

Module 13: Recovering a NetWorker Server

Upon completion of this module, you should be able to:

- List prerequisites for recovering a NetWorker server
- List the steps required to completely rebuild a NetWorker server
- Recover the media database, resource files and client file indexes
- Describe the functions of **scanner**

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Module 13: Recovering a NetWorker Server 1

This module focuses on the recovery of data residing on the NetWorker server. We will look at the recovery of control data:

- The NetWorker resource database
- Media database information
- Client file index data

Module 13: Recovering a NetWorker Server

Lesson 1: NetWorker Server Recovery Prerequisites

During this lesson the following topics are covered:

- NetWorker bootstrap reports
- Backing up the media and resource databases
- Backing up the client file indexes



This lesson covers the prerequisites for recovering a NetWorker server, including the NetWorker bootstrap reports and backups of the media database, resource database, and the client file indexes.

Prerequisites for Recovering a NetWorker Server


- A bootstrap save set must have been backed up.
- The bootstrap report should be available.
- Client file index save sets should have been backed up.

Bootstrap Report


bootstrap save set

- Media DB
- Resource Directory

```
June 02 14:25 2011 leg1-win10's bootstrap information Page 1
date      time      level  ssid      file  record  volume
5/10/2011 12:34:48 PM Full  3502860585 0      0      01
5/10/2011 12:34:48 PM Full  3502860585 0      0      01.RO
5/10/2011 12:49:18 PM Full  3318312078 0      0      01
5/10/2011 12:49:18 PM Full  3318312078 0      0      01.RO
5/10/2011 4:20:59 PM Full  3133775403 0      0      01
5/10/2011 4:20:59 PM Full  3133775403 0      0      01.RO
5/10/2011 4:20:59 PM Full  3133775403 0      0      leg1_win10_c_001
5/10/2011 4:20:59 PM Full  3133775403 0      0      leg1_win10_c_001.RO
5/10/2011 4:29:41 PM Full  2932449333 0      0      01
5/10/2011 4:29:41 PM Full  2932449333 0      0      01.RO
5/10/2011 4:29:41 PM Full  2932449333 0      0      leg1_win10_c_001
5/10/2011 4:29:41 PM Full  2932449333 0      0      leg1_win10_c_001.RO
6/2/2011  2:25:23 PM Full  2699548052 0      0      01
6/2/2011  2:25:23 PM Full  2699548052 0      0      01.RO
```



index:client_name1
index:client_name2
...

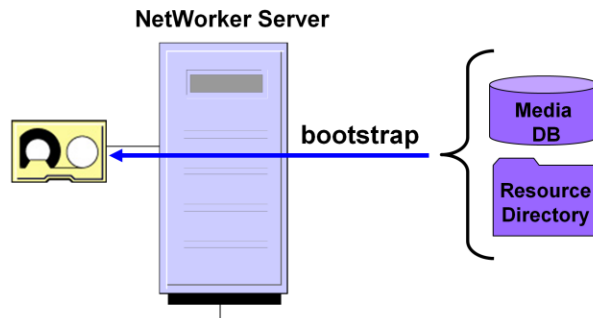


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Although it should be obvious, a NetWorker server's control data can only be recovered if it has been previously backed up. That is why the bootstrap and CFI save sets are automatically backed up during server-initiated backups.

Having a copy of the bootstrap report handy facilitates the recovery. Without the report you may not know which volume contains the bootstrap save set. Although a manual method of locating the proper volume is described later in this module, it can be very time-consuming.

Backing Up the Media DB and Resource Files



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Module 13: Recovering a NetWorker Server 4

To completely rebuild a NetWorker server, recovery of the bootstrap save set is the first step. Until the media database and resource files are restored, you will not be able to recover any other data, as NetWorker will not have knowledge of either volumes or clients.

The bootstrap save set is automatically backed up during server-initiated backups. The **savegrp** command is responsible for backing up the save set and creating the bootstrap report.

The Bootstrap Report

- The bootstrap report contains information required by `nsrdr` to recover the NetWorker server.
- The **Bootstrap** notification determines where the bootstrap report is sent:
 - ▶ The default action is to email the report to the default email recipient (root/administrator).
 - ▶ You can modify the existing notification.

