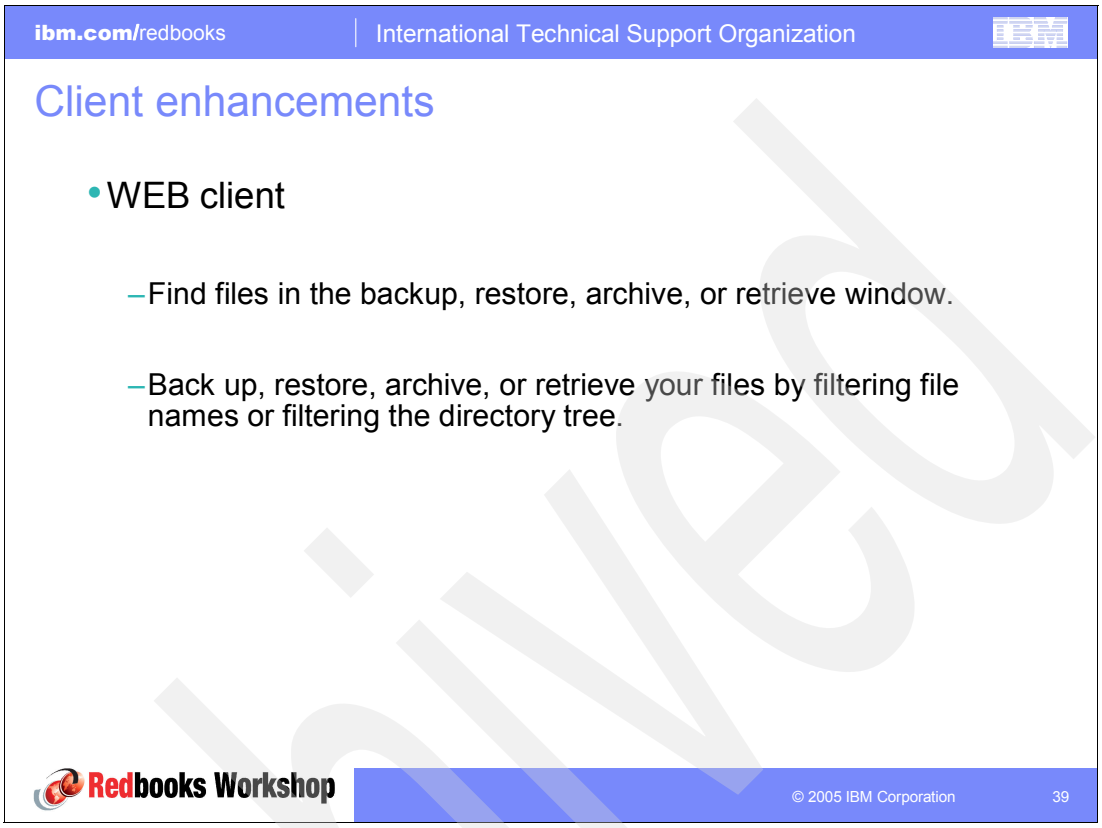



*Figure 3-9 WEB client enhancements*

# Client enhancements

## Enhanced WEB client GUI

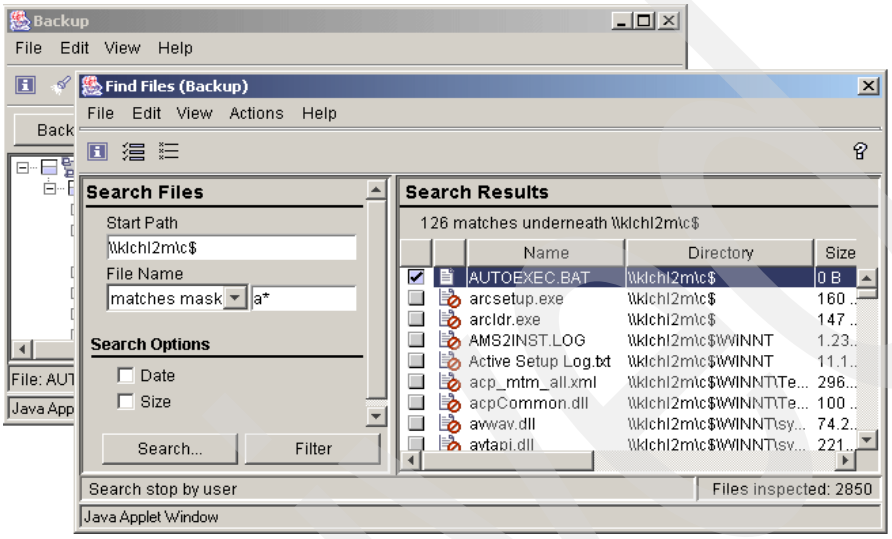







*Figure 3-10 WEB client GUI example*

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

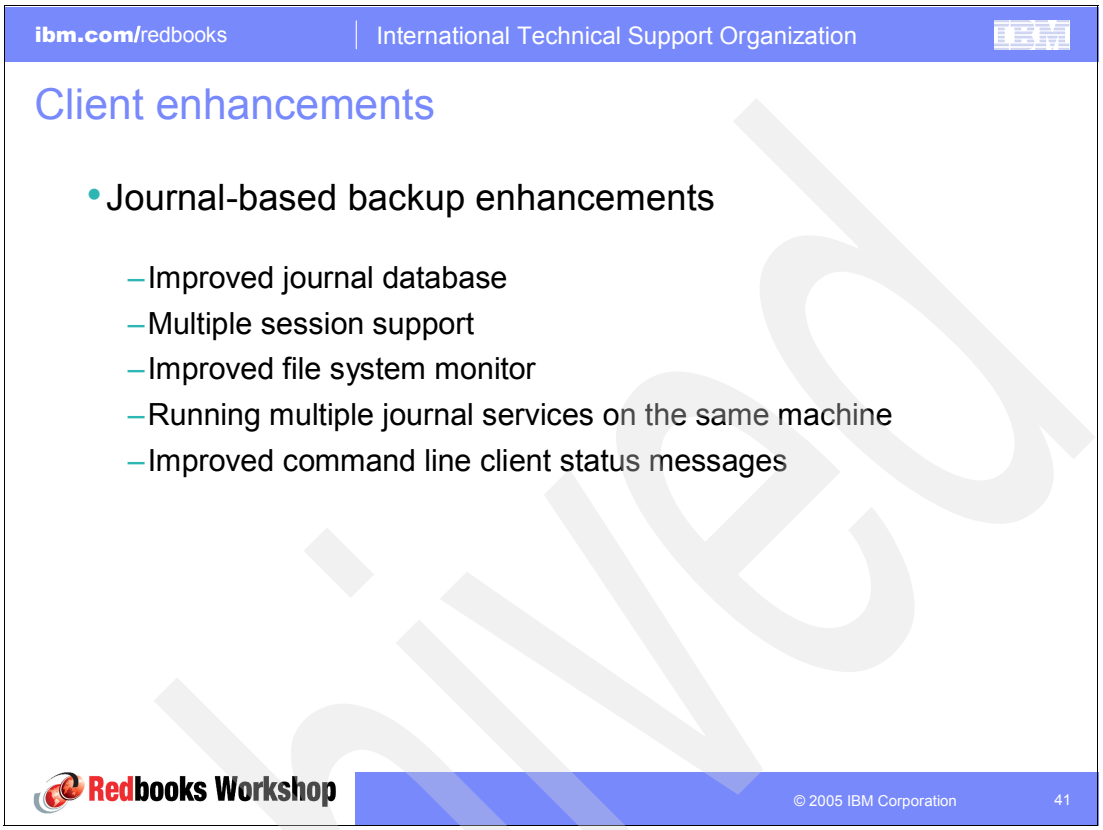



*Figure 3-11 Journal-based backup enhancements*

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 tsmjbbd.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

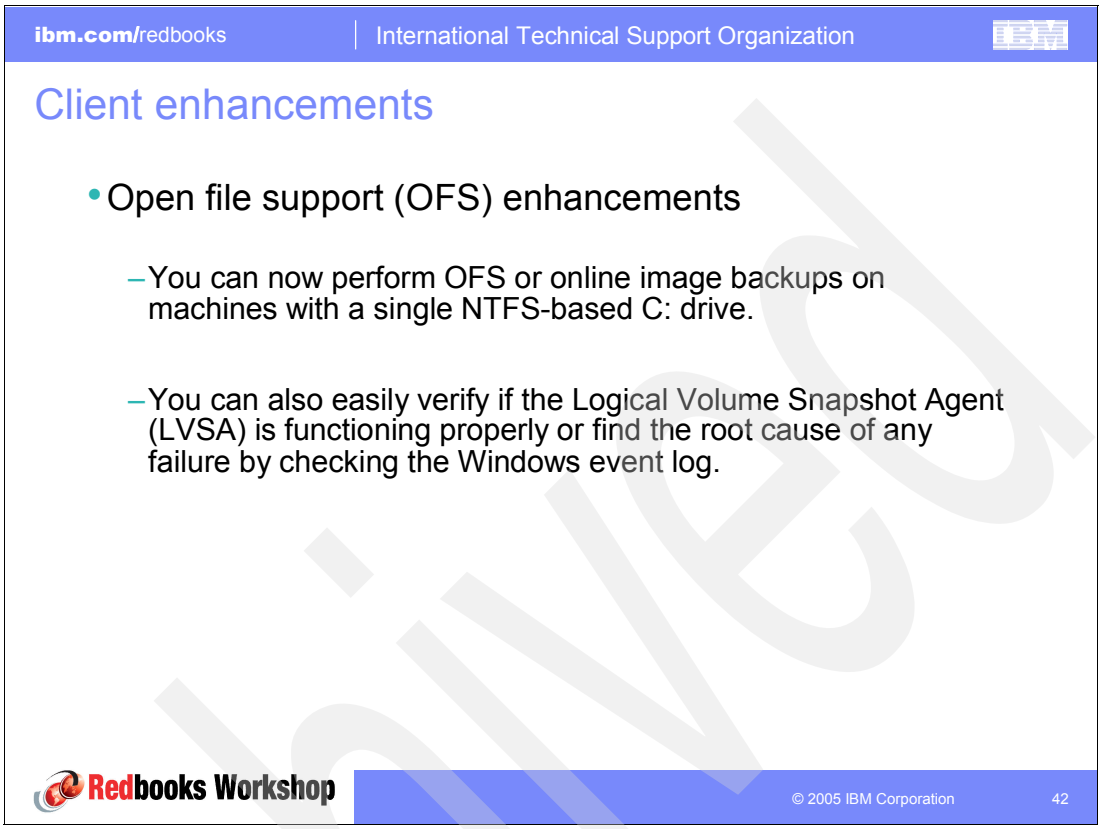



*Figure 3-12 Open file support enhancements*

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

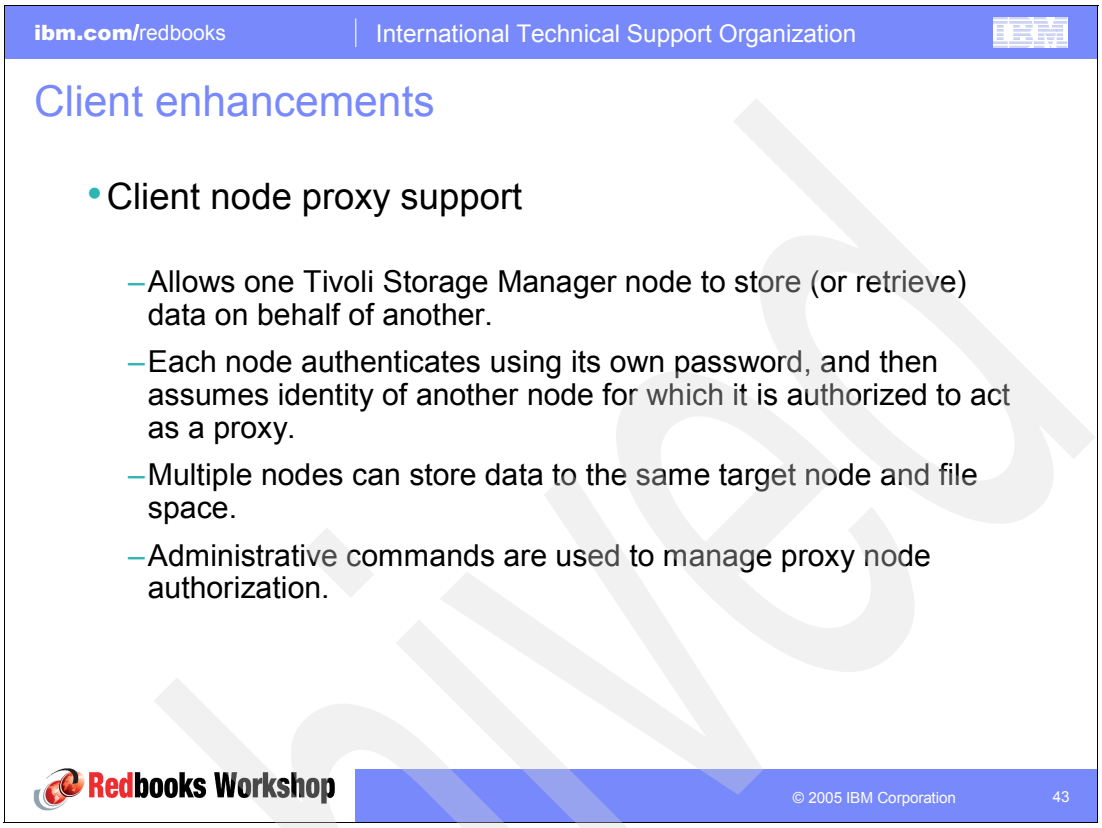



*Figure 3-13 Client node proxy support*

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

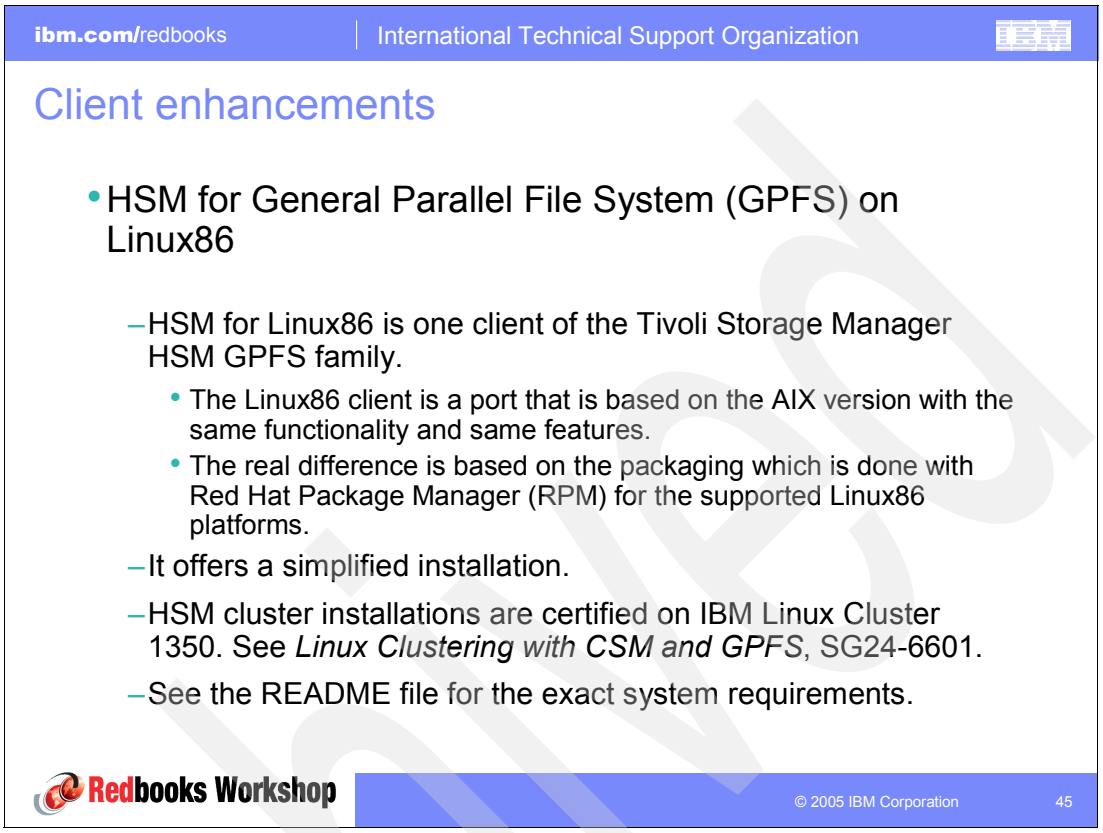



*Figure 3-14 HSM for GPFS on Linux86*

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 **`dsmrecalld`** 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
   - DSMSDRVersion

   It 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

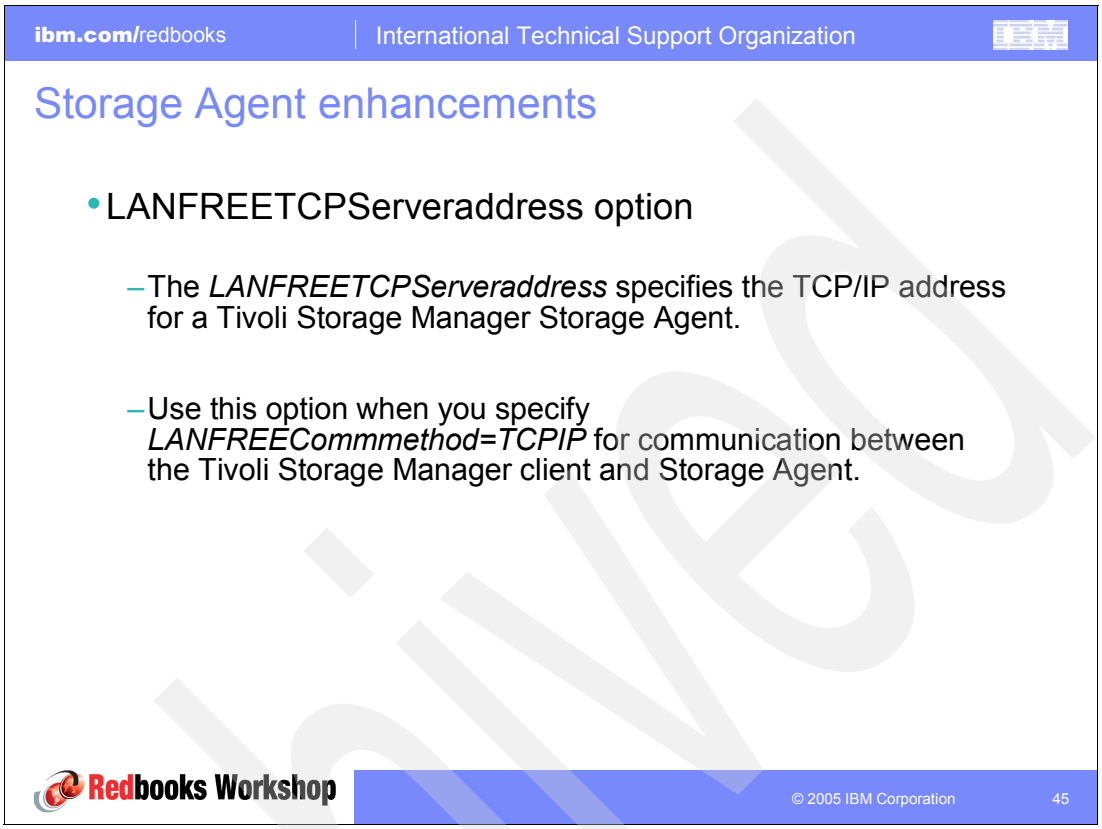



*Figure 3-15 LANFREETCPServeraddress option*

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.

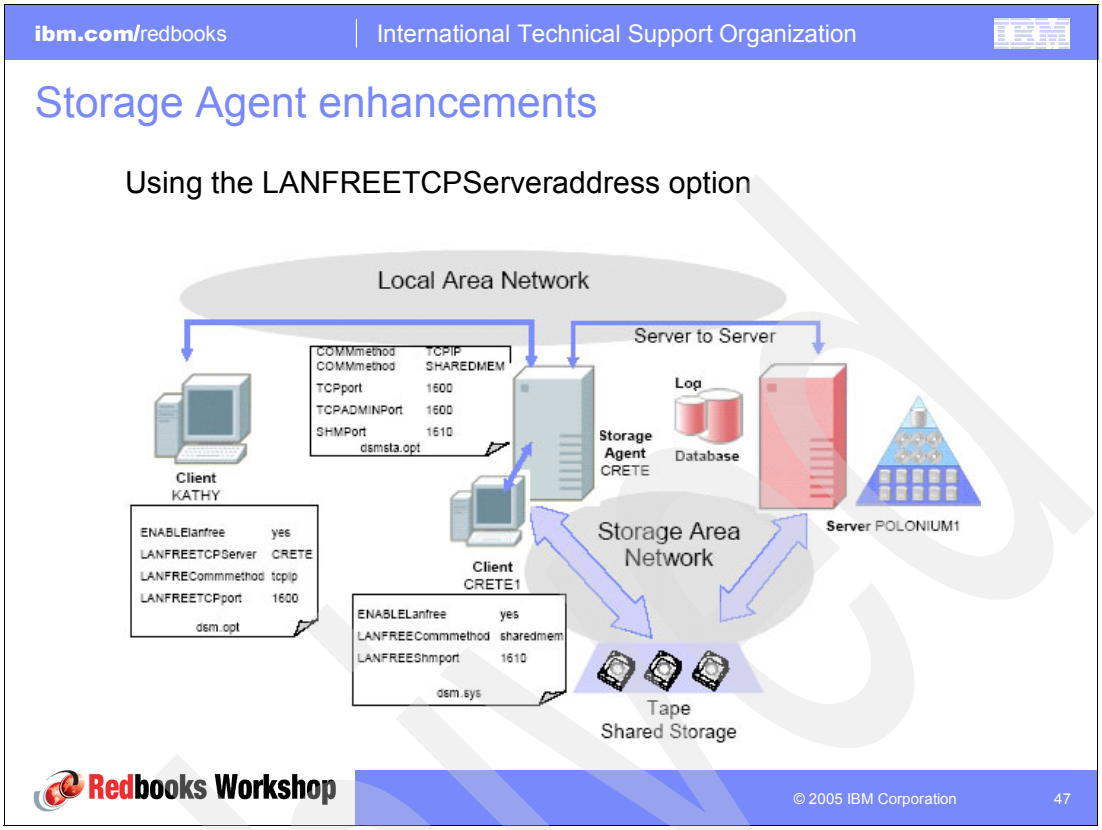



*Figure 3-16 Using LANFREETCPServeraddress option*

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.

