



Use Wireless Site Maps

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Introduction to Next Generation Wireless Site Maps

Cisco Prime Infrastructure introduces Next Generation wireless site maps from Release 3.2. The Next Generation site maps are enhanced with a new user interface which offers larger and more detailed maps.

To access the Next Generation wireless site maps, choose **Maps > Wireless Maps > Site Maps (New)**.

The **Domain Sidebar** menu lists the campuses, buildings, outdoor areas, and floors in a tree view. When you click a campus, building, outdoor area, or floor in the tree view, the corresponding map along with different panels appear in the right pane.

Related Topics

- [Work with Site Maps](#), on page 3
- [Configuring Map Properties](#), on page 24

- [Configure Outdoor Areas](#), on page 9
- [Configure Buildings](#), on page 10
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How Wireless Site Maps Are Organized

The wireless site maps have a predetermined hierarchy:

- **Campuses** are the highest level in the map hierarchy. Campus represents a single business location or site. Campuses consist of at least one building, with one or more floor areas, and many outside areas.
- **Buildings** represent single structures within a campus, serving to organization-related floor-area maps. You can add as many buildings you want to a single campus map. A building can have one or more floors and outside areas associated with it. You can add buildings only to a campus map.
- **Floor areas** are within the building which comprises of cubicles, walled offices, wiring closets, and so on. You can add floor areas only to building maps. You can add up to 100-floors to each building map that you create.
- **Basement levels** are similar to floor areas, except they are numbered in reverse order from floor areas. You can add basements to building maps only. You can add up to 100 basement levels to each building map you create, in addition to the 100 floor areas.
- **Outside areas** are the exterior locations. Although they are typically associated with buildings, outside areas must be added directly to campus maps, at the same level as buildings. You can add as many outside areas to a campus map as you want.

Cisco Prime Infrastructure comes with two default campus maps:

- **System Campus**—This is the default campus map. If you create a new building, floor, basement, or outside area, but do not create as part of your campus map, these subordinate maps are automatically created as children of the System Campus map.
- **Unassigned**—This is the default map for all network endpoints and hosts that you have not assigned to any other map (including the System Campus).

Guidelines for Preparing Image Files for Use Within Wireless Site Maps

- Use any graphics application that saves to the raster image file formats such as: PNG, JPEG, or GIF.
- For floor and outdoor area maps, Cisco Prime Infrastructure allows bitmap images such as PNG, JPEG, GIF, and CAD vector formats (DXF and DWG).
- Ensure that the dimension of the image is larger than the combined dimension of all buildings and outside areas that you plan to add to the campus map.
- Maximum dimensions supported for images used in wireless floor plan maps are:
 - PNG images - 20,000 pixels by 15,000 pixels.

- JPG images - 20,000 pixels by 20,000 pixels.
- Gather the horizontal and vertical dimensions of the site in feet or meters before importing. This helps you to specify these dimensions during import.
- If you are entering campus, building, floor, or outside area dimension in meters, change the default map measurement units to meters.
- Once you have created the maps, you can assign network elements to them. You can manually do this by selecting individual devices and assigning them to campuses, buildings, floors, and outside areas as needed. For wireless access points and access controllers, you can add them to your maps automatically by using your organization's access points or wireless access controllers naming hierarchy.

Troubleshoot Problems with CAD Image File Imports in Wireless Site Maps

Cisco Prime Infrastructure uses a native image conversion library to convert CAD and MET vector files into raster format. Select one of the following supported target raster formats during the CAD or MET file import: PNG, JPEG or (JPG), and GIF.

If Cisco Prime Infrastructure cannot load the native image conversion library, it displays an error message saying "Unable to convert the autocad file". If you receive this error message, make sure that all the required dependencies are met for the native library using the Linux `ldd` command. The following four DLLs must be present under `/webnms/rfdlls` install directory in Cisco Prime Infrastructure: **LIBGFL254.DLL**, **MFC71.DLL**, **MSVCR71.DLL**, and **MSVCP71.DLL**. If dependency problem persists, install all the required libraries and then restart Cisco Prime Infrastructure server.

Floor and outside area map images imported from CAD files are enhanced for zooming and panning. Without zoom, the image clarity is close to that of the original CAD file. But an imported CAD file can appear blurred during zoom. If you are having a problem with blurred floor map images, make sure that all relevant parts of the image are clearly visible in the original CAD file. Then import the CAD file again, and choose PNG or GIF as the target conversion file format, instead of JPEG or JPG.

Large floor map images can take time to import. While the conversion is in progress, not all the image is visible on the map. If you have a high-resolution image (an image with a resolution of 180 megapixels and a file size of 60 MB), it may take two minutes or more for the imported image to appear on the map.

Work with Site Maps



Note All special characters except '&<>/' are allowed while creating sitemaps and group from Release 3.1 onwards.

Choose **Maps > Wireless Maps > Site Maps (New)** to access this page.

Click the **Site Hierarchy** icon in the upper left corner of the Site Maps page to view or hide the **Domain Navigator** menu. The **Domain Navigator** menu lists all the campuses, buildings, floors, and outdoor areas in a tree hierarchy.

You can search the tree hierarchy to quickly find a campus, building, outdoor area, or floor. To search the tree hierarchy, enter the site name in the **Search** text box within the **Domain Navigator** menu. The tree hierarchy is filtered based on the parameter entered. Click the search result to view the corresponding map along with service domain panels which contain various site elements in the right pane. For example, if you

select a campus in the Domain Navigator menu, the right pane displays corresponding campus map along with various service domain panels. These service domain panels show the count of buildings, outdoor areas, floors, APs, clients, and critical radio for a particular camps.



- Note**
- The search result in the Domain Navigator menu does not show the hierarchy to which building a particular floor belongs to. Click the floor icon to view more details in the right pane.
 - If background images are absent, Site Maps show buildings stacked on top of each other over Atlantic Ocean, as their geo coordinates are (0,0) by default.
 - There is a temporary discrepancy between the data which is displayed on the floor directly and the data displayed on the service domain panels.

You can perform these operations on the **Site Maps** page:

- [Add Sites, on page 4](#)
- [Remove a Site, on page 5](#)
- [Update a Site, on page 5](#)
- [Import Maps Archive](#)
- [Export Maps Archive, on page 6](#)
- [Import Bulk APs in CSV Format, on page 6](#)
- [Export Bulk APs in CSV Format, on page 7](#)

Add Sites

-
- Step 1** Choose **Maps > Wireless Maps > Site Maps (New)** to navigate to this page.
- Step 2** In the **Domain Navigator**, navigate to the site map. The available site panels are displayed in the right pane.
- Step 3** Click **Add Site** in the upper right corner of the **Sites** page. The **New Site** window appears. All the mandatory fields are displayed with a yellow background.
- Step 4** Enter a name for the site in the **Site Name** text box. The site name can contain up to 32 characters.
- Step 5** Enter the email address in the **Contact** text box. The contact details can contain up to 32 characters.
- Step 6** Select the parent location group from the **Parent Location Group** drop-down list.
- Step 7** Upload a site map by clicking the **Click to select a file or drag it here**. Browse to the site image file or drag and drop the image file to the **Click to select a file or drag it here** area.
- Step 8** Enter civic location details in the **Civic Location** text box. The **Longitude** and **Latitude** text boxes are automatically updated when you enter valid civic location details.
- Step 9** Enter the actual dimension of the site in the **Width** and **Length** text boxes.
- Step 10** Click **Save** to save the details.
-

Remove a Site

- Step 1** Choose **Maps > Wireless Maps > Site Maps (New)** to navigate to this page.
- Step 2** In the **Domain Navigator**, navigate to the site map. The available site panels are displayed in the right pane.
- Step 3** In the site panel on the right pane, click **Delete**.
- Step 4** Confirm the deletion by clicking **Remove**.
-

Update a Site

- Step 1** Choose **Maps > Wireless Maps > Site Maps (New)** to navigate to this page.
- Step 2** From the **Domain Navigator**, navigate to the site map. The available site panels are displayed in the right pane.
- Step 3** In the site panel, click **Edit**.
- Step 4** In the **Edit** window, you can update the site attributes including the image file.
- Step 5** Click **Save**.
-

Import Maps Archive

- Step 1** Choose **Maps > Wireless Maps > Site Maps (New)** to navigate to this page.
- Step 2** In the **Domain Navigator**, navigate to the site map. The available site panels are displayed in the right pane.
- Step 3** From the **Import** drop-down list, choose **Map Archive**.
- Step 4** The **Import Map Archive** wizard opens.
- On the **Choose Format** page, you can choose either of the following map format types:
 - **XML Format**
 - **3rd Party XML / Zip**
- Step 5** On the **Select File** page, click **Click to select file or drag it here to browse to map location to import** or you can drag and drop the map file into the **Click to select file or drag it here** area. You can import either the zip or tar format files. You can download a sample template to understand the format by clicking the **Sample template can be downloaded here** link.
- Important** If maps archive is earlier than Prime Infrastructure version 3.2, import the exported maps .tar bundle first.
- Step 6** Select **Verify**. A message saying “**Uploading file to server. Please wait for validation results**” appears. Once the validation is complete, the result appears which contains information about map path, message, status, and overwrite information. You can overwrite or ignore.
- Step 7** Click **Process**. The map import process starts.

The **Summary** table shows the **Map Path**, **Message**, and **Status** information. A green dot in the **Status** column represents a successful import to the database. A red dot represents that there was an error while importing the map.

From the **Show** drop-down list, choose **All** or **Quick Filter** to search using the **Map Path** and **Message**.

- Step 8** After the import process is successful, click **Done**.
The imported maps appear in the **Domain Navigator** left sidebar menu on the Site Maps page.
-

Export Maps Archive

Before you begin

If you have manually updated the DB, there can be a DB discrepancy.

Before you export the maps, ensure that the edit operation works fine for the site, building, and floors in the source location. If the Edit building operation fails, you must adjust your position and save it in the source location.

To avoid missing the maps (site, building, floors) during the import maps operation, ensure that you follow the above check in the source location where you have exported the maps. When you import maps, the map data (position, coordinates, latitude, longitude) are validated before creation.

- Step 1** Choose **Maps > Wireless Maps > Site Maps (New)** to navigate to this page.
- Step 2** From the **Export** drop-down list, choose **Map Archive**.
- Step 3** The **Export Map Archive** wizard opens.
- Step 4** On the **Select Sites** page, configure the following. You must either select map information or calibration information to be included in the maps archive.
- **Map Information**—Turn the **On/Off** toggles to include map information in the archive.
 - **Calibration Information**—To export calibration information, turn the **On/Off** toggles. You can either select the **Calibration Information for selected maps** or **All Calibration Information** radio button. If you select **Calibration Information for selected maps**, then the calibration information for the selected site maps is exported. If you select **All Calibration Information**, then the calibration information for the selected map along with additional calibration information that is available in the system is also exported.
 - In the **Sites** left sidebar menu, check one or more check boxes of the site, campus, building floor, or outdoor area that you want to export. Check the **Select All** check box to export all the maps.
- Step 5** Select the **Generate Map Archive**. A message saying "Exporting data is in progress" is displayed. A tar file is created and is saved onto your local machine.
- Step 6** Click **Done**.
-

Import Bulk APs in CSV Format

- Step 1** Choose **Maps > Wireless Maps > Site Maps (New)** to navigate to this page.

- Step 2** From the **Import** drop-down list which is located in the upper right corner of the page, choose **Bulk AP in CSV**.
- Step 3** The **Import Bulk AP** wizard opens.
- Step 4** On the **Upload CSV** tab, click **Choose File** and browse to the location of the CSV file that you want to import. You can download a sample template by clicking the **Sample template can be downloaded here** link.
- If there is any unassociated ap's available in the CSV for bulk AP import, it will be in the unpositioned state once import is done. You should reposition the ap manually after it is associated with the controller.
- Step 5** Click the **Summary** tab to view if the CSV import was successful or not. The **Summary** table contains **Map Path**, **Message**, and **Status** information.
- Step 6** Click **Done**.
- If there is any unassociated ap's available in the imported CSV, it will be in the unpositioned state. You should reposition the ap manually after it is associated with the controller.
- after import -bulk ap.
- You should repositioned it manually Once it is associated with the controller.
-

Export Bulk APs in CSV Format

- Step 1** Choose **Maps > Wireless Maps > Site Maps (New)** to navigate to this page.
- Step 2** From the **Export** drop-down list located in the upper right corner of the page, choose **Bulk AP**.
- The **Export Bulk AP** wizard opens.
- Step 3** The **Select APs** page lists all the available APs.
- You can use the **Search Panel** to search the access point that you want to export. You can search using the AP name, MAC address (Ethernet and Radio), or IP address, and click **Search**.
 - You can select APs that are available in a particular outdoor area, site, campus, or floor. To do that:
 - Click the **Select Site** text box and check the check box of the corresponding outdoor area, site maps, campus, or floor.
 - Click **OK**. The selected site details appear in the **Select Site** field.
 - Click **Search**. The APs that are available in the selected sites are displayed.
 - Select the **Include Unassigned** check box to include APs that are not assigned to any floors.
- Step 4** From the **Show** drop-down list, choose **All** or **Quick Filter** to search access points by the **AP Name**, **MAC Address**, **Model**, **Controller**, **Status**, or **Floor**.
- Step 5** Check one or more **AP Name** check boxes and select **Assign Floor** to assign the selected APs to a floor.
- Step 6** Click **Assign To Floor**, select the floor to which you want to assign the AP in the **Sites** window, and click **OK**.
- Step 7** Click **Generate CSV**.
- The CSV file is exported.

Step 8 Click **Done**.

Import Access Points for GeoMap

Step 1 Click **Maps > Wireless Maps > Site Maps**.

Step 2 Click **Import > APs for GeoMap**.

Step 3 Click or drag the file you'd like to Import (you can download a sample CSV file) and click **Summary**.

Step 4 Click **Done**.

Export Access Points for GeoMaps

Step 1 Click **Maps > Wireless Maps > Site Maps**.

Step 2 Click **Export > APs for GeoMap**.

Step 3 Select the APs whose Geo location you want to export in the **Select APs** tab.

APs associated to the controllers managed in Prime Infrastructure are listed here. You can also use the **Search Panel** to search for an AP by AP Name, Mac Address, or IP.

Step 4 Click **Edit APs** and edit the **Longitude** and **Latitude** values of the selected APs.

Step 5 Click **Generate CSV** to generate a CSV file.

Edit Map Properties

Step 1 Choose **Maps > Wireless Maps > Site Maps (New)** to navigate to this page.

Step 2 Click the **User Preferences** icon in the top right corner of the **Sites** page to edit the following map properties:

- **Units of Measure**—From the **Units of Measure** drop-down list, choose **Feet** or **Meters** to set the dimension measurement for maps.
- **Wall Usage Calibration**—From the **Wall Usage Calibration** drop-down list, choose **Auto**, **Use Walls**, or **Do Not Use Walls**. Wall usage calibration helps Cisco Prime infrastructure to take drawn walls into consideration while calculating heatmaps.
- **Floor Start Index**—From the **Floor Start Index** drop-down list, choose the floor level which is either **0** or **1**.
- **Refresh Map from Network**—Select the **Enable** radio button for Cisco Prime Infrastructure to update maps by polling Cisco WLAN Solution every time an operator requests for a map update. Select the **Disable** radio button for Cisco Prime Infrastructure to update maps from its stored database.
- **Advanced Debug Mode**—Select the **Enable** radio button to allow Location Appliance and Cisco Prime Infrastructure to use the location accuracy testpoint feature.

- **Use Dynamic Heatmaps**—Select the **Enable** radio button to use the dynamic heatmaps. When the dynamic heatmaps are enabled, Cisco Prime Infrastructure recomputes the heatmaps to represent changed RSSI values.
- **Minimum Number of APs for Dynamic Heatmaps**—In the text box, enter the minimum number of APs that you want to use for dynamic heatmaps calculation. The minimum number of APs required is 3, and the maximum number of APs required is 10.
- **Recomputation Frequency (hours)**—In the text box, enter the heatmap recomputation frequency. The default frequency is 6 hours. The minimum frequency is 1 hour, and the maximum frequency is 24 hours.

Step 3 Click **Save**.

Configure Outdoor Areas

You can add outdoor areas to a campus map in Cisco Prime Infrastructure database regardless of whether you have added outdoor area maps to the database or not. You can define the dimensions of the area and add it to the database. The map can be of any size because Cisco Prime Infrastructure automatically resizes the map to fit the workspace.

Related Topics

- [Add an Outdoor Area, on page 9](#)
- [Remove an Outdoor Area, on page 10](#)
- [Edit Outdoor Areas, on page 10](#)

Add an Outdoor Area

Step 1 Choose **Maps > Wireless Maps > Site Maps (New)** to navigate to this page.

Step 2 Click **Add Outdoor** in the upper right corner of the campus page to which you want to add the outdoor area map. The **New Outdoor Area** window is displayed. All the mandatory fields are displayed with a yellow background.

- **Outdoor Area Name**—Enter the outdoor area name. The outdoor area name can contain up to 32 characters.
- **Contact**—Enter an email ID or a contact name. The contact details can contain up to 32 characters.
- **Height (Feet)**—Enter the outdoor area's height in feet. You can change this later in the **User Settings**.
- **Type (RF Model)**—From the drop-down list, choose **Cubes And Walled Offices**, **Drywall Office Only**, or **Outdoor Open Space (default)**.
- **Image File Name**—Click **Choose File** and browse to the image and upload the file. You can import only PNG, GIF, or JPEG image formats.
- **Civic Location**—Enter the outdoor area's location details.
- **Longitude and Latitude**—Enter the outdoor area's North-West corner coordinate values.

