MODULE SEVEN: INSIDE PLANT

Participant Guide
spatialNET Standard Users Workbook
January 4, 2012
Version 1.1
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OVERVIEW:

This module provides an overview of the spatialNET Inside Plant (ISP) module, how to create ISP dictionary entries, and how to build an ISP site.

OBJECTIVES:

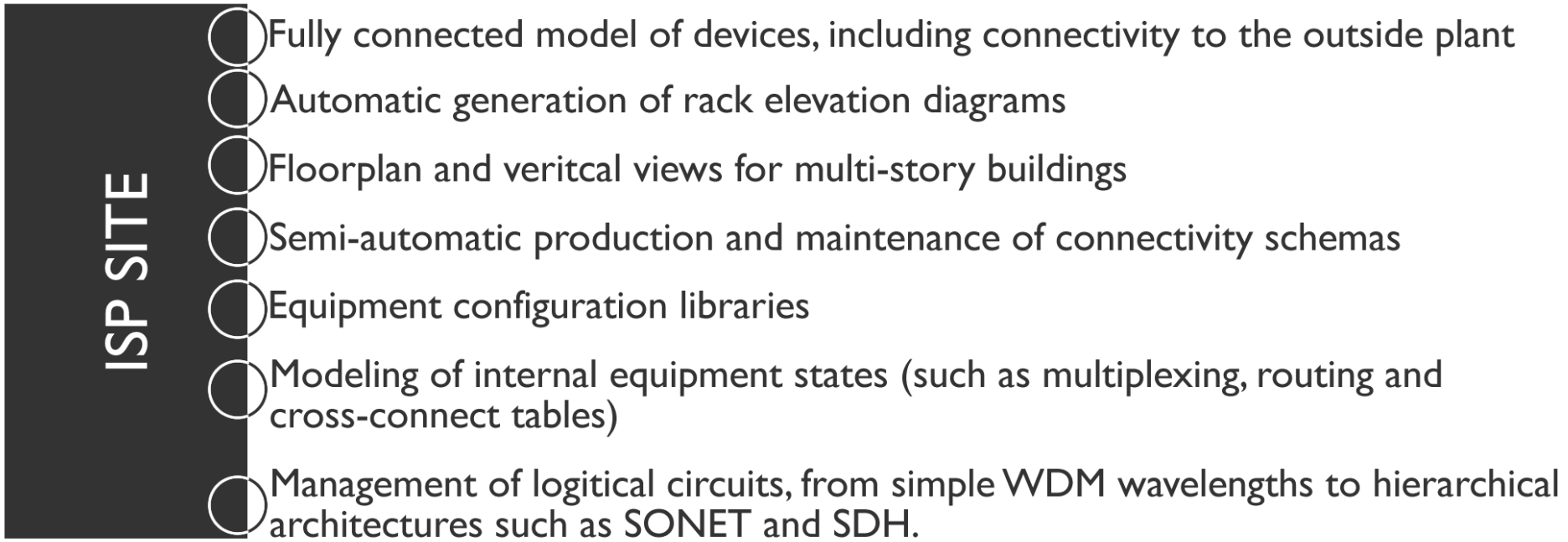
By completing this module, participants will be able to:

- Create ISP equipment
- Place equipment in sites
- Create connectivity between equipment in different views.

NOTES:

INTRODUCTION: ISP TOOLS

spatialNET includes a sophisticated set of tools for managing inside plan, including:



Notes:

NOTES



	Function	Use
	Add site	Add an OSP or ISP site to the OSP view.
	Add Rack	Add a rack to a floor.
	Add Chassis	Add a chassis to a selected rack.
	Add Card	Add a card to a selected chassis.
	Add Standalone Equipment	Add a standalone piece of equipment to a site.
	Add Cable	Add an ISP jumper cable to connect port to port
	Rack Elevation View	Opens the rack elevation view for the selected site or floor.
	Rack Elevation Control Panel	Opens the Rack Elevation Control Panel.
	Create Detail Drawing	Creates a Detail Drawing for a selected site.
	Follow Feather	Follows a feather from one detail drawing to another.
	Replace Feather with Card	Replace a feather with the actual card.
	Place Selected Card in Detail Drawing	Displays the selected card.
	Place Deleted Card in Detail Drawing	Redisplays the last deleted card.
	Display Detail Drawing	Displays a detail drawing for the current selected entity.

INTRODUCTION: SEARCHING/SELECTING AN ISP SITE

NOTES

Before the equipment can be added to a site, you must select the building and open the details. There are two ways to search and select the site in spatialNET:

Option 1: Select the ISP site on the map

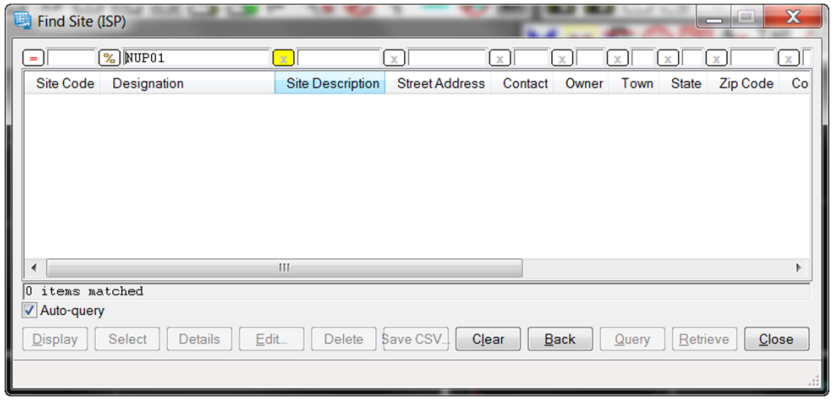
1. Select a building by clicking on the map symbol in the map view.
2. Click on the Details button on the general toolbar. 

Option 2: Search by Name

1. Click ISP>Find by Matching>Site from the menu bar.
2. When the Find Site by Matching window opens, enter the name in the Designation field. Use the button to the left of the field to control the method of the search:

 If you know part of the name

 If you know the exact name (must match



3. Verify the Auto-Query is checked in the lower left.
4. Select the entry and either display it on the map view or open the details.

Notes:

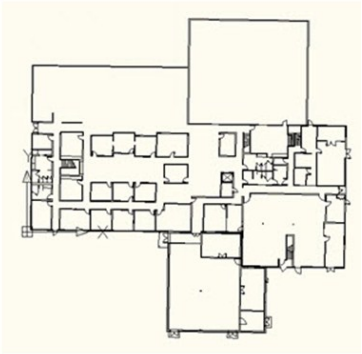
INTRODUCTION: INSIDE PLANT VIEWS

Inside plant has a number of characteristics that differ from OSP views. For example:

- Inside plant is typically much more densely packed than outside plant
- Inside plant has a vertical dimension (e.g. multi-story buildings, rack layouts)
- Inside plant typically has many more connection ports than outside plant equipment.

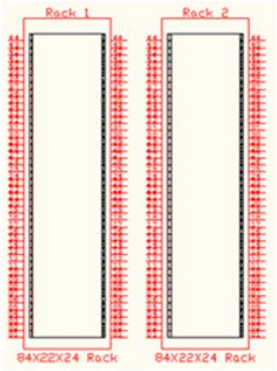
With the amount of detail, inside plant design requires the use of three separate views to represent equipment.

Floorplan



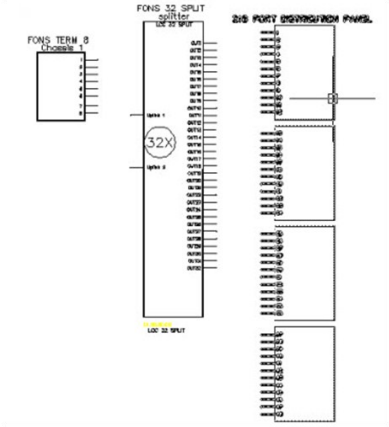
Top down view showing structural details of a site and the location of racks within the site. This view is generated automatically.

Rack Elevation



Front view of the racks housed in the site that display the physical layout of chassis and cards within them. This view is generated automatically.

Detailed Drawing



Views showing the physical connections between cards and chassis and available ports. This view must be manually created.

