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Computers
NetWorker 4.2.5
July 1997

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This release notice applies to the following models:

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1 Introduction

This release notice describes Legato NetWorker™ for Data General's family of AViiON® computers. It also includes specific information about NetWorker 4.2.5.

An on-line version of this release notice, suitable for lineprinters, is in the file `/usr/opt/networker/release/networker_4.2.5.rn`.

2 Product description

NetWorker is a backup and archive application for networked computers. Developed by Legato Systems, Inc., NetWorker is based on the client/server computing model. With this product, the system administrator can back up and archive data on both a server's disks and disks of its clients to local tape drives. The features of NetWorker include:

- **Scheduling**
Once the backup manager specifies the file systems and clients to be backed up, the tape drives to use, the backup levels, and backup intervals, NetWorker backs up a network of computer systems with minimal operator intervention.
- **Restoration from backup**
NetWorker maintains on-line indexes of all the files it backs up. A client user can browse through these indexes and select files to be restored, with minimal operator intervention.
- **Support for on-demand backups and overrides**
Client users, as well as the backup operator, can initiate on-demand backups. The backup operator can easily override a schedule without changing it permanently.
- **Data archive**
To conserve disk space, online data can be grouped and archived to removable media. Archived data is tracked separately from normal backup data. After data is archived, it can be removed from on-line storage.
- **Data verification**
After data is archived, it can be verified to ensure that it is reliable, safe, and retrievable before removing it from online storage.

- **Security**
By default, a client user can request an on-demand backup only for a local file system, and can browse through and restore only files that were backed up from a local file system. But the backup administrator may extend access to include file systems located on other clients.

By default, only the superuser on the backup server can change the backup configuration or access backed-up files. But the backup administrator, acting as superuser, can designate a subordinate backup operator to maintain the backup without giving the operator superuser access.
- **Parallelism**
NetWorker can back up an operator-specified number of file systems (up to 16) in parallel. The file systems can be located on the same or different clients. When multiple file systems are being backed up to the same tape drive concurrently, the data from the file systems is multiplexed. Parallelism can reduce the time required to complete a backup.
- **Concurrency**
NetWorker can write to multiple tape drives simultaneously. Used in combination with parallelism, concurrency can greatly reduce the time required to complete a backup.
- **Software compression**
Optionally, the operator can direct NetWorker to compress files before writing them to tape. Upon restoration, compressed files are uncompressed. Compression can reduce by up to 50 percent the tape space required for a backup.
- **File bypass**
Optionally, the operator can direct NetWorker to skip files that do not need to be backed up (for example, files ending with suffixes **.o** or **.backup**). Such directives can further reduce the number of tapes required to back up a disk.
- **Flexible volume control**
NetWorker maintains multiple versions of backup files, based on the operator's specifications.
- **Flexible server support**
A client can be supported by more than one backup server, and can choose between them. Also, a client and a server can be the same host. In this case, NetWorker backs up local disks to local tape drives.

- **Device support**
NetWorker works with all AViiON-supported tape drives, including the CLARiiON™ tape array.
- **Autochanger (jukebox) support**
NetWorker provides support for automated operation using tape jukeboxes. The tape jukeboxes supported include EXB-210, EXB-440, and EXB-480 jukeboxes.
- **Cluster support**
On a DG/UX cluster, NetWorker can be configured to take advantage of high availability features, by running it in cluster mode.

2.1 Legato Data Backup Utility

Legato Data Backup Utility is the restricted version of NetWorker, which is provided free of charge with the DG/UX operating system. It provides enough features to enable you to back up your local file systems to a single local backup device. The Legato Data Backup Utility can be upgraded to either NetWorker for DG/UX, Server Edition or NetWorker for DG/UX, Network Edition by purchasing a license. Licenses for other advanced features are also available from Data General. (See “Licensed Features” below.)

The NetWorker manuals assume you have purchased licenses to upgrade from Legato Data Backup Utility. Hence, when using the manuals with Legato Data Backup Utility, you should be aware of the following limitations:

- **Backup devices**
Only one backup device may be configured.
- **Parallelism**
The maximum value for parallelism (the number of concurrent save sessions allowed to multiplex to the device) is two. In addition, the “sessions per device” attribute will always be forced to mirror the value for parallelism.
- **Save sets**
A client resource will be created for the local host. The save set attribute for this client resource will be set to “All.” You cannot change this attribute. However, if you wish to skip a file system, you can use the “skip” directive at the appropriate locations in your file

system.

- **Schedules**
You can modify preconfigured schedules, but you cannot add or delete schedules.
- **Policies**
You can modify preconfigured policies, but you cannot add or delete policies.
- **Directives**
You can modify preconfigured directives, but you cannot add or delete directives.
- **Groups**
Preconfigured with one group, “default.” You can modify this group, but you cannot add groups. “Client retries” will be set to 0 and cannot be changed.
- **Media pools**
Legato Data Backup Utility should use the “default” pool. You may not create pools.
- **Clients window**
You cannot add clients. However, you may add machines to the “recover access” list.
- **Label templates**
You cannot add templates.

