ADSTAR Distributed Storage Manager

General Information

Version 2

GH35-0131-00

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Note!

Before using this information and the product it supports, be sure to read the general information under “Notices” on page v.

First Edition (July 1995)

This edition applies to Version 2 of ADSTAR Distributed Storage Manager, Program Numbers 5765-564, 5655-119, and to any subsequent releases until otherwise indicated in new editions or technical newsletters.

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Preface

This general information manual is for anyone interested in an introductory overview of the ADSTAR Distributed Storage Manager (ADSM) product. It introduces ADSM and describes the product's services and components, and the platforms on which ADSM component programs run. See "Program Product Numbers" on page 36 for a list of ADSM program numbers.

ADSTAR Distributed Storage Manager Publications

See "ADSTAR Distributed Storage Manager Information" on page 31 for a complete listing of ADSM publications available in hardcopy, softcopy, and CD-ROM formats. The bibliography includes pulblications translated to the French, German, or Japanese languages.

Software Developer's Program

The IBM Storage Systems Division (SSD) Software Developer's Program provides a range of services to software developers who want to use the ADSM application programming interface (API). Information about the SSD Software Developer's Program is available in:

- IBMSTORAGE forum on CompuServe
- SSD Software Developer's Program Information Package

To obtain the Software Developer's Program Information Package:

1. Call 800-4-IBMSSD (800-442-6773). Outside the U.S.A., call 408-256-0000.
2. Listen for the Storage Systems Division Software Developer's Program prompt.
3. Request the Software Developer's Program Information Package.

For more information about the ADSM API, see "Application Programming Interface" on page 24.

Version 2 Highlights

For Version 2, ADSM has been enhanced with the following:

- **ADSM database backup and recovery**
  Incremental backup copies of the ADSM server database can be made while the server is operational and available to clients. If the database becomes damaged, the backup copies can be used to restore the database. The database can be restored to the moment of failure or to any specific point in time. See “ADSM Database Backup and Recovery” on page 22 for more information.
- **Storage pool backup support**
  ADSM stores client data in a named set of storage volumes called storage pools. Storage pool backup support allows administrators to make a duplicate copy of all data within a storage pool. The storage pool copies can be stored in another location or on a different device type. This support enhances ADSM disaster recovery services. For example, with multiple backup copies, one copy can be stored on-site (for recovery from local media failure) while another copy can be stored off-site (for recovery from site-wide failure). See “ADSM Storage Pool Backup Copy Support” on page 22 for more information.
- **Administrative command scheduling**
  Commands can be scheduled for any client or server operation. These commands can be scheduled to take place at a specific date and time or on a continuous periodic basis. This allows ADSM administrators to automate both client and server services. See “Administrative Command Scheduling” on page 14 for more information.
- **Hierarchical storage management**
  The AIX platform offers hierarchical storage management (HSM) services that enable HSM clients to migrate files to an AIX or MVS server when local storage becomes full. This process, also referred to as space management, frees workstation or file server storage. If a user accesses a migrated file, it is automatically recalled from ADSM data storage and placed in the user’s local storage. See “Hierarchical Storage Management Client” on page 24 for more information.
- **ADSM API shipped with product**
  The ADSM application programming interface, previously available as a separately ordered component, is now shipped as part of the product. See “Application Programming Interface” on page 24 for more information.
- **ADSM utilities**
  Online ADSM utilities provide administrators with automated assistance for configuring and administrating ADSM. See “ADSM Utilities” on page 16 for more information.

Introducing ADSTAR Distributed Storage Manager

ADSTAR Distributed Storage Manager (ADSM) is a client/server program that provides storage management services in a multivendor, multiplatform computer environment.

ADSM provides data backup services and space management services with the goal of protecting data assets while reducing network computing costs. ADSM reduces computing costs by increasing administrator productivity and optimizing the utilization of storage resources. Centrally administrated, policy-driven ADSM services have been designed to reduce costly, repetitive, and error-prone tasks while providing maximum automation, security, and throughput.

Because ADSM is a client/server application, function is distributed across ADSM program components. Figure 1 shows a simplified ADSM environment.

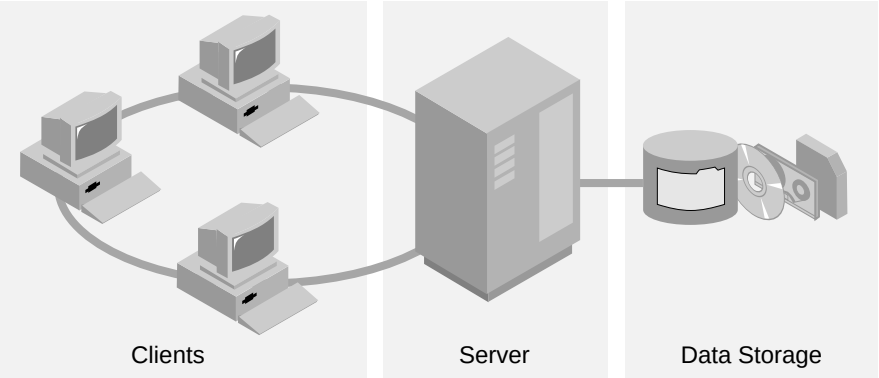


Figure 1. Overview of ADSM Components in Client/Server Configuration. Each ADSM client is a separate program running on a computer that receives ADSM services. ADSM clients interact with the ADSM server program running on a computer with sufficient capacity and resources to provide ADSM services.

ADSM for AIX provides an integral part of SystemView for AIX. Customers who choose the ADSM Option when ordering SystemView for AIX, benefit because SystemView can consolidate their storage management into a comprehensive systems management scheme.

ADSM is developed by IBM Storage Systems Division (SSD), an ISO 9000 certified organization, and is scalable from a single stand-alone computer to an entire enterprise.

The Need for Distributed Storage Management

As businesses increasingly move toward more distributed computing environments, the amount of important business and technical data residing on personal computers, workstations, and file servers increases. Managing data in this distributed environment becomes an increasingly difficult, expensive, and risky task. Therefore, ADSM provides the following storage management solutions that reduce network complexity, increase administrator productivity, minimize risk of data loss, and optimize the utilization of network resources.

The Need to Reduce Network Complexity

As computing environments grow in size and connectivity, the need to reduce the complexity of running multiple operating systems on a variety of hardware from different vendors increases. Coordination of automated processes, capacity planning, disaster recovery planning and reporting adds to the problem. ADSM reduces network complexity with interfaces and functions that span the network providing a consistent approach to implementing ADSM across different operating systems and hardware.

The Need to Increase Administrator Productivity

The growing cost of network administration far outweighs the cost of the hardware and software. ADSM can reduce the cost of network administration with enhancements that allow administrators to automate repetitive processes, schedule “lights-out” unmanned processes, and administrate ADSM from anywhere in the network.

The Need to Reduce Risk of Data Loss

The risk to sensitive business data increases as more and more data is distributed across the network. Who is now responsible for the backup and availability of data that was previously managed by a centralized group of data-processing professionals? Today, it is often the user. And while many users do not back up their data at all, others use stand-alone backup techniques with diskettes and tapes as the only protection for business data. These users can encounter the following common problems:

- Ensuring that users follow required procedures
- Finding administrator time to perform backups or write and monitor automated backup procedures
- Locating and restoring backed up files quickly when they are damaged or accidentally deleted
- Ensuring that data can be recovered in the event of a site-wide disaster, a fire, for example

Even when backups are performed on a regular basis, the success of these backup systems is often evaluated only at recovery time, often with very disappointing results. ADSM allows administrators to schedule routine backups and allows users to recover from accidental data deletion without administrator involvement.

The Need to Utilize Existing Storage Resources

ADSM utilizes existing storage resources by allowing users to move infrequently used or large files from client file systems to ADSM storage. This saves space on client file systems and often eliminates the expense of upgrading client storage hardware.

