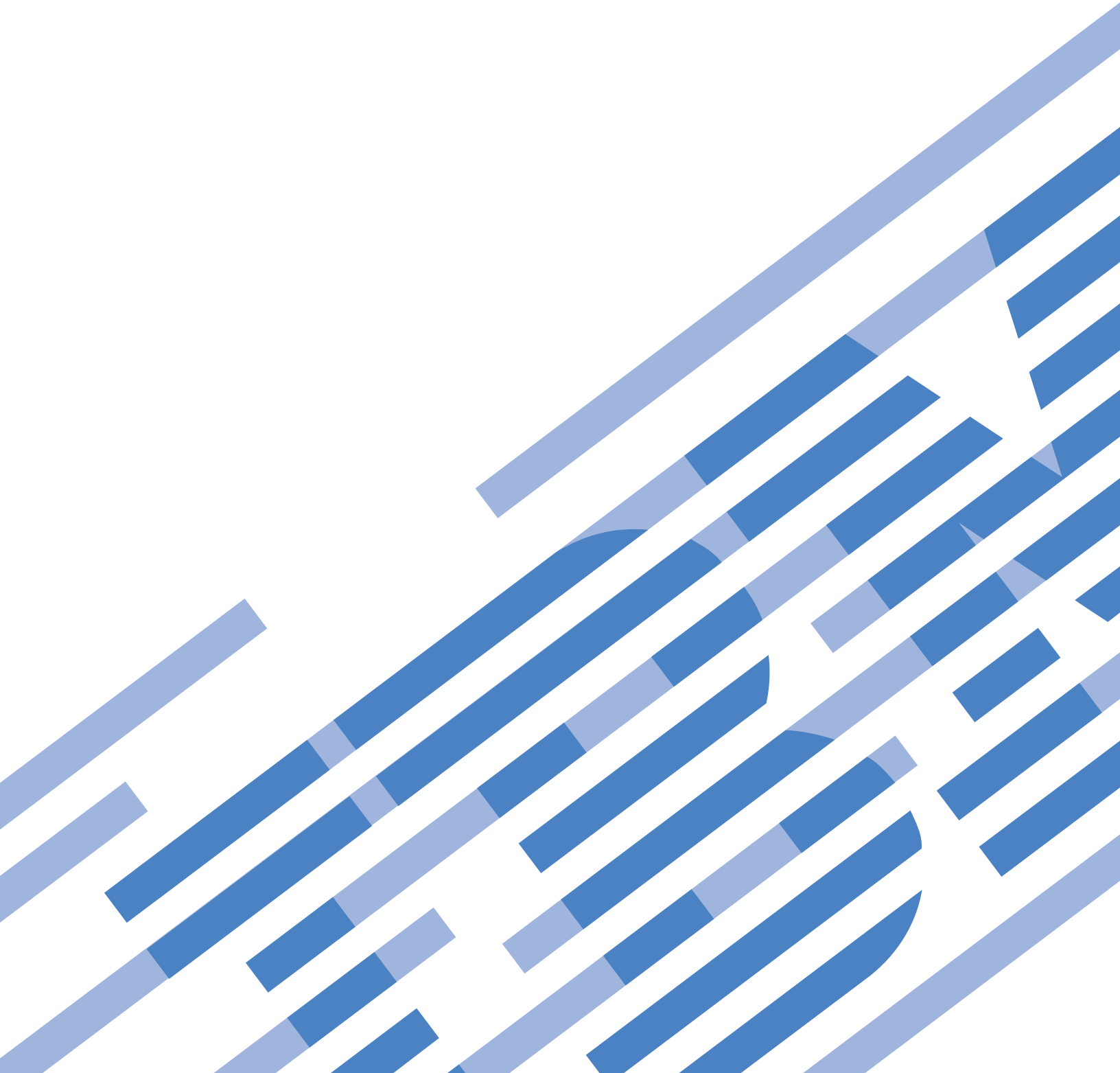# IBM

IBM i

Systems management
Backup, Recovery, and Media Services (BRMS)

7.1

IBM i

Systems management
Backup, Recovery, and Media Services (BRMS)

7.1

> **Note**
>
> Before using this information and the product it supports, read the information in "Notices," on page 39.

Contents

Backup, Recovery, and Media Services (BRMS)

IBM® Backup, Recovery, and Media Services (BRMS) helps you implement a disciplined approach to managing your backups and provides you with an orderly way to retrieve lost or damaged data.

BRMS is the IBM strategic solution for planning and managing save and restore operations on your System i® product. BRMS base product provides all of the functions that most System i users need to implement a fully automated, single system, backup, recovery, and media management strategy. Using BRMS, you can manage your most critical and complex save operations, including online backups of Lotus® servers. It also supports parallel save operations of a library or single object using up to 32 tape devices, which shortens the save window by using multiple devices. You can also recover your system fully during a disaster or failure, or restore single objects or libraries from your save media. BRMS can also perform some daily maintenance activities that are related to your backup routine.

In addition to these backup and recovery functions, BRMS can support and manage an unlimited number of media, shared tape devices, automated tape libraries, virtual tape devices, optical devices, and IBM Tivoli® Storage Manager servers. BRMS enables you to track all of your media from creation to expiration. You no longer have to keep track of which items are on which volumes, nor be concerned that you might accidentally write over active data.

As your business needs change and grow, you can add functions to the BRMS base product by purchasing and installing additional options. The Network feature of the BRMS product provides centralized management of multiple BRMS systems within a network using local TCP/IP, Advanced Peer-to-Peer Network (APPN), or both. A BRMS network system shares the inventory and policies associated with media managed within BRMS network group. In addition, users can view the save history of any system in the network from a single system. The networking feature also simplifies media duplication by using one system in the network to duplicate media for another system in the network. The systems in a BRMS network can be other System i platforms or individual IBM i partitions.

The Advanced feature of the BRMS product enables Hierarchical Storage Manager (HSM) archive with HSM dynamic retrieval and automated disk pool data migration. Parallel save operations work with the BRMS Advanced feature to allow for parallel archive and parallel dynamic retrieval of a single object. The ability to dynamically retrieve a large database file in parallel helps to reduce the window of the retrieval process. The BRMS Advanced feature allows archive capabilities of database files, stream files, and documents based on frequency of use, inactivity limit, object size, or disk pool thresholds.

BRMS provides both the traditional character-based interface and the graphical interface, which is available as a plug-in to the System i Navigator client and the IBM Navigator for i Web console. These interfaces are not mutually exclusive. You can either choose both interfaces, using the character-based interface for some tasks and the BRMS graphical interface for others, or you can choose to use one interface exclusively. However, differences between these BRMS interfaces do exist and you should be aware of them. For detailed information, refer to the BRMS interface differences and Related information sections in this topic collection.

Note: This topic collection describes how to work with BRMS functions on the System i Navigator client. You can refer to the online help for instructions on how to work with BRMS on the IBM Navigator for i Web console.

Important: BRMS is not a replacement for a backup, recovery, and media management strategy; it is a tool that you use to implement your strategy. Before you start doing backups using BRMS or any other product, you should plan your backup and recovery strategy.

Related concepts:

1

You can manage backups, recovery operations, and your media with BRMS by using either the BRMS graphical interface or the character-based interface.

Related information:

Planning your backup and recovery strategy

Backup, Recovery, and Media Services for i5/OS

What's new for 7.1

Read about new or significantly changed information for the IBM Backup Recovery and Media Services for i topic collection.

Graphical interface enhancements

This section lists the functions that were changed or added to the BRMS graphical interface.

- Support for the IBM Systems Director Web browser environment.
- Scheduling support for IBM Navigator for i Web browser environment.
- High Availability independent auxiliary storage pools enhancement.
- Enhanced the current e-mail function to support multiple e-mail addresses.
- Enhanced the BRMS log filter to provide the option to filter on control groups.
- BRMS maintenance feature in the Backup Policy now allows the user to run movement, expire partial volume sets and reorganize BRMS database files.

Note: *BRMS graphical interface* refers to both the System i Navigator BRMS plug-in and the IBM Systems Director Web environment BRMS plug-in.

In addition, enhancements to the BRMS functions are listed in the following sections.

Recovery enhancements

- New outfile support parameters have been added on the BRMS restore commands as well as the BRMS recovery policy.
- New ***COMPATIBLE** special value has been added for the `Allow object differences` parameter on BRMS restore commands.
- A new parameter **Saved auxiliary storage pool (SAVASP)** has been added on the BRMS restore commands to provide better control on the selection of which library or object was saved.
- On the work with object displays the "Objects saved" columns have been increased to support more then 999,999 objects
- New Recovery report enhancements:
  - The "Verify System Information" step in the recovery report has been updated to include new instructions to use the **Update System Information (UPDSYSINF)** command.
  - The "Recover User Profiles" step in the recovery report, under the "Attention" section where the user is instructed what restore defaults to use, the user is asked to use *COMPATIBLE now for the `Allow object differences` prompt.
  - On the **Start Recovery using BRM (STRRCYBRM)** command, a new parameter `Recovery element override` has been added to allow the user to override specific sections on the recovery report.

    Note: Currently only system data can be overridden with this new parameter.
  - The objects saved column on the recovery report has been increased to support more then 999,999 objects.

Media services enhancements

- Better handling of non-BRMS media when a customers inventory has a mixed media pool of BRMS media and non-BRMS media.
- Increased protection on backups saved to virtual media that have not been saved off to physical media.
- The **Print Media Movement (PRTMOVBRM)** command now includes media scheduled to move including media that are at the beginning of the media rotation.

Advanced Feature enhancements

- A new High Availability enhancement has been added for independent auxiliary storage pools.

Network enhancements

- Increased management of media information flow between the BRMS networked systems has been added.

Install enhancements

- For new installs of BRMS, the ***SYSGRP** control group will now have a new BRMS IFS list that contains all the IBM directory information.
- A new BRMS IFS list named QALLUSRLNK will be created on install. This list will have all of the IFS directory information except QIBM/ProdData and /QOpenSys/QIBM/ProdData.

Information enhancements

The Backup, Recovery, and Media Services (BRMS) topic collection includes information about how to use the new functions, and includes improvements to existing scenarios and improvements to task-based information. In addition, the online help for BRMS has been significantly updated and enhanced. The

Backup, Recovery, and Media Services for i5/OS (SC41-5345) manual has also been updated with these newest functional enhancements for users of the character-based interface.

How to see what's new or changed

To help you see where technical changes have been made, this information uses:

- The ≫ image to mark where new or changed information begins.
- The ≪ image to mark where new or changed information ends.

In PDF files, you might see revision bars (|) in the left margin of new and changed information.

To find other information about what's new or changed in this release, see the Memo to users.

PDF file for BRMS

You can view and print a PDF file of this information.

To view or download the PDF version of this document, select Backup, Recovery, and Media Services (about 328 KB).

Other information

You can also view or print the following PDF:

Backup, Recovery, and Media Services for i5/OS (about 2.3 MB)

Saving PDF files

To save a PDF on your workstation for viewing or printing:

1. Right-click the PDF link in your browser.
2. Click the option that saves the PDF locally.
3. Navigate to the directory in which you want to save the PDF.
4. Click **Save**.

Downloading Adobe Reader

You need Adobe Reader installed on your system to view or print these PDFs. You can download a free

copy from the Adobe Web site (www.adobe.com/products/acrobat/readstep.html) .