- **Dimensions (Feet)**—Enter the actual outdoor area's dimension. You can later change the dimensions in the **User Settings**.
-

Edit Outdoor Areas

- Step 1** Choose **Maps > Wireless Maps > Site Maps (New)** to navigate to this page.
- Step 2** From the **Domain Navigator**, navigate to the campus site map. The available outdoor area panels are displayed in the right pane.
- Step 3** Hover your mouse cursor to the outdoor area panel that you want to edit, and click the **Edit** icon.
- Step 4** In the **Edit Outdoor Area** window, modify the outdoor area attributes including the image.
- Step 5** Click **Save**.
-

Remove an Outdoor Area

- Step 1** Choose **Maps > Site Maps (New)**.
- Step 2** From the **Domain Navigator**, navigate to the campus site map. The available outdoor area panels are displayed in the right pane.
- Step 3** Hover your mouse cursor to the outdoor area panel that you want to delete, and click the **Delete** icon.
- Step 4** Click **Remove** to confirm the deletion.
-

Configure Buildings

You can add buildings only to a campus map. If you do not add them to a campus map you created, Cisco Prime Infrastructure adds them to the default System Campus map automatically.

Related Topics

- [Add a Building, on page 10](#)
- [Edit a Building, on page 11](#)
- [Remove a Building, on page 11](#)

Add a Building

- Step 1** Choose **Maps > Wireless Maps > Site Maps (New)** to navigate to this page.
- Step 2** Click **Add Building** in the upper right corner of the campus page to which you want to add this building. The **New Building** window appears. All the mandatory fields are displayed with a yellow background.

- **Building Name**—Enter a name for the building. The name must be unique among the other building names you plan to add to the same campus map. The building name can contain up to 32 characters.
- **Contact**—Enter an email ID or a contact name. The contact details can contain up to 32 characters.
- **Num.Floors**—Enter the number of floors in the building including the ground floor.
- **Num. Basements**—Enter the number of basements in the building.
- **Civic Location**—Enter the location information of the building.
- **Longitude and Latitude**—Enter the building's North-West corner coordinates.
- **Dimensions (Feet)**—Enter the building's actual dimension. You can change the dimension later in the **User Settings**.

To position a building, you can drag and drop a building on the floor and then position the building.

Edit a Building

- Step 1** Choose **Maps > Wireless Maps > Site Maps (New)** to navigate to this page.
 - Step 2** From the **Domain Navigator**, navigate to the campus site map. The available building panels are displayed in the right pane.
 - Step 3** Hover your mouse cursor to the building panel that you want to edit, and click the **Edit** icon.
 - Step 4** In the **Edit Building** window, edit the building attributes.
 - Step 5** Click **Save**.
-

Remove a Building

- Step 1** Choose **Maps > Wireless Maps > Site Maps (New)** to navigate to this page.
- Step 2** From the **Domain Navigator**, navigate to the building map. The available building panels are displayed in the right pane.
- Step 3** Hover your mouse cursor to the building that you want to delete, and click the **Delete** icon.
- Step 4** Confirm **Remove** to confirm the deletion.

Note Deleting a building also deletes all its container maps. The APs from the deleted maps are moved to an Unassigned state.









Monitor Floor Areas

The floor view navigation pane provides access to multiple map functions like:










- **Search on map**—Use the **Search** feature to find specific floor elements like APs, clients, rogue APs, and so on. The elements that match the search criteria are displayed on the floor map along with a table in the right pane. When you hover your mouse over the table, it points to the search element on the floor map with a connecting line.

- **Zoom in and out**—The zooming levels depend upon the resolution of an image. A high-resolution image may provide more zoom levels. Each zoom level is made of a different style map shown at different scales, each one showing more or less detail. Some maps will be of the same style but at a smaller or larger scale.
 - **Zoom In**—You need to zoom in to see a map with more details. You can do this by using the zoom bar on the left side of the map. Click the Zoom In (+) icon at the top left side of the map. To center and zoom in on a location, double click the location. If you are zooming in using the keyboard, click the + sign. If you are using a mouse, use the mouse scroll wheel to zoom in.
 - **Zoom Out**—To see a map with less details you need to zoom out. To do this, click the Zoom Out (-) icon at the top left side of the map. If you are zooming out using the keyboard, click the - sign. If you are using a mouse, use the mouse scroll wheel to zoom out.
- **Get Help**—Click the **Get Help (i)** sign on the left side of the map to view the next generation map icons. Below table lists the Next Generation Map icons.

Table 1: Next Generation Map Icons

Icon	Description
Icons	
	802.11 Tags
	Rogue AP
	Adhoc Rogue
	Rogue Client
	Interferers
	Wips Attacks
	GPS Markers
	Choke Points

Icon	Description
	WiFi TDOA Receivers
	Services
AP Status	
	Unknown
	Critical
	Major
	Minor
	Warning
	Information
	Ok
Radio Status	
	Not Associated
	Unreachable

Icon	Description
	Admin Disable
	Down
	Minor Fault
	Ok
Clients (by RSSI/SNR)	
	Not available
	Excellent
	Good
	Fair
	Poor
A P Mode	
A	Autonomous
L	Local
M	Monitor
F	FlexConnect
R	Rogue Detector
S	Sniffer
B	Bridge

Icon	Description
C	SE-Connect
Se	Sensor
Radio Band/Mode	
a	802.11 a/n/ac (5GHZ)
b	802.11 b/g/n (2.5GHZ)
n	802.11 a/b/g/n (2.4GHZ)
m	XOR (Monitor Mode)

Related Topics

- [Floor Map Display Settings](#)

Configure Floor Areas

You can add floor and basement areas to any building you have added to the campus map. Follow these guidelines while adding a floor:

- You can only add floor and basement areas to building maps.
- You can only add floor and basement areas up to the number of floors and basements you specified while adding a building to the campus map. If you enter these incorrectly, you must first edit the building map and then upload the floor map.

Related Topics

- [Add Floor Areas to Building](#)
- [Monitoring Floor Areas](#)

Add Floor Areas to Building

Step 1 Choose **Maps > Wireless Maps > Site Maps (New)** to navigate to this page.

Step 2 In the **Domain Navigator** left menu, navigate to the building to which you are adding the floor map.

Step 3 Click **Add Floor** in the upper right corner of the building page.

The **New Floor** window appears. All the mandatory fields are displayed with a yellow background.

- **Floor Name**—Enter a floor name. The floor name supports up to 32 characters.
- **Contact**—Enter the contact name or the email ID. The contact details can contain 32 characters.
- **Floor Number**—From the drop-down list, choose the floor number.

- **Floor Height**—Enter the floor-to-floor height in feet.
- **Type (RF Model)**—The RF model for the floor or basement. The model selected is used to calculate wireless signal strength, heat maps, and other wireless-related features for the floor or basement area.
- **Image File Name**—Click **Choose File** and select the floor map to upload. The floor map size is automatically calculated and displayed. Cisco Prime Infrastructure allows bitmap images such as PNG, JPEG, GIF, and CAD vector formats (DXF and DWG).

Note You can filter layers of CAD images by navigating to the floor map and then clicking **Tools > Show/Hide CAD Layers**

- **Civic Location**—Enter the location information of the floor. The longitude, latitude, and the location information are updated as per the valid civic location entered.
- **Longitude and Latitude**—Enter the north-west corner coordinates.
- **Dimensions (Feet)**—Enter the actual size in width and height. You can change the size later in the **User Settings**.
- **Position (Feet)**—Enter the horizontal and vertical position. The horizontal position is the distance from the top left corner of the floor area to the left edge of the campus map. The vertical position is the distance from the top left corner of the floor area to the top edge of the campus map. You can enter these dimensions in feet or meters. If you modify this, then the longitude, latitude, and location icon on the map is updated.

Step 4 Click **Save**.

Configure Display Setting for Various Floor Elements

Click the **Display Settings** icon located at the upper right corner of the floor to configure various floor elements. The floor map along with these panels appear in the right pane: **Access Point**, **Mesh**, **802.11 Tags**, **Overlay Objects**, **Clients**, **Rogue AP**, **Adhoc Rogue**, **Rogue Client**, **Interferers**, **wIPS Attacks**, **MSE/CMX Settings**, and **Map Properties**.

You can modify the appearance of the floor map by selecting or unselecting various parameters. For example, if you want to view only the access point information on the floor map, check the **Access Point** check box. You can expand each panel to configure various settings available for each floor element.

Related Topics

- [Configuring Display Settings for Access Points, on page 17](#)
- [Configuring Display Settings for Mesh Access Points, on page 18](#)
- [Configuring Display Settings for 802.11 Tags, on page 20](#)
- [Configuring Display Settings for Overlay Objects, on page 21](#)
- [Configuring Display Settings for Clients, on page 21](#)
- [Configuring Display Settings for Rogue Access Points, on page 21](#)
- [Configuring Display Settings for Adhoc Rogues, on page 22](#)
- [Configuring Display Settings for Rogue Clients, on page 22](#)
- [Configuring Display Settings for Interferers, on page 22](#)
- [Configuring Display Settings for wIPS Attacks, on page 23](#)
- [Configuring Display Settings for MSE/CMX Site Maps Integration, on page 23](#)

Configuring Display Settings for Access Points

Check the **Access Points** check box to view all APs on the map. Expand the **Access Points** panel to configure these settings:

- **Display Label**—From the drop-down list, choose a text label you want to view on the floor map for access point. The available display labels are:
 - **Name**—Displays the AP name.
 - **AP MAC Address**—Displays the AP MAC address.
 - **Controller IP**—Displays the IP address of Cisco WLC to which the AP is connected.
 - **Radio MAC Channel**—Displays the radio MAC address.
 - **Channel**—Displays the Cisco Radio channel number or Unavailable (if the access point is not connected).
 - **TX Power**—Displays the current Cisco Radio transmit power level (with 1 being high) or Unavailable (if the access point is not connected). If you change the radio band, the information on the map changes accordingly.

The power levels differ depending on the type of access point. The 1000 series access points accept a value between 1 and 5, the 1230 access points accept a value between 1 and 7, and the 1240 and 1100 series access points accept a value between 1 and 8.
 - **Tx Power (dBm)**—Displays the radio frequency (RF) power in decibels (dBm) for all radios in the AP.



Note Power level displays 0 (zero) if the radio is in scanning mode or is unavailable.

- **Channel and Tx Power**—Displays both the channel and transmit power level (or Unavailable if the access point is not connected).
- **Coverage Holes**—Displays a percentage of clients whose signal has become weaker until the client lost its connection, Unavailable for unconnected access points, or MonitorOnly for access points in monitor-only mode.
- **MAC Addresses**—Displays the MAC address of the access point, whether or not the access point is associated to a controller.
- **Names**—Displays the access point name. This is the default value.
- **Controller IP**—Displays the IP address of the controller to which the access point is associated or Not Associated for disassociated access points.
- **Utilization**—Displays the percentage of bandwidth used by the associated client devices (including receiving, transmitting, and channel utilization). Displays Unavailable for disassociated access points and MonitorOnly for access points in monitor-only mode.
- **Profiles**—Displays the load, noise, interference, and coverage components of the corresponding operator-defined thresholds. Displays Okay for thresholds not exceeded, Issue for exceeded thresholds, or Unavailable for unconnected access points.

se the Profile Type drop-down list to choose Load, Noise, Interference, or Coverage.

- **CleanAir Status**—Displays the CleanAir status of the access point and whether or not CleanAir is enabled on the access point.
 - **Average Air Quality**—Displays the average air quality on this access point. The details include the band and the average air quality.
 - **Minimum Air Quality**—Displays the minimum air quality on this access point. The details include the band and the minimum air quality.
 - **Average and Minimum Air Quality**—Displays the average and minimum air quality on this access point. The details include the band, average air quality, and minimum air quality.
 - **Associated Clients**—Displays the number of associated clients, Unavailable for unconnected access points or Monitor Only for access points in monitor-only mode.
 - **Dual-Band Radios**—Identifies and labels the XOR dual band radios on the Cisco Aironet 2800 and 3800 Series Access Points.
 - **Bridge Group Names**
 - **Antenna Angle**—Displays Azimuth angle and elevation for all radio antennas.
- **Air Quality**—You can either select **Average AQ** or **Minimum AQ**. You can set the access point heatmap type to view those details for the air quality selected on the map.
 - **Heatmap Opacity (%)**—Drag the slider between 0 to 100 to set the heatmap opacity.
 - **RSSI Cut off (dBm)**—Drag the slider to set the RSSI cutoff level. The RSSI cutoff ranges from -60 dBm to -90 dBm.
 - **Map Opacity (%)**—Drag the slider to set the map opacity.
 - **Show Mobility Express**—Toggle to view APs managed by a Mobility Express AP.

The AP details are reflected on the map immediately. Hover your mouse cursor over the AP icon on the map to view AP details and RX neighbor information.

Related Topics

- [Quick View of APs, on page 27](#)

Configuring Display Settings for Mesh Access Points



Note Mesh option is available only if you have any Mesh AP available on the floor.

Select the **Mesh** check box to view all Mesh APs on the map. Expand the **Mesh** panel to configure these settings:

- **Link Label**—From the **Link Label** drop-down list, choose a label for the mesh link:
 - **None**
 - **Link SNR**

- **Packet Error Rate**
- **Link Color**—From the **Link Color** drop-down list, choose a color for the mesh link:
 - **Link SNR**
 - **Packet Error Rate**

The Link label and color settings are reflected on the map immediately. You can display both SNR and Packet Error Rate values simultaneously.

Table 2: Link Colors: SNR and PER

Color	Link Signal/Noise Ratio (SNR)	Packet Error Rate (PER)
Green	Represents an SNR above 25 dB (high value)	Represents a PER of one percent (1%) or lower
Amber	Represents a SNR between 20 and 25 dB (acceptable value)	Represents a PER that is less than ten percent (10%) and greater than one percent (1%)
Red	Represents a SNR below 20 dB (low value)	Represents a PER that is greater than ten percent (10%)

Table 3: Link Colors: SNR and PER

Color	Link Signal/Noise Ratio (SNR)	Packet Error Rate (PER)
Green	Represents an SNR above 25 dB (high value)	Represents a PER of one percent (1%) or lower
Amber	Represents a SNR between 20 and 25 dB (acceptable value)	Represents a PER that is less than ten percent (10%) and greater than one percent (1%)
Red	Represents a SNR below 20 dB (low value)	Represents a PER that is greater than ten percent (10%)

Table 4: Link Colors: SNR and PER

Color	Link Signal/Noise Ratio (SNR)	Packet Error Rate (PER)
Green	Represents an SNR above 25 dB (high value)	Represents a PER of one percent (1%) or lower
Amber	Represents a SNR between 20 and 25 dB (acceptable value)	Represents a PER that is less than ten percent (10%) and greater than one percent (1%)
Red	Represents a SNR below 20 dB (low value)	Represents a PER that is greater than ten percent (10%)

To modify the mesh access points display based on the number of hops between them and their parents, do the following:

- In the **Mesh Parent-Child** hierarchical View, choose the appropriate options from the Quick Selections drop-down list. A description of the options is provided in this table:

Table 5: Quick Selection Options

Field	Description
Select only Root APs	Choose this setting if you want the map view to display root access points only.
Select up to 1st hops	Choose this setting if you want the map view to display 1st hops only.
Select up to 2nd hops	Choose this setting if you want the map view to display 2nd hops only.
Select up to 3rd hops	Choose this setting if you want the map view to display 3rd hops only.
Select up to 4th hops	Choose this setting if you want the map view to display 4th hops only.
Select All	Select this setting if you want the map view to display all access points.

- Click **Update Map View** to refresh the screen and display the map view with the selected options.



Note Map view information is retrieved from the Prime Infrastructure database and is updated every 15 minutes.



Note You can also select or unselect the check boxes of access points in the mesh hierarchical view to modify which mesh access points are displayed. For a child access point to be visible, the parent access point to root access point must be selected.

Configuring Display Settings for 802.11 Tags

Select the **802.11 Tags** check box to view tag location status on the map. Expand the 802.11 Tags panel to configure these settings:

- **Show All Tags**—Turn the On/Off toggles for tags to appear on the map.
- **Display Label**—Choose the tag identifier that you want to display on the map.
 - None
 - MAC Address
 - Asset Name
 - Asset Group
 - Asset Category

Configuring Display Settings for Overlay Objects

Expand the **Overlay Objects** panel to configure these settings. You can turn the **On/Off** toggles for the overlay objects to appear on the map.

- Coverage Areas
- Location Regions
- Obstacles
- Rails
- Markers
- GPS Markers
- ChokePoints
- WiFi TDOA Receivers
- Services

Configuring Display Settings for Clients

Expand the **Clients** panel to configure these settings.

- **Show Client Clusters**—Turn the **On/Off** toggles to view wireless client cluster on the floor map.
- **Color Code by**—You can view clients by their RSSI or SNR information by setting the color code: **RSSI** or **SNR**.
- **Display Label**—From the drop-down list, choose the client identifier to display on the map:
 - None
 - User Name
 - IP Address
 - MAC Address
 - Asset Name
 - Asset Group
 - Asset Category



Note Autonomous AP client tracking is not supported through Cisco MSE.