2.2 Licensed features

This section describes features you may license to upgrade Legato Data Backup Utility to obtain more advanced capabilities. Included for each feature is the short feature name (the feature name recognized by **sysadm** and **PCsysadm**), the prerequisite licenses (other licensed features the feature depends upon), and a description of the feature. Contact your Data General representative for information about purchasing these licenses.

2.2.1 NetWorker for DG/UX, Server Edition

Feature name: nw_server

This license upgrades Legato Data Backup Utility to NetWorker for DG/UX, Server Edition. Server Edition is ideally suited for sites where data protection is required for a stand-alone, non-cluster system, including large workgroup servers, database servers and branch office installations. Unlike Network Edition, Server Edition does not support any client connections.

Server Edition is a high-performance, high-capacity storage management application that provides for local, remote or centralized administration and supports NetWorker's advanced data management options to provide the following capabilities:

- Unmatched Performance - NetWorker's unique parallel streaming feature supports up to 32 concurrent backup/recover sessions on a single Server Edition system.
- Autochanger Aware - Systems running Server Edition can be extended to operate with tape autochangers through the addition of the appropriate Autochanger licenses.
- Concurrent Device Support - Provides support for backup and recovery operation using up to 16 backup devices simultaneously, including multiple autochangers.
- Autochanger Aware - Server Edition can be expanded to provide additional features for the management of archives through the addition of the NetWorker Archive license.

2.2.2 NetWorker for DG/UX, Network Edition

Feature name: nw_network

This licensed feature upgrades Legato Data Backup Utility to NetWorker for DG/UX, Network Edition. Network Edition includes all of the capabilities of Server Edition, and extends these capabilities to networked clients. This allows the server to back up these remote clients over the network. It also lets the remote clients restore backed up files from, and perform on-demand backups to, the server's tape drives. Any system with a local hard disk, ranging from a single PC to a multi-processor servers running various types of operating systems.

Network Edition's performance/capacity is suited for multi-platform, enterprise-wide environments and for servers running DG/UX clusters. It is pre-configured to support ten client connections.

2.2.3 NetWorker Archive

Feature name: nw_archive

Prerequisite license: NetWorker for DG/UX (Server Edition or Network Edition)

The NetWorker Archive license enables support for data archiving. Data archiving involves saving a snapshot of a group of files or directories as they reside on disk at a given point in time. It differs from backup in that its primary goal is to conserve disk space, while ensuring that the data on the archived media is reliable, safe, and easily retrievable. Data archiving is usually performed in addition to scheduled data backup.

NetWorker Archive lets you archive snapshots of groups of files and directories to offline media, then optionally delete the archived files and directories to conserve online disk space (grooming). When needed later, a snapshot of files and directories can be retrieved as a group.

Because data can optionally be groomed from the system, NetWorker Archive lets you verify the data on the archive media to ensure that it is reliable, safe, and retrievable.

NetWorker Archive media is maintained and managed separate from NetWorker backup media. This ensures that archive data is separated from backup data. In addition, since the primary goal of archiving is to store data on removable media for a long period of time, NetWorker Archive media is never recycled.

2.2.4 NetWorker Autochanger Licenses

Feature names:

nw_autochanger_8 – 1–8 slot autochangers

nw_autochanger_16 – 1–16 slot autochangers

nw_autochanger_32 – 1–32 slot autochangers

nw_autochanger_64 – 1–64 slot autochangers

nw_autochanger_128 – 1–256 slot autochangers

nw_autochanger_256 – 1–256 slot autochangers

nw_autochanger_u – unlimited (autochangers with more than 256 slots)

Prerequisite license: NetWorker for DG/UX, Server Edition or Network Edition

NetWorker autochanger licenses enable support for tape jukeboxes. NetWorker's autochanger (jukebox) support is integrated with its scheduling feature. Once the backup manager specifies the file systems and clients to be backed up, the tape drives to use, the backup levels, and backup schedules, backup tapes in the jukebox can be mounted and unmounted automatically. This allows regular backups to occur with minimal operator intervention.

The particular autochanger license needed to support an autochanger is determined by the by the total number of media slots in the device.

Note that you must purchase a separate license for each autochanger device you wish to use with NetWorker. For example, if you have 2 DLT autochanger devices which have 7 slots each, you must purchase two separate nw_autochanger_8 licenses—one for each autochanger.

2.2.5 NetWorker SNMP

Feature name: nw_snmp

Prerequisite license: NetWorker for DG/UX (Server Edition or Network Edition)

The NetWorker SNMP license supports an enterprise management strategy by providing seamless integration of an AViiON NetWorker server into an SNMP framework managed by HP Open View Network Node Manager or SunNet Manager.

