

Introduction to Oracle® Solaris 11 Network Services

Copyright © 2002, 2012, Oracle and/or its affiliates. All rights reserved.

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish, or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

If this is software or related documentation that is delivered to the U.S. Government or anyone licensing it on behalf of the U.S. Government, the following notice is applicable:

U.S. GOVERNMENT END USERS. Oracle programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, delivered to U.S. Government end users are "commercial computer software" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, use, duplication, disclosure, modification, and adaptation of the programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, shall be subject to license terms and license restrictions applicable to the programs. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate fail-safe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Xeon are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Opteron, the AMD logo, and the AMD Opteron logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group.

This software or hardware and documentation may provide access to or information on content, products, and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services.

Ce logiciel et la documentation qui l'accompagne sont protégés par les lois sur la propriété intellectuelle. Ils sont concédés sous licence et soumis à des restrictions d'utilisation et de divulgation. Sauf disposition de votre contrat de licence ou de la loi, vous ne pouvez pas copier, reproduire, traduire, diffuser, modifier, breveter, transmettre, distribuer, exposer, exécuter, publier ou afficher le logiciel, même partiellement, sous quelque forme et par quelque procédé que ce soit. Par ailleurs, il est interdit de procéder à toute ingénierie inverse du logiciel, de le désassembler ou de le décompiler, excepté à des fins d'interopérabilité avec des logiciels tiers ou tel que prescrit par la loi.

Les informations fournies dans ce document sont susceptibles de modification sans préavis. Par ailleurs, Oracle Corporation ne garantit pas qu'elles soient exemptes d'erreurs et vous invite, le cas échéant, à lui en faire part par écrit.

Si ce logiciel, ou la documentation qui l'accompagne, est concédé sous licence au Gouvernement des Etats-Unis, ou à toute entité qui délivre la licence de ce logiciel ou l'utilise pour le compte du Gouvernement des Etats-Unis, la notice suivante s'applique:

U.S. GOVERNMENT END USERS. Oracle programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, delivered to U.S. Government end users are "commercial computer software" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, use, duplication, disclosure, modification, and adaptation of the programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, shall be subject to license terms and license restrictions applicable to the programs. No other rights are granted to the U.S. Government.

Ce logiciel ou matériel a été développé pour un usage général dans le cadre d'applications de gestion des informations. Ce logiciel ou matériel n'est pas conçu ni n'est destiné à être utilisé dans des applications à risque, notamment dans des applications pouvant causer des dommages corporels. Si vous utilisez ce logiciel ou matériel dans le cadre d'applications dangereuses, il est de votre responsabilité de prendre toutes les mesures de secours, de sauvegarde, de redondance et autres mesures nécessaires à son utilisation dans des conditions optimales de sécurité. Oracle Corporation et ses affiliés déclinent toute responsabilité quant aux dommages causés par l'utilisation de ce logiciel ou matériel pour ce type d'applications.

Oracle et Java sont des marques déposées d'Oracle Corporation et/ou de ses affiliés. Tout autre nom mentionné peut correspondre à des marques appartenant à d'autres propriétaires qu'Oracle.

Intel et Intel Xeon sont des marques ou des marques déposées d'Intel Corporation. Toutes les marques SPARC sont utilisées sous licence et sont des marques ou des marques déposées de SPARC International, Inc. AMD, Opteron, le logo AMD et le logo AMD Opteron sont des marques ou des marques déposées d'Advanced Micro Devices. UNIX est une marque déposée d'The Open Group.

Ce logiciel ou matériel et la documentation qui l'accompagne peuvent fournir des informations ou des liens donnant accès à des contenus, des produits et des services émanant de tiers. Oracle Corporation et ses affiliés déclinent toute responsabilité ou garantie expresse quant aux contenus, produits ou services émanant de tiers. En aucun cas, Oracle Corporation et ses affiliés ne sauraient être tenus pour responsables des pertes subies, des coûts occasionnés ou des dommages causés par l'accès à des contenus, produits ou services tiers, ou à leur utilisation.

