Managing Your WLAN Radio Environment

The Radio Manager simplifies the deployment, expansion, and day-to-day management of your WLAN radio environment. The Radio Manager:

- Automatically configures network-wide radio parameters during initial deployment and network expansion.
- Continuously monitors the radio environment, detects interference and rogue access points, and alerts the WLAN administrator to radio network changes.
- Provides information to help visualize the network radio topology, including the path loss between APs and radio frequency coverage.

All the device information shown under the Radio Manager tab is polled from the managed devices in your network. The WLSE polls and receives Radio Manager aggregated data from access points running WDS and provides intelligent processing of this data. The WLSE can manage multiple subnets, so it can receive Radio Manager data from many APs running WDS.

Caution The WLSE must register with the WDS in each managed AP subnet to receive Radio Manager data. If the WLSE is not registered, *none of the Radio Manager functions will work*. For more information about preparing your network to manage radio devices, see Getting Started with Radio Manager, page 9-2.

After the access points have been configured for radio management, you can use the selections under the Radio Manager tab to collect radio data and manage your WLAN radio environment. The following topics discuss these options:

Related Topics

- Viewing Your WLAN Radio Environment with Location Manager, page 10-1

Getting Started with Radio Manager

Before you can use the radio management features provided by WLSE, you must make certain that your network is configured correctly. If your network is not properly configured, *none of the Radio Manager functions will work.*

Procedure

Step 1 Be sure that all APs are managed (discovered, inventoried, and managed—see Managing Devices, page 3-1).

Step 2 Configure one or more APs in each AP subnet to run WDS. When multiple WDSs exist in the same subnet, one WDS becomes the primary WDS and the other WDSs become standbys.

For more information about configuring WDS APs, see the *Installation and Configuration Guide for the CiscoWorks Wireless LAN Solution Engine*.

For more information about WDS and why the Radio Manager requires it, see What is WDS and Why Do I Need To Use It?, page 9-18.

Step 3 Enable LEAP authentication.

Note All APs must authenticate with a WDS AP using LEAP. This requirement is separate from the client's authentication scheme—clients can use a non-LEAP security scheme, but the AP and WLSE must use LEAP to authenticate to the WDS.

Note A WDS AP can connect to Cisco's ACS v3.2 as the LEAP Authentication server. You can use the AP's LEAP Local Authentication Server feature if the customer is not using LEAP for any purpose other than to fulfill the requirement on the WLSE/WDS/AP.

For more information about enabling LEAP authentication, see the *Installation and Configuration Guide for the CiscoWorks Wireless LAN Solution Engine*.

Step 4 Configure the WLCCP credentials (see Enter WLCCP Credentials for Wireless Domain Services, page 3-16).

Step 5 Verify that the active WDS appears under the device tree:

a. Select **Reports** > **Device Center.**

b. Open the **Wireless Domain Services** folder.

c. Open the **Active WDS** folder.

d. Select the device.

e. Select **WDS Summary Report**.

f. Verify that the **WLSE to WDS Authentication Status** column contains the string "KeysSetUpWithWDS" or "Authenticate".

You can also verify this setting by running the "show wlccp wnm status" CLI command on the primary WDS in enable mode. A typical output would look like this:

```
NMS-AP1200-1#show wlccp wnm status
WNM IP Address : 172.16.0.0 Status : SECURITY KEYS SETUP
```

where:

- 172.16.0.0 = IP address of WLSE

- Status = SECURITY KEYS SETUP. This indicates that the primary WDS is properlyauthenticated with WLSE.

Step 6 Verify that the APs are managed and registered with WDS:

a. Select **Reports** > **Device Center.**

b. Open the **Wireless Domain Services** folder.

c. Open the **Active WDS** folder.

d. Select the device.

e. Select **WDS Registered APs**. A list of all the APs that are registered with this WDS AP is displayed.

You can also verify this setting by running the “show wlccp wds ap” CLI command on the primary WDS in enable mode.

Step 7 Configure the ACS server to support fast roaming and simultaneous logins.

For information about configuring the ACS server to support roaming and simultaneous logins, see the ACS server documentation on Cisco.com.

For other information about configuring the ACS server, see the *Installation and Configuration Guide for the CiscoWorks Wireless LAN Solution Engine*.

Step 8 Configure the AAA server to allow multiple sessions.

For information about configuring the AAA server to multiple logins, see the AAA server documentation on Cisco.com.

For other information about configuring the AAA server, see the *Installation and Configuration Guide for the CiscoWorks Wireless LAN Solution Engine*.

After these requirements have been satisfied, you are ready to use the Radio Manager to gather the data and manage your WLAN radio environment. Table 9-1 provides a high-level overview of the sequence in which the Radio Manager tab selections (procedures and features) must be used.

Table 9-1 Using the Radio Manager

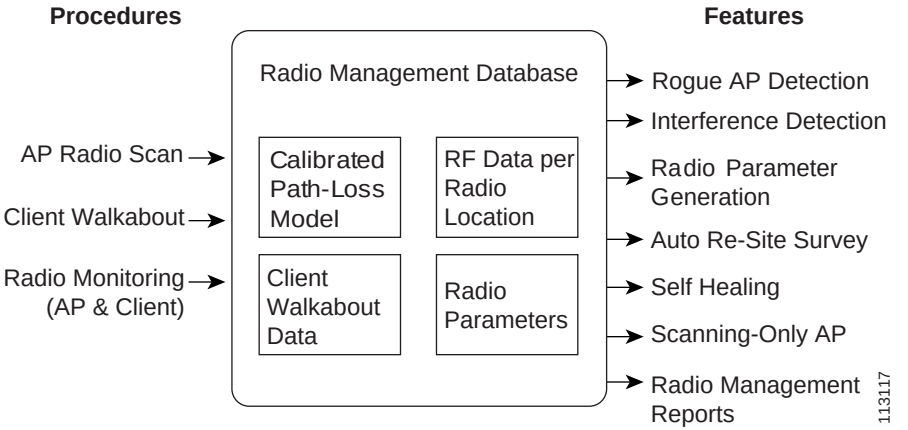
	Task	References
Step 1	Configure your network to use the Radio Manager.	See this topic and the *Installation and Configuration Guide for the CiscoWorks Wireless LAN Solution Engine*.
Step 2	Collect radio location data The Radio Manager uses these measurements to characterize the radio environment and determine the channels and power limits for each BSS.	Collecting Radio Location Data, page 9-27 Deleting RM Measurements, page 9-54
Step 3	Generate radio parameters The Radio Manager can generate optimal values for the radio parameters of a given group of APs.	Generating Radio Parameters, page 9-56
Step 4	Monitor the WLAN environment:	
	• Use the Radio Manager features to manage your radio network.	Using the Radio Manager Features, page 9-67
	• Use Radio Manager reports to view radio management information.	Displaying Radio Manager Reports, page 8-18
	• Use the Faults options to enable network-wide fault priority settings and thresholds and to view faults details related to Radio Manager features.	Managing Network-Wide Settings, page 2-81 Viewing Fault Details, page 2-10
	• Use the Location Manager to access a graphical view of the APs on each floor of your building(s) and display the predicted coverage of each AP.	Viewing Your WLAN Radio Environment with Location Manager, page 10-1
	• Use Auto Re-Site Survey to evaluate AP radio performance, and Self Healing to adjust neighboring AP interfaces to cover the potential areas of lost coverage.	Using Auto Re-Site Survey, page 9-69 Using Self Healing, page 9-71
	• Use Scanning-Only APs to detect rogue APs.	Using Scanning-Only APs, page 9-73

Understanding the Radio Manager

The Radio Manager consists of:

- *Procedures* that gather data about the radio environment.
- The Radio Management *database*, which contains radio data and parameters.
- *Features* that use the information in the database.

Figure 9-1 Radio Manager Overview



The following topics describe these procedures and features.

Radio Manager Data Collection Procedures

- Understanding AP Radio Scans, page 9-7
- Understanding Client Walkabouts, page 9-9
- Understanding Radio Monitoring, page 9-10

The Assisted Site Survey Wizard, part of Location Manager, walks you through these three data collection processes (see Using the Assisted Site Survey Wizard, page 10-22).

Radio Manager Features

- Understanding Rogue AP Detection, page 9-10

Related Topics

Understanding AP Radio Scans

Each AP broadcasts beacons and simultaneously listens for neighboring beacons. The AP Radio Scan option uses the resulting AP-to-AP measurements to establish the path loss model for the WLAN.

Note Run AP Radio Scan during initial setup, then periodically to capture any changes (for example, when APs are added, deleted, or moved).

How It Works

During the scanning process, an AP radio scan performs the following tasks:

1. Sets the selected APs to transmit beacons on the same channel at maximum transmit power.

   During a scan, AP frequencies, data rates, and power levels are temporarily changed but no data rates are modified. For each AP, the channel is fixed and the procedure steps through the power levels up to the specified maximum transmit power level.

Note The radio scan uses temporary configuration parameters so the AP can revert back to its normally configured parameters if the AP is reset or loses connection with the WLSE during the procedure.

2. Measures the signal strength and calculates the path loss of each AP.
3. Repeats this step, with the APs transmitting at successively lower power levels until the lowest setting is reached, to determine the power step calibration of each AP.
4. Saves this information in the database as AP radio locations.
5. Sets all APs back to their original power and channel settings.

Data Produced

The result of AP Radio Scan is a snapshot of the radio frequency interference at each AP and a set of signal strength measurements indicating the level at which each AP receives each neighbor AP. When the neighbor AP is controlled by WLSE, the Radio Manager uses that AP's current transmit level to compute the path loss between the two APs, which it saves to characterize the radio frequency environment. When the neighbor AP is not under WLSE control, the Radio Manager saves the received signal strength.

This data is used to:

- Determine how an AP is positioned relative to other APs
- Determine the amount of path loss due to obstructions (such as walls) between APs
- Compute rogue location estimations, radio parameter generation data, and coverage display data

These results are used in RM Assisted Configuration, Location Manager, Radio Manager Reports, and Faults.

Understanding Client Walkabouts

After running AP Radio Scan and initial radio configuration, you can run one or more optional client walkabouts. During a client walkabout, the client (typically a laptop) is walked around the desired coverage area and reports all detected APs. A client walkabout is an optional step that provides optimal coverage for the radio parameter generator (see Generating Radio Parameters, page 9-56).

Note Client Walkabout is currently supported only when using Cisco cards or non-Cisco client adapters that are Cisco Compatible Extensions version 2 (CCXV2) compliant. For the client adapters that support this feature, see the *Supported Devices Table for the CiscoWorks Wireless LAN Solution Engine, 2.7*, on Cisco.com.

How It Works

You can use up to five client stations, each identified by its 802.11 MAC address, during the Client Walkabout procedure. Use these client stations to walk around the area of WLAN or a portion of the WLAN where you want proper coverage. During the walkabout:

- The APs are set to the same channel.
- The transmit power in the APs is increased so that the power required to cover the edges of the WLAN can be determined.