Jun 02 15:27:37	leg1-win10:	leg1-win10's bootstrap information	Page 1
date	time	level ssid	file record volume
5/10/2011	12:34:48 PM	full 3502860585	0 0 01
5/10/2011	12:34:48 PM	full 3502860585	0 0 01.RO
5/10/2011	12:49:18 PM	full 3318312078	0 0 01
5/10/2011	12:49:18 PM	full 3318312078	0 0 01.RO
5/10/2011	4:20:59 PM	full 3133775403	0 0 01
5/10/2011	4:20:59 PM	full 3133775403	0 0 01.RO
5/10/2011	4:20:59 PM	full 3133775403	0 0 leg1_win10_c_001
5/10/2011	4:20:59 PM	full 3133775403	0 0 leg1_win10_c_001.RO
5/10/2011	4:29:41 PM	full 2932449333	0 0 01
5/10/2011	4:29:41 PM	full 2932449333	0 0 01.RO
5/10/2011	4:29:41 PM	full 2932449333	0 0 leg1_win10_c_001
5/10/2011	4:29:41 PM	full 2932449333	0 0 leg1_win10_c_001.RO
6/2/2011	2:25:23 PM	full 2699548052	0 0 01
6/2/2011	2:25:23 PM	full 2699548052	0 0 01.RO
6/2/2011	2:38:11 PM	full 2481445011	0 0 01
6/2/2011	2:38:11 PM	full 2481445011	0 0 01.RO
6/2/2011	3:16:31 PM	full 2296897935	0 0 01
6/2/2011	3:16:31 PM	full 2296897935	0 0 01.RO
6/2/2011	3:25:34 PM	full 2162680772	2 0 DFE05200

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Module 13: Recovering a NetWorker Server 5

For each bootstrap save set backed up in the last 40 days, the bootstrap report lists its save set ID (SSID) and the name of the volume on which it is located. The report also shows the exact location (file and record number) of the save set on the volume. Although not absolutely required during a bootstrap recovery, this information speeds up positioning of the volume to the proper location.

You should save the bootstrap report every time a bootstrap save set is created.

The preconfigured **Bootstrap notification** controls how the bootstrap report is saved. The bootstrap report is, by default, sent as an email to the default email recipient (administrator or root). The email recipient and the method of sending the report (e.g. send to printer instead) can be changed by modifying the **Action** attribute of the **Bootstrap** notification.

Important: You should make sure you are receiving the bootstrap information. If the bootstrap notification is configured for email and an email recipient is not configured, the bootstrap reports are lost. When a recipient is later configured, the reports are generated during the next `savegrp` operation. If configured to the printer (not the default configuration) and fails for any reason, the bootstrap information is appended to the savegroup completion report. It is recommended to send/save the bootstrap report to a host other than the NetWorker server for disaster recovery purposes.

Note: To send the bootstrap report to multiple destinations (for example to a printer and to an email address) you can either create additional notifications with the same event and priority but with a different action, or place the full pathname to a custom script in the action field of the notification.

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Backing Up the Client File Indexes

- During a group backup, the CFI of each client in the group is backed up automatically.
- The backup level of a client's CFI save set is determined by the backup level of the client.
 - ▶ Uses the same level as the client for all full and level backups.
 - ▶ Uses level 9 if the client is performing an incremental backup.
- To back up only CFI and bootstrap save sets, use:

```
savegrp -l full -O group_name
```



During a server-initiated backup, `savegrp` will automatically back up the client file index of each client in the group. The level of the CFI backup is determined by the level of the client backup during that save group:

- Full and Level 1-9 backups of a client result in the CFI being backed up at the same level as the client.
- Incremental backups of a client results in a Level 9 CFI backup.

To perform a full backup of the bootstrap save set and the client file indexes of all clients in a group, use:

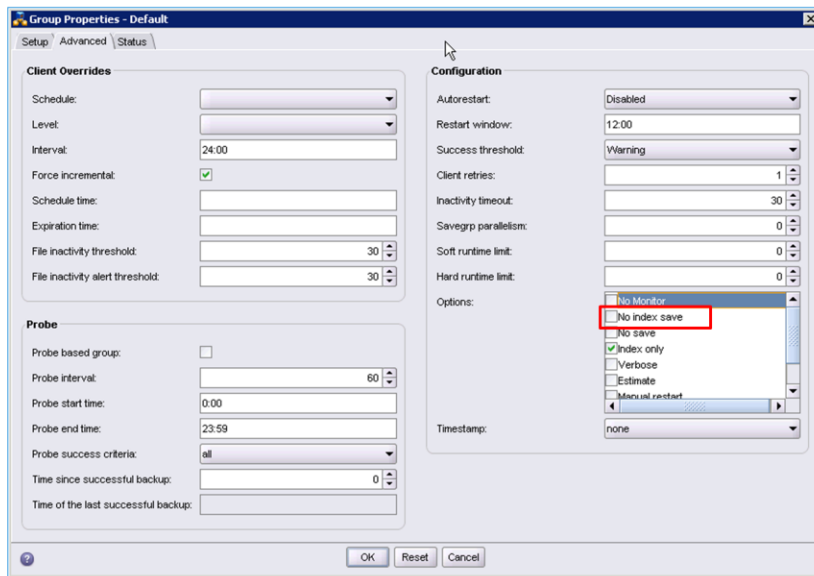
```
savegrp -l full -O group_name
```

Note: Although recovery of the bootstrap save set is required during recovery of a NetWorker server, recovery of individual client file index save sets is optional. A client file index provides a browsable interface during recovery, as well as the ability to easily recover a host to a particular point in time. If these benefits are not immediately necessary, you may decide to not recover the CFI of individual (or all) clients, especially if an index is extremely large.

