Chapter 4

Configuring The IRIX Operating System

This chapter provides information on the settings and files that need to be set and edited to customize your system for use. It is not necessary to change all listed settings and names on all systems. You are free to customize your systems as much or as little as necessary to suit your purposes. The following topics are covered in this chapter.

- "Checking System Configuration" on page 59 provides information on determining what hardware and software is installed and active and reporting the current system software settings.
- "Altering the System Configuration" on page 67 provides information on making changes to basic system settings and options.

Checking System Configuration

IRIX provides two commands that allow you to check your system hardware and software configurations. The *hinv*(1M) and *versions*(1M) commands display the hardware and software inventories, respectively. Other commands are presented that report on graphics hardware, the system name, configured printers, and basic system settings.

Checking Installed Hardware With hinv

The *hinv* command displays the workstation or server's hardware inventory. This command can be run from the Command (PROM) Monitor or from your system shell prompt. Pertinent information such as the processor type, amount of main memory, and all disks, tape drives, or other devices is included. A sample *hinv* output for a typical workstation is:

```
1 100 MHZ IP22 Processor
FPU: MIPS R4010 Floating Point Chip Revision: 0.0
CPU: MIPS R4000 Processor Chip Revision: 3.0
On-board serial ports: 2
On-board bi-directional parallel port
```

```
Data cache size: 8 Kbytes
Instruction cache size: 8 Kbytes
Secondary unified instruction/data cache size: 1 Mbyte
Main memory size: 64 Mbytes
Vino video: unit 1, revision 1
Iris Audio Processor: version A2 revision 4.1.0
Integral Ethernet: ec0, version 1
CDROM: unit 4 on SCSI controller 0
Disk drive: unit 1 on SCSI controller 0
Integral SCSI controller 0: Version WD33C93B, revision D
Graphics board: Indy 24-bit
```

A sample *hinv* output for a major server is:

```
12 200 MHZ IP19 Processors
CPU: MIPS R4400 Processor Chip Revision: 6.0
FPU: MIPS R4010 Floating Point Chip Revision: 0.0
Data cache size: 16 Kbytes
Instruction cache size: 16 Kbytes
Secondary unified instruction/data cache size: 4 Mbytes
Main memory size: 512 Mbytes, 4-way interleaved
I/O board, Ebus slot 11: IO4 revision 1
I/O board, Ebus slot 13: IO4 revision 1
I/O board, Ebus slot 15: IO4 revision 1
Integral EPC serial ports: 4
Integral Ethernet controller: et2, Ebus slot 11
Integral Ethernet controller: et1, Ebus slot 13
Integral Ethernet controller: et0, Ebus slot 15
XPI FDDI controller: xpi0, slot 15, adapter 6, firmware version
9506010800, DAS
XPI FDDI controller: xpi1, slot 15, adapter 6, firmware version
9506010800, DAS
EPC external interrupts
Integral SCSI controller 131: Version WD33C95A, single ended, revision
0
Integral SCSI controller 130: Version WD33C95A, single ended, revision
0
Integral SCSI controller 111: Version WD33C95A, single ended, revision
0
Integral SCSI controller 110: Version WD33C95A, single ended, revision
0
Integral SCSI controller 1: Version WD33C95A, differential, revision 0
Disk drive: unit 1 on SCSI controller 1
Integral SCSI controller 0: Version WD33C95A, differential, revision 0
Disk drive: unit 5 on SCSI controller 0
```

```
Disk drive: unit 4 on SCSI controller 0
Disk drive: unit 3 on SCSI controller 0
Disk drive: unit 2 on SCSI controller 0
Integral SCSI controller 4: Version SCIP/WD33C95A
Integral SCSI controller 3: Version SCIP/WD33C95A
Disk drive: unit 5 on SCSI controller 3
Disk drive: unit 4 on SCSI controller 3
Disk drive: unit 3 on SCSI controller 3
Disk drive: unit 2 on SCSI controller 3
Integral SCSI controller 2: Version SCIP/WD33C95A
Disk drive: unit 5 on SCSI controller 2
Disk drive: unit 4 on SCSI controller 2
Disk drive: unit 3 on SCSI controller 2
Disk drive: unit 2 on SCSI controller 2
CC synchronization join counter
Integral EPC parallel port: Ebus slot 11
Integral EPC parallel port: Ebus slot 13
Integral EPC parallel port: Ebus slot 15
VME bus: adapter 0 mapped to adapter 61
VME bus: adapter 61
```