As you walk the coverage area, the serving AP changes as the client moves from one BSS to another. As long as the client remains inside the coverage area, the serving AP continually commands it to measure and report the signal strength and background radio frequency energy it receives from neighboring APs. All measurements are passed to the Radio Manager, which incorporates them into its RF environment base. This base provides the information to compute the next radio configuration.

Data Produced

Although these measurements are not accompanied by location information, sets of measurements correspond to specific locations in the WLAN coverage area. The Radio Manager uses these measurements to create measurement objects, each containing path losses to the strongest controlled APs and received signal strength from uncontrolled sources at a specific location.

These results are used in RM Assisted Configuration, Location Manager, and Radio Manager Reports.

Understanding Radio Monitoring

Radio Monitoring runs on the specified Cisco IOS APs and its associated CCXV2-compliant clients to continuously monitor the WLAN radio environment and discover any new APs that are transmitting beacons. It generates alerts when new APs appear or interference occurs.

Note Radio Monitoring is your primary means of detecting rogue APs.

How It Works

During normal operation, the Radio Manager requests measurements from Cisco APs and clients to monitor the WLAN radio frequency environment. These measurements occur less frequently than during a walkabout, typically one or more minutes apart. Radio Monitoring allows you to select which channels are monitored; both APs and clients can measure serving and non-serving channels. You make this choice when you enable Radio Monitoring.

An AP can be added to the Radio Monitoring list and also be included on an AP Radio Scan or Client Walkabout; the measurement requests for these two features supersede the monitoring measurement requests. When the other, shorter term procedures end, the APs return to the normal radio monitoring mode.

Data Produced

The channel measurements are used for radio configuration, rogue AP discovery, and interference detection. These results are used in Location Manager and Faults.

Understanding Rogue AP Detection

The Radio Monitoring feature uses the radio measurement capabilities on Cisco IOS APs and Cisco client adaptors to discover any new 802.11 APs that are transmitting beacons. Both clients and APs periodically scan for other 802.11

beacon frames on all channels. Reports of detected beacons are returned to the Radio Manager, which validates these beacons against a list of APs known to be authorized to provide wireless access.

Note For the access points that support this feature, see the *Supported Devices Table for the CiscoWorks Wireless LAN Solution Engine, 2.7*, on Cisco.com.

A newly discovered AP that cannot be identified as a known authorized AP generates an administrator alert. You can categorize this new AP as one of the following AP types:

Table 9-2 Access Point Category Types

Type	Description
Managed AP	An AP that is authorized to provide wireless access to the LAN and requires management services provided by the WLSE. **Note** Only managed APs can participate in Radio Manager operations.
Unmanaged AP	An AP that is authorized to provide wireless access to the LAN but does *not* require any management services from the WLSE.
Friendly AP	An AP that is not connected to the LAN, but is known to be detectable by client's or AP's 802.11 radios within the managed WLAN. A Friendly AP is an AP that you know exists, for example, a neighboring network's AP or a neighboring company's AP.
Rogue AP	An AP that may or may not be connected to the LAN, is detected by client's or AP's 802.11 radios within the managed WLAN, and has not been identified as Friendly, Unmanaged, or Managed. By default, all unknown radios are classified as Rogue until you change them to Friendly, Unmanaged, or Managed.

How It Works

Rogue AP detection is based on the detection of an unknown radio interface broadcasting over the air. When Radio Monitoring detects a rogue AP, a new fault is generated. When you select the link in the Description or Timestamp fields in the Fault Summary Table for an unknown access point, the Rogue Access Point Details window displays information about the rogue AP (see Unknown AP Details, page 2-15).

Understanding Switch Port Location and Suppression

To find the switch port to which the rogue AP is connected, check the Switch Port Location information displayed in the Unknown AP Detail screen (see Unknown AP Details, page 2-15). The Switch Port Location feature tries to determine the rogue AP's Ethernet MAC address from its BSSID (or radio MAC address) that it hears over the air. The algorithm used to find the Ethernet MAC address assumes that the Ethernet MAC address is in the range of plus or minus 1 of the BSSID.

How It Works

The switch port location feature uses the AP that first detected the rogue AP as the seed device. From the seed device, WLSE tries to find any of the three MAC addresses on any port. If it finds any of the MAC addresses on any port, WLSE reports the port as a port to which the rogue AP is connected. You can chose to suppress the switch port and you can enable automatic suppression of switch ports so that each time a rogue AP is detected and WLSE finds the switch port to which the rogue AP is connected, it automatically disables the switch port (see Assigning Rogue AP Detection Network Settings, page 2-82).

Caution **In rare cases, the Auto Suppress feature can suppress a port other than the port to which the rogue AP is connected.** The algorithm that is used to find the Ethernet MAC address uses the radio MAC address and assumes that Ethernet MAC address is in the range of +-1 of the radio MAC address. **This may not be true in all cases**. If the trace finds any of the three MAC addresses on any port, WLSE shuts those ports down. There is *no guarantee* that the switch port to which the rogue is connected can be traced in all cases, because there is no guaranteed way to find the Ethernet MAC address from the radio MAC address.

If the Switch Port Location feature is unable to locate the switch port to which the rogue AP is connected, you click **Re-Trace** on the Rogue Access Point Details window to locate the switch port again (see Unknown AP Details, page 2-15).

Data Produced

When a Rogue AP fault is generated, the Rogue Access Point Details window displays information about the switch port to which the rogue AP is connected. (see Unknown AP Details, page 2-15).

Understanding Interference Detection

When you activate Radio Monitoring, you can start interference detection and choose what level of signal strength and duration of signal is required to detect interference. Only APs in the radio monitoring list and clients associated with these APs can participate in interference detection.

How It Works

The Radio Monitoring feature uses the radio measurement capabilities to discover any new interference.

Data Produced

When Radio Monitoring detects interference, a new fault is generated. To view details about the interference, click the link in the Description or Timestamp fields in the Fault Summary Table for an device to view the Fault Details window (se Viewing Fault Details, page 2-10).

Understanding Radio Parameter Generation

Radio Manager can generate optimal values for the radio parameters of a given group of APs. Each set of radio parameters can modify:

- AP channel
- AP power level
- AP beacon interval

RM Assisted Configuration helps you generate radio parameters by internally utilizing measurement data collected from a client walkabout and AP radio scanning. RM Assisted Configuration recommends optimal radio transmit power, channel selection, and beacon interval (optional), and then applies these configuration settings to the APs, if desired.

How It Works

RM Assisted Configuration uses data collected from client walkabouts and AP radio scans to calculate the optimal settings for the APs. You select the AP or group of APs that you want to include in the configuration task.

Data Produced

RM Assisted Configuration recommends optimal radio transmit power, channel selection, and beacon interval (optional) for the APs.

You can also use the Assisted Site Survey Wizard, which is part of Location Manager, to generate radio parameters (see Using the Assisted Site Survey Wizard, page 10-22).

Understanding Auto Re-Site Survey

Auto Re-site Survey extends the Radio Manager Assisted Site Survey Wizard functionality. It periodically evaluates the current AP radio performance on a per-floor basis against baselined performance data and alerts the user when the performance falls below a preset threshold.

How It Works

The Auto Re-Site Survey option uses data collected from previous RM Assisted Configuration jobs. The Auto Re-Site Survey option compares the current performance of the selected APs against the performance data collected the last time radio parameter generation was generated for the specified APs and applied to the specific floor. If the APs' radio performance has decreased by 20% (user-configurable), a fault is generated and you are asked if you want to generate new radio parameters. The new radio parameters are compared against the existing data, and if the newly generated radio parameter yield better results, you can apply the new radio parameters to the selected APs.

Data Produced

Auto Re-Site Survey generates a fault if the radio performance of the specified floor decreases by the percentage you specify. In addition, Auto Re-Site Survey allows you to generate new radio parameters and apply those parameters to the APs of the specified floor. (See Auto Re-Site Survey Details, page 2-20.)

Understanding Self Healing

Self Healing automatically adjusts the transmit power of APs to compensate for any loss of coverage in the event of a network failure. If the Radio Manager determines that an AP is down, Radio Management automatically adjusts neighboring AP interfaces to cover the potential areas of lost coverage.

How It Works

Self Healing performs two actions:

- Monitors the floor

  Self Healing uses path loss data collected from AP Radio Scan and Radio Monitoring to determine a set of radio links for monitoring purpses. If all monitored links to a given AP are missing for more than three measurement report intervals and the AP was not administratively shut down, a self healing event is triggered.

- Takes action if an AP is determined to be down

  Using the information previously gathered from AP Radio Scans and Radio Monitoring, Radio Manager adjusts the transmit power levels of neighboring APs, which might or might not be on the same floor as the failed AP, to eliminate or compensate for any loss of coverage due to the failed AP. Self Healing modifies the power setting only, not the channel frequency or beacon interval, of the neighboring APs.

Note Because Self Healing can change APs on different floors from the failed AP to cover any hole in coverage, but must do so without changing the channel frequency, the network might be operating in a sub-optimal manner. You should enable Auto Re-Site Survey (see Using Auto Re-Site Survey, page 9-69) and Self Healing on the surrounding floors as well.

Self healing is *not triggered* under the following conditions:

- When you are adjusting your network and you administratively shut down an AP's radio. Because this is an administrator-controlled operation, WLSE does not perform self healing on the network. In this case, when the device is re-enabled, all APs will still retain their original settings.
- When you are adjusting the power settings or channel settings.

Specifying Backup WDSs For Self Healing

The WDS provides WLSE with the data it needs to determine if a radio is up. If all the WDSs configured for the APs on a floor are down (non-operational), self healing might try to heal those APs due to the missing data.Therefore, all the APs on a floor configured with self healing should be registered with WDSs that have at least one backup. If a WDS goes down and there are no backups, self healing might try to heal every AP that was registered with that WDS.

Note If you have self healing enabled, you must specify one or more backup WDSs. However, any AP can be used as a backup WDS, you can have more than one backup, and your backups can have backups. For more information about configuring WDS APs, see the *Installation and Configuration Guide for the CiscoWorks Wireless LAN Solution Engine*.

Data Produced

When the Self Healing function detects a network failure, a new fault is generated. (See Self Healing Monitoring Details, page 2-21.)

Understanding Scanning-Only AP Mode

Scanning-Only AP mode puts a radio interface in a dedicated mode monitoring the air space surrounding it without carrying any regular WLAN user traffic. Scanning APs:

- Function in a "listen-only" mode that does not allow client associations.
- Monitor the radio environment by looking for rogue APs and unassociated clients.
- Detect unassociated clients vulnerable to "bug light", or potential association to unauthorized APs.

Note For information about the APs and firmware versions for which Scanning-Only AP mode is supported, see the *Supported Devices Table for the CiscoWorks Wireless LAN Solution Engine, Release 2.7*.

How It Works

Scanning-Only AP mode can be enabled on a per-radio interface. If an AP contains two or more radio interfaces, each interface can be configured into Scanning-Only AP mode or any other mode independent of other radio interfaces.

