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SAS® Solutions Services 1.4

Backup, Restoration, and Migration Tool

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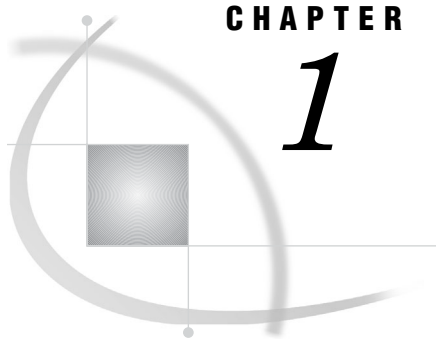
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CHAPTER

1

About the Backup, Restoration, and Migration Tool

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Definition of Terms

SAS Solutions Services uses the SAS Metadata Repository for the storage of metadata, a database (currently MySQL) for the storage of data, and a WebDAV repository for the storage of documents such as forms and reports. The Backup, Restoration, and Migration (BRM) tool provides a means of backing up the data and metadata managed by each of these components. Such a backup can be used for recovery from a system failure or for migration purposes.

The *backup* process takes a snapshot of the current state of the system. Backups can be used to take snapshots of the system while customer-specific modifications are being made, or they can be run nightly after the system has been deployed.

The *restoration* process overwrites the current data and metadata with backed-up data and metadata.

The *migration* process moves data and metadata from one working server configuration to another working server configuration. For example, you might migrate data and metadata from a test configuration to a production environment. The target server configuration should have the solutions software installed and working in a manner similar to the source server configuration. If there are differences between the installations, some manual configuration will likely be needed.

Conventions

Within this book, the following conventions are used in command syntax:

- Square brackets ([]) indicate optional parameters. Here is an example:

```
brmagent.bat [--allow-shutdown]
```

(Do not include the brackets when you type the command.)

- Italics indicate user-supplied values. Here is an example:

```
./WebDAVDump.sh http://hostname:port-number/sasdav /tmp/davdump
```

In addition, the following conventions are used to refer to common pathnames:

Path	Refers to	Examples
<i>SAS-install-dir</i>	path to the SAS installation directory	<i>Windows</i> C:\Program Files\SAS <i>UNIX</i> /usr/local/SAS
<i>SAS-config-dir</i>	path to the configuration directory	<i>Windows</i> C:\SAS\SASSolutionsConfig <i>UNIX</i> /usr/local/SAS/SASSolutionsConfig
<i>BEA-home-dir</i>	path to the BEA WebLogic home directory	<i>Windows</i> C:\bea <i>UNIX</i> Not applicable
<i>WebSphere-install-dir</i>	path to the IBM WebSphere installation directory	<i>Windows</i> Not applicable <i>UNIX</i> /usr/local/WebSphere
<i>MySQL-install-dir</i>	path to the MySQL installation directory	<i>Windows</i> C:\mysql <i>UNIX</i> /usr/local/mysql
<i>Apache-install-dir</i>	path to the Apache installation directory	<i>Windows</i> C:\Program Files\Apache Group\Apache2 <i>UNIX</i> /usr/local/IBMIHS
<i>Xythos-install-dir</i>	path to the Xythos WebFile Server installation directory	<i>Windows</i> C:\Program Files\SAS\xythos\2.2 <i>UNIX</i> /usr/local/SAS/xythos/2.2

What Is Backed Up

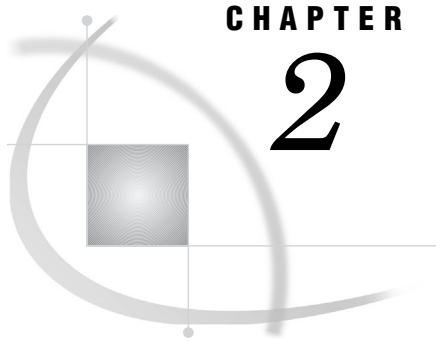
BRM can back up and restore the following directories and components:

Note: Your BRM configuration determines what is actually backed up and restored. See “Edit the Configuration Files” on page 6. △

Table 1.1 Folders and Files That Are Backed Up by the BRM Tool

Directory or Component	What Is Backed Up
SAS-config-dir	<p>Lev1\Data</p> <p>Lev1\SASMain\MetadataServer\MetadataRepository</p> <p>Lev1\SASMain\MetadataServer\rposmgr</p> <p>Lev1\SASMain\SASEnvironment\SASCode</p> <p>Lev1\SASMain\SASSolutionsServices\SASCode, \services, \XML</p> <p>Lev1\SASMain\SASFinancialManagement\SASCode, \services, \XML</p> <p>Lev1\SASMain\SASHumanCapitalManagement\SASCode, \services, \XML</p> <p>Lev1\SASMain\SASStrategicPerformanceManagement\SASCode, \services, \XML</p> <p>Lev1\SASMain\SASStoredProcessServer. This directory is backed up but is not automatically restored.</p> <p>If you have defined additional stored processes or jobs in a directory that is subordinate to the SASCode directory (such as SASSolutionsServices\SASCode\UserDefined), those files are automatically backed up and restored.</p>
MySQL	A complete mysqldump of all the databases is made, including the mysql database itself.
BEA WebLogic or IBM WebSphere	The sas.solutions.spm.webapp.war\images\customer directory of the scorecard application
Apache HTTP Server	The htdocs\sasdav directory
Xythos WebFile Server	BRM is capable of automatically backing up data that is stored by Xythos WebFile server. If the dav.server.type property in cmdLine.properties is set to Xythos (the default), then during a backup BRM runs WFSDump and backs up the contents of the Xythos WebFile Server. The WFSDump output is placed in the backup.location/webdav_component/davdump directory. (The backup.location property is set in the cmdLine.properties file.)
user-written stored processes	BRM queries the metadata repositories in search of any user-defined stored processes or other documents that are registered as a file . If any are found, the directories that contain those files are backed up but not automatically restored (unless they reside in one of the other backed-up directories).
user-defined libraries	If the backup.sas.library.dirs property in the cmdLine.properties file is set to true , then BRM queries the metadata repositories in search of any user-defined libraries or stored processes. If any are found, they are backed up (but not automatically restored).

Note: Operating system permissions are not saved on files and subdirectories that are backed up. When files and subdirectories are restored, they inherit permissions from their parents according to the normal operating system conventions. If you require special permissions on a file or subdirectory, you might want to write a special post-processing script to set those permissions. △



CHAPTER

2

Installing the BRM Tool

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Install the BRM Software

For each server in the server configuration, unzip the BRM.zip file to **SAS-config-dir\Utilities**. Unzipping this archive creates a folder named **SESContent**, which contains all the program files and configuration files for the BRM tool.

Verify the System Configuration

After installing the software, do the following:

- Make sure that your system path contains the following items:
 - the path to the MySQL **bin** directory

This path is required only on database machines so that the BRM tool can invoke the **mysqldump** utility.
 - the path to the JDK **bin** directory.
- Verify that the user who is performing a backup has read access to the directories that will be backed up and that the user who is performing a restoration or migration has write access to the directories.

On UNIX systems, the user who is performing the backup must be able to start and stop the SAS servers. Typically, this user is the sas user. For more information, see “Understanding the State of Your System” in the *SAS Intelligence Platform: System Administration Guide*.

Edit the Configuration Files

The BRM-specific configuration files are found in the **SESContent/config** directory. *All property names in all configuration files are case-sensitive. That is, the names must be spelled exactly as indicated, without changing characters from uppercase to lowercase or vice versa.*

The cmdLine.properties File

The cmdLine.properties file contains information that the BRM tool must know in order to perform backups or restorations.

Before editing this file, select one machine to act as the controller from which you run the **brmCmdLine** command. Typically, you would select the machine that hosts the metadata server, but you can select any server in the configuration. The only version of the cmdLine.properties file that you must update is the one on the controller machine.

To update the file, follow these steps:

- 1 Copy cmdLine.properties.template to cmdLine.properties.
- 2 Open cmdLine.properties for editing.
- 3 Modify the following properties if necessary:

Note: Property names in this file are case-sensitive.