Related reference:

"Related information for BRMS" on page 36
Product manuals, IBM Redbooks® publications, Web sites, and other information center topic collections
contain information that relates to the BRMS topic collection. You can view or print any of the PDF files.

Advantages of using BRMS

Backup, Recovery, and Media Services (BRMS) provides a robust, easy-to-use graphical user interface to
perform save and recovery operations and to manage media.

On the IBM i operating system, you can perform backup and recovery operations in several ways. You
can use local save and restore commands or the Save menu options, or you can create CL programs.
However, BRMS provides a more dynamic solution for your backup and recovery needs, enables you to
manage your media, provides archiving capabilities for infrequently used objects. It also maintains a
history of all saved items, which simplifies the restore process and enables BRMS to create a detailed
recovery report. BRMS provides the following added functions that other backup solutions do not have:

Graphical interface

The BRMS graphical interface is available as a plug-in for the System i Navigator client and for
the IBM Systems Director Web environment. The BRMS interface provides more granular backups
of individual files and directories, the ability to create control groups to manage archives and
backups on your system, a simple save history query function to quickly locate items to restore,
and an easy, effective method of managing media and devices used for BRMS save operations.

Tailored save operations

BRMS includes several standard control groups that cover your basic needs, but you can also
create customized control groups that save data based on your company's specific needs. You
have the option to create archive control groups, which provide a systematic way of saving
infrequently used objects to media to free space on the system, and backup control groups, which
perform save operations on data that is critical to your day-to-day operations. You can also
choose to back up individual files or directories or to perform incremental and online backups of
Lotus servers while they are still active.

Lotus server online and incremental saves

BRMS enables you to save Lotus servers while they are active. You can also easily define items to
omit from the save operation.

Enhanced save-while-active function

BRMS allows you to use your system during all or part of the save process, which can help you
reduce or eliminate your downtime for certain save operations.

Parallel save and restore support

BRMS provides the ability to save libraries and objects to multiple devices at once. You can use
up to 32 devices in this manner.

Network feature

By placing multiple systems in a BRMS network, you can share BRMS control groups, policies, media information, and storage locations across the network. This allows you to manage save and restore operations across all of your systems in a consistent manner.

Media and device management

BRMS enables you to keep an inventory of your media and track everything that is on them. When you do a backup, BRMS lets you know which tapes to use, so you do not have to worry about writing over active data. In addition, you can manage devices, such as Tivoli Storage Manager servers, to store your saved data.

Step-by-step disaster recovery

After every backup, you can print a disaster recovery report that will guide you through the recovery of your system. It even tells you which media you need to restore on which pieces of the system.

Note: It is recommended that after every scheduled backup, you print your disaster recovery report. In the event of an unplanned system outage, this report will guide you through a recovery of your entire system.

Related concepts:

"Online backups of Lotus servers" on page 25
Backup, Recovery, and Media Services (BRMS) supports online backups of Lotus server databases (such as Domino®, QuickPlace, or Quickr® databases).

Related tasks:

"Working with media" on page 31
After media is added to the BRMS inventory, you can view that media based on the criteria that you specify, such as the volume name, status, media pool, or expiration date.

"Printing a recovery report" on page 29
When you back up your system using BRMS, information about each backed-up item is recorded in the save history. The information in the save history is used to create a recovery report, which guides you through a full system recovery.

"Creating a backup control group" on page 22
You can use the **New Backup Control Group** wizard to create a new backup control group that is tailored to your needs.

BRMS interface differences

You can manage backups, recovery operations, and your media with BRMS by using either the BRMS graphical interface or the character-based interface.

Note: *BRMS graphical interface* refers to both the System i Navigator BRMS plug-in and the IBM Systems Director Web environment BRMS plug-in.

If you have used the character-based interface in the past and want to use the BRMS graphical interface, you need to be aware of the differences between these interfaces.

Terminology differences

The following table describes the different terminology that exists in each interface and the definitions of these terms.

Table 1. Terminology differences between the BRMS graphical interface and character-based interface

BRMS graphical interface	Character-based interface	Definition
Changes-only save	Nonincremental cumulative backup	Saves only those items that have changed since the last full save was performed.
Media pool	Media class	A grouping of media based on similar characteristics, such as density and capacity.
Disk pool	Auxiliary storage pool	A software-defined group of disk storage units on a system.
Disk pool group	Auxiliary storage pool class	A group of disk pools that are organized by similar purpose.
Container pool	Container class	A grouping of similar types of containers that hold similar media volumes.

Compatibility differences

If you are currently using the character-based interface control groups and they do not refer to the system policy (*SYSPCY), archive policy (*ARCPCY), or backup policy (*BKUPCY), then using the BRMS graphical interface should have no functional effect on your character-based control groups. If this is not true, read the following information.

The backup and archive control groups created by the BRMS graphical interface can be viewed and run from the character-based interface. Also, control groups that are created from the character-based interface can be viewed and edited through the BRMS graphical interface backup and archive control group properties. A message is presented to the user when a control group that is created or edited using the character-based interface is about to be changed by the BRMS graphical interface; the user can then cancel the operation or continue. However, changing control groups created on the character-based interface using the BRMS graphical interface is not recommended unless you understand the following:

- The BRMS graphical interface backup and archive control groups are designed to be independent of each other. Thus, if you make changes to one control group, it does not affect the others. To ensure this independence, control groups that are updated with the BRMS graphical interface will have all references to the character-based interface system policy (*SYSPCY), archive policy (*ARCPCY), and backup policy (*BKUPCY) removed. These references are resolved and replaced with the actual values when the backup control group is saved by the BRMS graphical interface. Changes to the archive policy, backup policy, or system policy in the character-based interface do not affect backup or archive control groups that are created or edited by the BRMS graphical interface. The exceptions to this are the network function, sign-off exceptions, and the subsystem to check controls in the system policy, which are used by the BRMS graphical interface.
- Changes made to other, non-IBM supplied policies are reflected in the BRMS graphical interface.

Related information:

Backup, Recovery, and Media Services for i5/OS

BRMS Graphical User Interface: Frequently Asked Questions

Setting up BRMS

You can work with the Backup, Recovery, and Media Services (BRMS) plug-in on the System i Navigator client and the IBM Systems Director Web console after you have installed the program on your system.

A *plug-in* is a program that is created separately from the System i Navigator client or from the IBM Systems Director Web console, but, when installed, it looks and behaves like the rest of the functions in the interface.

Note: This section describes how to install the BRMS plug-in on the System i Navigator client. For information about how to install the plug-in on the IBM Systems Director Web console, refer to the BRMS Web site.

Related information:

IBM Systems Director Navigator for i5/OS

⇨ Backup, Recovery, and Media Services

Hardware and software requirements for BRMS

Before you install the BRMS plug-in to the System i Navigator client, ensure that your system and the client meet the necessary requirements.

Requirements for your System i

- IBM i Version 5 Release 4 (5722-SS1), or later
- Backup Recovery and Media Services (5761-BR1 *BASE)
- Media and Storage Extensions (5761-SS1 Option 18)
- IBM i Access for Windows (5761-XE1) and System i Navigator

Optional installable features for BRMS

In addition to the System i requirements, you can also install optional features of BRMS that provide additional functions. You can purchase these features separately.

- BRMS -- Network feature (5761-BR1 Option 1)
- BRMS -- Advanced feature (5761-BR1 Option 2)
- Tivoli Storage Manager APIs (5733-197 *BASE)

  Note: This option is required if you plan to use Tivoli Storage Manager servers.

Requirements for your PC

- Processor: 850 mHz, minimum
- Memory: 512 MB is recommended for all platforms
- Display: 800 x 600 resolution, minimum. If you have trouble reading the fonts on some panels, try using a screen resolution of 1024x768 or better.
- Operating system: Microsoft Windows 2000, Microsoft Windows NT 4.0 with Microsoft Service Pack 5 or later, Microsoft Windows XP, Microsoft Windows Server 2003 and later
- IBM i Access for Windows with System i Navigator installed

Installing the BRMS plug-in on System i Navigator

To configure and manage your save operations on your system, you can install the Backup, Recovery, and Media Services (BRMS) plug-in on System i Navigator.

Before you install BRMS, you must first ensure that your system and client meet the hardware and software requirements. After you have installed all the prerequisite software and any optional features that you want, you can follow these steps to install the BRMS plug-in on System i Navigator:

1. In System i Navigator, right-click **My Connections** and select **Install Options** > **Install Plug-ins**.
2. On the Install Plug-ins page, select the system from which you want to install the plug-in (must be a system that has the 5770-BR1 product installed) and click **OK**.

3. On the Sign-on to the IBM i NetServer page, enter your user profile name and password and click **OK**. (The prompt might ask for the Windows password, but it needs to be the IBM i user profile password.)

   Note: Some Windows operating systems might require the Windows and IBM i user profile passwords to match.

   A scan for plug-ins on the selected system occurs.

4. On the Plug-ins Selection page, select the IBM.BRMS Plugin check box and click **Next**.

5. Click **Finish** on the page that reports the successful installation of the plug-in.

The first time the System i Navigator is used after installing a plug-in, the System i Navigator scan window is displayed, indicating that the system is determining the new components that are supported.

Uninstalling BRMS from System i Navigator

You might need to uninstall the BRMS plug-in from System i Navigator.

Follow these steps to uninstall the BRMS plug-in:

1. In System i Navigator, right-click **My Connections** and select **Install Options** > **Install Plug-ins**.

2. On the Install Plug-ins page, select the system for which you want to uninstall the plug-in and click **OK**.

3. On the Sign-on to the i5/OS NetServer page, enter your IBM i user profile name and password and click **OK**. (The prompt might ask for the Windows password, but it needs to be the IBM i user profile password.)

   Note: Some Windows operating systems might require the Windows and IBM i user profile passwords to match.

   A scan for plug-ins on the selected system occurs.

4. On the Plug-ins Selection page, clear the IBM.BRMSPlugin check box and click **Next**.

5. Click **Finish** on the page that reports the successful uninstallation of the plug-in.

Note: You can also uninstall the plug-in using the command line. See the Remove plug-ins section in the Integrating new functions into System i Navigator topic for more information.

Related information:

Integrating new functions into System i Navigator

Navigating to the BRMS plug-in

There are different ways to navigate to the BRMS plug-in, depending on which graphical user interface you use.

To help you navigate to the BRMS plug-in, the following steps have been provided.

Using System i Navigator

1. Expand **My Connections** (or your active environment).

2. Expand the system you plan to work with.

3. Expand **Backup, Recovery, and Media Services**.

Using IBM Navigator for i

1. Expand **IBM i Management**.

2. Select **Backup, Recovery, and Media Services**.

Note: A simplified panel may show first when completing step 2. To see all of the Backup, Recovery and Media tasks, select **Advanced** from the panel.

Scenarios: How one company uses BRMS

JKL Toy Company, a fictitious business, uses Backup, Recovery, and Media Services (BRMS) to perform backup and recovery operations on three of their systems. You can use these examples to create your own backup control groups and media management strategy with BRMS.

