



Netra™ High Availability Suite 3.0 1/08 Foundation Services Standalone CGTP Guide

Sun Microsystems, Inc.
www.sun.com

Part No. 819-5247-13
March 2008, Revision A

Submit comments about this document at: <http://www.sun.com/hwdocs/feedback>

Copyright 2008 Sun Microsystems, Inc., 4150 Network Circle, Santa Clara, California 95054, U.S.A. All rights reserved.

Sun Microsystems, Inc. has intellectual property rights relating to technology that is described in this document. In particular, and without limitation, these intellectual property rights may include one or more of the U.S. patents listed at <http://www.sun.com/patents>, and one or more additional patents or pending patent applications in the U.S. and in other countries.

This document and the product to which it pertains are distributed under licenses restricting their use, copying, distribution, and decompilation. No part of the product or of this document may be reproduced in any form by any means without prior written authorization of Sun and its licensors, if any.

Third-party software, including font technology, is copyrighted and licensed from Sun suppliers.

Parts of the product may be derived from Berkeley BSD systems, licensed from the University of California. UNIX is a registered trademark in the U.S. and other countries, exclusively licensed through X/Open Company, Ltd.

Sun, Sun Microsystems, the Sun logo, Java, docs.sun.com, Netra, and Solaris are trademarks, registered trademarks, or service marks of Sun Microsystems, Inc. in the U.S. and other countries.

All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. in the U.S. and other countries. Products bearing SPARC trademarks are based upon an architecture developed by Sun Microsystems, Inc.

The OPEN LOOK and Sun™ Graphical User Interface was developed by Sun Microsystems, Inc. for its users and licensees. Sun acknowledges the pioneering efforts of Xerox in researching and developing the concept of visual or graphical user interfaces for the computer industry. Sun holds a non-exclusive license from Xerox to the Xerox Graphical User Interface, which license also covers Sun's licensees who implement OPEN LOOK GUIs and otherwise comply with Sun's written license agreements.

U.S. Government Rights—Commercial use. Government users are subject to the Sun Microsystems, Inc. standard license agreement and applicable provisions of the FAR and its supplements.

DOCUMENTATION IS PROVIDED "AS IS" AND ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT, ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT SUCH DISCLAIMERS ARE HELD TO BE LEGALLY INVALID.

Copyright 2008 Sun Microsystems, Inc., 4150 Network Circle, Santa Clara, Californie 95054, Etats-Unis. Tous droits réservés.

Sun Microsystems, Inc. a les droits de propriété intellectuels relatants à la technologie qui est décrit dans ce document. En particulier, et sans la limitation, ces droits de propriété intellectuels peuvent inclure un ou plus des brevets américains énumérés à <http://www.sun.com/patents> et un ou les brevets plus supplémentaires ou les applications de brevet en attente dans les Etats-Unis et dans les autres pays.

Ce produit ou document est protégé par un copyright et distribué avec des licences qui en restreignent l'utilisation, la copie, la distribution, et la décompilation. Aucune partie de ce produit ou document ne peut être reproduite sous aucune forme, par quelque moyen que ce soit, sans l'autorisation préalable et écrite de Sun et de ses bailleurs de licence, s'il y en a.

Le logiciel détenu par des tiers, et qui comprend la technologie relative aux polices de caractères, est protégé par un copyright et licencié par des fournisseurs de Sun.

Des parties de ce produit pourront être dérivées des systèmes Berkeley BSD licenciés par l'Université de Californie. UNIX est une marque déposée aux Etats-Unis et dans d'autres pays et licenciée exclusivement par X/Open Company, Ltd.

Sun, Sun Microsystems, le logo Sun, Java, docs.sun.com, Netra, et Solaris sont des marques de fabrique ou des marques déposées de Sun Microsystems, Inc. aux Etats-Unis et dans d'autres pays.

Toutes les marques SPARC sont utilisées sous licence et sont des marques de fabrique ou des marques déposées de SPARC International, Inc. aux Etats-Unis et dans d'autres pays. Les produits portant les marques SPARC sont basés sur une architecture développée par Sun Microsystems, Inc.

L'interface d'utilisation graphique OPEN LOOK et Sun™ a été développée par Sun Microsystems, Inc. pour ses utilisateurs et licenciés. Sun reconnaît les efforts de pionniers de Xerox pour la recherche et le développement du concept des interfaces d'utilisation visuelle ou graphique pour l'industrie de l'informatique. Sun détient une licence non exclusive de Xerox sur l'interface d'utilisation graphique Xerox, cette licence couvrant également les licenciées de Sun qui mettent en place l'interface d'utilisation graphique OPEN LOOK et qui en outre se conforment aux licences écrites de Sun.

LA DOCUMENTATION EST FOURNIE "EN L'ÉTAT" ET TOUTES AUTRES CONDITIONS, DECLARATIONS ET GARANTIES EXPRESSES OU TACITES SONT FORMELLEMENT EXCLUES, DANS LA MESURE AUTORISEE PAR LA LOI APPLICABLE, Y COMPRIS NOTAMMENT TOUTE GARANTIE IMPLICITE RELATIVE A LA QUALITE MARCHANDE, A L'APTITUDE A UNE UTILISATION PARTICULIERE OU A L'ABSENCE DE CONTREFAÇON.



Adobe PostScript

Contents

Preface ix

- 1. Preparing to Install Standalone CGTP Without the Reliable Boot Service 1**
 - Defining the Topology 1
 - Installation Prerequisites 3
 - Standalone CGTP Patches and Package 3
- 2. Installing Standalone CGTP Without the Reliable Boot Service on the Solaris OS 5**
 - Installing the CGTP Patches 5
 - ▼ To Install the CGTP Patches 5
 - Installing the CGTP Package 6
 - ▼ To Install the CGTP Package 6
- 3. Installing Standalone CGTP on Linux 9**
 - Installing the CGTP Package 9
 - ▼ To Install the CGTP Package 9
- 4. Configuring Standalone CGTP Without the Reliable Boot Service on the Solaris OS 11**
 - Introducing CGTP Configuration 11
 - Preparing to Configure Standalone CGTP on the Solaris OS 12

▼ To Configure Interface Names	13
▼ To Configure an Ethernet Address Per Network Interface	13
▼ To Configure Node Addresses	14
▼ To Configure Netmasks	14
▼ To Configure the NIS Database Search	15
Configuring the <code>cgtp0</code> Virtual Physical Interface on the Solaris OS	16
▼ To Configure the <code>cgtp0</code> Interface	16
Configuring Additional CGTP Virtual Logical Interfaces on the Solaris OS	19
▼ To Configure Additional CGTP Interfaces	19
Creating Routes for CGTP on the Solaris OS	20
▼ To Create Routes Between Two Machines	20
Disabling CGTP on the Solaris OS	22
▼ To Disable Virtual Logical Interfaces	22
▼ To Disable the Virtual Physical Interface, <code>cgtp0</code>	23
5. Configuring Standalone CGTP on Linux	25
Introducing CGTP Configuration	25
Preparing to Configure Standalone CGTP on Linux	26
▼ To Configure Node Addresses on MontaVista Linux 4.0	26
▼ To Configure Node Addresses on Wind River Linux CGL 1.4	28
Configuring Additional CGTP Virtual Logical Interfaces on Linux	29
▼ To Configure Additional CGTP Interfaces	29
Ensuring Interoperability of the Solaris OS and Linux	30
▼ To Add Nodes to the Redundant Gateways Table	31
▼ To Remove Nodes to the Redundant Gateways Table	31
▼ To Change the IP Address of an Existing Entry	31
▼ To Get the Contents of the Redundant Gateways Table	31
Disabling CGTP on Linux	32
▼ To Disable the Virtual CGTP Interface <code>cgtp0</code>	32

6. Preparing to Install Standalone CGTP With the Reliable Boot Service on the Solaris OS 33

Installation Server Requirements 34

Cluster Node Requirements 35

Standalone Node Requirements 35

Connecting the Nodes 36

7. Installing Standalone CGTP With the Reliable Boot Service on the Solaris OS 37

Installing With the Reliable Boot Service 38

▼ To Install With the `nhinstall` Tool 38

▼ To Install Manually 38

Index 41

Figures

FIGURE 1-1	Star Topology of Three Standalone CGTP Nodes	2
FIGURE 4-1	CGTP Configuration for <code>machine A</code> and <code>machine B</code>	12
FIGURE 5-1	CGTP Configuration for <code>machine A</code> and <code>machine B</code>	26
FIGURE 6-1	Connecting the Standalone Nodes to a Two-Node Cluster	36

Preface

The *Netra High Availability Suite 3.0 1/08 Foundation Services Standalone CGTP Guide* introduces the standalone Carrier Grade Transport Protocol (CGTP). This document describes how to install standalone CGTP on a node that is not part of a Foundation Services cluster.

