PANDUIT™
infrastructure for a connected world

SYNAPSENSE by Panduit
Comprehensive Capacity Management
Wireless Monitoring | Energy Management | Power and Cooling Control

MapSense

User Manual

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Preface

About this Guide

This user guide is intended for customers and partners of Panduit who have already received training on the MapSense application from a Panduit Customer Support trainer or Panduit Professional Services representative.

Readers should have:

- A thorough knowledge of the physical and technical aspects of the data center
- Access to the MapSense Component Library
- Experience using applications on the Web
- Experience using the Microsoft Windows environment

Organization

This guide is divided into chapters based on the tasks typically performed during setup and maintenance of a project. The table below lists the sections and their descriptions.

Section	Description
Introduction	Provides information about system requirements, installation, and the user interface.
Working with Projects	Provides information about the tasks required to setup and maintain a MapSense project.
Power Monitoring	Covers activities related to setting up power monitoring for the data center.
PUE and Other Calculations	Covers activities for setting up PUE and other complex calculations within MapSense.

Introduction

This section provides information about system requirements, installation, and the user interface.

- [About MapSense](#)
- [MapSense Installation](#)
- [Minimum System Requirements](#)
- [MapSense User Interface](#)

About MapSense

SynapSense® MapSense is the configuration tool used to map the physical deployment of sensors installed on the actual data center hardware. MapSense uses a variety of components to represent actual data center equipment. For example, sensor nodes are represented by sensor components such as rack components and Gateways. Logical concepts and mathematical concepts used for collecting and reporting data are represented by calculation components such as math operations or PUE calculation components.

In MapSense, these components represent the floor plan of the data center and specify the different types of monitoring installed in the data center, including:

- Environmental (temperature, pressure, humidity, dew point)
- Power and Energy
- PUE
- Active Control (purchased separately - see your Panduit representative)

This MapSense representation of the data center is saved and exported to the SynapSense Web Console, which displays data coming from the actual sensors. Data used in generated images, tables, and charts are initially configured in MapSense

At a high level, the three main steps for creation and use of a project are:

- **Planning and Assessment** – Panduit Professional Services generally performs these tasks for our customers. They include:
  - Using a blank canvas to create a drawing or creating a background image from a customer provided schematic
  - Creating a project
  - Placing, sizing, and associating components

All of this creates a project plan by which the team can assess the number and positioning of SynapSense hardware required for instrumenting the data center.

● **Installing Hardware and Obtaining MAC IDs** – After the project plan is agreed upon, and the hardware is ordered and installed, sensor and hardware MAC IDs are collected and entered into MapSense.

● **Project Validation and Export to Web Console** – Perform project validation and export the project to the Web Console where the data from the installed sensors can be viewed and monitored in real time.

You should update your project plan in MapSense anytime something in the physical data center environment changes.

MapSense Installation

MapSense is included in the SynapSense Installation CD. The installation wizard guides you through the steps required to complete the installation.

Minimum System Requirements

The following minimum specifications must be met prior to installation of MapSense.

Hardware Requirements

● Processor – 2 GHz, 32 or 64-bit processor or better
● Memory – 2 GB RAM or more
● Disk Space – 100 GB or more

Software Requirements

● Operating System – Windows SynapSoft 2008 R2, Windows SynapSoft 2012 R2, and Windows SynapSoft 2016
● Software – Java Development Kit (JDK) version 8 – Included with the SynapSense installer.
● User Privileges – The user installing the software must be logged in with Administrator privileges before installing MapSense.

MapSense User Interface

The MapSense user interface incorporates standard point-and-click functionality for component placement and drawing management.
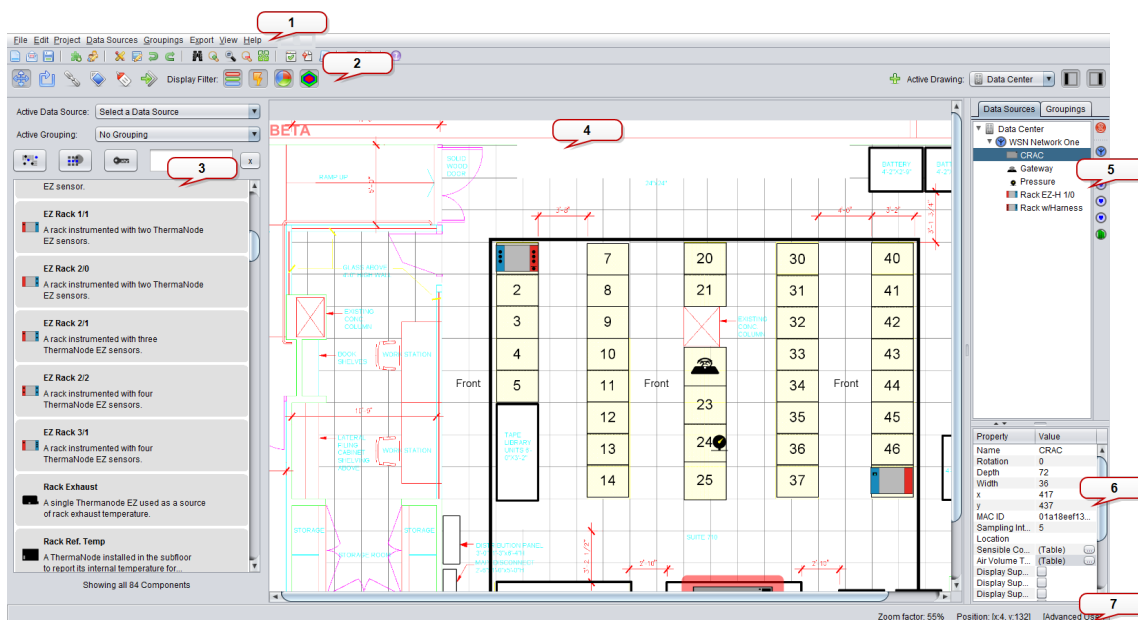
1. **Menu Bar** – Standard Windows-type drop-down menus display.

2. **Toolbars** – Quick access buttons for frequently used tasks like saving a project and selecting a component.

Toolbar Icons

Icon	Description	Icon	Description
	New Project		Zoom In
	Open from Disk		Zoom 1:1
	Save		Zoom Out
	Load Component Library		Zoom to Fit
	Change User Level		Validate Project
	Set Background Scale		Sync with SynapSoft
	Reload Background Image		Export Deployment Plan to PNG
	Undo		View Options
	Redo		View Stats

Icon	Description	Icon	Description
	Find		User Guide
	Assign MAC ID		Copy Settings
	Select		Add Drawing
	Rotate Object		Show/Hide Palette
	Associate		Show/Hide Properties Panel
	Quick Name		

Display Filters – Select or Deselect Filters

Filter	Description
	Environmentals
	Power and Energy
	PUE
	Contained Area

3. **Component Palette** – Provides the currently active data source and grouping, the ability to filter the component list by current project, active project, and tags. Click Tags to open a list and select the type of components to display. With none of the buttons selected, type a search term in the field to display just components containing that key word. See also About the Component Palette.

4. **Workspace** – Area in which the drawing displays and the work is done to place components.

5. **Data Sources and Groupings** – Displays a list of components in each room, calculation group, region, or network in a tree hierarchy. Users have access to the vertical quick access icons for adding and removing data sources.

6. **Properties Editor** – When an item is selected on the drawing or on one of the tabs above, the editor displays the properties for that item. When more than one item is

selected, the editor displays the properties that are common to all, leaving properties blank that the items do not share.

7. **Status Bar** – Displays messages, the Zoom Factor, the cursor position on the x/y axis, and the current User Level.

Working with Projects

This chapter provides information about the tasks required to setup and maintain a MapSense project.

In this chapter:

- Creating a New Project
- Additional Configuration Tasks
- Maintaining an Existing Project

Creating a New Project

MapSense requires several configuration steps before an installation is complete and sensors can begin reporting data. This section explains the steps required to create and configure a MapSense project and to export the final project file to the SynapSense Environment Server.

- New Project Checklist
- Open a New Project
- Set Scale for Background Image
- Set Options
- Create Data Source
- Background Images
- Using the Canvas
- Create Rooms
- Select and Place Components
- Planning Groups
- Size Racks
- Name Components
- Specify Location
- Assign MAC IDs
- Adding Associations
- Validate Project
- Export to SynapSense Environment SynapSoft
- Working with Multiple Floor Plans in a Project
- Considerations for Multiple Data Centers

New Project Checklist

A new SynapSense project requires preparation, planning, and configuration, prior to hardware installation and project validation. The checklist provided here should help to ensure that all of the steps are completed in the set order for a successful product implementation. Please contact your Panduit representatives with any questions concerning this process.

Preparation

There are three options for preparing a new project to be used in Web Console:

1. Obtain or create a background image with transparency layer in Portable Network Graphic (.png) format for each floor, room, roof, or virtual floor covered by the project file.
2. Obtain a background image with or without a transparency layer to use as a template for manually creating the drawing. When the drawing is done, you can delete the template.
3. Manually create a drawing from a blank Canvas. See Using the Canvas for details.

Planning and Configuration

- Open a new project
- Change the user level
- Using the Canvas
- Set the scale
- Set options
- Create data sources, including Wireless Sensor Networks
- Create rooms
- Select and place components
- Size Racks
- Copy Components
- Adding Associations
- Name Components

Hardware Installation and MAC ID Assignment

- Specify location of the physical hardware and assign MAC ID
- Adjust project details, as required

Background Image

See [Background Images](#) for details.

Project Validation and Export

- Save the project
- [Validate Project](#)
- Export the project file to the SynapSense Environment Server

Once the project is created, there are a number of optional tasks you can perform. See Additional Configuration Tasks or Maintaining an Existing Project for more information.

> **Note**: You must export a MapSense project file before the SynapSense platform is operational. An error displays in Web Console indicating configuration is not complete if the MapSense project file is absent.

WARNING! Immediately upon opening a file, MapSense creates a backup file in the same directory. The backup file has the extension of .bak. If a .bak file already exists with that name, it is overwritten. This file can be used to recover from inadvertent changes that have been saved, but not exported. Once an export has been done, this backup file is no longer in sync.

Open a New Project

The first step in opening a new project entails creating and naming a file and selecting the drawing with which to work.

To open a new project in MapSense:

1. On the **File** menu, select **New Project**. The Add Drawing dialog box displays.
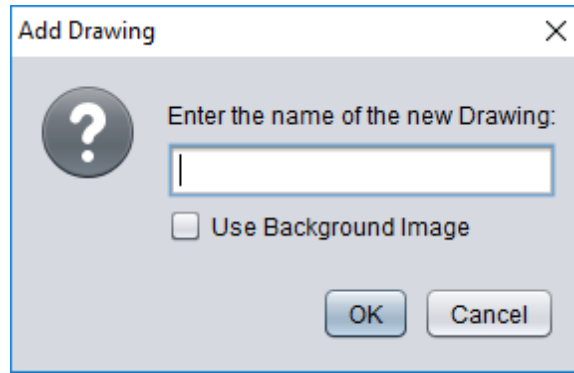
2. Enter a name for this project. Select the **Use Background Image** check box if desired. Then click **OK**.

3. The Select Background Image dialog box displays if you chose to use one. Navigate to the png file prepared with a transparency layer for use in MapSense. If there are multiple floors or rooms in this project, items will display in alphanumeric order.
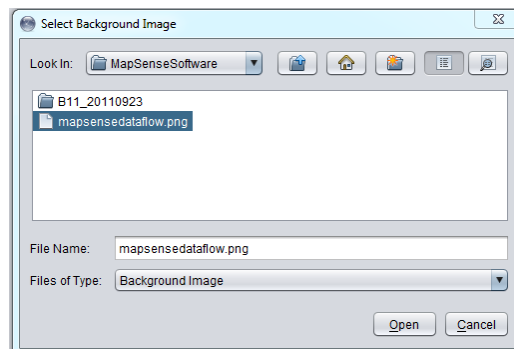
4. Click **Open**.

5. Save the new project and give it a name.
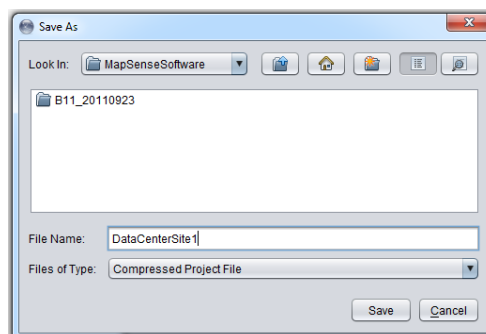
MapSense creates several drawing view images for exporting in the project file, one for the entire data center and one for each room. If necessary, each image is scaled to fit a 2879 x 2878 area. The SynapSense Web Console scales the image again, as needed, for display on the server. Therefore, for best (clearest) viewing, use a background image with the largest room pixel dimensions of approximately the same size as the display-resolution of the server. For example, if all monitors are 1024 x 768 pixels, design the background image so the largest room will be approximately 1024 pixels wide.

Change the User Level

MapSense has two user levels: Advanced and Expert.

- **Advanced** – This default user level can create and design projects and place components, as well as export projects to the SynapSense Environment Server.
- **Expert** – This user level is primarily for the use of Panduit technicians. Only use this level at the express direction of Panduit Technical Support or your Panduit technician.

To change the user level:
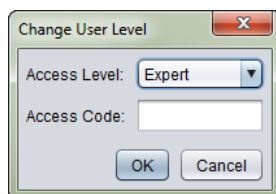
1. On the **Project** menu, select **Change User Level**.
2. Select the Access Level from the drop-down list.
3. When elevating the access level, enter the Access Code. The default access code is **1234**. *Panduit highly recommends that you change the default.* When lowering the access level to Advanced, no Access Code is required.
4. Click **OK**.

Access codes are local to the machine. To open a MapSense project file on another machine, use the access codes for that machine. If none was set, use the default.

Set Scale for Background Image

Scale is used to determine the distance between sensor components. The Scale parameter can be a close approximation, although precise measurement is preferred. If the scale of the background image changes after components are placed on the drawing,

the component size and relative locations adjust. Changing scale does not change the size or quality of the background image.

To set the scale parameter (Project menu method):

1. Find something on the drawing image for which you know the width. For example, floor tiles and racks are usually two (2) feet wide.

2. On the **Project** menu, select **Set Background Scale**.

3. Place the cross hair that displays at one edge of the object you selected in Step 1 and click once.

4. Move the cursor to the other side of the object and click again. A black line displays between the two points.
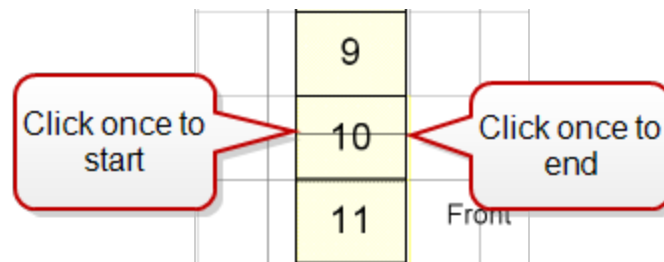
> **Tip**: The scale's accuracy increases as the line you draw gets longer. Pick and enter larger distances, such as drawing across multiple floor tiles.

5. In the Input dialog, enter the distance between the two points, then click **OK**.
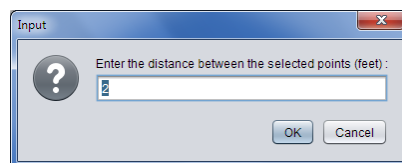
Find the Scale in inches per pixel in the Properties Editor panel to the right of the workspace.

> **Note**: Whenever a new background image is loaded for a project, set the scale parameter again to adjust the size and relative position of the components to the new image.

To set the scale parameter (Groupings tab method):

1. Click the **Groupings** tab.

2. Select the drawing. Its properties display in the Properties Editor panel.

3. Set the Scale property value in inches per pixel, as shown below.

Property	Value
Name	Second Floor
Scale	1
Data Center Elevation	10
Transparency	0%
Background Color	
Total Room Area	0
Configuration	Drawing
Description	An empty space for ... [...]

For example, if the background image is 3000 pixels wide and represents a distance in the data center of 80.3 feet, then set the Scale value to 0.3212, indicating that each screen pixel represents about one third of an inch in the actual data center.

Set Data Center Elevation

To ensure accurate pressure readings, always set the Elevation for every data center in the project. The pressure variations based on elevation are measurable enough that an accurate elevation of a data center is necessary. Elevation is the vertical distance between the local surface of the Earth and global sea level. The local surface of the Earth will be either land or water surface.

In a typical raised floor data center, the ideal pressure is .035-040 inches of water (inH_2O). At 0 feet elevation, true .035 inH_2O would read as .033 inH_2O, while at ~5000 feet (1500 meters) of elevation, the pressure would read as .040 inH_2O. Without the correct elevation entered, the pressure will have an error of -5% at sea level and +15% at 1500 meters. This degree of variation is enough that it affects SynapSense's manual balancing service, which relies on accurate pressure readings.

To determine a data center's elevation, consult http://www.whatismyelevation.com.

Note: For an installation in a high floor of a tall building, consider the height of that floor. For example, an installation on a 15th floor would add 200-300 feet to the base site elevation.

Set Options

MapSense allows the IP address of the SynapSense Environment Server and the unit system to be configured for each project file. There may be instances where you will need to change the default settings.