△

Property	Value
*_component	The location of each server. Use fully qualified names if possible.
backup.location	A default path for storing backups. If this value is a local path, such as C:/temp/mybackup , then backups are stored in this location on each of the machines. Alternatively, you can specify a networked file store to hold all the backed-up files. The location must exist; it is not created by the BRM tool. You can override this value when you run the BRM tool.
dav.server.type	The type of your WebDAV server (Xyθος or Apache).
XYTHOS_HOME	The home directory for the Xyθος WebFile Server. If your WebDAV server is Xyθος, and the Xyθος server is installed in a location other than the default, then you must uncomment the XYTHOS_HOME property (by removing the pound sign [#]) and modify its value so that it points to the Xyθος installation directory. The XYTHOS_HOME property in the WFSDump and WFSRestore scripts should contain the same value. These scripts are located in the Xyθος-install-dir\custom\bin directory. If you installed the Xyθος server in the default location, you do not need to uncomment or modify this property. However, you still must edit the WFSDump and WFSRestore scripts.
ApacheMount	The location of the WebDAV directory, if you use Apache as your WebDAV server.

Property	Value
port, user, and password	<p>(Optional) Settings for the metadata server. By default, BRM takes these values from the OMI_PORT, OMI_USER_ID, and OMI_USER_PASSWORD properties in the SAS-config-dir/soltnsdata.properties file. However, if you set the port, user, or password properties in the cmdLine.properties file, those values override the values from soltnsdata.properties. The password can be encoded if the site requires it.</p> <p>The host name of the metadata server comes from the metadata_component property in cmdLine.properties, unless that property is not set. In that case it defaults to the value of the OMI_HOST property in soltnsdata.properties.</p>
cross.platform	<p>Set this property to true (in both the source and target configurations) only if the purpose of your next BRM backup or restoration is to move data and metadata between machines with different operating systems—for example, if you are backing up data from a Windows system and restoring it on a UNIX system. Otherwise, set this property to false.</p> <p>This property controls whether PROC CPORT, PROC CIMPORT, and the %OMAPORT macro operate on the backed-up or restored SAS data sets.</p>
backup.sas.library.dirs	<p>Set this property to true if you want BRM to back up the contents of any directory referenced from a SAS library. These archives are placed in archive files in the backup.location/stored_process_component directory.</p> <p>These special archives are not automatically restored by BRM. For information about restoration as well as naming conventions for these files, see “Manually Restore Library Files” on page 18.</p>
database.list	<p>This property should contain a comma-separated list of the names of the solutions databases in MySQL. If the backup.all.databases property is set to false, then only the databases in this list are backed up. Each database is backed up to a file with a suffix of .sql in the backup.location/mysql_component/databases directory.</p> <p>Regardless of the value of backup.all.databases, when BRM does a restoration, it drops each database in this list before it restores the databases.</p>

Property	Value
backup.all.databases	<p>If this property is set to true, then all databases, including the MySQL control database, are backed up into a single file named <code>sesAll.sql</code>.</p> <p>Often it is undesirable to back up the MySQL control database because it contains security information. To exclude the control database, set backup.all.databases to false, so that only the databases that are listed in database.list are backed up.</p>
_command properties	<p>The properties whose names end with _command define special BRM commands.</p> <p>There is one predefined command, delete_command, which allows the user to delete the contents of the backup.location directories on each machine. To run this command, type the following at a command prompt in the SESContent directory:</p> <pre>brmCmdLine delete [backup.location]</pre> <p>The <i>backup.location</i> parameter is optional. If it is included, it overrides the directory name that is set in the <code>cmdLine.properties</code> file.</p> <p>You can define custom BRM commands in the <code>customAnt.xml</code> file and activate them here. For more information, see Chapter 6, “Customizing the BRM Tool,” on page 39.</p>

- Comment out the components that you do not want to back up or restore. For example, to exclude the MySQL databases, comment out the **mysql_component** line with a pound sign (#) at the beginning of the line, like this:

```
#mysql_component=default.host.com
```

For information about activating additional components, see Chapter 6, “Customizing the BRM Tool,” on page 39.

- Arrange the component lines to reflect the sequence in which you want operations to be performed.

Each component is shut down and backed up in the order in which it appears in the `cmdLine.properties` file, with the exception of the `metadata_component`, which is always treated as if it were last in the list.

Components are restarted in reverse order. Imagine a `cmdLine.properties` file that contains these lines:

```
webapp_component=default.host.com
remote_services_component=default.host.com
webdav_component=default.host.com
metadata_component=default.host.com
mysql_component=default.host.com
```

A backup operation would be executed in this sequence:

- Stop the Java application server.
- Back up the Web application contents. (Only the SAS Strategic Performance Management customer images are backed up.)

- c Stop the remote services. (There is no backup of this component.)
- d Stop the WebDAV server if it is Apache. (Xyθος is not shut down.)
- e Back up the WebDAV content.
- f Back up the MySQL content. (The MySQL server is not shut down.)
- g Stop the metadata server.
- h Back up the metadata.
- i Restart the metadata server.
- j Restart the WebDAV server (if it is Apache).
- k Restart the remote services.
- l Restart the Java application server.

Shutting down the Java application server first, as in this example, ensures that regular users do not modify solutions data while it is being backed up or restored, thus avoiding corrupted data.

- 6 Save the cmdLine.properties file.

The log4j.properties File

The log information that is generated by the backup, restoration, and migration process is written both to the standard output and to the BRM.log file, which is located in the **SESContent** directory.

The **SESContent\config\log4j.properties** file determines which log messages are written to the log file. You can edit this file to log more or less information. The priority levels are as follows, from most to least inclusive:

- ☐ **DEBUG**
- ☐ **INFO**
- ☐ **WARN**
- ☐ **ERROR**
- ☐ **FATAL**

A priority level of **DEBUG** logs all messages. A priority level of **FATAL** logs only messages that signify fatal errors.

By default, the file appender class is **DailyRollingFileAppender**. With this class, each day that the BRM tool runs, the previous BRM.log file is renamed to **BRM.log.yyyy-MM-DD** (where **yyyy**, **MM**, and **DD** represent the year, month number, and day, respectively).

To reduce the need to check different log files, all important BRM log messages are collected in the BRM.log file on the controller machine. Two properties in **log4j.properties** control which messages are sent to the BRM controller machine:

- ☐ **log4j.logger.remote.agentAnt**—controls which messages are sent to the BRM controller machine.
- ☐ **log4j.logger.agentAnt**—controls which of these messages are written into the log on the controller machine.

To get the maximum amount of log information, set both of these values to **DEBUG** on both the controller and agent machines.

By default, only warnings, errors, and a minimal number of progress messages are printed on the console when BRM runs. In addition, all BRM log messages, including **INFO**, **WARNING**, and **ERROR** messages, are written to the BRM.log file. Please check this log file to understand the context of any warning or error messages that are printed on the console.

If you modify any of the default log control settings in `log4j.properties`, make sure to back up your modified file before installing any new version of BRM. Otherwise, your changes might be overwritten.

The agentAnt.xml and customAnt.xml Files

The BRM agent performs its backup and restoration operations using a modified version of Apache Ant. The control file for all of the ant tasks is the `agentAnt.xml` file in the **SESContent/config** directory.

Do not modify the `agentAnt.xml` file. Any customization of the Ant tasks should be done by modifying the `customAnt.xml` file, which is imported by `agentAnt.xml`. For more information, see Chapter 6, “Customizing the BRM Tool,” on page 39.

The soltnsdata.properties File

When the BRM tool runs, it loads the properties that are specified in the properties files in **SAS-config-dir** (`soltnsdata.properties`, `soltnsmid.properties`, and `mysqldb.properties`). If you moved these properties files or removed passwords for security, make sure to replace them.

In addition, make sure that the properties files accurately reflect your configuration. For example, as part of an upgrade process, someone might have copied `soltnsmid.properties` to the data-tier machine. If the machine is no longer a middle-tier machine, you should delete or rename that file, so that the BRM tool does not load incorrect property values.

The WFSDump and WFSRestore Scripts

If your WebDAV provider is the Xyθος WebFile Server: Before performing a backup, make sure that the **XYTHOS_HOME** property is set correctly in the `WFSDump` and `WFSRestore` scripts that are located in the **xythos-install-dir\custom\bin** directory. Here is an example from a Windows system:

```
set XYTHOS_HOME=C:\Program Files\SAS\xythos\2.2
```

In order to ensure that the `WFSDump` and `WFSRestore` scripts do not run out of memory, you also need to edit this file:

On Windows, perform the following steps:

- 1 Edit `XYTHOS_HOME\wfs-4.2.35\utils\apirun.bat`
- 2 Find the line that looks like this:

```
%JAVA_HOME%\bin\java -cp %CP% -DXyθος.RunMode=Application %*
```

- 3 Change that line to make it look like this:

```
%JAVA_HOME%\bin\java -Xmx1024M -cp %CP% -DXyθος.RunMode=Application %*
```

On UNIX, perform the following steps:

- 1 Edit `XYTHOS_HOME/wfs-4.2.35/utils/apirun`
- 2 Find the line that looks like this:

```
$JAVA_HOME/bin/java -cp "$CP" -DXyθος.RunMode=Application $@
```

- 3 Change that line to make it look like this:

```
$JAVA_HOME/bin/java -Xmx1024M -cp "$CP" -DXyθος.RunMode=Application $@
```

If the Xythos server is installed in a location other than the default location as determined by the installation program, then you must also set the **XYTHOS_HOME** property in the cmdLine.properties file. See “The cmdLine.properties File” on page 6 for instructions.

