Troubleshooting

Interpreting LEDs

Information About Interpreting LEDs

This section describes how to interpret controller LEDs and lightweight access point LEDs.

Interpreting Controller LEDs

See the quick start guide for your specific controller for a description of the LED patterns. See the list of controllers and the respective documentation at http://www.cisco.com/c/en/us/products/wireless/index.html.

Interpreting Lightweight Access Point LEDs

See the quick start guide or hardware installation guide for your specific access point for a description of the LED patterns. See the list of access points and the respective documentation at http://www.cisco.com/c/en/us/products/wireless/index.html.

System Messages

Information About System Messages

This table lists some common system messages and their descriptions. For a complete list of system messages, see the *Cisco Wireless LAN Controller System Message Guide, Release 7.0*.

Table 1: System Messages and Descriptions

Error Message	Description
apf_utils.c 680: Received a CIF field without the protected bit set from mobile xx:xx:xx:xx:xx:xx	A client is sending an association request on a security-enabled WLAN with the protected bit set to 0 (in the Capability field of the association request). As designed, the controller rejects the association request, and the client sees an association failure.
dtl_arp.c 480: Got an idle-timeout message from an unknown client xx:xx:xx:xx:xx:xx	The controller's network processing unit (NPU) sends a timeout message to the central processing unit (CPU) indicating that a particular client has timed out or aged out. This situation typically occurs when the CPU has removed a wireless client from its internal database but has not notified the NPU. Because the client remains in the NPU database, it ages out on the network processor and notifies the CPU. The CPU finds the client that is not present in its database and then sends this message.
STATION_DISASSOCIATE	The client may have intentionally terminated usage or may have experienced a service disruption.
STATION_DEAUTHENTICATE	The client may have intentionally terminated usage or this message could indicate an authentication issue.
STATION_AUTHENTICATION_FAIL	Check disable, key mismatch, or other configuration issues.
STATION_ASSOCIATE_FAIL	Check load on the Cisco radio or signal quality issues.
LRAD_ASSOCIATED	The associated lightweight access point is now managed by this controller.
LRAD_DISASSOCIATED	The lightweight access point may have associated to a different controller or may have become completely unreachable.
LRAD_UP	The lightweight access point is operational; no action required.
LRAD_DOWN	The lightweight access point may have a problem or is administratively disabled.

Error Message	Description
LRADIF_UP	The Cisco radio is UP.
LRADIF_DOWN	The Cisco radio may have a problem or is administratively disabled.
LRADIF_LOAD_PROFILE_FAILED	The client density may have exceeded system capacity.
LRADIF_NOISE_PROFILE_FAILED	The non-802.11 noise has exceeded the configured threshold.
LRADIF_INTERFERENCE_PROFILE_FAILED	802.11 interference has exceeded threshold on channel; check channel assignments.
LRADIF_COVERAGE_PROFILE_FAILED	A possible coverage hole has been detected. Check the lightweight access point history to see if it is a common problem and add lightweight access points if necessary.
LRADIF_LOAD_PROFILE_PASSED	The load is now within threshold limits.
LRADIF_NOISE_PROFILE_PASSED	The detected noise is now less than threshold.
LRADIF_INTERFERENCE_PROFILE_PASSED	The detected interference is now less than threshold.
LRADIF_COVERAGE_PROFILE_PASSED	The number of clients receiving a poor signal are within threshold.
LRADIF_CURRENT_TXPOWER_CHANGED	Informational message.
LRADIF_CURRENT_CHANNEL_CHANGED	Informational message.
LRADIF_RTS_THRESHOLD_CHANGED	Informational message.
LRADIF_ED_THRESHOLD_CHANGED	Informational message.
LRADIF_FRAGMENTATION_THRESHOLD_CHANGED	Informational message.
RRM_DOT11_A_GROUPING_DONE	Informational message.
RRM_DOT11_B_GROUPING_DONE	Informational message.
ROGUE_AP_DETECTED	May be a security issue. Use maps and trends to investigate.
ROGUE_AP_REMOVED	A detected rogue access point has timed out. The unit might have shut down or moved out of the coverage area.
AP_MAX_ROGUE_COUNT_EXCEEDED	The current number of active rogue access points has exceeded system threshold.
LINK_UP	Positive confirmation message.
LINK_DOWN	A port may have a problem or is administratively disabled.
LINK_FAILURE	A port may have a problem or is administratively disabled.

Error Message	Description
AUTHENTICATION_FAILURE	An attempted security breech has occurred. Investigate.
STP_NEWROOT	Informational message.
STP_TOPOLOGY_CHANGE	Informational message.
IPSEC_ESP_AUTH_FAILURE	Check WLAN IPsec configuration.
IPSEC_ESP_REPLAY_FAILURE	Check for an attempt to spoof an IP address.
IPSEC_ESP_POLICY_FAILURE	Check for a IPsec configuration mismatch between WLAN and client.
IPSEC_ESP_INVALID_SPI	Informational message.
IPSEC_OTHER_POLICY_FAILURE	Check for a IPsec configuration mismatch between WLAN and client.
IPSEC_IKE_NEG_FAILURE	Check for a IPsec IKE configuration mismatch between WLAN and client.
IPSEC_SUITE_NEG_FAILURE	Check for a IPsec IKE configuration mismatch between WLAN and client.
IPSEC_INVALID_COOKIE	Informational message.
RADIOS_EXCEEDED	The maximum number of supported Cisco radios has been exceeded. Check for a controller failure in the same Layer 2 network or add another controller.
SENSED_TEMPERATURE_HIGH	Check fan, air conditioning, and/or other cooling arrangements.
SENSED_TEMPERATURE_LOW	Check room temperature and/or other reasons for low temperature.
TEMPERATURE_SENSOR_FAILURE	Replace temperature sensor as soon as possible.
TEMPERATURE_SENSOR_CLEAR	The temperature sensor is operational.
POE_CONTROLLER_FAILURE	Check ports; a possible serious failure has been detected.
MAX_ROGUE_COUNT_EXCEEDED	The current number of active rogue access points has exceeded system threshold.
SWITCH_UP	The controller is responding to SNMP polls.
SWITCH_DOWN	The controller is not responding to SNMP polls; check controller and SNMP settings.
RADIUS_SERVERS_FAILED	Check network connectivity between RADIUS and the controller.
CONFIG_SAVED	The running configuration has been saved to flash; it will be active after a reboot.

Error Message	Description
MULTIPLE_USERS	Another user with the same username has logged in.
FAN_FAILURE	Monitor controller temperature to avoid overheating.
POWER_SUPPLY_CHANGE	Check for a power-supply malfunction.
COLD_START	The controller may have been rebooted.
WARM_START	The controller may have been rebooted.

Viewing System Resources

Viewing System Resources

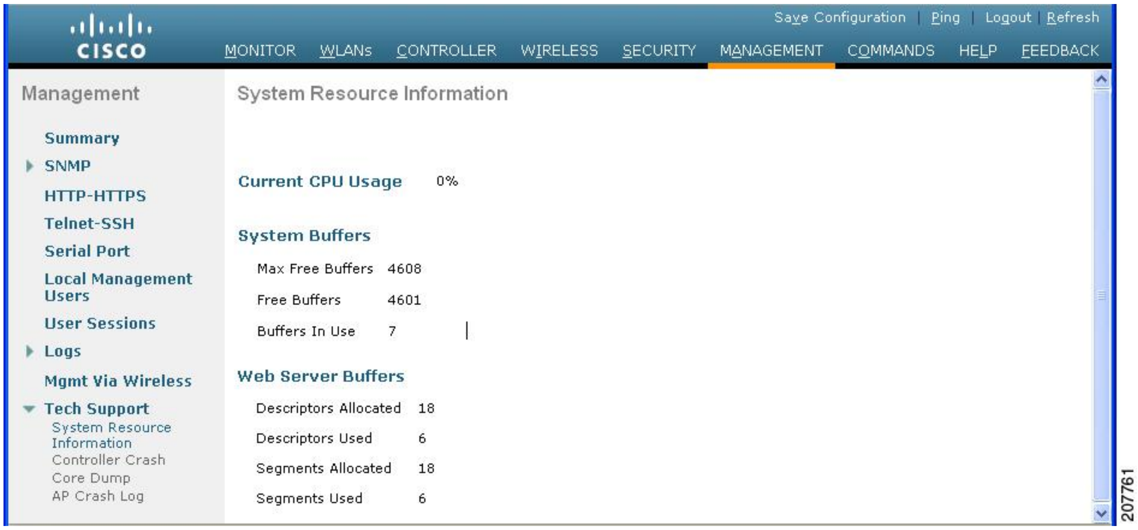
You can determine the amount of system resources being used by the controller. Specifically, you can view the current controller CPU usage, system buffers, and web server buffers.

The controllers have multiple CPUs, so you can view individual CPU usage. For each CPU, you can see the percentage of the CPU in use and the percentage of the CPU time spent at the interrupt level (for example, 0%/3%).

Viewing System Resources (GUI)

On the controller GUI, choose **Management > Tech Support > System Resource Information**. The System Resource Information page appears.

Figure 1: System Resource Information Page



System Resource Information

Current CPU Usage 0%

System Buffers

Max Free Buffers	4608
Free Buffers	4601
Buffers In Use	7

Web Server Buffers

Descriptors Allocated	18
Descriptors Used	6
Segments Allocated	18
Segments Used	6

The following system information is displayed:

- **System Resource Information**: Displays current and individual CPU usage, system buffers, and web server buffers.
- **Controller Crash Information**: Displays information present in the controller crash log file.
- **Core Dump**: Configures the core dump transfer through FTP. You must enter the server details to where the core dump has to be transferred.
- **AP Crash Logs**: Displays AP crash log information.
- **System Statistics**:
    - **IO Stats**: Displays CPU and input/output statistics for the controller.
    - **Top**: Displays the CPU usage.
- **Dx LCache Summary**: Displays database and local cache statistics.

Viewing System Resources (CLI)

On the controller CLI, enter these commands:

- **show cpu**: Displays current CPU usage information.

  The first number is the CPU percentage that the controller spent on the user application and the second number is the CPU percentage that the controller spent on the OS services.
- **show tech-support**: Displays system resource information.
- **show system dmesg clear**: Clears the dmesg logs after first printing its contents. The dmesg file contains the kernel log-messages.
- **show system interfaces**: Displays information about the configured network interfaces.
- **show system interrupts**: Displays the number of interrupts.
- **show system iostat** {**summary** | **detail**}: Displays CPU and input/output statistics.
- **show system ipv6**:
    - **show system ipv6 neighbours**: Displays the IPv6 neighbor cache.
    - **show system ipv6 netstat**: Displays system network IPv6 stats.
    - **show system ipv6 route**: Displays the IPv6 route information.
- **show system meminfo**: Displays system memory information.
- **show system neighbours**: Displays the IPv6 neighbor cache.
- **show system netstat**: Displays system network stats.
- **show system portstat**:
    - **show system portstat all verbose**: Displays all system active service or port statistics.
    - **show system portstat tcp verbose**: Displays system active service or port statistics related to TCP.
    - **show system portstat udp verbose**: Displays system active service or port statistics related to UDP.

- **show system process**:
    - **show system process maps** *pid*: Displays region of contiguous virtual memory in the PID.
    - **show system process stat** {**all** | *pid*}: Displays statistics for all or a particular process.
    - **show system process summary** : Displays a summary of processes.
- **show system route**: Displays system routing table.
- **show system slabs**: Displays memory usage on slab level.
- **show system slabtop**: Displays the slab usage.
- **show system timer ticks**: Displays the number of ticks and seconds since the timer lib started.
- **show system top**: Provides an ongoing look at processor activity in real time. It displays a list of the most CPU-intensive tasks performed on the system.
- **show system usb**: Displays configuration of USB.
- **show system vmstat**: Displays system virtual memory statistics.

Using the CLI to Troubleshoot Problems

If you experience any problems with your controller, you can use the commands in this section to gather information and debug issues.

- The **debug** command enables diagnostic logging of specific events. The log output is directed to the terminal session in which the debug command is entered.
- Only one debug session at a time is active. If one terminal has debugging running, and a **debug** command is entered on another terminal, the debug session on the first terminal is terminated.
- To turn off all debugs, use the **debug disable-all** command.
- To filter the debugs based on client or AP MAC addresses, use the **debug mac addr** *mac-address* command. Up to 10 MAC addresses are supported.

Procedure

- **show process cpu**: Shows how various tasks in the system are using the CPU at that instant in time. This command is helpful in understanding if any single task is monopolizing the CPU and preventing other tasks from being performed.

  The Priority field shows two values: 1) the original priority of the task that was created by the actual function call and 2) the priority of the task that is divided by a range of system priorities.

  The CPU Use field shows the CPU usage of a particular task.

  The Reaper field shows three values: 1) the amount of time for which the task is scheduled in user mode operation, 2) the amount of time for which the task is scheduled in a system mode operation, and 3) whether the task is being watched by the reaper task monitor (indicated by a “T”). If the task is being watched by the reaper task monitor, this field also shows the timeout value (in seconds) before which the task needs to alert the task monitor.

Note: If you want to see the total CPU usage as a percentage, enter the **show cpu** command.