If you choose not to recover a client's index, you must use `nsrck` to create an empty CFI prior to the next backup of the client.

```
nsrck client_name
```

CFI Only Backups In NetWorker Administration



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Module 13: Recovering a NetWorker Server 7

In addition to using the `savegrp -O` command, you can also select the **Index only** option on the **Advanced** properties of the group to backup only client file indexes. This can be particularly useful when configuring a single group to backup all indexes, as could be done when used in conjunction with the **No index save** option on other groups.

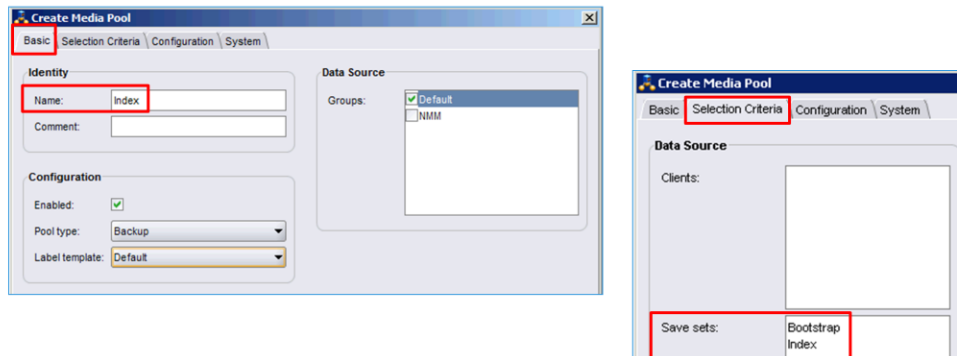
Note: Running the `savegrp` command with the `-I` option disables the saving of each client's index.

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Directing NetWorker Control Data to a Separate Pool

Configure a separate media pool:

- ▶ Name = Index
- ▶ Pool Type = Backup
- ▶ Save Sets = Bootstrap, index



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Module 13: Recovering a NetWorker Server 8

As a best practice, it is recommended to write all bootstrap and client file index backups to a dedicated pool. To send the bootstrap and client file indexes to the same media pool, create a pool resource with these attribute values:

- **Name:** Index
- **Pool type:** Backup
- **Save Sets:** Bootstrap
index

Also, check the group(s) for which you want this action to apply. When the group's scheduled backup runs, the client save sets are written to a volume labeled for the appropriate save set pool and the bootstrap and index save sets are written to a separate volume that has been labeled for the index pool.

Client	Save Set	SSID	Save Time
nwwindows...	C:\Windows\system32	3396134243	10/3/12 6:24:50 PM
nwwindows...	C:\Program Files\EMC NetW...	3412911458	10/3/12 6:24:46 PM
winclient.em...	C:\WUTemp\Java	3429688646	10/3/12 6:24:14 PM
winclient.em...	C:\WUTemp\Common Files	3446465850	10/3/12 6:24:07 PM
winclient.em...	C:\WUTemp\inf	3463243064	

Client	Save Set	SSID	Save Time
nwwindows...	bootstrap	3345802677	10/3/12 6:26:13 PM
nwwindows...	index:nwwindows.emc.edu	3362579891	10/3/12 6:26:10 PM
nwwindows...	index:winclient.emc.edu	3379357060	10/3/12 6:24:53 PM

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Module 13: Recovering a NetWorker Server

Lesson 1: Summary

During this lesson the following topics were covered:

- NetWorker bootstrap reports
- Backing up the media and resource databases
- Backing up the client file indexes

The EMC logo is located in the bottom right corner of the slide. It consists of the letters "EMC" in a bold, white, sans-serif font, with a small superscript "2" to the right of the "C". The logo is set against a blue background that spans the width of the slide.

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Module 13: Recovering a NetWorker Server

This lesson covered the prerequisites for recovering a NetWorker server, including the NetWorker bootstrap reports and backups of the media database, resource database, and the client file indexes.

Module 13: Recovering a NetWorker Server

Lesson 2: Recovering the NetWorker Server

During this lesson the following topics are covered:

- Recovering the NetWorker bootstrap save set
- Recovering the client file indexes



This lesson covers the procedures for recovering the NetWorker server, including recovering the NetWorker bootstrap data as well as the client file indexes.