The Netra™ High Availability (HA) Suite 3.0 Foundation Services product is described in the *Netra High Availability Suite 3.0 1/08 Foundation Services Overview*.

Use standalone CGTP for reliable transport between nodes over dual redundant network links. CGTP is the only service running on these nodes. Standalone CGTP has all the features of CGTP in the Foundation Services product.

Standalone CGTP can be installed with or without the Reliable Boot Service. If you want to run CGTP on diskless nodes, the Reliable Boot Service enables the nodes to be booted by a *master node*. This master node is backed up by a *vice-master node*. These nodes, called *master-eligible nodes*, remove the single point of failure for standalone nodes running the CGTP.

To install standalone CGTP with the Reliable Boot Service, you install Netra HA Suite on the master-eligible nodes. The diskless nodes are installed only with the CGTP but are configured to be booted by the master node. You can install the standalone CGTP with the Reliable Boot Service by using one of the following methods:

- `nhinstall` tool
- Manual installation

For more information, see Chapter 1 through Chapter 3.

Alternatively, you can install CGTP manually without the Reliable Boot Service on standalone nodes. For more information, see Chapter 4 and Chapter 5.

Who Should Use This Book

Use this book if you are an operator or system administrator who plans to install, configure, or maintain standalone CGTP on nodes.

Do not use this book if you are using CGTP as part of the Netra HA Suite product. When CGTP is used on cluster nodes that are running Netra HA Suite, CGTP is configured by the Cluster Membership Manager at cluster startup.

Before You Read This Book

Read the *Netra High Availability Suite 3.0 1/08 Foundation Services Overview* for an overview of the product.

How This Book Is Organized

- [Chapter 1](#) describes how to define the topology of your standalone nodes. This chapter also lists the installation prerequisites.
- [Chapter 2](#) explains how to install the standalone CGTP patches and packages on the Solaris™ Operating System (Solaris OS).
- [Chapter 3](#) explains how to install the standalone CGTP patches and packages on Linux.
- [Chapter 4](#) describes how to configure standalone CGTP on the Solaris OS.
- [Chapter 5](#) describes how to configure standalone CGTP on Linux.
- [Chapter 6](#) outlines the prerequisites for installing standalone CGTP with the Reliable Boot Service.
- [Chapter 7](#) describes how to install and configure standalone CGTP with the Reliable Boot Service. You can install CGTP using the `nhinstall` tool, or by manual installation.

Using UNIX Commands

This document might not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

- Software documentation that you received with your system
- Solaris Operating System documentation, which is at
`http://docs.sun.com`

Shell Prompts

Shell	Prompt
C shell	<i>machine-name%</i>
C shell superuser	<i>machine-name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#

Typographic Conventions

Typeface*	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. % You have mail.
AaBbCc123	What you type, when contrasted with on-screen computer output	% su Password:
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. To delete a file, type <code>rm filename</code> .

* The settings on your browser might differ from these settings.

Related Documentation

The following table lists the documentation for this product. The online documentation is available at:

<http://docs.sun.com/app/docs/prod/netra.ha30>

Application	Title	Part Number
Late-breaking news	<i>Netra High Availability Suite 3.0 1/08 Release Notes</i>	819-5249-14
Introduction to concepts	<i>Netra High Availability Suite 3.0 1/08 Foundation Services Overview</i>	819-5240-13
Basic setup, supported hardware, and configurations	<i>Netra High Availability Suite 3.0 1/08 Foundation Services Getting Started Guide</i>	819-5241-13
Automated installation methods	<i>Netra High Availability Suite 3.0 1/08 Foundation Services Installation Guide</i>	819-5242-13
Detailed installation methods	<i>Netra High Availability Suite 3.0 1/08 Foundation Services Manual Installation Guide for the Solaris OS</i>	819-5237-13
Cluster administration	<i>Netra High Availability Suite 3.0 1/08 Foundation Services Cluster Administration Guide</i>	819-5235-13

Application	Title	Part Number
Using the Cluster Membership Manager	<i>Netra High Availability Suite 3.0 1/08 Foundation Services CMM Programming Guide</i>	819-5236-13
Using the SAF CMM API	<i>Netra High Availability Suite 3.0 1/08 Foundation Services SA Forum Programming Guide</i>	819-5246-13
Using the Node Management Agent	<i>Netra High Availability Suite 3.0 1/08 Foundation Services NMA Programming Guide</i>	819-5239-13
Configuring outside the cluster using CGTP	<i>Netra High Availability Suite 3.0 1/08 Foundation Services Standalone CGTP Guide</i>	819-5247-13
Man pages for Foundation Services features and APIs using the Solaris OS	<i>Netra High Availability Suite 3.0 1/08 Foundation Services Solaris Reference Manual</i>	819-5244-13
Man pages for Foundation Services features and APIs using Linux	<i>Netra High Availability Suite 3.0 1/08 Foundation Services Linux Reference Manual</i>	819-5245-12
Definitions and acronyms	<i>Netra High Availability Suite 3.0 1/08 Foundation Services Glossary</i>	819-5238-13
Common problems	<i>Netra High Availability Suite 3.0 1/08 Foundation Services Troubleshooting Guide</i>	819-5248-13

Documentation, Support, and Training

The Sun web site provides information about the following additional resources:

- Documentation (<http://www.sun.com/documentation>)
- Support (<http://www.sun.com/support>)
- Training (<http://www.sun.com/training>)

Third-Party Web Sites

Sun is not responsible for the availability of third-party web sites mentioned in this document. Sun does not endorse and is not responsible or liable for any content, advertising, products, or other materials that are available on or through such sites or resources. Sun will not be responsible or liable for any actual or alleged damage or loss caused by or in connection with the use of or reliance on any such content, goods, or services that are available on or through such sites or resources.

Sun Welcomes Your Comments

Sun is interested in improving its documentation and welcomes your comments and suggestions. You can submit your comments by going to:

<http://www.sun.com/hwdocs/feedback>

Please include the title and part number of your document with your feedback:

Netra™ High Availability Suite 3.0 1/08 Foundation Services Standalone CGTP Guide,
part number 819-5247-13

Preparing to Install Standalone CGTP Without the Reliable Boot Service

Before you manually install standalone CGTP without the Reliable Boot Service, define the topology of your standalone nodes and verify that you have the necessary prerequisites.

For more information, see these sections:

- [“Defining the Topology” on page 1](#)
- [“Installation Prerequisites” on page 3](#)

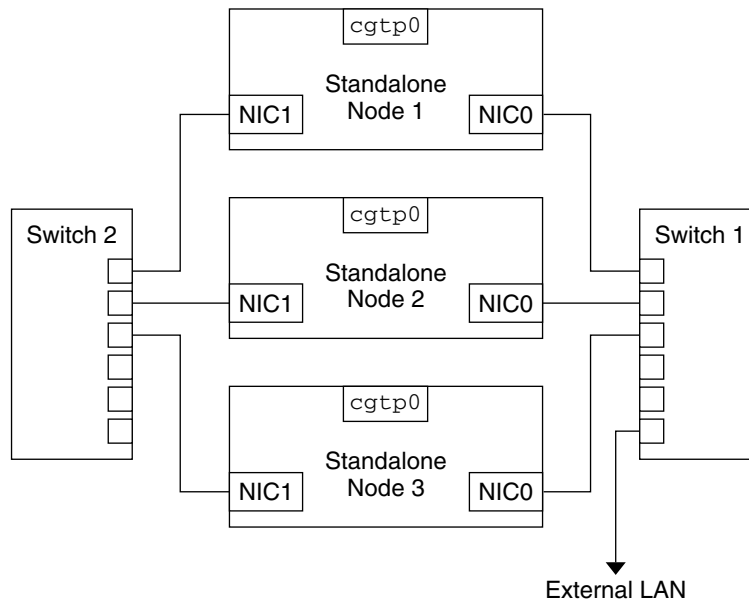
Note – Make certain that you understand the introductory information in the Preface before proceeding.

Defining the Topology

CGTP provides reliable transport by duplicating packets and sending the duplicates along two networks, where one of these networks is redundant. For an overview of CGTP, see “Cluster Addressing and Networking” and “Carrier Grade Transport Protocol” in the *Netra High Availability Suite 3.0 1/08 Foundation Services Overview*.