- **show process memory**: Shows the allocation and deallocation of memory from various processes in the system at that instant in time.

  In the example above, the following fields provide information:

  The Name field shows the tasks that the CPU is to perform.

  The Priority field shows two values: 1) the original priority of the task that was created by the actual function call and 2) the priority of the task that is divided by a range of system priorities.

  The BytesInUse field shows the actual number of bytes used by dynamic memory allocation for a particular task.

  The BlocksInUse field shows the chunks of memory that are assigned to perform a particular task.

  The Reaper field shows three values: 1) the amount of time for which the task is scheduled in user mode operation, 2) the amount of time for which the task is scheduled in system mode operation, and 3) whether the task is being watched by the reaper task monitor (indicated by a “T”). If the task is being watched by the reaper task monitor, this field also shows the timeout value (in seconds) before which the task needs to alert the task monitor.

- **show tech-support**: Shows an array of information that is related to the state of the system, including the current configuration, last crash file, CPU utilization, and memory utilization.
- **show run-config**: Shows the complete configuration of the controller. To exclude access point configuration settings, use the **show run-config no-ap** command.

Note: If you want to see the passwords in clear text, enter the **config passwd-cleartext enable command**. To execute this command, you must enter an admin password. This command is valid only for this particular session. It is not saved following a reboot.

- **show run-config commands**: Shows the list of configured commands on the controller. This command shows only values that you configured. It does not show system-configured default values.

Configuring System and Message Logging

System and Message Logging

System logging allows controllers to log their system events to up to three remote syslog servers. The controller sends a copy of each syslog message as it is logged to each syslog server configured on the controller. Being able to send the syslog messages to multiple servers ensures that the messages are not lost due to the temporary unavailability of one syslog server. Message logging allows system messages to be logged to the controller buffer or console.

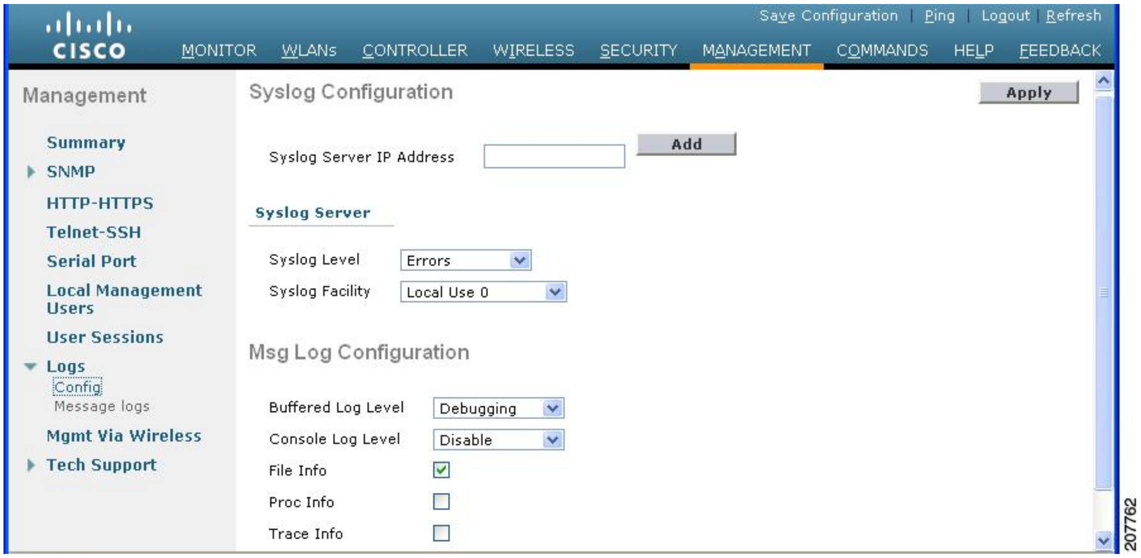
For more information about system messages and trap logs, see http://www.cisco.com/c/en/us/support/wireless/wireless-lan-controller-software/products-system-message-guides-list.html.

This section contains the following subsections:

Configuring System and Message Logging (GUI)

Step 1 Choose **Management** > **Logs** > **Config**. The Syslog Configuration page appears.

Figure 2: Syslog Configuration Page



Syslog Configuration

Syslog Server IP Address

Syslog Server

Syslog Level: Errors

Syslog Facility: Local Use 0

Msg Log Configuration

Buffered Log Level: Debugging

Console Log Level: Disable

File Info ☑

Proc Info □

Trace Info □

Step 2 In the **Syslog Server IP Address (IPv4/IPv6)** field, enter the IPv4/IPv6 address of the server to which to send the syslog messages and click **Add**. You can add up to three syslog servers to the controller. The list of syslog servers that have already been added to the controller appears below this field.

Note If you want to remove a syslog server from the controller, click **Remove** to the right of the desired server.

Step 3 To set the severity level for filtering syslog messages to the syslog servers, choose one of the following options from the **Syslog Level** drop-down list:

- **Emergencies** = Severity level 0
- **Alerts** = Severity level 1 (default value)
- **Critical** = Severity level 2
- **Errors** = Severity level 3
- **Warnings** = Severity level 4
- **Notifications** = Severity level 5
- **Informational** = Severity level 6
- **Debugging** = Severity level 7

If you set a syslog level, only those messages whose severity is equal to or less than that level are sent to the syslog servers. For example, if you set the syslog level to Warnings (severity level 4), only those messages whose severity is between 0 and 4 are sent to the syslog servers.

Note If you have enabled logging of debug messages to the logging buffer, some messages from application debug could be listed in message log with severity that is more than the level set. For example, if you execute the **debug client** *mac-addr* command, the client event log could be listed in message log even though the message severity level is set to **Errors**.

Step 4 To set the facility for outgoing syslog messages to the syslog servers, choose one of the following options from the **Syslog Facility** drop-down list:

- **Kernel** = Facility level 0
- **User Process** = Facility level 1
- **Mail** = Facility level 2
- **System Daemons** = Facility level 3
- **Authorization** = Facility level 4
- **Syslog** = Facility level 5 (default value)
- **Line Printer** = Facility level 6
- **USENET** = Facility level 7
- **Unix-to-Unix Copy** = Facility level 8
- **Cron** = Facility level 9
- **FTP Daemon** = Facility level 11
- **System Use 1** = Facility level 12
- **System Use 2** = Facility level 13
- **System Use 3** = Facility level 14
- **System Use 4** = Facility level 15
- **Local Use 0** = Facility level 16
- **Local Use 2** = Facility level 17
- **Local Use 3** = Facility level 18
- **Local Use 4** = Facility level 19
- **Local Use 5** = Facility level 20
- **Local Use 5** = Facility level 21
- **Local Use 5** = Facility level 22
- **Local Use 5** = Facility level 23

Step 5 Click **Apply**.

Step 6 To set the severity level for logging messages to the controller buffer and console, choose one of the following options from both the **Buffered Log Level** and **Console Log Level** drop-down lists:

- **Emergencies** = Severity level 0
- **Alerts** = Severity level 1
- **Critical** = Severity level 2
- **Errors** = Severity level 3 (default value)
- **Warnings** = Severity level 4
- **Notifications** = Severity level 5
- **Informational** = Severity level 6
- **Debugging** = Severity level 7
- **Disable**— This option is available only for Console Log level. Select this option to disable console logging.

If you set a logging level, only those messages whose severity is equal to or less than that level are logged by the controller. For example, if you set the logging level to Warnings (severity level 4), only those messages whose severity is between 0 and 4 are logged.

Step 7 Select the **File Info** check box if you want the message logs to include information about the source file. The default value is enabled.

Step 8 Select the **Trace Info** check box if you want the message logs to include traceback information. The default is disabled.

Step 9 Click **Apply**.

Step 10 Click **Save Configuration**.

Viewing Message Logs (GUI)

To view message logs using the controller GUI, choose **Management > Logs > Message Logs**. The Message Logs page appears.

Note To clear the current message logs from the controller, click **Clear**.

Configuring System and Message Logging (CLI)

Step 1 Enable system logging and set the IP address of the syslog server to which to send the syslog messages by entering this command:

config logging syslog host *server_IP_address*

You can add up to three syslog servers to the controller.

Note To remove a syslog server from the controller by entering this command: **config logging syslog host** *server_IP_address* **delete**.

Step 2 Set the severity level for filtering syslog messages to the syslog server by entering this command:

config logging syslog level *severity_level*

where *severity_level* is one of the following:

- emergencies = Severity level 0
- alerts = Severity level 1
- critical = Severity level 2
- errors = Severity level 3
- warnings = Severity level 4
- notifications = Severity level 5
- informational = Severity level 6
- debugging = Severity level 7

Note As an alternative, you can enter a number from 0 through 7 for the *severity_level* parameter.

Note If you set a syslog level, only those messages whose severity is equal to or less than that level are sent to the syslog server. For example, if you set the syslog level to Warnings (severity level 4), only those messages whose severity is between 0 and 4 are sent to the syslog server.

Step 3 Set the severity level for filtering syslog messages for a particular access point or for all access points by entering this command:

config ap logging syslog level *severity_level* {*Cisco_AP* | **all**}

where *severity_level* is one of the following:

- emergencies = Severity level 0
- alerts = Severity level 1
- critical = Severity level 2
- errors = Severity level 3
- warnings = Severity level 4
- notifications = Severity level 5
- informational = Severity level 6
- debugging = Severity level 7

Note If you set a syslog level, only those messages whose severity is equal to or less than that level are sent to the access point. For example, if you set the syslog level to Warnings (severity level 4), only those messages whose severity is between 0 and 4 are sent to the access point.

Step 4 Set the facility for outgoing syslog messages to the syslog server by entering this command:

config logging syslog facility *facility-code*

where *facility-code* is one of the following:

- ap = AP related traps.
- authorization = Authorization system. Facility level = 4.
- auth-private = Authorization system (private). Facility level = 10.
- cron = Cron/at facility. Facility level = 9.
- daemon = System daemons. Facility level = 3.
- ftp = FTP daemon. Facility level = 11.
- kern = Kernel. Facility level = 0.
- local0 = Local use. Facility level = 16.
- local1 = Local use. Facility level = 17.
- local2 = Local use. Facility level = 18.
- local3 = Local use. Facility level = 19.
- local4 = Local use. Facility level = 20.
- local5 = Local use. Facility level = 21.
- local6 = Local use. Facility level = 22.
- local7 = Local use. Facility level = 23.
- lpr = Line printer system. Facility level = 6.
- mail = Mail system. Facility level = 2.
- news = USENET news. Facility level = 7.
- sys12 = System use. Facility level = 12.
- sys13 = System use. Facility level = 13.

- sys14 = System use. Facility level = 14.
- sys15 = System use. Facility level = 15.
- syslog = The syslog itself. Facility level = 5.
- user = User process. Facility level = 1.
- uucp = Unix-to-Unix copy system. Facility level = 8.

Step 5 Configure the syslog facility for AP using the following command:

config logging syslog facility *AP*

where *AP* can be:

- associate= Associated sys log for AP
- disassociate=Disassociate sys log for AP

Step 6 Configure the syslog facility for an AP or all APs by entering this command:

config ap logging syslog facility *facility-level* {*Cisco_AP* | **all**}

where *facility-level* is one of the following:

- auth = Authorization system
- cron = Cron/at facility
- daemon = System daemons
- kern = Kernel
- local0 = Local use
- local1 = Local use
- local2 = Local use
- local3 = Local use
- local4 = Local use
- local5 = Local use
- local6 = Local use
- local7 = Local use
- lpr = Line printer system
- mail = Mail system
- news = USENET news
- sys10 = System use
- sys11 = System use
- sys12 = System use
- sys13 = System use
- sys14 = System use
- sys9 = System use
- syslog = Syslog itself
- user = User process
- uucp = Unix-to-Unix copy system

Step 7 Configure the syslog facility for client by entering this command:

config logging syslog facility client {**assocfail** | **associate** | **authentication** | **authfail** | **deauthenticate** | **disassociate** | **excluded**} {**enable** | **disable**}

where:

- **assocfail**: 802.11 association fail syslog for clients.
- **authentication**: Authentication success syslog for clients
- **authfail**: 802.11 authentication fail syslog for clients
- **deauthenticate**: 802.11 deauthentication syslog for clients
- **disassociate**: 802.11 disassociation syslog for clients
- **excluded**: Excluded syslog for clients

Step 8 Configure transmission of syslog messages over IPSec by entering this command:

config logging syslog ipsec {**enable** | **disable**}

Step 9 Configure transmission of syslog messages over transport layer security (TLS) by entering this command:

config logging syslog tls {**enable** | **disable**}

Enabling syslog over TLS on the controller enables the feature for all syslog hosts defined in the controller. You can define up to three syslog hosts per controller. The controller transmits messages concurrently to all the configured syslog hosts.

Check if the controller has an active TLS connection to the syslog server by entering the **show logging** command. The following is a sample output:

```
- syslog over tls............................... Enabled
  - Host 0...................................... 209.165.200.224
    - TLS auth status........................... connected
    - packets sent.............................. 3879
    - packets dropped........................... 2
  - Host 1......................................
  - Host 2......................................
```

Caution Issue: Some messages are not transmitted to the syslog server even though it is reachable.