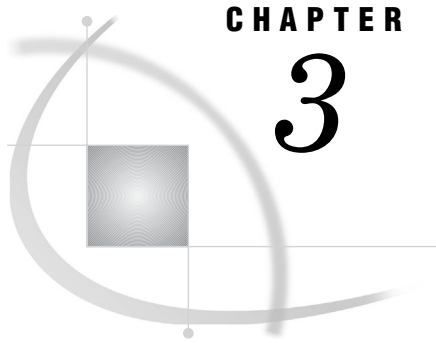
For information about restoring Xythos data, see “Restore Xythos Content” on page 18 and “Restore Xythos Content in a Migration” on page 29.

Where to Go Next in This Document

If you are only backing up content in a Solutions installation, or setting up an automated backup process, start at Chapter 3, “Backing Up the Data and Metadata,” on page 13.

If you want to restore backed up data onto the same physical machines on which you performed the backup (that is, to roll back to a previous state), go to Chapter 4, “Restoring the Data and Metadata,” on page 17.

If you want to migrate SAS Solutions content from one environment to another, go to Chapter 5, “Migrating to Another Configuration,” on page 21.



CHAPTER

3

Backing Up the Data and Metadata

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Performing the Backup

Note: If you are running BRM on UNIX, run the BRM agent (`brmagent.sh`) and the BRM controller (`brmCmdLine.sh`) in separate shell sessions. Running these scripts from the same shell session (that is, by running `brmagent.sh` in the background) can suspend the BRM backup or restore. △

To perform a backup, start the **brmagent** command on each server and then run the **brmCmdLine** command on the controller machine, as follows:

- 1 On each machine in the configuration, run the **brmagent** command.
 - a At a command prompt, change your current directory to **SESContent**.
 - b Type one of the following commands:

Windows

```
brmagent.bat [--allow-shutdown]
```

UNIX

```
./brmagent.sh [--allow-shutdown]
```

If **--allow-shutdown** is specified, the agent processes exit when they are finished. Otherwise, you must stop the processes manually after the backup or restoration is complete.

Note: For security reasons, do not leave the agent processes running after a backup or restoration. For example, do not attempt to create an automatic service or daemon that runs the **brmagent** command. Instead, you can create scheduled jobs to perform backups. See “Schedule Automatic Backups” on page 14. △

- 2 On the controller machine, start an additional command line in the **SESContent** directory.
- 3 Type one of the following commands:

Windows

```
brmCmdLine.bat backup [path]
```

UNIX

```
./brmCmdLine.sh backup [path]
```

(Optional) You can specify a *path* that overrides the **backup.location** value in the `cmdLine.properties` file. In the case of a backup, this value is the destination for the backed-up files. Specify a full pathname.

Note: You can create scheduled jobs for the backup. See “Schedule Automatic Backups” on page 14. △

Check Your Log File

Because restoring from a faulty backup can result in data loss, it is vital to check the BRM log after each run of the BRM tool. There are two key phrases that should alert you that an error has occurred. Both types of errors should be resolved before continuing:

- the word **ERROR** in capital letters

Note: The word **error**, in lowercase, might appear elsewhere in the log in some of the names of the folders being backed up. △

- the phrase **does not**

This phrase usually indicates that the BRM tool could not find a file (for example, a stored process that is registered in the metadata repository). This message is noted as a warning rather than as an error.

With the default log4j configuration, BRM sends warning and error messages to the console window where **brmCmdLine** is running. In addition, any error, warning, informational, and debug messages are written to the `BRM.log` file.

Schedule Automatic Backups

You can schedule automatic backups by using the **at** command (on Windows) or the **cron** command (on UNIX). Make sure to test the backup configuration manually before configuring the scheduled tasks.

- 1 Create a scheduled job to start the BRM agent on each machine, with a command such as the following:

Windows

```
brmagent.bat --allow-shutdown
```

UNIX

```
brmagent.sh --allow-shutdown
```

- 2 On only one of the machines to be backed up, create another scheduled job. This job should start the backup task after the brmagents are running on each machine in Step 1. Use this command:

Windows

```
brmCmdLine.bat backup [path]
```

UNIX

```
brmCmdLine.sh backup [path]
```

Check the logs regularly to make sure the backups were successful.

For convenience, you can delete the previous contents of the **backup.location** directory and perform a new backup with a single command:

Windows

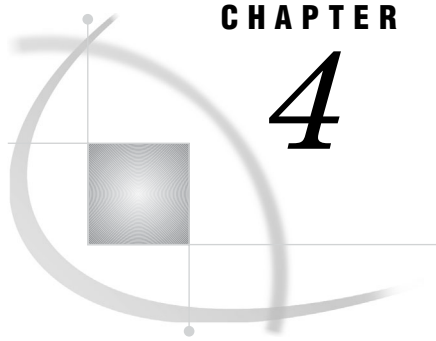
```
brmCmdLine.bat delete backup [path]
```

UNIX

```
brmCmdLine.sh delete backup [path]
```

Deleting previous backups ensures that no files in the backup area are left over from a previous backup.

(Optional) In the backup command, you can specify a *path* that overrides the **backup.location** value in the cmdLine.properties file. In the case of a backup, this value is the location for the backed-up files. Specify a full pathname.



CHAPTER

4

Restoring the Data and Metadata

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Perform the Restoration

To restore data and metadata that have been backed up:

- 1 Ensure that the metadata server is running.
- 2 On each machine in the configuration, run the **brmagent** command.
 - a At a command prompt, change your current directory to **SESContent**.
 - b Type one of the following commands:

Windows

```
brmagent.bat [--allow-shutdown]
```

UNIX

```
./brmagent.sh [--allow-shutdown]
```

If **--allow-shutdown** is specified, the agent processes exit when they are finished. Otherwise, you must stop the processes manually after the backup or restoration is complete.

- 3 On the controller machine, start an additional command line in the **SESContent** directory, and type one of the following commands:

Windows

```
brmCmdLine.bat restore [path]
```

UNIX

```
./brmCmdLine.sh restore [path]
```

(Optional) You can specify a *path* that overrides the **backup.location** value in the **cmdLine.properties** file. In the case of a restoration, this value is the source directory. Specify a full pathname.

- 4 Restore the WebDAV content.

If the source and destination configurations are both using Apache as the WebDAV server, then WebDAV content is restored automatically.

To restore the Xythos data, follow the instructions in “Restore Xythos Content” on page 18.

Restore Xythos Content

Currently, the BRM tool backs up Xythos content (using the WFSDump utility) but does not restore it automatically. To restore this content, use the WFSRestore utility, as follows:

- 1 If the **/sasdav** path already exists in the target WebDAV repository, log on to the Xythos administrative console, and delete or rename **/sasdav**. (Make sure to back up the directory before deleting it.) WFSRestore cannot write over existing data.
- 2 If you have configured Xythos to use an external storage location, delete its contents but do not delete the directory itself.
- 3 On the machine that hosts the Xythos WebFile Server, navigate to the path where the utilities are installed: **xythos-install-dir\custom\bin**.
- 4 Edit WFSRestore.bat if you have not done so already. For information about how to do this, see “The WFSDump and WFSRestore Scripts” on page 10.
- 5 At a command prompt, enter the following command:

Windows

```
WFSRestore.bat path
```

UNIX

```
./WFSRestore path
```

where *path* is the path to the directory that contains WFSDump.xml and the content resource files.

WFSRestore writes the folders and files to the WebDAV repository. For each resource, the utility assigns the properties that are specified in WFSDump.xml.

Manually Restore Library Files

The BRM tool archives all of the files in a library if both of these conditions exist:

- The **backup.sas.library.dirs** property in the cmdLine.properties file is set to **true**.
- In addition, the library definition in the metadata repository refers to a location that is accessible from the stored process server.

