



## Visualizing a WAE Network

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WAE Design creates a simple default layout for newly discovered networks using one site per node, and each site name is based on the node name. Once the plan is opened in the WAE Design GUI, you typically rename and re-arrange objects in the newly discovered network using a sequence of steps outlined in the following sections.

- [Remove Suffixes from Node Names](#)—Remove suffixes from node names to ease readability of them in the plot and tables.
- [Assign Sites to Nodes](#)—Automatically places nodes into appropriate sites using simple rules or using a mapping table kept in the plan file.
- [Arrange Sites and Nodes](#)—Arrange sites and nodes using tools that offer a variety of alignment and display options.
- [Circuits and Interfaces](#)—Change the manner in which circuits and interfaces are displayed.
- [Set Plot Backgrounds](#)—Set the background for the network plot, including schematic view, geographic outline background, and detailed geographic map views.
- [Traffic Utilization Colors](#)—Change the traffic utilization colors saved with the plan and its multiple layouts, and create a customized user default color scheme.
- [Set Plot Option Defaults](#)—Set and use both user defaults and system defaults.

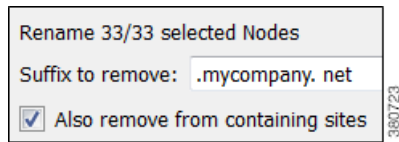
### Helpful Tips

- If you are using multiple layouts, arranging sites and nodes maintains the position of these sites in all layouts within the plan file. However, all changes made using the Plot Options dialog box are set on a per-layout basis so before making such changes, ensure you are in the proper layout.
- Topology changes, such as adding, duplicating, and deleting objects, affect simulation results. It is recommended that after making these types of changes that you rerun the initializers and optimization tools if you have been using them. For example, you might want to rerun Metric Optimization to optimize the undifferentiated traffic, or if modeling an MPLS network, you might want to rerun the FRR LSP initializer.

## Remove Suffixes from Node Names

Node names collected from the network often have long suffixes that are the same for all nodes. This tool simplifies the process of removing these unwanted suffixes and acts on all nodes in the network regardless of whether they are selected.

**Example:** If all nodes in the network had a .mycompany.net suffix, you could remove this suffix by entering .mycompany.net in the Suffix to Remove field.



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- Step 1** Select the Initializers->Rename Nodes menu.
- Step 2** Enter the suffix that you want to remove from the node names.
- Step 3** To remove this suffix from sites as well, select the “Also remove from containing sites” option. Then click OK.
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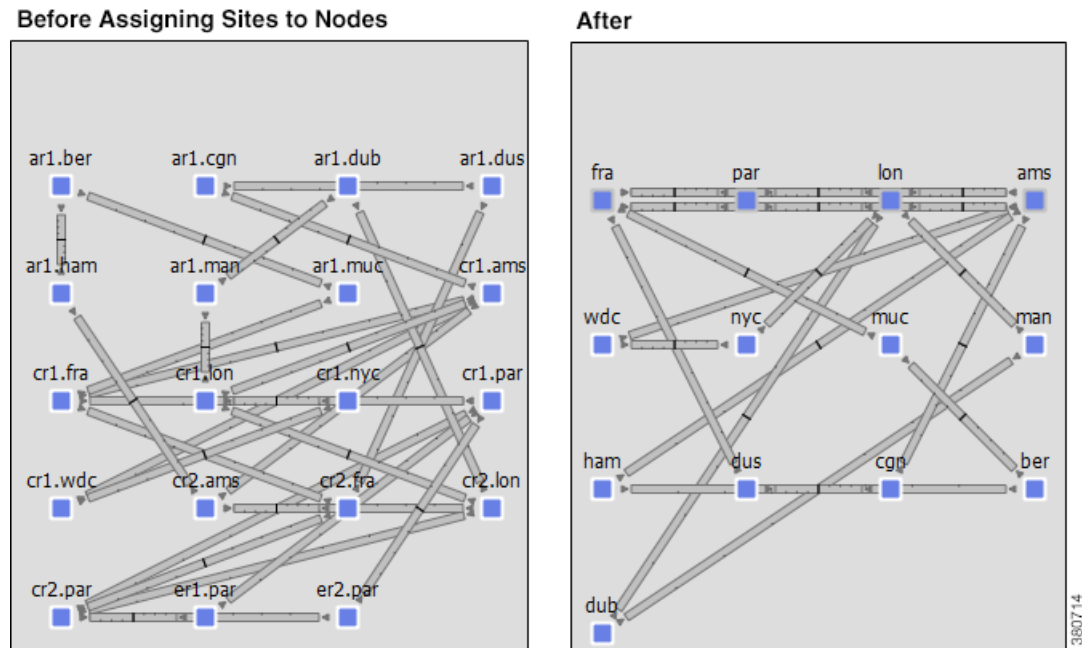
## Assign Sites to Nodes

Although nodes do not have to be contained in sites, adding them to sites can simplify and improve the visualization of the network. The Assign Sites to Nodes tool enables you to re-organize your network by changing the node-to-site mappings. For instance, you would typically place all nodes in the same geographic location or point-of-presence (PoP) into a single site. There are two options.

- One approach enables you to create a node-to-site association based on a simple mapping rule that applies to all nodes. This creates a temporary mapping that is not stored in the plan file.
- Another approach enables you to create or further customize a Node-to-Site Mapping table. This table uses more powerful rules to map nodes to sites based on regular expression substitutions. Because the table is stored in the plan file (as a <NodeSiteMappingRules> table), you can maintain and re-use it. In particular, when a collected plan is provided with a visual layout by a template plan for insertion into the WAE Design Archive, this table in the template is applied to assign sites to nodes in the collected plan file.

Figure 2-1 shows an example of network plot before and after assigning sites to nodes. Beforehand, there were 19 sites and after there were 13. Notice the new site names that were generated.

For a description of how WAE Design makes node-to-site assignments when nodes are discovered, see the [Plan Files and Templates](#) chapter.

**Figure 2-1** Example Before and After Assigning Sites to Nodes

## Site Assignment Rules

The Assign Sites to Nodes tool assigns sites as follows.

If a node is not in an external AS and is not a PSN, then WAE Design assigns nodes to sites based on the [Simple Mapping Rules](#) or on the [Node-to-Site Mapping Rules](#), depending on which is selected in the Assign Sites to Nodes dialog box.

If the node is in an external AS, WAE Design assigns it to a site named after the AS name. If the AS name does not exist, WAE Design assigns the node to a site named after its ASN.

If the node is not in an external AS and it is a pseudo-node (PSN), then WAE Design assigns it to the site that contains the most nodes connected to the PSN. In case of a tie, WAE Design assigns the node to the site with the lowest lexicographic name.

## Simple Mapping Rules

To create temporary node-to-site mappings that are not stored in the plan file, use the “Simple Mapping Rules” option in the Assign Sites to Nodes dialog box. The mapping is created using two fields: Node Name Delimiter and Site Name.

- Node Name Delimiter**—WAE Design uses this field to identify which sections of the node names are to be used in the assignments. By default, these are a period, a dash, and a colon (.-:). This means that new site names are based on the sections between these characters. For example, by default WAE Design parses the node name of acme.router into two sections: acme and router.

Node name delimiter(s):	.-:
Site name:	\$2

- **Site Name**—WAE Design uses this field to determine how to create the site names based on the node names. In the following list, # equals any integer.
- **\$#** — Specifies the section reading left to right. For example, \$1 matches **chicago** in **chicago.isp**. Note that \$0 specifies the entire node name. In [Figure 2-1](#), the new site names were created using \$2.
- **[#:#]** — Specifies the character range reading left to right. For example, \$1[1:3] matches **chi** in **chicago.isp**.
- **\$-#** — Specifies the section name reading right to left. For example, \$-1 matches **jose** in **san.jose**.
- **[-#:-#]** — Specifies the character range reading right to left. For example, both \$2[-4:-1] and \$-2[-4,-1] match **jose** in **san.jose.cr1**.