A fault is generated when WLSE detects any unregistered clients. The fault report shows all detected unregistered clients that have not been acknowledged and cleared by the administrator.

Note This release only detects clients using a null SSID to probe the network.

Scanning-Only AP mode can be used for rogue AP detection; the fault that is generated is the same as when a regular AP or client detects a rogue AP. Because the Scanning-Only AP dedicates itself in the radio monitoring mode, however, it can detect rogue devices more reliably and faster than a regular AP or client.

Viewing Radio Manager Faults

The fault monitoring feature queries managed devices for specific data, compares this data against thresholds, and declares faults when the thresholds have been crossed. When the Radio Manager detects interference or an unknown AP, a fault is generated. or more information about managing radio management faults, see Displaying Faults, page 2-6.

Viewing Radio Management Reports

The following Radio Manager reports contain useful information about your WLAN radio environment:

- Configured Radio Parameters Report—See Displaying a Configured Radio Parameters Report, page 8-18.

- Path Loss Between Managed APs Report—See Displaying a Path Loss Between Managed APs Report, page 8-20.
- Channel Loading Report—See Displaying a Channel Loading Report, page 8-22.

To view, export, and email these reports, select **Reports > Radio Manager**. For more information about displaying Radio Manager reports, see Displaying Radio Manager Reports, page 8-18.

The following reports contain useful information about the type of client that is associating with an access point, how much bandwidth the client is using, and a history of with which access points the client has been associated:

- Wireless Client Details Report—See Displaying a Client Detail Report, page 8-24
- Wireless Client Statistics Report—See Displaying a Client Statistics Report, page 8-27
- Wireless Client Historical Association Report—See Displaying a Client Historical Association Report, page 8-29
- Wireless Client Access Failure Report—See Displaying a Client Access Failure Report, page 8-32

To view, export, and email these reports, select **Reports > Wireless Clients**.

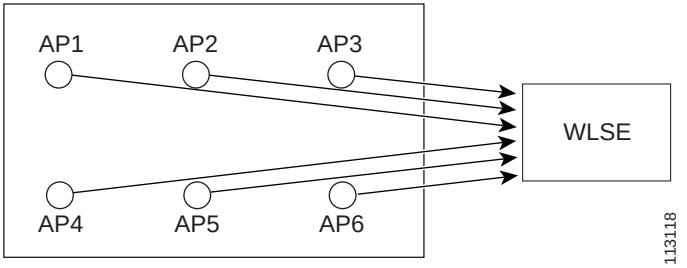
What is WDS and Why Do I Need To Use It?

The critical software component in the network is a set of IOS features called the Wireless Domain Services (WDS). The WDS provides control path technologies that must be active on an AP in each AP subnet; a backup WDS can also be defined in each AP subnet. The WDS provides:

- Fast, secure layer-2 wireless client roaming—The WDS acts as an 802.1x authenticator for wireless clients within the layer-2 network.
- Radio Management (RM) data aggregation—The WLSE provides intelligent processing of aggregated data collected by the WDS access points from other wireless clients in the network. The WLSE can manage multiple subnets, so it can receive radio data from many APs running WDS.

Caution The WLSE must register with the WDS in each managed AP subnet to receive Radio Manager data. If the WLSE is not registered, *none of the Radio Manager functions will work.*

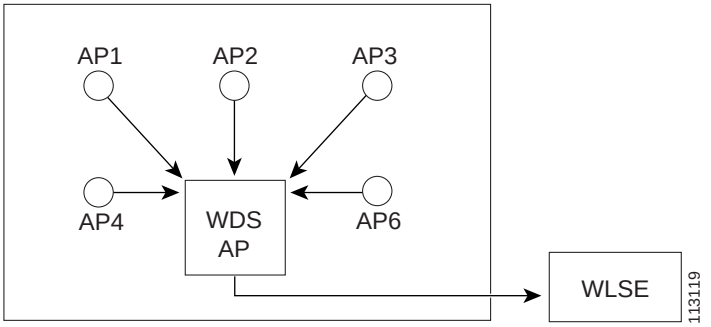
When you set up WLSE to manage the APs (the basic network management configuration), your network looks something like this:



Using this approach, the WLSE can communicate with the APs using only these two methods:

- Primary: SNMP
- Secondary: CLI over telnet or SSH

After you configure the network for Radio Management tasks (see Getting Started with Radio Manager, page 9-2), the same network would look like this:



Now the WLSE communicates all Radio Management activities with one or more WDS APs instead of all APs in the network. The WDS APs collect data from other wireless clients in the network and send this aggregated data to the WLSE.

Understanding Radio Performance—Coverage and Capacity

The Radio Manager:

- Divides the BSS (802.11 Basic Service Set) coverage area into radio performance regions

  Each region is defined by the rough degree of contention and packet collisions experienced by clients in the region due to traffic outside of the BSS.

- Quantifies the performance within each region

  The inter-BSS contention and collision translates into performance degradation, which the Radio Manager estimates for all potential clients within the region.

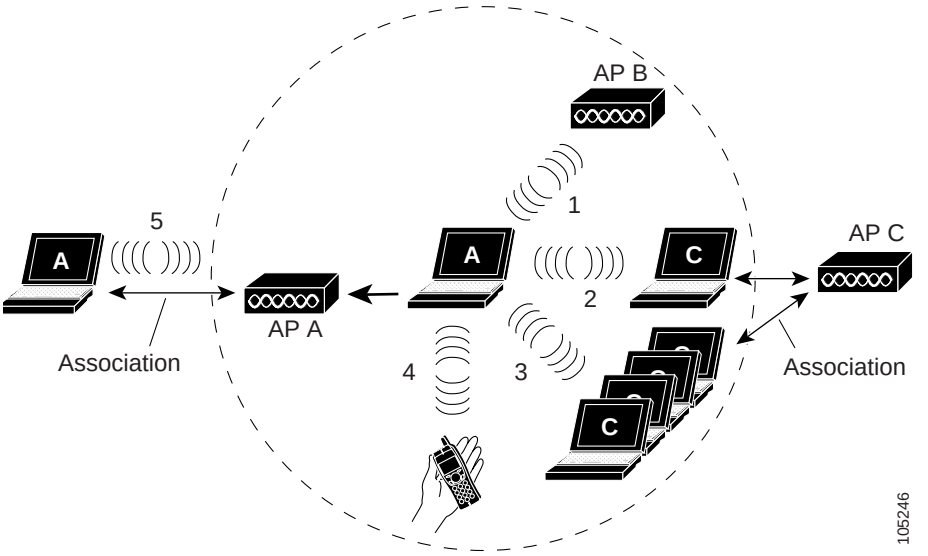
- Takes the region sizes into account and estimates the performance in each BSS and across the WLAN

  The types and sizes of performance regions determine the expected maximum, minimum, and average performance of a particular domain.

AP/Client Relationships

The Radio Manager acquires knowledge of the WLAN radio environment from measurements obtained from Cisco APs and Cisco clients. Figure 9-2 illustrates the relationships between three APs and their clients.

Figure 9-2 AP/Client Relationships



In this example, the measuring client and one other client are associated with AP A, but neither client detects the other AP's signal. AP B is close enough to be detected by the measuring client, and AP C is out of range, but the measuring client does detect some of AP C's associated clients. Table 9-3 describes these relationships in more detail.

Table 9-3 AP/Client Relationships

Item	Description
1	The measuring client identifies access point B as a source of 802.11 contention.
2	The measuring client detects contention from a client in another BSS and identifies access point C as the BSS access point.
3	The measuring client reports significant contention due to clients in another BSS. Access point C is identified as the BSS access point.
4	The measuring client indicates intermittent non-802.11 interference and describes the statistics of its received strength.

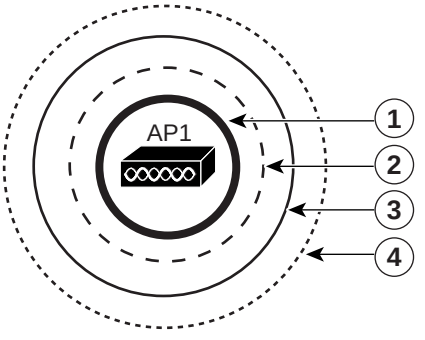
Table 9-3 AP/Client Relationships (continued)

Item	Description
5	The measuring client identifies another client in its BSS that appears to be hidden from it.

Radio Performance Regions

Radio performance regions within a BSS depend on the placement and transmit power of other co-channel APs. The transmit power of a BSS defines a set of RF reception rings around its AP (see Figure 9-3).

Figure 9-3 RF Reception Rings



1	Planned BSS coverage	3	Uplink may be decodable
2	Downlink RF influence	4	Uplink RF influence

Two rings correspond to the downlink:

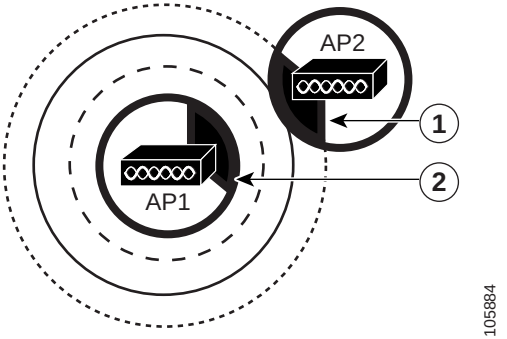
- The **planned BSS coverage ring** (1) corresponds to the area in which clients can reliably receive the downlink signal.
- The **downlink RF influence ring** (2) corresponds to the area in which reception is difficult, but the downlink signal may still contend or collide with a downlink from another AP on the same channel.

Two similar rings correspond with areas of reception and the RF influence emanating from a client positioned at the edge of the BSS coverage ring. The significant ring, the **uplink RF influence ring** (4), corresponds to the signal that originates from a client sending packets up to its AP.

Uplink Contention Regions

In Figure 9-4, AP1 and AP2 share the same channel. AP2 is examined as the BSS of interest, while AP1 is the cochannel neighbor. The highlighted performance region corresponds with an area in which BSS2 clients must contend with traffic from BSS1. The source of contention is shown as a set of clients in BSS1 near the edge of their planned coverage ring. This is known as uplink contention because it delays uplink traffic from clients to their AP.

Figure 9-4 Sample Performance Region



1	BSS2 performance region: AP2 clients that experience contention from AP1's clients
2	Source of contention: AP1 clients that cause the contention.

If AP2 has neighbors sharing the same channel on all sides, then similar uplink contention regions are defined in the direction of each neighboring AP. If any of these neighbors is closer than the one shown in Figure 9-4 or uses a higher power limit, then the uplink contention region is larger than shown in the figure. If clients of the neighboring BSSs are close enough to be detected by AP2, then AP2 experiences downlink contention due to the clients' traffic.

The BSS may also contain regions in which a client receives traffic that has collided with packets from another station. This occurs when the intended source and interfering source do not detect each other, which happens when:

- Stations in the same BSS are hidden from each other.