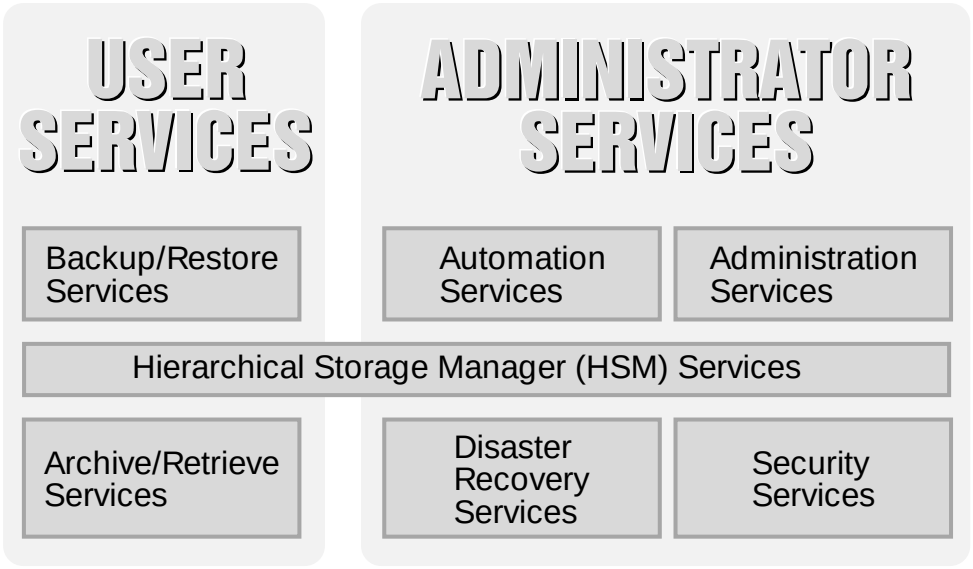
ADSM additionally provides services that ensure clients never run out of storage space. ADSM monitors client storage and moves files from client file systems to ADSM storage if an “out-of-space” condition threatens. This can also eliminate the expense of client hardware upgrades.

ADSTAR Distributed Storage Manager Services

ADSM provides services to users and to ADSM administrators.

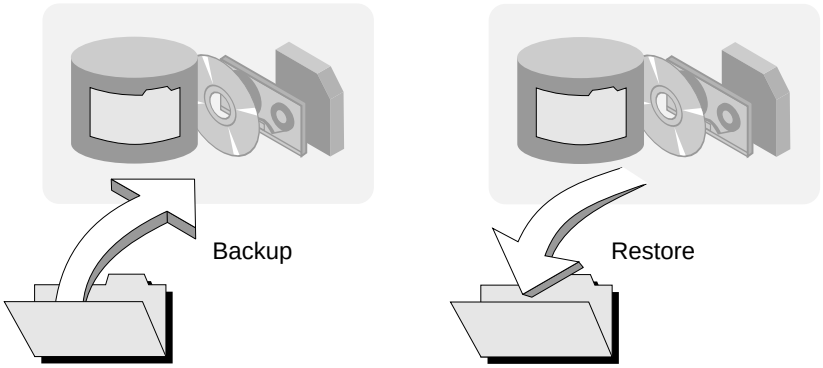
Users protect their data with ADSM backup and restore services. Users ensure their file systems never run out of space with HSM services and they ensure their legally and historically significant information is saved with ADSM archive services.

Administrators determine levels of service and they schedule automated services for clients. They ensure that system resources are effectively utilized by using HSM services. Administrators ensure recovery from site-wide disaster with ADSM disaster recovery services. And they protect data assets from unauthorized access with security services.



Backup and Restore Services

Backup and restore services provide backup-archive clients with the capability of making backup copies of data at specified intervals and restoring the data from those copies when required. These services provide protection from workstation or file server media failure, accidental file deletion, data corruption, data vandalism, and site-wide disasters.



Backup

Backup is a function that stores copies of files, subdirectories, and directories on storage media. Backups can be scheduled, and policy-driven to provide maximum backup automation. Client file systems are typically backed up at intervals so copies can quickly accumulate. ADSM provides services that automatically keep track of backup versions and deletes them when they are no longer current.

ADSM provides two types of backup:

Incremental backup
A type of ADSM backup that backs up only files that have changed since their last backup. Incremental backup reduces network usage and reduces the data storage required for backup versions. ADSM incremental backup differs from many other product incremental backups because with ADSM incremental backup, all client files are backed up only the first time ADSM backs up the entire file system. All subsequent backups are incremental because ADSM maintains a pointer in its database that points to the latest backup image of each file. Because the pointer always points to the latest version, there is no need for periodic full backups (generally performed to consolidate incremental backups into a single image).

For example, assume a client has a media failure and data must be restored from incremental backup copies. The server, using the information in the ADSM database, consolidates incremental backup copies of client files. The server uses its own resources for this consolidataion.

Selective backup
A type of ADSM backup that backs up eligible files and directories selected by the user.

The backup function provides backup-archive clients with the following:

- **Data compression**
  Files can be automatically compressed on the backup-archive client file system before backing them up. This reduces network traffic, transfer time, and storage requirements.
- **Backup service level selection**
  Typically, the data on backup-archive client file systems varies and requires different levels of backup service. ADSM provides policy objects that are defined by administrators and represent levels of backup and archive services.

  Users can specify which files should be considered for backup or archive and what level of service each file should receive.

Restore

Restore is a function that identifies backed up copies of files, subdirectories, and directories and initiates the procedures to restore them to the client file system. The restore function provides backup-archive clients with the following:

- **Flexible file restores**
  Users can restore selected files from a filtered list of backup copies or restore files to different directories than the one from which the file was backed up.
- **Cross-user authority**
  Users can give permission to other users to restore their files.
- **Cross-platform file restores**
  Files that were backed up on one platform can be restored to a different platform. For example, cross-platform restore is available on the following backup-archive clients:
  - Restore from DOS or Microsoft Windows to OS/2
  - Restore from OS/2 to DOS or Microsoft Windows (for files that adhere to the DOS file-naming rules)
  - Restore between the UNIX-based clients

Benefits of Backup and Restore Services

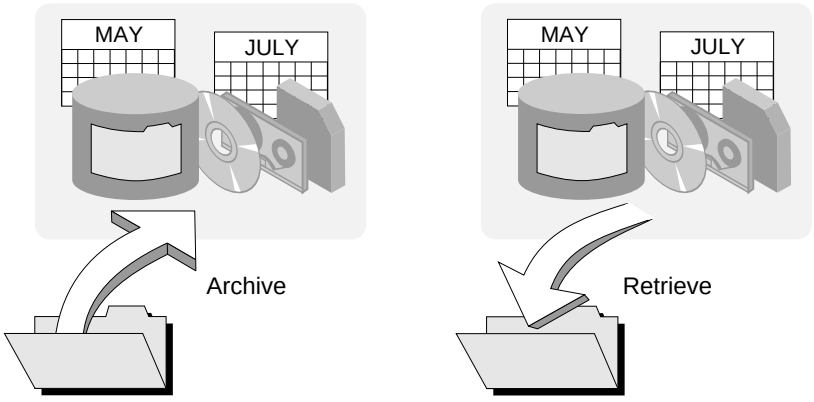
ADSM provides the following benefits to backup-archive clients:

Backup and Restore Services

- **Protection of data**
  ADSM backup and restore services can protect data assets from accidental erasure, media failure, data corruption, data vandalism, and site-wide disasters.
- **Policy-managed backup services**
  Policy-managed backup services enable ADSM administrators to provide various levels of backup services to ADSM clients. This increases administrator productivity because once the policies have been defined, ADSM consistently performs the backup service at the levels defined in the policies. Users benefit because they select the policies that match their backup requirements.
- **Automated backup services**
  Automated backup services ensure data is backed up regularly. Risk of data loss is reduced because regularly scheduled backup ensures a recoverable copy is available. Users benefit because they, too, are relieved of error-prone manual tasks, including remembering where and on what medium they have placed backup copies.
- **Highly efficient incremental backup**
  When ADSM performs the first incremental backup, ADSM backs up all eligible files. After the first backup, with ADSM, unchanged files require no additional backups. A highly efficient incremental backup technique keeps track of the most current backup copy for each of the files ADSM backs up so ADSM eliminates the need for full backups.

Archive and Retrieve Services

Archive and retrieve services provide backup-archive clients with point-in-time copies of data for long-term storage.



Archive

Archive is a function that stores copies of files, subdirectories, and directories for long-term storage. For example, some hospital records, audit records, and legal records require storage for an extended period of time. The archive function provides backup-archive clients with the following:

- **Data compression**
  Files can be automatically compressed on the backup-archive client file system before archiving them. This can reduce network traffic, transfer time, and storage requirements.
- **Convenient descriptions for archived files**
  Users can archive any file by its file name and a short description. This function is useful because archived files often contain records that are historically significant yet seldom accessed.
- **Point-in-time copies**
  Users can make point-in-time copies of important project milestones or significant historical data with ADSM archive and retrieve services.