To set general configuration options:

1. On the **Project** menu, select **Project Options**.
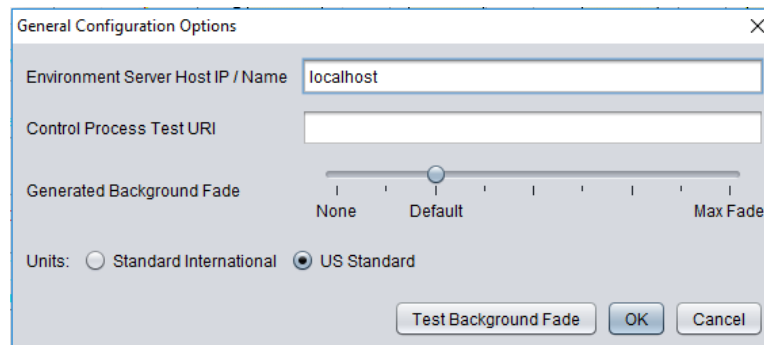
2. Use the following guidelines to complete the fields on the General Configuration Options dialog.

- **Environment SynapSoft Host IP** – In most cases, MapSense is installed on the same machine as the Environment Server. In this case, leave the field as the default "localhost". If MapSense is installed on a different machine, enter the IP address of the Environment Server in this text box field before exporting the project.
- **Control Process Test URI** – This is used for testing expressions in Generic Controlled Devices. If the data center contains no Generic Controlled Devices, leave this field blank.
- **Generated Background Fade** - If you choose not to include a background image with a MapSense project, when the project is exported to the Environmental Syn-apSoft, it displays as slightly faded in Web Console, so that the icons that lay on top of the background image are more visible. This option allows you to change the level of fading on a sliding scale between no fade and maximum fade. You can then click **Test Background Fade** to preview what your change will look like.
- **Units** – Select the unit of measurement to use while creating this MapSense project. The selection does not affect the units of measure displayed in the Web Console.
- **Test Background Fade** - Click this option to see a preview of the generated background with the fade level you selected.

3. When finished, click **OK**.

Create Data Source

Before placing components on the drawing, you must create at least one data source. A data source is the type of network on which SynapSense operates. Currently, there are five data source types available for use.

Wireless Sensor Network (WSN) – A network made up of wireless components that conform to a single PAN ID. This is the most commonly used data source. A WSN network requires at least one Gateway, but may have more than one. Even a small network may have more than one Gateway for redundancy, and in some cases additional Gateways are added to increase the speed of collecting data from networks with a large number of nodes.

Modbus TCP Network – A network that allows the system to communicate with Modbus devices via the Modbus TCP protocol. Devices that use Modbus TCP natively can be configured as the data source in a Modbus TCP Network. Devices that use another variant of Modbus (such as Modbus RTU) require a Modbus TCP gateway. For these deployments, the Modbus TCP gateway should be configured as the Data Source.

> **Note**: A Modbus Integrator's Read Length property is the number of registers read in a single Modbus request. It is used for devices that require 32-bit values to be read in pairs of registers and don't return values when the registers are read in 2 separate requests. An example of the "block read" lock is the Eaton PONI device for electrical sub-stations.

SNMP – Integrates with equipment using SNMP for reporting. MapSense provides agents for SNMP version 1, 2c, and 3.

> **Note**: SNMP Data Type "Integer32" is a signed 32-bit value.

BACnet Network – Allows the system to interface with devices that communicate via BACnet IP protocol.

Web Service Host – Reads a specific value from a specific XML document. It enables you to pull a single value from a URL-addressable XML file.

Adding a Data Source

The process of adding a Data Source is similar for all of the Data Source types. Wireless Sensor Networks require more detailed configuration. Adding a WSN network is covered in the next section.

To add a Data Source:

1. Do one of the following:

    - Select the data source type you want from the **Data Sources** menu.
    - With the Data Sources tab selected, click one of the icons on the vertical toolbar located on the right of the Data Sources/Groupings tabs.

2. When the Add Data Source dialog displays, give it a unique name, then click OK.

3. Once added, click the new data source on the **Data Sources** tab to display its properties.

4. In the Properties Editor panel, configure the properties listed for that Data Source type. Each type of data source requires a different configuration.

5. Repeat this process to add more data sources.

6. When finished, save the project.

To move a component between data sources:

1. Click and drag existing components in a Data Source between Data Sources of the same type. All other properties of the item are retained after the move.

To remove a data source:

1. Highlight the item, then click the 🚫 icon on the vertical toolbar.

⚠️

WARNING! Removing a data source will also remove all components under that data source.

Adding a WSN Network

Wireless Sensor Networks are the most commonly used network type in SynapSense Wireless Monitoring and Cooling Control. WSN uses PAN IDs, which are the unique

identifier that allows network nodes to begin communicating (join) with that network. The PAN ID is a four-character, hexadecimal number that is similar to the SSID in a Wi-Fi network. Nodes that have a different PAN ID from the specified network cannot send or receive data on the network.

The PAN ID is assigned to a node when it joins the network. Nodes are not allowed to join the network if their MAC ID is not listed for that particular WSN Network. Under the Data Sources tab, a WSN Network node will have child nodes for all gateways and sensors belonging to that particular network. Gateways and sensors under a WSN Network node are assigned its PAN ID. For new WSN Data Sources, the PAN ID is automatically assigned when the network is created.

> **Note**: A default WSN Network will be created automatically if one does not exist when a component is first placed on the drawing.

To add a WSN network:

1. On the **Data Sources** tab, select **Add WSN Network**.
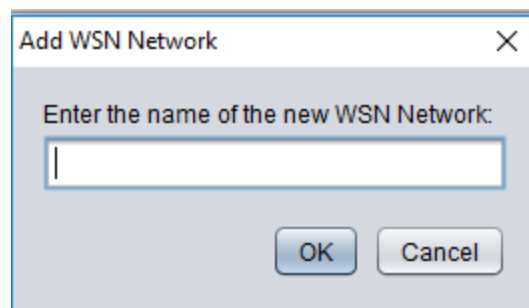
2. Enter a name for this network and click **OK**.

3. On the **Data Sources** tab, click to highlight the name of the WSN Data Source and display the network properties.

4. In the Properties Editor, review the information displayed and make any necessary changes.

Property	Value
Name	WSN Network One
PAN ID	DDEF
Notes	WSN Network
Network Version	N29
Configuration	WSN Network
Description	WSN Network

5. Save the project. The next step is to set up the rooms in the data center.

Background Images

An optional background image can be used to create a project of any size in MapSense. If the data center facility to be instrumented with SynapSense products is one room, then one background image can be used. If the facility has multiple floors in a building or includes a utility room, then a background image would be used for each one.

The format required is:

- Portable Network Graphic (png) with transparency layer for LiveImaging
- JPEG File Interchange Format (jpg), if LiveImaging is not used

Architectural drawings or AutoCAD®-type drawings are recommended but Visio® or another type of drawing to scale works too. If your facility can provide a CAD drawing and you choose to use a transparency layer with it, ask for or apply a vector transparency layer to the area of the floor plan where the SynapSense sensors are mounted. This allows the LiveImaging to display. Photoshop™ and other graphics programs also have this capability to add the transparency layer. If none of these programs is available, try the freeware product described in Appendix B, and follow the instructions provided, for adding a transparency layer to the floor plan image.

The exception to this rule is adding a PUE graph or other information that is essentially an overlay of a physical floor plan. See Working with Multiple Floor Plans in a Project for additional information.

> **Note**: The maximum size for background images is 67,108,864 total pixels. This uses 268 MB of memory.

Changing a Background Image

Because data centers change often, there is a specific menu option to reload the background image. If you are manually drawing a room on a blank canvas, you may want to go back to using a loaded image or add a loaded image to serve as a temporary template.

> **Note**: When using a background image, it is important to have the transparency layer added to the background image before loading it into the project. See Appendix B Create Background Images for instructions on how to add transparent areas to a background image. Transparent areas allow LiveImaging to display once they are added.

To reload the background image:

1. On the Project menu,select Reload Background Image.
2. Select the drawing to load.
3. Export the newly edited project to update the system database.

Note: If the drawing is a different size from the original, reset the background scale or adjust the location of the components. See Set Scale for Background Image for details. If the updated drawing has the same scale as the original, there is no need to reset the background scale.

Removing the Background Image

If you use a background image as a temporary template to use while manually drawing a room on a blank canvas, you will want to remove the background image before exporting. To permanently remove the background image from the project, perform the following steps.

1. Click **Project** and select **Remove Background Image** from the drop-down menu.
2. In the dialog box, select **Yes**. As a result, your canvas is transparent, while all components you have placed on the canvas are opaque.

Using the Canvas

When you add a drawing and choose not to use a background image, you will create your drawing on a blank canvas. If you use a background image as a template and then remove the template, the canvas size will default to the same size as the image it is replacing. When a new drawing is created with no template image, the canvas will default to a system-configurable size, initially 1800x1200 pixels to match the ideal size for Web Console and Live Imaging.

To change the size of the blank drawing canvas, perform the following steps after creating a new drawing with a blank canvas.

1. Click **Project** and select **Set Canvas Size** from the drop-down menu. The Set Canvas Size dialog displays, with the default values of 1800x1200 pixels.
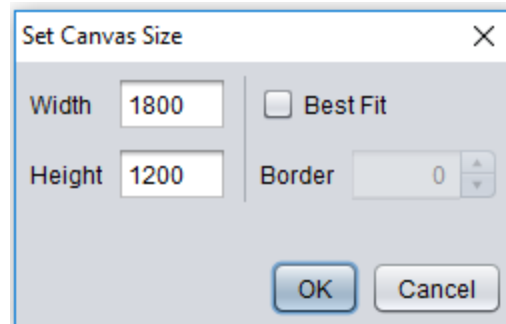
2. You may click **Best Fit** to automatically set the size to the smallest height and width that will contain all the components, along with a configurable border. Or you can enter new pixel values for the **Width** and **Height**.
3. Click **OK**.

The maximum image size limitations MapSense enforces for loaded images are also enforced for the drawing canvas.

If a drawing canvas is used, MapSense will generate a background image using the canvas and the components as seen on the MapSense drawing. The canvas background will be automatically set to transparent inside of rooms with environmental nodes. Floor tile grids and component images are then drawn on top of the canvas as opaque items.

Uninstrumented Components

MapSense now allows you to model components that are not instrumented. At the Components Tree, you can filter on these components by performing the following steps.

1. Click the [icon] icon
2. In the Filter by Tags dialog box, click **Clear All**.
3. Select the **Drawing Shapes** check box and then click **OK**.
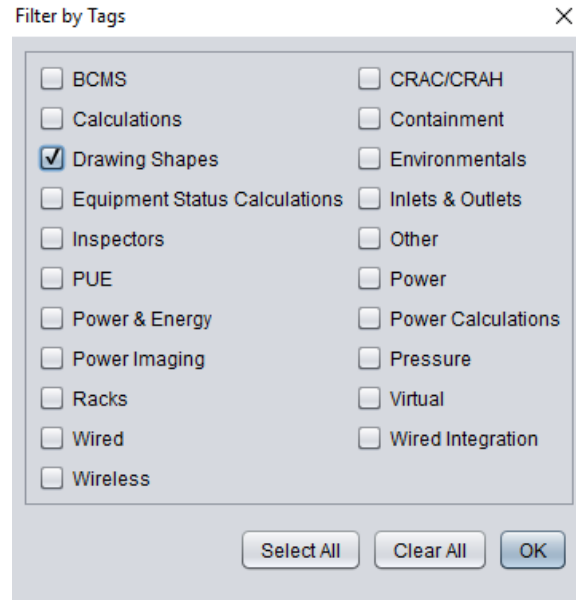
Only the Drawing Shapes display in the Components Tree.

Active Data Source: Select a Data Source ▼

Active Grouping: 🟨 Active Grouping ▼

Door
Represents a single door on the Drawing.

Double Door
Represents a double door on the Drawing.

Line
A generic multi-segment line shape used to model items on the Drawing.

Polygon
A generic polygon shape used to model items on the Drawing.

Rectangle
A generic rectangle shape used to model items on the Drawing.

Text
Text to display on the Drawing.

Uninstrumented CRAH
A CRAH with no SynapSense sensors.

Uninstrumented Rack
A rack with no SynapSense sensors.

Create Rooms

A Room is a polygon component added to the project to represent the physical boundaries of the rooms in a data center. A Room defines a single contiguous, confined airspace bounded by walls or partitions.

> **Note**: As you create the room, make sure to model *all* airflow-restricting partitions. Failure to do so will cause LiveImaging and Active Control to perform incorrectly.

A Room is not limited to containing only SynapSense components. It can be used to draw any part of a drawing that the user wants to see in the Web Console. All components inside of the Room boundaries are children of that Room. Rooms may be inside of another Room, but are not allowed to overlap. Components will be the children of the inner most Room.

Rooms have optional properties that allow you to model floor tiles in a raised floor room. (The View/Toggle Grid View option in previous versions of MapSense has been replaced by View/Toggle Floor Tiles.) To specify a Raised Floor, select **Raised Floor** from the Room Type property drop-down menu. This allows you to model tiles without using a background image.

Room Types

Property	Value
Name	Room 2
x	384.9952545...
y	279.4904632...
Room Type	Unspecifi... ▼
Heartbeat	Unspecified
Notes	Raised Floor
Net Area	Slab
Gross Area	
Line Width	3

For a Slab room type, the Control Type options are **None** or **Remote Control**.
For a Raised Floor room type, the Control Type options are:

- None
- CRAH Pressure
- CRAH Pressure and Temperature
- DX Temperature

The validations of the CRAC Component are the same as those for the CRAH component, with the following addition:
- Both the Air Volume Table (or the Max CFM field for non-VFD CRACs) and the Sensible Cooling Table are required.

The room's Control Type automatically applies the correct device objects to the Cooling Unit components.

To move objects within groupings:

1. Right-click on an object and select **Change Groupings** in the context menu.
2. In the Change Groupings dialog, select the radio button for the group where this object belongs.
3. Click **OK**.

To add a room within a room:
1. In Components pane, type room in the filter text box to display the Room component.