Analysis: This issue occurs because syslog over TLS is enabled in the controller, multiple syslog hosts are defined in the controller, the number of syslog messages generated are high, and one of the syslog hosts is not reachable over TLS.

Step 10 Set the severity level for logging messages to the controller buffer and console by entering these commands:

- **config logging buffered** *severity_level*
- **config logging console** *severity_level*

where *severity_level* is one of the following:

- emergencies = Severity level 0
- alerts = Severity level 1
- critical = Severity level 2
- errors = Severity level 3
- warnings = Severity level 4
- notifications = Severity level 5

- informational = Severity level 6
- debugging = Severity level 7

Note As an alternative, you can enter a number from 0 through 7 for the *severity_level* parameter.

Note If you set a logging level, only those messages whose severity is equal to or less than that level are logged by the controller. For example, if you set the logging level to Warnings (severity level 4), only those messages whose severity is between 0 and 4 are logged.

Step 11 Save debug messages to the controller buffer, the controller console, or a syslog server by entering these commands:

- **config logging debug buffered {enable | disable}**
- **config logging debug console {enable | disable}**
- **config logging debug syslog {enable | disable}**

By default, the console command is enabled, and the buffered and syslog commands are disabled.

Step 12 To cause the controller to include information about the source file in the message logs or to prevent the controller from displaying this information by entering this command:

config logging fileinfo {enable | disable}

The default value is enabled.

Step 13 Configure the controller to include process information in the message logs or to prevent the controller from displaying this information by entering this command:

config logging procinfo {**enable** | **disable**}

The default value is disabled.

Step 14 Configure the controller to include traceback information in the message logs or to prevent the controller from displaying this information by entering this command:

config logging traceinfo {enable | disable}

The default value is disabled.

Step 15 Enable or disable timestamps in log messages and debug messages by entering these commands:

- **config service timestamps log {datetime | disable}**
- **config service timestamps debug {datetime | disable}**

where

- **datetime** = Messages are timestamped with the standard date and time. This is the default value.
- **disable** = Messages are not timestamped.

Step 16 Save your changes by entering this command:

save config

Viewing System and Message Logs (CLI)

To see the logging parameters and buffer contents, enter this command:

show logging

Viewing Access Point Event Logs

Information About Access Point Event Logs

Access points log all system messages (with a severity level greater than or equal to notifications) to the access point event log. The event log can contain up to 1024 lines of messages, with up to 128 characters per line. When the event log becomes filled, the oldest message is removed to accommodate a new event message. The event log is saved in a file on the access point flash, which ensures that it is saved through a reboot cycle. To minimize the number of writes to the access point flash, the contents of the event log are written to the event log file during normal reload and crash scenarios only.

Viewing Access Point Event Logs (CLI)

Use these CLI commands to view or clear the access point event log from the controller:

- To see the contents of the event log file for an access point that is joined to the controller, enter this command:

  show ap eventlog *ap-name*

  Information similar to the following appears:

```
AP event log download has been initiated
Waiting for download to complete

AP event log download completed.
 ======================= AP Event log Contents =====================
*Sep 22 11:44:00.573: %CAPWAP-5-CHANGED: CAPWAP changed state to IMAGE
*Sep 22 11:44:01.514: %LINEPROTO-5-UPDOWN: Line protocol on Interface Dot11Radio0,
changed state to down
*Sep 22 11:44:01.519: %LINEPROTO-5-UPDOWN: Line protocol on Interface Dot11Radio1,
changed state to down
*Sep 22 11:44:53.539: *** Access point reloading. Reason: NEW IMAGE DOWNLOAD ***
*Mar 1 00:00:39.078: %CAPWAP-3-ERRORLOG: Did not get log server settings from DHCP.
*Mar 1 00:00:42.142: %CDP_PD-4-POWER_OK: Full power - NEGOTIATED inline power source
*Mar 1 00:00:42.151: %LINK-3-UPDOWN: Interface Dot11Radio1, changed state to up
*Mar 1 00:00:42.158: %LINK-3-UPDOWN: Interface Dot11Radio0, changed state to up
*Mar 1 00:00:43.143: %LINEPROTO-5-UPDOWN: Line protocol on Interface Dot11Radio1, changed
 state to up
*Mar 1 00:00:43.151: %LINEPROTO-5-UPDOWN: Line protocol on Interface Dot11Radio0, changed
 state to up
*Mar 1 00:00:48.078: %CAPWAP-3-ERRORLOG: Could Not resolve CISCO-CAPWAP-CONTROLLER
*Mar 1 00:01:42.144: %CDP_PD-4-POWER_OK: Full power - NEGOTIATED inline power source
*Mar 1 00:01:48.121: %CAPWAP-3-CLIENTERRORLOG: Set Transport Address: no more AP manager
 IP addresses remain
*Mar 1 00:01:48.122: %CAPWAP-5-CHANGED: CAPWAP changed state to JOIN
*Mar 1 00:01:48.122: %LINK-5-CHANGED: Interface Dot11Radio0, changed state to
administratively down
*Mar 1 00:01:48.122: %LINK-5-CHANGED: Interface Dot11Radio1, changed state to
```

```
administratively down
```

- To delete the existing event log and create an empty event log file for all access points or for a specific access point joined to the controller, enter this command:

  clear ap eventlog {**all** | *ap-name*}

Uploading Logs and Crash Files

Upload Logs and Crash Files

- Follow the instructions in this section to upload logs and crash files from the controller. However, before you begin, ensure you have a TFTP or FTP server available for the file upload. Follow these guidelines when setting up a TFTP or FTP server:
  - If you are uploading through the service port, the TFTP or FTP server must be on the same subnet as the service port because the service port is not routable, or you must create static routes on the controller.
  - If you are uploading through the distribution system network port, the TFTP or FTP server can be on the same or a different subnet because the distribution system port is routable.
  - A third-party TFTP or FTP server cannot run on the same computer as Cisco Prime Infrastructure because the Prime Infrastructure built-in TFTP or FTP server and the third-party TFTP or FTP server require the same communication port.

This section contains the following subsections:

Uploading Logs and Crash Files (GUI)

Step 1 Choose **Command** > **Upload File**. The Upload File from Controller page appears.

Step 2 From the **File Type** drop-down list, choose one of the following:

- **Event Log**
- **Message Log**
- **Trap Log**
- **Crash File**

Step 3 From the **Transfer Mode** drop-down list, choose from the following options:

- **TFTP**
- **FTP**
- **SFTP**

Step 4 In the **IP Address** text box, enter the IP address of the server.

Step 5 In the **File Path** text box, enter the directory path of the log or crash file.

Step 6 In the **File Name** text box, enter the name of the log or crash file.

Step 7 If you chose FTP as the Transfer Mode, follow these steps:

a. In the **Server Login Username** text box, enter the FTP server login name.

b. In the **Server Login Password** text box, enter the FTP server login password.

c. In the **Server Port Number** text box, enter the port number of the FTP server. The default value for the server port is 21.

Step 8 Click **Upload** to upload the log or crash file from the controller. A message appears indicating the status of the upload.

Uploading Logs and Crash Files (CLI)

Step 1 To transfer the file from the controller to a server, enter this command:

transfer upload mode {**tftp** | **ftp** | **sftp**}

Step 2 To specify the type of file to be uploaded, enter this command:

transfer upload datatype *datatype*

where *datatype* is one of the following options:

- **crashfile**—Uploads the system’s crash file.
- **errorlog**—Uploads the system’s error log.
- **panic-crash-file**—Uploads the kernel panic information if a kernel panic occurs.
- **systemtrace**—Uploads the system’s trace file.
- **traplog**—Uploads the system’s trap log.
- **watchdog-crash-file**—Uploads the console dump resulting from a software-watchdog-initiated reboot of the controller following a crash. The software watchdog module periodically checks the integrity of the internal software and makes sure that the system does not stay in an inconsistent or nonoperational state for a long period of time.

Step 3 To specify the path to the file, enter these commands:

- **transfer upload serverip** *server_ip_address*
- **transfer upload path** *server_path_to_file*
- **transfer upload filename** *filename*

Step 4 If you are using an FTP server, also enter these commands:

- **transfer upload username** *username*
- **transfer upload password** *password*
- **transfer upload port** *port*

Note The default value for the port parameter is 21.

Step 5 To see the updated settings, enter this command:

transfer upload start

Step 6 When prompted to confirm the current settings and start the software upload, answer **y**.

Uploading Core Dumps from the Controller

Uploading Core Dumps from the Controller

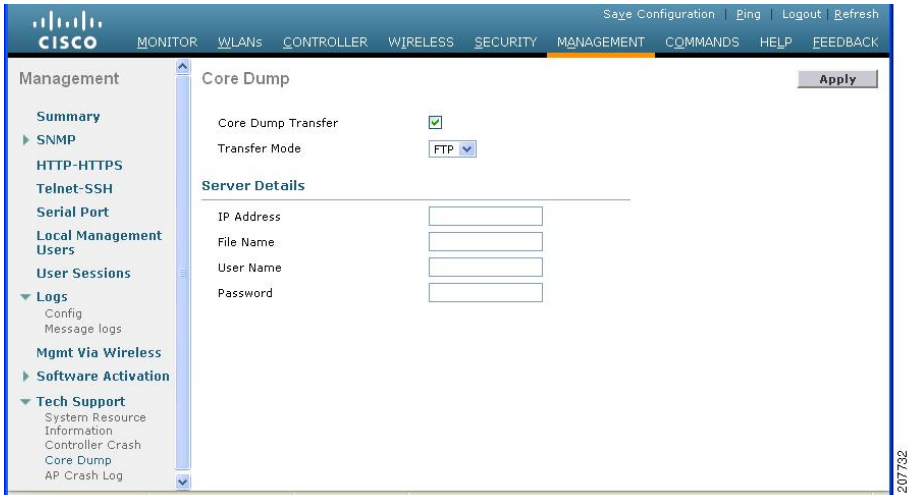
To help troubleshoot controller crashes, you can configure the controller to automatically upload its core dump file to an FTP server after experiencing a crash. However, you cannot automatically send crash files to an FTP server.

This section contains the following subsections:

Configuring the Controller to Automatically Upload Core Dumps to an FTP Server (GUI)

Step 1 Choose **Management > Tech Support > Core Dump** to open the Core Dump page.

Figure 3: Core Dump Page



Core Dump

Core Dump Transfer ☑

Transfer Mode FTP

Server Details

IP Address

File Name

User Name

Password

Step 2 To enable the controller to generate a core dump file following a crash, select the **Core Dump Transfer** check box.

Step 3 To specify the type of server to which the core dump file is uploaded, choose **FTP** from the **Transfer Mode** drop-down list.

Step 4 In the **IP Address** text box, enter the IP address of the FTP server.

Note The controller must be able to reach the FTP server.

Step 5 In the **File Name** text box, enter the name that the controller uses to label the core dump file.

Step 6 In the **User Name** text box, enter the username for FTP login.

Step 7 In the **Password** text box, enter the password for FTP login.

Step 8 Click **Apply** to commit your changes.

Step 9 Click **Save Configuration** to save your changes.

Configuring the Controller to Automatically Upload Core Dumps to an FTP Server (CLI)

Step 1 To enable or disable the controller to generate a core dump file following a crash, enter this command:

config coredump {**enable** | **disable**}

Step 2 To specify the FTP server to which the core dump file is uploaded, enter this command:

config coredump ftp *server_ip_address filename*

where

- *server_ip_address* is the IP address of the FTP server to which the controller sends its core dump file.

  Note The controller must be able to reach the FTP server.

- *filename* is the name that the controller uses to label the core dump file.

Step 3 To specify the username and password for FTP login, enter this command:

config coredump username *ftp_username* **password** *ftp_password*

Step 4 To save your changes, enter this command:

save config

Step 5 To see a summary of the controller’s core dump file, enter this command:

show coredump summary

Example:

Information similar to the following appears:

```
Core Dump is enabled

FTP Server IP.................................. 10.10.10.17
FTP Filename................................... file1
FTP Username................................... ftpuser
FTP Password................................. *********
```

Uploading Core Dumps from Controller to a Server (CLI)

Step 1 To see information about the core dump file in flash memory, enter this command:

show coredump summary

Information similar to the following appears:

```
Core Dump is disabled

Core Dump file is saved on flash

Sw Version.................................. 6.0.83.0
Time Stamp.................................. Wed Feb  4 13:23:11 2009
File Size................................... 9081788
File Name Suffix.......................... filename.gz
```

Step 2 To transfer the file from the controller to a server, enter these commands:

- **transfer upload mode** {**tftp** | **ftp** | **sftp**}
- **transfer upload datatype coredump**
- **transfer upload serverip** *server_ip_address*
- **transfer upload path** *server_path_to_file*
- **transfer upload filename** *filename*

Note After the file is uploaded, it ends with a .gz suffix. If desired, you can upload the same core dump file multiple times with different names to different servers.

Step 3 If you are using an FTP server, also enter these commands:

- **transfer upload username** *username*

  transfer upload password *password*
- **transfer upload port** *port*

Note The default value for the *port* parameter is 21.