Before configuring standalone CGTP, choose your topology. To minimize data loss, use a star topology as shown in [FIGURE 1-1](#). This topology uses two identical, but physically distinct, redundant-100 Mbps networks around switches.

FIGURE 1-1 Star Topology of Three Standalone CGTP Nodes



Hubs can be used instead of switches, but using hubs might impact CGTP performance by increasing the collision rate and network latency. CGTP can be used to remove single points of failure. However, if redundant routes share switching equipment or communication links, these common network components might constitute single points of failure.

IP over ATM or IP over CompactPCI can be used with standalone CGTP because both mediums support the IP protocol. However, depending on the selected medium, standalone CGTP might not support broadcasts.

Avoid using IP gateways between nodes because gateways might introduce unpredictable latencies and additional packet fragmentation.

Packets that are sent to a CGTP address are replicated by CGTP. The `mtu` value represents the maximum size of packets that you can send without fragmenting the packets. For CGTP, to avoid asymmetry when fragmenting, the `mtu` value on the redundant physical networks must be the same for each interface.

Duplicate packets that reach the CGTP destination address are filtered by the filtering module.

For the filtering module to be active on the Solaris OS, the `ndd` variable `ip_cgtp_filter` must be set to 1. Filtering only occurs when this value is set to 1. On Linux, however, the filtering module is activated by configuring the CGTP

packet filtering rule in the table mangle using the iptables command. To verify that the filter is active, ensure that the `ip_cgtp_filter -L -t mangle` command lists the CGTP filtering rule.

Installation Prerequisites

<i>Hardware requirements</i>	Two network interface cards per server
<i>Operating system</i>	Solaris 9 and 10 Operating Systems
<i>Software requirements</i>	CGTP packages and patches from the Netra HA Suite software distribution See “Standalone CGTP Patches and Package” on page 3.
<i>Disk capacity</i>	Minimum 1.5 Gbytes for the Solaris distribution
<i>Free space</i>	Minimum 1.5 Gbytes after the Solaris Operating System has been installed

Standalone CGTP Patches and Package

As part of the Netra HA Suite software delivery, you receive the following CGTP patches and packages.

TABLE 1-1 CGTP Patches and Package

Patches and Packages	Description
Patches for CGTP	See the <i>Netra High Availability Suite 3.0 1/08 Foundation Services README</i>
SUNWnhas-cgtp package	CGTP kernel drivers and user-space components for the Solaris 9 and 10 Operating Systems

See your Sun contact for licensing information.

Installing Standalone CGTP Without the Reliable Boot Service on the Solaris OS

This chapter describes how to install the standalone CGTP patches and packages on the Solaris OS.

You must perform the procedures on each node on which you want to use standalone CGTP. Do not perform these procedures on a node on which you are using the Foundation Services. Perform the procedures in the order presented.

For more information, see these sections:

- [“Installing the CGTP Patches” on page 5](#)
- [“Installing the CGTP Package” on page 6](#)

Installing the CGTP Patches

Note – Refer to the Netra High Availability Suite 3.0 1/08 Foundation Services README to determine which patches need to be installed, if any, for the version of Solaris OS used at your site.

▼ To Install the CGTP Patches

Before installing the CGTP patches, you must have installed the Solaris Operating System.

1. As superuser, log in to the node on which you want to install standalone CGTP.
2. Install the patches, using the following command to install each patch:

```
# patchadd software-distribution-dir patch-number
```

software-distribution-dir is the directory containing the Netra HA Suite patches and packages. For a list of patches required for the CGTP, see *Netra High Availability Suite 3.0 1/08 Foundation Services README*.

For more information on patchadd, see the patchadd1M man page.

After successful installation, the following message is displayed:

```
Checking installed patches...
Verifying sufficient filesystem capacity (dry run method)...
Installing patch packages...
Patch number patch-number has been successfully installed.
See /var/sadm/patch/patch-number/log for details
```

3. Verify that the patches were successfully installed:

```
# patchadd -p
```

If installation was successful, the following message is displayed:

```
Patch patch-number Obsoletes: Requires: Incompatibles:
Packages: SUNWcarx SUNWcsr SUNWcsu SUNWhea SUNWcsxu SUNWmipu
```

Installing the CGTP Package

▼ To Install the CGTP Package

Before installing the CGTP package, you must have installed the Solaris Operating System and the CGTP patches.

1. As superuser, log in to the node on which you want to install standalone CGTP.

2. Install the CGTP package:

```
# pkgadd -d software-distribution-dir SUNWnhas-cgtp
```

software-distribution-dir is the directory containing the Netra HA Suite patches and packages.

For more information on pkgadd, see the pkgadd1M man page.

The installation of the SUNWnhas-cgtp package begins as follows:

```
Processing package instance <SUNWnhas-cgtp> from <software-
distribution-dir>
Netra HA Suite Sun CGTP(sparc) 3.0,REV=11
Copyright 2006 Sun Microsystems, Inc. All rights reserved.
Use is subject to license terms
Using </> as the package base directory.
## Processing package information.
## Processing system information.
14 package pathnames are already properly installed.
## Verifying package dependencies.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.
This package contains scripts which will be executed with super-
user permission during the process of installing this package.
```

3. When the system asks if you want to continue with the installation of the SUNWnhas-cgtp package, type y:

```
Do you want to continue with the installation of <SUNWnhas-cgtp>
[y,n,?] y
```

The following messages are displayed:

```
Installing Netra HA Suite Sun CGTP Drivers as <SUNWnhas-cgtp>
/etc/opt/SUNWcggha/init.d/cgtpfilter
/kernel/drv/cgtp
/kernel/drv/cgtp.conf
/kernel/drv/sparcv9/cgtp
/kernel/strmod/cgtp_flt
/kernel/strmod/sparcv9/cgtp_flt
[ verifying class <none> ]
[ verifying class <manifest> ]
## Executing postinstall script.
exit status = 0
devfsadm[1006]: verbose: symlink /dev/cgtp ->
```

```
../devices/pseudo/clone@0:cgtp  
Driver (cgtp) installed.  
Installation of <SUNWnhas-cgtp> was successful.
```

4. Verify that the packages have been correctly installed:

```
# pkginfo | grep SUNWnhas-cgtp
```

If the installation was successful, you see the following output:

```
system    SUNWnhas-cgtp Netra HA Suite Sun CGTP
```

5. Reboot the node.

Note – For information about rebooting a node, see the *Netra High Availability Suite 3.0 1/08 Foundation Services Cluster Administration Guide*.

Installing Standalone CGTP on Linux

This chapter describes how to install the standalone CGTP patches and packages on the Linux operating system.

You must perform the procedures on each node on which you want to use standalone CGTP. Do not perform these procedures on a node on which you are using the Foundation Services. Perform the procedures in the order presented.

Installing the CGTP Package

▼ To Install the CGTP Package

Before installing the CGTP package, you must have installed the Linux kernel that has been modified for use with the Netra HA Suite software. For information about installing the modified Linux kernel, refer to the *Netra High Availability Suite 3.0 1/08 Foundation Services Installation Guide*.

1. **As superuser, log in to the node on which you want to install standalone CGTP.**
2. **Install the CGTP package:**

```
# rpm -i software-distribution-dir/sun-nhas-cgtp-3.0-*.rpm
```

software-distribution-dir is the directory containing the Foundation Services packages.

3. Verify that the package has been correctly installed:

```
# rpm -q sun-nhas-cgtp
```

If the installation was successful, you see the following output:

```
sun-nhas-cgtp-3.0- build
```

4. Reboot the node.

Note – For information about rebooting a node, see the *Netra High Availability Suite 3.0 1/08 Foundation Services Cluster Administration Guide*.

Configuring Standalone CGTP Without the Reliable Boot Service on the Solaris OS

This chapter describes how to configure standalone CGTP without the Reliable Boot Service. The examples in this chapter use IPv4.