## Node-to-Site Mapping Rules

To create a Node-to-Site Mapping <NodeSiteMappingRules> table in the plan file, particularly for use by the template, use the “Use rules in Node-to-Site Mapping Table” option in the Assign Sites to Nodes dialog box. An attempt is made to match the node name to expressions in the Node Matches column. If a match is found, then the node is assigned to the site as defined by the corresponding Site Expression. This graphical example matches cr1.lax into lax-core and er1.lax into lax-edge.

Order	Node Matches	Site Expression
1	cr\.(*)..*	\$1-core
2	er\.(*)..*	\$1-edge

The order in which these matches are attempted is defined by the Order column.

Column	Description
Order	Identifies the order in which rules are applied
Node Matches	Regular expression matching the node names
Site Expression	Site name expression, which can use references in the Node Matches rule

## Examples

Node Matches	Site Expression	Result
cr1.chi.isp.net	chi	Map node cr1.chi.isp.net to site chi
.*\.(*)\..*	\$1	Map node cr1.chi.isp.net to site chi as above, but also maps node cr1.okc.isp.net to site okc

Node Matches	Site Expression	Result
..(.)\.(.*)..*	\$2-\$1	Map node cr1.par.isp.net to site par-1

## Assign Sites to Nodes Dialog Box

- Step 1** Select one or more nodes if you want to assign sites to specific nodes. If you do not select nodes, WAE Design assigns sites for all nodes in the plan file for that view.
- Step 2** Access the Assign Sites to Nodes initializer using one of these methods.
- Right-click on one of the selected nodes, and select Assign Sites to Nodes from the context menu.
  - Select the Initializers->Assign Sites to Nodes menu.
- Step 3** Select which method of node-to-site mappings you want to use.
- To use a temporary node-to-site mapping that is not stored in the plan file, select the “Simple Mapping Rules” option. See the [Simple Mapping Rules](#) section.
  - To use a Node-to-Site Mapping table that is saved with in the file, select the “Use # rules in Node-to-Site Mapping Table” option.
  - To edit those rules, click the Edit Table button. See the [Node-to-Site Mapping Rules](#) section.
    - To add a new rule, select an existing rule (if applicable) from the list, and then click on either the Insert Before or Insert After button to determine where the new rule goes sequentially. This opens a dialog box for adding a new rule.

- To edit an existing rule, select it from the list and then select the Edit button.
  - To delete an existing rule, select it from the list, select the Delete button.
- Step 4** For those nodes that the node-to-site definition does not find or cannot create a matching site, you have the option to keep the nodes in their current sites (if applicable) or to remove them from sites. To keep them in their current sites, select the “Keep unmatched nodes in current sites” option.
- Step 5** Select options based on whether you are in the Layer 3 or Layer 1 view, as follows.

Layer	Description
Layer 3	<div><ul style="list-style-type: none"><li>For nodes that are in external AS's, assign them to sites according to one of the following options.<ul style="list-style-type: none"><li>AS name, then ASN if the name is empty</li><li>ASN</li><li>Using the same rules as other sites</li></ul></li><li>Select whether to assign PSN nodes and all remaining nodes to sites with most connections</li></ul></div> <div><div>Assign nodes in external AS's to sites with name equal to<ul style="list-style-type: none"><li><input checked="" type="radio"/> AS Name, then ASN if Name is empty</li><li><input type="radio"/> ASN</li><li><input type="radio"/> Same rule as other Sites</li></ul></div><div><input checked="" type="checkbox"/> Assign PSN nodes to sites with most connections <input type="checkbox"/> Assign all remaining nodes to sites with most connections</div></div>
Layer 1	<div><ul style="list-style-type: none"><li>Select whether to assign remaining nodes to sites with most connections</li></ul></div> <div><input type="checkbox"/> Assign all remaining nodes to sites with most connections</div>

**Step 6** To verify assignments, click the Update Preview button. Once satisfied with the mappings, click OK.

# Arrange Sites and Nodes

You can arrange sites and nodes using the following methods.



**Note**

All schematic (X and Y) properties are relevant to the network plot, not to a parent site.

- Schematically
  - Align sites and nodes automatically through using the Arrange palette. See the [Align Sites and Nodes Schematically](#) section.
  - Click and drag them to the desired location.
  - Sites: Enter values in the Screen X and Screen Y fields of a site Properties dialog box.
  - Nodes: Enter values in the X and Y fields of a node Properties dialog box.
- Geographically—Note that WAE Design uses geographic longitude and latitude for calculating distances and latencies between nodes that are used in various analyses.
  - Automatically assign sites to locations using the Initializers->Assign Locations to Sites tool. See the [Assign Geographic Locations to Sites](#) section.
  - Click and drag them to the desired location.
  - Enter values in the Longitude and Latitude fields of a site or nodes Properties dialog box.

### Helpful Tips

- Moving nodes and sites can often change the visibility of objects in within a site plot. Use the Fit-to-Plot (four arrows) icon in the site plot to bring all objects into view.
- Ensure you are in the proper plot background (Schematic or Geographic) for making the type of change you want to make. If you are using a geographic background and you move an object, this changes the geographic coordinates, but not the schematic ones. Conversely, if you are using a schematic background and you move an object, this changes the schematic coordinates, but not the geographic ones. To change the schematic or geographic background, use the Plot Options icon on the Visualization toolbar. For more information, see the [Set Plot Backgrounds](#) section.

## Assign Geographic Locations to Sites

WAE Design includes a database of worldwide city names and airport codes that identify the longitude and latitude of major cities. Using the Locations tool that accesses this database enables you to quickly lay out sites within a network with geographic precision.

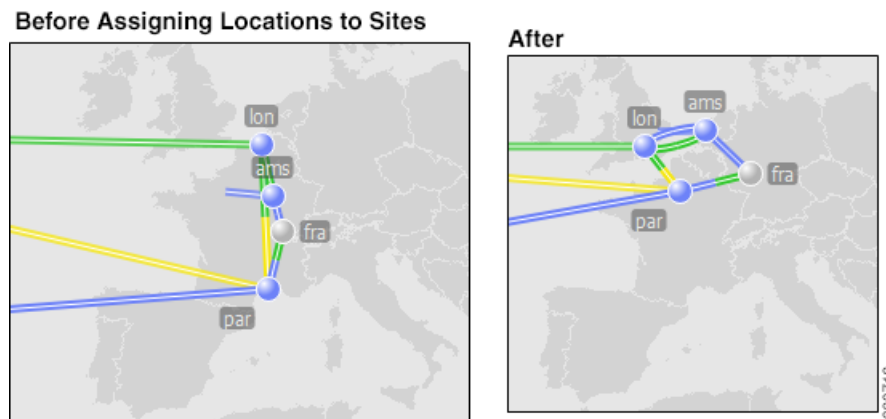
You can quickly assign multiple sites to these locations following these steps. Note that changing the geographic location of a site does not change the location of its children sites.



#### Note

To see the effects of geographic moves, you must be using a geographic background. To enable a geographic background, use the Plot Options icon on the Visualization toolbar. For more information, see the [Set Plot Backgrounds](#) section.

**Figure 2-2** Example Before and After Assigning Locations to Sites

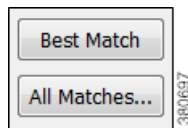


- Step 1** Optional: Select one or more sites. If you do not make a selection, a table containing airport codes for all sites is populated.
- Step 2** Open the tool in one of these ways.
  - Right-click on a selected site, and select Assign Locations to Sites from the context menu.
  - Select the Initializers->Assign Locations to Sites menu.
- Step 3** Set the longitude and latitude values using one of the following methods.
  - Enter longitude and latitude values directly into the table cells.

- In each of these two methods, WAE Design fills in the fields with the most closely associated airport or city code in its database, thereby assigning longitude and latitude.