2.2.6 NetWorker Clients

Feature name: nw_clients

Prerequisite license: NetWorker for DG/UX, Network Edition

This feature enables support for additional remote clients. Licenses may be purchased to support the following maximum client counts: 25, 50, 100, 250, 500.

2.3 Upgrades

2.3.1 Server Edition to Network Edition Upgrade

Upgrades Server Edition to Network Edition.

2.3.2 TurboPak Upgrade

This upgrade is for customers who purchased the NetWorker for DG/UX license prior to NetWorker 4.2.5, but did not purchase TurboPak. This license upgrades the customer to Network Edition (which is equivalent to what was formerly sold as NetWorker for DG/UX plus TurboPak).

2.4 Database Module for Oracle

Database Module for Oracle (DMO) provides NetWorker support for Oracle's Enterprise Backup Utility (EBU). It is available from DG/UX on a separate release medium. For information on ordering this module, contact your Data General Sales representative

3 Environment

NetWorker 4.2.5 requires DG/UX System Release 4.20 or later. It runs on any AViiON model. A NetWorker client must include one or more disks. A NetWorker server must include one or more backup devices.

When setting up this software package, you may configure your system as a local-only NetWorker server or as a NetWorker client.

Two user interfaces are available: a graphics interface based on the X Window System and Motif, and a curses-based ASCII terminal interface. The graphics interface program requires an AViiON workstation or X terminal, and the version of DG/UX System Release 4.20 (model P001A) that includes the X Window System software.

4 Enhancements and changes

The following enhancements and changes have been made to NetWorker since NetWorker 4.1.1:

4.1 Performance enhancements

NetWorker 4.2.5 introduces various performance-related enhancements.

- NetWorker CPU utilization has been significantly reduced for both server-based and networker-based backups. Previously, data from various save processes had to be sent through an intermediate agent process (**ansrd**). With NetWorker 4.2.5, this agent process has been eliminated. The save processes now send backup data directly to the tape writer daemon (**nsrmmd**).
- Index checking and repair is improved, reducing the amount of server downtime needed to maintain the system.
- Maximum parallelism has been increased from 16 to 32.
- Maximum number of devices supported has been increased from 10 to 16.

4.2 New backup devices

NetWorker 4.2.5 adds support for 2GB and 5GB QIC tape devices. DLT tape arrays are also supported by selecting the DLT device type.

4.3 “SmartMedia” support for standalone devices

“SmartMedia support for standalone devices allows automounting and autolabeling of media volumes for true autoverification of backed up data.

4.4 Pre- and post-processing commands

NetWorker now provides support for configuring savegroups with custom scripts or commands for performing pre- and post-processing. This is useful for performing operations such as shutting down a database prior to starting a backup, then bringing it back online after a backup.

4.5 Command name changes

The name of the **savegroup** command has been changed to **savegrp**. The name of the **jbm_enabler** command has been changed to **jb_config**.

5 Notes and warnings

This section lists the notes and warnings pertaining to this release of NetWorker.

5.1 New NetWorker licensing structure

NetWorker 4.2.5 introduces a new licensing structure for the NetWorker product. The NetWorker for DG/UX (nw_dgux) and NetWorker TurboPak (nw_turbo) licenses have been combined into a single license, NetWorker for DG/UX, Network Edition (nw_network). If you purchased the old nw_dgux and nw_turbo license tokens, these license tokens will still be recognized by NetWorker 4.2.5. Just enter these license tokens in via the

sysadm→system→license menu. **Sysadm** will accept these license tokens, even though they are not listed on the menu.

If you purchased the nw_dgux license but not the nw_turbo license, NetWorker 4.2.5 will recognize that license token also. In this case, you may upgrade to NetWorker for DG/UX, Network Edition by purchasing the TurboPak upgrade.

5.2 Performing Backup of Online Indices Recommended

Prior to upgrading to NetWorker 4.2.5, we recommend that you run a full save of the client indexes and server bootstrap (using the **saveindex** command as described in the man pages). This is a precautionary measure that is not strictly necessary, but we recommend it to speed up recovery in case problems do occur.

5.3 Conversion of Online Indices

In NetWorker 4.2.5, the format of the online indexes has been changed, the NetWorker software will convert existing online indexes from the 4.1 format to the new 4.2.5 format. Before starting up the NetWorker daemons after the upgrade, you must first prepare the indexes by running the command **nsr_index_prepare**. This command uses the **nsrck** utility to rebuild your index B-tree structure. This is a precautionary measure to ensure that your online indexes are in a consistent state prior to bringing up the NetWorker daemons for the first time.