  This situation can be remedied by blocking out time for an access point using RTS/CTS (request-to-send, clear-to-send) commands.

- A client in a neighboring BSS is within range of the client of interest but is not detected by the latter client's AP.

  This situation is an inter-BSS interference problem that could exist in any dense WLAN and *cannot* be remedied with RTS/CTS. One goal of the Radio Manager is to minimize its occurrence with a good radio configurations.

Types of Radio Measurements

The following topics describe the radio measurements and the benefits they provide to the Radio Manager:

- Beacon Measurements, page 9-24
- CCA Measurements, page 9-25
- RPI Histogram Measurements, page 9-25

Beacon Measurements

Beacon measurements are used to discover and monitor the presence of neighboring APs, regardless of whether they are controlled by the Radio Manager. This helps the Radio Manager characterize the overlap of co-channel BSSs and the redundancy of other-channel BSSs on the downlink.

The transmitting station address identifies the neighbor AP to the Radio Manager. The signal strength helps the Radio Manager assess the overlap of cochannel BSSs and the coverage redundancy of other-channel BSSs.

Contents

Received strength, identity, and body of neighbor AP beacon or probable response.

Benefits to AP Scan & Client Walkabout

Measure radio connectivity of APs and characterize potential BSS downlink coverage.

Benefits to Normal Operations

Identify specific sources of 802.11 contention, monitor known APs, detect new APs, roughly locate clients, determine path loss, and detect rogue APs.

CCA Measurements

CCA (Clear Channel Assessment) measurements, which can be collected on a serving or non-serving channel, characterize the degree of 802.11 contention at the location of the reporting STA. They are used to determine how heavily a channel is loaded.

CCA measurements include the CCA Busy Fraction, which measures the accumulated duration of all packets divided by the measurement interval length. This value includes successful packets and erroneous packets. The value range is 0 to 255, where 0 represents no traffic and 255 represents traffic occurring 100% of the time.

Contents

Fraction of time that STA observes channel busy with 802.11 traffic.

Benefits to AP Scan & Client Walkabout

Find channels already busy with 802.11 traffic to avoid in radio configuration.

Benefits to Normal Operations

Characterize degree of 802.11 contention at the location of the reporting STA.

RPI Histogram Measurements

Received Power Indicator (RPI) Histogram measurements can be collected on a serving or non-serving channel. The RPI Histogram data provides a measure of RF energy due to a combination of background noise and background signals, including non-802.11 devices and 802.11 devices whose signals cannot be properly decoded. The histogram helps the Radio Manager assess the

non-802.11-decodable RF energy contending with the WLAN at different locations. This information helps the Radio Manager decide the best channel for each BSS in the vicinity of the measuring STA.

Contents

Received strength and statistics of non-802.11 radio frequency energy.

Benefits to AP Scan & Client Walkabout

Find channels with non-802.11 radio frequency energy to avoid in radio configuration, if possible.

Benefits to Normal Operations

Monitor for new non-802.11 radio frequency energy and alarm, if necessary.

Collecting Radio Location Data

Radio location measurements characterize the radio environment and provide the information other Radio Manager features require to determine the channels and power limits for each BSS. To gather these measurements, the Radio Manager provides these procedures:

Table 9-4 Radio Manager Data Collection Procedures

RM Feature	Description	References
AP Radio Scan	APs transmit beacons on the same channel and detect all neighboring APs	Understanding AP Radio Scans, page 9-7 Using AP Radio Scans to Collect RM Data, page 9-28
Client Walkabout (optional, but recommended)	Client walks desired coverage area and reports all detected APs	Understanding Client Walkabouts, page 9-9 Using Client Walkabouts to Collect RM Data, page 9-39
Radio Monitoring	Periodically gather RF statistics and identify specific signal sources	Understanding Radio Monitoring, page 9-10 Using Radio Monitoring to Collect RM Data, page 9-52

Note The Assisted Site Survey wizard can also walk you through the process of determining the optimal radio transmit power and channel selection. It helps you select APs, run an AP radio scan job, perform a client walkabout, and generate radio parameters for the selected APs. For more information about this wizard, see Using the Assisted Site Survey Wizard, page 10-22.

Related Topics

- Deleting RM Measurements, page 9-54

Using AP Radio Scans to Collect RM Data

The AP Radio Scan feature produces path loss data used for rogue location estimations, radio parameter generation data, and coverage display data. You should run an AP radio scan during initial setup, then periodically during brief maintenance periods when the WLAN is not in use (for example, 2:00AM) to capture any changes made to the APs (for example, when APs are added, deleted, or moved).

Note A running scan job temporarily degrades wireless LAN service, which might affect client associations. To minimize any disruption, schedule scan jobs to run during off-hours.

AP Radio Scan allows you create, view, and manage AP radio scan jobs. Use this procedure to:

- Specify a group of APs that will participate in the scan procedure.
- Schedule a new job to run immediately or at a certain date and time. You can also specify whether this job will run only once or periodically.

These topics describe the procedures for managing AP Radio Scan jobs:

- Creating a New AP Radio Scan Job, page 9-33
- Viewing AP Radio Scan Jobs, page 9-29
- Managing AP Radio Scan Jobs, page 9-31

Related Topics

- Understanding AP Radio Scans, page 9-7

Viewing AP Radio Scan Jobs

Note Your login determines whether you can use this option.

Before You Begin

Before you can collect data using AP Radio Scan, you must have already:

- Configured your network for radio management (see Getting Started with Radio Manager, page 9-2)

Procedure

Step 1 Select **Radio Manager > AP Radio Scan**. The AP Radio Scan screen appears.

Step 2 From the Job State list, select the type of job you want to view:

- **Scheduled**—Lists all AP radio scan jobs that have been scheduled
- **Unscheduled**—Lists all AP radio scan jobs that have not been scheduled
- **Running**—Lists all AP radio scan jobs that are currently running
- **All**—Lists all AP radio scan jobs

The screen refreshes to show you details about the specified jobs. The information displayed depends on the selected job state:

Table 9-5 Job Details—Scheduled and Unscheduled

Field	Description
Job Name	The job name.
Recurring	Indicates if the job is run periodically (Yes or No).
Next Schedule	For scheduled jobs, this indicates when the job will run. For completed jobs, this is the time the job ran.
Owner	The user who last edited the job.

Table 9-6 Job Details—Running

Field	Description
Job Name	The job name.
Recurring	Indicates if the job is run periodically (Yes or No).
Job Start Time	The time the job started.
Percent Complete	The percent of the job that has completed running.
Next Schedule	Firmware jobs are not recurring.
Owner	The user who last edited the job.

Table 9-7 Job Details—All

Field	Description
Job Name	The job name.
Recurring	Indicates if the job is run periodically (Yes or No).
Job State	The state of the job. **Note** A job in the DidNotStart state must be rescheduled.
Next Schedule	For scheduled jobs, this indicates when the job will run. For completed jobs, this is when the job ran.
Last Run Status	The status of the job the last time it was run.
Owner	The user who last edited the job.

Step 3 To sort table data, click on the corresponding heading (see Sorting Table Data, page 1-13).

Step 4 From this window, you can manage your AP radio scan jobs (see Managing AP Radio Scan Jobs, page 9-31).

Related Topics

- Understanding AP Radio Scans, page 9-7

Managing AP Radio Scan Jobs

The buttons below the table of AP radio scan jobs (see Viewing AP Radio Scan Jobs, page 9-29) allow you to manage these jobs.

Note Your login determines whether you can use these options.

Before You Begin

Before you can collect data using AP Radio Scan, you must have already:

- Configured your network for radio management (see Getting Started with Radio Manager, page 9-2)

Procedure

Step 1 Select **Radio Manager** > **AP Radio Scan**. The AP Radio Scan screen appears.

Step 2 From the Job State list, select the type of job you want to manage. The screen refreshes to show the corresponding jobs.

Step 3 Click the radio button for the job you want to manage, then click one of the buttons that appear after the list of jobs:

- **Filtering Jobs**

  The **Filter** button displays a limited set of AP radio scan jobs, making it easier to search for a particular job by name. The filter remains in effect until the page is refreshed.

  Note You can use % as a wildcard: for example, entering %name% displays all the jobs that contain the word “name.”

- **Editing Jobs**

  Use the **Edit** button to edit jobs from the displayed list of jobs.

  Note If you have deleted the image that was associated with the job you are editing, the job will show that no image has been selected.

- **Stopping a Running Job**

  Use the **Stop** button to stop a running AP Radio Scan job.

- **Deleting a Job**

  Use the **Delete** button to delete jobs from the displayed list of jobs. Jobs that are scheduled, unscheduled, completed, or did not start can be deleted. Jobs that are running cannot be deleted.

- **Copying a Job**

  Use the **Copy** button to create a new job using the data (maximum transmit power and selected APs) from a previously-created job.

  Note This option does *not* copy the schedule data.

- **Viewing the Job Run Log**

  Use the **Job Run Log** button to view the run log for a selected job. The Job Runs table appears in a separate browser window.This table contains the following information for each run:

Field	Description
Select Run	Select this button to see the details for that run. The details for the selected job run appear below the list of runs for that job.
Job Start Time	The time the job started.
Job End Time	The time the job ended.
Job Status	The status of the job.
Percent Complete	The percent of the job that completed.

  The job run log appears below this table. To view the details for a different job run, select another run and click **Job Run Log**.

- **Refreshing the Job List**

  To make sure you are looking at the latest information after you have made changes to one or more AP radio scan jobs, click the **Refresh** button to refresh the job list.

Related Topics

- Understanding AP Radio Scans, page 9-7

Creating a New AP Radio Scan Job

Note Your login determines whether you can use this option.

Before You Begin

Before you can run an AP Radio scan job, you must have already:

- Configured your network for radio management (see Getting Started with Radio Manager, page 9-2)

Procedure

Step 1 Select **Radio Manager > AP Radio Scan**.

Step 2 Enter a name for the job and click **New Job**. For guidelines on job names, see Appendix B, "Naming Guidelines."

The window refreshes with the Job Creation menu in the left pane and the Job Name dialog box in the right pane.

Caution Clicking on any subtab (for example, Radio Monitoring or Client Walkabout) before you have saved your entries in the Job Creation window will reset the window and you will lose all the information you entered.

Step 3 Select the following numbered choices in the left pane to create and run the AP radio scan jobs:

Note These steps, except Schedule Job, must be completed, but do not have to be done in order. You can omit scheduling the job and edit the job later to provide a schedule.

1. Job Name—See Name the Job and Select the Maximum Transmit Power, page 9-34.

2. Select AP—See Select the APs, page 9-35.

3. Filter By PHY—See Select Radio Types, page 9-35.

4. Schedule Job—See Schedule the Job, page 9-36.

5. Finish—See Finish the Job, page 9-37.

Related Topics

- Understanding AP Radio Scans, page 9-7

Name the Job and Select the Maximum Transmit Power

Procedure

Step 1 Click **Job Name.**

Step 2 Enter the following information:

Field	Description
Job Name	Enter a unique name for the job. For guidelines on naming jobs, see Appendix B, “Naming Guidelines.”
Description	Enter a description of the job. For guidelines on entering descriptions, see Appendix B, “Naming Guidelines.”
Maximum Transmit Power	You can choose to enter a lower power setting when, for example, the default power level might affect a neighboring network.