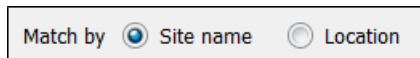
If desired, select one or more rows from the table. If you do not select rows, WAE Design fills in the longitude and latitude values for all sites.

- Click the Best Match button.
- Press **Enter**. (Do not press OK.)



- Select a cell in the table, and click the All Matches button. WAE Design finds all airport or city codes that might be applicable to that site or location. Select the one you want, and press OK.

**Step 4** If using an automated way of assigning locations, select whether to match the longitude and latitude values based on the sites or on the locations.



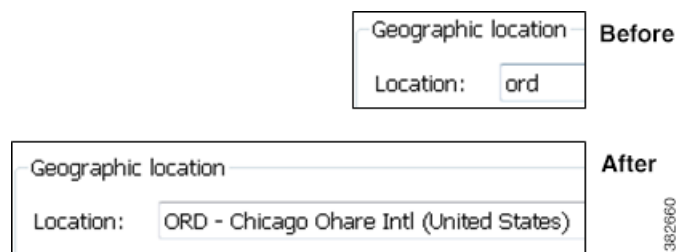
#### Note

You can directly enter location information in the Location column. If you then match by site, locations might change based on the match. If you match by location, the site names do not change.

**Step 5** Click OK to accept the newly assigned locations.

## Initialize Site Location

As an alternative to using the Assign Locations to Sites initializer, you can set a location from the Properties dialog box.



**Helpful Tip:** Use airport codes for best results.

**Step 1** Right-click on a site, and select Properties.

**Step 2** In the Location field, enter a geographic name, such as a city, or enter an airport code.

- To replace the location with the best match in the WAE Design database, press Enter.
- To look up the best location, press Alt-Enter. (On a Mac, press Option-Return.) A Lookup Location dialog box appears.

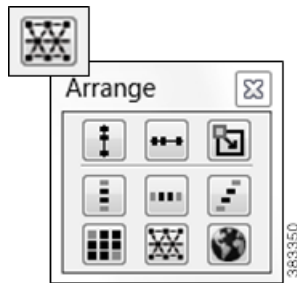


WAE Design fills in the Location fields with the most closely associated airport or city code in its database. Select a location, and click OK.

**Step 3** Click OK to accept the newly assigned location.

## Align Sites and Nodes Schematically

The Arrange palette offers a number of options for precisely aligning sites or nodes within the network plot and on a per-site basis. Although the schematic X and Y properties are in relationship to the network plot, the tools within the Arrange palette operate within the container, where the container can be the network plot or one or more sites, depending on which nodes and/or sites you selected.









### Note

To see the effects of schematic moves, you must be using a schematic background. To enable a schematic background, use the Plot Options icon on the Visualization toolbar. For more information, see the [Set Plot Backgrounds](#) section.

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- Step 1** Select multiple nodes or sites. If the selected nodes or sites are within different parent sites, they are arranged on a site-by-site basis, if applicable.
- Step 2** To open the Arrange palette, either right-click in an empty area of the network plot and select Arrange from the context menu, or select the Arrange icon in the Visualization toolbar.
- Step 3** Select objects to reposition in one of the following ways.
- Select sites or nodes either by selecting them individually (Shift-click) or by dragging the cursor around them. This is a good way to select a group of objects based on location or connectivity.
  - Select sites or nodes by selecting rows in the Sites or Nodes table, respectively. Both tables can be filtered and sorted so this is a good way to select a group of objects based on their name or other site properties.
- Step 4** Arrange the selected sites or nodes.
- To arrange sites or nodes within a plot, click the desired alignment icon.
  - To arrange sites or nodes within a specific boundary, set the boundary box and then click the desired icon.
-

**Boundary Box:** A user-defined *boundary box* sets the borders within which the sites or nodes are arranged. To create a boundary box, press and hold the Ctrl key (Cmd on Mac), click the alignment icon, and drag the cursor to form a box. When you release the Ctrl (Cmd) key, the sites or nodes are arranged to positions within that boundary box.

Icon	Description
	Align selected objects vertically without changing their horizontal location. Align selected objects horizontally without changing their vertical location.
	Align selected objects vertically, horizontally, or diagonally. The objects are evenly positioned between the outermost selections. You can use boundary boxes.
	Align selected objects vertically, horizontally, or diagonally. The objects are evenly positioned between the outermost selections. You can use boundary boxes.
	Distribute to a grid determined by upper left and lower right of the selected items. You can use boundary boxes.
	Arrange objects in an orderly way based on connections between them. You can use boundary boxes.
	Arrange selected objects proportional to their longitudes and latitudes, either within their original boundary box or within a new one. Any selected objects that do not contain longitudes and latitudes are arranged in an orderly way based on connections between them.

## Edge Groups

Large, complex networks often contain a limited number of core sites that form the network backbone, with many edge sites that connect locally to one or more of the core sites.

- A core site contains at least one core node, and an edge site contains only edge nodes.
- An edge group is the collection of edge sites that attach to core sites in the same way. A common example of an edge group is a topology where several edge sites have redundant connections to the core sites. If each edge site has the same redundant connections to the same core sites, they are in the same edge group.

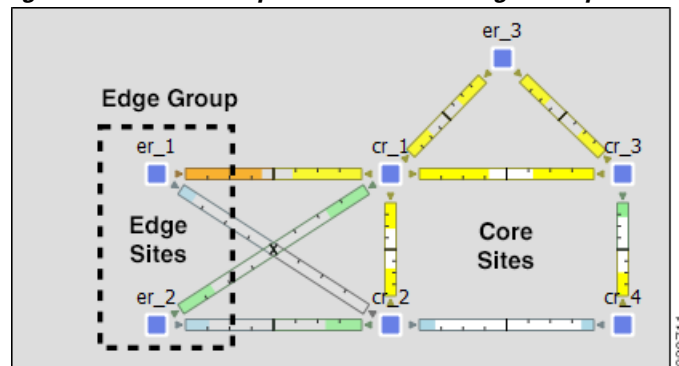
## Arrange Edge Sites

The Arrange palette has special features for arranging edge sites. To access this palette, right-click in an empty area, and select Arrange from the context menu.

Initializers->Edge Group Menu	Description
Select	<ul style="list-style-type: none"> <li>Select all sites in all edge groups.</li> <li>Select all sites within a specific edge group, select one site within it, and then select this menu.</li> </ul>
Separate	To separate one or more sites from the network, select those sites and then select this menu. Note this does not separate the entire edge group. It only separates the selected sites.

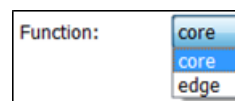
Figure 2-3 shows an example network with edge sites that have been arranged to separate them from the core. Both sites on the left are in the same edge group because they each have two connections to the same two core sites. The site at the top of the diagram is in a separate edge group because it has different connections to the core sites. Edge sites can have a somewhat more complex topology, because they can also connect to a core site through another edge site.

**Figure 2-3 Example Network with Edge Groups**



## Define Nodes as Edge or Core

Follow these steps to define nodes as core or edge. By default, all nodes are core nodes.



- Step 1** Select one or more nodes. Typically, in a large network with hundreds of nodes, filtering to the edge nodes is the fastest way to find and select them. For information on how to filter table entries, see the *WAE Design User Guide*.
- Step 2** Right-click on one of the nodes, and select Properties.
- Step 3** Select core or edge from the Function list, and press OK.

## Show and Hide Nodes or Sites

By default, nodes and sites are visible in the network plot. You can hide nodes and sites and their connecting circuits on a per-layout basis, though they still exist in the plan file and tables.

**Note**

Hiding a site also hides all of its contained objects.

