Name Server Operations Guide for BIND

Release 4.3

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1. Introduction

The Berkeley Internet Name Domain (BIND) Server implements the DARPA Internet name server for the UNIX† operating system. A name server is a network service that enables clients to name resources or objects and share this information with other objects in the network. This in effect is a distributed data base system for objects in a computer network. BIND is fully intergrated into 4.3BSD network programs for use in storing and retrieving host names and address. The system administrator can configure the system to use BIND as a replacement to the original host table lookup of information in the network hosts file */etc/hosts*. The default configuration for 4.3BSD uses BIND.

2. Building A System with a Name Server

BIND is comprised of two parts. One is the user interface called the *resolver* which consists of a group of routines that reside in the C library */lib/libc.a*. Second is the actual server called *named*. This is a daemon that runs in the background and services queries on a given network port. The standard port for UDP and TCP is specified in */etc/services*.

2.1. Resolver Routines in libc

When building your 4.3BSD system you may either build the C library to use the name server resolver routines or use the host table lookup routines to do host name and address resolution. The default resolver for 4.3BSD uses the name server.

Building the C library to use the name server changes the way *gethostbyname* (3N), *gethostbyaddr* (3N), and *sethostent* (3N) do their functions. The name server renders *gethostent* (3N) obsolete, since it has no concept of a next line in the database. These library calls are built with the resolver routines needed to query the name server.

The *resolver* is comprised of a few routines that build query packets and exchange them with the name server.

Before building the C library, set the variable *HOSTLOOKUP* equal to *named* in */usr/src/lib/libc/Makefile*. You then make and install the C library and compiler and then compile the rest of the 4.3BSD system. For more information see section 6.6 of ‘‘Installing and Operating

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4.3BSD on the VAX‡''.

2.2. The Name Service

The basic function of the name server is to provide information about network objects by answering queries. The specifications for this name server are defined in RFC882, RFC883, RFC973 and RFC974. These documents can be found in */usr/src/etc/named/doc* in 4.3BSD or *ftp*ed from sri-nic.arpa. It is also recommeded that you read the related manual pages, *named* (8), *resolver* (3), and *resolver* (5).

The advantage of using a name server over the host table lookup for host name resolution is to avoid the need for a single centralized clearinghouse for all names. The authority for this information can be delegated to the different organizations on the network responsible for it.

The host table lookup routines require that the master file for the entire network be maintained at a central location by a few people. This works fine for small networks where there are only a few machines and the different organizations responsible for them cooperate. But this does not work well for large networks where machines cross organizational boundaries.

With the name server, the network can be broken into a hierarchy of domains. The name space is organized as a tree according to organizational or administrative boundaries. Each node, called a *domain*, is given a label, and the name of the domain is the concatenation of all the labels of the domains from the root to the current domain, listed from right to left separated by dots. A label need only be unique within its domain. The whole space is partitioned into several areas called *zones*, each starting at a domain and extending down to the leaf domains or to domains where other zones start. Zones usually represent administrative boundaries. An example of a host address for a host at the University of California, Berkeley would look as follows:

monet.*Berkeley*.*EDU*

The top level domain for educational organizations is EDU; Berkeley is a subdomain of EDU and monet is the name of the host.

3. Types of Servers

There are three types of servers, Master, Caching and Remote.

3.1. Master Servers

A Master Server for a domain is the authority for that domain. This server maintains all the data corresponding to its domain. Each domain should have at least two master servers, a primary master and some secondary masters to provide backup service if the primary is unavailable or overloaded. A server may be a master for multiple domains, being primary for some domains and secondary for others.

3.1.1. Primary

A Primary Master Server is a server that loads its data from a file on disk. This server may also delegate authority to other servers in its domain.

3.1.2. Secondary

A Secondary Master Server is a server that is delegated authority and receives its data for a domain from a primary master server. At boot time, the secondary server requests all the data for the given zone from the primary master server. This server then periodically checks with the primary server to see if it needs to update its data.

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3.2. Caching Only Server

All servers are caching servers. This means that the server caches the information that it receives for use until the data expires. A *Caching Only Server* is a server that is not authoritative for any domain. This server services queries and asks other servers, who have the authority, for the information needed. All servers keep data in their cache until the data expires, based on a time to live field attached to the data when it is received from another server.

3.3. Remote Server

A Remote Server is an option given to people who would like to use a name server on their workstation or on a machine that has a limited amount of memory and CPU cycles. With this option you can run all of the networking programs that use the name server without the name server running on the local machine. All of the queries are serviced by a name server that is running on another machine on the network.

