EMC²

TECHNICAL NOTES

EMC NetWorker

Technical Guidance for Upgrades to EMC NetWorker 7.4 Service Pack 2

Technical Note

This technical note contains important information about upgrading your NetWorker environment. Please note the following information about the End of Service Life for older NetWorker releases:

- NetWorker 7.0.x and 7.1.x are End Of Service Life on December 2007
- NetWorker 7.2.x is End Of Primary Support on June 30, 2008
- Extended Support will be available for NW 7.2.x until June 30, 2010

For the latest information regarding issues related to installation and upgrades, please refer to the NetWorker Installation and Upgrade page on the EMC Support website at the following URL:

https://support.emc.com/products/NetWorker/InstallationAndUpgrade.asp

NetWorker 7.3.x delivered many new features, including a redesigned graphical user interface (GUI), security enhancements, and backup-to-disk advancements. NetWorker 7.4 and subsequent service packs include the 7.3.x enhancements along with improved support for language localization and several new features like de-duplication and Windows 2008 and Vista support. Upgrades to 7.3.x are outside of the scope of this document.

As a result, you should perform a thorough product review before upgrading to NetWorker 7.4 Service Pack 2. Because NetWorker 7.4 SP 2 represents a significant change from previous releases, you should review the release notes and become familiar with the new graphical interface, NetWorker Management Console (NMC), before deploying into a production environment.

The purpose of this document is to ensure that differences between NetWorker 7.4 SP 2 and previous releases of NetWorker are fully understood in advance, to help ensure a successful upgrade.

This document contains the following sections:

Key differences between NetWorker 7.4 Service Pack 2 and previous releases

Note: The features described in this section only apply for NetWorker versions 7.3.x and above. You would still be able to backup and recover data from older client versions (7.2.x and older) using a NetWorker 7.4 SP 2 server, but without the benefits provided by the new features (such as new authentication). Please refer to: http://solutions.emc.com/emcsolutionview.asp?id=esg83215 for more information.

Licensing changes

NetWorker 7.4 Service Pack 2 requires an update enabler

An update enabler is required when you are upgrading from a pre-7.3.x NetWorker server. This upgrade enabler should be entered before the upgrade takes place to avoid the server becoming disabled. The required upgrade enabler is **150397-d1e144-54605f**. Contact EMC Licensing prior to upgrading or within 15 days of adding this enabler to get it permanently authorized.

Virtual Tape Library (VTL) licensing enforcement with NetWorker 7.4

VTL devices such as EDLs, which used an Autochanger license in prior releases of NetWorker, will require a VTL license before upgrading to 7.4 SP 2 to avoid the VTL becoming disabled due to insufficient licensing. One VTL frame license is required for each physical VTL frame that will be used. Before upgrading to 7.4 SP 2, contact Licensing and reference part number 456-100-088 and serial number 2019260 to obtain and authorize a permanent VTL enabler, or add the following temporary VTL enabler code: **3b38bd-77c79e-0ebe01** and contact Licensing within 15 days obtain and authorize a permanent VTL enabler.

If you currently have an unlimited autochanger license for use with VTLs, you should contact Sales Support and Renewals to exchange your autochanger license for a VTL enabler.

Client Packs are no longer required

NetWorker 7.4 SP 2 no longer requires Client Packs.

Cluster Client Connections licenses are no longer required

Cluster Client Connections licenses are no longer required and have been replaced with standard Client Connections licenses. Cluster Client connection licenses which existed on the NetWorker server prior to the upgrade will continue to be displayed in the NetWorker Management Console, but the server will use them like standard Client Connection licenses.

VSS licenses are no longer required

A license is no longer required to back up the system state on Microsoft Windows.

NetWorker Application Modules license tiers have been reduced to 1 tier

With NetWorker 7.4 SP 2, NetWorker Application Modules for Windows operating systems are ordered via a single license tier. NetWorker 7.4 SP 2 will continue to honor and use the existing tiered licenses.

One NDMP license is required for each physical NDMP frame/array

In NetWorker 7.4 SP 2, licensing is enforced based on the defined NDMP physical arrays instead of the defined NDMP hosts. One NDMP license is required for each unique NDMP array name as specified in the new client attribute "NDMP Array Name" Refer to the Administration Guide for further details regarding configuring NDMP clients. NDMP licensing is still tiered based upon the vendor's model of the network attached device. Please refer to the NetWorker hardware compatibility guide (HCG).

Dedicated Storage Node (DSN) licenses support for clusters

In NetWorker 7.4 SP 2, a DSN can backup local virtual nodes, provided that the client resides on the physical node. Any physical node can be configured as a DSN and a regular storage node will not be required for the physical node. All physical nodes in the cluster will require a DSN license.