Contents

Preface	11
1 Network Service (Overview)	13
Topics for the Oracle Solaris 11 Release	13
Perl 5	14
Accessing Perl Documentation	14
Perl Compatibility Issues	15
Changes to the Oracle Solaris Version of Perl	15
2 Managing Web Cache Servers	17
Network Cache and Accelerator (Overview)	17
Managing Web Cache Servers (Task Map)	18
Planning for NCA	19
System Requirements for NCA	19
NCA Logging	19
Interpositioning Library for Daemon Support of the Door Server	19
Multiple Instance Support	19
Administering the Caching of Web Pages (Tasks)	20
▼ How to Enable Caching of Web Pages	20
▼ How to Disable Caching of Web Pages	22
▼ How to Enable or Disable NCA Logging	23
How to Load the Socket Utility Library for NCA	23
▼ How to Add a New Port to the NCA Service	23
Caching Web Pages (Reference)	24
NCA Files	24
NCA Architecture	25

3 Time-Related Services	27
Clock Synchronization (Overview)	27
About NTP in This Release	28
Managing Network Time Protocol (Tasks)	28
▼ How to Set Up an NTP Server	28
▼ How to Set Up an NTP Client	28
▼ How to Enable NTP Logging	29
▼ How to Display the SMF Properties Associated With the NTP Service	29
Using Other Time-Related Commands (Tasks)	30
▼ How to Synchronize Date and Time From Another System	30
Network Time Protocol (Reference)	30
Index	33

Figures

FIGURE 2-1	Data Flow With the NCA Service	26
------------	--------------------------------------	----

Tables

TABLE 2-1	NCA Files	24
TABLE 3-1	NTP Files	30

Examples

EXAMPLE 2-1	Using a Raw Device as the NCA Log File	21
EXAMPLE 2-2	Using Multiple Files for NCA Logging	22
EXAMPLE 3-1	Synchronizing Date and Time From Another System	30

Preface

Introduction to Oracle Solaris 11 Network Services is part of a multivolume set that covers a significant part of the Oracle Solaris system administration information. This book assumes that you have already installed the Oracle Solaris operating system, and you have set up any networking software that you plan to use.

Note – This Oracle Solaris release supports systems that use the SPARC and x86 families of processor architectures. The supported systems appear in the *Oracle Solaris OS: Hardware Compatibility Lists*. This document cites any implementation differences between the platform types.

Who Should Use This Book

This book is intended for anyone responsible for administering one or more systems that run the Oracle Solaris release. To use this book, you should have one to two years of UNIX system administration experience. Attending UNIX system administration training courses might be helpful.

Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info> or visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs> if you are hearing impaired.

Typographic Conventions

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

TABLE P-1 Typographic Conventions

Typeface	Description	Example
AaBbCc123	The names of commands, files, and directories, and onscreen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. <code>machine_name%</code> you have mail.
AaBbCc123	What you type, contrasted with onscreen computer output	<code>machine_name%</code> su Password:
<i>aabbcc123</i>	Placeholder: replace with a real name or value	The command to remove a file is <code>rm filename</code> .
<i>AaBbCc123</i>	Book titles, new terms, and terms to be emphasized	Read Chapter 6 in the <i>User's Guide</i> . <i>A cache</i> is a copy that is stored locally. Do <i>not</i> save the file. Note: Some emphasized items appear bold online.

Shell Prompts in Command Examples

The following table shows the default UNIX system prompt and superuser prompt for shells that are included in the Oracle Solaris OS. Note that the default system prompt that is displayed in command examples varies, depending on the Oracle Solaris release.

TABLE P-2 Shell Prompts

Shell	Prompt
Bash shell, Korn shell, and Bourne shell	\$
Bash shell, Korn shell, and Bourne shell for superuser	#
C shell	<code>machine_name%</code>
C shell for superuser	<code>machine_name#</code>

Network Service (Overview)

This chapter provides a list of the major topics covered in this library. In addition it includes a description of the PERL service that is included in this release.

Topics for the Oracle Solaris 11 Release

The following services or utilities are covered in this collection:

[“Perl 5” on page 14](#)

The Practical Extraction and Report Language (Perl) is a tool that can be used to generate scripts to assist with system administration tasks.

[Chapter 2, “Managing Web Cache Servers”](#)

NCA provides improved web server performance by caching web pages.

[Chapter 3, “Time-Related Services”](#)

NTP and time-related utilities can be used to synchronize time for many systems.

[Managing Network File Systems in Oracle Solaris 11.1](#)

NFS is a protocol that provides the ability to access file systems from a remote host.

[Managing Service Location Protocol Services in Oracle Solaris 11.1](#)

SLP is a dynamic service discovery protocol.

[Managing SMB File Sharing and Windows Interoperability in Oracle Solaris 11.1](#)

SMB is used to share file systems from Windows servers.

[Working With Naming and Directory Services in Oracle Solaris 11.1](#)

Naming Services provide centralized information that enables users and systems to communicate across the network.

[Managing sendmail Services in Oracle Solaris 11.1](#)

Mail services allow for a message to be sent to one or more people while routing the message over whatever networks are necessary.

Managing Serial Networks Using UUCP and PPP in Oracle Solaris 11.1

PPP is a protocol that provides point-to-point links between remote hosts.

