Power IQ 9.2.0 User Guide

Sunbird

FCC Information

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential environment may cause harmful interference.

VCCI Information (Japan)

この装置は，クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI－A

Sunbird is not responsible for damage to this product resulting from accident, disaster, misuse, abuse, non-Sunbird modification of the product, or other events outside of Sunbird's reasonable control or not arising under normal operating conditions.

If a power cable is included with this product, it must be used exclusively for this product.

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TOC

Power IQ 9.2 User Guide

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What's New in Power IQ 9.2.0

Click a link below or see the release notes for more information

- Password and Authentication Enhancements for Local Accounts
- Configure Application Announcement Banner
- Enable or Disable Discovery for Dynamic Plugins
- Logging through Syslog Enhancements
- New Daily Backups Scheduling Options
- AutoCAD® Floor Map Drawing Support Upgraded to 2018-2019
- Configure Power IQ's Threshold Evaluation Thread Pool Size
- Appliance Services Page
- Manage Your Event Notification Filters, Keypad Pin, Preferred Email Format and Grid Rows from Your Profile page.
- Site Administrators Can Export a List of All User Accounts and Each of their Assigned Roles

Data Calculations in Power IQ

This section describes various calculations in Power IQ, how they are calculated and their limitations. It is not all inclusive.

Note: The data in Power IQ is only as accurate as the data provided by the devices it's collecting data from.

Energy and CO_2 Calculations Calculations

Energy

If the device reports Energy, it will be used in the calculations. If the device does not report energy, the active power reading will be used to calculate an approximate energy reading.

To approximate an energy reading, Power IQ does the following:

- Raw readings used in charts: The average active power reading for each poll is multiplied by the poll_inverval / 60 minutes to calculated the amount of energy consumed in that poll interval. This value is not stored.
- Hourly Rollups: The average active power for the hour is multiple by the hour to calculate the amount of energy consumed in that hour. This is stored as the watt_hour_delta for the hour.
- Daily/Monthly Rollups: Sum of Hourly or Daily rollups. This is stored as the watt_hour_delta for the interval.

There are some caveats to be aware of for Facility Items that report Energy:

1. Power IQ records the delta from one poll to the next and stores it in the watt_hour_delta of the raw reading. The sum of these deltas is used for the watt_hour_delta at the hourly, daily and monthly levels.

2. If a device is non-responsive for a few polls, the consumed energy may be applied to a later interval than when it was consumed. This could look like a spike in consumption for that interval.
3. If the Energy reading for the current poll is less than the last poll, Power IQ assumes that the Energy meter was reset on the device and records 0 as the watt_hour_delta for that poll interval. It uses the new value as the comparison for the next poll.
4. Power IQ's polls don't occur at exactly the start and end of the hour. As such, some energy consumed during that hour will be applied to the next hour. A faster poll rate will reduce this effect.

There are a few caveats to be aware of for devices that don't report Energy but do report active power.

1. Calculating energy using the active power value from sample data is only an approximation. It should not be used for billing or other purposes that require a high accuracy value.
2. If a poll is missed for one or more poll intervals, then there will be no energy for those intervals in the raw values.
3. The hourly rollup will use the available active power values for a given hour to calculate the amount of energy consumed for that hour (e.g. the watt_hour_delta). If there are no readings for that hour, no consumption will be recorded for that hour.

CO_2 Calculations

There are two different CO_2 calculations in Power IQ. One is used in the Dashboard Trend Chart; the other is used for the data stored in rollups, which is only available via the API or ODBC.

- **Trend Chart**: When using the Trend Chart in the Dashboard, users can chart the CO_2 Footprint at any level. This calculation multiplies the 'approximate' energy values (average power * time) by the currently set CO_2 Factor. If you change the CO_2 Factor, it applies instantly to historical data.
- **Rollups**: In Power IQ 9.0.1; a column was added to the inlet and circuit rollups tables to keep a record of the CO emissions for that period (e.g. hour, day, month) using the CO_2 Factor set at the time of the rollup.

The hourly rollup will take the watt_hour_delta and multiply it by .001 (Watts-hour to kWh) * the relevant data center's CO_2 factor.

The daily/monthly rollups will take the sum of the hourly/daily rollups, respectively as their own value.

CO_2 Factor for the hour is the CO_2 Factor recorded at the end of the hour being rolled up. For example, at 10:00:00 AM if the value is X for data center 1 then the watt_hour_delta * .001 * X is the calculation for the 09:00:00 AM hour (through 10:00:00 AM hour) based on aligned_reading_time.

Minimum, Average, and Maximum Values

Minimum, Average, and Maximum values in Rollups

For values collected using non-buffered data retrieval, the minimum, average, and maximum values are based on the samples. They are not likely to reflect the 'true' value for that hour. For example, if Power IQ is polling every 10 minutes, it will only get 6 samples for the hour. Power IQ calculates the minimum, average, and maximum of those 6 samples for that hour, which it will store in the hourly rollups. Using a higher poll rate will reduce this effect and produce more accurate results.

For values collected using buffered data retrieval, they are as accurate as the device reporting them, assuming there are no gaps in the data.

Minimum, Average, and Maximum Active Power values in Aggregate Values

For aggregate values, such as active power, that are summed across inlets/outlets/circuits to create a reading for a higher-level item such as an IT Device, Rack, Room, Data Center, etc. there are some things to be aware of when looking at minimum, average, and maximum values.

For anything but an IT device or Rack, the statistic (minimum, average or maximum) is applied to the readings over the reporting period for each inlet/outlet/circuit used in the calculation and then those values are summed. Because those minimum, average, and maximum values can occur at different times, they are not likely to represent the true minimum, average, and/or maximum for the higher-level item.

IT Device and Rack Readings have special treatment in Power IQ. For those, the inlet/outlet/circuit readings are time-aligned and then summed by time. After which the minimum, average and maximum statistic is applied to generate a more accurate value. This value is still not a true minimum, average or maximum.

In both cases, you are still working with sample data, so it's possible the device was polled when the minimum or maximum didn't occur.

The following example illustrates the inaccuracy of aggregating maximum power at a higher level. The first table shows how it is done currently in Power IQ if charting the Maximum Active Power for a Room using the hourly max of each Rack. The second table shows the more accurate method for arriving at the maximum for the Room, however the raw data required to do so is no longer available in Power IQ at the time of generating the chart.

When charting Active Power and aggregating it at a higher-level. E.g. Room

	Each cell in the table below is the max for a rack on that day							
	Poll 1	Poll 2	Poll 3	Poll 4	Poll 5	Poll 6	Hour Max	
Rack 1	528	530	515	545	526	524	545	Rack 1 Max for the Hour stored in Hourly Rollup
Rack 2	346	350	343	324	336	345	350	Rack 2 Max for the Hour stored in Hourly Rollup
Rack 3	235	243	245	238	241	239	245	Rack 3 Max for the Hour stored in Hourly Rollup
							1140	Result if Room Maximum is charted based on hourly data and maximum statistic

Method required to aggregate Active power at a higer-level for more accurate Maximum

	Each cell in the table below is the max for a rack on that day							
	Poll 1	Poll 2	Poll 3	Poll 4	Poll 5	Poll 6	Hour Max	
Rack 1	528	530	515	545	526	524		
Rack 2	346	350	343	324	336	345		More accurate room max for the hour
Rack 3	235	243	245	238	241	239		Requires sum all racks at each poll and
Room Sum	1109	1123	1103	1107	1103	1108	**1123**	storing that as a Room-level hourly rollup

Non-Buffered Data Retrieval vs Buffered Data Retrieval

You should review the Buffered Data Retrieval section of the user's guide to understand the difference between Non-Buffered Data Retrieval (applies to most Facility Items) and Buffered Data Retrieval (applies to some Legrand PDUs when the feature is enabled).

Dashboard

The Power IQ dashboard allows each user to customize collections of charts and widgets in a single view. You can create multiple versions of your dashboard and select which one to view, or start a slideshow for all or selected dashboards.

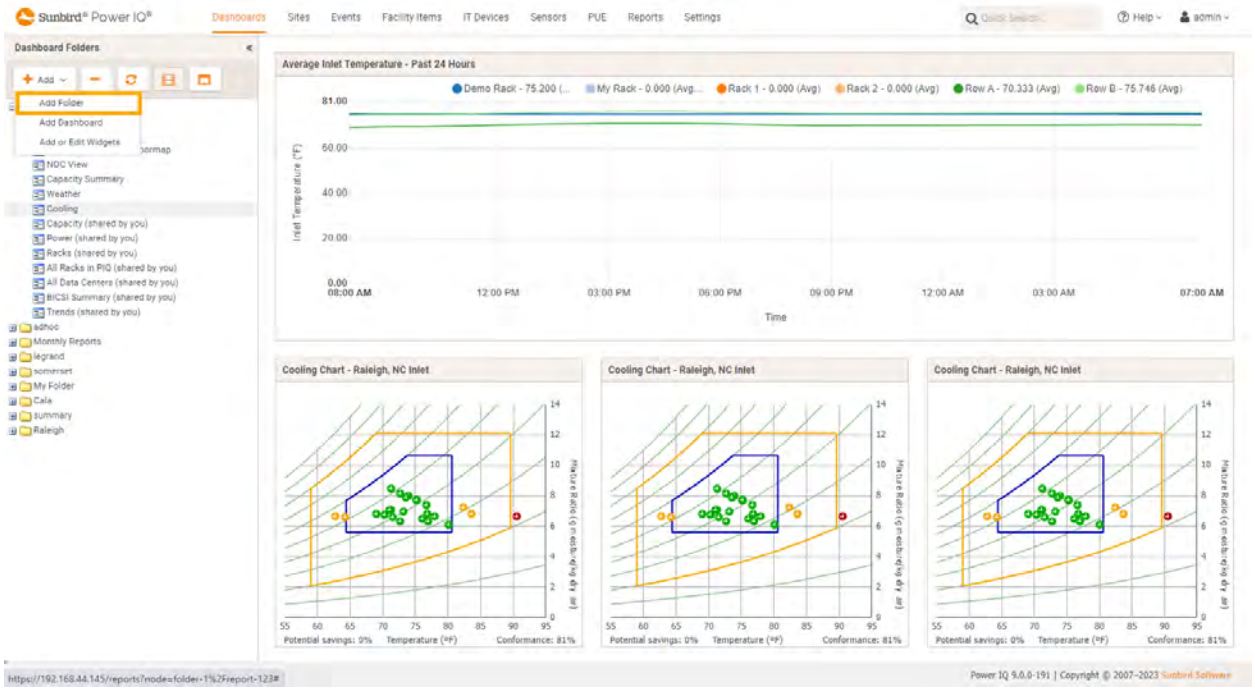
The default dashboard configuration includes two rows. The top row includes a health chart that shows overall PDU health. The second row is a device chart that shows average active power over the past 24 hours.

You must have the Create Dashboards role to edit the dashboard.

Manage Dashboards

Add a Dashboard Folder

1. In the Dashboards tab, click Add to display the Add drop-down menu.
2. Select the Add Folder option.



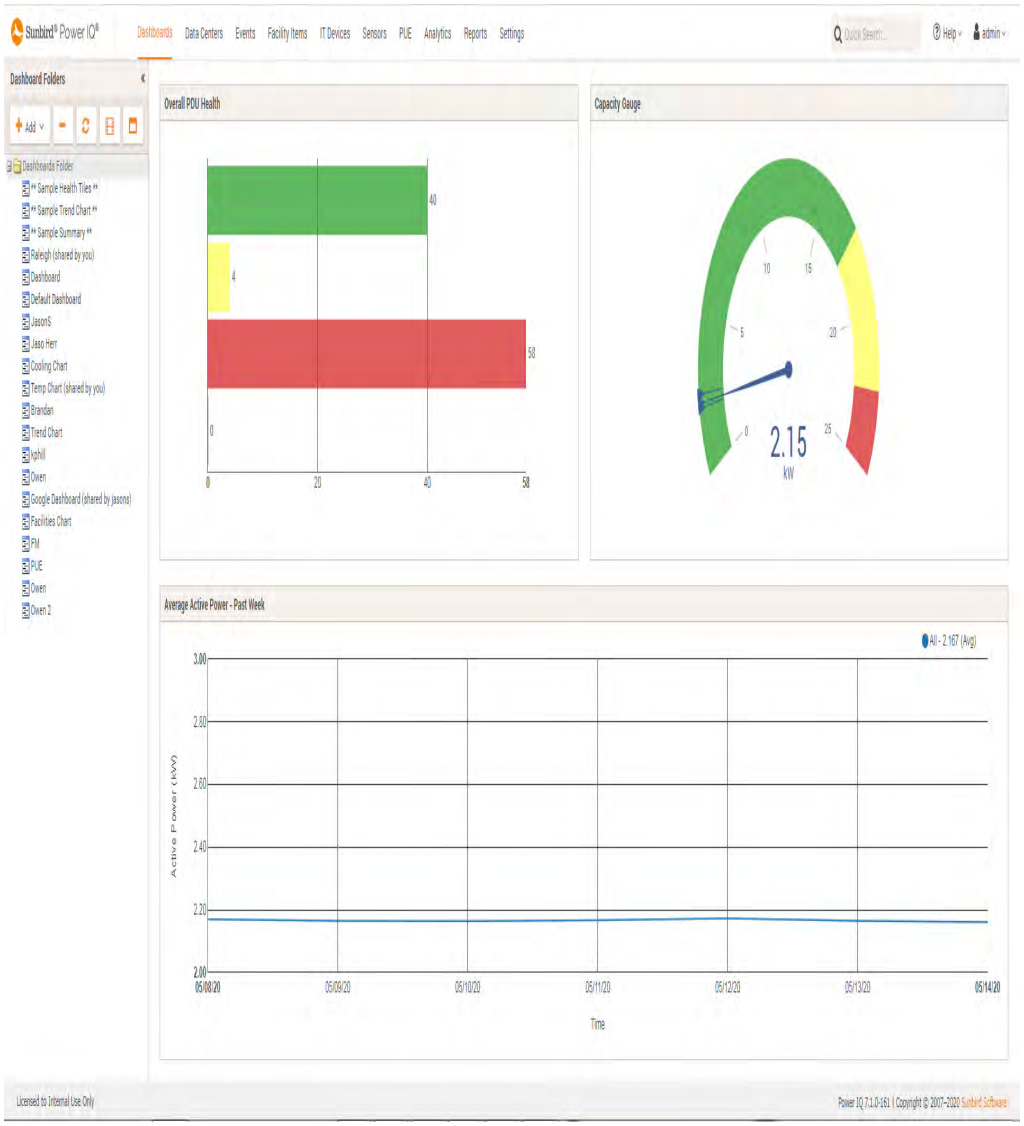
3. In the "My Folder" label for your new folder, delete the default name and replace it with the name of your choice

Add a Dashboard

You can configure more than one version of the dashboard so that each has different widgets, charts or layouts.

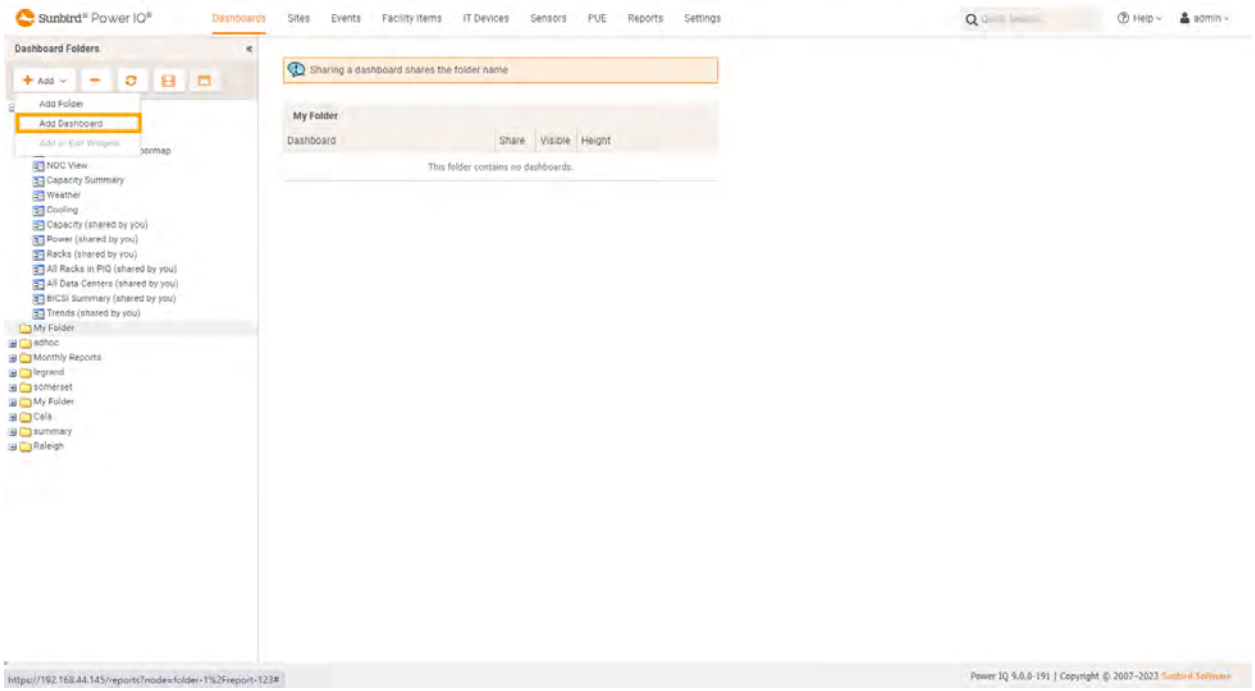
If any dashboard version is not needed anymore, you can remove it, but you can only remove the dashboards that you created.

1. In the Dashboards tab, click the folder you want to create the dashboard in.

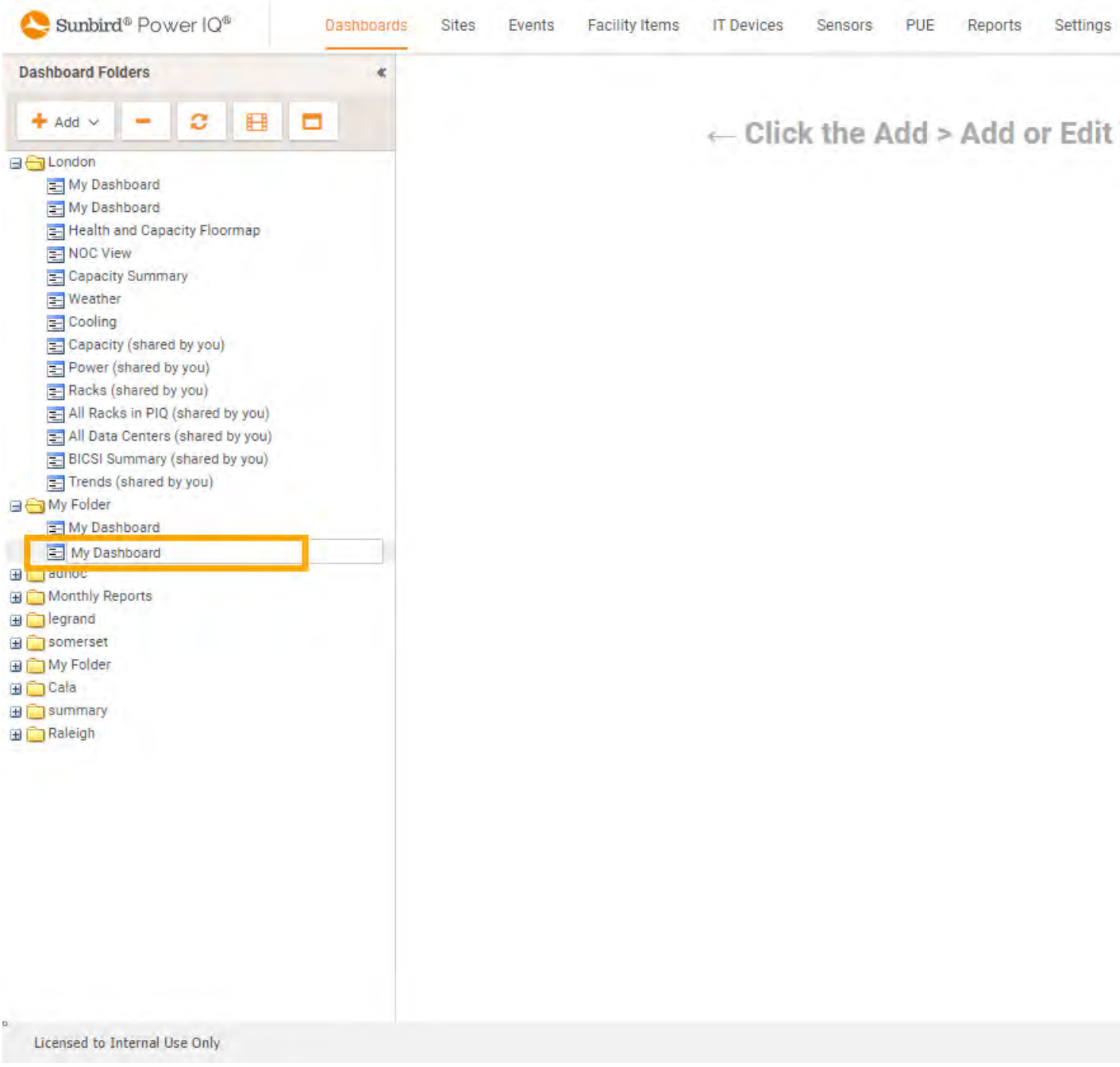


2. Click the Add button

3. Select the Add Dashboard option



4. In the "My Dashboard" label for your new dashboard, delete the default name and replace it with the name of your choice



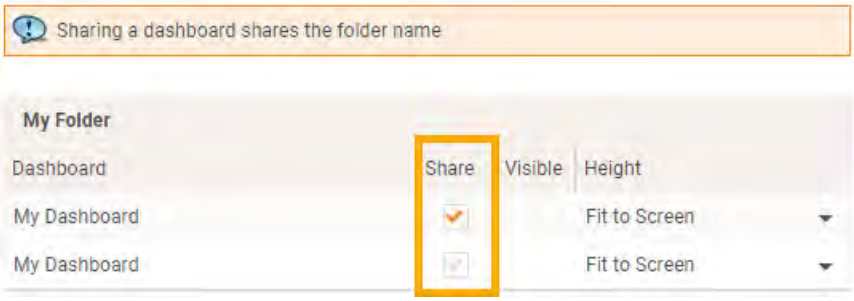
5. With the dashboard selected, click the "+ Add" button
6. Select "Add or Edit Widgets"
7. Select one of the four "layout" options. This determines the number of rows you will have in the dashboard

8. Select your desired "Dashboard Height" option
    - "Fit to Screen" - All rows will be visible on the screen. This is a good option if you are projecting the dashboard on a large screen in your network operations center for all to see
    - "2x Screen", "3x Screen", "4x Screen" - For these options your dasboard wil be "x" times larger than your screen size and provide a scroll bar for scrolling. This is a good option when placing multiple widgets (charts, gauges, floorplans etc.) on a single dashboard
9. Drag and Drop the widgets into the desired position
10. Click "Save" to save your settings

This will present your dashboard. You will now need to mouse-over each widget and select the widgets settings icon which is three horizontal bars often called a hamburger icon. The settings icon is only visible when your mouse is hovering over the widget.

Sharing Dashboards

1. Select the dashboard folder that contains one or more of the dashboards you want to share with all users who have permission to view dashboards.
2. Click the “Share” checkbox in the row of the reports you want to share. This will share the folder and all the selected dashboards. The actual data other users see will depend on their permissions. For example: a Power IQ has two data centers – Paris and London. Paris has a load of 300 KW and London has a load of 400KW. a user will only see the data for London if their permission is limited to London hence see a load of 400KW on the total power load gauge.



Hiding a Shared Dashboard

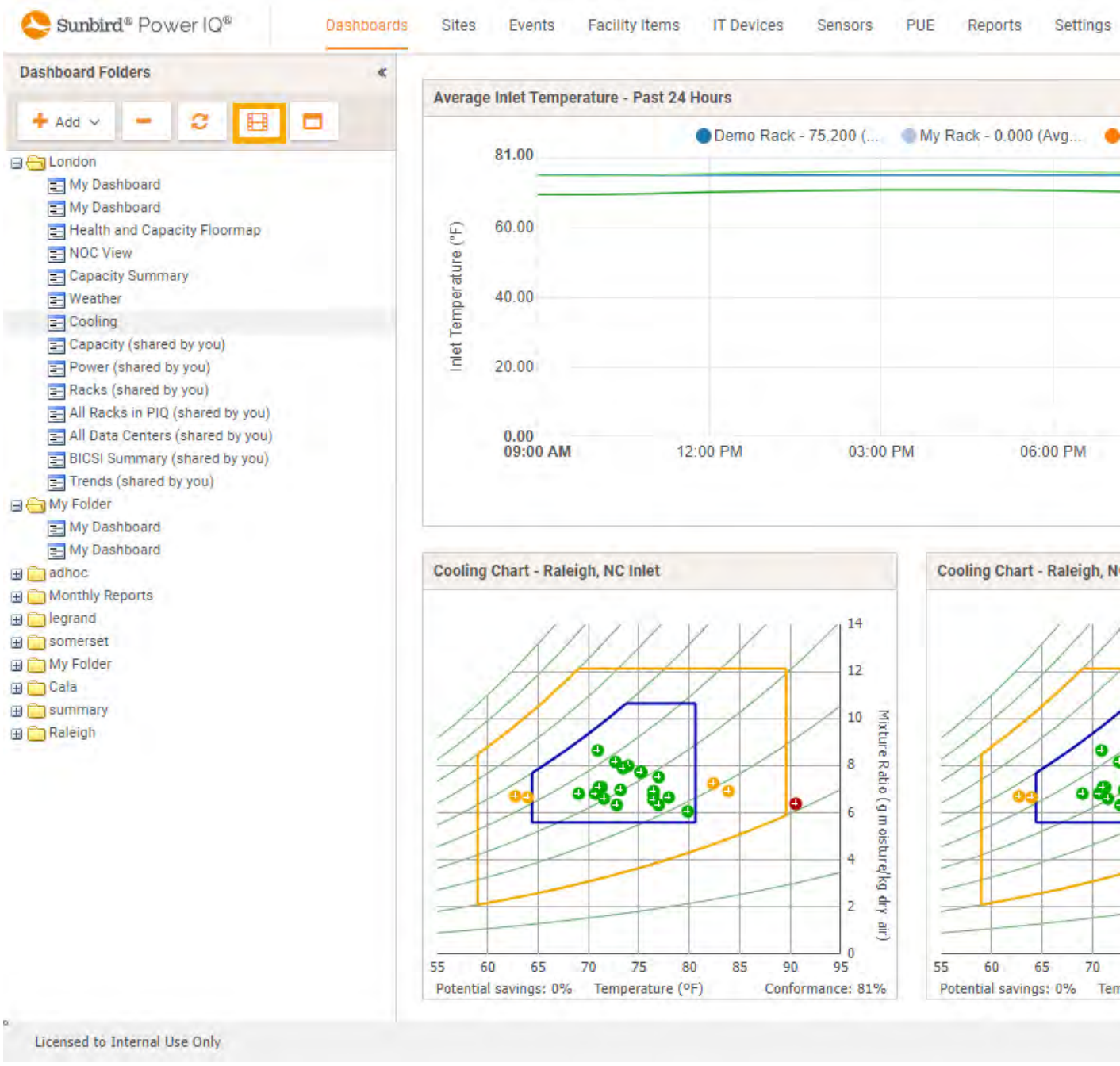
1. Select the dashboard folder that contains one or more shared dashboards you want to hide.
2. Uncheck the Share checkbox in the row of the dashboard you want to hide. This will hide the dashboard. If you hide all dashboards in the shared folder then it will delete the folder and dashboards from your dashboards tab.

Deleting Dashboard Folders and Dashboards

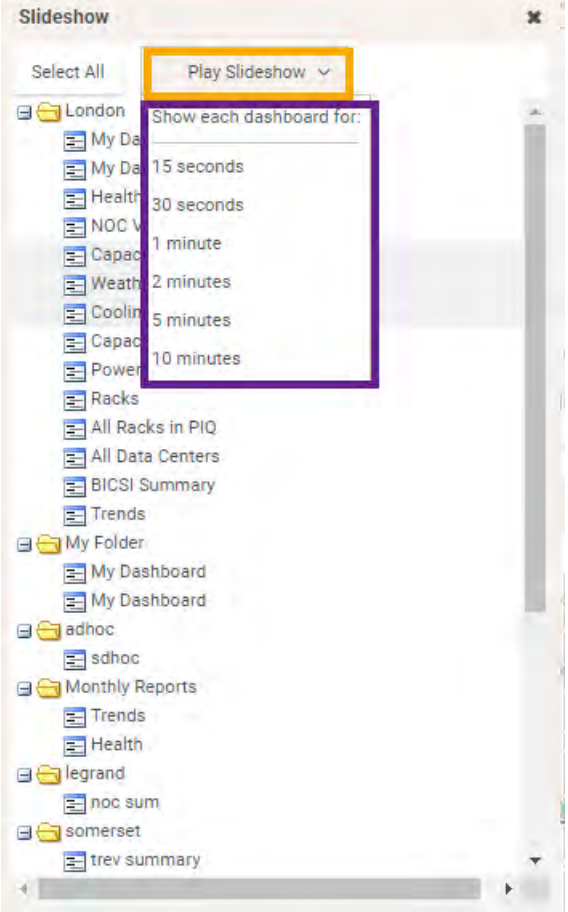
1. Select the dashboard folder and or a dashboard you want to delete.
2. Click the “-“ button

Dashboard Slide Show Mode

1. Click the slideshow button in the dashboard menu bar. The Slideshow dialog displays.



2. In the Slideshow dialog, select the dashboards (click the dashboard name) you want to be in slideshow mode. Hold the Ctrl key to select multiple dashboards.
3. Click the "Play Slideshow" button and select from the dropdown the time period you want each dashboard to display for.



Note that the data on each dashboard will refresh with each display or 30 seconds which ever interval is shorter.

4. Click "Exit Full Screen mode" to stop the slide show.

Configure Widgets

Widgets are the configurable tools and charts you can add to the dashboard layout. This section describes the widgets and how to configure them.

The table below displays widget icons and descriptions

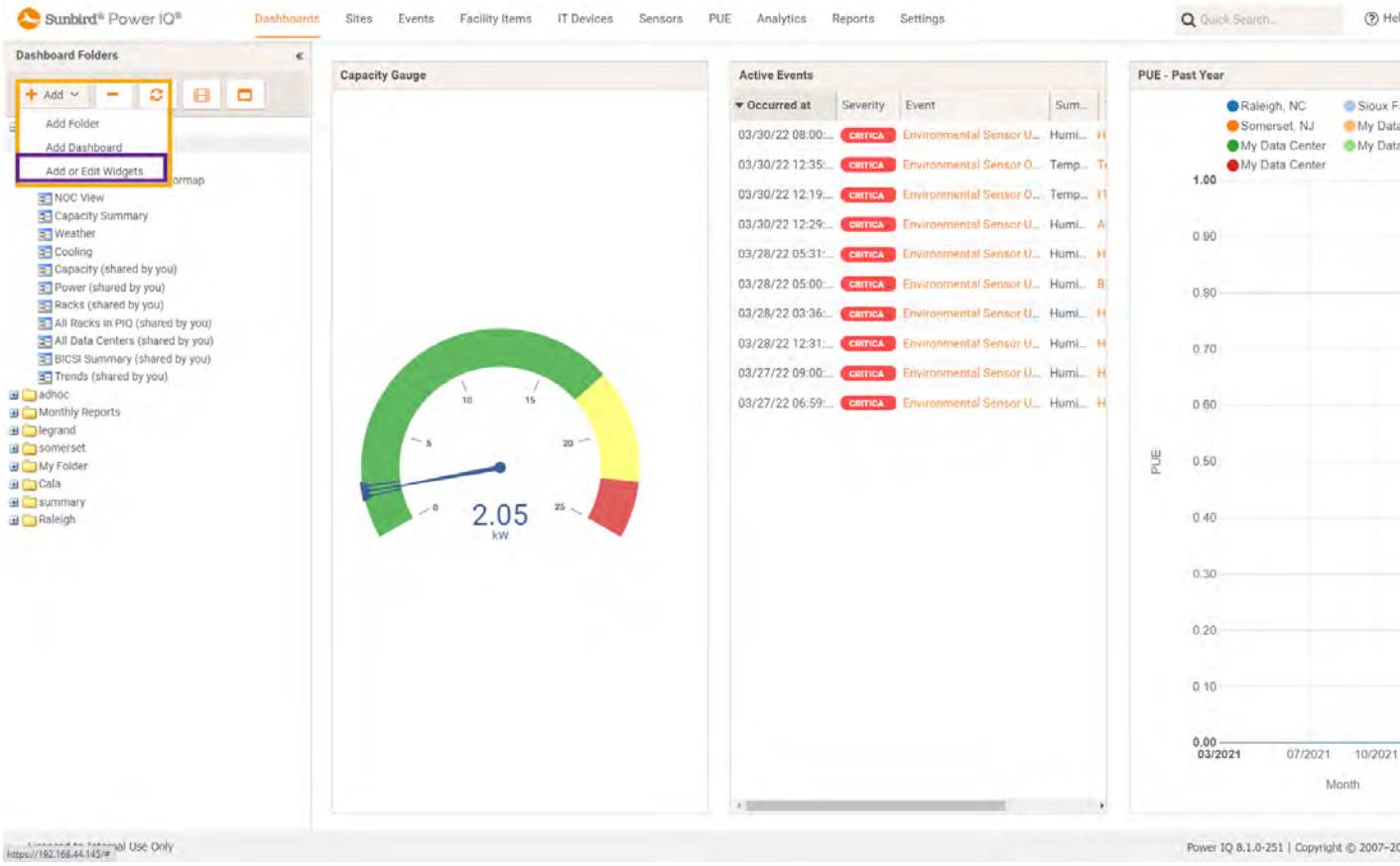
Widget Name	Widget Icon	Widget Description
Active Events Widget		The active events widget displays the 10 highest severity, active events in a list.
Capacity Forecast Chart Widget		The capacity forecast chart widget tracks the maximum active power of a data center. Based on the capacity settings, the chart displays how many days of supply remain before your data center reaches capacity, or it will indicate that you have adequate capacity.
Capacity Gauge Widget		The capacity gauge widget shows how much power a selected node of your data center has consumed over a specified time period. The gauge shows a tick mark for minimum, maximum and average power consumed during the time period. The dial points to the real time active power reading.
Cooling Chart Widget		Cooling charts enable you to compare your data center's sensor readings against ASHRAE recommendations.
Facility Items Trend Chart Widget		The facility items trend chart widget displays trend lines based on the user-selected statistical measure for each of the user-selected data sources.
Floor Maps Widget		The floor map widget uses a drawing of your data center, combined with information from your EDM and events, to create a color-coded health map of your data center.
Health Tiles Widget		The Health Tiles widget is a multi-tile widget that displays health data for the entities in the user-specified node.

Widget Name	Widget Icon	Widget Description
HTML Widget		The HTML widget enables you to add your custom HTML portlet to the dashboard. Use this widget to add a weather tool, maps, a video camera, or anything you can code using HTML.
Image Widget		The image widget displays an image that you upload on the dashboard.
PDU Health Chart Widget		The default PDU health chart widget displays the overall health of all PDUs in the system.
PUE Trend Chart		The PUE trend chart allows you to see how your data center's PUE has changed over a time period you select.
PUE Gauge		The latest PUE reading gauge allows you to see where your data center's PUE falls in the threshold range you have configured. You can set a warning and critical threshold level for each data center. Warning and critical threshold levels are displayed as yellow and red in the gauge.
Title Widget		The dashboard title widget allows you to add and format text on the dashboard. Position the widget above or next to other widgets to use it as a heading.
Trend Chart Widget		The trend chart widget trends a user-specified measurement over a selected time period or range.

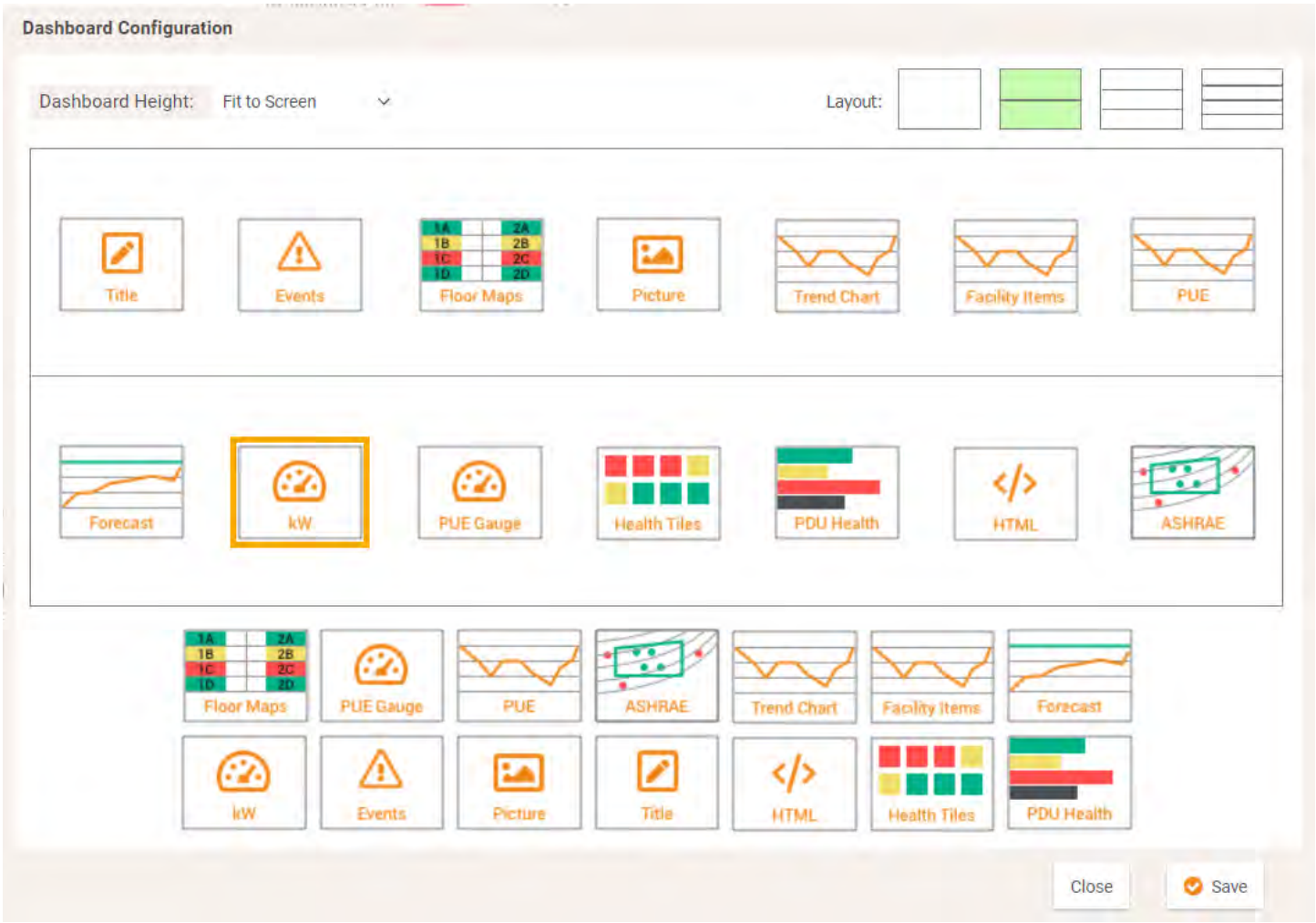
Capacity Gauge Widget

The capacity gauge widget shows how much power a selected node of your data center has consumed over a specified time period. The gauge shows a tick mark for minimum, maximum and average power consumed during the time period. The dial points to the real time active power reading.

1. In the left navigational panel of the Dashboards tab, click the Add button, then select the Add or Edit Widgets option. The Dashboard Configuration dialog displays.



2. Drag and drop the Capacity Gauge widget icon into a row. See Manage Dashboards for details.



3. Click the Settings icon in the upper right corner of the widget to display the Capacity Gauge Settings dialog.
4. Enter a name in the Title field.
5. In the Node field, click the browse icon, then select the data center node whose power consumption you want to display in the dial. Expand or collapse the nodes by clicking the plus and minus signs. Click the Select Node button to confirm your selection.
6. In the Period field, select the time period of power consumption to include in the dial:
    a. Past Hour
    b. Last Hour
    c. Past 23 Hours
    d. Yesterday
    e. Past Week
    f. Last Week
    g. Past Month
    h. Last Month
    i. Past Year
    j. Last Year
    k. Year-to-Date

7. Click the Save button. The widget is added to the dashboard.

Cooling Chart Widget

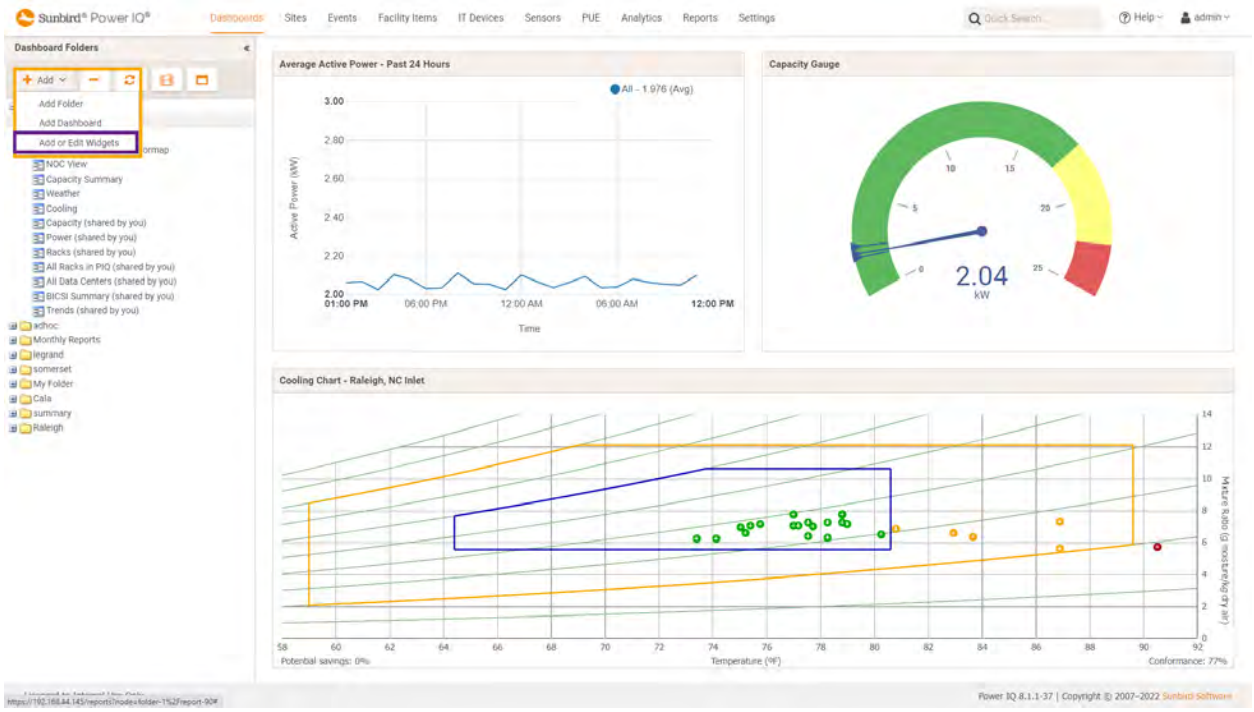
Cooling charts enable you to compare your data center's sensor readings against industry recommendations.

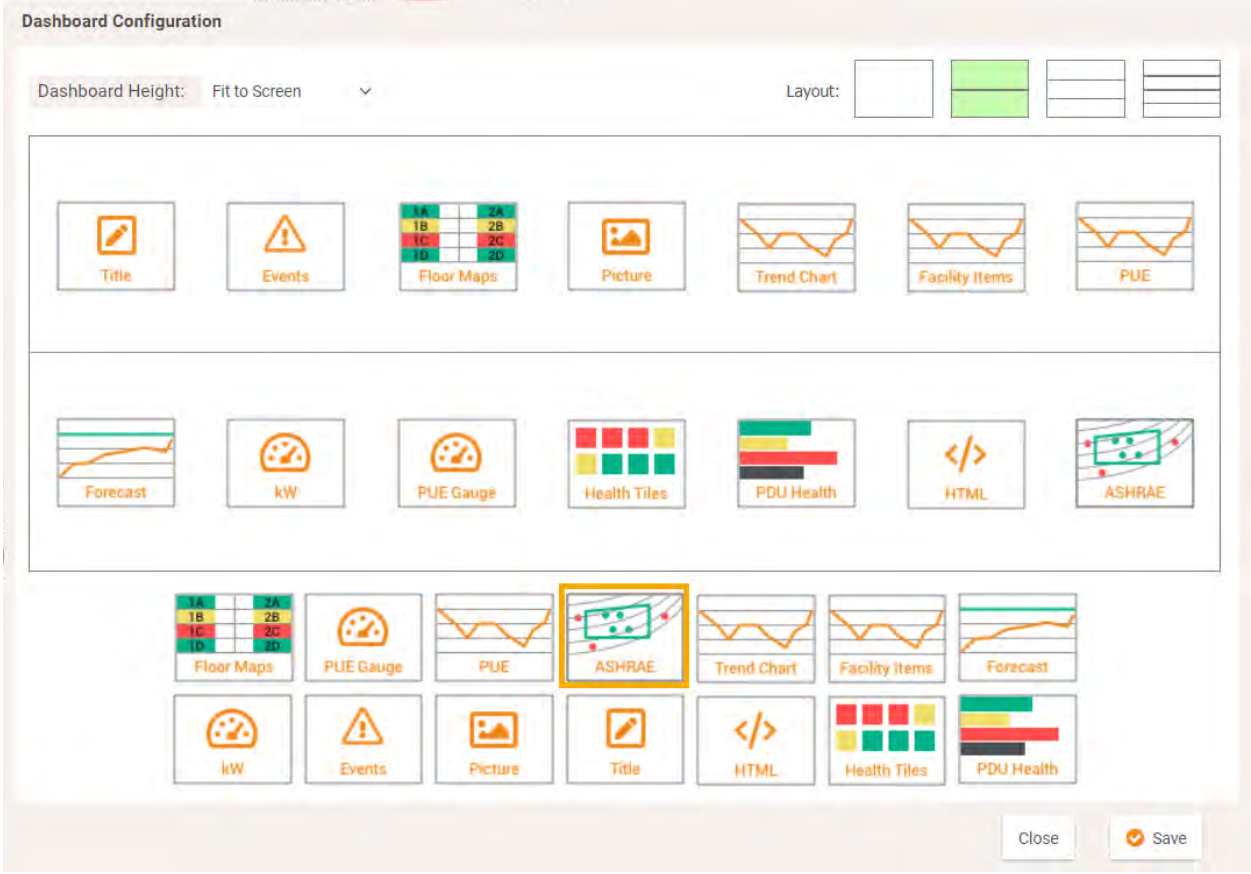
The American Society of Heating, Refrigerating and Air-Conditioning® (ASHRAE) is an industry consortium that provides guidelines for energy efficient data center operations.

ASHRAE recommends certain safe and energy-efficient operating temperatures and humidity levels. This data displays on the psychrometric chart in Power IQ. ASHRAE offers two different sets of recommendations, one from 2004, and one from 2008. The 2008 recommendations allow for slightly higher temperatures. When viewed on the chart, ASHRAE refers to these recommended regions of data as "envelopes."

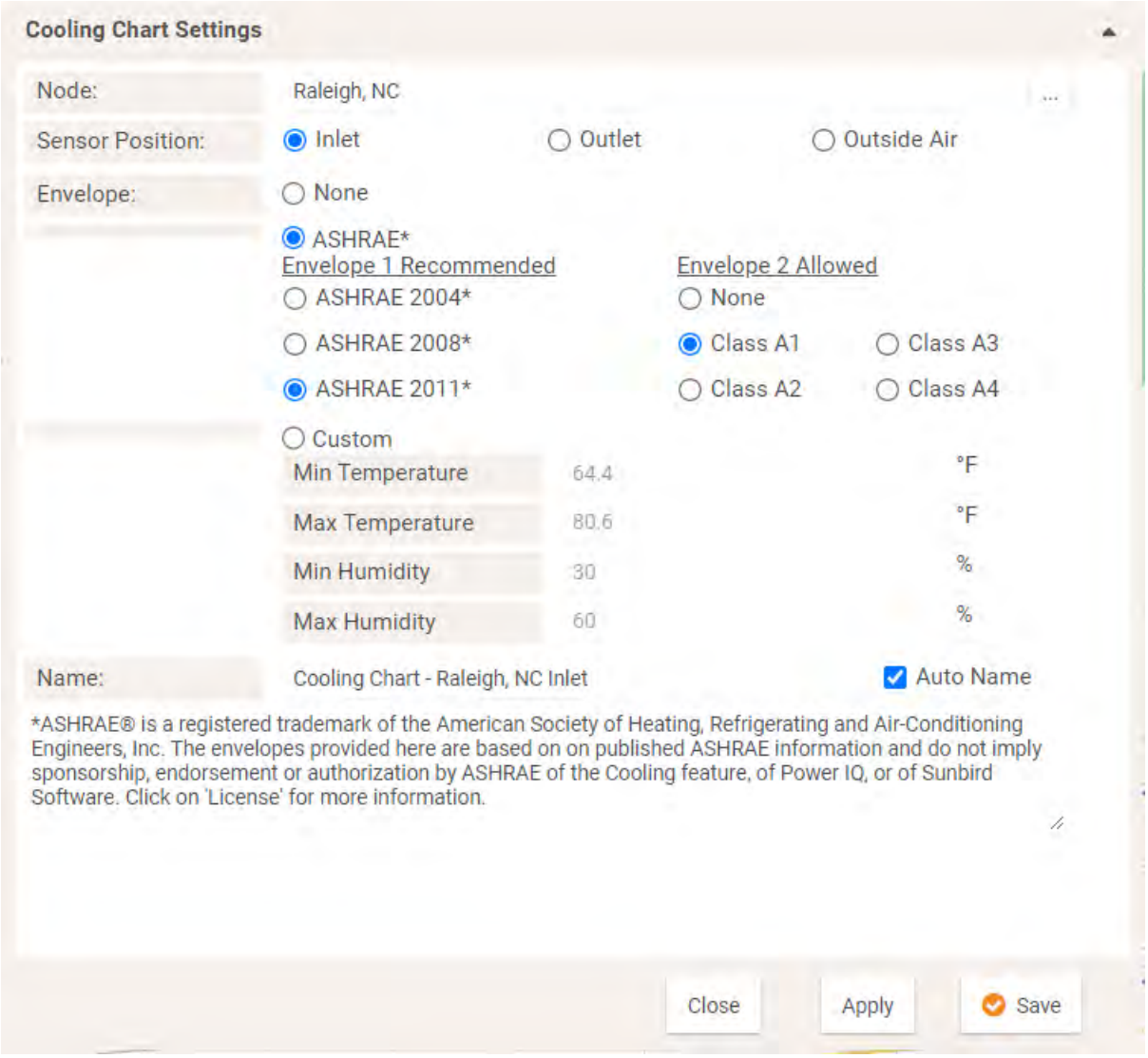
In Power IQ, you configure the chart to display your data center's humidity and temperature readings on the same psychrometric chart as ASHRAE's recommendations. You can also specify smaller sections within a data center, such as a room or rack. This allows you to determine how your readings compare to an ASHRAE recommendation. You can also specify your own custom target operating zones. See Create a Custom Region.

1. In the left navigational panel of the Dashboards tab, click the Add button, then select the Add or Edit Widgets option. The Dashboard Configuration dialog displays.





2. Click the Settings icon in the upper right corner of the widget. The Cooling Chart Settings dialog displays.



3. In the Node field, click the browse button to select a node from your enterprise data model. You can select any level, up to and including the data center. Potential energy savings is calculated only when a data center is selected.
4. In the Sensor Position field, select Inlet, Outlet, or Outside Air. Inlet specifies a "cold aisle" chart, and uses data from inlet located sensors. Outlet specifies a "hot aisle" chart, and uses data from outlet located sensors. Outside air uses data from outside located sensors. See Specify Inlet, Outlet, or Outside Air Location for Environmental Sensors.
5. Select the region to display on the chart. See **ASHRAE® Envelope Descriptions** for details of each region.
6. All regions display in blue on the chart. Custom regions have default settings you can change. Select Custom, then select the Min Temperature and Max Temperature and the Min Humidity and Max Humidity.

7. Enter a name for the chart, or check the Auto Name checkbox to accept the system name. The system name for a cooling chart contains the level of the enterprise data model, such as data center, and the sensor location information.
8. Click Save. The widget is added to the dashboard.
9. Hover your mouse over the sensor data points to view details. See Viewing Sensor Data Point Details.
10. Click the export icon to export sensor data in the chart to a .CSV file. See Exporting Sensor Data.
11. The chart will automatically refresh at each polling interval. Click the refresh icon to refresh the chart manually.
12. To calculate savings, see Calculate Potential Cooling Energy Savings.

Requirements for Cooling Charts

Cooling charts use data from the humidity and temperature sensors in your data center.

You must have at least 1 temperature sensor and at least 1 humidity sensor connected to use Cooling charts.

Cooling Chart Details - How Your Sensor Data is Charted

By default, Power IQ considers all environmental sensors to be inlet located. You can specify a sensor as outlet, inlet, or outside air located in the PDU details page. See Specify Inlet, Outlet, or Outside Air Location for Environmental Sensors.

For each sensor data point, the cooling chart will display the details of the associated humidity and temperature sensors. See Viewing Sensor Data Point Details.

Each data point requires two coordinates: temperature and humidity. For each temperature measurement, Power IQ correlates the corresponding humidity value. If the same sensor does not support both humidity and temperature readings, then the nearest humidity sensor is used to correlate temperature measurement with humidity measurement. The determination of the nearest humidity sensor is based on the Power IQ Enterprise Data Model hierarchy.

Exporting Sensor Data

To view pairs of sensor readings in a CSV file, export the data. The exported file contains a column called In Region, and a list of points. Points inside the region are listed as TRUE. Points outside the region are listed as FALSE.

Calculate Potential Cooling Energy Savings

Power IQ calculates the estimated cost savings you may experience by raising the temperature of your data center to a higher temperature while remaining within the guidelines of a selected ASHRAE® or custom region.

The potential cooling energy savings displays at the bottom of a cooling chart automatically when a data center is selected as the EDM node included.

Potential cooling energy savings can only be calculated at the data center level, not at lower levels, such as room, or rack.

All temperature sensor data points must be below the upper temperature limit for the region selected, or the calculation will show as 0% The calculation works by showing you a potential estimated savings based on raising your highest temperature to the maximum allowed by the selected region.

Industry estimates show that you could save 3.9%for each 1 degree Fahrenheit that you raise the data center temperature; or 7%for each 1 degree Celsius that you raise the data center temperature. Your actual savings will vary. You can adjust the savings percentage used in the calculation.

1. In the Sites tab, select the data center node.
2. In the Details Tab>Ratings and Settings section, enter the percentage to use in the calculation in the Savings % per degrees C field.

The Savings %is set to a default: 7%for Celsius readings. Readings for Fahrenheit are calculated based on the Celsius percentage, and estimated at 3.9%

Click Save. Go back to the cooling chart in the Dashboard to view updated potential cooling energy savings.

Facility Items Trend Chart Widget

The facility items trend chart widget displays trend lines based on the user-selected statistical measure for each of the user-selected data sources.

The data sources for this chart must be selected from the following facility items:

- Floor UPSs
- Floor PDUs
- Panels
- Meters
- CRACs

Rack PDUs are excluded from this chart.

Facility items must be mapped in the EDM before the data can be charted. See **Creating Your EDM**.

1. In the left navigational panel of the Dashboards tab, click the Add button, then select the Add or Edit Widgets option. The Dashboard Configuration dialog displays.


Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Analytics
Reports
Settings
Dashboard Folders
Add
Add Folder
Add Dashboard
Add or Edit Widgets
NOC View
Capacity Summary
Weather
Default Dashboard
JasonS
Jason Herr
Cooling Chart
Temp Chart
Brandan
Trend Chart
kphill
Owen
Google Dashboard (shared by jasons)
Facilities Chart
Floormap (shared by you)
Jason's Desk
Trend chart for Floor UPS, Floor PDUs, Panels, Meters and CRACs
All
Active Power (kW)
26.00
25.90
25.80
25.70
25.60
25.50
25.40
25.30
25.20
25.10
25.00
24.90
24.80
24.70
24.60
24.50
24.40
24.30
24.20
24.10
24.00
07:00 AM 08:00 AM 09:00 AM 10:00 AM 11:00 AM 12:00 PM 01:00 PM 02:00 PM 03:00 PM 04:00 PM 05:00 PM 06:00 PM 07:00 PM 08:00 PM 09:00 PM 10:00 PM 11:00 PM 12:00 AM 01:00 AM 02:00 AM 03:00 AM 04:00 AM 05:00 AM 06:00 AM 07:00 AM
Hour
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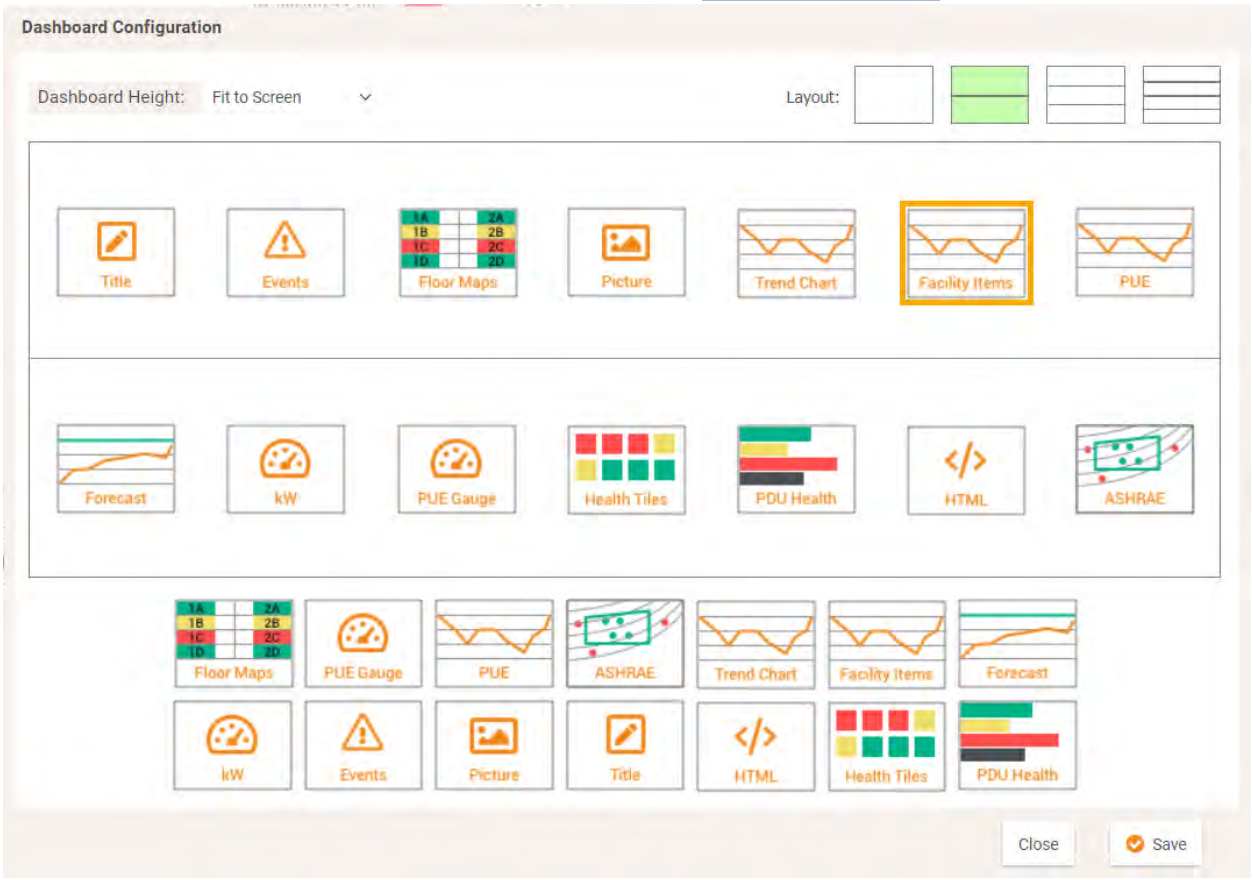
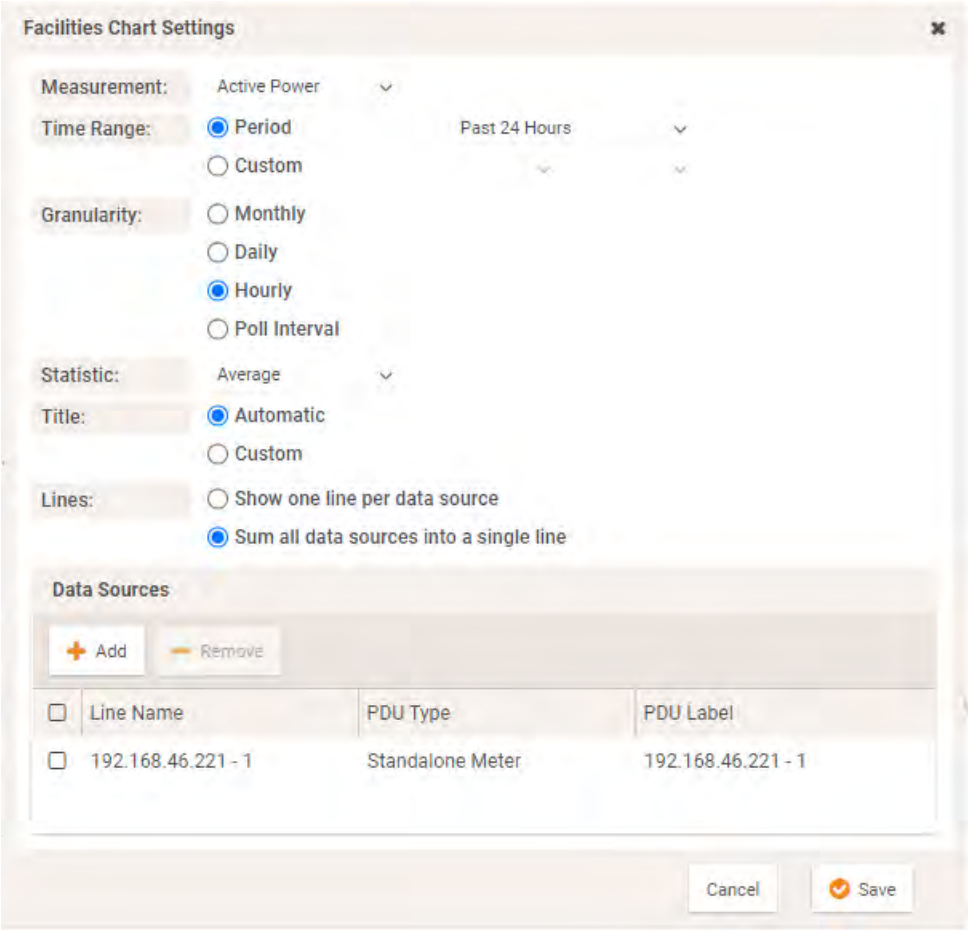
2. Drag and drop the Facilities Chart widget icon into a row. See Manage Dashboards for details.



3. The Facilities Chart Settings dialog displays



4. Configure the Settings:
    a. Measurement: Active Power or Energy
    b. Time Range: Period or Custom.
        a. Period Options include:
            a. Past Hour
            b. Last Hour
            c. Past 24 Hours
            d. Yesterday
            e. Past Week
            f. Last Week
            g. Past Month
            h. Last Month
            i. Past Year
            j. Last Year
            k. Year-to-Date
    c. Period shows preconfigured time options, such as Past hour, Past week, Past month, and so on. Select the time period from the drop-down list. See **What's the difference between "Past" and "Last" time periods?**

d. Custom show measurements between the Start Date and End Date chosen in the calendar dialogs.
   - Granularity: Monthly, Daily, Hourly, Poll Interval.
   - Monthly, Daily, and Hourly show one data point per month/day/hour for the time period the chart includes. The time period must be longer than the granularity.

   Note: "Past Hour" graphs in facilities charts require a granularity of "Poll Interval" to produce a plot.

5. Poll Interval shows one data point per poll interval for the time period the chart includes. The Poll Interval must be set to 5 minutes or longer to use Poll Interval granularity.
   - Statistic: Minimum, Maximum, or Average readings for each data point.
   - Title: Automatic or Custom. Automatic chart title is Statistic + Measurement + Time Range. For example, Average Active Power - Past 24 Hours.
   - Lines: Show one line per data source, or Sum all data sources into one line. A data source is one facility item selected in the Data Sources table.
6. In the Data Sources table, click Add, then select the facility items to include. Use Control+Click to multi-select items. Click Select Nodes. The table displays your selections.
7. Click Save. The widget is added to the dashboard.

HTML Widget

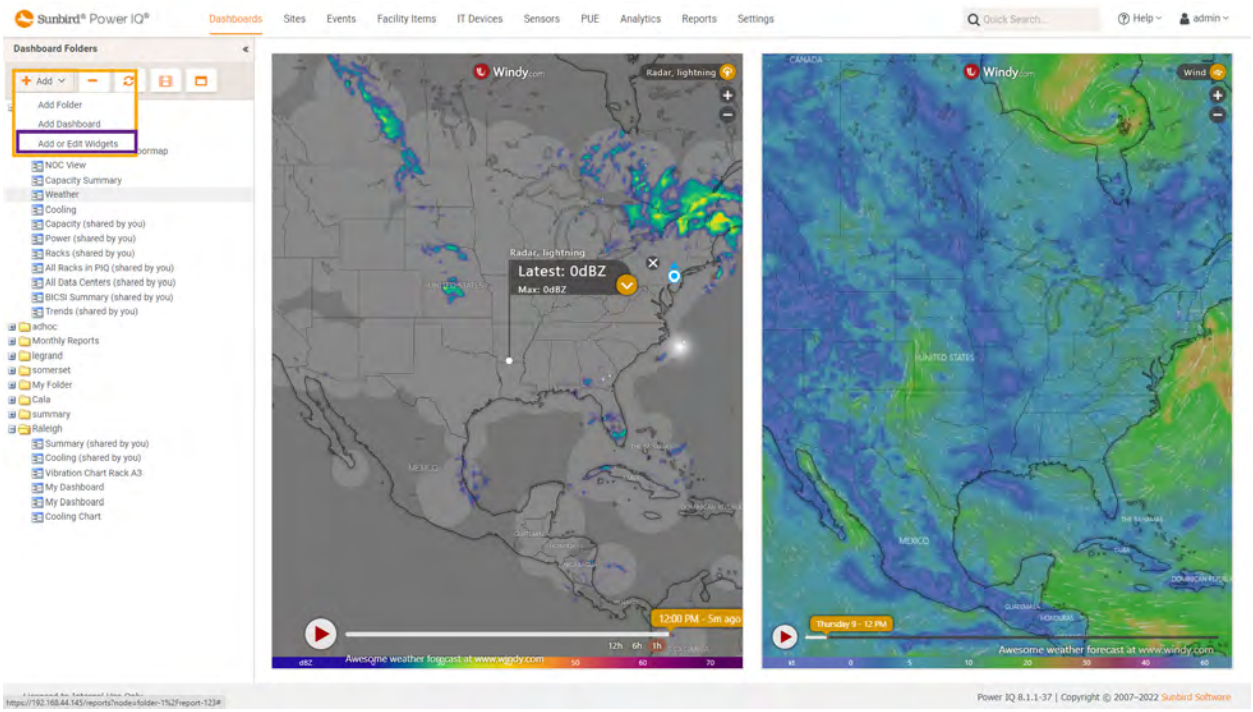
The HTML widget enables you to add your custom HTML portlet to the dashboard. Use this widget to add a weather tool, maps, a video camera, or anything you can code using HTML.

HTML portlets may have security implications. You must allow them before you can add an HTML widget to the Dashboards tab. See Allow HTML Widgets on Dashboard.

In Internet Explorer, you must accept a security warning the first time you view a dashboard containing an HTML widget.

Note: If your HTML widget contains active content, newer versions of Firefox and Chrome may block the content. Click the shield icon in the address bar to allow the content.

1. In the left navigational panel of the Dashboards tab, click the Add button, then select the Add or Edit Widgets option. The Configuration dialog displays. The Dashboard Configuration dialog appears.


Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Analytics
Reports
Settings
Dashboard Folders
Add
Add Folder
Add Dashboard
Add or Edit Widgets
NOC View
Capacity Summary
Weather
Cooling
Capacity (shared by you)
Power (shared by you)
Racks (shared by you)
All Racks in PIQ (shared by you)
All Data Centers (shared by you)
BICSI Summary (shared by you)
Trends (shared by you)
adhoc
Monthly Reports
legrand
somerset
My Folder
Cala
summary
Raleigh
Summary (shared by you)
Cooling (shared by you)
Vibration Chart Rack A3
My Dashboard
My Dashboard
Cooling Chart
Windy.com
Radar, lightning
Latest: 0dBZ
Max: 0dBZ
12:00 PM - 5m ago
Awesome weather forecast at www.windy.com
Wind
Thursday 9 - 12 PM
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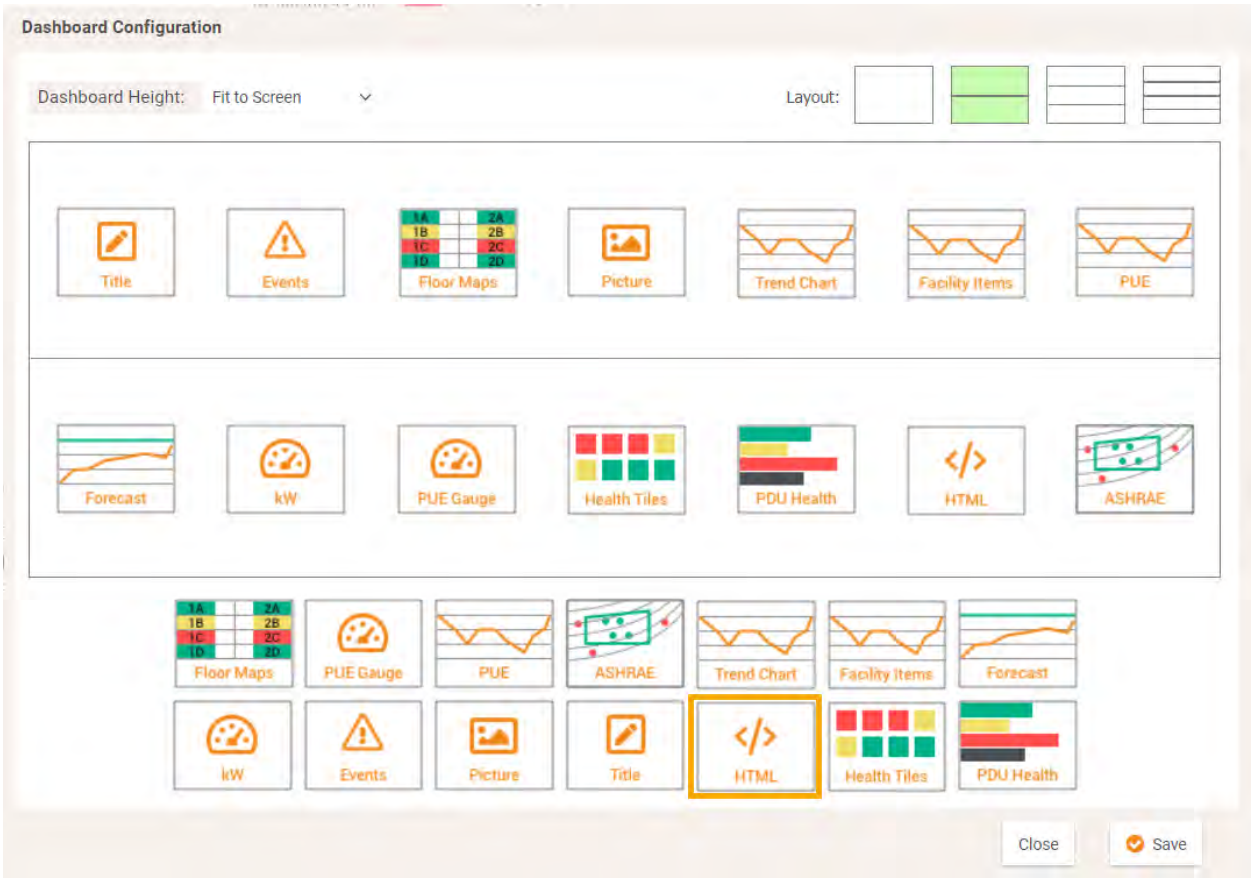
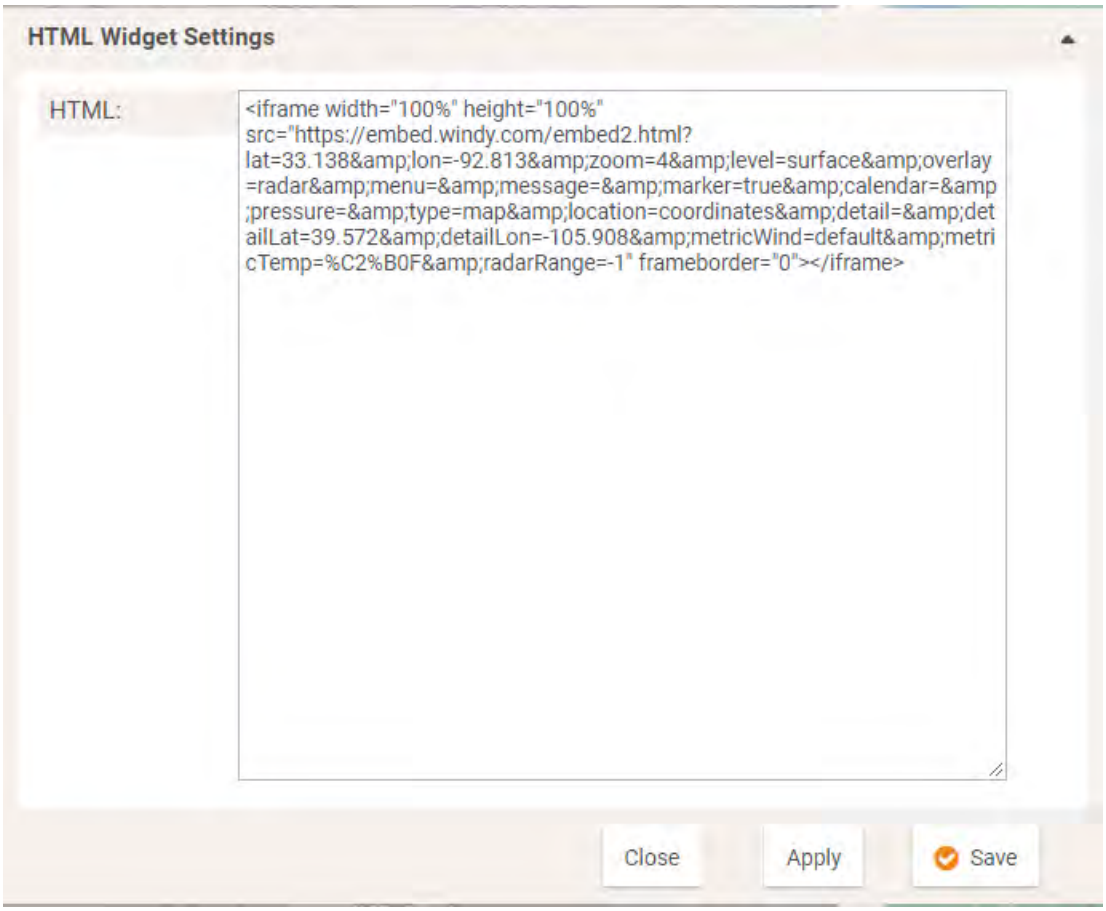
2. Drag and drop the HTML widget icon into a row. See Manage Dashboards for details.



If you don't see the HTML widget icon, you must allow HTML portlets. See Allow HTML Widgets on Dashboard.

3. Click the Settings icon . The HTML Widget Settings dialog appears



4. Enter your HTML code in the HTML field.
5. Click Save. The widget is added to the dashboard.

Note: If you see unexpected changes in your dashboard after adding an HTML widget, you can reset it by disabling HTML portlets in the Settings tab. See Allow HTML Widgets on Dashboard*.*

Image Widget

The image widget displays an image that you upload on the dashboard.

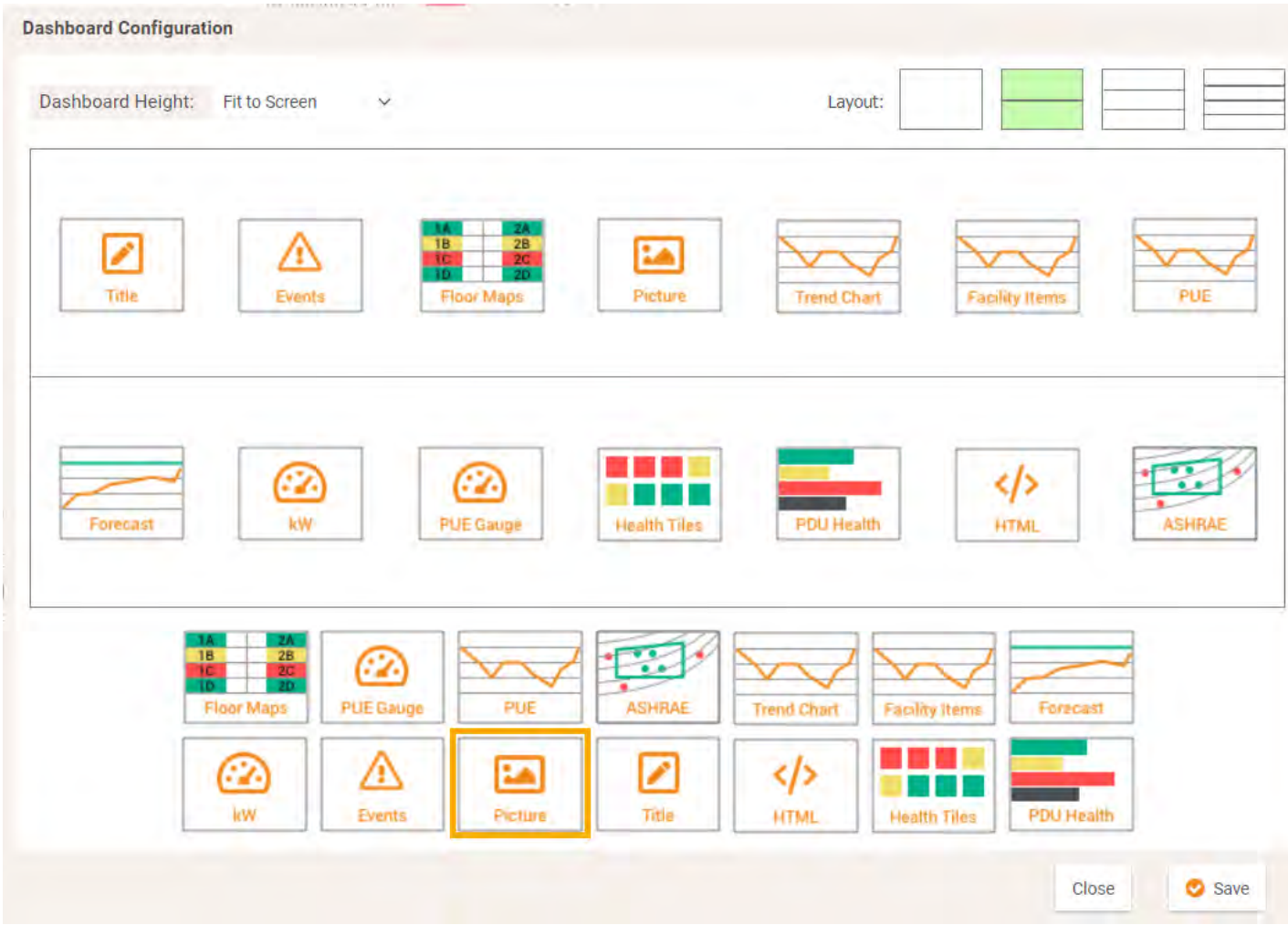
The maximum images size is 800 pixels high by 800 pixels wide. The maximum file size is 2MB for dashboard images. Images uploaded for logo usage can be up to 512KB.

Uploading a new image to an image widget removes the previously uploaded image.

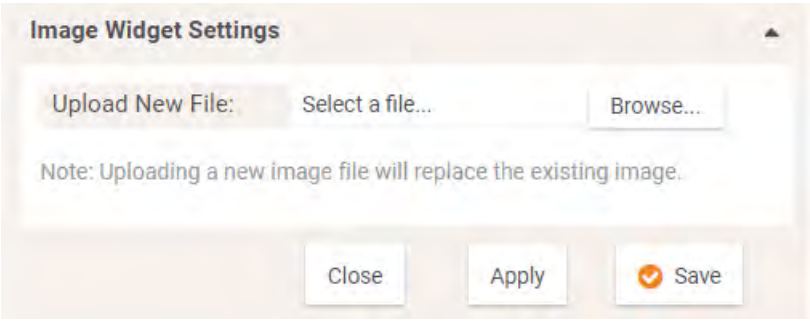
For details on adding a logo to every page in Power IQ, see Display a Logo on Every Page.

1. In the left navigational panel of the Dashboards tab, click the Add button, then select the Add or Edit Widgets option. The Dashboard Configuration dialog displays.

2. Drag and drop the Image widget icon into a row. See **Setting the Dashboard Layout** for details.



3. Click the Settings icon in the upper right corner of the widget..



4. Click the Browse button, select the image and click Open.
5. Click Save. The widget is added to the dashboard.

Latest PUE Reading Gauge Widget

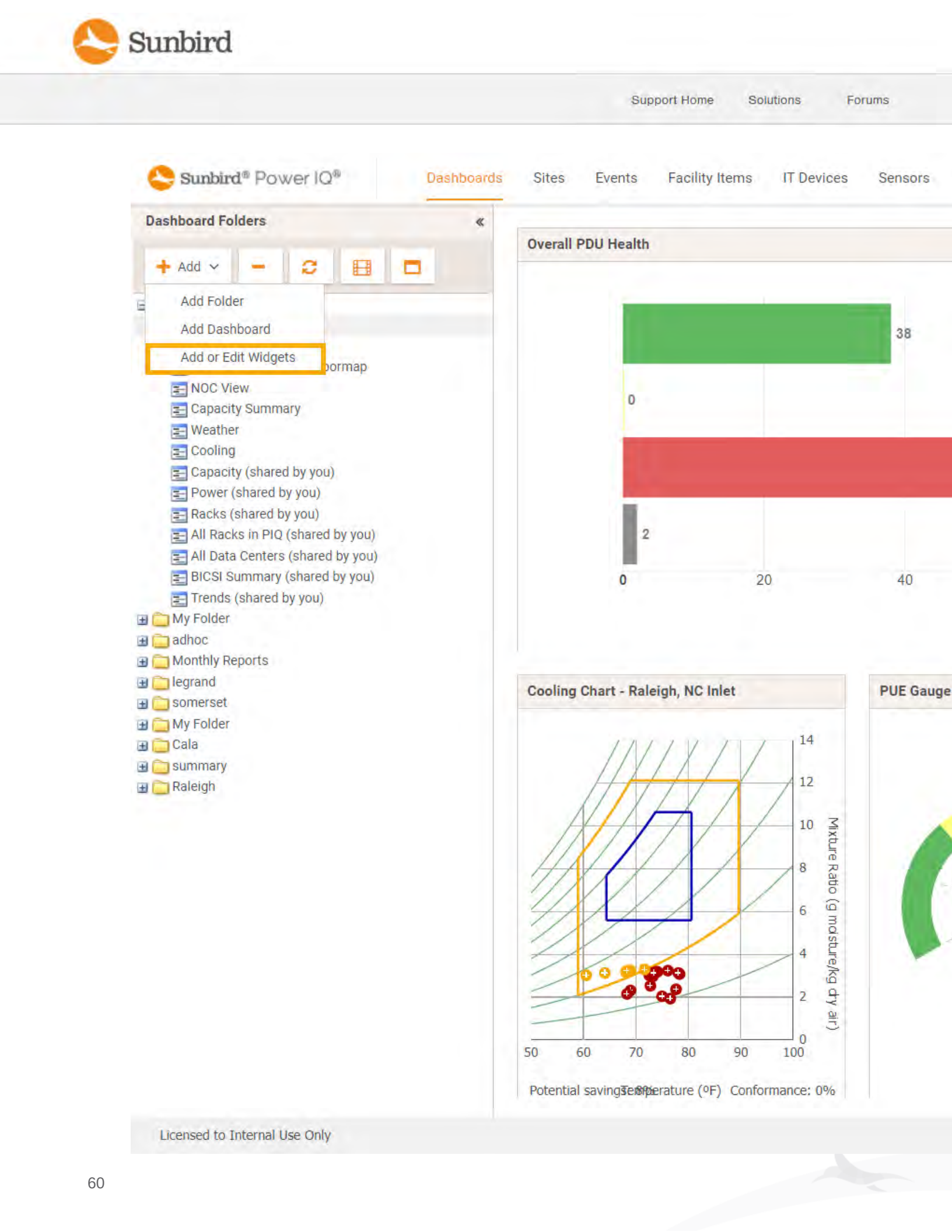
The latest PUE reading gauge allows you to see where your data center's PUE falls in the threshold range you have configured. You can set a warning and critical threshold level for each data center. Warning and critical threshold levels are displayed as yellow and red in the gauge. See Setting PUE Thresholds.

The gauge also shows the minimum PUE calculation and the maximum PUE calculation for a time period you specify. This data displays as tick marks, and may overlap.

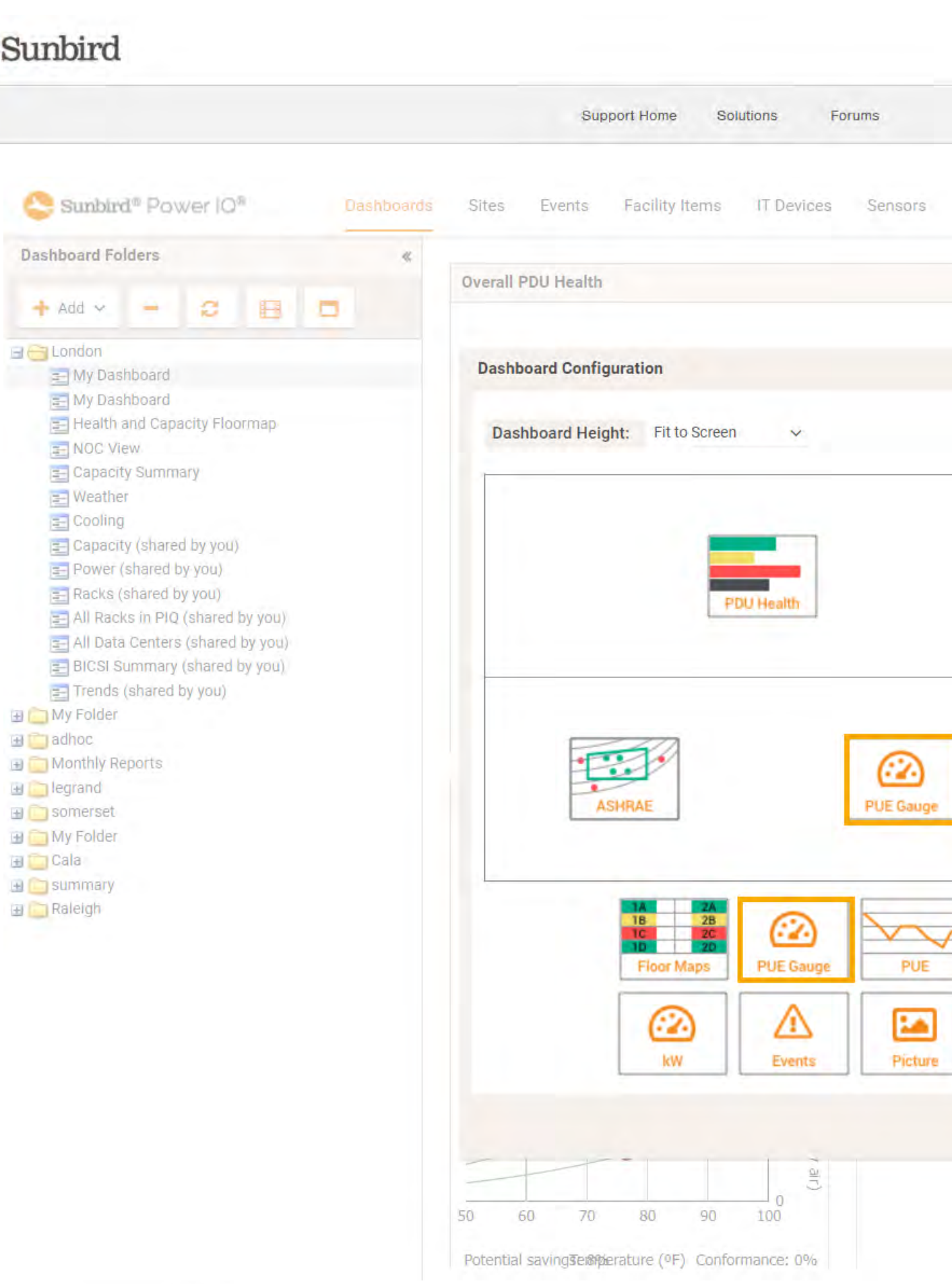
Either daily or monthly calculations may be used. The latest PUE calculation is used. For daily gauges, the previous day is used. For monthly gauges, the previous full month is used. Monthly data comes from a rollup conducted on the first of each month, using the previous month's data. Monthly gauges will update after each rollup.

You must configure your system before PUE is calculated. See Requirements for PUE.

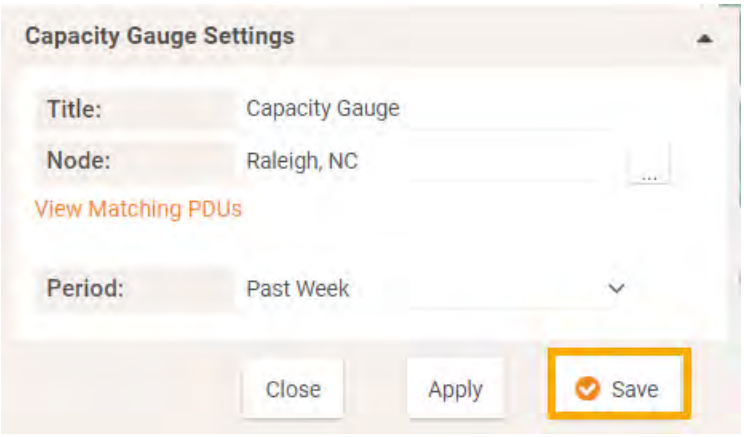
1. Click the Add or Edit Widgets button in the upper right corner of the Dashboards tab. The Dashboard Configuration dialog appears.


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
Dashboard Folders
Add
Add Folder
Add Dashboard
Add or Edit Widgets
NOC View
Capacity Summary
Weather
Cooling
Capacity (shared by you)
Power (shared by you)
Racks (shared by you)
All Racks in PIQ (shared by you)
All Data Centers (shared by you)
BICSI Summary (shared by you)
Trends (shared by you)
My Folder
adhoc
Monthly Reports
legrand
somerset
My Folder
Cala
summary
Raleigh
Overall PDU Health
38
0
2
0
20
40
Cooling Chart - Raleigh, NC Inlet
14
12
10
8
6
4
2
0
50
60
70
80
90
100
Mixture Ratio (g moisture/kg dry air)
Temperature (ºF)
Potential savings: 8%
Conformance: 0%
PUE Gauge
Licensed to Internal Use Only

2. Drag and drop the latest PUE reading gauge widget icon into a row. See Manage Dashboards for details.


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
Dashboard Folders
Add
London
My Dashboard
My Dashboard
Health and Capacity Floormap
NOC View
Capacity Summary
Weather
Cooling
Capacity (shared by you)
Power (shared by you)
Racks (shared by you)
All Racks in PIQ (shared by you)
All Data Centers (shared by you)
BICSI Summary (shared by you)
Trends (shared by you)
My Folder
adhoc
Monthly Reports
legrand
somerset
My Folder
Cala
summary
Raleigh
Overall PDU Health
Dashboard Configuration
Dashboard Height:
Fit to Screen
PDU Health
ASHRAE
PUE Gauge
1A
1B
1C
1D
2A
2B
2C
2D
Floor Maps
PUE Gauge
PUE
kW
Events
Picture
50
60
70
80
90
100
0
Potential savings: 8%
Temperature (ºF)
Conformance: 0%
Licensed to Internal Use Only

3. Click the Settings icon.



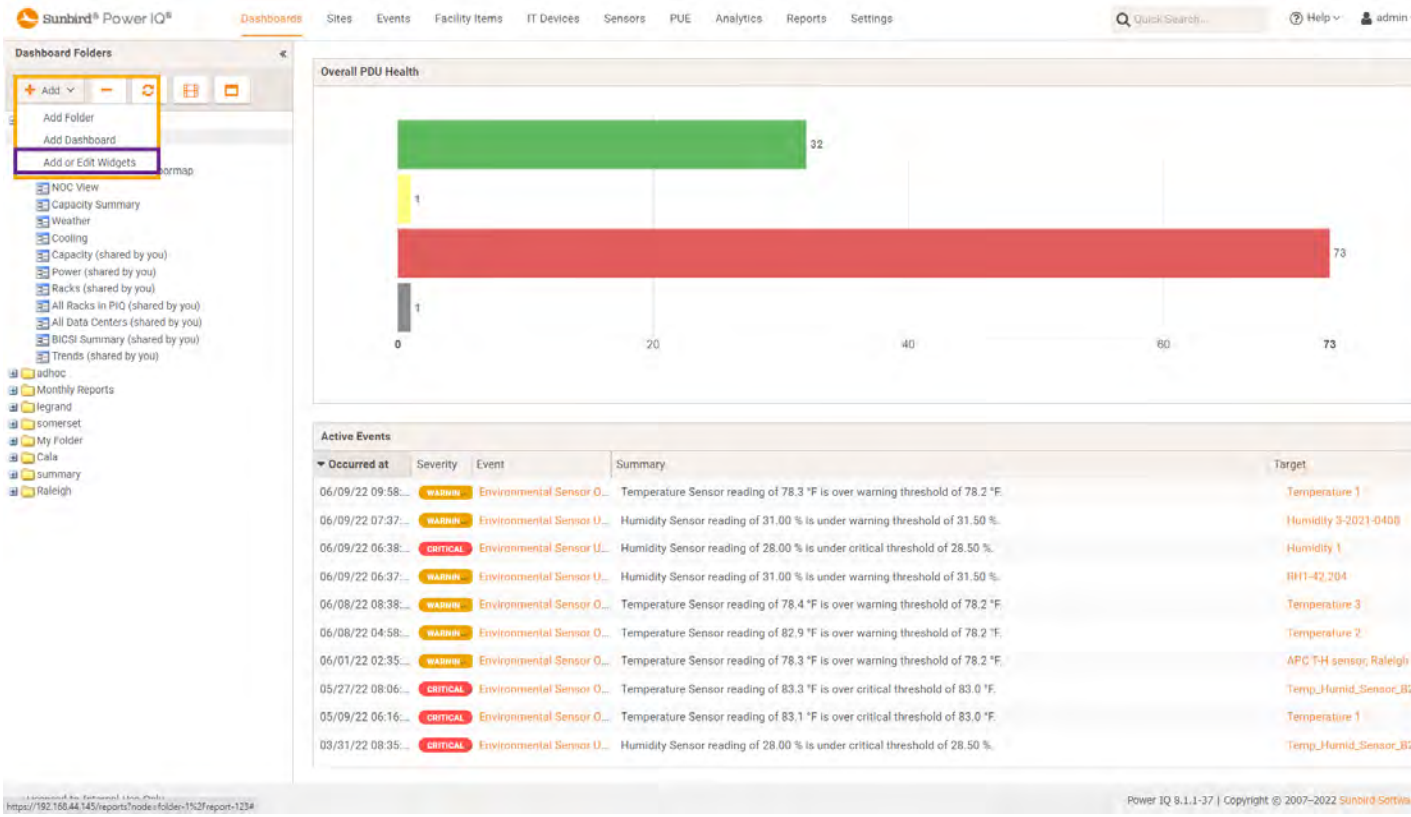
4. Enter a Title for the gauge.
5. Select the Node whose PUE you want to display.
6. In the Period field, select the period you want to chart.
7. Click Save. The widget is added to the dashboard.

PDU Health Chart Widget

The default PDU health chart widget shows overall health of all PDUs in the system.

You can configure the chart to show overall health, which includes connectivity and active events, or active events only, or connectivity only. You can also set the chart to include all PDUs in the system, or just the PDUs in a specific level of a data center. The chart refreshes automatically every minute.

1. In the left navigational panel of the Dashboards tab, click **Add**, then select**Add or Edit Widgets**. The Dashboard Configuration dialog displays.



2. Drag and drop the PDU health chart widget icon into a row. See **Setting the Dashboard Layout** for details.

3. Click the Settings icon in the upper right corner of the widget. The Health Chart Settings dialog displays.

4. Enter a name for the chart in the Title field in the Basics section.
5. In the Data From field,
    1. Select All to include all PDUs in the system in the chart.
    2. Select Data Center or other areas of the data center to filter the next field's selections. For example, select Racks to filter the Contained In field to include the racks in your system.
6. In the Contained In field, select the location of the PDUs you want to include in the Health chart.
7. In the Options section, select the health measurement you want to chart.
8. Select **Overall Health** to view a health chart that combines connectivity and active events to create an overall health status of the selected PDUs.
9. Select **Event Health Only** to exclude connectivity from the health status.
10. Select **Connectivity Health Only** to exclude active events from the health status.
11. Click **Save**.

    See **Overall PDU Health** for details on how health status is determined.

12. Click a color-coded bar in the graphic to view the list of PDUs with the selected health status.

The chart will automatically refresh to show the new health status based on any new and cleared events. Click the refresh icon to refresh the chart manually.

How Does Power IQ Calculate the Sum of a Data Center Node?

Power IQ uses a formula for charting a whole data center node, such as a Room, that prevents duplication of data.

The sum of a node is the sum of the inlets of all rack PDUs under the node, plus the sum of all non-duplicate Circuits in all Power Panels, Floor PDUs, and UPSs contained by the node.

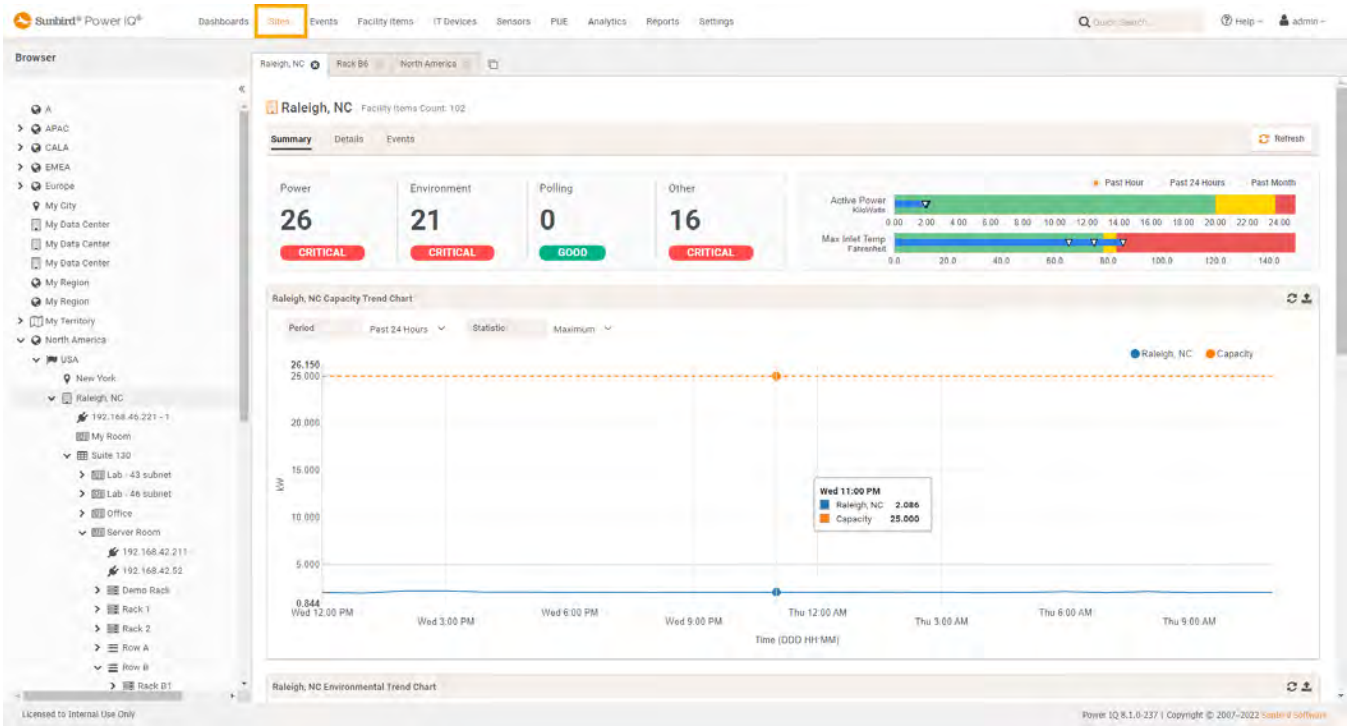
If a node contains a rack that contains an IT device mapped to a floor PDU outside that node, the IT device is not part of the sum of that node.

An HVAC system's power is part of the sum of the power for charts drawn for the physical location it serves, as position in the Data Center browser. See CRACs in the Data Center Browser.

Sites Tab

The Sites Tab, allows you to:

- Navigate and organize your EDM tree view.
- Manage the entities across your data center sites
- View data about your datacenter through zero-configuration analytics

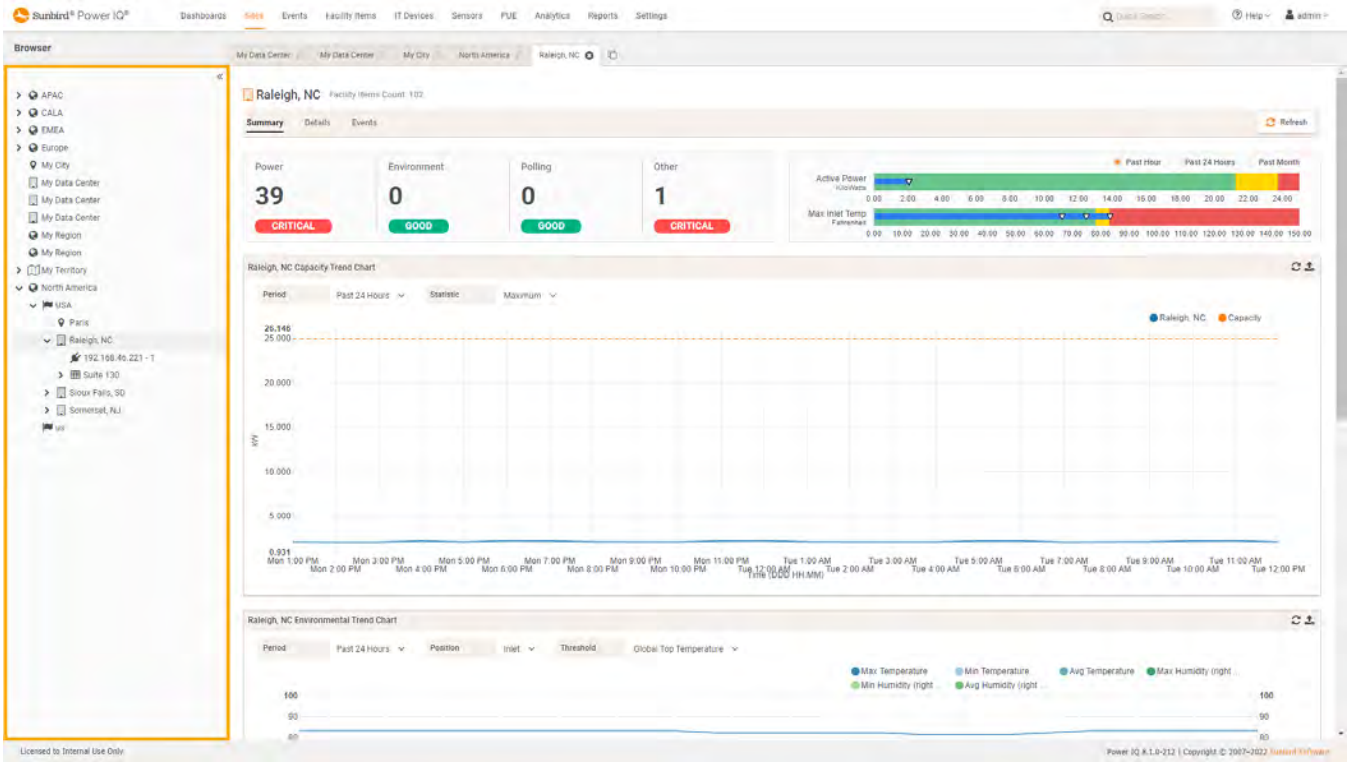


Tree View

The Tree View displays the Enterprise Data Model of your data center. In Power IQ's Sites Tab, the Tree View enables you to view the entitiesin your data center and their relationships. When you first access the Sites Tab, and the tree is populated, the top node in the tree will be selected by default, with its tab displayed in a new tab. If the tree is not populated, a blank tab will be display. In this case, you will need to populate the tree by adding to Power IQ

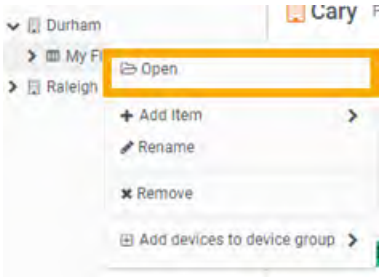
Note: You must have View permissions on a node to be able to see it and its children

The Tree View is in the left panel of the Sites Tab



Open and Close Tabs in the Sites Tab

- To remove all tabs, click the close all icon to the right of the tab bar.
- If the node you're attempting to open already has an open tab, that tab will become the active tab.
- To close an individual tab, click the close icon in the tab.
- To open an entity in the active tab, single-left click it
- To open an entity in a new tab, double-left click it
- An alternate method to open an entity in a new tab is to right click the entity and select Open from the right-click context menu:



Note: An entity can only be open in one tab. If you attempt to open an item that is already open in a tab, that tab will be made active.

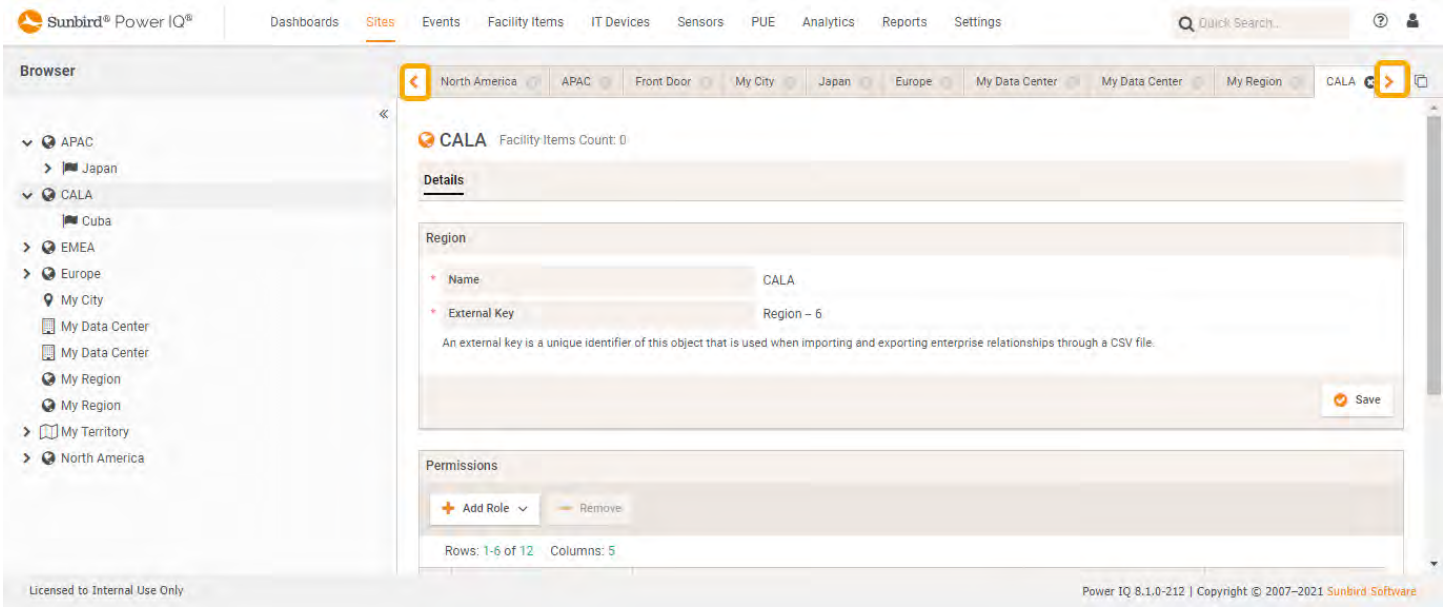
Scroll through tabs in the Sites Tab.

Power IQ allows you to scroll through Sites tabs when the tab list exceeds the allotted horizontal width of the tab row.

Horizontal scrolling is triggered when the tab list exceeds the allotted horizontal width of the tab row.

When horizontal scrolling is triggered, scrolling arrows will display at the far left and right of the tab bar as shown in the screenshot below.

Click the arrows to scroll through the tabs Alternatively, while hovering on the horizontal scroll bar, you can also hold down the SHIFT key and use your mouse wheel to scroll left and right.



Add a node/entity (or site)

To add a Region, Country, Territory, City, Data Center, Floor, Rooms, Aisle. Row, Rack or Door node/entity to your EDM tree, you can right-click any node in the EDM tree view, and follow the instructions below. Following the instructions below will also allow you to add an IT Device or Facility Item association, if allowed.

Note that the Region, Country, Territory, City, and Data Center entities can be added from any entity/node in the tree, but if the entity isn't allowed to be a child of the selected entity, it will be added as a new root node

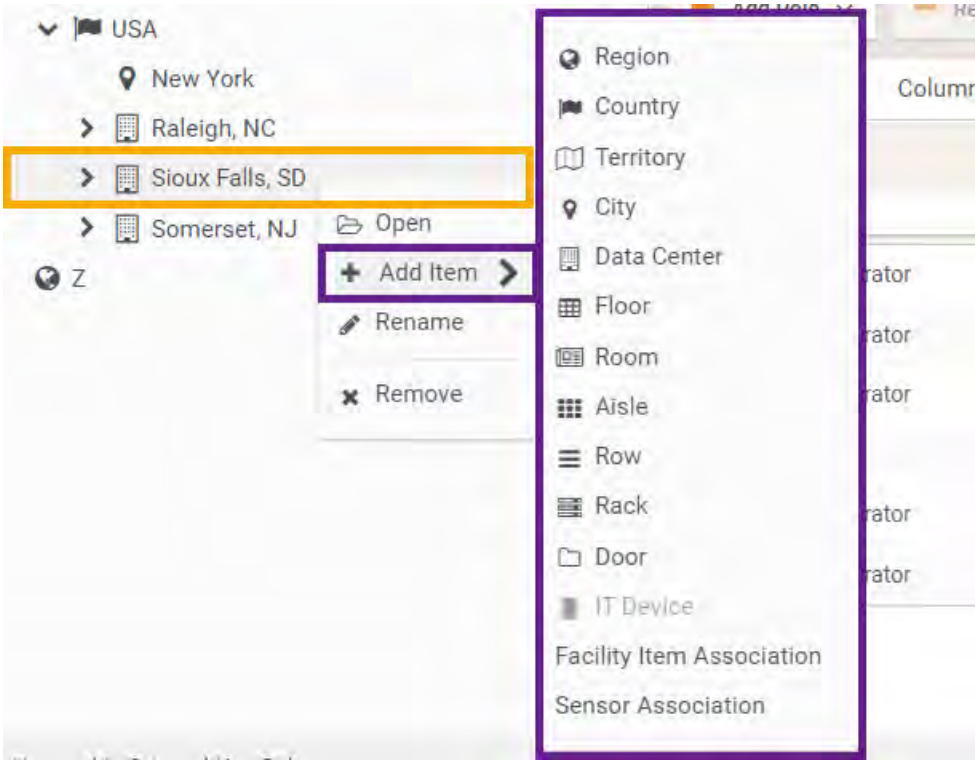
Power IQ enforces the following hierarchy for Region, Country, Territory, City or Data Center entities. Any lower-level entity can be added to a higher level one. These entities can be:

- Region
    - Country
        - Territory
            - City
                - Data Center

To add a Data Center, Floor, Rooms, Aisle Row, Rack or Door node to another entity:

1. Right-click the node you want to add to. In the example below, we are adding a node to Sioux Falls
2. Mouse over the **Add Item** option to display a list of nodes that can be added.
3. Ensure that the node to be added is a lower level than the target node Select the node you want to add

4. The node will automatically be added with the default name “My [node type]"



The nodes that you can add to a node vary based on the type of node selected. Only nodes lower in the hierarchy can be added as a child node. For a list of nodes in hierarchical order and their allowable children, see

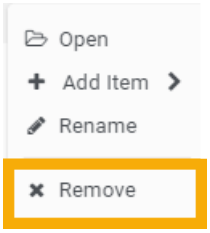
Permissions

To add a node, you must have the operator role or above on the node

Remove a node

To remove a node:

- Right-clicking the node and selecting the Remove option



Note: Removing a node removes the node and all its children

Note: Removing a data center or higher node also removes all PUE Calculations associated with any data centers it contains and readings used for reporting on child devices and racks.

Note: Removing associatns for sensors card readers will not the its readings .

Permissions

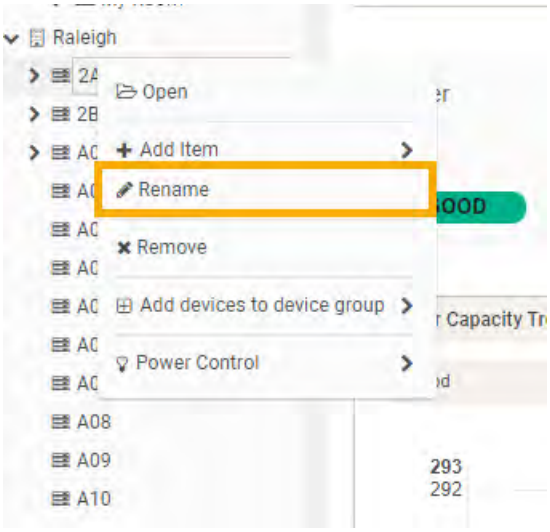
To remove a node, your permissions must satisfy one of the following conditions:

- You are the creator of the node
- You have the operator role or above on the node

Rename a Node

To rename a node:

1. Double-left-click the node until your mouse cursor changes to a typing cursor and you can type in a new name for the node, or
2. Right-click the node to open the context menu, and select the Rename option
3. Type your desired name.



Permissions

To re-name a node, your permissions must satisfy one of the following conditions:

- You are the creator of the node
- You have the operator role or above on the node

Drag and Drop Nodes in the Tree View

Dragging a node to a new node will change the dragged node's parent to the new node

To drag a node to another node:

1. Make sure your intended move follows the Drag and Drop rules listed below.

2. Mouse over the node you want to move until the curser changes to a four headed arrow, indicating that the node can be moved.

3. Left click the node and hold it to drag the node to its new position

Drag and Drop Rules

Drag-and-drop functionality adheres to the following rules:

- You can only drag and drop a data center or higher node to the root of the tree
- You cannot drop a node of one type into another node of the same type (e.g., you cannot drop sensors into sensors.)
- You cannot drop a higher type of node into a lower type (e.g., you cannot drop racks into senseors)
- You cannot drop anything lower than a data center into a regional node.
- Nodes that are not viable will be disabled
- You cannot drop a rack into a device.
- You cannot drop anything lower than a datacenter into a regional node.
- Devices can only be dropped into racks
- Dragging a PDU will also drag its associated sensors.

Drag-and-drop Permissions

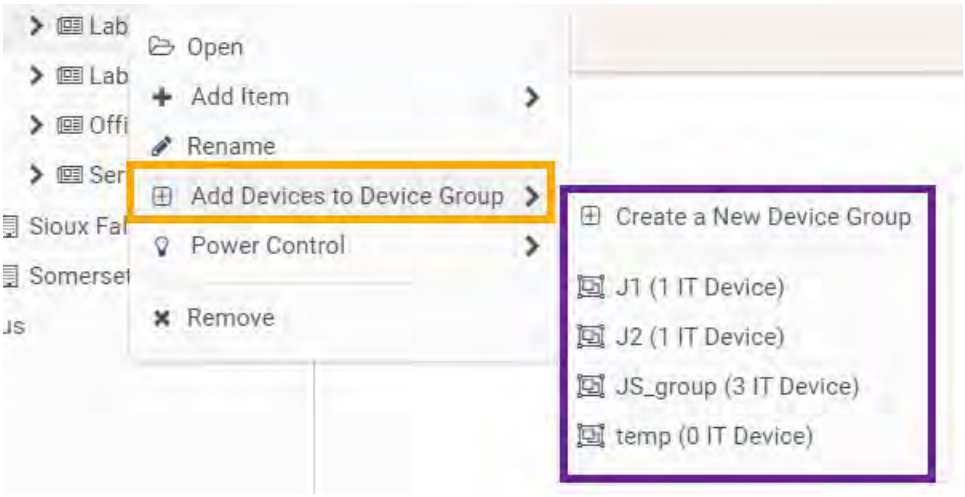
To drag-and-drop nodes, your permissions must satisfy all of the following conditions:

- You have the operator role or above
- You have permission on the landing node (the node where you plan to drop)
- You have permissions on the dragged objects
- You have the View role or another role that includes View permissions assigned at the appropriate node, such as Operator, or

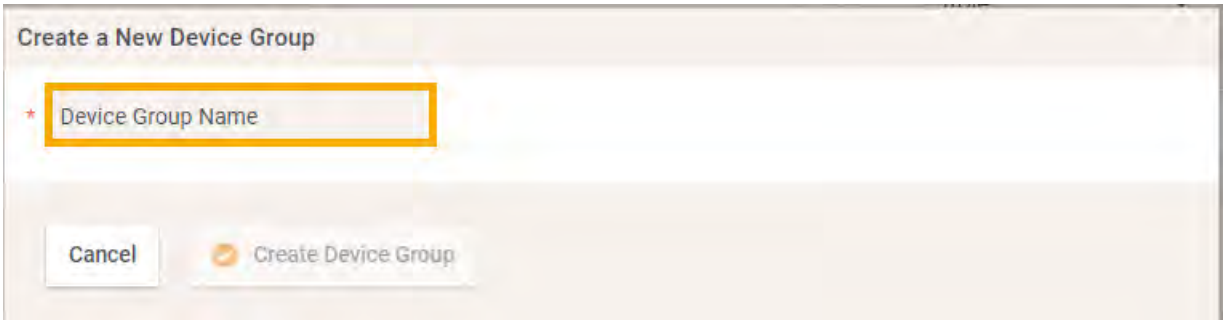
Add Devices to a Device Group

To add all devices in a Rack, Row, Aisle, Room, or Floor node to a new or existing device group:

1. Right-click the node, and mouse-over the Add devices to Device Group option



2. If creating a new device group, select the **Create a new Device Group** option
   - In the Create a new Device Group pop-up, provide a name for the new group



3. A success message will display with the number of devices added to the device group

Permissions

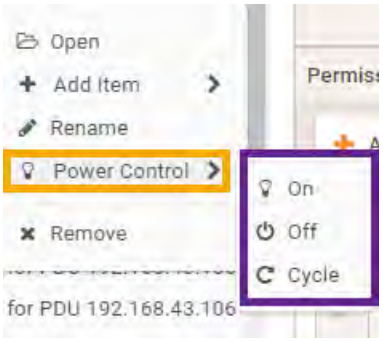
To add devices to a device group, your permissions must satisfy one of the following conditions:

- You have the power control role or above on the node
- You have a role above power control on the node

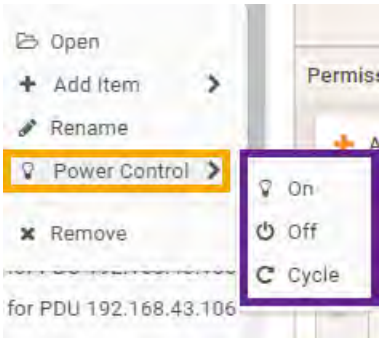
Controll Power to all devices under a Device, Rack, Aisles, Row or Room node

To control power to a Device, Rack, Aisles, Row or Room node:

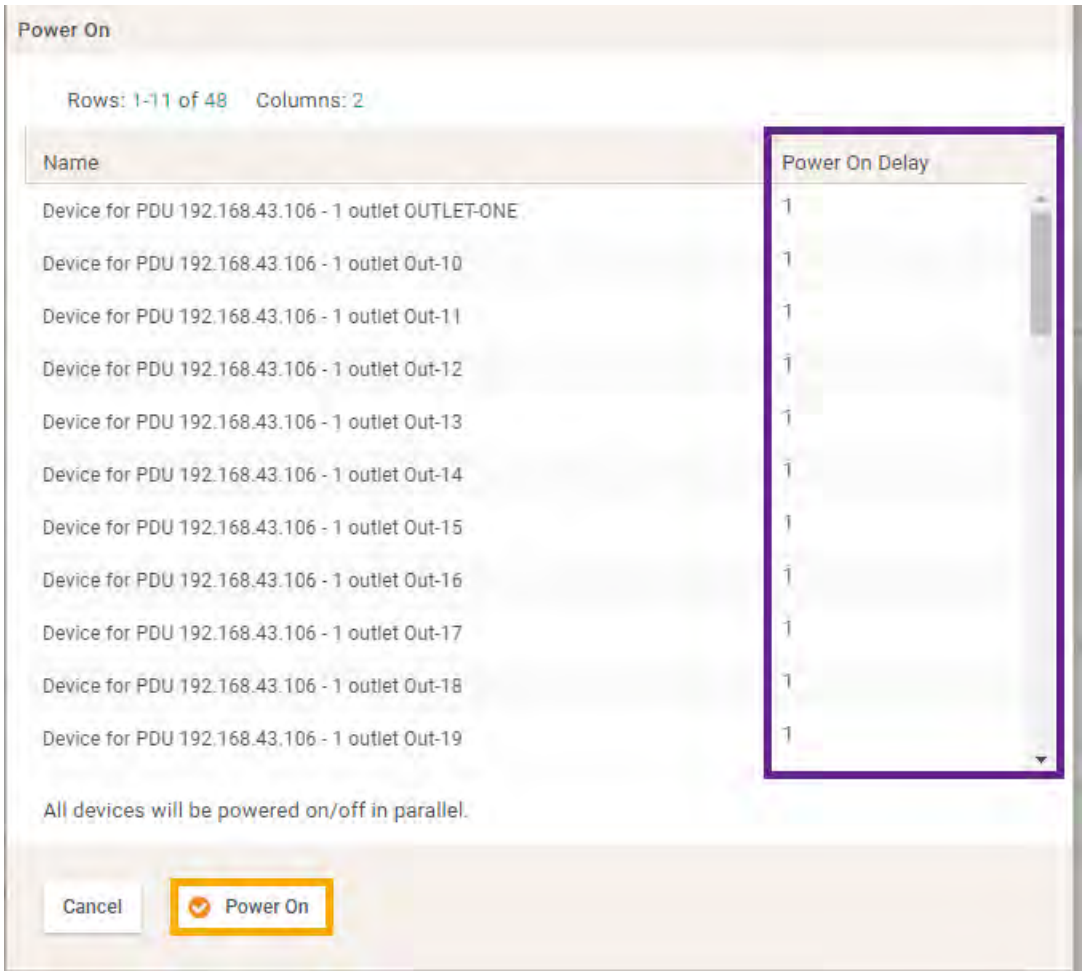
1. Right-click the node to open the context menu, and select the Power control



2. Select your desired power control option:
    - On: To power on all devices under a node
    - Off: To power off all devices under a node
    - Cycle: (Available for devices only, to power cycle a device)

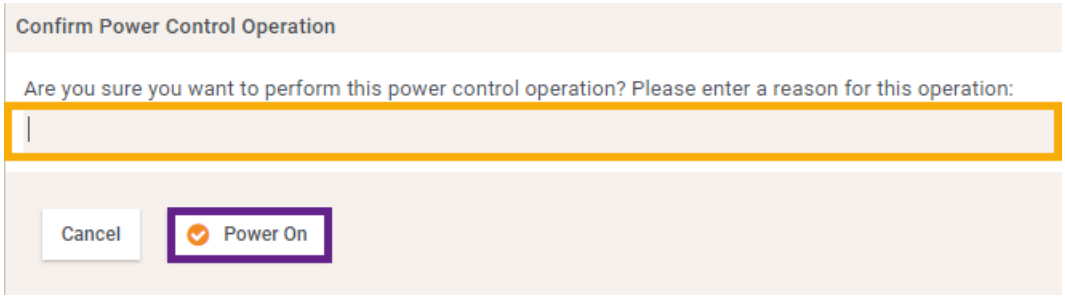


3. Selecting the Power On option will display a table listing all devices under the node. All devices will be powered on.

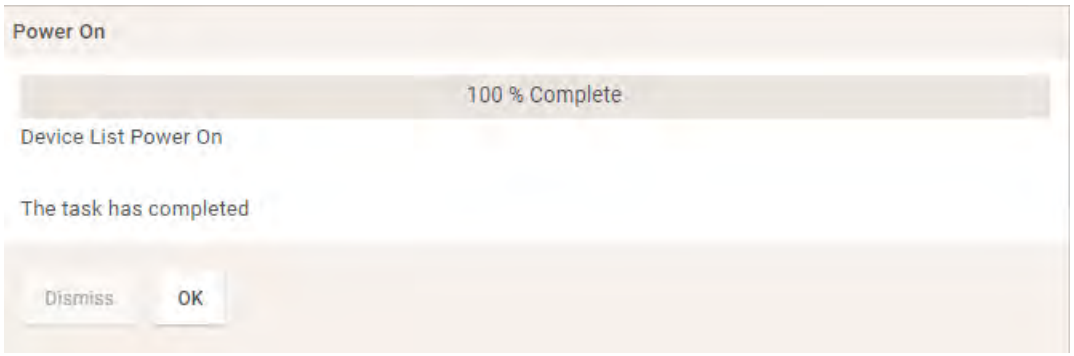


4. In the Power-On Delay Column, set the Power-On Delay in seconds
    - Click in the cell to change the default number “1” to your desired power-on delay in seconds
    - To jump from one row to the next row, press the tab button

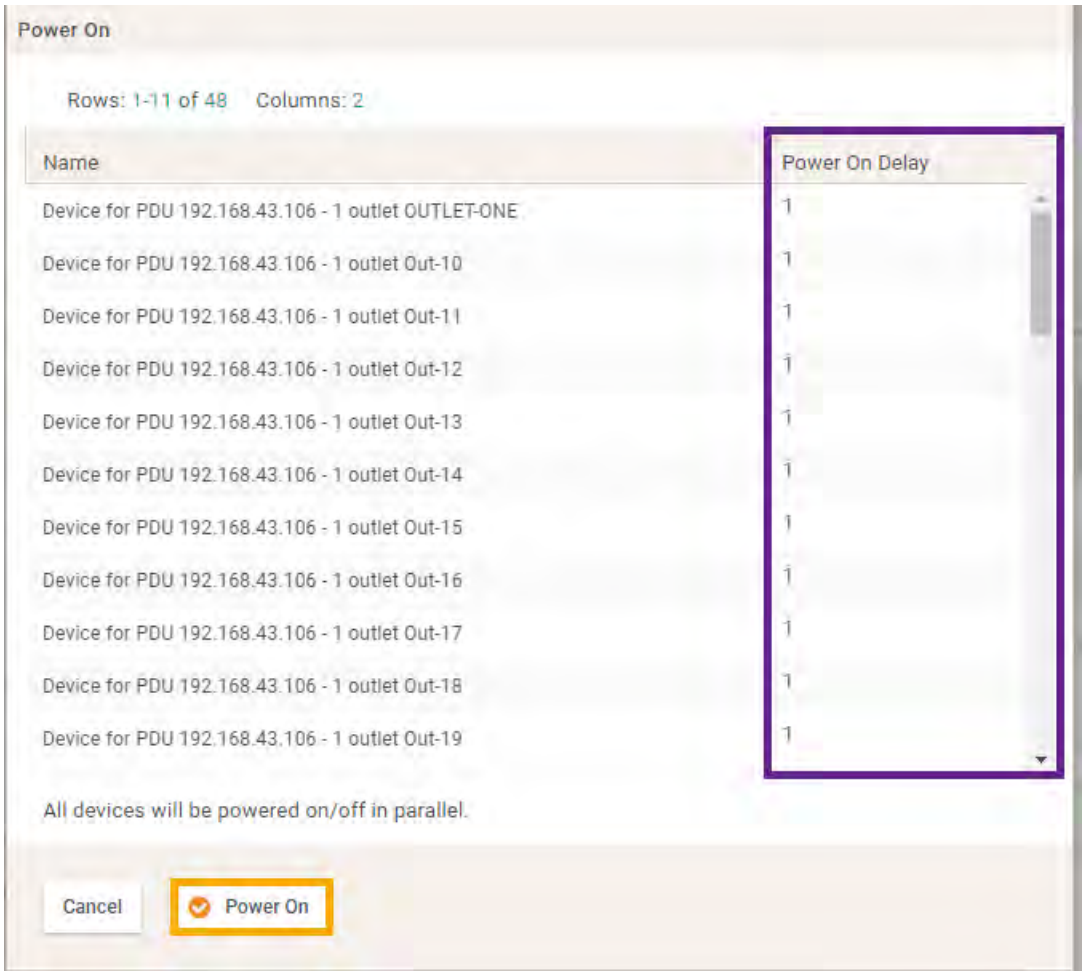
5. Click the **Power On** button
6. The **Confirm Power Control Operation** box will display



7. In the **Confirm Power Control Operation** box
8. Type in a reason for the power control operation
9. Click the **Power On** button
10. The task will begin.
11. Once the task is complete, a completion message will display

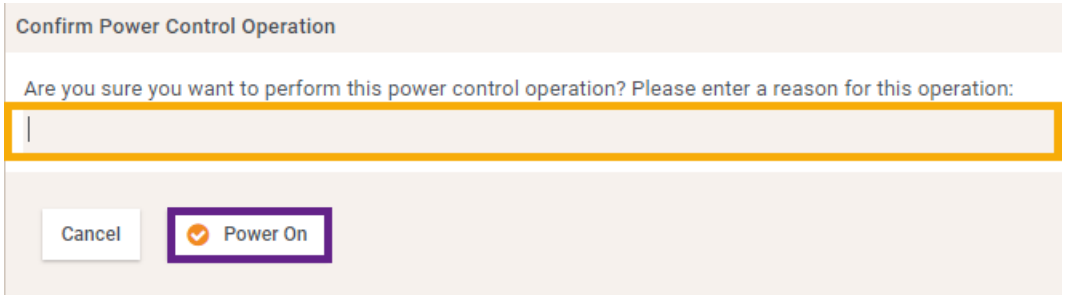


12. Selecting the Power On option will display a table listing all devices under the node. All devices will be powered on in parallel.

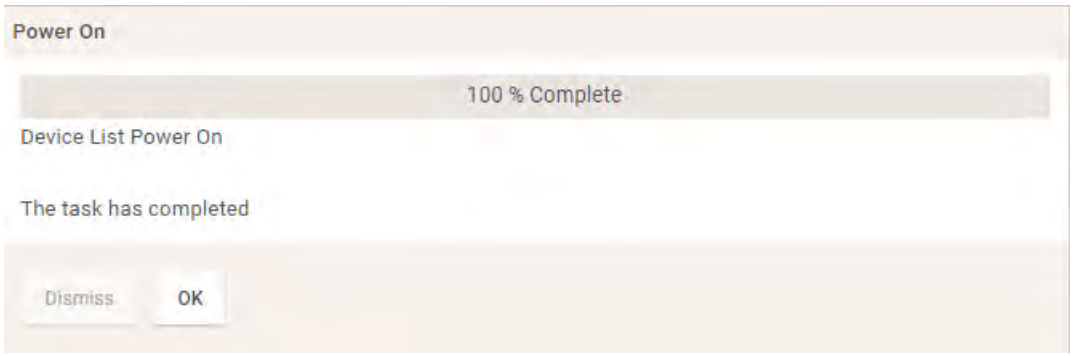


13. In the Power-On Delay Column, set the Power-On Delay in seconds
    - Click in the cell to change the default number “1” to your desired power-on delay in seconds
    - To jump from one row to the next row, press the tab button

14. Click the **Power On** button
15. The **Confirm Power Control Operation** box will display



16. In the **Confirm Power Control Operation** box
17. Type in a reason for the power control operation
18. Click the **Power On** button
19. The task will begin.
20. Once the task is complete, a completion message will display



Permissions

To control power to all devices under a node, your permissions must satisfy one of the following conditions:

- You have the power control role or above on the node
- You have a role on the node

Entities

An entity is an object that is a part of your data center.

Entities are mapped through Parent/Child (hierarchical) relationships, creating a hierarchy of objects in your data center. In this online help and in the Power IQ API guide, node and entity are used interchangeably in the context of the Sites tab. The following definitions and concepts are helpful for understanding how the objects in your data center are organized in Power IQ:

- Higher-level entities contain and organize lower-level entities. For example, a rack is an entity that contains devices, a row is an entity that can contain racks and an aisle is an entity that can contain rows.
- Intra-data center entities are nodes in the Sites tree view that are contained by a data center but are not racks or contained by racks. They include floor, room, aisle and row nodes.
- Regional entities are nodes in the Sites tree view that can contain a data center. They include region, country, territory and city nodes.
- Top-level resources in the Sites tree view are also called root nodes.
- The lowest-level entities are called devices. Devices are items such as servers, KVM drawers, network switches, or other equipment commonly installed in server racks. These are items you provide power to.