To start the NetWorker daemons for the first time after upgrading from NetWorker 4.1, perform the following steps as superuser:

- (1) Execute the command **nsr_index_prepare**
- (2) Use **nsr_start** to start the NetWorker daemons

If, for some reason, the **nsr_index_prepare** command fails to complete successfully, or if you encounter any problems when nsrd attempts to convert the indexes, perform the following steps:

- (1) Remove the file **/nsr/nsrck_not_completed**, if it exists.

- (2) Start the NetWorker server daemons using **nsr_start**, if they aren't running.
- (3) Use the **mmrecov** command to recover the server index, **mmvolume**, and **res** files.
- (4) For all client indexes, use **recover** to recover the client indexes. The process of recovering the indexes will automatically convert them to the new format.

5.4 NetWorker index file size

The maximum size allowed for NetWorker index files in `/nsr/index` is currently 2 GB. For hosts which back up a large number of files, the size of the index file may be controlled by setting the browse policy appropriately.

NetWorker checks the size of the file index each time a new save session is started on a client. At that time, if the size of the file index is within 5% of the maximum index size (i.e. greater than 1.9 GB), NetWorker refuses to accept the save session. Furthermore, once the index has grown to this point, NetWorker will not perform any operations on the index (including browse/recover) until the index is compressed to reduce its size below the 1.9 GB threshold. If this occurs, **save** and **recovery** commands will display an error message like:

```
save: SYSTEM error, Arg list too long
save: Cannot open save session with server
```

The **daemonlog** file, you will find a message like:

```
nsrindexd: session start failed for hostname error 1007
```

In this situation, you should take the following steps to reduce the size of the index:

- (1) Begin removing cycles from the online index using the **nsrim** command in order to free up space in the online index.
- (2) Compress the indexes using **nsrck** to reduce the size of the index file. (Alternatively, you may want to use the **-x** option with **nsrim** in the previous step to compress the index automatically when it reaches a certain utilization threshold. For details, see the description of the **-x** option in the **nsrim** man page.)

- (3) Adjust client browse policies to prevent the index from growing back to the 1.9 GB threshold on future backups. (Refer to the section "Disk layout and space requirements" for guidelines on estimating the size of the online index.)

A future major release of NetWorker from Legato will lift this 2GB index file size restriction.

5.5 Upgrading to NetWorker 4.2.5 on a cluster

If you are upgrading to NetWorker 4.2.5 on a cluster, you need to run **nsr_cluster_setup** or **nsr_node_setup** before starting NetWorker for the first time. If you are running NetWorker in clustered mode, you need to run the **nsr_cluster_setup** command. If you are running NetWorker in non-clustered mode, you need to run **nsr_server_setup** on each node you would like to configure as a NetWorker server.

If you run **nsr_cluster_setup** you will be asked to enter the IP service group for NetWorker. If you already have your NetWorker service configured under an IP service group from NetWorker 4.1.1, you should enter a 'q' at the prompt. NetWorker will continue to use the existing IP service group for the NetWorker service.

5.6 Using autochangers that support bar code labels

There is a known problem which causes a failure when opening an autochanger device which supports bar code labels but which contains tapes without bar code labels. In this instance, the sj driver may time out during the open when attempting to perform an initialize element status operation. In order to avoid this problem, use only tapes with bar code labels with autochangers which have a bar code reader.

5.7 Using jbxercise

When running **jbxercise** on autochanger devices which have an import/export port, jbxercise will display the message:

```
Please remove media from import/export port
```

If your autochanger does not allow you to remove media at this point, you simply press return, and **jbexercise** will continue.

5.8 Commands to start and stop NetWorker daemons

Do not invoke or kill NetWorker daemons directly. Instead use the new commands **nsr_start** and **nsr_stop**.

Use the **nsr_stop** command instead of the **nsr_shutdown** command for the common case where you wish to stop all the NetWorker daemons and active savegroups.

5.9 Motif app-defaults file

A Motif app-defaults file for customizing the NetWorker Motif interface is provided in **/usr/opt/networker/lib/app-defaults**.

5.10 Restrictions imposed by Legato Data Backup Utility

In releases prior to DG/UX System Release 4.20, the “single-client” version of NetWorker was bundled with the DG/UX operating system. In DG/UX System Release 4.20, “single-client” NetWorker has been replaced with a reduced-function version of NetWorker called Legato Data Backup Utility. Legato Data Backup Utility imposes a number of restrictions that did not exist with “single-client” NetWorker. For example, Legato Data Backup Utility allows configuration of only one device.

If you upgraded from a previous DG/UX release, and your current NetWorker configuration violates Legato Data Backup Utility’s restrictions, NetWorker may report an error message like the following:

```
NetWorker server: (info) Server is disabled (Too many devices).
```

If you are upgrading from a DG/UX release earlier than Release 4.20 and have purchased Data General’s Software Subscription Service, you should have received with your DG/UX update a license token for the feature NetWorker for DG/UX, Server Edition (“nw_server.”) This feature lifts the new restrictions imposed by Legato Data Backup Utility.

