EMC NetWorker Server Cross Platform Migration

Technical Note

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This procedure covers all supported Windows, UNIX, and Linux platforms, including migrations between 32-bit to 64-bit systems. The procedures outlined in this document apply to supported clustered NetWorker servers as well as standalone NetWorker servers.

Review the *EMC NetWorker Online Software Compatibility Matrix* to ensure that you migrate the NetWorker server to an OS that the NetWorker version supports.

Note

The procedure outlined in this document is only supported if performed by EMC Professional Services. Cross-platform migrations performed by end-customers and partners are not supported. This document should not be distributed to end-customers.

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Terminology

This publication uses the following terms.

Source

The original NetWorker server host that you will move to a new host. For a highly available NetWorker server, the source host is the physical node that hosts the virtual service, or has ownership of the virtual node.

Target

The host to which you will move the NetWorker server. For a highly available NetWorker server, the target host is the physical node that hosts the virtual service, or has ownership of the virtual node.

Cross-platform migration

Any migration of a NetWorker server from one platform to another platform. Consider the following information:

- Any change of Operating System (OS) is considered a cross-platform migration. For example, a migration from Windows to UNIX or Linux is considered to be a cross-platform migration.
- Any change in CPU or OS architecture that requires a different data layout is considered a cross-platform migration. If you are in doubt, assume that the migration requires you to follow the cross-platform migration process and is not a simple upgrade.
- A change of the OS version is not considered a cross-platform migration. For example, Windows 2003 to Windows 2008 is a direct upgrade.
- If you require a migration and a change in the OS version, ensure that the NetWorker software supports the OS version, and then change the OS version before you perform the cross-platform migration. The *EMC NetWorker Online Software Compatibility Matrix* provides more information about supported operating systems.

The following scenarios are examples of a direct upgrade and do not require you to follow the cross-platform migration process:

- Change from Windows 32-bit (x86) to Windows 64-bit (x86-64).
- Change from HP PA-RISC architecture to HP IA64 on HP-UX.
- Change from Linux 32-bit to Linux 64-bit.
- Change from Sun Sparc/UltraSparc to Sun UltraSparc T1/T2.

The following scenarios are examples that require you to follow a cross-platform migration process:

- Change from Intel x86 architecture to IA64 architecture.
- Change from Sun Solaris Sparc to Sun Solaris x86.

Scope

The migration of the NetWorker databases is an in-place process that does not require you to scan the information about used volumes into the media database. As a result,

the migration is a quick process that requires minimal downtime of the production backup environment.

The duration of the downtime varies and depends on the transfer speed of the NetWorker client file indexes, which are the largest component on the NetWorker server.

Considerations

Before completing the outlined tasks, review the following information.

- Complete all the required tasks that are outlined in this document. If you skip any task or steps in the procedure, or any task or step fails, the migration is considered invalid.
- Log each step of the migration. A migration that does not have corresponding log files is considered unsupported. If you perform all of the verification steps, the migration is considered successful and the solution is supported. There is no support offering for the migration process itself.
- Cross-platform restore operations are not supported. After the migration, do not restore data from the source host to the target host.
- Ensure that the version of NetWorker on the target is identical to the version on the source host. You can use the `nsrget` command to view the current binaries on the NetWorker server.

Note

It is recommended that you update the source host to the latest service pack for the major version before you perform the cross platform migration.

Client file index considerations

To recover the client file indexes (CFIs), you can copy the `/nsr/index` directory, which contains the client file indexes from the source host to the target host. However, when the indexes are too large to copy over the network, you will use the `nsrck -L7` command to recover the client file indexes on the target host.

NetWorker requires that the bootstrap backup reside on a device that is local to the NetWorker server. Typically, both the bootstrap and client file index backups reside on the same volume. You can configure the NetWorker server to backup client file indexes to a remote device.

To use the `nsrck -L7` command, ensure that the target host has access to the device that contains the client file index backups.