4

# 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

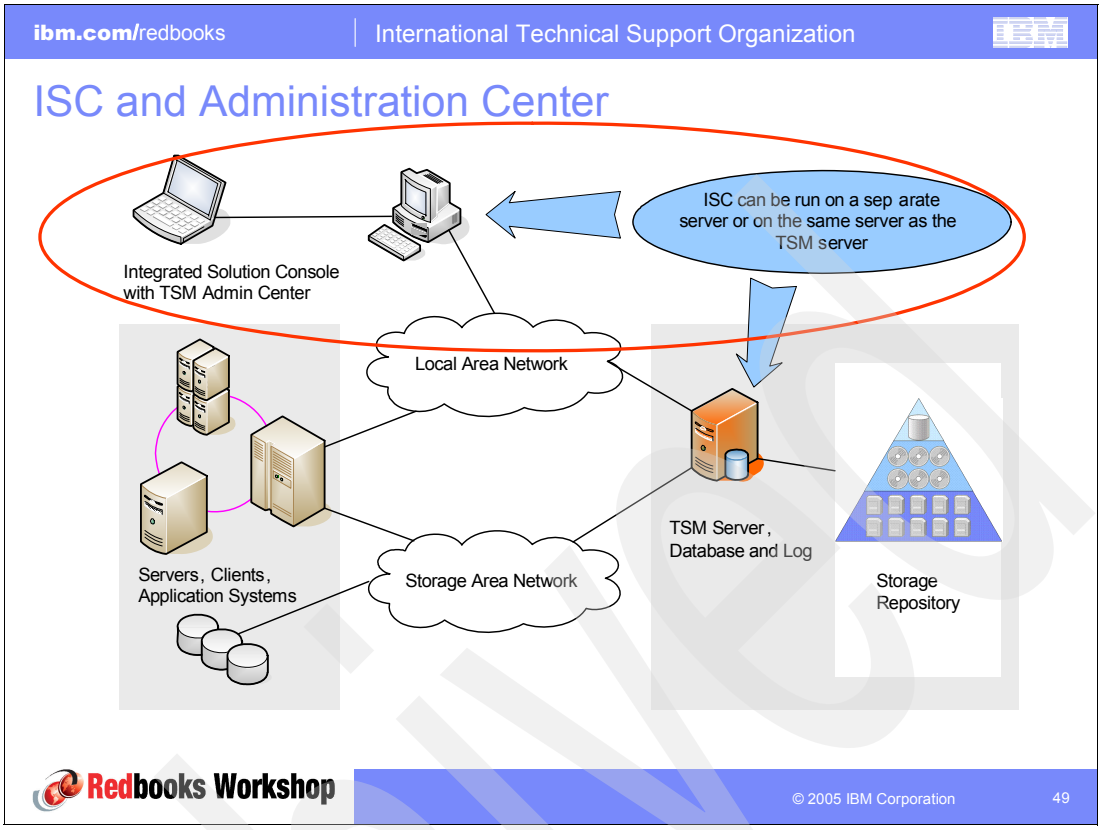



*Figure 4-1 Tivoli Storage Manager components*

## 4.1 The Integrated Solutions Console

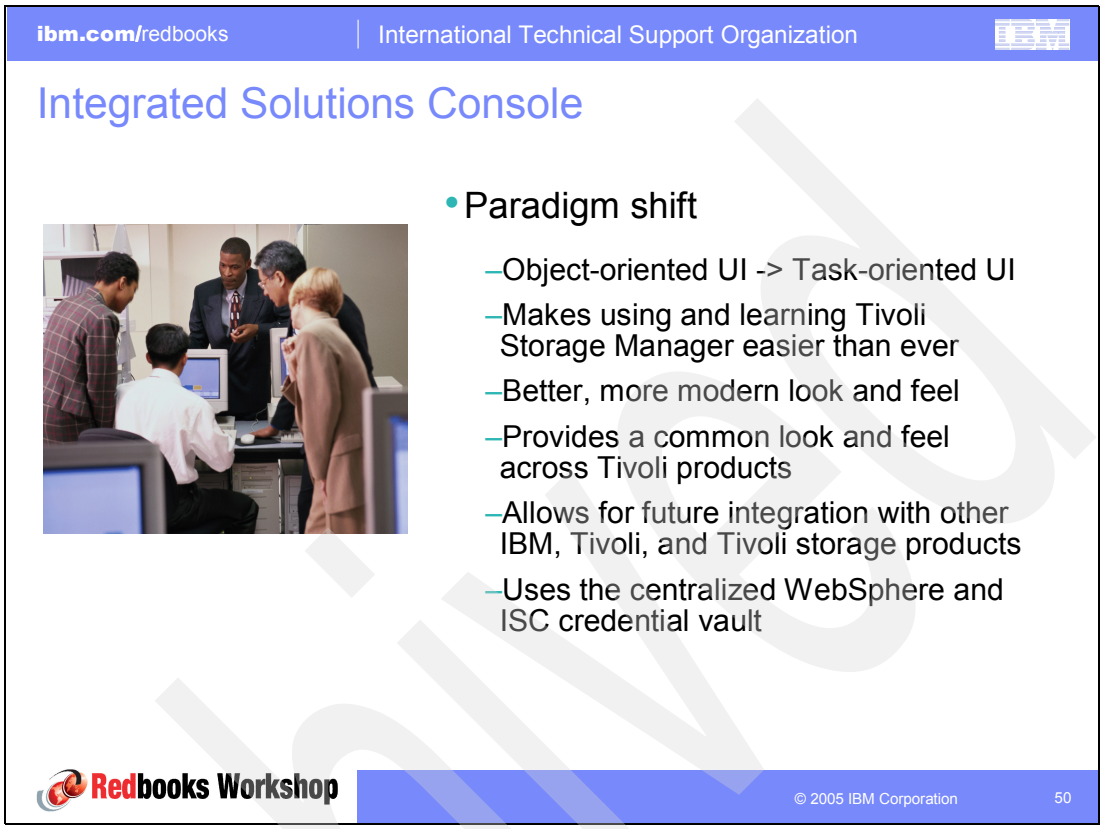



*Figure 4-2 Paradigm shift for the administrative GUI*

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

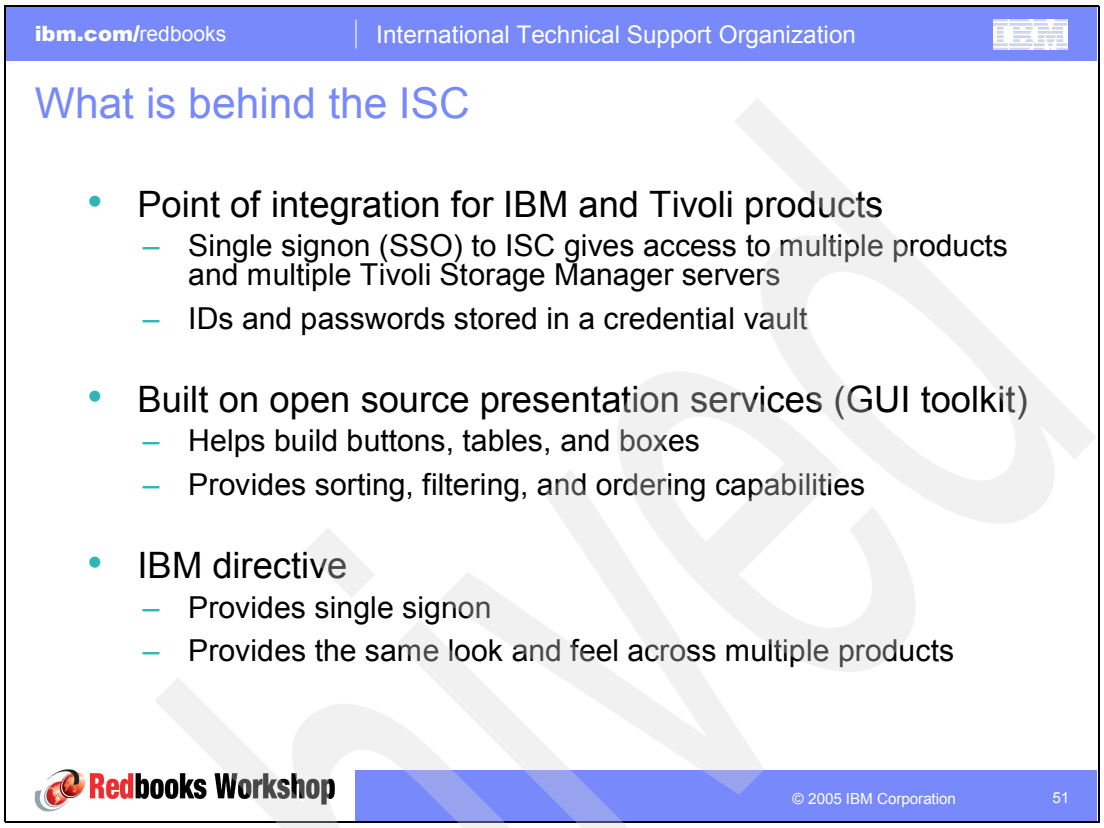



*Figure 4-3 What is behind the ISC*

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

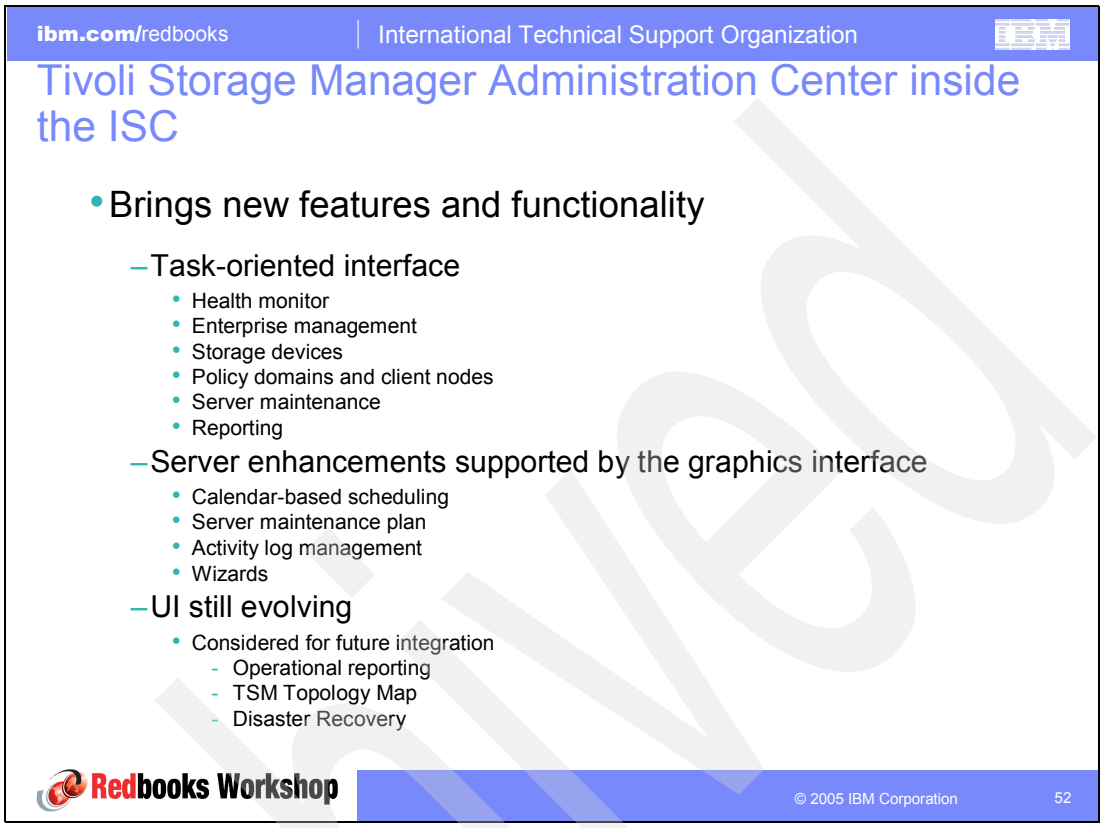



*Figure 4-4 ISC and the Administration Center*

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

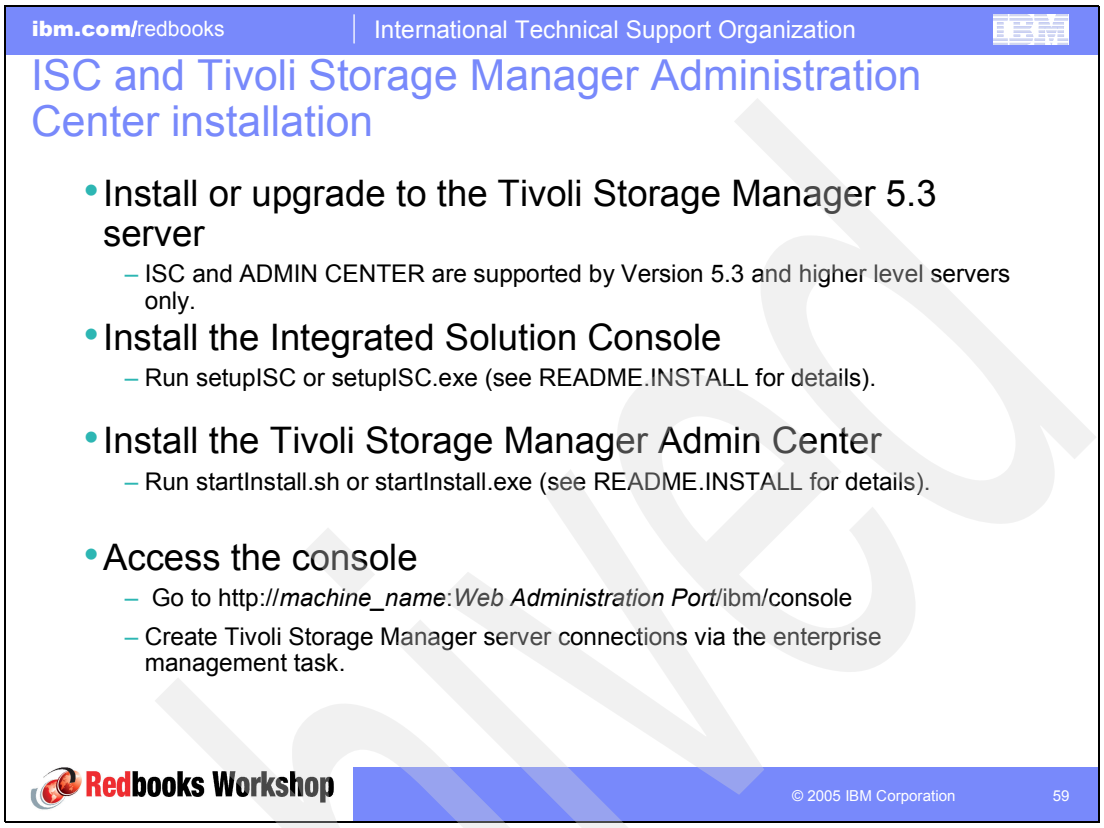



*Figure 4-5 ISC and Administration Center installation*

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 dsmcmd.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

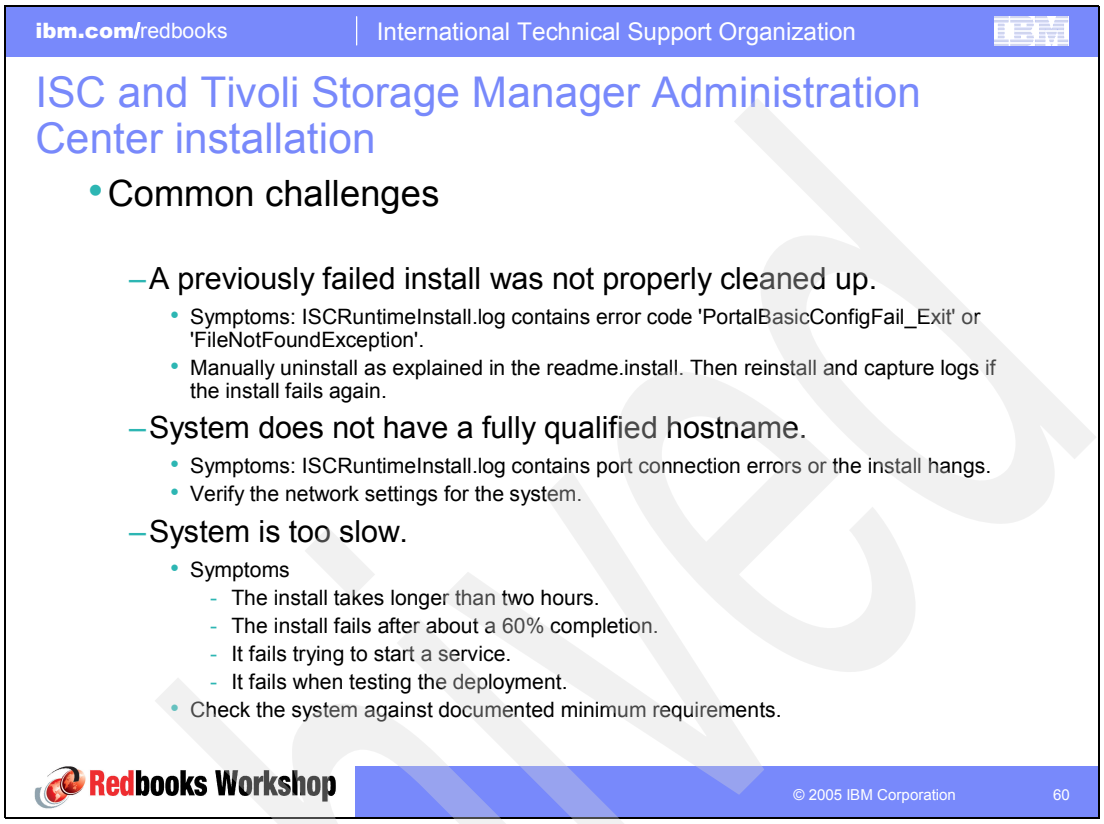
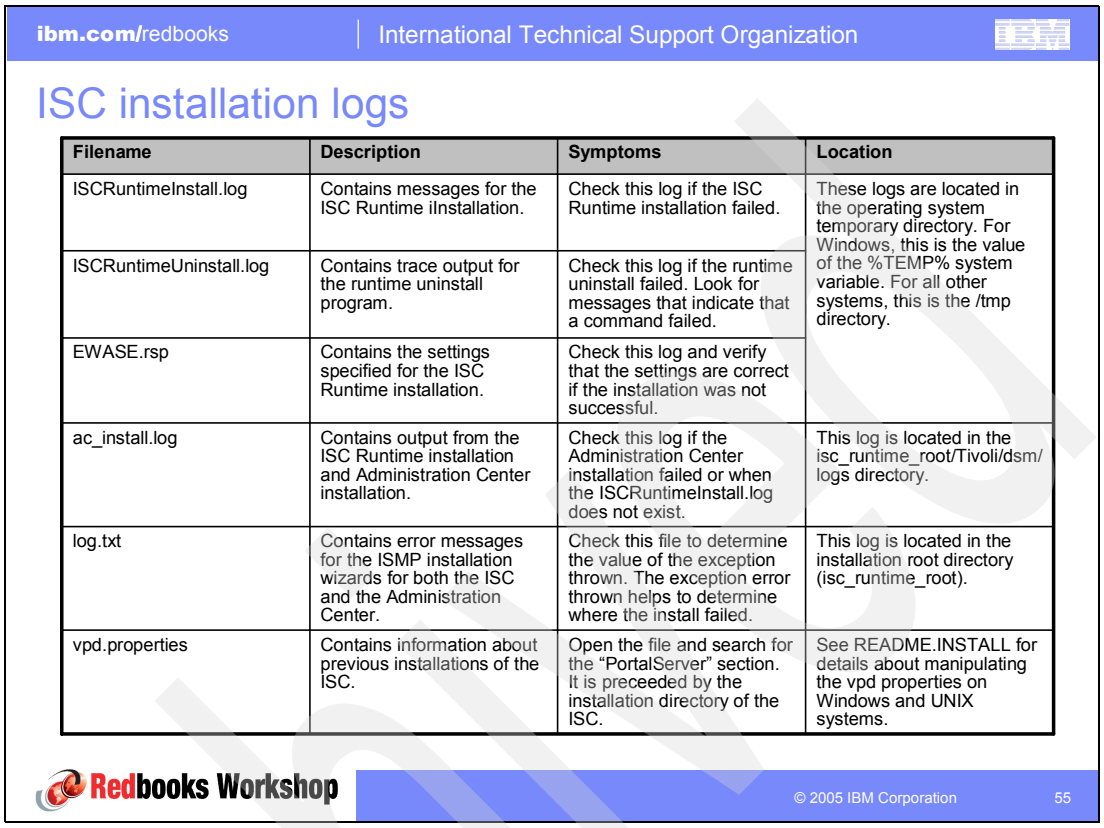



*Figure 4-6 ISC and Administration Center installation challenges*

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 iInstallation. | 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 preceeded 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

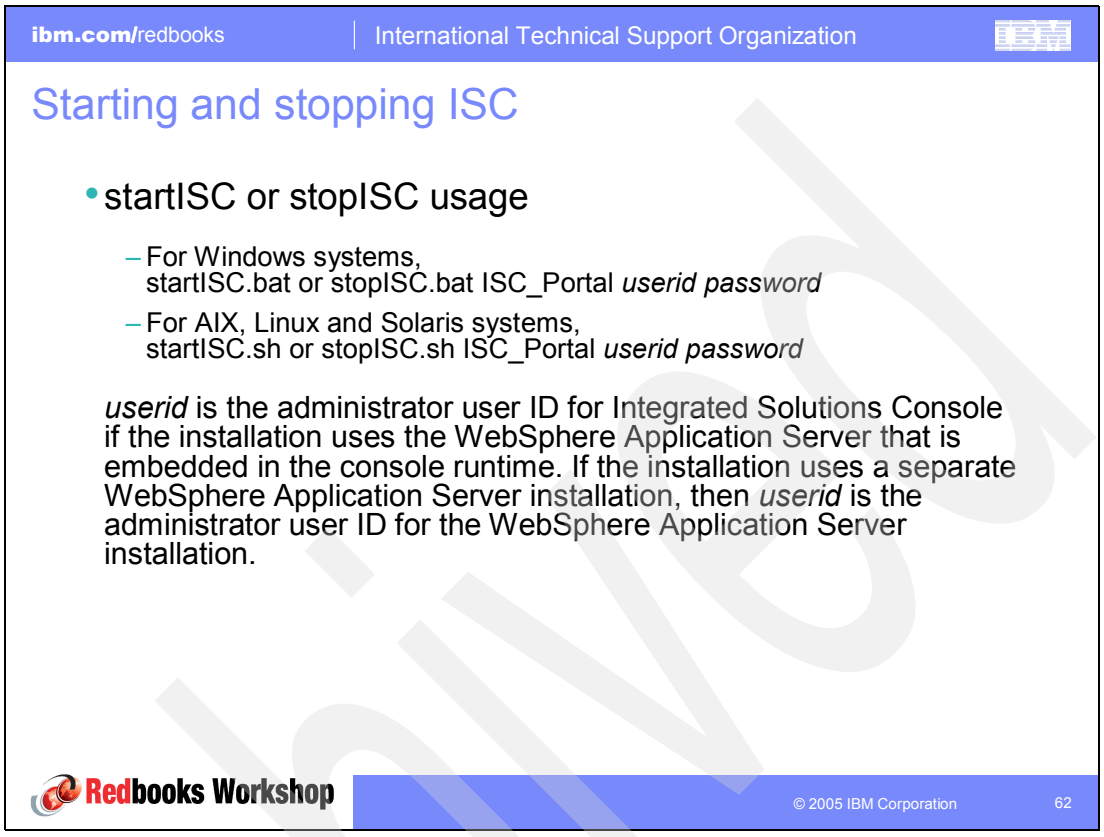



*Figure 4-8 Starting and stopping ISC*

## 4.8 ISC start and stop problem determination

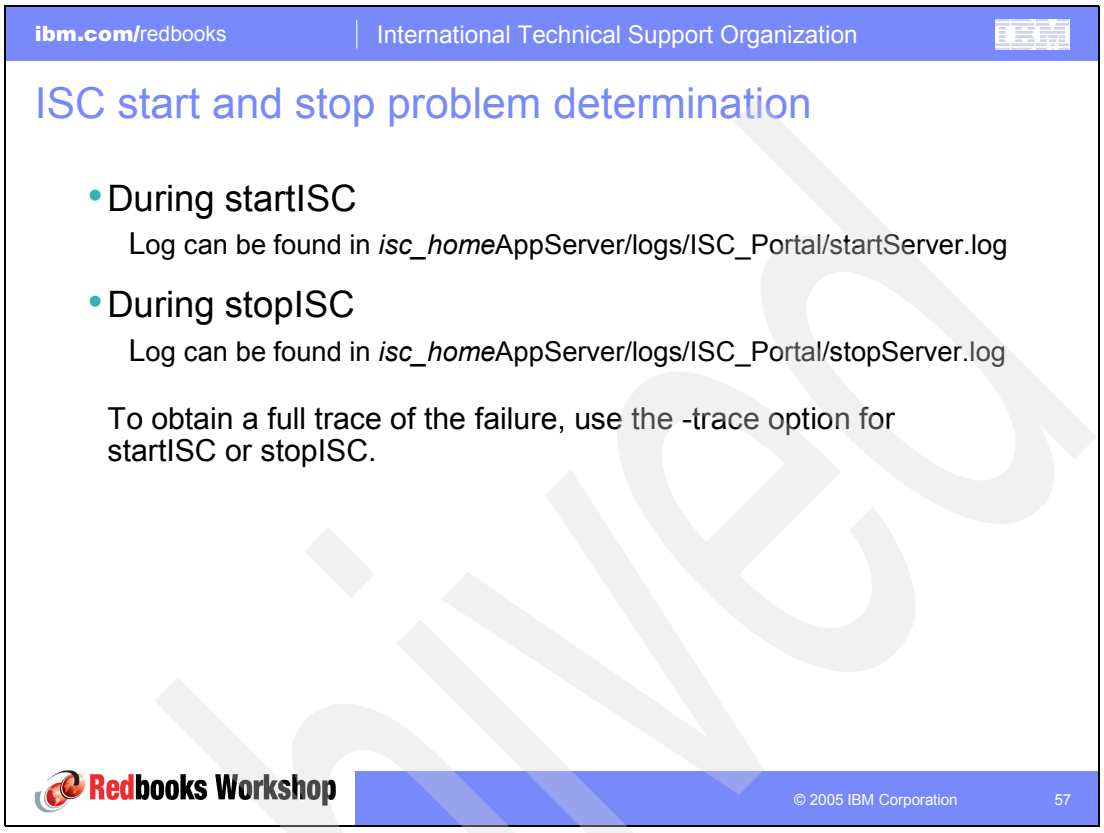



*Figure 4-9 ISC start and stop problem determination*

## 4.9 Administration Center Support Utility

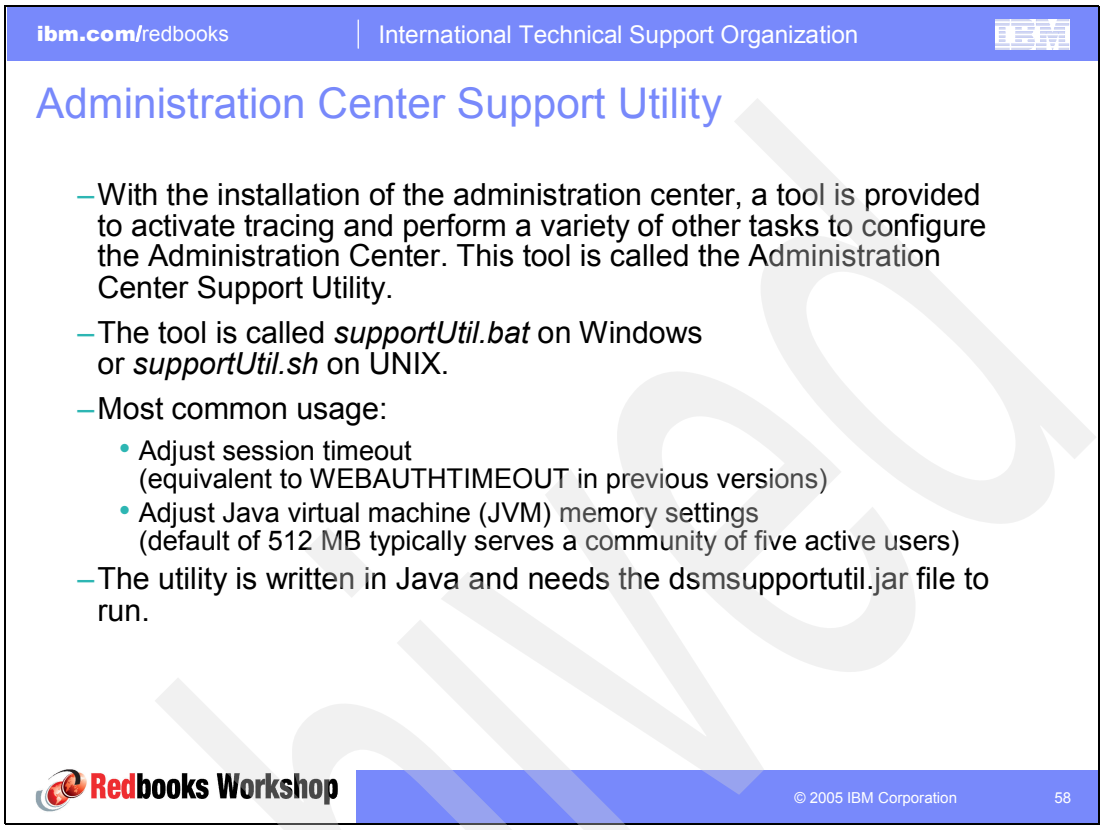



*Figure 4-10 Invoking the Administration Center Support Utility*

You can find the tool and the dsmsupportutil.jar file in *isc_home*Tivoli/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.

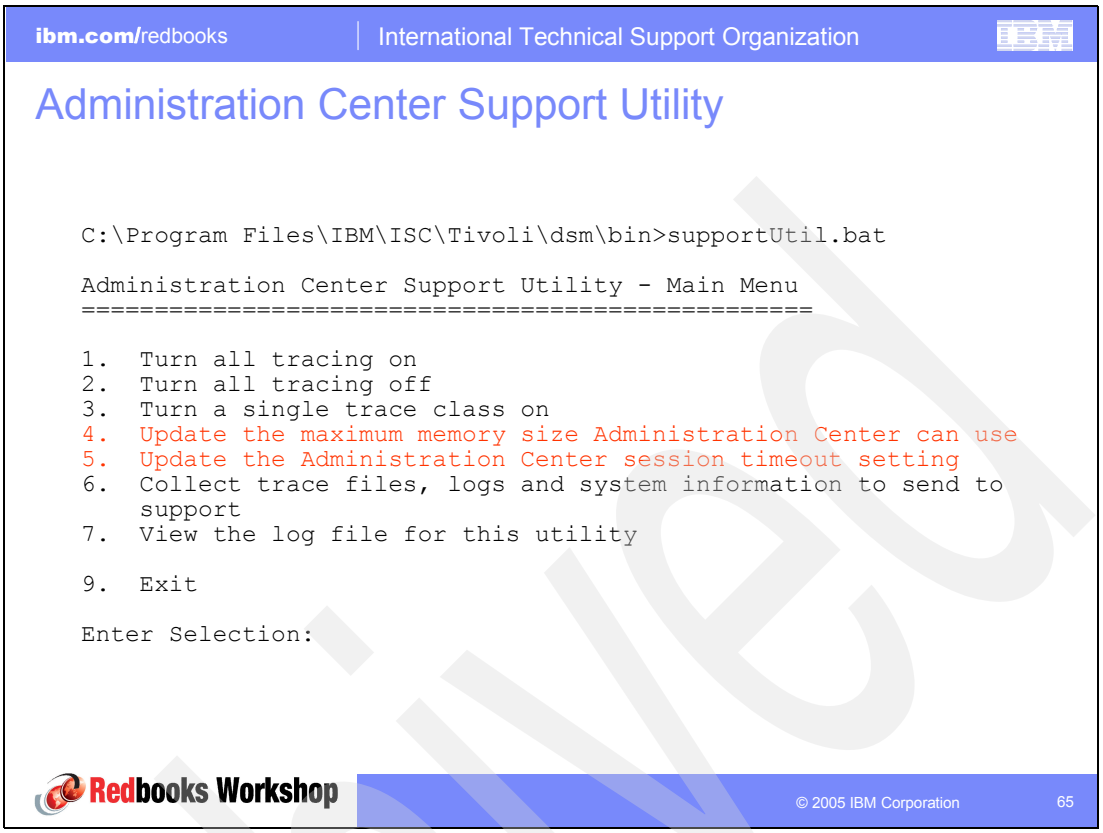



*Figure 4-11 Common tasks with the Administration Center Support Utility*

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

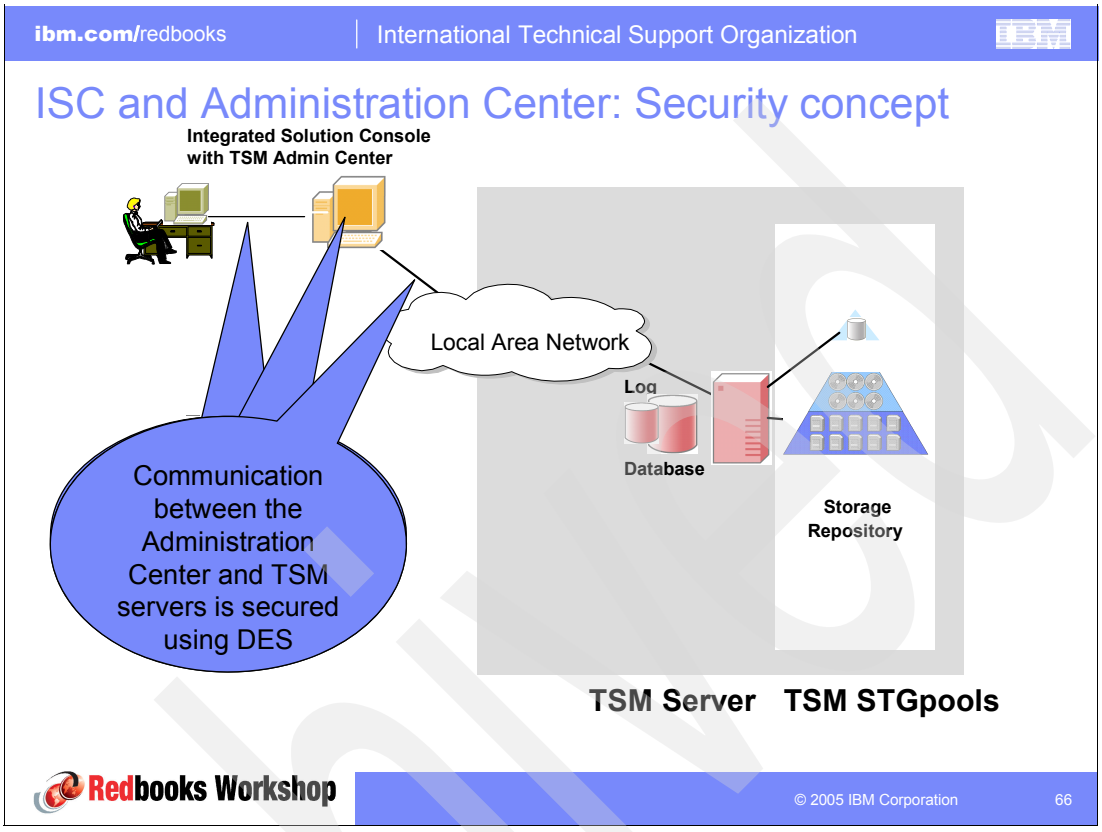



*Figure 4-12 ISC and Administration Center: Security concept*

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

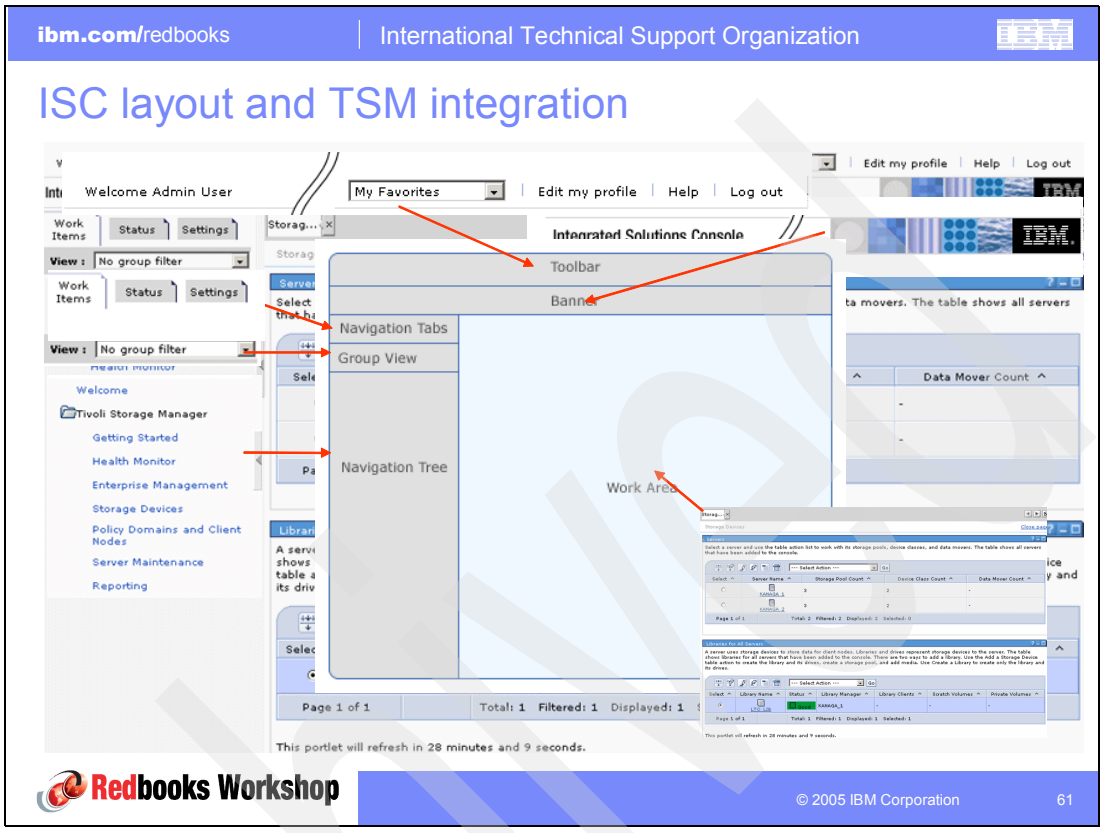



*Figure 4-13 ISC layout and Tivoli Storage Manager integration*

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.

