



# FortiPlanner™ v2.0

## User Guide



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# Using the FortiPlanner tool

This document explains how to use Fortinet FortiPlanner, a Wi-Fi planning tool that helps you to determine the optimal placement of FortiAP wireless access points on your premises.

The following topics are included in this section

- [Overview](#)
- [Drawing the floor plan](#)
- [Placing APs for optimal coverage](#)
- [Viewing the results](#)
- [Creating a report](#)

## Overview

Starting with a floor plan of the area that you want to cover with your wireless network, the planning tool will provide a color-shaded image predicting the expected signal strength throughout the coverage area. Using the tool, you can try out different placements of wireless access points prior to installation on the premises.

The overall process for using the planning tool is as follows:

- Draw a floor plan of the coverage area.
- Place APs on your floor plan.
- Run a propagation prediction.

The last two steps are iterative. If the prediction shows some areas with poor coverage, you can change the placement of your APs and run another propagation prediction.

After you have implemented your wireless network, you can

- Monitor the AP transmit power levels and client load.
- Perform a site survey in which you measure the actual received signal strength throughout the coverage area.

## Licensing

The FortiPlanner application that you download is locked into demo mode. Some features, such as Site Survey and Real Time Heat Map, are not available until you purchase a license from Fortinet. You will need to provide the application's Hardware ID. To find the Hardware ID, go to the Project menu, and select *License Management*.

### To apply a license file

1. In to the Project menu, and select *License Management*.
2. Select *Browse* and locate the license file in your file system.

If the *Browse* button is unavailable, the application is already licensed. If you want to replace the existing license with a new one, select *Upgrade* first.

3. Select *Activate*.

## Signal strength displays

The result of the propagation prediction, site survey, or real-time heat map is a floor plan color shaded to show signal strengths throughout the area.

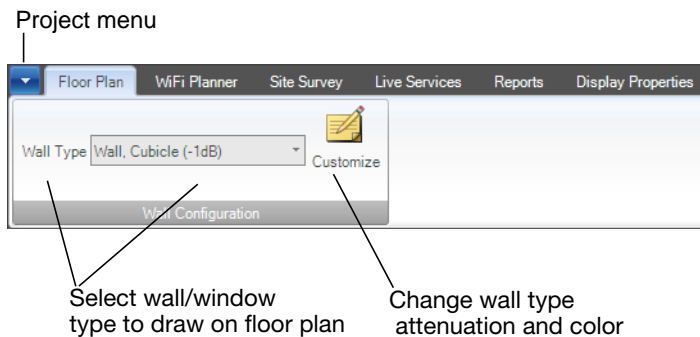
**Figure 1:** Example propagation prediction



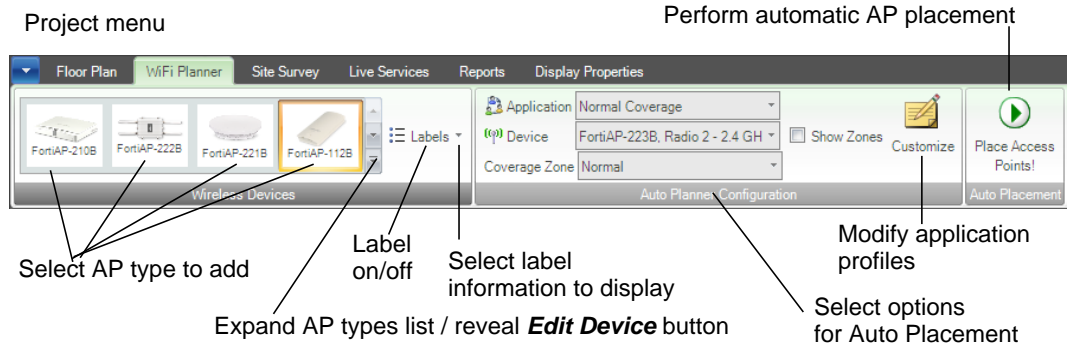
You can select from several color gradients. From left to right the colors represent increasing signal strength. If you select Absolute Range Scale, the range is -95dBm to +20 dBm. Otherwise the range is from weakest to strongest values calculated or measured. However, FortiPlanner does not color shade regions where the signal strength is below the Signal Floor or Receiver Sensitivity setting.

