



Work with Wireless 2D and 3D Maps

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Work with Floor Maps

You can visualize wireless network heatmaps in both 2D and 3D.

Work with 2D Maps

2D maps are primarily used to configure elements on a floor map and view heatmaps.

Using 2D maps, you can add floor map elements and overlays. While viewing a 2D map, you can manipulate the display of the various elements and overlays. You can also filter device data and identify wireless interferers.

Cisco DNA Center calculates the strength and quality of wireless signals. These RF predictions are commonly known as heatmaps, because they show the relative intensity of the RF signals on the 2D wireless coverages area map.

Configure Floor Map Elements and Overlays in 2D Maps

While viewing a 2D map, click **Add/Edit** from the map toolbar to enter edit mode. While in edit mode, you can do the following:

- Add, position, and delete the following devices:
 - Access points (APs) and planned access points (PAPs)
 - Sensors
- Add, edit, and delete the following overlay objects:
 - Coverage areas
 - Location regions
 - Walls

- Shelving units
- Markers
- GPS markers
- Align points

Work with APs on a Floor Map

Cisco DNA Center computes heatmaps for the entire map that show the relative intensity of the Radio Frequency (RF) signals in the coverage area. For 2D wireless maps, the heatmap is only an approximation of the actual RF signal intensity because it does not consider the attenuation of various building materials, such as drywall or metal objects, nor does it display the effects of RF signals bouncing off obstructions.

Follow these guidelines while placing APs on the floor map:

- Place APs along the periphery of coverage areas to keep devices close to the exterior of rooms and buildings. APs placed in the center of these coverage areas provide good data on devices that would otherwise appear equidistant from all other APs.
- Location accuracy can be improved by increasing overall AP density and moving APs close to the perimeter of the coverage area.
- 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 the device location.
- Although the design provides 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.
- For optimal heatmap visibility on floor maps, configure the AP height to approximately 10 feet (3 meters) or lower.

Export Bulk APs from Prime Infrastructure and Import into Cisco DNA Center

Cisco DNA Center allows you to import, assign and position a collection of access points to the floor map. If you have an existing collection of access points on Cisco Prime Infrastructure, you can import it into Cisco DNA Center, saving time and effort spent in importing, assigning, and positioning access points to the floor map.

This procedure describes how to export an existing collection of access points from Cisco Prime Infrastructure, and import into Cisco DNA Center.

Before you begin

- To perform the following task, you must be a **Super Admin** or **Network Admin**.
- Make sure that you have APs in your inventory. If not, discover them using the **Discovery** feature.
- Add and position APs on a floor map.
- The site, building, and floor must be present in the site hierarchy.

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- Step 1** Export the bulk AP positions from Cisco Prime Infrastructure as a CSV file to your workstation.
- Step 2** Click the menu icon (☰) and choose **Design > Network Hierarchy**.
- Step 3** From the left Hierarchy pane, hover your cursor over the ellipsis ... next to the site and choose **Import Bulk AP**.
- Step 4** In the **Import Bulk AP** pop-up window, drag and drop the AP file, or click **Choose a file** to select the file from your workstation.
- Note**
- To manually create the **AP Positions** CSV file with Prime Template, export a Prime Template to your workstation by clicking **Download Prime Template**. Prime Template does not support nested files.
 - To manually create the **AP Positions** CSV file with Cisco DNA Template, export a Cisco DNA Template to your workstation by clicking **Download Template**. Cisco DNA Template supports nested files.
- Wait for the CSV file to download. The CSV file contains information about AP positions of various sites in the network.
- Step 5** Click **Import**.
- The **Import Summary** window appears.
- The **Information** tab shows the list of successfully imported APs.
 - Click the **Warning** tab to see the list of warnings.
 - Click the **Error** tab to see the list of errors.
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Add APs to a Map

You can add APs one at a time or in bulk.

Before you begin

Make sure that you have Cisco APs in your inventory. If not, discover them using the Discovery feature. See [Discovery Overview](#).

- Step 1** Click the menu icon (☰) and choose **Design > Network Hierarchy**.
- Step 2** In the left hierarchy tree, choose a floor.
- Step 3** From the map toolbar, click **2D > Add/Edit > APs**.
- Step 4** In the map left pane, click **Add APs**.
- Step 5** In the **Add APs** slide-in pane, do one of the following:
- **To add a single AP:** Click **Add** next to an AP that you want to add.
 - **To add multiple APs:** Check the check boxes next to APs you want to add and click **Add Selected**.
- Note** You can search for APs using the search option available. Use the **Filter** field to search for APs using the AP name, MAC address, model, or Cisco Wireless Controller. The search is case-insensitive. The search results appear in a table. Click **Add** to add one or more of these APs to the floor area.

In edit mode, newly added APs appear in the **Unpositioned** category in the map left pane. For more information, see [Position an AP on a Map, on page 5](#).

Step 6 After adding the APs to a floor, close the **Add APs** window.

Add Planned APs to a Map

Using the AP Model Catalog feature, you can add a planned AP on a floor and configure its model, antenna type, azimuth, and elevation orientation. Then you can replicate that configuration to rest of the planned APs that belong to the same model type.

Step 1 Click the menu icon (☰) and choose **Design > Network Hierarchy**.

Step 2 In the left hierarchy tree, choose a floor.

Step 3 From the map toolbar, click **2D > Add/Edit > APs**.

Step 4 From the map left pane, in the **AP Models** area, click the AP model of the planned AP to add.

Note If the AP model is not listed, click **Add Model** to choose the AP model to add to the list.

Step 5 Click the location on the floor map where you want to place the planned AP.

A planned AP of the selected model is added to the floor map and the **Edit Planned AP** slide-in pane appears on the right, with an AP name added to it by default.

Step 6 From the **Edit Planned AP** slide-in pane, click the gear icon, which is located next to the **AP Name** field.

The **Name pattern** dialog box appears.

Step 7 When you add the first AP to the floor, make sure that you enter a valid name pattern, for example SJC-BLD21-FL2-AP####, and then click **Set name pattern**.

Note The planned APs must be unique within Cisco DNA Center, so make sure that the name pattern identifies the floor.

The #### in the name pattern is replaced by numbers in the **AP Name**, for example SJC-BLD21-FL2-AP0001, SJC-BLD21-FL2-AP0002, and so on.

Step 8 From the **Antenna** drop-down list, choose the appropriate antenna type, including dual antennas, for the AP.

Note The antenna image reflects the antenna selected.

Step 9 Depending on the antenna type, enter the **Azimuth** and **Elevation** orientation, in degrees.

Step 10 Perform the following actions, as needed:

- To add another planned AP with the same properties as that of the planned AP that you just created, click a location in the floor map where you want to position the new AP.

A new AP icon appears on the map with all of the properties inherited and the AP name appended, for example BLD1-AP0002-TX.

- To add more planned APs with the same properties and appended AP Name, click the floor map.
- To stop adding planned APs to the floor map, press **Esc** or right-click the floor map.
- To reposition the planned APs, drag and drop them to the appropriate location in the floor map.

- To delete a planned AP, right-click the AP icon and click **Delete**.
- To edit a planned AP, right-click the AP icon and click **Edit**.

Step 11 When you are done, from the map toolbar, click **Save**.

Assign Actual APs to Planned APs

When you are ready, you can assign actual APs to the planned APs on your map.

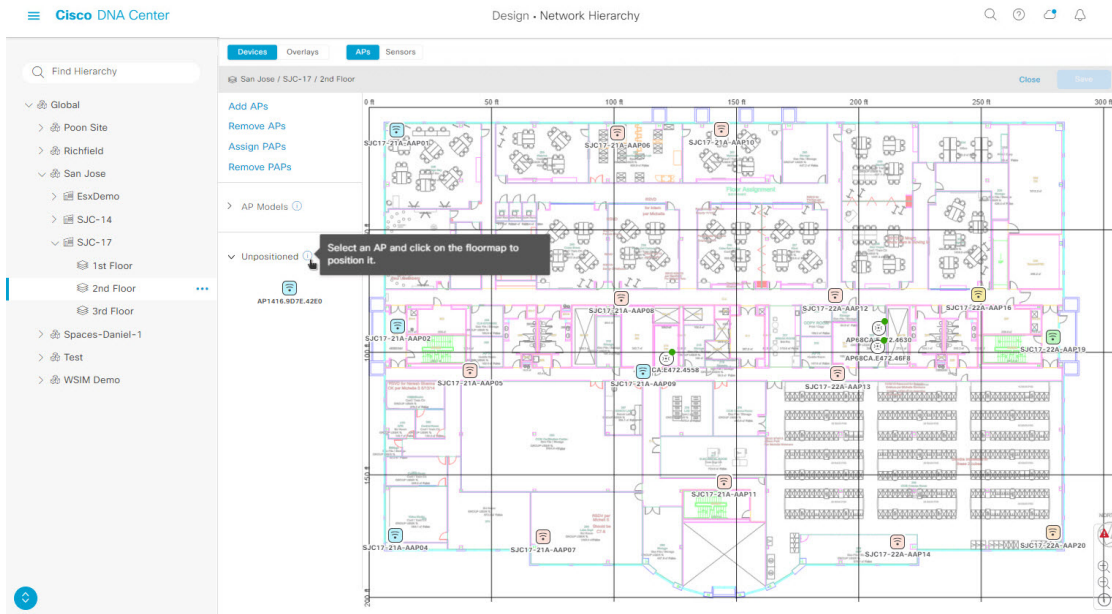
- Step 1** Click the menu icon (☰) and choose **Design > Network Hierarchy**.
- Step 2** In the left hierarchy tree, choose a floor.
- Step 3** From the map toolbar, click **2D > Add/Edit > APs**.
- Step 4** From the map left pane, click **Assign PAs**.
- Step 5** On the floor map, click a planned AP.
- Step 6** From the **Assign Planned APs** slide-in pane, check the check box next to the AP that you want to assign.
- Step 7** Click **Assign**.
- Step 8** From the map toolbar, click **Save**.
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Position an AP on a Map

After adding APs to a floor, you need to position them on the map.

- Step 1** Click the menu icon (☰) and choose **Design > Network Hierarchy**.
- Step 2** In the left hierarchy tree, choose a floor.
- Step 3** From the map toolbar, click **2D > Add/Edit > APs**.
- Step 4** From the **Unpositioned** category in the map left pane, click an AP.

Figure 1: Unpositioned APs



Step 5 To position the AP, do one of the following:

- Click the location on the floor map where you want to position the AP.
- From the **Edit AP** slide-in pane, enter the **x** and **y** coordinates in the corresponding fields.
- Draw three points on the floor map and position the AP by using the selected points. To do this:
 - a. In the **Edit AP** slide-in pane, click **Position by 3 points**.
 - b. To define the points, click anywhere on the floor map to draw the first point. Click again to finish drawing the point.
A dialog box appears to set the distance to the first point.
 - c. Enter the distance, in meters, and click **Set Distance**.
 - d. Define the second and third points similarly, and click **Save**.
- Define two walls on the floor map and position the APs between the defined walls. This method helps you to know the position of APs between the two walls.
 - a. In the **Edit AP** slide-in pane, click **Position by 2 walls**.
 - b. To define the first wall, click anywhere on the floor map to start drawing the line. Click again to finish drawing the line.
A dialog box opens to set the distance to the first wall.
 - c. Enter the distance in meters and click **Set Distance**.
 - d. Define the second wall similarly and click **Save**.
The AP is placed based on the defined distance between the walls.