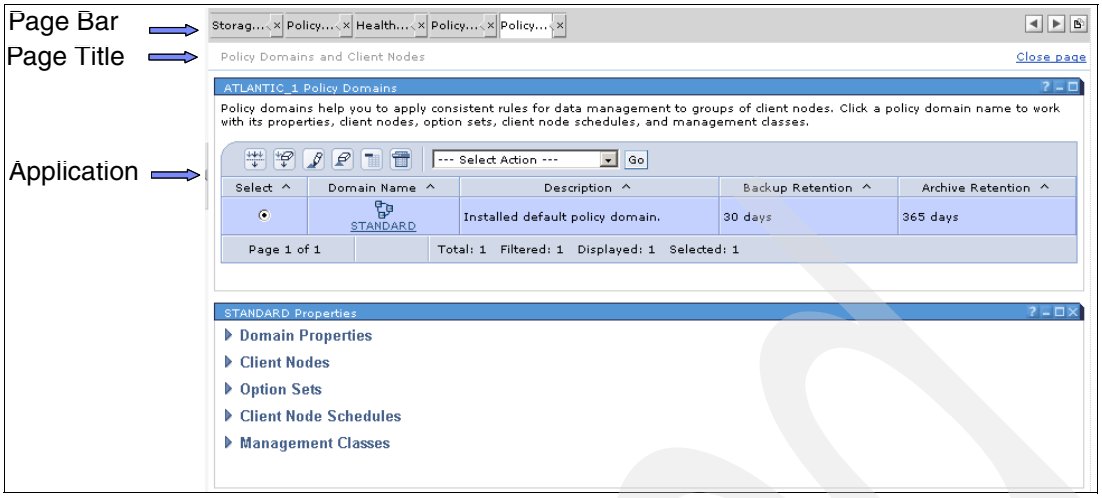



*Figure 4-14 ISC application workarea*

## 4.12 Task oriented interface

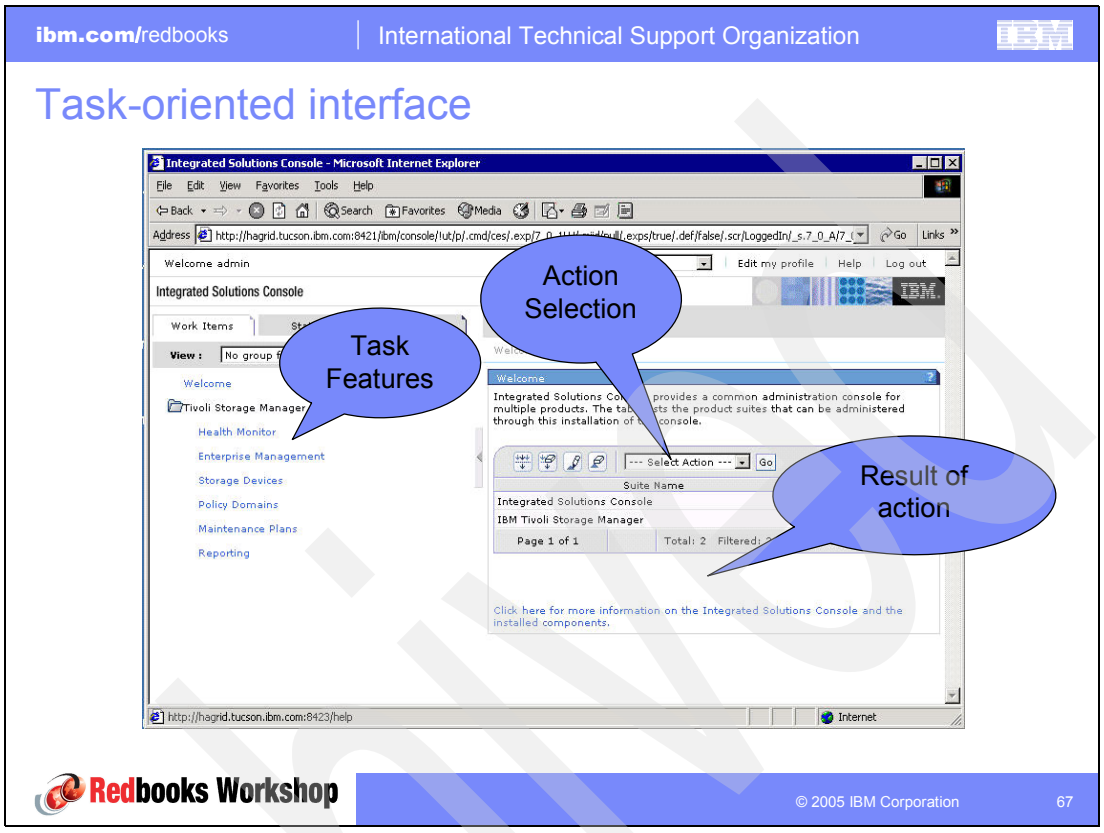



*Figure 4-15 Task-oriented interface*

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

## 4.13 Task example: Adding a file device class

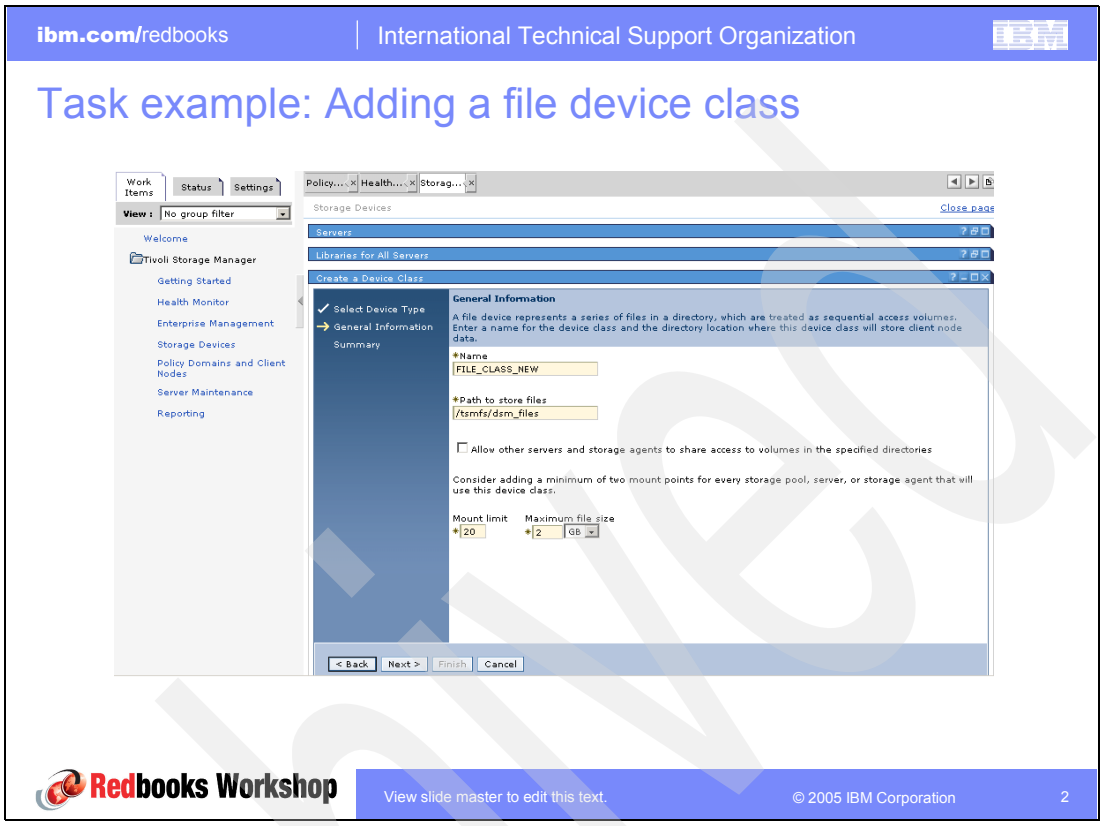



*Figure 4-16 Task example: Adding a file device class*

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

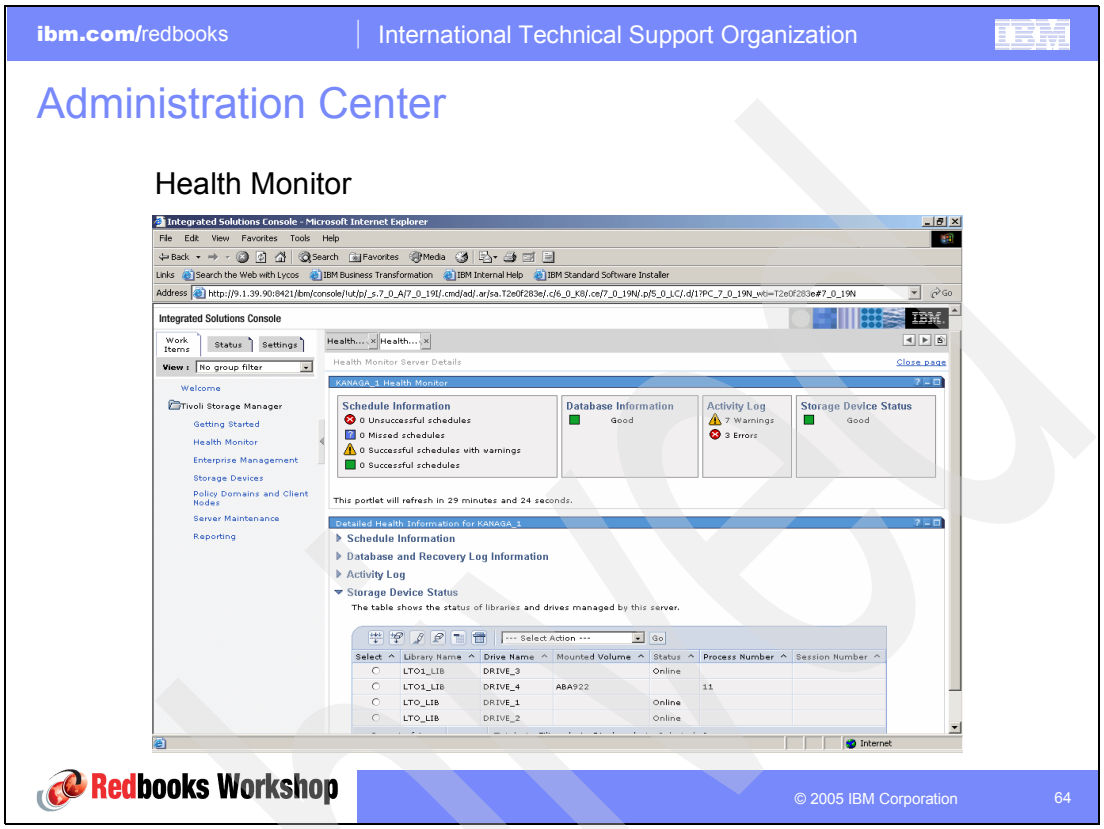



*Figure 4-17 Administration Center: Health Monitor*

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

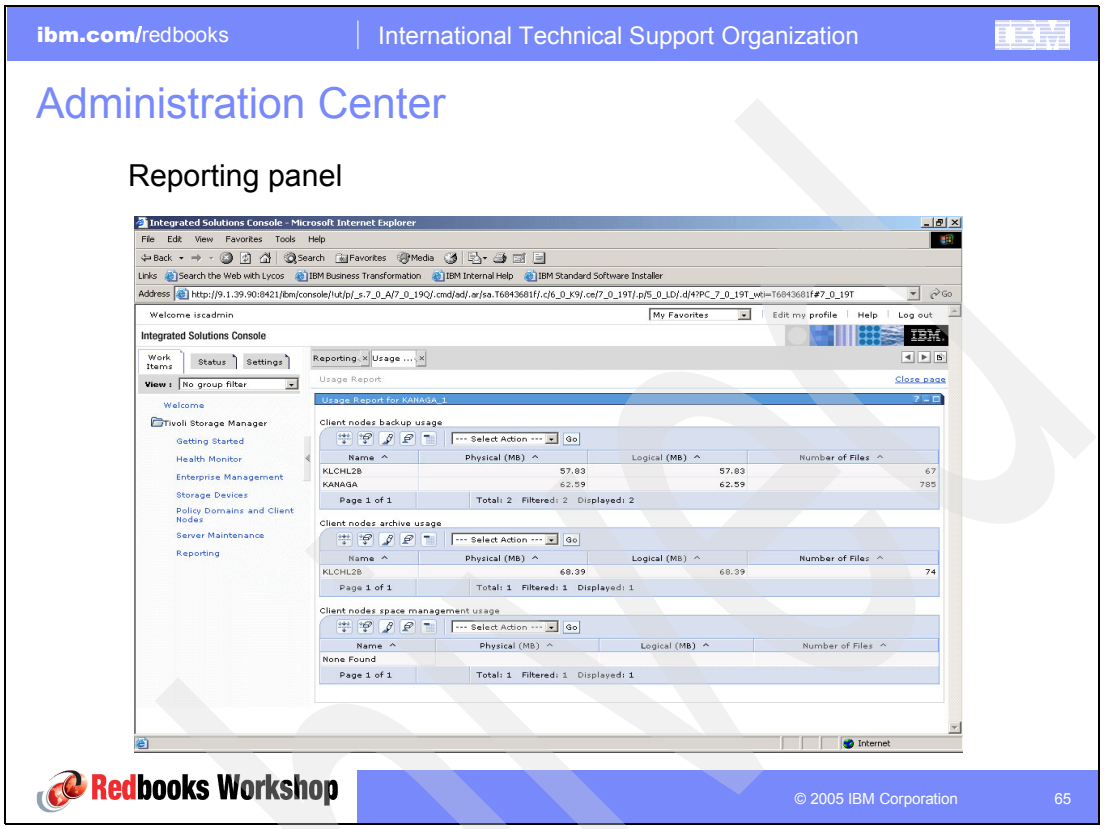



*Figure 4-18 Administration Center: Reporting panel*

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

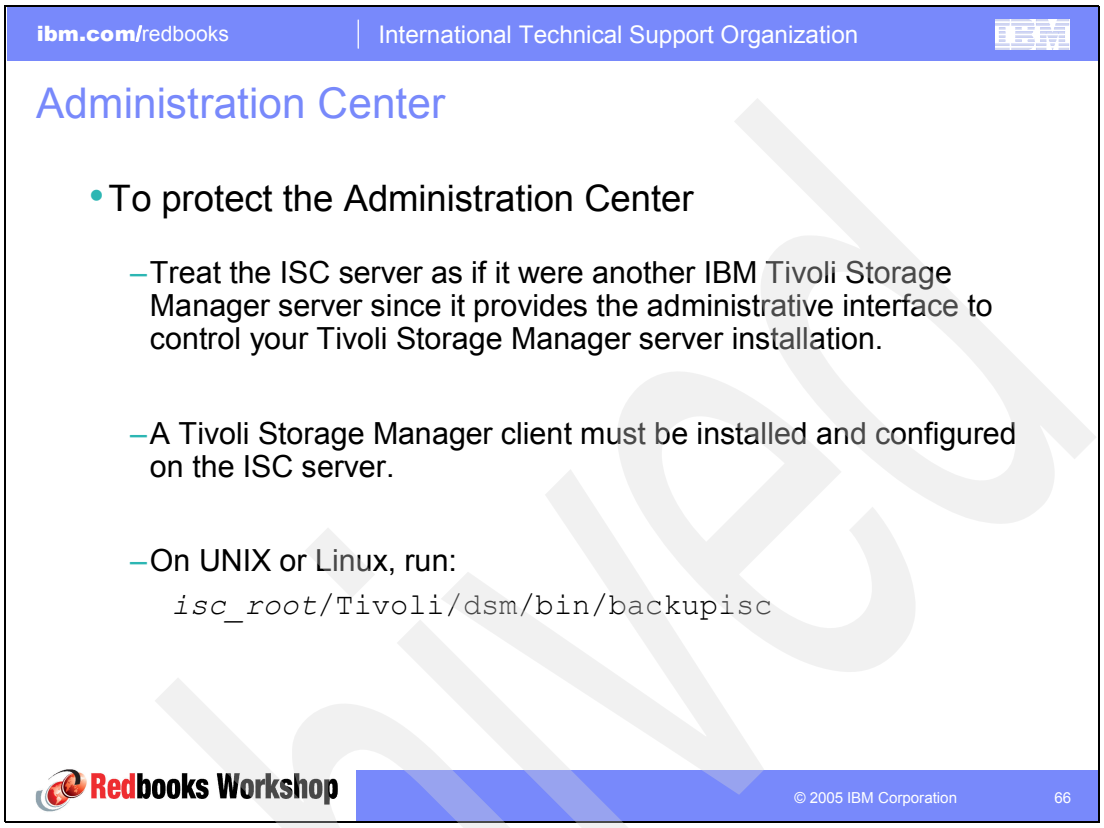



*Figure 4-19 Protecting the Administration Center*

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

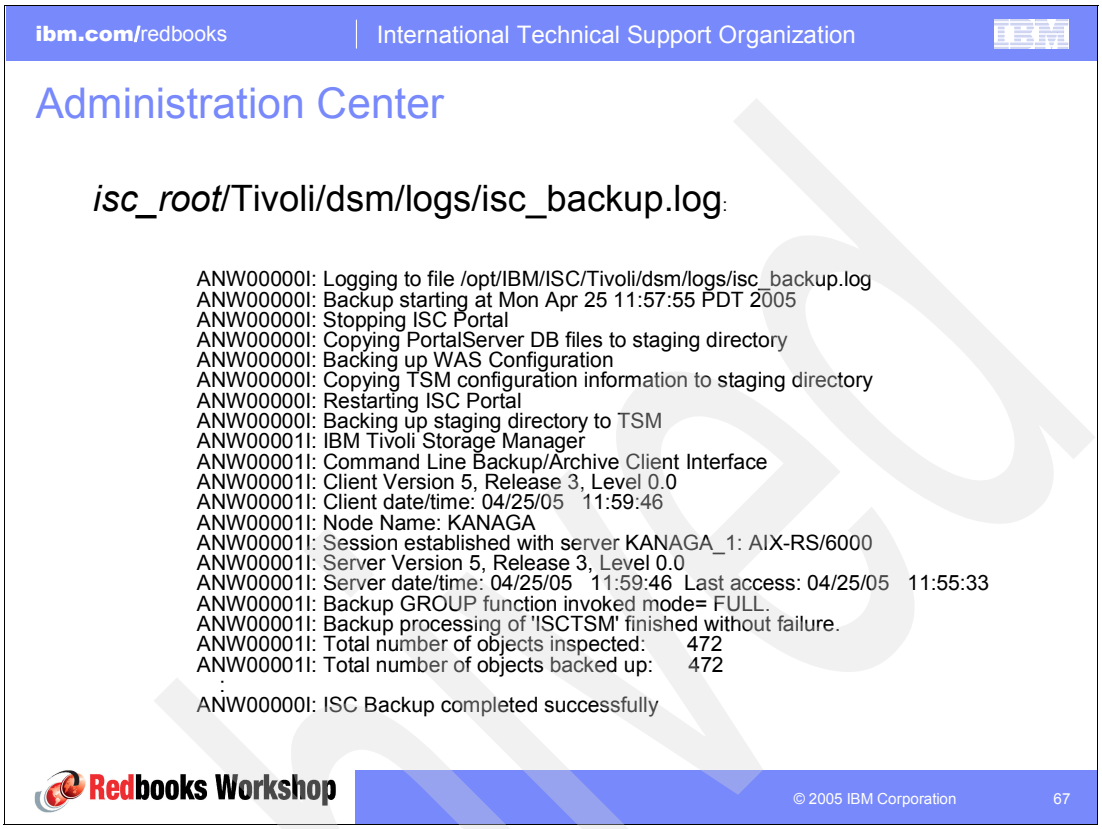



*Figure 4-20 Administration Center: Backup log*

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_home*Tivoli/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

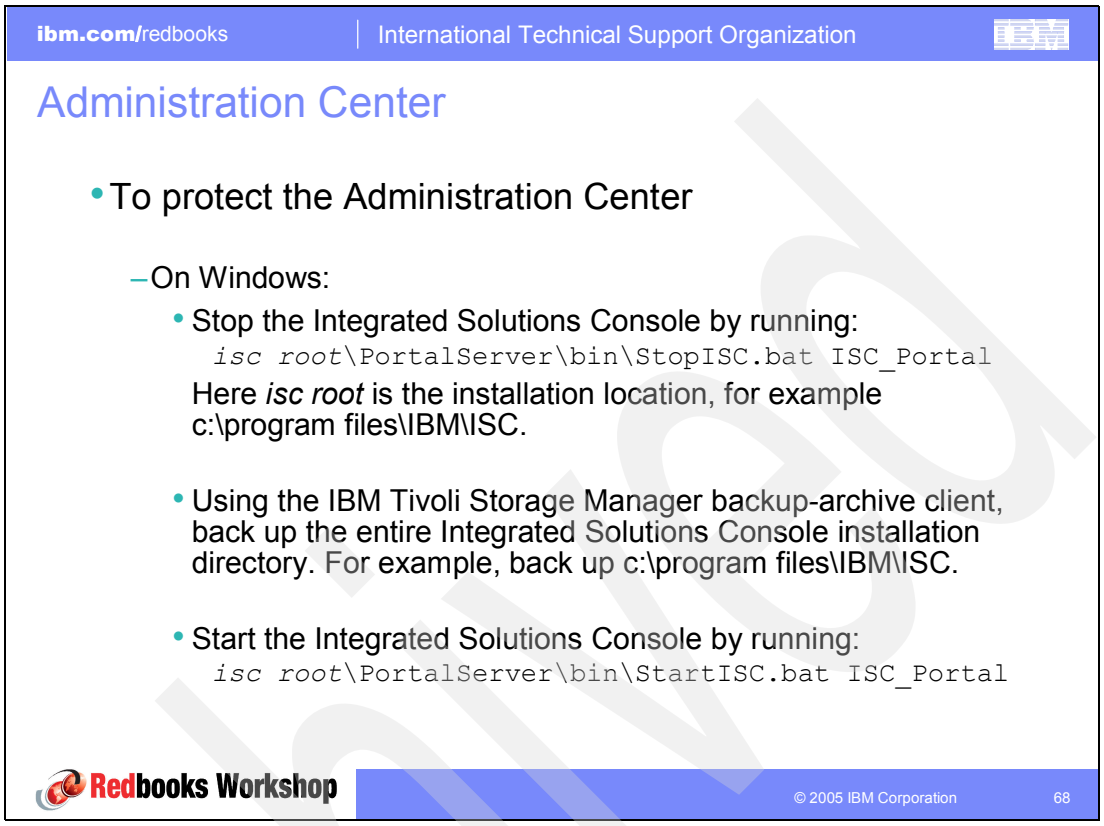



*Figure 4-21 Protecting the Administration Center: Windows*

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

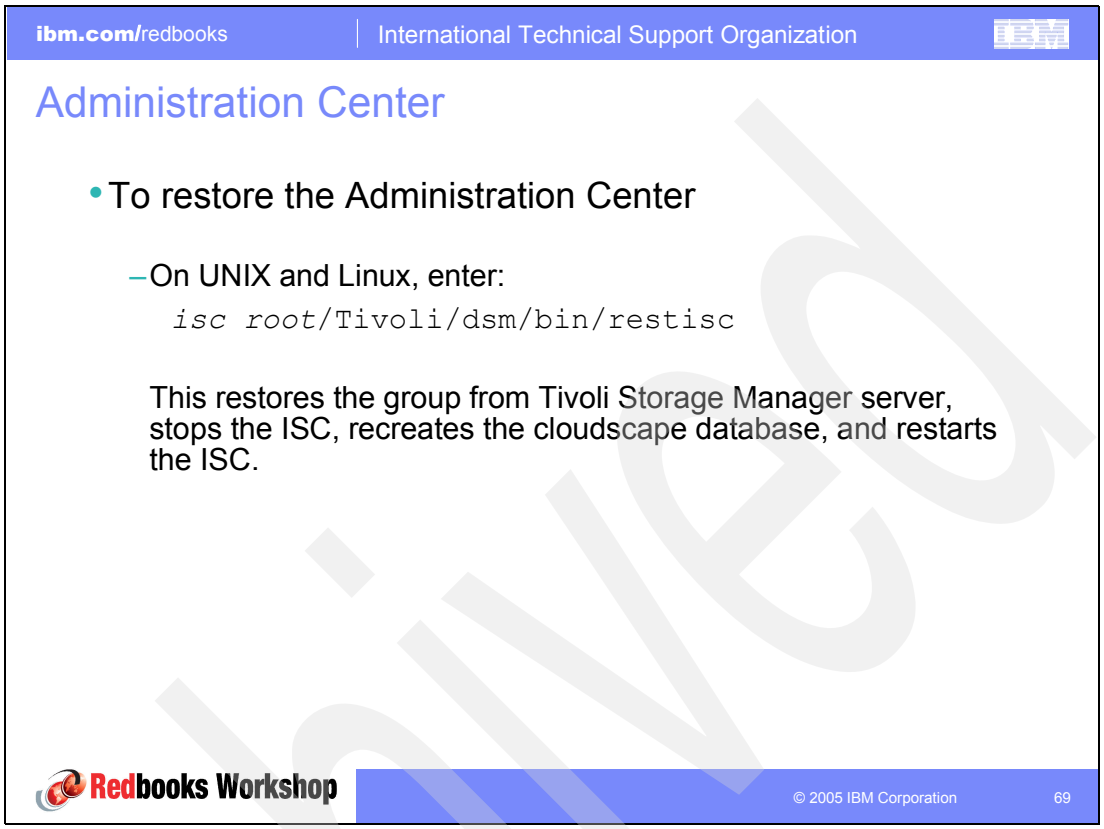



*Figure 4-22 Restoring the Administration Center on UNIX or Linux*

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_home*Tivoli/stage) that is used to temporarily hold the data to restore.
3. The /ISCBackup/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

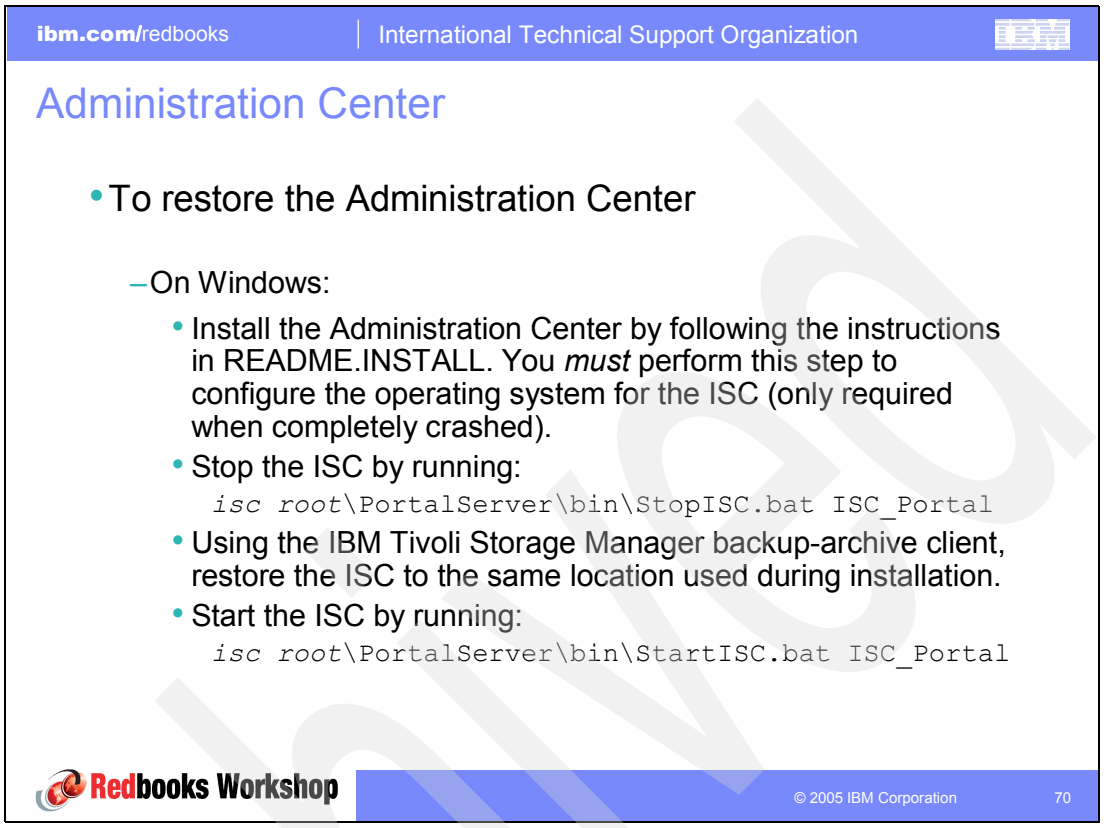



*Figure 4-23 Restoring the Administration Center on Windows*

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\IBM\ISC.
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\IBM\ISC.

