What's New in Netra High Availability Suite Foundation Services 2.1 6/03

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Preface

This book describes the service enhancements provided by the September 2004 patch level of the Netra™ High Availability (HA) Suite Foundation Services 2.1 6/03 product. See the patch READMEs for details of the exact patch contents and installation method.

Who Should Use This Book

This book is for system administrators or system developers who are upgrading to the Foundation Services 2.1 6/03 with the patches available at the time of publication of this book.

How This Book Is Organized

This book is organized as follows:

- Chapter 1 provides a quick glance at the service enhancements of the Foundation Services 2.1 6/03.
- Chapter 2 describes the changes to the installation process, the configuration files, and the system administration tools.
- Chapter 3 describes the service enhancements of the Foundation Services product.

Related Books

You will require some of the following books from the Foundation Services documentation set:

- *Netra High Availability Suite Foundation Services 2.1 6/03 Overview*
- *Netra High Availability Suite Foundation Services 2.1 6/03 Glossary*
- *What's New in Netra High Availability Suite Foundation Services 2.1 6/03*
- *Netra High Availability Suite Foundation Services 2.1 6/03 Quick Start Guide*
- *Netra High Availability Suite Foundation Services 2.1 6/03 Hardware Guide*
- *Netra High Availability Suite Foundation Services 2.1 6/03 Custom Installation Guide*
- *Netra High Availability Suite Foundation Services 2.1 6/03 Cluster Administration Guide*
- *Netra High Availability Suite Foundation Services 2.1 6/03 Troubleshooting Guide*
- *Netra High Availability Suite Foundation Services 2.1 6/03 CMM Programming Guide*
- *Netra High Availability Suite Foundation Services 2.1 6/03 NMA Programming Guide*
- *Netra High Availability Suite Foundation Services 2.1 6/03 Reference Manual*
- *Netra High Availability Suite Foundation Services 2.1 6/03 Standalone CGTP Guide*
- *Netra High Availability Suite Foundation Services 2.1 6/03 Release Notes*
- *Netra High Availability Suite Foundation Services 2.1 6/03 README*

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Typographic Conventions

The following table describes the typographic changes that are used in this book.

TABLE P–1 Typographic Conventions

Typeface or Symbol	Meaning	Example
`AaBbCc123`	The names of commands, files, and directories, and onscreen computer output	Edit your `.login` file. Use `ls -a` to list all files. `machine_name% you have mail.`
`AaBbCc123`	What you type, contrasted with onscreen computer output	`machine_name%` **`su`** `Password:`
AaBbCc123	Command-line placeholder: replace with a real name or value	The command to remove a file is `rm` *filename*.
AaBbCc123	Book titles, new terms, and terms to be emphasized	Read Chapter 6 in the *User's Guide*. These are called *class* options. Do *not* save the file. (Emphasis sometimes appears in bold online.)

Shell Prompts in Command Examples

The following table shows the default system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

TABLE P–2 Shell Prompts

Shell	Prompt
C shell prompt	`machine_name%`
C shell superuser prompt	`machine_name#`
Bourne shell and Korn shell prompt	`$`

TABLE P–2 Shell Prompts *(Continued)*

Shell	Prompt
Bourne shell and Korn shell superuser prompt	#

CHAPTER 1

What's New at a Glance

The Foundation Services 2.1 6/03 are a suite of reliable services that provide the foundation for next-generation network services. The Foundation Services 2.1 6/03 can be used by network equipment providers to create a highly available, dynamically scalable cluster of distributed nodes. They can also be used to augment existing frameworks. For an introduction to the service enhancements of the Foundation Services 2.1 6/03, see the following sections:

- "Purpose of Patch Release" on page 9
- "Highlights of This Delivery" on page 10

For further information about the services available in the Foundation Services 2.1 6/03 product, see the *Netra High Availability Suite Foundation Services 2.1 6/03 Overview*.

Purpose of Patch Release

The current patch level of the Foundation Services 2.1 6/03 supports an increased range of hardware platforms and an additional version of the Solaris™ operating system. Many of the services provided by the Foundation Services have been enhanced to improve the availability of applications and to increase your control of the data integrity policy.

For information about installing the Foundation Services 2.1 6/03, see the *Netra High Availability Suite Foundation Services 2.1 6/03 Custom Installation Guide*.