Step 3 From the menu in the left pane, go to the next step, Select the APs.

Related Topics

- Understanding AP Radio Scans, page 9-7

Select the APs

Procedure

Step 1 Click **Select AP.** All managed devices are listed in the Device selector in the middle pane.

Step 2 Select the devices you want to include in the job (see Using the Device Selector and Search, page 1-11).

Step 3 From the menu in the left pane, go to the next step, Select Radio Types.

Related Topics

- Understanding AP Radio Scans, page 9-7

Select Radio Types

Procedure

Step 1 Click **Filter By PHY.**

Step 2 Select the type of 802.11 radio that will perform the AP radio scan. By default, both options (11a and 11b/11g) are selected.

Note Only radios of the selected types will take part in the scan. If a selected AP has no interfaces of the desired radio types, this is noted in the job run log.

Step 3 From the menu in the left pane, go to the next step, Schedule the Job.

Related Topics

- Understanding AP Radio Scans, page 9-7

Schedule the Job

When scheduling an AP radio scan job, you can:

- Create multiple scan jobs, but only one job can be run at a time.
- Select **Run Now** to start the job immediately, or you can schedule the job for a future date and time.
- Save a job without scheduling it, then edit the job later to add the scheduling information.

Note A running scan job temporarily degrades wireless LAN service, which might affect client associations. To minimize any disruption, schedule scan jobs to run during off-hours.

Procedure

Step 1 Click **Schedule Job.**

Step 2 Enter the following information:

Field	Description
Run Now	Click to run the job. The job will run immediately after you click **Save** (see Finish the Job, page 9-37). **Note** This option ignores all of the other scheduling options (Start Date, Start Time, and Repeat).
Start Date	From the lists, select the month, day, and year you want your job to run.
Start Time	From the list, select the hour and minutes of the day you want your job to run.
Repeat	

Field	Description
Enable	Check to run the job repeatedly.
Every	Indicate how often you want the job to repeat by entering a numerical value, then selecting an interval of time: Hours, Days, Weeks, or Months. **Note** Selecting this option runs the job periodically, starting with the date and time that you entered in the Start Date and Start Time lists.

Step 3 From the menu in the left pane, select the next task, Finish the Job.

Related Topics

- Understanding AP Radio Scans, page 9-7

Finish the Job

Before selecting this option, you must name the job, select the maximum transmit power, and select the devices. You do not have to complete the scheduling information—you can save a job without scheduling it, then edit the job later to add the schedule.

Procedure

Step 1 Click **Finish** in the left pane to complete job creation.

Step 2 Click **Save** to add the job to the list of scheduled jobs or run the job now, depending on whether you scheduled the job for a later time or chose Run Now in the scheduling screen.

Note If a warning message appears saying that WLSE server is ahead of or behind your local time, see Understanding Time Discrepancy Problems in Job Scheduling, page 1-10.

The screen refreshes and the AP Radio Scan Job Save Summary window shows the following information:

Field	Description
Name	Name of the job.
Description	Job description, if any.
Maximum Power	The maximum power setting selected for the job.
Selected APs	Names of the devices selected for the job.
Schedule	Scheduled date and time for the job, or *No Schedule* if the job has not been scheduled.

The job stops automatically after all the required APs respond with the appropriate radio measurements.

Step 3 To review the job results, select **Radio Manager > AP Radio Scan > Job Run Log** (see Managing AP Radio Scan Jobs, page 9-31).

Step 4 To stop the job manually, see Managing AP Radio Scan Jobs, page 9-31.

Step 5 After the AP Radio Scan has completed successfully, you can either:

a. Run a client walkabout (see Using Client Walkabouts to Collect RM Data, page 9-39).

b. Configure your APs (see Using RM Assisted Configuration, page 9-56).

Related Topics

- Understanding AP Radio Scans, page 9-7

Using Client Walkabouts to Collect RM Data

Client Walkabout measurements can help determine AP coverage, and are used to provide optimal coverage for the radio parameter generator.

Tip If you do not perform a client walkabout, you *must* enter a floor plan that includes the distances between APs (see Adding Building Information, page 10-6).

Caution When you set up your APs, do not enable the option in the ACU (Aironet Client Utility) that periodically scans for a better AP if the threshold is below a specified value. This feature conflicts with the Radio Manager options.

Client Walkabout allows you create, view, and manage client walkabout jobs. Use this procedure to:

- Specify a group of APs that will participate in the walkabout.
- Start and stop a client walkabout.

These topics describe the procedures for managing Client Walkabout jobs:

- Viewing Client Walkabouts, page 9-40
- Managing Client Walkabout Sessions, page 9-41
- Creating a New Client Walkabout, page 9-43
- Guidelines for Running a Client Walkabout, page 9-49
- Running the Walkabout, page 9-51

Related Topics

- Understanding Client Walkabouts, page 9-9

Viewing Client Walkabouts

Use the default Client Walkabout screen to view client walkabout jobs.

Note Your login determines whether you can use this option.

Before You Begin

Before you can collect data using Client Walkabout, you must have already:

- Configured your network for radio management (see Getting Started with Radio Manager, page 9-2)

Procedure

Step 1 Select **Radio Manager > Client Walkabout**.

Step 2 From the Client Walkabout State list, select the type of walkabout you want to view (Running or All). The window refreshes and the walkabouts are displayed.

Field	Description
Name	The client walkabout name.
Status	The status of the walkabout.
Last Run Started	The time the last run of this client walkabout was started.
Last Run Stopped	The time the last run of this client walkabout was stopped.
Owner	The user who last edited the job.

Step 3 To sort table data, click on the corresponding heading (see Sorting Table Data, page 1-13).

Step 4 From this window, you can manage your client walkabout jobs (see Managing Client Walkabout Sessions).

Related Topics

- Understanding Client Walkabouts, page 9-9

Managing Client Walkabout Sessions

The buttons below the table of client walkabout sessions (see Viewing Client Walkabouts, page 9-40) allow you to manage these sessions.

Note Your login determines whether you can use these options.

Before You Begin

Before you can collect data using Client Walkabout, you must have already:

- Configured your network for radio management (see Getting Started with Radio Manager, page 9-2)

Procedure

Step 1 Select **Radio Manager > Client Walkabout**.

Step 2 From the Client Walkabout State list, select the type of walkabout you want to manage (Running or All). The screen refreshes to show the corresponding sessions.

Step 3 Click the radio button for the session you want to manage, then click one of the buttons that appear after the list of client walkabouts:

- **Edit**—Allows you to edit the selected walkabout.
- **Delete**—Deletes the selected walkabout from the displayed list of walkabouts. Walkabouts that are running cannot be deleted.
- **Start**—Starts the selected client walkabout.
- **Stop**—Stops the selected running walkabout.
- **Detailed**—Allows you to view the details of the selected client walkabout.

  The Client Walkabout Details window shows the following information:

Field	Description
Name	Name of the walkabout.
Description	Walkabout description, if any.
Power Mode	AP power setting selected for the walkabout.
Max. Power	The value of the AP power setting. This field is populated only if you entered a value in Use No More Than __ mW (see Enter Walkabout Options, page 9-47).
Selected APs	Names of the AP devices selected for the walkabout.
Client MAC Address	The list of client MAC addresses to be used during the walkabout.
Status	The status of the walkabout.
Last Run Started	The time the last run of this client walkabout was started.
Last Run Stopped	The time the last run of this client walkabout was stopped.

- **Walkabout Details—**Allows you to view the AP locations collected during a client walkabout session.

Note AP location information is available only for the *most recently completed* walkabout. If a new walkabout session is in progress, this information is not available for the latest completed walkabout.

The Client Walkabout Details window shows the following information:

Field	Description
AP Name	The name of the access point
IP Address	The IP address for that access point.
Number of Location Data	The number of location data points collected for that access point.

- **Refresh—**Allows you to refresh the list of walkabouts to make sure you are looking at the latest information.

Related Topics

- Understanding Client Walkabouts, page 9-9

Creating a New Client Walkabout

Note Your login determines whether you can use this option.

Before You Begin

Before you can collect data using Client Walkabout, you must have already:

- Configured your network for radio management (see Getting Started with Radio Manager, page 9-2)
- Configured the walkabout client to associate with the APs selected for the walkabout.
- Reviewed the guidelines for creating a client walkabout (see Guidelines for Running a Client Walkabout, page 9-49).

Procedure

Step 1 Select **Radio Manager** > **Client Walkabout**.

Step 2 Click **New**.

The window refreshes with the Client Walkabout menu in the left pane and the Client Walkabout Name dialog box in the right pane.

Caution Clicking on any subtab before you have saved your entries in the Job Creation window will reset the window and you will lose all the information you entered.

Step 3 Select the following numbered choices in the left pane to create a client walkabout:

Note All these steps must be completed, but do not have to be done in order.

1. **Name**—See Name the Walkabout, page 9-45.
2. **Select AP**—See Select the APs, page 9-45.
3. **Filter By PHY**—Select Radio Types, page 9-46
4. **Enter Client MAC**—See Enter Client MAC Addresses, page 9-47.
5. **Options**—See Enter Walkabout Options, page 9-47.
6. **Finish—**See Finish Creating the Walkabout, page 9-48.

Step 4 To run the client walkabout, see Running the Walkabout, page 9-51.

Related Topics

- Understanding Client Walkabouts, page 9-9

Name the Walkabout

Procedure

Step 1 Click **Name.**

Step 2 Enter the following data:

Field	Description
Job Name	Enter a unique name for the walkabout. To make each session easy to identify, consider including the floor number or a similar identifier in the job name. For additional naming convention guidelines, see Appendix B, "Naming Guidelines."
Description	Enter a description of the walkabout. For guidelines on entering descriptions, see Appendix B, "Naming Guidelines."

Step 3 From the menu in the left pane, go to the next step, Select the APs.

Related Topics

- Understanding Client Walkabouts, page 9-9

Select the APs

Procedure

Step 1 Click **Select AP.** All managed devices are listed in the Device selector in the middle pane.

Step 2 Select the APs you want to include in the session (see Using the Device Selector and Search, page 1-11).

Note In each walkabout session, include only the APs on that floor (see Guidelines for Running a Client Walkabout, page 9-49).

Step 3 From the menu in the left pane, go to the next step, Select Radio Types.

Related Topics

- Understanding Client Walkabouts, page 9-9

Select Radio Types

Procedure

Step 1 Click **Filter By PHY.**

Step 2 Select the type of 802.11 radio that will perform the client walkabout. By default, both options (11a and 11b/11g) are selected.

Note Only radios of the selected types will take part in the walkabout. If a selected AP has no interfaces of the desired radio types, this is noted in the Job Run Log.

