CHAPTER 1

Setting Up the ACE

This chapter describes how to initially configure basic settings on the Cisco 4700 Series Application Control Engine (ACE) appliance. It contains the following major sections:

- Prerequisites for Setting Up the ACE
- Default Settings
- Setting Up the ACE
- Displaying or Clearing the ACE Setup Configuration and Statistics

For details on configuring the GigabitEthernet ports, assigning VLANs to the ACE, configuring VLAN interfaces on the ACE, and configuring a default or static route on the ACE, see the *Cisco 4700 Series Application Control Engine Appliance Routing and Bridging Configuration Guide*.

Prerequisites for Setting Up the ACE

Setting up the ACE has the following requirements:

- Terminal—The terminal that you use to communicate with the ACE must contain a terminal communications application, such as HyperTerminal for Windows, and be configured as follows:
  - Asynchronous transmission
  - 9600 baud
  - 8 data bits
  - Hardware flow control
  - 1 stop bit
  - No parity
- Cable—The cable that connects the terminal to the ACE must meet the following requirements:
  - Serial cable with an RJ-45 connector
  - Adapter—RJ45 to DB-9 male
  - Cable type—Rollover serial cable to connect the ACE to a DTE device

  For instructions on connecting a console cable to your ACE, see the *Cisco Application Control Engine Appliance Hardware Installation Guide*.

Default Settings

Table 1-1 lists the default settings for the ACE setup parameters.

Table 1-1 Default Setup Parameters

Parameter	Default
User accounts	Administrator account: username: **admin** / password: **admin**
	XML interface account: username: **www:** / password: **admin**
	Device Manager GUI access account: username: **dm** / password: N/A
Host name	switch

Table 1-1 Default Setup Parameters

Parameter	Default
Inactivity timeout	5 minutes
Gigabit Ethernet port, port mode, and management VLAN parameters when using the ACE setup script	• Management VLAN allocated to the specified Ethernet port. • VLAN 1000 assigned as the management VLAN interface. • GigabitEthernet port mode configured as VLAN access port. • Extended IP access list that allows IP traffic originating from any other host addresses. • Traffic classification (class map and policy map) created for management protocols HTTP, HTTPS, ICMP, SSH, Telnet, and XML-HTTPS. HTTPS is dedicated for connectivity with the Device Manager GUI. • VLAN interface configured on the ACE and a policy map assigned to the VLAN interface.

Setting Up the ACE

This section describes the tasks associated with setting up the ACE and includes the following topics:

Establishing a Console Connection on the ACE

This section describes how to establish a direct serial connection between your terminal or a PC and the ACE by making a serial connection to the console port on the rear panel of the ACE. The ACE has one standard RS-232 serial port found on the rear panel that operates as the console port.

Prerequisites

This setup procedure requires a properly configured terminal and cable as described in the "Prerequisites for Setting Up the ACE" section.

Restrictions

Only the Admin context is accessible through the console port; all other contexts can be reached through Telnet or SSH sessions.

Detailed Steps

Follow these steps to access the ACE using a direct serial connection:

Step 1 Connect the serial cable between the ACE and the terminal and then use any terminal communications application to access the ACE CLI. This procedure uses HyperTerminal for Windows.

Step 2 Launch HyperTerminal. The Connection Description window appears.

Step 3 Enter a name for your session in the Name field.

Step 4 Click **OK**. The Connect To window appears.

Step 5 From the drop-down list, choose the COM port to which the device is connected.

Step 6 Click **OK**. The Port Properties window appears.

Step 7 Set the following port properties:

- Baud Rate = 9600
- Data Bits = 8
- Flow Control = none
- Parity = none
- Stop Bits = 1

Step 8 Click **OK** to connect.

Step 9 Press **Enter** to access the CLI prompt.

```
switch login:
```

What to Do Next

When the login prompt displays, proceed with the following tasks:

- Once a session is created, choose **Save As** from the File menu to save the connection description. Saving the connection description has the following two advantages:
  - The next time that you launch HyperTerminal, the session is listed as an option under **Start** > **Programs** > **Accessories** > **HyperTerminal** > **Name_of_session**. This option lets you reach the CLI prompt directly without going through the configuration steps.
  - You can connect your cable to a different device without configuring a new HyperTerminal session. If you use this option, make sure that you connect to the same port on the new device as was configured in the saved HyperTerminal session. Otherwise, a blank screen appears without a prompt.
- If this is the first time that you are booting the ACE, see the "Using the Setup Script to Enable Connectivity to the Device Manager" section.

  If this is not the first time that you are booting the ACE, see the "Connecting and Logging In to the ACE" section for information about logging in and entering the configuration mode to configure the ACE.

Using the Setup Script to Enable Connectivity to the Device Manager

This section describes how to use the setup script to simplify connectivity to the Device Manager GUI (as described in the *Cisco 4700 Series Application Control Engine Appliance Device Manager GUI Quick Configuration Guide).* When you boot the ACE for the first time and the appliance does not detect a startup-configuration file, a setup script appears to guide you through the process of configuring a management VLAN on the ACE through one of its Gigabit Ethernet ports.

After you specify a gigabit Ethernet port, port mode, and a management VLAN, the setup script automatically applies the following default configuration:

- Management VLAN allocated to the specified Ethernet port.
- VLAN 1000 assigned as the management VLAN interface.
- GigabitEthernet port mode configured as VLAN access port.

- Extended IP access list that allows IP traffic originating from any other host addresses.
- Traffic classification (class map and policy map) created for management protocols HTTP, HTTPS, ICMP, SSH, Telnet, and XML-HTTPS. HTTPS is dedicated for connectivity with the Device Manager GUI.
- VLAN interface configured on the ACE and a policy map assigned to the VLAN interface.

The ACE provides a default answer in brackets [ ] for each question in the setup script. To accept a default configuration prompt, press **Enter**, and the ACE accepts the setting. To skip the remaining configuration prompts, press **Ctrl-C** any time during the configuration sequence.

Note The script configuration process described in this section is identical to the script configuration process performed using the **setup** CLI command.

Detailed Steps

Follow these steps to configure the ACE using the setup script:

Step 1 Ensure that you have established a direct serial connection between your terminal or a PC and the ACE (see the "Establishing a Console Connection on the ACE" section).

Step 2 Press the power button on the front of the ACE and the boot process occurs. See the *Cisco Application Control Engine Appliance Hardware Installation Guide* for details.

Step 3 At the login prompt, log into the ACE by entering the login username and password. By default, the username and password are admin. For example, enter:

```
Starting sysmgr processes.. Please wait...Done!!!

switch login: admin
Password: admin
```

Step 4 At the prompt "Enter the password for "admin:", change the default Admin password. If you do not change the default Admin password, after you upgrade the ACE software you will only be able to log in to the ACE through the console port.

```
Enter the new password for "admin": xxxxx
Confirm the new password for "admin": xxxxx
admin user password successfully changed.
```

Step 5 At the prompt "Enter the password for "www:", change the default www user password. If you do not change the default www user password, the www user will be disabled and you will not be able to use Extensible Markup Language (XML) to remotely configure an ACE until you change the default www user password.

```
Enter the new password for "www": xxxxx
Confirm the new password for "www": xxxxx
www user password successfully changed.
```

Step 6 At the prompt "Would you like to enter the basic configuration dialog? (yes/no):", type **yes** to continue the setup (or select **no** to or bypass its operation and directly access the CLI).