Silo licenses are not required

Starting with NetWorker 7.4, autochanger licenses apply to silos as well. Existing silo licenses will still be recognized in 7.4 SP 2. The NetWorker and License Manager software will assign existing silo enablers to a silo device before using an autochanger license if one is present and available for use.

NetWorker Module for Oracle licensing changes

New license types are necessary for the NetWorker Module for Oracle. Prior to NetWorker 7.3.x, the following license types were used:

- License type D6 for NetWorker Module for Oracle clients in Unix environments.
- License type Z6 for NetWorker Module for Oracle clients in Windows environments.

Starting with NetWorker 7.3.x, the NetWorker server no longer recognize these license types. The following new licenses types are now required:

- License type D35 for NetWorker Module for Oracle clients in Unix environments
- License type Z35 for NetWorker Module for Oracle clients in Windows environments.

To determine if your datazone still makes use of these older revision licenses, please refer to
http://solutions.emc.com/emcsolutionview.asp?id=esg98263

Visual differences

New graphical interfaces

NetWorker Management Console is now used for server management and configuration

The NetWorker Management Console (NMC) replaces the NetWorker Administrator programs for UNIX and Windows (nwadmin) that were used in previous releases for server management and configuration. The nwadmin programs are no longer available.

The nwbackup and nwarchive graphical interfaces are no longer available on UNIX

Only command line backup and archiving are available.

The nwrecover graphical interface GUI on UNIX has been substantially modernized and improved

The nwrecover program now features better searching, support for directed recover, and other features. Some menus and workflows have changed slightly to better accommodate the new features. The archive retrieval functionality from nwretreive is now included in the new nwrecover.

The client-side backup and recovery interface on Windows, NetWorker User program (Winworker), remains the same.

All previously-existing command line functionality continues to be supported in this release.

Refer to http://solutions.emc.com/emcsolutionview.asp?id=esg83245 for further details regarding the design and functionality changes.

New device configuration wizard

A wizard has been introduced to automatically scan and create a tape library unit (virtual or physical) using the NetWorker Management Console. The wizard also allows you to dynamically add drives to an existing library configuration.

New client configuration wizard

A client configuration wizard has been introduced to aid in creating Client resources, Group resources, and in adding clients to groups.

Media operations on multiple slots

NetWorker introduces the ability to perform mounts, load without mount, labels, inventory, withdraw and remove operations simultaneously on **multiple** slots.

Pre-configured reports

NetWorker currently provides 55 pre-configured reports which come automatically with the NetWorker Management Console.

Proxy Host attribute in Client resource

A new attribute, Proxy Host, has been added to the Client resource to identify the VCB, PowerSnap, or Direct SCSI proxy host.

Embedded storage node with EMC Disk Library (EDL)

Beginning with EDL software version 2.2, you can order an EDL system with embedded NetWorker storage node code. This allows you to create

clones from virtual tapes to physical tapes, or clones between two EDL systems. This is supported with NW 7.3.x and above servers.

Localization and internationalization

Multi-locale datazones

NetWorker now supports a multi-locale datazone. Multiple 7.4 SP 2 machines in the same NetWorker datazone can run in different locale settings.

- Server-based scheduled backups and archive requests support non-English savesets.
- Saveset keyword ALL for a UNIX client will detect and back up non-English mounted volumes.
- Directed recovery to a non-English relocation directory is supported; however, note that the relocation directory will be created based on the locale being used by the machine that is performing the browsing during the recover session. If the relocation directory already exists, the locale being used by the browsing machine must be compatible with the locale used to create the relocation directory.

Save set recover and locale issues

If the save set recover uses the ssid, the recovery is not dependant on the locale that was used for the backup. If the save set recover uses a non-English save set name, the recovery will need to be done on a machine with the same locale as the backup.

Non-English NetWorker Module save sets will be supported only if the module client has also been localized (for example, the NetWorker Module for Oracle 4.5 will support NetWorker 7.4 localization, provided the NetWorker 7.4 client is installed on the NetWorker Module for Oracle client).

Client configuration requirements for internationalization (for backups and archives)

For clients containing non-English filenames or directories in the Save Set attribute, the Save Operations attribute must be populated with the following OS/version dependant string:

- For Windows clients and Windows/UNIX clients running a pre-7.4 version of NetWorker:

  I18N:mode=utf8path

◆   For UNIX clients running NetWorker release 7.4 or later:

I18N:mode=nativepath

Special considerations for 7.4 UNIX clients

Client and Archive resources must be created in an NMC session that is running in the same locale as the paths used when defining the save set.

The Save Set attributes for the Client and Archive resources can only contain paths and filenames created in the same locale. Separate Client and Archive resources must be created for each path that has a different locale.