If a piece of peripheral hardware installed on your system does not appear in the *hinv* output, it may or may not be an indication of trouble with your hardware. Some peripherals connected to the system by a board on a VME bus will not be identified when running *hinv* from the Command Monitor. First, you should invoke *hinv* from a system shell prompt; If your peripheral is still not recognized, attempt to reseat the board or device in its socket and check that it is using the correct SCSI address. If this does not relieve the problem, the hardware itself may be defective. Note also that most devices are not recognized by *hinv* until the *MAKEDEV*(1M) command has been run after their installation.

Checking Installed Software With versions

The *versions* command gives you an inventory of software packages that have been installed using *inst*(1M). This command can only be run at the system shell prompt, not from the Command Monitor. Software installed by other means is not included in the *versions* output. Along with the names of the software products, the release revision level numbers are displayed. By default, the output of *versions* includes all the products and their subsystems and is typically several hundred lines long, so it is often convenient to redirect the output to a file that you can view at your convenience. For a more general

look at the products you have installed, without the list of specific subsystems, use the **-b** (brief) flag.

A sample *versions -b* output reads as follows (an actual listing will be much longer):

```
I = Installed, R = Removed
   Name        Date      Description
I  4Dwm        04/29/93  4Dwm -- Default Window Manager, 5.3
I  demos       04/29/93  Graphics Demonstration Program, 5.3
I  desktop_eoe 04/29/93  Desktop Environment, 5.3
I  dps_eoe     04/29/93  Display PostScript, 2.0
I  eoe1        04/29/93  Execution Only Environment 1, 5.3
I  eoe2        04/29/93  Execution Only Environment 2, 5.3
I  insight     04/29/93  IRIS InSight Viewer, 2.1
I  motif_eoe   04/29/93  Motif Execution Only Environment
I  nfs         04/29/93  Network File System, 5.2
```

Checking Graphics Hardware With gfxinfo

The *gfxinfo* command is useful for determining the graphics hardware installed in the system. It is in the */usr/gfx* directory, which is not on any of the standard search paths. Thus *gfxinfo* typically needs the full path name to be specified for successful execution. The command requires no arguments to run.

An sample *gfxinfo* output for an Indy workstation:

```
% /usr/gfx/gfxinfo

Graphics board 0 is "NG1" graphics.
        Managed (":0.0") 1280x1024
        24 bitplanes, NG1 revision 3, REX3 revision B,
        VC2 revision A
        MC revision C, xmap9 revision A, cmap revision C,
        bt445 revision A
        Display 1280x1024 @ 60Hz, monitor id 12
```

This command provides much more information about the graphics system than the *hinv* command (*hinv* would simply return Indy 24-bit). From the output of *gfxinfo* you can determine the number of screens and their pixel resolutions, bitplane configurations, component revision levels, and monitor types. There is no reference page for *gfxinfo*. Servers without graphics capability will not have this command installed.

Basic System Identification With uname

The *uname* command returns information such as the OS version and hostname. The *-a* options gives a complete list of the *uname* output. See the reference page for a description of all the *uname* options and fields.

Getting Printer Status With lpstat

lpstat with the *-a* option will show all the printers configured for the *lp* spooling system and also give their status. For more information on the *lpstat* command, see the IRIX documentation on print services or the *lpstat* reference page.

Checking Options With chkconfig

You can quickly check the configuration of a workstation or server with *chkconfig*(1). The */sbin/chkconfig* command reports the state of various process daemons (that is, whether or not they are supposed to be active).