Sharon Jones, the system administrator for the JKL Toy Company, is responsible for ensuring that all of their data is backed up and that they can recover their systems in the event of a disaster or system failure. Following is a diagram of JKL's network:
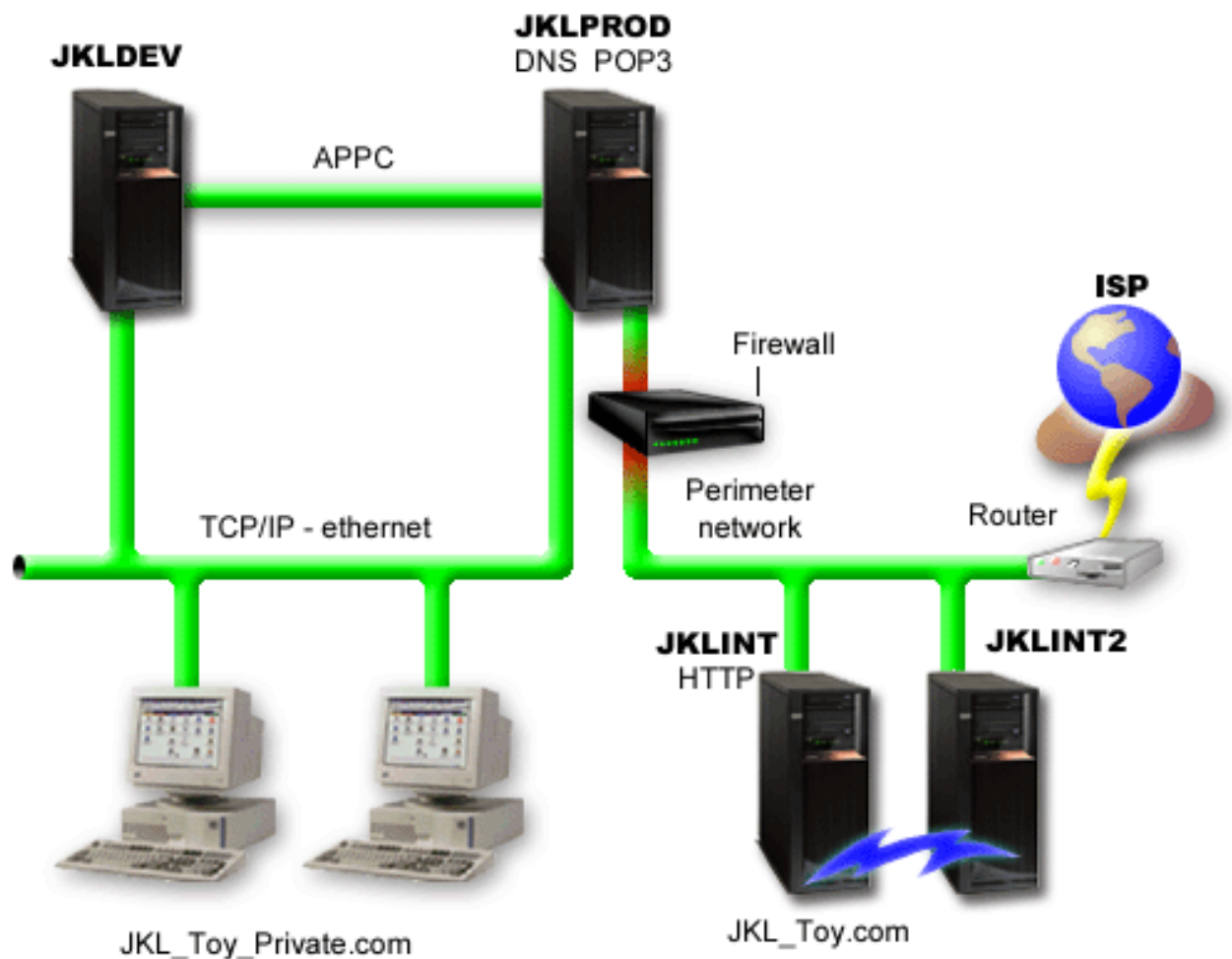
JKL has four System i platforms that each serve a different purpose and have different backup, recovery, and availability needs. These systems are as follows:

- JKLDEV: This system is for development and is used primarily during the week and during the day, although there is some development activity into the evening hours and on weekends.
- JKLPROD: This is the system that JKL uses for all of their customer orders and where their business applications are installed (inventory control, customer orders, contracts and pricing, accounts receivable).
- JKLINT and JKLINT2: These systems are used for the JKL Web site and e-mail.

Sharon spends considerable time initially planning the backup strategy that would best meet JKL's needs. In doing so, she has to answer the following questions:

- What will it cost JKL if a system goes down?
- What are the availability requirements for each system?
- What is the backup window for each system?
- What data has to be backed up and how often does it have to be backed up?

Related information:

Scenario: JKL Toy Company e-business plans

Planning a backup and recovery strategy

Scenario: Global policy properties

You can specify global properties to control how BRMS operates in your environment.

To access these settings, Sharon selects **Backup, Recovery, and Media Services** in System i Navigator, and then clicks **Global Policy Properties**. First, she wants to ensure that she is able to access the system during backup processing. She clicks the **Signoff Exceptions** tab and specifies the security officer user name.

Second, she wants to tailor how BRMS interacts with her during processing. She wants to be sure that she sees messages about a program or function ending abnormally, but she isn't interested in seeing messages that are purely informational. She clicks the **Notification** tab and specifies the settings she wants to use.

Related tasks:

"Specifying global policy properties" on page 20
Global policy properties are settings that are used with values that you specify in your backup control groups. You can use these properties to control how BRMS works in your environment.

Scenario: Backup using BRMS

Sharon's backup plan for JKL takes into account each system's purpose, workload, and availability requirements.

She also plans carefully for how the media that are used for each backup would be moved to and from offsite locations. Her strategy is reflected in the following diagram of JKL's network.
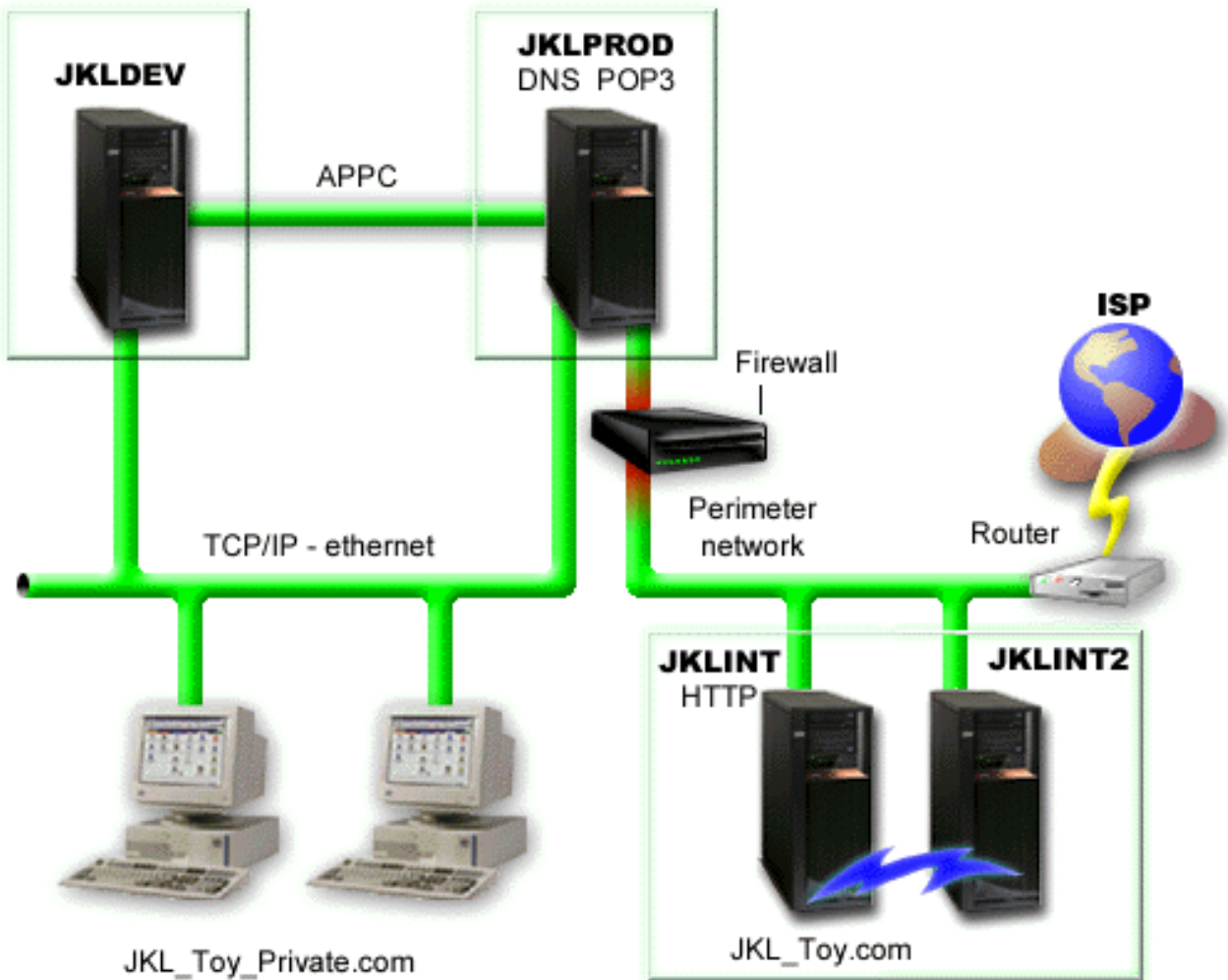
After Sharon establishes the backup strategy for each system (JKLPROD, JKLDEV, and JKLINT), she needs to decide how often the media from those backups would be rotated and moved to an offsite location for safekeeping.

Related tasks:

"Creating a backup control group" on page 22
You can use the **New Backup Control Group** wizard to create a new backup control group that is tailored to your needs.

"Creating a move policy" on page 32
As part of your backup plan, you need to manage media protection and rotation. Using Backup, Recovery, and Media Services (BRMS), you can create move policies to manage media movement.

Related information:

Planning a backup and recovery strategy

JKLDEV backup strategy

JKLDEV is JKL's development system and does not require continuous availability. It is used primarily during the week and during the day, although there is some development activity into the evening hours and on weekends.

JKLDEV

This system can be taken down for a full backup on a weekend night and have changes backed up on all of the other nights.

To accommodate these requirements, Sharon uses the *System control group that was included with BRMS. She schedules this control group to run every Saturday night at midnight. Sharon tests this backup and finds that the amount of data being backed up would fit on a single tape, so the backup can be run unattended. She must verify that the tape device is available and that an expired tape is mounted before leaving for the weekend.

During the week, Sharon also schedules the control group to start running at midnight every night. She chooses to override the control group setting and do a backup for cumulative changes only, which means that she saves all of the data that has changed since the last full backup.

Related tasks:

"Performing a fully automated backup" on page 24
In BRMS, you can start and run a system backup without using the interactive console monitor. This ability allows you to run your system backups unattended.

JKLPROD backup strategy

JKLPROD is the system that JKL uses for all of their customer orders and where their business applications are installed (inventory control, customer orders, contracts and pricing, accounts receivable).

JKLPROD

Right now the company's Web site is static, so customers place orders by telephone or e-mail. The telephone hours are 8 a.m. through 8 p.m. Monday through Saturday; if a customer wishes to place an order outside of those hours, they can send an e-mail.

The information on this system is extremely critical to the business, so it is important that Sharon does frequent backups. Sharon has scheduled a full system backup to start every Saturday night at midnight. She uses the *System control group that came with BRMS to do these backups. Because a large amount of data is backed up on this system, Sharon determines that she cannot do an unattended backup. A system

operator must be there to change tapes during the backup. Sharon is planning on writing a proposal to her manager asking for a tape library that can eliminate the need for an operator to be present during the full backups.