Step 4 To view the updated settings, enter this command:

transfer upload start

Step 5 When prompted to confirm the current settings and start the software upload, answer y.

Uploading Packet Capture Files

Uploading Crash Packet Capture Files

When a controller's data plane crashes, it stores the last 50 packets that the controller received in flash memory. This information can be useful in troubleshooting the crash.

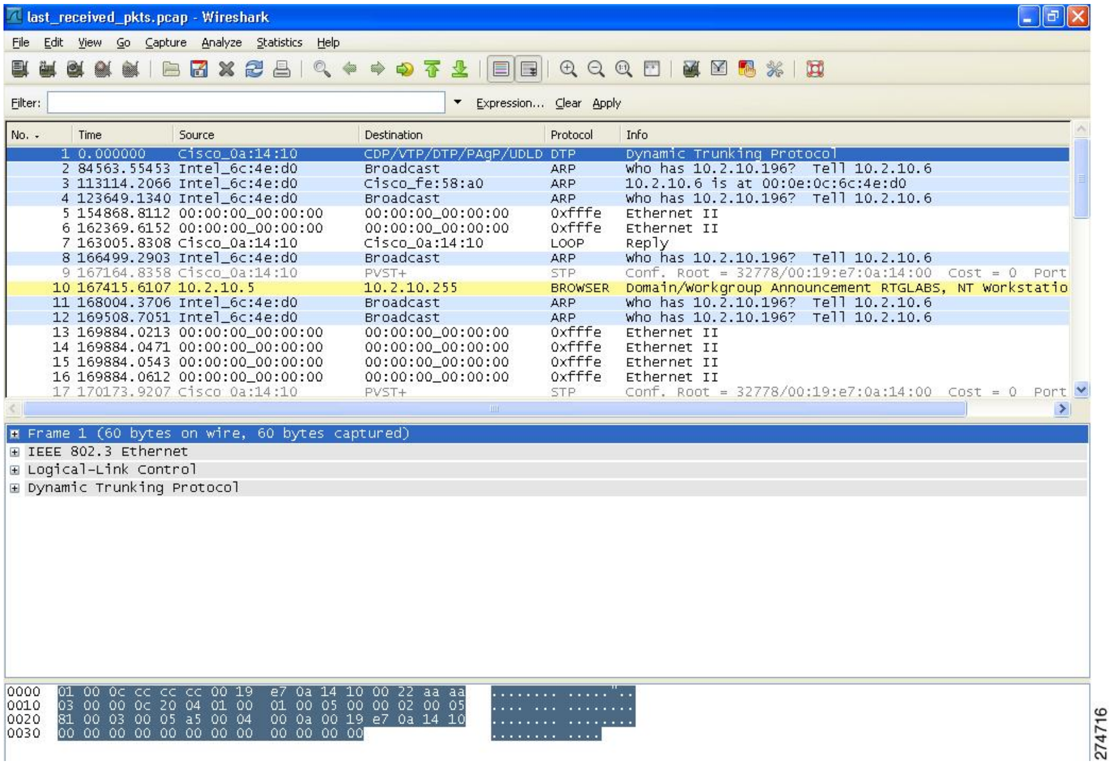
When a crash occurs, the controller generates a new packet capture file (*.pcap) file, and a message similar to the following appears in the controller crash file:

```
Last 5 packets processed at each core are stored in
 "last_received_pkts.pcap" captured file.
   - Frame 36,38,43,47,49, processed at core #0.
   - Frame 14,27,30,42,45, processed at core #1.
   - Frame 15,18,20,32,48, processed at core #2.
   - Frame 11,29,34,37,46, processed at core #3.
   - Frame 7,8,12,31,35, processed at core #4.
   - Frame 21,25,39,41,50, processed at core #5.
   - Frame 16,17,19,22,33, processed at core #6.
   - Frame 6,10,13,23,26, processed at core #7.
   - Frame 9,24,28,40,44, processed at core #8.
   - Frame 1,2,3,4,5, processed at core #9.
```

You can use the controller GUI or CLI to upload the packet capture file from the controller. You can then use Wireshark or another standard packet capture tool to view and analyze the contents of the file.

Figure 4: Sample Output of Packet Capture File in Wireshark

This figure shows a sample output of the packet capture in Wireshark.



last_received_pkts.pcap - Wireshark
File Edit View Go Capture Analyze Statistics Help
Filter:
Expression... Clear Apply
274716

```
No. -   Time         Source               Destination            Protocol  Info
      1 0.000000     Cisco_0a:14:10       CDP/VTP/DTP/PAgP/UDLD  DTP       Dynamic Trunking Protocol
      2 84563.55453  Intel_6c:4e:d0       Broadcast              ARP       Who has 10.2.10.196?  Tell 10.2.10.6
      3 113114.2066  Intel_6c:4e:d0       Cisco_fe:58:a0         ARP       10.2.10.6 is at 00:0e:0c:6c:4e:d0
      4 123649.1340  Intel_6c:4e:d0       Broadcast              ARP       Who has 10.2.10.196?  Tell 10.2.10.6
      5 154868.8112  00:00:00_00:00:00    00:00:00_00:00:00      0xfffe    Ethernet II
      6 162369.6152  00:00:00_00:00:00    00:00:00_00:00:00      0xfffe    Ethernet II
      7 163005.8308  Cisco_0a:14:10       Cisco_0a:14:10         LOOP      Reply
      8 166499.2903  Intel_6c:4e:d0       Broadcast              ARP       Who has 10.2.10.196?  Tell 10.2.10.6
      9 167164.8358  Cisco_0a:14:10       PVST+                  STP       Conf. Root = 32778/00:19:e7:0a:14:00  Cost = 0  Port
     10 167415.6107  10.2.10.5            10.2.10.255            BROWSER   Domain/Workgroup Announcement RTGLABS, NT Workstatio
     11 168004.3706  Intel_6c:4e:d0       Broadcast              ARP       Who has 10.2.10.196?  Tell 10.2.10.6
     12 169508.7051  Intel_6c:4e:d0       Broadcast              ARP       Who has 10.2.10.196?  Tell 10.2.10.6
     13 169884.0213  00:00:00_00:00:00    00:00:00_00:00:00      0xfffe    Ethernet II
     14 169884.0471  00:00:00_00:00:00    00:00:00_00:00:00      0xfffe    Ethernet II
     15 169884.0543  00:00:00_00:00:00    00:00:00_00:00:00      0xfffe    Ethernet II
     16 169884.0612  00:00:00_00:00:00    00:00:00_00:00:00      0xfffe    Ethernet II
     17 170173.9207  Cisco_0a:14:10       PVST+                  STP       Conf. Root = 32778/00:19:e7:0a:14:00  Cost = 0  Port

⊞ Frame 1 (60 bytes on wire, 60 bytes captured)
⊞ IEEE 802.3 Ethernet
⊞ Logical-Link Control
⊞ Dynamic Trunking Protocol

0000  01 00 0c cc cc cc 00 19  e7 0a 14 10 00 22 aa aa   ........ ....."..
0010  03 00 00 0c 20 04 01 00  01 00 05 00 00 02 00 05   .... ... ........
0020  81 00 03 00 05 a5 00 04  00 0a 00 19 e7 0a 14 10   ........ ........
0030  00 00 00 00 00 00 00 00  00 00 00 00               ........ ....
```

This section contains the following subsections:

Restrictions for Uploading Crash Packet Capture Files

- Only Cisco 5508 WLCs generate crash packet capture files. This feature is not available on other controller platforms.
- Ensure that you have a TFTP or FTP server available for the file upload. Follow these guidelines when setting up a TFTP or FTP server:
    - If you are uploading through the service port, the TFTP or FTP server must be on the same subnet as the service port because the service port is not routable, or you must create static routes on the controller.
    - If you are uploading through the distribution system network port, the TFTP or FTP server can be on the same or a different subnet because the distribution system port is routable.
    - A third-party TFTP or FTP server cannot run on the same computer as Cisco Prime Infrastructure because the Prime Infrastructure built-in TFTP or FTP server and the third-party TFTP or FTP server require the same communication port.

Uploading Crash Packet Capture Files (GUI)

Step 1 Choose **Commands** > **Upload File** to open the **Upload File from Controller** page.

Step 2 From the **File Type** drop-down list, choose **Packet Capture**.

Step 3 From the **Transfer Mode** drop-down list, choose from the following options:

- **TFTP**
- **FTP**
- **SFTP**

Step 4 In the **IP Address** field, enter the IP address of the server.

Step 5 In the **File Path** field, enter the directory path of the packet capture file.

Step 6 In the **File Name** field, enter the name of the packet capture file. These files have a .pcap extension.

Step 7 If you are using an FTP server, follow these steps:

a) In the **Server Login Username** field, enter the username to log into the FTP server.
b) In the **Server Login Password** field, enter the password to log into the FTP server.
c) In the **Server Port Number** field, enter the port number on the FTP server through which the upload occurs. The default value is 21.

Step 8 Click **Upload** to upload the packet capture file from the controller. A message is displayed indicating the status of the upload.

Step 9 Use Wireshark or another standard packet capture tool to open the packet capture file and see the last 50 packets that were received by the controller.

Uploading Crash Packet Capture Files (CLI)

Step 1 Log on to the controller CLI.

Step 2 Enter the **transfer upload mode** {**tftp** | **ftp** | **sftp**} command.

Step 3 Enter the **transfer upload datatype packet-capture** command.

Step 4 Enter the **transfer upload serverip** *server-ip-address* command.

Step 5 Enter the **transfer upload path** *server-path-to-file* command.

Step 6 Enter the **transfer upload filename** *last_received_pkts*.pcap command.

Step 7 If you are using an FTP server, enter these commands:

- **transfer upload username** *username*
- **transfer upload password** *password*
- **transfer upload port** *port*

Note The default value for the *port* parameter is 21.

Step 8 Enter the **transfer upload start** command to see the updated settings and then answer **y** when prompted to confirm the current settings and start the upload process.

Step 9 Use Wireshark or another standard packet capture tool to open the packet capture file and see the last 50 packets that were received by the controller.

Monitoring Memory Leaks

This section provides instructions for troubleshooting hard-to-solve or hard-to-reproduce memory problems.

Caution The commands in this section can be disruptive to your system and should be run only when you are advised to do so by the Cisco Technical Assistance Center (TAC).

This section contains the following subsection:

Monitoring Memory Leaks (CLI)

Step 1 To enable or disable monitoring for memory errors and leaks, enter this command:

config memory monitor errors {**enable** | **disable**}

The default value is disabled.

Note Your changes are not saved across reboots. After the controller reboots, it uses the default setting for this feature.

Step 2 If you suspect that a memory leak has occurred, enter this command to configure the controller to perform an auto-leak analysis between two memory thresholds (in kilobytes):

config memory monitor leaks *low_thresh high_thresh*

If the free memory is lower than the *low_thresh* threshold, the system crashes, generating a crash file. The default value for this parameter is 10000 kilobytes, and you cannot set it below this value.

Set the *high_thresh* threshold to the current free memory level or higher so that the system enters auto-leak-analysis mode. After the free memory reaches a level lower than the specified *high_thresh* threshold, the process of tracking and freeing memory allocation begins. As a result, the **debug memory events enable** command shows all allocations and frees, and the **show memory monitor detail** command starts to detect any suspected memory leaks. The default value for this parameter is 30000 kilobytes.

Step 3 To see a summary of any discovered memory issues, enter this command:

show memory monitor

Information similar to the following appears:

```
Memory Leak Monitor Status:
low_threshold(10000), high_threshold(30000), current status(disabled)

-------------------------------------------

Memory Error Monitor Status:
Crash-on-error flag currently set to (disabled)
No memory error detected.
```

Step 4 To see the details of any memory leaks or corruption, enter this command:

show memory monitor detail

Information similar to the following appears:

```
Memory error detected. Details:
------------------------------------------------
-  Corruption detected at pmalloc entry address:        (0x179a7ec0)
-  Corrupt entry:headerMagic(0xdeadf00d),trailer(0xabcd),poison(0xreadceef),
entrysize(128),bytes(100),thread(Unknown task name, task id = (332096592)),
file(pmalloc.c),line(1736),time(1027)

Previous 1K memory dump from error location.
------------------------------------------------
(179a7ac0): 00000000 00000000 00000000 ceeff00d readf00d 00000080 00000000 00000000
(179a7ae0): 17958b20 00000000 1175608c 00000078 00000000 readceef 179a7afc 00000001
(179a7b00): 00000003 00000006 00000001 00000004 00000001 00000009 00000009 0000020d
(179a7b20): 00000001 00000002 00000002 00000001 00000004 00000000 00000000 5d7b9aba
(179a7b40): cbddf004 192f465e 7791acc8 e5032242 5365788c a1b7cee6 00000000 00000000
(179a7b60): 00000000 00000000 00000000 00000000 00000000 ceeff00d readf00d 00000080
(179a7b80): 00000000 00000000 17958dc0 00000000 1175608c 00000078 00000000 readceef
(179a7ba0): 179a7ba4 00000001 00000003 00000006 00000001 00000004 00000001 00003763
(179a7bc0): 00000002 00000002 00000010 00000001 00000002 00000000 0000001e 00000013
(179a7be0): 0000001a 00000089 00000000 00000000 000000d8 00000000 00000000 17222194
(179a7c00): 1722246c 1722246c 00000000 00000000 00000000 00000000 00000000 ceeff00d
(179a7c20): readf00d 00000080 00000000 00000000 179a7b78 00000000 1175608c 00000078
```

Step 5 If a memory leak occurs, enter this command to enable debugging of errors or events during memory allocation:

debug memory {errors | events} {enable | disable}

Troubleshooting CCXv5 Client Devices

Information About Troubleshooting CCXv5 Client Devices

The controller supports three features designed to help troubleshoot communication problems with CCXv5 clients: diagnostic channel, client reporting, and roaming and real-time diagnostics.