## FortiPlanner controls

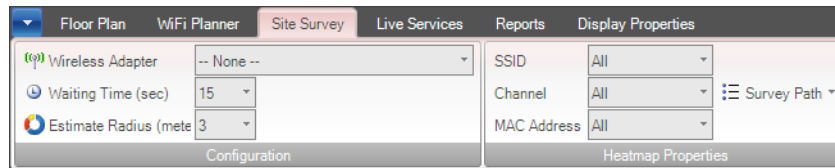
### Floor Plan tab



## WiFi Planner tab

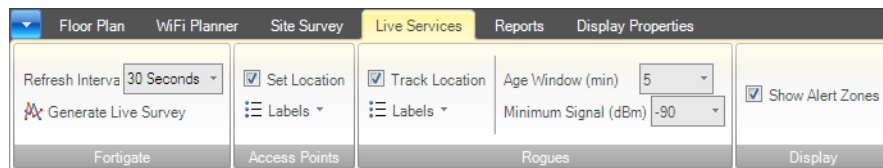


## Site Survey tab



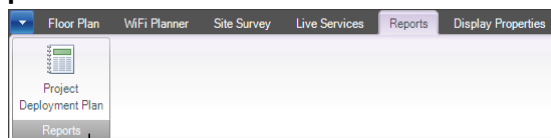
This is available only if the FortiPlanner application is licensed.

## Live Services tab



This is available only if the FortiPlanner application is licensed.

## Reports tab

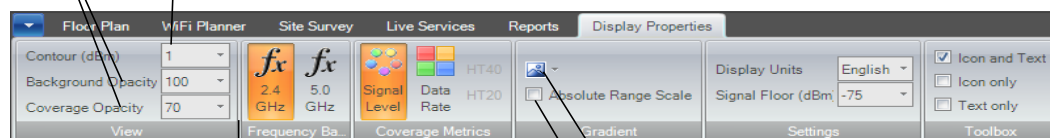


Create/print/export reports

## Display Properties tab

Adjust balance of background and coverage display

Contour gradient step size

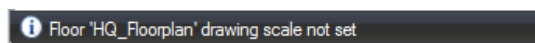


Select Wi-Fi band to display

Select Signal or Data Rate display

Select display gradient  
Absolute (-95 to +20dBm) range

## Status bar



Informational messages,  
status of last operation, etc.



Fit to page

Zoom control

## Drawing the floor plan

The floor plan shows not only the shape of the rooms in the coverage area, but also the materials from which they are constructed. Different materials absorb, refract, and reflect radio waves to different degrees. The planning tool takes this into account when predicting the coverage you can expect from a particular placement of wireless access points.

You can use the Floor Planner tab as a blank canvas to draw your plan, or you can import a bitmap image of a floor plan and use it as a guide as you draw walls, doors, windows, and so on, carefully selecting the material types from which they are constructed.

### To start FortiPlanner

1. On the Start menu, select *All Programs > Fortinet Inc. > FortiPlanner 2> FortiPlanner 2*.

### To start the New Project Wizard

1. From the project menu (▼), select *New Project*.

On the Project menu, select *New Project* to start the *Add to Project* wizard. The wizard requests:

- Project Name
- Region Name
- Building Name and address
- Floor Name


On the Floor Name page, you can select *Choose Image* to load an image file containing the floor plan layout. Most common image formats are supported, including JPEG, PNG, GIF, BMP, TIFF, EMF/WMF. If you do not have a floor plan image, select *Default Background* instead. You can draw the floor plan later.




Use these buttons to rotate the image into the best orientation for your floor plan.

---

### To set the scale

1. Select the *Floor Planner* tab.
2. On the toolbar, select *Set Scale* (  ) and draw a line representing a structure of known length, such as a wall.
3. In the dialog box, enter the length of the structure you drew and then select OK.  
You can use either metric or English units.

