Visual Capacity Optimization Manager

Web Interface User Guide

Release 1.2

Eaton

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Chapter 1: Introduction

About This Guide

The *Web Administration User Guide* provides detailed instructions to help you implement and maintain the application using the web interface of the application.

Application Overview

The web portal lets you access a wide array of data information from several disparate sources in one consolidated interface. The power of this aggregation is the simplicity it provides to operators to monitor and control both Facilities and IT devices in the data center environment. Since the application is vendor neutral, any device can be included in the interface and monitoring capabilities.

The application portal lets you access a wide array of data information from several disparate sources in one consolidated interface. The power of this aggregation is the simplicity it provides to operators to monitor and control both Facilities and IT devices in the data center environment. Since this application is vendor neutral, any device can be included in the interface and monitoring capabilities.

The application provides the following features for data center operators:

- Visual Navigation and Information to multiple floor plans

- Navigation to Main Data Center floor plans or Remote IT closets

- Real-time data metrics related to any device in the system

- Historical trend analysis for metrics defined for devices

- Reporting capabilities for user, device, performance and executive reporting requirements.

- Integration to third party software solutions. For example, Power Strip controls, IP Camera Systems, Card Access Security Systems, Other Vendor Support and Maintenance portals, third party Monitoring applications, and more are supported.

- Complete Design management of navigation and floor plans. Administrators can assign new devices to floor plans and customize the images and menu links associated with them.

- Full featured Rack Builder. This feature permits administrators to create online graphical representations of their rack layouts. Key information related to devices and racks can then be viewed individually or at the rack level to understand the Weight, Power and physical characteristics of that rack.

■   Port mapping capabilities for both power and network ports.

■   Complete Administrator command of the Access Control Rights of users on the system. Floor plans, Devices and Reports are all controlled by standard User and User Group access rights in the System Administrator area of the application.

Client versus Web

The application provides both a web and client interface to use for performing actions and managing devices. This User Guide defines which functions are contained in the web interface. For definition of client features please consult the related *Visual Data Center 3D Client User Guide*.

The following is a high-level list of functions that are available in the web interface:

■   Device management – Add and remove devices from the application. Update attributes and device settings.

■   Monitoring profiles – Define the data points to monitor for devices.

■   Dashboard & Trend Charts – Define and assign dashboard and trend charts to devices and locations managed by the application.

■   User management – Add, modify and delete all users in the application, and reset passwords.

■   Access Rights Control – Manage user rights to view, modify, create delete certain components of the application.

■   Reports – View all reports related to device performance and application information.

■   Calendar – View and manage calendar events for all devices and users in the system.

■   Location Studio – Build and configure the navigation tree for all locations managed by the application. Create floor plans to assign devices to.

■   Device placement – Assign, remove and relocate devices on floor plans.

■   Rack Building – Place devices within racks.

■   Port Mapping – Define and manage port connections for power and network ports.

■   Device Data Viewing – View all data related to a device including alarms, dashboards, trend charts, port mappings and more.

■   Alarms – View all alarm information for locations and devices.

■   Network and Power Paths – Create one line summary of the network, a power tree of a facility, or both. This feature allows logical and physical definitions.

■   Discovery – Define discovery jobs which will poll networks and create devices based on network discovery.

■   Firmware – Bulk upload firmware files to supported device types and models.

Log in to the Web Interface

The Web interface is a web-based portal that is accessible through a standard web browser. If you do not know the URL to access the login page for the application login, contact your company system administrator for this information. Some companies allow access to the login page from remote locations. Others restrict access to internal computing devices or allow access through the company virtual private network (VPN).

Follow these steps:

1. Access the URL for the application in a supported browser. The application must be accessed using the URL configured during installation. Accessing the application with only the IP address in the web browser will lead to communication errors with the application server.

2. Enter the user name in the Login box.

3. Enter your password in the Password box.

4. Select the arrow button or press Enter to Login.

Note: If you have created a Server Host with an SSH Proxy connection, you must log in to the 3D to access the 2D.

If you successfully log into the application, the main portal interface appears with a series of tabs for accessing the application features.

Login Issues

Issues could prevent a successful login to the application. Note that this User Guide assumes that the application web server and database are functioning properly. Detailed Technical Support related to the actual processes and database is not covered in the scope of this document.

Incorrect User/Password Combination

If you submit the incorrect User Name and Password combination, "Unsuccessful Login" is displayed:

Click the arrow to return to the login screen and try to enter the User Name and Password combination again.

Account Already Logged on System

Logins are restricted to a single concurrent logon session. If another computer has already logged on to the portal with a user and password combination, you are asked if you want that user to log out.

Clicking the Yes button continues the login process and displays the application portal interface. The remote user already logged in with that account has their session terminated. In addition, no additional functions are allowed against the database by that other user.

Clicking the No button returns you to the Login prompt and lets you try to log in with a different set of login credentials.

Log Out of the Session

To log out of the session, select Logout on the right side of the top banner and confirm that you are ending the session.

When logout is completed, you return to the Login prompt.

Web Interface Overview

The web interface is designed with an easy to use framework that is consistent throughout the application. The components of this interface are discussed below and individual features and their descriptions are covered later in this document. The administrative interface can be accessed in one of two ways:

- Direct Web Access – You can type the URL directly in browser and login with their standard user/password combination. The available functions will be tied to the users access rights for this site.

- Access from 3D Client Interface – You can click the Admin Interface icon on the main page of the 3D client interface to display a separate web browser window with the web interface function. Note that since the user is already logged into the 3D client, the application will perform an encapsulated logon to the web administrative site with the current client user credentials

Chapter 2: Home Page Navigation Tree

Home Page Overview

Navigation Tree

The navigation tree is the primary method to navigate the location and device database. All floorplans, devices, ports, etc will be located in the navigation tree and information or features related to these objects can be accessed easily while in the navigation tree through device specific dashboards.

The Application links across the top of the screen provide access to a series of user sub-functions. Access to links are managed by user rights access controls and may not be visible for all users. In most cases, a new browser tab for each sub-function is opened when selected.

Information Label

Displays the company, user name, application version and current date/time.

Admin

This area is where core user and device management functions are performed. The Admin tab has its own series of sub menus which provide these management functions.

Locations

Allows users to define and manage the nodes of the navigation tree from World to Area node levels.

Floors

Allows users to define a floor or edit a previously defined floor. Floorplan images are uploaded and tools are used to define walls, areas, grid naming convention and raised floor configurations. Device placement on the floor and floorplan layer views are also accessed on this page.

Racks

Allows users to graphically mount devices into the front, rear and sides of racks.

Ports

Allows users to graphically connect and manage network and power port connections for the devices in the device list.

Alarms

Allows users to view and manage active alarms for monitored data on devices in the application.

Calendar

Allows users to review all activity which has occurred in the application from either a device or user perspective. Events can be reported and exported.

Reports

Allows users to access a productized reports. A separate window opens and displays a menu of system reports and a report creator design interface. After the reports are generated, they are displayed in Adobe Acrobat or exported to Excel and can be saved or printed as needed.

Settings

Allows the user to change their password and configure other user-specific settings.

Help

Provides access to a series of Product Documentation and a link to the support portal.

Search

Provides quick access to devices managed by the application. Search performs a wild-card search against all data elements associated with a device and returns a list of devices that have data elements that match the search criteria.

Logout

Logs users out of the current session and returns the browser to the login screen.

Left Hand Side Menus

Each of the Main Application Tabs reserve the left portion of the interface for a series of sub-menus, functions or lists that relate to the main tab. The menus are arranged vertically and work in an accordion-like manner, where clicking on a heading reveals the contents of that menu item and hides all other menu content.

List Filters

Where a list is presented there is typically a search filter field identified by the magnifying glass. The text entered is used to filter the items in the list below. The funnel icon in the search field accesses advanced search options.

Main Application Window

The Main Application Window displays content for the Application Tab or Menu functions selected in other portions of the interface.

Alarm Panel

At the bottom of the page there is an alarm widget which will display alarms for the currently selected navigation tree node. This feature provides basic alarm information and a link to the full alarm interface where more advanced alarm data can be reviewed.

Navigation Tree

The navigation tree is used to browse, manage and modify locations, devices and objects. The information below will describe the components and features of the navigation tree for the application.

Tree Nodes

The navigation tree has nodes for all the objects in the database displayed in a hierarchical format. The navigation tree nodes listed below are available to help users organize their sites and devices for easy management.

Next to each node of the tree is a series of numbers and icons which indicate the following:

▼ ▣ 2F1 [4] [2] [42]   ✎ ✗ ⓘ ↻

- ■ Number of Subnodes – Represented by the Blue number and only counts the number of next level nodes under the selected node.

- ■ Number of VM Hosts in the node and all subnodes – First Green number

- ■ Number of VM Guests in the node and all subnodes – Second Green number

- ■ Edit Icon – Allows the user to edit the object attributes using the appropriate application tab filtered for the node such as the admin tab for the selected IT device, and the location tab for the selected floor or area.

- ■ Manage Icon – Allows the user to manage how the object is used and interacts with other objects using the appropriate application tab such as Floor Define view for floors and Rack Builder view for racks.

- ■ Information Icon – Allows the user to easily view attribute information related to the node.

- ■ Refresh Icon – Will force a refresh of data being displayed for the node and all subnodes.

Node	Description
Decommissioned Devices	Devices which have been set to Decommission status in the Project workflow process. Users are not able to drag and drop devices into this folder.
Discovered Devices	Device which have been discovered with an auto discovery process. Users can move these devices into other location nodes and then mount them into Racks or other Enclosures.
Unassigned Devices	Users can create devices in this node as a temporary holding area until they are installed with a project or moved to a specific location manually.
World	Top node of navigation and is included in the default install
Country	List of countries that can be managed in the application.
State	List of States for the selected country. Note if a country does not have predefined States to choose from the list, the All Areas option can be selected to create a State node in the navigation tree.
Campus/City	Under the State node, users can create a Campus or City node. There is not a predefined list of these locations available for the user to select. Users enter the city name in the Name field.
Building	Address or other reference to the building being managed
Floor	Reference to the floor within the selected building
Area	Multiple options for Area types to help organize the navigation tree to match the needs of the customer. Multiple types of Area can be included under a single Floor node.
Local Discovery Device	Under some of the Area nodes users can place discovered devices from the Global Discovered Device store into the local Discovery Device folder
Device	Actual devices being managed. Devices can be facility, IT or other types of devices available to create in the application.
Port	Network or power ports related to the device are located under the device node.

Device Dashboards Overview

As users select individual devices in the navigation tree, specialized dashboard information will be displayed related to the selected device. For example, the Rack Dashboard shows specific data relevant to rack devices and their attributes, capacity, etc. The following device types have specialized interfaces for users to view:

Rack, Cabinet, 2 Post Rack and 4 Post Rack Dashboard

- Rack View – Graphical view of rack with devices mounted in the rack. Users can drag, zoom in/out using the mouse functions. Right click on the devices will allow shortcut access to relevant project actions for the device.

- Device List – Will show a list of devices currently mounted into the rack including devices which may be part of a pending project or work order.

- Work Order Information – List of Work Orders related to devices mounted into the rack.

- VM List – List of Virtual Server guests which are currently running on a VM Host mounted into the rack. Users can control the VM by selecting them in the list and using the action buttons above the VM table.

- Monitored Date – List of data points actively being monitored on all devices within the rack.

- Power|U|Ports|Weight Capacity – Capacity information related to key metrics associated with the selected rack.

Server Dashboard

- Monitored Data – Full list of all monitored data points, values and current alarm status.

- Calendar – List of all tracked activities related to the server.

- Connections – Detail relating to the port connections for power and network.

- Trend Charts – Thumbnail trend data for key performance indicators. Users can click these trend charts to see full size, interactive trend chart views.

- Capacity – Power and Current capacity and real time information.

- Application List – List of applications which have been added to the device. This application list is managed manually on the Studio – Assets page for the server device.

VM Host Dashboard

- VM Guest List – List of all currently assigned VM Guests to the selected VM Host. Users can see the running status, operating system icon, guest name and Estimated power consumption (if available) from the ESX environment.

- Summary – Key attribute data related to the VM Host and summary performance data related to CPU, Memory and Storage.

- Configuration – Detailed information related to the Processor, Memory, Datastore and Network component of the VM Host server.

- Capacity – List of VM Guests and their specific details related to Processor, Memory and Storage attributes. The guests listed on this page can be filtered using the filter table at the top of the page.

- Performance – Series of trend charts which provide detail on CPU, Disk and Memory performance metrics.

- Application – List of applications collected from the VM Guest machines.

- Health Status – Core information for the health of the VM Host.

- Log – Log entries posted to the VM Host ESX logs.

- Controls – User managed actions to turn on, off or suspend the virtual guest system.

Switch Dashboard

- Monitored Data – Full list of all monitored data points, values and current alarm status.

- Calendar – List of all tracked activities related to the server.

- Connections – Detail relating to the port connections for power and network.

- Capacity – Power and Current capacity and real time information.

- Projects – List of project related to the selected switch device.

- Port Status – List of ports and the status of the ports being monitored on the switch.

Rack PDU Dashboard

- Capacity – Power and Current capacity and real time information.

- Connections – Detail relating to the port connections for power and network.

- Outlet Status – List of outlets and the status of outlets being monitored on the Rack PDU device.

- Calendar – List of all tracked activities related to the server.

- Trend Charts – Thumbnail trend data for key performance indicators. Users can click these trend charts to see full size, interactive trend chart views.

Admin Tab Overview

The admin tab is the central location for all the administrative tasks. On the admin tab there are subtabs for each of the administrative functions described below:

Devices

This area is where all devices are created for use in the application. A device must be created in the Device Manager before it can be available to a floor plan and active monitoring can take place.

System

The System tab is the core of the administrative functions. Here, administrators can control Users, Access Rights, Device Groups and other administrative components of the platform.

Monitor

This tab controls the definition of the monitoring profile and settings for Gauges, Dashboards, Trend Charts and Notifications related to devices and their monitored data elements.

Dash & Trend

This tab provides access to all dashboard and trend charts that have been created in the system. Also, you can custom-define new dashboards and trend charts and assign them to devices, locations, or users in the system.

Firmware

Allows users to maintain a library of firmware files to transfer to one or many supported devices.

Discovery

Allows users to define and manage the IP ranges and device communication settings for the Discovery process. Discovered devices can be managed in bulk in this feature.

Tools

Allows users to manage a variety of system settings and lists which are used throughout the application.

Search

Provides quick access to devices managed by the application. Search performs a wild-card search against all data elements associated with a device and returns a list of devices that have data elements that match the search criteria.

Chapter 3: Admin > Devices Tab

Device Library

The application database contains a preloaded library of device types, device manufacturers, products, device images and data related to the product models in the Device Manager.

Devices not included in the library can be manually created by an administrator of the application. In addition, a Model Request can be submitted to Support through the Help section of the application or your support portal account to include your model to the central device library.

Device Hierarchy

Before adding and managing devices, the administrator must understand the Device Hierarchy. Each device has several properties or attributes which are included in the reports once the devices are added to the interface. When you include a device in the application, the following elements are tracked for the device:

- Device Type – These are broad categories such as Air Conditioners, Servers, Racks, and so on. A core list of Device Types is included with the application.

- Manufacturer – A core list of data center equipment manufacturers is provided with the application. Administrators can add to this list any other software or hardware providers that need to be included in the interface.

- Product Line – A core list of Product Lines are included in the application. Administrators have the ability to add new Product Lines to the database as needed.

- Model – An extensive list of IT and Facility devices is preloaded in the application. Administrators have the rights needed to add new models to the database as needed to accommodate devices that are not included in the application.

- Device – Devices are added to the system via the Device Tab or with the Import spreadsheets. Users can define the images, popup menus, monitoring thresholds and all information related to that device once it has been added to the Device Manager.

Types, Manufacturers, Product Lines, and Models

If any devices need to be created in the application and no corresponding Type, Manufacturer, Product Line, or Model exists, administrators can create new items in each of these categories. Instructions for creating a new item for each category are included in this User Guide. Application administrators cannot add new Types to the application.

Type Menu

The application provides a list of extensive device types for users to better manage and navigate the devices added to the application.

Type Settings

Items in the Type menu have a set of properties and attributes that are inherited in other parts of the application.

Properties

Device type properties are as follows:

■ Type Name – This value is the name of the Device Type and can be edited at any time.

■ Description – Basic description of the device type.

■ Manufacturer – A list of all Manufacturers that have devices based on this device type are listed in this location. Items are added to this list when new Product Lines are created. Double-clicking an item in the list displays that Manufacturer in the Manufacturer Menu.

All manufacturers that have a model created with this device type are listed in the Manufacturer list. Double-clicking an entry in the list opens the Manufacturer menu and highlights the chosen Manufacturer.

Images

Device type images are automatically inherited to all Models, which are created based on that particular Type. At the Device Type level, three types of images are defined:

■ Icon – This image is displayed in Studio and on the Floorplan Tab when viewing the Icon Layer view.

■ Photo – This image is displayed when the user selects the device from the floor plan view. The image will be displayed on the device pop-up window.

- Small Icon – A small icon is available for situations where 3000+ devices are loaded to a single floor plan. The application uses the Small Icon for these situations to help ensure that load times for the floor plan are acceptable.

- Front – This image will be used in the Rack Builder module and must be a flash (.swf) image type to work correctly.

Attributes

Device type attributes are a very important component of the application. They provide a very flexible way to manage these settings and values. At the Device Type level, you can choose which defined attributes will appear at the Model level for any model created which is based on this device type. Click on or off any attributes that should be displayed by default on those models. Values for these attributes are not defined at the Type level as they must be defined at either the Model or the Device level of the application.

Refer to the Model and Device sections to understand how to assign values to these attributes and how to override default settings. Refer to the Attributes Manager section to understand how to create new attributes for the system.

Search Box

At the top of the menu is a progressive search toolbar that lets you quickly filter the list to the relevant search criteria. Typing in a partial name filters the full list when you stop typing in the search box. When typing has stopped for 1.5 seconds, the application runs the filter on the list below, based on the text entered in the search box.

Manufacturer Menu

The application is pre-populated with a large number industry manufacturer and vendors. If a new Manufacturer needs to be added to the system, click on the New button when viewing the list of Manufacturers and provide the basic information for the company. Selecting the Create button adds the Manufacturer to the list in the window on the left and lets you create Product Lines and Models based on this Manufacturer.

The Product Line list displays a list of all Product Lines in the system for this Manufacturer. Double clicking an entry in the list opens the Product Line menu and displays the chosen Product Line for viewing or editing.

At the top of the menu is a progressive search toolbar which allows users to quickly filter the list to the relevant search criteria. Typing in a partial name filters the full list when you stop typing in the search box. When typing has stopped for 1.5 seconds, the application runs the filter on the list below, based on the text entered in the search box.

Product Line Menu

The application has a predefined set of Products that are included in the Device Manager. One of the defining properties of these devices is the Product Line, which is the general grouping that manufacturers assign to their specific devices. For example, PowerEdge for Dell is a Product Line that comprises multiple models.

When you select an existing Product Line from the list, the following information is displayed:

- Product Line Name – Name used to identify the Product Line.

- Manufacturer – Each Product Line must have a single Manufacturer associated to that line.

- Description – Optional field used to provide detail on the Product Line.

- Model List – All models in this list are based on this particular Product Line. Double-click an item in this list to view that model in the Model menu.

Add Model Button

The Add Model button is a shortcut function to add a new model based on this product line. While viewing a product line, click the Add Model button. The web UI displays the Model Menu and pre-populates a new model wizard with information related to that Product Line.

Add a Product Line

To add a new Product Line, click the New button when viewing the Product Line list. Provide the Product Line name and select the Manufacturer of the Product Line in the Manufacturer drop down list. Select the Create button to add the Product Line to the list in the window on the left.

Search and Filter

At the top of the Product Line list is a progressive search box that lets you filter the full list to one that matches a partial name search. By entering a partial name in the search box, the list will automatically filter the full list to instances match the search. In the example below, the letters "pow" filter the full product line list to only those that start with those letters. The auto search filter will execute 1.5 seconds after typing has stopped in the search box.

Another filter option is to use the dropdown selection box to choose a Manufacturer. Once selected, the Product Line list will be filtered to only show items which are matched to that Manufacturer. In the example below, selecting the Cisco Systems Manufacturer will only display Cisco product line.

Note that the search and filter items can be used in combination to filter for both the progressive search and the Manufacturer setting.

Model Menu

The Model menu on the Device Tab is the central location for managing several settings and attributes for all models. All settings defined at the Model level will inherit to all devices created which are based on that model, so this is a very efficient way to manage settings which apply to groups of devices. . In the web interface, the Model UUID is displayed next to the Model name when you select a Model in the Model tab.

The types of settings that can be defined at the model level are defined as follows:

- Properties – Basic properties for the model.

- Energy – Defines how energy should be tracked and reported for devices based on the model.

- Links – Links to URLs, Documents, or other items that should be assigned by default to all created devices based on this model.

- Images – Icon, Photo and Front images used in other parts of the application.

- Attributes – Defines the available attributes and their values to be inherited by all created devices based on the model.

- Ports – Defines the power and network ports available for use in the relationship editor.

Upload Model Sync Function

The model menu allows user to synchronize the model library. To do so users will need to create an import spreadsheet and include the following information:

- Device Type

- Vendor Name

- Model

Upon completing the import spreadsheet and clicking 'Upload' from the Model menu, users will be prompted to upload their spreadsheet into the system.

After the upload is complete a Model Import summary will appear showing the result of the upload. Here users will find two icons to indicate whether the model has been successfully matched to the system successfully or not.

For non-matched Model's, users can click the edit icon and manually match the model by selecting the type/manufacturer (vendor)/production line/model.

Once all Models have been matched successfully, users can submit their match results and the system will save the updates.

Properties

The Properties tab provides the basic information for the selected Model. The following fields are defined on this page:

- Model Name – The name used to identify the model.

- Type – The Device Type of the selected Model.

- Manufacturer – The Manufacturer of the selected Model.

- Product Line – The Product Line of the selected Model.

- Description – Basic description of the model.

- Device List – List of all created devices based on the selected Model.

When you double-click an item in the list, the Device Menu opens and displays the selected Device for viewing or editing.

Energy

Energy settings are used to define how certain power attributes should be reported in the reporting system. Several options for defining Energy provide a flexible way to control how values are aggregated and reported. Note that Energy settings defined at the Model level are inherited by default on all created devices based on that model. However, these settings can be overridden at the device level.

The following options are available for Energy reporting:

- Energy Device Type – Each device is assigned an Energy category which allows the application to group similar devices for reporting. These categories allow for a series of data center efficiency metrics to be calculated. The options for this setting are as follows:

  - Energy Monitor – This value is a monitoring probe that collects energy data from devices.

  - Energy Source – This value defines the amount of power delivered to the facility. For efficiency purposes, this value allows us to understand the total power consumed at the facility and will inform users of how efficiently power is being delivered to end devices.

  - Energy Transport – All devices used to deliver power form the source to the end devices fall into this category. For example, PDU, UPS, switch gear and other similar devices will deliver power thru the facility to the end devices.

  - IT Device – This value is the target of the power provided to the facility. For example, servers, storage and network gear would typically be assigned this category.

  - Non-IT Device – In some instances, computers, monitors and other IT devices are located in the data center but are not the end user IT devices which the data center is designed to support. An example of a Non-IT device would be the system administrator's computer which is located in a cube within the data center facility.

  - IT Cooling Device – This value is any type of cooling device used in the data center. This device is tracked separate from other facility devices to better understand the impact that cooling power consumption has on the data center and allows for cooling specific efficiency calculations.

  - Non-IT Cooling Device – In some instances there are cooling devices which serve locations other than the Data Center which are served by the data center power source. These devices are also tracked separately to improve the accuracy of the efficiency calculations used for the data center facility.

- Energy Data Source – Defines where the values should be collected to report on Energy attributes. Available options are as follows:

  - Monitor – Use values collected from monitoring probes to calculate energy for the device.

  - Static – Use the nameplate attributes defined in static attributes for the device.

- None (or null) – Do not include this device in Energy reporting.

■ Voltage Select – Manufacturers report nameplate attributes based on a range of selected voltages. The user can define which voltage level to use for nameplate reporting actions. The available options are as follows:

  - 100V – Use the attributes with the "@100V" setting.

  - 200V – Use the attributes with the "@200V" setting.

  - Custom – Use the attributes with the "@Custom" setting.

  - None – Do not use this device in energy reporting calculations.

Based on the Power Source selection static or monitor the data is either set as a static attribute, or pulled from a monitor attribute.

Power

Power Source	Static	Monitor
Rack Power	Attributes named "Power" of rack	MA named "Layer - Power" of rack
PDU Rackmount	■ Count all devices with Energy Device Type = "Energy Transport" and "Energy Source" ■ Attributes named "Power"	■ Count all devices with Energy Device Type = "Energy Transport" and "Energy Source" ■ MA named "Layer - Power"
It Devices	■ Count all devices with Energy Device Type = "IT Device" ■ Attributes named "Power"	■ Count all devices with Energy Device Type = "IT Device" ■ MA named "Layer - Power"

Current

Power Source	Static	Monitor
Rack Power	Attributes named "Current" of rack	MA named "Layer - Amps" of rack

Power Source	Static	Monitor
PDU Rackmount	■ Count all devices with Energy Device Type = "Energy Transport" and "Energy Source" ■ Attributes named "Current"	■ Count all devices which Energy Device Type = "Energy Transport" and "Energy Source" ■ MA named "Layer - Amps"
It Devices	■ Count all devices with Energy Device Type = "IT Device" ■ Attributes named "Current"	■ Count all devices with Energy Device Type = "IT Device" ■ MA named "Layer - Amps"

BTU

Power Source	Static	Monitor
Rack Power	Attributes named "BTU" of rack	MA named "Layer - BTUs" of rack
PDU Rackmount	■ Count all devices with Energy Device Type = "Energy Transport" and "Energy Source" ■ Attributes named "BTU" ■ If the "BTU" is null, it calculates the BTU from the Power attribute.	■ Count all devices with Energy Device Type = "Energy Transport" and "Energy Source" ■ MA named "Layer - BTUs" ■ If the "Layer - BTUs" is null, it calculates the BTU from Layer - Power.
It Devices	■ Count all devices with Energy Device Type = "IT Device" ■ Attributes named "BTU" ■ If the "BTU" is null, it calculates the BTU from Power attribute.	■ Count all devices with Energy Device Type = "IT Device" ■ MA named "Layer - BTUs" ■ If the "Layer - BTUs" is null, it calculates the BTU from Layer - Power.

Links

Links on device menus let you add single click access to a variety of content for a particular device. When you click a device, you see the links defined for that device. When defined at the model level, all devices based on that model automatically inherit the links defined.

The following types of links are available to add to a model/device by default. Note that other link types may be added if custom plug-in integration is completed for a particular customer:

- Local File – Used for images, documents or other files to be uploaded for the device. Provide the link name in the Label field and click the Upload button to find the document to be associated with the link.

- External Link – Used for a hyperlink to a URL on the internet. After assigning the link name in the Label field, type the URL in the form of http://www.visualdatacenter.com in the Action field.

- Text Popup – Used to display a popup text box with designated text. This box is commonly used to display Support Information for a device. In the Action field, enter the text to be displayed when the user clicks on the link on the device pop-up.

Manage Links

After links have been added to the model or device, you can add, edit, delete, or change the order of the links

- To add a link, click the New Link button and provide the fields as defined in the section above for the new link.

- To edit a link, change the label or action of the link and click Modify.

- To delete a link, select the link and then click the Delete Link button.

Images

The application lets you add custom images for your devices. By default, models inherit the Images defined at the Device Type level. However, if images are defined at the Model level, they override the Device Type settings.

Similar to the Device Type level, four types of images can be managed at the Model level:

- Icon, Front & Back – This image is used in the Rack Builder module and must be a flash (.swf) image type to work correctly.

- Photo – This image is displayed when you double-click the device from a list in the administrative web interface. The image is displayed in the device popup window.

To add an image, click the Browse button, find the image to be used for the Model, click the Upload button, and choose the image type from the Image Key drop-down box.

To remove an image from the device type, click on the image and select the red "x" in the top, left corner of the image.

Attributes

Attributes are a key part of the model system since many of the reporting metrics are based on attributes available at the device level. Model attributes and their values are inherited to all created Devices based on that model.

Inherited Attributes

By default, models display the attributes defined for their Device Type, but the values of these attributes can be defined at the model level. For example, a Liebert Series 610 UPS displays the attributes defined for the UPS Device Type. The attributes inherited from the Device Type level have a red asterisk next to the attribute name. In addition, the inherited attributes cannot be deleted from the model, so the Remove link does not appear for these attributes.

Add New Attributes

If the list of inherited attributes does not include an attribute needed for a particular model, you can add additional attributes to the model. When viewing the Model attributes, click the Add Attribute button on the top right of the screen and the Device Attribute List dialog is displayed.

Select the attributes that need to appear at the Model level and click Submit to add the selected attributes to the list. You will notice that these attributes do not have the red asterisk next to the name, which indicates they have been added at the Model level and not inherited from the type level. When these attributes are added to the list, they will have a Green plus symbol in the Action Icon column. This symbol indicates that attribute will be added to the model when the Modify button is selected.

Remove Attributes

As mentioned previously, attributes inherited from the Device Type level (red asterisk) cannot be removed at the model level. However, other attributes that have been added to a model will have the Remove link activated. To remove the attribute from the model, click the Remove link next to the attribute name. A red X appears next to the attribute to indicate that this attribute will be removed when the Modify button is selected for the model.

Change Attribute Values

In many cases, models have predefined values for certain attributes of the model. To update the values of these nameplate attributes, click the value field for the attribute and enter a new value. When an attribute has been changed, a grey asterisk appears in the action icon column to indicate that the value has been changed and will be modified when the Modify button is selected. The values assigned to attributes are inherited by all devices in the system, based on the Model.

After an attribute value has been edited, but before the Modify button is selected, you can click the Undo link to the left of the attribute to revert the attribute value to the original value.

Ports

Devices in the device list have ports that let you manage that device's relationships with other devices. These ports are created and managed on the Ports page accessed from the Model and Device menus. Relationships between devices are created in the Port Mapping module of the client.

Different types of ports can be created for a device, and each has a specific function within the application:

- Network In and Network Out – Lets you define relationships between devices and their network ports. An example of this relationship is a 24-port switch that has 24 relationships with network-out ports to end devices such as servers. This feature enables reporting on Port Capacity for network components and racks.

- Power In and Power Out – Lets you create a power diagram that displays how power is provided to a device and how a device provides power to other devices.

View and Edit Ports

Clicking the Ports tab displays the list of currently defined ports for the model. To change a property of the port, click the Port Name or the Description field and edit the value.

Delete Ports

To delete a port from the list, click the name of the port to be deleted and click the Delete Port button at the bottom of the screen.

Add Ports

To define new ports for the model, follow these steps:

1. Click the New Port button at the bottom of the screen.

The Ports page is displayed.

2. Do the following:

- Select the Port Type from the dropdown based on which type of port needs to be created.

- Provide the Starting and Ending Port Numbers – Automatically creates multiple ports based on the Starting and Ending numbers provided with the number appended to the prefix name.

- Assign a Port Name Prefix – This field is not required but lets you add a prefix to the port number. For example, creating a port with start = 1, end = 5, and prefix = N would create the ports N01, N02, N03, N04 and N05.

3. Click the Add button to add these ports to the Port list.

These ports will now be available in the Relationship Editor to map relationships between other devices with other defined ports. You can update Port Names manually by placing the cursor in the Name field and typing in a new name for the port.

Add Device Button

When viewing a model, you can create a device based on that model by clicking the Add Device button at the bottom of the model detail screen. The Create Device wizard opens on the Device Menu and pre-populates the wizard with the model details.

Device Menu

The Device menu on the Devices page lets you create, clone, and configure all devices that will be managed in other parts of the application. As discussed in the next sections, you have four options for creating devices in the Device Manager:

- Manually create devices

- Clone the device from an existing device

- Import the device from the Import spreadsheet

- Use Auto Discovery to find devices

After devices are created, they have several properties and attributes that can either be inherited from the model level or defined at the device level. The following types of settings can be controlled at the device level:

- Properties – Basic properties for the device.

- Links – Links to URLs, documents or other items available when the device is selected in the floor plan view.

- Images – icon, photo and front images used in other parts of the application.

- Attributes – Available attributes and their values that you can define for use in reporting and floor plan layer views.

- Ports – Available ports that you can define for mapping relationships to other devices by using the relationship editor.

- Access – Access information for a device over a selected protocol. This access information is primarily used for CMDB data collection of servers.

- Application – Applications/software that can be added manually to a device.

Device Management

The core function of the application is to let you manage information related to devices. One of the more important concepts to master is how to create devices in the device manager quickly and efficiently. The Model library is comprised of over 8,000 models. Administrators can easily add any missing models to this library. Managing the model library is detailed in the Model Menu section of this guide.

Create Devices Manually

You can create a single device in the Device Manger by selecting the New button at the bottom of the device list on the Device menu. Clicking this button displays a blank device template in the main portion of the application. You can provide the required information and select the Create New Device button to add the device to the device manager. Refer to the Managing Properties & Attributes section of this guide for specific information related to the device settings.

Device Clone Tool

If a similar device is already listed in the Device Manager, you can easily create multiple copies of that device by utilizing the clone tool on the device page. Select the device that you want to copy and click the Clone button at the bottom of the device list on the Device Menu. A dialog box opens and lets you specify the number of copies to create. Note that you are limited to 1000 copies to control abuse of the database system and avoid any corruption issues that may occur with excessive use of the clone tool.

After you click the OK button, the specified number of device copies are added to the device manager. The original name of the device is preserved, and a serial number is added in parentheses to the end of the original device name for all copies created.

You can then rename each of the copies of the devices to a new device name. If a large number of cloned devices have to be renamed, the export/import process can use an Excel spreadsheet to update device settings, including the device name, quickly and easily.

Important! The cloned devices are created based on the Model template of the original device and not the exact custom settings that the original device may have. The new devices will look as if they were created individually by means of the New button on the device page. If the original clone device has custom ports, attribute values, and so on, those settings are *not* cloned to the new devices.

Import & Export Device Tool

The Import & Export tool provides a powerful way to make mass changes to several devices in the device manager. You can use a standard Excel spreadsheet to add or modify new devices and existing devices with the click of a button. All Property, Energy, Attribute, and Port settings can be updated with this spreadsheet.

You can obtain a copy of the spreadsheet by accessing the Help menu and clicking on the Import/Export Spreadsheet link. Specific instructions for using the Import spreadsheet and the fields are located in the spreadsheet on the Instructions page at the bottom of the file.