Room
Represents the physical boundaries of a room.
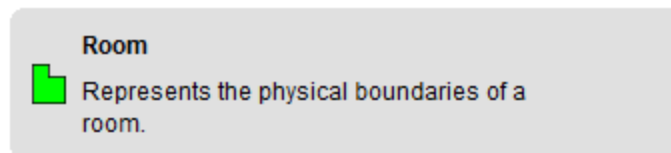
2. Single-click the room icon.
3. Click the place where the first corner of the new room is located, and then move the cursor to the second corner. MapSense will display the dashed line. Repeat this for the other corners of the room.
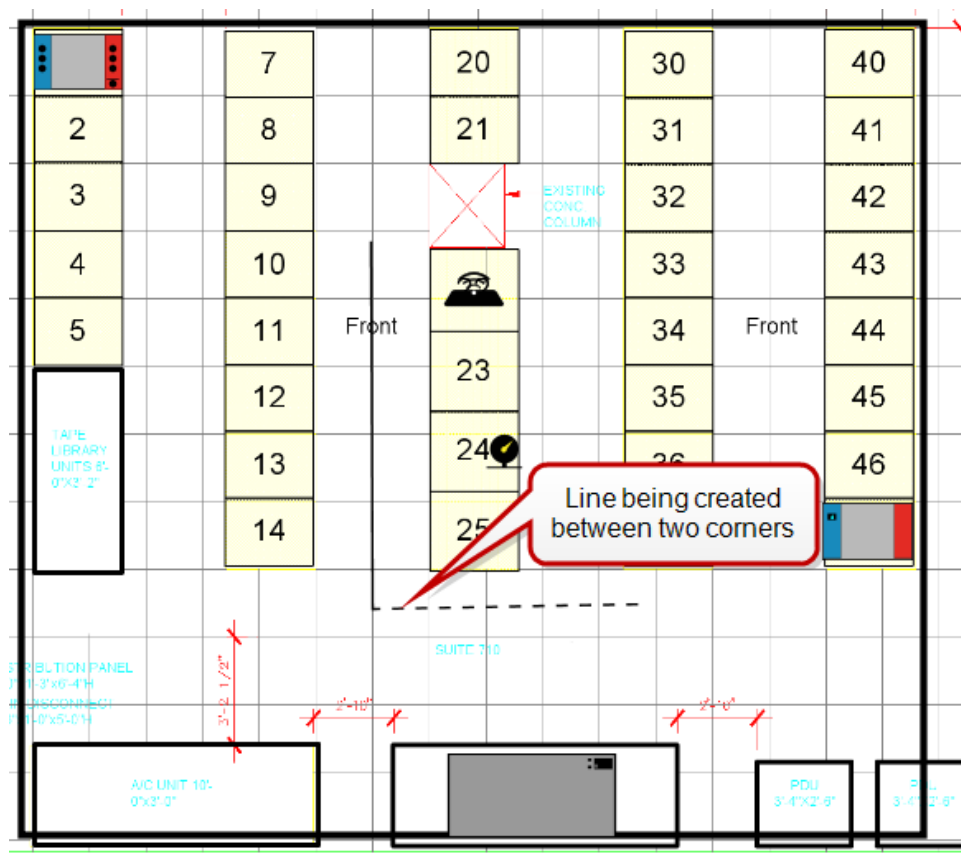
4. To complete the room, you can either click on the first corner to complete the last line or right-click to auto-complete the last line. The new room will be highlighted in a red outline.
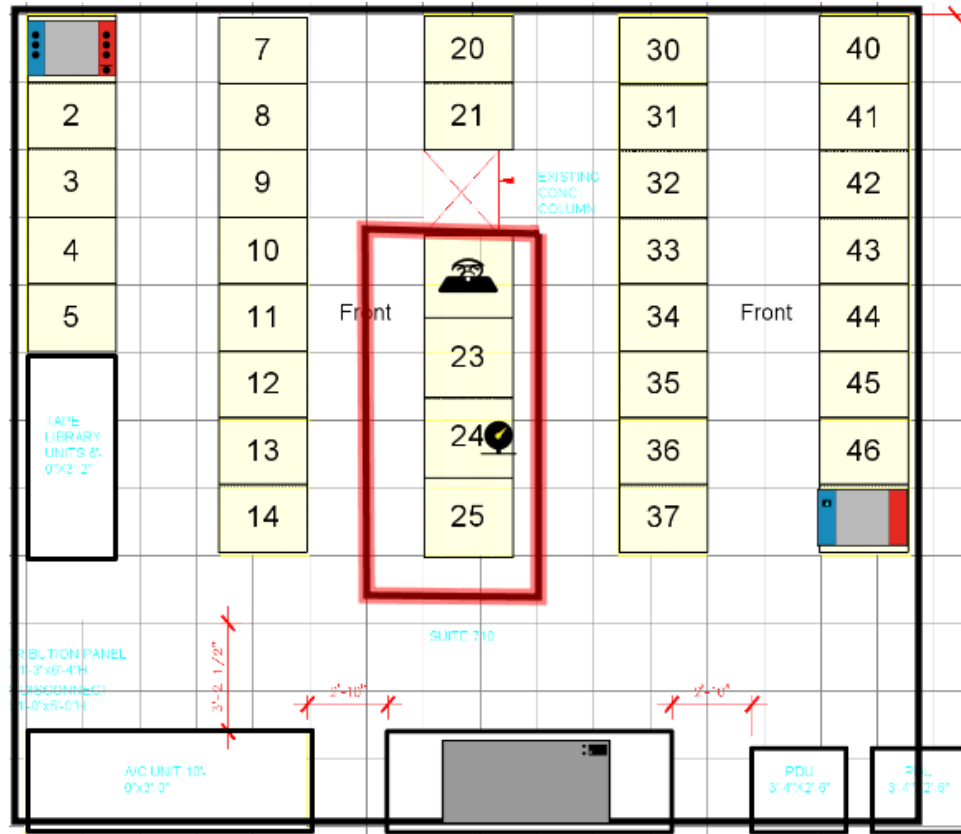
5. At the Groupings tab, click the Name field's **Values** box to name the room. Make any other necessary changes to the properties necessary and save.
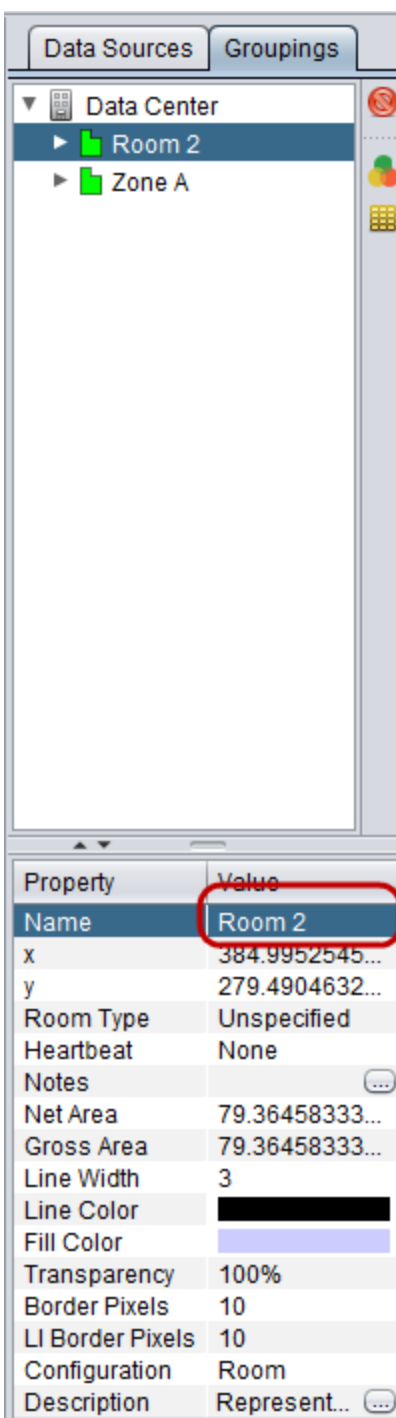
To change the room, you may:

- Drag the corner dots to a new location
- Right-click a corner dot and remove it
- Right-click on the line to add another dot, and then drag it to where you want it

To display room properties:

Highlight the Room name on the Groupings tab to view the properties for that room in the Properties Editor panel. Once assigned, a room requires no further configuration. However, room properties can be adjusted.

Property	Value
Name	Room 2
x	384.9952545...
y	279.4904632...
Room Type	Unspecified
Heartbeat	None
Notes	⊡
Net Area	79.36458333...
Gross Area	79.36458333...
Line Width	3
Line Color	▮
Fill Color	▮
Transparency	100%
Border Pixels	10
LI Border Pixels	10
Configuration	Room
Description	Represent... ⊡

Place components into the rooms you created. You may move them within the drawing. They will automatically be reassigned to the inner-most room when they are moved.

Room Properties Definitions

- Border Pixels default to "10", but can be increased or decreased (to a minimum of 0). This parameter represents the amount of additional space included outside the rectangle used for the drawing in the Web Console. MapSense trims the rectangle to include only the components in a room. The default value of "10" adds an additional 10 pixels in each direction beyond the rectangle that includes all of the components in that room.
- The amount of LI Border Pixels determines how much area beyond the room's rectangle is included in LiveImaging. It only includes the sensor node components in a room.

> **Note**: Border pixel settings are additive. Therefore, if you set the Border Pixels to 10 and the LiveImaging Border Pixels to 10, the result would be a 20-pixel border.

- The Name property is displayed in the Site list in the Web Console. It can be changed any time after a room is created.

- The Description is used in the tooltip on the Sites list in the Web Console. This is optional information.
- The Gross Area is the area of the entire selected room (including inner rooms) in Square Feet or Square Meters. The Net area is the area of the room minus any internal rooms.

Select and Place Components

Placing components on the drawing is the main task in MapSense. In this section, learn to place, edit, align, distribute, or change the order of components on a drawing that represent the physical components in the data center.

About the Component Palette

The Component Palette displays the available components in MapSense. Additional Component Libraries, when loaded, also display here.
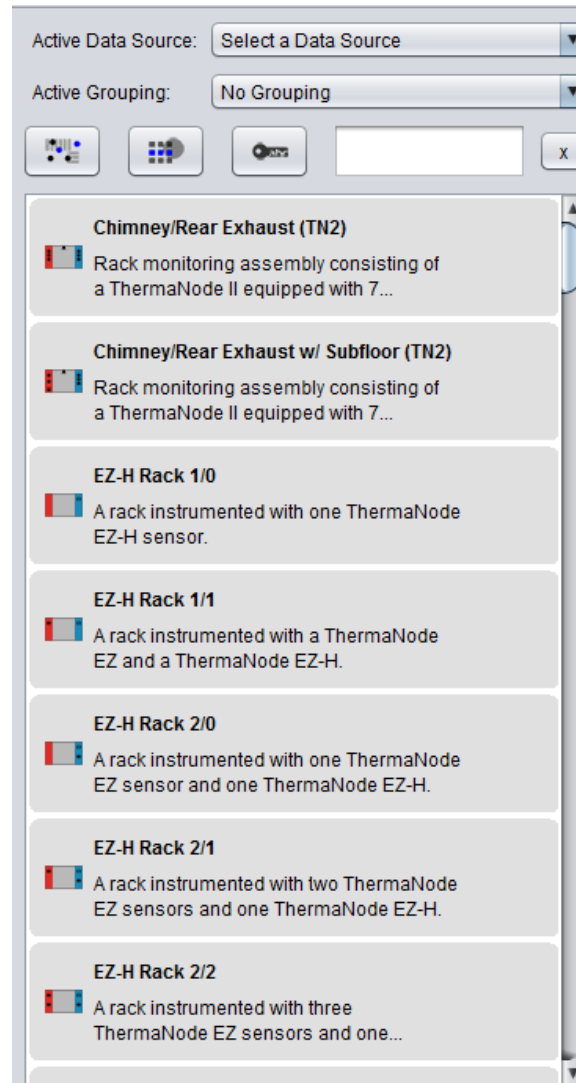
Active Data Source and Active Grouping display according to the currently active drawing.

Filters provide for listing only the components used in the current project; only components allowed in active data source or grouping; only components with selected tags; and, by the keywords typed in the field. Clear the filters by clicking the X.

Components display as a list by type. Hover over the components to read the complete tooltip description of the item. Refer to the Component Encyclopædia for details about any of the components.

To place a single component:

1. In the Component Palette, locate the component to place on the drawing.

2. Click to highlight the component (turns icon blue).

3. Move the cursor to the location on the drawing then click to place the component.

4. Once placed, the cursor resumes Selection mode so you can click other types of components or perform other activities in MapSense.

> **Note**: Once you place a component into a room, the component automatically associates as a child of the room. If you move that component to a different room, the component automatically associates with the new room. If a component is not placed in a room, it will show in the Groupings panel under Not In Room. Anything listed there must be in a room before deploying the configuration to the SynapSoft.

To place multiple components of the same type:

1. In the Component Palette, double-click a component to activate multiple formatting mode (turns icon red).

2. Click to place the component as many times as needed on the drawing.

3. When finished, click the Selection tool, on the lower toolbar, to resume selection mode (turns icon gray).
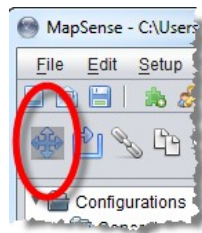
WSN Components Assignment to a Network

When a component is placed on the drawing that requires a WSN network, MapSense automatically assigns the component to a WSN network based on its relationship to WSN Gateway components on the same drawing. If no WSN network exists for the active drawing, MapSense will create one automatically.

WSN Gateway components will not automatically assign to a network due to their importance to the auto-assignment rules. When placing a WSN Gateway component, you will be prompted to choose one of the already existing networks or to create a new network. Adding or moving a gateway may affect the network assignment of other components for drawings that have more than one network.

The logic MapSense uses to assign a component to a WSN network is shown in the diagram below.
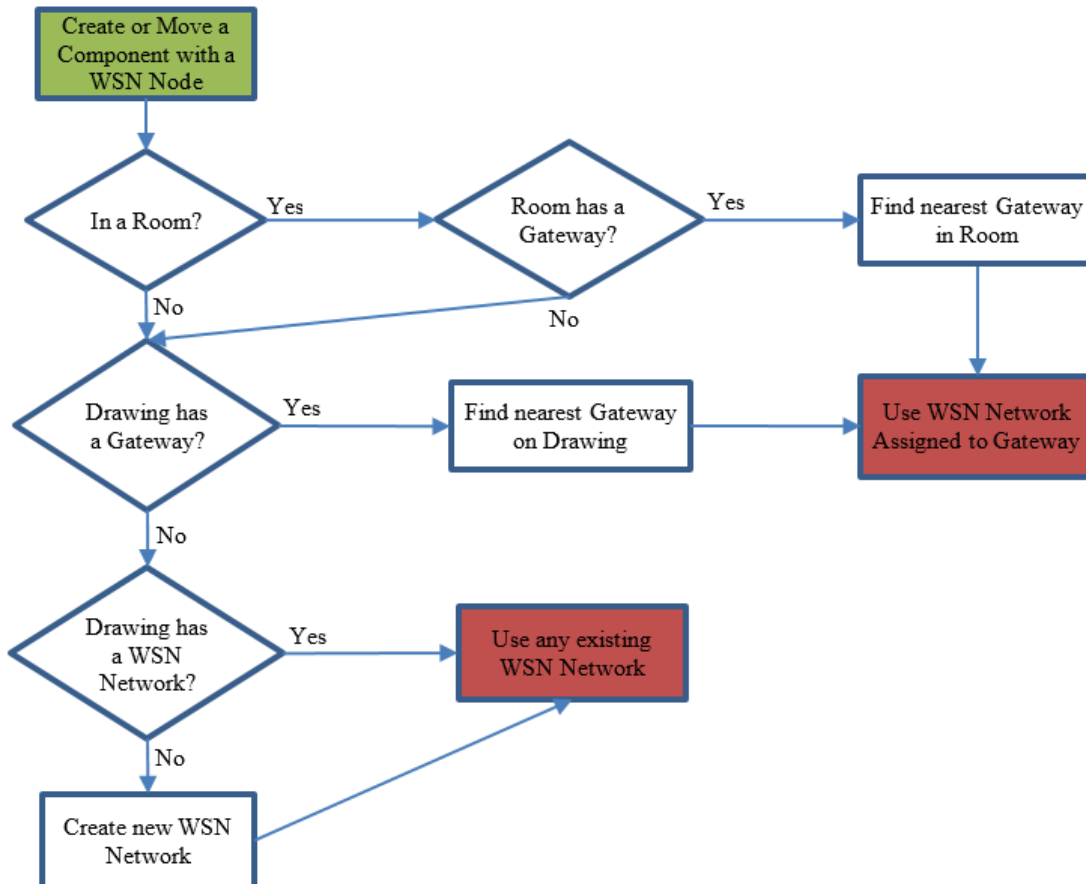
To manually override the WSN network assignment for a component, perform the following steps.

1. Right-click the component and select **Manually Assign to WSN** (or other network type) from the drop-down menu.

The context menu shows:
- Rotate
- Associate
- Mac Assign
- Copy Settings
- Copy
- Create Proxy
- Change Grouping
- **Manually Assign To WSN**
- Show/Hide Components ▶
- Order ▶
- Replace Configuration
- Find/Replace
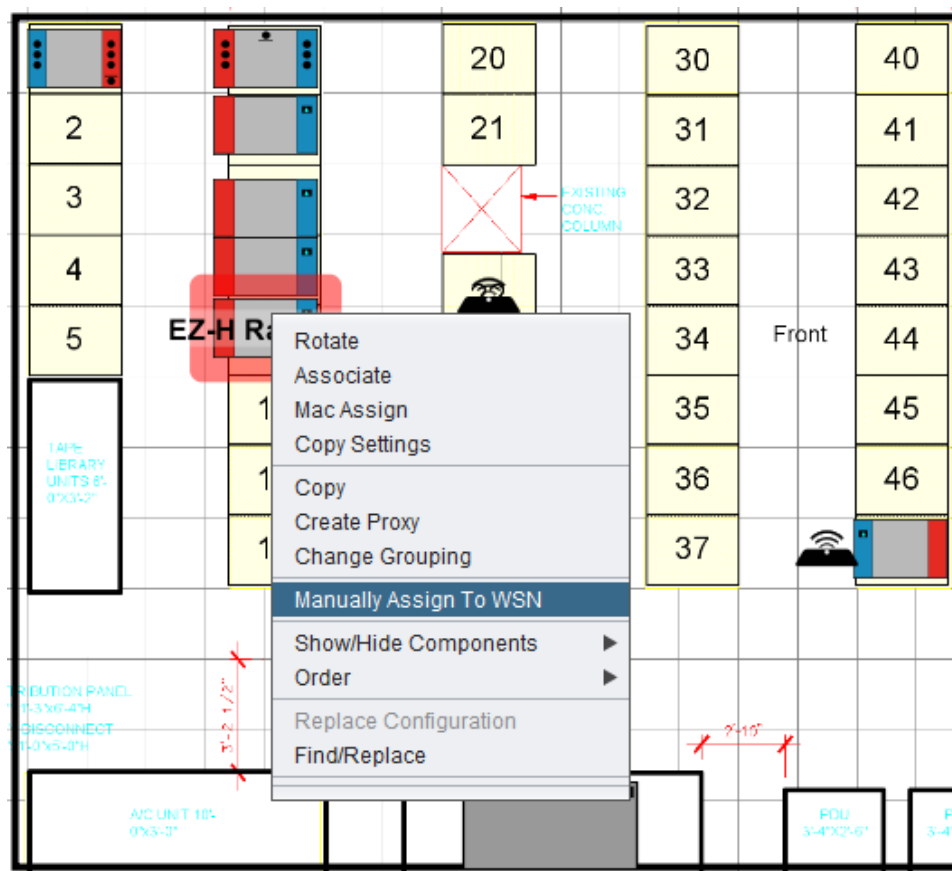
2. In the Change Data Source dialog box, select the desired network and click **OK**.