Support for UTF8 encoding

Supported UTF8 input files:

nsradmin –I, nsrclone –f, nsrndmp_clone –f, nsrexec –f nsrexecd –f recover –l save –l savepnpc –l

Supported UTF8 output files:

lgtolic -U –f, jbverify -U –f (the -U option denotes that the output file should be UTF-8 encoded)

Supported UTF8 directives:

local directives (nsr.dir & .nsr)

save –f, nsrarchive –f, save –f, savepnpc –f, savefs –f, uasm -f

Note: On Microsoft Windows, a file is considered UTF8 encoded only if it has UTF-8 BOM (and can therefore be viewed in notepad or wordpad).

Support for localized date/time strings

Now you can use a localized date/time string, rather than being limited to the US format. The following commands are examples of the support for localized date/time strings:

changetime -l (for an interactive recover)

recover -t

For the interactive recover command, use the format of the date/time string provided by the ls –l or dir commands.

Message files in raw format to support on-demand localization

A new log viewer program, nsr_render_log, is used to render "raw" log files into the user's current locale. You can also render log files into the current locale immediately, rather than using the nsr_render_log program, by setting the Runtime Rendered Log attribute in the NSR Log resource of the client-side nrsla database.

The following raw log files are being used:

◆ daemon.raw—The daemon.log file is replaced with the daemon.raw file. Upon upgrade, a pre-existing daemon.log file will remain in place but by default will not be updated with new messages.

◆ gst.raw—The gstd.log file (log file for the NMC server) is replaced with the gstd.raw file.

◆ networkr.raw—The networkr.log file (Windows client-side log file) is replaced with the networkr.raw file.

Note: The savegrp.log, summary, messages log, etc, will still adhere to legacy formats and cannot be rendered into a non English locale.

Obfuscation is supported with the 7.4 Service Pack 2 raw log files.

The obfuscation feature allows customers to obscure sensitive information in the raw log files at the time of rendering. With 7.4 SP 2, real usernames, hostnames and IP addresses can be suppressed in the raw log files and replaced with generic aliases. For more information please refer to the NetWorker 7.4 Command Reference Guide under nsr_render_log, or the nsr_render_log man page.

Workflow differences

New authentication

NetWorker now uses a new authentication method that provides a much more secure environment. This feature is configurable; to take full advantage it, please review the NetWorker Authentication section of the NetWorker Administration Guide.

NetWorker now using strict TCP standard

Control sessions using the UDP protocol were replaced with TCP.

New gst daemon

With the inclusion of NetWorker Management Console, the console server has a gst daemon which is used to collect backup, recover and device statistics to facilitate reporting functionality.

New jobs daemon

A new "jobs" daemon was added to improve the tracking of system activity. The jobs daemon centralizes much of the communication and control of backup and recover processes. For larger environments (more than 50 clients), EMC recommends changing the jobsdb size to 40 MB from the default of 20 MB, and the retention period to 3 days from the default of 7 days. You can change the default values under the Configuration tab in the NetWorker Management Console by right clicking the NetWorker Server, selecting Properties, and choosing the Configuration tab of the Properties window.

Changes to the Storage Node resource

NetWorker introduces the "AFTD Allow Directories" attribute, which provides the ability to restrict directories that can be used to create an advanced file type device. There is also a new Deduplicaton node included with the storage node display.

Library operations

Library operations are improved with the introduction of two new daemons: nsrlcpd and nsrmmgd. These daemons track the state of the library and volumes from request to request, eliminating the need for library commands to get state information for the device each time a request is made. However, this does make NetWorker server and storage nodes more vulnerable to confusion if changes to the library are made outside of NetWorker's control. Customers may want to review their procedures for how volumes are managed in a library to guarantee that NetWorker is managing the library operations appropriately.

Increased thread usage

NetWorker now makes more use of threads than earlier NetWorker releases, allowing for improved performance and scaling. You should check the NetWorker server's operating system limits for the maximum number of threads.

Media database upgrade and client file index conversion

Upgrading to NetWorker 7.4.x upgrades the media database and changes the index directory structure. It is not possible to "downgrade" a NetWorker 7.4.x installation to a version prior to the 7.3.x NetWorker release.

NetWorker 7.4.x servers can interoperate with storage nodes running NetWorker 7.3.x or higher, but not with NetWorker 7.2.x or earlier

EMC recommends that storage nodes and servers should both be upgraded to 7.4 SP 2. However, NetWorker 7.4 SP 2 servers will operate with 7.3.4 or higher storage nodes.

New pool attribute

NetWorker pools have a new attribute to allow clones to have a different retention policy than that of the original save set. Clone save sets will still adhere to the browse policy that has been defined for the original save set.

NetWorker adds support for SCSI reserve/release

Customers interested in reserve/release should read the release notes.

NetWorker drops support for Intel "486" and older CPUs on Linux and Windows

486 and older CPUs on Linux and Windows are no longer supported.