Export Device Information

You can click the Export button to access the Export function while on the Device page. You can select the device names from the column on the left which need to be exported and then press the Add button to move them to the Selected Devices column on the right. The shortcut Ctrl and Shift keys can be used to select multiple devices at a time. The Export All button exports all devices if you would like to export information for all devices in the system. As soon as one device is selected in the list, the Export All button will convert to an Export button and only the selected device information can be exported.

If the device list needs to be filtered to specific list of devices, you can use two methods to reduce the number of devices presented. These two features can be used simultaneously to both filter on model information and device name if needed:

- Search field – Enter a partial device name and click the search icon to show only devices that match the search criteria provided.

- Filter options – Click the filter option and select specific Device Type, Manufacturer, Product Line, Model, and Operational/Available settings. When done, click the Set button to execute the filter on the device list. To reset the filter for all devices, click the Reset button.

When all required devices are selected, you can click the Export button. The devices and their associated information and settings are exported to the Excel spreadsheet. Device settings can then be updated in the spreadsheet and imported to update the device settings in the Device Manager.

Refer to the Instructions page on the Excel spreadsheet for information about each column of data in the spreadsheet. The Examples page provides sample records of devices to demonstrate the common actions for making changes to devices.

The other method to export all devices is from UNIX using below mentioned script
Execute command as /opt/VDC/bin/exportdevice.sh
output file will be located in folder   /var/tmp/device.csv

Import Device Information

After the Excel spreadsheets have been updated to add and manage devices, you can return to Web Admin interface and click the Import tab in the Device menu. You are prompted to select the Excel file from your computer or network.

After selecting the file, click the Submit button. The application will process the Excel spreadsheet. This processing includes an analysis of your data input to verify that the data is valid and to ensure model information and rack mount options are selected correctly.

If any errors are in the import spreadsheet, the error details are displayed in a table. The columns in the table are as follows:

- Sheet – The Worksheet (in the Excel file) that has an issue.

- Row - Refers to the row (in the Excel spreadsheet) that has an error.

- Column – Column that has an error value.

- Error - Provides text detail of the error.

You can then update the spreadsheet to address the issues discovered in the Import process. Press the Try Again button to upload the new Import spreadsheet. If the file review does not encounter issues, a list of all devices to be imported is displayed. The total number of devices to be created or updated is listed in parentheses on the top line.

Select the Confirm button to commit changes to the Device Manager or the Cancel button to terminate the import process and return to the spreadsheet.

PDU Import/Export

The Import and Export function for PDUs allows users to manage breakers and panels on PDUs. The following explains the PDU spreadsheet and also provides examples of how to create panels, breakers, and connections.

Panel Sheet

PDU Information

This section references the PDU that the panels and breakers belong to.

PDU UUID

The universal unique identifier that the application uses to distinguish the PDU.

NOTE: When referencing a PDU you need the UUID if the PDU name is not unique.

PDU Name

Name of the PDU.

Panel Information

This sections references the Panel that belongs to a PDU.

- A panel that appears on this list must have a PDU defined.

- A panel doesn't need to have a breaker defined

Panel UUID

The universal unique identifier that the application uses to distinguish the panel.

Panel Name

Name of the panel.

View Mode

This describes how the panel is laid out. The two view options are Double Table and Single Table. A double table refers to a circuit board that has two columns with either all odds on one side and even circuits on the other or 1-21 on one side and 22-42 circuits on the other side. The single table refers to a circuit board that has all 42 circuits in one column.

NOTE: All panels that belong to the same PDU must all have the same view mode.

Numbering Schema

The two numbering schemas that are available are 1,3,5 and 1,2,3. The numbering refers to how the first column circuits are displayed. 1,2,3 refers to a schema that has all circuits going in sequential order either 1-21 or 1-42 depending on the View Mode applied. If 1,3,5 is chosen it refers to all odd circuits on the left and all even circuits on the right.

NOTE: Only the 1, 2, 3 schema is available for the Single Table.

NOTE: All panels that belong to the same PDU must all have the same numbering schema.

Department

The department that the power being consumed for all circuits on this panel belong to. The live power reading that comes from the circuits on this panel associated to the department will be added together and a kWh will be calculated and applied towards this customer's power draw. The results are displayed in the Customer Power Report.

NOTE: If the department is set at the panel all breakers will automatically be associated to the department defined at the panel. If the breaker is then set to have a different department association, then only the breaker will change departments. The department must exist in the department list in the 2D web UI.

Current Capacity

The Amp capacity of the panel.

Breaker Information

This section references the breaker that belongs to a panel. A breaker that appears on this list must have a panel and PDU defined.

Breaker UUID

The universal unique identifier that the application uses to distinguish the breaker.

Breaker Name

Name of the breaker.

Phase

There are three phase options available: 1-Pole Breaker, 2-Pole Breaker, 3-Pole Breaker.

When calculating the kW for a breaker, two things are accounted for: voltage, and phase. The below table describes how the application calculates power based on the phase of the breaker.

Phase	Power Calculation
1-Pole Breaker	ampere * 120 / 1000
2-Pole Breaker	highest leg ampere reading * 208 / 1000
3-Pole Breaker	highest leg ampere reading * √3 * 208 / 1000

Circuit #

The circuits that are being used by the breaker. The circuits being used will depend on the view mode, numbering schema, and phase.

Department

The department that the power being consumed on the circuits belongs to. The live power reading that comes from the circuits associated to the department will be added together and a kWh will be calculated and applied towards this customers power draw. The results are displayed in the Customer Power Report.

NOTE: If the panel has a department currently set, setting the breaker department will only override the department for that breaker. The department must exist in the department list in the 2D web UI.

Current Capacity

The capacity of the breaker. Unit is in Amps

Voltage

The voltage of the breaker.

Creating breakers and panels through import

The below will explain how to populate the PDU with panels and breakers.

1. Populate the PDU Name cell with the name of the PDU that the panels and breakers belong to. In this example our PDU name will be PW – PDU.

   No UUID is necessary unless the PDU name is not unique.

2. Populate the Panel Name cell with the name of the panel to be created. In this example three panels will be created: Panel A, Panel B, and Panel C.

   All panels must follow after the PDU is referenced, but you don't need to reference the PDU on each subsequent panel. Refer to the image.

	A	B	C	D	
1	PDU Information				
2	PDU UUID	PDU Name	el U	Panel Name	Vie
3	cf31b9b2-21	PW - PDU		Panel A	
4				Panel B	
5				Panel C	
6					

3. Define a view mode. In this example we are creating a circuit board that has all odds the left and all evens on the right. The view mode that creates that panel is a Double Table.

4. Define the numbering schema. Since the view mode is set to Double Table, we can use both options: 1,3,5 or 1,2,3. The circuit board that is to be created is all odds on the left and evens on the right, the 1,3,5 option will provide us with the correct layout.

5. Define the current capacity. The capacity in our example is equal to 200.

	A	B	C	D	E	F	G	H
1	PDU Information				Panel Information			
2	PDU UUID	PDU Name	el U	Panel Name	View Mode	Numbering Shema	Department	Current Capacity
3	cf31b9b2-21	PW - PDU		Panel A	Double Table	1,3,5...		200
4				Panel B	Double Table	1,3,5...		200
5				Panel C	Double Table	1,3,5...		200
6								
7								

6. When defining breakers for a panel, the same rules apply for breakers to panels that apply for panels to PDU; all breakers associated to a panel must follow immediately after the panel in the excel file. With our example rows must be inserted to make room for the breakers.

7. Add breaker names. In our example each panel will get two breakers except for Panel C which will get 3 breakers.

8. Add the phase definition for each breaker.

Breaker Information			
Breaker Name	Phase	Circuit#	Depa
AB1	1-Pole Breaker	1	
AB2	2-Pole Breaker	3,5	
BB1	2-Pole Breaker	2,4	
BB2	2-Pole Breaker	1,3	
CB1	3-Pole Breaker	1,3,5	
CB2	3-Pole Breaker	7,9,11	
CB3	3-Pole Breaker	26,28,30	

9. If there are any departments that the power is to be associated to, define the departments.

10. Define the capacity of the breaker and the breaker voltage.

Breaker Information						
Breaker UUID	Breaker Name	Phase	Circuit#	Department	Current Capacity	Voltage
	AB1	1-Pole Breaker	1	DC Devices	15	120
	AB2	2-Pole Breaker	3,5	DC Devices	20	208
	BB1	2-Pole Breaker	2,4	DC Devices	20	208
	BB2	2-Pole Breaker	1,3	DC Devices	20	208
	CB1	3-Pole Breaker	1,3,5	CompuSoft	30	208
	CB2	3-Pole Breaker	7,9,11	CompuSoft	30	208
	CB3	3-Pole Breaker	26,28,30	CompuSoft	30	208

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	PDU Information				Panel Information						Breaker Information				
2	PDU UUID	PDU Name	el U	Panel Name	View Mode	Numbering Shema	artnnt	Capker U	Breaker Name	Phase	Circuit#	Department	Current Capacity	Voltage	
3	cf31b9b2	PW - PDU		Panel A	Double Table	1,3,5...		200	AB1	1-Pole Breaker	1	DC Devices	15	120	
4									AB2	2-Pole Breaker	3,5	DC Devices	20	208	
5				Panel B	Double Table	1,3,5...		200	BB1	2-Pole Breaker	2,4	DC Devices	20	208	
6									BB2	2-Pole Breaker	1,3	DC Devices	20	208	
7				Panel C	Double Table	1,3,5...		200	CB1	3-Pole Breaker	1,3,5	CompuSoft	30	208	
8									CB2	3-Pole Breaker	7,9,11	CompuSoft	30	208	
9									CB3	3-Pole Breaker	26,28,30	CompuSoft	30	208	

11. The fields that were not populated will be hidden in the next screenshot.

12. Import the spreadsheet. The import successful message will not list the breakers and panels that are created but will say the PDU was successfully updated. If the spreadsheet is unsuccessful, it will list the reasons and reference the errors with the panels and/or breakers.

13. New breaker and panel devices will appear in the device list. If the PDU that was being imported is Operational, then all created and imported breakers and panels will become Operational as well.

Connections Sheet

Sheet two of the PDUImport.xlsx file (Connections) allows users to create port connections between breakers on PDUs and other devices within the application.

Cable Information

This section of the sheet describes the connection attributes between two entities.

Cable UUID

The universal unique identifier that the application uses to distinguish the connection between two entities.

Cable Name

The name of the cable connection between two devices.

Cable Serial Number

The serial number associated to a cable.

Cable Color

The color of a cable between two devices. The color of this connection will be seen on the floor plan when viewing cables. Cable color must be in hexadecimal color code. Use the following link to find out color codes: http://www.w3schools.com/tags/ref_colorpicker.asp

Cable length

The length of the cable connection. This is user entry, not automatically determined.

Breaker Information

This section describes which breaker is to be part of the connection.

Breaker UUID

The universal unique identifier that the application uses to distinguish the breaker. If the UUID is not provided, the PDU, PDU Panel, and Breaker name cells must be populated. If the UUID field is populated, the subsequent Breaker Information sub fields don't need to be populated.

PDU

The name of the PDU that breaker belongs to.

PDU Panel

The name of the PDU panel the breaker belongs to.

Breaker Name

The name of the breaker.

Provides Power To

This section describes what device and port the breaker is connected to.

Provides Power To {device uuid, port uuid}

The user only needs to populate this sub field if the device name (consumer device) is not unique. The format of the entry must be in braces and the device uuid and port uuid must be separated by a comma.

Provides Power To {device name, port name}

The user may only populate this field and not column J if the device name is unique. The format of the entry must be in braces and the device name and port name must be separated by a comma.

Creating connections between breakers and devices

Follow the below steps to create connections between breakers and other devices. An example will be created through the steps.

1. Export a PDU that contains the breakers that are to be connected to other devices by selecting the Export PDU button in the 2D web UI.

2. Populate the fields:

   a. Provide a cable name. This is the only mandatory field with the Cable Information group.

   b. Provide breaker information. Since the breaker we are creating connections with was exported, all information needed is on the Panels sheet.

   c. Provide consumer device information. If the device has a unique name then column K can be populated. If the device name is not unique UUIDs must be provided in column.

	Cable Information			Breaker Information					Provides Power To
	Cable Name	Cable Serial Number	Cable Color	Cable Length	Breaker UUID	PDU	PDU Panel	Breaker Name	(dev | Provides Power To{device name, port name)
3	CB1 to RPDU1	SNC1233	#4C0000	5		PW - Panel C	CB1			(RPDU1, pi 1)
4	CB3 to RPDU2	SNC1234	#4C0000	10		PW - Panel C	CB3			(RPDU2, pi 1)
5	CB2 to RPDU3	SNC1235	#4C0000	15		PW - Panel C	CB2			(RPDU3, pi 1)
6	AB2 to RPDU4	SNC1236	#4C0000	20		PW - Panel A	AB2			(RPDU4, pi 1)
7	AB1 to RPDU5	SNC1237	#4C0000	20		PW - Panel A	AB1			(RPDU5, pi 1)
8	BB1 to RPDU6	SNC1238	#4C0000	20		PW - Panel B	BB1			(RPDU6, pi 1)
9	BB2 to RPDU7	SNC1239	#4C0000	20		PW - Panel B	BB2			(RPDU7, pi 1)

3. Import the spreadsheet. The import successful message will not list the cables that are created but will say the PDU was successfully updated. If the spreadsheet is unsuccessful, it will list the reasons and reference the errors with the cables.

Attributes and Properties Management

You can manage the following:

■ Device properties

■ Links

■ Images

■ Attributes

■ Ports

■ Access

■ Application

Properties Tab

The Properties tab provides the basic information for the selected Device. The following fields are defined on this page:

■ Device Name – The name used to identify the device.

■ UUID – This value is the system ID associated with a device. This ID is guaranteed to be unique across all devices in the database.

■ Device Type – The Device Type of the selected device.

■ Manufacturer – The Manufacturer of the selected device.

■ Product Line – The Product Line of the selected device.

■ Model – The Model of the selected device.

■ Description – Basic description of the device.

■ Group – Device Group for the selected device.

■ Owner – Owner of the device. This list is managed in the Owner menu on the Monitor tab.

■ Department – This field lists all Company – Department combinations created on the System Tab so the device can have an owner.

■ Energy Data Source – Defines where the values should be collected to report on Energy attributes. Available options are as follows:

– Monitor – Use the values collected from SNMP, IPMI or Modbus probes for the energy reports and calculations.

– Static – Use the nameplate attributes defined for the device.

– None – Do not include this device in Energy reporting.

- Energy Device Type – Each device is assigned an Energy category which allows the application to group similar devices for reporting. These categories also allow the application to very easily calculate a series of data center efficiency metrics. The options for this setting are as follows:

  - Energy Source – This value defines the amount of power delivered to the facility. For efficiency purposes, this allows us to understand the total power consumed at the facility and will inform users of how efficiently power is being delivered to end devices.

  - Energy Transport – All devices used to deliver power form the source to the end devices will fall into this category. For example, PDU, UPS, switch gear and other similar devices will deliver power thru the facility to the end devices.

  - IT Device – This value is the target of the power provided to the facility. For example, servers, storage and network gear would typically be assigned this category.

  - Non-IT Device – In some instances, computers, monitors and other IT devices are located in the data center but are not the end user IT devices which the data center is designed to support. AN example of a Non-IT device would be the system administrator's computer which is located in a cube within the data center facility.

  - IT Cooling Device – This is any type of cooling device used in the data center. This device is tracked separately from other facility devices to better understand the impact that cooling power consumption has on the data center and allows for cooling specific efficiency calculations.

  - Non-IT Cooling Device – In some instances there are cooling devices which serve locations other than the Data Center which are served by the data center power source. These are also tracked separately to improve the accuracy of the efficiency calculations used for the data center facility.

- Selected Voltage – Manufacturers report nameplate attributes based on a range of selected voltages. Users can define which voltage level to use for nameplate reporting actions. The available options are as follows:

  - 100V – Use the attributes with the "@100V" setting.

  - 200V – Use the attributes with the "@200V" setting.

  - Custom – Use the attributes with the "@Custom" setting.

  - None – Do not use this device in energy reporting calculations.

- Description – Basic description of the device.

- Device Location Section – Provides information on the location of a device if it has been assigned to a floor plan. If it has not been assigned to a floor plan then these fields will be left blank. . If the device is mounted on a position which is belong to more than one area, the areas will all displayed in the device Area location. If a non-admin user just has one area privilege, only the area that he has privilege is displayed in Device Location and Attribute

Links

Links on device menus let you easily add single-click access to a variety of content for a particular device. When you click a device, the links defined for that device are displayed. When defined at the model level, all devices based on that model automatically inherit the links defined.

The following types of links are available to add to a model or device by default. Note that other link types may be added if custom plug-in integration is completed for a particular customer:

- Local File – Used for images, documents or other files to be uploaded for the device. Provide the link name in the Label field and click the Upload button to find the document to be associated with the link.

- External Link – Used for a hyperlink to a URL on the internet. After assigning the link name in the Label field, type the URL in the form of http://www.website.com in the Action field.

- Text Popup – Used to display a popup text box with designated text. This box is commonly used to display Support Information for a device. In the Action field, enter the text to be displayed when the user clicks on the link on the device popup.

After links have been added to the model or device, you can add, edit, delete or change the order of the links with the following actions:

- Add – Click the New Link button and provide the fields as defined in the section above for the new link.

- Edit – Change the label or action of the link and click Modify.

- Delete – Select the link and then click the Delete Link button.

- Change Order – Links have a drag and drop function. Click and drag a link up or down the list and drop it in the list where you would like for it to appear.

Images

Users can add custom images for your devices. By default, devices inherit the Images defined at the Model level. However, if additional photo images are needed, they can be uploaded on the Images page.

Unlike the Device Type and Model levels, only one type of image can be managed at the Device level. When you upload new images at the Device level, they are automatically assigned the Photo type. This image is displayed when you double-click the device from a list in the administrative web interface. The image is displayed on the device popup window.

To add an image, click the Browse button, find the image to be used for the Device, and click the Upload button.

To remove an image from the device, click the image and select the red "x" in the top, left corner of the image. Images inherited from the Model cannot be deleted at the device level.

Attributes

Attributes are a key part of the system since many of the reporting metrics are based on attributes that are available at the device level. Model attributes and their values are inherited by all Devices that are based on that model when they are created.

Inherited Attributes

By default, devices display the attributes defined for their Model, but the values of these attributes can be inherited from the model or defined at the device level. For example, a Liebert Series 610 UPS device named UPS01 will display the attributes defined for the Liebert Series 610 model. The attributes inherited from the Model level have a red asterisk next to the attribute name. In addition, the inherited attributes cannot be deleted from the device, so the Remove link does not appear for these attributes. To delete these attributes, you must remove them at the model level, which impacts all devices created based on that model.

Add New Attributes

If the list of inherited attributes does not include an attribute needed for a particular device, you can easily add additional attributes to the device from the available attribute list. When viewing the Device attributes, click the Add Attribute button on the top right of the screen. The Device Attribute List dialog lists all attributes in all categories that are not already assigned to the device:

Select the attributes that need to appear at the Device level and click Submit. The selected attributes are added to the list. These attributes do not have the red asterisk next to the name, which indicates that they have been added at the Device level. When these attributes are added to the list, they will have a Green plus symbol in the Action Icon column. This symbol indicates that the attribute will be added to the device when the Modify button is selected. You can assign values for the attributes and then click the Modify button to save these changes to the device.

Remove Attributes

Attributes inherited from the Model level (red asterisk) cannot be removed at the device level. However, other attributes that have been added will have the Remove link activated. To remove the attribute from the device, click the Remove link next to the attribute name. This action places a red X next to the attribute to indicate that it will be removed when the Modify button is selected for the device.

Change Attributes

If you would like to update the values of any attributes, click the value field for the attribute and enter a new value. When an attribute has been changed, a gray asterisk appears in the action icon column to indicate that the value has been changed and will be updated when the Modify button is selected.

To change the attribute value back to the default value inherited from the Model, click the Undo link next to the attribute and click the Modify button for the device.

Ports

Devices in the model library have ports that let you manage that device's relationships with other devices. These ports are created and managed on the Ports page accessed from the Model and Device menus.

Four types of ports can be created for a device, and each has a specific function:

- Network In and Out – Lets you define relationships between devices and their network ports. An example of this relationship is a 24 port switch that has 24 relationships with network ports on end devices such as servers.

- Power In and Out – Lets you create a power diagram that displays how power is provided to a device and how a device provides power to other devices.

View and Edit Ports

Clicking on the Ports tab displays the list of currently defined ports for the device. By default, the device inherits any ports defined at the model level. To change a property of the port, click the Port Name or the Description field and edit the value. The Network and Speed settings are used to help with the Auto Assign and Port Reservation functions. Two ways to create new items in the Network and Speed drop-down selection boxes are as follows:

- Click the drop-down from this port screen and select the New… entry in the list. Provide the information required in the next screen and select Save.

- Select the Network or Speed tabs in the Management Tools module, accessible form the top banner of the web administrative interface, and create new entries for these lists.

Delete Ports

To delete a port from the list, click the name of the port to be deleted and click the Delete Port button at the bottom of the screen. The port assignment is removed from the device.

Add Ports

To define new ports for the device, follow these steps:

1. Click the New Port button at the bottom of the screen.

   The Ports page is displayed.

2. Select the Port Type from the dropdown.

3. Note that SFP ports can be used to connect to Fiber and Copper Network ports.

4. Provide the Starting and Ending Port Numbers.

   The application will automatically create multiple ports based on the Starting and Ending numbers provided.

5. Assign a Port Name Prefix

   This field is not required but lets you add a prefix to the port number. For example, creating a port with start = 1, end = 5, and prefix = N will create the ports N01, N02, N03, N04 and N05.

6. Click the Add button to add these ports to the Port list.

Access

Access is used for the configuration of the CMDB, which is same as Auto-Discovery. The CMDB monitors the applications/software changes on the servers.

Application

Application is used for adding server applications/software manually. After you set the CMDB on the Access tabbed page, the Application tabbed page lists all applications installed on the server.

Note: Adding application software requires an application license, which you can add on the Systems-Application tabbed page.

Search and Filter Functions

The Model and Device lists can easily grow to contain thousands of models and devices for a given instance. It is important to have an easy method to locate models, devices, or both that need to be modified. Using the Search and Filter methods, you can quickly locate and work on device properties and settings on the Device page. Note that the device lists can be sorted, based on the columns provided, by clicking on the column heading.

Search Models and Devices

In the search bar at the top of the list, enter the first few characters of the model. The model list will be filtered, based on the partial entry in this area. For example, suppose you are searching for all models that start with "dl". The filter action occurs after a 1 second pause of typing in this search box. During the filter process, the search bar is locked until the list has been presented. The search box is *not* case sensitive.

Filter Models and Devices

In some cases you may not know the exact name of the model or device, but may know some characteristics such as "Dell" and "PowerEdge". Clicking the Filter icon next to the search bar displays the filter drop-down where you can provide search criteria for the Type, Manufacturer and Product Line for the model list. Select the known properties of the model and click the Set button. This action closes the filter view and displays only the list of models that meet the criteria defined.

On the Device List, you can also filter the list, based on whether a device has been assigned to a floor plan or is available. Use the radio buttons for All, Operational or Available, which are located under the other filter drop down boxes.

To return to the full list of models or devices, click the Reset button while on the Filter view of this page.

Devices - Monitor Subtab

The Monitor tab on the device menu lets you configure specific monitoring settings for a device so that it can be added to the polling engine. SNMP, IPMI, Modbus, HTTP/XML and custom protocol settings are defined to control how the device is polled within the monitoring system. When the Monitor tab is selected, the Monitor page displays production status, protocol configuration, and target information.

Activate Monitor Tab

The Monitor Tab is not necessarily visible for all devices, so you must verify that it is activated for the Device before protocol configuration can take place. This activation is defined on the Monitor Tab under the Plug-in Management menu. Select the Monitor plug-in and choose the Type, Manufacturer, Product Line or Model that should receive the Monitor tab on the Device Menu. As long as the device matches one of the assigned categories for the Monitor plug-in, the Monitor tab will be visible on the Device page. By default, all Device Types are activated for the Monitor plug-in, which displays this tab on the device page.

Common Protocol Settings

Regardless of the protocol to be configured, the following monitoring attributes are defined for the device.

- Production Status – Determines if the device should be included in the relevant monitoring probe configured on this page. Regardless of this setting, if the device has an IP Address configured for monitoring, it counts towards the license quota for Monitored Devices.

    - Production - Indicates the device should be actively polled for data if monitor configuration is provided. By default, this field is set to Production.

    - Inactive – Indicates this device should not be included in the monitoring probe activity. When set to Inactive, new data is not be collected for the device even if proper monitoring configurations are provided for the device.

- Retries – If selected, the polling engine retries a polling attempt that did not respond during the timeout period. If the specified number of retry attempts also fails to get a response from the device, the probe stops trying for a response on this polling attempt.

- Location – Determines which probe engine will be the primary source for collecting the raw data from the device.

- Probe Interval – Defines the probe interval for the polling engine to use to collect data from the device. By default this is set to 60 seconds.

- IP Address – Defines the IP address of the device providing the data for the device. Note that if gateways or aggregators are used to provide data, use the IP Address of these devices and not the end device.

- Timeout – Defines the period of time in which the polling engine considers the device to be unreachable for a specific polling attempt if no response is received from the target device.

- Protocol List – Any available protocols to be used for a device are listed in the table below the IP address. These protocols are made available to devices based on their configuration on the Monitor Tab in the Monitor Register menu section. The Advanced tab provides settings and configurations to be defined for each protocol.

SNMP Settings

You can select the SNMP Advanced button and apply the SNMP specific configurations for the device as follows.

- Port – SNMP port to use for communication with the device. Port 161 is assigned by default.

- Protocol – By default, the SNMP protocol is set to UDP and is not configurable.

- Version – SNMP can operate on v1, v2 and v3 versions. The version information must be set correctly to communicate with the device.

- Get Community – This value is the snmpget community string used for the device. By default, public is set for this field.

- Set Community – This value is the snmpset community string used for the device. This value is needed only if set commands are executed against the device.

- Other Settings – Other settings can be defined for advanced SNMP configuration and access to the information from the device.

IPMI Settings

If the IPMI protocol check box is selected, the IPMI tab is activated. You can then apply the IPMI-specific configurations for the device as follows:

- Port – Port to be used to communicate with the device. By default, this value is set to port 623.

- User Name – User name for the IPMI account on the device.

- Password – Password for the IPMI user on the device.

- CmdType – IPMI uses either the sdr or sensor command to collect detailed sensor information from the device. You can choose which of these commands to use.

- AuthType – Security setting for the communication with the device. By default, this value is set to none, but can be updated as needed if security settings have been applied to the IPMI protocol on the device.

- PrivelegeLevel – IPMI allows custom control of the access granted for the account. By default, this value is set to Admin, but other options can be defined if needed.

Modbus Settings

If the Modbus protocol check box is selected, the Modbus tab is activated. You can then apply the Modbus specific configurations for the device as follows:

- Device Number – Device Number for the Modbus TCP connection.

- Port – Port to use for the communication over Modbus TCP. The default value is port 502.

BACnet Settings

If the BACnet protocol is selected, the device will have the following configuration options:

- Device Instance – This value will be defined in the BACnet configuration of the target device.

- Port – The default port is used for communication. This setting can be updated if necessary.

HTTP/XML Settings

If the HTTP/XML protocol is selected, the device will have the following configuration options:

- Type

- TagId

- Port

- Username

- Password

The likely scenario for this protocol option is that these fields will be pre-populated by an auto discovery process, but they can be entered manually if needed.

VMWare ESX

If your server is a VM host running VMWare ESC operating system, then configuration parameters can be defined to enable the VM dashboard interface for the device. Upon entering the username and password the system will check to see if it is a valid VM and if your username and password are correct. Only one server device can be configure with the same IP and user access information.

- Username

- Password

Target & Target Member Lists

At the bottom of the Monitor page is the list of available target and target members that can be monitored for the selected device. You can select a Target in the Target list, which shows the Target Members that comprise that Target. The items selected in these lists are collected from the selected device when the polling engine performs a polling event against the device.

Note that a Target and Target Member do not appear on this page unless a monitor attribute for that device is mapped to one of the target members. Refer to the Monitor Attributes Manager section of this guide for more information on mapping Target Members and Monitor Attributes to enable this setting.

Testing Configuration Settings

After the settings have been applied to the device, you can click the Verify button to conduct a sample polling of the device as configured on this page. A window displays the configured Target Members and results from the polling attempt. If the target member is unreachable, the Value will be null and the Status Msg column will indicate that the given data point is unreachable. This helpful tool lets you know if the monitoring configurations are set up correctly.

Camera

Camera tab is activated when the device type is Camera. The Camera option requires Camera information which is mainly the ftp_user which is the user name that is added on the image server. For FTP Camera to work, the ftp user needs to be set up on the image server and the ftp settings needs to be configured on the camera itself.

Attributes Manager Menu

Users can define custom attributes or properties that can be assigned to device types, models, or devices. By creating these custom attributes on the Device Tab – Attributes Manager, you can then assign them to the device type, model, or device levels of the device hierarchy. This section describes how to create, edit and delete these custom attributes. Refer to the other help documents to understand how to assign these attributes to those particular levels.

When you select the Attributes Manager menu item on the Device Tab, a list of custom defined attributes appears on the left and specific details about the selected attribute appear on the right of the application window.

Create Custom Attributes

The application is preloaded with standard attributes related to the following categories:

- Capacity

- Common

- Electrical/Power

- Environmental

- Network

You can define custom attributes by using the Attribute Manager and assign them at the type, model, and device level of the device hierarchy.

To create the new attribute, click the New button below the list of previously defined custom attributes. A new attribute template appears on the main portion of the screen. Complete the fields, described as follows:

- Name – New attribute name.

- Category – Defines which group category displays the custom attribute.

- Data Type – Defines the data type of the attribute value:
    - Decimal – Decimal value.
    - Integer – Integer value.
    - String – Text value.
    - Datetime – Calendar date/time value.

- Uniqueness – If set to Yes, then "duplicate values" for the attribute is not allowed for all devices. If set to No, then "duplicate attribute values" can be assigned to different devices. An example of where this value may be set to Yes is an attribute similar to Asset Tag, where a unique asset tag number would be expected for each device in the system.

- Usage – This field is a deprecated feature in version 2.1 and will be removed from the user interface in a patch release.

- Description – Basic description of the attribute.

Define Attribute Units

When the Data Type field is set to Decimal or Integer, you are prompted to define a System Unit or a Custom Unit for the attribute. You can select a predefined set of system units or create a custom unit designation for the new attribute.

The following custom unit options let you define a new unit for the attribute:

- Custom Unit – Name of the custom unit assigned to attribute.

- Decimals – Number of decimals to use by default for the attribute.

The system unit options consist of the following:

- Quantity – Categories that contain specific units of measure for the attribute created. Selecting one of these populates the other fields with available units for that category.

- Internal Unit – Defines how to display the default values for the attribute.

- Metric Unit – When you opt for Metric Units in user settings, the units to be displayed.

- US Unit – When you opt for US units in user settings, the units to be displayed.

- Decimals – Default number of decimals to display for the attribute.

Note that using a System attribute lets you convert target members to monitor attributes by using different units. For example, you can collect data from a device in kW but display in gauges with Watts. This option is not available if a custom unit is defined.

Edit Attributes

The system attributes defined within the application are not available for editing. The custom defined attributes on the Attributes Manger menu, however, are able to be modified. You can select the attribute that you want to edit, make changes to the attribute properties, and click OK to save changes to the attribute.

Delete Attributes

To delete a custom defined attribute, select the attribute name in the left menu area of the application and click the Delete button on the right of the screen. When an attribute is deleted, it is removed from the attribute settings for all Types, Models, and Devices to which it has been assigned.

Chapter 4: Admin > System Tab

Managing Rights Access

A key component to any implementation is the management of the users and access control rights they have within the system. The System Tab lets administrators manage detailed access controls for all users created in the system. These controls relate to all devices, locations, reports, and other components of the instance.

Companies Menu

The companies section of the System Tab lets administrators manage multiple companies in the same instance. When users are created, a company designation is required to allow controls for reports and access rights to be applied at the company level.

- To add a new company, click the New button and complete the fields shown in the main portion of the screen.

- To delete a company, select the company from the list and click the Delete button.

Departments Menu

The Departments menu on the System Tab lets users manage and report devices, based on the departments that own them. Each device is assigned to a department on the Device Tab, and the options available for this assignment are based on the departments added to this list on the System Tab. In addition, a department setting is assigned to all users added to the system.

Device Groups Menu

Device groups let administrators manage rights access to all devices created in the application. Grouping several devices together in a device group lets administrators assign create, modify, delete, and view rights to these groups. These privileges are managed in the User Groups menu section of the System Tab.

The Device groups menu lets you manage the device group and the devices assigned to that device group. Devices that do not have a device group setting can be managed only by users in the administrators group. Other users can only view and manage devices where they have explicitly been granted rights to a Device Group that contains the device.

Create Device Group

To create a new device group, click the New button in the menu area, provide a Device Group Name and a Description, and click the Create button. The device group is added to the list of device groups that can be managed in the application.

Manage Devices in a Device Group

You have two options for managing the device group assignment for a device.

- The first method is performed on an individual device on the Device page from the Device Menu. Select a device that needs to be assigned to a device group. Then select the appropriate Device Group in the Group drop-down box and click Modify for the device.

- The second method is performed on the System page from the Device Groups menu. Administrators can manage the device group assignment to multiple devices in one action.

When you select a Device Group from the list, the current devices assigned to that device group are listed in the Devices list box. All other devices loaded into the Device Manager but not assigned to this device group are listed in the area on the right. This device list displays the Name, Type, Model, and current Device Group assignment for those devices.

Remove Devices from the Device Group

To remove devices from a device group, select the devices from the device list on the Device Group page. You can select multiple devices by using the Shift and Ctrl shortcut keys. After selecting the devices, click the Remove icon, which separates the two lists of devices.

Add Devices to the Device Group

To add devices into a device group, select the devices from the device list on the right of the device group page. You can search or filter the full device list by using the following functions:

■ Search – The text box above the device list serves as a progressive search bar. You can enter a partial device name in this field, and the device list will automatically filter to a set of devices that match the device name search. The auto search filter is executed when you stop typing in the box for 1.5 seconds.

■ Filter – You can filter the list based on the Type, Manufacturer, Product Line, Model, or device status, whether it is operational or available. Note that you can sort the devices by clicking on the column headings. One click orders the list in ascending order and a second click orders the list in descending order.

– Click the Filter icon next to the progressive search text box.

– Select the appropriate settings for the Type, Manufacturer, Product Line, and Model drop-down boxes.