Note: There are a few special exceptions that are tracked in Power IQ, but not displayed in the tree view. You can map circuits and outlets as part of your EDM, but these objects don't show in the Sites tree view. Since their associations are to your IT devices, circuits display in the device details tabs, and outlets display in both the device details tabs, and rack PDU entity tabs. See *Enterprise Relationships and the EDM on page 549 Data Management on page 528* *for more information on the EDM (Enterprise Data Model).*

Node Type/ Entity	Icon	Description	Allowable child nodes	Allowable parent nodes
Region		The region node type is a top-level resource and has no parent. It can contain country, city, territory and data center nodes.	• Territory • Country • City • Data Center	• Can be a root node

Node Type/ Entity	Icon	Description	Allowable child nodes	Allowable parent nodes
Country		The country node type can have a region as a parent and can contain territory, city and data center nodes. This node can be a top-level resource.	• Territory • City • Data Center	• Region • Can be a root node
Territory		The territory node type can be a top-level resource or have a region or country as a parent and can contain city and data center nodes.	• Country • City • Data Center	• Region • Country • Can be a root node
City		The city node type can be a top-level resource or have a territory, region or country as a parent and can contain a data center node.	• Data Center	• Region • Country • Territory • Can be a root node
Data Center		The data center node type can be a top-level resource. A Data Center can also have a city, territory, country or region as a parent. An intra-data-center node. Not supported via CSV import or in the V2 API.	• Floor • Room • Aisle • Row, • Rack • Door • PDU • Sensor	• Can be a root node • Region • Country Territory • City
Floor		The floor node type. An intra-data-center node. Not supported via CSV import or in the V2 API.	• Room • Aisle • Row • Rack • Door • PDU	• Data Center

Node Type/ Entity	Icon	Description	Allowable child nodes	Allowable parent nodes
			• Sensor	
Room		The room node type. An intra-data-center node. Not supported via CSV import or in the V2 API.	• Aisle • Row • Rack • Door • PDU • Sensor	• Data Center • Floor
Aisle		The aisle node type is an intra-data-center node. It represents the space between rows of racks. Not supported via CSV import or in the V2 API.	• Row • Rack • Door • PDU • Sensor	• Data Center • Room • Floor
Row		The row node type is an intra-data-center node. It represents a line of server racks or rack pdus. Not supported via CSV import or in the V2 API.	• Rack • Door • PDU • Sensor	• Floor • Room • Aisle
Rack		The rack entity type. An intra-data-center node. Not supported via CSV import or in the V2 API. A line of racks is referred to as a "row."	• Door • PDU • Sensor	• Floor • Room • Aisle • Row
Rack PDU		The Rack PDU entity type represents all Rack PDUs in Power IQ, including Rack PDUs, Rack Transfer Switches, CRACs, Floor PDUs, Floor UPS, Power Panels, and Standalone Meters. This object can have a data center, floor, room, aisle, row, or rack as a parent.	• Sensor	• Data Center Floor • Room • Aisle • Row • Rack.

Node Type/ Entity	Icon	Description	Allowable child nodes	Allowable parent nodes
Floor PDU		The Floor PDU entity type represents all standalone, non-racked PDUs and devices mounted to a data center floor that distribute power to multiple pieces of equipment which then feed into the rack PDUs that power IT devices like servers.		
Floor UPS		The Floor UPS entity type refers to an intelligent, standalone Uninterrupted Power Supply (UPS) device Rack UPS is not supported.		
Door		The door entity type can have a data center, floor, room, aisle, row, or rack node as a parent.	• PDU • Sensor	
Panel		The Panel entity type represents a single panel on a PDU. PDUs may have one or more panels. Panels may contain one or more inlets, each of which may contain one or more inlet poles. Generally, inlets belonging to single-phase PDUs will have one associated inlet pole, and panels belonging to three-phase PDUs will have three associated inlet poles.		
Standalone Meter		The standalone meter entity is a facility item node type that Power IQ can monitor standalone power monitor if defined by a dynamic plugin.		

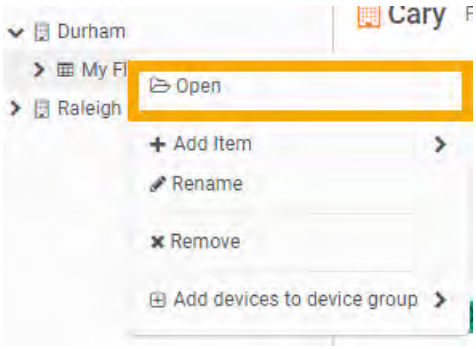
Node Type/ Entity	Icon	Description	Allowable child nodes	Allowable parent nodes
Floor UPS		The Floor UPS entity type represents an intelligent, standalone Uninterruptible Power Supply (UPS) device.		
Rack UPS		The Rack UPS entity type represents an intelligent, rack-mountedUninterruptible Power Supply (UPS) device.		
Rack Transfer Switch		The Rack Transfer Switch entity is a facility item node type that represents a rack-mounted transfer switch.		
CRAC		The CRAC (Computer Room Air Conditioners) node type represents any HVAC system that manages the temperature or humidity of a computer room. It does not refer to a standalone raised-floor unit that sits on the data center floor.		
Card Reader		The card reader node type can only have a door node as a parent.		
Keypad		The keypad node type. This node can only have a door node as a parent.		
Device		The IT Device node type. This node can only have a rack as a parent.		
Sensor		The sensor node type. This node can have a data center, floor, room, aisle, row, or rack node as a parent. Supports the following:		

Node Type/ Entity	Icon	Description	Allowable child nodes	Allowable par-ent nodes
		• Vibration (on/off) • Air Pressure • Temperature • Smoke (on/off) • Vibration/Acceleration (numeric) • Water (on/off) • Humidity (numeric perctem Node Typesent) • Contact Closure (on/off) • Tamper Detection (on/off) • Absolute Humidity (numeric) • Powered Dry Contact (on/off + control) • Motion Detection (on/off) • Air Flow (numeric) • On Off (on/off)		
Floor PDU		The floor PDU node type. A facility-item node type. Not supported via CSV import or in the V2 API.		
CRAC		The CRAC node type. A facility-item node type. Not supported via CSV import or in the V2 API.		
Power Panel		The power panel node type. A facil-ity-item node type. Not supported via CSV import or in the V2 API.		

View an Entity's tab from the Tree View

- To view an entity's tab in the active tab: Left-click the entity

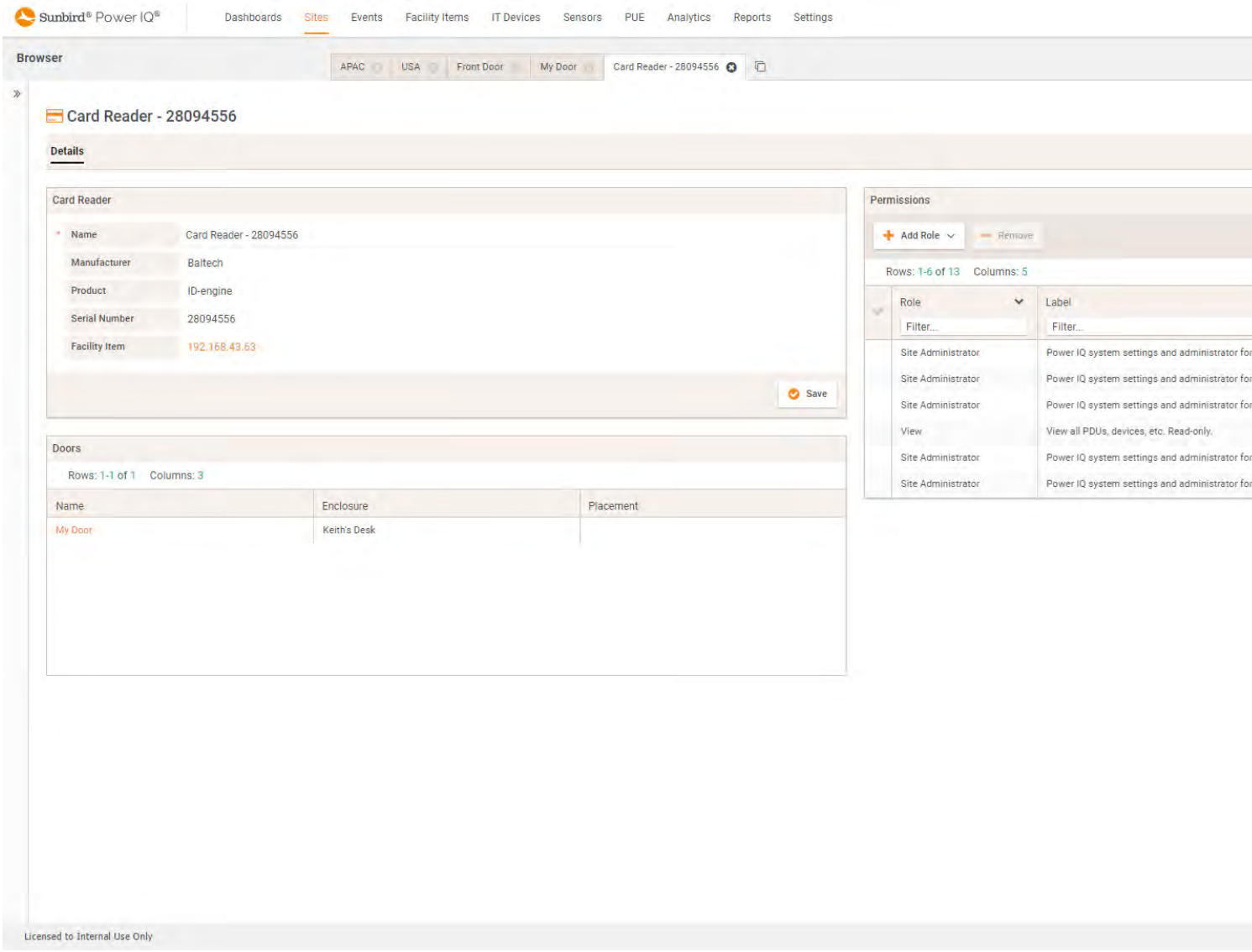
- To view an entity's Sites tab Page in a new tab: Double-Left-click the entity, or Right-click the entity, and select the option to open it in a new tab.



Note: To remove all tabs, click the close all icon *at the far right of the tab bar.*

Note: If the entity that you're attempting to open already has an open tab, that tab will become the active tab.

Card Reader Entity Tab



The Card Reader Entity tab display the following page elements:

Header:

The header at the top of the page displays the following for each facility item entity:

- Icon
- Name/Title
- EDM Ancestor List (excluding Data Center Entities)

Entity Details Page:

Users with the appropriate permissions will be able to see the following modules on the Entity Details page

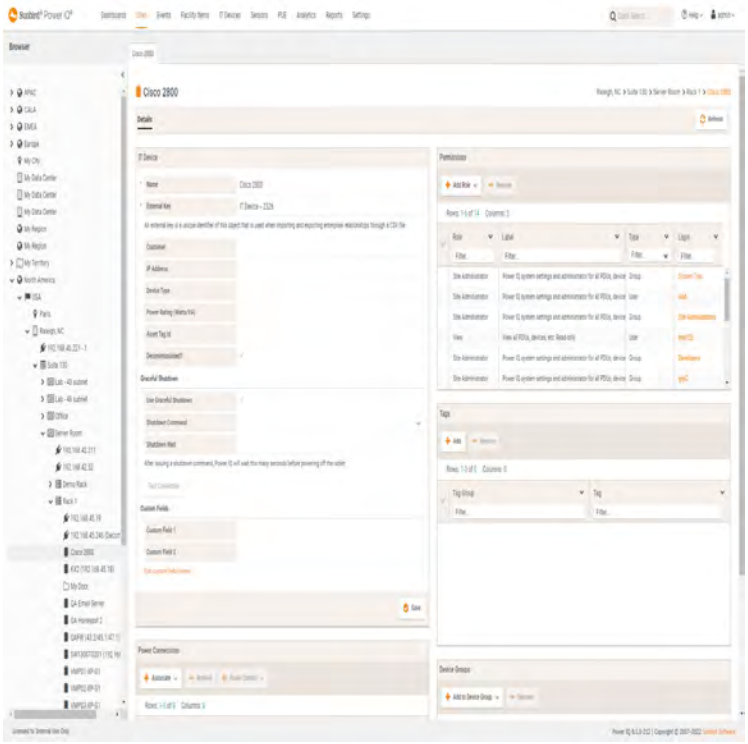
- Facility Item Entity Property Detail Panel
- Entity Permissions Panel

Toolbar:

The toolbar located directly below the header at the top of the page contains the following:

- Details Tab Sub-navigational Link (The details page is open by default)
- Refresh Button: The Refresh Button reloads the full page

Device Entity Tab

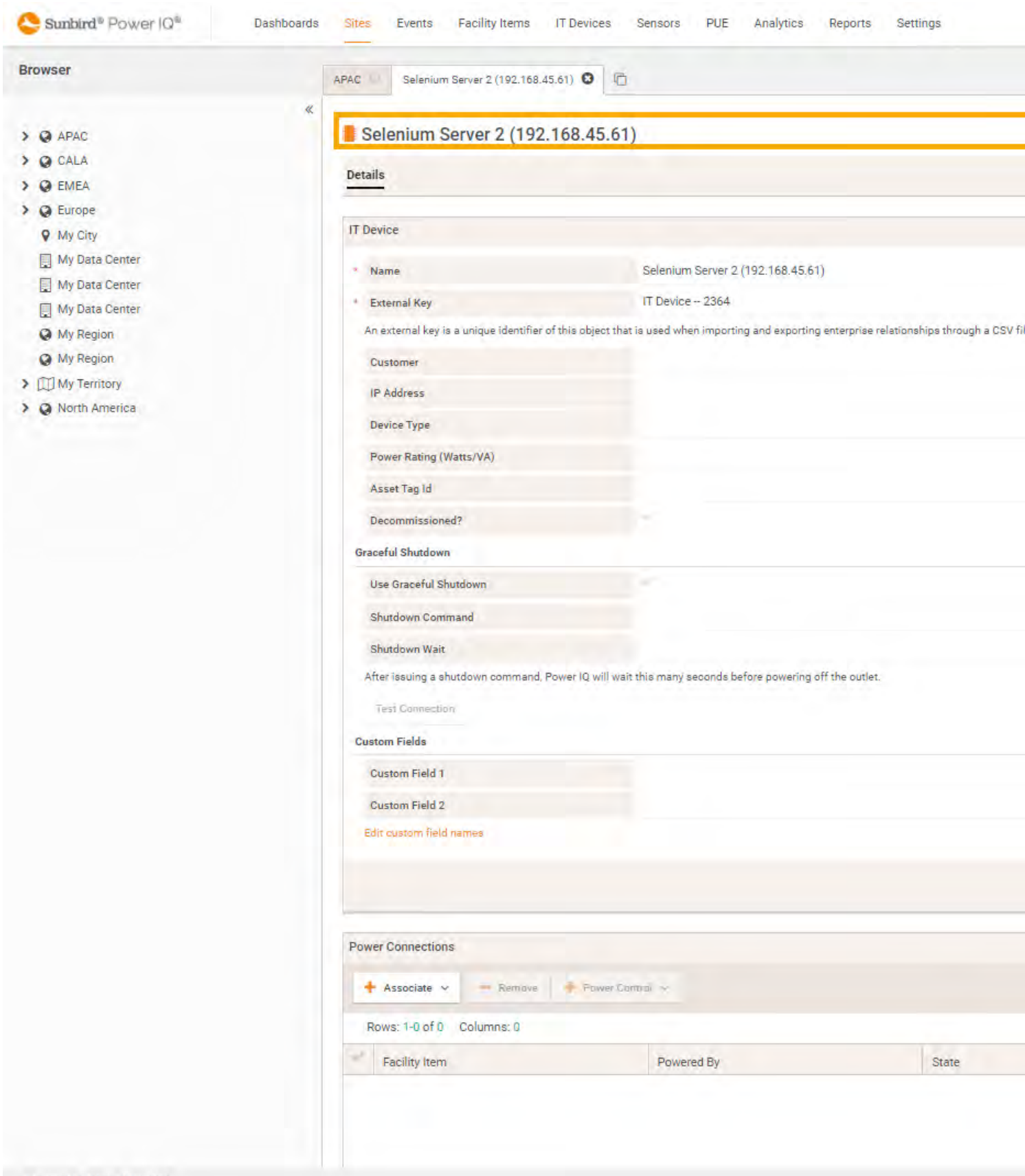


The Device Entity Tab display the following tab elements:

Header

The header at the top of the tab is always visible regardless of subtab selection and displays the following for each entity:

- Icon
- Name/Title
- EDM Ancestor List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Browser
APAC
Selenium Server 2 (192.168.45.61)
APAC
CALA
EMEA
Europe
My City
My Data Center
My Data Center
My Data Center
My Region
My Region
My Territory
North America
Selenium Server 2 (192.168.45.61)
Details
IT Device
Name
Selenium Server 2 (192.168.45.61)
External Key
IT Device -- 2364
An external key is a unique identifier of this object that is used when importing and exporting enterprise relationships through a CSV fil
Customer
IP Address
Device Type
Power Rating (Watts/VA)
Asset Tag Id
Decommissioned?
Graceful Shutdown
Use Graceful Shutdown
Shutdown Command
Shutdown Wait
After issuing a shutdown command, Power IQ will wait this many seconds before powering off the outlet.
Test Connection
Custom Fields
Custom Field 1
Custom Field 2
Edit custom field names
Power Connections
Associate
Remove
Power Control
Rows: 1-0 of 0
Columns: 0
Facility Item
Powered By
State
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Toolbar:

The toolbar located directly below the header at the top of the tab contains the following:

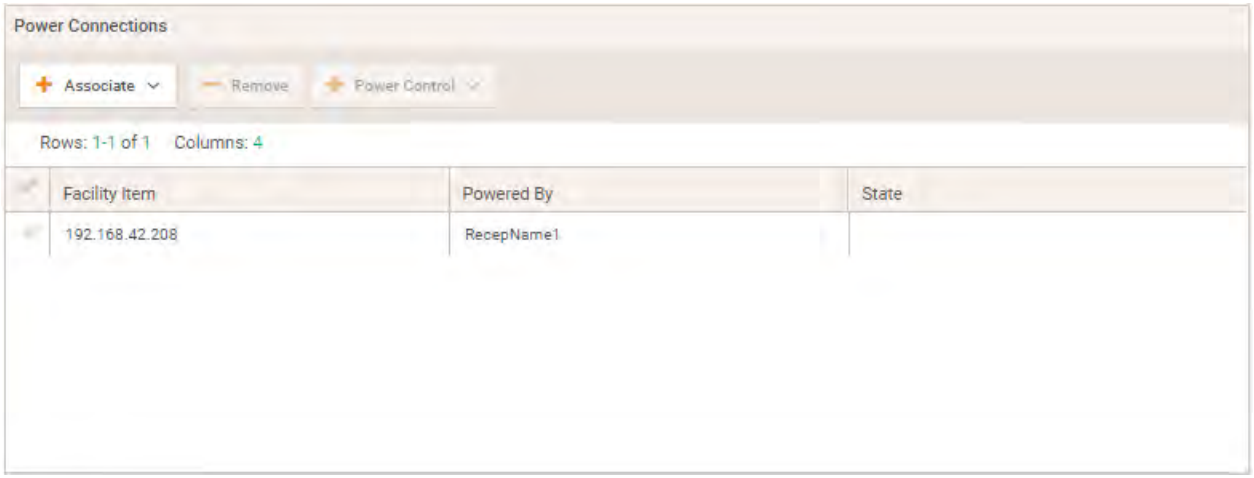
- Details Tab Sub-navigational Link (The details tab is open by default)
- Refresh Button: The Refresh Button re-loads the full tab

Entity Details Tab:

Users with the appropriate permissions will be able to see the following modules on the Entity Details tab

- Device Entity Details Card
- Power Connections Panel
- Permissions Panel
- Tags

Device Entity Power Connections Panel

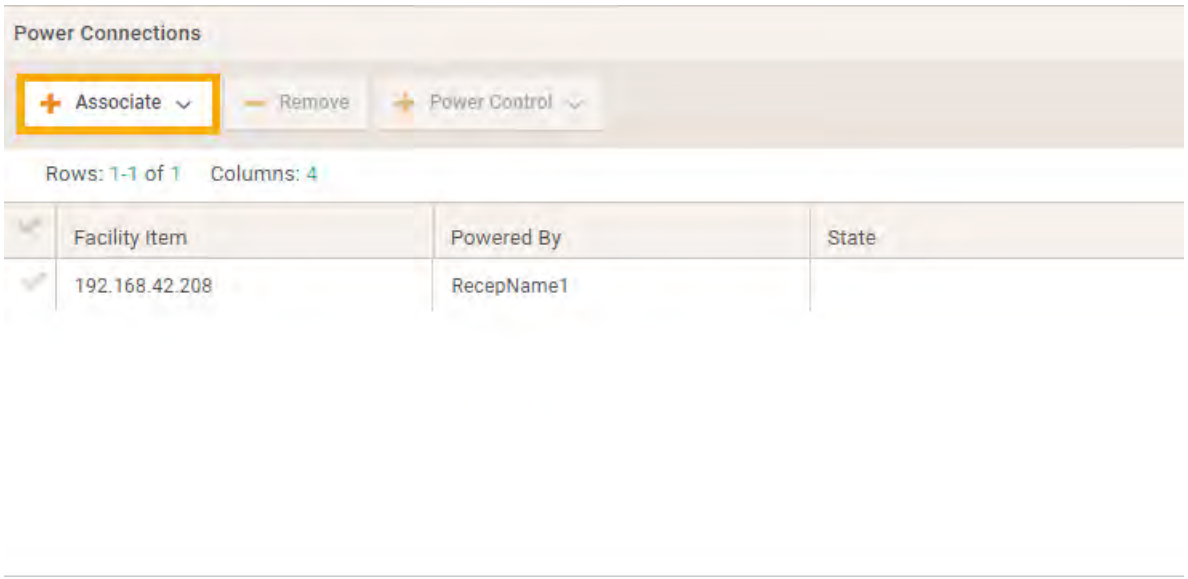


The Power Connections Panel displays a list of associated circuits and outlets, and provides the controls by which you can manage them:

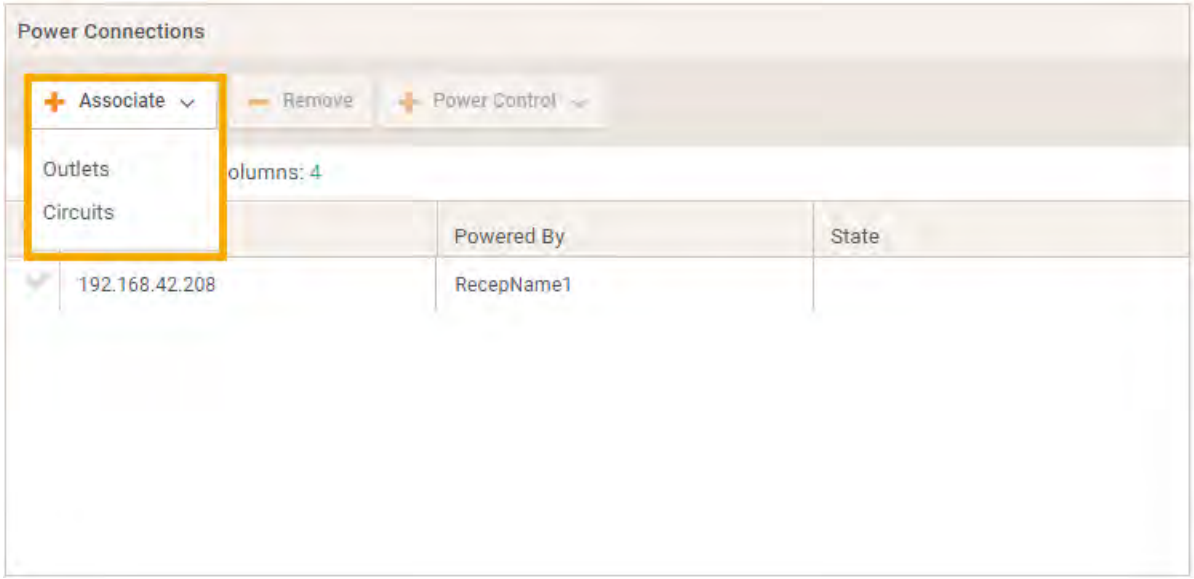
Add a circuit or outlet association

To add a circuit or outlet association:

1. In the Power Connections Panel, select the Associate button

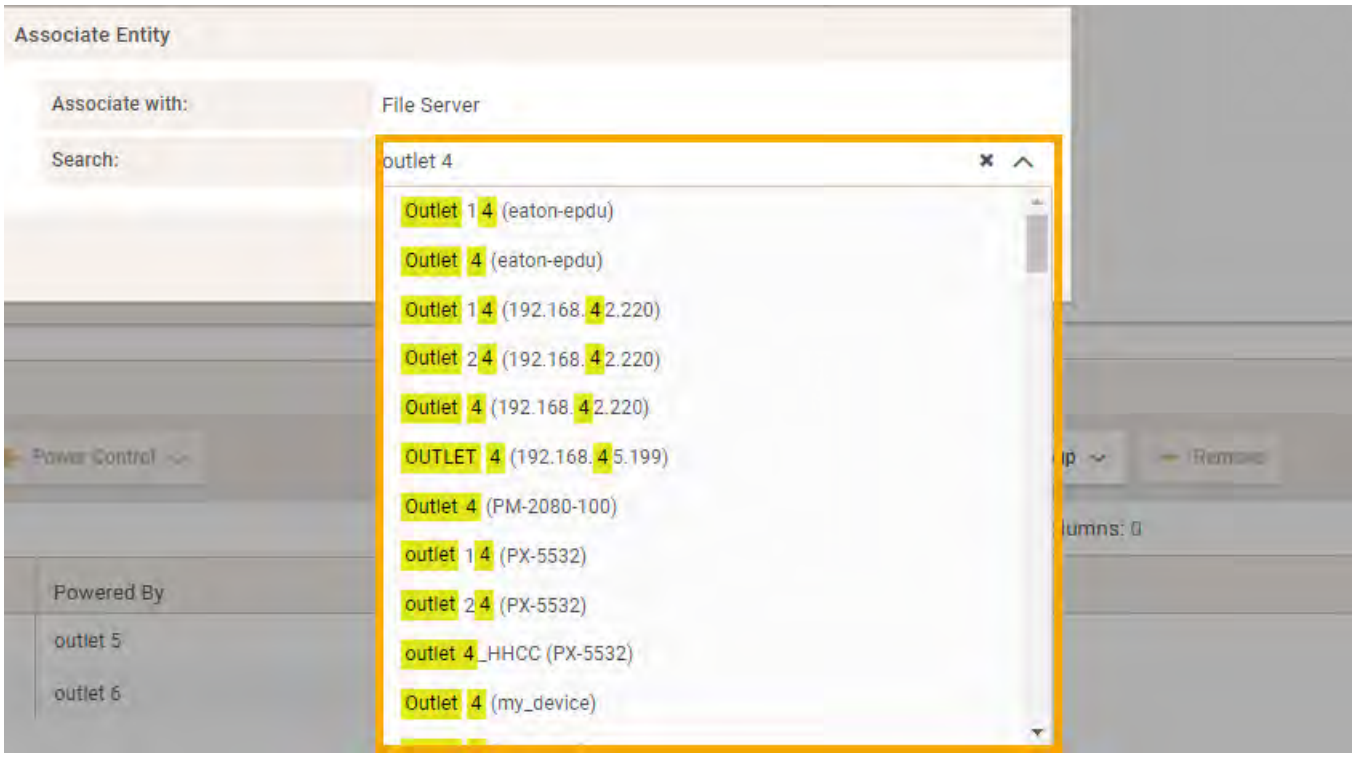


2. From the Associate drop-down, select the type of association you want to make: Outlets or Circuits



Note: To add a new IT Device to a rack, and associate outlets from a PDU in that rack to the device, you must have the Operator role on the parent rack.

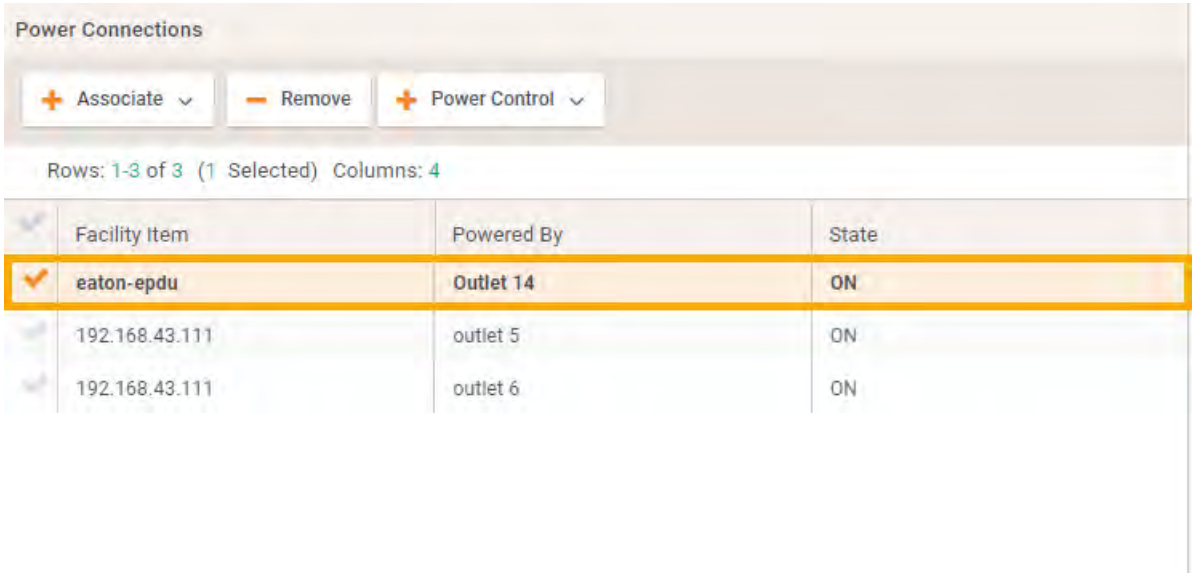
3. In the Associate Entity pop-up, type in the search box to search for, and select your desired outlet or circuit



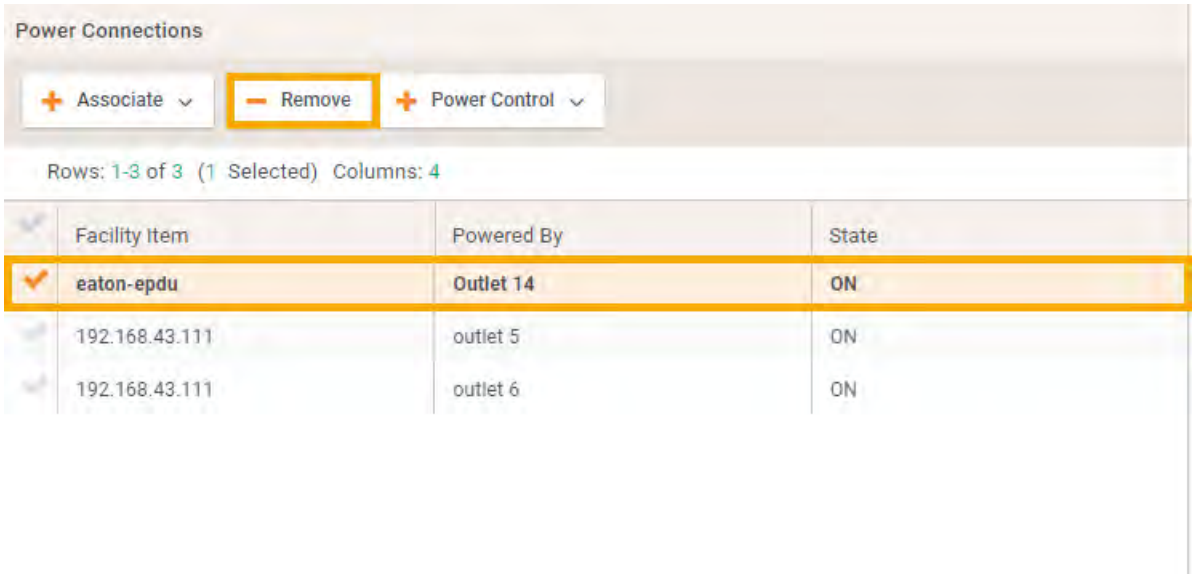
Remove a circuit or outlet association

To remove a circuit or outlet association, select circuit or outlet in the Facility Item List

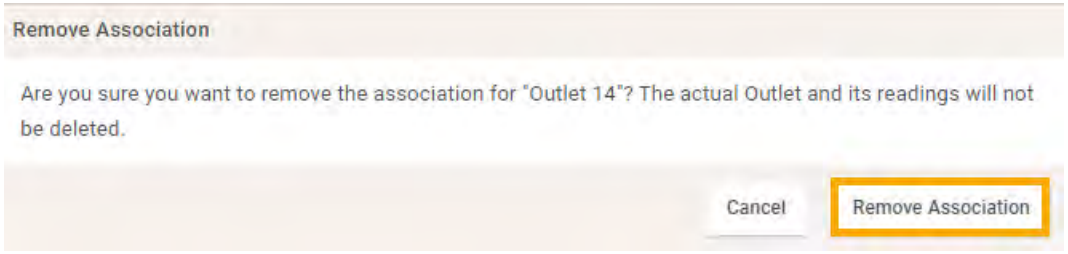
1. Select the association you want to remove. To multi-select associations, press and hold the control (ctrl) key on your keyboard



2. Select the **Remove** button



3. Confirm the removal in the **Remove Association** pop-up by selecting the **Remove Association** button.



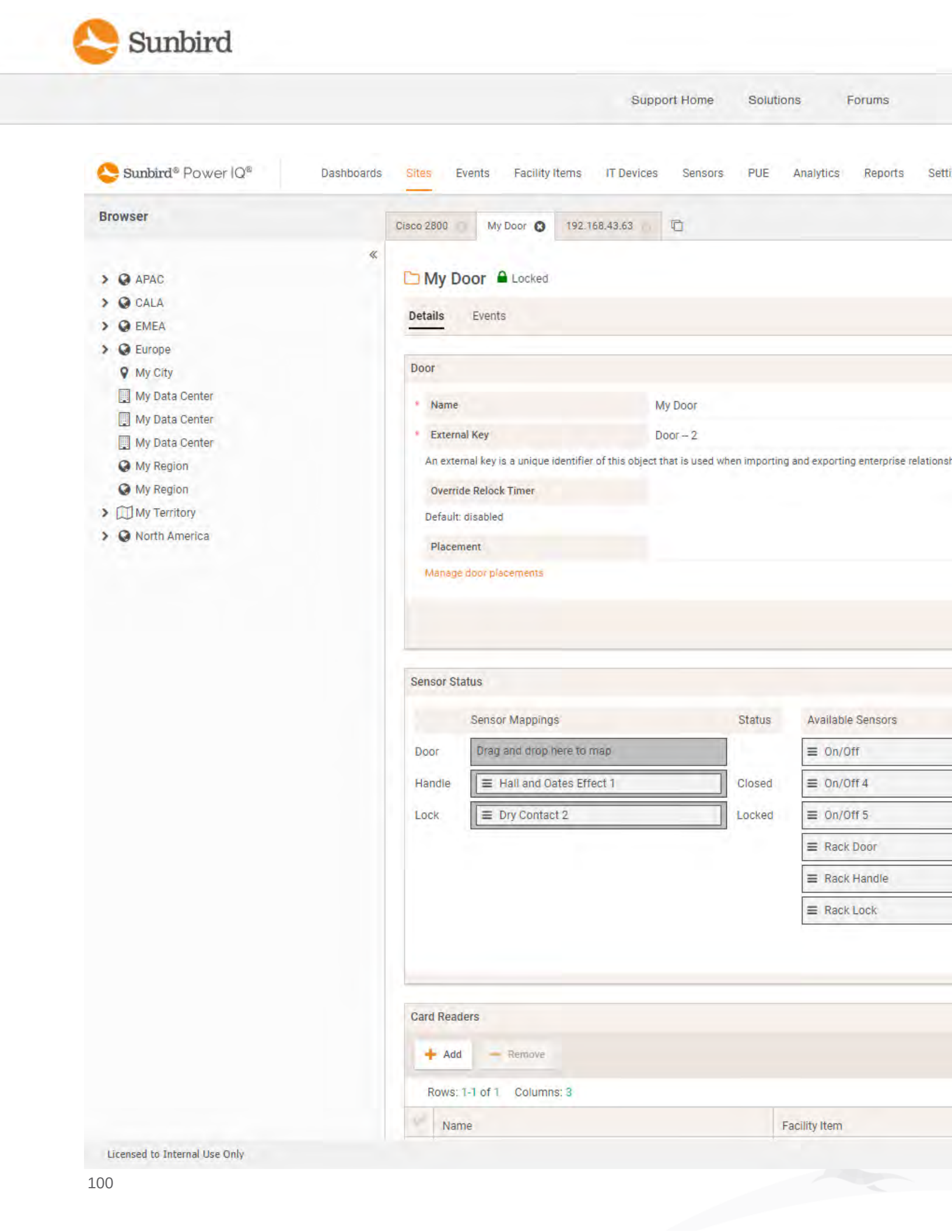
Note: To see and interact with this panel, you must have the View and Power Control roles on the device or the global View and Operator roles.

Outlet Association Restrictions when Power IQ is integrated with dcTrack

The following restrictions can affect your ability to create outlet associations using the Power IQ GUI when Power IQ is integrated with dcTrack:

- Through the Power IQ GUI, you cannot create an outlet association for a device in a Data Center that is not integrated with dcTrack.
- Through the Power IQ GUI, you cannot create an outlet association for a device that is in a data center that is integrated with dcTrack.
- In cases where Power IQ is integrated with dcTrack, a message will be displayed in the Power Connections Panel directing you to make outlet associations through dcTrack.

Door Entity Tab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Cisco 2800
My Door
192.168.43.63
APAC
CALA
EMEA
Europe
My City
My Data Center
My Data Center
My Data Center
My Region
My Region
My Territory
North America
My Door
Locked
Details
Events
Door
Name
My Door
External Key
Door – 2
An external key is a unique identifier of this object that is used when importing and exporting enterprise relationsh
Override Relock Timer
Default: disabled
Placement
Manage door placements
Sensor Status
Sensor Mappings
Status
Available Sensors
Door
Drag and drop here to map
On/Off
Handle
Hall and Oates Effect 1
Closed
On/Off 4
Lock
Dry Contact 2
Locked
On/Off 5
Rack Door
Rack Handle
Rack Lock
Card Readers
Add
Remove
Rows: 1-1 of 1
Columns: 3
Name
Facility Item
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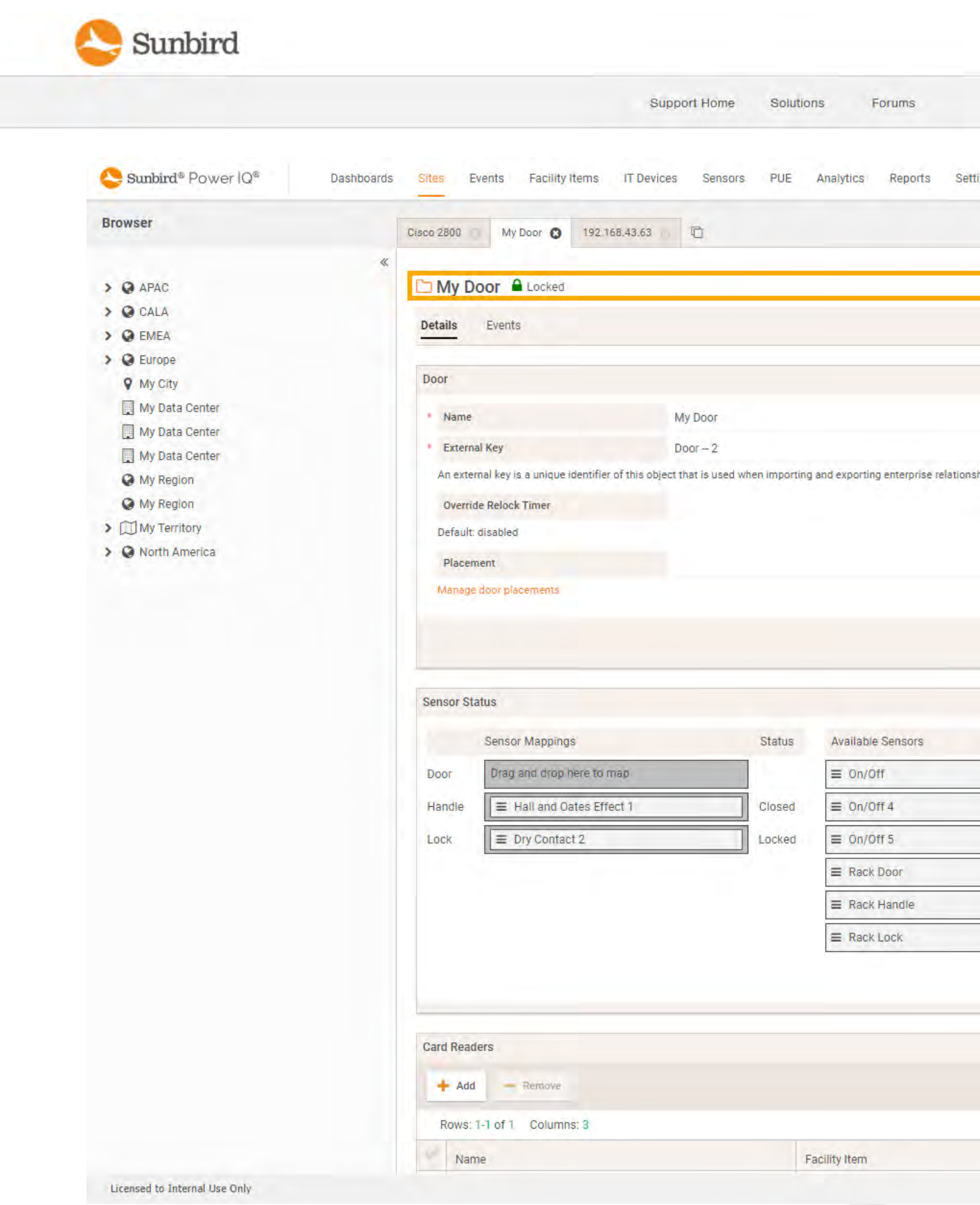
The Door Entity Tab display the following page elements:

Header

The header at the top of the page is always visible regardless of subtab selection and displays the following for each entity:

- Icon
- Name/Title
- Indicator of door state as open or closed
- EDM Ancestor List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APAC
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My Data Center
My Data Center
My Data Center
My Region
My Region
My Territory
North America
My Door
Locked
Details
Events
Door
Name
My Door
External Key
Door – 2
An external key is a unique identifier of this object that is used when importing and exporting enterprise relationsh
Override Relock Timer
Default: disabled
Placement
Manage door placements
Sensor Status
Sensor Mappings
Status
Available Sensors
Door
Drag and drop here to map
On/Off
Handle
Hall and Oates Effect 1
Closed
On/Off 4
Lock
Dry Contact 2
Locked
On/Off 5
Rack Door
Rack Handle
Rack Lock
Card Readers
Add
Remove
Rows: 1-1 of 1
Columns: 3
Name
Facility Item
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Entity Details Page:

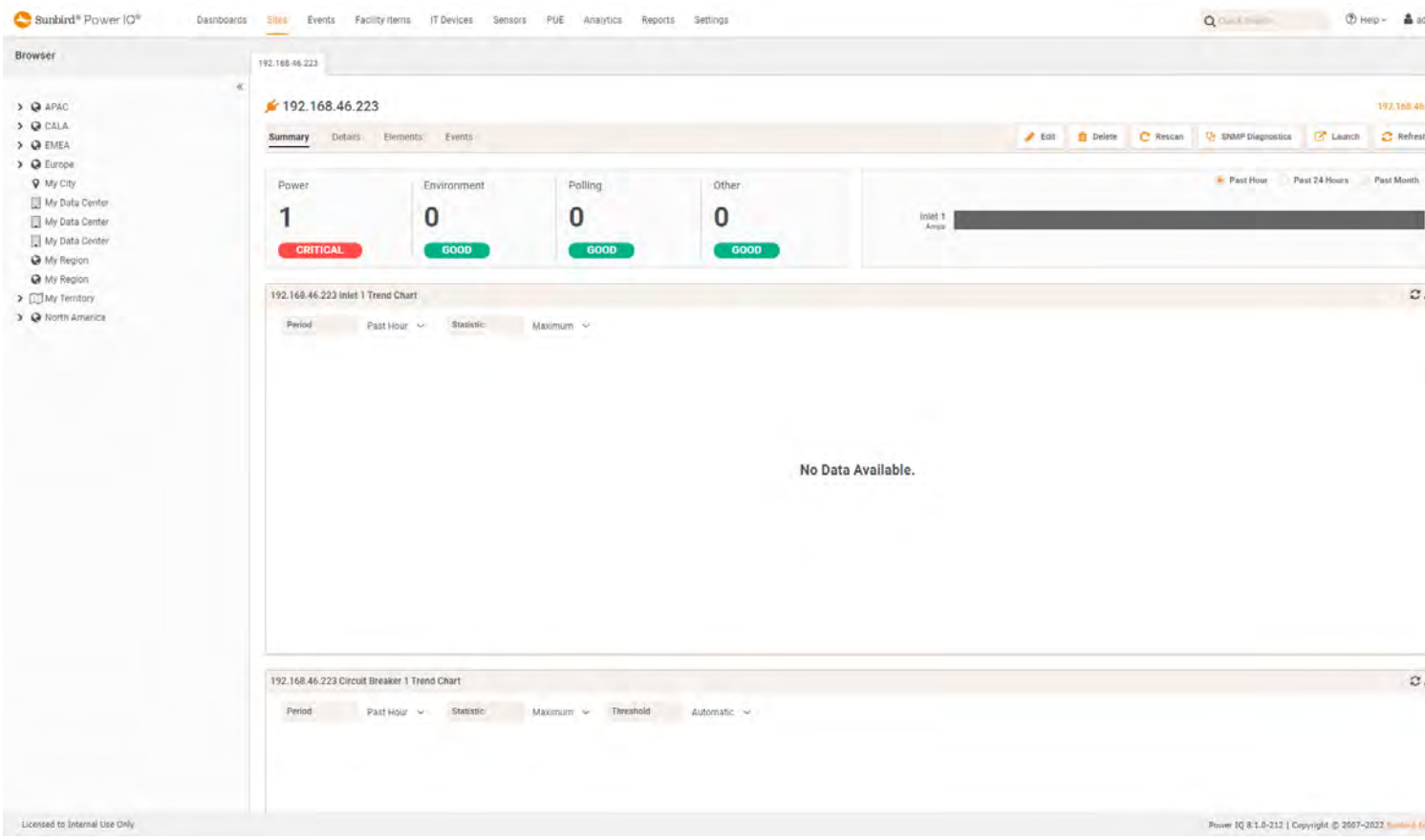
Users with the appropriate permissions will be able to see the following modules on the Entity Details page

- Door Details Card
- Sensor Status
- Card Readers
- Permissions Panel
- Keypads
- Tags

Facility Items Entity (Floor PDU, Power Panel, Rack PDU, Rack Transfer Switch, Rack UPS, Stand Alone Meters)Tabs

This article applies to the following facility Items:

- Floor PDU
- Power Panel
- Rack PDU
- Rack Transfer Switch
- Rack UPS
- Stand Alone Meters

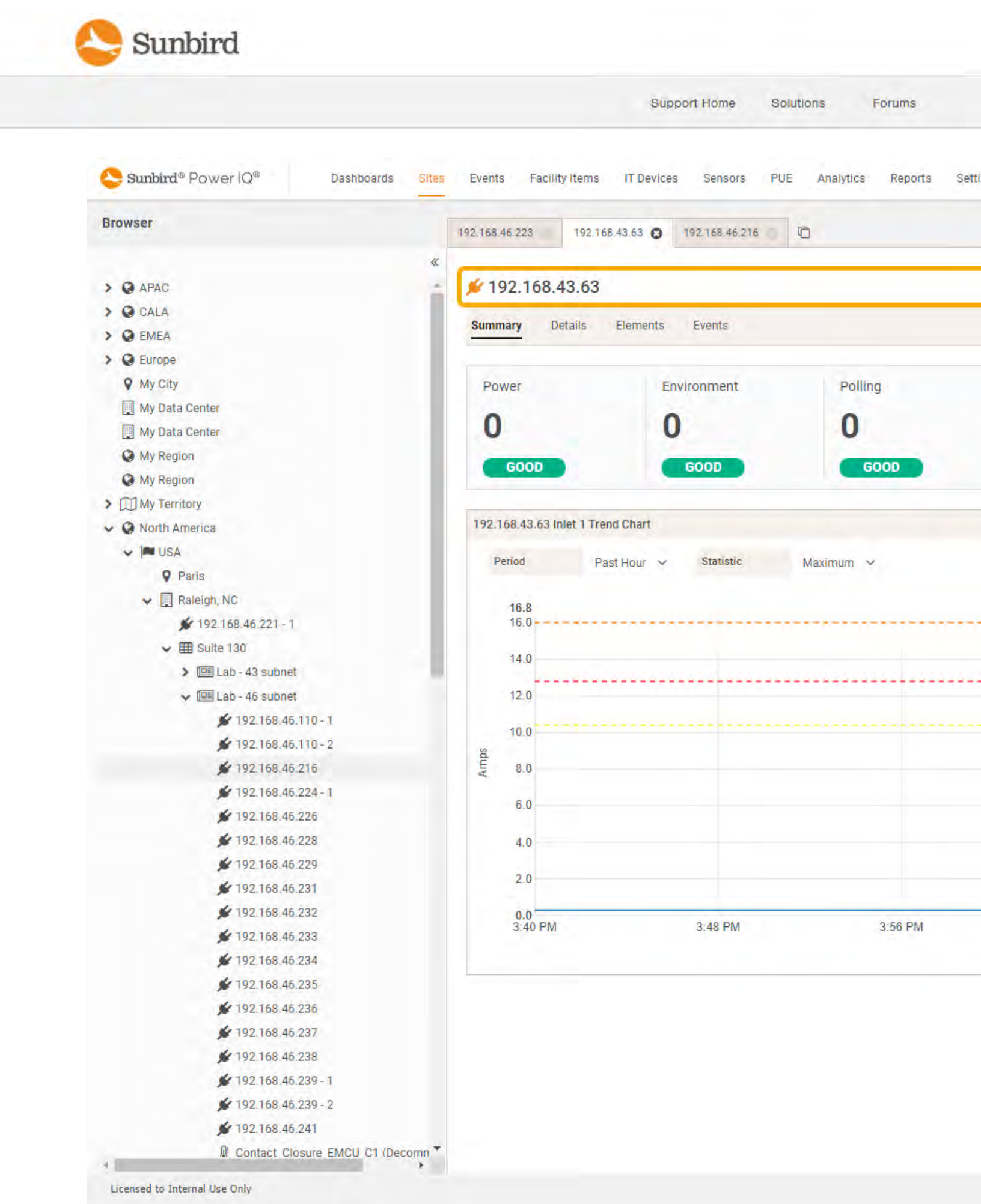


The Facility Items Entity (Floor PDU, Panel, and Rack PDU) Tabs share the following elements.

Header:

The header at the top of the tab displays the following for each facility item entity:

- Icon
- Name/Title
- EDM Ancestor List (excluding Data Center Entities)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192.168.46.216
APAC
CALA
EMEA
Europe
My City
My Data Center
My Data Center
My Region
My Region
My Territory
North America
USA
Paris
Raleigh, NC
192.168.46.221 - 1
Suite 130
Lab - 43 subnet
Lab - 46 subnet
192.168.46.110 - 1
192.168.46.110 - 2
192.168.46.216
192.168.46.224 - 1
192.168.46.226
192.168.46.228
192.168.46.229
192.168.46.231
192.168.46.232
192.168.46.233
192.168.46.234
192.168.46.235
192.168.46.236
192.168.46.237
192.168.46.238
192.168.46.239 - 1
192.168.46.239 - 2
192.168.46.241
Contact Closure EMCU C1 (Decomn
192.168.43.63
Summary
Details
Elements
Events
Power
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GOOD
Environment
0
GOOD
Polling
0
GOOD
192.168.43.63 Inlet 1 Trend Chart
Period
Past Hour
Statistic
Maximum
16.8
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Amps
3:40 PM
3:48 PM
3:56 PM
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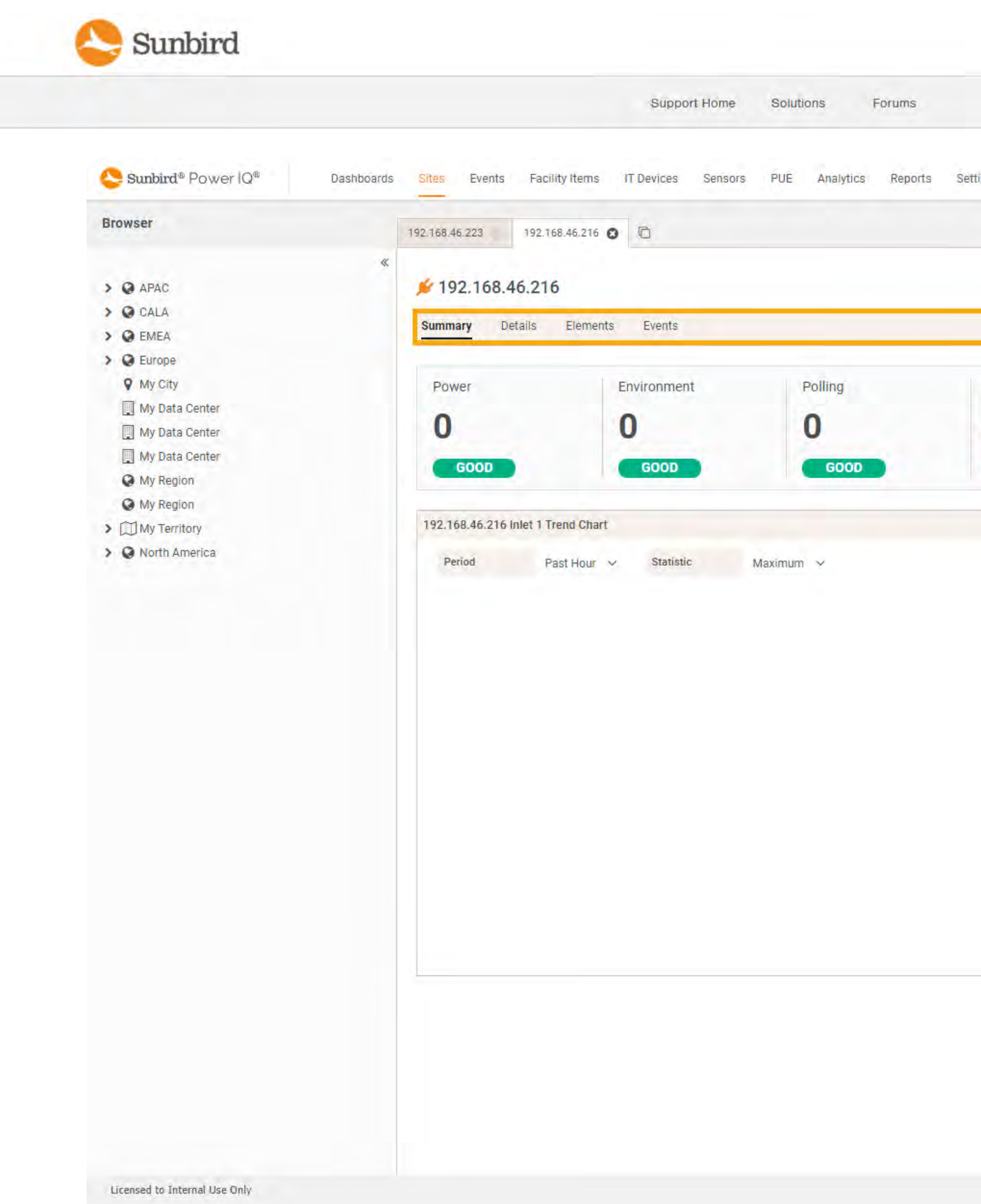
Toolbar:

The toolbar located directly below the header at the top of the tab contains the following:

- Summary Tab Sub-navigational Link (Initially, the “Summary tab will be selected by default.)
- Details Tab Sub-navigational Link
- Elements Tab Sub-navigational Link
- Events Tab Sub-navigational Link
- Edit Button
- Delete Button
- Rescan Button: The Rescan Button re-scans the facility item
- SNMP Diagnostics (Only Available to Site Admins)

  Note: SNMP Diagnostics are available only to Site Admins.

- Launch: The launch button opens the launch URL in a new window, so you can log-in to the PDU
- Refresh Button: The Refresh Button reloads the full tab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Facility Items
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Browser
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APAC
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EMEA
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My Data Center
My Data Center
My Data Center
My Region
My Region
My Territory
North America
192.168.46.216
Summary
Details
Elements
Events
Power
0
GOOD
Environment
0
GOOD
Polling
0
GOOD
192.168.46.216 Inlet 1 Trend Chart
Period
Past Hour
Statistic
Maximum
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Entity Details Tab:

Users with the appropriate permissions will be able to see the following modules on the Entity Details tab

- Facility Item Entity Property Detail Panel
- Entity Permissions Panel (Not displayed for PDU that are not associated within the EDM)
- Facility Item Entity Tags Panel

Intra-Data Center Entity (Data Center, Floor, Room, Aisle, Row and Rack) Entity Tabs

The Data Center Floor, Room, Aisle, Row, and Rack entity Tabs share the following page elements.

Header:

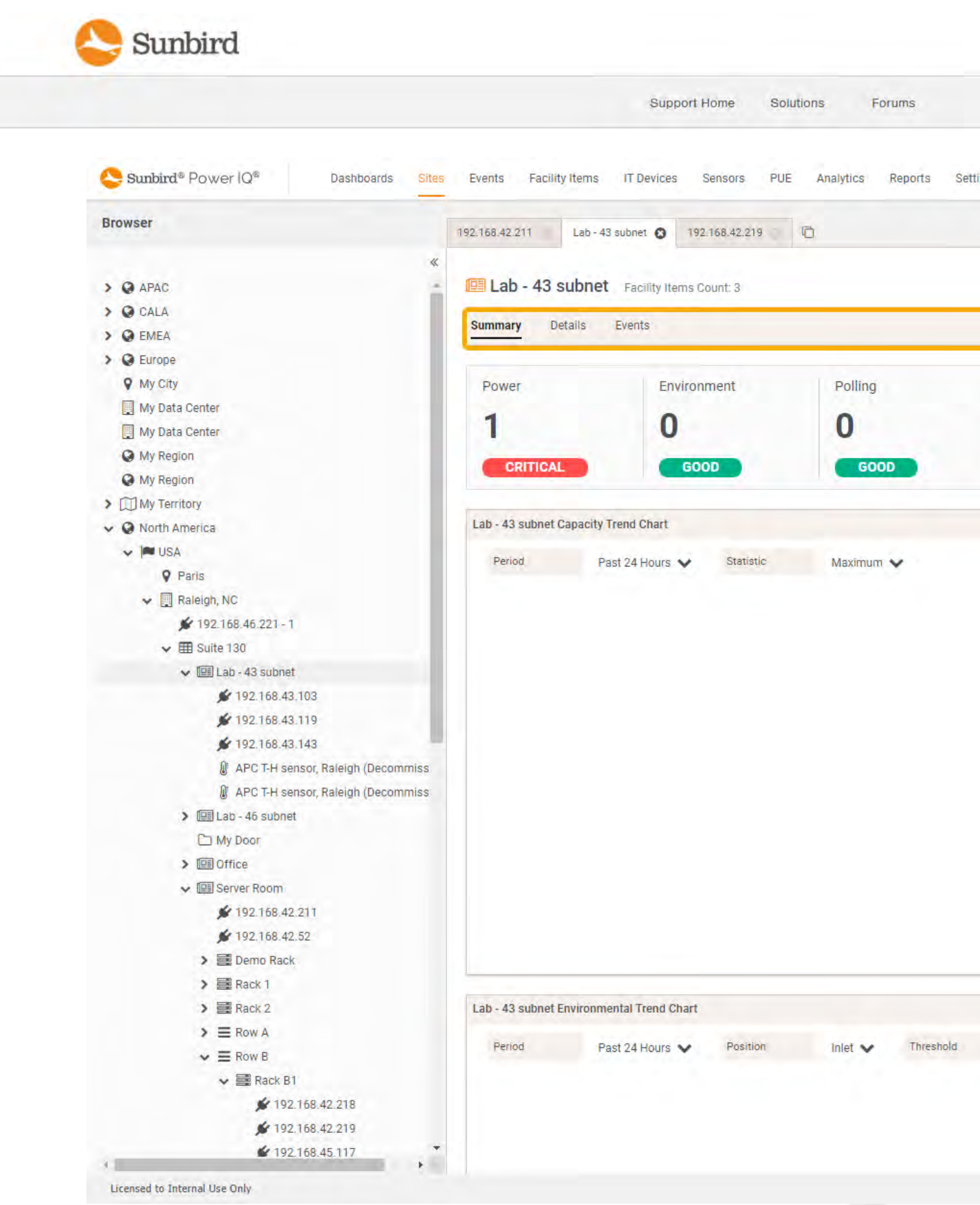
The header at the top of the page displays the following for each entity:

- Icon
- Name/Title
- Facility Item count
- EDM Ancestor List (not shown on Data Center Entity Pages)

Toolbar:

The toolbar located directly below the header at the top of the page contains the following:

- Summary Tab Sub-navigational Link
- Details Tab Sub-navigational Link
- Elements Tab Sub-navigational Link (Rack Only)
- Events Tab Sub-navigational Link
- Refresh Button: The Refresh Button reloads the full entity page


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Analytics
Reports
Browser
192.168.42.211
Lab - 43 subnet
192.168.42.219
APAC
CALA
EMEA
Europe
My City
My Data Center
My Data Center
My Region
My Region
My Territory
North America
USA
Paris
Raleigh, NC
192.168.46.221 - 1
Suite 130
Lab - 43 subnet
192.168.43.103
192.168.43.119
192.168.43.143
APC T-H sensor, Raleigh (Decommiss
APC T-H sensor, Raleigh (Decommiss
Lab - 46 subnet
My Door
Office
Server Room
192.168.42.211
192.168.42.52
Demo Rack
Rack 1
Rack 2
Row A
Row B
Rack B1
192.168.42.218
192.168.42.219
192.168.45.117
Lab - 43 subnet
Facility Items Count: 3
Summary
Details
Events
Power
1
CRITICAL
Environment
0
GOOD
Polling
0
GOOD
Lab - 43 subnet Capacity Trend Chart
Period
Past 24 Hours
Statistic
Maximum
Lab - 43 subnet Environmental Trend Chart
Period
Past 24 Hours
Position
Inlet
Threshold
Licensed to Internal Use Only

Summary Tab

To access the Summary Tab, select the Summary Tab Sub-navigational Link in the Toolbar

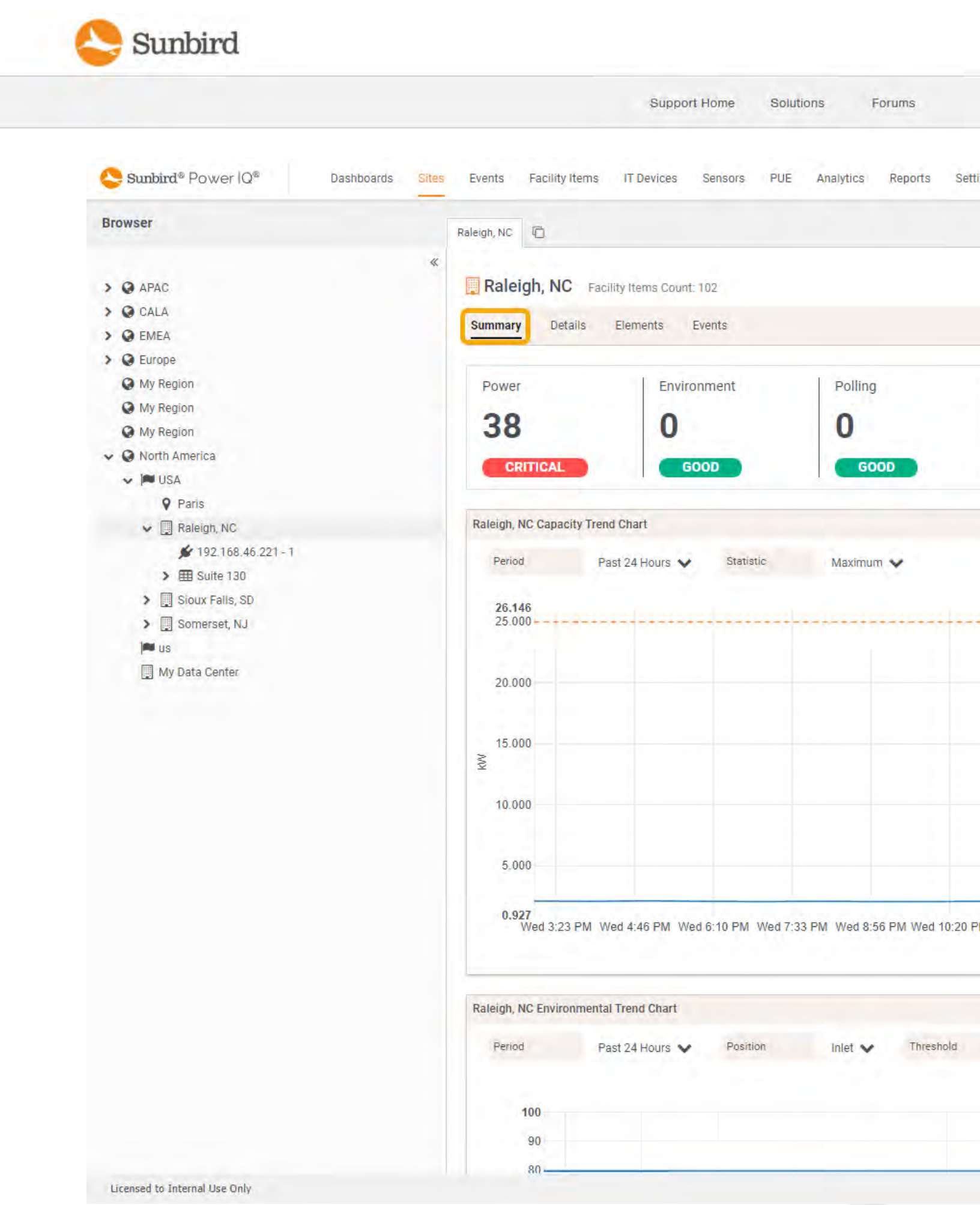
The Summary Tab contains the following modules:

- Event Summary Card
- Entity Capacity Trend Chart
- Entity Environmental Trend Chart
- Entity Comparison Chart

Toolbar:

The toolbar located directly below the header at the top of the page contains the following:

- Summary Tab Sub-navigational Link
- Details Tab Sub-navigational Link
- Elements Tab Sub-navigational Link (Rack Only)
- Events Tab Sub-navigational Link
- Refresh Button: The Refresh Button reloads the full entity page

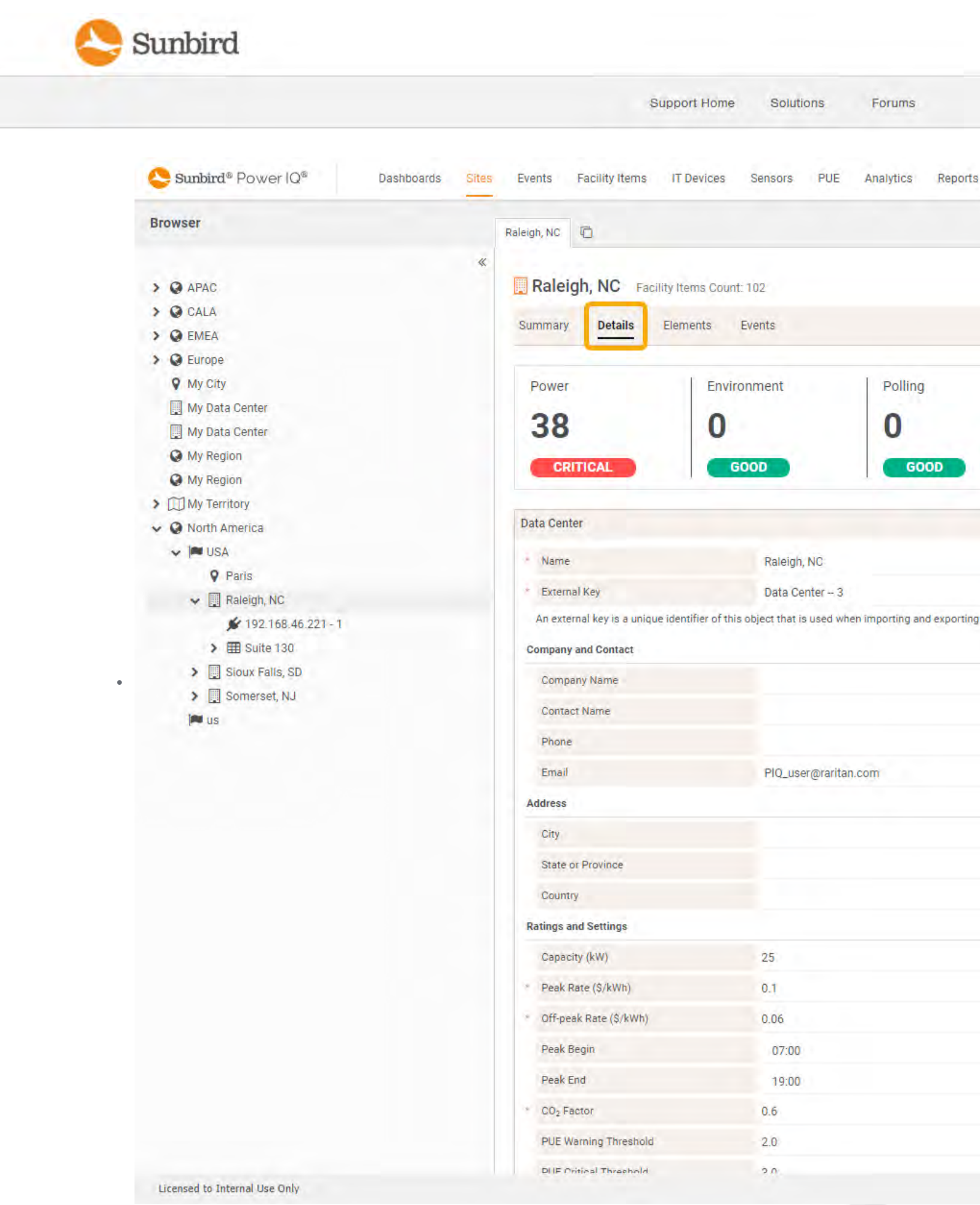

Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Analytics
Reports
Browser
Raleigh, NC
APAC
CALA
EMEA
Europe
My Region
My Region
My Region
North America
USA
Paris
Raleigh, NC
192.168.46.221 - 1
Suite 130
Sioux Falls, SD
Somerset, NJ
us
My Data Center
Raleigh, NC
Facility Items Count: 102
Summary
Details
Elements
Events
Power
38
CRITICAL
Environment
0
GOOD
Polling
0
GOOD
Raleigh, NC Capacity Trend Chart
Period
Past 24 Hours
Statistic
Maximum
26.146
25.000
20.000
15.000
10.000
5.000
0.927
kW
Wed 3:23 PM
Wed 4:46 PM
Wed 6:10 PM
Wed 7:33 PM
Wed 8:56 PM
Raleigh, NC Environmental Trend Chart
Period
Past 24 Hours
Position
Inlet
Threshold
100
90
80
Licensed to Internal Use Only

Details Tab

To access the Details Tab, select the Details Tab Sub-navigational Link in the Toolbar

The Details Tab contains the following modules:

- Entity Details Card
- Entity Permissions Panel


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Analytics
Reports
Browser
Raleigh, NC
APAC
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EMEA
Europe
My City
My Data Center
My Data Center
My Region
My Region
My Territory
North America
USA
Paris
Raleigh, NC
192.168.46.221 - 1
Suite 130
Sioux Falls, SD
Somerset, NJ
us
Raleigh, NC
Facility Items Count: 102
Summary
Details
Elements
Events
Power
38
CRITICAL
Environment
0
GOOD
Polling
0
GOOD
Data Center
Name
Raleigh, NC
External Key
Data Center -- 3
An external key is a unique identifier of this object that is used when importing and exporting
Company and Contact
Company Name
Contact Name
Phone
Email
PIQ_user@raritan.com
Address
City
State or Province
Country
Ratings and Settings
Capacity (kW)
25
Peak Rate ($/kWh)
0.1
Off-peak Rate ($/kWh)
0.06
Peak Begin
07:00
Peak End
19:00
CO_2 Factor
0.6
PUE Warning Threshold
2.0
Licensed to Internal Use Only

Sensor Entity Tab

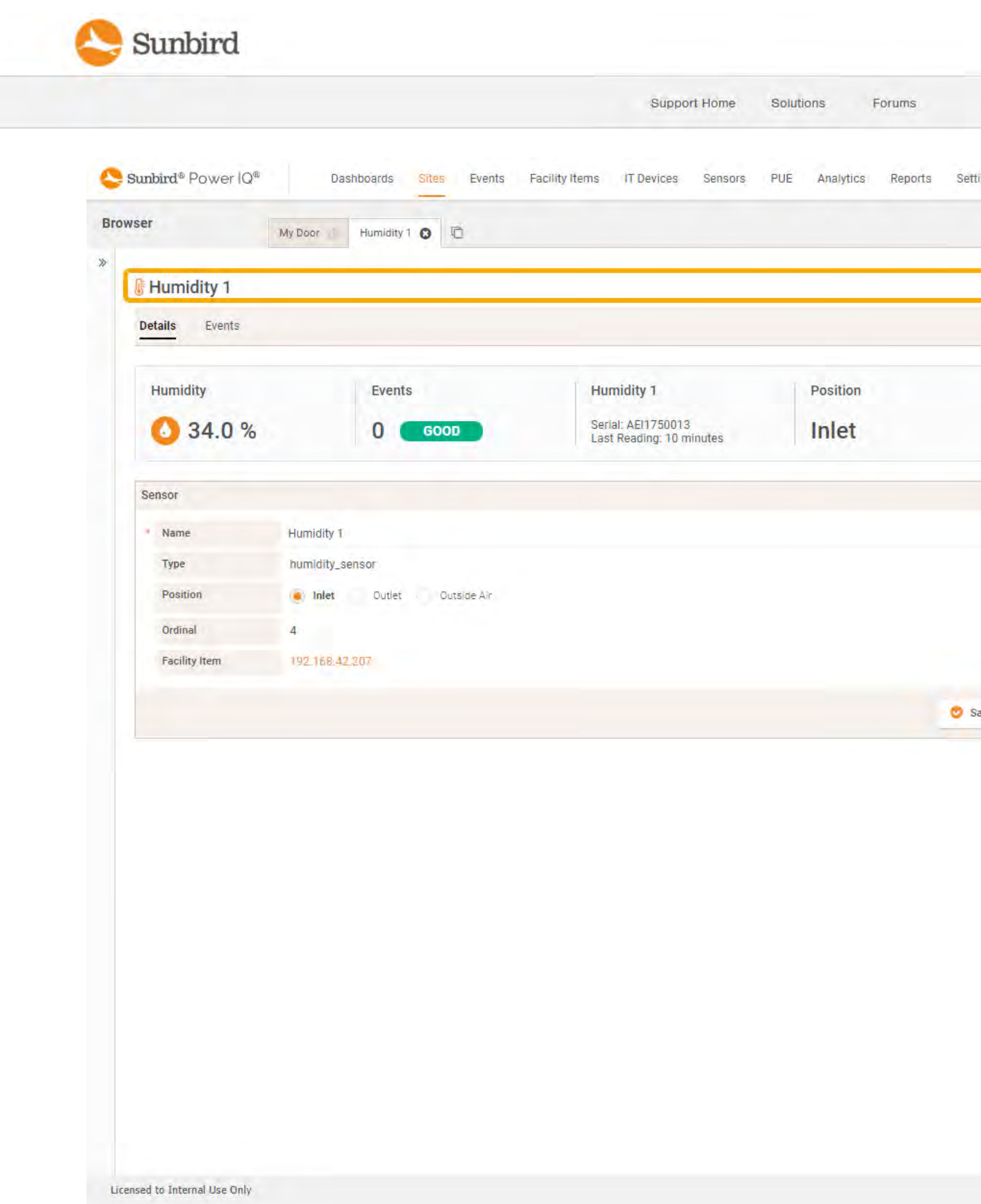
The Sensor Entity Brower Tab display the following tab elements:

Header:

The header at the top of the tab displays the following for each sensor:

- Icon
- Name/Title
- EDM Ancestor List (excluding Data Center Entities)

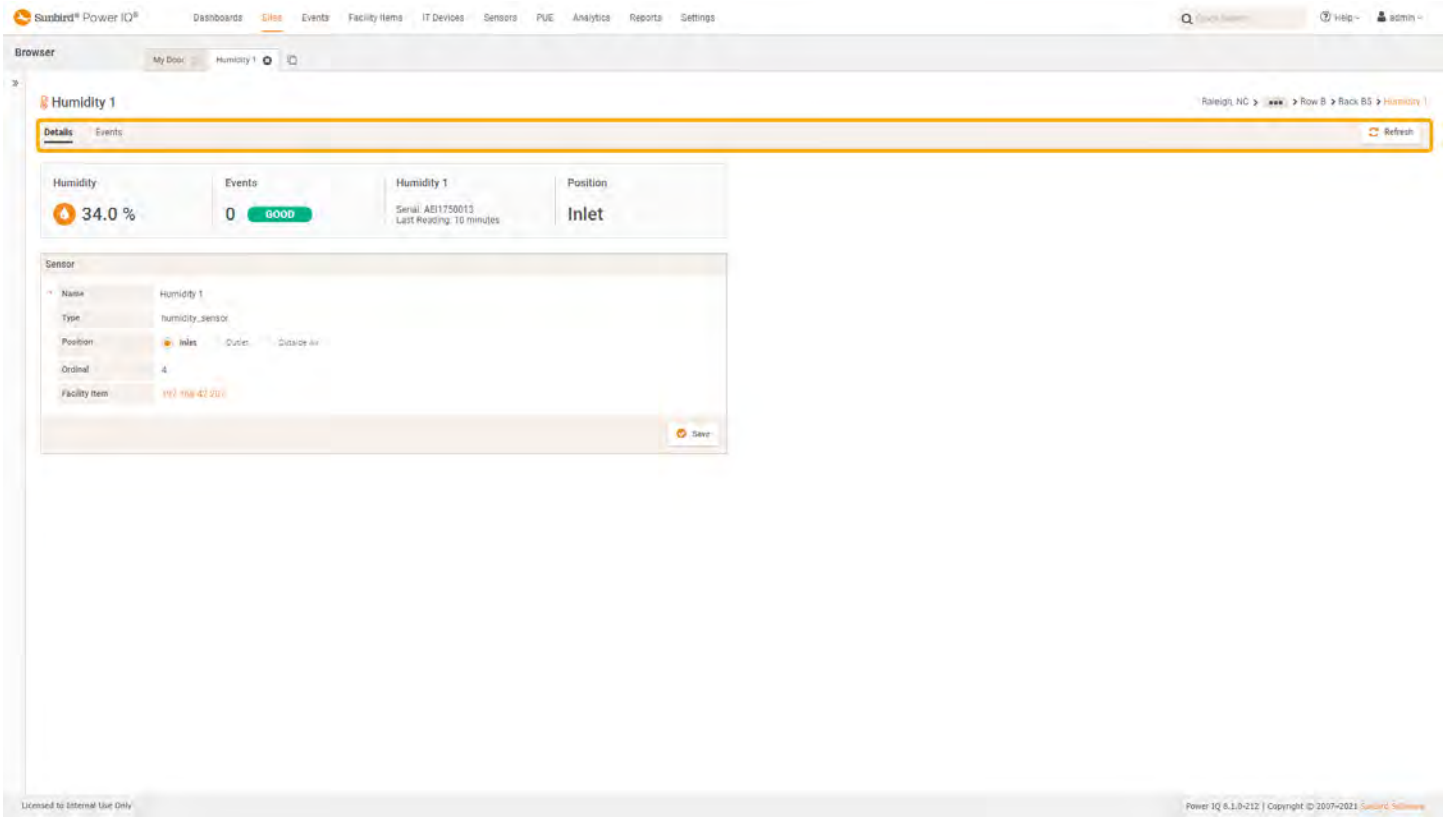
Note: Decomissioned sensors are not visible in the Sites Tab tree view


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Analytics
Reports
Browser
My Door
Humidity 1
Humidity 1
Details
Events
Humidity
34.0 %
Events
0
GOOD
Humidity 1
Serial: AEI1750013
Last Reading: 10 minutes
Position
Inlet
Sensor
Name
Humidity 1
Type
humidity_sensor
Position
Inlet
Outlet
Outside Air
Ordinal
4
Facility Item
192.168.42.207
Licensed to Internal Use Only

Toolbar:

The toolbar located directly below the header at the top of the tab contains the following:

- Details Tab Sub-navigational Link (The details tab is open by default upon initial load)
- Refresh Button: The Refresh Button reloads the full tab



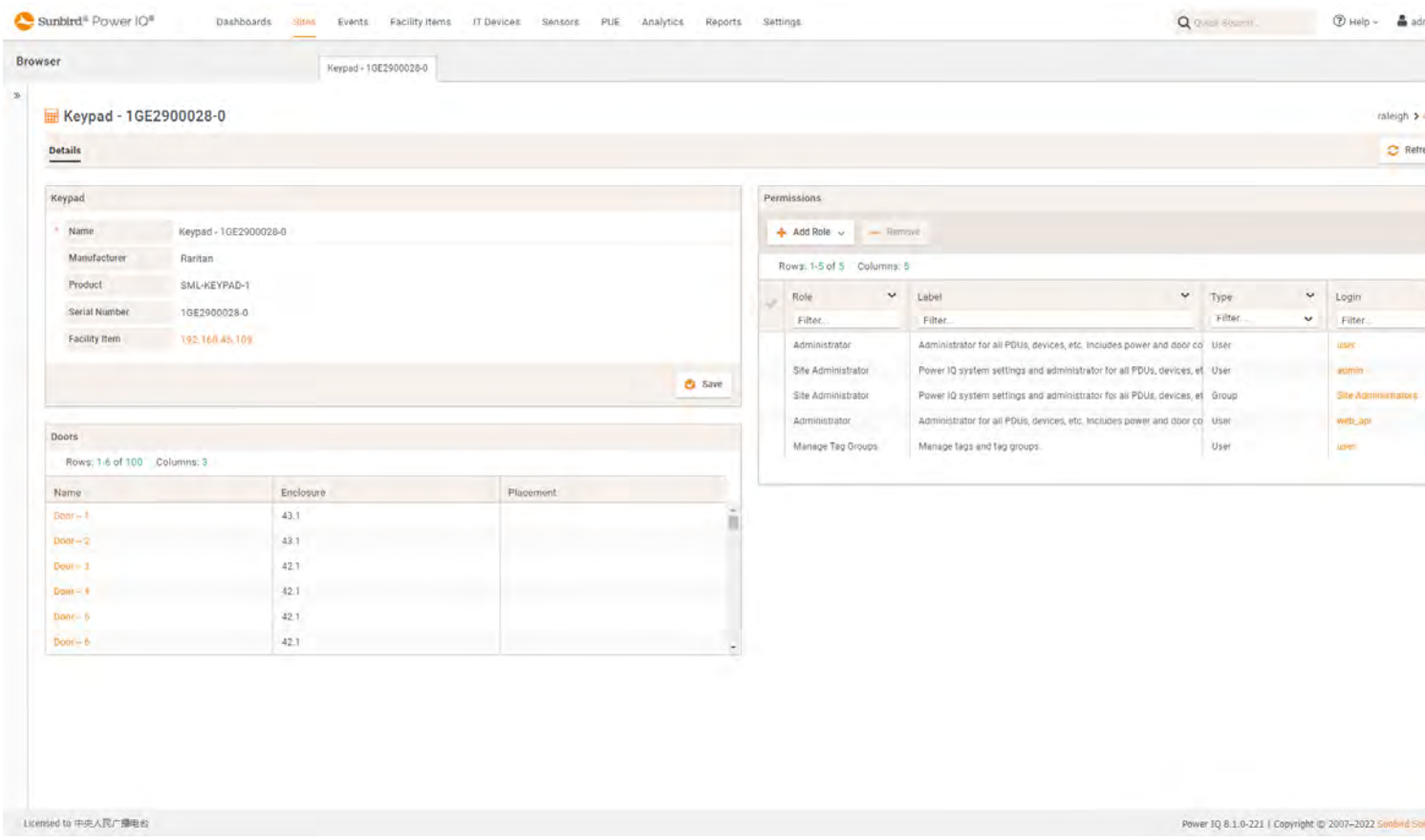
Sensor Entity Details Tab:

Users with the View role on the sensor or the global admin role can see the following modules on the Sensor Details Tab

- Sensor Widget
- Sensor Details Card

Users with the operator role on the sensor can edit the sensor details card.

Keypad Entity Tab

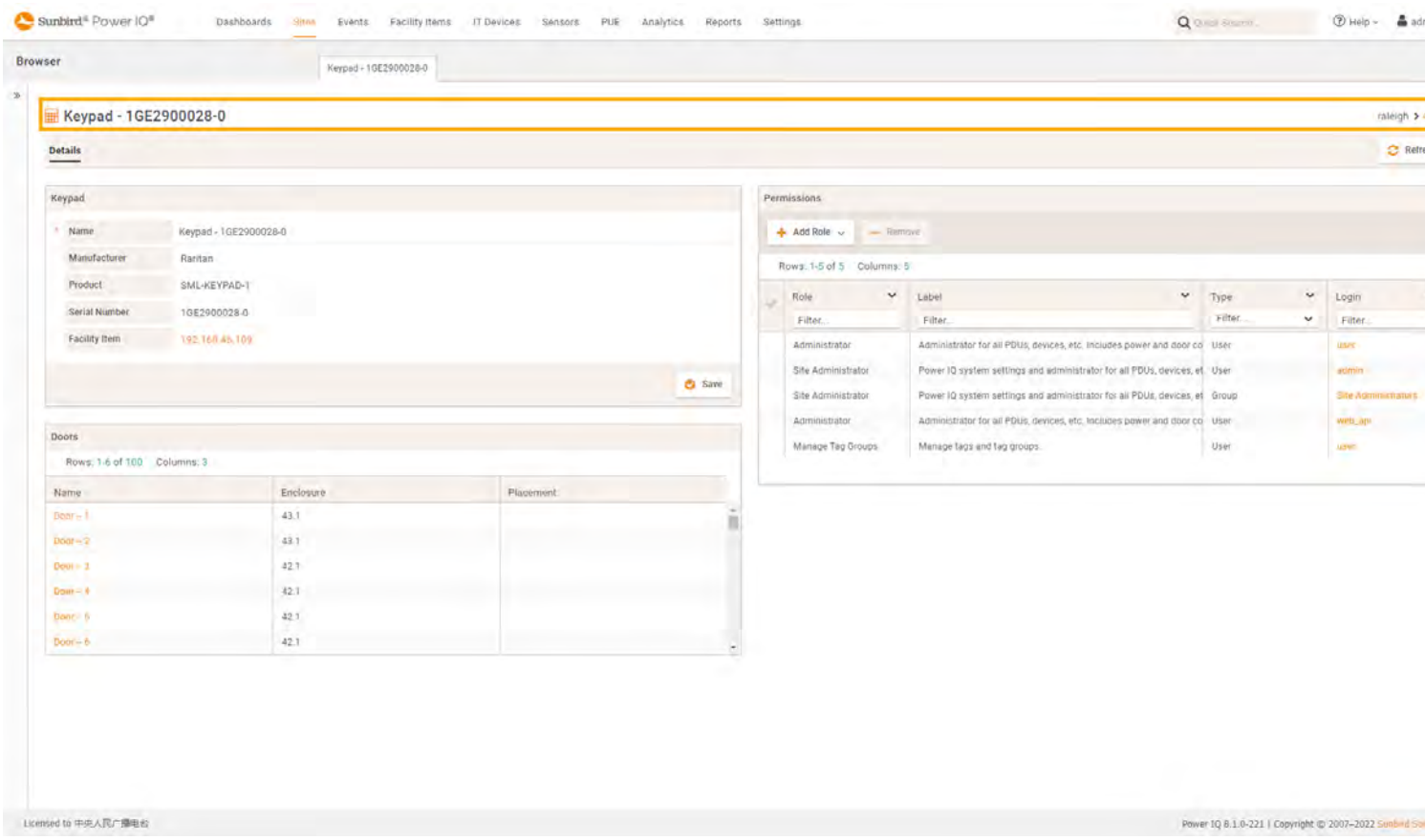


The Keypad Entity Tab display the following tab elements:

Header:

The header at the top of the tab displays the following for each facility item entity:

- Icon
- Name/Title
- EDM Ancestor List



Entity Details Tab:

Users with the View role on the keypad or the global admin role can see the following modules on the Keypad Details tab

- Keypad Details Card
- Doors Panel: The Doors panel lists the doors associated with the card reader
- Entity Permissions Panel

Users with the operator role on the keypad can edit the keypad details card.

Toolbar:

The toolbar located directly below the header at the top of the tab contains the following:

- Details Tab Sub-navigational Link (The details tab is open by default)
- Refresh Button: The Refresh Button reloads the full tab

Regional Entities (Region, Country, Territory, and City Entity Tabs

Regional entities (Region, Country, Territory, and City) are those that can contain a data center in the Sites Tab Tree View. The Region, Territory, Country, and City entity tabs share the following tab elements:

Header

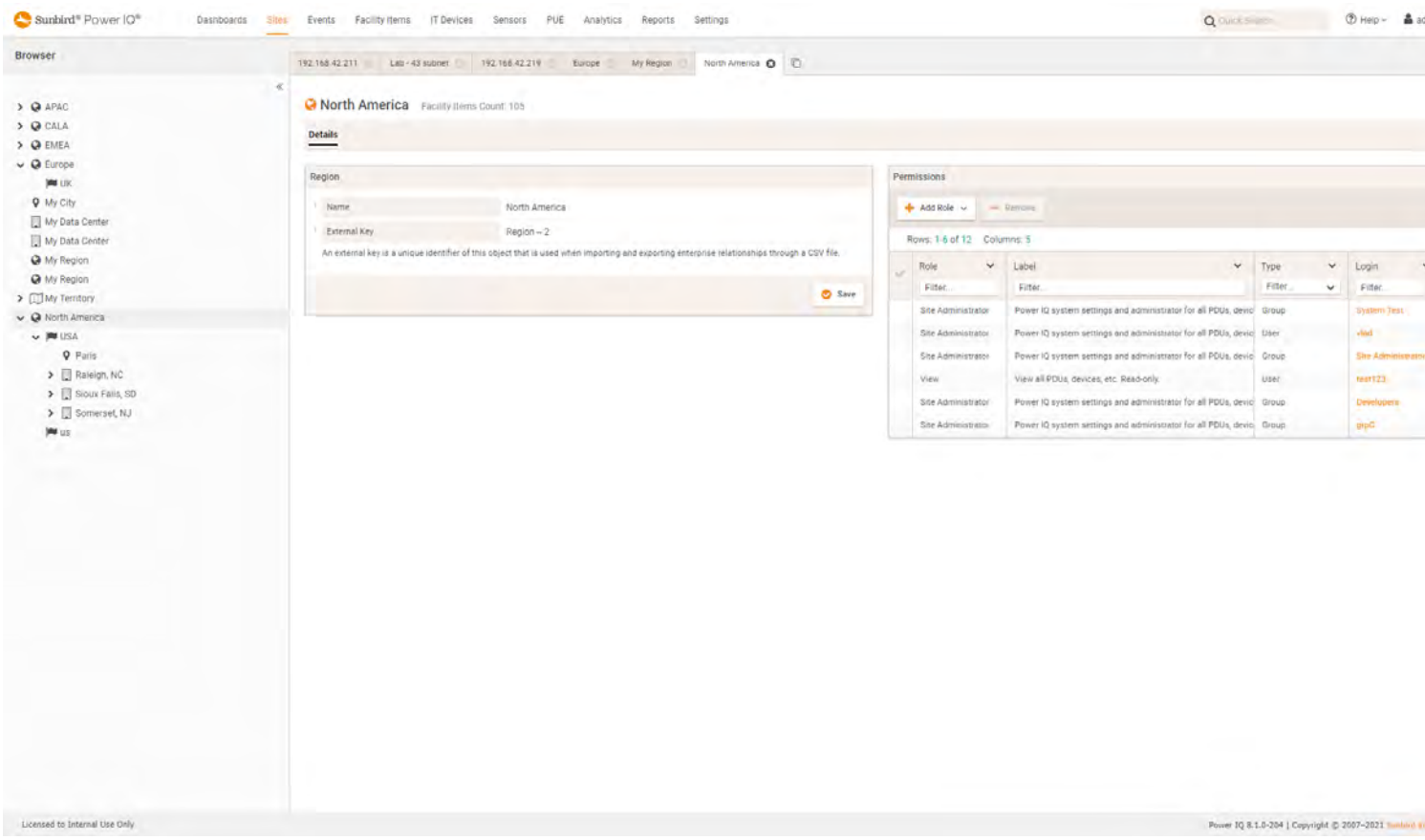
The header at the top of the tab is always visible regardless of subtab selection and displays the following for each entity:

- Icon
- Name/Title
- Facility item count

Entity Details Tab:

Users with the appropriate permissions will be able to see the following modules on the Entity Details Tab

- Entity Details Card
- Entity Permissions Panel



Note: Upon initial load the details tab is displayed by default

Common Modules and Charts

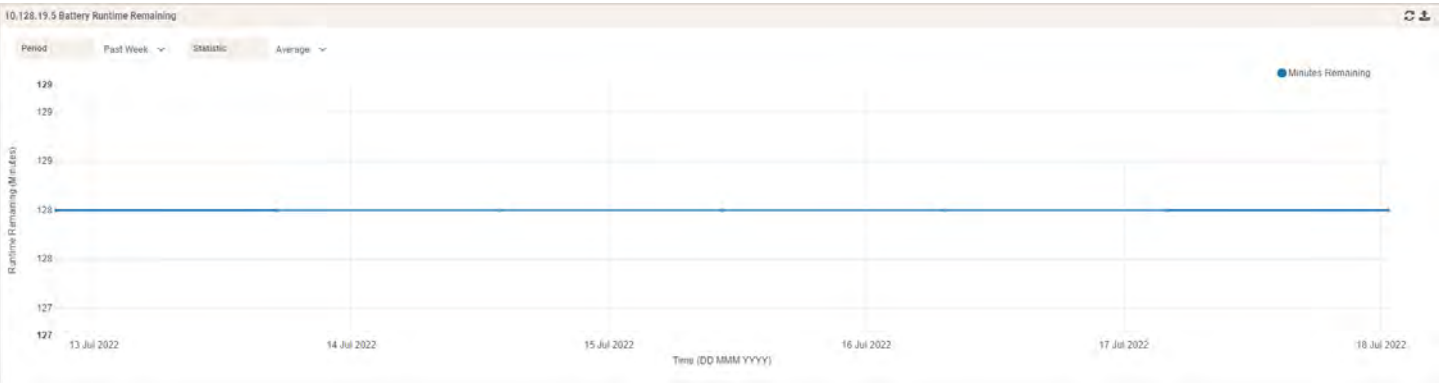
The modules and charts in this section are used across multiple entities in Power IQ

- *Battery Runtime Remaining Trend Chart* on the facing page
- *Battery Voltage vs Amperage Trend Chart* on page 122
- *Bullet Chart Card (Data Center/Floor/Room/Aisle/Row/Rack)* on page 124
- *Bullet Chart Card (Facility Items)* on page 125
- *Capacity Trend Chart (Data Center/Floor/Room/Aisle/Row/Rack)* on page 126
- *Circuit Breaker Capacity Trend Chart* on page 129
- *Comparison Chart* on page 130
- *Details Sub-Navigation Tab* on page 133
- *Door Table Module* on page 153

- *Elements Sub-Navigation Tab* on page 168
- *Environmental Trend Chart - One line per sensor* on page 155
- *Environmental Trend Chart (Summary)* on page 153
- *Events Sub-Navigation Tabs* on page 157
- *Event Summary Card* on page 163
- Inlet Capacity Trend Chart
- *UPS Output Percent Load Chart* on page 165
- *Permissions Table Module* on page 203
- *Rack Entity Details Card* on page 151
- *Rack Capacity Trend Chart* on page 167
- *Tags and Tag Groups Panel* on page 201

Battery Runtime Remaining Trend Chart

The Battery Runtime Remaining Trend Chart displays the UPS's remaining battery runtime



The Battery Runtime Remaining Trend Chart is displayed on the summary sub-tabs of the following node/entity types:

- Floor UPS
- Rack UPS

The available Statistic options for charting the data values in the Battery Runtime Remaining Trend Chart are as follows:

- Average
- Maximum (Default)

- Minimum

The blue line represents minutes remaining

Hovering over the points on the line displays a timestamped reading of minutes remaining

The period of the data of the data can be selected from the following options:

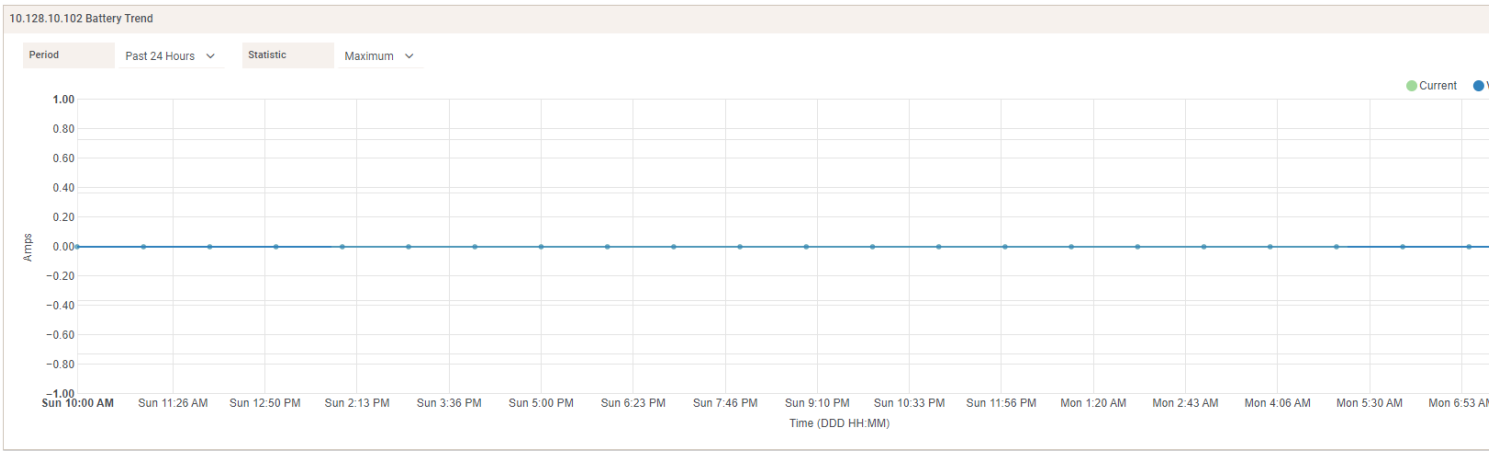
- Past Hour
- Last Hour
- Past 24-hours
- Yesterday
- Past Week
- Last Week
- Past Month
- Last Month
- Year-to-Date
- Past Year
- Last Year

The Battery Runtime Remaining Trend Chart Charts display the selected Average/ Maximum/ Minimum statistic over the selected period. To use the chart:

1. Use the drop-down to select the period for the data.
2. Select the Average/ Maximum/ Minimum statistic that you want to chart

Battery Voltage vs Amperage Trend Chart

The Battery Voltage vs Amperage Trend Chart displays up to two trend lines for a UPS's voltage **readings trend line and current readings trend line** and **voltage readings trend line**. The lines will only display if there is data. The green line represents the current readings and the blue line represents



The Battery Voltage vs Amperage Trend Chart Trend Chart is displayed on the summary sub-tabs of the following node/entity types:

- Floor UPS
- Rack UPS

Note: If there are no voltage or current readings, then the chart displays the following message: "No data to display"

The available Statistic options for charting the data values in both the Circuit Breaker Trendline are as follows:

- Average
- Maximum (Default)
- Minimum

The period of the data of the data can be selected from the following options:

- Past Hour
- Last Hour
- Past 24-hours
- Yesterday
- Past Week
- Last Week
- Past Month
- Last Month
- Year-to-Date
- Past Year
- Last Year

The green line represents your current, and the blue line represents voltage

The Battery Runtime Remaining Trend Chart display the selected Average/ Maximum/ Minimum statistic over the selected period

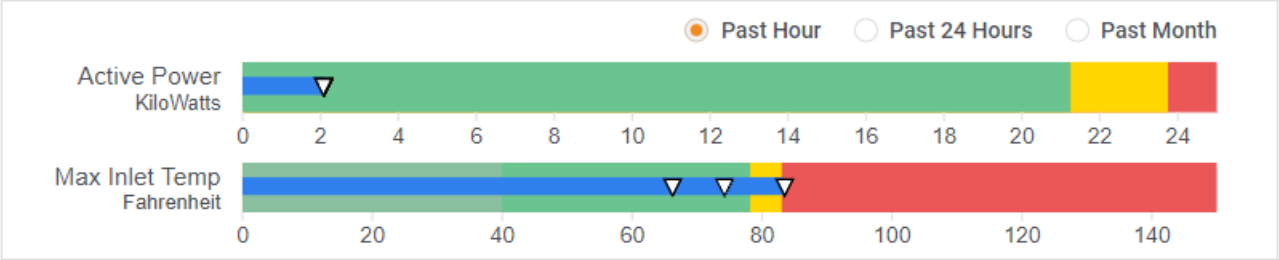
To use the chart:

1. Use the drop-down to select the period for the data
2. Select the Average/ Maximum/ Minimum statistic that you want to chart

Bullet Chart Card (Data Center/ Floor/ Room/ Aisle/ Row/ Rack)

The Bullet Chart Card displays two bullet charts:

- Active Power: Displays the current active power value for the selected node
- Max Inlet Temperature: Displays the current hottest inlet temperature in the selected nod
- Tick marks on the chart display the minimum, maximum,average and latest readings over the specified period.



The Bullet Chart card is used on the following node types:

- Data Center
- Floor
- Room
- Aisle
- Row
- Rack

The time range of the data in each chart can be selected from the following options:

- Past Hour
- Past Day
- Past Month

The green/yellow/red background color corresponds to the following thresholds:

- Green: Less than the warning threshold
- Yellow: Less than the critical threshold
- Red: Greater than or equal to the critical threshold

If there is no data available for either of the charts, the chart will be grayed out with a label stating, “No data.”

Note: Each facility node type, other than PDU has its own corresponding data charted.

Max Inlet Temperature Chart

The Max Inlet temperature chart displays the current hottest inlet temperature in the selected node.

The blue bar running down the center of the graph represents the max latest reading from inlet sensors in the node.

A sublabel indicates the temperature scale, which is based on global setting.

Active Power

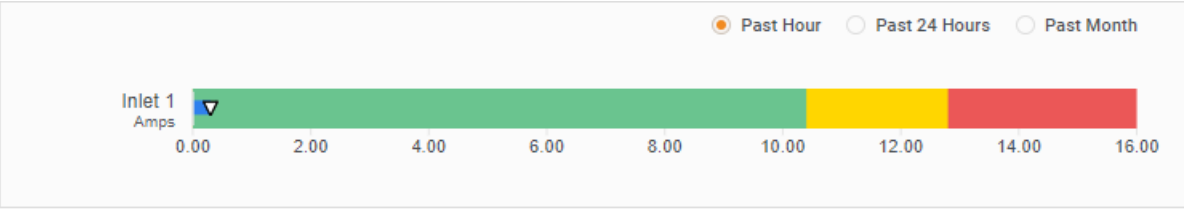
The active power chart displays the current active power value in kilowatts for the selected node as represented by

The blue bar running down the center of the graph represents the current active power value

The red/yellow/green region breakpoints for the active power chart and the max value displayed vary based on the type of node selected:

- For Rack nodes: the local rack thresholds are used to define the red/yellow/green region breakpoints, if they were overridden. Otherwise, the global rack thresholds are used. The max value displayed is the rack capacity, or if not available, 110%of the current reading
- For Row, Aisle, and Data Center nodes: the global rack thresholds are used, and the maximum value is the entity's capacity

Bullet Chart Card (Facility Items)



A Bullet Chart Card that displays the latest current readings is displayed on each Facility Item (Rack PDU, Floor UPS, Floor PDU, Standalone Meters, Rack PDU) sub-tab page

The Bullet Chart Card displays up to two bullet chart measuring inlet amps as follows:

- If the facility item has no inlets, the card displays one bullet chart that is greyed out
- If the facility item has one to two inlets, all inlets are displayed
- If there is no data available for either of the charts, the chart will be grayed out with a tool-tip stating, “No data.”
- Tick marks on the chart display the minimum, maximum and average over the specified period. In a 3-Phase PDU configuration, the maximum of the three phases is displayed.

Note: If the facility item has more than two inlets, only the first two are displayed. (In the case of inline meters that have more than two inlets you can also view the inlets on the inlets tab or the summary chart).

The time range granularity for the data in each chart can be selected from the following options:

- Past Hour
- Past Day
- Past Month

The blue bar running down the center represents the current reading in Amps for the inlet. Hovering over the bar displays the value of the latest reading

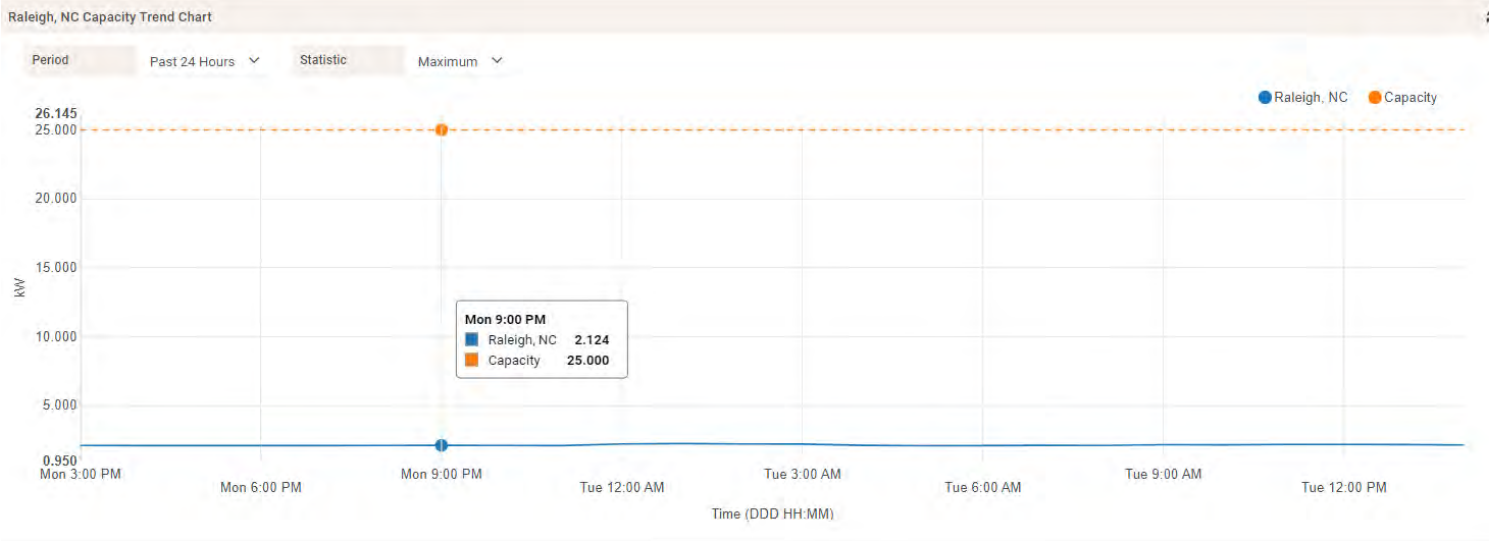
The green/yellow/red background color corresponds to the following thresholds:

- Green: Less than the warning threshold
- Yellow: Less than the critical threshold
- Red: Greater than or equal to the critical threshold

If the inlet has no rating and no local override or global value has been set, the background for the entire chart will be yellow, with a tooltip stating, "Set an inlet threshold using the Sensors tab to get accurate red, yellow, and green regions."

Capacity Trend Chart (Data Center/Floor/Room/Aisle/Row/Rack)

The Capacity Trend Chart displays two trend lines, one for Capacity data and the other for the Readings data. The lines will only display if there is data. The orange line represents the Capacity data and the blue line represents the Readings data



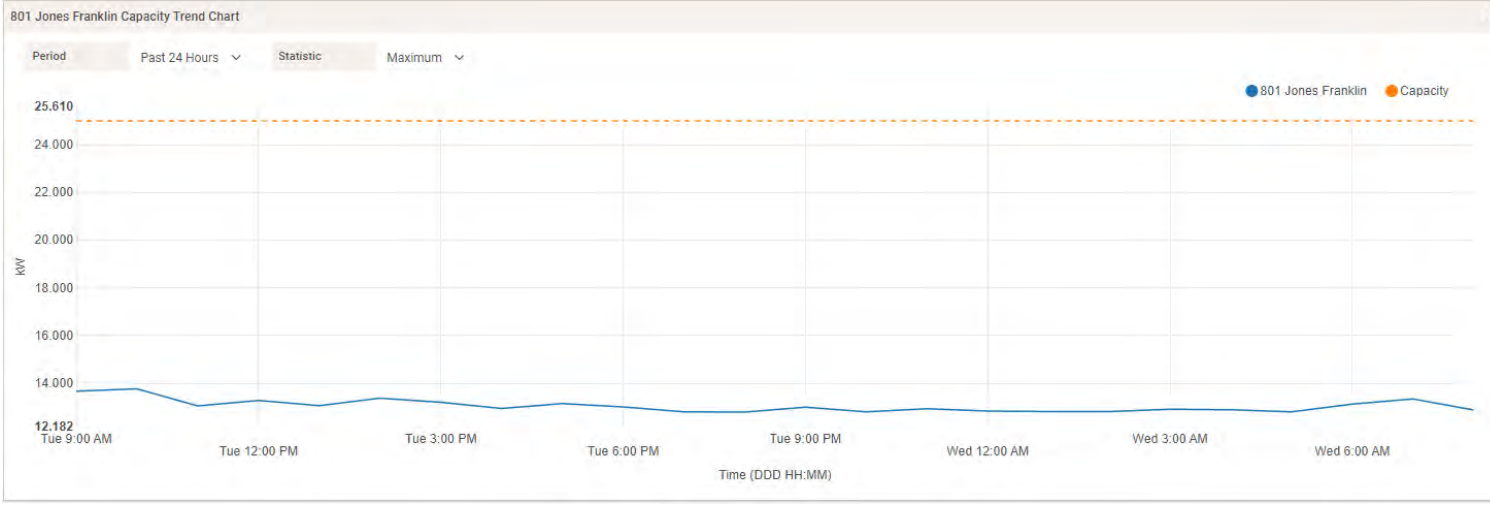
A Capacity Trend Chart is displayed on the summary sub-tab on the following node types:

- Data Center
- Floor
- Room
- Aisle
- Row

The readings line is the sum of the following:

- The sum of all inlet readings for Rack PDUs, Rack Transfer Switches, and Rack UPSs that are descendants of the entity.
- The sum of circuit readings from devices that are associated with IT Devices that are descendants of the entity.

Note: If the line is not displaying, ensure that the Capacity value is set for the specified entity. For more information, see: Set a Capacity



The Capacity Trend Chart is used on the following node types:

- Data Center
- Floor
- Room
- Aisle
- Row

The available Statistic options for charting the data values in the Circuit Breaker Trend Chart are as follows:

- Average
- Maximum (Default)
- Minimum

The Period of the data of the data can be selected from the following options:

- Past Hour
- Last Hour
- Past 24-hours
- Yesterday
- Past Week
- Last Week
- Past Month
- Last Month
- Year-to-Date
- Past Year
- Last Year

To use the chart:

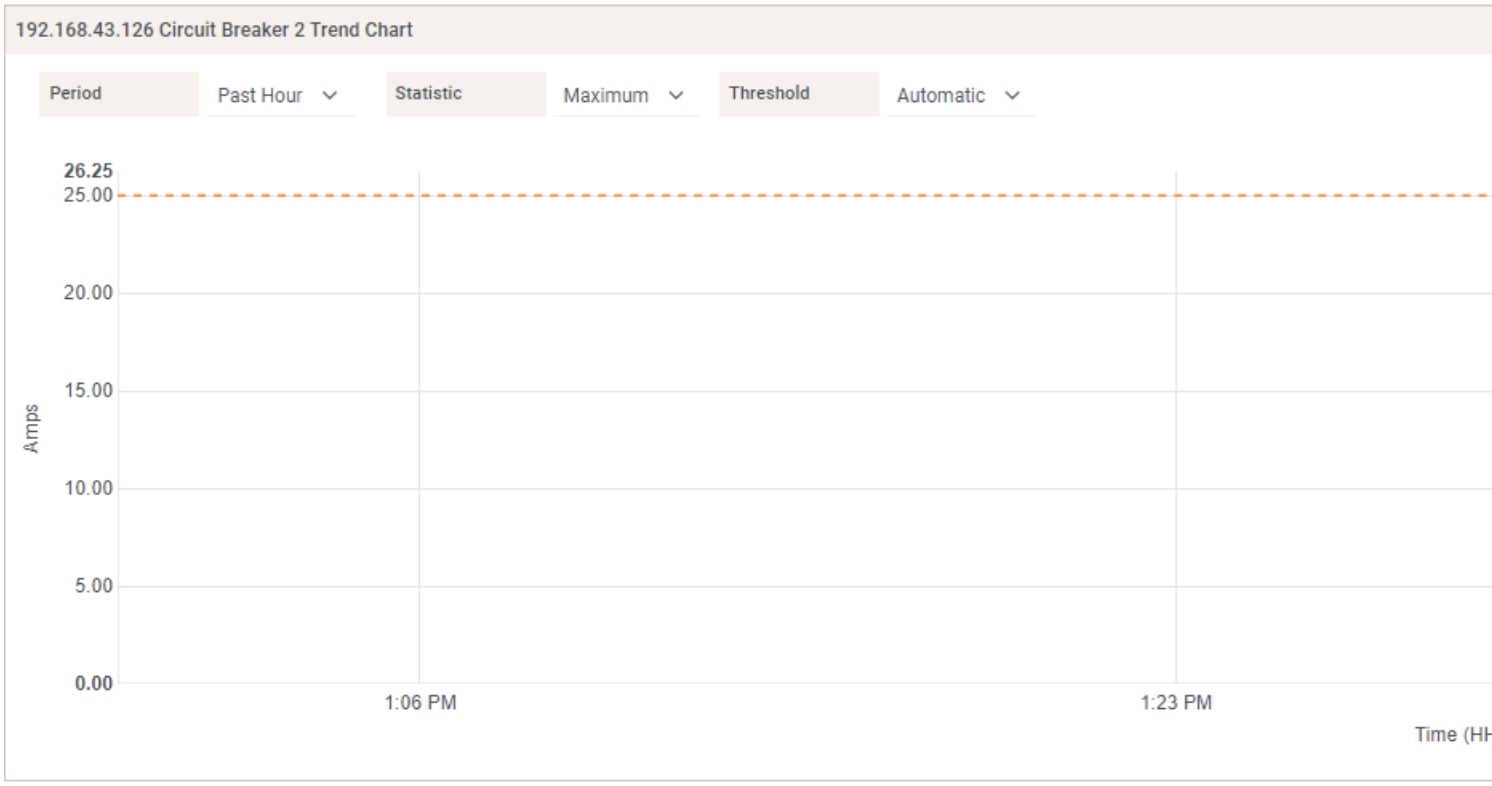
1. Use the drop-down to select the period for the data
2. Select the Average/ Maximum/ Minimum statistic that you want to chart

Circuit Breaker Capacity Trend Chart

A Circuit Breaker Capacity Trend Chart is displayed on the summary sub-tab on the following entity/ node types:

- Rack UPS
- Rack Transfer Switch
- Rack PDUs

The Capacity Trend Chart displays a capacity trend line representing the rated amps value of each circuit breaker in orange, if the value is provided by the Facility Item.



The Threshold drop-down displays the following options and threshold:

- Automatic: Uses the override value for the circuit breaker, if available. Otherwise, the global default shall be used.

- None: No thresholds are charted

If Inlet and Circuit Breaker thresholding is enabled, the following threshold lines will also be displayed:

- Red dash line: Upper Critical -
- Yellow dash line: Upper Warning -
- Yellow dash line: Lower Warning - Yellow dash line
- Red dash line Lower Critical:

If the value for any threshold is 'null', no line will be displayed for it.

The available Statistic options for charting the data values in the Circuit Breaker Trend chart are as follows:

- Average
- Maximum (Default)
- Minimum

The period options for this chart are as follows:

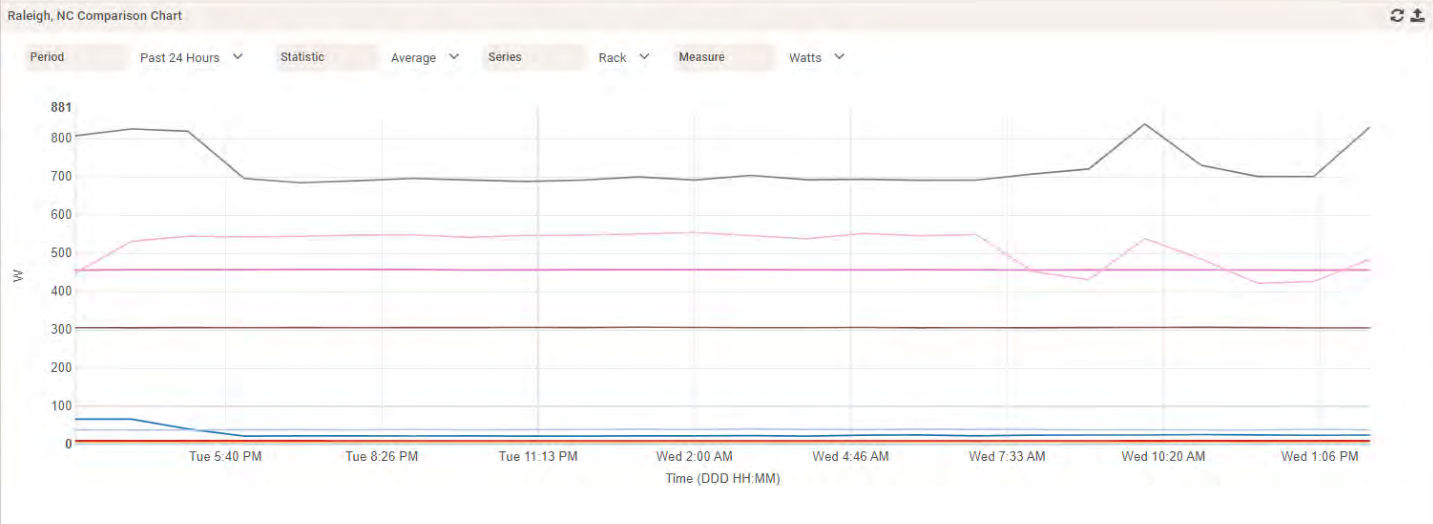
- Past Hour (Default)
- Last Hour
- Past 24-hours
- Yesterday
- Past Week
- Last Week
- Past Month
- Last Month
- Year-to-Date
- Past Year
- Last Year

To use the chart:

1. Select the period for the data
2. Select the Average/ Maximum/ Minimum statistic that you want to chart

Comparison Chart

The Comparison Chart displays readings trend lines for user-selected item series. The Comparison chart enables you to easily compare measures across a group of items, for example, you can compare the load across all the racks in a data center.



Selectable items are only those that can be contained in the entity and therefore vary based on the selected entity type, but can include the following:

- Floor
- Room
- Aisle
- Rack
- Rack PDU Inlets
- IT Device
- Outlets

The Comparison chart is used on the following entities:

- Data Center
- Floor
- Room
- Aisle
- Row
- Racks

The table below summarizes the selectable items for each entity:

Entity	Selectable Items
Data Center	• Floor

Entity	Selectable Items
	• Room • Aisle • Rack • Rack PDU Inlets
Floor	• Room • Aisle • Row • Rack • Rack PDU
Room	• Aisle • Row • Rack • Rack PDU
Aisle	• Row • Rack • Rack PDU
Row	• Rack • Rack PDU
Rack	• Rack PDU Inlets • IT Devices • Outlet

Note: In Power IQ 8.1.1, the IT Devices and Outlets options will both have Watts as the default measure.

The period of the data of the data can be selected from the following options:

- Past Hour (Default for Rack and below entities)
- Last Hour

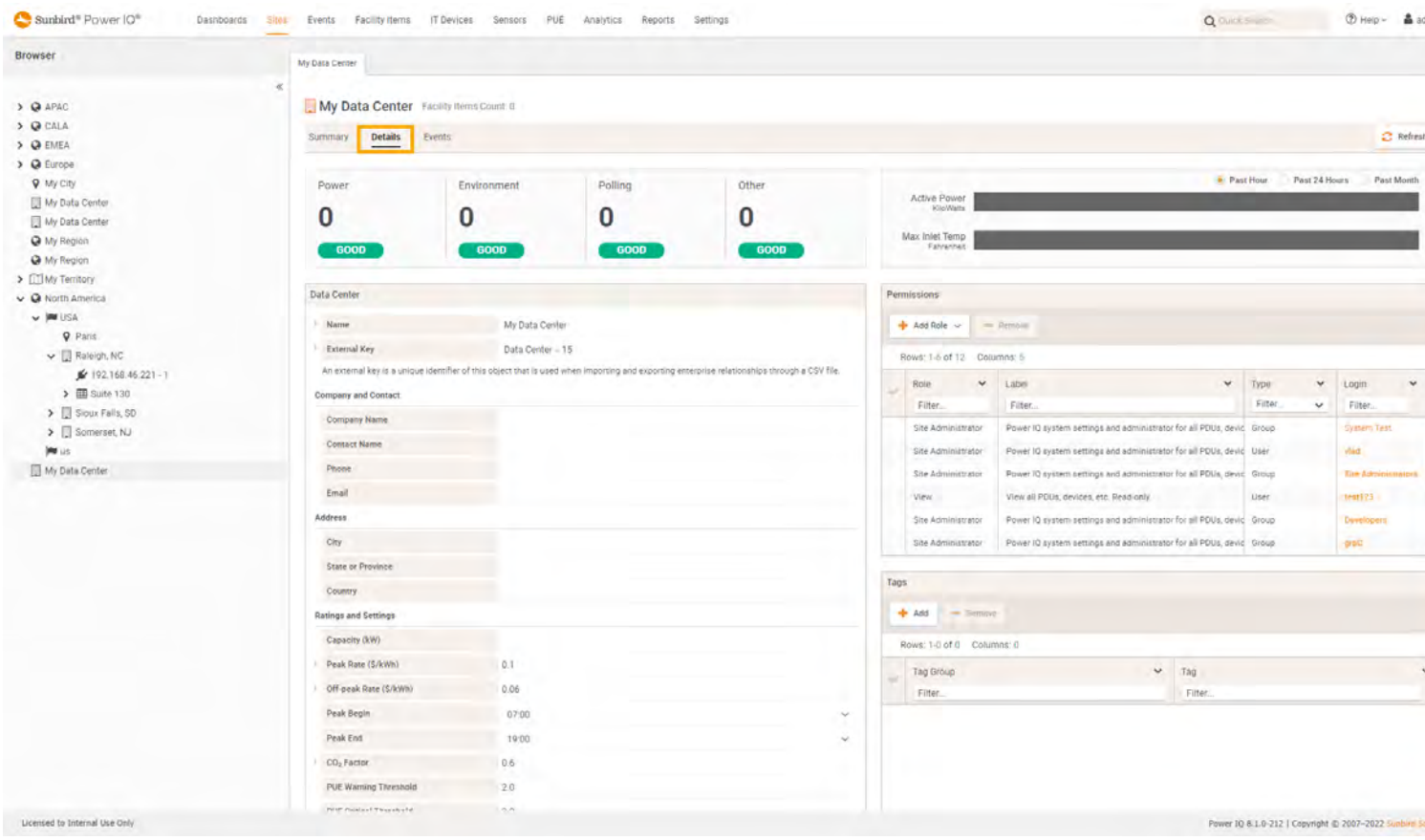
- Past 24 Hours (Default for Row and above entities)
- Yesterday
- Past Week
- Last Week
- Past Month
- Last Month
- Year-to-Date
- Past Year
- Last Year

The available Statistic options for charting the data values in the Circuit Breaker Trend chart are as follows:

- Average
- Maximum (Default)
- Minimum

Details Sub-Navigation Tab

Details sub-navigation tabs contain several cards with information about a node's elements. Users with the View role on a node can view the node’s Element sub-navigation tab by selecting the node in the tree view and then selecting the Details link from the toolbar on the node’s tab, as shown in the screenshot below.



The following cards and their fields can be viewed on the Details sub-navigation page, varying by the type of entity and your permissions:

- *Card Reader Entity Details Card* on the facing page
- *Data Center Details Card* on page 136
- *Device Entity Details Card* on page 140Device EntityDetails Card
- *Door Entity Details Card* on page 143
- *Facility Item Entity Property Detail Panel* on page 144
- *Floor, Room, Aisle, and Row Node Details Card* on page 149
- *Keypad Entity Details Card* on page 150
- *Permissions Table Module* on page 203
- *Rack Entity Details Card* on page 151
- *Regional Entities (Region, Country, Territory, and City Entity Tabs* on page 119
- *Sensor Entity Details Card* on page 150
- Sensor Entity Details Card

Card Reader Entity Details Card

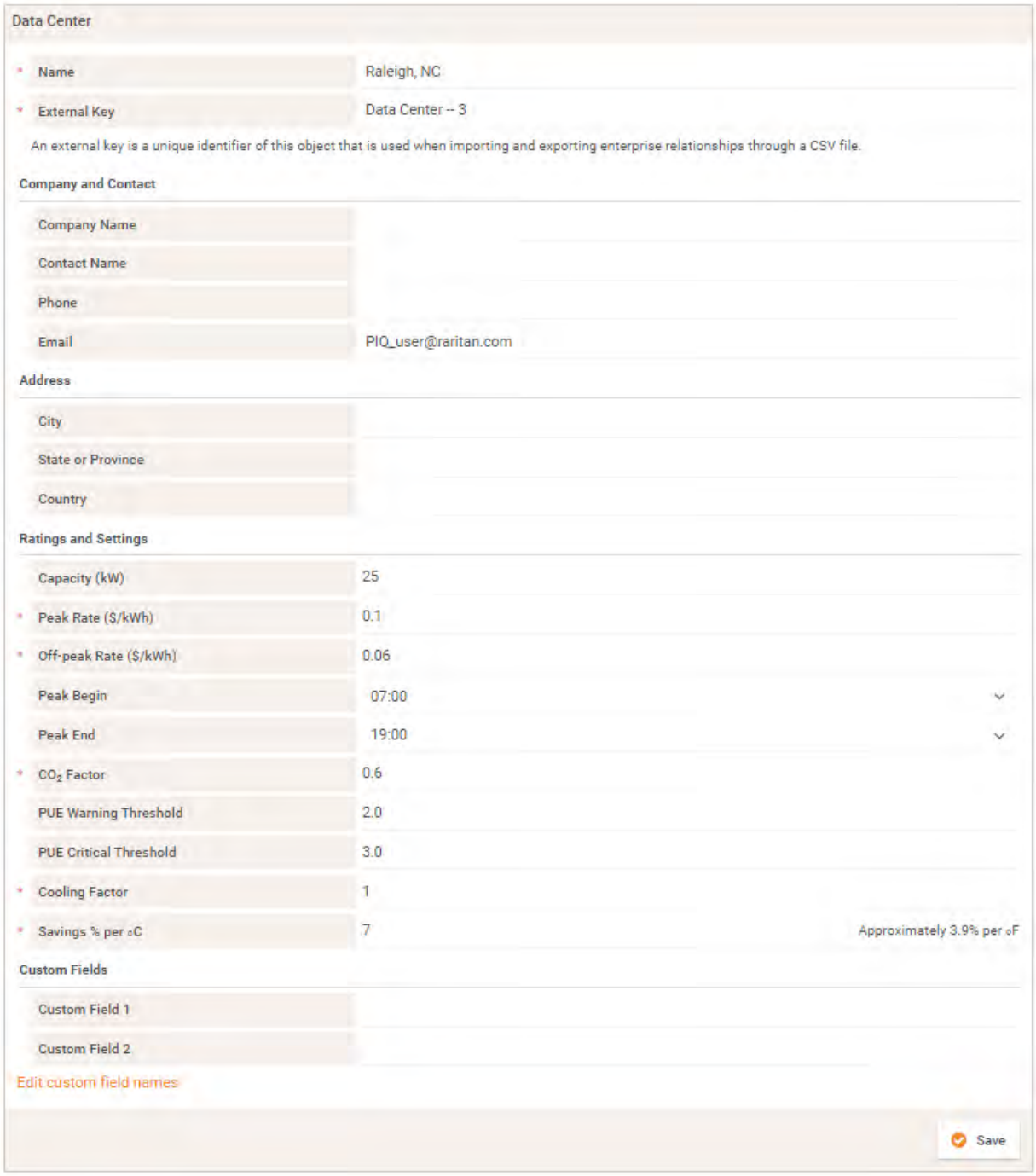
The fields displayed in the Card Reader Details Card are as follows.

You must have the View role on the card reader or the global View role to see the card reader details card.

You must have the Operator role on the card reader or the global Operator role to edit the card reader details card if the card reader is active.

- Name (required field, max length: 255)
- Manufacturer (read-only field)
- Product (read-only field)
- Serial Number (read-only field)
- Facility Item (read-only field, Links to the facility item if viewable).

Data Center Details Card



The fields contained in the Data Center Details Card are as follows:

Data Center

- Name (required field, max length: 255)
- External Key (required field, max length: 255, The external key is a unique identifier for this object that is used when importing and exporting enterprise relationships through a CSV file)

Company and Contact

- Company Name (max length: 255)
- Contact Name (max length: 255)
- Phone (max length: 255)
- Email (valid email address, max length: 255)

Address

- City (max length: 255)
- State or Province (max length: 255)
- Country (max length: 255)

Ratings and Settings

- Capacity (kW) : The capacity for the Data Center must be manually entered in this field.
- Peak Rate ($/kWh): (required field)
- Off-peak Rate ($/kWh): (required field)

Note: Changes to a Data Center's Peak or Off Peak rates via the GUI or API, are audit logged.

Note: The Peak and Off-Peak Rates are displayed using the system-wide currency. The Peak beginning and end times can either be selected from the drop-down.

- Peak Begin
- Peak End
- CO_2 factor (required field)

Note: CO2 value are available in the V2 API and ODBC. Several ODBC views have been updated with new columns for CO_2 and Peak/Off-Peak energy. The Hourly rollups for Inlet, Circuit, and Rack readings capture the

CO2 reading for that interval based on the CO_2 factor that was set at the end of that hour. The hourly values are also rolled up into Daily and Monthly values. See Power IQ ODBC Schema and Racks

Note: CO_2 factor displays up to four decimal places. Changes to this field are audit logged.

- PUE Warning Threshold
- PUE Critical Threshold
- Cooling factor (required field)
- Savings %per ◦C: (required field, min: 0, max: 100. If the system-wide temperature unit is Fahrenheit, the savings percentage will be converted to the Fahrenheit scale and displayed in text next to the field: Approximately x.x% per ◦F.)

Custom Fields

- Custom Field 1 (max length: 255)
- Custom Field 2 (max length: 255)

Note: To edit the Custom field names, click the “Edit custom field names” link below the custom fields.

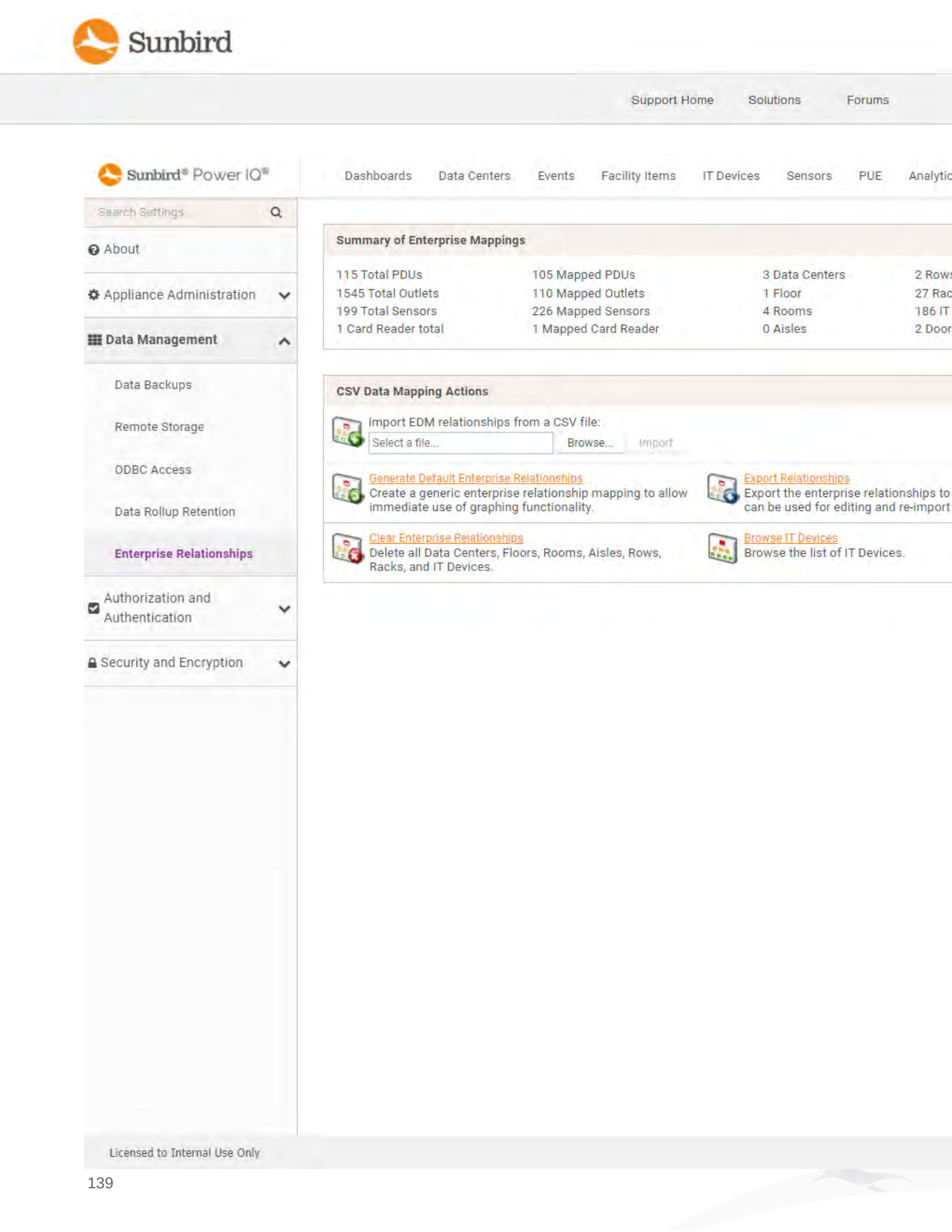
User must have the Operator role to view the link. This link will take you to the Settings tab > Management >

Permissions

You must have the View role on the Data Center or the global View role to see the Data Center details card.