Step 6 From the map toolbar, click **Save**.


Note If a Cisco Connected Mobile Experiences (CMX) is synchronized with Cisco DNA Center, you can view the location of clients on the heatmap. See [Create Cisco CMX Settings](#).

Reposition an AP on a Map

At any time, you can reposition APs on a map.



Note This task can be performed in a 2D or 3D map.

Step 1 Click the menu icon () and choose **Design > Network Hierarchy**.

Step 2 In the left hierarchy tree, choose a floor.

Step 3 For 2D, do the following:

- a) From the map toolbar, click **2D > Add/Edit**.
- b) In the map, drag and drop the AP to the new position.

Step 4 For 3D, do the following:

- a) From the map toolbar, click **3D > Add/Edit**.
- b) In the map, right click the AP and choose **Move**.
- c) In the map, drag and drop the AP to the new position.


Step 5 From the map toolbar, click **Save**.

Edit an AP

You can change the configuration of a single AP. To change the configuration of multiple APs, see [Edit Multiple APs, on page 9](#).



Note This task can be performed in a 2D or 3D map.

Step 1 Click the menu icon () and choose **Design > Network Hierarchy**.

Step 2 In the left hierarchy tree, choose a floor.

Step 3 For 2D, do the following:

- a) From the map toolbar, click **2D > Add/Edit**.
- b) In the map, right click the AP and choose **Edit**.

Step 4 For 3D, do the following:

- a) From the map toolbar, click **3D > Add/Edit**.
- b) In the map, right click the AP and choose **Details**.

Step 5 In the **Edit AP** slide-in pane, change any of the following AP settings, as needed:

- **AP Name** or **Planned AP Name**: Name of the AP
- **MAC Address**: MAC address of the selected AP.
- **AP Model**: Model of the selected AP.
- **x**: X axis coordinate of the AP.
- **y**: Y axis coordinate of the AP.
- **AP Height**: Height of the AP.
- **Antenna**: Antenna type for this AP.

Note For external APs, you must select an antenna, or the AP will not be present in the map.

- **Azimuth**: Angle of the antenna, measured relative to the x axis, clockwise. The azimuth range is 0 to 360. In Cisco DNA Center, pointing right is 0 or 360 degrees; pointing down is 90 degrees.

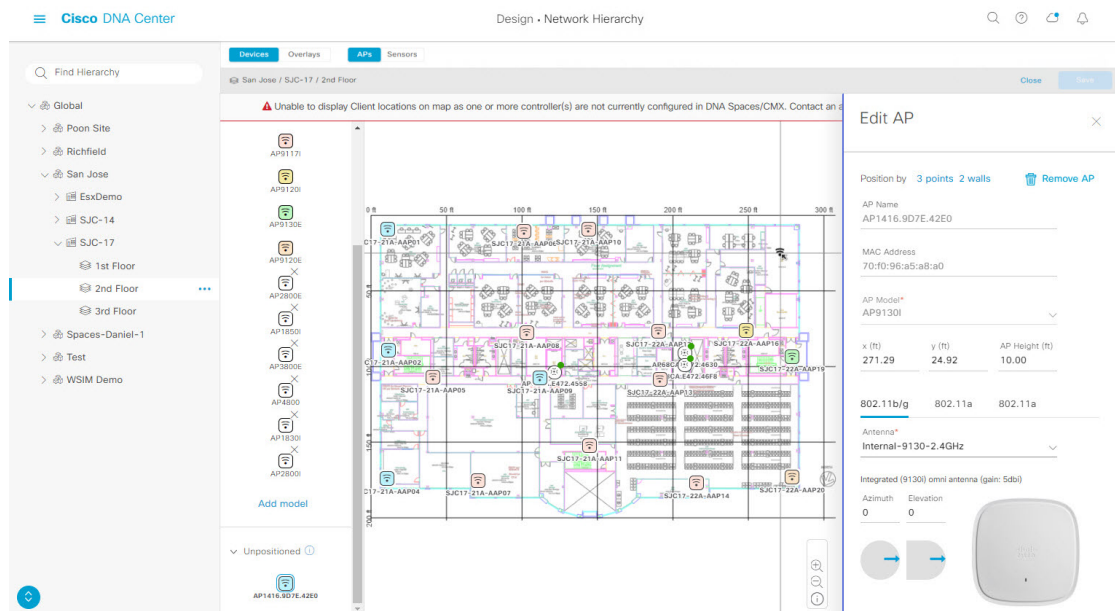
You can manually enter the value or use the blue arrow under the field to change the value.

Note For omnidirectional antennas, the azimuth is not relevant if the elevation is 0.

- **Elevation**: in degrees. You can manually enter the value or use the blue arrow under the field to change the value.

Note For APs and antenna models that are designed to be placed on a ceiling, 0 elevation means pointing down. For APs and antenna models that are designed to be placed on a wall, 0 elevation means pointing horizontally and negative values means pointing down.

Figure 2: Edit AP Slide-In Pane



Step 6 From the map toolbar, click **Save**.


Edit Multiple APs

When you select only one AP, you can change all editable attributes. However, when you select multiple APs, the following guidelines apply:

- When the selected devices have the same value for an attribute, the value is displayed. Otherwise, the value is blank. In either case, if you change the value, the new value is applied to all the selected devices.
- When the selected APs have the same model number and radios (number of radios and operating band), the antennas are editable. Otherwise, they are not editable.
- You can change the model numbers of planned APs, but not added APs. So, if you select an AP, the model number is not editable.
- Because bulk changes affect more devices, they do not take effect immediately. You need to click **Apply** to apply your changes.



Note This task can be performed in a 2D or 3D map.

Step 1 Click the menu icon () and choose **Design > Network Hierarchy**.

Step 2 In the left hierarchy tree, choose a floor.

Step 3 Do one of the following:

- For 2D, from the map toolbar, click **2D > Add/Edit**.
- For 3D, from the map toolbar, click **3D > Add/Edit**.

Step 4 Select the APs, using one of the following methods:

- Click the first device, then press and hold the **Shift** key while you click the rest of the devices.
- From the map navigation toolbar, click **Select by rectangle**. Then click an area of the map and drag the highlighted rectangle to select APs in a contiguous area. All the highlighted APs within the rectangle are selected.

To deselect APs, use one of the following methods:

- To deselect a single AP, press and hold the **Shift** key while you click the AP.
- To deselect all APs except one, click the AP you want to remain selected. All others are deselected.
- To deselect all APs, press the **ESC** key or close the **Edit** pane.

Step 5 From the **Edit AP** slide-in pane, configure the settings, as available:

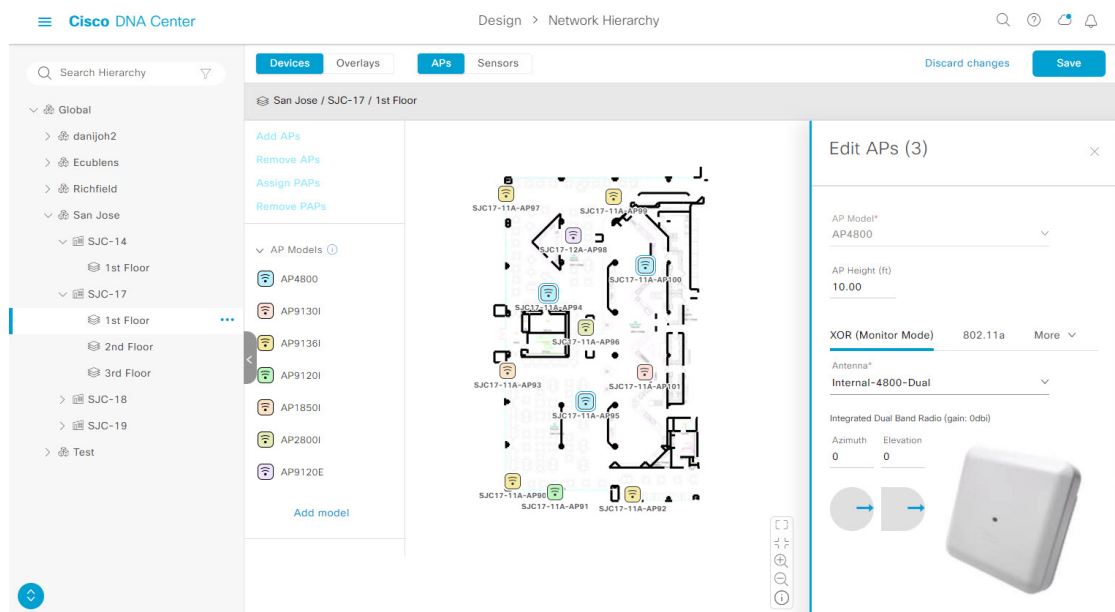
- **AP Name** or **Planned AP Name**: Name of the AP
- **MAC Address**: MAC address of the selected AP.
- **AP Model**: Model of the selected AP.
- **x**: X-axis coordinate of the AP. You can manually enter the value.
- **y**: Y-axis coordinate of the AP. You can manually enter the value.

Remove APs from a Map

- **AP Height:** Height of the AP. You can manually enter the value.
- **Antenna:** Antenna type for this AP.
Note For external APs, you must select an antenna, or the AP will not be present in the map.
- **Azimuth:** Angle of the antenna, measured relative to the x axis, clockwise. The azimuth range is 0 to 360. In Cisco DNA Center, pointing right is 0 or 360 degrees; pointing down is 90 degrees.
 You can manually enter the value or use the blue arrow under the field to change the value.
Note For omnidirectional antennas, the azimuth is not relevant if the elevation is 0.
- **Elevation:** in degrees. You can manually enter the value or use the blue arrow under the field to change the value.

Note For APs and antenna models that are designed to be placed on a ceiling, 0 elevation means pointing down. For APs and antenna models that are designed to be placed on a wall, 0 elevation means pointing horizontally and negative values means pointing down.

Figure 3: Edit Multiple APs Slide-In Pane



Step 6 From the map toolbar, click **Save**.

Remove APs from a Map

You can remove APs and planned APs (PAPs) from a map.

- Step 1** Click the menu icon (**≡**) and choose **Design > Network Hierarchy**.
- Step 2** In the left hierarchy tree, choose a floor.
- Step 3** From the map toolbar, click **2D > Add/Edit**.