Change Data Source ✕
- ⦿ Ⓨ WSN Network One
- ○ Ⓨ WSN2

OK   Cancel
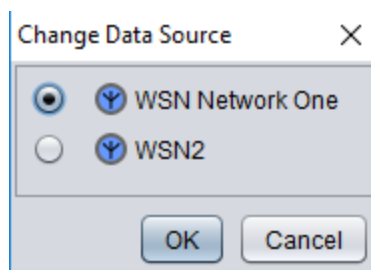
3. In the Data Sources tab, the manually assigned component will display with an (M) before its name. This indicates that the component will not automatically be assigned to another network even if you move it to a different location.
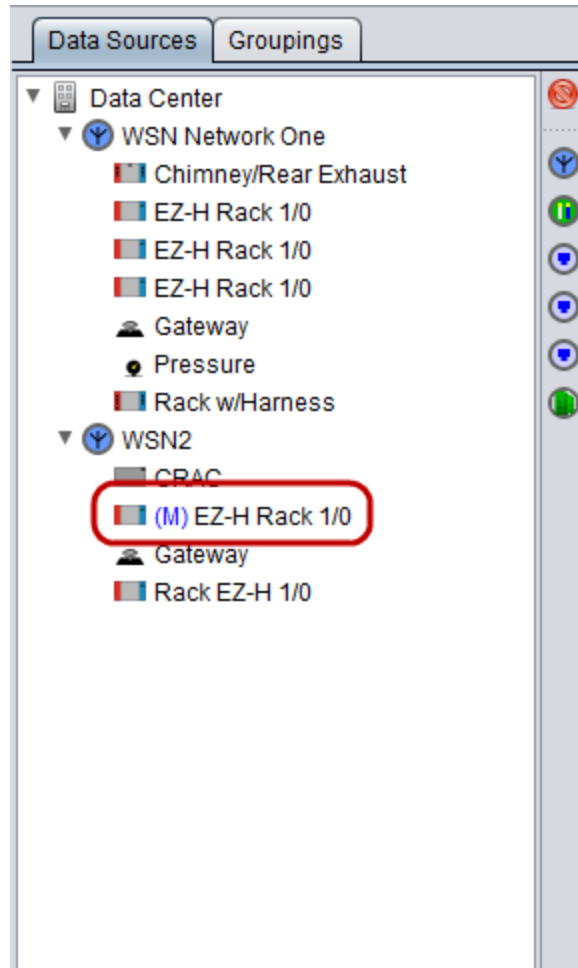
If there are multiple WSN Networks in your project, you can reassign or specify which network a component belongs to as needed (for example, if there is interference between a component and its nearest gateway). You also can manually override the WSN Network assignment by dragging the item to a different WSN Network. You can return to Auto Assign by right-clicking and selecting **Automatically Assign to WSN**.
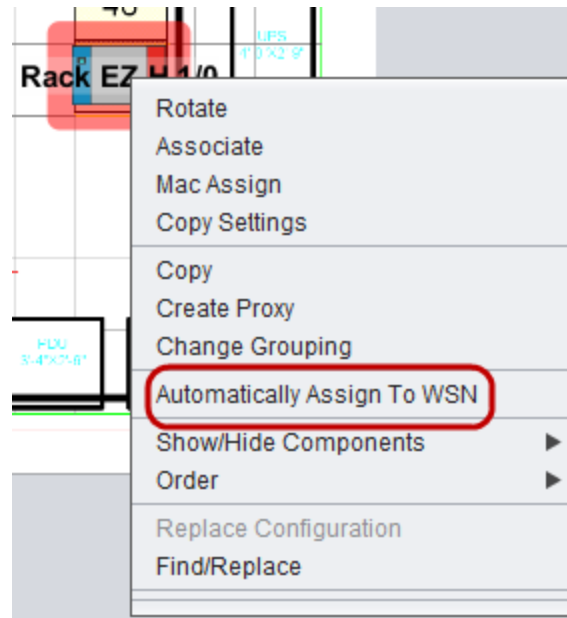
Editing Selected Components

The following tools are available to manipulate selected components. Alignment, distribution, and change order are available from the Edit menu on the menu bar and from the context menu for a specific selected component or group of components. The nudge and scroll lock features are available using the keyboard whenever an object is selected.

To align components:

1. On the drawing, highlight a group of components.
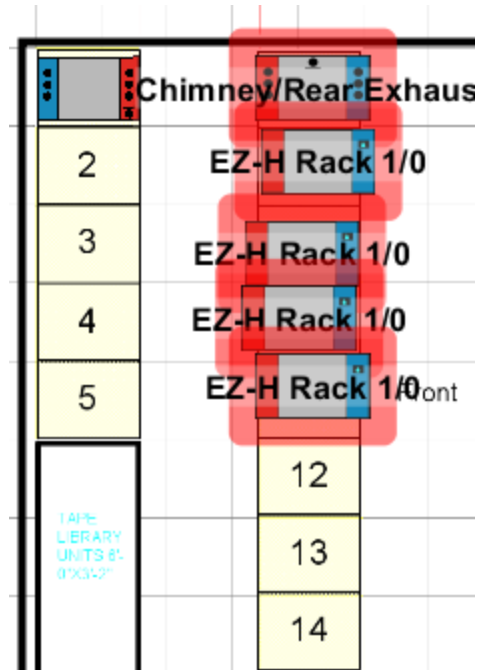
2. On the **Edit** menu, select **Align** , and then on the submenu, select one of the options: **Align Left**, **Align Right**, **Align Top**, or **Align Bottom**. In the image below, **Align Left** was selected.
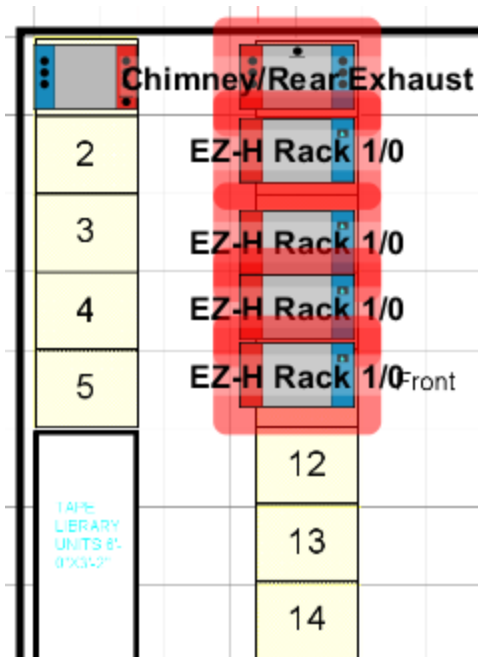
To distribute components horizontally or vertically:

On the drawing, highlight a group of components. On the Edit menu select Distribute then on the submenu, select either **Distribute Vertical** or **Distribute Horizontal**.

To change component order:

On the drawing, select one or more components. On the Edit menu, select Order then choose from the submenu options:

- **Bring to Front** – Bring the selected component to the top (most visible top position) of the group of components.
- **Bring Forward** – Brings the selected component up one position in the group of components.
- **Send Backward** – Pushes the selected component down one position in the group of components.
- **Send to Back** – Pushes the selected component to the bottom (behind all other items) of the group of components.

Note: Rooms are always placed at the back of the drawing, with contained areas placed in front of the rooms. This cannot be changed. All other components are in front of the rooms and contained areas and can be changed.

To nudge a component:

Highlight a component object and use the arrow keys on the keyboard to move the object by small increments (nudge) in one direction or another.

To move the whole drawing in this way, press Scroll Lock on the keyboard. For example, when zoomed in on an area of the drawing to make an association, and the component you need is just out of the visible area. Press Scroll Lock once to activate the feature then use the arrow keys to nudge the view to include the component you want. Press the Scroll Lock key again to deactivate the nudge feature.

Copy Components and Settings

Some components, such as the rack component, are placed many times to develop a drawing in MapSense. Instead of configuring these components individually, you can copy the settings for the components that are similar.

There are two methods for copying components:

Copying Components — After creating one of each component type, (for example, sizing and rotating a Rack component) copy and place the component as many times as

required. Copy the components individually or in groups. This is useful for quickly populating rows of identically monitored racks.
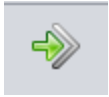
Copying the Component Settings — Use the Copy Settings tool to copy most of the settings from a fully configured component (except for name, MAC ID, and x and y location) to another component. This is useful for designs that have many similar components.

To copy single or multiple components:

1. Select all of the components to be copied.

2. Select **Copy** from the **Edit** menu.

3. Select **Paste** from the **Edit** menu. The copied components remain selected.

4. Click and drag the components to the desired location.

To copy component settings:

1. Select the **Copy Settings** tool on the toolbar.

2. Select the component to be used as a template for the settings.

3. Click to select each of the components to which you want to apply the settings. The settings automatically apply to the new component.

4. View these newly applied settings in the Properties Editor panel.

Contained Area Components

The Contained Area components give you finer control over LiveImaging beyond what is available from rooms. When LiveImaging creates images, the temperature data does not extend beyond the edges of a Contained Area component. For example, if a data center has hot aisle containment, pressure, and humidity, a Contained Area component could be placed on the hot aisle. The exhaust- side sensors of the racks on that aisle would be used to develop LiveImaging inside the contained area and the intake-side sensors would be used to develop LiveImaging outside the contained area.

There are two types of Contained Area components: polygon and rectangle. Use the Polygon Component to create an arbitrary shape that can accommodate real-world rack

sizes. This component shape is helpful for accommodating unusual areas in the data center.

Optionally, the Contained Rectangle Component creates a rectangle. The Length and Width properties represent the size of the contained rectangle in inches. This component shape is helpful for creating basic contained areas over racks or aisles.

The components work in the same manner. A black line on the drawing indicates the border of the contained area that LiveImaging will not cross. Contained Area components do not require a Data Source or a Grouping. The icon on the drawing represents the center of the contained area.

To use the contained polygon components:

1. Place the **Contained Polygon** component on the drawing.

2. Click the desired set points on the drawing. There is no limit to the amount of points. Because it is a polygon, the points cannot cross (MapSense displays an error message if this happens.) The last point is equal to the first, so that it closes the polygon. Points can be added or removed after the polygon is created, by right clicking on the polygon to display the context menu.

3. Configure the minimum number of sensors in the Properties Editor panel. By default, Contained Area Components require a minimum of two sensors located on each level within the area to calculate data for LiveImaging. If this requirement is not met, then the area appears as a solid color. Optionally, set the color to be used to fill the area when the minimum number is not met.

4. Select the appropriate checkboxes in the Properties Editor panel to isolate sensors on one or more LiveImaging layers. Only the selected layers apply to the contained component during data calculations.
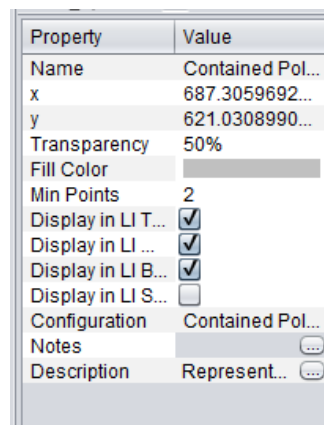
In the hot-aisle containment example, the Contained Polygon component is applied only to the top, middle, and bottom LiveImaging layers, but not to the subfloor.

Planning Groups

A Planning Group is an optional utility that allows you to logically group components in MapSense for any reason. A Planning Group provides project statistics and visualization of the components within the group.

A Planning Group and all of its components can be excluded from export outside of MapSense. This allows a partial staging of the project without requiring all components to be fully compliant before exporting the rest of the project. However, to maintain the integrity of an export, project validation will display an error if any component in a non-exporting Planning Group group is associated with a component that will export. To clear the error, do one of the following:

- Remove the component from the Planning Group
- In the Property pane, select the Export Components check box for the Planning Group
- Remove the association with the component in the Planning Group

Note: If a previously exported component is added to a Planning Group that will not export, any subsequent updates to that component will not be updated on the SynapSoft during the next export. The previously exported version of the component will remain on the SynapSoft.

⚠️ **Warning!** If a component is in a planning group that is set to NOT export, and the component is then deleted or replaced with a different type, it will be deleted on the SynapSoft after the next export even though the planning group does not export.

Create a Planning Group

To create a Planning Group, perform the following steps.

1. Click **Groupings** and select **Add Planning Group** from the drop-down menu.
2. In the Add Planning Group dialog box, enter a name for the new group and click

   OK. The new Planning Group will display next to a 🔴 icon under the Groupings tab.
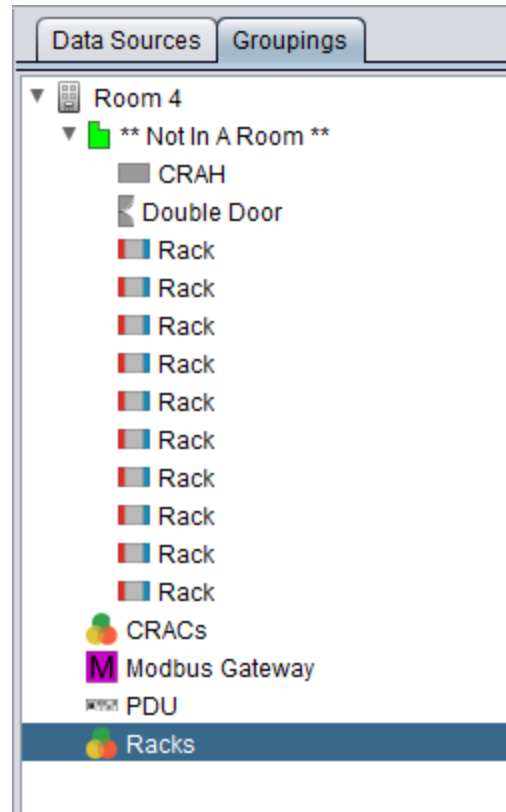
3. Drag and drop the desired components into the Planning Group, or right-click the component and select **Change Grouping**.
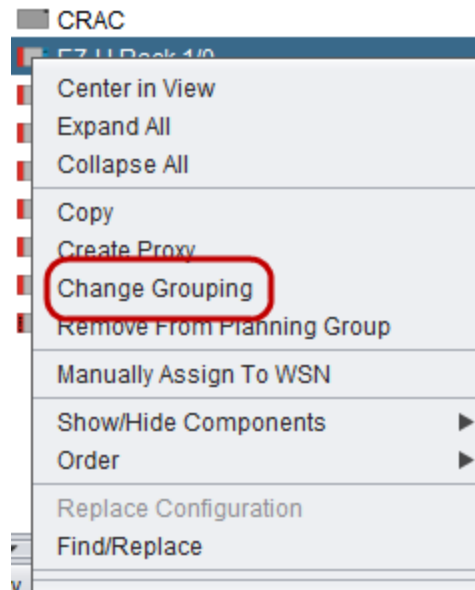
4. By default, the Export Components check box is selected in the Properties pane. To prevent export of the Planning Group components outside of MapSense,

deselect the check box.

Configure Racks and Components

Size Racks

The next step in creating a new project is to adjust the size of the racks. It is important to size the Rack components to be the same as the rack on which they are installed. LiveImaging uses the cold and hot aisle locations as starting data points for the extrapolation between the actual data points.

To size a Rack Component:

1. Select the component using the Select tool from the toolbar.

2. Edit Width and Depth in the Properties Editor panel to match the actual rack dimensions (in inches).

3. Reposition or rotate (see the next section, Rotate Racks) the Rack component as necessary.
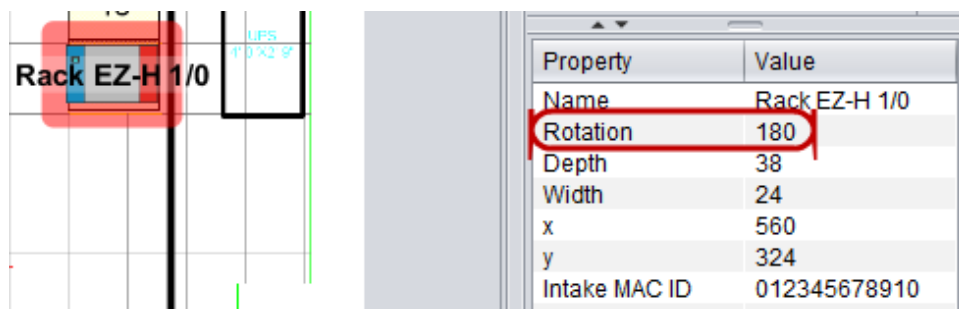
Rotate Racks

To rotate a rack component (Rotation tool method):

1. Select the icon from the toolbar.

2. Click the Rack component and and drag the mouse pointer to the left or right to rotate the component. The component will rotate as you do this.
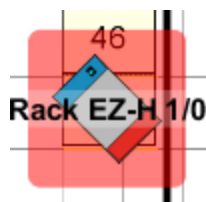
3. Click again when the Rack component is facing in the correct direction.

Another method for rotating racks is to manually set the Rotation property. In the Properties Editor panel for a rack, enter the appropriate degrees in the Rotation value, as shown in the table below.

To rotate the rack	Enter this value (to indicate degrees)
Facing right	0
Facing up	90
Facing left	180
Facing down	270

Name Components

Each component must have a unique name.

To name a component:
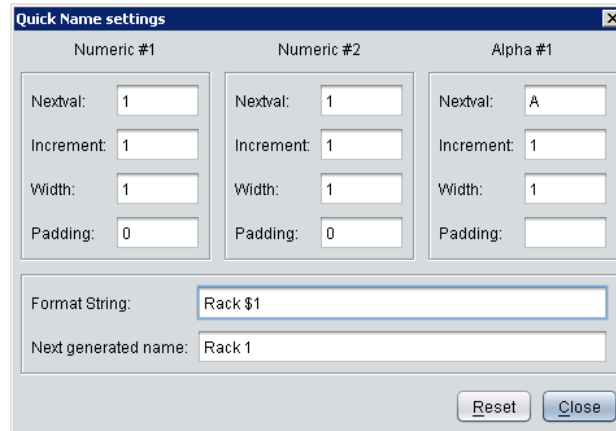
Select a component with the Selection tool and change the name property.

Or double-click directly on a component and change the name displayed beneath the icon.

Using the Quick Name tool from the toolbar is faster in some circumstances.

1. Select the icon on the toolbar.

2. In the Quick Name Settings dialog, configure up to three variables that automatically-increment with the placement of each component. See details below.

3. To use these settings, click **Close** and begin placing components. The Quick Name tool button remains highlighted.

4. To stop using the Quick Tool, select another button on the toolbar.

To use these settings at another time, click the Quick Name tool button. The settings remain the same until changed or reset.

To configure Quick Name settings:

Numeric #1 ($1), Numeric #2 ($2), and Alpha #1 ($3) are variables that increment with each click (placement) of a component. With each new rack component placement, the name and numbering increments. The first name will be "Rack 1"; the second "Rack 2", and so forth.

Variables can be incremented at different rates and have varying widths. For example, Rack 01 is width 2. Rack 0001 is width 4. The padding can be different for each variable. Using the Alpha variable with padding set to "A" and width set to 3 will name racks – Rack AAA1, Rack AAA2, and so forth.