You must have the Operator role on the Data Center or the global Operator role to edit the Data Center details card.

Enterprise Relationships, where you can edit the custom fields in the Configure Custom Fields panel.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Data Backups
Remote Storage
ODBC Access
Data Rollup Retention
Enterprise Relationships
Authorization and Authentication
Security and Encryption
Summary of Enterprise Mappings
115 Total PDUs
105 Mapped PDUs
3 Data Centers
2 Rows
1545 Total Outlets
110 Mapped Outlets
1 Floor
27 Rac
199 Total Sensors
226 Mapped Sensors
4 Rooms
186 IT
1 Card Reader total
1 Mapped Card Reader
0 Aisles
2 Door
CSV Data Mapping Actions
Import EDM relationships from a CSV file:
Select a file...
Browse...
Import
Generate Default Enterprise Relationships
Create a generic enterprise relationship mapping to allow immediate use of graphing functionality.
Export Relationships
Export the enterprise relationships to
can be used for editing and re-import
Clear Enterprise Relationships
Delete all Data Centers, Floors, Rooms, Aisles, Rows, Racks, and IT Devices.
Browse IT Devices
Browse the list of IT Devices.
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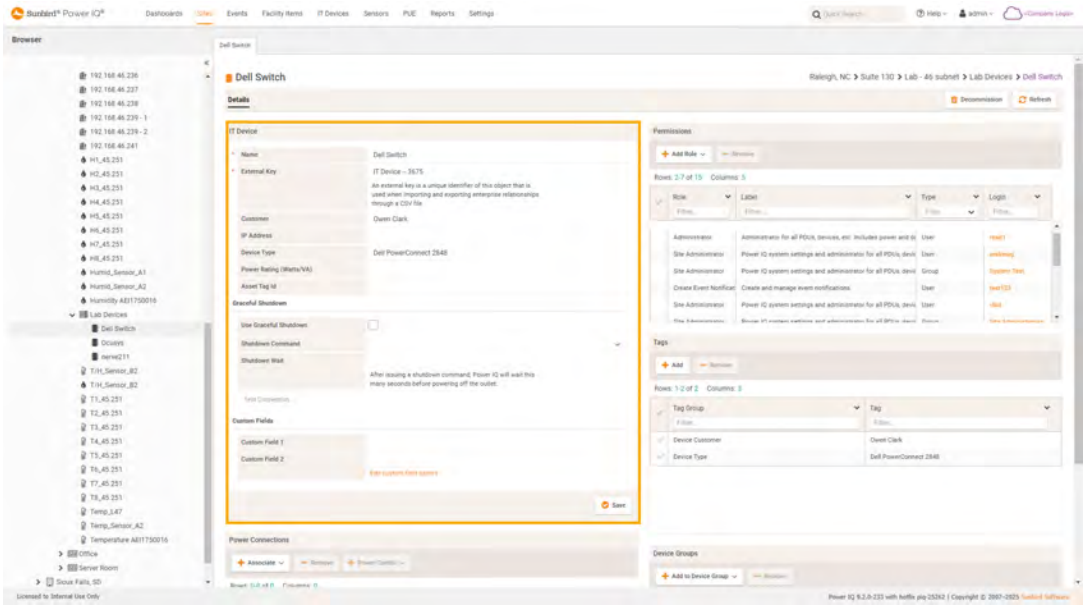
Device Entity Details Card

Device entities are the lowest-level entities in your data center hierarchy. Devices include items such as servers, KVM drawers, network switches, or other equipment commonly installed in server racks. These are items that you provide power to.



The fields contained in the Device Details Card are as follows:

- Name (required field, max length: 255)
- External Key (required field, max length: 255, The external key is a unique identifier for this object that is used when importing and exporting enterprise relationships through a CSV file)
- Customer (max length: 255)
- IP Address (ipv4 and ipv6 validator, max length: 255)
- Device Type (max length: 255)

- Power Rating (Watts/VA)
- Asset Tag ID

Asset Data (if Asset Tag ID is defined and it belongs to a rack unit)

- Rack Unit Number (read-only field)
- LED State (read-only field)
- Mode (read-only field)
- Color (read-only field)
- Decommissioned?

Graceful Shutdown

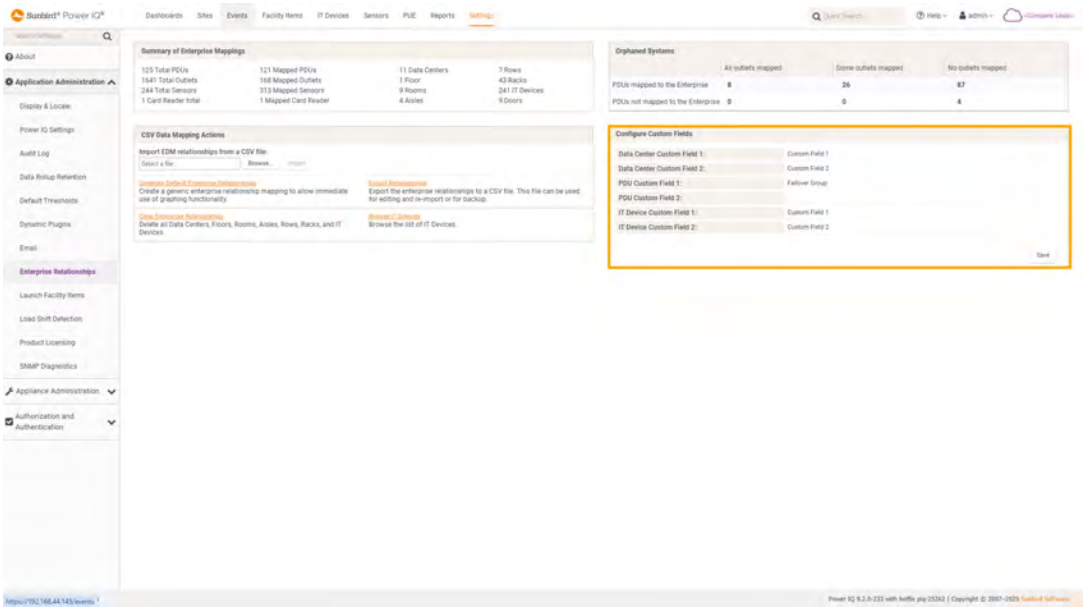
- Use Graceful Shutdown
- Shutdown Command
- Shutdown Wait (max: 3600)
- After issuing a shutdown command, Power IQ will wait this many seconds before powering off the outlet.
- Test Connection (User must have Operator role to see this button. A Shutdown Command must be selected to be able to perform the Test Connection).

Custom Fields

- Custom Field 1 (max length: 255)
- Custom Field 2 (max length: 255)

Note: To edit the Custom field names, click Edit custom field names" link below the custom fields.

You must have the Operator role to view the link. This link will take you to the Settings tab > Management > Enterprise Relationships, where you can edit the custom fields in the Configure Custom Fields panel.



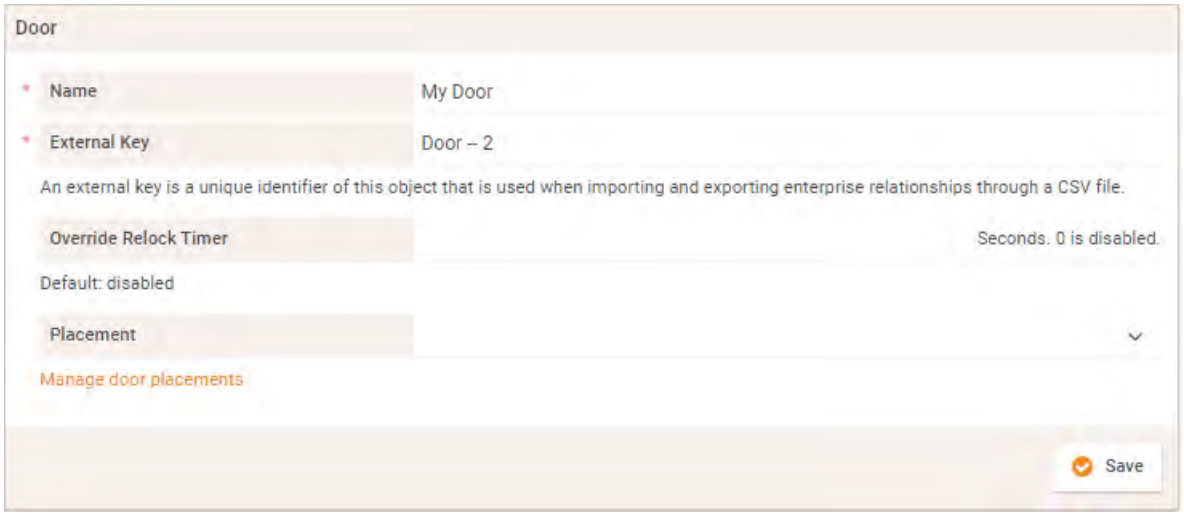
You must have the View role on the device or the global View role to see the device entity details card.

You must have the Operator role on the device or the global Operator role to edit the device details card.

The table below lists the character limits for each field

Field	Character Limit
Name	255Characters
External Key	255 Characters

Door Entity Details Card



The fields contained in the Door Details Card are as follows:

- Name (required field, max length: 255)
- External Key (required field, max length: 255, The external key is a unique identifier for this object that is used when importing and exporting enterprise relationships through a CSV file)
- Override Relock Timer relock timer value, if it is zero or not set, it displays as Disabled
- Placement
- Manage door placements link: (read-only Link to the Manage Tags and Tag Groups page. (Only users with the global System Administrator role or the global Tag Group Manager role can view the field)
- Save button: Click the Save button to save your changes.

Note: The Override Relock Timer is an optional setting on each individual door that allows you to override the global door relock timer on the individual door. If this option is disabled, the door will automatically relock based on the global door relock timer value. The Override Relock Timer is set in seconds. The minimum value is 0s, the maximum value is 2147483647s. The default value is the system wide relock timer value, if it is 0, or not set, then the value is displayed as "Disabled"

You must have the View role on the door or the global View role to see the door details card.

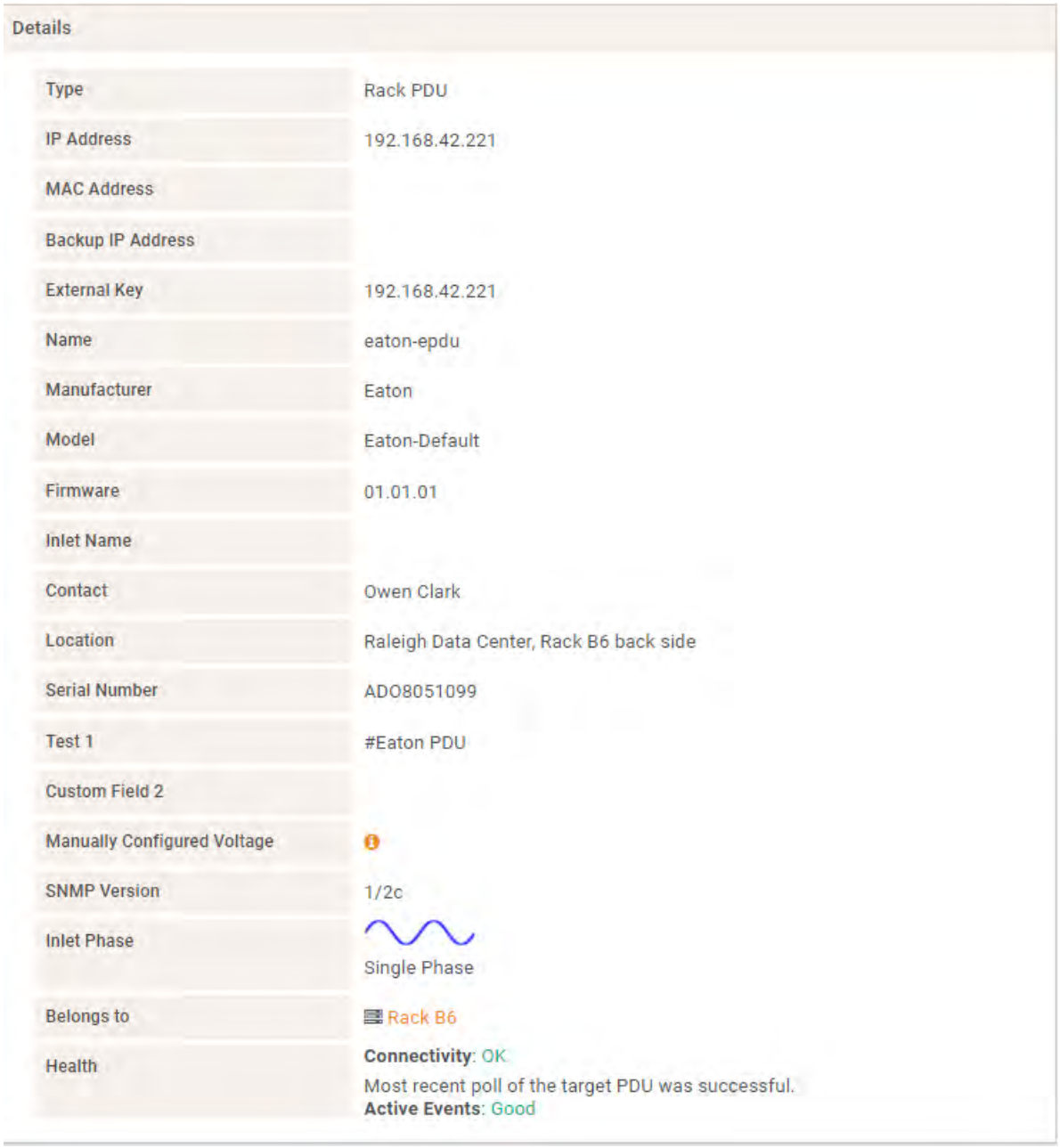
You must have the Operator role on the door or the global Operator role to edit the door details card.

The table below lists the character limits for each field

Field	Character Limit
Name	255 Characters
External Key	255 Characters

Facility Item Entity Property Detail Panel

The Facility Item Entity Property Detail Panel is a panel with key/value property details for the selected facility item. This panel is used on the Details sub-navigational Sites Tab pages for **Floor PDUs, Panels, Rack Transfer Switches and Rack PDU**



The fields contained in the Facility Item Entity Property Detail Panel are as follows:

- Type
- IP Address (If the facility item label configuration is IP Address)
- MAC Address (If the facility item label configuration is IP Address)
- Proxy Index (If available)
- Backup IP Address (If the facility item label configuration is IP Address)

- External Key
- Decommissioned At (If Applicable)
- Maintenance Mode (If Applicable)
- Name
- Manufacturer
- Model
- Firmware
- Inlet Name
- Contact
- Location
- Serial Number
- Rated Current
- Rated Current
- Rated VA
- Custom Field 1 (This label will show the system configured key of “Custom Field 1” If it is configured)
- Custom Field 2 (This label will show the system configured key of “Custom Field 2” If it is configured)

Note: The two custom fields for PDUs are included in email alerts.

- Manually Configured Voltage (If PDU requires manual voltage and is not three phases. If PDU is single phase, the tooltip is “The default for this setting for single phase PDUs is %{ configured_voltage} .” If PDU is not single phase or three phase, the tooltip is “PDU phase type is not defined. This must be defined before the voltage may be configured.”)
- Manually Configured Inlet Voltage (If PDU requires manual voltage and is three phases. The tooltip is “The default for this setting for the inlet of three phase PDUs is %{ configured_voltage} .”)
- Manually Configured Outlet Voltage (If PDU requires manual voltage and is three phases. The tooltip is “The default for this setting for outlets of three phase PDUs is %{ configured_voltage} .”)
- SNMP Version
- Authorization Level (If snmp3)
- Authorization Protocol (If snmp3 and auth required)
- Privacy Protocol (If snmp3 and priv required)
- Inlet Phase (single or three phase icon and text)
- Preferred Inlet (If transfer switch)
- Active Inlet (If transfer switch)
- Inline Meter (If inline meter)
- Belongs to (link to parent edm entity with id)

- Health (PDU health description consisting of current status, explanation, health, active events. The active events are only visible If user has **global event manager, or administrator, or site administrator role**)

Fields with blank values are hidden except Inlet name, and Custom Fields 1 and 2, Health.

You must have the View role on the entity or the global View role to see the Facility Item Entity Property Detail Panel

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Summary of Enterprise Mappings

115 Total PDUs	105 Mapped PDUs	3 Data Centers	2 Rows
1545 Total Outlets	110 Mapped Outlets	1 Floor	27 Rac
199 Total Sensors	226 Mapped Sensors	4 Rooms	186 IT
1 Card Reader total	1 Mapped Card Reader	0 Aisles	2 Door

CSV Data Mapping Actions

Import EDM relationships from a CSV file:

Select a file... Browse... Import

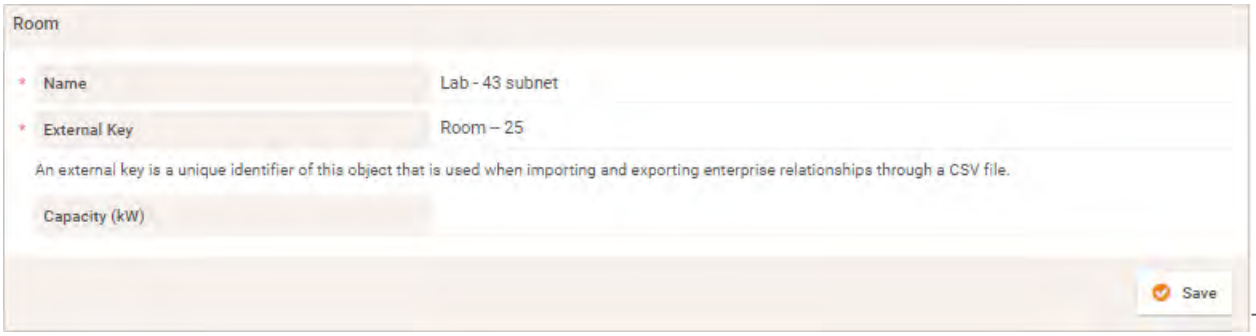
Generate Default Enterprise Relationships
Create a generic enterprise relationship mapping to allow immediate use of graphing functionality.

Export Relationships
Export the enterprise relationships to can be used for editing and re-import

Clear Enterprise Relationships
Delete all Data Centers, Floors, Rooms, Aisles, Rows, Racks, and IT Devices.

Browse IT Devices
Browse the list of IT Devices.

Floor, Room, Aisle, and Row Node Details Card



The fields contained in the Floor, Room, Aisle, and Row Node Details Cards are as follows:

- Name (required field, max length: 255)
- External Key (required field, max length: 255, The external key is a unique identifier for this object that is used when importing and exporting enterprise relationships through a CSV file)
- Capacity (kW):The capacity for the Floor, Room, Aisle, or Row Entity must be manually entered in this field.

You must have the View role on the **entity** or the global View role to see the **entity** details card.

You must have the Operator role on the **entity** or the global Operator role to edit the **entity** details card.

The table below lists the character limits for each field

Field	Character Limit
External Key	255 Characters
Capacity (kW)	Numeric Field

Keypad Entity Details Card

The fields displayed in the Keypad Details Card are as follows.

You must have the View role on the keypad or the global View role to see the keypad details card.

You must have the Operator role on the keypad or the global Operator role to edit the keypad details card if the keypad is active.

- Name (required field, max length: 255)
- Manufacturer (read-only field)
- Product (read-only field)
- Serial Number (read-only field)
- Facility Item (read-only field, Links to the facility item if viewable).

Sensor Entity Details Card

The fields displayed in the Sensor Details Card are as follows.

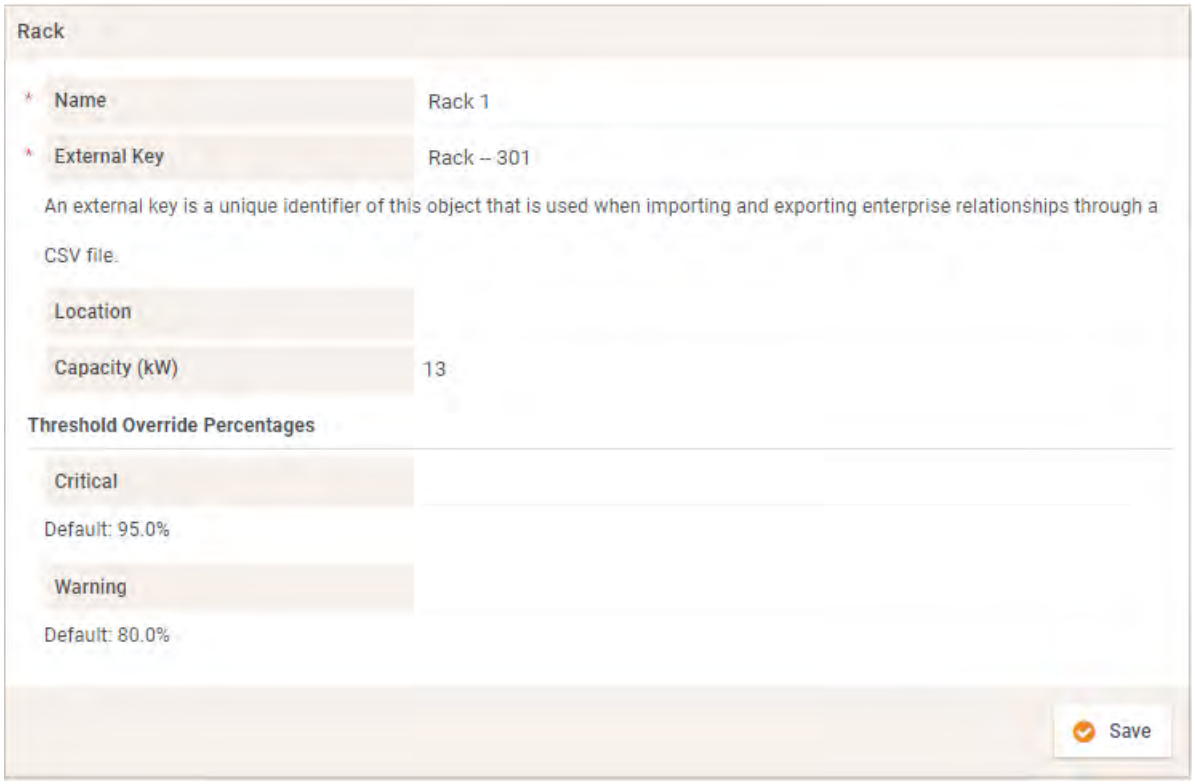
- Name (required field, max length: 255)
- Type (read-only field)
- Sensor Position (If position-able and active)
- Ordinal (read-only field)
- Facility Item (read-only field, link if view-able)
- State (read-only field, if stateful)

Note: Temperature Thresholds are not supported for sensors in the Outside Air position.

You must have the View role on the sensor or the global View role to see the sensor details card.

You must have the Operator role on the sensor or the global Operator role to edit the sensor details card if the sensor is active.

Rack Entity Details Card



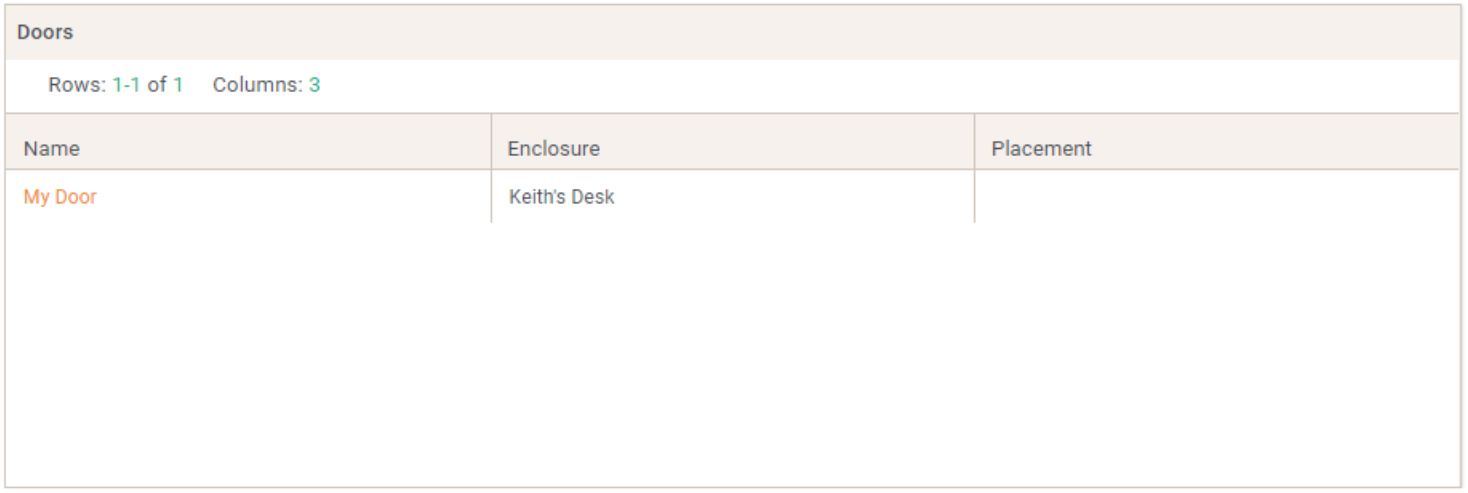
The fields contained in the Rack Entity Details Cards are as follows:

- Name (required field, max length: 255)
- External Key (required field, max length: 255, The external key is a unique identifier for this object that is used when importing and exporting enterprise relationships through a CSV file)
- Location (max length: 255)
- Capacity (kW): The capacity for the Rack must be manually entered in this field.
- Threshold Override Percentages
    - Critical (min Value: 0.01, max Value: 999.99, value must be greater than Warning value)
    - Default: “System Default Upper Critical Threshold” or "No Default"
    - Warning (min Value: 0.01, max Value: 999.99, value must be smaller than Critical value)
    - Default: “System Default Upper Warning Threshold” or "No Default"

You must have the View role on the **entity** or the global View role to see the **entity** details card.

You must have the Operator role on the **entity** or the global Operator role to edit the **entity** details card.

Door Table Module



The Door Table Module displays a read-only list of associated doors and is used on the following node/ entity pages:

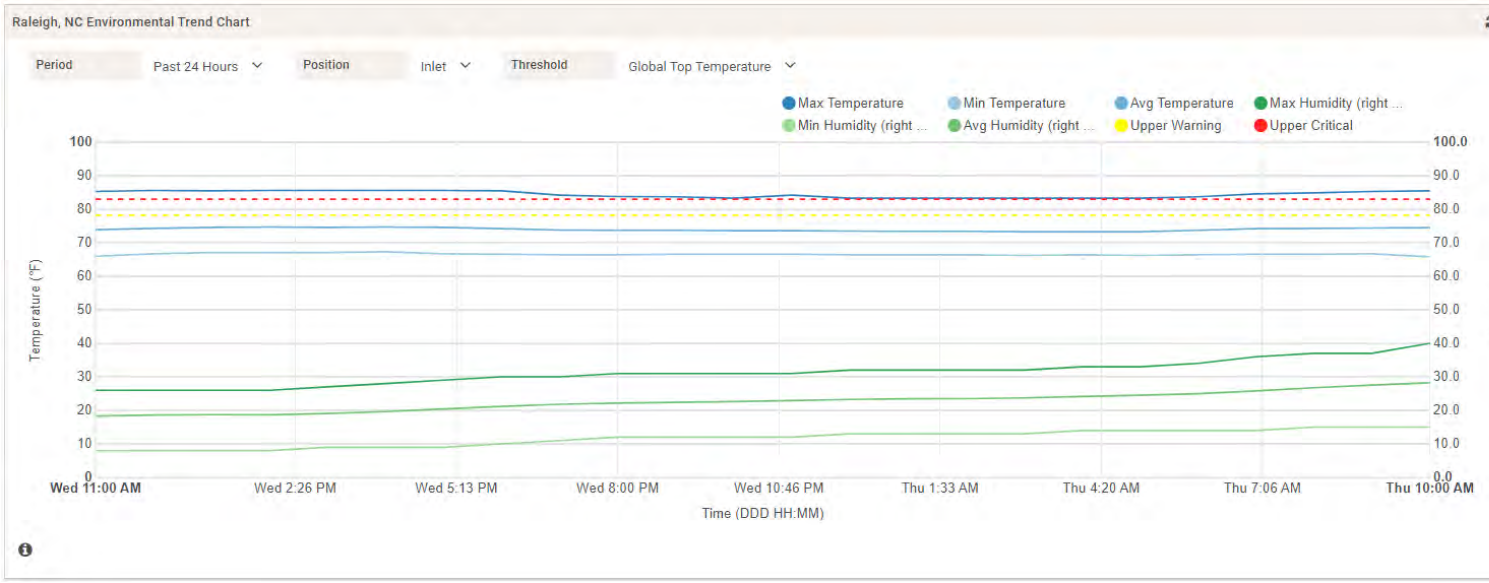
- Card Readers
- Keypads

The Door Table Module displays the following columns:

- Name: Door name with a navigable link to the Door Details page
- Enclosure: Name of the Door's EDM parent entity
- Placement: Placement tag (if set, blank if not)

Environmental Trend Chart (Summary)

The Environmental Trend Chart (Summary) displays trend lines for humidity and temperature in a summary view for all sensors in the selected node



The Environmental Trend Chart is used on the summary sub-tab on the following node/entity types:

- Data Center
- Floor
- Room
- Aisle

The period options for this chart include the following:

- Past Hour
- Last Hour
- Past 24-hours
- Yesterday
- Past Week
- Last Week
- Past Month
- Last Month
- Year-to-Date
- Past Year
- Last Year

If temperature thresholding is enabled, the following threshold lines are displayed:

- Upper Critical: Red dash line
- Upper Warning: Yellow dash line

When selecting the readings from the database, the average, maximum, or minimum value is selected based on the Statistic selection.

If no temperature or humidity data is available, then the chart displays a "No data to display" message.

Caution: The chart displays the Global Threshold value for temperature sensors. Individual sensors may have a local override value that is different than the global setting[period.]

Note: If the value for any threshold is null there will be no line for it.

The Environmental Trend Chart display the selected Average/Maximum/Minimum statistic over the selected period. To use the chart:

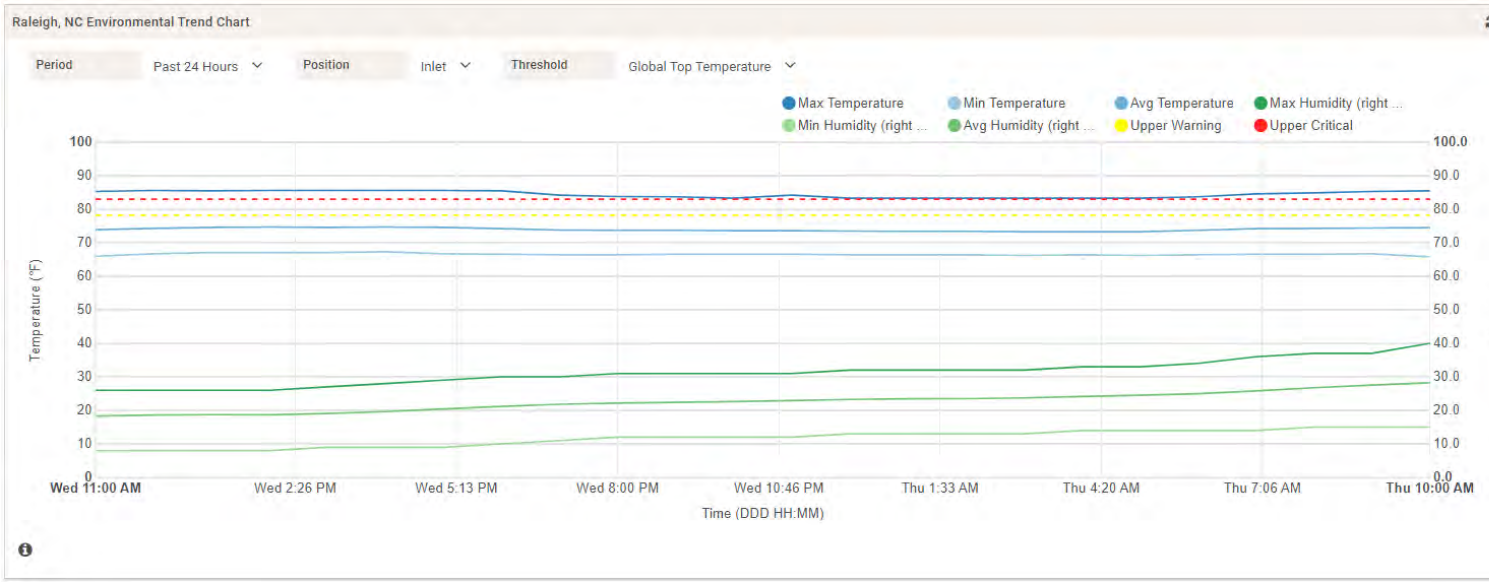
1. Use the drop-down to select the period for the data
2. Select the Average/Maximum/Minimum statistic that you want to chart.

*Note: If all sensor on a node have their **Position in Rack** set to **Outside Air**, no reading trend lines are displayed on the Environmental Trend Chart.*

Environmental Trend Chart - One line per sensor

This Environmental Trend Chart displays one reading trend line for each temperature or humidity sensor in the selected entity and its descendants. Additionally, the chart displays temperature thresholds lines if temperature thresholding is enabled.

There is one line per descendant inlet/outlet temperature sensor in the entity and its descendants There is one line per descendant for inlet/outlet humidity sensors in the entity. The readings come from the sensor readings and sensor readings rollup tables based on your selected granularity.



This chart is used on the following entities:

- Row
- Rack

If temperature thresholding is enabled, the following threshold lines are displayed:

- Upper Critical: Red dash line
- Upper Warning: Yellow dash line

When selecting the readings from the database, the average, maximum, or minimum value is selected in based on the Statistic selection.

If no temperature or humidity data is available, then the chart displays a "No data to display" message.

Note: The chart displays the Global Threshold value for temperature sensors. Individual sensors may have a local override value that is different than the global setting

Note: If the value for any threshold is null there will be no line for it.

Note: When the chart displays more than 20 reading trend lines, the legend will be hidden.

The period options for this chart include the following:

- Past Hour
- Last Hour
- Past 24-hours
- Yesterday

- Past Week
- Last Week
- Past Month
- Last Month
- Year-to-Date
- Past Year
- Last Year

Thresholding parameter for this chart include:

- Global Top Temperature
- Global Middle Temperature
- Global Bottom Temperature
- Global Not Set Temperature (“Not set” is a term used in the threshold setting)

The sensor positions that can be selected for this chart include:

- Inlet
- Outlet

If temperature thresholding is enabled, the following thresholde lines will be displayed:

- Upper Critical: Red dash line
- Upper Warning: Yellow dash line

To use the chart:

1. Select the period for the data
2. Select your desired thresholding parameter
3. Select the position for the sensors.
4. Select the Average/ Maximum/ Minimum statistic that you want to chart

Events Sub-Navigation Tabs

Events sub-navigation tabs contain an events table that lists all the events for the selected node/entity and its descendants. You must have both the View and Event Manager roles on a node/entity to view its Events sub-navigation page.

The Events sub-navigation pages can only be viewed by global site administrator, or administrator, or event manager role with entity view permission.

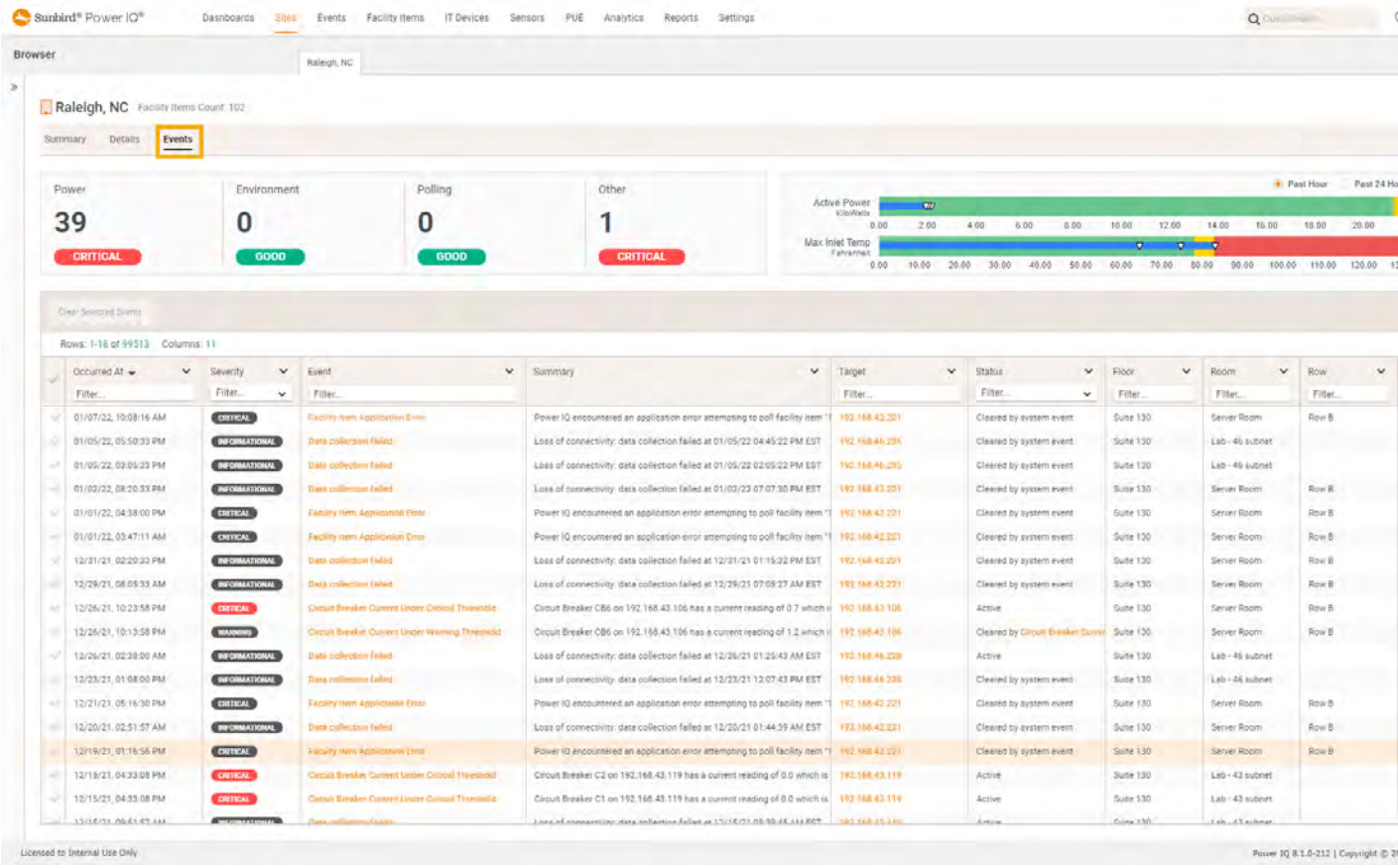
The events sub-navigation page is used on the following nodes/entities:

- Data Center
- Floor
- Room
- Aisle
- Row
- Rack
- Facility Item
- Sensor
- Door

To view the Events sub-navigation page for a specific entity:

1. Access the entity's Sites Tab page.
2. Select the Events sub-navigation link from the toolbar on the entity's Sites tab page, as shown in the screenshot

below.



All events for the selected entity and its descendants can be viewed and filtered from the Event's sub-navigational page.

The events table can be refreshed using the Refresh button in the toolbar.

By default, the following columns can be viewed by all entities:

- Occurred At
- Severity
- Event
- Summary
- Target
- Status

By default, the following columns are always hidden, can also be viewed and added to the far right of the table.

- Clearing reason
- Region
- Country

- Territory
- City
- Data Center

The table below lists additional default columns, and available columns following the defaults, depending on the entity type viewed:

Entity	Additional Default Columns	Additional Hidden Columns Available following the Defaults
Data Center	Floor Room Row Rack	Aisle Door
Floor	Room Row Rack	Floor Aisle Door
Room	Aisle Row Rack Door	Floor Room
Aisle	Row Rack Door	Floor Room Aisle
Row	Rack Door	Floor Room Aisle Row
Rack	Door	Floor Room Aisle Row

Facility Item	Rack Floor Room Aisle Row Rack Door
Sensor	Floor Room Aisle Row Rack Door
Door	Floor Room Aisle Row Rack Door

The table below lists available columns in order from left to right, with additional columns following the defaults, depending on the entity type viewed:

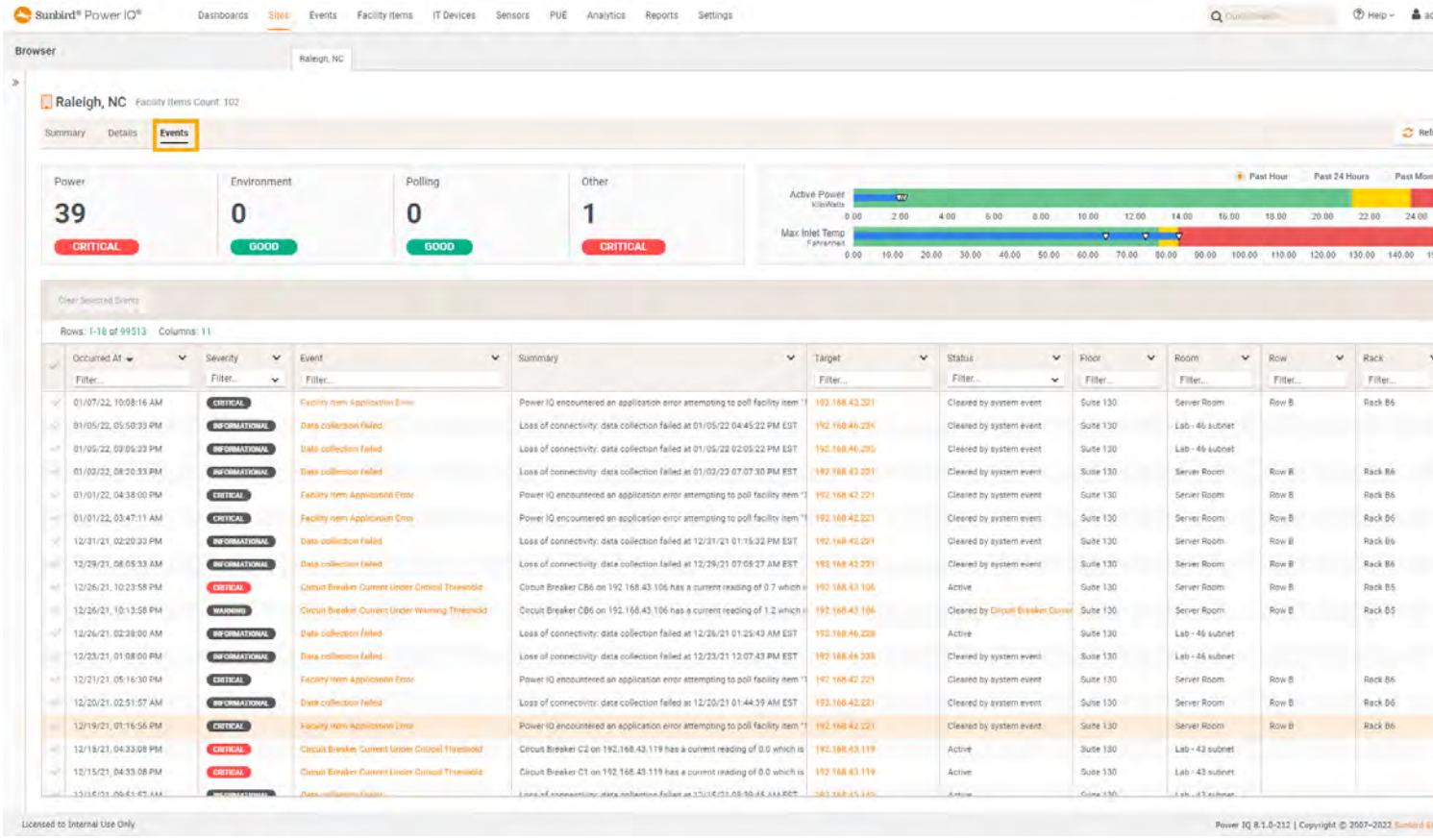
Visibility	Default Grid Configuration	Additional Columns when viewing Data Center entities	Additional Columns when viewing Data Center entities
Available Columns	Occurred At Severity Event Summary Target Status	Floor Room Row Rack	

The following columns can also be viewed and added to the far right of the table.

- Clearing reason
- Region
- Country
- Territory
- City
- Data Center
- Floor
- Room
- Aisle
- Row
- Rack
- Door

The Events sub-navigation page is used on the following entities:

- **Data Centers**
- **Floors**
- **Rooms**
- **Aisles**
- **Rows**
- Racks
- **All facility items**
- **All sensors,**
- **Doors**

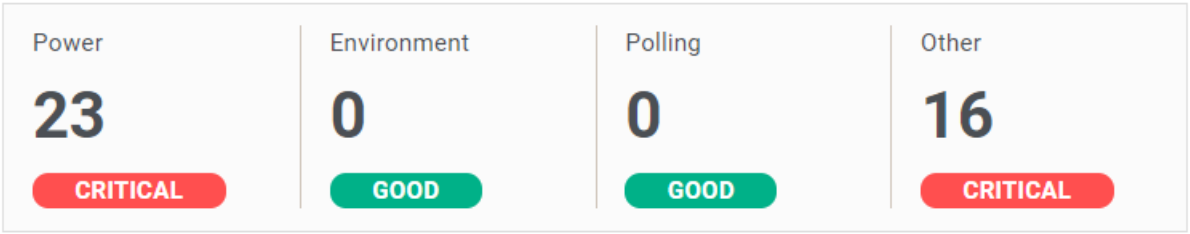


Event Summary Card

The event summary card is located directly below the toolbar and displays event counts and statusfor the following event groups:

- Power
- Environment
- Polling
- Other

The events are selected starting with the high severity levels from the active events. Next, the count of events with that severity level is displayed. This example shows that there are 23 active Critical Power events, but it's possible that there are 10 other Warning level events)



The Event Summary card is used on the following entity pages:

- Data Center
- Floor
- Room
- Row
- Rack
- All facility items (Rack PDU, Floor PDU, Standalone Meter),

Power Events

Power events are based on data from the following:

- Inlets
- Transfer Switches
- UPSs
- Circuit Breakers
- Racks
- Circuits
- Outlets

Environment Events

Environment events are based on data from environmental sensors.

Polling Events

Polling events are based on PDU connectivity data.

Other Events

Other events are based on data from the following:

- PDUs
- Asset Strips
- Doors
- PDU Config
- Internal Power IQ Services
- Dynamic Plugins

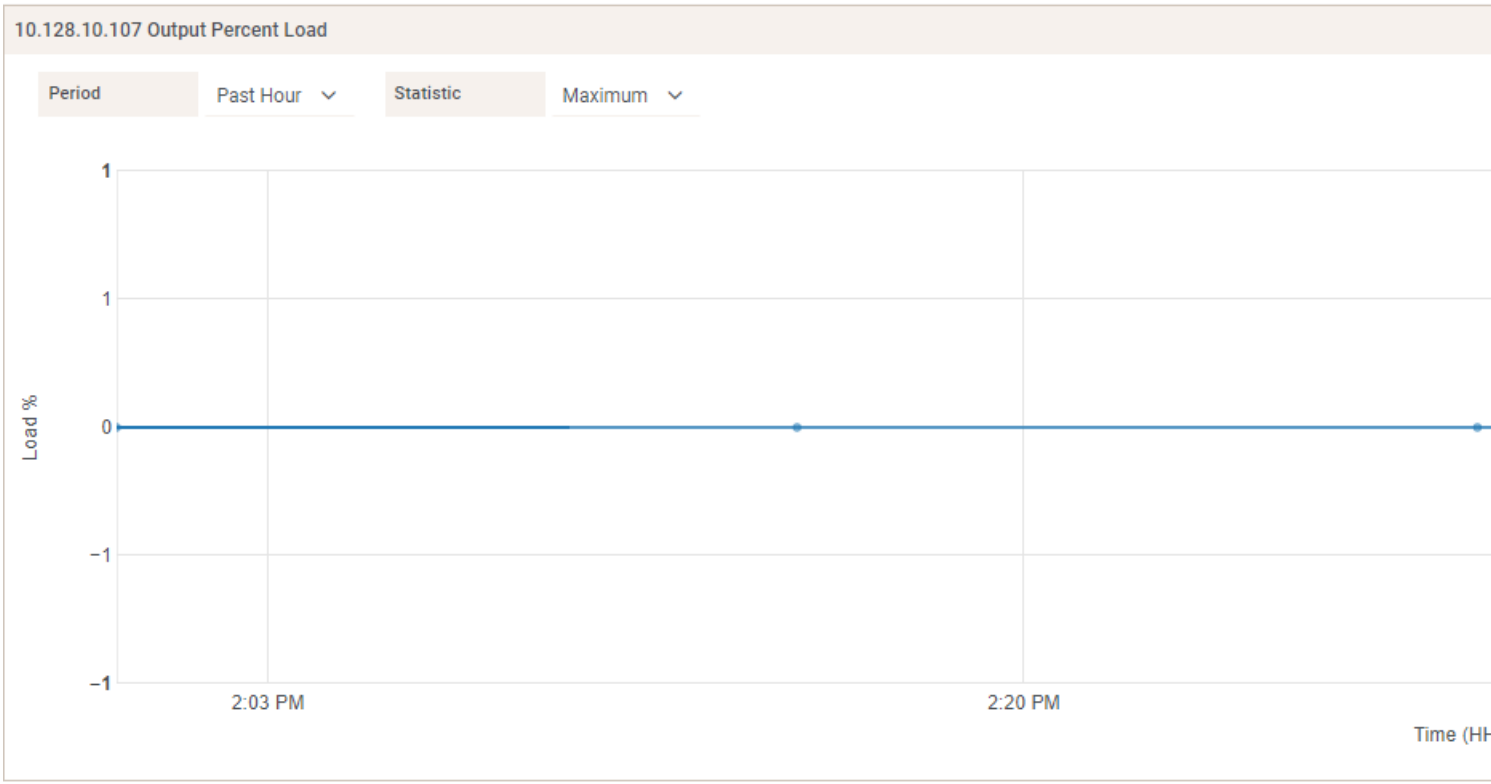
Severities

The severities displayed in the Event Summary card include:

- Critical
- Warning
- Good

UPS Output Percent Load Chart

An UPS Output Percent Load Chart displays the output percent load trend lines for the selected facility item, with one line per output. This is currently supported only on UPSs.



The Output Percent Load Chart is used on the following node types:

- Floor UPSs,
- Rack UPS

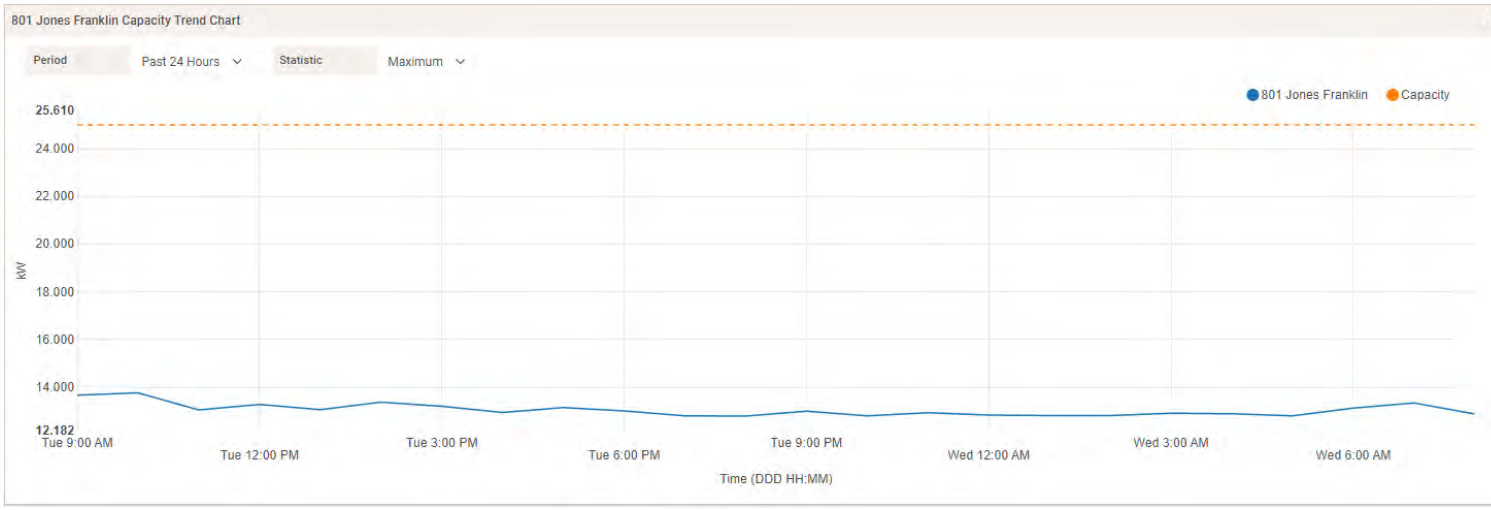
The period options can be selected from the following options:

- Past Hour
- Past Day
- Past Month

To use the chart:

1. Select the period for the data
2. Select the statistic for the data (Maximum by default)

Rack Capacity Trend Chart



A Rack Capacity Trend Chart is displayed on the summary sub-tab on Rack entity pages.

The Capacity Trend Chart displays up to two trend lines, one for the Capacity data and the other for the Readings data. The lines will only display if there is data. The orange line represents the Capacity data and the blue line represents

Additionally, if rack threshold is enabled, the following threshold lines will be displayed:

- Upper Critical threshold: Red dash line
- Upper Warning threshold: Yellow dash line

If a value for the Rack Capacity is not set (capacity is used to calculate actual threshold), no lines for thresholds will display.

If the value of a global threshold and the local override are both not set for a given threshold, then shall be no line for that threshold.

The readings line is the sum of the following two things

- The sum of All inlet readings where source = true for rack-able PDUs (Rack PDUs, Rack ftransferr Switch, and Rack UPS) that are descendants of the entity.
- The sum of circuit readings from devices that are associated with IT Devices that are decendants of the entity.

The available Statistic options for charting the data values in both the Circuit Breaker Trendline are as follows:

- **Average**
- **Maximum (Default)**
- **Minimum**

The period of the data of the data can be selected from the following options:

- **Past Hour**
- **Last Hour**
- **Past 24-hours**
- **Yesterday**
- **Past Week**
- **Last Week**
- **Past Month**
- **Last Month**
- **Year-to-Date**
- **Past Year**
- **Last Year**

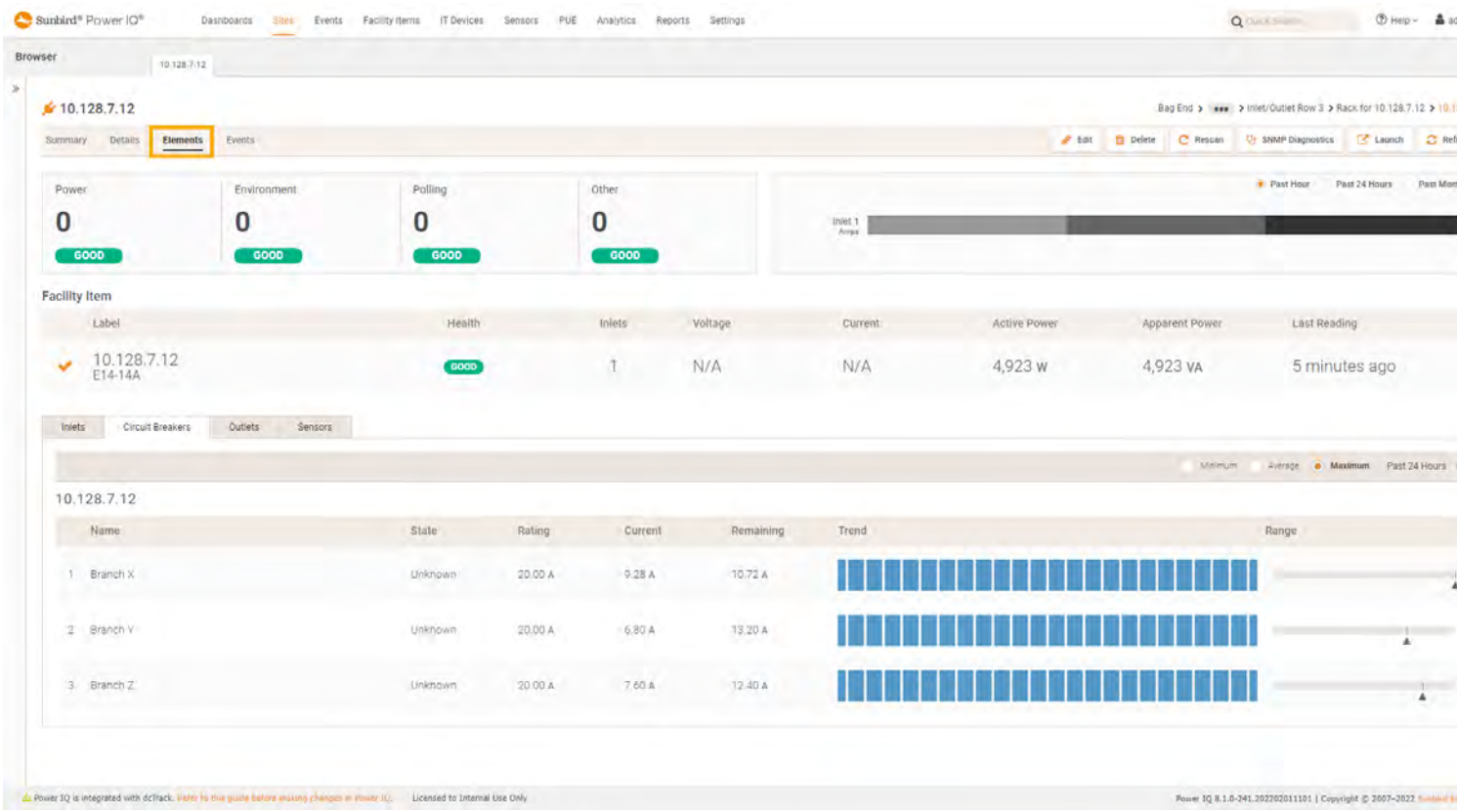
To use the chart:

1. Use the drop-down to select the period for the data
2. Select the Average/ Maximum/ Minimum statistic that you want to chart

Elements Sub-Navigation Tab

The Elements sub-navigation tabcontain several widgets that display data about an entity's elements. The widgets vary by facility item type.

Users with the View role on a node can view the node's elements sub-navigation page by selecting the node in the tree view and then selecting the Details link from the toolbar on the nod's tab, as shown in the screenshot below.



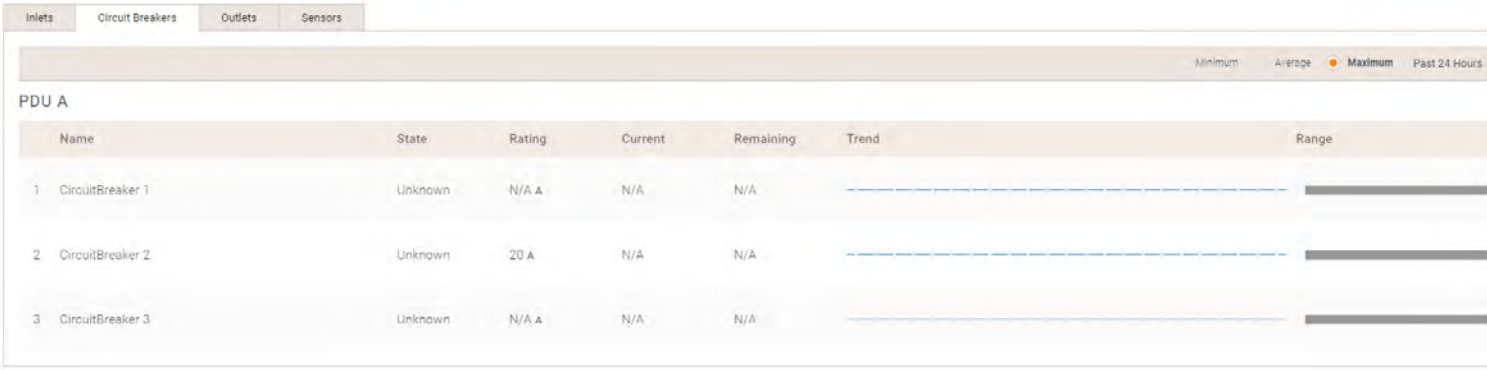
The widgets available on the Elements sub-nav page vary by facility item type and include the following:

- *Circuit Widget for Facility Items* on the next page
- *Circuit Breaker Widget* on page 173
- *Devices Widget* on page 176
- *Facility Items List Widget* on page 179
- *Inlets with Inlet Poles Widget* on page 181
- *Outlets and Circuits for Racks Widget* on page 183
- *Outlets Widget for Facility Items* on page 188
- *Panels for Facility Items Widget* on page 194
- *Sensor Widget* on page 195
- *UPS and Battery Widgets* on page 199

Circuit Widget for Facility Items

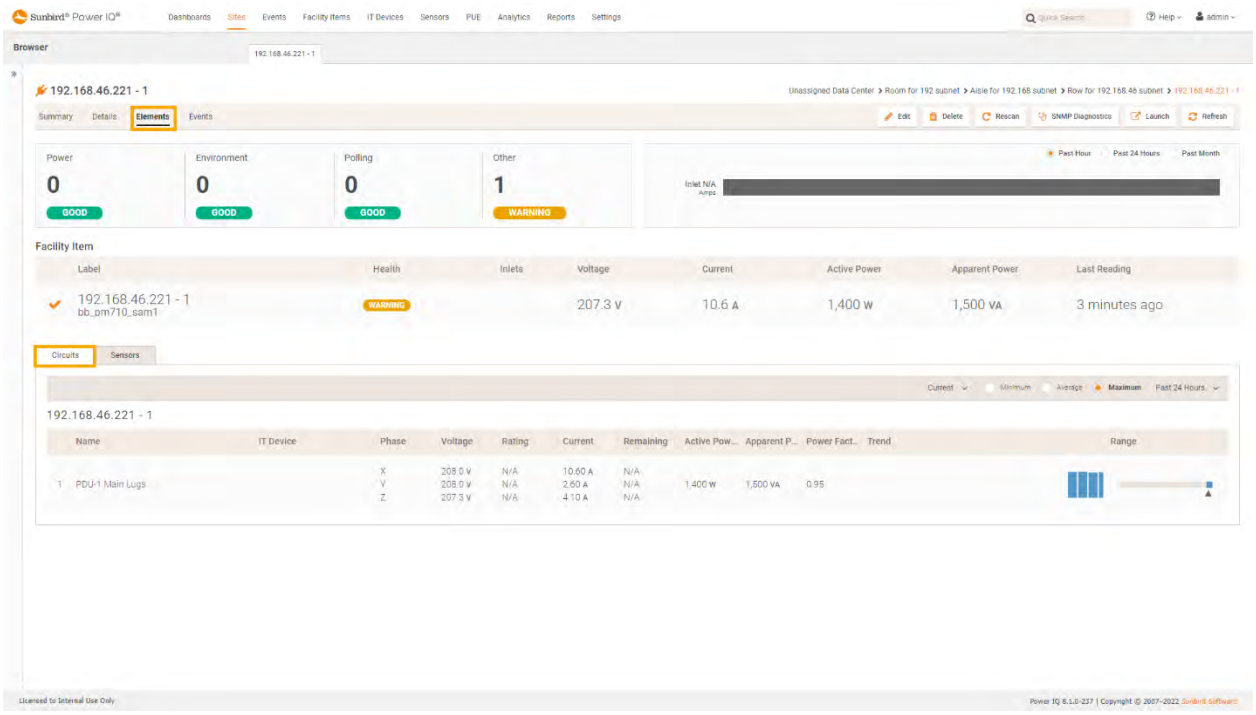
The Circuit Widget displays circuit readings and is accessible from the Elements sub-navigational menu on the following facility items tabs:

- Rack UPS
- Floor UPS
- Floor PDU
- Power panel
- Standalone meter



To view the Circuit Widget for a specific facility item:

1. Access the facility item's Sites Entity tab
2. On the facility item's Sites Entity tab, select the Elements sub-navigational link in the facility item's toolbar as shown in the screenshot below:



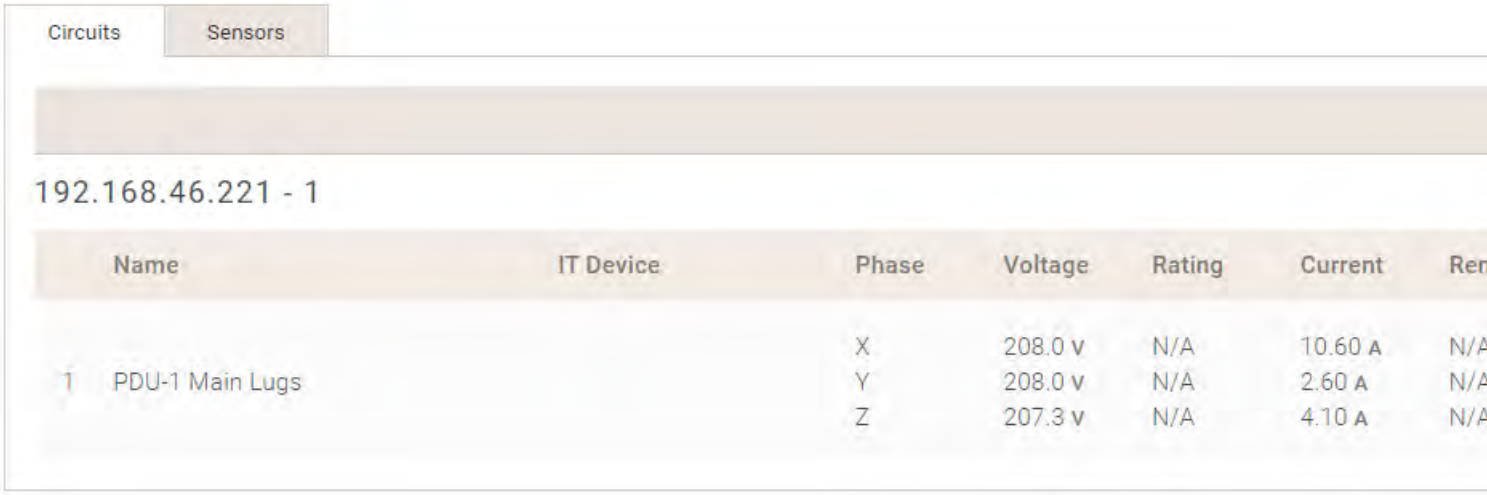
The columns in the Circuit Widget are as follows, in order from left to right:

- **Ordinal (No header)**
- **Name**
- IT Device
- Phase
- Voltage
- Rating (In Amps)
- Current
- Remaining:
    - Remaining capacity of each circuit pole in ascending order of circuit pole ordinal.
    - The number of entries in this column matches those of Phase, Voltage, and Rating.
- Active Power
- Apparent Power
- Power Factor
- Trend Chart
- Range Chart

Note: Active power, apparent power, and power factor are one entry per circuit no matter the wiring.

Note: "NA" will be displayed if there is no value available for a column

Circuits for Facility Items Trendline and Range Charts



The Circuits for Facility Items Trendline and Range Charts display the selected Average/ Maximum/ Minimum value over the time range/ granularity. To use these charts:

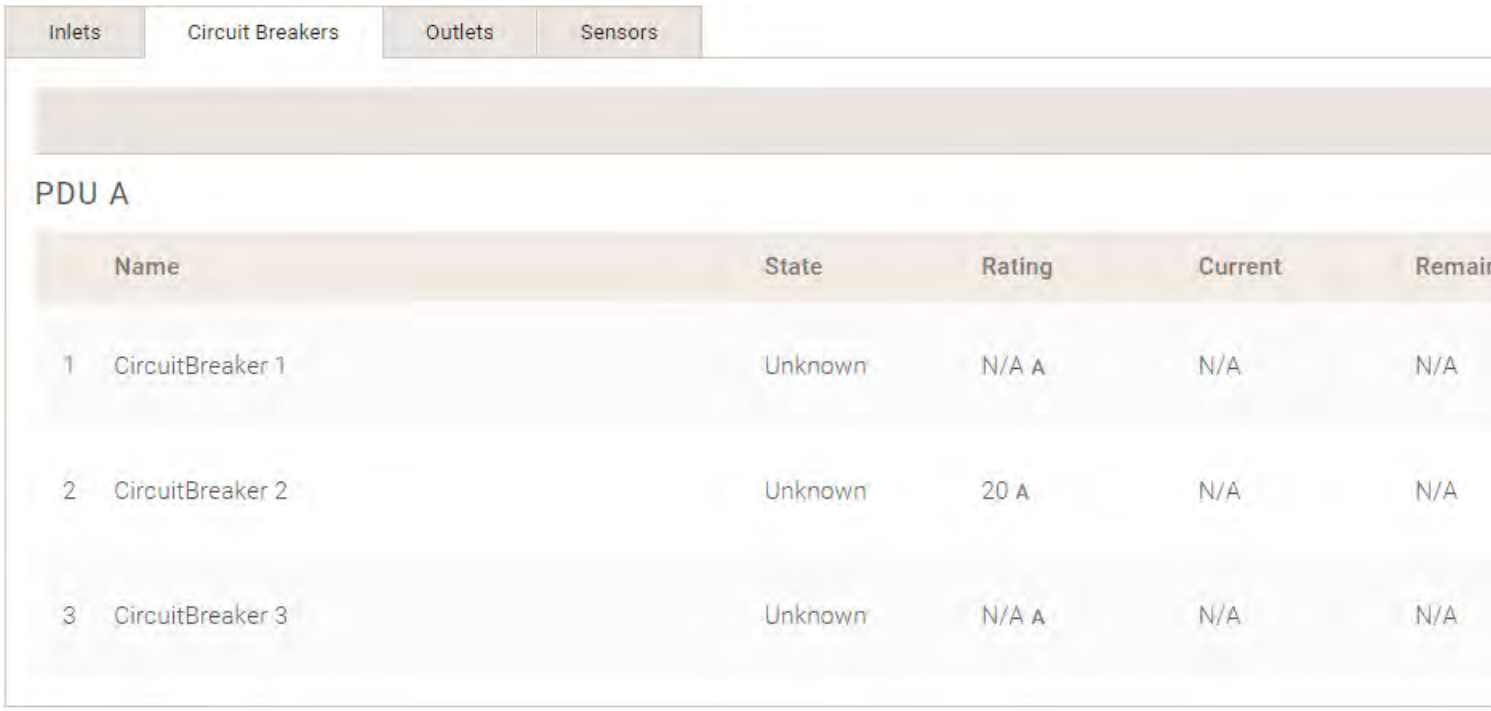
1. Select the Average/ Maximum/ Minimum value you want to chart
2. Use the drop-down to select the time range/ granularity for the data

The available radio-button options for charting the data values in both the Circuit Breaker Trendline and Range Charts are as follows:

- Minimum
- Average
- **Maximum (Default)**

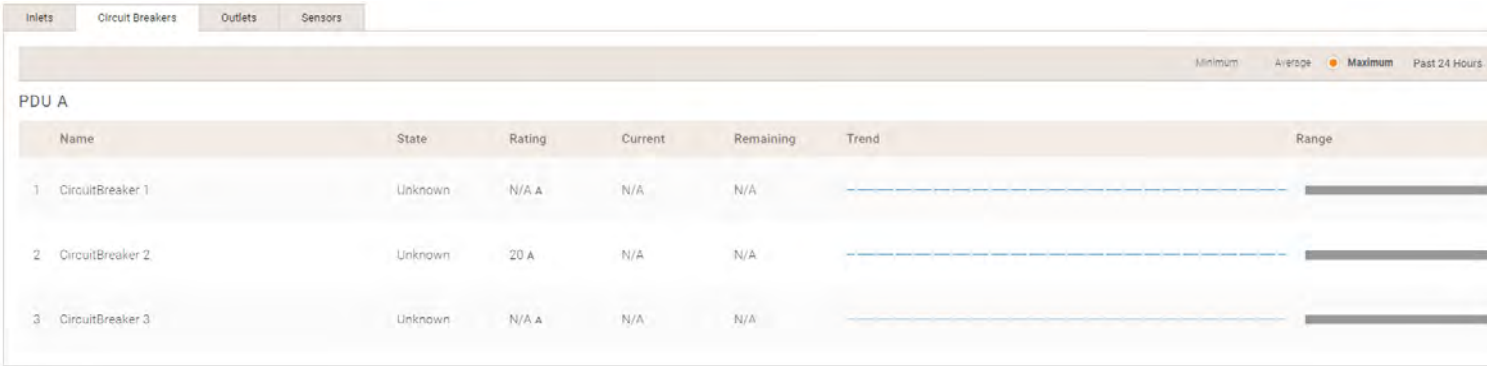
The available time range and data granularity options for the Circuit Breaker Trendline and Range Chart are as follows:

- Past Hour: Raw readings
- Past 24 Hours (default): Hourly rollups
- Past Week: Daily rollups
- Past Month: Daily rollups
- Past Year: Monthly rollups



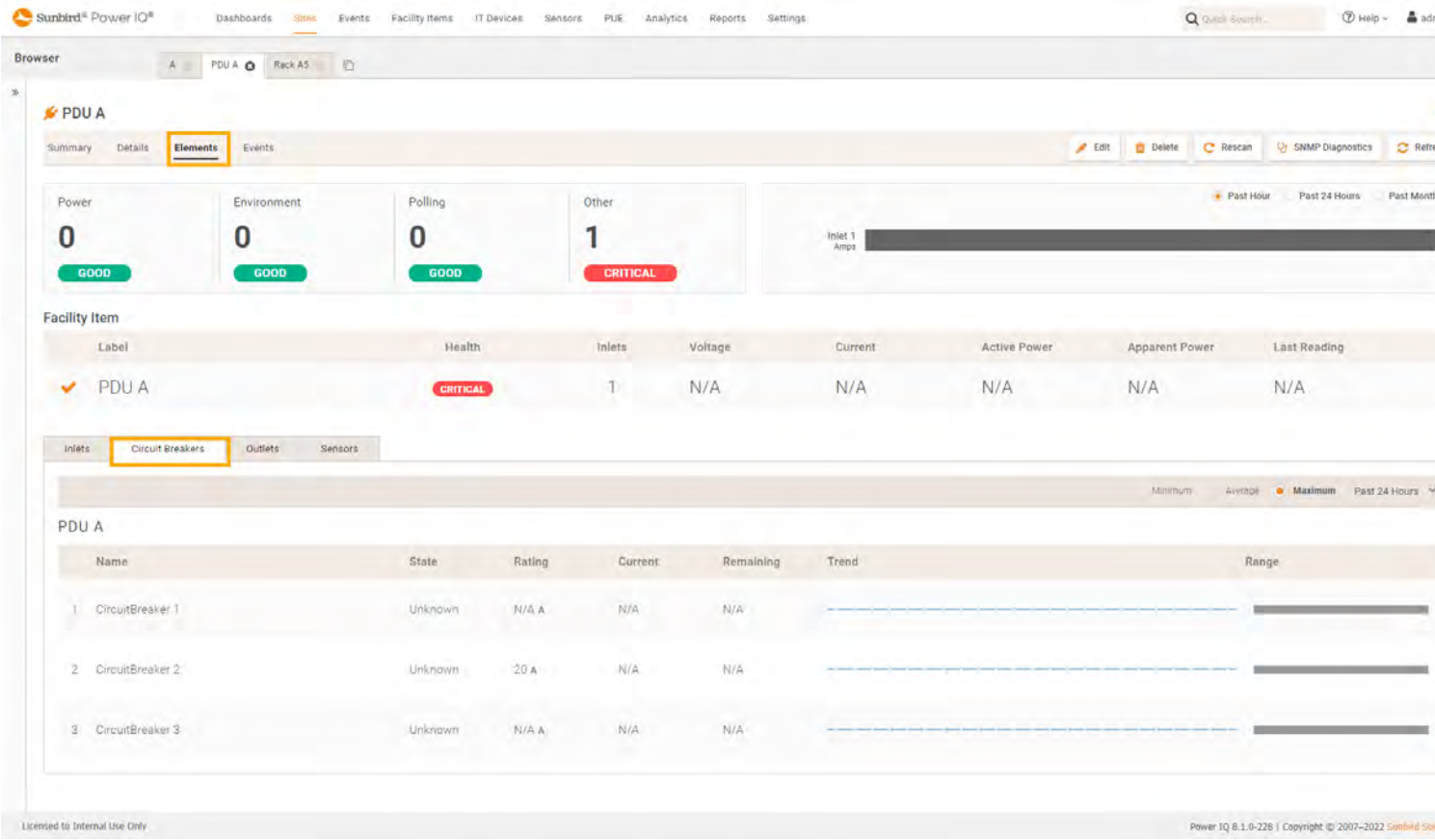
Circuit Breaker Widget

The Circuit Breakers Widget is accessible from the Elements sub-navigational menu on Facility Item node/entity pages and displays Circuit Breaker readings.



To view the Circuit Breakers Widget for a specific facility item:

1. Access the facility item's Sites Tab page
2. On the facility item's Sites Tab page, select the Elements sub-navigational link in the facility item's toolbar as shown in the screenshot below:

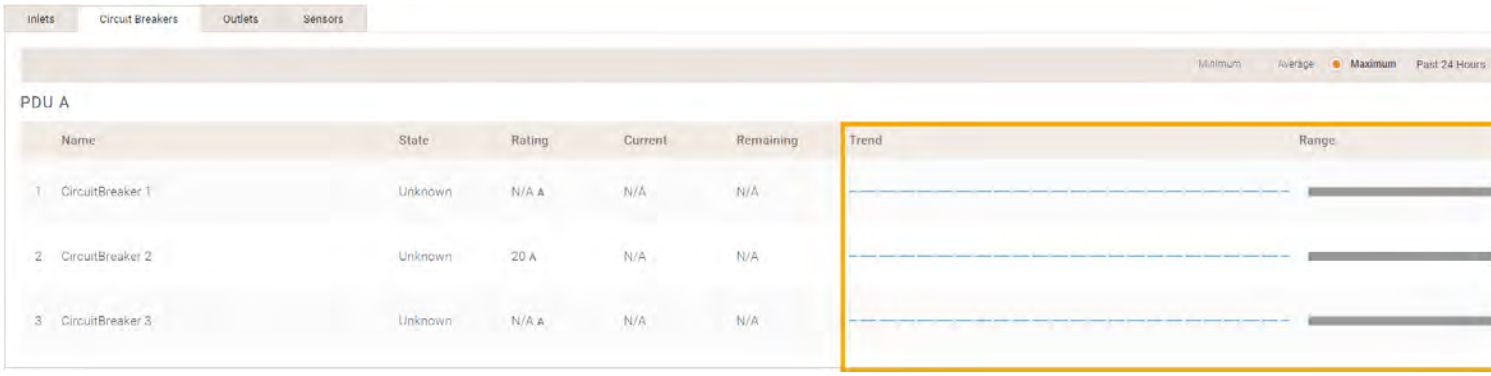


The columns in the Circuit Breakers Widget are as follows, in order from left to right:

- Number (No column heading)
- Name
- State
- Rating (In Amps)
- Current
- Current Trend Chart (Displayed only if there is data)
- Range Chart (Displayed only if there is data)
- Remaining: The difference between the rating and the current.

Note: "NA" will be displayed if there is no value available for a column

Circuit Breaker Trendline and Range Charts



The Circuit Breaker Trendline and Range Charts display the selected Average/ Maximum/ Minimum value over the time range/ granularity. To use these charts:

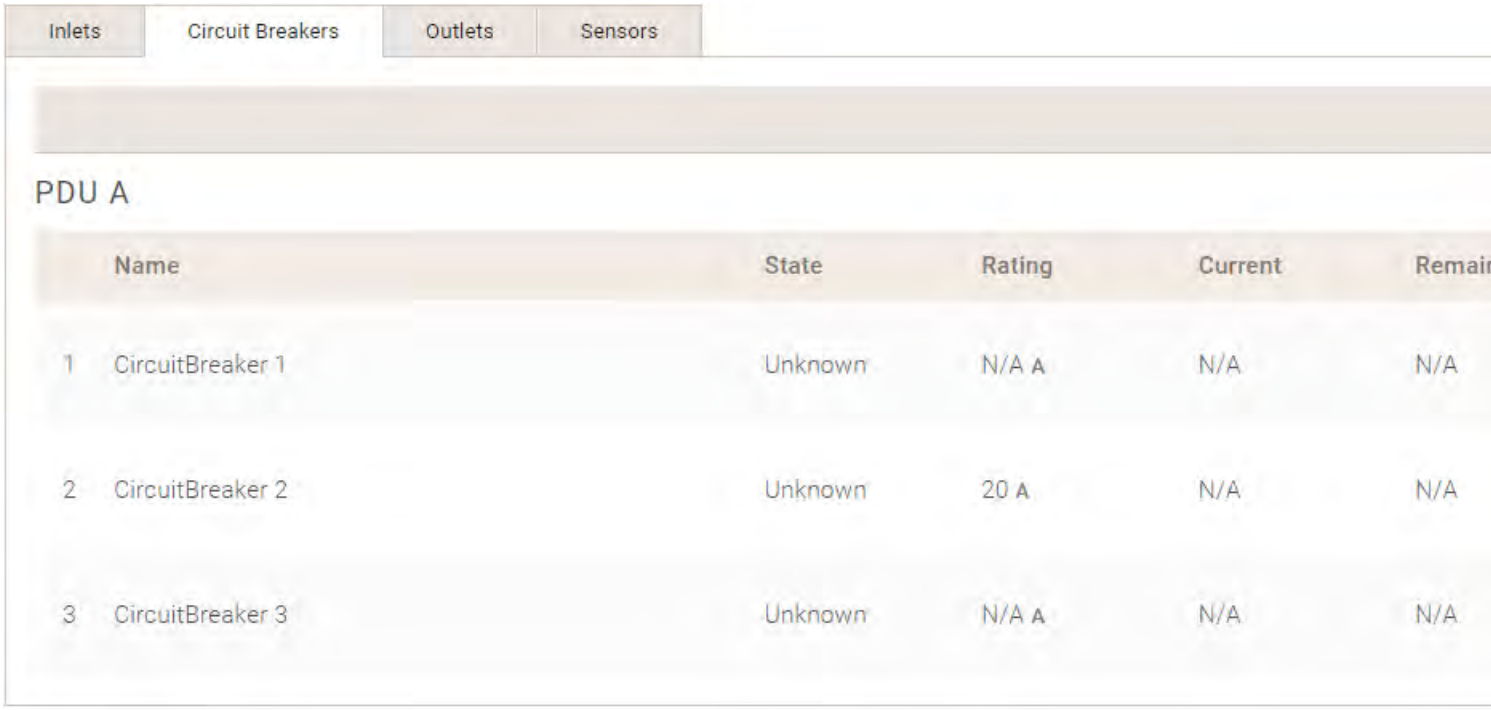
1. Select the Average/ Maximum/ Minimum value you want to chart
2. Use the drop-down to select the time range/ granularity for the data

The available radio-button options for charting the data values in both the Circuit Breaker Trendline and Range Charts are as follows:

- **Minimum**
- Average
- **Maximum (Default)**

The available time range and data granularity options for the Circuit Breaker Trendline and Range Chart are as follows:

- Past Hour: Raw readings
- Past 24 Hours (default): Hourly rollups
- Past Week: Daily rollups
- Past Month: Daily rollups
- Past Year: Monthly rollups

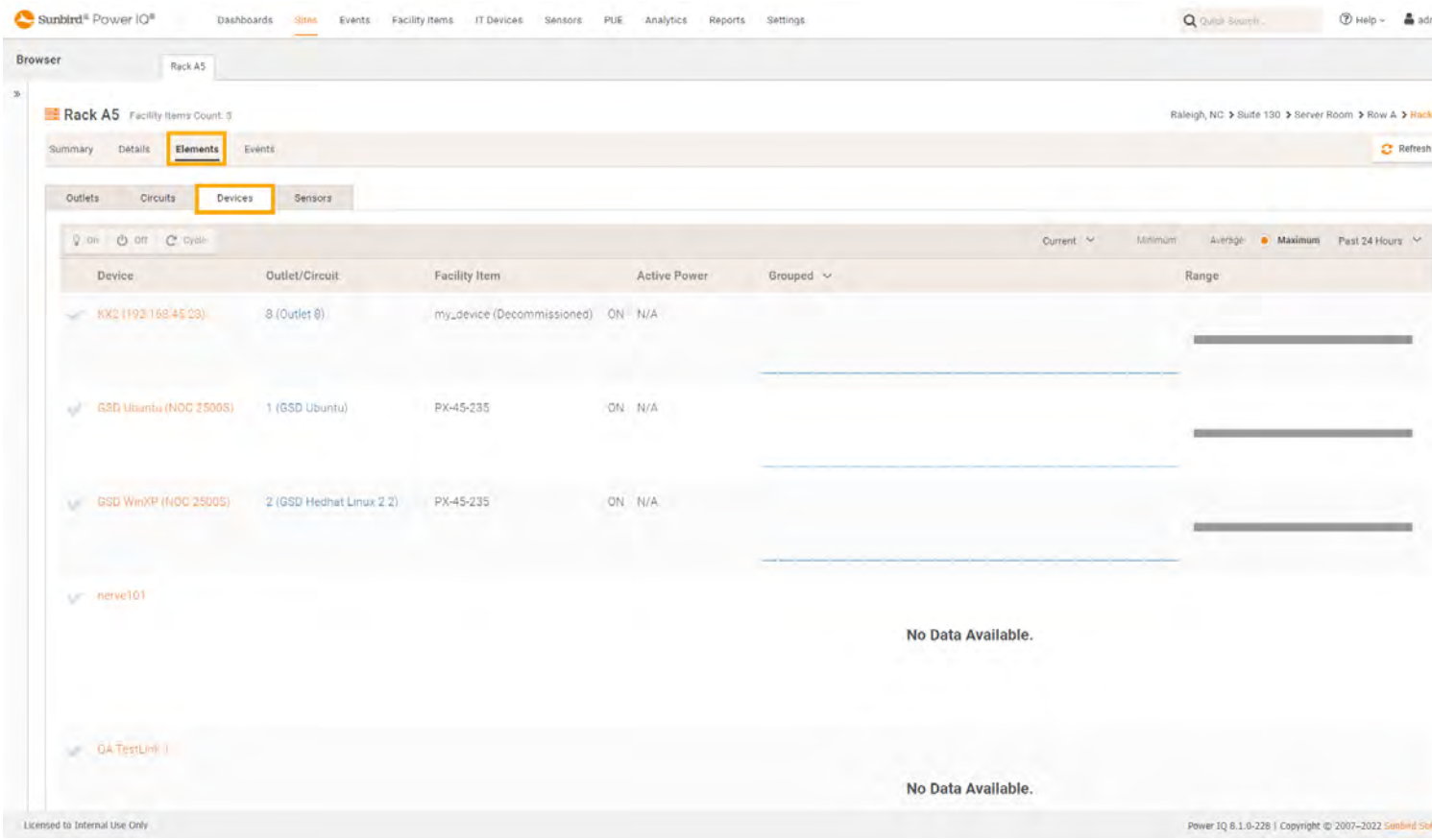


Devices Widget

The Devices Widget displays Device readings and is accessible from the Elements sub-navigational menu on Rack pages.

To view the Devices Widget for a specific Rack:

1. Access the Rack's Sites Tab page
2. On the Rack's Sites Tab page, select the Element's sub-navigational link in the Rack's toolbar, then select the Devices tab as shown in the screenshot below.

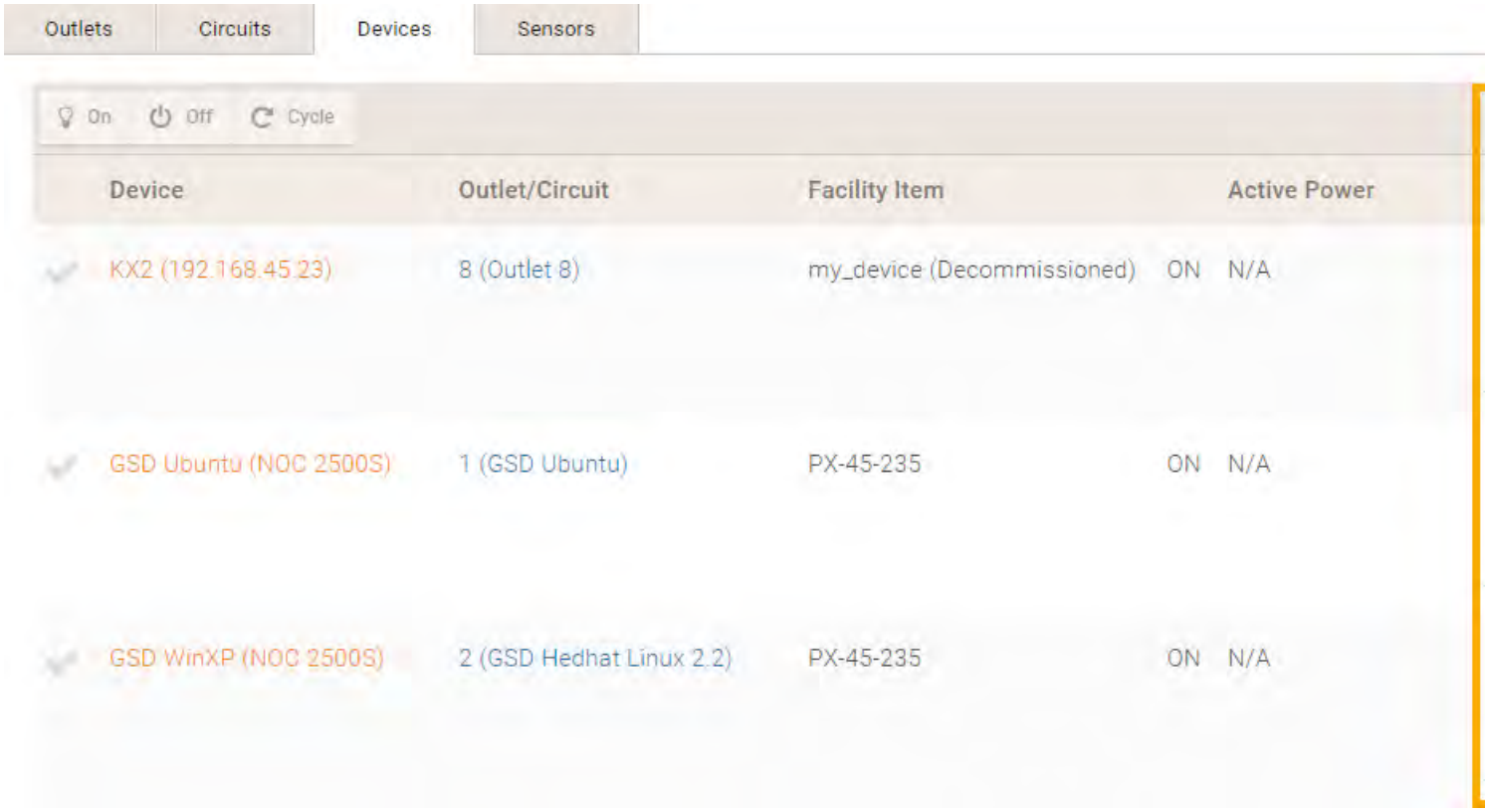


The columns in the Devices Widget are as follows, in order from left to right:

- Checkbox/ Selector (No header)
- Device: The device name is displayed next to the checkbox (listed alphabetically in ascending order.)
- Outlet/ Circuit
- Facility Item
- State (No header): **On/ Off values only**
- Active Powe
- Trend Chart
- Range Chart

Circuit and Outlets Trendline and Range Charts

The Circuit Trendline and Range Charts display the selected Minimum/ Average / Maximum value over the selected time range.



The available options for charting the data value in both the Circuit Breaker Trendline and Range Charts are as follows:

- Minimum
- Maximum (Default)
- Average

The available options for measurement include:

- Current (default)
- Active Power

The available time period and data granularity options for the Circuit Breaker Trendline and Range Chart are as follows:

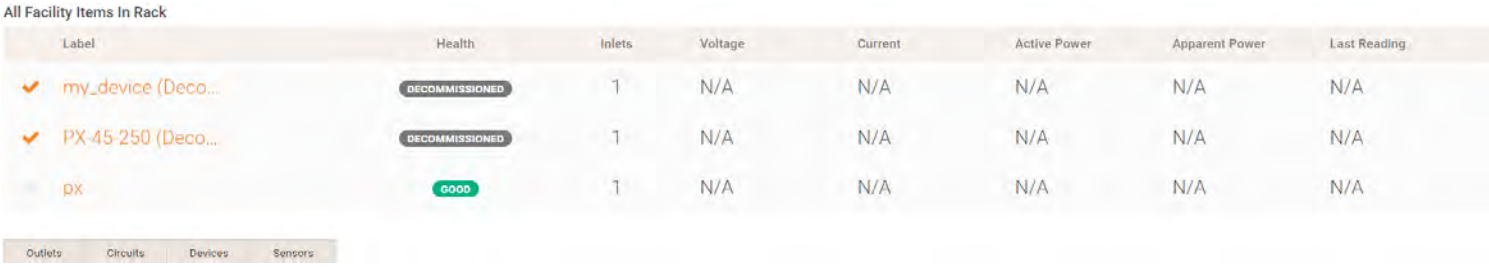
- Past Hour: Raw readings
- Past 24 Hours (default): Hourly rollups
- Past Week: Daily rollups
- Past Month: Daily rollups
- Past Year: Monthly rollups

The Grouped/Stacked Dropdown modifies how the data is displayed as follows:

- Grouped: Each values has a horizontal bar
- Stacked: Each value is stacked on a single vertical bar

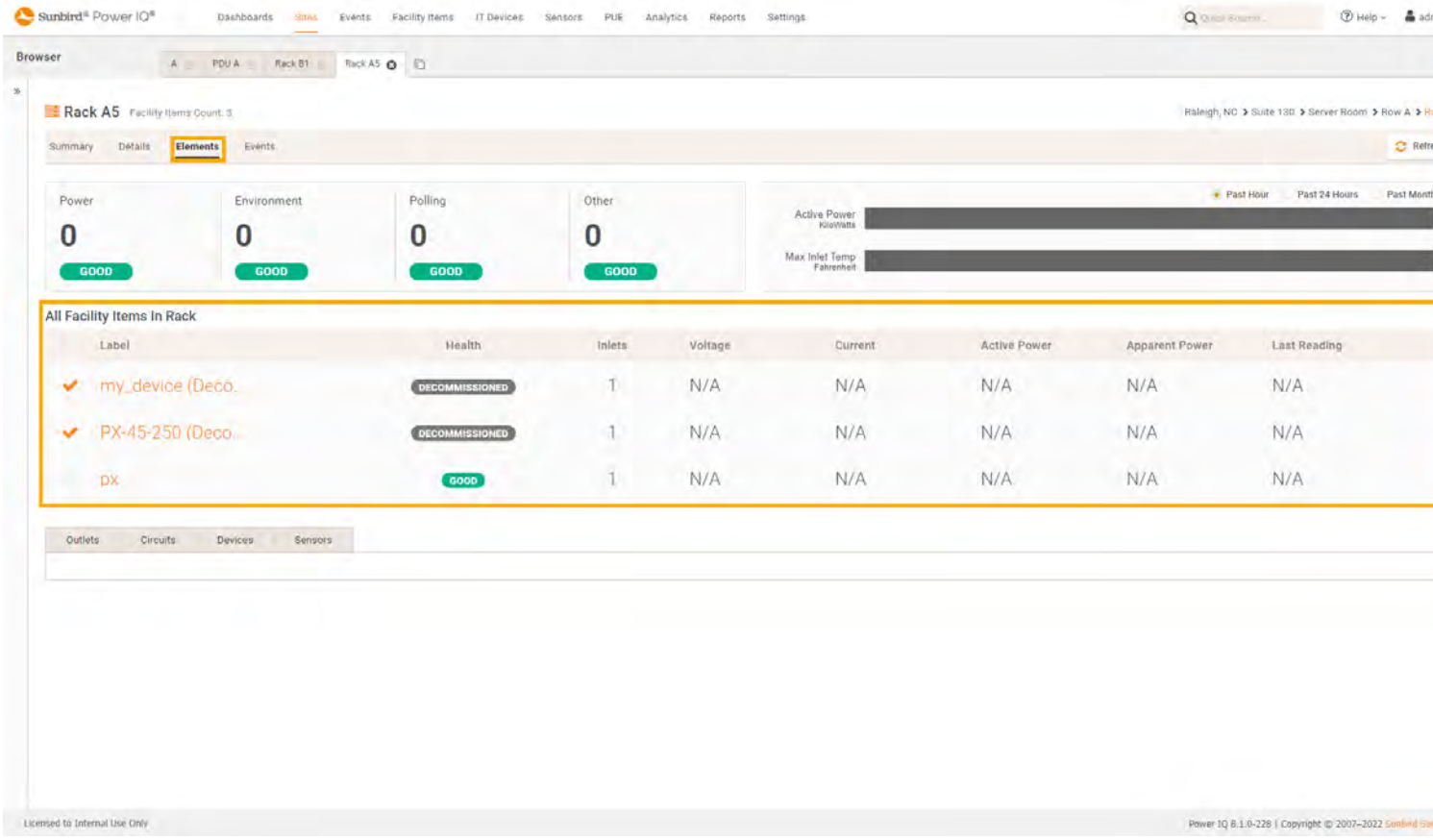
Facility Items List Widget

The Facility Items List Widget is accessible from the Elements sub-navigational menu on Rack and Facility Items node/entity Sites pages and displays all facility items associated with the node/entity.



To view the Facility Items List Widget for a specific node/entity:

1. Access the node/entity's Sites Tab page
2. On the node/entity's Sites Tab page, select the Elements sub-navigational link in the node/entity's toolbar as shown in the screenshot below:



The columns in the Facility Items Widget are as follows, in order from left to right:

- Checkbox/ Selector (No header)
- Label
    - Follows the global setting, and therefore may display Name, IP Address, or Inlet
    - On Rack pages: Clickable link to the entity/ node's Sites Tab page
- Health
- Inlets: Displays the number of inlets on the facility item
- Voltage
- Current
- Active Power
- Apparent Power
- Last Reading: Timestamp of the latest reading for the facility item
-

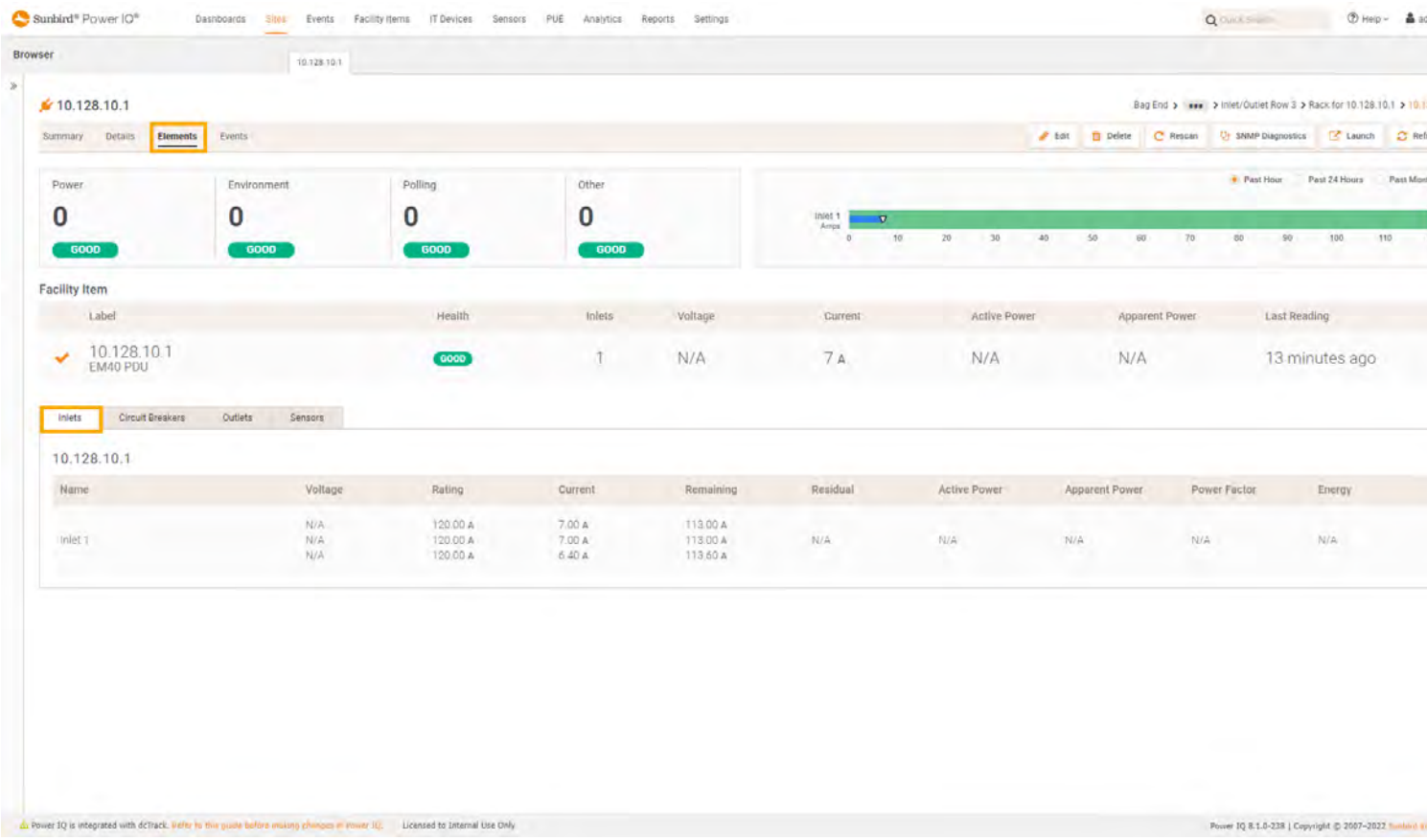
Note: "NA" will be displayed if there is no value available for a column

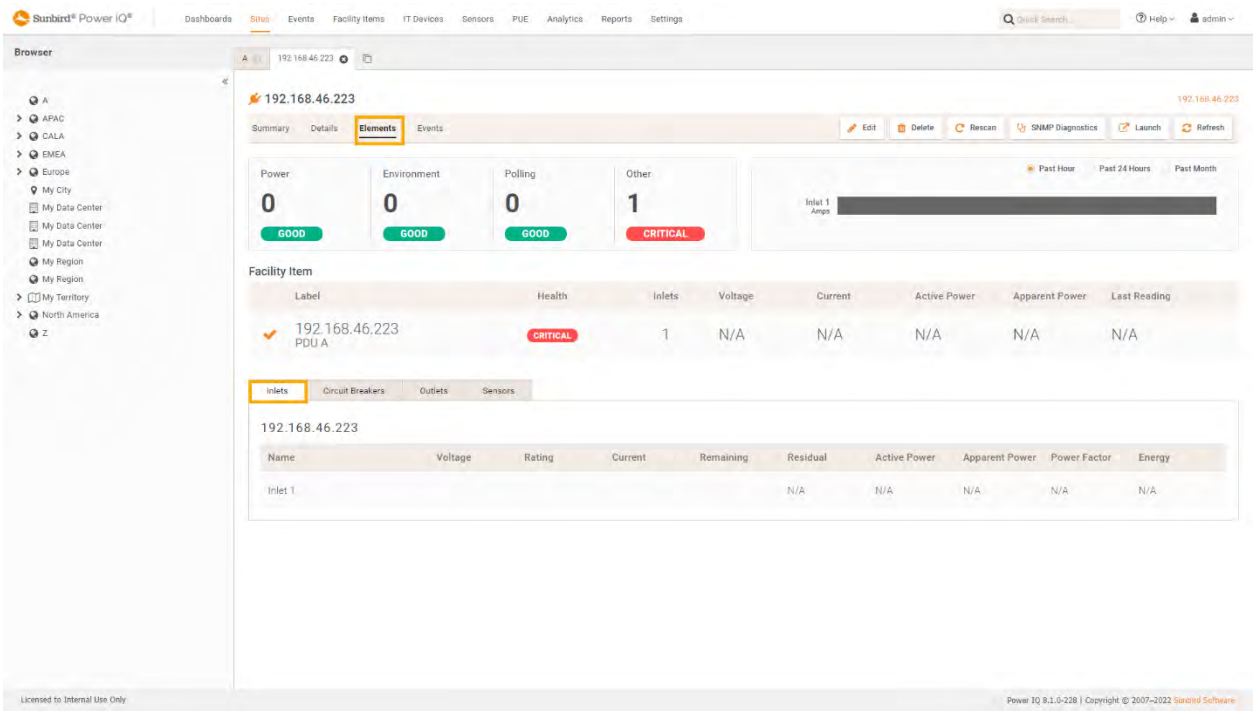
Inlets with Inlet Poles Widget

The Inlets with Inlet Poles Widget is accessible from the Elements sub-navigational menu on all Facility Item nodeentity pages, except for standalone meters, and displays Circuit Breaker readings.

To view the Inlets with Inlet Poles Widget for a specific rack:

1. Access the rack's Sites tab.
2. On the rack's Sites tab, select the Elements sub-navigational tab in the facility item's toolbar as shown in the screen shot below, the Inlets tab is open by default.





The columns in the Inlets with Inlet Poles Widget are as follows, in order from left to right:

- Name: Displays Inlet name (if available, otherwise displays “Inlet <inlet_number>”)
- Voltage: Voltage of each inlet pole in ascending order of inlet pole ordinal
- Rating (In Amps): Displays the Rating of each inlet pole, which in turn is the actual inlet rating.
- Current (In Amps): Current of each inlet pole in ascending order of inlet pole ordinal
- Remaining: Remaining capacity of each inlet pole in ascending order of inlet pole ordinal. The difference between the rating and the current.
- Residual: Residual Current of the Inlet in Amps
- Active Power (W): Active Power of the Inlet in W
- Apparent Power: Apparent Power of the Inlet in VA
- Power Factor: Power Factor of the Inlet (unit-less)
- Energy: Energy value for the inlet in WHr

Note: Power IQ collects and displays rated current for Eaton ePDUs.

Note: Power IQ collects Rated VA and Rated Amps readings for single-inlet Server Technology Pro1 and Pro2 Series PDUs and will only display this data in the Inlets with Inlets poles widgett when the data is available.

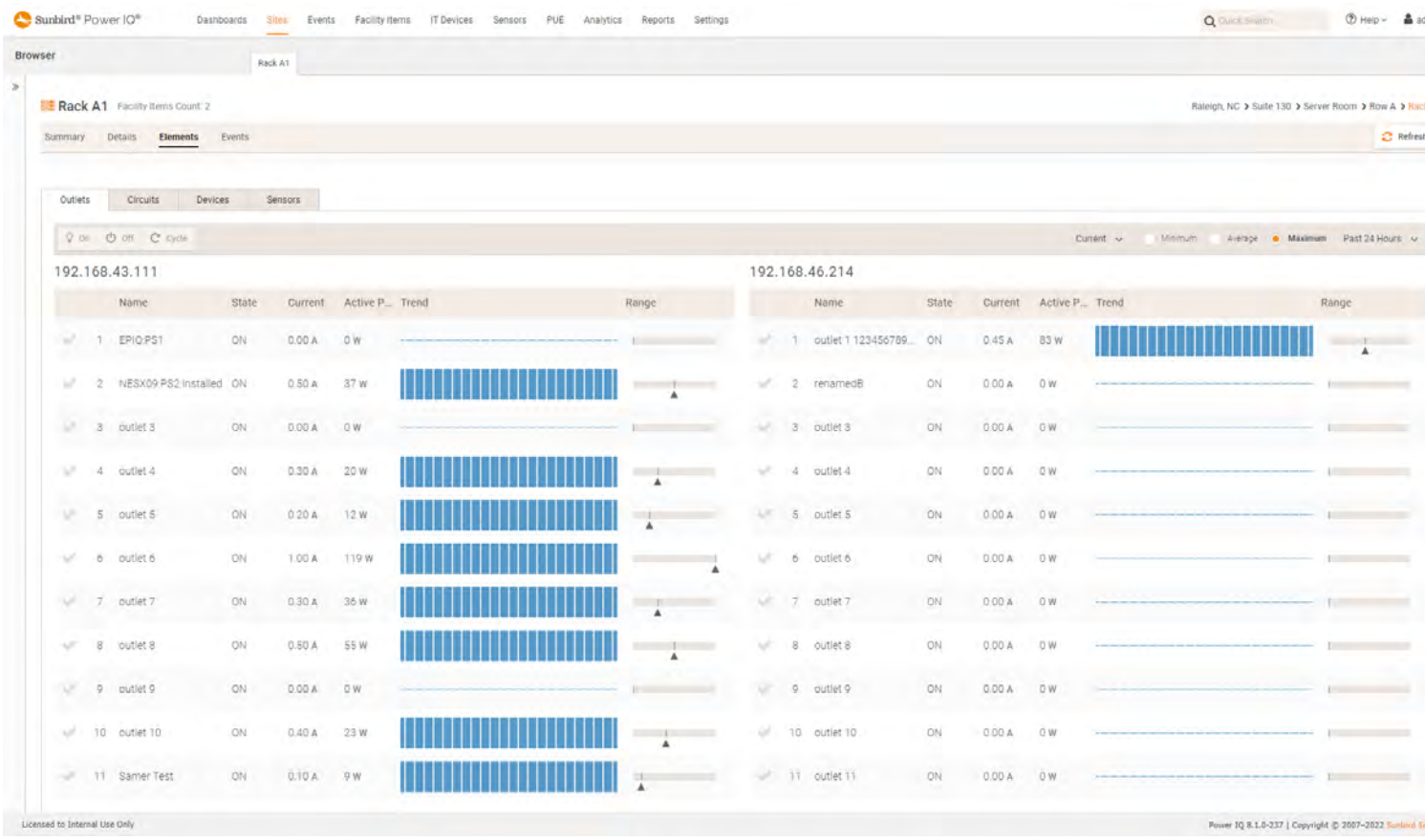
Note: Only one entry is displayed for single pole PDUs; Three entries are displayed for three phase PDU

Note: "N/A" is displayed if there is no value available for a column

Note: Power IQ only model standalone meters as having circuits.

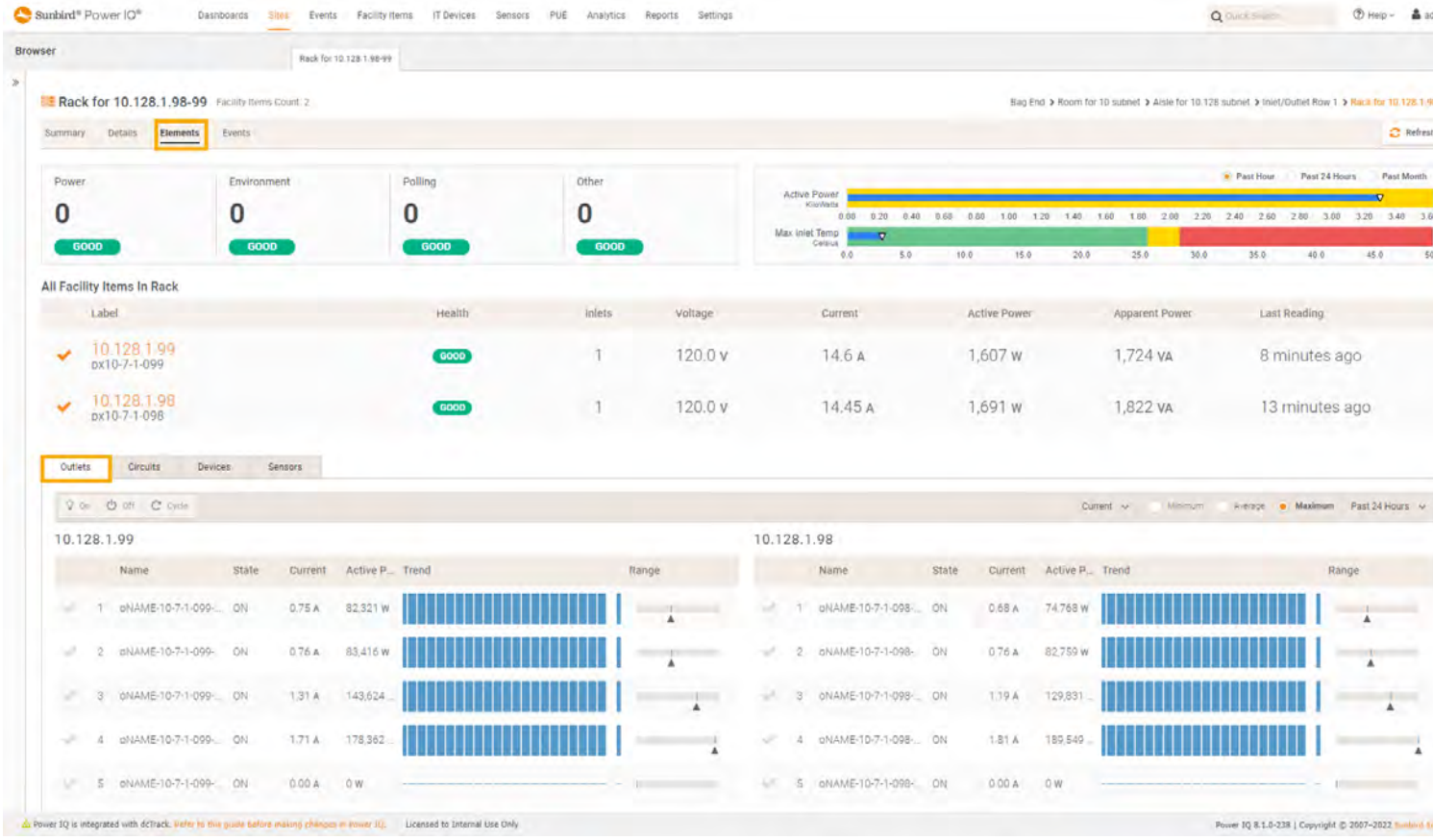
Outlets and Circuits for Racks Widget

The Outlets and Circuits for Racks Widget displays outlet and circuit readings and is accessible from the Elements sub-navigational menu on Rack pages



To view the Outlets and Circuits for Racks Widget for a specific rack:

1. Access the Rack's tab in the Sites Tab.
2. On the rack's tab in the Sites Tab, select the Elements sub-navigational link in the toolbar as shown in the screen-shot below, the Outlet's tab will be open by default:



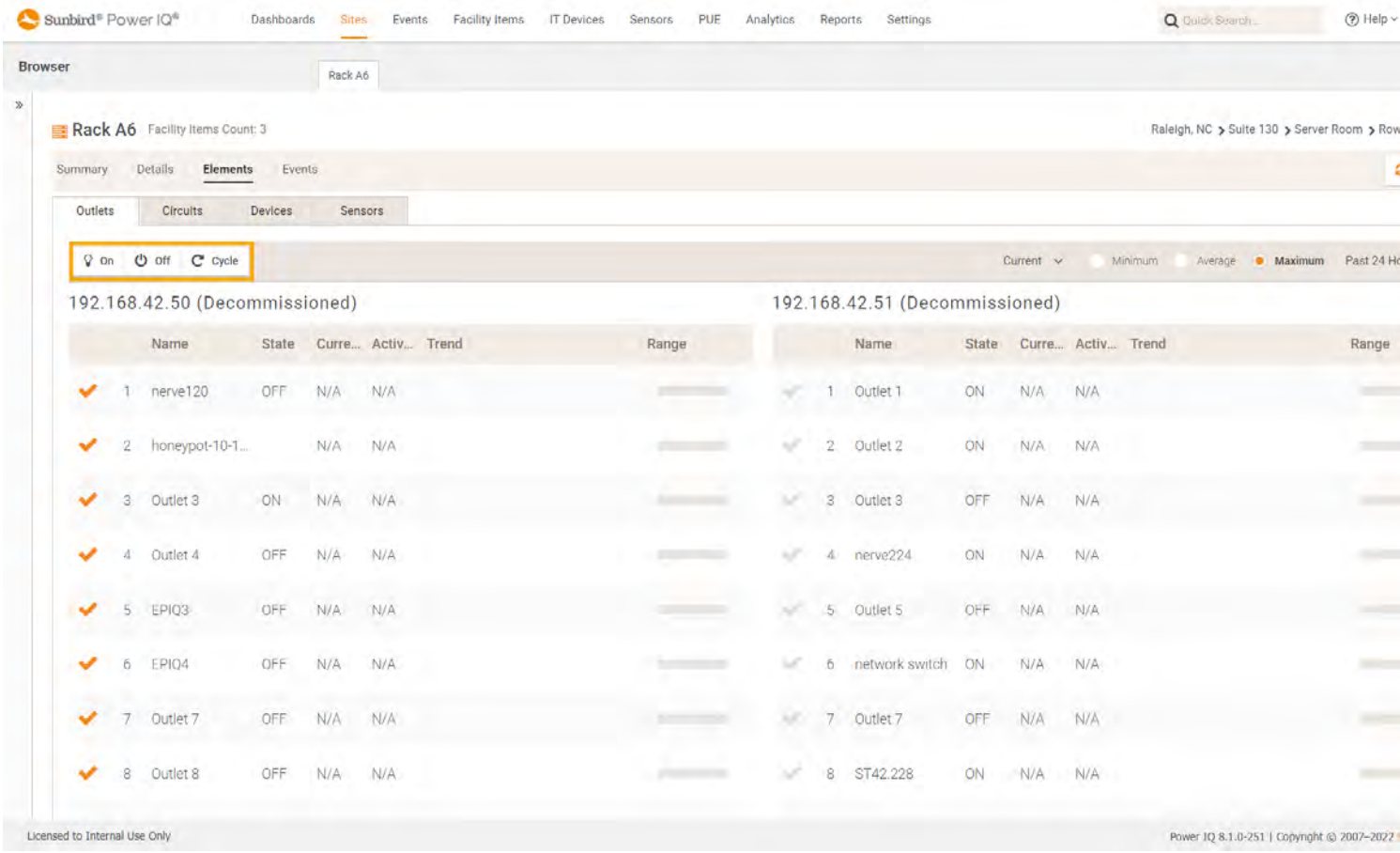
Note: In Power IQ 8.1.1, the default measure for the Range and Trend chart when viewing Outlets using the Outlets and Circuits for Racks widget is Active Power (Watts) instead of Current

Power Control

Power control options are visible to users with the Power Control role on the facility item or the global Power Control role, Power control options include the following:

- The first column Checkbox/ Selector for Power Control Selection (Only visible to users with the Power Control role)
- The On/ Off/ Cycle buttons.

Note: After selecting outlets for power control, you may need to scroll back up to the top of the page to see the power control buttons



To power control the outlets:

1. Select your desired outlet
2. Select your desired power control option
    - On
    - Off
    - Cycle

The columns in the Outlets and Circuits for Racks Widget are as follows, in order from left to right:

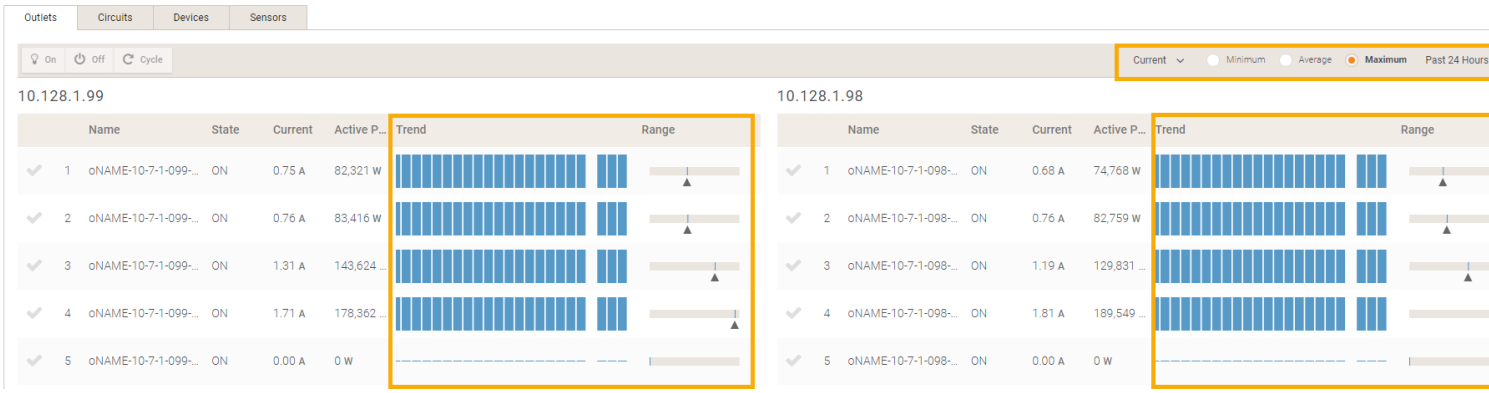
- Checkbox/ Selector (No header)
- Ordinal (No header)
- Name
- State: On/ Off value
- IT Device
- Active Power: Active Power of the Outlet/ Circuit (W)

- Current
- Trend Chart
- Range Chart

Note: *N/A* will be displayed if there is no value available for a column

Note: Active power, Apparent power, and power factor each have one entry per circuit no matter the wiring.

