Troubleshooting Your Cisco WAAS Network

This chapter describes the troubleshooting and diagnostics tools available in the Cisco WAAS Central Manager that can help you identify and resolve issues with your Cisco WAAS network.

Note Throughout this chapter, the term Cisco WAAS device is used to refer collectively to the WAAS Central Manager and Cisco Wide Area Application Engines (WAEs) in your network. The term WAE refers to WAE and Wide Area Application Virtual Engine (WAVE) appliances, and Cisco Virtual WAAS (vWAAS) instances.

This chapter contains the following sections:

Cisco WAAS Troubleshooting Guidelines

To troubleshoot your Cisco WAAS system, follow these guidelines:

1. Maintain a consistent and recommended software version across all your Cisco WAAS devices.

   If versions must differ, the Cisco WAAS Central Manager must be running the highest version. To determine the version in use, see Verifying the Cisco WAAS Image, on page 5.

2. See the Cisco WAAS Release Note for your Cisco WAAS software version.

See the Release Note for Cisco Wide Area Application Services for the latest features, operating considerations, caveats, and CLI command changes.

3. Before you introduce configuration changes on the Cisco WAAS Central Manager, use the CMS backup feature to save your configuration.

   If you run into problems with the new configuration, you can restore the previous configuration (see Backing Up and Restoring Your Cisco WAAS System in the chapter "Maintaining Your Cisco WAAS System." Troubleshoot any problems with new configuration changes immediately after making them.

4. Verify that your configuration is correct for your network application.

   Make any required changes to the running-config file, and then test the configuration. If it is satisfactory, save it to the startup-config file by running the **copy running-config startup-config** command.

5. Enable system message logging.

   See Configuring and Viewing Logs, on page 12.

6. Run the diagnostic tool to verify device functionality and connectivity.

   See Using Diagnostic Tests, on page 20.

7. Verify the physical connectivity between WAAS peers and to the application servers.

   See Verifying WAAS Physical Connectivity, on page 25.

8. Gather information that defines the specific symptoms.

   See Gathering Cisco WAAS Troubleshooting Information, on page 2.

9. After you have determined that your troubleshooting attempts have not resolved the problem, contact the Cisco Technical Assistance Center (TAC) or your technical support representative.

   See Contacting Cisco Technical Support, on page 26.

Gathering Cisco WAAS Troubleshooting Information

This section contains the following topics:

Rebooting the Cisco WAAS Device

⚠

Caution Do not reboot the Cisco WAAS device unless it is absolutely necessary. Some information that is important to troubleshooting may not survive a reboot. Try to gather as much information as possible before rebooting.

Using the copy tech-support Command

In most cases, you can gather the information you need to troubleshoot the device with the **copy tech-support** command. This command runs many **show** commands that are useful for troubleshooting, and it gathers the output into a single file.

You can redirect the output of the **copy tech-support** command to a disk file, an FTP server, or a TFTP server, using the following syntax:

copy tech-support {**disk** *filename* | **ftp** {*hostname* | *ip-address*} *remotedirectory remotefilename* | **tftp** {*hostname* | *ip-address*} *remotefilename*}

Using show Commands

You can use several **show** EXEC commands to gather information specific to the symptoms you are observing in your device.

- **show alarms**
- **show accelerator**
- **show license**
- **show statistics connection**
- **show statistics tfo**
- **show interface**

Using show Commands for WCCP Deployments

For WCCP deployments, use the following commands on the Cisco WAE:

- **show wccp gre**
- **show wccp routers**
- **show wccp wide-area-engine**
- **show wccp flows**
- **show egress-methods**

For WCCP deployments, use the following commands on the router or switch (for each service group, where applicable):

- **show ip wccp**
- **show ip wccp interfaces detail**
- **show ip wccp service**
- **show ip wccp service detail**

For WCCP deployments when hashing is used, use the following commands on the router or switch:

- **show tcam counts**
- **show mls stat**
- **show mls netflow table detail**
- **show mls netflow ip count**

- **show mls netflow ip sw-installed count**
- **show mls netflow ip sw-installed detail**
- **show fm interface** *interface_name*

For WCCP deployments when masking used, use the following commands on the router or switch:

- **show ip wccp service mask**
- **show ip wccp service merge**
- **show tcam interface** *interface_name* **acl {in | out} ip**
- **show tcam interface** *interface_name* **acl {in | out} ip detail**

Generating a System Report

A system report (**sysreport**) is a comprehensive report that you will need before you contact Cisco technical support. You can generate a sysreport by running the copy sysreport command.

The system report contains the output from many commands and logs on the system, including show commands, network statistics, graphs, log contents, configuration settings and statistics. It can take some time to generate a system report and it can be from 30 to 100 MB in size or larger. The system report contains many more elements than are included in the **copy tech-support** command, and is generally needed when contacting Cisco technical support.

Consider these guidelines when you generate a system report:

- Before generating a system report, use the test command to run the diagnostic tests so that this information is included in the system report.
- When generating a system report on a Cisco WAAS Central Manager (or Standby Cisco WAAS Central Manager), you should first make a database backup by running the **cms database backup** command.
- When generating a system report, do not use any command options that limit the report to a specific time period, as this could cause information even within that time period not to be included.

To generate a sysreport and store it to an FTP server, use this form of the command:

copy sysreport ftp *server-ip remote-directory remote-file-name*

For example:

```
wae# copy sysreport ftp 10.10.10.5 /reports wae1report
```

Capturing and Analyzing Packets

Capturing packets (sometimes referred to as a **TCP dump**) is a useful aid in troubleshooting connectivity problems with the Cisco WAAS device or for monitoring suspicious activity.

The Cisco WAAS device can track packet information for network traffic that passes through it. The attributes of the packet are defined by an ACL. The Cisco WAAS device buffers the captured packets, and you can copy the buffered contents to a file or to a remote server. You can also display the captured packet information on your console or terminal.

Two packet capture utilities are available: **tcpdump** and **tethereal**. These commands require admin privileges.

Consider these guidelines when you run **tcpdump** or **tethereal** to capture packets:

- By default, these commands capture only the first 64 bytes of each packet. We recommend that you use the **-s 1600** option to capture full packet data.
- If you will be taking large traces, use tcpdump to create rolling packet captures in multiple files. (The **-C** option sets the maximum size of each captured file in KB and the **-M** option sets the maximum number of log files to create.)
- If you need to filter the packets captured, use tethereal with the **-R** read filter option. You can use tcpdump to create a large packet capture, then use tethereal against the captured file to perform filtering.
- Be careful when using **tcpdump** in a WCCP environment because **tcpdump** filters do not look within the GRE wrapper. You will need to use tethereal if you need to do that.
- With both commands, use the **-i any** option to capture all interfaces, or separate telnet sessions to capture on separate interfaces. Use **^c** (CTRL+c) to stop the packet capture.
- For more information on how to use **tcpdump** and **tethereal**, see the *Cisco Wide Area Application Services Command Reference*.

There are several packet analysis tools that you can use to analyze packet capture files after you have captured them, including Wireshark, Ethereal, Microsoft Netmon and Sniffer Pro.