– Click the All, Operational or Available radio button to show all devices, only devices assigned to a floor plan or only devices not assigned to a floor plan.

– Click the Set button to execute the filter command on the device list.

After the device list has been filtered by one of the methods above, you can select devices from the resulting list and click the Add button between the device lists. Those devices are added to the Device Group being modified. You can select multiple devices by using the Shift and Ctrl shortcut keys.

Additionally, users may add a single device to multiple Device Groups. Select a device from the device list on the Device tab, then check the groups you would like to assign the device to in the 'Device Group' option located in the Device Information Properties tab. After selecting all device groups you would like to assign the device to, save your modifications.

To return the list to the full set of devices, click the Reset button in the Filter function.

Delete a Device Group

To delete a devices group, select a device group from the list and click the Delete button. If Device Group is deleted while it contains devices, those devices will no longer have a device group assignment.

User Groups Menu

User Groups are the central location for access rights control definition and are the primary location for managing all Privileges to all components of the platform. Note that user inherit their rights access based on their membership in a User Group. If a user belongs to multiple groups, they will have effective rights that represent a superset of the individual User Group rights. Properly defining User Groups helps ensure that administrators have a flexible mechanism for managing all access control rights for all users in the system.

Two system User Groups are installed within the system by default: Administrators and Public. The Administrators user group has rights to ALL components of the application, and this access right cannot be modified. Administrators should add only super-administrators of the platform to this group since they will inherit rights to all parts of the system.

All users in the platform are assigned to the Public user group by default, and this group membership cannot be removed. Any access rights granted to the Public User Group are automatically granted to ALL users in the system. This feature provides an easy way for administrators to grant rights to certain parts of the system to all users without editing all User Groups individually.

The three basic pages associated with the User Group are Basic, Members, and Privileges. The following sections describe the information contained on each page.

Basic Page

The Basic page of the User Group contains only the User Group name and an optional description of that user group.

Members Page

The Members page lets administrators add users to the User Group and remove them from the group. The list on the left in the Users box displays all users in the system not assigned to the currently viewed user group. The list on the right in the Group Members box displays all users currently assigned to the User Group being viewed.

Administrators can add and remove users by selecting users from the respective user list and clicking on the Add or Remove icon. You can select multiple users from the lists by using the Shift and Ctrl shortcut keys.

Privileges Page

The Privileges page is where access control rights are granted or blocked for a User Group. The following sub-tabs control certain components of the system:

- Systems Provides access to the main features of the application, such as to tabs and menus like Project Wizard, Capacity Planner, Site Data etc. The System now also includes Upload Model option, which specifies if user can upload models where in previous version only the admin could upload the models.

- Locations – Lets you navigate to certain locations in the Navigation tree, including area, zone and cage.

- Device Groups – Lets you manage devices within these Device Groups.

- Devices – Lists inherited rights the current user has for all devices in the system. These rights are determined based on the superset of Device Group rights that the current user maintains.

- Default User Groups

  When CA VI is installed, four device groups are created automatically:

  - Administrators

    This user group has assigned privileges that cannot be edited. Access to this group should only be given to users with the highest authority within the organization.

  - Anywhere User Group

    This user group is used for granting access to users that want to use the CA VI Anywhere application. Associating a user with this group lets that user access their Anywhere application by using their own login credentials.

  - Mobile User group

    This group is used for granting access to users that want to use the CA VI mobile application. Associating a user with this group lets that user access their mobile application by using their own login credentials.

  - Public

    By default all users are associated with this group.

Add User Groups

Administrators should add User Groups based on the access control rights they would like to grant to the various components of the platform. Users have effective rights based on the superset of all User Group privileges to which they belong. Properly planning, creating, and assigning user groups to users is an extremely important process in managing the overall system.

To create a user group, click the New button below the list of User Groups on the User Groups menu. This action starts the User Group wizard, which prompts you for settings on each of the 6 tabs described on the Privileges page. Select the effective rights that should be granted to users in this user group and click the Next button to view the next page of settings.

Delete User Groups

To delete a user group, select the user group and click the Delete button from the main detail window. Note that Public and Administrator groups may not be deleted from the system.

Modify User Groups

Members and settings for user groups can be edited at any time. You can select the user group from the list, update the Members or Privileges settings, and select the Modify button to commit the change.

Users Menu

The Users menu on the System Tab lets administrators create, modify, and delete users that have access to the platform. You can also use this menu to reset passwords.

Create New Users

To create new users, click the New button while viewing the Users menu on the System Tab. The New User wizard appears and lets you specify user settings.

Three tabs of information are provided for the user view. Fields marked with a red asterisk are required

- Basic
    - User Name – The logon name for the user.
    - First Name, Middle Name and Last Name – Names of the user.
    - Password, Password Confirm – The logon password for the user. To enable the Password Confirm field, verify that the check box to the right of the Password field is activated.
    - Company – The company that the user belongs to. This field displays a list of companies defined in the Companies menu.
    - Department – The department that the user belongs to. This field displays a list of departments defined in the Department menu. The departments belong to the company selected in the Company field.
    - Phone Number and Email – Contact information for the user. The Email address provided is used for alarm notifications.
    - Description – Optional description field for the user.
- Group – Lets administrators assign User Group membership to a user. All access control rights for a user are inherited based on the User Groups to which they belong. All users are members of the Public group by default, and this setting cannot be changed.

    You can manage User Group membership by selecting User Groups from the group lists and selecting the Add or Remove buttons as needed. You can select multiple User Groups by using the Shift or Ctrl shortcut keys.

- Privileges – You can modify user privileges only by adding or removing the user to/from a User Group. The Privileges tab in the User section provides a read-only view of the effective rights for a user to the various component of the system. The default list of rights is the union of All Group memberships maintained by the user. This list represents a superset of all rights for those User Groups. To see the individual rights inherited by each group, select the User Group from the drop down box.

Clone Users

Administrators can clone exiting users, which copies properties and rights for an existing user to a new user. Click the Clone button in the Users menu to display the Clone Users dialog. Enter the number of users to create (maximum of 10) and click the Yes button.

The new users are added to the User list and have the same username as the original user with a number added to create a unique name. All User fields and user group assignments from the original user are propagated to the newly created users.

Delete Users

To delete a user, administrators can select the user from the list on the System Tab and click the Delete button. Note that the administrator account may not be deleted from the system.

Reset Passwords

To reset the password for a user, select the user account from the list on the System page. Enter a new password in the Password field. Click the check box to the right of the Password field and retype the password in the Confirm Password field.

Current Users Menu

The Current Users section of the System page lets administrators see who is actively using the application. The IP Address, Login Time, and Last Active timestamps are displayed for all currently connected users to the system.

You can terminate User sessions by selecting the check box in the Select column and clicking the Terminate button. Users are notified that their session is terminated and are returned to the login screen.

Clicking the Refresh button updates the user list and the Last Active timestamps.

Chapter 5: Admin > Monitor Tab

Monitoring Configuration

Device Monitoring has several components that need to be properly configured and activated to enable Dashboard and Trend Chart data to be stored in the database. The following sections cover these components and describe how to establish a monitored device.

Monitoring Overview

The most important feature of the application is its ability to monitor a wide array of devices from any manufacturer. The product provides a monitoring architecture that allows for the ultimate flexibility in displaying and reporting on all device data points and collected metrics. To configure and use the monitoring system properly, you need to understand the basic fundamentals of how the architecture manages this key feature.

Definitions

The following terms are used in the configuration and use of the monitoring system, and it is important for users to understand the definitions:

- Probe Server – Part of application which polls devices for information.

- Target – Group of data points to be collected from a device.

- Target Member – Individual data point to collect from a device.

- Monitoring Attribute – Component used to map Target Member values into dashboards, trend charts, reports and other key features of the application.

- Application Adapter – Customizable plug-in component of the application which allows for custom interface to third party applications and databases.

- SNMP OID – Reference to a data point on a device when using the SNMP protocol.

- IPMI Sensor – Reference to a data point on a device when using the IPMI protocol.

- Modbus Register – Reference to a data point on a device when using the Modbus protocol.

- Traps – Information delivered from the device to the application indicating an alarm condition exists on the device.

General Architecture

In general, monitoring refers to the application's ability to poll or probe a physical device and collect information related to different data points of that device. When configuring the settings to allow the application to properly gather that information, you must understand the following basic monitoring concepts:

- Several different protocols or languages can be used to gather information from a device. Determining which protocol to use depends on the physical device which is to be monitored. In general, the following protocols are used by the various facility and IT devices:

  - SNMP

  - IPMI

  - Modbus

  - BACnet

  - LonWorks

  - Proprietary protocols

- The application supports the use of SNMP, IPMI, BACnet IP, and Modbus TCP protocols out of the box. Any device using one of these protocols can be monitored without custom configuration of the software. Other protocols can be supported in one of two ways:

  - Protocol converters/gateways – There are a series of protocol converters which can sit between the target device and the application server which converts the device protocol to a supported protocol.

  - Application Plug-in Adapter – The application is built on an extremely flexible architecture, which allows our developers to very quickly and easily support new communication protocols with devices. This adapter can be added to the system which will allow the application to speak directly and natively to the target device.

- Each protocol has a set of configuration settings which need to be defined to properly connect and receive information from the target device. The following is a basic summary of each supported protocol:

  - SNMP

    - Port – Set to 161 by default

    - Protocol – Set to UDP by default

    - Version – 1, 2c, and 3 are supported versions of SNMP

    - Get/Set Community – Strings to be used for accessing device information. These are essentially passwords defined by administrators for gaining access to SNMP data. By default these are set to public and private respectively.

- ■ Other fields are used in situations where advanced SNMP security controls are enforced.

  - – IPMI

    - ■ Port – Set to 623 by default.

    - ■ Username, Password – Login credentials to access the IPMI data.

    - ■ Other fields – Advanced configurations for IPMI data access on a device.

  - – BACnet IP

    - ■ Device Instance – Reference to the device in the BACnet configuration where multiple devices are being monitored.

    - ■ Port – Set to 47808 by default.

  - – Modbus TCP

    - ■ Device ID – Modbus device ID for referencing the device on a Modbus network.

    - ■ Port – Set to 502 by default.

Once configured, the system collects device information by using one of the protocols described above and stores the data in the device database. After the application has this data stored, several other features can then utilize the data to provide a variety of information to the users. The following sections explain how this data is taken from the database and used in the other components of the application.

Target Members Versus Monitoring Attributes

An important concept to understand is the difference between the device data point (Target Members) and the Monitor Attributes defined in the application. Once you understand this distinction, the rest of the application monitoring system will be very easy to comprehend.

- ■ Target Members – Each type of device could have different ways to represent certain data points. Each of these data points is considered a Target Member for purposes of the application. As you configure a generic monitoring profile for a Target (certain device type like Eaton Powerware UPS), you will define multiple target members for the device. These members are the individual data points that you will collect from the device as part of the target profile.

- ■ Monitor Attributes – Monitor Attributes are the attributes that all functional components of the application use to show data, trigger alarms, and report on data collected as part of the profile. Several Targets or profiles can share common Monitor Attributes to allow for common reporting on metrics across device classes and models.

As part of the monitoring configuration, you map the Target Members created in the Target profiles to the common Monitor Attribute. The application then knows how to display the data in dashboards, trend charts, reports, and other features of the application.

For example, you may be interested in measuring temperatures for Racks and CRAC units. Racks could report Temperature in a very straightforward Temp (F) data point. However, you may want to represent Temperature at the CRAC unit by using the Return Temperature data point. You would create a Rack Profile with a Target Member of Temp (F) and create a CRAC profile with a Target Member Return Temperature. By mapping both of the Target Members to the Temperature Monitor Attribute, you can use common application components in the form of dashboard gauges, trend chart templates, and reports to display the temperature value. This functionality is possible even though each of these device types have very different ways of reporting a common data point such as temperature.

Dashboards, Trend Charts, Alarms, Layer Data, and Reports

At this point of the overview, the application has been configured to collect data, the data has been gathered and stored in the database, and the data points and target members have been mapped to the application Monitor Attributes. The rest of the application is designed to reference values stored in the Monitor Attributes. Therefore, all Dashboards, Trend Charts, Floorplan Layers, Alarm LEDs, and Reports will pick up the correct values and perform their respective functions. The diagram below shows the relationship between the device data points/target members, the Monitor Attributes, and the functional components of the application.
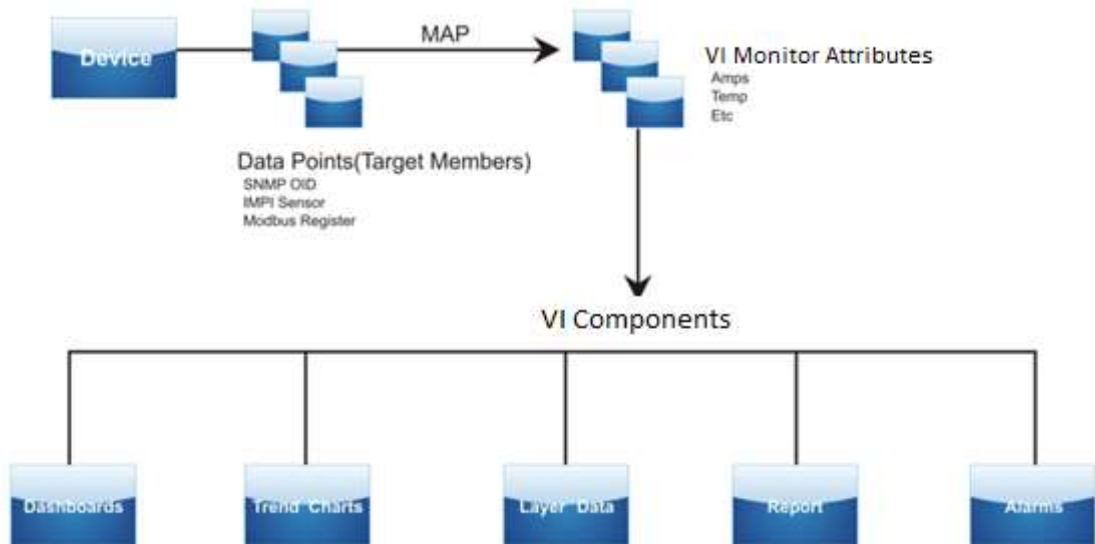
Targets and Target Members

The application refers to the device profiles as *targets* and to the data points of each device profile as a *target member*. The goal is to create generic Target profiles that can be applied to several devices of a given Device Type, Manufacturer, Product Line, Model, or combination of these device characteristics. In some cases, however, generic profiles cannot be configured, and a separate Target profiles must be created for each device.

Create Targets

The first step in creating target profiles is to create the actual target, which will later be populated with one or more target members.

Follow these steps:

1. Click on the Target menu, which is on the Monitor page.

2. Click the New button at the bottom of the list of existing targets and populate the following template fields:

    Name

    Specify the name of the Target to be created.

    Description

    Type a basic description of the target.

    Trap

    Select this check box if the Target is a set of trap target members.

    Clear this check box if the Target is a set of standard target members.

    Types, Manufacturers, Product Lines, and Models

    Select the device profiles that should have this target profile available for monitoring.

    For example, if this Target should be available for all UPS devices, click the + button under Types and select the UPS item from the list. All devices with Type = UPS will then have this monitor profile available for use.

    A device can have multiple profiles available. Selecting items from these sections makes this profile available only to end devices. It does not activate these target members for any type of live monitoring.

3. Click the Create button to add the new Target profile to the Target list on the left.

Add Target Members

After the Target has been created, you can add all the target members to the target profile. Target Members are the specific data points from the device that need to be collected by the polling engine of the application. The settings of each target member are highly dependent on the protocol used to collect the data from the target device. The application supports SNMP, IPMI and Modbus TCP protocols in this version of the software. Custom support can be created with the use of plug-ins and adapters, but configuration requirements for those integrations are beyond the scope of this document. Any custom adapters that have been created will also be listed in the Type drop-down box on the New Target Member page.

Basic Information

The Basic section lets you assign a Target Member name and determine whether this target member is listed at the device level for active monitoring.

Monitor

The Monitor section provides information for the target member related to the kind of information being collected from the device.

- Data Type – Three options are available to the user in this field.
    - Scalar is a single value or string that is returned by the device when this information is requested.
    - Tabular represents an SNMP Table OID.
    - Tabular Column represents a Table Column OID with the SNMP protocol. When this option is selected, the user will define which Table OID this column is related to and the Table OID will be pre-populated in the OID field below.

- Value Type – The user will define the type of value being returned by the device. This is useful in mapping the data point to the other components in the application, including Dashboards, Trend Charts, Reports and more. The three options available for the user are Decimal (which includes Integers), DateTime and String.

- Unit – You can define the Unit of the data point being collected. This value is needed only if you want to automatically convert the value to a different unit in other parts of the application. For example, if the data point is retuning Celsius readings, but you want gauges on a dashboard to show Fahrenheit, then defining the Unit at the Target Member level allows automatic conversion on the dashboard. If you do not define the Unit at the Target Member level, you can still change the dashboard readings by adding math calculations to get to Fahrenheit. The system unit types and options are listed in the drop-down boxes to help you manage unit definitions at this level.

Configuration

The Configuration section is where you define the protocol to be used to capture the data point from a device along with the specific information required for that protocol. Each protocol in the Type drop-down has its own list of required fields for communicating with the device and collecting the information. For purposes of this document, only SNMP, IPMI, and Modbus are covered. Other protocols may be available in this part of the application, depending on the implementation of the system.

SNMP

SNMP is the most common protocol supported by device manufacturers. Only one field is required to define the SNMP Target Member:

- OID – This long string of digits is known as the Object Identifier, which stores the data which needs to be collected. This information is found in the MIB of the device and can be entered to this field so the poller knows the "address" of the data point which needs to be polled. This OID value must be enclosed by these brackets {}. For example, {.1.3.6.1.2.1.25.1.1.4} is the format to use for defining an OID value.

  Note that clicking the OID button next to the OID field launches a MIB browser, which lets you load and browse MIB files directly in the application. The MIB Browser interface looks similar to the following and allows these functions:

MIB Browser

- Upload/Delete – Lets you load or Unload the MIB files into the MIB tree located on the left.

- Address – Enter the IP address of a target device to be used to test for data.

- Advanced – Lets you define settings for a connection to be established to the IP Address provided. These settings include the Port, Get/Set Community strings and the SNMP Version to be used.

- OID – Lets you manually enter an OID or select the MIB node from the tree to populate the OID to be requested from the device at the defined IP Address.

- Walk – Sends an SNMP request to the IP address provided to retrieve the OID defined in the OID field. Results of the request are shown in the main section of the page to the right.

- Name/OID – Provides the Name or OID of the information listed.

- Value – Shows the value returned by the SNMP request for that OID.

- Type – Lists the OID type defined by the MIB file for the device.

- OK and Cancel – If you select a node from the OID tree and click OK, this OID is added to the OID field in the New Target Member window. If you click Cancel, you return to the New Target Member window without adding an OID to the field.

IPMI

IPMI is a protocol which has gained popularity over the last several years and is becoming adopted by many of the IT device manufacturers as a way to provide enhanced reporting on their devices. While SNMP provides a certain level of data, IPMI can provide some of the same data along with more advanced device settings and values such as CPU Temperatures, Fan Speeds, and so on.

Configuring an IPMI Target Member is very similar to configuring an SNMP Target Member. Instead of defining an OID for SNMP, define the Sensor ID for IPMI device.

Sensor ID – Sensor ID is the sensor id defined in the IPMI protocol. To obtain a list of available sensors for a device, run the ipmitool sdr or ipmitool sensor commands against the target device to see which sensors are configured and providing data. Refer to IPMI documentation on proper configuration and use of IPMI and these commands. Below is a sample output from the ipmitool sdr command against a Raritan Dominion Px 8 power strip. The Sensor ID is in the left column and the values returned are in the second column. This SensorID value must be enclosed by these brackets {}. For example, {Env Temp 1} is the format to use for defining a Sensor ID value.

The following is a sample of the ipmitool sensor command on the same device. The output of this command provides additional information such as units, hi/lo thresholds, and so on as configured on the device itself:

```
CPU Temp.       I 50.000   I degrees C I ok  I 0.000   I 2.000   I 0.000   I 85.000   I 87.000   I 89.000
Env Temp 1      I 24.500   I degrees C I ok  I -20.000 I -19.000 I -18.000 I 105.500  I 107.000  I 107.500
Env Temp 2      I na       I degrees C I na  I -20.000 I -19.000 I -18.000 I 105.500  I 107.000  I 107.500
Env Temp 3      I na       I degrees C I na  I -20.000 I -19.000 I -18.000 I 105.500  I 107.000  I 107.500
Env Temp 4      I na       I degrees C I na  I -20.000 I -19.000 I -18.000 I 105.500  I 107.000  I 107.500
Env Temp 5      I na       I degrees C I na  I -20.000 I -19.000 I -18.000 I 105.500  I 107.000  I 107.500
Env Temp 6      I na       I degrees C I na  I -20.000 I -19.000 I -18.000 I 105.500  I 107.000  I 107.500
Env Temp 7      I na       I degrees C I na  I -20.000 I -19.000 I -18.000 I 105.500  I 107.000  I 107.500
Env Temp 8      I na       I degrees C I na  I -20.000 I -19.000 I -18.000 I 105.500  I 106.000  I 107.500
Env Humidity 1  I 41.000   I (null)    I ok  I 2.000   I 5.000   I 10.000  I 90.000   I 95.000   I 98.000
Env Humidity 2  I na       I (null)    I na  I 2.000   I 5.000   I 10.000  I 90.000   I 95.000   I 98.000
Env Humidity 3  I na       I (null)    I na  I 2.000   I 5.000   I 10.000  I 90.000   I 95.000   I 98.000
Env Humidity 4  I na       I (null)    I na  I 2.000   I 5.000   I 10.000  I 90.000   I 95.000   I 98.000
Env Humidity 5  I na       I (null)    I na  I 2.000   I 5.000   I 10.000  I 90.000   I 95.000   I 98.000
Env Humidity 6  I na       I (null)    I na  I 2.000   I 5.000   I 10.000  I 90.000   I 95.000   I 98.000
Env Humidity 7  I na       I (null)    I na  I 2.000   I 5.000   I 10.000  I 90.000   I 95.000   I 98.000
Env Humidity 8  I na       I (null)    I na  I 2.000   I 5.000   I 10.000  I 90.000   I 95.000   I 98.000
Board 0 Volt    I 112.000  I Volts     I ok  I 76.000  I 79.000  I 81.000  I 250.000  I 250.000  I 255.000
Board 0 Freq    I 60.000   I Hz        I ok  I na      I na      I na      I na       I na       I na
Board 1 Volt    I 114.000  I Volts     I ok  I 76.000  I 79.000  I 81.000  I 250.000  I 250.000  I 255.000
Board 1 Freq    I 60.000   I Hz        I ok  I na      I na      I na      I na       I na       I na
Unit Volt       I 113.000  I Volts     I ok  I 76.000  I 79.000  I 81.000  I 250.000  I 250.000  I 255.000
R.01 Current    I 0.008    I Amps      I ok  I na      I na      I na      I 8.582    I 9.462    I 32.063
R.01 PwrFactor  I 87.000   I (null)    I ok  I na      I na      I na      I na       I na       I na
R.01 Max Curr   I 0.044    I Amps      I ok  I na      I na      I na      I 15.417   I 15.417   I 32.063
R.01 Act. Power I 0.000    I Watts     I ok  I na      I na      I na      I 4285.485 I 6683.439 I 8346.415
R.01 Apt. Power I 0.000    I VA        I ok  I na      I na      I na      I 4285.485 I 6683.439 I 8346.415
R.01 Max Act.Po I 2.146    I Watts     I ok  I na      I na      I na      I 4285.485 I 6683.439 I 8346.415
R.01 Avg. Act P I 0.000    I Watts     I ok  I na      I na      I na      I 4285.485 I 6683.439 I 8346.415
R.02 Current    I 0.046    I Amps      I ok  I na      I na      I na      I 8.582    I 9.462    I 32.063
R.02 PwrFactor  I 75.000   I (null)    I ok  I na      I na      I na      I na       I na       I na
R.02 Max Curr   I 0.117    I Amps      I ok  I na      I na      I na      I 15.417   I 15.417   I 32.063
R.02 Act. Power I 1.376    I Watts     I ok  I na      I na      I na      I 4285.485 I 6683.439 I 8346.415
R.02 Apt. Power I 5.220    I VA        I ok  I na      I na      I na      I 4285.485 I 6683.439 I 8346.415
R.02 Max Act.Po I 4.370    I Watts     I ok  I na      I na      I na      I 4285.485 I 6683.439 I 8346.415
R.02 Avg. Act P I 1.504    I Watts     I ok  I na      I na      I na      I 4285.485 I 6683.439 I 8346.415
```

Modbus

The Modbus protocol is widely used in the monitoring of facility devices such as UPS, CRAC, PDU, and Generator device types. The application supports the Modbus TCP version of the protocol which allows IP access to the device or device gateway. The following instructions explain how to add Modbus Target Members to an existing Target profile.

- Register – Modbus stores data in Register numbers which can be accessed by the monitoring system. The Register field is used for the Register number which stores the data that needs to be retrieved. This register value must be enclosed by these brackets {}. For example, {22} is the format to use for defining a register value.

- Register Length – Many options are available for the register length definition of the Modbus data point. Consult the device documentation to understand which if the options should be selected for a specific Modbus value.

- Register Type – Four tables in Modbus are used to store register data. Selecting the correct table lets Visual Data Center know where to access the register number specified in the Register field. Device documentation should provide information about which of these options to select for a specific Modbus data point.

Math on Target Members

SNMP, IPMI and Modbus target member settings let you perform math on the collected value prior to passing the value to the database for use in other parts of the application. To add math to the target member field, apply math equations to the SNMP OID, IPMI Sensor ID or the Modbus Register as follows:

- SNMP OID – You can enter standard math operators around the OID to perform math on the value collected from the device. For example, an OID of {.1.3.6.1.2.1.25.1.5} would result in a value or 10. However, if the OID field contained the setting {.1.3.6.1.2.1.25.1.5}*20, the value collected will be 200.

- IPMI Sensor – You can enter standard math operators around the Sensor ID to calculate new values for the device. For example, the Sensor ID {Unit Volt} will return a value of 110, but the {Unit Volt}/10 entry will return a value of 11.

- Modbus Register – Modbus register math is very similar to the SNMP and IPMI math options. For example, the register {23} will return a value of 1200, but the Register {23}/100 will return a value of 12.

Modify Target Members

Many configuration settings are needed to properly define a target member that will collect data from a target device correctly. However, not all of the target member configurations can be edited after the target member is created. The reason is that after Target Members are assigned to multiple devices, only a limited number of settings can be changed without severely impacting the monitoring of those devices.

- Name – Target Member names can be modified anytime as needed.

- Active – You can activate and deactivate a target member from a Target profile as required.

- Type – You can change the protocol for the defined target member.

- Protocol Options – Each of the Protocol Options can be updated as needed.

After applying edits, select the Save button to commit the changes to the system.

Delete Targets and Target Members

You can remove a target member from a target profile by selecting the target member and clicking the Delete Target Member button above the target member list. Note that the Delete button below the target member list will delete the entire target and all target members.

Monitor Attributes

The monitor attribute component of the monitoring system is the foundation for all key features of the application. Alarms, Layers, Reports, Dashboards and Trend Charts all pull their respective data and information from the Monitor Attribute for a device. This section describes the process for creating monitor attributes and explains how to map the targets/target members to the monitor attribute. After completing this task, you can define thresholds and create trend chart templates for these monitor attributes.

Overview (Monitor Attributes)

A monitor attribute is created for each unique data point or SNMP trap to be tracked from devices. If temperature is being tracked for 5 different models, only a single temperature monitor attribute needs to be created. Each of the 5 model data points can be mapped to the single temperature monitor attribute.

The application has pre-defined monitor attributes that cannot be deleted by users. These monitor attributes are used in the standard layer views on the Floorplan tab: Temperature, Humidity, Amps, BTU, Volts, Kilowatts.

Monitor Attributes Menu

The Monitor Attributes menu on the Monitor tab lets to create, edit, and delete monitor attributes from the system.

System Monitor Attributes

By default, there is an extensive list of system monitor attributes under the System node of the monitor attribute tree. Monitor Attributes listed in this part of the tree cannot be deleted or edited. The basic monitor attributes for each device type and the attributes that map to the floor plan layers are created in this part of the tree. Monitor Attributes that map to floor plan layers are named "Layer - *" where * represents the layer value (Power, Humidity, Temperature, and so on).

The Standard node of the tree contains single data points and the Table node of the tree contains pre-defined monitor attribute tables to be used for displaying data mapped from target members.

User Monitor Attributes

The User part of the monitor attribute tree is where you can create custom monitor attributes to be used in the application. This flexibility preserves the system defined settings, but lets you create any monitor attribute that you might need to display data points or traps form their devices.

Create Monitor Attributes

You create new monitor attributes by clicking the User Node of the monitor attribute tree and clicking the Create button. This action creates a folder under the User node to contain any new attributes to be created.

You can then select the newly created folder and complete a blank template for a new monitor attribute. The following properties are defined for the monitor attribute. Note that several different Data Types can be defined. Each of these data types has specific properties to be defined.

- Name – Name of the monitor attribute.

- Data Type – Data Type of the monitor attribute. This setting tells the system how to present the data with a specific gauge.

  The following data types and specific settings are available:

  - Calculate – Select this option to create a new monitor attribute based on math of other monitor attributes. This math or calculation can be generic or can specifically refer to a device already being monitored in the application.

    - Min Value/Max Value – Defines the min and max values to be displayed on gauges for this monitor attribute.

    - Internal Unit – Convert units as needed from Watts to Kilowatts, and so on. This setting is not required.

    - Custom Unit/Custom Precision – Lets you set a custom unit type for the monitor attribute and define the number of decimals to display for the value.

    - Metric Unit/Metric Precision – If you want to view unit types in Metric units, this value is displayed for the device. Precision is the number of decimals to display for this monitor attribute.

    - US Unit/US Precision - If you want to view unit types in US units, this value is displayed for the device. Precision is the number of decimals to display for this monitor attribute.

    - Expression – Formula to be used for calculating the value of the monitor attribute. Select the Edit icon to the right of this field to open the calculator tool. Refer to the Calculator section of this guide for more information on how to use this tool.

  - Datetime – String in the format of a Date/Time combination. No special properties are defined for this type of data type.

  - Decimal/Integer

    - Min Value/Max Value – Defines the min and max values to be displayed on gauges for this monitor attribute.

    - Internal Unit – Convert units as needed from Watts to Kilowatts, and so on. This setting is not required.

    - Custom Unit/Custom Precision – Lets you set a custom unit type for the monitor attribute and define the number of decimals to display for the value.

    - Metric Unit/Metric Precision – If you want to view unit types in Metric units, this value is displayed for the device. Precision is the number of decimals to display for this monitor attribute.

    - US Unit/US Precision - If you want to view unit types in US units, this value is displayed for the device. Precision is the number of decimals to display for this monitor attribute.

- Enum – Lets you configure status gauge components to indicate certain color when a specific value/status is contained in the Monitor Attribute. When your select the Enum data type, a properties dialog is displayed.

  You can then populate the matrix of possible names and desired LED colors in the chart provided. Click in the Name field to add a name. Click on the color drop-down for a list of colors to select the color to be displayed when this value is present in the Monitor Attribute.

- String – Text string value from the monitor attribute. No special properties are defined for this data type.

- Table – If the data point is an actual SNMP OID Table, create a monitor attribute table data type. No special properties are configured for the Table data type, but you must create related table columns for these tables separately. When a Table is created, two subcategories are created for the table in the monitor attribute tree.

  - Column – Select the Column node and create individual Table Column monitor attributes for the selected table. Individual table columns are created by means of the same create procedure as other standard monitor attributes, but they are associated to this table only.

  - Custom Table Trend – You can define custom historical trend chart behavior for columns and records contained in tables. For more information, refer to the Table Trend Charts section in this guide.

- Data Source Type – Gauge, Counter, Driver, Absolute

- Description – Basic description of the monitor attribute.

- Allow Control – Turns on the ability to modify the attribute from the All Data Points dashboard.

- Allow Schedule – Allows users to define scheduled changes to the attribute. As part of this configuration users define the two values which can be defined on the schedule calendar. The Schedule Tool feature is located in the 3D client interface.

Table Trend Charts

Unlike other monitor attributes, Tables present a challenge for users to properly configure the data to monitor and track in the historical trend charts. For all decimal or integer monitor attributes, data is collected and trended in the historical charts by default. For tables, you can define a default behavior for trend charts and configure custom behavior or record filtering for the data contained in the trend chart.

Default Trend Charts

You can configure the default trend chart behavior by selecting the table monitor attribute from the list and clicking the Default Trends button. A configuration dialog appears.

By default, a new table has no trend charts enabled. You can configure trend charts for these tables by following these steps below. Using this method creates trend lines for all records contained in the table. To filter items from the table, you can create custom trend charts defined in the next section:

- Default Key – This field must be a string value type. This value is the reference in the trend chart in the legend for the line contained in the chart. Keep in mind that a table trend chart contains multiple lines of data for records in the table, so the trend chart must have a label that refers to the line of data.

- Default Value – You can select one or more columns from the table to display in the trend chart. Columns selected in this field must be either Decimal or Integer data types.

Custom Trend Charts

If you want to assign conditions to the data to include in the trend chart, you can utilize the custom trend chart interface. To access this user interface, click the Custom Table Trend node in the monitor attribute under the table to be configured.

- Enter a name for the trend chart.

- Assign a Key for the legend of the trend chart. This field must be a column with a data type equal to a string.

- Assign a Value that will be the actual data plotted in the chart. This field must be a column with a data type equal to integer or decimal.

- Condition – You can assign rules by using regular expressions to filter data from the full set of data to be displayed in the trend charts. These regular expressions can apply to either the Key or Value columns.

Monitor Attributes Manager

After the monitor attributes have been created in the Monitor Attributes menu, they can be applied to any number of devices by using the Monitor Attributes Manager menu item on the Monitor Tab. Users need to properly plan what types of data they would like to present for given devices and then add the Monitor Attributes as needed so the data points are available for layers, dashboards and other monitoring components.

Upon accessing the Monitor Attributes Manager menu, users will be presented with the Level dropdown box which determines which device classifications will be managed. The device classifications are the same as what was defined at the Dashboard Studio. Selecting one of the categories will apply the monitor attributes to any device which meets the chosen device classification

- Device – Choose specific devices to have the monitor attribute. (Server-Rackmount)

- Model – Select a model to receive the dashboard. All devices based on this model will receive the monitor attribute (PowerEdge 1950)

- Product Line/Type – Will assign the monitor attribute to the selected combination of Product Line and Device Type. (Server Dashboard/PowerEdge). This option helps with issues such as PowerEdge Storage vs. PowerEdge Servers.

