CHAPTER 5

Viewing ACE Hardware and Software Configuration Information

This chapter describes how to view Cisco 4700 Series Application Control Engine (ACE) appliance hardware and software configuration information. The ACE CLI provides a comprehensive set of **show** commands in Exec mode that you can use to gather ACE hardware and software configuration information.

This chapter contains the following major sections:

- Displaying Software Version Information
- Displaying Software Copyright Information
- Displaying Hardware Information
- Displaying the Hardware Inventory
- Displaying System Processes
- Displaying Process Status Information and Memory Resource Limits
- Displaying System Information
- Displaying ICMP Statistics
- Displaying Technical Support Information

To view the contents of the current running-configuration file and startup-configuration file, see Chapter 4, Managing the ACE Software.

Note The **show buffer**, **show fifo**, **show netio**, **show np**, and **show vnet** commands display internal system-level hardware show output for use by trained Cisco personnel as an aid in debugging and troubleshooting the ACE. See the *Cisco 4700 Series Application Control Engine Appliance Command Reference* for background information about those **show** commands.

Displaying Software Version Information

To display the version of system software that is currently running on the ACE in Flash memory, use the **show version** command. You use the **show version** command to verify the software version on the ACE before and after an upgrade.

The syntax of this command is:

show version

For example, to display the entire output for the **show version** command, enter:

```
host1/Admin# show version
Cisco Application Control Software (ACSW)
TAC support: http://www.cisco.com/tac
Copyright (c) 1985-2008 by Cisco Systems, Inc. All rights reserved.
The copyrights to certain works contained herein are owned by
other third parties and are used and distributed under license.
Some parts of this software are covered under the GNU Public
License. A copy of the license is available at
http://www.gnu.org/licenses/gpl.html.

Software
  loader:    Version 0.95
  system:    Version A3(1.0) [build 3.0(0)A3(0.0.148)
adbuild_03:31:25-2008/08/0
6_/auto/adbure_nightly2/nightly_rel_a3_1_0_throttle/REL_3_0_0_A3_0_0
  system image file: (nd)/192.168.65.31/scimitar.bin
  Device Manager version 1.1 (0) 20080805:0415

  installed license: ACE-AP-VIRT-020 ACE-AP-C-1000-LIC

Hardware
  cpu info:
    Motherboard:
        number of cpu(s): 2
    Daughtercard:
        number of cpu(s): 16
  memory info:
    total: 6226392 kB, free: 4315836 kB
    shared: 0 kB, buffers: 17164 kB, cached 0 kB
  cf info:
    filesystem: /dev/hdb2
    total: 935560 kB, used: 611564 kB, available: 276472 kB

last boot reason:  Unknown
configuration register:  0x1
 kernel uptime is 0 days 21 hours 25 minute(s) 17 second(s)
```

Displaying Software Copyright Information

To display the software copyright information for the ACE, use the **show copyright** command. The syntax of this command is:

show copyright

For example, enter:

```
host1/Admin# show copyright
Cisco Application Control Software (ACSW)
TAC support: http://www.cisco.com/tac
Copyright (c) 1985-2008 by Cisco Systems, Inc. All rights reserved.
The copyrights to certain works contained herein are owned by
other third parties and are used and distributed under license.
Some parts of this software are covered under the GNU Public
License. A copy of the license is available at
http://www.gnu.org/licenses/gpl.html.
```

Displaying Hardware Information

To display ACE hardware inventory details, use the **show hardware** command. The syntax of this command is:

show hardware

For example, to display the ACE hardware inventory details, enter:

```
host1/Admin # show hardware
Hardware
Product Number: ACE-4710-K9
Serial Number: QCN21220038
Hardware Rev: 1.1
VID: V01
CLEI: COUCADFCAA
MFG Part Num: 800-29070-01
MFG Revision: 01
Slot No. : 1
Type: ACE Appliance
```

Table 5-1 describes the fields in the **show hardware** command output.

Table 5-1 Field Descriptions for the show hardware Command

Field	Description
Product Number	Product number of the ACE
Serial Number	Serial number of the ACE
Hardware Rev	Hardware revision of the ACE
VID	Version identification number of the ACE
MFG Part Num	Manufacturing part number of the ACE
MFG Revision	Manufacturing revision of the ACE
Slot No.	Not applicable
Type	Identifies the type of ACE, appliance or module

Displaying the Hardware Inventory

To display the system hardware inventory of the ACE, use the **show inventory** command. This command displays information about the field replaceable units (FRUs) in the ACE, including product identifiers, serial numbers, and version identifiers.