Verifying the Cisco WAAS Image

This section contains the following topics:

Verifying the Current Cisco WAAS Image

Before you begin

Run the **show version** command to display the version of the software image that is currently running in your WAAS device.

The command output includes:

- Copyright information
- Software Release number, for example: **Cisco Wide Area Application Services Software Release 6.4.3d**
- Device model and Cisco WAAS Version, for example:**oe-vwaas-6.4.3.17**
- Most recent compiled date and time
- Most recent restart date and time
- Device uptime, weeks, hours, minutes, and seconds

You can run the **show version** command from the CLI or from the Cisco WAAS Central Manager:

To run the **show version** command from the CLI:

- wae# **show version**

Procedure

Step 1 To run the **show version** command from the Cisco WAAS Central Manager, choose **Navigate** > **Devices** > *DeviceName* > **Monitor** > **CLI Commands show commands**

Step 2 From the **show commands** dropdown list, choose **show version**.

Step 3 Click **Submit**.

Verifying a Pending Cisco WAAS Image

Before you begin

Run the **show version pending** command to verify that there is no pending software upgrade (waiting for a device reboot). You should see the message **No pending version**.

You can run the **show version** command from the CLI or from the Cisco WAAS Central Manager:

To run the **show version** pending command from the CLI:

```
wae# show version pending
```

To run the **show version pending** command from the Cisco WAAS Central Manager, follow these steps:

Procedure

Step 1 To run the **show version pending** command from the Cisco WAAS Central Manager, choose **Devices** > *DeviceName* > **Monitor** > **CLI Commands** > **show commands**.

Step 2 From the **show commands** dropdown list, select **show version**.

Step 3 In the **Arguments** field, enter **pending**.

Step 4 Click **Submit**.

Cisco WAAS Central Manager Alarm Panel

This section has the following sections:

Viewing the Alarm Panel

The alarm panel provides a near real-time view of incoming alarms and refreshes every two minutes to reflect updates to the system alarm database.

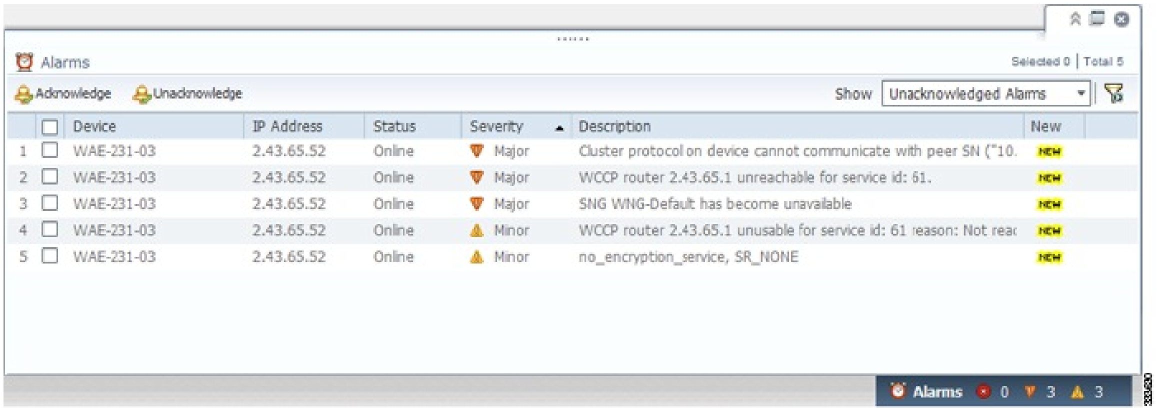
To view the alarms panel, click **Alarms** at the bottom right side of the Cisco WAAS Central Manager window.

Only **Active** alarms can be acknowledged in the alarm panel. **Pending**, **Offline**, and **Inactive** alarms cannot be acknowledged in the alarm panel.

The alarm panel also allows you to filter your view of the alarms in the list. Filtering allows you to find alarms in the list that match the criteria that you set.

The following figure shows the alarm panel.

Figure 1: Alarm Panel



Selected 0 | Total 5

Show Unacknowledged Alarms

	□	Device	IP Address	Status	Severity	Description	New
1	□	WAE-231-03	2.43.65.52	Online	Major	Cluster protocol on device cannot communicate with peer SN ("10.	NEW
2	□	WAE-231-03	2.43.65.52	Online	Major	WCCP router 2.43.65.1 unreachable for service id: 61.	NEW
3	□	WAE-231-03	2.43.65.52	Online	Major	SNG WNG-Default has become unavailable	NEW
4	□	WAE-231-03	2.43.65.52	Online	Minor	WCCP router 2.43.65.1 unusable for service id: 61 reason: Not reac	NEW
5	□	WAE-231-03	2.43.65.52	Online	Minor	no_encryption_service, SR_NONE	NEW

Acknowledging an Active Alarm

Procedure

Step 1 In the alarm panel, check the check box next to the name of the alarm that you want to acknowledge.

Step 2 Click the **Acknowledge** taskbar icon.

The **Acknowledge Alarm Comments** dialog box that allows you to enter comments about the alarm is displayed.

Step 3 Enter a comment and click **OK**. Alternatively, click **Cancel** to return to the alarm panel without completing the acknowledge action.

Comments enable you to share information about the cause or solution of a particular problem that caused the alarm. The comments field accepts up to 512 characters. You can use any combination of alpha, numeric, and special characters in this field.

Filtering and Sorting Alarms

Procedure

Step 1 From the **Show** drop-down list, choose one of the following filtering options:

- **All**
- **Quick Filter**

- **Unacknowledged Alarms**
- **Acknowledged Alarms**
- **Alarms for** *device-name* (shown in the device context)

Step 2 If you choose **Quick Filter**, enter the match criteria in one or more fields above the list.

Step 3 To sort alarm entries, click a column header.

Entries are sorted alphabetically (in ASCII order). The sort order (ascending or descending) is indicated by an arrow in the column header.

Step 4 Choose **All** to clear the filter.

Device Alarms

Device alarms are associated with device objects and pertain to applications and services running on your Cisco WAAS devices. Device alarms are defined by the reporting application or service. Device alarms can also reflect reporting problems between the device and the Cisco WAAS Central Manager GUI. The following table describes the various device alarms that can appear.

Table 1: Device Alarms for Reporting Problems

Alarm	Alarm Severity	Device Status	Description
Device is offline	Critical	Offline	The device has failed to communicate with the WAAS Central Manager.
Device is pending	Major	Pending	The device status cannot be determined. This status can appear after a new device is registered, but before the first configuration synchronization has been performed.
Device is inactive	Minor	Inactive	The device has not yet been activated or accepted by the WAAS Central Manager.
Device has lower software version	Minor	Online	The device has an earlier software version than the WAAS Central Manager, and it may not support some features.

Alarm Email Notification

Before you begin

For Cisco WAAS Version 6.2.3d and later, the Cisco WAAS software supports an email notification mechanism, that is triggered whenever the Cisco WAAS Central Manager receives an alarm notification for a raised or cleared alarm.