NetWorker provides software distribution

Upgrades of NetWorker 7.3 clients to 7.4 can be initiated, or pushed out from a NetWorker server via NMC and the new nsrpush command. NetWorker Modules for Oracle, Exchange and SQL can also be pushed with NMO 4.5 (from NMO 4.1 and higher), and with NME 5.1 (from NME 4.0 and higher) and NMSQL 5.1 (from NMSQL 4.1 and higher). The software distribution feature will only work with the new authentication (nsrauth) enabled for the NetWorker server, NetWorker Management Console server, and the client.

NetWorker introduces Direct SCSI (EDM Open Integration Module) functionality

This feature allows you to perform raw device backup and recoveries of EMC Symmetrix devices by entering the Symmetrix device number into the new NetWorker commands nsrscsi_save and nsrscsi_restore.

The RAP resources for clients and groups now include the "File Inactivity Threshold" and "File Inactivity Alert Threshold" attributes

These attributes support reporting and notification for inactive files. Customers should set the values appropriate for their site, or use 0 to disable the new feature.

Data De-duplication

NetWorker now supports data de-duplication on its clients. NetWorker data de-duplication support requires that EMC Avamar 3.7.2 is installed on the de-duplication node. See the NetWorker Administration Guide for more information.

VMware Consolidated Backups support

NetWorker offers support for VMware Consolidated Backups (VCB). Data de-duplication is also supported with VCB.

Support for the NetWorker Module for Microsoft Applications

With the NetWorker Module for Microsoft Applications, you can protect your operating system and applications using the Microsoft VSS technology from a single client. The module currently supports Exchange 2003/2007, SQL 2005, SharePoint 2007 and DPM. NetWorker 7.4 SP 2 continues to support VSS natively, in addition to supporting the NetWorker Module for Microsoft Applications.

Java Runtime Environments (JRE) versions 1.5 and 1.6 are supported

If you are using NetWorker Dashboard, you must use JRE 1.5 , which is shipped with NetWorker 7.4 SP 2.

New operating system support

The following operating system are now supported:

◆ Microsoft Windows Vista support (introduced in NetWorker 7.4).
◆ Mac OS X on Intel support (in NetWorker 7.3.3 and 7.4 SP 1).

- ◆ Linux RHEL 5 support for the NetWorker client (in NetWorker 7.3.3 and 7.4 SP 1).
- ◆ Microsoft Windows 2008 support for the NetWorker client (in NetWorker Module for Microsoft Applications 2.0 and NetWorker 7.4 SP 2).

Solaris 10 Support

NetWorker 7.4.x supports Solaris 10 including zones/containers and ZFS. Read the release notes about device configuration on Solaris 10 as it is different than in prior versions of Solaris.

ACSLS support for Linux

ACSLS support is now provided for supported Linux operating systems.

Technical considerations prior to upgrading

Note: Please review the NetWorker Software Compatibility Guide and Hardware Compatibility Guide before upgrading. Ensure that the current operating systems, applications and hardware devices in your environment are supported with the latest version of NetWorker before upgrading.

If the operating systems of your current NetWorker server and storage nodes are not supported with the 7.4 SP 2 version of NetWorker, you should upgrade your operating system before upgrading the NetWorker application.

Start the upgrade with the NetWorker server and storage nodes. NetWorker clients can be upgraded in phases after the server and storage nodes are upgraded.

NetWorker catalog consistency checking

Before the Upgrade please ensure the NetWorker's catalog consistency by running the following commands:

- ◆ nsrim –X
- ◆ nsrck –m
- ◆ nsrck –L6

Servers and storage nodes must be upgraded together

The new daemons and communication between the server and storage nodes requires that both sides run NetWorker 7.4 SP 2 . Please plan upgrades accordingly.

Installing NetWorker 7.4 Service Pack 2 requires a significant amount of temporary space on some platforms

Please check the NetWorker release notes for more information. The release notes can be located on Powerlink.EMC.com at:

Home > Support > Documentation/White Paper Library > Software J-O Documentation > NetWorker

Operating system connectivity tuning

NetWorker now uses two file descriptors for each active session. Since the maximum number of sessions on a backup server is limited to 512 sessions, setting the number of available file descriptors to 1048 is sufficient for all environments. Note that some operating systems have a value of 256.

Performance issues can be encountered when offloading is enabled on a network interface card and TCP CRC is used as a checksum. It is recommended to disable offloading:

    # ethtool -K eth0 tso off

Note: This will increase CPU usage during high network usage.

EMC also recommends increasing the network interface card queue length. Most new network interface cards already have this as a default.