## 4.21 Administration Center changes with 5.3.1

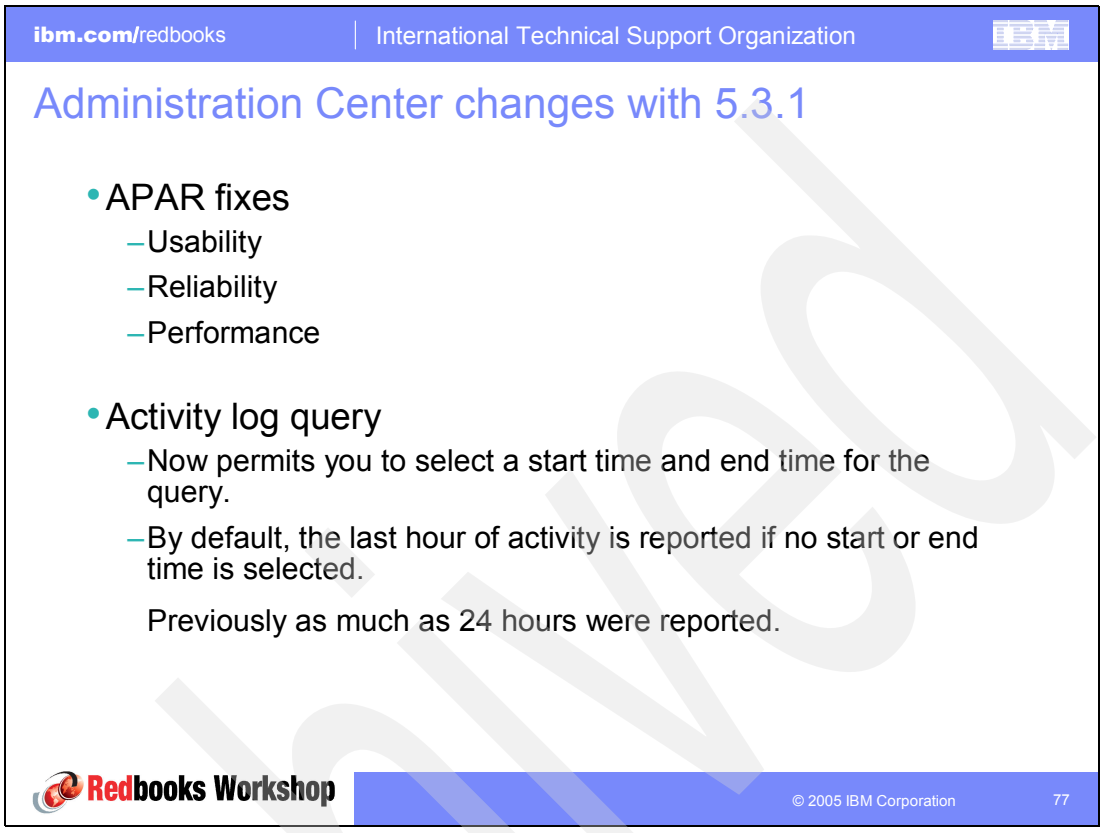



*Figure 4-24 Administration Center changes with 5.3.1*

## 4.22 Administration Center changes with 5.3.1: Command line

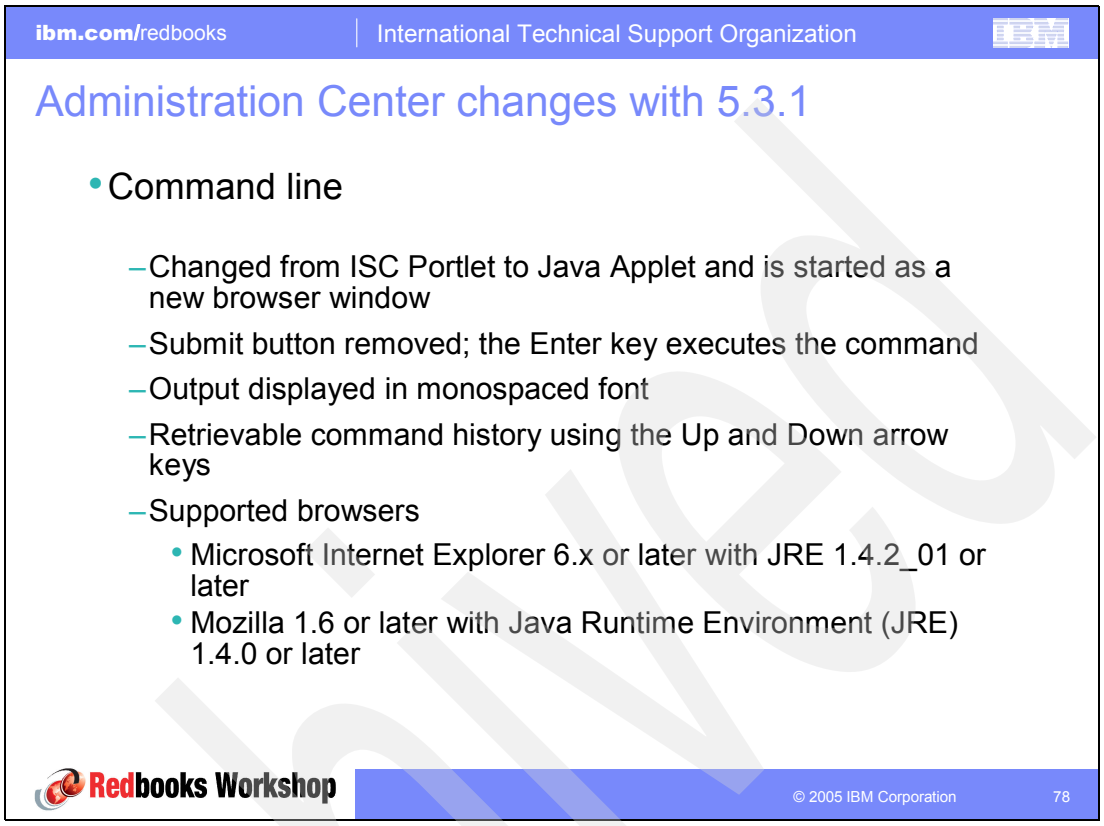



*Figure 4-25 Administration Center changes with 5.3.1: Command line*

## 4.23 Administration Center changes with 5.3.2

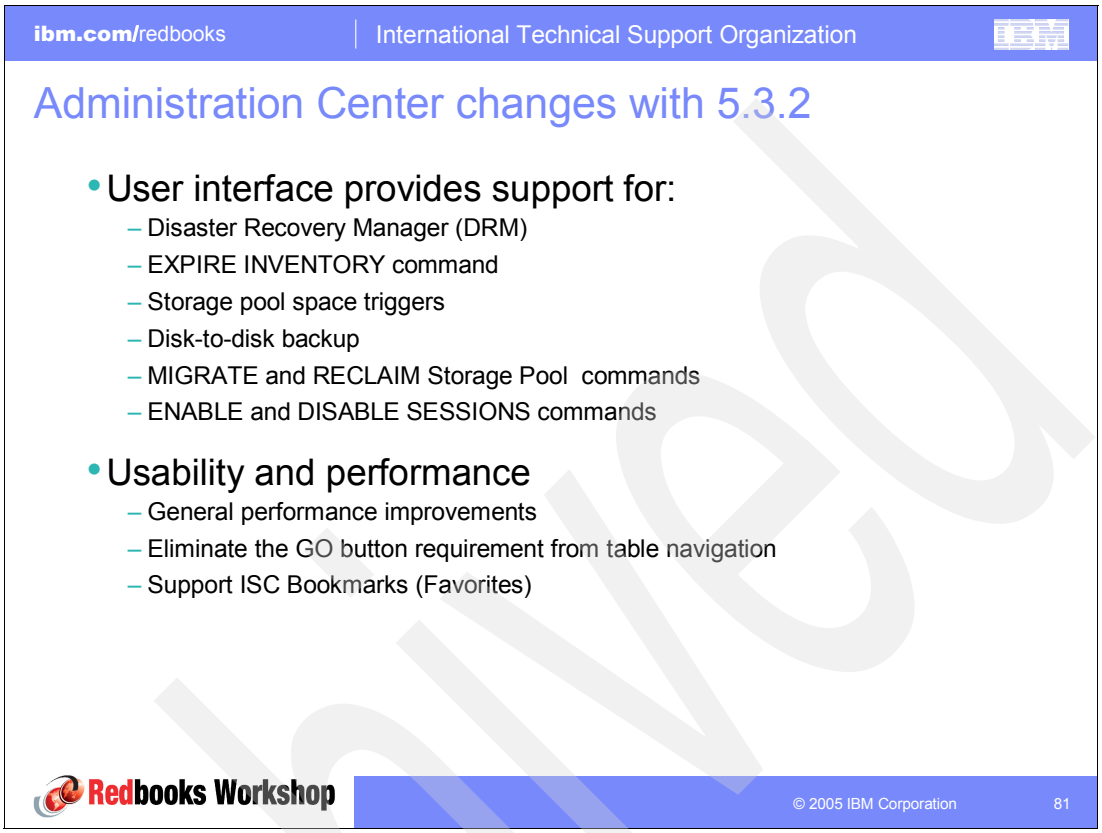



*Figure 4-26 Administration Center changes with 5.3.2*

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

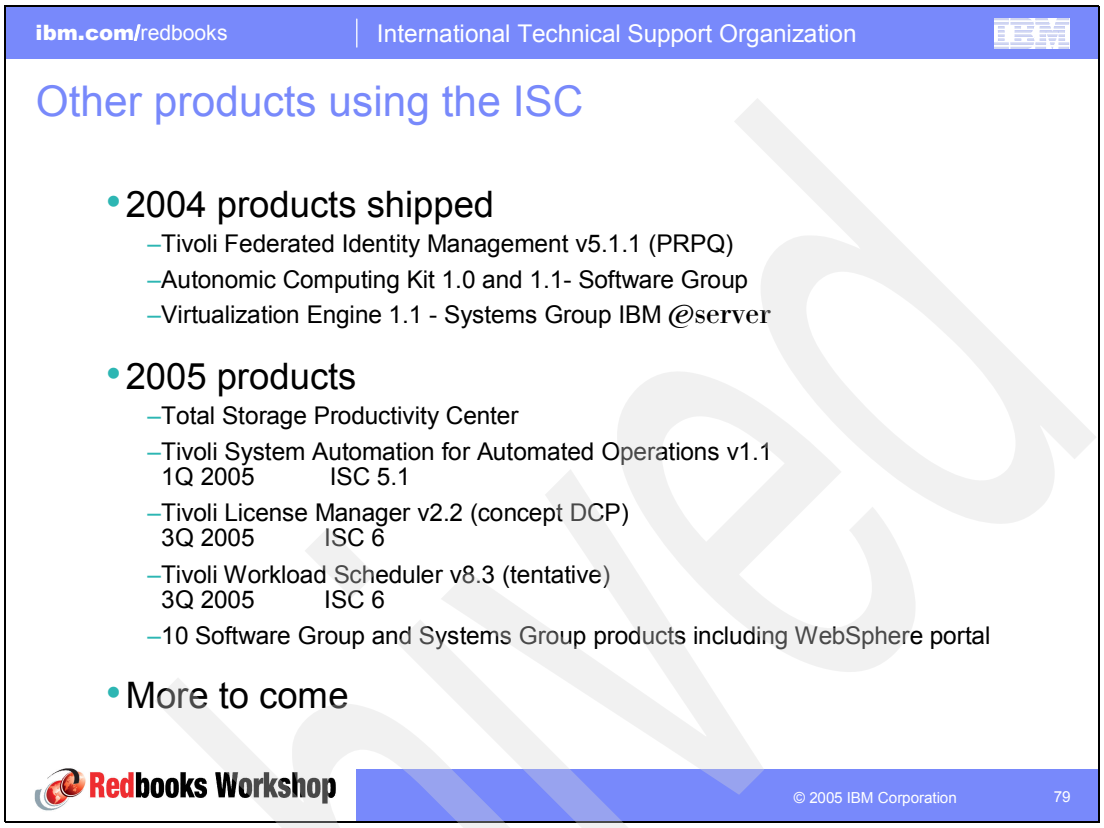



*Figure 4-27 Other products using the ISC*

5

# 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.

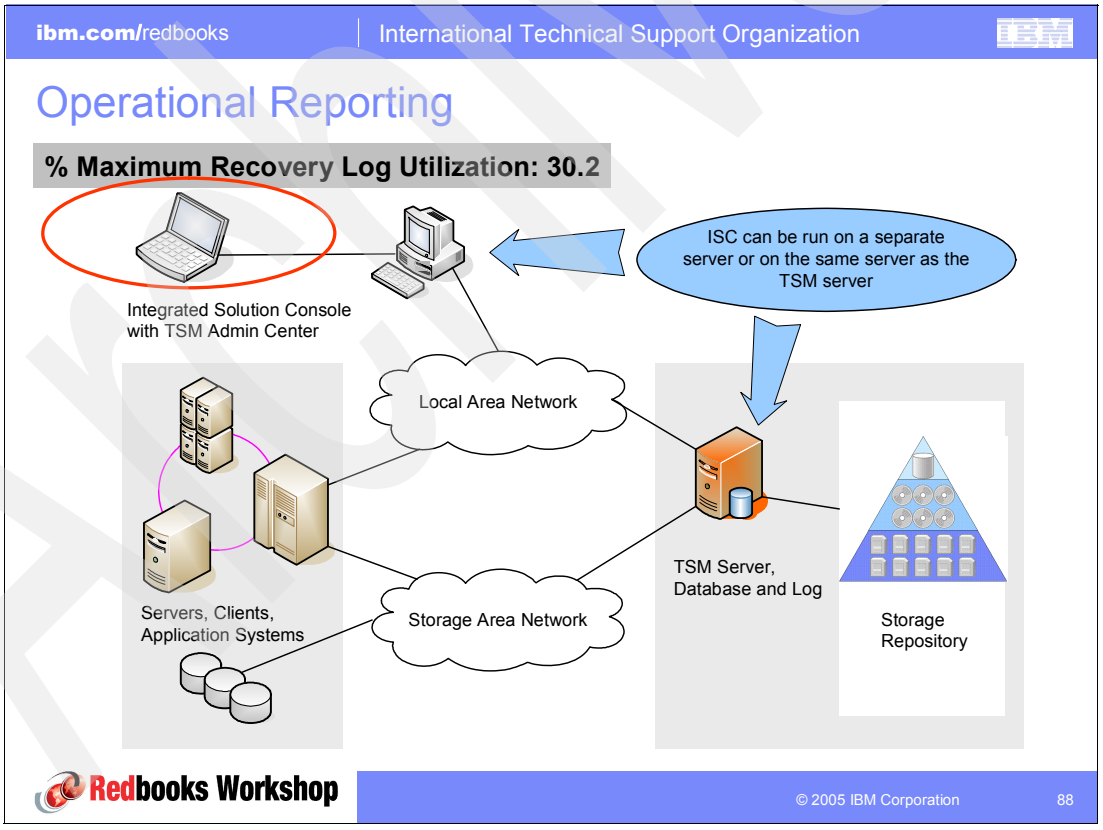



*Figure 5-1 Tivoli Storage Manager components*

## 5.1 Basics of the Operational Reporting feature

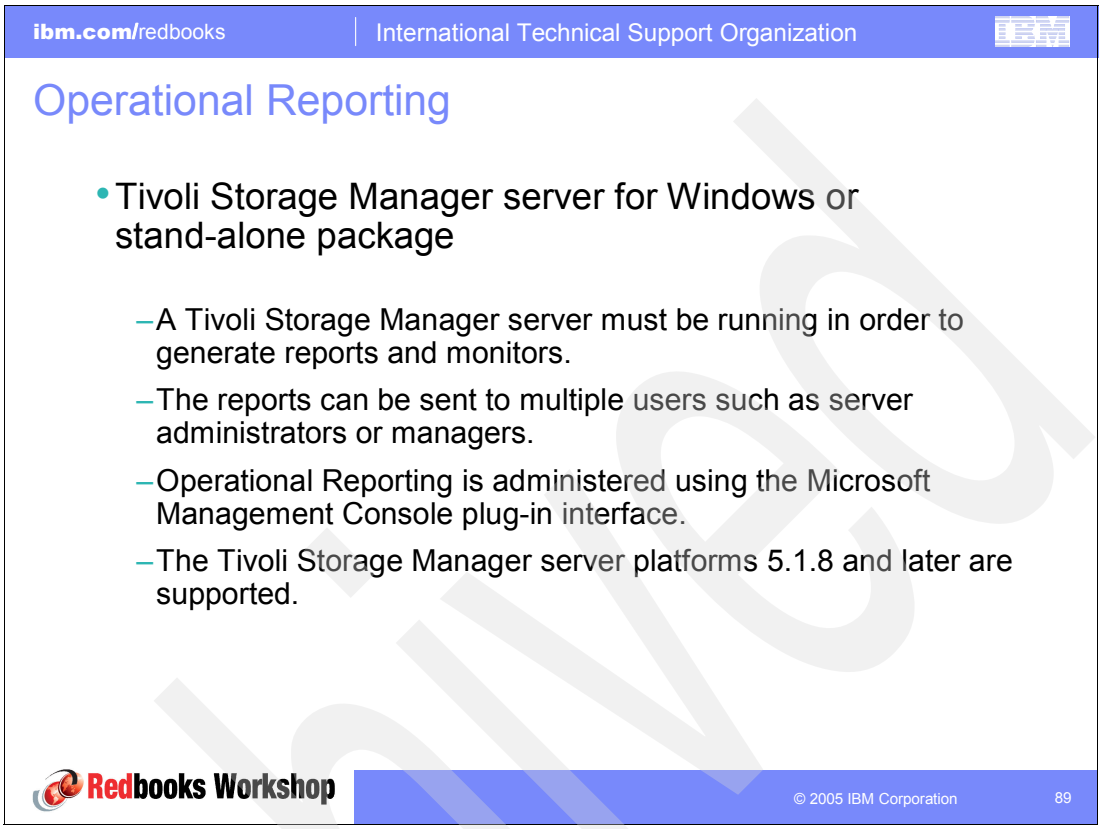



*Figure 5-2 Operational Reporting basics*

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

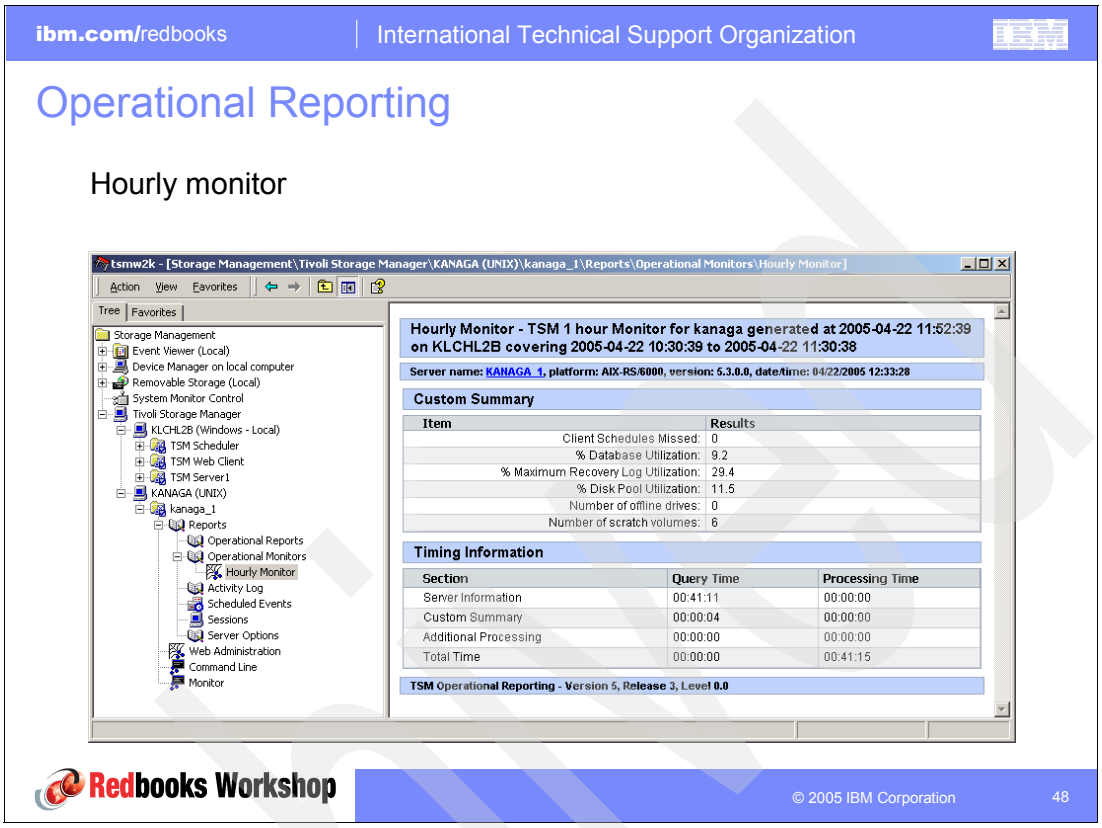



*Figure 5-3 Microsoft Management Console view showing operational reporting elements*

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

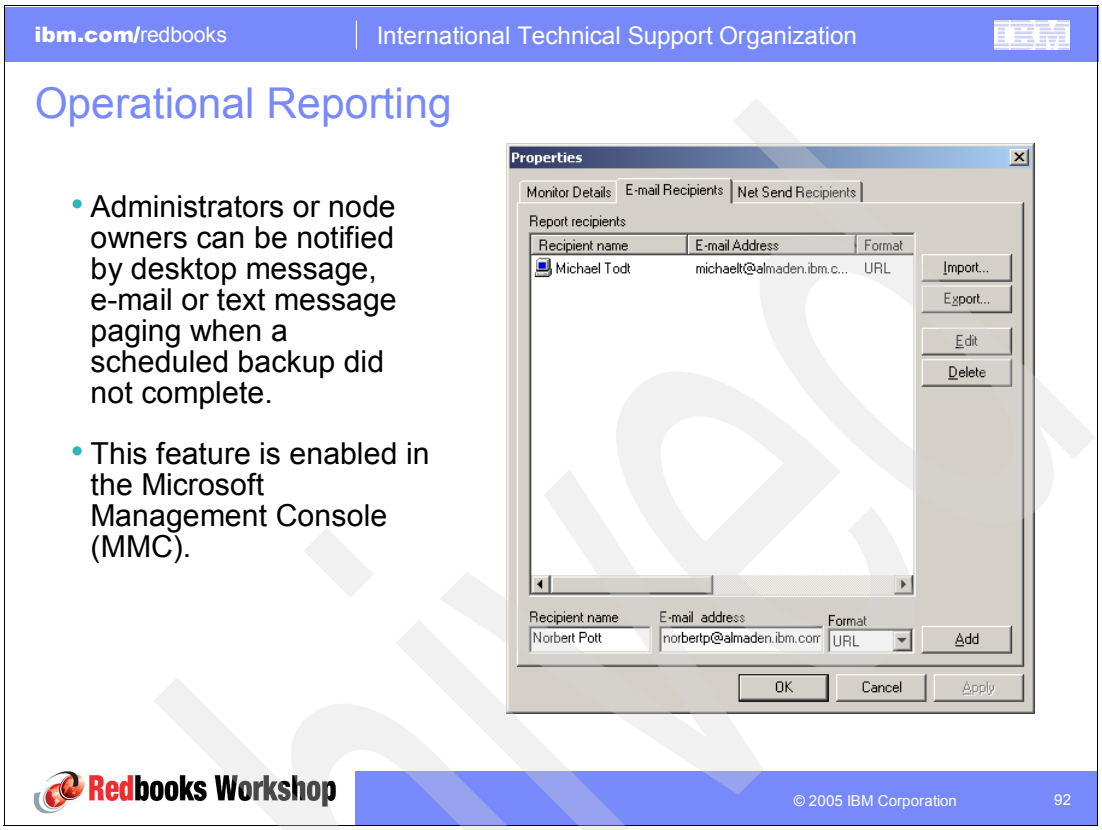



*Figure 5-5 Configuring e-mail notification*

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

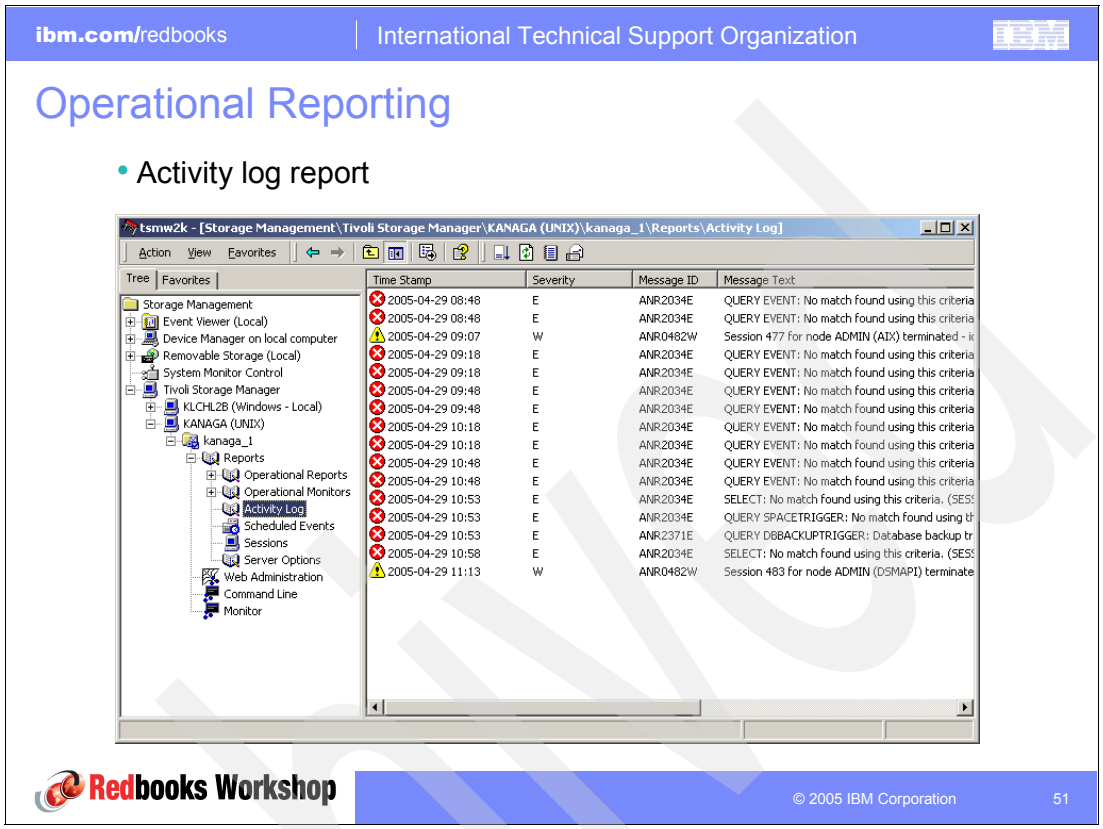



*Figure 5-6 Activity log report*

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.