You may install the NetWorker for DG/UX, Server Edition license using the System → License → Install operation of **sysadm** or **PCsysadm**.

If you have **not** purchased Data General's Software Subscription Service, and your site requires advanced capabilities that are no longer available with Legato Data Backup Utility, you may purchase licenses from Data General to enable advanced NetWorker features. Contact your Data General sales representative. To use Legato Data Backup Utility on your system with the new restrictions, do the following:

Stop the NetWorker daemons:

```
# nsr_stop ↵
```

Rename the old NetWorker resource files (to force NetWorker to create new resource files):

```
# mv /nsr/res/nsr.res /nsr/res/nsr.res.old ↵
```

```
# mv /nsr/res/nsrjb.res /nsr/res/nsrjb.res.old ↵
```

Restart the NetWorker daemons:

```
# nsr_start ↵
```

Upon startup, NetWorker will create new versions of the resource files, and the server will no longer be disabled.

For more information, see the section "Legato Data Backup Utility."

5.11 Recovering raw disks

When recovering a raw disk, NetWorker does not prompt to warn that the previous raw disk will be overwritten.

When recovering backups of raw disks created on a NetWorker version prior prior to NetWorker 4.1.1, NetWorker will display a warning that there is not enough space in the file system. Ignore this prompt and indicate that you wish to continue the backup.

5.12 Running NetWorker in cluster mode

On a DG/UX cluster, NetWorker may be run in cluster mode or normal mode. Cluster mode allows you to utilize high-availability features, and to centralize administration of your NetWorker backups on the cluster.

However, in cluster mode, tape devices used for backup must be attached to a shared bus. This means that some older tape devices (for example, “single-ended” SCSI) may not be available for use as backup devices. If you need to back up to a tape device that cannot be attached to a shared bus, you must run NetWorker in normal mode.

For more information, see *Managing a DG/UX Cluster*.

5.13 Configuring jukeboxes

To configure a jukebox for use with NetWorker, you must purchase the appropriate NetWorker Autochanger license from Data General and enable that license via **sysadm** or **PCsysadm**. In addition to this, you also need to enable your jukebox device using the **jb_config** command. For instructions, refer to the *Legato NetWorker Administrator's Guide*.

5.14 Do not use NetWorker on DSO systems

Do not use NetWorker to back up data on a DG/UX system with information security. Instead, use the **dump2** and **restore** utilities.

5.15 Portmap dependency

NetWorker uses RPC calls and, hence, requires that **portmap** be running. **portmap** is started automatically by the DG/UX system when it is booted to init level 3.

5.16 Segregating a host's file systems

By default, all file systems on a single host are assigned to the same backup schedule and belong to the same groups. However, you may sometimes want to segregate an individual host's file systems by giving them a different schedule, or by assigning them to different groups. You may do this as follows:

1. Add the host as a client multiple times.
2. Divide the file systems between the client instances.
3. Assign each client instance to a separate backup group or schedule.

For example, for a NetWorker server named "foo," you can add several clients named "foo." For a thorough explanation of how to do this, refer to the section "Scheduling Large Client Filesystems" in the chapter "Configuring and Monitoring Clients" in the *Legato NetWorker Administrator's Guide*.

Note: This is not allowed with Legato Data Backup Utility, since it does not allow you to create multiple client instances.

5.17 Using NetWorker from diskless workstations

Diskless workstations use dedicated areas of disks belonging to their server. The correct way to back up a diskless workstation's disk area is to back up the server. Do not attempt to install NetWorker on a diskless workstation.

You can use the NetWorker user and administrative graphical interface from a diskless workstation provided that NetWorker is installed on the workstation's server (or the workstation's server is set up as a NetWorker client) and the workstation has login privileges on the server. The procedure is as follows:

1. Allow the workstation's server to use the workstation's display. From a terminal window on the workstation, type this command:

```
xhost server
```

where *server* is the workstation server's hostname.

2. Open a terminal session on the server. For example, type:

```
rlogin server
```

and log in.

3. From this terminal window on the server, start the appropriate NetWorker graphical user interface using `-display` to set the display to your diskless workstation. For example, to start the NetWorker administrative interface, type this command:

```
nwadmin -display wrks:0 &
```

where *wrks* is the workstation's hostname. If the NetWorker server is different from the workstation's server (that is, if the workstation's server is a NetWorker client), type this command:

```
nwadmin -display wrks:0 -s networker-server &
```

where *networker-server* is the NetWorker server's hostname.

You can automate this procedure by editing your `.login` and `.mwmrc` files.

5.18 Using NetWorker from terminals

The NetWorker manuals document the graphical user interface for NetWorker, which requires a workstation or X terminal. If you plan to use NetWorker from an ASCII terminal, consult the NetWorker manual pages.