Restrictions for CCXv5 Client Devices

Diagnostic channel, client reporting, and roaming and real-time diagnostics features are supported only on CCXv5 clients. They are not supported for use with non-CCX clients or with clients running an earlier version of CCX.

Configuring Diagnostic Channel

You can choose a diagnostic channel to troubleshoot why the client is having communication problems with a WLAN. You can test the client and access points to identify the difficulties that the client is experiencing and allow corrective measures to be taken to make the client operational on the network. You can use the controller GUI or CLI to enable the diagnostic channel, and you can use the controller **diag-channel** CLI to run the diagnostic tests.

Note We recommend that you enable the diagnostic channel feature only for nonanchored SSIDs that use the management interface. CCX Diagnostic feature has been tested only with clients having Cisco ADU card

Configuring the Diagnostic Channel (GUI)

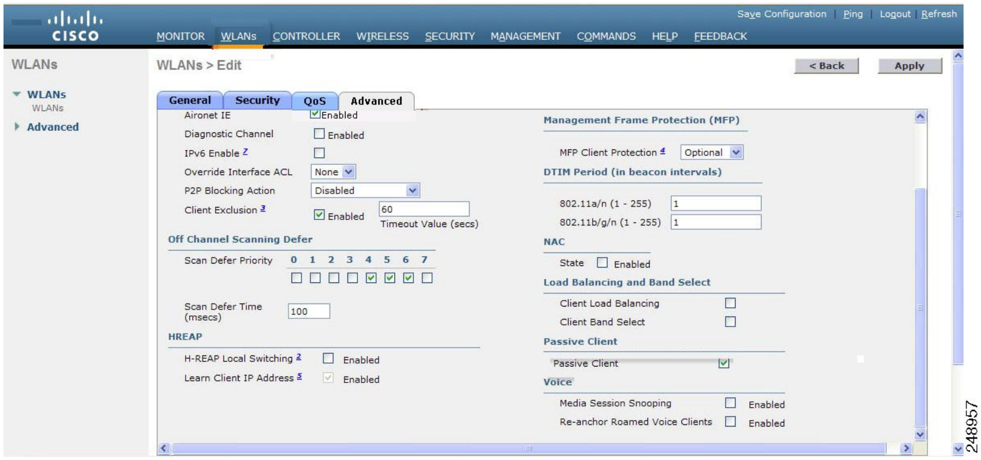
Step 1 Choose **WLANs** to open the WLANs page.

Step 2 Create a new WLAN or click the ID number of an existing WLAN.

Note We recommend that you create a new WLAN on which to run the diagnostic tests.

Step 3 When the **WLANs** > **Edit** page appears, choose the **Advanced** tab to open the **WLANs** > **Edit (Advanced)** page.

Figure 5: WLANs > Edit (Advanced) Page


Save Configuration | Ping | Logout | Refresh
CISCO
MONITOR WLANs CONTROLLER WIRELESS SECURITY MANAGEMENT COMMANDS HELP FEEDBACK
WLANs
WLANs
WLANs
Advanced
WLANs > Edit
< Back
Apply
General
Security
QoS
Advanced
248957

Aironet IE ☑ Enabled
Diagnostic Channel □ Enabled
IPv6 Enable 7 □
Override Interface ACL None
P2P Blocking Action Disabled
Client Exclusion 3 ☑ Enabled 60 Timeout Value (secs)

Off Channel Scanning Defer

Scan Defer Priority 0 □ 1 □ 2 □ 3 □ 4 ☑ 5 ☑ 6 ☑ 7 □
Scan Defer Time (msecs) 100

HREAP

H-REAP Local Switching 2 □ Enabled
Learn Client IP Address 5 ☑ Enabled

Management Frame Protection (MFP)

MFP Client Protection 4 Optional

DTIM Period (in beacon intervals)

802.11a/n (1 - 255) 1
802.11b/g/n (1 - 255) 1

NAC

State □ Enabled

Load Balancing and Band Select

Client Load Balancing □
Client Band Select □

Passive Client

Passive Client ☑

Voice

Media Session Snooping □ Enabled
Re-anchor Roamed Voice Clients □ Enabled

Step 4 If you want to enable diagnostic channel troubleshooting on this WLAN, select the **Diagnostic Channel** check box. Otherwise, leave this check box unselected, which is the default value.

Note You can use the CLI to initiate diagnostic tests on the client.

Step 5 Click **Apply** to commit your changes.

Step 6 Click **Save Configuration** to save your changes.

Configuring the Diagnostic Channel (CLI)

Step 1 To enable diagnostic channel troubleshooting on a particular WLAN, enter this command:

config wlan diag-channel {**enable** | **disable**} *wlan_id*

Step 2 To verify that your change has been made, enter this command:

show wlan *wlan_id*

Information similar to the following appears:

```
WLAN Identifier.................................. 1
Profile Name..................................... employee1
Network Name (SSID).............................. employee
Status........................................... Disabled
MAC Filtering.................................... Disabled
Broadcast SSID................................... Enabled
AAA Policy Override.............................. Disabled
Number of Active Clients......................... 0
Exclusionlist Timeout............................ 60 seconds
Session Timeout.................................. Infinity
Interface........................................ virtual
WLAN ACL......................................... unconfigured
DHCP Server...................................... Default
DHCP Address Assignment Required................. Disabled
Quality of Service............................... Silver (best effort)
WMM.............................................. Disabled
CCX - AironetIe Support.......................... Enabled
CCX - Gratuitous ProbeResponse (GPR)............. Disabled
CCX - Diagnostics Channel Capability............. Enabled
...
```

Step 3 To send a request to the client to perform the DHCP test, enter this command:

config client ccx dhcp-test *client_mac_address*

Note This test does not require the client to use the diagnostic channel.

Step 4 To send a request to the client to perform the default gateway ping test, enter this command:

config client ccx default-gw-ping *client_mac_address*

Note This test does not require the client to use the diagnostic channel.

Step 5 To send a request to the client to perform the DNS server IP address ping test, enter this command:

config client ccx dns-ping *client_mac_address*

Note This test does not require the client to use the diagnostic channel.

Step 6 To send a request to the client to perform the DNS name resolution test to the specified host name, enter this command:

config client ccx dns-resolve *client_mac_address host_name*

Note This test does not require the client to use the diagnostic channel.

Step 7 To send a request to the client to perform the association test, enter this command:

config client ccx test-association *client_mac_address ssid bssid* {**802.11a | 802.11b | 802.11g**} *channel*

Step 8 To send a request to the client to perform the 802.1X test, enter this command:

config client ccx test-dot1x *client_mac_address profile_id bssid* {**802.11a | 802.11b | 802.11g**} *channel*

Step 9 To send a request to the client to perform the profile redirect test, enter this command:

config client ccx test-profile *client_mac_address profile_id*

The *profile_id* should be from one of the client profiles for which client reporting is enabled.

Note Users are redirected back to the parent WLAN, not to any other profile. The only profile shown is the user's parent profile. Note however that parent WLAN profiles can have one child diagnostic WLAN.

Step 10 Use these commands if necessary to terminate or clear a test:

- To send a request to the client to terminate the current test, enter this command:

  config client ccx test-abort *client_mac_address*

  Only one test can be pending at a time, so this command terminates the current pending test.

- To clear the test results on the controller, enter this command:

  config client ccx clear-results *client_mac_address*

Step 11 To send a message to the client, enter this command:
config client ccx send-message *client_mac_address message_id*

where *message_id* is one of the following:

- 1 = The SSID is invalid.
- 2 = The network settings are invalid.
- 3 = There is a WLAN credibility mismatch.
- 4 = The user credentials are incorrect.
- 5 = Please call support.
- 6 = The problem is resolved.
- 7 = The problem has not been resolved.
- 8 = Please try again later.
- 9 = Please correct the indicated problem.
- 10 = Troubleshooting is refused by the network.
- 11 = Retrieving client reports.
- 12 = Retrieving client logs.
- 13 = Retrieval complete.
- 14 = Beginning association test.
- 15 = Beginning DHCP test.
- 16 = Beginning network connectivity test.
- 17 = Beginning DNS ping test.
- 18 = Beginning name resolution test.
- 19 = Beginning 802.1X authentication test.
- 20 = Redirecting client to a specific profile.
- 21 = Test complete.

- 22 = Test passed.
- 23 = Test failed.
- 24 = Cancel diagnostic channel operation or select a WLAN profile to resume normal operation.
- 25 = Log retrieval refused by the client.
- 26 = Client report retrieval refused by the client.
- 27 = Test request refused by the client.
- 28 = Invalid network (IP) setting.
- 29 = There is a known outage or problem with the network.
- 30 = Scheduled maintenance period.
- 31 = The WLAN security method is not correct.
- 32 = The WLAN encryption method is not correct.
- 33 = The WLAN authentication method is not correct.

Step 12 To see the status of the last test, enter this command:

show client ccx last-test-status *client_mac_address*

Information similar to the following appears for the default gateway ping test:

```
Test Type........................................ Gateway Ping Test
Test Status...................................... Pending/Success/Timeout

Dialog Token..................................... 15
Timeout.......................................... 15000 ms
Request Time..................................... 1329 seconds since system boot
```

Step 13 To see the status of the last test response, enter this command:

show client ccx last-response-status *client_mac_address*

Information similar to the following appears for the 802.1X authentication test:

```
Test Status...................................... Success

Response Dialog Token............................ 87
Response Status.................................. Successful
Response Test Type............................... 802.1x Authentication Test
Response Time.................................... 3476 seconds since system boot
```

Step 14 To see the results from the last successful diagnostics test, enter this command:

show client ccx results *client_mac_address*

Information similar to the following appears for the 802.1X authentication test:

```
dot1x Complete................................... Success
EAP Method....................................... *1,Host OS Login Credentials
dot1x Status.................................. 255
```

Step 15 To see the relevant data frames captured by the client during the previous test, enter this command:

show client ccx frame-data *client_mac_address*

Information similar to the following appears:

```
LOG Frames:

Frame Number:.................................... 1
Last Frame Number:............................... 1120
Direction:....................................... 1
Timestamp:....................................... 0d 00h 50m 39s 863954us
Frame Length:.................................... 197
Frame Data:
00000000: 80 00 00 00 ff ff ff ff  ff ff 00 12 44 bd bd b0  ............D...
00000010: 00 12 44 bd bd b0 f0 af  43 70 00 f2 82 01 00 00  ..D.....Cp......
00000020: 64 00 11 08 00 01 00 01  08 8c 12 98 24 b0 48 60  d...........$.H`
00000030: 6c 05 04 01 02 00 00 85  1e 00 00 89 00 0f 00 ff  l...............
00000040: 03 19 00 41 50 32 33 2d  31 30 00 00 00 00 00 00  ...AP23-10......
00000050: 00 00 00 00 00 00 26 96  06 00 40 96 00 ff ff dd  ......&...@.....
00000060: 18 00 50 f2 01 01 00 00  50 f2 05 01 00 00 50 f2  ..P.....P.....P.
00000070: 05 01 00 00 40 96 00 28  00 dd 06 00 40 96 01 01  ....@..(....@...

00000080: 00 dd 05 00 40 96 03 04  dd 16 00 40 96 04 00 02  ....@......@....
00000090: 07 a4 00 00 23 a4 00 00  42 43 00 00 62 32 00 00  ....#...BC..b2..
000000a0: dd 05 00 40 96 0b 01 dd  18 00 50 f2 02 01 01 82  ...@......P.....
000000b0: 00 03 a4 00 00 27 a4 00  00 42 43 5e 00 62 32 2f  .....'...BC^.b2/

LOG Frames:

Frame Number:.................................... 2
Last Frame Number:............................... 1120
Direction:....................................... 1
Timestamp:....................................... 0d 00h 50m 39s 878289us
Frame Length:.................................... 147
Frame Data:
00000000: 80 00 00 00 ff ff ff ff  ff ff 00 0d ed c3 a0 22  ..............."
00000010: 00 0d ed c3 a0 22 00 bd  4d 50 a5 f7 78 08 00 00  ....."..MP..x...
00000020: 64 00 01 00 00 01 00 01  08 8c 12 98 24 b0 48 60  d...........$.H`
00000030: 6c 05 04 01 02 00 00 85  1e 00 00 84 00 0f 00 ff  l...............
00000040: 03 19 00 72 6f 67 75 65  2d 74 65 73 74 31 00 00  ...rogue-test1..
00000050: 00 00 00 00 00 00 23 96  06 00 40 96 00 10 00 dd  ......#...@.....
00000060: 06 00 40 96 01 01 00 dd  05 00 40 96 03 04 dd 05  ..@.......@.....
00000070: 00 40 96 0b 01 dd 18 00  50 f2 02 01 01 81 00 03  .@......P.......

00000080: a4 00 00 27 a4 00 00 42  43 5e 00 62 32 2f 00 d2  ...'...BC^.b2/..
00000090: b4 ab 84                                          ...

LOG Frames:

Frame Number:.................................... 3
Last Frame Number:............................... 1120
Direction:....................................... 1
Timestamp:....................................... 0d 00h 50m 39s 881513us
Frame Length:.................................... 189
Frame Data:
00000000: 80 00 00 00 ff ff ff ff  ff ff 00 12 44 bd 80 30  ............D..0
00000010: 00 12 44 bd 80 30 60 f7  46 c0 8b 4b d1 05 00 00  ..D..0`.F..K....
00000020: 64 00 11 08 00 01 00 01  08 8c 12 98 24 b0 48 60  d...........$.H`
00000030: 6c 05 04 00 02 00 00 85  1e 00 00 89 00 0f 00 ff  l...............
00000040: 03 19 00 41 50 34 30 2d  31 37 00 00 00 00 00 00  ...AP40-17......
00000050: 00 00 00 00 00 00 26 dd  18 00 50 f2 01 01 00 00  ......&...P.....
00000060: 50 f2 05 01 00 00 50 f2  05 01 00 00 40 96 00 28  P.....P.....@..(
00000070: 00 dd 06 00 40 96 01 01  00 dd 05 00 40 96 03 04  ....@.......@...
```

```
00000080: dd 16 00 40 96 04 00 05  07 a4 00 00 23 a4 00 00  ...@........#...
00000090: 42 43 00 00 62 32 00 00  dd 05 00 40 96 0b 01 dd  BC..b2.....@....
000000a0: 18 00 50 f2 02 01 01 85  00 03 a4 00 00 27 a4 00  ..P..........'..
000000b0: 00 42 43 5e 00 62 32 2f  00 0b 9a 1d 6f           .BC^.b2/....o
...
```