Recovering the NetWorker Server

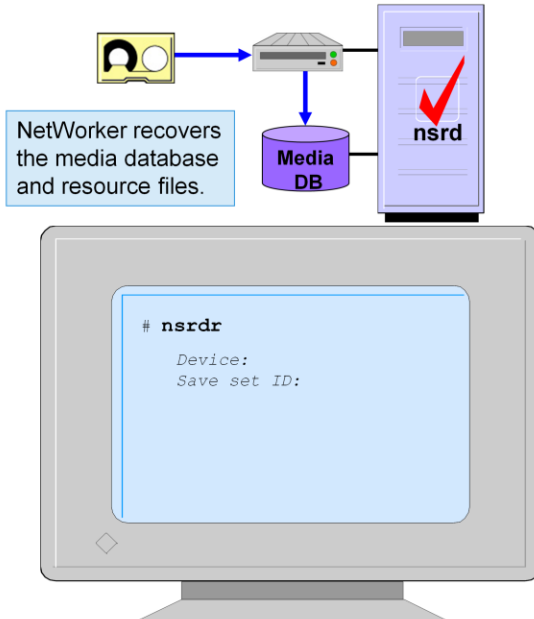
1. Verify the functionality of non-NetWorker components (hardware, operating system, devices, network, etc.).
2. Install the NetWorker server software.
3. Configure a NetWorker device resource.
4. Recover the bootstrap save set and client file indexes using **nsrdr**.



The slide summarizes the steps needed to perform a complete recovery of a NetWorker server. The steps assume that the original server is no longer available and a new NetWorker server is being configured. Several of the steps are discussed further on the following pages.

1. Before installing NetWorker, verify the functionality of the server it is being installed on.
2. To recover the bootstrap save set, NetWorker must already be installed. Thus, it is necessary to perform a default installation of the NetWorker server. The original default resource files will be installed, in addition to an empty media and jobs database.
3. After starting all the NetWorker daemons/services, the only customization you must perform to the default NW installation is to create a device resource for the device used to recover the bootstrap save set.
4. Use `nsrdr` to recover the bootstrap save set and optionally recover the client file indexes.

Recovering the Bootstrap Save Set: `nsrdr`



1. Confirm that NetWorker processes are running.
2. Place the bootstrap volume in a drive.
3. Execute `nsrdr` and respond to the prompts.

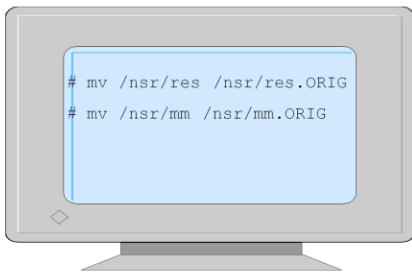
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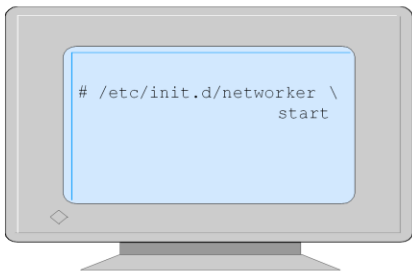
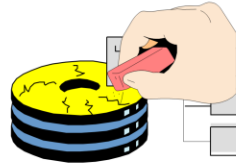
Module 13: Recovering a NetWorker Server 12

1. All NetWorker processes must be running prior to executing `nsrdr`.
2. Configure a NetWorker device resource and insert the volume containing the bootstrap save set into the device.
3. Using `nsrdr` is the only method of recovering the bootstrap save set.
`nsrdr` is interactive, prompting for the SSID of the bootstrap save set being recovered. It also prompts you to automatically recover the client file indexes.

Starting NetWorker if Control Data is Corrupt



1. Move the media database and/or the resource directory.



2. Start NetWorker.

NetWorker creates an empty media database and a set of default resource files.

3. Configure a device resource to support the device to be used by `nsrdr`.

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Module 13: Recovering a NetWorker Server 13

It is possible that corruption of the media database or resource files is severe enough that the NetWorker processes cannot start. However, recovering the bootstrap save set with `nsrdr` requires that NetWorker be running.

When `nsrd` starts, if the media database does not exist, it creates an empty one. Thus, remove or rename a damaged `/nsr/mm` directory before starting NetWorker. `nsrdr` can then be used to recover a recent backup of the media database.

Similarly, if corrupt resource files cause `nsrd` to abort during startup, simply remove or rename the `/nsr/res` directory. When `nsrd` starts, if `/nsr/res` does not exist, `nsrd` will create the same default set of resources that are configured when NetWorker server software is initially installed. After configuring a device resource, you can then use `nsrdr` to recover a recent backup of the resource directory.

Note: Renaming a corrupt `/nsr/mm` or `/nsr/res` directory is recommended instead of removing it. After `nsrdr` has successfully recovered a good bootstrap save set, the renamed directory can be removed.