Configuring Display Settings for Rogue Access Points

Expand the **Rogue AP** panel to configure these settings:

- **Show Rogue APs Cluster**—Turn the **On/Off** toggles to view all rogue APs in the cluster on the floor map.
- **Show Rogue AP Zone of Impact**—Turn the **On/Off** toggles to display the zone of impact for rogues APs. The rogue impact zone is determined by the transmission power of the Rogue AP and the number of clients associated with the rogue AP. The opacity of the circle on the map denotes the severity. A solid red circle represents a very strong impacted zone.

Configuring Display Settings for Adhoc Rogues

Expand the **Adhoc Rogue** panel to configure these settings:

- **Show Adhoc Rogues Cluster**—Turn the **On/Off** toggles to view adhoc rogue APs in the cluster.
- **Show Rogue AP Zone of Impact**—Turn the **On/Off** toggles to display the zone of impact for adhoc rogues APs.

Configuring Display Settings for Rogue Clients

Check the **Rogue Client** check box to view all the rogue clients on the map. Expand the **Rogue Client** panel to configure these settings:

- **Show Rogue Clients Cluster**—Turn the **On/Off** toggles to view rogue clients in the cluster.

Quick View of Rogue Clients on the Map

Hover your mouse cursor over the **Rogue Clients** icon on the floor map to view the MAC address of the rogue client. You can click the **Rogue Clients** icon to view rogue clients details in the right pane:

- Detected By
- State
- Assoc. Rogue AP
- Detecting APs
- First Seen
- Last Seen
- Last Located
- Last Reported

Configuring Display Settings for Interferers

Check the **Interferers** check box to view all interferers on the map. Expand the **Interferes** panel to configure these settings:

- **Show Zone of Impact**—Displays the approximate interference impact area. The opacity of the circle denotes its severity. A solid red circle represents a very strong interferer that likely disrupts Wi-Fi communications, a light pink circle represents a weak interferer.

Configuring Display Settings for wIPS Attacks

Expand the **wIPS Attacks** panel to configure:

- **Show wIPS Attack Cluster**—Turn the On/Off toggles to view all wIPS attacks on the map.

Configuring Display Settings for MSE/CMX Site Maps Integration

Expand the **MSE/CMX Settings** panel to integrate site maps with Cisco Mobility Services Engine (MSE) or Cisco Connected Mobile Experiences (CMX).

- From the **Show Data** drop-down list, choose to view mobility services engine data from a range including the past two minutes up to the past 24 hours. This option only appears if a mobility services engine is present in Cisco Prime Infrastructure.
- To integrate maps with Cisco MSE, select the **MSE** radio button, and click **Change MSE Assignment**.



Note Autonomous AP client tracking is not supported through Cisco MSE.

1. In the **Assigned MSEs** table, select the mobility services engine to which the maps have to be synchronized.
2. Click **Synchronize** to complete the synchronization process.
3. Click **Cancel** to discard the changes to mobility services engine assignment.

- To integrate maps with Cisco CMX, select the **CMX** radio button, and click **Change CMX Assignment**.



Note If you delete AP from the Next Generation map floor, you must export the CMX floor map again to get the latest update from CMX. Otherwise, CMX assumes that it is using the same floor plan and AP positions and sends data which results in an inconsistency between floor clients count and other mobility entities.

1. In the **Assigned CMXs** table, select the CMX to which the maps have to be synchronized.
2. Click **Synchronize** to synchronize maps data to Cisco CMX.
3. Click **Cancel** to discard the changes to mobility services engine assignment.



Note When a Controller is removed from inventory, you need to manually re-sync the corresponding site maps in MSE or CMX again.

Configuring Map Properties

Expand the **Map Properties** panel to configure:

- **Auto Refresh**—Provides an interval drop-down list to set how often to refresh map data from the database. From the **Auto Refresh** drop-down list, set the time intervals: **None**, **1 min**, **2 mins**, **5 mins**, and **15 mins**.

Edit Floor Elements

Using the **Edit** option available on the floor area, you can add, position, define, draw, and enhance various floor elements. Click **Edit** at the upper right corner of any floor area to:

- Add, position, and delete these floor elements:
 - Access Points
 - ChokePoints
 - WiFi TDOA Receivers
- Add, edit, and delete these overlays:
 - Coverage Areas
 - Obstacles
 - Location Regions
 - Rails
 - Markers
 - GPS Markers

Related Topics

- [Add, Position, and Delete APs, on page 24](#)
- [Add, Position, and Delete Choke Points, on page 28](#)
- [Add, Position, and Delete WiFi TDOA Receivers, on page 29](#)
- [Add Coverage Area, on page 30](#)
- [Create Obstacles, on page 31](#)
- [Location Region Creation, on page 32](#)
- [Rail Creation, on page 34](#)
- [Place GPS Markers, on page 35](#)

Add, Position, and Delete APs

Cisco Prime Infrastructure computes Heat maps for the entire map which shows the relative intensity of the RF signals on the coverage area map. This display is only an approximation of the actual RF signal intensity

because it does not take into account the attenuation of various building materials, such as drywall or metal objects, nor does it display the effects of RF signals bouncing off obstructions.

Antenna gain settings have no effect on heatmaps and location calculations. Antenna gain is implicitly associated to the antenna name. Because of this, the following apply:

- If an antenna is used and marked as “Other” in Prime Infrastructure, it is ignored for all heatmap and location calculations.
- If an antenna is used and marked as a Cisco antenna in Prime Infrastructure, that antenna gain setting (internal value on Prime Infrastructure) is used no matter what gain is set on the controller.

-
- Step 1** Choose **Maps > Site Maps (New)**.
- Step 2** From the **Domain Navigator** left sidebar menu, select the applicable floor to open the floor view page.
- Step 3** Click **Edit** at the upper right corner of the page.
- Step 4** In the **Floor Elements** panel, next to Access Points, click **Add**.
All the access points that are not assigned to any floors appear in the list.
- In the Add APs page, select check box(es) of the access points that you want to add to the floor area, and click **Add Selected**.
 - To add all access points, click **Select All**, and click **Add Selected**.
 - To directly assign access points to the floor area, click +.
 - You can search for access points using the search option available. Use the **Quick Filter** and search using the AP name, MAC address, Model, or Controller. The search is case-insensitive. The search result appears in the table. Click + icon to add to the floor area.
- Step 5** Close the **Add APs** window after assigning access points to the floor area.
- Step 6** Each access point that you added to the floor map appears on the right side of the map. You need to position them correctly.
- Step 7** In the **Floor Elements** pane, next to Access Points, click **Position** to place them correctly on the map.
- Click and drag each access point to the appropriate location or update the x and y coordinates and AP Height in the Selected AP Details page. When you drag an access point on the map, its horizontal (x) and vertical (y) position appears in the text box. When selected, the access point details are displayed in the right pane. The Selected AP Details page shows the following:
 - **Position by 3 points**—You can draw three points on the floor map and position AP using the points created. To do this:
 - Click **Position by 3 points**.
 - To define the points, click anywhere on the floor map to start drawing the first point. Click again to finish drawing a point. A pop-up appears to set the distance to first point. Enter the distance in meters and click **Set Distance**.
 - Define the second and third points in the similar way and click **Save**.
 - **Position by 2 Walls**—You can define two walls on the floor map and position AP between the defined walls. This helps you know the position of AP between two walls. This helps you to understand the AP position between the walls.
 - Click **Position by 2 walls**.

- To define the first wall, click anywhere on the floor map to start drawing the line. Click again to finish drawing a line. A pop-up appears to set the distance to first wall. Enter the distance in meters and click **Set Distance**.
- Define the second wall in the similar way and click **Save**.

The AP is placed automatically as per the defined distance between the walls.

- **AP Name Shows**—Shows the AP Name.
- **AP Model**—Indicates the model type of the selected access point.
- **MAC Address**—Displays the MAC address.
- **x**—Enter the horizontal span of the map in feet.
- **y**—Enter the vertical span of the map in feet.
- **AP Height**—Enter the height of the access point.
- **Protocol**—Protocol for this access point: 802.11a/n/ac, 802.11b/g/n (for Hyper Location APs), or 802.11a/b/g/n.
- **Antenna**—Antenna type for this access point.
- **Antenna Image**—Shows the AP image.
- **Antenna Orientation**—Depending on the antenna type, enter the **Azimuth** and **Elevation** orientations in degrees.

- Note**
- For APs with internal antennas, the Azimuth and Elevation values for all radios are locked together; i.e. if you change the settings for one radio, the orientation parameters get copied to other radios as well.
 - Azimuth option does not appear for Omnidirectional antennas because their pattern is nondirectional in azimuth.

- Note** Changing the AP Azimuth, Elevation, and Power level values impact the heat map and coverage values.

Step 8 When you have completed placing and adjusting each access point, click **Save**.

Clicking Save causes the antenna gain on the access point to correspond to the selected antenna. This might cause the radio to reset.

Heatmap is generated based on the new position of the AP.

Step 9 In the Floor Elements panel, next to Access Points, click **Delete**.

The Delete APs page appears which lists all the assigned and places access points.

- Select check box(es) of the access points that you want to delete, and click **Delete Selected**.
- To delete all access points, click **Select All**, and click **Delete Selected**.
- To directly delete an access points from the floor, click the **Delete** icon.

- Use **Quick Filter** and search using the AP name, MAC address, Model, or Controller. The search is case-insensitive. The search result appears in the table. Click the **Delete** icon to delete from the floor area.

Quick View of APs

Hover your mouse cursor over the AP icon on the floor map to view AP details and Rx Neighbor information.

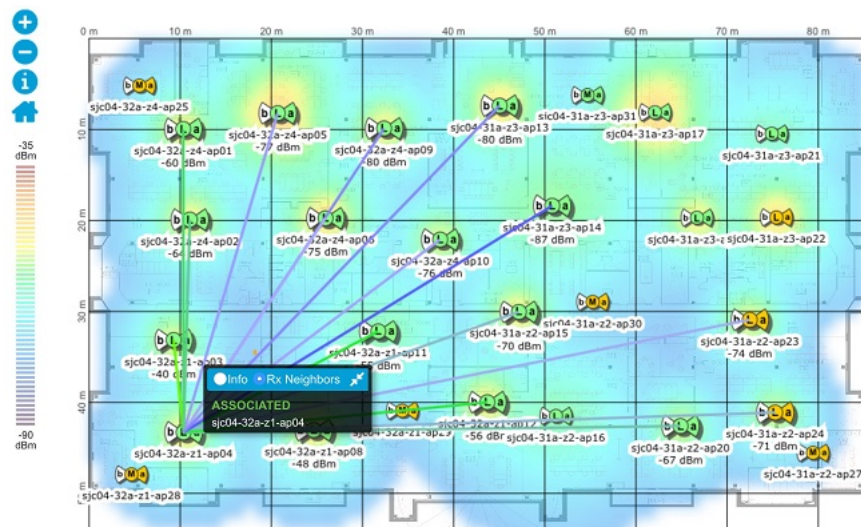
- Select **Info** to view the following AP details :
 - **Associated**—Indicates whether the AP is associated or not.
 - **Name**—Displays the AP Name.
 - **MAC Address**—Displays the AP MAC address.
 - **Model**—Displays the AP Model number.
 - **Op./Admin/Mode**—Displays the operational status and the AP mode.
 - **Type**—Displays the radio type.
 - **Channel**—Displays the channel number of the access point.
 - **Antenna**—Displays the antenna name.
 - **Azimuth**—Displays the direction of the antenna.



Note Prime Infrastructure supports the below mentioned 3rd party tools:

- Ekahau Pro site survey
- VisualRF (from systems like Aruba)
- AirMagnet

-
- Select the **Rx Neighbors** radio button to view the immediate Rx neighbors for the selected AP on the map with a connecting line. It also shows whether the AP is associated or not along with the AP name.



For all non-autonomous APs, the admin status of the radio in Prime Infrastructure maps checks their dot11aConfig/dot11bConfig entry in the database. If the respective dot11aConfig/dot11bConfig is down, then the admin status of the radio appears Down even though the admin status of the radio is Up.

Add, Position, and Delete Choke Points

Choke points are installed and configured as recommended by the Choke point vendor. After the choke point installation is complete and operational, the chokepoint can be entered into the location database and plotted on an Prime Infrastructure map.

-
- Step 1** Choose **Maps > Site Maps (New)**.
- Step 2** From the **Domain Navigator** left sidebar menu, select the applicable floor to open the floor view page.
- Step 3** Click **Edit** at the upper right corner of the page.
- Step 4** In the **Floor Elements** panel, next to Choke Points, click **Add**.
The Add Choke Points page lists all recently added chokepoints that are in the database but are not yet mapped.
- Select check box(es) of the choke point that you want to add to place on the floor map and click **Add Selected**.
 - To add all choke points, click **Select All**, and click **Add Selected**.
 - You can search for choke points using the search option available. Use **Quick Filter** and search using the name, MAC address, or IP address. The search is case-insensitive. The search result appears in the table. Select the chokepoint check box and click **Add Selected**.
- Step 5** Close the Add Choke points window after assigning access points to the floor area.
- Step 6** The choke points that you added to the floor map appears on the right side of the map. You are now ready to position them on the map.
- Step 7** In the **Floor Elements** pane, next to Choke Points, click **Position** to place them correctly on the map.
- Left-click the chokepoint icon and drag it to the proper location on the map.
 - The MAC address, name, and coverage range of the chokepoint appear in the dialog box when you click the chokepoint icon for placement.

- Click **Save**. You are returned to the floor map and the added chokepoint appears on the map.

Note The newly created chokepoint icon might or might not appear on the map depending on the display settings for that floor. If the choke point does not appear on the map, ensure that the Choke Points toggle is set to On in the Display Settings > Overlay Objects.

Note The rings around the chokepoint icon indicate the coverage area. When a CCX tag and its asset passes within the coverage area, location details are broadcast, and the tag is automatically mapped on the chokepoint coverage circle. When the tag moves out of the chokepoint range, its location is calculated as before and is no longer mapped on the chokepoint rings.

Note The MAC address, name, entry/exit chokepoint, static IP address, and range of the chokepoint appear when you hover your mouse cursor over its map icon.

Note Do not click Save Settings unless you want to save this display criteria for all maps.

You must synchronize the network design to the mobility services engine or location server to push chokepoint information.

Step 8 In the Floor Elements panel, next to choke Points, click **Delete**.

The Delete choke points page appears which lists all the assigned and places choke points.

- Select check box(es) of the choke points that you want to delete, and click **Delete Selected**.
- To delete all choke points, click **Select All**, and click **Delete Selected**.
- To directly delete a choke point from the floor, click the **Delete** icon.
- Use Quick Filter and search using the Name, MAC address, or IP address. The search is case-insensitive. The search result appears in the table. Click the Delete icon to delete from the floor area.

Step 9 Click **(i)** sign to launch the AP 360° view.

Add, Position, and Delete WiFi TDOA Receivers

The Wi-Fi TDOA receiver is an external system designed to receive signals transmitted from a tagged, tracked asset. These signals are then forwarded to the mobility services engine to aid in the location calculation of the asset. TDOA receivers use the method of Time Difference of Arrival (TDOA) to calculate tag location. This method uses data from a minimum of three TDOA receivers to generate a tagged asset location.

Step 1 Choose **Maps > Site Maps (New)**.

Step 2 From the **Domain Navigator** left sidebar menu, select the applicable floor to open the floor view page.

Step 3 Click **Edit** at the upper right corner of the page.

Step 4 In the **Floor Elements** panel, next to Wifi TDOA Receivers, click **Add**.

The Add Wifi TDOA Receivers page lists all recently added Wi-Fi TDOA receivers that are in the database but are not yet mapped.

- Select check box(es) of the Wifi TDOA receivers that you want to add to place on the floor map and click **Add Selected**.
- To add all Wifi TDOA Receivers points, click **Select All**, and click **Add Selected**.

- You can search for a Wifi TDOA receiver using the search option available. Use the **Quick Filter** and search using the Name, MAC address, or IP Address. The search is case-insensitive. The search result appears in the table. Select the Wifi TDOA receiver check box and click **Add Selected**.

Step 5 A map appears with a green WiFi TDOA receiver icon located in the top left-hand corner. You are now ready to position the Wi-Fi TDOA receiver on the map.

Step 6 Each access point that you added to the floor map appears on the right side of the map. You need to position them correctly.

Step 7 In the **Floor Elements** pane, next to Wifi TDOA Receivers, click **Position** to place them correctly on the map.

- Left-click the Wifi TDOA receiver icon and drag it to the proper location on the map.
- The MAC address and name of the Wi-Fi TDOA receiver appear in the left pane when you click the WiFi TDOA receiver icon for placement.
- Click **Save** when the icon is placed correctly on the map. The MAC address of the Wi-Fi TDOA receiver appears when you hover your mouse cursor over its map icon.

If the Wifi TDOA receivers does not appear on the map, ensure that the Wifi TDOA Receivers toggle is set to **On** in the **Display Settings > Overlay Objects**.

Step 8 In the Floor Elements panel, next to Wifi TDOA Receivers, click **Delete**. The Delete Wifi TDOA Receivers page appears which lists all the assigned and placed Wifi TDOA Receivers.

- Select check box(es) of the Wifi TDOA Receivers that you want to delete, and click **Delete Selected**.
- Use the **Quick Filter** and search using the Name, MAC address, or IP Address. The search is case-insensitive. The search result appears in the table. Click the **Delete** icon to delete the choke point from the floor area.

Add Coverage Area

Any floor area or outside area defined as part of a building map is by default considered a wireless coverage area.