The files are archived in the **stored_process_component** subdirectory of the backup directory. Archive names follow these patterns:

- On Windows, the archive file will have a name that resembles the following:

```
rootdrive--directory[-directory...]-filename.tar.gz
```

For example, if **SASSolutionsConfig** is on the **C** drive of a Windows configuration, the DDSData is backed up to this file:

```
rootC--SAS-SASSolutionsConfig-Levl-Data-DDSData.tar.gz
```

- On UNIX, the filename would resemble the following:

```
root--SAS-SASSolutionsConfig-Levl-Data-DDSData.tar.gz
```

- If the library path uses a Universal Naming Convention (UNC) pathname, the BRM tool stores the file with a name such as the following:

```
root--hostname-directory[-directory]...-filename.tar.gz
```

For example, a library with a pathname such as `\\mymachine\Data\ABMData` would be stored with a name such as the following:

```
root--mymachine-Data-ABMData.tar.gz
```

The BRM tool does not restore these files automatically. After the restoration, check for these files and move their contents to the proper locations.

Recover from Errors in the Restoration Process

The restoration process replaces the existing data and metadata of a working system with the data and metadata of the backup. To safeguard the integrity of the system, the restoration process works as follows:

- 1 It renames current data and metadata directories, giving them `.BRM.bak` extensions.
- 2 It restores data and metadata from the backup files.

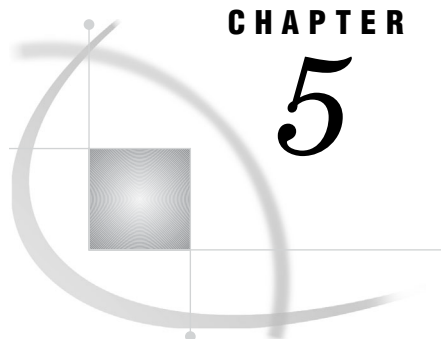
If an error occurs, it reverts to the pre-restoration state:

- a It renames restored data and metadata directories.
- b It renames saved data and metadata directories to their original names.

Note: At this point, you can make necessary corrections and begin the restoration process again. One possible reason for error is that directory permissions prevented the user from renaming the directories. △

- 3 After the restoration has completed successfully, the process deletes the extra directories it created. Then it restarts the services.

If the metadata service does not start, you must manually restore the BRM backup of the current machine.



CHAPTER

5

Migrating to Another Configuration

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Overview of the Migration Process

With the BRM tool's backup, restoration, and migration processes, you can copy data and metadata from one server configuration to another and then update the metadata on the target configuration to replace host names, domain names, and drive names. The migration process can migrate data from a Windows-based installation to a UNIX-based installation, as well as between two installations of the same type.

Migration works in this way:

- 1 First you back up data and metadata from a source configuration.
- 2 Then you restore the data and metadata to the new (target) configuration.

At this point, the metadata on the target metadata server still contains host names, domain names, and drive names from the source configuration.

- 3 After the restoration, you use the migration process to convert these references to be consistent with the new server environment.

Note: BRM assumes that you have already installed the target server configuration and that it is at the same release level as the source configuration. \triangle

Supported Server Configurations

BRM is capable of migrating data and metadata from any supported solutions configuration to any other supported solutions configuration. For example, BRM can perform the following migrations:

- ☐ from a two-server installation to a single-server installation
- ☐ from a single-server installation to a two-server installation
- ☐ from a two-server installation on one pair of machines to a two-server installation on another pair of machines.

Migrating to and from configurations with three or more machines is also possible.

Convert Your WebDAV Server If Necessary

Overview of WebDAV Server Conversion

The BRM tool does not support migration between configurations that use different WebDAV providers. Before you start a migration, you must ensure that the WebDAV provider on the source configuration matches the WebDAV provider on the target configuration. Generally speaking, follow these steps:

- 1 Before performing the migration, convert your WebDAV provider on the source configuration to match the provider on the target configuration.
- 2 On the source configuration, copy the WebDAV content to the new WebDAV provider.
- 3 Test your source configuration to check that the conversion succeeded.
- 4 Perform the migration.
- 5 If the target configuration uses Xythos, the BRM tool backs up Xythos content but does not restore it. After the migration, you must copy the Xythos content from the source configuration to the WebDAV repository on the target configuration.

There are no manual steps for migrating WebDAV content for Apache. The BRM tool automatically backs it up and restores it.

The remainder of this section contains instructions for converting your source configuration from using Apache to using Xythos, in preparation for migrating to a target configuration that also uses Xythos.

Move Content from Apache to Xythos

Follow these steps on the source configuration to move content from an Apache WebDAV server to a Xythos WebDAV server:

- 1 Ensure that the Apache server is running.
- 2 Change your current directory to **SAS-config-dir/Utilities/SESContent** (the directory in which you installed the BRM tool).
- 3 In a UNIX installation, ensure that all the shell scripts in this directory are executable by running this command:

```
chmod ugo+x *.sh
```

- 4 Create a temporary directory (with a name such as **davdump**) in which to store the WebDAV content. This directory must exist and must be empty.

On UNIX, you might use a command such as the following:

```
mkdir /tmp/davdump
```

- 5 At a command prompt, run the **WebDAVDump** command. (These examples assume a directory of **C:\tmp\davdump** or **/tmp/davdump**.)

Windows

```
WebDAVDump.bat http://localhost:80/sasdav C:\tmp\davdump
```

UNIX

```
./WebDAVDump.sh http://localhost:80/sasdav /tmp/davdump
```

Replace the port number for the WebDAV server if necessary.

Running the command creates a control file (for example, `/tmp/davdump/WFSDump.xml`) that contains the WebDAV metadata (resource names and property values) and files named `Xnnnnnn` that contain the actual WebDAV resource contents. (The first file is named `X000000`; subsequent files are named `X000001`, `X000002`, and so on.) If authentication is required, supply it as part of the URL on the command line—for example, `http://user:password@localhost:80/sasdav`. The user name and password identify a solutions user who has complete read and write permission to the `/sasdav` content.

- 6 If the `/sasdav` directory already exists in the target WebDAV repository, log on to the Xythos administrative console, back up the directory, and then delete it.
- 7 If you configured Xythos to use an external storage location, delete the contents of that directory, but do not delete the directory itself.
- 8 At a command prompt, set the current directory to `Xythos-install-dir\custom\bin`.
- 9 Load the saved content into the new WebDAV server by running this command:

Windows

```
WFSRestore.bat path
```

UNIX

```
./WFSRestore path
```

where *path* is the path to the directory that contains `WFSDump.xml` and the content resource files.

- 10 Because you are restoring from a backup from Apache, the directory permissions are not set. Set the directory permissions appropriately.

Update the WebDAV Server Port Number

When you change WebDAV servers in the source configuration, make sure to modify the local and remote services as well as the definition of the HTTP DAV Server so that they reference the correct port number. To update these port numbers, do the following:

- 1 Log on to SAS Management Console as the administrative user (sasadm).
- 2 Select the Foundation repository.
- 3 Modify the local services:
 - a Navigate to **Environment Manager ► Foundation Services Manager ► ID Portal Local Services ► BIP Local Services OMR**.
 - b Right-click **BIP Information Services** and select **Properties**.
 - c Click the **Service Configuration** tab.
 - d Click **Edit Configuration**.
 - e In the Edit Service Configuration dialog box, click the **Repositories** tab.
 - f Select **DAV** and click **Edit**.
 - g Modify the port number to correspond to the new WebDAV server (typically **80** for Apache and **8300** for Xythos).
 - h Save your changes.
- 4 Modify the remote services:

Repeat the change in Step 3 for **Foundation Services Manager ► Remote Services ► BIP Remote Services OMR ► BIP Information Service**.
- 5 Modify the definition of the HTTP DAV Server:

- a Navigate to **Server Manager ► HTTP DAV Server**.
- b Open the properties for **Connection: HTTP DAV Server**.
- c In the dialog box, click the **Options** tab.
- d Modify the port number to match the new WebDAV server.
- e Save your changes.

Modify the Content Mapping Properties

To use Xythos as your WebDAV server, you must enable WebDAV authentication, as follows:

- 1 Log on to SAS Management Console as the administrative user (sasadm).
- 2 Select the foundation repository.
- 3 Navigate to **BI Manager**.
- 4 Right-click **BIP Tree** and select **Properties**.
- 5 In the BIP Tree Properties dialog box, click the **Content Mapping** tab.
- 6 Select **WebDAV location**.
- 7 From the **Server** drop-down list, select **HTTP DAV Server**.
- 8 From the **Base path** drop-down list, select **/sasdav**.
- 9 In the **User ID** field, type the ID of the user who has WebDAV access rights (typically, saswbadm, the SAS Web Administrator).
- 10 In the **Password** field, type this user's password.
- 11 Click **OK**.