During the week, she backs up all changed user data using the *Bkugrp control group that is include in BRMS. She overrides the default full backup with an incremental backup, which means that every night she backs up the changes since the previous night's incremental backup.

JKLINT backup strategy

JKLINT is the system that JKL uses for their Web site and e-mail. While this data is critical to their business, it is fairly static--they don't make a lot of changes to the user profiles or configuration data on the system.

They need continuous availability for the critical data on this system, and they accomplish that by having a second system, JKLINT2, that shadows JKLINT. They use a high availability replication solution to copy the data from JKLINT to JKLINT2. Then, if JKLINT goes down, they can switch to JKLINT2.

Sharon does not have enough time to turn off JKLINT for a full backup, so, instead, she backs up JKLINT2, because it is a replication of JKLINT. She does a full backup of JKLINT2 every weekend using the *System backup control group that came with BRMS. She uses the Lotus server control group (QLTSSVR) to do an online backup of the company's Lotus Notes® mail databases every night except the night of the full backup.

Another possible setup: Sharon investigates using logical partitions on JKLINT and JKLINT2 to increase the security of these systems. They could use a firewall to filter all but e-mail on one partition and all but Web traffic on the other partition. Then, the Web partition would be protected from any security threats that might come through e-mail, which is a common route of attack. While this setup would have allowed for greater security, it also increased the level of complexity in their network, and Sharon decides that at this point they would stay with the simpler setup.

Scenario: Archiving data

Sharon Jones, the system administrator at the JKL Toy Company, wants to archive older data currently stored on one of the systems to media. You can use this example to plan and configure archive control groups using BRMS.

Situation

The JKL Toy Company stores large monthly sales invoices in an Accounts database on its JKLPROD system. Unfortunately these records have been kept on the system for several years and the large volume of data is negatively affecting the performance of the application. JKL wants to archive any records that are older than two years. For this older data, the company wants to save it off the system to media, but ensure that it can be accessed, if necessary. Although this data is not current, employees occasionally need

to access payment histories and other account information for these accounts. Users typically respond to a customer inquiries about this data, such as validating payment or addresses. Accounts that have a history shorter than two years are considered active. Data in these accounts are updated regularly and are saved as part of the backup control group for JKLPROD system.

For data that is older than two years, the company would like to save it to media but retain it in case it is needed. Using the BRMS archive function, Sharon plans to save these monthly sales records to write once, read many (WORM) media and set criteria on what objects are saved. Sharon plans to create an archive control group for this data.

Objectives

JKL Toy Company has the following objectives for this scenario:
1. To improve application performance by removing older data from the system.
2. To allow the access to data that has been archived.

Prerequisites and assumptions

This scenario assumes that several prerequisite steps have been completed and tested before beginning any steps. These prerequisites are assumed to have been completed for this scenario:

Ensure that the following requirements have been installed on your system:
- IBM i Version 5 Release 4 (5722-SS1), or later
- Media and Storage Extensions (5761-SS1 Option 18)
- Backup, Recovery, and Media Services (5761-BR1 *BASE)
- BRMS -- Network feature (5761-BR1 Option 1)
- BRMS -- Advanced feature (5761-BR1 Option 2)
- IBM i Access for Windows (5761-XE1) and System i Navigator
- The latest PTFs

Ensure that the requirements have been installed on the client:
- IBM i Access for Windows and System i Navigator
- BRMS System i Navigator plug-in

Ensure that these planning tasks have been completed:
- All backup and recovery planning has been conducted and documented.
- All storage planning has been conducted and documented.

Configuration details

Preparing media
Sharon needs to define write once, read many (WORM) with BRMS to save information that she wants to archive.

Because invoice information does not change after an account is paid she feels that WORM media is be a good choice. Active and delinquent accounts will continue to be part of regular backups that are performed weekly. You can save once, but allow read access to the data. To add WORM media to BRMS, complete the following tasks:
1. In System i Navigator, expand **My Connections** (or your active environment).
2. Expand **JKLPROD** > **Backup, Recovery, and Media Services** > **Media** > **Media Pools** and right-click *Qic1000*. Then select **Properties**.

> **Note:** The media pool name is generated automatically based on the tape density of the media, or you can right-click an existing media pool and select **New based on** to create a new media pool.

3. On the Properties page, select **Write once media** to indicate that this media pool will contain write once media.
4. Click **OK**.

Adding media

To store her archived data, Sharon Jones needs to add media to the system.

Sharon Jones completes these steps:

1. In System i Navigator, expand **My Connections** (or your active environment).
2. Expand **JKLPROD** > **Backup, Recovery, and Media Services** > **Media**.
3. Right-click **Volumes** and select **Add**.
4. On the Welcome page, click **Next**.
5. On the Select Media Pool page, select *Qic1000*, and click **Next**.
6. On the Add Volumes page, type vol1 in the **Volume name** field and click **Add**. This volume is used for data that is over two years old. Click **Next**.
7. On the Add Volumes--Select Media Storage Location page, select **Vault** in the **Location** field. Click **Next**.
8. On the Add Volumes--Initialize Volumes page, select **Initialize** for *Vol1* in the **Volume to initialize** field. In the **Device** field, select *Tap01* for *Vol1*. In the **Media action when done** field, select **Rewind**. Click **Next**.
9. On the Add Volumes--Summary page, validate the entries and click **Finish**.

Creating archive control group for older data

Sharon Jones also decided to create a new archive control group for older data.

Sharon Jones completes these steps to create a new control group:

1. In System i Navigator, expand **My Connections** (or your active environment).
2. Expand **JKLPROD** > **Backup, Recovery, and Media Services**.
3. Right-click **Archive Control Groups** and select **New**.
4. On the Welcome page, click **Next**.
5. On the New Archive Control Group--Control Group Name page, type OLDACCTS. In the **Description** field, enter Archive control group for accounts older than 2 years. Click **Next**.
6. On the New Archive Control Group--Select Items to Save page, navigate to the Accounts library and select the folder called "Accounts". Click **Next**.
7. On the Lists to Create page, click **Next**.
8. On the Selected Items for Save Summary page, click **Finish** to return to the Select Items to Save page. Click **Next**.
9. On the New Archive Control Group--Save Order page, click **Next**.
10. On the New Archive Control Group--Disk Pool Threshold page, select **No minimum value** and click **Next**.
11. On the New Archive Control Group--Frequency Used Threshold page, select **No maximum** and click **Next**.
12. On the New Archive Control Group--Inactivity Threshold page, enter **730** in the **Number of days inactive** field and select **Since last used or last changed** for the **Inactivity type**. Click **Next**.
13. On the New Archive Control Group--Object Size Threshold page, enter **50** in the **Save objects with a size greater than** field. Click **Next**.

14. On the New Archive Control Group--Storage Freed Objects page, select **Save object regardless of whether they can be storage freed** and clear the **Enable dynamic retrieval of storage freed objects** check box. Click **Next**.

15. On the New Archive Control Group--Retrieved Object Retention page, specify **Indefinitely or until archived by a subsequent archive operation**. Click **Next**.

16. On the New Archive Control Group--Select Media Policy page, select **Medplcy01** and then select **Manage Media Policies**.

17. On the Media Policies page, select **Medplcy01**, and then select **Item actions** > **Properties**. Click **OK** on the Media Policy Usage Warning page.

18. On the Media properties page, select the **Retention** tab and enter **730** for the number of days to keep the data. Click **OK** to return to the Select Media Policy page. Click **Next**.

19. On the New Archive Control Group--Select Devices page, select **Use the selected devices** and click **Add** to browse for *Tap01*. Click **Next**.

20. On the New Archive Control Group--Add Media page, click **Next**. This was completed in Step 2: Add media.

21. On the New Archive Control Group--Summary page, validate the properties of the new archive control group and click **Finish**.

Viewing archive control group report

Sharon Jones wants to ensure that the properties for the archive control group are correct. She uses BRMS to create a report that she can view and validate the archive control group that she just created.

She completes the following steps to create the archive control group report:

1. In System i Navigator, expand **My Connections** (or your active environment).
2. Expand **JKLPROD** > **Backup, Recovery, and Media Services** > **Archive Control Groups**.
3. Right-click *oldaccts* and select **View Report**.
4. On the View Report page, select **Include lists used by this control group** and click **View**.

   Note: You can also choose to save the report to a file or print the report. The information in the reports reflects what is on the system at the time the reports print, not at the time you schedule the report to print.

5. Validate that the items on the Archive report are accurate.

Scheduling archive control group

After creating and testing her archive control group, Sharon now is ready to schedule the control groups to run.

She completes the following steps:

1. Expand **JKLPROD** > **Backup, Recovery, and Media Services** > **Archive Control Groups**.
2. Right-click *OLDACCTS* and select **Schedule**. Sharon chose to schedule these archives to occur once every 6 months.

Scenario: Moving media

This scenario describes how to create a move policy to track your backup media.

Sharon knows that media management is critical to the success of her backup strategy. If her media is damaged or destroyed, her backups are destroyed with it. If the correct media cannot be located when it is needed, her recoveries can be unnecessarily delayed. Sharon knows that it is important to have multiple copies of her media, and to have at least one copy stored offsite. Sharon creates a move policy in BRMS that she uses to track her media.

The following figure shows the locations that Sharon establishes:
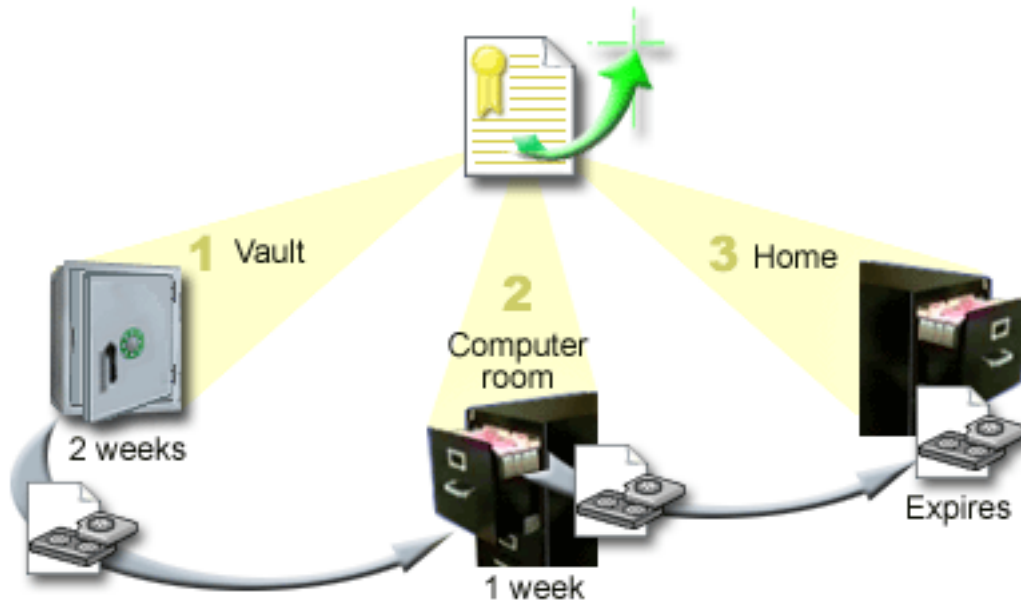
She defines three locations in the move policy where the media will reside:

Vault   This is Sharon's secure offsite location. She has a contract with a local company who picks her media up every day and takes it to this facility for safekeeping. She indicates that the media will stay here for two weeks.