- Manufacturer/Type – Will assign the monitor attribute to the selected combination of Manufacturer and Device Type. (Liebert/PDU)

- Product Line – Select a Product Line to receive the dashboard. All devices based on this Product Line will receive the monitor attribute. (PowerEdge).

- Manufacturer – Select a manufacturer to receive the dashboard. All devices based on this manufacturer will receive the monitor attribute. (Dell).

- Type – Select a Device Type to receive the monitor attribute. (Air Conditioners)

- Global – Applies the configuration to all devices in the application.

- Locations - Allows users to define alarm thresholds for locations in the navigation tree.

- Rack Group – Allows users to define alarm thresholds for data which is tracked on the Rack Group dashboard.

Once an option has been selected, the user must then choose the specific device classifications from the dropdown boxes and/or lists. In the example below, the Product Line = Deluxe System 3 has been selected and the management template is presented to the user to manage monitor attributes for this device classification. All devices with the Product Line = Deluxe System 3 will receive these configurations.

Monitor Attributes

The Monitor Attributes subtab lets you add or delete monitor attributes from this classification. Any data point that you would like to see mapped to this type of device should be added from the list of possible monitor attributes.

Click the Add button and select the monitor attributes to add. Note that the shortcut Ctrl and Shift keys can be used to select multiple monitor attributes. Click the OK button to add them to the list.

To remove monitor attributes from a classification, select them from the list, and click the Delete button.

Monitor Attributes with the green arrow are inherited from a different level of the device tree. The Defined At column lets you know where this inherited attribute was created.

Mapping

The Mapping Sub Tab lets you map the target members or data points defined on the Targets menu to the list of selected Monitor Attributes. This mapping function centralizes all internal monitoring functions based on the Monitor Attribute, but provides user flexibility for defining monitoring profiles for devices at the Target/Target Member part of the application.

Selecting the Mapping Tab displays a list of the Monitor Attributes that belong to the device classification. You can then select one of the monitor attributes and display a new list of all Target Members or data points defined in the system. Note that only the target members whose data type matches the data type of the monitor attribute are listed. For example, if the monitor attribute is a data type of integer, no string data type target members are listed on the right. The reason is to prevent the mapping of different types of data in this process.

You can then select the Target Member to be mapped to the Monitor Attribute and click the Assign button in the middle of the columns of data. Repeat this process for all Monitor Attributes listed. For a Table Monitor Attribute, each Table Column Monitor Attribute also needs to be mapped to an available Target Member.

To remove a mapping, select the monitor attribute from the list and click the Unassign button.

To utilize the bulk import/export of monitoring configuration, follow the below steps:

1. To export the current TM and MA mapping set for a specific level, first select the desired level that you wish to change.

2. Select the Export button to export an excel file of the current configuration for the selected level. Below is a list of columns and their definition that appear in the exported excel file.

   ■ Level – the level at which the TM to MA mapping will take place

   ■ Type – level type

   ■ Vendor – vendor defined for level

   ■ Pline – product line defined for selected level

   ■ Model – model defined for selected level

   ■ Device – name of device (if device level selected)

   ■ Define at – MA location

   ■ MA – name of MA

   ■ Target – name of target group

- Target Member – name of target

3. Populate the spreadsheet.

4. Select the Import button and import the edited spreadsheet.

5. Upon import the new mappings will be seen.

Alarm Threshold

The Alarm Threshold Sub Tab lets you define one or more thresholds for each Monitor Attribute assigned to a device. These thresholds feed alarm state information into the alarm subsystem so that alarm LEDs appear on the devices. The alarm counter in the application header increases or decreases if values are in the threshold range and triggers notifications to end users that want to receive information on devices in the alarm.

When you select the Alarm Threshold tab, you see the list of Monitor Attributes selected for this device classification and the Alarm Threshold configuration table.

Add Thresholds

You can select a monitor attribute from the list and then click the Add Threshold button to add a new threshold to the table. This action displays the Define Threshold dialog box where you can define the threshold to be applied to the monitor attribute.

- Label – Specify the name of the alarm threshold. This value appears in notifications and on the active alarm table.

- Type – You have three options for matching thresholds for a given monitor attribute:

  - Numeric Interval – Applies a lower and upper numeric threshold for the data. If the data point falls within this range, the alarm is triggered. This option is available only on monitor attributes with a type equal to Decimal or Integer.

  - String Equal – If the monitor attribute is a string, the String Equal alarm is triggered if the value returned from the monitored data is identical to the string provided. Note that the string matching is case sensitive.

  - String Contain – If the monitor attribute is a string, the String Contain alarm is triggered if the value returned from the monitored data contains the text string provided. Note that the string matching is case sensitive.

- Alarm Level – Choose a level if this value range represents a Warning or a Critical alarm.

- Inc/Not Inc. – These dialog boxes are at the lower and upper threshold ranges. If set to Inc, the value provided in the field is inclusive. If set to Not inc, the value in the field is not inclusive of the value provided. Inclusive is represented with the [or] characters, and not inclusive is represented with the (or) characters in other parts of the application and notification emails.

- Lower/Upper Values – Add the lower and upper values in the fields provided if this threshold is numeric.

Click the Add button to add the threshold to the threshold table.

Additional thresholds can be added as needed for the selected monitor attribute. It could be common to have up to four thresholds for a single numeric monitor attribute such as Low Critical/Low Warning/High Warning/High Critical value ranges.

To configure a greater than or less than scenario for a data poitn, follow the below steps:

1. To set up a greater than situation, populate the second value box of the Define Threshold window. Once added the first value box will be populated with a negative infinity sign. This will state any value below the number in the second value box will be the alarm level specified.

2. To set up a less than situation, populate the first value box of the Define Threshold window. Once added the second value box will be populated with a positive infinity sign. This will state that any value above the number in the first value box will be the alarm level specified.

Min Time On/Off Alarm Settings

Min time on/min time off provides a mechanism for users to eliminate what is commonly referred to as spurious or nuisance alarms. These alarms can be generated by devices that have values constantly straddling an alarm threshold. For instance, suppose a warning threshold is set to 10–20 and the actual value of the data point being monitored is the following sequence from polling attempts: 9, 11, 8, 12, 10, 9, 12, 8. The system would constantly be taking the device into and out of the Warning alarm state.

To address this issue, fields called 'Min Time On' and 'Min Time Off' control nuisance alarms. The concept behind these settings is that when a value is collected that is in an alarm threshold, the overall alarm state of the device remains Normal until the Min Time On duration has been exceeded and the device is still receiving alarm values.

The same concept works for a device that is in an alarm state when readings show normal values. The Min Time Off setting keeps the device in the alarm state until Normal readings are shown for the duration of the Min Time Off setting.

After you have added the thresholds and Min Time settings, click the Save Table button to commit those thresholds to the selected monitor attribute.

Edit Thresholds

You can edit an existing threshold by clicking on the Threshold and selecting the Modify Threshold Button or by double-clicking the threshold in the table. Either method displays the threshold information that can be edited. Clicking the Save Table button commits changes to the system. Note that the inherited threshold setting cannot be edited. You must remove and recreate those thresholds by selecting the Redefine Table button when the inherited thresholds are displayed.

Delete Thresholds

You can select a threshold from the table and click the Delete Threshold button at the bottom to remove a threshold from the table. To remove all thresholds, select the Clear Table button and all thresholds will be removed from the table.

Notification Rules Menu

The alarm engine lets you define Notification Rules so that you can be notified of certain alarms generated by devices managed within the application.

Alarm Options

The options available for configuring a Notification Rule are as follows:

- Rule Name – This value is the Notification Rule name that will be listed in the left menu area when you access the Notification Rules menu.

- Maximum X messages in Y minutes – This setting lets you throttle the number of delivered notifications that are based on the alarm events generated in the application. This setting applies to the unique Device/Monitor Attribute combination. For example, Device UPS01 and Monitor Attribute Input Voltage would be the sample data element. If you set the throttle to 10 messages in 60 minutes, then you would receive the first 10 alarm state changes between Normal-Critical-Warning-Unreachable for that data element in a rolling 60 minute window.

- Alarm Level – You can select which alarm levels are delivered to which notification destinations. Clicking the Warning, Critical, Unreachable, or Return to Normal check boxes activates that alarm level for the Notification Rule being defined.

Service Options

The Service Options let you send SMTP notifications for scheduled service events and warranty expiration dates.

Message Recipients

The message recipients section lets you define which users should receive the generated notifications that meet the rule definition. To Add a recipient to the rule, click the Add button. The Message Recipients dialog appears.

■ Escalation Delay – Indicates whether this recipient should receive a notification immediately (when set to 0) or should be notified as an escalation resource after a certain amount of time which is defined in this field. This value is in minutes.

■ Type – Rule definitions can apply to one or more users/user groups. The Type field indicated whether this entry in the recipient table is for a single user or for a user group. Depending on this selection, the values in the Name drop-down will reflect available selections.

■ Name – Depending on which option is selected in the Type field, the user or user group name will appear in this list. This list is populated from the Users and User Groups defined in the instance on the System Tab.

■ Email Address – Lists the email address or addresses for the item selected in the Name field. If the Name value is a single user then the email address for that user will be displayed. If the value in the Name field is a User Group, then a list of all user email addresses for users in that group will be displayed in the Email Address field.

■ Calendar – Allows recipients to be defined for different parts of the day. The times defined here apply to the users selected in the sections above.

Escalations

As the recipient table is defined, it is important to understand the concept of notification escalations and how the system performs this function. In the following example of a notification rule, 3 levels of notifications are defined for an alarm:

■ User ryan – Will receive the notification for selected alarm levels and devices immediately.

■ User tami – If the alarms generated with this rule are not addressed within 30 minutes, this user will receive a notification email about the alarm.

■ User admin - If the alarms generated with this rule are not addressed within 120 minutes, this user will receive a notification email about the alarm.

Notification Escalations can be prevented in three ways:

■ Return to Normal – The device values return to normal in the typical polling intervals. After the Normal status is received, all timing of notifications and escalations are reset, and the cycle starts over again when a new alarm condition is reached for the device.

- Clear Alarm – In the Alarm Panel, you can clear the alarm from the list. This approach would not typically be recommended as a course of action since the alarm will most likely return when the next polling event takes place. The Clear function is typically reserved for an alarm that is not clearing out of the list on its own, but is known to be in Normal condition.

- Acknowledge Alarm – In the Alarm Panel, you can acknowledge the alarm that is listed. This action updates the alarm history for the device, changes the alarm LED to indicate it has been acknowledged, and suppresses continued notifications for this alarm. When the device returns to a normal state, notifications will begin for this device/data element combination again.

Select Devices

Device Targets – You can apply the rule to all devices managed by the application or to select specific Device Groups or Devices that are subject to the notification rule.

- All Devices – Selecting the All option applies the rule to all devices.

- Selected Groups or Devices – Choosing this option enables the Device Group and Devices option boxes. Click the + sign to add Device Groups/Devices to the respective lists and use the – sign to remove previously selected items from the lists. The Ctrl and Shift shortcut keys are enabled to allow multiple item selections in the lists.

- For the Devices list, the filter option is available to limit the devices in the list to ones that match the filter rule. Click the filter icon, assign values to any of the available selections, and click the Set button to filter the device list.

Notification History Menu

The Notification History function provides an easy way to view all notifications that have been delivered out of the alarming module to SMTP addresses. The interface provides several filtering options to let you view only a specific set of notifications that have been delivered. By default, the date range for this page is set to the previous one week of notification messages. The filtering options are described as follows:

- Type – Four options are available for filtering messages. By default, this field is set to All.

  – All – All messages are displayed.

  – Msg Sent – Messages which are successfully delivered are displayed.

  – Msg Not Sent – Messages which were not successfully delivered are displayed.

- Msg Not Sent (Maint) – When a device alarm triggers a notification event but is under a maintenance window defined on the Service page, the message is not sent to the notification recipients. These messages are logged for review to help you understand why a message was not sent to a user under a Maintenance window.

- Device Name – Lets you provide a partial word search for the device name to which the Notification event is related. The partial name search is case sensitive, and by default this field is left blank so that all devices are returned in a search.

- Rule Name - Lets you provide a partial word search for the notification rule to which the Notification event is related. The partial name search is not case sensitive and by default this field is left blank so all notification rule events are returned in a search.

- Recipient - Lets you provide a partial word search for the recipient to which the Notification event was delivered. This recipient name is the email address of the user and not the name of the user defined on the System Tab in the Users function. The partial name search is not case sensitive. By default, this field is left blank so that all notification rule events delivered to all recipients are returned in a search.

- Dates – By default, these fields are set to the most recent one week of time. These date options filter the list to show only notification events delivered within the specified start and end dates.

After setting the filter options, you can select the Search button to execute the search. Notification events that meet the filter criteria are listed in the table below the Search button. If multiple pages of events are returned, you can navigate the pages of lists with the pages tools above the list.

You can select a message in the list and see a copy of the exact notification delivered in the area below the table of messages.

Once the list of events has been presented, you have two options to manage this list outside the application:

- Export – Selecting the Export button exports the events listed in the table to Excel. You can then use the data in your own custom reporting engines or work with data in the spreadsheet format.

- Print – This option lists events in the standard reporting format.

Probe Control Menu

The Probe Control feature located on the Monitor Tab is designed to provide system administrators with real time information on the status of all probe servers deployed to the architecture. Multiple probe processes can be deployed to handle a large number of devices and/or data points within the customer architecture. Each process is listed separately in the Probe Control section of the Monitor Tab. Each process provides information related to the work being performed by that probe server.

Start and Stop the Probe

The Probe Control menu lets you Stop and Start the probe server by clicking on the Stop or Start buttons. You can temporarily Pause the probe and Resume the probe process to troubleshoot any issues.

Header Information

When you select a probe from the probe menu on the left, the header information is updated to provide basic information on the status of the probe. This information is composed of the following fields:

- IP – Indicates the IP address and port for the probe selected.

- Device Count – Provides three different device counts for the probe in the following order:

  - Devices Managed by Probe

  - Slow Response Devices – The slow response threshold is controlled by a setting in configuration files.

  - Total Unreachable Devices

- Running Time – Time since the probe server was last started.

- Thread Count – Two types of threads are spawned in the probe server. One is the fast response thread, and the other is the slow response thread. Devices are managed by a thread, based on the response time they have to the polling requests, and threads are created to manage device loads as needed by the probe engine. The values next to this label are as follows:

  - First number is the number of fast response threads.

  - Second number is the number of slow response threads.

Probe Control Table

The main portion of the probe control function provides a list of devices and statistics related to the probing of those devices. The following information is defined in the table:

- Device Name – Name of the device being polled for data.

- Last Status – Alarm status of the device as of the most recent poll event. Available values for this field are Normal, Unreachable, Warning or Critical.

- Probe Count – Number of times the probe has attempted to collect information from the device.

- Success Probe – Number of times the probe attempt was successful.

- Recent Missed – Number of times the device did not respond in the most recent one hour of time.

- Missed Count – Total number of probe attempts for the device that were unsuccessful in the last one hour of time.

- Interval (A/L/S) – Provides information on the probe interval when the probe attempts to contact a device for information. Values are reported in milliseconds.
  - A – The average amount of time between probe attempts.
  - L – The longest amount of time between probe attempts.
  - S – The shortest amount of time between probe attempts.

- Response (A/L/S) – Provides information on the amount of time between a probe attempt and probe response from the device. Values are reported in milliseconds.
  - A – The average amount of time for the device to respond.
  - L – The longest amount of time for the device to respond.
  - S – The shortest amount of time for the device to respond.

Refresh Statistics

A refresh button is provided at the top of the page to refresh the statistics of the Probe Control panel.

Plug-in Management Menu

The architecture allows easy integration of third-party applications and tools by using application plug-ins. As a plug-in is written and tested, it appears in the Plug-in Management portion of the application under the Monitor Tab.

Each certified plug-in on the menu provides some form of enhanced functionality in the application. The main screen on the right provides controls for that plug-in so that only certain types of devices can take advantage of the plug-in features. By default, the application contains a plug-in named "monitor", which adds the Monitor tab to devices in the Device Tab

By choosing device types, manufacturers, product lines or models from the available boxes, you can activate the Monitor tab on a specific set of devices. To add items to one of the boxes, click the + button and choose the appropriate items. The shortcut Ctrl and Shift keys allow lets you select multiple items from the list at the same time. To remove items from the list, select the items in the box to be removed and click the – button below the selections.

Process Control Menu

The Process Control menu lets you view status and stop/start key monitoring processes running on the application. When you access the Process Control menu, you see a window that provides the information and functions defined in this section.

Each of these processes reports its status to a Monitor process, which has the ability to notify an administrator email address of reporting issues.

- Name – Name of the application process.

- Type – Type of the process listed.

- Status –Running or stopped.

- Start Time – Last time the process was started.

- Last Report Time – Last time the process reported its status to the application.

- Action – Link to Stop or Start the process. If the status of the process is Running, you can Stop the process. If the status of the process is Stopped, you can Start the process.

When a process is selected in the table, the section below the table provides additional information related to the process. The following three fields are displayed in this area.

- Report Interval – Amount of time in milliseconds where the process is scheduled to report its status to the monitor.

- IP – IP address of the process.

- Message – Additional information related to the status of the process. If the process is behaving normally, this message will read only "Normal".

MIB Browser Menu

A self-contained MIB Browser that lets you manage and view MIB files in the system. This function, which is located on the Monitor page, provides the following functionality:

- Upload/Delete – Lets you load or Unload the MIB files into the MIB tree located on the left.

- Create Target – After selecting the data points or folders in the MIB, clicking the Create Target button prompts you to define the created Target, which contains all of the MIB nodes selected. Also, this function creates associated Monitor Attributes and performs a mapping of the new Target Members to the new Monitor Attributes.

- IP Address – Enter the IP address of a target device to be used to test for data.

- Advanced – Clicking this button lets you define settings for a connection to be established to the IP Address provided. These settings include the Port, Get/Set Community strings and the SNMP Version to be used.

- OID – Lets you manually enter an OID or select the MIB node from the tree to populate the OID to be requested from the device at the defined IP Address.

- Walk – Clicking this button sends an SNMP request to the IP address provided to retrieve the OID defined in the OID field. Results of the request are shown in the main section of the page.

- Name/OID – Provides the Name or OID of the information listed.

- Value – Shows the value returned by the SNMP request for that OID.

- Type – Lists the OID type defined by the MIB file for the device.

Monitor Register Menu

The Monitor Register provides controls over which monitoring protocols are available to certain groups of devices. While the list of actual protocols available cannot be managed by end users in the application, the availability of these protocols is configurable in the Monitor Register menu area.

When you select a protocol from the list on the left, you can view all settings and configurations for the protocol. Most of these settings are read-only and cannot be edited by users. The only options available for the user to edit are the levels of the device hierarchy that should have access to the selected protocol.

You can provide access for devices to use this protocol by selecting the appropriate Type, Manufacturers, Product Lines and Models options in the appropriate boxes at the bottom of the screen. Clicking the + symbol lets you add items to the list. Selecting items from these boxes and clicking the – button lets you remove supported options from these components. You can select multiple items from either the add/remove list by using the Shift and Ctrl keys to choose multiple items and then selecting the add/remove button.

When a device has support for a given protocol, it is listed on the Device-Monitor tab for that device. At this page, specific settings defined for the protocol are defined for the device.

Chapter 6: Admin > Dash & Trend Tab

Dashboard and Trend Chart Studio

The main purpose of the application is to monitor devices and provide data to users of the system. The Dashboard and Trend Chart Studio provides the maximum flexibility in customizing how the data collected from monitoring can be viewed and accessed by its users.

Various Access Levels

The Dashboard and Trend Chart Studio can be accessed from the Floorplan view, the Navigation tree and the Admin > Dash & Trend tab.

Floorplan View

By default, any data point monitored for a device is available on the device pop-up menu in the Trend Chart interface. If a device has no data points being monitored, then the Trend Chart link does not exist in the menu.

For dashboards, any dashboard mapped to some part of the device tree for that device (Type, Manufacturer, Product Line, Model, Specific Device Name, etc) is listed in the device pop-up menu if the device matches that device tree component. For example, a Poweredge 1950 named Server01 would show links to all dashboards mapped to Server-Rackmount, Dell, Poweredge, 1950 OR Server01 parts of the tree. This feature enables you to create a single dashboard template to apply to multiple devices in a single step.

Navigation Tree

When viewing different nodes of the navigation tree, you can access Dashboards and Trend Charts that have been mapped to that level in the tree. The menus are located in the ribbon bar in the data section. They list all dashboards or trend charts available on that floor. You can double-click the item in the list to launch the dashboard or trend chart interface.

Admin > Dash & Trend Tab

The final place where you can access dashboards and trend charts is on the Dash & Trend Tab of the web interface. This central location for accessing all dashboards and trend charts and also contains the studio functions where you can create and modify all dashboards and trend charts in the system. The Available subtab allows access to all Dashboards and Trend Charts.

Available Dashboards and Trend Charts

When you first access the Dash & Trend Tab, you see the Available subtab, which lets you view and access all dashboards and trend charts in the system. Three main views help you see how dashboards and trend charts are mapped in the system. You control these views by using the radio buttons at the top of the left menu area.

- By Device – This view shows a list of all devices from the device manager and lets you view how these tools have been assigned through the device tree. You can select Types, Manufacturers, and Product Lines, Models or individual devices to see what tools are available at each level of the tree.

- By Location – This view shows the Navigation tree of locations and lets you see which tools are available at each node of the navigation tree.

- By Users – Dashboards and Trend Charts can be created for a specific user to access when they log in. This is helpful for Executive reports and views that may not be needed for other users. This view allows a list of users and their folders to see dashboards and trend charts assigned to that user and/or user group.

In each of these views, the list of available dashboards or trend charts is displayed on the main part of the screen. Double-clicking an item from the list opens that particular view.

Dashboard Studio

The dashboard studio is designed to let you create custom dashboards for any devices which are being monitored. Similar to the other monitoring components, the best practice is to create generic dashboards that can be applied to multiple devices. However, the Studio does also allow data from specific devices to be combined into a single Dashboard interface. The following information covers instructions on how to create new dashboard template and dashboards for specific data points of multiple devices.

New Dashboard Types

To Create a new dashboard, users access the Dashboard Studio and select the New button at the bottom of the dashboard list in the left menu area. Clicking this button will present the user with an option to create one of two kinds of dashboards:

- Dashboard Template – These dashboards require user to assign a monitor attribute to the dashboard gauge and the dashboard can only be saved to a portion of the Device Tree which will inherit to devices which match that device component. Since these are saved using the By Device option, these dashboards will be accessed from the device popup menu. These dashboards can't be saved to Locations or Users.

- Specific Device(s) Dashboard – These dashboards require user to assign a monitor attribute and a device to the gauge. So, specific data form a specific device can be added to these dashboards. These dashboards can only be saved to Locations or Users and will not appear on a device pop-up menu.

Dashboard Components

The Dashboard Studio provides a series of dashboard gauges and controls to present the data being collected in the monitoring engine and stored in the database. Once a New dashboard canvas is available, users can drag and drop the gauge component on the canvas to assemble the dashboard. The following summarizes the gauge types available for users to create these custom dashboard interfaces.

Group Box

The Group Box tool is used to group more than one gauge into a certain portion of the dashboard. This tool will allow users to place multiple gauges within the group box without creating a new row in the template. There are only two properties for the group box:

- Width – Width of the group box.
- Height – Height of the group box.

Horizontal Line

The horizontal line tool places a thin horizontal line across the dashboard where it is placed. This line is useful for dividing different sections of gauges. The only property that can be defined for this tool is width.

Title

The title tool lets you enter a string title above any groupings of gauges. There are three properties for a Title:

- Width – Width of the title window.

■ Font Size – Font size of the text entered to the title bar.

■ Label – The text to be displayed in the title bar.

Vertical Space

The Vertical Space tool lets you create space between rows of dashboard components. There are only two properties to be defined for the vertical space tool:

■ Width – Width of the Vertical Space.

■ Height – Height of the Vertical Space.

Alarm Counter

The Alarm Counter gauge displays the value of the monitor attribute in a speedometer-like gauge. A small LED next to the value indicates the alarm status of the device. The LED is Green for Normal, Yellow for Warning, and Red for Critical. The following properties are defined for the alarm counter gauge:

■ Width – Width of the Alarm Counter gauge.

■ Label – Text to be displayed to the left of the counter.

■ Show Counter – If the user would simply like to see an alarm LED, the user may opt to hide the actual digits which display the value of the monitor attribute.

■ Digits – The number of digits to display in the counter.

■ Decimals – The number of decimals to display in the counter.

■ Bindable Device – This field will only be displayed on the Specific Device(s) Dashboards. This represents the device from which to display the selected Monitor Attribute chosen in the next field below.

■ Monitor Attribute – The Monitor Attribute to display in the value of the counter.

Alarm Gauge

The Alarm Gauge is a simple LED that indicates if a given monitor attribute is in an alarm state. The following properties can be configured for this gauge:

■ Width – Width of the Alarm Gauge.

■ Label – Text to display next to the alarm LED.

■ Bindable Device – This field is displayed only on the Specific Device(s) Dashboards. This represents the device from which to display the selected Monitor Attribute chosen in the next field below.

■ Monitor Attribute – The Monitor Attribute to display in the gauge. If the monitor attribute is a Normal alarm state it will show Green, Warning alarm state will show Yellow, and Critical alarm state will show Red.

Circular Gauge

A circular gauge looks like an odometer dial on a car dashboard and will display the value of the monitor attribute. There are a few components that can be defined on the properties page and a few components that are inherited from the Monitor Attribute itself:

- Width – The width of the circular gauge component.

- Height – The height of the circular gauge component.

- Label – Text to be displayed under the circular gauge.

- Bindable Device – This field will only be displayed on the Specific Device(s) Dashboards. This represents the device from which to display the selected Monitor Attribute chosen in the next field below.

- Monitor Attribute – The monitor attribute value to display in the gauge.

- Gauge Value – Minimum, Maximum and Unit values are inherited from the Monitor Attribute properties defined in the Monitor Attributes menu.

Information Gauge

The information gauge is a multi-use tool which can display one of four value types returned by a monitor attribute. Each of these options is displayed by changing the Mode drop-down value. The following options are available with the information gauge

- Mode – Option drop-down box that lets you select the type of data to display. Options are as follows:

  - Number – Displays a value in a counter gauge. You can configure the width, text label, number of digits and decimals to display and the monitor attribute value to display.

  - Enum – Displays an alarm gauge which is a colored LED based on the alarm state of the value being collected. Configurable properties are the width, text label and the monitor attribute value to display.

  - Date – Displays a text string with the date value collected by the monitor attribute.

  - String – Displays a basic field with the text string collected from the monitor attribute.

- Digits – The number of digits to display in the counter.

- Decimals – The number of decimals to display in the counter.

- Bindable Device – This field will only be displayed on the Specific Device(s) Dashboards. This represents the device from which to display the selected Monitor Attribute chosen in the next field below.

- Monitor Attribute – The monitor attribute value to display in the gauge.

List Gauge

The List Gauge lets you display a list of values returned from a monitoring poll event. For example, if an OID returns an array of data, the list gauge displays each item in a separate line in a list format.

- Width – Width of the List Box.

- Height – Height of the List Box.

- Label – Title of the List Box.

- Bindable Device – This field is displayed only on the Specific Device(s) Dashboards. This represents the device from which to display the selected Monitor Attribute chosen in the next field below.

- Monitor Attribute – The monitor attribute value to display in the gauge.

Slider Gauge

The slider gauge provides a combination of a slider, a readout of the value, and an alarm LED for the value collected from the monitor attribute. The following properties can be managed with the slider gauge component:

- Width – Width of the slider gauge.

- Label – Text string displayed on the slider gauge.

- Monitor Attribute – The value to be displayed on the gauge.

- Bindable Device – This field is displayed only on the Specific Device(s) Dashboards. This represents the device from which to display the selected Monitor Attribute chosen in the next field below.

- Slider Value – These values are inherited form the selected Monitor Attribute.

Slider Group Gauge

The Slider Group Gauge is used to display values collected from an SNMP Table. This lets you add a single dashboard tool that displays a gauge for each row in the table and greatly reduces the creation of dashboard tools. The following properties are defined for the Slider Group Gauge:

- Width – Width of the series of gauges added to the group.

- Bindable Device – This field is displayed only on the Specific Device(s) Dashboards. This represents the device from which to display the selected Monitor Attribute chosen in the next field below.

- Bindable Table – User selects the SNMP Table which contains the value to be displayed in the groups of slider gauges.

- Label – User selects the table column which contains the description of the value to be displayed. The value of this table column will be placed in the gauge to the left of the slider value.

- Value – User selects the table column which contains the value to be displayed in the group of slider gauges.

Table

The Table dashboard component is used to display a series of values collected from an SNMP Table. To add the Table component, define these properties:

- Width – Controls the total width of the table. By default, all columns have an equal width within the table.

- Height – Controls how many rows of data will be displayed in the basic view of the table. If more rows are part of the SNMP Table than can be viewed, a scroll bar is added to the table so that you can scroll through available rows of data.

- Bindable Device – This field is displayed only on the Specific Device(s) Dashboards. This value represents the device from which to display the selected Monitor Attribute chosen in the next field below.

- Bindable Table – Select the SNMP Table to be used for this dashboard display.

- Column – Click the Add Column button to add a column to the table. The HeaderText and DataField fields will be displayed for the first column of the table. The HeaderText field is a string text that will be placed as the column header in the dashboard. The DataField drop-down contains a list of the Table Columns defined for the SNMP Table. Select the table column to be displayed in the rows of the dashboard table for that column.

You can click the Add Column button to continue to add columns to the dashboard table as needed.

Build Dashboards

You can easily drag and drop dashboard components onto the dashboard canvas to assemble dashboards for the application. As the component is dropped onto the dashboard, the properties dialog box for that component will appear. Completing the properties and clicking OK will add that component to the dashboard.

The basic concept to understand when creating dashboards is that gauges are applied to rows of the dashboard. The gauge with the greatest Height property defines the height of that row. Consequently, dashboards will look more attractive if components with the same height are placed on the same rows. To get multiple shorter gauges in a tall row, utilize the Group Box tool on that row and place shorter gauges inside the group box.

The first gauge component dropped on the dashboard canvas will create the first row. To add a gauge to that row, drop the second gauge to the right of the first gauge. To create a new row, drop the second gauge below the first gauge.

Modify Dashboards

You can add, modify, move, or delete gauges from the dashboard at any time. These changes will be propagated to all devices which use the dashboard. The following updates can be made to the dashboard components.

- Drag & Drop – Users can drag and drop dashboard components anywhere on the dashboard canvas. This includes moving an existing dashboard component to a new location.

- Right Click Menu – Users can click the right mouse button while on a dashboard gauge and will have the following options available:

  - Remove – Deletes the selected gauge from the dashboard.

  - Edit – Displays the gauge property page to edit the gauge settings.

  - Insert Block Up – Adds a blank row in the dashboard directly above the selected gauge.

  - Insert Block Down – Adds a blank row in the dashboard directly below the selected gauge.

  - Insert component… – Lets you select a gauge type from the menu and insert the new gauge to the left or right of the selected gauge.

Save Dashboards

After the dashboard components have been applied to the dashboard canvas, a few toolbar options let you improve the usability of the dashboard. The toolbar functions are as follows:

- Clip Blank – This tool clips the blank regions of the dashboard canvas from the bottom and right of the dashboard. This action improves the view of the dashboard on the Floorplan tab when you open it from the link menu. All excess area from the right and left is removed so that the window is as small as possible, and all components can be viewed.

- Set Size – This tool lets you change the size of the dashboard canvas. This tool is useful to add more rows of gauges to the bottom and to eliminate scroll bars when you see two sets of scroll bars when viewing the dashboard on the Floorplan tab. You can set the Width and Height of the dashboard canvas by using the properties.

- Save – The Save dashboard icon opens a window that lets you define how and where the dashboard will appear. The Dashboard Setting window appears when the Save icon is selected:

  - Name – Name of the dashboard and the name of the link that will appear on the device pop-up that uses this dashboard.

  - Description – Basic description of the dashboard.

– Usages – You define how this dashboard will be saved and presented to users in the application. As discussed previously, there are three options available for saving a dashboard which are By Device, By Location and By User. Depending on the type of dashboard template being created, a subset of these options will be available to the user for saving.

■ By Device – Lets you define which Device Types, Manufacturers, Product Lines, and Models, Devices or combination of these classifications should display this dashboard. Click the Add New button to define the first device classification which should receive the dashboard link.

Device – Choose specific devices to have the dashboard.

Model – Select a model to receive the dashboard. All devices based on this model will receive the dashboard link on the device pop-up menu (PowerEdge 1950)

Product Line – Select a Product Line to receive the dashboard. All devices based on this Product Line will receive the dashboard link on the device pop-up menu. (PowerEdge)

Manufacturer – Select a manufacturer to receive the dashboard. All devices based on this manufacturer will receive the dashboard link on the device popup menu. (Dell)

Type – Select a Device Type to receive the dashboard. All devices based on this Device Type will receive this dashboard link on the device pop-up menu. (Air Conditioners)

Product Line/Type – Assigns the dashboard to the selected combination of Product Line and Device Type. (Server Dashboard/PowerEdge). This option helps with issues such as PowerEdge Storage versus PowerEdge Servers.

Manufacturer/Type - Assign the dashboard to the selected combination of Manufacturer and Device Type. (Liebert/PDU)

■ By Location – Dashboards can be assigned to certain locations, which will make them visible in either the Navigator Tab (if Country, Region, State, City or Building are selected) or on the Floorplan Tab (if a specific floor plan is selected).

■ By User – Dashboards can be made available to a certain set of users or user groups by using this option. A list of Users and User Groups will be presented to the user for which they have rights to save dashboards. Select the folder under a Username to save a dashboard for that user or select the folder under a User Group to make the dashboard available to all users which belong to that group.

For the By User option, dashboards must be saved to a folder. Use the settings at the top of the page to create, modify or delete folders under a specific user or user group. Folders allow for better organization of the dashboards.

For each dashboard, multiple Usages can be included. This feature provides flexible control over where the dashboards are presented to specific end users for viewing.

Delete Dashboards

To delete a dashboard, view a list of all dashboards in the Dashboard Studio and select the dashboard from the list on the left. Highlighting the dashboard name in the list and clicking the Delete button removes the dashboard link from all devices that currently have the dashboard assigned.