Specify Location

All components have a Location field that displays in the Web Console. Maintaining this field in the data center enables faster location of components. For example, using the Location field can help locate a pressure node placed under server racks in the subfloor. The Location field can also be included in Alert templates so that the alert message provides more information.

Assign MAC IDs

MAC IDs are unique, 16 digit, hexadecimal numbers. Each physical sensor node has a unique MAC ID. The MAC ID property for a component associates that component in MapSense with a physical sensor node installed in the data center. Without a MAC ID associated to a component in MapSense, a sensor node configured and turned on within range of a Gateway cannot join the network.

Note: Components for ThermaNode EZ use a modified EUI 64 ID.
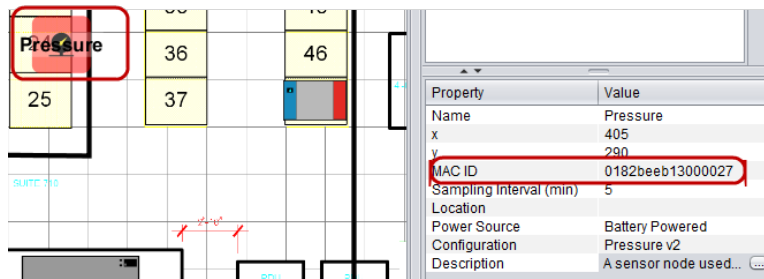
To enter a MAC ID (Edit Method)

The simplest method for entering a single MAC ID is to select a component and edit the MAC ID property in the Properties Editor panel. It is important to enter any leading zeros that are part of the MAC ID. The MAC ID is printed on the bar code label on the physical sensor node.

To enter a MAC ID (MAC Assign tool method):

1. Select the MAC Assign tool (red and white tag icon on the toolbar).

2. Click the component to which you want to assign the MAC ID. Each component selected opens a dialog box in which to enter the MAC ID.

3. Scan the bar code on the physical sensor node to be installed at the location of this component.

Two entry boxes appear for CRAH components; one is for the supply air node, the other is for the return air node. It will close automatically when finished.

All components must have MAC IDs entered before the project is exported to the system database. Incorrect MAC IDs are detected through a checksum calculation and generate a validation warning during export. Use this feature to check the project for bad MAC IDs prior to physical installation of the sensors in the data center.

Adding Associations

Associations relate a property of one component with another component. For example, a group of rack components using the subfloor reference temperature of another rack

component. In this manner, most of the racks will not need to be installed with their own subfloor thermistors, saving cost and installation complexity.

Association lines are drawn across the drawing from one component to another. Make associations between two specific components, using the Associate tool, or make multiple associations using the context menu.
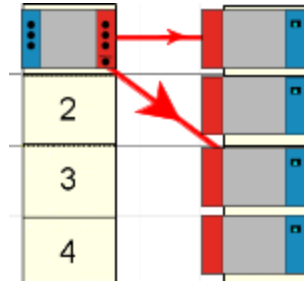
To associate two components (Associate tool):

1. Select the icon on the toolbar.

2. Click the first component.

3. Click the second component to use as a reference temperature.

Note: The best reference temperature is usually the closest subfloor temperature sensor to the actual rack.
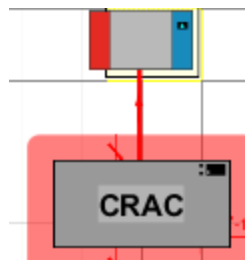
A solid line indicates the association of the two components. Place the mouse on an association line to highlight it. Continue to associate components until all racks that require a reference temperature are associated to a component with a subfloor temperature sensor.

To make multiple associations (context menu):

1. Use the cursor to highlight a group of components.

2. Right-click to display the context menu then select Associate.

3. Click the component with which you want to associate all of the selected components. When the line displays connecting the components the operation is successful.

Editing Associations

When an association line is selected, a dialog box appears to allow removal of existing associations. This is useful when configuring PUE or power components with many associations.

To edit an association:

1. Select the Association tool from the toolbar.

2. Click an Association Line to open the Select Association Type dialog.

3. Check or uncheck the associations as desired. Unchecking removes the association.

4. Click OK.

Association Line Color

Association types are represented in different colors, making them easier to identify in complex projects. The following table lists the line color set for each displayed association type.

Association Type	Line Color
Environmental	
Hover (when cursor hovers over any Association type)	Light Blue
Reference Temperature	Red
Current	Gray
Power	Forest Green
Equipment Status	Olive
Panel	Red
Power Monitoring	
Circuit	Indigo
Phase	Indigo

Association Type	Line Color
Power <-> Env. Bridge	Indigo

Pin the Current Hover

Using the cursor, hover over an association line highlights the line in light blue (and highlights the components on both ends of the line). The line returns to its original designated color when the cursor moves away from the line.

To pin the association line so it remains highlighted, hover over an association and press Ctrl+Comma. Then, move away from the link and scroll or zoom to view other areas of the drawing. This is useful for tracing PUE calculation lines across a large data center floor plan.
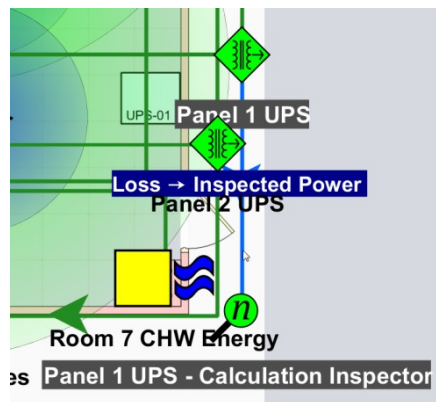
Note: MapSense can zoom in on a drawing up to 20x.

To remove the highlighting of an association line (unpin) press Ctrl + Shift + Comma. The line returns to its original designated color.

Association View Settings

Several selection options exist for viewing associations.

On the View menu, select View Options to bring up a multi-tab dialog (defaults to the General tab).
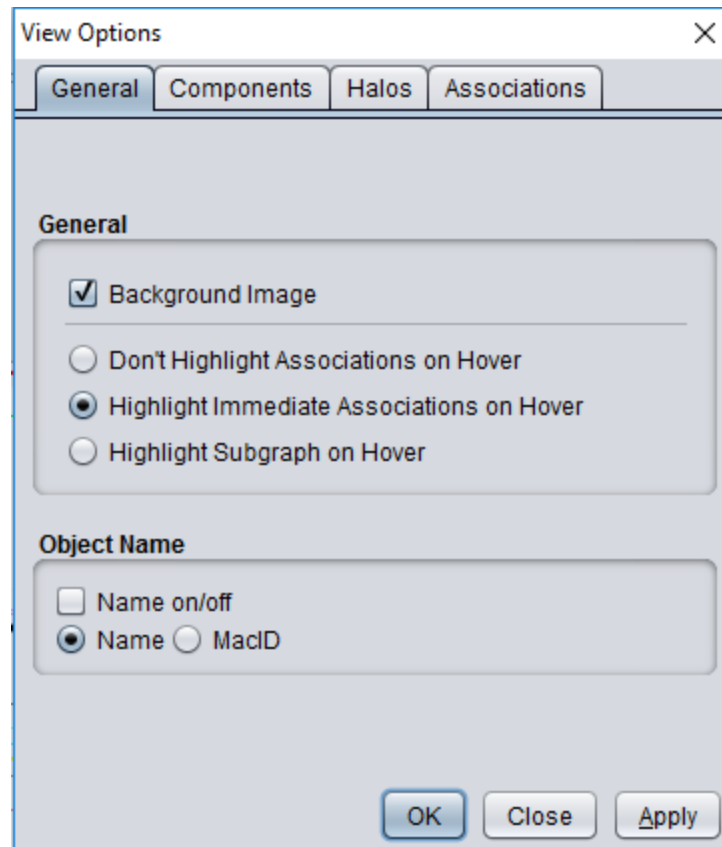
Use the descriptions below to select how you want to view associations.

- **Don't Highlight Associations on Hover** – When selected, hovering over a component highlights only that component (no association lines).
- **Highlight Immediate Associations on Hover** – When selected, hovering over a component highlights all association lines directly connected to that component, as well as the components on the other end of those lines. Hovering over an association line highlights only the selected line and the components on either end of that line.
- **Highlight Subgraph on Hover** – When selected, hovering over a component highlights all of the association lines attached to that component and all of the connected subgraph elements (for example, child components and lines). Hovering over an association highlights that line, the components on either end of that line, and all sub graph elements (for example, child components and lines).

Validate Project

The Validate Project option in the Export menu checks all aspects of the configuration before the system database is updated with a new project file. MapSense generates warnings, error messages, and notifications.

Errors

Errors display in red and must be corrected before the project successfully exports.

Warnings

Warnings display in yellow. Although the project will sync with the SynapSoft with warnings, it is best to ensure that all of the warnings are addressed before export.

Information

The Information tab lists notifications. These are not as urgent as warnings; however, there may be items that you should address prior to deployment in the data center.
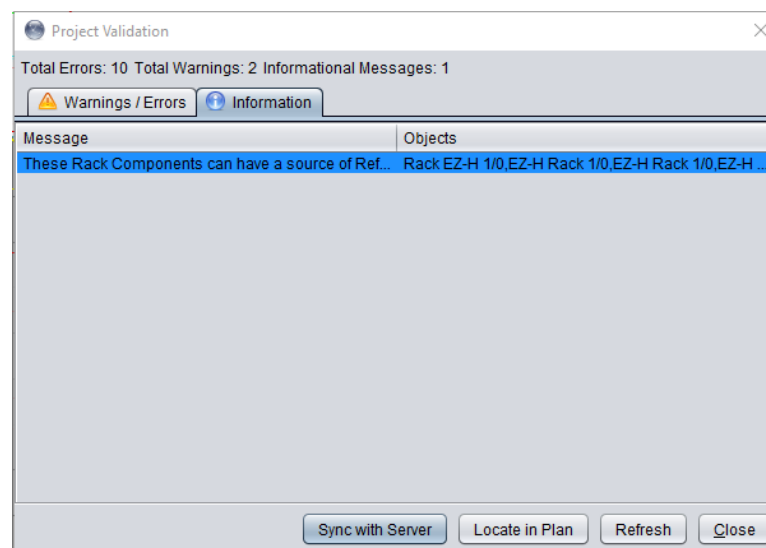
Sync with SynapSoft

See Export to SynapSense Environment Server.

Locate in Plan

The Locate in Plan button on the export Validate Project dialog provides a link to the objects on the drawing. When selected, the drawing displays with the object highlighted. If the object is outside of the current view, the drawing moves to display the object in the center of the screen. When working on a project with multiple drawings, the selected item on the Active drawing is highlighted. If the Active drawing contains none of the selected items, the drawing with the most occurrences of the item displays with the items centered.

To locate an item in the Drawing, click an item on the Validate Project list, and then click Locate in Plan.

Refresh

After making changes to rectify the cause of an information, error or warning message, click **Refresh** to run the project validation again.

Test Device Expressions

This option, included in the Export drop-down menu, triggers a retest of all devices in a project after validation. In the latest release of MapSense, there are more conditions that invalidate the test and require retesting, making it important to simplify the process.

For details, see the Active Control User Manual.

Sync with SynapSense Environment Server

Export the project file from an instance of MapSense that is installed on the same server as the rest of the SynapSense suite of products.

To sync with the Environmental SynapSoft:

1. Ensure all errors listed in Project Validation are fixed.

2. Click Export and select Sync with SynapSoft from the drop-down menu.

3. The Confirm Export dialog box displays if there are any errors or warnings. You can proceed with the export if there are warnings, but you cannot proceed if there are errors. Click **Yes** if you want to proceed despite the warnings.
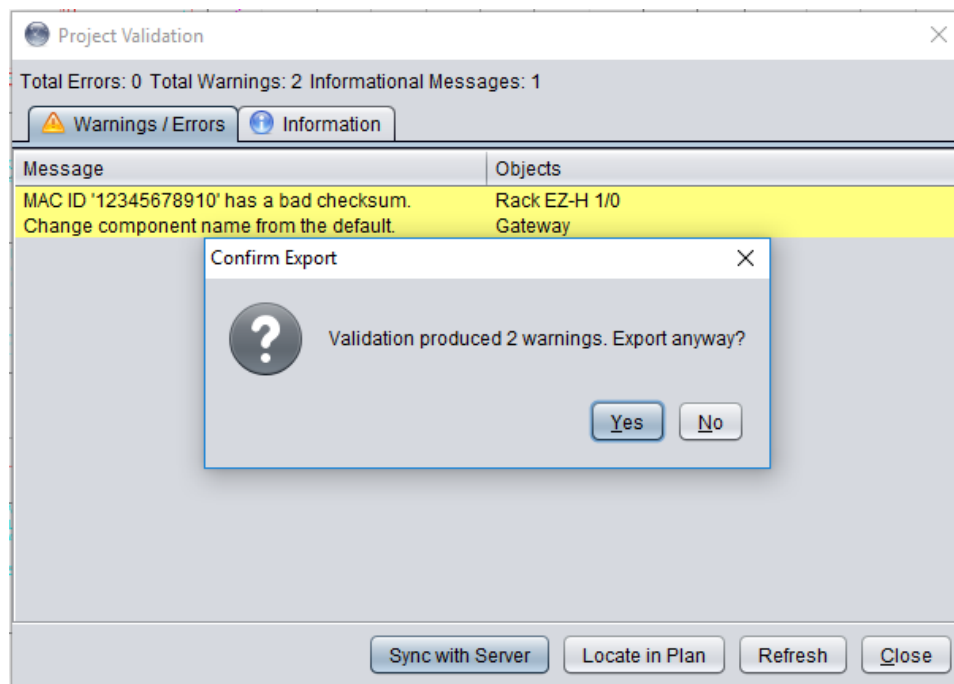
4. In the Server Login dialog, enter a SynapSense Administrator password.
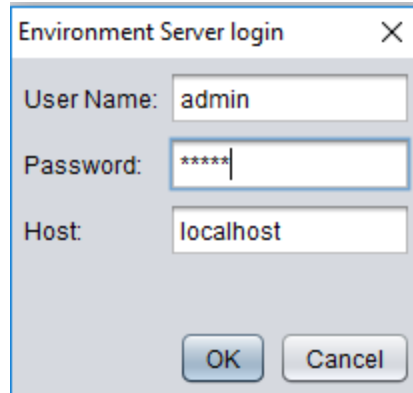
5. A message displays to indicate successful export. If an error notification displays, take steps to remedy the problem and run this export process again.
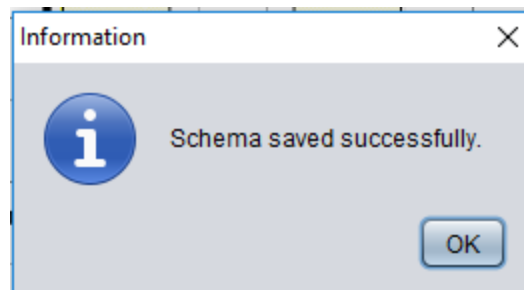
Note: MapSense caches the credentials during the session so that you don't need to input the Environmental SynapSoft credentials each time.

Working with Multiple Drawings in a Project

Data center facilities come in a variety of configurations and MapSense handles the myriad of possibilities with a drawing for each data center that can have (where appropriate) associations between floors or rooms. These drawings are added and instrumented individually with a background image of the data center layout or no background image for mapping things like PUE graphs. Most tasks related to configuring a project are the same whether the data center has one or many drawings. This section describes what is different when the data center has more than one drawing.

Adding More Drawings to a Project

Add and instrument a new drawing or import an existing MapSense project as a new drawing in a new project.

To add another drawing:

1. Select **Add Drawing** from the Project menu.
2. In the Add Drawing dialog, enter a name for the new drawing.
3. Click **OK**.

> **Note**: Drawings display in alphabetical order.

To import an existing drawings from another project file:

1. Create and save the new project.
2. Select **Import Project** from the **Project** menu.
3. In the Import Project dialog box, navigate to and select the project file (.dl or .dlz file extension) to import.
4. Click **OK**.

To delete a drawing:

1. On the Active Drawing drop down list, select the drawing to delete so it displays in the Workspace.
2. On the **Project** menu, select **Delete Drawing**.
3. Click **Yes** to confirm the deletion.

To add a drawing with no background image:

1. Select Add Drawing from theProject menu or toolbar.

2. On the Add Drawing dialog,deselect the Set Background Image checkbox.
3. Click OK.

Working with Components across Drawings

With multiple drawings, it is possible to:

- Move a component from one drawing to another in the same project.
- Create proxies to represent a component on one or more drawings
- Split a drawing with two rooms into two drawings with one room each

Note: For both Move to Drawing and Make New Drawing from Selection, a proxy is automatically created and left in the previous location whenever the moved component on the original drawing was associated with components that were not moved.

Move to Drawing

1. Highlight the component to move.
2. Select **Move to Drawing** on the Edit menu.
3. In the Choose Drawings dialog, select the radio button for the destination drawing.
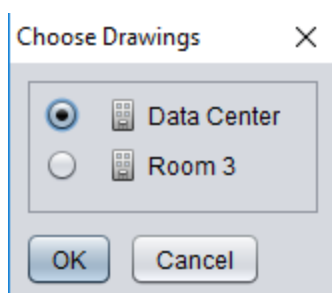
4. Click **OK**.

Make New Drawing from Selection

For cases where a single drawing will be divided into more than one room or section, use the Make New Drawing from Selection feature on the Project menu. This feature makes a copy of the area selected and automatically creates a new drawing. The background image remains the same. To change the name, highlight the new drawing and change the Name in the properties panel.