UUCP enables hosts to exchange files.

Managing Remote Systems in Oracle Solaris 11.1

These commands are used to access files on remote systems. The commands include `ftp`, `rlogin` and `rcp`.

Perl 5

This Oracle Solaris release includes Practical Extraction and Report Language (Perl) version 5.8.4 and 5.12, a powerful general-purpose programming language that is generally available as free software. Perl has emerged as the standard development tool for complex system administration tasks because of its excellent process, file, and text manipulation features.

Perl 5 includes a dynamically loadable module framework, which allows the addition of new capabilities for specific tasks. Many modules are freely available from the Comprehensive Perl Archive Network (CPAN) at <http://www.cpan.org>. If you wish to build and install add-on modules from CPAN using `gcc`, you can do so using the `/usr/perl5/5.8.4/bin/perlcc` or the `/usr/perl5/5.12/bin/perlcc` script. See the `perlcc(1)` man page with the 5.8.4 distribution for details.

Accessing Perl Documentation

Several sources of information about Perl are included in this Oracle Solaris release. The same information is available by using these two mechanisms.

You can access the man pages by adding `/usr/perl5/man` to your `MANPATH` environment variable. This example displays the Perl overview.

```
% setenv MANPATH ${MANPATH}:/usr/perl5/man
% man perl
```

You can access additional documentation by using the `perldoc` utility. This example displays the same overview information.

```
% /usr/perl5/bin/perldoc perl
```

The `perl` overview page lists of all the documentation that is included with the release.

Perl Compatibility Issues

In general, the 5.12 version of Perl is compatible with the previous version. Scripts do not have to be rebuilt or recompiled to function. However, any XSUB-based (.xs) modules require recompilation and reinstallation.

Changes to the Oracle Solaris Version of Perl

The Oracle Solaris version of Perl was compiled to include system memory allocator, 64-bit integer and large file support. In addition, appropriate patches have been applied. For a full list of all configuration information, review the results from this command.

```
% /usr/perl5/bin/perlbug -dv
---
Flags:
  category=
  severity=
---
Site configuration information for perl v5.12.4:
.
```

You can generate a shorter list by using `perl -V`.

Managing Web Cache Servers

This chapter provides an overview of the Network Cache and Accelerator (NCA) in the Oracle Solaris 11 release. Procedures for using NCA and reference material about NCA are included.

- “Network Cache and Accelerator (Overview)” on page 17
- “Managing Web Cache Servers (Task Map)” on page 18
- “Administering the Caching of Web Pages (Tasks)” on page 20
- “Caching Web Pages (Reference)” on page 24

To improve security between two applications, you may want to look at [Chapter 3, “Web Servers and the Secure Sockets Layer Protocol,”](#) in *Securing the Network in Oracle Solaris 11.1*.

Network Cache and Accelerator (Overview)

The Network Cache and Accelerator (NCA) increases web server performance by maintaining an in-kernel cache of web pages that are accessed during HTTP requests. This in-kernel cache uses system memory to significantly increase performance for HTTP requests that are normally handled by web servers. Using system memory to hold web pages for HTTP requests increases web server performance by reducing the overhead between the kernel and the web server. NCA provides a sockets interface through which any web server can communicate with NCA with minimal modifications.

In situations where the requested page is retrieved from the in-kernel cache (cache hit), performance improves dramatically. In situations where the requested page is not in the cache (cache miss) and must be retrieved from the web server, performance is also significantly improved.

This product is intended to be run on a dedicated web server. If you run other large processes on a server that runs NCA, problems can result.

NCA provides logging support in that NCA logs all cache hits. This log is stored in binary format to increase performance. The `ncab2clf` command can be used to convert the log from binary format to common log format (CLF).

The Oracle Solaris release includes the following enhancements:

- Sockets interface.
- Support for vectored sendfile, which provides support for AF_NCA. See the [sendfilev\(3EXT\)](#) man page for more information.
- New options for the `ncab2clf` command that support the ability to skip records before a selected date (`-s`) and to process a specified number of records (`-n`).
- `logd_path_name` in `ncalogd.conf` can specify either a raw device, a file, or a combination of the two.
- Support for a web server to open multiple AF_NCA sockets. With multiple sockets, you can have different web servers that run on one server.
- A new configuration file that is called `/etc/nca/ncaport.conf`. The file can be used to manage the IP addresses and ports that NCA uses. Your web server might not provide native support of the AF_NCA socket. If your server lacks this support, use this file and the NCA socket utility library to convert an AF_INET socket to an AF_NCA socket.