NOTES

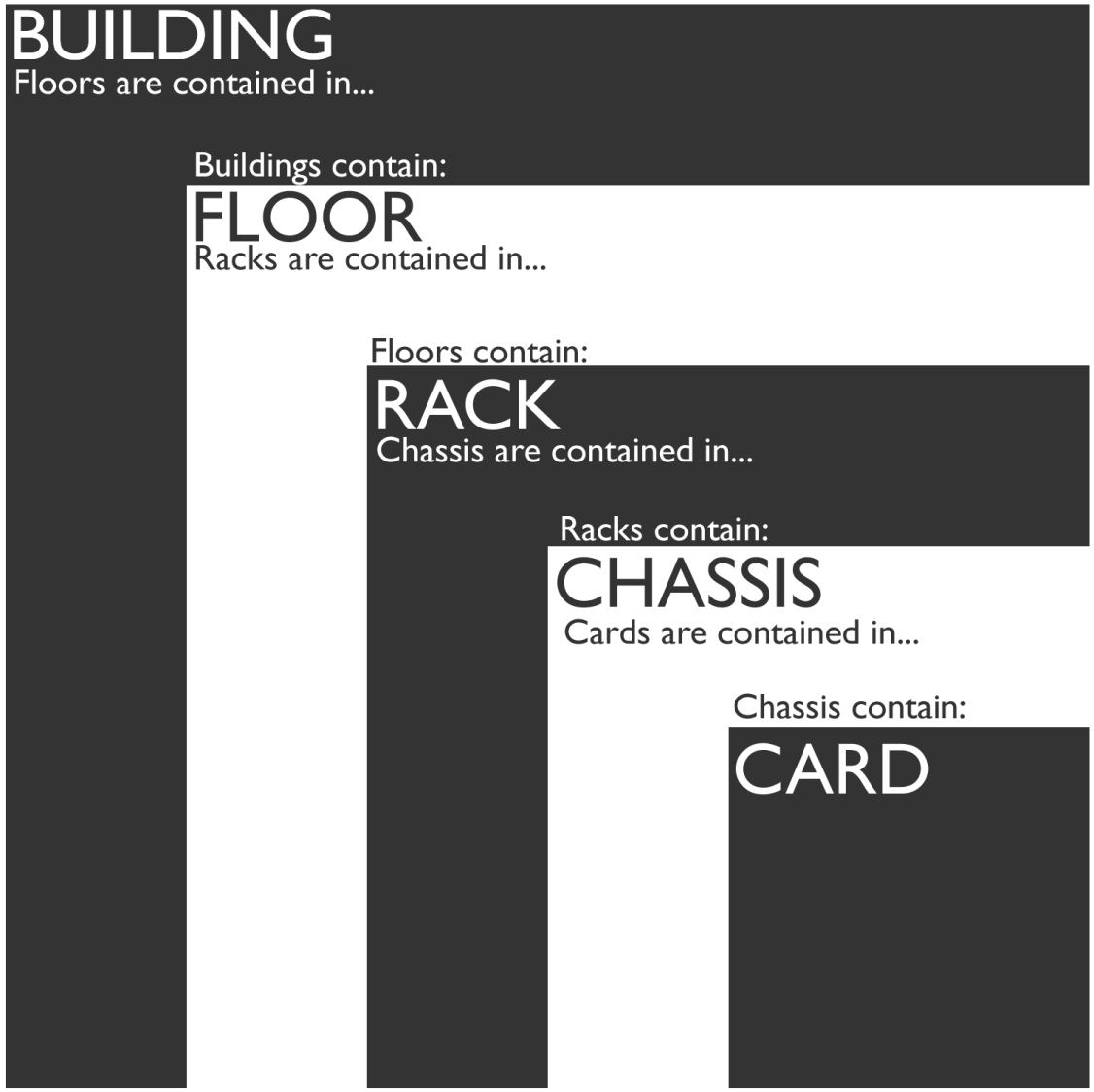
INTRODUCTION: INSIDE PLANT EQUIPMENT HIERARCHY

NOTES

spatialNET requires that you specify a location for each piece of inside plant equipment. The equipment must adhere to this hierarchy:

- Floors are contained in buildings
- Racks are on specific floors
- Chassis are located on a rack and on a specific mount point within the rack
- Cards are located in a chassis and on a specific mount point within the chassis.

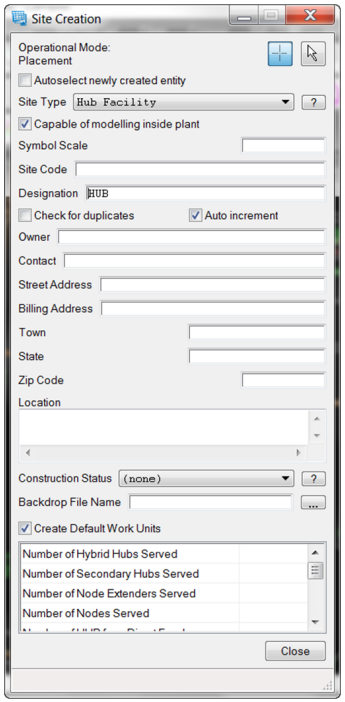
Due this hierarchy, spatialNET users must make sure the object in which it is contained already exists when you want to add a new piece of equipment to the database.



ADDING AN ISP SITE

All inside plant equipment in spatialNET must be contained within a site. The site is a "shell" that houses all of the equipment that the spatialNET user will need to add. There are two methods to create an ISP site:

Option 1: Create an Empty Building



1. Open the ISP menu, and choose Add, Site.
2. Make sure that the Capable of Modeling Inside Plant button is checked. If not, this will create an OSP site.
3. Click on the map to place the site.

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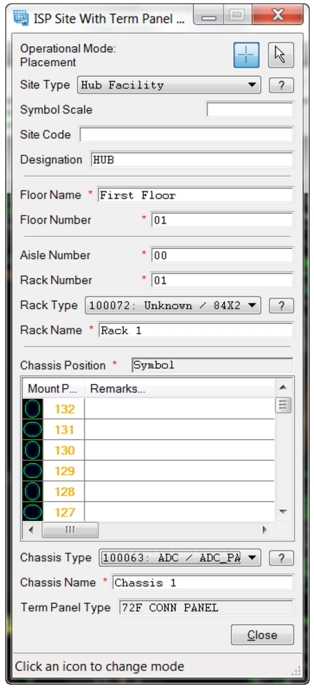
Option 2: Creating an ISP Site with Term Panel



1. Click the Add ISP Site with Term Panel button on the Fiber toolbar.

   This dialog box allows you to create an ISP site with the first floor, the first rack, the first chassis and a term panel included. The chassis must be pre-configured in the dictionary to contain a term panel.
2. Click on the map to place the site.

Notes:

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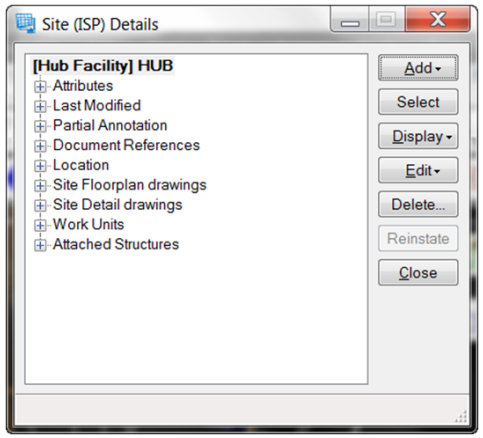
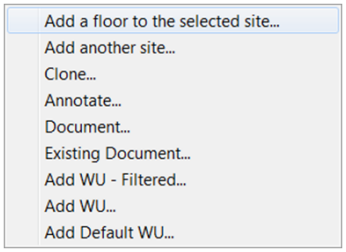
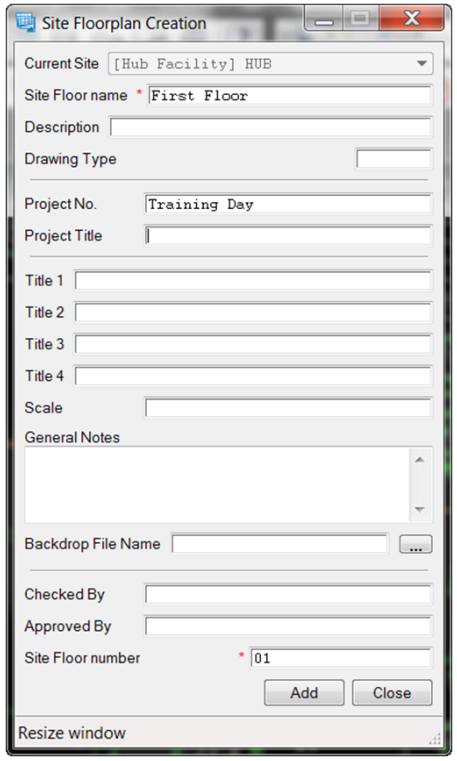
PLACING EQUIPMENT: ADDING A FLOOR TO A SITE

Once a site is created, the floors within the site should be created. Once the site is selected, open the details for the site. spatialNET users will use the Details screen to add all equipment to a site. Click the Add button, and choose Add a floor to the selected site.