If you have a building that is non-rectangular or you want to mark a non-rectangular area within a floor, you can use the map editor to draw a coverage area or a polygon-shaped area.

Step 1 Choose **Maps > Site Maps (New)**.

Step 2 From the **Domain Navigator** left sidebar menu, select the applicable floor to open the floor view page.

Step 3 Click **Edit** at the upper right corner of the page.

Step 4 In the **Overlays** panel, next to Coverage Areas, click **Add**. A pop-up appears.

Step 5 To draw a coverage area, from the **Type** drop-down list, choose **Coverage Area**.

- Enter the name of the area you are defining, and click **Ok**.
- Move the drawing tool to the area you want to outline.
 - Click the left mouse button to begin and end drawing a line.
 - When you have completely outlined the area, double-click the left mouse button and the area is highlighted in the page.

The outlined area must be a closed object to appear highlighted on the map.

- Click **Save** to save the newly drawn area.

- Step 6** To draw a polygon-shaped area, from the **Type** drop-down list, choose **Perimeter**.
- Enter the name of the area you are defining, and click **Ok**.
 - Move the drawing tool to the area you want to outline.
 - Click the left mouse button to begin and end drawing a line.
 - When you have completely outlined the area, double-click the left mouse button and the area is highlighted in the page.
- Step 7** To edit a coverage area, in the **Overlays** panel, next to Coverage Areas, click **Edit**.
- The available coverage areas are highlighted on the map.
 - Make the changes and click **Save** after the changes.
- Step 8** To delete a coverage area, in the **Overlays** panel, next to Coverage Areas, click **Delete**.
- The available coverage areas are highlighted on the map.
 - Hover your mouse cursor on the coverage area and click delete.
 - Click **Save** after the deletion.
-

Create Obstacles

You to create obstacles so that they can be taken into consideration while computing RF prediction heatmaps for access points.

- Step 1** Choose **Maps > Site Maps (New)**.
- Step 2** From the **Domain Navigator** left sidebar menu, select the applicable floor to open the floor view page.
- Step 3** Click **Edit** at the upper right corner of the page.
- Step 4** In the **Overlays** panel, next to Obstacles, click **Add**.
- Step 5** In the **Obstacle Creation** window, select an Obstacle Type from the **Obstacle Type** drop-down list. The type of obstacles you can create are: Thick Wall, Light Wall, Heavy Door, Light Door, Cubicle, and Glass.
- Step 6** Click **Add Obstacle**.
- Step 7** Move the drawing tool to the area where you want to create an obstacle.
- Click the left mouse button to begin and end drawing a line.
 - When you have completely outlined the area, double-click the left mouse button and the area is highlighted in the page.
 - Click **Done**.
 - The outlined area must be a closed object to appear highlighted on the map.
 - Click **Save** to save the obstacle.

Step 8 To edit an obstacle, In the **Overlays** panel, next to Obstacles, click **Edit**.

- All the available obstacles are highlighted on the map.
- Click **Save** after the changes.

Step 9 To delete an obstacle, In the **Overlays** panel, next to Obstacles, click **Delete**.

- All the available obstacles are highlighted on the map.
- Hover your mouse cursor on the obstacle and click to delete.
- Click **Save** after the deletion.

Place Markers

Step 1 Choose **Maps > Site Maps (New)**.

Step 2 From the **Domain Navigator** left sidebar menu, select the applicable floor to open the floor view page.

Step 3 Click **Edit** at the upper right corner of the page.

Step 4 In the **Overlays** panel, next to Markers, click **Add**.

Step 5 Enter the name for the markers, and then click **Add Marker**. A drawing icon appears.

Step 6 Click the drawing icon and place the marker on the map.

Step 7 Click **Save**.

Step 8 To resynchronize Prime Infrastructure and mobility services engine, choose **Services > Synchronize Services**.

Step 9 In the **Overlays** panel, next to Markers, click **Edit**.

- The available markers are highlighted on the map.
- Make changes, and click **Save**.

Step 10 In the **Overlays** panel, next to Markers, click **Delete**.

- All the available markers are highlighted on the map.
- Hover your mouse cursor on the marker you want to delete, and click to delete.

Step 11 Click **Save** after the deletion.

Location Region Creation

You can create inclusion and exclusion area to further refine location calculations on a floor. You can define the areas that are included (inclusion areas) in the calculations and those areas that are not included (exclusion areas). For example, you might want to exclude areas such as an atrium or stairwell within a building but include a work area (such as cubicles, labs, or manufacturing floors).

Define Inclusion Region on a Floor

Area within a floor or outside area map where wireless coverage data, such as signal strength, will be either mapped (included) or ignored (excluded).

-
- Step 1** Choose **Maps > Site Maps (New)**.
- Step 2** From the **Domain Navigator** left sidebar menu, select the applicable floor to open the floor view page.
- Step 3** Click **Edit** at the upper right corner of the page.
- Step 4** In the **Overlays** panel, next to Location Regions, click **Add**.
- Step 5** In the **Location Region Creation** window, select **Inclusion Type** drop-down list.
- Step 6** Click **Location Region**. A drawing icon appears to outline the inclusion area.
- Step 7** To begin defining the inclusion area, move the drawing icon to a starting point on the map and click once.
- Step 8** Move the cursor along the boundary of the area you want to include and click to end a border line. Click again to define the next boundary line.
- Step 9** Repeat Step 8 until the area is outlined and then double-click the drawing icon. A solid aqua line defines the inclusion area.
- Step 10** Choose **Save** to save the inclusion region.
- Step 11** Select the **Location Regions** check box if it is not already selected. If you want it to apply to all floor maps, click **Save settings**. Close the Layers configuration page.
- Step 12** To resynchronize Prime Infrastructure and MSE databases, choose **Services > Mobility Services > Synchronize Services**.
- Note** If the two DBs are already synchronized then a resynchronization happens automatically every time there is a change. There is no need for an explicit resynch.
- Step 13** In the Synchronize page, choose **Network Designs** from the **Synchronize** drop-down list and then click **Synchronize**. You can confirm that the synchronization is successful by viewing two green arrows in the Sync. Status column.
- Note** Newly defined inclusion and exclusion regions appear on heatmaps only after the mobility services engine recalculates location.
-

Define Exclusion Region on a Floor

To further refine location calculations on a floor, you can define areas that are excluded (exclusion areas) in the calculations. For example, you might want to exclude areas such as an atrium or stairwell within a building. As a rule, exclusion areas are generally defined within the borders of an inclusion area.

To define an exclusion area, follow these steps:

-
- Step 1** Choose **Maps > Site Maps (New)**.
- Step 2** From the **Domain Navigator** left sidebar menu, select the applicable floor to open the floor view page.
- Step 3** Click **Edit** at the upper right corner of the page.
- Step 4** In the **Overlays** panel, next to Location Regions, click **Add**.
- Step 5** In the **Location Region Creation** window, select **Exclusion Type** drop-down list
- Step 6** Click **Location Region**. A drawing icon appears to outline the exclusion area.
- Step 7** To begin defining exclusion area, move the drawing icon to a starting point on the map and click once.
- Step 8** Move the drawing icon along the boundary of the area you want to exclude. Click once to start a boundary line, and click again to end the boundary line.

- Step 9** Repeat Step 8 until the area is outlined and then double-click the drawing icon. The defined exclusion area is shaded in purple when the area is completely defined. The excluded area is shaded in purple.
- Step 10** To define additional exclusion regions, repeat Step 5 to Step 9.
- Step 11** When all exclusion areas are defined, choose **Save** to save the exclusion region.
- Step 12** Select the **Location Regions** check box if it is not already selected, click **Save settings**, and close the Layers configuration page when complete.
- Step 13** To resynchronize Prime Infrastructure and location databases, choose **Services > Synchronize Services**.
- Step 14** In the **Synchronize** page, choose **Network Designs** from the **Synchronize** drop-down list and then click **Synchronize**. You can confirm that the synchronization is successful by viewing two green arrows in the Sync. Status column.

Edit Location Regions

In the **Overlays** panel, next to Location Regions, click **Edit**.

- The available location regions are highlighted on the map.
- Make changes, and click **Save**.

Delete Location Regions

In the **Overlays** panel, next to Location Regions, click **Delete**.

- The available location regions are highlighted on the map.
- Hover your mouse cursor on the location region you want to delete, and click to delete.
- Click **Save**.

Rail Creation

You can define a rail line on a floor that represents a conveyor belt. Additionally, you can define an area around the rail area known as the snap-width to further assist location calculations. This represents the area in which you expect clients to appear. Any client located within the snap-width area is plotted on the rail line (majority) or just outside of the snap-width area (minority).

The snap-width area is defined in feet or meters (user-defined) and represents the distance that is monitored on either side (east and west or north and south) of the rail.

- Step 1** Choose **Maps > Site Maps (New)**.
- Step 2** From the **Domain Navigator** left sidebar menu, select the applicable floor to open the floor view page.
- Step 3** Click **Edit** at the upper right corner of the page.
- Step 4** In the **Overlays** panel, next to Location Regions, click **Add**.
- Step 5** Enter a snap-width (feet or meters) for the rail and then click **Add Rail**. A drawing icon appears.

- Step 6** Click the drawing icon at the starting point of the rail line. Click again when you want to stop drawing the line or change the direction of the line.
- Step 7** Click the drawing icon twice when the rail line is completely drawn on the floor map. The rail line appears on the map and is bordered on either side by the defined snap-width region.
- To delete a rail line, click the area to be deleted. The selected area is outlined by a dashed purple line. Next, click the X icon on the toolbar. The area is removed from the floor map.
- Step 8** Click **Save**.
- Step 9** To resynchronize Prime Infrastructure and mobility services engine, choose **Services > Synchronize Services**.
- Step 10** In the **Synchronize** page, choose **Network Designs** from the **Synchronize** drop-down list and then click **Synchronize**. You can confirm that the synchronization is successful by viewing two green arrows in the Sync. Status column.
- Step 11** In the **Overlays** panel, next to Rails, click **Edit**.
- The available rails are highlighted on the map.
 - Make changes, and click **Save**.
- Step 12** In the **Overlays** panel, next to Rails, click **Delete**.
- All the available rail lines are highlighted on the map.
 - Hover your mouse cursor on the rail line you want to delete, and click to delete.
- Step 13** Click **Save** after the deletion.
-

Place GPS Markers

Before you begin

The X, Y coordinates for each GPS marker are linear measures (feet or meter) of the position relative to the North West (upper left) corner of the floor. These X, Y coordinates have corresponding latitude and longitude values. For each GPS marker, there must be no discrepancies in its latitude and longitude. A warning message appears if the latitude and longitude values do not match the co-ordinate (X,Y) distances.

When there are several GPS markers on the floor (three or more), for all of them the X, Y, latitude, longitude must agree with each other, and with the latitude and longitude of the floor.

If the floor is positioned at 0,0 co-ordinates inside the building, the latitude and longitude of the floor are the same as that of the building. Here, the NW corner of the floor coincides with the NW corner of the building.

Ensure that the latitude/longitude and horizontal/vertical regions are accurate before adding the GPS markers

- Step 1** Choose **Maps > Site Maps (New)**.
- Step 2** From the **Domain Navigator** left sidebar menu, select the applicable floor to open the floor view page.
- Step 3** Click **Edit** at the upper right corner of the page.
- Step 4** In the **Overlays** panel, next to GPS Markers, click **Add**.
- Step 5** Enter the name for the GPS markers.
- Step 6** Enter the value for Latitude and Longitude. GPS Markers identify the campus, building, or floor by longitude and latitude.

- Step 7** Click **Add GPS Marker**.
- Step 8** Click the drawing icon and place the GPS marker on the map.
- Step 9** Click **Save**.
- Step 10** In the **Overlays** panel, next to GPS Markers, click **Edit**.
- The available markers are highlighted on the map.
 - Make changes, and click **Save**.
- Step 11** In the **Overlays** panel, next to GPS Markers, click **Delete**.
- All the available GPS markers are highlighted on the map.
 - Hover your mouse cursor on the GPS marker you want to delete, and click to delete.
- Step 12** Click **Save** after the deletion.
-

Use Floor Tools

Use Monitoring Tools

Track Client Movement Using Client Playback

You can track the movement of a client on a floor using the Client Playback feature in Cisco Prime Infrastructure. Note that this feature is only available for clients detected by CMX.

To see a client's movement in a floor, follow the below procedure:

-
- Step 1** Click **Maps > Wireless Maps > Site Maps**.
- Step 2** Select **Campus > Building > Floor**.
- Step 3** Add the APs that have the associated or probing clients.
- Step 4** Click **Services > Mobility Services > Connected Mobile Experiences**.
- Step 5** Export the maps and import them to CMX.
- Step 6** Navigate to the desired sitemap and synchronize the floor with CMX.
- Step 7** Click the desired client on the floor.
- Step 8** Click **Data > Client > Playback**.
The map will display client's movement over a period of time.
-

Inspect Location Readiness

You can configure Prime Infrastructure to verify the ability of the existing access point deployment to estimate the true location of a client, rogue client, rogue access point, or tag within 10 meters at least 90% of the time. The location readiness calculation is based on the number and placement of access points.

You can also check the location quality and the ability of a given location to meet the location specification (10 m, 90%) based on data points gathered during a physical inspection and calibration.

The Inspect Location Readiness feature is a distance-based predictive tool that can point out problem areas with access point placement.

Step 1 Choose **Maps > Site Maps (New)**.

Step 2 From the **Domain Navigator** left sidebar menu, select the applicable floor to open the floor view page.

Step 3 Click **Tools** at the upper right corner of the page, and click **Inspect Location Readiness**.

The deprecated Site Maps page opens. A color-coded map appears showing those areas that meet (indicated by Yes) and do not meet (indicated by No) the ten meter, 90% location specification.

Note If RSSI is not displayed, you can enable AP Heatmaps by selecting the AP Heatmaps check box on the left sidebar menu.

Note If clients, tags, and access points are not displayed, verify that their respective check boxes are selected on the left sidebar menu. Licenses for both clients and tags must also be purchased for each to be tracked.

Inspect Voice Readiness

The voice readiness tool allows you to check the RF coverage to determine if it is sufficient for your voice needs. This tool verifies RSSI levels after access points have been installed.

Step 1 Choose **Maps > Site Maps (New)**.

Step 2 From the **Domain Navigator** left sidebar menu, select the applicable floor to open the floor view page.

Step 3 Click **Tools** at the upper right corner of the page, and click **Inspect Voice Readiness**.

The deprecated Site Maps page opens.

Step 4 Choose the applicable Band, AP Transmit Power, and Client parameters from the drop-down lists.

Note By default, the region map displays the b/g/n band for Cisco Phone-based RSSI threshold. The new settings cannot be saved.

Step 5 Depending on the selected client, the following RSSI values might not be editable:

- Cisco Phone—RSSI values are not editable.
- Custom—RSSI values are editable with the following ranges:
 - Low threshold between -95dBm to -45dBm
 - High threshold between -90dBm to -40dBm

Step 6 The following color schemes indicate whether or not the area is voice ready:

- Green—Yes
- Yellow—Marginal
- Red—No

The accuracy of the Green/Yellow/Red regions depends on the RF environment and whether or not the floor is calibrated. If the floor is calibrated, the accuracy of the regions is enhanced.

RF Calibration Methods

Step 1 Choose **Maps > Site Maps (New)**.

Step 2 From the **Domain Navigator** left sidebar menu, select the applicable floor to open the floor view page.

Step 3 Click **Tools** at the upper right corner of the page, and click **Inspect Voice Readiness**.

The deprecated Site Maps page opens. On the RF Calibration Models page, you can:

- Apply calibration models to maps
 - View calibration model properties
 - Edit calibration model details
-

Adjust RF Calibration Models Used in Wireless Maps

Prime Infrastructure provides multiple RF models to characterize the attenuation characteristics of the floor areas in the wireless site maps you create. These calibration models are used as RF overlays with measured RF signal characteristics that can be applied to different floor areas. If none of these is precise enough for your needs, you can create one or more custom calibration models that better represent the attenuation characteristics of your actual floor areas and then apply them to your maps of these floor areas. This enables your team to:

- Lay out one or more floors in a real-world building.
- Use the RF calibration tool to measure the RF attenuation characteristics of the actual floor.
- Save the RF characteristics of that floor as a new calibration model.
- Apply that calibration model to all the other floors with the same physical layout.

You can collect data for a calibration using one of two methods:

- Point mode data collection—Calibration points are selected and their coverage area is calculated one location at a time.
- Linear mode data collection—A series of linear paths are selected and then calculated as you traverse the path. This approach is generally faster than point mode. You can also employ point mode data collection to augment data collection for locations missed by the linear paths.

Calibration models can only be applied to clients, rogue clients, and rogue access points. Calibration for tags is done using the Aeroscout System Manager (for more information on this product and how to use it, send an email inquiry to cisco-rtls@cisco.com).

Use a laptop or other wireless device to open a browser to a Prime Infrastructure server and perform the calibration process.

To expedite the calibration process for both spectrums, Cisco recommends using a client device that supports both 802.11a/n and 802.11b/g/n radios.

For more information on the calibration process, see the following related topics.