6

# 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.

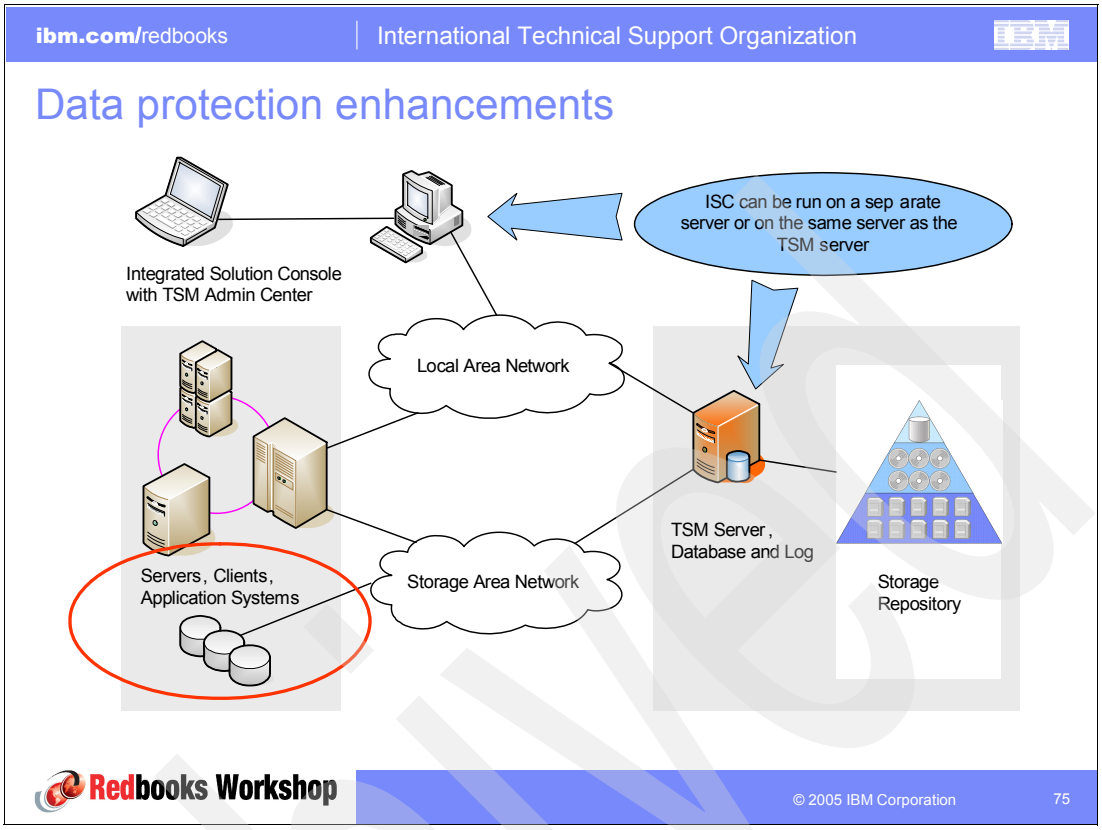



*Figure 6-1 Tivoli Storage Manager components*

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

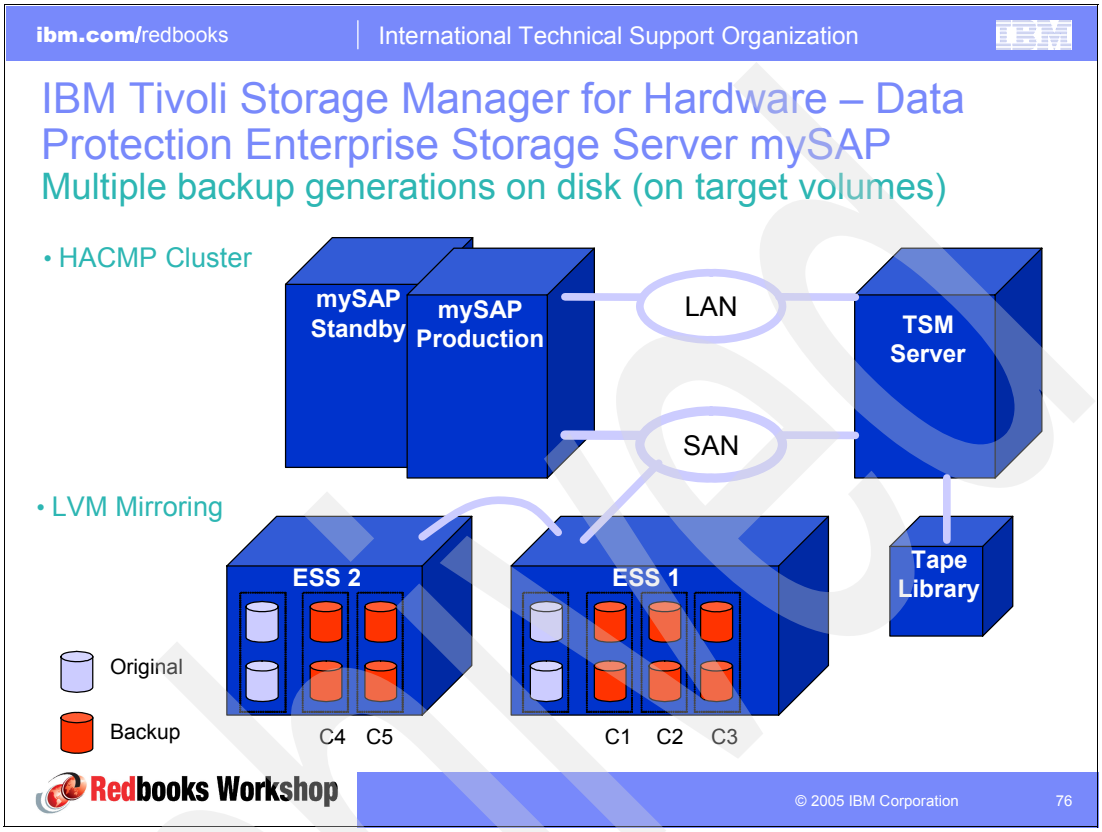



*Figure 6-2 DP ESS mySAP: Multiple backup generations on disk*

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

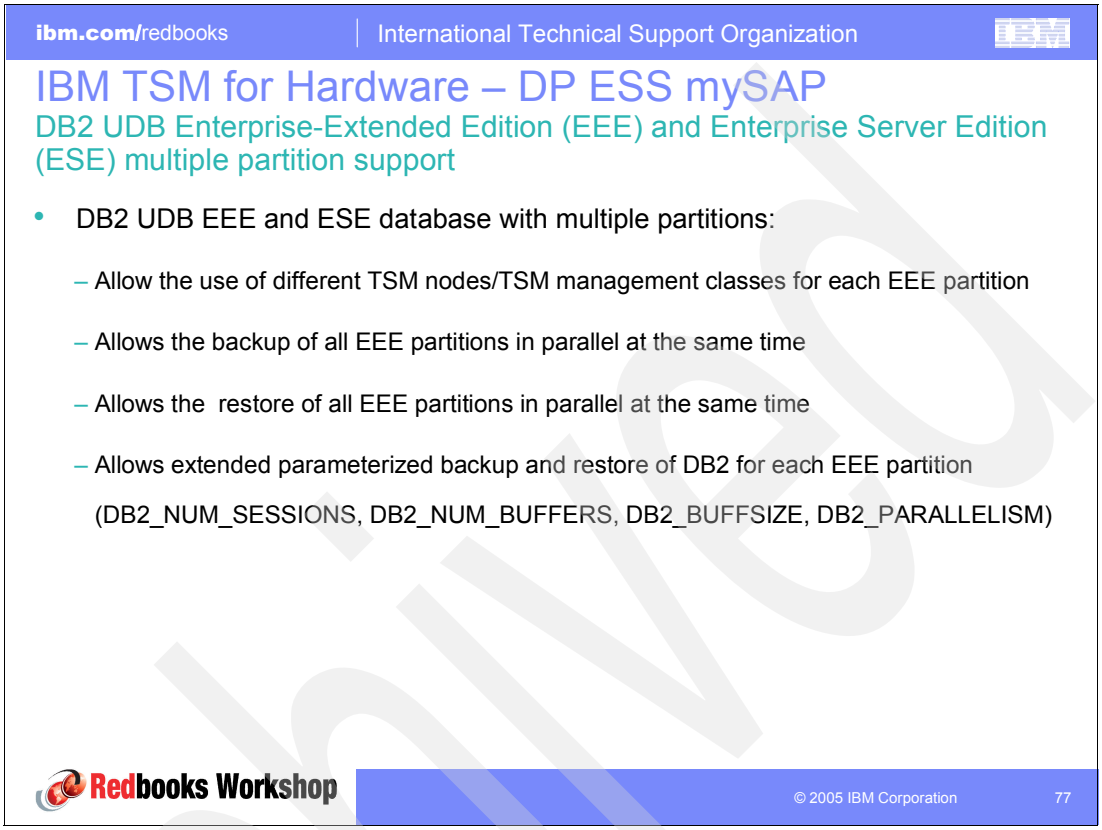



*Figure 6-3 DP ESS mySAP: DB2 UDB EEE/ESE multiple partition support*

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

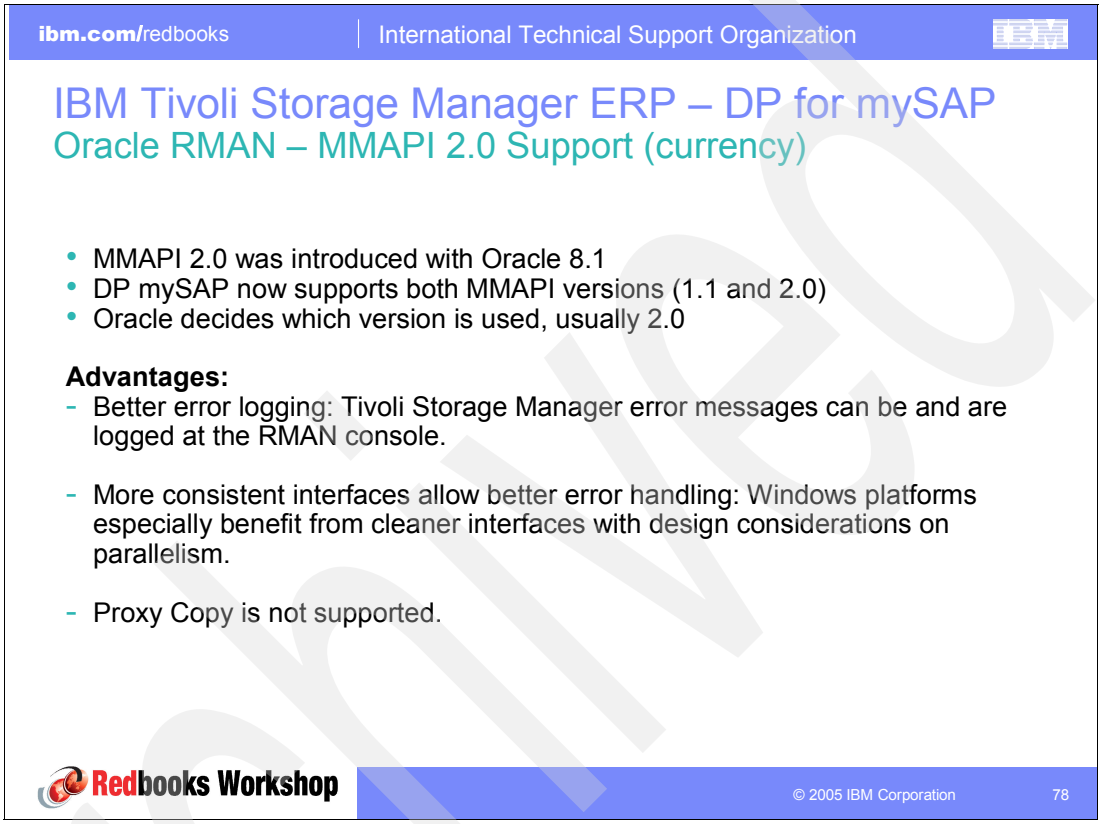



*Figure 6-4 TSM ERP — DP for mySAP: MMAPI 2.0 support*

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

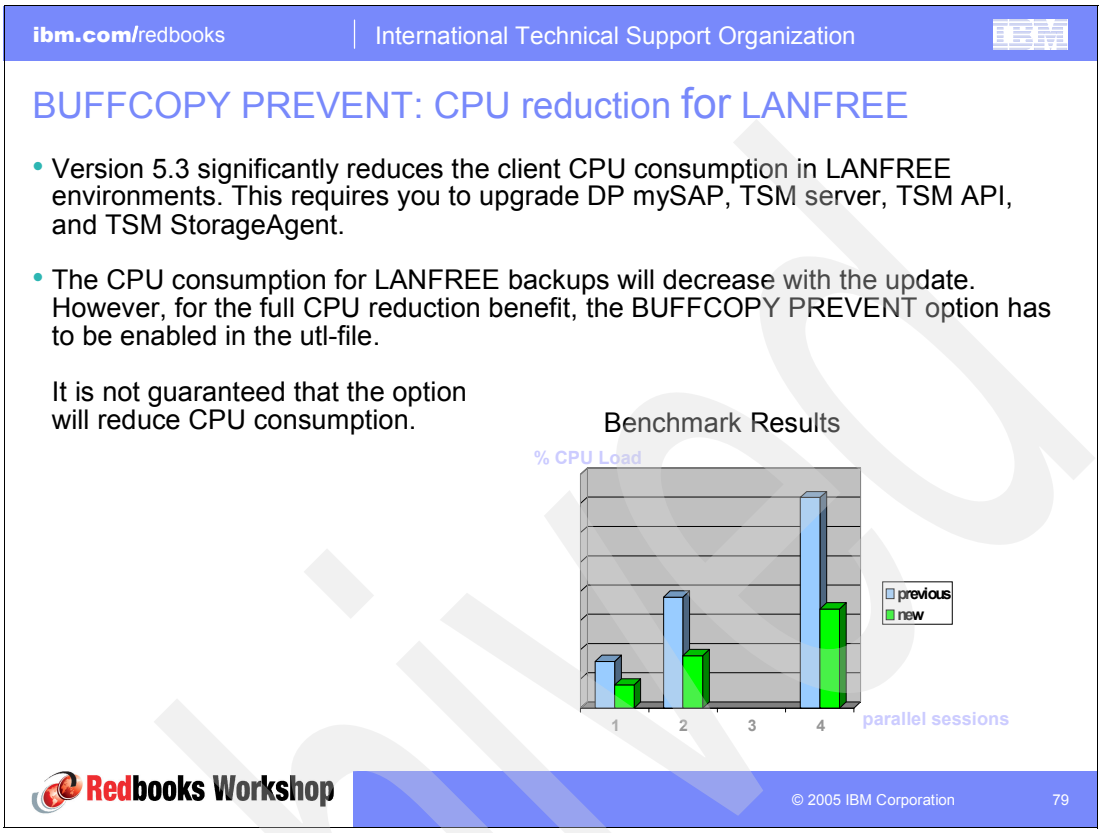



*Figure 6-5 Tivoli Storage Manager ERP — DP for mySAP: Reduced CPU consumption*

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

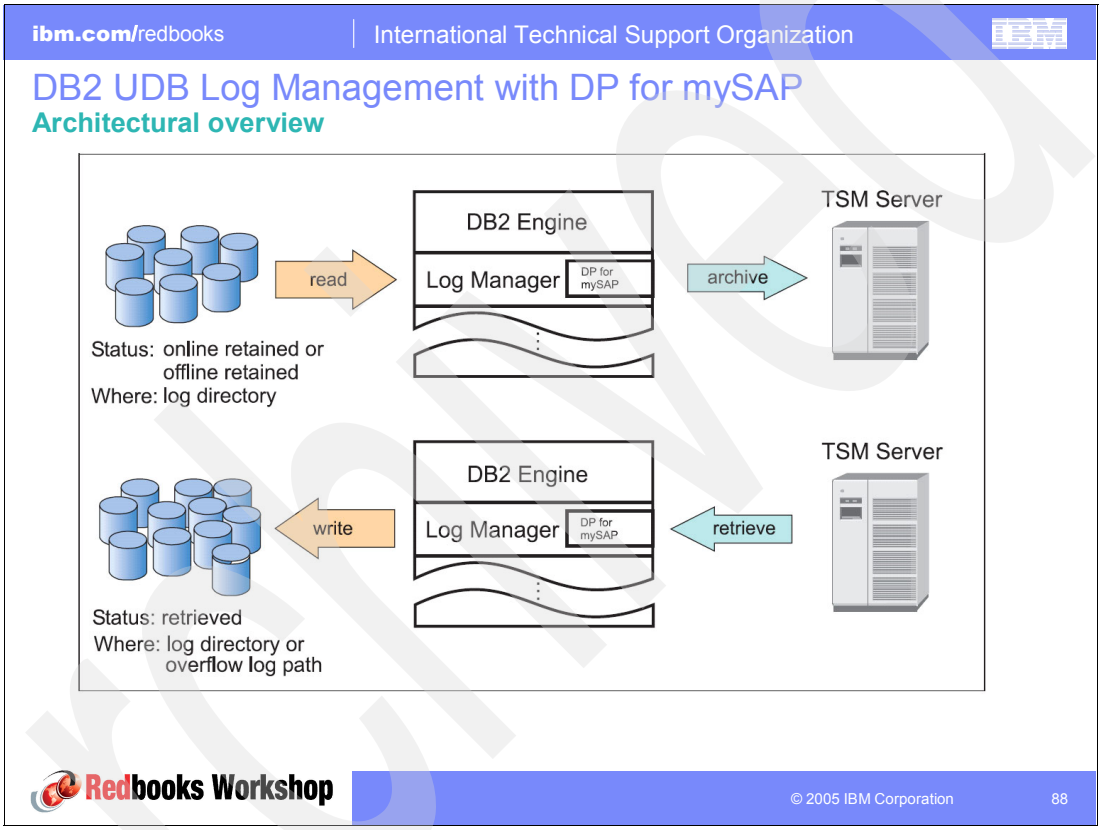



*Figure 6-6 DP for mySAP: DB2 UDB Log management architectural overview*

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

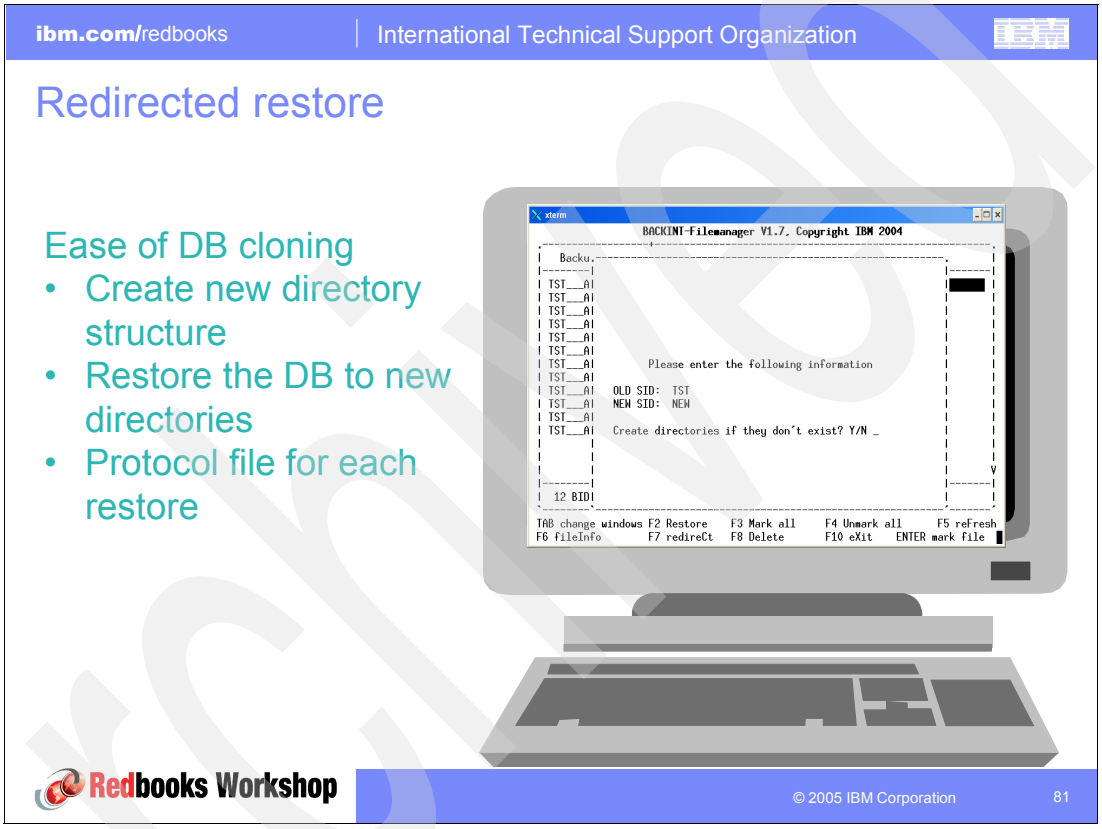



*Figure 6-7 DP for mySAP: Redirected restore*

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

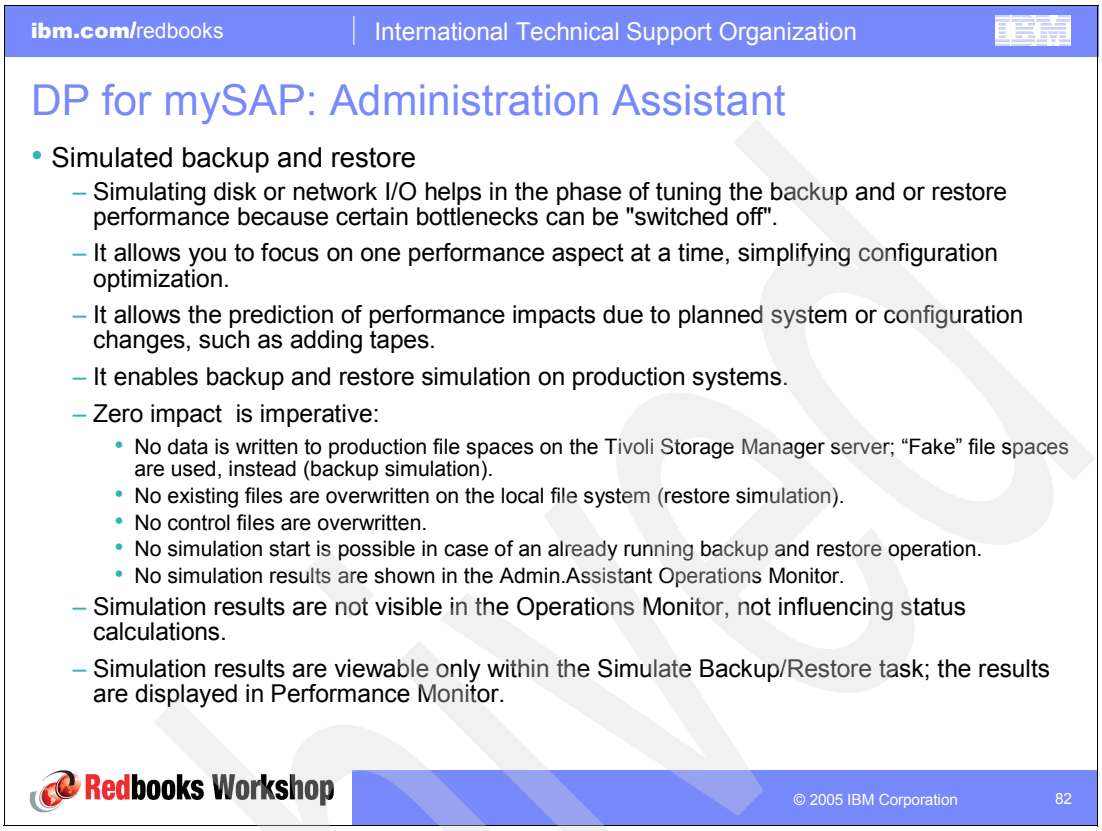



*Figure 6-8 DP for mySAP: Simulated backup and restore*

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.

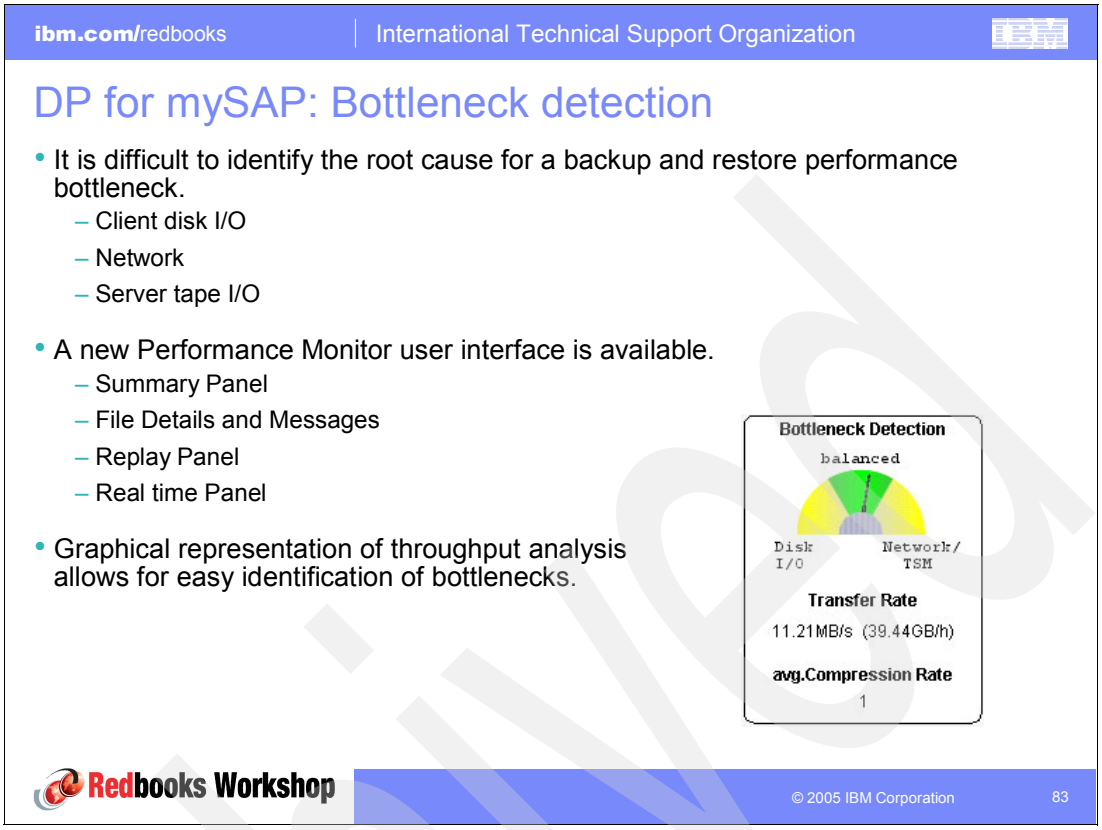



*Figure 6-9 DP for mySAP: Bottleneck detection*

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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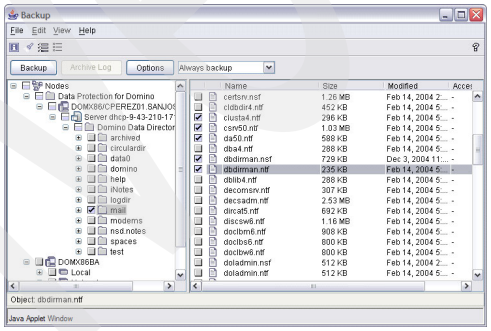
**Data Protection for Lotus® Domino 5.3.0**