Areas of Discussion:

- Attribute Fields
- Background File Name
- Site Floor Number

Notes:

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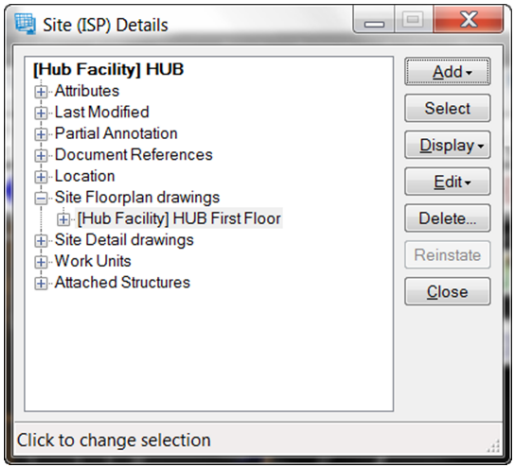
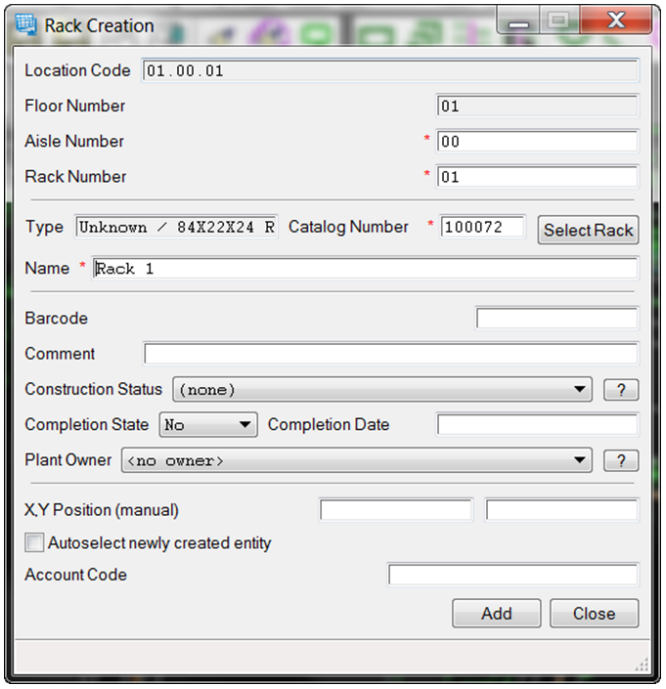
PLACING EQUIPMENT: ADDING A RACK TO A SITE

NOTES

Once the floor has been added to the site, users will need to add a rack to the floor in order to add any other equipment at the site. To place a rack, open the Details of the site. Under the Site Floorplan drawings, select the floor that will contain the racks. Click Add, and select Add a rack to the selected site floor. Once the Rack Creation window is displayed, enter a catalog number for the rack (if known), or use the Select Rack button to choose one from the dictionary. Once added, the rack is immediately visible on the Floorplan View.





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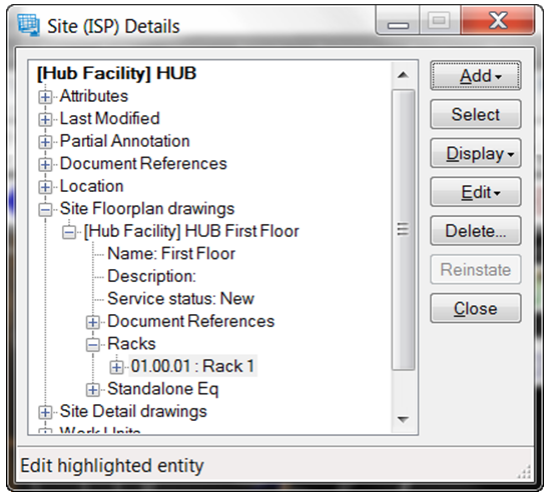
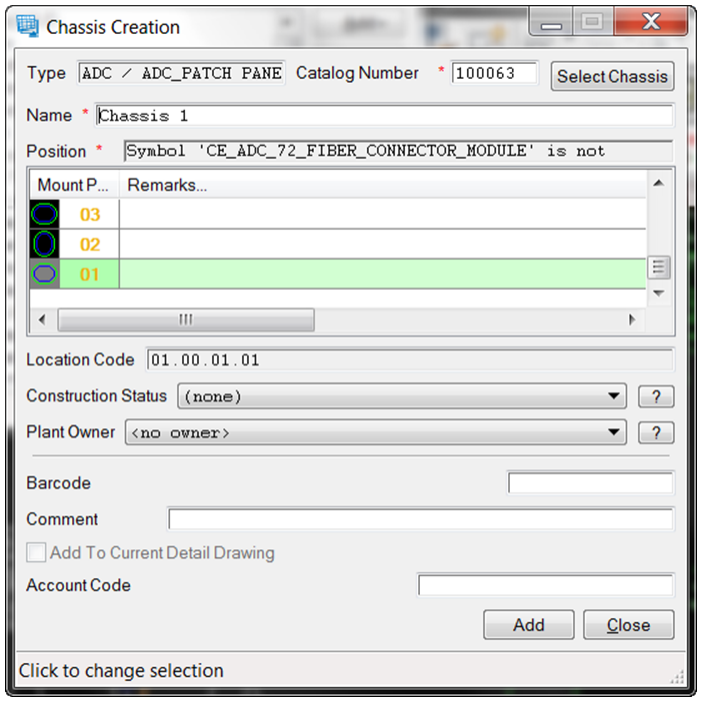
PLACING EQUIPMENT: ADDING A CHASSIS TO A RACK

NOTES

To add a chassis to a rack, open the Details of the site. Under the Site Floorplan drawings, open the floor. Click Add, and then click on Add a chassis to the highlighted rack once the rack is selected. Enter a catalog number for the chassis (if known), or use the Select Chassis button to choose one from the dictionary. Select the mount point that the chassis will sit on just as it is in reality. If adding multiple chassis to the rack, ensure there is enough space in between the chassis on the rack. Once added, the chassis is immediately visible on the Rack Elevation view.





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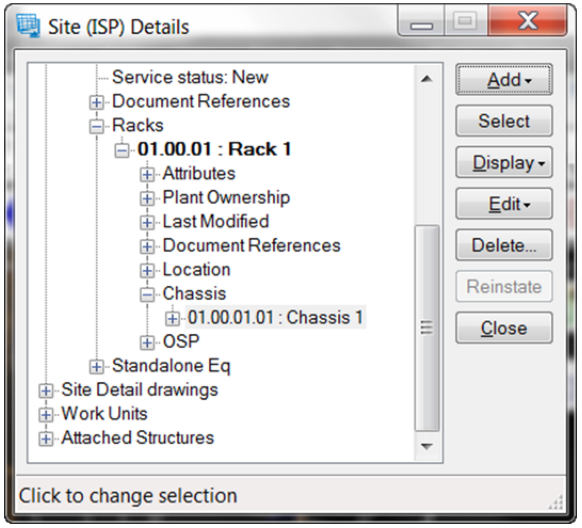
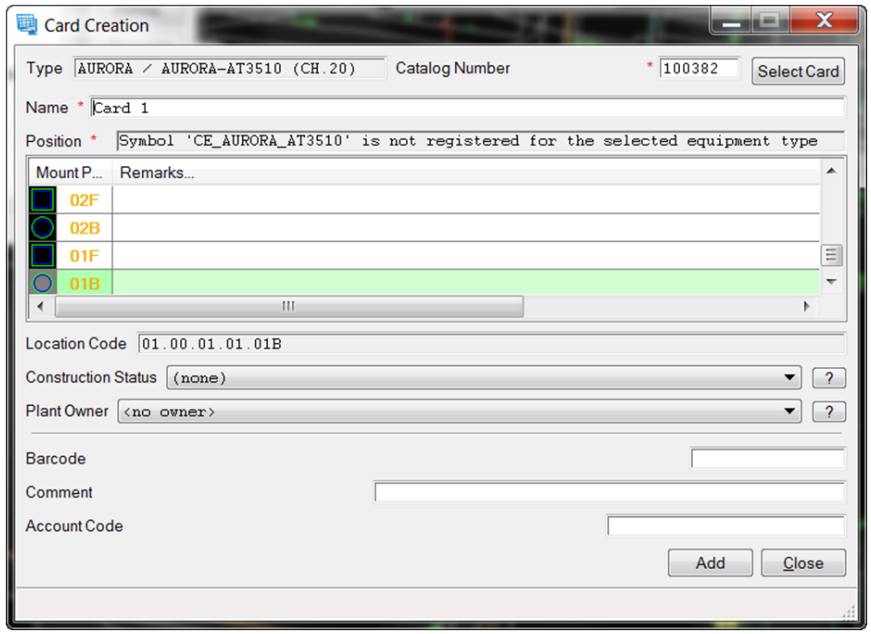
PLACING EQUIPMENT: ADDING A CARD TO A CHASSIS

From the Details of the site, open the floor and the rack then select the chassis that will contain the card under the Site Floorplan drawings. Click Add, and then click Add a card to the highlighted chassis. Enter a catalog number for the card (if known), or use the Select Card button to choose one from the dictionary. Select the mount point that the card will sit on. Once added, the card is immediately visible on the Rack Elevation view.





