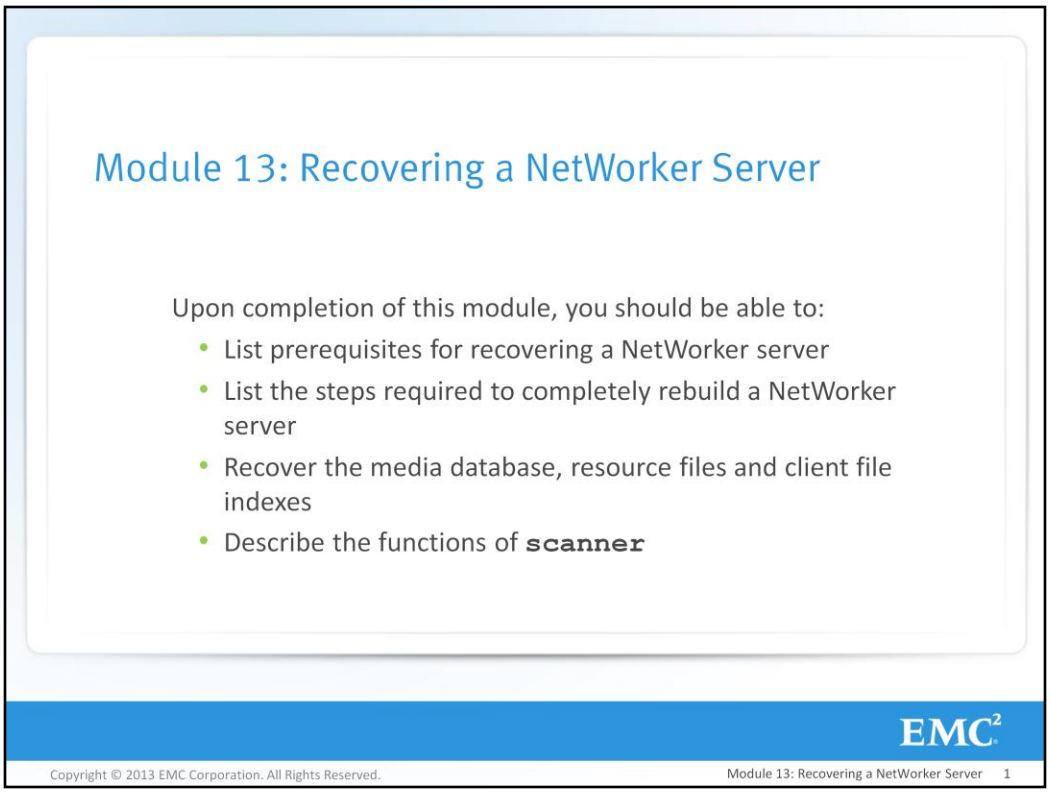
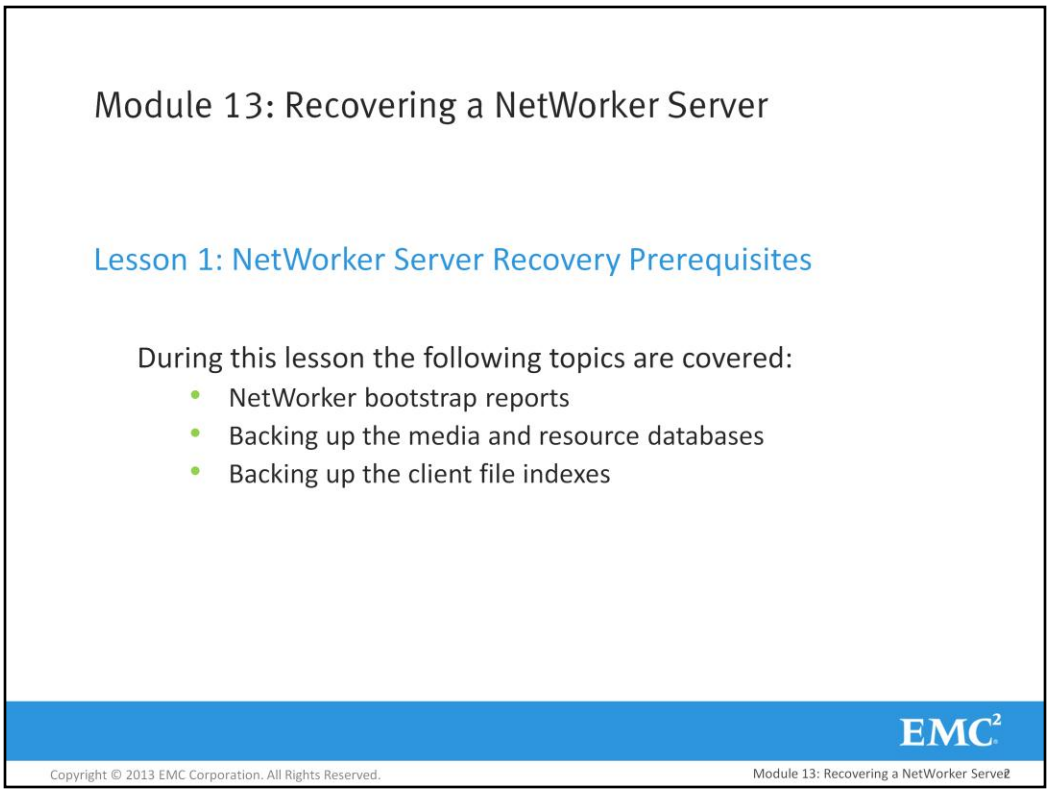
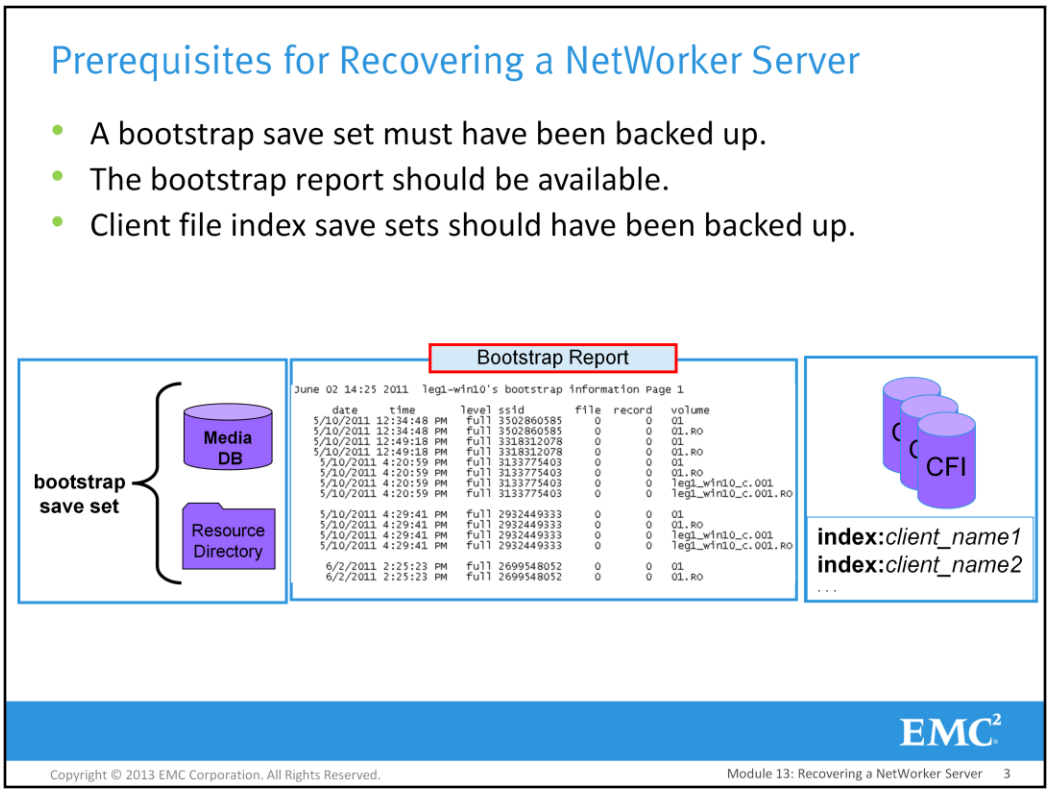


This module focuses on the recovery of data residing on the NetWorker server. We will look at the recovery of control data:

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

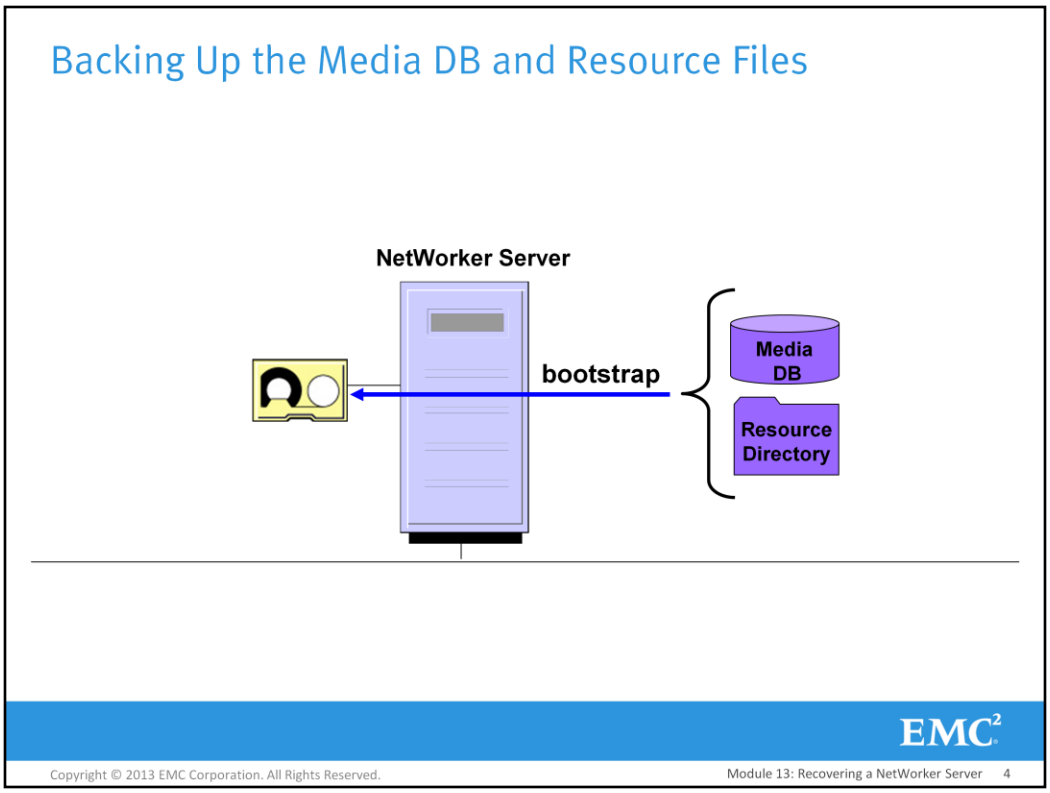


This lesson covers the prerequisites for recovering a NetWorker server, including the NetWorker bootstrap reports and backups of the media database, resource database, and the client file indexes.