Managing Web Cache Servers (Task Map)

The following table describes the procedures that are needed to use NCA.

Task	Description	For Instructions
Planning for NCA	A list of issues to be resolved before you enable the use of NCA.	“Planning for NCA” on page 19
Enabling NCA	Steps to enable in-kernel caching of web pages on a web server.	“How to Enable Caching of Web Pages” on page 20
Disabling NCA	Steps to disable in-kernel caching of web pages on a web server.	“How to Disable Caching of Web Pages” on page 22
Administering NCA logging	Steps to enable or disable the NCA logging process.	“How to Enable or Disable NCA Logging” on page 23
Loading the NCA socket library	Steps to use NCA if the AF_NCA socket is not supported.	“How to Load the Socket Utility Library for NCA” on page 23

Planning for NCA

The following sections cover the issues that need to be resolved before starting the NCA service.

System Requirements for NCA

To support NCA, the system must meet these requirements:

- 256 Mbytes RAM must be installed.
- The Oracle Solaris release must be installed.
- Support for a web server which has native support for NCA or a web server whose startup script has been modified to use the Socket Utility Library for NCA:
 - Apache web server, ships with the Oracle Solaris release
 - Sun Java System Web Server
 - Zeus web server available from Zeus Technology, <http://www.zeus.com>

This product is intended to be run on a dedicated web server. The running of other large processes on a server that runs NCA can cause problems.

NCA Logging

The NCA service can be configured to log web activity. Generally, NCA logging should be enabled if the web server logging is enabled.

Interpositioning Library for Daemon Support of the Door Server

Many web servers use AF_INET sockets. By default, NCA uses AF_NCA sockets. To correct this situation, an interpositioning library is provided. The new library is loaded in front of the standard socket library, `libsocket.so`. The library call `bind()` is interposed by the new library, `ncad_addr.so`. Suppose that the status is enabled in `/etc/nca/ncakmod.conf`. The version of Apache that is included with the Solaris 9 and Solaris 10 release is already set up to call this library. If you are using IWS or Netscape servers, see “[How to Load the Socket Utility Library for NCA](#)” on page 23 to use the new library.

Multiple Instance Support

Systems that have NCA installed often need to run multiple instances of a web server. For instance, a single server might need to support a web server for outside access as well as a web administration server. To separate these servers, you would configure each server to use a separate port.

Administering the Caching of Web Pages (Tasks)

The following sections cover the procedures to enable or disable parts of the service.

▼ How to Enable Caching of Web Pages

1 Become an administrator.

For more information, see “How to Use Your Assigned Administrative Rights” in *Oracle Solaris 11.1 Administration: Security Services*.

2 Register the interfaces.

Type the names of each of the physical interfaces in the `/etc/nca/nca.if` file. See the `nca.if(4)` man page for more information.

```
# cat /etc/nca/nca.if
hme0
hme1
```

Each interface must have an accompanying `hostname.interface-name` file and an entry in `/etc/hosts` file for the contents of `hostname.interface-name`. To start the NCA feature on all interfaces, place an asterisk, `*`, in the `nca.if` file.

3 Enable the `ncakmod` kernel module.

Change the status entry in `/etc/nca/ncakmod.conf` to enabled.

```
# cat /etc/nca/ncakmod.conf
#
# NCA Kernel Module Configuration File
#
status=enabled
httpd_door_path=/system/volatile/nca_httpd_1.door
nca_active=disabled
```

See the `ncakmod.conf(4)` man page for more information.

4 (Optional) Enable NCA logging.

Change the status entry in `/etc/nca/ncalogd.conf` to enabled.

```
# cat /etc/nca/ncalogd.conf
#
# NCA Logging Configuration File
#
status=enabled
logd_path_name="/var/nca/log"
logd_file_size=1000000
```

You can change the location of the log file by changing the path that is indicated by the `logd_path_name` entry. The log file can be a raw device or a file. See the following examples for samples of NCA log file paths. See the `ncalogd.conf(4)` man page for more information about the configuration file.

5 (Optional) Define ports for multiple instance support.

Add the port numbers in the `/etc/nca/ncaport.conf` file. This entry causes NCA to monitor port 80 on all configured IP addresses.

```
# cat /etc/nca/ncaport.conf
#
# NCA Kernel Module Port Configuration File
#
.
.
ncaport=*/80
```

6 For x86 only: Increase the virtual memory size.

Use the `eeprom` command to set the `kernelbase` of the system.

```
# eeprom kernelbase=0x90000000
# eeprom kernelbase
kernelbase=0x90000000
```

The second command verifies that the parameter has been set.