- 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

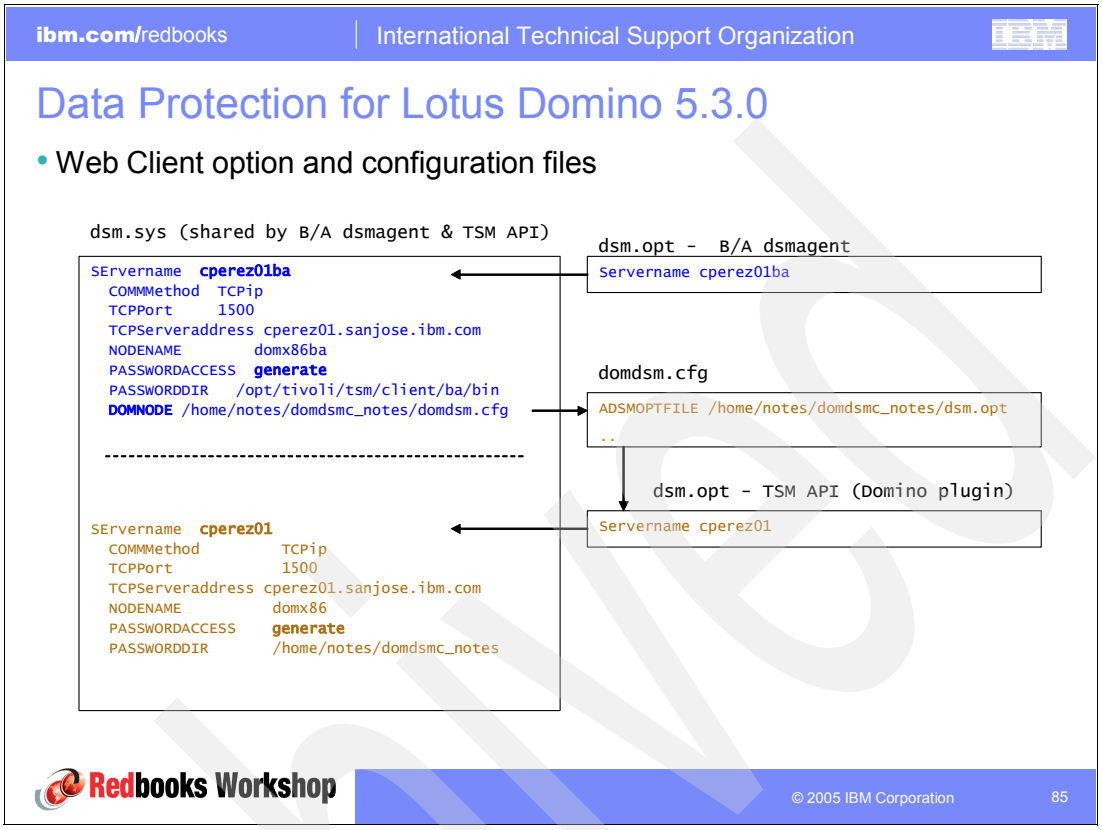



*Figure 6-11 DP for Lotus Domino: Option and configuration files*

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

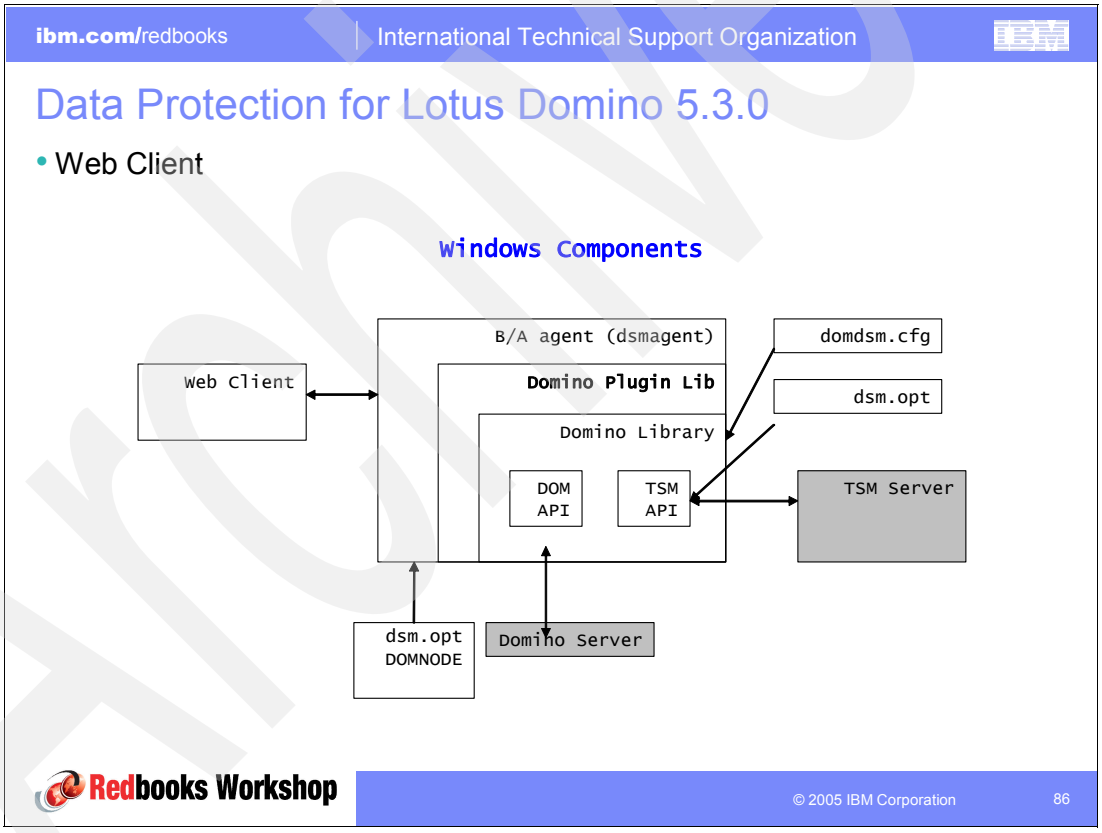



*Figure 6-12 DP for Lotus Domino: Windows components*

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

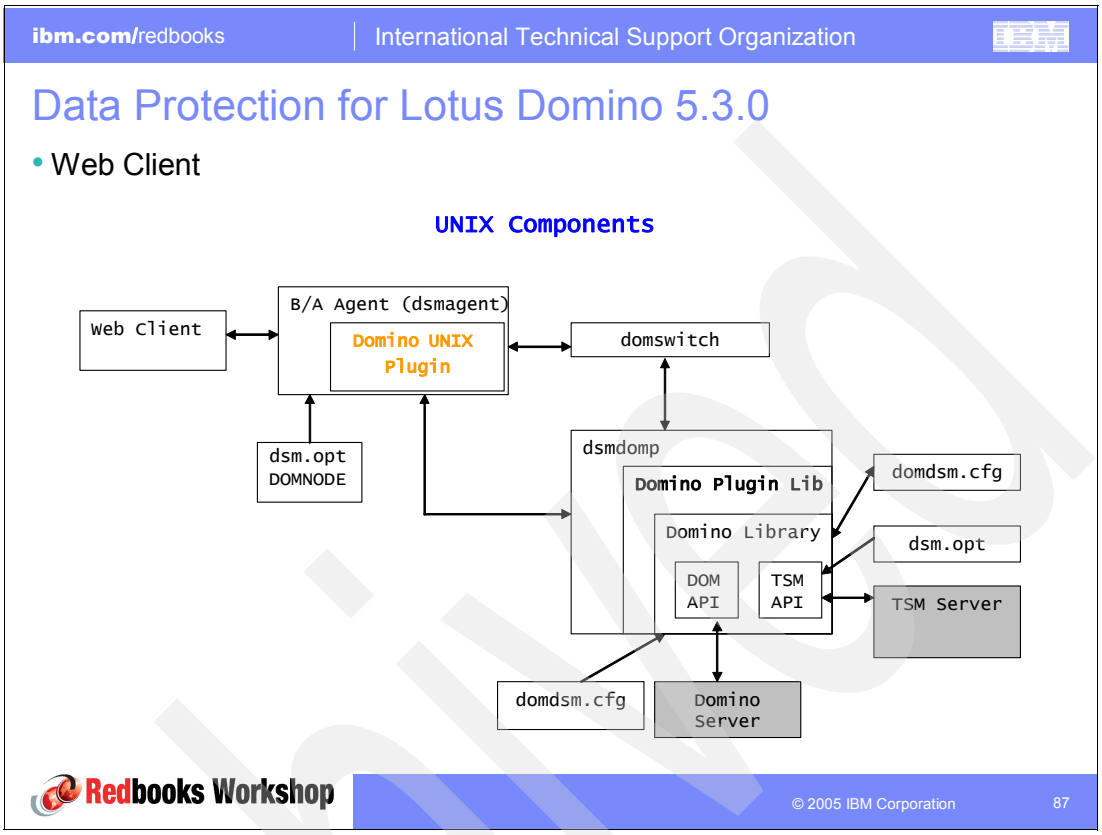



*Figure 6-13 DP for Lotus Domino: UNIX components*

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.

7

# Use cases

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

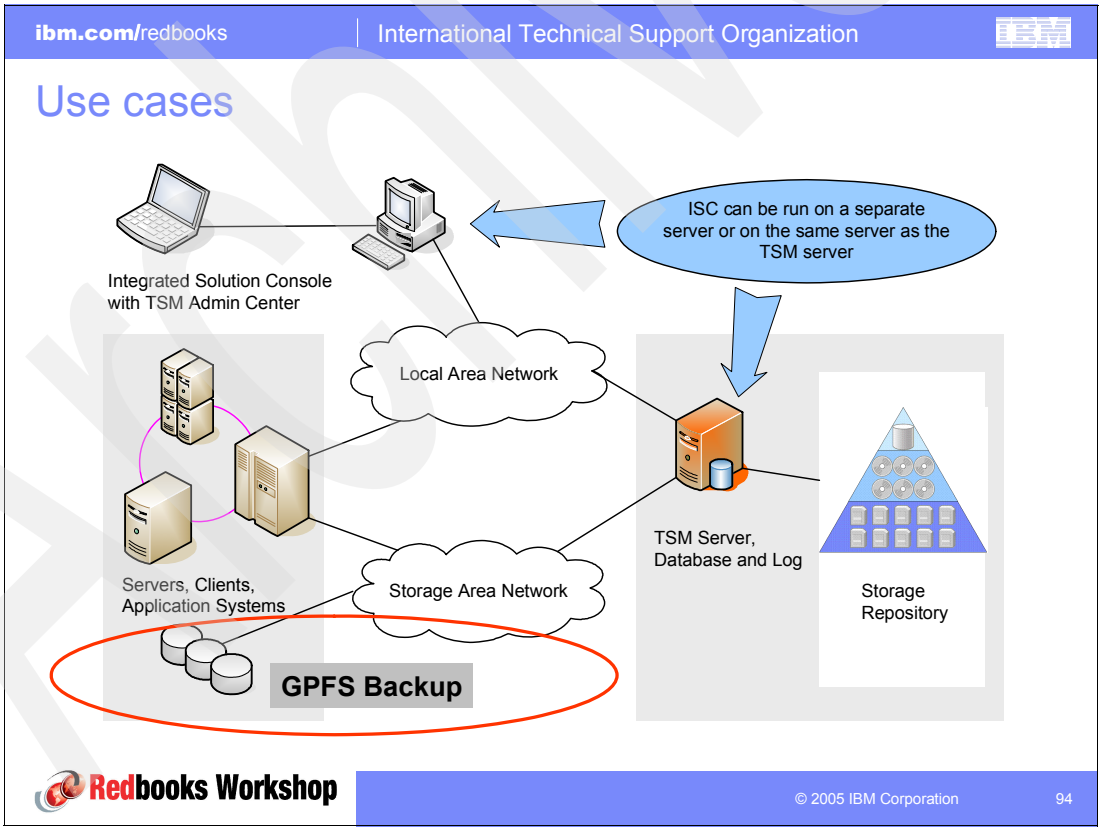



*Figure 7-1 Tivoli Storage Manager components*

## 7.1 Client node proxy support and GPFS

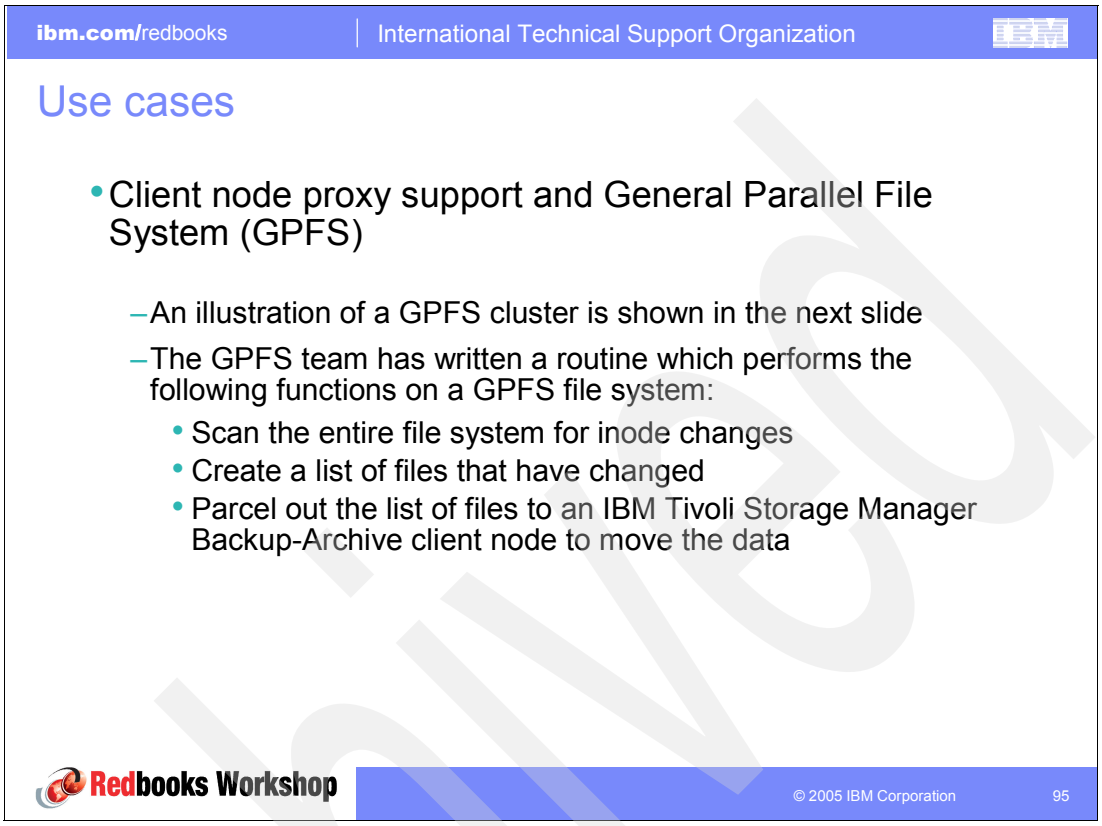



*Figure 7-2 Client node proxy support and GPFS*

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 is 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.

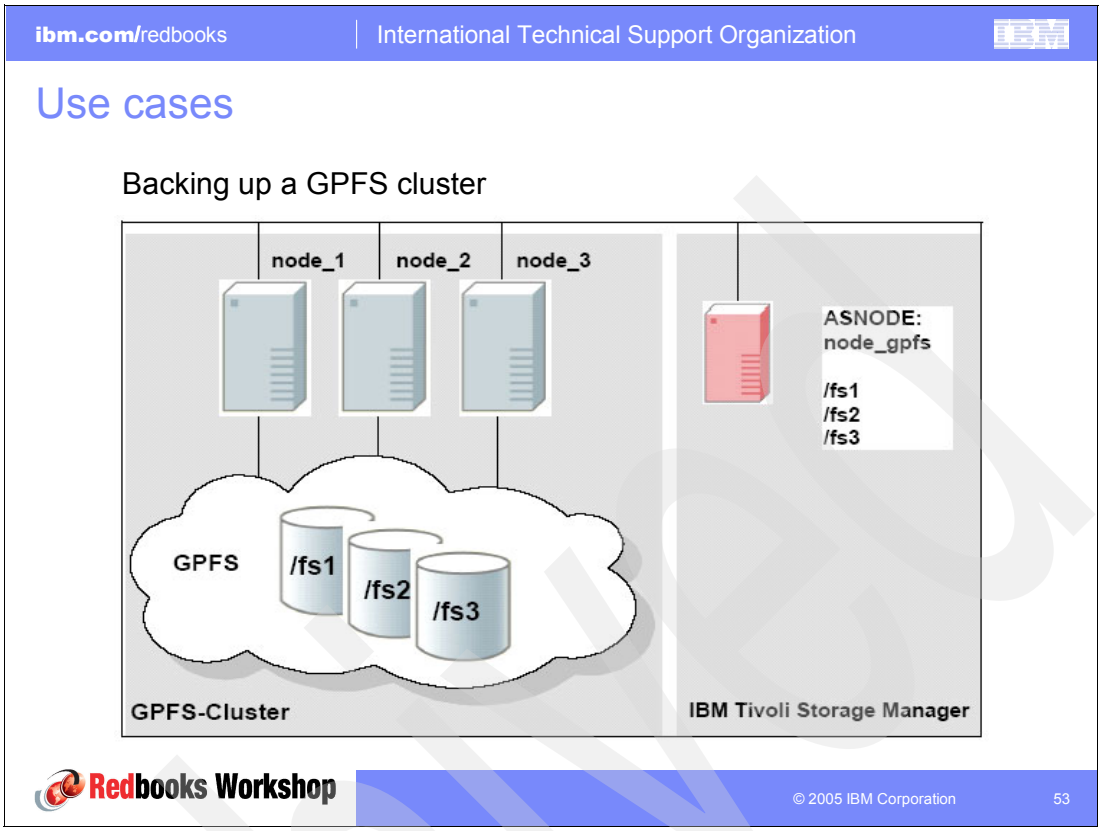



*Figure 7-3 Backing up a GPFS cluster*

## 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 filespaces 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 filespace naming limitations that are inherent in Windows systems.

## 7.2 CHECKOUT LIBVOL enhancements

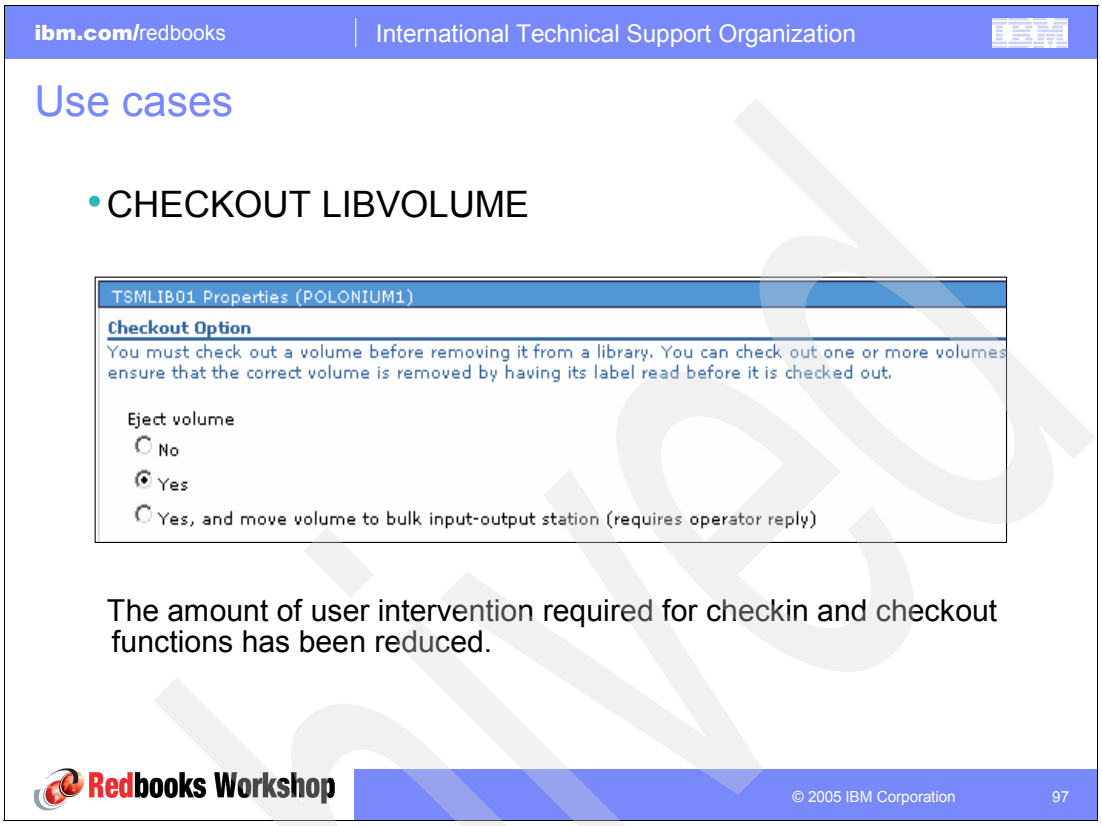


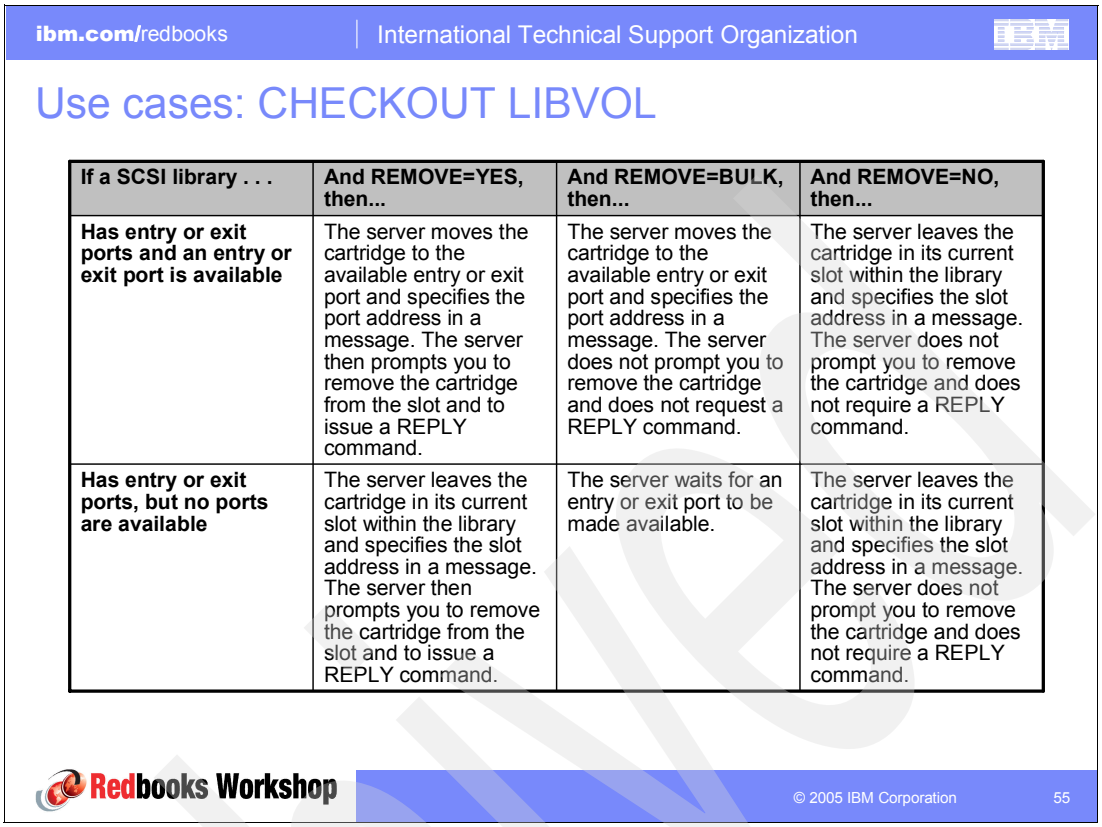

*Figure 7-4 CHECKOUT LIBVOL enhancements*

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.




| 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*.

# 8

# 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.

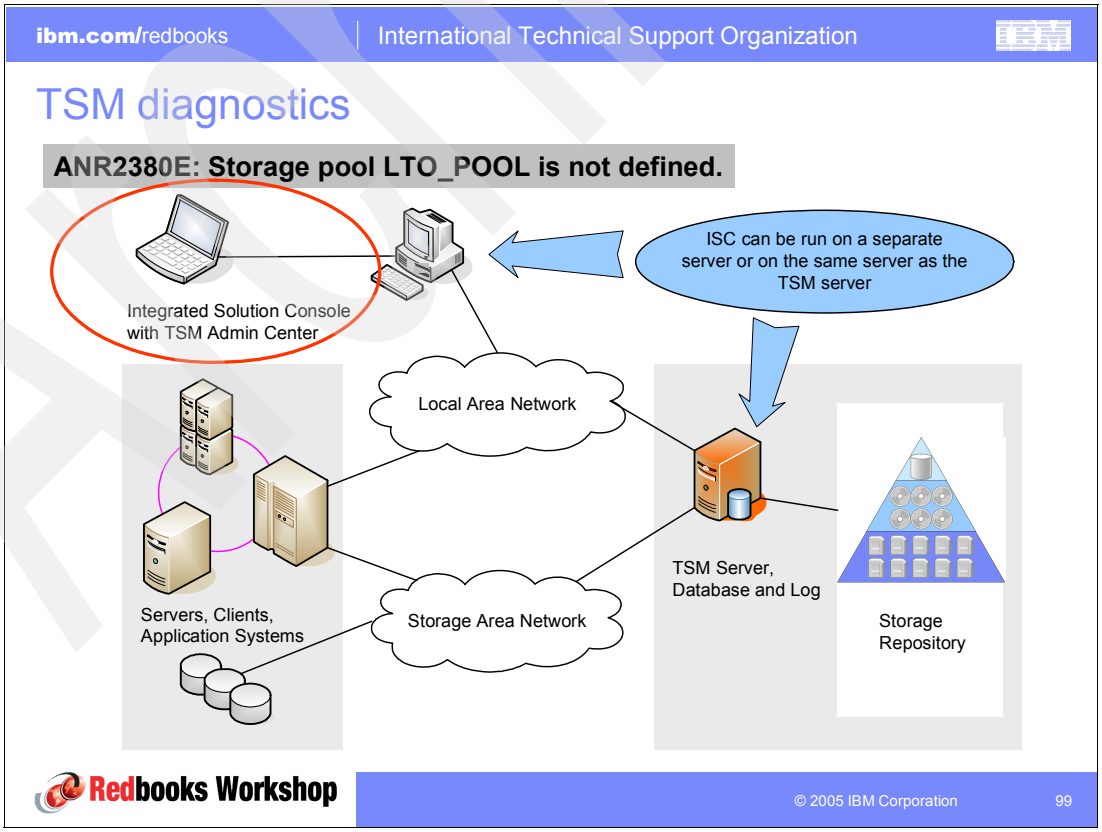



*Figure 8-1 Tivoli Storage Manager components*

## 8.1 Problem determination guide

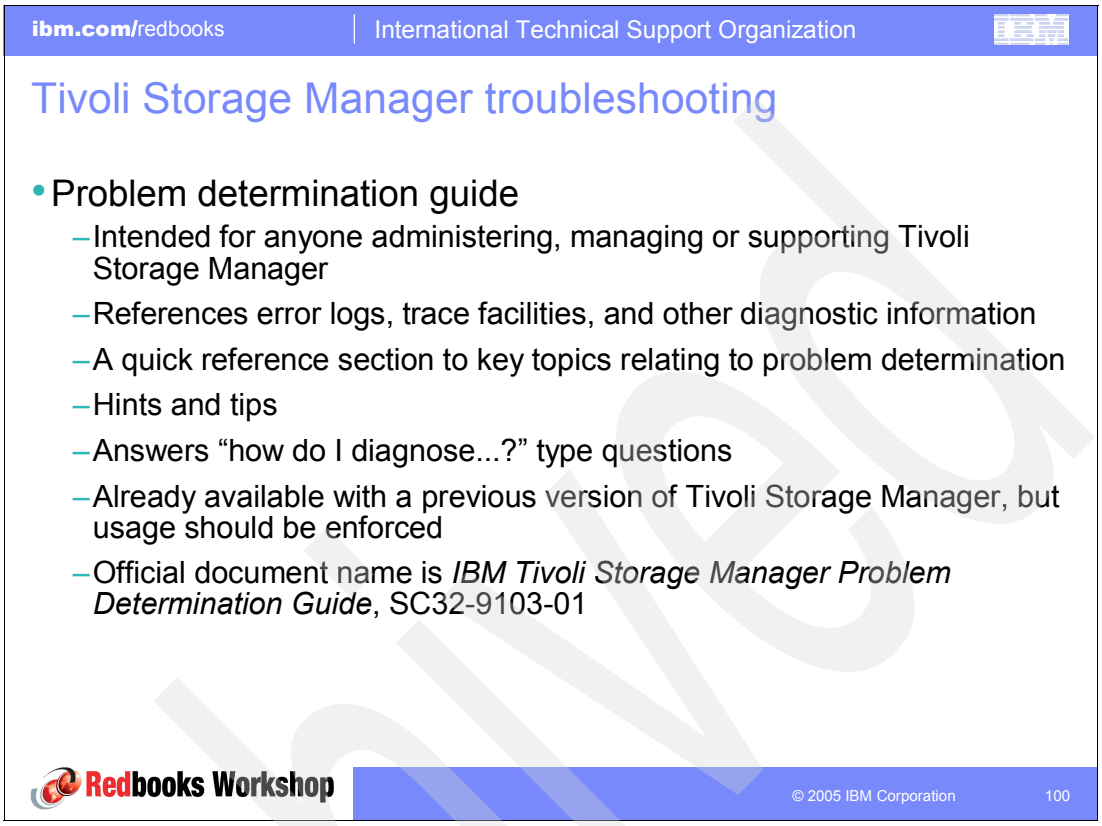



*Figure 8-2 Problem Determination Guide*

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

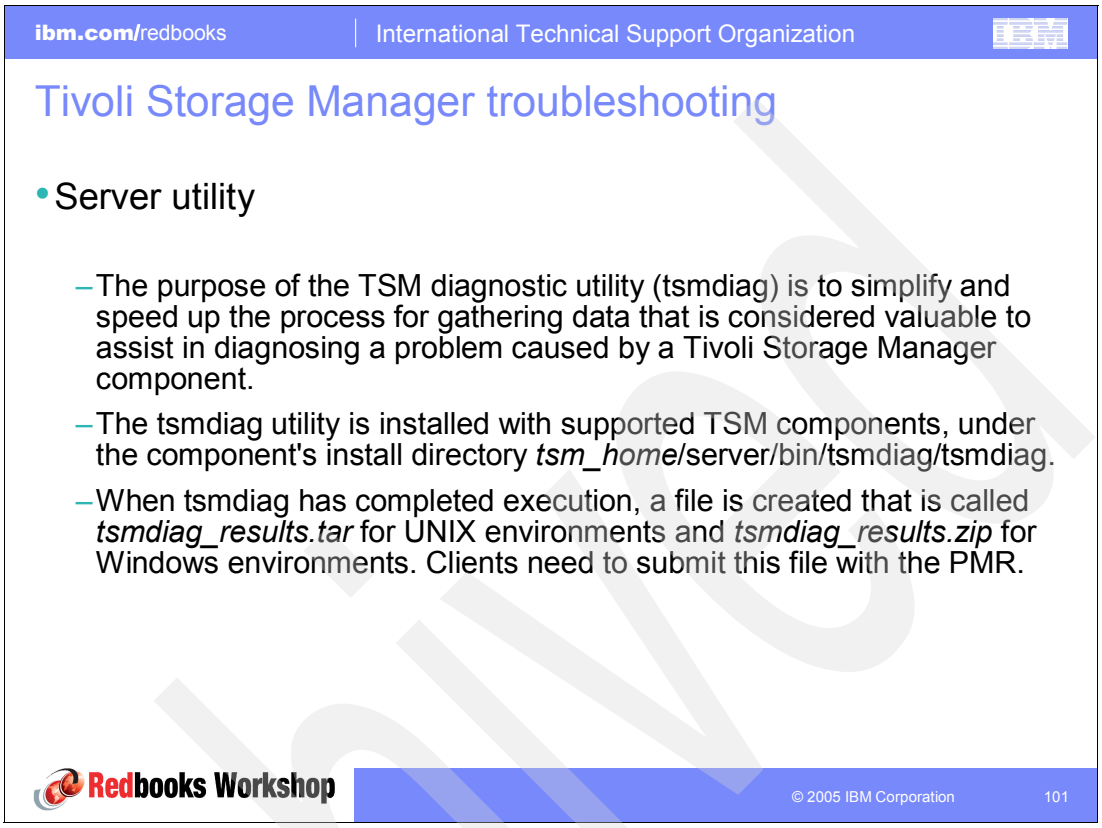



*Figure 8-3 Troubleshooting: tsmdiag*

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 **tsmdiag** 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 **tsmdiag** 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 **tsmdiag** 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

A

# 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**.

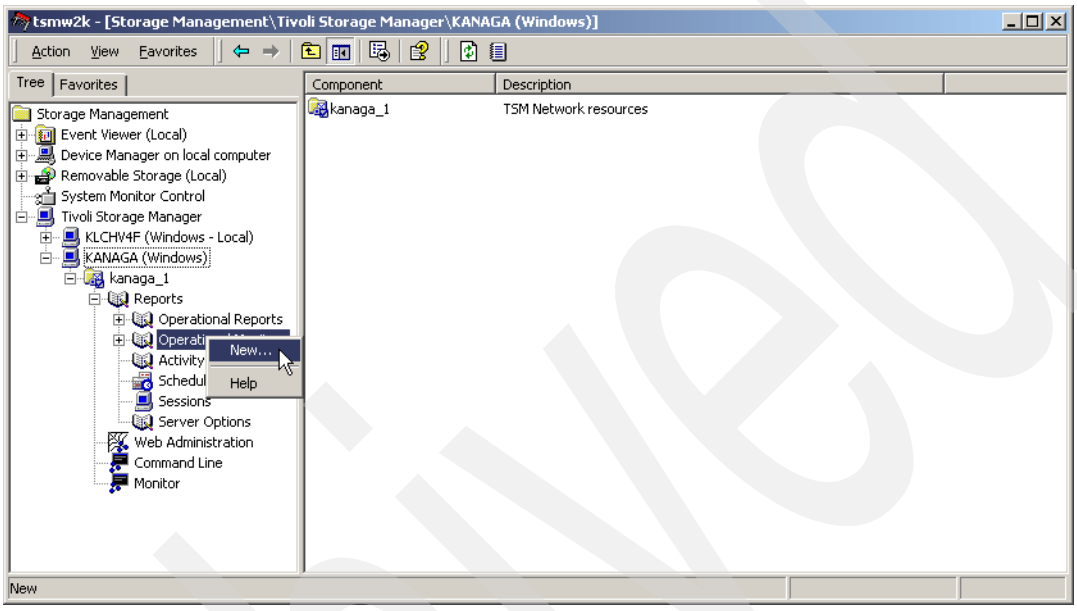



*Figure A-1 Operational Reporting: Creating a monitor*

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

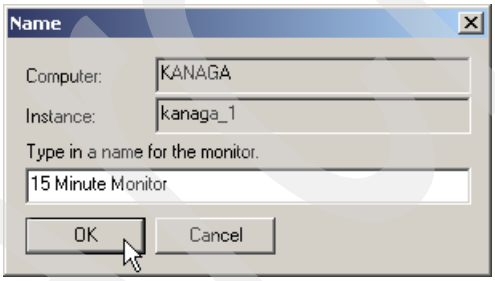



*Figure A-2 Operational Reporting: 15 minute monitor*

3. In the Properties window (Figure A-3), complete these steps:
   a. Deselect the **Activate monitor** check box.
   b. Select the **Use Collapsable 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**.