Outlets and Circuits for Racks Trend and Range Charts



The Outlets and Circuits for Racks Trend and Range Charts display the selected Average/ Maximum/ Minimum value over the time range/ granularity. To use these charts:

1. Use the Measure drop-down to select which you want to measure: Current (default) or Active Power.
2. Select the Average/ Maximum/ Minimum value you want to chart
3. Use the drop-down to select the time range/ granularity for the data

The available radio-button options for charting the data values in both the Outlets and Circuits for Racks Trend and Range Trendline are as follows:

- Minimum
- Average
- **Maximum (Default)**

The available time range and data granularity options for the Outlets and Circuits for Racks Trend and Range Trendline and Range Chart are as follows:

- Past Hour: Raw readings
- Past 24 Hours (default): Hourly rollups
- Past Week: Daily rollups

- Past Month: Daily rollups
- Past Year: Monthly rollups

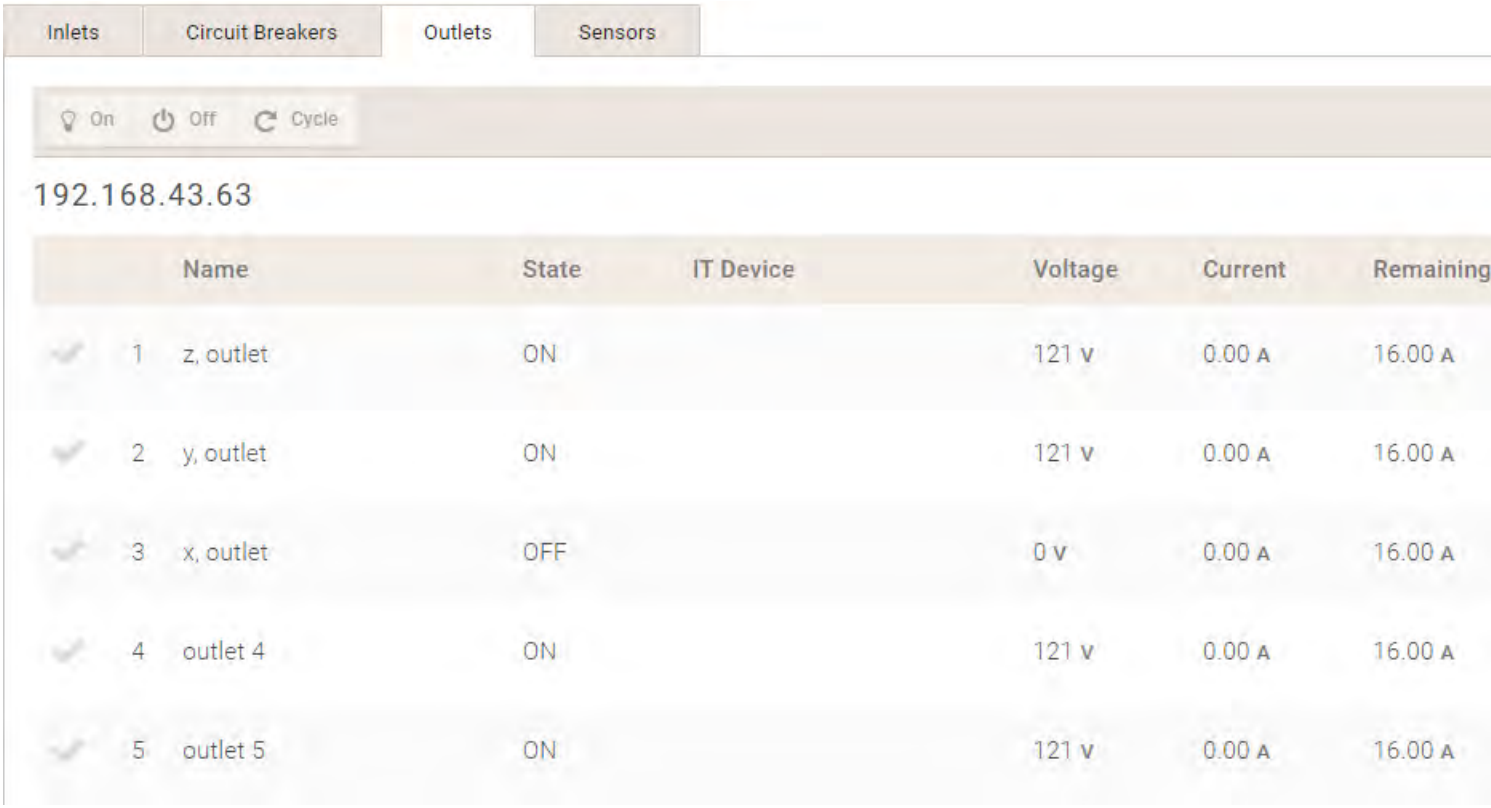
The available Measure options for the Outlets and Circuits for Racks Trend and Range Trendline and are as follows:

- Current
- Active Power

Outlets Widget for Facility Items

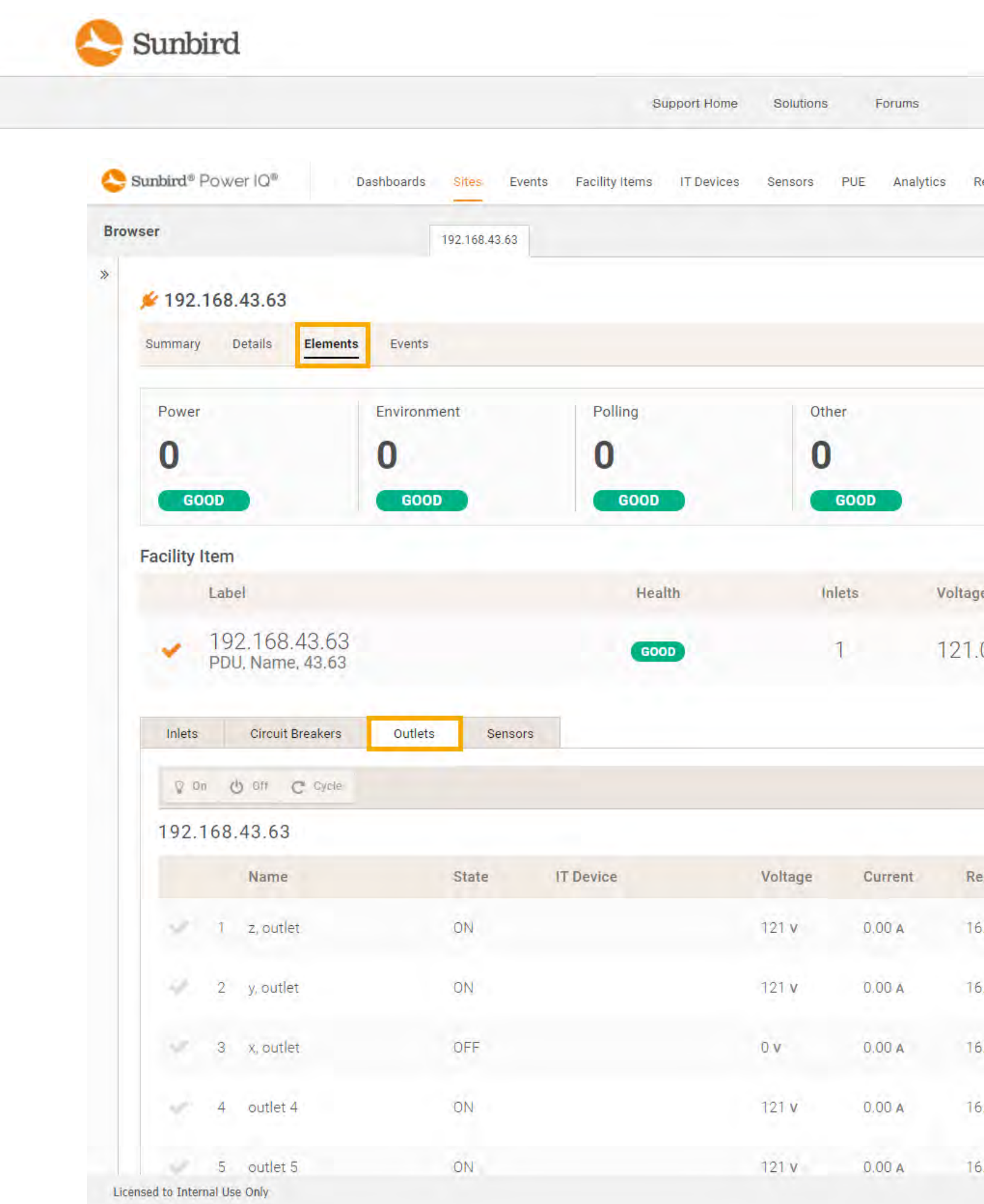
The Outlet Widget for Facility items displays outlet and circuit readings and is accessible from the Elements sub-navigational menu on the following facility items tabs:

- Rack PDU
- Rack PDU (where Inline = True=
- Rack Transfer Switch
- Rack UPS
- Power panel



To view the Outlet Widget for a specific facility item:

1. Access the facility item's Sites entity tab
2. On the facility item's Sites entity tab, select the Elements sub-navigational link in the facility item's toolbar as shown in the screenshot below:


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Analytics
Browser
192.168.43.63
192.168.43.63
Summary
Details
Elements
Events
Power
0
GOOD
Environment
0
GOOD
Polling
0
GOOD
Other
0
GOOD
Facility Item
Label
Health
Inlets
192.168.43.63
PDU, Name, 43.63
GOOD
1
Inlets
Circuit Breakers
Outlets
Sensors
On
Off
Cycle
192.168.43.63
Name
State
IT Device
Voltage
Current
1 z, outlet ON 121 V 0.00 A
2 y, outlet ON 121 V 0.00 A
3 x, outlet OFF 0 V 0.00 A
4 outlet 4 ON 121 V 0.00 A
5 outlet 5 ON 121 V 0.00 A
Licensed to Internal Use Only

The columns in the Outlets Widget for Facility Items are as follows, in order from left to right:

- Checkbox/Selector (No header)
- Ordinal (No header): Displays outlet number and outlets are displayed in ascending order
- Name
- State: On/Off value
- IT Device
- Voltage
- Current
- Remaining: The unutilized current of each outlet in Amps

  Note: While Power IQ does not display the outlet rating/capacity value in the outlets widget. The Remaining column displays the retrieved rating value minus the Current column
- Active Power: The Active Power of the Outlet in Watts
- Apparent Power: The Apparent Power of the Outlet in VA.
- Trend Chart (Only if data is available)
- Range Chart (Only if data is available)

Note: "NA" will be displayed if there is no value available for a column

*Note: In Power IQ 8.1.1, the default measure for the Range and Trend chart when viewing Outlets using the Outlets Widget for Facility Items Elements Tab is **Active Power** (Watts) instead of **Current**.*

Power Control

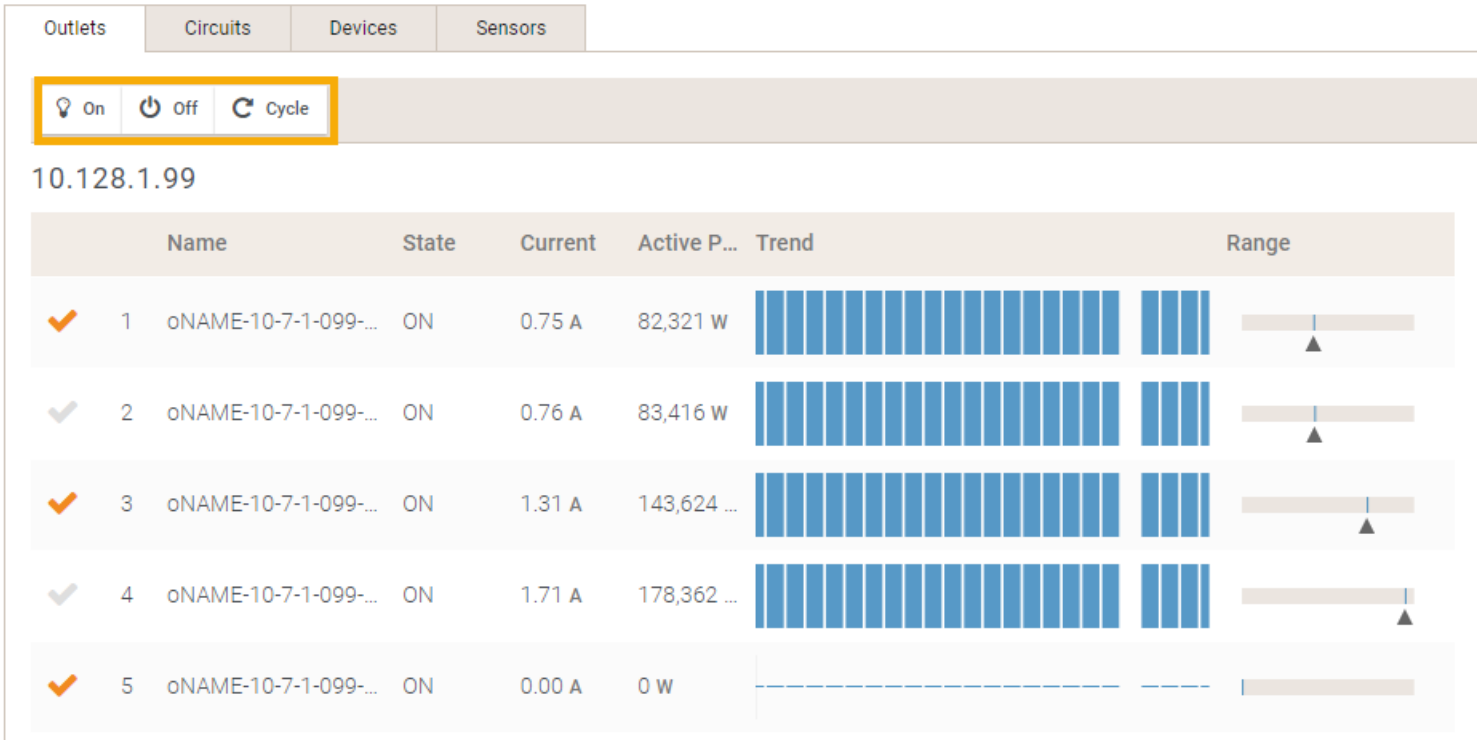
Power control options are visible to users with the Power Control role on the facility item or the global Power Control role, including the following:

- The first column Checkbox/Selector for Power Control Selection (Only visible to users with the Power Control role)
- The On/Off/Cycle buttons

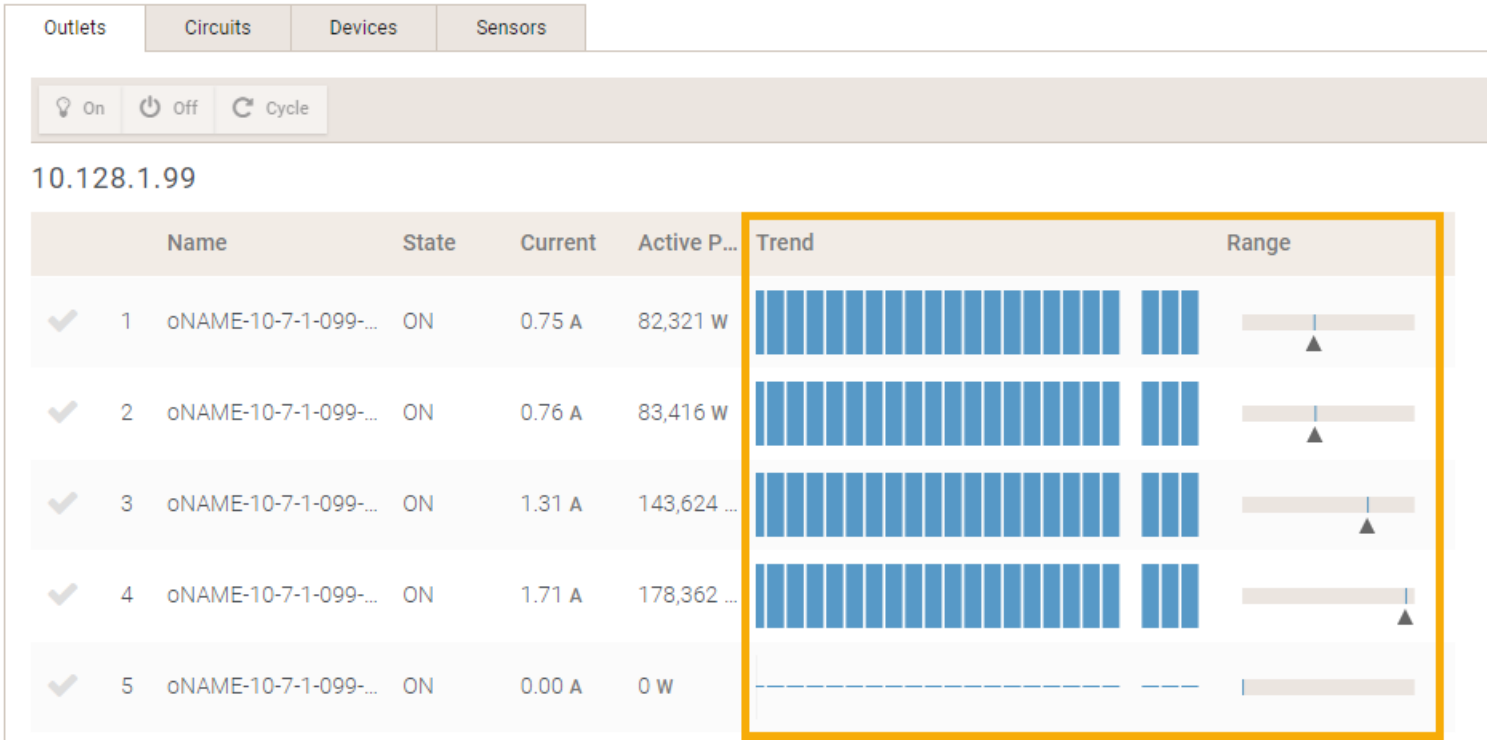
Note: After selecting outlets for power control, you may need to scroll back up to the top of the tab to see the power control buttons

To power control the outlets:

1. Select your desired outlet
2. Select your desired power control option
    - On
    - Off
    - Cycle



Outlets for Facility Items Trendline and Range Charts



The Outlets and Circuits for Racks Trend and Range Charts display the selected Average/ Maximum/ Minimum value over the time range/ granularity. To use these charts:

1. Use the Measure drop-down to select which you want to chart: Current (default) or Active Power.
2. Select the Average/ Maximum/ Minimum value you want to chart
3. Use the drop-down to select the time range/ granularity for the data

The available radio-button options for charting the data values in both the Outlet Widget for Facility items Trendline and Range Charts are as follows:

- Minimum
- Average
- **Maximum (Default)**

The available time range and data granularity options for the Outlet Widget for Facility items displays Trendline and Range Chart are as follows:

- Past Hour: Raw readings
- Past 24 Hours (default): Hourly rollups
- Past Week: Daily rollups
- Past Month: Daily rollups
- Past Year: Monthly rollups

Note: The tick mark represents the latest reading

Panels for Facility Items Widget

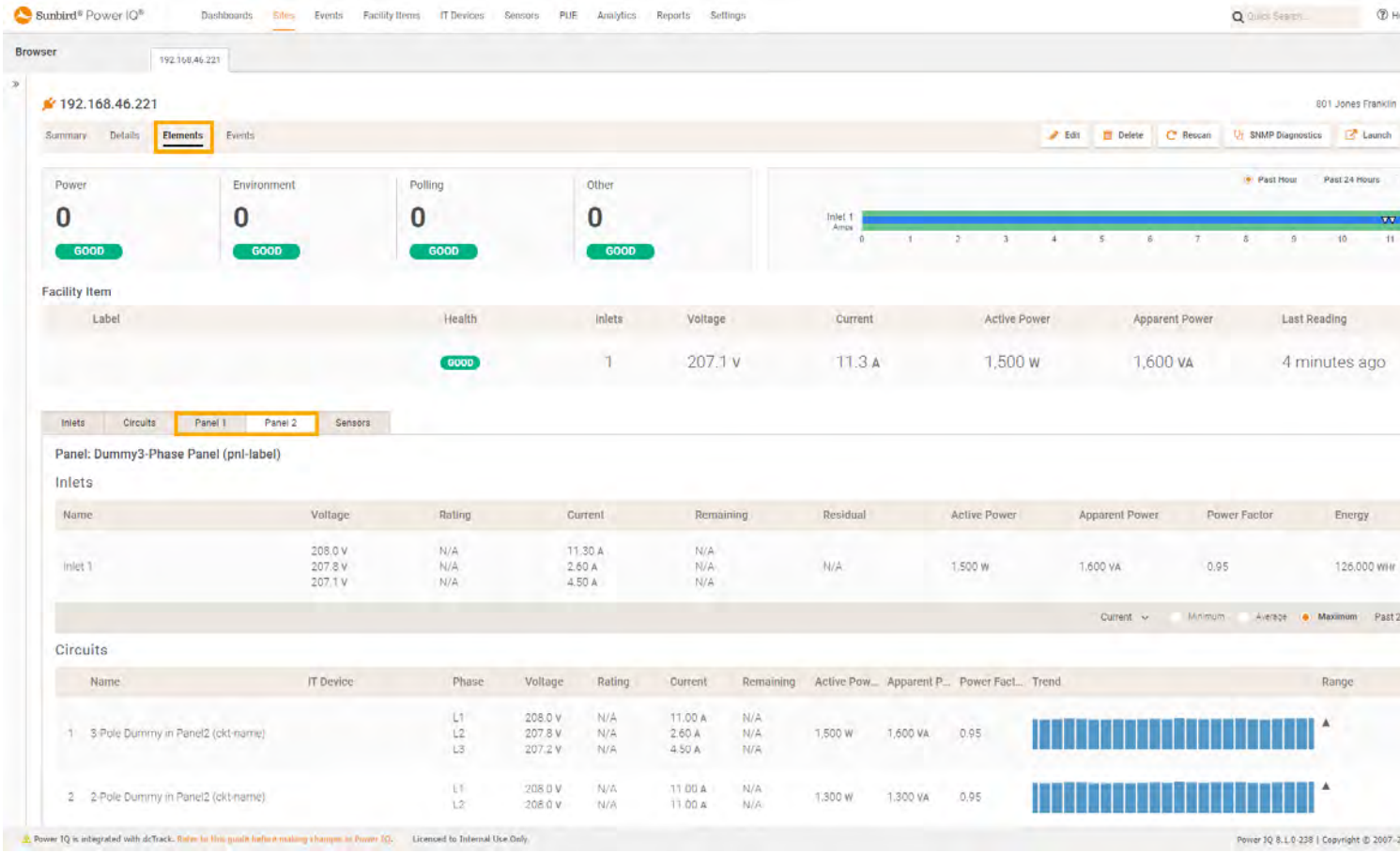
The Panels for Facility Items Widget has two sections to displays **both inlets and circuits on a panel. The Inlets section at the top of the widget leverages the *Inlets with Inlet Poles Widget* on page 181. The Circuits section at the bottom of the widget leverages the** Circuits Widget for Facility Items**. These sections are displayed only if the panel has inlets and circuits respectively.**

Multiple Panel Sub-Navigational options may be available for a facility item, depending on the number of panels the item has. This widget is available for the following facility items:

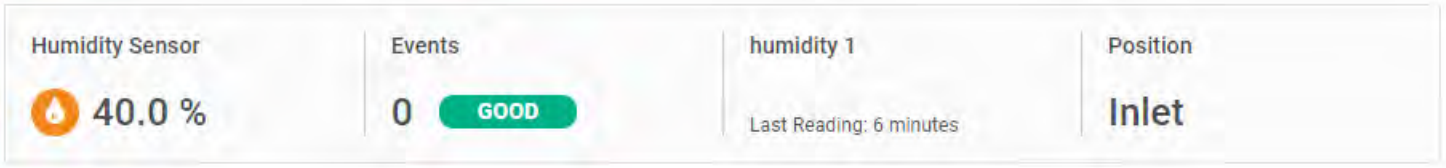
- Floor UPS
- Floor PDU
- Power Panel

To view the Panels for Facility Items Widget for a specific facility item:

1. Access the Rack's Sites Tab page
2. On the Rack's Sites Tab page, select the Element's sub-navigational link in the Rack's toolbar, then select the Panel(s) tab(s) as shown in the screenshot below.

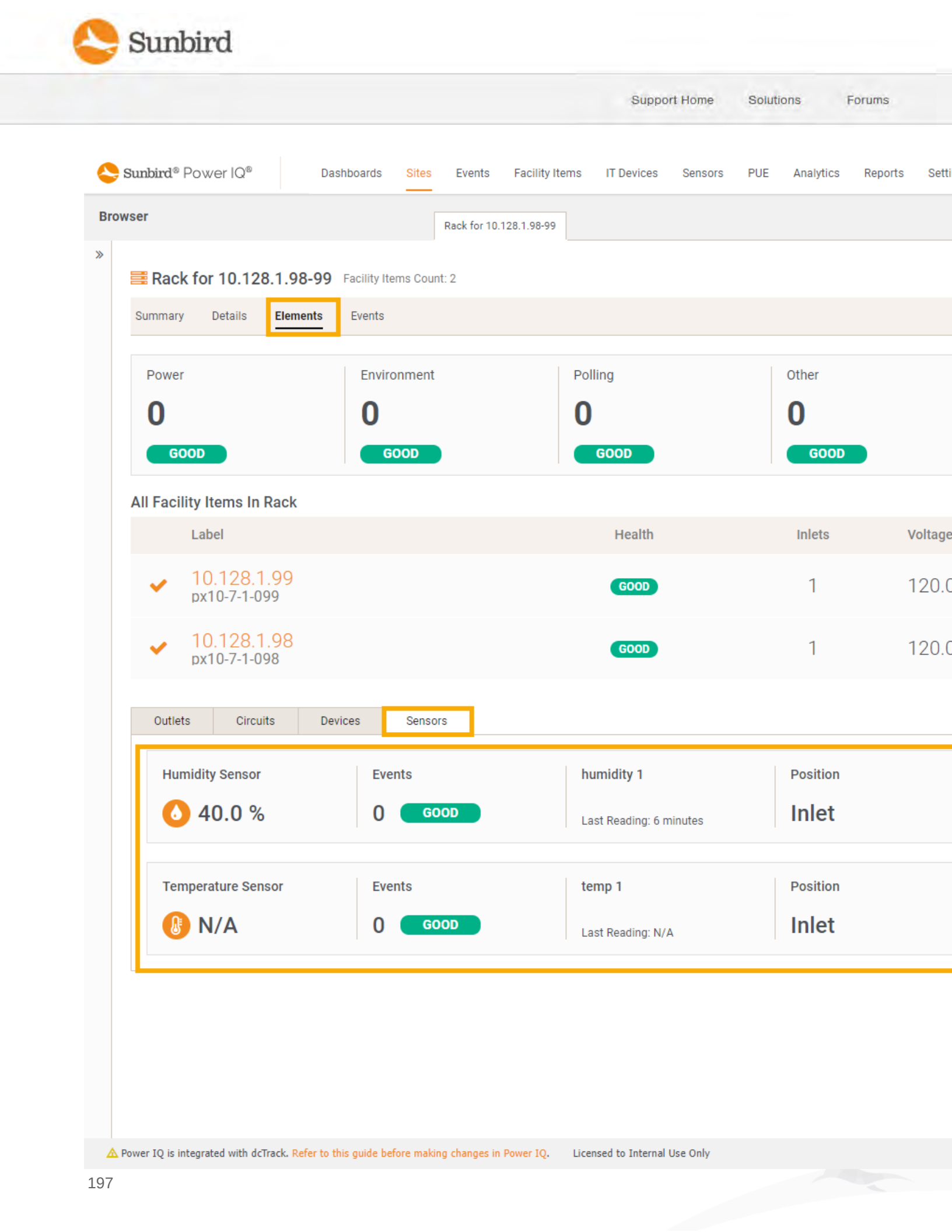


Sensor Widget



The Sensors Widget displays sensor information and is accessible on Sensors pages and from the Sensors tab in the Elements sub-navigational menu on the following entity/ node pages:

- Racks
- Rack PDUS


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Analytics
Reports
Setti
Browser
Rack for 10.128.1.98-99
Rack for 10.128.1.98-99
Facility Items Count: 2
Summary
Details
Elements
Events
Power
0
GOOD
Environment
0
GOOD
Polling
0
GOOD
Other
0
GOOD
All Facility Items In Rack
Label
Health
Inlets
Voltage
10.128.1.99
px10-7-1-099
GOOD
1
120.0
10.128.1.98
px10-7-1-098
GOOD
1
120.0
Outlets
Circuits
Devices
Sensors
Humidity Sensor
40.0 %
Events
0
GOOD
humidity 1
Last Reading: 6 minutes
Position
Inlet
Temperature Sensor
N/A
Events
0
GOOD
temp 1
Last Reading: N/A
Position
Inlet
Power IQ is integrated with dcTrack. Refer to this guide before making changes in Power IQ.
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The widget has four columns:

Column 1

Column 1 displays the following:

- Sensor icon: The icon will be orange for active sensors and grey for decommissioned sensors.
- Latest Reading (For numeric sensors)
- Current State (For state sensors): On, Off, Normal, Alarm, Open, Closed
- Sensor type

Column 2

The second column displays the state of the sensor: if it if it is commissioned or commissioned decommissioned. For it will also show the count of events for the sensor in the date since the sensor was decommissioned

Column 2 displays the following based on whether the sensor is decommissioned.

- For non-decommissioned sensors: Column 2 displays the count of events for the sensor
- For decommissioned sensors, Column 2 displays the date since the sensor was decommissioned.

Column 3

Column 3 displays the following:

- Sensor ordinal
- Sensor name
- Serial number (if available)
- Last reading time

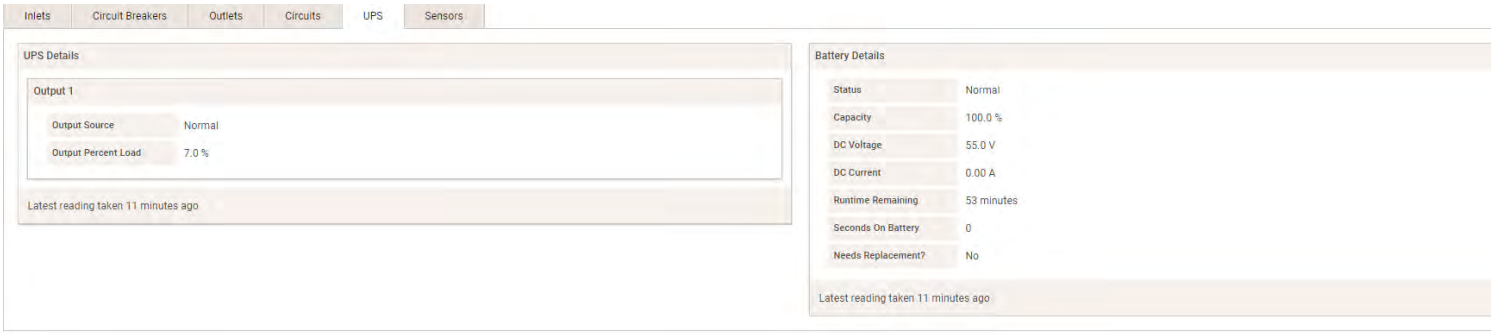
Column 4

The fourth column is only available for Temperature, Relative Humidity, and Absolute Humidity sensors, and displays the position of the sensor as follows:

- Options for horizontal position: Inlet, Outlet, Outside Air
- Options for vertical position: Top, Middle, Bottom

Note: "NA" is displayed if there is no value available for a column

UPS and Battery Widgets

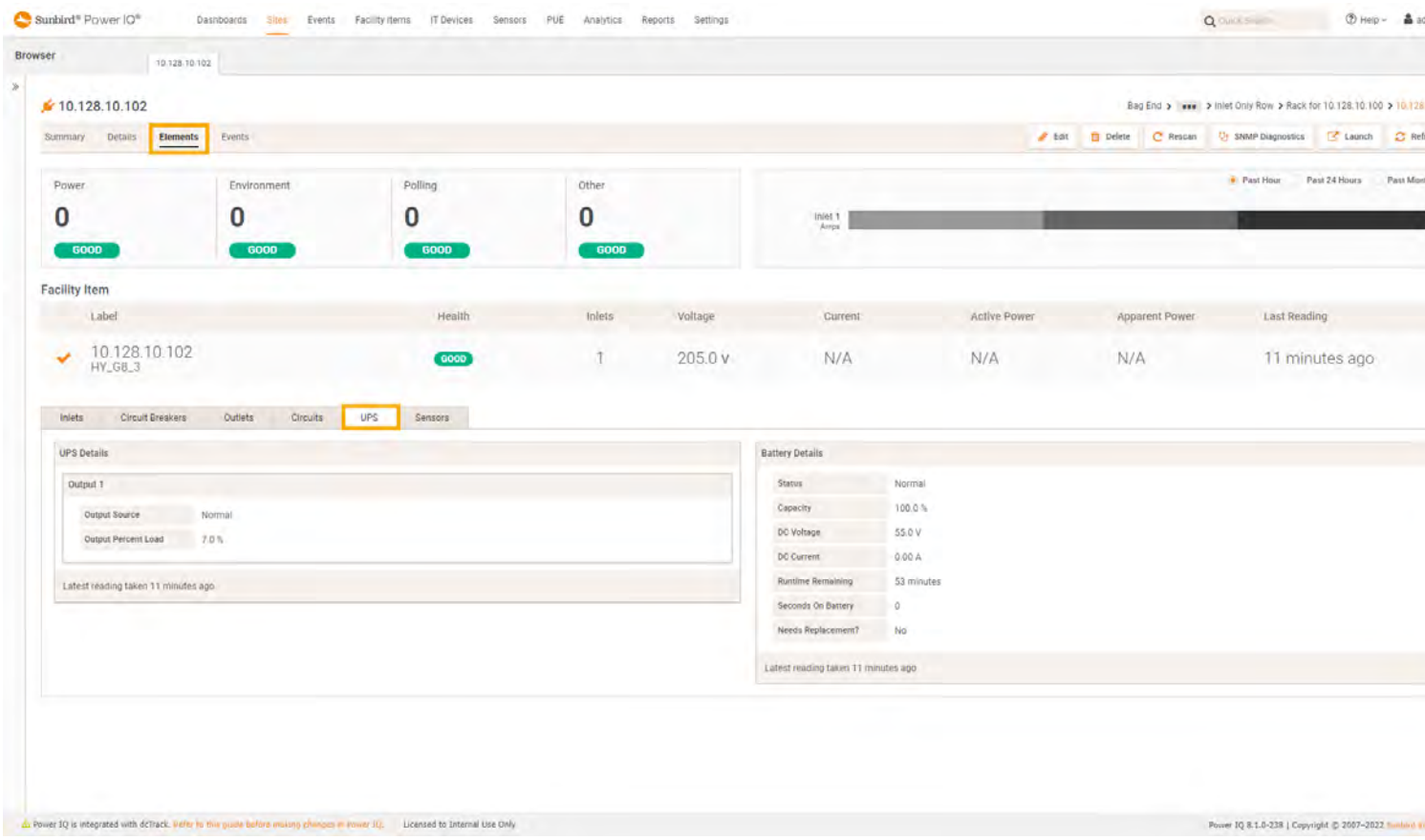


The UPS and Battery widgets are displayed on the Elements Sub-Nav for UPSs and batteries

The UPS and Battery widgets displays information about the UPS **output and battery respectively.**

To view the UPS and Battery widgets for a specific UPS:

1. Access the UPS's Sites entity
2. On the UPS's Sites entity tab, select the Element's sub-navigational link in the UPS's toolbar, then select the UPS tab as shown in the screenshot below.



The fields contained in the UPS details include the following grouped by name and ordinal:

- **Output Source**
- Output Percent Load

The fields displayed in the battery details are as follows:

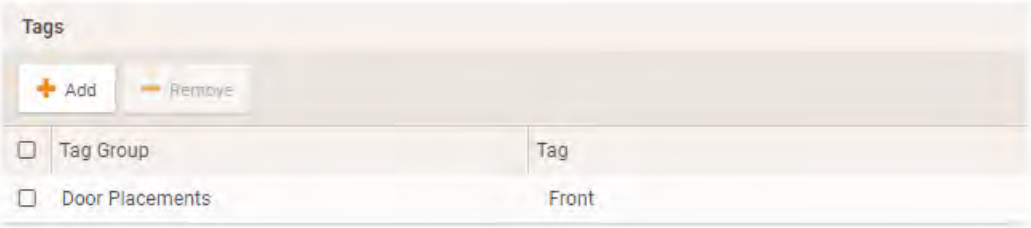
- **Status**
- **Capacity**
- DC voltage
- **DC current**
- **Runtime remaining**
- **Seconds on battery**
- **Needs replacement?**

Tags and Tag Groups Panel

To edit the tags table for a node, you must meet the following requirements:

- You have the site administrator role.
- You have the administrator role on this instance or on a parent of if in the EDM
- You have the operator role on this instance or on a parent of if in the EDM
- You have the global administrator role.
- You have the global operator role or above

Note: You must have View and View Tag groups permissions on the node to view the tags panel

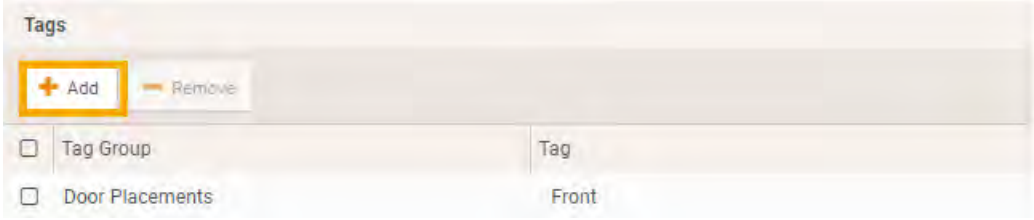


Add a Tag

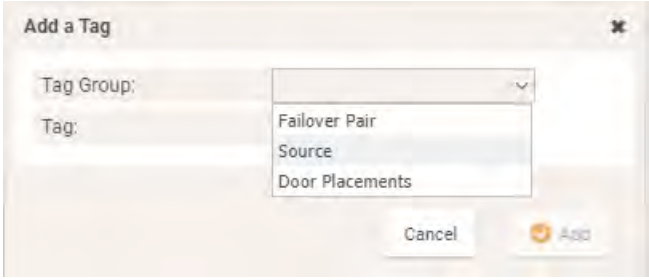
You can add a tag to the node from the Tags pane:

Click the Add button on the Tags panel to add a tag to the node.

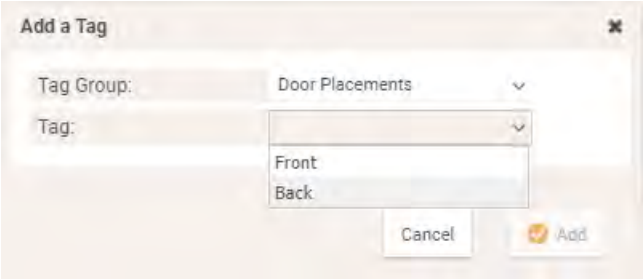
1. Click the Add button on the Tags panel to add a tag to the node.



2. In the Add A tag dialog box, select your desired Tag Group from the dropdown list. This will populate the Tag dropdown with a list of available tags.



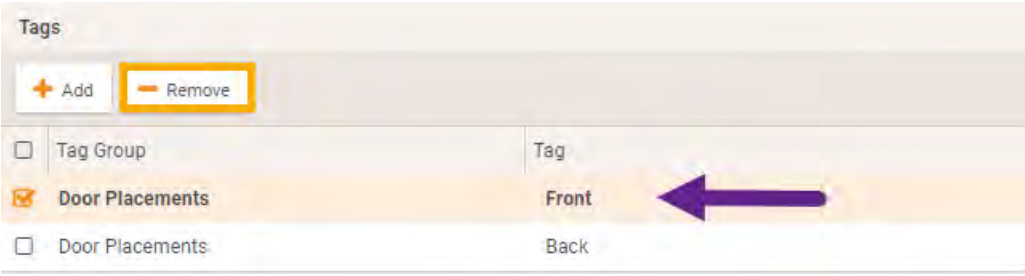
3. Select your desired tag from the Tag dropdown then click the Add button



Remove a Tag.

You can remove a tag from the node:

1. Select the tag you want to remove.

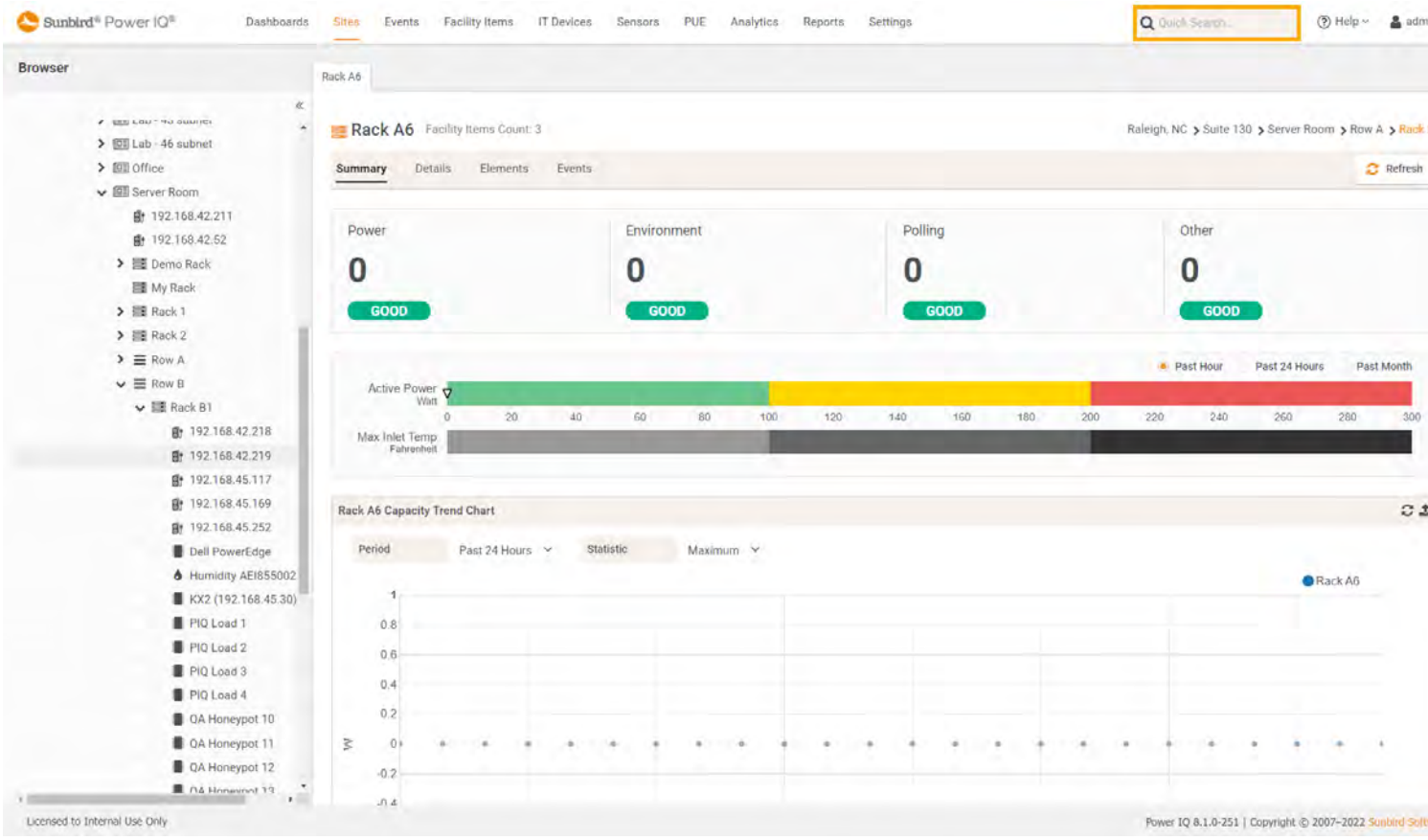


2. Click the Remove button

   Note: To select multiple tags, press the Ctrl button and select your desired tags

Quick Search PDUs, IT Devices, Racks,or Doors

You can use the Quick Search field at the top of the Power IQ interface to search for a PDU, IT device, Rack or Door,



Simply type the name of a facility item, rack, door, or IT device to search by name.

Type the IP address of a facility item or IT device into the Quick Search field to search by IP address. A list of search results will populate below the Quick Search field. Selecting a node will display that node's tab in the Sites Tab.

If a match is found, Power IQ displays the appropriate smart view.

Note: The facility item display setting affects the Quick Search feature. If IP address is selected in the display settings, you can search facility items by either name or IP address. If facility item name is selected, only searching by facility item name is permitted. Devices can always be searched by either name or IP address regardless of the PDU display preference. See *Configure Facility Item Display Settings - View Facility Items by IP or Name on page 812.*

Permissions Table Module

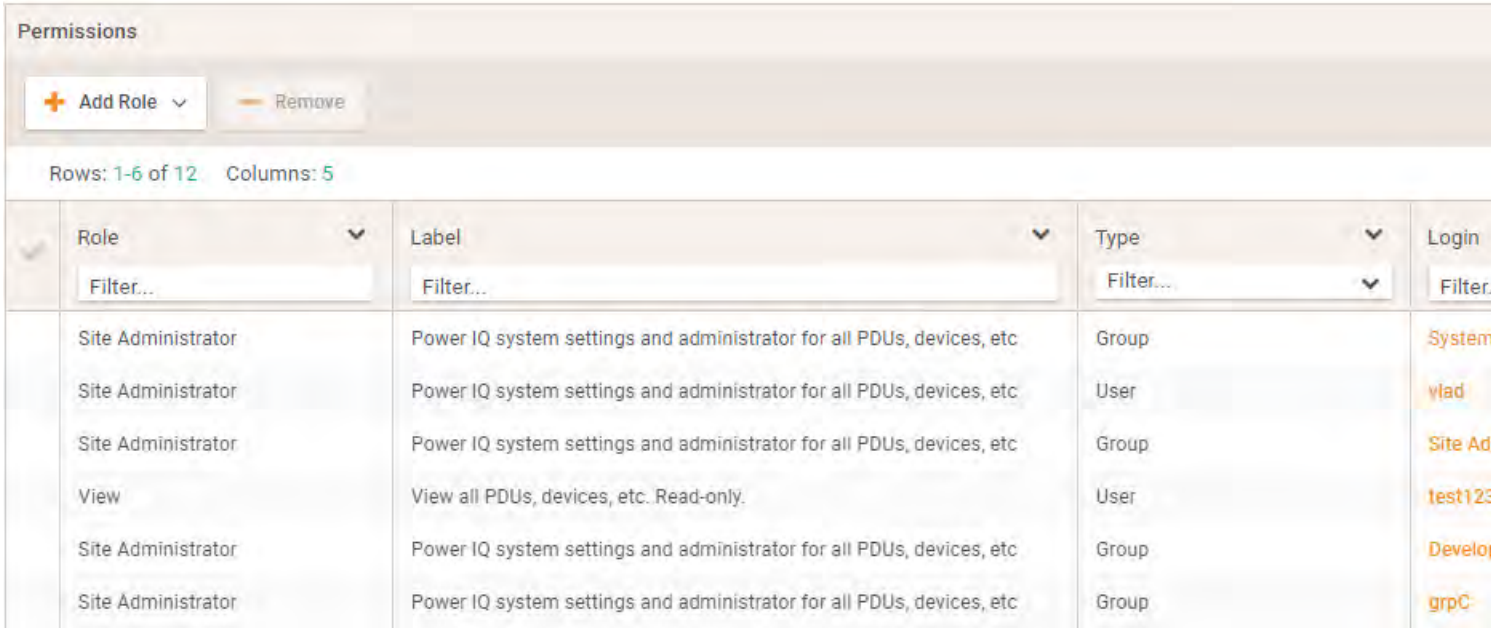
Users who have the required permissions can view the permissions table for a node.

To view and modify the permissions table for a node, your permissions must satisfy one of the following conditions:

- You have the site administrator role.
- You have the administrator role on this instance or on a parent of if in the EDM
- You have the global administrator role.
- You have the global operator role or above

The permissions table lists the following for each permission:

- The name of the role: Roles can be assigned to users **or user groups to allow the permissions for operations within Power IQ. For a full list of roles, see** Assigning Roles for User Permissions
- The label: A description of the permission and the node(s) limiting the permission)
- The source type: The user or group that is matched to this role



Add a role to a node

Users with the required permissions can add a role to a node. Either a user role or a group role can be added

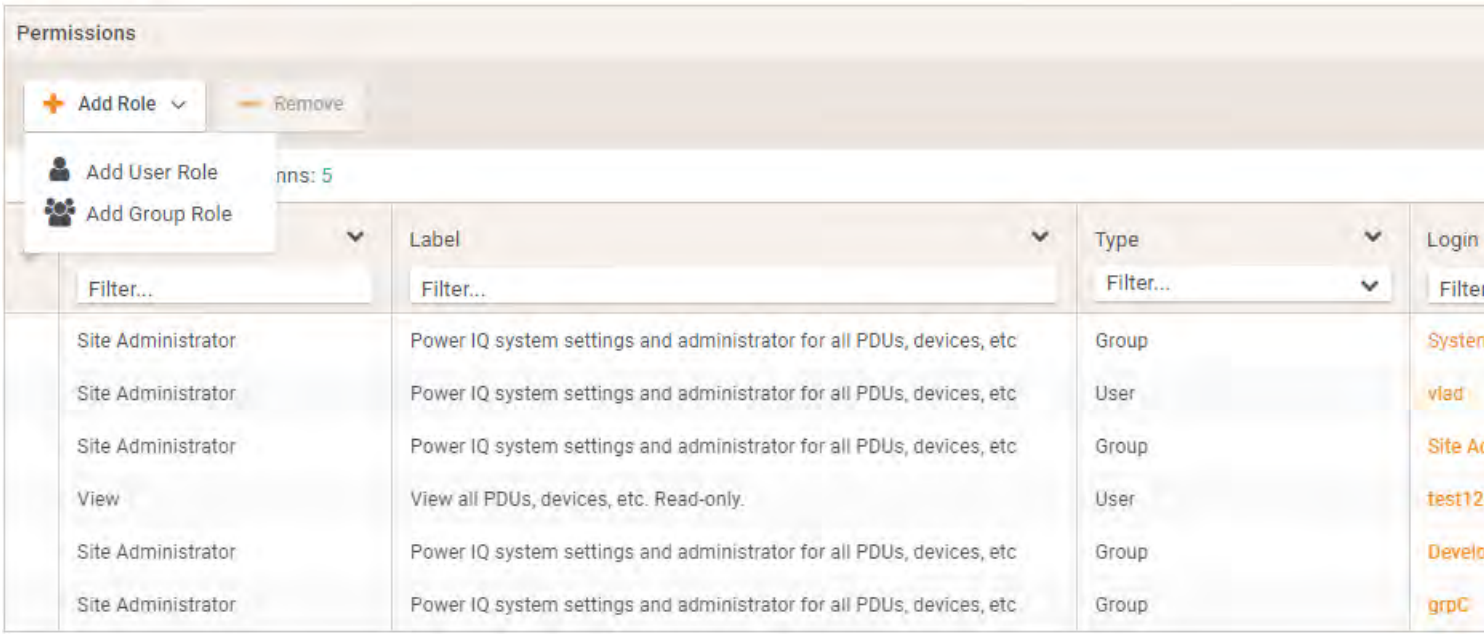
To add a role from the Permissions panel:

1. Click the Add Role button.
2. From the dropdown menu, select the appropriate option to add either a user role or group role.

- To add a user role, you need to select the user from a dropdown list, then select the role you want to add from a second drop down
- To add a group role, you need to select the group from a dropdown list, then select the role you want to add from a second drop down

To remove a permission, select the permission you want to remove, and then click the Remove button

Note: The global roles in the table cannot be selected.



Users with the required permissions can remove a role to a node. Either a user role or a group role can be added

To remove a role from the Permissions panel:

1. Select the roles you want to remove. You can multi-select roles by pressing the control button
2. Click the Remove button.

Event and Trap Management

Power IQ can receive SNMP traps from supported PDUs and display them as events. You can also set power thresholds for racks based on capacity, and Power IQ will generate events when the thresholds are exceeded. See *Rack Thresholds* on page 282.

You can also enable notifications, so that Power IQ sends an email message for specific events.

User Permissions for Event Management

You must have the Event Manager role to view the Events tab. See Assign Roles to a User.

You must have the Create Event Notifications role to manage event notifications. See Assigning Roles for User Permissions.

Prepare PDUs for Power IQ Event Management

Power IQ receives and displays supported events in the Events tab, and sends notifications if enabled.

You must configure PDUs to send the supported SNMP traps to Power IQ. SNMP v1 and SNMP v2/v3 trap types are supported. See *Supported Events* on the next page.

PDU trap names differ by vendor, so Power IQ maps the trap names to common event names to highlight the common traps across PDUs.

Supported Events

Power IQ supports SNMP traps from the following vendors and products and converts the traps into Power IQ events. See the vendor/product below for supported events.

APC Supported Events

The APC standard plugin can be used to manage APC rack PDUs, UPSs, transfer switches, and APC Netbotz devices. For more information on the supported events for each device type, see the following topics:

APC 78XX/79XX/8XXX/9XXX Series PDU Supported Events

APC Rack PDU Supported Events		
Event description	**Trap name**	**Common event name**
Underload Threshold	rPDULowLoad	inletCurrentLowerWarning
Underload Condition Cleared	rPDULowLoadCleared	inletCurrentLowerWarningClear
Low Overload Threshold	rPDUNearOverload	inletCurrentUpperWarning
Low Overload Threshold cleared	rPDUNearOverloadCleared	inletCurrentUpperWarningClear
Overload Threshold	rPDUOverload	inletCurrentUpperCritical
Overload Threshold cleared	rPDUOverloadCleared	inletCurrentUpperCriticalClear
Outlet Turned on	rPDUOutletOn	outletPowerOn
Outlet Turned off	rPDUOutletOff	outletPowerOff
High temperature threshold violated on the probe	envHighTempThresholdViolation	envTemperatureUpperCritical
High temperature threshold violation cleared on the probe	envHighTempThresholdViolationCleared	envTemperatureUpperCriticalClear
Low temperature threshold violated on the probe	envLowTempThresholdViolation	envTemperatureLowerCritical
Low temperature threshold violation cleared on the probe	envLowTempThresholdViolationCleared	envTemperatureLowerCriticalClear
High humidity threshold	envHighHumidityThresholdViolation	envHumidityUpperCritical

APC Rack PDU Supported Events		
Event description	**Trap name**	**Common event name**
violated on the probe		
High humidity threshold violation cleared on the probe	envHigHumidityThresholdViolationCleared	envHumidityUpperCriticalClear
Low humidity threshold violated on the probe	envLowHumidityThresholdViolation	envHumidityLowerCritical
Low humidity threshold violation cleared on the probe	envLowHumidityThresholdViolationCleared	envHumidityLowerCriticalClear
Trap used to test SNMP trap functionality	apcTestTrap	testTrap

APC 10000 Series PDU Supported Events

Event description	Trap Name	Common event name
Inlet Active Power Above Critical Threshold Clear	trapInfo	inletOverActivePowerCriticalClear
Inlet Active Power Above Critical Threshold	trapCritical	inletOverActivePowerCritical
Inlet Active Power Below Critical Threshold Clear	trapInfo	inletUnderActivePowerCriticalClear
Inlet Active Power Below Critical Threshold	trapCritical	inletUnderActivePowerCritical
Inlet Active Power Above Warning Threshold Clear	trapInfo	inletOverActivePowerWarningClear
Inlet Active Power Above Warning Threshold	trapWarning	inletOverActivePowerWarning
Inlet Active Power Below Warning Threshold Clear	trapInfo	inletUnderActivePowerWarningClear
Inlet Active Power Below Warning Threshold	trapWarning	inletUnderActivePowerWarning

Event description	Trap Name	Common event name
Inlet Current Above Critical Threshold	trapCritical	inletOverCurrentCritical
Inlet Current Above Critical Threshold Clear	trapInfo	inletOverCurrentCriticalClear
Inlet Current Under Critical Threshold	trapCritical	inletUnderCurrentCritical
Inlet Current Under Critical Threshold Clear	trapInfo	inletUnderCurrentCriticalClear
Inlet Current Over Warning Threshold	trapWarning	inletOverCurrentWarning
Inlet Current Over Warning Threshold Clear	trapInfo	inletOverCurrentWarningClear
Inlet Current Over Warning Threshold	trapWarning	inletUnderCurrentWarning
Inlet Current Over Warning Threshold Clear	trapInfo	inletUnderCurrentWarningClear
Inlet Voltage Over Critical Threshold Clear	trapInfo	inletOverVoltageCriticalClear
Inlet Voltage Over Critical Threshold	trapCritical	inletOverVoltageCritical
Inlet Voltage Under Critical Threshold Clear	trapInfo	inletUnderVoltageCriticalClear
Inlet Voltage Under Critical Threshold	trapCritical	inletUnderVoltageCritical
Inlet Voltage Over Warning Threshold	trapWarning	inletOverVoltageWarning
Inlet Voltage Over Warning Threshold Clear	trapClear	inletOverVoltageWarningClear
Inlet Voltage Under Warning Threshold	trapWarning	inletUnderVoltageWarning
Inlet Voltage Under Warning Threshold Clear	trapInfo	inletUnderVoltageWarningClear
Outlet Turned On	trapInfo	outletPowerOn
Outlet Turned Off	trapInfo	outletPowerOff
Outlet Active Power Above Critical Threshold	trapCritical	outletOverActivePowerCritical
Outlet Active Power Above Critical Threshold Clear	trapInfo	outletOverActivePowerCriticalClear

Event description	Trap Name	Common event name
Outlet Active Power Above Critical Threshold Clear	trapInfo	outletOverActivePowerWarningClear
Outlet Active Power Above Warning Threshold	trapWarning	outletOverActivePowerWarning
Outlet Active Power Below Critical Threshold Clear	trapInfo	outletUnderActivePowerCriticalClear
Outlet Active Power Below Critical Threshold	trapCritical	outletUnderActivePowerCritical
Outlet Active Power Below Warning Threshold Clear	trapInfo	outletUnderActivePowerWarningClear
Outlet Active Power Below Warning Threshold	trapWarning	outletUnderActivePowerWarning
Circuit Breaker Current Above Critical Threshold Clear	trapInfo	cbOverCurrentCriticalClear
Circuit Breaker Current Above Critical Threshold	trapCritical	cbOverCurrentCritical
Circuit Breaker Current Above Warning Threshold Clear	trapInfo	cbOverCurrentWarningClear
Circuit Breaker Current Above Warning Threshold	trapWarning	cbOverCurrentWarning
Circuit Breaker Current Under Critical Threshold Clear	trapInfo	cbUnderCurrentCriticalClear
Circuit Breaker Current Under Critical Threshold	trapCritical	cbUnderCurrentCritical
Circuit Breaker Current Under Warning Threshold Clear	trapInfo	cbUnderCurrentWarningClear
Circuit Breaker Current Under Warning Threshold	trapWarning	cbUnderCurrentWarning
Circuit Breaker On	trapInfo	cbTrippedClear
Circuit Breaker OFF	trapCritical	cbTripped

APC UPS Supported Events

APC UPS Supported Events		
Event description	**Trap name**	**Common event name**
UPS load is greater than 100%of its rated capacity	upsOverload	upsOverload
UPS load is greater than 100%of its rated capacity cleared	upsOverloadClear	upsOverloadClear
UPS failed diagnostics self-test	upsDiagnosticsFailed	upsDiagnosticsFailed
UPS failed diagnostics self-test cleared	upsDiagnosticsPassed	upsDiagnosticsFailedClear
UPS batteries are discharged	upsDischarged	upsDepletedBattery
UPS batteries are discharged cleared	dischargeCleared	upsDepletedBatteryClear
UPS has switched to battery backup power	upsOnBattery	upsOnBattery
UPS has switched to battery backup power cleared	powerRestored	upsOnBatteryClear
UPS batteries are low and will soon be exhausted	lowBattery	upsLowBattery
UPS batteries are low	returnFromLowBatteryInfo	upsLowBatteryClear

APC UPS Supported Events		
Event description	**Trap name**	**Common event name**
and will soon be exhausted cleared		
UPS batteries need replacement	upsBatteryNeedsReplacement	upsBatteryNeedsReplacement
UPS batteries need replacement cleared	upsBatteryReplaced	upsBatteryNeedsReplacementClear
UPS on bypass due to internal fault	hardwareFailureBypass	upsBypassFailure
UPS on bypass due to internal fault cleared	returnFromBypass	upsBypassFailureClear
UPS battery temperature threshold has been reached	batteryOverTemperature	upsBatteryOverTemperature
UPS battery temperature threshold has been reached cleared	batteryOverTemperatureCleared	upsBatteryOverTemperatureClear
UPS internal over temperature condition exists	upsInternalOverTemperature	upsInternalOverTemperature
UPS internal over temperature condition exists cleared	upsInternalOverTemperatureCleared	upsInternalOverTemperatureClear
UPS inverter over temperature condition exists	upsInverterOverTemperature	upsInverterOverTemperature
UPS inverter over tem-	upsInverterOverTemperature	upsInverterOverTemperatureClear

APC UPS Supported Events		
Event description	**Trap name**	**Common event name**
perature condition exists cleared		
UPS battery over voltage condition exists	upsBatteryOverVoltage	upsBatteryOverVoltage
UPS battery over voltage condition exists cleared	upsBatteryOverVoltageCleared	upsBatteryOverVoltageClear
High temperature threshold violated on the probe	envHighTempThresholdViolation	envTemperatureUpperCritical
High temperature threshold violation cleared on the probe	envHighTempThresholdViolationCleared	envTemperatureUpperCriticalClear
Low temperature threshold violated on the probe	envLowTempThresholdViolation	envTemperatureLowerCritical
Low temperature threshold violation cleared on the probe	envLowTempThresholdViolationCleared	envTemperatureLowerCriticalClear
High humidity threshold violated on the probe	envHighHumidityThresholdViolation	envHumidityUpperCritical
High humidity threshold violation cleared on the probe	envHigHumidityThresholdViolationCleared	envHumidityUpperCriticalClear
Low humidity threshold violated on the probe	envLowHumidityThresholdViolation	envHumidityLowerCritical
Low humidity threshold	envLowHumidityThresholdViolationCleared	envHumidityLowerCriticalClear

APC UPS Supported Events		
Event description	**Trap name**	**Common event name**
violation cleared on the probe		
Trap used to test SNMP trap functionality	apcTestTrap	testTrap

APC Transfer Switch Supported Events

APC Transfer Switch Supported Events		
Event description	**Trap name**	**Common event name**
Transfer Switch Active Inlet Changed	atsSourceSwitched	transferSwitchActiveInletChangedCritical transferSwitchActiveInletChangedWarning
Transfer Switch Operating State Change	atsLostRedundancy atsLostRedundancy atsRedundancyRestored	transferSwitchOperatingStateNonRedundant transferSwitchOperatingStateStandby transferSwitchOperatingStateNormal

APC Netbotz Supported Events

Note: Netbotz devices may be managed by either the APC standard plugin or the Netbotz standard plugin. The MIB used by the target device will determine which standard plugin is used. For supported events for the Netbotz plugin, see *Netbotz Supported Events on page 245.*

APC Netbotz Supported Events		
Event description	**Trap name**	**Common event name**
Temp Env Sensor High Threshold	apcEnvHighTempThresholdViolation apcEnvHighTempThresholdViolationCleared apcEnvMaxTempThresholdViolation apcEnvMaxTempThresholdViolationCleared	envOverTemperatureWarning envOverTemperatureWarningClear envOverTemperatureCritical envOverTemperatureCriticalClear
Temp Env Sensor Low Threshold	apcEnvLowTempThresholdViolation apcEnvLowTempThresholdViolationCleared apcEnvMinTempThresholdViolation apcEnvMinTempThresholdViolationCleared	envUnderTemperatureWarning envUnderTemperatureWarningClear envUnderTemperatureCritical envUnderTemperatureCriticalClear
Humidity Env Sensor High Threshold	apcEnvHighHumidityThresholdViolation apcEnvHighHumidityThresholdViolationCleared apcEnvMaxHumidityThresholdViolation apcEnvMaxHumidityThresholdViolationCleared	envOverHumidityWarning envOverHumidityWarningClear envOverHumidityCritical envOverHumidityCriticalClear
Humidity Env Sensor Low Threshold	apcEnvLowHumidityThresholdViolation apcEnvLowHumidityThresholdViolationCleared apcEnvMinHumidityThresholdViolation apcEnvMinHumidityThresholdViolationCleared	envUnderHumidityWarning envUnderHumidityWarningClear envUnderHumidityCritical envUnderHumidityCriticalClear
Contact Closure	apcWarningDiscreteInputContactStateAbnormal apcWarningDiscreteInputContactStateNormal apcCriticalDiscreteInputContactStateAbnormal apcCriticalDiscreteInputContactStateNormal	envContactSensorWarning envContactSensorWarningClear envContactSensorCritical envContactSensorCriticalClear
Powered Dry	apcOutputRelayStateAbnormal	envPoweredDryContactCritical

APC Netbotz Supported Events		
Event description	**Trap name**	**Common event name**
Contact	apcOutputRelayStateNormal	envPoweredDryContactCriticalClear
Trap used to test SNMP trap functionality	apcTestTrap	testTrap

Aphel Supported Events

Aphel Supported Events		
Event description	**Trap name**	**Common event name**
Inlet Current Upper Critical Threshold	ampsCT1TRAP ampsCT8TRAP	inletCurrentUpperCritical

Avocent Supported Events

Note: The table below lists all Avocent supported events. Not all events are supported for all PDU models.

Avocent Supported Events		
Event description	**Trap name**	**Common event name**
Outlet Turned on	avctPmOutletStatusOnTrap avctPmOutletCmdOnTrap	outletPowerOn
Outlet Turned off	avctPmOutletStatusOffTrap avctPmOutletCmdOffTrap	outletPowerOff
Inlet/ Inlet Pole/ Circuit Breaker/ Outlet Current Upper Critical Threshold	avctPmPduMaxLoadHighTrap	inletOverCurrentCritical inletOverCurrentCritical cbOverCurrentCritical outletOverCurrentCritical
Inlet/ Inlet Pole/ Circuit Breaker/ Outlet Current Low Critical Threshold	avctPmPduMinLoadLowTrap	inletUnderCurrentCritical inletUnderCurrentCritical cbUnderCurrentCritical outletUnderCurrentCritical
Inlet/ Inlet Pole/ Circuit Breaker/ Outlet Current Upper Warning Threshold	avctPmPduWarnLoadTrap	inletOverCurrentWarning inletOverCurrentWarning cbOverCurrentWarning outletOverCurrentWarning
Inlet/ Inlet Pole/ Circuit Breaker/ Outlet Current Low Warning Threshold	avctPmPduLowLoadLowTrap	inletUnderCurrentWarning inletUnderCurrentWarning cbUnderCurrentWarning outletUnderCurrentWarning
Current Threshold Cleared	avctPmPduMaxLoadBackTrap	inletOverCurrentCriticalClear inletOverCurrentCriticalClear cbOverCurrentCriticalClear

Avocent Supported Events		
Event description	**Trap name**	**Common event name**
		outletOverCurrentCriticalClear

Note: The Current Threshold Cleared event clears any active current threshold event, regardless of event severity. The pmTrapObjectPduElementName varbind value will indicate which PDU element ordinal is specifically targeted. The inlet pole inletOverCurrentCriticalClear event has an event parameter that identifies the specific inlet pole involved.

Baytech Supported Events

Baytech Supported Events		
Event description	**Trap name**	**Common event name**
Outlet Turned on	outletOn	outletPowerOn
Outlet Turned off	outletOff	outletPowerOff
Inlet Current Upper Critical Threshold	currentThresholdViolation	inletCurrentUpperCritical
Inlet Current Upper Critical Threshold Cleared	currentThresholdViolationCleared	inletCurrentUpperCriticalClear
Inlet Current Low Critical Threshold	currentUnderThresholdViolation	inletCurrentLowerCritical
Inlet Current Low Critical Threshold Cleared	currentUnderThresholdViolationCleared	inletCurrentLowerCriticalClear
Inlet Voltage Upper Critical Threshold	voltageOverThresholdViolation	inletVoltageUpperCritical
Inlet Voltage Upper Critical Threshold Cleared	voltageOverThresholdViolationCleared	inletVoltageUpperCriticalClear
Inlet Voltage Lower Critical Threshold	voltageUnderThresholdViolation	inletVoltageLowerCritical
Inlet Voltage Lower Critical Threshold Cleared	voltageUnderThresholdViolationCleared	inletVoltageLowerCriticalClear
Circuit Breaker Tripped	circuitBreakerAlarm	cbTripped
Circuit Breaker Recovered	circuitBreakerAlarmClearTrap	cbRecovered
Temp Env Sensor High Threshold	sensorTempThreshHiAlarmTrap	envTemperatureUpperCritical
Temp Env Sensor High Threshold Cleared	sensorTempThreshHiAlarmClearedTrap	envTemperatureUpperCriticalClear

Baytech Supported Events		
Event description	**Trap name**	**Common event name**
Temp Env Sensor Low Threshold	sensorTempThreshLoAlarmTrap	envTemperatureLowerCritical
Temp Env Sensor Low Threshold Cleared	sensorTempThreshLoAlarmClearedTrap	envTemperatureLowerCriticalClear

Chatsworth Supported Events

Note: Events marked with an asterisk (*) are only generated when doors have been created and configured with the appropriate sensors correctly. For more information, see Door Access Management on page 390.

Chatsworth Supported Events		
Event description	**Trap name**	**Common event name**
Branch Maximum Current	maxCurrent	cbOverCurrentCritical
Branch Minimum Current	minCurrent	cbUnderCurrentCritical
Inlet Maximum Voltage	maxVolt	inletOverVoltageCritical
Inlet Minimum Voltage	minVolt	inletUnderVoltageCritical
Maximum Temperature Sensor	maxTemperature	envOverTemperatureCritical
Minimum Temperature Sensor	minTemperature	envUnderTemperatureCritical
Maximum Humidity Sensor	maxHumidity	envOverHumidityCritical
Minimum Humidity Sensor	minHumidity	envUnderHumidityCritical
Outlet Threshold Triggered	outletMaxCurrent	outletOverCurrentCritical
Door Locked/Unlocked State Change*	easLockOpenAlert easLockCloseAlert	envPoweredDryContactCritical electronicallyUnlocked* envPoweredDryContactCriticalClear electronicallyLocked*
Door Opened/Closed State Change*	easDoorOpenAlert easDoorCloseAlert	envContactSensorCritical doorOpen* envContactSensorCriticalClear doorClosed*

Cyberswitching Supported Events

Cyberswitching Supported Events		
Event description	Trap name	Common event name
Inlet Current Upper Critical Threshold	tricomG2UnitCurrentCritical	inletCurrentUpperCritical
Inlet Current Upper Warning Threshold	tricomG2UnitCurrentWarning	inletCurrentUpperWarning
Outlet Current Upper Warning Threshold	tricomG2OutletHighCurrentWarning	outletCurrentUpperWarning
Outlet Current Lower Warning Threshold	tricomG2OutletLowCurrentWarning	outletCurrentLowerWarning
Circuit Breaker Tripped	tricomG2OutletTripped	cbTripped

Eaton eAM004 Supported Events

Eaton eAm004 Supported Events		
Enterprise OID - 1.3.6.1.4.1.534.6.6.7		
Event description	**Trap name**	**Common event name**
Temperature Sensor Threshold	notifyTemperatureThStatus	envOverTemperatureCriticalClear, envOverTemperatureCritical, envOverTemperatureWarningClear, envOverTemperatureWarning, envUnderTemperatureCriticalClear, envUnderTemperatureCritical, envUnderTemperatureWarningClear, envUnderTemperatureWarning

Eaton eAm004 Supported Events		
Enterprise OID - 1.3.6.1.4.1.534.6.6.7		
Event description	**Trap name**	**Common event name**
Humidity Sensor Threshold	notifyHumidityThStatus	envOverHumidityCriticalClear, envOverHumidityCritical, envOverHumidityWarningClear, envOverHumidityWarning, envUnderHumidityCriticalClear, envUnderHumidityCritical, envUnderHumidityWarningClear, envUnderHumidityWarning
Outlet Current Threshold	notifyOutletCurrentThStatus	outletOverCurrentCriticalClear, outletOverCurrentCritical, outletOverCurrentWarningClear outletOverCurrentWarning, outletUnderCurrentCriticalClear, outletUnderCurrentCritical, outletUnderCurrentWarningClear, outletUnderCurrentWarning
Outlet Voltage Threshold	notifyOutletVoltageThStatus	outletOverVoltageCriticalClear, outletOverVoltageCritical, outletOverVoltageWarningClear, outletOverVoltageWarning, outletUnderVoltageCriticalClear, outletUnderVoltageCritical outletUnderVoltageWarningClear, outletUnderVoltageWarning
Inlet Current Threshold	notifyInputCurrentThStatus	inletOverCurrentCriticalClear, inletOverCurrentCritical, inletOverCurrentWarningClear,

Eaton eAm004 Supported Events		
Enterprise OID - 1.3.6.1.4.1.534.6.6.7		
Event description	**Trap name**	**Common event name**
		inletOverCurrentWarning, inletUnderCurrentCriticalClear, inletUnderCurrentCritical, inletUnderCurrentWarningClear, inletUnderCurrentWarning
Inlet Voltage Threshold	notifyInputCurrentThStatus	inletOverVoltageCriticalClear, inletOverVoltageCritical, inletOverVoltageWarningClear, inletOverVoltageWarning, inletUnderVoltageCriticalClear, inletUnderVoltageCritical, inletUnderVoltageWarningClear, inletUnderVoltageWarning

Geist Supported Events

Geist Supported Events		
Event description	**Trap name**	**Common event name**
Inlet Current Upper Critical Threshold	totalDeciAmpsPhaseATRAP totalDeciAmpsPhaseBTRAP totalDeciAmpsPhaseCTRAP	inletCurrentUpperCritical
Inlet Current Upper Critical Threshold Cleared		inletCurrentUpperCriticalClear
Circuit Breaker Current Upper Critical Threshold	outlet1ADeciAmpsTRAP outlet12CDeciAmpsTRAP	CBCurrentUpperCritical
Circuit Breaker Current Upper Critical Threshold Cleared		CBCurrentUpperCriticalClear
Outlet Current Upper Critical Threshold	outlet1ADeciAmpsTRAP outlet12CDeciAmpsTRAP	OutletCurrentUpperCritical
Outlet Current Upper Critical Threshold Cleared		OutletCurrentUpperCriticalClear

Geist EM Supported Events

Geist EM Supported Events		
Event description	**Trap name**	**Common event name**
Circuit Breaker Current Threshold Warning Event	mainChannelDeciAmps01WARN mainChannelDeciAmps07WARN	
Circuit Breaker Current Threshold Critical Event	mainChannelDeciAmps01ALARM mainChannelDeciAmps07ALARM	
Outlet Current Threshold Warning Event	auxChannelDeciAmps01WARN auxChannelDeciAmps32WARN outlet1AB-1DeciAmpsWarningTRAP outlet24CA-8DeciAmpsWarningTRAP	OutletCurrentUpperCritical
Outlet Current Threshold Warning Event Cleared		
Outlet Current Threshold Critical Event	auxChannelDeciAmps01ALARM auxChannelDeciAmps32ALARM outlet1AB-1DeciAmpsTRAP outlet24CA-8DeciAmpsTRAP	OutletCurrentUpperCritical
Outlet Current Threshold Critical Event Cleared		OutletCurrentUpperCriticalClear
Phase Current Threshold Warning Event	totalDeciAmpsPhaseAWarningTRAP totalDeciAmpsPhaseCWarningTRAP	inletCurrentUpperWarning
Phase Current Threshold Warning Event Cleared		inletCurrentUpperWarningClear
Phase Current Threshold Critical Event	totalDeciAmpsPhaseATRAP totalDeciAmpsPhaseCTRAP	inletCurrentUpperCritical
Phase Current Threshold Critical Event Cleared		inletCurrentUpperCriticalClear

Geist RCX Supported Events

Geist RCX Supported Events		
Event description	**Trap name**	**Common event name**
Ctrl3ChDELTADeciAmpsA = Three Phase Inlet Phase A Current	gstCtrl3ChDELTADeciAmpsANOTIFY (10606)	
Ctrl3ChDELTADeciAmpsB = Three Phase Inlet Phase B Current	gstCtrl3ChDELTADeciAmpsBNOTIFY (10607)	
Ctrl3ChDELTADeciAmpsC = Three Phase Inlet Phase C Current	gstCtrl3ChDELTADeciAmpsCNOTIFY (10608)	
Pow3ChDeciAmpsA = Three Phase Inlet Phase A Current	gstPow3ChDeciAmpsANOTIFY (11110)	
Pow3ChDeciAmpsB = Three Phase Inlet Phase B Current	gstPow3ChDeciAmpsBNOTIFY (11119)	
Pow3ChDeciAmpsC = Three Phase Inlet Phase C Current	gstPow3ChDeciAmpsCNOTIFY (11128)	
Ctrl3ChIECDeciAmpsA =Three Phase Inlet Phase A Current	gstCtrl3ChIECDeciAmpsANOTIFY (12508)	
Ctrl3ChIECDeciAmpsB =Three Phase Inlet Phase B Current	gstCtrl3ChIECDeciAmpsBNOTIFY (12516)	
Ctrl3ChIECDeciAmpsC =Three Phase Inlet Phase C Current	gstCtrl3ChIECDeciAmpsCNOTIFY (12524)	

Geist V3 Supported Events

Geist V3 Supported Events		
Event description	**Trap name**	**Common event name**
Temperature Threshold High Violation	gstTempSensorTempCNOTIFY gstTempSensorTempFNOTIFY gstClimateTempCNOTIFY gstClimateTempFNOTIFY (alarmTripType = 2)	
Temperature Threshold Low Violation	gstTempSensorTempCNOTIFY gstTempSensorTempFNOTIFY gstClimateTempCNOTIFY gstClimateTempFNOTIFY (alarmTripType = 1)	
Temperature Threshold Clear	gstTempSensorTempCNOTIFY gstTempSensorTempFNOTIFY gstClimateTempCNOTIFY gstClimateTempFNOTIFY (alarmTripType = 0)	
Humidity Threshold High Violation	gstClimateHumidityNOTIFY (alarmTripType = 2)	
Humidity Threshold Low Violation	gstClimateHumidityNOTIFY (alarmTripType =)1	
Humidity Threshold Clear	gstClimateHumidityNOTIFY (alarmTripType = 0)	
Outlet Current Threshold High Violation	gstCtrlOutletDeciAmpsNOTIFY (alarmTripType = 2)	

Geist V3 Supported Events		
Event description	**Trap name**	**Common event name**
Outlet Current Threshold Low Violation -	gstCtrlOutletDeciAmpsNOTIFY (alarmTripType = 1)	
Outlet Current Threshold Violation Clear	gstCtrlOutletDeciAmpsNOTIFY (alarmTripType = 0)	

Hewlett Packard Supported Events

Note: This plugin supports most HP rack PDUs. For supported events for rack PDUs with HP power strips that use the PDU2 section of the HP-Compaq Power MIB, such as the HP D9N15A (8.6kVA 208V 3Ph 21out NA/JP mPDU) model, see Hewlett Packard PDU2 Supported Events on the facing page.

Hewlett Packard Supported Events		
Event description	**Trap name**	**Common event name**
Voltage High Critical	trapCritical	inletOverVoltageCritical
Voltage High Critical Clear	trapCleared	inletOverVoltageCriticalClear
Voltage Low Critical	trapCritical	inletUnderVoltageCritical
Voltage Low Critical Clear	trapCleared	inletUnderVoltageCriticalClear
Current Critical	trapCritical	inletOverCurrentCritical
Current Critical Clear	trapCleared	inletOverCurrentCriticalClear
Voltage High Warning	trapWarning	inletOverVoltageWarning
Voltage High Warning Clear	trapCleared	inletOverVoltageWarningClear
Voltage Low Warning	trapWarning	inletUnderVoltageWarning
Voltage Low Warning Clear	trapCleared	inletUnderVoltageWarningClear
Current Warning	trapWarning	inletOverCurrentWarning
Current Warning Clear	trapCleared	inletOverCurrentWarningClear

Hewlett Packard PDU2 Supported Events

Note: This plugin supports rack PDUs with HP power strips that use the PDU2 section of the HP-Compaq Power MIB, such as the HP D9N15A (8.6kVA 208V 3Ph 21out NA/JP mPDU) model. For supported events for other HP hardware, see Hewlett Packard Supported Events on the previous page.

Hewlett Packard PDU2 Supported Events		
Event description	**Trap name**	**Common event name**
Voltage High Critical	trapCritical	inletOverVoltageCritical
Voltage High Critical Clear	trapCleared	inletOverVoltageCriticalClear
Voltage Low Critical	trapCritical	inletUnderVoltageCritical
Voltage Low Critical Clear	trapCleared	inletUnderVoltageCriticalClear
Current High Critical	trapCritical	inletOverCurrentCritical
Current High Critical Clear	trapCleared	inletOverCurrentCriticalClear
Voltage High Warning	trapWarning	inletOverVoltageWarning
Voltage High Warning Clear	trapCleared	inletOverVoltageWarningClear
Voltage Low Warning	trapWarning	inletUnderVoltageWarning
Voltage Low Warning Clear	trapCleared	inletUnderVoltageWarningClear
Current High Warning	trapWarning	inletOverCurrentWarning
Current High Warning Clear	trapCleared	inletOverCurrentWarningClear
Current Low Critical	trapCritical	inletUnderCurrentCritical
Current Low Critical Clear	trapCleared	inletUnderCurrentCriticalClear
Current Low Warning	trapWarning	inletUnderCurrentWarning
Current Low Warning Clear	trapCleared	inletUnderCurrentWarningClear

Knurr Supported Events

Knurr Supported Events		
Event description	**Trap name**	**Common event name**
Inlet Pole Current Upper Warning Threshold	pdu-M1TrapPreWarnPh1 pdu-M1TrapPreWarnPh2 pdu-M1TrapPreWarnPh3 pdu-M2TrapPreWarnPh1 pdu-M2TrapPreWarnPh2 pdu-M2TrapPreWarnPh3 pdu-M3TrapPreWarnPh1 pdu-M3TrapPreWarnPh2 pdu-M3TrapPreWarnPh3 pdu-M4TrapPreWarnPh1 pdu-M4TrapPreWarnPh2 pdu-M4TrapPreWarnPh3	inletOverCurrentWarning
Inlet Pole Current Upper Critical Threshold	pdu-M1TrapAlarmPh1 pdu-M1TrapAlarmPh2 pdu-M1TrapAlarmPh3 pdu-M2TrapAlarmPh1 pdu-M2TrapAlarmPh2 pdu-M2TrapAlarmPh3 pdu-M3TrapAlarmPh1 pdu-M3TrapAlarmPh2 pdu-M3TrapAlarmPh3 pdu-M4TrapAlarmPh1 pdu-M4TrapAlarmPh2 pdu-M4TrapAlarmPh3	inletOverCurrentCritical
Inlet Pole Current Lower Warning Threshold	pdu-M1TrapInfoPh1 pdu-M1TrapInfoPh2	inletUnderCurrentWarning

Knurr Supported Events		
Event description	**Trap name**	**Common event name**
	pdu-M1TrapInfoPh3 pdu-M2TrapInfoPh1 pdu-M2TrapInfoPh2 pdu-M2TrapInfoPh3 pdu-M3TrapInfoPh1 pdu-M3TrapInfoPh2 pdu-M3TrapInfoPh3 pdu-M4TrapInfoPh1 pdu-M4TrapInfoPh2 pdu-M4TrapInfoPh3	
Inlet Pole Current Threshold Clear - All	pdu-M1TrapRetToNormPh1 pdu-M1TrapRetToNormPh2 pdu-M1TrapRetToNormPh3 pdu-M2TrapRetToNormPh1 pdu-M2TrapRetToNormPh2 pdu-M2TrapRetToNormPh3 pdu-M3TrapRetToNormPh1 pdu-M3TrapRetToNormPh2 pdu-M3TrapRetToNormPh3 pdu-M4TrapRetToNormPh1 pdu-M4TrapRetToNormPh2 pdu-	inletOverCurrentWarningClear inletOverCurrentCriticalClear inletUnderCurrentWarningClear

Knurr Supported Events		
Event description	**Trap name**	**Common event name**
	M4TrapRetToNormPh3	
Inlet Unbalanced Current Upper Warning Threshold	pdu-M1TrapOutOfBal pdu-M2TrapOutOfBal pdu-M3TrapOutOfBal pdu-M4TrapOutOfBal	inletOverUnbalancedCurrentWarning

Liebert Supported Events

Liebert Supported Events		
Event description	**Trap name**	**Common event name**
Outlet turned on	lgpEventRcpPowerStateChangeOn	outletPowerOn
Outlet turned off	lgpEventRcpPowerStateChangeOff	outletPowerOff
"Active:Alarm:Branch Breaker Open [Label]Branch A" "Cleared:Alarm:Branch Breaker Open[Label]Branch A"	lgpSysNotification	cbTripped cbTrippedClear
"Active:Warning:PDU Over Current L3[Label]MPH2 [Pole]L3 [Value]1.18A [Threshold]3%" "Cleared:Warning:PDU Over Current L3[Label]MPH2"	lgpSysNotification	inletOverCurrentWarning inletOverCurrentWarningClear

MRV Supported Events

MRV Supported Events		
Event description	**Trap name**	**Common event name**
Temp Env Sensor High Threshold	irTempHighTholdAlarmRaised	envTemperatureUpperCritical
Temp Env Sensor High Threshold Cleared	irTempHighTholdAlarmCleared	envTemperatureUpperCriticalClear
Temp Env Sensor Low Threshold	irTempLowTholdAlarmRaised	envTemperatureLowerCritical
Temp Env Sensor Low Threshold Cleared	irTempLowTholdAlarmCleared	envTemperatureLowerCriticalClear
Humidity Env Sensor High Threshold	irHumidityHighTholdAlarmRaised	envHumidityUpperCritical
Humidity Env Sensor High Threshold Cleared	irHumidityHighTholdAlarmCleared	envHumidityUpperCriticalClear
Humidity Env Sensor Low Threshold	irHumidityLowTholdAlarmRaised	envHumidityLowerCritical
Humidity Env Sensor Low Threshold Cleared	irHumidityLowTholdAlarmCleared	envHumidityUpperCriticalClear

Netbotz Supported Events

Note: Netbotz devices may be managed by either the APC standard plugin or the Netbotz standard plugin. The MIB used by the target device will determine which standard plugin is used. For Netbotz supported events for the APC plugin, see APC Netbotz Supported Events on page 221.

Netbotz Supported Events		
Event description	**Trap name**	**Common event name**
Temp Env Sensor High Threshold	netBotzTempTooHigh	envTemperatureUpperCritical
Temp Env Sensor High Threshold Cleared	netBotzTempTooHighRTN	envTemperatureUpperCriticalClear
Temp Env Sensor Low Threshold	netBotzTempTooLow	envTemperatureLowerCritical
Temp Env Sensor Low Threshold Cleared	netBotzTempTooLowRTN	envTemperatureLowerCriticalClear
Humidity Env Sensor High Threshold	netBotzHumidityTooHigh	envHumidityUpperCritical
Humidity Env Sensor High Threshold Cleared	netBotzHumidityTooHighRTN	envHumidityUpperCriticalClear
Humidity Env Sensor Low Threshold	netBotzHumidityTooLow	envHumidityLowerCritical
Humidity Env Sensor Low Threshold Cleared	netBotzHumidityTooLowRTN	envHumidityLowerCriticalClear

Raritan EMX Supported Events

Note: Events marked with an asterisk (*) are only generated when doors have been created and configured correctly. For more information, see Door Access Management on page 390.

Event description	Trap name	Common event name
Raritan EMX Supported Events		
Air Flow	externalSensorStateChange	envOverAirFlowCritical envOverAirFlowCriticalClear envOverAirFlowWarning envOverAirFlowWarningClear envUnderAirFlowCritical envUnderAirFlowCriticalClear envUnderAirFlowWarning envUnderAirFlowWarningClear envAirFlowSensorUnavailable envAirFlowSensorUnavailableClear
Air Pressure	externalSensorStateChange	envOverAirPressureCritical envOverAirPressureCriticalClear envOverAirPressureWarning envOverAirPressureWarningClear envUnderAirPressureCritical envUnderAirPressureCriticalClear envUnderAirPressureWarning envUnderAirPressureWarningClear envAirPressureSensorUnavailable envAirPressureSensorUnavailableClear
Contact Closure	externalSensorStateChange	envContactSensorCritical envContactSensorCriticalClear
Door Open Sensor State Change*	externalSensorStateChange	doorOpen doorOpenClear

Event description	Trap name	Common event name
Raritan EMX Supported Events		
Electronic Lock Sensor State Change*	externalSensorStateChange	electronicallyUnlocked electronicallyUnlockedClear
External Sensor Slot State Change	External sensor '[EXTSENSORNAME]' in slot '[EXTSENSORSLOT]' is closed.	SensorContactOpen SensorContactClosed
Handle Open Sensor State Change*	externalSensorStateChange	handleOpen handleOpenClear
Humidity	externalSensorStateChange	envOverHumidityCritical envOverHumidityCriticalClear envOverHumidityWarning envOverHumidityWarningClear envUnderHumidityCritical envUnderHumidityCriticalClear envUnderHumidityWarning envUnderHumidityWarningClear envHumiditySensorUnavailable envHumiditySensorUnavailableClear
Motion Detection	externalSensorStateChange	envMotionDetectionCritical envMotionDetectionCriticalClear envMotionDetectionUnavailable envMotionDetectionUnavailableClear
Powered Dry Contact	externalSensorStateChange	envPoweredDryContactCritical envPoweredDryContactCriticalClear
Server Reachability from PDU	serverReachable serverNotReachable	serverNotReachableClear serverNotReachable
Smoke	externalSensorStateChange	envSmokeSensorCritical envSmokeSensorCriticalClea

Event description	Trap name	Common event name
Raritan EMX Supported Events		
		envSmokeSensorUnavailable envSmokeSensorUnavailableClear
Tamper Detection	externalSensorStateChange	envTamperDetectionCritical envTamperDetectionCriticalClear envTamperDetectionUnavailable envTamperDetectionUnavailableClear
Temperature	externalSensorStateChange	envOverTemperatureCritical envOverTemperatureCriticalClear envOverTemperatureWarning envOverTemperatureWarningClear envUnderTemperatureCritical envUnderTemperatureCriticalClear envUnderTemperatureWarning envUnderTemperatureWarningClear envTemperatureSensorUnavailable envTemperatureSensorUnavailableClear
Vibration	externalSensorStateChange	envVibrationSensorCritical envVibrationSensorCriticalClear envVibrationSensorUnavailable envVibrationSensorUnavailableClear
Water	externalSensorStateChange	envWaterSensorCritical envWaterSensorCriticalClea envWaterSensorUnavailable envWaterSensorUnavailableClear

Raritan Power Meter Supported Events

Raritan Power Meter Supported Events		
Event description	**Trap name**	**Common event name**
Circuit Voltage	circuitSensorStateChange circuitPoleSensorStateChange	circuitOverVoltageCriticalClear circuitOverVoltageCritical circuitOverVoltageWarningClear circuitOverVoltageWarning circuitUnderVoltageCriticalClear circuitUnderVoltageCritical circuitUnderVoltageWarningClear circuitUnderVoltageWarning circuitVoltageSensorUnavailable circuitVoltageSensorUnavailableClear
Circuit Current	circuitSensorStateChange circuitPoleSensorStateChange	circuitOverCurrentCriticalClear circuitOverCurrentCritical circuitOverCurrentWarningClear circuitOverCurrentWarning circuitUnderCurrentCriticalClear circuitUnderCurrentCritical circuitUnderCurrentWarningClear circuitUnderCurrentWarning circuitCurrentSensorUnavailable circuitCurrentSensorUnavailableClear
Circuit Active Power	circuitSensorStateChange circuitPoleSensorStateChange	circuitOverActivePowerCriticalClear circuitOverActivePowerCritical circuitOverActivePowerWarningClear circuitOverActivePowerWarning circuitUnderActivePowerCriticalClear circuitUnderActivePowerCritical

Raritan Power Meter Supported Events		
Event description	**Trap name**	**Common event name**
		circuitUnderActivePowerWarningClear circuitUnderActivePowerWarning circuitActivePowerSensorUnavailable circuitActivePowerSensorUnavailableClear
Circuit Apparent Power	circuitSensorStateChange circuitPoleSensorStateChange	circuitOverApparentPowerCriticalClear circuitOverApparentPowerCritical circuitOverApparentPowerWarningClear circuitOverApparentPowerWarning circuitUnderApparentPowerCriticalClear circuitUnderApparentPowerCritical circuitUnderApparentPowerWarningClear circuitUnderApparentPowerWarning circuitApparentPowerSensorUnavailable circuitApparentPowerSensorUnavailableClear
Circuit Power Factor	circuitSensorStateChange circuitPoleSensorStateChange	circuitOverPowerFactorCriticalClear circuitOverPowerFactorCritical circuitOverPowerFactorWarningClear circuitOverPowerFactorWarning circuitUnderPowerFactorCriticalClear circuitUnderPowerFactorCritical circuitUnderPowerFactorWarningClear circuitUnderPowerFactorWarning circuitPowerFactorSensorUnavailable circuitPowerFactorSensorUnavailableClear
Circuit Phase Angle	circuitSensorStateChange circuitPoleSensorStateChange	circuitOverPhaseAngleCriticalClear circuitOverPhaseAngleCritical circuitOverPhaseAngleWarningClear circuitOverPhaseAngleWarning circuitUnderPhaseAngleCriticalClear

Raritan Power Meter Supported Events		
Event description	**Trap name**	**Common event name**
		circuitUnderPhaseAngleCritical circuitUnderPhaseAngleWarningClear circuitUnderPhaseAngleWarning circuitPhaseAngleSensorUnavailable circuitPhaseAngleSensorUnavailableClear
Circuit Frequency	circuitSensorStateChange circuitPoleSensorStateChange	circuitOverFrequencyCriticalClear circuitOverFrequencyCritical circuitOverFrequencyWarningClear circuitOverFrequencyWarning circuitUnderFrequencyCriticalClear circuitUnderFrequencyCritical circuitUnderFrequencyWarningClear circuitUnderFrequencyWarning circuitFrequencySensorUnavailable circuitFrequencySensorUnavailableClear
Water	externalSensorStateChange	envWaterSensorCritical envWaterSensorCriticalClea envWaterSensorUnavailable envWaterSensorUnavailableClear
Smoke	externalSensorStateChange	envSmokeSensorCritical envSmokeSensorCriticalClea envSmokeSensorUnavailable envSmokeSensorUnavailableClear
Vibration	externalSensorStateChange	envVibrationSensorCritical envVibrationSensorCriticalClear envVibrationSensorUnavailable envVibrationSensorUnavailableClear
Temperature	externalSensorStateChange	envOverTemperatureCritical

Raritan Power Meter Supported Events		
Event description	**Trap name**	**Common event name**
		envOverTemperatureCriticalClear envOverTemperatureWarning envOverTemperatureWarningClear envUnderTemperatureCritical envUnderTemperatureCriticalClear envUnderTemperatureWarning envUnderTemperatureWarningClear envTemperatureSensorUnavailable envTemperatureSensorUnavailableClear
Humidity	externalSensorStateChange	envOverHumidityCritical envOverHumidityCriticalClear envOverHumidityWarning envOverHumidityWarningClear envUnderHumidityCritical envUnderHumidityCriticalClear envUnderHumidityWarning envUnderHumidityWarningClear envHumiditySensorUnavailable envHumiditySensorUnavailableClear
Air Flow	externalSensorStateChange	envOverAirFlowCritical envOverAirFlowCriticalClear envOverAirFlowWarning envOverAirFlowWarningClear envUnderAirFlowCritical envUnderAirFlowCriticalClear envUnderAirFlowWarning envUnderAirFlowWarningClear envAirFlowSensorUnavailable envAirFlowSensorUnavailableClear

Raritan Power Meter Supported Events		
Event description	**Trap name**	**Common event name**
Air Pressure	externalSensorStateChange	envOverAirPressureCritical envOverAirPressureCriticalClear envOverAirPressureWarning envOverAirPressureWarningClear envUnderAirPressureCritical envUnderAirPressureCriticalClear envUnderAirPressureWarning envUnderAirPressureWarningClear envAirPressureSensorUnavailable envAirPressureSensorUnavailableClear

Raritan PX/PX2/PX3/PX4 Supported Events

Note: The Raritan PX2 plugin is responsible for managing the following PDUs: Raritan PX2, PX3, and PX4 PDUs and ServerTechnology PRO3X and PRO4X PDUs.

Event description	Trap name	Common event name
Raritan PX Supported Events		
Active Power	inletSensorStateChange	inletOverActivePowerCriticalClear inletOverActivePowerCritical inletOverActivePowerWarningClear inletOverActivePowerWarning inletUnderActivePowerCriticalClear inletUnderActivePowerCritical inletUnderActivePowerWarningClear inletUnderActivePowerWarning inletActivePowerSensorUnavailable inletActivePowerSensorUnavailableClear
Active Power	outletSensorStateChange	outletOverActivePowerCriticalClear outletOverActivePowerCritical outletOverActivePowerWarningClear outletOverActivePowerWarning outletUnderActivePowerCriticalClear outletUnderActivePowerCritical outletUnderActivePowerWarningClear outletUnderActivePowerWarning outletActivePowerSensorUnavailable outletActivePowerSensorUnavailableClear
Air Flow	externalSensorStateChange	envOverAirFlowCritical envOverAirFlowCriticalClear envOverAirFlowWarning envOverAirFlowWarningClear

Event description	Trap name	Common event name
Raritan PX Supported Events		
		envUnderAirFlowCritical envUnderAirFlowCriticalClear envUnderAirFlowWarning envUnderAirFlowWarningClear envAirFlowSensorUnavailable envAirFlowSensorUnavailableClear
Air Pressure	externalSensorStateChange	envOverAirPressureCritical envOverAirPressureCriticalClear envOverAirPressureWarning envOverAirPressureWarningClear envUnderAirPressureCritical envUnderAirPressureCriticalClear envUnderAirPressureWarning envUnderAirPressureWarningClear envAirPressureSensorUnavailable envAirPressureSensorUnavailableClear
Apparent Power	inletSensorStateChange	inletOverApparentPowerCriticalClear inletOverApparentPowerCritical inletOverApparentPowerWarningClear inletOverApparentPowerWarning inletUnderApparentPowerCriticalClear inletUnderApparentPowerCritical inletUnderApparentPowerWarningClear inletUnderApparentPowerWarning inletApparentPowerSensorUnavailable inletApparentPowerSensorUnavailableClear
Apparent Power	outletSensorStateChange	outletOverApparentPowerCriticalClear outletOverApparentPowerCritical

Event description	Trap name	Common event name
Raritan PX Supported Events		
		outletOverApparentPowerWarningClear outletOverApparentPowerWarning outletUnderApparentPowerCriticalClear outletUnderApparentPowerCritical outletUnderApparentPowerWarningClear outletUnderApparentPowerWarning outletApparentPowerSensorUnavailable outletApparentPowerSensorUnavailableClear
Circuit Breaker Peak Current	overCurrentProtectorSensorStateChange	cbOverPeakCurrentCriticalClear cbOverPeakCurrentCritical cbOverPeakCurrentWarningClear cbOverPeakCurrentWarning cbUnderPeakCurrentCriticalClear cbUnderPeakCurrentCritical cbUnderPeakCurrentWarningClear cbUnderPeakCurrentWarning cbPeakCurrentSensorUnavailable cbPeakCurrentSensorUnavailableClear
Contact Closure	externalSensorStateChange	envContactSensorCritical envContactSensorCriticalClear
Door Open Sensor State Change*	externalSensorStateChange	doorOpen doorOpenClear
Electronic Lock Sensor State Change*	externalSensorStateChange	electronicallyUnlocked electronicallyUnlockedClear
Frequency	outletSensorStateChange	outletOverPowerFactorCriticalClear

Event description	Trap name	Common event name
Raritan PX Supported Events		
		outletOverPowerFactorCritical outletOverPowerFactorWarningClear outletOverPowerFactorWarning outletUnderPowerFactorCriticalClear outletUnderPowerFactorCritical outletUnderPowerFactorWarningClear outletUnderPowerFactorWarning outletPowerFactorSensorUnavailable outletPowerFactorSensorUnavailableClear
Frequency	inletSensorStateChange	inletOverFrequencyCriticalClear inletOverFrequencyCritical inletOverFrequencyWarningClear inletOverFrequencyWarning inletUnderFrequencyCriticalClear inletUnderFrequencyCritical inletUnderFrequencyWarningClear inletUnderFrequencyWarning inletFrequencySensorUnavailable inletFrequencySensorUnavailableClear
Handle Open Sensor State Change*	externalSensorStateChange	handleOpen handleOpenClear
Humidity	externalSensorStateChange	envOverHumidityCritical envOverHumidityCriticalClear envOverHumidityWarning envOverHumidityWarningClear envUnderHumidityCritical envUnderHumidityCriticalClear

Event description	Trap name	Common event name
Raritan PX Supported Events		
		envUnderHumidityWarning envUnderHumidityWarningClear envHumiditySensorUnavailable envHumiditySensorUnavailableClear
Motion Detection	externalSensorStateChange	envMotionDetectionCritical envMotionDetectionCriticalClear envMotionDetectionUnavailable envMotionDetectionUnavailableClear
Outlet Power State On/Off	outletSensorStateChange	outletPowerStateUnavailable outletPowerStateUnavailableClear outletPowerStateOff outletPowerStateOffClear outletPowerStateOn outletPowerStateOnClear
Peak Current	inletSensorStateChange	inletOverPeakCurrentCriticalClear inletOverPeakCurrentCritical inletOverPeakCurrentWarningClear inletOverPeakCurrentWarning inletUnderPeakCurrentCriticalClear inletUnderPeakCurrentCritical inletUnderPeakCurrentWarningClear inletUnderPeakCurrentWarning inletPeakCurrentSensorUnavailable inletPeakCurrentSensorUnavailableClear
Peak Current	outletSensorStateChange	outletOverPeakCurrentCriticalClear outletOverPeakCurrentCritical outletOverPeakCurrentWarningClear

Event description	Trap name	Common event name
Raritan PX Supported Events		
		outletOverPeakCurrentWarning outletUnderPeakCurrentCriticalClear outletUnderPeakCurrentCritical outletUnderPeakCurrentWarningClear outletUnderPeakCurrentWarning outletPeakCurrentSensorUnavailable outletPeakCurrentSensorUnavailableClear
Phase Angle	outletSensorStateChange	outletOverPhaseAngleCriticalClear outletOverPhaseAngleCritical outletOverPhaseAngleWarningClear outletOverPhaseAngleWarning outletUnderPhaseAngleCriticalClear outletUnderPhaseAngleCritical outletUnderPhaseAngleWarningClear outletUnderPhaseAngleWarning outletPhaseAngleSensorUnavailable outletPhaseAngleSensorUnavailableClear
Phase Angle	inletSensorStateChange	inletOverPhaseAngleCriticalClear inletOverPhaseAngleCritical inletOverPhaseAngleWarningClear inletOverPhaseAngleWarning inletUnderPhaseAngleCriticalClear inletUnderPhaseAngleCritical inletUnderPhaseAngleWarningClear inletUnderPhaseAngleWarning inletPhaseAngleSensorUnavailable inletPhaseAngleSensorUnavailableClear
Power Factor	outletSensorStateChange	outletOverPowerFactorCriticalClear

Event description	Trap name	Common event name
Raritan PX Supported Events		
		outletOverPowerFactorCritical outletOverPowerFactorWarningClear outletOverPowerFactorWarning outletUnderPowerFactorCriticalClear outletUnderPowerFactorCritical outletUnderPowerFactorWarningClear outletUnderPowerFactorWarning outletPowerFactorSensorUnavailable outletPowerFactorSensorUnavailableClear
Power Factor	inletSensorStateChange	inletOverPowerFactorCriticalClear inletOverPowerFactorCritical inletOverPowerFactorWarningClear inletOverPowerFactorWarning inletUnderPowerFactorCriticalClear inletUnderPowerFactorCritical inletUnderPowerFactorWarningClear inletUnderPowerFactorWarning inletPowerFactorSensorUnavailable inletPowerFactorSensorUnavailableClear
Power Quality	inletSensorStateChange	powerQualityUnavailable powerQualityUnavailableClear powerQualityWarning powerQualityWarningClear powerQualityCritical powerQualityCriticalClear
Powered Dry Contact	externalSensorStateChange	envPoweredDryContactCritical envPoweredDryContactCriticalClear

Event description	Trap name	Common event name
Raritan PX Supported Events		
Residual Current	inletSensorStateChange	inletOverResidualCurrentCriticalClear inletOverResidualCurrentCritical inletOverResidualCurrentWarningClear inletOverResidualCurrentWarning inletUnderResidualCurrentCriticalClear inletUnderResidualCurrentCritical inletUnderResidualCurrentWarningClear inletUnderResidualCurrentWarning inletResidualCurrentSensorUnavailable inletResidualCurrentSensorUnavailableClear
Server Reach-ability from PDU	serverReachable serverNotReachable	serverNotReachableClear serverNotReachable
Smoke	externalSensorStateChange	envSmokeSensorCritical envSmokeSensorCriticalClea envSmokeSensorUnavailable envSmokeSensorUnavailableClear
Tamper Detec-tion	externalSensorStateChange	envTamperDetectionCritical envTamperDetectionCriticalClear envTamperDetectionUnavailable envTamperDetectionUnavailableClear
Temperature	externalSensorStateChange	envOverTemperatureCritical envOverTemperatureCriticalClear envOverTemperatureWarning envOverTemperatureWarningClear envUnderTemperatureCritical envUnderTemperatureCriticalClear envUnderTemperatureWarning envUnderTemperatureWarningClear

Event description	Trap name	Common event name
Raritan PX Supported Events		
		envTemperatureSensorUnavailable envTemperatureSensorUnavailableClear
Unbalanced Current	inletSensorStateChange	inletOverUnbalancedCurrentCriticalClear InletOverUnbalancedCurrentCritical inletOverUnbalancedCurrentWarningClear inletOverUnbalancedCurrentWarning inletUnderUnbalancedCurrentCriticalClear inletUnderUnbalancedCurrentCritical inletUnderUnbalancedCurrentWarningClear inletUnderUnbalancedCurrentWarning inletUnbalancedCurrentSensorUnavailable inletUnbalancedCurrentSensorUnavailableClear
Unbalanced Current	outletSensorStateChange	outletOverUnbalancedCurrentCriticalClear outletOverUnbalancedCurrentCritical outletOverUnbalancedCurrentWarningClear outletOverUnbalancedCurrentWarning outletUnderUnbalancedCurrentCriticalClear outletUnderUnbalancedCurrentCritical outletUnderUnbalancedCurrentWarningClear outletUnderUnbalancedCurrentWarning outletUnbalancedCurrentSensorUnavailable outletUnbalancedCurrentSensorUnavailableClear
Vibration	externalSensorStateChange	envVibrationSensorCritical envVibrationSensorCriticalClear envVibrationSensorUnavailable envVibrationSensorUnavailableClear
Voltage Line to Neutral	outletPoleSensorStateChange	outletOverVoltageLnCriticalClear

Event description	Trap name	Common event name
Raritan PX Supported Events		
		outletOverVoltageLnCritical outletOverVoltageLnWarningClear outletOverVoltageLnWarning outletUnderVoltageLnCriticalClear outletUnderVoltageLnCritical outletUnderVoltageLnWarningClear outletUnderVoltageLnWarning outletVoltageLnSensorUnavailable outletVoltageLnSensorUnavailableClear
Voltage Line to Neutral	InletPoleSensorStateChange	inletOverVoltageLnCriticalClear inletOverVoltageLnCritical inletOverVoltageLnWarningClear inletOverVoltageLnWarning inletUnderVoltageLnCriticalClear inletUnderVoltageLnCritical inletUnderVoltageLnWarningClear inletUnderVoltageLnWarning inletVoltageLnSensorUnavailable inletVoltageLnSensorUnavailableClear
Water	externalSensorStateChange	envWaterSensorCritical envWaterSensorCriticalClea envWaterSensorUnavailable envWaterSensorUnavailableClear

Raritan PX3TS Transfer Switch Supported Events

Raritan PX3TS Supported Events		
Event description	**Trap name**	**Common event name**
Transfer Switch Active Inlet Changed	transferSwitchStateChange	transferSwitchActiveInletChangedCritical transferSwitchActiveInletChangedCriticalClear transferSwitchActiveInletChangedWarning
Transfer Switch Operating State Change	transferSwitchStateChange	transferSwitchOperatingStateNormal transferSwitchOperatingStateStandby
Water	externalSensorStateChange	envWaterSensorCritical envWaterSensorCriticalClea envWaterSensorUnavailable envWaterSensorUnavailableClear
Smoke	externalSensorStateChange	envSmokeSensorCritical envSmokeSensorCriticalClea envSmokeSensorUnavailable envSmokeSensorUnavailableClear
Vibration	externalSensorStateChange	envVibrationSensorCritical envVibrationSensorCriticalClear envVibrationSensorUnavailable envVibrationSensorUnavailableClear
Temperature	externalSensorStateChange	envOverTemperatureCritical envOverTemperatureCriticalClear envOverTemperatureWarning envOverTemperatureWarningClear envUnderTemperatureCritical envUnderTemperatureCriticalClear envUnderTemperatureWarning

Raritan PX3TS Supported Events		
Event description	**Trap name**	**Common event name**
		envUnderTemperatureWarningClear envTemperatureSensorUnavailable envTemperatureSensorUnavailableClear
Humidity	externalSensorStateChange	envOverHumidityCritical envOverHumidityCriticalClear envOverHumidityWarning envOverHumidityWarningClear envUnderHumidityCritical envUnderHumidityCriticalClear envUnderHumidityWarning envUnderHumidityWarningClear envHumiditySensorUnavailable envHumiditySensorUnavailableClear
Air Flow	externalSensorStateChange	envOverAirFlowCritical envOverAirFlowCriticalClear envOverAirFlowWarning envOverAirFlowWarningClear envUnderAirFlowCritical envUnderAirFlowCriticalClear envUnderAirFlowWarning envUnderAirFlowWarningClear envAirFlowSensorUnavailable envAirFlowSensorUnavailableClear
Air Pressure	externalSensorStateChange	envOverAirPressureCritical envOverAirPressureCriticalClear envOverAirPressureWarning envOverAirPressureWarningClear envUnderAirPressureCritical envUnderAirPressureCriticalClear

Raritan PX3TS Supported Events		
Event description	**Trap name**	**Common event name**
		envUnderAirPressureWarning envUnderAirPressureWarningClear envAirPressureSensorUnavailable envAirPressureSensorUnavailableClear

Rittal Supported Events

Rittal Supported Events		
Event description	**Trap name**	**Common event name**
Inlet Current Upper Critical Threshold	alarmUnit1 alarmUnit2 alarmUnit3 alarmUnit4	inletCurrentUpperCritical
Inlet Current Upper Critical Threshold Cleared	alarmUnit1 alarmUnit2 alarmUnit3 alarmUnit4	inletCurrentUpperCriticalClear
Inlet Current Lower Critical Threshold	alarmUnit1 alarmUnit2 alarmUnit3 alarmUnit4	inletCurrentLowerCritical
Inlet Current Lower Critical Threshold Cleared	alarmUnit1 alarmUnit2 alarmUnit3 alarmUnit4	inletCurrentLowerCriticalClear
Inlet Voltage Upper Critical Threshold	alarmUnit1 alarmUnit2 alarmUnit3 alarmUnit4	inletVoltageUpperCritical
Inlet Voltage Upper Critical Threshold Cleared	alarmUnit1 alarmUnit2 alarmUnit3 alarmUnit4	inletVoltageUpperCriticalClear

Rittal Supported Events		
Event description	**Trap name**	**Common event name**
Inlet Voltage Lower Critical Threshold	alarmUnit1 alarmUnit2 alarmUnit3 alarmUnit4	inletVoltageLowerCritical
Inlet Voltage Lower Critical Threshold Cleared	alarmUnit1 alarmUnit2 alarmUnit3 alarmUnit4	inletVoltageLowerCriticalClear
Temp Env Sensor Upper Critical	alarmUnit1 alarmUnit2 alarmUnit3 alarmUnit4	envTemperatureUpperCritical
Temp Env Sensor Upper Critical Cleared	alarmUnit1 alarmUnit2 alarmUnit3 alarmUnit4	envTemperatureUpperCriticalClear
Temp Env Sensor Low Critical	alarmUnit1 alarmUnit2 alarmUnit3 alarmUnit4	envTemperatureLowerCritical
Temp Env Sensor Low Critical Cleared	alarmUnit1 alarmUnit2 alarmUnit3 alarmUnit4	envTemperatureLowerCriticalClear
Humidity Env Sensor Upper Critical	alarmUnit1 alarmUnit2 alarmUnit3	envHumidityUpperCritical

Rittal Supported Events		
Event description	**Trap name**	**Common event name**
	alarmUnit4	
Humidity Env Sensor Upper Critical Cleared	alarmUnit1 alarmUnit2 alarmUnit3 alarmUnit4	envHumidityUpperCriticalClear
Humidity Env Sensor Lower Critical	alarmUnit1 alarmUnit2 alarmUnit3 alarmUnit4	envHumidityLowerCritical
Humidity Env Sensor Lower Critical Cleared	alarmUnit1 alarmUnit2 alarmUnit3 alarmUnit4	envHumidityLowerCriticalClear

Schleifenbauer Supported Events

Schleifenbauer Supported Events		
Event description	**Trap name**	**Common event name**
Temperature High Threshold	sdbDevSsTemperatureAlertDetected	envOverTemperatureCritical
Inlet Current High Threshold	sdbDevSsInputCurrentAlertDetected	inletOverCurrentCritical
Outlet Current High Threshold	sdbDevSsOutletCurrentAlertDetected	outletOverCurrentCritical
Inlet Voltage High Threshold	sdbDevSsInputVoltageAlertDetected	inletOverVoltageCritical

Schleifenbauer Supported Events		
Event description	**Trap name**	**Common event name**
Outlet Current Low Threshold	sdbDevSsOutletCurrentDropAlertDetected	outletUnderCurrentCritical
Inlet Current Low Threshold	sdbDevSsInputCurrentDropAlertDetected	inletUnderCurrentCritical
Outlet Voltage Low Threshold	sdbDevSsOutletVoltageDropAlertDetected	outletUnderVoltageCritical
Trap Used for Clearing Events	sdbDevSsDeviceStatusCodeChanged	envOverTemperatureCriticalClear inletOverCurrentCriticalClear inletUnderCurrentCriticalClear inletOverVoltageCriticalClear outletOverCurrentCriticalClear outletUnderCurrentCriticalClear outletUnderVoltageCriticalClear

Note: To work optimally with PIQ, the Auto Reset Alert option under Settings > Reset in the Schleifenbauer PDU settings should be enabled and set to one-minute intervals (the shortest possible time interval).

Note: Power IQ natively supports Schleifenbauer hybrid PDUs but can also manage Classic PDUs in a daisy chain configuration where a hybrid PDU is the primary or head PDU of the chain.

Server Technology Supported Events

Note: This plugin supports hardware prior to Server Technology's next-generation "PRO2" series of CDU (cabinet distribution unit). For supported events for PRO2 series hardware, see Server Technology PRO2 (Sentry4) Supported Events on the next page.

Servertech Supported Events		
Event description	**Trap name**	**Common event name**
Infeed Current High Threshold	infeedLoadEvent	inletCurrentUpperCritical inletCurrentUpperCriticalClear
Infeed Current Low Threshold	infeedLoadEvent	inletCurrentLowerCritical inletCurrentLowerCriticalClear
Outlet Current High Thresholds	outletLoadEvent	outletCurrentUpperCritical outletCurrentUpperCriticalClear
Outlet Current Low Thresholds	outletLoadEvent	outletCurrentLowerCritical outletCurrentLowerCriticalClear
Outlet Current Status Change	outletChangeEvent	outletPowerOn outletPowerOff
Temp Env Sensor High Threshold	tempHumidSensorTempEvent	envTemperatureUpperCritical envTemperatureUpperCriticalClear
Temp Env Sensor Low Threshold	tempHumidSensorTempEvent	envTemperatureLowerCritical envTemperatureLowerCriticalClear
Humidity Env Sensor High Thresholds	tempHumidSensorHumidEvent	envHumidityUpperCritical envHumidityUpperCriticalClear
Humidity Env Sensor Low Thresholds	tempHumidSensorHumidEvent	envHumidityLowerCritical envHumidityLowerCriticalClear
Water		envWaterSensorCriticalClear envWaterSensorCritical

Servertech Supported Events		
Event description	**Trap name**	**Common event name**
Contact Closure		envContactSensorCriticalClear envContactSensorCritical

Server Technology PRO2 (Sentry4) Supported Events

Note: The Sentry4 plugin supports Server Technology's next-generation "PRO2" series of CDU (cabinet distribution unit). For supported events for the original Servertech plugin, which supports hardware prior to the PRO2 series, see Server Technology Supported Events on the previous page.

Note: To access the environmental sensors, water sensor, and dry contact closure door sensors available on the Servertech EMCU-1-1B unit, you must first add the EMCU-1-1B to Power IQ with a proxy ID of 5 that extends the existing Star topology.

Servertech Supported Events		
Event description	**Trap name**	**Common event name**
Inlet Active Power	st4InputCordActivePowerEvent	inletOverActivePowerCriticalClear inletOverActivePowerCritical inletOverActivePowerWarningClear inletOverActivePowerWarning inletUnderActivePowerCriticalClear inletUnderActivePowerCritical inletUnderActivePowerWarningClear inletUnderActivePowerWarning
Inlet Apparent Power	st4InputCordApparentPowerEvent	inletOverApparentPowerCriticalClear inletOverApparentPowerCritical inletOverApparentPowerWarningClear inletOverApparentPowerWarning inletUnderApparentPowerCriticalClear

Servertech Supported Events		
Event description	**Trap name**	**Common event name**
		inletUnderApparentPowerCritical inletUnderApparentPowerWarningClear inletUnderApparentPowerWarning
Inlet Power Factor	st4InputCordPowerFactorEvent	inletUnderPowerFactorCriticalClear inletUnderPowerFactorCritical inletUnderPowerFactorWarningClear inletUnderPowerFactorWarning
Inlet Voltage	st4InputCordVoltageEvent	inletOverVoltageCriticalClear inletOverVoltageCritical inletOverVoltageWarningClear inletOverVoltageWarning inletUnderVoltageCriticalClear inletUnderVoltageCritical inletUnderVoltageWarningClear inletUnderVoltageWarning
Inlet Unbalanced Current	st4InputCordOutOfBalanceEvent	inletOverUnbalancedCurrentCriticalClear inletOverUnbalancedCurrentCritical inletOverUnbalancedCurrentWarningClear inletOverUnbalancedCurrentWarning
Outlet Current	st4OutletCurrentEvent	outletOverCurrentCriticalClear outletOverCurrentCritical outletOverCurrentWarningClear outletOverCurrentWarning outletUnderCurrentCriticalClear outletUnderCurrentCritical outletUnderCurrentWarningClear outletUnderCurrentWarning

Servertech Supported Events		
Event description	**Trap name**	**Common event name**
Outlet Active Power	st4OutletActivePowerEvent	outletOverActivePowerCriticalClear outletOverActivePowerCritical outletOverActivePowerWarningClear outletOverActivePowerWarning outletUnderActivePowerCriticalClear outletUnderActivePowerCritical outletUnderActivePowerWarningClear outletUnderActivePowerWarning
Outlet Power Factor	st4OutletPowerFactorEvent	outletUnderPowerFactorCriticalClear outletUnderPowerFactorCritical outletUnderPowerFactorWarningClear outletUnderPowerFactorWarning
Circuit Protector (Breaker) Tripped	st4OcpStatusEvent	cbTrippedClear cbTripped
Outlet Power Status Change	st4OutletStateChangeEvent	outletPowerStateOff outletPowerStateOn
Contact Closure Sensor Status	st4CcSensorStatusEvent	envContactSensorCriticalClear envContactSensorCritical
Water Sensor Status	st4WaterSensorStatusEvent	envWaterSensorCriticalClear envWaterSensorCritical
Temperature Sensor Status	st4TempSensorEvent	envOverTemperatureCriticalClear envOverTemperatureCritical envOverTemperatureWarningClear envOverTemperatureWarning envUnderTemperatureCriticalClear envUnderTemperatureCritical envUnderTemperatureWarningClear

Servertech Supported Events		
Event description	**Trap name**	**Common event name**
		envUnderTemperatureWarning
Humidity Sensor Status	st4HumidSensorEvent	envOverHumidityCriticalClear envOverHumidityCritical envOverHumidityWarningClear envOverHumidityWarning envUnderHumidityCriticalClear envUnderHumidityCritical envUnderHumidityWarningClear envUnderHumidityWarning

Sinetica Supported Events

Note: The Sinetica plugin supports Unite Technologies/Panduit PDUs.

Note: Events marked with an asterisk (*) are only generated when doors have been created and configured correctly. For more information, see *Door Access Management on page 390.*

Event description	Trap name	Common event name
Temp Env Sensor High Threshold	alarmCritical alarmWarning alarmCleared	envOverTemperatureCritical envOverTemperatureWarning envOverTemperatureCriticalClear envOverTemperatureWarningClear
Temp Env Sensor Low Threshold	alarmCritical alarmWarning alarmCleared	envUnderTemperatureCritical envUnderTemperatureWarning envUnderTemperatureCriticalClear envUnderTemperatureWarningClear
Humidity Env Sensor High Threshold	alarmCritical alarmWarning	envOverHumidityCritical envOverHumidityWarning

Event description	Trap name	Common event name
	alarmCleared	envOverHumidityCriticalClear envOverHumidityWarningClear
Humidity Env Sensor Low Threshold	alarmCritical alarmWarning alarmCleared	envUnderHumidityCritical envUnderHumidityWarning envUnderHumidityCriticalClear envUnderHumidityWarningClear
Contact Closure	alarmCritical alarmCleared	envContactSensorCritical envContactSensorCriticalClear
Powered Dry Contact	alarmCritical alarmCleared	envPoweredDryContactCritical envPoweredDryContactCriticalClear
Inlet Voltage High Threshold	alarmCritical alarmWarning alarmCleared	inletOverVoltageCritical inletOverVoltageWarning inletOverVoltageCriticalClear inletOverVoltageWarningClear
Inlet Voltage Low Threshold	alarmCritical alarmWarning alarmCleared	inletUnderVoltageCritical inletUnderVoltageWarning inletUnderVoltageCriticalClear inletUnderVoltageWarningClear
Inlet Current High Threshold	alarmCritical alarmWarning alarmCleared	inletOverCurrentCritical inletOverCurrentWarning inletOverCurrentCriticalClear inletOverCurrentWarningClear
Inlet Current Low Threshold	alarmCritical alarmWarning alarmCleared	inletUnderCurrentCritical inletUnderCurrentWarning inletUnderCurrentCriticalClear inletUnderCurrentWarningClear

Event description	Trap name	Common event name
Inlet Apparent Power High Threshold	alarmCritical alarmWarning alarmCleared	inletOverApparentPowerCritical inletOverApparentPowerWarning inletOverApparentPowerCriticalClear
Inlet Active Power High Threshold	alarmCritical alarmWarning alarmCleared	activePowerCritical activePowerWarning activePowerCriticalClear activePowerWarningClear
Inlet Power Factor Threshold	alarmCritical alarmCriticalCleared	inletOverPowerFactorCritical inletOverPowerFactorCriticalClear
Inlet Frequency Threshold	alarmCritical alarmCriticalCleared	inletOverFrequencyCritical inletOverFrequencyCriticalClear
Door Open Sensor State Change*	alarmCritical alarmCriticalCleared	doorOpen doorOpenClear
Handle Open Sensor State Change*	alarmCritical alarmCriticalCleared	handleOpen handleOpenClear
Electronic Lock Sensor State Change*	alarmCritical alarmCriticalCleared	electronicallyUnlocked electronicallyUnlockedClear
PSU Failure	alarmCritical alarmCriticalCleared	pduInternalFault pduInternalFaultClear

Starline Supported Events

Supported Events for M-Type Endfeed Meters		
Event description	**Trap name**	**Common event name**
Circuit Current	cpmAcInfOvCurrAssertEv cpmAcInfOvCurrDeassertEv cpmAcInfUnCurrAssertEv cpmAcInfUnCurrDeassertEv	Circuit Pole Current Over Critical Circuit Pole Current Over Critical Clear Circuit Pole Under Current Critical Circuit Pole Under Current Critical Clear
Circuit Voltage	cpmAcInfOvVoltAssertEv cpmAcInfOvVoltDeassertEv cpmAcInfUnVoltAssertEv cpmAcInfUnVoltDeassertEv	Circuit Pole Over Critical Voltage Circuit Pole Over Critical Voltage Clear Circuit Pole Under Critical Voltage Circuit Pole Under Critical Voltage Clear

Supported Events for M-Type Tapbox Meters		
Event description	**Trap name**	**Common event name**
Inlet Current	cpmAcInfOvCurrAssertEv cpmAcInfOvCurrDeassertEv cpmAcInfUnCurrAssertEv cpmAcInfUnCurrDeassertEv	Inlet Current Over Critical Inlet Current Over Critical Clear Inlet Current Under Critical Inlet Current Under Critical Clear
Inlet Voltage	cpmAcInfOvVoltAssertEv cpmAcInfOvVoltDeassertEv cpmAcInfUnVoltAssertEv cpmAcInfUnVoltDeassertEv	Inlet Pole Over Critical Voltage Inlet Pole Over Critical Voltage Clear Inlet Pole Under Critical Voltage Inlet Pole Under Critical Voltage Clear
Circuit Breaker State	cpmAcBrkrStatusAssertEv cpmAcBrkrStatusDeassertEv	Circuit Breaker Tripped Circuit Breaker Tripped Clear

Note: Circuit Breaker State is supported for M56x and M57x meters.

Supported Events for V-Type Meters		
Event description	**Trap name**	**Common event name**
Outlet Current	cpmAcOtlOvCurrAssertEv cpmAcOtlOvCurrDeassertEv cpmAcOtlUnCurrAssertEv cpmAcOtlUnCurrDeassertEv	Outlet Pole Over Current Critical Outlet Pole Over Current Critical Clear Outlet Pole Under Current Critical Outlet Pole Under Current Critical Clear
Circuit Breaker State	cpmAcBrkrStatusAssertEv cpmAcBrkrStatusDeassertEv	Circuit Breaker Tripped Circuit Breaker Tripped Clear

Note: Circuit Breaker State is supported for V56x and V57x meters.

TANlock Locks

Power IQ enables you to unlock doors secured with TANlock locks.

Only SNMP v2 is supporte. Discovery is blocked if SNMPv3 is used

Power IQ discovers TANlock door locks, their handles, and associated sensors and converts the TANlock door traps to Power IQ events and allows users to unlock doors secured with TANlock locks. When Power IQ receives a trap and converts it into a Power IQ event, Power IQ also updates the sensor's state based on information from the trap

The table below outlines the sensors discovered by Power IQ:

Sensor Type	Name
Powered Dry Contact	Electronic Lock
Contact Closure	Handle Status
Contact Closure	Door Sensor 0
Contact Closure	Door Sensor 1

TANlock also is supported by the Door Security - Status report and Door Security - Audit Report. See:*Creating a Door Security Audit Report* on page 499

Notes on TANlock door locks: The units ship from the factory with SNMP disabled. After enabling it, you need to reboot the device. Only one version of SNMP can be enabled at once. The read and write community strings must be the same.

When a TANlock lock is decommissioned, all associated sensors are also decommissioned.

Note: The TANlock door lock's relay and temperature and humidity sensors are not supported

Note: To use Power IQ's door control features on a door secured with a TANlock door lock, a contact closure sensor must be mapped to a door State and a powered dry contact closure sensors must be mapped to a lock.

For TANlock Supported Events, see: TANlock Supported Events

Tripplite Supported Events

Tripplite Supported Events		
Event description	**Trap name**	**Common event name**
Environmental sensor events	tlUpsTrapAlarmEntryAdded	envTemperatureUpperCritical envTemperatureUpperWarning envHumidityUpperCritical envHumidityUpperWarning
	tlUpsTrapAlarmEntryRemoved	envTemperatureUpperCriticalClear envTemperatureUpperWarningClear envHumidityUpperCriticalClear envHumidityUpperWarningClear

PDU Connectivity Lost and Restored Events

Power IQ generates PDU connectivity events when connectivity with a PDU changes.

When Health Polling is enabled, the Health Poller and Data Poller work together to report events on these two aspects of connectivity: responding to ping and responding to data collection, each based on the specified intervals. The PDU's health status will change to red when connectivity is lost. Loss of connectivity is a critical severity event.

The Data Poller checks for data connectivity every 15 minutes. If a PDU remains inaccessible for 1 hour, the Connectivity Lost event is generated. Once communication with the PDU is restored, the Connectivity Restored event is generated, and the health status will update.

The Health Poller checks for network connectivity and device operational status by sending a ping and getting a response. The Health Poll process is generally quicker than a data poll.

In Power IQ, backup IP addresses are supported for PDUs. Health Poller will poll all of the IP addresses available for a PDU. If at least one IP address is reachable, no event will be created. Health Poller will continue to poll the backup IP address until it becomes unreachable. For more information, see Configuring Backup IP Addresses for PDUs.

To configure email notifications for this event, see *Configure Event Notification Filters* on page 303. Event notifications must be enabled. See on page 301.

The event details are in the table.

Event description	Event name
A PDU has not responded to the Health Poller pings after all retries.	Lost Connectivity: Ping Failed
A PDU has not responded to the Data Poller's data collection attempts after all retries.	Lost Connectivity: Data Collection Failed
A PDU becomes responsive to the Data Poller.	Persistent Data Collection Failed Clear
A PDU becomes responsive to the Health Poller pings.	Ping Failed Clear
A PDU has an unsupported device configuration change and cannot be managed anymore.	Unsupported PDU Configuration Change Event

Rack Thresholds

Rack thresholding creates events and event notifications when a rack reaches a set percentage of the rack's capacity, measured using active power (kW).

Calculations use the maximum active power reading found for each inlet, during each polling period, and the total active power for each circuit associated with an IT device in the rack. The maximum values are summed to determine the rack active power. If the summed value exceeds a set threshold, an event is triggered.

The threshold calculation interval is based on the configured polling interval. For example, with a polling interval of 15 minutes, Power IQ will also run a rack threshold calculation every 15 minutes.

Note: Calculations are estimates. Raritan PDUs with buffered data retrieval ("data logging") enabled will give more accurate maximum readings. Other PDU types may have less accurate maximum readings, which can cause false negatives or false positives.

Warning or critical rack threshold events are not cleared unless all inlets on all PDUs in a rack are responding. A new warning or critical event will still be issued even when a rack has PDUs that are not responding, if the collected readings from the PDUs that are responding are enough to exceed the configured capacity threshold.

You can set rack thresholds under Power IQ settings > Threshold Settings or on rack Sites Tab tabs. For more information, see:

- Configuring Default Threshold Settings.
- Set Rack Capacity and Override Threshold Percentages.

To receive event notifications, configure notification filters to include Rack events. See *Configure Event Notification Filters* on page 303.

Configuring Default Rack Threshold Settings

When you enable calculating of rack thresholds, Power IQ calculates each rack's active power at the polling interval. The calculation uses the inlet active power of each PDU. For PDUs with buffered data retrieval, the maximum active power reading is used.

Power IQ uses the threshold percentages to determine when a rack is nearing capacity.

- Default upper warning threshold: 80%
- Default upper critical threshold: 90%

These percentages apply to all racks, unless you set an override at the rack level. See Set Rack Capacity and Override Threshold Percentages.

Events are triggered when the calculated capacity of the rack equals or exceeds the threshold.

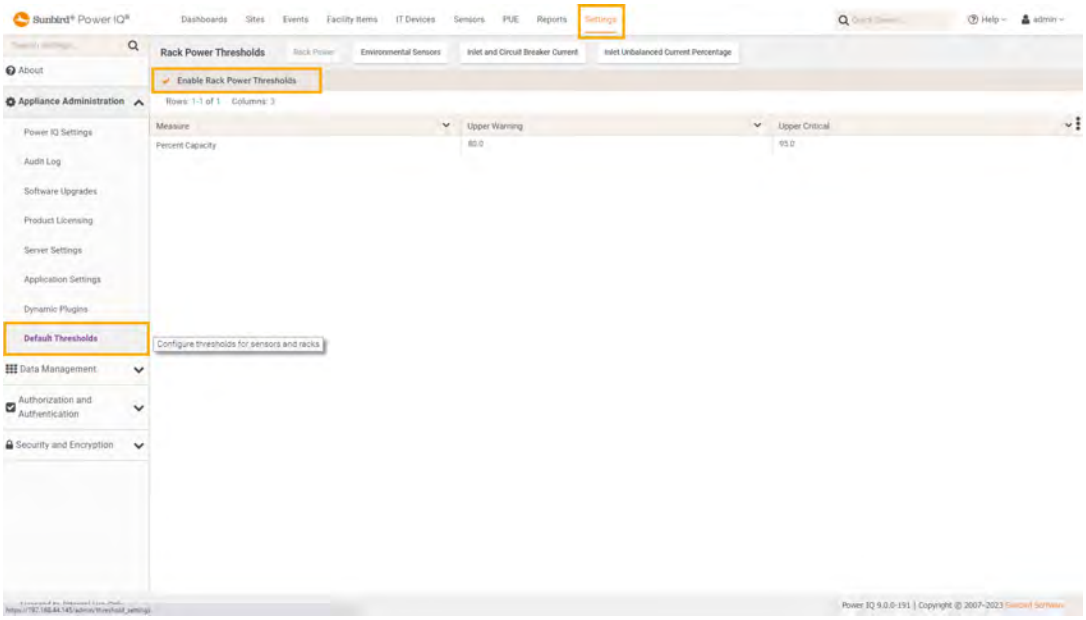
Each rack must have a configured capacity for rack thresholds to be calculated. See Set Rack Capacity and Override Threshold Percentages.

To edit default thresholds:

1. Click the Settings Tab > Appliance Administratio
2. Under Appliance Administration, click Default Thresholds.
3. On the Default Thresholds page, check the Enable Power, Temperature, and Humidity Thresholding box.

Note: To disable thresholding, uncheck the Enable Power, Temperature, and Humidity Thresholding box. However, if you disable thresholding, a message will display indicating that changing polling options requires the poller software to restart, which may take up to a few seconds. To confirm and continue, click the OK button. Otherwise, click the Cancel button to return to the Default Thresholds page.

4. To edit the lower warning, lower critical, upper warning, and upper critical thresholds, double-click in each cell.
5. Your changes are saved automatically. A green success message will display at the top of the page when a threshold change has successfully been saved.

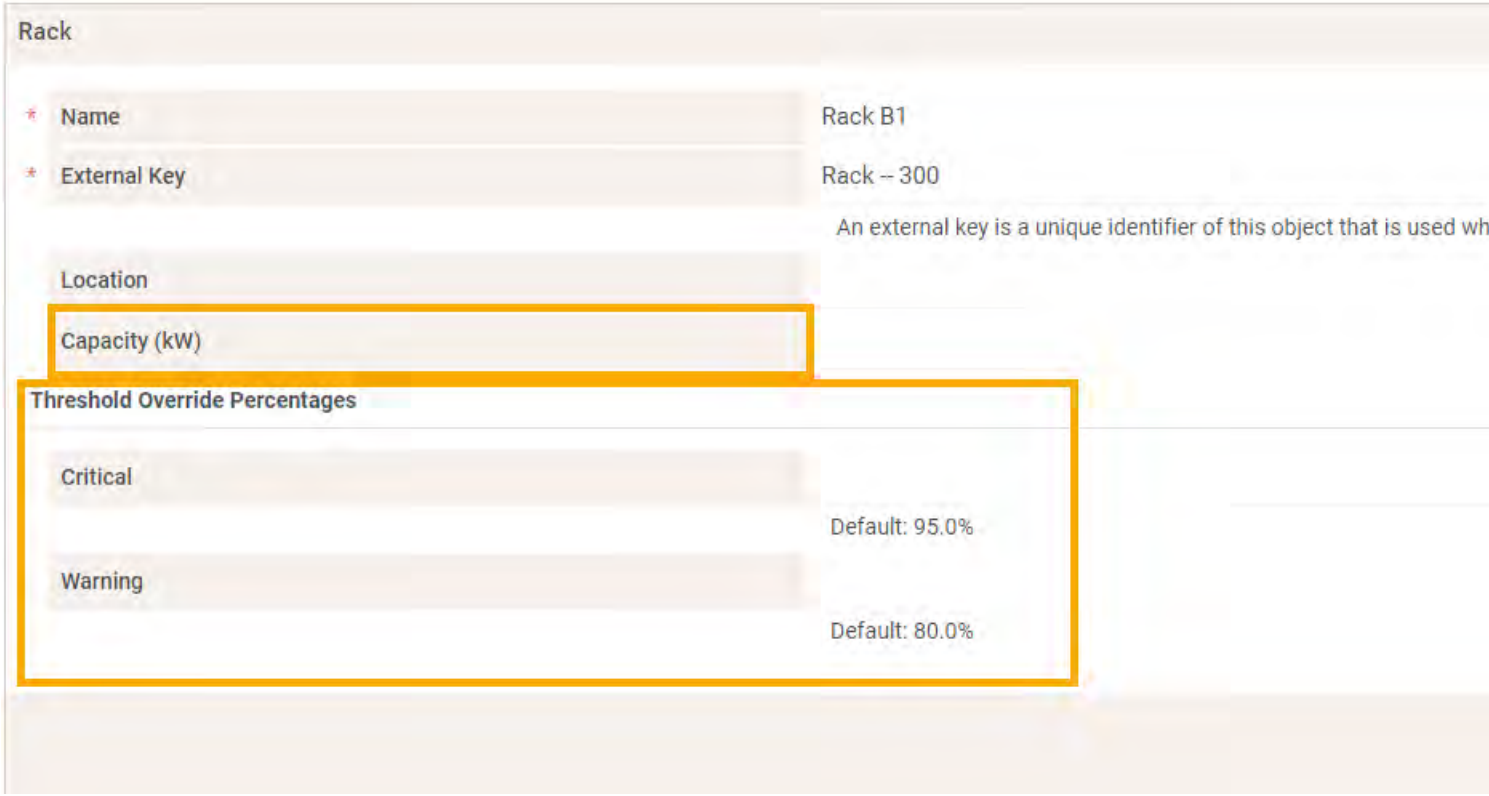


Set Rack Capacity and Override Threshold Percentages

Power IQ uses the rack capacity to calculate when a threshold has been exceeded, and generate an event. Power IQ uses the default threshold unless you set a different percentage at the rack level, to override the default setting.

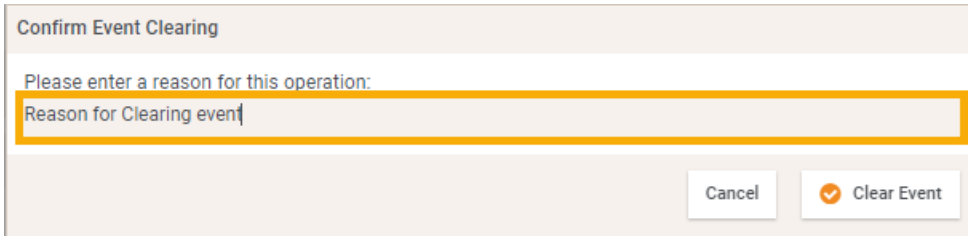
To set capacity and override threshold percentages for multiple racks simultaneously, use the EDM import function. See Import EDM Object Mappings.

1. In the Sites tab, select the rack. The Rack Sites entity tab displays.
2. Click the Details tab.
3. In the Rack Entity Details Card, enter the capacity for the rack in kW. See *Rack Entity Details Card* on page 151.
4. Enter a percentage in the Critical or Warning level fields to override the default global thresholds. When these fields are blank, the defaults are used. See Configure Default Threshold Settings.



Enable the Optional Event Clearing Reason

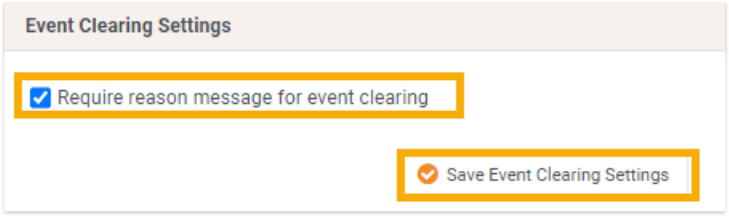
An optional "reason for clearing" dialogue can be enabled to allow a user with the admin role to require a text reason/description when clearing an event.



The reason for clearing dialog box can be enabled in the Power IQ Settings section under Appliance Administration in the Settings tab.

To enable in the Power IQ settings:

1. Check the **Require reason message for event clearing** check box
2. Click **Save Event Clearing Settings**



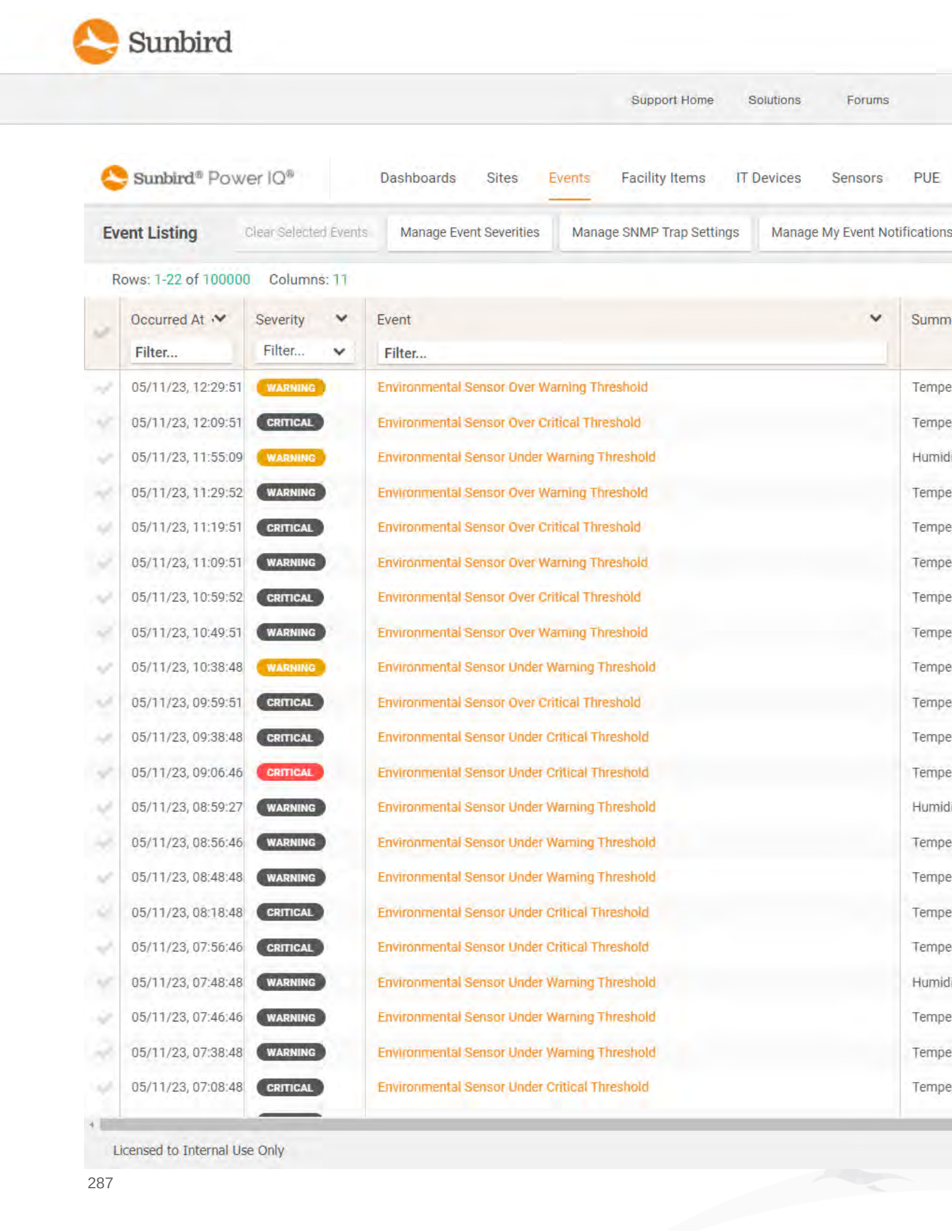
Viewing Events

The Events tab displays all events that Power IQ receives from configured facility items. For each event, it includes the date- and time-stampled:

- Severity
- Event
- Summary
- IP or Name of the Target Device
- Status

Additional EDM location information is also available on the Event Details pages and the Event Listing on the Events tab. For more information, see *EDM Location Information for Events* on page 288 and *EDM Locations in the Events Tab* on page 289.

Each column can be sorted or filtered. See *Filter the Events List* on page 292 for more information.