- View the List of Current RF Calibration Models
- Accessing Current Calibration Models
- Apply Wireless Calibration Models to Wireless Site Maps
- View RF Calibration Model Properties
- Create New RF Calibration Models
- Calibrate, Compute and Apply New RF Calibration Models
- Compute Collected "Live" Data Points for New RF Calibration Models
- Apply Fully Calibrated New RF Calibration Models to Floor Areas in Wireless Site Maps
- Delete RF Calibration Models

Create New RF Calibration Models

To create a new calibration model, follow these steps:

-
- Step 1** Choose **Maps > Site Maps**.
 - Step 2** Choose **Select a command > RF Calibration Models > Go**.
 - Step 3** Choose **Select a command > Create New Model > Go**.
 - Step 4** Enter a name for the new RF calibration model, then click **OK**.

The new model appears in the list along with the other RF calibration models, with a status of "Not Yet Calibrated". To calibrate the model, see the related topic "[Calibrate, Compute and Apply New RF Calibration Models](#)"

Calibrate, Compute and Apply New RF Calibration Models

To fully apply a newly created RF calibration model, you must:

1. Collect "live" calibration data.
2. Compute that data so that the model can use it.
3. Apply the model to the floors you want.

To complete this process with a new RF calibration model that you have just created and named (but whose status is "Not Calibrated"), follow the steps below. Before you begin, you will need to have your data collection device enabled, along with a connection to the Prime Infrastructure server. If you are not using the Cisco Centralized architecture, you will also need to know the data collection device's MAC address.

-
- Step 1** Choose **Maps > Site Maps**.
 - Step 2** Choose **Select a command > RF Calibration Models > Go**.

Step 3 Click the model name to open the Calibration Model > *Model Name* page.

Step 4 Choose **Select a command** > **Add Data Points** > **Go**.

Step 5 Enter the MAC address of the device being used to perform the calibration. Manually-entered MAC addresses must be delimited with colons (such as FF:FF:FF:FF:FF:FF).

If this process is being performed from a mobile device connected to Prime Infrastructure through the Cisco Centralized architecture, the MAC address text box is automatically populated with the device address.

Step 6 Choose the appropriate campus and building, and then the floor area, basement level, or outdoor area where you want to perform the calibration. Then click **Next**.

Step 7 When the chosen floor area map and access point (AP) locations appear, a grid of plus marks (+) indicates the locations where data collection must be performed.

Using these locations as guidelines, you can perform either a *point* or *linear* collection of data. You can do this via appropriate placement of either the Calibration Point pop-up (point) or the Start and Finish pop-ups (linear) that appear on the map when the respective options are displayed.

Step 8 To perform a *point* collection of data for the calibration, do the following:

- a) Choose **Collection Method** > **Point** and select the **Show Data Points** check box (if not already selected). A Calibration Point pop-up appears on the map.
- b) Position the tip of the Calibration Point pop-up at one of the data points on the map (+), and click **Go**. A dialog box appears showing the progress of the data collection.

Rotate the calibrating client laptop during data collection so that the client is heard evenly by all APs in the vicinity.

- c) When the data collection is complete for a selected data point and the coverage area is plotted on the map, move the Calibration Point pop-up to another data point, and click **Go**.

The coverage area plotted on the map is color-coded and corresponds with the specific wireless LAN standard used to collect the data. Information on color-coding is provided in legend on the left side of the page. Additionally, the progress of the calibration process is indicated by two status bars above the legend, one for 802.11a/n and one for 802.11b/g/n.

To delete data points for locations selected in error, click **Delete** and move the black square that appears over the appropriate data points. Resize the square as needed by pressing **Ctrl** and then moving the mouse.

- d) Repeat point collection Steps A through C until the calibration status bar of the relevant spectrums (802.11a/n, 802.11b/g/n) display as "Done".

The calibration status bar indicates data collection for the calibration as done after roughly 50 distinct locations and 150 measurements have been gathered. For every location point saved in the calibration process, more than one data point is gathered. The progress of the calibration process is indicated by two status bars above the legend, one for 802.11b/g/n and one for 802.11a/n.

Step 9 To perform a *linear* collection of data for the calibration, do the following:

- a) Choose **Collection Method** > **Linear** and select the **Show Data Points** check box (if not already selected). A line appears on the map with both Start and Finish pop-ups.
- b) Position the tip of the Start pop-up at the starting data point.
- c) Position the Finish pop-up at the ending data point.
- d) Position yourself with your laptop at the starting data point, and click **Go**. Walk slowly and steadily toward the end point along the defined path. A dialog box appears to show that data collection is in process.

Do not stop data collection until you reach the end point, even if the data collection bar indicates completion.

Only Intel and Cisco adapters have been tested with this method. Make sure that both **Enable Cisco-compatible Extensions** and **Enable Radio Management Support** are enabled in the Cisco-compatible Extension Options.

- e) Press the space bar (or **Done** on the data collection panel) when you reach the end point. The collection pane displays the number of samples taken before it closes to reveal the map. The map displays all the coverage areas where data was collected.

To delete data points for locations selected in error, click **Delete** and move the black square that appears over the appropriate data points. Resize the square as needed by pressing **Ctrl** and then moving the mouse.

The coverage area is color-coded and corresponds with the specific wireless LAN standard used to collect that data. Information on color-coding is provided in legend on the left-hand side of the page.

- f) Repeat linear collection Steps B through E until the status bar for the respective spectrum is filled in (done).

You can augment linear collection with point mode data collection to address missed coverage areas.

Step 10 When you are finished collecting data points, click the name of the calibration model at the top of the page to display the model again.

If needed, you can now stop and complete the computation and application of the stored data points at a later time. If you decide to do this, continue by following the instructions in the related topics "Compute Collected "Live" Data Points for New RF Calibration Models" and then "Apply Fully Calibrated New RF Calibration Models to Floor Areas in Wireless Site Maps".

Step 11 To calibrate the model against the collected data points: Choose **Select a command > Calibrate > Go**.

Step 12 When calibration processing completes, click the **Inspect Location Quality** link. A map displays showing RSSI readings.

Step 13 To apply the newly calibrated model to the wireless site map floor area on which it was created (and to any other floor areas with similar attenuation characteristics): Choose **Maps > Site Maps**. On the Maps page, choose the link that corresponds to the floor area where you want to apply the new RF calibration model.

Step 14 With the floor area map displayed, choose **Select a command > Edit Floor Area > Go**.

Step 15 From the **Floor Type (RF Model)** drop-down list, choose the newly created calibration model. Click **OK** to apply the model to the floor.

This process can be repeated for as many models and floors as needed. After an RF calibration model is applied to a floor, all location determination performed on that floor is done using the RF attenuation data in the calibration model.

Compute Collected "Live" Data Points for New RF Calibration Models

To compute previously collected calibration data so that it can be used with an RF calibration model, follow these steps:

Step 1 Choose **Maps > Site Maps**.

Step 2 From the Select a command drop-down list, choose **RF Calibration Models**, then click **Go**.

Step 3 Click the name of the model for which "live" data points were previously collected. The Calibration Model > Model Name page displays the RF calibration model you selected.

Step 4 From the **Select a command** drop-down list, choose **Calibrate** and click **Go**.

Step 5 When calibration processing completes, click the **Inspect Location Quality** link. A map displays showing RSSI readings.

Apply Fully Calibrated RF Calibration Models to Floors in Wireless Site Maps

To use a new RF calibration model, you must apply the model to the floor on which it was created (along with other floors with similar attenuation characteristics).

To apply the model to the floor, follow these steps:

- Step 1** Choose **Maps > Site Maps**.
- Step 2** Locate the specific floor to which the model is applied.
- Step 3** From the Select a command drop-down list, choose **Edit Floor Area**, then click **Go**.
- Step 4** From the **Floor Type (RF Model)** drop-down list, choose the newly-created RF calibration model.
- Step 5** Click **OK** to apply the model to the floor.

This process can be repeated for as many models and floors as needed. After a model is applied to a floor, all location determination performed on that floor is done using the specific collected attenuation data from the calibration model.

Delete RF Calibration Models

To delete a calibration model, follow these steps:

- Step 1** Choose **Maps > Site Maps**.
 - Step 2** Choose **Select a command > RF Calibration Models > Go**. The list of current RF calibration models displays.
 - Step 3** Click the name of the model you want to delete. The Calibration Model > *Model Name* page displays.
 - Step 4** Choose **Select a command > Delete Model > Go**. Prime Infrastructure deletes the calibration model.
-

View RF Calibration Model Properties

To view or edit current calibration models, follow these steps:

- Step 1** Choose **Maps > Site Maps**.
- Step 2** Choose **Select a command > RF Calibration Models > Go**.
- Step 3** Click the model name to access the RF calibration model whose properties you want to view or change.
- Step 4** To view or edit the selected model's properties:
 - a) Choose **Select a command > Properties > Go**.

You can view or edit the following properties:

- Sweep Client Power for Location—Click to enable. You might want to enable this if a high density of access points (APs) exists and transmit power is reduced or unknown. Using the sweep range may improve location data accuracy, but scalability will be affected negatively.

- HeatMap Binsize—Choose 4, 8, 16, or 32 from the drop-down list.
- HeatMap Cutoff—Determine the heatmap cutoff. Cisco recommends a low heatmap cutoff especially if the AP density is high and RF propagation conditions are favorable. A higher cutoff value increases scalability but might cause difficulty when locating clients.

Step 5 When you are finished, click **OK**.

Apply RF Calibration Models to Wireless Site Maps

To apply a current calibration model to a map, follow these steps:

Step 1 Choose **Maps > Site Maps**.

Step 2 Choose **Select a command > RF Calibration Models > Go**. The Model Name and Status for each calibration model are listed.

Step 3 Click the model name to access the RF calibration model you want.

Step 4 Choose **Select a command > Apply to Maps > Go**.

Using Planning Mode

You can calculate the recommended number and location of access points based on whether data and/or voice traffic and/or location are active.

Based on the throughput specified for each protocol (802.11a or 802.11 b/g), planning mode calculates the total number of access points required that would provide optimum coverage in your network.

Step 1 Choose **Maps > Site Maps (New)**.

Step 2 From the **Domain Navigator** left sidebar menu, select the applicable floor to open the floor view page.

Step 3 Click **Tools** at the upper right corner of the page, and click **Planning Mode**.

Planning mode does not use AP type or Antenna pattern information for calculating the number of access points required. The calculation is based on the access point coverage area or the number of users per access point.

Planning Mode options are:

- Add APs—Enables you to add access points on a map. See the Using Planning Mode to Calculate Access Point Requirements for details.
- Delete APs—Deletes the selected access points.
- Map Editor—Opens the Map Editor window. See the Using the Map Editor for more details.
- Synchronize with Deployment—Synchronizes your planning mode access points with the current deployment scenario.
- Generate Proposal—View a planning summary of the current access points deployment.

- **Planned AP Association Tool**—Allows you to perform add, delete or import an AP Association from an excel or CSV file. Once an access point is defined, it can be associated to a base radio MAC address using the Planned AP Association Tool. If the AP is not discovered they get pushed into a standby bucket and get associated when discovered.

Note AP association is subjected to a limitation that AP should not belong to any floor or outdoor area. If the AP is already assigned to a floor or outdoor area, then the standby bucket holds the AP and when removed from the floor or outdoor, get positioned to the given floor. One Mac address cannot be put into bucket for multiple floor or outdoor areas.

Step 4 The map synchronization works only if the AP is associated to a base radio MAC address and not to its Ethernet MAC address.

What Does the Wireless Site Map Editor Do?

You use the map editor to define, draw, and enhance floor plan information. The map editor allows you to create obstacles so that they can be taken into consideration while computing RF prediction heatmaps for access points. You can also add coverage areas for location appliances that locate clients and tags in that particular area.

When you launch the map editor from planning mode (Maps > SiteMaps(new) > Floor > Tools > Planning mode > Map editor), the planning mode opens the map editor in the browser window from which the planning tool is launched. Use the **Edit** menu in the floor view to modify and save the changes. After you save the changes, reload or relaunch the Planning Mode window.

- Guidelines for Using the Map Editor
- Guidelines for Placing Access Points
- Guidelines for Inclusion and Exclusion Areas on a Floor
- Opening the Map Editor
- Map Editor Icons
- Using the Map Editor to Draw Coverage Areas
- Using the Map Editor to Draw Obstacles
- Defining an Inclusion Region on a Floor
- Defining an Exclusion Region on a Floor
- Defining a Rail Line on a Floor

Guidelines for Using the Wireless Site Map Editor

Consider the following when modifying a building or floor map using the map editor:

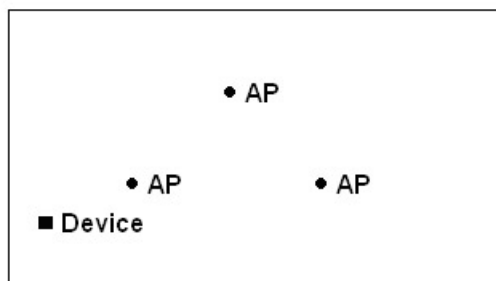
- We recommend that you use the map editor to draw walls and other obstacles rather than importing an FPE file from the legacy floor plan editor.
- If necessary, you can still import FPE files. To do so:

1. Navigate to the desired floor area.
 2. Choose **Select a command** > **Edit Floor Area** > **Go**.
 3. Select the **FPE File** check box.
 4. Browse to the FPE file and click **OK**.
- You can add any number of walls to a floor plan with the map editor. However, the processing power and memory of a client workstation may limit the refresh and rendering aspects of Prime Infrastructure.
 - We recommend a practical limit of 400 walls per floor for machines with 1 GB RAM or less.
 - All walls are used by Prime Infrastructure when generating RF coverage heatmaps.

Guidelines for Placing Access Points

Place access points (APs) along the periphery of coverage areas to keep devices close to the exterior of rooms and buildings. Access points placed in the center of these coverage areas provide good data on devices that would otherwise appear equidistant from all other APs.

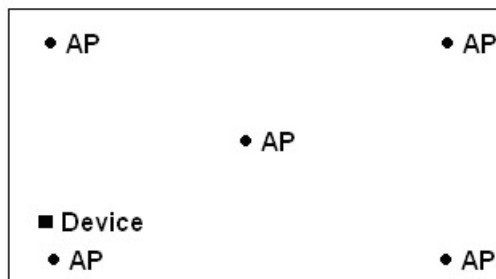
Figure 1: Access Points Clustered Together



142708

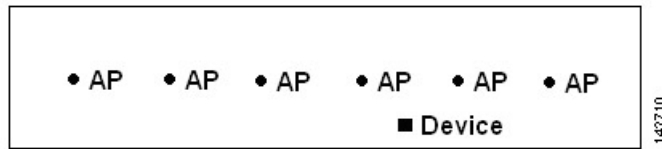
By increasing overall AP density and moving APs towards the perimeter of the coverage area, location accuracy is greatly improved.

Figure 2: Improved Location Accuracy by Increasing Density



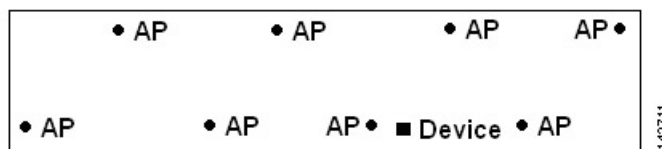
142709

In long and narrow coverage areas, avoid placing APs in a straight line. Stagger them so that each AP is more likely to provide a unique snapshot of a device location.

Figure 3: Refrain From Straight Line Placement

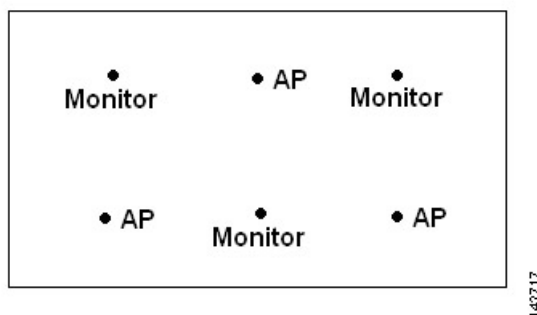
Although the design in might provide enough AP density for high bandwidth applications, location suffers because each AP view of a single device is not varied enough; therefore, location is difficult to determine.

Move the APs to the perimeter of the coverage area and stagger them. Each has a greater likelihood of offering a distinctly different view of the device, resulting in higher location accuracy.

Figure 4: Improved Location Accuracy by Staggering Around Perimeter

Most current wireless handsets support only 802.11b/n, which offers only three non-overlapping channels. Therefore, wireless LANs designed for telephony tend to be less dense than those planned to carry data. Also, when traffic is queued in the Platinum QoS bucket (typically reserved for voice and other latency-sensitive traffic), lightweight APs postpone their scanning functions that allow them to peak at other channels and collect, among other things, device location information. The user has the option to supplement the wireless LAN deployment with APs set to monitor-only mode. Access points that perform only monitoring functions do not provide service to clients and do not create any interference. They simply scan the airwaves for device information.

Less dense wireless LAN installations, such as voice networks, find their location accuracy greatly increased by the addition and proper placement of monitor APs.

Figure 5: Less Dense Wireless LAN Installations

Verify coverage using a wireless laptop, handheld, or phone to ensure that no fewer than three APs are detected by the device. To verify client and asset tag location, ensure that the Prime Infrastructure reports client devices and tags within the specified accuracy range (10 m, 90%).

If you have a ceiling-mounted AP with an integrated omni-directional antenna, the antenna orientation does not really need to be set in Prime Infrastructure. However, if you mount that same AP on the wall, you must set the antenna orientation to 90 degrees.

Guidelines for Placing Inclusion and Exclusion Areas on a Floor Map

Inclusion and exclusion areas can be any polygon shape and must have at least three points.