View Dashboards

No matter where the dashboard is accessed, the dashboard window provides a view of the data points configured for the gauges saved to that dashboard. For all of these dashboard windows, there are a few important notes to understand with regard to the functions of the gauges and display of information:

- Title Bar – The title bar of the window displays the Device Name and the Dashboard Name for the selected dashboard. If the dashboard is saved By Location or By User, the title bar displays only the Dashboard Name.

- Mouse Over – You can place the cursor over the gauge (see above). This action displays a timestamp of the last data point collected from the monitoring engine. This is helpful in letting the user know if data in the display is current.

- Alarm Status – Depending on the gauge type, the alarm status is displayed with Red for Critical, Yellow for Warning, Green for Normal, and Orange for Unreachable. Reported alarm levels are based on the thresholds defined for this device.

Trend Chart Studio

By default, all decimal or integer data points monitored for a device are collected and stored in trend charts. These single-line trend charts are available on the device pop-up menus on the floor plans where they have been assigned. However, in many cases, you might want to have multiple data points plotted on the same historical trend chart. These multiple data points could be different data for the same device or the same data for multiple devices. Regardless, the Trend Chart Studio lets you create custom Trend Chart interfaces to display historical data charts with multiple data points.

The Trend Chart studio includes components that help you properly configure and build a new trend chart for the application. The following sections must be completed for a new trend chart:

- Name – Name of the trend chart. It appears in the Trend Chart drop-down list if accessed from the device pop-up link. It also appears in the floor plan and navigator trend chart list if assigned to a location.

- MA – Monitor Attribute to include in the trend chart. This setting is mandatory for the new trend chart.

- Devices – You can optionally select specific devices to use for the trend chart. If the Device is not selected, the Trend Chart can be used as a template and assigned to multiple devices.

- Usages – Similar to the Dashboards, this setting determines how and where the Trend Chart is presented to the users in the application interface.

Create Trend Charts

When accessing the Trend Chart Studio, click the New button to create a new Trend Chart for the system. After entering the Name, determine whether you are creating a Trend Chart Template to be inherited by devices or a Trend Chart with specific device information. Each of these types has different requirements on setup of a new chart.

MA

The MA field is a list of all Monitor Attributes available to be plotted in a trend chart. You must select a Monitor Attribute to display in the body of the Trend Chart. In this field, multiple Monitor Attributes can be selected to be included on a single trend chart. For example, Temperature and Humidity can be plotted on the same chart.

To add a monitor attribute to the trend chart, click the + button below the MA field. A list of all monitor attributes appears in the list to the right. Select one or more monitor attributes and click the + button below the monitor attribute list. The selected monitor attributes move to the MA field.

Devices

The Devices field only needs to be defined if the trend chart is going to display data points for specific devices. If the Devices are not selected, the Trend Chart is saved as a template, and the Monitor Attributes defined are displayed for whichever devices the chart is saved to during the save process.

Usages

The Usages settings define where and how the Trend Charts will be displayed. Similar to the dashboards, trend charts can be saved By Device, By Location or By User. Depending on the trend chart settings, these options will be available when the + button is selected next to the Usages list.

- By Device – Trend Charts can be assigned to devices or components of the device tree when ONLY an MA is defined for the trend chart. If specific devices have been listed in the trend chart settings, the By Device option cannot be used.

■ By Location – Users can make trend charts available to be view in the different levels of the Navigator Tab or in the trend chart are of the Floorplan Tab by using this option.

When this option is used, the trend charts appear at the bottom of the Navigator page when that node in the navigation tree is selected (in Country, Region, State, City, Building are selected) or in the Trend Chart menu at the bottom of the Floorplan Tab (if a specific floor plan is selected). Double-click the trend chart and the information is displayed in the trend chart window.

By User – Trend Charts can be saved to specific users or user groups with this option. When users log into the application, they can view these trend charts on the Available section of the Dash & Trend Tab.

Modify Trend Charts

You can modify any of the settings of the trend chart at any time. Access the Trend Chart Studio and select the trend chart to be edited. Make edits to the settings and click the Save button. The updated trend charts will be in effect immediately for any place defined in the Usages section of the trend chart.

Delete Trend Charts

You can delete Trend Charts from the Trend Chart Studio by selecting the Trend Chart name from the list and clicking the Delete button.

View Trend Charts

Trend Charts provide information about historical data points collected from the monitoring engine and help you understand trends in the device data history. As a trend chart is opened, you will notice a few options to let you update the data being presented:

■ Date Ranges – You can custom-define the start and end date/time for the x axis of the trend chart. By default, the initial view is a one-week trend chart.

■ Date Buttons – You can jump to a predefined time view by clicking the 1 Hour, 1 Day, 1 Week, 1 Month or 1 Year buttons.

■ Data Checkboxes – On the right part of the trend chart, there is a list of all data points included in the trend chart. You can activate or deactivate the lines included in the trend chart by turning on or off the check boxes listed. Note that the color of the check box corresponds to the color of the line displayed in chart.

Chapter 7: Admin > Firmware Feature

The Firmware feature allows users to maintain a library of firmware files and to upload them to one or many devices. The general order of actions for completing this function is as follows:

- Find devices to send a firmware file. Note, only Eaton PDU Rackmount devices are supported for this feature.
- Set the access information for the selected devices.
- Upload files to the firmware library
- Select firmware file to upload to the selected devices
- Upload the files to the selected devices

Search Devices

Filter fields are available at the top of the page to allow users to limit the devices listed in the device list. When the filter options are completed hit the Search button to filter the device list. To restore the full device list users can select the Clear button. Users select the devices to be used for a firmware file upload from the list of devices by choosing the checkbox next to the Device Name.

Note the filter fields support partial keyword search. To search for a string that starts with simply enter the matching string. To search for a string that contains enter the % wildcard character to find any device with a match in the field.
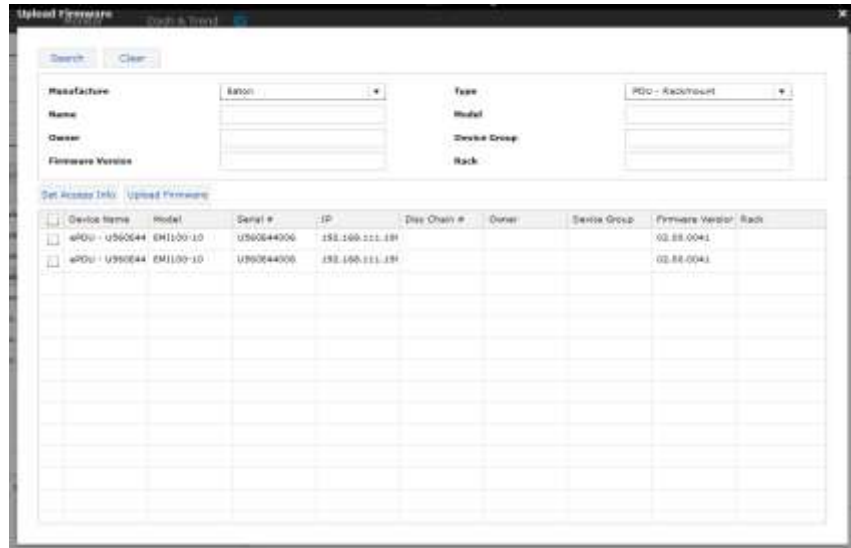
Set Access Information

For the firmware file upload process to complete successfully the proper access information is required to establish a connection and deliver the file to the device. Provide the Admin User and Admin Password for the selected devices.
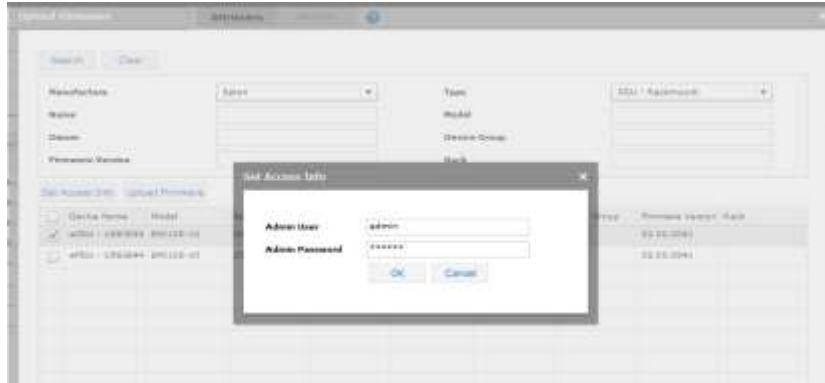
Upload Firmware

The Upload Firmware button will launch the firmware file library interface. On this page, users can upload files to the firmware library with the Browse and Add buttons at the bottom of the page. To send the file to the selected devices, select the file from the list and click the Upload button. This will initiate the connection to the device using the defined access information.

To remove a firmware file from the library simply select the file from the list and click the red X located to the far right of the file record in the list.

Note, when the file upload process is performed, the Events Calendar will log the start and end of the connection and file upload processes.

Chapter 8: Admin > Discovery Feature

The Discovery feature allows users to define and manage the auto discovery feature of the application. This feature will poll defined IP ranges and allow users to decide if devices found are added to the device list with full monitored capabilities or as manage-only devices which can be placed in racks and used in port mapping. Note, auto discovery will only find PDU Rackmount and UPS Rackmount devices.

Main Discovery Page

When the Discovery feature is selected, the main page displayed provides a summary of the discovery jobs defined and the results of the discovery process. Key data managed on this page are as follows:

- Auto Discovery Engine Status – Indicates the running state of the discovery service. Users can Stop and Start the process using the toggle button provided with this data point. A green LED shows the process is running and a red LED shows the process is stopped.
- Discovery Agents – Displays the number of agents (probes) deployed and hovering over the number provides the name and status for each agent. A green LED show the agents are running and a red LED indicates a problem.
- % of IP Processed – Indicates the progress of the current discovery process against the defined IP ranges. The View Log button will present a detailed log list of all attempted discovery poll attempts against the defined IP ranges.
- Total IP Processed | Remaining – Shows a raw count of the IP addresses defined and remaining to be polled by the discovery service.
- Total Discovery Jobs Defined – Number of IP ranges and associated configuration options defined for the discovery service to process. The Edit button will present the page which allows users to define and manage the IP ranges to be polled with the discovery process.
- Total Devices Found – Number of devices discovered by the Discovery process. The Manage button will present the page which allows users to Set Model, Move to Monitor or Move to Manage the discovered devices.
- Job Table – Lists the defined jobs to be processed by the Discovery process the current status and additional historical data.

View Log

This page shows the detailed log history of the discovery process. The log entries are exportable using the buttons at the bottom of the log page.

Edit

This page is the main location to define and manage the IP ranges and authentication options for the discovery process. The following functions are provided on this page:
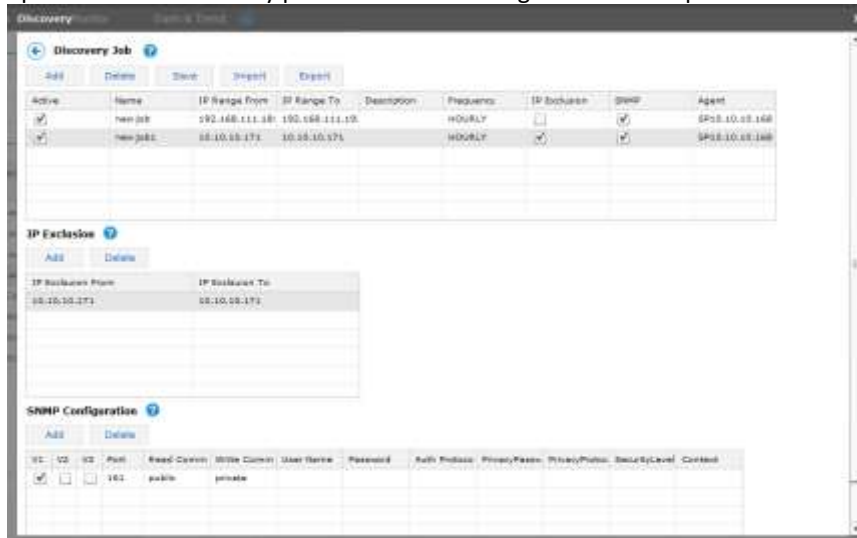
Add
Adds an entry to the table for a new discovery job to be defined. Fields are updated directly in the table.

- Active – Determines if the discovery job is included in the discovery process or omitted from the list of jobs processed in the discovery process.
- Job Name – Name of the discovery job. This name is referred to when devices are discovered by the discovery process.
- IP From | To – The range of the IP addresses to be polled for devices.
- Description – Text description of the job. This is for reference only.
- Frequency – This setting determined the frequency the defined job is included in the discovery service. Note, the discovery service is processing many different jobs so the setting may not be exact as the discovery job picks up jobs on a scheduled routine as other jobs are finished.
- IP Exclusion – Allows users to omit IP addresses or ranges from the IP Range To | From address range. When this checkbox is selected the IP Exclusion table is presented below the discovery job table. Users can then Add, Edit and Remove IP ranges from the table to remove them from the defined ranges to be polled. Ranges defined on this table are only used for the selected discovery job. Each discovery job will have its own Exclusion IP ranges.
- SNMP – Allows users to define the authentication parameters for the defined jobs. When this checkbox is selected the SNMP Configuration table will be presented and users can define the SNMP options to be used for collecting data from the targeted IP ranges. Note, multiple SNMP configuration options can be added to the table.
  - Versions – Users can select one or all of the version options. If multiple versions are selected then the discovery service will attempt

to contact devices using all options to establish a connection and collect data.
- o Port – Port to be used for SNMP communications.
- o Read | Write Community – Community strings to be used for collecting data and writing control actions to devices managed in the application.
- o Other Options – SNMP v3 options for communications.
- RF Code – Allows users to define the authentication parameters for defined jobs. When this checkbox is selected the RF Code Configuration table will be presented and users can define the RF Code options to be used for collecting data from the targeted IP ranges. Note, multiple RF Code configuration options can be added to the table.
  - o User Name and Password for RF Code communications to the Zone Manager software.
  - o Port – Port to be used for RF Code communications to the Zone Manager software.
- Agent – IP Address of the probe used to discover the devices. Note, for all in one implementations the IP Address will be 127.0.0.1.

Delete
Deletes the selected job from the table of discovery jobs to be used by the discovery process.

Save
Commits changes to the job definitions and adds them to the Discovery service queue.

Import
Allows users to bulk import the discovery job settings. To obtain the spreadsheet to be used for bulk importing discovery job settings users can select the Export button to get the current settings exported to an Excel file. The Excel file is comprised of three tabs which have the same options and fields defined in the Add feature above.

Export
Allows users to export all currently defined job configurations on the discovery page.

Import | Export Notes
- The Action column supports the following values: A to add a new job, U to Update an existing job.
- Job names must be unique.
- Job Names are used to cross reference the IP Exclusion, SNMP and RFCODE tabs to the main Job tab job list.

Manage

The Manage page lists the devices which have been discovered by the discovery service. If a device is included in multiple discovery jobs it will only be listed one time with the first job to find the device listed in the Job Name field. The data populated is taken directly from the device during communication with the discovery service. If a specific model cannot be determined with the discovery process, a generic model will be applied and the user can update as needed.

Set Model
If the model listed for the device is not correct, users can update the model to be used for the device using the Set Model feature. Multiple devices can be updated using the Set Model feature by choosing the checkbox in the first column for all devices which need to be updated. Clicking the button will present a window which lists all models from the master model library. Users can search and filter the list to find the match for the discovered devices and then users hit the OK button to make updates to the selected devices.

Move to Monitor
Allows users to create the selected devices in the application device list with full data collection included by the probe monitoring engine.

Move to Manage
Allows users to create the devices in the application device list but will not activate data collection with the probe monitoring engine. This feature allows users to create devices, place them in racks, perform port mapping and manage device attributes for the selected devices.

Chapter 9: Admin > ITSM Feature

The application fully supports interaction with popular third party IT Service Management (ITSM) applications. A generic framework has been created to allow for automated tasks to be synchronized between this application and the third party ITSM application. This framework establishes connections with the ITSM solution and performs synchronization actions based on user settings defined in the ITSM page. The synchronization process, if enabled, will perform updates every 30 seconds.

ITSM Data & Settings

In order to properly configure the application to synchronize with the ITSM application, there are several settings which must be defined in the Admin page to identify the communication settings and synch triggers to be processed. To access these settings, select the Admin tab on the Home page and then choose the ITSM feature in the upper right area of the ribbon across the top of the page.

Synched Devices

The Synched Device table provides a list of devices which have been synchronized between the two systems. The tables list key model information, serial number of the device and the Last Updated time for the device. This Last Updated time represents the last time that the device was updated based on changes processed by the ITSM feature.

Configuration

The Configuration tab has the key parameters which need to be defined to control the communication and triggers for the ITSM integration. The following settings are defined on this page:

Setting	Description
Product	Select the ITSM product used for integration.
Status	Status of the integration process. If Enabled, the process will actively synch with the selected Product. When Enabled, the feature will process updates every 30 seconds.
URL	URL of the ITSM server. Note, do not include the /

	at the end of the URL. For example, a valid URL would be as follows: https://dev34654.service-now.com
User Name	User name needed to log in to the interface of the ITSM server.
Password	Password needed to access the ITSM interface.
Proxy Server	Status of the proxy communication to the ITSM server. If Enabled, the Proxy settings are used to communicate with the ITSM server.
Address	IP Address of the Proxy Server needed to access the ITSM solution.
Port	Port to be used for Proxy communication.
Proxy Authentication	Status of Proxy Authentication. If Enabled, the Proxy User and Proxy Password are used to establish communication with the ITSM Server.
Proxy User	User name to be submitted for the proxy connection.
Proxy Password	Password used with the proxy connection.
Synch Asset	Determines the direction of the synchronization process for device creation and attribute updates: • Disabled – No device synch will be processed with an ITSM application. • To ITSM – Device changes will be pushed to the ITSM application. • From ITSM – Device changes in the ITSM application will be processed in the Device list. • Bi-Directional – Device changes will be sent to the ITSM application and pulled from the ITSM application.
Incident Push	Determines if Alarms generated will be pushed to the ITSM application in the form of new Incidents. If Enabled, alarms generated will open a new Incident in the ITSM application. Note, only alarm changes from Normal to

	Warning|Critical|Unreachable and back to Normalnwill generate a ticket on the ITSM system.
Incident Caller ID	System ID of the account to be used to open the Incident on the ITSM solution.

Model Map

The ITSM model library will not be using the same naming convention as this application so administrators must establish a mapping between the two systems. The Model Map feature allows users to connect the models from the two systems so translation can be performed on synch activity going in each direction.

When the Model Map feature is accessed, the application will fetch the Model Library from the current Master Model Database and the Model list from the target ITSM solution. Users can select the model from the Application and the Model from the ITSM solution and click the Map button. This will establish the translation map for these models between the systems which will be listed in the table on the far right of the page.

To remove a mapping, user can simply click the Unmap link in the Action column from the Mapped Models table.

Attribute Map

The ITSM asset attribute list will not be using the same naming convention as this application so administrators must establish a mapping between the two systems. The Attribute Map feature allows users to connect the asset attributes from the two systems so translation can be performed on synch activity going in each direction.

When the Attribute Map feature is accessed, the application will fetch the list of asset attributes from the current instance of the application and the asset attribute list from the target ITSM solution. Users can select the attribute name from the Application and the attribute name from the ITSM solution and click the Map button. This will establish the translation map for these attributes between the systems which will be listed in the table on the far right of the page.

To remove a mapping, user can simply click the Unmap link in the Action column from the Mapped Attributes table.

View Log

The View Log feature allows users to review detailed log information related to the synchronization process. All activity related to the synchronization of device creation, attribute updates, etc. will contain an entry in the log tables.

Service Now

The Service Now application provides a wide range and of asset management functions which can be integrated with this application. The functions supported in the Service Now integration include the following:

- Device Creation – One way to bi-directional support for device creations.

- Attribute Changes – One way or bi-directional support for changes to asset attributes.

- Incident Reporting – Creation of a ticket based on alarm generation in the application.

Specifics for how these integrated features are supported for Service Now are included in the sections below.

Configurations

Integration to the Service Now application uses the general parameters defined above in the Configuration table. One clarifying note related to the configuration settings is related to the Incident Caller ID. In Service Now, this field is obtained by accessing the Users page in Service Now, right clicking on the User Name to be used for generating Incidents and selecting the Copy sys_id option from the shortcut menu.
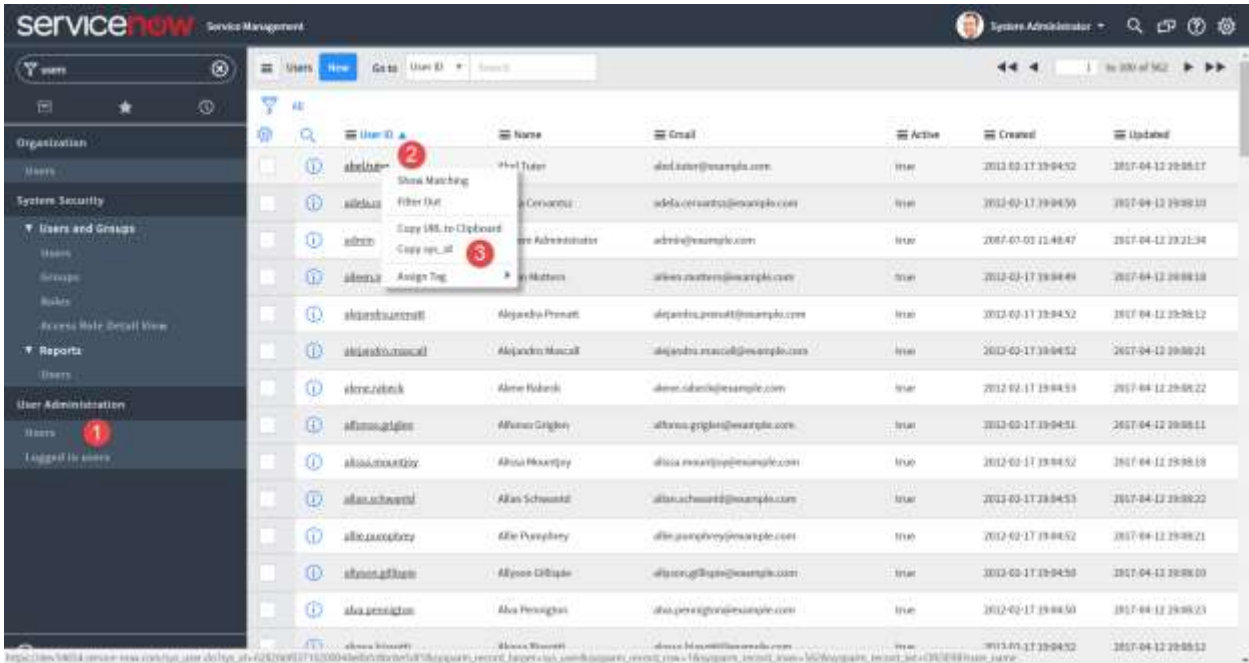
Models

As part of the integration configurations for any ITSM solution there needs to be a model map between the two applications. For Service Now, the Model Map list is synchronized from the Hardware Assets page which can be accessed by filtering the menu list for "Models" and then choosing the Hardware Models menu item.

Attributes

As part of the integration configurations for any ITSM solution there needs to be an attribute map between the two applications. For Service Now, the Attribute Map list is synchronized from the Tables - Assets page which can be accessed by filtering the menu list for "Tables", selecting the Tables menu and then choosing the Assets link from the list of Tables.
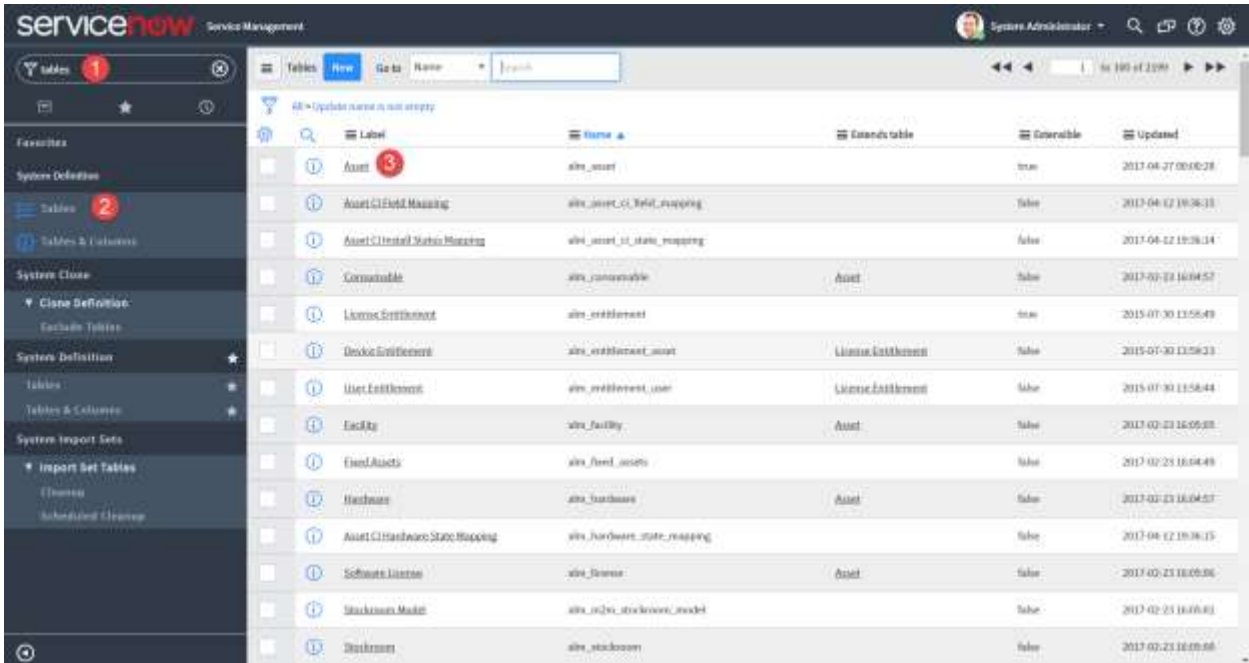
Assets

The actual device or asset synchronization will occur in the Assets list of Service Now. Depending on the one way or bi-directional support for ITSM integration which is defined on the Configuration pages, the devices or assets will be automatically created or updated on the respective applications. In Service Now, the Asset list is accessed by entering "Assets" into the menu filter and then selecting the Hardware Assets menu item from the list.

Incidents

When alarms are generated in this application, incident tickets can be automatically generated in the Service Now system. The following alarm condition changes will result in the creation of a new incident in the Service Now incident list:

- Normal to Unreachable

- Normal to Warning

- Normal to Critical

In Service Now, the Incident list can be accessed by typing "Incidents" into the menu filter and selecting the Incidents menu item. Note, the resulting list of incidents may be filtered to only show the incidents reported by or assigned to the active Service Now user. If needed, remove the filter for the current user to see the list for all Service Now users or the specific user configured to report incidents from this application. In the ITSM Configuration page, the Incident Caller ID setting is used to define the Service Now user who reports the incidents generated by alarms in this application.

Chapter 10: Admin > Tools Feature

The Tools feature provides a set of lists and settings which can be defined for all users in the system. The following options are available for the user to define on this page:

- Port Allocation – By default all network and power ports are considered to be counted towards the racks in which the devices are mounted. If users would like to allocate ports, for purposes of capacity and utilization reporting, to other racks, then this tool enables user to allocate the ports to the other racks.

- Server Settings – Allows users to define key parameters for the application.

- Networks – Allows users to define Network options when defining the Network attribute for ports.

- Storage Networks - Allows users to define Storage Network options when defining the Storage Network attribute for ports.

- Switch Speed – Allows users to define options for the Switch Speed setting on ports for devices.

- Fiber Switch Speed = Allows users to define options for the Fiber Switch Speed setting on ports for devices.

- Unit Manager – Allows users to define new units to be used with Target Members and Monitor Attribute configuration settings.

- System Settings – Controls specific functions and rules within the application. Available options as noted below.

- Log – Allows administrators to view the back end log files for troubleshooting.

System Settings

Setting	Description
Device Grid Reference Point	Allows users to define the point on a device which is used to populate the Row and Column attributes. For a device to inherit the Row and Column values, the area on the floor must have a grid defined in the Floor Studio feature of the application and the device must be assigned to a location.
Allow Rackmount Device Overlap	When set to True this feature will allow users to place devices into a Rack with overlap to other devices already mounted into the rack. When set to False the user is not allowed to place devices in the rack which overlap with other devices.

3D Client Alarm Popup	Allows the user to control the behavior of the alarm popup message in the 3D client. When alarms are generated in the application, the alarm popup will provide a visual and audio notification in the bottom right of the 3D client. Users can click the popup message for more detail on the alarm which was generated.
Require Unique Cable Names	When set to True all cable names defined in the application must have a unique name. When set to False users can name multiple cable connections with the same name. Note, this is a global setting for all locations and devices in the application.
Allow Multiple Port Connections	When set to True users can define multiple connections to a single port. When set to False users are not able to define multiple connections on a single port. Note, this is a global setting which applies to all device types and all port types (power, network, storage, etc).
Require Unique Port Names	When set to True users are not allowed to create ports on a device with the same port name as an existing port. When set to False users can define port names which match an existing port. This setting applies to a single device only. The same port name can be defined on different devices regardless of the value of this setting.
Allow Rack Overlap	When set to True users can place racks on the floorplan which overlap other racks. When set to False users are not allowed to place racks on the floorplan which are within the specified distance. This setting is particularly important when using the Join feature for racks on the floorplan. The distance between racks using the Join feature must be equal to or greater than the distance defined with this setting when enabled.
Max Network Path Hops	Controls the number of connections to show in the Network Path feature of the application. Note that for devices such as a patch panel, the connection of the front patch panel port to the rear patch panel port will be counted as 1 for this connection limit.
End Network Path at End Device	When set to True the Network Path will only show connections to the next End Device. When set to False the Network Path will show all connections beyond the End Device until the Max Network Path Hops limit is reached.

Chapter 11: Admin > Search Feature

The Search feature on the Admin page is a simple search which allows users to easily find devices based on search text. The resulting list will display the device specifics for model information and location for the devices which meet the criteria.

The search text is automatically used with a wildcard search for all the columns presented in the table. There is no need to include special wildcard characters or to select a specific attribute to search.

Chapter 12: Home > Locations Tab

The Location feature is designed to allow users to create and modify locations in the navigation tree. The Navigation tree defines the various nodes of navigation from World to Floor and Area of the various sites managed in the application. When this feature is selected several tabs of functions are available to the user as defined below.

Navigation Tree

The Navigation Tree shows the hierarchy of different locations defined in the application.
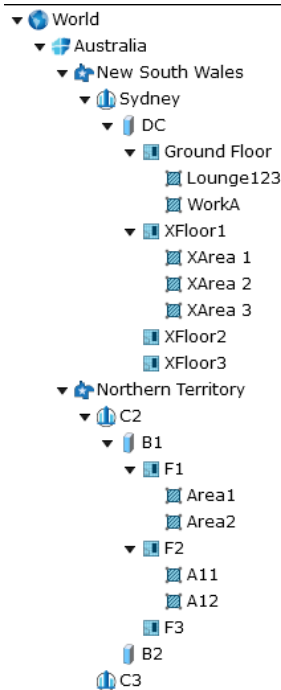
Users can browse locations using the tree and depending on the view option selected, operations for create, modify and delete can be performed in the tree as well. The information below will describe the components and features of the navigation tree for the application.
The following navigation tree nodes are available to help users organize their sites.

Node	Description
World	Top node of navigation and is included in the default install/ This node cannot be modified or deleted.
Country	List of countries that can be managed in the application.
State	List of States for the selected country. Note if a country does not have predefined States to choose from the list, the All Areas option can be selected to create a State node in the navigation tree called "All Areas".
City	Under the State node, users can create a city node. There is not a predefined list of these locations available for the user to select. Users enter the city name in the Name field.
Building	Address or other reference to the building being managed.
Floor	Reference to the floor within the selected building.
Area	Multiple options for Area types to help organize the navigation tree to match the needs of the customer. Multiple types of Area can be included under a single Floor node. Note, this node of the tree must be created before Areas can be defined on floorplans in the Floors feature.

Create

In the Create tab there are different options available to a user to create a location. In some cases, options may be disabled for certain types of nodes. The following list of options is available for users to help manage the creation of these parts of the application.

- Name – Name of the node to create.
- ID – Allows users to perform bulk create with the other fields below to create uniquely named objects in the tree.
- Start Number/Start Letter – For bulk creation will append this Number/Letter to the first device in the list and increment the letter or number for the defined quantity.
- Suffix – Will append the fixed text provided to all objects created with the create function.
- Quantity – Defines the number of objects to create. The Number or Letter progression for the object name will continue this many times.
- Preview Button – Displays the list of proposed object names in the table below.
- Clear Button – Clears the object names from the table.
- Type – Node Attribute (refer to the table above).
- Description – User defined information for the navigation node.
- Save – Create the defined location(s) in the navigation tree.
- Clear Button – Clears all information from the node creation form.
- Manage Button – When the Floor node is selected, this button is visible and will allow users to open the Floors feature to manage the selected floor with that application feature.

Modify

In the Modify tab users can make basic changes to the node name and description. Clicking the Save button will commit the changes to the navigation tree. A Delete button is available to delete the node from the navigation tree.

Web and 3D Location Studio Notes

Both the web and the 3D client interfaces contain features which allow users to manage navigation tree nodes and configure floorplan details

In the Location and Floors pages, nodes created in the 3D client interface will be appended with the (3D) reference and users will be unable to select them to manage. Users will be able place devices and use other web interface features with 3D client created nodes of the navigation tree and floorplans.

Chapter 13: Home > Floors Tab

The Floors feature of the application allows users to manage the graphical floorplan details and allows users to mount devices onto the floor. Prior to using this feature, the floor which needs to be configured must be included in the Locations navigation tree. On this page there are two core feature sets related to the management of the floorplan.

- Floor Define – Upload floor images, draw walls and define areas.
- Floor View – Assign floor mount devices onto the floorplan.
- Floorplan Layers – Allows users to see certain attribute values embedded on the devices in the floorplan view.

Floor Define

The Floor Define page is designed to allow users to upload and configure the floorplan for their particular location. Once the floorplan is constructed, users can mount devices onto the floorplan using the Floor View feature. When the Floor Define page is accessed, there are two sets of icons available to help with the tasks needed to create the floorplan.

Along the top of the screen the following icons are available:

- Upload Image – Users upload floorplan images so they can define attributes of the floor. Supported file type for the upload include jpg, png and bmp.
- Save– Saves edits to the floorplan only in the Floor Define View.
- Publish – Saves edits to the floorplan and posts the changes to the navigation tree and the Floor View feature.
- Remove – Allows users to remove previously defined anchor points, walls or area definitions. When this option is selected the floor define view will show X icons on each anchor point, wall, area and floor shape defined on the floor. Users can then select the X icon for the component which needs to be removed from the floor.
- Escape – Toggles the mode out of Delete mode and back to standard Edit mode.