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Event Listing
Clear Selected Events
Manage Event Severities
Manage SNMP Trap Settings
Manage My Event Notifications
Rows: 1-22 of 100000
Columns: 11
Occurred At
Severity
Event
Filter...
05/11/23, 12:29:51 WARNING Environmental Sensor Over Warning Threshold
05/11/23, 12:09:51 CRITICAL Environmental Sensor Over Critical Threshold
05/11/23, 11:55:09 WARNING Environmental Sensor Under Warning Threshold
05/11/23, 11:29:52 WARNING Environmental Sensor Over Warning Threshold
05/11/23, 11:19:51 CRITICAL Environmental Sensor Over Critical Threshold
05/11/23, 11:09:51 WARNING Environmental Sensor Over Warning Threshold
05/11/23, 10:59:52 CRITICAL Environmental Sensor Over Critical Threshold
05/11/23, 10:49:51 WARNING Environmental Sensor Over Warning Threshold
05/11/23, 10:38:48 WARNING Environmental Sensor Under Warning Threshold
05/11/23, 09:59:51 CRITICAL Environmental Sensor Over Critical Threshold
05/11/23, 09:38:48 CRITICAL Environmental Sensor Under Critical Threshold
05/11/23, 09:06:46 CRITICAL Environmental Sensor Under Critical Threshold
05/11/23, 08:59:27 WARNING Environmental Sensor Under Warning Threshold
05/11/23, 08:56:46 WARNING Environmental Sensor Under Warning Threshold
05/11/23, 08:48:48 WARNING Environmental Sensor Under Warning Threshold
05/11/23, 08:18:48 CRITICAL Environmental Sensor Under Critical Threshold
05/11/23, 07:56:46 CRITICAL Environmental Sensor Under Critical Threshold
05/11/23, 07:48:48 WARNING Environmental Sensor Under Warning Threshold
05/11/23, 07:46:46 WARNING Environmental Sensor Under Warning Threshold
05/11/23, 07:38:48 WARNING Environmental Sensor Under Warning Threshold
05/11/23, 07:08:48 CRITICAL Environmental Sensor Under Critical Threshold
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To view event details:

1. Click the Events tab. The Events Listing displays.
2. Click the links in the Events column to open the Event details pages for different events.

Note: For Raritan PX, PX2 and EMX, Power IQ also displays the actual measured reading values for the event whenever that information is available in notifications.

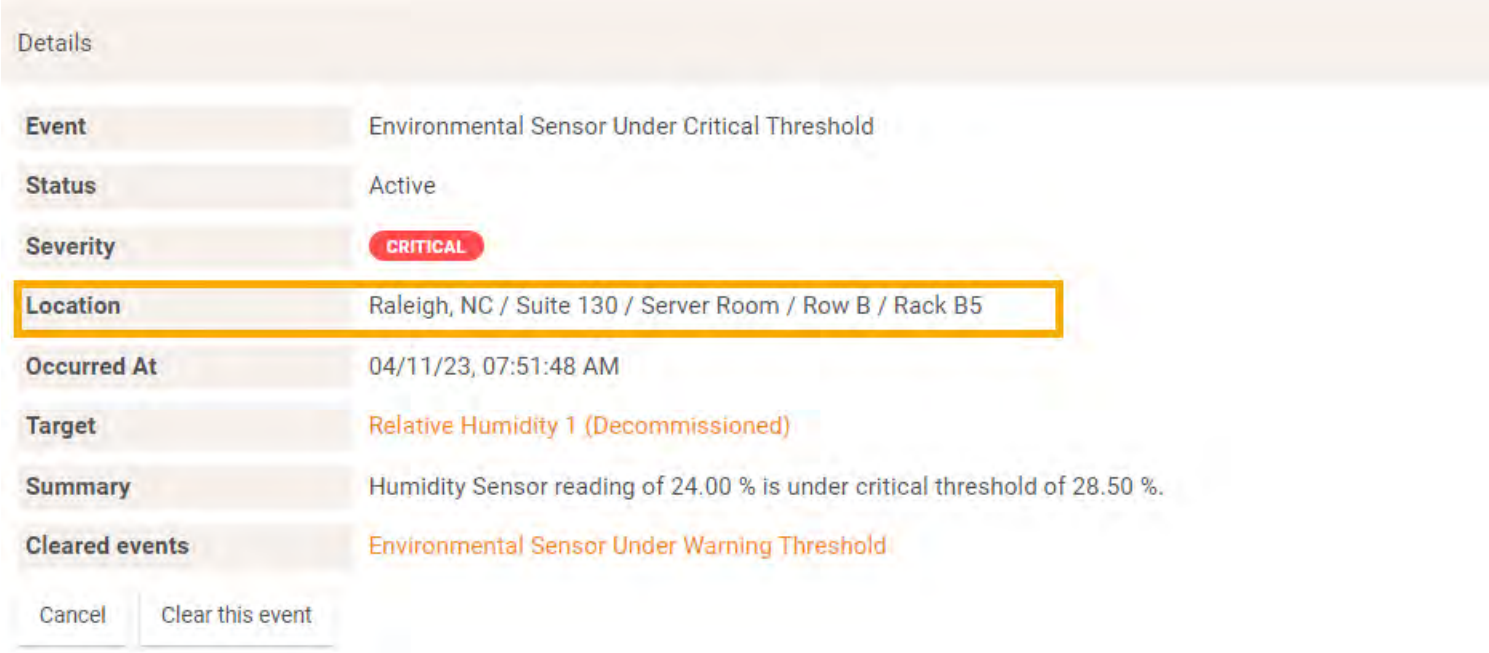
Events Page Auto-Refresh

The Events panel on the Events tab auto-refreshes every 30 seconds. This simplifies event management for users who want to monitor for new events by watching this tab.

The refresh is based on your current settings for filters, sort order, and page (e.g., page 5 of 20). When the panel is set to sort descending based on "Occurred at," newer events appear at the top when the page is auto-refreshed.

EDM Location Information for Events

A Location value displays in the details for all non-internal Power IQ services events and notifications, showing the EDM path to the target item and ending with its parent.



For internal Power IQ services events, the Location field displays "System."

EDM Locations in the Events Tab

Additionally, EDM locations are available in the Event Listing on the Events tab. A column for each EDM level that is a possible parent of the target item of the event displays in the Event Listing:

- Data Center
- Floor
- Room
- Aisle
- Row
- Rack

EDM Location Information in Event Notifications

EDM location information is also available in email and HTTP event notifications.

For email notifications for events, the "Located in" field will display the EDM location.

Sunbird

Support Home Solutions Forums

From: Power IQ
Date: Friday, December 1, 2017 at 8:42 AM
Subject: [CRITICAL] Break Room: Active power over critical threshold

CRITICAL: Active power value of 1.234kW exceeds 10% of 1.5kW Fri 12/01/17 08:40:00

DETAILS

Generated by **Break Room**

Located in Raleigh, NC / Suite 130 / Office

Event is **Active**

Event parameters		
Ordinal	Parameter	Value
	activePowerKW	1.234
	timestamp	1512135600000
	activePowerThresholdPercentage	10
	activePowerThresholdValueKW	0.15
	activePowerRackCapacityKW	1.5
	thresholdingActualSourceCount	1
	thresholdingExpectedSourceCount	1

ACTIONS

- View this event
- Configure your event notifications

Location fields are included in the notification JSON sent to the specified HTTP end point for event notifications. The location fields include:

- data_center_name
- data_center_id
- floor_name
- floor_id
- room_name

- room_id
- aisle_name
- aisle_id
- row_name
- row_id
- rack_name
- rack_id
- door_name
- door_id

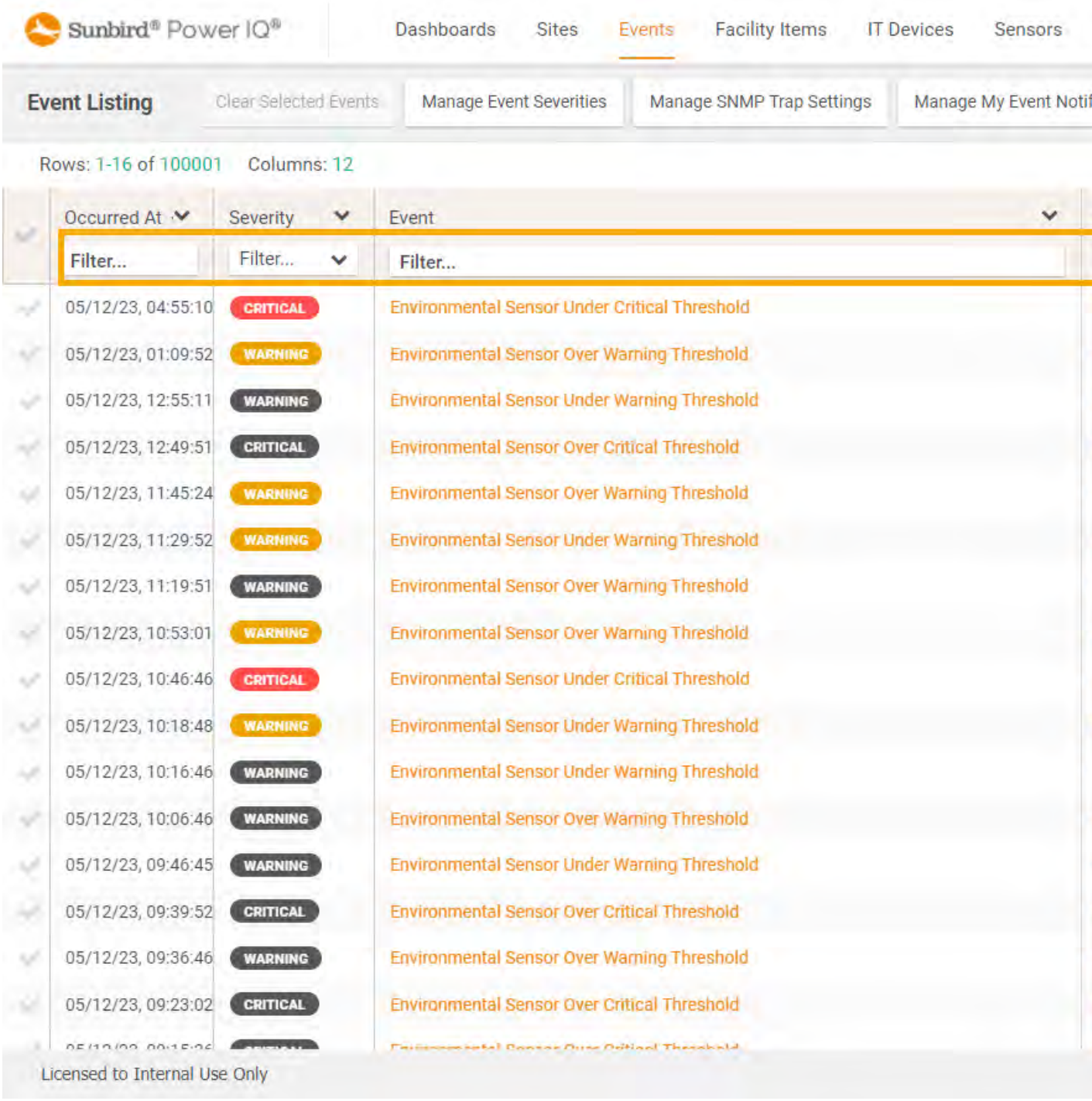
Filter the Events List

You can customize your view of the Events list by using filters and sorting.

See *Customize Your View of Facility Items, IT Devices, and Events* on page 814

1. In the Events tab, all events in the system display in a list.
2. All columns of data contain a filter criteria selection. Enter the filter criteria in the filter boxes located below each column header.

3. Filter by date: The Occurred At column accepts valid date ranges. To enter a date range select the Year, Month and Day using the Calendar Selector for both the "From" and "To" dates and click "Apply".



4. Filter by event severity: In the Severity column filter, select the checkbox for the severity of events you want to view. Select multiple options as needed.

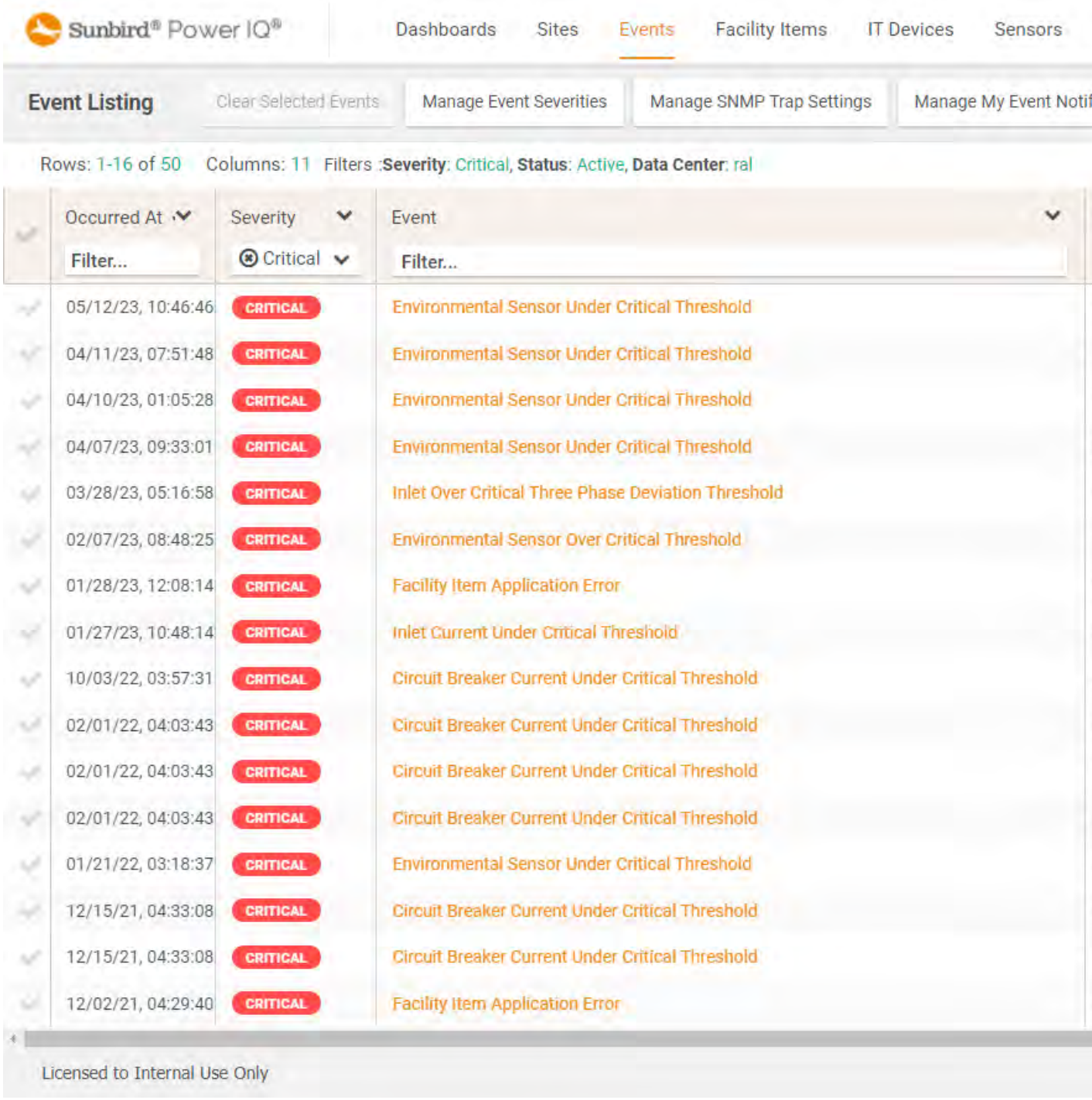
5. Filter by event name: In the Event column filter, enter an event name to view.
6. Filter by PDU associated with the event: In the Associated PDU column filter, enter a PDU name or IP address to view events associated with a PDU.
7. Filter by event status: In the Status column filter, select the checkbox for the status of events you want to view, either active, or cleared. Select multiple options as needed.

Export the Events List to CSV

Export the Events list to create a CSV file that contains all the information in the grid on the Events tab.

If you have applied filters, the same filters will apply to the exported information. Export includes all records matching the filter criteria. The export is not limited by the number of events shown in the list grid.

1. In the Events tab, click the Settings icon in the upper right corner of the grid.
2. Select **Export Grid Data to CSV**.



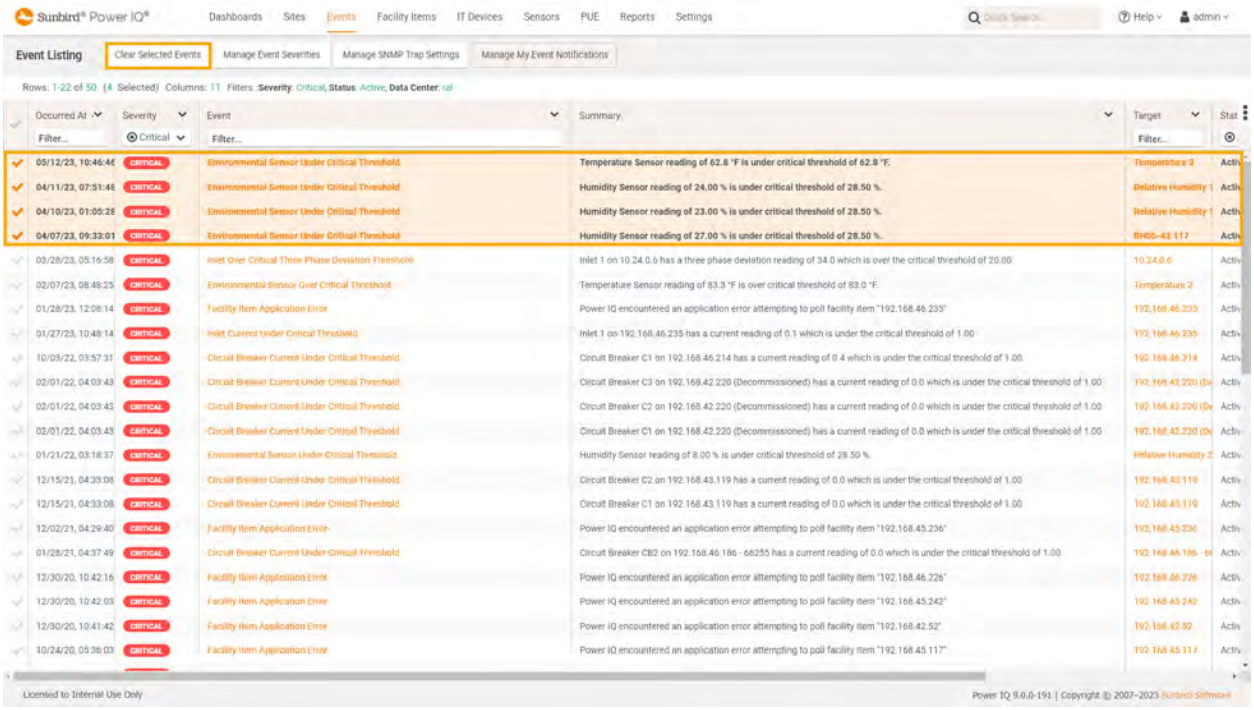
3. The following is the list of exported columns:
    - Occurred At
    - Cleared By
    - Cleared At
    - Notification Status
    - HTTP Notification Status
    - Created At
    - Region Name
    - Country Name
    - Territory
    - Name
    - City Name
    - Data Center Name
    - Floor Name
    - Room Name
    - Aisle Name
    - Row Name
    - Rack Name
    - Door Name
    - Region ID
    - Country ID
    - Territory ID
    - City ID
    - Data Center ID
    - Floor ID Room ID
    - Aisle ID
    - Row ID
    - Rack ID
    - Door ID
    - Type Seen in Events
    - ID Seen in Events
    - Name Summary
    - Severity Code

- Severity
- Name Seen in Events

Clear Events

Events can be automatically cleared by other events, or you can clear them manually.

1. In the Events tab, select the checkbox for an event in the list. Select multiple checkboxes to choose multiple events to clear.
2. Click Clear Selected Events.
3. To clear an event from the Events details page:
4. In the Events tab, click the link for an event to open the Event details page. The link to open Event details is in the Events column.
5. In the Event details page, click the Clear this event" button.



Automatic Deletion of Cleared Events

Power IQ automatically deletes cleared events from the system hourly.

Cleared events will only be deleted when there are more than 100,000 events in the database.

The oldest events in the system are eligible to be deleted first. If there are 100,000 or fewer events in the database at the hourly check, then no events will be deleted.

Only cleared events are eligible to delete. Power IQ will not delete active events.

You can access events and event configurations via ODBC views. If you need to keep a log of all generated events, run a script periodically that retrieves event data via ODBC before Power IQ deletes cleared events automatically.

Events generated by dynamic plugins are not automatically cleared. See *Event Clearing* on page 616.

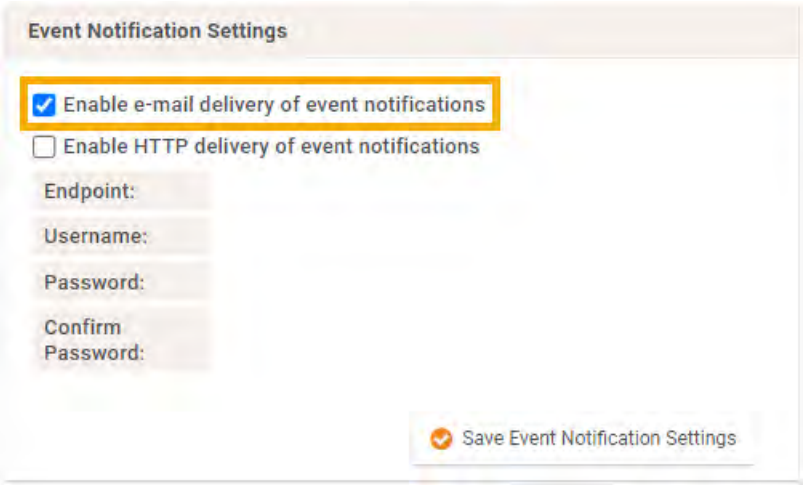
Enable or Disable Event Notifications via Email

If you would like to receive email notification for events that Power IQ receives, you must enable event notifications. When event notification is enabled, Power IQ sends an email message for every event. Set up notification filters if you want to receive emails only for specific event. See *Configure Event Notification Filters* on page 303.

1. In the Settings tab, click Application Administration.
2. Click Power IQ Settings
3. In the Event Notification Settings panel, select Enable e-mail delivery of event notifications to enable event notifications.

   or

4. Deselect Enable e-mail delivery of event notifications to disable event notifications.
5. Click Save Event Notification Settings



After enabling event notifications, the "Configure event notifications for your account" link appears. Click this link to use filters to manage your notifications.

After enabling, configure the SMTP settings for your system. See *Configure SMTP Server Settings* on page 326

You can also receive event notifications via JSON. For more information, see *Enable or Disable Event Notifications via JSONEnable or Disable Event Notifications via JSON* on the next page.

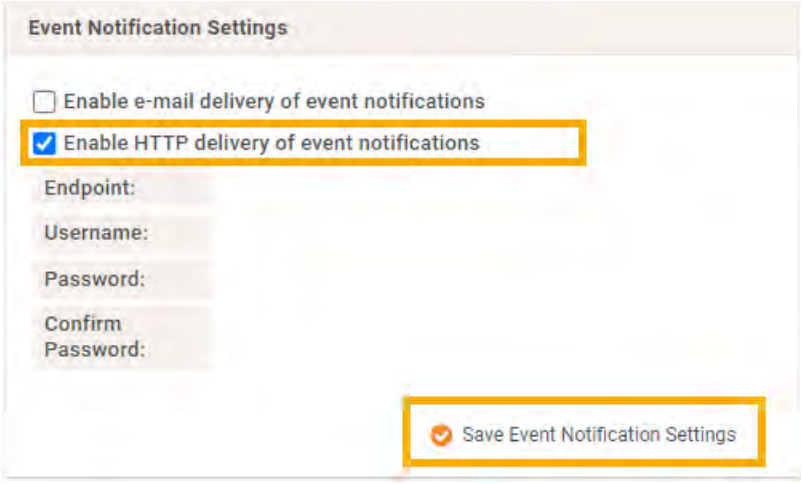
Enable or Disable Event Notifications via JSON

In addition to event notifications via email, you can also receive event notifications via JSON over HTTP or HTTPS through an endpoint that you choose. Only System Administrators can enable or disable event notification settings within Power IQ.

1. In the Settings tab, click Application Administration > Power IQ Settings
2. In the Event Notification Settings panel, select Enable HTTP delivery of event notifications to enable event notifications via JSON.

   or

3. Deselect Enable HTTP delivery of event notifications to disable event notifications via JSON.
4. If enabling, provide the following information:
   a. Endpoint (required)
   b. Username (optional)
   c. Password (optional)
5. Click Save Event Notification Settings to save your changes.



Note: The endpoint is required and must start with http:// or https://. Username and password are optional to allow you to set up basic authentication for your endpoint (if preferred).

When event notifications via JSON are enabled or disabled, the changes will be captured in the system audit log.

Send events using the same format as when retrieving them via the API. For more info, see the Power IQ API Guide.

Configure Event Notification Filters

When you enable event notifications, Power IQ sends an email message for every event. Set up notification filters if you want to receive emails for every event.

1. In the Events tab, click Manage My Event Notifications.
2. Select Enable this Filter.
3. Select the Severity levels of the events you want Power IQ to send email notifications for: Critical, Warning, and Informational.
4. Select the Sources of the events you want Power IQ to send email notifications for:
    - PDU
    - Inlet
    - Transfer switch
    - UPS
    - Circuit breaker
    - Circuit
    - Outlet
    - Device
    - Environmental sensors
    - Asset strip
    - Rack
    - Door
    - PDU connectivity
    - PDU Configuration
    - Internal Power IQ services
    - Dynamic Plug

    Note: The two custom fields for PDUs are included in email alerts.

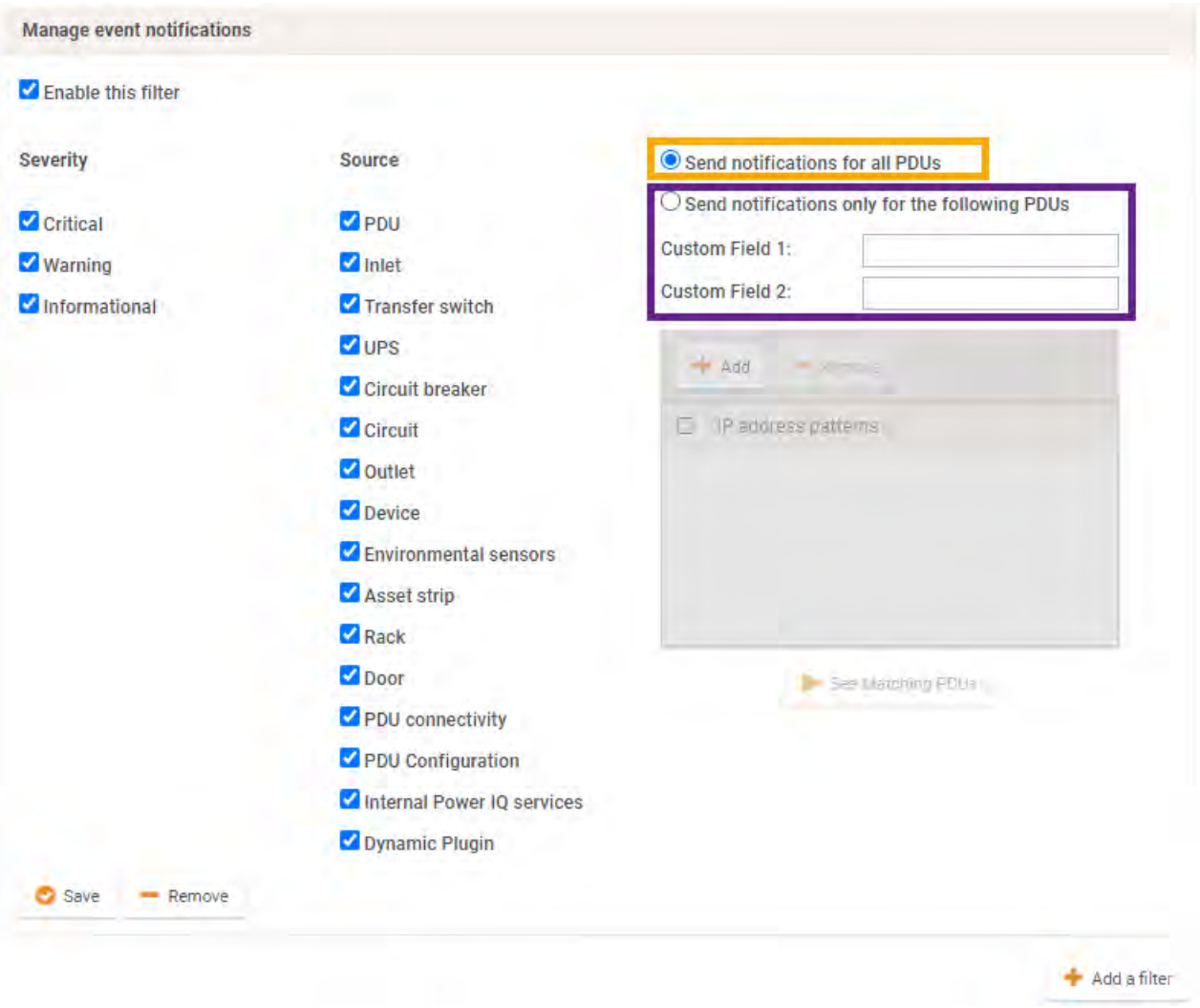
    Note: PDU connectivity events are for failed communication events reported by Health or Data Poller. Rack sources events are for rack capacity threshold events. Power IQ Internal services is for Enterprise Power IQ extraction failure events.
5. Select Send notifications for all PDUs to receive email notifications for all PDUs that meet the Severity level and Source criteria selected.

    or

6. Select Send notifications only for the following PDUs and then enter IP addresses for PDUs or values for Custom Fields associated with the PDUs.
7. Enter a value in either or both custom fields to receive email notifications only for PDUs that have those custom field values assigned. Custom Field 1 and Custom Field 2 may be renamed in your system. See Configuring Custom Fields.
8. Click Add to enter the IP addresses of the PDUs for which email notifications should be sent. Enter a partial IP address appended with an asterisk (*) to specify a group of PDUs in sequence For example, enter 192.168.45* to specify a list of all IP addresses beginning with that sequence. Click See Matching PDUs to verify the list of PDUs that Power IQ will send email notifications.

   Note: IP address filters do not apply to rack events or internal Power IQ service events.

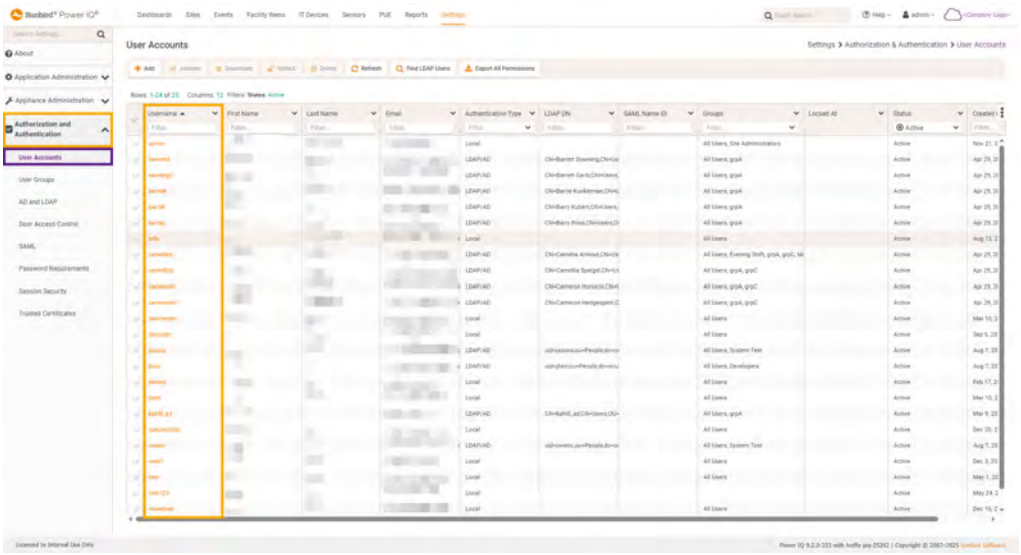
9. Click Save.



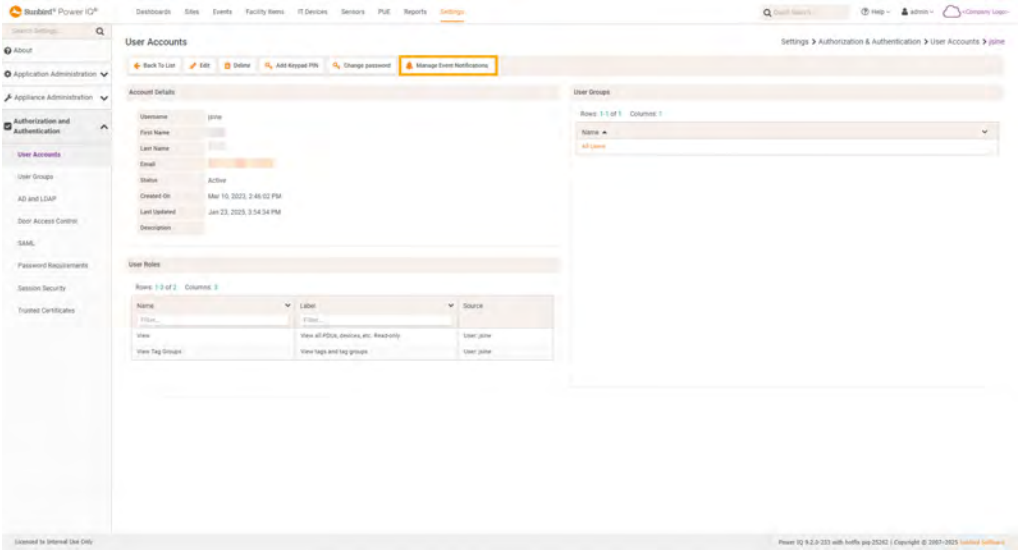
Manage Event Notifications for Users

Users with the System Administrator role can manage other user's event notification settings.

1. In the Settings tab, click Authorization and Authentication.
2. Click User Accounts.
3. Click the username link for the user whose event notification settings you want to manage. The user's account details page displays,



4. On the user's account details page, click Manage Event Notifications



5. Change the settings as needed and click Save. See Configure Notification Filters for details.

Note: The two custom fields for PDUs are included in email alerts. See Facility Item Entity Property Detail Panel on page 144

Events by Sources

The following table lists all event sources in Power IQ and the events that could be impacted by each source to help you understand the types of alerts each event source could send:

Source	Events Impacted
PDU	serverNotReachable serverNotReachableClear testTrap pduInternalFault pduInternalFaultClear readingTimeMismatch readingTimeMismatchClear facilityItemHardwareFailureReported facilityItemHardwareFailureReportedClear facilityItemUpgradeSucceeded facilityItemUpgradeFailed facilityItemHealthAlert webcamStorageUploadStarted pduApplicationError pduApplicationErrorClear pduDoorAuthenticationSucceeded pduDoorAuthenticationFailed pduDoorExtendedOpen pduDoorExtendedOpenClear
Inlet	inletOverCurrentCritical inletOverCurrentWarning inletUnderCurrentCritical inletUnderCurrentWarning inletOverVoltageCritical inletOverVoltageWarning

Source	Events Impacted
	inletUnderVoltageCritical inletUnderVoltageWarning inletCurrentSensorUnavailable inletVoltageSensorUnavailable inletOverActivePowerCritical inletOverActivePowerWarning inletUnderActivePowerCritical inletUnderActivePowerWarning inletActivePowerSensorUnavailable inletOverApparentPowerCritical inletOverApparentPowerWarning inletUnderApparentPowerCritical inletUnderApparentPowerWarning inletApparentPowerSensorUnavailable inletOverPowerFactorCritical inletOverPowerFactorWarning inletUnderPowerFactorCritical inletUnderPowerFactorWarning inletCurrentSensorUnavailableClear inletVoltageSensorUnavailableClear inletPowerFactorSensorUnavailable inletOverPeakCurrentCritical inletOverPeakCurrentWarning inletUnderPeakCurrentCritical inletUnderPeakCurrentWarning inletPeakCurrentSensorUnavailable inletOverUnbalancedCurrentCritical inletOverUnbalancedCurrentWarning inletUnderUnbalancedCurrentCritical inletUnderUnbalancedCurrentWarning inletUnbalancedCurrentSensorUnavailable

Source	Events Impacted
	inletOverFrequencyCritical inletOverFrequencyWarning inletUnderFrequencyCritical inletUnderFrequencyWarning inletFrequencySensorUnavailable inletOverPhaseAngleCritical inletOverPhaseAngleWarning inletUnderPhaseAngleCritical inletUnderPhaseAngleWarning inletPhaseAngleSensorUnavailable inletOverResidualCurrentCritical inletOverResidualCurrentWarning inletUnderResidualCurrentCritical inletOverFrequencyCriticalClear inletUnderResidualCurrentWarning inletResidualCurrentSensorUnavailable inletOverVoltageLnCritical inletOverVoltageLnWarning inletUnderVoltageLnCritical inletUnderVoltageLnWarning inletVoltageLnSensorUnavailable powerQualityUnavailable powerQualityWarning powerQualityCritical rcmStateUnavailable rcmStateSelfTest rcmStateFail rcmStateWarning rcmStateCritical surgeProtectorUnavailable surgeProtectorFault

Source	Events Impacted
	inletResidualCurrentSensorUnavailableClear inletOverVoltageLnCriticalClear inletPoleCurrentSensorUnavailable inletPoleVoltageSensorUnavailable inletOverCurrentCriticalClear inletOverCurrentWarningClear inletUnderCurrentCriticalClear inletUnderCurrentWarningClear inletOverVoltageCriticalClear inletOverVoltageWarningClear inletUnderVoltageCriticalClear inletUnderVoltageWarningClear inletOverActivePowerCriticalClear inletOverActivePowerWarningClear inletUnderActivePowerCriticalClear inletUnderActivePowerWarningClear inletActivePowerSensorUnavailableClear inletOverApparentPowerCriticalClear inletOverApparentPowerWarningClear inletUnderApparentPowerCriticalClear inletUnderApparentPowerWarningClear inletApparentPowerSensorUnavailableClear inletOverPowerFactorCriticalClear inletOverPowerFactorWarningClear inletUnderPowerFactorCriticalClear inletUnderPowerFactorWarningClear inletPowerFactorSensorUnavailableClear inletOverPeakCurrentCriticalClear inletOverPeakCurrentWarningClear inletUnderPeakCurrentCriticalClear inletUnderPeakCurrentWarningClear

Source	Events Impacted
	inletPeakCurrentSensorUnavailableClear inletOverUnbalancedCurrentCriticalClear inletOverUnbalancedCurrentWarningClear inletUnderUnbalancedCurrentCriticalClear inletUnderUnbalancedCurrentWarningClear inletUnbalancedCurrentSensorUnavailableClear inletOverFrequencyWarningClear inletUnderFrequencyCriticalClear inletUnderFrequencyWarningClear inletFrequencySensorUnavailableClear inletOverPhaseAngleCriticalClear inletOverPhaseAngleWarningClear inletUnderPhaseAngleCriticalClear inletUnderPhaseAngleWarningClear inletPhaseAngleSensorUnavailableClear inletOverResidualCurrentCriticalClear inletOverResidualCurrentWarningClear inletUnderResidualCurrentCriticalClear inletUnderResidualCurrentWarningClear inletOverVoltageLnWarningClear inletUnderVoltageLnCriticalClear inletUnderVoltageLnWarningClear inletVoltageLnSensorUnavailableClear powerQualityUnavailableClear powerQualityWarningClear powerQualityCriticalClear rcmStateUnavailableClear rcmStateSelfTestClear rcmStateFailClear rcmStateWarningClear rcmStateCriticalClear

Source	Events Impacted
	surgeProtectorUnavailableClear surgeProtectorFaultClear inletPoleCurrentSensorUnavailableClear inletPoleVoltageSensorUnavailableClear inletThreePhaseDeviationOverCriticalThreshold inletThreePhaseDeviationOverWarningThreshold inletThreePhaseDeviationOverCriticalThresholdClear inletThreePhaseDeviationOverWarningThresholdClear inletCurrentOverCriticalThreshold inletCurrentOverWarningThreshold inletCurrentUnderWarningThreshold inletCurrentUnderCriticalThreshold inletCurrentOverCriticalThresholdClear inletCurrentOverWarningThresholdClear inletCurrentUnderWarningThresholdClear inletCurrentUnderCriticalThresholdClear inletVoltageReadingUnavailable inletVoltageReadingUnavailableClear
Transfer switch	transferSwitchActiveInletChangedWarning transferSwitchActiveInletChangedCritical transferSwitchOperatingStateNormal transferSwitchOperatingStateStandby transferSwitchOperatingStateNotRedundant transferSwitchOperatingStateOff transferSwitchActiveInletSensorUnavailable transferSwitchOperatingStateSensorUnavailable transferSwitchOverInletPhaseSyncAngleCritical transferSwitchOverInletPhaseSyncAngleWarning transferSwitchUnderInletPhaseSyncAngleCritical transferSwitchUnderInletPhaseSyncAngleWarning transferSwitchInletPhaseSyncAngleSensorUnavailable

Source	Events Impacted
	transferSwitchActiveInletChangedCriticalClear transferSwitchActiveInletSensorUnavailableClear transferSwitchOperatingStateSensorUnavailableClear transferSwitchOverInletPhaseSyncAngleCriticalClear transferSwitchOverInletPhaseSyncAngleWarningClear transferSwitchUnderInletPhaseSyncAngleCriticalClear transferSwitchUnderInletPhaseSyncAngleWarningClear transferSwitchInletPhaseSyncAngleSensorUnavailableClear
UPS	upsOverload upsOverloadClear upsDiagnosticsFailed upsDiagnosticsFailedClear upsDepletedBattery upsDepletedBatteryClear upsOnBattery upsOnBatteryClear upsLowBattery upsLowBatteryClear upsBatteryNeedsReplacement upsBatteryNeedsReplacementClear upsBypassFailure upsBypassFailureClear upsBatteryOverTemperature upsBatteryOverTemperatureClear upsInternalOverTemperature upsInternalOverTemperatureClear upsInverterOverTemperature upsInverterOverTemperatureClear upsBatteryOverVoltage upsBatteryOverVoltageClear
Circuit breaker	cbTripped

Source	Events Impacted
	cbOverCurrentCritical cbOverCurrentWarning cbUnderCurrentCritical cbUnderCurrentWarning cbCurrentSensorUnavailable cbTripSensorUnavailable cbOverPeakCurrentCritical cbOverPeakCurrentWarning cbUnderPeakCurrentCritical cbUnderPeakCurrentWarning cbPeakCurrentSensorUnavailable cbTrippedClear cbOverCurrentCriticalClear cbOverCurrentWarningClear cbUnderCurrentCriticalClear cbUnderCurrentWarningClear cbCurrentSensorUnavailableClear cbTripSensorUnavailableClear cbOverPeakCurrentCriticalClear cbOverPeakCurrentWarningClear cbUnderPeakCurrentCriticalClear cbUnderPeakCurrentWarningClear cbPeakCurrentSensorUnavailableClear circuitBreakerStateThresholdCritical circuitBreakerStateThresholdCriticalClear circuitBreakerCurrentOverCriticalThreshold circuitBreakerCurrentOverWarningThreshold circuitBreakerCurrentUnderWarningThreshold circuitBreakerCurrentUnderCriticalThreshold circuitBreakerCurrentOverCriticalThresholdClear circuitBreakerCurrentOverWarningThresholdClear

Source	Events Impacted
	circuitBreakerCurrentUnderWarningThresholdClear circuitBreakerCurrentUnderCriticalThresholdClear
Circuit	circuitOverVoltageCritical circuitOverVoltageWarning circuitUnderVoltageCritical circuitUnderVoltageWarning circuitVoltageSensorUnavailable circuitOverCurrentCritical circuitOverCurrentWarning circuitUnderCurrentCritical circuitUnderCurrentWarning circuitCurrentSensorUnavailable circuitOverActivePowerCritical circuitOverActivePowerWarning circuitUnderActivePowerCritical circuitUnderActivePowerWarning circuitActivePowerSensorUnavailable circuitOverApparentPowerCritical circuitOverApparentPowerWarning circuitUnderApparentPowerCritical circuitUnderApparentPowerWarning circuitApparentPowerSensorUnavailable circuitOverPowerFactorCritical circuitOverPowerFactorWarning circuitUnderPowerFactorCritical circuitUnderPowerFactorWarning circuitPowerFactorSensorUnavailable circuitOverPhaseAngleCritical circuitOverPhaseAngleWarning circuitUnderPhaseAngleCritical circuitUnderPhaseAngleWarning

Source	Events Impacted
	circuitPhaseAngleSensorUnavailable circuitOverFrequencyCritical circuitOverFrequencyWarning circuitUnderFrequencyCritical circuitUnderFrequencyWarning circuitFrequencySensorUnavailable circuitOverApparentPowerWarningClear circuitUnderApparentPowerCriticalClear circuitUnderApparentPowerWarningClear circuitApparentPowerSensorUnavailableClear circuitOverPowerFactorCriticalClear circuitOverPowerFactorWarningClear circuitOverVoltageCriticalClear circuitOverVoltageWarningClear circuitUnderVoltageCriticalClear circuitUnderVoltageWarningClear circuitVoltageSensorUnavailableClear circuitOverCurrentCriticalClear circuitOverCurrentWarningClear circuitUnderCurrentCriticalClear circuitUnderCurrentWarningClear circuitCurrentSensorUnavailableClear circuitOverActivePowerCriticalClear circuitOverActivePowerWarningClear circuitUnderActivePowerCriticalClear circuitUnderActivePowerWarningClear circuitActivePowerSensorUnavailableClear circuitOverApparentPowerCriticalClear circuitUnderPowerFactorCriticalClear circuitUnderPowerFactorWarningClear circuitPowerFactorSensorUnavailableClear

Source	Events Impacted
	circuitOverPhaseAngleCriticalClear circuitOverPhaseAngleWarningClear circuitUnderPhaseAngleCriticalClear circuitUnderPhaseAngleWarningClear circuitPhaseAngleSensorUnavailableClear circuitOverFrequencyCriticalClear circuitOverFrequencyWarningClear circuitUnderFrequencyCriticalClear circuitUnderFrequencyWarningClear circuitFrequencySensorUnavailableClear circuitThreePhaseDeviationOverCriticalThreshold circuitThreePhaseDeviationOverWarningThreshold circuitThreePhaseDeviationOverCriticalThresholdClear circuitThreePhaseDeviationOverWarningThresholdClear
Outlet	outletOverCurrentCritical outletOverCurrentWarning outletUnderCurrentCritical outletUnderCurrentWarning outletOverVoltageCritical outletOverVoltageWarning outletUnderVoltageCritical outletUnderVoltageWarning outletPowerOn outletPowerOff outletOverCurrentCriticalClear outletOverCurrentWarningClear outletUnderCurrentCriticalClear outletUnderCurrentWarningClear outletCurrentSensorUnavailable outletVoltageSensorUnavailable outletPoleCurrentSensorUnavailable

Source	Events Impacted
	outletPoleVoltageSensorUnavailable outletOverActivePowerCritical outletOverActivePowerWarning outletUnderActivePowerCritical outletUnderActivePowerWarning outletActivePowerSensorUnavailable outletOverApparentPowerCritical outletOverApparentPowerWarning outletUnderApparentPowerCritical outletUnderApparentPowerWarning outletApparentPowerSensorUnavailable outletOverPowerFactorCritical outletOverPowerFactorWarning outletUnderPowerFactorCritical outletUnderPowerFactorWarning outletPowerFactorSensorUnavailable outletOverPeakCurrentCritical outletOverPeakCurrentWarning outletUnderPeakCurrentCritical outletUnderPeakCurrentWarning outletPeakCurrentSensorUnavailable outletOverUnbalancedCurrentCritical outletOverUnbalancedCurrentWarning outletUnderUnbalancedCurrentCritical outletUnderUnbalancedCurrentWarning outletUnbalancedCurrentSensorUnavailable outletOverFrequencyCritical outletOverFrequencyWarning outletUnderFrequencyCritical outletUnderFrequencyWarning outletFrequencySensorUnavailable

Source	Events Impacted
	outletOverPhaseAngleCritical outletOverPhaseAngleWarning outletUnderPhaseAngleCritical outletUnderPhaseAngleWarning outletPhaseAngleSensorUnavailable outletOverVoltageLnCritical outletOverVoltageLnWarning outletUnderVoltageLnCritical outletUnderVoltageLnWarning outletVoltageLnSensorUnavailable outletPowerStateUnavailable outletPowerStateOff outletPowerStateOn outletOverVoltageCriticalClear outletOverVoltageWarningClear outletUnderVoltageCriticalClear outletUnderVoltageWarningClear outletCurrentSensorUnavailableClear outletVoltageSensorUnavailableClear outletPoleCurrentSensorUnavailableClear outletPoleVoltageSensorUnavailableClear outletOverActivePowerCriticalClear outletOverActivePowerWarningClear outletUnderActivePowerCriticalClear outletUnderActivePowerWarningClear outletActivePowerSensorUnavailableClear outletOverApparentPowerCriticalClear outletOverApparentPowerWarningClear outletUnderApparentPowerCriticalClear outletUnderApparentPowerWarningClear outletApparentPowerSensorUnavailableClear

Source	Events Impacted
	outletOverPowerFactorCriticalClear outletOverPowerFactorWarningClear outletUnderPowerFactorCriticalClear outletUnderPowerFactorWarningClear outletPowerFactorSensorUnavailableClear outletOverPeakCurrentCriticalClear outletOverPeakCurrentWarningClear outletUnderPeakCurrentCriticalClear outletUnderPeakCurrentWarningClear outletPeakCurrentSensorUnavailableClear outletOverUnbalancedCurrentCriticalClear outletOverUnbalancedCurrentWarningClear outletUnderUnbalancedCurrentCriticalClear outletUnderUnbalancedCurrentWarningClear outletUnbalancedCurrentSensorUnavailableClear outletOverFrequencyCriticalClear outletOverFrequencyWarningClear outletUnderFrequencyCriticalClear outletUnderFrequencyWarningClear outletFrequencySensorUnavailableClear outletOverPhaseAngleCriticalClear outletOverPhaseAngleWarningClear outletUnderPhaseAngleCriticalClear outletUnderPhaseAngleWarningClear outletPhaseAngleSensorUnavailableClear outletOverVoltageLnCriticalClear outletOverVoltageLnWarningClear outletUnderVoltageLnCriticalClear outletUnderVoltageLnWarningClear outletVoltageLnSensorUnavailableClear outletPowerStateUnavailableClear

Source	Events Impacted
	outletPowerStateOffClear outletPowerStateOnClear
Device	outletLoadShiftDetected outletLoadShiftDetectedClear
Environmental sensors	envOverTemperatureCritical envOverTemperatureWarning envUnderTemperatureCritical envUnderTemperatureWarning envOverHumidityCritical envOverHumidityWarning envUnderHumidityCritical envUnderHumidityWarning envContactSensorCritical envSmokeSensorCritical envWaterSensorCritical envVibrationSensorCritical envOverAirFlowCritical envOverAirFlowWarning envUnderAirFlowCritical envUnderAirFlowWarning envOverAirPressureCritical envOverAirPressureWarning envUnderAirPressureCritical envUnderAirPressureWarning envTemperatureSensorUnavailable envHumiditySensorUnavailable envAirFlowSensorUnavailable envAirPressureSensorUnavailable envContactSensorUnavailable envSmokeSensorUnavailable envWaterSensorUnavailable

Source	Events Impacted
	envVibrationSensorUnavailable envOverAbsoluteHumidityCritical envOverAbsoluteHumidityWarning envUnderAbsoluteHumidityCritical envUnderAbsoluteHumidityWarning envContactSensorWarning envPoweredDryContactCritical envPoweredDryContactWarning envAbsoluteHumiditySensorUnavailable envOverTemperatureCriticalClear envOverTemperatureWarningClear envUnderTemperatureCriticalClear envUnderTemperatureWarningClear envOverHumidityCriticalClear envOverHumidityWarningClear envUnderHumidityCriticalClear envUnderHumidityWarningClear envContactSensorCriticalClear envSmokeSensorCriticalClear envWaterSensorCriticalClear envVibrationSensorCriticalClear envOverAirFlowCriticalClear envOverAirFlowWarningClear envUnderAirFlowCriticalClear envUnderAirFlowWarningClear envOverAirPressureCriticalClear envOverAirPressureWarningClear envUnderAirPressureCriticalClear envUnderAirPressureWarningClear envTemperatureSensorUnavailableClear envHumiditySensorUnavailableClear

Source	Events Impacted
	envAirFlowSensorUnavailableClear envAirPressureSensorUnavailableClear envContactSensorUnavailableClear envSmokeSensorUnavailableClear envWaterSensorUnavailableClear envVibrationSensorUnavailableClear envOverAbsoluteHumidityCriticalClear envOverAbsoluteHumidityWarningClear envUnderAbsoluteHumidityCriticalClear envUnderAbsoluteHumidityWarningClear envAbsoluteHumiditySensorUnavailableClear envContactSensorWarningClear envPoweredDryContactCriticalClear envPoweredDryContactWarningClear externalSensorOverCriticalThreshold externalSensorOverCriticalThresholdClear externalSensorOverWarningThreshold externalSensorOverWarningThresholdClear externalSensorUnderWarningThreshold externalSensorUnderWarningThresholdClear externalSensorUnderCriticalThreshold externalSensorUnderCriticalThresholdClear envMotionDetectionCritical envMotionDetectionCriticalClear envMotionDetectionUnavailable envMotionDetectionUnavailableClear envTamperDetectionCritical envTamperDetectionCriticalClear envTamperDetectionUnavailable envTamperDetectionUnavailableClear envVibrationAccelerationSensorUnavailable

Source	Events Impacted
	envVibrationAccelerationSensorUnavailableClear envUnderVibrationAccelerationCritical envUnderVibrationAccelerationCriticalClear envUnderVibrationAccelerationWarning envUnderVibrationAccelerationWarningClear envOverVibrationAccelerationWarning envOverVibrationAccelerationWarningClear envOverVibrationAccelerationCritical envOverVibrationAccelerationCriticalClear
Asset strip	assetStripStateChange assetStripFirmwareUpdateStarted assetStripFirmwareUpdateSuccessful assetStripFirmwareUpdate assetStripUnsupported assetStripAvailable assetStripFirmwareUpdateFailed assetStripDisconnected bladeExtensionOverflowOccured bladeExtensionOverflowCleared
Rack	assetTagConnected assetTagDisconnected assetBladeConnected assetBladeDisconnected
Door	doorLockControlSucceeded doorLockControlFailed doorLockControlRelockSucceeded doorLockControlRelockFailed doorOpen handleOpen electronicallyUnlocked

Source	Events Impacted
	doorLockControlSucceededClear doorLockControlFailedClear doorLockControlRelockSucceededClear doorLockControlRelockFailedClear doorOpenClear handleOpenClear electronicallyUnlockedClear doorLockControlRelockFailedFinal doorLockControlRelockFailedFinalClear cardReaderAuthorizationFailed cardReaderAuthorizationSucceeded cardSwipe pduCabinetAuthenticationSucceeded pduCabinetAuthenticationFailed
PDU connectivity	connectivityLost pduAdminCredentialsInvalid pingFailed ipFailover connectivityLostClear pduAdminCredentialsInvalidClear pingFailedClear ipFailoverClear
Internal Power IQ services	thresholdingCycleTimeExceeded thresholdingCycleTimeExceededClear extractionFailedFilesystemFull extractionFailedToMoveFiles extractionFailed trapFuseTripped trapFuseTrippedClear trapHandlingBacklogWarning trapHandlingBacklogWarningClear

Source	Events Impacted
	trapHandlingBacklogCritical trapHandlingBacklogCriticalClear trapHandlingHaltedDueToBacklog trapHandlingHaltedDueToBacklogClear hourlyDataRollupFailed hourlyDataRollupFailedClear dailyDataRollupFailed dailyDataRollupFailedClear monthlyDataRollupFailed monthlyDataRollupFailedClear delayedHourlyDataRollup delayedHourlyDataRollupClear
Dynamic Plugin	genericInfo genericWarning genericCritical

Configure SMTP Server Settings

Configure the SMTP server settings to determine how email notifications are sent when Power IQ receives events.

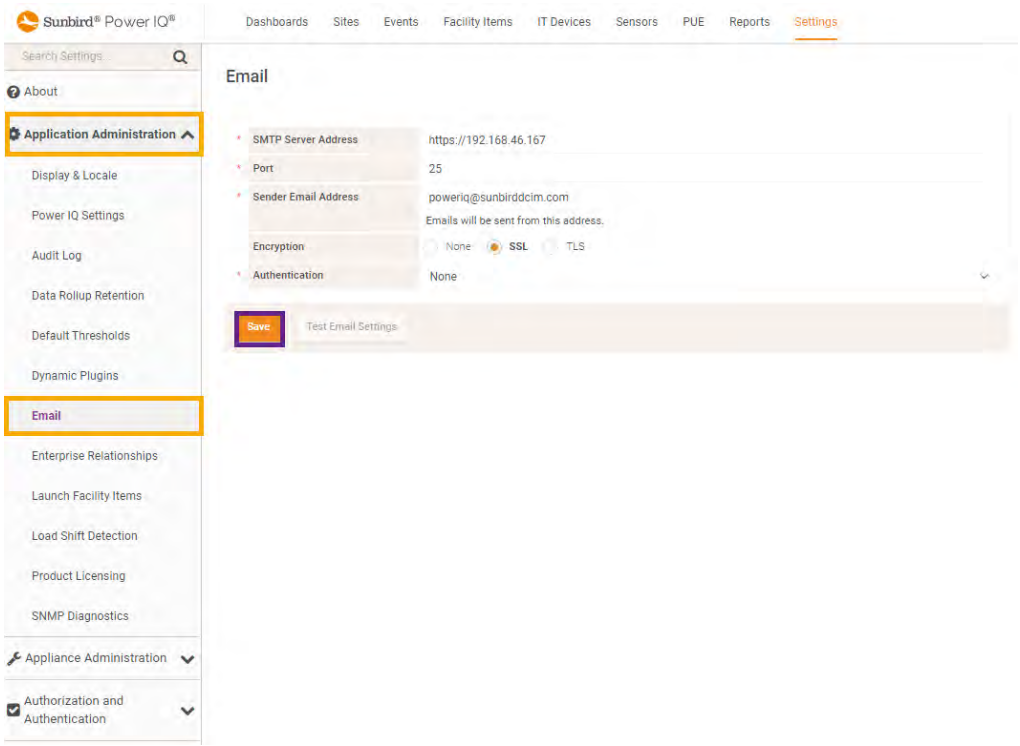
Note: You must reboot Power IQ after changing the encryption method in the SMTP server settings. See Shutting Down and Restarting Power IQ.

1. In the Settings tab, click Application Administration > Email. The Email panel displays.
2. In the Email panel, configure the following required settings for the SMTP server.
   - SMTP Server Address: Enter the email server's domain name or IP address.
   - Port: The default port is 25. Change this number if you use a different port.
   - Sender Email Address: Enter the email address that Power IQ emails will be sent from.

     Note: E-mails are sent from this address (for example, poweriq@example.com)

   - Encryption type: Select the encryption method for your SMTP server: None, SSL, TLS
   - Authentication type: Select None or Password. If you select Password, enter the Username, and Password,
3. Click Save to save your setting
4. Click Test Email Settings to display the Test Email Settings dialog box. where you can enter your email address and try to send a test email to yourself.
   1. In the Test Email Settings dialog box, type the email address where you want to send the test email in the Recipient Email Address field.
   2. Click Send Test Email.
   3. If you see a success message, you can save your SMTP Settings.
5. If you see a failure message, edit your settings and try again.

Note: You must enter a password in the page to test the settings. Once saved, passwords do not display in the page for security.


Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Reports
Settings
Search Settings
About
Application Administration
Display & Locale
Power IQ Settings
Audit Log
Data Rollup Retention
Default Thresholds
Dynamic Plugins
Email
Enterprise Relationships
Launch Facility Items
Load Shift Detection
Product Licensing
SNMP Diagnostics
Appliance Administration
Authorization and Authentication
Email
SMTP Server Address
https://192.168.46.167
Port
25
Sender Email Address
poweriq@sunbirddcim.com
Emails will be sent from this address.
Encryption
None
SSL
TLS
Authentication
None
Save
Test Email Settings

Events That Clear Quickly

If two events occur, active and cleared, within 30 seconds, only one event notification is sent, for the cleared event. For example, if a PDU experiences a temperature spike, but the temperature returns to normal within one second, only the event notification for the cleared event is sent.

The event notification contains information indicating when the original event occurred and when that event was cleared.

SNMP Trap Filtering and Event-Based Trap Forwarding

In Power IQ, users with the global Site Administrator role are able to specify the traps that they want to discard or filter out (trap filtering) and to forward SNMP traps from PDUs to other network devices (trap forwarding) based on Power IQ events.

The SNMP Trap Settings panel is accessible through the Event Listings page or on the Power IQ Settings page. For detailed instructions, see *Accessing the SNMP Trap Settings Panel* on the next page.

Individual filters can be created for both trap forwarding and trap filtering. For more information, see *Managing Individual Trap Drop Filters* on page 335 and *Managing Individual Trap Forwarding Filters* on page 346.

Note: Trap forwarding is supported only for SNMPv1/v2 traps. SNMPv3 trap forwarding not supported.

Accessing the SNMP Trap Settings Panel

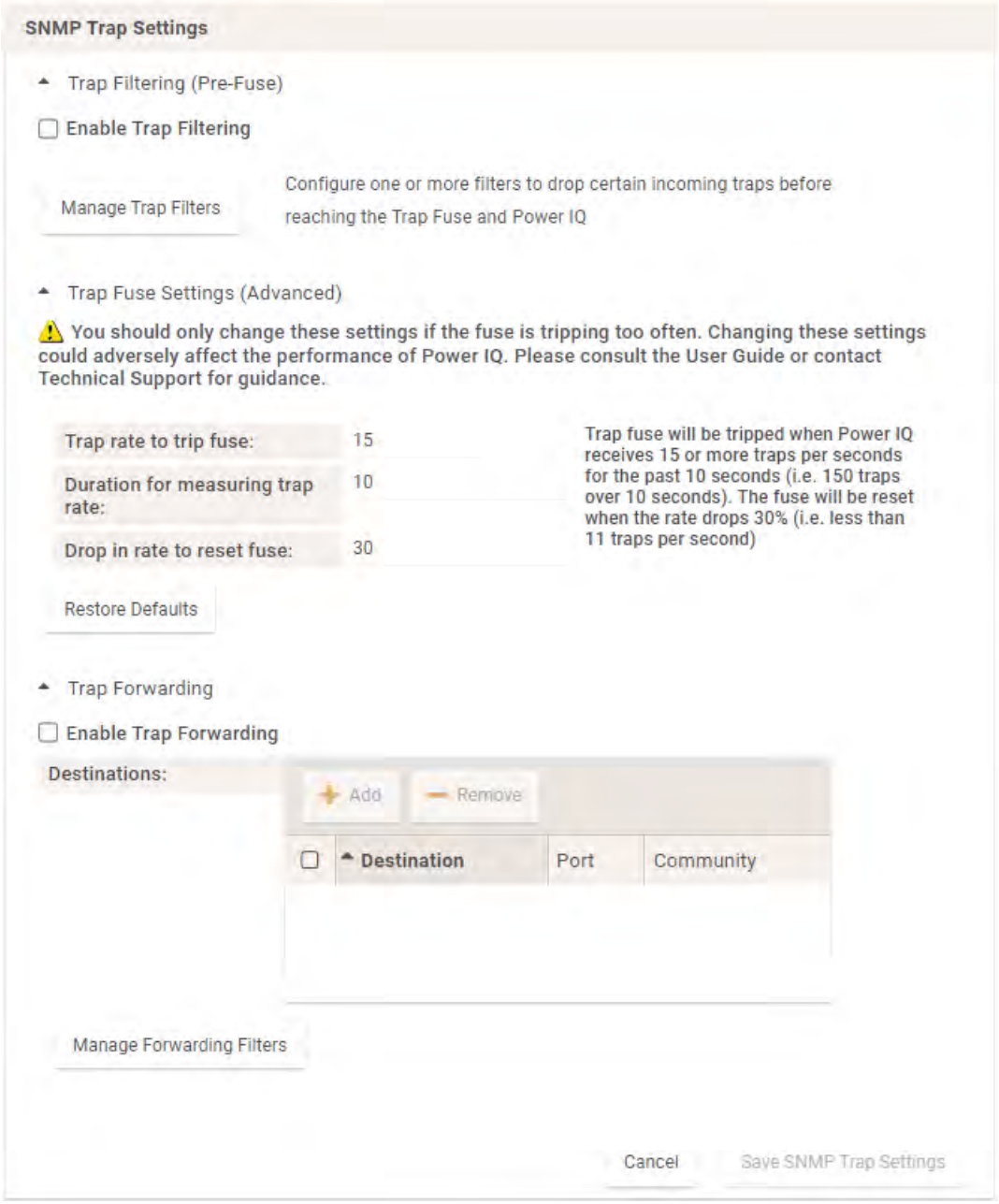
SNMP trap settings can be configured by users with the Site Administrator role from the SNMP Trap Settings panel. Users can access the SNMP Trap Settings panel th A new page with the SNMP Trap Settings panel will load.

- Click the Settings tab > Appliance Administration> Power IQ Settings > SNMP Trap Settings to load the SNMP Trap Settings panel.

SNMP Trap Settings Panel

The SNMP Trap Settings panel contains three distinct subpanels that can be updated independently of each other. For more information on how to access SNMP Trap Settings in Power IQ, see Accessing the SNMP Trap Settings Panel.

Below is an example screenshot of the SNMP Trap Settings panel, followed by the details of each subpanel.



Trap Filtering (Pre-Fuse)

The Trap Filtering (Pre-Fuse) sub-panel is located at the top of the panel and provides controls for enabling/disabling trap filtering, which allows you to specify which traps you wish to filter out or discard, and for configuring specific individual trap filters. You can configure trap filters by clicking the Manage Trap Filters button, which will take you to the Manage Trap Drop Filters page. For more information, see Managing Individual Trap Drop Filters.

Note: "Pre-Fuse" refers to the fact that traps that are filtered out do not count toward tripping the fuse. They are dropped before the fuse. For more information, see Trap Fuse Handling on page 339.

Trap Fuse Settings (Advanced)

The Trap Fuse Settings (Advanced) subpanel is located in middle of the SNMP Trap Settings panel and provides controls for you to customize the settings for Power IQ's trap fuse. For more information, see *Trap Fuse Handling* on page 339.

Note: This section is expandable/collapsible and will be collapsed by default when the SNMP Trap Settings panel is loaded initially.

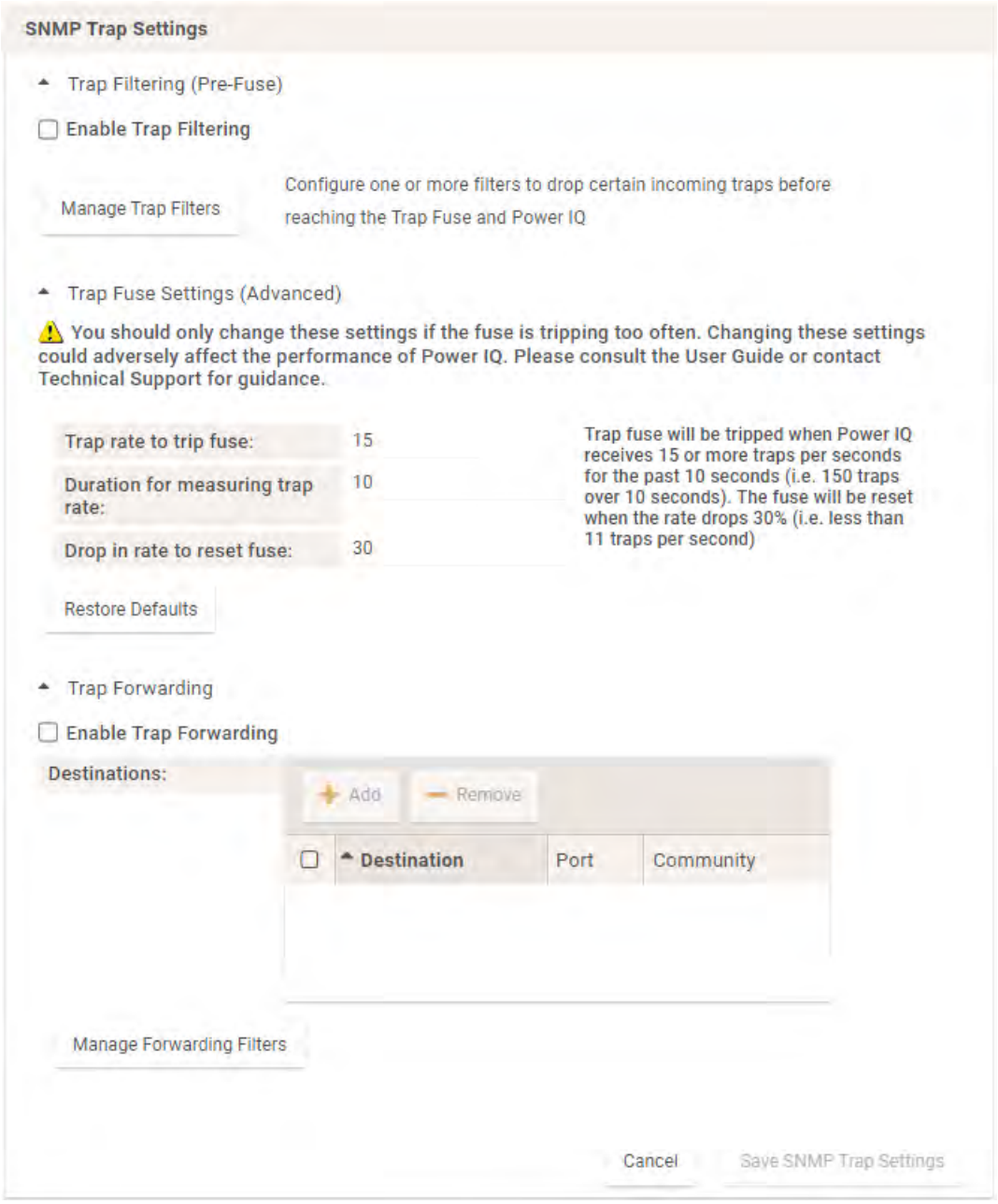
Trap Forwarding

The Trap Forwarding subpanel is located at the bottom of the SNMP Trap Settings panel and provides controls for enabling/disabling trap forwarding and for configuring specific individual event-based trap forwarding filters. You can configure trap forwarding filters by clicking the Manage Forwarding Filters button, which will take you to the Manage Trap Forwarding Filters page. For more information, see *Managing Individual Trap Forwarding Filters* on page 346.

Enabling/Disabling Trap Filtering

Users with the Site Administrator role can enable/disable trap drop filtering from the SNMP Trap Settings panel.

1. Click Events > Manage SNMP Settings to load a new page with the SNMP Trap Settings panel.
2. In the Trap Filtering (Pre-Fuse) subpanel, check/uncheck the box labeled Enable Trap Filtering.
    a. Check the Enable Trap Filtering box to enable trap filtering.
    b. Uncheck the Enable Trap Filtering box to disable trap filtering.
3. Click the Save SNMP Trap Settings button at the bottom of the SNMP Trap Settings panel to save your changes.



Note: By default, trap forwarding is disabled.

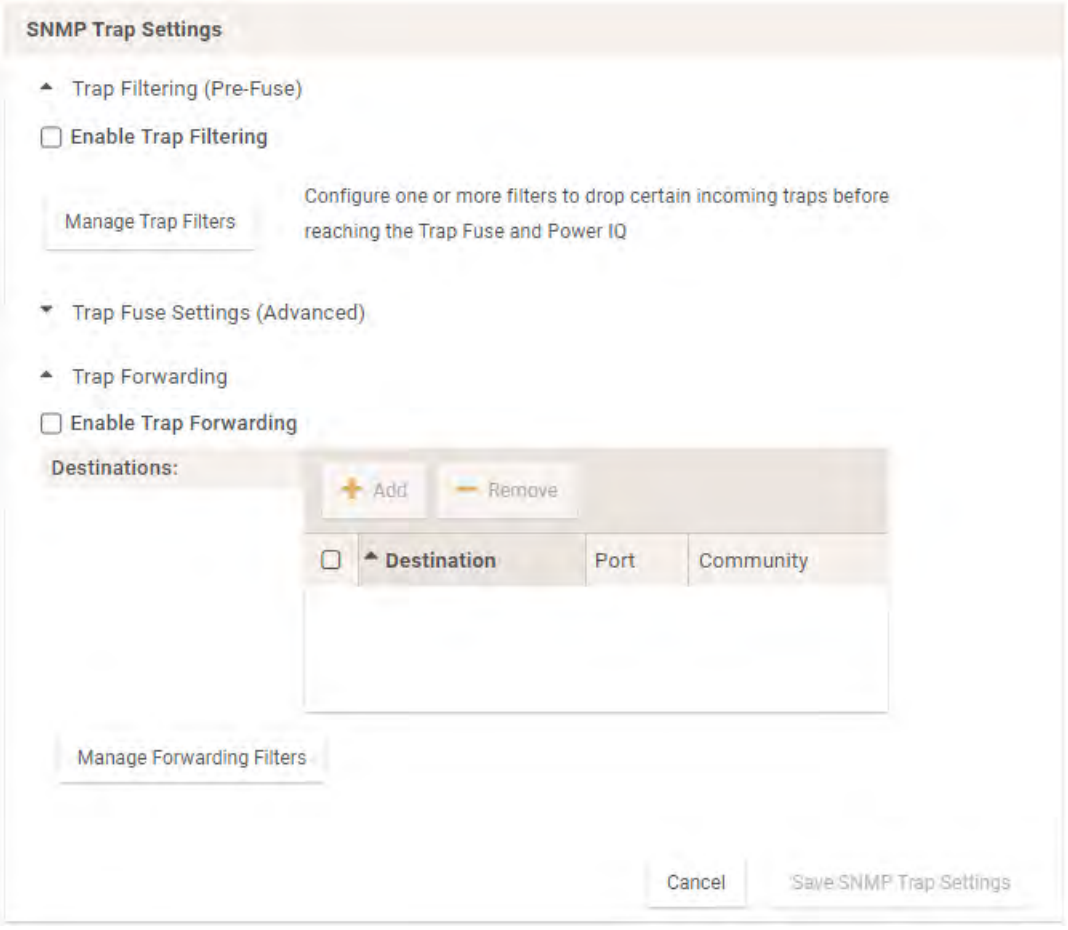
Managing Individual Trap Drop Filters

You can enable/disable and add/edit/delete individual trap filters from the Manage Trap Drop Filters page, which is accessible by clicking the Manage Trap Filters button (via the SNMP Trap Settings panel > Trap Filtering (Pre-Fuse) sub-panel).

Trap filters are organized by name, which is in bold at the top of the trap filter's details. Whether the trap filter is enabled or disabled will be indicated in parentheses to the right of the trap filter name.

Editable fields on the Manage Trap Drop Filters page include the Filter Name, Trap OID, and Source IP. Traps can be filtered by Trap OID and Source IP. For more information on filtering criteria for the Trap OID and Source IP, see *Trap Drop Filtering Criteria* on page 338.

The details of each trap filter can be expanded/collapsed by clicking the button next to the trap filter name. By default, only the first filter will be expanded when the page is initially loaded; all other filters will be collapsed. To expand/-collapse the details of all trap filters, click Expand All/Collapse All in the upper-left corner.



Adding a New Trap Filter

1. On the Manage Trap Drop Filters page, click the Add a filter link and icon.
2. A new filter with its details expanded will display.
3. Edit the Filter Name: The Filter Name can be edited by making your changes to the Filter Name text field.
4. Edit the Trap OID: The Trap OID can be specified by making your changes to the Trap OID text field. The Trap OID field supports a single wild card in the last position.

   For example: 1.3.6.1.4.1.13742.6.*

5. Add/Edit/Delete Source IP address patterns: One or more Source IP address patterns can be specified. Click the Add button to add a new Source IP address. You can edit or delete Source IP addresses once they have been added. Both IPv4 and IPv6 addresses are supported.

   a. Add a New Source IP Address Pattern: Click the Add link and icon next to Source IP. A new IP Address Pattern will be added to the box. The default IP displayed will be 0.0.0.0. Click the new IP Address Pattern to edit it with your desired IP.
   b. Edit a Source IP Address: Simply click the Source IP to edit it. The Trap IP address field supports a single wild card in the last position.

      For example: 10.10.10.*

   c. Delete a Source IP Address: Click the IP address pattern to select it, then click the Remove button. The IP address pattern will be deleted. If no IP address is selected, the Remove button will be grayed out.

6. Optional: To generate a list of PDUs matching your filtering criteria, click the See Matching PDUs button. For more information on filtering the Trap OID and Source IP, see Trap Filtering Criteria.
7. On the Manage Trap Drop Filter panel, click the Save button to save your changes.
8. Click the Back to SNMP Trap Settings link to return to the SNMP Trap Settings panel.

Editing an Existing Trap Filter

1. On the Manage Trap Drop Filters page, click the trap filter name to expand the filter details.
2. Edit the Filter Name: The Filter Name can be edited by making your changes to the Filter Name text field.
3. Edit the Trap OID: The Trap OID can be edited by making your changes to the Trap OID text field.
4. Add/Edit/Delete Source IP addresses: Existing Source IP address patterns can be edited or deleted, or you can add a new Source IP. Both IPv4 and IPv6 addresses are supported.

   a. Add a New Source IP Address Pattern: Click the Add link and icon next to Source IP. A new IP Address Pattern will be added to the box. The default IP displayed will be 0.0.0.0. Click the new IP Address Pattern to edit it with your desired IP.
   b. Edit a Source IP Address: Simply click the Source IP to edit it.
   c. Delete a Source IP Address: Click the IP address pattern to select it, then click the Remove button. The IP address pattern will be deleted. If no IP address is selected, the Remove button will be grayed out.

5. Optional: To generate a list of PDUs matching your filtering criteria, click the See Matching PDUs button. For more information on filtering the Trap OID and Source IP, see Trap Filtering Criteria.
6. On the Manage Trap Drop Filter panel, click the Save button to save your changes.
7. Click the Back to SNMP Trap Settings link to return to the SNMP Trap Settings panel.

Deleting an Existing Trap Filter

1. On the Manage Trap Drop Filters page, click the trap filter name to expand the filter details.
2. Click the Remove button.
3. The trap filter will be deleted.
4. On the Manage Trap Drop Filter panel, click the Save button to save your changes.
5. Click the Back to SNMP Trap Settings link to return to the SNMP Trap Settings panel.

Trap Drop Filtering Criteria

Incoming traps are discarded or filtered out based on criteria defined in each filter. Filters must be defined for traps to be discarded.

Traps can be filtered by trap OID and/or IP pattern. Filtering for both the trap OID and the IP address can be based on an exact match or a partial match via wildcard. If both the trap OID and IP address are specified in a filter, then filtering occurs only if the trap matches both criteria.

Power IQ supports a single asterisk (*) as the wildcard character. The wildcard must be the last character of the trap OID or IP address. If no wildcard is specified, then filtering occurs based on an exact match of the filtering criteria.

For more information, see *Managing Individual Trap Drop Filters* on page 335.

Trap Fuse Handling

The trap fuse is a precautionary measure in place to protect Power IQ and guard against performance issues caused by an excessive amount of incoming traps (a trap storm).

Power IQ receives traps, processes them, and, when applicable, converts the traps into events. The trap fuse is tripped if the rate of the incoming traps exceeds the configured threshold. When the trap fuse is tripped, any new traps received will be discarded until the incoming trap rate drops to an acceptable rate, and the fuse is reset.

By default, the trap fuse is tripped when the sustained incoming trap rate exceeds 15 traps per second for 10 seconds, and a tripped trap fuse will reset (resume processing traps) when the incoming trap rate drops 30%below the configured traps/second threshold.

Users with the Site Administrator role can customize the default values for Power IQ's trap fuse under SNMP Trap Settings > Trap Fuse Settings (Advanced). For more information, see *Configuring Trap Fuse Settings* on the next page.

Note: The trap rate is recalculated and the fuse state reevaluated every time a trap is received. Therefore, a tripped trap fuse will be reset only after a subsequent trap is received, and the trap rate is determined to have dropped sufficiently.

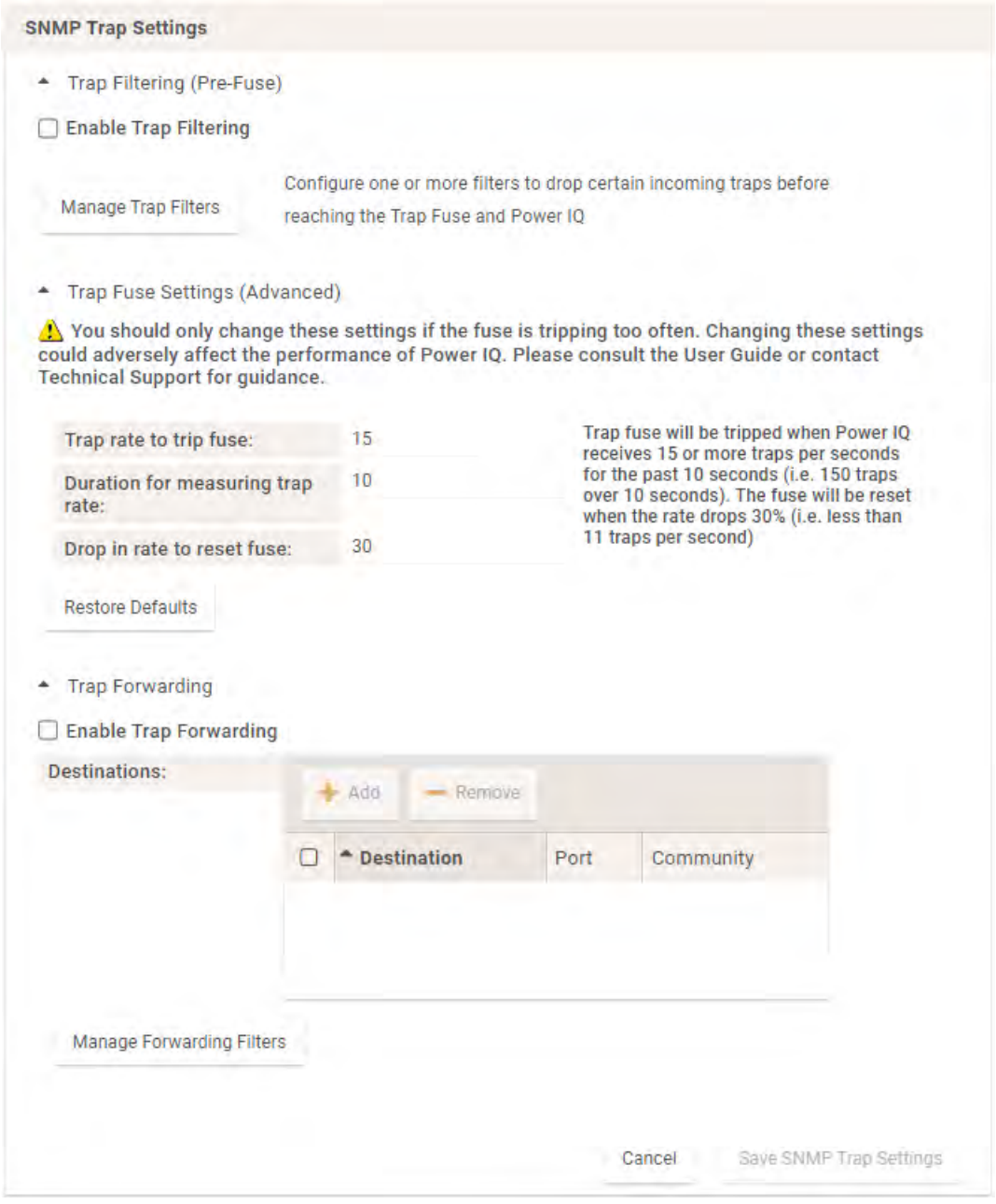
When the fuse is tripped, Power IQ will create an event indicating that the fuse has been tripped and including the trap rate. When the fuse is reset, the event will be cleared.

Note: Although traps from facility items in Maintenance Mode will be dropped (they will not be processed), they will still impact the trap fuse and could contribute to the fuse tripping resulting in other traps being dropped.

Configuring Trap Fuse Settings

Power IQ utilizes an event/trap fuse that trips when the rate of traps received exceeds the maximum allowed. Power IQ will stop processing traps until after the fuse has been reset. For more information, see *Trap Fuse Handling* on the previous page.

Users with the Site Administrator role can configure trap fuse settings from the SNMP Trap Settings panel.



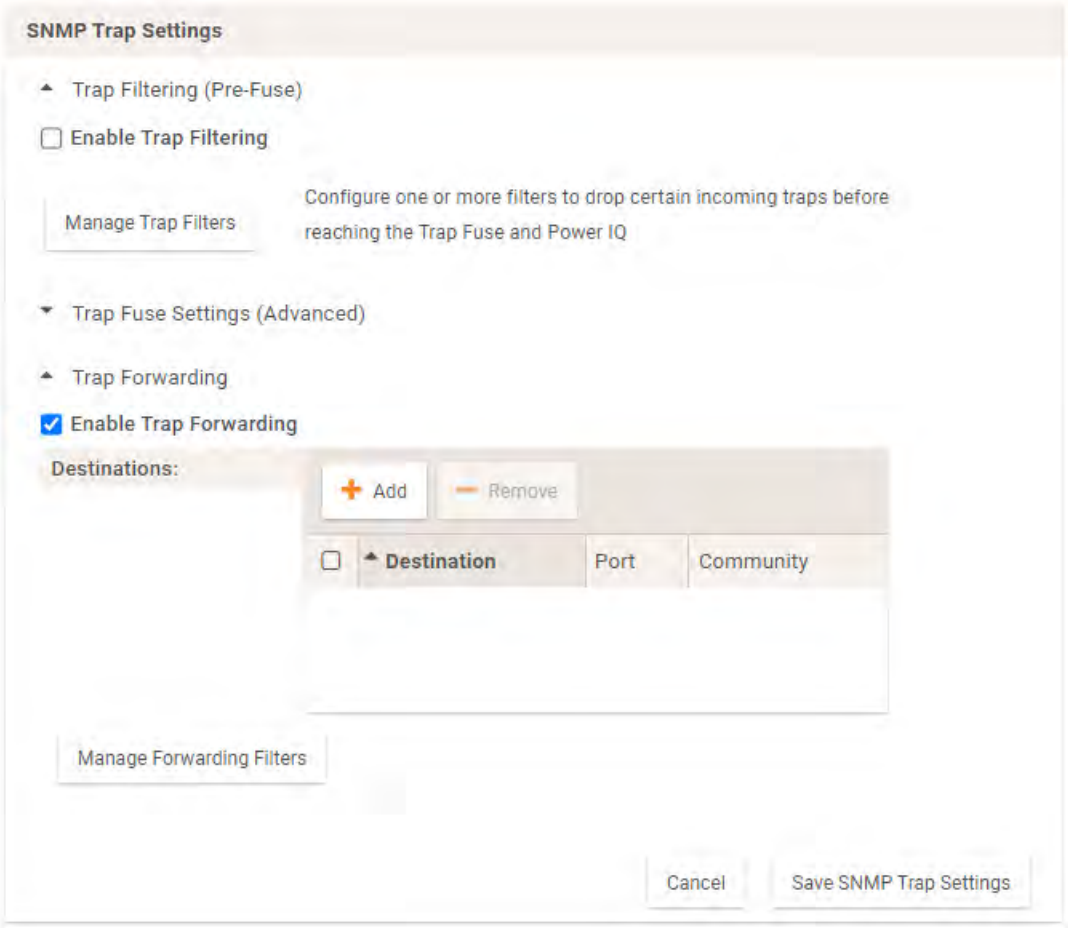
1. Click Events > Manage SNMP Settings to load a new page with the SNMP Trap Settings panel.
2. In the Trap Fuse Settings (Advanced) subpanel, change the default values to your desired values.
    a. Trap rate to trigger fuse: The number of traps received per second that is required to trip the fuse. The default is 15 with a maximum of 999.
    b. Duration for measuring trap rate: The length of time in seconds over which the number of traps received is divided. The default is 10 seconds with a maximum of 300 seconds.
    c. Drop in rate to reset fuse: The percentage drop in the rate of traps received to reset the fuse. The default is 30%
3. Optional: To restore the default values, click the Restore Defaults button.
4. Click the Save SNMP Trap Settings button at the bottom of the SNMP Trap Settings panel to save your changes.

Note: Editing these settings is not recommended unless the trap fuse is tripping often. For help with determining the appropriate values for your environment, please contact Sunbird Technical Support.

Enabling/Disabling Event-Based Trap Forwarding

Users with the Site Administrator role can enable/disable trap forwarding from the SNMP Trap Settings panel.

1. Click the Events tab > Manage SNMP Settings to load a new page with the SNMP Trap Settings panel.
2. In the Trap Forwarding subpanel, check/uncheck the box labeled Enable Trap Forwarding.
    a. Check the Enable Trap Forwarding box to enable trap forwarding.
    b. Uncheck the Enable Trap Forwarding box to disable trap forwarding.
3. Click the Save SNMP Trap Settings button at the bottom of the SNMP Trap Settings panel to save your changes.

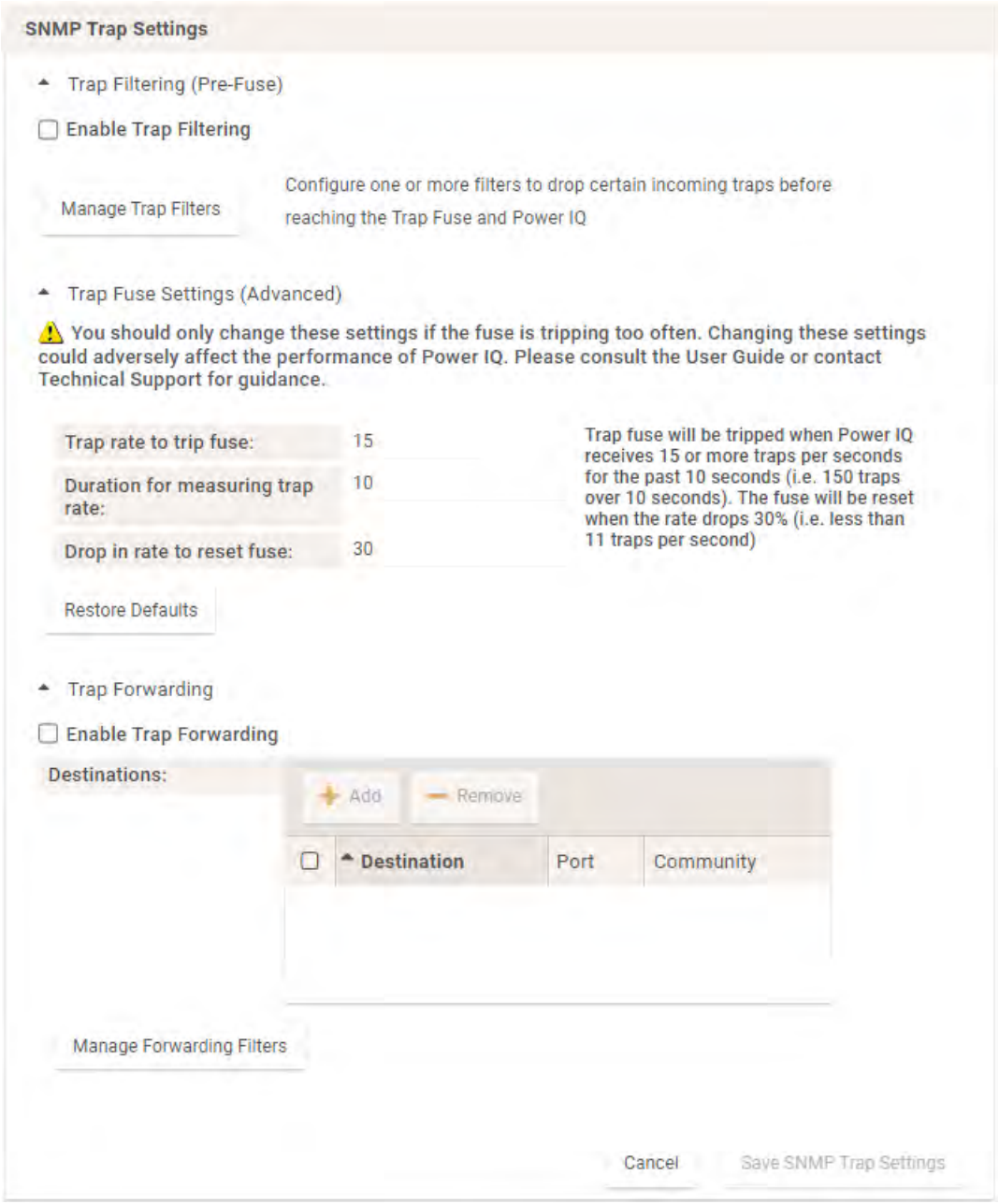


Configuring Trap Forwarding Destinations

Once trap forwarding is enabled, users with the Site Administrator role can configure up to four IP addresses as trap forwarding destinations. Trap destinations must be unique. Both IPv4 and IPv6 addresses are supported.

To enable trap forwarding, select the Enable Trap Forwarding box via the SNMP Trap Settings panel > Trap Forwarding subpanel.

Note: To edit trap destinations, trap forwarding must be enabled. If trap forwarding is disabled, the trap destinations will be grayed out and will not be editable.



Adding a New Trap Forwarding Destination

1. Click the Events tab > Manage SNMP Settings to load a new page with the SNMP Trap Settings panel.
2. In the Trap Forwarding subpanel, click the Add link and icon next to Destinations.
3. Destination: A new destination will be added. The default IP displayed will be 0.0.0.0. Click the new destination to edit it with your desired IP address.

4. Port: Click the field under Port to edit the field with your desired port. Power IQ will accept non-standard ports for this field.
5. Community: Click the field under Community to edit the field with your desired community string.
6. Click the Save SNMP Trap Settings button to save your changes.

Editing an Existing Trap Destination

1. Click the Events tab > Manage SNMP Settings to load a new page with the SNMP Trap Settings panel.
2. In the Trap Forwarding subpanel, click the destination you wish to edit.
3. Destination: Click the destination to edit it with your desired IP address.
4. Port: Click the field under Port to edit the field with your desired port. Power IQ will accept non-standard ports for this field.
5. Community: Click the field under Community to edit the field with your desired community string.
6. Click the Save SNMP Trap Settings button to save your changes.

Deleting an Existing Trap Destination

1. Click the Events tab > Manage SNMP Settings to load a new page with the SNMP Trap Settings panel.
2. In the Trap Forwarding subpanel, click the destination you wish to delete to select it. If no destination is selected, the Remove button will be grayed out.
3. Click the Remove button. The destination will be removed.
4. Click the Save SNMP Trap Settings button to save your changes.

Managing Individual Trap Forwarding Filters

Users with the global Site Administrator role can enable/disable and add/edit/delete individual trap forwarding filters from the Manage Trap Forwarding Filters page, which is accessible by clicking the Manage Forwarding Filters button (in the Trap Forwarding subpanel of the SNMP Trap Settings panel).

When a trap is received, Power IQ will convert the trap and generate an event. If trap forwarding is enabled and the criteria for forwarding traps is defined, Power IQ will evaluate the event against the defined criteria. If the event matches the criteria, Power IQ will forward the original trap that generated the event.

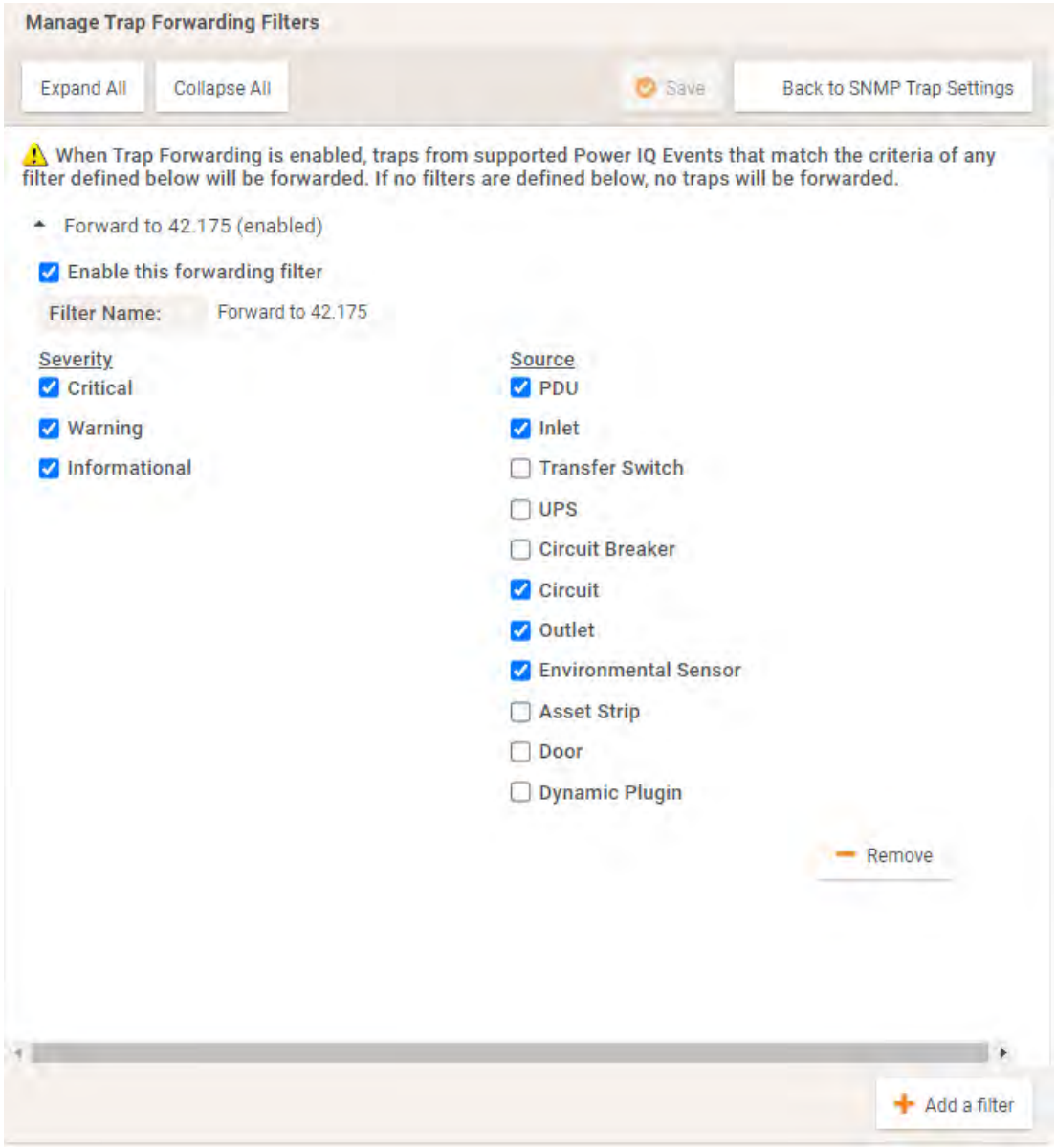
The following severity and source criteria can be defined for trap forwarding filters:

- Severity: Available options include Critical, Warning, and/or Information.
- Source: Available options include PDU, Inlet, Transfer Switch, UPS, Circuit Breaker, Circuit, Outlet, Environmental Sensor, Asset Strip, Door, and/or Dynamic Plugin.

At least one selection each must be made for Severity and Source. The event must match both the Severity and Source criteria for the underlying trap to be forwarded.

Trap forwarding filters are organized by name, which is in bold at the top of the filter's details. Whether the trap forwarding filter is enabled or disabled will be indicated in parentheses to the right of the filter name.

The details of each trap forwarding filter can be expanded/collapsed by clicking the button next to the trap filter name. By default, only the first filter will be expanded when the page is initially loaded; all other filters will be collapsed. To expand/collapse the details of all trap filters, click Expand All/Collapse All in the upper-left corner.



Adding a New Trap Forwarding Filter

1. On the Manage Trap Forwarding Filters page, click the Add a filter link and icon.
2. A new filter will display with its details expanded.
3. Edit the Filter Name: The Filter Name can be edited by making your changes to the Filter Name text field.
4. Select the Severity: Check/uncheck the boxes to select/deselect the appropriate Severity. Multiple boxes can be checked.
5. Select the Source: Check/uncheck the boxes to select/deselect the appropriate trap Source. Multiple boxes can be checked.

6. On the Manage Trap Drop Filter panel, click the Save button to save your changes.
7. Click the Back to SNMP Trap Settings link to return to the SNMP Trap Settings panel.

Editing an Existing Trap Forwarding Filter

1. On the Manage Trap Forwarding Filters page, click the trap filter name to expand the filter details.
2. Edit the Filter Name: The Filter Name can be edited by making your changes to the Filter Name text field.
3. Select the Severity: Check/uncheck the boxes to select/deselect the appropriate Severity. Multiple boxes can be checked.
4. Select the Source: Check/uncheck the boxes to select/deselect the appropriate trap Source. Multiple boxes can be checked.
5. On the Manage Trap Drop Filter panel, click the Save button to save your changes.
6. Click the Back to SNMP Trap Settings link to return to the SNMP Trap Settings panel.

Deleting an Existing Trap Forwarding Filter

1. On the Manage Trap Forwarding Filters page, click the trap filter name to expand the filter details.
2. Click the Remove button.
3. The trap filter will be deleted.
4. On the Manage Trap Drop Filter panel, click the Save button to save your changes.
5. Click the Back to SNMP Trap Settings link to return to the SNMP Trap Settings panel.

Trap Queue Handling

Power IQ i includes configuration options for handling the SNMP trap backlog (the queue of traps to be processed). Once the maximum trap backlog queue size has been reached, trap handling will be disabled, the trap backlog will be processed, and incoming traps will be dropped until the backlog queue size has dropped to within the specified trap backlog recovery percentage. At that point, new incoming traps will once again be added to the queue for processing.

The following options are configurable via the database:

- trap_handling_pool_threads_per_core (default: 5)
- trap_max_backlog_threshold_per_core (default: 500)
- trap_backlog_threshold_warning_percentage (default: .50)
- trap_backlog_threshold_critical_percentage(default: .80)
- trap_max_backlog_recovery_percentage (default: .15)

New events and audit log messages have been added for cases when the trap handling queue is backlogged or if traps are being dropped because the backlog threshold is exceeded.

The table below summarizes the trap queue handling events and audit log messages:

Description	Event Name	Event Text	Event Summary	Audit Log Message
When the trap backlog state transitions from NORMAL or CRITICAL to WARNING, a warning event is generated.	trapHandlingBacklogWarning	Trap backlog warning	Trap backlog warning threshold exceeded.	Trap backlog warning threshold exceeded.
When the trap backlog state transitions from WARNING to NORMAL, a clearing event is generated.	trapHandlingBacklogWarningClear	N/A	N/A	Trap backlog state has returned to normal.
When the trap backlog state transitions from NORMAL or WARNING to CRITICAL, a critical event is generated.	trapHandlingBacklogCritical	Trap backlog critical	Trap critical threshold exceeded.	Trap backlog critical threshold exceeded.
When the trap backlog state transitions from CRITICAL to NORMAL, a clearing event is generated.	trapHandlingBacklogCriticalClear	N/A	N/A	Trap backlog state has returned to normal.
When the trap backlog reaches	trapHandlingHaltedDueToBacklog	Trap	Trap hand-	Trap hand-

Description	Event Name	Event Text	Event Summary	Audit Log Message
the maximum permitted trap backlog size, a critical event is generated.		handling halted due to backlog	ling temporarily halted due to trap backlog.	ling temporarily halted due to trap backlog.
If a trapHandlingHaltedDueToBacklog event is active, when the trap backlog drops below the maximum trap backlog recovery percentage, a clearing event is generated.	trapHandlingHaltedDueToBacklogClear	N/A	N/A	Trap handling backlog has been cleared sufficiently to resume trap processing.

Note: Contact Sunbird Technical Support for assistance with modifying the trap backlog threshold values.

Note: Clearing events simply clear active events but are not persisted as events in Power IQ.

Configure Event (Trap) Notification Settings for APC Devices

This topic provides instructions for how to configure APC devices (including APC Netbotz devices and Rack PDUs) that support repeating and non-repeating modes for sensor threshold traps so that the devices work most effectively with Power IQ.

All sensor threshold-related event (trap) notifications should be configured via the APC web user interface with the following settings:

- Event notification repeating should be disabled
- All critical threshold event notifications should be configured with a five-second delay
- All warning threshold event notifications should be configured with a zero-second delay

These recommendations eliminate the possibility of race conditions that affect trap reception in Power IQ. With these settings, if a sensor state changes, Power IQ should receive and process the traps in the correct order. In this case, if a sensor state changes from normal to critical, Power IQ should receive the warning trap before the critical trap.

The APC web user interface provides two options for configuring event notification settings:

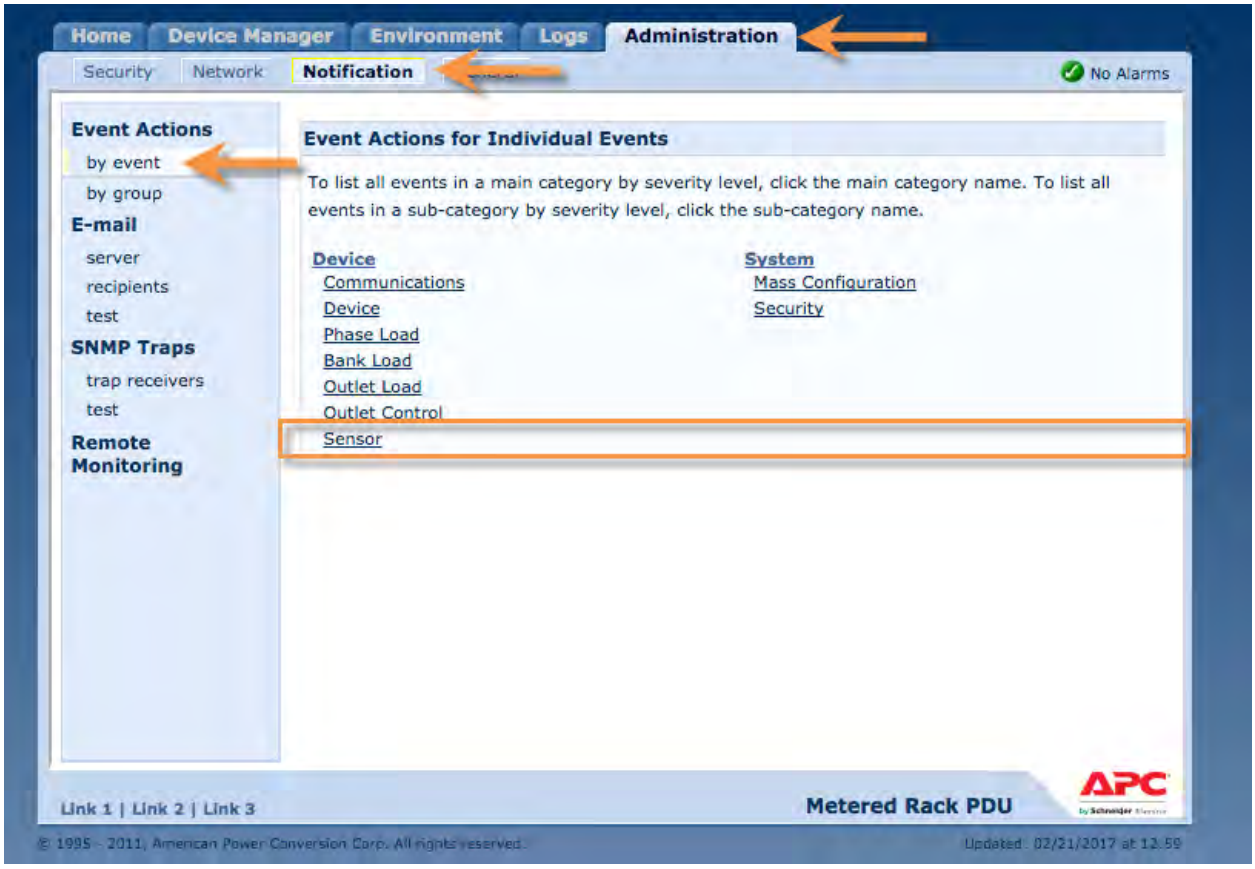
- Configure by event: Configure settings for an individual event. For more information, see *Configure Notifications by Individual Event* on the next page.
- Configure by group: Configure settings for a group of events. For more information, see *Configure Notifications by Event Group* on page 357.

Configure Notifications by Individual Event

To configure notifications for an individual event in the APC web user interface:

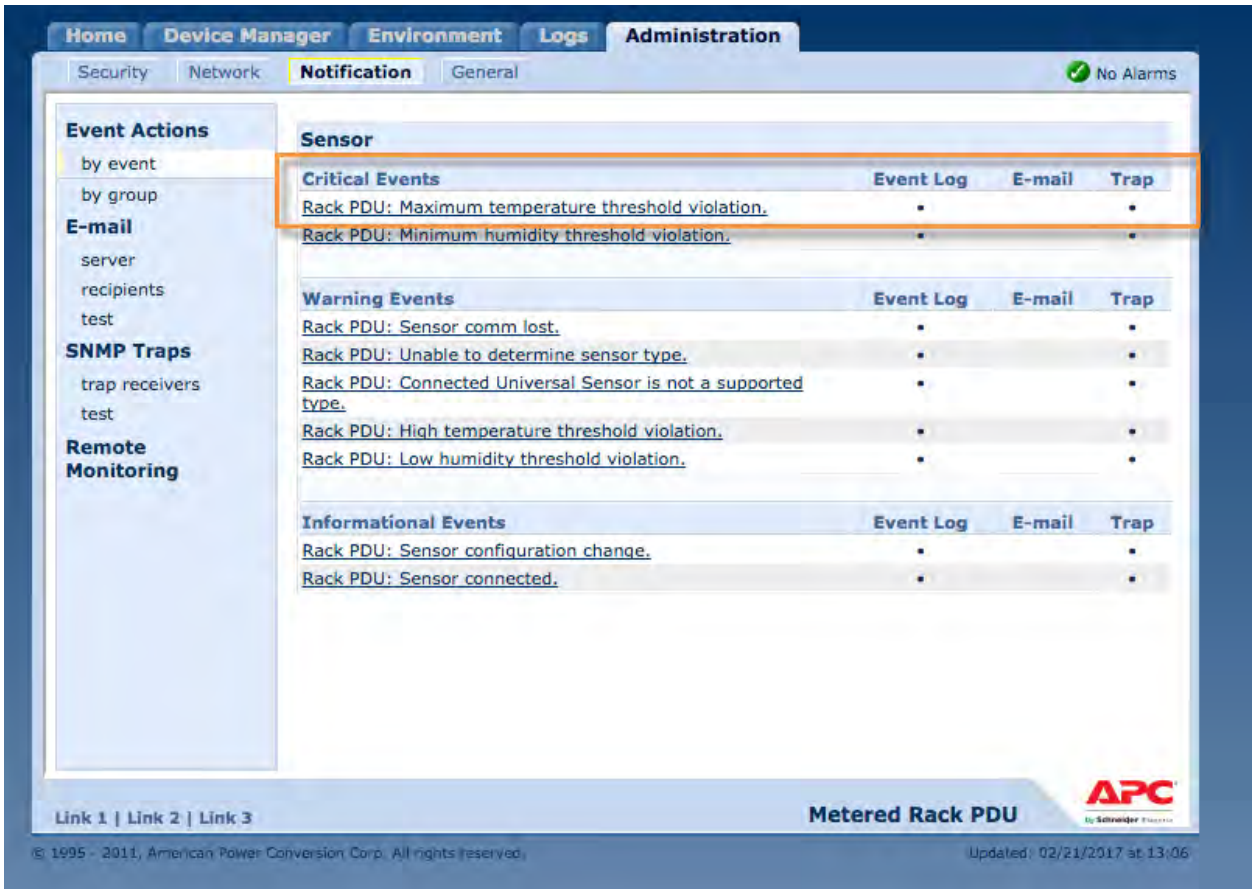
1. Select the Administration tab > Notification on the top menu bar > Event Actions in the left navigation bar > by event. The main (right) pane displays the Event Actions for Individual Events page, which lists event categories and sub-categories.

2. In the main pane under Devices, select Sensor to display the sensor sub-category events.



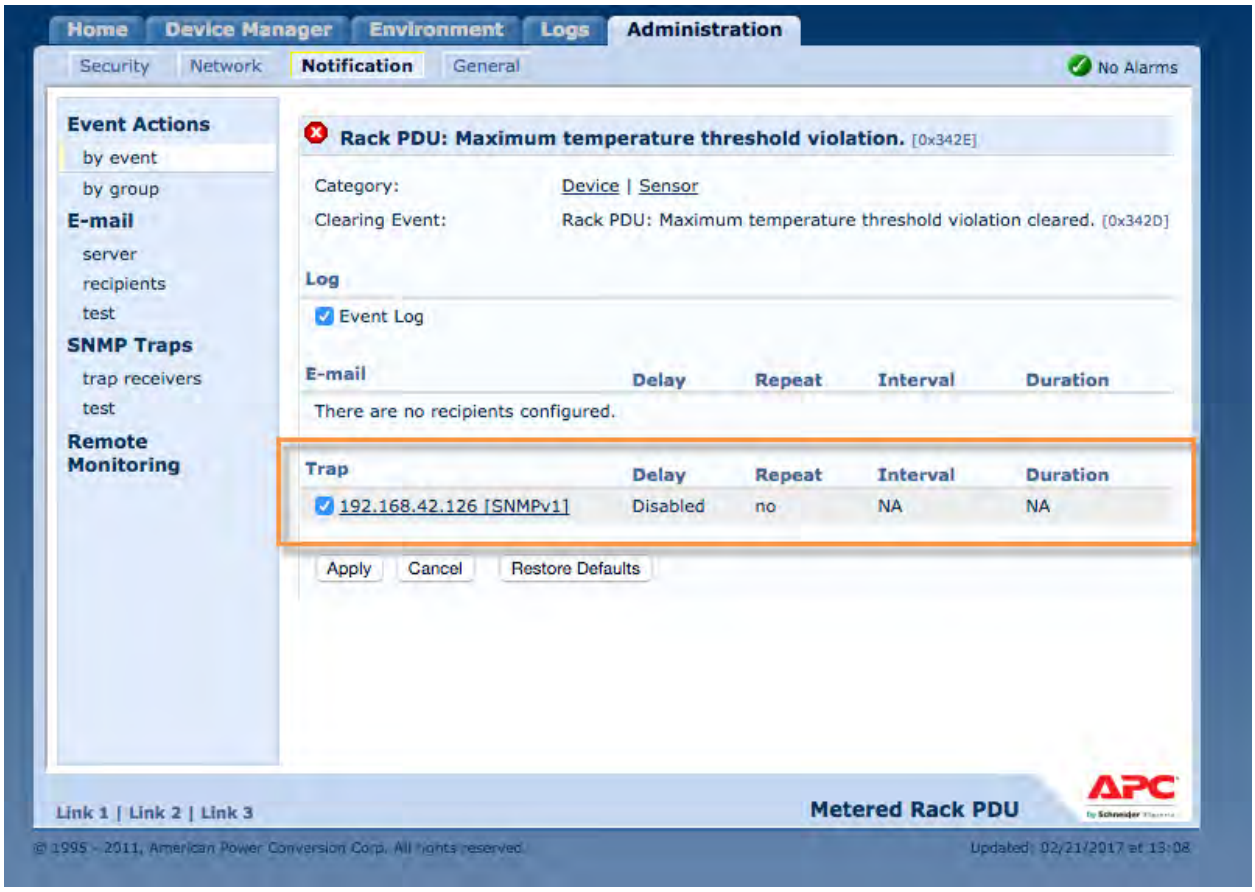
3. Click the name of an event notification to view or change its current configuration.

Note: In these example screenshots, the critical event Rack PDU: Maximum temperature threshold violation is selected.

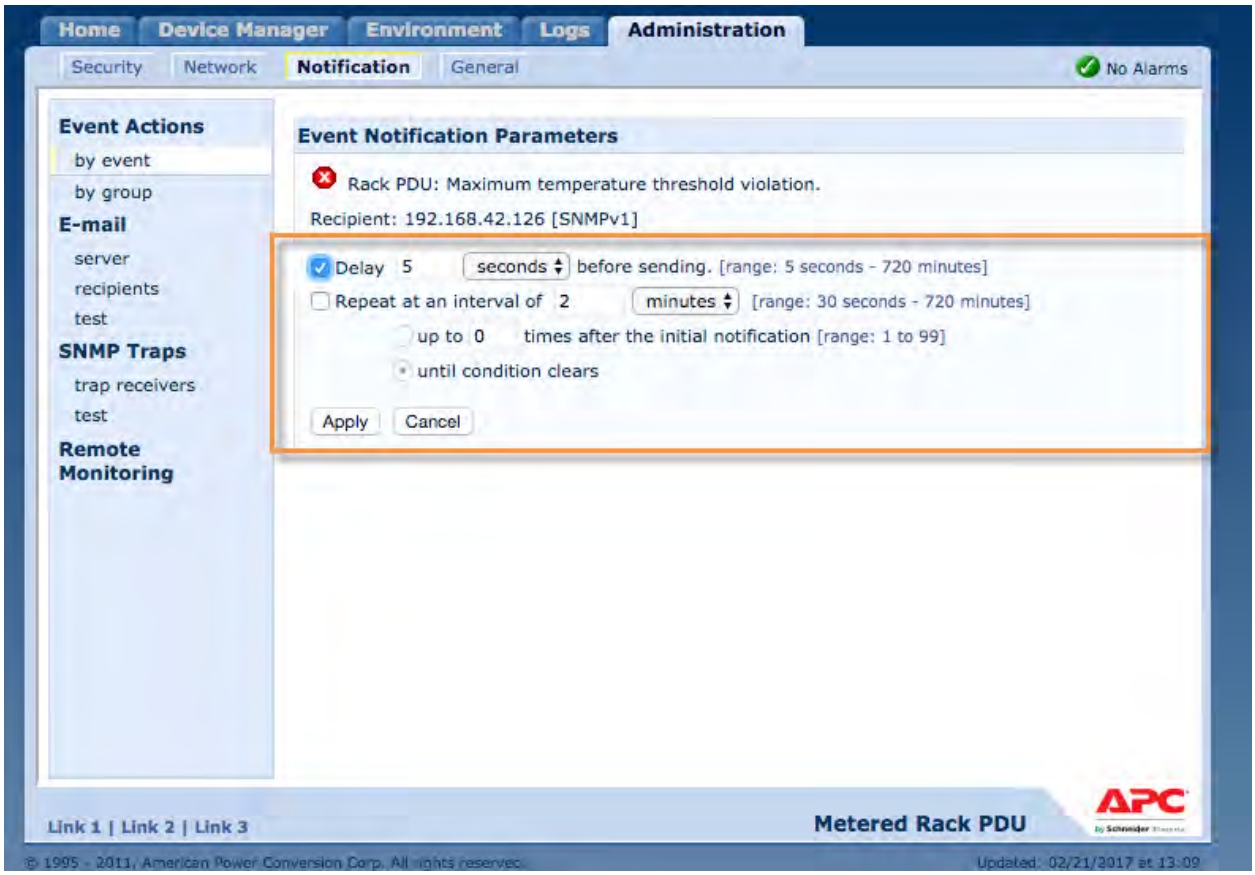


4. Under Trap, choose a trap receiver to view or configure its notifications for the selected event.

Note: You must have at least one trap receiver configured to select this option.



5. The Event Notification Parameters page for the trap receiver displays.



Set the following parameters:

Event Parameter	Description	Configuration for Power IQ
Delay x time before sending	If the event persists for the specified time, a notification is sent. If the condition clears before the time expires, no notification is sent.	Set parameter checkbox to checked. Set parameter to 5 seconds for critical threshold event notifications. Set parameter to 0 seconds for warning threshold event notifications.
Repeat at an interval of x time	The notification is sent at the specified interval.	Set parameter checkbox to unchecked to disable repeating.
Up to x times	During an active event, the notification repeats	Disabled when repeating is disabled. No

Event Parameter	Description	Configuration for Power IQ
	for this number of times.	configuration required.
Until condition clears	The notification is sent repeatedly until the condition clears or is resolved.	Disabled when repeating is disabled. No configuration required.

6. Click Apply to save your changes.

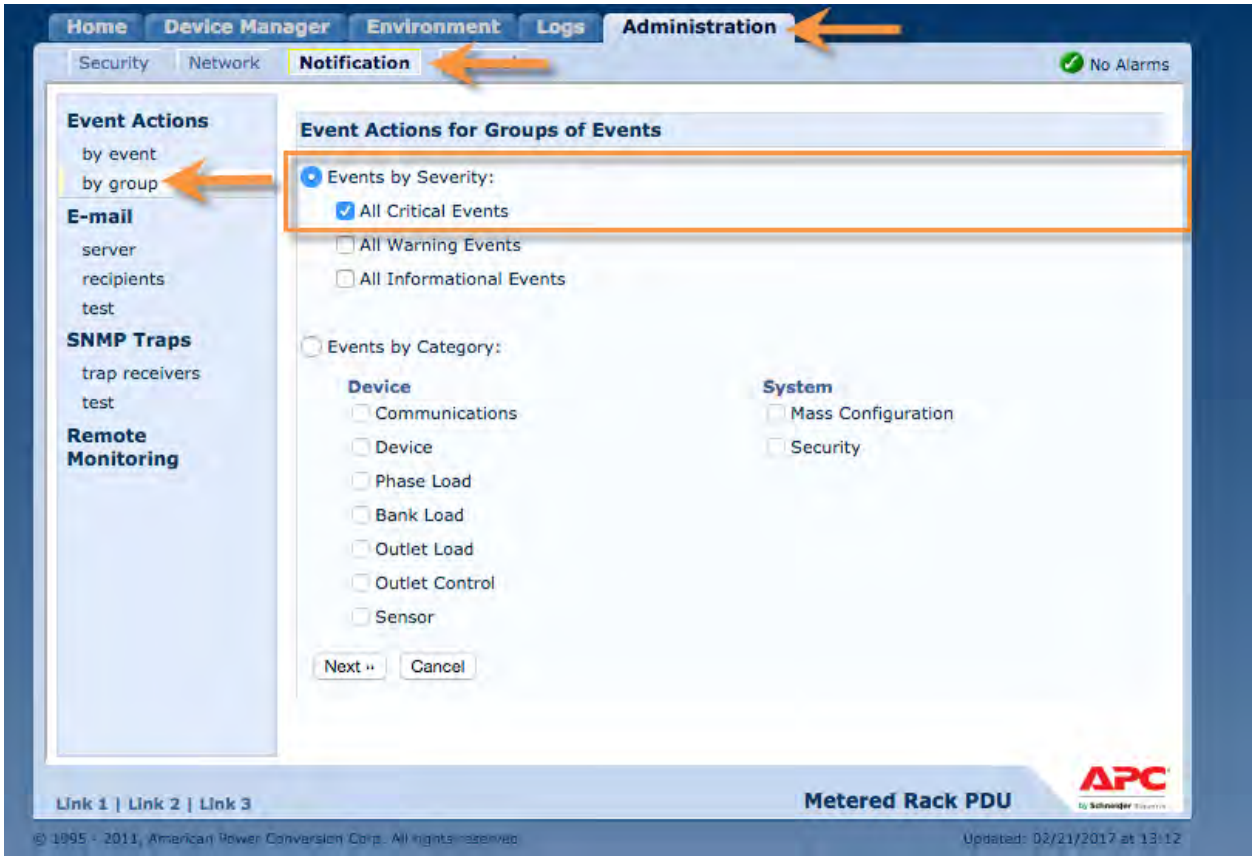
Configure Notifications by Event Group

To configure notifications for a group of events:

1. Select the Administration tab > Notification on the top menu bar > Event Actions in the left navigation bar > by group under Event Actions. The main (right) pane will display the Event Actions for Groups of Events page, which lists options for grouping event actions.

2. In the main pane, select Events by Severity and select the severity level to be configured.

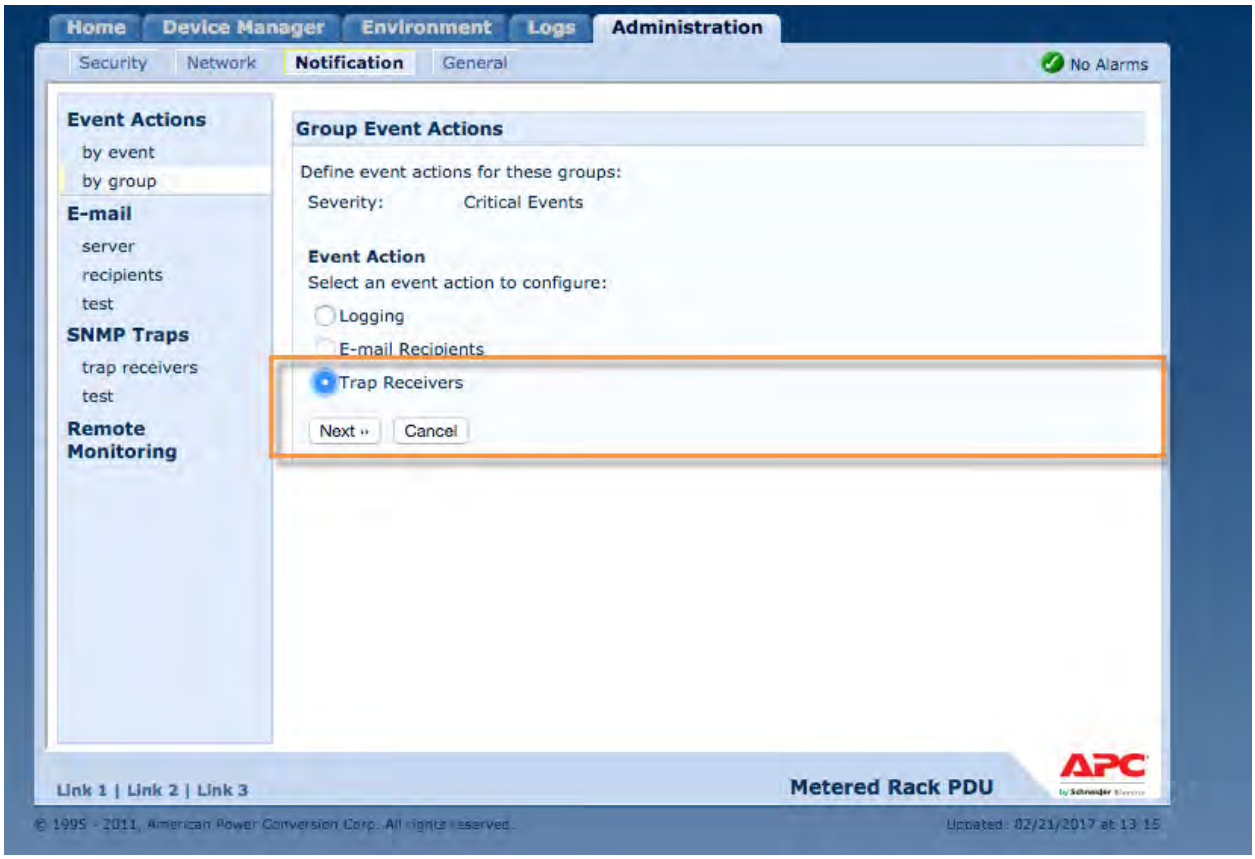
Note: The severity levels include: Critical, Warning, and Informational events. In these example screenshots, the option for All Critical Events has been selected.



3. Click Next>> to proceed.

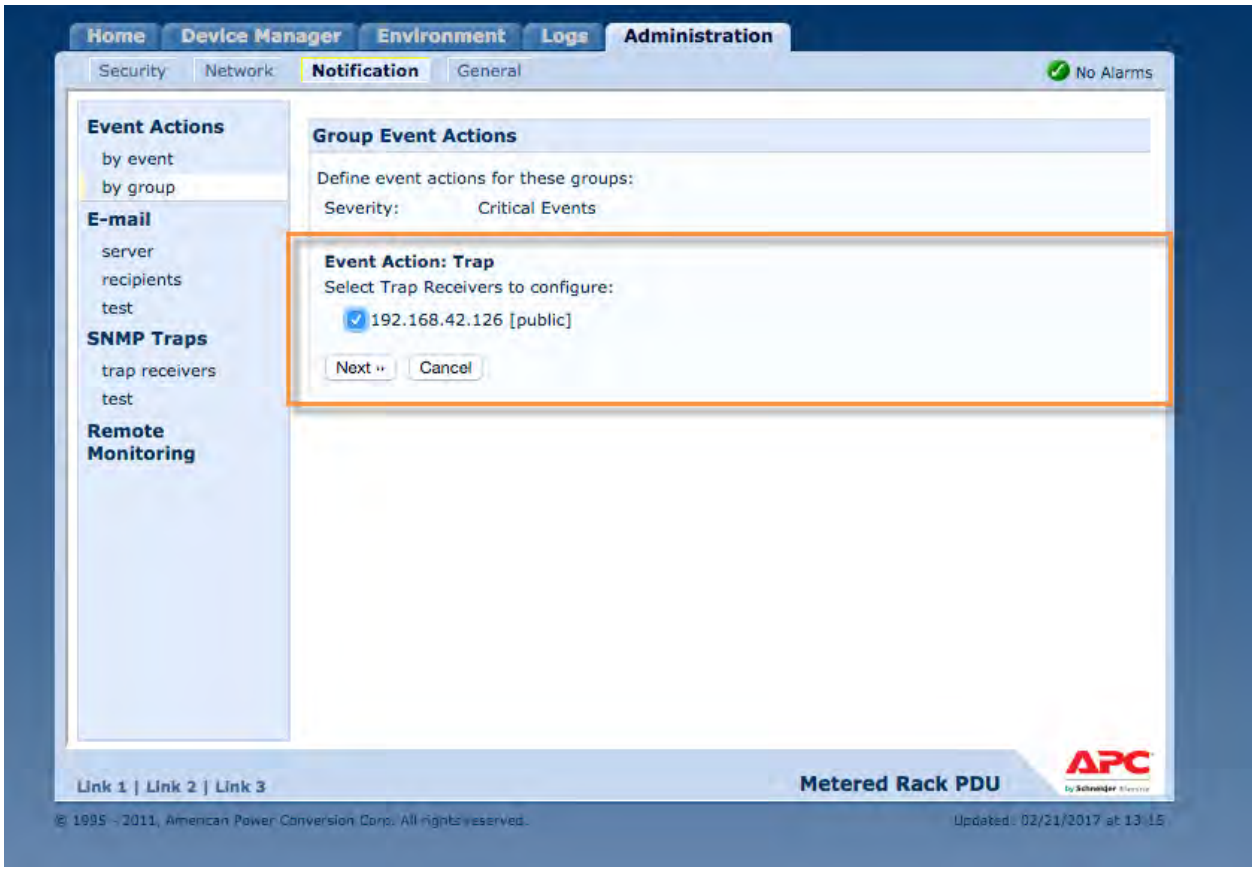
4. On the Group Event Actions page, select Trap Receivers under Event Actions.

Note: You must have at least one trap receiver configured to select this option.

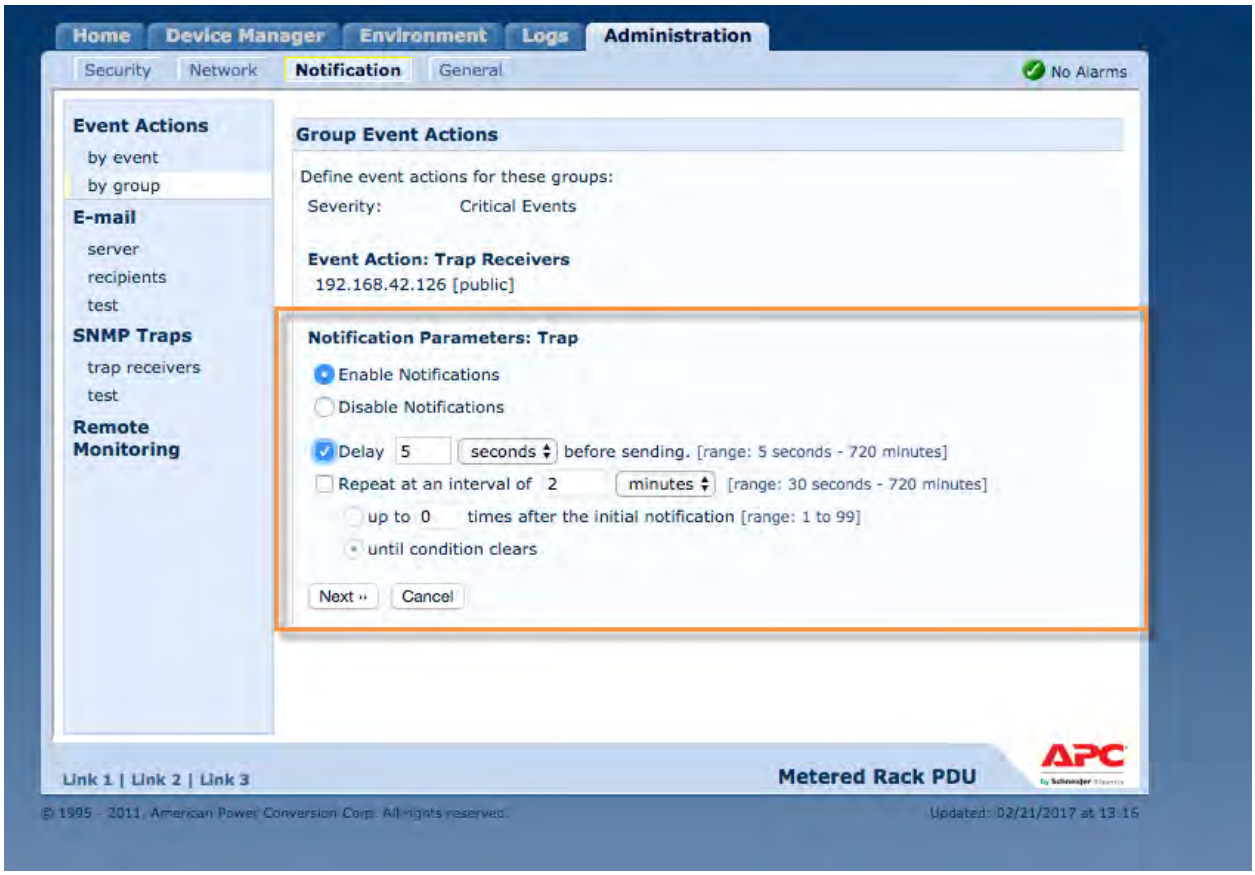


5. Click Next>> to proceed.

6. Under Event Action: Trap, choose a trap receiver to configure its notification parameters for the selected group of events.