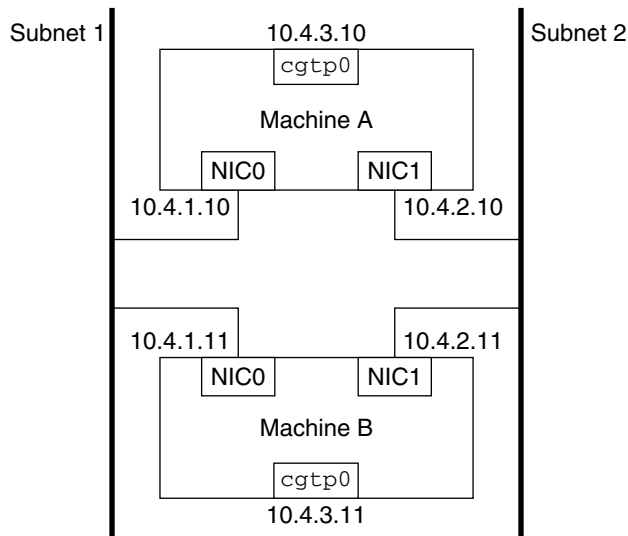
For more information, see these sections:

- [“Introducing CGTP Configuration” on page 11](#)
- [“Preparing to Configure Standalone CGTP on the Solaris OS” on page 12](#)
- [“Configuring the cgtpp0 Virtual Physical Interface on the Solaris OS” on page 16](#)
- [“Configuring Additional CGTP Virtual Logical Interfaces on the Solaris OS” on page 19](#)
- [“Creating Routes for CGTP on the Solaris OS” on page 20](#)
- [“Disabling CGTP on the Solaris OS” on page 22](#)

Introducing CGTP Configuration

This chapter describes the steps that you perform on nodes that are to run standalone CGTP. All examples in this chapter describe the configuration of two nodes, machine A and machine B, as shown in [FIGURE 4-1](#). When configured, these nodes communicate through dual network links that form a CGTP network. You must decide the number of nodes that you want to configure to be part of this CGTP network.

FIGURE 4-1 CGTP Configuration for machine A and machine B



Preparing to Configure Standalone CGTP on the Solaris OS

To have a CGTP network, each node on the network must be configured to have three interfaces:

- Two interfaces, *NIC0* and *NIC1*, that can be either physical or logical. Names of the interfaces vary depending on the hardware you use (some examples are: *hme*, *eri*, *le*, *bge*, *e1000g*, and *ge*). For more information and the interface type for specific supported hardware, see the *Netra High Availability Suite 3.0 1/08 Release Notes*.
- One virtual physical interface, *cgt0*.

Configure CGTP on the node's `local` file system. Do not configure CGTP on a remote shared file system because a remote file system might become unreachable if the network fails. Before configuring CGTP interfaces and routes, configure the interface names, addresses, netmasks, and the database search on each node.

Perform the following procedures on each node that you are configuring for standalone CGTP.

- [“To Configure Interface Names” on page 13](#)
- [“To Configure an Ethernet Address Per Network Interface” on page 13](#)

- “To Configure Node Addresses” on page 14
- “To Configure Netmasks” on page 14
- “To Configure the NIS Database Search” on page 15

Note – If you use zones in the Solaris 10 OS and exclusive, per-zone, IP stacks, be aware that CGTP filtering currently works only in the global zone, with the shared IP stack.

▼ To Configure Interface Names

Configure the interface names manually to enable creation of interfaces, and redundant routes, at first boot.

Note – You cannot enable the auto configuration of routes on subsequent reboots.

1. Log in to the node that you want to configure for CGTP.

2. Register the host names for each local IP interface.

To ensure that the devices that you configure for CGTP are located in subsequent reboots, create three files:

- `/etc/hostname.NIC0`
- `/etc/hostname.NIC1`
- `/etc/hostname.cgtp0`

These files must be empty.

Note – Network interfaces, such as *NIC0*, might have been created during the installation process.

▼ To Configure an Ethernet Address Per Network Interface

Configure the network interfaces of the node to use the Ethernet address on the card and not the Ethernet address stored in its NVRAM.

Note – This applies only to Sun4U architectures, for example, SPARC® machines.

1. Log in to the node as superuser.
2. Enable the `ok` prompt:
 - a. To get the `telnet` prompt, press **Control** and **]**:

```
# Control ]
```

- b. To get the `ok` prompt, type `send brk` at the `telnet` prompt:

```
telnet> send brk
Type 'go' to resume
ok>
```

3. Configure the processors to use local Ethernet (MAC) addresses:

```
ok> setenv local-mac-address? true
```

▼ To Configure Node Addresses

Manually configure the node addresses so that the interfaces and the redundant routes are created at first boot.

1. Log in to the node that you want to configure for CGTP.
2. Open `/etc/inet/hosts` in a text editor.
3. Define the set of IP addresses for *NIC0*, *NIC1*, and *cgtp0* in the `/etc/inet/hosts` file as described in [“To Configure Interface Names” on page 13](#).
4. Save the `/etc/inet/hosts` file and exit the text editor.
5. Reboot the node.
6. Check that the node addresses are automatically assigned to the interface:

```
% ifconfig -a
```

For more information on the `ifconfig` command, see the `ifconfig(1M)` man page.

▼ To Configure Netmasks

1. Log in to the node that you want to configure for CGTP.

2. **Open** `/etc/inet/netmasks` **in a text editor.**
3. **Declare the subnet masks in the** `/etc/inet/netmasks` **file by adding an entry in the following format:**

```
aa.bb.cc.0 255.255.255.0
```

This step assumes that all the CGTP subnet masks share a common Class C network prefix.

4. **Save the** `/etc/inet/netmasks` **file and exit the text editor.**

▼ To Configure the NIS Database Search

1. **Log in to the node that you want to configure for CGTP.**
2. **Open the** `/etc/nsswitch.conf` **file in a text editor.**
3. **For entries that concern hosts, replace this line:**

```
hosts ...
```

with the line

```
hosts ...files nis
```

This forces the system to use the modified network configuration by placing a local search as first choice.

4. **For entries that concern netmasks, replace this line:**

```
netmasks ...
```

with the line

```
netmasks ...files nis
```

5. **Save the file and exit the text editor.**

Configuring the cgtpp0 Virtual Physical Interface on the Solaris OS

This section describes how to create a cgtpp0 interface on two nodes. cgtpp0 is a virtual physical interface. You must create a cgtpp0 interface on each node on which you want to use standalone CGTP.

Note – Before performing this procedure, you must configure your interfaces, nodes, and netmasks as explained in [“To Configure Interface Names”](#) on page 13, [“To Configure Node Addresses”](#) on page 14, and [“To Configure Netmasks”](#) on page 14.

▼ To Configure the cgtpp0 Interface

1. **As superuser, log in to a node on which you want to configure CGTP.**
In [FIGURE 4-1](#), the node could be machine A.
2. **Create the virtual physical interface for CGTP by using the `plumb` option of `ifconfig`:**

```
# ifconfig cgtpp0 plumb
```

The `plumb` option opens the device that is associated with the physical interface name. This option then sets up the streams needed for IP to use the device. For further information, see the `ifconfig1M` man page.

3. View the new interface on machine A:

```
# ifconfig -a
```

A result similar to the following is displayed:

```
lo0: flags=1000849UP,LOOPBACK,RUNNING,MULTICAST,IPv4> mtu 8232 index 1
inet 127.0.0.1 netmask ff000000
hme0: flags=1000843UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 3
inet 10.4.1.10 netmask fffffff0 broadcast 10.4.1.255
ether 8:0:20:da:6:58
hme1: flags=1000843UP,BROADCAST,RUNNING,MULTICAST,IPv4>mtu 1500 index 4
inet 10.4.2.10 netmask fffffff0 broadcast 10.4.2.255
ether 8:0:20:da:6:59
cgtp0: flags=1000842BROADCAST,RUNNING,MULTICAST,IPv4>mtu 1500 index 5
inet 0.0.0.0 netmask 0
ether 0:0:0:0:0:0
```

You can observe that no IP address has been assigned to the `cgtp0` interface, `inet 0.0.0.0`. Also, no MAC address is assigned to the interface, `ether 0:0:0:0:0:0`, because this interface is a virtual physical interface. For further information, see the `cgtp7D` man page.

To display a shortened form of this result, displaying only the (as yet unassigned) `cgtp0` interface values, use this command:

```
# ifconfig cgtp0
```

A shorter result similar to the following is displayed on the console window:

```
cgtp0: flags=1000842BROADCAST,RUNNING,MULTICAST,IPv4>mtu 1500
index 5
inet 0.0.0.0 netmask 0
ether 0:0:0:0:0:0
```

Note – Before an interface is plumbed, the interface is not listed in the output of the `ifconfig -a` command.

4. Assign an IP address, a netmask, and a broadcast address on machine A.

The up option enables the cgtpp0 interface.

```
# ifconfig cgtpp0 10.4.3.10 netmask 0xffffffff00 broadcast 10.4.3.255
up
```

In this example, the IP address is 10.4.3.10, the netmask is 0xffffffff00, and the broadcast address is 10.4.3.255.