Note In a mixed-version Cisco WAAS network, the email notification is triggered for all raised alarms for all Cisco WAAS devices. However, the email notification is triggered for cleared alarms only on devices running Cisco WAAS versions 6.2.3d or later.

Procedure

Step 1 To configure the email server settings: From the Cisco WAAS Central Manager menu choose **Devices** > **WCM** > **Configure** > **Monitoring** > **Email Notification**.

Step 2 To configure the email notification settings: From the Cisco WAAS Central Manager menu choose **Home** > **Admin** > **Alarm Email Notification** > **Configure**.

Step 3 Check the **Enable Alarm Email Notification** check box. It is disabled by default.

Step 4 Select the alarms based on the severity level for **Raised** and **Cleared** alarms. The **Minor Alarms** checkbox is disabled by default.

Step 5 To notify users, enter the valid email addresses in the **Address** fields. For multiple email addresses, use comma separators.

Step 6 Enter the subject in the **Subject** field.

Step 7 Click **Submit**.

Consider the following guidelines:

- After configuring, you are notified of all alarms for the devices that are registered with the Cisco WAAS Central Manager.
- The email subject consists of Device Information such as **Device name**, **IP Address** and **Alarm raised** and **Alarm cleared** count.
- The email summary consists of Alarm details in a tabular format.

An example of email content is shown in the following table.

Alarm ID	Sequence number	Module	Severity	Description	Time raised	Time cleared
700002	30	CMS	Major	WAE clock needs to be synchronized.	01-07-2017 09:10:36 PM GMT	N/A

The following details of the particular alarm can be seen in the mail notification.

- **Alarm ID**: ID of the Alarm
- **Sequence number**: Order of the alarm in the device. This is applicable only for alarms pertaining to the WAE devices and not applicable for Cisco WAAS Central Manager and Router alarms.
- **Module**: Component for the alarm, for example, CMS, disk, DRE, NHM, and others.
- **Severity**: Category of alarm: Critical, Major, or Minor.
- **Description**: Detailed description of the alarm, which includes the condition of the alarm.

- **Time Raised**: For **Raised Alarms**, the time when it was raised will be shown in the email content and the time when it was cleared will be shown as **N/A**.
- **Time Cleared**: For the **Cleared Alarms**, the time when it was cleared and the time when it was raised are both shown.
- You can configure the number of days you want the system to retain the records of the alarms. To do so, from the Cisco WAAS Central Manager menu, choose **Configure** > **Global** > **System Properties** and modify the **System.clearedAlarm.purging.interval**. The default value is **7 days**, but you can choose **up to 365 days**.

Troubleshooting Devices Using Alerts

Before you begin

The Cisco WAAS Central Manager GUI allows you to view the alarms on each device and troubleshoot a device in the Troubleshooting Devices window.

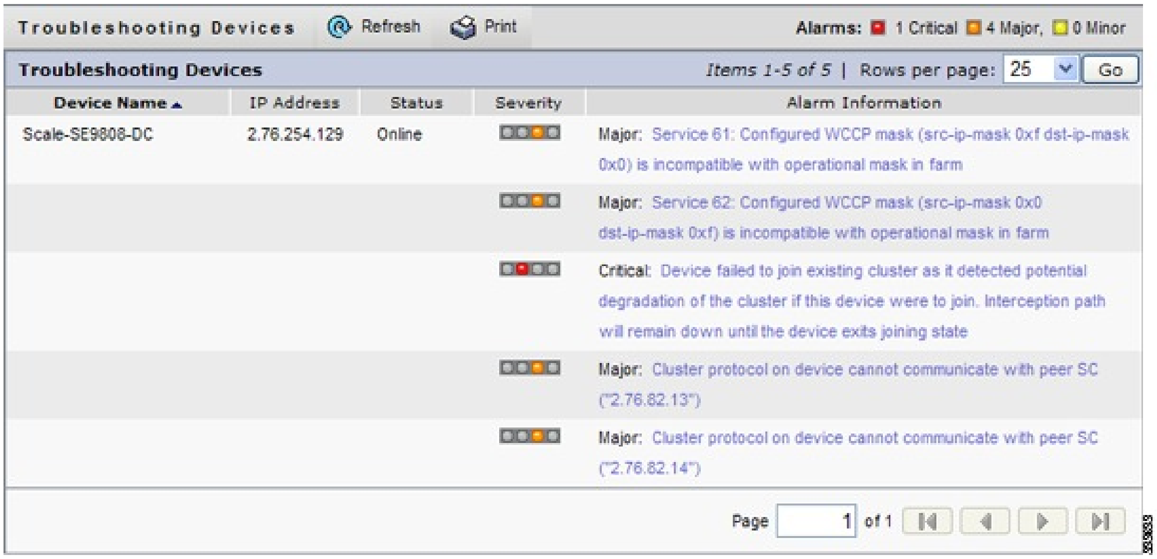
Procedure

Step 1 From the Cisco WAAS Central Manager menu, choose **Devices** > **All Devices**.

Step 2 Click the device alarm light bar in the **Device Status** column to view the alarms on a single device.

The **Troubleshooting Devices** pane appears, either in the Cisco WAAS Central Manager window or as a separate dialog box.

Figure 2: Troubleshooting Devices Window



Device Name ▲	IP Address	Status	Severity	Alarm Information
Scale-SE9808-DC	2.76.254.129	Online	□□🟧□	Major: Service 61: Configured WCCP mask (src-ip-mask 0xf dst-ip-mask 0x0) is incompatible with operational mask in farm
			□□🟧□	Major: Service 62: Configured WCCP mask (src-ip-mask 0x0 dst-ip-mask 0xf) is incompatible with operational mask in farm
			□🟥□□	Critical: Device failed to join existing cluster as it detected potential degradation of the cluster if this device were to join. Interception path will remain down until the device exits joining state
			□□🟧□	Major: Cluster protocol on device cannot communicate with peer SC ("2.76.82.13")
			□□🟧□	Major: Cluster protocol on device cannot communicate with peer SC ("2.76.82.14")

Step 3 In the **Alarm Information** column, hover your mouse over an alarm message until the Troubleshooting tools contextual menu appears. The pop-up menu provides links to the troubleshooting and monitoring windows in the Cisco WAAS Central Manager GUI.

Step 4 From the drop-down list that is displayed, choose the troubleshooting tool that you want to use, and click the link. The link takes you to the appropriate window in the Cisco WAAS Central Manager GUI. The following table describes the tools available for device alarms.

You can view the **Troubleshooting Devices** window for all devices by choosing **Monitor** > **Troubleshoot** > **Alerts** from the global context.

Table 2: Troubleshooting Tools for Device Alarms

Item	Navigation	Description
Update Software	Choose device, **Admin** > **Versioning** > **Software Update**	Displays the **Software Update** window for this device. Appears only if the device software version is lower than that of the Cisco WAAS Central Manager.
Edit/Monitor Device	Device dashboard	Displays the **Device Dashboard** for configuration.
Telnet to Device	Opens a Telnet window	Initiates a Telnet session using the device IP address.
View Device Log	Choose device, **Admin** > **History** > **Logs**	Displays system message logs filtered for this device.
Run **show** Commands	Choose device, **Monitor** > **CLI Commands** > **show Commands**	Displays the device **show** command tool. For more information, see Using the show and clear Commands from the Cisco WAAS Central Manager, on page 11.