Highlights of This Delivery

Following are the enhancements provided in the current patch level of the Foundation Services 2.1 6/03:

- Support of clusters of more than 12 nodes. For information about the cluster size supported, see the *Netra High Availability Suite Foundation Services 2.1 6/03 Release Notes*.
- Support of Sun StorEdge 3310 disk arrays for single attachment. For a full list of supported hardware and example cluster configurations, see the *Netra High Availability Suite Foundation Services 2.1 6/03 Hardware Guide*.
- Support of clusters containing both dataless and diskless nodes. You must install these clusters manually. For further information on the installation method, see the *Netra High Availability Suite Foundation Services 2.1 6/03 Custom Installation Guide*.
- Reduction of the time taken for full synchronization.
- Data management policies: `Integrity`, `Availability`, and `Adaptability`.
- Qualification of Foundation Services 2.1 6/03 on new hardware platforms and new versions of the Solaris operating system. For information about the hardware and software supported, see the *Netra High Availability Suite Foundation Services 2.1 6/03 Release Notes*.
- Ability to have diskless and dataless nodes running when there is no longer a master in the cluster.
- Sanity check of the blocks on the replicated slices.
- Sequential slice synchronization.
- Ability to delay the beginning of synchronization and later trigger synchronization at a time of your choice.
- Control of the order in which `nhinstall` installs patches and packages. For further information, see "Installation" on page 12.
- Update of the books in the documentation set to reflect the changes to the product described in Chapter 2 and Chapter 3. The new versions of the books in the documentation set have part numbers of the format 817–*xxxx*-20.

CHAPTER 2

Installation, Configuration, and Administration

For a summary of the changes to the installation process, the configuration files, and the system administration tools, see the following sections:

- "Supported Cluster Configurations" on page 11
- "Installation" on page 12
- "Cluster Configuration File" on page 13
- "New Tools" on page 14

Supported Cluster Configurations

Like the previous version of the Foundation Services, the current patch level of the product supports cluster configurations of two master-eligible nodes and a number of master-ineligible nodes. The limitation of 10 master-ineligible nodes no longer exists. For information about the cluster size supported, see the *Netra High Availability Suite Foundation Services 2.1 6/03 Release Notes*. You can also now have a mix of diskless and dataless nodes in a single cluster.

The following new hardware items are now supported with the current patch level of the Foundation Services.

- Netra CT 820 server
- Netra 240
- Sun Fire™ V240
- Sun Fire V210
- Sun StorEdge 3310 disk array for single attachment

For a full list of supported hardware and example cluster configurations, see the *Netra High Availability Suite Foundation Services 2.1 6/03 Hardware Guide*.

Installation

This section summarizes the changes to the packages that are installed on a cluster, and the changes to the installation processes.

Patches

The Foundation Services 2.1 6/03 distribution contains the following patches:

114175–0*x* Patch for master-eligible nodes

115606–0*x* Patch containing enhancements to services for all cluster nodes

115644–0*x* Patch for `nhinstall` tool

When you install these patches, you must also install patch `116710`. This patch is not part of the Foundation Services 2.1 6/03 distribution and is only available to Foundation Services customers. For information about the availability of this patch, ask your Sun support contact.

For a full list of the Foundation Services 2.1 6/03 packages and patches, see the *Netra High Availability Suite Foundation Services 2.1 6/03 README*.

The `nhinstall` Tool

The `nhinstall` tool has been adapted to include the enhancements made to the Foundation Services 2.1 6/03. For information about the enhancements, see Chapter 3. For information about how to install a cluster using the `nhinstall` tool, see the *Netra High Availability Suite Foundation Services 2.1 6/03 Custom Installation Guide*.

The `nhinstall` tool has been adapted to include the following enhancements:

- A choice of method by which the tool installs patches
- Ability to configure DHCP on the local file system of master-eligible nodes during diskless node installation
- Ability to use a router other than the installation server. By default the router is the installation server
- Choices on how you install the Solaris operating system:
  - Installing a different Solaris package set on diskless nodes to from the one you install on the master-eligible nodes. Both package sets must be from the same Solaris distribution. For more information, see the `nodeprof.conf`(4) and `diskless_nodeprof.conf`(4) man pages.

- Identifying the appropriate OS profile to be installed even when the version of the Solaris operating system cannot be automatically detected.
- Installing a different version of the Solaris operating system on diskless nodes to the one you install on the master-eligible nodes.