Step 7 At the prompt "Enter the Ethernet port number to be used as the management port (1-4):? [1]:", specify the Ethernet port that you want to use to access the Device Manager GUI. Valid entries are 1 through 4. The default is Ethernet port 1. Press **Enter**.

Step 8 At the prompt "Enter the management port IP Address (n.n.n.n): [192.168.1.10]:", assign an IP address to the management VLAN interface. When you assign an IP address to a VLAN interface, the ACE automatically makes it a routed mode interface. Press **Enter**.

Step 9 At the prompt "Enter the management port Netmask(n.n.n.n): [255.255.255.0]:", assign a subnet mask to the management VLAN interface. Press **Enter**.

Step 10 At the prompt "Enter the default route next hop IP Address (n.n.n.n) or <enter> to skip this step:", choose whether to assign an IP address of the gateway router (the next-hop address for this route). If you specify **yes**, enter the IP address of default gateway. The gateway address must be in the same network as specified in the IP address for a VLAN interface. Press **Enter**.

Step 11 After you configure the Ethernet port, the setup script displays a summary of entered values:

```
Management Port: 3
Ip address 12.3.4.5
Netmask: 255.255.255.0
Default Route: 23.4.5.6
```

Step 12 At the prompt "Submit the configuration including security settings to the ACE Appliance? (yes/no/details): [y]:", enter one of the following replies:

- Type **y** to apply the appropriate configuration and save the running-configuration to the startup-configuration file. This is the default.
- Type **n** to bypass applying the configuration and saving the running-configuration to the startup-configuration file.
- Type **d** to view a detailed summary of the entered configuration values before you apply those configuration values to the ACE.

Step 13 If you select **d**, the configuration summary appears:

```
interface gigabitEthernet 1/3
  switchport access vlan 1000
  no shut
access-list ALL extended permit ip any any class-map type management match-any
remote_access
  match protocol xml-https any
  match protocol dm-telnet any
  match protocol icmp any
  match protocol telnet any
  match protocol ssh any
  match protocol http any
  match protocol https any
  match protocol snmp any
policy-map type management first-match remote_mgmt_allow_policy
  class remote_access
    permit
interface vlan 1000
  ip address 192.168.1.10 255.255.255.0
  access-group input ALL
  service-policy input remote_mgmt_allow_policy
  no shutdown
ssh key rsa
ip route 0.0.0.0 0.0.0.0 172.16.2.1
```

The prompt "Submit the configuration including security settings to the ACE Appliance? (yes/no/details): [y]:" reappears. Enter one of the following replies:

- Type **y** to apply the appropriate configuration and save the running-configuration to the startup-configuration file. This is the default.

- Type **n** to bypass applying the configuration and saving the running-configuration to the startup-configuration file.

Step 14 When you select **y**, the following message appears:

```
Configuration successfully applied. You can now manage this ACE Appliance by entering the
url 'https://192.168.1.10' into a web browser to access the Device Manager GUI.
```

Connecting and Logging In to the ACE

This section describes how to connect (session) to the ACE as the default user from the ACE console port. Once you connect to the ACE as the default user, you can then log in and enter the configuration mode to configure the ACE.

The ACE creates the following default users at startup: admin, dm, and www.

- The admin user is the global administrator and cannot be deleted.
- The dm user is for accessing the Device Manager GUI and cannot be deleted. The dm user is an internal user required by the Device Manager GUI; it is hidden on the ACE CLI.

Note Do not modify the dm user password from the ACE CLI. If the password is changed, the Device Manager GUI will become inoperative. If this occurs, restart the Device Manager using the **dm reload** command (you must be the global administrator to access the **dm reload** command). Note that restarting the Device Manager does not impact ACE functionality; however, it may take a few minutes for the Device Manager to reinitialize as it reads the ACE CLI configuration.

- The ACE uses the www user account for the XML interface and cannot be deleted.

Later, when you configure interfaces and IP addresses on the ACE itself, you can remotely access the ACE CLI through an ACE interface by using a Telnet or SSH session. To configure remote access to the ACE CLI, see Chapter 2, Enabling Remote Access to the ACE. For details on configuring interfaces on the ACE, see the *Cisco 4700 Series Application Control Engine Appliance Routing and Bridging Configuration Guide*.

You can configure the ACE to provide a higher level of security for users accessing the ACE. For information about configuring user authentication for login access, see the *Cisco 4700 Series Application Control Engine Appliance Security Configuration Guide*.

Restrictions

Only the Admin context is accessible through the console port; all other contexts can be reached through a Telnet or SSH remote access session.

Detailed Steps

Follow these steps to session into the ACE and access configuration mode to perform the initial configuration:

Step 1 Access the ACE directly by its console port, attach a terminal to the asynchronous RS-232 serial port on the rear panel of the ACE. The ACE has one standard RS-232 serial port found on the rear panel that operates as the console port. Any device connected to this port must be capable of asynchronous transmission. Connection requires a terminal configured as 9600 baud, 8 data bits, hardware flow control on, 1 stop bit, no parity.See the "Establishing a Console Connection on the ACE" section.

Step 2 Log into the ACE by entering the login username and password at the following prompt:

```
switch login: admin
Password: admin
```

By default, both the username and password are admin.

The prompt changes to the following:

```
host1/Admin#
```

To change the default login username and password, see the "Changing or Resetting the Administrative Password" section for details.

Caution You must change the default Admin password if you have not already done so. Otherwise, you will be able to log in to the ACE only through the console port. You will not be able to access the ACE using Telnet or SSH until you change the default Admin password.

Note When you boot the ACE for the first time and the appliance does not detect a startup-configuration file, a setup script appears to enable connectivity to the ACE Device Manager GUI. The start-up script is not intended for use with the CLI. Select **no** to skip the use of the setup script and proceed directly to the CLI. See "Connecting and Logging In to the ACE" section for details.

Step 3 To access configuration mode, enter:

```
host1/Admin# configure
Enter configuration commands, one per line. End with CNTL/Z
```

The prompt changes to the following:

```
host1/Admin(config)#
```

Changing or Resetting the Administrative Password

This section describes how to change or reset the administrative password and includes the following topics:

Changing the Administrative Password

This section describes how to change the administrative password. During the initial login process to the ACE, you enter the default user name **admin** and the default password **admin** in lowercase text. You cannot modify or delete the default administrative username; however, for security reasons, you must change the default administrative password. If you do not change the password, then security on your ACE can be compromised because the administrative username and password are configured to be the same for every ACE shipped from Cisco Systems.

The administrative username and password are stored in Flash memory. Each time that you reboot the ACE, it reads the username and password from Flash memory. Global administrative status is assigned to the administrative username by default.

Note For information about changing a user password, see the *Cisco 4700 Series Application Control Engine Appliance Virtualization Configuration Guide*.

Caution You must change the default Admin password if you have not already done so. Otherwise, you can log in to the ACE only through the console port.