The syntax of this command is:

show inventory [**raw**]

The optional **raw** keyword displays information about each component in the ACE.

For example, to display the ACE hardware inventory details, enter:

```
host1/Admin # show inventory
```

Table 5-2 describes the fields in the **show inventory** command output.

Table 5-2 Field Descriptions for the show inventory Command

Field	Description
Name	Name assigned to the ACE component. **Note** If you do not specify the **raw** keyword, the only named object that displays is the ACE chassis. If you specify the **raw** keyword, each monitored component of the chassis displays.
Descr	Description of the ACE component.
PID	Product identifier of the ACE.
VID	Version identifier of the ACE.
SN	Serial number of the ACE.

Displaying System Processes

To display general information about all of the processes running on the ACE, use the **show processes** command. The **show processes** command displays summary CPU information for the Intel Pentium processor.

The **show processes** command is available only to users with an Admin role across all contexts. The displayed system processes information is at the CPU system level (the total CPU usage) and is not on a per-context level.

The syntax of this command is:

show processes [**cpu** | **log** [**details** | **pid** *process_id*] | **memory**]

The keywords, arguments, and options are:

- **cpu**—Displays CPU information for the Intel Pentium processor.
- **log—**Displays information about process logs.
- **details**—Displays process log information for all process identifiers.
- **pid** *process_id*—Displays information about a specific process identifier.
- **memory**—Displays memory information about the processes.

For example, to display memory information for the Intel Pentium processor, enter:

```
host1/Admin# show processes mem
PID    MemAlloc  StackBase/Ptr      Process
-----  --------  -----------------  ----------------
    1    495616  bffffed0/bffff9c0  init
    2         0         0/0         ksoftirqd/0
    3         0         0/0         desched/0
    4         0         0/0         events/0
    5         0         0/0         khelper
   10         0         0/0         kthread
   18         0         0/0         kacpid
  110         0         0/0         kblockd/0
  161         0         0/0         pdflush
  162         0         0/0         pdflush
  163         0         0/0         kswapd0
  164         0         0/0         aio/0
  241         0         0/0         kseriod
  320         0         0/0         loop0
  451         0         0/0         kjournald
  453         0         0/0         kjournald
  511         0         0/0         loop1
  512         0         0/0         kjournald
  518         0         0/0         loop2
--More--
```

Table 5-3 describes the fields in the **show processes** command output. The **show processes** command displays summary CPU information for the Intel Pentium processor.

Table 5-3 Field Descriptions for the show processes Command

Field	Description
PID	Process identifier.
State	Process state. Included below is a summary of the different process state codes that can appear to describe the state of a process: • **D**—Uninterruptible sleep (usually I/O related) • **ER**—Error while running • **NR**—Not running • **R**—Running or runnable (on run queue) • **S**—Interruptible sleep (waiting for an event to complete) • **T**—Stopped, either by a job control signal or because it is being traced • **W**—Paging • **X**—Process is dead • **Z**—Defunct (“zombie”) process, terminated but not reaped by its parent
PC	Current program counter in hex format.
Start_cnt	Number of times a process has been started.
TTY	Terminal that controls the process. A “—” usually means a daemon is not running on any particular tty.
Process	Name of the process.

Table 5-4 describes the fields in the **show processes cpu** command output.

Table 5-4 Field Descriptions for the show processes cpu Command

Field	Description
CPU Utilization	Lists the percentage of CPU utilization for the ACE for a 5-second interval, 1-minute interval, and a 5-minute interval
PID	Process identifier
Runtime (ms)	CPU time the process has used, expressed in milliseconds
Invoked	Number of times that the process has been invoked
uSecs	Microseconds of CPU time as an average for each process invocation
1 Sec	CPU utilization as a percentage for the last second
5 Sec	CPU utilization as a percentage for the last 5 seconds
1 Min	CPU utilization as a percentage for the last minute
5 Min	CPU utilization as a percentage for the last 5 minutes
Process	Name of the process

Table 5-5 describes the fields in the **show processes log** command output.

Table 5-5 Field Descriptions for the show processes log Command

Field	Description
Process	Name of the process
PID	Process identifier
Normal-exit	Status of whether the process exited normally
Stack	Status of whether a stack trace is in the log
Core	Status of whether a core file exists
Log-create-time	Time when the log file was generated

Table 5-6 describes the fields in the **show processes log details | pid** command output.