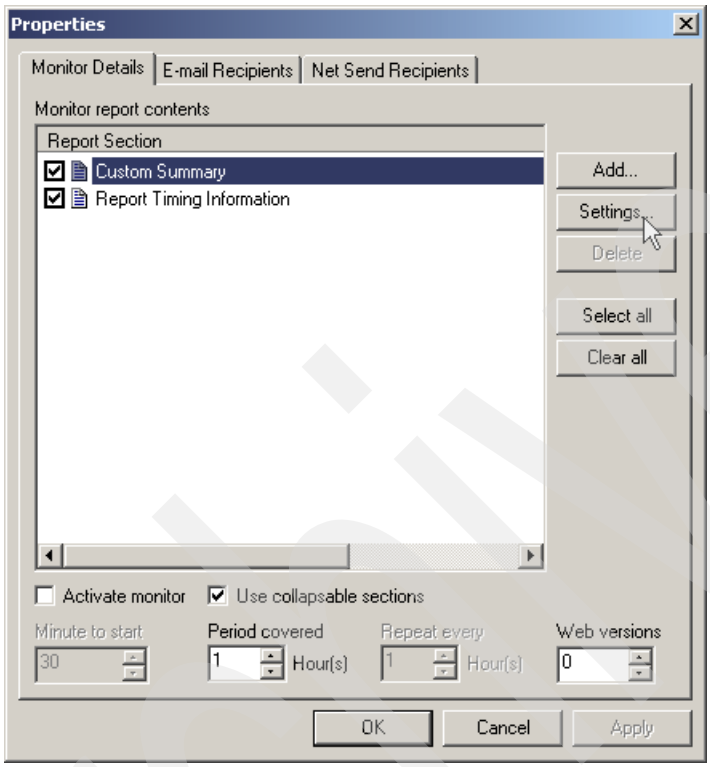



*Figure A-3 Operational Reporting: Monitor properties*

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.

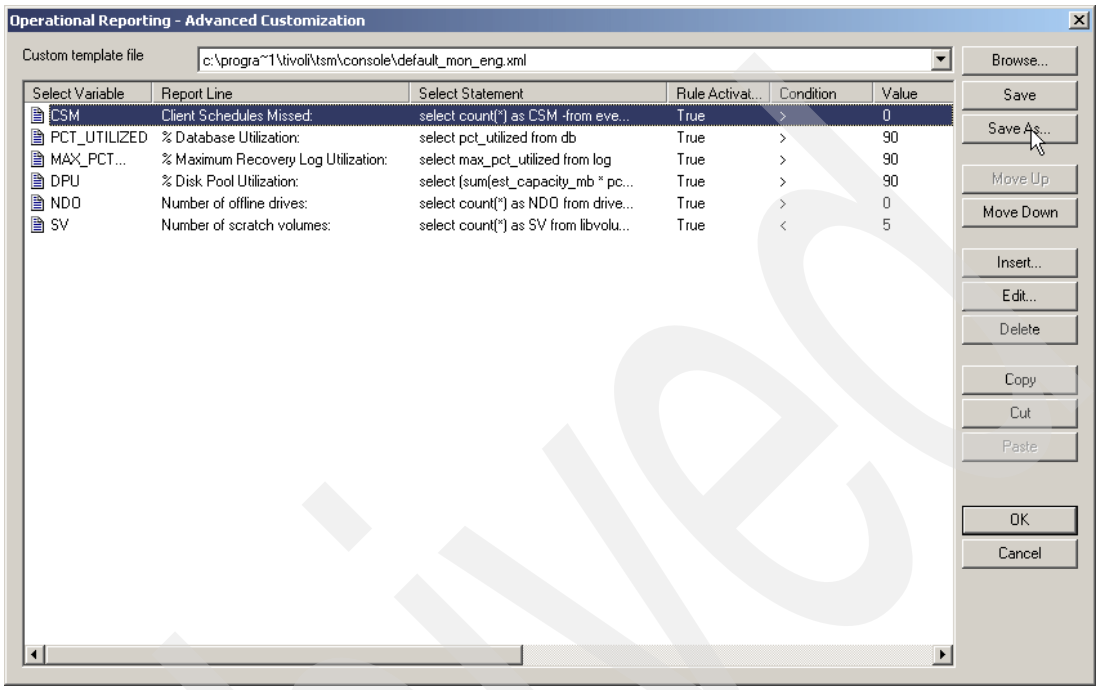



*Figure A-4 Operational Reporting: Advanced customization*

   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**.