Configuring Client Reporting

The client reporting protocol is used by the client and the access point to exchange client information. Client reports are collected automatically when the client associates. You can use the controller GUI or CLI to send a client report request to any CCXv5 client any time after the client associates. There are four types of client reports:

- **Client profile**—Provides information about the configuration of the client.
- **Operating parameters**—Provides the details of the client's current operational modes.
- **Manufacturers' information**—Provides data about the wireless LAN client adapter in use.
- **Client capabilities**—Provides information about the client's capabilities.

Configuring Client Reporting (GUI)

Step 1 Choose **Monitor > Clients** to open the Clients page.

Step 2 Click the MAC address of the desired client. The **Clients > Detail** page appears.

Step 3 To send a report request to the client, click **Send CCXV5 Req**.

Note You must create a Trusted Profile using ACAU for Cisco CB21AG or equivalent software from your CCXv5 vendor.

Step 4 To view the parameters from the client, click **Display**. The Client Reporting page appears.

Step 5 Click the link for the desired client profile. The Profile Details page appears displaying the client profile details, including the SSID, power save mode, radio channel, data rates, and 802.11 security settings.

Configuring Client Reporting (CLI)

Step 1 To send a request to the client to send its profiles, enter this command:

config client ccx get-profiles *client_mac_address*

Step 2 To send a request to the client to send its current operating parameters, enter this command:

config client ccx get-operating-parameters *client_mac_address*

Step 3 To send a request to the client to send the manufacturer's information, enter this command:

config client ccx get-manufacturer-info *client_mac_address*

Step 4 To send a request to the client to send its capability information, enter this command:

config client ccx get-client-capability *client_mac_address*

Step 5 To clear the client reporting information, enter this command:

config client ccx clear-reports *client_mac_address*

Step 6 To see the client profiles, enter this command:

show client ccx profiles *client_mac_address*

Step 7 To see the client operating parameters, enter this command:

show client ccx operating-parameters *client_mac_address*

Step 8 To see the client manufacturer information, enter this command:

show client ccx manufacturer-info *client_mac_address*

Step 9 To see the client's capability information, enter this command:

show client ccx client-capability *client_mac_address*

Note This command displays the client's available capabilities, not current settings for the capabilities.

Configuring Roaming and Real-Time Diagnostics

You can use roaming and real-time logs and statistics to solve system problems. The event log enables you to identify and track the behavior of a client device. It is especially useful when attempting to diagnose difficulties that a user may be having on a WLAN. The event log provides a log of events and reports them to the access point. There are three categories of event logs:

- Roaming log—This log provides a historical view of the roaming events for a given client. The client maintains a minimum of five previous roaming events including failed attempts and successful roams.
- Robust Security Network Association (RSNA) log—This log provides a historical view of the authentication events for a given client. The client maintains a minimum of five previous authentication attempts including failed attempts and successful ones.
- Syslog—This log provides internal system information from the client. For example, it may indicate problems with 802.11 operation, system operation, and so on.

The statistics report provides 802.1X and security information for the client. You can use the controller CLI to send the event log and statistics request to any CCXv5 client any time after the client associates.

Configuring Roaming and Real-Time Diagnostics (CLI)

Step 1 To send a log request, enter this command:

config client ccx log-request *log_type client_mac_address*

where *log_type* is roam, rsna, or syslog.

Step 2 To view a log response, enter this command:

show client ccx log-response *log_type client_mac_address*

where *log_type* is roam, rsna, or syslog.

Information similar to the following appears for a log response with a *log_type* of roam:

```
Tue Jun 26 18:28:48 2007  Roaming Response LogID=133: Status=Successful
                          Event Timestamp=0d 00h 00m 13s 322396us
                         Source BSSID=00:0b:85:81:06:c2, Target BSSID=00:0b:85:81:06:c2, Transition
 Time=3125(ms)
                          Transition Reason: Normal roam, poor link
                          Transition Result: Success
Tue Jun 26 18:28:48 2007  Roaming Response LogID=133: Status=Successful
                          Event Timestamp=0d 00h 00m 16s 599006us
                         Source BSSID=00:0b:85:81:06:c2, Target BSSID=00:0b:85:81:06:c2, Transition
 Time=3235(ms)
                          Transition Reason: Normal roam, poor link
                          Transition Result: Success
                          Event Timestamp=0d 00h 00m 19s 882921us
                         Source BSSID=00:0b:85:81:06:c2, Target BSSID=00:0b:85:81:06:c2, Transition
 Time=3234(ms)
                          Transition Reason: Normal roam, poor link
                          Transition Result: Success
Tue Jun 26 18:28:48 2007  Roaming Response LogID=133: Status=Successful
                          Event Timestamp=0d 00h 00m 08s 815477us
                         Source BSSID=00:0b:85:81:06:c2, Target BSSID=00:0b:85:81:06:d2, Transition
 Time=3281(ms)
                          Transition Reason: First association to WLAN
                          Transition Result: Success
                          Event Timestamp=0d 00h 00m 26s 637084us
                         Source BSSID=00:0b:85:81:06:d2, Target BSSID=00:0b:85:81:06:c2, Transition
 Time=3313(ms)
```

Information similar to the following appears for a log response with a *log_type* of rsna:

```
Tue Jun 26 18:24:09 2007  RSNA Response LogID=132: Status=Successful
                          Event Timestamp=0d 00h 00m 00s 246578us
                          Target BSSID=00:14:1b:58:86:cd
                          RSNA Version=1
                          Group Cipher Suite=00-0f-ac-02
                          Pairwise Cipher Suite Count = 1
                              Pairwise Cipher Suite 0 = 00-0f-ac-04
                          AKM Suite Count = 1
                              AKM Suite 0 = 00-0f-ac-01
                          RSN Capability = 0x0
                          RSNA Result: Success
Tue Jun 26 18:24:09 2007  RSNA Response LogID=132: Status=Successful
                          Event Timestamp=0d 00h 00m 00s 246625us
                          Target BSSID=00:14:1b:58:86:cd
                          RSNA Version=1
                          Group Cipher Suite=00-0f-ac-02
                          Pairwise Cipher Suite Count = 1
                              Pairwise Cipher Suite 0 = 00-0f-ac-04
                          AKM Suite Count = 1
                              AKM Suite 0 = 00-0f-ac-01
                          RSN Capability = 0x0
                          RSNA Result: Success
Tue Jun 26 18:24:09 2007  RSNA Response LogID=132: Status=Successful
                          Event Timestamp=0d 00h 00m 01s 624375us
                          Target BSSID=00:14:1b:58:86:cd
                          RSNA Version=1
                          Group Cipher Suite=00-0f-ac-02
                          Pairwise Cipher Suite Count = 1
                              Pairwise Cipher Suite 0 = 00-0f-ac-04
                          AKM Suite Count = 1
                              AKM Suite 0 = 00-0f-ac-01
                          RSN Capability = 0x0
              RSNA Result: Success
```

Information similar to the following appears for a log response with a *log_type* of syslog:

```
Tue Jun 26 18:07:48 2007  SysLog Response LogID=131: Status=Successful
                          Event Timestamp=0d 00h 19m 42s 278987us
                         Client SysLog = '<11> Jun 19 11:49:47 uraval3777 Mandatory elements missing
 in the OID response'
                          Event Timestamp=0d 00h 19m 42s 278990us
                         Client SysLog = '<11> Jun 19 11:49:50 uraval3777 Mandatory elements missing
 in the OID response'
Tue Jun 26 18:07:48 2007  SysLog Response LogID=131: Status=Successful
                          Event Timestamp=0d 00h 19m 42s 278993us
                         Client SysLog = '<11> Jun 19 11:49:53 uraval3777 Mandatory elements missing
 in the OID response'
                          Event Timestamp=0d 00h 19m 42s 278996us
                         Client SysLog = '<11> Jun 19 11:49:56 uraval3777 Mandatory elements missing
 in the OID response'
Tue Jun 26 18:07:48 2007  SysLog Response LogID=131: Status=Successful
                          Event Timestamp=0d 00h 19m 42s 279000us
                         Client SysLog = '<11> Jun 19 11:50:00 uraval3777 Mandatory elements missing
 in the OID response'
                          Event Timestamp=0d 00h 19m 42s 279003us
                         Client SysLog = '<11> Jun 19 11:50:03 uraval3777 Mandatory elements missing
 in the OID response'
Tue Jun 26 18:07:48 2007  SysLog Response LogID=131: Status=Successful
                          Event Timestamp=0d 00h 19m 42s 279009us
                         Client SysLog = '<11> Jun 19 11:50:09 uraval3777 Mandatory elements missing
 in the OID response'
                          Event Timestamp=0d 00h 19m 42s 279012us
                         Client SysLog = '<11> Jun 19 11:50:12 uraval3777 Mandatory elements missing
 in the OID response'
```

Step 3 To send a request for statistics, enter this command:

config client ccx stats-request *measurement_duration stats_name client_mac_address*

where *stats_name* is dot11 or security.

Step 4 To view the statistics response, enter this command:

show client ccx stats-report *client_mac_address*

Information similar to the following appears:

```
Measurement duration = 1

     dot11TransmittedFragmentCount       = 1
     dot11MulticastTransmittedFrameCount = 2
     dot11FailedCount                    = 3
     dot11RetryCount                     = 4
     dot11MultipleRetryCount             = 5
     dot11FrameDuplicateCount            = 6
     dot11RTSSuccessCount                = 7
     dot11RTSFailureCount                = 8
```

```
dot11ACKFailureCount                = 9
dot11ReceivedFragmentCount          = 10
dot11MulticastReceivedFrameCount    = 11
dot11FCSErrorCount                  = 12
dot11TransmittedFrameCount          = 13
```

Using the Debug Facility

Using the Debug Packet Logging Facility

The debug packet logging facility enables you to display all packets going to and from the controller CPU. You can enable it for received packets, transmitted packets, or both. By default, all packets received by the debug facility are displayed. However, you can define access control lists (ACLs) to filter packets before they are displayed. Packets not passing the ACLs are discarded without being displayed.

Each ACL includes an action (permit, deny, or disable) and one or more fields that can be used to match the packet. The debug facility provides ACLs that operate at the following levels and on the following values:

- Driver ACL
  - NPU encapsulation type
  - Port
- Ethernet header ACL
  - Destination address
  - Source address
  - Ethernet type
  - VLAN ID
- IP header ACL
  - Source address
  - Destination address
  - Protocol
  - Source port (if applicable)
  - Destination port (if applicable)
- EoIP payload Ethernet header ACL
  - Destination address
  - Source address
  - Ethernet type

    - VLAN ID

- EoIP payload IP header ACL
    - Source address
    - Destination address
    - Protocol
    - Source port (if applicable)
    - Destination port (if applicable)
- CAPWAP payload 802.11 header ACL
    - Destination address
    - Source address
    - BSSID
    - SNAP header type
- CAPWAP payload IP header ACL
    - Source address
    - Destination address
    - Protocol
    - Source port (if applicable)
    - Destination port (if applicable)

At each level, you can define multiple ACLs. The first ACL that matches the packet is the one that is selected.