For example, enter the *chkconfig* command:

```
chkconfig
```

You see a display similar to this:

```
Flag                State
====                =====
acct                off
audit               off
automount           on
fmlicserv           off
gated               off
lockd               on
mrouted             off
named               off
network             on
nfs                 on
noiconlogin         off
nsr                 on
quotacheck          off
quotas              off
routed              on
```

```
rtnetd              off
rwhod               off
sar                 on
snmpd               on
timed               on
timeslave           off
verbose             off
visuallogin         on
windowsystem        off
yp                  on
ypmaster            off
ypserv              off
```

This example is typical for a networked workstation with the Network File System (NFS) option installed. The left column of the output describes a system feature, and the right column indicates whether it is on or off. The following list provides more specific information about each system feature:

acct — Detailed system accounting is turned on or off.

audit — The System Audit Trail is turned on or off.

automount — The NFS *automount*(1M) daemon is turned on or off. This configuration option is available only if you have NFS installed on the workstation.

gated — The *gated*(1M) daemon, which manages multiple routing protocols is turned on or off.

glb — This option is used by the NetLS license server for the global location broker daemon.

llb — This option is used by the NetLS license server for the local location broker daemon.

lockd — The Network File System (NFS) lock daemon is turned on or off. This configuration option is available only if you have NFS installed on the workstation.

mrouted — The Stanford IP multicast routing daemon is turned on or off.

named — *named*(1M), the Internet domain name server, is turned on or off.

network — The network is turned on or off.

nfs — NFS is turned on or off. This configuration option is available only if you have NFS installed on the workstation.

noiconlogin	The visual login program, *pandora*(1), displays icons that represent users on the system. This feature does not enable or disable *pandora*; it only affects whether or not *pandora* displays icons. It is turned on or off. To enable or disable *pandora*, use the *visuallogin* feature.
nsr	IRIS Networker backup utility. This configuration option is available only if you have Networker installed on the workstation.
quotacheck	The disk space quota checker is enabled or disabled.
quotas	Disk quotas are enabled or disabled.
routed	*routed*(1M), which manages the network routing tables, is turned on or off.
rtnetd	*rtnetd*(1M), which allows higher priority real-time processes to preempt processing of incoming network packets, is turned on or off.
rwhod	*rwhod*(1M) is turned on or off.
sar	*sar*(1), the system activity reporter, is turned on or off.
snmpd	The Simple Network Management Protocol Daemon is turned on or off.
timed	*timed*(1M), the 4.3 BSD time server daemon, is turned on or off.
timeslave	The Silicon Graphics time server daemon is turned on or off. Like *timed*, this attaches a workstation's clock to a different clock, usually some kind of master time server for a group of workstations or for the entire site.
verbose	If this feature is enabled, as the system boots or is shut down, daemons print information about their functions. If this feature is disabled, less information is printed when the system is started and shut down.
visuallogin	The visual login program, *pandora*(1), is turned on or off.
windowsystem	The window manager is turned on or off.
yp	The network information service (NIS) is enabled on or off. This is called "yp" for historical reasons. NIS is available with the NFS software. This configuration option is available only if you have NFS installed on the workstation.
ypmaster	NIS master services are turned on or off. This configuration option is available only if you have NFS installed on the workstation.
ypserv	NIS server and bind processes are turned on or off. This configuration option is available only if you have NFS installed on the workstation.

Note that if a daemon is enabled using *chkconfig*, it does not necessarily mean that the daemon starts up immediately, or that it is running successfully. To verify that a daemon is running, use the *ps*(1) command to identify what processes are running on the system. For example, the command:

```
ps -ef
```

produces output similar to this:

Table 4-1 *ps -ef* Output

UID	PID	PPID	C	STIME	TTY	TIME	COMMAND
root	0	0	0	Aug 3	?	0:00	sched
root	1	0	0	Aug 3	?	0:45	/etc/init
root	2	0	0	Aug 3	?	0:08	vhand
root	3	0	0	Aug 3	?	0:09	bdflush

This example is edited for simplicity. An actual, full *ps* listing shows many more active processes.