### To draw walls and windows


1. Select the *Floor Planner* tab.  
If necessary, you can zoom in or out on the floor plan using the mouse scroll wheel.
2. On the toolbar, select *Add Wall* (  ).
3. Select the *Wall Type*.
4. Place the cursor, drag the mouse and release the button to draw a straight line segment, such as a wall. To delete a line, right-click it and select *Delete*.
5. Repeat steps 3 and 4 until you have drawn all of the structural elements of the floor plan with the appropriate building materials.



You can draw only on the grid lines. The small difference in position between the lines you draw and the lines in the image file is not significant in the propagation calculations.

---

### To save the project

1. Select Save from the project menu (  ).



## Placing APs for optimal coverage

You can use automatic or manual placement of APs. It is also possible to combine the two methods: use automatic placement initially and then fine-tune the AP positions manually. The FortiAP model selected on the Access Points tab is the AP type that will be used in either automatic or manual AP placement.

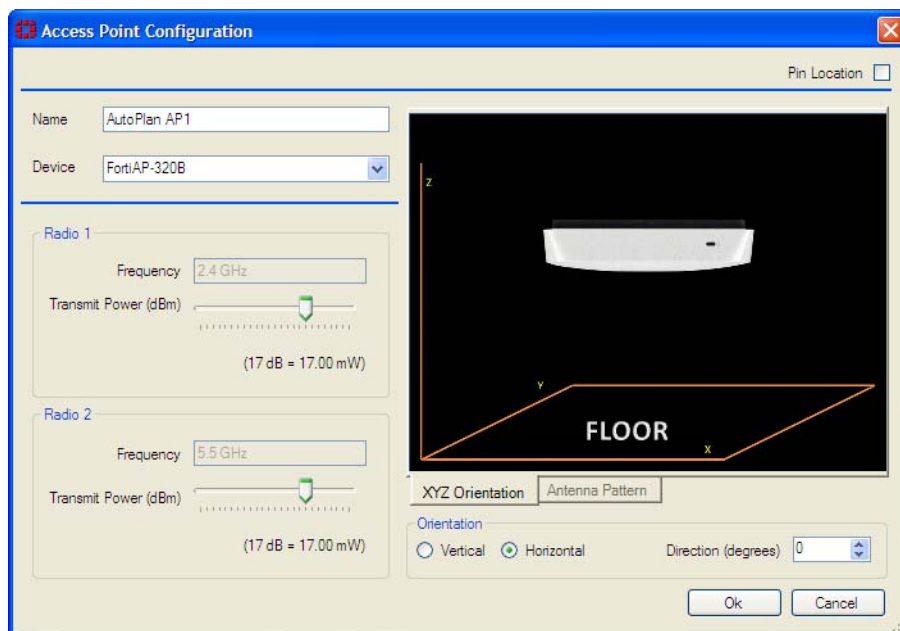
### Access point parameters

You can adjust the parameters of each AP type prior to placement, or adjust individual APs after placement. The parameters are:

<b>Name</b>	This field defines an identifier for the AP. If used prior to automatic placement, the name is used as a prefix. Each AP name will consist of the prefix followed by a number. The default name is "Access Point". APs will be named "Access Point_1", "Access Point_2" and so on.
<b>Device</b>	FortiAP model number.
<b>Radio 1, Radio 2</b>	
<b>Frequency</b>	Show the frequency band of the radio: 2.4GHz or 5GHz. This depends on the FortiAP model.
<b>Transmit Power (dBm)</b>	The AP transmit power to use in the next analysis.
<b>Orientation</b>	Select Vertical or Horizontal. The graphic illustrates the unit orientation compared to the floor.
<b>Direction (degrees)</b>	AP orientation as a compass heading. 0 is North, 90 is East, 180 is South, 270 is West.

### To adjust Access Point parameters before placement

1. On the *WiFi Planner* tab, select the FortiAP model, select the down arrow (▼), then select *Edit Device*.



2. Set AP parameters as need. See “[Access point parameters](#)”, above.
3. Select *OK*.

### To adjust Access Point parameters after placement

1. Select the *WiFi Planner* tab.
2. Select Pointer in the toolbar.
3. Right-click on the AP in the floor plan and select *Edit*.
4. Set AP parameters as need. See “[Access point parameters](#)”, above.
5. Select *OK*.