Locating a Recent Bootstrap Save Set

The screenshot shows the Windows Event Viewer interface. The 'Event Viewer (Local)' window displays a list of events under the 'Application' category. The event log is filtered to show 10,887 events. The selected event is an 'Information' event from 4/8/2009 at 8:08:20 PM, sourced from 'NetWorker' and categorized as 'Savegroup'. The 'Event Properties' window shows the event details, including the date, time, source, category, type, event ID, user, and computer name (LEG1-WIN8). The description of the event is as follows:

```
"leg1-win8 bootstrap
"leg1-win8 bootstrap
"leg1-win8 bootstrap April 08 20:08 2009 leg1-win8's bootstrap
information Page 1
"leg1-win8 bootstrap
"leg1-win8 bootstrap date time level:ssid file record
volume "leg1-win8 bootstrap 4/8/2009 8:08:18 PM full
4225580146 4225580146 0 BootStrapANDindex.0
```

Below the Event Viewer, a command prompt window shows the following commands and output:

```
C:\Program Files\Legato\nsr\logs>nstr_render_log -S 04/01/2010 -E 04/02/2010 -O nstrd daemon.raw > temp.log
C:\Program Files\Legato\nsr\logs>notepad temp.log
C:\Program Files\Legato\nsr\logs>_

/nstr/logs/daemon.raw

C:\Program Files\Legato\nsr\logs>scanner -B \\.\Tape1
8909:scanner: using '\\.\Tape1' as the device name
8936:scanner: scanning LTO Ultrium tape DFE05Z00 on \\.\Tape1
8761:scanner: done with LTO Ultrium tape DFE05Z00
8919:scanner: Bootstrap 2162680772 of 6/02/11 15:25:34 located on volume DFE05Z00, file 2.
```

The EMC logo is visible in the bottom right corner of the screenshot.

If you do not have the bootstrap report and therefore do not know on which volume the most recent bootstrap save set resides, there are several methods of determining the volume.

On a Windows NetWorker server, the Event Viewer should contain Application Log entries with a category of **Savegroup**. View the most recent entry and look for information pertaining to the bootstrap save set.

The `daemon.raw` file in the NetWorker server log directory may also contain an entry showing which volume the most recent bootstrap save set was written to.

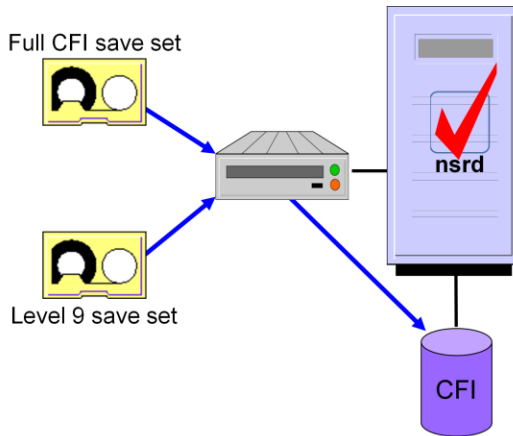
If the previous methods do not provide a volume name, another option is to use the `scanner` command with the `-B` option to locate information about bootstrap save sets. This method requires that you guess which volume contains the most recent bootstrap save set and manually load it into a drive before running `scanner`.

`scanner -B` reads an entire volume and displays information about the most recent bootstrap save set found. Depending on the size of the volume and the speed of the device, this process can sometimes be lengthy. If the most recent bootstrap save set on the volume is not the one you want, load another volume into the drive and run `scanner` again.

Note: `scanner` reads the volume directly without using `nstrmmd`. Therefore, it is not necessary that NetWorker services be running.

Recovering Client File Indexes: `nsrck -L7`

```
nsrck -L7 [ -t date ] [ client ]
```



1. Ensure that NetWorker server processes are running.
2. Enter the command:
`nsrck -L7 client_name`
 - The most recent full save set of the index is recovered.
 - The most recent save set of each level is recovered.

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Module 13: Recovering a NetWorker Server 15

To recover client file indexes:

1. Verify that the NetWorker server daemons/services are running.
2. Execute the `nsrck -L7` command.

If no client name is provided, `nsrck` recovers all client file indexes. It uses the media database and resource files to determine the list of clients. When all CFIs are recovered, you cannot control the order in which they are recovered.

To control the order in which client indexes are recovered or to restrict the recovery to specific client indexes, one or more **client_name** arguments, separated by white space, must be provided to `nsrck`.

`nsrck` automatically recovers a CFI to its most recent condition, recovering the last full backup and any dependent save sets. The `-t` option, followed by a date in `nsr_getdate(3)` format, can be used to recover a CFI to its condition at a previous point in time. See the *NetWorker Command Reference Guide* for more information.

Important: When recovering an index that already contains entries, the entries being recovered are MERGED with the existing entries.

Module 13: Recovering a NetWorker Server

Lesson 2: Summary

During this lesson the following topics were covered:

- Recovering the NetWorker bootstrap saveset
- Recovering the client file indexes



This lesson covered the procedures for recovering the NetWorker server, including recovering the NetWorker bootstrap data as well as the client file indexes.