7. Under Notification Parameters: Trap, select Enable Notifications.



Set the following parameters:

Event Parameter	Description	Configuration for Power IQ
Delay x time before sending	If the event persists for the specified time, a notification is sent. If the condition clears before the time expires, no notification is sent.	Set parameter checkbox to checked. Set parameter to 5 seconds for critical threshold event notifications. Set parameter to 0 seconds for warning threshold event notifications.
Repeat at an interval of x time	The notification is sent at the specified interval.	Set parameter checkbox to unchecked to disable repeating.
Up to x times	During an active event, the notification repeats	Disabled when repeating is disabled. No

Event Parameter	Description	Configuration for Power IQ
	for this number of times.	configuration required.
Until condition clears	The notification is sent repeatedly until the condition clears or is resolved.	Disabled when repeating is disabled. No configuration required.

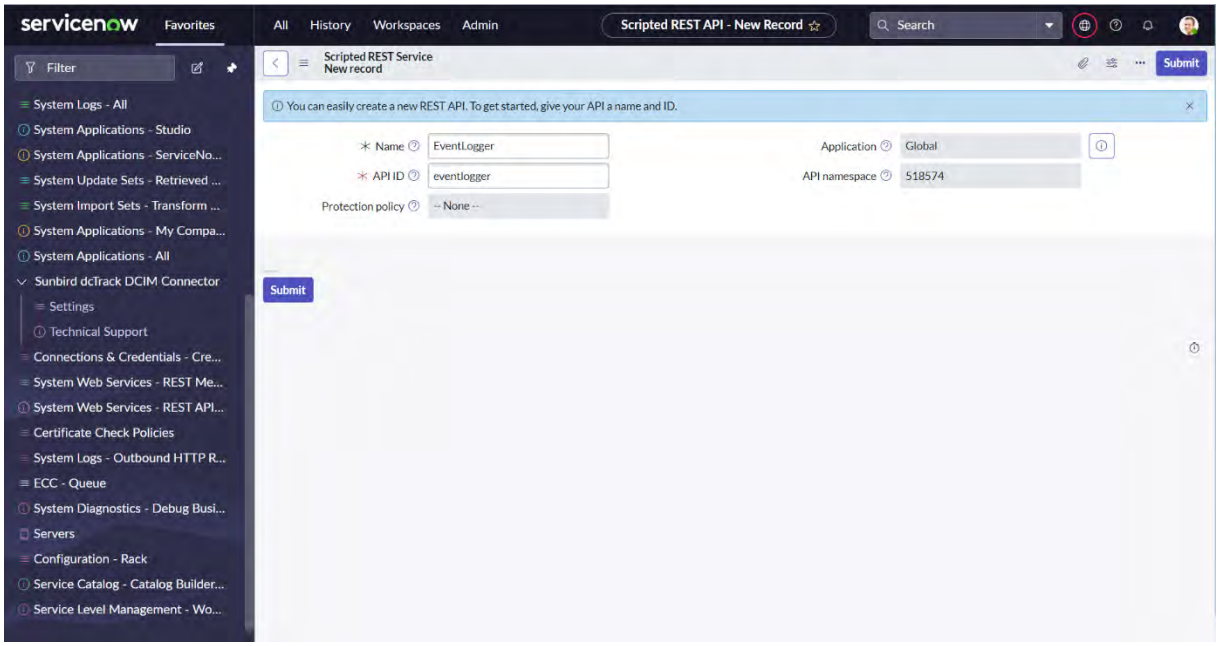
8. Click Next>> to proceed.

9. Select whether to leave the newly configured event action enabled for this group of events or to disable the action.

Use Event Notification with ServiceNow

If you are using ServiceNow, you can also use a Webhook to capture events from Power IQ. The process involves creating a Webhook in Power IQ (the Webhook Provider) which will automatically push events to the Web Service configured in ServiceNow (the Webhook Receiver). When an event is triggered in Power IQ, it serializes the data about that event and sends it to the webhook URL you created in ServiceNow in JSON format.

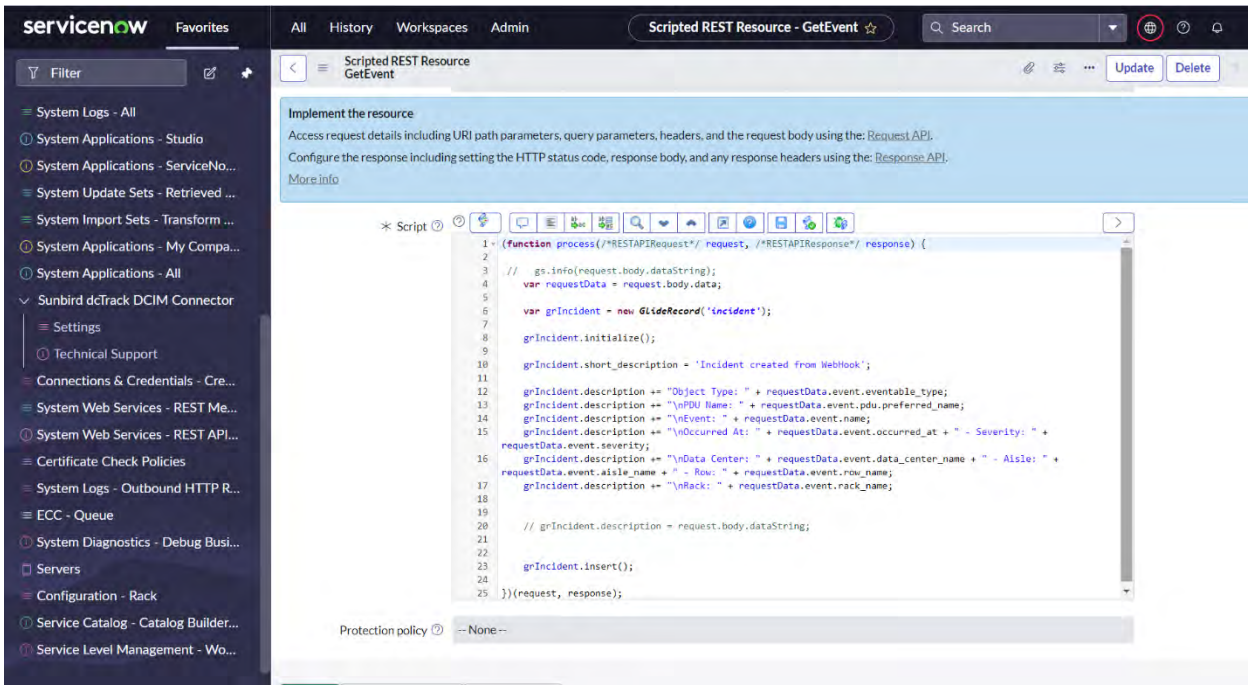
To begin, create a scripted REST API in ServiceNow to define your Web Service endpoint.



Provide a Name to identify your API. The API ID will be automatically generated based on the name you specified. You can change this ID if you like, but the API ID must be unique. After submitting the page, open the record you just created. You will see that ServiceNow automatically created the Base API Path. This is the URI that will be used to access your Service.

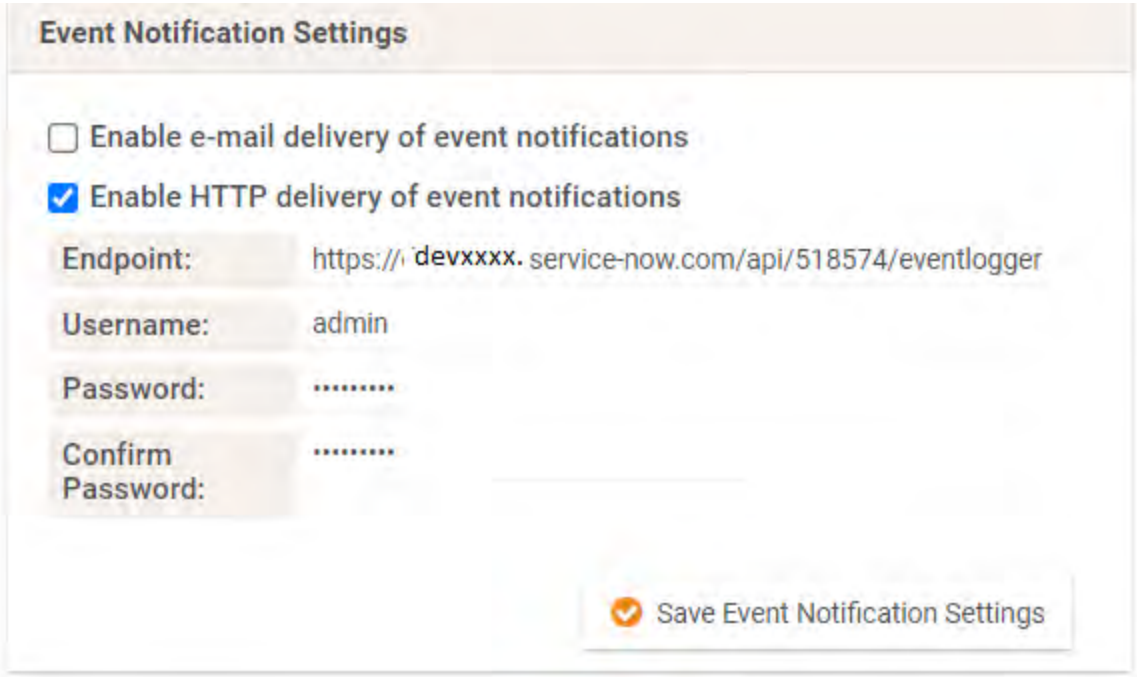
After creating your REST Service, you will create a Scripted REST Resource for your API by clicking the “New” button on the “Resource” tab located at the bottom of the page. The Resource defines the HTTP method to execute, the

processing script, and any override settings from the parent API. The example below is designed to create an Incident record based on the data received from Power IQ, however you can script your service to perform any action supported by ServiceNow.



Once you have configured your Service on ServiceNow, you are ready to configure your Webhook on Power IQ.

1. In Power IQ's Settings tab, click Power IQ Settings in the Appliance Administration section.
2. In the Event Notification Settings panel, select the Enable HTTP delivery of event notifications checkbox to enable event notifications via JSON.
3. In the Event Notifications panel input the following information:
    - Endpoint: This is the URI for your ServiceNow instance appended with the Base API Path from your Scripted REST API.
    - Username: Specify a valid ServiceNow user (we recommend you create a web service USER account that is used exclusively for this integration
    - Password: Specify the password for the user and confirm the password by entering it again.
4. Click Save Event Notification Settings to save your settings.



Once this setup is complete, Power IQ will call your Web Service each time an Event is triggered.

Below is a sample Response from a Power IQ Event:

{
"events": [
{
"id": 37,
"event_config_id": 72,
"source": 2,
"created_at": "2023/04/13 18:01:58 +0000",
"pdu_id": 11,
"outlet_id": null,
"circuit_breaker_id": null,
"sensor_id": null,
"trap_oid": null,
"cleared_by": 2,
"cleared_at": "2023/04/13 18:03:23 +0000",
"clearing_event_id": null,
"clearing_user_id": 1,

"notification_status": 6,
"asset_strip_id": null,
"rack_unit_id": null,
"blade_slot_id": null,
"eventable_type": "pdu",
"eventable_id": 11,
"occurred_at": "2023/04/13 18:01:58 +0000",
"circuit_id": null,
"match_key": null,
"http_notification_status": 6,
"generic_event_label": null,
"user_clearing_message": null,
"name": "Admin credentials invalid",
"severity": "WARNING",
"params": [],
"pdu_circuitbreaker_id": null,
"pdu_outlet_id": null
}
]
}

Manage Event Severities

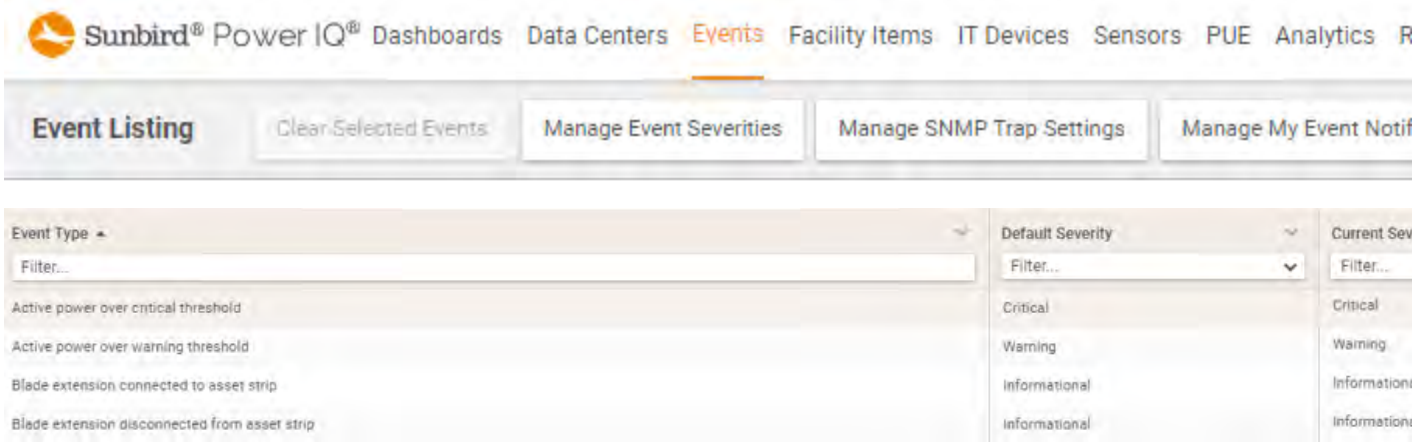
The following information is applicable to all Power IQ events.

Users may adjust the severity of any or all Power IQ “Events”. All device traps, Power IQ system events, Power IQ thresholds and Power IQ failed polls convert into a Power IQ “Event” with a “Default Severity”. There are over 600 unique Power IQ “Events”. Now you can adjust their “Current Severity” so you are only alerted for the “Events” that are important to your organization. The “Event Severity” is a system wide setting. The “Current Event Severity” is what determines the red/yellow/green color of an “Event” in the event list and on the dashboard. Critical is red, warning is yellow and Informational will be green. Severity is also a field filter for email notifications such that you can set a filter to only send emails for critical “Events”.

Steps:

1. Click the “Events” tab
2. Click the “Manage Event Severities” button;
3. Enter text in any of the columns to filter on one or more “Events”
4. Click the “Down Arrow” button in the “Current Severity” column.

5. Select the “Severity Value” of your choice.



Facility Items

Power IQ can manage your data center's facility items, including CRACs, UPSs, Floor PDUs, Standalone Meters, and Power Panels.

You can work with these objects in Power IQ the same way you work with rack PDUs. The Facility Items tab, which lists all rack PDUs, also contains all facility items.

When you flag your facility items as part of your data center's total power, Power IQ calculates your Power Usage Effectiveness (PUE). See PUE - Power Usage Effectiveness.

Note: Screenshots of Sites tabs are for illustration purposes only, and do not contain real, polled data.

Use the Facility Items Tab

The Facility Items tab contains a list of all PDUs added to Power IQ, even if they have not been mapped in the EDM. See Creating Your EDM.

The Facility Items List can be configured to meet your needs:

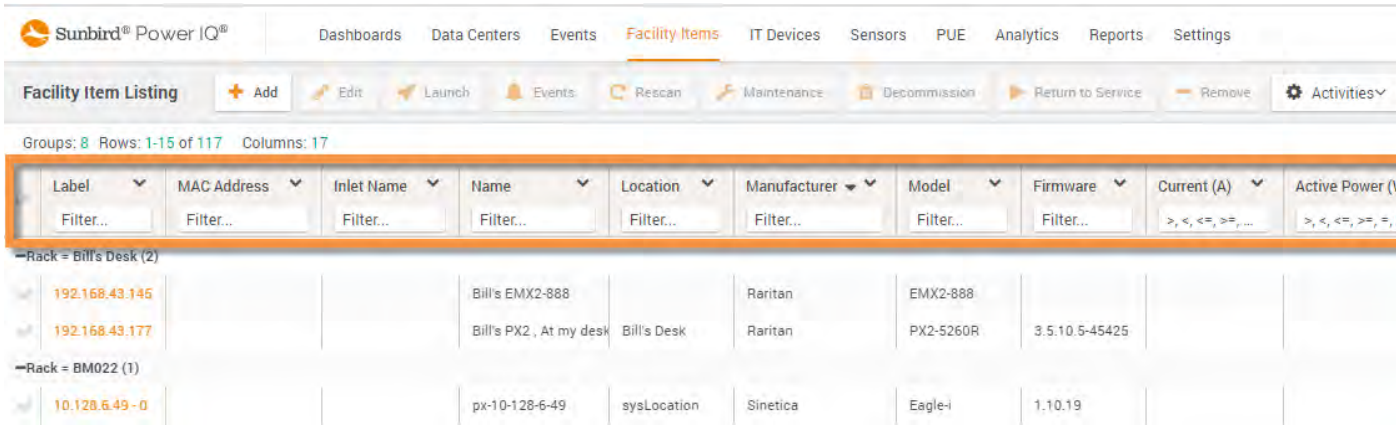
- *Filter the Facility Items List* on the facing page
- *Configure the Number of Items in the Facility Items List* on page 375

Filter the Facility Items List

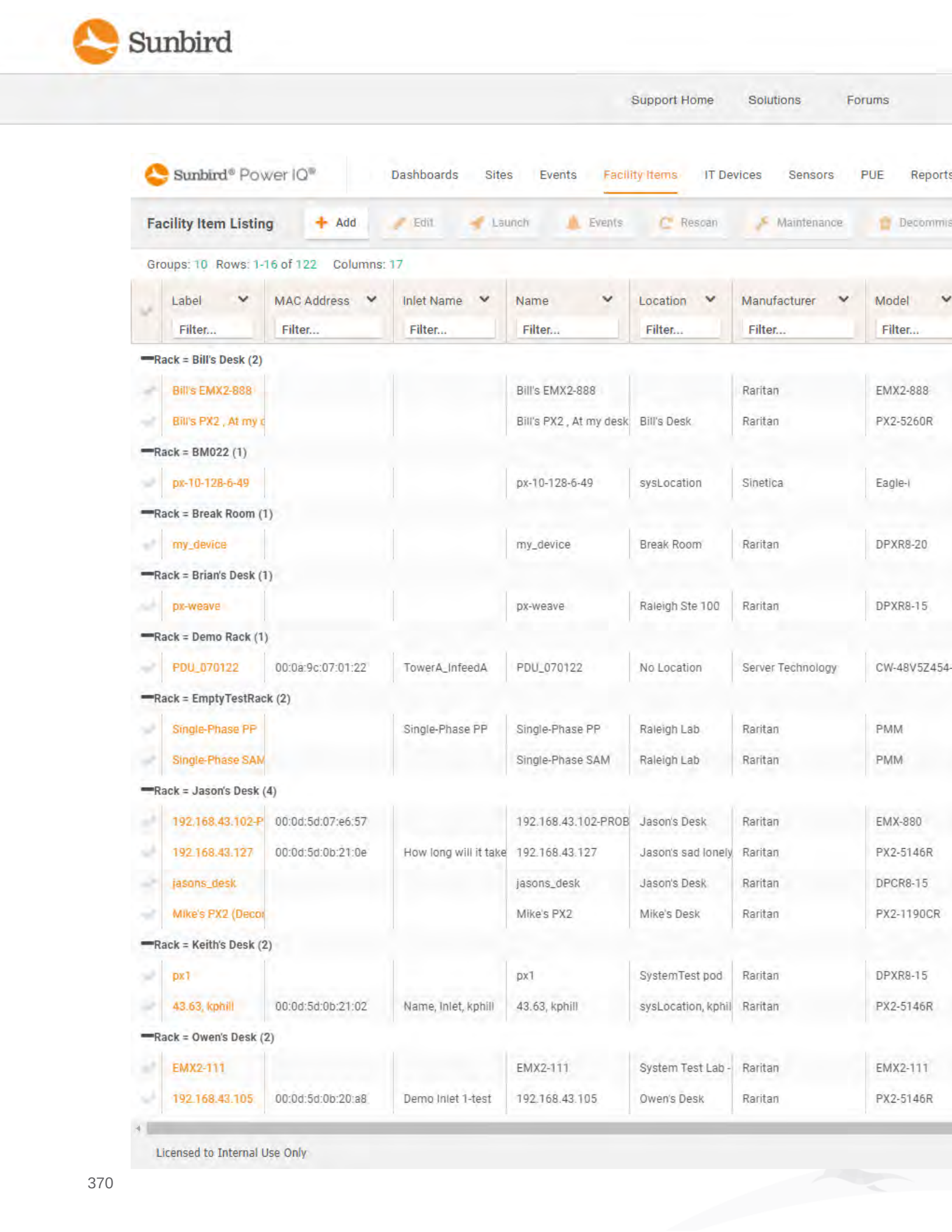
You can customize your view of the Facility Items List by using filters, sorting, and hiding or displaying columns of data.

See *Customize Your View of Facility Items, IT Devices, and Events* on page 814.

- In the Facility Items tab, all items in the system display in a list.
- The Facility Items list can be filtered by specifying the search criteria for any of the available columns.



- For filtering on numeric columns you can enter numerical operators (>,<,<=,>=,=,null,!null) in the filter box. For example entering “10>” would only display values greater than 10


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Reports
Facility Item Listing
Add
Edit
Launch
Events
Rescan
Maintenance
Groups: 10 Rows: 1-16 of 122 Columns: 17
Label
MAC Address
Inlet Name
Name
Location
Manufacturer
Model
Filter...
Rack = Bill's Desk (2)
Bill's EMX2-888
Bill's EMX2-888
Raritan
EMX2-888
Bill's PX2 , At my d
Bill's PX2 , At my desk
Bill's Desk
Raritan
PX2-5260R
Rack = BM022 (1)
px-10-128-6-49
px-10-128-6-49
sysLocation
Sinetica
Eagle-i
Rack = Break Room (1)
my_device
my_device
Break Room
Raritan
DPXR8-20
Rack = Brian's Desk (1)
px-weave
px-weave
Raleigh Ste 100
Raritan
DPXR8-15
Rack = Demo Rack (1)
PDU_070122
00:0a:9c:07:01:22
TowerA_InfeedA
PDU_070122
No Location
Server Technology
CW-48V5Z454-
Rack = EmptyTestRack (2)
Single-Phase PP
Single-Phase PP
Single-Phase PP
Raleigh Lab
Raritan
PMM
Single-Phase SAM
Single-Phase SAM
Raleigh Lab
Raritan
PMM
Rack = Jason's Desk (4)
192.168.43.102-P
00:0d:5d:07:e6:57
192.168.43.102-PROB
Jason's Desk
Raritan
EMX-880
192.168.43.127
00:0d:5d:0b:21:0e
How long will it take
192.168.43.127
Jason's sad lonely
Raritan
PX2-5146R
jasons_desk
jasons_desk
Jason's Desk
Raritan
DPCR8-15
Mike's PX2 (Deco
Mike's PX2
Mike's Desk
Raritan
PX2-1190CR
Rack = Keith's Desk (2)
px1
px1
SystemTest pod
Raritan
DPXR8-15
43.63, kphill
00:0d:5d:0b:21:02
Name, Inlet, kphill
43.63, kphill
sysLocation, kphil
Raritan
PX2-5146R
Rack = Owen's Desk (2)
EMX2-111
EMX2-111
System Test Lab -
Raritan
EMX2-111
192.168.43.105
00:0d:5d:0b:20:a8
Demo Inlet 1-test
192.168.43.105
Owen's Desk
Raritan
PX2-5146R
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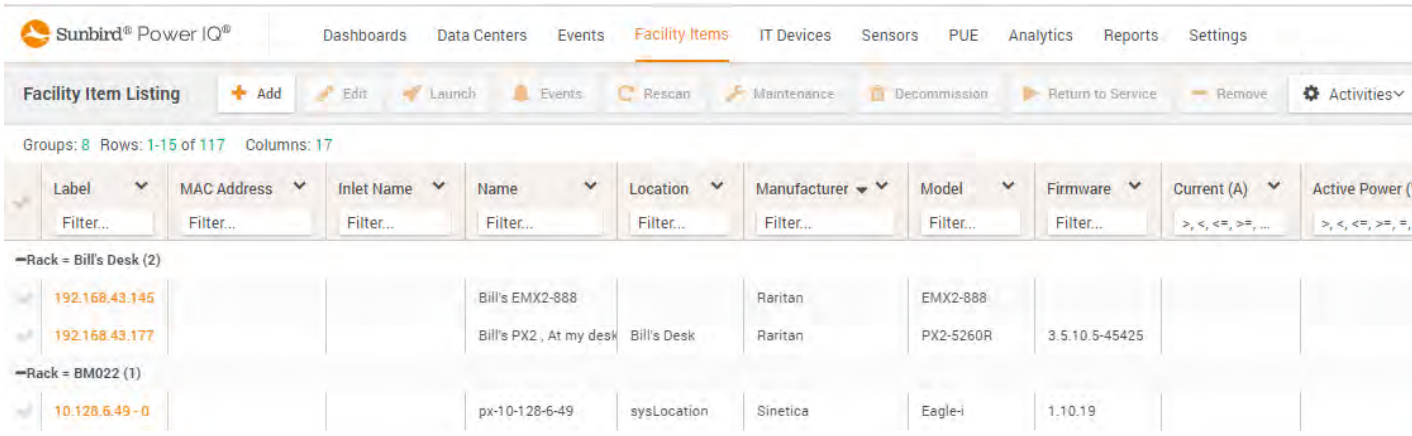
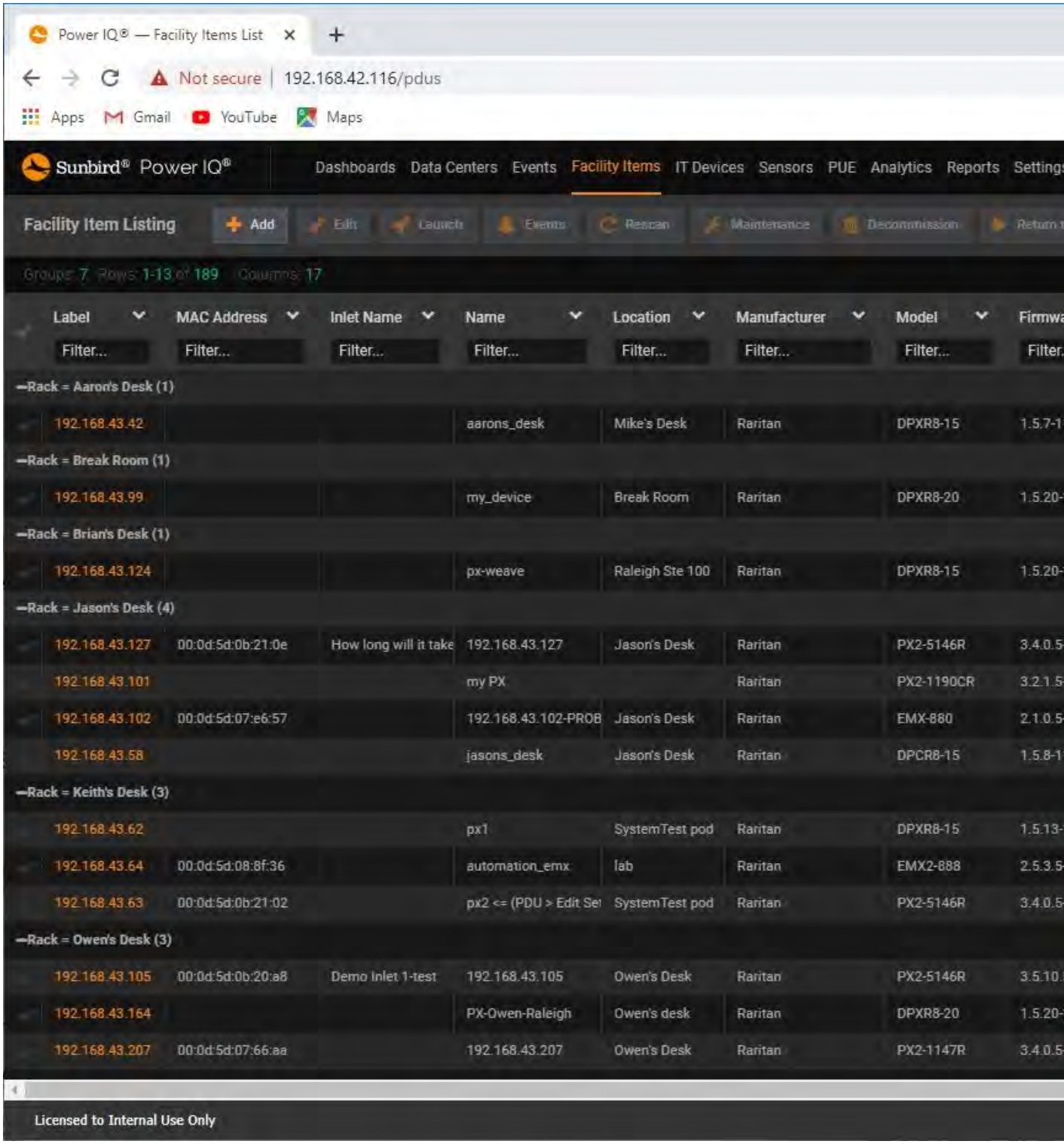
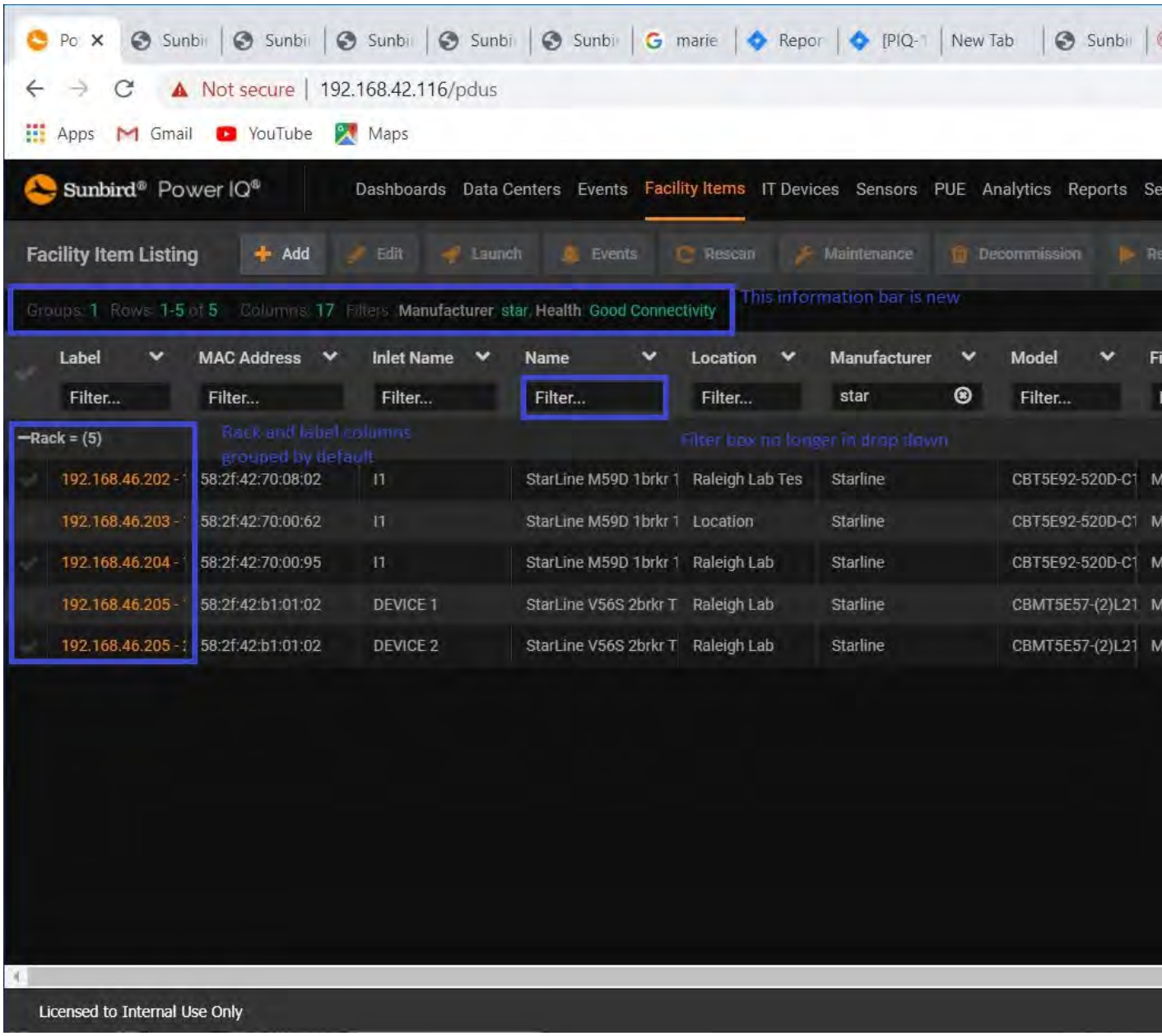
- Columns can be sorted by clicking in the field header to toggle between Ascending and Descending order, or by clicking the arrow in the column header and selecting the desired sort option.
- Columns can be arranged by dragging and dropping into place.
- You can choose which columns appear in the grid by clicking the Show/Hide icon in the grid.



- Activities can be selected by clicking the Activities button in the toolbar



- Filter by PDU health: In the Health column filter, select the health statuses you want to view: Good, Warning, Critical, Maintenance, or Decommissioned. For Good, Warning, or Critical, select the source for each status, either Connectivity or Active Events. Select multiple options as needed.
- If a PDU has multiple line readings in the Current column, all values are shown separated by commas. This column can be filtered using numerical operators (>,<,<=,>=,=,null,!null) in the filter box." For example entering "10>" would only display values greater than 10.
- Filter by inlet temperature: In the Inlet Temperature (C) column filter box, enter the number of degrees Celsius as well as any of the numerical operators (>,<,<=,>=,=,null,!null) to view only PDUs with inlet temperature sensor readings in the correct range.
- The inlet temperature shown is the maximum reading for all inlet-positioned temperature sensors associated with the PDU.
- Filter by PDU Type: Types of PDU include rack PDUs and facility items managed by dynamic plugin, such as CRACs or Floor PDUs. Add the Type column by selecting the checkbox.


Not secure | 192.168.42.116/pdus
Apps Gmail YouTube Maps
Sunbird® Power IQ®
Dashboards Data Centers Events Facility Items IT Devices Sensors PUE Analytics Reports
Facility Item Listing
Add Edit Launch Events Rescan Maintenance Decommission
Groups: 1 Rows: 1-5 of 5 Columns: 17 Filters: Manufacturer: star, Health: Good Connectivity
This information bar is new
Label MAC Address Inlet Name Name Location Manufacturer Model
Filter... Filter... Filter... Filter... Filter... star Filter...
Rack = (5)
Rack and label columns grouped by default
Filter box no longer in drop down
192.168.46.202 - 58:2f:42:70:08:02 I1 StarLine M59D 1brkr 1 Raleigh Lab Tes Starline CBT5E92-520D-C1
192.168.46.203 - 58:2f:42:70:00:62 I1 StarLine M59D 1brkr 1 Location Starline CBT5E92-520D-C1
192.168.46.204 - 58:2f:42:70:00:95 I1 StarLine M59D 1brkr 1 Raleigh Lab Starline CBT5E92-520D-C1
192.168.46.205 - 58:2f:42:b1:01:02 DEVICE 1 StarLine V56S 2brkr T Raleigh Lab Starline CBMT5E57-(2)L21
192.168.46.205 - 58:2f:42:b1:01:02 DEVICE 2 StarLine V56S 2brkr T Raleigh Lab Starline CBMT5E57-(2)L21
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Configure the Number of Items in the Facility Items List

The number of PDU's displayed is determined by your screen size and resolution. Use the vertical scroll bar to view all of the Items in the grid.

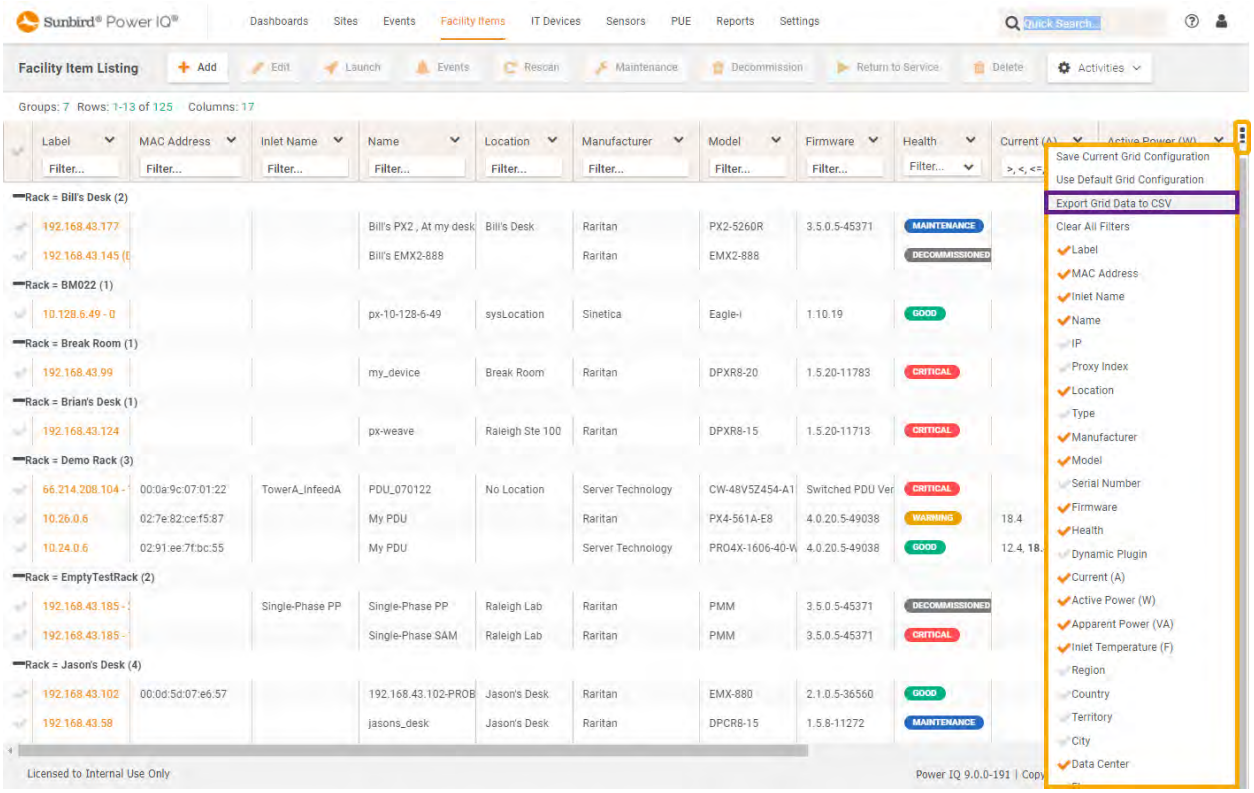
Export the Facility Items List to CSV

Export the Facility Items to create a CSV file containing all the data listed in the grid on the Facility Items tab.

If you have applied filters, the same filters will apply to the exported information.

The export PDUs CSV file is not the same as the file used for importing PDUs into Power IQ. See Adding PDUs in Bulk with CSV Files.

1. In the Facility Items tab, click the Settings icon in the upper right corner of the grid and select the Export Grid Data to CSV option.



2. Save or open the file using the dialog that appears.

The exported file contains the following columns:

- Region Name
- Country Name
- Territory Name
- City Name
- Data Center Name
- Floor Name

- Room Name
- Aisle Name
- Row Name
- Rack Name
- Door Name
- Region ID
- Country ID
- Territory ID
- City ID
- Data Center ID
- Floor ID Room ID
- Aisle ID
- Row ID
- Rack ID
- Door ID
- ID
- Location
- MAC Address
- Serial Number
- Model
- Manufacturer
- Firmware Version
- Inlet Name
- Name
- Dynamic Plugin Name
- Current Status
- Overall Health (raw)
- Overall Health
- Proxy Index
- Health Label
- External Key
- Custom Field 1
- Custom Field 2

- Decommissioned At
- Maintenance Enabled
- Name
- Type Code
- Inlet Temperature (F)
- IP Address
- Latest Active Power (W)
- Latest Apparent Power (VA)
- Latest Current (A)
- Latest Pole Current (A)
- Latest Status Start Time
- Latest Status End time
- Latest Status (raw)
- Latest Status
- Severity of Latest Status (raw)
- Severity of Latest Status

Add Facility Items to Power IQ Management

You can add facility items to Power IQ using the dynamic plugins function. The process for adding facility items is:

1. Create a dynamic plugin capable of managing your object. See Dynamic Plugins.
2. Add the items using the Add a PDU function. See **Adding PDUs to Power IQ**. If you use a custom mapping dynamic plugin, see Adding PDUs with Custom Dynamic Plugins.
3. Make sure the item is included in your enterprise data model (EDM), which displays in the Sites Tab. Objects must be in the EDM for inclusion in PUE calculations and Dashboard charts. See Enterprise Relationships and the EDM. See also Organizing Facility Items in the Sites Tree View

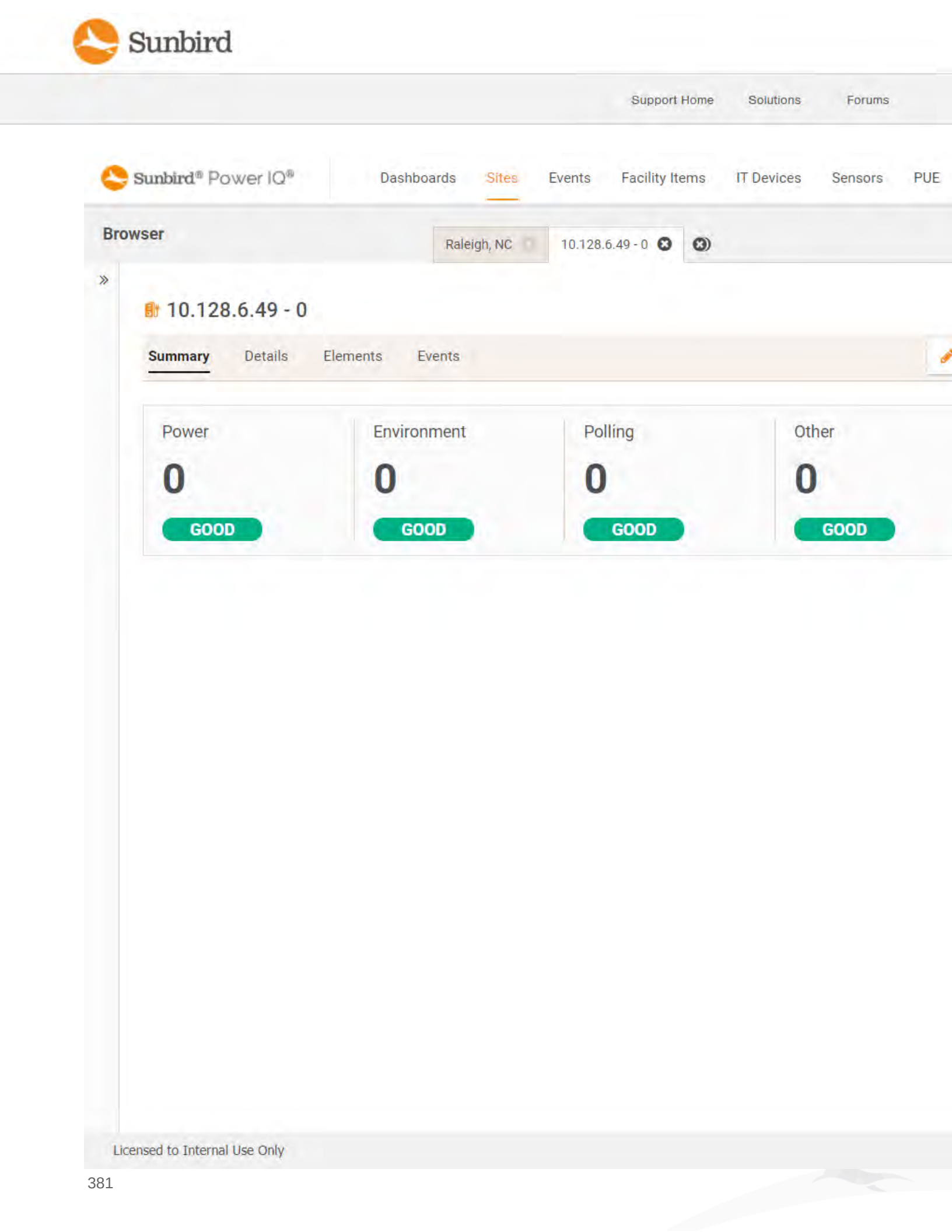
Note: Some rack transfer switches are supported, and you do not need to create a dynamic plugin.

Rescan Facility Items

You can rescan a facility item to poll it and update its status from the item's Sites entity tab.

To rescan from the item's Sites entity tab:

1. On the item's Sites entity tab, click Rescan.
2. The rescan task runs
3. When the task is complete, click OK to close the status popup.


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Browser
Raleigh, NC
10.128.6.49 - 0
10.128.6.49 - 0
Summary
Details
Elements
Events
Power
0
GOOD
Environment
0
GOOD
Polling
0
GOOD
Other
0
GOOD
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Note: SNMPv3 PDUs will not manually re-scan after powering Off/On. The rescan does not occur until after the next polling cycle.

Load Shift Detection

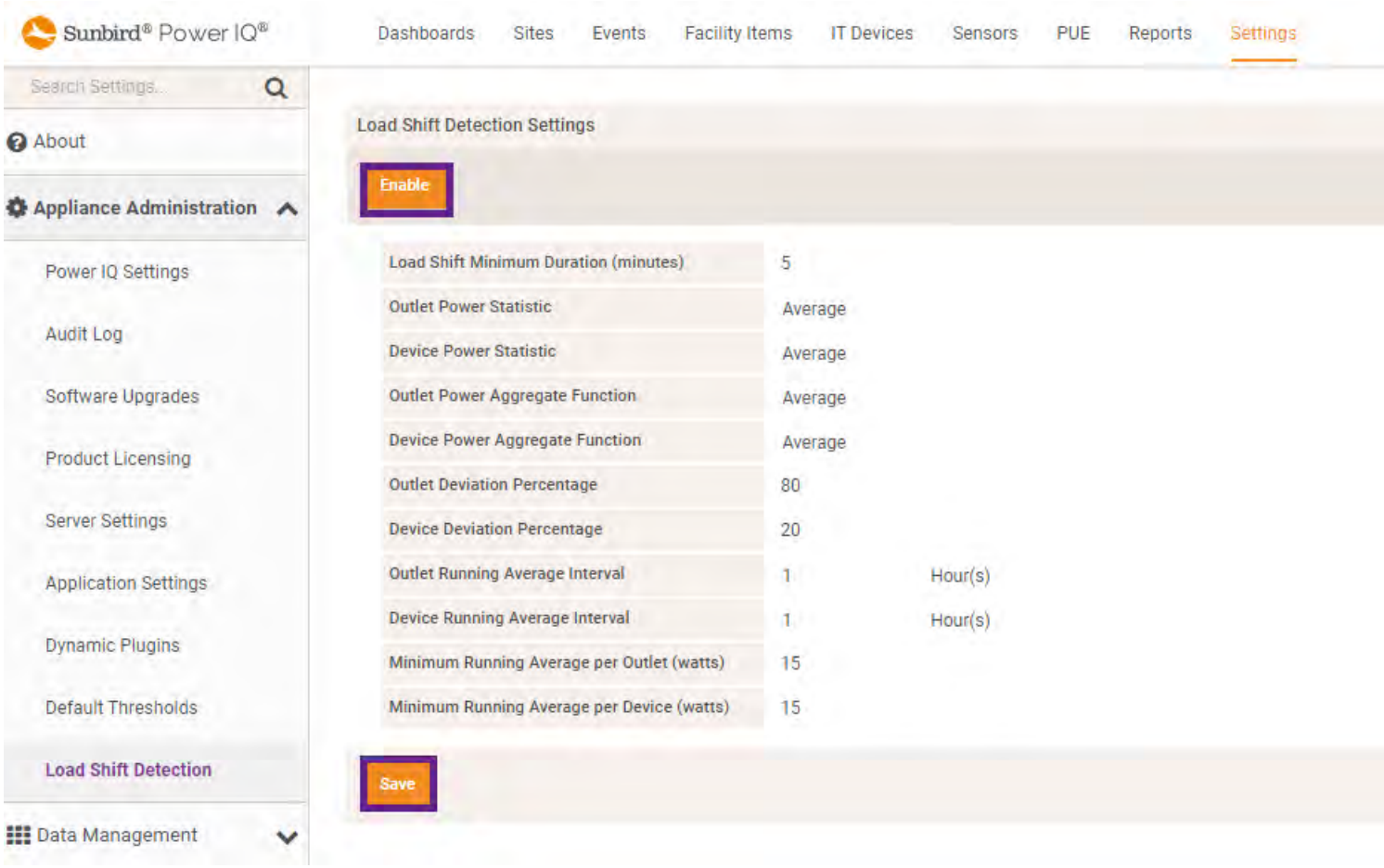
Load Shift Detection uses outlet-metered data to detect when a power supply may have failed for an IT device. System Administrators can configure the load shift detection parameters in the Settings tab.

The purpose of this feature is to detect when there is a sustained drop in load on one outlet connected to a device, but the overall device load does not drop significantly, indicating that power has shifted from one outlet to another. When a load shift is detected, Power IQ generates an alert, so the issue can be investigated. An outlet load shift could indicate a power supply failure.

Configure Load Shift Detection Settings

Click Settings > Appliance Administration > Load Shift Detection.

To enable/disable the Load Shift Detection feature, click Enable/Disable in the Load Shift Detection Settings pane.
Note: By default, Load Shift Detection is disabled.



The following table outlines the configurable load shift detection parameters:

Parameter	Description	Minimum	Maximum	Default
Load Shift Minimum Duration (minutes)	How long the condition must last at a minimum.	5	120	60
Outlet Power Statistic	Which outlet active power value will be used (Minimum/Maximum/Average)	N/A	N/A	Average
Device Power Statistic	Which device active power value will be used (Minimum/Maximum/Average)	N/A	N/A	Average
Outlet Power Aggregate Function	Whether to use Minimum\Maximum\Average of selected outlet active power value over the load shift duration period).	N/A	N/A	Average

Device Power Aggregate Function	Whether to use Minimum\ Maximum\ Average of selected device active power value over the load shift duration period)	N/A	N/A	Average
Outlet Deviation Percentage	The allowed deviation below the average running power before an outlet is flagged for a potential issue. The default value is 80% So given an outlet load of 100 W average and an 80%setting, the outlet would be flagged if the aggregate value over the duration fell below 20 W.	1	100	80%
Device Deviation Percentage	The allowed deviation below the average running power where an outlet load shift can be detected.	1	100	20%
Outlet Running Average Interval	Interval over which the running average of an outlet will be calculated.	1 Hour	1 Month	30 Days
Device Running Average Interval	Interval over which the running average of a device will be calculated.	1 Hour	1 Month	30 Days
Minimum Running Average per Outlet (watts)	Minimum outlet running average value in W for an outlet to be evaluated for load shifts.	0	1000	15
Minimum Running Average per Device (watts)	Minimum device running average value in W for a device to be evaluated for load shifts.	0	1000	15

Load Shift Detection Algorithm

Power IQ detects load shift events by checking for specific conditions for each outlet or device.
The load shift detection check runs every hour on the hour, starting with the first hour after it is enabled.

Power IQ calculates a running average for outlets and devices for comparison purposes.

The following table outlines each condition and what it checks for:

Condition	Condition	Condition
Condition 1	Detect a significant drop in outlet power.	Outlet

Condition	Condition	Condition
Condition 2	Confirms that device power remained in line with previous readings	Device
Condition 3	Confirms that the 'Minimum Running Average Per Outlet' was met based on the running average for each outlet.	Outlet
Condition 4	Confirms that that the 'Minimum Running Average Per Device was met based on the running average for each outlet.	Device
Condition 5	Confirms that there are enough readings for the outlet to consider the running average valid.	Outlet
Condition 6	Confirms that there are enough readings for the device to consider the running average valid.	Device
Condition 7	Confirms that there are enough readings for the outlet over the 'Load Shift Minimum Duration' interval to consider the running average valid	Outlet
Condition 8	Confirms that there are enough readings for the device over the 'Load Shift Minimum Duration' interval to consider the running average valid.	Device

Load Shift Detection Event Details

The load shift detection event provides the information needed to identify the affected outlet and device.

Note: Devices can raise Multiple events. The events can be detected per device if the outlet IDs are different.

Note: Load Shift Detection Events do not clear automatically. They can only be cleared by a user.

The table below lists the details of the Load Shift Detection

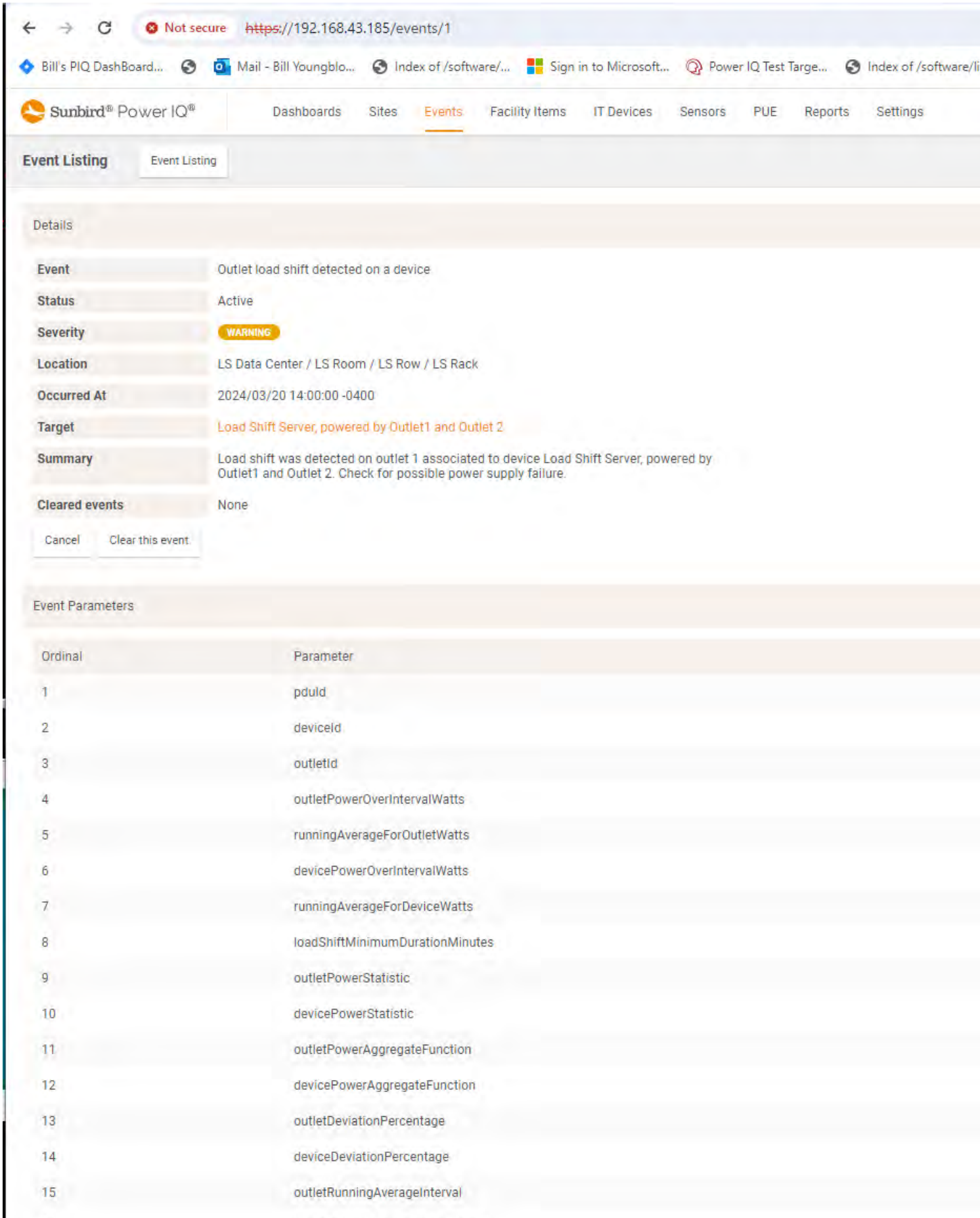
Field	Details
Summary	Load shift was detected on outlet <ordinal> associated to device <device_name>. Check for possible power supply failure.
Severity	Warning
Name	outletLoadShiftDetected

Field	Details
Event Source	Poller
Target	The affected device

The screenshot below displays a load shift detection event.

Sunbird

Support Home Solutions Forums



Event Parameters

Parameter	Description
outletID	The id of the outlet that lost power
PDUID:	The ID of the PDU where the event was detected
deviceID	The ID of the device where the event was detected.
outletPowerOverIntervalWatts	Value as configured in the Load Shift Detection Settings. See *Configure Load Shift Detection Settings* on page 382
runningAverageForOutletWatts	Value as configured in the Load Shift Detection Settings. See *Configure Load Shift Detection Settings* on page 382
minimumOutletRunningAverageWatts	Value as configured in the Load Shift Detection Settings. See *Configure Load Shift Detection Settings* on page 382
devicePowerOverIntervalWatts	
runningAverageForDeviceWatts	
minimumDeviceRunningAverageWatts	
loadShiftMinimumDurationMinutes	The load shift duration minimum in minutes as configured in the Load Shift Detection Settings. See *Configure Load Shift Detection Settings* on page 382
outletPowerStatistic:	The statistic (Minimum/ Maximum/ Average) selected for outlet power in the Load Shift Detection Settings. See *Configure Load Shift Detection Settings* on page 382

Load Shift Detection Caveats

When using Load Shift Detection, keep in mind the following limitations of the feature and the impact of various combination of settings:

1. Load Shift Detection does not generally detect a load shift that occurs due to a failure in the Power Chain, such as one PDU losing power. The reason is that Power IQ needs to be able to poll the PDU and get a reading to

evaluate for a drop in load on a given outlet. If the PDU is offline, Power IQ wont' get a reading. Some PDU's have an alternate power source for their controller. In these cases, Power IQ would get data and be able to do an evaluation.

2. To calculate the running average, Power IQ pulls data from either the raw readings hourly rollups or the daily rollups. depending on setting and retention policy. As a result, there are a couple of points to be aware of:
    - There is a delay of up to two hours rolling data up from the raw tables to hourly. Therefore, there may not be as many readings in the hourly table as expected.
    - Due to the above point, Sunbird recommends that you use running average intervals that are not in the 2 to 4 hour range. (The longer the running average interval can be, the better.)
3. The Load Shift Minimum Duration should be set to twice the poll rate or higher. Using a value lower than that, especially if it's less than the poll rate, may provide inconsistent results. If the issue that caused a load shift event is not quickly resolved, it could affect the long-term running average and data during the duration window. This could prevent a subsequent event from being detected until the data normalizes.
4. If the issue that caused a load shift event is not quickly resolved, it could affect the long-term running average and data during the duration window. This could prevent a subsequent event from being detected until the data normalizes.
5. All PDUs and Power IQ must have clocks synced with NTP. If a clocks is off by even just a few seconds, Load Shift Detection may not work.
6. Some power supplies rapidly switch from providing power to not providing power. To prevent false positives, consider setting the outlet statistic and aggregate function to average or maximum.
7. When you add a new PDU to Power IQ, it may take some time before Power IQ can detect a load shift event using data from that PDU. The reason is that Power IQ requires a certain number of readings to consider the data valid. Once the PDU has been online for longer than running average intervals plus the duration interval, the data will be considered valid. The same condition applies if the PDU was offline for an extended period of time.
8. The following data retention requirements must be met for Load Shift Detection to work as expected:
    - Raw data retention must be greater than the Load Shift Minimum Duration setting.
    - Hourly data retention must be greater than one day.
    - Daily data retention must be greater than the Outlet/Device Running Average Interval settings.

Door Access Management

Power IQ supports the ability to control door access and door locks on cabinet and containment area doors.

Doors can be added and deleted via the EDM in the Data Centers tab.

The door Sites Tab tab view displays details on the door's status, sensor mappings, placement, and associated card readers. For more information, see *Door Entity Tab* on page 99

Users with the appropriate authorization can manage door access permissions and authentication through Power IQ for supported devices. For more information, see *Door Control Permissions* on the next page.

Door status is tracked via contact closure and powered dry contact sensors mapped to door, handle, and electronic lock components. Contact closure sensors can be mapped to door or handle components only. Powered dry contact sensors can be mapped to electronic lock components only. Only one sensor at a time can be mapped to each door component. For more information, see *Configure a Door* on page 394.

Doors, sensor mappings, and values for the override relock timer also can be added, edited, and deleted via CSV import in bulk. For more information, see *Bulk Configuring Doors Using CSV* on page 395.

Card readers can be added to doors to electronically control physical access to them. For more information, see Card Reader Access Support.

Note: Door access management is supported for CPI, Raritan, and Panduit devices only. Card reader access management is supported for Raritan facility items only.

Door Control Permissions

Power IQ user the Door Control role to manage access to doors. The Door control role can apply globally, to individual EDM nodes and their children, and to individual doors.

Users with the View and Door Control roles can lock/unlock the doors that they have access to from the doors' respective Sites entity tab in Power IQ, but they cannot edit the door details.

Users with the Operator role and above can edit a door's name and other details, map/unmap sensors, and add a door to the EDM. Operators also can add a door via drag-and-drop to nodes that they have access to.

In addition to the door-related tasks available to Operators, System Administrators and Administrators can assign and revoke the Door Control role on specific nodes and individual doors. System Administrators can lock/unlock any door in the system, while Administrators can lock/unlock only those doors that they have Administrator privileges for. Only System Administrators can assign the Door Control role globally.

For more information on assigning roles in Power IQ, see Assigning Roles for User Permissions.

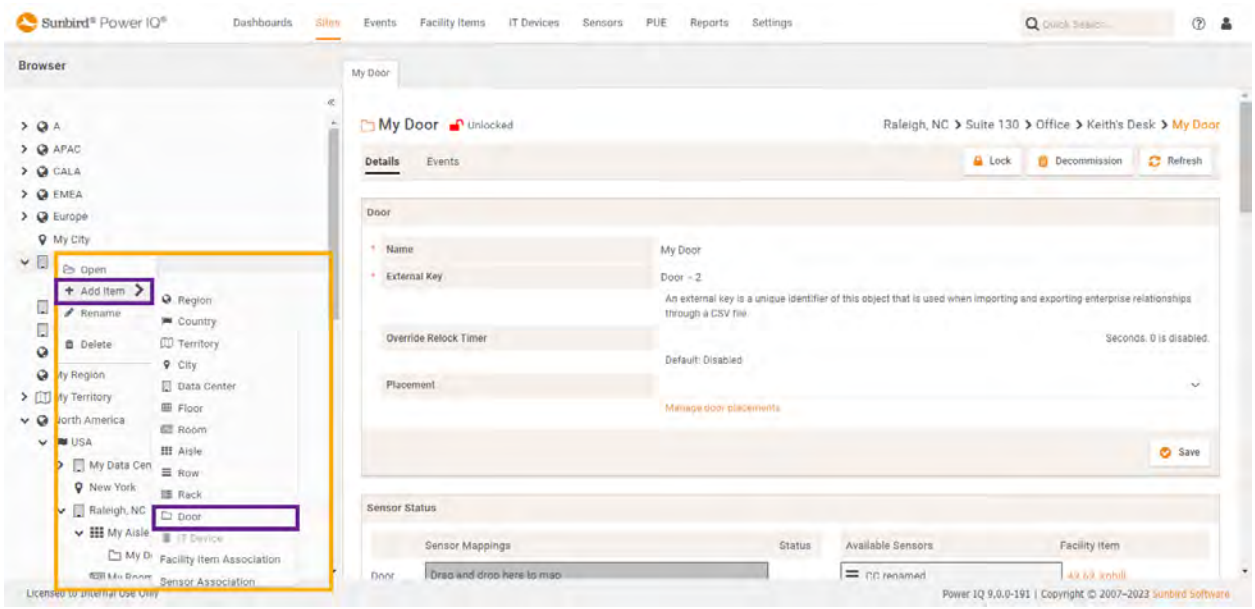
Add or Delete a Door

Doors can be added or deleted through the EDM in the Sites Tab.

Adding a Door

Users with the Operator role and above can add doors to the EDM via the Sites Tab.

1. In the EDM hierarchy, highlight the node where you want to add the door.
2. Click the Add icon and select Door from the dropdown menu.



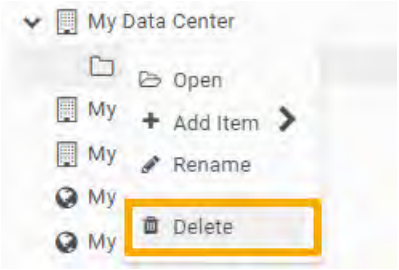
3. The door is added as a child of the node highlighted in Step 1.

Note: The default name for a new door is "My Door." You can rename the door by left-clicking on it twice (first to select the door and second to rename it) or by right-clicking and selecting the Rename option.

Deleting a Door

Users with the Operator role and above can delete doors in the EDM via the Sites Tab.

1. Right-click the door in the Sites Tab Tree view aselect the Remove option.



Alternatively, highlight the door you want to remove and click the Remove icon in the EDM menu.

2. You will be asked to confirm the deletion.

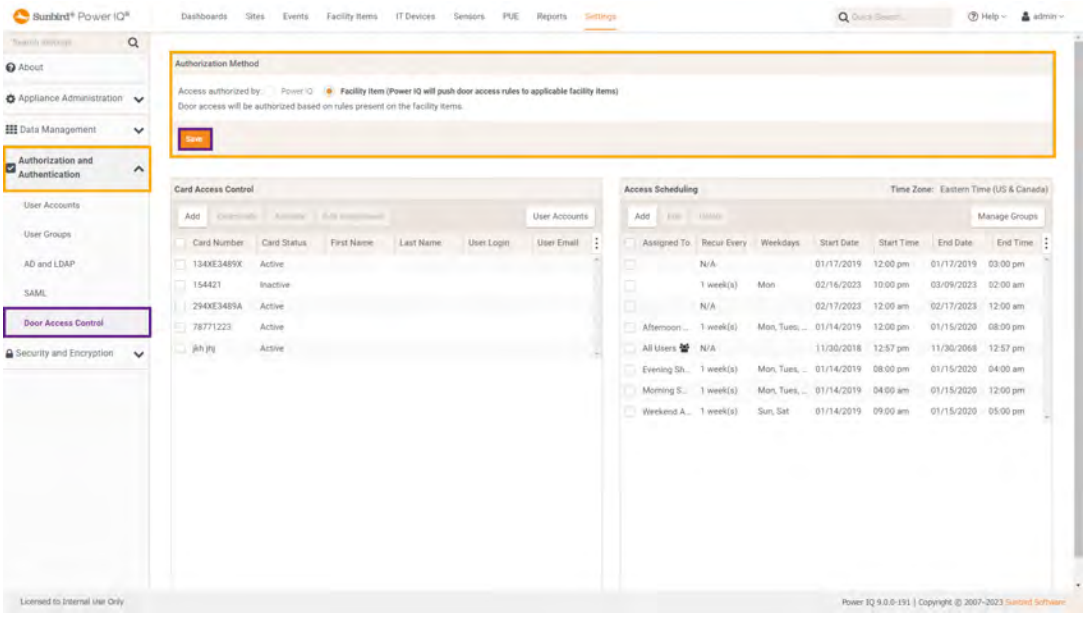
Note: Deleting a door will delete the door and the audit history for the door.

3. Click the Delete Door and Audit History button to delete the door. To cancel out of the dialog, click the Cancel button.

Once the deletion is confirmed, the EDM will automatically refresh, and the door with be removed.

Configure the Door Access Control Authorization Method

Power IQ supports two authorization methods for door access control. Administrators can configure this setting under Settings > Authorization and Authentication > Door Access Control by following the instructions below:



1. Selecting one of the following options:
    a. **Power IQ**: Power IQ acts as the authorization agent for door access.
        a. **Facility Item**: Power IQ pushes door access rules to applicable facility items

> *Note: The Facility Items option only applies to specific Legrand PDUs. See Appendix C: Feature Compatibility on page 833*

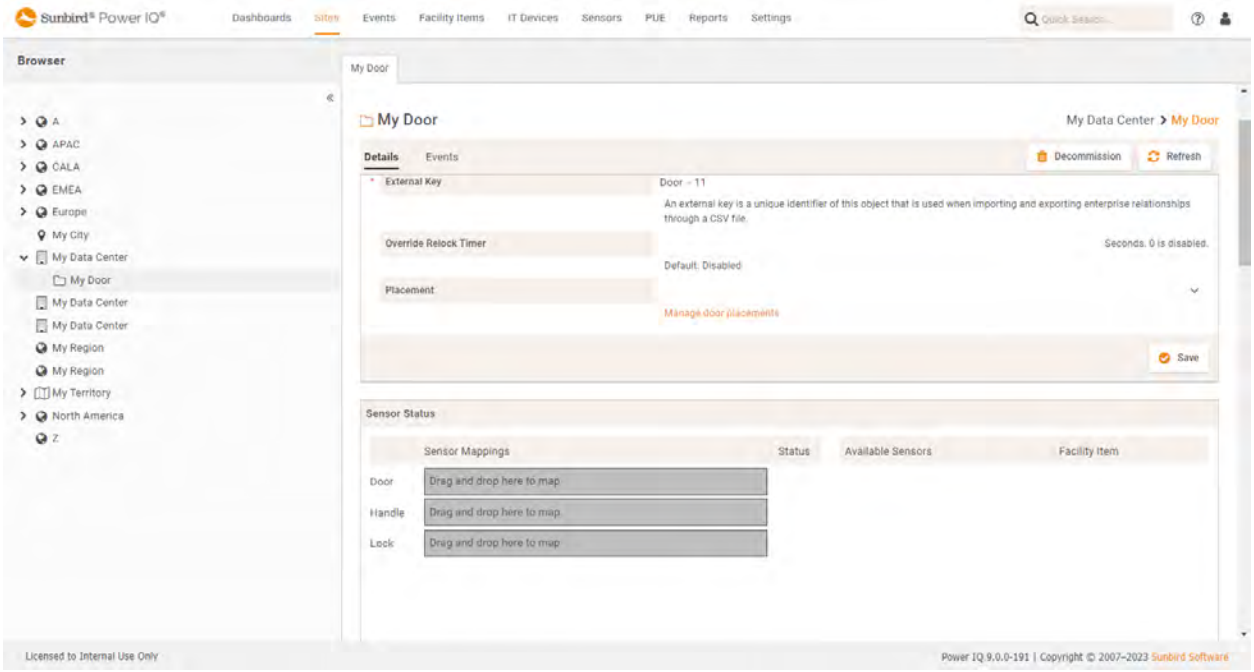
> *Note: When the Door Access Authorization Method is configured for Facility Item, the automatic re-locking of doors via the Global or Override Door Relock Timer is non-functional. Automatic re-locking occurs when the door handle is set back into the lock cradle.*

2. Click Save

Configure a Door

Once added, the door can be edited or configured by users with the appropriate permissions.

Click on the door in the Sites Tab Tree view to view the door Sites Tab entity tab and edit its details.



1. In the Door Control section, select the Lock or Unlock button to request the door be locked or unlocked.
2. In the Sensors and Door Status section, drag-and-drop sensors to map/unmap them to the door components: door, handle, and electronic lock.

a. Available sensors are located in the Available Sensors panel on the right.
b. To replace a mapped sensor, drag the available replacement sensor to the mapped sensor you want to replace.
c. To unmap a sensor, click the Unmap icon () to the right of the sensor. The unmapped sensor will be listed in the Available Sensors panel. If there is no sensor to be removed, the icon will be grayed out.
d. Only one sensor at a time can be mapped to each door component. Contact closure sensors can be mapped to door or handle components only. Powered dry contact sensors can be mapped to electronic lock components only.

3. In the Door section, change the name, external key, and placement of the door.

a. The external key is a unique attribute that is used to identify the door when importing and exporting enterprise relationships through a CSV file.
b. The placement of the door is an optional field. Placement is defined using tags for the Door Placements tag group. For more information on editing tags for this group, see *Set Door Placement with Tags and Tag Groups* on the facing page.

4. Click the Save button to save your changes.

Note: Doors and sensor mappings also can be added, edited, and deleted via CSV import/export in bulk. For more information, see Bulk Configuring Doors Using CSV.

For more information on the details available on the door Sites entity tab, see .

Bulk Configuring Doors Using CSV

Users with the appropriate permissions can add, edit, and delete doors and sensor mappings via CSV import/export.

1. In the Settings Tab, navigate to Data Management > Enterprise Relationships
2. Export the existing EDM relationships to CSV by clicking the Export Relationships link in the CSV Data Mapping Actions section. The resulting CSV file will include all doors and their associated sensors.
3. To map a door to its parent, add or edit the attributes in the following door columns in the CSV file:

a. parent_object_type (required)
b. parent_external_key (required)
c. override_relock_timer (optional; configure to enable/disable the override relock timer on the door)
d. object_type
e. external_key
f. name

4. To map a sensor to a door, add or edit the attributes in the following door columns in the CSV file.

a. parent_object_type (required; specify as DOOR)
b. parent_external_key (required)
c. door_component (required; specify as DOOR, HANDLE, ELECTRONIC_LOCK/ELECTRONIC LOCK/ELECTRONIC-LOCK)
d. object_type
e. pdu_ip
f. pdu_proxy_address

g. type
h. ordinal

5. Import your edited CSV file.

Note: Attempting an import without the required fields completed will display an error.

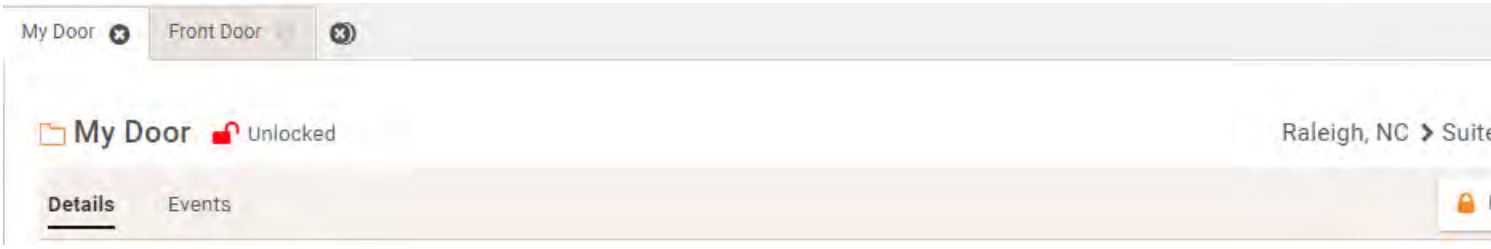
Note: Contact closure sensors can be mapped to door or handle components only. Powered dry contact sensors can be mapped to electronic lock components only. An error will be displayed on import if you attempt to map sensors to incompatible components.

Lock, Unlock, and Automatic Relock Doors

Users with the Door Control role can lock/unlock a door from the door Sites Tab tab.

In the Door Control section, select the Lock or Unlock button to request the door be locked or unlocked. The button aligning to the door's current state (Locked or Unlocked) will be grayed out.

In the screenshot below, the door is unlocked. The user can request to unlock the door by clicking the Unlock button.



Unlocked doors will be automatically scheduled to relock based on either the global door relock timer value or the override relock timer value on the individual door if configured. If both the global door relock timer and the local override relock timer on the door are disabled, Power IQ will not attempt to relock the door. For more information, see *Enable/Disable the Global Door Relock Timer* on the next page and *Enabling/Disabling the Door Override Relock Timer* on page 398.

When a relock attempt is successful, the door will be locked, and an event indicating relock success via the relock timer will be created in Power IQ.

When a relock attempt is unsuccessful, the door will remain unlocked, and an event indicating the relock failure will be created in Power IQ. Power IQ will attempt to relock the door every 60 seconds afterward for up to 20 retries or until the attempt is successful.

For more information, see .

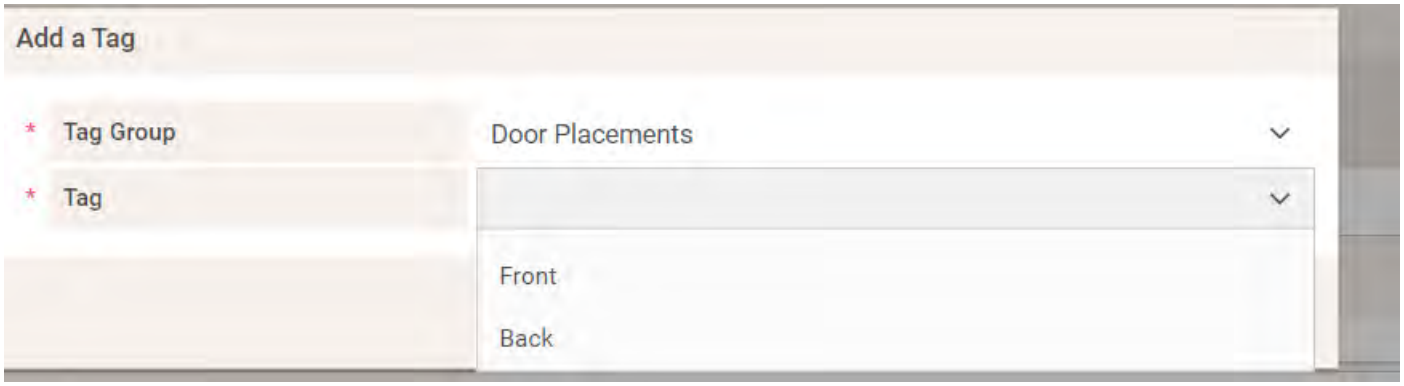
Set Door Placement with Tags and Tag Groups

Placement is an optional dropdown field in the Door section of the door Sites entity tab. On the door Sites Tab tab, select the appropriate dropdown option to set the door placement.

Placement is defined using tags from the Door Placements tag group.

Users with the Manage Tag Groups role or Site Administrator role will see a Manage Door Placements link to the right of the Placement drop-down menu on the door Sites Tab tab. Clicking on the link will direct the user to the Manage Tags and Tag Groups page.

By default, in Power IQ 5.2, there is a Door Placements tag group containing Front and Back tags.



Users can add tags to this tag group to define placement. For more information, see *Adding Tag Groups and Tags* on page 506.

Tags also can be added via CSV import.

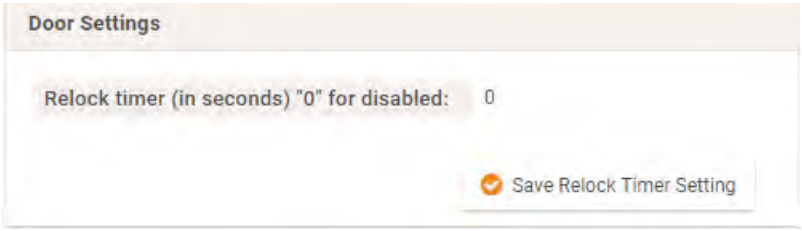
Note: Only add one Door Placement tag for each door. If you add multiple Door Placement tags, only the oldest tag (the tag added earliest) will be displayed on the door Sites entity tab and will be used to determine door placement.

Enable/Disable the Global Door Relock Timer

The global door relock timer is an optional setting that allows you to set a default duration before unlocked doors are automatically relocked. As a global setting, the door relock timer affects all doors in Power IQ.

Only users with the Site Administrator role can enable/disable the global door relock timer.

The global door relock timer is set in seconds. It can be disabled by setting the value to 0. In the example screenshot below, the relock timer is set for 120 seconds.



1. In the Settings tab, click Application Administration
2. Click Power IQ Settings
3. In the Door Settings panel, set the relock timer value in seconds.
4. Click Save Relock Timer Setting to save your changes.

Note: This global setting can be overridden locally when the override relock timer is enabled on an individual door. For more information, see Enabling/Disabling the Door Override Relock Timer below.

Note: When the Door Access Authorization Method is configured for Facility Item, the automatic re-locking of doors via the Global or Override Door Relock Timer is non-functional. Automatic re-locking occurs when the door handle is set back into the lock cradle.

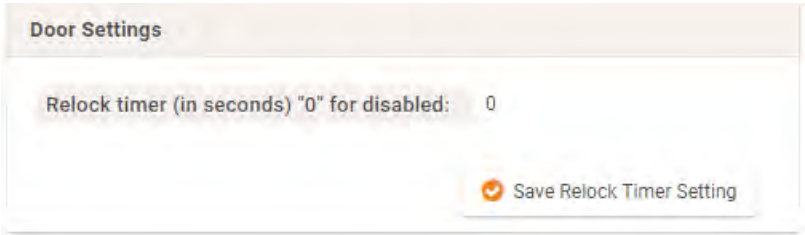
Enabling/Disabling the Door Override Relock Timer

The override relock timer is an optional setting on each individual door that allows you to override the global door relock timer on the individual doors that they have access to. If this option is disabled, the door will automatically relock based on the global door relock timer value, which is displayed in seconds for convenience below the Override Relock Timer field. For more information, see *Enable/Disable the Global Door Relock Timer* on the previous page.

The override relock timer value can also be set via CSV import. For more information, see *Bulk Configuring Doors Using CSV* on page 395.

Only users with the Operator role or above can configure the door override relock timer.

The override relock timer is set in seconds. It can be disabled by setting the value to 0. In the example screenshot below, the override relock timer is disabled, and the global door relock timer value is set to 120 seconds.



1. In the Sites tab, click the door you want to edit to display its Sites entity tab.
2. On the door Sites entity, in the Door panrl, set the override relock timer value.
    a. The override relock timer value must be set in seconds. For example, a desired value of two minutes should be set as 120 seconds (1 minute = 60 seconds).
    b. To disable the override relock timer, set the value to 0.

3. Click the Save button to save your changes.

Note: When the Door Access Authorization Method is configured for Facility Item, the automatic re-locking of doors via the Global or Override Door Relock Timer is non-functional. Automatic re-locking occurs when the door handle is set back into the lock cradle.

Note: If the global door relock timer is set to 0, the default value under the Override Relock Timer field will display as disabled.

Card Reader Access Support

Power IQ supports electronic access control via cards and card readers.

Card readers are added to Power IQ via discovery. Upon polling, discoverable card readers that are attached to supported devices are added to the Power IQ database.

Once in the system, card readers can be associated with doors. For more information, see *Adding and Removing Card Readers from the Door tab* on page 402.

Card readers can be decommissioned and recommissioned by 1) decommissioning or recommissioning the facility item where the card reader is attached respectively, or 2) unplugging the card reader from the facility item. For more information, see *Decommissioning and Recommissioning Card Readers* on page 404.

The card reader Sites entity tab provides information on a reader's name, manufacturer, serial number, doors it is associated with, and permissions. For more information, see *Card Reader Entity Tab* on page 90

Cards can be assigned to users in the Card Access Control panel under Settings > Authorization and Authentication > Door Access Controll, which lists card assignment details, including the card number, status, first and last name, user login, and user email. Users with the Site Administrator role and above have permissions to create, deactivate, and reactivate cards and to edit card assignments. For more information, see *Creating, Activating, Deactivating, and Assigning Cards* on page 405.

Adding Card Readers in Power IQ

Card readers are added to Power IQ via discovery. Upon polling, discoverable card readers that are attached to supported devices are added to the Power IQ database. If there are multiple card readers attached for each front and back door, both card readers will be found by Power IQ.

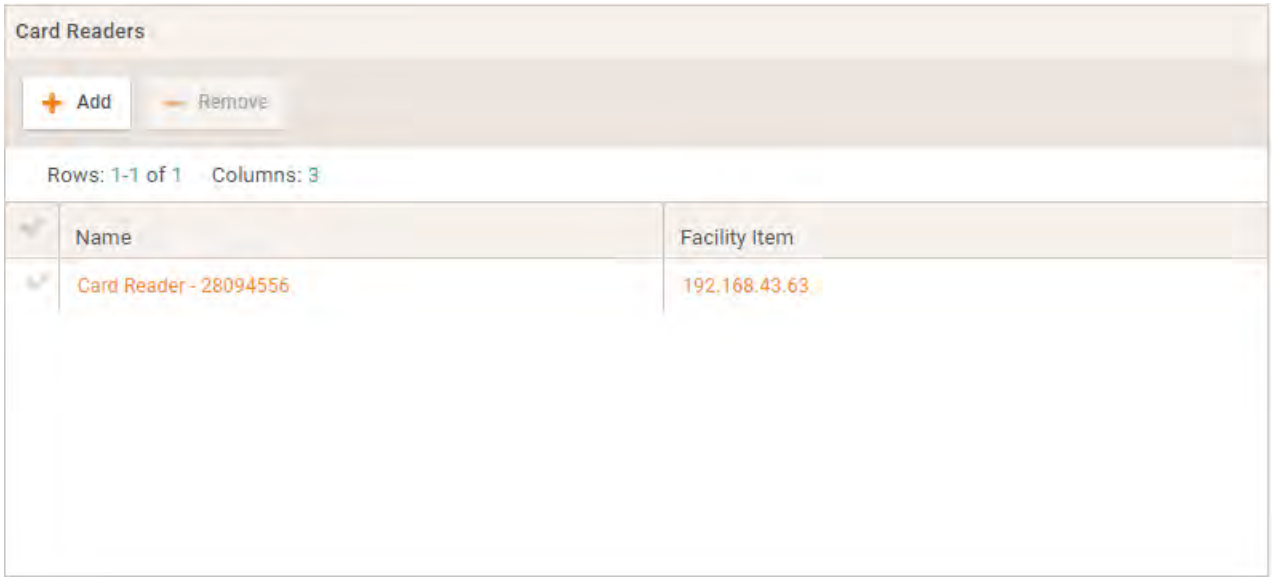
The default card name assigned is the card serial number.

Once in the system, card readers can be associated with doors. For more information, see *Adding and Removing Card Readers from the Door tab* on the facing page.

Note: When a card reader is associated to a facility item, PIQ will automatically associate it with the facility item's parent in the EDM hierarchy.

Adding and Removing Card Readers from the Door tab

Users with the Operator role and above on a door can add or remove readers from the Door Sites entity tab. The reader must already be in your Power IQ system to be added to the door. You can add one card reader at a time.



Adding a Card Reader from the Card Readers Panel

1. In the Card Readers panel, click the Add button.
2. In the Associate Entity panel, search for the card reader. The readers attached to the door's parent object in the EDM will be displayed at the top of the search results. The list shall show the card reader name and the facility item label. The facility item label will display either the name of the facility item or its IP address, based on your Power IQ settings.
3. Select the desired card reader.
4. Click the Add button to add the card reader. Click the Cancel button to close the dialog box.

Removing a Card Reader from the Card Readers Panel

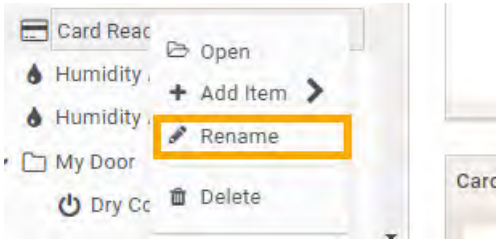
1. In the Card Readers panel, select the card reader that you want to remove.
2. Click the Remove button.

Renaming and Removing Card Readers from the Sites Tab Tree View

Card readers can be renamed and removed from the EDM in Power IQ.

Renaming a Card Reader

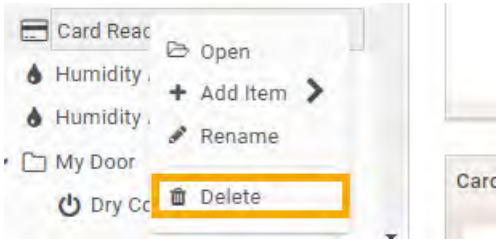
1. In the Sites tab tree view, select the node of the card reader you want to rename
2. Right-click to display the Rename or Remove buttons
3. Click the Rename button
4. Rename the card reader
5. The EDM will display the card reader node with the new name



Removing a card reader disassociates the card reader from the parent node. The card reader will no longer be visible in the EDM; however, the card reader will still be available in the system, and no data will be deleted.

Removing a Card Reader

1. In the Sites tab Tree View, in the select the node of the card reader you want
2. Right-click to display the Rename or Remove buttons
3. Click the Remove button
4. In the Warning dialog, confirm that you want to remove the card reader.
5. The Tree view will refresh with the card reader removed



Note: Like a sensor node, if a card reader node is removed from the EDM, it will be "refound' within five minutes and will be placed under the same parent node as the facility item it is attached to.

Decommissioning and Recommissioning Card Readers

Card readers can be decommissioned and recommissioned by 1) decommissioning or recommissioning the facility item where the card reader is attached respectively, or 2) unplugging the card reader from the facility item.

Note: A decommissioned card reader will be identified with "(Decommissioned)" at the end of its name in the door Sites Tab tab, EDM hierarchy, and card reader Sites Tab tab.

If you decommission a facility item with an attached card reader, the card reader will also be decommissioned. If you recommission a facility item with an attached card reader, that the card reader will also be recommissioned.

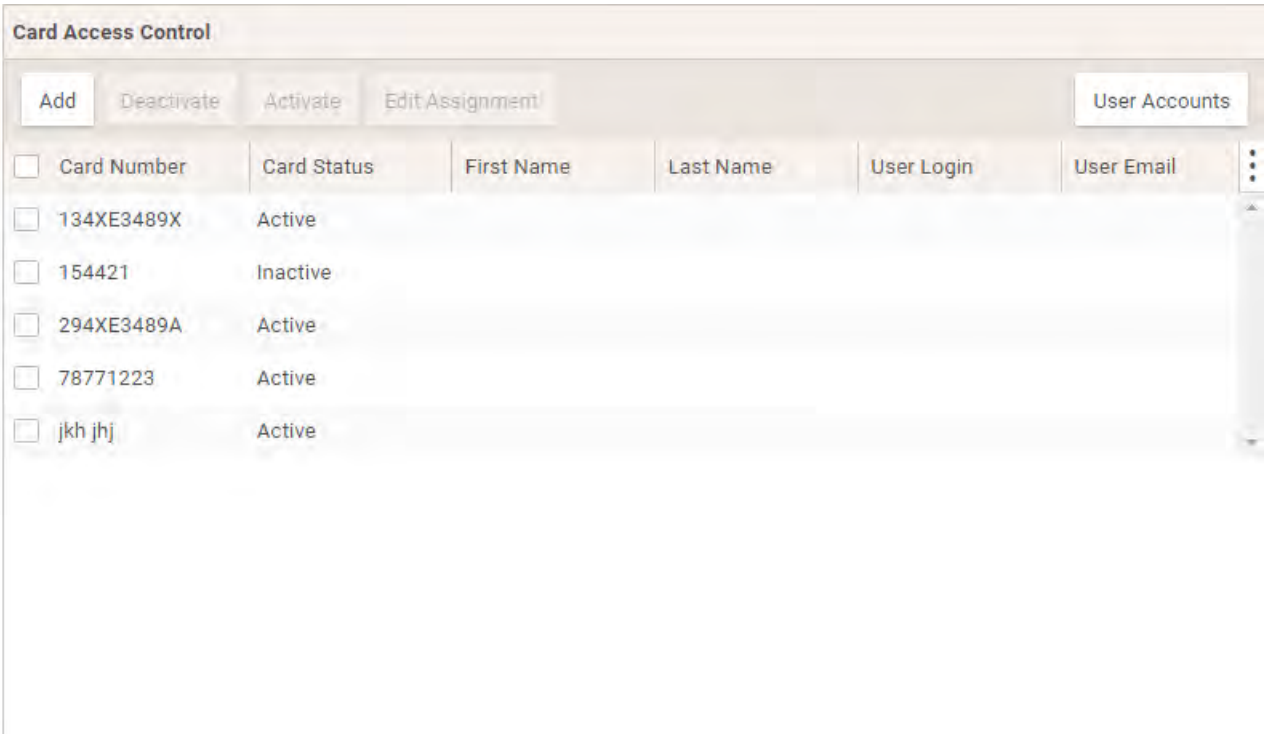
Note: If a facility item with an attached card reader is set to maintenance mode, Power IQ to continue to process card reader events. For more information on facility item maintenance, see Maintenance Mode.

If a card reader is unplugged from a facility item, when that facility item is polled, the card reader will be decommissioned. If a card reader is removed from one facility item and added to another, the card reader will be added or recommissioned (if it had been previously attached to the new card reader) on the next polling cycle.

Creating, Activating, Deactivating, and Assigning Cards

Users with the Site Administrator role and above have permissions to create, deactivate, and reactivate cards and to edit card assignments. Any updates made to card assignments, including when cards are created, activated, and deactivated, will create entries in the Power IQ audit log.

Cards can be assigned to users in the Card Access Control panel, which lists card assignment details, including the card number, status, first and last name, user login, and user email. Select a card to activate, deactivate, or edit its assignment.



Users can be assigned multiple cards. To assign a user to a newly created card, first create the card, and then edit its assignment.

Note: To unlock a door, the user must have the Door Control role for the specified door.

Note: For auditing purposes, Power IQ does not allow a user to delete a card from the system. Users with the appropriate permissions can, however, deactivate a card or change who is assigned it. Power IQ tracks the history of who was assigned to each card for the purposes of generating the door security audit report and to show accurate information when viewing an event.

Creating a New Card

1. Go to Settings > Authorization and Authentication > Door Access Control
2. In the Card Access Control panel, click the Add link

3. In the Add New Card panel, add the card number
4. Click the Add button

Deactivating a Card

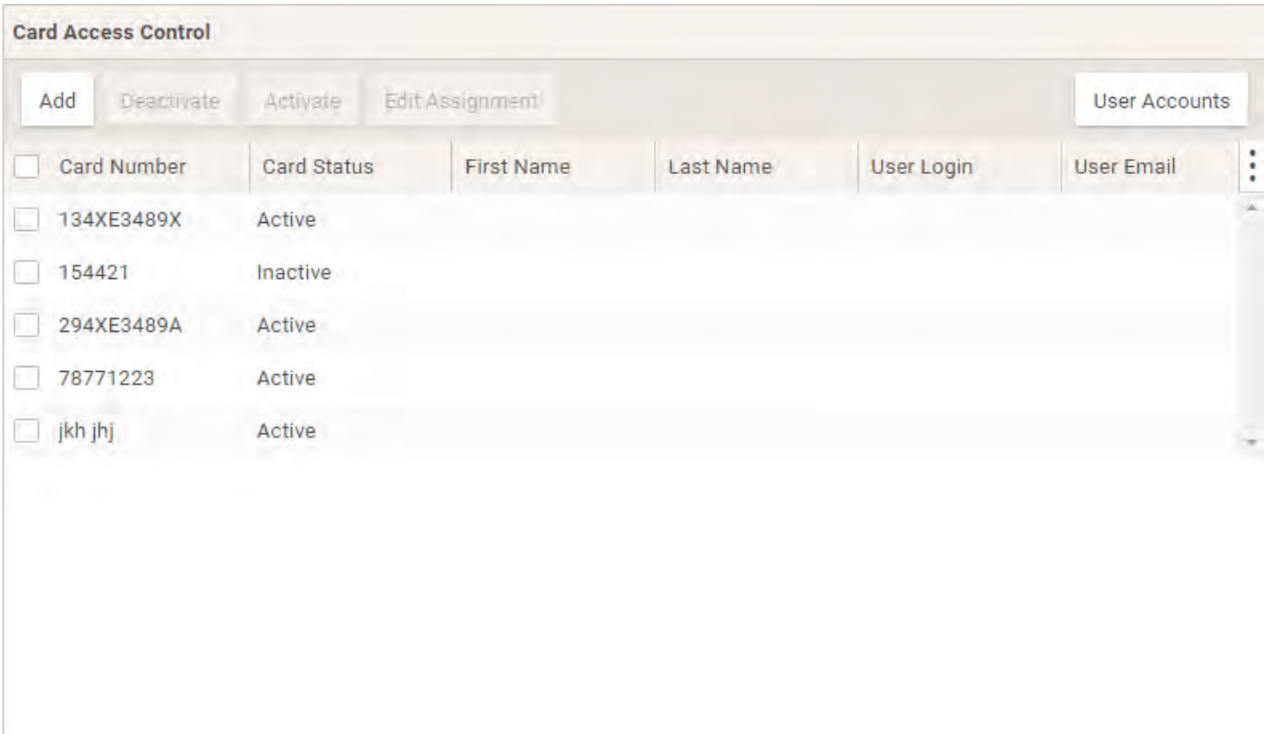
1. Go to Settings > Authorization and Authentication > Card Access Control
2. In the Card Access Control panel, select the cards that you want to deactivate.
3. Click the Deactivate button to make the card inactive.

Activating a Card

1. Go to Settings > Authorization and Authentication > Door Access Control
2. In the Card Access Control panel, select the cards that you want to activate.
3. Click the Activate button to activate the card.

Editing a Card's Assignment

1. Go to Settings > Authorization and Authentication > Door Access Control
2. In the Card Access Control panel, select the card whose assignment you want to edit. Note: You can only edit one card assignment at a time.
3. Click the Edit Assignment button
4. In the Assign Card to User dialog, search for and select the user you want to assign the card to.
5. Click the Assign to User button.



Card Reader Events and Audit Log Entries

Power IQ tracks the history of who was assigned to each card for the purposes of generating the door security audit report and to show accurate information when viewing an event and in the audit log.

Power IQ processes events from the facility item that has a card reader to determine when access has been authorized via the card reader.

All events for successful card access authorizations have a severity of Informational. All events for failed card access authorizations have a severity of Warning.

When a card reader event is processed:

- The door security audit report will display the user, the requested action, and a summary of the request. For more information on the door security audit report, see *Creating a Door Security Audit Report* on page 499.
- A date- and time-stamped event is created with the event name, severity, target (the card reader), and a summary of the event.
- A date- and time-stamped entry is created in the audit log with a message indicating whether the attempt was successful, the card reader name, card number, user (if applicable) and reason the authorization attempt succeeded or failed.

Additionally, users with the appropriate permissions will see entries in Power IQ's audit log for each time they:

- Create a card
- Deactivate a card
- Activate a card
- Assign a card to a user
- Update a card assignment

Note: Door lock access event logging varies based on vendor. All Chatsworth door locks access attempts are logged in the Audit Log. Power IQ does not log Raritan PDU door authentication events in the audit log

The table below summarizes Chatsworth door access events and audit log entries in Power IQ.

Description	Event	Event Summary	Audit Log Message
Card number is valid, but the card either isn't associated to a user or is deactivated.	Card reader authorization failed	A failed card authorization attempt was made at reader <reader_name>. Reason: Card is either deactivated or not associated with a user.	Power IQ: Failed card authorization attempt <attempt_id> at reader <reader_name> using card number <card_number>: Card is either deactivated or not associated with a user.
Card number is associated to an active user, but that user does not have	Card reader authorization	A failed card authorization attempt was	Power IQ: Failed card authorization attempt <attempt_id> at

Description	Event	Event Summary	Audit Log Message
Door Control permissions to any of the doors associated to the card reader. This also applies when no doors are associated to the card reader.	failed	made at reader <reader_name>. Reason: User <user> is not authorized.	reader <reader_name> using card number <card_number>. User <user_name > is not authorized.
Card number is associated to an active user and that user has Door Control permissions to one or more of the doors associated to the card reader.	Card reader authorization succeeded	A successful card authorization attempt was made by user <user> at card reader <reader_name>.	Power IQ: Successful card authorization attempt <attempt_id> at reader <reader_name> using card number <card_number>. User <user_name > has access to <authorized_doors> of <controlled_doors> doors.
	An access attempt is successful		"[PowerIQ] A successful access attempt on cabinet < cabinet_id > < door_location > by user < user_name> and badge <badge_no> was reported by facility Item < pdu >"
	An access attempt fails		[PowerIQ] A failed access attempt on cabinet < cabinet_id > < door_location > by user < user_name> and badge <badge_no> was reported by facility Item < pdu >"

Note: There are no automatic clearing events.

Bulk Card Reader Configuration via CSV

Users with the appropriate permissions can configure card readers via CSV import/export.

1. In the Sites Tab, click the Import/Export button on the EDM menu to go to the Enterprise Relationships page. Alternatively, go to Settings > Data Management > Enterprise Relationships.
2. Export the existing EDM relationships to CSV by clicking the Export Relationships link in the CSV Data Mapping Actions section.

> *Note: You must have an EDM in your Power IQ to export existing EDM relationships via CSV. For more information, see Creating Your EDM on page 554.*

3. Use the CSV file to configure card readers.
4. Import your edited CSV file back into Power IQ.

Mapping a Card Reader to Its Parent

To map a card reader to its parent, add or edit the following attributes in the card reader columns in the CSV file (specifying parent_object_type and parent_external_key will map a card reader to its parent):

1. object_type (required; specify as CARD_READER)
2. pdu_ip (required)
3. pdu_proxy_address
4. serial_number (required)
5. parent_object_type (required)
6. parent_external_key (required)

Mapping a Card Reader to a Door

To map a card reader to a door, add or edit the following attributes in the CSV file (specifying these attributes and door_external_key will associate the door with the card reader):

- object_type (required; specify as DOOR_CARD_READER_MAPPING)
- pdu_ip (required)
- pdu_proxy_address
- serial_number (required)
- door_external_key (required)

Note: Attempting an import without the required fields completed will result in an error.

Electronic Access Control for Chatsworth Doors and Locks

Power IQ provides centralized cabinet-level Electronic Access Control (EAC) for doors and electronic locks connected to supported Chatsworth Products, Inc. (Chatsworth) PDUs, including eConnect Monitored, Monitored Pro, Switched,

and Switched Pro PDUs.

Power IQ supports card reader access and authentication for the RFID readers built into Chatsworth PDU door hardware. See Configure Chatsworth PDUs for Card Reader Access for details on how to configure this feature.

When you associate a supported Chatsworth PDU that has door sensors in the Power IQ EDM (data model), doors and door sensor mappings are automatically created. For more information, see *Autoconfiguration of Chatsworth Doors and Door Mappings* below.

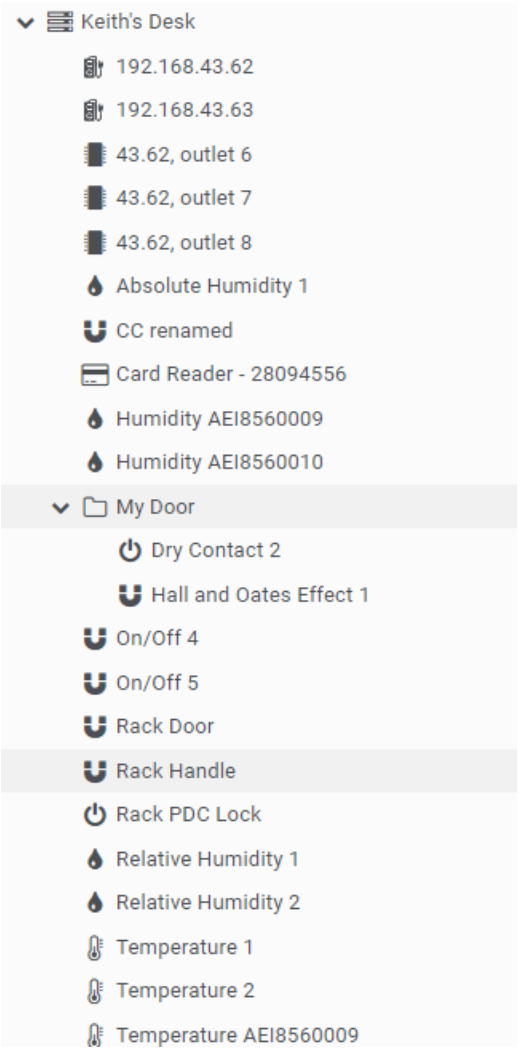
After a door is created or identified, the sensors are mapped to it. Contact closure sensors are mapped to the door component. Powered dry contact closures are mapped to the electronic lock component. For more information, see *Supported Chatsworth Door and Electronic Lock Sensor Statuses* on the next page.

Chatsworth doors can only be unlocked, not locked or relocked, through Power IQ. For more information, see *Unlock Chatsworth Doors* on page 413.

Autoconfiguration of Chatsworth Doors and Door Mappings

When you associate a supported Chatsworth PDU that has door sensors in the Power IQ EDM (data model), doors and door mappings are automatically created. Tags for door placement also are applied as appropriate to the created doors.

Doors are created as siblings to the PDU in the EDM. Doors are tagged for door placement as either Front for the front door or as Back for the rear door. Contact closure door status sensors and powered dry contact closure electronic lock sensors are created for each door attached to the PDU. For more information, see *Supported Chatsworth Door and Electronic Lock Sensor Statuses* on the next page.

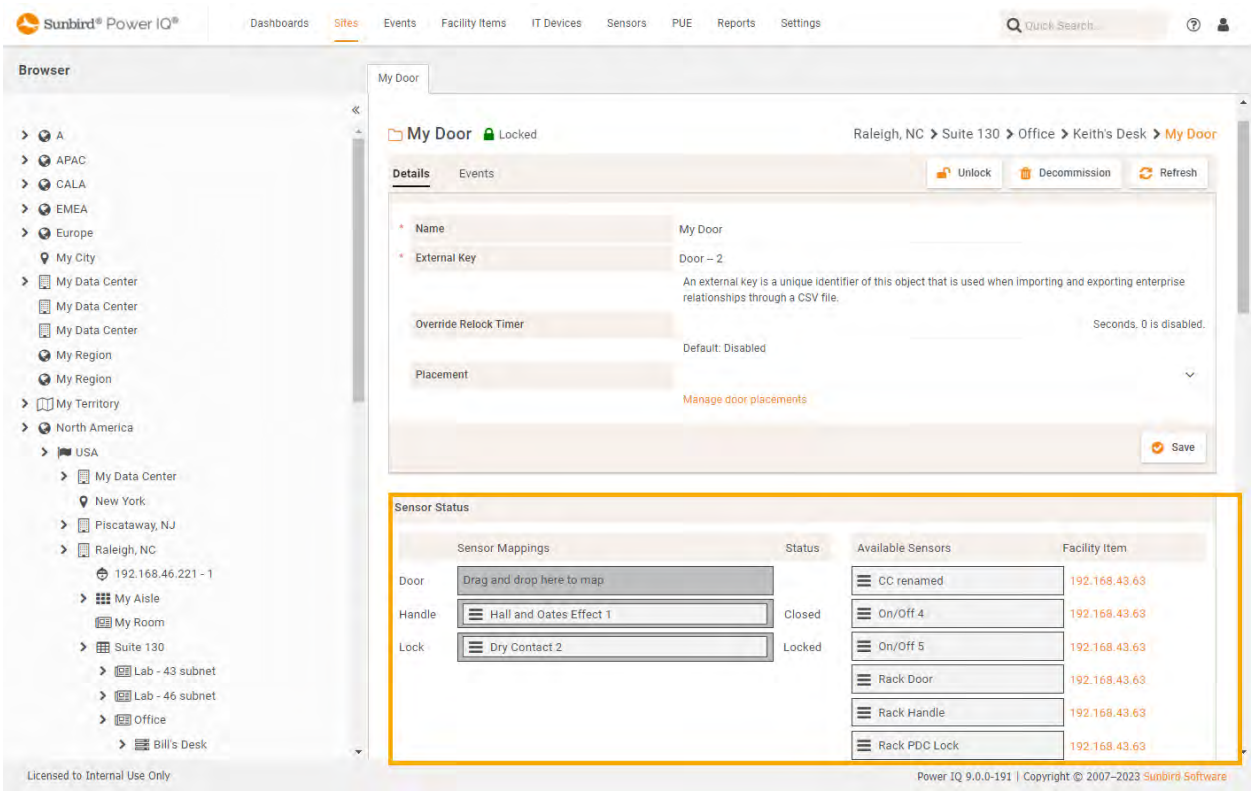


A door named Front Door is created if either a front contact closure or powered dry contact closure exists. If a front door already exists, that door will be tagged with a Front tag, and no new door will be created. Similarly, a door named Back Door will be created if either a rear contact closure or powered dry contact closure exists. If a rear door already exists, that door will be tagged with a Back tag, and no new door will be created.

Note: Front and Back tags will be created if the tags do not already exist. For more information on door placement, see Set Door Placement with Tags and Tag Groups on page 396.

Supported Chatsworth Door and Electronic Lock Sensor Statuses

After a Chatsworth door is created or identified, the sensors are automatically mapped to it. Contact closure sensors are mapped to the door component. Powered dry contact closures are mapped to the electronic lock component. Door and electronic lock sensors and their statuses can be viewed on the Door Sites Tab tab > Sensors and Door Status > Sensor Mappings section.



Supported contact closure door sensor statuses include:

- Open
- Closed
- N/A

Supported powered dry contact closure electronic lock sensor statuses include:

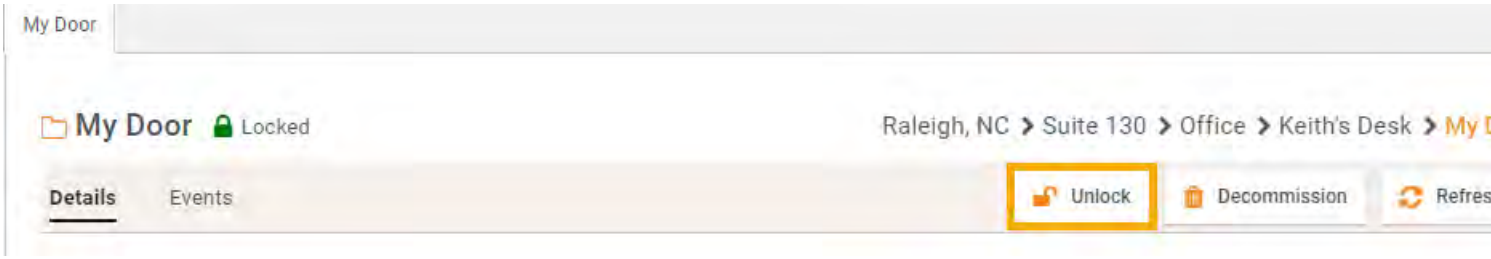
- On
- Off
- N/A

Note: Door handle sensors are not supported

Note: Power IQ-based authenticates card access via the RFID reader built into the CPI door hardware, and provides door access auditing, including events and the door security audit report. See: Creating a Door Security Audit Report on page 499.

Unlock Chatsworth Doors

Door control for Chatsworth doors only supports unlocking through Power IQ. To unlock a locked Chatsworth door, click Unlock on the door's entity tab in the Sites tab. If the door is already unlocked, the Unlock button will be disabled.



Chatsworth doors do not support locking/relocking through Power IQ.

The global door relock timer and override relock timer are ignored for Chatsworth doors. If a door is unlocked through Power IQ, Power IQ will not attempt to relock the door.

If you attempt to lock a Chatsworth door through Power IQ, a failure message is displayed.

Note: The Chatsworth firmware only supports unlocking one of two locks attached to a single PDU at a time. As a result, card access attempts and SNMP requests to unlock another lock when one lock attached to the PDU is already unlocked, will be rejected. If you encounter this issue, check the Chatsworth PDU GUI for an error message with more information. To avoid any potential issues, only one Chatsworth door should be mapped to a card reader.

Note: Chatsworth doors can be set to automatically lock/relock after a user-configured timeout has elapsed through the Chatsworth GUI.

Raritan Electronic Door Locks

Power IQ version 8.0.0 and above provides the following enhanced support for Raritan Electronic Door Locks running Raritan's Xerus Firmware v3.6.10 or higher.

This includes support for:

1. Authorization via keypad connected to a Raritan Facility Item (RFI)
2. A new Authorization Method that supports authorization at the RFI that is independent of the network availability resulting in a quicker response. The remote authorization via Power IQ is still an option that can be set by the admin. The admin should select one mode of operation.
3. Authorization rules configured in Power IQ and pushed to the RFIs upon configuration or change.
4. Automatic push of LDAP and AD changes to the RFIs.

Requirements to setup to push rules.

Facility Item

- Firmware 3.6.10.5-46551 or newer
- Configured to send traps to Power IQ (PIQ)
- Door hardware attached

Power IQ Requirements

- Power IQ configured for Facility Item door authorization
- Door EDM Node/Entity
- Door Handle Lock of Facility Item mapped to PIQ Door Lock component
- Card Reader associated to door (for card auth)
- Keypad associated to Door (for keypad auth)
- User with Key Card (active card assignment)
- User with PIN
- User has Door Control role for door
- User has an access schedule (there is a default schedule to allow all users)

What pushes rules:

Daily Cron Task

- Daily Cron task 01:05

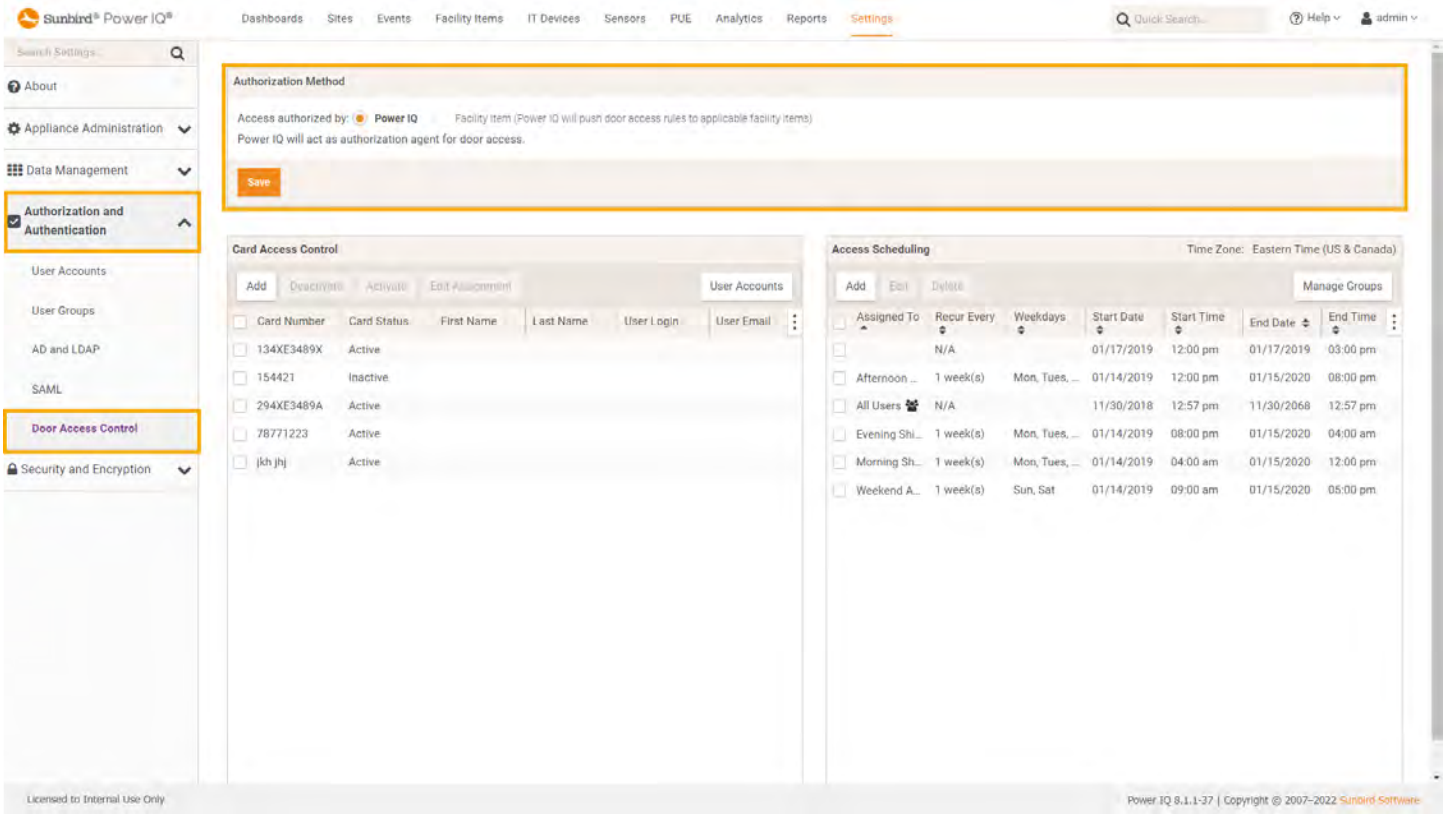
PIQ will send door rules on-demand. Update when any of the following conditions are met:

- The user enables PDU-based authentication
- The PIN is edited, added, or removed from a user(s)
- A keypad to door mapping or card to door mapping is removed or added
- Access scheduling gets modified
- Door control role added or removed from user
- Card is assigned, deactivated or reassigned to user

Set the Door Access Control Authorization Method

1. Navigate to Settings >Authorization and Authentication > Door Access Control
2. In the Authorization Method panel, select the appropriate radio button to enable authorization via either Power IQ or the Facility Item (RFI)

Note: When the Door Access Authorization Method is configured for Facility Item, the automatic re-locking of doors via the Global or Override Door Relock Timer is non-functional. Automatic re-locking occurs when the door handle is set back into the lock cradle.



Set or Change the Keypad PIN Code and Assign Keypad PIN Role to Users

1. Navigate to Settings > Authorization and Authentication > User Accounts
2. Select a User by clicking the hyperlink in the Log-in column.

3. Click the "Add Keypad PIN" button to set the code (this button is labeled "Change Keypad PIN" when a code has been previously set).
4. The Authorization Keypad PIN codes are associated with a User. The admin can set or change the Keypad PIN code for all users. To allow individual users to manage their own Keypad PIN codes, assign the Keypad PIN role from the User Roles panel in the user's details page. See Assigning Roles for User Permissions.

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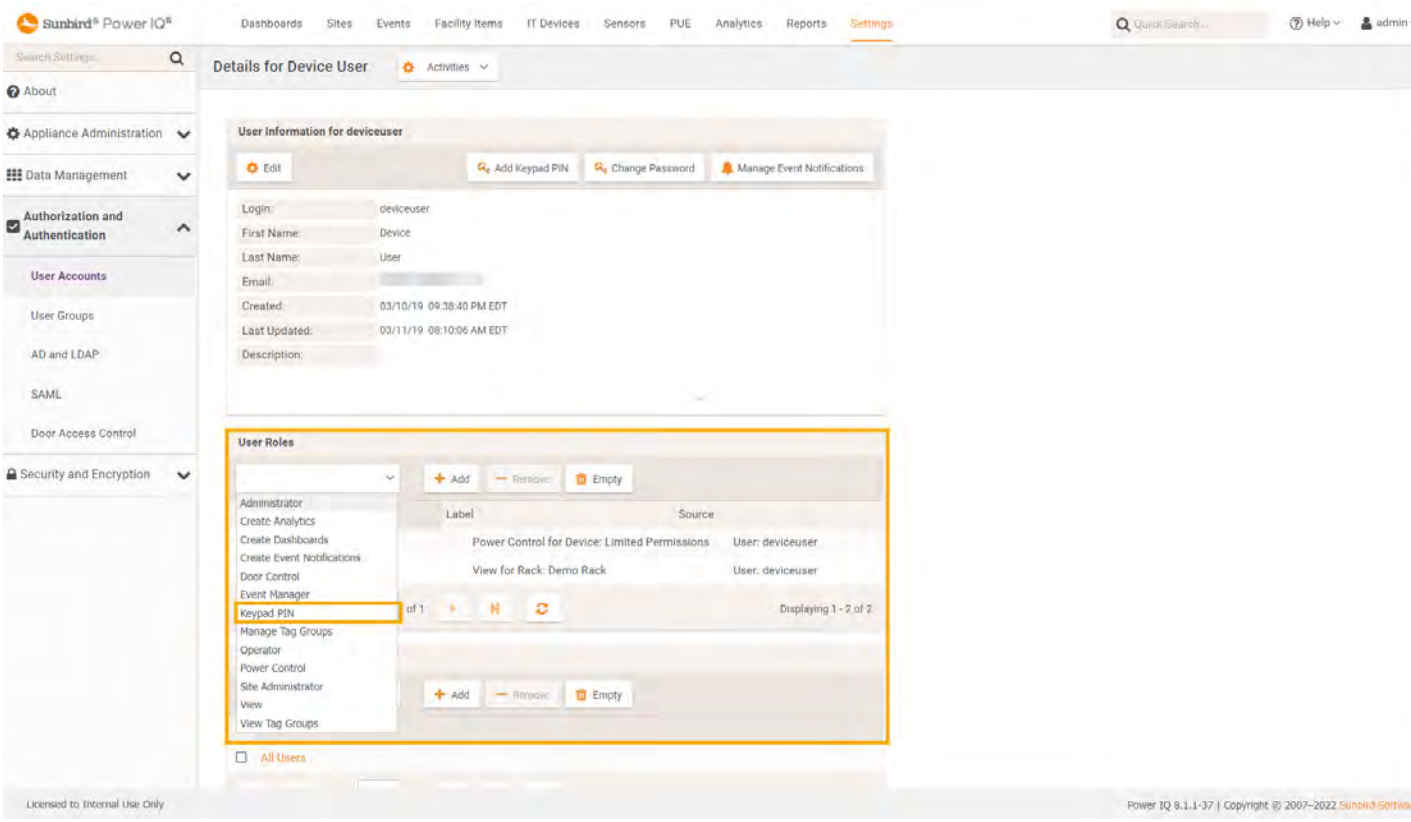
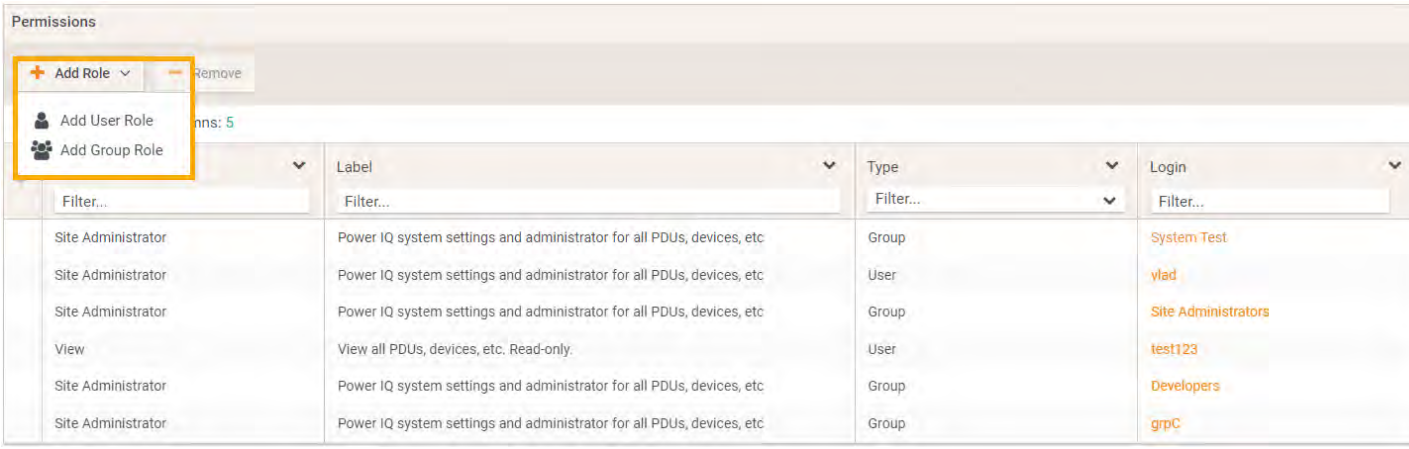


Assign Door Control Role to Users and Groups

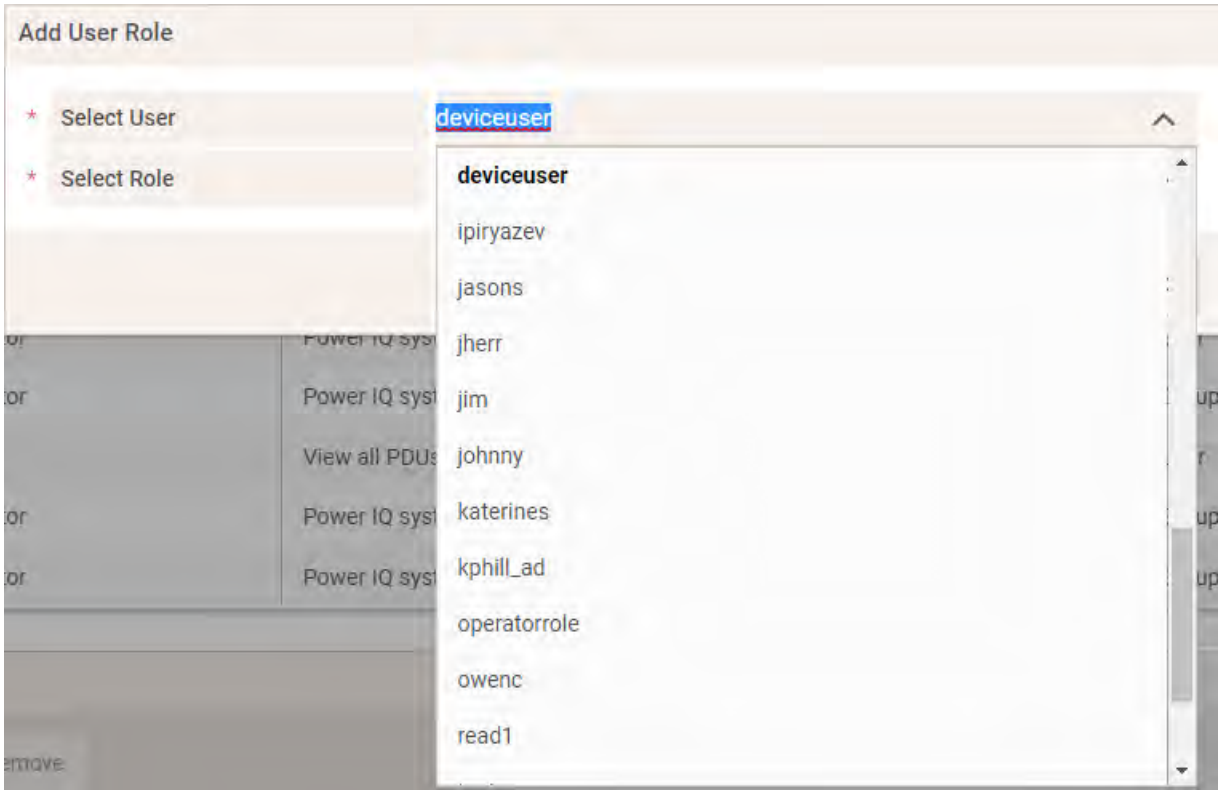
The site admin can assign the Door Control Role to Users or Groups. The Role can be assigned globally from Setting > Authorization & Authentication as described above, or you can grant the Role locally to a specific Door. Users with the Door Control Role are authorized to Lock/Unlock doors.

To assign local privileges:

1. Navigate to the Door in the Sites tab
2. In the Permissions Panel on the Door tab, click the Add Role button to display the drop-down menu. Select whether you want to add a role to a user or to a group. The Add User Role/Group Role dialog displays based on your selection



3. In the Add User Role/Group Role dialog, select the user or group from the list box.

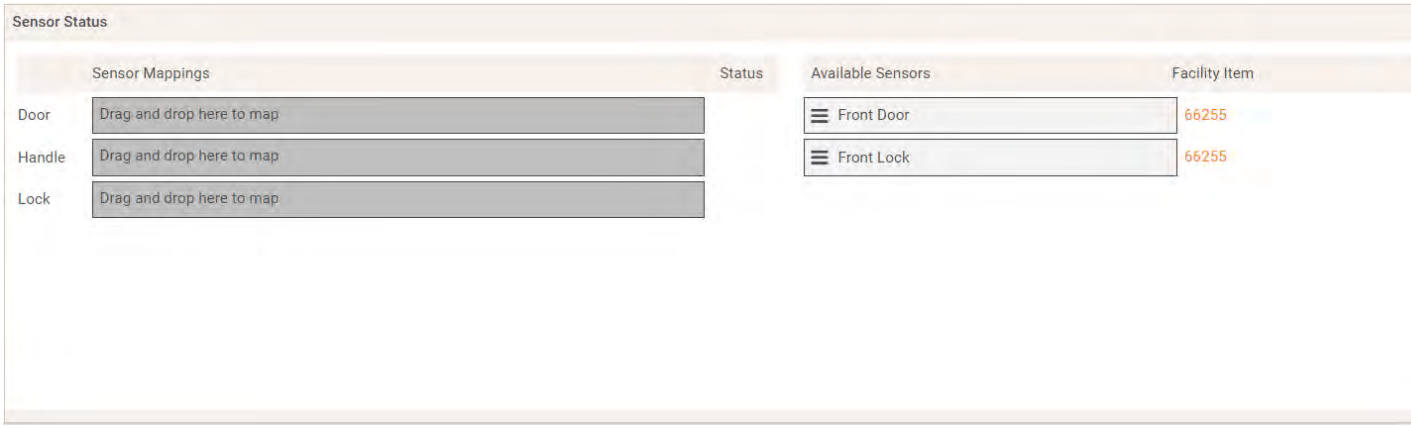


4. Select the Door Control role from the list of Roles
5. Click the **Add** button to add the Role.

Associate Door, Lock and Handle Sensors

Administrators can associate Door, Lock and Handle Sensors via the GUI in the Sites tab.

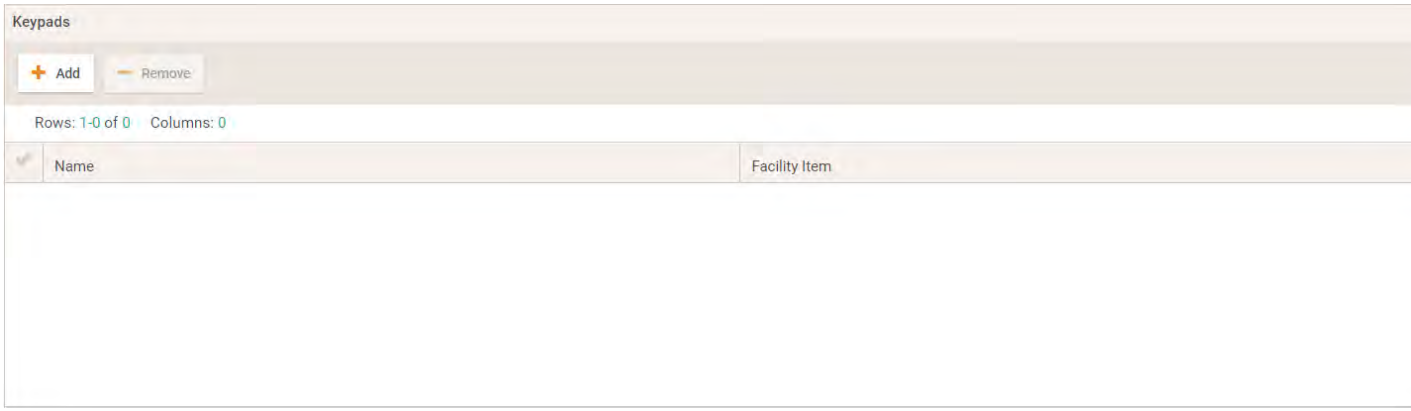
1. Navigate to the door in the Sites tab. On the door tab,
2. In the Sensor Status panel, drag and drop the appropriate available sensor to the appropriate door, lock or handle box.



Associate Keypads with One or More Doors

Administrators can associate Keypads with doors via the GUI in the Sites Tab or in bulk via csv import.

1. Navigate to the door in the Sites tab
2. In the Keypads panel on the door tab, click the **Add** button to display the Associate Entity dialog



3. The Associate with field will automatically be populated with the name of the door

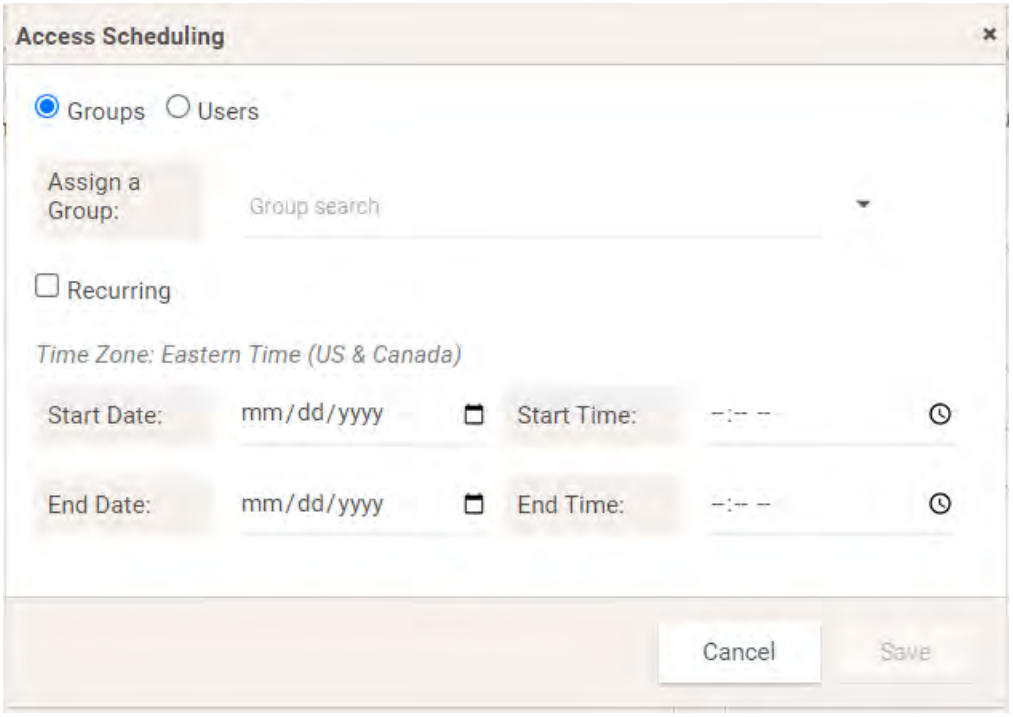
4. Click in the Search field for a list of Keypads in your Power IQ. Select the keypad you want to associate with the door.

Assign Users and Groups Access Schedules

The Site Administrator can assign one or more Access Schedules to users and groups to control the times access is permitted.