Appendix C of the manual *Legato NetWorker Administrator's Guide* provides useful descriptions of the administrative commands available in the ASCII interface and instructions for printing out the manual pages.

Make sure the `TERM` environment variable is correctly set for the terminal you use. The `nsradmin` and `nsrwatch` commands do not work properly if `TERM` is set incorrectly. The manual *Setting Up and Managing Terminals on the DG/UX System* discusses terminal setup.

5.19 Using NetWorker in heterogeneous networks

You can back up non-AViiON clients to the AViiON server, provided that NetWorker is installed on those clients and that you have purchased a license from Data General to allow your AViiON server to back up remote NetWorker clients. For example, you can back up Sun, HP/UX, RS6000, DEC, MIPS, and PC clients to an AViiON backup server. However, to do so, you must obtain an appropriate version of the NetWorker software for those clients from Data General or from Legato Systems, Inc.

5.20 Disk space for NetWorker index files

The NetWorker index files can consume a large amount of disk space. The section “Disk Layout and Space Requirements” tells how to estimate the space requirements.

If you run out of index space during a backup and you have additional physical disk space that can be allocated to the file system containing the NetWorker index information (`/var/opt/networker`), you do not have to cancel the backup. Rather, you can expand the index file system using the File System → Local Filesys → Expand operation in `sysadm` or `PCsysadm`. Within a few seconds after the file system expansion completes, NetWorker detects that there is additional space available and continues the backup.

5.21 Using NetWorker with the CLARiiON tape array

Before NetWorker can use a tape volume, you must label the volume using the Operation → Label or Operation → Label and Mount selection in the graphical interface or the `nsrmm` command in the terminal interface. NetWorker writes the label you supply on the tape and records it in the on-line indexes. Therefore, you should affix an adhesive label to the tape. Labels allow NetWorker to prompt for the tape it needs to fulfill a restoration request.

With the CLARiiON tape array, a single NetWorker label applies to all tapes in the array. When labeling a CLARiiON tape array volume, affix the adhesive volume label to each separate tape and keep the tapes together in a group. A prompt from NetWorker to insert or remove a CLARiiON tape array volume means you should insert or remove the complete group. The tapes in the group can be inserted in any array slot and in any order.

NetWorker does not provide a special device type for a tape array. So when you add, for example, a CLARiiON DLT tape array device via NetWorker's administrative interface, give it the type "DLT."

5.22 Inspecting NetWorker syslog entries

When you install NetWorker, several entries are added to the server's `/etc/syslog.conf` file, specifying where NetWorker messages and logging information are sent. You should inspect these entries, which appear between two comment lines identifying NetWorker as their source. You can change the specifications if they are not appropriate at your site.

More specifically, the default configuration for NetWorker uses `local1.notice` for default log messages, and `local0.alert` for the second tape mount request. If this use of `syslog` conflicts with your current configuration, you can modify NetWorker's `syslog` entries to use another facility (such as `local2` and `local3`). If you do this, you will also need to use `nsradmin` or `nwadmin` to modify the directives for "Log default" and "Tape mount request 2" so that they log to the appropriate facility. For more information, see the `syslog.conf(5)` and `syslogd(1M)` manual pages.

5.23 Changing your system to a NetWorker client

By default, the NetWorker daemons start whenever the system enters run level 3 (init 3). To change this behavior, edit the file `/etc/networker.params` and change the variable `networker_START` to `false`.

If you set up a system as a NetWorker server and later decide to set it up as a NetWorker client, stop the daemons:


```
# nsr_stop ↵
```

Next, edit the `/etc/networker.params` file and change the variable `networker_SERVER` to `false`, then restart the client NetWorker daemons:

```
# nsr_start ↵
```

5.24 Changing the destination of bootstrap information

Bootstrap information lets you use NetWorker backup volumes for recovery should a disaster befall the computer system. As each savegroup of a backup completes, NetWorker sends the saveset bootstrap information to the default printer. This lets you store the information with the tape volumes to which the information applies.

You can change the destination of bootstrap information to a different printer. To do so, use either `nwadmin` or `nsradmin`. Follow the instructions in the *Legato NetWorker Administrator's Guide*, Appendix B, section “Cannot Print Bootstrap Information.” For detailed information about using `nsradmin`, see its manual page (type `man nsradmin`).

If the destination printer for bootstrap information is unavailable, the information is included in the savegroup completion notification message.

5.25 Selecting files for backup and recovery

The *Legato NetWorker User's Guide* explains how to use Operation → Backup → View to request on-demand backups and Operation → Recover → View to recover backed-up files. The section “Expanding a Branch” explains that the Expand Branch option lets you view all levels of subdirectories in a directory. Do not choose Expand Branch in directories that contain many or large subdirectories, as this operation takes a long time to complete. Instead, choose Expand One Level to traverse subdirectories individually until you reach the one containing the files that you want to back up or recover.