This section contains the following subsection:

Configuring the Debug Facility (CLI)

Step 1 To enable the debug facility, enter this command:

- **debug packet logging enable** {**rx** | **tx** | **all**} *packet_count display_size*

  where

    - **rx** displays all received packets, **tx** displays all transmitted packets, and **all** displays both transmitted and received packets.
    - *packet_count* is the maximum number of packets to log. You can enter a value between 1 and 65535 packets, and the default value is 25 packets.
    - *display_size* is the number of bytes to display when printing a packet. By default, the entire packet is displayed.

    Note To disable the debug facility, enter this command: **debug packet logging disable**.

- **debug packet logging acl driver** *rule_index action npu_encap port*

  where

  - *rule_index* is a value between 1 and 6 (inclusive).
  - *action* is permit, deny, or disable.
  - *npu_encap* specifies the NPU encapsulation type, which determines how packets are filtered. The possible values include dhcp, dot11-mgmt, dot11-probe, dot1x, eoip-ping, iapp, ip, lwapp, multicast, orphan-from-sta, orphan-to-sta, rbcp, wired-guest, or any.
  - *port* is the physical port for packet transmission or reception.

- Use these commands to configure packet-logging ACLs:

  debug packet logging acl eth *rule_index action dst src type vlan*

  where

  - *rule_index* is a value between 1 and 6 (inclusive).
  - *action* is permit, deny, or disable.
  - *dst* is the destination MAC address.
  - *src* is the source MAC address.
  - *type* is the two-byte type code (such as 0x800 for IP, 0x806 for ARP). This parameter also accepts a few common string values such as “ip” (for 0x800) or “arp” (for 0x806).
  - *vlan* is the two-byte VLAN ID.

- **debug packet logging acl ip** *rule_index action src dst proto src_port dst_port*

  where

  - *proto* is a numeric or any string recognized by getprotobyname(). The controller supports the following strings: ip, icmp, igmp, ggp, ipencap, st, tcp, egp, pup, udp, hmp, xns-idp, rdp, iso-tp4, xtp, ddp, idpr-cmtp, rspf, vmtp, ospf, ipip, and encap.
  - *src_port* is the UDP/TCP two-byte source port (for example, telnet, 23) or “any.” The controller accepts a numeric or any string recognized by getservbyname(). The controller supports the following strings: tcpmux, echo, discard, systat, daytime, netstat, qotd, msp, chargen, ftp-data, ftp, fsp, ssh, telnet, smtp, time, rlp, nameserver, whois, re-mail-ck, domain, mtp, bootps, bootpc, tftp, gopher, rje, finger, www, link, kerberos, supdup, hostnames, iso-tsap, csnet-ns, 3com-tsmux, rtelnet, pop-2, pop-3, sunrpc, auth, sftp, uucp-path, nntp, ntp, netbios-ns, netbios-dgm, netbios-ssn, imap2, snmp, snmp-trap, cmip-man, cmip-agent, xdmcp, nextstep, bgp, prospero, irc, smux, at-rtmp, at-nbp, at-echo, at-zis, qmtp, z3950, ipx, imap3, ulistserv, https, snpp, saft, npmp-local, npmp-gui, and hmmp-ind.
  - *dst_port* is the UDP/TCP two-byte destination port (for example, telnet, 23) or “any.” The controller accepts a numeric or any string recognized by getservbyname(). The controller supports the same strings as those for the *src_port*.

- **debug packet logging acl eoip-eth** *rule_index action dst src type vlan*
- **debug packet logging acl eoip-ip** *rule_index action src dst proto src_port dst_port*
- **debug packet logging acl lwapp-dot11** *rule_index action dst src bssid snap_type*

where

- *bssid* is the Basic Service Set Identifier.
- *snap_type* is the Ethernet type.

- **debug packet logging acl lwapp-ip** *rule_index action src dst proto src_port dst_port*

Note To remove all configured ACLs, enter this command: **debug packet logging acl clear-all**.

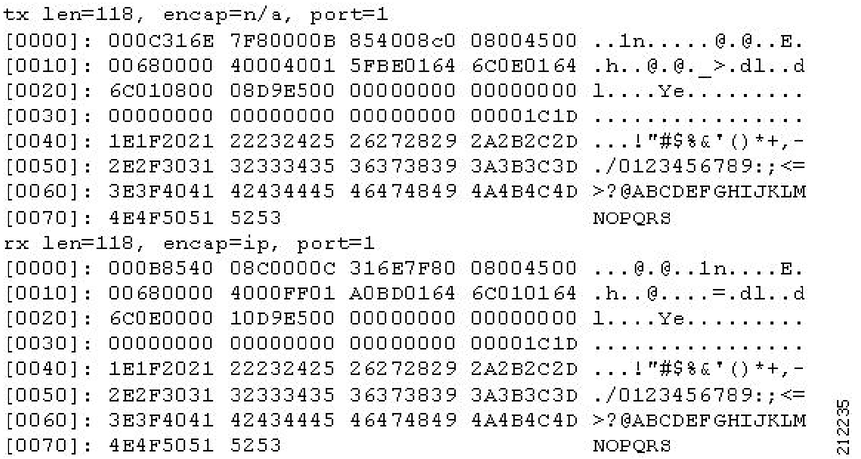
Step 2 To configure the format of the debug output, enter this command:

debug packet logging format {**hex2pcap** | **text2pcap**}

The debug facility supports two output formats: hex2pcap and text2pcap. The standard format used by IOS supports the use of hex2pcap and can be decoded using an HTML front end. The text2pcap option is provided as an alternative so that a sequence of packets can be decoded from the same console log file.

Figure 6: Sample Hex2pcap Output

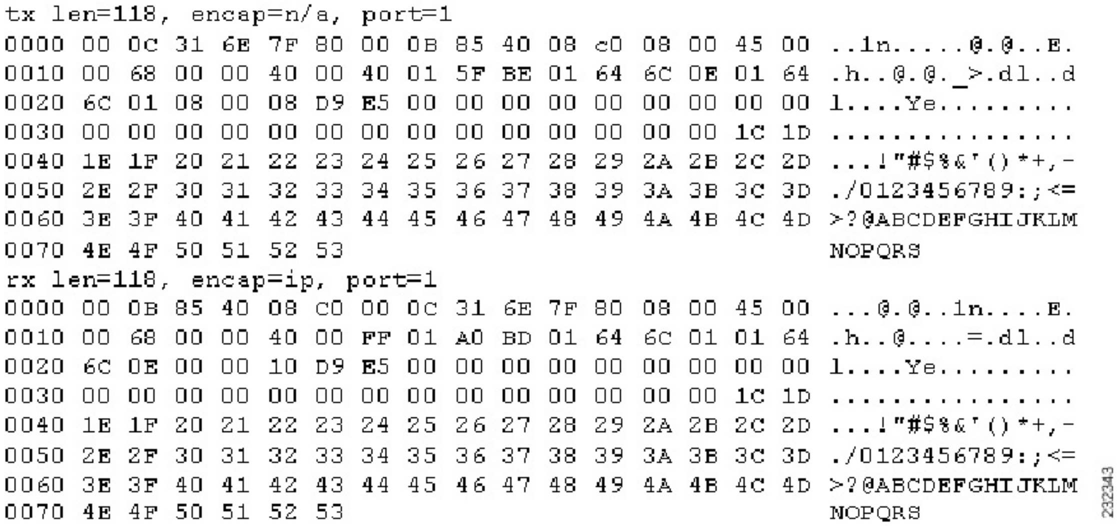
This figure shows an example of hex2pcap output.



```
tx len=118, encap=n/a, port=1
[0000]: 000C316E 7F80000B 854008c0 08004500 ..1n.....@.@..E.
[0010]: 00680000 40004001 5FBE0164 6C0E0164 .h..@.@._>.dl..d
[0020]: 6C010800 08D9E500 00000000 00000000 l....Ye.........
[0030]: 00000000 00000000 00000000 00001C1D ................
[0040]: 1E1F2021 22232425 26272829 2A2B2C2D ...!"#$%&'()*+,-
[0050]: 2E2F3031 32333435 36373839 3A3B3C3D ./0123456789:;<=
[0060]: 3E3F4041 42434445 46474849 4A4B4C4D >?@ABCDEFGHIJKLM
[0070]: 4E4F5051 5253                       NOPQRS
rx len=118, encap=ip, port=1
[0000]: 000B8540 08C0000C 316E7F80 08004500 ...@.@..1n....E.
[0010]: 00680000 4000FF01 A0BD0164 6C010164 .h..@....=.dl..d
[0020]: 6C0E0000 10D9E500 00000000 00000000 l....Ye.........
[0030]: 00000000 00000000 00000000 00001C1D ................
[0040]: 1E1F2021 22232425 26272829 2A2B2C2D ...!"#$%&'()*+,-
[0050]: 2E2F3031 32333435 36373839 3A3B3C3D ./0123456789:;<=
[0060]: 3E3F4041 42434445 46474849 4A4B4C4D >?@ABCDEFGHIJKLM
[0070]: 4E4F5051 5253                       NOPQRS
```

Figure 7: Sample Text2pcap Output

This figure shows an example of text2pcap output.



```
tx len=118, encap=n/a, port=1
0000 00 0C 31 6E 7F 80 00 0B 85 40 08 c0 08 00 45 00 ..1n.....@.@..E.
0010 00 68 00 00 40 00 40 01 5F BE 01 64 6C 0E 01 64 .h..@.@._>.dl..d
0020 6C 01 08 00 08 D9 E5 00 00 00 00 00 00 00 00 00 l....Ye.........
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 1C 1D ................
0040 1E 1F 20 21 22 23 24 25 26 27 28 29 2A 2B 2C 2D ...!"#$%&'()*+,-
0050 2E 2F 30 31 32 33 34 35 36 37 38 39 3A 3B 3C 3D ./0123456789:;<=
0060 3E 3F 40 41 42 43 44 45 46 47 48 49 4A 4B 4C 4D >?@ABCDEFGHIJKLM
0070 4E 4F 50 51 52 53                               NOPQRS
rx len=118, encap=ip, port=1
0000 00 0B 85 40 08 C0 00 0C 31 6E 7F 80 08 00 45 00 ...@.@..1n....E.
0010 00 68 00 00 40 00 FF 01 A0 BD 01 64 6C 01 01 64 .h..@....=.dl..d
0020 6C 0E 00 00 10 D9 E5 00 00 00 00 00 00 00 00 00 l....Ye.........
0030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 1C 1D ................
0040 1E 1F 20 21 22 23 24 25 26 27 28 29 2A 2B 2C 2D ...!"#$%&'()*+,-
0050 2E 2F 30 31 32 33 34 35 36 37 38 39 3A 3B 3C 3D ./0123456789:;<=
0060 3E 3F 40 41 42 43 44 45 46 47 48 49 4A 4B 4C 4D >?@ABCDEFGHIJKLM
0070 4E 4F 50 51 52 53                               NOPQRS
```

Step 3 To determine why packets might not be displayed, enter this command:

debug packet error {**enable** | **disable**}

Step 4 To display the status of packet debugging, enter this command:

show debug packet

Information similar to the following appears:

```
Status.......................................... disabled
Number of packets to display.................... 25
Bytes/packet to display......................... 0
Packet display format........................... text2pcap

Driver ACL:
      [1]: disabled
      [2]: disabled
      [3]: disabled
      [4]: disabled
      [5]: disabled
      [6]: disabled
   Ethernet ACL:
      [1]: disabled
      [2]: disabled
      [3]: disabled
      [4]: disabled
      [5]: disabled
      [6]: disabled
   IP ACL:
      [1]: disabled
      [2]: disabled
      [3]: disabled
      [4]: disabled
      [5]: disabled
      [6]: disabled
   EoIP-Ethernet ACL:
      [1]: disabled
      [2]: disabled
      [3]: disabled
      [4]: disabled
      [5]: disabled
```

```
         [6]: disabled
      EoIP-IP ACL:
         [1]: disabled
         [2]: disabled
         [3]: disabled
         [4]: disabled
         [5]: disabled
         [6]: disabled
      LWAPP-Dot11 ACL:
         [1]: disabled
         [2]: disabled
         [3]: disabled
         [4]: disabled
         [5]: disabled
         [6]: disabled
      LWAPP-IP ACL:
         [1]: disabled
         [2]: disabled
         [3]: disabled
         [4]: disabled
         [5]: disabled
         [6]: disabled?
```

Configuring Wireless Sniffing

Wireless Sniffing

The controller enables you to configure an AP as a network *sniffer*, which captures and forwards all the packets on a particular channel to a remote machine that runs packet analyzer software. These packets contain information on time stamps, signal strength, packet sizes, and so on. Sniffers allow you to monitor and record network activity and to detect problems.

For more information about wireless sniffing using Cisco APs in Sniffer mode, see https://www.cisco.com/c/en/us/support/docs/wireless-mobility/80211/200527-Fundamentals-of-802-11-Wireless-Sniffing.html#anc11.