Note – By setting the `kernelbase`, you reduce the amount of virtual memory that user processes can use to less than 3 Gbytes. This restriction means that the system is not ABI compliant. When the system boots, the console displays a message that warns you about noncompliance. Most programs do not actually need the full 3-Gbyte virtual address space. If you have a program that needs more than 3 Gbytes, you need to run the program on a system that does not have NCA enabled.

7 Reboot the server.**Example 2-1 Using a Raw Device as the NCA Log File**

The `logd_path_name` string in `ncaLogd.conf` can define a raw device as the place to store the NCA log file. The advantage to using a raw device is that the service can run faster because the overhead in accessing a raw device is less.

The NCA service tests any raw device that is listed in the file to ensure that no file system is in place. This test ensures that no active file systems are accidentally written over.

To prevent this test from finding a file system, run the following command. This command destroys part of the file system on any disk partition that had been configured as a file system. In this example, `/dev/rds/c0t0d0s7` is the raw device that has an old file system in place.

```
# dd if=/dev/zero of=/dev/rds/c0t0d0s7 bs=1024 count=1
```

After running `dd`, you can then add the raw device to the `ncaLogd.conf` file.

```
# cat /etc/nca/ncaLogd.conf
#
# NCA Logging Configuration File
```

```
#
status=enabled
logd_path_name="/dev/rdisk/c0t0d0s7"
logd_file_size=1000000
```

Example 2-2 Using Multiple Files for NCA Logging

The `logd_path_name` string in `nca.logd.conf` can define multiple targets as the place to store the NCA log file. The second file is used when the first file is full. The following example shows how to select to write to the `/var/nca/log` file first and then use a raw partition.

```
# cat /etc/nca/nca.logd.conf
#
# NCA Logging Configuration File
#
status=enabled
logd_path_name="/var/nca/log /dev/rdisk/c0t0d0s7"
logd_file_size=1000000
```

▼ How to Disable Caching of Web Pages

1 Become an administrator.

For more information, see “How to Use Your Assigned Administrative Rights” in *Oracle Solaris 11.1 Administration: Security Services*.

2 Disable the `ncakmod` kernel module.

Change the status entry in `/etc/nca/ncakmod.conf` to `disabled`.

```
# cat /etc/nca/ncakmod.conf
# NCA Kernel Module Configuration File
#
status=disabled
httpd_door_path=/system/volatile/nca_httpd_1.door
nca_active=disabled
```

See the `ncakmod.conf(4)` man page for more information.

3 Disable NCA logging.

Change the status entry in `/etc/nca/nca.logd.conf` to `disabled`.

```
# cat /etc/nca/nca.logd.conf
#
# NCA Logging Configuration File
#
status=disabled
logd_path_name="/var/nca/log"
logd_file_size=1000000
```

See the `nca.logd.conf(4)` man page for more information.

4 Reboot the server.

▼ How to Enable or Disable NCA Logging

NCA logging can be turned on or turned off, as needed, after NCA has been enabled. See “[How to Enable Caching of Web Pages](#)” on page 20 for more information.

1 Become an administrator.

For more information, see “[How to Use Your Assigned Administrative Rights](#)” in *Oracle Solaris 11.1 Administration: Security Services*.

2 Change NCA logging.

To permanently disable logging, you need to change the status in `/etc/nca/nca.logd.conf` to disabled and reboot the system. See the `nca.logd.conf(4)` man page for more information.

a. Stop logging.

```
# /etc/init.d/ncaLogd stop
```

b. Start logging.

```
# /etc/init.d/ncaLogd start
```

How to Load the Socket Utility Library for NCA

Follow this process only if your web server does not provide native support of the AF_NCA socket.

In the startup script for the web server, add a line that causes the library to be preloaded. The line should resemble the following:

```
LD_PRELOAD=/usr/lib/ncad_addr.so /usr/bin/httpd
```

▼ How to Add a New Port to the NCA Service

1 Become an administrator.

For more information, see “[How to Use Your Assigned Administrative Rights](#)” in *Oracle Solaris 11.1 Administration: Security Services*.

2 Add a new port.

Add a new port entry to `/etc/nca/ncaport.conf`. This example adds port 8888 on IP address 192.168.84.71. See `ncaport.conf(4)` for more information.

```
# cat /etc/nca/ncaport.conf
#
# NCA Kernel Module Port Configuration File
```

```
#  
.  
ncaport=*/80  
ncaport=192.168.84.71/8888
```

3 Start a new web instance.

An address needs to be in the file that contains the NCA port configurations before a web server can use the address for NCA. If the web server is running, it must be restarted after the new address is defined.

Caching Web Pages (Reference)

The following sections cover the files and the components that are needed to use NCA. Also, specifics about how NCA interacts with the web server are included.