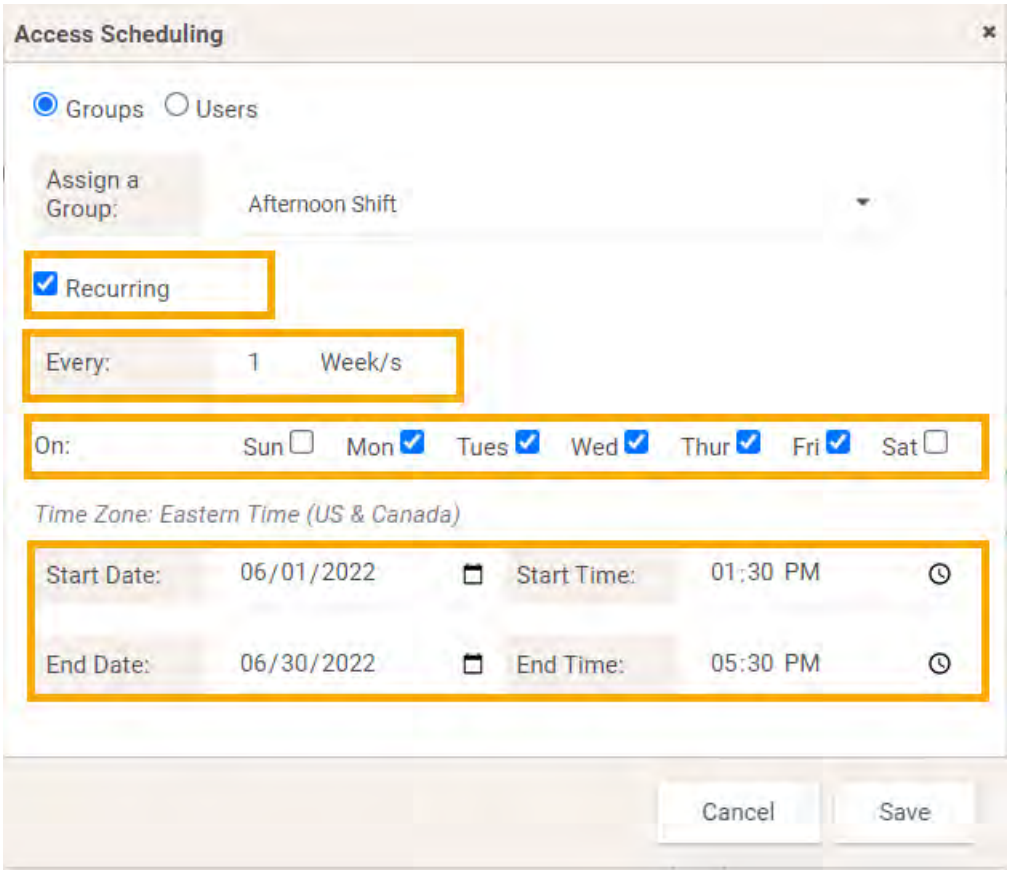
1. Navigate to Settings > Authorization and Authentication > Door Access Control
2. Select the "Add" button in the Access Scheduling panel
3. Select Groups or Users, then select the Group or User from the drop down list.

4. The Access Scheduling dialog displays



5. To create a recurring schedule select the "Recurring" check box and select the days of the week and Start and End Dates and Times.

6. Click the Save button



Note: Raritan firmware can handle 64 rules. Each Schedule for each User is a Rule. For example, 5 Users with one Schedule each equates to 5 Rules. Additionally Raritan firmware supports Weekly Schedules only.

TANlock Locks Support

Power IQ enables you to unlock doors secured with TANlock locks. Only SNMP v2 is supported. Discovery is blocked if SNMPv3 is used

Power IQ discovers TANlock door locks, their handles, and associated sensors and converts the TANlock door traps to Power IQ events and allows users to unlock doors secured with TANlock locks. When Power IQ receives a trap and converts it into a Power IQ event, Power IQ also updates the sensor's state based on information from the trap

The table below outlines the sensors discovered by Power IQ:

Sensor Type	Name
Powered Dry Contact	Electronic Lock

Sensor Type	Name
Contact Closure	Handle Status
Contact Closure	Door Sensor 0
Contact Closure	Door Sensor 1

TANlock also is supported by the Door Security - Status report and Door Security - Audit Report

Notes on TANlock door locks: The units ship from the factory with SNMP disabled. After enabling it, you need to reboot the device. Only one version of SNMP can be enabled at once. The read and write community strings must be the same.

When a TANlock lock is decommissioned, all associated sensors are also decommissioned.

Note: The TANlock door lock's relay and temperature and humidity sensors are not supported

Note: To use Power IQ's door control features on a door secured with a TANlock door lock, a contact closure sensor must be mapped to a door State and a powered dry contact closure sensors must be mapped to a lock.

For TANlock Supported Events see: TANlock Supported Events

PDUs

In the GUI and in this documentation, Power IQ uses the term PDU to encompass any device that Power IQ polls to gather power or sensor data. In some cases, PDU and Facility Item may be used interchangeably.

When you see the terms PDU and Facility Items in the product interface, remember that they include every polled object: rack PDUs, CRACs, floor PDUs, floor UPSs, power panels, standalone meters, and environmental sensor aggregators.

In this guide, the following terms are also used:

- Rack PDU
- Facility Items: CRAC, Floor PDU, Floor UPS, Power panel, and standalone meter.

The Term "PDU" in Power IQ

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When you see the terms PDU and Facility Items in the product interface, remember that they include every polled object: rack PDUs, CRACs, floor PDUs, floor UPSs, power panels, standalone meters, and environmental sensor aggregators.

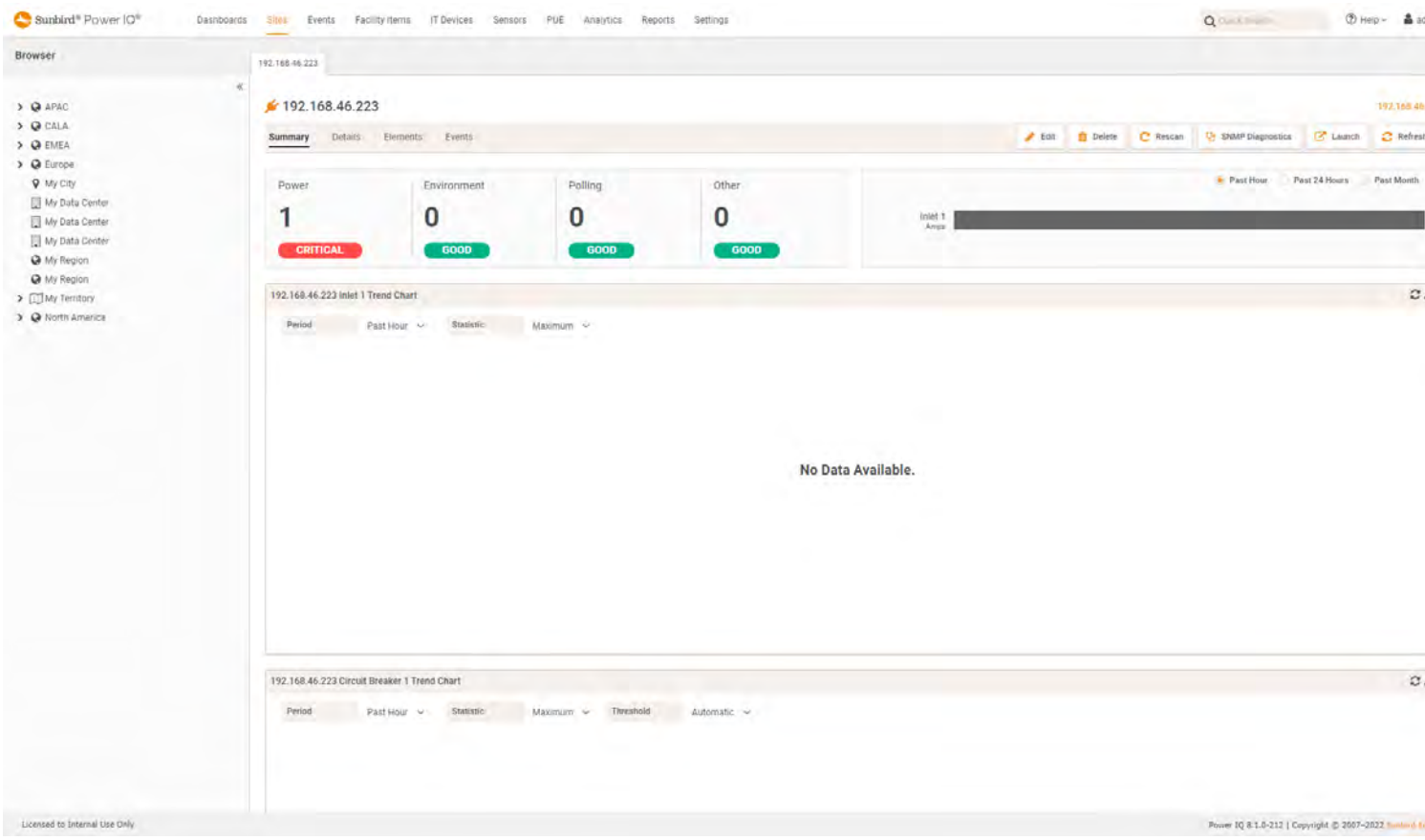
In this guide, the following terms are also used:

- Rack PDU
- Facility Items: CRAC, floor PDU, floor UPS, power panel, and standalone meter.

Facility Items Entity (Floor PDU, Power Panel, Rack PDU, Rack Transfer Switch, Rack UPS, Stand Alone Meters)Tabs

This article applies to the following facility Items:

- Floor PDU
- Power Panel
- Rack PDU
- Rack Transfer Switch
- Rack UPS
- Stand Alone Meters

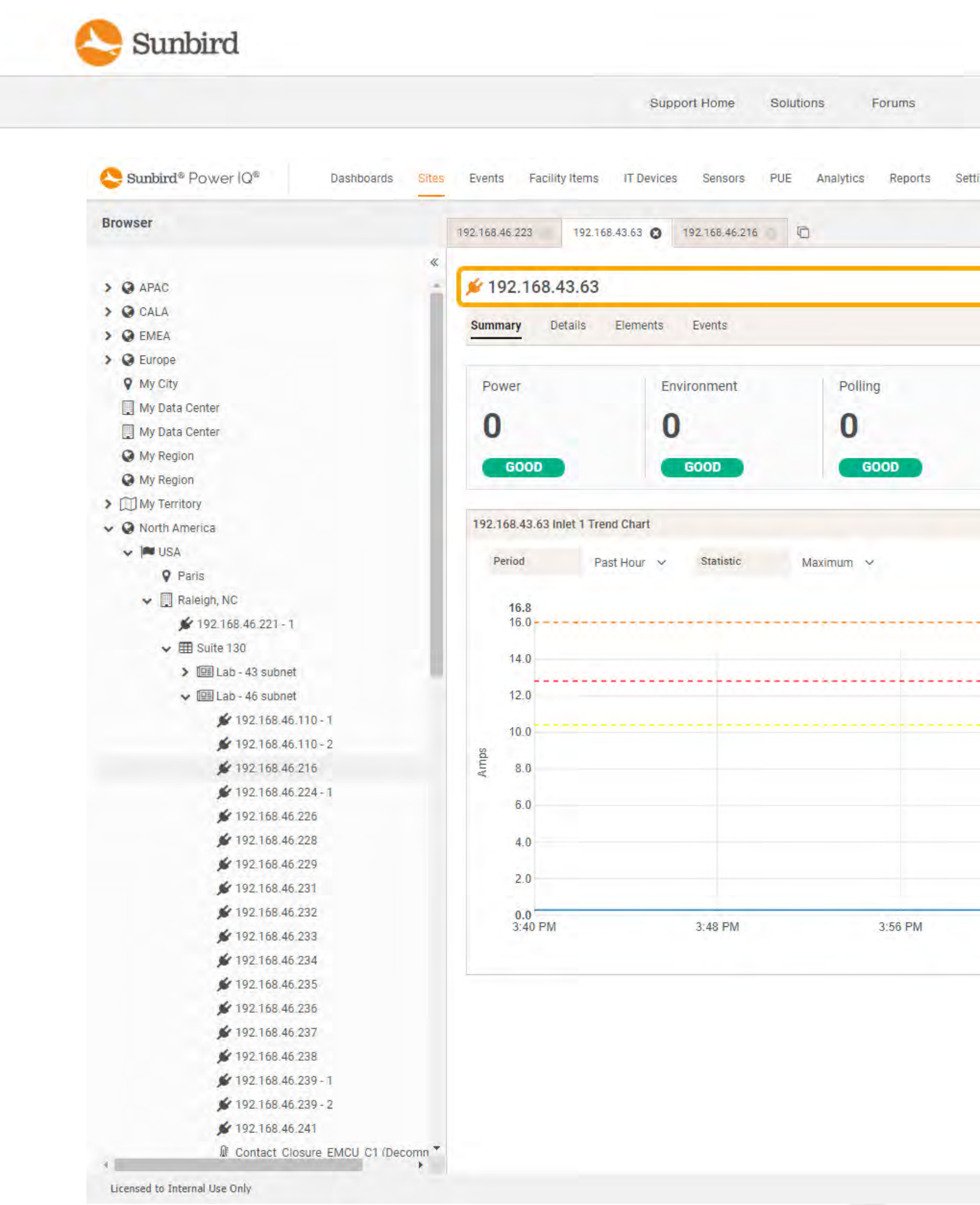


The Facility Items Entity (Floor PDU, Panel, and Rack PDU) Tabs share the following elements.

Header:

The header at the top of the tab displays the following for each facility item entity:

- Icon
- Name/Title
- EDM Ancestor List (excluding Data Center Entities)


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Analytics
Reports
Browser
192.168.46.223
192.168.43.63
192.168.46.216
APAC
CALA
EMEA
Europe
My City
My Data Center
My Data Center
My Region
My Region
My Territory
North America
USA
Paris
Raleigh, NC
192.168.46.221 - 1
Suite 130
Lab - 43 subnet
Lab - 46 subnet
192.168.46.110 - 1
192.168.46.110 - 2
192.168.46.216
192.168.46.224 - 1
192.168.46.226
192.168.46.228
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Summary
Details
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Events
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GOOD
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GOOD
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Period
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Amps
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3:48 PM
3:56 PM
Licensed to Internal Use Only

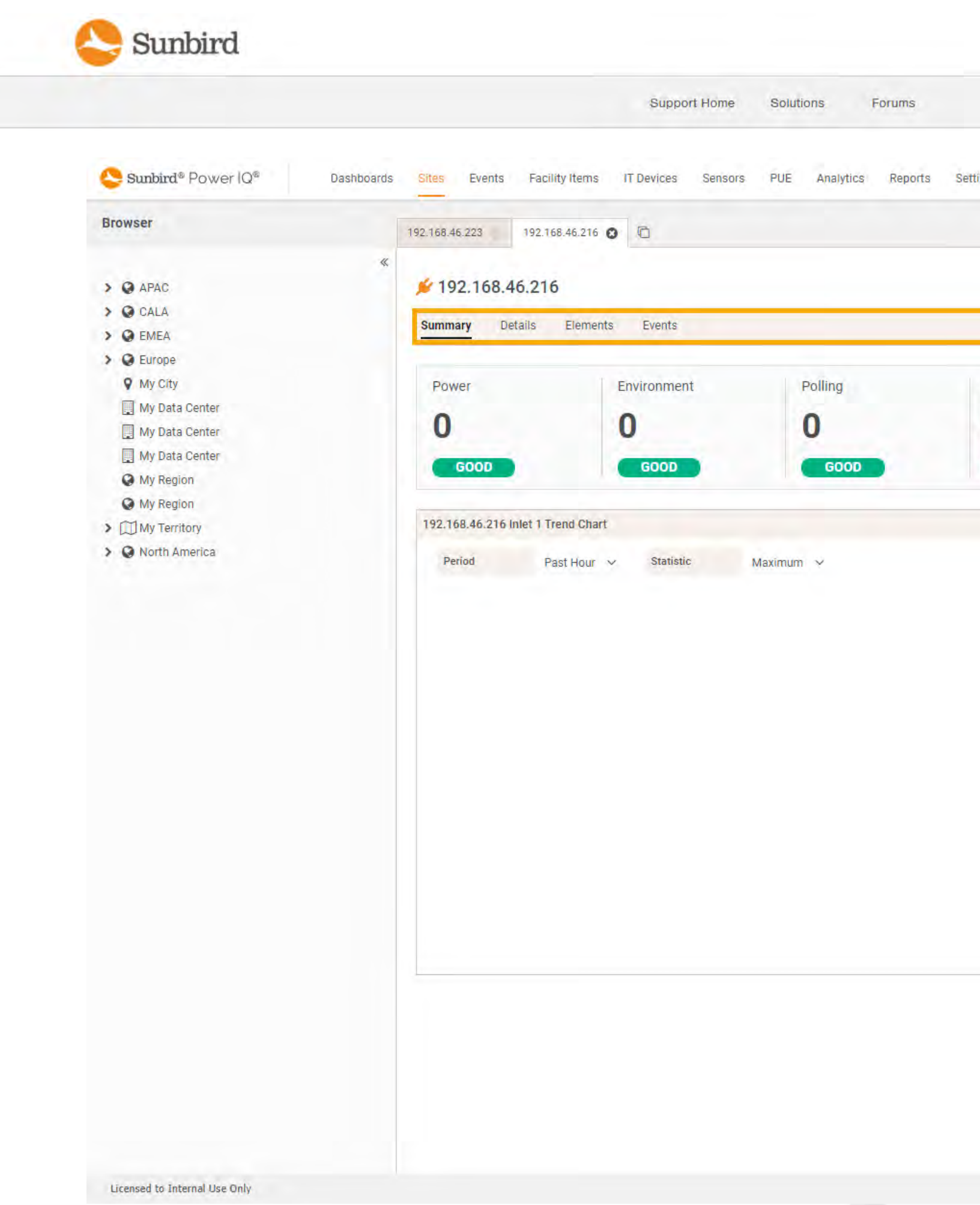
Toolbar:

The toolbar located directly below the header at the top of the tab contains the following:

- Summary Tab Sub-navigational Link (Initially, the “Summary tab will be selected by default.)
- Details Tab Sub-navigational Link
- Elements Tab Sub-navigational Link
- Events Tab Sub-navigational Link
- Edit Button
- Delete Button
- Rescan Button: The Rescan Button re-scans the facility item
- SNMP Diagnostics (Only Available to Site Admins)

  Note: SNMP Diagnostics are available only to Site Admins.

- Launch: The launch button opens the launch URL in a new window, so you can log-in to the PDU
- Refresh Button: The Refresh Button reloads the full tab


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Analytics
Reports
Browser
192.168.46.223
192.168.46.216
APAC
CALA
EMEA
Europe
My City
My Data Center
My Data Center
My Data Center
My Region
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My Territory
North America
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Details
Elements
Events
Power
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GOOD
Environment
0
GOOD
Polling
0
GOOD
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Past Hour
Statistic
Maximum
Licensed to Internal Use Only

Entity Details Tab:

Users with the appropriate permissions will be able to see the following modules on the Entity Details tab

- Facility Item Entity Property Detail Panel
- Entity Permissions Panel (Not displayed for PDU that are not associated within the EDM)
- Facility Item Entity Tags Panel

Rack Transfer Switches

Rack Transfer Switches are high speed switches that provide power from one of two sources depending on settings and availablity. Power IQ supports several Raritan and APC rack transfer switches.

PDU Connectivity Health Statuses

These statuses appear in the mouse-over text when your mouse hovers over the Health column for a PDU on the PDU listings page. The statuses also appear in the Health section of the PDU smart view.

When Health Polling is enabled, results of both the Health Pollers' pings and the Data Poller's data collection attempts are used to update the status. See Configuring Health Polling.

Status	Explanation
OK	Most recent polls of the target PDU was successful.
New	The system has not yet completed a successful scan or poll of the PDU. This is typical for systems that have been recently added.
Unknown	The system has not yet completed a successful scan or poll of the PDU. This is typical for systems that have been recently added.
Degraded	This status indicates certain non-critical aspects of the poll failed. The issue is most commonly caused when data-buffered data retrieval is enabled in Power IQ but is configured with a "read" SNMP community string instead of a "write" community string. In this case, Power IQ can still perform a poll, but it won't be able to enable data buffering and set the appropriate sample rate on PDUs that support data buffering. Other possible causes of this error are incompatibility issues with the PDU running older firmware revisions, or if Power IQ is unable to persist sensor readings data to CSV file.
Poll incomplete	Certain aspects of the scan or poll failed, such as retrieving the model name, persisting outlet sensor data to CSV file, or retrieving information via SNMP. This can be due to an incompatibility with this version of the PDU or because the SNMP is misconfigured or the agent is disabled on the target PDU. Make sure the PDU's SNMP settings are correct. See Editing PDUs under Power IQ Management.
Application error	If the PDU is associated with a dynamic plugin, an index mapping may have failed to resolve. Check the dynamic plugin log for mapping resolution errors. If the PDU is not associated with a dynamic plugin, this indicates an unexpected application error. Contact Professional Services on the **Sunbird Support portal at http://support.sunbirddcim.com/support/home**.
No contact	This indicates that Power IQ was unable to communicate with the PDU over any of the supported management protocols and so can't discover and manage the PDU. The most often used protocol is SNMP, but a few PDU models are managed using other protocols like HTTP. There are a number of possible root causes for this. This may indicate that the IP address is incorrect.

Status	Explanation
	Correct the PDU's IP address. See **Editing PDUs under Power IQ Management**
Invalid Login Credentials	This indicates that the PDU was configured with an invalid administrative username or password. SNMP communication is still possible and Power IQ can manage the PDU, but firmware upgrades will not work.
Missing credentials	This indicates invalid or missing credentials. Correct the PDU's credentials. See Editing PDUs under Power IQ Management.
Unmanageable	This indicates that Power IQ contains no plug-in capable of managing the PDU. The target PDU is not supported by this version of Power IQ, or the plug-in requires a proxy index and one was not specified. Specify an appropriate proxy index if one is required but was not specified. Make sure Power IQ supports the PDU. See the list of supported PDUs on the Sunbird Addons Site. Create a dynamic plugin for the PDU. See **Dynamic Plugins**
Data Collection Failed	This indicates a PDU has not responded to the Data Poller after all retries. Event is generated: "Lost Connectivity: Data Collection Failed"
Ping Failed	This indicates a PDU has not responded to the Health Poller's pings after all retries. Event is generated: "Lost Connectivity: Ping Failed."
No Communication	This indicates a PDU has not responded to the Health Poller OR the Data Poller after all retries.

Troubleshooting Connectivity Health

A PDU's Ping Failed, No Communication, or Data Collection Failed Connectivity health status may be caused by one of these common problems. Troubleshoot using the following checklist.

Cause	Solution
The user has configured Power IQ with the wrong community string for the PDU.	Verify that Power IQ is configured with the correct SNMP community string.
The user has configured Power IQ with the wrong IP address for the PDU.	Verify that Power IQ is configured with the correct IP address.
There is an actual network connectivity issue between Power IQ and the target PDU.	Make sure the required ports are open between Power IQ and the PDU. See Ports Open Between Power IQ and PDUs. Verify that there aren't any other network issues preventing communication between Power IQ and the target PDU.
The PDU is powered off or not connected to the network.	Confirm that the PDU is powered on and is responding to requests over the network. For example, responding to ICMP echo or PING requests.
SNMP support is disabled on the PDU.	Some PDUs allow the SNMP agent to be started and stopped through the PDU's management interface. Verify that SNMP is running on the PDU and that it is responding to SNMP requests by running SNMP diagnostics from Power IQ or through 3rd party tools.
The configured SNMP timeout and retry value are insufficient for your use case. For example, managing remote PDUs over a WAN and due to network latency or bandwidth limitations, the default SNMP settings result in a large number of SNMP timeouts.	If you suspect that the default SNMP settings used by Power IQ are insufficient it may be possible to correct the issue by modifying the default SNMP settings used by Power IQ. See **Advanced Thread Pooling Settings**.
The SNMP agent on the target PDU is not responding to requests. One possible reason is that the PDU's processor is busy handling other tasks and is temporarily unable to respond to SNMP requests.	Verify that SNMP is running on the PDU and that it is responding to SNMP requests by running SNMP diagnostics from Power IQ or through 3rd party tools. If the SNMP agent on the PDU is the issue, restarting the SNMP agent on the PDU or rebooting the PDU may correct the problem.

Native Support for APC PDUs

Power IQ has a built-in/standard plug-in for APC PDUs

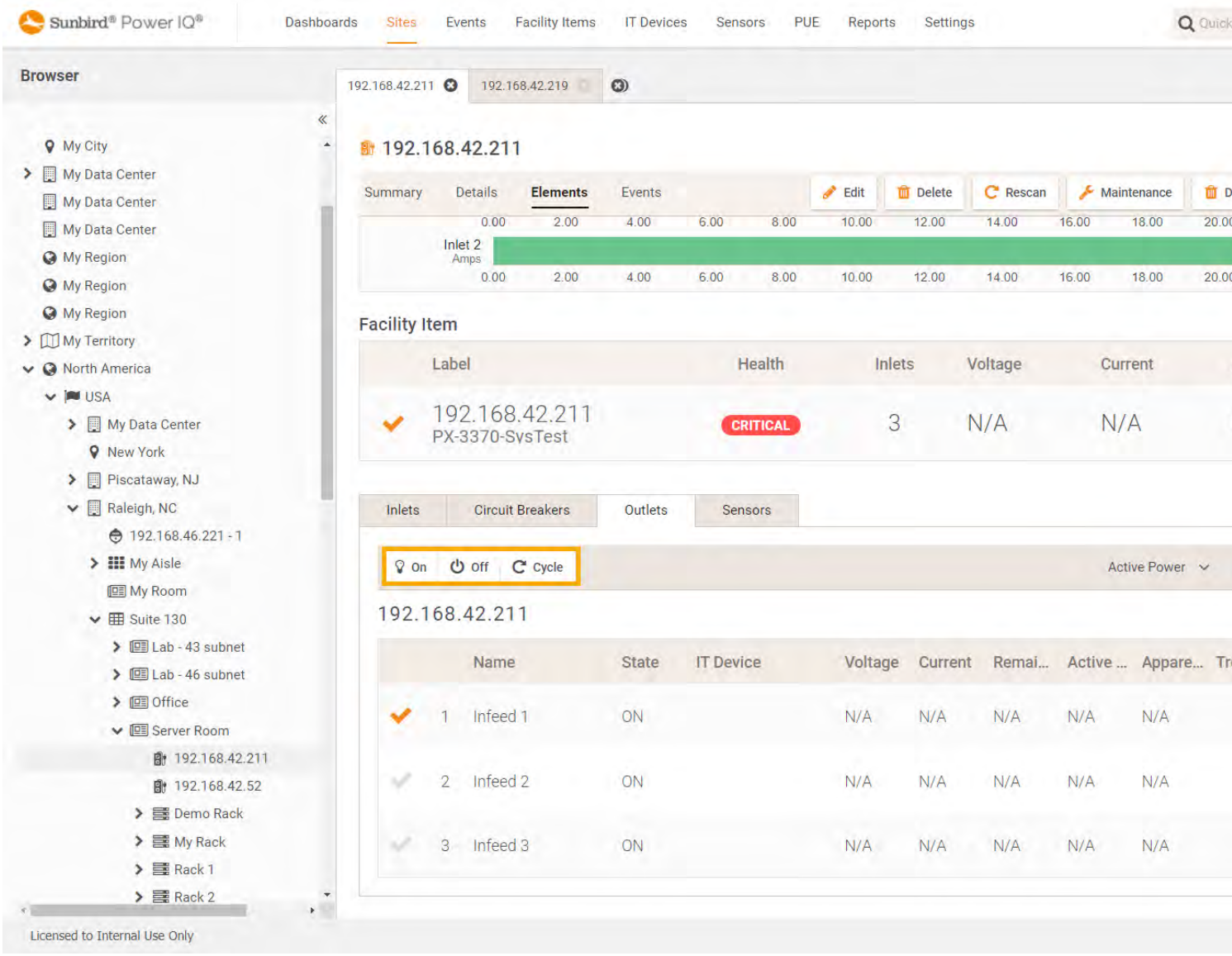
The following table lists supported APC models:

PDU Typr	PDU Type	PDU Model
Rack PDU	Metered Rack PDU Series	78XX
Switched Rack PDU Series	Switched Rack PDU Series	79XX
Rack PDU	Switched and Metered (Note: The standalone and daisy chained PDUs are both supported.)	8XXX
Rack PDU	Switched Rack PDU Series (Note: The standalone and daisy chained PDUs are both supported.)	9XXX
Rack PDU	Switched and Metered (Note: The standalone and daisy chained PDUs are both supported.)	10XXX

See the following links for Supported events by model:

- *APC 10000 Series PDU Supported Events* on page 213
- *APC 78XX/79XX/8XXX/9XXX Series PDU Supported Events* on page 212

Once Power IQ discovers the Chatsworth PDU via SNMP, it creates a Sites Entity tab for the PDU. The Sites Entity tab displays summary information about the PDU's power readings, health, and events. For more information, see *Facility Items Entity (Floor PDU, Power Panel, Rack PDU, Rack Transfer Switch, Rack UPS, Stand Alone Meters)Tabs* on page 424 If the PDU has outlets, these will also be available to view the monitored data and to perform power control, and power cycling of the outlets.



Note: Power IQ previously would have estimate the Apparent Power value for APC PDU's if that value wasn't reported by the PDU. In 9.1.0, Power IQ will no longer estimate this value. Instead, no apparent power value will show if the PDU doesn't report it directly.

Note: APC 10k Series PDUs need to be on firmware 2.0.6 or higher. Otherwise, you could see validation errors on outlet power control actions.

Note: Due to a firmware issue, environmental sensor traps are not supported for APC 10k Series PDUs.

Note: Due to issues with APC 10k PDU, Power IQ does not collect breaker status in R9.1.0.

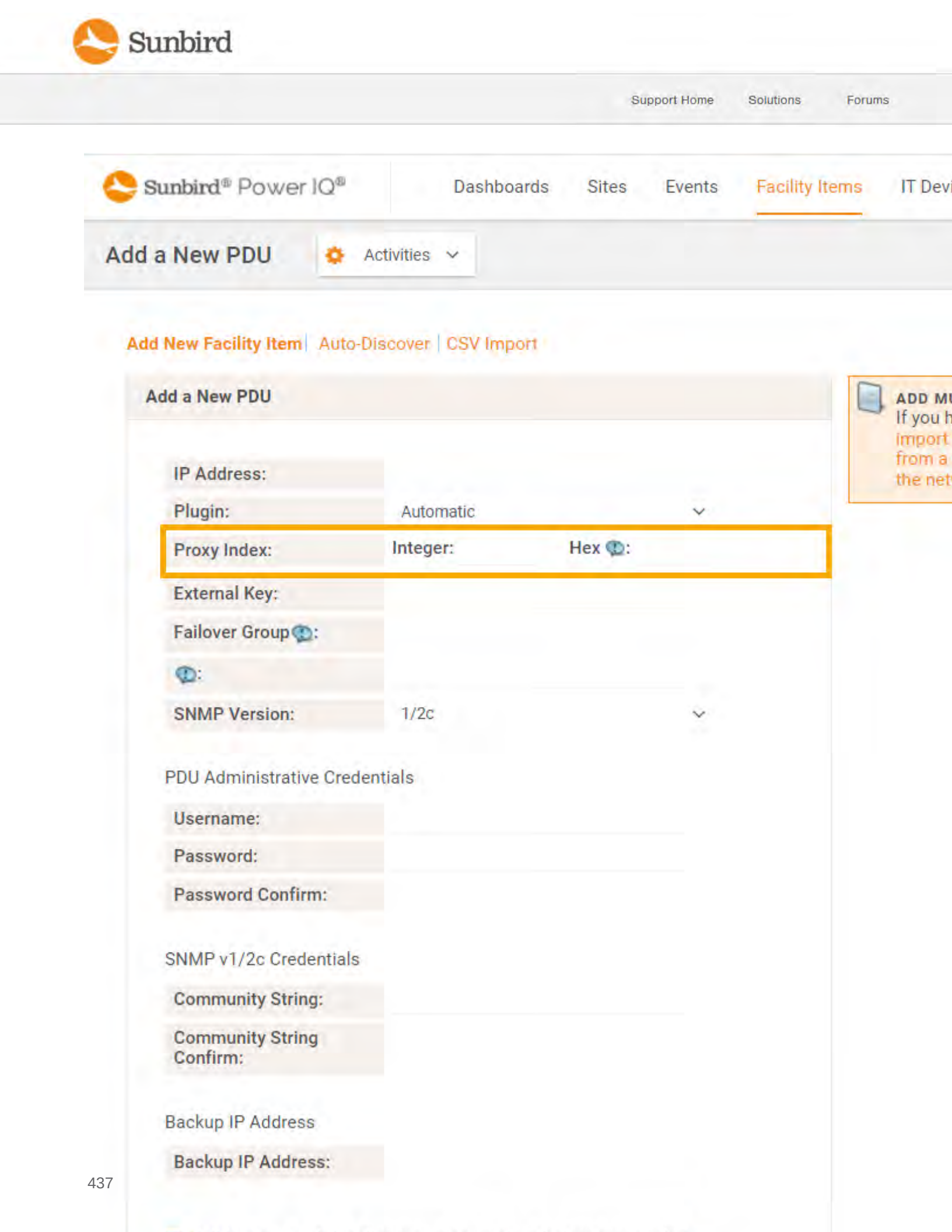
Native Support for Chatsworth eConnect PDUs

Power IQ has a built-in plug-in for Chatsworth e-Connect PDUs. When adding a PDU via the GUI, entering the Proxy Index as an Integer or in Hex is now supported. When a user enters in Hex, it will convert to an Integer and vice versa.

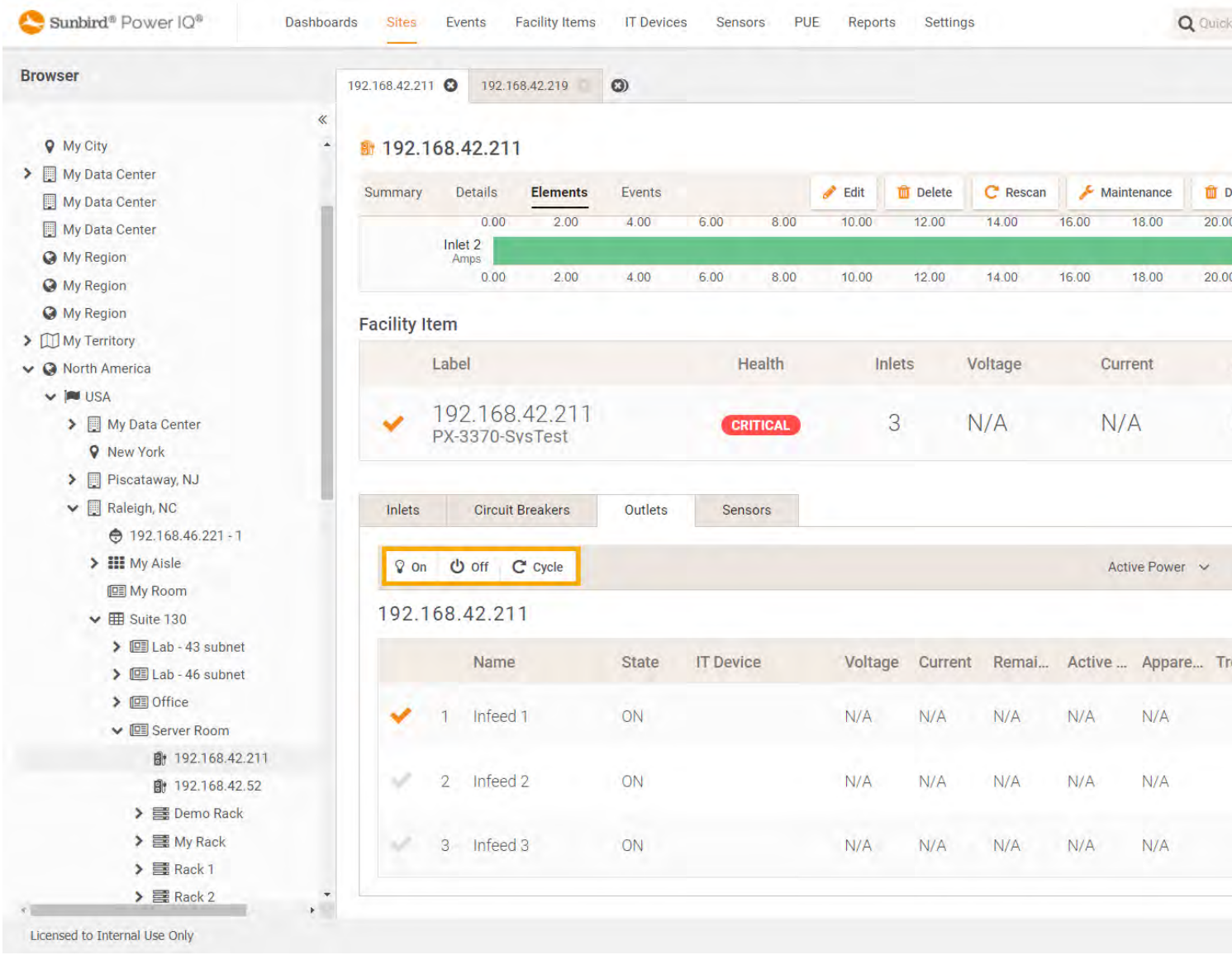
The standard plugin allows for Power Monitoring, Environmental Monitoring and Power Control.

Power IQ persist the MAC address of CPI eConnect PDUs as reported via the CPI MIB.

Note: When entering the proxy index in Hex for PDUs that use the MAC address as the proxy index, including Chatsworth e-Connect PDUs, enter the last six digits of the MAC address only.


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devi
Add a New PDU
Activities
Add New Facility Item | Auto-Discover | CSV Import
Add a New PDU
IP Address:
Plugin:
Automatic
Proxy Index:
Integer:
Hex :
External Key:
Failover Group :
:
SNMP Version:
1/2c
PDU Administrative Credentials
Username:
Password:
Password Confirm:
SNMP v1/2c Credentials
Community String:
Community String Confirm:
Backup IP Address
Backup IP Address:

Once Power IQ discovers the Chatsworth PDU via SNMP, it creates a Sites Entity tab for the PDU. The Sites Entity tab displays summary information about the PDU's power readings, health, and events. For more information, see *Facility Items Entity (Floor PDU, Power Panel, Rack PDU, Rack Transfer Switch, Rack UPS, Stand Alone Meters)Tabs* on page 424 If the PDU has outlets, these will also be available to view the monitored data and to perform power control, and power cycling of the outlets.

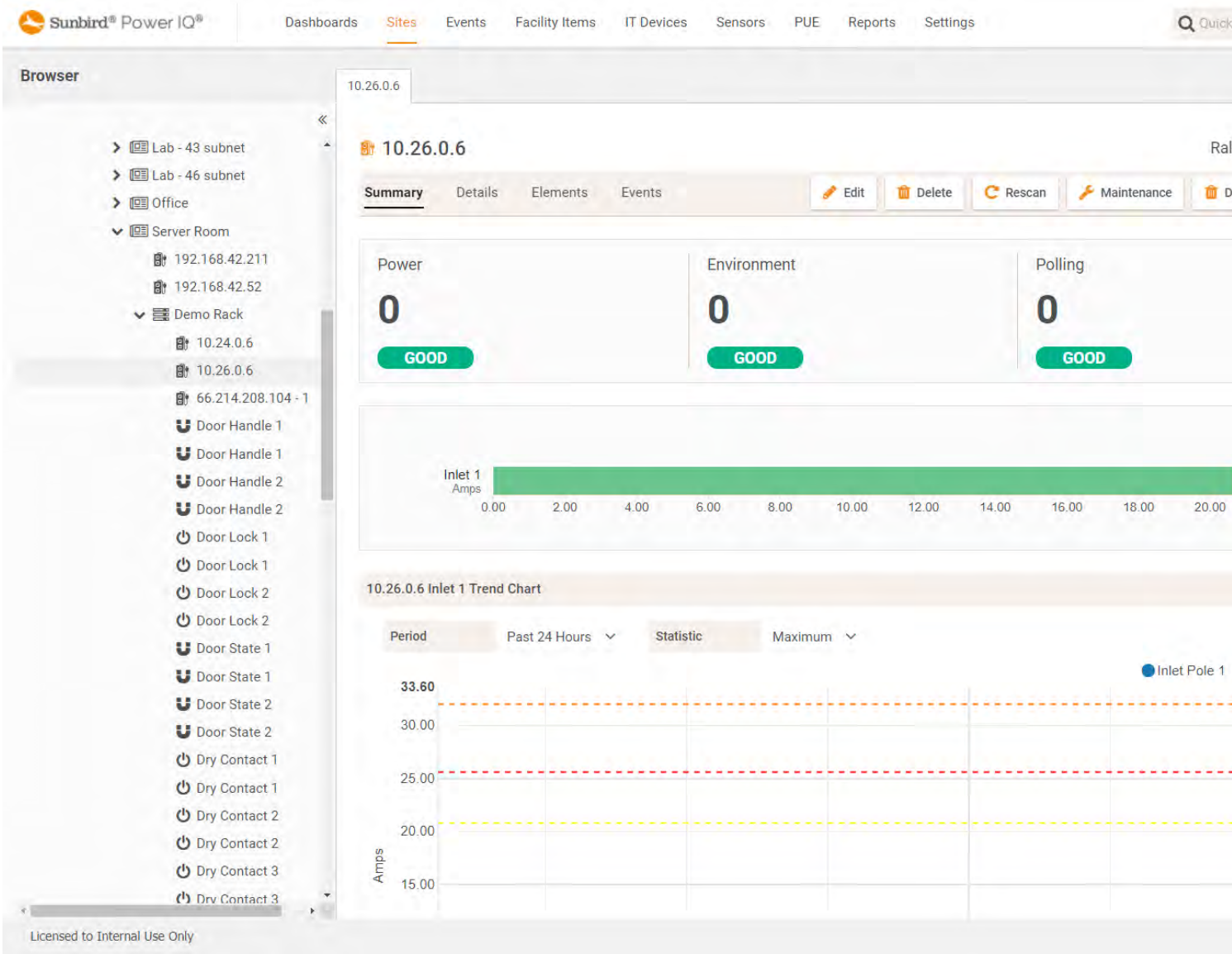


Note: Support for Power IQ Based Authentication of CPI Door Locks will be released after the new CPI firmware is available.

Launch the Web Browser of the Chatsworth PDU

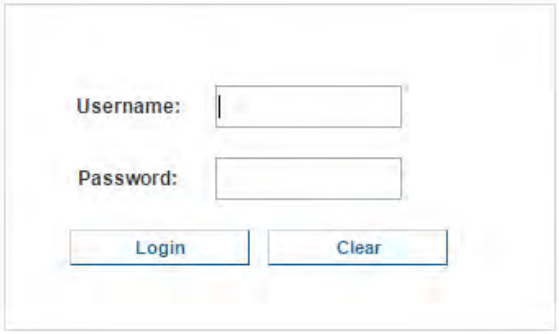
From the Actions menu on the PDU Sites Entity tab, the user will be able to launch the web browser of the Chatsworth PDU.

To launch the browser, click Actions > Launch.



After clicking Launch, you will be brought to the login page of the PDU itself.


CHATSWORTH
PRODUCTS, INC.


Username:
Password:
Login
Clear

3 Phase PDU Outlet Readings for Raritan PX1

Power IQ uses the following algorithm to convert three line readings into one outlet reading for current and voltage only. This algorithm applies only to 3 phase PX1 inline meters.

In the algorithm, "LineX_Readings" is a list of all the readings for a given time period.

```
MAX = MAX(MAX(Line1_Readings), MAX(Line2_Readings), MAX(Line3_Readings))AVG = MAX
(AVG(Line1_Readings), AVG(Line2_Readings), AVG(Line3_Readings))MIN = MAX(MIN
(Line1_Readings), MIN(Line2_Readings), MIN(Line3_Readings))
```

PDUs with Fuses

Most Raritan PDUs monitor load at the internal PDU circuit breaker. Some PDUs have fuses instead of circuit breakers.

If a PDU has fuses, information about them displays in Power IQ with the "Circuit Breaker" label.

PX models with an F1 suffix have a fuse instead of a circuit breaker.

Appendix C: Feature Compatibility

Sunbird Software is a vendor-agnostic solution that works with the rack PDUs you have. As the software partner of Raritan, Server Technology, Legrand, and Chatsworth Products, Sunbird offers additional functionality for the rack PDUs manufactured by these brands. The following table provides a comprehensive overview of the key features that Power IQ supports for each vendor as of version 9.0.1:

Power IQ Feature	Raritan PX3/PX4	Server Technology PRO4X	Server Technology PRO3X	Server Technology Sentry4	Server Technology Sentry3	Chatsworth Products (CPI)	All Rack PDUVendors
Collect Sensor Data	X	X	X	X	X	X	X
Receive Traps	X	X	X	X	X	X	X
Power Control	X	X	X	X	X	X	X
Bulk Update PDU Names	X	X	X	X	X	X	X
Bulk Update Sensor Names	X	X	X	X	X	X	X

Power IQ Feature	Rar-itan PX3/P-X4	Server Tech-nology PRO4X	Server Tech-nology PRO3X	Server Tech-nology Sentry4	Server Tech-nology Sentry3	Chats-worth Product-s (CPI)	All Rack PDUVen-dors
Bulk Update PDU Loca-tion	X	X	X	X	X	X	X
Bulk Update PDU Contact	X	X	X	X	X	X	X
Bulk Update PDU Outlet Names	X	X	X	X	X	X	X
Bulk Firm-ware Updates	X	X	X	X	X	X	
Bulk Set Trap Destin-ation	X	X	X	X	X	X	
Bulk Update SNMP Con-fig	X	X	X	X	X	X	
Bulk Update Password	X	X	X	X	X	X	
Bulk IP Address	X	X	X	X	X	X	

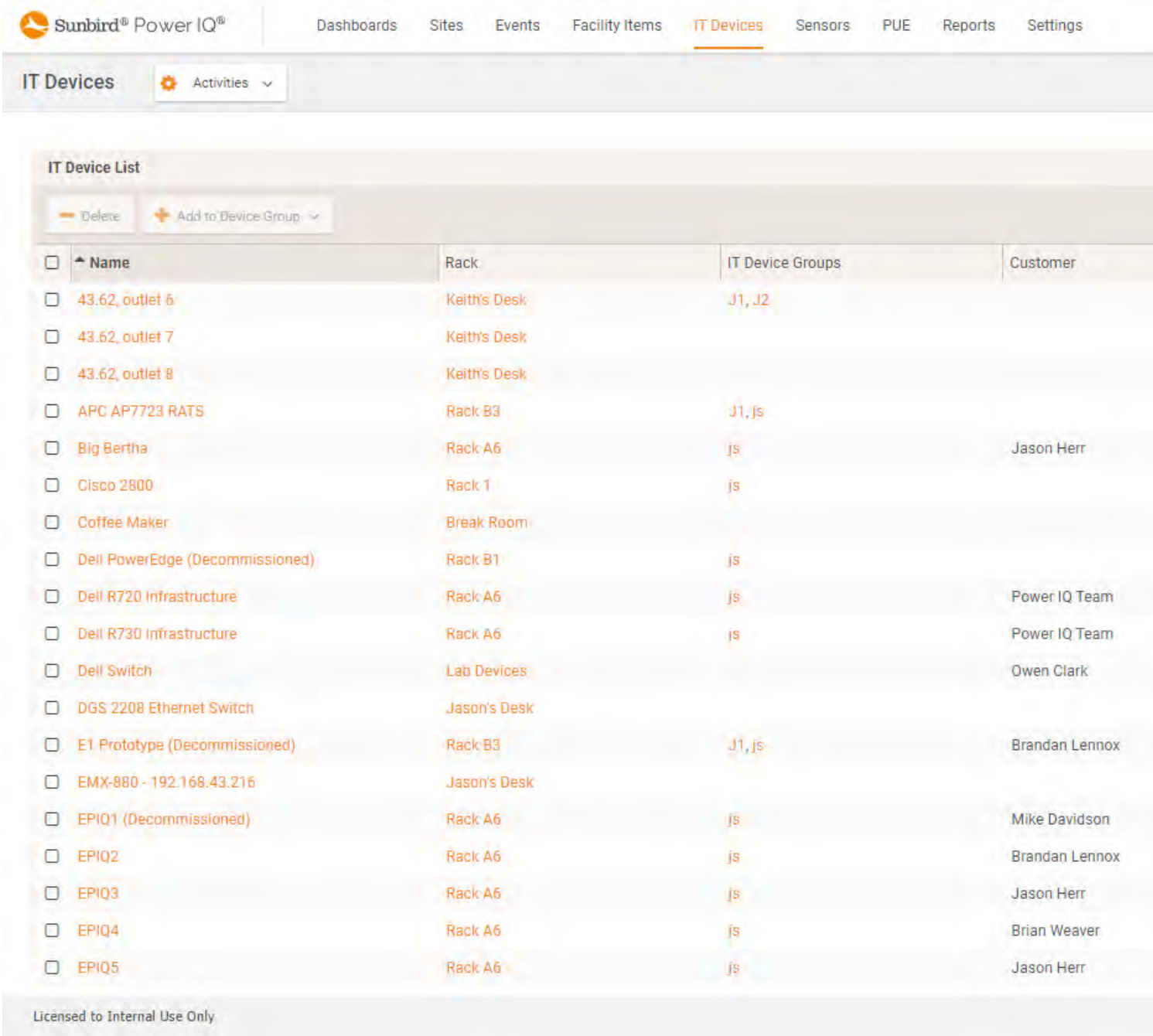
Power IQ Feature	Raritan PX3/PX4	Server Technology PRO4X	Server Technology PRO3X	Server Technology Sentry4	Server Technology Sentry3	Chatsworth Products (CPI)	All Rack PDUVendors
Change							
Collect Daily Config Backup	X	X	X	X			
Restore/Clone Config	X	X	X	X			
SNMP Informs	XX	X	X				
Stored Buffer Data Retrieval	X	X	X				
Door Access Authorized By Power IQ	X	X				X	
Door Access Authorized By Facility Item	X	X					

Note on Door Lock Support: Power IQ supports two authorization methods for door access control. The Facility Items push method only applies to the specified Legrand PDUs. See Configure the Door Access Control Authorization Method on page 393. for more information.

IT Devices

The IT Devices tab lists all the IT Devices in Power IQ and is the primary screen for managing IT Devices and Device Groups.

On the IT Devices list, you can delete IT devices or add devices to a device group via the Actions bar.



The following table summarizes the options available in the Activities menu

Activities Menu Options	
Option	**User Action/Description**
Show all devices	View the list of all devices.
Device groups	View the list of all devices groups and the controls to manage them.
Shutdown Commands	View the list of shutdown commands
Task Scheduling	View the Scheduling Tasks panel to schedule tasks
Add new task	View the New Power Scheduling Task panel to schedule new power control tasks
View task results	View the Power Scheduling Task Results List,
Import PDUs from CSV file	View the Import PDUs panel to import PDUs via CSV
Discover PDUs on the Network	View the Discover PDUs on the Network page, where you can auto-discover PDUs on your network.
Bulk configuration Activities	View the Bulk Configuration Activities panel in the Facility Items tab. See*Bulk Configuration of PDUs* on page 766
Bulk Firmware Updates	View the Bulk Configuration Activities panel in the Facility Items tab. See*Bulk Configuration of PDUs* on page 766
Download PDU sensor readings	View the Sensor Reading Archives, where you can download archives of PDU sensor readings.
PDU History	View the list of facility items you viewed recently

For more information see: *Creating a Device Group* on the facing page

Creating a Device Group

To create device groups for power control:

1. Make sure power control and scheduled power control is enabled. See **Enable or Disable Power Control** and **Configuring Power Control Options**.
2. In the IT Devices tab, select the devices you want to add to the group.
3. Click Add to Device Group > Create a new device group.
4. In the "Create a new device group" dialog, enter a name for the group, then click "Create device group".
5. The group is created, and the selected devices are added. A success message displays. Click "View device group" to open the device group details, where you can set the default power control delays and sequence of devices for power control operations. See Configuring the Power Control Settings for a Device Group.

Adding Devices to an Existing Device Group

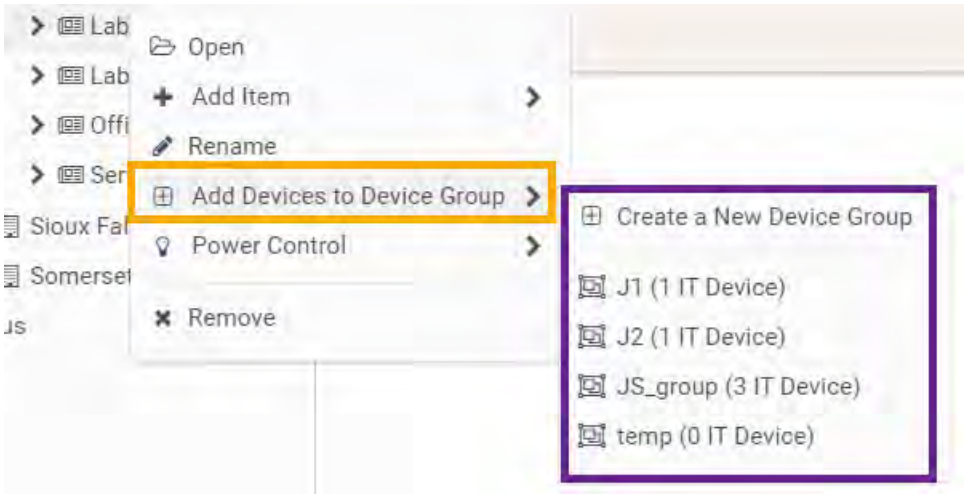
Once groups have been created, you can add devices to the group in the IT Devices tab.

1. In the IT Devices tab, select the devices you want to add to the group.
2. Click Add to Device Group, and the list of groups that have been created displays beneath the "Create a new group" option. Select the group you want to add the devices to.

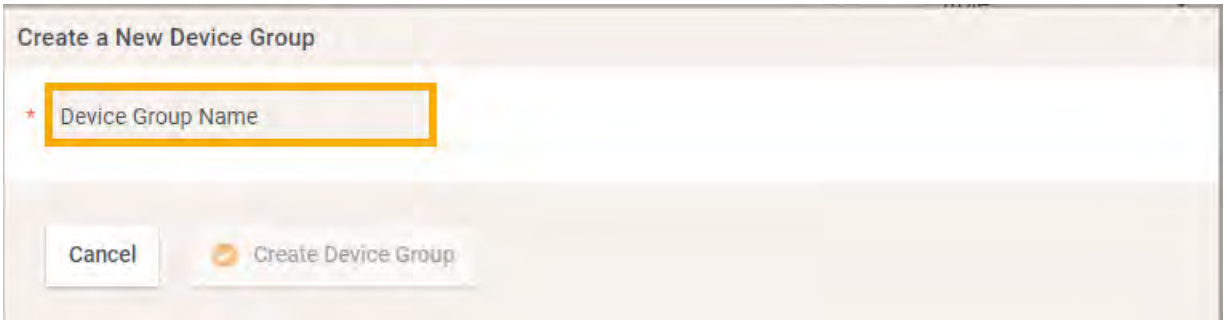
Adding Devices to a Group in the Sites Tab

You can add all devices within a Rack, Row, Aisle, Room, or Floor node to a new or existing device group in the Sites Tab.

1. In the Sites Tab, select the Rack, Row, Aisle, Room, or Floor node with the devices you want to add to a new or existing device group.
2. Right-click the node, and mouse-over the **Add devices to Device Group** option



3. If creating a new device group, select the **Create a new Device Group** option
   - In the Create a new Device Group pop-up, provide a name for the new group



   - Click the **Create Device Group** button
4. A success message will display with the number of devices added to the device group

Permissions

To add devices to a device group, your permissions must satisfy one of the following conditions:

You have the power control role or above on the node

You have a role above power control on the node

Remove a Device from a Group

1. In the IT Devices tab, choose Activities > Device groups.
2. Click the device group Name link.
3. Select the device you want to remove, then click Remove. The device is removed from the group, but not removed from Power IQ.

Sensors

When you add a PDU to Power IQ, the attached sensors are discovered.

Sensors can be viewed and managed using the Sensors grid in the Sensors tab. For more information, see *Use the Sensors Tab* below.

You can view the list of sensors attached to a PDU in the PDU's Sites entity tab.

Power IQ automatically associates your sensors into the EDM when their PDU is in the EDM. See Automatically Associate Sensors in the EDM.

You can change this automatic association to place a sensor in the EDM at any room, row, aisle, or rack level. View your sensors in the EDM hierarchy in the Data Centers tab. See Creating Your EDM.

Use the Sensors Tab

The Sensors Tab displays tables of all the sensors in Power IQ by the following categories: Environmental Sensors, Inlets and Circuit Breakers. Click a button in the sub-navigational menu to display the corresponding table

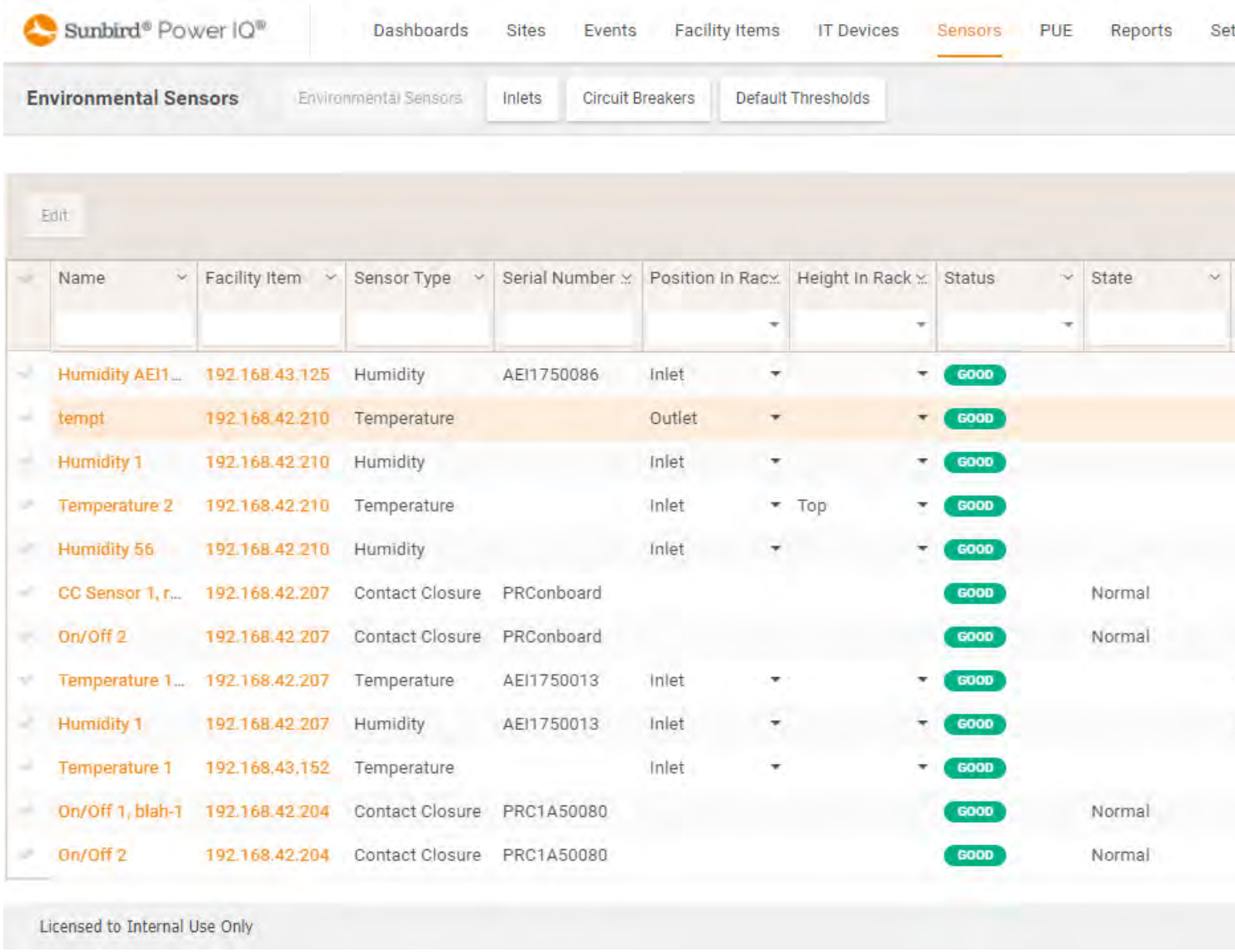
In the Sensors tab, System Administrators can easily view and manage all sensors in Power IQ with the following functions:

- Edit sensor information, including name, position in rack, height in rack, and thresholds (high warning, high critical, low warning, and low critical thresholds) in bulk or by double-clicking to edit
- Sort, filter, and group sensors by any of the available column criteria
- Aggregate numeric columns using count, sum, minimum, maximum, and average aggregate functions
- Show/hide the columns in the Sensors tables and save the modified grid configuration as the default
- Export the data to CSV

You can view a sensor's Sites entity tab by click the orange link with the sensor's name in the Name column. You can view the associated facility item's Sites entity tab by clicking the associated IP address link in the Facility Item column.

Note: Decomissioned sensors are not listed in the Sites Tab treeview

Note: The Status column reflects the health of the individual PDU, not the sensor.



Edit Sensors in the Sensors Tab

Sensor name, position in rack, height in rack, and thresholds (high warning, high critical, low warning, and low critical) can be edited via the Sensors grid in the Sensors tab.

To edit sensor information:

1. Select one sensor in the Sensors Table.
2. Click the Edit button. If no sensors are selected, the Edit button will be grayed out and inaccessible.

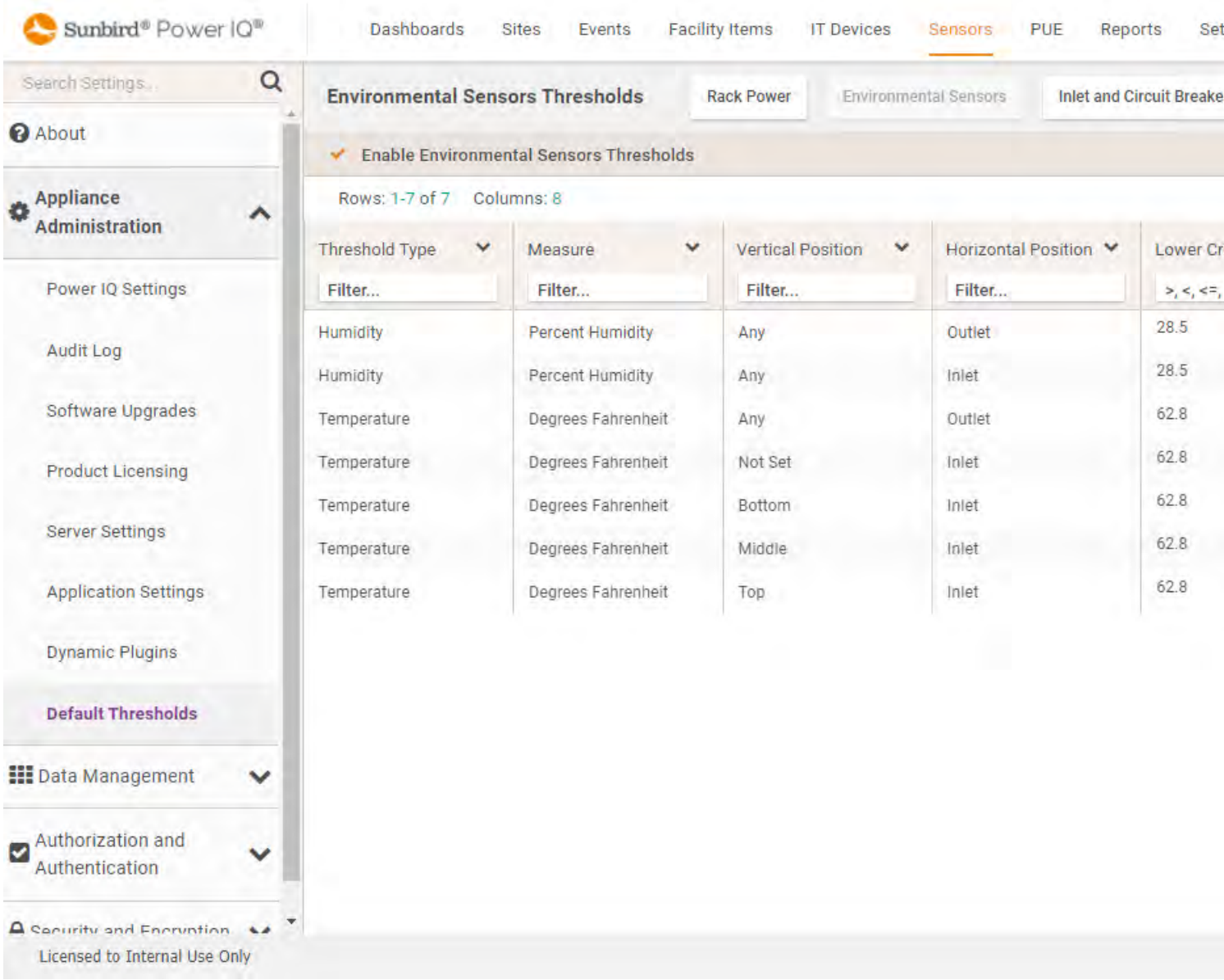
3. In the Updating Sensor dialog, make your changes to the following fields:
    a. Name
    b. Position in Rack: Inlet, Outlet, Outside Air
    c. Height in Rack: Top, Middle, Bottom
    d. Critical High Threshold (leave blank to use the default)
    e. Warning High Threshold (leave blank to use the default)
    f. Warning Low Threshold (leave blank to use the default)
    g. Critical Low Threshold (leave blank to use the default)
4. Click the Submit button.

A success message will display if your updates are successful.

Following the success message, the dialog will automatically close. The Sensors Table displays.

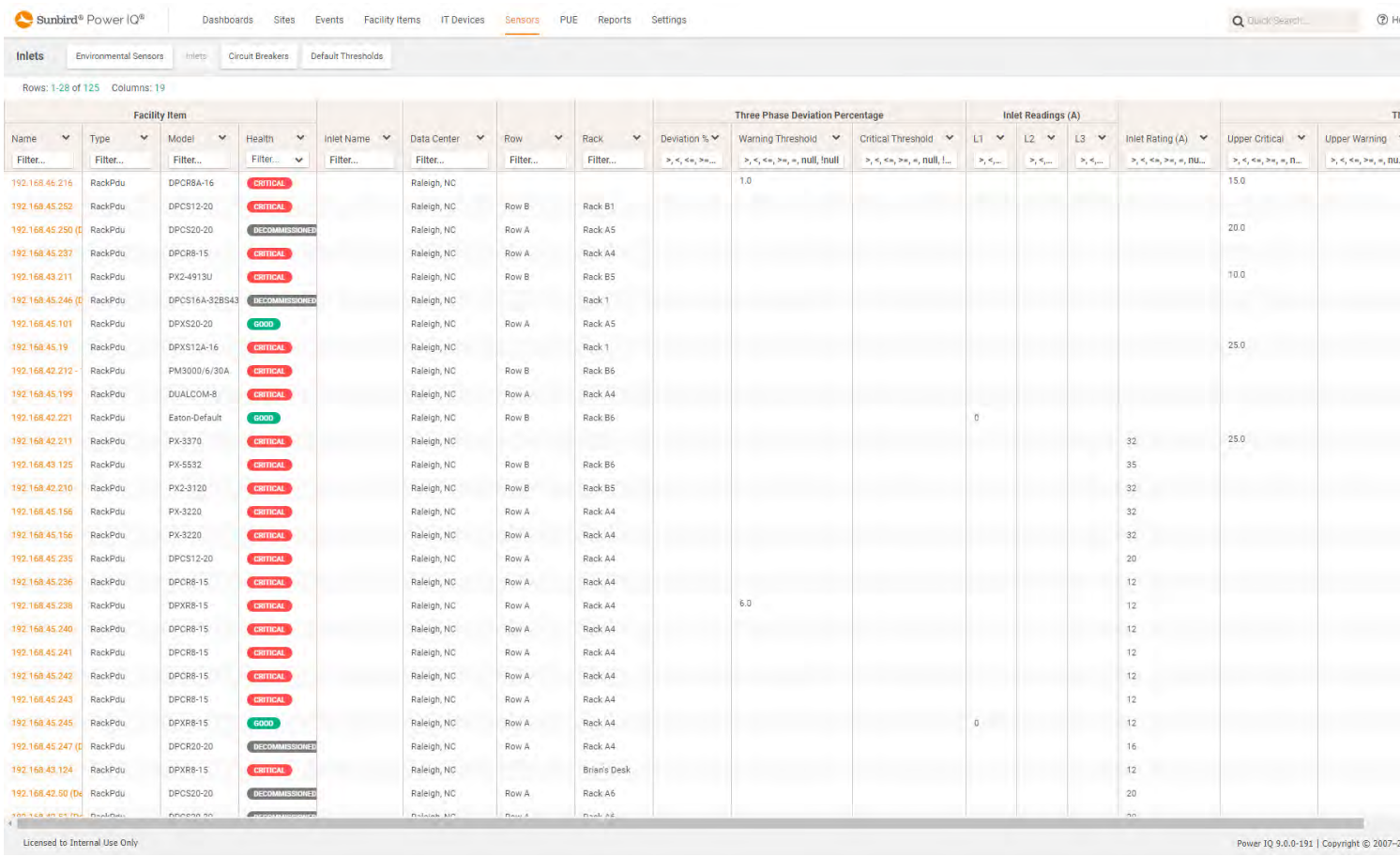
Administrators can set the default values for temperature and humidity sensors through the Power IQ Settings tab or by clicking the Default Thresholds button on the Sensors tab. For more information, see Configuring Default Threshold Settings.

You can also save the grid configuration, clear all filters, and choose to show or hide columns on the Thresholds table. Click the kebab menu icon in the upper-right of the table to display the Configuration menu and select the desired options.

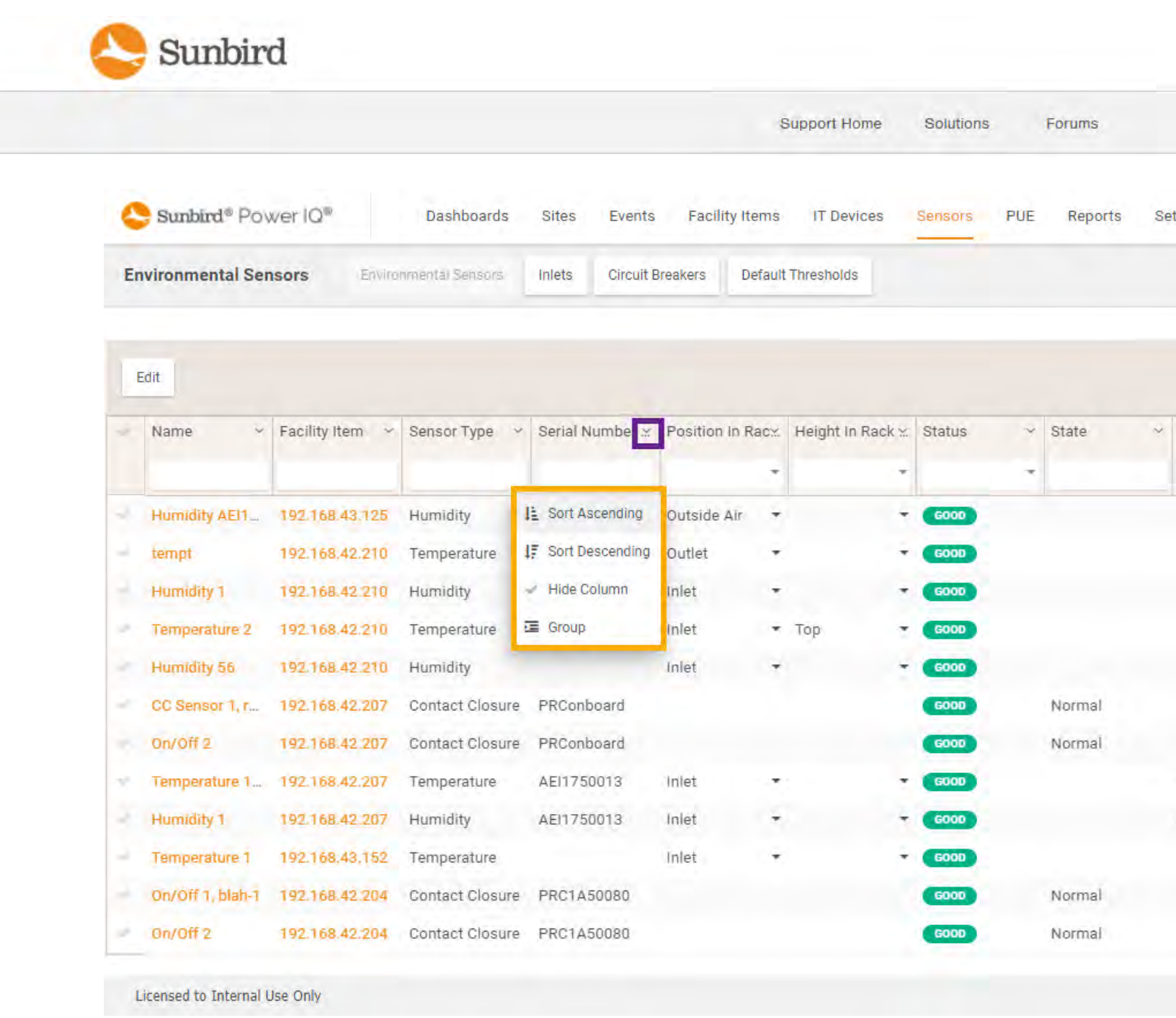


Sorting, Filtering, and Grouping Sensors

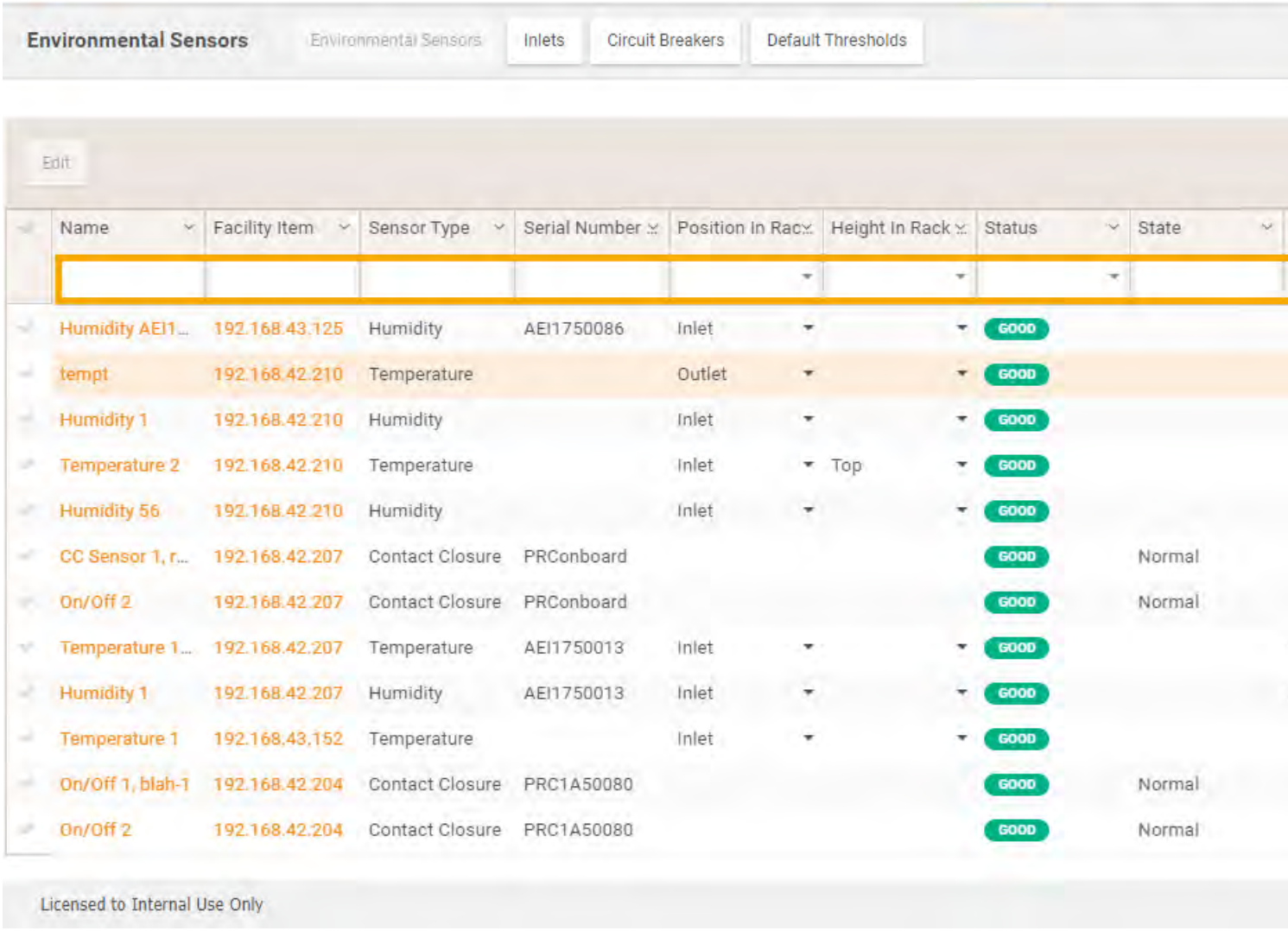
On the Sensors Table, you can sort, filter, aggregate, and group sensors by any of the available columns.



To sort, click on the downward chevron next to the column name in the header row. A dropdown menu displays with the options to sort, hide or group columns. For numeric columns, you also see options for the following aggregate functions: count, sum, minimum, maximum, and average.



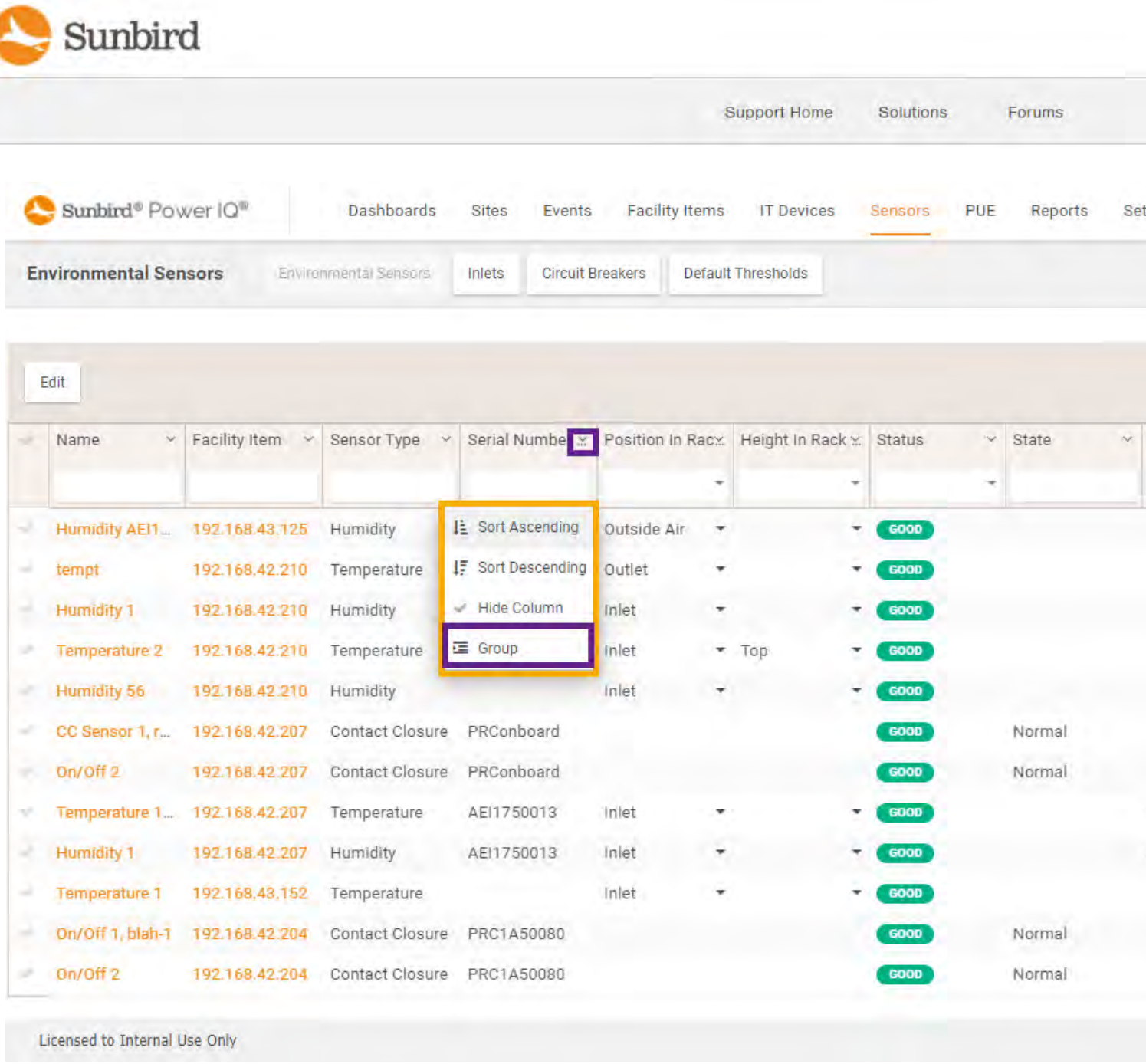
Type text to filter by that text in the filter text box fields directly below the name of each column. Numeric filters (less than, equal to, and greater than) can be used in any of the numeric columns.



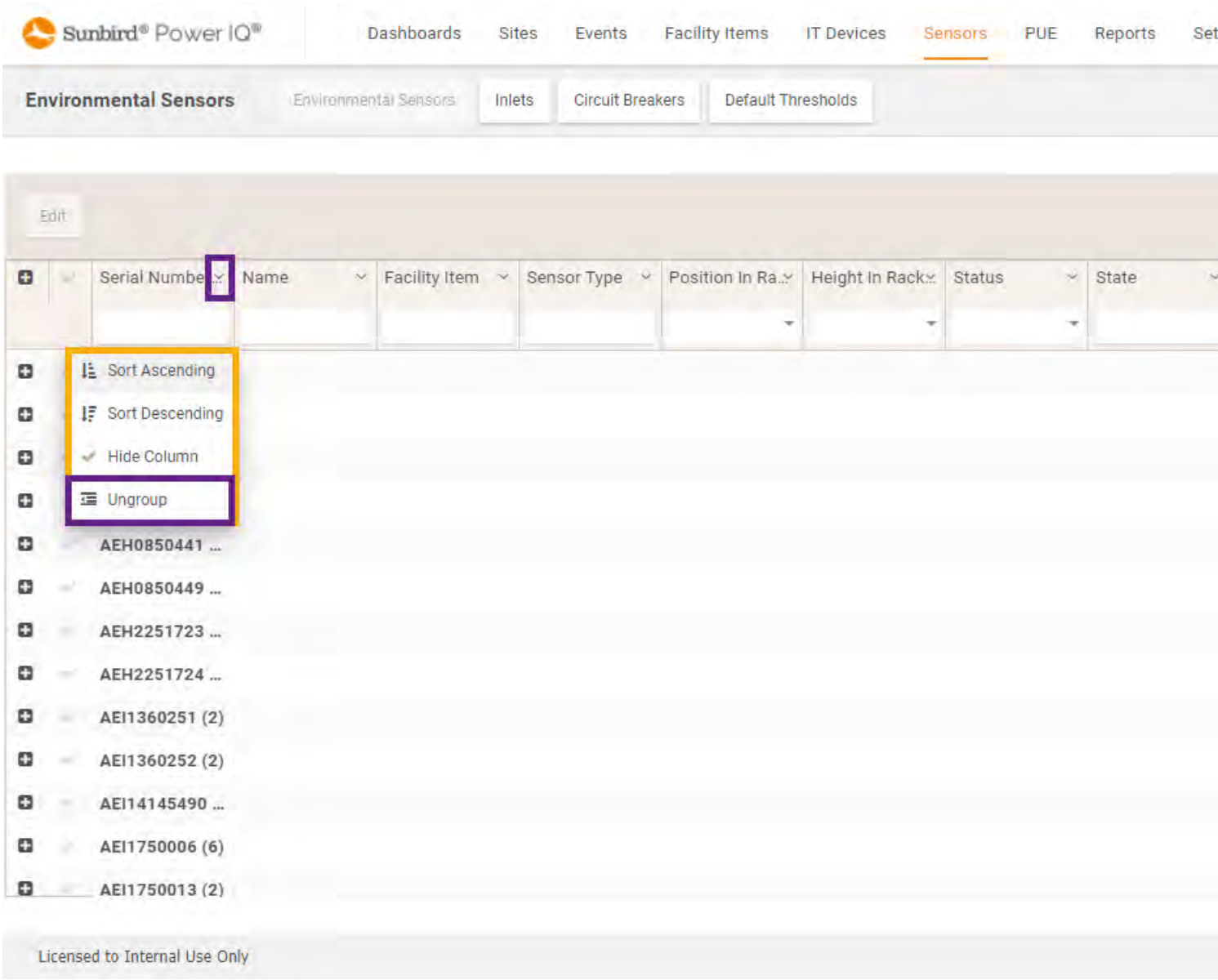
To clear filters, click the cancel (X) icon in each filter text field, or click the grid configuration icon and select the Clear all filters option.

To group sensors, click the downward chevron next to the name of the column you want to group by, then select the Group option.

When you group sensors by criteria, all of the sensors will be organized based on your selected criteria. The column you want to group by will be set to the first column in the grid. To view the sensors in each group, click the plus sign in the left column to expand each group.



To ungroup, click the download chevron next to the name of the column you are grouping by, and then select the Ungroup option.



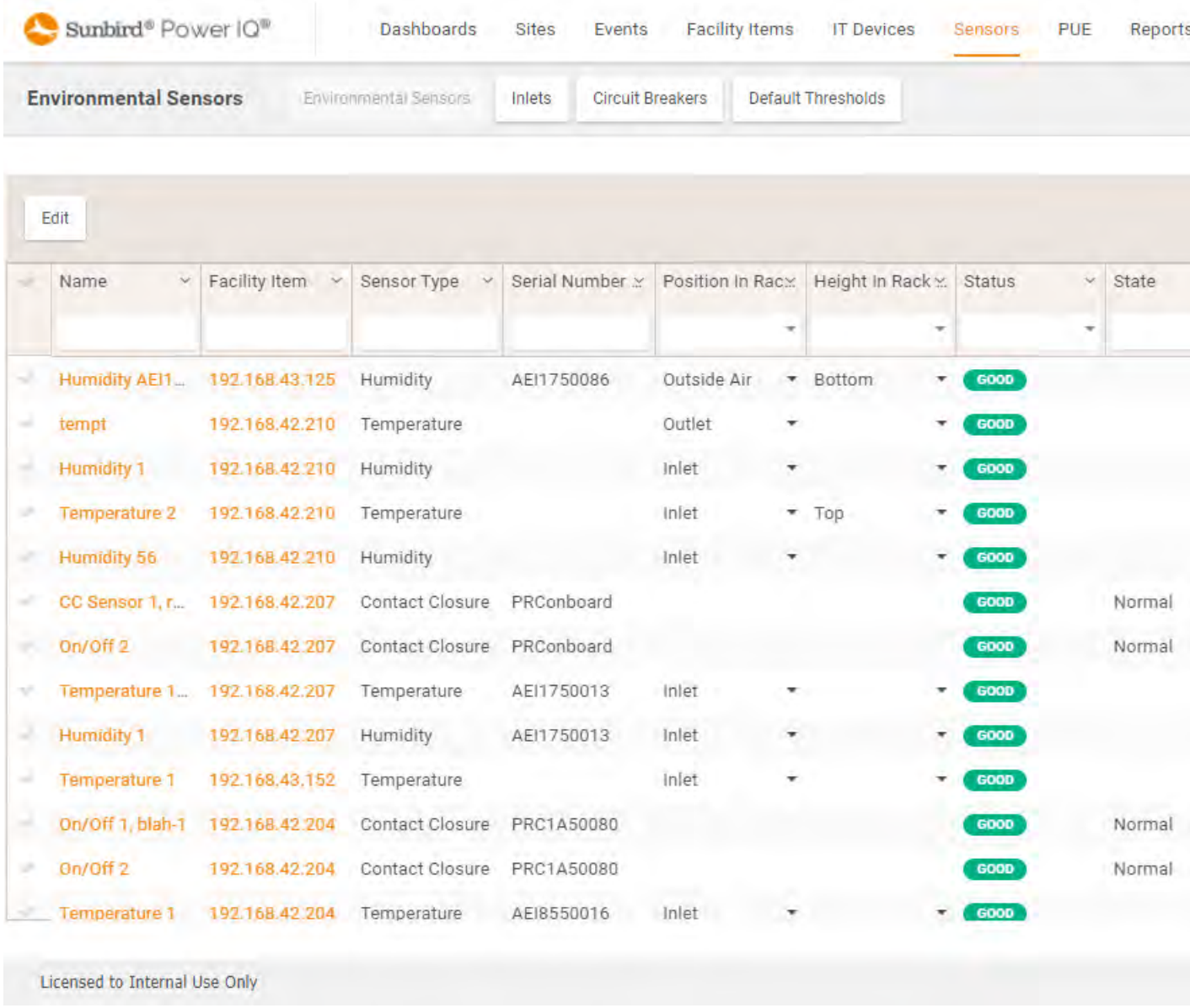
Export Data to CSV

Column data in the Sensors grid can be exported to a CSV file for further analysis. You can export either all of the sensor data in the grid or only the visible columns.

To export data to CSV:

1. On the Sensors grid, click the Grid Configuration (kebab) icon in the upper right corner of the table. The configuration drop-down menu displays.

2. To export all data in the grid, select the Export all data as csv option. To export only the data you can see in the current view, select the Export visible data as csv option.
3. In the Save As dialog, name your file and click the Save button.



Sensor Tab Columns

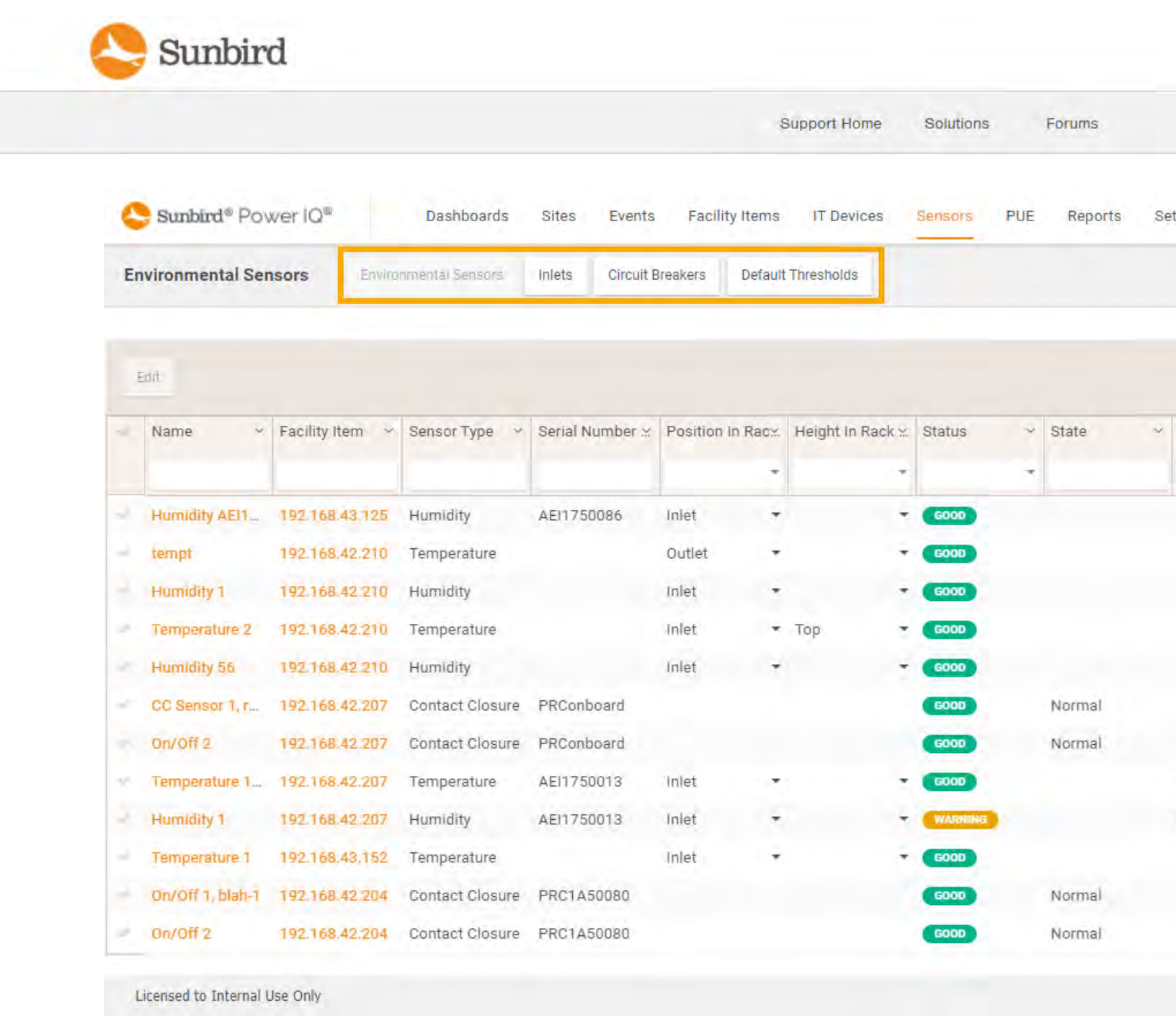
The following columns are available in the Sensors Tab:

- Name (always shown)
- Facility Item (always shown)

- Sensor Type
- Serial Number
- Position in Rack: Inlet, Outlet, Outside Air
- Height in Rack: Top, Middle, Bottom
- Status
- State
- Latest Reading
- 30 Day High
- 30 Day Moving Average
- 30 Day Low
- Data Center
- Unit of Measure (hidden by default)
- EDM Information Columns
    - Data Center
    - Floor
    - Room
    - Aisle
    - Row
    - Rack
- Critical Low
- Warning Low
- Warning High
- Critical High

Sub-navigational Menu

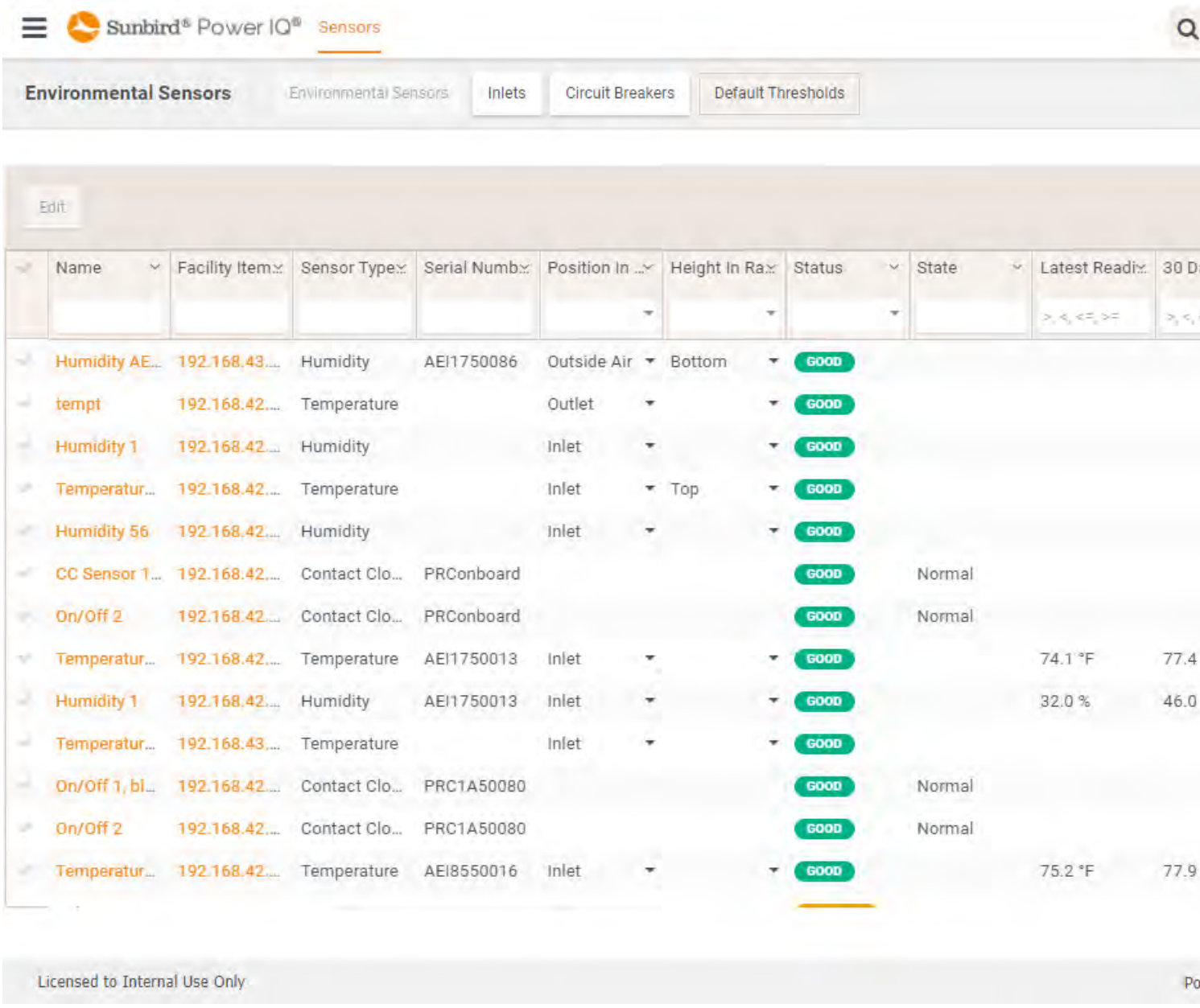
The Sensors Tab displays tables of all the sensors thresholds in Power IQ by the following categories: Environmental Sensors, Inlets and Circuit Breakers. Click a button in the sub-navigational bar to display the corresponding table. Thresholding must be enabled for all tables to be accessible. For more information, see Configuring Default Threshold Settings



The default rack thresholds can be overridden when set at the rack level. For more information, see *Rack Thresholds* on page 282.

Environmental Sensor Table

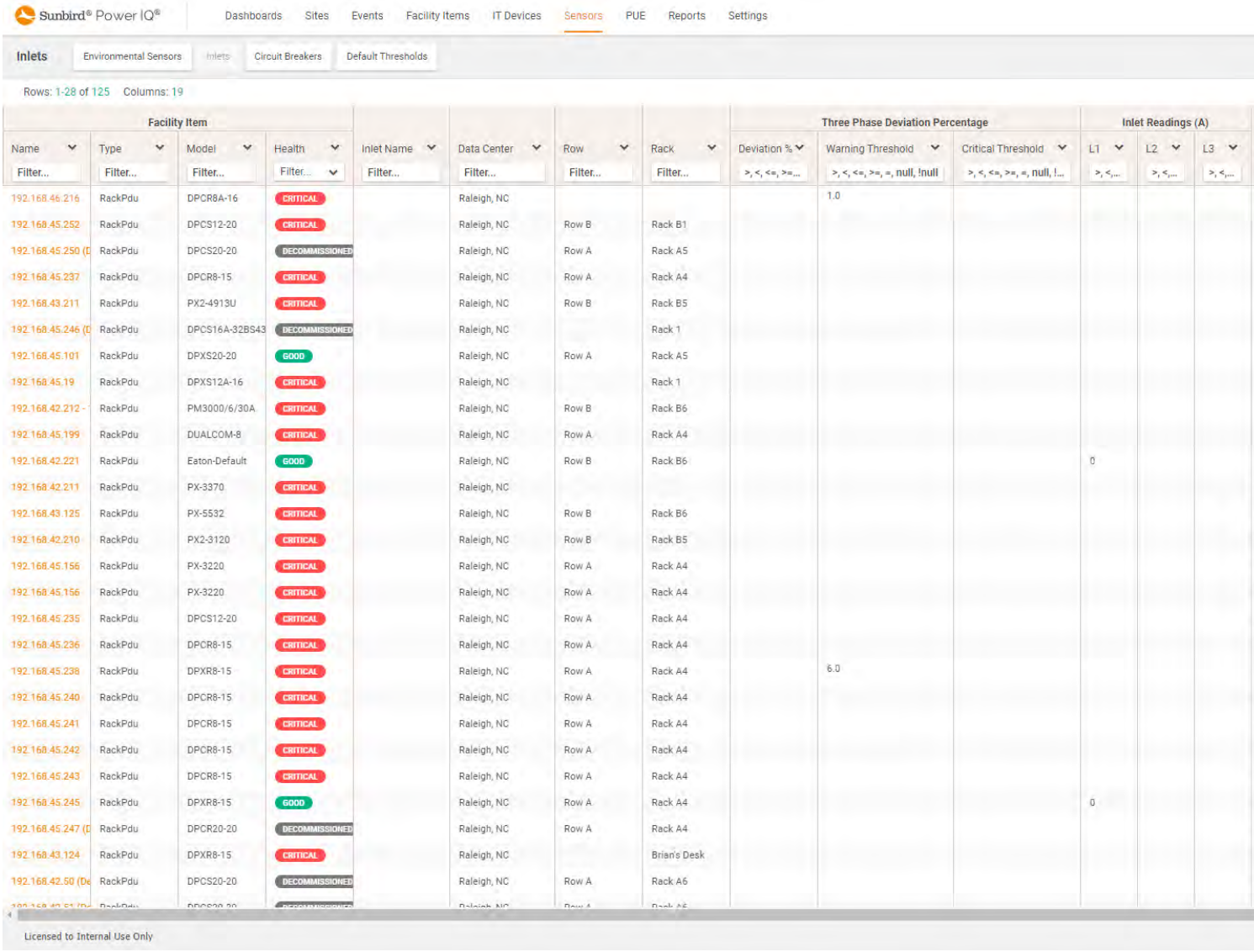
The environmental sensors table is the default view of the Sensors Tab



Inlets Table

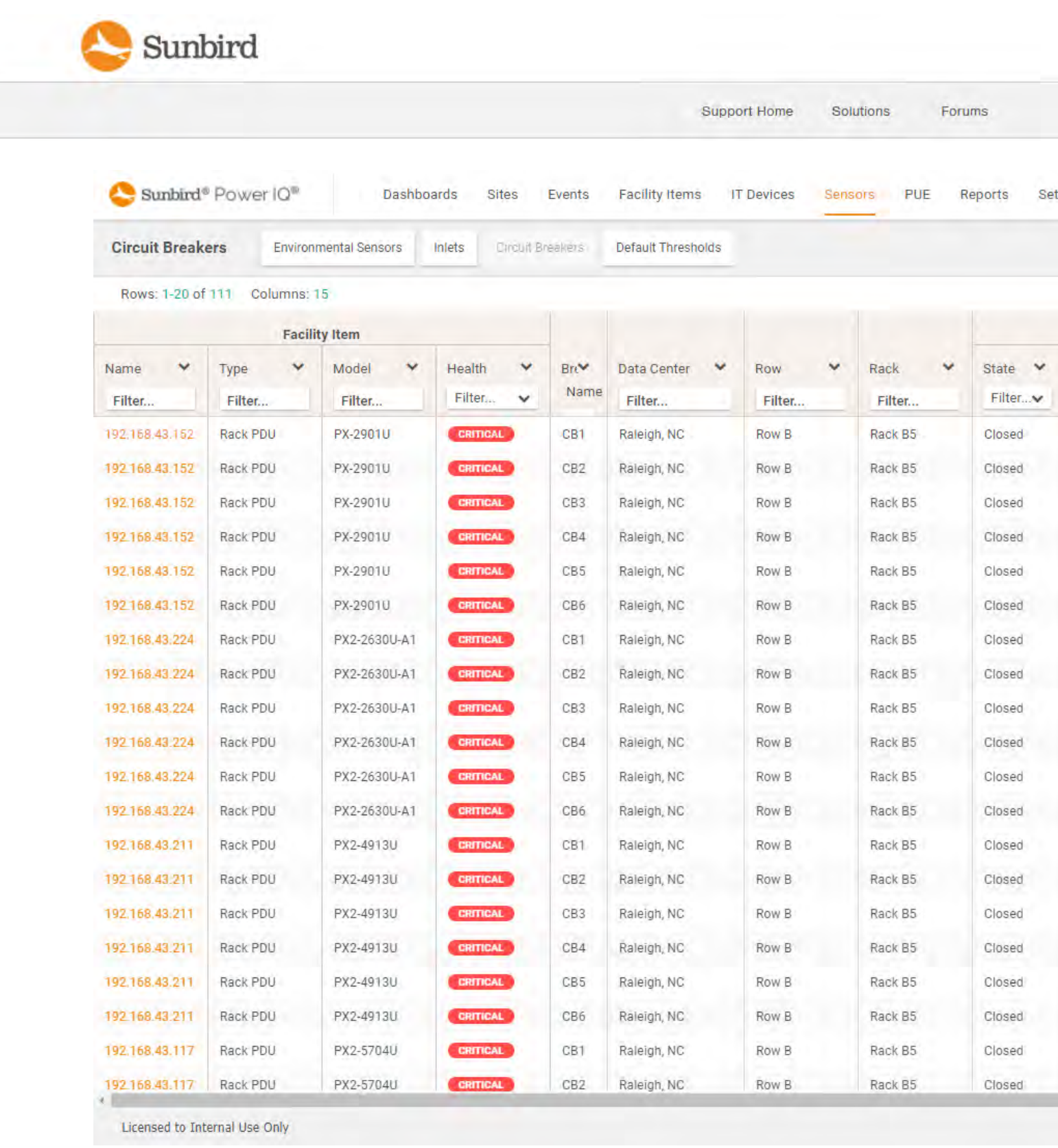
In the inlets table, users can override default thresholds by typing new values in the appropriate Thresholds column.

Note: Inlet Unbalanced Current Percentage Thresholds must be enabled to override Unbalanced Current thresholds. (Unbalanced Current values are calculated when there is at least 5 Amps of current on one of the phases.



Circuit Breakers

In the Circuit Breakers table, users can override default thresholds by typing new values in the appropriate Thresholds column.


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Reports
Circuit Breakers
Environmental Sensors
Inlets
Circuit Breakers
Default Thresholds
Rows: 1-20 of 111
Columns: 15
Facility Item
Name
Type
Model
Health
Br
Name
Data Center
Row
Rack
State
Filter...
192.168.43.152 Rack PDU PX-2901U CRITICAL CB1 Raleigh, NC Row B Rack B5 Closed
192.168.43.152 Rack PDU PX-2901U CRITICAL CB2 Raleigh, NC Row B Rack B5 Closed
192.168.43.152 Rack PDU PX-2901U CRITICAL CB3 Raleigh, NC Row B Rack B5 Closed
192.168.43.152 Rack PDU PX-2901U CRITICAL CB4 Raleigh, NC Row B Rack B5 Closed
192.168.43.152 Rack PDU PX-2901U CRITICAL CB5 Raleigh, NC Row B Rack B5 Closed
192.168.43.152 Rack PDU PX-2901U CRITICAL CB6 Raleigh, NC Row B Rack B5 Closed
192.168.43.224 Rack PDU PX2-2630U-A1 CRITICAL CB1 Raleigh, NC Row B Rack B5 Closed
192.168.43.224 Rack PDU PX2-2630U-A1 CRITICAL CB2 Raleigh, NC Row B Rack B5 Closed
192.168.43.224 Rack PDU PX2-2630U-A1 CRITICAL CB3 Raleigh, NC Row B Rack B5 Closed
192.168.43.224 Rack PDU PX2-2630U-A1 CRITICAL CB4 Raleigh, NC Row B Rack B5 Closed
192.168.43.224 Rack PDU PX2-2630U-A1 CRITICAL CB5 Raleigh, NC Row B Rack B5 Closed
192.168.43.224 Rack PDU PX2-2630U-A1 CRITICAL CB6 Raleigh, NC Row B Rack B5 Closed
192.168.43.211 Rack PDU PX2-4913U CRITICAL CB1 Raleigh, NC Row B Rack B5 Closed
192.168.43.211 Rack PDU PX2-4913U CRITICAL CB2 Raleigh, NC Row B Rack B5 Closed
192.168.43.211 Rack PDU PX2-4913U CRITICAL CB3 Raleigh, NC Row B Rack B5 Closed
192.168.43.211 Rack PDU PX2-4913U CRITICAL CB4 Raleigh, NC Row B Rack B5 Closed
192.168.43.211 Rack PDU PX2-4913U CRITICAL CB5 Raleigh, NC Row B Rack B5 Closed
192.168.43.211 Rack PDU PX2-4913U CRITICAL CB6 Raleigh, NC Row B Rack B5 Closed
192.168.43.117 Rack PDU PX2-5704U CRITICAL CB1 Raleigh, NC Row B Rack B5 Closed
192.168.43.117 Rack PDU PX2-5704U CRITICAL CB2 Raleigh, NC Row B Rack B5 Closed
Licensed to Internal Use Only

Sensor Thresholds

Sensor thresholding creates events and event notifications when a power, temperature or humidity sensor reading exceeds or is below the threshold settings. The readings are based on the latest readings collected by Power IQ via the associated facility item.

System Administrators can set default sensor thresholds in the Settings tab > Appliance Administration > Threshold Settings or override the default values individually on the Sensors grid in the Sensors tab. Note that environmental thresholding is automatically enabled if rack power thresholding is already enabled on your system. Otherwise, thresholding is disabled by default. System Administrators can configure the setting on the Settings tab on the Default Thresholds tab under Appliance Administration. For more information, see:

- Configuring Default Threshold Settings.
- *Use the Sensors Tab* on page 454

To receive event notifications, configure notification filters to include environment sensor events. See *Configure Event Notification Filters* on page 303.

Configuring Default Threshold Settings

To edit default thresholds:

1. Click the Settings Tab.
2. Under Appliance Administration, click the Default Thresholds link.
3. On the Default Thresholds page, check the Enable Power, Temperature, and Humidity Thresholding box.

   Note: To disable thresholding, uncheck the Enable Power, Temperature, and Humidity Thresholding box. However, if you disable thresholding, a message will display indicating that changing polling options requires the poller software to restart, which may take up to a few seconds. To confirm and continue, click the OK button. Otherwise, click the Cancel button to return to the Default Thresholds page.

4. To edit the lower warning, lower critical, upper warning, and upper critical thresholds, double-click in each cell.
5. Your changes are saved automatically. A green success message will display at the top of the page when a threshold change has successfully been saved.

Note: Temperature Thresholds are not supported for sensors in the Outside Air position.

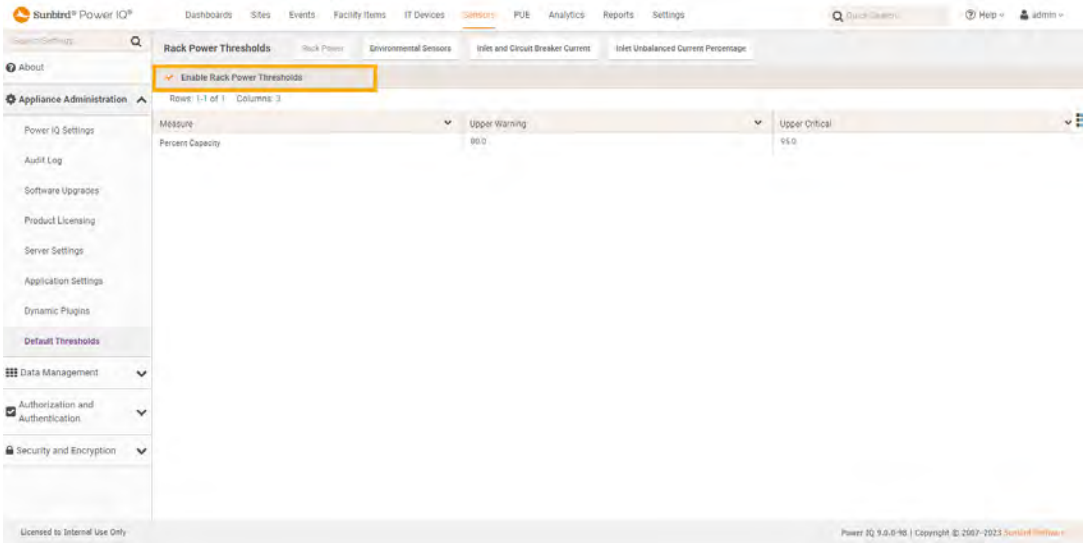
Report and Monitor 3 Phase Power

The following information is applicable to all 3 phase devices that are metered for AMPs on each inlet. These devices can be rack PDUs, rack UPSs, meters, drops, end of busway meters, RPPs, panels, floor PDUs and UPSs.

The monitoring feature can be enabled or disabled by the admin. It is disabled by default.

To enable monitoring

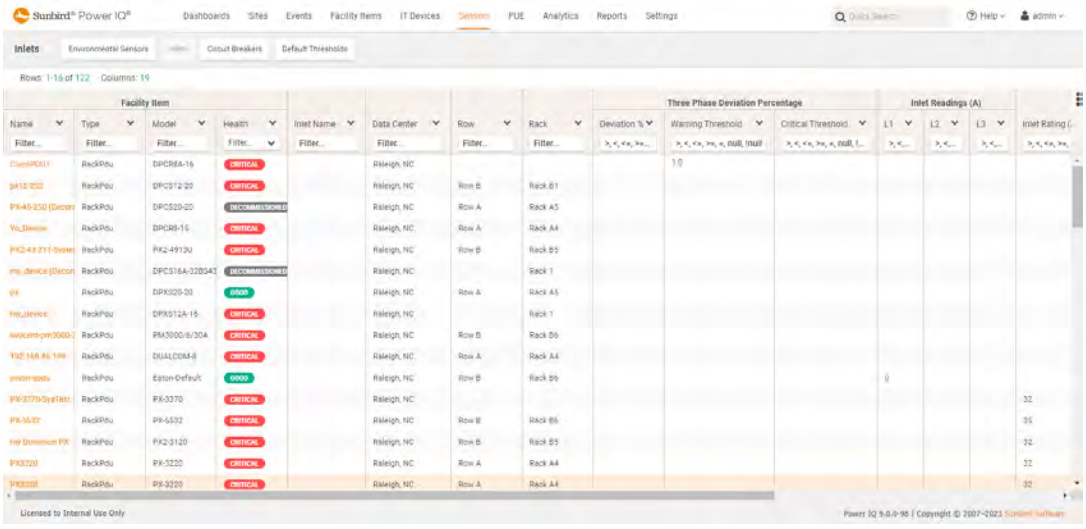
1. In the Sensors Tab, click Default Thresholds.
2. Check Enable Rack Power Thresholds.



Power IQ collects the 3 phase inlet amp readings and rating (if available) during each poll.

It calculates an "Unbalanced Current %" with the following equation: "Unbalanced Current %" = (max difference of any one phase from the average of all three phases)/ (average of all three phases).

Power IQ displays the above readings in a sortable, filterable and exportable table along with other related information such as location, facility item name, inlet name, type, model and health. You can also save your favorite table configuration.



To enable Inlet Unbalanced Current Percentage Thresholds,

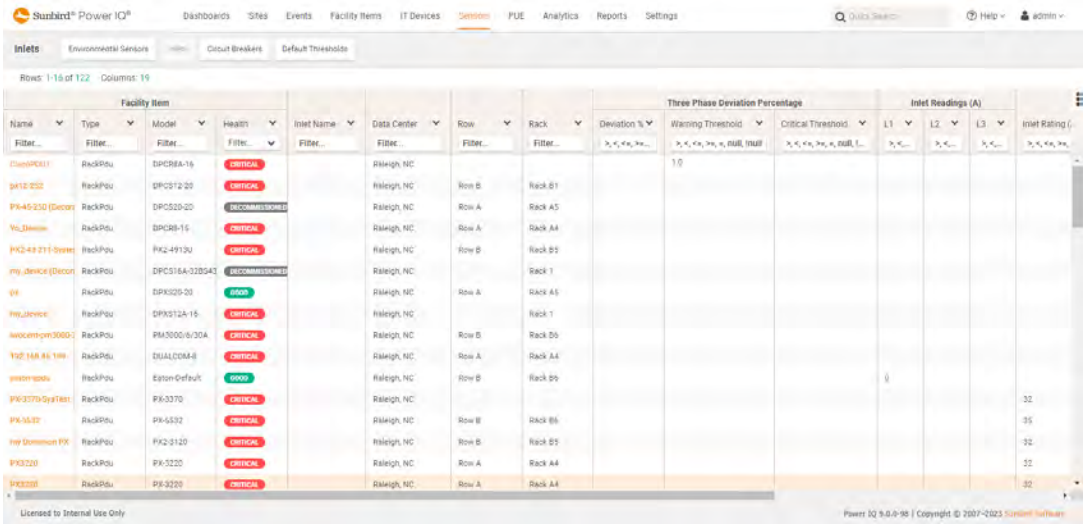
1. Ensure that monitoring is enabled
2. In the Sensors Tab, click the Default Thresholds. Click Inlet Unbalanced Current Percentage.

3. Check Enable Inlet Unbalanced Current Percentage Thresholds.

Note: Unbalanced Current values are calculated when there is at least 5 Amps of current on one of the phases.)

To view Inlet data:

1. In the Sensors tab, click Inlets
2. Filter on one or more columns
3. Click the 3 dot icon to show/hide columns, export report & save grid configuration.



For additional information, see this video on the Sunbird Support Portal: Power IQ Sensor Tab Data and Configuration

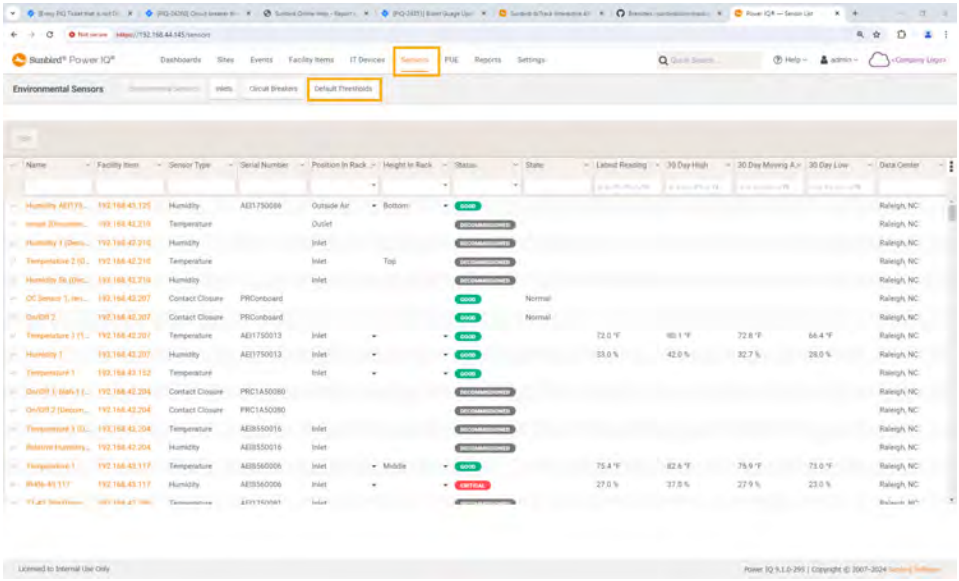
Report and Monitor Circuit Breakers

The following information applies to all devices for which Power IQ collects circuit breaker information. These devices are typically rack PDUs and busway drops.

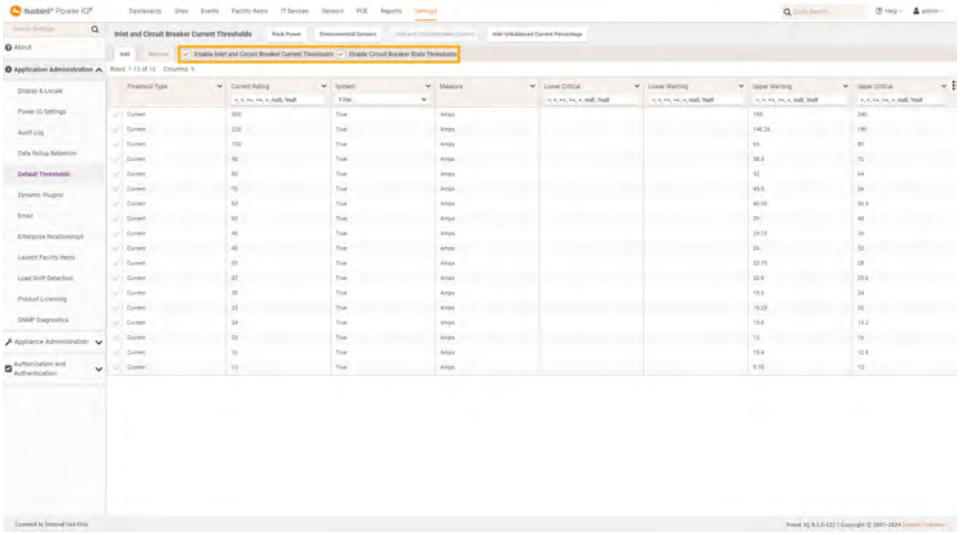
The monitoring feature needs to be enabled by the admin.

To enable monitoring:

1. In the Sensors Tab, select Default Thresholds.

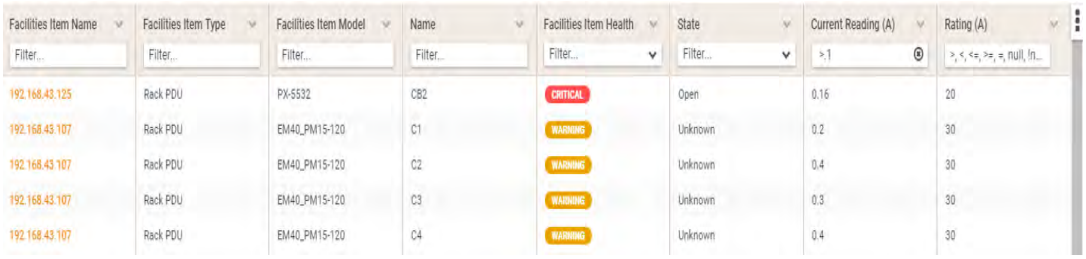


2. Alternatively, in the Settings tab, select Application Administration > Default Thresholds.
3. Select Inlet and Circuit Breaker Curren. The Inlet and Circuit Breaker Current Thresholds list displays
4. On the Inlet and Circuit Breaker Current Thresholds list, check Enable Inlet and Circuit Breaker Current Thresholds and Enable Circuit Breaker State Thresholds.



Power IQ collects each circuit breaker state, load and rating(if available) during each poll.

It displays the above readings in a sortable, filterable and exportable table along with other related information such as location, facility item name, circuit breaker name, type, model and health. You can also save your favorite table configuration.



Facilities Item Name	Facilities Item Type	Facilities Item Model	Name	Facilities Item Health	State	Current Reading (A)	Rating (A)
192.168.43.125	Rack PDU	PX-5532	CB2	CRITICAL	Open	0.16	20
192.168.43.107	Rack PDU	EM40_PM15-120	C1	WARNING	Unknown	0.2	30
192.168.43.107	Rack PDU	EM40_PM15-120	C2	WARNING	Unknown	0.4	30
192.168.43.107	Rack PDU	EM40_PM15-120	C3	WARNING	Unknown	0.3	30
192.168.43.107	Rack PDU	EM40_PM15-120	C4	WARNING	Unknown	0.4	30

Steps to view Circuit Breaker Thresholds data::

1. Click the Sensor tab
2. Click Circuit Breakers.
3. Filter on one or more columns
4. Click the Grid configuration icon to show/hide columns, export report and save grid configuration.

For additional information, see *Sensors* on page 453 and the video at Sensors & Thresholds

Specify Inlet, Outlet, or Outside Air Location for Environmental Sensors

You can specify the position of a sensor from the following options: Inlet, Outlet, or Outside Air. By default, Power IQ categorizes all environmental sensors to be in the Inlet position.

Sensors are editable only when included in the EDM. See Creating Your EDM.

All sensor types can be included in Cooling charts on the dashboard. See Cooling Chart Widget.

Note: Temperature Thresholds are not supported for sensors in the Outside Air position.

In the Sensor's Sites entity details tab, select the Sensor Location: in the Sensor details card. See*Sensor Entity Details Card* on page 150 .

Sensors Connected to PX1 and PX2 PDUs

Raritan PX1 and PX2 PDUs support environmental and contact closure sensors, which you can poll through Power IQ.

The sensors must be setup and configured correctly via the PX1 or PX2 before they will work correctly with Power IQ.

See the online help for your PX model PDU here:

- Raritan PX Product Support
- Raritan PX2 Product Support

States of Managed Sensors

An environmental sensor shows the state after being managed.

Available sensor states vary depending on the sensor type -- numeric or discrete sensors. For example, a contact closure sensor is a discrete (on/off) sensor so it switches between three states only -- unavailable, alarm and normal.

Note: Numeric sensors show both numeric readings and sensor states to indicate environmental or internal conditions while discrete (on/off) sensors show sensor states only to indicate state changes.

Sensor states	Applicable to
unavailable	All sensors
Alarm	Discrete sensors
Normal	Discrete sensors
ok	Numeric sensors
below lower critical	Numeric sensors
below lower non-critical	Numeric sensors
above upper non-critical	Numeric sensors
above upper critical	Numeric sensors

Note: The state change of a contact closure sensor occurs only if the sensor enters the new state for at least 1 consecutive sample.

Sensor Assignment Guideline

A Raritan PDU allows users to release managed sensors and then bring them back under management, using either automatic or manual assignment option.

- Automatic assignment: This option may change the sensor ID on the PDU. Therefore, sensor indexes of the same sensor type are likely to swap in Power IQ, causing the sensor readings to swap as well. Power IQ users must not use this option.
- Manual assignment: This option permits users to specify the original sensor ID so that no sensor indexes and readings are swapped in Power IQ. Always use this option to ensure the sensor data accuracy in Power IQ.

PUE - Power Usage Effect-iveness

Power Usage Effectiveness (PUE) is the ratio of the total amount of power used by a data center to the power delivered to actual IT equipment. An ideal PUE is 1.0.

$$PUE = \frac{\text{Total Facility Power}}{\text{IT Equipment Power}}$$

Power usage for anything that is not a computing device, such as lighting and cooling, is considered facility power usage.

Power IQ measures total power and IT power based on the flags set for each inlet, outlet or circuit. Flags indicate whether the kilowatt hours measured count toward total power, IT power, both, or neither. See Set PUE Flags and What PUE Flags Does Power IQ Set Automatically?.

Power IQ sums up the measured values on a daily and monthly basis, then uses the values to calculate PUE. Both daily and monthly PUE calculations are offered. Power IQ does a rollup of daily measurements on the first day of each month, using the previous month's data, to create a monthly PUE calculation for each data center. You can adjust the monthly sums for total power and IT power as needed after the rollup.

All data represents the PUE flags and EDM configuration as set when the data was collected.

Power IQ displays the PUE calculations in several ways.

- **List PUE Calculations and Adjustments**: a list of the monthly PUE calculations for each data center that enables you to enter offset values to adjust the monthly total power and IT power readings.
- PUE Trend Chart Widget: a dashboard chart that shows PUE calculations over time.
- Latest PUE Reading Gauge Widget: a dashboard gauge that shows your latest PUE reading and where it falls within the thresholds set.

Requirements for PUE

PUE calculations can begin once your system is set up to include:

- Enterprise data model (EDM) is configured and includes the objects you want to flag as part of the PUE calculation. See **Enterprise Relationships and the EDM**.
- Objects are flagged as Total Power and IT Power. See Set PUE Flags.

Set PUE Flags

You must identify the sources of total power and IT power using flags. Power IQ uses the flags to determine which readings to use in the PUE calculation.

Total Power

IMPORTANT: When setting Total Power, make sure not to flag the same power more than once. Set the flag at the highest level source only.

- Set the flag for Total Power if the object supplies power to the data center. Avoid double-flagging Total Power in the stream. For example, flagging Total Power on a standalone meter AND the inlet to a downstream floor PDU would double-flag the same energy.
- A best practice is to measure Total Power at the main line in to the data center. For example, if you have a standalone meter, flag it as Total Power.
    - Another method is to search for circuits of your Power IQ managed facility items, such as floor PDUs, power panels, UPS, and so on, and flag the highest level sources as Total Power.

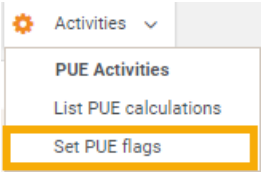
Power IQ does not automatically flag Total Power.

IT Power

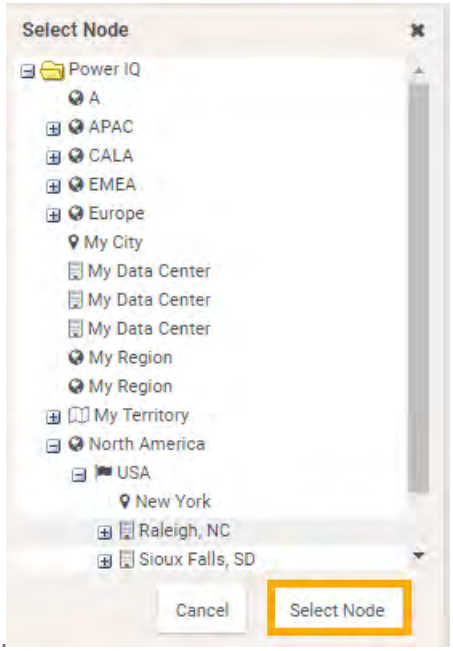
- Set the flag for IT Power if the object supplies power for computing purposes only.
    - Outlets on Rack PDUs
    - Inlets on Rack PDUs without outlet meters
- Power IQ automatically flags rack PDUs as IT Power.

Set PUE Flags in the PUE Tab

1. In the PUE Tab, click Activities > Set PUE Flags, then use the search criteria to list the objects you want to flag.



2. In the Type dropdown, select from: All Types, Circuits, Outlets, or Inlets.
3. Filter by Node: To filter your search results by a specific node, click the Select button to open a dialog box where you can select a node in your Power IQ EDM Tree. In the dialog box, select your desired node, and click the



select button to confirm your selection.

4. Flagged as Total: Filters objects by their Total Power flag status.
5. Flagged as IT: Filters objects by their IT Power flag status.
6. Click Search.
7. In the search results list, select the check boxes under the Total and IT columns for each object to flag it.

Note: Use the All Total and All IT icons to automatically flag all objects in the search results, or to remove a flag from all objects in the search results.

For related information, see What PUE Flags Does Power IQ Set Automatically?.

What PUE Flags Does Power IQ Set Automatically?

Power IQ does not automatically flag for Total power.

Power IQ automatically sets some PUE flags for IT power.

When you upgrade to 4.1 or later:	
Object	Flagged as IT Power
Rack PDU or inline meter with outlets	outlets
Rack PDU and inline meter without outlets	inlets

When you add a new object :	
Object	Flagged as IT Power
Rack PDU or inline meter with outlets	outlets
Rack PDU or inline meter without outlets	inlets
Floor PDU, Power Panel, Standalone Meter, UPS, CRAC Note: These facility items are added as PDUs, and supported using Dynamic Plugins. See **Dynamic Plugins**.	none

List PUE Calculations and Adjustments

The PUE tab displays the monthly rollup PUE calculations for each data center. Monthly data comes from a rollup conducted on the first of each month, using the previous month's data. You can adjust the monthly values for Total Power and IT Power for the month.

- Adjustments can be positive or negative watt-hours.
- Daily values are not displayed, and they cannot be adjusted.
- Adjustments made will affect all PUE charts in the dashboard that use monthly data.

1. In the PUE tab, select Activities > List PUE Calculations. The list includes a line for each month of data for each data center in your EDM.
2. Enter the number of watt-hours for adjustments to Total Power or IT Power in the fields provided. Use a "-" sign to make a negative adjustment to the number of hours.
    - Total Wh Adj: Adjustment to Total Power
    - IT Wh Adj: Adjustment to IT Power

Reports and Tags

The Reports tab allows users to create reports and administer tags.

The reporting feature supports the following reports: Power/Energy, Temperature, and Rack Failover simulation.

Through the Activities menu, users can create and administer Tag Groups and the available Tags for those groups.

You choose the rows and columns you want to include, and how rows are grouped and filtered.

Filters can employ the tags assigned to EDM nodes to determine which PDUs and IT device readings are included in the reports.

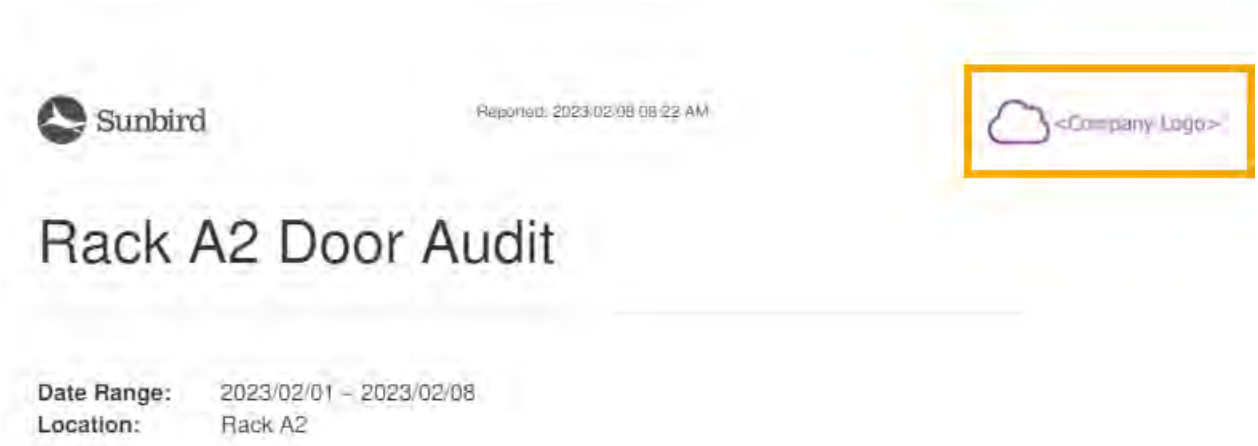
See Creating a Report.

Reports are only available to the user who creates them. The data included is limited to the user's permissions to view objects in the EDM. If you do not have permission to view Data Center 1, for example, no data about Data Center 1, or any room , rack and so on contained by it, will be included in your reports.

Reports you create can be emailed to anyone you like. Set up a schedule for the report to be run and emailed, or send an exported report by email. See Schedule a Report and Exporting a Report to PDF or CSV.