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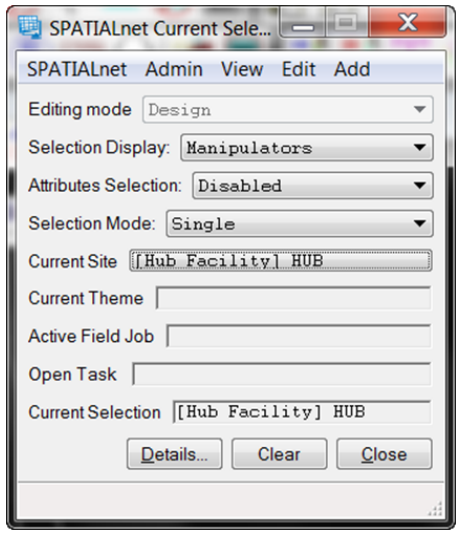
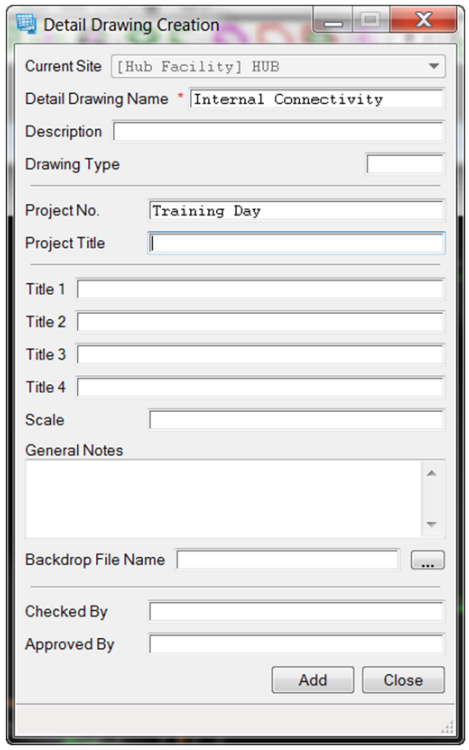
DETAIL DRAWING: CREATING A DETAIL DRAWING

NOTES

Rack Elevation views and Floorplan views are created on-the-fly in spatialNET, while Detail Drawings are persistent objects. This means that the detail view must be created in the database before you can place equipment on it. The site must be set as the Current Site in spatialNET before the Detail Drawing space is created. It is not necessarily sufficient to click on the site to select it.

1. **Click** the **Current Selection Panel** button. 
2. **Click** the button next to Current Site to choose the site from the list of all possible sites.
3. From the ISP menu, **select** the **Detail Drawings**.
4. Update the information for the Detail Drawing attributes.
5. **Create** the **Detail Drawing** by **clicking Add**.





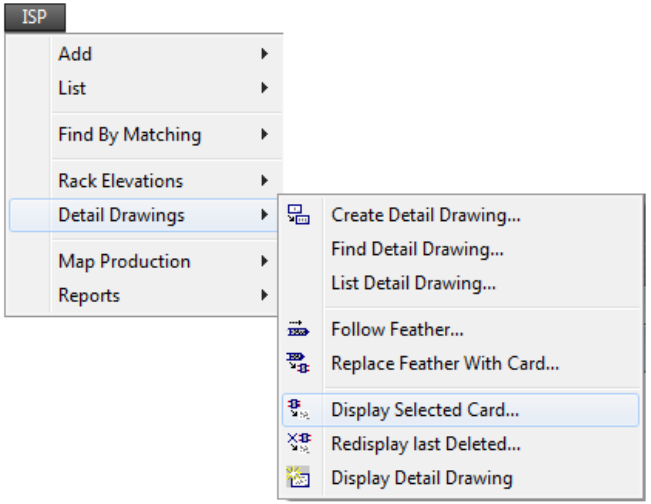
The name for the Detail Drawing is required. Multiple detail drawings can be created for one site and connected using feathers.

Notes:

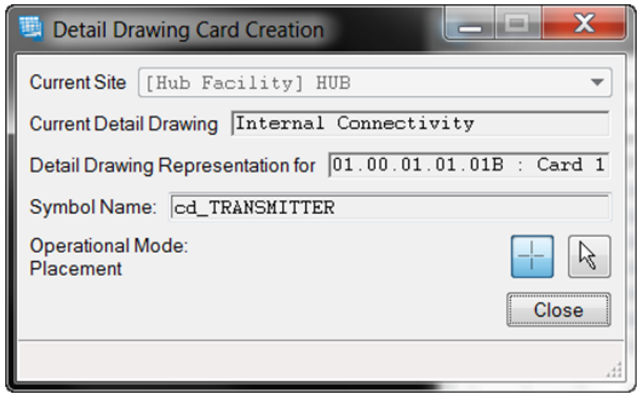
DETAIL DRAWING: DISPLAY AND PLACE EQUIPMENT ON A DETAIL DRAWING

NOTES

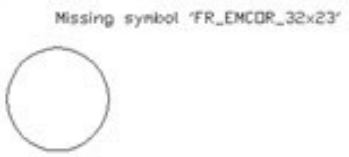
Once the Detail Drawing space has been allocated, equipment must be manually placed on it. spatialNET does not automatically add equipment to the detailed drawing since a specific piece of networking equipment can be displayed on one detail drawing at one time.



1. With the site selected, **click** the **Display Detail Drawing** button.
2. With the blank detail drawing visible, open the details of the site to view the list of equipment the site.
   Note: You can also add equipment by choosing it on the Rack Elevation view. This will require that the two screen be visible side by side.
3. **Select** the **card** or **chassis** (any device with ports) to be displayed. In the ISP menu, choose Detail Drawings and the **Display Selected Card**. The Detail Drawing Card Creation window will appear.



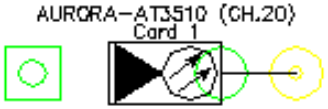
4. Click once in the Detail Drawing to place the card. The symbols will not be displayed correctly if the directories containing the block files are not on AutoCAD's support path. In this case, a missing symbol is displayed.

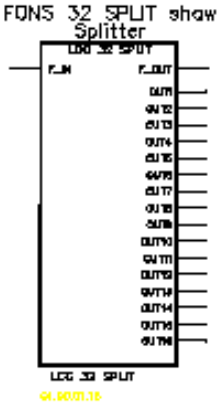


To remedy this problem, ensure that the blklib\elevation and blklib\detail subdirectories of your spatialNET installation are both included in AutoCAD's support file search path.

DETAIL DRAWING: CREATING CONNECTIVITY WITH ISP JUMPER CABLES

Once equipment is visible in a schematic drawing, connecting it is very easy. When you select an object in a schematic view, yellow circles appear at each connectable port. These are “connection manipulators” and are used to form new connections when you drag and drop them from one port to another.





In order to complete the connection, click on the out port. A connection manipulator (shown as a yellow circle) appears at each of the ports.

Click on the connection manipulator and drag it over each piece of equipment. When a connection manipulator senses another piece of equipment nearby, it activates the manipulators on that equipment’s ports.

Areas of Discussion:

- Identifying Ports
- How spatialNET Drafts Jumpers

Notes:

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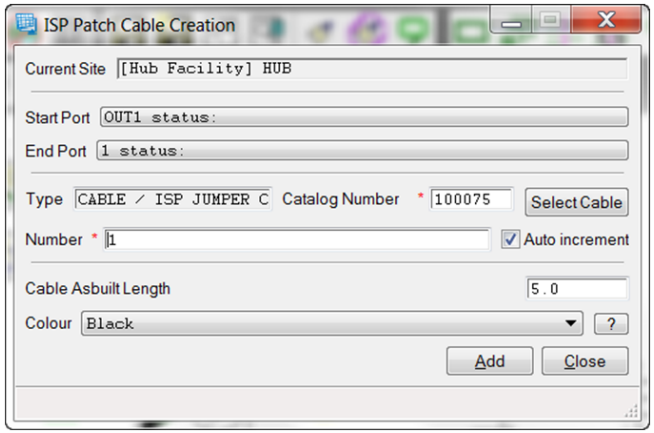
DETAIL DRAWING: CREATING CONNECTIVITY WITH ISP JUMPER CABLES

NOTES

Continue to drag the connection manipulator to an in port on the second device. Drop the manipulator onto this port. The ISP Patch Cable Creation window appears when the connection between the two ports is established. In the ISP Patch Cable Creation window, spatialNET users will need to populate the attributes of the jumper cable that is connecting the two ports.



To draft the cable, enter a catalog number for a cable or choose one from the dictionary using the Select Cable button. Each cable also requires a number or name.

CAD scrape may be used in schematic drawings to add miscellaneous annotation, mark-up, and other information that needs to be displayed to other spatialNET users.