Detailed Steps

	Command	Purpose
Step 1	**config** **Example:** host1/Admin# config host1/Admin(config)#	Enters global configuration mode.
Step 2	**username** *name1* [**password** [**0** | **5**] {*password*}] **Example:** host1/Admin(config)# username admin password 0 mysecret_801	Changes the default username and password. The keywords, arguments, and options are as follows: • *name1*—Sets the username that you want to assign or change. Enter **admin**. • **password**—(Optional) Keyword that indicates that a password follows. • **0**—(Optional) Specifies a clear text password. • **5**—(Optional) Specifies an MD5-hashed strong encryption password. • *password*—The password in clear text, encrypted text, or MD5 strong encryption, depending on the numbered option (0 or 5) that you enter. If you do not enter a numbered option, the password is in clear text by default. Enter a password as an unquoted text string with a maximum of 64 characters. **Note** If you specify an MD5-hashed strong encryption password, the ACE considers a password to be weak if it less than eight characters in length. The ACE supports the following special characters in a password: , . / = + - ^ @ ! % ~ # $ * ( ) Note that the ACE encrypts clear text passwords in the running-config.
Step 3	**do copy running-config startup-config** **Example:** host1/Admin(config)# do copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Resetting the Administrator Account Password

This section describes how recover the admin password during the initial bootup sequence of the ACE if you forget the password for the ACE administrator account and cannot access the ACE. You must have access to the ACE through the console port to be able to reset the password for the Admin user back to the factory-default value of admin.

Restrictions

Only the Admin context is accessible through the console port.

Detailed Steps

Follow these steps to reset the password that allows the Admin user access to the ACE:

Step 1 Connect to the console port on the ACE.

Step 2 Log in to the ACE. See the "Connecting and Logging In to the ACE" section.

Step 3 Reboot the ACE. See the "Restarting the ACE" section.

Step 4 During the bootup process, output appears on the console terminal. Press **ESC** when the "Starting services..." message appears on the terminal (see the example below). The setup mode appears. If you miss the time window, wait for the ACE to properly complete booting, reboot the ACE, and try again to access the setup mode by pressing **ESC**.

```
Daughter Card Found. Continuing...


INIT: Entering runlevel: 3
Testing PCI path ....
This may take some time, Please wait ....
PCI test loop , count 0
PCI path is ready
Starting services... <<<<< Press ESC when you see this message
Entering setup sequence...
Reset Admin password [y/n] (default: n): y
Resetting admin password to factory default...
.

Starting sysmgr processes.. Please wait...Done!!!

switch login:
```

Step 5 The setup mode prompts if you want to reset the **admin** password. Enter **y**. The "Resetting admin password to factory default" message appears. The ACE deletes the admin user password configuration from the startup-configuration and resets the password back to the factory default value of admin.

The boot process continues as normal and you are able to enter the **admin** password at the login prompt.

Assigning a Name to the ACE

This section describes how to specify a hostname for the ACE or for the peer ACE in a redundant configuration. The hostname is used to identify the ACE and for the command-line prompts. If you establish sessions to multiple devices, the hostname helps you track where you enter commands. By default, the hostname for the ACE is "switch."

Restrictions

Only the Admin context is accessible through the console port.

Detailed Steps

	Command	Purpose
Step 1	**config** **Example:** host1/Admin# config host1/Admin(config)#	Enters global configuration mode.
Step 2	**hostname** *name* **Example:** host1/Admin(config)# hostname ACE_1 ACE_1/Admin(config)#	Changes the ACE name. The *name* argument specifies a new hostname for the ACE. Enter a case-sensitive text string that contains from 1 to 32 alphanumeric characters.
Step 3	**peer hostname** *name* **Example:** ACE_1/Admin(config)# peer hostname ACE_2	(Optional) Changes the peer ACE name in a redundant configuration. The *name* argument specifies a new hostname for the peer ACE. Enter a case-sensitive text string that contains from 1 to 32 alphanumeric characters.
Step 4	**do copy running-config startup-config** **Example:** ACE_1/Admin(config)# do copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Configuring an ACE Inactivity Timeout

This section describes how to modify the length of time that can occur before the ACE automatically logs off an inactive user by specifying the length of time that a user session can be idle before the ACE terminates the console, Telnet, or SSH session. By default, the inactivity timeout value is 5 minutes.

Restrictions

The **login timeout** command setting overrides the **terminal session-timeout** setting (see the "Configuring Terminal Display Attributes" section).

Detailed Steps

	Command	Purpose
Step 1	**config** **Example:** host1/Admin# config host1/Admin(config)#	Enters global configuration mode.
Step 2	**login timeout** *minutes* **Example:** host1/Admin(config)# login timeout 10	Configures the inactivity timeout value. The *minutes* argument specifies the length of time that a user can be idle before the ACE terminates the session. Valid entries are from 0 to 60 minutes. A value of 0 instructs the ACE never to timeout. The default is 5 minutes.

	Command	Purpose
	no login timeout **Example:** host1/Admin(config)# no login timeout	(Optional) Restores the default timeout value of 5 minutes.
Step 3	**do copy running-config startup-config** **Example:** host1/Admin(config)# do copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Configuring a Message-of-the-Day Banner

This section describes how to configure a message in configuration mode to display as the message-of-the-day banner when a user connects to the ACE. Once connected to the ACE, the message-of-the-day banner appears, followed by the login banner and Exec mode prompt.

Restrictions

If you connect to the ACE by using an SSH version 1 remote access session, the message-of-the-day banner is not displayed.

Detailed Steps

	Command	Purpose

Step 1	**config**
	
	Example:
	`host1/Admin# config`
	`host1/Admin(config)#`
		Enters global configuration mode.

Step 2	**banner motd** *text* **Example:** `host1/Admin(config)# banner motd #Welcome to "$(hostname)"...#`	Configures the message-of-the-day banner. The *text* argument is a line of message text to be displayed as the message-of-the-day banner. The text string consists of all characters that follow the first space until the end of the line (carriage return or line feed). The pound (#) character functions as the delimiting character for each line. For the banner text, spaces are allowed but tabs cannot be entered at the CLI. To instruct the ACE to display multiple lines in a message-of-the-day banner, enter a new banner motd command for each line that you want to appear. The banner message is a maximum of 80 characters per line, up to a maximum of 3000 characters (3000 bytes) for a message-of-the-day banner. This maximum value includes all line feeds and the last delimiting character in the message. To add multiple lines to an existing a message-of-the-day banner, precede each line by using the banner motd command. The ACE appends each line to the end of the existing banner. If the text is empty, the ACE adds a carriage return (CR) to the banner. You can include tokens in the form $(token) in the message text. Tokens will be replaced with the corresponding configuration variable. For example, enter: • $(hostname)—Displays the hostname for the ACE during run time. • $(line)—Displays the tty (teletypewriter) line or name (for example, "/dev/console", "/dev/pts/0", or "1"). To use the $(hostname) in a single line banner motd input, you must include double quotes (") around the $(hostname) so that the $ is interpreted as a special character at the beginning of a variable in the single line (see the Step example). Do not use the double quote character (") or the percent sign character (%) as a delimiting character in a single line message string. For multi-line input, double quotes (") are not required for the token because the input mode is different from signal-line mode. When you operate in multi-line mode, the ACE interprets the double quote character (") literally.

	Command	Purpose
	no banner motd **Example:** host1/Admin(config)# do show banner motd	(Optional) Replace a banner or a line in a multi-line banner.
Step 3	**do show banner motd** **Example:** host1/Admin(config)# no banner motd	(Optional) Display the configured banner message.
Step 4	**do copy running-config startup-config** **Example:** host1/Admin(config)# do copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Examples

The following example shows how to span multiple lines and use tokens to configure the banner message:

```
host1/Admin(config)# banner motd #
Enter TEXT message. End with the character '#'.
================================
Welcome to Admin Context
--------------------------------
Hostname: $(hostname)
Tty Line: $(line)
================================
#
```

Configuring the Date and Time

This section describes how to manually configure the date, time, and time zone settings for an ACE.