- Step 4** To remove APs (including planned APs), do the following:
- Click the AP, or to select multiple APs, click the first AP and while pressing the **Shift** key, click the rest of the APs.
 - In the **Edit** pane, click **Remove**.
- Step 5** From the map toolbar, click **Save**.
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Work With Sensors on a Floor Map

The following topics show you how to add sensors to floor maps and position, reposition, and delete them, if needed.

Add Sensors to a Map



Note Make sure you have the Cisco AP 1800S sensor in your inventory. The Cisco Aironet 1800s Active Sensor must be provisioned using Plug and Play for it to show up in the Inventory. See the *Provision the Wireless Cisco Aironet 1800s Active Sensor* topic in the [Cisco DNA Assurance User Guide](#).

A *sensor device* is a dedicated AP 1800s sensor. The Cisco Aironet 1800s Active Sensor gets bootstrapped using PnP. After it obtains the Assurance server reachability details, it directly communicates with the Assurance server. For more information, including information about sensor tests, see the [Cisco DNA Assurance User Guide](#).

- Step 1** Click the menu icon (☰) and choose **Design > Network Hierarchy**.
- Step 2** In the left hierarchy tree, choose a floor.
- Step 3** From the map toolbar, click **2D > Add/Edit > Sensors**.
- Step 4** From the **Add Sensors** slide-in pane, check the check boxes of the sensors that you want to add. Alternatively, click **Add** next to the sensor row.
- Note** You can search for specific sensors using the **Filter** field. Search using the name, MAC address, or model of a sensor. The search is not case-sensitive. The results are displayed in the table. Click **Add** to add one or more of these sensors to the floor area.

Newly added sensors appear in the **Unpositioned** category from the map left pane in edit mode.

- Step 5** When you are done, click **Save**.
-


Position Sensors on a Map

Newly added sensors appear in the **Unpositioned** category from the map left pane in edit mode. This procedure shows you how to position a sensor after initially adding it.

Before you begin

Sensors must be added to the map before they can be positioned. For information, see [Add Sensors to a Map, on page 11](#)

Reposition a Sensor on a Map


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- Step 1** Click the menu icon () and choose **Design > Network Hierarchy**.
- Step 2** In the left hierarchy tree, choose a floor.
- Step 3** From the map toolbar, click **2D**.
- Step 4** From the map toolbar, click **Add/Edit**.
- Step 5** From the map toolbar, click **Sensors**.
- Step 6** From the map left pane, click a sensor in the **Unpositioned** category to position the sensor.
- Step 7** Click the location on the floor map where you want to position the sensor.
- You can use the **x**, **y**, and **sensorHeight** fields in the **Sensor Details** slide-in pane to enter the exact x, y, and z coordinates for the sensor.
- Step 8** Click **Save**.
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Reposition a Sensor on a Map

At any time, you can reposition sensors on a map.




Note This task can be performed in a 2D or 3D map.

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- Step 1** Click the menu icon () and choose **Design > Network Hierarchy**.
- Step 2** In the left hierarchy tree, choose a floor.
- Step 3** From the map toolbar, click **2D** or **3D**.
- Step 4** From the map toolbar, click **Add/Edit**.
- Step 5** In the map, drag and drop the sensor to the new position.
- Step 6** When you are done, click **Save**.
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Remove Sensors from a Map

You can remove sensors from a floor map.

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- Step 1** Click the menu icon () and choose **Design > Network Hierarchy**.
- Step 2** In the left hierarchy tree, choose a floor.
- Step 3** From the map toolbar, click **2D**.
- Step 4** From the map toolbar, click **Add/Edit**.
- Step 5** To remove sensors, do the following:
- Click the sensor, or to select multiple sensors, click the first sensor and while pressing the **Shift** key, click the rest of the sensors.
 - In the **Edit** pane, click **Remove**.

Step 6 When you are done, click **Save**.

Add, Edit, and Delete Coverage Areas

By default, any floor area or outside area defined as part of a building map is considered as a wireless coverage area.

If you have a building that is nonrectangular or you want to mark a nonrectangular area within a floor, you can use the map drawing tool to create a coverage area or a polygon-shaped area.

Step 1 Click the menu icon (☰) and choose **Design > Network Hierarchy**.

Step 2 In the left hierarchy tree, choose a floor.

Step 3 From the map toolbar, click **2D > Add/Edit > Overlays > Coverage Areas**.

Step 4 To add a coverage area, do the following:

- a) In the **Coverage Area** dialog box, enter a name for the coverage area in the field.
- b) Click **Add Coverage**.
- c) Click on the map to create a point and initiate the drawing tool.
- d) Continue creating points to define the coverage area shape.

Note The coverage area shape must have at least 3 points. Click and drag a point to redefine the coverage area shape.

- e) Double-click to exit the drawing tool and finalize the coverage area shape.
- f) From the map toolbar, click **Save**.

Step 5 To edit a coverage area, do the following:

- a) From the map toolbar, click **Add/Edit > Coverage Areas**.
- b) To redefine the shape of a coverage area, click and drag a point.
- c) To edit a coverage area name, right-click the coverage area and choose **Edit**.
- d) When you are done, in the map toolbar, click **Save**.

Step 6 To delete a coverage area, do the following:

- a) From the map toolbar, click **Add/Edit > Coverage Areas**.
 - b) Right-click the coverage area and choose **Delete**.
 - c) After the coverage area is deleted, from the map toolbar, click **Save**.
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Add, Edit, and Delete Location Regions


You can create inclusion and exclusion areas 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.

Use the following guidelines to define inclusion and exclusion areas on a map:

- Inclusion and exclusion areas can be any polygon-shaped area and must have at least 3 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 in a floor area.

Add, Edit, and Delete an Inclusion Region

- Step 1** Click the menu icon () and choose **Design > Network Hierarchy**.
- Step 2** In the left hierarchy tree, choose a floor.
- Step 3** From the map toolbar, click **2D > Add/Edit > Overlays > Location Regions**.
- Step 4** From the map left pane, click the **Inclusion** icon.
- Step 5** To create an inclusion region, use the drawing tool:
- Click the map to create a point where you want the inclusion region to begin.
 - Move the cursor to the next point and click again.
 - Continue creating points to define the inclusion region shape.
 - To finalize the shape, double-click the map.
- Alternatively, from the map left pane, click the **Inclusion** icon.
- To exit the drawing tool, double-click the map again.
- Step 6** To edit the location of an inclusion region, drag and drop the shape to the new location.
- Step 7** To delete an inclusion region, right-click the shape and choose **Delete**.
- Step 8** From the map toolbar, click **Save**.
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Add, Edit, and Delete an Exclusion Region

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

- Step 1** Click the menu icon () and choose **Design > Network Hierarchy**.
- Step 2** In the left hierarchy tree, choose a floor.
- Step 3** From the map toolbar, click **2D > Add/Edit > Overlays > Location Regions**.
- Step 4** From the map left pane, click the **Exclusion** icon.
- Step 5** To create an exclusion region, use the drawing tool:
- Click the map to create a point where you want the exclusion region to begin.
 - Move the cursor to the next point and click again.
 - Continue creating points to define the exclusion region shape.
 - To finalize the shape, double-click the map.
- Alternatively, from the map left pane, click the **Exclusion** icon.
- To exit the drawing tool, double-click the map again.
- Step 6** To edit the location of an exclusion region, drag and drop the shape to the new location.

Step 7 To delete an exclusion region, right-click the shape and choose **Delete**.

Step 8 From the map toolbar, click **Save**.

Add, Edit, and Delete Walls

Add walls to a floor for a more accurate heatmap. Walls affect the signal attenuation and how the RF is calculated in the heatmap.

Step 1 Click the menu icon (☰) and choose **Design > Network Hierarchy**.

Step 2 In the left hierarchy tree, choose a floor.

Step 3 From the map toolbar, click **2D > Add/Edit > Overlays > Walls**.

Step 4 To add walls, do the following:

- a) From the map left pane, click a wall type from the **Others** or **On this floor** category.

Note If a wall type isn't listed, click **Add Wall Type** to create a custom wall type.

- b) Click the map to create a point where you want the wall to begin.
- c) Move the cursor to the next point, where you want to end the wall or where you want to create a corner and click again.
- d) Continue creating points to define the wall shape.
- e) To end a wall, double click the map.

Alternatively, from the left pane, click the wall type.

- f) To exit the drawing tool, double-click the map again.

Step 5 To change a wall type, and depending on the wall type also configure its parameters, do the following:

- a) Click the wall that you want to change.

The **Wall Type** dialog box opens.

- b) From the **Wall Type** drop-down list, choose the type of wall.
- c) Configure any other parameters that are appropriate for the new wall type.
- d) Click **Update**.

Step 6 To move a wall, do the following:

- a) Hover your cursor over the wall that you want to move.

The wall turns black, which means it's selected.

- b) Click the wall and drag and drop it to the new location.

Step 7 To delete a wall, right-click it and choose **Remove**.

Step 8 From the map toolbar, click **Save**.

Add, Edit, and Delete Shelving Units

Shelving units are obstacles that affect signal attenuation. A high-ceiling warehouse is an example of a location with shelving units.

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- Step 1** Click the menu icon (☰) and choose **Design > Network Hierarchy**.
- Step 2** In the left hierarchy tree, choose a floor.
- Step 3** From the map toolbar, click **2D > Add/Edit > Overlays > Shelving Units**.
- Step 4** To add shelving units, do the following:
- From the map left pane, click the shelving type you want to add.
 - In the shelving dialog box, configure the name, dimensions, orientation, and whether the unit is double-sided, or leave the default values. The orientation means the angle of the shelving unit. A shelving unit with an orientation of 0 means that the shelving is vertical and parallel to the y axis.

If a shelving type is not in the list, click **Add Shelving Type** to create a new shelving type.
 - Click **Add Shelving**.

The shelving unit appears on the map.
 - Drag and drop the shelving to its location on the map.
 - To create a copy or an array of a shelving unit, do one of the following:
 - To create a copy, right click the shelving unit and choose **Clone**.
 - To create an array, right click the shelving unit and choose **Array**. Then specify the number of units and the distance between them.
- Step 5** To edit the name, dimensions, orientation, and whether it is two-sided, choose **Edit**.
- Step 6** To delete a shelving unit and remove it from the floor map, choose **Delete**.
- Step 7** From the map toolbar, click **Save**.
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Add, Edit, and Delete Markers

- Step 1** Click the menu icon (☰) and choose **Design > Network Hierarchy**.
- Step 2** In the left hierarchy tree, choose a floor.
- Step 3** From the map toolbar, click **2D > Add/Edit > Overlays > Markers**.
- Step 4** From the map left pane, click the **Markers** icon.
- Step 5** In the **Place Markers** dialog box, enter the name for the marker, and click **Add Marker**.
- Step 6** To place the marker, click the map where you want to place the marker.
- Step 7** To move a marker, hover your cursor over the marker until it turns blue. Then drag and drop it in the new location.
- Step 8** To edit a marker, right-click the marker and choose **Edit**.
- Step 9** To delete a marker, right-click the marker and choose **Delete**.
- Step 10** From the map toolbar, click **Save**.
-

Add, Edit, and Delete GPS Markers

To locate the physical position of a building on the world map and increase the accuracy of a client's position, you can place a GPS marker on a 2D map.