4. Setting up Your Own Domain

When setting up a domain that is going to be on a public network the site administrator should contact the organization in charge of the network and request the appropriate domain registration form. An organization that belongs to multiple networks (such as *CSNET*, *DARPA Internet* and *BITNET*) should register with only one network.

The contacts are as follows:

4.1. DARPA Internet

Sites that are already on the DARPA Internet and need information on setting up a domain should contact HOSTMASTER@SRI-NIC.*ARPA*. You may also want to be placed on the BIND mailing list, which is a mail group for people on the DARPA Internet running BIND. The group discusses future design decisions, operational problems, and other related topic. The address to request being placed on this mailing list is:

bind-request@ucbarpa.Berkeley.EDU.

4.2. CSNET

A *CSNET* member organization that has not registered its domain name should contact the *CSNET* Coordination and Information Center (*CIC*) for an application and information about setting up a domain.

An organization that already has a registered domain name should keep the *CIC* informed about how it would like its mail routed. In general, the *CSNET* relay will prefer to send mail via *CSNET* (as opposed to *BITNET* or the *Internet*) if possible. For an organization on multiple networks, this may not always be the preferred behavior. The *CIC* can be reached via electronic mail at *cic@sh.cs.net*, or by phone at (617) 497-2777.

4.3. BITNET

If you are on the BITNET and need to set up a domain, contact INFO@BITNIC.

5. Files

The name server uses several files to load its data base. This section covers the files and their formats needed for *named*.

5.1. Boot File

This is the file that is first read when *named* starts up. This tells the server what type of server it is, which zones it has authority over and where to get its initial data. The default location for this

file is */etc/named.boot*. However this can be changed by setting the *BOOTFILE* variable when you compile *named* or by specifying the location on the command line when *named* is started up.

5.1.1. Domain

The line in the boot file that designates the default domain for the server looks as follows:

domain Berkeley.Edu

The name server uses this information when it receives a query for a name without a ''.''. When it receives one of these queries, it appends the name in the second field to the query name.

5.1.2. Primary Master

The line in the boot file that designates the server as a primary server for a zone looks as follows:

primary Berkeley.Edu /etc/ucbhosts

The first field specifies that the server is a primary one for the zone stated in the second field. The third field is the name of the file from which the data is read.

5.1.3. Secondary Master

The line for a secondary server is similar to the primary except for the word secondary and the third field.

secondary Berkeley.Edu 128.32.0.10 128.32.0.4

The first field specifies that the server is a secondary master server for the zone stated in the second field. The rest of the line, lists the network addresses for the name servers that are primary for the zone. The secondary server gets its data across the network from the listed servers. Each server is tried in the order listed until it successfully receives the data from a listed server.

5.1.4. Caching Only Server

You do not need a special line to designate that a server is a caching server. What denotes a caching only server is the absence of authority lines, such as *secondary* or *primary* in the boot file.

All servers should have a line as follows in the boot file to prime the name servers cache:

cache . /etc/named.ca

For information on cache file see section on *Cache Initialization.*

5.1.5. Remote Server

To set up a host that will use a remote server instead of a local server to answer queries, the file */etc/resolv.conf* needs to be created. This file designates the name servers on the network that should be sent queries. It is not advisable to create this file if you have a local server running. If this file exists it is read almost every time *gethostbyname()* or *gethostbyaddr()* is called.

5.2. Cache Initialization

5.2.1. named.ca

The name server needs to know the server that is the authoritative name server for the network. To do this we have to prime the name server's cache with the address of these higher authorities. The location of this file is specified in the boot file. This file uses the Standard Resource Record Format covered further on in this paper.

5.3. Domain Data Files

There are three standard files for specifying the data for a domain. These are *named.local*, *hosts* and *host.rev*. These files use the Standard Resource Record Format covered later in this paper.

5.3.1. named.local

This file specifies the address for the local loopback interface, better known as *localhost* with the network address 127.0.0.1. The location of this file is specified in the boot file.

5.3.2. hosts

This file contains all the data about the machines in this zone. The location of this file is specified in the boot file.

5.3.3. hosts.rev

This file specifies the IN-ADDR.ARPA domain. This is a special domain for allowing address to name mapping. As internet host addresses do not fall within domain boundaries, this special domain was formed to allow inverse mapping. The IN-ADDR.ARPA domain has four labels preceding it. These labels correspond to the 4 octets of an Internet address. All four octets must be specified even if an octets is zero. The Internet address 128.32.0.4 is located in the domain 4.0.32.128.IN-ADDR.ARPA. This reversal of the address is awkward to read but allows for the natural grouping of hosts in a network.