You can automatically set the date and time of the ACE by synchronizing to a Network Time Protocol (NTP) server. For details, see the "Synchronizing the ACE with an NTP Server" section.

This section contains the following topics:

Setting the System Time and Date

This section describes how to set the time and the date for an ACE.

Note If you wish to use the Network Time Protocol (NTP) to automatically synchronize the ACE system clock to an authoritative time server (such as a radio clock or an atomic clock), see the "Synchronizing the ACE with an NTP Server" section. In this case, the NTP time server automatically sets the ACE system clock.

Restriction

If you previously configured NTP on an ACE, the ACE prevents you from using the **clock set** command to set the time and the date and displays an error message. To manually set the ACE system clock, remove the NTP peer and NTP server from the configuration before setting the clock on an ACE. See the "Synchronizing the ACE with an NTP Server" section for more information.

Detailed Steps

	Command	Purpose

Step 1	**clock set** *hh:mm:ss DD MONTH YYYY*
	
	Example:
	`host1/Admin# clock set 01:38:30 7 August 2009`
	`Fri Aug 7 01:38:30 PST 2009`
		Sets the time and the date for an ACE. When you enter this command, the ACE displays the current configured date and time.
		
		The arguments are:
		• *hh:mm:ss*—Current time to which the ACE clock is being reset. Specify two digits for the hours, minutes, and seconds.
		• *DD MONTH YYYY*—Current date to which the ACE clock is being reset. Specify one or two digits for the day, the full name of the month, and four digits for the year. The following month names are recognized: January, February, March, April, May, June, July, August, September, October, November, and December.

Step 2	**show clock**
	
	Example:
	`host1/Admin# show clock`
	`Fri Aug 7 01:38:30 PST 2009`
		(Optional) Displays the current clock settings.

Configuring the Time Zone

This section describes how to set the time zone of the ACE. The ACE keeps time internally in Universal Time Coordinated (UTC) offset.

Detailed Steps

	Command	Purpose
Step 1	**config** **Example:** host1/Admin# config host1/Admin(config)#	Enters global configuration mode.
Step 2	**clock timezone** {*zone_name*{**+** | **-**} *hours minutes*} | {**standard** *timezone*} **Example:** host1/Admin(config)# clock timezone PST -8 0	Configures the time zone of the ACE. The keywords, arguments, and options are as follows: • *zone_name*—The 8-character name of the time zone (for example, PDT) to be displayed when the time zone is in effect. Table 1-1 lists the common time zone acronyms that you can use for the *zone_name* argument. • *hours*—Hours offset from UTC. The range is from –23 to +23. • *minutes*—Minutes offset from UTC. The range is from 0 to 59 minutes. • **standard** *timezone*—Displays a list of well known time zones that include an applicable UTC hours offset. Available choices in the list are as follows: – **AKST**—Alaska Standard Time, as UTC –9 hours – **AST**—Atlantic Standard Time, as UTC –4 hours – **BST**—British Summer Time, as UTC + 1 hour – **CEST**—Central Europe Summer Time, as UTC + 2 hours – **CET**—Central Europe Time, as UTC + 1 hour – **CST**—Central Standard Time, as UTC –6 hours – **CST**—Central Standard Time, as UTC + 9.5 hours – **EEST**—Eastern Europe Summer Time, as UTC + 3 hours – **EET**—Eastern Europe Time, as UTC + 2 hours – **EST**—Eastern Standard Time, as UTC -5 hours – **GMT**—Greenwich Mean Time, as UTC – **HST**—Hawaiian Standard Time, as UTC –10 hours – **IST**—Irish Summer Time, as UTC + 1 hour – **MSD**—Moscow Summer Time, as UTC + 4 hours – **MSK**—Moscow Time, as UTC + 3 hours – **MST**—Mountain Standard Time, as UTC –7 hours – **PST**—Pacific Standard Time, as UTC –8 hours – **WEST**—Western Europe Summer Time, as UTC + 1 hour – **WST**—Western Standard Time, as UTC + 8 hours

	Command	Purpose
	no clock timezone **Example:** host1/Admin(config)# no clock timezone	(Optional) Removes the clock timezone setting.
Step 3	**do show clock** **Example:** host1/Admin (config)# do show clock Fri Aug 7 01:38:30 PST 2009	(Optional) Displays the current clock settings.
Step 4	**do copy running-config startup-config** **Example:** host1/Admin(config)# do copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Table 1-1 lists common time zone acronyms that you use when specifying the zone name using the command's *zone_name* argument.

Table 1-1 Common Time Zone Acronyms

Acronym	Time Zone Name and UTC Offset
Europe	
BST	British Summer Time, as UTC + 1 hour
CET	Central Europe Time, as UTC + 1 hour
CEST	Central Europe Summer Time, as UTC + 2 hours
EET	Eastern Europe Time, as UTC + 2 hours
EEST	Eastern Europe Summer Time, as UTC + 3 hours
GMT	Greenwich Mean Time, as UTC
IST	Irish Summer Time, as UTC + 1 hour
MSK	Moscow Time, as UTC + 3 hours
MSD	Moscow Summer Time, as UTC + 4 hours
WET	Western Europe Time, as UTC
WEST	Western Europe Summer Time, as UTC + 1 hour
United States and Canada	
AST	Atlantic Standard Time, as UTC – 4 hours
ADT	Atlantic Daylight Time, as UTC – 3 hours
CT	Central Time, either as CST or CDT, depending on the place and time of the year
CST	Central Standard Time, as UTC – 6 hours
CDT	Central Daylight Saving Time, as UTC – 5 hours
ET	Eastern Time, either as EST or EDT, depending on the place and time of the year
EST	Eastern Standard Time, as UTC – 5 hours
EDT	Eastern Daylight Saving Time, as UTC – 4 hours
MT	Mountain Time, either as MST or MDT, depending on the place and time of the year
MDT	Mountain Daylight Saving Time, as UTC – 6 hours

Table 1-1 Common Time Zone Acronyms (continued)

Acronym	Time Zone Name and UTC Offset
MST	Mountain Standard Time, as UTC – 7 hours
PT	Pacific Time, either as PST or PDT, depending on the place and time of the year
PDT	Pacific Daylight Saving Time, as UTC – 7 hours
PST	Pacific Standard Time, as UTC – 8 hours
AKST	Alaska Standard Time, as UTC – 9 hours
AKDT	Alaska Standard Daylight Saving Time, as UTC – 8 hours
HST	Hawaiian Standard Time, as UTC – 10 hours
Australia	
CST	Central Standard Time, as UTC + 9.5 hours
EST	Eastern Standard/Summer Time, as UTC + 10 hours (+11 hours during summer time)
WST	Western Standard Time, as UTC + 8 hours

Adjusting for Daylight Saving Time

This section describes how to configure the ACE to change the time automatically to summer time (daylight saving time) by specifying when summer time begins and ends. All times are relative to the local time zone; the start time is relative to standard time and the end time is relative to summer time. If the starting month is after the ending month, the ACE assumes that you are located in the Southern Hemisphere.