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.



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: June 02 15:27 2011   leg1-win10's bootstrap information Page 1
Jun 02 15:27:37 leg1-win10:       date     time       level ssid        file  record   volume
Jun 02 15:27:37 leg1-win10:    5/10/2011 12:34:48 PM   full 3502860585     0       0   01
Jun 02 15:27:37 leg1-win10:    5/10/2011 12:34:48 PM   full 3502860585     0       0   01.RO
Jun 02 15:27:37 leg1-win10:    5/10/2011 12:49:18 PM   full 3318312078     0       0   01
Jun 02 15:27:37 leg1-win10:    5/10/2011 12:49:18 PM   full 3318312078     0       0   01.RO
Jun 02 15:27:37 leg1-win10:     5/10/2011 4:20:59 PM   full 3133775403     0       0   01
Jun 02 15:27:37 leg1-win10:     5/10/2011 4:20:59 PM   full 3133775403     0       0   01.RO
Jun 02 15:27:37 leg1-win10:     5/10/2011 4:20:59 PM   full 3133775403     0       0   leg1_win10_c.001
Jun 02 15:27:37 leg1-win10:     5/10/2011 4:20:59 PM   full 3133775403     0       0   leg1_win10_c.001.RO
Jun 02 15:27:37 leg1-win10:     5/10/2011 4:29:41 PM   full 2932449333     0       0   01
Jun 02 15:27:37 leg1-win10:     5/10/2011 4:29:41 PM   full 2932449333     0       0   01.RO
Jun 02 15:27:37 leg1-win10:     5/10/2011 4:29:41 PM   full 2932449333     0       0   leg1_win10_c.001
Jun 02 15:27:37 leg1-win10:     5/10/2011 4:29:41 PM   full 2932449333     0       0   leg1_win10_c.001.RO
Jun 02 15:27:37 leg1-win10:      6/2/2011 2:25:23 PM   full 2699548052     0       0   01
Jun 02 15:27:37 leg1-win10:      6/2/2011 2:25:23 PM   full 2699548052     0       0   01.RO
Jun 02 15:27:37 leg1-win10:      6/2/2011 2:38:11 PM   full 2481445011     0       0   01
Jun 02 15:27:37 leg1-win10:      6/2/2011 2:38:11 PM   full 2481445011     0       0   01.RO
Jun 02 15:27:37 leg1-win10:      6/2/2011 3:16:31 PM   full 2296897935     0       0   01
Jun 02 15:27:37 leg1-win10:      6/2/2011 3:16:31 PM   full 2296897935     0       0   01.RO
Jun 02 15:27:37 leg1-win10:      6/2/2011 3:25:34 PM   full 2162680772     2       0   DFE05Z00
```

EMC²

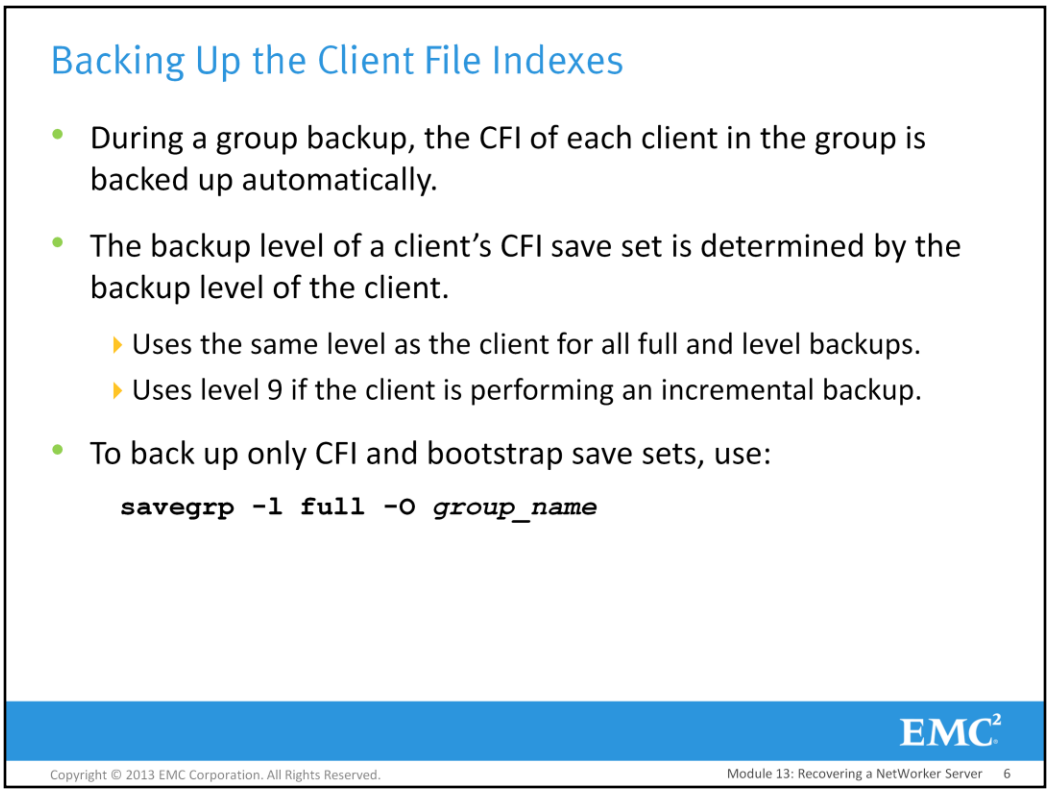
For each bootstrap save set backed up in the last 40 days, the bootstrap report lists its save set ID (SSID) and the name of the volume on which it is located. The report also shows the exact location (file and record number) of the save set on the volume. Although not absolutely required during a bootstrap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



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.