Areas of Discussion:

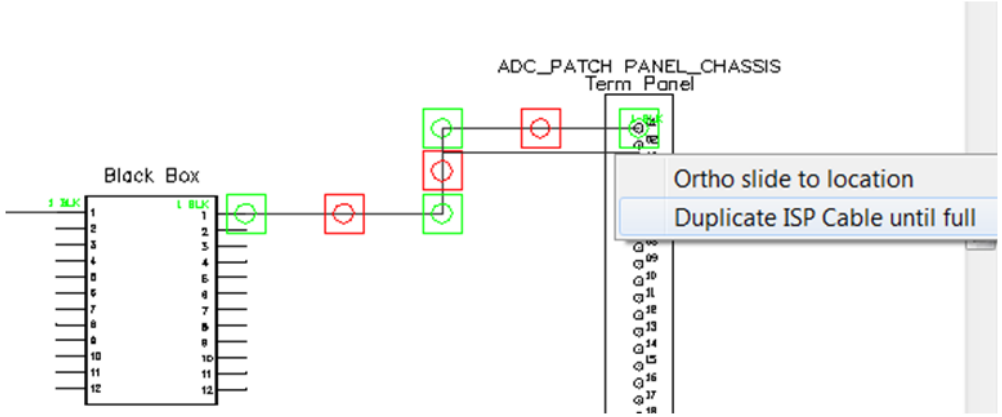
- Cable As built Length
- Color

Notes:

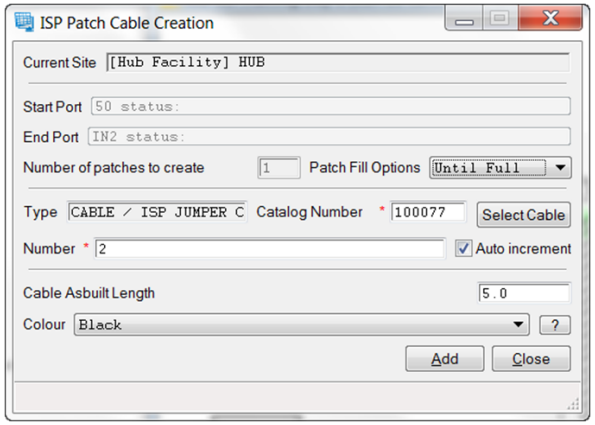
DETAIL DRAWING: DUPLICATING JUMPER CABLES

NOTES

Some equipment will have a large number of ports. Drawing each cable individually can be tedious, so spatialNET has added a feature to duplicate ISP jumper cables. Draft the first jumper cable as usual.



Once the jumper cable has been drafted, click on the jumper cable to select it. Pick up the red grip closest to the end of the cable, and drag it over to the next port down on the destination piece of equipment. Click on the next port on the piece of equipment and a menu will appear. Choose Duplicate ISP Cable until Full.



There are three patch fill options:

- Until Full: Until all ports on the originating piece of equipment are used.
- Custom Number: Enter a value in the Number of Patch to Create field.
- Tube of 12: A tube of fibers.

NOTE: The number of the cable will auto-increment, but be sure to enter 01 as the starting number to go above 9.

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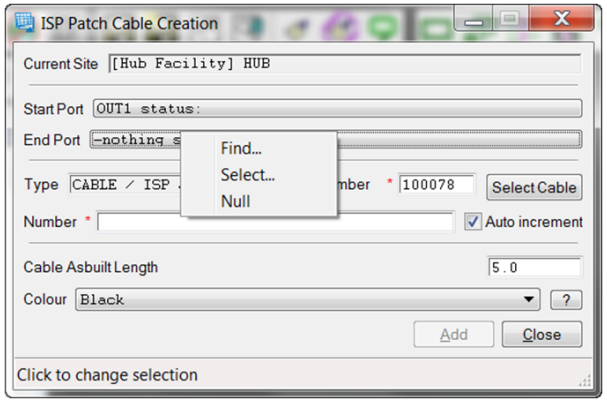
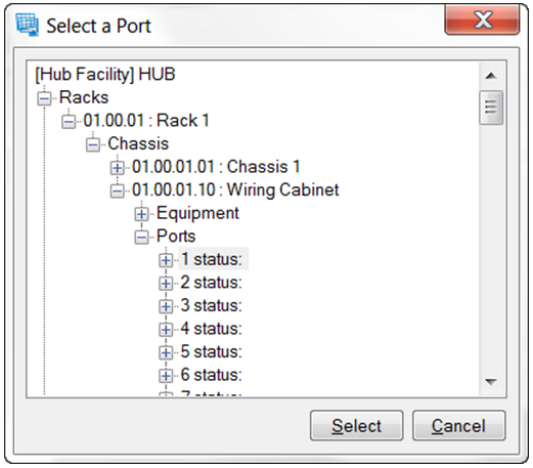
DETAIL DRAWING: FEATHERS

NOTES

Since the same network device cannot be on two detailed drawings at the same time, feathers are used to show connectivity between different devices that would otherwise be on the same detailed drawing. To add a feather, place two cards or chassis in separate detail drawings that you wish to connect. Display both detailed drawings at the same time using the tile windows options in AutoCAD. Click on the out port of the device in the first drawing and drop the port anywhere in the drawing. The ISP Patch Cable Creation window prompts spatialNET to create a new connection between ports. With the starting point already set based on the selected entity, the End Port field will display no endpoint.





Click Nothing Selected to define the end point. The port of the other entity needs to be selected.

Expand each section until you locate the port list on the card or chassis to connect to. Once located, select the entity's port location.

Choose a cable type from the catalog and enter a number for the cable. Click Add. Each drawing will now have a feather to show the attachment to the next piece of equipment.

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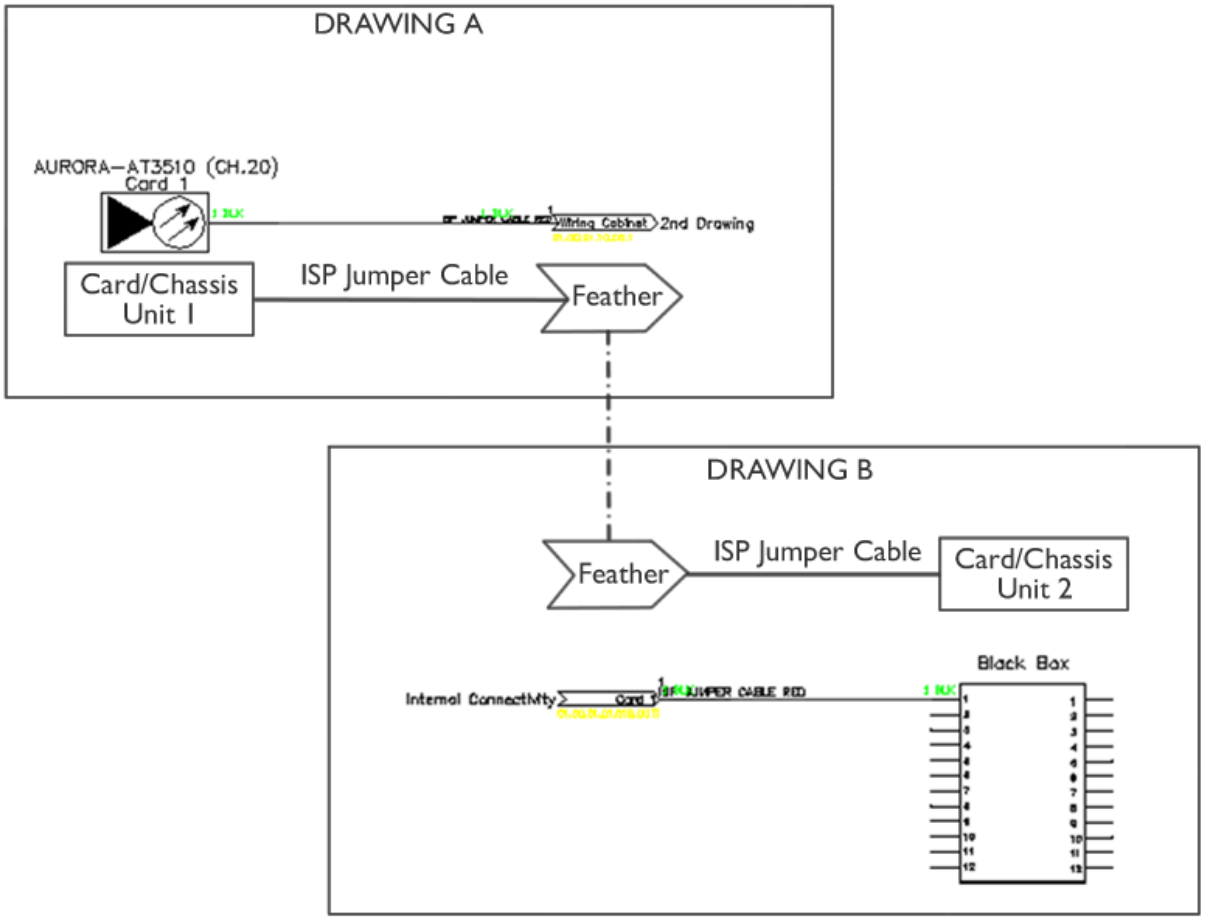
DETAIL DRAWING: FEATHERS



Each drawing will now have a feather to show the attachment to the next piece of equipment. This provides logical connection between the two entities. spatialNET users will be able to conduct traces over this connection.