Detailed Steps

	Command	Purpose
Step 1	**config** **Example:** host1/Admin# config host1/Admin(config)#	Enters global configuration mode.
Step 2	**clock summer-time** {*daylight_timezone_name start_week start_day start_month start_time end_week end_day end_month end_time daylight_offset* | **standard** *timezone*} **Example:** host1/Admin(config)# clock summer-time Pacific 1 Sun Apr 02:00 5 Sun Oct 02:00 60	Configures the ACE to change the time automatically to summer time (daylight saving time). The keywords, arguments, and options are as follows: • *daylight_timezone_name*—The eight-character name of the time zone (for example, PDT) to be displayed when summer time is in effect. See Table 1-1 for the list the common time zone acronyms used for the *daylight_timezone_name* argument. • *start_week end_week*—The week, ranging from 1 through 5. • *start_day end_day*—The day, ranging from Sunday through Saturday. • *start_month end_month*—The month, ranging from January through December. • *start_time end_time*—Time, in military format, specified in hours and minutes. • *daylight_offset*—Number of minutes to add during the summer time. Valid entries are 1 to 1440. • **standard** *timezone*—Displays a list of well known time zones that include an applicable daylight time start and end range along with a daylight offset. Available list choices are as follows: – **ADT**—Atlantic Daylight Time: 2 a.m. 1st Sunday April to 2 a.m. last Sunday Oct, + 60 min – **AKDT**—Alaska Standard Daylight Time: 2 a.m. 1st Sunday April to 2 a.m. last Sunday Oct, + 60 min – **CDT**—Central Daylight Time: 2 a.m. 1st Sunday April to 2 a.m. last Sunday Oct, + 60 min – **EDT**—Eastern Daylight Time: 2 a.m. 1st Sunday April to 2 a.m. last Sunday Oct, + 60 min – **MDT**—Mountain Daylight Time: 2 a.m. 1st Sunday April to 2 a.m. last Sunday Oct, + 60 min – **PDT**—Pacific Daylight Time: 2 a.m. 1st Sunday April to 2 a.m. last Sunday Oct, + 60 min

	Command	Purpose
	no clock summer-time **Example:** host1/Admin(config)# no clock summer-time	(Optional) Remove the clock summer-time setting.
Step 3	**do copy running-config startup-config** **Example:** host1/Admin(config)# do copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

Synchronizing the ACE with an NTP Server

This section describes how to use Network Time Protocol (NTP) to synchronize the ACE system clock to a time server. NTP is an Internet protocol designed to synchronize the clocks of computers over a network. Typically, an NTP network receives its time from an authoritative time source, such as a radio clock or an atomic clock attached to a time server, and assures accurate local time-keeping. NTP distributes this time across the network. The NTP protocol can synchronize distributed clocks within milliseconds over long time periods.

NTP runs over User Datagram Protocol (UDP), which runs over IP. NTP is documented in RFC 1305. All NTP communication uses Coordinated Universal Time (UTC), which is the same as Greenwich Mean Time.

An NTP association can be a peer association, which means that the ACE is willing to synchronize to the other system or to allow the other system to synchronize to the ACE. An NTP association can also be a server association, which means that only this system will synchronize to the other system, not the other way around. You can identify multiple servers; the ACE uses the most accurate server. To configure the ACE system clock to synchronize a peer (or to be synchronized by a peer) or to be synchronized by a time server, use the **ntp** command. To display a list of the current associated peers and NTP statistical information, see the "Displaying NTP Statistics and Information" section.

Prerequisites

This configuration topic includes the following prerequisites:

- An NTP server must be accessible by the client ACE.
- If you are configuring application acceleration and optimization functionality (as described in the *Cisco 4700 Series Application Control Engine Appliance Application Acceleration and Optimization Configuration Guide),* and you plan to use an optional Cisco AVS 3180A Management Console with multiple ACE nodes, we strongly recommend that you synchronize the system clock of each ACE node with an NTP server. AppScope performance monitoring relies on very accurate time measurement, in the millisecond range. If you instal multiple ACE appliances, you must synchronize the clocks so that different parts of a single transaction can be handled by different nodes.

Restrictions

Only users authenticated in the Admin context can use the **ntp** command.

Detailed Steps

	Command	Purpose

Step 1	**config**
	
	Example:
	`ACE_1/Admin# config`
	`ACE_1/Admin(config)#`
		Enters global configuration mode.

Step 2	**ntp peer** *ip_address* [**prefer**] **Example:** `ACE_1/Admin(config)# ntp peer 192.168.10.0`	Configure the ACE system clock to synchronize a peer (or to be synchronized by a peer). The keywords, arguments, and options are: • *ip_address*—IP address of the peer providing or being provided by the clock synchronization. • **prefer**—(Optional) Makes this peer the preferred peer that provides synchronization. Using the **prefer** keyword reduces switching back and forth between peers.
	no ntp peer *ip_address* **Example:** `ACE_1/Admin(config)# no ntp peer 192.168.10.0`	(Optional) Remove an NTP peer or server from the configuration.
Step 3	**ntp server** *ip_address* [**prefer**] **Example:** `ACE_1/Admin(config)# ntp server 192.168.10.10`	Configure the ACE system clock to be synchronized by a time server. The keywords, arguments, and options are: • *ip_address*—IP address of the time server that provides the clock synchronization. • **prefer—**(Optional) Makes this server the preferred server that provides synchronization. The **prefer** keyword sets this NTP server as the preferred server if multiple servers have similar accuracy. NTP uses an algorithm to determine which server is the most accurate and synchronizes to that one. If servers have similar accuracy, then the **prefer** keyword specifies which server to use.
	no ntp server *ip_address* **Example:** `ACE_1/Admin(config)# no ntp server 192.168.10.10`	(Optional) Remove an NTP peer or server from the configuration.
Step 4	**do copy running-config startup-config** **Example:** `ACE_1/Admin(config)# do copy running-config startup-config`	(Optional) Copies the running configuration to the startup configuration.

Examples

For example, to specify multiple NTP server IP addresses and identify a preferred server, enter:

```
host1/Admin(config)# ntp server 192.168.10.10 prefer
host1/Admin(config)# ntp server 192.168.4.143
host1/Admin(config)# ntp server 192.168.5.10
```

Configuring Terminal Settings

This section describes how to access the ACE CLI by using one of the following methods:

- Make a direct connection by using a dedicated terminal attached to the console port on the front of the ACE.
- Establish a remote connection to the ACE using the Secure Shell (SSH) or Telnet protocols.

This section contains the following topics:

- Configuring Terminal Display Attributes
- Configuring Virtual Terminal Line Settings

For details on configuring remote access to the ACE CLI using SSH or Telnet, see Chapter 2, Enabling Remote Access to the ACE.

Restrictions

This configuration topic includes the following restrictions:

- Only the Admin context is accessible through the console port; all other contexts can be reached through Telnet or SSH.
- The login timeout command setting overrides the terminal session-timeout setting (see the "Configuring an ACE Inactivity Timeout" section).

Configuring Terminal Display Attributes

This section describes how to specify the number of lines and the width for displaying information on a terminal during a console session.

Restrictions

The maximum number of displayed screen lines is 511 columns.