Retrieve

Retrieve is a function that identifies archived files, subdirectories, and directories and initiates the procedures to retrieve the data to a client workstation. The retrieve function provides backup-archive clients with the following:

- **Flexible file retrieval**
  Users can retrieve archive copies from a list sorted by archive date, by file name, or by user-specified descriptive information.
- **Cross-user authority**
  Users can give permission to other users to retrieve their files.
- **Cross-platform file retrieval**
  Users can retrieve files that were archived on one platform to a different platform. For example, cross-platform retrieval is available on the following backup-archive clients:
  - Retrieve from DOS or Microsoft Windows to OS/2
  - Retrieve from OS/2 to DOS or Microsoft Windows (for files that adhere to the DOS file-naming rules)
  - Retrieve between the UNIX-based clients

Benefits of Archive and Retrieve Services

ADSM provides the following benefit to backup-archive clients:

Archive and Retrieve Services

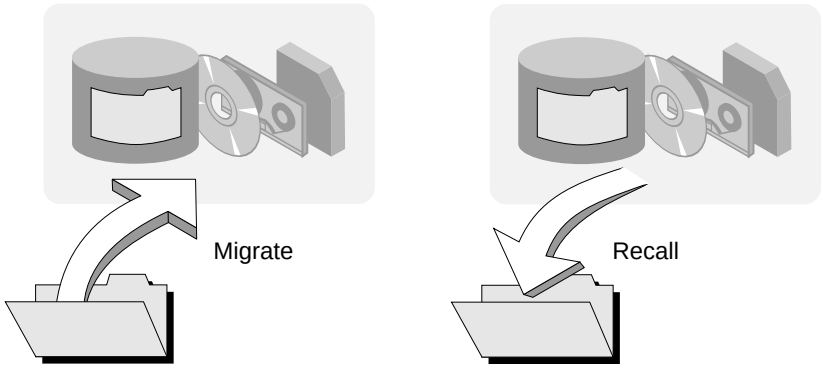
- **Policy-driven archive services**
  Policy-driven archive services enable ADSM administrators to provide various levels of archive services to ADSM clients. This increases administrator productivity because once the policies have been defined, ADSM consistently performs the archive service at the levels defined in the policies. Users benefit because they can select the policies that match their archive requirements.
- **Automated archive services**
  Automated archive services ensure data is archived regularly. Where archive copies are a matter of record, for example legal documents or accounting information, regularly scheduled archive services ensure a copy is made on an important date or time. Users benefit because they, too, are relieved of error-prone manual tasks, including remembering where and on what medium they have placed backup copies.

Hierarchical Storage Management Services

Hierarchical storage management (HSM) services, also known as space management services, utilize existing storage space for HSM-clients and for ADSM servers through migration.

Migration

Migration is a function that frees storage space on workstations and file servers by moving infrequently used or large files to ADSM server storage.



ADSM can prevent out-of-space conditions on HSM clients by migrating files from the HSM client file system to ADSM server storage. ADSM can effectively utilize ADSM storage by migrating files in ADSM server storage from one device to another. Figure 2 illustrates both aspects of space management.

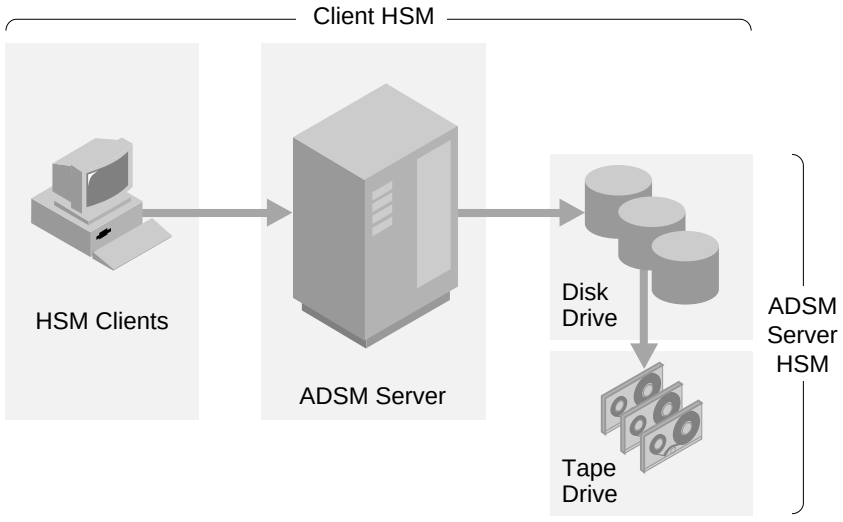


Figure 2. Overview of ADSM Space Management. HSM migrates files from the client file system to the server and then to ADSM server storage. After a file has been moved to ADSM server storage, it travels through the storage hierarchy as it ages.

ADSM client HSM
Client HSM services utilize space on HSM client file systems by moving large, seldom used, or aging files from workstations and file servers to ADSM server storage. HSM services return the files to the HSM client file system automatically if they are referenced. HSM services also ensure that HSM client file systems never experience an “out-of-space” condition. The function that moves files to ADSM server storage is called migration and the function that returns the files is called recall.

ADSM provides three types of migration for HSM clients:

Automatic migration
A type of ADSM migration that monitors HSM client storage and automatically controls the movement of files to ADSM server storage based upon administrator-defined parameters

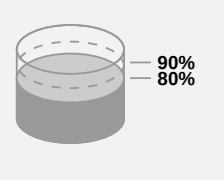
Selective migration
A type of ADSM migration that allows users to move one or more files from workstations to ADSM server storage

Demand migration
A type of ADSM migration that automatically moves files to ADSM server storage when out-of-space conditions occur in client storage

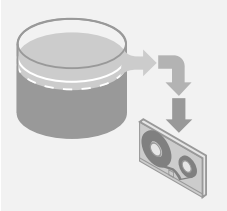
The migration function provides ADSM-HSM clients with the following:

- **Guaranteed backup copy for migrated files**
  ADSM enables administrators to set policies that migrate files only when a valid backup of the file exists in ADSM server storage. This ensures the recoverability of migrated data if the original copy is damaged.
- **Threshold-driven data movement**
  Root users can define capacity thresholds for HSM client file systems. When a threshold is reached, client files are automatically moved from client storage to ADSM server storage.

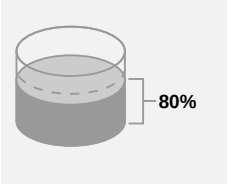
For example, consider the following scenario for setting up the thresholds for an HSM client:



1. The root user defines a high threshold of 90 percent. The root user also defines a low threshold of 80 percent.



2. As ADSM activity increases, data fills the file system. When the file system becomes 90 percent full data is automatically migrated to ADSM data storage.



3. Once ADSM begins migration, it migrates files until the HSM client file system is 80 percent full or until no more files are eligible to migrate.

ADSM server HSM
Server HSM services utilize space in the ADSM server storage hierarchy by moving aging files or very large files from relatively expensive devices (disk, for example) to less expensive devices (tape or optical, for example). This movement of data within the server storage hierarchy applies to all client data (backup, archive and HSM).

Server storage hierarchy migration
ADSM can maintain a hierarchy of devices that includes disk, optical disk, and tape devices. As data ages, it can be directed to lower cost devices in the storage hierarchy. Movement of data from one device to another is determined by the thresholds defined for the volumes in the storage hierarchy.

For example, consider the hierarchy shown in Figure 3. At the top of the hierarchy are expensive, high-speed disk devices. As data ages, it can be migrated to the less expensive sequential-access devices at the bottom of the hierarchy.

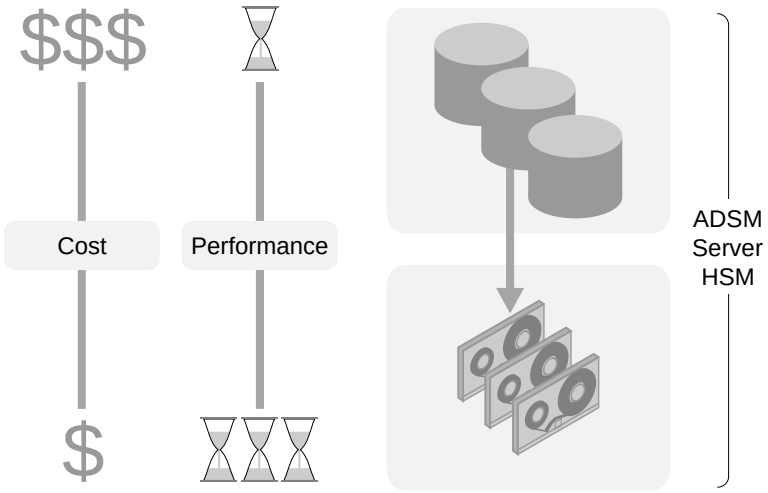


Figure 3. ADSM Server Storage Hierarchy Based upon Speed and Cost of Device. Typically, files are first backed up to a disk device and later migrated to a tape device. However, the server hierarchy can be extended to any number of levels and any supported device type.

Recall

Recall is a function that identifies migrated files and moves them from data storage to the client file system.