You can only define one inclusion region on a floor. By default, an inclusion region is defined for each floor area when it is created. The inclusion region is indicated by a solid aqua line, and generally outlines the entire floor area.

You can define multiple exclusion regions on a floor area.

Newly defined inclusion and exclusion regions appear on heatmaps only after the mobility services engine recalculates location.




Launch and Use the Wireless Site Map Editor









Follow these steps to use the map editor:

-
- Step 1** Choose **Maps > Site Maps**.
 - Step 2** Select the desired campus and building.
 - Step 3** Click the desired floor area. The **Site Maps > Campus Name > Building Name > Floor Area Name** page appears.
 - Step 4** Choose **Select a command > Map Editor > Go**. The Map Editor page appears.
Make sure that the floor plan images are properly scaled so that all white space outside of the external walls is removed. To make sure that floor dimensions are accurate, click the **compass tool**.
 - Step 5** Position the reference length. The **Scale Floor** menu appears with the line length supplied. Enter the dimensions (width and height) of the reference length, then click **OK**.
 - Step 6** Determine the propagation pattern from the **Antenna Mode** drop-down list.
 - Step 7** Make antenna adjustments by sliding the antenna orientation bar to the desired degree of direction.
 - Step 8** Choose the desired access point.
 - Step 9** Click **Save**.
-

Wireless Site Map Editor Icons

Table 6: Wireless Site Map Editor Icons

Icon	Description
	Scale Floor—Click anywhere on the map to start drawing a line. Double click to finish the line and enter the new line length in the popup shown. This will modify the floor dimensions to the new dimensions.
	Measure Distance—Click anywhere on the map to start drawing a line. Double click to finish the line. The line length in feet/meters is shown at the top.
	Copy/Move Obstacles—Select obstacles either by drawing a box on the map or by clicking the obstacles. To copy obstacles, click Copy . This will create new obstacles just above the selected obstacles. To move the obstacles, drag the selected obstacles to a new position. Clicking anywhere on the map will unselect all the elements.

Icon	Description
	Delete Mode—Select the elements to be deleted either by drawing a box on the map or clicking each element. Use the Shift key to select multiple elements. Use the Ctrl key to toggle selection of elements, one at a time. Clicking anywhere on the map will unselect all the elements. Click Delete to delete the selected elements
	Modify Mode—Click an element and click the vertices to reshape or drag the element to a new position. Clicking anywhere on the map will unselect the selected element.
	Draw Coverage Area
	Draw Location Region
	Draw Rail
	Draw Obstacle—Click anywhere on the map to start drawing. Double click to finish drawing. Use Ctrl-z to undo, Ctrl-y to redo and 'Esc' key to cancel the current drawing.
	Place Marker
	Navigation—Remove any selected modes such as drawing or editing and switches to navigation mode where you can view the map and perform zooming or panning.

Define Coverage Areas in Wireless Site Maps

If you have a building that is non-rectangular or you want to mark a non-rectangular area within a floor, you can use the map editor to draw a coverage area.

-
- Step 1** Add the floor plan if it is not already represented in Prime Infrastructure.
- Step 2** Choose **Maps > Site Maps**.
- Step 3** Click the Map Name that corresponds to the outdoor area, campus, building, or floor you want to edit.
- Step 4** Choose **Select a command > Map Editor > Go**. The Map Editor page appears.
- Step 5** Click the **Draw Coverage Area** icon on the toolbar.
A pop-up appears.
- Step 6** Enter the name of the area that you are defining, then click **OK**.
A drawing tool appears.
- Step 7** Move the drawing tool to the area you want to outline.
- Click the left mouse button to begin and end drawing a line.
 - When you have completely outlined the area, double-click the left mouse button and the area is highlighted in the page.







The outlined area must be a closed object to appear highlighted on the map.

Step 8 Click the disk icon on the toolbar to save the newly drawn area.

Obstacle Color Coding in Wireless Site Maps

The following table describes the color coding applied to obstacles on wireless site maps, as well as the estimated signal loss used to calculate RF signal strength in the vicinity of these obstacles.

Table 7: Obstacle Color Coding

Type of obstacle	Color coding	Signal Loss (in dB)
Thick wall		13
Light wall		2
Heavy door		15
Light door		4
Cubicle		1
Glass		1.5

Define Inclusion Regions in Wireless Site Maps

To help refine device location information displayed on a floor area in a wireless site map, you can define the regions that you want included (inclusion regions) in location data and regions that you do not want included (exclusion regions). For example, you might want to exclude common areas (such as an atrium or stairwells within a building), but include work areas (such as cubicles, labs, or manufacturing floors).

By default, Prime Infrastructure defines an inclusion region for each newly added floor. When you define a new inclusion region, any previously defined inclusion region is automatically removed. An inclusion region is indicated by a solid aqua line outlining the region.

Step 1 Choose **Maps > Site Maps**.

Step 2 Click the name of the appropriate floor area.

Step 3 Choose **Select a command > Map Editor > Go**.

Step 4 On the map, click the aqua box on the toolbar.

A message box appears reminding you that only one inclusion area can be defined at a time.

- Step 5** Click **OK** in the message box. A drawing icon appears to help you outline the inclusion area.
- Step 6** To begin defining the inclusion area, move the drawing icon to a starting point on the map and click once.
- Step 7** Move the cursor along the boundary of the area you want to include and click to end a border line. Click again to define the next boundary line.
- Step 8** Repeat Step 7 until the area is outlined and then double-click the drawing icon. A solid aqua line defines the inclusion region.
- Step 9** Choose **Save** from the Command menu or click the **disk** icon on the toolbar to save the inclusion region.
- If you made an error in defining the inclusion area, click the area. The selected area is outlined by a dashed aqua line. Next, click the **X** icon on the toolbar. The area is removed from the floor map.
- Step 10** To return to the floor map to enable inclusion regions on heatmaps, choose **Exit** from the Command menu.
- Step 11** Select the **Location Regions** check box if it is not already selected. To apply the changes to all floor maps, click **Save settings**.
- Step 12** To resynchronize Prime Infrastructure and MSE databases, choose **Services > Synchronize Services**. If the two DBs are already synchronized then a resynchronization happens automatically every time there is a change and there is no need for an explicit resynch.
- Step 13** In the Synchronize page, choose **Synchronize > Network Designs**, then click **OK**. You can confirm that the synchronization is successful by viewing two green arrows in the Sync Status column.
- Newly defined inclusion and exclusion regions appear on heatmaps only after the mobility services engine recalculates location.

Define Exclusion Regions in Wireless Site Maps

To refine location calculations on a floor, you can define regions that are excluded (exclusion regions) from the calculations. For example, you might want to exclude areas such as an atrium or stairwell within a building. As a rule, exclusion regions are generally defined within the borders of an inclusion region.

-
- Step 1** Choose **Maps > Site Maps**.
- Step 2** Click the name of the appropriate floor area.
- Step 3** Choose **Select a command > Map Editor > Go**. The Map Editor page appears.
- Step 4** At the map, click the purple box on the toolbar.
- Step 5** Click **OK** in the message box that appears. A drawing icon appears to help you outline the exclusion region.
- Step 6** To begin defining the exclusion region, move the drawing icon to the starting point on the map, and click once.
- Step 7** Move the drawing icon along the boundary of the region you want to exclude. Click once to start a boundary line, and click again to end the boundary line.
- Step 8** Repeat Step 7 until the region is outlined and then double-click the drawing icon. The defined exclusion region is shaded in purple when the region is completely defined.
- Step 9** To define additional exclusion regions, repeat Step 5 to Step 8.
- Step 10** When all exclusion regions are defined, choose **Save** from the Command menu or click the **disk** icon on the toolbar to save the exclusion region.
- To delete an exclusion region, click the region to be deleted. The selected region is outlined by a dashed purple line. Next, click the **X** icon on the toolbar. The region is removed from the floor map.

- Step 11** To return to the floor map to enable exclusion regions on heatmaps, choose **Exit** from the Command menu.
- Step 12** Select the **Location Regions** check box if it is not already selected, click **Save settings**, and close the Layers configuration page when complete.
- Step 13** To resynchronize Prime Infrastructure and location databases, choose **Services > Synchronize Services**.
- Step 14** In the Synchronize page, choose **Synchronize > Network Designs** and then click **Synchronize**. You can confirm that the synchronization is successful by viewing the green arrows in the **Sync. Status** column.
-

Define Rail Lines in Wireless Site Maps

You can define rail lines on any floor area. Rail lines help you streamline location calculations and summarize the display of location data on wireless clients who are constantly on the move and for whom you do not require precise location data (such as for handheld wireless devices on a busy manufacturing floor area or outside construction site).

You can also define an area around the rail line known as the snap width. The snap width represents the area in which you expect roaming clients to appear. The snap-width represents the distance that is monitored on either side (either east/west or north/south) of the rail. Any client located within the snap-width area is either plotted directly on the rail line (the majority of roaming clients) or just outside of the snap-width area (minority).

Rail lines do not apply to tags. You can choose to define the snap-width area in either feet or meters.

- Step 1** Choose **Maps > Site Maps**.
- Step 2** Click the name of the appropriate floor area.
- Step 3** Choose **Select a command > Map Editor > Go**. The Map Editor page appears.
- Step 4** In the map, click the **rail** icon (to the right of the purple exclusion-area icon) on the toolbar.
- Step 5** In the message dialog box that appears, enter a snap-width (feet or meters) for the rail and then click **OK**. A drawing icon appears.
- Step 6** Click the drawing icon at the starting point of the rail line. Click again when you want to stop drawing the line or change the direction of the line.
- Step 7** Click the drawing icon twice when the rail line is completely drawn on the floor map. The rail line appears on the map and is bordered on either side by the defined snap-width region.
- To delete a rail line, click the area to be deleted. The selected area is outlined by a dashed purple line. Next, click the **X** icon on the toolbar. The area is removed from the floor map.
- Step 8** To return to the floor map to enable rails on heatmaps, choose **Exit** from the Command menu.
- Step 9** With the floor map displayed, choose the **Layers** drop-down list.
- Step 10** Select the **Rails** check box if it is not already selected, then click **Save settings**, and close the **Layers** configuration pane when complete.
- Step 11** To resynchronize Prime Infrastructure and mobility services engine, choose **Services > Synchronize Services**.
- Step 12** In the Synchronize page, choose **Synchronize > Network Designs** and then click **Synchronize**.
- You can confirm that the synchronization is successful by viewing the green arrows in the **Sync. Status** column.
-

Search Wireless Site Maps

You can use the following parameters in the Search Maps page:

- Search for
- Map Name
- Search in
- Save Search
- Items per page

After you click **Go**, the map search results page appears, with the options shown in the following table.

Table 8: Wireless Site Map Search Results

Field	Options
Name	Clicking an item in the Name column provides a map of an existing building with individual floor area maps for each floor.
Type	Campus, building, or floor area.
Total APs	Displays the total number of Cisco Radios detected.
a/n Radios	Displays the number of 802.11a/n Cisco Radios.
b/g/n Radios	Displays the number of 802.11b/g/n Cisco Radios.

Adjust RF Antennas Using the Wireless Site Map Editor

Follow these steps to use the wireless site map editor to adjust RF antennas:

-
- Step 1** Choose **Maps > Site Maps**.
- Step 2** Click the campus containing the building and floor area you want. The Site Maps > *Campus Name* page appears.
- Step 3** Click the building you want. The Site Maps > *Campus Name*>*Building Name* page appears.
- Step 4** Click the floor area, basement level, or outside area you want. The Site Maps > *Campus Name* > *Building Name* > *Floor Area Name* page appears.
- Step 5** Choose **Select a command > Map Editor > Go**. The Map Editor page appears.
- Before proceeding, ensure that the floor area images are properly scaled, so that all white space outside of the external walls is removed. To ensure that floor dimensions are accurate, click the **compass tool** on the toolbar and then adjust as needed.
- Step 6** Position the reference length. When you do, the **Scale** menu appears with the line length supplied. Enter the dimensions (width and height) of the reference length, then click **OK**.
- Step 7** Determine the propagation pattern from the **Antenna Mode** drop-down list.
- Step 8** Make antenna adjustments by sliding the antenna orientation bar to the desired degree of direction.
- Step 9** Choose the desired access point.

Step 10 Click **Save**.

Locate Low-Coverage Areas Using AP Location Readiness

You can configure Prime Infrastructure to verify the ability of the existing access point (AP) deployment to estimate the true location of a client, rogue client, rogue AP, or tag within 10 meters at least 90 percent of the time. The location readiness calculation is based on the number and placement of APs. The Inspect Location Readiness feature is a distance-based predictive tool that can point out problem areas with AP placement.

To access the Inspect Location Readiness tool, follow these steps:

Step 1 Choose **Maps > Site Maps**.

Step 2 Click the applicable floor area name to view the map.

If RSSI is not displayed, you can enable AP Heatmaps by selecting the **AP Heatmaps** check box on the left sidebar menu.

If clients, tags, and APs are not displayed, verify that their respective check boxes are selected on the left sidebar menu. Licenses for both clients and tags must also be purchased for each to be tracked.

Step 3 Choose **Select a command > Inspect Location Readiness > Go**.

A color-coded map appears, showing those areas that meet (indicated by "Yes") or do not meet ("No") the 10-meter, 90-percent location specification.

Assess the Quality of AP Coverage Using RF Calibration Data

After completing a RF calibration model based on data points generated during a physical tour of the area (see the related topic, "Calibrate, Compute and Apply New RF Calibration Models"), you can inspect the location quality of the access points (APs). The assessment of a given location's ability to meet the location accuracy specification (that is: within 10 meters, 90 percent of the time) will be based on data points gathered during physical inspection and calibration.

To inspect location quality based on calibration, follow these steps:

Step 1 Choose **Maps > Site Maps**.

Step 2 Choose **Select a command > RF Calibration Model > Go**. A list of RF calibration models appears.

Step 3 Click the appropriate RF calibration model.

Details on the RF calibration model are displayed. These include: the date of last calibration, number of data points by signal type (802.11a, 802.11 b/g) used in the calibration, location, and coverage.

Step 4 Under the **Calibration Floors** heading, click the **Inspect Location Quality** link. Prime Infrastructure displays a color-coded map giving the percentage of location errors. You can modify the distance selected to see the effect on the location errors.

Determine If RF Coverage is Sufficient for Voice Readiness

The VoWLAN Readiness (voice readiness) tool allows you to check the RF coverage to determine if it is sufficient for your voice needs. This tool verifies RSSI levels after access points (APs) have been installed.

To access the VoWLAN Readiness Tool (VRT), follow these steps:

-
- Step 1** Choose **Maps > Site Maps**.
- Step 2** Click the name of the floor area, outside area, or basement level you want to inspect for voice readiness.
- Step 3** From the **Select a command > Inspect VoWLAN Readiness > Go**.
- Step 4** Choose the applicable **Band**, **AP Transmit Power**, and **Client** parameters from the drop-down lists.

By default, the region map displays the b/g/n band for Cisco Phone-based RSSI thresholds. Any new settings cannot be saved. Depending on the selected client, the following RSSI values may not be editable:

- Cisco Phone—RSSI values are not editable.
- Custom—RSSI values are editable within the following ranges:
 - Low threshold between -95dBm to -45dBm
 - High threshold between -90dBm to -40dBm

- Step 5** Examine the map for problem areas. The map is color-coded as follows:
- Green—Voice ready
 - Yellow—Marginal
 - Red—Not Voice ready

The accuracy of the Green/Yellow/Red region color-coding depends on the RF environment and whether or not the floor area map has been calibrated (for details on this, see the related topic "[Calibrate, Compute and Apply New RF Calibration Models](#)"). If the floor area map is calibrated, the accuracy of the region coding will be enhanced.

- Step 6** You can troubleshoot areas with poor or no coverage by adjusting the **AP Transmit Power** setting, as follows:
- Set the **AP Transmit Power** field to "Max" (the maximum downlink power settings). If the map still shows some yellow or red regions, more APs are probably required to provide full VoWLAN coverage.
 - Set the **AP Transmit Power** field to "Current". If the calibrated model shows red or yellow regions where voice will be deployed, increasing the power level of the APs may help.

Show Wired Device Info

- Step 1** Choose **Maps > Site Maps (New)**.
- Step 2** From the **Domain Navigator** left sidebar menu, select the applicable floor to open the floor view page.
- Step 3** Click **Tools** at the upper right corner of the page, and click **Show Wired Device Info**.

A pop-up page appears which contains the following information:

- Summary and details about wired switches
- Summary and details about wired clients

Step 4 Click **Ok** to return to close the window.

Configure Interferer Notification

Step 1 Choose **Maps > Site Maps (New)**.

Step 2 From the **Domain Navigator** left sidebar menu, select the applicable floor to open the floor view page.

Step 3 Click **Tools** at the upper right corner of the page, and click **Configure Interferer Notification**.

Step 4 In the **Interferer CAS Notification Configuration** window, check the check box(es) of the device for which you want a notification to be generated:

- Bluetooth Link
- Microwave Oven
- 802.11FH
- Bluetooth Discovery
- TDD Transmitter
- Jammer
- Continuous Transmitter
- DECT Like Phone
- Video Camera
- 802.15.4
- WiFi Inverted
- WiFi Invalid Channel
- SuperAG
- Radar
- Canopy
- Xbox
- WiMAX Mobile
- WiMAX Fixed

Step 5 Click **Save**.

Show/Hide

Click **Tools** at the upper right corner of the page, and click **Show/Hide** to show or hide the grid that displays distance in feet on the map.