Table 5-6 Field Descriptions for the show processes log | pid details Command

Field	Description
Service	Name of the service.
Description	Brief description of the service.
Started at	Time the process started.
Stopped at	Time the process stopped.
Uptime	Length of time that the process was active.
Start type	System manager option that indicates the process restartability characteristics (that is, whether it is a stateless restart or stateful restart).
Death reason	Reason that the system manager killed the process (for example, no sysmgr heartbeats).
Exit code	Exit code with which the process exited. **Note** Normally, the Exit code provides the signal number which killed the process.
CWD	Current working directory.
Virtual memory	Virtual memory addresses where the code, data heap, and stack of the process are located.
PID	Process identifier.
SAP	Service access point.
UUID	Universal unique identifier of the Intel Pentium processor

Table 5-7 describes the fields in the **show processes memory** command output.

Table 5-7 Field Descriptions for the show processes memory Command

Field	Description
PID	Process identifier
MemAlloc	Total memory allocated by the process
StackBase/Ptr	Process stack base and current stack pointer in hex format
Process	Name of the process

Displaying Process Status Information and Memory Resource Limits

To display detailed process status information and memory resource limits, use the **show terminal internal info** Exec mode command.

The syntax of this command is:

show terminal internal info

For example, enter:

```
host1/Admin# show terminal internal info
```

Table 5-8 describes the fields in the **show terminal internal info** command output.

Table 5-8 Field Descriptions for the show terminal internal info Command

Field	Description
Process Information	
Name	Name of the executable that started the process.

Table 5-8 Field Descriptions for the show terminal internal info Command (continued)

Field	Description
State	Process state. Included below is a summary of the different process state codes that can appear to describe the state of a process: • **D**—Uninterruptible sleep (usually I/O related) • **ER**—Error while running • **NR**—Not running • **R**—Running or runnable (on run queue) • **S**—Interruptible sleep (waiting for an event to complete) • **T**—Stopped, either by a job control signal or because it is being traced • **W**—Paging • **X**—Process is dead • **Z**—Defunct (“zombie”) process, terminated but not reaped by its parent
SleepAVG	Percentage sleep rate of the task.
TGID	Terminal group identifier.
PID	Process identifier.
PPID	Parent process identification number.
TracerPID	Tracer process identification number.
UID	Identifier of the user that started the process (four element list).
GID	Identifier of the group the process belongs to (four element list).
FDSize	Process file descriptor size.
Groups	Total number of groups.
VmSize	Total amount of virtual memory used by the process (in kBytes).

Table 5-8 Field Descriptions for the show terminal internal info Command (continued)

Field	Description
VmLck	Total locked virtual memory (in kBytes).
VmRSS	Total amount of physical memory used by the process (in kBytes).
VmData	Virtual memory data size (in kBytes).
VmStk	Virtual memory stack size (in kBytes).
VmExe	Executable virtual memory (in kBytes).
VmLib	Virtual memory library size (in kBytes).
VmPTE	Virtual memory pointer size (in kBytes).
Threads	Number of threads.
SigPnd	Signals pending.
ShdPnd	Shared pending signals.
SigBlk	Signals blocked.
SigIgn	Signals ignored.
SigCat	Signals caught.
CapInh	Capability inherited privilege
CapPrm	Capability privilege (processor resource manager)
CapEff	Capability effective privilege
Memory Limits	
Core file size	Maximum size of core file (in blocks) that may be created.
Data seg size	Maximum size (in kbytes) of the data segment for a process.
File size	Maximum size (in blocks) of files created by the shell.
Max locked memory	Maximum size (in kbytes) which a process may lock into memory.

Table 5-8 Field Descriptions for the show terminal internal info Command (continued)

Field	Description
Max memory size	Maximum size (in kbytes) to which a process's resident set size may grow. This imposes a limit on the amount of physical memory to be given to a process.
Open files	Maximum number of open files for this process.
Pipe size	Pipe buffer size (in bytes).
Stack size	Maximum size (in kbytes) of the stack segment for a process.
CPU time	Maximum amount of CPU time (in seconds) to be used by each process
Max user processes	Maximum number of simultaneous processes for the user identifier.
Virtual memory	Maximum amount (in kbytes) of available virtual memory available to the process.