To ...	Do This ...
Hide nodes or sites	<ol style="list-style-type: none"><li>1. Select one or more nodes or sites from the plot, or select them from their respective Nodes or Sites table.</li><li>2. Right-click on one of the selected objects, and select Layout-&gt;Hide Nodes or Hides Sites from the context menu.</li></ol>
Find hidden nodes or sites	<ol style="list-style-type: none"><li>1. Use the Shown column of the Nodes table or Sites table.</li></ol>
Show nodes or sites	<ol style="list-style-type: none"><li>1. Select one or more nodes or sites from their respective Nodes or Sites table.</li><li>2. Right-click on one of the objects, and select Layout-&gt;Show Nodes or Show Sites from the context menu.</li></ol>

## Site Relationships to L3 and L1 Nodes

The WAE Design network plot supports the visualization of both L1 and L3 topologies. By default, sites containing L3 nodes appear in the L3 view and sites containing L1 nodes appear in the L1 view. Empty sites and sites containing both L3 and L1 nodes appear in both views. To toggle whether to show or hide sites per view based on whether they contain L3 or L1 nodes, use the Layer 1 tab in the Plot Options dialog box. For detailed information, see the *WAE Design User Guide*. For information on saving user defaults, see the [Set Plot Backgrounds](#) section.

Although the WAE Design GUI shows weathermap layouts in the Layer 1 view, WAE Live and WAE Design Archive applications show only L3 topologies.

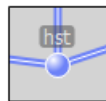
## Set and Position Display Name

By default, site and node names appear above the object. However, you can change this positioning. Additionally, rather than showing the site names, you can set a different display name that can be internationalized. [Figure 2-4](#) shows an example of changing both for a site.

To ...	Do This ...
Set the site display name	<ol style="list-style-type: none"><li>1. Either double-click a site in the Sites table, or right-click on a site and select Properties from the context menu.</li><li>2. Enter a name in the Display Name field, and click OK.</li></ol>

To ...	Do This ...
Change where site names are positioned	<ol style="list-style-type: none"> <li>1. Right-click on one or more selected sites, and select the Layout-&gt;Set Site Name Position context menu.</li> <li>2. Select the direction in which you want the site name to appear in reference to the site, and click OK.</li> </ol>
Change where node names are positioned	<ol style="list-style-type: none"> <li>1. Right-click on one or more selected nodes, and select the Set Node Name Position context menu.</li> <li>2. Select the direction in which you want the node name to appear in reference to the site, and click OK.</li> </ol>

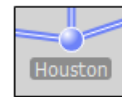
**Figure 2-4**  
**Before**



**Example of Changing the Site Display Name and Position**

Name:	hst
Display Name:	Houston

**After**



Set Site Name Position

☐ Northwest
 ☐ North
 ☐ Northeast

☐ West
 ☐ East

☐ Southwest
 ☒ South
 ☐ Southeast

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## Circuits and Interfaces

### Set Circuit and Interface Appearance

You can change how circuits are displayed by clicking the Plot Options icon in the top, right of the Visualization toolbar. Alternatively, select the Edit->Plot->Plot Options->Edit Options menu. For information on saving user defaults, see the [Set Plot Backgrounds](#) section.

The Design Circuits tab has the following options.

Design Circuits

Circuit Width

Minimum width  pixels

Circuits set to min width for capacity below  Mbps

Increase in width for each 4x increase in capacity  pixels

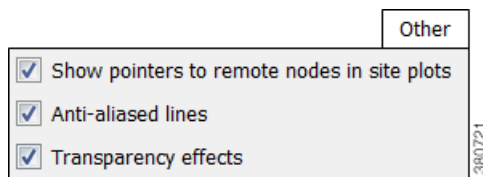
Interface Text

Parallel Grouping

☒ Show QoS Bounds

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- **Circuit Width**—The circuit width is based on its capacity (the higher the capacity, the wider the circuit). Using these options, you can set the minimum width and the capacity it represents, as well as how fast the width grows as the capacity grows.
- **Interface Text**—This option, which is applicable to Design layouts only, enables you to display the percentage of interface filled with traffic, or the interface name, IP address, or IGP metric.
- **Parallel Grouping**—This option simplifies the representation of parallel circuits into a single circuit. By default, there is no grouping. See [Set How Parallel Circuits Appear](#).
- **Show QoS Bounds**—This option, which is applicable to Design layouts only, enables you to toggle on/off the display of QoS bounds, which is the maximum interface capacity available without violating the QoS requirements. The default is On. For QoS bound information, see the *WAE Design User Guide*.
- The Other tab enables you to toggle on/off the following settings.



- Whether remote node names appear in the site plot.
- Whether to use anti-aliased lines. Turning off this option reduces the smoothness of lines in the plot, but speeds up the plot updates on some platforms.
- Whether transparency effects are used when plotting some circuits on top of others. Turning off this option speeds up the plot updates on some platforms.

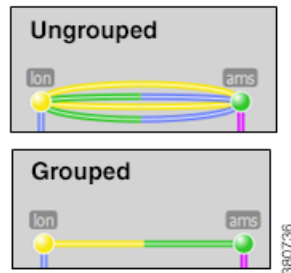
## Set How Parallel Circuits Appear

By default, WAE Design displays all circuits individually. For example, if you have parallel site circuits, they are displayed in a stacked manner.

To simplify the visual display of a plan, you can group parallel circuits using any one of the methods described in step 3 of the following instructions. The grouped circuits show capacity and outbound utilization in the network plot and if applicable, in the site plots as follows. If the circuits are between sites, the utilization includes the utilization of nested interfaces, if applicable.

### Weathermap Layout

#### Grouped Parallel Circuits Show Average Interface Utilization



- The capacity of the grouped circuit is the sum of the individual circuits.
- The utilization of the grouped circuit is the average of the utilizations (weighted by capacity) of the individual circuits. The color fill of the grouped circuit shows this average.
- In the Design layout, each side of the grouped circuit is divided lengthwise into its constituent interfaces that are individually selectable. Each interface within a grouped circuit has a thin colored border showing the utilization of that interface. Each interface continues to show textual information, such as IGP metric, if this has been enabled.

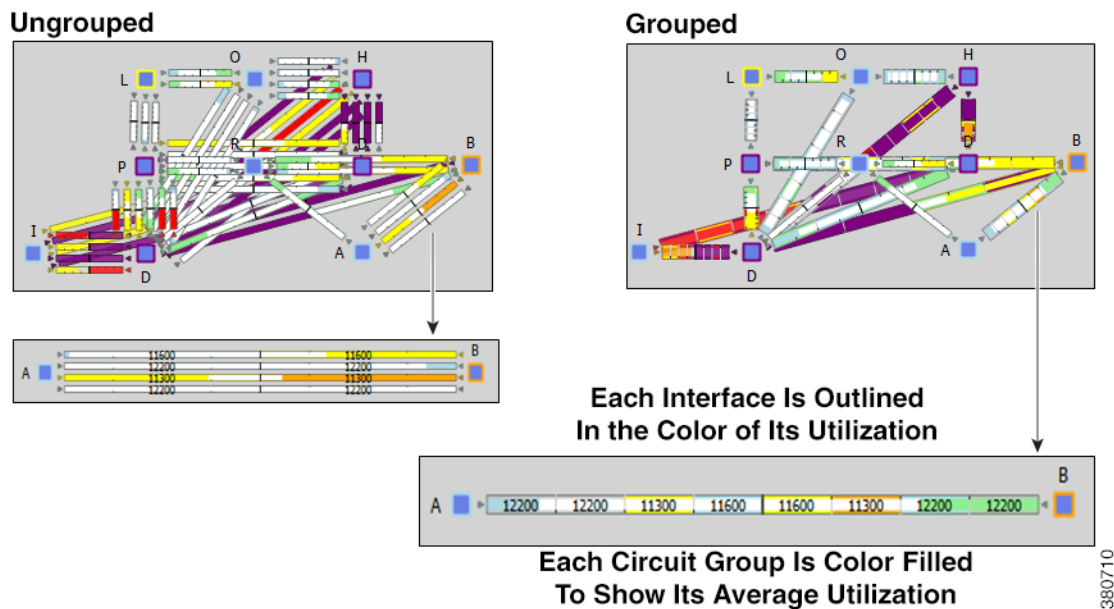
Figure 2-5 shows an example in the network plot using a Design layout.