Note The GPS marker is an attribute of the building and can be applied to all the floors of the building.

-
- Step 1** Click the menu icon (☰) and choose **Design > Network Hierarchy**.
- Step 2** In the left hierarchy tree, choose a floor.
- Step 3** From the map toolbar, click **2D > Add/Edit > Overlays > GPS Markers**.
- Step 4** To add a GPS marker, do the following:
- From the map left pane, click the **GPS Markers** icon.
 - Click a location on the map where you want to place the GPS marker.
 - In the **Place Markers** dialog box, enter the name, latitude, longitude, x and y coordinates in the appropriate fields.
 - Click **Add GPS Marker**.
- Step 5** To edit a GPS marker, right-click it and choose **Edit**.
- Step 6** To delete a GPS marker, right-click it and choose **Delete**.
- Step 7** From the map toolbar, click **Save**.
-

Add, Edit, and Delete Align Points

In 3D maps, floors are aligned at the top-left corner of the map (point 0,0). If you manage each floor independently, the misalignment is not a problem. However, to use some of the features of 3D maps, the floors need to be aligned as they are in reality. To compensate this misalignment, you can insert one or more align points on two or more floors, so that the floors align properly one on top of the other in a 3D map.

-
- Step 1** Click the menu icon (☰) and choose **Design > Network Hierarchy**.
- Step 2** In the left hierarchy tree, choose a floor.
- Step 3** From the map toolbar, click **2D > Add/Edit > Overlays > Align Points**.
- Step 4** To add an alignment point, do the following:
- From the map left pane, click the **Align Points** icon.
 - Click a location on the map where you want to place the alignment point.
- Step 5** To edit the name of an alignment point, do the following:
- Right-click the alignment point and choose **Edit**.
 - Change the name and click **Edit Marker**.
- Step 6** To change the location of an alignment point, do the following:
- Right-click the alignment point and choose **Edit**.
 - Click **Edit Marker**.
 - Drag and drop the alignment point to the new location.

Step 7 To delete an alignment point, right-click it and choose **Delete**.

Step 8 From the map toolbar, click **Save**.

View a 2D Wireless Floor Map

Use the 2D heatmap to view information about your wireless network.

Step 1 Click the menu icon (☰) and choose **Design > Network Hierarchy**.

Step 2 In the left hierarchy tree, choose a floor.

Step 3 From the map toolbar, click **2D**.

The wireless 2D map opens.

Step 4 To display specific details about devices, do the following, based on the device type:

- **APs:** The AP icon indicates the number of radios, their frequency and health, the device's overall health score, and the AP name and mode. For more information about interpreting the AP icon, see [AP Icon Legend, on page 25](#).

To display device details, hover your cursor over an AP icon. Information, such as the AP's Rx neighbors, clients, interferers, and health score, is displayed.

For more details about an AP, from the dialog box, click the **Device 360** link.

Note For **Device 360**, the package *Assurance - Base* is required.

- **Mesh APs:** To display device details, hover your cursor over the mesh AP icon. Information, such as mesh, backhaul, and access data, is displayed.
- **Clients:** To display client information, including a link to its associated AP, hover your cursor over or click a client. For more details about a client, from the dialog box, click the **Client 360** link.
- **Sensors:** To view a sensor's status and test results, click a sensor icon.
- **Switches and Switch Stacks:** To display member switches of a switch stack, click the arrow next to the switch stack icon. To display the connections between a switch and its associated APs, hover your cursor over the switch or switch stack icon. The map displays a line showing the connections from the switch and its associated APs. You can also identify switch and AP associations by color. APs connected to one specific switch have labels that match the color code on the switch icon.

To display device details, click a switch or switch stack icon. A slide-in pane opens and displays the device details and options for the heatmap display. Under the **Select Heatmap** heading, you can click any of the following radio buttons:

- **All visible switches:** Computes and displays the heatmap for all of the switches in the visible map area.
- **This switch:** Computes and displays the heatmap for the selected switch only.
- **Rest of visible switches:** Computes and displays the heatmap for all of the visible switches, except for the selected switch.
- **None:** Does not include any switches in the heatmap computation and does not include any switches in the heatmap display.

Step 5 To display information about a link, click the link. Depending on the type of link, information such as link health and other statistics are displayed.

For a mesh link, you can perform a link test between two mesh APs.

Step 6 Use the tools and options shown in the following figure to gain insights about your wireless network.

Figure 4: 2D Wireless Map Showing Tools and Options



- **Map Toolbar:** From above the map, use the toolbar options to control what's displayed on the heatmap. For details, see [2D Map Toolbar, on page 19](#).
- **View Options Slide-in Pane:** In the slide-in pane, use the view options to customize the heatmap display. For details, see [2D Map View Options, on page 22](#).
- **Navigation Controls:** From the bottom-right corner of the map, use the map navigation controls to manage the heatmap display. For details, see [2D Map Navigation Controls, on page 24](#).


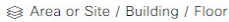



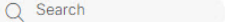
2D Map Toolbar

To access the 2D map, click the menu icon (☰) and choose **Design > Network Hierarchy**. In the left hierarchy tree, choose a floor, and from the map toolbar, click **2D**.

The map toolbar consists of two bars and is located above the map. Use the map toolbar for the following actions and settings:

Item	Description
	Click 2D to view the wireless map in 2D or 3D to view it in 3D.
	Wi-Fi Band Filter: Use this filter to view the heatmap for the 2.4 GHz and 5 GHz Wi-Fi bands.

Item	Description
Add/Edit	<p>Click this button to add, edit, and delete the following devices and overlay objects:</p> <ul style="list-style-type: none"> • Access points: For details, see Work with APs on a Floor Map, on page 2. • Sensors: For details, see Add Sensors to a Map, on page 11. • Coverage areas: For details, see Add, Edit, and Delete Coverage Areas, on page 13. • Location regions: For details, see Add, Edit, and Delete Location Regions, on page 13. • Walls: For details, see Add, Edit, and Delete Walls, on page 15. • Shelving Units: For details, see Add, Edit, and Delete Shelving Units, on page 15. • Markers: For details, see Add, Edit, and Delete Markers, on page 16. • GPS markers: For details, see Add, Edit, and Delete GPS Markers, on page 17. • Align points: For details, see Add, Edit, and Delete Align Points, on page 17.
Data	<p>Apply filters to the access point, sensor, and client data that appear in the wireless map. For details, see Filter Device Data on a Floor, on page 26.</p>
View Options	<p>Click this button to open the View Options slide-in pane, which contains the options for controlling the display of the map, devices, and overlays. For details, see 2D Map View Options, on page 22.</p>

Item	Description
	<p>Gear Icon: Hover your cursor over this icon for the following options:</p> <ul style="list-style-type: none"> • Recompute: Recompute the heatmap. • Export: Export the floor map to a PDF or CSV file format. • Edit Floor: Change the floor details, such as its name. • Set Scale: Change the map scale by providing a known measurement on the map: <ol style="list-style-type: none"> 1. Click the map to specify the starting point of the measurement. 2. Click the map again to specify the ending point of the measurement. 3. In the New line length (ft) field, enter the length of the measurement. 4. Click OK. <p>The floor map dimensions are recalculated based on the new measurement.</p> • Measure Distance: Measure a distance on the floor map. Click the map to specify a starting point. Click the map again to specify an ending point. The distance of the measurement is displayed. • DNA Spaces/CMX Sync History: Display a log that shows when Cisco DNA Spaces and Cisco Connected Mobile Experiences (CMX) synchronized data. The log entries include the request received time, start and end times, status, and failure message (if the operation failed). • Floor Health: Display the health of installed applications, such as Cisco DNA Assurance, Cisco DNA Spaces Connector, and Cisco DNA Spaces Floor Subscription
	<p>Full Hierarchy Path: Displays the full navigational path of the floor, including its associated building and area or site. Click the down arrow to navigate to a different floor.</p>
	<p>Refresh: Click this icon to update the device and map data. To the left of the icon is the timestamp for the last refresh</p>
	<p>DNA Spaces Connector: Click this icon to display information, such as the IP address, status, and version, about the Cisco DNA Spaces Connector.</p>
	<p>Map Notification: Click this icon to display map information, such as the number of unpositioned APs or planned APs.</p>
	<p>Search: Use this search field to find specific floor map elements such as APs, sensors, clients, and so on.</p>

2D Map View Options

To access the 2D map, click the menu icon (☰) and choose **Design > Network Hierarchy**. In the left hierarchy tree, choose a floor, and from the map toolbar, click **2D > View Options**.

The **View Options** slide-in pane opens. Expand the categories to view the settings:

- **Map**: Contains various floor map and heatmap settings:

Item	Description
Show Grid	Click this toggle button to enable or disable a grid on the floor map. The grid provides the dimensions of the floor map.
Map Opacity %	Use this slider to customize the opacity or transparency of the floor map.
Heatmap Type	<p>The heatmap provides a graphical representation of Radio Frequency (RF) wireless data where the values taken by variable are represented in maps as colors. RSSI heatmaps are computed based on a floor's RSSI prediction model, antenna type, and its orientation.</p> <p>2D heatmaps use fixed transmit powers: 18 dB for 2.4 GHz; 15 dB for 5 GHz; and 5dB for 6 GHz.</p> <p>3D heatmaps use real-time transmit power of operational APs and 11 dB for planned APs.</p> <p>Use the drop-down list to choose the heatmap type:</p> <ul style="list-style-type: none"> • Operational RSSI: Coverage heatmap, which identifies the wireless signal strength of operational APs. • Planned Heatmap: Hypothetical heatmap that shows the coverage that planned access points would have on a floor. • Operational + Planned RSSI: (3D-only) Coverage heatmap created using both operational and planned APs. 2D maps only show operational AP coverage, so you need to switch to 3D maps to view this combined coverage heatmap. • Client Density: Density of associated clients. • IDS: Heatmap that shows the monitor mode access point coverage provided to the wireless clients on a floor map.
RSSI Cut off (dBm)	Use this slider to set the threshold for the RSSI value to appear on the heatmap. RSSI values that do not meet the threshold are faded.
Heatmap Opacity %	Use this slider to customize the opacity or transparency of the heatmap.
Heatmap Color Scheme	Customize the color scheme for the heatmap. Options are Legacy and Natural .

- **Access Points**: Click this toggle button to enable or disable the AP icons on the floor map.

Expand this category to configure the type of label to display with each AP. Valid label types are **Name**, **AP MAC address**, **IP address**, **Bridge Group Names**, and so on. From the **Display Label** drop-down list, choose a label type.

To display other details about APs, see [View a 2D Wireless Floor Map, on page 18](#).

