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Troubleshooting

This appendix lists system messages that can appear on the Cisco UWN Solution interfaces, describes the LED patterns on controllers and lightweight access points, and provides CLI commands that can be used to troubleshoot problems on the controller. It contains these sections:

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Interpreting LEDs

Interpreting Controller LEDs

Refer to the quick start guide for your specific controller for a description of the LED patterns.

Interpreting Lightweight Access Point LEDs

Refer to the quick start guide or hardware installation guide for your specific access point for a description of the LED patterns.

System Messages

[Table 1](#) lists some common system messages and their descriptions. For a complete list of system messages, refer to the *Cisco Wireless LAN Controller System Message Guide, Release 6.0*.

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 normally 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	Client may have intentionally terminated usage or may have experienced a service disruption.
STATION_DEAUTHENTICATE	Client may have intentionally terminated usage or it 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.

Table 1 **System Messages and Descriptions (continued)**

Error Message	Description
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.
LRADIF_UP	Cisco radio is UP.
LRADIF_DOWN	Cisco radio may have a problem or is administratively disabled.
LRADIF_LOAD_PROFILE_FAILED	Client density may have exceeded system capacity.
LRADIF_NOISE_PROFILE_FAILED	The non-802.11 noise has exceed configured threshold.
LRADIF_INTERFERENCE_PROFILE_FAILED	802.11 interference has exceeded threshold on channel -- check channel assignments.
LRADIF_COVERAGE_PROFILE_FAILED	Possible coverage hole 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	Load is now within threshold limits.
LRADIF_NOISE_PROFILE_PASSED	Detected noise is now less than threshold.
LRADIF_INTERFERENCE_PROFILE_PASSED	Detected interference is now less than threshold.
LRADIF_COVERAGE_PROFILE_PASSED	Number of clients receiving 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	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.

Table 1 System Messages and Descriptions (continued)

Error Message	Description
LINK_DOWN	Port may have a problem or is administratively disabled.
LINK_FAILURE	Port may have a problem or is administratively disabled.
AUTHENTICATION_FAILURE	Attempted security breach. Investigate.
STP_NEWROOT	Informational message.
STP_TOPOLOGY_CHANGE	Informational message.
IPSEC_ESP_AUTH_FAILURE	Check WLAN IPsec configuration.
IPSEC_ESP_REPLAY_FAILURE	Check for attempt to spoof IP Address.
IPSEC_ESP_POLICY_FAILURE	Check for IPsec configuration mismatch between WLAN and client.
IPSEC_ESP_INVALID_SPI	Informational message.
IPSEC_OTHER_POLICY_FAILURE	Check for IPsec configuration mismatch between WLAN and client.
IPSEC_IKE_NEG_FAILURE	Check for IPsec IKE configuration mismatch between WLAN and client.
IPSEC_SUITE_NEG_FAILURE	Check for IPsec IKE configuration mismatch between WLAN and client.
IPSEC_INVALID_COOKIE	Informational message.
RADIOS_EXCEEDED	Maximum number of supported Cisco radios exceeded. Check for 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 ASAP.
TEMPERATURE_SENSOR_CLEAR	Temperature sensor is operational.
POE_CONTROLLER_FAILURE	Check ports — possible serious failure detected.
MAX_ROGUE_COUNT_EXCEEDED	The current number of active rogue access points has exceeded system threshold.
SWITCH_UP	Controller is responding to SNMP polls.
SWITCH_DOWN	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	Running configuration has been saved to flash - will be active after reboot.
MULTIPLE_USERS	Another user with the same username has logged in.

Table 1 System Messages and Descriptions (continued)

Error Message	Description
FAN_FAILURE	Monitor controller temperature to avoid overheating.
POWER_SUPPLY_CHANGE	Check for power-supply malfunction.
COLD_START	The controller may have been rebooted.
WARM_START	The controller may have been rebooted.

Viewing System Resources

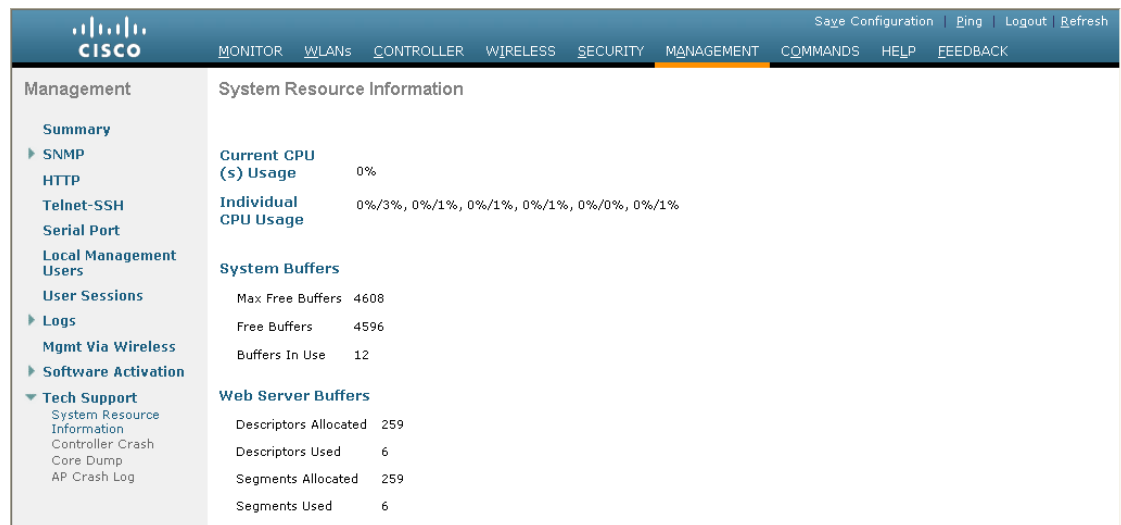
You can use the GUI or CLI to determine the amount of system resources being used by the controller. Specifically, you can view the current controller CPU usage, system buffers, and web server buffers.



Note

The 5500 series 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%).

On the controller GUI, choose **Management > Tech Support > System Resource Information**. The System Resource Information page appears (see [Figure 1](#)).

Figure 1 System Resource Information Page

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On the controller CLI, enter these commands:

- **show cpu**

Information similar to the following appears:

```
Current CPU(s) load: 0%
Individual CPU load: 0%/3%, 0%/1%, 0%/1%, 0%/1%, 0%/0%, 0%/1%
```

- **show tech-support**

Information similar to the following appears:

```
System Information
Manufacturer's Name..... Cisco Systems Inc.
Product Name..... Cisco Controller
Product Version..... 6.0.165.0
...
-----Show cpu-----
Current CPU(s) Load..... 0%
Individual CPU Load..... 0%/3%, 0%/1%, 0%/1%, 0%/1%, 0%/0%,
0%/1%

-----Show system buffers-----

System Buffers
  Max Free Buffers..... 4608
  Free Buffers..... 4596
  Buffers In Use..... 12

Web Server Resources
  Descriptors Allocated..... 259
  Descriptors Used..... 4
  Segments Allocated..... 259
  Segments Used..... 4

System Resources
  Uptime..... 595748 Secs
  Total Ram..... 907872 Kbytes
...
```

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.