Module 13: Recovering a NetWorker Server

Lesson 3: Recovering NetWorker Control Data

During this lesson the following topics are covered:

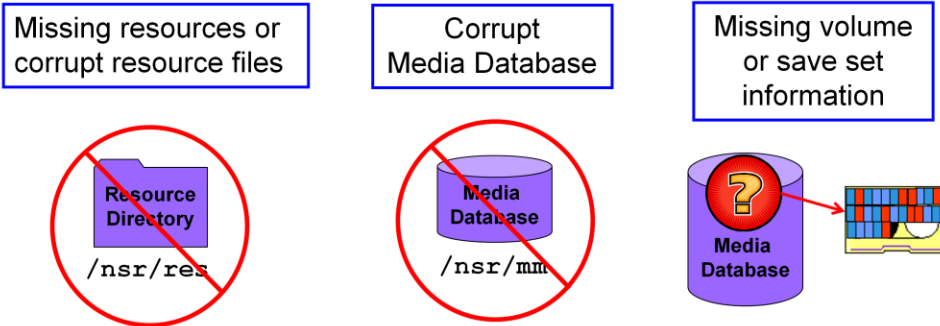
- Recovering only the media database
- Recovering only the resource database



This lesson covers the processes for recovering only specific subsets of the NetWorker server control data, including the recovery of only the media database and only the resource database.

Recovery - Corrupt or Missing Control Data

Possible Conditions



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Module 13: Recovering a NetWorker Server 18

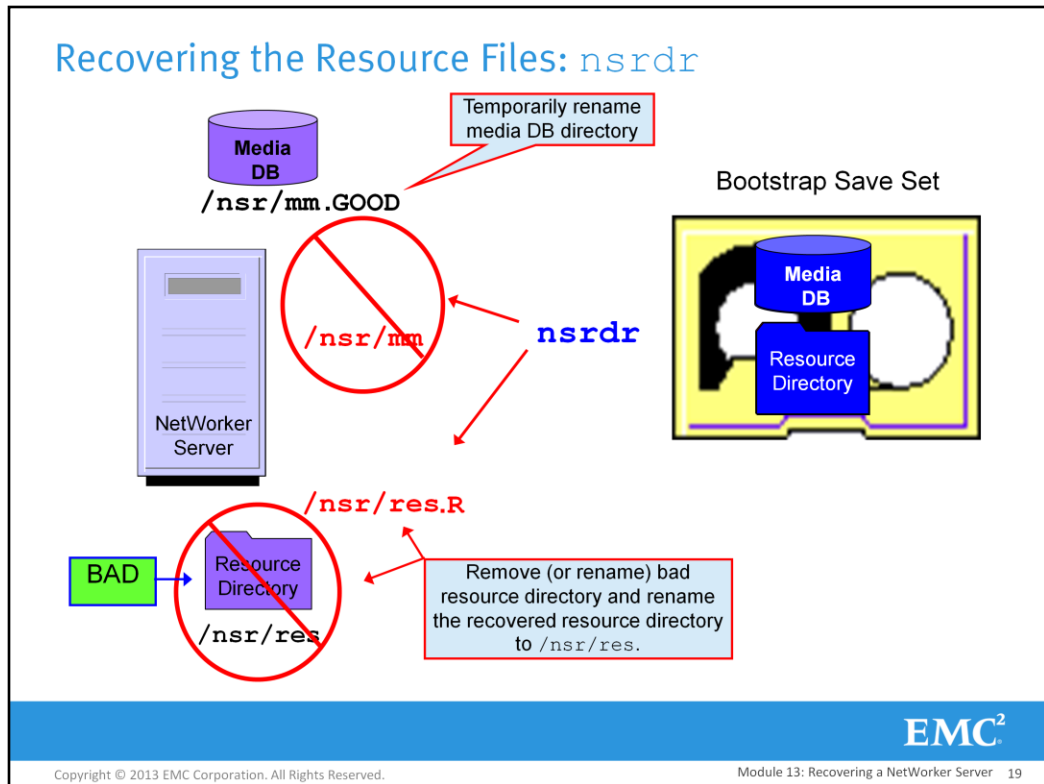
There may be situations where the entire NetWorker server does not need to be recovered. The media database may be damaged, corrupted, or missing important information, but the resource directory is perfectly fine. Conversely, NetWorker resources may have been accidentally or maliciously deleted or modified, requiring that only the resource directory be recovered.

Recovering either the media database or the resource directory still requires that you use `nsrdr` to recover the entire bootstrap save set. However, tasks performed before or after running `nsrdr` vary for different situations.

To insert missing volume or save set information into the media database, a command called `scanner` is used to scan a volume and insert information directly into the media database (and optionally, client file indexes) while reading the volume.

The conditions shown in the slide are discussed on the following pages.