For example, if the CFI backups reside on a disk device that is local to the source host, consider the following options to recover the CFIs:

- Configure the device as an NFS or CIFS share, and then configure the device on the target host as a remote device.
- Before the migration, create a backup of the CFIs on the source host to a tape or Data Domain device that is also accessible by the target host. During the migration, configure a NetWorker device on that the target host for the tape or Domain device, and then recover the CFIs.

Cluster considerations

NetWorker supports the migration of a highly available NetWorker server.

The steps that you perform to migrate a NetWorker server that run on a physical host also apply to a clustered NetWorker server. The migration process copies only data that is stored on the shared disk. The migration process does not copy the data from the source physical hosts to the target physical hosts. The hostname of the target virtual node must match the hostname source virtual node. The migration process does not require that the hostnames of the target physical nodes match the hostnames of the source physical nodes.

Traditional licensing model considerations

In a traditional licensing model, individual license enabler codes are required to enable specific features and functionality. To use a feature that requires a license enabler beyond the 90 day trial period, you must authorize the license by applying an authentication code to the enabler code. EMC Licensing generates an authentication code for a NetWorker server, based on the host ID of the NetWorker server.

Before you perform a cross platform migration of the NetWorker server that uses the traditional licensing model, review the following information:

- The host ID on the target host might differ from the host ID on the source host. In this scenario, the existing NetWorker authentication codes are not valid after the server migration. To resolve this issue, you must determine if the host ID on the target server is the same as the host ID on the source server. If the licenses differ, contact EMC Licensing and perform a host transfer affidavit. The affidavit provides you with new authentication codes that are based on the host ID of the target NetWorker server
- Enabler codes that are specific to the source host OS might not be valid on the target host. In this scenario, you might require additional licenses or a license exchange. For example, to migrate a Linux NetWorker server that runs NetWorker Power Edition to a Windows host, you must exchange the NetWorker Power Edition - Linux Edition license for a NetWorker Power Edition - Windows Edition license. Contact EMC Licensing for more information about how to exchange the licenses.

Preparing the source host

Complete the following steps within 48 hours of the start of the NetWorker server migrations. These steps might take a long time to complete.

To prepare the data on the source host, perform the following steps:

Procedure

1. Connect to the source NetWorker server with an administrator account on Windows or the root account on UNIX/Linux, and open a command prompt.
2. Perform a deep check of the media database, by typing the following command:
   ```
   nsrim -X
   ```
3. Perform a deep check of the client file indexes database, by typing the following commands:
   ```
   nsrck -m
   nsrck -L6
   ```

4. If the source system uses AFTD devices on a local file system, stage all the data to tapes or to remote disk devices, such as DD Boost device. If the AFTD devices were configured on a CIFS or an NFS device, no actions are required.

Note

Migration of the existing data that resides on an AFTD that is hosted on a local storage on a backup server is not covered in this scenario.

Source host information checklist

Review the following checklist for a summary of the information that you require from the source host, to compare with on the target host, after you migrate the data.

Completed?	Required information
☐	For NetWorker servers that use traditional licensing, save the licensing summary information, by typing the following command: **`nsrlic -v nsrlic.log`**
☐	Record the permission and ownership properties of the following directories: • Linux and UNIX: ▪ `/nsr/res` ▪ `/nsr/index` • Windows: ▪ `C:\Program Files\EMC NetWorker\nsr\res` ▪ `C:\Program Files\EMC NetWorker\nsr\index`
☐	Save information about current disk usage for each client file index, by typing the following commands: • Linux and UNIX only: **`du -sk /nsr/index/* >index_size.log`** • **`nsrls >nsrls.log`**
☐	Record the size of the media database folder, which is located in one of the following locations: • Linux and UNIX: `/nsr/mm` • Windows: `C:\Program Files\EMC NetWorker\nsr\mm`
☐	Save volume information that NetWorker stores in the media database, by typing the following command: **`mminfo -mv >mminfo.log`**
☐	Record the host ID on the source host. To determine the host ID, perform one of the following tasks: • Linux and UNIX: From a system prompt, type **`hostid`**. • Window: Use NMC to connect to the NetWorker server, and from the **Administration** window, browse to **Server** > **Registrations**. View the properties of a license and record the value in the host ID field.
☐	Ensure that the name resolution resolver order matches on the source and target hosts. Check the following files for the configuration:

Completed?	Required information

	• AIX uses three methods to configure name resolution:
	  ▪ *NSORDER* environment variable
	  ▪ `/etc/irs.conf` file
	  ▪ `/etc/netsvc.conf` file
	• HP-UX, Linux, and Solaris: `nsswitch.conf`
	•
	Note
	On Windows, the default search order is the `hosts` file, and then DNS.

Preparing the target host

To prepare the target host, perform the following steps.

Procedure

1. Ensure that the hostname (long name and short name) matches the hostname of the source host.

   This step prevents the NetWorker server from creating a new server resource when the NetWorker daemons on the target server start for the first time. If required, change the hostname after you complete all tasks outlined in this document, including the task to verify that the migration was successful.

   Note

   The source IP address and the target IP address do not have to be same.

   For example, you must define the same source hostname on the OS of both the source and target systems.

   If the source and target system are present on the same network, perform the following tasks:

   a. Configure DNS entries for the hosts that are different from the names that you configure in the operating system of each host.

   b. Configure the name resolution search order to give the `hosts` file a higher priority than the DNS. For more information about how to configure the name resolution search order, refer to the OS documentation.

   Before migration, DNS resolves "source" to source system. After migration, the DNS resolves "source" to target system. In this case, the name "source" must be defined in the `hosts` file on both systems to point to the local system.

   The location of the `hosts` file differs on UNIX/Linux and Windows:

   - Linux/UNIX: `/etc`
   - Windows: `C:\Windows\System32\drivers\etc`

2. Ensure that the target has identical name resolving options as the source host.

   For example, if the original host is configured to resolve the short name first and then the fully qualified domain name (FQDN), then the target host must do

the same. Failure to perform this step results in either backup failures or the creation of save sets that are incorrectly stored in the media database.

3. Ensure that the destination file system on the target host is at least as large as the file system that stores the NetWorker databases on the source host.
4. Ensure that the time on the target host clock is set to within 1 hour of the time on the source host clock.
5. Install the NetWorker server software.

   Consider the following information:

   - Install the same major version of the NetWorker software, as is installed on the source host. For example, in NetWorker version 8.1, the major version is denoted by the .1. If you cannot find the same major version for the target system platform, a separate validation is required before you begin the migration.
   - Install the same or later minor version of the NetWorker software, as is installed on the source host. For example, in NetWorker version 8.1 SP2, the minor version is denoted by SP2.
   - You are not required to install the same hotfixes on the target, if any were installed. To prevent regressions not related to the migration, it is recommended that you install any hotfixes on the target host, that were installed on the source host.
   - You are not required to install the NetWorker software in the same location, as the source host because the NetWorker software uses relative paths for its databases.
   - If required, update the major version of the NetWorker software after you complete all tasks included in this document, including verifying the migration.

6. Start the NetWorker services, which creates the NetWorker server directory structure.
7. Stop the NetWorker services, and then delete the contents of the following NetWorker subdirectories:

   - Windows:
     - `C:\Program Files\EMC NetWorker\nsr\mm`
     - `C:\Program Files\EMC NetWorker\nsr\index`
     - `C:\Program Files\EMC NetWorker\nsr\res`
   - Unix:
     - `/nsr/mm`
     - `/nsr/index`
     - `/nsr/res`

8. Rename the following binaries in the NetWorker `bin` folder, to prevent the binaries from starting when the NetWorker services start:

   - `nsrck`
   - `nsrim`
   - NetWorker 8.2.x only: `nsrclone` and `savegrp`
   - NetWorker 9.x only: `nsrworkflow`

9. Determine the host ID on the target host.
   - Linux and UNIX: From a system prompt, type `hostid`.
   - Windows: Use NMC to connect to the NetWorker server, and from the **Administration** window, browse to **Server** > **Registrations**. View the properties of a license and record the value in the **host ID** field. If the host ID of the target host differs from the source host, contact Licensing and perform a host transfer affidavit.