Displaying System Information

To display the system information, use the **show system** command. The syntax of this command is:

show system {**cpuhog** | **error-id** {*hex_id* | **list**} | **internal** | **kmemtrack** | **resources** | **skbtrack** | **uptime**}

The keywords, arguments, and options are:

- **cpuhog**—Displays information related to the process watchdog timer that monitors CPU usage by any currently active processes.
- **error-id**—Displays description about errors.
- *hex_id*—The error ID in hexadecimal format. The range is 0x0 to 0xffffffff.
- **list**—Specifies all error IDs.

- **internal**—Specifies a series of internal system-level commands for use by trained Cisco personnel only. This option is available in the Admin context only.
- **kmemtrack**—Displays the kernal memory allocations in the kernel loadable modules.
- **resources**—Displays system-related CPU and memory statistics.
- **skbtrack**—Displays the socket buffer (network buffer) allocations in the kernel loadable modules.
- **uptime**—Displays how long the ACE has been up and running.

For example, to display CPU and memory statistics for the ACE, enter:

```
host1/Admin# show system resources
```

Table 5-9 describes the fields in the **show system resources** command output.

Table 5-9 Field Descriptions for the show system resources Command

Field	Description
Load average	Load that is defined as the number of running processes. The average reflects the system load over the past 1-minute, 5-minute, and 15-minute interval.
Processes	Number of processes in the system, and how many processes are actually running when you enter the command.
CPU states	CPU usage percentage in user mode, kernel mode, and idle time in the last second.
Memory usage	Total memory, used memory, free memory, memory used for buffers, and memory used for cache in KB. Buffers and cache are also included in the used memory statistics.

Table 5-10 describes the fields in the **show system uptime** command output.

Table 5-10 Field Descriptions for the show system uptime Command

Field	Description
System start time	Date and time when the ACE was turned on
System uptime	Length of time that the ACE hardware and software have been running
Kernel uptime	Length of time that the operating system (OS) has been running

Displaying ICMP Statistics

To display Internet Control Message Protocol (ICMP) statistics, use the **show icmp statistics** command. The syntax of this command is:

show icmp statistics

For example, enter:

```
host1/Admin # show icmp statistics
```

Use the **clear icmp statistics** command to clear the ICMP statistics.

Table 5-11 describes the fields in the **show icmp statistics** command output.

Table 5-11 Field Descriptions for the show icmp-statistics Command

Field	Description
Total Messages	Total number of ICMP messages transmitted or received by the ACE
Errors	Number of ICMP error messages transmitted or received by the ACE
Echo Request	Number of ICMP echo request messages transmitted or received by the ACE
Echo Reply	Number of ICMP echo reply messages transmitted or received by the ACE

Table 5-11 Field Descriptions for the show icmp-statistics Command

Field	Description
Unreachable	Number of ICMP unreachable packets transmitted or received by the ACE
TTL Expired	Number of ICMP TTL-expired messages transmitted or received by the ACE
Redirect	Number of ICMP redirect messages transmitted or received by the ACE
Address Mask	Number of ICMP Address Mask Request messages transmitted or received by the ACE
Param problem	Number of ICMP Parameter Problem messages transmitted or received by the ACE
Source Quench	Number of ICMP Source Quench messages transmitted or received by the ACE
Time Stamp	Number of ICMP Time Stamp (request) messages transmitted or received by the ACE

Displaying Technical Support Information

To display general information about the ACE when you report a problem, use the **show tech-support** command in Exec mode. You can also use this command to collect a large amount of information about your ACE and provide the output of this command to technical support representatives when you report a problem.

The **show tech-support** command displays the output of several **show** commands at once. The output from this command varies depending on your configuration.

You can choose to have detailed information for each command or even specify the output for a particular interface or appliance. Each command output is separated by the line and the command that precedes the output.

Note Explicitly set the terminal length command to 0 (zero) to disable autoscrolling and enable manual scrolling. Use the **show terminal** command to view the configured terminal size. After obtaining the output of this command, reset your terminal length as required (see Chapter 1, Setting Up the ACE).

Note You can save the output of this command to a file by appending > *filename* to the **show tech-support** command (see Chapter 4, Managing the ACE Software). If you save this file, verify that you have sufficient space to do so; each file may take about 1.8 MB.