Repeat these steps for each repository in which you store WebDAV content. If you installed SAS Web Report Studio and are using Xythos as the WebDAV server, select **/sasdav/wrs** as the **Base path**.

Prepare the Target Configuration

- 1 If the target configuration is on a different operating system from the source configuration, make a note of the existing repositories on the target so that you can re-create them later:
 - Log on to SAS Management Console as the administrative user (sasadm).
 - Navigate to **Metadata Manager ► Active Server**.
 - For each repository, make a note of its name and location as well as the names of any dependent repositories. Make sure to preserve the case and any spaces in the names.

- 2 Install the BRM software on the target servers, and modify the cmdLine.properties file (and, if necessary, the customAnt.xml file).

These steps are described in Chapter 2, "Installing the BRM Tool," on page 5 and Chapter 6, "Customizing the BRM Tool," on page 39.

- 3 Use the BRM tool to perform a backup of the target configuration.

This step is a precaution in case of errors during the restoration and migration processes. Give this backup a different name from the name you gave the source backup, because later you will copy the source backup folders to the target servers, and you do not want the backups to overwrite one another.

Create the Backup of the Source Configuration

- 1 Cross-platform migrations: If you are migrating between Windows and UNIX, set the **cross.platform** property in the `cmdLine.properties` file to **true** before performing the backup.

After the backup is complete, make sure that the **metadata_component** folder of the backup contains a `*.cport` file for each repository that is defined in your installation—for example, `Foundation.cport` and `Solutions.cport`.

- 2 On each machine in the configuration, run the **brmagent** command.

Note: If you are running BRM on UNIX, run the BRM agent (`brmagent.sh`) and the BRM controller (`brmCmdLine.sh`) in separate shell sessions. Running these scripts from the same shell session (that is, by running `brmagent.sh` in the background) can suspend the BRM backup or restore. △

- a At a command prompt, change your current directory to **SESContent**.
- b Type one of the following commands:

Windows

```
brmagent.bat [--allow-shutdown]
```

UNIX

```
./brmagent.sh [--allow-shutdown]
```

- 3 On the controller machine, start an additional command line in the **SESContent** directory and type one of the following commands:

Windows

```
brmCmdLine.bat backup [path]
```

UNIX

```
./brmCmdLine.sh backup [path]
```

(Optional) You can specify a *path* that overrides the **backup.location** value in the `cmdLine.properties` file. Specify a full pathname.

Restore the Data to the Target Configuration

- 1 Copy the backup directories from the source servers to the corresponding machines of the target server configuration.

Use the same path on each of the target servers (for example, **C:/temp/mybackup**). If you are migrating from a Windows configuration to a UNIX configuration, make sure to use a binary transfer rather than ASCII.

Note: If you used a networked file store for your backup, then this step is not necessary as long as the directory is accessible from the target servers. △

- 2 Cross-platform migrations: If you are migrating between Windows and UNIX, set the **cross.platform** property in the `cmdLine.properties` file of the target configuration to **true** before performing the restoration.
- 3 On each machine in the configuration, run the **brmagent** command.

- a At a command prompt, change your current directory to **SESContent**.
- b Type one of the following commands:

Windows

```
brmagent.bat [--allow-shutdown]
```

UNIX

```
./brmagent.sh [--allow-shutdown]
```

If **--allow-shutdown** is specified, the agent processes exit when they are finished. Otherwise, you must stop the processes manually after the backup or restoration is complete.

- 4 On the target controller machine, start an additional command line in the **SESContent** directory and type one of the following commands:

Windows

```
brmCmdLine.bat restore [path]
```

UNIX

```
./brmCmdLine.sh restore [path]
```

You can also specify a *path* that overrides the **backup.location** value in the `cmdLine.properties` file. In the case of a restoration, this value is the backup directory on the source configuration. Specify a full pathname.

Note: If the source and destination configurations are both using Apache as the WebDAV server, then WebDAV content is restored automatically. If you are using Xyθος, you will need to restore the Xyθος content manually (see “Restore Xyθος Content in a Migration” on page 29). △

If there are errors in the log file, see “Recover from Errors in the Restoration Process” on page 19.

Re-Create Repositories (Windows-to-UNIX Migration)

If you are migrating from a Windows platform to a UNIX platform, you must perform the steps listed here.

Note: Perform the first two steps before you restart the metadata server on the target configuration. △

- 1 Change your current directory to **SAS-config-dir/Utilities/SESContent/config**.
- 2 At a command prompt, run this command:


```
./unix-restore-metadata.sh
```
- 3 Re-create the foundation repository:
 - a Restart the metadata server.
 - b Log on to SAS Management Console as the administrative user (sasadm).
 - c When you see a dialog box that indicates that there are no repositories, click **OK** to create the foundation repository.
Accept all the defaults.
- 4 Re-create the dependent repositories:

Perform the following steps for each repository other than the foundation repository. Refer to the list repository names that you made in “Prepare the Target Configuration” on page 25.

- a Navigate to **Metadata Manager ► Active Server**.
- b Right-click **Active Server** and select **Add Repository**.

The repository type should be **Custom**. Add any repository dependencies that existed on the source configuration. For example, the Performance Management, HR, and Finance repositories all depend on the Solutions repository as well as on the foundation repository.

The engine type should be **BASE**. The **Path** must be a relative path in the form **MetadataServer/MetadataRepositories/Repository-name**. Remove any spaces in *Repository-name*. For example, **Performance Management** would become **PerformanceManagement**.

For more information, see the online Help for the Metadata Manager.

Note: A workaround is available for the following problem.

Problem: While running the unix-restore-metadata.sh script, the process fails after the following error messages are written to the logs:

ERROR: Unable to port repository data set OLDRPOS.DS_DEFN variable ne because at least one character in observation 1

ERROR: Unable to port repository data set OLDRPOS.DS_DEFN variable va because at least one character in observation 1

ERROR: Unable to port repository data set OLDRPOS.DS_DEFN variable lo because at least one character in observation 1

Explanation: The error messages pertain to data set DS_DEFN, a data set that is produced by the server subsequent to running OMAPORT. This data set contains performance-related data for the Windows environment from which the user is porting. The data will not be valid in AIX; the server will create a new DS_DEFN data set as it runs under AIX.

Suggested workaround: Remove data set DS_DEFN from the repository and run OMAPORT again. △

Re-Create the Resource Templates

Delete and re-create the resource templates:

- 1 Log on to SAS Management Console as the administrative user (sasadm).
- 2 In the foundation repository, navigate to **Metadata Manager ► Resource Templates**.
- 3 Make a note of the number of templates that appear in the right pane.
This number (typically 69 or 71) appears in the lower left corner of the status bar.
- 4 Select all the templates that appear in the right pane.
- 5 Right-click and select **Delete**.
- 6 In the navigation tree, right-click **Resource Templates** and select **Add Resource Template**.
- 7 In the Add Resource Template wizard, select **Typical** and click **Next**.
- 8 In the list of templates, click **Select All**. Then click **Next**.

- 9 To add templates for a locale other than English, select the locale and click the right arrow button. Click **Next**.
 - 10 Review your selections and click **Finish**.
 - 11 When the operation is complete, highlight **Resource Templates** and select **View ► Refresh**.
 - 12 Again check the status bar to see the current number of resource templates. If you have fewer templates than the number you noted in Step 3, repeat Steps 6 through 12 until all the templates have been re-created.
- Note:* If you see the message **Existing Resource Templates Found**, click **OK** to continue. △

Restore Xythos Content in a Migration

If the **dav.server.type** property in `cmdLine.properties` is set to **Xythos** (the default), then during a backup BRM runs WFSDump and backs up the contents of the Xythos WebFile Server. To restore this content, use the WFSRestore utility, as follows:

- 1 If the SAS Web Administrator user is authenticated on the local machine, modify the login for that user if necessary:
 - a Log on to SAS Management Console as an administrator.
 - b Open the properties for the SAS Web Administrator.
 - c On the **Logins** tab, edit the properties for the user login.
 - d If you are migrating from one Windows configuration to another Windows configuration, change the domain specification in the **User ID** field.
 - e If you are migrating from a Windows configuration to a UNIX configuration, remove the domain specification. For example, if the **User ID** is **MYDOMAIN\saswbadm**, change it to **saswbadm**.
 - f Modify the password to match the password for this user on the destination system. Otherwise, the WFSRestore utility will fail.
- 2 Re-initialize the WebDAV server:
 - a Stop the Xythos service.
 - b At a command prompt, set the current directory to **Xythos-install-dir\Config**.
 - c Run the appropriate configuration script:

Windows

```
run_config.bat
```

UNIX

```
./run_config
```

On the Global schema page, select the **Create databases?** check box. For details about running this script, refer to the installation instructions for your Xythos WebFile Server.