## Placing APs automatically

The auto-place function determines the optimal number and placement of APs while performing a propagation prediction. You must first define the zones where AP placement is permitted. Then you can run the auto-placement and propagation prediction.

### Defining zones


The auto-placement feature requires zones to define where it can or cannot place APs. At a minimum, define a Normal area. This could be simply a single zone that covers the intended Wi-Fi coverage area. If there are areas where you do not want or cannot install APs, define an Exclusion zone there.

#### To define a zone

1. Select the *WiFi Planner* tab.

If necessary, you can zoom in or out on the floor plan using the Zoom control or the mouse scroll wheel.

For best results, select *Show Zones* in *Auto Planner Configuration*.

2. In the *Coverage Zone* list in *Auto Planner Configuration*, choose:
  - Normal - can place APs here
  - Limited - coverage desired, but cannot place APs here
  - Exclusion - coverage not required, cannot place APs here
3. In the toolbar, select *Add Zone* .
4. Click to define the starting point, move the mouse to draw. Click when you want to change the direction of the line. When you have defined a closed area, right-click to stop drawing.
5. Repeat steps 2 through 4 to define additional zones.

## Running auto-placement and propagation prediction

**With the auto-place zones defined, you can now use the auto-place function. The result is a propagation prediction with the optimal number and placement of APs.**

### To place APs automatically and calculate propagation

1. Open your project.
2. Select the *WiFi Planner* tab.
3. If there are no zones defined, define them now. See [“Defining zones” on page 10](#).
4. In *Auto Planner Configuration*, select the desired type of coverage (*Application*) to predict.  
The default is Normal Coverage. There are several pre-defined profiles, such as High Priority Data and VoIP. You can also select *Customize* to create your own custom profiles. See [“To create custom auto planner profiles” on page 12](#).
5. In *Device*, select the type of access point and radio band to use.
6. Select *Place Access Points*.  
FortiPlanner calculates and displays the coverage prediction.

### To configure the analysis display parameters

1. With your project open, select the *Display Properties* tab.
2. In *Frequency Band*, select either 2.4GHz or 5.0GHz.
3. In *View*, you can adjust how the signal levels are displayed:
 

<b>Contour (dBm)</b>	Adjusts the step size of the color gradient. For example, a 3dB setting shows a different color for each 3dB change in signal.
<b>Background Opacity</b>	Adjusts how well the background image can be seen through the coverage shading. 100 maximizes background visibility but parts of the background may not be visible if Coverage Opacity is too high.
<b>Coverage Opacity</b>	Adjusts how much the coverage shading hides the background image. 100 maximizes coverage visibility but might obscure the background.
4. In *Gradient*, select the color spectrum that will represent signal strengths. Optionally you can enable *Absolute Range Scale*.
5. In *Settings*, set

<b>Display Units</b>	Choose English or Metric measurement.
<b>Signal Floor (dBm)</b>	Enter the lowest acceptable signal level for your intended coverage area.

### To create custom auto planner profiles

1. On the *WiFi Planner* tab, in *Auto Planner Configuration*, select *Customize*.

The *Auto Planner Profile Configuration* window opens.

2. Select *New*, enter a name for the profile, and then select *OK*.

3. Enter the following information, select *Apply* and *Exit*:

<b>Transmit Power (dBm)</b>	Make sure that your selected power level does not exceed the regulatory limits for your region.
<b>Receiver Sensitivity (dBm)</b>	Enter the lowest signal level that the AP's receiver can receive reliably.
<b>Access Point Orientation</b>	Select either <i>Vertical</i> or <i>Horizontal</i> mounting orientation for the AP unit.
<b>Access Point Coverage Aggressive</b>	Select to attempt 100% coverage for zones where coverage is desired. Otherwise, a 90% coverage target is used. A point is considered covered if the signal strength exceeds the Receiver Sensitivity.