The default output of the **show tech-support** command includes the output of the following commands:

- **show hardware—**See the "Displaying Hardware Information" section
- **show interface—**See the *Cisco 4700 Series Application Control Engine Appliance Routing and Bridging Configuration Guide*
- **show process—**See the "Displaying System Processes" section
- **show running-config—**See the Chapter 4, Managing the ACE Software
- **show version—**See the "Displaying Software Version Information" section

The syntax of this command is:

show tech-support [**details**]

The optional **details** keyword provides detailed information for each **show** command.

For example, to display an excerpt of the current running state of the ACE, enter:

```
host1/Admin# show tech-support


`show version`
Cisco Application Control Software (ACSW)
TAC support: http://www.cisco.com/tac
Copyright (c) 1985-2008 by Cisco Systems, Inc. All rights reserved.
The copyrights to certain works contained herein are owned by
other third parties and are used and distributed under license.
Some parts of this software are covered under the GNU Public
License. A copy of the license is available at
http://www.gnu.org/licenses/gpl.html.

Software
  loader:    Version 0.95
  system:    Version A3(1.0) [build 3.0(0)A3(0.0.148)
adbuild_03:31:25-2008/08/06_/auto/adbure_nightly2/nightly_rel_a3_1_0_
throttle/REL_3_0_0_A3_0_0
  system image file: (nd)/192.168.65.31/scimitar.bin
```

```
  Device Manager version 1.1 (0) 20080805:0415

  installed license: ACE-AP-VIRT-020 ACE-AP-C-1000-LIC

Hardware
  cpu info:
    Motherboard:
        number of cpu(s): 2
    Daughtercard:
        number of cpu(s): 16
  memory info:
    total: 6226392 kB, free: 4315836 kB
    shared: 0 kB, buffers: 17164 kB, cached 0 kB
  cf info:
    filesystem: /dev/hdb2
    total: 935560 kB, used: 611564 kB, available: 276472 kB

last boot reason:  Unknown
configuration register:  0x1
 kernel uptime is 0 days 21 hours 25 minute(s) 17 second(s)

`show pvlans`
*** Context 0: cmd parse error ***
    cpu: 0, model: Intel(R) Pentium(R) 4, speed: 3399.991 MHz
  memory info:
    total: 6226704 kB, free: 4637164 kB
    shared:  kB, buffers: 19436 kB, cached 0 kB
  cf info:
    filesystem: /dev/hdb2
    total: 861668 kB, used: 348552 kB, available: 469344 kB

last boot reason:  reload command by root
configuration register:  0x1
switch kernel uptime is 0 days 18 hours 59 minute(s) 49 second(s)



`show clock`
Tue Aug 5 10:13:57 UTC 2008

`show inventory`

 NAME: "chassis", DESCR: "ACE 4710 Application Control Engine
Appliance"
 PID: ACE-4710-K9       , VID:    , SN: 2061

--More--
```

To redirect the output of the **show tech-support** command to a file to the disk0: file system on the ACE or to a remote server using File Transfer Protocol (FTP), Secure Copy Protocol (SCP), Secure Transfer Protocol (SFTP), or Trivial Transfer Protocol (TFTP), use the **tac-pac** command in Exec mode.

Note The output of the **tac-pac** command is in gzip format. We recommend that you include the .gz extension in the filename so that it can be easily unzipped from the destination filesystem.

The syntax of this command is:

tac-pac {**disk0:**[*path/*]*filename* | **ftp://***server/path*[*/filename*] |
scp://[*username*@]*server/path*[*/filename*] |
sftp://[*username*@]*server/path*[*/filename*] |
tftp://*server*[**:***port*]*/path*[*/filename*]}

The keywords, arguments, and options are:

- **disk0:**[*path/*]*filename*—Specifies that the file destination is the disk0: file system of the current context. If you do not provide the optional path, the ACE copies the file to the root directory on the disk0: file system.
- **ftp://***server/path*[*/filename*]—Specifies the FTP network server and optional file name.
- **scp://**[*username*@]*server/path*[*/filename*]**—**Specifies the SCP network server and optional file name.
- **sftp://**[*username*@]*server/path*[*/filename*]—Specifies the SFTP network server and optional file name.
- **tftp://***server*[**:***port*]*/path*[*/filename*]—Specifies the TFTP network server and optional file name.

For example, to send the output of the **show tech-support** command to a remote FTP server, enter:

```
host1/Admin# tac-pac ftp://192.168.1.2/tac-output_7-7-08.gz
```