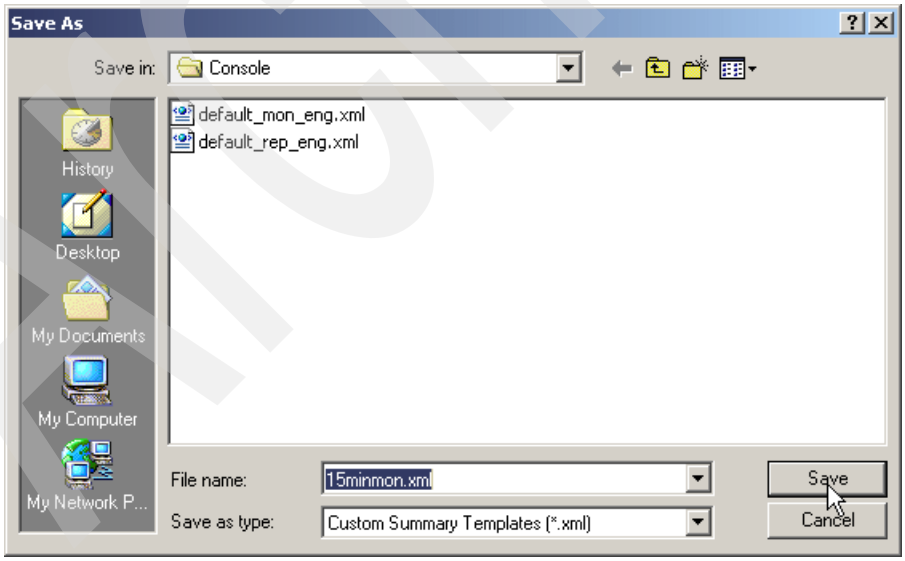



*Figure A-5 Operational Reporting: Save as 15minmon.xml*

5. Customize the default template.

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

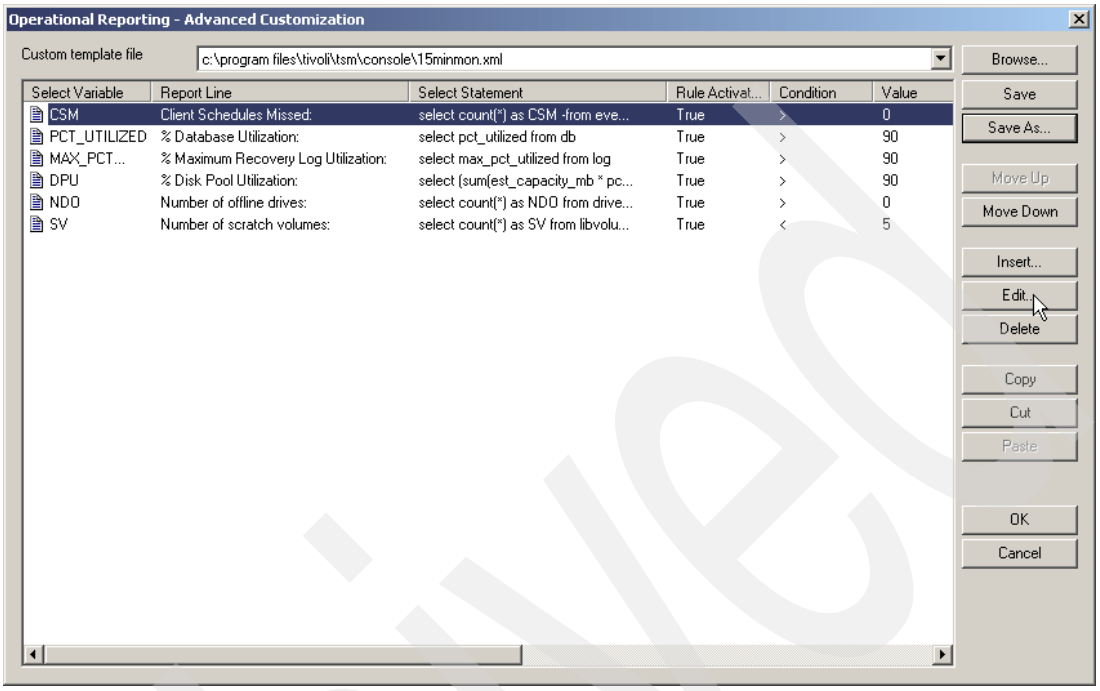



*Figure A-6 Operational Reporting: Edit*

   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'
```

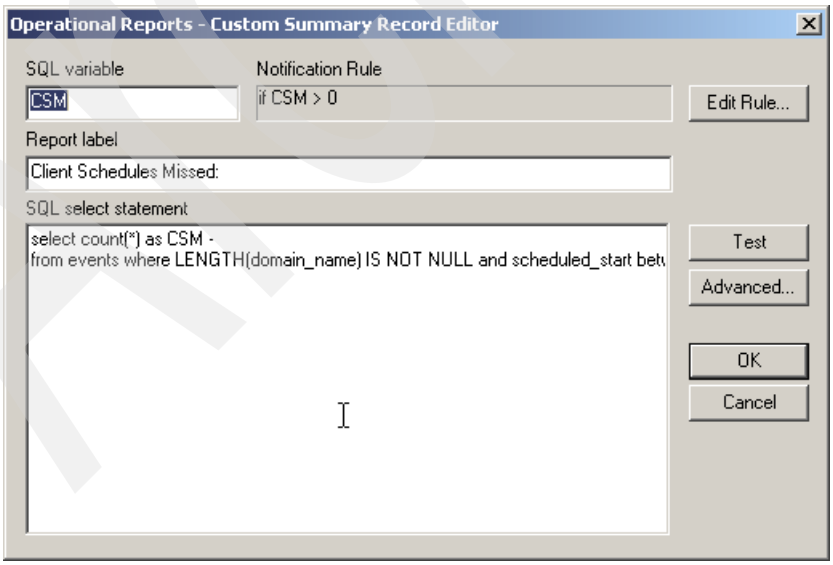



*Figure A-7 Operational Reporting: Custom summary reports editor*

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.

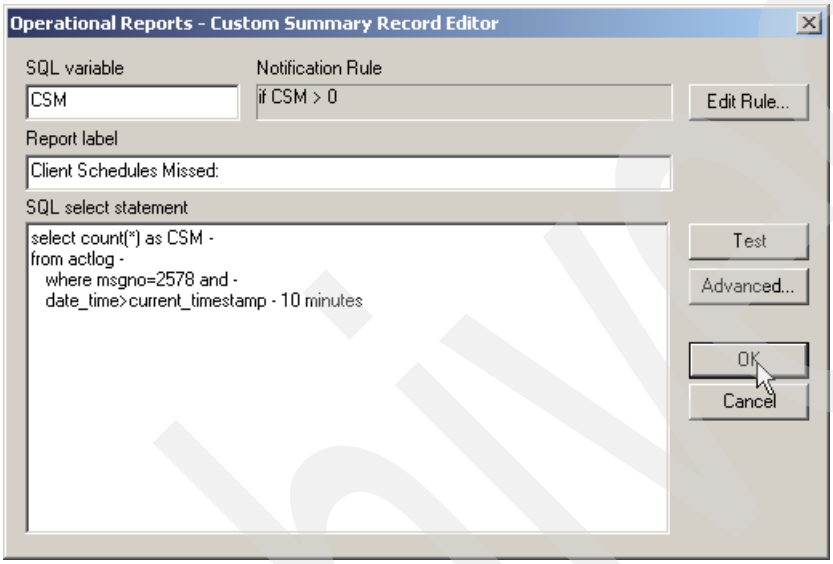



*Figure A-8 Operational Reporting: Custom summary reports editor*

c. Confirm by clicking **OK**.

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

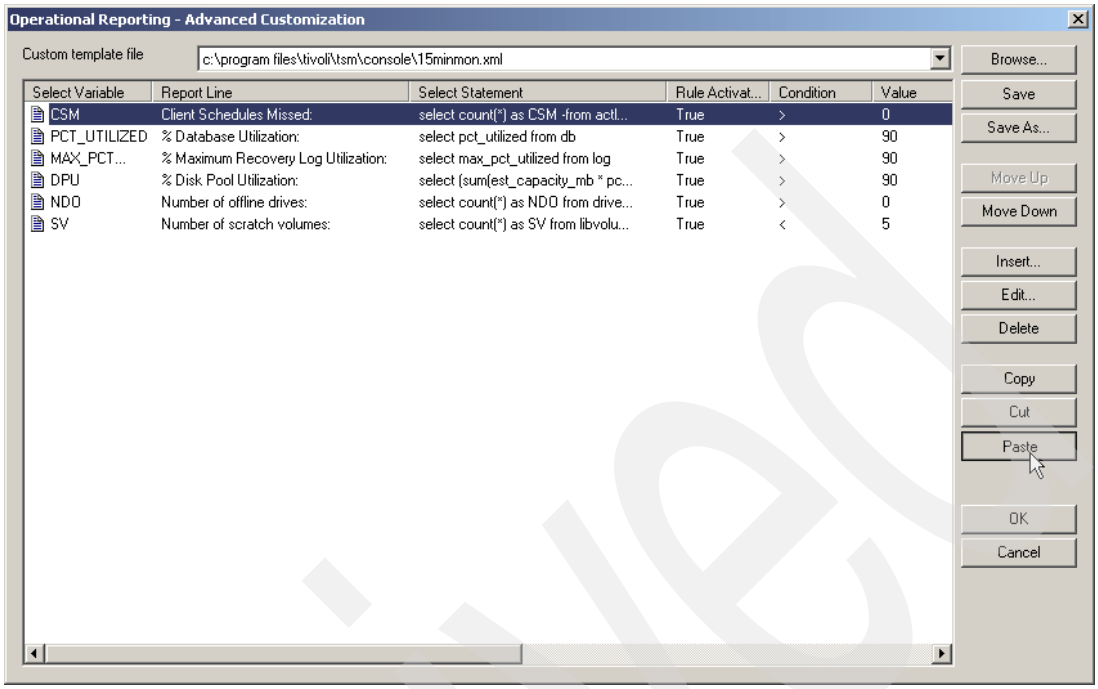



*Figure A-9 Operational Reporting: Advanced customization: Copy/paste of summary record*

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

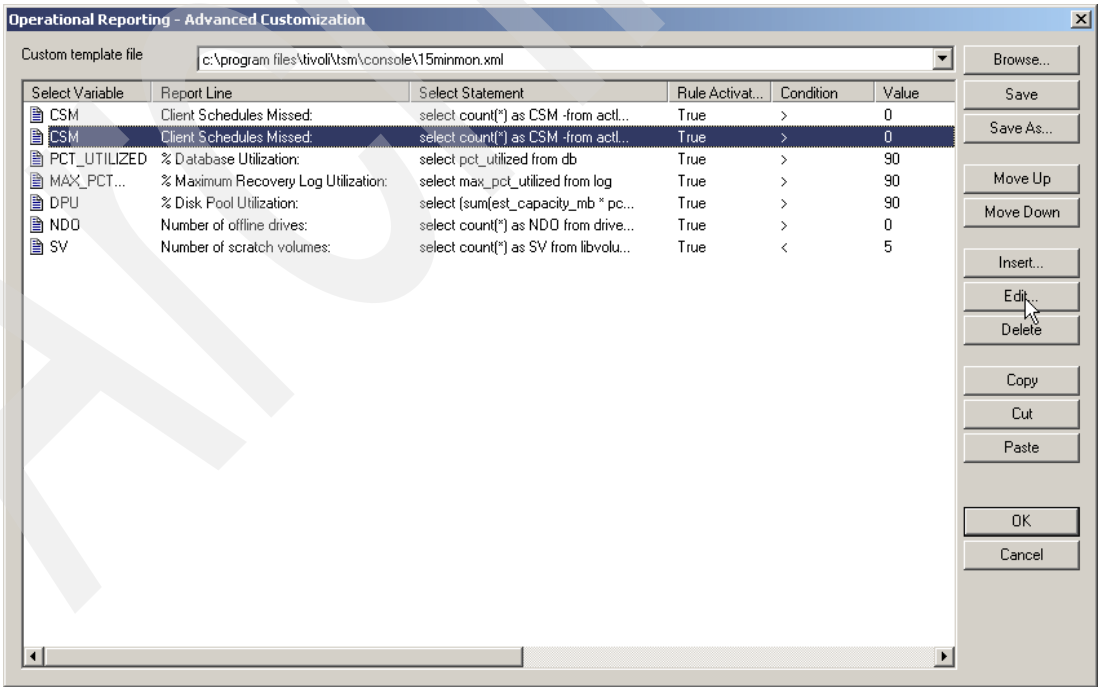



*Figure A-10 Operational Reporting: Advanced customization: Editing the report*

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.

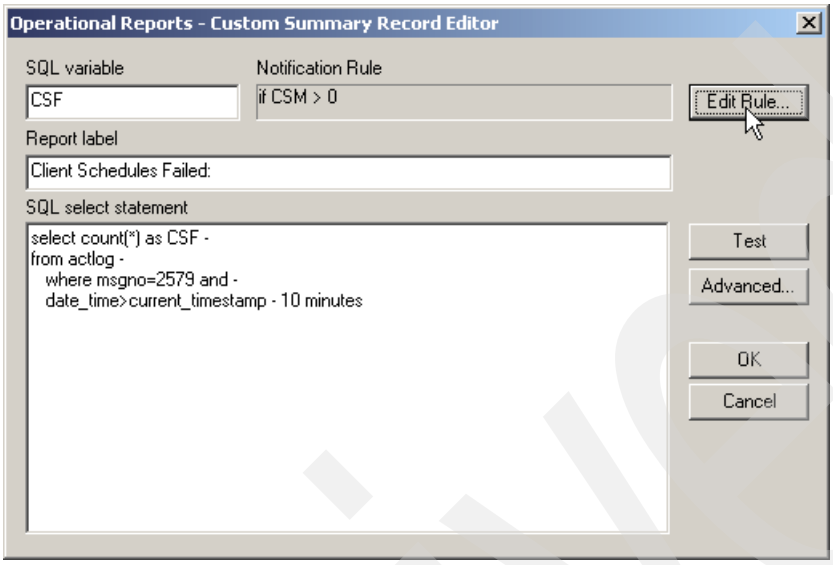



*Figure A-11 Operational Reporting: Editing the custom summary*

Figure A-12 shows the updated Notification rule.

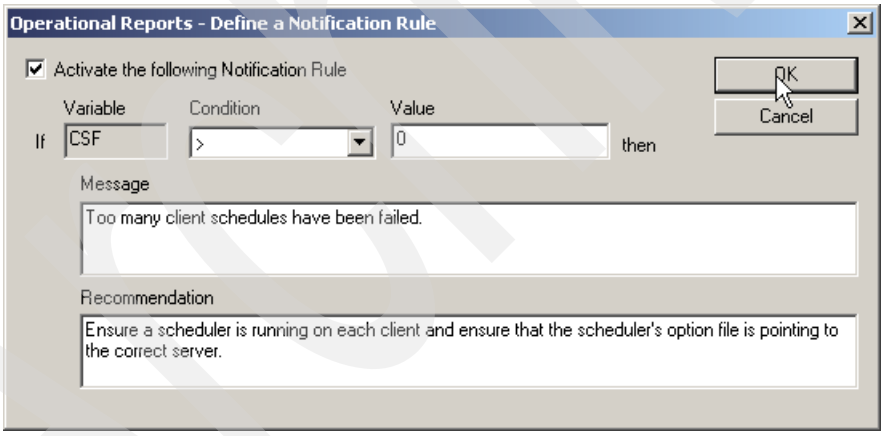



*Figure A-12 Operational Reporting: Defining a notification rule*

8. 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.

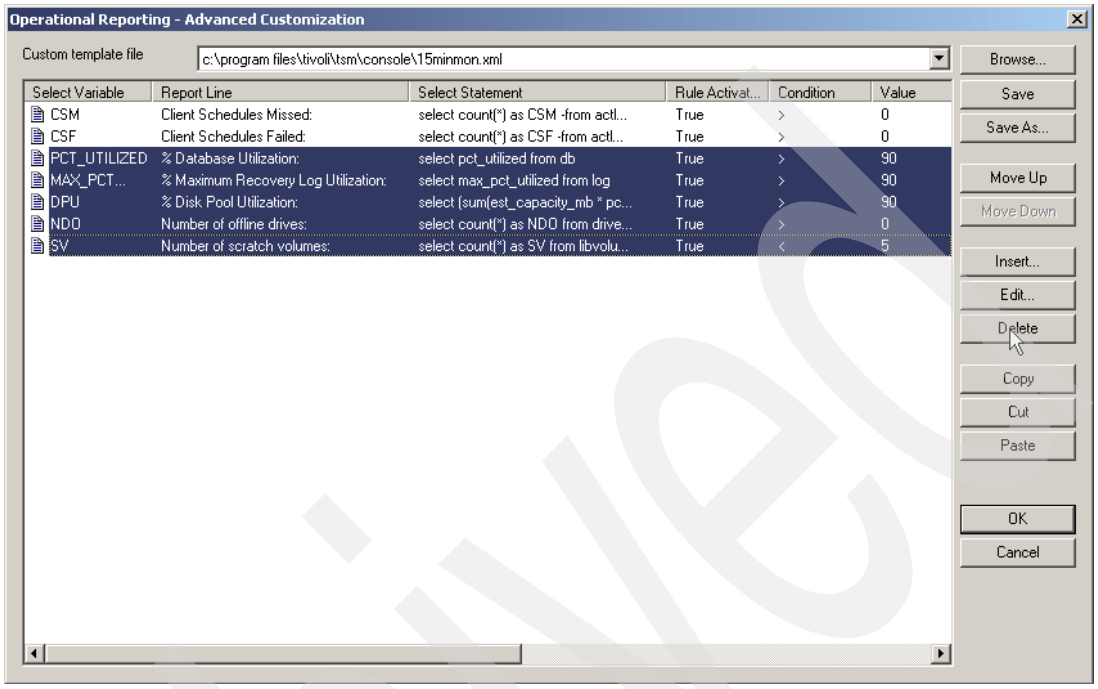



*Figure A-13 Operational Reporting: Deleting reports*

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.

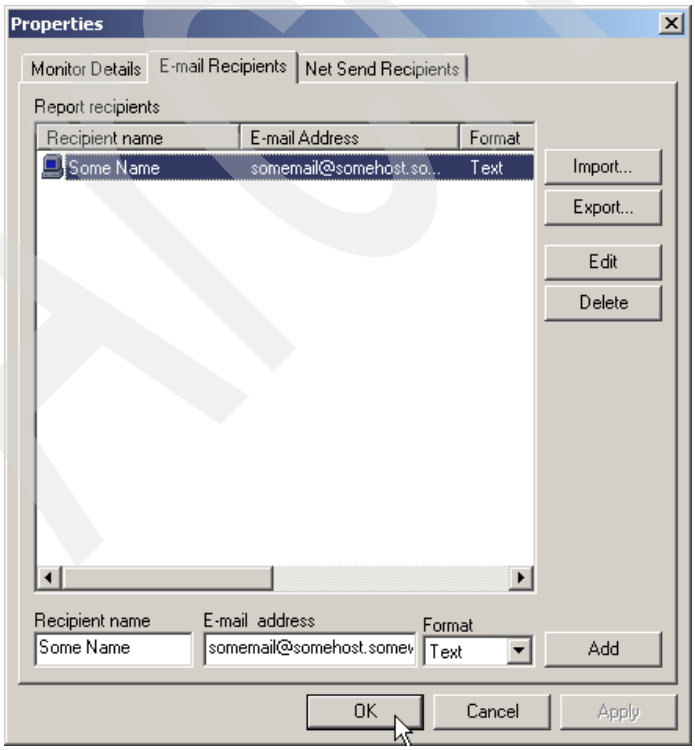



*Figure A-14 Operational Reporting: Defining the e-mail recipients*

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.

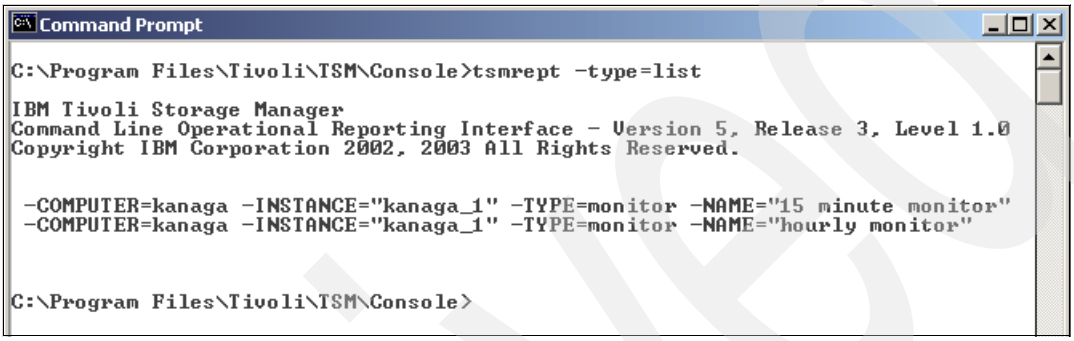



*Figure A-15 Operational Reporting: tsmrept -type=list*

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

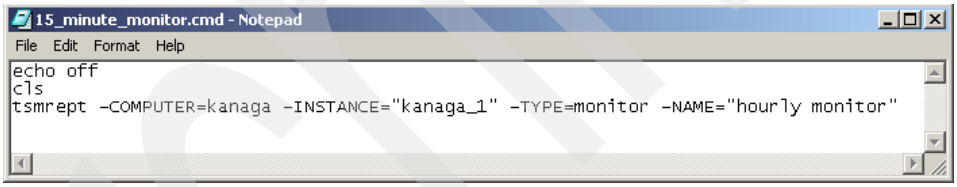



*Figure A-16 Operational Reporting: Defining a .cmd file*

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.

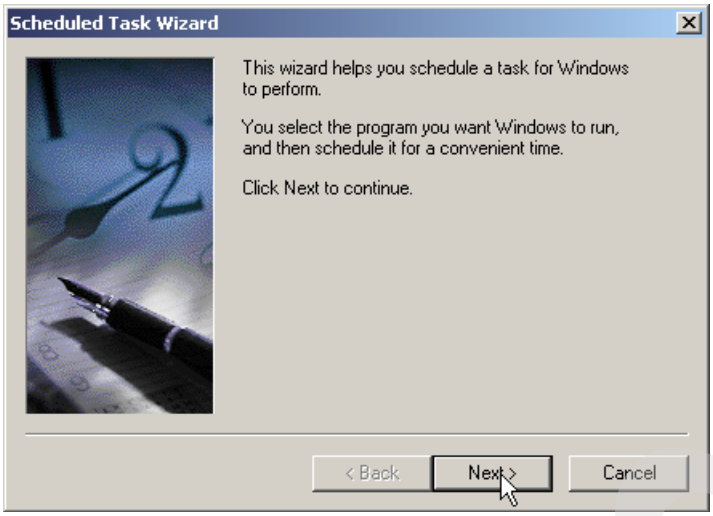



*Figure A-17 Scheduled task wizard*

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**.

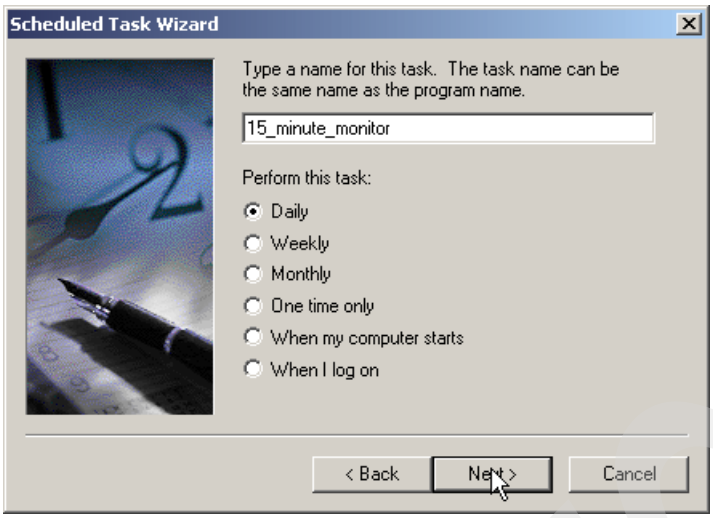



*Figure A-19 Scheduled Task Wizard: Name task*

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

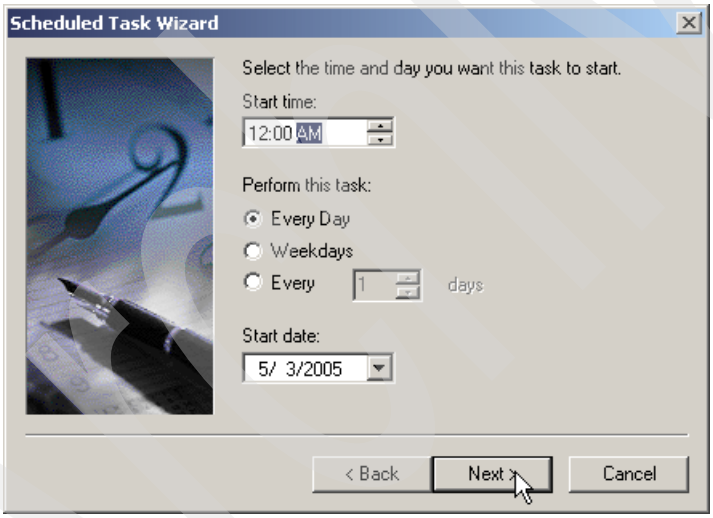



*Figure A-20 Scheduled task wizard: Scheduling details*

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.

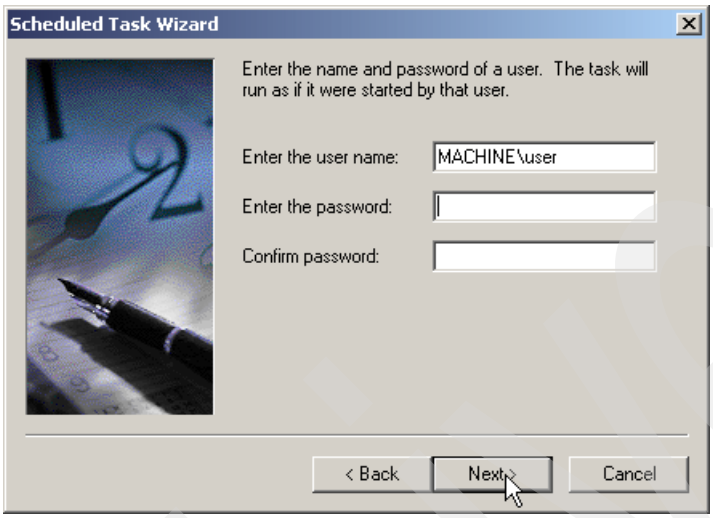



*Figure A-21 Scheduled Task Wizard: User definitions*

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.

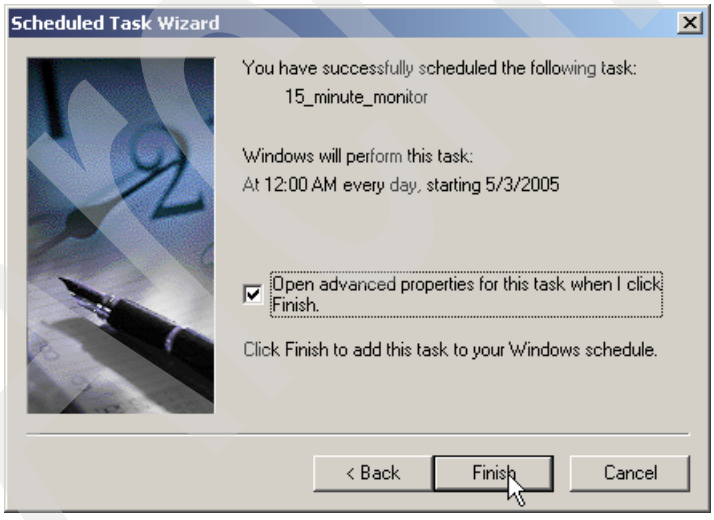



*Figure A-22 Scheduled Task Wizard: Finish configuration*

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.

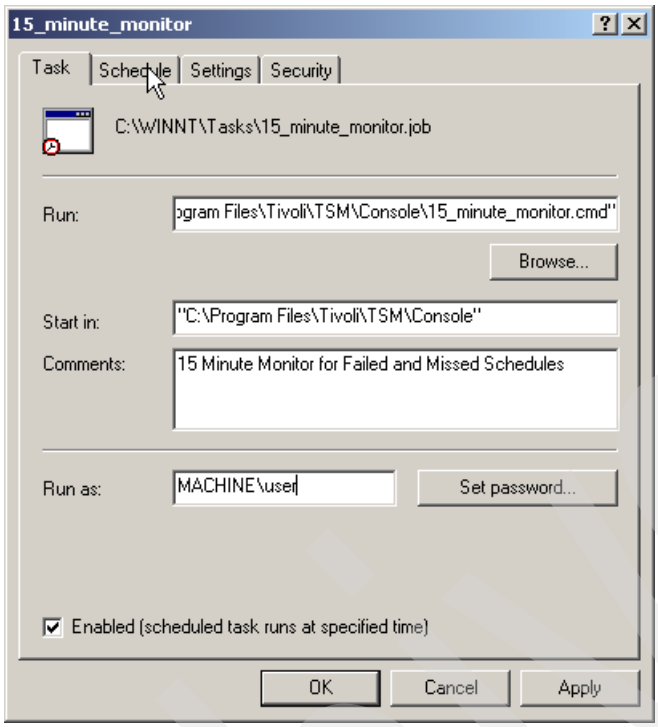



*Figure A-23 Scheduled tasks: Task definitions*

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

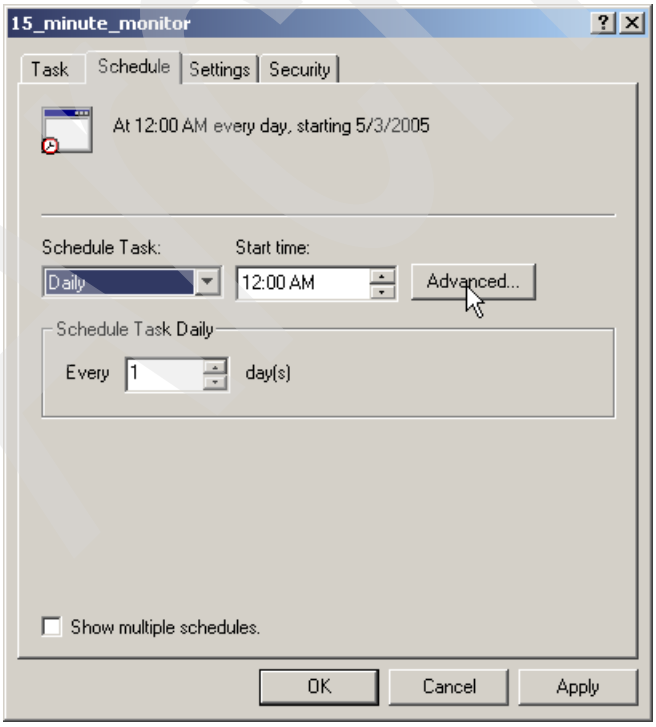



*Figure A-24 Scheduled tasks: Schedule details*

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**.

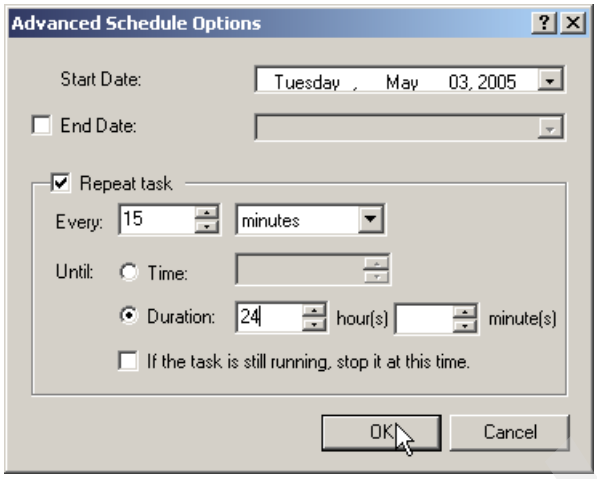



*Figure A-25 Scheduled tasks: Advanced schedule options*

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.

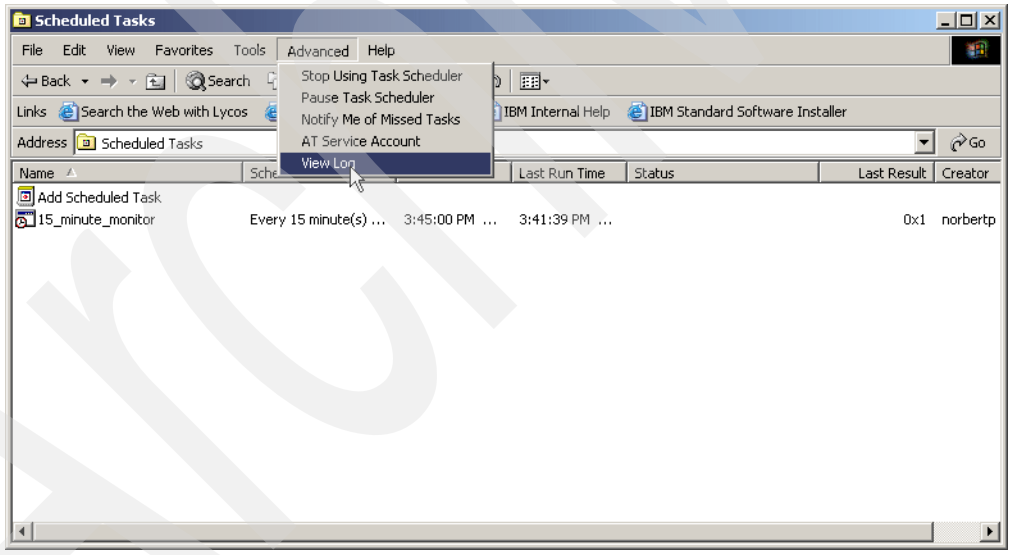



*Figure A-26 Scheduled tasks: View log*

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

# B

# 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.

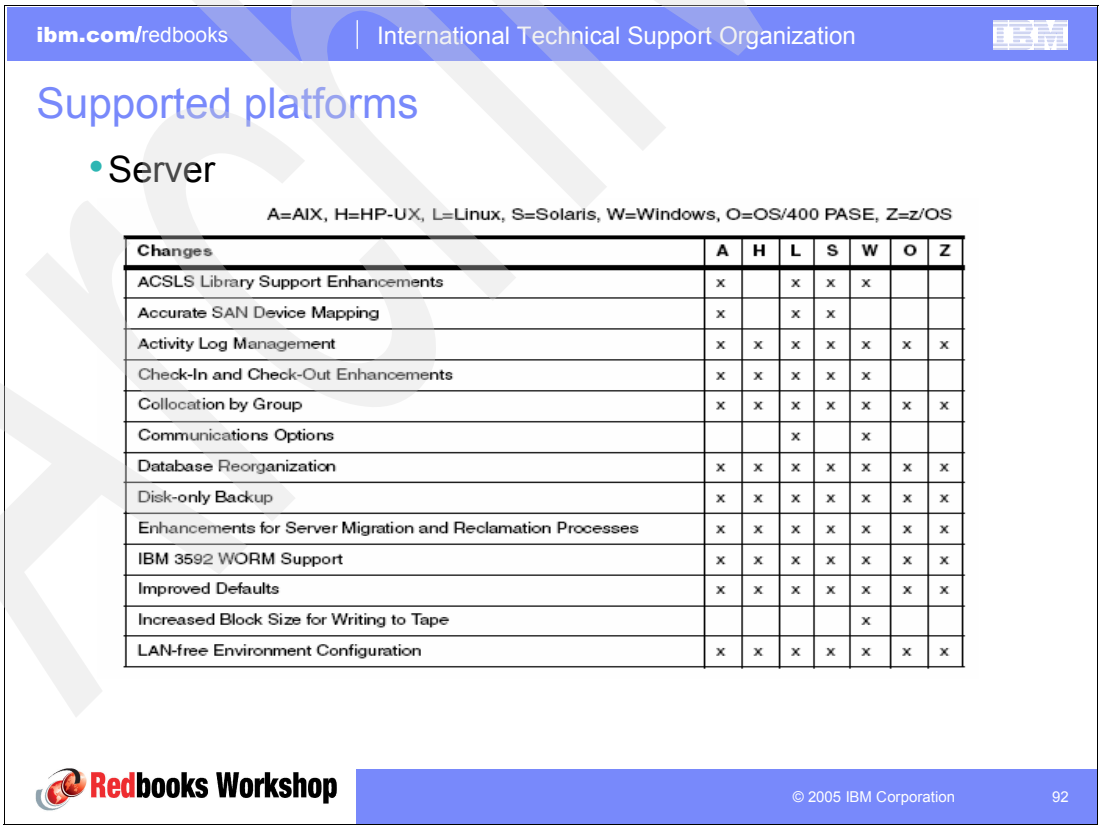



*Figure B-1 Supported platforms: Server*

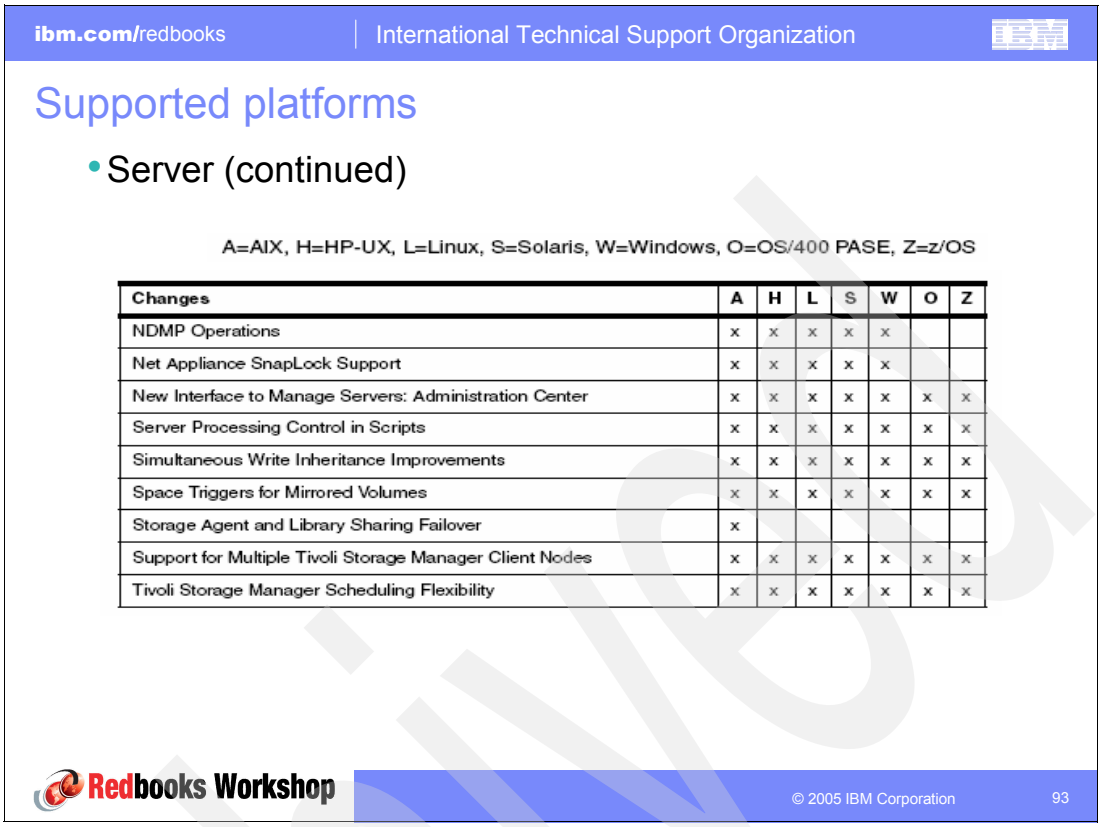



*Figure B-2 Supported platforms: Server (continued)*

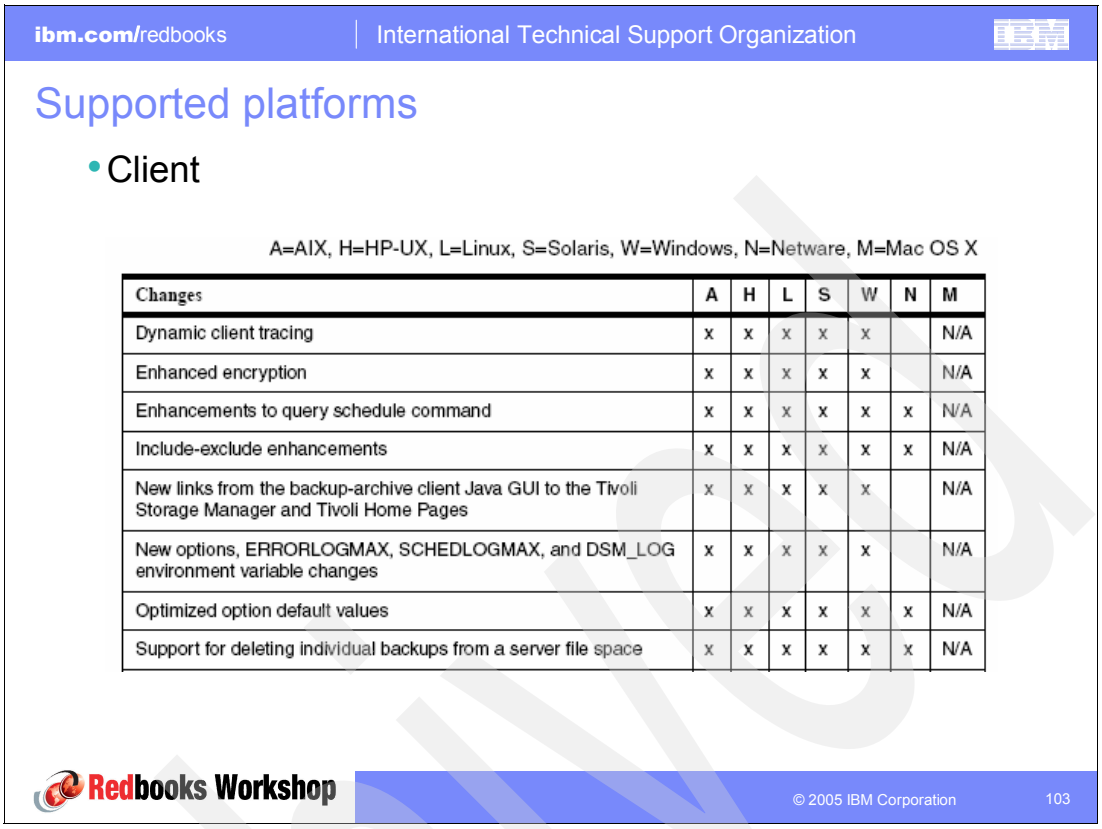



*Figure B-3 Supported platforms: Client*

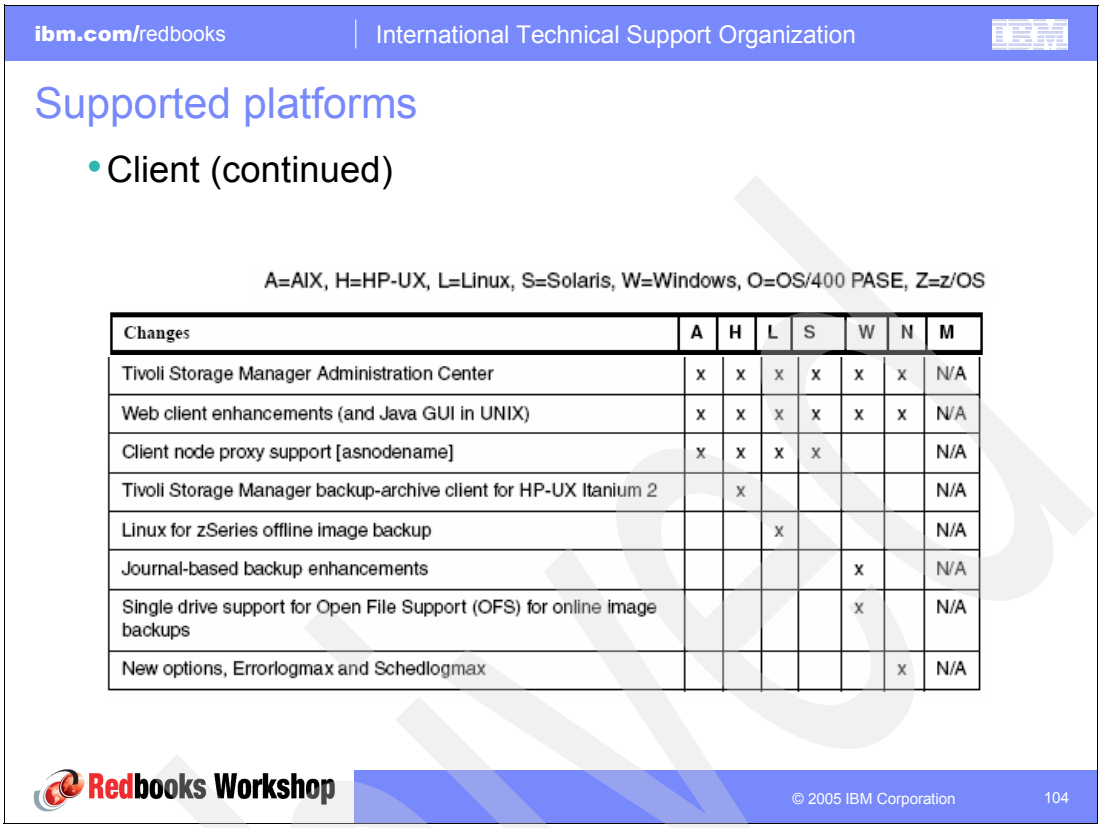



*Figure B-4 Supported platforms: Client (continued)*

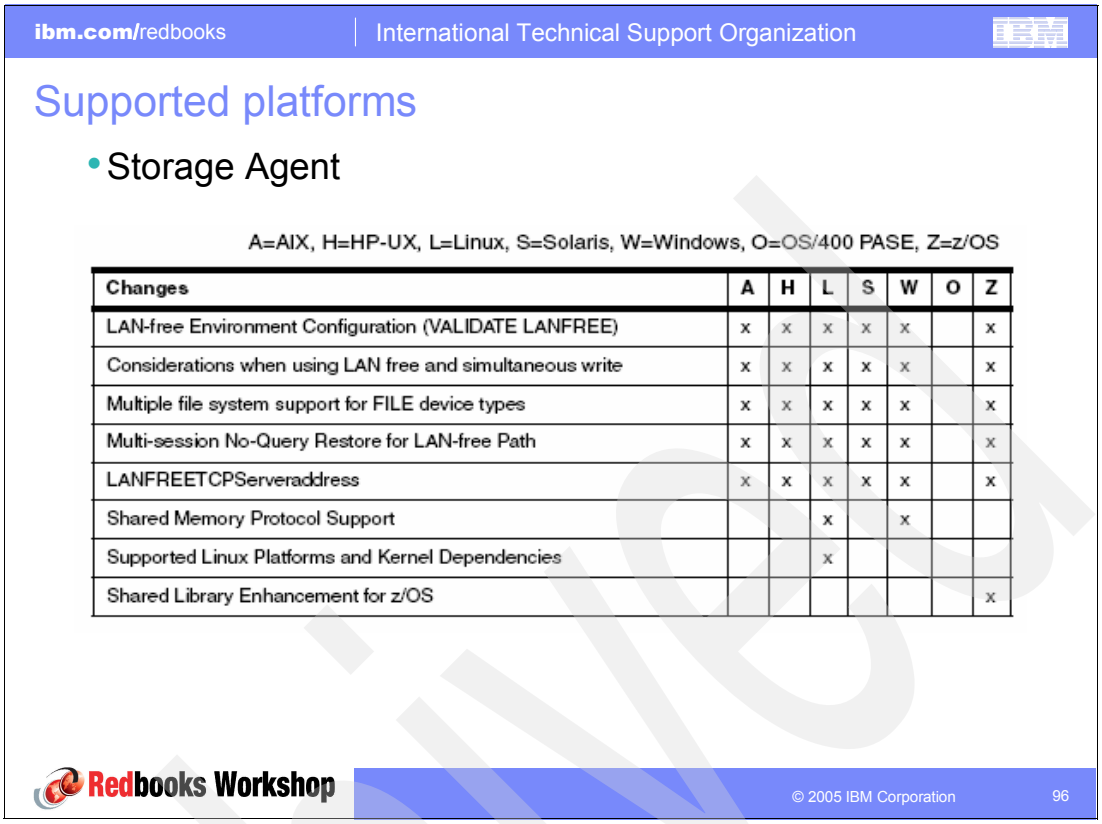



*Figure B-5 Supported platform: Storage Agent*

# Abbreviations and acronyms

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

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

| | |
|---|---|
| **RDBMS** | relational database management system |
| **RISC** | Reduced Instruction Set Computer |
| **RMC** | Resource Monitoring and Control |
| **RMSS** | Reduced-Memory System Simulator |
| **ROLTP** | Relative OnLine Transaction Processing |
| **ROS** | read-only storage |
| **RPC** | Remote Procedure Call |
| **RSM™** | Removable Storage Management |
| **RSVP** | Resource Reservation Protocol |
| **SAM** | Security Account Manager |
| **SAN** | Storage Area Network |
| **SCSI** | Small Computer System Interface |
| **SDK** | Software Developer's Kit |
| **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 |
| **VGDA** | Volume Group Descriptor Area |
| **VGID** | Volume Group Identifier |
| **VGSA** | Volume Group Status Area |
| **VIPA** | virtual IP address |
| **VP** | virtual processor |
| **VPD** | Vital Product Data |
| **VPN** | virtual private network |
| **VSM** | Virtual System Management |
| **W3C** | World Wide Web Consortium |
| **WAN** | wide area network |
| **WLM** | Workload Manager |
| **WWN** | World Wide Name |
| **WWW** | World Wide Web |

# 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.

**FAStT Storage Server** A RAID controller device that contains Fibre Channel interfaces that connect the host systems and the disk drive enclosures. The FAStT 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/tivoliglossarymst.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
- T*SM 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_AIXHPSUNWIN.html

- Tivoli Support - IBM Tivoli Storage Manager Version Release Information

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

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## S



## T



## U



## V



## W

# IBM Tivoli Storage Manager Version 5.3 Technical Workshop Presentation Guide

(0.2”spine)
0.17”<->0.473”
90<->249 pages

# IBM Tivoli Storage Manager Version 5.3

## Technical Workshop Presentation Guide

Redbooks

**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**

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.

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