Computer room
Sharon defines this location as the filing cabinet in the computer room. The media will move from the vault to here and will stay here one week.

Home   Sharon defines her home location as the filing cabinet in her office. This is the final location for the media. This is where the media expires, which means that it can be used again.

Every morning, Sharon prints out a copy of the BRMS recovery report for each system and makes two copies of each report. She also makes two copies of the media used for each backup. She gives one copy to the courier, stores one copy in a filing cabinet in her office, and stores the third copy in the computer room.

Related tasks:

"Creating a move policy" on page 32
As part of your backup plan, you need to manage media protection and rotation. Using Backup, Recovery, and Media Services (BRMS), you can create move policies to manage media movement.

Scenario: Reclaiming media

This scenario describes how to copy active data from old tapes to new tapes. This process is called *reclaiming media*.

Note: Reclaim is not supported for optical volumes.

Periodically, Sharon retrieves a special set of tapes from the vault. These tapes contain some of their business records that need to be kept for several years. She decides to run reclaim to copy only the active data to new tape volumes. This saves the latest data that has not expired on the tape volumes to the new volumes and then they are sent back to the vault.

To figure out the volumes to reclaim, Sharon does the following:

1. In System i Navigator, expand **Backup, Recovery, and Media Services** > **Media**.
2. Right-click **Volumes** and select **Customize this View -> Include**.
3. On the Volumes - Include window, select **Active** for the **Status** field and click **OK**.
4. Right-click a tape volume that you want more information about and select **Open**.
5. On the Save History - Include window, click **OK** to view all the saved items within the volume.
6. On the Save History window, select **List actions -> Columns and sorts** and add **File sequence** to the columns to be displayed.
7. Look at the tape volume information and determine which volumes should be reclaimed. Look for large gaps in the sequence numbers that indicate expired data. (For example, 1 ..... 10 .... 35 ......100 might be a good candidate. 1, 2, 3, 4, 5, 6, 7... might not.)
8. Right-click **Volumes** and select **Reclaim** to go through the Reclaim wizard and reclaim the media.

Related tasks:

"Reclaiming your media" on page 32
Backup, Recovery, and Media Service (BRMS) enables you to efficiently reuse old fragmented tape volumes by copying active file sequences to unused media.

Scenario: Performing recovery operations

One of the reasons that the JKL Toy Company chose BRMS as its backup and recovery solution is because it makes full system recoveries much easier.

Sharon and her team are developing ways for JKL to expand their business over the Internet, and they recognize that system availability is key if they want to play in the Internet market. Any system downtime could mean a loss of sales and a loss of customer satisfaction. BRMS simplifies system recoveries so that, should disaster strike, they can get their system back online as quickly as possible.

BRMS also makes it very easy to restore a single item that has been accidentally deleted or corrupted. This is a task that Sharon does pretty regularly, as their developers work in a fast paced environment.

In addition to using BRMS, Sharon has a contract with IBM Business Continuity and Recovery Services. This contract ensures that she has an offsite system to use in the event of a disaster; Sharon goes to the recovery hotsite twice a year to perform full system recoveries. Her contract with IBM Business Continuity and Recovery Services gives her an extra measure of security because she knows she can recover any of her systems should the need arise.

Related concepts:

"Restoring items on your system" on page 28
When you back up your system using BRMS, information about each backed-up item is recorded in the save history. The information in the save history allows BRMS to provide the function of restoring individual objects or files.

Related information:

IBM Business Continuity and Resiliency Services

Recovering a system after a natural disaster using BRMS

This scenario shows how Sharon Jones uses BRMS to recover one of her systems after a natural disaster.

In the middle of the night during a particularly wet spring, 8 inches of rain fell on the main office of the JKL Toy Company. A leak started in the corner of the roof that quickly turned into a small stream. The development system, JKLDEV, was positioned near the corner of the building where the water was leaking in. By the time Sharon arrived for work the next morning, JKLDEV was ruined.

While repairs were being made to the roof and she was waiting for the new system to be delivered, Sharon contacted her storage service provider and had them bring over the latest recovery report and media for JKLDEV. Then, she went to the recovery hotsite provided by IBM Business Continuity and Recovery Services. With the assistance of the skilled staff at the hotsite, Sharon followed each of the steps in the recovery report for JKLDEV, referring to the instructions in Recovering your system when necessary, until the system was recovered.

After the roof was repaired and they had a new system to take JKLDEV's place, Sharon did a full backup of the system at the recovery hotsite and then restored the latest data on the new JKLDEV system.

Related tasks:

"Printing a recovery report" on page 29
When you back up your system using BRMS, information about each backed-up item is recorded in the save history. The information in the save history is used to create a recovery report, which guides you through a full system recovery.

Related information:

IBM Business Continuity and Resiliency Services

Recovering your system

Restoring an accidentally deleted item using BRMS
Sharon Jones uses BRMS to recover an important file that was deleted from the system.

Nate Anderson is a recent college graduate who was hired by JKL for his Java™ programming and Web systems administration skills. His primary duty is to ensure that the JKL Web site is easy to use and functions correctly.

In his free time, he likes to work on innovative ideas for the future. He has a library on the JKL development system, JKLDEV, where he stores any programs he is working on for the future--ideas he hopes to implement one day when the JKL Web site becomes interactive. Last Thursday, another programmer accidentally deleted this library. Nate called on Sharon to restore the library for him.

Sharon uses the BRMS Restore wizard to restore Nate's library on JKLDEV. Because she uses BRMS to manage the backups on JKLDEV, she can restore the library right from the backup history. The backup strategy for JKLDEV includes a weekly full backup on Saturday night and a changes-only backup every other night of the week.

Related tasks:

"Restoring individual saved items" on page 28
It is sometimes necessary to restore individual items on your system (for example, if a file is corrupted or accidentally deleted).

Specifying global policy properties

Global policy properties are settings that are used with values that you specify in your backup control groups. You can use these properties to control how BRMS works in your environment.

To change the global policy properties on your system, perform the following steps:

1. In System i Navigator, right-click **Backup, Recovery, and Media Services**, and select **Global Policy Properties**.
2. On the Global Policy Properties page, click the following tabs to specify the settings that you want to use:

   General
   > You can specify how you want to perform save operations of the i5/OS Licensed Internal Code, whether you want to allow BRMS to monitor media, and whether you want to allow restore operations from alternate media. You can also specify an optical volume prefix for short names if you have optical devices.

   Notification
   > You can specify how and when you want BRMS to communicate with you about backup processing.

   Power down
   > You can specify the earliest and latest times that you want your system to be restarted, and you can specify the subsystems that you want to check for activity before the system restarts.

   Signoff exceptions
   > You can specify any users or display devices that you want to stay active when BRMS does a backup. For example, you might add the security officer or the system console to this list to ensure that the system can be accessed by that person or device during processing.

   Maintenance
   > You can customize the maintenance options that are to be run when maintenance is selected to be run from a backup control group.

   Retrieval
   > You can specify the options you want BRMS to use when you retrieve objects that have had their storage freed by BRMS. For example, you can specify the type of media to retrieve objects from, such as whether to use devices in parallel or serial mode and how long to retain retrieved objects on the system.

The retrieval options are associated with archive operations which are currently not supported by the BRMS client.

Network
You can manage the systems in your BRMS network and specify options such as whether TCP/IP or SNA should be used as your networking protocol for BRMS operations.

Logging
You can specify which messages that you want to include or exclude from the BRMS log.

Backing up your system

Backup control groups allow you to control and manage your backup operations.

One of the advantages of using Backup, Recovery, and Media Services (BRMS) is that you can use global settings and backup control groups to control your backups and other operations. Global settings control how your system processes backups in a general way.

A backup control group is a group of defaults that controls what information is saved, how it is saved, and where it is saved. After you set up your backup control groups, you can run them at any time or schedule them to run at particular times. This way, you can ensure that your backups are complete and are done when it is most convenient and appropriate for your business.

Several basic backup control groups are included with BRMS. You might be able to meet your backup needs by using these control groups, either alone or in combination. If so, you might not have to create any control groups of your own.

When you back up data using a BRMS backup control group, information about each item backed up is stored in the **save history**. This information includes the item name, type of save operation done on that item, the date of the save operation, and the volume on which each item is saved. You specify the level of detail you want to track for each item in the properties for the control group. You can then restore items by selecting them from the save history. The information in the save history is also used for full system recoveries.

The IBM Systems Director web environment plugin for BRMS includes a simplified interface for BRMS. It provides actions to save your system and user data, and restore previously saved items. Also, a summary of the most recent full system save is shown. The summary section includes the date and time of the save and actions to view the BRMS log and history associated with the recent save. This new dialog is intended to guide BRMS users to the basic functions BRMS provides.

Backup control groups included with BRMS

To help you in creating backup control groups on your system, IBM includes several standard backup control groups with the BRMS product.

The following backup control groups are included with BRMS:
- *System: Backs up the entire system (except printer output).
- *Sysgrp: Backs up all system data.
- *Bkugrp: Backs up all user data.
- Lotus Server control groups QLTSSVR, QLTSDOM or QLTSQPL: Perform online backups of Lotus servers. These control groups only appear in the list if you have Lotus servers.

If you do not have a complicated environment, these backup control groups might be all you need to protect your data.

Creating a backup control group

You can use the **New Backup Control Group** wizard to create a new backup control group that is tailored to your needs.

To access the wizard follow these steps:

1. Select **Backup, Recovery, and Media Services** > **Backup Control Groups** > **New** action item.
2. Follow the wizard to create a new backup control group.

The wizard gives you the following options for creating your backup control groups:

Table 2. Backup control group options

Option	Description
Back up all system and user data	Enables you to do a full system backup of all user and IBM-supplied data. Printer output is not included in this backup.
Back up all user data	Enables you to back up the data that belongs to users on your system, such as user profiles, user libraries, folders, configuration data, security data, and objects in directories.
Back up Lotus server data online or a customized set of objects	Enables you to do online and incremental online backups of Lotus servers (such as Domino and QuickPlace) or choose the items that you would like to back up.

When you finish creating the control group, you can run the control group or schedule it to run later. If you want to modify the control group later, you can do that by editing the properties of the control group. Many customization options are available in the properties of the control group that are not available in the New Backup Control Group wizard. To access the control group properties, select **Properties** action item on the control group.

Related concepts:

"Online backups of Lotus servers" on page 25
Backup, Recovery, and Media Services (BRMS) supports online backups of Lotus server databases (such as Domino, QuickPlace, or Quickr databases).

Related tasks:

"Scheduling a backup control group" on page 24
When you use BRMS, you can do backup, restore, and media operations without having to be nearby when they occur.

Changing backup control group properties

Backup control groups contain information about what, where, and when objects are being saved. You can change the properties associated with a control group.

To view or change the properties of a control group, follow these steps:

1. Select **Backup, Recovery, and Media Services** > **Backup Control Groups**.
2. Select the control group you want to change and select the **Properties** action item.
3. On the Backup Control Group Properties page, select from the following options to change backup control group activities:

Before Specifies what activities should occur before the save operation runs. These settings prepare your system for the save operation. You can specify commands to run before the save operation begins, whether to sign off interactive users, and whether to shut down integrated servers, hosted logical partitions, TCP/IP servers, and Lotus servers.

What Controls the items to save and whether to unmount the user-defined file systems before the control group runs. You can select **Advanced** to specify more detailed information about the

items you are backing up, or select **Change All Activities** to change all the actions for the saved items that are associated with this control group. You can customize the columns, or search and filter the items shown on this page.