## Placing APs manually

Manual AP placement is an iterative process. You put APs on the floor plan and view the propagation prediction. Then, you try moving the APs or adding additional APs and then viewing the prediction again to see if you have improved the wireless coverage.

### To place APs on the floor plan

1. With your project open, select the *Access Points* tab.
2. In *Wireless Devices*, select the type of access point that you want to place.
3. Do any of the following:
  - In the toolbar, select *Add Device*. Click on the floor plan where you want to place an AP.
  - Drag an existing AP to a new position.
  - Right-click an AP to modify its settings or remove it.

The propagation prediction is updated.

4. Repeat any of the actions in Step 3 as needed to produce the desired coverage.

The *Labels* button in *Wireless Devices* toggles AP labels on and off. The drop-down menu on the *Labels* button controls which pieces of information are included on the labels.

5. From the project menu () , select *Save*.

## Adjusting AP parameters after placement

You can select individual APs and adjust their settings.

### To adjust Access Point parameters after placement

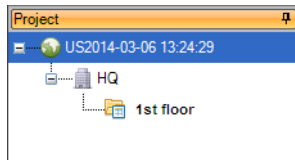
1. On either the *Floor Plan* or *WiFi Planner* tab, right-click the access point and select *Edit*.  
You must have the Pointer tool selected in the toolbar.
2. Adjust the parameters in the Access Point Configuration window and select *OK*.  
The propagation prediction is updated.

### To remove an access point

1. On either the *Floor Plan* or *WiFi Planner* tab, right-click the access point and select *Delete*.  
You must have the Pointer tool selected in the toolbar.

## Creating multi-floor or multi-building plans

The Project window shows your project as a tree diagram hierarchy of region, building, and floor elements.



To add an element, you right-click the parent element in the tree, select *New* and then select *Region*, *Building*, or *Floor*. For example, to add a floor to a particular building, right-click that building and select *New > Floor*.

The *Add to Project* wizard starts at the selected element level and requests information for that level and below, as it does when creating a new project. For example, if you select *New > Building*, you are also asked for floor information.

To remove any element, right-click it and select *Delete*.

### To rename a floor plan

1. In the *Project* pane, right-click the floor and select *Rename*.

## Viewing the results

Now you can view the propagation prediction. On the *Display Properties* tab:

- Select either the 2.4GHz or the 5.0GHz band results.
- Select either Signal Level or Data Rate results.
- Select the color gradient scheme and adjust the gradient step size (*Contour (dBm)*).
- Adjust the balance between the floor plan background and coverage prediction using the *Background Opacity* and *Coverage Opacity* settings.
- Set the minimum acceptable signal in *Signal Floor*.

Using the left column, you can select which floor of a multi-floor project to view. Using the controls at the bottom right of the page, you can zoom in on areas of interest.

Information about each AP is listed, depending on the selections in *Labels* on the *WiFi Planner* tab.

## Creating a report

FortiPlanner can create a report with the following optional sections:

- Deployment Placement — your floor plan including access point locations
- Device Placement Detail — name, configuration and location map of each AP
- Device Inventory — list of network APs by model, with count by model
- Propagation Analysis — the propagation prediction for 2.5GHz and/or 5GHz
- Auto Placement Zones — maps of your Normal, Limited, and Exclusion zones
- Site Survey — Site Survey information for a specified SSID
- Rogue Devices — details of detected rogue APs

If there are multiple floors in the project, the selected report sections are generated for each floor. You can print the report or save it in several different formats.

**To create the report**

1. With your project open, select the *Reports* tab, then select *Project Deployment Plan*.
2. In the *FortiPlanner Reports* window, select the report sections that you want to include.
3. Select *Generate*.
4. The first report is displayed in the *Report Preview* window.
5. Do any of the following:
  - Print the report.
  - Save the report. Several output formats are supported. PDF is the default.
6. When you are finished printing or saving the report, close the window.

# Creating a Site Survey

Site Survey enables you to walk about your WiFi coverage area with a portable computer and measure actual received signal strengths.