5.4. Standard Resource Record Format

The records in the name server data files are called resource records. The Standard Resource Record Format (RR) is specified in RFC882 and RFC973. The following is a general description of these records:

{name} {ttl} addr-class Record Type Record Specific data

Resource records have a standard format shown above. The first field is always the name of the domain record. For some RR's the name may be left blank; in that case it takes on the name of the previous RR. The second field is an optional time to live field. This specifies how long this data will be stored in the data base. By leaving this field blank the default time to live is specified in the *Start Of Authority* resource record (see below). The third field is the address class; there are currently two classes: *IN* for internet addresses and *ANY* for all address classes. The fourth field states the type of the resource record. The fields after that are dependent on the type of the RR. Case is preserved in names and data fields when loaded into the name server. All comparisons and lookups in the name server data base are case insensitive.

The following characters have special meanings:

. A free standing dot in the name field refers to the current domain.

@ A free standing @ in the name field denotes the current origin.

.. Two free standing dots represent the null domain name of the root when used in the name field.

\X Where X is any character other than a digit (0-9), quotes that character so that its special meaning does not apply. For example, ''\.'' can be used to place a dot character in a label.

\DDDWhere each D is a digit, is the octet corresponding to the decimal number described by DDD. The resulting octet is assumed to be text and is not checked for special meaning.

( ) Parentheses are used to group data that crosses a line. In effect, line terminations are not recognized within parentheses.

; Semicolon starts a comment; the remainder of the line is ignored.

* An asterisk signifies wildcarding.

Most resource records will have the current origin appended to names if they are not terminated by a ‘‘**.**’’. This is useful for appending the current domain name to the data, such as machine names, but may cause problems where you do not want this to happen. A good rule of thumb is that, if the name is not in of the domain for which you are creating the data file, end the name with a ‘‘**.**’’.

5.4.1. $INCLUDE

An include line begins with $INCLUDE, starting in column 1, and is followed by a file name. This feature is particularly useful for separating different types of data into multiple files. An example would be:

```
$INCLUDE /usr/named/data/mailboxs
```

The line would be interpreted as a request to load the file */usr/named/data/mailboxes*. The $INCLUDE command does not cause data to be loaded into a different zone or tree. This is simply a way to allow data for a given zone to be organized in separate files. For example, mailbox data might be kept separately from host data using this mechanism.

5.4.2. $ORIGIN

The origin is a way of changing the origin in a data file. The line starts in column 1, and is followed by a domain origin. This is useful for putting more then one domain in a data file.

5.4.3. SOA - Start Of Authority

name	*{ttl}*	*addr-class*	*SOA*	*Origin*	*Person in charge*
@		IN	SOA	ucbvax**.**Berkeley**.**Edu**.**	kjd**.**ucbvax**.**Berkeley**.**Edu**.** (
			1 . 1	; Serial	
			3600	; Refresh	
			300	; Retry	
			3600000	; Expire	
			3600)	; Minimum	

The *Start of Authority*, *SOA*, record designates the start of a zone. The name is the name of the zone. Origin is the name of the host on which this data file resides. Person in charge is the mailing address for the person responsible for the name server. The serial number is the version number of this data file, this number should be incremented whenever a change is made to the data. The name server cannot handle numbers over 9999 after the decimal point. The refresh indicates how often, in seconds, a secondary name servers is to check with the primary name server to see if an update is needed. The retry indicates how long, in seconds, a secondary server is to retry after a failure to check for a refresh. Expire is the upper limit, in seconds, that a secondary name server is to use the data before it expires for lack of getting a refresh. Minimum is the default number of seconds to be used for the time to live field on resource records. There should only be one *SOA* record per zone.

5.4.4. NS - Name Server

{name}	*{ttl}*	*addr-class*	*NS*	*Name servers name*
		IN	NS	ucbarpa **.** Berkeley **.** Edu**.**

The *Name Server* record, *NS*, lists a name server responsible for a given domain. The first name field lists the domain that is serviced by the listed name server. There should be one *NS* record for each Primary Master server for the domain.

5.4.5. A - Address

{name}	*{ttl}*	*addr-class*	*A*	*address*

```
ucbarpa         IN      A    128.32.0.4
                IN      A    10.0.0.78
```

The *Address* record, *A*, lists the address for a given machine. The name field is the machine name and the address is the network address. There should be one *A* record for each address of the machine.