Where Specifies where you want to save items in this control group. This includes the media policy that you would like to use with this control group for full save operations, the minimum and maximum number of device resources to be used in a parallel save operation, whether you want to have a serial save operation, how devices are selected for save operations using this control group, and whether you want the items in this control group to be saved on new volumes or to be added to media that already contains active files.

Activity

Changes values associated with save activity for the entire control group. This includes whether to override the backup activity and retention settings in the control group every time the control group is run or scheduled, the type of changes-only save operation that occurs for every save item in this control group, and whether to force a full save after the specified number of days has passed.

After Specifies what activities should occur after the save operation runs. These activities are performed on your system after the save operation is completed. You can specify commands to run after the save ends, where you want the last volume used in the save operation to be positioned when the save operation ends, whether to automatically save the media information needed for recovery each time a save operation is performed using this control group, and the name of the object list for which you want to check journaling status.

Power down

Specifies how you want the system to be powered down after the control group runs.

Job queues

Specifies the job queues that you want to hold before a save operation runs with this control group and want to release after the operation ends.

Subsystems

Specifies the subsystems that you want to stop before the save operation begins and want to start after the operation is completed.

Copying a backup control group to a remote system

You can copy a backup control group to other remote systems either within or outside of the BRMS network group.

To copy a backup control group to a remote system, follow these steps:

1. Select **Backup, Recovery, and Media Services** > **Backup Control Groups** > **Open** action item.
2. On the backup control group that you want to copy, select **Copy** action item.
3. In the Copy control group panel, specify the target systems that you want.
   - Select **Copy to the BRMS network group** to copy the control group to all the systems in the network group. Select **Manage BRMS Network Group** to view all the systems currently in the BRMS network.
   - Select **Copy to these systems** to copy the selected control group to one or more systems outside of the BRMS network group. You can click **Browse** to select from all available systems. You can also add a system by clicking **Add** to enter the name of a specific system.
4. Specify the copy lists that you want to copy to the target system. The following options are available:

   All All lists associated with this control group are copied to the target systems.

   New Only new lists associated with this control group are copied to the target systems.

   None No lists associated with this control group are copied to the target systems.
5. Select **Copy over existing control group** to overwrite the existing control group on the target system.

| 6. Click **Ok**.

Backing up pieces of your system

In addition to using backup control groups to back up the data on your system, you can back up individual files, libraries, or folders from the hierarchy.

To back up an individual item, perform the following steps:

1. In System i Navigator, expand *your system* > **File Systems**.
2. Right-click the item you want to back up under Integrated File System and select **Back Up**.

Related tasks:

"Creating a backup control group" on page 22
You can use the **New Backup Control Group** wizard to create a new backup control group that is tailored to your needs.

Performing a fully automated backup

In BRMS, you can start and run a system backup without using the interactive console monitor. This ability allows you to run your system backups unattended.

To run a fully automated backup, you must make sure that you have enough tape capacity so that your backup can run without getting tape volume mount messages. For example, if you schedule an automated system backup over the weekend, you need to verify that the tape device and enough expired tapes are available before leaving for the weekend. You can use Global Policy Properties to ensure that you specify enough time for the backup to run.

To schedule a fully automated backup, follow these steps:

1. Select **Backup, Recovery, and Media Services** > **Backup Control Groups** > **Open** action item.
2. Choose the control group you want to run and select **Schedule** action item.
3. On the Run Backup Control Group *System - Backup Overrides window, clear the **Use interactive console monitor** check box and click **OK**.

   Note: To do this, you need to clear the **Only use interactive console monitor** check box on the general page of Global policy properties first.

Scheduling a backup control group

When you use BRMS, you can do backup, restore, and media operations without having to be nearby when they occur.

To schedule a backup control group, complete these steps:
| 1. Navigate to the main **Backup, Recovery, and Media Services** panel.
| 2. Select **Backup Control Groups**.

| **Note:** If you are using IBM Navigator for i Web environment, the simplified panel is first shown. To
| get to the advanced panel, click on the **Advanced** button. It is from this panel that you are able
| to work with control groups.
| 3. Select the control group you want to schedule and select the **Schedule** action item.

When you schedule a control group to run, keep in mind that only the items that are scheduled to be backed up on the day you run the control group will be backed up. For example, you have a backup control group that includes library MYLIB. In the control group properties, you have MYLIB scheduled to be backed up every Thursday. If you schedule the control group to run on Thursday, MYLIB will be backed up. If you schedule the same control group on any other day, MYLIB will not be backed up.

Also, be aware that some operations (such as a full system backup) require that your system be in a restricted state when they run. With BRMS, the interactive console monitor allows you to submit a backup job, either scheduled or directly, to the interactive session that is running on the system console. A system operator can use the interactive system console session to monitor the progress of the backup and respond to tape mount messages. When you schedule a backup using the interactive console monitor, you will see the instructions on how to start the console monitor.

If you choose not to use the interactive console monitor and no one will be present to process commands as the backup runs, then you must ensure that your backup can run without intervention. A restricted state backup that does not use the interactive console monitor can also be scheduled if the backup can run unattended.

Note: The scheduling function is available on IBM Navigator for i Web environment and System i Navigator environment. The actions that can be scheduled differ depending on what environment you are using.

The following actions can be scheduled from the IBM Navigator for i Web environment.
* Backup control groups
* Archive control groups
* BRMS maintenance

The following actions can be scheduled from the System i Navigator environment.
* Backup control groups
* Archive control groups
* BRMS maintenance
* Reclaim media
* Movement of media

Online backups of Lotus servers

Backup, Recovery, and Media Services (BRMS) supports online backups of Lotus server databases (such as Domino, QuickPlace, or Quickr databases).

An *online backup* is a backup that you do while your Lotus server databases are in use. There are no save-while-active synchronization points. You can direct your online backups to a tape device, media library, save file, or a Tivoli Storage Manager server.

Important: Do not use online Lotus server backups in place of complete system backups. Lotus server online backups only back up Lotus server databases. Other important Lotus server data and system data should be backed up on a regular basis.

Related information:

BRMS: Online Lotus Server backup

Using archives

Archiving provides a method of saving disk space by saving infrequently used objects to media, and then removing them from the disk.

During the archive operation, the disk storage on the system is freed, thus allowing you to store more vital data in that disk space. Therefore, you have the benefit of retaining the data, but without an impact to the storage capacity of your primary disk space. BRMS tracks the information associated with the objects that you archive.

Note: To use archive capabilities within BRMS, you must install the Advanced feature of BRMS (5761-BR1 Option 2).

There are two concepts related to archiving: storage freed objects and dynamic retrieval of those objects.

Storage freed objects

Archiving saves objects, then deletes those objects or just the content of that object. When you archive objects that can be storage freed, you archive the data associated with the object to alternate media, but the object's description remains on the system. This description uses very little space and acts as a placeholder in the event that the object data needs to be retrieved. Only certain objects can have their data storage freed. They include: Database files, source files, stream files, and document library objects (DLOs).

Dynamic retrieval of storage freed objects

Dynamic retrieval of storage freed objects provides a way to access archived objects. When you need to use a storage freed object, such as a database file, BRMS locates and restores that object's data dynamically, using the description stored on the system. See "Managing dynamic retrieval" on page 28 of storage freed objects for details on how to use dynamic retrieval.

With BRMS, you can manage archives by creating an **archive control group**. Unlike backup control groups, archive control groups save objects that are used infrequently, but might need to be accessed for later use if needed. The saved objects are removed from the system. For example, you might have seldom-used customer information stored in a database and you want to free disk space by archiving this data to media. Another difference between backup and archive is the difference between restore and retrieve. In general, objects saved as part of a backup control group are recovered from the save media. Archived objects are retrieved from the media, and then after they are used, can be re-archived back to the media.

Note: Objects that are saved using an archive control group are not included in the system disaster recovery report.

Creating an archive control group

An archive control group allows you to handle infrequently used objects on your system. You can create a new archive control group to control what items you archive and when.

The **New Archive Control Group** wizard enables you to create an archive control group, select the media you want to use for that control group, and then run or schedule the control group after it is created. You can also create an archive control group based on the properties of an existing archive control group. To create a new archive control group, follow these steps:

1. Select **Backup, Recovery, and Media Services** > **Archive Control Groups** > **New** action item.
2. Follow the wizard's instructions to create the archive control group.

Changing archive control group properties

Archive control groups contain information about what, where, and when objects are being archived. You can change the properties associated with a control group.

To view or change the properties of a control group, follow these steps:

1. Select **Backup, Recovery, and Media Services** > **Archive Control Groups** > **Open** action item.
2. Choose the control group you want to view and select **Properties** action item.
3. On the **Archive Control Group Properties** page, select from the following options to change archive control group activities:

Before Specifies what activities should occur before the archive operation runs. These settings prepare your system for the save operation. You can specify commands to run before the save operation begins, and whether to sign off interactive users.

What Controls what activities should occur during the archive operation. This includes what items are archived, where those items are archived, what level of information is kept about the save operation, when the control group is run, and what disk pools are associated with this control group.

Where Specifies where you want to archive items in this control group. This includes the media policy that you would like to use with this control group for full save operations, the minimum and maximum number of device resources to be used in a parallel archive operation, how devices are selected for archive operations using this control group, and whether you want the items in this control group to be archived on new volumes or to be added to media that already contains active files.

Archive criteria
Sets criteria that determines how and when a given archive control group is run. You can specify how long an item must be inactive before the archive control group is run and whether objects are to be included in the archive control group based on the size of the object and frequency that the object has been used. You can also specify whether you want the objects whose storage can be freed are to be included in the archive operation, and the percentage of storage utilization that, if exceeded, allows objects that meet all other archive criteria to be archived.

Retrieve retention
Specifies how long retrieved archived objects are retained on the system before being re-archived by a BRMS maintenance or archive operation.

After Specifies what activities should occur after the archive runs. These activities are performed on your system after the archive is completed. You can specify commands to run after the save operation ends, where you want the last volume used in the save operation to be positioned when the save operation ends, and whether to automatically save the media information needed for recovery each time a save operation is performed using this control group.

Power down
Specifies how you want the system to be powered down after the control group runs.

Job queues
Specifies the job queues that you want to hold before an archive operation runs with this control group and want to release after the operation ends.

Subsystems
Specifies the subsystems that you want to stop before the archive operation begins and want to start after the operation is completed.

Copying an archive control group to a remote system

You can copy an archive control group to other remote systems either within or outside of the BRMS network group.

To copy an archive control group to a remote system, follow these steps:

1. Select **Backup, Recovery, and Media Services** > **Archive control groups** > **Open** action item.
2. Choose the archive control group that you want to copy and select **Copy** action item.
3. In the Copy control group window, specify the target systems that you want.
   - Select **Copy to the BRMS network group** to copy the control group to all the systems in the network group. Select **Manage BRMS Network Group** to view all the systems currently in the BRMS network.
   - Select **Copy to these systems** to copy the selected control group to one or more systems outside of the BRMS network group. You can click **Browse** to select from all available systems. You can also add a system by clicking **Add** to enter the name of a specific system.
4. Specify the option for the copy lists that you want to copy to the target system. The following options are available:

All All lists associated with this control group are copied to the target systems.

New Only new lists associated with this control group are copied to the target systems.

None No lists associated with this control group are copied to the target systems.