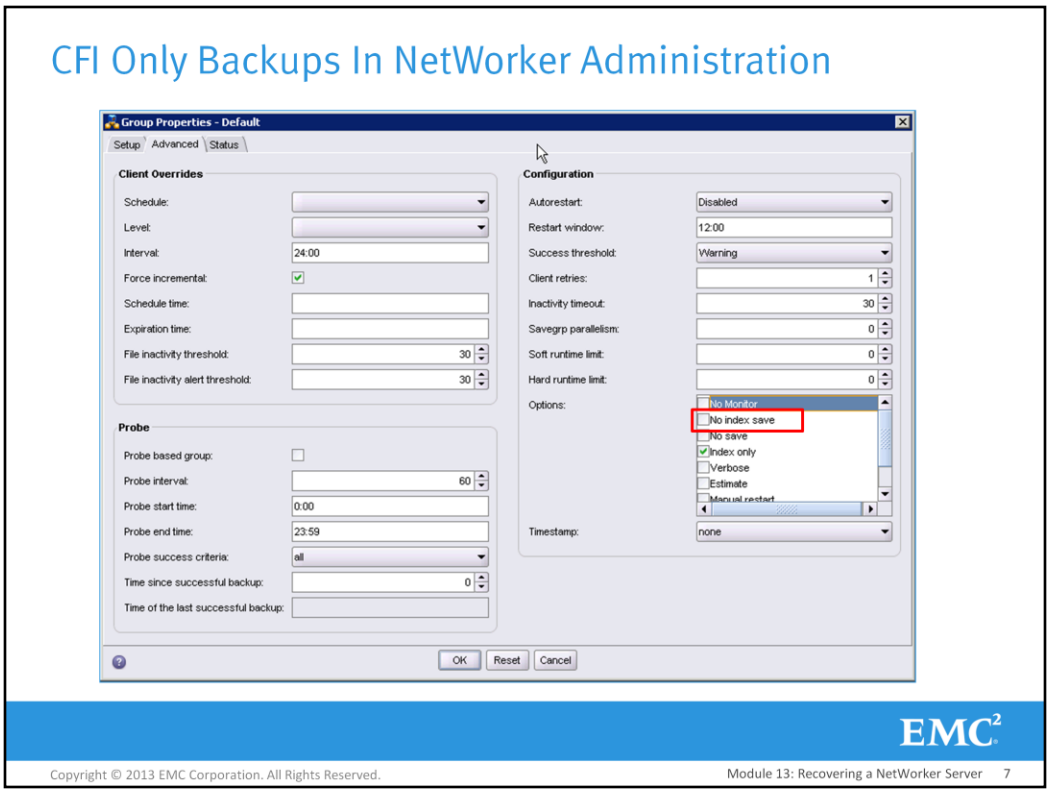
To perform a full backup of the bootstrap save set and the client file indexes of all clients in a group, use:

```
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
```



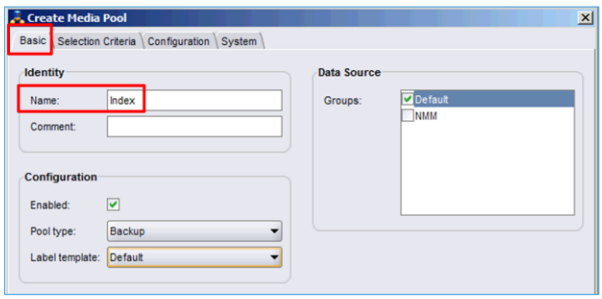
In addition to using the **`savegrp -O`** command, you can also select the **Index only** option on the ***Advanced*** properties of the group to backup only client file indexes. This can be particularly useful when configuring a single group to backup all indexes, as could be done when used in conjunction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

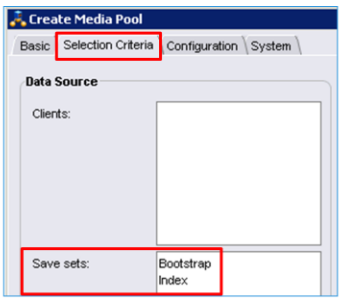
Note: Running the `savegrp` command with the `-I` option disables the saving of each client's index.

Directing NetWorker Control Data to a Separate Pool

Configure a separate media pool:

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

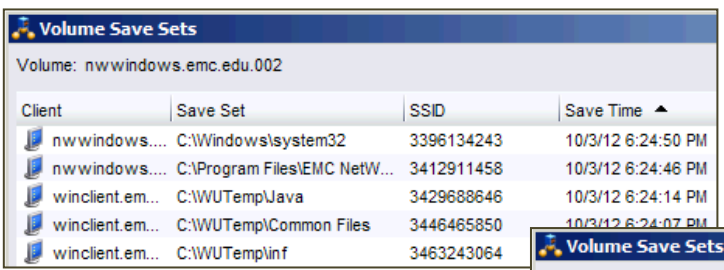


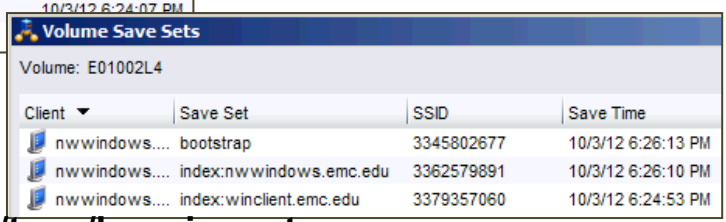


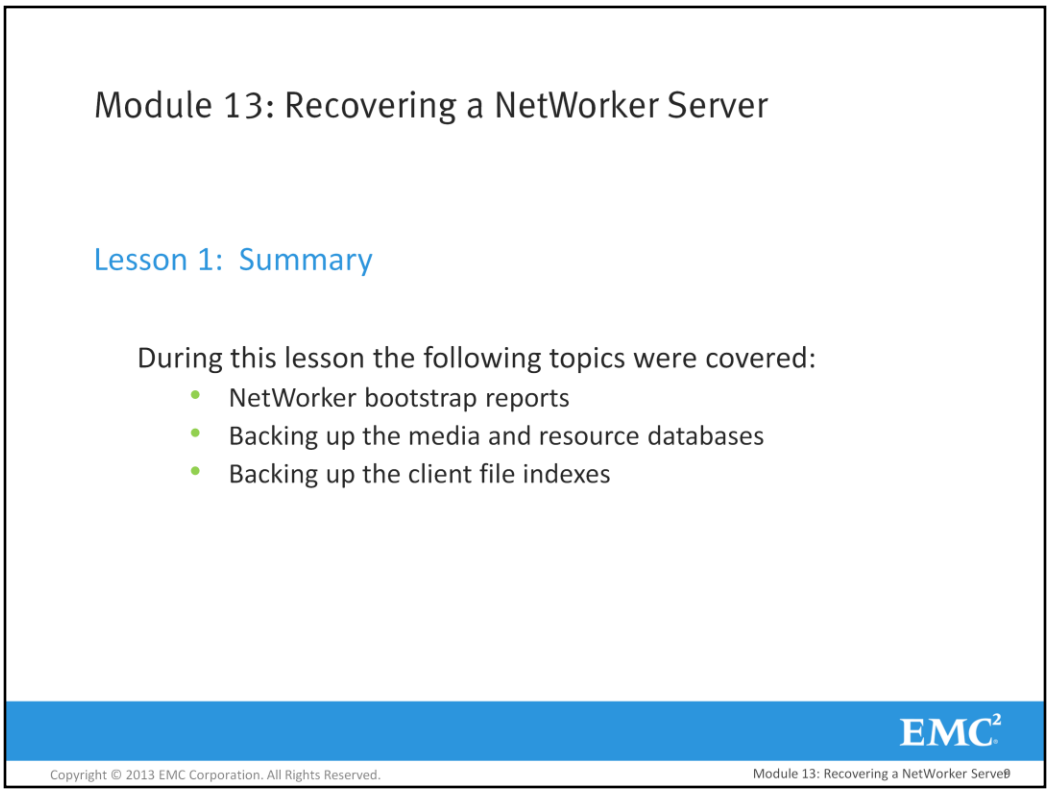
As a best practice, it is recommended to write all bootstrap and client file index backups to a dedicated pool. To send the bootstrap and client file indexes to the same media pool, create a pool resource with these attribute values:

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

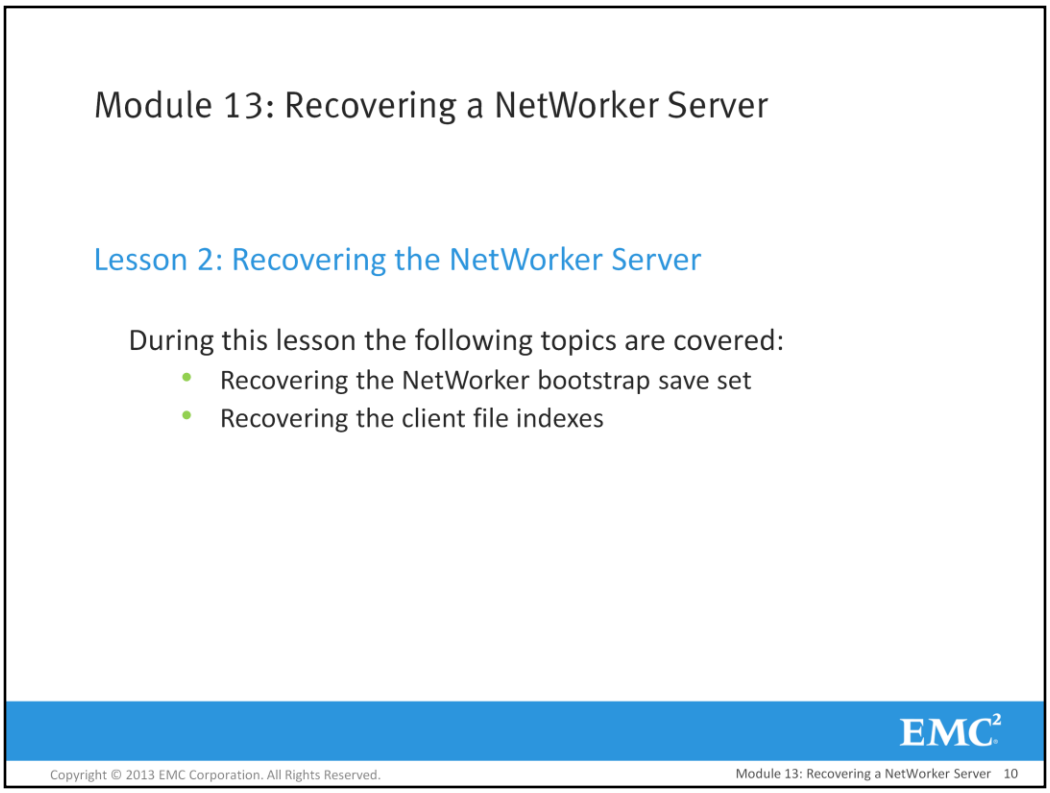
Also, check the group(s) for which you want this action to apply. When the group's scheduled backup runs, the client save sets are written to a volume labeled for the appropriate save set pool and the bootstrap and index save sets are written to a separate volume that has been labeled for the index pool.