On the left of the page there are icons which provide tools to help the user define walls and areas. The icons allow users to perform the following functions:

- Scale Tool – Allows users to set the scale of the drawing. When the floorplan image is uploaded a default scale is applied. Users click this icon to enable the Scale Tool and the icon will change to a pencil icon. Users click the first location of the floorplan for a known length on the image, move the cursor to the second location of the known length and click the mouse button again. As the cursor is moved the measuring tape will display the length of the drawn line so the user knows exactly how long they have drawn the line used for the scale of the drawing. The scale of the drawing will establish wall lengths, sizes of devices in 3D view and more so it is important to set the proper scale as soon as the image has been uploaded.
- Draw Anchor – Users place an anchor point on each corner where walls connect of the floorplan drawing. This will allow the connecting walls to be created properly. Users click this icon to enter the mode to place anchor points. Mouse clicks will assign an anchor point to the image. Users can click the Escape icon to exit the anchor point mode and return to the standard edit mode.
- Draw Wall – Users connect anchor points to create walls of the floorplan. Clicking this icon will enter the Draw Wall mode. Users can then systematically click anchor points to draw a set of walls around the floorplan image. If the user needs to start the wall drawing exercise over the Escape button will toggle the session back to standard Edit mode. Note a right click of a wall on the floorplan provides these functions:
    - Delete Wall – Removes the wall from the floorplan.
    - Set Scale – Allows user to define the length of the wall. The units displayed will be presented based on the user settings.
    - Set Type – Allows users to define the wall as solid, cage or half solid/half cage.
- Draw Floor Shape – After the walls have been created the full area of the floor is defined by selecting this icon and then clicking the anchor points around the perimeter of the entire floor. This process establishes the area of the floorplan for capacity planning purposes. As the perimeter anchor points are selected, an overlay will be placed on top of the floorplan showing the full floor area defined. To complete the floor definition process users must "close" the perimeter by selecting the first anchor point again. To start the process over, users can select the Escape icon to return to the standard Edit mode. When the full floor area has been selected users will be prompted to define specific attributes of the floor as follows:

- o Color – Select from the color palette the color to be displayed for the floor in all views of the application. By default the floor is grey.
- o Raised Floor – If a raised floor should be applied to the entire floor then the user can select this checkbox. Note, users can apply raised floor to specific areas of the floor only but defining this setting at the area level.
- o Tile Settings – If a raised floor is used, this setting will define the size of the tiles to be used on the floor.
- o Starting Corner Tile Size – In some cases the top left tile may not be a full sized tile. Using this setting, users can shift the raised floor grid by adjusting the top left tile size. Using a 1/2 setting will only show half of the tile width/height and align the remaining floor tiles based on that setting.
- o Coordinates – If a single grid coordinate system is used for the entire floor then user can define that setting on this page. Grid designations can be either Letters or Numbers for the X and Y axis of the floorplan. Users can define the starting point for the first grid. By default the system uses Letters with A as the starting X axis and Numbers with 1 as the starting Y axis. For letters, if users add AA as the starting letter then the system will AA, AB, AC, etc as the grid labels. Users can also determine if the grid naming starts in eachof the four corners of the floor by using the Starting Point of the Axis option. By default the system assigns the Top Left Corner as the starting point for the grid definitions.
- Draw Area – After the floor is defined, users can then define areas of the floor. This process is similar to the floor definition feature. Users select the Draw Area icon and then connect wall anchor points until a full area is defined. As the perimeter anchor points are selected, an overlay will be placed on top of the floorplan showing the area defined. To start the process over, users can select the Escape icon to return to the standard Edit mode. When the area is defined, users can define specific attributes of the area as follows:
  - o Color – Select from the color palette the color to be displayed for the floor in all views of the application. By default the floor is grey.
  - o Raised Floor – If a raised floor should be applied to the entire floor then the user can select this checkbox. Note, users can apply raised floor to specific areas of the floor only by defining this setting at the area level.
  - o Tile Settings – If a raised floor is used, this setting will define the size and position of the tiles to be used on the floor.
  - o Starting Corner Tile Size – In some cases the top left tile may not be a full sized tile. Using this setting, users can shift the raised floor grid by adjusting the top left tile size. Using a 1/2 setting will only show half of the tile width/height and align the remaining floor tiles based on that setting.
  - o Coordinates – If a single grid coordinate system is used for the entire floor then user can define that setting on this page. Grid designations can be either Letters or Numbers for the X and Y axis of the floorplan. Users can define the starting point for the first grid. By default the system uses Letters with A as the starting X axis and Numbers with 1

as the starting Y axis. For letters, if users add AA as the starting letter then the system will AA, AB, AC, etc as the grid labels. Users can also determine if the grid naming starts in each of the four corners of the floor by using the Starting Point of the Axis option. By default the system assigns the Top Left Corner as the starting point for the grid definitions.

- Move Anchor Point – Allows users to click and drag existing anchor points to a new location. If walls are connected to the anchor point, they will also move to the new anchor point location.
- Crosshair Tool – Allows users to automatically align new anchor points with existing anchor point or to allow free-form placement of new anchor points with no auto alignment with the existing anchor points.

The floorplan image can be moved with click and drag of the mouse cursor. Zoom controls are located on the right side of the screen to allow users to zoom in, zoom out and reset to the default view. The mouse wheel can be used to zoom in and out of the floorplan as well.

As Areas of the floor are defined they will be added to a list of area on the bottom right of this page. Users can easily view the full list of areas defined and manage these areas. Edit and delete functions are available in the Area list. Note, users can also right click on the Area or Floor to access the Edit or Delete functions as well.
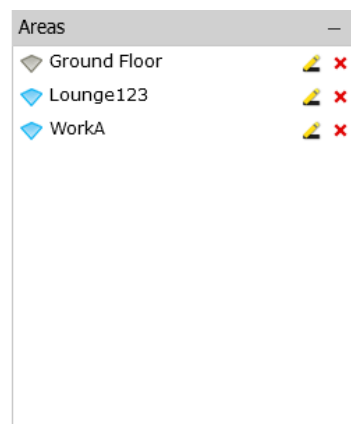
Once these updates are published, users can access and view the defined floor in the Navigation tree and assign devices to the floor or areas defined on the Floor View page.

Floor View

The Floor View feature allows users to place devices from the navigation tree onto floorplans which have been created with the Floor Define feature. When a navigation tree node which is Floor or lower in the tree is selected, the Floor View screen will display the selected floor. Otherwise, there is no content on the Floor View page when a node in the navigation tree above the Floor is selected.

Overview

The Floor View page has several important features which allow users to easily assign and align devices on the floorplans.
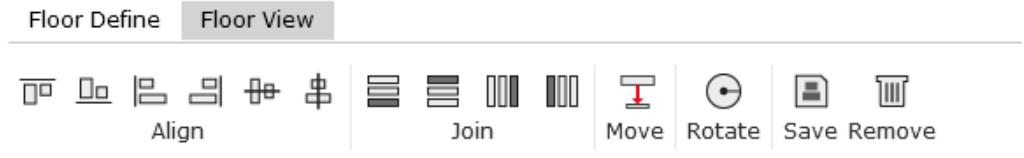
- Align Icons – Allow users to align multiple devices by one of its edges or centerpoints. Users select multiple device using the Ctrl key while clicking devices on the floor. The last device selected, which is highlighted orange, will be the reference for the other devices. After multiple devices are selected, click one of the Align icons to align all selected devices based on the selected edge or centerpoint feature.
- Join Icons – Allow users to join multiple devices in a row on the floorplan. Users select multiple device using the Ctrl key while clicking devices on the floor. The last device selected, which is highlighted orange, will be the reference for the other devices. Joining to the Top, Bottom, Left or Right of the orange device can be done with s single click of the icon.
  - If multiple devices are selected the order in which they are selected determines the join order. The first device selected in the series is joined directly to the orange reference device.
  - The left, right, top and bottom options are based on the view on the screen. Top indicates the top of the screen, bottom indicated the bottom of the screen, etc.
- Set Height Icon – Allows users to set the height of a device off the floor. Users are able to place devices above the floor or under the floor with a radio button selection while running this function. Multiple devices may be selected while performing this function.
- Rotate Icon – Will rotate all selected devices 90 degrees clockwise.
- Save Icon – Saves all changes from the floorplan to the navigation tree. Devices placed onto the floor will be assigned the location attributes and will be changed from Available to Operational device status.
- Remove Icon – Will remove all selected devices from the floorplan. Note, this will not delete the device from the application device list.

Adding Devices
Users can add devices to the floorplan with an easy drag and drop action from the Devices list. Multiple devices can be selected from the navigation tree using either the Ctrl or Shift keys. After selecting devices, drag and drop the devices onto the floorplan. By default, the selected devices will be added to the floor in a joined row in the order they were selected. Once on the floorplan, the user can move the devices manually or use the icons at the top to help update alignment or join order in the layout.

The device name will highlight in the right bottom Devices list when users choose device on the floor. There will be a tooltip indicating Name, Type and Model of this selected floor-mount device when the user places the mouse cursor over the device image.
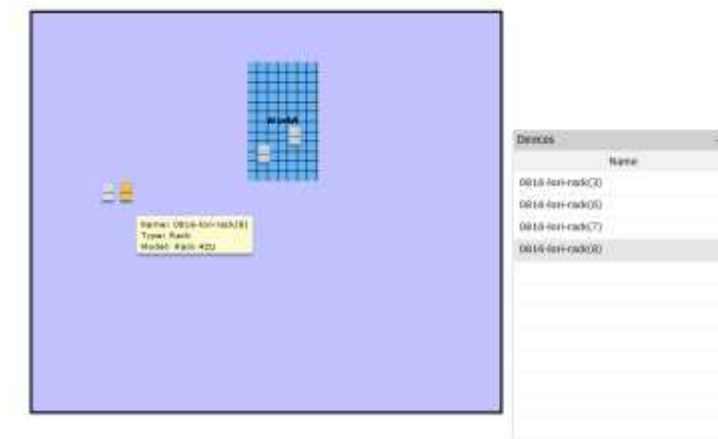
Floorplan Layers

The floorplan layers feature allows users to see a single attribute value for many devices by embedding the value on top of the device in the floorplan views. The following functions are available with this feature.

Layer Selection

Under the floorplan image users can select from one of many options for the attribute value views. There are four categories of attributes named UI Layers, Rack Layers, Environment Layers and Energy Layers. When one of these options is selected the corresponding value for that attribute will be displayed on the device in the floorplan image. If multiple attributes are selected, a separate tab will be opened to allow users to navigate between the opened attributes easily. These tabs are arranged on the top of the floorplan layers page as indicated in the screen below:

Filters

Filters are used to restrict the devices which show the attribute data on the selected layer to only devices which match the filter criteria. Users may define complex filter criteria by defining filter rules for any of the available layer attributes associated to the devices. To define a filter for a layer view users can hit the Edit pencil icon next to the Filters label above the floorplan view. This will present a window which prompts the user to select the attribute and define the filter rule.

The primary option to define is the Filter By option which is Device or Layer. If Device is selected then users can restrict data to show only certain device types which are defined in the device option list. If Layer is selected then users can choose an attribute and define the associated constraints for that attribute. Filter options are as follows:

Device Options	
Type	Define the device Types to show values.
Manufacturer	Define the device Manufacturers to show values.
Product Line	Define the device Product Lines to show values.
Model	Define the device Models to show values.
Device Group	
Layer Options	***Select the Add button to define new layer filters.***
Layer Type	Choose between Enumerate and Value attributes. Enumerate are attributes where values are converted to strings and Values are standard integer/decimal values.
Layer	Choose form the list of attributes which match the selected Layer Type.
Operator	Depending on the Layer Type this operator field will have different options. For Enumerate it allows for Includes and Not Includes, but for Values it will allow for some standard ways to measure values with greater than, less than, between, etc.
Value	Value to be used with the selected operator.

After one or more filters are defined the user selects the Filter button to update the floorplan view. Only devices which meet the criteria rules will show the attribute value. To clear or reset the view on the floorplan users can hit the Clear button to delete all defined filters and reset the values on the floorplan for the selected layer attribute.

If users have a common set of filters to apply to floorplans then the filter rules can be saved as favorites. Once the filters have been defined users select the Favorite icon next to the Filter label and give the filter options a favorite name. This favorite will be saved to the Favorites dropdown list so users can easily apply complex filters to different floors or during subsequent login sessions. Note, the Favorites features is a personal favorite and is not shared with other users of the application.

Chapter 14: Home > Racks Tab

The Racks feature allows users to manage devices within the rack and to view rack detail and capacity information. The rack building function is a key asset management feature of the application and the graphical, drag and drop features provide intuitive methods to manage rackmounted devices.

On the Racks page there are four key areas of the page for the user to manage and view devices and data:

- Rack List
- Devices List
- Rack View
- Rack Dashboard

Rack List

This part of the page lists all Rack devices managed in the application. Users can select the rack in the list and view the rack or assign devices to the racks. Filter controls can be used with the filter icon at the top of the page and the search box allows users to enter keyword search to find specific racks which match the search name. The * and % characters act as wildcard characters in the search list.
The rack list will update dynamically with text entry after a one second delay in key entry. If the Filter option is used, the user needs to click the search icon to refresh the rack list.

Devices List

This part of the page lists all non-Rack devices managed in the application. Filter controls can be used with the filter icon at the top of the page and the search box allows users to enter keyword search to find specific racks which match the search name. The * and % characters act as wildcard characters in the search list.
The rack list will update dynamically with text entry after a one second delay in key entry. If the Filter option is used, the user needs to click the search icon to refresh the rack list. Users can drag and drop the devices onto the racks.

Rack View

When the rack is selected from the Rack list the rack image and view of the mounted devices will be presented to the user. The following features are provided on the rack view portion of the page:

- Users can move the rack with a click and drag action with the mouse and can zoom in and out of the rack using the mouse wheel.
- There are four sides to the rack where devices can be mounted. The Front view is displayed by default, but the Front, Rear, Left and Right buttons allow users to

rotate the rack to mount devices onto any of these sides. Note that the sides of the rack are typically used for 0U PDU Rackmount devices. These devices are not mounted into the front or rear views to avoid occupying the U positions for these devices.

- SnapRU checkbox will force the device to be placed into an integer RU position. The Rack U positions are divided into 3 standard numbering locations to allow for more granular management of the rack space. These positions are x.0, x.1 and x.2. The SnapRU feature will move the device to the x.0 U position automatically when it is dropped onto the rack. To assign a device to the x.2 or x.2 U positions users can disable the SnapRU feature.
- Device Name will provide a text overlay on the device in the rack to view the device name.
- Next to the device name option, the U Position for the currently selected device will be displayed. Note, the U position for all devices in the rack is represented by the bottom edge of the device.
- Save and Print buttons allow users to save their modifications to the rack as changes are made and to print the rack image to a PDF report format.

The main section of this page is dedicated to providing a visual view of the rack. If devices are mounted into the rack then they will appear in the rack image in the appropriate U position to which they were mounted.

Rack Dashboard

The Summary section of the page provides details of the reserved, occupied and available space on the front and rear of the rack. The Properties section will display attributes defined for any selected device.

Adding Devices to Rack

Adding devices to the rack is a simple drag and drop function. First, users select which side of the rack the device will be mounted by clicking the Front, Rear, Left, Right options. Then, users choose the device from the navigation tree which needs to be placed in the rack and drags to the proper position on the rack image. The U Position label above the rack will indicate the current U Position where the device is located as it is moved over the eligible U position slots. When the U Position is correct, users can release the mouse button to assign the device to the specified U position.   Users must hit the Save button prior to navigating to a new rack to save the changes.

Moving Devices in Rack

Once devices are assigned a rack position, users can easily move the devices with a drag and drop action. Reposition the device to a new location and release the mouse button to assign to the new position. Please make sure to hit the save button prior to navigating to a new rack to save the changes.

Removing Devices from Rack

Devices can be removed from a rack position by single clicking the device in the rack and then clicking the blue X icon on the top right of the device to remove from the rack. Please make sure to hit the save button prior to navigating to a new node of the navigation tree to save the changes. Note, this action does not remove the device from the device list. The device will change its device status from Operational to Available.

Chapter 15: Home > Ports Tab

The Ports feature allows users to create mappings between devices for power ports. If a device does not have a port created on its Device Tab page, the relationship editor does not allow ports to be mapped to that device. The general process to create a connection to add the devices to be connected to the top of the page in the Candidate Device section and to drag and drop the ports to establish connections.

Port Mapping Device Filter

The left side of the Port Mapping window includes a device filter. By default, the list wil include all devices managed in the application. The device list can be filtered by a number of device attributes. This set of options is accessed by clicking the filter icon at the top of the device list page. After settings have been selected on the filter page the search icon must be clicked to update the device list to match the filtered settings. Users can also limit the list of devices by entering partial device name searches in the search bar at the top of the device list. The % and * characters are used as wildcard characters to facilitate the device filter process. The list will dynamically update after approximately 1 second of delay in keyboard entry or the user can hit the search icon to force the update to the list.

Add a Candidate Device

The Candidate Devices shows devices that have been chosen by the user and are eligible to accept a port mapping connection. Any device that has a port defined to it can become a candidate device.

To add a device as a candidate device for port mapping simply double click the device from the device list. The device will be added into the Candidate Device list at the top of the page. To remove a device from the candidate device list, select the red X in the top-right corner of the device window.

Cable Connections Table

A summary table of existing cable connections for the candidate devices is listed on the bottom of the port mapping window. To view the list of connections for one of the Candidate Devices users select the cable icon for the device at the top of the screen.

From this list of connections in the connections table, users are able to perform the following functions:

- Edit details of an existing connection by selecting the pencil icon in the Operations column for the connection which needs to be updated.
- Delete an existing connection by selecting the red X icon in the Operations column for the connection which needs to be removed.

Create a Port Connection

Create a device connection between two ports is done with a simple drag and drop function. A port on one device is dropped onto the port of another device. The order of the port selection is not important as the system will automatically recognize the outbound source port compared to the inbound destination port on the end device. To define a connection perform these steps:

- Click and drag the port from one device to the port of the second device which need to be connected.
- The Add Connection window will popup and the user will be prompted to provide the following information:
    - Cable Name – Reference name for the cable connection.
    - Direction – Indicates the direction of the connection for source and destination ports. This is important information for the application to properly represent the connections in the power path tree. Note, for power connections, this is a read only graphic.
    - Type – By default this value is set to a generic Power connection and cannot be edited by the user.
    - Serial Number – User defined serial number for the cable connection.
    - Length – User defined length of the cable connection.
    - Color – User can click the color palette icon to choose the color of the cable used to define the connection.

Create PDU Panel & Breakers

When viewing a PDU device as a Candidate Device, users can create Panels and Breakers for the PDU. These panels and breakers can then be connected to PDU Rackmount devices or end devices to define a complete power connection tree.

To define the panel and breaker devices for a PDU users can follow these steps:
- Add a PDU device to the Candidate Devices section of the page
- Select the PDU device name within the table for the Candidate Device
- Click the green + icon at the bottom of the candidate device to add Panels and Breakers
    - When the icon is selected with the PDU device selected a new Panel will be created.
    - When the icon is selected with the Panel selected a new Breaker will be created.
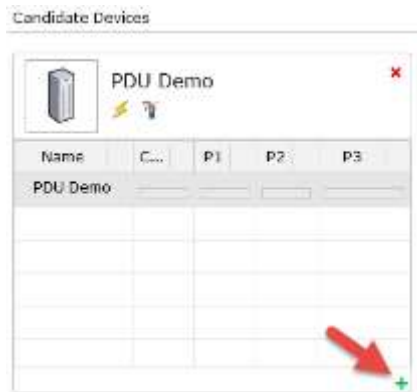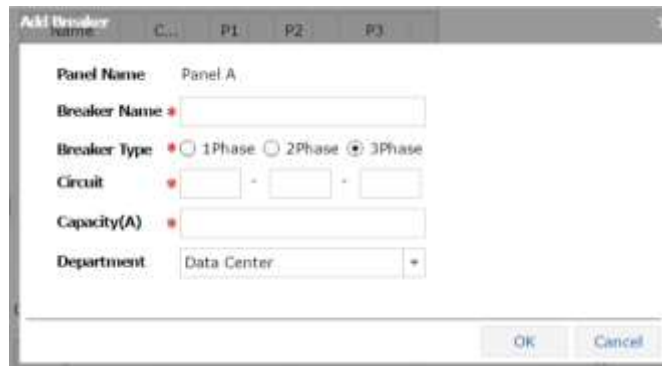
- When a new panel is being created the Add Panel page will be presented and the user can define the following information for the panel:
    - PDU Name – This is a read only value with the name of the PDU for which the panel is being created.
    - Panel Name – User defined panel name for the panel. Note, the panel will be created in the device list so a unique panel name should be assigned to differentiate from panels on other PDU devices.
    - View Mode – Double Table will show the circuit table in two columns of 21 circuits. Single Table will show the circuit table in one 42 circuit table.
    - Numbering Scheme – The 1, 3, 5 option will show odd circuits in the left column of the table and even circuits in the right column of the table. The 1, 2, 3 option will show circuits 1-21 on the left column of the table and circuits 22-42 on the right column of the table. Note, this option is only enabled when View Mode is set to Double Table.
    - Capacity – Allows the user to define the Current – Rated attribute for the panel device.
    - Department – Defines the default Department assignment for all breakers created on the panel. Breaker level department settings can override this default setting.

- When a new breaker is being created the Add Breaker page will be presented and the user can define the following information for the breaker:
  - Panel Name – This is a read only value with the name of the Panel for which the breaker is being created.
  - Breaker Name – User defined breaker name for the panel. Note, the breaker will be created in the device list so a unique breaker name should be assigned to differentiate from breakers on other PDU panel devices.
  - Breaker Type – Defines if the breaker is a 1, 2 or 3 phase breaker.
  - Circuit – Circuit numbers associated to the breaker. The number of circuit numbers to be defined is based on the Breaker Type setting. When one Circuit number is defined the other numbers will be assigned based on the configuration of the panel. Note, users cannot define the same circuit number on more than one breaker.
  - Capacity – Allows the user to define the Current – Rated attribute for the breaker.
  - Department – Assigns a department to the circuit for purposes of branch circuit monitoring. This value will be set by default to the value for Department on the panel on which the breaker is created.

View Power Path

The self-generated power path for a chain of devices is accessible from the device when it is a candidate device. Users can access this view by clicking the power path icon which is represented with the yellow bolt icon. The defined connections will be presented on the power path image. A blue arrow icon will be present on the bottom of a device icon if there are other devices which are being hidden. Clicking this icon will redraw the connection tree and display this additional set of devices.

Print & Export Buttons

Users can select the Print or Export buttons to print the cable list to a PDF format or export the cable list to an Excel spreadsheet.

Chapter 16: Home > Alarms Tab

The full alarm interface provides features and capabilities related to the alarms in the application. This interface can be accessed by clicking the Alarms on the home page menu bar.

Alarms Subtab

On the alarm subtab the following components and features are available to the user:

- Device Search – Users can enter a partial word search for the device name. Enter the characters and hit the Search button to refresh the list of devices which match the search criteria. Devices are listed with all data points which match the selected alarm levels. Hitting the expand arrow next to the device name will toggle expand|collapse the list of data points under the device.

- Alarm Level Options – The alarm level checkboxes next to the Search button can be turned on or off to filter the search results to include or not include these alarm levels in the alarm table. By default, Normal and Exceptions alarms are not included in the search results. Alarm levels are determined by comparing actual data collected for a monitor attribute to the user defined alarm thresholds in the Monitor Attribute Manager feature of the application.

- Exceptions checkbox will optionally display alarm issues related to stale data, stopped probes, etc. These are not typical events to track, but may be useful in troubleshooting data collection issues with devices in the application.

- Clear allows users to clear alarms for a device or individual data points. Note, if a device or data point is currently in an active alarm, clearing the alarm will likely only hide the problem until the next poll interval at which point the alarm will be regenerated. When the Clear option is selected and the Submit button is hit, the alarms for the selected devices will be reset to Normal as if the alarm does not exist. If a Return to Normal alarm notification has been configured, a notification will be sent to the recipients that the alarm has been eliminated and the value is now back to Normal.

- ACK stands for Acknowledge which allows users to Acknowledge an alarm issue. Acknowledging an alarm will prevent further escalation of the alarm notifications if multiple levels of escalation are defined in the alarm notification rules. Users can select the checkbox next to the device or data point and click the Submit button to Acknowledge the alarm. The Alarm LED will maintain its color indicating the severity of the alarm, but will have an embedded "A" over the LED to indicate the alarm has been acknowledged. Note that the Acknowledged status will be maintained until the alarm is either Cleared or naturally returns to a Normal condition.

- The Submit button is used to process the Clear and ACK function for selected devices or data points.

- Alarms are organized and grouped by device. Expand the device node to view the full set of alarms which meet the search criteria by selecting the arrow next to the device name. Selecting the arrow again will collapse the full points list.

- When an alarm is selected, the Detailed Event Information is displayed at the bottom of the screen to indicate the data point name, actual value and the threshold settings which triggered the alarm condition.

- When an individual data point alarm record is double clicked, the system will display a detailed polling history of the data point. Each row of the table presented represents a change in the alarm status of the device. The Alarm Count column indicates how many consecutive poll collection cycles the data point was in the alarm status indicated in the Level column.

- Both the Alarm Summary page and Alarm Detail page allow users to Export the data to an Excel CSV or Print the list to a PDF report.

Traps

Users can configure traps in the application so hardware trap notifications can be processed and displayed in the alarm panel. On the hardware configuration, set the IP of the Visual Data Center master server as the trap destination and then configure traps as follows.

- Create the monitoring attribute (MA) for the trap. Use the 'string' option as the Data Type.

- Add the MA to the desired level within the Monitor Attributes Manager tab. You only need to add the MA, no assigning of the MA to a target member (TM) is necessary.

- Create a new Target. Ensure you select the Trap checkbox. Add this target to the same level you defined the trap MA to.

- Select the Trap Information tab to configure the trap.

- Add a Trap Object by selecting the "Add Row" button.

- Open the IReasoning application. Building of Traps 8 Server Installation Guide

- Load the MIB file that contains the trap definitions. To load a MIB file select, File Load.

- To define the MIB OID, select the Root directory within IReasoning. Refer to the below image.

- To populate the rest of the required fields, right click a trap and select the "Send Trap" option.

- Refer to the below image on where to find the information to populate the rest of the Trap Object. Note: The Enterprise OID can only be grabbed from within the Trap Sender window. Do not get this OID from any other location.

- Once all the required fields have been populated an object will be added to the Trap Object List. Next, variables bindings are to be defined for the objects. The variables that are sent by a trap will be listed under the trap. Select a trap and right click within IReasoning and select the "Send Trap" option. The variables are SNMP OIDs that are located throughout the MIB file. Locate them and add them to the variable binding section of the application.

- Once all variables are completed, now conditions must be tied to them within the objects. Reopen an object by double clicking the object name.

- Select the plus icon to bind an MA to the trap. Select the level at which this trap is to be defined at and select the trap MA.

- Define the severity of the trap.

- Define a value. The values listed are the variable bindings.

- Define a message. A custom message can be written that will be displayed when a trap is sent. By putting the variable OID in brackets {}, this will display the actual variable value in the message.

- To add a threshold to this trap, select the Condition box and click the plus icon. Select the OID that you wish to associate a threshold to, select the operation symbol and input the value tied to the threshold.

- To enable the trap notification select the checkbox to the right of the Message Format column.

Chapter 17: Home > Calendar Tab

The Calendar feature allows users to review all activity performed in the application with a combination of search and filter tools. All key functions in the application are logged into the Calendar list. By default, then the Calendar page is opened, all items are listed for the current day.

Filter

The filter options allow users to limit the items listed in the event table on the main section of the page. The filter options are broadly categorized into the following sections:

- User Activities – Items related to a user performing a function will be managed with events in this list.
- Device Activities – Items related to a device will be managed with event in this list.
- Discovery – Discovery related event items are managed in this list.

Clicking on a category hyperlink will present a list of detailed functions included in that category. Users can turn on/off items to specifically include/exclude those events from the event list output in the main table. After options have been selected, users must select the Search icon at the top of this section to process the event list.

Date Ranges

Users can easily toggle from Day, Week, Month or a custom date range by using the radio buttons at the top of the event list. The list is automatically updated when these options are defined by the user.

Event List

The Event list will present the full set of selected event options defined by the user in the filter section for the defined date ranges. By default, the most recent events are at the top of the list. Users can browse to multiple pages of output using the pagination tools at the bottom of the list. The number of events on a page is controlled by the personal setting Number of Generic Entries per Page.

Print & Export

Print and Export options are presented to the user to print the event list to a PDF format or export the event list to an XLS format.

List & Calendar View

List view will provide a table list of all events which match the search criteria. Calendar view will present the events in a standard calendar format. In this view, the first three items for the day will be indicated in the Month view and a blue arrow will be presented to the user if additional events occurred on that day.

Chapter 18: Home > Reports Tab

The application is provided with a set of predefined reports for common asset management and monitoring use cases along with features to allow users to tailor reports for specific users, administrative capabilities related to reports and an ad hoc report creator tool to create new device reports.

Reports Modules

The Reports module is a very important component of the overall system. Output from this feature provides a wealth of information related to the physical assets managed by the application. System operators can use this information to make decisions related to management of the overall data center infrastructure. You access the Reports module by selecting the reports icon in the top banner of the application.

Clicking this icon displays a new window with a pre-defined set of reports and functions defined below. Reports can be generated in the standard PDF format for easy saving. They can also be generated in Microsoft Excel file format for viewing outside of the application.

The availability of certain report menu functions is based on user privileges established by the administrative user. All members of the administrators user group see six report tabs:

- Standard Reports – List of predefined application reports.
- My Reports – List of user saved favorite reports.
- Recent Reports – List of 10 most recent reports run.
- Admin Reports – List of reports saved to the Admin queue for edits and rights access to be managed by an administrator.
- Report Access Control – Tool to grant or restrict access to reports in the application to different users and user groups.
- Report Creator – Ad hoc report tool to create custom device reports.
- Scheduled Reports – Tool to manage delivery of reports to user email addresses.

Unlike the administrative user, the standard user has access only to Standard Reports, My Reports and Recent Reports.

Report Configuration

The list of available report filter options is based on the selected report. Select the check boxes to apply the filter options to the report. These options will limit the report output to the defined report criteria. Users can then save the filtered reports to facilitate subsequent runs of the report.

Standard Report Menu

The Standard Report menu contains the list of predefined and common reports needed to view asset and monitoring information related to the devices managed by the application. Each report has its own set of filter controls to help limit the output of the report to specified criteria. The following reports are available for users to run in the base installation of the product.

Standard Reports

By default, every user has access to every standard report. Every report can be printed out through a PDF using the Run button or a Microsoft Excel file using the Export button.

Standard reports are grouped in the following categories:

- Alarm – Alarm summary and detail reports for devices in the application.
- Asset – Standard Asset reports.
- Capacity – Capacity information for groups of devices in the system.
- Efficiency – Performance and efficiency reports for different sets of devices.
- Service – Warranty, Maintenance Schedules, and other items from the Service page.
- System – Information about Users and Groups in the system.
- Customized – Extra out-of-box special reports

Alarm Reports

Alarm reports including the following:

- Alarm Detail – Provides specific alarm detail for devices selected for the report.
- Alarm Summary – Provides alarm counts for devices selected for the report.

Asset Reports

Asset reports include the following:

- Asset List – Reports on all assets in the system and sorts the output by optional settings for the device.
- Cable Connection – Lists power and network cable connections for devices in the application. The report also displays the color of the Cable.
- CMDB – Provides detailed reporting on the server configuration, including operating system, memory, CPU, disk space, and more.

- CMDB Change – Lists CMDB changes by the device owners.

- Data Mapping List – Lists all devices that have mapped data points.

- Decommission Device List – Lists decommissioned assets in the application

- Device List By Area – Lists the devices associated with a specific area.

- Device List by Rack – Reports on all assets located within a rack and sorts the list by rack name.

- Device Port Details – Lists power and network ports defined on devices in the application.

- Device Port VLAN – Shows devices and ports grouped by VLAN definitions.

- Rack Details – Summary information for racks which are grouped by location.

- Redundancy – Lists the devices with redundant power and network redundancy.

- Relationship Summary – Provides detail on all network and power port mappings for selected devices.

- Software Application By Owner – Provides a report on software applications by Owner.

- Software Audit – Provides a list of software deployed to servers compared to counts purchased.

- Software License Compliance – Lists software installed and counts across all devices.

- Virtual Machine – Provides detail on all virtual machine—host and guest—system information.

- Virtual Machine Density – Provides a list of host virtual machines and the guest's machines that are operating on them.

- Virtual Machine Performance – Displays real-time virtual machine performance information.

Capacity Reports

Capacity reports include the following:

- Blade Enclosure Capacity – Reports on the blade enclosures and the capacity information pertaining to them.

- Building Capacity – Tracks the average and peak utilization of the Generator and Main Switch devices in the system.

- Cooling Capacity – Tracks the cooling capacity compared to cooling required. The required cooling is based on the total load of the building measured at the main switch devices.

- Generator Capacity – Tracks the average and peak utilization of the Generator devices in the system.

- IT Redundancy – Shows which devices have redundant paths defined for network and/or power connections.

- PDU Capacity – Tracks capacity power information for floor standing PDU and RPP devices.

- Port Capacity – Lists all switches and routers with their port capacity, port usage, and utilization %. These values are based on the configurations completed in the Relationship Editor part of the application.

- Project Capacity – Lists all projects and their information.

- Project Device Capacity – Lists all project devices and their information.

- Rack Capacity – Shows the rack capacity, rack space used, and the largest contiguous space for each rack in the system. At the location level, rack capacity figures are aggregated to provide capacity information for a site. The grand total capacity is also provided so that you can see rack capacity and rack usage statistics for the company as a whole.

- Rack Power Capacity – Tracks the A and B power loads for all racks in the system.

- Rack Unit Occupied Area – Shows the rack density by area for locations in the system.

- Rack Weight – Shows the rack weight capacity and utilization for all racks in the application.

- UPS Capacity – Tracks the average and peak utilization of the UPS devices in the system.

Efficiency Reports

Efficiency reports include the following:

- A-B Energy – Provides a summary of power based on the A or B power designation for a device. This report lets managers evaluate A versus B power consumption for each branch of the power tree. Input for the report lets you specify start and end dates and locations for the report output.