5. View the details of the cgtpp0 interface on machine A:

```
# ifconfig cgtpp0
cgtpp0: flags=1000843UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500
index 2
inet 10.4.3.10 netmask ffffffff00 broadcast 10.4.3.255
ether 0:0:0:0:0:0
```

Note – You can modify the broadcast address and the netmask, if necessary, by using the ifconfig command.

6. As superuser, log in to the second machine, machine B.

7. Create the standard interface for CGTP by using the plumb option of ifconfig:

```
# ifconfig cgtpp0 plumb
```

8. Assign an IP address, a netmask, and a broadcast address to machine B.

The up option enables the cgtpp0 interface.

```
# ifconfig cgtpp0 10.4.3.11 netmask 0xffffffff00 broadcast 10.4.3.255
up
```

In this example, the IP address is 10.4.3.11, the netmask is 0xffffffff00, and the broadcast address is 10.4.3.255.

9. View the newly created cgtpp0 interface on machine B:

```
# ifconfig -a
cgtpp0: flags=1000843UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 2
inet 10.4.3.11 netmask ffffffff00 broadcast 10.4.3.255
ether 0:0:0:0:0:0
hme0: flags=1000843UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 3
inet 10.4.1.11 netmask ffffffff00 broadcast 10.4.1.255
ether 8:0:20:da:6:62
```



```
hme1: flags=1000843UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 4
inet 10.4.2.11 netmask ffffffff broadcast 10.4.2.255
ether 8:0:20:da:6:63
```

Configuring Additional CGTP Virtual Logical Interfaces on the Solaris OS

In addition to the `cgtp0` interface, you can configure additional CGTP interfaces. These additional interfaces are virtual logical interfaces that are associated with `cgtp0`, such as `cgtp0:1` and `cgtp0:2`. You might want to create such an additional interface if you want to have services using different interfaces, but want to maintain the redundancy.

The `cgtp0` and `cgtp0:x` interfaces on a node must have the same subnet prefix. This means that the primary CGTP address and the logical, or aliased, addresses must only differ by their `hostid`. Routes to the aliased interfaces can accordingly be set up on the other cluster nodes.

▼ To Configure Additional CGTP Interfaces

1. As superuser, log in to machine A.
2. Create the logical interface for CGTP:

```
# ifconfig cgtp0 addif \destination-address netmask netmask broadcast
broadcast-address
```

The `addif` option creates the next unused logical interface associated with the interface you specify. For example, if you specify `cgtp0`, the next unused logical interface is `cgtp0:1`. This option replaces the `plumb` option. In addition, the `addif` option avoids conflicts because it assigns the next available interface name. For further information, see the `ifconfig1M` man page.

Alternatively, you can still specify the logical interface name by using the `plumb` and `up` options:

```
# ifconfig cgtp0:1 plumb
```

```
# ifconfig cgtp0:1 destination-address \netmask netmask broadcast broadcast-
address up
```

3. Create logical interfaces for the gateways (destinations) on machine A:

```
# ifconfig hmer addif \destination-address netmask netmask broadcast  
broadcast-address up
```

4. As superuser, log in to machine B.

5. Repeat Step 2 and Step 3 for machine B.

Creating Routes for CGTP on the Solaris OS

This section describes how to create routes for CGTP between two nodes, machine A and machine B. CGTP routes should not cross physical interfaces that are part of a CompactPCI network interface, IPMP group.

You must configure all CGTP interfaces before configuring CGTP routes.

▼ To Create Routes Between Two Machines

In this procedure, machine B is the destination address or *gateway*.

1. As superuser, log in to machine A.

2. Create routes from machine A to machine B using the general notation:

```
# route add destination-cgtp-address \gateway-address -multirt -setsrc src-cgtp-  
address
```

Routes must be separately configured for each CGTP target on the network. The `-setsrc` option is used to specify a source address. For further information on the `-multirt` and `-setsrc` options, see the `route1M` man page in the Solaris OS documentation set.

Note that all commands for adding routes from machine A to machine B are executed on machine A.

```
# route add 10.4.3.11 10.4.1.11 -multirt -setsrc 10.4.3.10
```

```
# route add 10.4.3.11 10.4.2.11 -multirt -setsrc 10.4.3.10
```

3. Examine the routing table on machine A:

```
# netstat -rn
```

The following table gives an example of the routing table for machine A. Note that the two routes have the same destination address, but different gateways.

Destination	Gateway	Flags	Ref	Use	Interface
10.4.3.11	10.4.1.11	UGHMS	1	0	
10.4.3.11	10.4.2.11	UGHMS	1	0	
10.4.2.0	10.4.2.10	U	1	0	hme1
10.4.3.0	10.4.3.10	U	1	0	cgtp0
10.4.1.0	10.4.1.10	U	1	0	hme0
224.0.0.0	10.4.1.10	U	1	0	hme0
127.0.0.1	127.0.0.1	UH	2	8	lo0

The Flags column contains the letter M to indicate that the routes are marked as `multirt`. The letter S indicates that the route is declared with the `setsrc` option. The routing table provides this information to enable you to check whether your manual configuration is correct.

4. Create routes from machine B to machine A.

Note that all commands in adding routes from machine B to machine A are executed on machine B.

```
# route add 10.4.3.10 10.4.1.10 -multirt -setsrc 10.4.3.11
```

```
# route add 10.4.3.10 10.4.2.10 -multirt -setsrc 10.4.3.11
```

Routes must be separately configured for each CGTP target on the network, in both directions.

5. Examine the routing table on machine B:

```
# netstat -rn
```

The following table gives an example of the routing table for machine B.

Destination	Gateway	Flags	Ref	Use	Interface
10.4.3.10	10.4.1.10	UGHMS	1	0	
10.4.3.10	10.4.2.10	UGHMS	1	0	
10.4.2.0	10.4.2.11	U	1	0	hme1
10.4.3.0	10.4.3.11	U	1	0	cgtp0
10.4.1.0	10.4.1.11	U	1	0	hme0
127.0.0.1	127.0.0.1	UH	2	8	lo0

The filtering module is now configured because routes are declared to the CGTP destination address that is filtering packets from that address.

Disabling CGTP on the Solaris OS

This section describes how to disable the CGTP interfaces, and the associated routes, on two machines where each machine is attached to two subnets. The CGTP interfaces that can be disabled are as follows:

- Virtual logical interfaces (*cgtp0:x*), where you have assigned more than one IP address to the *cgtp0* virtual physical interface, or *hme0:x* for *hme0*
- Virtual physical interface (*cgtp0*)

▼ To Disable Virtual Logical Interfaces

1. As superuser, log in to machine A.
2. Remove the routes that you set up in [“To Create Routes Between Two Machines”](#) on page 20:

```
# route delete machine-B-cgtp-address gateway-address
```

3. Use the `ifconfig` command to disable your logical interfaces.

- The following command disables the logical interface `hme0:1`:

```
# ifconfig hme0:1 down unplumb
```

- The following command disables the logical interface `cgtp0:1`:

```
# ifconfig cgtp0:1 down unplumb
```

▼ To Disable the Virtual Physical Interface, `cgtp0`

1. **As superuser, log in to machine A.**
2. **Remove the routes between machine A and machine B:**

```
# route delete machine-B-cgtp-address gateway-address
```

On machine A, the following commands remove the routes.

```
# route delete 10.4.3.11 10.4.1.11
```

```
# route delete 10.4.3.11 10.4.2.11
```

3. **As superuser, log in to machine B.**
4. **Remove routes between machine B and machine A.**

On machine B, the following commands remove the routes.

```
# route delete 10.4.3.10 10.4.1.10
```

```
# route delete 10.4.3.10 10.4.2.10
```

5. **As superuser, log in to machine A.**
6. **Remove the interfaces that you configured for CGTP.**

For example, to remove the `cgtp0` interface on machine A, type the following:

```
# ifconfig cgtp0 down unplumb
```

7. **As superuser, log in to machine B.**
8. **Remove the interfaces that you configured for CGTP on machine B.**

Configuring Standalone CGTP on Linux

This chapter describes how to configure standalone CGTP without the Reliable Boot Service. The examples in this chapter use IPv4.