NCA Files

You need several files to support the NCA feature. Many of these files are ASCII, but some of the files are binary. The following table lists all of the files.

TABLE 2-1 NCA Files

File Name	Function
/dev/nca	The path name for the NCA device.
/etc/hostname.*	File that lists all physical interfaces that are configured on the server.
/etc/hosts	File that lists all host names that are associated with the server. Entries in this file must match entries in /etc/hostname.* files for NCA to function.
/etc/init.d/ncakmod	Script that starts the NCA server. This script is run when a server is booted.
/etc/init.d/ncaologd	Script that starts NCA logging. This script is run when a server is booted.
/etc/nca/nca.if	File that lists the interfaces on which NCA is run. See the nca.if(4) man page for more information.
/etc/nca/ncakmod.conf	File that lists configuration parameters for NCA. See the ncakmod.conf(4) man page for more information.

TABLE 2-1 NCA Files (Continued)

File Name	Function
/etc/nca/ncalogd.conf	File that lists configuration parameters for NCA logging. See the ncalogd.conf(4) man page for more information.
/etc/nca/ncaport.conf	File that lists the IP addresses and the ports for NCA. See the ncaport.conf(4) man page for more information.
/system/volatile/nca_httpd_1.door	The door path name.
/usr/bin/ncab2clf	Command that is used to convert data in the log file to the common log format. See the ncab2clf(1) man page for more information.
/usr/lib/net/ncaconfd	Command that is used to configure NCA to run on multiple interfaces during boot. See the ncaconfd(1M) man page for more information.
/usr/lib/nca_addr.so	Library that uses AF_NCA sockets instead of AF_INET sockets. This library must be used on web servers that use AF_INET sockets. See the ncad_addr(4) man page for more information.
/var/nca/log	File that holds the log file data. The file is in binary format, so do not edit it.

NCA Architecture

The NCA feature includes the following components.

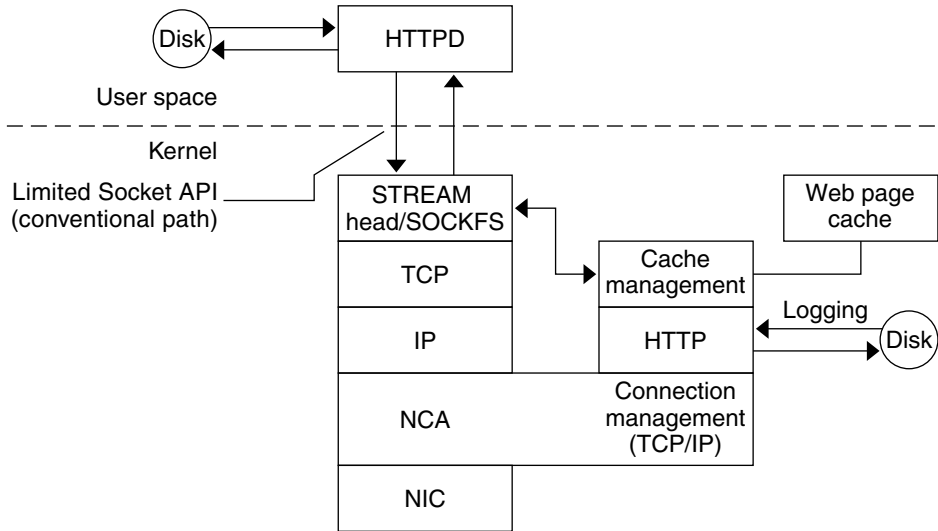
- Kernel module, `ncakmod`
- Web server, `httpd`

The kernel module `ncakmod` maintains the cache of web pages in system memory. The module communicates with a web server, `httpd`, through a sockets interface. The family type is `PF_NCA`.

The kernel module also provides a logging facility that logs all HTTP cache hits. NCA logging writes HTTP data to the disk in binary format. NCA provides a conversion utility for converting binary log files to common log format (CLF).

The following figure shows the flow of data for the conventional path and the path that is used when NCA is enabled.

FIGURE 2-1 Data Flow With the NCA Service



NCA to Httpd Request Flow

The following list shows the request flow between the client and the web server.

1. An HTTP request is made from the client to the web server.
2. If the page is in cache, the in-kernel cache web page is returned.
3. If the page is not in cache, the request goes to the web server to retrieve or update the page.
4. Depending on the HTTP protocol semantics that are used in the response, the page is cached or not. Then the page is returned to the client. If the Pragma: No-cache header is included in the HTTP request, the page is not cached.