Once the feather displays, select the feather.

Use the Follow Feather button to switch to the connected piece of equipment in the next drawing.

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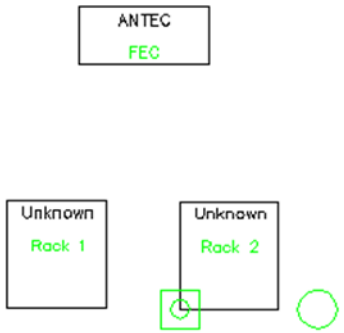
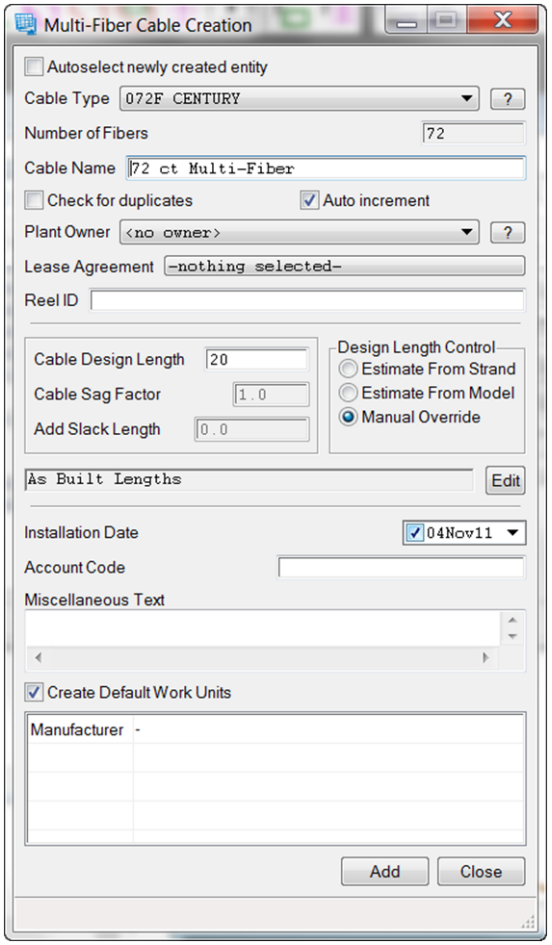
PIGTAIL/MULTI-FIBER CABLES: MULTI-FIBER CABLES

The ISP cables defined in the ISP dictionary are all single count jumper cables. Multi-fiber cables are used to connect equipment racks using fiber sheaths rather than individual jumpers. This is commonly seen from a FEC (OCEF where an OSP cable enters the building) and connects to a termination or patch panel rack further in the equipment.



Multi-fiber cables come from the OSP Fiber Cable dictionary and can only be placed on a Floorplan view. Once the starting rack is selected, open the ISP menu, and choose Add, Multi-Fiber cable. Choose a cable and name it. Click Add to begin drafting.



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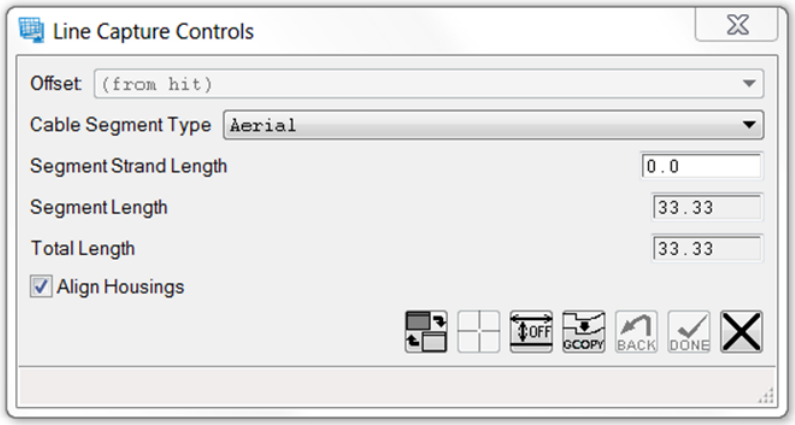
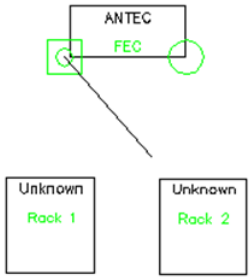
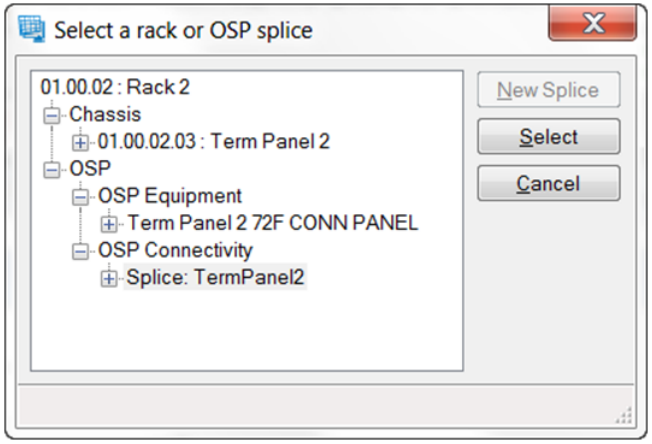
Draft the cable from the starting rack. When drafting, the standard spatialNET line capture controls will display.





Right-click on the destination rack to connect to it. When it is associated correctly, the line will snap to the attach-ment point for the rack. This is typically at one of the lower corners of the selected rack.

A dialog box will open to prompt you to choose the splice to connect to. Drill down to OSP Connectivity and choose a splice. To splice this cable to the term panel, select the rack and use the Physical Splice Panel button.



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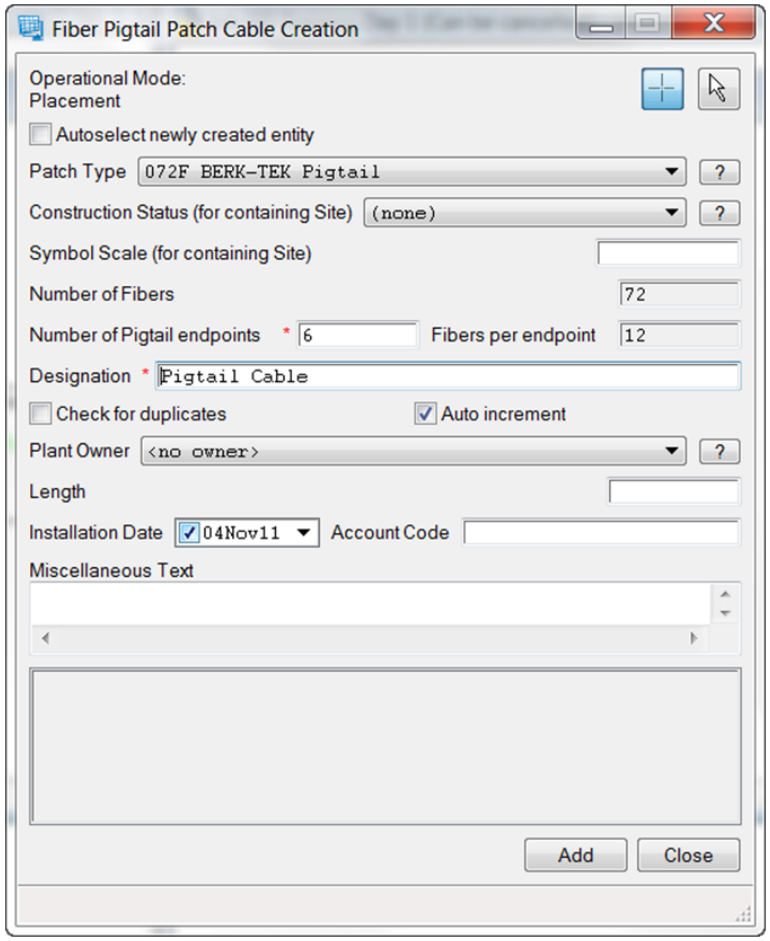
PIGTAIL/MULTI-FIBER CABLES: PIGTAIL CABLES

Pigtail cables are multi-fiber cables that can terminate at multiple slice locations in a building. For instance, a 72 count pigtail cable will have one start, and six ends that can all connect to different racks. Pigtail cables are built in the OSP Fiber Shunt Cable Dictionary and can only be drafted on a Floorplan view.

The cable will first be added to the Details of the site, and the geometry of the cable will be drafted in a separate step.

Select the starting rack in the Details window or on the Floorplan view. Open the ISP menu, choose Add, Pigtail Cable. The Fiber Pigtail Patch Cable Creation window will display. Select the appropriate cable listed on the Patch Type pull-down menu.

In the Number of Pigtail Endpoints field, enter how many end connections should be created for this cable. Once all of the attributes are updated that are required, click Add.