- Carbon Emissions – Provides a default CO_2 output rate setting for the states in the navigation tree when you click the CO_2 Rate button. By default, the application looks up the 2-letter abbreviation or full name of a state and matches it to the corresponding CO_2 rate. If the State node of the navigation tree has a name that does not match one of these default state definitions, you can map the node to the appropriate state by using the CO_2 Rate button. The rate and navigation node name are displayed by default. If a custom state assignment has been created, that state name appears in brackets at the end of the node name.

  For reference, the CO_2 rates used in this application are based on the Energy Information Administration from the Department of Energy report published on April 2002. You can access the rates at this URL:

  http://www.eia.doe.gov/pub/oiaf/1605/cdrom/pdf/e-supdoc.pdf.

- Customer Power Summary – Provides a summary of customer power consumption. This information is typically tracked at the branch circuit level of a PDU device.

- Customer Rack Power – Lists racks, customer, power, energy and cost information for all racks in the application.

- Customer Server Power – List of power, energy and cost information for rackmount devices.

- Detailed Customer Energy – List of power, energy and cost for devices groups by customers and locations.

- Device Customer Energy – Summary of power, energy and cost by customer.

- Energy - Lists all devices that have a defined Energy Source attribute and provides actual kWh consumption and cost of using the device.

- Energy Source Summary – Provides energy source information for all devices.

- Environmental Summary – Provides temperature and humidity information for devices.

- Intel PDU Energy Cost – Provides data taken from the Intel Data Center Manager plug-in to summarize energy and cost data for Rackmount PDU devices managed by Intel.

- Intel PDU Power Summary – Provides data taken from the Intel Data Center Manager plug-in to summarize the power consumption for Rackmount PDU devices managed by Intel.

- Intel Server – Provides a summary of server information collected by means of the Intel Data Center Manager (DCM) plugin.

- Location Occupancy Summary – Summary of types of Floorspace areas and utilization.

- PDU Circuit Summary – Provides a summary of PDU circuit information.

- PUE Report – Review of key PUE data based on time duration and location.

- Rack Power Summary – Summary of power consumption and costs for racks in the application.

- Server CPU Idle – Collects and shows the CPU loads for devices under management. This information helps you understand which assets are being over/under utilized. Data for this report is collected from the Monitor Attribute table. For a device to report this data, the target member must be mapped to this monitor attribute table.

- Server Throughput – Collects and evaluates the amount of traffic in and out of network interface cards, and shows devices being utilized. This report provides a list of servers and switches and lets you see the amount of network traffic being processed by the device. Data for this report is collected from the Monitor Attribute table. For a device to report this data, the target member must be mapped to this monitor attribute table.

Service Reports

Service reports include the following:

- Service Events Overdue – Provides a list of all events that have not been completed on schedule, which is similar to the Services Scheduled report. The filter controls for this report and the scheduled events report are the same. The output of this report is grouped by week and sorted by day within the week grouping.

- Service Events Scheduled – Provides an easy way to query the scheduled events and view in a report format. Lets you define service events for devices on the Services page. You can define a date range for Scheduled Services and select a specific City-Building combination to filter the report output. The report output is grouped by week and then sorted by day within the week grouping.

- Warranty Expiration – Lists all warranty expiration dates stored in the system.

System Reports

System reports include the following:

- License Compliance – Shows the device count quota being enforced by the license key and the current total of devices managed in the application.

- Sizing Report – Summary of key application metrics such as devices, pots, cables, etc.

- User Account List – Defines all users and their basic attributes in the system.

- User Group List – Defines the User Groups and the members of the user group.

Customized Reports

Customized reports include the following:

- CUE – Carbon Usage Effectiveness

- EDF – Energy Distribution Factors

- Eff UPS – UPS System Efficiency

- LD – Lighting Density

- PUE – Power Usage Effectiveness

- RH – Ambient Relative Humidity

- RTI – Return Temperature Index

- TMP – Temperature Supply and Return

Save Reports

When you configure a Standard Report to run for viewing, you can save the report to your My Reports menu or, if you belong to the administrators user group, you can save the report to the Admin Reports list. When you select the Save Report button at the bottom of the report page, you are prompted for three pieces of information:

- Save Location – If you are a member of the administrators user group, you can save the report to your personal My Reports menu or to the Admin Reports menu. If you save it to the Admin Reports menu, you can then assign rights access to other users to run, view and edit the report.

- Report Name – Lets you specify a name for the report that appears in the My Reports or Admin Reports menu.

- Description – Lets you provide a brief description of the report.

My Reports

My Reports is a user's personal report shortcut list. This menu contains reports that are saved by the user and includes reports which are assigned to the user by the administrator in the Report Access Control feature. Note, the name of the original standard report is included in parentheses after the name given to the My Reports shortcut.

- Reports with a lock logo are personal reports created by the user.

- Report with a gear logo are reports created by an admin user and granted to a standard user for viewing.

To delete a saved report from the My Reports menu, select the Delete Report button at the bottom of the My Reports report page. This does not delete the original report from the application, but will remove the shortcut from the My Reports list.

Recent Reports

The Recent Reports tab lists the last 10 reports that have been run by a user and the time that each report was run. Users can easily select the report from the list and chooses to Run or Export the report once again. Note, there is no option to customize the recent report and save for use in other parts of the report feature.

Admin Reports

The Admin Reports list displays reports which have been saved by users in the administrators group to the Admin Reports folder. All administrators have access to the same list of Admin Reports. The name of the report in the list is the name assigned when it was saved and the name of the original report from which it was created in parentheses.

When the report is selected from the list users can perform the following functions:

- Run – Generate a PDF output of the defined report.

- Export – Generate an Excel CSV output of the defined report.

- Save – Allows users to modify the report settings and save back to the Admin Reports section for future use.

- Delete – Removes the report from the Admin Reports menu. Note this has no impact on the original report from which the Admin Report link was created.

Note, only users in the administrators group have access to run or manage reports in this list.

Report Access Control

The Report Access Control feature allows administrators of the application to manage rights access to the Standard Reports and the custom user defined reports in the application. A list of these reports is presented to the user so rights access management definitions can be performed. Note, all Standard reports by default are able to be managed by all users of the application. Administrators must restrict access to these reports to limit users from running them.

When a report is selected from the list the administrator can select one or multiple users to move to the Allowed Users list. To remove access to the report users should be moved to the All Users list. Alternatively, administrators can grant access to reports by selecting User Groups from the user group control lists.

Report Creator

The Report Creator feature allows users to define their own ad hoc reports by choosing fields, applying filters, sort order, grouping and math to the resulting output as needed. When the menu item is first selected users will be presented with a list of folders and reports which have been created already.

Under the Report Creator menu the following functions are available to the user:

- Create Folder

- Edit Folder

- Delete Folder

- Delete Report

- Add & Edit Report

Create Folder
Users can create a folder structure to help organize the custom created reports by clicking the Create link at the top of the reports list. Users provide a folder name and click the OK button.

Edit Folder
Users can select the folder from the list and then click the Edit button to change the folder name.

Delete Folder
Users can delete the folder from the folder tree by selecting the folder and then clicking the Delete button. Note that the user will need to confirm that deleting a folder will also delete ALL reports which are listed under the report. Please execute this command carefully as there is no undo feature if the reports are inadvertently deleted.

Delete Report
Users can delete a report by selecting the report from the list and clicking on the Delete button.

Add & Edit Report
The Add Report button will open the report configuration page which allows users to define the custom report. To edit a report users can choose the report from the list and the current settings will be presented in the configuration part of the page. Edits to the settings can be made and choosing the Save button will update the report configurations. On this page the following functions and features are available:

- Edit/Preview Views – By default the Edit view is presented to the user which allows for report configurations to be defined. At any time during the creation or modification of the report, the Preview button can be selected to view a sample of the data which would be reported based on the current configuration settings. Please note the Preview output is limited to the first 20 records of the report only. These buttons act as toggle buttons to swap between these views of the configuration tool.

- Save/Run/Export Buttons – Users can save the report to capture edits to the configuration, run the report to view the output in PDF format or export the report to view the output in Excel format.

- Name/Folder/Description – Users assign the custom report a name and description by entering text into the relevant fields for this information. The Folder option is a dropdown list of folders which are created in the Report Creator list so the custom reports can be better organized.

- Data Group – Defines the type of report to be created. Currently only the Device Data option is enabled.

- **Row Limit** – This value will limit the output of records into the report. If the actual data exceeds the defined Row Limit the data reported will be the first number of records defined with this field.

- **Sorted By** – Allows the user to define the primary sort order for records in the report. Fields must be added to the report output to be included in this dropdown selection box.

- **Field List** – A list of the fields selected for the report is presented in a table at the bottom of the screen. As fields are selected they are added to the list in the order in which they are selected. Users can change the order of the fields with a simple drag and drop of the field name to the location in the list where user would like to see the field listed. By default, the Device Name field is listed in the report.

- **Add Field Button** – Clicking the Add Field button shows a list of the fields which can be added to the report. Users can click the checkbox next to the fields that need to be included in the report. The following options are available for fields to be added:
    - **Asset** – Basic asset information related to model library and status.
    - **Attribute** – List of all possible static attributes which can be defined for a device.
    - **Location** – Information related to the location of the device.
    - **Monitored Attribute** – List of all possible monitored data points which can be configured for the device.

- **Remove All Field Button** – This feature will remove all fields from the field list with the exception of Device Name. To remove only a single field users can click the blue X button to the left of the field name in the Edit view.

After the fields have been selected and put in the correct order, users can then fine tune the data presentation with the following field attributes:

- **Field** – This is the actual field name from the list of fields to be included in the report. By default, this name will be used in the column heading of the report output.

- **Field Name** – Allows the user to override the column heading in the report output to use a text string different than the default field name.

- **Decimal** – For integer and decimal data types, this setting will present the defined number of decimals for all values in the report output.

- **Group By** – Allows users to define a primary group by setting for grouping records in the report output. Only one level of grouping is available for the report definition.

- **Range/Value** – Allows users to filter the results of the report based on a defined criteria for the field. For example, if users customize the Manufacturer field with the range "equals" and value "Eaton", the report output will only show Eaton devices.

- **Formula Applied** – Allows the user to modify the reported data based on specific math calculations. There are two use cases for using the Formula feature:
    - **Customize Existing Field** – Apply math to the data retuned for an existing field. For example, if the field is Power and is being reported in Watts, the user may want to divide this value by 1000 to report the

value in kW. Add the MA to the formula tool and divide by 1000. This will result in the [Power]/1000 to be included in the formula field.

o   Create New Calculated Field – In some cases users may want to create a new field in the report which is based on two or more other actual data points. For example, if the user has selected Power and Power Capacity to show in the report, the Power Utilization field can be created. In the formula window select the MA and math operators to create the result needed. [Power]/[Power Capacity]*100 will display the Power Utilization in the output of the report.

Scheduled Reports

The Scheduled Report feature allows administrators to schedule the delivery of reports to any user of the application. The reports will be sent via email to the email address defined for the users. The email server settings are defined during the installation process and are maintained in the configuration files of the application. Destination email addresses are defined for each user when they are provisioned to the system.

A list of previously defined schedules will be listed in the left part of the menu. Users can create New scheduled report jobs by hitting the New button, edit an existing scheduled report by selecting the scheduled report and making changes or deleting a scheduled report by selecting the report from the list and hitting the Delete button. The following fields can be defined for the scheduled report jobs:

- Task Name – Name of the scheduled report which will be listed in the menu area on the left.

- Report Type – Allows the user to select from the three primary types of reports to manage. Personal Reports are the list of My Reports. Admin Reports are listed in the Admin Reports menu and only available for users in the administrators group. Custom Reports are a list of the reports created in the Report Creator feature.

- Report – List of reports which match the Report Type selected. Users can select one report to define the scheduled deliver for that report.

- Message Recipients – List of users to include on the email distribution. The email address configured for the users on the System Users page will be used to deliver the report. Individual users can be selected or user groups can be selected to define which users will receive the report.

- Run Frequency – Allows the user to define the frequency to deliver the report. The time of the delivery will be based on the cron job setting which controls this report delivery feature.

- Start Date/End Date – Start and end dates for the delivery of the report.

The Verify button will send a sample email notification for the defined scheduled report to confirm the settings of the task are defined correctly. This verification process only sends an email to the user configuring the report and not to all intended recipients defined as part of this scheduled report job.

Chapter 19: Home > Settings

The user settings page allows users to customize the application interface to their own personal preferences. Clicking the Settings icon in the top banner opens the My Settings window, where users can specify the following custom settings for the session:

Theme

Allows users to define the coloring theme of the application. The options are Dark (default) or Light.

Unit

Several device properties and monitored attributes are stored in either metric or US designations. Users can use this option to select the unit type to be displayed in the interface.

Number of Generic Entries Per Page

When users view lists of items in the left menu area, the page uses a paginated feature that enables users to view long lists on multiple pages. This setting lets you control how many items are viewed on each page of the object list.

Number of Alarms Per Page

When viewing lists of alarms on the Alarm Panel and the Alarm History Panel users can control the number of items contained on each page of the object list.

Home Page

Allows users to define the home page which will be opened automatically when the user signs into the 3D client interface.

Display Timezone Warning

The user has the ability to have an alert notify them during the logon process that their computer clock is different than the application's internal server clock. To enable the alert select "Yes," to disable the alert select "No."

Verify Rack U Collision

Users can control whether there is a warning displayed when attempting to place devices in the rack where there is already a device in the same U location on the other side. For example, if a device is already mounted to the rear U position 24, a warning message will be displayed if the user attempt to mount a device to the front of the rack which occupies the U position 24.

Layer Refresh Interval

When viewing the floorplan layers part of the application this setting will control the frequency of the data updates.

Auto Align

Controls the 3D client device placement behavior. When Enabled, the floorplan studio will prevent the overlap of devices and auto aligns them. When Disabled, users can place devices on top of each other in the floorplan studio.

Change Password

To change your password: enter your current password, enter new password and confirm new password then click change password.

Chapter 20: Home > Help, Search & Logout

Help

Clicking Help on the home page provides the following list of system resources, which you can select if you need help with issues:

■ File Downloads – Provides access to a repository of any files made available by Support. By default it contains the 3D client installation packages. Other files could be patches, model templates, or other system files needed by users.

■ Users Guides – Various user and installation guides are listed

■ Export & Import Template – Provides a blank template of the import and export spreadsheet.

■ Support Portal – Opens a new browser window to the support.ca.com Support portal.

■ Model Request – Provides a template for users to submit requests for new models to be added to the master model database.
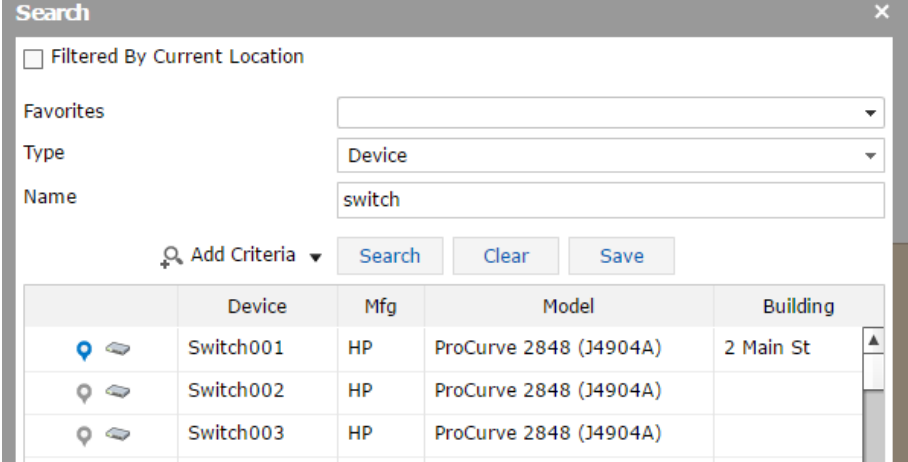
Smaller Help icons are located throughout the application to provide context sensitive help information related to application features. Click on the blue help icons to see the content for the help topics.

Search

Clicking Search on the home page opens a search window that ties to the navigation tree.

■ Filtered By Current Location — Check here to constrain the search to the current tree node.

■ Favorites — Displays the list of saved searches.

■ Type — Select Device, Location or Port to narrow the search criteria.

■ Add Criteria — Presents a list attributes related to the selected type that can be added to the search filter. The user enters a value in the added fields or selects from a list.

■ Search   — Executes the search.

■ Clear — Clears all of the fields and removes any added criteria.

■ Save — Allows the user to name the search and retrieve it from the favorites list later.

- Once selected an attribute field is added to the query. You can enter a value for the attribute or for those attributes with a defined list of entries you can select

- Search Results Table — The search results table includes the Device Name, Manufacturer, Model and Building. If the object has a location a blue pin is available in the first column. Click on the blue pin to go directly to the object's node in the navigation tree.

Logout

The Logout link will terminate the active session and return the user to the application login page.

Chapter 21: Import/Export

Spreadsheet Breakdown

The bulk importing spreadsheet is composed of five spreadsheets – Devices, Ports, Relationship, Monitor_Device, and Monitor_Target. For just creating the actual device and importing it into the device library, Devices is the one sheet that is of concern.

Column 1 has six column headers. They are in detail below. Below each column description is a graphic showing how it looks in the Excel spreadsheet.

1. Operations – Tells the application what to do with the data in that column. The four action options are either A (add the device to the library), U (update the device in the library), D, (delete the device from the inventory list), and AU (add the device if not already created, if created then update device in library).

2. Model Info – Contains device specific details. While doing a bulk import, either the UUID must be completed or the type, Manufacturer, Product Line, and Model Name must be completed. This is because the model UUID will spell out the device information, and the device information will fill out the model UUID. One or the other is a requirement for bulk import.

   a. Model UUID – UUID that is specific to the model

   b. Type – device type

   c. Manufacturer – device manufacturer

   d. Product Line – device product line

   e. Model Name – device model

3. Device Info – Information that is specific to a single.

   a. Device UUID – UUID that is specific to that individual device

b. Device Name – Name of the individual device. This field is NOT a unique attribute.

c. Device Ref ID – "Nickname" for the device. Used as a reference when being referenced by another device. This field will be deleted once imported.

d. Device Group – Device group that the device belongs to. Description – Notes to be held on device.

e. Department – Department that the device belongs to.

f. Owner – The device's owner.

4. Location – Information about where the device is placed or to be placed.

a. Location – where the device is located/going to be placed. {Building – Floor – Area}

b. Area – Area on the floor that the device is located in

c. Row – Row on the floor within the area specified that the device is located on

d. Column – Column on the floor within the area specified that the device is located on

e. X Offset – displacement of floor device on X-axis

f. Y Offset – displacement of floor device

5. Rack Mount – Information held on devices that are located within/on a rack.

a. Target Device UUID – This is the UUID of the device where the selected device resides.

b. Target Device Ref ID – References the Devices Ref ID where the selected device is to be placed.

c. Target Device Name – Device name of the device where the selected device resides.

d. Mount Type – Type

- Floor Mount – used for racks and facility devices

- Attach Mount – used for devices that are placed on side of racks

- Rack Mount External – used for devices that go on the enclosure of racks

- Rack Mount Internal – used for server to be placed inside a U position

- Shelf Mount – used for devices to be placed on rack shelf

- Chassis Mount – used for blades that are going into chassis

e. Rotation Angle - Rotation of devices. Only required for devices that have mount type of Floor Mount. By default the devices will face the wall that is labeled with the floor grid   (Rotation = 0 degrees)

f. Rackmount External - Position of the device on the outside of the rack

g. U Position – location of device within a rack. There are three rack positions within a rack unit. Refer to the below image for more detail.
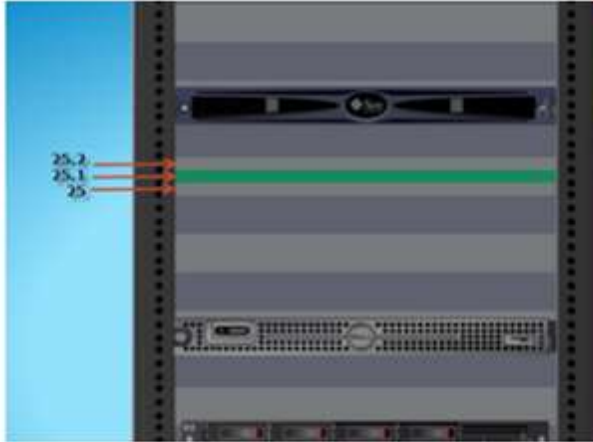
h. Shelf ID – location of disks in disk arrays

i. Slot IDs – position of blade within blade chassis, refer to diagram below for the naming convention of half and full blades.
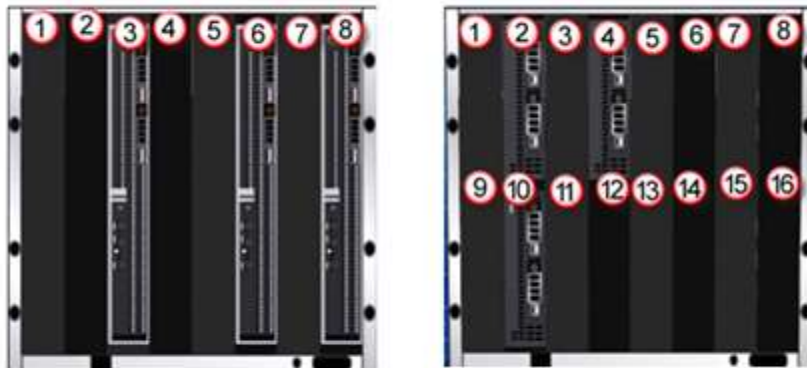
j. Device Attributes – attributes that are specific to the selected device.

Creating New Devices – W/O Rack Building

This section discusses how to create devices like racks, servers, a blade chassis, and blades through the Excel bulk import spreadsheet. The only prerequisite for this section is the Excel spreadsheet that can be located in the web UI Help section. In the below example a rack, 2 blades, blade chassis, and server were created and added to the model library.

Follow these steps:

1. With a blank Excel import spreadsheet, fill in the required information. With just creating a device and adding it to the device library, the below fields must be filled out. Below is a screen shot.

    - Operations
        - Actions
    - Model Info
        - Type
        - Manufacturer
        - Product Line
        - Model Name
    - Device Info
        - Device Name

Operations		Model Info					
Action	UUID	Type	Manufacturer	Product Line	Model Name	UUID	Device Name
AU		Rack	Generic	Generic - Rack	Rack 42U		RD - Rack1
AU		Server - Rackmount	HP	Proliant	DL380		RD - Server1
AU		Server - Blade Enclosure	HP	Proliant	BL C7000		RD - Blade
AU		Server - Blade	HP	Proliant	BL480c		RD - Blade1
AU		Server - Blade	HP	Proliant	BL480c		RD - Blade2

   *** Don't create the UUIDs, these will be self-generated by the system. If the Model UUID is know that one can be inserted instead of the other model information. ***

2. The model information can be found within the web UI Devices tab.

3. In the 2D web administrative UI, go to the Device tab and select the Import button and find the saved Excel file that was created for import. For the complete history of the upload refer to the Scheduler module.

Creating New Devices – W/ Rack Building

This section discusses how to create devices like racks, servers, blade chassis, and blades through the VDC bulk import spreadsheet. The only prerequisite for this section is the Excel spreadsheet that can be located through the 2D web interface under the Device tab. In the below example a rack, 2 blades, blade chassis, and server were created and added to the model library.

Follow these steps:

1. With a blank Excel import spreadsheet, fill in the required information. With just creating a device and adding it to the device library, the below fields must be filled out. Below is a screen shot.

    ■ Operations

       ■ Actions

    ■ Model Info

       ■ Type

       ■ Manufacturer

       ■ Product Line

       ■ Model Name

    ■ Device Info

       ■ Device Name

| Operations | Model Info | | | | | | |
Action	UUID	Type	Manufacturer	Product Line	Model Name	UUID	Device Name
AU		Rack	Generic	Generic - Rack	Rack 42U		RD - Rack1
AU		Server - Rackmount	HP	Proliant	DL380		RD - Server1
AU		Server - Blade Enclosure	HP	Proliant	BL C7000		RD - Blade
AU		Server - Blade	HP	Proliant	BL480c		RD - Blade1
AU		Server - Blade	HP	Proliant	BL480c		RD - Blade2

    *** It is not necessary to populate the UUID cells. This cell will be self-generated by the application. If the Model UUID is known, then it can be inputted rather than providing the Type, Manufacturer, Product Line, and Model Name cells. ***

2. Once the model information/model UUID has been inputted, users must provide the correct Rack Mount information. In this described example a server and blade chassis will be mounted in a rack. To accomplish this, the server and blade chassis will reference the rack they are to be placed in. When a rack is being created through a spreadsheet and having devices mounted inside itself and this is all being done in the same spreadsheet, the only way to reference the rack is by using the Device Red ID column. As well as populating the Device Ref ID cell, you must input information into the Mount Type and U Position for the devices being mounted within the rack. Refer to the diagram below. (Required fields: Device Ref ID, Mount Type, U Position).

To have the blades to go into the chassis during the import, give the blade chassis a Device Ref ID and reference the blade chassis for the blades the same way the server referenced the rack. Select "Chassis Mount" as Mount Type and specify the Slot ID for the blades. Refer to the diagram below. Please note that Slot ID/U position collision during import is supported. If there is a conflict with either the Slot ID and/or U Position, the user will be notified of the failure.

3. In the 2D web administrative UI, go to the Device tab and select the Import button and find the saved Excel file that was created for import. For the complete history of the upload refer to the Scheduler module.

Exporting Devices – W/ Rack Building

This section will discuss how to build out a rack through the bulk import spreadsheet with devices that already exist in the device library. There are three ways to build out a rack with existing devices. These three ways will be divided into three sections. In the example there will be a rack that is to be populated with a server, blade chassis, and two blades.

Target Device UUID - Referencing

1. Go to the 2D web administrative UI and select the Device tab. Export the required devices from the 2D web administrative UI.
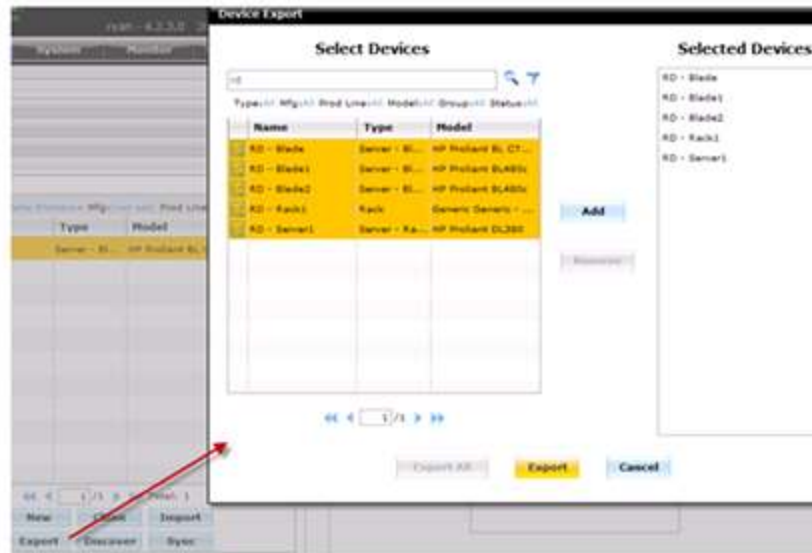
2. The first thing to note is that both the Model Info UUID and the Device Info UUID are populated. Visual Infrastructure self-populates those fields. This is why during the importing of new devices those rows are left blank.

3. The goal is to place the blades in the blade chassis and then both the blade chassis and server into the rack. The first step is to place the blades within the blade chassis. Within the Target Device UUID row for the blades, this is where to reference the blade chassis, copy the Device Info UUID of the blade chassis and paste it in the Target Device UUID cell in the column of both servers. Next, specify the slot IDs of the blades within the chassis in the Slot ID cell of each blade. Lastly, define the Mount Type of the blades – "Chassis Mount."

4. Once the blades have been referenced to the blade chassis, the blade chassis and the server must be referenced to the rack. Within the Target Device UUID cell of the server and blade chassis, copy and paste the Model UUID of the rack they are to be placed in. Next, specify the U Position of the two devices in the rack. Lastly, define the Mount Type of the server and blade chassis – "Rack Mount Internal."

5. In the 2D web administrative UI, go to the Device tab and select the Import button and find the saved Excel file that was created for import. For the complete history of the upload refer to the Scheduler module.

Target Device Ref ID

6. Go to the 2D web administrative UI and select the Device tab. Export the required devices from the 2D web administrative UI.

7. The first thing to note is that both the Model Info UUID and the Device Info UUID are populated. Visual Infrastructure will self-populate those fields. This is why during the importing of new devices those rows are left blank.

8. The goal is to place the blades in the blade chassis and then both the blade chassis and server into the rack. The first step is to place the blades within the blade chassis.

9. Create a reference ID for the blade chassis in the blade chassis' Device Ref ID cell.

10. Within each blades Target Device Ref ID reference the blade chassis' reference ID. Review the below diagram.

11. Once the blades have been referenced to the blade chassis, the blade chassis and the server must be referenced to the rack. Within the Target Device Ref ID cell of the server and blade chassis, copy and paste the Device Ref ID (assigned by the user) of the rack they are to be placed in. Next, specify the U Position of the two devices in the rack. Lastly, define the Mount Type of the server and blade chassis – "Rack Mount Internal."

12. In the 2D web administrative UI, go to the Device tab and select the Import button and find the saved Excel file that was created for import. For the complete history of the upload refer to the Scheduler module.

Target Device Name

13. Go to the 2D web administrative UI and select the Device tab. Export the required devices from the 2D web administrative UI.
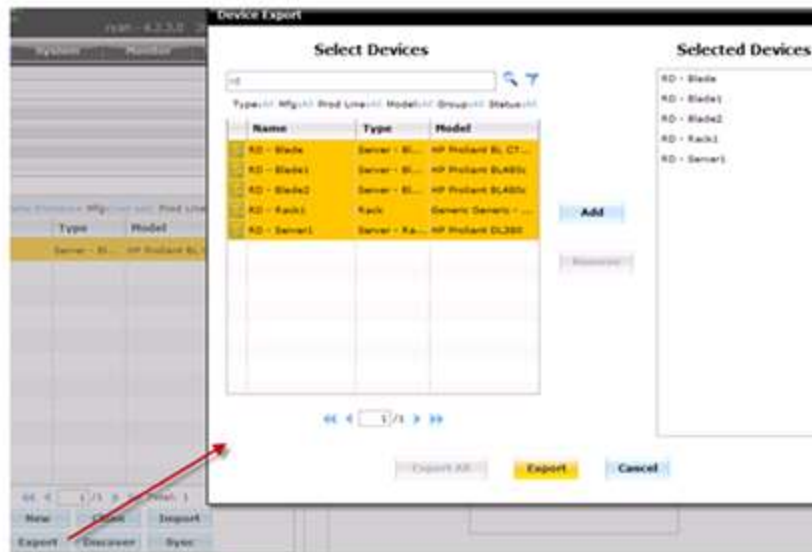
14. The first thing to note is that both the Model Info UUID and the Device Info UUID are populated. CA Visual Infrastructure will self-populate those fields. This is why during the importing of new devices those rows are left blank.

15. The goal is to place the blades in the blade chassis and then both the blade chassis and server into the rack. The first step is to place the blades within the blade chassis.

16. Find the Device Name of the blade chassis under the Model Info section of the Excel spreadsheet. With the blade chassis name, input it in the Target Device Name cell under the Rack Mount section of each blade.

17. Specify the Slot ID of each blade within the blade chassis

18. For the server and blade chassis, type the rack's name that the two devices are to be placed in.

19. Specify the U Position of each server and blade chassis within the rack.

20. Select the Mount Type of each device.

21. In the 2D web administrative UI, go to the Device tab and select the Import button and find the saved Excel file that was created for import. For the complete history of the upload refer to the Scheduler module.

How to Reference a Device

Target Ref ID

■ Used when referencing devices that haven't been loaded into the application.

■ must create reference name

■ Used with exported devices

■ must create reference name

Target Device Name

■ Cannot be used when referencing devices that haven't been loaded into the application

■ Used with exported devices

Target Device UUID

■ Cannot be used when referencing devices that haven't been loaded into the application.

■ Used with exported devices

Chapter 22: PDU Smart Interface

The application provides a complete solution for configuring PDU panels and breakers to allow for branch circuit monitoring of these important power devices. Data associated with the breakers can easily be mapped to connected devices such as Rackmount PDU devices. The following sections detail the specific steps needed to configure branch circuit monitoring for PDU panels and to map the data to Rackmount PDU devices.

Overview

The PDU Smart Interface is a dashboard view that allows users to see a PDU with breakers broken up and composed of individual circuits. Based upon values entered by the user and live data being collected, ampere water capacity gauges self-populate showing a percentage utilized image to viewers.