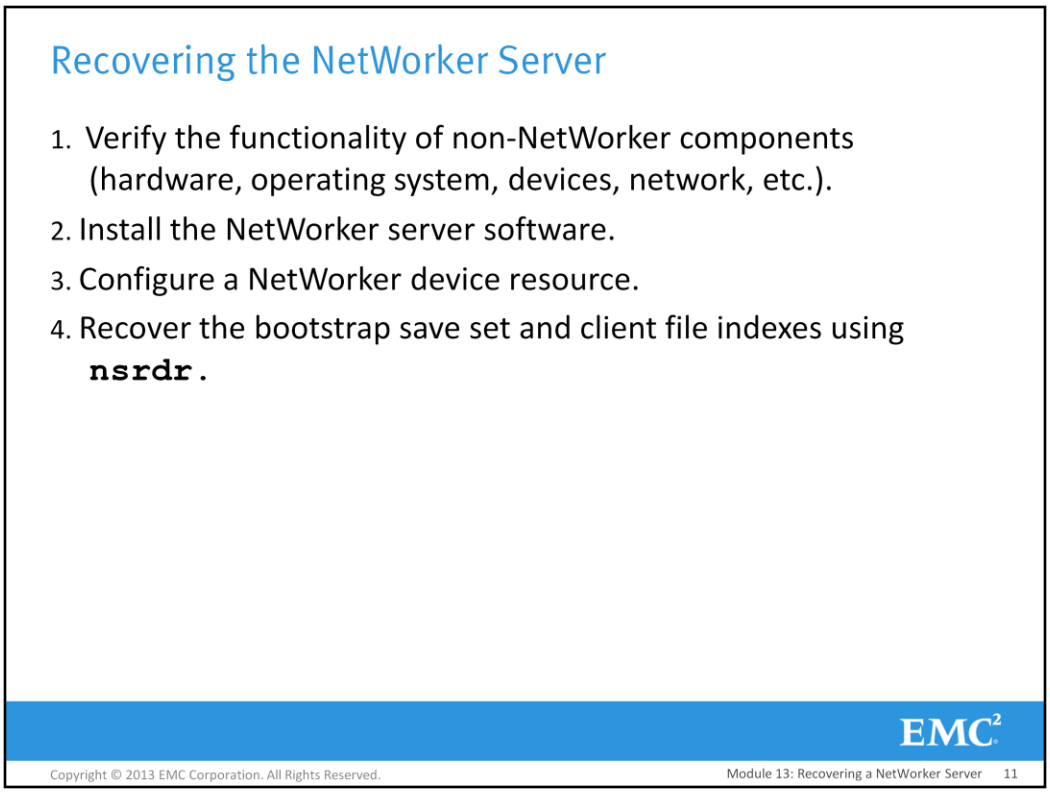




This lesson covered the prerequisites for recovering a NetWorker server, including the NetWorker bootstrap reports and backups of the media database, resource database, and the client file indexes.

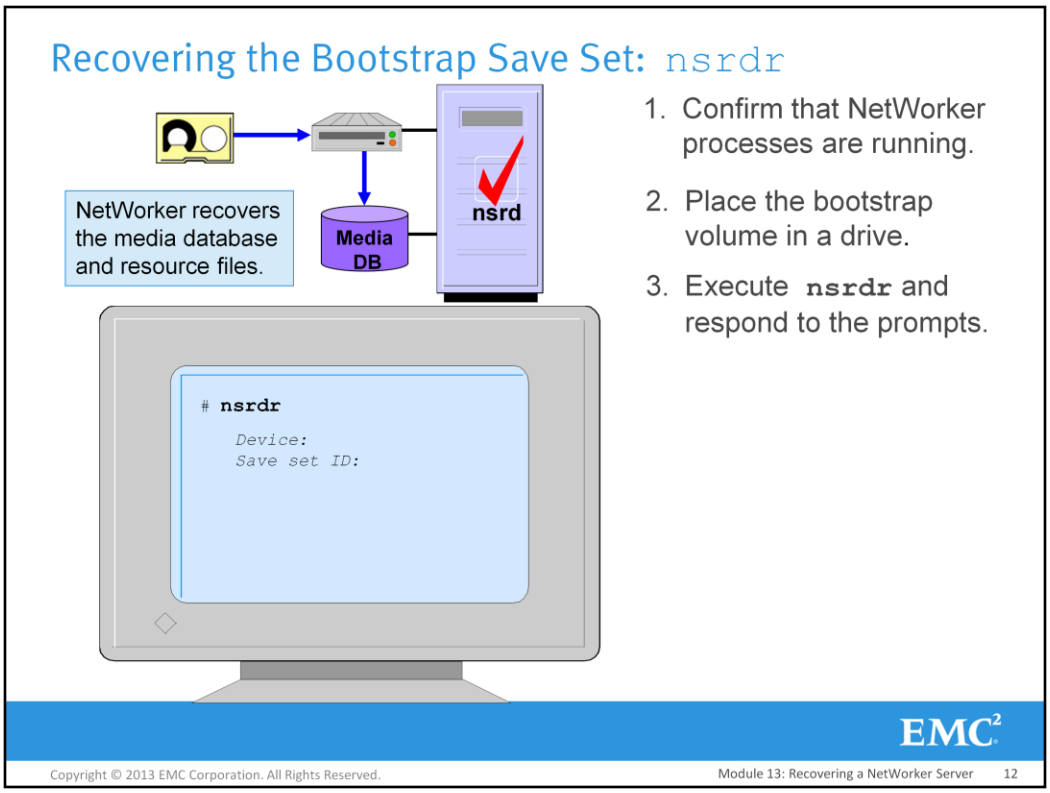


This lesson covers the procedures for recovering the NetWorker server, including recovering the NetWorker bootstrap data as well as the client file indexes.



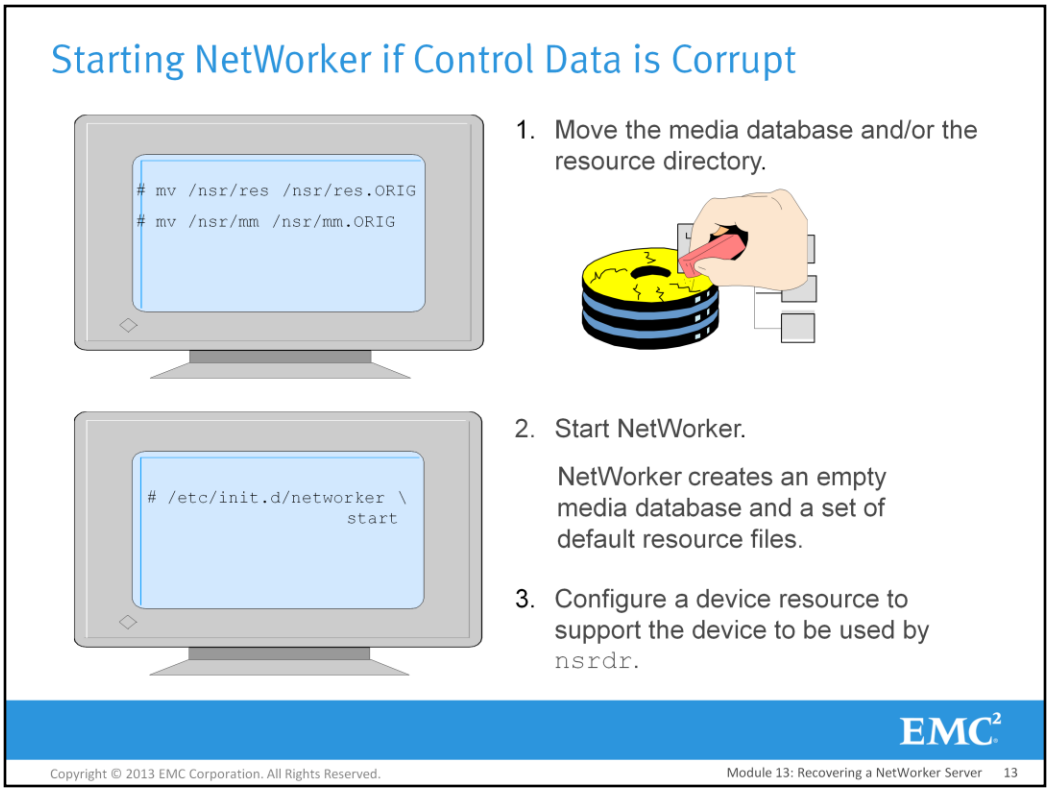
The slide summarizes the steps needed to perform a complete recovery of a NetWorker server. The steps assume that the original server is no longer available and a new NetWorker server is being configured. Several of the steps are discussed further on the following pages.