5.4.6. HINFO - Host Information

```
{name}    {ttl}    addr-class    HINFO     Hardware      OS
                   ANY           HINFO     VAX-11/780    UNIX
```

Host Information resource record, *HINFO*, is for host specific data. This lists the hardware and operating system that are running at the listed host. It should be noted that only a single space separates the hardware info and the operating system info. If you want to include a space in the machine name you must quote the name. Host information is not specific to any address class, so *ANY* may be used for the address class. There should be one *HINFO* record for each host.

5.4.7. WKS - Well Known Services

```
{name}    {ttl}    addr-class    WKS     address        protocol    list of services
                   IN            WKS     128.32.0.10    UDP         who route timed domain
                   IN            WKS     128.32.0.10    TCP         ( echo telnet
                                                                     discard sunrpc sftp
                                                                     uucp-path systat daytime
                                                                     netstat qotd nntp
                                                                     link chargen ftp
                                                                     auth time whois mtp
                                                                     pop rje finger smtp
                                                                     supdup hostnames
                                                                     domain
                                                                     nameserver )
```

The *Well Known Services* record, *WKS*, describes the well known services supported by a particular protocol at a specified address. The list of services and port numbers come from the list of services specified in */etc/services.* There should be only one *WKS* record per protocol per address.

5.4.8. CNAME - Canonical Name

```
aliases     {ttl}    addr-class    CNAME     Canonical name
ucbmonet             IN            CNAME     monet
```

Canonical Name resource record, *CNAME*, specifies an alias for a canonical name. An alias should be unique and all other resource records should be associated with the canonical name and not with the alias. Do not create an alias and then use it in other resource records.

5.4.9. PTR - Domain Name Pointer

```
name    {ttl}    addr-class    PTR     real name
7.0              IN            PTR     monet.Berkeley.Edu.
```

A *Domain Name Pointer* record, *PTR*, allows special names to point to some other location in the domain. The above example of a *PTR* record is used in setting up reverse pointers for the special *IN-ADDR.ARPA* domain. This line is from the example *hosts.rev* file. *PTR* names should be unique to the zone.

5.4.10. MB - Mailbox

```
name    {ttl}    addr-class    MB    Machine
```

```
miriam          IN          MB    vineyd.DEC.COM.
```

MB is the *Mailbox* record. This lists the machine where a user wants to receive mail. The name field is the users login; the machine field denotes the machine to which mail is to be delivered. Mail Box names should be unique to the zone.

5.4.11. MR - Mail Rename Name

name	*{ttl}*	*addr-class*	*MR*	*corresponding MB*
Postmistress		IN	MR	miriam

Main Rename, MR, can be used to list aliases for a user. The name field lists the alias for the name listed in the fourth field, which should have a corresponding *MB* record.

5.4.12. MINFO - Mailbox Information

name	*{ttl}*	*addr-class*	*MINFO*	*requests*	*maintainer*
BIND		IN	MINFO	BIND-REQUEST	kjd.Berkeley.Edu.

Mail Information record, *MINFO*, creates a mail group for a mailing list. This resource record is usually associated with a mail group *Mail Group*, but may be used with a *Mail Box* record. The *name* specifies the name of the mailbox. The *requests* field is where mail such as requests to be added to a mail group should be sent. The *maintainer* is a mailbox that should receive error messages. This is particularly appropriate for mailing lists when errors in members names should be reported to a person other than the sender.

5.4.13. MG - Mail Group Member

{mail group name}	*{ttl}*	*addr-class*	*MG*	*member name*
		IN	MG	Bloom

Mail Group, MG lists members of a mail group.

An example for setting up a mailing list is as follows:

```
Bind        IN      MINFO       Bind-Request            kjd.Berkeley.Edu.
            IN      MG          Ralph.Berkeley.Edu.
            IN      MG          Zhou.Berkeley.Edu.
            IN      MG          Painter.Berkeley.Edu.
            IN      MG          Riggle.Berkeley.Edu.
            IN      MG          Terry.pa.Xerox.Com.
```

5.4.14. MX - Mail Exchanger

name	*{ttl}*	*addr-class*	*MX*	*preference value*	*mailer exchanger*
Munnari.OZ.AU.		IN	MX	0	Seismo.CSS.GOV.
*.IL.		IN	MX	0	RELAY.CS.NET.