Using the show and clear Commands from the Cisco WAAS Central Manager

Before you begin

You can run the **show** and **clear** EXEC commands from either the Cisco WAAS CLI or the Cisco WAAS Central Manager. To run the **show** and **clear** command from the Cisco WAAS CLI, see the Cisco Wide Area Application Services Command Reference.

Procedure

Step 1 From the Cisco WAAS Central Manager menu, choose **Devices** > *device-name*.

Step 2 Choose **Monitor** > **CLI Commands** > **Show Commands** or **Clear Commands**.

Step 3 From the **Command** drop-down list, choose either a **show** or **clear** command.

Step 4 Enter arguments for the command, if any.

Step 5 Click **Submit** to display the command output.

A window displays the command output for that device.

Note The **show** and **clear** Cisco WAAS CLI commands that are available differ depending on the type of device that you select.

Configuring and Viewing Logs

This section contains the following topics:

Configuring System Logging

This section contains the following topics:

Enabling System Logging

Before you begin

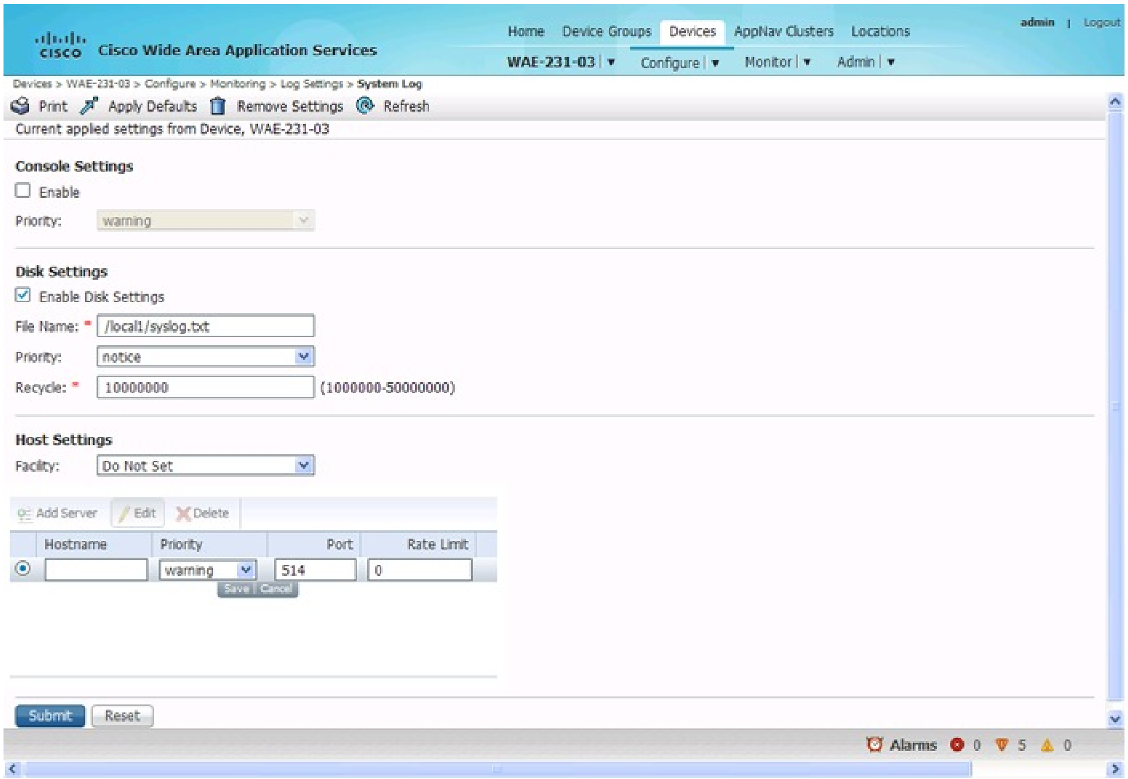
Use the Cisco WAAS system logging feature to set specific parameters for the system log file (syslog). This file contains authentication entries, privilege-level settings, and administrative details. The system log file is located in the system file system (sysfs) partition as /local1/syslog.txt.

Procedure

Step 1 From the Cisco WAAS Central Manager menu, choose **Devices** > *device-name* or **Device Groups** > *device-group-name*.

Step 2 Choose **Configure > Monitoring > Log Settings > System Log**. The **System Log Settings** window appears.

Figure 3: System Log Settings Window



Current applied settings from Device, WAE-231-03

Console Settings

☐ Enable

Priority: warning

Disk Settings

☑ Enable Disk Settings

File Name: * /local1/syslog.txt

Priority: notice

Recycle: * 10000000 (1000000-50000000)

Host Settings

Facility: Do Not Set

	Hostname	Priority	Port	Rate Limit
●		warning	514	0

Step 3 Enable system log files to be sent to the console:

a) In the **Console Settings** pane, check the **Enable** check box.

b) From the **Priority** drop-down list, choose the severity level of the message that should be sent to the specified remote **syslog** host. The default priority-code is warning (level 4). Each **syslog** host is capable of receiving a different level of event messages.

Step 4 Enable **syslog** files to be sent to a disk:

a) In the **Disk Settings** pane, check the **Enable Disk Settings** check box. This setting is checked by default.

b) In the **File Name** field, enter a path and a filename where the **syslog** files will be stored on a disk.

c) From the **Priority** drop-down list, choose the severity level of the message that should be sent to the specified remote **syslog** host. The default priority code is warning (level 4). Each **syslog** host is capable of receiving a different level of event messages.

d) In the **Recycle** field, specify the size of the **syslog** file (in bytes) that can be recycled when it is stored on a disk. (The default value of the file size is **10000000**.)

Whenever the current log file size surpasses the recycle size, the log file is rotated. (The default recycle size for the log file is 10,000,000 bytes.) The log file cycles through a maximum of five rotations, and each rotation is saved as *log_file_name.[1-5]* under the same directory as the original log.

The rotated log file is specified in the File Name field (or by using the **logging disk** *filename* command).

Step 5 Enable **syslog** files to be sent to a host server:

a) In the **Host Settings** pane, from the **Facility** drop-down list, choose the appropriate facility.

b) Click the **Add Server** taskbar icon above the host server list. You can add up to four host servers to which syslog messages can be sent.
c) In the **Hostname** field, enter a hostname or IP address (IPv4 or IPv6) of the remote syslog host. You must specify at least one hostname if you have enabled system logging to a host.
d) From the **Priority** drop-down list, choose the severity level of the message that should be sent to the specified remote syslog host. The default priority code is warning (level 4). Each syslog host is capable of receiving a different level of event messages.
e) In the **Port** field, specify the destination port on the remote host to which the WAAS device should send the message. The default port number is **514**.
f) In the **Range Limit** field, specify the number of messages per second that are allowed to be sent to the remote syslog host. To limit bandwidth and other resource consumption, messages to the remote syslog host can be rate limited. If this limit is exceeded, the specified remote syslog host drops the messages. There is no default rate limit, and by default, all syslog messages are sent to all of the configured syslog hosts.