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.



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.

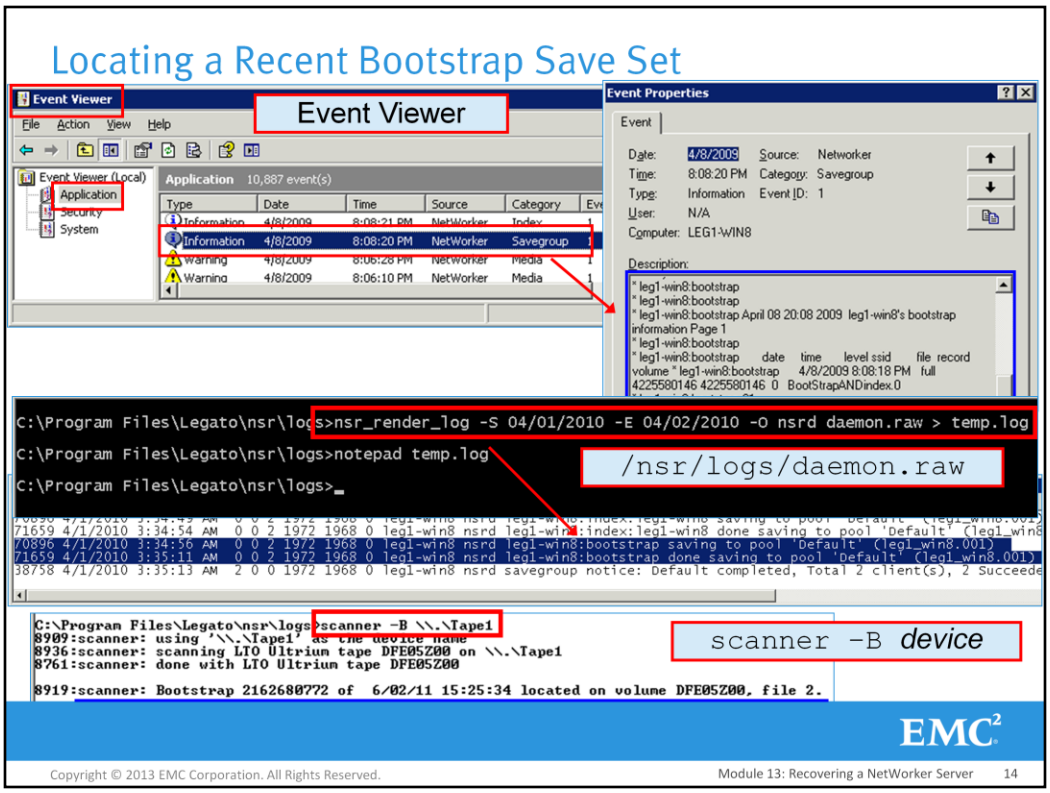


It is possible that corruption of the media database or resource files is severe enough that the NetWorker processes cannot start. However, recovering the bootstrap save set with `nsrdr` requires that NetWorker be running.

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.



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.

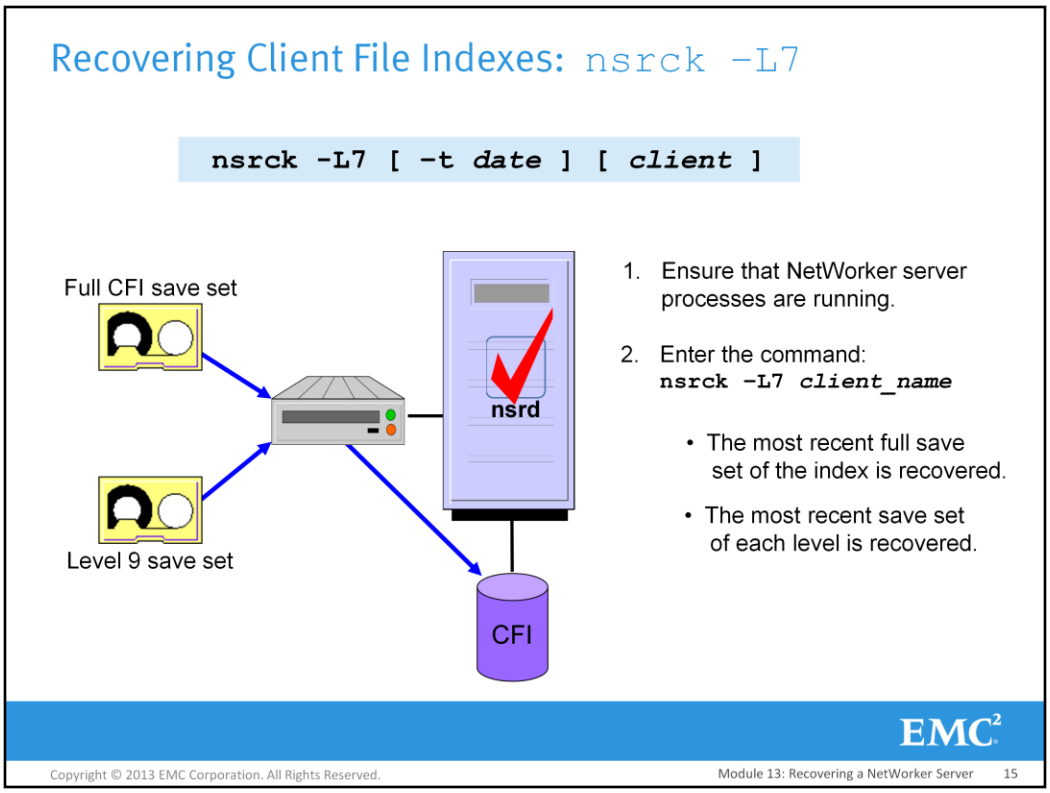
On a Windows NetWorker server, the Event Viewer should contain Application Log entries with a category of **Savegroup**. View the most recent entry and look for information pertaining to the bootstrap save set.

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 `nsrmmd`. Therefore, it is not necessary that NetWorker services be running.



To recover client file indexes:

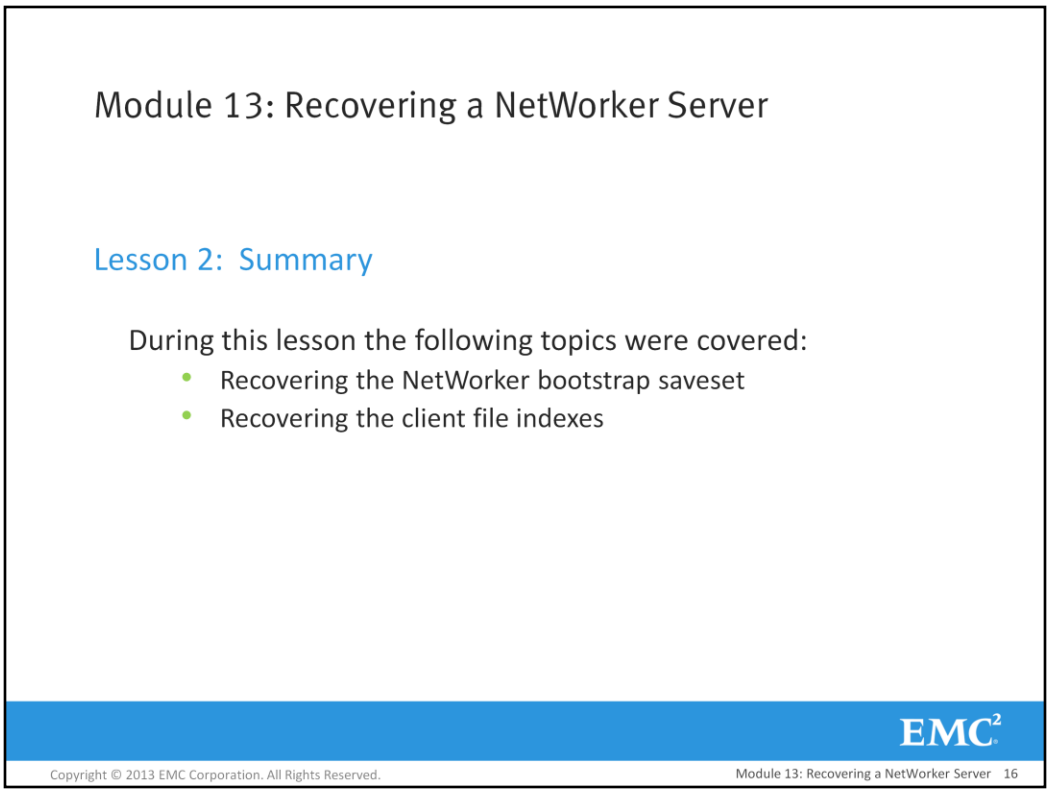
1. Verify that the NetWorker server daemons/services are running.
2. Execute the **`nsrck -L7`** command.

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.