1. **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.

Information similar to the following appears:

Name	Priority	CPU Use	Reaper
reaperWatcher	(3/124)	0 %	(0/ 0)% I
osapiReaper	(10/121)	0 %	(0/ 0)% I
TempStatus	(255/ 1)	0 %	(0/ 0)% I
emWeb	(255/ 1)	0 %	(0/ 0)% T 300
cliWebTask	(255/ 1)	0 %	(0/ 0)% I
UtilTask	(255/ 1)	0 %	(0/ 0)% T 300

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 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 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.

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

Information similar to the following appears:

Name	Priority	BytesInUse	BlocksInUse	Reaper
reaperWatcher	(3/124)	0	0	(0/ 0)% I
osapiReaper	(10/121)	0	0	(0/ 0)% I
TempStatus	(255/ 1)	308	1	(0/ 0)% I
emWeb	(255/ 1)	294440	4910	(0/ 0)% T 300
cliWebTask	(255/ 1)	738	2	(0/ 0)% I
UtilTask	(255/ 1)	308	1	(0/ 0)% T 300

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 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.
3. **show tech-support**—Shows an array of information related to the state of the system, including the current configuration, last crash file, CPU utilization, and memory utilization.
 4. **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 **config passwd-cleartext enable**. 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.

5. **show run-config commands**—Shows the list of configured commands on the controller. This command shows only values configured by the user. It does not show system-configured default values.

Configuring 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.

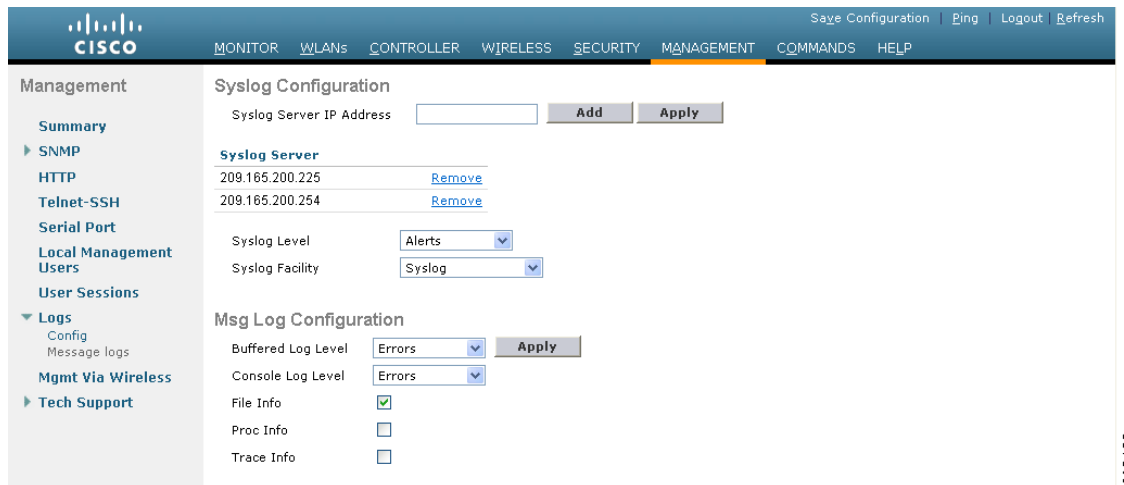
You can use the controller GUI or CLI to configure system and message logging.

Using the GUI to Configure System and Message Logging

Using the GUI, follow these steps to configure system and message logging.

- Step 1 Choose **Management > Logs > Config**. The Syslog Configuration page appears (see [Figure 2](#)).

Figure 2 Syslog Configuration Page



- Step 2 In the Syslog Server IP Address field, enter the IP 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 ever 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 box:

- **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.

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 box:

- **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 1** = Facility level 17
- **Local Use 2** = Facility level 18
- **Local Use 3** = Facility level 19
- **Local Use 4** = Facility level 20
- **Local Use 5** = Facility level 21
- **Local Use 6** = Facility level 22
- **Local Use 7** = Facility level 23

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

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 boxes:

- **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

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 Check 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 Check the **Proc Info** check box if you want the message logs to include process information. The default value is disabled.

Step 9 Check the **Trace Info** check box if you want the message logs to include traceback information. The default value is disabled.

Step 10 Click **Apply** to commit your changes.

Step 11 Click **Save Configuration** to save your changes.

Using the GUI to View Message Logs

To view message logs using the controller GUI, choose **Management > Logs > Message Logs**. The Message Logs page appears (see [Figure 3](#)).

Figure 3 Message Logs Page

**Note**

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

Using the CLI to Configure System and Message Logging

Using the CLI, follow these steps to configure system and message logging.

Step 1 To enable system logging and set the IP address of the syslog server to which to send the syslog messages, enter 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, enter this command:

```
config logging syslog host server_IP_address delete
```

Step 2 To set the severity level for filtering syslog messages to the syslog server, enter 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 To set the severity level for filtering syslog messages for a particular access point or for all access points, enter 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 To set the facility for outgoing syslog messages to the syslog server, enter this command:

config logging syslog facility *facility_code*

where *facility_code* is one of the following:

- 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 To set the severity level for logging messages to the controller buffer and console, enter 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 6 To save debug messages to the controller buffer, the controller console, or a syslog server, enter 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 7 To cause the controller to include information about the source file in the message logs or to prevent the controller from displaying this information, enter this command:

config logging fileinfo {enable | disable}

The default value is enabled.

Step 8 To cause the controller to include process information in the message logs or to prevent the controller from displaying this information, enter this command:

config logging procinfo {enable | disable}

The default value is disabled.

Step 9 To cause the controller to include traceback information in the message logs or to prevent the controller from displaying this information, enter this command:

config logging traceinfo {enable | disable}

The default value is disabled.

Step 10 To enable or disable timestamps in log messages and debug messages, enter 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 11 To save your changes, enter this command:

save config

Using the CLI to View System and Message Logs

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

show logging

Information similar to the following appears:

```
Logging to buffer :
- Logging of system messages to buffer :
  - Logging filter level..... errors
  - Number of system messages logged..... 8716
  - Number of system messages dropped..... 2906
- Logging of debug messages to buffer ..... Disabled
  - Number of debug messages logged..... 0
  - Number of debug messages dropped..... 0
```

```

Logging to console :
- Logging of system messages to console :
  - Logging filter level..... errors
  - Number of system messages logged..... 0
  - Number of system messages dropped..... 11622
- Logging of debug messages to console ..... Enabled
  - Number of debug messages logged..... 0
  - Number of debug messages dropped..... 0
Logging to syslog :
- Syslog facility..... local0
- Logging of system messages to syslog :
  - Logging filter level..... errors
  - Number of system messages logged..... 8716
- Number of debug messages dropped..... 0
- Number of remote syslog hosts..... 0
  - Host 0..... Not Configured
  - Host 1..... Not Configured
  - Host 2..... Not Configured
Logging of traceback..... Disabled
Logging of process information..... Disabled
Logging of source file informational..... Enabled
Timestamping of messages.....
- Timestamping of system messages..... Enabled
  - Timestamp format..... Date and Time
- Timestamping of debug messages..... Enabled
  - Timestamp format..... Date and Time

Logging buffer (8722 logged, 2910 dropped)

*Mar 26 09:23:13.574: %MM-3-INVALID_PKT_RECVD: mm_listen.c:5508 Received an invalid packet
from 1.100.163.144. Source member:0.0.0.0. source member unknown.
*Mar 26 09:23:13.574: %MM-3-INVALID_PKT_RECVD: mm_listen.c:5508 Received an invalid packet
from 1.100.163.144. Source member:0.0.0.0. source member unknown.
Previous message occurred 2 times.
*Mar 26 09:22:44.925: %MM-3-INVALID_PKT_RECVD: mm_listen.c:5508 Received an invalid packet
from 1.100.163.144. Source member:0.0.0.0. source member unknown.
...

```

Viewing 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.

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

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

```
show ap eventlog Cisco_AP
```

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 a specific access point or for all access points joined to the controller, enter this command:

```
clear ap-eventlog {specific Cisco_AP | all}
```

Uploading Logs and Crash Files

Follow the instructions in this section to upload logs and crash files from the controller through the GUI or CLI. However, before you begin, make sure you have a TFTP or FTP server available for the file upload. Keep these guidelines in mind 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 WCS because the WCS built-in TFTP or FTP server and the third-party TFTP or FTP server require the same communication port.

Using the GUI to Upload Logs and Crash Files

Using the controller GUI, follow these steps to upload logs and crash files.

-
- Step 1** Choose **Command > Upload File**. The Upload File from Controller page appears (see [Figure 4](#)).

Figure 4 Upload File from Controller Page

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- Step 2** From the File Type drop-down box, choose one of the following:
- **Event Log**
 - **Message Log**
 - **Trap Log**
 - **Crash File**
- Step 3** From the Transfer Mode drop-down box, choose **TFTP** or **FTP**.
- Step 4** In the IP Address field, enter the IP address of the TFTP or FTP server.
- Step 5** In the File Path field, enter the directory path of the log or crash file.
- Step 6** In the File Name field, 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 field, enter the FTP server login name.
 - b. In the Server Login Password field, enter the FTP server login password.
 - c. In the Server Port Number field, 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.

Using the CLI to Upload Logs and Crash Files

Using the controller CLI, follow these steps to upload logs and crash files.

- Step 1** To transfer the file from the controller to a TFTP or FTP server, enter this command:
- ```
transfer upload mode {tftp | ftp}
```

**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 non-operational 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 view 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

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, or you can upload the core dump file from the flash memory of a 5500 series controller to a TFTP or FTP server. The 5500 series controllers save the core dump file to flash memory following a crash. Follow the instructions in this section to perform one of these functions.

# Configuring the Controller to Automatically Upload Core Dumps to an FTP Server

## Using the GUI to Configure the Controller to Automatically Upload Core Dumps to an FTP Server

Using the controller GUI, follow these steps to enable the controller to automatically upload a core dump file to an FTP server.

- Step 1** Choose **Management > Tech Support > Core Dump** to open the Core Dump page (see [Figure 5](#)).

**Figure 5** Core Dump Page

- Step 2** To enable the controller to generate a core dump file following a crash, check 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 box.
- Step 4** In the IP Address field, 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 field, enter the name that the controller uses to label the core dump file.
- Step 6** In the User Name field, enter the username for FTP login.
- Step 7** In the Password field, enter the password for FTP login.
- Step 8** Click **Apply** to commit your changes.
- Step 9** Click **Save Configuration** to save your changes.

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## Using the CLI to Configure the Controller to Automatically Upload Core Dumps to an FTP Server

Using the controller CLI, follow these steps to enable the controller to automatically upload a core dump file to an FTP server.

**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, and



**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**

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 a 5500 Series Controller to a TFTP or FTP Server

Using the controller CLI, follow these steps to upload the core dump file from the flash memory of a 5500 series controller to a TFTP or FTP server.

**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 TFTP or FTP server, enter these commands:

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

When a 5500 series 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:

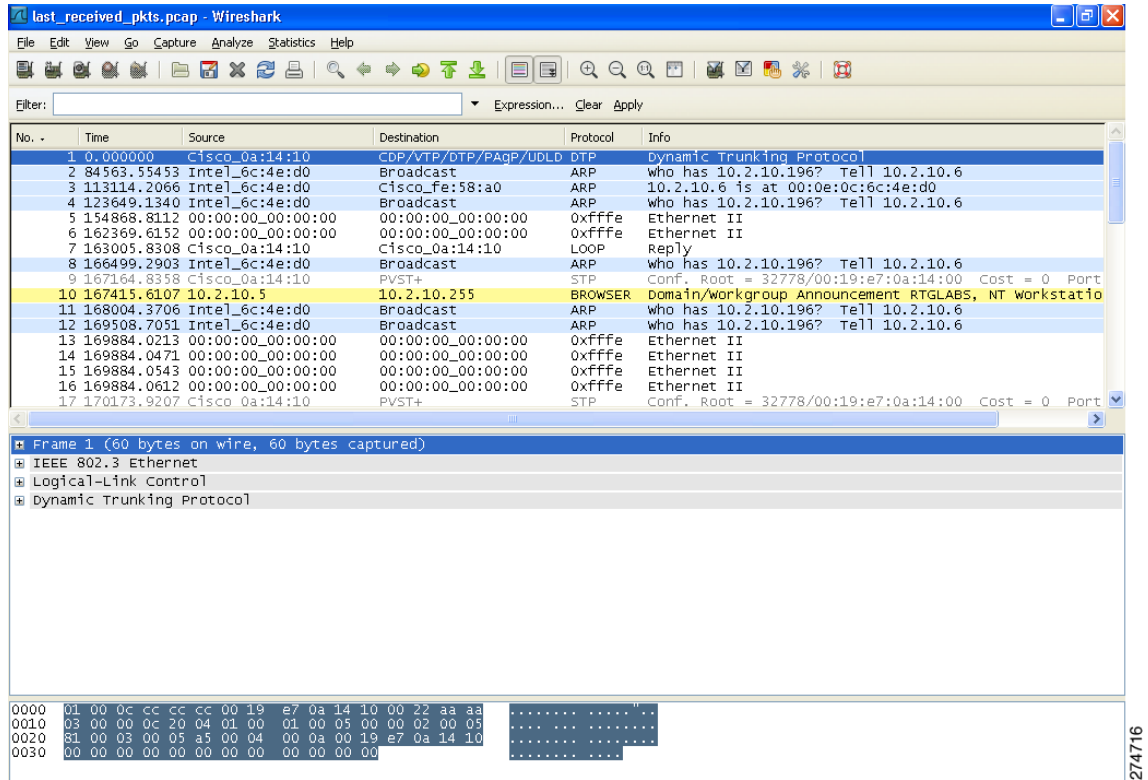
```
Last 5 packets processed at each core are stored in
"last_received_pkts.pcap" captured file.
- Frame 36,38,43,47,49, processed at core #0.
- Frame 14,27,30,42,45, processed at core #1.
- Frame 15,18,20,32,48, processed at core #2.
- Frame 11,29,34,37,46, processed at core #3.
- Frame 7,8,12,31,35, 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 6 shows a sample output of a packet capture file in Wireshark.

**Figure 6** Sample Output of Packet Capture File in Wireshark



**Note**

Only 5500 series controllers generate packet capture files. This feature is not available on other controller platforms.

Follow the instructions in this section to upload packet capture files from the controller through the GUI or CLI. However, before you begin, make sure you have a TFTP or FTP server available for the file upload. Keep these guidelines in mind 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 WCS because the WCS built-in TFTP or FTP server and the third-party TFTP or FTP server require the same communication port.

## Using the GUI to Upload Packet Capture Files

Using the controller GUI, follow these steps to upload a packet capture file from the controller.

- Step 1** Choose **Commands > Upload File** to open the Upload File from Controller page (see [Figure 7](#)).

**Figure 7** Upload File from Controller Page

- Step 2** From the File Type drop-down box, choose **Packet Capture**.
- Step 3** From the Transfer Mode drop-down box, choose **TFTP** or **FTP**.
- Step 4** In the IP Address field, enter the IP address of the TFTP or FTP 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:
- In the Server Login Username field, enter the username to log into the FTP server.
  - In the Server Login Password field, enter the password to log into the FTP server.
  - 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 appears 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.

## Using the CLI to Upload Packet Capture Files

Using the controller CLI, follow these steps to upload a packet capture file from the controller.

- Step 1** Log into the controller CLI.
- Step 2** Enter **transfer upload mode {tftp | ftp}**.
- Step 3** Enter **transfer upload datatype packet-capture**.
- Step 4** Enter **transfer upload serverip server-ip-address**.
- Step 5** Enter **transfer upload path server-path-to-file**.

**Step 6** Enter **transfer upload filename** *last\_received\_pkts.pcap*.

**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 **transfer upload start** to view the updated settings; then answer **y** when prompted to confirm the current settings and start the upload process. This example shows the upload command output:

```
Mode..... TFTP
TFTP Server IP..... 10.10.10.10
TFTP Path..... /tftp/user/
TFTP Filename..... last_received_pkts.pcap
Data Type..... Packet capture
```

```
Are you sure you want to start? (y/N) y
```

```
TFTP Packet Capture Dump starting.
```

```
File transfer operation completed successfully.
```

**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).

Using the controller CLI, follow these steps to monitor the controller for memory leaks.

**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 view 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 view 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

The controller supports three features designed to help troubleshoot communication problems with CCXv5 clients: diagnostic channel, client reporting, and roaming and real-time diagnostics. See the [“Configuring Cisco Client Extensions” section on page 49](#) for more information on CCX.

**Note**

---

These 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.

---

## Diagnostic Channel

The diagnostic channel feature enables you to troubleshoot problems regarding client communication with a WLAN. The client and access points can be put through a defined set of tests in an attempt to identify the cause of communication difficulties the client is experiencing and then 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 CLI or WCS to run the diagnostic tests.

**Note**

---

Cisco recommends that you enable the diagnostic channel feature only for non-anchored SSIDs that use the management interface.

---

## 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.

## 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.

## Using the GUI to Configure the Diagnostic Channel

Follow these steps to configure the diagnostic channel using the controller GUI.

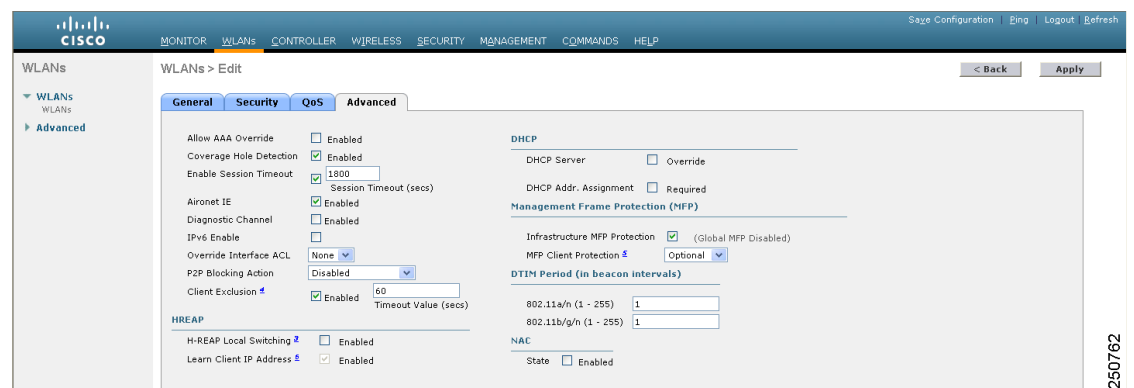
- Step 1** Choose **WLANs** to open the WLANs page.
- Step 2** Create a new WLAN or click the ID number of an existing WLAN.



**Note** Cisco recommends 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 (see [Figure 8](#)).

**Figure 8** WLANs > Edit (Advanced) Page



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



**Note** You can use the CLI to initiate diagnostic tests on the client. See the [“Using the CLI to Configure the Diagnostic Channel”](#) section on page 28 for details.

- Step 5** Click **Apply** to commit your changes.
- Step 6** Click **Save Configuration** to save your changes.

## Using the CLI to Configure the Diagnostic Channel

Using the controller CLI, follow these steps to configure the diagnostic channel.

**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..... management
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 abort or clear a test:

- To send a request to the client to abort 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 aborts 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 b0D...
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".MP..x...
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 30D..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.....@....
00000a0: 18 00 50 f2 02 01 01 85 00 03 a4 00 00 27 a4 00 ..P.....'...
00000b0: 00 42 43 5e 00 62 32 2f 00 0b 9a 1d 6f .BC^.b2/.....o
...

```

## Using the GUI to Configure Client Reporting

Follow these steps to configure client reporting using the controller 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 (see [Figure 9](#)).