Performing the migration steps on the source host

To perform the migration on the source host, complete the following steps.

Before you begin

Do not perform any recoveries on the source host. After the migration completes, perform the recoveries from the target host.

Procedure

1. Unmount all volumes in all devices, including tape and AFTD.
2. Disable all the devices, by typing the following commands:

```
source#nsradmin
nsradmin>print type: NSR device
nsradmin>update enabled: no
nsradmin>quit
```

Note

You cannot disable devices with mounted volumes.

3. Perform a CFI and media database cross check by typing `nsrck -m`.

   If any warnings appear, run the `nsrck -L6` command until no messages appear. Production system will always have some records that are purged.

Note

If a client ID error message appears, correct the client ID issues. The *EMC NetWorker Administration Guide* describes how to resolve client ID issues.

4. Export the media database. by performing the following tasks:
   a. For Windows 2012 only:
      a. Start the command prompt as LocalSystem, by using the `psexec` command from Microsoft's SysInternals toolkit:

```
C:\>psexec -i -s cmd.exe
```

Note

http://technet.microsoft.com/en-us/sysinternals/pxexec.aspx provides more information about the `psexec` command.

b. To confirm that the LocalSystem account is used, type the `whoami` command. Output similar to the following appears when LocalSystem controls the command prompt:

```
nt authority\system
```

b. Type the following command:

```
nsrmmdbdasm -s path_to_mm > mmdb.dump
```

where *path_to_mm* is `"C:\Program Files\EMC NetWorker\nsr\mm"` on Windows and `/nsr/mm` on UNIX and Linux.

Note

Use the absolute path to the media database. If you use a relative path the `nsrmmdbdasm` command creates an empty export file.

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5. Check the size of `mmdb.dump` file. The file is likely to be smaller than the `/nsr/mm` folder, but should be at least half of the `/nsr/mm` folder size. If the size is smaller, check for errors that appear during export operation.

Note

If the `nsrmmdbasm` command fails, an error message is not generated. Data loss might occur after the media database is rebuilt and this can significantly reduce the bootstrap size. Knowledge base article 455161 provides more information.

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6. Create an archive of the NetWorker server RAP resource database directory.
   - On Linux and UNIX, tar the `/nsr/res` directory.
   - On Windows, create a zip file of the `res` directory. By default the `res` directory is `C:\Program Files\EMC NetWorker\nsr\res`.
7. Shutdown the NetWorker server daemons.
8. Create an archive of the NetWorker server `index` directory.
   - On Linux and UNIX, tar the `/nsr/index` directory.
   - On Windows, create a zip file of the `index` directory. By default the `index` directory is `C:\Program Files\EMC NetWorker\nsr\index`.

Copying the files from the source to the target

Copy the media database dump and the archives of the resource database and CFIs from the source host to the target host. To ensure that the files are available in the event that you need to fall-back to the source host, do not not move the files.

Before you begin

Ensure that you have sufficient disk space on the target host to store the archived files and to extract the files.

To copy over the database, perform the following steps:

Procedure

1. Determine which transport method you will use to copy the files. The transport method must guarantee a fully binary consistent copy.

   For example:

   - If the source or target host is an ftp server, use `ftp` in binary mode.
   - If `ssh` is configured on the target host, use the `scp` command.
   - If `rsh` is enabled on the target host, use the `rcp` command.