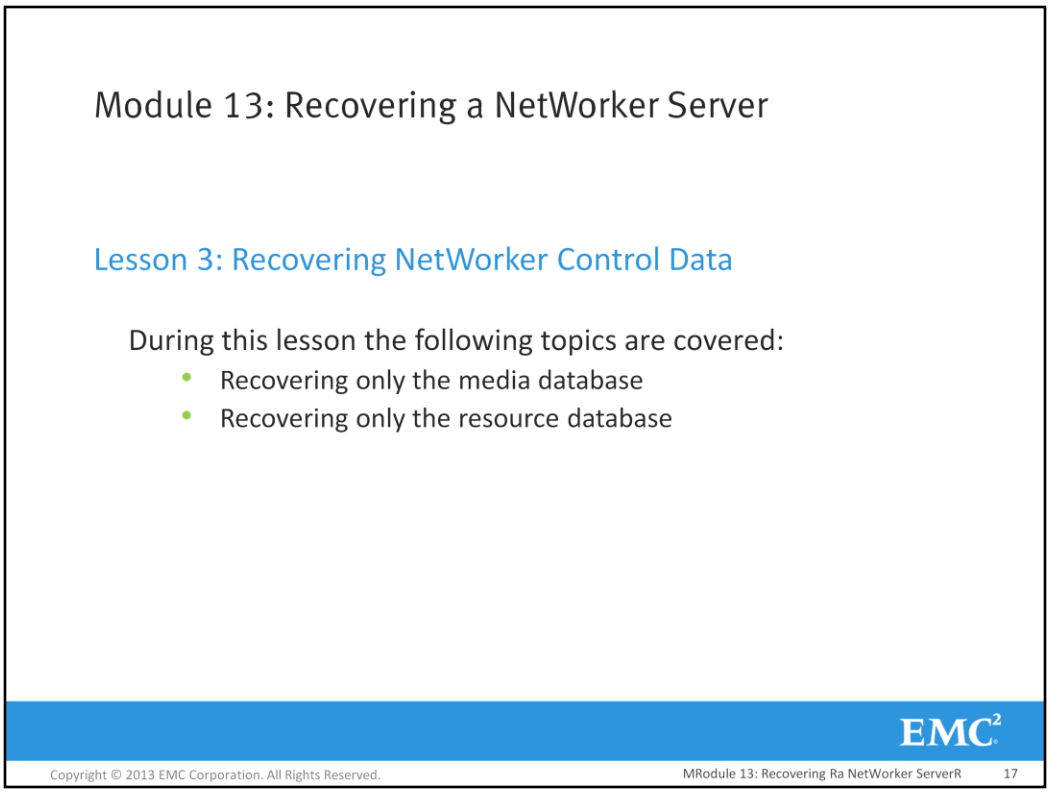
To control the order in which client indexes are recovered or to restrict the recovery to specific client indexes, one or more **client_name** arguments, separated by white space, must be provided to `nsrck`.

`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.

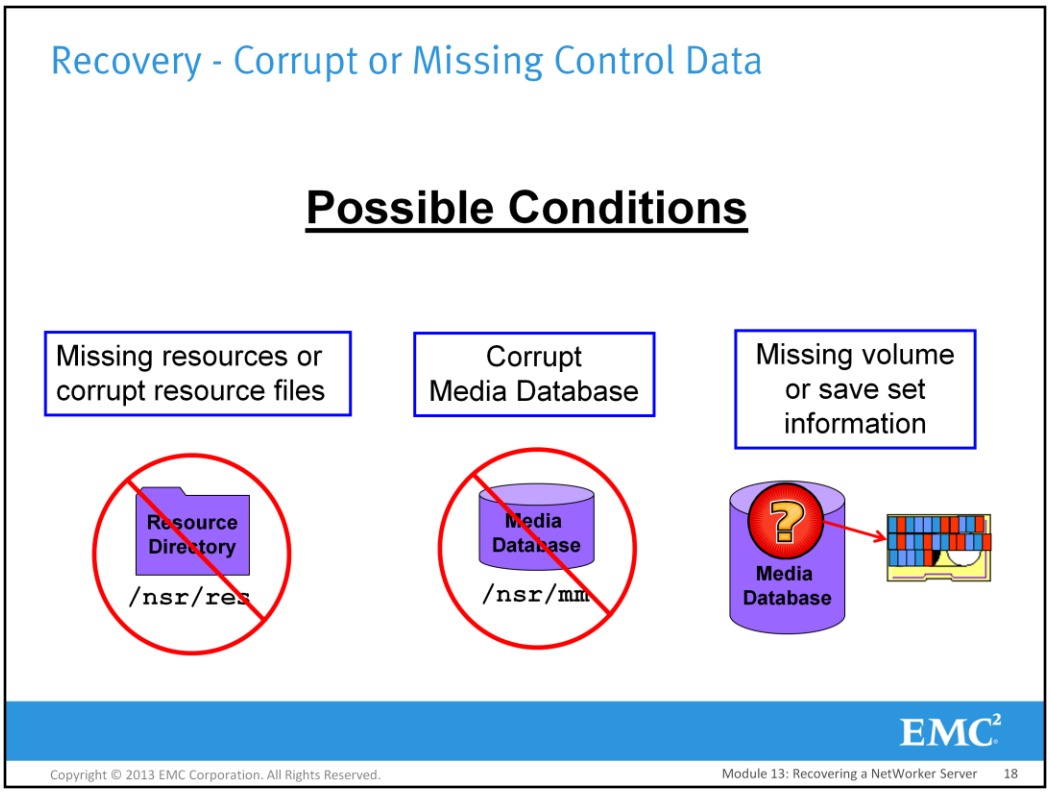
Important: When recovering an index that already contains entries, the entries being recovered are MERGED with the existing entries.



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



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.