Figure 9 Clients > Detail Page

The screenshot shows the Cisco ISE Client Detail page. The top navigation bar includes 'MONITOR', 'WLANS', 'CONTROLLER', 'WIRELESS', 'SECURITY', 'MANAGEMENT', 'COMMANDS', and 'HELP'. The left sidebar has a 'Monitor' section with sub-items: Summary, Access Points, Statistics, CDP, Rogues, Clients, and Multicast. The main content area is titled 'Clients > Detail' and includes buttons for '< Back', 'Apply', 'Link Test', 'Remove', 'Send CCXv5 Req', and 'Display'. The page is divided into several sections:

- Client Properties:** A table listing attributes such as MAC Address (00:40:96:a7:5d:55), IP Address (209.165.200.225), Client Type (Regular), User Name, Port Number (1), Interface (management), VLAN ID (0), CCX Version (CCXv5), E2E Version (Not Supported), Mobility Role (Local), Mobility Peer IP Address (N/A), Policy Manager State (RUN), Mirror Mode (Disable), and Management Frame Protection (No).
- AP Properties:** A table listing attributes such as AP Address (00:0b:85:62:65:90), AP Name (ap:62:65:90), AP Type (802.11a), WLAN Profile (ssid1), Status (Associated), Association ID (1), 802.11 Authentication (Open System), Reason Code (0), Status Code (0), CF Pollable (Not Implemented), CF Poll Request (Not Implemented), Short Preamble (Not Implemented), PBCC (Not Implemented), Channel Agility (Not Implemented), Timeout (0), and WEP State (WEP Disable).
- Security Information:** A table listing Security Policy Completed (Yes), Policy Type (N/A), Encryption Cipher (None), and EAP Type (N/A).
- Quality of Service Properties:** A table listing WMM State (Enabled), U-APSD Support (Disabled), QoS Level (Silver), Diff Serv Code Point (DSCP) (disabled), 802.1p Tag (disabled), Average Data Rate (disabled), Average Real-Time Rate (disabled), Burst Data Rate (disabled), and Burst Real-Time Rate (disabled).
- Client Statistics:** A table listing Bytes Received (641114), Bytes Sent (13583884), Packets Received (9910), Packets Sent (9136), Policy Errors (0), RSSI (-51), SNR (53), Sample Time (Thu Aug 30 11:14:54 2007), Excessive Retries (0), Retries (0), Success Count (0), Fail Count (0), and Tx Filtered (0).

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**Step 3** To send a report request to the client, click the **CCXv5 Req** button.



**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 (see [Figure 10](#)).

**Figure 10** Client Reporting Page

The screenshot shows the Cisco Client Reporting page with the following sections:

- Profile Information:**
  - Number of Client Profiles: 3
  - Table with columns: Profile, Currently Used
 

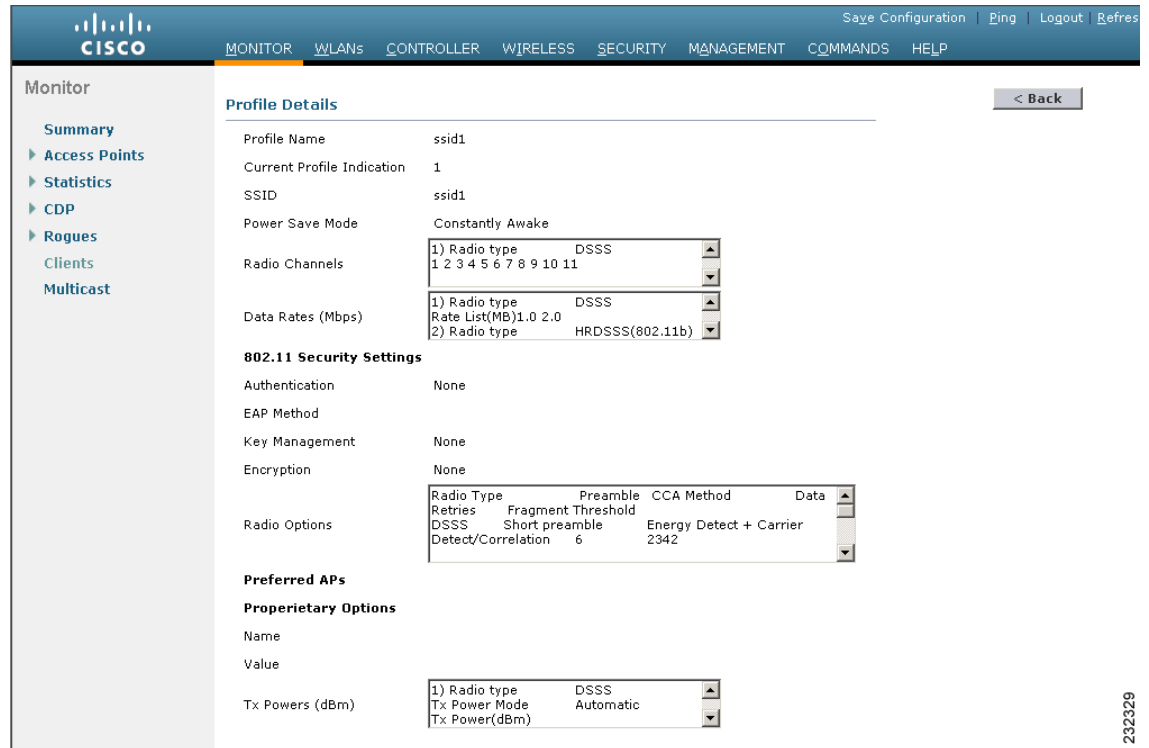
| Profile               | Currently Used |
|-----------------------|----------------|
| <a href="#">ssid1</a> | Yes            |
| <a href="#">ssid2</a> | No             |
| <a href="#">ssid3</a> | No             |
- Operating Parameters:**
  - MAC Address: 00:40:96:a7:5d:55
  - Radio Type: OFDM(802.11a)
  - Radio Channels: 1) Radio type OFDM(802.11a), Radio Channels 36 40 44 48 52 56, 60 64 149 153 157 161 165
  - Data Rates (Mbps): 1) Radio type OFDM(802.11a), Rate List(MB) 6.0 9.0 12.0 18.0, 24.0 36.0 48.0 54.0
  - SSID: ssid1
  - Device Name: Wireless Network Connection 2
  - Device Type: Laptop
  - OS Identification string: Windows XP
  - OS Version String: 5.1.2600 Service Pack 2
  - IP v4 Address: 209.165.200.225
  - IP v4 Subnet Address: 209.165.200.225
  - IP v6 Address: 209.165.200.225
  - IP v6 Subnet Address: 209.165.200.225
  - IP Address Type: DHCP
  - Default Gateway Address: 209.165.200.225
  - DNS Servers: 209.165.200.225
  - WINS Servers: 209.165.200.225
  - Enterprise Phone numbers: Cellular Phone number
  - Firmware version: 4.0.0.232
  - Power save mode: Normal Power Save
  - Localisation: Tx Powers (dBm) 1) Radio type OFDM(802.11a), Tx Power Mode Automatic, Tx Power(dBm)
- 802.11 Security type:**
  - Authentication: None
  - EAP Method: None
  - Key Management: None
  - Encryption: None
- Manufacturers' Information:**
  - Manufacturer OUI: 00:40:96
  - Manufacturer ID: Cisco
  - Manufacturer Model: Cisco Aironet 802.11a/b/g
  - Manufacturer Serial Number: FOC0902N57C
  - Radio Type: DSSS OFDM(802.11a) HR
  - MAC Address: 00:40:96:a7:5d:55
  - Antenna Type: Omni-directional diversity
  - Antenna Gain (dBi): 2
  - Receiver Sensitivity: 1) Radio type DSS, Rx Sensitivity Rate MinRssi Max, 1.0 -95 -30, 2.0 -95 -30
- Client Capability:**
  - Radio Type: OFDM(802.11a) DSSS OFF
  - Radio Channels: 1) Radio type DSS, Radio Channels 1 2 : 10 11
  - Data Rates (Mbps): 1) Radio type DSS, Rate List(MB) 1.0 : 1.0 : 2) Radio type HRD
  - Service Capabilities:**
    - Voice: supported
    - Streaming Video: supported
    - Interactive Video: supported
    - GPS Location: Not supported or Unknown
    - Tx Powers (dBm): 1) Radio type DSS, Tx Power Mode Autc, Tx Power(dBm)

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This page lists the client profiles and indicates if they are currently in use. It also provides information on the client’s operating parameters, manufacturer, and capabilities.