Using Proxies

Proxies enable the association of two components located on different drawings. The proxy is a component that exists as a child of one data center component but which has

no managed objects of its own. It acts as the proxy for a component in another drawing.

Proxies have only five properties: name, x, y, configuration, and description. The proxy will have the same icon as the component it represents.

Considerations for Multiple Data Centers

When configuring a SynapSense server for multiple data centers or locations, several projects may be exported into one SynapSense installation. This creates multiple data centers in the Sites list in the Web Console.

There are several issues to consider when exporting multiple data center projects into one installation:

Data center names should be unique – This makes the Sites list more usable and helps you identify each data center accurately.

MAC IDs cannot be duplicated – The same MAC ID cannot be used in different data centers. This would only happen as a mistake since the same node cannot be installed on two different racks at the same time.

Names of components across data centers should be unique – It is best to call the components by different names in different data centers to make them easier to find or reference. A short prefix designating to which data center a component belongs may alleviate confusion.

Additional Configuration Tasks

The following are tasks that can be performed, but are not required, to create a project.

- [Exporting Floorplan Images](#)
- [Using Project Statistics](#)
- [Change View Options](#)
- [Find Tool](#)
- [Rotate Floor Plan](#)
- [Component Libraries](#)

Exporting Drawing Images

MapSense enables you to embed the drawing in other documents using the Export Image option. There are three options for this export including Export Deployment Plan, Export Background Image and Export All Images.

- **Export Background Image** – Exporting the Background Image saves only the background image (drawing) to a .png file.
- **Export Deployment Plan** – Export Deployment Plan saves all components in addition to the background image to a .png file. This is useful for reports or presentations where configuration and layout details must be documented. Export Deployment Plan creates a .png file that looks exactly like the image on the screen. It is rendered exactly the way it appears on the screen. All halos, association lines, and so forth are shown, including the highlight of any selected components. The plan can be adjusted by modifying the view options of the drawing.
- **Export All Images** – Export All Images exports the background image and the image that MapSense creates for each room. This causes multiple .png files to be saved to disk.

To export an image of the drawing:
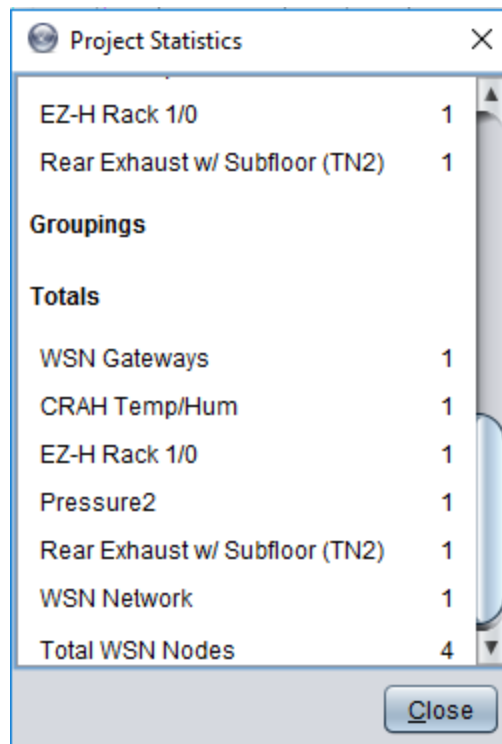
1. Ensure that the screen appears as desired.

2. On the Export menu, select Export Image.

3. Select the export image type.

4. Navigate to location where you want to place the exported file.

5. Click Save.

Using Project Statistics

Use Project Statistics to assist with ordering equipment from Panduit after the SynapSense implementation is complete. There is a total of all components used in the entire SynapSense implementation. Each room has its own subtotals for components placed within that room. Contact your Panduit representative for more information.

To view project statistics:

On the Project menu, select Project Statistics or Project Statistics by WSN Network. This provides the number and type of SynapSense nodes for the entire project or by WSN network, respectively.

Note: The listings do not create separate entries for racks requiring a Reference Temperature and those that do not. For example, all Rear Exhaust Racks, both with and without a Reference Temperature requirement, are included in one total.

Change View Options

The manner in which components and other parts of the interface are displayed can be customized.

To customize view options:

Select View Options from the View menu. The View Options dialog displays the following tabs:

- General
- Components
- Halos
- Associations

The following sections describe the set up options within each of these tabs.

General Tab

Use this tab to display or hide the background image and component names. In addition, the Component Name property can be changed to display MAC ID instead. See the section Association View Settings for details on association line behavior options.
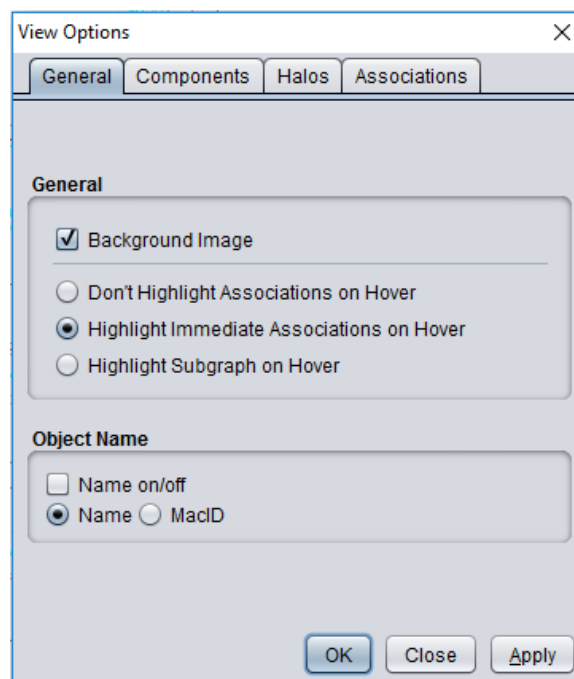
Components Tab

Use this tab to select the component types to be displayed on the drawing. It does not remove the components, it only hides them from view and when saving to a .png file.
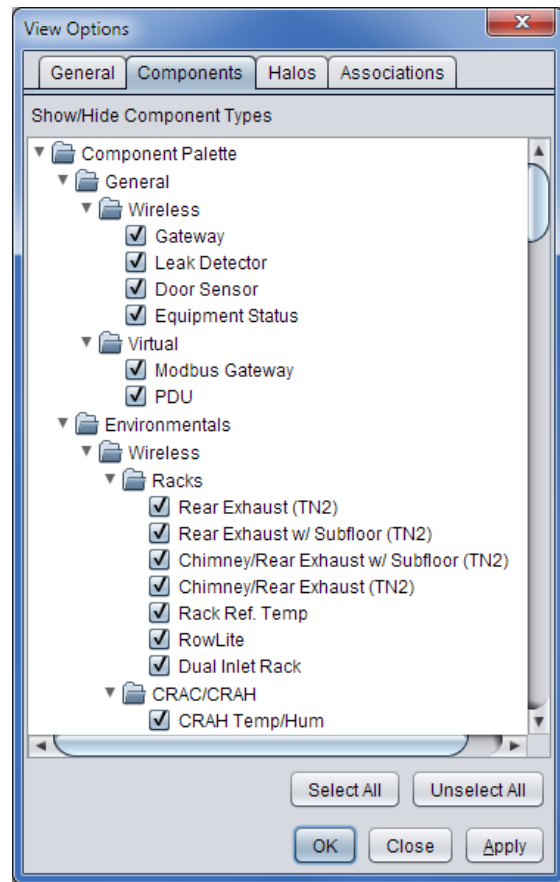
Halos Tab

Use this tab to display or hide the Design Assistance Halos for the components that have halos associated with them, such as Rack components and Pressure components.
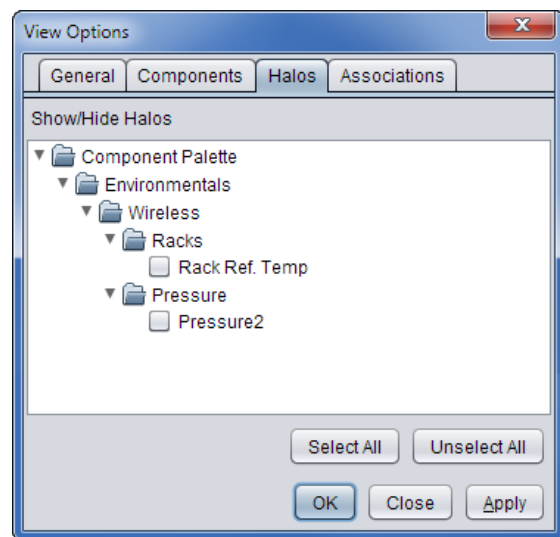
Associations Tab

Use this tab to display or hide the various types of association lines and association details.
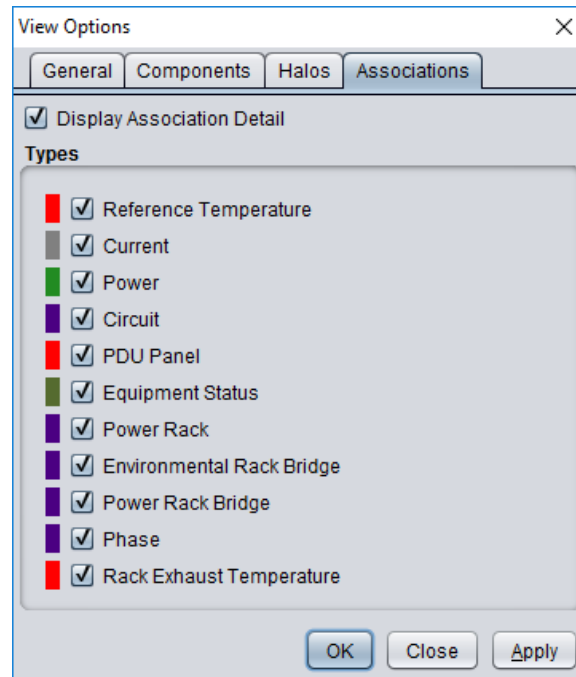
Find Tool

Use this tool to search for components by property name or property value on the drawing. The Find tool is accessible from two locations:

- On the Edit menu, select Find
- Click the Find button on the toolbar

Search for – Use the Search for field to enter a specific value.
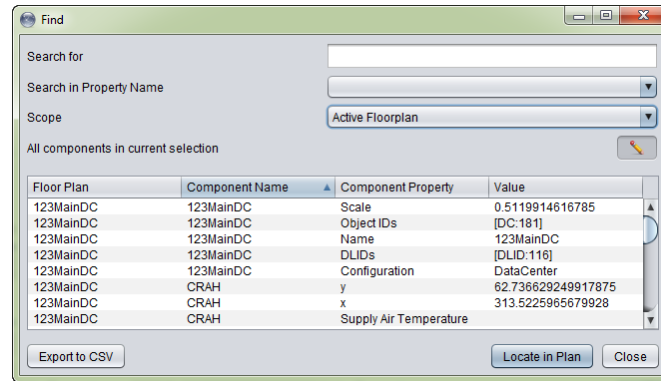
Search in Property Name – Use the Search in Property Name drop down list to constrain the search results to a specific component property.

Scope – Select the group of items to display.

Entire Project - Includes every item from every drawing in the current DL file. Active Floorplan shows those items in the currently selected drawing (for projects with multiple floors or a PUE graph).

Current Selection - displays a list of items selected on the drawing. This is helpful when changing an object property for one or more components. See Editing a Value.

Locate in Plan – Click Locate in Plan to highlight all of the components on the drawing that were selected in the search results dialog. MapSense zooms and centers the drawing to display the selected items.

Export to CSV – Export search results to a separate file in comma-separated value (CSV) format.

Searching Pre-selected Components

The number of items currently selected displays just above the filtered search list in the Find tool dialog. In the image above, the field "All components in current selection" indicates that nothing on the drawing was pre-selected prior to opening the Find tool dialog, and all components are available for searching. If components were selected prior to opening the Find tool dialog, the message field would indicate the number of items selected. For example, if 100 components were selected the text field would show "100 components in current selection".

The Search on Selection checkbox constrains the Find tool search to the pre-selected items.

Editing a Value

Instead of clicking on every component to change one property value, use the Find tool to list the components needing the property change. Click the Edit button, then double click on the value to activate the field and make the change. Click off the field to deactivate it. The edit button remains active until it is deactivated (clicked again), or until the Find tool is closed.

Replace Tool

Use this tool to search and replace text strings, either throughout the project or within the components currently selected.
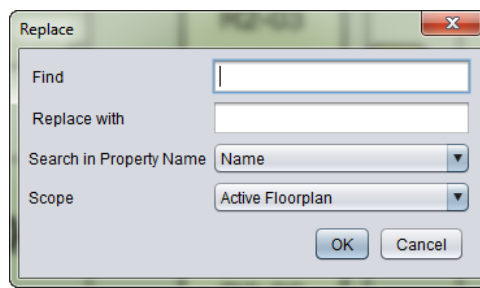
To replace text strings:

1. In the Find field, enter the string to be located and replaced.

2. In the Replace with field, enter the replacement string.

3. Select the appropriate Scope from the drop down list.

4. Click OK to replace.

Rotate Drawing

Use this feature to rotate a drawing for easier viewing in the Web Console. This feature rotates the entire drawing and all of the components.

The figures above shows a drawing in its original orientation, then the same drawing after being rotated right (clockwise) 90 degrees.

To rotate the drawing:

1. On the **Edit** menu, select **Rotate Drawing 90°Right** or **Rotate Drawing 90°Left**, then click **Yes** to continue or **No** to decline the action. You cannot undo the rotation.

Rotating a Selection

The Edit menu contains several options for rotating one or more objects. Rotate Right/Left, Rotate 90˚
Right/Left are straightforward. Rotate Selection Around Center is less so.
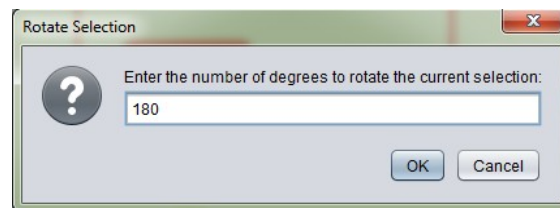
To rotate a selection around center

1. With the Selection tool, highlight the group of objects to rotate.

2. Right-click on the object you want to use as the center point.

3. On the Edit menu, select Rotate Selection Around Center.

4. In the Rotate Selection dialog, enter the degree to which the object should rotate. For example, 180˚.

5. Click OK.

Component Libraries

A Component Library is a bundle of legacy or customized components that are not part of the current default installation of MapSense. Once loaded, the additional components display in the Palette Selection Area.

Previous installations of MapSense used sensor node components that have since been updated. Panduit may have created one or more customized, data center-specific sensor node components not included in the basic set. In either case, these sensor node components are placed by Panduit into a Component Library that is loaded with all the existing sensor node components.

To load a library:

Note: Only proceed with this task when expressly asked to do so by Panduit Technical Support or Panduit Professional Services representatives.

1. On the File menu, select Load Component Library.

2. Browse to the Component Library directory on the Installation CD.
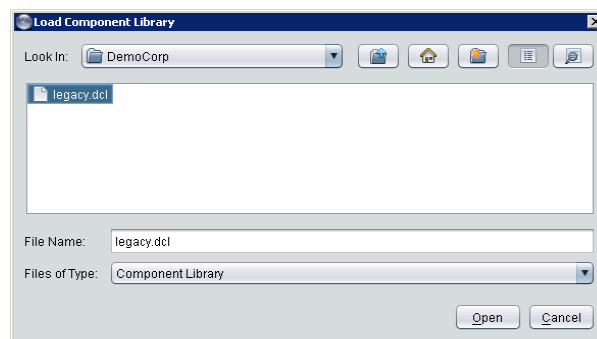
3. Select the library (in this case, it is the legacy library).

4. Click Open to add the new components to the Component Palette.

Maintaining an Existing Project

Once the project is created, it is relatively easy to move and replace components on the drawing as changes are made in the data center. Make the required changes in MapSense and export the drawing to the Web Console. The new version will replace the old without loss of data.

Common maintenance tasks in the data center include replacing and changing sensor nodes, and changing the location of racks. These physical changes also require changes to the related MapSense drawing including changes to components and background image.

Also see:

- Opening an Existing Project
- Making Changes to Components

Opening an Existing Project

There are several ways to open an existing MapSense project. This topic describes each method.

To open a project stored on the local machine:

1. Open the MapSense application.

2. On the **File** menu, select **Open from Disk**.

3. Navigate to the location of the project on the local machine.

4. Select the file name then click OK.

To open a project stored on the SynapSense Environment SynapSoft

1. Open the MapSense application.

2. On the **File** menu, select **Open from SynapSoft**.

3. In the Server Login dialog, type the user name, password, and server name for the Environment Server.
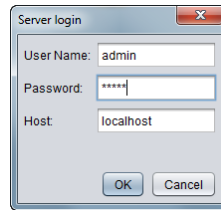
4. Click **OK**.

5. In the Open from Disk dialog, select the project file you want, then click **Save & Open**.
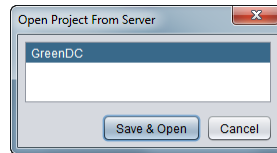
6. In the SaveAs dialog, navigate to the location where this file should be saved and click **Save**. This action saves a copy of the project to the local machine.

Other ways to open an existing MapSense project

- Double-click on the project file name in Windows Explorer. This automatically launches the MapSense application and opens the file.
- On the File menu in MapSense, select the name of a recently opened file

Making Changes to Components

This section describes how to replace and swap components, change component name, add or delete components, and how to change the background image. See also Working with Multiple Drawings in a Project.

Replacing a Component with One of the Same Type

When a physical sensor node is damaged or becomes unstable and needs to be replaced, follow these steps within MapSense to replace the component.