#### Note

Parallel groupings change the visual representation of the layout, but do not affect the plan itself. If you want to literally merge parallel circuits (rather than just change the appearance), see the *WAE Design User Guide*.

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- Step 1** Click the Plot Options icon in the Visualization toolbar.
- Step 2** Select the Design Circuits tab.
- Step 3** From the Parallel Grouping drop-down list, select one of the following methods.
- None—Each parallel circuit is displayed as a separate circuit (default).
  - Node—Groups parallel circuits between two nodes.
  - Metric—Groups parallel circuits between two nodes whose interfaces have the same IGP metric.
  - Site—Groups parallel circuits between two sites.
  - SRLG—Groups parallel circuits that belong to the same SRLG.
  - Group Name—Groups circuits belonging to a user-specified group set in the Parallel Group Name field of the circuit Properties dialog box. (See the *WAE Design User Guide*.)
- Step 4** For Design layouts, you can set the maximum display width for parallel circuits.
- Step 5** Click OK. For information on saving user defaults, see the [Set Plot Option Defaults](#) section.
-

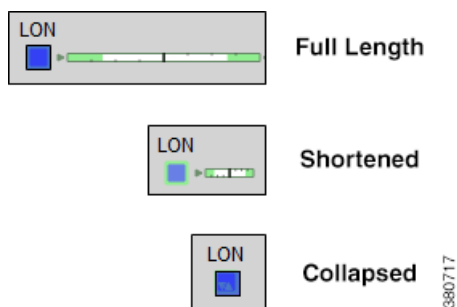
**Figure 2-5 Both Ungrouped and Grouped Parallel Circuits by Site in a Design Layout**

## Set Interface Style

By default, two interfaces are represented in the plot as two sides of a full-length circuit drawn from one site to another. However, circuits connected to internal or external AS's are shortened.

This full-length model works well when the sites are close together, but if they are far apart full-length circuits can clutter the plot. You may want to display the sites as regions by shortening circuits between them.

Interfaces between the same two sites or between the same two nodes have the same interface style. If you change the style for any one of these interfaces, the style of all associated interfaces changes too.



- 
- Step 1** Select one or more interfaces or circuits.
- Step 2** Right-click on one of the selections. From the context menu, select Layout->Set Interface Style->Option, where Option is one of the following choices.
- Full Length—The entire interface is displayed.
  - Shortened—A short portion of each interface is shown attached to the node containing the outward-bound interface.

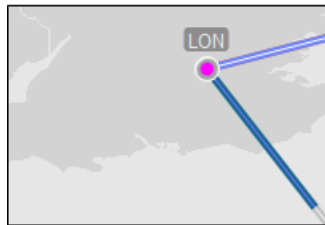


- Collapsed—The interfaces are not shown on either side of the node or site. The remote interface on the circuit does not appear.
- Default—If the circuit is connecting two nodes in the same internal AS, the interfaces appear as full length; if it connecting two nodes in different AS's, the interfaces appear as shortened.

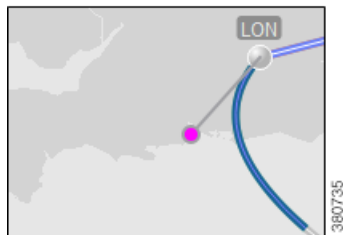
## Curved Weathermap Circuits

Follow these steps to move and curve the circuits in a Weathermap layout.

### 1. Click circuit



### 2. Drag icon



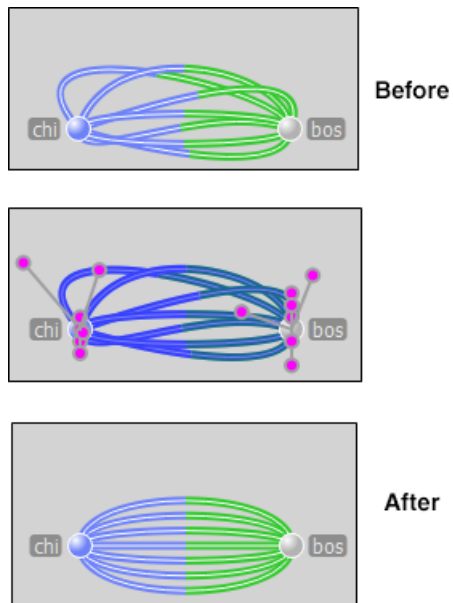
**Step 1** Click the circuit to see a circular pink icon.

**Step 2** Drag the pink circle in any direction, thus creating curved circuit lines.

To move circuits such that the sites or peers stay in horizontal or vertical alignment, press and hold the Shift key while dragging the circular icon.

## Reset Curves

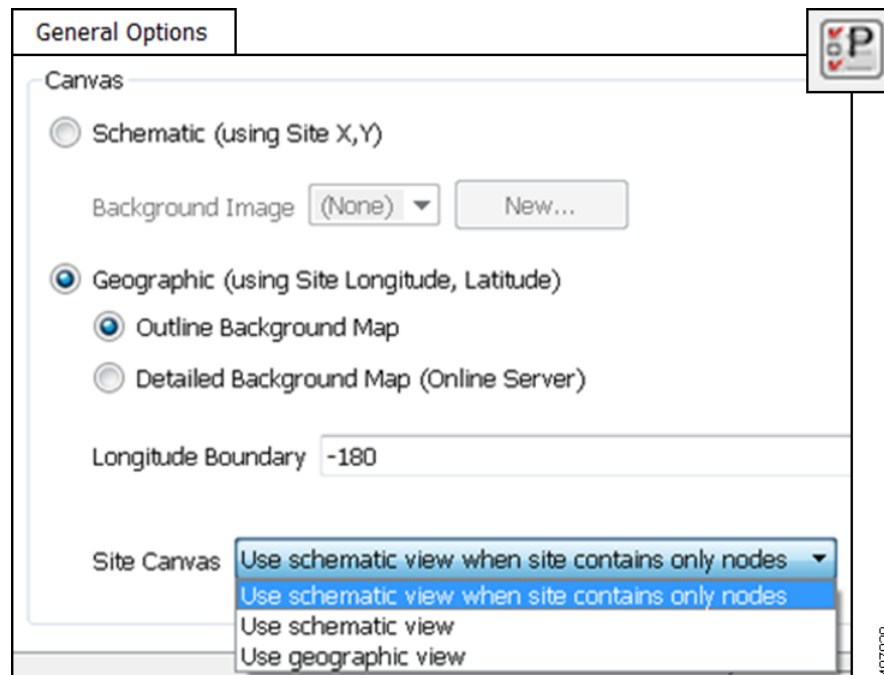
One way to simplify a Weathermap layout is to reset the circuits' curves. Doing so changes the curves so they are more similar to ones that exist, and removes circuit overlap.



- 
- Step 1** Select all circuits that you want to reset.
- Step 2** Right-click on one of the selected circuits, and select Layout->Reset Curves from the context menu.
-

## Set Plot Backgrounds

Select the network plot background in the Plot Options dialog box, General Options tab, which is selectable via the Plot Options icon in the Visualization toolbar. Alternatively, select the Edit->Plot->Plot Options->Edit Options menu. [Figure 2-6](#) shows an example of three available options. For information on user and system defaults, see the [Set Plot Backgrounds](#) section.



- Schematic views show the network based on the X,Y properties of the nodes and sites.

Additionally, you have the option to select or add a static background image in .png format. If the image is a background map, the topology likely will not map to an imported image, so you have to re-arrange the sites accordingly. Note that these images can be saved in .pln or .db formats, but not in .txt format.