    # ifconfig eth0 txqueuelen 1000

Recommended settings for UNIX and Linux

Kernel parameter tuning for all UNIX and Linux systems

EMC recommends that for all UNIX and Linux systems, the following kernel parameters should be increased. The amount that these parameters should be increased is relative to the physical memory of the system; however, you should consider increasing these to at least twice the default settings.

- maxfiles (number of file descriptors per process)
- maxsiz (size of stack segment)
- maxmsg (message sizes)
- nfiles/nflocks (the number of file descriptors/locks)

  - ◆ semmax (the number of semaphore sets available)
  - ◆ shmmax (shared memory)

The following settings are recommended for specific UNIX and Linux operating systems:

AIX

Increase TCP buffers by modifying the tcp_sendspace and tcp_recvspace parameters to 524288.

Solaris

Use the ndd –set /dev/tcp command to set the following values:

  - ◆ tcp_conn_req_max_q 1024

    This parameter sets the maximum number of pending, non-processed TCP requests.

  - ◆ tcp_conn_req_max_q0 4096

    Normally, this setting is four times the tcp_conn_req_max_q parameter.

  - ◆ tcp_time_wait_interval 60000

    This allows Solaris to free connections faster once they are closed.

HP-UX

EMC recommends increasing the max_thread_proc kernel parameter from 64 to 256.

TRU64

Under /etc/sysconfigtab, please set the following values:

```
socket:
        somaxconn = 65535
        sominconn = 65535
    proc:
        open_max_hard = 32768
        open_max_soft = 32768
     ipc:
        sem_mni = 1024
        sem_msl = 512
        sem_opm = 512
        sem_ume = 512
        shm_allocate_striped = 1
        shm_max = 2139095040
        shm_min = 1
        shm_mni = 256
        shm_seg = 256
```

inet:
>   tcbhashnum = 16
>   tcbhashsize = 8192

Linux

To increase the connection backlog (hash tables) to a maximum allowed value, modify the following parameters in /etc/sysctl.conf as follows:

>   net.ipv4.tcp_max_syn_backlog = 8192

>   net.core.netdev_max_backlog = 8192

To increase the memory size available for TCP buffers, modify the parameters as follows:

>   net.core.rmem_max = 16777216

>   net.core.wmem_max = 16777216

>   net.ipv4.tcp_rmem = 4096 87380 16777216

>   net.ipv4.tcp_wmem = 4096 65536 16777216

The following keep alive values are recommended:

>   net.ipv4.tcp_keepalive_intvl = 30

>   net.ipv4.tcp_keepalive_probes = 8

>   net.ipv4.tcp_keepalive_time = 7200

The following timeout after improper close is recommended:

>   net.ipv4.tcp_fin_timeout = 60

The following RPC value is provided:

>   sunrpc.tcp_slot_table_entries = 64

Connectivity and DNS name resolution

Please check your DNS to determine if both forward and reverse lookups are properly configured across your environment for each IP address that is configured on your hosts, even if it is not used by NetWorker. Also, if your DNS is connected to a 100MBit Ethernet network while your backup network is 1GigaBit Ethernet, there will be performance implications under heavy loads, where multiple clients are accessing the DNS at the same time.

Dedicated host for the NetWorker Management Console server

EMC recommends dedicating a host machine for the NetWorker Management Console (NMC) server. If your environment is small (less than 50 clients), you may be able to install the NMC server on the same server that hosts the NetWorker server.

Hardware Requirements for the NetWorker server and storage nodes

Because NetWorker 7.3 and above introduces new processes, such as the jobsd and nsrlcpd daemons, EMC recommends adding additional memory to your NetWorker server to accommodate these processes memory requirements.

As a general rule of thumb, the NetWorker server and the storage nodes should not use virtual memory (page or swap), which will decrease performance and will mean that physical memory is not available to process I/Os flowing through the server. A base recommendation of 8 GB of memory is a good starting point for all NetWorker servers and storage nodes.

CPU requirements: Please calculate 10MH/z of CPU cycles for every 1 MB of data that is flowing across the server. For example, if the intention is to push 300 MBs through a specific server under heavy load, you would need at least 3 GHz of CPU cycles (300 x 10 = 3GHz). In addition, you should add 30% to that calculation to make sure that maximum of 70% of the CPU is being used under heavy load. If more than 70% of the cycles are being utilized, the CPU response time increases dramatically and may impact processing performance significantly.

Backup Policies

Because there are a number of new disk and tape technologies available for backup, this represents an excellent opportunity to consider changing your backup policies.

In general, EMC recommends a backup policy that consists of:

* A full backup every month
* A differential backup (level 1) every weekend between full backups
* Incremental backups between differentials

In terms of recoverability speeds, this backup policy works as well as a full backup every weekend and incremental backups between fulls, while providing significant advantages because less data is backed up on a daily basis, which means less backup target capacity is being used. This decreases the chances of backup failures and makes cloning much more affordable.