Detailed Steps

	Command	Purpose
Step 1	**terminal length** *lines* **Example:** host1/Admin# terminal lines 50	Specifies the number of lines for displaying information on a terminal during a console session. The *lines* argument sets the number of lines displayed on the current terminal screen. This command is specific to only the console port. Telnet and SSH sessions set the length automatically. Valid entries are from 0 to 511. The default is 24 lines. A value of 0 instructs the ACE to scroll continuously (no pausing) and overrides the terminal width value. If you later change the terminal length to any other value, the originally configured terminal width value takes effect.
Step 2	**terminal monitor** **Example:** host1/Admin# terminal monitor %ACE-7-111009: User 'admin' executed cmd: terminal monitor %ACE-7-111009: User 'admin' executed cmd: terminal monitor.....	Starts the terminal monitor session and displays syslog output on the terminal. To enable the various levels of syslog messages to the terminal, use the **logging monitor** command (see the *Cisco 4700 Series Application Control Engine Appliance System Message Guide* for details).
	terminal no monitor **Example:** host1/Admin# terminal no monitor	(Optional) Stops the current terminal monitoring session.
Step 3	**terminal session-timeout** *minutes* **Example:** host1/Admin# terminal session-timeout 600	Specifies the inactivity timeout value in minutes to configure the automatic logout time for the current terminal session on the ACE. When inactivity exceeds the time limit configured by this command, the ACE closes the session and exits. The range is from 0 to 525600. The default value is inherited from the value that is configured for the **login timeout** command. If you do not configure a value for the **login timeout** command, the default for both commands is 5 minutes. You can set the **terminal session-timeout** value to 0 to disable this feature so that the terminal remains active until you choose to exit the ACE. The ACE does not save this change in the configuration file. The *minutes* argument sets the timeout value in minutes.
Step 4	**terminal terminal-type** *text* **Example:** host1/Admin# terminal terminal-type vt200	Specifies the name and type of the terminal used to access the ACE. If a Telnet or SSH session specifies an unknown terminal type, the ACE uses the VT100 terminal by default. The *minutes* argument is the terminal type. Specify a text string from 1 to 80 alphanumeric characters.
Step 5	**terminal width** *characters* **Example:** host1/Admin# terminal width 250	Specifies the width for displaying information on a terminal during a console session. This command is specific to the console port only.Telnet and SSH sessions set the width automatically. The *characters* argument sets the number of characters displayed on the current terminal screen. Valid entries are from 24 to 512. The default is 80 columns.

	Command	Purpose
	terminal no width **Example:** host1/Admin# terminal no width	(Optional) Resets a terminal setting to its default value.
Step 6	**show terminal** **Example:** host1/Admin# show terminal TTY: /dev/pts/0 Type: "vt100" Length: 25 lines, Width: 80 columns Session Timeout: 60 minutes	(Optional) Displays the console terminal settings.

Configuring Virtual Terminal Line Settings

This section describes how to configure the virtual terminal line settings to enable remote access to the ACE. A virtual terminal line is not associated with the console port; instead, it is a virtual port that allows you to access the ACE.

Detailed Steps

	Command	Purpose
Step 1	**config** **Example:** host1/Admin# config host1/Admin(config)#	Enters global configuration mode.
Step 2	**line vty** **Example:** host1/Admin(config)# line vty host1/Admin(config-line)#	Enters line configuration mode.
Step 3	**session-limit** *number* **Example:** host1/Admin(config-line)# session-limit 23	Specifies the maximum number of terminal sessions per line. The range is from 1 to 251.
	no session-limit *number* **Example:** host1/Admin(config-line)# no session-limit 23	(Optional) Disables a setting for the configured virtual terminal line.
Step 4	**do copy running-config startup-config** **Example:** host1/Admin(config-line)# do copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.

	Command	Purpose
Step 5	**Ctrl-z** **Example:** host1/Admin(config-line)# ctrl-z host1/Admin#	(Optional) Returns to the Exec mode prompt.
Step 6	**clear line** *vty_name* **Example:** host1/Admin# clear line vty vty1	(Optional) Closes a specified vty session. The *vty_name* argument specifies the name of the VTY session. Enter a maximum of 64 characters for the name of the virtual terminal.

Modifying the Boot Configuration

This section describes how control the way in which the ACE performs its boot process. You can instruct the ACE to automatically boot the system image identified in the BOOT environment variable or you can manually identify the system boot image to use. In addition, you can choose to have the ACE load the startup-configuration file or ignore the startup-configuration file upon reboot.

This section describes how to modify the boot configuration of the ACE and contains the following topics:

- Setting the Boot Method from the Configuration Register
- Setting the BOOT Environment Variable
- Configuring the ACE to Bypass the Startup Configuration File During the Boot Process

Setting the Boot Method from the Configuration Register

This section describes how to modify the boot method that the ACE uses at the next startup by setting the boot field in the software configuration register. The configuration register identifies how the ACE should boot, automatically or manually.

Restrictions

The **config-register** command used to change the configuration register settings affects only the configuration register bits that control the boot field and leaves the remaining bits unaltered.

Detailed Steps

	Command	Purpose
Step 1	**config** **Example:** host1/Admin# config host1/Admin(config)#	Enters global configuration mode.

	Command	Purpose
Step 2	**config-register** *value* **Example:** host1/Admin(config)# config-register 0x1	The *value* argument represents the configuration register value that you want to use the next time that you restart the ACE. The supported *value* entries are as follows: • **0x0—**Upon reboot, the ACE boots to the GNU GRand Unified Bootloader (GRUB). From the GRUB boot loader, you specify the system boot image to use to boot the ACE. Upon startup, the ACE loads the startup-configuration file stored in the Flash memory (nonvolatile memory) to the running-configuration file stored in RAM (volatile memory). For information about using the GRUB boot loader during a reboot, see the "Restarting the ACE" section. • **0x1—**Upon reboot, the ACE boots the system image identified in the BOOT environment variable (see the "Setting the BOOT Environment Variable" section). The BOOT environment variable specifies a list of image files on various devices from which the ACE can boot at startup. If the ACE encounters an error or if the image is not valid, it will try the second image (if one is specified). Upon startup, the ACE loads the startup-configuration file stored in the Flash memory (nonvolatile memory) to the running-configuration file stored in RAM (volatile memory).
	no config-register 0x1 **Example:** host1/Admin(config)# no config-register 0x1	(Optional) Resets the config-register setting.
Step 3	**do copy running-config startup-config** **Example:** host1/Admin(config)# do copy running-config startup-config	Copies the running configuration to the startup configuration.

Setting the BOOT Environment Variable

This section describes how to add several images to the BOOT environment variable to provide a fail-safe boot configuration. The BOOT environment variable specifies a list of image files on various devices from which the ACE can boot at startup. If the first file fails to boot the ACE, subsequent images that are specified in the BOOT environment variable are tried until the ACE boots or there are no additional images to attempt to boot. If there is no valid image to boot, the ACE enters ROMMON mode where you can manually specify an image to boot.

The ACE stores and executes images in the order in which you added them to the BOOT environment variable. If you want to change the order in which images are tried at startup, you can either prepend and clear images from the BOOT environment variable to attain the desired order or you can clear the entire BOOT environment variable and then redefine the list in the desired order.