## Configuring FortiAP units for test survey mode

Before permanent WiFi equipment installation, you can configure FortiAP units in survey mode and place them temporarily. No FortiGate unit is required. The APs will broadcast a test SSID whose coverage you can measure with the FortiPlanner application. This allows for fine adjustments to the AP placements you determined with the WiFi Planner function.

After permanent installation you can perform a site survey to investigate complaints of poor coverage or to determine where adjustments might be needed after office reconfiguration or renovation.

### To reset the FortiAP unit to factory defaults

1. Connect the power adapter to the FortiAP 12VDC connector and plug in the adapter.
2. Reset the FortiAP to factory defaults. Use a pin to press the reset button until the power light flashes amber (about 5 seconds).

### To prepare the FortiAP

1. Connect an Ethernet cable from the FortiAP RJ-45 connector to the network interface on your computer.
2. Set the computer's IP address to 192.168.1.3.
3. Use a browser to connect to 192.168.1.2, the FortiAP unit's default IP address.
4. On the System Information Tab, in the Network Configuration section, in Administrative Access, enable TELNET.
5. Using a terminal emulator, connect to 192.168.1.2.  
Some terminal emulators: telnet, HyperTerminal, PuTTY.
6. Log in as admin. By default, there is no password.

7. Enter:

```
cfg -a AP_MODE=2
cfg -c
```

8. Optionally, you can also configure the following parameters:

SURVEY_SSID	- default is FAP_SURVEY
SURVEY_TX_POWER	- power in dBm, default 30
SURVEY_CH_24	- 2.4GHz band channel
SURVEY_CH_50	- 5GHz band channel
SURVEY_BEACON_INTV	- beacon interval

Precede the parameter with `cfg -a` as was done for `AP_MODE` in the preceding step. You can review your settings by entering `cfg -s`. When you are finished, enter `cfg -c` to commit the changes.

## Creating a Site Survey

The Site Survey is based on signal strength readings that you take with a portable computer as you move about the coverage area.

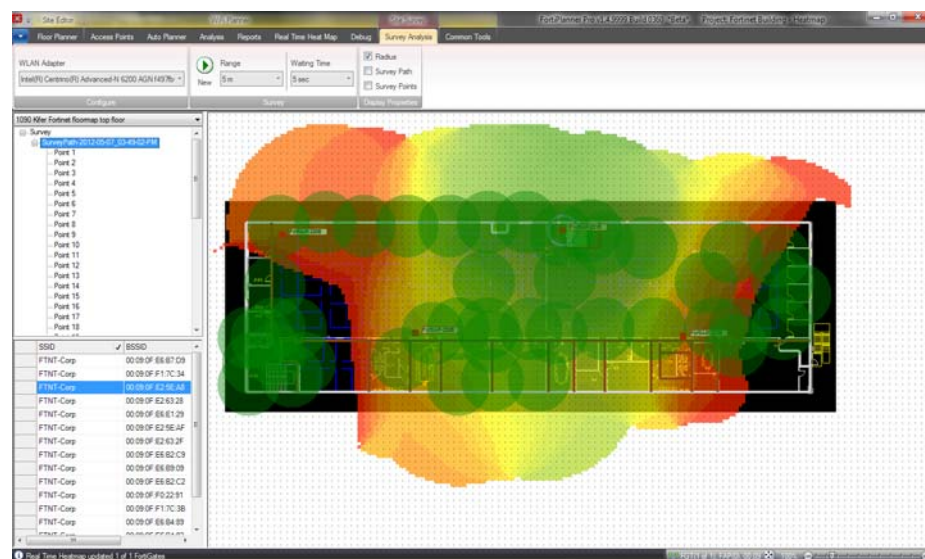
### To perform a site survey

1. Connect a WLAN adapter to your laptop computer.
2. Start FortiPlanner and go to the *Site Survey* tab.
3. In *Configuration*, choose the *Wireless Adapter* that you connected.
4. Optionally adjust the *Range* and *Waiting Time*.
5. In *Survey*, select *New*.
6. Click your current location on the floor layout and start walking at a slow steady pace. Click your location on the floor layout periodically and when you stop, start, or change direction.