Create PDU Device

The first step is to create a standard PDU or RPP device in the device list. This can be done manually in the Devices menu of the application or this device can be cloned from an existing device or imported using the bulk import tool. Branch circuit monitoring is only available for devices where the device type is PDU or RPP. Once created, users should place this device on the floorplan.
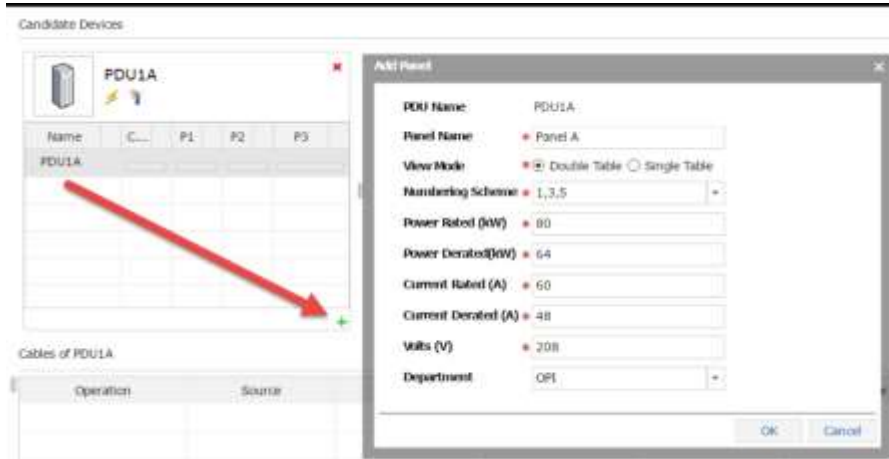
Create Panels & Breakers

In order for data to be properly displayed in the panel schedules and to allow users to map the data to other power consuming devices, users must create the Panels and Breakers for the PDU or RPP device. To access this feature, users can go to the Ports feature of the application and add the PDU or RPP device to the Candidate Devices area by double clicking the device from the device list. In this state, the device does not have any panels or breakers defined.
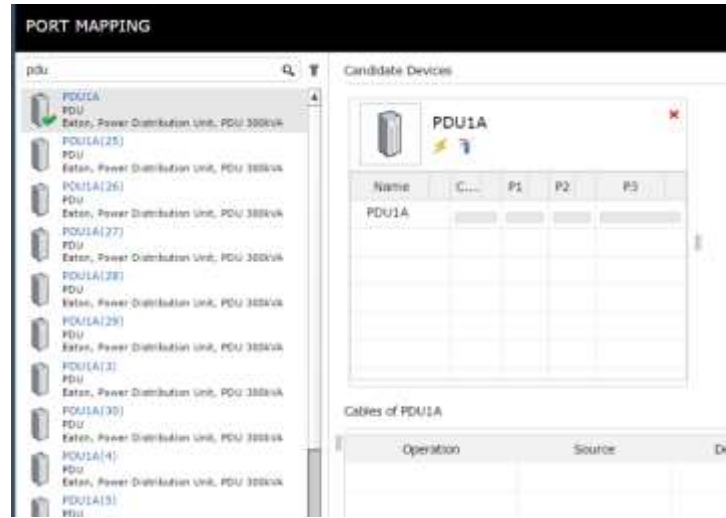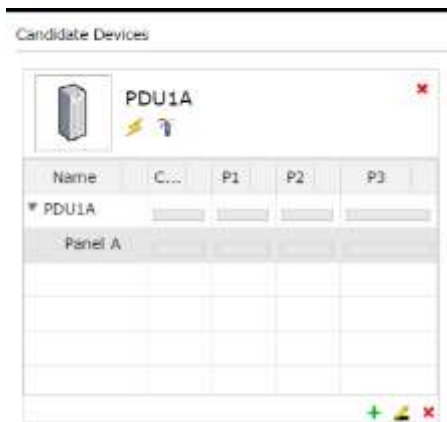

Create Panels

Select the device name in the candidate device window and then click the green + icon to add panels to the device. The panel window will be presented and users can define the required information for the panel as follows:

- Panel Name – Define the panel name. Note this device will be created in the device list so if there are many PDU devices with Panel A then you should differentiate the panel name so it can be distinguished in the full device list.
- View Mode – The panel schedule can be displayed in a single column of circuits or in two columns of circuits.
- Numbering Scheme – Circuits in the panel schedule can be either 1, 3, 5, etc or 1, 2, 3, etc. Users should select the appropriate setting for their PDU/RPP device.
- Power|Current Rated|Derated – Capacity values for the panel which can be used for measuring utilization.
- Volts – Setting to define the Volts of the panel.
- Department – This value will be used as the default setting for new Breakers defined on the panel. Note, the breaker can override this setting.

When the panel is added to the device users can then edit or delete the panel settings using the edit and delete icons when the panel is selected in the list.


Create Breakers

With the Panel name selected in the table, user can click the green + icon to add Breakers on the panel. Breakers can consist 1, 2 or 3 circuits as the breakers are configured for each panel. The Add Breaker information is defined as follows:

- Breaker Name – Define the breaker name. Note this device will be created in the device list so if there are many PDU devices with many breakers then you should differentiate the breaker name so it can be distinguished in the full device list.
- Breaker Type – Define if the breaker is a 1, 2, or 3 phase breaker. The number of Circuit input boxes will update based on the selection of the Breaker Type option.
- Circuit – Define the circuit numbers which comprise the breaker. Users only need to input the first circuit value and the other circuit input boxes will be populated automatically based on the panel settings.

- Current Rated|Derated – Capacity values for the panel which can be used for measuring utilization. These will be displayed in the panel schedule along with the actual current values.
- Volts – Setting to define the Volts of the panel.
- Department – Department for the breaker. This setting can help provide billing reports for customers using data from the PDU branch circuit monitoring data.
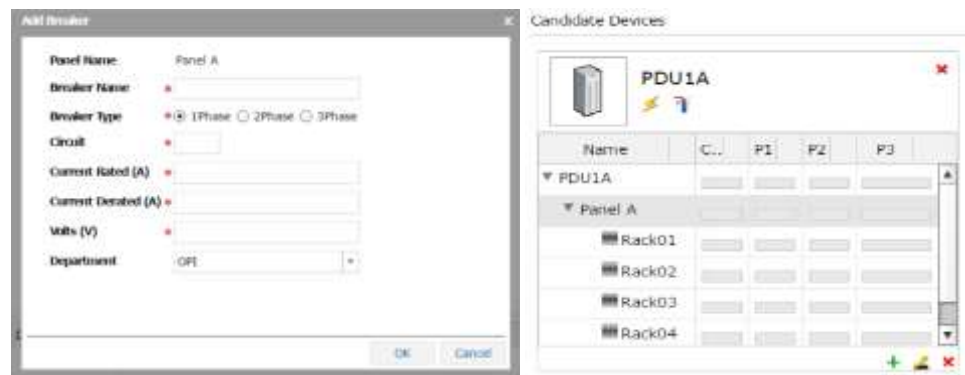
Connecting Breakers to Rack PDU Devices

A common need for power management and properly defining the full power path for end IT devices is to connect Rack PDU devices to the PDU Panels and Breakers. This function is performed in the Ports tool and is similar to connecting standard power in|out ports on IT devices. Users can add the PDU/RPP device and the Rack PDU devices to the list of Candidate devices by double clicking them in the device list on the Ports tool. Once in the Candidate Device list, the Breaker can be connected to the Power In port of the Rack PDU with a simple drag and drop action. This will prompt the user to define the Name, Serial Number, Color, etc if applicable for the cable connection.
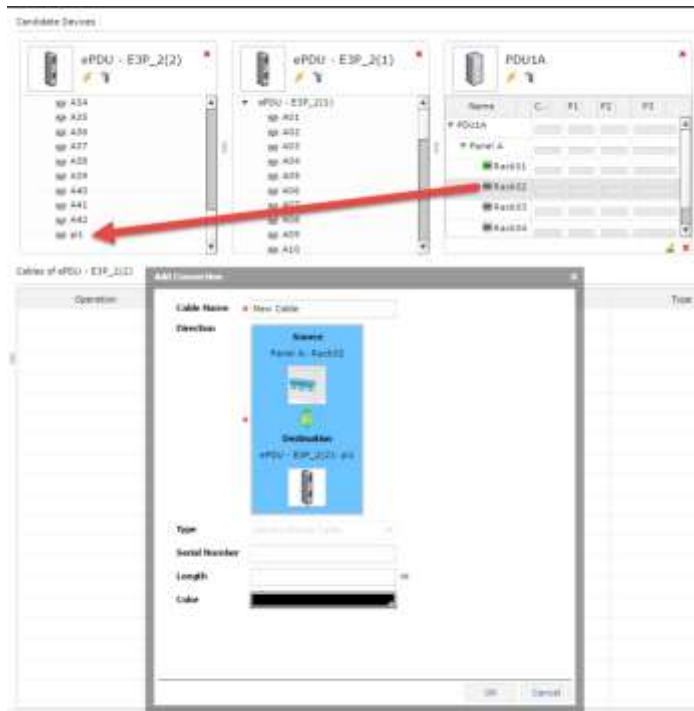
Once these connections are established the power path for the Rack PDU device will now include the breaker, panel and PDU device to which is was connected.

Activating Monitoring for Branch Circuit Data

After the panels and breakers are created the devices can be configured with live monitored data. This configuration is performed using the standard monitoring features included in the application and are detailed below specifically for PDU/RPP branch circuit monitoring.

- Define Target Members – Ensure the data points are made available to the appropriate devices so they can be mapped at a later stage. Note, these will be mapped to the Panels created on the PDU/RPP which are type equal to Electrical Panel in the model library.

- Map Target Members to the Monitor Attributes using Monitor Attributes Manager – Map the raw data points configured on the Targets page to the system Monitor Attributes for the Panel device.

- Activate Monitoring for the Panel device – Select the Panel device in the device list and configure the specific monitoring information for the device. Specific configurations will depend on the monitoring protocol being used for the panel, but for standard SNMP configurations provide the IP address, SNMP version, port and

community string settings. Select the Target and Target Members which should be collected. The Verify button will execute a single cycle of data collection using the settings configured and will provide the actual data from the device or an Unreachable status for the user to troubleshoot configuration settings.
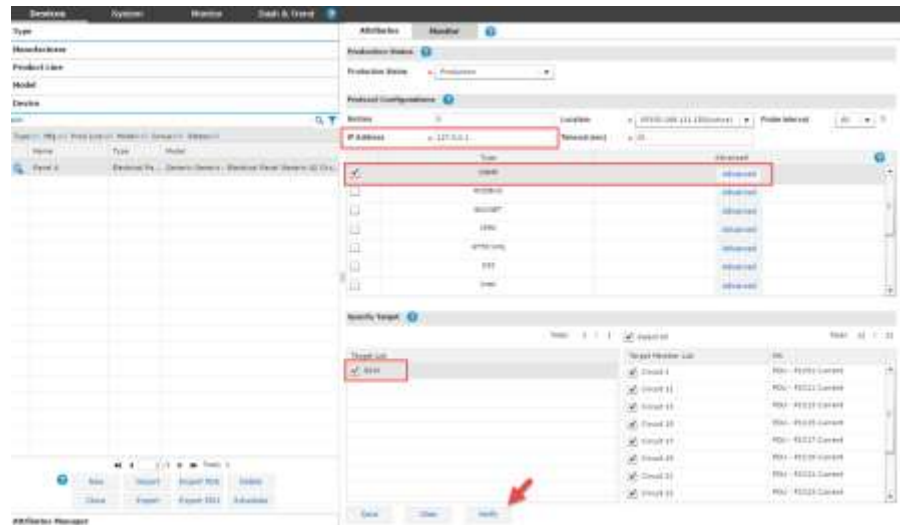
Viewing Panel Schedules

When the configuration and monitoring settings have been completed users can view the PDU/RPP panel schedules and other relevant PDU/RPP device information by selecting the device in the device list. The PDU/RPP dashboard will be displayed with the panel schedule which has been created for the device. If multiple panels are defined for the PDU/RPP they will be listed in separate tabs at the top of the panel schedule listing.

- Circuit – Number of the circuit on the panel.
- Breaker – Name of the breaker assigned in the port tool when the breaker was created.

- Device – Name of the device that the breaker is connected to in the port tool.
- Owner – Owner of the connected device. This is an attribute of the connected device and is not defined at the panel or breaker device level.
- Rated|Derated Amps – Defined in the port tool when the Breaker is created.
- Actual Amps – Live data which is collected and mapped to the circuits on the panel.
  - Percentage readings are calculated using the Actual and Derated Amps values.
  - Color codes indicate normal, warning and critical breaker usage levels. The Warning and Critical ranges used are defined at the PDU/RPP attribute settings in the screenshot below:
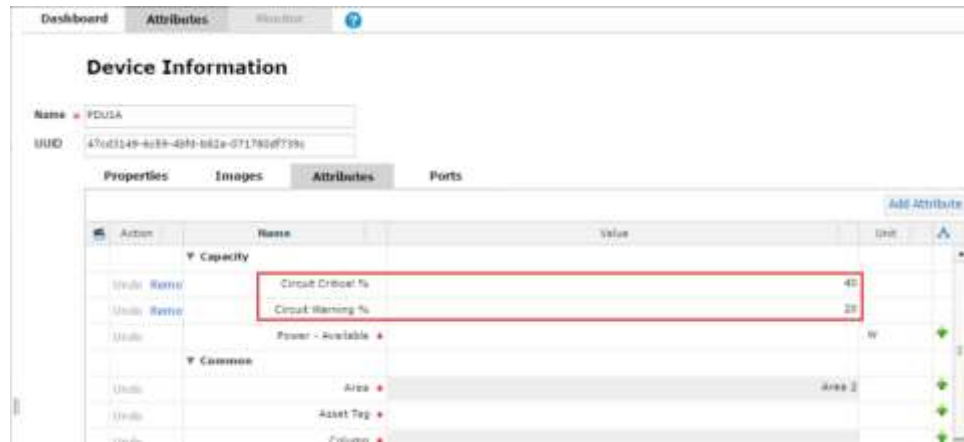
PDU Export & Import Tools

There are many details to properly configuring and managing the PDU/RPP devices, but the application provides for a bulk export/import tool to allow for easier management of these key devices. The PDU Export and PDU Import buttons are located under the device list on the Device menu.

Export PDU

The Export PDU wizard will prompt the user to select the PDU devices which should have the configuration data exported to an Excel spreadsheet. The resulting spreadsheet has two tabs of data as with the fields listed in the table below. Note, when creating new panels and breakers there is no need to define the UUDI fields since the devices do not currently exist. The UUID field acts as the unique identifier in the application database to help identify objects when a referenced object has one instance in the list.

Panel Tab	*Defines the panel and breaker configuration settings.*
PDU UUID	System identifier for the PDU device.
PDU Name	Name of the PDU device.
Panel UUID	System identifier for the Panel device.

View Mode	Defines how the circuits will be presented in the panel schedule. Options are Single Table or Double Table.
Numbering Scheme	Defines how the circuits will be arranged in each column of a Double Table panel schedule. Options are 1,3,5… or 1,2,3…
Department	Default department for all new breakers configured on the panel. This field is in the format of Company – Department which are defined on the System menu.
Power Rated	Rated power setting for the panel.
Power Derated	Derated power setting for the panel.
Current Rated	Rated Current setting for the panel.
Current Derated	Derated current setting for the panel.
Voltage	Voltage setting for the panel.
Breaker UUID	System identifier for the breaker device.
Breaker Name	Name of the Breaker device.
Phase	Number of phases used by the breaker. Options are 1-Pole Breaker, 2-Pole Breaker and 3-Pole Breaker.
Circuit#	Circuit numbers included in the definition of the breaker. The number of values included in this field must match the number of phases defined in the line above. Circuit values should be separated with a comma and no spaces should be used. For example, an entry of 1,3,5 would be a 3 pole circuit using circuits 1, 3 and 5.
Department	Department assigned to the Breaker and associated power/current data. This field is in the format Company – Department which are defined on the System menu.
Current Rated	Rated current setting for the breaker.
Current Derated	Derated current setting for the breaker.
Voltage	Voltage setting for the breaker.

Connections Tab	Defines the connections between the breaker and the end device.
Cable UUID	System identifier for the cable used to establish the connection.
Cable Name	Name of the cable connecting the breaker to the end device.
Serial Number	Serial number for the cable connecting the breaker to the end device.
Cable Color	Color of the cable connecting the breaker to the end device. Note the field requires the hexadecimal code used for the color. These codes can be retrieved by defining a connection and exporting the connection to the spreadsheet.
Cable Length	Length of the cable connecting the breaker to the end device.
Breaker UUID	System identifier for the breaker device.
PDU Name	Name of the PDU where the Breaker is configured.
PDU Panel	Name of the Panel where the Breaker is configured.
Breaker Name	Name of the Breaker device.
Poles	Listing of the Poles used on the breaker. Options are
Power To (uuid)	Device and port system identifiers for the end device connected to the breaker.
Power To (name)	Device and port names for the end device connected to the breaker.

Import PDU
The Import PDU tool will prompt the user to select the Excel spreadsheet to be used for managing the panels and breakers. The import process will use the Scheduler tool to validate and log the progress of the import attempt.

As a best practice, users should import the panel and breaker settings in different phases. This approach can help limit the number of configuration issues that may occur during the import process (ie breakers cant be created until after panels are created). The following three phases are recommended for the import process to create new panels, breakers and connections:

- Create Panels – Complete columns A-L on the Panels tab but there is no need to define the UUID fields since the panels are newly create through the import process.
- Create Breakers – Export the PDU and Panels with the Export spreadsheet and add support for the Breakers which need to be defined. It may be helpful to define a Breaker manually so it is included in the export process and can be used to easily copy/paste for other breakers which need to be created.
- Create Connections – Using the panel and breaker information imported above, the Connections tab can be completed to establish connections from the breakers to end device.

Chapter 23: Rack Dashboard

When a Rack type device is selected in the navigation tree a specialized dashboard interface will be presented to the user for detailed information and management of the selected rack. Trend Chart icons are located on the dashboard which will open a trend chart interface for the selected data point or multiple data points. The following sections and detailed data are available on this dashboard interface.

Users can double click the graphic for the devices to navigate to the dashboard for the device.

Rack View

Item	Description
Manage	Rack dashboard is read only and does not permit changes to the locations of devices. User can click the Manage button to open the Racks tab and perform all available rack building functions.
Print Button	Print will send the rack image and all rack detail to a PDF report.
Front/Rear Radio Buttons	Users can toggle from front and rear views of the rack. Note that 0U PDU Rackmount devices will be visible on both Front and Rear views.
Rack Name	Name of the rack currently being viewed.
Rack Group	Value of the Rack Group attribute for the rack. Note this is not the Device Group setting.
Non Production/Production	The default is Non Production. In Production mode the device notifications are enabled when alarm conditions are encountered.
Controls	Users can zoom in/out using the mouse wheel and pan of the rack can be performed with a left click and drag of the mouse.

Current (Amps) Capacity Charts

Two charts are presented to the user to provide information related to the capacity and actual values of the racks for current (Amps). The values shown in the rack charts are inherited from one of three locations based on the following rules. This source of power is defined at the top of the chart with the Power Source designation.

- PDU – Rackmount – If the rack has one or more PDU – Rackmount devices mounted into the rack which are actively being monitored for actual current then the Rackmount PDU values will be used.

- PDU/RPP – If the PDU – Rackmount devices are not actively being monitored AND the Rackmount – PDU devices are connected to PDU/RPP Branch Circuit monitoring panels then the current and power data for the rack will be pulled from the Branch Circuit monitoring configurations.

- UPS – Rackmount – If neither of the conditions above exists and the rack has monitored UPS – Rackmount devices then the power data for the rack will be pulled from these devices.

In either case, the A|B Power setting for the data is derived from the attribute setting at the monitored device. The name of the attribute is A-B Side Power in the Electrical/Power attribute category.

The actual current values will be compared to the Derated Current values for the rack device. There are two attributes to define with the racks to establish this derated value for the A and B sides of the power connections. The attribute names to define for this feature are A Current Derated and B Current Derated in the Electrical/Power attribute category.
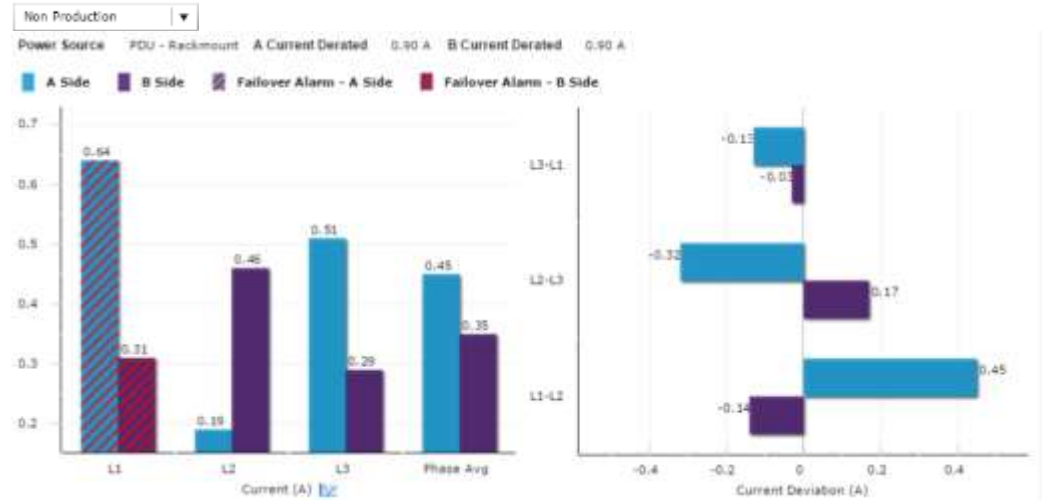
- Current Chart – Shows the A and B Current actual values for each phase (L1, L2 and L3) connected to the rack. If there is a single phase power source for the rack then only one bar will be displayed.
- Current Deviation – Shows the balance of current on phases by showing the difference on phases for both A and B rated power sources.

The bar charts presented in the graph will be blue for A side values and purple for B side values. If the Phase (L1, L2, L3 or Phase Average) is not able to withstand a failover from A to B then the hash graphic will be applied to the bars which are not able to sustain failover. This effect provide a graphical way for users to identify when there is an issue with failover capacity for a rack. In addition to the hash effect on the rack dashboard, the alarm subsystem will generate a Critical alarm for the Rack indicating which phase and A|B power side is in this important alarm condition. These alarms can be managed and routed with the standard alarm processing tools covered in a separate section of this document.

Power

Two tables of power data are provided to the user in the rack dashboard.

In the top table, a summary of A and B Current readings is provided. The following defines the values used in this table:

- A | B power – Will sum the values for all PDU Rackmount devices mounted to the rack with the A or B Side Power designations.

- Current Rated – Sum of all Current – Rated attribute settings.

- Current Derated – Sum of all Current – Derated attribute settings.

- L1 Current (A) – Phase 1 readings for the mounted devices

- L2 Current (A) – Phase 2 readings for the mounted devices

- L3 Current (A) – Phase 3 readings for the mounted devices

- Avg Current (A) – Average of the three phase reading for mounted devices

In the second table, a list of all mounted PDU Rackmount devices will be displayed showing the A | B Side Power attribute setting for each PDU rackmount device, the Active Power collected directly from the device using the Active Power attribute and the Max Power for the device. A Total Power row is included at the bottom to sum the Active Power readings for all devices.

If there are UPS Rackmount devices mounted into the Rack, a third table will be displayed which summarizes the data collected for the UPS Rackmount devices which are mounted into the rack.

Environment

This table will list the Temperature and Humidity data points for all mounted devices which are collecting this value.

Capacity Tables

Capacity tables are presented to the user to provide detail on the capacity, use and utilization of the rack.

- U Capacity – Details use of the rack units of the rack. These U positions are consumed by using the Racks feature of the application to place devices in the Front and Rear of the rack. Note, the Reserved column is not currently supported with an upcoming feature including Project, Tasks and Work Orders to manage planned asset move, installs and decommissions.

- Weight Capacity – Weight capacity is defined for rack devices using the Rack Weight Capacity attribute for the device. As devices are mounted to the rack the weight of each devices will be aggregated to the Mounted column of the table.

- Ports Capacity – The total number of power out ports for the PDU Rackmount devices will be added and displayed in the Total column. As ports are connected to the PDU Rackmount devices using the Port Mapping feature of the application they will be listed in the Used column of this table.

Device List

A list of all mounted devices is presented. Devices will not be included in the list until the device is mounted to the rack and the Save button is selected in the Racks feature. This action will commit the device into the rack. On the Rack dashboard, this data is not updated dynamically so users may need to click the Refresh button on the top, right of the dashboard to see devices which may have been recently added to the rack.

Chapter 24: Rack Group Dashboard

When the selected rack is associated with a Rack Group the group name appears in parenthesis next to the rack name. Two tabs appear labelled Rack and Group. The Rack tab displays the Rack Dashboard described above. The Group tab displays a Rack Group Dashboard described below.
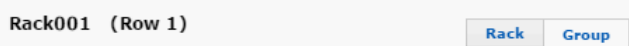
Users can click the graphic for the devices to navigate to the dashboard for the device.

Rack View

Item	Description
Edit Rack Button	Rack dashboard is read only and does not permit changes to the locations of devices. User can click the Edit Rack button to open the Racks feature and perform all available rack building functions.
Print Button	Print will send the rack image and all rack detail to a PDF report.
Front/Rear Radio Buttons	Users can toggle from front and rear views of the rack. Note that 0U PDU Rackmount devices will be visible on both Front and Rear views.
Rack Name	Name of the rack currently being viewed.
Rack Group	Value of the Rack Group attribute for the rack. Note this is not the Device Group setting.
Controls	Users can zoom in/out using the mouse wheel and pan of the rack can be performed with a left click and drag of the mouse.

Rack Power Usage Charts

The Power by Rack (W) is a bar chart comparing power consumption per rack in descending order.

The Aggregate Row Power Consumption (W) plots a total of power used by all rack for the last reading collected on the date listed.

Rack Group Details Table

Displays usage percentages for the total rack group in top row of the table and subsequent rows for each rack in the group.

Item	Description
Rack Name	The name of a rack in the group.
A Power Usage (W)	Bar displays A side power usage percentage and the actual versus derated values underneath.
B Power Usage (W)	Bar displays B side power usage percentage and the actual versus derated values underneath.
Front U	Bar displays front space usage percentage and the actual versus capacity values underneath.
Rack PDU Outlets	Bar displays PDU outlet usage percentage and the actual versus total outlet count underneath.
Rack UPS Outlets	Bar displays UPS outlet usage percentage and the actual versus total outlet counts underneath.
Weight Capacity (lb)	Bar displays weight capacity percentage and the actual versus capacity values underneath. The capacity value is defined with each rack using the Weight Capacity attribute.

Chapter 25: PDU Rackmount Dashboard

When a PDU Rackmount device is selected in the navigation tree a specialized dashboard interface will be presented to the user for detailed information and management of the selected device. The following sections and detailed data are available on this dashboard interface.

Several Trend Chart icons are located on the dashboard which will open a trend chart interface for the selected data point or multiple data points.
The buttons located on the top right of the dashboard provide integrated functions with other parts of the application.

Basic Information

Item	Description
Alarm	Current alarm condition for the device.
Name	Device name as defined in the application.
Model	Model from the model library assigned to the active device.
Location	Location the device has been assigned in the Floors feature. If no location is listed the device has not been placed on the floor or in a rack.
IP Address	IP Address used to collect data for the device. This is managed in the Monitor subtab for the selected device in the device menu.
Daisy Chain Number	Setting collected from the target device which indicated the unit number for the device when connected together to share an IP Address.
MAC Address	Attribute collected from the device.
Asset Tag	Attribute defined by users in the attributes section of the device.
Serial Number	Attribute collected from the device.
Firmware Version	Attribute collected from the device.
A | B Side Power	Attribute defined by users in the attributes section of the device. This setting is used to help present rack power for A and B side power devices.
Owner	Attribute defined in the application on the device attributes page.

Power Capacity

Item	Description
Actual	Power value collected from the device using the Active Power monitor attribute.
Derated	Attribute defined by users for the selected device. The Power – Derated attribute is used for this value.
Rated	Attribute defined by users for the selected device. The Power – Rated attribute is used for this value.
Phase Table	Key phase related data for the selected device. If the device is a single phase then only one line of data will be presented. If the device is a three phase device then three lines of data will be presented.

Outlets Capacity

Item	Description
Power Path Button	Displays a graphical depiction of devices connected to the selected device. Connections are managed in the Port Mapping feature.
Port Mapping Button	Opens the Port Mapping feature in a new browser tab and allows users to define and manage power connections to the selected device.
Remaining	Number of power out ports which have not been connected to a device in the Port Mapping feature.
Used	Number of defined power out port connections which have been defined in the Port Mapping feature for the selected device.

Measures

Item	Description
Status	Alarm status for the data point. Alarm thresholds are defined in the Monitor Attribute Manager feature of the application.
Attribute	Defined attribute which is collecting monitored data for the selected device.
Value	Last polled data point value.
Unit	Unit defined for the listed monitored attribute.
Last Polled Time	Last successful data collection time for the monitored attribute.

Events

Item	Description
Event	Event performed on the selected device.
Timestamp	Time the event was performed on the selected device.
Description	Description of the event performed on the device.
Drop Down Menu	The default setting displays the events for the current calendar day. The time period can be changed from Day to Week, Month or Range. The Calendar options to the right of the drop down menu let the user specific any desired date for the time period.

Note, the list of events is only related to the active device selected in the device list. To view the full calendar interface users can select the Calendar button at the top of the dashboard.

Outlets

The Outlets table provides several outlet level data and control features for the selected device. Not all models support the outlet level data collection and/or data control features. On, Off and Reboot features are only enabled for Eaton devices which support this capability.

Item	Description
On Button	Outlets which are selected will be sent the command to turn On. A warning appears before the command is sent to the target device.
Off Button	Outlets which are selected will be sent the command to turn Off. A warning appears before the command is sent to the target device.
Reboot Button	Outlets which are selected will be sent the command to Reboot the outlet. A warning appears before the command is sent to the target device. When sent there may be a delay on processing at the end device. The application will immediately show the outlet state as Off and will return to On when a polled data returns an On value.
Warning	The warning gives users the option of cancelling the On, Off and Reboot commands. Users can select to stop showing the warning for the current login session by checking "Don't show this message again."
Checkbox	When selected, the outlets will be included in the On, Off and Reboot functions.
Status	Shows the status of the LED for On (Green) and Off (Red) values. These outlet status icons do not relate to monitoring or alarm thresholds defined for the device.
Outlet	Outlet index number for the outlet on the selected device.
Outlet Name	Outlet name collected from the device. Users can select the Edit icon to update the Outlet name and the name will be written to the target device. Note, the outlet name must be under 12 characters.
Connected Device	Device name of the device connected to the outlet in the Port Mapping feature of the application.
Device Owner	Owner of the device connected to the outlet in the Port Mapping feature of the application.
Energy kWh	Energy value collected from the device using the Outlet Energy_Port## attribute. The date listed in this field is collected from the device and indicates the "Energy Since" date for the reported Energy value. Resetting this counter must be done on the device web interface directly.
Active Power	Active Power value collected from the device using the Outlet Power_Port## attribute.

Group

Item	Description
Group Name	Displays the name of the branch circuit group.
Group Current	Displays the current for the group.

Trend Charts

Item	Description
Active Power/Input Current	Multi line trend chart showing the Active Power and Input Current for the device.
Temp/Humidity	Multi line trend chart showing available Temp and Humidity
Phase Power	Multi line trend chart showing phase power readings for the device.

Chapter 26: UPS Rackmount Dashboard

When a UPS Rackmount device is selected in the navigation tree a specialized dashboard interface will be presented to the user for detailed information and management of the selected device. The following sections and detailed data are available on this dashboard interface.

Several Trend Chart icons are located on the dashboard which will open a trend chart interface for the selected data point or multiple data points.
The buttons located on the top right of the dashboard provide integrated functions with other parts of the application.

Basic Information

Item	Description
Alarm	Current alarm condition for the device.
Name	Device name as defined in the application.
Model	Model from the model library assigned to the active device.
Location	Location the device has been assigned in the Floors feature. If no location is listed the device has not been placed on the floor or in a rack.
IP Address	IP Address used to collect data for the device. This is managed in the Monitor subtab for the selected device in the device menu.
MAC Address	Attribute collected from the device.
Asset Tag	Attribute defined by users in the attributes section of the device.
Serial Number	Attribute collected from the device.
Firmware Version	Attribute collected from the device.
A	B Side Power	Attribute defined by users in the attributes section of the device. This setting is used to help present rack power for A and B side power devices.
Owner	Attribute defined in the application on the device attributes page.

Battery

Item	Description
Remaining Time	Value collected from the device.
Voltage	Value collected from the device.
Current	Value collected from the device.
Charge Remaining	Value collected from the device.
Status	Value collected from the device.
Last Replace Date	Value collected from the device.
Seconds On Battery	Value collected from the device.

Contact

Item	Description
Type	Value collected from the device.
Status	Value collected from the device.
Description	Value collected from the device.

Input

Item	Description
Frequency	Value collected from the device.
Line Bads	Value collected from the device.
Number of Phases	Value collected from the device.
Source	Value collected from the device.
Bad Status	Value collected from the device.
Line Fail Cause	Value collected from the device.
Phase	Value collected from the device.
Voltage	Value collected from the device.
Current	Value collected from the device.
Power	Value collected from the device.

Output

Item	Description
Load	Value collected from the device.
Frequency	Value collected from the device.
Number of Phases	Value collected from the device.
Source	Value collected from the device.
Phase	Value collected from the device.
Voltage	Value collected from the device.
Current	Value collected from the device.
Power	Value collected from the device.

Measures

Item	Description
Status	Alarm status for the data point. Alarm thresholds are defined in the Monitor Attribute Manager feature of the application.
Attribute	Defined attribute which is collecting monitored data for the selected device.
Value	Last polled data point value.
Unit	Unit defined for the listed monitored attribute.
Last Polled Time	Last successful data collection time for the attribute.

Events

Item	Description
Event	Event performed on the selected device.
Timestamp	Time the event was performed on the selected device.
Description	Description of the event performed on the device.
Drop Down Menu	The default setting displays the events for the current calendar day. The time period can be changed from Day to Week, Month or Range. The Calendar options to the right of the drop down menu let the user specific any desired date for the time period.

Note, the list of events is only related to the active device selected in the device list. To view the full calendar interface users can select the Calendar button at the top of the dashboard.

Trend Charts

Item	Description
Humidity	Trend chart showing available Humidity
Temp	Trend chart showing available Temp

Chapter 27: Accessing the Server Admin Tool

Once the admin server tool has been installed it will be running on port 12005 and is accessible via a web browser interface. A secure HTTPS connection is required to access the tool login screen. The URL used to access the interface is below:

https://Server_IP:12005/

For example, https://192.168.14.90:12005/ will open the admin tool in a browser where the application is installed on a server with this IP address.

System Status

The System Status module provides basic information about the server and allows users to manage the application processes.

Attribute	Definition
System Version	Current version of the Product instance
Operating Status	Operating status of the current instance based on number of processes
Uptime	Amount of time the since the server was last rebooted
Current Load Average	Load Average on the server

Current Users	Number of users logged onto the server
Physical Memory Used	Amount of physical memory used
Swap Used	Amount of swap spaced used
Application File Storage	Percentage and Size of the /opt/VDC directory
Database File Storage	Percentage Size of the Database
Backup Storage Usage	Percentage Size of the /opt/VDC.BACKUP directory

License

Attribute	Definition
Current License File	Filename of the current activation license key on the server
Start Date	Start date for the use of the activation license key
End Date	End date for the activation license key
FMA Total/FMA Allowed	Number of licenses used compared to the number of licenses enabled in the license activation key

Button	Definition
Generate License Request	Produces and downloads a license request to the user's computer so users can request an activation key for the application
Upload License File	Uploads an activation license key to the server
Update License	Completes process of adding a license to the server (placing, restarting processes, setting permissions, etc)

Patches

Attribute	Definition
Applied Patches	Shows a list of the patches that have been applied to the system
Download Patch History	Downloads the patch history onto the user's computer

Log Files

Button	Definition
Download Web Logs	Download a zip file containing logs in opt/VDC/tomcat/logs
Download Monitor Logs	Download a zip file containing logs in opt/VDC/monitor/vms/logs
Download Health Logs	Download a zip file containing logs in opt/VDC/vdcmon/logs

Troubleshooting

Attribute	Definition
Execute Diagnostic Tool	Executes getsupportinfo script