Time-Related Services

Keeping system clocks synchronized within a network is required for many databases and authentication services. The following topics are covered in this chapter.

- “Clock Synchronization (Overview)” on page 27
- “Managing Network Time Protocol (Tasks)” on page 28
- “Using Other Time-Related Commands (Tasks)” on page 30
- “Network Time Protocol (Reference)” on page 30

Clock Synchronization (Overview)

The Network Time Protocol (NTP) public domain software from the University of Delaware is included in the Oracle Solaris software. The `ntpd` daemon sets and maintains the system time of day. The `ntpd` daemon is a complete implementation of the version 4 standard, as defined by RFC 5905.

The `ntpd` daemon reads the `/etc/inet/ntp.conf` file at system startup. See the `ntp.conf(4)` man page for information about configuration options.

Remember the following when using NTP in your network:

- The `ntpd` daemon uses minimal system resources.
- An NTP client synchronizes automatically with an NTP server when it boots. If the client becomes unsynchronized, the client resynchronizes again when the client contacts a time server.

Another way to synchronize clocks is to run `rdate` while using `cron`.

About NTP in This Release

The following changes are available in the Oracle Solaris release:

- The `xntpd` daemon, which was based on the version 3 standard, has been replaced with a `ntpd` daemon, which is based on the version 4 standard.
- Additional documentation for the NTP service can be found at `/usr/share/doc/ntp/index.html` on a system running the Oracle Solaris 11 release.

Managing Network Time Protocol (Tasks)

The following procedures show how to set up and use the NTP service.

▼ How to Set Up an NTP Server

1 Become an administrator.

For more information, see [“How to Use Your Assigned Administrative Rights”](#) in *Oracle Solaris 11.1 Administration: Security Services*.

2 Create the `ntp.conf` file.

To ensure proper execution of the `ntpd` daemon, the `ntp.conf` file must first be created. The `ntp.client` file can be used as a template.

```
# cd /etc/inet
# cp ntp.client ntp.conf
```

3 Read the `ntp.server` file.

If needed, add more information to the `ntp.conf` file.

4 Edit the `ntp.conf` file.

Make site specific changes to this file as needed.

5 Start the `ntpd` daemon.

```
# svcadm enable ntp
```

▼ How to Set Up an NTP Client

1 Become an administrator.

For more information, see [“How to Use Your Assigned Administrative Rights”](#) in *Oracle Solaris 11.1 Administration: Security Services*.

2 Create the `ntp.conf` file.

To activate the `ntpd` daemon, the `ntp.conf` file must first be created.

```
# cd /etc/inet
# cp ntp.client ntp.conf
```

3 Edit the `ntp.conf` file.

Make site specific changes to this file as needed.

4 Start the `ntpd` daemon.

```
# svcadm enable ntp
```

▼ How to Enable NTP Logging**1 Become an administrator.**

For more information, see “[How to Use Your Assigned Administrative Rights](#)” in *Oracle Solaris 11.1 Administration: Security Services*.

2 Enable logging.

```
# svccfg -s svc:/network/ntp:default setprop config/verbose_logging = true
```

See the `svccfg(1M)` man page for more information.

3 Update the SMF repository and restart the service.

```
# svcadm refresh svc:/network/ntp:default
# svcadm restart svc:/network/ntp:default
```

4 Verify that logging has been enabled.

```
# svcprop -p config/verbose_logging svc:/network/ntp:default
true
```

▼ How to Display the SMF Properties Associated With the NTP Service**● List the SMF properties.**

- To list all of the properties associated with the NTP service, type:

```
# svcprop svc:/network/ntp:default
```

- To list all of the properties in the `config` property group, type:

```
# svcprop -p config svc:/network/ntp:default
```

Using Other Time-Related Commands (Tasks)

The following procedure can be used to update the current time when ever needed, without having to setup NTP.

▼ How to Synchronize Date and Time From Another System

1 Become an administrator.

For more information, see “[How to Use Your Assigned Administrative Rights](#)” in *Oracle Solaris 11.1 Administration: Security Services*.

2 Reset the date and time to synchronize with another system, by using the `rdate` command.

```
# rdate another-system
another-system    Name of the another system
```

3 Verify that you have reset your system's date correctly by using the `date` command.

The output should show a date and time that matches that of the other system.

Example 3–1 Synchronizing Date and Time From Another System

The following example shows how to use `rdate` to synchronize the date and time of one system with another. In this example, the system `earth`, running several hours behind, is reset to match the date and time of the server `starbug`.

```
earth# date
Tue Jun  5 11:08:27 MDT 2001
earth# rdate starbug
Tue Jun  5 14:06:37 2001
earth# date
Tue Jun  5 14:06:40 MDT 2001
```

Network Time Protocol (Reference)

The following files are needed for the NTP service to run.