Step 6 Click **Submit**.

Step 7 To configure system logging from the CLI, run the **logging** global configuration command.

Priority Levels

The following table lists the different priority levels of detail that can be sent to the recipient of **syslog** messages for a corresponding event.

Table 3: System Logging Priority Levels and Descriptions

Priority Code	Condition	Description
0	Emergency	System is unusable.
1	Alert	Immediate action needed.
2	Critical	Critical conditions.
3	Error	Error conditions.
4	Warning	Warning conditions.
5	Notice	Normal but significant conditions.
6	Information	Informational messages.
7	Debug	Debugging messages.

Each **syslog** host can receive different priority levels of syslog messages. You can configure different syslog hosts with a different syslog message priority code to enable the Cisco WAAS device to send varying levels of syslog messages to the four external syslog hosts. For example, a Cisco WAAS device can be configured to send messages that have a priority code of error (level 3) to the remote syslog host that has an IP address of 10.10.10.1 and messages that have a priority code of warning (level 4) to the remote syslog host that has an IP address of 10.10.10.2.

Note Setting a logging priority to Levels 1-4 can be CPU-intensive, and can generate a large amount of output.

To achieve **syslog** host redundancy or failover to a different syslog host, you must configure multiple **syslog** hosts on the Cisco WAAS device and assign the same priority code to each configured syslog host, for example, assigning a priority code of critical (level 2) to syslog host 1, syslog host 2, and syslog host 3.

In addition to configuring up to four logging hosts, you can also configure the following for multiple syslog hosts:

- A port number that is different from the default port number, **514**, on the Cisco WAAS device to send **syslog** messages to a logging host.
- A rate limit for the syslog messages, which limits the rate at which messages are sent to the remote syslog server (messages per second) in order to control the amount of bandwidth used by syslog messages.

Multiple Hosts for System Logging

Each **syslog** host can receive different priority levels of syslog messages. You can configure different **syslog** hosts with a different **syslog** message priority code to enable the Cisco WAAS device to send varying levels of **syslog** messages to the four external **syslog** hosts. For example, a Cisco WAAS device can be configured to send messages that have a priority code of error (level 3) to the remote **syslog** host that has an IP address of 10.10.10.1 and messages that have a priority code of warning (level 4) to the remote **syslog** host that has an IP address of 10.10.10.2.

To achieve **syslog** host redundancy or failover to a different **syslog** host, you must configure multiple **syslog** hosts on the Cisco WAAS device and assign the same priority code to each configured **syslog** host, for example, assigning a priority code of critical (level 2) to **syslog host 1**, **syslog host 2**, and **syslog host 3**.

In addition to configuring up to four logging hosts, you can also configure the following for multiple **syslog** hosts:

- A port number that is different from the default port number, **514**, on the Cisco WAAS device to send syslog messages to a logging host.
- A rate limit for the **syslog** messages, which limits the rate at which messages are sent to the remote **syslog** server (messages per second) in order to control the amount of bandwidth used by **syslog** messages.

Configuring Transaction Logging

This section contains the following topics:

Enabling Transaction Logging

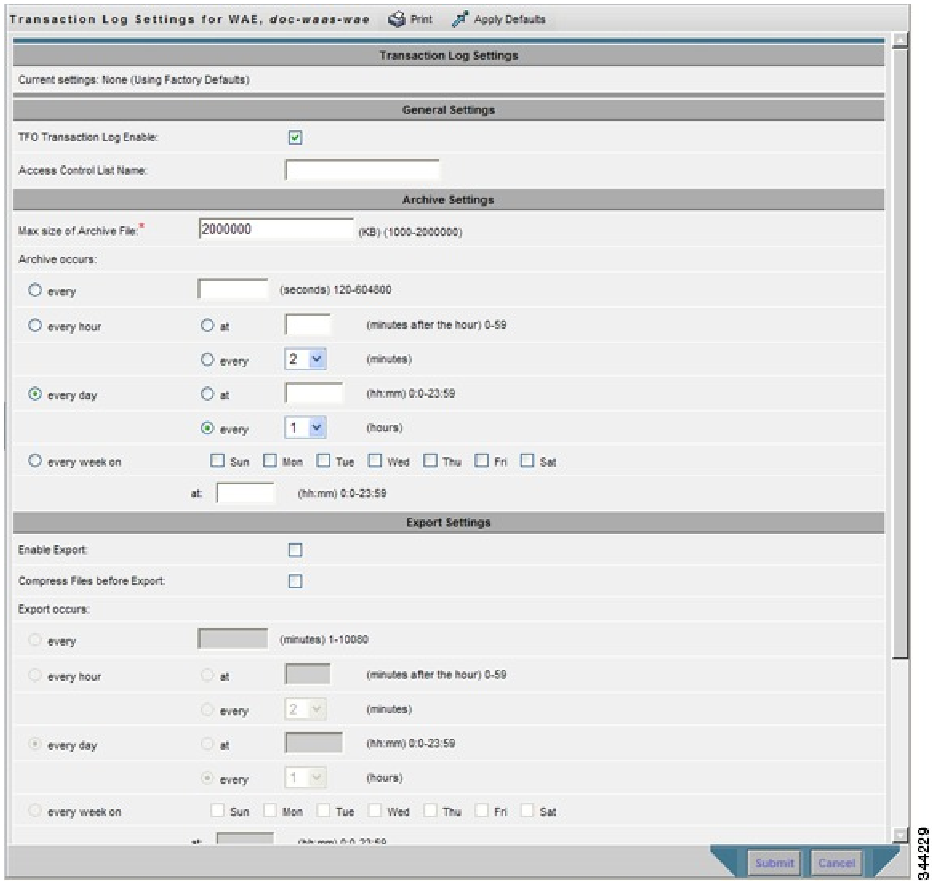
Procedure

Step 1 From the Cisco WAAS Central Manager menu, choose **Devices** > *device-name* or **Device Groups** > *device-group-name*.

Step 2 Choose **Configure > Monitoring > Log Settings > Transaction Log** for TFO transaction logging or **Configure > Monitoring > Log Settings > Video Acceleration Transaction Log** for video transaction logging.

The **Transaction Log Settings** window appears. (The **Video Transaction Log Settings** window looks the same, but does not include the **General Settings** area at the top.)

Figure 4: Transaction Log Settings Window



Transaction Log Settings for WAE, *doc-waas-wae*

Transaction Log Settings

Current settings: None (Using Factory Defaults)

General Settings

TFO Transaction Log Enable: ☑

Access Control List Name:

Archive Settings

Max size of Archive File:* 2000000 (KB) (1000-2000000)

Archive occurs:

○ every (seconds) 120-604800

○ every hour ○ at (minutes after the hour) 0-59

○ every 2 (minutes)

● every day ○ at (hh:mm) 0:0-23:59

● every 1 (hours)

○ every week on □ Sun □ Mon □ Tue □ Wed □ Thu □ Fri □ Sat

at: (hh:mm) 0:0-23:59

Export Settings

Enable Export: □

Compress Files before Export: □

Export occurs:

○ every (minutes) 1-10080

○ every hour ○ at (minutes after the hour) 0-59

○ every 2 (minutes)

● every day ○ at (hh:mm) 0:0-23:59

● every 1 (hours)

○ every week on □ Sun □ Mon □ Tue □ Wed □ Thu □ Fri □ Sat

at: (hh:mm) 0:0-23:59

Step 3 Under the **General Settings** pane title, check the **TFO Transaction Log Enable** check box to enable transaction logging. (This check box does not appear for video transaction logging.)