Step 3 From the menu in the left pane, go to the next step, Enter Client MAC Addresses.

Related Topics

- Understanding Client Walkabouts, page 9-9

Enter Client MAC Addresses

Procedure

Step 1 Click **Enter Client MAC.**

Step 2 Enter the 802.11 MAC addresses for up to five clients, or select up to five MAC addresses from the Most Recent pulldown list. These are the clients that will move around during the walkabout.

Note Entering a MAC address that consists of more than 12 characters will generate an error message.

Step 3 From the menu in the left pane, select the next task, Enter Walkabout Options.

Related Topics

- Understanding Client Walkabouts, page 9-9

Enter Walkabout Options

During a walkabout, the transmit power in the APs is increased so that the power required to cover the edges of the WLAN can be determined. Use this option to reset the maximum transmit power level used by the APs.

Procedure

Step 1 Click **Options.**

Step 2 Select the AP power setting.

You can choose to enter a lower power setting when, for example, the default power level might affect a neighboring network.

Step 3 From the menu in the left pane, select the next task, Finish Creating the Walkabout.

Related Topics

- Understanding Client Walkabouts, page 9-9

Finish Creating the Walkabout

Before selecting this option, you must name the walkabout, select the devices, enter the client MAC addresses, and choose the AP power setting option.

Procedure

Step 1 Click **Finish** in the left pane.

Step 2 Click **Save** to add the walkabout to the list of client walkabouts.

Note If a warning message appears saying that WLSE server is ahead of or behind your local time, see Understanding Time Discrepancy Problems in Job Scheduling, page 1-10.

The screen refreshes and the Client Walkabout Summary window shows the following information:

Field	Description
Name	Name of the walkabout.
Description	Walkabout description, if any.
Power Mode	AP power setting selected for the walkabout.
Maximum Power	The value of the AP power setting. This field is populated only if you entered a value in Use No More Than __ mW (see Enter Walkabout Options, page 9-47).
Devices	Names of the AP devices selected for the walkabout.
Client MAC Address	The list of client MAC addresses to be used during the walkabout.

Step 3 To run the walkabout, see Running the Walkabout, page 9-51.

Related Topics

- Understanding Client Walkabouts, page 9-9
- Guidelines for Running a Client Walkabout, page 9-49

Guidelines for Running a Client Walkabout

Although there is no limit to the number of APs that may participate in a walkabout and no performance impact when you include a large number of APs, the total number of *data points* collected during a walkabout session does affect the processing time of RM Assisted Configuration—the more data points, the longer it takes to calculate the parameters.

To set the coverage area, walk the client (the laptop) around the area. Use these guidelines as you walk:

- Walk at a slow, measured pace. The client takes measurements every 10 seconds, so if you walk too quickly, you will not collect enough data points.
- Walk the edges of the network.
- Emphasize areas where you want coverage, such as conference rooms and other enclosed areas.
- When you have finished collecting the data, *stop the walkabout.* The client will continue taking measurements if you do not explicitly stop the process.
- Client walkabout data collection is cumulative, so you can stop and start as often as necessary.
- To delete the current client walkabout data, use the Manage RM Measurements tab (see Deleting RM Measurements, page 9-54).

To minimize the time it takes to calculate the radio parameters, try to use these guidelines when performing the walkabout:

- Walk around the proximity of each AP for which you want coverage for approximately 2 minutes. At a rate of capturing one walkabout location every 10 seconds, this will yield about 12 walkabout locations over a 2-minute period. For a floor that contains 10 APs, this translates to a 20-minute walkabout that covers the perimeter of the floor as well as the areas between different APs.
- If you use the Location Manager's RM Assisted Wizard (see Using the Assisted Site Survey Wizard, page 10-22), you can also see the walkabout results in a table that includes each AP and the number of walkabout locations

that can hear that AP. If a location can hear multiple APs, it will be counted multiple times, once per AP. Therefore, the sum of the total location numbers across all selected APs may be (and almost always is) larger than the total number of actual walkabout locations.

- You can run RM Assisted Configuration either on a per-building or per-floor basis. You will usually get better channel combinations if you run RM Assisted Configuration for an entire building.

  A longer walkabout will generate more location data. Although collecting more location samples can improve the parameter generation results, it will also increase the number of computations. For a floor consisting of the 10 APs described above, a WLSE1105 will take 10 to 12 minutes or less to complete the parameter generation process—*without* other jobs, such as inventory, configuration, discovery, or another Radio Manager task running simultaneously.

  Note Because the WLSE 1130 and WLSE 1130-19 are higher performance products, their parameter generation speed will be significantly better than a WLSE1105.

- For a network that contains both 11a and 11b/g radios (for example, when you are using a AP1200 dual mode AP), both types of radios must participate in a Client Walkabout operation to generate location data. Data collected using the 11b clients during a Client Walkabout is *not usable* for 11a network planning. You can mix the two types of clients together in the same Client Walkabout procedure, but you must collect the Client Walkabout data using both types of clients.

Related Topics

- Understanding Client Walkabouts, page 9-9

Running the Walkabout

When you start a client walkabout, the walkabout session starts immediately and continues until you stop the procedure. Only one client walkabout session can be active at any time.

Note The Client Walkabout feature temporarily degrades wireless LAN service, which might affect client associations. You should run a walkabout session during off-hours to minimize any disruptions to the network.

Before You Begin

- You must have successfully created a client walkabout job (see Creating a New Client Walkabout, page 9-43).

Procedure

Step 1 Take the client (typically a laptop) to the area where the walkabout will be run.

Step 2 Select **Radio Manager > Client Walkabout**. A list of the current Client Walkabout sessions appears.

Step 3 Select the name of the client walkabout session that you want to run from the list.

Step 4 Click **Start**.

Step 5 To set the coverage area, walk the client (the laptop) around the area (see Guidelines for Running a Client Walkabout, page 9-49).

Step 6 When you have finished collecting the data, *stop the walkabout.* Select the walkabout session name from the list and click **Stop**.

Note The client will continue taking measurements if you do not explicitly stop the process.

Step 7 To view the results of the walkabout:

- Click **Detailed** to view walkabout details (see Managing Client Walkabout Sessions, page 9-41.)
- Click **Walkabout Details** to view the AP locations collected during a walkabout (see Managing Client Walkabout Sessions, page 9-41).

- Use the Location Manager to view the results of the walkabout session (see Viewing Your WLAN Radio Environment with Location Manager, page 10-1).

Step 8 After the client walkabout has completed successfully, you are ready to generate the radio parameters and configure your APs (see Using RM Assisted Configuration, page 9-56).

Related Topics

- Understanding Client Walkabouts, page 9-9

Using Radio Monitoring to Collect RM Data

To detect interference and rogue APs, Radio Monitoring must be running.

Tip Leave Radio Monitor continuously running on your network so new APs are discovered promptly, the necessary faults are generated, and your reports are accurate and current.

You can use Radio Monitoring to:

- Specify the serving channel monitoring option (APs, clients, or both)
- Specify the non-serving channel monitoring option (to monitor channels the AP is not transmitting on)
- Specify the group of APs and clients to perform the channel measurements

Note Your login determines whether you can use this option.

Before You Begin

Before you can select devices to be included in radio monitoring, you must have already:

- Configured your network for radio management (see Getting Started with Radio Manager, page 9-2)

Procedure

Step 1 Select **Radio Manager > Radio Monitoring**. The Radio Monitoring Options window appears.

Step 2 Click **Enable** to monitor your WLAN environment.

Step 3 For **Serving Channel Monitoring**, select one or both of the following check boxes for measurements on the channel the devices are configured to:

- **APs** to perform monitoring measurements on the Cisco IOS APs on the serving channel.
- **Clients** to perform monitoring measurements on CCX-compliant clients on the serving channel.

Step 4 For **Non-Serving Channel Monitoring**, select one or both of the following check boxes to measure other channels in the band:

- **APs** to perform monitoring measurements on the Cisco IOS APs on the non-serving channels.
- **Clients** to perform monitoring measurements on CCX-compliant clients on the non-serving channels.

Note Non-serving channel monitoring means that the channels the AP is not transmitting on are monitored. By monitoring non-serving channels, Radio Manager can detect rogue APs that you might not have discovered had it monitored only the channel the AP is transmitting on (the serving channel).

Step 5 For **Client Registration Scanning** select

- **Enable** to enable AP scanning to track client association and probe requests and report the information.
- **Disable** to disable AP scanning.

Note The Client Registration Scanning option is applicable only for an AP in *scanning* mode. When an AP is in scanning mode, it monitors the radio environment by looking for rogue APs and unassociated clients; it does not accept client associations. For more information about scanning APs, see Using Scanning-Only APs, page 9-73.

Step 6 Click **Select AP**. All managed devices are listed in the Device selector in the middle pane.

Step 7 Select the devices you want to monitor (see Using the Device Selector and Search, page 1-11).

Step 8 Click **Filter By PHY** to select the type of 802.11 radio that you want to monitor.

Note Only radios of the selected types are monitored. If a selected AP has no interfaces of the desired radio types, this is noted in the job run log.

Now that you have selected your radio monitoring options, you need to save your settings.

Step 9 Click **Finish**. The Finish dialog box appears.

Step 10 Click **Save** to save your radio monitoring options.

Radio Monitor will now begin monitoring the devices you selected. Radio Monitoring takes measurements every 90 seconds.

Related Topics

- Collecting Radio Location Data, page 9-27
- Understanding Radio Monitoring, page 9-10
- Understanding Scanning-Only AP Mode, page 9-16
- Assigning Scanning AP Network Settings, page 2-87
- Assigning Interference Detection Network Settings, page 2-83

Deleting RM Measurements

Use the Manage RM Measurements tab to delete previously-collected radio location measurements, including links and path loss data. You might need to delete radio location data, for example:

- When APs have been added, deleted, or physically moved.

Note If you run a new AP radio scan, the radio location information for the selected APs is deleted automatically.

- If the number of walkabout locations is slowing down the RM Assisted Configuration. You can use the Location Manager's RM Assisted Wizard (see Using the Assisted Site Survey Wizard, page 10-22), to view the walkabout results, including each AP and the number of walkabout locations that can hear that AP.

Procedure

Step 1 Select **Radio Manager > Manage RM Measurements.**

Step 2 Choose the radio location measurements to be deleted:

- **Delete Radio Measurements**—Deletes the AP radio locations collected during AP radio scans and radio monitoring.
- **Delete Walkabout Measurements**—Deletes the client radio locations collected during client walkabouts.

Step 3 Click **Select Devices.** All managed devices are listed in the Device selector in the middle pane.

Step 4 Select the devices (see Using the Device Selector and Search, page 1-11). Only measurements for the selected devices will be deleted.

Step 5 Click **Filter By PHY.**

Step 6 Select the 802.11 radio types. Only measurements for radios of the selected types will be deleted.

Step 7 Click **Finish** in the left pane. The data for the selected devices and radio types is deleted immediately.