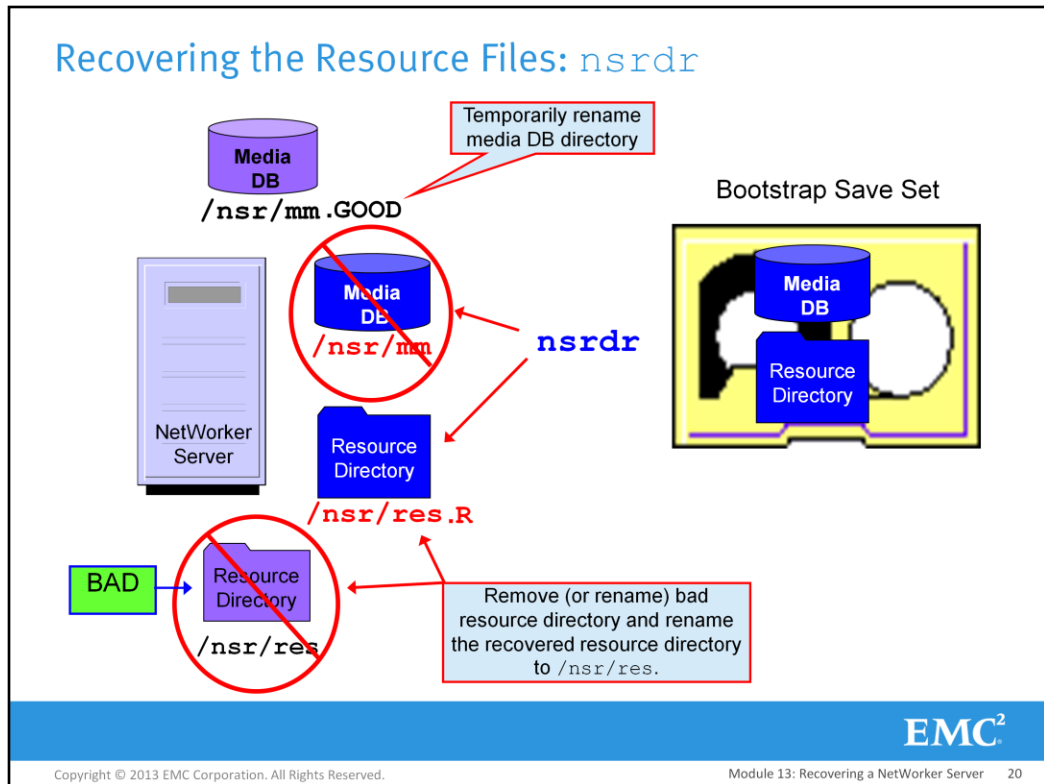
Recovering the Resource Files: `nsrdr`



If the media database is fine and recovery of the resource directory is all that is desired, perform the following steps:

1. Shut down NetWorker.
2. Rename the media database directory (`/nsr/mm`) BEFORE running `nsrdr`. This should be done so that the existing media database will not be overwritten; it is possible that additional save sets were generated via cloning or client-initiated backups after the most recent bootstrap backup was performed. This information would be lost if the existing media database was overwritten by the bootstrap save set.
3. Restart NetWorker.
4. Execute `nsrdr`. This recovers the `/nsr/mm` directory and places the recovered resource files in `/nsr/res.R`.
5. Shut down all NetWorker daemons/services.
6. Remove the `/nsr/mm` directory that was recovered, because it is not needed, and change the name of the original media database directory back to `/nsr/mm`.
7. Remove the `/nsr/res` directory that contains the corrupted resource files, and rename `/nsr/res.R` to `/nsr/res`.
8. Restart NetWorker.

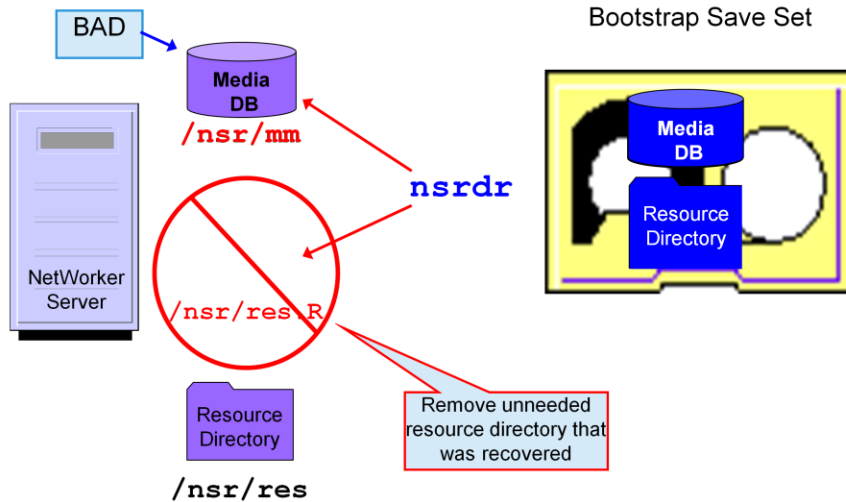
Recovering the Resource Files: `nsrdr`



If the media database is fine and recovery of the resource directory is all that is desired, perform the following steps:

1. Shut down NetWorker.
2. Rename the media database directory (`/nsr/mm`) BEFORE running `nsrdr`. This should be done so that the existing media database will not be overwritten; it is possible that additional save sets were generated via cloning or client-initiated backups after the most recent bootstrap backup was performed. This information would be lost if the existing media database was overwritten by the bootstrap save set.
3. Restart NetWorker.
4. Execute `nsrdr`. This recovers the `/nsr/mm` directory and places the recovered resource files in `/nsr/res.R`.
5. Shut down all NetWorker daemons/services.
6. Remove the `/nsr/mm` directory that was recovered, because it is not needed, and change the name of the original media database directory back to `/nsr/mm`.
7. Remove the `/nsr/res` directory that contains the corrupted resource files, and rename `/nsr/res.R` to `/nsr/res`.
8. Restart NetWorker.

Recovering the Media Database: `nsrdr`



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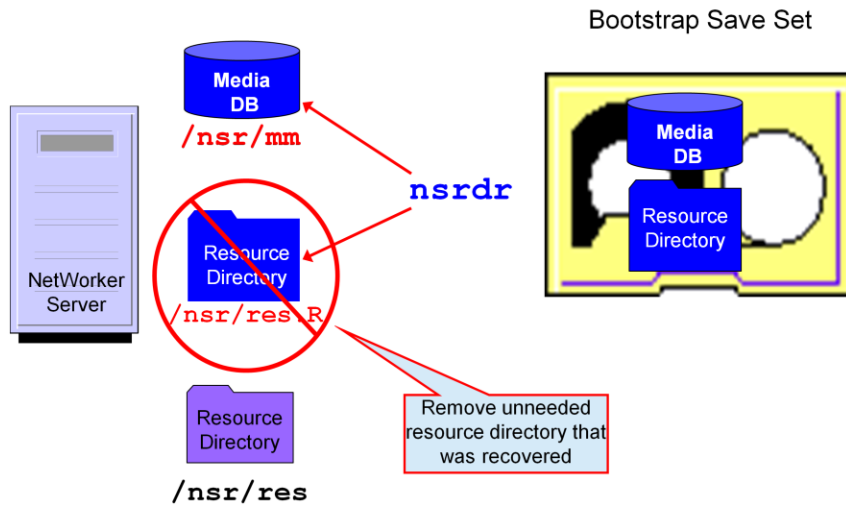
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Module 13: Recovering a NetWorker Server 21

If recovery of the media database is all that is desired, recover the bootstrap save set and then simply remove the `/nsr/res.R` directory. There is no need to shut down the NetWorker services to remove the directory.

Important: Before using `nsrdr` to recover the entire media database, you should attempt to correct the damage using `nsrck -m`.

Recovering the Media Database: `nsrdr`



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Module 13: Recovering a NetWorker Server 22

If recovery of the media database is all that is desired, recover the bootstrap save set and then simply remove the `/nsr/res.R` directory. There is no need to shut down the NetWorker services to remove the directory.

Important: Before using `nsrdr` to recover the entire media database, you should attempt to correct the damage using `nsrck -m`.

Module 13: Recovering a NetWorker Server

Lesson 3: Summary

During this lesson the following topics were covered:

- Recovering only the media database
- Recovering only the resource database



This lesson covered the processes for recovering only specific subsets of the NetWorker server control data, including the recovery of only the media database and only the resource database.

Lab 13: Recover NetWorker Server Control Data



In this lab, you will perform a recovery of the NetWorker media and resource databases and a client CFI.

- Lab Exercise 13-1: Recover the Bootstrap and CFI Save Sets

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Module 13: Recovering a NetWorker Server 24

In this lab you will:

- Perform a recovery of the bootstrap save set.
- Perform a recovery of the client file indexes.
- Verify that the recoveries were successful.

Module 13: Summary

Key points covered in this module include:

- Prerequisites for recovering a NetWorker server
- Steps required to completely rebuild a NetWorker server
- Recovering the media database, resource files and client file indexes
- Functions of scanner

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Module 13: Recovering a NetWorker Server

25

This module covered the recovery of data residing on the NetWorker server. We looked at how to recover NetWorker control data: the NetWorker resource database, media database information, and client file index data.

Course Summary

Key points covered in this course:

- Installation of NetWorker and NetWorker Management Console software
- Use of NetWorker resources and administrative interfaces
- Configuring and performing backups
- Configuring and managing backup devices
- Performing recoveries of client data and the NetWorker server
- Managing NetWorker databases
- Performing cloning and staging of save sets
- Administering the NetWorker Management Console and NetWorker servers
- How to back up and recover in VSS and cluster environments



This course covered topics related to the installation, configuration, maintenance and management of EMC NetWorker. Please take a moment to read the course summary.

Thank You!