ADSM provides two types of recall:

Transparent recall
A type of ADSM recall that automatically moves a migrated file from ADSM storage to the HSM client file system if the file is accessed

Selective recall
A type of ADSM recall that allows a user to move one or more selected files from ADSM storage to a user's workstation

Benefits of HSM Services

ADSM provides the following benefits to space management clients:

HSM Services

- **Automatic monitoring and data movement**
  ADSM monitors client file systems to ensure that sufficient storage space is available and automatically moves files from client storage to data storage if an out-of-space condition threatens.
- **Cached migration copies for quick storage availability**
  ADSM prepares files for migration with an operation called premigration. To premigrate a file, ADSM copies the file to ADSM storage, and leaves the original file intact on the local file system. An identical copy of the file resides both on the local file system and in ADSM storage.

  The next time free space is needed on the client file system, ADSM can quickly change files to migrated files without requiring the time necessary to copy the files to ADSM storage. It simply replaces the copies of the files on the local file system with stub files.
- **Transparent access to migrated data**
  ADSM recalls data automatically and transparently when users access migrated data.
- **Read migrated files without recalling them to the client file system**
  Users of HSM services can read migrated files without recalling them. This is especially useful when large files are being used as reference information because it eliminates the need to find space for these files on HSM client file systems.
- **Run commands against files without recalling them to the client file system**
  Users of HSM services can run many operating system commands against migrated files without recalling them. Examples include chgroup, chmod, chown, del, dir, find, ls, mv, and rm.
- **Client file system space savings.**
  Users of HSM services can save space on HSM client file systems by migrating relatively large or seldom used files. This often eliminates the need for costly hardware upgrades.

Automation Services

Automation services increase administrator productivity by providing ADSM administrators with the capability to automate many day-to-day storage administration tasks.

Policy-Driven Services

Policy-driven services are those ADSM services that are automatically performed at the level specified in administrator-defined ADSM policy.

For example, an administrator has to answer the following questions as part of establishing a level of backup and restore service:

- How many backup versions of a file should be kept?
- On what kind of storage media should backup copies be stored?
- Should unchanged files with existing backup copies be backed up?
- How many days should elapse between backups?

After these questions are answered and the administrator's choices are saved as ADSM policy, ADSM consistently performs that service as defined by policy. The administrator can update the policies or create additional policies to satisfy the backup requirements of different data.

After policies have been defined, users associate their files with the policies that offer them the level of backup service their files require. Some files require daily backups, while others require only weekly or monthly backups. As backup copies age, they are automatically expired based upon information in the backup policy definition.

Central Scheduling

Central scheduling is the activity of specifying when ADSM should begin automated services and in what order those services are performed. For example, backup can be scheduled between midnight and 4 a.m. It can be scheduled periodically (every day, every other day, or every Friday evening) or scheduled only once on a specified date. Clients processing critical data can be scheduled so their data is backed up before other clients' data. The administrator can query the central scheduler for the status of scheduled services.

After a user starts the ADSM backup-archive client program in scheduling mode, no further action is required. The only requirement is that the client PC or workstation remains powered on. Users can browse a log file on the client file system to verify expected results for centrally scheduled services.

Administrative Command Scheduling

Administrative command scheduling is the activity of automating ADSM client operations and ADSM server operations. Commands can be scheduled for any client or server operations. The results of scheduled server commands are written to an activity log. Administrative command scheduling is especially useful for unattended operations.

Benefits of Automation Services

ADSM provides the following benefits to ADSM administrators:

Automation Services

- **Increased administrator productivity**
  Automation services relieve administrators of error-prone repetitive tasks and expand the time they have for other system activities.
- **Regularly performed services**
  Once in place, ADSM automation can regulate backup and recovery processing as well as many administrative tasks.
- **Consistently performed services**
  Once in place, ADSM policy can offer a user a level of ADSM service that is predictable and reliable.

Administration Services

Administration services provide ADSM administrators with support for day-to-day monitoring, administration, and accounting of ADSM.

Administrative Client Component

The administrative client enables ADSM administrators to administrate and monitor the ADSM server from another system or the same system. See “Administrative Client” on page 23 for more detail.

ADSM Utilities

Administrators can access a set of ADSM configuration and administration utilities that allow them to set client and server options, define devices, format storage volumes, add additional clients, label sequential volumes, and other administrator tasks.

Monitoring Scheduled Operations

ADSM monitors scheduled operations and maintains information about their status in the database. This information can be viewed by the administrator to determine if all scheduled operations are running as expected.

Exporting Data to or Importing Data from Another Server

An administrator can export the following types of information to removable media:

- Policy information
- Client node definitions and file data
- Administrator registrations and authority definitions
- Schedules

This data can then be imported by another server, making the export and import features a handy utility for moving server information.

Accounting Records

When an administrator specifies the accounting option, an accounting record is generated at the end of each client session. For example, an accounting record could record the date, time, and total number of files backed up in a backup session.

Tape Reclamation

Tape reclamation, shown in Figure 4, is an ADSM option that focuses on the issue of tape cartridge utilization. As backup data residing on tape ages and is logically expired, it continues to occupy physical space on the tape. Tape reclamation consolidates valid data from several source tape volumes onto one destination tape volume. The source tape volumes can then be reused.

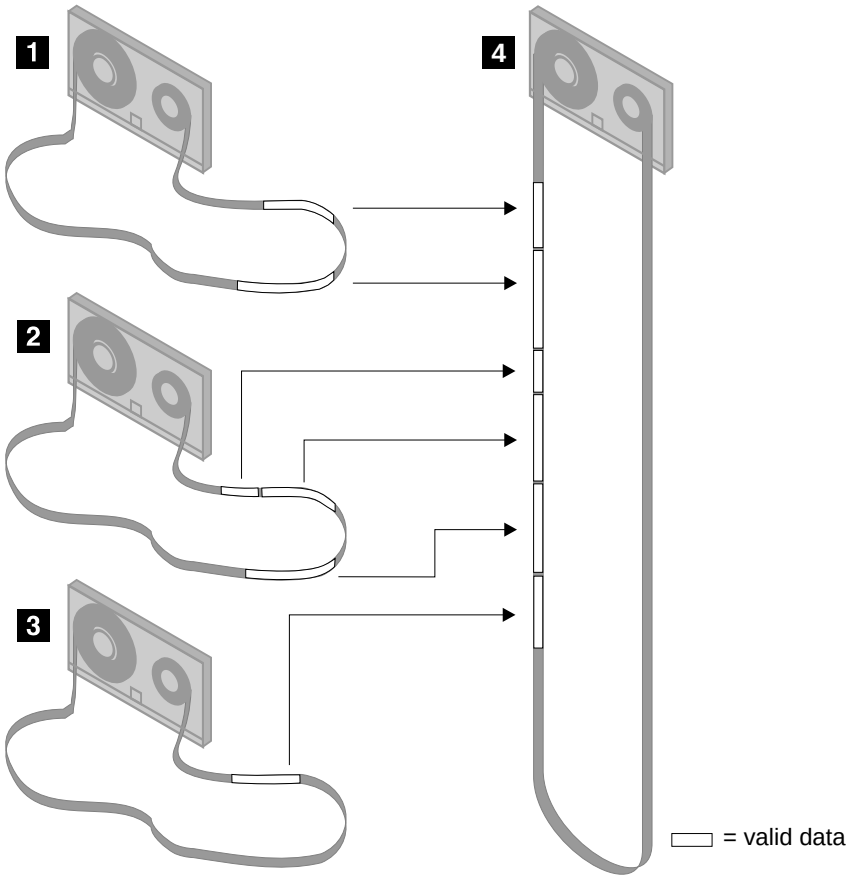


Figure 4. Tape Reclamation. Valid data from tapes 1, 2, and 3 is consolidated on tape 4.

Backup processing is optimized when incremental backup is used with the ADSM tape reclamation function. Tape reclamation consolidates valid data onto fewer tapes by merging current data from partially filled tapes to fewer tapes. Reclamation can significantly reduce the number of tape mounts if a restore is required.

Collocation

Collocation is an ADSM option that automatically collects files associated with a client file system and places them on a minimal number of storage volumes, thereby reducing restore and retrieval time for collocated data. The collocation option is useful for critical data that must be recovered quickly (for example, the order entry application for a mail-order business).

For example, Figure 5 shows how, with collocation disabled, backup files are placed on a tape in the order in which they are backed up.