2. Copy the following files from the source host to the target host:

   - `mmdb.dump`—The export of the media database.
   - Archive file that you created of the RAP resource database directory.
   - Archive file that you created of the NetWorker server index directory.

   Note

   If you cannot copy the archive of the index directory due to the size of the file, how to recover the index directories from a backup is explained later in this document.

   For example, to archive the index directory and copy the directory between UNIX and Linux hosts by using `rsh`, perform the following steps:

   a. On the target host, type: `echo "source_IP_address" /.rhosts`

   b. On the source host, type: `cd /nsr/index; tar cf - * \ rsh target_IP_address "cd $PWD; tar xfp -"`

   Note

   When you specify the source and target hosts in the copy command, you must use the IP address because the hostname of the source and target are identical.

3. Power off the source host or remove the source host from the network.

Performing the migration steps on the target host

Perform the following steps on the target host.

Before you begin

Install the NetWorker software on the target host and ensure that the daemons are not running.

Procedure

1. Unpack the archive of the NetWorker server RAP resource database directory. Ensure that the folder structure is preserved.
2. If the archive of the NetWorker server index directory was copied over from the source system, unpack the archive.
3. Check the permissions and ownership properties of the following files and folders and ensure that they match the permission and ownership properties on the source host:

   - Linux and UNIX:

- /nsr/res
- /nsr/index

Note

The root account usually has ownership of the folders and files.

- Windows:
  - C:\Program Files\EMC NetWorker\nsr\res
  - C:\Program Files\EMC NetWorker\nsr\index

Note

The administrator account usually has ownership of the folders and files.

4. In the res directory, ensure that the directives file uses the OS-specific name:
   - For Windows to Linux or UNIX migrations, rename the nsr.dir file to .nsr.
   - For Linux or UNIX to Windows migrations, rename the .nsr to nsr.dir.
5. Start the NetWorker server services.
6. Import the media database from the exported dump file, by typing the following command from the nsr directory:

```
nsrmmdbdasm -r -2 < path_to_dump_file/mmdb.dump
```

Note

If a warning message appears about the NSR auditlog path, update the value of *NSR autditlog path* attribute on the NetWorker server to match the NetWorker log file location. On UNIX and Linux, the default log location is /nsr/logs. On Windows the default log file location is C:\Program Files\EMC NetWorker\nsr\logs.The *EMC NetWorker Security Configuration Guide* provides more information about the *NSR auditlog path* attribute.

7. To ensure that all media database data was imported, confirm that the size of the media database folder on the target host matches the size of the folder on the source host.

   By default, the media database files are in the following location:
   - Windows: C:\Program Files\EMC NetWorker\nsr\mm
   - UNIX and Linux: /nsr/mm
8. Mount all devices including tape and Data Domain devices. Do not relabel the volumes in the devices.
9. Verify that the volumes in the media database match the media database on the source host, by performing one of the following steps:
   - From the **Administration** window in NMC, click **Media**, and then select **Volumes**.
   - Use the mminfo -avot command.
10. (Optional) To recover the CFIs by using nsrck -L7, perform one of the following tasks:

- To recover all the indexes:
  a. From a command prompt, type: **`nsrck -L7`**
  b. When the `nsrck -L7` command completes, delete the CFI directory for the NetWorker server. On Windows, delete `C:\Program Files\EMC NetWorker\nsr\index\`*`NetWorker_server_name`*. On UNIX and Linux, delete `/nsr/index/`*`NetWorker_server_name`*
- To recover indexes individually, from a command prompt type: *nsrck -L client_name*.

Note

Do not recover the client file index for the NetWorker server.