1. Open the project file in MapSense.

2. Use the Select tool on the toolbar to select the component that represents the sensor node to be replaced.

3. Change the MAC ID to that of the new sensor node. For more about MAC IDs, see the section Assign MAC IDs.
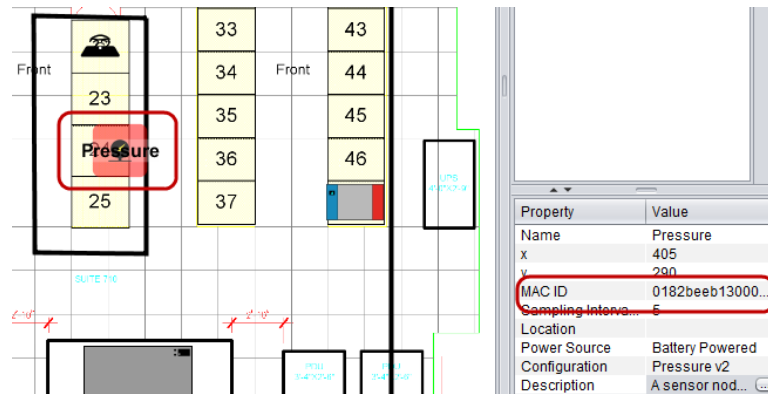
After the MAC ID is changed, the project must be exported to update the system configuration. See
Export to SynapSense Environment SynapSoft for more information on exporting a project.

Replacing a Component with One of a Different Type

As data centers change, different types of components are needed. These steps describe how to replace an existing component with one of a different type.

To replace a component with one of a different type:

1. Right-click the component and select **Replace Configuration** from the context menu.

2. Select the new component type in the dialog box that displays.

3. Select one of the following:

- **Replace** to completely replace the component.
- **Update** maintains the historical data when a similar object is selected.

4. Click **OK**.

⚠️   WARNING: Selecting Replace deletes all historical data on the server that is associated with that component.

Changing a Component Name

This section describes how to change a single component name. If many components need to be renamed, see the section Name Components for details on how to make the process faster using the Quick Name tool. After the component is renamed, you must export the project to update the system database.

1. Select the component to display its properties.

2. Click the Name value in the Properties Editor to activate the field.

3. Type the new name.

4. Click off of the field to deactivate the field.

You can also double-click the component on the drawing to edit the name property.
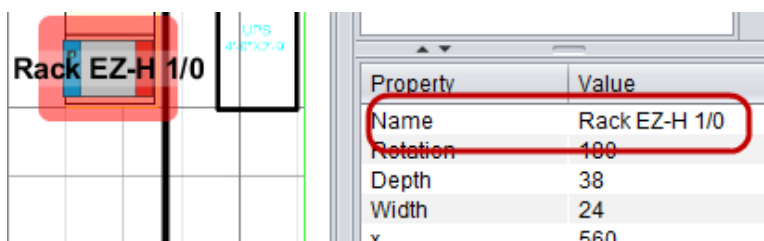
Moving a Component

To move a component click and drag the component to the new location. If the location of a rack component is changed, the Reference Temperature for that component may also need to be changed. The project must be exported to update the system database.

Deleting a Component

To delete a component, select the component then press the Delete key. The project must be exported to update the system database.

⚠️ WARNING: Any deleted component permanently loses all of the associated historical data.

Swapping Components

This enables changing component names without causing any errors and without losing the historical data from the corresponding sensor nodes.

1. Enter the MAC ID of Sensor Node 1 into the component representing Sensor Node 2.

2. Enter the MAC ID of Sensor Node 2 into the component representing Sensor Node 1.

3. Export the project to update the system database.

4. Power-cycle both nodes. If the nodes are not power cycled, they will continue to report into the previous sensor set in the database.

Remove Project from SynapSoft

You can remove a project from the system database so that it is no longer accessible from the Web Console.

On the **Export** menu, select **Remove From SynapSoft**, then confirm the deletion in the message displayed.

Power Monitoring

This chapter provides the information you need to configure Power Monitoring in MapSense.

About Power Monitoring

Power Monitoring enables you to optimize loads, reduce stranded power, and identify both power and space capacity in real-time. Power Monitoring is set up in MapSense using Power Suite components.

Once configured within MapSense, view data in PowerImaging™ which displays the power usage, along with the environmental readings for temperature and pressure.

Also see Configuring Power Monitoring.

Configuring Power Monitoring

Power Suite components add power monitoring to your data center. Power Suite components can be used with their own environmental harnesses or can be used in conjunction with existing environmental monitoring components.

Note: When installing power monitoring, work with your Panduit representative to define an appropriate power-monitoring plan. This section describes only the steps to configure your plan in MapSense.

PUE and Other Calculations

This chapter provides the information you need to work with PUE and other calculations in MapSense.

About PUE

Power Utilization Effectiveness (PUE) refers to how much of the energy used by a data center is consumed directly by the IT equipment, compared to the overall amount of energy used to power and cool the entire data center.
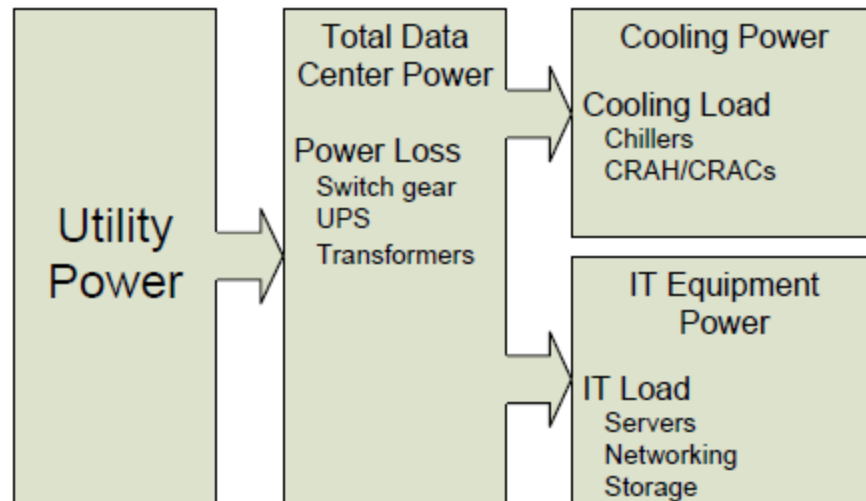
PUE Formula

PUE = All energy used by DC (including power loss and general lighting) ÷ IT Load

PUE calculations can take data from wireless or wired sensors, as well as other building management systems. To correctly instrument and design accurate PUE calculations, knowledge of the electrical one-line drawing and how it is implemented in a facility is required.

> **Note**: Not all SynapSense platform configurations include sensors to monitor and provide data for PUE calculations. It is important to have a Panduit partner that is knowledgeable with large- scale electrical systems help design the PUE calculation and install the sensors required.

Designing Your PUE Graph

Before creating the PUE graph in MapSense, do the following:

- **Prepare the Equipment** - Physically equip all power panels, PDUs, transformers, UPS devices, coolant pipes, or other points of power usage that relate to PUE with sensors that report kilowatts (kW). (PUE calculations in MapSense are in kW.)
- **Draw a diagram of the data flow** - Include monitoring points, calculations, and exclusions. The PUE Graph shown above uses an example of a simple data center with only one panel for IT power, one for cooling power, a chilled water energy meter for coolant energy and an equipment status sensor for lighting. More often, data centers have several panels for each item. There may be circuits for each panel that should be subtracted from the total panel power usage because

they go to a resource other than the data center. Coolant fluid calculations are also complex because coolant pipes often also feed equipment that is not related to the data center.

- **Manually calculate PUE** - Use this to double-check the PUE result displayed in the Web Console.

When finished preparing, create a separate drawing for the PUE graph in MapSense. In the Web Console, only PUE and Custom Metrics tabs display for this data center.

To create a PUE graph in MapSense:

1. Add a drawing to the data center without a background image.
2. Make proxies for all input components to be used for calculating PUE.
3. Create one or more calculation groups.
4. Create and associate Calculation components on the drawing.
5. Configure Inspectors on the drawing.
6. Export the graph to the Environment Server and troubleshoot in Web Console.
7. Add the PUE Reporter component.
8. Export the design to the Environment Server.

These steps are explained in greater detail in the following sections.

Types of PUE Components

There are three general classes of components used to create a PUE Graph:

Inputs generate data either from an energy meter, other power sensor or an external data source such as a building automation system. They are inputs into the PUE Graph. Place proxies on the PUE drawing for each input component on the actual drawing.

Calculation Components take inputs, perform mathematical calculations on them and provide output to the PUE Graph. These may be as simple as a Summation component or as complex as a Rated Power Loss component.

Reporters and Inspectors take the data from providers and Calculation components and generate an output display in the Web Console. The only consumers in a PUE system are the PUE Reporter and Inspectors. Place one reporter on the virtual floor. Inspectors are critical for troubleshooting.

PUE Lite requires fewer properties to configure a basic PUE calculation. See your Panduit Professional Services representative for additional information.

PUE Contribution Categories

PUE is based on four basic categories of data: IT Power, Cooling Power, Lighting and General Power, and Losses. PUE is the ratio of IT Power to the entire power load of the facility, but measuring each area separately is useful for investigation. Each area is described below:

- **IT Power Contributions** – Power meters or BCMS systems that measure the feeds to computer or networking equipment.
- **Cooling Power Contributions** – Chiller plant energy, pumps, CRAH fans, CRAC compressors and other similar types of power used to cool the data center. This includes all power associated with the cooling loop. This should also include cooling power for areas that support the data center such as UPS rooms, MDF rooms, DC plants, and battery rooms.
- **Lighting and General Electrical Contributions** – Typically this category is for non-IT and non-cooling energy usage. Lighting is the most common example. General electrical plugs around the data center should be put into this category. This should include lighting and general receptacles in the same support areas mentioned under cooling.
- **IT Power Losses** – Losses across power conversion equipment, such as UPS devices, transformers and PDUs. Separate components are provided to calculate the loss based on whether the load is metered before or after the transformer. However, it is always best to directly measure the load before and after power conversion equipment.

The PUE Graph is a series of calculation operations that aggregates each of these categories, and then calculates the final PUE. Since data centers may have complex power distribution systems, many calculations may be required to aggregate each category.

Creating a Calculation Group

A calculation group is a grouping to which the PUE components are added. Sensor components, like Racks and Gateways, reside in rooms, but they can also be linked to PUE components in a calculation group.

Multiple calculation groups can be added to a project file. Multiple calculation groups are often useful for organizing energy data into categories (for example, loss, IT load, cooling load, general).

Note: Use at least one Calculation Group per PUE category. Panduit recommends creating four calculation groups which match the four types of PUE (IT, Losses,

Cooling, and Lighting/General). This makes it easier to troubleshoot the calculations and to run reports from the Data Analysis tool in the Web Console.

To create a Calculation Group:

1. Ensure that the user level is set to Advanced.
2. Select **Add Calculation Group** from the **Groupings** menu, or click the **Add Calculation Group** icon.
3. Enter a unique name and use the **Active Grouping** drop-down list to select it as the current calculation group. View the newly added calculation group in the Groupings tab on the right side of the user interface.
4. Repeat Steps 1 to 3 to add more Calculation Groups – one for each type of PUE category.
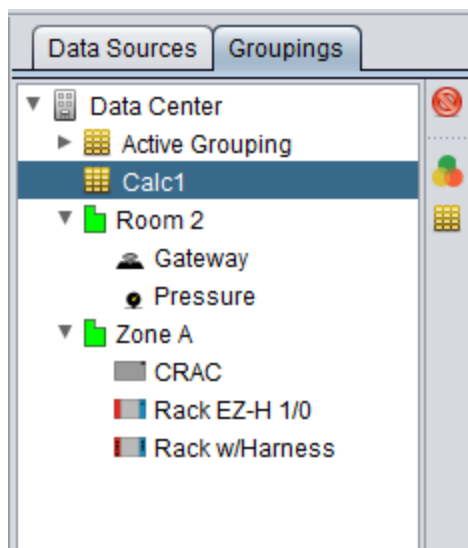
Creating and Associating Calculations

PUE graphs may require calculations to be performed prior to input to the PUE Reporter. Most PUE Graphs require calculations be performed on sensor inputs before they can be properly used as   inputs to the PUE Reporter component. For example, if there is a circuit on a panel that feeds a load unrelated to the data center, then two power meters would be required; one to measure the total power of the panel and the other to measure the power used by the unrelated circuit (to be subtracted from the total).

There are a variety of components available for performing math operations on incoming values from power or calculation components. Each performs a specific math function, such as addition, subtraction, multiplication, square root, and so forth. These components can be strung together in series and parallel to perform complex

mathematical calculation on values to provide the Web Console (via the PUE Reporter) with valuable information on energy flow and usage within the data center.

Note: Some of the specific calculations and their uses are reviewed in the section, Specific Components.

For each component, the Properties Editor panel displays the selected operation. All associations are created in the same method, shown as follows.

To associate Calculation Components

1. Click the Select tool from the toolbar and drag the selection cursor over the components.
2. Right-click over a Calculation component to associate. The Associations dialog appears.
3. Select the type of calculation from the drop down list.
4. Repeat Steps 1 to 3 as necessary.

Note: It is important to choose the correct connections. For example, be careful not to include the loss from one calculation in with the addition calculation that will eventually be associated with the IT load.

Configuring Inspectors

Add Inspector components to the drawing. Inspectors enable you to troubleshoot a PUE graph. Inspectors are the only way to see calculation data in the Web Console. Inspectors are also used to visualize data that cannot be viewed any other way, or to create a custom metric for the data center.
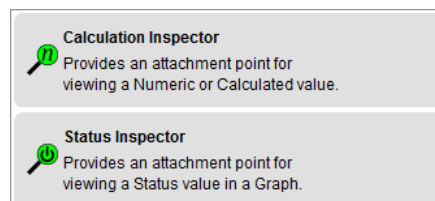
Select the Inspector component from the Palette then click on the component (on the drawing) to which you want the inspector attached. The Inspector automatically prepends the name of the component to which it is attached.

Export and Troubleshoot

Verify that the PUE Graph is correct by exporting and troubleshooting the calculations and associations as created up to this point. Exporting enables you to clarify errors (that is, troubleshoot) prior to using the PUE reporter, which is active and starts recording history immediately upon adding it to the drawing.

Once the file is exported and data is flowing into the various calculation objects, this data can be viewed in the Custom Metrics tab in the Web Console. This tab only becomes active once there are objects with inspectors exported. The data for each object with an inspector can be viewed in tabular and chart format in this tab. Enter the data into a spreadsheet to validate that calculations are correct and the PUE is as expected.

Adding the PUE Reporter Component

The PUE Reporter component is the central piece of the PUE Graph. This component causes the Web Console to show the PUE tab for a particular data center. It accepts four inputs (loss, IT load, cooling load, and lighting/general). The PUE Reporter component calculates inputs in kilowatts (kW). Those inputs typically come either from other calculations or directly from meters. It performs the PUE calculation for display on the PUE tab. All calculations need to be associated to the PUE Reporter component for data to display on the Web Console.
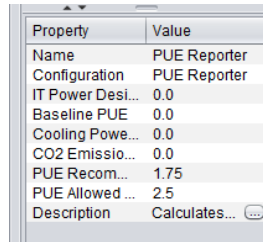
To add a PUE Reporter component:

1. Select the PUE category on the Palette Tree and select the PUE Reporter component.
2. Click to place the PUE Reporter component. This component does not display on the physical drawing tab in the Web Console so you can place it anywhere on the drawing. However, for troubleshooting purposes, it is recommended that all of the elements in the PUE graph be placed so that the layout is easy to follow.
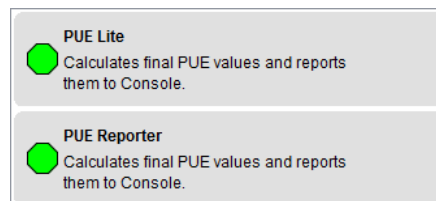
Only one of these components can be placed in a data center design. If additional PUE Reporter components are placed in a project, an error is generated during export.

3. Enter the values for IT Power Design, Baseline PUE, and Cooling Power Design in the Properties Editor panel for the PUE reporter. The CO_2 Emissions property is also required. Find the information listed by location in a Department of Energy document entitled "Voluntary Reporting of Greenhouse Gases" on the web at http://www.eia.gov/oiaf/1605/pdf/Appendix%20F_r071023.pdf. The project file cannot be exported without these values populated.

Property	Value
Name	PUE Reporter
Configuration	PUE Reporter
IT Power Desi...	0.0
Baseline PUE	0.0
Cooling Powe...	0.0
CO2 Emissio...	0.0
PUE Recom...	1.75
PUE Allowed ...	2.5
Description	Calculates...

- **IT Power Design** is the theoretical maximum power available for IT load. It is typically calculated by adding up all of the kW capacity of the UPS devices and applying an 80 percent safety factor. This value is used to calculate the percent utilization of IT power in the data center.
- **Baseline PUE** is entered so that the user can see what effects improvements in the data center make in the PUE number.
- **Cooling Power Design** is calculated from the theoretical capacity of the chiller plant and all of the fans. It is used by the system in the same manner as IT Power Design.

Exporting the PUE Design

After all metered points, manual inputs, Inspectors, and Calculations have been configured and connected to the PUE Reporter, the PUE drawing is ready to be exported to the Environment Server. See the section, Export to SynapSense Environment Server for more information.

Note: Verify that the PUE Graph output is correct by manually performing the same calculations as are used by the Calculation components in the design.