This section contains the following subsections:

Prerequisites for Wireless Sniffing

To perform wireless sniffing, you need the following hardware and software:

- A dedicated access point—An access point configured as a sniffer cannot simultaneously provide wireless access service on the network. To avoid disrupting coverage, use an access point that is not part of your existing wireless network.
- A remote monitoring device—A computer capable of running the analyzer software.
- Software and supporting files, plug-ins, or adapters—Your analyzer software may require specialized files before you can successfully enable

Restrictions on Wireless Sniffing

- Supported third-party network analyzer software applications are as follows:
    - Wildpackets Omnipeek or Airopeek
    - AirMagnet Enterprise Analyzer
    - Wireshark
- The latest version of Wireshark can decode the packets by going to the Analyze mode. Select **decode as**, and switch UDP5555 to decode as PEEKREMOTE..
- You must disable IP-MAC address binding in order to use an access point in sniffer mode if the access point is joined to a Cisco WLC. To disable IP-MAC address binding, enter the **config network ip-mac-binding disable** command in the controller CLI.
- You must enable WLAN 1 in order to use an access point in sniffer mode if the access point is joined to a Cisco WLC. If WLAN 1 is disabled, the access point cannot send packets.

Configuring Sniffing on an Access Point (GUI)

Step 1 Choose **Wireless** > **Access Points** > **All APs** to open the **All APs** page.

Step 2 Click the name of the access point that you want to configure as the sniffer. The **All APs** > **Details** for page appears.

Step 3 From the **AP Mode** drop-down list, choose **Sniffer**.

Step 4 Click **Apply**.

Step 5 Click **OK** when prompted that the access point will be rebooted.

Step 6 Choose **Wireless** > **Access Points** > **Radios** > **802.11a/n (or 802.11b/g/n**) to open the **802.11a/n/ac (or 802.11b/g/n) Radios** page.

Step 7 Hover your cursor over the blue drop-down arrow for the desired access point and choose **Configure**. The **802.11a/n/ac (or 802.11b/g/n) Cisco APs** > **Configure** page appears.

Step 8 Select the **Sniff** check box to enable sniffing on this access point, or leave it unselected to disable sniffing. The default value is unchecked.

Step 9 If you enabled sniffing in Step 8, follow these steps:

a) From the Channel drop-down list, choose the channel on which the access point sniffs for packets.

b) In the **Server IP Address** text box, enter the IP address of the remote machine running Omnipeek, Airopeek, AirMagnet, or Wireshark.

Step 10 Click **Apply**.

Step 11 Click **Save Configuration**.

Configuring Sniffing on an Access Point (CLI)

Step 1 Configure the access point as a sniffer by entering this command:

config ap mode sniffer *Cisco_AP*

where *Cisco_AP* is the access point configured as the sniffer.

Step 2 When warned that the access point will be rebooted and asked if you want to continue, enter **Y**. The access point reboots in sniffer mode.

Step 3 Enable sniffing on the access point by entering this command:

config ap sniff {802.11a | 802.11b} enable *channel server_IP_address Cisco_AP*

where

- *channel* is the radio channel on which the access point sniffs for packets. The default values are 36 (802.11a/n) and 1 (802.11b/g/n).
- *server_IP_address* is the IP address of the remote machine running Omnipeek, Airopeek, AirMagnet, or Wireshark.
- *Cisco_AP* is the access point configured as the sniffer.

Note To disable sniffing on the access point, enter the **config ap sniff** {**802.11a | 802.11b**} **disable** *Cisco_AP* command.

Step 4 Save your changes by entering this command:

save config

Step 5 See the sniffer configuration settings for an access point by entering this command:

show ap config {**802.11a | 802.11b**} *Cisco_AP*

Troubleshooting Access Points Using Telnet or SSH

The controller supports the use of the Telnet and Secure Shell (SSH) protocols to troubleshoot Cisco APs. Using these protocols makes debugging easier, especially when the AP is unable to join the controller.

- Telnet is not supported on Cisco Wave 2 and 802.11ax APs.

Information About Troubleshooting Access Points Using Telnet or SSH

The controller supports the use of the Telnet and Secure Shell (SSH) protocols to troubleshoot lightweight access points. Using these protocols makes debugging easier, especially when the access point is unable to connect to the controller.

- To avoid potential conflicts and security threats to the network, the following commands are unavailable while a Telnet or SSH session is enabled: **config terminal, telnet, ssh, rsh, ping, traceroute, clear, clock, crypto, delete, fsck, lwapp, mkdir, radius, release, reload, rename, renew, rmdir, save, set, test, upgrade**.
- Commands available during a Telnet or SSH session include **debug, disable, enable, help, led, login, logout, more, no debug, show, systat, undebug** and **where**.

Note For instructions on configuring Telnet or SSH sessions on the controller, see the "Telnet and Secure Shell Sessions" section.

You can configure Telnet or SSH by using the controller CLI in software release 5.0 or later releases or using the controller GUI in software release 6.0 or later releases.

Troubleshooting Access Points Using Telnet or SSH (GUI)

Step 1 Choose **Wireless > Access Points > All APs** to open the **All APs** page.

Step 2 Click the name of the access point for which you want to enable Telnet or SSH.

Step 3 Choose the **Advanced** tab to open the **All APs > Details for (Advanced)** page.

Step 4 Select the **Telnet** check box to enable Telnet connectivity on this access point. The default value is unchecked.

Step 5 Select the **SSH** check box to enable SSH connectivity on this access point. The default value is unchecked.

Step 6 Click **Apply**.

Step 7 Click **Save Configuration**.

Troubleshooting Access Points Using Telnet or SSH (CLI)

Step 1 Enable Telnet or SSH connectivity on an access point by entering this command:

config ap {**telnet** | **ssh**} **enable** *Cisco_AP*

The default value is disabled.

Note Disable Telnet or SSH connectivity on an access point by entering this command: **config ap** {**telnet** | **ssh**} **disable** *Cisco_AP*

Step 2 Save your changes by entering this command:

save config

Step 3 See whether Telnet or SSH is enabled on an access point by entering this command:

show ap config general *Cisco_AP*

Information similar to the following appears:

```
Cisco AP Identifier.............................. 5
Cisco AP Name.................................... AP33
Country code..................................... Multiple Countries:US,AE,AR,AT,AU,BH
Reg. Domain allowed by Country................... 802.11bg:-ABCENR 802.11a:-ABCEN
AP Country code.................................. US - United States
AP Regulatory Domain............................. 802.11bg:-A 802.11a:-A
Switch Port Number .............................. 2
MAC Address...................................... 00:19:2f:11:16:7a
IP Address Configuration......................... Static IP assigned
IP Address....................................... 10.22.8.133
IP NetMask....................................... 255.255.248.0
Gateway IP Addr.................................. 10.22.8.1
Domain...........................................
Name Server......................................
Telnet State..................................... Enabled
Ssh State........................................ Enabled
...
```

Debugging the Access Point Monitor Service

Debugging the Access Point Monitor Service

The controller sends access point status information to the Cisco 3300 Series Mobility Services Engine (MSE) using the access point monitor service.

The MSE sends a service subscription and an access point monitor service request to get the status of all access points currently known to the controller. When any change is made in the status of an access point, a notification is sent to the MSE.

This section contains the following subsection:

Debugging Access Point Monitor Service Issues (CLI)

If you experience any problems with the access point monitor service, enter this command:

debug service ap-monitor {all | error | event | nmsp | packet} {enable | disable}

where

- **all** configures debugging of all access point status messages.
- **error** configures debugging of access point monitor error events.
- **event** configures debugging of access point monitor events.
- **nmsp** configures debugging of access point monitor NMSP events.
- **packet** configures debugging of access point monitor packets.
- **enable** enables the debub service ap-monitor mode.
- **disable** disables the debug service ap-monitor mode.

Troubleshooting Memory Leaks

Troubleshooting Memory Leaks

To investigate the cause for low memory state, follow these steps:

Step 1 **show memory statistics**

Step 2 **test system cat** */proc/meminfo*

Step 3 **show system top**

```
PID
1078 root      18   0  4488  888  756 S    0  0.1   0:00.00 gettyOrMwar
1081 root      20   0  980m 557m  24m S    0 56.9  41:33.32 switchdrvr
```

In this example, the PID to focus on is 1081.

Step 4 **test system cat** */proc/1081/smaps*

Step 5 **show system timers ticks-exhausted**

```
Timer Ticks .................................... 3895180 ticks   (779036 seconds)
```

Here focus on the seconds value 779036.

Step 6 **show memory allocations [all/<pid>] [all/<pool-size>] [<start_time>] [<end_time>]**

If you see any allocations, they are probable memory leak candidates. You need to check if these are valid allocations made earlier to the low memory state issue.

Troubleshooting OfficeExtend Access Points

Troubleshooting OfficeExtend Access Points

This section provides troubleshooting information if you experience any problems with your OfficeExtend access points.

For information about troubleshooting Cisco 600 Series OfficeExtend APs, see http://www.cisco.com/c/en/us/support/docs/wireless/aironet-600-series-officeextend-access-point/113003-office-extend-config-00.html#troubleshoot.

This section contains the following subsections:

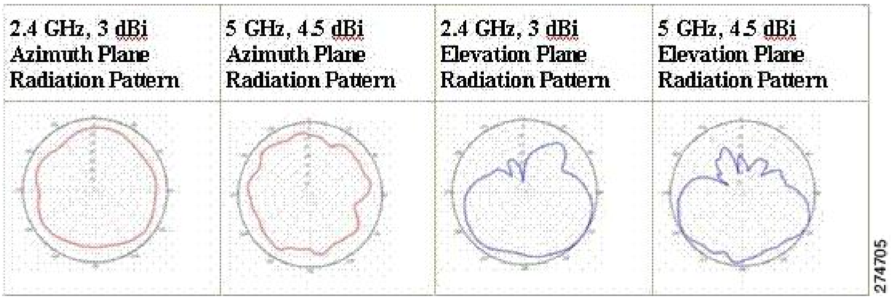
Interpreting OfficeExtend LEDs

The LED patterns are different for 1130 series and 1140 series OfficeExtend access points. For a description of the LED patterns, see the *Cisco OfficeExtend Access Point Quick Start Guide* at http://www.cisco.com/c/en/us/products/wireless/index.html.

Positioning OfficeExtend Access Points for Optimal RF Coverage

When positioning your OfficeExtend access point, consider that its RF signals are emitted in a cone shape spreading outward from the LED side of the access point. Ensure to mount the access point so that air can flow behind the metal back plate and prevent the access point from overheating.

Figure 8: OfficeExtend Access Point Radiation Patterns



Troubleshooting Common Problems with OfficeExtend Access Points

Most of the problems experienced with OfficeExtend access points are one of the following:

- The access point cannot join the controller because of network or firewall issues.

  Resolution: Follow the instructions in the Viewing Access Point Join Information section to see join statistics for the OfficeExtend access point, or find the access point's public IP address and perform pings of different packet sizes from inside the company.

- The access point joins but keeps dropping off. This behavior usually occurs because of network problems or when the network address translation (NAT) or firewall ports close because of short timeouts.

  Resolution: Ask the teleworker for the LED status.

- Clients cannot associate because of NAT issues.

  Resolution: Ask the teleworker to perform a speed test and a ping test. Some servers do not return big packet pings.

- Clients keep dropping data. This behavior usually occurs because the home router closes the port because of short timeouts.

  Resolution: Perform client troubleshooting in Cisco Prime Infrastructure to determine if the problem is related to the OfficeExtend access point or the client.

- The access point is not broadcasting the enterprise WLAN.

  Resolution: Ask the teleworker to check the cables, power supply, and LED status. If you still cannot identify the problem, ask the teleworker to try the following:

  - Connect to the home router directly and see if the PC is able to connect to an Internet website such as https://www.cisco.com/. If the PC cannot connect to the Internet, check the router or modem. If the PC can connect to the Internet, check the home router configuration to see if a firewall or MAC-based filter is enabled that is blocking the access point from reaching the Internet.

  - Log on to the home router and check to see if the access point has obtained an IP address. If it has, the access point's LED normally blinks orange.

- The access point cannot join the controller, and you cannot identify the problem.

  Resolution: A problem could exist with the home router. Ask the teleworker to check the router manual and try the following:

  - Assign the access point a static IP address based on the access point's MAC address.

  - Put the access point in a demilitarized zone (DMZ), which is a small network inserted as a neutral zone between a company's private network and the outside public network. It prevents outside users from getting direct access to a server that has company data.
  - If problems still occur, contact your company's IT department for assistance.

- The teleworker experiences problems while configuring a personal SSID on the access point.

  Resolution: Clear the access point configuration and return it to factory default settings by clicking **Clear Config** on the access point GUI or by entering the **clear ap config Cisco_AP** command and then configuring a personal SSID on an OfficeExtend Access Point. If problems still occur, contact your company's IT department for assistance.

- The home network needs to be rebooted.

  Resolution: Ask the teleworker to follow these steps:

  Leave all devices networked and connected, and then power down all the devices.

  Turn on the cable or DSL modem, and then wait for 2 minutes. (Check the LED status.)

  Turn on the home router, and then wait for 2 minutes. (Check the LED status.)

  Turn on the access point, and then wait for 5 minutes. (Check the LED status.)

  Turn on the client.