Related Topics

- Understanding the Radio Manager, page 9-6

Generating Radio Parameters

There are two ways you can generate radio parameters and configure your APs:

- Using RM Assisted Configuration, page 9-56

  Use this option when you have collected data from a AP radio scanning and a client walkabout.

- Using the Assisted Site Survey Wizard, page 10-22

  Use this option when you want to use the wizard interface to step through AP radio scan, client walkabout, and radio parameter generation.

Using RM Assisted Configuration

Use RM Assisted Configuration to configure your APs. This feature uses the measurement data collected from a client walkabout and AP radio scanning.

Tip To get optimal channel settings, run RM Assisted Configuration on a per building basis. That is, include all APs in one building in a single RM Assisted Configuration task.

The following topics describe how to run RM Assisted Configuration:

- Viewing Assisted Configuration Tasks, page 9-57
- Managing Assisted Configuration Tasks, page 9-58
- Creating a New Assisted Configuration Task, page 9-59

Viewing Assisted Configuration Tasks

Note Your login determines whether you can use this option.

Procedure

Step 1 Select **Radio Manager > RM Assisted Configuration**. The RM Assisted Configuration screen appears.

Step 2 From the pulldown menu, select what type of configuration tasks you want to view:

- **All**—Lists all configuration tasks
- **Planning**—Lists configuration tasks who's constraints are still being calculated by the RM Assisted Configuration engine.

Note A configuration job stays in the Planning state if something disrupts the network, for example, a server crashes or is restarted.

- **Unscheduled**—Lists all configuration tasks that have not been scheduled
- **Scheduled**—Lists all configuration tasks that have been scheduled
- **Completed**—Lists all completed configuration tasks

The screen refreshes to show you details about the specified configuration tasks. You can sort the configuration tasks by name, status, next schedule, or owner by clicking on the corresponding column heading.

Step 3 From this window, you can manage existing assisted configuration tasks (see Managing Assisted Configuration Tasks, page 9-58).

Managing Assisted Configuration Tasks

The buttons below the list of existing assisted configuration tasks (see Viewing Assisted Configuration Tasks, page 9-57) allow you to manage these tasks.

Note Your login determines whether you can use these options.

Procedure

Step 1 Select **Radio Manager > RM Assisted Configuration**. The RM Assisted Configuration screen appears.

Step 2 From the RM Assisted Configuration pulldown menu, select the configuration tasks you want to edit. The screen refreshes to show the corresponding tasks.

Step 3 Click on the radio button next to the task you want to manage, then click one of the buttons that appear after the lists of tasks:

- **Edit**—Allows you to edit assisted configuration tasks that were previously created.
- **Copy**—Allows you to create a new assisted configuration task that is similar to a previously created configuration task, you can make a copy of an existing configuration task and then make modifications to the copied task.
- **Stop**—Stops the selected configuration task that is currently being processed.
- **Delete**—Allows you to delete assisted configuration tasks that were previously created.
- **Details**—Allows you to view details of selected configuration tasks.
- **Refresh**—Refreshes the list of configuration tasks to make sure you're looking at the latest information. You might also need to refresh the configuration tasks if you have a configuration in the Planning state.

Creating a New Assisted Configuration Task

To configure the power level, channel settings, and beacon interval of an AP or a group of APs, you can use RM Assisted Configuration to configure these parameters. Using AP Scan and Client Walkabout data, RM Assisted Configuration generates optimal values for the radio parameters of a given group of APs.

Tip To get optimal channel settings, run RM Assisted Configuration on a per building basis. That is, include all APs in one building in a single RM Assisted Configuration job.

Note Instead of using RM Assisted Configuration, you can use the Assisted Site Survey Wizard, which walks you through the process of determining the optimal radio transmit power and channel selection. It helps you select APs, run an AP radio scan job, perform a client walkabout, and generate radio parameters for the selected APs. See Using the Assisted Site Survey Wizard, page 10-22.

Note Your login determines whether you can use this option.

Before You Begin

Before you can create a new RM assisted configuration task, you must have already:

- Configured your network for radio management (see Getting Started with Radio Manager, page 9-2)
- Performed an AP Radio Scan (see Using AP Radio Scans to Collect RM Data, page 9-28)
- Performed a Client Walkabout (optional but recommended) or added device information in Location Manager (see Using Client Walkabouts to Collect RM Data, page 9-39 and Viewing Your WLAN Radio Environment with Location Manager, page 10-1).

Procedure

Step 1 Select **Radio Manager > RM Assisted Configuration.** The RM assisted configuration information appears.

Caution Clicking on any subtab (for example, Radio Monitoring or Client Walkabout) before you have saved your entries in the Jobs window will cause the window to reset and you will lose all the information you entered.

Step 2 Enter a task name in the blank field and click **New**. The screen refreshes with the Job Name dialog box in the right pane, and the Task Creation job in the left pane.

Step 3 Select the following numbered choices in the left pane to create a new RM assisted configuration task:

1. Name—See Naming the Configuration Task, page 9-60.

2. Select Devices—See Filtering by PHY, page 9-61.

3. Filter by PHY—Filtering by PHY, page 9-61.

3. Constraints/Goals—See Assigning Constraints and Goals, page 9-62.

4. Calculate Parameters—See Calculating Parameters, page 9-64.

5. Results— See Viewing the Calculated Results, page 9-65.

6. Schedule—See Scheduling the Assisted Configuration, page 9-65.

7. Finish— See Finishing the Task, page 9-66.

Naming the Configuration Task

Procedure

Step 1 Click **Name**.

The screen refreshes so you can enter information about the new task. You'll see the name you entered in the Task Name field.

Step 2 Enter the following information:

Field	Description
Task Name	Enter a unique name for the job. For guidelines on naming jobs, see Appendix B, "Naming Guidelines."
Description	Enter a description of the job. For guidelines on entering descriptions, see Appendix B, "Naming Guidelines."

Step 3 From the menu in the left pane, go to the next step, Selecting Devices.

Selecting Devices

Procedure

Step 1 Click **Select Devices.** All managed devices are listed in the Device selector in the middle pane.

Step 2 Select the devices you want to include in the job. See Using the Device Selector and Search, page 1-11).

Step 3 From the menu in the left pane, go to the next step, Filtering by PHY.

Filtering by PHY

Procedure

Step 1 Click **Filter By PHY**.

Step 2 Select the type of 802.11 radio that you want to include in the assisted configuration task.

Note Only radios of the selected types are included in the assisted configuration task. If a selected AP has no interfaces of the desired radio types, this is noted in the job run log.

Step 3 From the menu in the left pane, go to the next step, Assigning Constraints and Goals, page 9-62.

Assigning Constraints and Goals

After selecting the devices for the assisted configuration task, you need to specify the constraints and goals of the task.

Procedure

Step 1 Determine whether you want to apply the constraints to all APs that you selected or if you want to apply the constraints to individual APs.

Step 2 If you selected to apply the constraints to individual APs, a list box appears in which you can select the AP on which to apply the constraints. Click on the AP name in the list box.

Step 3 For the Channel Set, select either option:

- Recommended—Use the channels Radio Manager recommends in the Recommended field.
- Custom—Select the channels from the Custom selection box. You can Ctrl-click to select more than one channel from the selection box.

Note Some channels are not approved for use in specific regulatory domains. Table 9-8 lists the regulatory domains and their valid, approved channel sets.

Table 9-8 Regulatory Domains and Their Approved Channel Sets[1]

Radio Type	Regulatory Domain	Approved Channel Set
802.11b/g	FCC (United States)	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
	DOC (Canada)	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
	ETSI	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
	Spain	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
	France	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
	Belgium	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
	MKK (Japan)	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 (b only)
	Singapore	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
	Taiwan	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
	Israel	5, 6, 7, 8
	Australia	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
	China	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
802.11a	FCC (United States)	36, 40, 44, 48, 52, 56, 60, 64, 149, 153, 157, 161
	DOC (Canada)	36, 40, 44, 48, 52, 56, 60, 64, 149, 153, 157, 161
	ETSI	36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140
	Spain	36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140
	France	36, 40, 44, 48, 52, 56, 60, 64
	Belgium	36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140
	MKK (Japan)	34, 38, 42, 46
	Singapore	36, 40, 44, 48
	Taiwan	52, 56, 60, 64, 149, 153, 157, 161
	Israel	N/A
	Australia	36, 40, 44, 48, 52, 56, 60, 64, 149, 153, 157, 161
	China	149, 153, 157, 161, 165

1.Not all radios support all approved channel sets listed.

Step 4 Enter a number for the minimum transmit power and a number for the maximum transmit power. You might choose to enter a lower power setting when, for example, the default power level might affect a neighboring network. You must enter a numeric value greater than zero and less than 100.

Step 5 Enter a numerical value for the expected maximum number of clients per AP and a numerical value for the expected average number of clients per AP. You must enter a numeric value greater than zero and less than 500.

Step 6 Select whether to enable black hole mitigation. If you select this option, Radio Manager recommends a beacon interval, which is slightly altered from what the AP is configured to, for the APs. If you do not select the Black Hole Mitigation option, Radio Manager displays the beacon interval to which the AP is currently configured.

Related Topics

- Creating a New Assisted Configuration Task, page 9-59
- Managing Assisted Configuration Tasks, page 9-58

Calculating Parameters

After you assign the constraints and goals, the next step is for Radio Manager to calculate the parameters. In this step, you will see a progress bar that indicates the progress Radio Manager is making in its calculations.

Note Depending on the number of APs selected for the job and how much data was collected during Client Walkabout, the calculating parameters step could take a while to complete.

To stop the parameter calculation, click on the **Stop** button.

When the parameter calculation is complete, the results are displayed. For more information about the parameter results, see Viewing the Calculated Results, page 9-65.

Viewing the Calculated Results

After Radio Manager calculates the parameters for the assisted configuration job, it displays the calculation results. The calculation results specify the following information:

Field	Description
Name	Name of the AP
Transmit Power	Recommended transmit power for this AP. If the radio type is 11g, the CCK power and OFDM power are also displayed.
Channel	Recommended channel for the AP
Beacon Interval	Recommended beacon interval for the AP. If you did not select the Enable Black Hole Mitigation option, this column displays the value the AP is currently configured to. (See Assigning Constraints and Goals, page 9-62 for more information.)
Estimated Maximum Throughput	The estimated maximum megabytes per second that the AP can process

Scheduling the Assisted Configuration

After you have viewed the calculation results of the assisted configuration task (see Viewing the Calculated Results, page 9-65 for more information) and want to apply these changes, you need to determine when to apply configuration changes.

Procedure

Step 1 Click **Schedule**. The Schedule RM Assisted Configuration Job form appears.

Step 2 To start the assisted configuration task immediately, click **Run Now**.

Step 3 To run the assisted configuration task at a later time, under Run Later, select a Month, Day, Year to run the configuration task. You must also specify the start time by selecting the hour and minute to start the job.

Finishing the Task

Before selecting this option, you must name the assisted configuration task, select the devices, enter constraints and goals, and schedule the assisted configuration task.