Detailed Steps

	Command	Purpose
Step 1	**config** **Example:** host1/Admin# config host1/Admin(config)#	Enters global configuration mode.
Step 2	**boot system image:***image_name* **Example:** host1/Admin(config)# boot system image:c4710ace-mz.A3_1_0.bin	Sets the BOOT environment variable. The *image_name* argument specifies the name of the system image file. If the file does not exist (for example, if you entered the wrong filename), then the filename is appended to the bootstring, and this message displays, "Warning: File not found but still added in the bootstring." If the file does exist, but is not a valid image, the file is not added to the bootstring, and this message displays, "Warning: file found but it is not a valid boot image."
Step 3	**do show bootvar** **Example:** host1/Admin(config)# BOOT variable = "image:/c4710ace-mz.A3_1_0.bin;image:/c4710ace-mz.A1_8_0A.bin" Configuration register is 0x1	(Optional) Displays the BOOT environment variable settings.
Step 4	**do copy running-config startup-config** **Example:** host1/Admin(config)# do copy running-config startup-config	Copies the running configuration to the startup configuration.

Configuring the ACE to Bypass the Startup Configuration File During the Boot Process

This section describes how to use the GRUB bootloader to instruct the ACE to bypass the startup-configuration file stored on the appliance in the Flash memory (nonvolatile memory) during the boot process. You may require the ACE to bypass the startup configuration file during bootup in the following instances:

- Certain configurations cause problems that result in the ACE becoming nonresponsive. You can bypass the startup configuration file to safely boot the ACE and then resolve issues with the configuration.
- You forget the password for the ACE administrator CLI account and cannot access the ACE. You can bypass the startup configuration file and log in with the default password of admin.

Note For the procedure on resetting the administrator CLI account password, see the "Resetting the Administrator Account Password" section.

Detailed Steps

Follow these steps to instruct the ACE to bypass the startup-configuration file during the boot process from the GRUB bootloader:

1. Enter the **config-register** command so that upon reboot the ACE boots to the GRUB bootloader. See the "Setting the Boot Method from the Configuration Register" section.
2. Reboot the ACE. See the "Restarting the ACE" section. Upon reboot, the ACE boots to the GRUB bootloader.
3. Press **Esc** when the countdown initiates on the GNU GRUB multiboot loader. The following GRUB menu appears.

```
GNU GRUB  version 0.95  (639K lower / 3144640K upper memory)

*****************************************************************
*  image(c4710ace-mz.A3_1_0.bin)                                *
*  image(c4710ace-mz.A1_8_0A.bin)                               *
*
*                                                                        *
* ***************************************************************
```

4. In the GRUB menu, use the arrow keys to select from the ACE images loaded in Flash memory. The ACE image entry is highlighted in the list.
5. Type **e** to edit the kernel command line. If the boot string is greater than one line, you must press **e** a second time. Append **ignorestartupcfg=1**. to the end of the boot.

   For example, the following illustrates the screen output when you first type **e**:

```
*****************************************************************
* kernel=(hd0,1)/c4710ace-mz.A3_1_0.bin ro root=LABEL=/ auto consol*  *
*                                                                      *
*****************************************************************
```

   For example, the following illustrates the screen output when you press **e** a second time:

```
< auto console=ttyS0,9600n8 quiet bigphysarea=32768
```

   At this point, append **ignorestartupcfg=1** after the second edit.

```
< auto console=ttyS0,9600n8 quiet bigphysarea=32768 ignorestartupcfg=1
```

6. Press **enter** to return to the previous GRUB menu.
7. Press **b** to boot with this modified boot string.The ACE boot screen appears as follows:

Note When you instruct the ACE to bypass the startup-configuration file stored on the appliance, after you boot the ACE and the startup-configuration file is empty (typically for a new ACE), the ACE will automatically launch the setup script to enable connectivity to the ACE Device Manager GUI (see the "Connecting and Logging In to the ACE" section). Otherwise, the ACE boot screens appears as described in the output below. If necessary, you can manually launch the setup script using the **setup** command in Exec mode.

```
kernel=(hd0,1)/c4710ace-mz.A3_1_0.bin ro root=LABEL=/ auto console=ttyS0,96
00n8 quiet bigphysarea=32768
```

```
   [Linux-bzImage, setup=0x1400, size=0xb732b7a]

INIT: version 2.85 booting

Daughter Card Found. Continuing...

INIT: Entering runlevel: 3
Testing PCI path ....
This may take some time, Please wait ....
PCI test loop , count 0
PCI path is ready
Starting services...

Installing MySQL
groupadd: group nobody exists
useradd: user nobody exists
MySQL Installed
Installing JRE
JRE Installed

Starting sysmgr processes.. Please wait...Done!!!

switch login: admin
password# xxxxx
```

What to Do Next

You may now configure the ACE to define basic configuration settings for the appliance.

Restarting the ACE

You can reboot the ACE directly from its CLI and reload the configuration. When you reboot the ACE, it performs a full power cycle of both the hardware and software. Any open connections with the ACE are dropped. The reset process can take several minutes.

Caution Configuration changes that are not written to the Flash partition are lost after a reload. Before rebooting, enter the **copy running-conf startup-config** command in Exec mode to store the current configuration in Flash memory. If you fail to save your configuration changes, the ACE reverts to its previous settings upon restart.

This section includes the following topics:

- Restarting the ACE From the CLI
- Using the GRUB Boot Loader to Specify the System Boot Image During a Reload

Restarting the ACE From the CLI

This section describes how to reboot the ACE directly from its CLI.

Detailed Steps

	Command	Purpose
Step 1	**copy running-config startup-config** **Example:** host1/Admin# copy running-config startup-config	(Optional) Copies the running configuration to the startup configuration.
Step 2	**reload** **Example:** host1/Admin# reload This command will reboot the system Save configurations for all the contexts. Save? [yes/no]: yes Generating configuration.... running config of context Admin saved Perform system reload. [yes/no]: [yes] yes	Restarts the ACE and reloads the configuration. When you specify **reload**, the ACE prompts you for confirmation and performs a cold restart of the ACE. During the reload process, the ACE performs one of the following actions: • If you specified a value of **0x1** for the **config-register** command (see the "Setting the Boot Method from the Configuration Register" section), the ACE boots the system image identified in the BOOT environment variable. • If you specified a value of **0x0** for the **config-register** command, the ACE enters the GRUB boot loader mode and you must identify the location of an image file to boot (see the "Using the GRUB Boot Loader to Specify the System Boot Image During a Reload" section).

Using the GRUB Boot Loader to Specify the System Boot Image During a Reload

This section describes how to specify a value of **0x0** for the **config-register** command (see the "Setting the Boot Method from the Configuration Register" section) to force the ACE to enter the GRUB boot loader mode upon a reload or power cycle of the ACE. The ACE remains in GRUB boot loader mode until you identify the location of an image file to boot.

Press **Esc** when the count down initiates on the GRUB boot loader. The following GRUB menu appears.

```
GNU GRUB  version 0.95  (639K lower / 3144640K upper memory)

*************************************************************
*  image(c4710ace-mz.A3_1_0.bin)                            *
*  image(c4710ace-mz.A1_8_0A.bin)                           *
*                                                                    *
* ***********************************************************
```

In the GRUB menu, use the arrow keys to select from the ACE images loaded in the Flash memory. The ACE image entry is highlighted in the list.

Perform one of the following actions:

- Press **enter** to boot the selected software version.
- Type **e** to edit the commands before booting.
- Type **c** to access a command line.

If no ACE images are loaded in the Flash memory, the GNU GRUB multiboot loader appears as follows:

```
grub>
```

Shutting Down the ACE

This section describes how to remove power from the ACE by using the power button found on the front panel.