- Geographic views show the network based on the Longitude and Latitude properties of the nodes and sites.
  - Outline Background Map—Geographic map with outline of countries and if applicable, USA states.
  - Detailed Background Map—Geographic map with streets. Click the zoom icon (magnifying glass icon in the Visualization toolbar) to see the level of desired detail. This option requires Internet connectivity to access the online map server. If connectivity is unavailable, use the outline background, or download a map image and import it as a background image. To access a different online map server, see the *WAE Design Integration and Development Guide*.
  - Longitude Boundary—Measurement in degrees that specifies the east-west position of a point on the Earth's surface. The default is the -180 degrees, but could be changed, for example, to provide a continuous view of the Pacific.

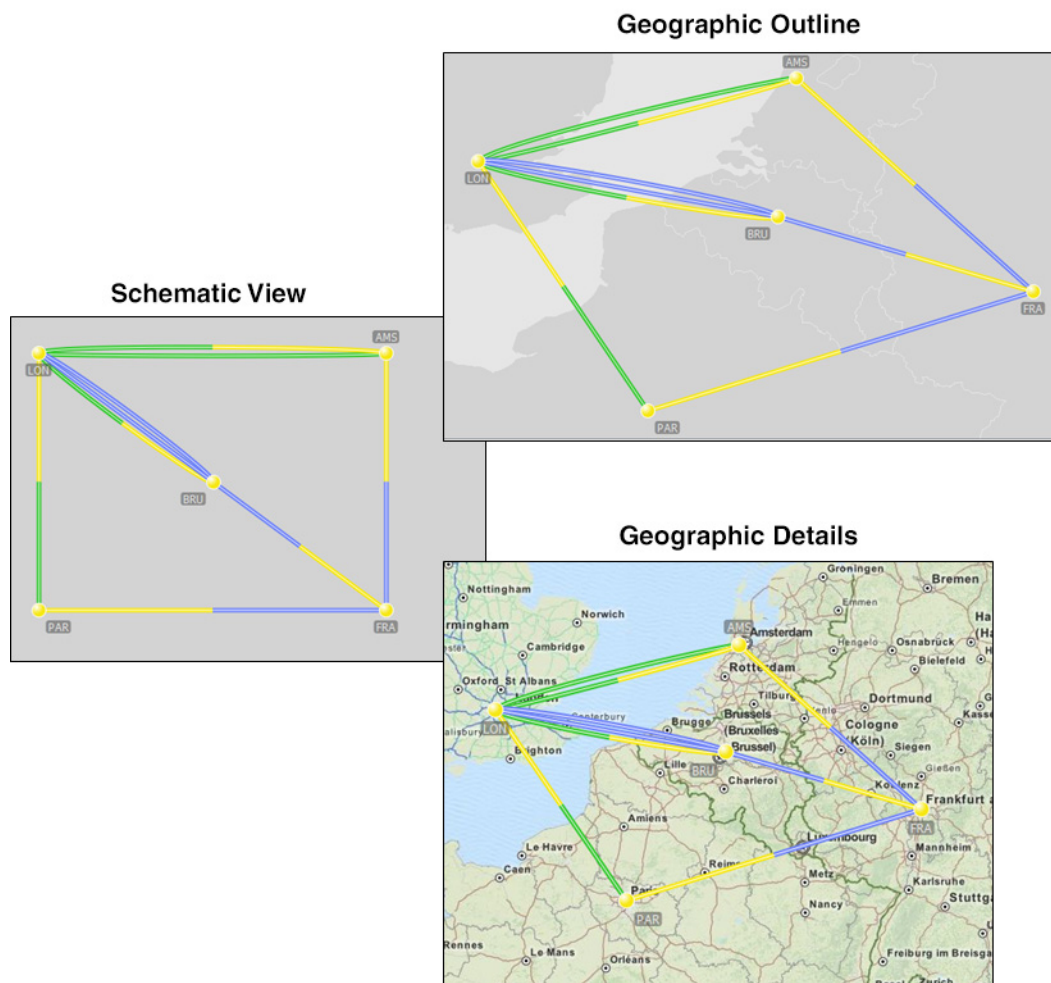
- **Site Canvas**—If you are using the schematic view for the network plot, all sites show only the schematic view and you cannot further configure the site view. If you are using either of the geographic views, you can specify how to view the sites using the Site Canvas options. These options apply to all sites, regardless of whether they contain L3 nodes, L1 nodes, or both. Note that this option does not affect the placement of nodes that are not in sites.

**Schematic view**—Shows nodes and sites network based on the X,Y properties of the nodes and sites.

**Geographic view**—Shows the same background as the geographic view selected for the network plot (outline or detailed).

**Schematic view when site contains only nodes**—Use this option to visualize nodes that have the same geographic coordinates within the same site. Using the geographic view results in these nodes being placed on top of each other.

**Figure 2-6** Backgrounds for WAE Design Network Plot



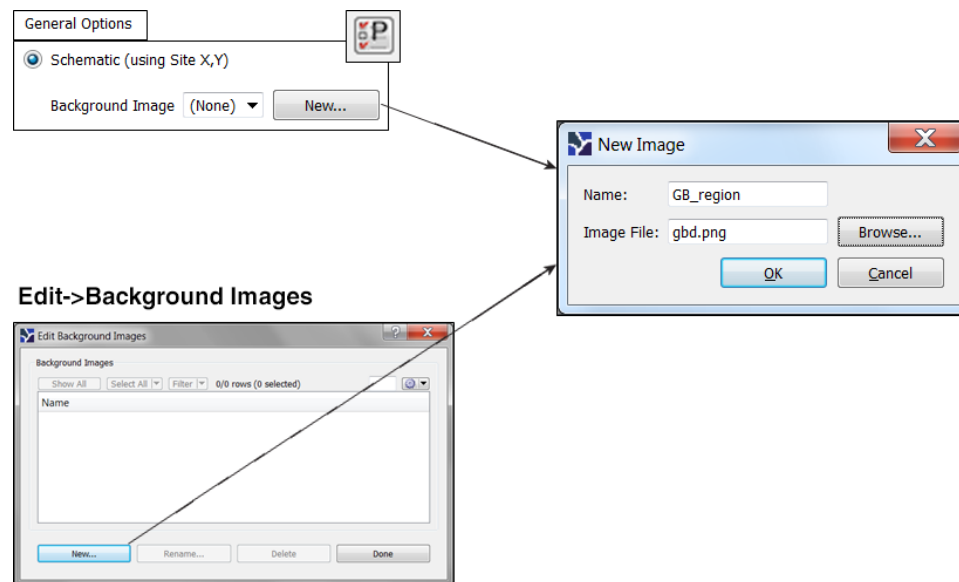
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## Create Static Background Map

If you have a static .png image that you prefer to use as a background, you can add these either through the Plot Options dialog box or the Edit menu. You can also rename and delete them using the Edit option.

Add Static Background Map Through Plot Options	Add Static Background Map Through Edit Menu
<ol style="list-style-type: none"> <li>1. Click the Plot Options icon in the Visualization toolbar, or select the Edit-&gt;Plot-&gt;Plot Options-&gt;Edit Options menu.</li> <li>2. In the General Options tab, select the Schematic option.</li> <li>3. Click the New button next to the Background Image list. <ol style="list-style-type: none"> <li>a. Enter the name of the map as it will appear for selection from the GUI.</li> <li>b. Enter or browse to the name of the .png file that is the static image you are uploading.</li> <li>c. Click OK.</li> </ol> </li> <li>4. Click OK in the Plot Options dialog box.</li> </ol>	<ol style="list-style-type: none"> <li>1. Select the Edit-&gt;Plot-&gt;Background Images menu.</li> <li>2. Click the New button. <ol style="list-style-type: none"> <li>a. Enter the name of the map as it will appear for selection in the GUI.</li> <li>b. Enter or browse to the name of the .png file that is the static image you are uploading.</li> <li>c. Click OK.</li> </ol> </li> <li>3. Click Done in the Edit Background Images dialog box.</li> </ol>

**Figure 2-7 Add a Static Background Image**



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## Traffic Utilization Colors

Interfaces have both measured and simulated traffic (in Mbps). This traffic appears on the interfaces as color fills that represent the percentage of outbound traffic in comparison to its capacity. The default colors for these representations appear in the Utilization Color menu, which is a set of color-coded drop-down lists in the Visualization toolbar. There are six default colors representing thresholds ranging from 0% to 100% (Figure 2-8).