- 3 If you previously configured Xythos to use an external storage location, delete the contents of that directory but do not delete the directory itself.
- 4 On the target machine, open the WFSDump.xml file for editing. This XML file is located in the **backup.location/webdav_component/davdump** directory.

- 5 In this file, edit any machine names that are included in domain-qualified user IDs. For example, you would modify **mymachine** in this line:

```
<property>{http://www.sas.com/rnd/itech/WebDAV}publisherAlias="sassrv"
  "mymachine\sasdemo"</property>
```

However, you would not edit **mymachine** in a line such as this (the WFSRestore utility will modify those names):

```
<resource name="/sasdav/Users/sasdemo.mymachine/PR/MyResults/">
```

- 6 Navigate to the path where the Xythos utilities are installed:
xythos-install-dir\custom\bin.
- 7 At a command prompt, enter the following command:

Windows

```
WFSRestore.bat path
```

UNIX

```
./WFSRestore path
```

where *path* is the path to the directory that contains WFSDump.xml and the content resource files.

WFSRestore writes the folders and files to the WebDAV repository. For each resource, the utility assigns the properties that are specified in WFSDump.xml.

- 8 Modify the BIP Tree content mapping in metadata as follows:
- a Log on to SAS Management Console as the administrative user (sasadm).
 - b In the Foundation repository, navigate to **Environment Management ► BIP Manager ► BIP Tree**.
 - c Right-click **BIP Tree** and select **Properties**.
 - d Select the **Content Mapping** tab in the **BIP Tree Properties** dialog box.
 - e Correct the user ID. In the **User ID** field, change the old domain prefix (the part of the login ID before the backslash [\] character) to the new metadata server name. If you are moving from Windows to UNIX, remove the domain prefix (and remove the backslash [\] character) so that the user name is **saswbadm**.
 - f Correct the password. Make sure that the password is the correct password for the **saswbadm** user on this system.
 - g Repeat these steps for the Solutions, HR, and Finance repositories.

Restore Library Files

The BRM tool archives all of the files in a library if both of these conditions exist:

- The **backup.sas.library.dirs** property in the cmdLine.properties file is set to **true**.
- In addition, the library definition in the metadata repository refers to a location that is accessible from the stored process server.

The BRM tool does not restore these files automatically. After the restoration, check for these files and move their contents to the proper locations. For details, see “Manually Restore Library Files” on page 18.

Restore the MySQL sqladmin Password

If the **backup.all.databases** property was set to **true** in the `cmdLine.properties` file, then all MySQL data, including MySQL user names, passwords, and permissions, was copied from the source system to the destination system.

If the sqladmin password differed between the source system and the destination system, you must restore the original sqladmin password on the destination system.

Run the Migration Command

Modify the migrate.ini File

On the target server where you will run the migration command, modify the **SESContent\config\migrate.ini** file. The file contains information such as the location of the `setinit.sss` file, the fully qualified machine name that hosts each component, and the path to the MySQL installation.

- 1 Copy the appropriate `migrate.ini.template` file to `migrate.ini`, if you have not already done so.

There are two template files provided in the **config** directory:

- `migrate.ini.template-winwin`, for migrating between two Windows installations
- `migrate.ini.template-winunix`, for migrating from a Windows installation to a UNIX installation.

- 2 Edit the `migrate.ini` file as necessary. In particular, make the following changes:
 - In the **[stored_process_dirs]** section, modify the **.from.Prefix** and **.to.Prefix** properties to reflect the locations of stored process directories on the destination system.
 - Modify the **[logins]** section to control the way user logins are modified during migration. If you are migrating from Windows to UNIX, you will typically set **from.Domain** to contain the user login domain of the source configuration and set **to.Domain** to be an empty string (**to.Domain=**).

In this file, the **From** property refers to the source servers; the **To** property refers to the target servers.

For details about modifying the `migrate.ini` file, see the comments in the file.

Run the Command

- 1 On the controller machine, start a command line in the **SESContent** directory.

Note: The **brmagent** does not need to be running for a migration. △

- 2 Type one of the following commands:

Windows

```
brmCmdLine.bat migrate
```

UNIX

```
./brmCmdLine.sh migrate
```

Modify Metadata References

The BRM migration command finds and updates most references to the source machines in the metadata. A few references still must be updated manually.

To modify the TCP/IP connection information for the ODCS server, follow these steps:

- 1 Log on to SAS Management Console as an administrator.
- 2 In the Solutions repository, navigate to **Application Management ► Configuration Manager**.
- 3 Right-click **SAS Solutions Services - Operations Data and Compute Server** and select **Properties**.
- 4 On the **Connection** tab, enter the correct **Host Name** for the ODCS server.
- 5 In the foundation repository, navigate to **Environment Management ► Foundation Services Manager ► Remote Services ► BIP Remote Services OMR**.
- 6 Right-click **Platform Service Registry** and select **Properties**.
- 7 On the **TCP/IP Connection** tab, enter the correct **Host Name** for the server that is running the BIP Remote Services.

For assistance in finding and updating any remaining instances of the source machine name, contact your SAS representative.

Restore the OLAP Server Startup Configuration

In order to be able to start the OLAP servers after a migration has been performed, some additional steps are required. For each OLAP server that is installed, refer to the following table and perform these steps:

Repository	Server Name	Product Directory
Finance	Finance-OLAP	OLAPServer_Finance
HR	HR-OLAP	OLAPServer_HR
Performance Management	PerfMgmt-OLAP	OLAPServer_PerfMgmt
Solutions	Solution-OLAP	OLAPServer_Solution

- 1 Log on to SAS Management Console as the administrative user (sasadm).
- 2 Select a repository from the table.
- 3 Navigate to **Server Manager ► *server name***.
- 4 Right-click ***server name* - Logical OLAP Server** and select **Properties**.
- 5 On the **General** tab, select the text that follows **ID:** and copy it to the clipboard. Save this text using Notepad or another text editor until it is needed later.
- 6 In the Windows or UNIX file system, navigate to ***SAS-config-dir\SASMain\product-directory***.

The *product-directory* is a value from the table.

7 Edit the appropriate OLAP startup file, as follows:

Windows

- a Open the sasv9_OLAPServer.cfg file for editing.
- b Search for a line that resembles the following:

```
-objectserverparms "cel=credentials server='omsobj:LogicalServer\
A5M7HAHA.AJ000001'"
```

- c Replace the server metadata ID (such as **A5M7HAHA.AJ000001**) with the value that you copied earlier from SAS Management Console.
- d Save the file.

UNIX

- a Open the OLAPServer.sh file for editing.
- b Search for a line that resembles the following:

```
OLAPSERVER="'omsobj:LogicalServer\\A5M7HAHA.AJ000001'"
```

- c Replace the server metadata ID (such as **A5M7HAHA.AJ000001**) with the value that you copied earlier from SAS Management Console.
- d Save the file.

After following these steps, you should be able to successfully start the OLAP servers.

Update Passwords

If the passwords are different between the source and target configurations, then you must update certain user passwords in the metadata repository so that they match the passwords that are used on the target configuration. This task must be performed after the migration process has completed.

On the target configuration, begin by logging on to SAS Management Console and selecting the foundation repository. Then follow these steps to change the passwords:

- SAS General Servers Group
 - 1 In the User Manager, open the properties for the SAS General Servers group.
 - 2 Click the **Logins** tab.
 - 3 Edit the password for the sassrv login and save your changes.
- Solutions Users Group
 - 1 Open the properties for the Solutions Users group.
 - 2 Click the **Logins** tab.
 - 3 Edit the password for the sasspusr login and save your changes.
- SAS Trusted User

Use the Foundation Services Manager to change this password, as follows:

 - 1 In the navigation tree, find **Foundation Services Manager ► ID Portal Local Services ► BIP Local Services OMR**.
 - 2 Right-click **BIP User Services** and select **Properties**.
 - 3 Click the **Services Configuration** tab and then click **Edit Configuration**.
 - 4 Click the **Users** tab.
 - 5 Select the **domain\sastrust** user and click **Edit**.

- 6 In the dialog box that appears, change the password in the two text boxes to match the password for sastrust on that server.
- 7 Save your changes.