- **Planned Access Points:** Click this toggle button to enable or disable the appearance of planned AP icons on the floor map.

Expand this category to display labels with the planned AP name. From the **Display Label** drop-down list, choose a label type.

- **Switches and Switch Stacks:** Click this toggle button to enable or disable the appearance of switch or switch stack icons on the floor map.

Expand this category to display labels with the switch name, MAC address, or AP count. From the **Display Label** drop-down list, choose a label type.

To display other details about switches, see [View a 2D Wireless Floor Map, on page 18](#).

- **Sensors:** Click this toggle button to enable or disable the appearance of sensor icons on the floor map.

Expand this category to display labels with the sensor name, MAC address, or AP count. From the **Display Label** drop-down list, choose a label type.




To display other details about sensors, see [View a 2D Wireless Floor Map, on page 18](#).

- **Mesh :** Click this toggle button to enable or disable the appearance of mesh APs on the floor map.

Expand this category to configure options that control how the mesh AP-to-root AP link relationships are displayed:

- **Link Label:** To disable link labels, click the **None** radio button. To display labels for link signal-to-noise ratios, click the **Link SNR** radio button. To display labels for packet error rates, click the **Packet Error Rate** radio button. The link label setting is reflected on the map immediately.
- **Link Color:** To disable link color, click the **None** radio button. To display links link signal-to-noise ratios in color, click the **Link SNR** radio button. To display packet error rates in color, click the **Packet Error Rate** radio button.

The link color settings are reflected on the map immediately. See the following table for color definitions.

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

- **Mesh Parent-Child Hierarchical View:** Choose which mesh APs to display. From the this drop-down list, choose **Select Only Root APs**, **Select up to 1st hops**, **Select up to 2nd hops**, **Select up to 3rd hops**, or **Select All**.
- **Overlay Objects:** Expand this category and click any of the following toggle buttons to enable or disable the overlay objects on the floor map:


- **Coverage Areas**
 - **Location Regions**
 - **Walls 2D & 3D**
 - **Walls 3D only**
 - **Shelvings**
 - **Markers**
 - **GPS Markers**
 - **Align Points**
- **Clients:** Click this toggle button to enable or disable the appearance of client icons on the floor map.
Expand this category to display labels with the client name, MAC address, or AP count. From the **Display Label** drop-down list, choose a label type.
To enable or disable clients in close proximity to be grouped together, click the **Show Client Clusters** toggle button.
 - **Interferers:** Click this toggle button to enable or disable the appearance of client icons on the floor map.
Expand this category to enable or disable the appearance of a zone of impact from interferers. Click the **Show Zone of Impact** toggle button.
 - **Map Properties:** Expand this category to specify the time interval between each auto refresh of map data. From the **Auto Refresh** drop-down lists, choose a time interval.
Additional information is provided depending on the types of devices displayed on the map. For example, when mesh APs are selected to be displayed, the **Map Properties** category shows mesh SNR and PER color charts. You can configure the mesh SNR and PER value ranges and their corresponding colors.
 - **Global Map Properties:** Expand this category to change the preferred measurement system. From the **Units of Measure** drop-down list, choose either **Feet** (imperial system) or **Meters** (metric system).
This setting applies to all wireless maps.

























2D Map Navigation Controls

To access the 2D map, click the menu icon (☰) and choose **Design > Network Hierarchy**. In the left hierarchy tree, choose a floor, and in the map toolbar, click **2D**.

The 2D map navigation controls are located at the bottom-right of the map. For details about the map, see [View a 2D Wireless Floor Map, on page 18](#).







Use the map navigation controls for the following functions:

Map Navigation Controls	Description
	Default Map View: Click to reset the map view to the default.

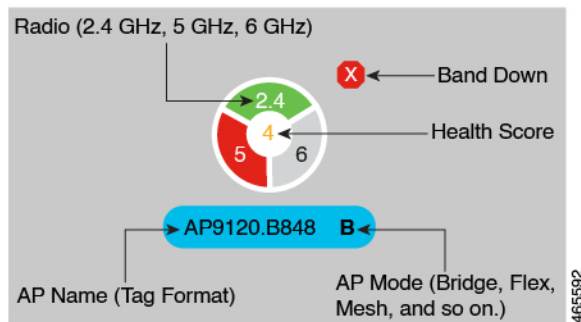
Map Navigation Controls	Description
	<p>Zoom In / Zoom Out: Click the zoom in and out icons to enlarge and reduce the size of the map. Alternatively, you can use your mouse wheel to zoom in and out.</p>
	<p>Map Legend: Click this icon to view the map legend which describes the map icons such as the device type, average health score, and AP status.</p> <p>Devices</p> <ul style="list-style-type: none">  Access Point  Planned AP  Sensor  Switch  Interferer  Client  Marker <p>Average Health Score</p> <ul style="list-style-type: none">  1-3  4-7  8-10  Unknown  Down <p>AP Status</p> <ul style="list-style-type: none">  Covered by sensor  Not covered by sensor  Covered by RMA or refreshing  Radio Down <p>AP Mode</p> <ul style="list-style-type: none"> L: Local M: Monitor F: FlexConnect R: Rogue Detector S: Sniffer B: Bridge C: SE-Connect FB: Flex+Bridge RH: Remote Hybrid Se: Sensor <p>Radio Status</p> <ul style="list-style-type: none">  Not Associated  Unreachable  Admin Disabled  Down  Ok  Unknown <p>Radio Mode</p> <ul style="list-style-type: none"> 2, 4, 5 or 6: Servicing clients in that band M: Monitor X: XOR ?: Other

AP Icon Legend

AP icons provide information about the configuration and health of the APs in your network. The circular AP icon is divided into radio bands that are color coded to show the radio status:

-  Not Associated
-  Unreachable
-  Admin Disabled
-  Down
-  Ok
-  Unknown

The following diagram shows all the elements of an AP icon:



Filter Device Data on a Floor

For 2D wireless maps, you can apply various filters to network devices such as access points, sensors, and so on. Based on the filter criteria, the search results appear in a table. Filtering device data is helpful in locating specific devices for floors with many devices.

- Step 1** Click the menu icon (☰) and choose **Design > Network Hierarchy**.
- Step 2** In the left hierarchy tree, choose a floor.
- Step 3** From the map toolbar, click **2D**.
- Step 4** From the map toolbar, click **Data**.
- Step 5** From the **Data** slide-in pane, click the device type that you want to apply a filter to.
- Step 6** Define the filter rules by using the drop-down lists to choose the parameters.
- Step 7** To add more filter rules, click the + icon near the top of the slide-in pane.
- Step 8** When you are done, click **Apply Filters to List**.
- The filter results appear in the table at the bottom of the slide-in pane.
- Step 9** You can hover your cursor over a device in the table to locate its position on the floor map.

Figure 5: Locating a Device from the Filter Results

The screenshot shows the Cisco DNA Center interface. On the left is a search hierarchy tree. The main area is a 2D floor map of San Jose / SJC-17 / 1st Floor, displaying several access points (APs) with their IDs (e.g., SJC17-11A-AP97, SJC17-11A-AP98, SJC17-11A-AP99, SJC17-11A-AP100, SJC17-11A-AP96, SJC17-11A-AP95, SJC17-11A-AP93, SJC17-11A-AP94). On the right, the 'Access Points' data pane is open, showing a table of filtered APs. The table has columns: Name, AP Model, Average Health Score, Issues Count, and Coverage Issues. The table contains several rows of AP data. A red box highlights the 'None' filter rule in the data pane, and a red arrow points from this box to a specific AP on the map.

Name	AP Model	Average Health Score	Issues Count	Coverage Issues
<input type="checkbox"/> SJC17-11A-AP93	AIR-AP1852I-B-K9	NaN	N/A	N/A
<input type="checkbox"/> SJC17-11A-AP93	AIR-AP1852I-B-K9	NaN	N/A	N/A
<input type="checkbox"/> SJC17-11A-AP96	AIR-AP2802I-B-K9	NaN	N/A	N/A
<input type="checkbox"/> SJC17-11A-AP96	AIR-AP2802I-B-K9	NaN	N/A	N/A
<input type="checkbox"/> SJC17-11A-AP100	AIR-AP4800I-B-K9	NaN	N/A	N/A
<input type="checkbox"/> SJC17-11A-AP100	AIR-AP4800I-B-K9	NaN	N/A	N/A

- Step 10** To remove applied filters, do the following:
- Close the **Data** slide-in pane.
 - From the map toolbar, click **Data**.
 - Click the filter icon next to the device type to remove the filter.

Identify Wireless Interferers on the Floor Map

This is a 2D map feature.

Cisco DNA Center detects interference and disables the interference source for a specific band on a floor map. Any interference in the 2.4-GHz band disrupts the network traffic of the 802.11 wireless network.

Cisco DNA Center identifies the position, area of impact, and intensity of the interferer.

This procedure shows how to identify network interferers on a floor map.

Before you begin

Ensure that either Cisco Connected Mobile Experiences (CMX) or Cisco DNA Spaces is synchronized with Cisco DNA Center.

-
- Step 1** Click the menu icon (☰) and choose **Design > Network Hierarchy**.
- Step 2** In the left hierarchy tree, choose a floor.
- Step 3** From the map toolbar, click **2D**.
- Step 4** Hover your cursor over the ellipsis icon ... next to the floor and choose **Sync: DNA Spaces/CMX** to synchronize **DNA Spaces** or **CMX** with the floor.
- Note** (Optional) In the world map, hover your cursor over the floor and choose **Sync: DNA Spaces/CMX** to synchronize **DNA Spaces** or **CMX** with the floor.
- Step 5** In the **Network Hierarchy** window, click **View Options**.
- Step 6** In the **View Options** window, scroll down and click the **Interferers** toggle button to enable interferers to appear on the floor map.
- Step 7** Expand the **Interferers** category and click the **Show Zone of Impact** toggle button to enable the zone of impact of interferers to appear on the floor map.
- Note** By default, **Zone of Impact** is disabled.
- Step 8** In the floor map, hover your cursor over the interferer icon and click the impacted channel to view the interferer device details.
-

Work with 3D Maps

3D maps are primarily used to plan and analyze a wireless network on a floor. As such, there are minimal configuration and edit functions that you can perform in 3D maps.

With 3D wireless maps, you can view a 3D representation of your wireless network. A near real-time predictive model dynamically updates the 3D map to show changes in RF coverage.

Here are some of the unique features and functionality that 3D wireless maps offers:

- Navigate through your wireless network in a 3D environment with a first person view or third person view.
- Gain insights into the areas in your wireless network where service-level agreements (SLAs) are not being met.
- View the RF coverage for different elevations and use the **Scanner** tool to view the RF coverage for specific elevations.