During the survey, a point data is recorded each time you click on the floor plan. A green circle is added, representing the *Range* setting, default 5 metres. For the most complete survey, you should click to record another data point when you reach the edge of the previous data point's circle.

7. When you have finished walking the coverage area, stop the survey.

A Site Survey result looks like this:



## Viewing the site survey

After site survey is completed, you can view the results. The BSSID and SSID's captured during site survey is shown in the table in lower left hand corner.

### To determine coverage for a specific SSID

1. Use the search tool find the SSID of interest.
2. In the table, shift-select all of the instances of that SSID.

### To determine if network is ready for voice over wireless

1. Determine the lowest signal that voice handset requires, usually -68dB.
2. Shift-click the SSID of interest.



3. On the *Display Properties* menu, set *Signal Floor* to -68dB.

Only the coverage areas where the signal level is stronger than -68dB are highlighted. Any uncolored areas have inadequate signal and calls may drop.

### Printing a site survey

On the *Reports* tab, select *Project Deployment Plan*. Site Survey is one of the optional report elements.

# Monitoring WiFi Coverage

FortiPlanner can evaluate and monitor the real-world performance of your wireless network, whether you designed it with FortiPlanner or not. There are two main tools to do this:

- Live Survey retrieves coverage information from the FortiGate WiFi controllers, including actual transmit power and the number of connected clients. This display is particularly useful when Auto Tx Power Control is in use.

The following topics are included in this section:

- [Creating a Live Survey](#)
- [Rogue detection](#)

## Creating a Live Survey

The Live Survey or real time heat map is based on information retrieved from the FortiGate units that manage your access points. FortiPlanner connects automatically to these FortiGate units. You need to position the FortiAP units on your floor plan corresponding to their actual locations on your premises.

This section describes how to:

- Create a FortiPlanner project containing a floor plan of the coverage area.
- Add the WiFi controller FortiGate units to your floor plan
- Place the managed APs on your floor plan.

## Creating a FortiPlanner project


If you used FortiPlanner to plan your network, you might be able to use that project for the Real Time Heat Map as well. The floor plan must contain visual landmarks such as walls and windows on its background. Walls added with the Add Wall function are not visible in the Live Services display.

Otherwise, create a new project as follows.

### To start FortiPlanner

1. On the Start menu, select *All Programs > Fortinet Inc. > FortiPlanner 2> FortiPlanner 2*.

### To start the New Project Wizard

1. From the project menu () , select *New Project*.

On the Project menu, select *New Project* to start the *Add to Project* wizard. The wizard requests:

- Project Name
- Region Name
- Building Name and address
- Floor Name


On the Floor Name page, you can select *Choose Image* to load an image file containing the floor plan layout. Most common image formats are supported, including JPEG, PNG, GIF, BMP, TIFF, EMF/WMF.




Use these buttons to rotate the image into the best orientation for your floor plan.

---

#### To set the scale

1. On the toolbar, select *Set Scale* () and draw a line representing a structure of known length, such as a wall.
2. In the dialog box, enter the length of the structure you drew and then select OK.  
You can use either metric or English units.

#### To save the project

1. Select *Save* from the project menu ()

## Adding FortiGate units to your project

You need to add to your project the FortiGate units that manage your FortiAP units.

#### To add a FortiGate unit to your project

1. In the Project pane window, right-click the top node and select *New > FortiGate*.
2. Enter:

<b>Name</b>	A name to identify this FortiGate unit.
<b>VDOM</b>	The virtual domain that applies to the WiFi controller. If you are not using VDOMs, enter <i>root</i> .
<b>Network address</b>	The FortiGate unit's IP address for administrative access.
<b>Username Password</b>	The credentials for administrative access to the FortiGate unit.

3. Select *OK*.

A new FortiGate node is added to the Project pane. The icon color shows the status of the FortiGate unit.



Not connected.



Connected.