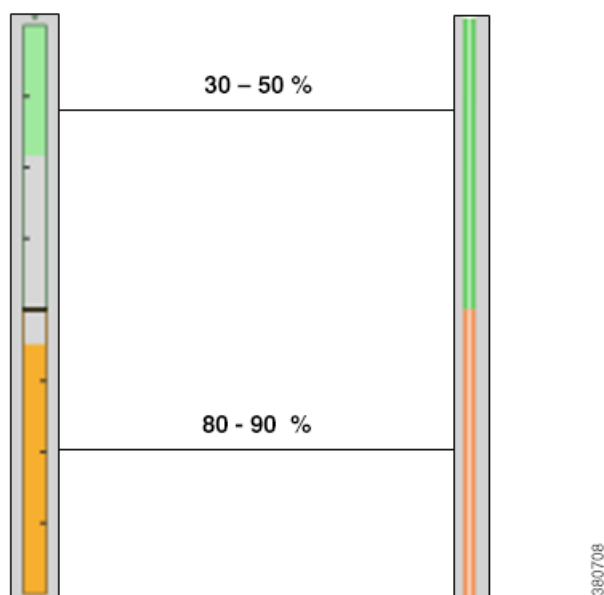
Note that in the L1 view, only the Failure Impact view shows colors, and those colors are related to L3 interface utilization. For information, see the *WAE Design User Guide*, Layer 1 chapter.

**Figure 2-8**      **Default Utilization Colors**

Default Utilization Colors



Example Interface Traffic Utilization



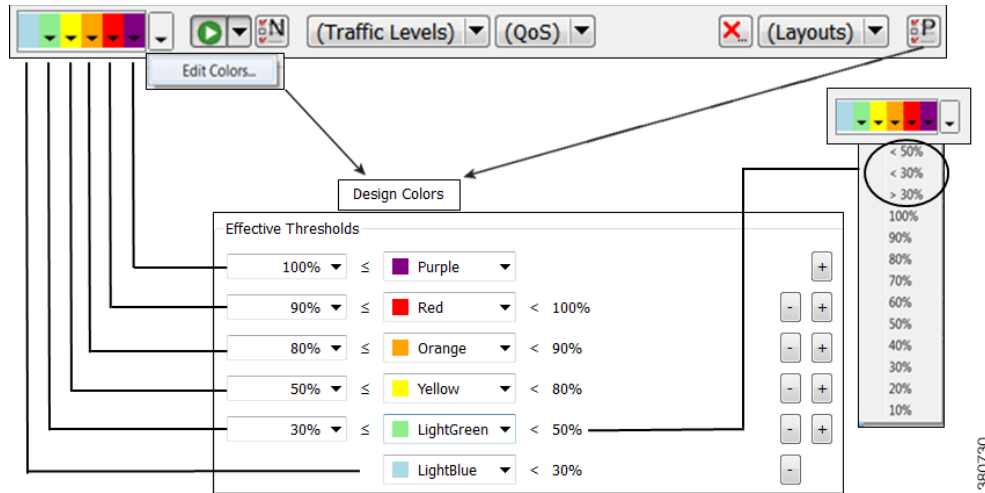
Each default utilization color has a menu whose numbers correspond with their values in the Design Colors tab of the Plot Options dialog box (Figure 2-9). It is from this Edit Colors dialog box that you edit the colors used for traffic utilization.

You can edit the utilization values, add and remove colors, and locate interfaces that meet utilizations levels of special concern. Edits to these colors are saved to the plan file when the file is saved. You can also create and save a set of user defaults that can be applied to other plan files. Different utilization colors can be set for different layouts in a plan. For information on saving and applying user defaults, see the [Set Plot Backgrounds](#) section.



**Note**

All documentation and instructions are written according to default colors using a Design layout. If you change to a Weathermap layout or if you change colors and their uses, the instructions herein still apply.

**Figure 2-9 Relationship of Edit Colors Dialog Box to Traffic Utilization Color Menu**

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## Change Traffic Utilization Values

### Find and Set Maximum Utilization

- Select Max from the purple drop-down list. WAE Design finds the most utilized interface and sets the minimum utilization for purple to that value. As a result, that interface (and only that interface) is highlighted in the plot with purple. This method offers a quick way to determine the most highly utilized interface.
- Open the Plot Options, Design Colors dialog box by selecting the far right, gray drop-down list from the Utilization Color menu. Here, either enter a new value or select a value from the drop-down list in the top, purple row. Click OK to save the changes.

### Change Minimum Utilization Values

If you set a minimum value that imposes on an existing utilization value, WAE Design calculates a new percentage for that existing utilization or calculates that it cannot be used.

**Example:** The default for red is 90-100%, and the default for orange is 80-90%. If you set red to mean 80-100% utilization, orange is not used in the plot to show utilization. If you set red, however, to mean 85-100%, then WAE Design adjusts the orange value to the remaining amount available, which in this example is 80-85%.

To change minimum utilization values, use either the color drop-down list or the Plot Options, Design Colors dialog box. Both options behave the same way. Modifications in the drop-down list appear in the Design Color dialog box and vice versa.

**Step 1** If using the dialog box, open it using one of these methods.

- Click the Plot Options icon, and select the Design Colors tab.
- Select the far right, gray drop-down list from the Utilization Color menu.
- Select the Edit->Plot->Plot Options->Edit Options menu, and select the Design Colors tab.

**Step 2** Change the minimum value using one of these methods.

- If you select an exact value, that value becomes the new minimum.
- If you select a number with a greater-than sign (>) next to it, WAE Design finds the interface that is closest to and greater than that value.

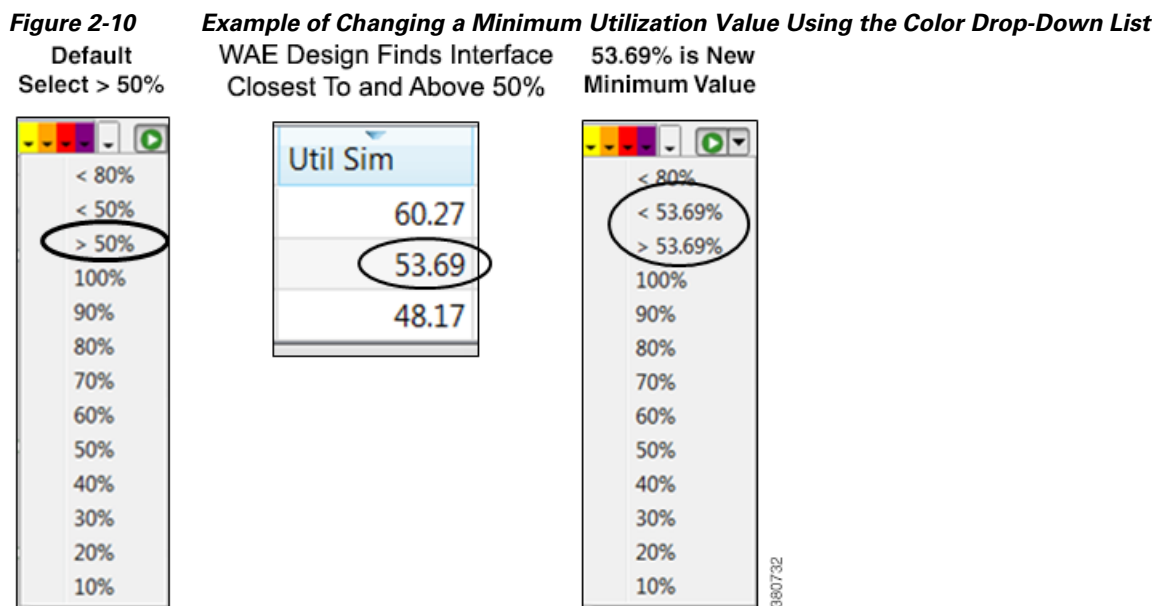
**Example:** By default, yellow is 50-80%. If you select >50%, WAE Design finds the interface with a utilization that is closest to and greater than 50% (Figure 2-10).