**Step 5** Click the link for the desired client profile. The Profile Details page appears (see [Figure 11](#)).

**Figure 11** Profile Details Page



This page shows the client profile details, including the SSID, power save mode, radio channel, data rates, and 802.11 security settings.

## Using the CLI to Configure Client Reporting

Using the controller CLI, follow these steps to configure client reporting.

- 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*

Information similar to the following appears:

```

Number of Profiles..... 1
Current Profile..... 1

Profile ID..... 1
Profile Name..... wifiEAP
SSID..... wifiEAP
Security Parameters[EAP Method,Credential]..... EAP-TLS,Host OS Login Credentials
Auth Method..... EAP
Key Management..... WPA2+CCKM
Encryption..... AES-CCMP
Power Save Mode..... Constantly Awake
Radio Configuration:
Radio Type..... DSSS
 Preamble Type..... Long preamble
 CCA Method..... Energy Detect + Carrier
Detect/Correlation
 Data Retries..... 6
 Fragment Threshold..... 2342
 Radio Channels..... 1 2 3 4 5 6 7 8 9 10 11
 Tx Power Mode..... Automatic
 Rate List (MB)..... 1.0 2.0

Radio Type..... HRDSSS(802.11b)
 Preamble Type..... Long preamble
 CCA Method..... Energy Detect + Carrier
Detect/Correlation
 Data Retries..... 6
 Fragment Threshold..... 2342
 Radio Channels..... 1 2 3 4 5 6 7 8 9 10 11
 Tx Power Mode..... Automatic
 Rate List (MB)..... 5.5 11.0

Radio Type..... ERP(802.11g)
 Preamble Type..... Long preamble
 CCA Method..... Energy Detect + Carrier
Detect/Correlation
 Data Retries..... 6
 Fragment Threshold..... 2342
 Radio Channels..... 1 2 3 4 5 6 7 8 9 10 11
 Tx Power Mode..... Automatic
 Rate List (MB)..... 6.0 9.0 12.0 18.0 24.0 36.0 48.0 54.0

Radio Type..... OFDM(802.11a)
 Preamble Type..... Long preamble
 CCA Method..... Energy Detect + Carrier
Detect/Correlation
 Data Retries..... 6
 Fragment Threshold..... 2342
Radio Channels..... 36 40 44 48 52 56 60 64 149 153 157 161
165
 Tx Power Mode..... Automatic
 Rate List (MB)..... 6.0 9.0 12.0 18.0 24.0 36.0 48.0 54.0

```

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

**show client ccx operating-parameters** *client\_mac\_address*

Information similar to the following appears:

```
Client Mac..... 00:40:96:b2:8d:5e
Radio Type..... OFDM(802.11a)

Radio Type..... OFDM(802.11a)
 Radio Channels..... 36 40 44 48 52 56 60 64 100 104 108 112
116 120 124 128 132 136 140 149 153 157 161 165
 Tx Power Mode..... Automatic
 Rate List(MB)..... 6.0 9.0 12.0 18.0 24.0 36.0 48.0 54.0

Power Save Mode..... Normal Power Save
SSID..... wifi
Security Parameters[EAP Method,Credential]..... None
Auth Method..... None
Key Management..... None
Encryption..... None
Device Name..... Wireless Network Connection 15
Device Type..... 0
OS Id..... Windows XP
OS Version..... 5.1.2600 Service Pack 2
IP Type..... DHCP address
IPv4 Address..... Available
IP Address..... 70.0.4.66
Subnet Mask..... 255.0.0.0
Default Gateway..... 70.1.0.1
IPv6 Address..... Not Available
IPv6 Address..... 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0:
0: 0: 0:
IPv6 Subnet Mask..... 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0: 0:
0: 0: 0:
DNS Servers..... 103.0.48.0
WINS Servers.....
System Name..... URAVAL3777
Firmware Version..... 4.0.0.187
Driver Version..... 4.0.0.187
```

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

**show client ccx manufacturer-info** *client\_mac\_address*

Information similar to the following appears:

```
Manufacturer OUI..... 00:40:96
Manufacturer ID..... Cisco
Manufacturer Model..... Cisco Aironet 802.11a/b/g Wireless
Adapter
Manufacturer Serial..... FOC1046N3SX
Mac Address..... 00:40:96:b2:8d:5e
Radio Type..... DSSS OFDM(802.11a) HRDSSS(802.11b)
ERP(802.11g)
Antenna Type..... Omni-directional diversity
Antenna Gain..... 2 dBi

Rx Sensitivity:
Radio Type..... DSSS
Rx Sensitivity Rate:1.0 Mbps, MinRssi:-95, MaxRssi:-30
Rx Sensitivity Rate:2.0 Mbps, MinRssi:-95, MaxRssi:-30
Radio Type..... HRDSSS(802.11b)
Rx Sensitivity Rate:5.5 Mbps, MinRssi:-95, MaxRssi:-30
Rx Sensitivity Rate:11.0 Mbps, MinRssi:-95, MaxRssi:-30
```

```
Radio Type..... ERP(802.11g)
Rx Sensitivity Rate:6.0 Mbps, MinRssi:-95, MaxRssi:-30
Rx Sensitivity Rate:9.0 Mbps, MinRssi:-95, MaxRssi:-30
Rx Sensitivity Rate:12.0 Mbps, MinRssi:-95, MaxRssi:-30
Rx Sensitivity Rate:18.0 Mbps, MinRssi:-95, MaxRssi:-30
```

**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.

Information similar to the following appears:

```
Service Capability..... Voice, Streaming(uni-directional) Video,
Interactive(Bi-directional) Video
Radio Type..... DSSS OFDM(802.11a) HRDSSS(802.11b)
ERP(802.11g)

Radio Type..... DSSS
Radio Channels..... 1 2 3 4 5 6 7 8 9 10 11
Tx Power Mode..... Automatic
Rate List(MB)..... 1.0 2.0

Radio Type..... HRDSSS(802.11b)
Radio Channels..... 1 2 3 4 5 6 7 8 9 10 11
Tx Power Mode..... Automatic
Rate List(MB)..... 5.5 11.0

Radio Type..... ERP(802.11g)
Radio Channels..... 1 2 3 4 5 6 7 8 9 10 11
Tx Power Mode..... Automatic
Rate List(MB)..... 6.0 9.0 12.0 18.0 24.0 36.0 48.0 54.0

Radio Type..... OFDM(802.11a)
Radio Channels..... 36 40 44 48 52 56 60 64 100 104 108 112
116 120 124 128 132 136 140 149 153 157 161 165
Tx Power Mode..... Automatic
Rate List(MB)..... 6.0 9.0 12.0 18.0 24.0 36.0 48.0 54.0
```

## Using the CLI to Configure Roaming and Real-Time Diagnostics

Using the controller CLI, follow these steps to configure roaming and real-time diagnostics.