TABLE 3–1 NTP Files

File Name	Function
<code>/etc/inet/ntp.conf</code>	Lists configuration options for NTP.

TABLE 3-1 NTP Files (Continued)

File Name	Function
/etc/inet/ntp.client	Sample configuration file for NTP clients and servers.
/etc/inet/ntp.leap	Leap seconds configuration file.
/etc/inet/ntp.keys	Contains the NTP authentication keys.
/etc/inet/ntp.server	Contains additional configuration instructions for some NTP servers.
/usr/lib/inet/ntpd	NTP daemon. See the <code>ntpd(1M)</code> man page for more information.
/usr/sbin/ntp-keygen	Program used to generate public and private keys for NTP. See the <code>ntp-keygen(1M)</code> man page for more information.
/usr/sbin/ntpdc	NTP query program for the <code>ntpd</code> daemon. See the <code>ntpdc(1M)</code> man page for more information.
/usr/sbin/ntpdate	Utility to set the local date and time, based on NTP. See the <code>ntpdate(1M)</code> man page for more information.
/usr/sbin/ntpq	NTP query program. See the <code>ntpq(1M)</code> man page for more information.
/var/ntp/ntpstats	Directory for holding NTP statistics.
/usr/sbin/ntptime	Program to display or set the kernel time variables. See the <code>ntp(1M)</code> man page for more information.
/usr/sbin/ntptrace	Program to trace NTP hosts back to the master NTP server. See the <code>ntp(1M)</code> man page for more information.
/var/ntp/ntp.drift	Sets the initial frequency offset on NTP servers.

Index

D

date, synchronizing with another system, 30
/dev/nca file, NCA and, 24
disabling
 NCA, 22
 NCA logging, 23
drift file, 31

E

enabling
 NCA, 20–22
 NCA logging, 23
/etc/hostname.*interface* file, NCA and, 24
/etc/hosts file, 24
/etc/inet/ntp.client file, 31
/etc/inet/ntp.conf file, 30
/etc/inet/ntp.keys file, 31
/etc/inet/ntp.leap file, 31
/etc/inet/ntp.server file, 31
/etc/init.d/ncakmod script, 24
/etc/init.d/ncalogd script, 24
/etc/nca/nca.if file, 24
/etc/nca/ncakmod.conf file, 24
/etc/nca/ncalogd.conf file, 25
/etc/nca/ncaport.conf file, 25

H

hostname.*interface* file, NCA and, 24

hosts file, 24

httpd command, NCA and, 25–26

K

keys file, NTP, 31

L

leap file, NTP, 31
list of tasks, NCA, 18
log file, for NCA, 25

N

NCA

 architecture, 25–26
 changing logging, 23
 disabling, 22
 enabling, 20–22
 files description, 24
 httpd and, 25–26
 kernel module, 25–26
 list of tasks, 18
 new features, 18
 overview, 17–18
 requirements, 19
 socket library, 23
 sockets, 19
nca_addr.so library, 25

nca_httpd_1.door file, 25
nca.if file, 20, 24
NCA log file, 25
ncab2clf command, 25
ncaconfd command, 25
ncakmod.conf file, 20, 22, 24
ncakmod module, 25–26
ncalogd.conf file, 20, 22, 25
ncalogd script, 24
ncaport.conf file, 25
Network Cache and Accelerator, *See* NCA
NTP client, setting up, 28–29
ntp.conf file, 28, 29
NTP files, 30
ntp-keygen command, 31
NTP server, setting up, 28
ntpd daemon, 28, 29, 31
ntpdate command, 31
ntpd command, 31
ntpq command, 31
ntpstats directory, 31
ntptime command, 31
ntptrace command, 31

P

Perl 5, introduction, 14–15

R

rdate command, 30

S

sockets, NCA and, 19
synchronizing time, with another system, 30
/system/volatile/nca_httpd_1.door file, 25

T

time
 synchronizing with another system, 30

U

/usr/bin/ncab2clf command, 25
/usr/lib/inet/ntpd daemon, description, 31
/usr/lib/nca_addr.so library, 25
/usr/lib/net/ncaconfd command, 25
/usr/ntp/ntpstats directory, 31
/usr/sbin/ntp-keygen command, 31
/usr/sbin/ntpdate command, 31
/usr/sbin/ntpd command, 31
/usr/sbin/ntpq command, 31
/usr/sbin/ntptime command, 31
/usr/sbin/ntptrace command, 31

V

/var/nca/log file, 25
/var/ntp/ntp.drift file, 31