Modify Port Numbers for the Web Applications

If you are migrating between a host that is using the BEA WebLogic application server and one that is using the IBM WebSphere application server, you must update the port numbers in the metadata records for each Web application. Follow these steps:

- 1 Log on to SAS Management Console as the administrative user (sasadm).
- 2 Select the foundation repository.
- 3 Navigate to **Application Management ► Configuration Manager**.
- 4 For each application that is listed under **Configuration Manager**, do the following:
 - a Right-click the application name and select **Properties**.
 - b Click the **Connection** tab.
 - c Modify the **Port Number** field so that it matches the port number of the deployed application (on the target machine).
 - For WebLogic, you can find the port numbers for deployed applications in the config.xml file that is located in **BEA-home-dir\user_projects\domains\SASSolutions**. Alternatively, you can log on to the administrative console. The **Targets** tab for each application lists the servers to which the application was deployed. The **Configuration ► General** tab for each server shows the Listen port for that server.
 - For WebSphere, you can find the port numbers for each server by logging on to the administrative console and navigating to **Application Servers ► server name ► Web Container ► HTTP Transport**.
 - d Save your changes.
- 5 Select each of the other repositories in turn (other than Detail Data Store) and modify the port numbers for each of the Web applications that are listed under **Configuration Manager**.

Refresh Scorecard Diagrams

Unless both the source and destination configurations are Windows systems that use Apache as the WebDAV server, users will need to refresh their scorecard diagrams after migration so that the diagrams will display correctly. Users should follow these steps:

- 1 Log on to the portal.
- 2 In each Performance Diagram portlet, click the **Refresh Data** icon () in the lower left corner.

Re-Create Cubes and SAS Information Maps

If you have installed SAS Human Capital Management (HCM), you must re-create the HCM cubes and SAS Information Maps after a migration, as follows:

- 1 Log on to SAS Data Integration Studio with a profile that specifies HR as the default repository.
Create a new profile if necessary.
- 2 On the **Inventory** tab, delete any cubes and SAS Information Maps that are listed in the HR repository.
- 3 Run the jobs to re-create the cubes.
- 4 Update the Create HCM Information Maps job to specify the user and password. The password can be encrypted.
- 5 Run the Create HCM Information Maps job.

For instructions about running these jobs, see the *SAS Solutions Services: Data Administration Guide*.

Modify the Path for the HCM Locale Properties File

If you have HCM installed, after migration, perform the following steps:

- 1 Log in to the Portal.
- 2 Select **Administer SAS Human Capital Management**.
- 3 Select the **General** tab.
- 4 Select **Configuration** in the list on the left.
- 5 Edit the path in the **Property file path** text box to specify the appropriate path for the new machine. (For example, in a Windows-to-UNIX migration, the old file path might be **C:\Program Files\SAS\SAS 9.1\hrds\sasmisc**. In that case, you should replace the old file path with a file path that is similar to the following: **SASHOME/misc/hrds**, where **SASHOME** is the SAS 9.1 installation directory.
- 6 Click **Apply**.

Additional Post-Migration Steps (Windows-to-UNIX Migrations)

These tasks are necessary only if you are migrating from a Windows environment to a UNIX environment:

- Restore the server launch commands; see “Modify Server Launch Commands” on page 36.
- Remove the prefixes from login names; see “Modify Login Names” on page 37.
- Modify stored process settings; see “Modify the Execution Settings for Stored Processes” on page 37.
- Modify permissions on the **Data** directory; see “Modify the Data Directory Permissions” on page 38.
- Modify the sashelp library location; see “Modify the SASHELP Library Location” on page 38

Modify Server Launch Commands

If you are migrating from a Windows environment to a UNIX environment, restore the server launch commands, as follows:

- 1 Log on to SAS Management Console as the administrative user (sasadm).
- 2 Select the foundation repository.
- 3 Modify the command for the workspace server:
 - a Navigate to **Server Manager ► SASMain ► SASMain - Logical Workspace Server ► SASMain - Workspace Server**.
 - b Right-click **SASMain - Workspace Server** and select **Properties**.
 - c Click the **Options** tab.
 - d Under **Launch Commands**, modify the **Command** text box so that it contains this value:

```
SAS-config-dir/Levl/SASMain/sas.sh
```

Replace *SAS-config-dir* with the path to the SAS configuration directory.

- 4 Modify the command for the stored process server:
 - a Navigate to **Server Manager ► SASMain ► SASMain - Logical Stored Process Server ► SASMain - Stored Process Server**.
 - b Right-click **SASMain - Stored Process Server** and select **Properties**.
 - c Click the **Options** tab.
 - d Under **Launch Commands**, modify the **Command** text box so that it contains this value:

```
SAS-config-dir/Levl/SASMain/StoredProcessServer/sas_SPS.sh
```

Replace *SAS-config-dir* with the path to the SAS configuration directory.

- 5 Modify the command for the SAS DATA Step Batch Server, if it is installed:
 - a Navigate to **Server Manager ► SASMain ► SASMain - Logical SAS DATA Step Batch Server ► SASMain - SAS DATA Step Batch Server**.
 - b Right-click **SASMain - SAS DATA Step Batch Server** and select **Properties**.
 - c Click the **Options** tab.
 - d From the **SubType** drop-down list, select **UNIX**.
 - e Modify the **Command** text box so that it contains this value:

```
SAS-config-dir/Levl/SASMain/BatchServer/sasbatch.sh
```

Replace *SAS-config-dir* with the path to the SAS configuration directory.

- f Modify the **Logs Directory** text box so that it contains this value:

```
SAS-config-dir/Levl/SASMain/BatchServer/logs
```

- 6 Modify the command for the connect server, if it is installed:
 - a Navigate to **Server Manager ► SASMain ► SASMain - Logical SAS/CONNECT Server ► SASMain - Connect Server**.
 - b Right-click **SASMain - Connect Server** and select **Properties**.
 - c Click the **Options** tab.
 - d Modify the **SASCMD Option** text box so that it contains this value:

```
SAS-config-dir/Levl/SASMain/sasconnect.sh
```

Replace *SAS-config-dir* with the path to the SAS configuration directory.

Modify Login Names

If you configured the **[logins]** section of the migrate.ini file before running the BRM migration command, as recommended in “Run the Migration Command” on page 31, then the *machinename* prefix will have already been stripped from the user login IDs. In that case, you can skip the remainder of this section.

If you are migrating from Windows to UNIX, you must edit the user login properties and remove the *machinename* prefix from the user IDs. It is particularly important to remove the prefixes for the following standard users and groups before attempting to start the Java application server:

- ☐ SAS Administrator
- ☐ SAS Trusted User
- ☐ SAS Guest
- ☐ SAS Demo User
- ☐ SAS Web Administrator
- ☐ Solutions Role Administrator
- ☐ Solutions Installer
- ☐ Solutions Users
- ☐ SAS General Servers.

To modify the user IDs:

- 1 Log on to SAS Management Console as the administrative user (sasadm).
- 2 Select the foundation repository.
- 3 Navigate to **User Manager**.
- 4 For each user whose user ID you want to change, do the following:
 - a Right-click the user name and select **Properties**.
 - b Click the **Logins** tab.
 - c Select the login entry and click **Modify**.
The Edit Login Properties dialog box appears.
 - d In the **User ID** field, remove the *machinename* prefix.
 - e Click **OK**.
- 5 Click **OK**.

Modify the Execution Settings for Stored Processes

In a Windows-to-UNIX migration, log on to SAS Management Console as the administrative user (sasadm). For each repository, do the following:

- 1 In the navigation tree, select **BI Manager**.
- 2 For each stored process or ETL job that is located in any of the folders under **BI Manager**, do the following:
 - a Navigate to the stored process—for example, **BI Manager ► BIP Tree ► Documents ► SAS Content ► Data Management ► Solutions Data Mart ► Import Users and Groups**.
 - b Right-click the stored process icon and select **Properties**.
 - c Click the **Execution** tab.
 - d In the **Source code repository** field, verify that the directory name is correct.

On UNIX installations, stored processes are located in the **!sasroot/sasstp/[finance, hrds, scorecard, soltnsdata]** directory, where **!sasroot** is the actual name of the SAS root directory and **finance**, **hrds**, **scorecard**, and **soltnsdata** are subdirectories of **sasstp**.

Check the directory name closely. For example, the directory name might appear as **/usr/local/SAS/SAS_9.1/soltnsdata/sasstp**, although the correct location might be **/usr/local/SAS/SAS_9.1/sasstp/soltnsdata**.

If the correct path does not appear in the list, click **Manage** and add the path to the list. Then select the correct path.