**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

The debug 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.

Follow these steps to use the debug facility.

---

**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**.

---

**Step 2** Use these commands to configure packet-logging ACLs:

- **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, rbc, wired-guest, or any.
- *port* is the physical port for packet transmission or reception.

- **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 3** 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 12](#) shows an example of hex2pcap output, and [Figure 13](#) shows an example of text2pcap output.

**Figure 12** Sample Hex2pcap Output

```

tx len=118, encap=n/a, port=1
[0000]: 000C316E 7F80000B 854008c0 08004500 ..1n.....@.@..E.
[0010]: 00680000 40004001 5FBED0164 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

```

212235

**Figure 13** Sample 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 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 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

```

232343

**Step 4** To determine why packets might not be displayed, enter this command:

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

**Step 5** 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

The controller enables you to configure an access point 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 timestamp, signal strength, packet size, and so on. Sniffers allow you to monitor and record network activity and to detect problems.

Supported third-party network analyzer software applications include:

- Wildpackets Omnippeek or Airopeek
- AirMagnet Enterprise Analyzer
- Wireshark



**Note** The latest version of Wireshark can decode the packets by going to the ‘Analyze’ mode. select ‘decode as’, and switch UDP5555 to decode as "AIROPEEK".



**Note**

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 5500 series controller, a 2100 series controller, or a controller network module running software release 6.0. To disable IP-MAC address binding, enter this command using the controller CLI: **config network ip-mac-binding disable**. Refer to the “[Configuring IP-MAC Address Binding](#)” section on page 66 for more information.



**Note**

WLAN 1 must be enabled in order to use an access point in sniffer mode if the access point is joined to a 5500 series controller, a 2100 series controller, or a controller network module running software release 6.0. If WLAN 1 is disabled, the access point cannot send packets.

## Prerequisites for Wireless Sniffing

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

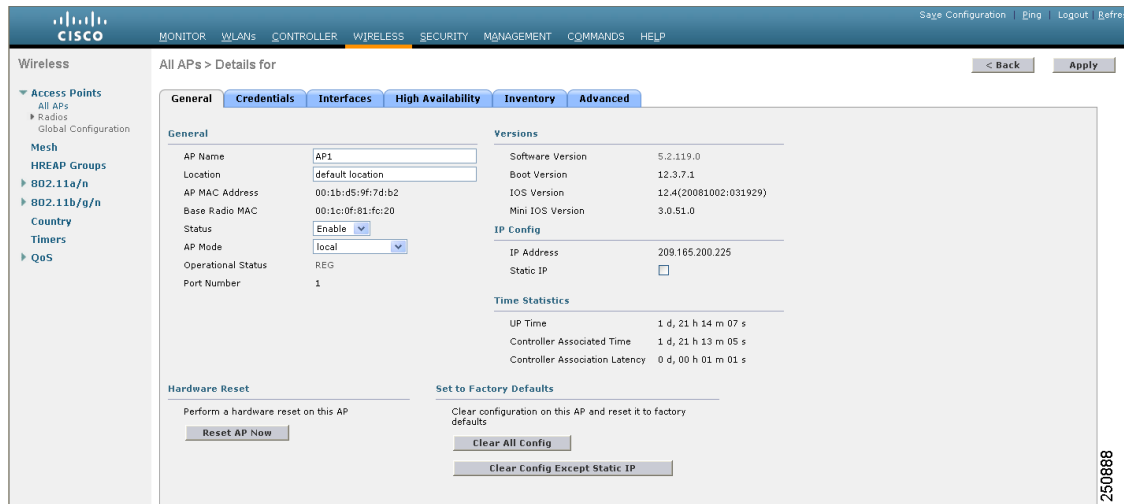
- **A dedicated access point**—An access point configured as a sniffer cannot simultaneously provide wireless access service on the network. To avoid disrupting coverage, use an access point that is not part of your existing wireless network.
- **A remote monitoring device**—A computer capable of running the analyzer software.
- **Windows XP or Linux operating system**—The controller supports sniffing on both Windows XP and Linux machines.
- **Software and supporting files, plug-ins, or adapters**—Your analyzer software may require specialized files before you can successfully enable sniffing:
  - **Omnipeek or Airopeek**—Go to WildPackets’ website and follow the instructions to purchase, install, and configure the software.
  - **AirMagnet**—Go to Fluke Networks’ website and follow the instructions to purchase, install, and configure the software.
  - **Wireshark**—Go to <http://www.wireshark.org/download.html> and follow the instructions to download Wireshark and the correct installation wizard for your operating system.

# Using the GUI to Configure Sniffing on an Access Point

Using the controller GUI, follow these steps to configure sniffing on an access point.

- 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 (see [Figure 14](#)).

**Figure 14** All APs > Details for Page



- Step 3** From the AP Mode drop-down box, choose **Sniffer**.
- Step 4** Click **Apply** to commit your changes.
- Step 5** Click **OK** when warned 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 (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 (or 802.11b/g/n) Cisco APs > Configure page appears (see [Figure 15](#)).



Figure 15 802.11b/g/n Cisco APs &gt; Configure Page

The screenshot shows the Cisco configuration interface for 802.11a/n Cisco APs. The page is titled "802.11a/n Cisco APs > Configure" and includes a navigation menu with options like MONITOR, WLANs, CONTROLLER, WIRELESS, SECURITY, MANAGEMENT, COMMANDS, and HELP. The left sidebar shows a tree view of configuration options, including Access Points, Radios, Mesh, HREAP Groups, 802.11a/n, 802.11b/g/n, Country, Timers, and QoS. The main content area is divided into several sections:

- General:** AP Name (API250), Admin Status (Enable), Operational Status (DOWN).
- Sniffer Channel Assignment:** Sniff (checked), Channel (36), Server IP Address (0.0.0.0).
- 11n Parameters:** 11n Supported (Yes).
- Antenna Parameters:** Antenna Type (External), Antenna (A, B, C), Antenna Gain (7 x 0.5 dBi). The C antenna is selected.
- WLAN Override:** WLAN Override (disable).
- Performance Profile:** View and edit Performance Profile for this AP.

A note at the bottom right states: "Due to low PoE radio is transmitting at degraded power. Note: Changing any of the parameters causes the AP temporarily disabled and thus may result in loss of some clients."

- Step 8** Check the **Sniff** check box to enable sniffing on this access point, or leave it unchecked to disable sniffing. The default value is unchecked.
- Step 9** If you enabled sniffing in [Step 8](#), follow these steps:
- From the Channel drop-down box, choose the channel on which the access point sniffs for packets.
  - In the Server IP Address field, enter the IP address of the remote machine running Omnipeek, Airopeek, AirMagnet, or Wireshark.
- Step 10** Click **Apply** to commit your changes.
- Step 11** Click **Save Configuration** to save your changes.

## Using the CLI to Configure Sniffing on an Access Point

Using the controller CLI, follow these steps to configure sniffing on an access point.

- Step 1** To configure the access point as a sniffer, enter 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 To enable sniffing on the access point, enter 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 this command:

```
config ap sniff {802.11a | 802.11b} disable Cisco_AP
```

Step 4 To save your changes, enter this command:

```
save config
```

Step 5 To view the sniffer configuration settings for an access point, enter this command:

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

Information similar to the following appears:

```
Cisco AP Identifier..... 17
Cisco AP Name..... AP1131:46f2.98ac
...
AP Mode ..... Sniffer
Public Safety ..... Global: Disabled, Local: Disabled
Sniffing ..... No
...
```

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, where.**

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



Note

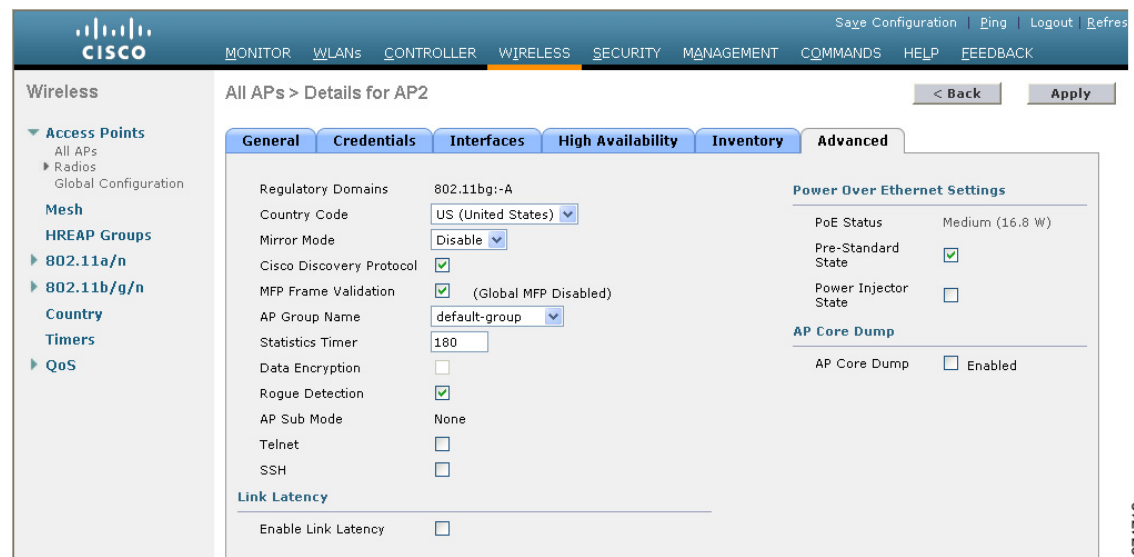
Refer to the [“Configuring Telnet and SSH Sessions” section on page 34](#) for instructions on configuring Telnet or SSH sessions on the controller.

Using the GUI to Troubleshoot Access Points Using Telnet or SSH

Using the controller GUI, follow these steps to enable Telnet or SSH access (or both) on lightweight access points.

- 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 (see [Figure 16](#)).

Figure 16 All APs > Details for (Advanced) Page



- Step 4** To enable Telnet connectivity on this access point, check the **Telnet** check box. The default value is unchecked.
- Step 5** To enable SSH connectivity on this access point, check the **SSH** check box. The default value is unchecked.
- Step 6** Click **Apply** to commit your changes.
- Step 7** Click **Save Configuration** to save your changes.

Using the CLI to Troubleshoot Access Points Using Telnet or SSH

Using the controller CLI, follow these steps to enable Telnet or SSH access (or both) on lightweight access points.

- Step 1** To enable Telnet or SSH connectivity on an access point, enter this command:

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

The default value is disabled.



Note To disable Telnet or SSH connectivity on an access point, enter this command:
config ap {telnet | ssh} disable Cisco_AP

Step 2 To save your changes, enter this command:

save config

Step 3 To see whether Telnet or SSH is enabled on an access point, enter 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

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.

Using the CLI to Debug Access Point Monitor Service Issues

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, and
- **packet** configures debugging of access point monitor packets.

Troubleshooting OfficeExtend Access Points

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

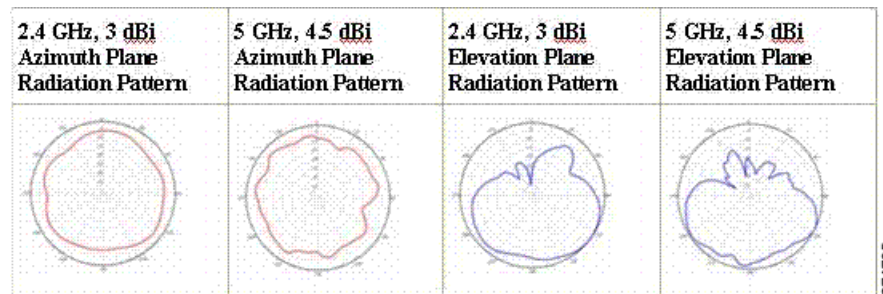
Interpreting OfficeExtend LEDs

The LED patterns are different for 1130 series and 1140 series OfficeExtend access points. Refer to the *Cisco OfficeExtend Access Point Quick Start Guide* for a description of the LED patterns.

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 (see [Figure 17](#)). Be sure to mount the access point so that air can flow behind the metal back plate and prevent the access point from over heating.

Figure 17 OfficeExtend Access Point Radiation Patterns



Troubleshooting Common Problems

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 on [page 38](#) to view 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 in DSL Reports website. Some servers do not return big packet pings, so use the www.dslreports.com server to do pings such as `ping -l 1500 -n 10 www.dslreports.com`.
- Clients keep dropping data. This behavior usually occurs because the home router closes the port because of short timeouts.
Resolution: Perform client troubleshooting in WCS 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 <http://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 into 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 this command on the controller CLI: `clear ap config Cisco_AP`, and then follow the steps in the “[Configuring a Personal SSID on an OfficeExtend Access Point](#)” section on page 58 to try again. 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:
 - a. Leave all devices networked and connected; then power down all the devices.
 - b. Turn on the cable or DSL modem; then wait for 2 minutes. (Check the LED status.)
 - c. Turn on the home router; then wait for 2 minutes. (Check the LED status.)
 - d. Turn on the access point; then wait for 5 minutes. (Check the LED status.)
 - e. Turn on the client.