Manual Installation

The manual installation procedure has been adapted to support the installation of diskless and dataless nodes in a single cluster.

All of the new features that are automatically installed by the `nhinstall` tool can be installed manually. For information about the manual installation procedure, see the *Netra High Availability Suite Foundation Services 2.1 6/03 Custom Installation Guide*. For a complete list of packages to install, see the *Netra High Availability Suite Foundation Services 2.1 6/03 README*.

Cluster Configuration File

The Foundation Services are configured by the `nhfs.conf` file. The following new parameters have been defined in the `nhfs.conf` file:

`RNFS.SyncType`	Control of the replication mode. This impacts the time it takes for a full synchronization of the vice-master and master disks. For further information, see "Reduced Duration of Disk Synchronization" on page 16.
`Cluster.DataManagementPolicy`	Set the data management policies to be `Integrity`, `Availability`, or `Adaptability`. For further information, see "Data Management Policy" on page 16.
`CMM.MasterLoss.Detection`	Permit the diskless and dataless nodes to stay up even when there is no master node in the cluster. For further information, see "Masterless Cluster" on page 17.

`RNFS.CheckReplicatedSlices`	Continuously scan the state of replicated slices. For further information, see "Sanity Check of Replicated Slices" on page 18.
`RNFS.EnableSync`	Delay the start of disk synchronization. For further information, see "Delayed Synchronization" on page 18.
`RNFS.SerializeSync`	Synchronize the master and vice-master disks one slice at a time. For further information, see "Serialized Slice Synchronization" on page 19.

New Tools

The Foundation Services 2.1 6/03 provides a new tool, `nhenablesync`, which enables you to trigger disk synchronization if you have delayed the start of this synchronization. For information on this tool see the `nhenablesync`(1M) man page. For information on delaying disk synchronization, see the "Delayed Synchronization" on page 18.

The Foundation Services 2.1 6/03 also provides a new subcommand of `nhadm` command, `nhadm copy`. The `copy` subcommand enables you to copy files that are held locally on the master node onto the vice-master node. Examples of files you could choose to hold locally on the master-eligible nodes are the DHCP configuration files. For more information on the `copy` subcommand, see the `nhadm`(1M) man page.

CHAPTER 3

Service Enhancements

For a summary of the service enhancements in the Foundation Services product, see the following sections:

- "Introduction to Service Enhancements" on page 15
- "Reduced Duration of Disk Synchronization" on page 16
- "Data Management Policy" on page 16
- "Masterless Cluster" on page 17
- "Sanity Check of Replicated Slices" on page 18
- "Delayed Synchronization" on page 18
- "Serialized Slice Synchronization" on page 19

Introduction to Service Enhancements

A number of enhancements have been made to the Foundation Services to enable you to prioritize data integrity, to increase the availability of your applications, or to reduce disk and network load on the cluster. These enhancements are as follows:

Prioritizing data integrity

- "Reduced Duration of Disk Synchronization" on page 16
- The `Integrity` and `Adaptability` data management policies, as described in "Data Management Policy" on page 16

Improving availability

- The `Availability` data management policy, as described in "Data Management Policy" on page 16
- "Masterless Cluster" on page 17

- "Delayed Synchronization" on page 18

Reducing disk and network load

- "Serialized Slice Synchronization" on page 19

Enable or disable these service enhancements to suit your cluster needs.

Reduced Duration of Disk Synchronization

This feature enables you to choose how the master and vice-master disks are synchronized. You can have synchronization either of an entire master disk or of only those blocks that contain data. By choosing the latter option, you reduce the time it takes to synchronize the master and vice-master disks.

Set this feature to have the same value on both master-eligible nodes. If you change the value of the `RNFS.SyncType` property defining this feature, reboot the cluster as described in "Shutting Down and Restarting a Cluster" in the *Netra High Availability Suite Foundation Services 2.1 6/03 Cluster Administration Guide*.

Choose the synchronization method by setting the value of the `RNFS.SyncType` parameter in the `nhfs.conf` file. If you are installing the cluster with `nhinstall`, choose the synchronization method by setting the value of `SLICE_SYNC_TYPE` in the `cluster_definition.conf` file. For more information, see the `nhfs.conf`(4) and `cluster_definition.conf`(4) man pages.

Data Management Policy

There are three data management policies available in the current patch level of the Foundation Services 2.1 6/03. These policies determine how the cluster behaves when a failed vice-master reboots in a cluster that has no master node. The policy you choose depends on the availability and data-integrity requirements of your cluster.