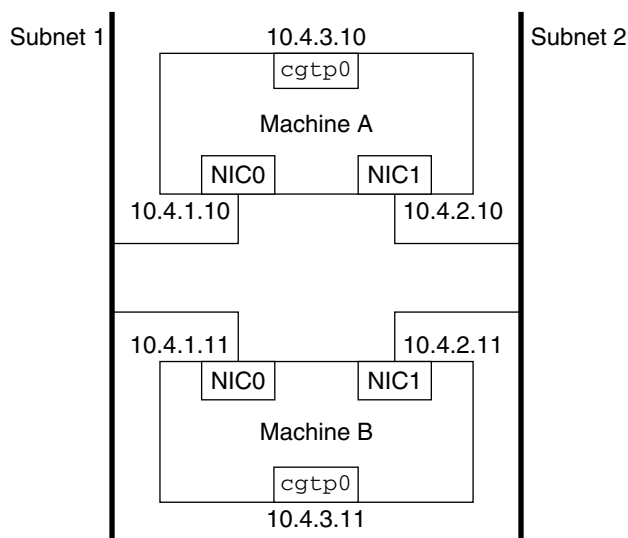
For more information, see these sections:

- [“Introducing CGTP Configuration” on page 25](#)
- [“Preparing to Configure Standalone CGTP on Linux” on page 26](#)
- [“Configuring Additional CGTP Virtual Logical Interfaces on Linux” on page 29](#)
- [“Ensuring Interoperability of the Solaris OS and Linux” on page 30](#)
- [“Disabling CGTP on Linux” on page 32](#)

Introducing CGTP Configuration

This chapter describes the steps that you perform on nodes that are to run standalone CGTP. All examples in this chapter describe the configuration of two nodes, `machine A` and `machine B`, as shown in [FIGURE 5-1](#). When configured, these nodes communicate through dual network links that form a CGTP network. You must decide the number of nodes that you want to configure to be part of this CGTP network.

FIGURE 5-1 CGTP Configuration for machine A and machine B



Preparing to Configure Standalone CGTP on Linux

To have a CGTP network, each node on the network must be configured to have three interfaces:

- Two physical interfaces, `NIC0` and `NIC1`.
- One virtual physical interface, `cgtp0`.

Configure CGTP on the node's `local` file system. Do not configure CGTP on a remote shared file system because a remote file system might become unreachable if the network fails. Before configuring CGTP interfaces and routes, configure the interface names, addresses, netmasks, and the database search on each node.

▼ To Configure Node Addresses on MontaVista Linux 4.0

Perform the following procedure on each node that you are configuring for standalone CGTP.

Manually configure the node addresses so that the interfaces are created at boot.

Note – This procedure is valid only for MontaVista Linux 4.0. If you are using any other distribution of Linux, follow the procedures provided in the documentation that accompanied the distribution.

1. **Log in to the node that you want to configure for CGTP.**
2. **Define the configuration for *NIC0*, *NIC1*, and *cgtp0* in the `/etc/network/interfaces` file. The following interfaces and addresses are examples that you can modify to meet your needs.**

```
# CGTP's NIC0
auto eth2
iface eth2 inet static
address 10.217.1.10
network 10.217.1.0
netmask 255.255.255.0
broadcast 10.217.1.255

# CGTP's NIC1
auto eth3
iface eth3 inet static
address 10.217.2.10
network 10.217.2.0
netmask 255.255.255.0
broadcast 10.217.2.255

# CGTP interface
auto cgtp0
iface cgtp0 inet static
address 10.217.3.10
network 10.217.3.0
netmask 255.255.255.0
broadcast 10.217.3.255
up echo 0 > /proc/sys/net/ipv4/conf/all/rp_filter || true
up /opt/sun/sbin/cgtpool cgtp0 eth2 eth3
```

3. **Configure the autoloading at boot time of the CGTP module.**
Add one line to the `/etc/modules` file with the module name.

```
cgtp
```

4. **Reboot the node.**

5. Check that the node addresses are automatically assigned to the interface:

```
# ifconfig -a
```

For more information on the `ifconfig` command, see the `ifconfig8` man page.

▼ To Configure Node Addresses on Wind River Linux CGL 1.4

Manually configure the node addresses so that the interfaces are created at boot.

Note – This procedure is valid only for Wind River Linux CGL 1.4. If you are using any other distribution of Linux, follow the procedures provided in the documentation that accompanied the distribution.

1. Log in to the node that you want to configure for CGTP.
2. Define the configuration for *NIC0*, *NIC1*, and *cgtp0* in the `/etc/network/interfaces` file. The following interfaces and addresses are examples that you can modify to meet your needs.

```
File /etc/sysconfig/network-scripts/ifcfg-eth0
# CGTP's NIC0
DEVICE=eth0
File /etc/sysconfig/network-scripts/ifcfg-eth1
BOOTPROTO=static
# CGTP's NIC1
DEVICE=eth1
BOOTPROTO=static
BROADCAST=10.217.2.255
IPADDR=10.217.2.10
NETMASK=255.255.255.0
NETWORK=10.217.2.0
STARTMODE=onboot
BROADCAST=10.217.1.255
File /etc/sysconfig/network-scripts/ifcfg-cgtp0
IPADDR=10.217.1.10
# CGTP interface
DEVICE=cgtp0
BOOTPROTO=static
BROADCAST=10.217.3.255
IPADDR=10.217.3.10
NETMASK=255.255.255.0
```

```
NETWORK=10.217.3.0STARTMODE=onboot
NETMASK=255.255.255.0
NETWORK=10.217.1.0STARTMODE=onboot
```

3. **Configure the autoloading at boot time of the CGTP module. Add one line to the `/etc/modules` file with the module name.**

```
cgtp
```

4. **Reboot the node.**

5. **Check that the node addresses are automatically assigned to the interface:**

```
# ifconfig -a
```

For more information on the `ifconfig` command, see the `ifconfig8` man page.

Configuring Additional CGTP Virtual Logical Interfaces on Linux

In addition to the `cgtp0` interface, you can configure additional CGTP interfaces. These additional interfaces are virtual logical interfaces that are associated with `cgtp0`, such as `cgtp0:1` and `cgtp0:2`. You might want to create such an additional interface if you want to have services using different interfaces, but want to maintain the redundancy.

The `cgtp0` and `cgtp0:x` interfaces on a node must have the same subnet prefix. This means that the primary CGTP address and the logical, or aliased, addresses must only differ by their `hostid`. Routes to the aliased interfaces can accordingly be set up on the other cluster nodes.

▼ To Configure Additional CGTP Interfaces

1. **As superuser, log in to machine A.**

2. Create the logical interface for CGTP:

```
# ifconfig cgtip0 add ip-address \netmask netmask broadcast broadcast-address
```

The `add` option creates the next unused logical interface associated with the interface you specified. For example, if you specify `cgtip0`, the next unused logical interface is `cgtip0:0`. For further information, see the `ifconfig8` man page.

Alternatively, you can still specify the logical interface name by explicitly configuring it:

```
# ifconfig cgtip0:10 ip-address \netmask netmask broadcast broadcast-address up
```

3. As superuser, repeat [Step 2](#) for machine B.

Ensuring Interoperability of the Solaris OS and Linux

CGTP for Linux provides a way to resolve the differences that exist in the way the Solaris OS and Linux manage the Address Resolution Protocol (ARP). This section describes how to set up CGTP on Linux when Linux nodes must interoperate with Solaris nodes using CGTP.

Because of the differences in the way the Solaris OS and Linux handle the ARP, CGTP is unable to find the MAC addresses of remote Solaris nodes. To solve this problem, the redundant gateways table must be populated with information that explains how to reach those nodes. An entry in this table is made of the following, globally unique, triplet:

- Destination CGTP IP address
- Gateway IP address
- Network interface through which the gateway address must be resolved.

Generally, there should be two entries associated to the same destination CGTP IP address. The redundant gateways table is accessible through the `/proc/net/cgtip interface/gateway` file.

▼ To Add Nodes to the Redundant Gateways Table

1. As superuser, log in to the Linux node.
2. Add an entry to the file as follows:

```
# echo "add dest IP addr gateway IP addr slave interface" > \
/proc/net/cgtp0/gateway
```

▼ To Remove Nodes to the Redundant Gateways Table

1. As superuser, log in to the Linux node.
2. Add an entry to the file as follows:

```
# echo "del <dest IP addr> <gateway IP addr> <slave interface>" > \
/proc/net/cgtp0/gateway
```

▼ To Change the IP Address of an Existing Entry

1. As superuser, log in to the Linux node.
2. Change the entry in the file as follows:

```
# echo "change <dest IP addr> <gateway IP addr> <slave int.>" > \
/proc/net/cgtp0/gateway
```

▼ To Get the Contents of the Redundant Gateways Table

1. As superuser, log in to the Linux node.

2. Read the contents of the file, as follows:

```
# cat /proc/net/cgtp0/gateway
Device      Dest. IP addr  Gateway IP addr
-----
eth0        11.0.3.15     11.0.1.15
eth1        11.0.3.15     11.0.2.15
```

In this example, a packet being sent over the CGTP link to the destination IP address 11.0.3.15 will be duplicated on the interfaces eth0 and eth1 as if it was a packet being sent to 11.0.1.15 and 11.0.2.15, respectively.