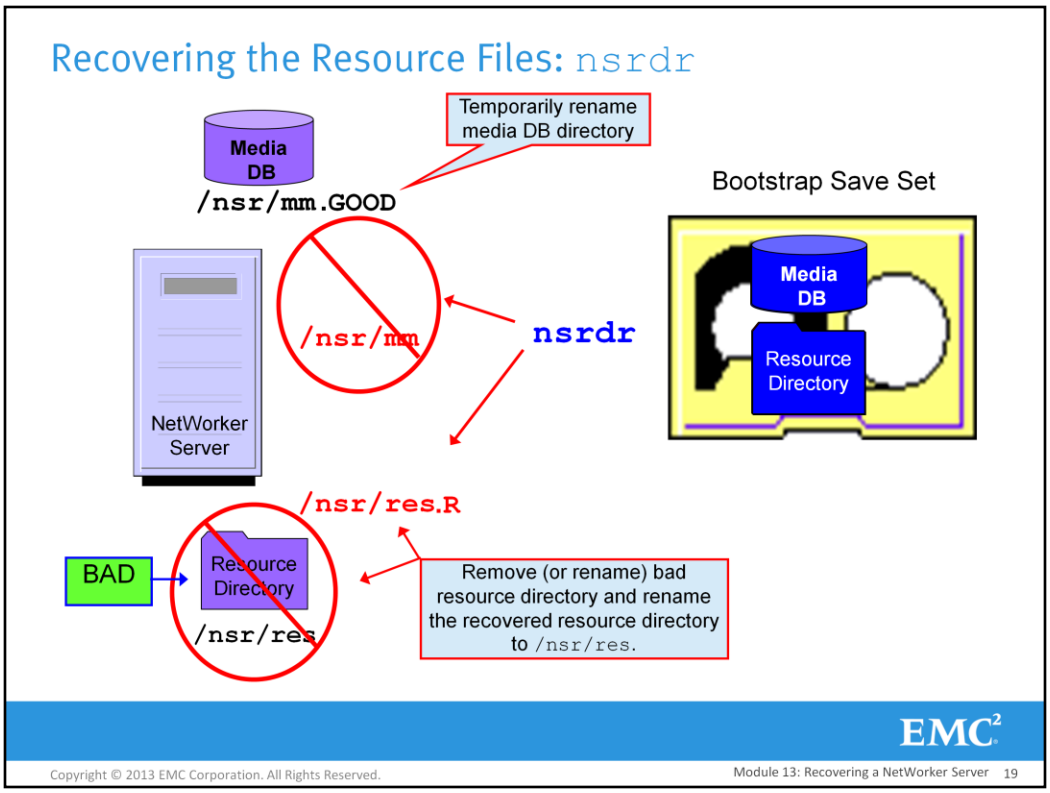


There may be situations where the entire NetWorker server does not need to be recovered. The media database may be damaged, corrupted, or missing important information, but the resource directory is perfectly fine. Conversely, NetWorker resources may have been accidentally or maliciously deleted or modified,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

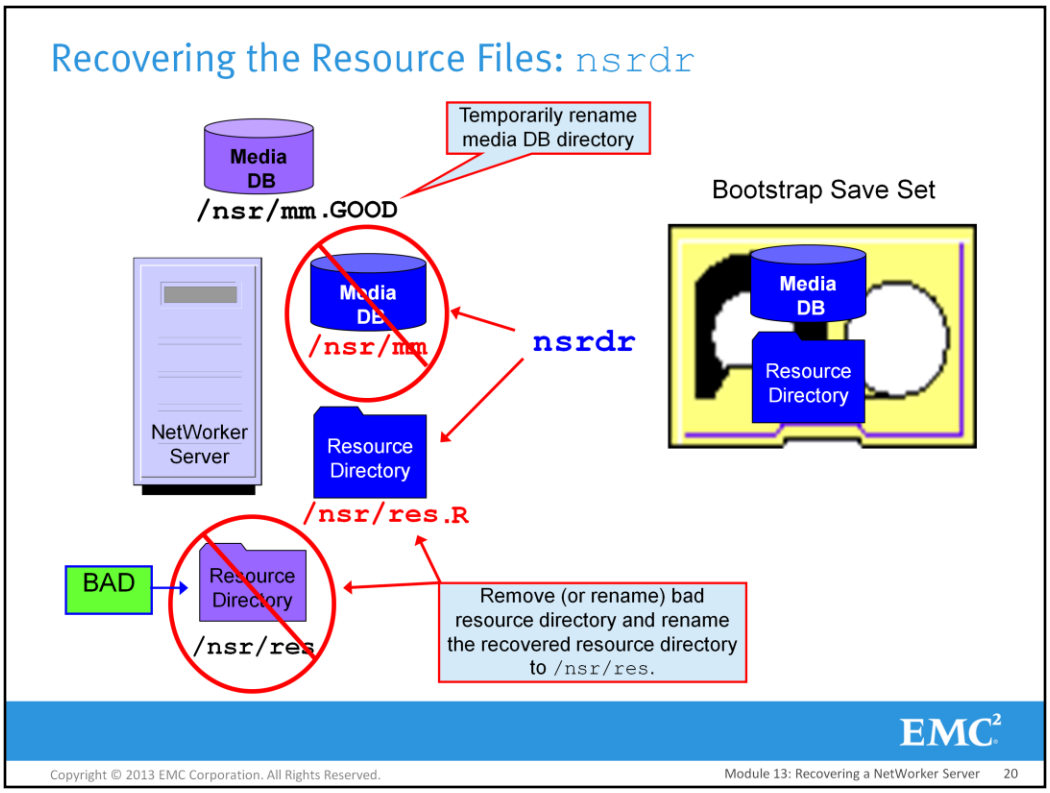
To insert missing volume or save set information into the media database, a command called `scanner` is used to scan a volume and insert information directly into the media database (and optionally, client file indexes) while reading the volume.

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



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.



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3. Restart NetWorker.
4. Execute `nsrdr`. This recovers the `/nsr/mm` directory and places the recovered resource files in `/nsr/res.R`.
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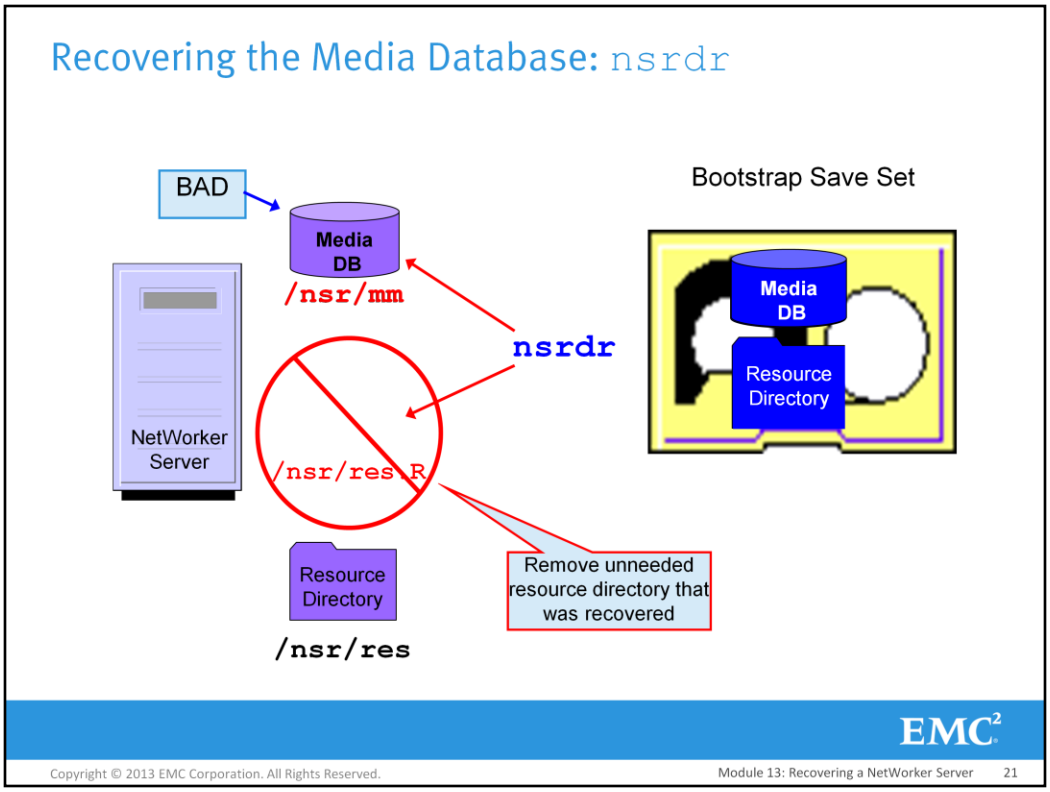
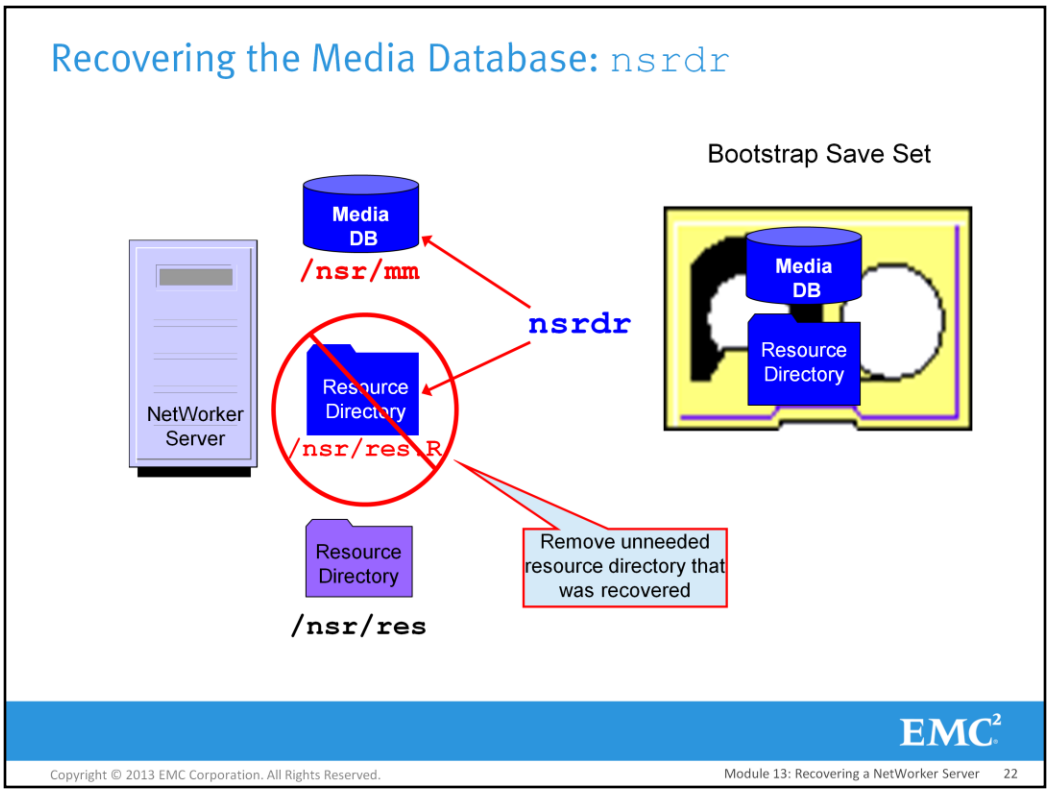
6. Remove the `/nsr/mm` directory that was recovered, because it is not needed, and change the name of the original media database directory back to `/nsr/mm`.