5.26 Sharing tape drives with NetWorker

Do not access (read, write, or rewind) a mounted NetWorker drive with another utility (for example, with **cpio**). This interrupts the backup and recovery process and can destroy the contents of a NetWorker volume.

Before using a tape drive that NetWorker uses, first make sure that NetWorker is not using the drive. If NetWorker has the drive mounted, unmount it and remove the NetWorker tape volume. You cannot unmount a drive or remove a tape while a NetWorker backup or recovery operation is in progress.

5.27 Unmounting /var/opt/networker

If you attempt to unmount **/var/opt/networker** you may get the message:

```
/var/opt/networker: Device busy
```

If you get this message, and **fuser -F** shows that no processes have the file system open, the error is probably due to the existence of temporary named STREAMS pipe files which NetWorker created. To remove these files, issue the following command:

```
rm -rf /var/opt/networker/tmp/secure ↵
```

You should then be able to unmount **/var/opt/networker**.

6 Documentation

The graphical user interface provided by NetWorker is documented in these manuals:

Legato NetWorker Administrator's Guide (069-100495)

Legato NetWorker User's Guide (069-100496)

See also the on-line Help information. The *Legato NetWorker User's Guide* explains how to use the pull-down Help menu.

For a useful summary of the shell commands and manual pages, see Appendix C of the *Legato NetWorker Administrator's Guide*. For more detailed reference information, see the on-line manual pages. To print the complete set of manual pages, enter this command after loading NetWorker:

```
zcat /usr/catman/networker/man?/*.Z | lp -dprinter
```

where *printer* is the name of an ASCII-capable printer.

For special instructions regarding operation of NetWorker on a DG/UX cluster, see the manual *Managing a DG/UX Cluster*.

7 Software distribution

The Legato NetWorker software is part of the general DG/UX operating system release package. See the DG/UX release notice for exact media details.

These on-line files in `/usr/opt/networker/release` list the contents of NetWorker 4.2.5:

```
networker.man_4.2.5.fl  
networker_4.2.5.fl
```

8 Installation instructions

NetWorker is optionally loadable at the time you install DG/UX. To load and install NetWorker at this time, accept the default value (**all**) when asked for the packages to load. Should you choose not to install NetWorker when you install the DG/UX system, you can load and install it at a later time from the DG/UX CD-ROM, using the Software → Package → Install operation of **sysadm** or **PCsysadm**.

8.1 Disk layout and space requirements

NetWorker requires a minimum of 40,000 blocks of disk space. Do not attempt to install NetWorker on disk unless you have at least this much free disk space. (As noted below, you can install NetWorker on a client by mounting the software from the NetWorker server instead of loading the software onto the client's disk.)

In addition, on the NetWorker server, you need disk space for NetWorker's on-line indexes. How much disk space you need depends on a number of factors, including:

1. The number of files you back up and their combined size.
2. The browse policy: how long you keep on-line the indexes for each backup.
3. The number of full backups performed during the browse policy period.
4. The number and average size of incremental backups performed during the browse policy period.

NetWorker requires approximately one block of on-line index space for every two files it backs up. Different versions of backed-up files count as separate files. For example, if two files are backed up on a monthly full backup and also on each of four weekly full backups, five blocks are required for those two files.

By default, on-line indexes for backed-up files are recycled (discarded and reused) after one month. If you choose a longer browse period (for example, quarterly), you will need more disk space. You can decrease the index space requirements by shortening the browse period, by reducing the number of backups within the browse period, or by replacing full with incremental backups.

A rule of thumb for determining index space requirements is to estimate the total number of files in all file systems you plan to back up and allow two blocks for each file. This is enough space for four distinct backup versions of each file. You may need to experiment over time to determine the best index size for your site.

8.2 Installing NetWorker

This section describes installation of the NetWorker software from the DG/UX tape or CD-ROM. It summarizes detailed installation instructions for NetWorker in the manual *Installing the DG/UX System*.

8.2.1 Server installation

When you indicate that you want to install NetWorker (or accept the default, which is to load all packages), a NetWorker installation script on the CD-ROM does the following:

- Creates a virtual disk and file system named **usr_opt_networker**.
- Loads the NetWorker files into this file system.
- Mounts the file system as **/usr/opt/networker**.
- Creates symbolic links in **/usr/bin** to the NetWorker executables in **/usr/opt/networker/bin**.

During NetWorker setup, you are prompted as follows:

```
Is this system being set up as a node within a cluster? [no]
```

If you answer **yes**, your system is automatically configured to run the NetWorker client software, and you are not asked any further questions for NetWorker package setup. To configure the NetWorker server software on the cluster, you must run a special command, **nsr_cluster_setup**, after the DG/UX cluster software has been loaded and the cluster is fully operational. For further instructions, see the section below on cluster installation.