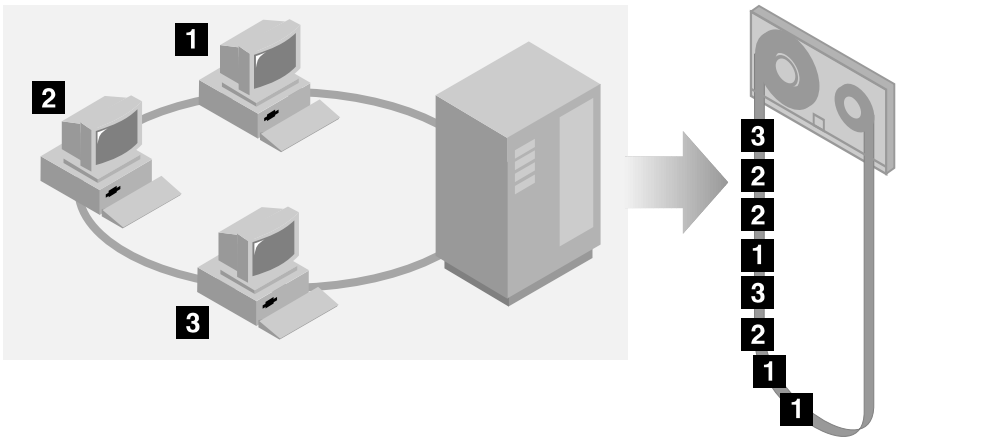


Figure 5. Normal Backup Processing. Client data is placed on tape in the order it is backed up.

Figure 6 shows a backup with the collocation option. Client files are grouped together on the server when they are copied to tape. It ensures a minimum number of tape mounts for recovery. Ideally, each client's files would be backed up to a separate tape.

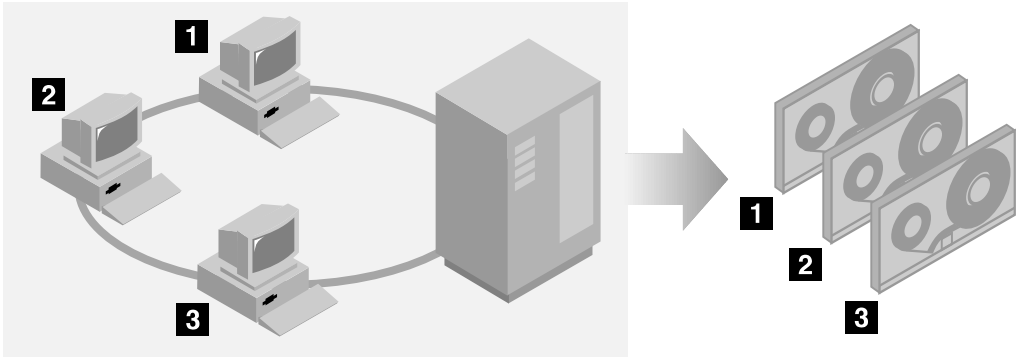


Figure 6. Backup Processing with Collocation Option. With collocation, backup data is collected for each client and placed on media as a grouping; ideally, each client's data is placed on a separate tape.

Benefits of Administration Services

ADSM provides the following benefits to ADSM administrators:

Administration Services

- **Nondisruptive ADSM management**
  Administrators can add, delete, and modify clients without interrupting network availability. They can also add, delete, and modify ADSM storage without interrupting ADSM services.
- **Broad-based administrative client support**
  Administrators can administrate ADSM remotely from almost any platform within the ADSM network. Most platforms provide the administrator with a command-line interface. Additionally, graphical user interfaces (GUIs) are available on the OS/2, AIX, HP, and SUN platforms.
- **Administrative interface that can be set up as a server console or as a tape mount console.**
  Administrators can set up the ADSM administrative client interface to perform the function of the server console or they can set up the interface as a tape mount console.

Security Services

Security services prevent unauthorized access to ADSM-managed data, storage, policy definitions, and administrative commands. These security options allow the security administrator to control the limit or extent of a person's access to these resources.

Administrator Privilege Classes

Administrator privilege classes are logical representations of ADSM authority that determine an administrator's span of control across ADSM-managed data, storage, policy definitions, and administrative commands.

Some tasks can be performed by any administrator. Other tasks require an administrator to be authorized to the appropriate privilege class. Privilege classes allow your organization to assign different levels and scopes of authority to different administrators.

Open or Closed Client Registration

Workstations and file servers on which the ADSM backup-archive client has been installed can be registered in two ways:

Open registration
Allows users to add their own nodes to the ADSM server.

Closed registration
Requires nodes be added to the ADSM server only by administrators.

Client/Server Authentication

Client/server authentication is an ADSM security option that verifies the identities of both the ADSM client and the ADSM server. This security option prompts the ADSM client for a password when the client establishes a session with the ADSM server. The password is used to generate a set of encrypted keys that is used to authenticate both the client and the server. The client/server verification does *not* send the password across the network so it cannot be intercepted.

Benefits of Security Services

ADSM provides the following benefits to security administrators:

Security Services

- **Scalable authority levels for administrators**
  Different levels and scopes of administrator authority can be specified by allowing any combination of distributed or centralized administration of ADSM.
- **Scalable system control**
  ADSM can be scaled so that it is almost completely open to all end users, where they all have significant authority, or it can be completely controlled, where automation and administrative organization is implemented through policy definitions and security options.
- **File sharing**
  Users can give permission to other users to access backed up or archived files. By default, ADSM protects files by ensuring that only the file owner can access them. ADSM allows the file owner to grant access privilege to other users on a file-by-file basis.
- **Two-way authentication**
  ADSM requires both the client and the server to identify themselves to each other before establishing a session. This prevents non-authorized programs from masquerading as ADSM clients and servers.

Disaster Recovery Services

Disaster recovery services assist the recovery administrator with the implementation of a comprehensive backup and recovery procedure for important business applications, data, and records.

The ADSM database contains information about client data and where in ADSM storage that data resides. Database availability is improved with mirroring; however, in the event of site-wide disaster, mirrored copies could also be damaged or unavailable.

ADSM Database Backup and Recovery

Administrators can protect the ADSM database by initially performing a full backup followed by periodic incremental backups of new or changed database files. The backup is nondisruptive to ADSM processing and it backs up the database in a consistent state. ADSM can recover the database to a point-in-time or it can add transactions from the recovery log to recover the database to the latest state. Database backup copies can be stored off-site for disaster recovery.

ADSM Storage Pool Backup Copy Support

Administrators can extend ADSM protection of client data by creating additional copies of ADSM storage pools. A storage pool is a named set of storage volumes that is used as the destination for client backup files. Storage pool backup copies can be stored off-site for disaster recovery purposes. With ADSM storage pool backup copy support, ADSM backs up changed files incrementally, keeps track of backup copy versions, and expires the copies when they are no longer current. Storage pool backup, when used with database backup and recovery, offers a comprehensive approach to implementing a disaster recovery plan that can include off-site storage of ADSM data.

Benefits of Disaster Recovery Services

ADSM provides the following benefits to disaster recovery planners:

Disaster Recovery Services

- **Automated backup for distributed data**
  ADSM can protect data residing on distributed workstations and file servers by backing it up regularly and automatically as determined by schedule and policy. This data is sent to an ADSM server for protection and can also be copied from the server for off-site storage.
- **Comprehensive backup and recovery strategy for ADSM**
  ADSM provides disaster recovery by enabling administrators to schedule database backups and storage pool backups in addition to normal backups. These backups can be stored off-site.
- **Non-interruptive incremental database backup**
  The ADSM database and storage pools are backed up without interruption to ADSM users. The backup is incremental, which saves time and storage resources.

ADSTAR Distributed Storage Manager Components

As a client/server application, ADSM distributes its function across its clients and the ADSM server. This section discusses the ADSM server program component and the four client program components that together make ADSM. The components of ADSM are illustrated in Figure 8 on page 25.

Server

The server program provides administrative services and server resources to ADSM clients. The server is at the center of ADSM activity. It uses the ADSM database, transaction recovery log, and ADSM data storage to ensure data availability. The ADSM server coordinates backup and migration of client data to disk, optical disk, or tape.

The server console provides a command-line interface, but it is often more convenient to access the server from the ADSM administrative client. The ADSM server is intended to be controlled by the administrative client. The administrative client provides a command-line interface on all platforms in addition to a graphical user interface on many platforms. The administrative client can access the server from anywhere in the network. See "ADSTAR Distributed Storage Manager Platforms" on page 27 for more information about server platforms and administrative client interfaces.

Administrative Client

The administrative client program provides an ADSM administrator with an interface for controlling the ADSM server, its database, and the ADSM transaction recovery log. It also provides the capability to manage the server from anywhere within the ADSM network.

ADSM administrators can use the administrative client program to:

- Define the extent or limit of administrators' ADSM authority
- Register and administrate backup-archive client nodes
- Define and administrate storage management policy
- Centrally schedule services for clients
- Control and monitor ADSM server activity
- Control and administrate ADSM data storage

The administrative client is available with a command-line interface on most platforms, with a GUI interface on many platforms, and with both on some platforms. See "ADSTAR Distributed Storage Manager Platforms" on page 27 for more detail.