To view information about specific processes, and avoid searching through a large *ps* listing, you can filter the listing with the *grep*(1) or *egrep*(1) commands. For example, to look at process information for only the NFS daemons, use this command:

```
ps -ef | egrep 'nfsd|biod'
```

The output of this command is similar to this (assuming you have NFS installed and running):

```
root  120 1  0    09:40:05 ?     0:02 /usr/etc/nfsd 4
root  122 12 0 0  09:40:05 ?     0:02 /usr/etc/nfsd 4
root  123 12 0 0  09:40:05 ?     0:02 /usr/etc/nfsd 4
root  124 12 0 0  09:40:05 ?     0:02 /usr/etc/nfsd 4
root  126 1  0    09:40:05 ?     0:00 /usr/etc/biod 4
root  127 1  0    09:40:05 ?     0:00 /usr/etc/biod 4
root  128 1  0    09:40:05 ?     0:00 /usr/etc/biod 4
root  129 1  0    09:40:05 ?     0:00 /usr/etc/biod 4
root  131 1  0    09:40:11 ?     0:00 /etc/mount -at nfs
ralph 589 55 0 11 15:25:30 ttyq1 0:00 egrep nfsd|biod
```

Note that the final entry in the *ps* listing is the process that produced the listing and that it is the only non-*root* process to have *nfsd* or *biod* in its name.

Altering the System Configuration

The following sections describe how to set the various options available to customize your IRIX operating system.

Setting Options With chkconfig

You can use the *chkconfig* command to change some aspects of system configuration. To determine which aspects of a system you can alter with

chkconfig, enter the *chkconfig* command:

```
chkconfig
```

You see a list of configuration options, which are described in "Checking Options With chkconfig" on page 63. If you use the **-s** option, you see a list that is sorted by whether the configuration item is on or off.

To change a configuration option, use the *chkconfig* command with two arguments: the name of the option you wish to change and the new status of the configuration (on or off). You must have *root* privilege to change a system configuration.

For example, to turn on detailed process accounting, log in either as *root* or as the system administrator, and enter:

```
chkconfig acct on
```

To turn off process accounting, enter:

```
chkconfig acct off
```

Some aspects of system configuration do not take effect until the system is shut down and rebooted because startup scripts, which are in the directory */etc/init.d*, are run when the system is booted up and brought to multiuser mode. These scripts read the files that *chkconfig* sets to determine which daemons to start.

Some configuration items that can be controlled by *chkconfig* may not be displayed by *chkconfig*. These include:

nostickytmp Sets "sticky" behavior for the directory */tmp*. When the directory is sticky, (with *nostickytmp* set to **off**), users may not remove files from the directory unless they own the files, have explicit permission to remove the files (write permission), or have superuser privileges.

The opposite behavior allows users to remove or replace files in */tmp*, which is a publicly writable directory, even if they do not own the files. This is handy behavior if you have users who need to create large temporary files and you are short on disk space. But it is better to increase disk space to avoid important files being removed.

nocleantmp Controls whether or not the directory */tmp* is cleaned out each time the system is booted. If *nocleantmp* is on, */tmp* is not cleaned. If *nocleantmp* is off, all files in */tmp* are removed each time the system is started.

If you want to see these flags in the *chkconfig* menu, you can use the **-f** option to force *chkconfig* to create a configuration file for the options:

```
chkconfig –f nocleantmp on
```

In this example, *chkconfig* creates a configuration file called *nocleantmp* in the directory */etc/config*.

Changing Other System Defaults

These system-wide defaults affect programs and system functions:

- the system display
- the time zone
- the name of the system
- the network address
- the default system printer

Some of these defaults are described more thoroughly in specific sections of this guide, but they are all presented here to provide a more thorough overview of the IRIX system.