- Crop the Key Performance Indicator (KPI) heatmap with the clipping tools.
- Predict the x, y, z coordinates of a specific point on the floor plan with the pin tool to better plan for placement of APs or sensors.
- Visualize floor plan elements, such as walls, in 3D to see how they affect RF coverage and attenuation.
- Simulate your wireless network in various configurations to see how the wireless coverage on a floor is affected. You can save these simulations and open them later to make more changes.
- Modify KPIs, telemetry, and 3D map element settings to customize your map display.

Prerequisite

The system you use to compute and display 3D wireless heatmaps must have a Graphical Processing Unit (GPU) installed and enabled on it. For example, if you're using a Windows virtual machine (VM), you need to make sure that it has a GPU.

Configure Floor Map Elements and Overlays in 3D Maps

In 3D maps, you are limited to the following configuration and edit functions:

- [Clone an AP, on page 28](#)
- [Edit an AP, on page 7](#)
- [Edit Multiple APs, on page 9](#)
- [Reposition an AP on a Map, on page 7](#)
- [Reposition a Sensor on a Map, on page 12](#)



To configure other floor map elements or overlays, you need to use the 2D map. For details, see [Configure Floor Map Elements and Overlays in 2D Maps, on page 1](#).

Clone an AP

You can duplicate an AP with its configuration by cloning it.

Before you begin

You must have actual APs to clone.

-
- Step 1** Click the menu icon () and choose **Design > Network Hierarchy**.
 - Step 2** In the left hierarchy tree, choose a floor.
 - Step 3** From the map toolbar, click **3D**.
 - Step 4** From the map toolbar, click the simulation icon .
 - Step 5** From the map toolbar, click **Add/Edit**.
 - Step 6** From the map, click an AP.
 - Step 7** From the **AP Details** slide-in pane, click **Clone**.

A duplicate AP is created and displayed below the original AP. Its name is appended with **-1**. If you keep cloning the same AP, the name continues to be incrementally appended. For example, the first clone for **a-floor1-ap01** is named **a-floor1-ap01-1**, the second clone for the same AP is named **a-floor1-ap01-2**, and so on.

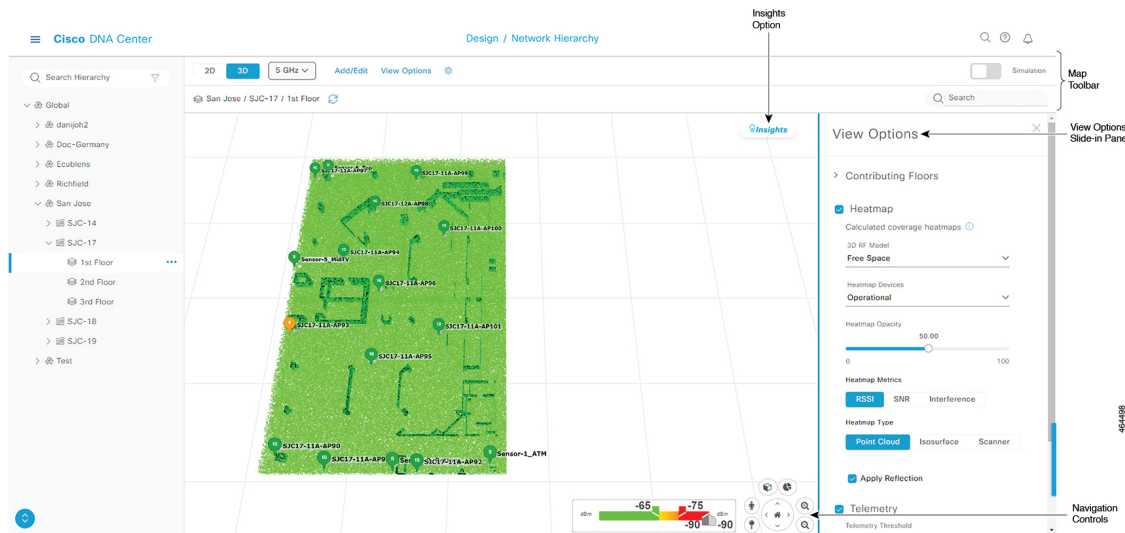
- Step 8** In the map, right-click the cloned AP and choose **Move**.
- Step 9** Drag and drop the AP to its new position.
- Step 10** Click **Save**.
-

View a 3D Wireless Map

Use this procedure to view a 3D wireless map.

- Step 1** Click the menu icon (☰) and choose **Design > Network Hierarchy**.
- Step 2** In the left hierarchy tree, choose a floor.
- Step 3** In the map toolbar, click **3D**.
- The 3D wireless map opens.
- Note** A 3D heatmap is delimited by its coverage area, which is the full floor width and length, by default. To specify a polygon for the heatmap boundaries, edit the **Coverage Area** field value in the 2D map view. However, these boundaries don't apply to the 2D map view because the full floor width and length are used for the 2D map view.
- Step 4** To display specific details about devices, hover your cursor over the device icon. Information about the device is displayed in a dialog box.
- Note** If the *Assurance - Base* package is installed, a link to the **Device 360** window is also displayed in the dialog box.
- Step 5** To view the heatmap for one or more APs, select and deselect the APs using one of the following methods:
- To select a single AP, click the AP.
 - To select multiple APs, press the **Shift** key while clicking each AP, and then release the **Shift** key.
 - To deselect a single AP, click the AP.
- Note** If no APs are selected, the heatmap includes all APs.
- To deselect all APs, press the **ESC** key or double-click an area of the map that doesn't have any APs.
- Step 6** Use the tools and options shown in the following figure to gain insights about your wireless network.

Figure 6: 3D Wireless Map Showing Tools and Options







- **Toolbar:** Above the map, use the toolbar options to control what's displayed on the heatmap. For details, see [3D Wireless Map Toolbar, on page 30](#).
- **Insights:** In the top-right corner of the map, click **Insights** to view and understand potential issues in your wireless network. For details, see [Gain Insights from a 3D Wireless Map, on page 40](#).
- **View Options:** In the slide-in pane, use the view options to control the heatmap display. You can manipulate elements, such as which floors that are displayed, heatmap coverage and metrics, telemetry thresholds, devices and clients, overlay objects, and the depiction of a floor and sky. For details, see [3D Map View Options, on page 31](#)
- **Navigation Controls:** In the bottom-right corner of the map, use the map navigation controls to view the heatmap from various perspectives. For details, see [3D Map Navigation Controls, on page 34](#).

3D Wireless Map Toolbar


To access the 3D map, click the menu icon (☰) and choose **Design** > **Network Hierarchy**. In the left hierarchy tree, choose a floor, and from the map toolbar, click **3D**.

The map toolbar consists of two bars and is located above the map. Use the map toolbar for the following actions and settings:

Item	Description
	Click 3D to view the wireless map in 3D or click 2D to view it in 2D.
	Click the Wi-Fi band down arrow and choose one of the following Wi-Fi bands: <ul style="list-style-type: none"> • 5 GHz • 6 GHz • 2.4 GHz

Item	Description
Add/Edit	Click Add/Edit to add planned APs by cloning existing APs or planned APs. For information, see Clone an AP . Note Adding operational APs from inventory is not available in 3D. To add operational APs, use Add/Edit from the 2D map.
View Options	Open the 3D Floormap slide-in pane to display the contributing floors, KPI, telemetry, device and client information, and floor element settings. For details, see 3D Map View Options, on page 31 .
	Hover your cursor over the gear icon and click Insights Configuration to customize the conditions for insights. For details, see Gain Insights from a 3D Wireless Map, on page 40 .
Simulation toggle button	Click the Simulation toggle button to view the map in simulation mode. The default view is operation mode. For details, see Create Simulations for 3D Wireless Maps, on page 41 . Note Simulation mode is available only in 3D maps, not in 2D maps.
 Area or Site / Building / Floor	Full Hierarchy Path: Displays the full navigational path of the floor, including its associated building and site. Click the down arrow to navigate to a different floor.
	Click the refresh icon to update the device and map data. To the left of the icon is the timestamp for the last refresh.
 Search	Use the Search field to find specific floor map elements such as APs, sensors, clients, and so on. The results of your search are listed below the Search field. When you hover your cursor over an element in the list, an indicator points to the element on the map. If the element is outside the field of view, the indicator displays as a broken red line. Reorient the map to see the element.

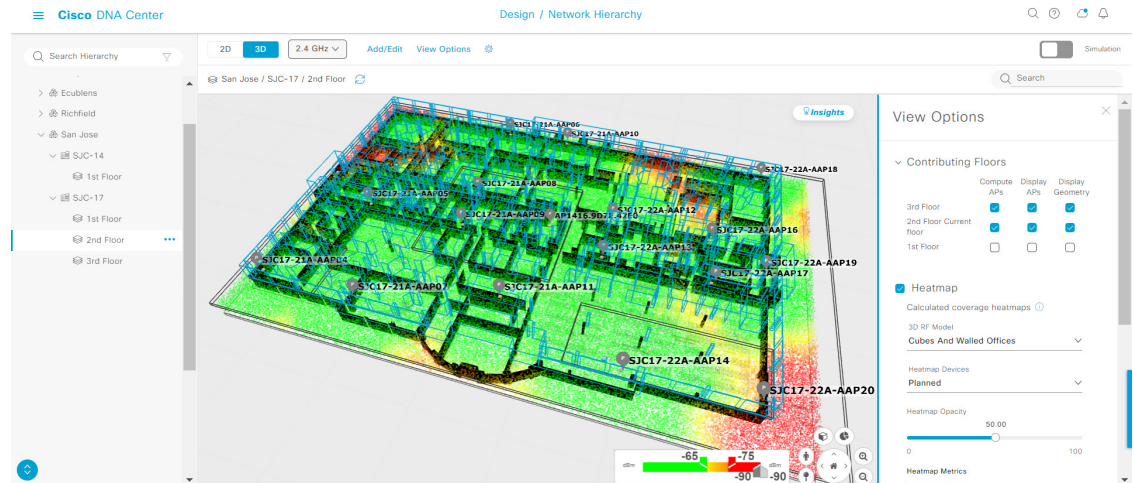
3D Map View Options

To access the 3D map, click the menu icon () and choose **Design > Network Hierarchy**. In the left hierarchy tree, choose a floor, and from the map toolbar, click **3D > View Options**.

The **View Options** slide-in pane opens. Expand the categories to view the settings:

- **Contributing Floors:** Expand this option to include more floors in the heatmap computation. When including a floor, you can choose to add its APs in the heatmap computation and display its APs and floor geometry. Click **Apply** to generate the heatmap with your settings.

Figure 7: 3D Map of Multiple Floors



Item	Description
Compute APs check box	Check this check box to include a floor's APs when computing the heatmap.
Display APs check box	Check this check box to display a floor's APs in the heatmap.
Display Geometry check box	Check this check box to display a floor's physical attributes in the heatmap.