Backup-Archive Client

The backup-archive client program provides backup and restore services in addition to archive and retrieve services to ADSM clients. The component runs on each PC, workstation, file server, or LAN server that requires ADSM backup and archive services.

Backup-archive clients provide both a command-line interface and a graphical user interface.

Hierarchical Storage Management Client

The hierarchical storage management (HSM) client program provides HSM services to ADSM-HSM clients. HSM services ensure that users never run out of storage space on client file systems. This service includes the automatic movement of less frequently used files to the server to maintain sufficient levels of storage in the client file systems. The component can be installed on workstations or file servers.

ADSM-HSM clients provide both a command-line interface and a graphical user interface.

Application Programming Interface

The application programming interface (API) program provides backup and archive services to applications running on API client platforms; it allows programmers to enhance new and existing applications by enabling them to store, query, and retrieve data from the ADSM server. Figure 7 illustrates an application that is able to communicate with the ADSM server through the ADSM API.

The ADSM API allows application programmers to define the objects that will be stored in ADSM-managed storage. An *object* is a collection of data that is defined by an application and managed by the server. For example, an object can be a file, a directory, a database table, or an image, depending on the needs of the application.

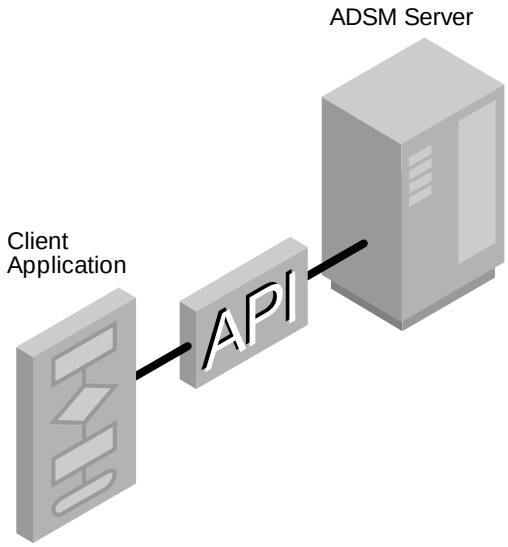


Figure 7. The ADSM Application Programming Interface. This ADSM component allows client applications to communicate directly with the ADSM server for ADSM services.

For example, an application programmer at a bank can write a program that periodically invokes API procedures to automatically store scanned images of customers' monthly checks. These images could then be bundled into a single object representing the customers' monthly checks. Using the API, the application can retrieve any or all of the check images.

Component Summary

Figure 8 summarizes the program components of ADSM. The four ADSM clients are shown in the left column (the API is a kind of backup-archive client). The server, and its database and transaction recovery log are shown in the center column. The devices, data, and storage managed by ADSM are represented in the right column. Clients interact with storage only through the server. The server is the center of ADSM activity.

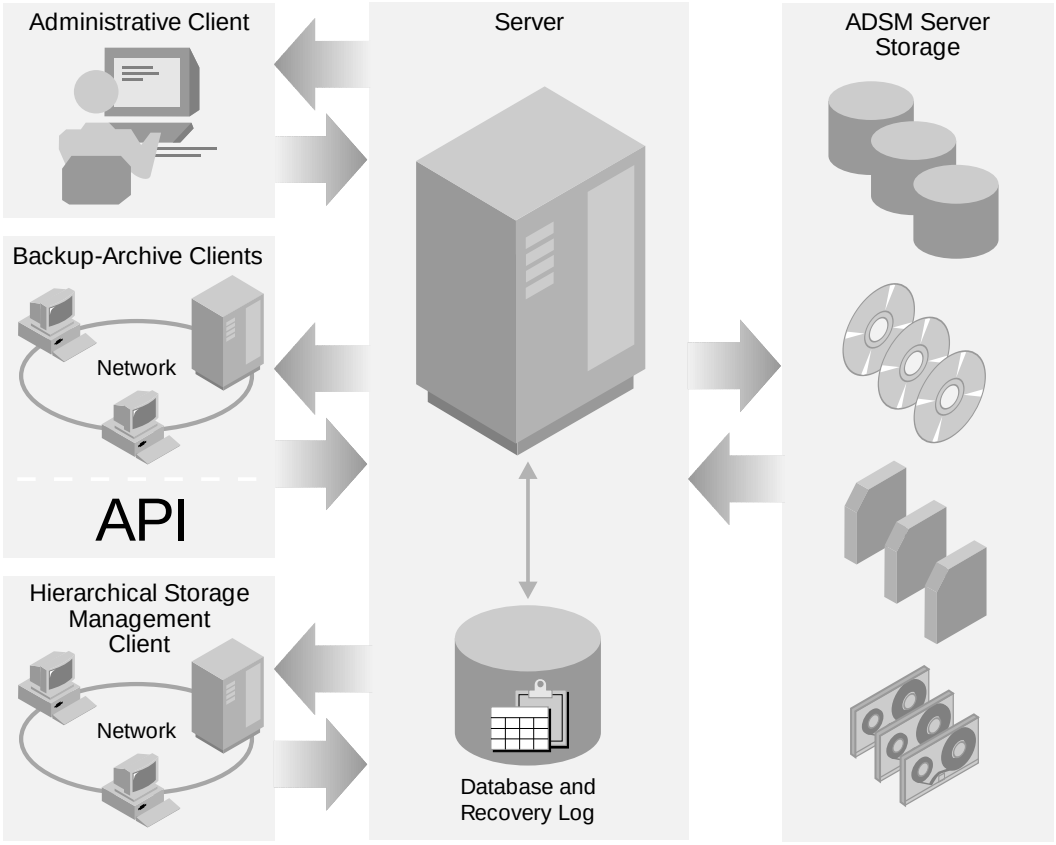


Figure 8. Overview of ADSM Components and Data Storage

External Database Support

ADSM provides backup services for external databases that can be implemented to back up the databases either while they are offline (stopped) or online (operational).

Offline database backup
ADSM provides backup support for any database or application that stores its data in files. The offline backup usually requires stopping the database.

Online database backup
ADSM provides online backup support to databases that support the ADSM application programming interface (API). Databases that support the ADSM API are being added continuously and include the following:

- DB2/6000
- DB2/2
- SQL-BackTrack for Sybase
- Lotus Notes

ADSTAR Distributed Storage Manager Platforms

The following table describes the ADSM-supported platforms and the ADSM components available on each platform.

Platform	Server	Admin-istrative Client	Backup Archive Client	Space Management Server	Space Management Client	API
Apple Macintosh Operating System			GUI			
AT&T UNIX		CL	CL, GUI			√
DEC Ultrix for DECstation		CL	CL, GUI			
Disk Operating System (DOS)		CL	CL, DOS			
Hewlett Packard HP-UX	√	CL, GUI	CL, GUI			√
IBM AIX/6000	√	CL, GUI	CL, GUI	√	√	√
IBM MVS	√	CL		√		
IBM Operating System/2 (OS/2)	√	CL, GUI	CL, GUI			√
IBM OS/2 double-byte character set (DBCS)	√					
IBM OS/400	√					
IBM VM	√	CL				
IBM VSE	√					
Microsoft Windows		CL	GUI			√
Microsoft Windows NT		CL	CL, GUI			
Novell NetWare			CL			√
SCO UNIX 386/SCO Open Desktop		CL	CL, GUI			
Siemens SINIX-Z		CL	CL, GUI			√
Sun Microsystems SunOS/Solaris	√	CL, GUI	CL, GUI			√
Lotus Notes			CL, GUI			√

Legend:

- CL = Command Line interface
- GUI = Graphical User Interface

ADSM Scenarios

The following scenarios demonstrate how ADSM can benefit your enterprise:

When There Are Several Workstation Types to Administer

A system programmer at company XYZ is responsible for ensuring that the data stored on hundreds of workstations is safeguarded from loss. The engineering department works on UNIX workstations, the accounting department works on PCs running Microsoft Windows, and the LAN servers are running Novell NetWare. Most workstations are LAN-attached with access to commonly used applications and critical data stored on the file servers.

With ADSM, a single administrator can centrally schedule backup processing for all XYZ users. From his workstation, the administrator can use the ADSM administrative client to schedule weekly backups for most workstations, and daily backups for file servers and workstations with requirements for frequent backup. If a computer fails, or if data is accidentally deleted, a recent backup version can be recovered and normal business processing can continue.

When Files Are Accidentally Erased

A writer at company ABC works on a series of files at home. The writer brings the files back to work the next morning and copies them into a directory on the workstation's fixed disk. Later that morning, the writer realizes that some of the file names created last night were identical to existing file names. The writer has overwritten the original work.