Upgrades to AlphaStor

Upgrades in AlphaStor environments need careful pre-planning. Customers should make sure they are completely familiar with the procedures as outlined in the latest release supplements and documentation. Refer to the AlphaStor release 3.1 release notes and install guide for pre-planning information..

Firewall considerations

Client port requirements

If only clients are located in the Data Management Zone (DMZ), you need to open 4 ports in the NetWorker ports range. Those 4 ports are **shared** between all clients.

Storage node port requirements

If a storage node is in the DMZ, a total of 4 + the number of jukeboxes + 2 x (number of tape drives) need to be opened. For example, for a storage node that has a tape library with four drives, you would need 13 ports (4 + 1 + 2 x 4 = 13). If more than one storage node is in the DMZ, The range of ports will be **shared** among all the storage nodes in the DMZ. Therefore, you should open the range of ports required for the storage node with the most number of tape drives.

Service port requirements

To calculate service ports requirements for the NetWorker 7.4 or greater server, use 12 + the number of jukeboxes + 2 x (number of tape drives) should to be opened. NetWorker releases greater than 7.4 will also use an additional service port for software distribution.

Connection ports

NetWorker 7.3 and 7.4 uses more connection ports than earlier releases. An example is the new jobsdb daemon, which uses one additional port for every connection to nsrexecd when starting a save. In busy environments with more than 200 saves running at the same time, it is best to let operating system handle port assignment rather than restricting the range within NetWorker. This is done by setting the connection port range to 0-0 (for example, nsrports -C 0-0).

New installations of NetWorker 7.4 and greater will automatically set the connection port range to 0-0. Upgrades to 7.4 and greater will maintain the setting that existed prior to the upgrade.

Microsoft Windows Firewall Handling

Detection of Windows firewall occurs during NetWorker installation, and the user will be prompted to enable firewall support. If the user chooses to configure firewall support, the NetWorker installation will create an exception for the NetWorker software. To confirm the exception at the end of the installation, users can go to the Properties of the Local Area Connection -> Advanced -> Settings. Under the Exceptions tab of the Windows Firewall window, there will be an entry for NetWorker client.

Note: To troubleshoot firewall configuration issues on Windows, a debug log is create in %temp%\nwmsivbs.log.

Device Configuration

The following are some recommendations regarding LTO (generation 1 through 4) device configuration for various operating systems.

In all cases, persistent binding must be set at the HBA level using the configuration utility that comes with the HBA.

While these recommendations are based primarily on IBM manufactured drives (original or OEM), the scenarios are similar for HP or Quantum configurations.

AIX

Recommended Atape device driver

The minimum recommended version of the Atape device driver is 9.7.5.0. The most recent version available from IBM is is 11.1.3.0. A new driver can be installed and reloaded online without requiring a system reboot.

Device reservation

AIX automatically keeps device files reserved, so no additional steps are needed unless device files under /dev are manually removed. If the device files in /dev are manually removed and recreated, make sure that device ordering in NW is correct.

Solaris

Device reservation

Solaris automatically keeps device files reserved, so no additional steps are needed unless device files under /dev/rmt are manually removed. If the device files in /dev are manually removed and recreated, make sure that device ordering in NW is correct.

Generic st kernel module patch

For Solaris 8 and 9, a patch is required for the Solaris generic st (SCSI tape) kernel module. The patch required depends on the operating system:

◆ Solaris 8: Patch ID 108725; minimum required revision is -21; the latest available version is -28.

   This patch can be installed online; no reboot is required, you will only need to reload the st kernel module.

◆ Solaris 9: Patch ID 113277; minimum required revision is -35; the latest available version is -60.

   This patch also includes sd (SCSI disk) kernel module. A reboot is required upon installation.

◆ Solaris 10: The minimum revision of the st kernel module included in Solaris 10 has native LTO support. Therefore, no additional patches are needed.

To determine the current patch level, type the following at the command line:

   # showrev -p | grep 'Patch: <patch_num>'

Note that if the appropriate patch version is installed, there should not be any additional entries in /etc/st.conf present on the system.

IBM also provides Atape driver for Solaris, but its usage is not recommended by EMC at this time.

Windows 2003

For all the following changes, a reboot is required after the changes have been made. All tape drives should appear with long name and the current device configuration should be created to utilize those names.

Recommended Atape device driver

EMC recommends using native drivers from IBM (Atape) instead of the drivers built into the operation system (ltotape). The latest available version of Atape drivers for Windows 2003 is 6.1.9.3.

Tape Unit Ready

Tape Unit Ready (TUR) should be disabled at the operating system level. For instructions, see MS KB article 842411.

Removable Storage Manager

Disable the Removable Storage Manager (RSM) service at the operating system level.