Export to PDF

Click **Tools** at the upper right corner of the page, and click **Export** to PDF to export floor plan as a PDF.

Measure Distances

Step 1 Click **Tools** at the upper right corner of the page, and click **Measure Distance**.

Step 2 Click anywhere on the map to start drawing line. Measured line length in feet is shown in the tool tip.

Data Filtering

Filtering Access Points Data

The access point filtering options include the following:

- Choose the radio type: **2.4 GHz** or **5 GHz**.
- Click **Add Rule** to add a query:
 - Choose the access point identifier you want to view on the map: Name, MAC Address, Tx Power, Channel, Avg Air Quality, Min. Air Quality, Controller IP, Coverage Holes, Tx Utilization, Rx Utilization, Profiles, CleanAir Status, Associated Clients, Dual-Band Radios, Radio, or Bridge Group Name.
 - Choose the parameter by which you want to filter the access point.
 - Type the specific filter criteria in the text box for the applicable parameters, and click **Go**. The access point search results appear.
 - Click **Apply Filter** to view the filter results on map.

When you hover your mouse cursor over the search result in the table, the location of the AP gets pointed with a line on the map.

Filtering Clients Data

The Clients filter option appears if an MSE is added in to Cisco Prime Infrastructure. The Clients filtering options include the following:

- Click **Add Rule** to add a query:
 - Choose the client identifier you want to view on the map: IP Address, User Name, MAC Address, Asset Name, Asset Group, Asset Category, Controller, SSID, Protocol, or State.
 - Type the specific filter criteria in the text box for the applicable parameters, and click **Go**. The clients search results appear in the table.
 - Click **Apply Filter** to view the filter results on map.

If there are multiple IPv6 addresses for a client, then you can specify any one IP address to uniquely identify the client.

When you hover your mouse cursor over the search result in the table, the location of the client gets pointed with a line on the map.

Filtering Tags Data

The tag filtering options include the following:

- Choose a tag identifier you want to view on the map: MAC Address, Asset Name, Asset Group, Asset Category, or Controller.
- Choose the parameter by which you want to filter the tag. Once selected, type the specific device in the text box. Click **Go**. The search results appear in the table.
- Click **Apply Filter** to view the filter results on maps.

Filtering Rogue AP Data

Click **Apply Filter** to view the filter results on maps.

- Choose the **Rogue AP** identifier you want to view on the map: MAC Address, Classification Type, or State.
- Choose the State—Use the drop-down list to choose from Alert, Authenticated, Associated, Idle, Pending, or Probing.
 - Classification Type—Enter the classification type in the text box.
 - Click **Go**. The search results appear in the table.
- Click **Apply Filter** to view the filter results on maps.

Filtering Adhoc Rogues Data

The **Rogue Adhoc** filter dialog appears that contains these parameters:

- MAC Address—If you want to view a particular MAC address, enter it in the MAC Address text box.
- State—Use the drop-down list to select from Alert, Known, Acknowledged, Contained, Threat, or Unknown contained states.
- On Network—Use the drop-down list to specify whether or not you want to display rogue adhoc on the network.
- Click **Go**. The search results appear in the table.
- Click **Apply Filter** to view the filter results on maps.

Filtering Interferer Data

If you enable Interferer floor setting and then click the blue arrow to the right, the Interferers filter dialog box appears. Interferer filtering options include the following:

- Interferer Status
- Interferer Type
- Click **OK** when all applicable filtering criteria are selected.

Filtering Access Points Heatmap Data

An RF heatmap is a graphical representation of RF wireless data where the values taken by variables are represented in maps as colors. The current heatmap is computed based on the RSSI prediction model, Antenna Orientation, and AP transmit power.

If you enable the Access Point Heatmap floor setting and click the blue arrow to the right of the Floor Settings, the Contributing APs dialog appears with heatmap filtering options.

Prime Infrastructure introduces dynamic heatmaps. When dynamic heatmaps are enabled, the Prime Infrastructure recomputes the heatmaps to represent changed RSSI values.

Access point heatmap filtering options include the following:

- **Heatmap Type**
 - **Coverage**—If you have monitor mode access points on the floor plan, you have a choice between IDS or coverage heatmap types. A coverage heatmap excludes monitor mode access points.



Note The coverage area heatmap shows the span of the signal (in terms of area) and intensity of the signal. The RSSI cutoff is the lowest value of RSSI in dBm which is considered a usable signal and it is shown in dark blue color. RSSI cutoff value in rendering heat map, identifies the span over which the signal is higher than the specified RSSI cutoff value.

- **Air Quality**—Not applicable for XOR Monitor mode radios. If you choose Air Quality, you can further filter the heat map type for access points with average air quality or minimum air quality. Select the appropriate radio button. It displays heatmaps for radios operating in client serving mode. Cisco Aironet 2800 and 3800 Series APs operate with Fixed-A band and XOR 2.4 GHz or XOR 5.4 GHz mode radios.
- **IDS**—Available only for radios operating in monitor mode. IDS heatmap option is displayed only if there is at least one AP in the floor in the monitor mode or at least one XOR radio in the monitor mode.



Note Only APs in Local, FlexConnect, or Bridge mode can contribute to the Coverage and Air Quality Heatmap.

- Show only XOR—Displays heatmaps only for the XOR radios. With this you can differentiate between the heatmaps for fixed and dual band radios.
- **Total APs**—Displays the number of access points positioned on the map.
- Select the access point check box(es) to determine which heatmaps are displayed on the image map.

Click **OK** when all applicable filtering criteria are selected.

Use Planning Mode to Help Place APs in Wireless Site Maps

You can calculate the recommended number and location of access points (APs) based on any combination of data traffic, voice traffic, and location.

Based on the throughput specified for each protocol (802.11a or 802.11 b/g), planning mode calculates the total number of APs required to provide optimum wireless coverage in your network.

Planning Mode options include:

- Add APs—Enables you to add APs to a map. See the related topic “[Use Planning Mode to Calculate Access Point Coverage Requirements](#)” for details.
- Delete APs—Deletes the selected APs.
- Map Editor—Opens the Map Editor window.
- Synchronize with Deployment—Synchronizes your planning mode APs with the current deployment scenario.
- Generate Proposal—View a planning summary of the current APs deployment.
- Planned AP Association Tool—Allows you to perform add, delete or import an AP Association from an excel or CSV file. Once an AP is defined, it can be associated to a base radio MAC address using the Planned AP Association Tool. If the AP is not discovered they get pushed into a standby bucket and get associated when discovered.

AP association works only if AP does not belong to any floor or outdoor area. If the AP is already assigned to a floor or outdoor area, then the standby bucket holds the AP; when the AP is removed from the floor or outdoor area, it will be positioned to the given floor. One Mac address cannot be put into bucket for multiple floor or outdoor areas.

Map synchronizations work only if the AP is associated to a base radio MAC address and not to its Ethernet MAC address.

Planning mode does not use AP type or Antenna pattern information for calculating the number of APs required. The calculation is based on the AP coverage area or the number of users per AP.

Planning mode does not support the following AP models:

- C9136AXI (Maui AP)
- CM6X
 - CW9164I-B
 - CW9162I-B
 - CW9166I-B

-
- Step 1** Choose **Maps > Site Maps**.
- Step 2** Choose the desired campus, building, and floor area.
- Step 3** Choose **Select a command > Planning Mode > Go**.
-

Use Planning Mode to Calculate Access Point Coverage Requirements

Prime Infrastructure planning mode lets you calculate the number of access points (APs) required to cover an area by placing fictitious APs on a map and viewing the coverage area. Based on the throughput specified for each protocol (802.11a/n or 802.11b/g/n), planning mode calculates the total number of APs required to provide optimum coverage in your network. You can calculate the recommended number and location of APs based on the following criteria:

- Traffic type active on the network: data or voice traffic or both
 - Location accuracy requirements
 - Number of active users
 - Number of users per square foot
-

- Step 1** Choose **Maps > Site Maps**.
- Step 2** Choose the desired campus, building, and floor area. A color-coded map appears showing all elements (APs, clients, tags) and their relative signal strength.
- Step 3** Choose **Select a command > Planning Mode > Go**. A blank floor area map appears.
- Step 4** Click **Add APs**.
- In the page that appears, drag the dashed-line rectangle around the area of the map for which you want to calculate the total number of recommended APs.
- Adjust the size or placement of the rectangle by selecting the edge of the rectangle and holding down the **Ctrl** key. The rectangle is resizable by dragging on the handles on its edges and corners.
- Step 5** From the **Add APs** drop-down list, choose **Automatic**.
- Step 6** Choose the AP Type and the appropriate antenna and protocol for the selected AP.
- Step 7** Choose the target throughput for the AP.
- Step 8** Select the check box(es) next to the **service(s)** used on the floor. You must select at least one service.
- Step 9** Select the **Advanced Options** check box to select the following AP planning options:
- Demand and Override Coverage per AP
 - Safety Margin (for the Data/Coverage and Voice safety margin options)
- Step 10** Click **Calculate**.
- The recommended number of APs for the selected parameters appears. Recommended calculations assume the need for consistently strong signals unless adjusted downward by the **safety margin** advanced option. In some cases, the recommended number of APs will be higher than the amount actually required.

Walls are not used or accounted for in planning mode calculations.

- Step 11** Click **Apply** to generate a map showing the proposed deployment of the recommended APs in the selected area.
- Step 12** Choose **Generate Proposal** to display a textual and graphical report of the recommended AP number and deployment based on the given inputs.
-

Configure Refresh Settings for Wireless Site Maps

Prime Infrastructure provides various refresh options for wireless site maps:

- **Load**—Refreshes map data from the Prime Infrastructure database on demand.
- **Auto Refresh**—Provides an interval drop-down list to set how often to refresh the map data from the database.
- **Refresh from network**—Refreshes the map status and statistics directly from the controller through an SNMP fetch rather than polled data from the Prime Infrastructure database.
- **Refresh browser**—Refreshes the complete page, or refreshes the map and its status and statistics if you are on a map page.

If you have monitor mode access points on the floor plan, you have a choice between IDS or coverage heatmap types. A coverage heatmap excludes monitor mode access points, and an IDS heatmap includes them.

How RF Heatmaps are Calculated

A radio frequency heat map is a graphical representation of the strength of the RF signals generated by Wi-Fi access points covering a floor area, basement level. Because WLANs are very dynamic and nondeterministic in nature, administrators can never be certain of the coverage at any one spot at a particular moment. To help combat this challenge, Prime Infrastructure provides a map of your floor plan along with visual cues as to the Wi-Fi coverage on the floor. These maps are called heatmaps because they are similar to the colored maps used to show varying levels of heat in oceanography or geographical sciences. Color is used to show the various levels of signal strength. The different shades in the heatmap reflect differing RF signal strengths.

This color visualization provides a quick view of the current state of coverage (without having to walk around measuring it), the signal strength, and any gaps or “holes” in the WLAN. This enhances the speed and ease with which you support your organization and troubleshoot specific problems.

The RF heatmap calculation is based on an internal grid. Depending on the exact positioning of an obstacle in that grid, the RF heatmap, within a few feet or meters of the obstacle, might or might not account for the obstacle attenuation. The RF prediction heatmaps for access points approximates the actual RF signal intensity. It takes into account the attenuation of obstacles drawn using the Map Editor but it does not take into account the attenuation of various building materials, such as drywall or metal objects, nor does it display the effects of RF signals bouncing off obstructions. The thick wall (color-coded orange) with a loss of 13 dB might not be enough to contain the RF signal beyond the walls of the heatmap.

In detail, grid squares partially affected by an obstacle crossing the grid square might or might not incorporate the obstacle attenuation according to the geometry of the access point, obstacle, and grid.

For example, consider a wall crossing one grid square. The midpoint of the grid square is behind the wall from the AP, so the whole grid square is colored with attenuation, including (unfortunately) the top left corner that is actually in front of the wall.

The midpoint of the grid square is on the same side of the wall as the AP, so the whole grid square is not colored with attenuation, including (unfortunately) the bottom right corner that is actually behind the wall from the AP.

The RF heatmap calculation can be static or dynamic. By default, it is dynamic. The main purpose of the dynamic heatmap feature is to recompute the RF heatmaps due to obstacles. The Prime Infrastructure server maintains a current list of all APs' RSSI strengths. Prime Infrastructure uses neighboring APs' RSSI strength to modify the RF heatmaps for all APs.

To configure static heatmap calculation, you must disable the dynamic heatmap option in the map properties page.

Floor View Navigation Pane Tools

The main Floor View navigation pane provides access to multiple map functions and includes the following functionality:

- **Zoom In/Zoom Out**—Click the magnifying glass icon with the plus sign (+) to enlarge the map view. Click the magnifying glass icon with the minus sign (-) to decrease the size of the map view.
- **Map Size**—See the related topic “Pan and Zoom with Next Generation Maps”.
- **Show Grid**—Click to show or hide the grid that displays distance in feet on the map.
- **RSSI Legend**—Hover your mouse cursor over the RSSI Legend icon to display the RSSI color scheme (ranging from red/-35 dBm to dark blue/-90 dBm).
- **Add Access Points**—Click to open the Add Access Points page. For more information, see the related topic “Add Access Points to a Floor Area”.
- **Remove Access Points**—Click to open the Remove Access Points page. Select the access points that you want to remove and click **OK**.
- **Position Access Points**—Click to open the Position Access Points page.
- **Add Chokepoints**—Click to open the Add Chokepoints page. For more information, see the [Cisco Context-Aware Services Configuration Guide](#).
- **Add WiFi TDOA Receivers**—Click to open the Add Wi-Fi TDOA Receivers page. For more information, see the [Cisco Context-Aware Services Configuration Guide](#).
- **Auto Refresh**—From the drop-down list, choose the length of time between each system refresh.
- **Refresh from Network**—Click to initiate an immediate refresh of the current data.
- **Planning Mode**—Click to open the Planning Mode window.
- **Map Editor**—Click to open the Map Editor.
- **Full Screen**—Click to increase the size of the map to full screen. Once there, click Exit Full Screen to return to the normal view.

Create Wireless Site Maps Using Automatic Hierarchy Creation

Before you begin

Automatic Hierarchy Creation uses regular expressions to help you create wireless site maps and assign access points (APs) to them quickly and easily. To use this feature, you must first:

- Create a naming pattern for your wireless APs. This AP naming pattern must include the names of the campuses and buildings, and the names of the floor areas, basements, and outdoor areas, that you have either created or plan to create for your wireless site maps. If you have already created these wireless site maps, the names you use in your wireless AP naming pattern must match those used for your wireless site maps (including spelling and capitalization). You will also want to select a delimiter character to separate the parts of the AP naming pattern. For example: If you have a campus named "San Jose", a building named "01", a floor area named "GroundFloor", and an AP on that floor named "AP3500i1", you might create a naming pattern for APs like this: "San Jose-01-GroundFloor-AP3500i1".
- You have already used Prime Infrastructure to discover your APs and wireless LAN controllers, and have renamed the APs using your naming pattern.



Warning

It is recommended that you take a maps backup before proceeding, as you cannot revert changes made in the maps location info.

Step 1 Choose **Maps > Automatic Hierarchy Creation** to display the Automatic Hierarchy Creation page.

Step 2 Enter the name of an AP on your network in the text box, or choose one from the list.

This name is used to create a regular expression to create your maps.

To update a previously created regular expression, click **Load and Continue** next to the expression and update the expression accordingly. To delete a regular expression, click **Delete** next to the expression.

Step 3 Click **Next**.

Step 4 If your AP's name has a delimiter, enter it in the text box and click **Generate basic regex based on delimiter**. The system generates a regular expression that matches your AP's name based on the delimiter.

For example, using the dash (-) delimiter in the AP name San Jose-01-GroundFloor-AP3500i1, produces the regular expression `/(.*)-(.*)-(.*)-(.*)/`. If you have a more complicated AP name, you can manually enter the regular expression.

You are not required to enter the leading and trailing slashes.

As a convention, Prime Infrastructure displays regular expressions in slashes.

Step 5 Click **Test**. The system displays the maps that will be created for the AP name and the regular expression entered.

Step 6 Using the Group fields, assign matching groups to hierarchy types.

For example, if your AP is named: SJC14-4-AP-BREAK-ROOM

In this example, the campus name is SJC, the building name is 14, the floor name is 4, and the AP name is AP-BREAK-ROOM.

Use the regular expression: `/([A-Z]+)(\d+)-(\d+)-(.*)/`

From the AP name, the following groups are extracted:

- a. SJC
- b. 14
- c. 4
- d. AP-BREAK-ROOM

The matching groups are assigned from left to right, starting at 1.

To make the matching groups match the hierarchy elements, use the drop-down list for each group number to select the appropriate hierarchy element.

This enables you to have almost any ordering of locations in your AP names.

For example, if your AP is named: EastLab-Atrium2-3-SanFrancisco

If you use the regular expression: `/(.*)-(.*)-(.*)-(.*)/`

with the following group mapping:

- a. Building
- b. Device Name
- c. Floor
- d. Campus

Automatic Hierarchy Creation produces a campus named SanFrancisco, a building under that campus named EastLab, and a floor in EastLab named 3.

The two hierarchy types, Not in device name and Device have no effect, but enable you to skip groups in case you need to use a matching group for some other purpose.