To recover, the writer needs backup copies of the overwritten files. In the past, the writer was responsible for backups; however, the writer rarely backed up work.

Luckily, company ABC has installed ADSM and has initiated a policy of automatically backing up all new and changed workstation files each evening. With ADSM, the writer can create a list of backed up files and selectively restore the necessary files to last night's level.

When Fallback to Previous Work Is Necessary

A programmer at company HIJ wrote a series of routines two weeks ago, but decided that the structure was incorrect, erased them, and reworked the design. Today, the programmer realizes that the original design was correct and needs to make only a few minor changes to the original code. Unfortunately, the programmer has erased all of the original code.

Without ADSM, the programmer requires backup hardware and media and must remember to back up all of the work. Additionally, the programmer needs to remember where the backup copies are stored and the file naming conventions.

Failure to back up files, loss or accidental erasure of diskettes, or hardware and media failure can cause the programmer to spend valuable development time reconstructing code from notes and memory.

Because the programmer's team uses ADSM for AIX on their file server, the programmer's files were backed up before the programmer erased them. To recover them, the programmer enters the appropriate commands to restore the files from two weeks ago and continues coding.

When Maximizing Workstation Storage Eliminates a Costly Hardware Upgrade

The need for increased fixed disk space grows continuously. Often, it is caused by users who want to keep many files at their fingertips—files that are rarely used, but are nevertheless valuable.

ADSM hierarchical storage management (HSM) services provide HSM clients with the ability to optionally move seldom-used files on their workstations or file servers to ADSM server storage. ADSM-HSM services, also referred to as space management services, allow users to free up valuable space on their workstations. Users can then easily and quickly recall the files when needed. Users of HSM services can make more effective use of their time and workstation storage.

When Maximizing Disk Storage Eliminates a Costly Hardware Upgrade

As more clients are registered with ADSM, the demand for more server storage increases. This process creates the need for expensive purchases of additional disk hardware. ADSM space management services offer another solution; more effective use of existing disk storage by compressing and moving seldom used files to data storage.

When Using the Application Programming Interface in a Client Application

Company DEF markets a popular database program that many of their customers use on a daily or weekly basis. The program creates and uses objects with nonstandard formats, such as database records. After each session with the database, a user must back up the database's tables and other data objects to an ADSM server. This requirement helps prevent the loss of critical information in the event of a workstation failure. However, the user must remember to perform this action each time the database is used.

DEF decides to enhance their product by giving the database program itself the ability to automatically back up the program's objects. The company uses the ADSM API function calls to enable the program to back up its own data objects to the ADSM server when a user ends a session with the database.

After the next release of the database program, DEF customers appreciate the security of knowing that their database records are automatically backed up after being used.

ADSTAR Distributed Storage Manager Information

This bibliography lists information sources for Version 2 and Version 1 of ADSM.

Hardcopy Publications

The information in this section lists the ADSM hardcopy publications.

Server Publications

The following table lists ADSM hardcopy server publications.

Short Title	Publication Title	Version 2 Order Number	Version 1 Order Number
Server Publications (All Platforms)			
ADSM General Information	ADSTAR Distributed Storage Manager General Information	GH35-0131	GH35-0114
ADSM Device Configuration	ADSTAR Distributed Storage Manager: Device Configuration	SH35-0137	SH26-4044
ADSM Messages	ADSTAR Distributed Storage Manager: Messages	SH35-0133	
ADSM Administration Messages	ADSTAR Distributed Storage Manager: Administration Messages		SH35-0129
AIX Server Publications			
ADSM Licensed Program Specifications	ADSTAR Distributed Storage Manager for AIX: Licensed Program Specifications	GH35-0132	
ADSM/6000 License Information	ADSTAR Distributed Storage Manager/6000: Licensed Program Specifications		GH26-4011
ADSM Administrator's Guide	ADSTAR Distributed Storage Manager for AIX: Administrator's Guide	SH35-0134	—
ADSM Administrator's Guide	ADSTAR Distributed Storage Manager/6000: Administrator's Guide	—	SH26-4005
ADSM Administrator's Reference	ADSTAR Distributed Storage Manager for AIX: Administrator's Reference	SH35-0135	
ADSM Administrator's Reference	ADSTAR Distributed Storage Manager/6000: Administrator's Reference		SH26-4006
ADSM Installing the Server and Administrative Client	ADSTAR Distributed Storage Manager for AIX: Installing the Server and Administrative Client	SH35-0136	
ADSM Installing the Server and Administrative Client	ADSTAR Distributed Storage Manager/6000: Installing the Server and Administrative Client		SH26-4013
AS/400 Server Publications			
ADSM Licensed Program Specifications	ADSTAR Distributed Storage Manager/400: Licensed Program Specifications		GH26-4015
ADSM Administrator's Guide	ADSTAR Distributed Storage Manager/400: Administrator's Guide		SH26-4008
ADSM Administrator's Reference	ADSTAR Distributed Storage Manager/400: Administrator's Reference		SH26-4009
ADSM Administrator's Reference Summary	ADSTAR Distributed Storage Manager/400: Administrator's Reference Summary		SX26-6004
ADSM Installing the Server and Administrative Client	ADSTAR Distributed Storage Manager/400: Installing the Server and Administrative Client		SH26-4016
HP-UX Server Publcations			

Short Title	Publication Title	Version 2 Order Number	Version 1 Order Number
ADSM Licensed Program Specifications	ADSTAR Distributed Storage Manager for HP-UX: Licensed Program Specifications		GH26-4017
ADSM Administrator's Guide	ADSTAR Distributed Storage Manager for HP-UX: Administrator's Guide		SH26-4018
ADSM Administrator's Reference	ADSTAR Distributed Storage Manager for HP-UX: Administrator's Reference		SH26-4019
ADSM Installing the Server and Administrative Client	ADSTAR Distributed Storage Manager for HP-UX: Installing the Server and Administrative Client		SH26-4020
MVS Server Publications			
ADSM Licensed Program Specifications	ADSTAR Distributed Storage Manager for MVS: Licensed Program Specifications	GH26-4038	
ADSM Installing the Server and Administrative Client	ADSTAR Distributed Storage Manager for MVS: Installing the Server and Administrative Client	SH26-4043	
ADSM Administrator's Guide	ADSTAR Distributed Storage Manager for MVS: Administrator's Guide	SH26-4039	
ADSM Administrator's Reference	ADSTAR Distributed Storage Manager for MVS: Administrator's Reference	SH26-4040	
MVS and VM Server Publications			
ADSM Licensed Program Specifications	ADSTAR Distributed Storage Manager: Licensed Program Specifications for MVS and VM		GH35-0115
ADSM Administrator's Guide	ADSTAR Distributed Storage Manager: Administrator's Guide for MVS and VM		SH35-0117
ADSM Administrator's Reference	ADSTAR Distributed Storage Manager: Administrator's Reference for MVS and VM		SH35-0130
OS/2 Server Publications			
ADSM Licensed Program Specifications	ADSTAR Distributed Storage Manager/2: Licensed Program Specifications		GH26-4012
ADSM Administrator's Guide	ADSTAR Distributed Storage Manager/2: Administrator's Guide		SH26-4003
ADSM Administrator's Reference	ADSTAR Distributed Storage Manager/2: Administrator's Reference		SH26-4004
ADSM Installing the Server and Administrative Client	ADSTAR Distributed Storage Manager/2: Installing the Server and Administrative Client		SH26-4014
Sun Solaris Server Publications			
ADSM Licensed Program Specifications	ADSTAR Distributed Storage Manager for Sun Solaris: Licensed Program Specifications		GH26-4021
ADSM Administrator's Guide	ADSTAR Distributed Storage Manager for Sun Solaris: Administrator's Guide		SH26-4022
ADSM Administrator's Reference	ADSTAR Distributed Storage Manager for Sun Solaris: Administrator's Reference		SH26-4023
ADSM Installing the Server and Administrative Client	ADSTAR Distributed Storage Manager for Sun Solaris: Installing the Server and Administrative Client		SH26-4024
VSE/ESA Server Publications			
ADSM Licensed Program Specifications	ADSTAR Distributed Storage Manager for VSE/ESA: Licensed Program Specifications		GH26-4026
ADSM Administrator's Guide	ADSTAR Distributed Storage Manager for VSE/ESA: Administrator's Guide		SH26-4027
ADSM Administrator's Reference	ADSTAR Distributed Storage Manager for VSE/ESA: Administrator's Reference		SH26-4028

Short Title	Publication Title	Version 2 Order Number	Version 1 Order Number
ADSM Installing the Server and Administrative Client	ADSTAR Distributed Storage Manager for VSE/ESA: Installing the Server and Administrative Client		SH26-4029

Client Publications

The following table lists ADSM hardcopy client publications.