Specific Components

This section reviews some common calculation components, which includes Inlets and Outlets, Rated Power Loss, and Equipment Status (conditional) calculations.

Note: A detailed description of all the components (including 3-Phase Current to kW, Absolute Value, and Less-Than Filter) is explained in the MapSense Component

Libraries. Wired Integration components are explained in that reference document, as well.

Extending PUE Calculations across Projects

PUE is calculated per floor, and is saved in a project file; however there may be cases where PUE needs to be calculated across projects. The Inlet and Outlet components enable a single PUE Reporter to be placed in a single project, but pull information from other calculations in other project files.
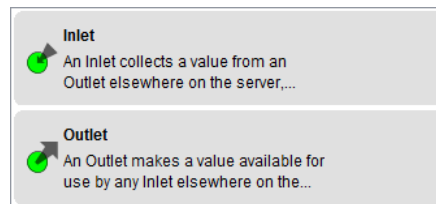
- **Outlets** – A calculation component that can be attached to any other calculation value, which makes that value available to any Inlet on the server. It has the 'power' consumer type. The Outlet can connect to any single calculation producer in a project file. The Outlet consumes the value (much like an Inspector) and makes it available for Inlets to use.
- **Inlet** – A calculation component that can have any other calculation component associated with it. To use it, enter the name of the Outlet from which you want to draw calculations. MapSense finds that outlet, regardless of which data center or project file it is in, and finds the Inlet with the current value of the specified Outlet. It has the 'power' producer type. The Inlet's producer can be connected to any number of other calculations consumers in a project file, allowing them access to the value that the Inlet has copied form an Outlet. Any number of Inlets can reference the same Outlet.

There may be cases where PUE is calculated for the entire building. Use the Inlets and Outlets to access the calculations from several project files to implement PUE across an entire building. To do this, ensure that an Outlet is added to the first drawing. Then, in the second drawing, use an Inlet.

Note: It is critical that the name of the Outlet in the other project files exactly the same name as the name in the properties panel for the Inlet on this project file.

Calculating PUE for Multiple Locations

PUE can be calculated for multiple locations. This is useful in co-location situations where you want to compute the percentage of cooling costs associated with each IT load

at a separate location.

Set up the calculations for each of the locations in the project file with the cooling loads.

An example of a metric that can be used would be dividing the total IT load of each co-locations into the total cooling load of the building, minus some overhead factor.
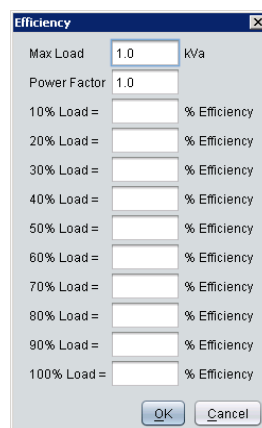
Rated Power Loss Components

Rated Power Loss components are designed to save a series of calculations that are typically performed many times when calculating PUE. These components can be used for any electrical device that converts power from one form to another. The most common usages are UPS devices or transformers.

- **Rated Power Loss (Input)** – Simulates a piece of equipment with a rated power loss where the only known value is the input (primary) power. The component accepts an Efficiency Table then calculates output power and power loss. This component has one 'value' input, one 'value' output and a configurable table.
- **Rated Power Loss (Output)** – Simulates a piece of equipment with a rated power loss (such as a UPS or transformer) where the only known value is the output power. The component accepts an Efficiency Table from the user and then calculates the input power and power loss. This component has one 'value' input, one 'value' output and a configurable table.

To configure Rated Power Loss components:

1. Select the correct Rated Power Loss components for the situation. Usually, only the input side or the output side is metered.
2. In the Properties Editor panel, click the Efficiency property to display the Efficiency dialog.

3. Enter the efficiency curve from the rated power loss specifications for the device. There are 10 divisions available, but only two are required to draw a straight line.
4. Click OK.

If the electrical device has the same efficiency rating across its entire operating range, then only two points need to be entered (in any two of the % Efficiency boxes).

Once the efficiency curve is entered, the Rated Power Loss component can then be linked to the PUE Reporter or other component. The figure above shows the types of connections and data that can be sent to other components. The most common are loss and power.

Conditional Calculations (Equipment Status)

Equipment Status Calculations are conditional calculations. Most PUE graphs require conditional inputs into the PUE calculation. The conditional calculation components are shown below.
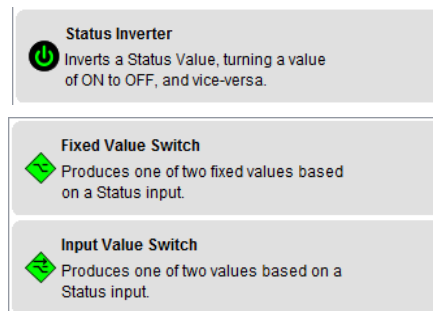
- **Fixed Value Switch** – Used when an energy meter is not attached to a load, but there is an equipment status sensor attached. The default value is output when the equipment status sensor is 'off', and the fixed value is output when the equipment status sensor is 'on'.

  The Fixed Value Switch component can be used for lighting circuits. No meter is necessary because the load is fixed. The fixed load only needs to be measured once and then included in the PUE calculation at times when the circuit is energized (the default value can be set to '0', to be the output when the lighting is 'off'). This component has one Boolean input and one 'value' output.

- **Input Value Switch** – Accepts a connection from a power meter or calculation and will output that value only when a separate Equipment Status sensor input reports that the equipment is 'on'. Otherwise it outputs the default value (normally set to '0'). This component has one Boolean input, one 'value' input and one 'value' output.

- **Status Inverter** – Normally used after an equipment status sensor to reverse its Boolean output. Outputs the opposite Boolean value from its input (if '1' is input then '0' is output, and if '0' is input then '1' is output).

Appendix A: Functions and Hotkeys

Perform various MapSense functions faster using the key assignments listed in the table below.

MapSense Tools Hotkey Assignments

	No Modifier	CTRL	SHIFT	ALT	CTRL-SHIFT	CTRL-ALT	CTRL-ALT-SHIFT
A		Select All		Filter Contained Areas	Unselect All		
B		Toggle BG					
C		Copy				Add Calc Group	
D		Toggle Associations Detail				Change Data Source	
E		Toggle Floor Tiles					
F		Find				Add Drawing	New Drawing from Selection
G		Replace				Add Planning Group	Change Grouping
H		Toggle Halos					
I						Import Project	
J		Toggle Associations					
K		Create Proxy					
L		Rotate Drawing 90° Left					
M		Toggle Names					

N		New Project		Filter Enviros		Add WSN	
O		Open Disk				Project Options	
P		Open from SynapSoft		Filter Power & Energy			
Q		Rotate Left			Rotate 90° Left		
R		Rotate Drawing 90° Right					
S		Save					
U		Change User Level		Filter PUE			
V		Paste					
W		Rotate Right			Rotate 90° Right		
Y		Redo					
Z		Undo					

|						
1			Select Tool			
2			Rotate Tool			
3			Associate Tool			
4			Quick Name Tool			
5			MAC Assign Tool			
6			Copy Settings Tool			
LEFT		Align Left				
RIGHT		Align Right				
UP		Align Top				
DOWN		Align Bottom				
\		Distribute Horizontal			Distribute Vertical	
]		Bring Forward			Bring To Front	
[		Send Backward			Send To Back	
,		Pin Current Hover			Unpin Current Hover	
.		Clear Pinned Hover				
Num +		Zoom In				
Num -		Zoom Out				
Num 0		Zoom to Fit				
F1	User Guide		Component Encyclopedia			
F5	Reposition Secondary Nodes					
F6	View Stats					
F7	Validation					
F8	Sync with Server					
F9	Export Deployment Plan Image					

Appendix B: Create Background Images

> **Note**: This Appendix pertains to users who plan to create a background image outside of MapSense for use in generating a room drawing.

The background image illustrates the floor plan of the data center being monitored. Background images are created using third-party software and are rendered in PNG format (.png file). Drawings should include racks, CRAHs, PDUs, walls, doors, and floor tile lines. Later, it will be necessary to know which side of each rack is the cold air intake.

The background image is usually derived from data center architectural drawings, typically in AutoCAD® or Visio® format. Both of those programs have the ability to save images as a .png file.

Before a background image is inserted into the MapSense project, it must have transparent areas strategically added to it. Transparent areas are where the LiveImaging™ colors through the drawing. In the example below, only the area around the racks was made transparent. The area where the desks are located is opaque and does not have LiveImaging coloration. Any portion of the data center that does not have sensors installed should not be made transparent.
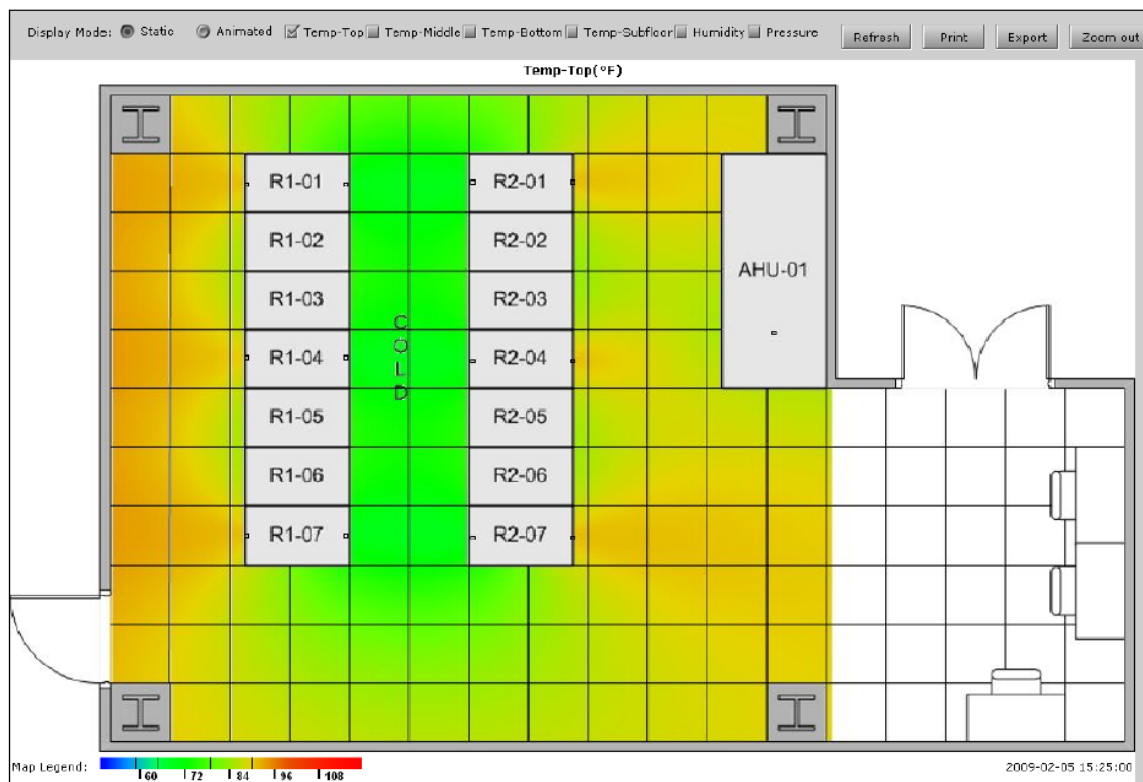
The racks themselves are also not made transparent. This is a practice that Panduit Professional Services uses because the true temperature of the servers inside each rack is not known by the system. As a rule, areas six feet (two meters) or more away from the last sensor on an edge should not be made transparent.

Creating a Transparent Area

Create a transparent layer in a graphic image with an image-editing program. The example below uses an Open Source product called GIMP (GNU Image Manipulation Program).

1. Start the image-editing program.

2. Open the image file requiring transparent areas by selecting File from the menu, then Open.

3. Add an alpha channel to the image (alpha channel is another term for a transparent layer). To do this, open the task drop-down list on the map window. Select Transparency from the Layer menu. Then, select Add Alpha Channel. If the Add Alpha Channel selection is grayed, then the alpha channel already exists.
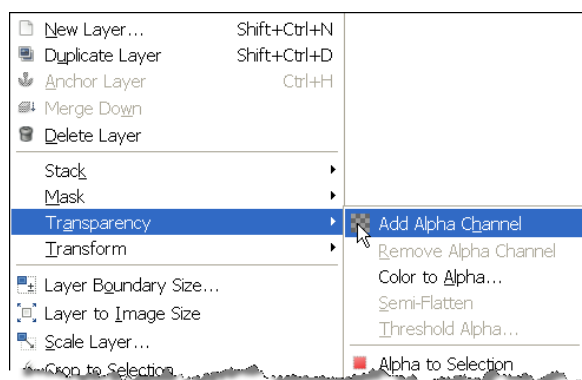
4. On the GIMP tool window, click the Select by color tool button.

5. Click the area on the map to be made transparent inside an area of color to become transparent. This is typically colored white. Jagged lines indicate that all the white areas on the image have been selected.
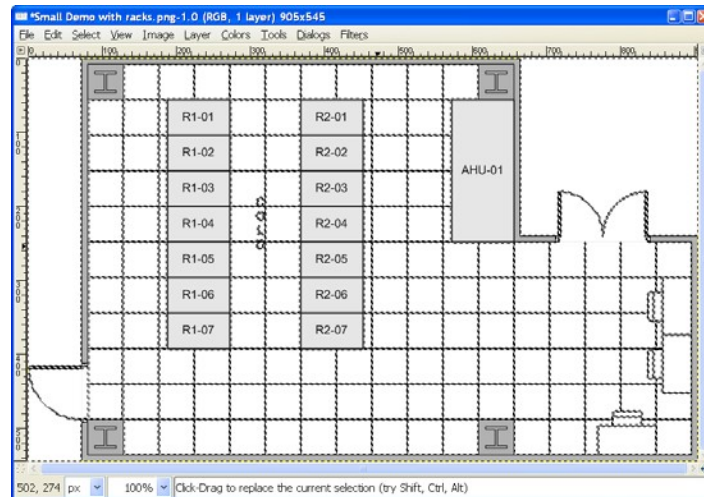
6. The next step is to deselect all of the areas that should not become transparent. These should include all of the racks, CRAHs, furniture, and areas outside the room walls. Deselect any rooms contained by the data center that do not have sensors (for example, stairwells), as well as equipment like PDUs and tape backup units. Click the Rectangle Select button on the GIMP tool window.
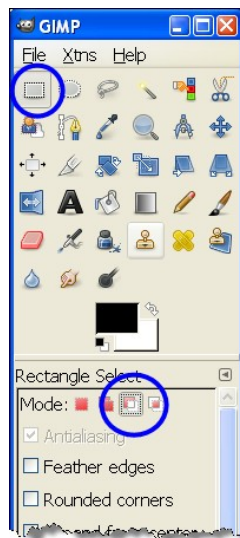
7. Click the Deselect Mode button in the GIMP tool window near middle of the window (third icon from left).

    This is the area to subtract from the transparency color previously selected in Step 4.

8. Use the mouse to create non-transparent boxes over the items described in Step 6 until complete. Mistakes can be undone by selecting Undo from the Edit menu.

Note the selection box over the area of the drawing with the desks, which prevents that area from becoming transparent.

9. When all areas are complete, press Delete on the keyboard. This removes all of the white areas still selected from Step 5.

10. Save changes with Save As under a new name (for example, append "trans" to the end of the file name). This ensures that the original (non-transparent) image remains intact.

Appendix C: Scan MAC IDs

The Scan MAC IDs dialog, displays a list of the items in the project that require MAC IDs by product type. For example, if you are adding two Gateways and 100 ThermaNode EZ products, those would be listed in groups, first the Gateways, then the ThermaNode EZs. The user scans the number of items per product type. Once the MAC IDs are scanned, validate the list and correct any errors, then export and save the file.

To scan MAC IDs:

1. Open the MapSense application.

2. On the File menu, select **Open from Disk** to display the project file (.dlz) you want to work with.

3. On the MapSense Project menu, select Scan MAC IDs.

4. When the Scan MAC IDs dialog displays, select the Drawing and WSN network from the drop-down lists. The default is the active drawing.

5. Scan the MAC IDs for each type of product in the order displayed on the list.

6. Click Validate to check for errors.

7. Click Hide Valid MAC IDs to display only those items with errors; those with empty MAC ID cells, Bad Checksum, or Platform Mismatch.

Scan MAC IDs			✕
Drawing		Data Center	▼
Network		WSN Network One	▼
Hide Valid MAC IDs		☑ (3 of 12 hidden)	

Platform Name	Component Name	Property Name	MAC ID Value
ThermaNode EZ	EZ-H Rack 1/1	Exhaust MAC ID	
ThermaNode EZ	EZ-H Rack 1/1	Exhaust MAC ID	
ThermaNode EZ	EZ-H Rack 1/1	Exhaust MAC ID	
ThermaNode EZ	EZ-H Rack 1/1	Exhaust MAC ID	
ThermaNode EZ-H	EZ-H Rack 1/1	Intake MAC ID	
ThermaNode EZ-H	EZ-H Rack 1/1	Intake MAC ID	
ThermaNode EZ-H	EZ-H Rack 1/1	Intake MAC ID	
ThermaNode EZ-H	EZ-H Rack 1/1	Intake MAC ID	
ThermaNode EZ-H	Rack EZ-H 1/0	Intake MAC ID	012345678910

Error Legend: Bad Checksum   Platform Mismatch   Duplicate

Export Names   Validate   OK

8. Click Export Names to create a Labels file in the appropriate location on your network. Export Names exports those items currently displayed. To export the entire list, ensure the Hide Valid MAC IDs filter is deselected.

9. Click OK to close the dialog.

Repeat this process for each WSN network.