- **Heatmap:** Check this check box to display the heatmap and to configure the settings in the following table:

Item	Description
3D RF Model	Use this drop-down list to choose the RF model. The RF model determines how RF is calculated based on the floor geometry. Available models include drywall offices, cubes and walled offices, free space, outdoor open space, and indoor high-ceiling. Note We recommend that you choose Free Space if you manually placed the walls or imported them from a CAD file or Ekahau project. If you didn't manually place the walls, use an RF model other than Free Space .
Heatmap Devices	Use this drop-down list to choose whether to display operational devices, operational and planned devices, or only planned devices on the heatmap.
Heatmap Opacity	Use this slider to customize the opacity or transparency of the heatmap.

Item	Description
Heatmap Metrics	<p>Choose the type of metrics to display on the heatmap:</p> <ul style="list-style-type: none"> • RSSI: Displays the Received Signal Strength Indication (RSSI) values. • SNR: Displays the signal-to-noise ratio (SNR) values. • Interference: Displays the SNR that is caused by co-channel interference (CCI) or adjacent channel interference. • Leakage: Displays signal leakage between floors. For this option to be available, you must compute the heatmap with two or more contributing floor.
Heatmap Type	<p>Choose the heatmap type:</p> <ul style="list-style-type: none"> • Point Cloud: Provides a collection of data points in space. Each data point has x, y, and z coordinates. • Isosurface: Represents the RSSI with isolines or lines of a contiguous value. • Scanner: Displays the RSSI for a specific elevation.
Apply Reflection	<p>Check this check box to show signal reflection, which can be caused when a signal bounces off materials such as glass, whiteboards, and plastic.</p>
Telemetry	<p>Use this toggle button to enable or disable telemetry.</p> <p>When telemetry is enabled, click a sensor or AP to view its telemetry:</p> <ul style="list-style-type: none"> • The telemetry for a sensor displays the predicted and measured RSSI values between a sensor AP and other APs. • The telemetry for an AP displays the predicted and measured RSSI values between neighbor APs.

- **Telemetry**: Check this check box and use the **Telemetry Threshold** slider to set the threshold for telemetry sources to be displayed on the heatmap.

Telemetry sources with predicted values that do not meet the threshold are faded.

- **Devices and Clients**: Click this option to configure the settings in the following table:

Item	Description
APs	Click this check box to display APs on the map.
Planned APs	Click this check box to display planned APs on the map.
Sensors	Click this check box to display sensors on the map.

Item	Description
Clients	<p>Click this check box to display clients on the map. Additionally, you can do the following:</p> <ul style="list-style-type: none"> • Display clients in their default blue color (None) or by their RSSI, SNR, or Health Score. For RSSI, SNR, and health score, clients are colored blue, yellow, or red, depending on their current condition. • Use the slider to change the size of the ball that represents a client on the map.


- **Overlay Objects:** Click this option to configure the settings in the following table:

Item	Description
Geometry	Click this check box to display the floor geometry.
Height	Use this slider to set the height of walls on the heatmap.

- **Map:** Click this option to configure the settings in the following table:


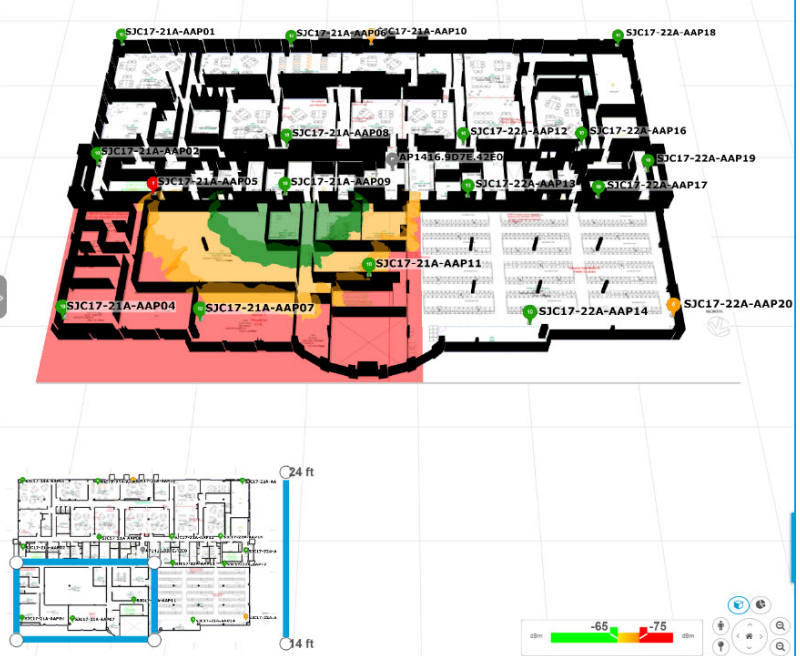
Item	Description
Sky	Click this check box to display the sky in the heatmap.
Floor	Click this check box to display the floor in the heatmap.




3D Map Navigation Controls



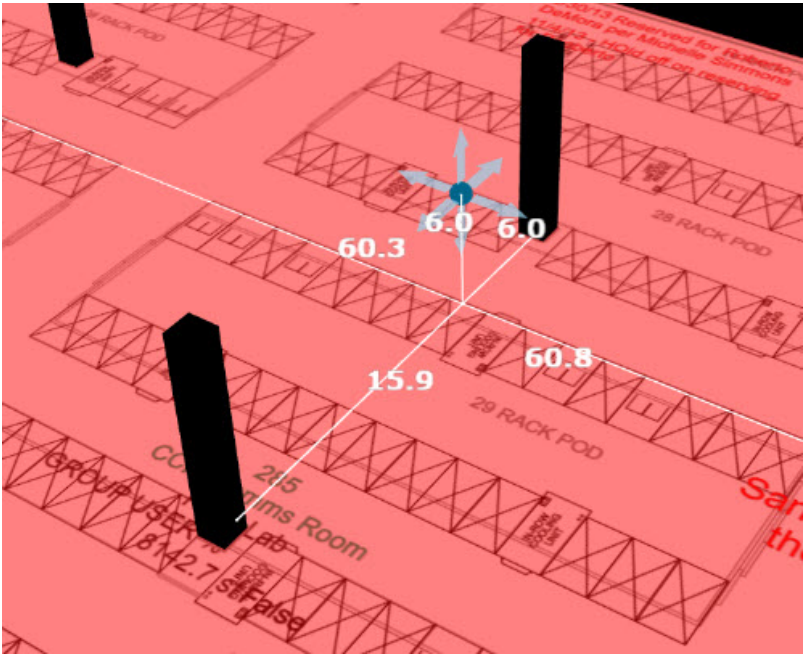

To access the 2D map, click the menu icon () and choose **Design > Network Hierarchy**. In the left hierarchy tree, choose a floor, and from the map toolbar, click **3D**.



The 3D map navigation controls are located at bottom-right of the map. For details about the map, see [View a 3D Wireless Map, on page 29](#).

Use the map navigation controls at the bottom-right corner of the map to control the map view.

Map Navigation Control	Description
	<p>Use clip box: Click this icon to crop the heatmap using a box shape. Use the clipper at the bottom-left corner of the map to specify the crop:</p> <ul style="list-style-type: none"> • Click and drag one of the anchor points to change the size of the crop. • Click and drag one of the anchor points on the right vertical slider to specify the height range of the crop. <p><i>Figure 8: Clip Box</i></p> 


Map Navigation Control	Description
	<p>Use clip planes: Click this icon to crop the heatmap using a donut shape. Use the clipper at the bottom-left corner of the map to specify the crop:</p> <ul style="list-style-type: none"> • Click and drag the anchor point in the center of the donut to reposition the donut. • Click and drag the two outer anchor points to change the shape of the crop. <p><i>Figure 9: Clip Planes in Use</i></p> 
	<p>First Person View: Click this icon to switch between first-person view and third-person view.</p> <p>The blue sphere indicates your position on the map. As you move throughout the map, your field of view changes. You can use the mini map at the lower left corner to get an idea of your field of view and orientation.</p> <p>Note If you have more than one floor selected for display, the First Person View automatically positions you on the current floor.</p> <p>For details, such as the controls for view, see Use First-Person and Third-Person Views for 3D Wireless Maps, on page 38.</p>

Map Navigation Control	Description
	<p>Third Person View: Click this icon to switch between first person view and third person view. You can also drag and drop the icon on the map where you want to be positioned.</p> <p>The blue sphere indicates your position on the map. As you move throughout the map, your field of view changes. You can use the mini map at the lower left corner to get an idea of your field of view and orientation.</p> <p>For details, such as the controls for view, see Use First-Person and Third-Person Views for 3D Wireless Maps, on page 38.</p>
	<p>Place a pin: Click this icon to view a predicted measurement (x, y, and z coordinates) of a specific point on the floor map. By placing a pin, you can view the measurements of the distance from the pin to the end of the yard stick. As you zoom in or out, the position of the measurements is adjusted to stay in your view. Drag and drop the pin to change its position, as follows:</p> <ul style="list-style-type: none"> • To move the pin horizontally: Click the horizontal arrows and drag the pin left, right, forward, or backward. The selected arrows and yard stick are highlighted while active. • To move the pin vertically: Click the vertical arrows and drag the pin up or down. The selected arrows and yard stick are highlighted while active. <p>For a video demonstration, click here.</p> <p>Figure 10: Adjusting a Pin</p> 
	<p>Zoom In: Click this icon to enlarge the view. Alternatively, you can use your mouse wheel to zoom in.</p>

Map Navigation Control	Description
	Zoom Out: Click this icon to reduce the size of the image and to increase your field of view. Alternatively, you can use the scroll wheel on your mouse to zoom out.
	Map Rotation and Default Map View: Click the directional arrows to change the camera angle. Click the Return Home icon to reset the map to the default view.



Use First-Person and Third-Person Views for 3D Wireless Maps

You can use the first-person and third-person views to gain different perspectives of your wireless network.

Step 1 Click the menu icon () and choose **Design > Network Hierarchy**.