Notes:

NOTES

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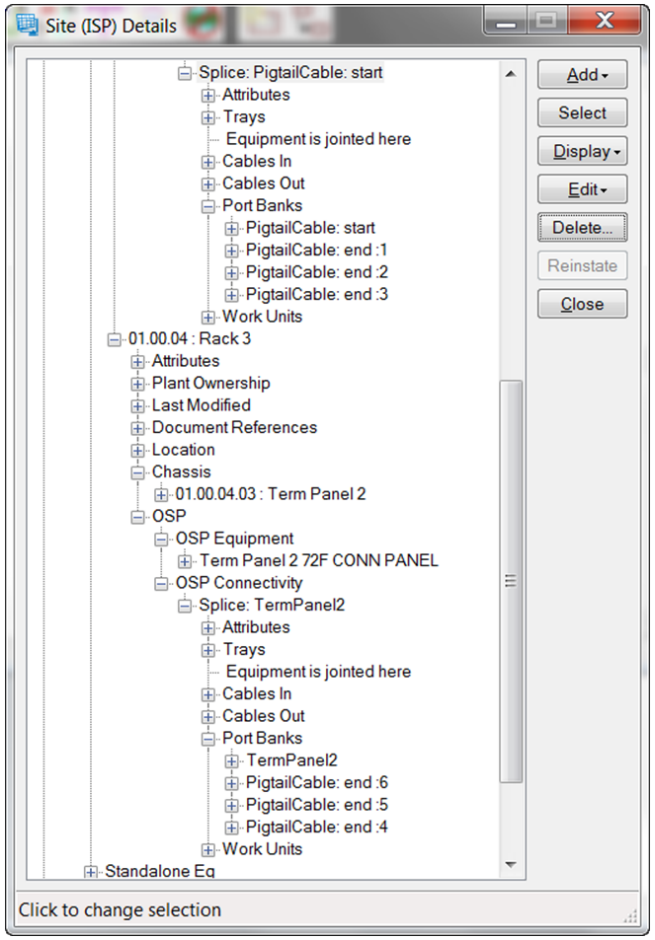
Open the Details for the rack with the pigtail cable. spatialNET users will see the start and end connections listed under OSP heading. Expand out the splice location for the OSP connectivity location. Once the splice is expanded out, also expand out the Port Banks. The next step will be to drag the ends of the cable to the splices on the other racks. Expand the details window so you can see both the rack with the pigtail cable and the second rack with a term panel.

Drag the ends of the cable one by one down to the new rack. This will be listed under the OSP, OSP Connectivity and to the specific splice location. Drop the cable on the new splice and select Reconnect to Joint Splice. For the other connection points, repeat this process for each cable end. Leave the start of the cable on the original rack.



Areas of Discussion:

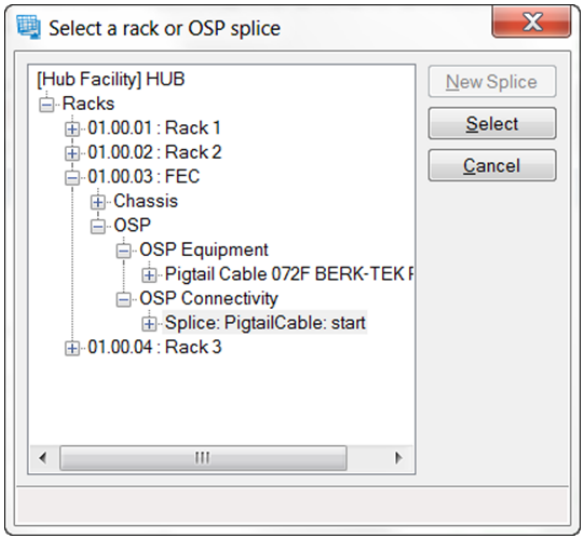
- Select Functionality
- Multiple termination locations

Notes:

PIGTAIL/MULTI-FIBER CABLES: CONNECTING TO OUTSIDE PLANT

NOTES

One of the most powerful features of spatialNET is the ability to integrate both inside and outside plant networks in one seamless environment. To do this, OSP fiber cables must be drafted in or out of the ISP sites and spliced together. OSP Fiber Cables can be spliced to term panels, multi-fiber cables and pigtail cables. Be careful when drafting the OSP fiber cables, spatialNET will determine the direction of the fiber based on whether it was drafted to or from the site. The following dialog box will appear either when you start drafting the fiber cable or when you terminate the cable at a site, depending on whether the cable starts or ends at a site.



A splice must be chosen to connect to. Expand out the connection locations into the rack until you find OSP heading. Under the OSP connectivity locating, find the splicing location. Use the Physical Splice Panel button to connect the cables.

Areas of Discussion:

- Multiple Splicing Locations
- A to Z Directionality
- Multiple Cable Splicing

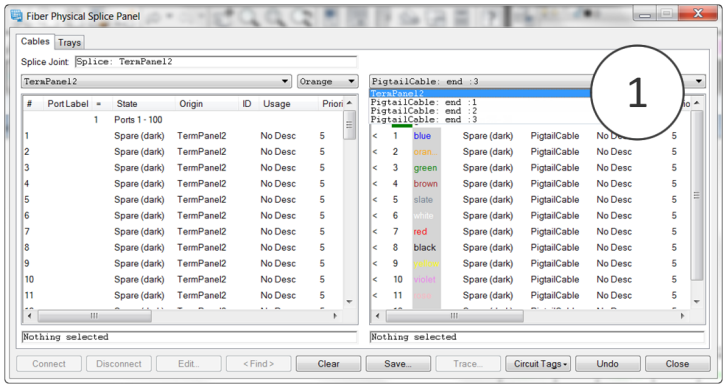
Notes:

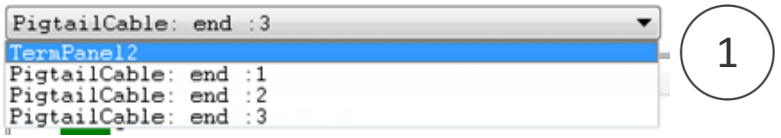
PIGTAIL/MULTI-FIBER CABLES: SPLICING PIGTAIL AND MULTI-FIBER CABLES

NOTES

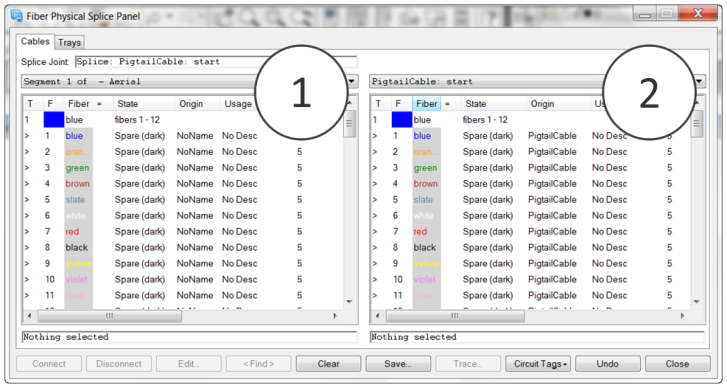
Multi-fiber and pigtail cables are considered OSP entities in spatialNET, even though they are modeled in ISP sites. To connect these cables you will need to use the Physical Splice Panel just as you would in OSP. The first step will be to select the rack that has a connection with a multi-fiber or pigtail cables. You can use either the floorplan view or the Details window for the site. Once the rack is selected, open the Physical Splice Panel.

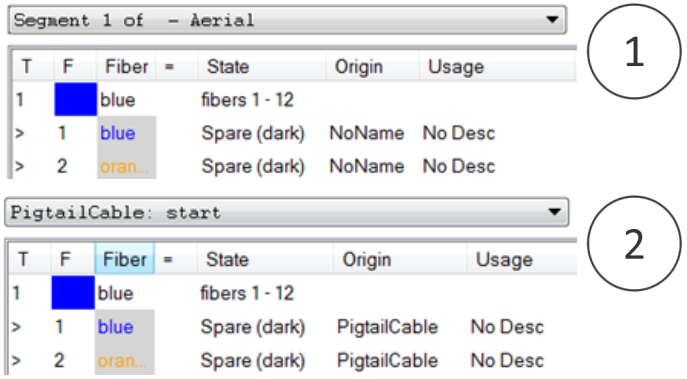
In this example, the rack contains a term panel and 3 ends of pigtail cable that can be spliced together. Change the splice joints until the correct entities display.





In this example, a FEC was selected. The OSP 72 count fiber cable appears on the left and the start of the pigtail cable appears on the right.