5. Select **Copy over existing control group** to overwrite the existing control group on the target system.
6. Click **Ok**.

Managing dynamic retrieval

Storage freed objects allow you to archive certain object types, such as database files, source files, stream files, and document library objects (DLOs), off your system to media.

When you archive objects that can be storage freed, you archive the data associated with the object to alternate media, but the object's description remains on the system. This description uses little space and acts as a placeholder in the event that the object data needs to be retrieved.

Dynamic retrieval of storage freed objects provides a way to access archived objects. If a user accesses the object, BRMS locates and restores that object's data dynamically, using the description stored on the system. You can either create an archive control group to handle storage freed objects or you can change an existing control group's archive criteria. To manage how retrieved objects are handled, follow these steps:

1. Select **Backup, Recovery, and Media Services** > **Global Policy Properties** action item.
2. On the Retrieval page, you can select the type of media from which you want to retrieve objects. You can also specify how long retrieved objects will be retained on the system, whether to extend the retention of an object if it was used, and monitor use of that object after it was retained. For specifics on these retrieval options, click **Help** on the Retrieval page.

Restoring items on your system

When you back up your system using BRMS, information about each backed-up item is recorded in the save history. The information in the save history allows BRMS to provide the function of restoring individual objects or files.

The primary reason for having a backup and recovery strategy and doing regular backups is to be ready if an item needs to be restored, or if your entire system needs to be recovered. The only way to ensure that you are fully protected by your backup and recovery strategy is to perform a full system save and then recover your system from that save.

Restoring individual saved items

It is sometimes necessary to restore individual items on your system (for example, if a file is corrupted or accidentally deleted).

When you use BRMS backup control groups to back up items on your system, you can restore those items from the backup history. When you restore an item from the backup history, you can view details about the item, such as when it was backed up or how large it is. If several versions of the item exist in the save history, you can select which version of the item you want to restore. The items must have been backed up with a BRMS backup control group.

Note: In order to have details about the item, you must be saving the item with object level detail. These are options when setting up your BRMS backup control group.

For example, if a mail database was corrupted by a user, you can easily find and restore the database file by following these steps:

1. Select **Backup, Recovery, and Media Services** > **Restore** action item.

2. Under **Saved items** on the Save History - Include window, select **Directories or file** for the **Type** field and enter *userName.nsf* (for example, msmith.nsf) in the **File** field and click **OK**.

   Other include criteria can also be specified to further filter the search.

3. On the **Save History** window, choose the file you wish to restore and select **Restore**.

4. Follow the instructions of the **Restore** wizard to restore the items.

Printing a recovery report

When you back up your system using BRMS, information about each backed-up item is recorded in the save history. The information in the save history is used to create a recovery report, which guides you through a full system recovery.

Should your system fail or a disaster occur, you can use the recovery report to recover your system to the point it was at before the failure. Because your recovery report contains critical information about your system, it is important that you take a few precautions to ensure that this information is current and accessible when you need it.

- The successful completion of nearly every step in the recovery report relies on information in the *Recovering your system* topic. It is recommended you review this topic first as well as use it along with the BRMS recovery report.

- Your recovery is only as good as your backup, so be sure to test your backup and recovery strategy any time you change it by doing a full system recovery. You might need to adjust your strategy to ensure that a full recovery is possible.

- You should test your recoveries at a disaster recovery hotsite, or by using a test system. **Do not** use your production system.

- Print your recovery report every time you do a backup. By doing this, you ensure that your report includes the most current information.

- Print at least two copies of your recovery report every time you do a backup. Keep one copy with your system and keep the other in a safe place offsite, such as an offsite vaulting location.

To print your recovery report, follow these steps:

1. Select **Backup, Recovery, and Media Services** > **Print Reports** action item.

2. Select **Disaster Recovery** and click **OK**.

Related concepts:

"Viewing or printing BRMS reports" on page 35
Backup, Recovery, and Media Services (BRMS) provides powerful reporting capabilities to help you manage your save operations more effectively and track the information that BRMS records.

Related information:

Recovering your system

➡ IBM Business Continuity and Resiliency Services

➡ IBM-Business Continuity and Resiliency Services

Managing devices

You can use Backup, Recovery, and Media Services (BRMS) to display, add, remove, and change the properties of any stand-alone devices, media libraries, and Tivoli Storage Manager servers used for your save operations.

BRMS enables you to back up your data to stand-alone devices, media libraries, and Tivoli Storage Manager servers. You can also use DVD, CD-ROM, optical libraries and virtual optical devices. Any device you want to use in your BRMS processing must be known to BRMS. You can display, add, remove, and change the properties of these devices through the Manage Devices window. For example,

you can specify in the properties of a device whether the device is shared with other systems. You can also specify connection information for your Tivoli Storage Manager servers.

Related information:

Storage solutions

Managing disk pools

Backup, Recovery, and Media Services (BRMS) allows you to manage information about the disk pools that are used during save operations.

A disk pool, also referred to as an auxiliary storage pool (ASP) in the character-based interface, is a software definition of a group of disk units on your system. BRMS stores information about the disk pool to perform migration of data between disk pools during save operations. This information is updated in the BRMS database but does not update the information of the actual disk pool on the system. To manage a disk pool, complete the following steps:

1. Select **Backup, Recovery, and Media Services** > **Manage Disk Pools** action item.
2. On the **Manage Disk Pools** panel, you can select to edit disk pools or manage disk pool. For more detailed descriptions of each of these options, click **Help**.

Managing your media

Backup, Recovery, and Media Services (BRMS) keeps an inventory of media and simplifies media management by tracking everything in that inventory--what pieces of information are saved where and which media have available space.

When you create your policies, you can specify the following locations for storing the save items--serial media, parallel media, save file, or Tivoli Storage Manager server. Then, when you do a save, BRMS selects the media it needs from the available pool of that type of media. You don't have to worry about accidentally writing over active files or using an invalid piece of media because it is all tracked for you.

Once you back up your data, you can use BRMS to help you track your media as it moves through the different storage locations you define. For example, you might move your backups offsite for storage; BRMS will keep track of when the media leaves and when it is scheduled to return.

You can use the **Add Media** wizard to add media to BRMS and prepare it for use. You can also manually expire media, which returns it to the inventory of available media. You can also create media pools which are groupings of media based on similar characteristics, such as density or capacity. Over time, you might find that you have media that have many expired items on them and only a few active items. You can reclaim this media by moving the active items onto media that have other active items on them.

Related information:

Storage solutions

Adding media

Before you can perform save operations using Backup, Recovery, and Media Service (BRMS), you need to add media to the BRMS inventory and initialize it.

You can use the **Add media** wizard to add media to the BRMS inventory. To access the wizard in System i Navigator or IBM Systems Director, follow these steps:

1. If using System i Navigator expand **Backup, Recovery, and Media Services** > **Media**. If using IBM Systems Director select **Backup, Recovery, and Media Services**.
2. Select **Volumes** > **Add** action item.
3. Follow the wizard's instructions to add the media to BRMS.

Working with media

After media is added to the BRMS inventory, you can view that media based on the criteria that you specify, such as the volume name, status, media pool, or expiration date.

Knowing the expiration date for the media helps to manually expire a piece of media, which returns that piece of media to the BRMS media inventory.

To filter which media you see in the list, follow these steps:

1. If using System i Navigator expand **Backup, Recovery, and Media Services** > **Media**. If using IBM Systems Director select **Backup, Recovery, and Media Services**.
2. Using System i Navigator, right-click **Volumes** and select **Customize this View** > **Include**. Using IBM Systems Director select **Volumes** > **Include**.

Creating a media policy

A media policy defines the type and length of media retention. It also defines the media class and move policy that you want to use for the save operation.

To create a new media policy, follow these steps:

1. Select **Backup, Recovery, and Media Services** > **Media policies** > **New** action item.
2. Follow the wizard to create a new media policy.

You can specify the following options for the media policy that you are creating:

Where Specifies where data that is associated with this media policy is saved. You can choose to encrypt the media that this media policy uses for save operations. You need to understand how to work with keystore files, keystore libraries, and key record labels if you want to encrypt the media.

> **Notes:**
> - To use the encryption function, you need to have the BRMS Advanced feature (5770-BR1 Option 2) and Encrypted Backup Enablement (5770-SS1 Option 44) installed on your operating system.
> - Encryption is not supported for save files and optical media.

Retention
Specifies the type of retention for media and save files that this media policy uses for save operations.

Automatic duplication
Specifies whether you want to duplicate data to other media using multiple devices when a save operation ends.

Related information:
Cryptographic services key management

Changing media policy properties

Media policies contain information about what, where, and when media are being used. You can change the properties associated with a media policy.

To view or change the properties of a media policy, follow these steps:

1. Expand **Backup, Recovery, and Media Services** > **Media Policies** if using System i Navigator. Select **Backup, Recovery, and Media Services** > **Media Policies** > **Open**, if using IBM Systems Director.
2. On the media policy you want to change, select the **Properties** action item.
3. Specify the properties you want to change on each tab and click **OK**.

Reclaiming your media

Backup, Recovery, and Media Service (BRMS) enables you to efficiently reuse old fragmented tape volumes by copying active file sequences to unused media.

You can use the reclaiming media function to duplicate a volume or set of volumes that have become fragmented to new volumes. Typically, over time, you have volumes that just sit in storage unusable. These volumes are highly fragmented with gaps in the active file sequences due to the varying expiration dates of the saved items on the media. The reclaim function allows you to copy only the unexpired or active file sequences to unused (scratch) media. The old volumes will be expired and the backup history of the active saved items is updated to reflect the new volume. This allows you to remove the old volumes from the media inventory or make the old volumes available for reuse. Ultimately, this should reduce the number of active volumes you must manage plus reduce the total number of volumes being managed and minimize your media and media storage costs.

You can use the Reclaim wizard to reclaim one or more volumes in BRMS. To access the Reclaim wizard, follow these steps:

1. If using System i Navigator expand **Backup, Recovery, and Media Services** > **Media**. If using IBM Systems Director select **Backup, Recovery, and Media Services**.
2. Select **Volumes** > **Reclaim** action item.
3. Follow the instructions of the wizard to reclaim your media.

Balancing your media

The media balancing function enables you to balance the number of media owned by each system within a BRMS network so that each system has the required number of media.

This function requires that the system is running IBM i 6.1, or later.

To balance media across systems in a BRMS network, follow these steps:

1. If using System i Navigator expand **Backup, Recovery, and Media Services** > **Media**. If using IBM Systems Director select **Backup, Recovery, and Media Services**
2. Select **Volumes** > **Manage volume balancing** action item.
3. Select **Add** action item to add BRMS systems to participate in media balancing.
4. On the Add Available Systems for Media Balancing page, enter the name of the system, its associated media pool and location, and set a priority for this system as well as the number of required media that it uses for save operations. Prioritizing your systems ensures that those system with more critical data have the necessary media to complete the save operations.
5. Select **OK** to add the system to the list of systems that will balance media among them.
6. From the Manage Volume Balancing page, run media balancing for all the selected systems by selecting **Balance Volumes for All Systems** action item. You can also run a report that shows the results of balancing your media among these systems.

Creating a move policy

As part of your backup plan, you need to manage media protection and rotation. Using Backup, Recovery, and Media Services (BRMS), you can create move policies to manage media movement.

To ensure the safety of your data, it is recommended that you keep at least the last two versions of your full system backups and the most current backed up version stored on media. In addition, you should duplicate the media for each backup and keep the copies in a safe, offsite location to ensure that in the event of a natural disaster, such as a fire, these versions of your data can be obtained.