Caution Configuration changes that are not written to the Flash partition are lost after a shutdown. Before you shut down the ACE, enter the **copy running-conf startup-config** command in Exec mode to store the current configuration in Flash memory. If you fail to save your configuration changes, the ACE reverts to its previous settings upon restart.

Detailed Steps

	Command	Purpose
Step 1	**copy running-config startup-config** **Example:** `host1/Admin# copy running-config startup-config`	(Optional) Copies the running configuration to the startup configuration.
Step 2	Press the front panel power button.	Shuts down the ACE.

Displaying or Clearing the ACE Setup Configuration and Statistics

This section describes how to display or clear the ACE setup configuration and includes the following topics:

- Displaying ACE Setup Configuration and Statistics
- Clearing NTP Statistics

Displaying ACE Setup Configuration and Statistics

This section describes how to display the ACE setup configuration and statistical information and includes the following topics:

- Displaying NTP Statistics and Information
- Displaying Other ACE Setup Configuration Information

Displaying NTP Statistics and Information

This section describes how to instruct the ACE to display the following NTP statistics and information:

- NTP peer statistics
- Input/output statistics

- Counters maintained by the local NTP
- Counters related to the memory code
- Listing of all associated peers

Restrictions

Only users who are authenticated in the Admin context can use the **show ntp** command.

To display the NTP statistics and information, use the **show ntp** command from Exec mode as follows:

Command	Purpose
show ntp {**peer-status** | **peers** | **statistics** {**io** | **local** | **memory** | **peer** *ip_address*}} **Example:** host1/Admin# show ntp peer-status	Displays the NTP statistics and information. The keywords, arguments, and options are as follows: • **peer-status**—Displays the status for all configured NTP servers and peers. • **peers**—Displays a listing of all NTP peers. • **statistics**—Displays the NTP statistics. • **io**—Displays the input/output statistics. • **local**—Displays the counters maintained by the local NTP. • **memory**—Displays the statistic counters related to the memory code. • **peer**—Displays the per-peer statistics counter of a peer. • *ip_address*—Displays the peer statistics for the specified IP address.

Table 1-2 describes the fields in the **show ntp peer-status** command output.

Table 1-2 Field Descriptions for the show ntp peer-status Command

Field	Description
Total Peers	Number of associated peers
Remote	IP addresses that correspond to the remote server and peer entries listed in the configuration file
Local	IP addresses that correspond to the local server and peer entries listed in the configuration file
St	The stratum
Poll	The poll interval (in seconds)
Reach	The status of the reachability register (see RFC-1305) in octal
Delay	The latest delay (in microseconds)
Peer IP Address	IP address of each associated peer
Serv/Peer	Indication of whether the peer functions as an NTP server or NTP peer

Table 1-3 describes the fields in the **show ntp peers** command output.

Table 1-3 Field Descriptions for the show ntp peers Command

Field	Description
Peer IP Address	The IP address of each associated peer
Serv/Peer	Indicates whether the peer functions as an NTP server or NTP peer

Table 1-4 describes the fields in the **show ntp statistics io** command output.

Table 1-4 Field Descriptions for show ntp statistics io Command

Field	Description
Time since reset	Time since the last reset of the NTP software on the primary server
Receive buffers	Total number of UDP client-receive buffers
Free receive buffers	Current number of available client-receive buffers
Used receive buffers	Current number of unavailable client-receive buffers
Low water refills	Total number of times buffers were added, which also indicates the number of times there have been low memory resources during buffer creation
Dropped packets	Total number of NTP packets dropped by the ACE
Ignored packets	Total number of NTP packets ignored by the ACE
Received packets	Total number of NTP packets received by the ACE
Packets sent	Total number of NTP packets transmitted by the ACE
Packets not sent	Total number of NTP packets not sent by the ACE due to an error
Interrupts handled	Total number of NTP timer interrupts handled by the ACE
Received by int	Total number of pulses received that triggered an interrupt

Table 1-5 describes the fields in the **show ntp statistics local** command output.

Table 1-5 Field Descriptions for show ntp statistics local Command

Field	Description
System uptime	Length of time that the ACE has been running.
Time since reset	Time in hours since the ACE was last rebooted.
Old version packets	Number of packets that match the previous NTP version. The version number is in every NTP packet.
New version packets	Number of packets that match the current NTP version. The version number is in every NTP packet.
Unknown version number	Number of packets with an unknown NTP version.
Bad packet format	Number of NTP packets that were received and dropped by the ACE due to an invalid packet format.
Packets processed	Number of NTP packets received and processed by the ACE.
Bad authentication	Number of packets not verified as authentic.

Table 1-6 describes the fields in the **show ntp statistics memory** command output.

Table 1-6 Field Descriptions for show ntp statistics memory Command

Field	Description
Time since reset	Time in hours since the ACE was last rebooted.
Total peer memory	Total peer memory available for the allocation of memory to peer structures.
Free peer memory	Current available peer memory.
Calls to findpeer	The number of calls to findpeer. **Note** findpeer is an entry point to the allocation of memory to peer structures that looks for matching peer structures in the peer list.
New peer allocations	Number of allocations from the free list.
Peer demobilizations	Number of structures freed to the free list.
Hash table counts	The count of peers in each hash table.

Table 1-7 describes the fields in the **show ntp statistics peer** command output.

Table 1-7 Field Descriptions for show ntp statistics peer Command

Field	Description
Remote Host	IP address of the specified peer.
Local Interface	IP address of specified local interface.
Time Last Received	Time that the last NTP response was received.
Time Until Next Send	Length of time until the next send attempt.
Reachability Change	The reachability status for the peer.
Packets Sent	Number of packets sent to the NTP peer.
Packets Received	Number of packets received from the NTP peer.
Bogus Origin	Number of packets received from the NTP peer of a suspect origin.
Duplicate	Number of duplicate packets received from the NTP peer.
Bad Dispersion	Number of packets with an invalid dispersion. **Note** Dispersion measures the errors of the offset values, based on the round-trip delay and the precision of the system and the server.
Bad Reference Time	Number of packets with an invalid reference time source.
Candidate Order	Order in which the ACE may consider this server when it chooses the master.

Displaying Other ACE Setup Configuration Information

To display the ACE setup configuration information, use the following **show** commands from Exec mode:

Command	Purpose
show banner motd	Displays the configured banner message (see the "Configuring a Message-of-the-Day Banner" section).
show bootvar	Displays the BOOT environment variable settings (see the "Setting the BOOT Environment Variable" section).
show clock	Displays the current clock settings (see the "Setting the System Time and Date" or the "Configuring the Time Zone" sections).
show login timeout	Displays the configured login time value (see the "Configuring an ACE Inactivity Timeout" section).
show terminal	Displays the console terminal settings (see the "Configuring Terminal Display Attributes" section).

For detailed information about the fields in the output from these commands, refer to the *Cisco 4700 Series Application Control Engine Appliance Command Reference*.

Clearing NTP Statistics

To clear the NTP statistical information, use the following command from Exec mode:

Command	Purpose
clear ntp statistics {**all-peers** | **io** | **local** | **memory**}	Clears the NTP statistics and information. The keywords are as follows: • **all-peers**—Clears I/O statistics for all peers • **io**—Clears I/O statistics for I/O devices • **local**—Clears I/O statistics for local devices • **memory**—Clears I/O statistics for memory