The fields on the window become active.

Step 4 (Optional) In the **Access Control List Name** field, enter the name of an access control list that you want to use to limit transaction logging. If you specify an access control list, only transactions from hosts that are defined in that access list are logged. (This field does not appear for video transaction logging.)

To define an access list, run the **ip access-list** global configuration command.

Step 5 Under the **Archive Settings** pane title, specify values for the following fields:

- **Max Size of Archive File**: Maximum size (in kilobytes) of the archive file to be maintained on the local disk. This value is the maximum size of the archive file to be maintained on the local disk. The range is **1000** to **2000000**. The default is **2000000**.
- **Archive Occurs Every (interval)**: Interval at which the working log data is cleared and moved into the archive log.

Step 6 Configure the fields in the **Export Settings** pane to export the transaction log file to an FTP server.

The following table describes the fields in the **Export Settings** pane.

Table 4: Export Settings

Field	Function
Enable Export	Enables transaction logging to be exported to an FTP server.
Compress Files before Export	Enables compression of archived log files into gzip format before exporting them to external FTP servers.
Export occurs every (interval)	Interval at which the working log should be cleared by moving data to the FTP server.
Export Server	The FTP export feature can support up to four servers. Each server must be configured with a username, password, and directory that are valid for that server. • **Export Server**: The IP address or hostname of the FTP server. • **Name**: The user ID of the account used to access the FTP server. • **Password/Confirm Password**: The password of the FTP user account specified in the Name field. You must enter this password in both the Password and Confirm Password fields. Do not use the following characters: space, backward single quote ('), double quote ("), pipe (|), or question mark (?). • **Directory**: The name of a working directory that will contain the transaction logs on the FTP server. The user specified in the Name field must have write permission to this directory. • **SFTP**: If the specified FTP server is a secure FTP server, check the **SFTP** check box.

Step 7 Click **Submit**.

A **Click Submit to Save** message appears in red next to the **Current Settings** name when there are pending changes to be saved after you have applied default or device group settings. You can also revert to the previously configured settings by clicking **Reset**. The **Reset** button, which is visible only when you have applied default or group settings to change the current device settings, but have not yet submitted the changes.

If you try to exit this window without saving the modified settings, a dialog box with a warning message prompts you to submit the changes.

Note This dialog box is displayed only if you are using the Internet Explorer browser.

To enable and configure transaction logging from the CLI, run the **transaction-logs** global configuration command.

Transaction Logs

TFO transaction logs are maintained in the local disk in the **/local1/logs/tfo** directory. Video (Windows media) logs are maintained in the **/local1/logs/wmt/wms-90** directory.

When you enable transaction logging, you can specify the interval at which the working log should be archived, by moving the data to an archive log. The archive log files are located on the local disk in the **local/local1/logs/working.log** directory.

Because multiple archive files are saved, the filename includes the time stamp of when the file was archived. Because the files can be exported to an FTP or SFTP server, the filename also contains the IP address of this Cisco WAAS device.

- The archive filenames for TFO transactions use this format:

  tfo_IPADDRESS_YYYYMMDD_HHMMSS.txt

- The archive filenames for Windows media transactions use this format:

  wms_90_IPADDRESS_YYYYMMDD_HHMMSS.txt

The transaction log format is documented in Appendix B, “Transaction Log Format.”

Viewing the System Message Log

Before you begin

Using the system message log feature of the Cisco WAAS Central Manager GUI, you can view information about events that have occurred in your Cisco WAAS network. The Cisco WAAS Central Manager logs the messages from registered devices with a severity level of warning, error, or fatal.

Procedure

Step 1 From the Cisco WAAS Central Manager menu, choose **Admin** > **Logs** > **System Messages**.

The **System Message Log** window appears.

Note If no name is available for a node, "Unavailable" is displayed. This situation might occur if a node has been deleted or has been reregistered with the Cisco WAAS software.

Step 2 (Optional) From the Show drop-down list, choose **Quick Filter**, and enter a value in one or more fields to filter the log to include only the entries with the specified values.

Step 3 (Optional) Truncate the message log to ensure that not as many messages appear in the table, by completing the following steps:

a) Click the **Truncate** icon in the taskbar.

   The **Truncate System Message Log** pane appears.

b) Choose one of the following options:

   - **Size Truncation**: Limits the messages in the log to the number you specify. The log uses a first in, first out process to remove old messages once the log reaches the specified number.
   - **Date Truncation**: Limits the messages in the log to the number of days you specify.
   - **Message Truncation**: Removes messages that match the specified pattern from the log.

c) After you have finished specifying the truncation parameters, click **OK**.

Viewing the Audit Trail Log

Before you begin

The Cisco WAAS Central Manager logs user activity in the system. The only activities that are logged are those activities that change the Cisco WAAS network. This feature provides accountability for users' actions by describing the time and action of the task. Logged activities include the following:

- Creation of Cisco WAAS network entities
- Modification and deletion of Cisco WAAS network entities
- System configurations
- Clearing the audit log

Procedure

Step 1 From the Cisco WAAS Central Manager menu, choose **Admin** > **Logs** > **Audit Trail Logs**.

The **Audit Log** window appears. All the logged activities in the CIsco WAAS Central Manager are listed by user, the IP address of the machine that was used, date and time, and operation that was logged.

Step 2 (Optional) From the **Show** drop-down list, choose **Quick Filter**, and enter a value in one or more fields to filter the log to include only the entries with the specified values.

Viewing a Device Log

Before you begin

To view information about events that have occurred on a specific device in your Cisco WAAS network, use the system message log feature that is available in the Cisco WAAS Central Manager GUI.

To view the events that have occurred on your entire Cisco WAAS network, see Viewing the System Message Log, on page 18.

Procedure

Step 1 From the Cisco WAAS Central Manager menu, choose **Devices** > *device-name*.

Step 2 Choose **Admin** > **Logs** > **Device Logs**.

The **Device Log** window appears.

Step 3 (Optional) From the **Show** drop-down list, choose **Quick Filter** and enter a value in one or more fields to filter the log to include only the entries with the specified values.

CLI Commands for Verifying and Viewing Logs and System Image

- **Verify the WAAS image**: Run the **show version** command to display the version of the software image that is currently running in your Cisco WAAS device. This command also displays information including device model and WAE uptime.
- **Verify no pending software**: Run the **show version** pending command to verify that there is no pending software upgrade (waiting for a device reboot).
- **Verify WAAS error logging**: General system error WAAS logging to the disk file **/local1/syslog.txt** is enabled by default. Run the **show logging** command to verify that logging is enabled.
- **Enable console logging**: Run the **(config) logging console enable** command to enable logging to the console. You can set the following logging priority levels: **Alert** (Priority 1), **Critical** (Priority 2), **Error** (Priority 3), **Warning** (Priority 4), **Notice** (Priority 5), **Information** (Priority 6), and **Debug** (Priority 7).