Short Title	Publication Title	Version 2 Order Number	Version 1 Order Number
Client Publications			
ADSM Installing the Clients	ADSTAR Distributed Storage Manager: Installing the Clients	SH26-4049	
ADSM Client Reference Cards	ADSTAR Distributed Storage Manager: Client Reference Cards	SX26-6013	
ADSM Using the Application Programming Interface	ADSTAR Distributed Storage Manager: Using the Application Programming Interface	SH26-4002	
ADSM Using the UNIX HSM Clients	ADSTAR Distributed Storage Manager: Using the UNIX Hierarchical Storage Management Clients	SH26-4030	
Trace Facility Guide	Trace Facility Guide	SH26-4057	
Apple Client Publications			
ADSM V2 Using the Apple Macintosh Backup-Archive Client	ADSTAR Distributed Storage Manager Version 2: Using the Apple Macintosh Backup-Archive Client	SH26-4051	
ADSM User's Guide and Reference	ADSTAR Distributed Storage Manager: User's Guide and Reference for Apple Macintosh		SH35-0119
UNIX Client Publications			
ADSM Using the UNIX Backup-Archive Clients	ADSTAR Distributed Storage Manager Version 2: Using the UNIX Backup-Archive Clients	SH26-4052	
ADSM User's Guide and Reference	ADSTAR Distributed Storage Manager: User's Guide and Reference for UNIX		SH35-0120
OS/2 Client Publications			
ADSM V2 Using the OS/2 Backup-Archive Client	ADSTAR Distributed Storage Manager Version 2: Using the OS/2 Backup-Archive Client	SH26-4053	
ADSM User's Guide and Reference	ADSTAR Distributed Storage Manager: User's Guide and Reference for OS/2		SH35-0122
DOS Client Publications			
ADSM V2 Using the DOS Backup-Archive Client	ADSTAR Distributed Storage Manager Version 2: Using the DOS Backup-Archive Client	SH26-4054	
ADSM User's Guide and Reference	ADSTAR Distributed Storage Manager: User's Guide and Reference for DOS		SH35-0123
Novell Client Publications			
ADSM V2 Using the Novell NetWare Backup-Archive Client	ADSTAR Distributed Storage Manager Version 2: Using the Novell NetWare Backup-Archive Client	SH26-4055	
ADSM User's Guide and Reference	ADSTAR Distributed Storage Manager: User's Guide and Reference for Novell NetWare		SH35-0124

Short Title	Publication Title	Version 2 Order Number	Version 1 Order Number
Windows Client Publications			
ADSM V2 Using the Microsoft Windows Backup-Archive Clients	ADSTAR Distributed Storage Manager Version 2: Using the Microsoft Windows Backup-Archive Clients	SH26-4056	
ADSM User's Guide and Reference	ADSTAR Distributed Storage Manager: User's Guide and Reference for Microsoft Windows		SH35-0125
Lotus Notes Client Publications			
ADSM Using the Lotus Notes Backup Agent	ADSTAR Distributed Storage Manager: Using the Lotus Notes Backup Agent	SH26-4047	

Softcopy Publications

The following CD-ROMs contain ADSM softcopy publications:

Title	Version 2 Order Number	Version 1 Order Number
ADSTAR Distributed Storage Manager Online Product Library	SK2T-1878	SK2T-8714
IBM Online Library Omnibus Edition: AIX Collection	SK2T-2066	SK2T-2066
IBM SystemView for AIX	SK2T-1451	SK2T-1451
AS/400 Base Collection Kit (V3R1 only)		SK2T-2171
AS/400 Base Collection Kit (V3R6 only)		SK2T-2839
IBM Online Library Omnibus Edition: MVS Collection	SK2T-0710	SK2T-0710
IBM Online Library Omnibus Edition: OS/2 Collection		SK2T-2176
IBM Online Library Omnibus Edition: VM Collection	SK2T-2067	
IBM Online Library Omnibus Edition: VSE Collection Kit		SK2T-0060

Translated Publications

The ADSM publications are shipped with the product in the American English language.

The following table lists ADSM publications that have been translated into languages other than American English. Use your local ordering process to order these publications. Contact your IBM representative for the most current list of translated ADSM publications.

Server Publications

The following ADSM server publications are translated into the French, German, and Japanese languages.

Title	US Order Number	Translation Order Number
ADSM General Information	GH35-0114	France-GH11-0971 Japan-GH88-5500
ADSM: Administration Messages	SH35-0129	Japan-SH88-6021

Title	US Order Number	Translation Order Number
AIX/6000 Server Publications		
ADSM/6000: Licensed Program Specifications	GH26-4011	Japan-GH88-6066
ADSM/6000: Administrator's Guide	SH26-4005	Japan-SH88-6062
ADSM/6000: Administrator's Reference	SH26-4006	Japan-SH88-6063
ADSM/6000: Installing the Server and Administrative Client	SH26-4013	Japan-SH88-6068
AS/400 Server Publications		
ADSM/400: Licensed Program Specifications	GH26-4015	Japan-GH88-6070
ADSM/400: Administrator's Guide	SH26-4008	Japan-SH88-6064
ADSM/400: Administrator's Reference	SH26-4009	Japan-SH88-6065
ADSM/400: Administrator's Reference Summary	SX26-6004	Japan-SX88-6040
ADSM/400: Installing the Server and Administrative Client	SH26-4016	Japan-SH88-6071
HP-UX Server Publications		
ADSM: HP UX Licensed Program Specifications	GH26-4017	Japan-GH88-6072
ADSM: HP UX Administrator's Guide	SH26-4018	Japan-SH88-6073
ADSM: HP UX Administrator's Reference	SH26-4019	Japan-SH88-6074
ADSM: HP UX Installing the Server and Administrative Client	SH26-4020	Japan-SH88-6075
MVS and VM Server Publications		
ADSM: Licensed Program Specifications for MVS and VM	GH35-0115	Japan-GH88-6019
ADSM: Administrator's Guide for MVS and VM	SH35-0117	Japan-SH88-6020
ADSM: Administrator's Reference for MVS and VM	SH35-0130	Japan-SH88-6029
OS/2 Server Publications		
ADSM/2: Licensed Program Specifications	GH26-4012	Japan-GH88-6067
ADSM/2: Administrator's Guide	SH26-4003	Japan-SH88-6060
ADSM/2: Administrator's Reference	SH26-4004	France-SH11-0970 Japan-SH88-6061
ADSM/2: Installing the Server and Administrative Client	SH26-4014	Japan-SH88-6069
Sun Server Publications		
ADSM: Sun Licensed Program Specifications	GH26-4021	Japan-GH88-6076
ADSM: SUN Administrator's Guide	SH26-4022	Japan-SH88-6077
ADSM: SUN Administrator's Reference	SH26-4023	Japan-SH88-6078
ADSM: SUN Installing the Server and Administrative Client	SH26-4024	Japan-SH88-6079

Client Publications

The following ADSM client publications are translated into the French, German, and Japanese languages.

Title	US Order Number	Translation Order Number
ADSM: User's Guide and Reference for Apple Macintosh	SH35-0119	Japan-SH88-6022
ADSM: User's Guide and Reference for UNIX	SH35-0120	Germany-SH12-2274 Japan-SH88-6023
ADSM: User's Guide and Reference for OS/2	SH35-0122	France-SH11-0994 Germany-SH12-2273 Japan-SH88-6024
ADSM: User's Guide and Reference for DOS	SH35-0123	France-SH11-0995 Japan-SH88-6025

Title	US Order Number	Translation Order Number
ADSM: User's Guide and Reference for Novell NetWare	SH35-0124	Japan-SH88-6026
ADSM: User's Guide and Reference for Microsoft Windows	SH35-0125	France-SH11-0996 Germany-SH12-2275 Japan-SH88-6027

Program Product Numbers

The following table lists the ADSM program product numbers.

Program Product	Version 2 Program Number	Version 1 Program Number
AIX	5765-564	5765-203 5697-078
AS/400		5763-SV1 5733-197 5716-SV1
HP-UX		14H0260
VM		5648-020
MVS	5655-119	5648-020
OS/2		5622-112 89G1342
Sun Solaris		28H2189
VSE/ESA		5686-073

Related Publications

The following CD-ROM contains publications intended to help you use APPC, APPN, and CPI-C.

Title	Order Number
The Best of APPC, APPN, and CPI-C Collection Kit	SK2T-2013

Operating Requirements and Device Support Publications

Operating system requirements and device support information are available in the product announcement letters for all ADSM-supported platforms. Additional device support is added continuously.

IBM also provides the latest product support information online:

- CompuServe in the ADSM forum - GO ADSM
- Internet (ftp index.storsys.ibm.com, get /adsm/info/adsmdevt.txt)

or call:

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