Automatic Hierarchy Creation requires the following groups to be mapped in order to compute a map on which to place the AP:

Campus group present in match?	Building group present in match?	Floor group present in match?	Resulting location
Yes	Yes	Yes	Campus > Building > Floor
Yes	Yes	No	Failed match
Yes	No	Yes	Campus > Floor (where Floor is an outdoor area)
Yes	No	No	Failed match
No	Yes	Yes	System Campus > Building > Floor
No	Yes	No	Failed match
No	No	Yes	Failed match
No	No	No	Failed match

Automatic Hierarchy Creation attempts to guess the floor index from the floor name. If the floor name is a number, AHC will assign the floor a positive floor index. If the floor name is a negative number or starts with the letter B (for example, b1, -4, or B2), AHC assigns the floor a negative floor index. This indicates that the floor is a basement.

When searching for an existing map on which to place the AP, AHC considers floors in the AP's building with the same floor index as the AP's name.

For example, if the map SF > MarketStreet > Sublevel1 exists and has a floor index of -1, then the AP SF-MarketStreet-b1-MON1 will be assigned to that floor.

Step 7 Click **Next**. You can test against more APs. You may test your regular expression and matching group mapping against more APs by entering the AP names in the **Add more device names to test against** field, and clicking **Add**.

You then click **Test** to test each of the APs names in the table. The result of each test is displayed in the table.

If required, return to the previous step to edit the regular expression or group mapping for the current regular expression.

Step 8 Click **Next**, then click **Save and Apply**. This applies the regular expression to the system. The system processes all the APs that are not assigned to a map.

You can edit the maps to include floor images, correct dimensions, and so on. When Automatic Hierarchy Creation creates a map, it uses the default dimensions of 20 feet by 20 feet. You will need to edit the created maps to specify the correct dimensions and other attributes.

Maps created using Automatic Hierarchy Creation appear in the maps list with an *incomplete* icon. Once you have edited a map, the *incomplete* icon disappears. You may hide the column for incomplete maps by clicking the **Edit View** link.

View Google Earth Maps in Wireless Site Maps

You must have Google Earth installed on your computer and configured to auto-launch when data is sent from the server.

Google Earth uses SSL 3.0 for communication. But in Cisco Prime Infrastructure 3.2 Release by default it supports only TLSv1.2. You must perform these steps if you want Google Earth support:

- Do ssh login to Cisco Prime Infrastructure server with admin privileges.
- Use the `ncs run set-tls-versions <tls-versions>` command to enable the required TLS version. For example, to enable TLSv1.2, TLSv1.1 and TLSv1.0, issue the following command: `prime-server/admin# ncs run tls-server-versions TLSv1.2 TLSv1.1 TLSv1`
- Restart the application

To view Google Earth Maps in Wireless Site Maps:

Step 1 Choose **Maps > Google Earth**. The Google Earth Maps page displays all folders and the number of access points included within each folder.

Step 2 Click **Launch** for the map you want to view. Google Earth opens in a separate page and displays the location and its access points.

View Google Earth Map Details in Wireless Site Maps

To view details for a Google Earth Map folder, follow these steps:

-
- Step 1** Choose **Maps > Google Earth**.
 - Step 2** Click the folder name to open the details page for this folder. The Google Earth Details provide the access point names and MAC or IP addresses.
 - Step 3** To delete an access point, select the applicable check box and click **Delete**.
 - Step 4** To delete a folder, select the check box next to the folder name, then click **Delete**. Deleting a folder also deletes all subfolders and access points inside the folder.
 - Step 5** Click **Cancel** to close the details page.
-

Use Geographical Coordinates to Group APs into Outdoor Locations on Wireless Site Maps

To group access points together into outdoor locations, use the Latitude/Longitude geographical coordinates for each access point. You first need to create the required access point geographical coordinates, which you can then import into Prime Infrastructure. You can create either of the following file types to provide the coordinates:

- A KML (Google Keyhole Markup Language) File
- A CSV File (Spreadsheet format with comma-separated values)

Prerequisites for Creating Outdoor Locations Using Geographical Coordinates

You must provide the following geographical information for each access point. You can create the geographical coordinates in Google Earth and then import them into Prime Infrastructure. If you add an AP to a Google Earth map without having the AP associated on a standard map, you will not see a heatmap when you view the AP in Google Earth.

- Longitude (East or West)—Angular distance in degrees relative to Prime Meridian. Values west of Meridian range from –180 to 0 degrees. Values east of Meridian range from 0 to 180 degrees. The default is 0.

Coordinates in degrees, minutes, seconds, direction:

- Degrees (–180 to 180)
- Minutes (0 to 59)
- Seconds (00.00 to 59.99)
- Direction—East or West (E, W)

Decimal format (converted from degrees, minutes, and seconds).

- Longitude can range from –179.59.59.99 W to 179.59.59.99 E.

- Latitude (North or South)—Angular distance in degrees relative to the Equator. Values south of the Equator range from –90 to 0 degrees. Values north of the Equator range from 0 to 90 degrees. The default is 0.

Coordinates in degrees, minutes, seconds, direction:

- Degrees (–90 to 90)
- Minutes (0 to 59)
- Seconds (00.00 to 59.99)
- Direction—North or South (N, S)

Decimal format (converted from degrees, minutes, and seconds):

- Latitude can range from –89.59.59.99 S to 89.59.59.99 N

- Altitude—Height or distance of the access point from the surface of the earth in meters. If not provided, value defaults to 0. Values range from 0 to 99999.
- Tilt—Values range from 0 to 90 degrees (cannot be negative). A tilt value of 0 degrees indicates viewing from directly above the access point. A tilt value of 90 degrees indicates viewing along the horizon. Values range from 0 to 90. The default azimuth angle is 0.
- Range—Distance in meters from the point specified by longitude and latitude to the point where the access point is being viewed (the Look At position) (camera range above sea level). Values range from 0 to 999999.
- Heading—Compass direction in degrees. The default is 0 (North). Values range from 0 to ±180 degrees.
- Altitude Mode—Indicates how the <altitude> specified for the Look At point is interpreted.
 - Clamped to ground—Ignores the <altitude> specification and places the Look At position on the ground. This is the default.
 - Relative to ground—Interprets the <altitude> as a value in meters above the ground.
 - Absolute—Interprets the <altitude> as a value in meters above sea level.
- Extend to ground—Indicates whether or not the access point is attached to a mast.

Use Google Earth to Import Geographical Coordinates Into Outdoor Locations On Wireless Site Maps

You can create the geographical coordinates in Google Earth and then import them into Prime Infrastructure. You can create either a folder or individual placemarks. Creating a folder helps group all the Placemarks into a single folder and allows you to save the folder as a single KML (a.k.a. XML) file. KML is a file format used to display geographic data in Google Earth. If you create individual Placemarks, you must save each Placemark individually.

Using a KML file, folders can be created hierarchically to any depth. For example, you can create folders and placemarks organized by country, city, state, zip. In CSV files, there is one level of hierarchy only.

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- Step 1** Launch Google Earth.
- Step 2** In the **Places** page on the left sidebar menu, choose **My Places** or **Temporary Places**.
- Step 3** Right-click **Temporary Places** and select **Add > Folder** from the drop-down lists.
- Step 4** Enter the required information.

If you specify View coordinates (latitude, longitude, range, heading, and tilt), this information is used to “fly” or advance to the correct location when Google Earth is first loaded. If you do not specify View coordinates, the latitude and longitude information is derived using the minimum and maximum latitude and longitude of all access points within the specified group or folder.

- Step 5** Click **OK**.
- After the folder is created, you can select it from the **Places** page to create Placemarks.
-

Create Placemarks for KML Files Used in Wireless Site Maps

To create Placemarks, follow these steps:

- Step 1** Launch Google Earth.
- Step 2** In the **Places** page on the left sidebar, select **My Places** or **Temporary Places**.
- Step 3** Select the folder that you previously created.
- Step 4** Right-click your created folder and select **Add > Placemark** from the drop-down lists.
- Step 5** Complete the required fields. For more information regarding Google Earth, see the Google Earth online help.
- The Placemark name must contain the name, MAC address (the radio MAC *not* Ethernet MAC), or IP address of the appropriate access point.
- Step 6** Click **Snapshot current view** or click **Reset** to return the coordinates to the original settings.
- Step 7** Click **OK**.
- Step 8** Repeat these steps for all placemarks you want to add.
- Step 9** When all placemarks are created, save the folder as a .kmz file (KML Zip file) or as a .kml file. You can import both .kmz and .kml files into Prime Infrastructure.
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Create CSV Files to Import Geographical Coordinates Into Wireless Site Maps

You can create a CSV file that contains the required access point geographical coordinates, and then import the CSV file into Prime Infrastructure.

- Step 1** Using a text editor, create a new file that provides the necessary fields, separated by commas, as described in the following table.

Table 9: Sample Fields for Geographical Coordinates CSV File

“FolderName”	“Value Optional”	Max Length: 32
“FolderState”	“Value Optional”	Permitted Values: true/false
“FolderLongitude”	“Value Optional”	Range: 0 to ± 180
“FolderLatitude”	“Value Optional”	Range: 0 to ± 90
“FolderAltitude”	“Value Optional”	Range: 0 to 99999
“FolderRange”	“Value Optional”	Range: 0 to 99999
“FolderTilt”	“Value Optional”	Range: 0 to 90
“FolderHeading”	“Value Optional”	Range: 0 to ± 180
“FolderGeoAddress”	“Value Optional”	Max Length: 128
“FolderGeoCity”	“Value Optional”	Max Length: 64
“FolderGeoState”	“Value Optional”	Max Length: 40
“FolderGeoZip”	“Value Optional”	Max Length: 12
“FolderGeoCountry”	“Value Optional”	Max Length: 64
“AP_Name”	“Value Required”	Max Length: 32
“AP_Longitude”	“Value Required”	Range: 0 to ± 180
“AP_Latitude”	“Value Required”	Range: 0 to ± 90

Step 2 Save the file with CSV filename extension and then copy it to a location accessible from your browser.

Import Geographical Coordinate Files to Create Outdoor Locations in Wireless Site Maps

To group access points together into outdoor locations, use the Latitude/Longitude geographical coordinates for each access point. You first need to create the required access point geographical coordinate files, which you can then import into Prime Infrastructure. You can import either a Google KML or a CSV file containing access point geographical coordinates into Prime Infrastructure.

Step 1 Choose **Maps > Google Earth**.

Step 2 Choose **Select a command > Import Google KML > Go** (or, if you are importing a CSV file, choose **Select a command > Import CSV > Go**).

Step 3 Navigate to the KML, KMZ, or CSV file, then click **Next**.

The input file is parsed and validated for the following:

- Access points specified in the uploaded file are validated (the specified access points must be available within Prime Infrastructure).
- Range validations are performed for tilt, heading, range, and other geographical coordinates fields. If longitude and latitude are provided, range validations are performed; if not, the value is defaulted to 0.

Step 4 After the files pass all validation checks, review the file details and click **Save**.

If the uploaded information was previously saved, the information is overwritten as follows:

- If the folder was uploaded previously, the coordinates are updated for the folder.
- If access points were uploaded previously, the coordinates are updated for the access points.
- Existing access points in the folder are not removed.
- New folders are created as needed and access points are placed accordingly.

Add Google Earth Location Launch Points to Access Point Details

You can expand the number of Google Earth Location launch points within Prime Infrastructure by adding launch points to the Access Point summary and detail pages.

Step 1 Choose **Monitor > Wireless Technologies > Access Point Radios**.

Step 2 In the Access Point summary page, click the **Edit View** link next to page heading.

Step 3 In the Edit View page, highlight **Google Earth Location** in the left-hand column, then click **Show**.

The Google Earth Location column heading moves into the View Information column.

Step 4 To change the display order of the columns, highlight the Google Earth Location entry and click the **Up** and **Down** buttons as needed, then click **Submit**.

You are returned to the Access Points summary page, and a Google Earth launch link appears. The launch link also appears in the general summary page of the Access Points details page (Monitor > Wireless Technologies > Access Point Radios > *AP Name*).

Configure Your Google Earth Map Preferences

You can configure access point settings for the Google Earth Maps feature:

Step 1 Choose **Maps > Google Earth**.

Step 2 Configure the following parameters:

- Refresh Settings—Select the **Refresh from Network** check box to enable on-demand refresh. This option is applied only once and then disabled. Based on the number of access points in your network, the refresh can take a long period of time.
- Layers—Layer filters for access points, access point heat maps, and access point mesh information can be selected and saved. Select the check box to activate the applicable layer and click > to open the filter page. These settings apply when Google Earth sends the request for the next refresh.
 - Access Points—From the AP Filter drop-down list, choose to display channels, Tx power level, coverage holes, MAC addresses, names, controller IP, utilization, profiles, or clients.

If the access point layer is not checked, no data is returned, and an error message is returned to Google Earth as a Placemark without an icon.
 - AP Heatmap—From the Protocol drop-down list, choose 802.11a/n, 802.11b/g/n, 802.11a/n & 802.11b/g/n, or None. Select the cutoff from the RSSI Cutoff drop-down list (- 60 to - 90 dBm).

If you chose both 802.11a/n and 802.11b/g/n, the heat maps are generated for both and overlaid on top of each other. The order cannot be defined. To prevent this overlay, you must turn off individual overlay in Google Earth or change it in the Google Earth Settings in Prime Infrastructure.
 - AP Mesh Info—Choose Link SNR, Packet Error Rate, or none. Choose Link SNR or Packet Error Rate from the Link Color drop-down list. When you select AP Mesh Info, Mesh Links are also automatically shown.

Step 3 Click **Save Settings** to confirm these changes or **Cancel** to close the page without saving the changes.

Monitor Mesh Access Points Using Maps

You can view summary information for a mesh access point (AP) from a mesh network map. This information is in addition to the information shown for all APs (MAC address, AP model, controller IP address, location, height of AP, AP uptime, and LWAPP uptime).

To view summary and detailed configuration information for a mesh AP from a mesh network map, follow these steps:

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- Step 1** Choose **Maps > Site Maps**.
- Step 2** Select the campus, building, floor area, basement level or outdoor area containing the AP you want to monitor.
- Step 3** To view summary configuration information for an AP, hover your mouse cursor over the AP that you want to monitor. A dialog box appears with configuration information for the selected AP.
- Step 4** To view detailed configuration information for an AP, double-click the AP appearing on the map. The configuration details for the AP appear.
- If the AP has an IP address, a **Run Ping Test** link is also visible at the bottom of the mesh AP dialog box.
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View Mesh Access Point Configurations Using Wireless Site Maps

To view detailed configuration information for a mesh access point (AP) from a mesh network map, follow these steps:

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- Step 1** Choose **Maps > Site Maps**.
- Step 2** Select the campus, building, floor area, basement level or outdoor area containing the AP you want to monitor.
- Step 3** Double-click the AP for which you want to view detailed configuration information.
- Step 4** Click any of the following tabs to get the required information:
- **General**—Displays the overall configuration of the mesh AP such as the AP name, MAC address, AP Up time, associated controllers (registered and primary) operational status, and software version.
The software version for mesh APs is appended with the letter *m* and the word *mesh* appears in parentheses.
 - **Interface**—Displays configuration details for the interfaces supported on the mesh AP. Interface options are radio and Ethernet.
 - **Mesh Links**—Displays parent and neighbor details (name, MAC address, packet error rate, and link details) for the mesh AP. You can also initiate link tests from this page.
 - **Mesh Links**—Displays parent and neighbor details (name, MAC address, packet error rate, and link details) for the mesh AP. You can also initiate link tests from this page.
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View Device Details on Wireless Site Maps

Hover your cursor over any device icon in a map to view details about that device.

Monitor mode access points are shown with gray labels to distinguish them from other access points.

What Is a Wireless Network Site Map?

A wireless network site map is a representation within Prime Infrastructure of the physical placement of access points throughout your facilities, as well as the facilities themselves. A hierarchy of a single physical campus, the buildings that comprise that campus, and the floors of each building, together with the physical location of access points in that hierarchy, constitutes a single wireless network map.

Create a Simple Wireless Network Site Map

After access points have been installed and have joined a controller, and you've configured Prime Infrastructure to manage the controllers, you can create a network design.

The location appliance must be set to poll the controllers in that network, as well as be configured to synchronize with that specific network design, to track devices in that environment. The concept and steps to perform synchronization between Prime Infrastructure and the mobility services engine are explained in the [Cisco Mobility Services Engine Configuration Guide](#).

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- Step 1** Log in to Prime Infrastructure with SuperUser, Admin, or ConfigManager access privileges.
- Step 2** Choose **Maps > Site Maps**.
- Step 3** Create a new campus and at least one building.
- Step 4** Create a new floor area in one of the buildings.

- Step 5** Select the access points to be placed on the floor area.
- Each access point you add to the floor area is represented by a gray circle (labeled with the access point name or MAC address) and is lined up in the upper left part of the floor map.
- Step 6** Drag each access point to the appropriate location. (Access points turn blue when you click them to relocate them.) The small black arrow at the side of each access point represents Side A of each access point, and each arrow of the access point must correspond with the direction in which the access points were installed. (Side A is clearly noted on each 1000 series access point and has no relevance to the 802.11a/n radio.)
- Step 7** To adjust an access point's directional arrow, choose the appropriate orientation on the Antenna Angle drop-down list.
- Access point placement and direction must directly reflect the actual access point deployment or the system cannot pinpoint the device location.
- Step 8** Click **Save** when you are finished placing and adjusting each direction of the access point.
- Step 9** Repeat these steps to create additional campuses, buildings, and floors until each device location is properly detailed in the network design.
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