11. To update the Server OS type attribute in the NSR resource to match the new platform, type the following commands from an `nsradmin` prompt:

```
print type: NSR
update Server OS type: os_type
```

where *os_type* is one of the following values:

- AIX (NetWorker 8.x only)
- HP-UX (NetWorker 8.x only)
- Linux
- Solaris (NetWorker 8.x only)
- Windows

12. Rename the following binaries in the NetWorker `bin` directory:
    - `nsrck`
    - `nsrim`
    - NetWorker 8.2.x only: `nsrclone` and `savegrp`
    - NetWorker 9.x only: `nsrworkflow`
13. Restart the NetWorker server services.
14. Use NMC to connect to the NetWorker server, navigate to **Server** > **Registrations**, and then and perform the following licensing tasks:
    a. Delete the base enabler that was used for the previous platform or OS.
    b. Add a new base enabler for the current platform or OS.
    c. Add all the required licenses enabler and auth codes.
15. In the **Administration** window, click **Devices** on the toolbar, and then delete and reconfigure all the tape libraries that were controlled by the backup server.

Note

You are not required to reconfigure a tape library that was controlled by a storage node.

16. Delete and reconfigure all the tape drives that were configured on the backup server.

Note

You are not required to reconfigure a tape drive that was configured on a storage node.

17. If the migration is from Windows to UNIX or Linux, or vice versa, modify the action attribute of each NetWorker notification, to use the correct mail command for the platform. The *EMC NetWorker Administration Guide* provides more information about how to modify the action attribute of a NetWorker notification.

Note

For NetWorker 9.x, also modify the action for each policy notification. The *EMC NetWorker Administration Guide* provides more information.

Verifying the migration

To confirm that the migration was successful, perform the following steps.

Procedure

1. Restart the daemons on the NetWorker server, and then review the `daemon.raw` file. Upon startup, warning messages should not appear in the log.

   The `daemon.raw` file is in the following location:

   - Windows—`C:\Program Files\EMC NetWorker\nsr\logs`
   - UNIX/Linux—`/nsr/logs`

2. Compare the NetWorker server name in the RAP resource database on the target host with the exported copy of the NetWorker server the RAP resource database on the source host.

   For example, type the following command from an `nsradmin` prompt:

   ```
   print type: NSR
   ```

   Consider the following information:

   - Ensure that the **Name** field is identical on the target and source hosts.
   - If one **Name** field displays the short hostname and the other **Name** field displays the FQDN, ensure that the hostname resolution order on the target operating system is the same as the source host.
   - If the order in which the operating system checks resources such as DNS and the hosts file differ on the hosts, index and media database corruption might occur and the migration operation fails.

3. Perform a deep check of the media database, by typing **`nsrim -X`**.

   After the command completes, review the `daemon.raw` file. If client ID errors or warnings appear in the `daemon.raw` file, the migration has failed.

4. Perform an index and media database cross-check, by typing **`nsrck -m`**.

   After the command completes, review the `daemon.raw` file. If errors or warnings appear in the `daemon.raw` file, the migration has failed.

5. Perform a deep check of the client file indexes, by typing **`nsrck -L3`**.

   If errors or warning appear, the migration has failed.

6. Verify that the size of the each index directory on the target matches the size of the index directory on the source host.

   Incorrect hostname mappings cause NetWorker to delete index entries without warning.

7. Verify that the records per client on the target host matches the source house, by typing **`nsrls`**.

   Error messages can appear when there are hostname resolution differences between the source and target host or when there are file permission issues on one or more files in the `nsr` folder.

8. Verify that the licenses are accurate, by comparing the output of the **`nsrlic -v`** command on the target host the information in the `nsrlic.log` file on the source host.

9. Perform a test restore of any file for a client of the NetWorker server.

   If you cannot browse for files or the recovery operation reports errors, such as `unknown volume needed`, then the migration has failed.

10. Perform a client backup, and then ensure that you can perform the following tasks:

    - Browse for a file from a recover prompt, or by using the NetWorker User application on a Windows client.
    - Locate information about the backup on the volume by using the `mminfo` command or the **Media** > **Volumes** window in the NMC GUI.

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