Upon enabling all of the above, a reboot is required. Furthermore, all tape drives should appear with long name and the current device configuration should be created to utilize those names.

Linux

Linux st st (SCSI tape) kernel module has native LTO support, but some of the default settings are known to cause problems. The appropriate entries must be added to /etc/stinit.def file and devices initialized with stinit command. A sample stinit.def file is provided at the end of this section.

IBM also provides Atape driver for Linux, but its usage is not recommended by EMC at this time

Sample stinit.def file

```
# Common settings for all device types

{buffer-writes read-ahead can-bsr scsi2logical drive-buffering}

# Per-type settings
# Perform cat /proc/scsi/scsi to make sure that manufacturer and model strings
# match perfectly or the settings will not be applied corretly.

# IBM ULTRIUM 4

manufacturer=IBM model="ULTRIUM-TD4" {

auto-lock=0
timeout=3600
long-timeout=14400
can-partitions=0

# This gives highest performance, but with old versions of st module it can
# cause problems with spaning tapes

async-writes=1

# Those are optimal performance values, but check if tapes can be properly
# accessed multi-platform

mode1 blocksize=0 density=0x44 compression=1 # ULTRIUM 3 density, compression
on
mode2 blocksize=0 density=0x44 compression=0 # ULTRIUM 3 density, compression
off
mode3 blocksize=0 density=0x42 compression=1 # ULTRIUM 2 density, compression
on
mode4 blocksize=0 density=0x40 compression=1 # ULTRIUM density, compression on

# For maximum flexibility, option is to use device defaults instead of forcing
# density settings
# mode1 blocksize=0 density=0x00
}
```

```
# IBM ULTRIUM 3

manufacturer=IBM model="ULTRIUM-TD3" {

auto-lock=0
timeout=3600
long-timeout=14400
can-partitions=0

# This gives highest performance, but with old versions of st module it can
# cause problems with spaning tapes

async-writes=1

# Those are optimal performance values, but check if tapes can be properly
# accessed multi-platform

mode1 blocksize=0 density=0x44 compression=1 # ULTRIUM 3 density, compression
on
mode2 blocksize=0 density=0x44 compression=0 # ULTRIUM 3 density, compression
off
mode3 blocksize=0 density=0x42 compression=1 # ULTRIUM 2 density, compression
on
mode4 blocksize=0 density=0x40 compression=1 # ULTRIUM density, compression on

# For maximum flexibility, option is to use device defauls instead of forcing
# density settings
# mode1 blocksize=0 density=0x00
}


# IBM ULTRIUM 2

manufacturer=IBM model="ULTRIUM-TD2" {

auto-lock=0
timeout=3600
long-timeout=14400
can-partitions=0

# This gives highest performance, but with old versions of st module it can
# cause problems with spaning tapes

async-writes=1

# Those are optimal performance values, but check if tapes can be properly
# accessed multi-platform

mode1 blocksize=0 density=0x44 compression=1 # ULTRIUM 3 density, compression
on
mode2 blocksize=0 density=0x44 compression=0 # ULTRIUM 3 density, compression
off
mode3 blocksize=0 density=0x42 compression=1 # ULTRIUM 2 density, compression
on
mode4 blocksize=0 density=0x40 compression=1 # ULTRIUM density, compression on
```

```
# For maximum flexibility, option is to use device defauls instead of forcing
# density settings
# mode1 blocksize=0 density=0x00
}


# IBM ULTRIUM 1

manufacturer=IBM model="ULTRIUM-TD1" {

auto-lock=0
timeout=3600
long-timeout=14400
can-partitions=0

# This gives highest performance, but with old versions of st module it can
# cause problems with spaning tapes

async-writes=1

# Those are optimal performance values, but check if tapes can be properly
# accessed multi-platform

mode1 blocksize=0 density=0x44 compression=1 # ULTRIUM 3 density, compression
on
mode2 blocksize=0 density=0x44 compression=0 # ULTRIUM 3 density, compression
off
mode3 blocksize=0 density=0x42 compression=1 # ULTRIUM 2 density, compression
on
mode4 blocksize=0 density=0x40 compression=1 # ULTRIUM density, compression on

# for maximum flexibility, option is to use device defauls instead of forcing
# density settings
# mode1 blocksize=0 density=0x00
}
```

Persistent Binding

Some operating systems tend to switch the order of virtual or physical tape drives after rebooting. Since the NetWorker software uses the operating systems device drivers, a change in the drive order requires a complete reconfiguration of the drives. To eliminate that need, use persistent binding at the operating system level to make sure that drives will not be re-ordered after rebooting. The following is a short description explaining how to set persistent binding on each operating system:

AIX

Because AIX operating systems communicate with devices using WWN (not SCSI ID), persistent naming is used by default. See the IBM Redbook: Implementing IBM Tape in UNIX Systems section 4.3.2 Persistent binding for HP-UX and AIX.