Main Exchanger records, *MX*, are used to specify a machine that knows how to deliver mail to a machine that is not directly connected to the network. In the first example, above, Seismo.CSS.GOV. is a mail gateway that knows how to deliver mail to Munnari.OZ.AU. but other machines on the network can not deliver mail directly to Munnari. These two machines may have a private connection or use a different transport medium. The preference value is the order that a mailer should follow when there is more then one way to deliver mail to a single machine. See RFC974 for more detailed information.

Wildcard names containing the character ‘‘*’’ may be used for mail routing with *MX* records. There are likely to be servers on the network that simply state that any mail to a domain is to be routed through a relay. Second example, above, all mail to hosts in the domain IL is routed through RELAY.CS.NET. This is done by creating a wildcard resource record, which states that *.IL has an *MX* of RELAY.CS.NET.

5.5. Sample Files

The following section contains sample files for the name server. This covers example boot files for the different types of servers and example domain data base files.

5.5.1. Boot File

5.5.1.1. Primary Master Server

```
;
; Boot file for Primary Master Name Server
;

; type      domain                source file or host
;
domain      Berkeley.Edu
primary     Berkeley.Edu          /etc/ucbhosts
cache       .                     /etc/named.ca
primary     32.128.in-addr.arpa   /etc/ucbhosts.rev
primary     0.0.127.in-addr.arpa  /etc/named.local
```

5.5.1.2. Secondary Master Server

```
;
; Boot file for Primary Master Name Server
;

; type      domain                source file or host
;
domain      Berkeley.Edu
secondary   Berkeley.Edu          128.32.0.4 128.32.0.10 128.32.136.22
cache       .                     /etc/named.ca
secondary   32.128.in-addr.arpa   128.32.0.4 128.32.0.10 128.32.136.22
primary     0.0.127.in-addr.arpa  /etc/named.local
```

5.5.1.3. Caching Only Server

```
;
; Boot file for Primary Master Name Server
;

; type      domain                source file or host
;
domain      Berkeley.Edu
cache       .                     /etc/named.ca
primary     0.0.127.in-addr.arpa  /etc/named.local
```

5.5.2. Remote Server

5.5.2.1. /etc/resolv.conf

```
domain Berkeley.Edu
nameserver 128.32.0.4
nameserver 128.32.0.10
```

5.5.3. named.ca

```
;
; Initial cache data for root domain servers.
;
.                       99999999    IN    NS    USC-ISIC.ARPA.
                        99999999    IN    NS    USC-ISIB.ARPA.
                        99999999    IN    NS    BRL-AOS.ARPA.
                        99999999    IN    NS    SRI-NIC.ARPA.
;  Prep the cache (hotwire the addresses).
SRI-NIC.ARPA.       99999999    IN    A     10.0.0.51
USC-ISIB.ARPA.      99999999    IN    A     10.3.0.52
USC-ISIC.ARPA.      99999999    IN    A     10.0.0.52
BRL-AOS.ARPA.       99999999    IN    A     128.20.1.2
BRL-AOS.ARPA.       99999999    IN    A     192.5.22.82
```

5.5.4. named.local

```
@       IN      SOA     ucbvax.Berkeley.Edu. kjd.ucbvax.Berkeley.Edu. (
                        1       ; Serial
                        3600    ; Refresh
                        300     ; Retry
                        3600000 ; Expire
                        3600 )  ; Minimum
        IN      NS      ucbvax.Berkeley.Edu.
1       IN      PTR     localhost.
```

5.5.5. Hosts

```
;
;   @(#)ucb-hosts   1.1   (berkeley)   86/02/05
;
@               IN      SOA     ucbvax.Berkeley.Edu. kjd.monet.Berkeley.Edu. (
                                        1.1     ; Serial
                                        3600    ; Refresh
                                        300     ; Retry
                                        3600000 ; Expire
                                        3600 )  ; Minimum
                IN      NS      ucbarpa.Berkeley.Edu.
                IN      NS      ucbvax.Berkeley.Edu.
localhost       IN      A       127.1
ucbarpa         IN      A       128.32.4
                IN      A       10.0.0.78
                ANY     HINFO   VAX-11/780 UNIX
arpa            IN      CNAME   ucbarpa
ernie           IN      A       128.32.6
                ANY     HINFO   VAX-11/780 UNIX
ucbernie        IN      CNAME   ernie
monet           IN      A       128.32.7
                IN      A       128.32.130.6
                ANY     HINFO   VAX-11/750 UNIX
ucbmonet        IN      CNAME   monet
ucbvax          IN      A       10.2.0.78
                IN      A       128.32.10
                ANY     HINFO   VAX-11/750 UNIX
                IN      WKS     128.32.0.10 UDP syslog route timed domain
                IN      WKS     128.32.0.10 TCP ( echo telnet
                                discard sunrpc sftp
                                uucp-path systat daytime
                                netstat qotd nntp
                                link chargen ftp
                                auth time whois mtp
                                pop rje finger smtp
                                supdup hostnames
                                domain
                                nameserver )
vax             IN      CNAME   ucbvax
toybox          IN      A       128.32.131.119
                ANY     HINFO   Pro350 RT11
toybox          IN      MX      0  monet.Berkeley.Edu
miriam          ANY     MB      vineyd.DEC.COM.
postmistress    ANY     MR      Miriam
Bind            ANY     MINFO   Bind-Request kjd.Berkeley.Edu.
                ANY     MG      Ralph.Berkeley.Edu.
                ANY     MG      Zhou.Berkeley.Edu.
                ANY     MG      Painter.Berkeley.Edu.
                ANY     MG      Riggle.Berkeley.Edu.
                ANY     MG      Terry.pa.Xerox.Com.
```