---

## Adding managed APs to the floor plan

The Project window lists managed Forti APs under the FortiGate unit that manages them. The FortiAPs are identified by serial number. To place a FortiAP on your floor plan, drag the FortiAP icon to the appropriate location on the floor plan. You will need to know the locations where the APs were installed and the serial number of the unit in each location.

FortiAP units that are already placed on the floor plan are listed in a smaller typeface in the Project window.

## Viewing the results

The coverage display on the *Live Services* tab is updated after each *Refresh Interval*. You can modify the display in several ways:

- In *Access Points*, you can select which AP information *Labels* to display.
- You can switch to the *Display Properties* tab to
  - change color gradient
  - balance display of background and coverage
  - set Signal Floor (minimum acceptable signal)
- On the floor plan, enable *Show AP Propagation*.

**Figure 2:** Live Survey Result



## Rogue detection

After you have set up the Live Survey, FortiPlanner receives information about suspected rogue APs from FortiGate units. A Rogue AP is one that is not managed by any of the FortiGate units in the FortiPlanner project.

You can:

- View the Rogue list to see the information gathered about suspected rogues.
- Select rogues to locate and track. The most likely location of the rogue is then shown on the floor plan.
- Optionally, receive an alert when a rogue AP is detected in alert zones you draw on the floor plan.

### Viewing the Rogue list

The *Rogue* list is initially empty. Select *Refresh* at the top left of the *Rogue* pane to populate the list.

The list columns show typical WiFi parameters: SSID, MAC address, AP manufacturer, security mode (such as WPA Auto), received signal strength, radio channel, number of clients (WTPs), and when the AP was detected. In addition, there is a column that indicates whether the FortiGate unit considers the suspected rogue to be “on-wire” and therefore a potential security threat.

The following check box columns show the current status of the FortiGate unit’s attempts to locate and track the rogue AP:

locating	The rogue has been added to the FortiPlanner project. To add a rogue to the project, double-click its entry in the <i>Rogue</i> list.
has_location	The FortiGate unit is able to track this rogue.
is_located	The FortiGate has determined the rogue’s location.
is_tracking	The FortiGate is continuously determining the location of this rogue AP. By default, FortiGate determines the location only once. To apply tracking to a rogue AP, find it in the <i>Project</i> list, right-click and select <i>Location &gt; Continuous</i> .

Clicking a column header sorts the *Rogue* table by the content of that column.

### Selecting suspected rogues to locate or track

You can locate and track suspected rogues only if you add them to the project.

#### To add a suspected rogue AP to the project

1. If the *Rogue* list is empty, select *Refresh* at the top left of the list.
2. In the *Rogue* list, double-click the suspected rogue that you want to track.

The row is shaded red and the suspected rogue AP is added to the *Project* pane under the FortiGate unit that detected it. If you select the AP, detailed information about it is displayed in the *Detail* pane.

If the FortiGate unit can determine an approximate location for the suspected rogue AP, that location is shown as a red triangle on the floor plan. In the *Project* pane, the AP icon changes from orange to green.

### To remove a suspected rogue AP from the project

1. Locate the rogue AP in the *Project* list, right-click it and select *Delete*.

The AP is still listed in the Rogue list, but the FortiGate unit no longer tries to locate or track it.

## Viewing suspected rogue locations on the floor plan

When you add suspected rogue APs to the project, the FortiGate unit can attempt to locate and track the APs. It displays the likely location on the floor plan.

### To view locations of suspected rogue APs

1. On the *Live Services* tab, make sure that *Track Location* is enabled.
2. On the *Labels* drop-down list, select the AP information that you want to display on the floor plan.

*AOU* is Area of Uncertainty. Location calculations have limited resolution. If you enable *AOU*, a circle is displayed around the AP triangle. The actual location of the AP could be anywhere within the circle.

3. Optionally, adjust the *Age Window* (maximum age of the rogue information in minutes) and the *Minimum Signal* (dBm) (the weakest signal to list as a suspected rogue).

## Printing a report of suspected rogue APs

On the *Reports* tab, select *Project Deployment Plan*. Rogue Devices is one of the optional report elements.