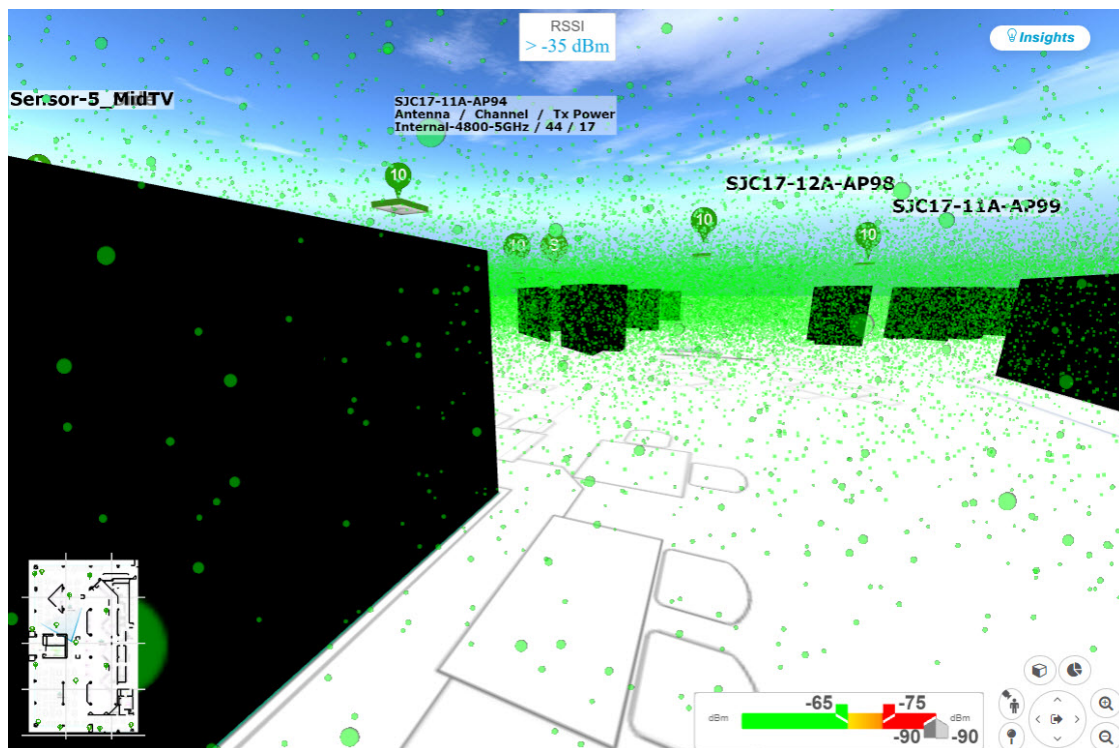
Step 2 In the left hierarchy tree, choose a floor.

Step 3 From the map toolbar, click **3D**.

Step 4 To use the first-person view, click the first-person view icon  in the map navigation controls. Optionally, you can drag and drop the person icon  to a specific location on the map.

The map view changes to the first-person view.

Figure 11: First-Person View



Step 5 You can control the first person view by doing the following:

Action	Controls
Move forward/backward and right/left.	Use the W , A , S , and D keys or arrow keys.
Change the camera angle.	Click and hold the left mouse button on the map and move the mouse wheel.
Raise the altitude of the camera angle.	Hold the Spacebar .
Lower the altitude of the camera angle.	Hold Shift + Spacebar .


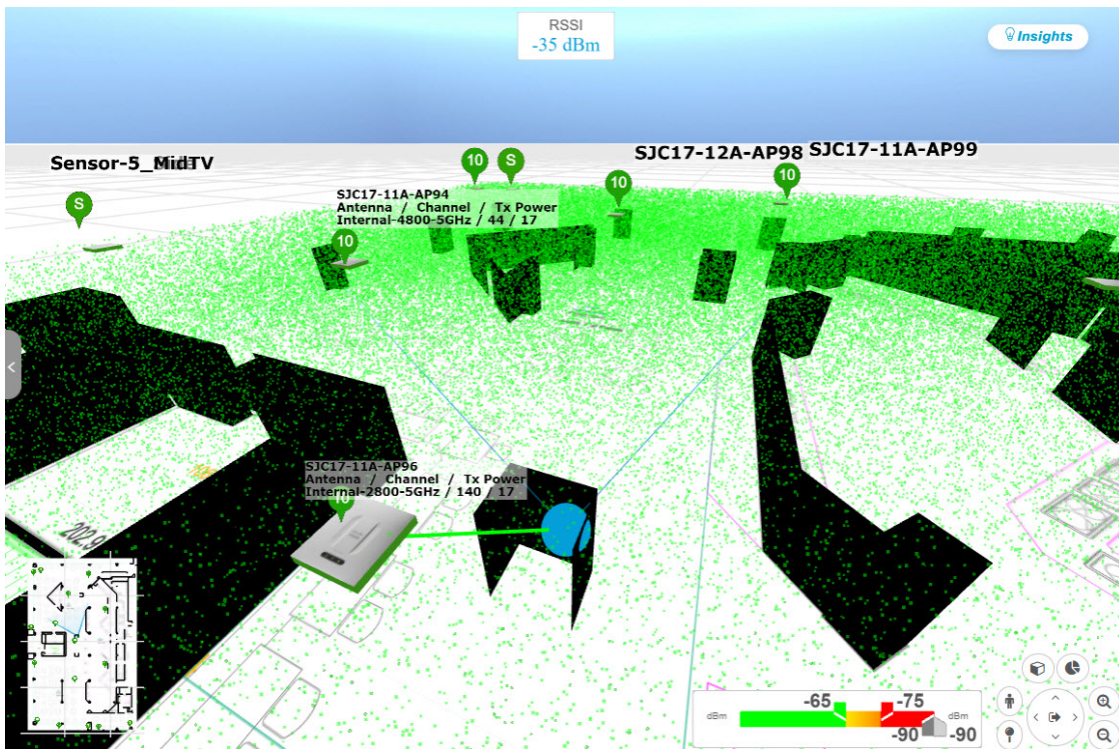
Step 6 To use the third person view, click the third-person view icon  from the map navigation controls. The map view changes to the third person view.


Figure 12: Third Person View



Step 7 You can control the third person view by doing the following:

Action	Controls
Move forward/backward and right/left.	Use the W , A , S , and D keys or arrow keys.
Change the camera angle.	Click and drag on the map.
Raise the altitude of the camera angle.	Hold the Spacebar .

Action	Controls
Lower the altitude of the camera angle.	Hold Shift + Spacebar .

Step 8 To return to the default view, click the return home icon .

Display Details About APs and Clients

If you have a location service, such as Cisco DNA Spaces or Cisco Connected Mobile Experiences (CMX), installed on Cisco DNA Center, you can view the locations of clients on a floor. Clients are identified as a small blue ball (●) on the map.

Step 1 Click the menu icon (☰) and choose **Design > Network Hierarchy**.

Step 2 In the left hierarchy tree, choose a floor.

Step 3 From the map toolbar, click **3D**.

Note A 3D heatmap is delimited by its coverage area, which is the full floor width and length, by default. To specify a polygon for the heatmap boundaries, you need to edit the **Coverage Area** field value in the 2D map view. However, these boundaries do not apply to the 2D map view, as the full floor width and length is used for the 2D map view.

Step 4 To display details about an AP, click it.

Step 5 To display information about a client, hover your cursor over the ball (client).

A line is drawn between the client and its associated AP. A dialog box is displayed with information, such as the client's IPv4 address, IPv6 IP address, RSSI value, and so on. To open the **Client 360** page, click the **Client 360** link in the dialog box.

Step 6 To display the client in a color that corresponds to its RSSI, SNR, or health score, do the following:

- Click **View Options > Devices and Clients**.
- Click the **Clients** check box.
- Under the **Clients** check box, click **None** (default blue color), **RSSI**, **SNR**, or **Health Score**.

Step 7 To resize the ball, use the **Ball Size** slider in the **View Options** pane. This feature helps you view clients in cases where there are many clients or only a few. For example, in cases where there are many clients, you may want to make the ball smaller, and in cases where there are only a few clients, you may want to make the ball larger.

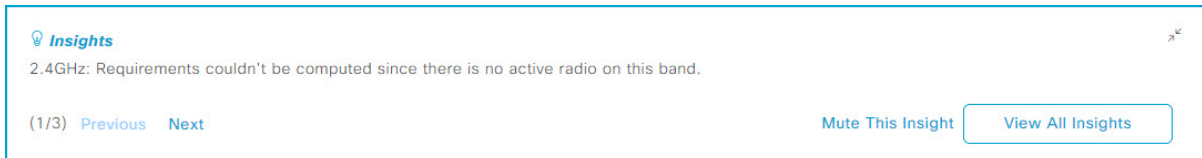
Gain Insights from a 3D Wireless Map

Cisco DNA Center actively monitors the network performance of 3D wireless maps and provides insights into areas where service-level agreements (SLA) are not being met.


Step 1 Click the menu icon (☰) and choose **Design > Network Hierarchy**.

- Step 2** In the left hierarchy tree, choose a floor.
- Step 3** From the map toolbar, click **3D**.
- Step 4** At the top-right corner of the map, click **Insights**.
The **Insights** area appears.

Figure 13: Insights Area



- Step 5** In the **Insights** area, you can do the following:

Actions	Details
View insight details.	The Insights area displays entries about the coverage areas that don't meet a specific KPI threshold, for example, RSSI is ≥ -70 dBm. To view more insights, click Next and Previous .
Customize insight settings.	Customizing an insight setting allows you to change the insight's KPI threshold value. Click View All Insights and then click Edit Configuration for the insight settings that you want to customize. Alternatively, you can hover your cursor over the Gear icon  in the map toolbar and choose Insights Configurations to customize insight settings.
Mute insights.	Click Mute Insight to stop Cisco DNA Center from reporting an insight. Muted insights appear at the bottom of the list in the All Insights slide-in pane.
Get an overview of all insights.	Click View All Insights to open the All Insights slide-in pane that displays all insights (active and muted).


Create Simulations for 3D Wireless Maps

You can create simulations for 3D wireless maps.



Note Simulation mode is available only in 3D maps, not in 2D maps.

Simulations allow you to make changes to device configurations without actually implementing them. You can create multiple simulations and load them at any time.

- Step 1** Click the menu icon () and choose **Design > Network Hierarchy**.

Step 2 In the left hierarchy tree, choose a floor.

Step 3 From the map toolbar, click **3D**.

Step 4 From the map toolbar, click the **Simulation** toggle button.

The 3D wireless map enters simulation mode, which is indicated by the color of the lower map toolbar changing to light blue.

Step 5 From the map toolbar, click **Add/Edit**.

In simulation mode, only particular attributes are editable and only for previewing the impact of changes on the heatmap.

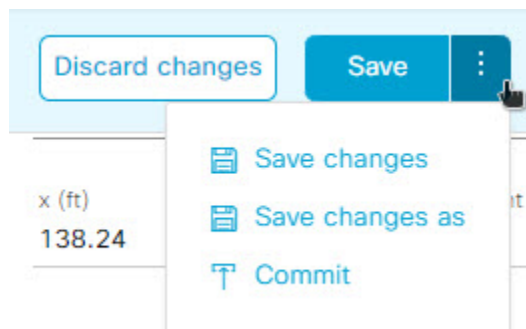
Step 6 Make the changes to the devices, as needed:

- **APs**: You can change the model, channel, and transmission power.
- **PAPs**: You can change the channel and transmission power.

a) Click **Apply**.

Step 7 From the map toolbar, hover your cursor over the vertical ellipsis and choose **Save changes as**.

Figure 14: Saving as a Simulation



Note Choosing **Save changes** saves your changes to Operation mode.

Choosing **Commit** saves your changes to production devices.

Step 8 In the **Save Simulation** dialog box, enter a name for the simulation and click **Save**.

Step 9 To load a simulation, click the **Simulation** toggle button and, from the **Select Simulation** drop-down list, choose a simulation. If you have no saved simulations, **None available** is displayed.