Note – Addresses must be supplied in numeric format. No name resolution is supported.

Disabling CGTP on Linux

This section describes how to disable the CGTP interfaces on two machines where each machine is attached to two subnets.

▼ To Disable the Virtual CGTP Interface cgtp0

1. As superuser, log in to machine A.
2. Take the interface down:

```
# ifdown cgtp0
```

3. As superuser, repeat [Step 2](#) for machine B.

Preparing to Install Standalone CGTP With the Reliable Boot Service on the Solaris OS

To provide standalone CGTP nodes with Reliable NFS and the Reliable Boot Service, install the Foundation Services on a two-node cluster. You can use the `nhinstall` tool, or manually install and configure both the standalone node and the cluster nodes.

Note – Because diskless nodes are not supported for use on Linux, the information in this chapter applies only to the Solaris OS.

The following sections describe the main requirements for the installation. For further information about the hardware and software requirements, see the *Netra High Availability Suite 3.0 1/08 Foundation Services Installation Guide* and the *Netra High Availability Suite 3.0 1/08 Foundation Services Manual Installation Guide for the Solaris OS*.

For a list of the main hardware and software requirements, see the following sections:

- [“Installation Server Requirements” on page 34](#)
- [“Cluster Node Requirements” on page 35](#)
- [“Standalone Node Requirements” on page 35](#)
- [“Connecting the Nodes” on page 36](#)

Installation Server Requirements

You require an *installation server* to install the Netra HA Suite product. An installation server enables you to install the Solaris Operating System and Netra HA Suite software on the cluster by using the Solaris JumpStart™ software.

The installation server requires the following:

<i>Hardware requirements</i>	<ul style="list-style-type: none">• UltraSPARC® platform• Two network devices:<ul style="list-style-type: none">- One network device connects the installation server to an external network.- The other network device connects the installation server to the cluster network.
<i>Operating system</i>	Solaris Operating System
<i>Software requirements</i>	Perl Version 5, which is available with the Developer Solaris Software Group.
<i>Disk capacity</i>	Minimum 1.5 Gbytes for a Solaris software distribution This size does not include applications that you might want to deploy on the cluster.
<i>Free space</i>	Minimum 1.5 Gbytes after the Solaris Operating System has been installed

To connect the installation server to the cluster and the standalone nodes, see [“Connecting the Nodes” on page 36](#).

Cluster Node Requirements

The hardware and software requirements for the two-node cluster to be installed with the Foundation Services are as follows:

<i>Hardware requirements</i>	<ul style="list-style-type: none">• Two Netra servers For example, Netra T1 servers.• Two Ethernet switches• A terminal server to manage the consoles
<i>Operating system</i>	Solaris 9 or 10 Operating Systems
<i>Software requirements</i>	<ul style="list-style-type: none">• The Solaris distribution• The Netra HA Suite software distribution

Standalone Node Requirements

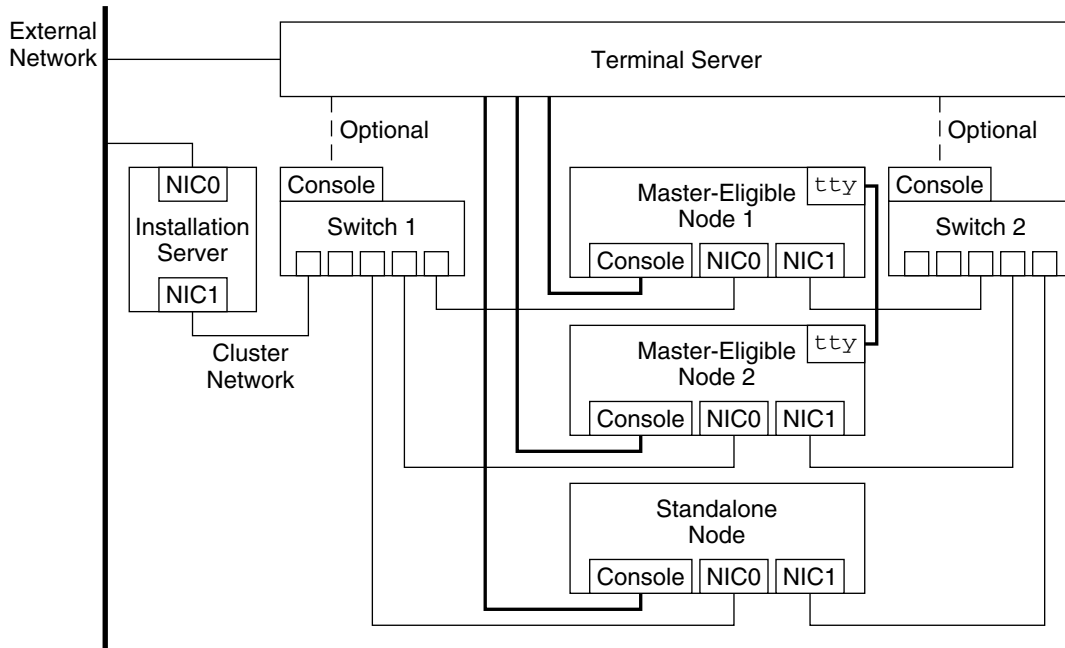
The hardware and software requirements for the diskless nodes to be installed with standalone CGTP are as follows:

<i>Hardware requirements</i>	<ul style="list-style-type: none">• Two Netra servers• Two Ethernet cards
<i>Operating system</i>	Solaris 9 or 10 Operating Systems
<i>Software requirements</i>	<p>The following CGTP packages and patches from the Netra HA Suite software distribution:</p> <ul style="list-style-type: none">• CGTP patches. Note: For exact patch numbers, see the <i>Netra High Availability Suite 3.0 1/08 Foundation Services README</i>• SUNWnhas-cgtp package, CGTP kernel drivers and user-space components for the Solaris 9 and 10 OS• SUNWnhas-common package, Foundation Services common components• SUNWnhas-common-libs package, Foundation Services common libraries• SUNWnhas-diskless-standalone package, Foundation Services standalone diskless support

Connecting the Nodes

Connect the nodes as shown in [FIGURE 6-1](#).

FIGURE 6-1 Connecting the Standalone Nodes to a Two-Node Cluster



NIC0 = Interface to the first network card.

NIC1 = Interface to the second network card.

Installing Standalone CGTP With the Reliable Boot Service on the Solaris OS

After you have installed and connected the hardware for your standalone diskless nodes and the two-node cluster, you are ready to install the software on the nodes.

You can install the software using the `nhinstall` tool, or by manual installation. For introductory information about each type of installation, see the *Netra High Availability Suite 3.0 1/08 Foundation Services Overview*.

Use one of the following procedures to install and configure CGTP on the standalone nodes and Netra HA Suite software on the two-node cluster:

- [“To Install With the `nhinstall` Tool” on page 38](#)
- [“To Install Manually” on page 38](#)

Note – Because diskless nodes are not supported for use on Linux, the information in this chapter applies to only the Solaris OS.

Note – If you use zones in the Solaris 10 OS and exclusive, per-zone, IP stacks, be aware that CGTP filtering currently works only in the global zone, with the shared IP stack.

Installing With the Reliable Boot Service

▼ To Install With the `nhinstall` Tool

1. **Set up the `nhinstall` tool and install the product as described in the *Netra High Availability Suite 3.0 1/08 Foundation Services Installation Guide*.**
2. **In the `cluster_definition.conf` file, specify that you are installing standalone nodes:**

```
DISKLESS_TYPE=STANDALONE
```

For a description of all parameters in the `cluster_definition.conf` file, see the `cluster_definition.conf4` man page.