Setting the System Display

You can make the output of programs and utilities running on one system appear on the screen of another system on the same network by changing the DISPLAY environment variable. This is useful if your network includes graphical systems and non-graphical servers. In order to view information from the server graphically, you reset the display to a graphics workstation.

For example, if your server has only a character-based terminal as its console and you wish to run *gr_osview*(1M) to visually inspect your CPU usage, you would issue commands similar to these on the server:

setenv DISPLAY *graphics_machine*:0

```
gr_osview
```

When you invoke *gr_osview*, the window with the output will appear on the machine name you specify. In this example, *graphics_machine* was used in place of the system name. The **:0** used after the machine name indicates that display monitor 0 (the graphics console) should be used to display the output. When you have finished using the graphics console, be sure to reset the display by issuing this command on the server:

setenv DISPLAY *local_server*:0

where *local_server* is the name of your server.

Changing Processors on Multi-Processor Systems

If you have a multi-processor system, the *mpadmin*(1M) and *pset*(1M) commands allow you to change the way programs are assigned to the various processors on your system. To determine if your system is multi-processor, use the *hinv*(1M) command. A multi-processor system returns information similar to the following in its *hinv* output:

```
Processor 0: 40 MHZ IP7
Processor 1: 36 MHZ IP7
Processor 2: 40 MHZ IP7
Processor 3: 40 MHZ IP7
Processor 4: 40 MHZ IP7
Processor 5: 40 MHZ IP7
Processor 6: 40 MHZ IP7
Processor 7: 40 MHZ IP7
```

Or, alternately, output similar to the following:

```
8 40 MHZ IP7 Processors
```

A single-processor system returns information similar to the following for the *hinv* command:

```
1 100 MHZ IP22 Processor
```

If you have only one processor on your system (and the vast majority of systems have only one processor) these commands still operate, though they have no useful purpose.

The *mpadmin* command allows you to ''turn off'' processors, report various states of the processors, and move system functions such as the system clock to specific processors. The *pset* command is used both to display and modify information concerning the use of processor sets and programs running in the current system. The *pset* command provides a much more detailed level of control of processes and processors.

For complete information on *mpadmin*(1M) and *pset*(1M), see the respective reference pages.

Changing the Name of a System

The name of the system is stored in several places. If you wish to change the name of your system, you must change all these files together or your system will not function correctly:

- in the file */etc/sys_id*
- in the file */etc/hosts* (for networking purposes)
- in a kernel data structure, which you read and set with either *hostname*(1) or *uname*(1)
- in an NIS map on the NIS master server, if you are running NIS

Note that you should not arbitrarily change the name of a running workstation. Many programs that are started at boot time depend on the name of the workstation.

To display the name of the system, use the *hostname* command with no arguments:

```
hostname
```

This displays the name of the system. The *uname* command also displays the name of the system, along with other information.

To change the name of the workstation, follow these steps:

1. Log in as **root**.
2. Edit the file */etc/sys_id*. Change the name of the host to *newname*. Write and exit the editor.
3. You must also change the name of the host in any network files, such as */etc/hosts*, and possibly in the NIS map on the master NIS server.
4. Reboot your system.

The name of the workstation is now changed. When the workstation is booted, all programs that are started at boot time, and read the host name when they start, now use the correct host name.

For information about the Internet address of a workstation, see the IRIX networking documentation. For more information about the name of the system, see the *hostname*(1) and *uname*(1) reference pages.

Setting the Network Address

The system's network address (IP address) is covered more thoroughly in the IRIX networking documentation.

To set the network address, follow these steps:

1. Place the network address in */etc/hosts* on the same line as the system name.
2. If you use the network information service (NIS), place the name of your domain in the file */var/yp/ypdomain*, if it is installed.
3. Use the *nvram*(1M) command to set the variable *netaddr* to the IP number of the machine. For example:

```
nvram netaddr 192.13.52.4
```

Setting the Default Printer

The *lpadmin*(1M) command sets the default printer. This command sets the default printer to *laser*:

```
lpadmin -dlaser
```

Note that the printer *laser* must already exist and be configured. For complete information on setting up printers, see the IRIX print services documentation.