HP-UX

Because HP-UX 11i v3 (11.31) uses "agile addressing," persistent naming is used by default. HP-UX documentation states that "persistent DSFs are created by default on newly installed servers".

Linux 2.6. kernels

Some distributions of Linux provide udev rules that automatically create persistently-named symbolic links in /dev/tape/by-id and /dev/generic/by-id. These symbolic links are named using one or more device-specific attributes (for example, serial number or WWPN). This binds a device file to a specific tape or jukebox device. This works in SLES 9 SP3, SLES 10 SP1; RHEL 4.7, and will work in RHEL 5.2.

Persistent binding is achieved using udev rules which are controlled by /etc/udev/udev.conf. Newer versions of udev already contain some rules for tape devices. Note that udev subsystem can be upgraded regardless of the version of the underlying Linux distribution with minimum kernel version 2.6.

The following is an example rule which creates entries like /dev/tape/x-xxxx-nst. Refer to documentation for your specific Linux distribution for more details.

```
KERNEL=="nst*", ENV{ID_SERIAL}=="?*", SYMLINK+="tape/by-
id/$env{ID_BUS}-$env{ID_SERIAL}"-nst
```

Any rule which is linked to a static property is a valid rule. Avoid using rules which utilize external programs like lsscsi or scsiinfo, as they may cause SCSI resets during configuration.

Refer to http://solutions.emc.com/emcsolutionview.asp?id=esg96314 for details regarding how to configure NetWorker to use udev and persistent bindings on NetWorker 7.4 SP2.

EMC Disk Library and NetWorker Embedded Storage Node

Refer to http://csgateway.emc.com/primus.asp?id=emc186941 for information about creating persistent bindings on an EMC Disk Library (EDL) for NetWorker Embedded Storage Node (ESN).

Solaris 10

Solaris 10 uses /etc/devlink.tab entries to map Fibre Channel WWPN and LUN to a specified /dev/rmt/{rmt number}. This is a manually-configured feature. See the Solaris SAN Configuration and Multipathing Guide: Chapter 8 Persistent Binding for tape devices

Microsoft Windows

—Windows 2003 SP 1 and later provide persistent names for tape devices. To configure the machine to use persistent naming, create the following Registry entry:

HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control\ Tape\Persistence

After the system is rebooted, devices will have persistent names. For example, the device file \\.\Tape0 will use a name similar to \\.\Tape2147483646, which is persistent.

◆ If Microsoft-provided drivers are used (tape and/or ltotape), details are covered in the attached document as well in Microsoft Knowledge Base article 873337.

For systems using Windows 2003 SP1, a Microsoft hotfix documented under KB article 933682 is also needed. Older systems do not have persistent binding functionality.

◆ If IBM-provided drivers are used (ibmtp2k3), refer to the IBM Tape Device Drivers Installation and User's Guide, which explains

Note: If persistent binding does not appear to be in effect after setting the registry key, upgrade tape drive drivers. For example, older versions of IBM's Atape driver do not adhere to the rules set by Windows.

Recommended NetWorker Module versions

This section lists the recommend base versions of NetWorker Modules to be used in conjunction with a NetWorker 7.4 SP 2 client.

Note: All earlier versions of the modules that are supported on earlier versions of the NetWorker client will still be supported in a NetWorker 7.4 SP 2 datazone. However, if you upgrade your NetWorker client to 7.4 SP 2, you should also upgrade your NetWorker Modules to the following versions.

Module	Recommended Version
NetWorker Module for DB2 (NMDB2)	Version 2.1
NetWorker Module for Informix (NMI)	Version 3.0
NetWorker Module for Lotus Notes (NML)	Version 3.0 (UNIX)
	Version 3.0.1 (Windows)
NetWorker Module for Exchange (NME)	Version 5.1
NetWorker Module for SQL (NMSQL)	Version 5.1
NetWorker Module for Oracle (NMO)	Version 4.5
NetWorker Module for SAP (NMSAP)	Version 3.5
NetWorker Module for Sybase (NMS)	Version 3.0
NetWorker Module for Documentum (NMD)	Version 1.2
NetWorker Module for Centera (CBRM)	Version 2.1
NetWorker Module for Meditech (NMMEDI)	Version 2.0
NetWorker PowerSnap	Version 2.4 Service Pack 1
NetWorker SnapImage	Version 2.0.2 (Windows)
	Version 1.6.1 (UNIX)
NetWorker Client for OpenVMS	Version 7.3.2
NetWorker Module for Microsoft Applications	Version 2.0
NetWorker Dashboard	Version 1.0 Service Pack 2
EMC Backup Advisor	Version 3.1