3. **Complete the installation and configuration procedure as described in the *Netra High Availability Suite 3.0 1/08 Foundation Services Installation Guide*.**

▼ To Install Manually

1. **Check that you have the necessary hardware.**
See [Chapter 6](#).
2. **Prepare the installation environment for a two-node cluster.**
For information, see “Preparing to Install Manually” in *Netra High Availability Suite 3.0 1/08 Foundation Services Manual Installation Guide for the Solaris OS*.
3. **Install the Solaris Operating System and Netra HA Suite on the master-eligible nodes.**
See “Installing the Software on the Master-Eligible Nodes” in *Netra High Availability Suite 3.0 1/08 Foundation Services Manual Installation Guide for the Solaris OS*.
4. **Prepare to install the diskless node.**
See “Preparing to Install a Diskless Node” in *Netra High Availability Suite 3.0 1/08 Foundation Services Manual Installation Guide for the Solaris OS*.

5. Install the Solaris Operating System for the diskless node on the master node.

See “Installing the Solaris Operating System” for Diskless Nodes on the Master Node in *Netra High Availability Suite 3.0 1/08 Foundation Services Manual Installation Guide for the Solaris OS*.

6. Install and configure the DHCP and the Reliable Boot Service.

- “Installing the DHCP and the Reliable Boot Service” in *Netra High Availability Suite 3.0 1/08 Foundation Services Manual Installation Guide for the Solaris OS*.
- “Configuring the DHCP for a Diskless Node” in *Netra High Availability Suite 3.0 1/08 Foundation Services Manual Installation Guide for the Solaris OS*

7. Configure the DHCP boot policy for the diskless node.

See “Configuring the DHCP Boot Policy for Diskless Nodes” in *Netra High Availability Suite 3.0 1/08 Foundation Services Manual Installation Guide for the Solaris OS*.

8. Install the Standalone CGTP packages on the diskless node:

```
# pkgadd -d pkg-dir SUNWnhas-cgtp SUNWnhas-common-libs  
SUNWnhas-common SUNWnhas-diskless-standalone
```

pkg-dir is the directory where the CGTP packages are located.

9. Install the Standalone CGTP patches on the diskless node by using the following command to install each patch:

```
# patchadd -d patch-dir patch-list
```

For more information on `patchadd`, see the `patchadd1M` man page.

After successful installation, the following message is displayed:

```
Checking installed patches...  
Verifying sufficient filesystem capacity (dry run method)...  
Installing patch packages...  
Patch number patch-number has been successfully installed.  
See /var/sadm/patch/patch-number/log for details
```

10. Configure the diskless node:

- See “To Update the Network ID Files for the Diskless Node” in the *Netra High Availability Suite 3.0 1/08 Foundation Services Manual Installation Guide for the Solaris OS*
- See “To Configure External IP Addresses” in the *Netra High Availability Suite 3.0 1/08 Foundation Services Manual Installation Guide for the Solaris OS*
- See “To Set up File Systems for a Diskless Node” in the *Netra High Availability Suite 3.0 1/08 Foundation Services Manual Installation Guide for the Solaris OS*

11. Declare the diskless node to the master-eligible nodes.

See “Integrating a Diskless Node Into the Cluster” in the *Netra High Availability Suite 3.0 1/08 Foundation Services Manual Installation Guide for the Solaris OS*.

12. Boot the master-eligible nodes.

13. Boot the diskless node.

When you boot the nodes, the scripts in the `SUNWnhas-diskless-standalone` package create routes from the diskless nodes to the master node by using the floating address triplet of the master node. These routes are used to provide the Reliable Boot Service to the standalone diskless nodes running CGTP.

Index

A

addresses, configuring
 on Linux, 26, 28
 on the Solaris OS, 14
ATM, 2

B

broadcasts, support of, 2

C

CGTP
 disabling
 on Linux, 32
 on Linux *See also* standalone nodes
 on the Solaris OS, 22
 on the Solaris OS *See also* standalone nodes
cgtp0
 interfaces
 configuring, 16
 disabling, 22
 x interfaces, configuring
 on Linux, 29
 on the Solaris OS, 19
 x interfaces, disabling
 on Linux, 32
 on the Solaris OS, 22
cluster node requirements, 35
cluster_definition.conf file (nhinstall), 38
CompactPCI, 2
configuring standalone CGTP
 additional interfaces
 on Linux, 29

 on the Solaris OS, 19
CGTP networks
 on Linux, 25
 on the Solaris OS, 11
cgtp0 interface, creating and configuring, 16
file systems
 on Linux, 26
 on the Solaris OS, 12
preparing to configure
 on Linux, 25
 on the Solaris OS, 11
 routes between nodes, adding and creating, 20
connecting nodes, 36

D

database search, configuring on the Solaris OS, 15
disabling CGTP
 on Linux, 32
 on the Solaris OS, 22
diskless standalone nodes
 configuring, 38
 requirements, 35, 36

E

Ethernet address, configuring, 13

F

file system for configuring CGTP
 Linux, 26
 Solaris OS, 12
filtering packets, 2

H

- host names, registering for local IP interfaces, 13
- hostname.cgtp0 file, creating, 13
- hostname.NIC0 file, creating, 13
- hostname.NIC1 file, creating, 13
- hosts file, editing, 14

I

- installation server requirements, 34
- installing standalone CGTP
 - manually
 - with Reliable Boot Service, 38
 - without Reliable Boot Service
 - on Linux, 9
 - on the Solaris OS, 5
 - using nhinstall, 38
- interface names, configuring on Solaris, 13
- IP gateways between nodes, 2

L

- latencies, avoiding, 2
- licensing information, 3
- logical interfaces
 - Linux, 26
 - Linux *See also* virtual logical interfaces
 - Solaris, 12
 - Solaris *See also* virtual logical interfaces

M

- manual installation
 - with Reliable Boot Service, 38
 - without Reliable Boot Service
 - on Linux, 9
 - on the Solaris OS, 5

N

- netmasks
 - configuring, 14
 - editing, 15
- network interfaces
 - configuring
 - database searches, 15
 - Ethernet addresses, 13
 - interface names, 13
 - netmasks, 14
 - node addresses

- on Linux, 26, 28
- on the Solaris OS, 14

logical

- on Linux, 26
- on the Solaris OS, 12

number on each node

- on Linux, 26
- on the Solaris OS, 12

physical

- on Linux, 26
- on the Solaris OS, 12

virtual physical

- on Linux, 26
- on the Solaris OS, 12

- nhinstall tool, 38

node addresses, configuring

- on Linux, 26, 28
- on the Solaris OS, 14

node requirements

- cluster, 35
- standalone, 35

- nodes, connecting standalone, 36

- nsswitch.conf file, editing, 15

P

packages

- installation procedure, 9
- installation procedure on the Solaris OS, 6
- SUNWnhas-cgtp, 3, 35
- SUNWnhas-common, 35
- SUNWnhas-common-libs, 35
- SUNWnhas-diskless-standalone, 35
- verifying installation
 - on Linux, 10
 - on the Solaris OS, 8

packets

- filtering duplicates, 2
- mtu value, 2
- reducing fragmentation, 2
- replication, 2

patchadd command, installing

- with Reliable Boot Service, 39
- without Reliable Boot Service, 5

patches for CGTP

- installing on the Solaris OS, 5
- verifying installation on the Solaris OS, 6

- performance, of CGTP, 2

physical interfaces

Linux, 26

Linux *See also* virtual logical interfaces, 26

Solaris, 12

Solaris *See also* virtual logical interfaces, 12

pkgadd command, installing

with Reliable Boot Service, 39

without Reliable Boot Service, 7

prerequisites, installation

with Reliable Boot Service, 33

without Reliable Boot Service, 3

R

redundancy, maintaining

on Linux, 29

on the Solaris OS, 19

redundant routes, creating

on Linux, 27, 28

on the Solaris OS, 14

Reliable Boot Service, installing

with, 38

without, 5

requirements, installation

with Reliable Boot Service, 33

without Reliable Boot Service, 3

routes, creating on the Solaris OS, 20

S

single point of failure, removing, 2

standalone nodes

with Reliable Boot Service

configuring on Linux, 25

connecting to cluster, 36

installing, 38

packages and patches, 35

requirements, 35

without Reliable Boot Service

configuring on Solaris, 11

installing on the Solaris OS, 5

packages and patches, 3

requirements, 3

topology, defining, 1

SUNWnhdb package, 35

SUNWnhp9 package, 3, 35

SUNWnhp9 package, 35

T

topology, standalone nodes without Reliable Boot Service, 1

V

virtual logical interfaces

creating and configuring

on Linux, 29

on the Solaris OS, 19

disabling

on Linux, 32

on the Solaris OS, 22

virtual physical interface

creating and configuring on Solaris, 16

disabling on the Solaris OS, 23

preparing to configure

on Linux, 26

on the Solaris OS, 12