The data management policies are are the following:

`Integrity`	Ensures that the cluster uses the most up-to-date data. The vice-master does not take the master role but waits for the old master to return to the cluster. This is the default data management policy.
`Availability`	Prioritizes the availability of services running on the cluster over data integrity. The vice-master node takes the master role when there is no master in the cluster. This policy triggers a full synchronization when the old master node joins the cluster as the vice-master node. This synchronization might result in the loss of any data written to the old master while the vice-master was down.
`Adaptability`	Prioritizes availability only if the master and vice-master disks are synchronized. Such disk synchronization would increase the level of data integrity. The vice-master checks the disk synchronization state. If the state indicates that the master and vice-master nodes are not synchronized, the vice-master node does not take the master role but waits until the old master node returns to the cluster. If the state indicates that the master and vice-master disks are synchronized, the vice-master takes on the master role without waiting for the old master to rejoin the cluster.

Choose the data management policy by setting the value of the `Cluster.DataManagementPolicy` parameter in the `nhfs.conf` file. If you are installing the cluster with `nhinstall`, choose the data management policy by setting the value of `DATA_MGT_POLICY` in the `cluster_definition.conf` file. For more information, see the `nhfs.conf`(4) and `cluster_definition.conf`(4) man pages.

Masterless Cluster

This feature permits the diskless and dataless nodes to stay up even when there is no master node in the cluster. By default, this feature is disabled and so diskless and dataless nodes reboot if there is no master node in the cluster for more than a few minutes. Enable this feature if you want to reduce the possible downtime for services running on master-ineligible nodes.

If you enable this feature, you must ensure that the diskless and dataless nodes can handle the situation where they would no longer be able to access the files exported by the master node.

Activate this feature by setting the value of the `CMM.Masterloss.Detection` parameter in the `nhfs.conf` file. If you are installing the cluster with `nhinstall`, enable this feature by setting the value of `MASTER_LOSS_DETECTION` in the `cluster_definition.conf` file. For more information, see the `nhfs.conf`(4) and `cluster_definition.conf`(4) man pages.

Sanity Check of Replicated Slices

This feature enables you to continuously scan the state of replicated slices. By default, this feature is disabled and it can only be used if the master and vice-master disks are synchronized. If you do not monitor the state of the replicated slices, it is possible that the vice-master disk is corrupted and so partly or completely inaccessible.

Activate this feature by setting the value of the `RNFS.CheckReplicatedSlices` parameter in the `nhfs.conf` file. If you are installing the cluster with `nhinstall`, enable this feature by setting the value of `CHECK_REPLICATED_SLICES` in the `cluster_definition.conf` file. For more information, see the `nhfs.conf`(4) and `cluster_definition.conf`(4) man pages.

Delayed Synchronization

This feature enables you to delay the start of synchronization between the master and vice-master disks. By default this feature is disabled. Delay synchronization if you do not want the synchronization task to conflict with other high CPU activities. If you enable this feature, you can trigger synchronization at a later time of your choosing using the `nhenablesync` command.

Until synchronization is triggered and completed, the vice-master is not eligible to become master and so the cluster is open to a single point of failure. By delaying synchronization you are prolonging this vulnerability.

Activate this feature by setting the value of the `RNFS.EnableSync` parameter in the `nhfs.conf` file. If you are installing the cluster with `nhinstall`, specify the synchronization method by setting the value of `SYNC_FLAG` in the `cluster_definition.conf` file. For more information, see the `nhfs.conf`(4), `cluster_definition.conf`(4), and `nhenablesync`(1M) man pages.

Serialized Slice Synchronization

This feature enables you to synchronize the master and vice-master disks one slice at a time rather than all at once. By default this feature is disabled. Enabling this feature reduces the disk and network load. However, it limits the availability of the cluster during a certain limited time period because the vice-master cannot become master before all slices have been synchronized. During this time period, the cluster is vulnerable to a single point of failure.

Activate this feature by setting the value of the `RNFS.SerializeSync` parameter in the `nhfs.conf` file. If you are installing the cluster with `nhinstall`, specify the synchronization method by setting the value of `SERIALIZE_SYNC` in the `cluster_definition.conf` file. For more information, see the `nhfs.conf`(4), and `cluster_definition.conf`(4) man pages.