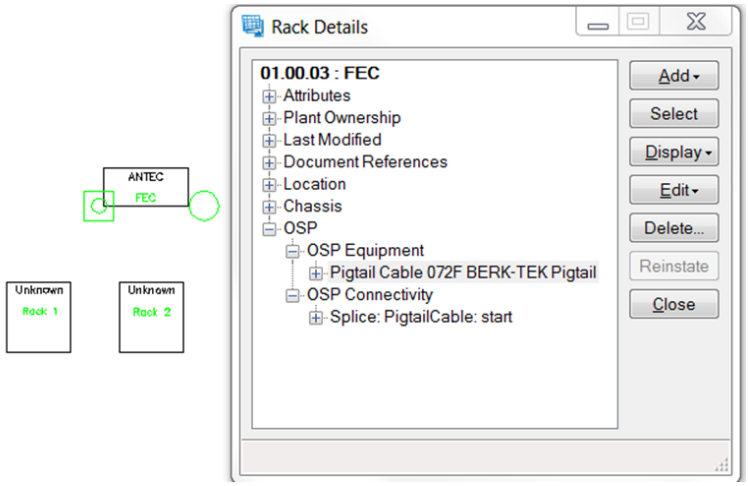


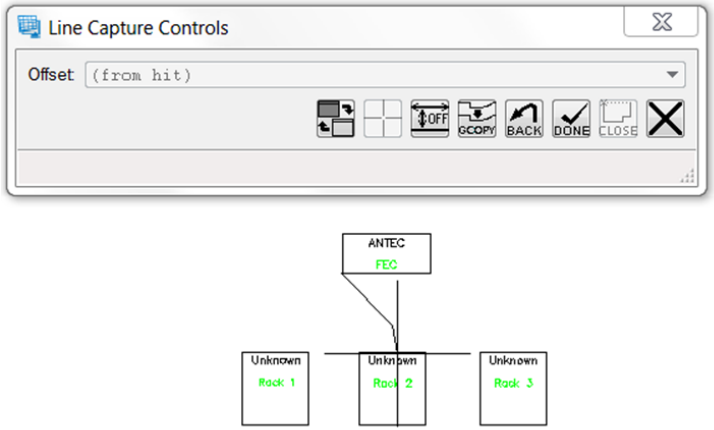


PIGTAIL/MULTI-FIBER CABLES: ADD GEOMETRY TO A PIGTAIL CABLE

NOTES

A pigtail cable is created in the details of a site, but it may also be helpful to have a visual representation of the cable as well. Pigtail cables can only be drafted on a Floorplan view, much like multi-fiber cables. This is drafted in the floorplan view. Access the floorplan view. When the floorplan view is displayed, select the rack where the pigtails cable starts and open the details of the rack. Expand the rack details until the OSP Equipment is listed. Select the pigtail cable.





Click Add, and choose Add Geometry to Pigtail Cable. Draft the cable between the racks as usual using the line capture controls. Repeat the process to show the different rack connections. Pigtail cables will not highlight as part of a trace.

Notes:

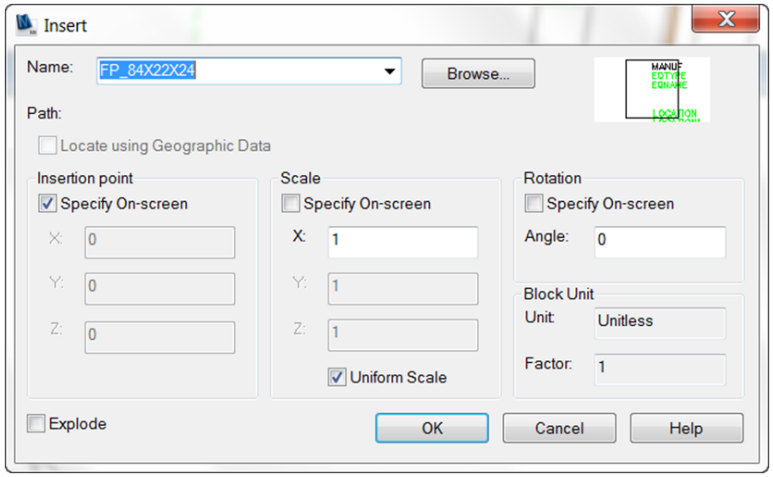
FLOORPLANS: IMPORTING A FLOOR PLAN DRAWING

NOTES

Since floorplan drawings are used to show the structural details of a building and placement of the racks, this is a natural view to display architectural drawings of a building. There are two easy methods to add a dwg to a floorplan drawing.

1. Open a dwg file that contains the architectural drawing of the building. Copy all graphics necessary and paste them into the floorplan view.

2. With the floorplan drawing displayed, open the Insert menu and select Block. Locate the file you wish to import and make sure the Insertion Point is set to Specify On-screen. Click OK. With the insertion ready, click inside the floorplan view where you wish to place the drawing.



Notes:

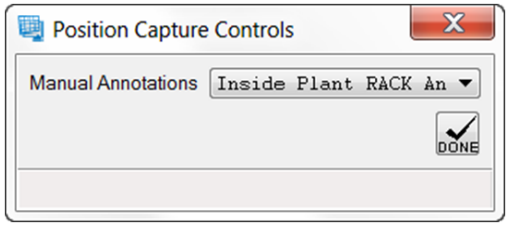
FLOORPLANS: CONNECTING FLOORPLAN DRAWINGS

NOTES

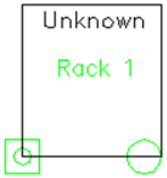
If a building contains multiple floors, there will be multiple floorplan drawings for the site (e.g., one for each floor of the building.) Unfortunately, this means there is no quick way to represent multi-fiber cables that run from floor to floor. To show the cables that connect from floor to floor, you must create a third floor called "Riser" that will be used to represent the cables. Once this floorplan is created, an annotation for each rack will be created in the Riser drawing to create a physical representation.

1. Select the rack from the details of the site. With the rack selected, press the Annotate button on the General toolbar.

2. Click in the riser floorplan drawing where you wish to place the rack symbol.

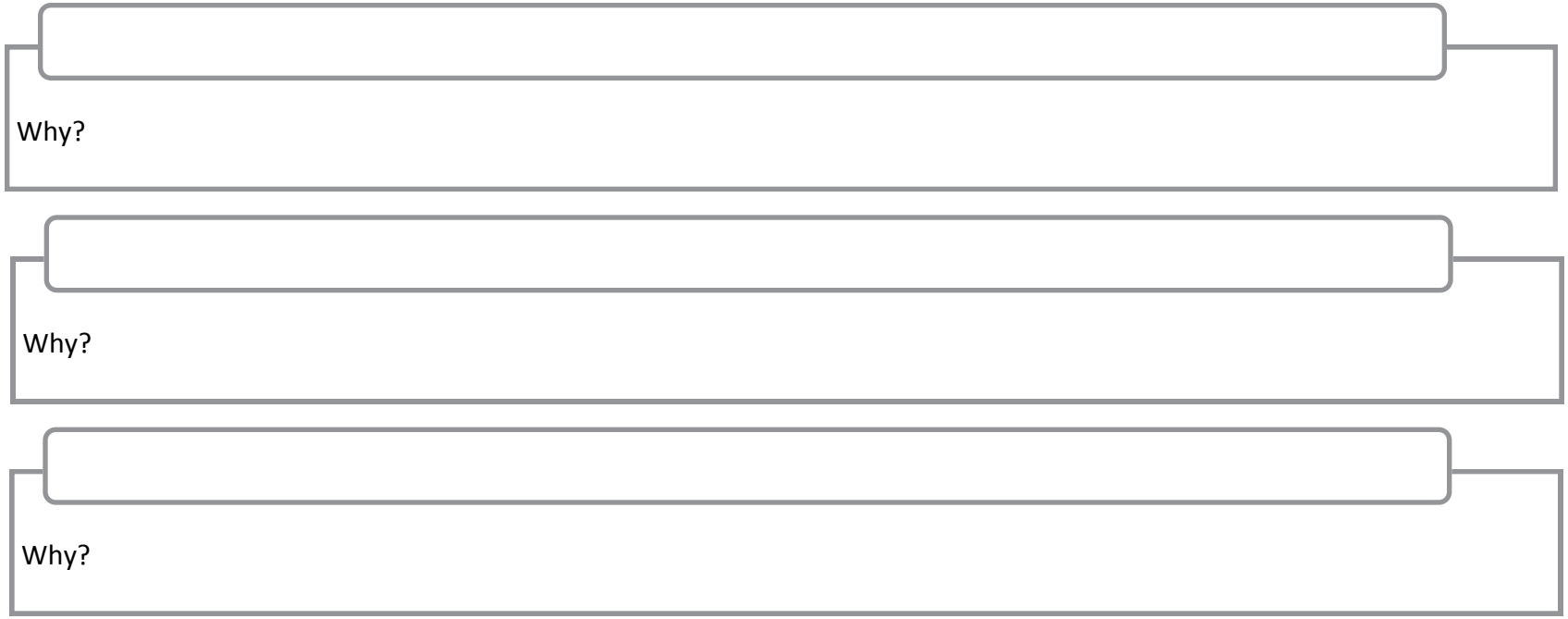


3. In the Riser drawing, select the first floor rack. Open the ISP menu, and choose Add…Multi-Fiber cable.



LEARNING MOMENTS

What are your top three learning moments from this discussion? Why?



Which topics in this training do you think will be the most challenging to apply?

_____

_____

What will you do differently as a result of this training?

_____

_____