Note Setting a logging priority to Levels 1-4 can be CPU-intensive, and can generate a large amount of output.

- **Navigating and viewing log files**: The following directories are used for Cisco WAAS log files:
  - **/local1**: Root directory for all log files and location of syslog.txt
  - **/local1/logs**: Service log files (admin and transaction logs)
  - **/local1/errorlog**: Service log files (debug logs)
  - **/local1/errorlog/cifs**: CIFS internal log files (for Cisco WAAS versions earlier than Cisco WAAS Version 6.x)
  - **/local1/core_dir**: Process core dump files

Use the following commands to navigate and view these log files:

- **cd**
- **pwd**
- **dir**
- **type-tail filename line follow**
- **find-pattern**

Using Diagnostic Tests

This section contains the following topics:

Device Diagnostics Using the Cisco WAAS Central Manager

Procedure

Step 1 To use the Cisco WAAS troubleshooting and diagnostic reporting facility: From the Cisco WAAS Central Manager menu, choose **Devices** > *device-name* or **Device Groups** > *device-group-name*.

Step 2 Choose **Monitor** > **Tools** > **Diagnostics Tests**.

The **Diagnostic Tool** window appears.

Step 3 Check the check box next to each diagnostic test you want to run, or check the top check box, Test, to run all tests. The following tests are available:

- **Device Operation**: Checks the device’s status and the presence of coredump files or alarms of major or critical severity.
- **Basic Configuration**: Checks the device’s basic network configuration.
- **Basic Connectivity**: Checks the device’s connectivity to configured external devices (DNS, authentication, NTP servers, and so forth).
- **Physical Interface**: Checks the configuration and operation of the device’s physical interfaces.

Note A Virtual Interface test is available for Cisco vWAAS devices.

- **Configuration Security**: Checks the running configuration for potentially malicious (cross-site scripting [XSS]) entries.
- **Traffic Optimization** Checks the TFO configuration and operation.
- **WCCP Configuration and Operation**: Checks the configuration and operation of WCCP traffic interception.
- **Inline configuration and operation**: Checks the configuration and operation of inline group interfaces.

Note The inline configuration and operation test is not available for Cisco vWAAS devices.

Step 4 Click **Run**.

Step 5 View the test results in the lower part of the window.

Note If any of the tests fail, error messages describe the problem and provide recommended solutions.

You can run the same diagnostic tests again and refresh the results by clicking the **Refresh** icon in the taskbar.

To print the results, click the **Print** icon in the taskbar.

Device Diagnostics Using the Cisco WAAS CLI

To perform diagnostic and connectivity tests, run the **test** EXEC command.

Use network-level tools to intercept and analyze packets as they pass through your network. Two of these tools are **TCPdump** and **Tethereal**, which you can access from the CLI by running the **tcpdump** and **tethereal** EXEC commands.

The Cisco WAAS device also supports multiple debugging modes, which can be reached with the **debug** EXEC command. These modes allow you to troubleshoot problems from configuration errors to print spooler problems. We recommend that you use the **debug** command only at the direction of Cisco Technical Assistance Center (TAC).

The output associated with the **debug** command is written to either the syslog file in **/local1/syslog.txt** or the debug log associated with the module in the **/local1/errorlog/***module_name* **-errorlog.current** file.

The output associated with the **debug accelerator** *name module* command for an application accelerator is written to the file **ao-errorlog.currentname**, where *name* is the accelerator name. The accelerator information manager debug output is written to the **aoim-errorlog.current** file.

The debug log file associated with a module will be rotated to a backup file when the current file reaches its maximum size. The backup files are named as follows: *name* **-errorlog.#** , where # is the backup file number.

For **debug** commands, system logging must be enabled. The command that enables logging, the **logging disk enable** global configuration command, is enabled by default.

If a **debug** command module uses the syslog for debug output, the **logging disk priority debug** global configuration command must be configured (the default is **logging disk priority notice**).

If a **debug** command module uses the debug log for output, the output can be filtered based on a priority-level configuration for the four different levels of debug log output:

- For filtering of critical debug messages only, run the **logging disk priority critical** global configuration command.
- For filtering of critical and error-level debug messages, run the **logging disk priority error** global configuration command.
- For filtering of critical, error, and trace debug level debug messages, run the **logging disk priority debug** global configuration command.
- For seeing all debug log messages, including critical, error, trace and detail messages, run the **logging disk priority detail** global configuration command.

Regardless of the priority-level configuration, syslog messages at the LOG_ERROR or higher severity will be automatically written to the debug log associated with a module.

For more details on these CLI commands, see *Cisco Wide Area Application Services Command Reference*.

Akamai Connect Diagnostics Using the Cisco WAAS Central Manager

Before you begin

For Cisco WAAS devices with Akamai Connect, the **Akamai Diagnostics** window provides status information for the Akamai Connect license and Akamai Connect service, and enables you to unregister or synchronize selected devices.

Procedure

Step 1 From the Cisco WAAS Central Manager menu, choose **Home** > **Monitor** > **Troubleshoot** > **Akamai Diagnostics**.

The **Akamai Diagnostics** window appears.

Step 2 The upper section of the **Akamai Diagnostics** window shows the Akamai Connect License status (Step 3) and the Akamai registration service status (Step 4).

Step 3 To display a dialog box of additional information, click the **Akamai Connect License Details** button:

The upper half of the dialog box provides details on the Akamai API credentials used by the Cisco WAAS Central Manager for this license (including API host, client ID, and customer ID).

The lower half of the dialog box shows test information, with the message **Below are results of previous test. Please click "Test" button to get up-to-date results**.

a) To test the connection to the API server, click **Test**.
b) A **Device Registration Status** table listing is displayed, showing the total number of devices, and with columns displaying each **Cisco WAAS Device**, **Akamai ID**, **Akamai Device Status** (ActivationInProgress or Active), **Operational Status** (Disconnected, Connected, or Running), and **Connectivity to Akamai** (Disconnected, Activating, or Connected).).

Step 4 To display a dialog box that shows additional status information (including external HTTP proxy, last synchronization with Akamai, number of pending operations, and number of API errors), click the **Akamai Registration Service Status Details** button.

a) To enable debugging of Akamai API calls, at the **Akamai Registration Service Status** dialog box, check the **Enable debugging Akamai API calls** check box to enable debugging of Akamai API calls.

   The **Device Registration Service Status** dialog box displays an API error log with the total number of API errors, and a table listing with columns labeled **When**, **Device**, **Operation** (such as Refresh All Devices), and **Error Message** (such as Read timed out (HTTP status code -1)).