If you are not setting up a cluster node, answer **no**. The system then displays the following prompt:

```
Configure system as a client for a remote NetWorker server? [no]
```

If your host will be backed up to a NetWorker server over the network, answer **yes**. If you answer **yes**, you are configured as a NetWorker client, and setup is complete.

Accepting the default sets up the system as a NetWorker server. The setup script does the following:

- Creates a virtual disk and file system named **var_opt_networker** for the NetWorker index files (or you can supply a different name). You must decide how large to make this file system based on how many files you will back up.
- Mounts the file system as **/var/opt/networker**.
- Creates a symbolic link file named **/nsr** pointing to the index file mount point. (During operation, the NetWorker software writes indexes to the location indicated by **/nsr** on the server.)
- Enables execution of the NetWorker daemons at system startup.

For a list of all the prompts that appear during the setup procedure, see the manual *Installing the DG/UX System*.

If you have not purchased a NetWorker for DG/UX, Server Edition or NetWorker for DG/UX, Network Edition license, your system will run Legato Data Backup Utility, which lets you back up local disks to a single local tape drive. For more information about the various NetWorker licenses available from Data General, see the subsection “Licensed Features” under “Product Description.”

8.2.2 Cluster installation

On a DG/UX cluster, NetWorker configuration is accomplished in two phases: One during setup of the NetWorker software package; the other after the cluster software is loaded and the cluster is fully operational.

At package setup time, you are prompted:

```
Is this system being set up as a node within a cluster? [no]
```

On a cluster node, answer **yes** to this question. The setup script configures your system to run the NetWorker client software but defers configuration of the server software.

The second phase should occur only after the DG/UX cluster software has been loaded and set up and the cluster is fully operational. At this point, the NetWorker client daemon, **nsrexecd**, should be running on all nodes in the cluster. Run the special setup command, **nsr_cluster_setup**, to configure your cluster to run the NetWorker server software.

For more information, see the manual *Managing a DG/UX Cluster*.

8.2.3 Client installation

At each NetWorker client, do one of the following:

- If you installed NetWorker 4.2.5 on the client's disk when you installed the DG/UX System, do nothing. The system is already prepared to operate as a NetWorker client.

NetWorker will work as a client even if you indicated during installation that the system was a NetWorker server. However, if the system was previously set up as a NetWorker server, you *may* want to reconfigure it as a NetWorker client so that the server daemons will not get executed at system startup. For more information, see "Changing your system to a NetWorker client" in this release notice. While the server daemons do no harm, they consume resources needlessly and may cause confusion. For example, if the daemons continue to run on the client, you might inadvertently request a system backup of the local copy of the NetWorker software.

- If you did not install NetWorker 4.2.5 at the time of DG/UX installation, do so now:

Create a 40,000-block virtual disk and file system named **usr_opt_networker** (if one does not exist) and mount it under the mount point **/usr/opt/networker**. The NetWorker software will be loaded into this file system.

Insert the appropriate DG/UX CD-ROM into a drive. Start **sysadm** or **PCsysadm**, then select Software → Package → Install, and choose only the NetWorker packages (**networker** and **networker.man**). Answer **yes** to this prompt:

Configure system as a client for a remote NetWorker server? [no]

Answering **yes** to this prompt prevents the setup script from enabling startup of the NetWorker server daemons (which need to run only on the NetWorker server) and from creating the **/var/opt/networker** file system (which is not needed on NetWorker clients).

- Optionally, instead of loading and setting up the NetWorker software on the client's disk, you can:
 - (1) Remote mount the NetWorker software from the NetWorker server (directory *servername:/usr/opt/networker*).
 - (2) Add this remote mount to the client's **/etc/fstab** file.
 - (3) Add the NetWorker executable directory, **/usr/opt/networker/bin**, to the search path of **root** and of any other NetWorker user on the client.
 - (4) Using **nsradm** or **nwadmin**, set the hidden attribute **executable path** for the client to **/usr/opt/networker/bin**. Hidden attributes can be accessed with **nwadmin**, by choosing the "Details" menu choice under the "View" menu in the Clients window. They can be accessed with **nsradm** via the "Display options" attribute under the "Options" menu.

You can use **sysadm** or **PCsysadm** to perform (1) and (2) in one step.

9 Preparing a software trouble report

If you believe you have found an error in the NetWorker software or its documentation, consult the manual *Preventing and Fixing Problems on the DG/UX System*. This manual, which is provided in both printed and CD-ROM versions with your system, explains the procedures for filing a software trouble report (STR).

- For the product name and release, enter NetWorker 4.2.5.
- For the model number, enter **Q017A**.

To comment on the documentation, fill out the reader comment form in **/usr/release/doc_comment_form** and send it to the address on the form.

End of NetWorker Release Notice