Procedure

Step 1 Click **Finish** in the left pane.

Note If a warning message appears saying that WLSE server is ahead of or behind your local time, see Understanding Time Discrepancy Problems in Job Scheduling, page 1-10.

The Done form appears indicating that the job has completed or it has been scheduled (if you scheduled it to run later).

Using the Radio Manager Features

After the radio data has been collected and the radio parameters have been generated, you can use the following features to help you manage your WLAN radio environment:

Detecting Rogue APs

Radio Monitoring continuously monitors your WLAN radio environment to discover the presence of any new APs that are transmitting beacons. Any newly discovered AP that cannot be identified as a known authorized AP generates a new fault. You can view faults under **Faults > Display Faults**.

From the Fault Summary Table for an unknown AP, you can click on the link in the Address, Description, or Timestamp fields to see the Rogue Access Point Details which displays the following information:

- Rogue Access Point Details
- Beacon Information
- Location Estimation
- Switch Port Tracing
- Reporting APs
- Fault History

See Unknown AP Details, page 2-15 for additional information about displaying information about detected rogue APs.

You also need to set network-wide policies for the detection of rogue APs. See Assigning Rogue AP Detection Network Settings, page 2-82.

In addition to the information gathered in the Fault Summary Screen, you can also view the estimated location of the rogue AP using Location Manager. See Changing Display Options for Unknown Radios, page 10-21).

Related Topic

- Understanding Rogue AP Detection, page 9-10

Detecting Switch Port Location and Suppressing Ports

When a Rogue AP fault is generated, the Rogue Access Point Details window displays information about the switch port to which the rogue AP is connected. See Unknown AP Details, page 2-15 for additional information about switch port tracing information.

You can also set network-wide policies to enable the suppression of the port to which a rogue AP is connected (see Assigning Rogue AP Detection Network Settings, page 2-82).

Caution **In rare cases, the Auto Suppress feature can suppress a port other than the port to which the rogue AP is connected.** The algorithm that is used to find the Ethernet MAC address uses the radio MAC address and assumes that Ethernet MAC address is in the range of +-1 of the radio MAC address. **This may not be true in all cases**. If the trace finds any of the three MAC addresses on any port, WLSE shuts those ports down. There is *no guarantee* that the switch port to which the rogue is connected can be traced in all cases, because there is no guaranteed way to find the Ethernet MAC address from the radio MAC address.

Related Topic

- Understanding Switch Port Location and Suppression, page 9-12

Detecting Interference

Radio Monitoring continuously monitors your WLAN radio environment to discover the presence of any interference. You need to set the threshold condition for interference detection. See Assigning Interference Detection Network Settings, page 2-83. When interference is detected, a fault is generated. You can view faults under **Faults** > **Display Faults**.

Note It is recommended, though not required, that you place your APs in Location Manager (see Viewing Your WLAN Radio Environment with Location Manager, page 10-1).

Using Auto Re-Site Survey

Use Auto Re-Site Survey to have Radio Manager automatically evaluate the AP's current radio performance against collected AP radio performance data. If Radio Manager finds a degradation in performance, a fault is generated.

Note Your login determines whether you can use this option.

Before You Begin

Before using the Auto Re-Site Survey option, you must have:

- Configured your network for radio management (see Getting Started with Radio Manager, page 9-2)
- Performed an AP Radio Scan on all APs on the specified floor (see Using AP Radio Scans to Collect RM Data, page 9-28)
- Enabled Radio Monitoring on all APs on the specified floor (see Using Radio Monitoring to Collect RM Data, page 9-52)
- Set network-wide policies for detecting network performance degradation. See Assigning Auto Re-Site Survey Settings, page 2-86.
- Created buildings and floors in Location Manager (see Adding Building Information, page 10-6)
- Placed APs on the floor images (see Adding Devices to the Floor, page 10-12)

Procedure

Step 1 Select **Radio Manager > Auto Re-Site Survey**. The Review Current form appears displaying the building, floor, and frequency band of the APs on the specified floor that are already enabled for Auto Re-Site Survey.

Step 2 Click **Select Floor** and select a building from the Floors Selector list. The floors for the selected building appear in the Available Floors list.

Step 3 Click on a floor, and click the right arrows (>>) to add it to the Selected Floors list.

Step 4 Click **Set Base Values**.

Step 5 Click **Compute and Apply** to calculate the current performance data for each floor specified in the Selected Floors pulldown menu and use that data as the baseline for future performance comparisons. You can select individual floors from the Selected Floors pulldown menu and set its baseline data. The default is to calculate the performance of all floors. Go to Step 8.

If you specify an individual floor from the Selected Floors pulldown menu, click the **Enable Auto Re Site Survey** check box next to the radio type to enable Auto Re-Site Survey for the radio types on the floor you specified.

Step 6 Click **Re-evaluate** to evaluate the current performance of the floor you selected. This data will be used as a baseline for future comparisons.

Step 7 Click **Current > Base** to make the current data the baseline for future performance comparisons.

Step 8 Click **Finish** to complete Auto Re-Site Survey. The Finish form appears displaying the current fault setting.

Step 9 Click **Save** to save your Auto Re-Site Survey settings.

Every hour, the collected baseline data is compared against the current performance, and if there is a 20% (default value) degradation in performance, a fault is generated. From the Faults Details Conditions table for an Auto Re-Site Survey fault, you can select the icon (the document with the eyeglasses) to view details about the fault (see Auto Re-Site Survey Details, page 2-20).

Related Topic

Understanding Auto Re-Site Survey, page 9-14

Using Self Healing

Use Self Healing to have Radio Manager automatically adjust the radio parameters of APs to eliminate any loss of coverage in the event that there is a network failure.

Note If an AP has a hot-standby enabled, it is not monitored by Self Healing. In the event of a failure and the hot-standby takes over, Self Healing will monitor the hot-standby AP.

Note Your login determines whether you can use this option.

Before You Begin

Before using the Self Healing option, you must have:

- Configured your network for radio management (see Getting Started with Radio Manager, page 9-2).

  Note Before you enable self healing, you must specify one or more backup WDSs (see Understanding Self Healing, page 9-15).

- Performed an AP Radio Scan on all APs on the specified floor (see Using AP Radio Scans to Collect RM Data, page 9-28).
- Enabled Radio Monitoring on all APs (for both serving and non-serving channels) on the specified floor (see Using Radio Monitoring to Collect RM Data, page 9-52).
- Set network-wide policies for detecting client registration request counts that exceed a specified limit. See Assigning Self Healing Network Settings, page 2-85.
- Created buildings and floors in Location Manager (see Adding Building Information, page 10-6).
- Placed APs on the floor images (see Adding Devices to the Floor, page 10-12).

Procedure

Step 1 Select **Radio Manager > Self Healing**. The floors currently selected for Self Healing are displayed.

Step 2 Click **Select Floors**. Select a building from the Floor Selector to see the available floors.

Step 3 Select a floor from the Available Floors list and click the right arrows (>>) to add it to the Selected Floors list.

Step 4 Click **Finish** to complete Self Healing.

Step 5 Click **Save** to save the Self Healing settings.

When Radio Manager monitoring does not detect a given radio interface on the selected floor for more that three measurement report intervals, it will automatically adjust the power levels of the neighboring AP interfaces to cover the potential areas of lost coverage and generate a fault.

Step 6 To enable an automatic Self Healing response and to assign a severity level to the fault that is generated when Self Healing is triggered, see Assigning Self Healing Network Settings, page 2-85.

Step 7 To view more details about the fault that is generated when Self Healing occurs, select the icon (the document with the eyeglasses) from the Faults Details Conditions table for a Self Healing fault (see Auto Re-Site Survey Details, page 2-20).

Step 8 Because Self Healing can chose an AP on a different floor from the failed AP to cover any holes in coverage, you might want to enable Auto Re-Site Survey to monitor performance of your APs (see Using Auto Re-Site Survey, page 9-69).

Related Topic

- Understanding Self Healing, page 9-15

Using Scanning-Only APs

When an AP is in scanning-only mode, it monitors the radio environment by looking for rogue APs and unassociated clients. An AP in scanning-only mode does not accept client associations.

Note Your login determines whether you can use this option.

Before You Begin

Before you can enable scanning mode on an AP, you must have already:

- Configured your network for radio management (see Getting Started with Radio Manager, page 9-2)
- Performed an AP Radio Scan (see Using AP Radio Scans to Collect RM Data, page 9-28)

  Note When a Scanning-Only AP participates in an AP Radio Scan, it behaves like a regular AP. That is, the transmit beacon is set on a designated channel at maximum power. After the AP Radio Scan is complete, the Scanning-Only AP is returned to "listen-only" mode and will no longer transmit any signal or accept any associations.

- Enabled Radio Monitoring (see Using Radio Monitoring to Collect RM Data, page 9-52)
- Set network-wide policies for detecting client registration request counts that exceed a specified limit (see Assigning Scanning AP Network Settings, page 2-87).

Procedure

Step 1 Use a template-based configuration job to configure one or more APs as scanning-only APs (see Using IOS Templates, page 4-1). Follow these guidelines when you create the template:

- Keep the configuration simple. For example, do not configure VLAN/SSID for Scanning-Only APs.

- Do not configure the scanning-only AP as an active/backup WDS (to serve fast roaming traffic).

Note Even though configuring Scanning-Only APs and configuring WDS are independent features, they will contend with each other on the same CPU if both are enabled on the same AP. To make certain that Scanning-Only AP traffic does not affect the real time performance for fast roaming, *do not* configure a Scanning-Only AP to act as a WDS (active or backup) to support fast roaming clients. However, if the subnet contains only Scanning-Only APs and no regular APs serving fast roaming clients, you *can* configure one of the Scanning-Only APs to run WDS.

Step 2 Use Radio Monitoring to enable and disable the Client Registration Scanning setting for selected APs (see Using Radio Monitoring to Collect RM Data, page 9-52).

This setting will be applied to APs that are configured as scanning-only APs. It will *not* be applied to APs that are configured as regular APs.

Step 3 Use one of these methods to determine which APs are running in scanning-only mode:

- Select **Devices > Discover > Inventory**. The **Scanning AP** folder in the Device Selector contains the APs that are running in scanning-only mode.
- Select **Reports**. In report types where the Device Selector is displayed, the **Scanning AP** folder contains the APs that are running in scanning-only mode.

Step 4 In a heavy-load environment, APs running in scanning-only mode may face sporadic connection loss and image upgrade failure. To resolve these problems, use the following configuration commands to balance CPU time:

```
scheduler interval <100-xxx>
scheduler allocate <3000-xxx> <1000-xxx>
```

Many newer Cisco platforms use the command **scheduler allocate** instead of **scheduler interval**. The scheduler allocate command takes two parameters: a period in microseconds for the system to run with interrupts enabled, and a period in microseconds for the system to run with interrupts masked. Please refer to the IOS documentation for more information about these commands.

Related Topic

- Understanding Scanning-Only AP Mode, page 9-16