5.5.6. host.rev

```
;
;   @(#)ucb-hosts.rev   1.1   (Berkeley)   86/02/05
;
@       IN    SOA     ucbvax.Berkeley.Edu. kjd.monet.Berkeley.Edu. (
                      1.1     ; Serial
                      3600    ; Refresh
                      300     ; Retry
                      3600000 ; Expire
                      3600 )  ; Minimum
        IN    NS      ucbarpa.Berkeley.Edu.
        IN    NS      ucbvax.Berkeley.Edu.
4.0     IN    PTR     ucbarpa.Berkeley.Edu.
6.0     IN    PTR     ernie.Berkeley.Edu.
7.0     IN    PTR     monet.Berkeley.Edu.
10.0    IN    PTR     ucbvax.Berkeley.Edu.
6.130   IN    PTR     monet.Berkeley.Edu.
```

6. Domain Management

This section contains information for starting, controlling and debugging *named*.

6.1. /etc/rc.local

The hostname should be set to the full domain style name in */etc/rc.local* using *hostname (1)*. The following entry should be added to */etc/rc.local* to start up *named* at system boot time:

```
if [ -f /etc/named ]; then
        /etc/named [options] & echo -n ' named'      >/dev/console
fi
```

This usually directly follows the lines that start *syslogd*. **Do Not** attempt to run *named* from *inetd*. This will continuously restart the name server and defeat the purpose of having a cache.

6.2. /etc/named.pid

When *named* is successfully started up it writes its process id into the file */etc/named.pid*. This is useful to programs that want to send signals to *named*. The name of this file may be changed by defining *PIDFILE* to the new name when compiling *named*.

6.3. /etc/hosts

The *gethostbyname ()* library call can detect if *named* is running. If it is determined that *named* is not running it will look in */etc/hosts* to resolve an address. This option was added to allow *ifconfg (8C)* to configure the machines local interfaces and to enable a system manager to access the network while the system is in single user mode. It is advisable to put the local machines interface addresses and a couple of machine names and address in */etc/hosts* so the system manager can rcp files from another machine when the system is in single user mode. The format of */etc/host* has not changed. See *hosts (5)* for more information. Since the process of reading */etc/hosts* is slow, it is not advised to use this option when the system is in multi user mode.

6.4. Signals

There are several signals that can be sent to the *named* process to have it do tasks without restarting the process.

6.4.1. Reload

SIGHUP - Causes *named* to read *named.boot* and reload the database. All previously cached data is lost. This is useful when you have made a change to a data file and you want *named*'s internal database to reflect the change.

6.4.2. Debugging

When *named* is running incorrectly, look first in */usr/adm/messages* and check for any messages logged by *syslog*. Next send it a signal to see what is happening.

SIGINT - Dumps the current data base and cache to */usr/tmp/named_dump.db* This should give you an indication to whether the data base was loaded correctly. The name of the dump file may be changed by defining *DUMPFILE* to the new name when compiling *named*.

Note: the following two signals only work when *named* is built with *DEBUG* defined.

SIGUSR1 - Turns on debugging. Each following USR1 increments the debug level. The output goes to */usr/tmp/named.run* The name of this debug file may be changed by defining *DEBUGFILE* to the new name before compiling *named*.

SIGUSR2 - Turns off debugging completely.

For more detailed debugging, define DEBUG when compiling the resolver routines into */lib/libc.a*.

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