7. Remove the `/nsr/res` directory that contains the corrupted resource files, and rename `/nsr/res.R` to `/nsr/res`.
8. Restart NetWorker.



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`.



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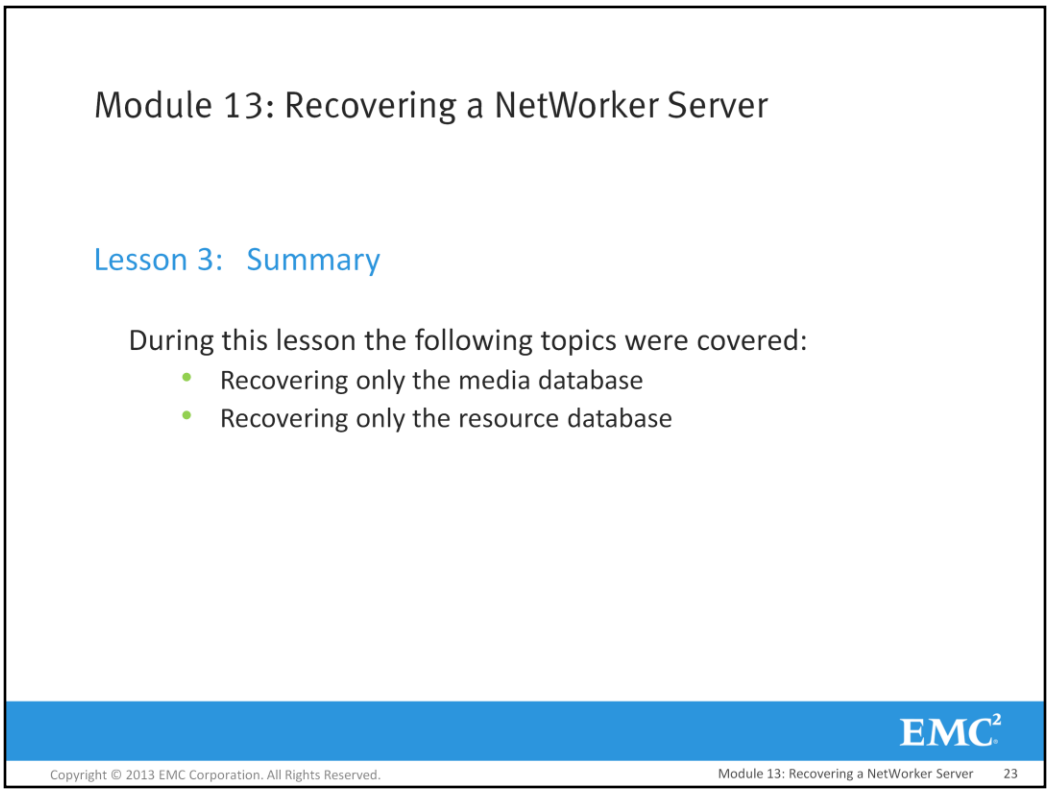


This lesson covered the processes for recovering only specific subsets of the NetWorker server control data, including the recovery of only the media database and only the resource database.

Lab 13: Recover NetWorker Server Control Data

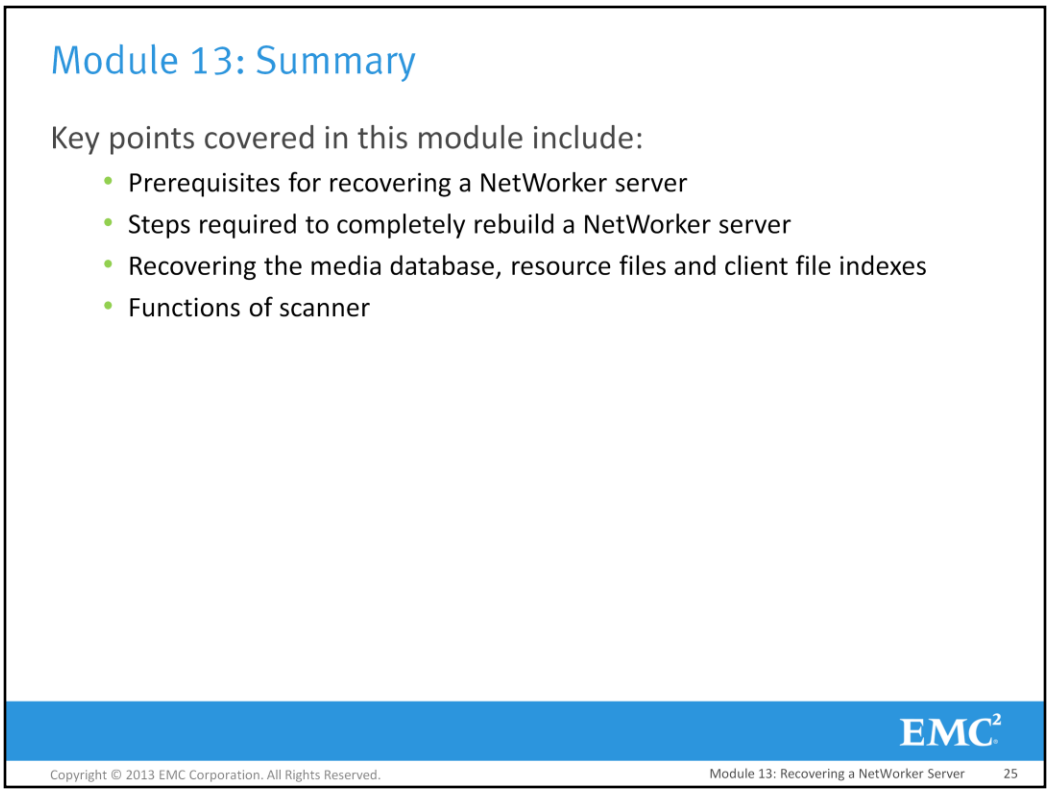
In this lab, you will perform a recovery of the NetWorker media and resource databases and a client CFI.

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

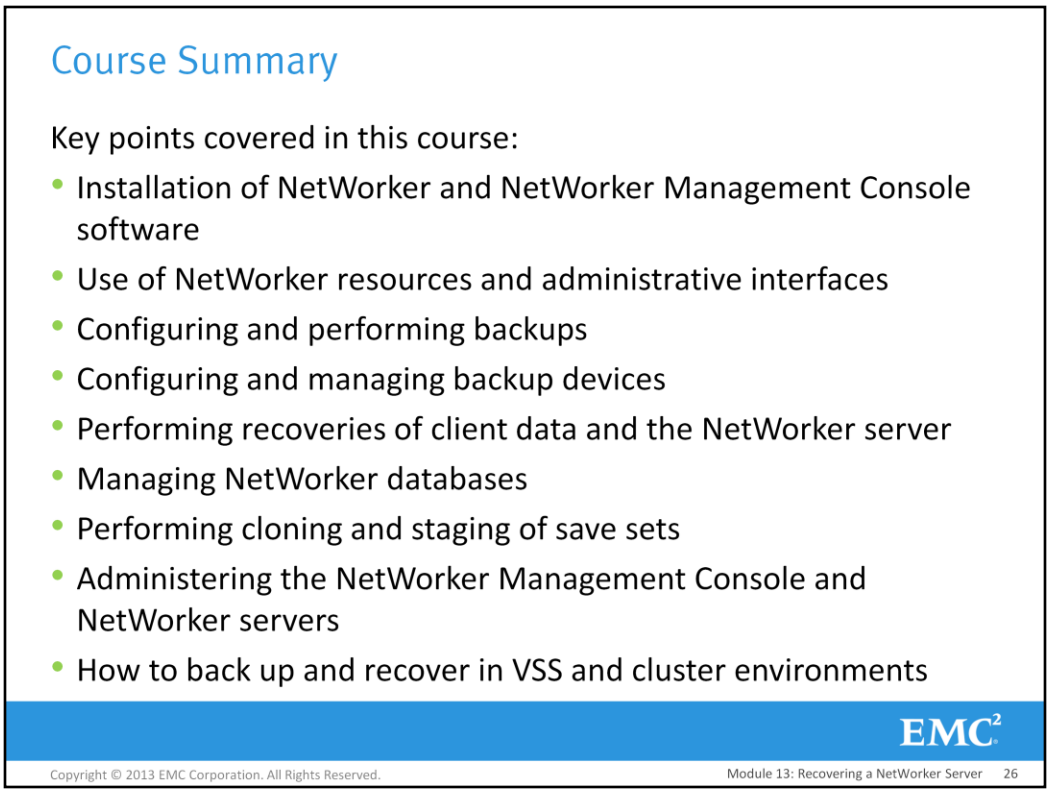
EMC²

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.



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.



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!