- e In the **Source file** field, verify that the name of the stored process uses lowercase letters (for example, **sdm_imp.sas** rather than **Sdm_Imp.sas**). If necessary, modify the name.
- f Click **OK** to save these settings.

Repeat these steps for each stored process and ETL job in every folder under **BI Manager** in every repository, using the appropriate name in each **Source code repository** setting and **Source file** setting.

Modify the Data Directory Permissions

In the target configuration of a Windows-to-UNIX migration, modify the permissions on the **Data** directory by running this command:

```
chmod -R 775 SAS-config-dir/Levl/Data
```

In place of *SAS-config-dir*, substitute the path to the SAS configuration directory.

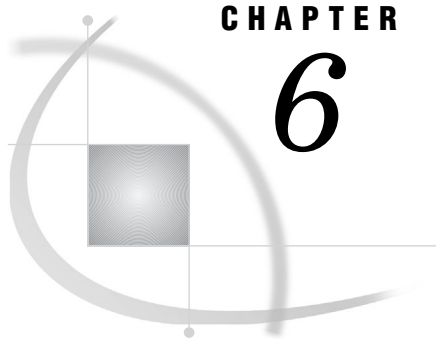
Modify the SASHELP Library Location

In the target configuration of a Windows-to-UNIX migration, modify the Sashelp library location by performing the following steps:

- 1 Log on to SAS Management Console as the administrative user (sasadm) and select the Detail Data Store repository.
- 2 Select **Data Library Manager ► SAS Libraries ► SAS Supplied**.
- 3 Right-click **SAS Supplied** and select **Properties**.
- 4 In the SAS Supplied Properties window, select the **Options** tab.
- 5 Change the path specification from **!SASROOT/soltnsdata/sashelp** to **!SASROOT/sashelp** by selecting the current path and clicking **Edit**.
- 6 Click **Yes** in the warning dialog box. (You can change this path even though it contains files or might be used elsewhere.)

Restart All Servers

After performing all the post-migration steps, restart all the servers in the target configuration so that your changes will take effect.



CHAPTER

6

Customizing the BRM Tool

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Overview of Customizing the BRM Tool

BRM delegates most backup and restoration operations to the BRM agent, which in turn does its work by means of a special built-in version of Apache Ant. The Ant tasks are defined in the **SESContent/config** directory, in two files: **agentAnt.xml** and **customAnt.xml**.

If you want to customize the BRM tool, begin by copying the **customAnt.xml.template** file to **customAnt.xml**. Do not modify **agentAnt.xml**. It might be helpful to examine the **agentAnt.xml** file to understand how BRM works and to get ideas for custom Ant tasks. However, if this file changes in later versions of the BRM tool, it would be difficult to merge your changes with an updated version of the file.

Ant tasks that are defined in **customAnt.xml** and activated in **cmdLine.properties** can be used to create new BRM components in place of the predefined components, in order to modify the behavior of BRM.

Note: If your BRM customizations do not appear to have taken effect, make sure that your modified BRM configuration files, such as **customAnt.xml**, are the same on every machine. △

How agentAnt.xml and customAnt.xml Work

If it exists, **customAnt.xml** is imported into **agentAnt.xml** at run time. Tasks that are defined in **customAnt.xml** do not override tasks that are defined in **agentAnt.xml** but rather supplement these tasks. If two tasks of the same name are defined both in **agentAnt.xml** and in **customAnt.xml**, the task in **agentAnt.xml** is used and the task in **customAnt.xml** is ignored.

Tasks are grouped by components. In the **cmdLine.properties** file, a component is activated and assigned to a specific machine. Then the tasks for that component are defined, either in **agentAnt.xml** or in **customAnt.xml**. For example, this line in **cmdLine.properties** activates the metadata component and assigns it to host name **host1.domain.com**:

```
metadata_component=host1.domain.com
```

When a BRM backup or restoration is performed, the BRM tool runs the corresponding tasks in `agentAnt.xml`:

Task	When the Task is Run
<code>stop_metadata_component</code>	before backup or restoration
<code>start_metadata_component</code>	after backup or restoration
<code>backup_metadata_component</code>	during backup
<code>restore_prepare_metadata_component</code>	after <code>stop_metadata_component</code> but before <code>restore_metadata_component</code>
<code>restore_metadata_component</code>	during restoration
<code>restore_clean_metadata_component</code>	if the restoration completes without errors (optional task)
<code>restore_recover_metadata_component</code>	if the restoration fails (optional task)

Each of these task definitions can be found in `agentAnt.xml`. They look similar to the following code (line breaks inserted for readability):

```
<target name="start_metadata_component">
  <service OS="windows" action="start"
    service="{METADATA_SERVICE_NAME}"/>
  <service OS="unix" action="start" service="{SSCMountPoint}/{SSC}/
    ${level}/{applicationDirectory}/MetadataServer/MetadataServer.sh"/>
</target>
```

Learning More About Ant

You can find more general information about Ant commands at <http://ant.apache.org/manual/index.html>.

Note: Be aware that the Ant manual on the Web site is for the latest version of Ant. BRM uses Ant 1.6.5. To obtain the documentation for Ant 1.6.5, download the Ant source code ZIP file at <http://archive.apache.org/dist/ant/source/apache-ant-1.6.5-src.zip> and extract the documentation, which is located in the `apache-ant-1.6.5/docs` directory. \triangle

Overriding the Built-In BRM Commands for a Component

Imagine that you want to override the default commands for restoring the Xythos WebDAV content. This scenario is a likely one, because this version of the BRM tool simply displays a warning message for Xythos restoration.

Follow these steps:

- 1 If you have not already done so, rename `customAnt.xml.template` to `customAnt.xml`.

- 2 In agentAnt.xml, find all of the targets with names that end in **_webdav_component**. Copy each of these targets and paste them into customAnt.xml. Make sure to include the **properties_webdav_component** target.

Note: Be careful not to alter the structure of the XML document; for example, pay attention to nesting of tags. △

- 3 Modify all of the target names in a consistent fashion.

For example, you might change **backup_webdav_component** to **backup_webdav2_component**.

- 4 In the cmdLine.properties file, find the line that activates the WebDAV component and replace it with the new component name.

In this example, you would find this line:

```
webdav_component=host1.domain.com
```

The new value would be:

```
webdav2_component=host1.domain.com
```

- 5 In the customAnt.xml file, modify the commands in your new targets, as needed. For example, in the **restore_webdav_component** target, in place of this text:

```
<echo level="warning">Xyθος WFSRestore must be run manually</echo>
```

you would substitute actual Ant commands to perform the restoration.

- 6 If there are some Ant targets for this component whose code you do not want to change, replace the Ant commands with a call back to the original target in agentAnt.xml.

In the current example, to preserve the functionality of **backup_webdav_component**, you would modify your **backup_webdav2_component** target as follows:

```
<target name=backup_webdav2_component">
    <ant antfile="config/agentAnt.xml" target="backup_webdav_component"/>
</target>
```

You might create similar components for OLAP servers. For details, read the comments in the customAnt.xml.template file.

Properties That Are Available to agentAnt.xml and customAnt.xml Files

Inside an Ant command file, any text of the form **\${property-name}** is replaced by the value of the corresponding property. When the BRM tool runs the Ant engine, it sets up the following properties:

Variable	Example
SSCMountPoint	Windows: C:\SAS UNIX: /usr/local/sas
SSC	SASSolutionsConfig
level	Lev1
applicationDirectory	SASMain

These variable values are automatically extracted from the SOLUTIONS_SAS_SERVER_DIR property value in the install properties files. For example, on a data-tier machine, the soltnsdata.properties file contains this line:

```
SOLUTIONS_SAS_SERVER_DIR=C:\\SAS\\SASSolutionsConfig\\Lev1\\SASMain
```

In that case, BRM starts at the end of the path and sets the variable values as follows:

For the last directory name (**SASMain**), BRM sets this variable:

```
applicationDirectory
```

For the second-to-last directory name (**Lev1**), BRM sets this variable:

```
level
```

For the third-to-last directory name (**SASSolutionsConfig**), BRM sets this variable:

```
SSC
```

For the remaining directory name (**C:\\SAS**), BRM sets this variable:

```
SSCMountPoint
```

Note: These variable names, like all property names, are case-sensitive. \triangle

Additionally, any properties that are specified in the properties files in **SAS-config-dir** (soltnsdata.properties, soltnsmid.properties, and mysqldb.properties) are loaded. You can reference these properties as you would any Ant variable, by using the key from the properties file as the variable name. You can also reference any of the properties that are defined in the cmdLine.properties file. Make sure that the contents of these files accurately reflect your configuration.

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