Step 5 The lower section of the **Akamai Diagnostics** window is a table listing of Cisco WAAS devices with Akamai Connect, with columns for **Cisco WAAS Device**, **Akamai Device Status** (ActivationInProgress or Active), **Operational Status** (Disconnected, Connected, or Running), and **Connectivity to Akamai** (Disconnected, Activating, or Connected).

The table heading provides two buttons: **Unregister** (Step 6) and **Synchronize** (Step 7).

Step 6 To unregister a device from this table listing:

a) Select the device(s).
b) Click the **Unregister** button in the table heading.

   The **Unregister** button triggers the removal of the device record on the Akamai server, and invalidates the entitlement key used by the Cache Engine to talk with Akamai Connect devices. The unregistered device can continue to function with transparent caching benefits, but it will not utilize Akamai Connected Cache or OTT caching benefits.

c) When you click **Unregister**, the following warning message is displayed: **De-registering device(s) would prevent Akamai Connected Cache and OTT features from working on devices that have these features enabled. Please confirm de-registration of selected device(s)**.
d) To de-register to the selected device(s), click **OK**. Or, to exit the procedure without de-registering the selected device(s), click **Cancel**.

Step 7 Click the **Synchronize** button in the table heading.

a) Synchronization between the Akamai server and the Cisco WAAS Central Manager occurs in specified time intervals automatically. The **Synchronize** button enables you to trigger synchronization between the Akamai server and all Akamai-registered Cisco WAAS devices,

b) When you click **Synchronize**, it communicates with the Akamai server for the latest updates of all devices registered with the Cisco WAAS Central Manager, and the status of these devices is updated accordingly.

Consider the following operating guidelines when using the **Synchronize** button:

- The **Synchronize** button applies to all Akamai-enabled devices; it is not specific to a particular device update.
- You can check the last synchronization time from the **Akamai Registration Service Status Details** button, described in Step 4.

Using the Kernel Debugger

Before you begin

The Cisco WAAS Central Manager GUI allows you to enable or disable access to the kernel debugger (**kdb**). After being enabled, the kernel debugger is automatically activated when kernel problems occur.

Procedure

Step 1 From the Cisco WAAS Central Manager menu, choose **Devices** > *device-name* or **Device Groups** > *device-group-name*.

Step 2 Choose **Monitor** > **Tools** > **Kernel Debugger**.

The **Kernel Debugger** window appears.

Step 3 Check the **Enable** check box to enable the kernel debugger, and click **Submit**. By default, this option is disabled.

Using WAAS TCP Traceroute

Before you begin

The WAAS TCP Traceroute tool can help you troubleshoot network and connection issues, including asymmetric paths. You can use it to find a list of WAAS nodes between the client and the server, and the configured and applied policies for a connection. From the Cisco WAAS Central Manager, you can choose any device in your Cisco WAAS network from which to run the traceroute.

Procedure

Step 1 From the Cisco WAAS Central Manager menu, choose **Monitor** > **Troubleshoot** > **WAAS Tcptraceroute**.

Alternatively, you can choose a device first and then choose this menu item to run the traceroute from that device.

Step 2 From the **WAAS** Node drop-down list, choose a Cisco WAAS device from which to run the traceroute. (This item does not appear if you are in the device listing.)

Step 3 In the **Destination IP** and **Destination Port** fields, enter the IP address and port of the destination for which you want to run the traceroute

Step 4 Click **Run TCPTraceroute** to display the results.

WAAS nodes in the traced path are displayed in the table below the fields. From the **Show** drop-down list, choose a filter setting to filter the devices, as needed. You can use a quick filter to filter any value, or show all devices.

Step 5 To view traceroute information from the Cisco WAAS CLI, run the **waas-tcptrace** EXEC command.

Another troubleshooting tool that you can use to trace connections on a WAAS appliance ANC is the **Connection Trace** tool. For details, see AppNav Connection Tracing in the chapter "Configuring Cisco AppNav."

Verifying WAAS Physical Connectivity

This section contains the following topics:

Verifying Physical Connectivity Between Peer WAAS Devices

Procedure

Step 1 Check all cable connections on the switch or router that may impact the WAAS device.

Step 2 To send an ICMP Echo request to the peer WAE, run the **ping** command. For example:

```
WAE# ping 10.1.1.2 172.19.131.189
PING 172.19.131.189 (172.19.131.189) from 10.1.1.21 : 56(84) bytes of data.
64 bytes from 172.19.131.189: icmp_seq=0 ttl=249 time=613 usec
64 bytes from 172.19.131.189: icmp_seq=1 ttl=249 time=485 usec
64 bytes from 172.19.131.189: icmp_seq=2 ttl=249 time=494 usec
64 bytes from 172.19.131.189: icmp_seq=3 ttl=249 time=510 usec
64 bytes from 172.19.131.189: icmp_seq=4 ttl=249 time=493 usec

--- 172.19.131.189 ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max/mdev = 0.485/0.519/0.613/0.047 ms
```

Step 3 If a device is one hop away and you are unable to reach the device, then ping the intermediary gateway. If the gateway is not reachable, use the show ip routes command to verify that the correct route is displayed.

Step 4 If necessary, enter a static route for the gateway.

Note Firewalls may block ICMP traffic, and ICMP traffic does not follow the WCCP redirection path. Therefore, running the **ping** command does not verify redirection or acceleration. As an alternative way to verify redirection or acceleration, we recommend that you use a third-party tool that performs a TCP-based ping.

Verifying Physical Connectivity Between WAAS Data Center and Application Server Hosts

The procedure for verifying physical connectivity between the WAAS data center and application server hosts is the same procedure as described in Verifying Physical Connectivity Between Peer WAAS Devices, on page 25.

Troubleshooting Smart License Issues

There can be various issues with devices that are smart license enabled and not registered or authorized with Cisco Smart Software Manager (CSSM). Common issues include:

- invalid token
- communication issue with CSSM
- communication response error if CSSM is unavailable

For more information, and to troubleshoot any of the above scenarios, check the smart-license log files.

Contacting Cisco Technical Support

If you are unable to resolve a problem after using the troubleshooting suggestions in this chapter, contact the Cisco Technical Assistance Center (TAC) for assistance and further instructions. Before you call, have the following information ready to help your TAC engineer assist you as quickly as possible:

- Date that you received the Cisco WAAS hardware
- Chassis serial number
- Type of software and release number (if possible, run the **show version** EXEC command)
- Maintenance agreement or warranty information
- A good problem description including:
  - What is the problem and what are the user visible symptoms?
  - Where and when it occurs
  - Error messages, alerts, and alarms seen
  - Steps to duplicate the problem

- Brief explanation of the steps that you have already taken to isolate and resolve the problem
- The diagnostic test output (see Using Diagnostic Tests).
- A Cisco WAAS Central Manager database backup (run the **cms database backup** EXEC command)
- Information gathered in Gathering Cisco WAAS Troubleshooting Information
- Topology diagrams, including network, wiring, and logical diagrams
- Any other evidence of the problem such as packet captures, transaction logs, core files, WCCP **show** command output from routers, switches, and Cisco WAEs, and other log files.

You can contact support in these ways:

- Contact TAC
- Contact the Small Business Support Center (SBSC)