You can use move policies to keep track of where your media is and when it is scheduled to be in each storage location. Move policies include information about the different storage locations that your media

resides in during its lifecycle. For example, when you do weekly full backups of your system, you have a courier come to pick up your media and take it to a vault, where it stays for 21 days. At the end of the 21 days, the media is returned to your site and placed in a filing cabinet in your computer room. A move policy for your full backups would keep track of where your media was at each step of its journey, and would include information about each storage location, such as how long it would take to retrieve the media from this location in the event of an emergency.

To create a move policy, follow these steps:

1. Select **Backup, Recovery, and Media Services** > **Move Policies** > **New Policy** action item.
2. Follow the wizard's instructions to create a new move policy.

Note: Media management and movement is a very important part of your backup strategy. If your media is lost or not adequately protected, you could lose data in the event of a disaster or system failure. If you would like help in implementing an effective backup strategy for your company, including media management, contact IBM Business Continuity and Recovery Services.

Related information:

➡ IBM Business Continuity and Resiliency Services

Verifying media movement

By creating a move policy, you can optionally choose to have BRMS automatically verify media movement or you can choose to manually verify the move operation.

When you create a move policy, you are asked if you want to verify the actions that take place when the move policy runs--what volumes move where and when. Verifying moves keeps BRMS synchronized with what actually happens.

You can choose to manually verify move operations, or you can have BRMS automatically verify move operations. Because you need to be sure that your media is where BRMS says it is, it is recommended that you verify move operations manually at first. You may choose to have BRMS verify move operations automatically after your media movement procedures are established and have been working smoothly for some time.

To manually verify a move operation, follow these steps:

1. Select **Backup, Recovery, and Media Services** > **Move Policies** > **Verify Moves** action item. You will see a table of all volumes of media currently scheduled to be moved. For each volume listed, the table columns display the current location, the next location the volume is moving to, the move date, as well as the name of the move policy the volume is associated with.
2. Contact the storage location by telephone or e-mail to ensure that the media has arrived at the location.
3. Select the volumes you want to verify and click **Verify**.

If you opt to have BRMS verify moves automatically, no action is required on your part to verify moves. When the date and time of the move passes, BRMS will automatically update the information about that media. In addition, BRMS will print a media movement report when you run or schedule the move policy.

Important: Remember that if you verify moves automatically, BRMS will update the information about the media whether the physical move of the volume takes place or not. If the move does not take place, the information in the BRMS database will not be accurate.

Managing containers

Containers are any holders that store multiple media volumes on your system. You can also manage containers with Backup, Recovery, and Media Services (BRMS).

Containers typically hold one media pool, although you can specify any media pool. Using containers adds complexity to your storage management system and is optional. You can specify that you want to store media in physical containers at specified locations, and use these containers to move volumes in the container according to a move policy.

1. Select **Backup, Recovery, and Media Services** > **Move Policies** > **Manage Containers** action item.
2. From this panel you can complete the following tasks:.
   - Create a new container
   - Delete a container
   - Edit a container
   - Manage a container pool
   - View volumes in a container

Managing locations

Move policies allow you to define the movement of media between storage locations and the length of time that the media stays in each location.

To create, delete, edit, or view the volumes that are at a particular location, follow these steps:

1. Select **Backup, Recovery, and Media Services** > **Move Policies** > **Manage Locations** action item.
2. Follow the steps below for the specified action:
   - To create a new location, select **List actions** > **New** action item.
   - To create a location using an existing location as a base, choose the location in the list and select **New Based On** action item.
   - To delete a location, right-click the location in the list and select **Delete** action item.
   - To change an existing location, right-click the location in the list and select **Properties** action item.
   - To view a list of the volumes that are at a particular location, choose the location and select **View Volumes** action item.

Running BRMS maintenance

Running maintenance on your system automatically performs Backup, Recovery, and Media Services (BRMS) cleanup, updates save information, and runs reports.

You should run maintenance every day. You can customize which activities you want to perform when you run maintenance.

If you do not customize the maintenance activities, the following are performed:
- Expire media
- Remove media information
- Remove migration information (180 days old)
- Remove log entries (from beginning entry to within 90 days of current date)
- Run cleanup
- Retrieve volume statistics
- Audit system media (if you are working in a network)
- Change journal receivers
- Print expired media report
- Print media audit information
- Print version report
- Print media information
- Print recovery reports

To run maintenance, select **Backup, Recovery, and Media Services** > **Run Maintenance** action item. If you want to customize the maintenance activities, click **Options**. There is also an option to run maintenance at the end of a backup in the properties for each backup policy.

Viewing or printing BRMS reports

Backup, Recovery, and Media Services (BRMS) provides powerful reporting capabilities to help you manage your save operations more effectively and track the information that BRMS records.

You can change the parameters for the server command for each report. To print reports, select **Backup, Recovery, and Media Services** > **Print Reports** action item.

You can also view or save selected reports in HTML format. HTML reports for backup and move policies contain the details for all policies or a selected policy. There are also reports available for volume information and BRMS log entry information. To view or save one of these reports in HTML format, choose the folder or item that you want and select the **View Report** action item.

BRMS printed reports

The table shows the BRMS reports that are available for printing, the name each report has in the output queue, and a brief description of each report.

For a complete list of BRMS reports, refer to Appendix B of the Backup, Recovery, and Media Services for i5/OS ![icon] (SC41-5345) manual.

Table 3. BRMS printed reports

Report name	File name	Description
Backup plan	QP1ABP	Lists all backup policies and the items that make up each policy.
Backup statistics	QP1ABS	Summarizes the information about the objects that have been saved by BRMS.
Container	QP1ACN	Lists containers based on class, status, and location.
Container pool	QP1ACT	Lists all container pools that are specified in BRMS.
Devices and libraries	QP1ADV	Lists all devices defined to BRMS.
Disaster recovery	QP1ARCY - analysis; QP1A2RCY - volume summary; QP1AASP - disk pools; QP1AJR - journal receiver chain; QP1AJREXC - journal receiver exception	Lists the steps necessary to recover your system, the volumes that are required to complete a recovery, and the disk pools that are set up on your system.
Disk pools	QP1AASP	Lists all disk pools that are set up and provides statistical information for each.
Journal receivers	QP1AJR - journal receiver chain; QP1AJREXC - journal receiver exception	Lists the journal receiver chains and also any exceptions to those chains.
Lists	QP1ALQ - printer output QP1AFL - folder QP1AOB - object QP1AFL - directory	Shows all of the items in each of the lists.
Locations	QP1ASL	Shows the storage locations that you have set up for your system and the current contents and maximums that you have set up.

Table 3. BRMS printed reports (continued)

Report name	File name	Description
Location analysis	QP1A2SL	Lists all locations that are specified to BRMS, together with details of the current and maximum volumes and containers at each location.
Volumes (active)	QP1AMM	Summarizes the status, location information, and volume identifier information for the active volumes in a media library.
Volumes (all)	QP1AMM	Summarizes the status, location information, and volume identifier information for all volumes in a media library.
Volumes (expired)	QP1AMM	Summarizes the status and location information for the expired volumes in a media library.
Media movement	QP1APVMS	Shows all volumes that are scheduled to move from one location to another location.
Media pools	QP1AMT	Shows basic information for each media pool that is defined to BRMS.
Media statistics	QP1AVU	Shows how your media are being used; helps to identify if any volumes are being used excessively when compared to others.
Media library media	QP1A1MD	Shows all media or specific media in a media library device that you specify.
Media balance	QP1ABAL	Shows the scratch media currently available as well as the scratch media requirements for BRMS operations. This information is provided for each system that is specified in the System name (SYSNAME) parameter.
Move policies	QP1AMP	Shows the move sequences and associated values for each move policy defined to BRMS.
Save files	QP1ASF	Shows all libraries that have been saved to save files and whose media content information has not been deleted.

Related information for BRMS

Product manuals, IBM Redbooks publications, Web sites, and other information center topic collections contain information that relates to the BRMS topic collection. You can view or print any of the PDF files.

Manuals

Backup, Recovery, and Media Services for i5/OS (about 4500 KB)

IBM Redbooks

- Backup Recovery and Media Services for OS/400®: A Practical Approach
- Integrating Backup Recovery and Media Services and IBM Tivoli Storage Manager on the IBM

  eServer™ iSeries Server

Web sites

- Backup, Recovery, and Media Services (http://www.ibm.com/servers/eserver/iseries/service/brms/)

  Use this site to find the latest news and product information for Backup, Recovery, and Media Service.

- BRMS graphical user interface: Frequently asked questions (http://www.ibm.com/servers/eserver/iseries/service/brms/pluginfaq.html)

  Use this site to answer your common questions about the BRMS plug-in on System i Navigator.

- IBM Business Continuity and Recovery Services (http://www.ibm.com/services/continuity/recover1.nsf/documents/home)

  Use this site to help you assess your business continuity needs and provides resources to enable continuous availability of your information and processes.

Other information

- Planning a backup and recovery strategy
- Recovering your system
- Storage solutions

Related reference:

"PDF file for BRMS" on page 3
You can view and print a PDF file of this information.

Appendix. Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

Intellectual Property Licensing
Legal and Intellectual Property Law
IBM Japan, Ltd.
3-2-12, Roppongi, Minato-ku, Tokyo 106-8711

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Corporation

39

Software Interoperability Coordinator, Department YBWA
3605 Highway 52 N
Rochester, MN 55901
U.S.A.

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement, IBM License Agreement for Machine Code, or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. The sample programs are provided "AS IS", without warranty of any kind. IBM shall not be liable for any damages arising out of your use of the sample programs.

Each copy or any portion of these sample programs or any derivative work, must include a copyright notice as follows:

© (your company name) (year). Portions of this code are derived from IBM Corp. Sample Programs. © Copyright IBM Corp. _enter the year or years_. All rights reserved.

If you are viewing this information softcopy, the photographs and color illustrations may not appear.

Programming interface information

This BRMS publication documents intended Programming Interfaces that allow the customer to write programs to obtain the services of IBM i5/OS and BRMS.

Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at Copyright and trademark information at www.ibm.com/legal/copytrade.shtml.

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Other company, product, and service names may be trademarks or service marks of others.

Terms and conditions

Permissions for the use of these publications is granted subject to the following terms and conditions.

Personal Use: You may reproduce these publications for your personal, noncommercial use provided that all proprietary notices are preserved. You may not distribute, display or make derivative works of these publications, or any portion thereof, without the express consent of IBM.

Commercial Use: You may reproduce, distribute and display these publications solely within your enterprise provided that all proprietary notices are preserved. You may not make derivative works of these publications, or reproduce, distribute or display these publications or any portion thereof outside your enterprise, without the express consent of IBM.

Except as expressly granted in this permission, no other permissions, licenses or rights are granted, either express or implied, to the publications or any information, data, software or other intellectual property contained therein.

IBM reserves the right to withdraw the permissions granted herein whenever, in its discretion, the use of the publications is detrimental to its interest or, as determined by IBM, the above instructions are not being properly followed.

You may not download, export or re-export this information except in full compliance with all applicable laws and regulations, including all United States export laws and regulations.

IBM MAKES NO GUARANTEE ABOUT THE CONTENT OF THESE PUBLICATIONS. THE PUBLICATIONS ARE PROVIDED "AS-IS" AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE.

IBM ®

Printed in USA