Setting the Time Zone

To set the time zone of the system, edit the file */etc/TIMEZONE*. For a site on the east coast of the United States, the file might look something like this:

```
# Time Zone
TZ=EST5EDT
```

The line `TZ=EST5EDT` means:

- The current time zone is Eastern Standard Time.
- It is 5 hours to the west of Greenwich mean time.
- Daylight saving time applies here (EDT).

The *TZ* environment variable is read by *init*(1) when the system boots, and the value of *TZ* is passed to all subsequent processes. The time zone designation (such as EST) is simply passed through for your convenience. The important parts of the designation are the specification of the deviation from Greenwich Mean Time and the presence of the Daylight Savings Time indicator. The following tables provide convenient time zone information for the majority of North America, Europe, Asia, the Middle East, South America, and Australia and New Zealand.

Table 4-2 North America Time Zones

Region	GMT Differential	Abbreviation
Newfoundland	-3:30	NST
Atlantic	-4:00	AST
Eastern	-5:00	EST
Central	-6:00	CST
Saskatchewan	-6:00	CST
Mountain	-7:00	MST
Pacific	-8:00	PST
Yukon	-9:00	YST

Table 4-2 (continued) North America Time Zones

Region	GMT Differential	Abbreviation
Alaska	-10:00	AST
Hawaii	-10:00	HST
Bering	-11:00	BST
BajaNorte	-8:00	PST
BajaSur	-7:00	MST
Mexico General	-6:00	CST

Table 4-3 Europe Time Zones

Region	GMT Differential	Abbreviation
Ireland	0:00	BST
The United Kingdom	0:00	BST
Western Europe	0:00	WET
Iceland	0:00	WET
Middle Europe	1:00	MET
Poland	1:00	MET
Eastern Europe	2:00	EET
Turkey	3:00	EET
Western Russia	3:00	WSU

Table 4-4 Asia Time Zones

Region	GMT Differential	Abbreviation
Rep. Of China	8:00	CST
Hongkong	8:00	HKT
Japan	9:00	JST
Rep. Of Korea	9:00	ROK
Singapore	8:00	SST

Table 4-5 Middle East Time Zones

Region	GMT Differential	Abbreviation
Israel	2:00	IST
Egypt	2:00	EET

Table 4-6 South America Time Zones

Region	GMT Differentia	Abbreviation
Brazil/East	-3:00	EST
Brazil/West	-4:00	WST
Brazil/Acre	-5:00	AST
Brazil/DeNoronha	-2:00	FST
Chile/Continental	-4:00	CST
Chile/EasterIsland	-6:00	EST

Table 4-7 Australia and New Zealand Time Zones

Region	GMT Differential	Abbreviation
Australia/Tasmania	10:00	EST
Australia/Queensland	10:00	EST
Australia/North	9:30	CST
Australia/West	8:00	WST
Australia/South	9:30	CST
Australia/Victoria	10:00	EST
Australia/NSW	10:00	EST
New Zealand	12:00	NZT

For complete information about setting your time zone, see the *timezone*(4) reference page.

Changing the Date and Time

Use the *date*(1) command to set the date and time. For example, to set the date to April 1st, 1999, and the time to 09:00, log in as *root* and enter:

```
date 0401090099
```

Changing the date and time on a running system can have unexpected consequences. Users and administrators use system scheduling utilities (*at*(1), *cron*(1), and *batch*(1)) to perform commands at specified times. If you change the effective date or time on the system, these commands may not execute at the desired times. Similarly, if your users use the *make*(1) utility provided with the system, the commands specified in Makefiles can incorrectly compile or process your users' work. Always try to keep your system date and time accurate within reason. Random changes of the date and time can be extremely inconvenient and possibly destructive to users' work.

If *timed*(1M) is running on the system, and it is a slave system, the time is reset by *timed* and not the above command. For more information, see the *timed*(1M) reference page.