- If you select a number with a less-than sign (<) next to it, WAE Design finds the interface that is closest to and less than that value.

**Example:** By default, light green is 30-50%. If you select <50%, WAE Design finds the interface with a utilization that is closest to and less than 50% (Figure 2-11).

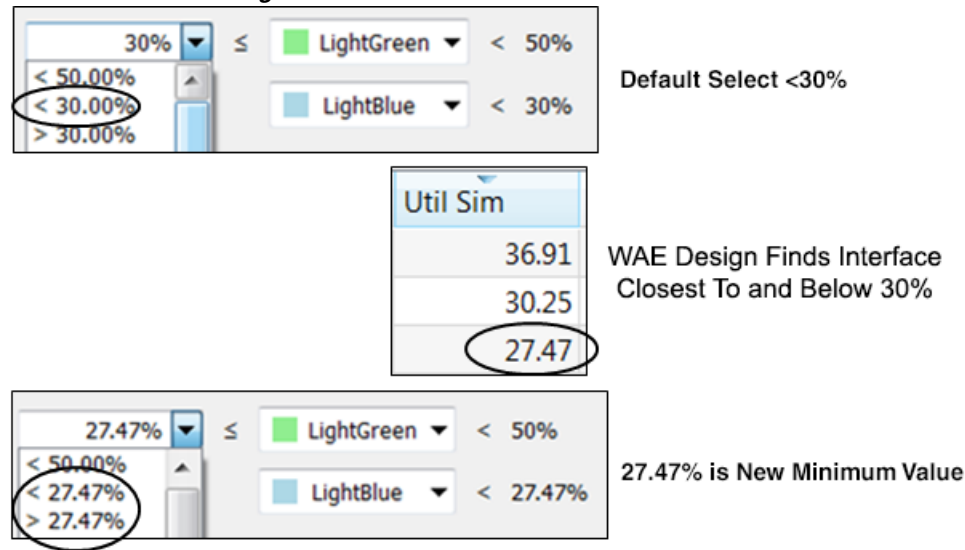
- If in the dialog box, you can enter a value directly into the field.

**Step 3** If in the dialog box, click OK to save the changes.





**Figure 2-11** Example of Changing a Minimum Utilization Value in the Plot Options, Design Colors Dialog Box



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## Add and Delete Utilization Colors

### Add New Utilization Colors

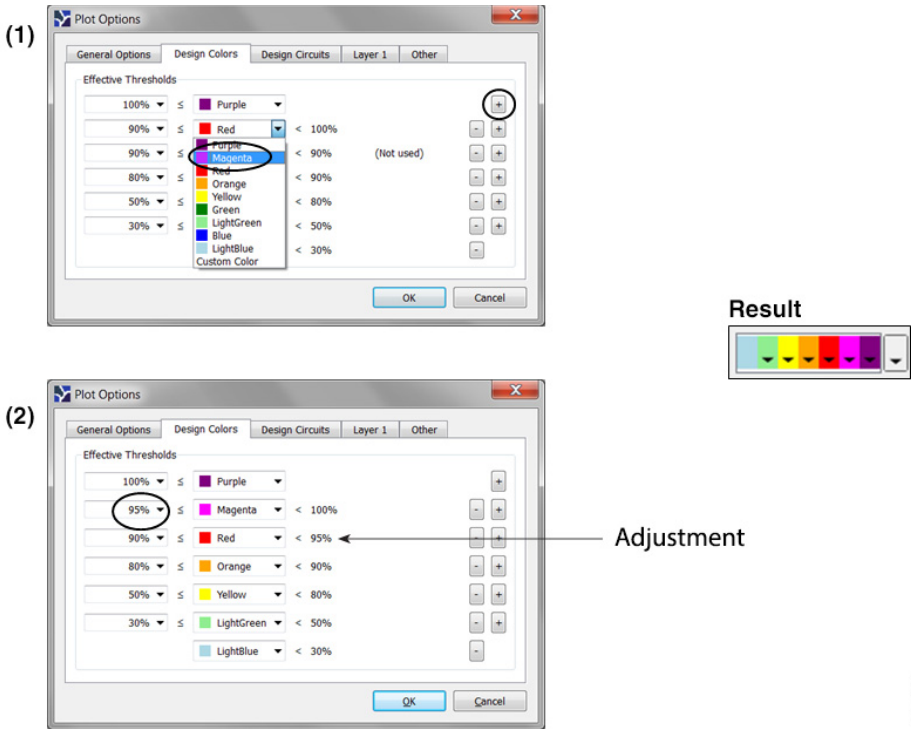
After adding a color, the maximum utilization value for it is based on the minimum value above it. When you assign the new color a minimum utilization value, it always imposes on the utilization range below it (unless the utilization value you are adding is the lowest). Since this minimum value imposes on an existing one, WAE Design recalculates a new percentage for that existing utilization or calculates that it cannot be used.

Once a utilization color is added, it appears in the Utilization Color menu.

- 
- Step 1** Open the Design Colors dialog box using one of these methods.
- Click the Plot Options icon, and select the Design Colors tab.
  - Select the far right, gray drop-down list from the Utilization Color menu.
  - Select the Edit->Plot->Plot Options->Edit Options menu, and select the Design Colors tab.
- Step 2** Click on the plus (+) button to the right of the color below which you are adding a new color. The row is replicated below it and is marked as *Not used*. For example, to add a utilization color below red, click on the + button on the same row as red.
- Step 3** In the new row, either enter a new minimum value or select it from the list, and then click OK.
- 

**Example:** Figure 2-12 demonstrates adding a magenta utilization color with a range of 95-100%.

Figure 2-12 Example of Adding a Magenta Utilization Color with a Range of 95-100%



### Delete a Utilization Color

Although you can delete a default color so that it is not represented on the plot, doing so does not remove that color from the Utilization Color menu. Deleting a color that you previously added, however, removes it from the toolbar.



- Step 1

Select the far right, gray drop-down list from the Utilization Colors toolbar.
- Step 2

Click on the minus (-) button associated with the row you want delete. Then click OK.

## Set Plot Option Defaults

Each time you modify one or more plot options, they are saved in the plan file for the current layout. When you save the file, these plot options are saved per layout.

There are two types of plot option defaults.

- User Defaults**—A set of customized plot options that you can create, set, and apply to other plan files. Each time you set a user default, it overrides the previous version.

If you open a previously unopened plan file, its default plot options are the user defaults if they exist.

**Example:** If you set the user defaults for plan A, you can then open plan B and apply these user defaults to it.

- **System Defaults**—The set of plot option defaults that comes with WAE Design. These are not configurable, and can always be applied.

System defaults are applied to a previously unopened plan file if no user defaults have yet been defined.

User and system defaults are per layout type. For instance, if you are in a Design layout and you apply user defaults, then the Design user defaults apply. If you are in a Weathermap layout and you apply system defaults, then the Weathermap system defaults apply.

To ...	Select This Menu ...
Apply system defaults.	Edit->Plot->Plot Options->Apply System Defaults
Save current plot options to user defaults. Note you cannot cancel the result of having saved the user defaults.	Edit->Plot->Plot Options->Save User Defaults
Apply user defaults.	Edit->Plot->Plot Options->Apply User Defaults

**Note**

You can also save how you view tables, columns, foreground and background objects, and other preferences for all plan files that you open in the future, use the View menu. For more information, see the *WAE Design User Guide*, User Interface chapter.

## Related Topics

- [Using Layouts](#) chapter
- *WAE Design User Guide*
- *WAE Design Integration and Development Guide*