Once a report has been run, the output is saved in the Report History. Report runs are kept in the report history until a report is deleted.

Custom logos uploaded to Power IQ display on both the application header bar and in the upper right corner of Reports page and exports.



Creating a Report

Create a report to set the parameters of the data you want included. You can choose the rows and columns to include, and specify sorting and filtering.

Power IQ supports five types of reports:

Creating a Power/Energy Report

1. In the Reports tab, click New Report, and select Power/Energy Report.
2. Enter a name for the report in the dialog and click OK. You can change it later if needed.
3. The Preview/Edit page appears. In the Report Details section, select the data you want in the report rows.

- Row for each:
  - Time: each row is a time period. Select Day, Week, Month, or Year
  - Tag: each row is a tag from the selected tag group. Select a Tag Group. See Adding Tag Groups and Tags.
  - EDM Node: each row is a node in your data center, as configured in your EDM. Select Data Center, Floor, Room, Aisle, Row, Rack, PDU, or Device.
- Data from:
  - PDUs: readings are taken from the PDU inlets.
  - Devices: readings are taken from the PDU outlets or circuits mapped to the IT device.
  - Racks: readings are taken from the rack power data.
- Summary Function:
  - None
  - Sum
  - Minimum
  - Maximum
  - Average
- Sort direction:
  - Ascending or Descending. Rows will be sorted by the Time, Tag, or EDM Node, unless you choose a measurement in Sort by measure. The Sort by measure field becomes active after you add a measurement.
  - Sort by measure: Select the measurement as defined for the report columns. Select None to sort by the Time, Tag, or EDM Node.
  - None, Energy, Average Active Power, Minimum Active Power, or Maximum Active Power, depending on the column settings.
- Time range:
  - Period: Select a time period to limit the data included in the report.
    - Yesterday – the day before today.
    - Past Week – would be to count back exactly a week from now
      - For example: If you view a device chart on Tuesday, and the period is set to Past Week, the chart includes data from last Tuesday through this Tuesday.
    - Last Week – the calendar week preceding the present week.
      - For example: If you view a device chart on Tuesday, and the period is set to Last Week, the chart includes data from last Sunday through last Saturday. The chart shows the last full week.
    - Last Month – Starts at 12:00:00 a.m. the month before the current month and continues for n months. (The range does not include the current month.)

    - Year to Date – is a period, starting from the beginning of the current year and continuing up to the present day.
    - Past Year – means the 365 days preceding today. For example, if it was 14th Feb, 2016 today, then the past year would mean the time between 15th Feb, 2015 and 14th Feb, 2016
    - Last Year - "Last year" refers to the previous calendar year.
  - Custom: Select a custom date range. Use the calendar tool to select a beginning and ending date.

4. Click Save.
5. In the Report Columns section, select the readings you want to include in the report columns. Click Add, then select Energy or Active Power in the Measure field and specify one statistic type, if available, in the Statistic field. Repeat to add multiple measurements for a multi-column report.
   - Energy: Readings are kilowatt hours. Data comes from daily rollups. No statistic options are available for this reading.
   - Active Power: Readings are active power in kilowatts. Data comes from daily rollups.
   - Three statistic types are available: Average, Maximum and Minimum.
6. In the Tag Filters section, select tags to filter what sources of data are included in the report. Only data from tagged sources is included. Click Add, then select Tag Group and Tag. Repeat to add more tag filters. If multiple tag filters are applied to a report, an object must have all the tags in order to be included in the report.
7. Click Run Now to run the report. See **Schedule a Report** for adding scheduled email delivery.

Creating a Temperature Report

A temperature report shows inlet/outlet temperatures at a rack level. Therefore, the row of the report is always racks and cannot be configured.

Temperature units are either degrees Celsius or Fahrenheit, based on system settings in Settings > Application Settings > Language and Local Settings.

Users without View permissions or a role that includes View permissions for certain racks cannot retrieve the temperature data from those racks when running the temperature report. See Assigning Roles for User Permissions.

1. In the Reports tab, click New Report, and select Temperature Report.
2. Enter a name for the report in the dialog and click OK. You can change it later if needed.

   The Preview/Edit page appears.
3. In the Report Details section, select how you want the data to be presented.
4. Summary Function:
   - None
   - Average
   - Minimum
   - Maximum
5. Ascending or Descending. The report is sorted by the rack names, unless you choose a measurement in Sort by measure. The Sort by measure field becomes active after you add a measurement.
6. Sort by measure: Select the measurement as defined for the report columns. Select None to sort by rack names.
7. None, Average Inlet Temperature, Minimum Inlet Temperature, Maximum Inlet Temperature, Average Outlet Temperature, Minimum Outlet Temperature, or Maximum Outlet Temperature, depending on the column settings.
8. Time range:
   - Period
     - Yesterday – the day before today.
     - Past Week – would be to count back exactly a week from now
       - For example: If you view a device chart on Tuesday, and the period is set to Past Week, the chart includes data from last Tuesday through this Tuesday.
     - Last Week – the calendar week preceding the present week.
       - For example: If you view a device chart on Tuesday, and the period is set to Last Week, the chart includes data from last Sunday through last Saturday. The chart shows the last full week.
     - Last Month – Starts at 12:00:00 a.m. the month before the current month and continues for n months. (The range does not include the current month.)
     - Year to Date – is a period, starting from the beginning of the current year and continuing up to the present day.

    - Past Year – means the 365 days preceding today. For example, if it was 14th Feb, 2016 today, then the past year would mean the time between 15th Feb, 2015 and 14th Feb, 2016
    - Last Year - "Last year" refers to the previous calendar year.
  - Custom: Select a custom date range. Use the calendar tool to select a beginning and ending date.
9. Click Save.
10. In the Report Columns section, select the readings you want to include in the report columns. Click Add, then select a temperature type in the Measure field, and a statistic type in the Statistic field. Repeat to add multiple measurements for a multi-column report.
11. Measure: Inlet Temperature or Outlet Temperature.
12. Statistic: Average, Maximum or Minimum.
13. In the Tag Filters section, select tags to filter what sources of data are included in the report. Only data from tagged sources is included. Click Add, then select Tag Group and Tag. Repeat to add more tag filters. If multiple tag filters are applied to a report, an object must have all the tags in order to be included in the report.
14. Selected tags filter out not only racks but also temperature sensors, based on whether their parent nodes match the selected tags.
15. Click Run Now to run the report. See **Schedule a Report** for adding scheduled email delivery.

Creating a Rack Capacity and Failover Report

A Rack Capacity and Failover Report shows which rack PDUs may completely lose power when one of the two redundant power sources fails or is turned off for maintenance.

The information in the report is organized by rack. For details on the data included in the report, see *Information Available in the Rack Capacity and Failover Report* on the next page.

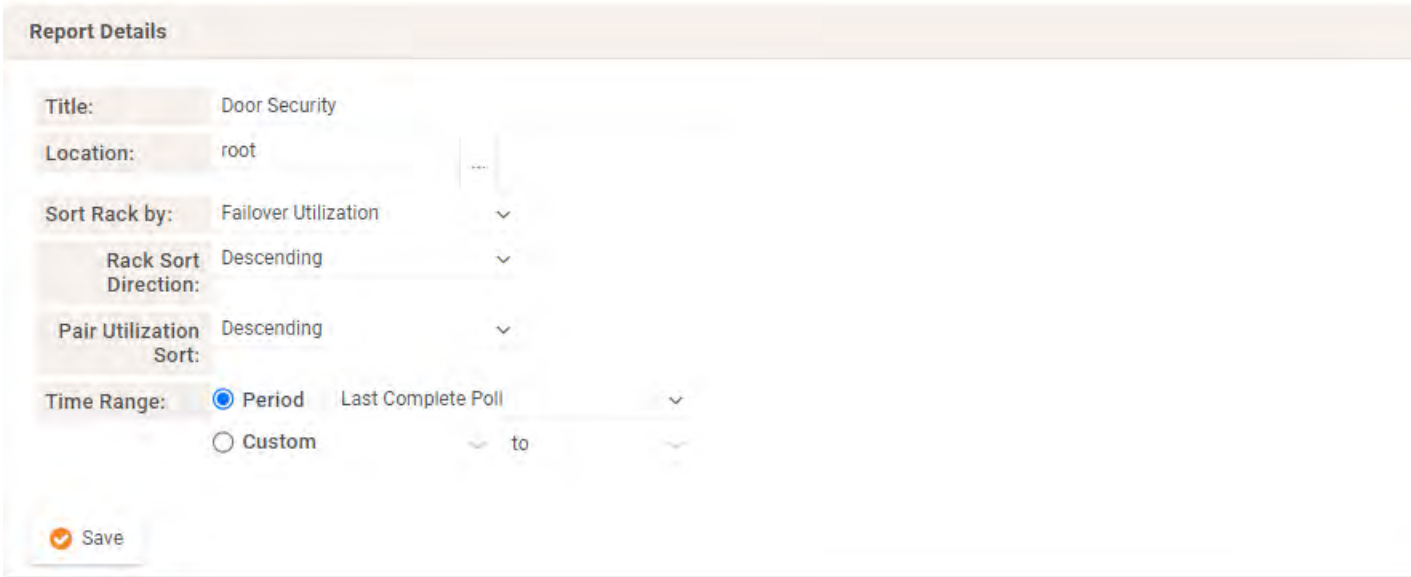
PDUs can be paired if they have the same number of inlets and circuit breakers and the same capacity ratings. In cases where two PDUs meet this criteria, they will be automatically paired; you do not have to manually pair them. In cases where more than two PDUs meet this criteria, the PDUs may be paired automatically or you can pair the PDUs by applying the appropriate tags to the PDUs. A PDU must have at least one inlet to be included in the report. For more information, see *Pairing PDUs for Rack Capacity and Failover Reports* on the next page.

Note: The report does not provide notification for loss of power but rather should be is used to help you preemptively identify PDUs that are vulnerable in a failover simulation. This report makes assumptions about supported devices and should not be used as the sole basis for the design of an effective failover plan. For more information, see Assumptions About Supported Racks on page 494.

1. In the Reports tab, click New Report, and select Rack Capacity and Failover Report. Enter a name for the report in the dialog and click the OK button. You can change it later if needed.

   The Report Details page appears.

2. In Location, click the browse button to select the EDM node containing the racks you want to analyze. You can select EDM nodes from Data Center to Row.



3. In Sort Rack by, select one of the following options:
   a. Rack Name
   b. Rack Utilization (rack power utilization for rack-level analysis)
   c. Failover Utilization (rack failover utilization, for failover analysis similar to the previously available reports)

4. In Rack Sort Direction, select Descending or Ascending.
5. In Pair Utilization Sort, select Descending or Ascending.
6. In Time Range, select a period of time or set a custom range of dates. By default, this field is set to Last Complete Poll. For more information, see *Data Sources for Each Time Range* on page 495.
7. Click the Save button.
8. Click the Run Now button to run the report. See *Schedule a Report* on page 503 for adding scheduled email delivery.

Note: To Edit the report details, click the Edit button on the report page. Make your edits on the Report Details page and click the Save button.

The data in the report can be exported to PDF or CSV.

Pairing PDUs for Rack Capacity and Failover Reports

PDUs can be paired if they have the same number of inlets and circuit breakers and the same capacity ratings.

In cases where two PDUs meet this criteria, they will be automatically paired; you do not have to manually pair them.

In cabinets with more than two rack PDUs, the PDUs may be paired automatically (randomly) or explicitly by tagging the PDUs with Failover Pair tags and Source tags.

The tag groups Failover Pair and Source are available by default in Power IQ 5.2 and later.

When there are more than two PDUs in a rack, specific PDUs can be paired together by tagging the PDUs with the same tag from the Failover Pair tag group. Tags in the Failover Pair tag group can be created by users.

Tags in the Source tag group can be created by users and indicate left versus right column placement in the report (from left to right based on alphabetical order). For example, a PDU tagged with Alpha will be in the left column, and a PDU tagged with Beta will be in the right column.

For more information on tagging, see *Adding Tag Groups and Tags* on page 506.

Information Available in the Rack Capacity and Failover Report

The following topics summarize the information available in the Rack Capacity and Failover Report.

Rack Summary

A Rack Summary is located at the top of each rack section in the Rack Capacity and Failover Report. The Rack Summary displays the following information:

- Capacity (kW)
- Load (kW)
- Utilization

Note: Capacity can be set by the user in the Rack Details tab (accessible from the Sites Tab) or via CSV Import by entering the appropriate value(s) in the Capacity column in the CSV file.

Rack PDU Capacity and Failover Information

The Rack Capacity and Failover Report displays the following PDUs in their own sub-sections:

- Paired (matched, compatible) PDUs within a single rack
- Single (mismatched, non-pairable, non-compatible) PDUs
- Transfer switches and multi-inlet PDUs

In addition to a Failover Simulation column that provides load and utilization information, each sub-section includes the following information for each PDU:

- Type (indicating if the reading is for an inlet, inlet pole, or a circuit breaker)
- Capacity (A)
- Load (A)
- Utilization

In the Failover Simulation column, the report shows the sum of the two PDU load values and compares it to the capacity of either one. When capacity is exceeded, the value is highlighted in red. When the load is within 80%of the capacity, the value is highlighted in yellow.

A section with an unpaired PDU will only show information for that PDU. Blank values will be displayed for Load and Utilization in the column where the second paired PDU typically would be located as well as in in the Failover Simulation column. A note clarifying the reason why the PDU is not paired also will be displayed. For example: “Unpaired because: A matching PDU for failover simulation was not found on the rack.”

When a rack PDU has three-phase inlets, the report shows a row for each line and a row for each circuit breaker when available.

Note: A row indicating the highest utilization is available only for paired PDUs.

Note: A PDU must have at least one inlet to be included in the report.

Note: Non-PDU facility items and environmental monitoring systems are not supported in this report.

Assumptions About Supported Racks

Supported racks in the Rack Capacity and Failover Report are assumed to follow these guidelines.

- The load of the servers is split between the two rack PDUs
- IT Devices in the rack have an even number of cords. Half of the cords are connected to one PDU, and the other half are connected to the other PDU
- For 3-phase rack PDUs, IT Devices are connected to the same phase legs on both rack PDUs

The report disclaimer, included at the bottom of each Rack Capacity and Failover Report, details further assumptions and conditions regarding the accuracy and use of the report.

Report Disclaimer

For 3-phase Rack PDUs, a device is assumed to be connected to the same phase legs on both PDUs. This report may not be accurate for racks with Rack PDUs that lost connectivity, lost power, or were decommissioned during the time period selected for the report. Reports that specify a time range use average amp readings, while reports with Last Complete Poll use a recent reading. The report does not report peak loads such that while the report may indicate that on average your rack would pass a failover situation, it cannot indicate that it will always pass. In general, this report relies on data collected in the past under a set of conditions. If these conditions change, this report will no longer be accurate. This report should not be used as the sole basis for the design of an effective failover plan.

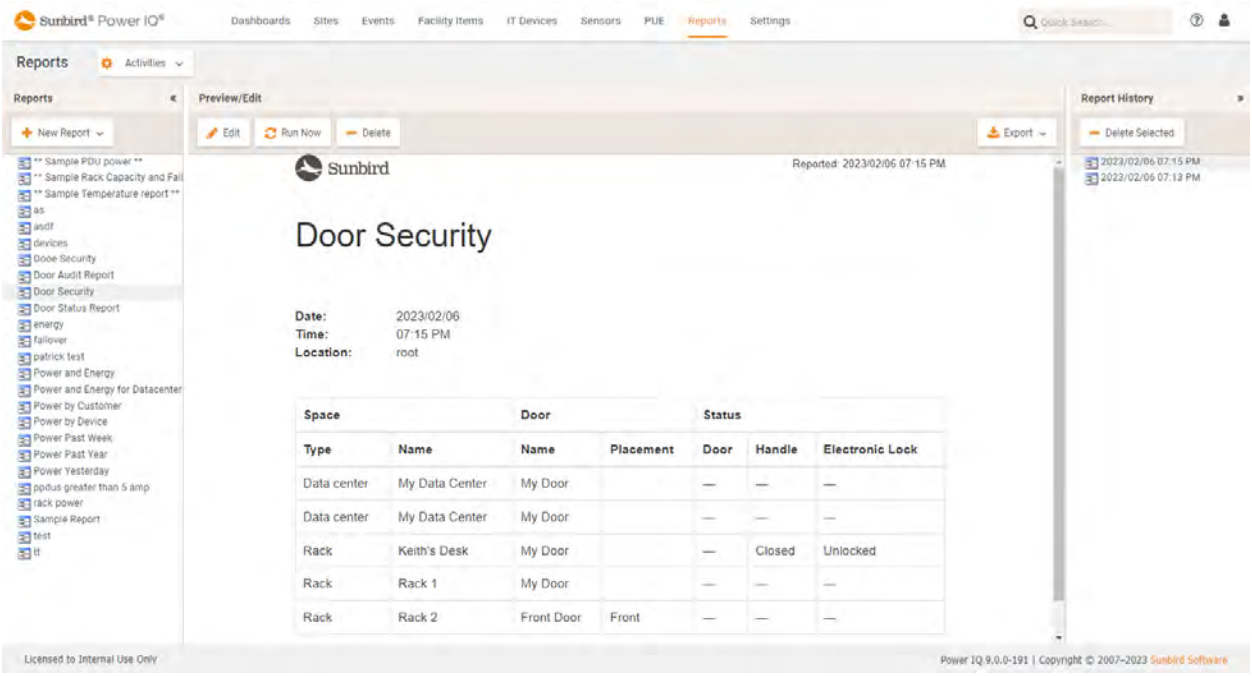
Data Sources for Each Time Range

A different data source is used for each time range selection in the reports. The time range is set when you create or edit a report. For more information on setting the time range for a Rack Capacity and Failover Report, see *Creating a Rack Capacity and Failover Report* on page 491.

Time Interval	Data Source
Last Complete Poll	Raw readings from the last completed poll cycle: inlet current and circuit breaker current
Yesterday Custom range that is 1 or 2 days long	Hourly rollups: Inlet average current and circuit breaker average current For each PDU, the average of all the hourly readings for the time period is displayed in the report.
Last Week Past Week Last Month Past Month Month to Date Custom range that is greater than 2 days and less than or equal to 62 days	Daily rollups: Inlet average current and circuit breaker average current For each PDU, the report shows the average of all the daily readings for the time period.
Last Year Past Year Year to Date Custom range greater than 62 days	Monthly rollups: Inlet average current and circuit breaker average current For each PDU, the report shows the average of all the daily readings for the time period.

Creating a Door Security Status Report

The Door Security Status report provides security status information for doors within a specific location and its children and at the current date and time. This information is sorted into sections by the door space type (based on EDM parent node) and name, with a separate row for each door included in the report.



The Door Security Status report displays only the doors in the selected location that you have View permissions for.

The report includes the following columns:

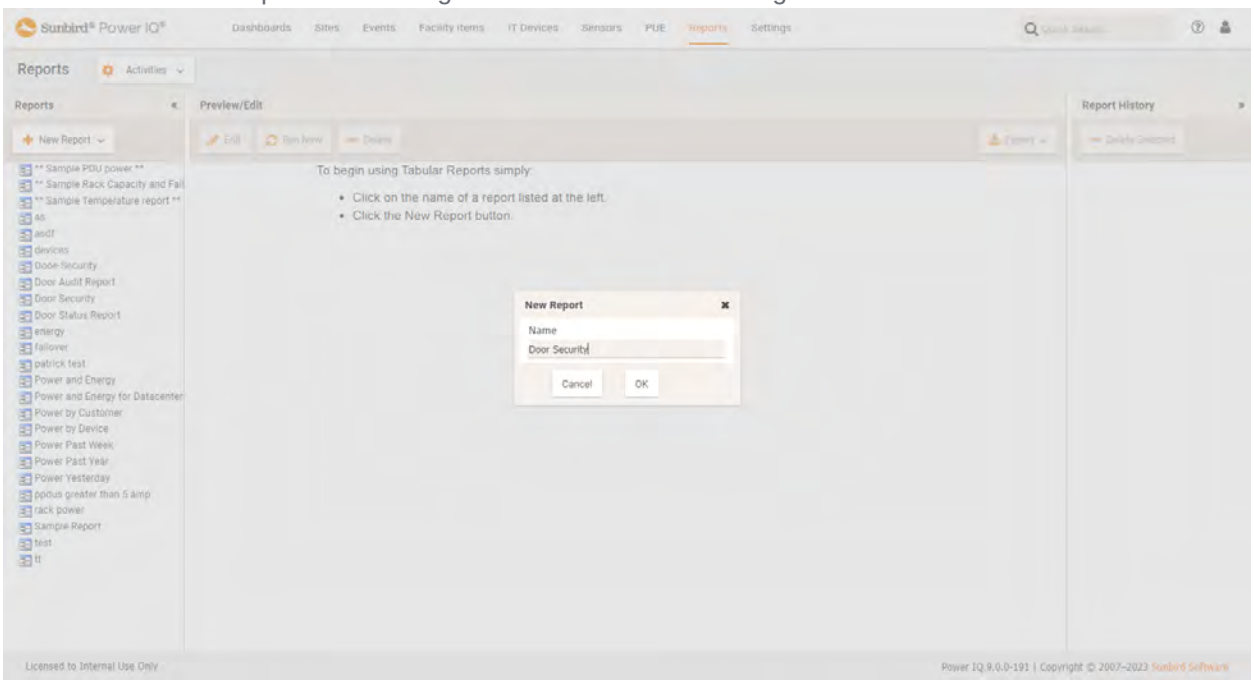
- The Space column lists the type of space (Data Center, Floor, Room, Aisle, Row, or Rack) and its name.
- The Door column identifies each door included in the report and its placement (Front or Back). If placement has not been set for the door, the placement cell will be blank.
- The Status column lists the statuses for each door, handle, and electronic lock. The following statuses are supported: Locked/Unlocked and Open/Closed. If no sensor is mapped to the component, a dash (—) will be displayed.

The data in the report can be exported to PDF or CSV.

Note: If there are no doors in the selected location, the report will display a message indicating that no doors have been found.

Note: The statuses in this report are as of the last successful PDU communication.

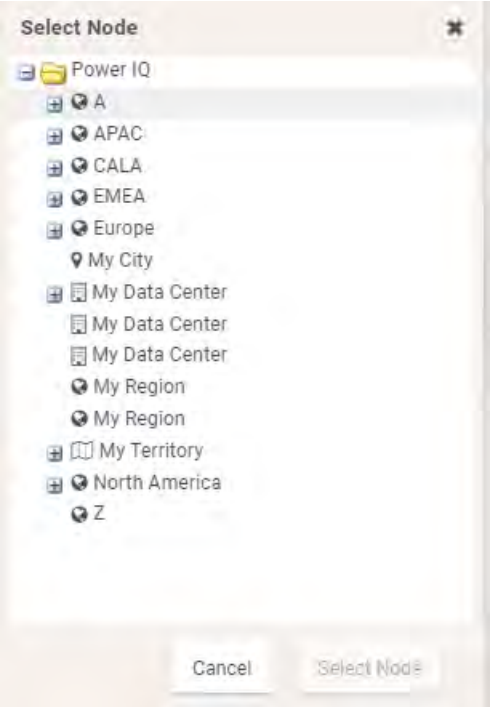
1. In the Reports tab, click New Report > Door Security – Status Report.
2. Enter a name for the report in the dialog and click OK. You can change it later if needed.



3. The Preview/Edit page appears. In the Report Details section, select the data you want to include.

2. In Location, click the browse button (...) to select the EDM node containing the doors you want to include in the report. You can select from the following EDM nodes: Data Center, Floor, Room, Aisle, Row, or Rack. Click the

Select Node button in the dialog to make your selection.

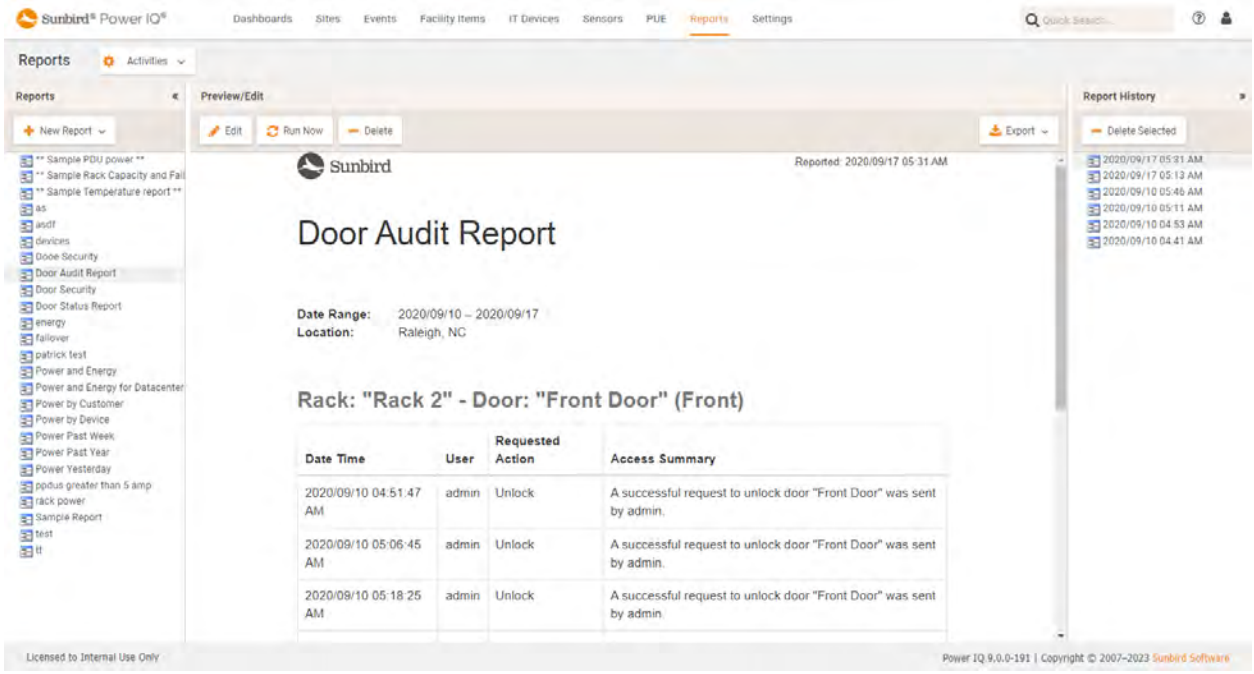


3. Back on the Preview/Edit page, click the Save button.
4. Click the Run Now button to run the report. See *Schedule a Report* on page 503 for adding scheduled email delivery.

Note on Editing and Deleting Reports: To Edit the Report Details, click the Edit button on the report page. Make your edits on the Preview/Edit page and click the Save button. To delete the report, click the Delete icon on the Preview/Edit page.

Creating a Door Security Audit Report

The Door Security Audit Report provides door, door handle, and card reader access summaries for doors for a specific location and date range. This information is sorted into sections by the door space type (based on EDM parent node) and name, with a separate row for each request logged in the report.

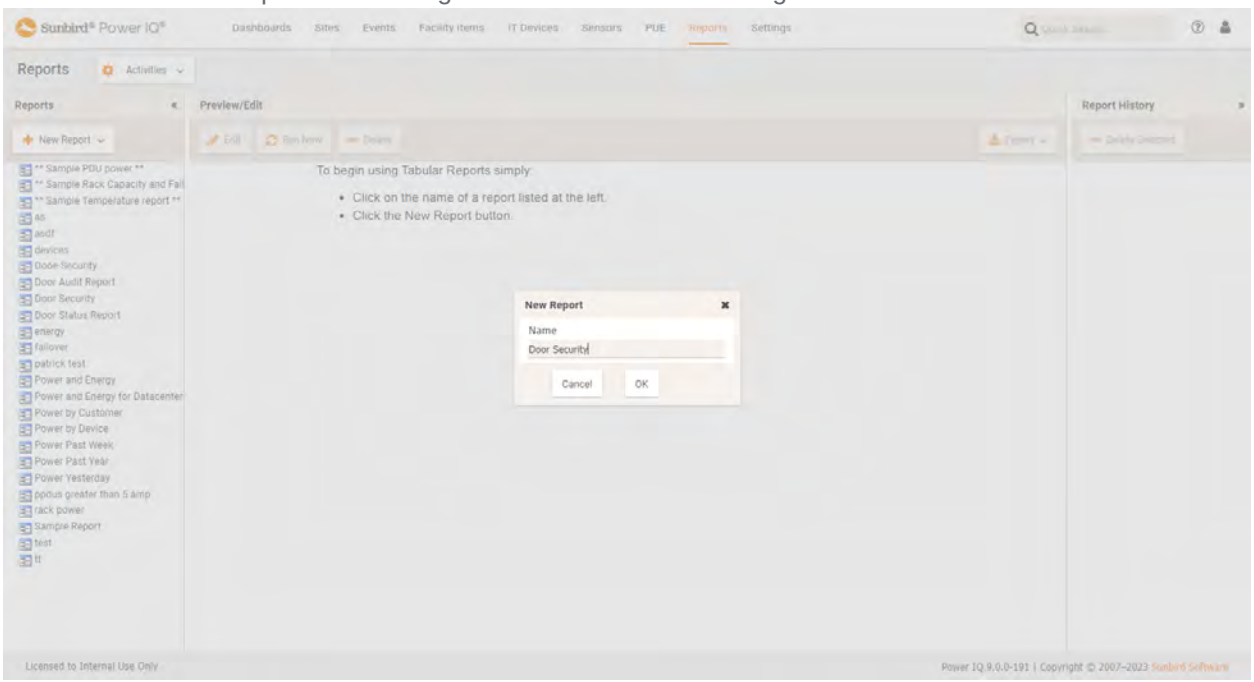


The data in the report can be exported to PDF.

Each request log is time- and date-stamped and indicates the user who initiated the request and an access summary.

Note: For doors accessed physically (when the request is not initiated in Power IQ), the Requested Action and User columns will remain blank.

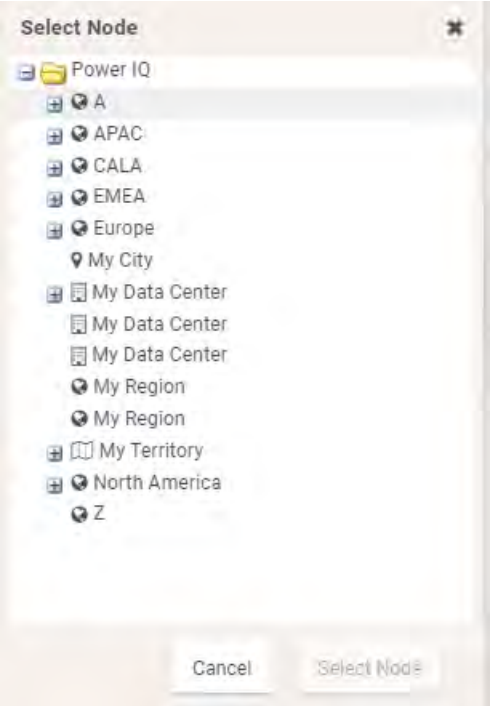
1. In the Reports tab, click New Report > Door Security – Status Report.
2. Enter a name for the report in the dialog and click OK. You can change it later if needed.



3. The Preview/Edit page appears. In the Report Details section, select the data you want to include.

2. In Location, click the browse button (...) to select the EDM node containing the doors you want to include in the report. You can select from the following EDM nodes: Data Center, Floor, Room, Aisle, Row, or Rack. Click the

Select Node button in the dialog to make your selection.



3. Back on the Preview/Edit page, click the Save button.
4. Click the Run Now button to run the report. See *Schedule a Report* on page 503 for adding scheduled email delivery.

Note: The data in the Door Security Audit report can be exported as a PDF file only.

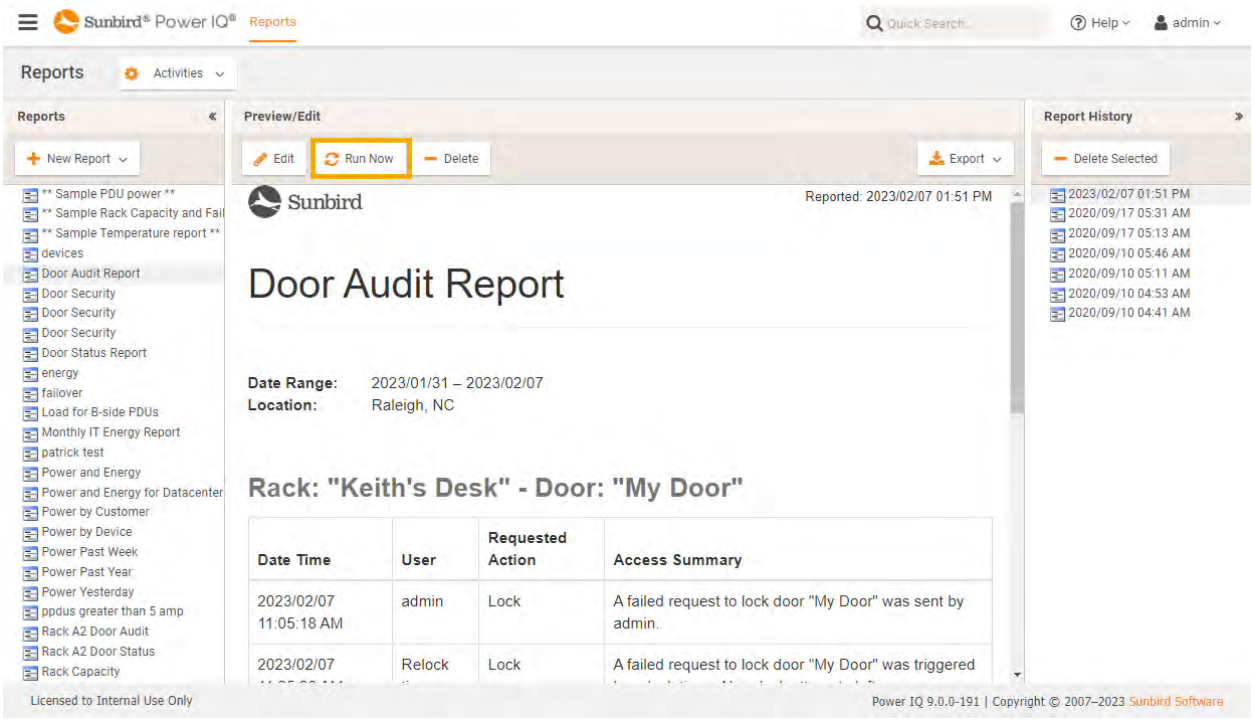
Note on Editing and Deleting: To Edit the Report Details, click the Edit icon on the report page. Make your edits on the Preview/Edit page and click the Save button. To delete the report, click the Delete icon on the Preview/Edit page.

Run a Report

1. In the Reports tab, select the report in the Tabular Reports list. The last-run version of the report displays.
2. Click Run Now. A status message displays while the report generates.

   The new report appears in the Preview/Edit section.

3. Verify the report version by looking to the Report History column listing all versions of the report. Click other report versions to view.

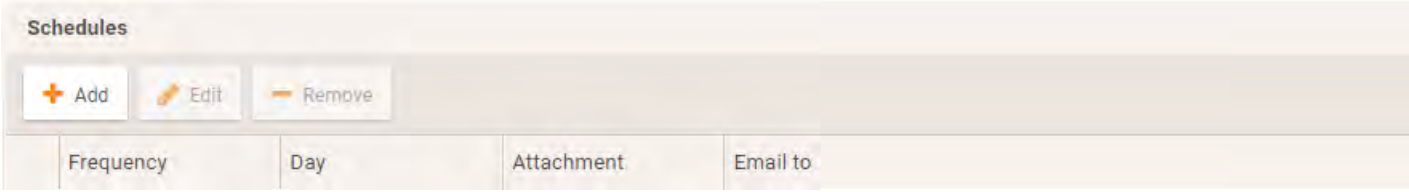


Schedule a Report

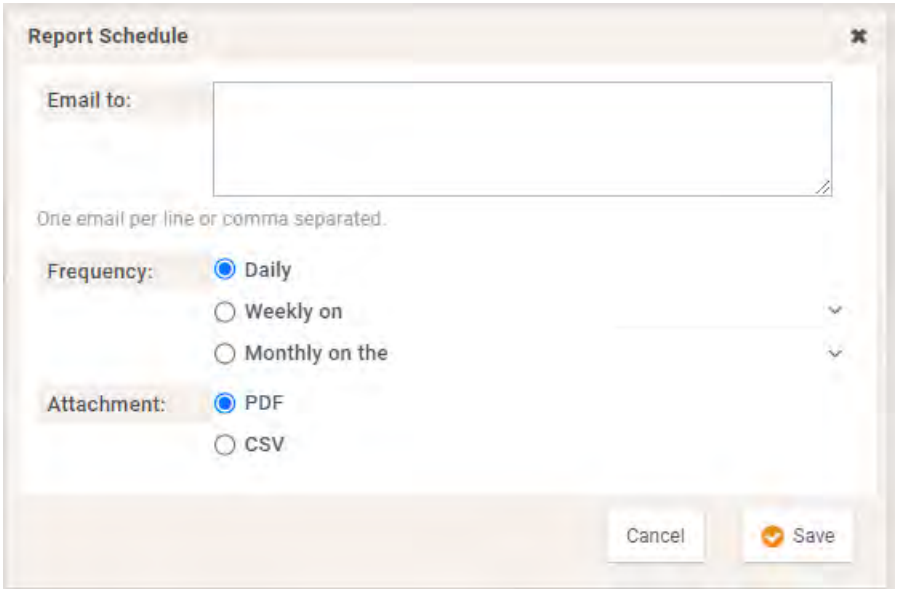
You can schedule a report to run at a selected interval. Scheduled reports are run after 1:30am on the day scheduled. The report is emailed to the recipient list shortly after the report run completes.

Scheduled report runs also appear in the Report History section in the Reports tab.

1. In the Reports tab, select the report you want to schedule.
2. Click Edit.
3. In the Schedules section at the bottom of the report parameters, click Add.



4. A report may have more than one schedule.
5. In the Report Schedule dialog, set the schedule parameters:
   - Email to: Enter the email addresses for all recipients of the report.
   - Frequency: Select Daily, Weekly, or Monthly. For Weekly or Monthly, specify the day or date.
   - Attachment: Select the file type for the report, CSV or PDF.



6. Click the Save button.

Delete a Report Run

1. In the Reports tab, select the report in the Tabular Reports list. The last-run version of the report displays.
2. In the Run History section, select the Report run you want to delete and click the Delete Selection button

3. Verify the report version by looking to the Report History column listing all versions of the report. Click other report versions to view.
4. The Report run is deleted.

Export a Report to PDF or CSV

You can export most report data to either a PDF or CSV file.

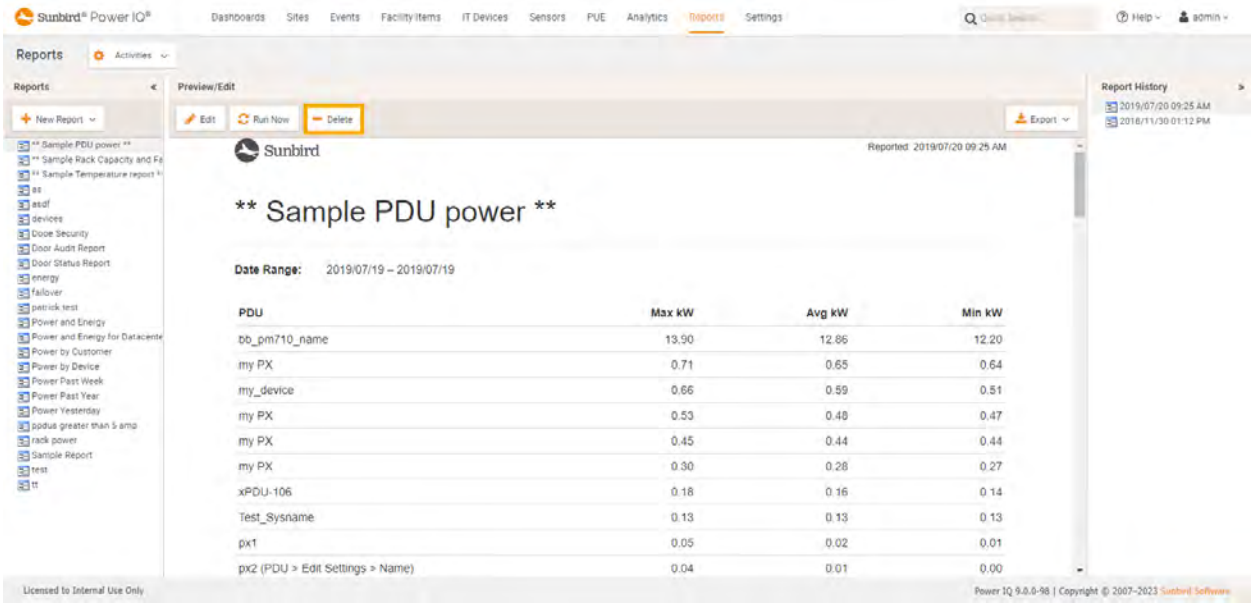
Failover reports can only export to PDF.

1. In the Reports tab, select the report you want to export.
2. Choose Export > PDF or CSV.
3. Save or open the file. Choices depend on your browser.

Note: If opening a temperature report in CSV with Microsoft applications, such as Excel, a redundant character appears prior to the degree symbol. This character is resulted from the default Microsoft encoding and can be ignored.

Delete a Report

1. In the Reports tab, select the report you want to delete in the Tabular Reports list. The last-run version of the report displays.
2. Click the Delete button.



3. Verify the report version by looking to the Report History column listing all versions of the report. Click other report versions to view.

Adding Tag Groups and Tags

Adding tag groups and tags is the first step toward using filtering by tag in reports.

Tag groups and tags help you categorize objects in your data center. When you filter by tag in a report, the report automatically includes readings from only the tagged objects. If multiple tag filters are applied to a report, an object must have all the tags in order to be included in the report.

Some examples of tag groups are Customer, Department, PDU Type, or Device Type. See Tag Example: Report on Racks by Customer Tag.

Tags must be added before you can assign them to EDM nodes. See Assign Tags in the Sites Tab.

Manage Tags and Tag Groups

Activities

Tag Groups

Add Remove

Name	Tags
Custom Field 1 (IT Device)	6
Custom Field 2 (IT Device)	1
Custom Field 2 (PDU)	3
Device Customer	9
Device Type	28
Door Placements	2
Failover Pair	0
Rack	1
Source	0
Test 1 (PDU)	10

Tags

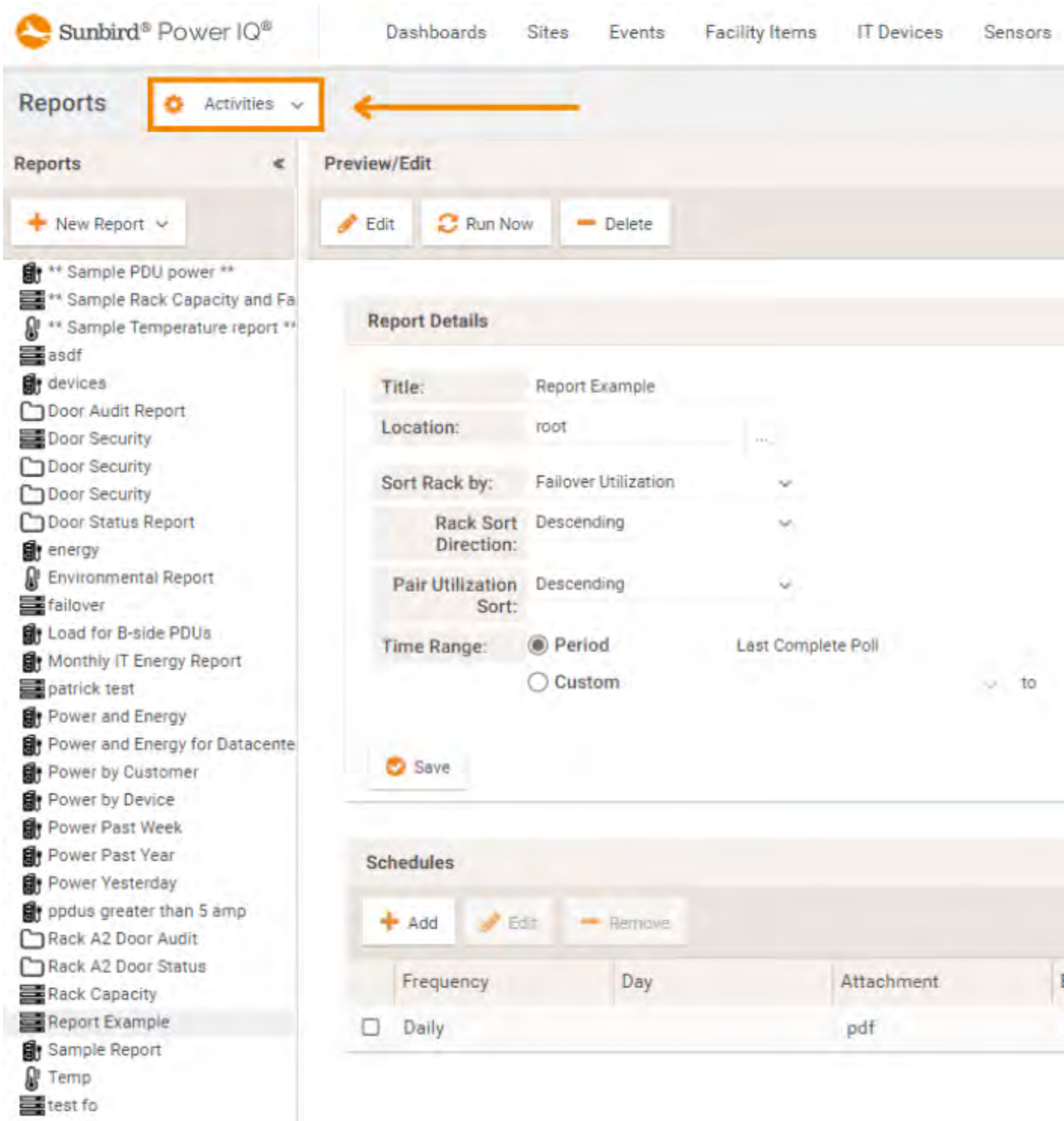
Add Remove

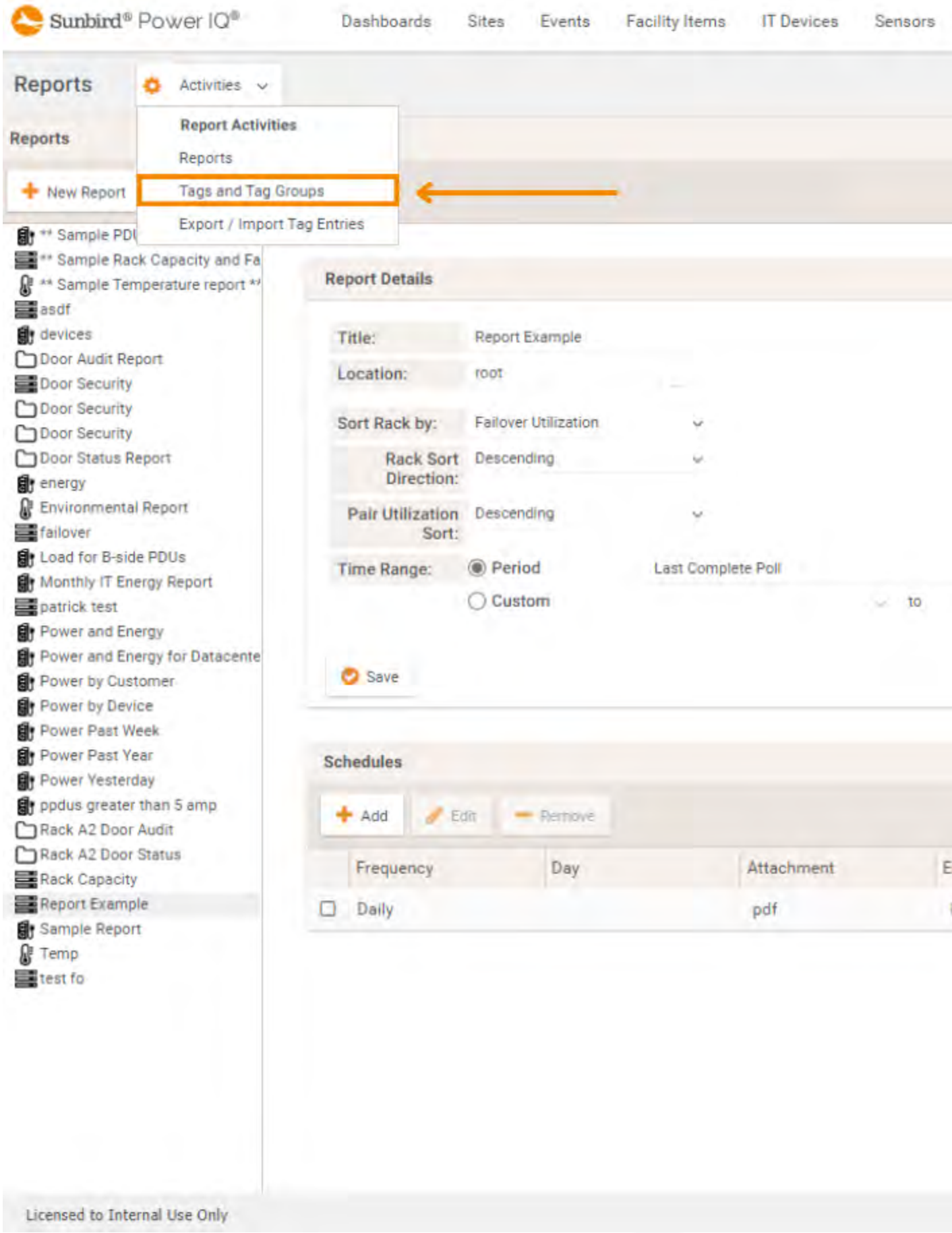
Name
Tag Group: Custom Field 1 (IT Device)
Alt IP: 192.168.42.{10,11,12,13,14,15}, 192.16...
Formerly nerve122.raleigh.raritan.com
INST-53249
INSTALLED
KX2 Rack5 Port #31
esxi1.raleigh.raritan.com
Tag Group: Custom Field 2 (IT Device)
thomas
Tag Group: Custom Field 2 (PDU)
test
Fail Tree
John Doe
Tag Group: Device Customer
Brandan Jones
Brian Weaver
IT
Jason Herr
Owen Clark
Power IQ Team

Migrate Cu

Create new
existing cu

1. In the Reports tab, choose Activities > Tags and Tag Groups.

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Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
Reports
Activities
Report Activities
Reports
Tags and Tag Groups
Export / Import Tag Entries
Reports
New Report
** Sample PDU
** Sample Rack Capacity and Fa
** Sample Temperature report **
asdf
devices
Door Audit Report
Door Security
Door Security
Door Security
Door Status Report
energy
Environmental Report
failover
Load for B-side PDUs
Monthly IT Energy Report
patrick test
Power and Energy
Power and Energy for Datacente
Power by Customer
Power by Device
Power Past Week
Power Past Year
Power Yesterday
ppdus greater than 5 amp
Rack A2 Door Audit
Rack A2 Door Status
Rack Capacity
Report Example
Sample Report
Temp
test fo
Report Details
Title:
Report Example
Location:
root
Sort Rack by:
Failover Utilization
Rack Sort Direction:
Descending
Pair Utilization Sort:
Descending
Time Range:
Period
Last Complete Poll
Custom
to
Save
Schedules
Add
Edit
Remove
Frequency
Day
Attachment
Daily
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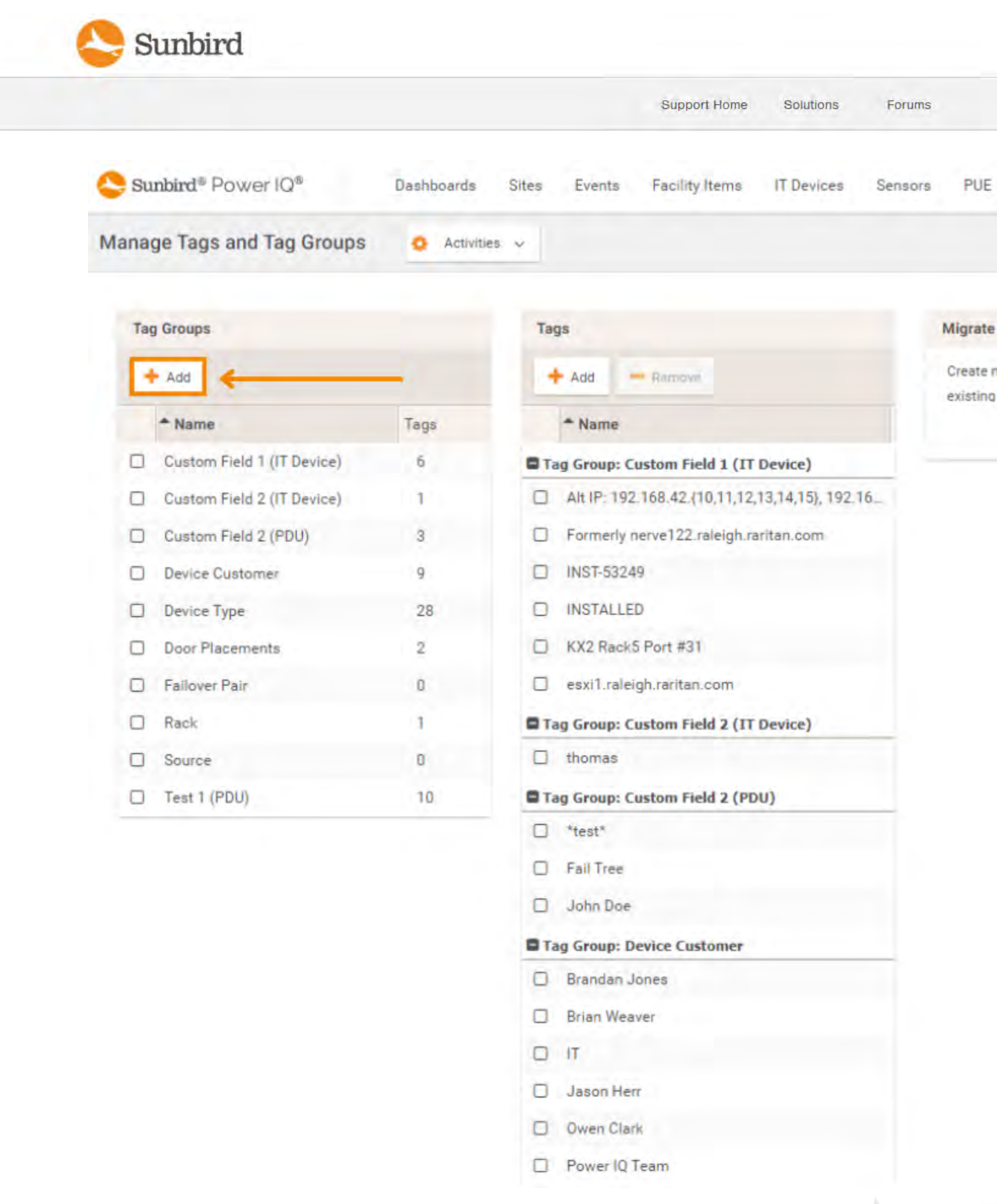
2. In the Tag Groups section, click Add, then add the names of a group of tags you want to add. Click Add.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Forums
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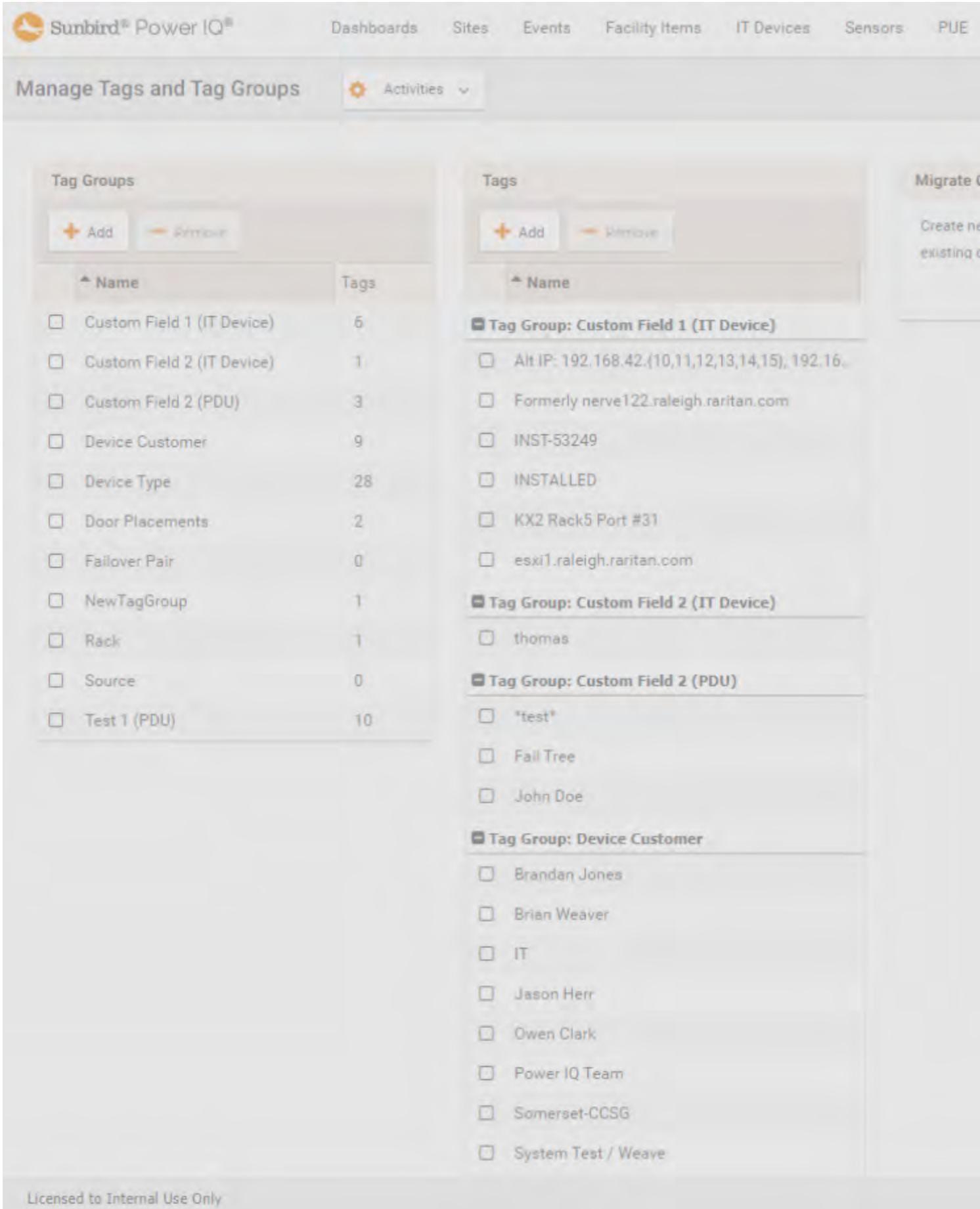
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Manage Tags and Tag Groups
Activities
Tag Groups
Add
Name
Tags
Custom Field 1 (IT Device) 6
Custom Field 2 (IT Device) 1
Custom Field 2 (PDU) 3
Device Customer 9
Device Type 28
Door Placements 2
Failover Pair 0
Rack 1
Source 0
Test 1 (PDU) 10
Tags
Add
Remove
Name
Tag Group: Custom Field 1 (IT Device)
Alt IP: 192.168.42.(10,11,12,13,14,15), 192.16...
Formerly nerve122.raleigh.raritan.com
INST-53249
INSTALLED
KX2 Rack5 Port #31
esxi1.raleigh.raritan.com
Tag Group: Custom Field 2 (IT Device)
thomas
Tag Group: Custom Field 2 (PDU)
test
Fail Tree
John Doe
Tag Group: Device Customer
Brandan Jones
Brian Weaver
IT
Jason Herr
Owen Clark
Power IQ Team
Migrate
Create
existing

Sunbird

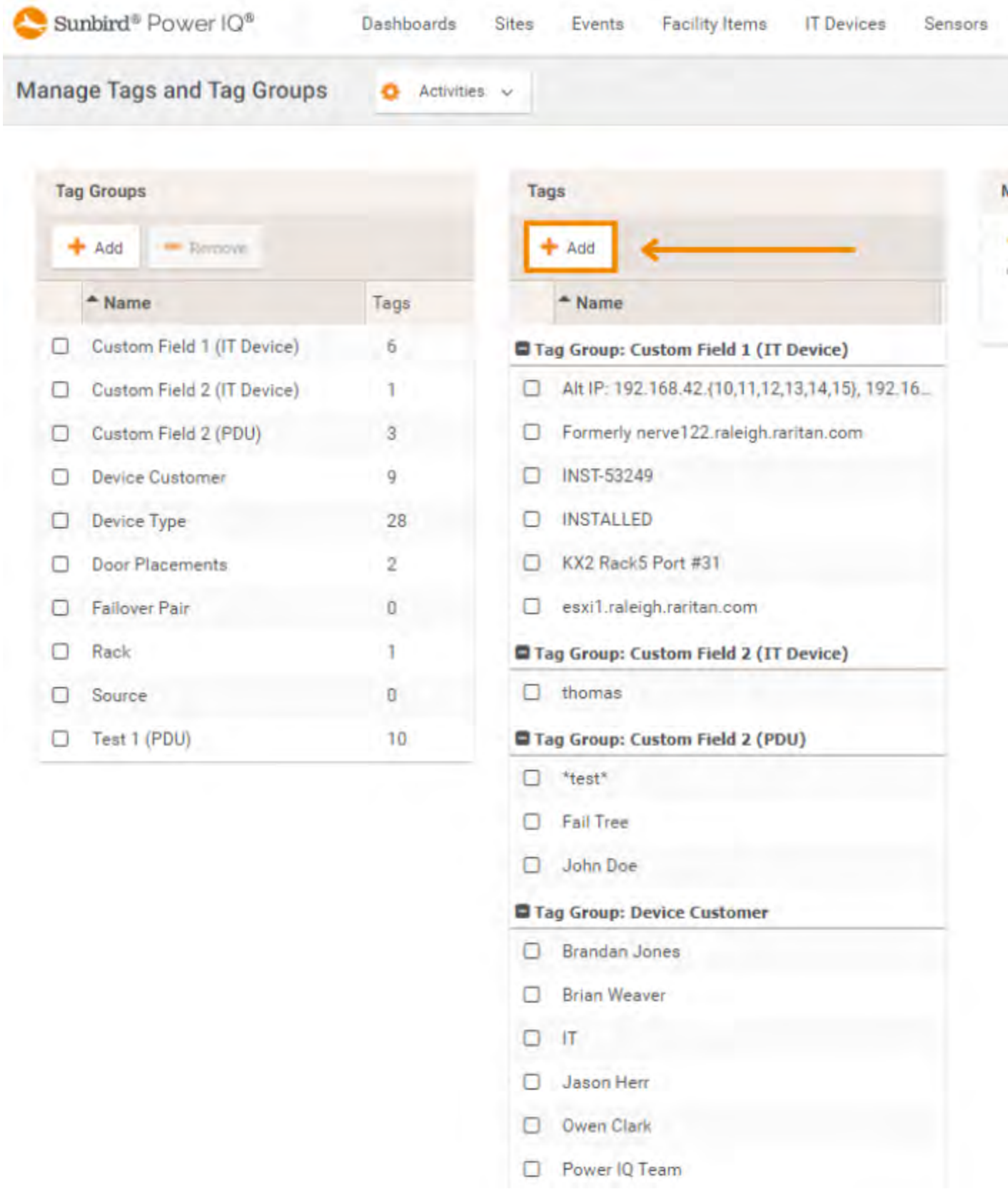
Support Home Solutions Forums



Example

If you plan to tag by customer name, add a Tag Group called Customer.

3. In the Tags section, click Add, then select the Tag Group you want to add tags to, and enter the tag name in the Name field. Click Add.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Activities
Tag Groups
Add
Remove
Name
Tags
Custom Field 1 (IT Device) 6
Custom Field 2 (IT Device) 1
Custom Field 2 (PDU) 3
Device Customer 9
Device Type 28
Door Placements 2
Failover Pair 0
Rack 1
Source 0
Test 1 (PDU) 10
Tags
Add
Name
Tag Group: Custom Field 1 (IT Device)
Alt IP: 192.168.42.(10,11,12,13,14,15), 192.16...
Formerly nerve122.raleigh.raritan.com
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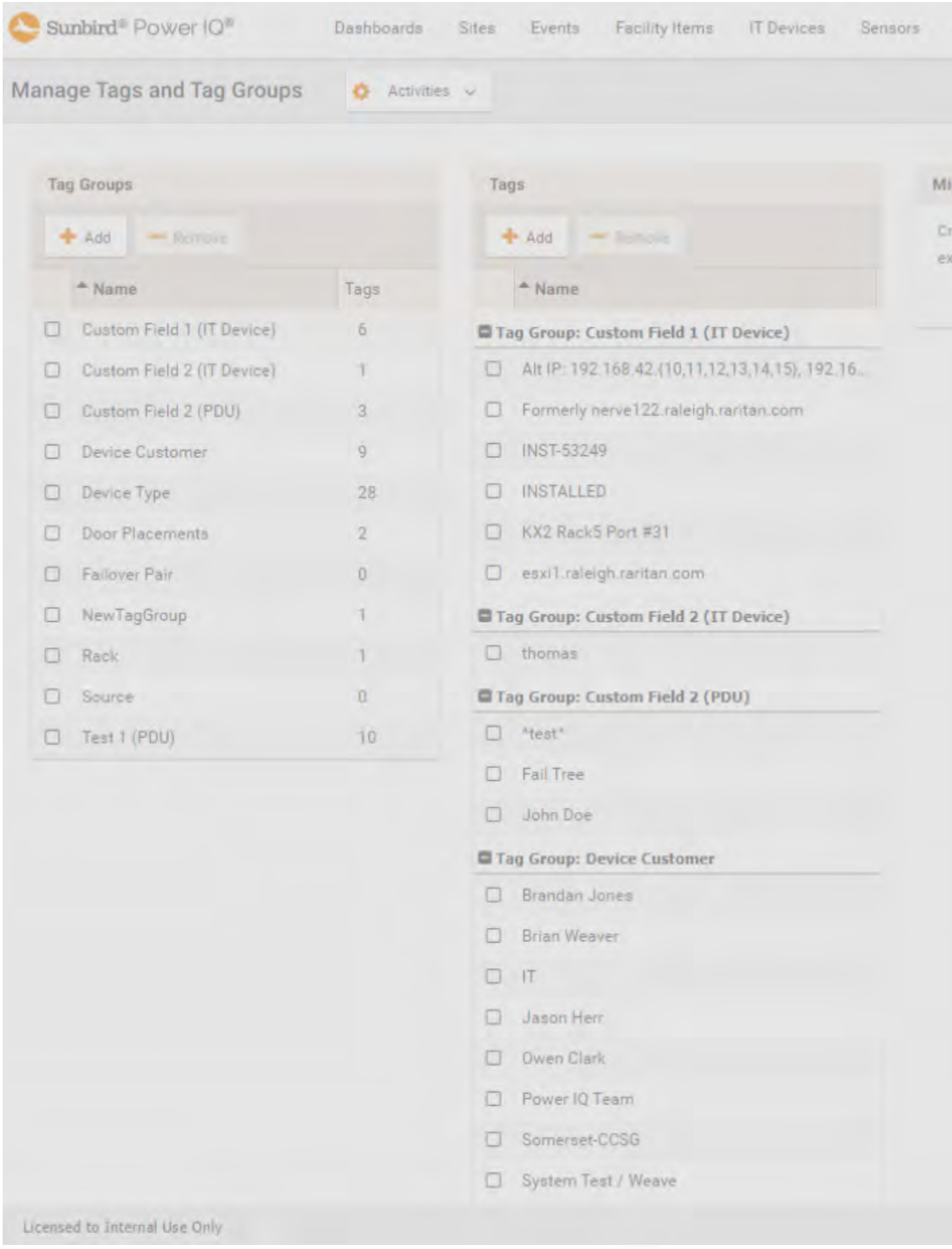
esxi1.raleigh.raritan.com
Tag Group: Custom Field 2 (IT Device)
thomas
Tag Group: Custom Field 2 (PDU)
test
Fail Tree
John Doe
Tag Group: Device Customer
Brandan Jones
Brian Weaver
IT
Jason Herr
Owen Clark
Power IQ Team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IT Devices
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Activities
Tag Groups
Add
Name
Tags
Custom Field 1 (IT Device) 6
Custom Field 2 (IT Device) 1
Custom Field 2 (PDU) 3
Device Customer 9
Device Type 28
Door Placements 2
Failover Pair 0
NewTagGroup 1
Rack 1
Source 0
Test 1 (PDU) 10
Tags
Add
Name
Tag Group: Custom Field 1 (IT Device)
Alt IP: 192.168.42.(10,11,12,13,14,15), 192.16...
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esxi1.raleigh.raritan.com
Tag Group: Custom Field 2 (IT Device)
thomas
Tag Group: Custom Field 2 (PDU)
test
Fail Tree
John Doe
Tag Group: Device Customer
Brandan Jones
Brian Weaver
IT
Jason Herr
Owen Clark
Power IQ Team
Somerset-CCSG
System Test / Weave
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Example

If you have a Tag Group called Customer, enter your customer names as the Tags in that group.

4. Next step: Assign the tags to EDM nodes. See Assign Tags in the Sites Tab.

Tag Example: Report on Racks by Customer Tag

In a colocation facility, you may want to track racks by customer.

- Add a tag group called Customer.
- Add tags for each customer name.
- Assign the correct customer name tag to the racks in the EDM that the customer owns.

In tabular reports, there are two ways to use tags.

- Create a report with the Row for Each as Tag, then select Tag Group: Customer, and Tag: "Customer Name". When the report runs, you see one row of data for each customer.

  OR

- Create a report with the Row for Each as Time or EDM Node. Add a Tag Filter, for example, using Tag Group: Customer, then selecting Tag: Customer Name of your choice. When the report runs, you see one row of data for each time or node, but the data is filtered to include only nodes tagged with the specified customer name.

Migrating Existing Data to Tags

You can migrate some existing data in your EDM to tags.

- Data Centers, PDUs and IT Devices: Custom Field 1 and Custom Field 2
- IT Devices: Customer and Device Type

You can find these fields on the Data Center, IT Device, and PDU objects in the Data Centers tab.

Migration creates tag groups from the field names, and creates tags from the data in the fields. Migration also applies the newly created tags to the EDM nodes where they were originally entered.

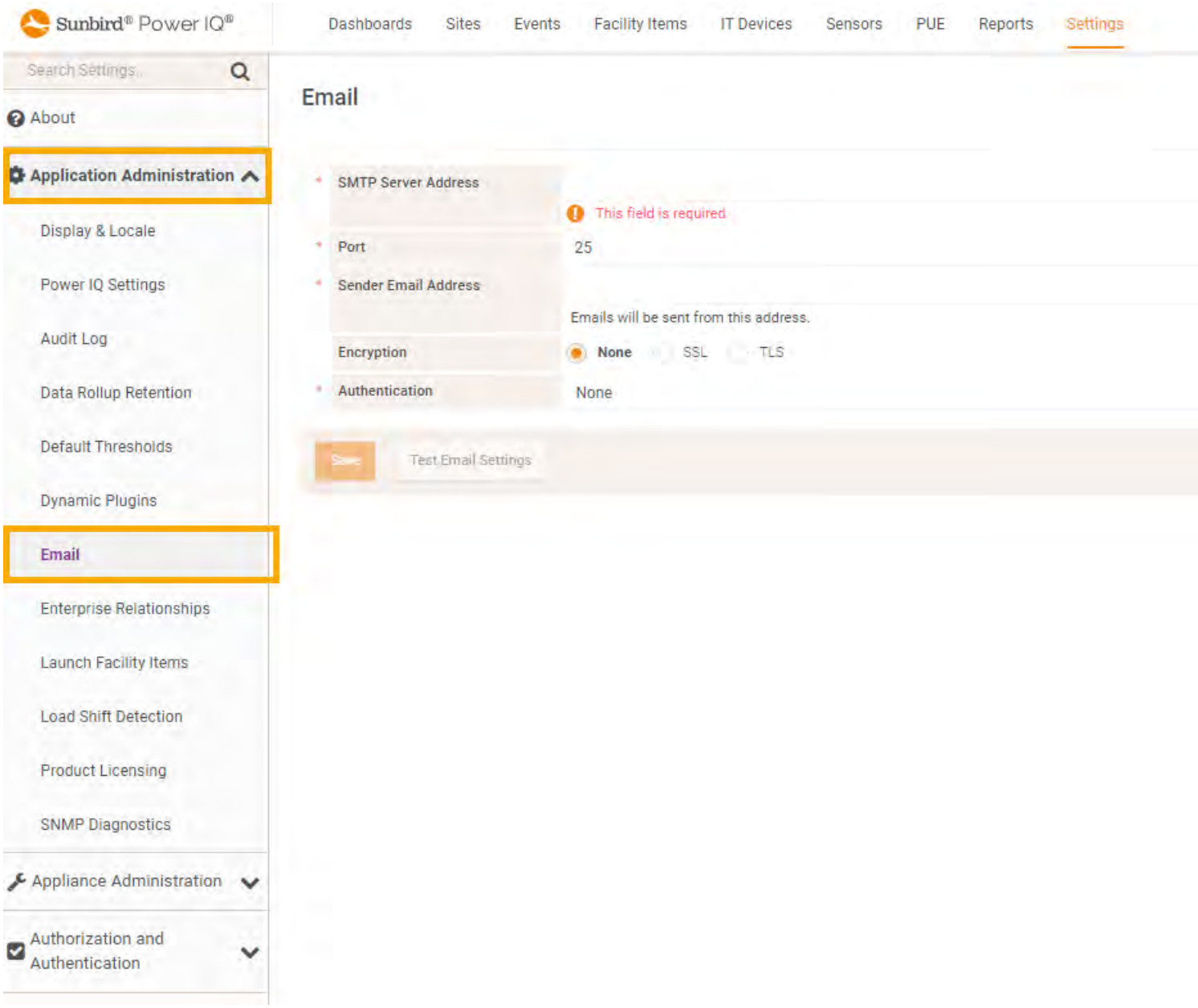
> *Note: Migration does not remove the data from the original fields. The original fields are not linked to the new tags in any way, so if you choose to maintain both data locations, you must do so manually. The best practice is to maintain this data as tag groups and tags, going forward.*

See Migrate Custom Field Data for instructions to do the migration.

IT Devices, Data Centers, and PDUs:

- Each IT Device, Data Center and PDU contains two custom fields, Custom Field 1 and Custom Field 2. You may have edited the names.
- Upon migration, the name of the custom field becomes the tag group name, with the EDM node in parentheses, to identify where the data came from.

EDM Node	Field Name: Contents	Migration Creates ->	Tag Group: Tag
Data Center	Custom Field 1: Sales Custom Field 2: Marketing		Custom Field 1 (Data Center): Sales Custom Field 2 (Data Center): Marketing
IT Device	Custom Field 1: Colo1 Custom Field 2: Colo2		Custom Field 1 (IT Device): Colo1 Custom Field 2 (IT Device): Colo2
PDU	Custom Field 1: Facilities Custom Field 2: IT		Custom Field 1 (PDU): Facilities Custom Field 2 (PDU): IT

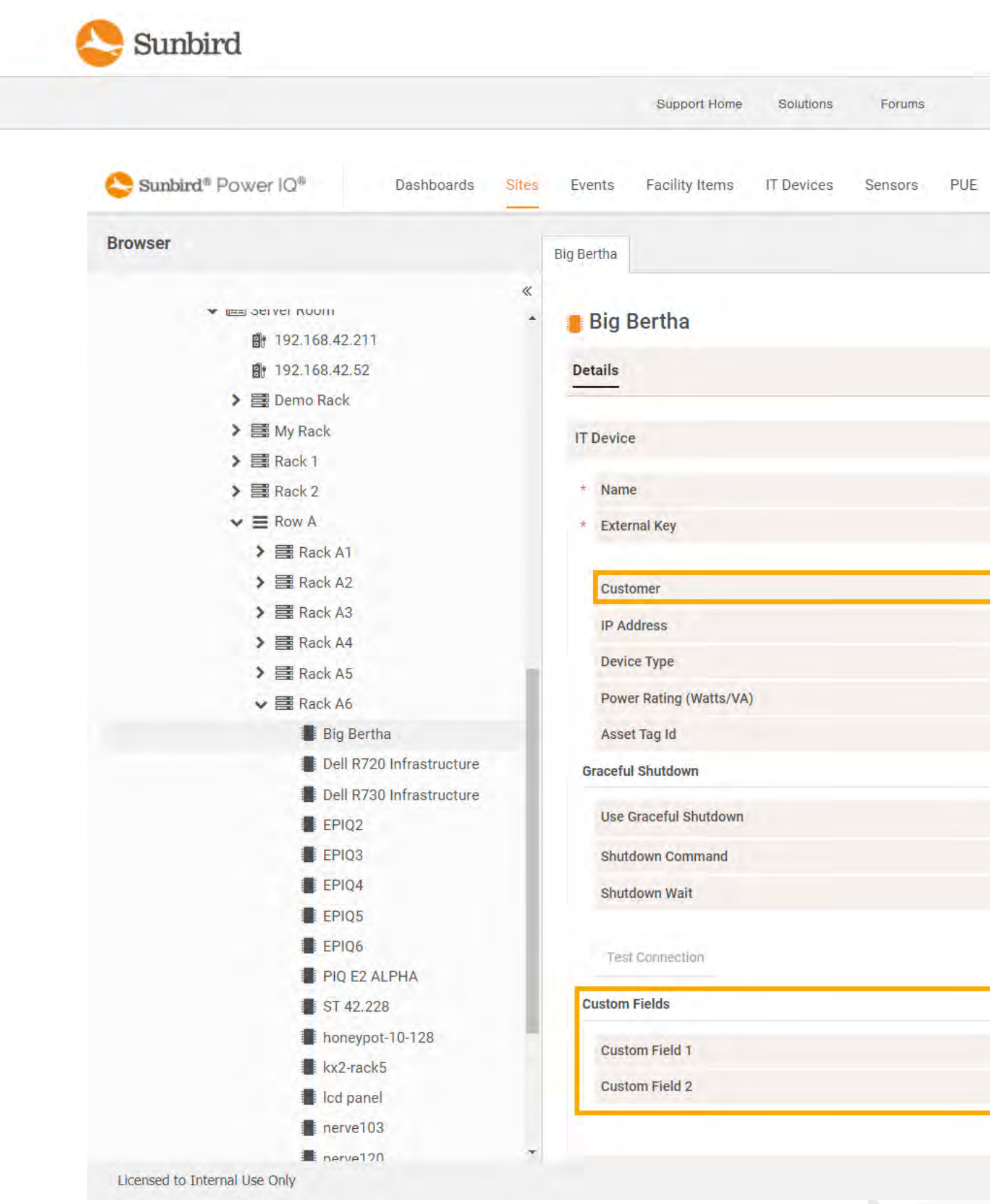


IT Devices:

- In addition to Custom Fields 1 and 2, IT devices also contain fields for Customer and Device Type that you can migrate to tags.

Field Name: Contents	Migration Creates ->	Tag Group: Tag
Customer: Bank		Device Customer: Bank

Field Name: Contents	Migration Creates ->	Tag Group: Tag
Device type: Dell PowerConnect 2848		Device Type: Dell PowerConnect 2848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Facility Items
IT Devices
Sensors
PUE
Browser
Big Bertha
192.168.42.211
192.168.42.52
Demo Rack
My Rack
Rack 1
Rack 2
Row A
Rack A1
Rack A2
Rack A3
Rack A4
Rack A5
Rack A6
Big Bertha
Dell R720 Infrastructure
Dell R730 Infrastructure
EPIQ2
EPIQ3
EPIQ4
EPIQ5
EPIQ6
PIQ E2 ALPHA
ST 42.228
honeypot-10-128
kx2-rack5
lcd panel
nerve103
Big Bertha
Details
IT Device
Name
External Key
Customer
IP Address
Device Type
Power Rating (Watts/VA)
Asset Tag Id
Graceful Shutdown
Use Graceful Shutdown
Shutdown Command
Shutdown Wait
Test Connection
Custom Fields
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Migrate Custom Field Data

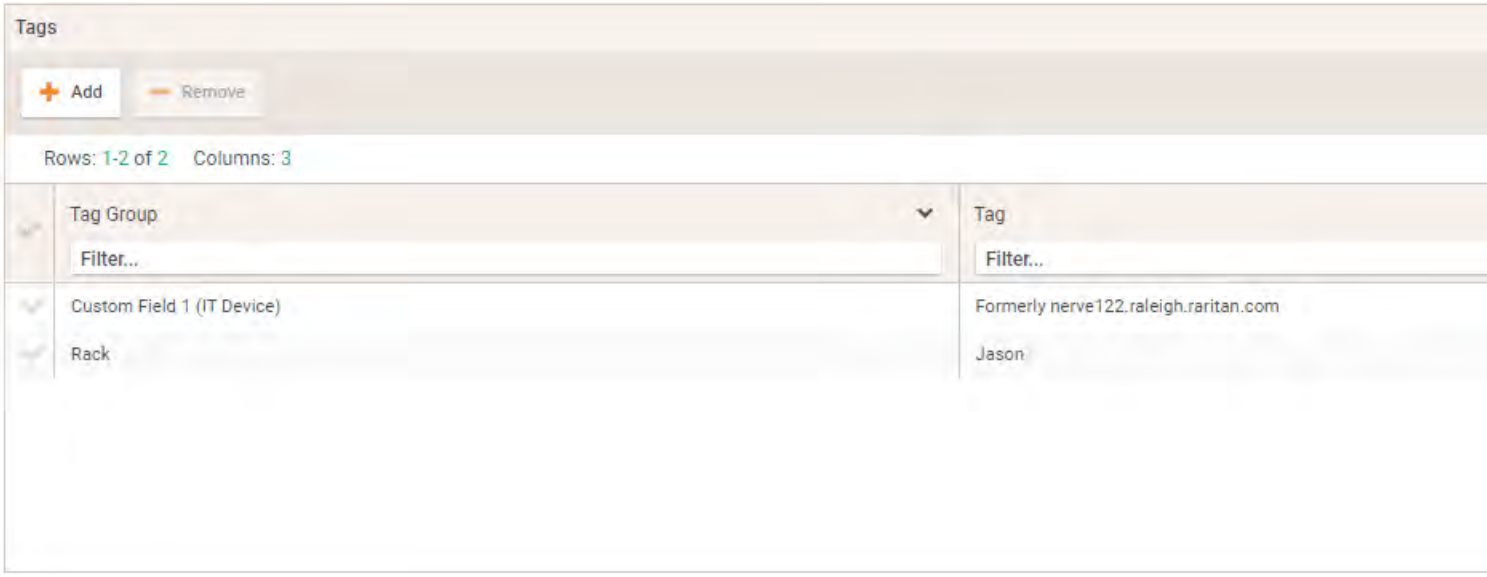
The Migrate Custom Field Data tool creates new tags and tag groups based on existing custom and standard field data for PDUs, devices, and data centers.

See Migrating Existing Data to Tags for details.

If you use the migration tool more than once, duplicate tags and tag groups will not be created. If new data is found, new tags will be added to the existing tag groups.

1. In the Reports tab, select Activities > Tags and Tag Groups.
2. Click Migrate.
3. To confirm, click Migrate Custom Field Data in the message that appears.

   When complete, tag groups and tags appear in the Reports tab. The tags have also been applied to the EDM nodes where they originated.
4. To view the tags applied, go to the EDM node in the Sites tab, then click the Details tab and locate the Tags panel



Assign Tags in the Sites Tab

You can assign tags to EDM nodes in the Sites Tab. To assign tags to multiple EDM nodes at once, use the CSV import tool. See Assigning Tags with CSV Import.

Tags can be assigned to the following EDM nodes:

- Data Center
- Floor
- Room
- Row
- Aisle
- Rack
- PDU: rack PDUs only, no facility items
- IT Device

1. In the Sites Tab, go to the EDM node you want to tag.
2. Click the Details tab. Scroll down to the Tags panel.
3. Click the Add button, then select the Tag Group and Tag. Click Add. The assigned tags display in the list.

To remove tags:

> *Note: This is the only way to remove a tag. You cannot remove a tag using CSV import.*

1. In the Sites Tab, go to the EDM node whose tag you want to remove a tag from.
2. Select the tag and click the Remove button.

Data Management

This section provides information on the configuration and management of data and data storage, including data rollup retention policies, backups, and EDM relationships.

Data Backups

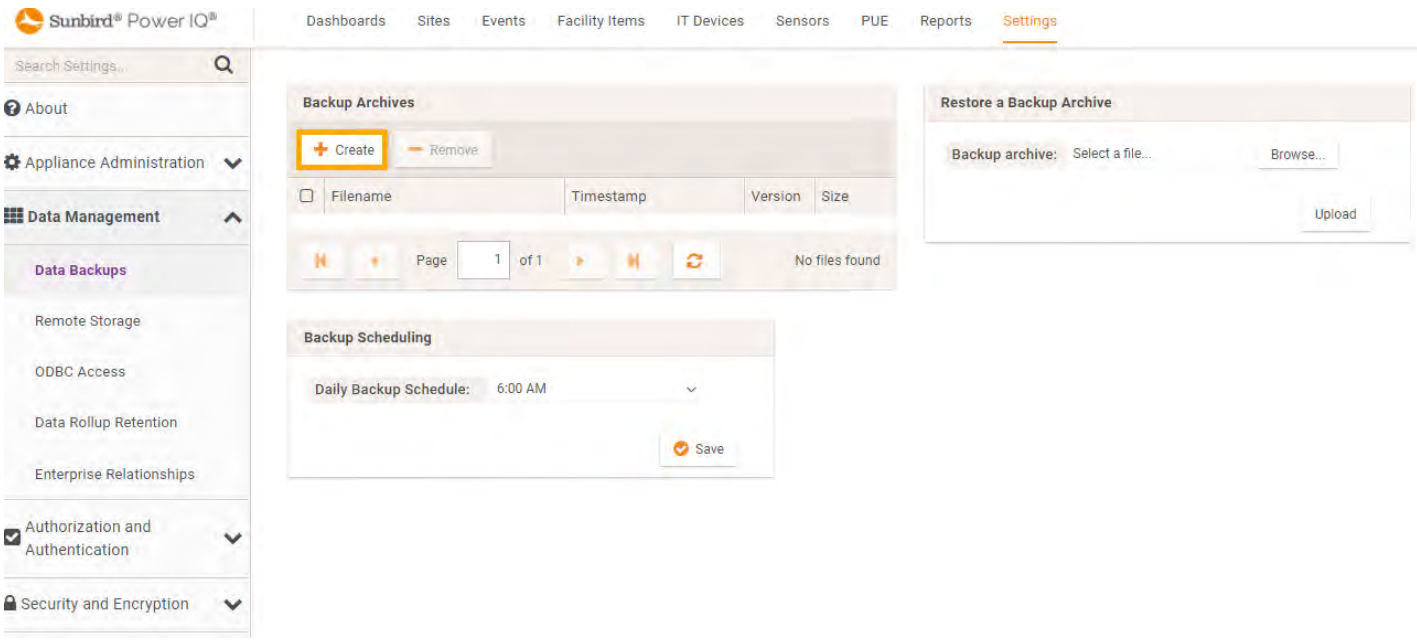
Power IQ creates a daily system configuration backup file.

You can download the files to another location. Downloading System Configuration Backup Files.

To automatically download daily backup files, setup a remote storage location. See Configuring Remote Storage of Archive Files.

You can also create a new system configuration backup file at any time, and/or schedule a recurring time a daily backup will occur. See Create a System Configuration Backup File.

If needed, you can use a backup file to restore your Power IQ to an earlier, backed-up configuration. See Restoring System Configuration Backups.



Download System Configuration Backup Files

The configuration of your Power IQ is backed up and archived once each day. System Administrators should copy these backup files to an external server for redundancy purposes. Saving a backup of your Power IQ system configuration file is critical for safeguarding your Power IQ configuration and data and recovering from human error.

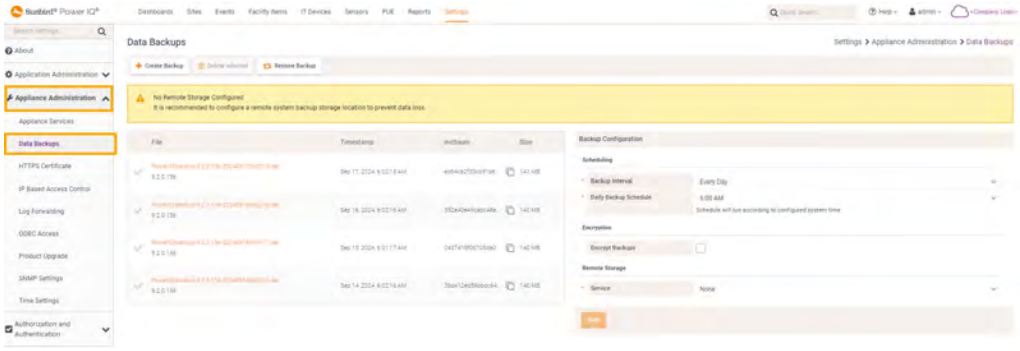
Note: Back Up Your System Before You Upgrade! *Before you upgrade to a new Power IQ release, we strongly recommend that you generate a backup of your Power IQ system configuration and save it to another location, such as your hard drive or an external server. We also strongly recommend that you set up remote storage for backup files to automatically push all daily backups to a remote storage location.*

The backup files are saved in the .DAT file format.

Each backup file is date- and time-stamped and includes the Power IQ build version and the file size.

To download a system configuration backup file:

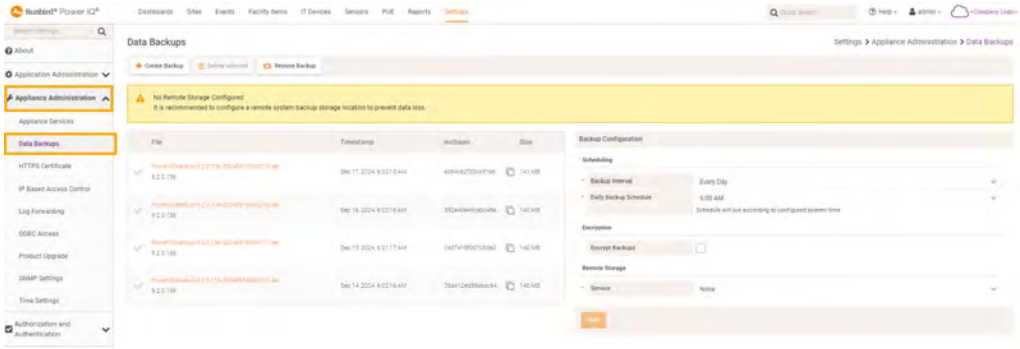
1. In the Settings tab, click Appliance Administration > Data Backups



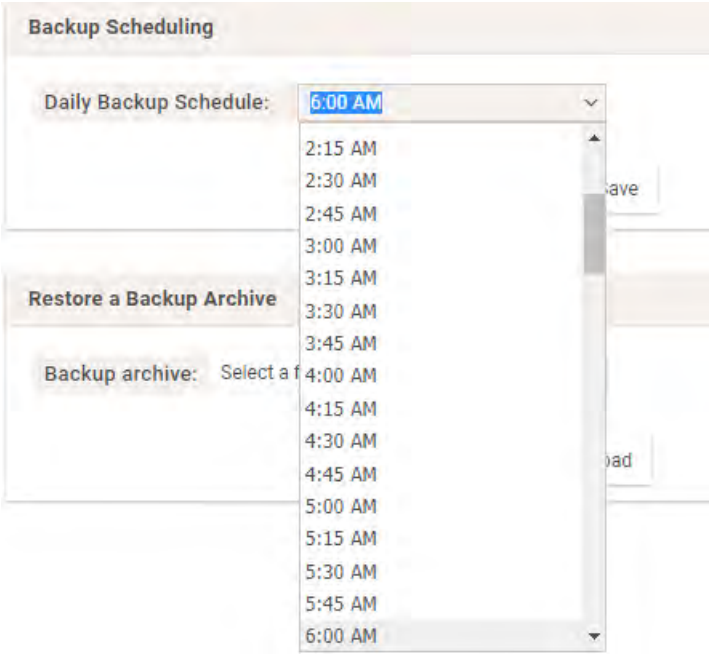
Note: You can also manually create an archive of the system configuration by clicking Create at any time. For more information, see Create a System Configuration Backup File on the next page.

Create a System Configuration Backup File

1. In the Settings tab, click Appliance Administration > Data Backups



2. Click Create Backup.
3. The backup archive creation process begins immediately after you click Create Backup. A Creating backup archive bar displays. Note that the time required to create the backup archive may vary based on the size of your database.
4. **Optional**. If needed, you can set a time at which to schedule the backup to occur. Select a time from the Daily Backup Schedule drop-down in the Back Scheduling section of the page.



5. The file is created immediately or at the scheduled time, and is added at the top of the list in the Backup Archives section. An MD5 file is also created for verification.
6. Backups are taken once daily at the specified time.

Configure Your System Backups Schedule

1. In the Settings tab, click Appliance Administration > Data Backups.
2. In the Backup Configuration panel, specify the following options to schedule your backups:
3. Backup Interval. Select from: Every Hour, Every 2 Hours, Every 4 Hours, Every 8 Hours, Every Day.
4. If you select Every Day, the Daily Backup Schedule field displays. In this field, specify the time when you want tje backup to occur

Note: The schedule will run according to the configured system time

Decrypt Backup Files Before Restoring

You must decrypt encrypted backup files before they can be used to restore a dcTrack system.

To decrypt a PGP encrypted backup file, you need a key pair (private and public matching keys) private key matching the private key used to encrypt the file..

Use the gpg Linux commands to create a key pair to encrypt/decrypt a PGP encrypted backup file. The keys can be exported to a file and shared with another user.

Example of Creating a Key pair

$ gpg --full-generate-key

gpg (GnuPG) 2.2.19; Copyright (C) 2019 Free Software Foundation, Inc.

This is free software: you are free to change and redistribute it.

There is NO WARRANTY, to the extent permitted by law. Please select what kind of key you want:

(1) RSA and RSA (default)

(2) DSA and Elgamal

(3) DSA (sign only)

(4) RSA (sign only)

(14) Existing key from card

Your selection? 1

RSA keys may be between 1024 and 4096 bits long.

What keysize do you want? (3072) 4096

Requested keysize is 4096 bits

Please specify how long the key should be valid.

0 = key does not expire

<n> = key expires in n days

<n>w = key expires in n weeks

<n>m = key expires in n months

<n>y = key expires in n years

Key is valid for? (0) 0

Key does not expire at all

Is this correct? (y/N) yGnuPG needs to construct a user ID to identify your key.Real name: Example User

Email address: user@example.com

Comment: This is an example key and is only for documentation purposes.

You selected this USER-ID:

"Example User (This is an example key and is only for documentation purposes.) <user@example.com>"Change (N)ame, (C)omment, (E)mail or (O)kay/(Q)uit? O

We need to generate a lot of random bytes. It is a good idea to perform

some other action (type on the keyboard, move the mouse, utilize the

disks) during the prime generation; this gives the random number

generator a better chance to gain enough entropy.

We need to generate a lot of random bytes. It is a good idea to perform

some other action (type on the keyboard, move the mouse, utilize the

disks) during the prime generation; this gives the random number

generator a better chance to gain enough entropy.

gpg: key 0E4036BA1064FA59 marked as ultimately trusted

gpg: directory '/home/example/.gnupg/openpgp-revocs.d' created

gpg: revocation certificate stored as '/home/example/.gnupg/openpgp-revoc-s.d/61F711554805DEB232C8995F0E4036BA1064FA59.rev'

public and secret key created and signed.pub rsa4096 2024-01-15 [SC]

61F711554805DEB232C8995F0E4036BA1064FA59

uid Example User (This is an example key and is only for documentation purposes.) <user@example.com>

sub rsa4096 2024-01-15 [E]

Note: DSA certificates are deprecated in Power IQ 9.2. NIST has deprecated the use of DSA (Digital Signature Algorithm) because it is no longer considered secure. If you currently use a DSA certificate, Power IQ will continue to use it for securing HTTPS traffic. However, you can no longer upload these certificates via the web UI.

To export the public key to use in Power IQ:

Example

gpg --output example_public.pgp --armor user@example.com

To share the private key with other users:

Example

gpg --output example_private.pgp --armor --export-secret-key user@example.com

To import the private key to use to decrypt the backup:

Example

gpg --import example_private.pgp

Note: You must share the password from creating the private key with other users.

After you enter the password, you should see something similar to:

Example

gpg: key 0E4036BA1064FA59: secret key imported

gpg: Total number processed: 1

gpg: unchanged: 1

gpg: secret keys read: 1

gpg: secret keys imported: 1

To decrypt the backup:

Example

gpg --decrypt --output Power IQ-backup-9.1.0.381-20240115103146.dat Power IQ-backup-9.1.0.381-20240115103146.dat.gpg

Note: You get to chose the filename for the output but we recommend you just eliminate the .gpg suffix.

You will be prompted for your password and the decryption will commence

You should see similar output with your user/ commment/ email replacing our example:

Example

gpg: encrypted with 4096-bit RSA key, ID B6F566147BE71DF6, created 2024-01-15

"Example User (This is an example key and is only for documentation purposes.) <user@example.com>"

If you did it all in the same directory (on unix) you should see:

Example

g$ ls -l

total 6016008

-rw-r--r-- 1 user user 3079347431 Jan 15 10:51 Power IQ-backup-9.1.0.381-20240115103146.dat

-rw-r--r-- 1 user user 3081034456 Jan 15 10:45 Power IQ-backup-9.1.0.381-20240115103146.dat.gpg

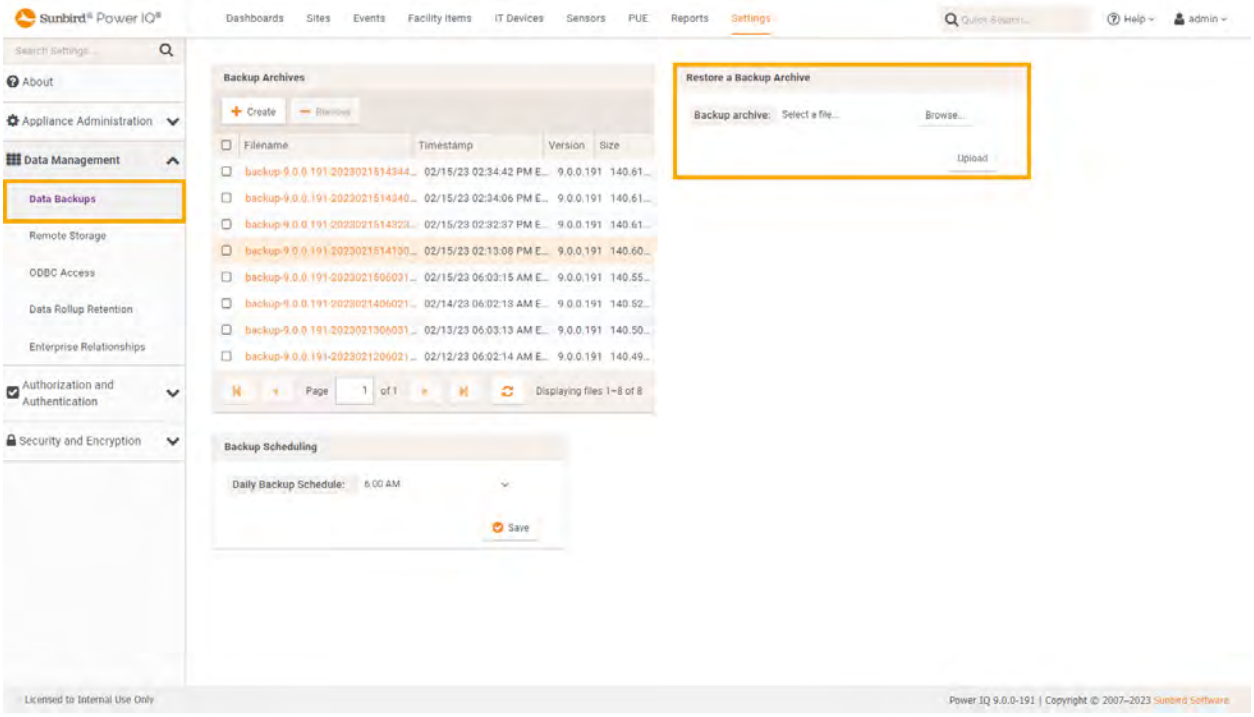
Restoring System Configuration Backups

Restoring a system configuration backup file returns Power IQ's configuration to the settings captured when the backup was made.

Note: If you restore a backup containing an SSL security certificate that is different from the one currently installed on the system, the progress bar for "Restoring the system and restarting..." will not complete. This happens because the browser will not accept any messages from Power IQ until you establish a secure connection using the restored certificate. Start a new browser session and you can log into the system once the former certificate has been restored.

Note: Power IQ cannot decrypt system configuration back up filed. You must decrypt backup files before restoringIf your system configuration backup file is encrypted, see Decrypt Backup Files Before *.*

1. Navigate to Settings > Data Management > Data Backup section.
2. In the Restore a Backup Archive section, click Browse, then select a backup file.



3. Click Upload.
4. The Power IQ data and configuration settings are restored to the backup's configuration settings, and the server is rebooted.

Note: Database versions prior to 7.0 can not be applied directly on Power IQ version 8.0.0. If you are running an earlier Power IQ version you must first upgrade to at lease version 7.0 and then to 8.0.

System Configuration Backup File Retention

Power IQ retains backup for four days. A file older than four days is deleted automatically, unless it is the only stored backup file. One backup file is always kept, regardless of age.

Configure Remote Storage of Archive Files

You can configure a remote storage server to automatically store your archive files in the Power IQ Settings tab.

All files that are not being actively written to are automatically stored on the configured server. Sensor reading archives are often being actively written to, so their storage may be approximately one day delayed.

Supported remote storage service types are: Amazon Web Services, SCP, SFTP, and FTP. You can also discontinue remote storage by selecting the None option.

Note: To configure an SFTP or SCP server, you will need a host key. For information on retrieving the host key, see *How to Retrieve the Host Key for an SFTP or SCP Server on page 540*

Note: The remote storage settings page no longer displays the actual values for Private Key and Host Public. Instead, it shows the SHA-256 digest of the values.

Two file types are eligible for automatic remote storage:

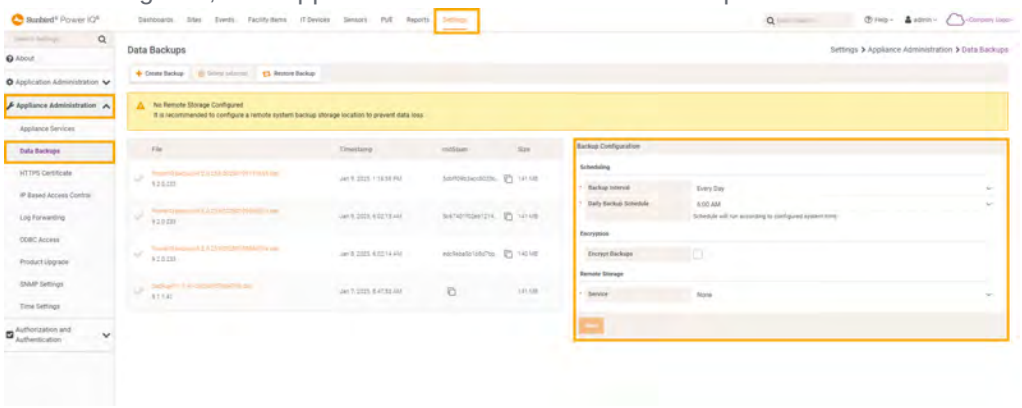
- System configuration archives (system configuration backup files, including daily automatic backups and manually created backups).

  Note: When using an SCP remote storage service, only automatic backups are moved. Manually created backups are not affected.

- Sensor reading archive files

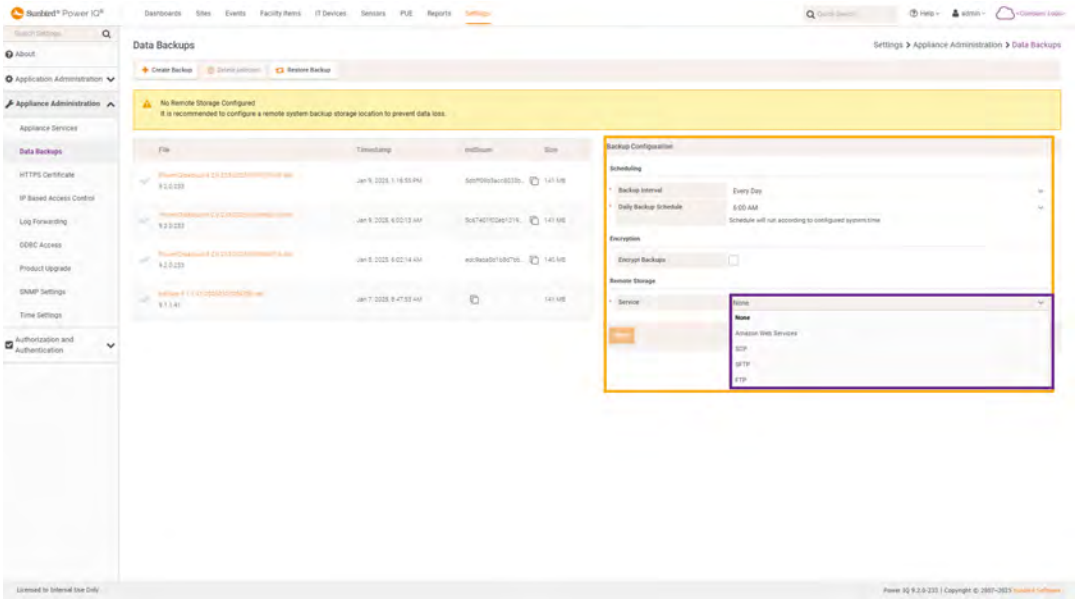
To configure remote storage in Power IQ:

1. In the Settings tab, click Appliance Administration > Data Backups.

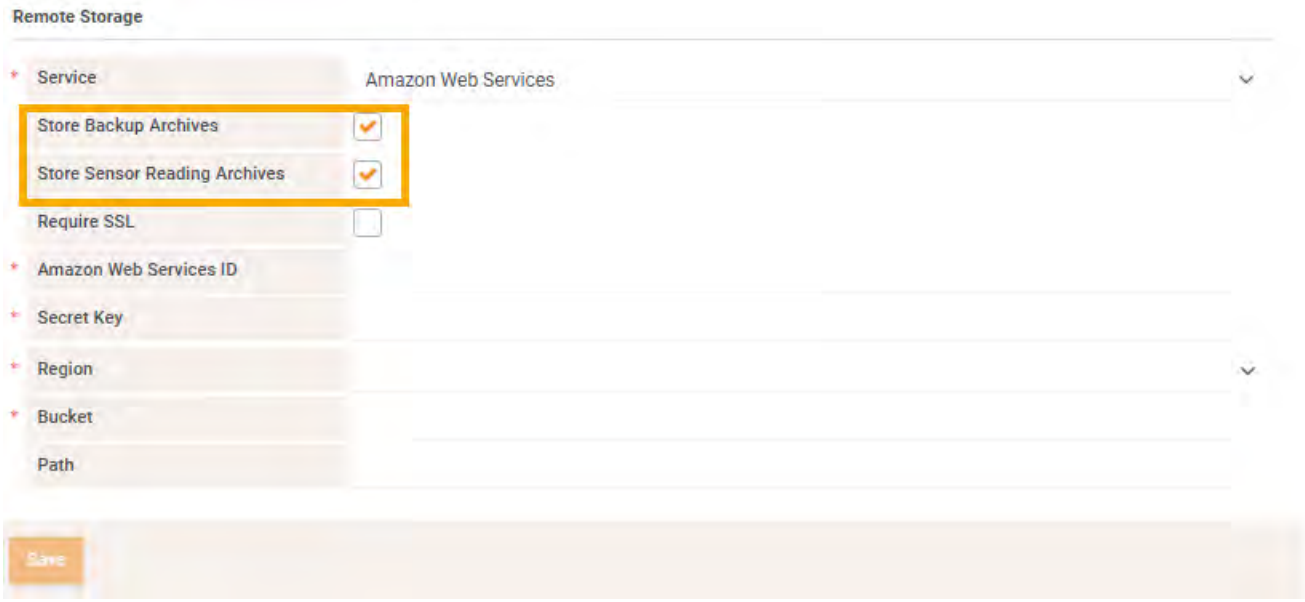


2. In the Backup Configuration panel, select your Remote storage service from the listbox options.
   a. None: Option to stop automatic remote storage
   b. Amazon Web Services
   c. SCP

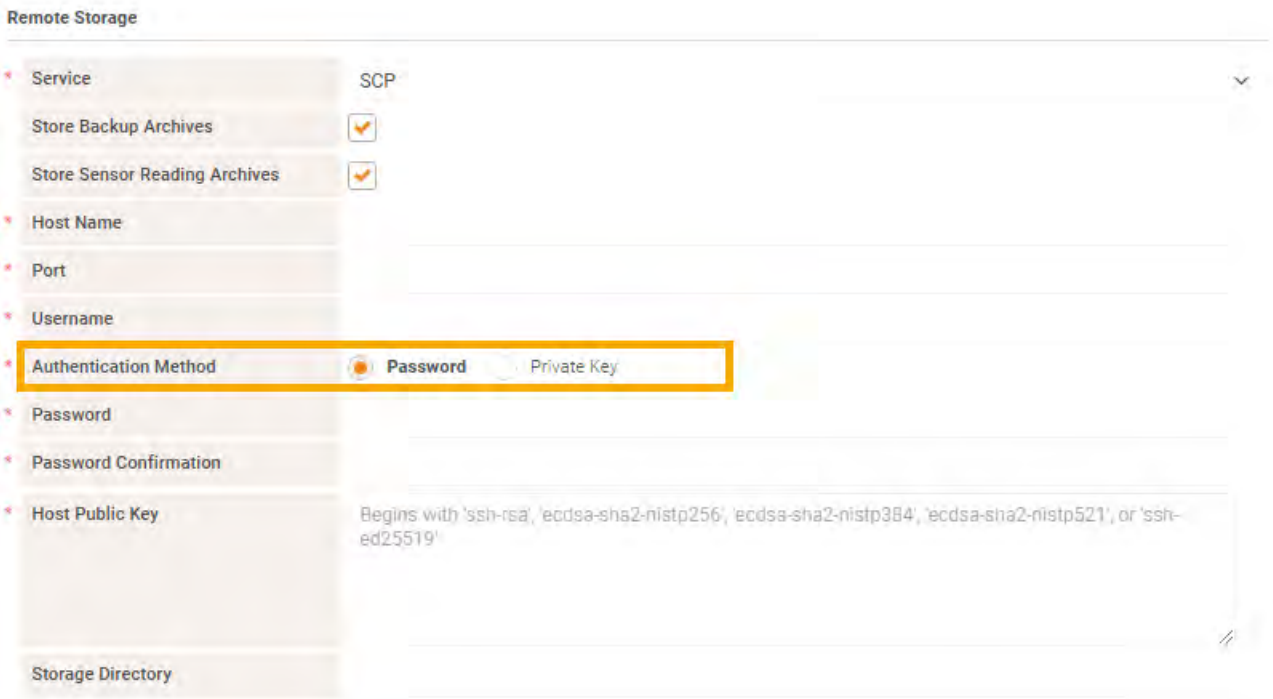
d. SFTP



3. Upon selecting your Remote Storage Service, additional fields display in the Remote Storage panel, where you can configure storage options. Required fields are marked with an asterisk (*).
4. Select the check boxes for the file types you want to automatically store on a remote server.
   a. Store backup archives
   b. Store sensor reading archives



5. For SCP/SFTP configurations, you must select an authentication method: Password or Private Key



6. Click Save.

Note: The authentication and location information will vary based on your selected remote storage service.

How to Retrieve the Host Key for an SFTP or SCP Server

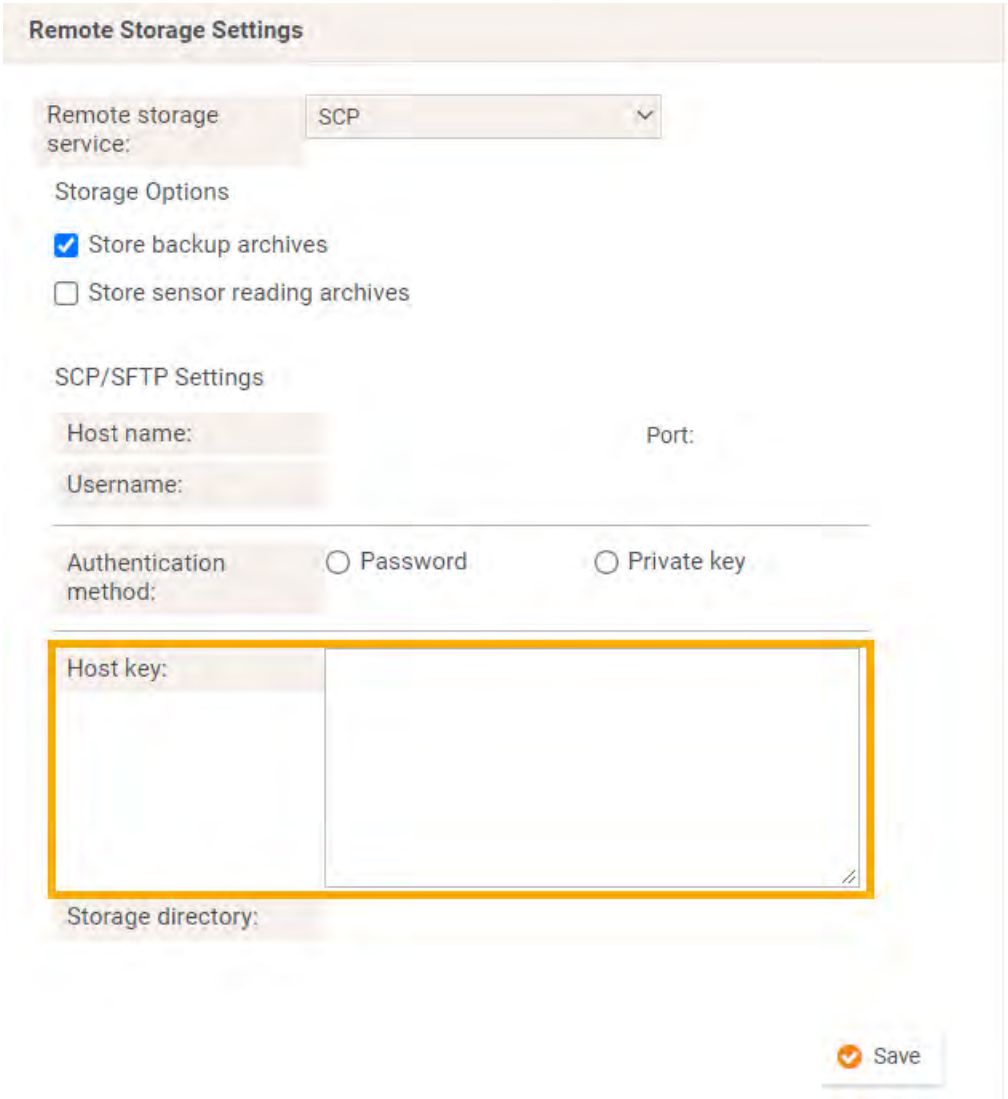
To configure remote storage using an SFTP or SCP server, you will need to provide a host key during the authentication and location information step outlined above. To do so, you can use the `ssh-keyscan` utility.

1. From a Linux box, run this command to get the host key:

```
ssh-keyscan -p 22 -t rsa techftp.sunbirddcim.com 2>/dev/null| awk '{print $2,$3}'
```

Note: If you are copying and pasting from the example above, make sure to change the bolded text—the port (22) and host server (techftp.sunbirddcim.com)—to reflect your own environment.

2. Copy the lines returned into the Host Key box under SCP/SFTP Settings under Remote Storage Settings in Power IQ



3. Click Save.

More Information on ssh-keyscan

The syntax for the command is as follows:

```
ssh-keyscan -p [PORT] -t [TYPE] [HOST] 2>/dev/null| awk '{print $2,$3}'
```

With the following options:

Tag	Description
-p [PORT]	Port to connect to on the host
-t [TYPE]	Specifies the type of the key to fetch from the host. Use **rsa** as in the example above.

The host is the server IP address or host name, such as techftp.sunbirddcim.com.

Configure Remote Access to Database

Power IQ's ODBC interface allows ODBC compliant applications access to the power data of managed devices. For example, an ODBC compliant reporting application like Crystal Reports can access Power IQ data to create customized reports.

See ODBC Access for details on configuration and queries.

Configure Data Rollup Retention and the Data Archive

Power IQ performs periodic roll-ups. During a roll-up, the values over that period are averaged and stored along with the minimum and maximum values that were measured. As time passes, the stored roll-up data itself is rolled up into larger sets of data. Raw data measurements are rolled up every hour, and 24 hourly roll-ups are rolled up every day, and so on. Power IQ enables users to retain raw data in a set of archive tables when the data archive feature is enabled. The inlet_readings, outlet_readings, circuit_readings, and sensor_readings tables have corresponding archive tables

Data does not have to be purged immediately after a roll-up occurs.

Example

Raw data is rolled up every hour but a set of raw data can still be made available five hours later. You can configure how long Power IQ retains each level of data.

Ideally, you should adjust the data retention periods before adding facility items to Power IQ management. You should also revisit these settings after adding a large number of facility items.

Note: Power IQ collects a lot of data. Keeping this data for long periods of time consumes large amounts of storage space and may affect performance. If you need long term access to the raw poll data, you should download daily sensor readings regularly. See Downloading Daily Sensor Readings.

Before making any changes to this configuration, enter your settings in the data storage calculator to ensure adequate database capacity. Improper configuration may result in data loss. Access the data storage calculator by clicking the link on the Settings > Data Rollup Retention page in Power IQ.

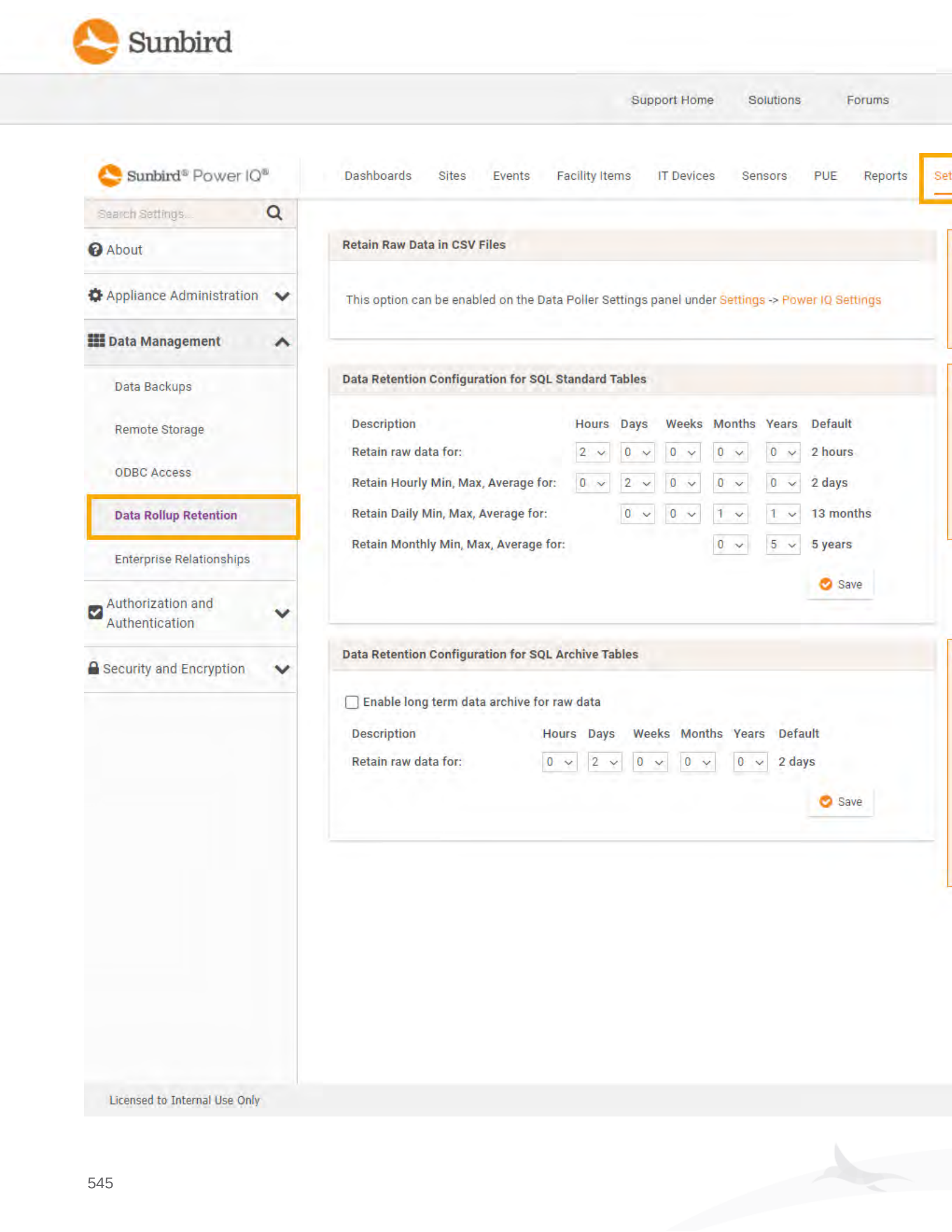
1. In the Settings tab, click Data Managemen.
2. Under Data Management, click Data Rollup Retention.
3. In the Data Retention Configuration for SQL Standard Tables panel, use the drop-down lists in the Retain raw data for row to select how long Power IQ should keep this raw data.
4. In the Retain hourly data row, configure how long hourly roll-ups should be stored.
5. In the Retain daily data row, configure how long daily roll-ups should be stored.
6. In the Retain monthly data row, configure how long monthly roll-ups should be stored by Power IQ.

On the Data Rollup Retention tab, in the Data Retention Configuration for SQL Archive Tables panel, you can enable and configure the retention of archived data.

Note: Power IQ allows the collection and rollup of power readings greater than one megawatt.

Note: The default retention policy for raw archive is two days.

Note: Data is only added to the archive when the long term data archive feature is enabled. Raw Data is only moved to the archive when the retention policy for the SQL Standard Tables expires. Therefore, you should always set the raw archive retention policy to a value greater than the SQL Standard retention policy for raw data.


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Reports
Search Settings...
About
Appliance Administration
Data Management
Data Backups
Remote Storage
ODBC Access
Data Rollup Retention
Enterprise Relationships
Authorization and Authentication
Security and Encryption
Retain Raw Data in CSV Files
This option can be enabled on the Data Poller Settings panel under Settings -> Power IQ Settings
Data Retention Configuration for SQL Standard Tables
Description Hours Days Weeks Months Years Default
Retain raw data for: 2 0 0 0 0 2 hours
Retain Hourly Min, Max, Average for: 0 2 0 0 0 2 days
Retain Daily Min, Max, Average for: 0 0 1 1 13 months
Retain Monthly Min, Max, Average for: 0 5 5 years
Save
Data Retention Configuration for SQL Archive Tables
Enable long term data archive for raw data
Description Hours Days Weeks Months Years Default
Retain raw data for: 0 2 0 0 0 2 days
Save
Licensed to Internal Use Only

Enable and Configure the Data Archive

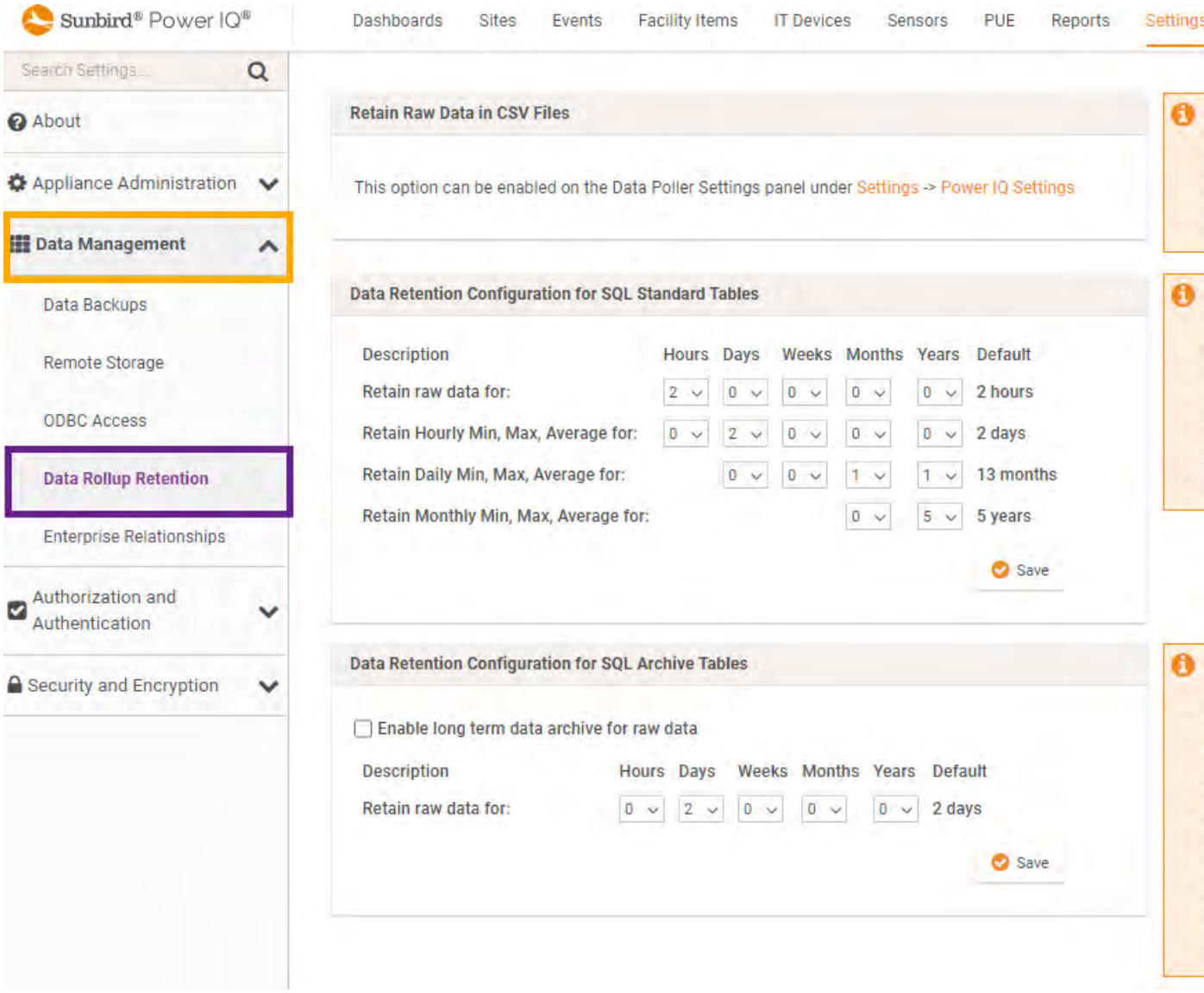
Power IQ allows users to store and analyze archived data so that users can retain the raw data for a long time period while minimizing system performance impact. This feature is useful in cases where users need to audit a past event on a specific facility item or rack.

Data will only be added to the archive when the feature is enabled. Raw Data is only moved to the archive when the retention policy for the SQL Standard Tables expires. Therefore, you should always set the raw archive retention policy to a value greater than the SQL Standard retention policy for raw data.

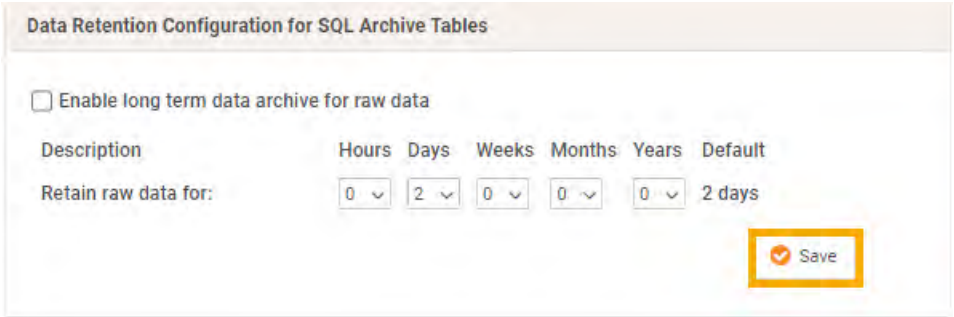
Power IQ deletes data from the archive tables in accordance with the retention policies specified under Power IQ Settings > Data Management > Data Rollup Retention. Additionally, raw data is moved to the archive only when the retention policy for the SQL Standard Tables has expired. For more information on setting the standard retention policies, see *Configure Data Rollup Retention and the Data Archive* on page 543

To use the data archive feature, you first must enable it through the Power IQ Settings.

1. Under Settings > Data Management, select Data Rollup Retention



2. In the Data Retention Configuration for SQL Archive Tables panel, check the Enable long-term data archive for raw data checkbox.



3. You can also specify the duration to retain the raw data. The default is two days. Optional.
4. Click Save to save your changes. A “Data archival configuration updated successfully” message will display once your changes have been saved.

You can now use the data archive feature. For more information on how to chart archived data using a device chart, see .

Note: Archive data is included in backups and restores. As a result, systems with large archives may take longer to back up and restore.

Note: Regardless of whether or not the option to 'Enable long term data archive for raw data' is enabled, Power IQ deletes data from the archive tables in accordance with what is set for the retention policy. The policy shall be applied hourly.

Note: The default retention policy for raw archive is two days.

Enterprise Relationships and the EDM

One of Power IQ's advanced features is the ability to model the IT equipment infrastructure within your data center. Power IQ can model something as simple as a single rack, or as large as a building with multiple server rooms.

In Power IQ, this hierarchical representation of your data center is called the enterprise data model, or EDM. The EDM shows the relationships between objects in your data center and enables Power IQ to:

- Display a representation of your equipment in the Sites Tab.
- Generate charts in the Analytics tab.
- Generate charts and gauges on the Dashboard.
- Calculate PUE.

What is an Enterprise Data Model (EDM) Object?

An object is an item that is a part of your data center.

The objects are mapped by relationships of parent and child, creating a hierarchy.

Higher-level objects contain and organize lower-level objects. For example, a Rack is an object that contains Devices, a Row is an object that can contain Racks, and an Aisle is an object that can contain Rows. See Object Types and their Hierarchy.

The lowest-level objects are called Devices. Devices are items such as servers, KVM drawers, network switches, or other equipment commonly installed in server racks. Generally speaking, these are items you provide power to.

There are a couple of special exceptions. You can map circuits and outlets as part of your EDM, but these objects don't show in the main hierarchy in the Data Centers tab. Since their associations are to your IT devices, circuits display in the device details pages, and outlets display in both the device details pages, and rack PDU Sites Entity tabs

What are Mappings and Relationships?

All objects, except for the Data Center, must have a larger object as a parent. Generally speaking, a parent object is a larger object that contains a smaller object.

The Data Center object is the largest object. It has no parent object.

This ability to identify an object's parent is a single mapping. Mapping each object to its parent describes a model of equipment and how it is organized to Power IQ.

Your model does not have to include every level, as long as it follows the rules for parent-child relationships. See Object Types and their Hierarchy.

Object Types and Their Hierarchy

From the top of the hierarchy to the bottom:

- REGION: The region object type. This object has no parent. It is not supported via CSV import or in the V2 API.
- COUNTRY: The country object type. This object can have a REGION as a parent. It is not supported via CSV import or in the V2 API.
- TERRITORY: The territory object type. This object can have a COUNTRY or REGION as a parent. It is not supported via CSV import or in the V2 API.
- CITY: The city object type. This object can have a TERRITORY, COUNTRY or REGION as a parent. It is not supported via CSV import or in the V2 API.
- DATA_CENTER: The data center object type.
- FLOOR: The floor object type. This object can only have a DATA_CENTER as a parent.
- ROOM: The room object type. This object can have a DATA_CENTER or FLOOR as a parent.
- AISLE: The aisle object type. This object can have a DATA_CENTER, FLOOR, or ROOM as a parent.
- ROW: The row object type. This object can have a DATA_CENTER, FLOOR, ROOM, or AISLE as a parent.
- RACK: The rack object type. This object can have a DATA_CENTER, FLOOR, ROOM, AISLE, or ROW as a parent.
- DEVICE: The IT Device object type. This object can only have a RACK as a parent.
- DOOR: The door object type. This object can have a DATA_CENTER, FLOOR, ROOM, AISLE, ROW, or RACK as a parent.

These objects represent PDUs and sensors:

- PDU: The PDU object type. This object represents all types of PDUs in Power IQ, including Rack PDUs, Rack Transfer Switches, CRACs, Floor PDUs, Floor UPS, Power Panels, and Standalone Meters. This object can have a DATA_CENTER, FLOOR, ROOM, AISLE, ROW, or RACK as a parent.
- SENSOR: The sensor object type. This object can have a DATA_CENTER, FLOOR, ROOM, AISLE, ROW, or RACK as a parent.

For more information on entities in the Sites Tab please see *Entities* on page 84

Requirements for Creating the EDM

All PDUs included in your EDM must already be added to Power IQ. See Adding PDUs to Power IQ Management.

Creating Your EDM

There are several ways to create your EDM:

- Import a CSV file containing the EDM object mappings. See Importing EDM Object Mappings.
- Add items manually in the Sites tab, using drag-and-drop to arrange the hierarchy. See Creating an EDM Manually.
- Generate a default EDM. A default EDM gives you a starting point for customization using the other methods, and enables you to start using dashboard charts immediately. See Generate a Default EDM.

Creating an EDM Manually

The Sites tab has menu options to add each EDM object manually, and associate PDUs and sensors. Once objects are added, drag and drop them to arrange the hierarchy that represents your data center. See Object Types and their Hierarchy for details on each object and how it can be used in the EDM.

Note: If you want to move an EDM item within the hierarchy it needs to be selected first. Just left-clicking and dragging will not work (Left Click - Release - Left Click Drag - Release).

See Importing EDM Object Mappings for an alternative to creating the EDM manually.

Prerequisite: PDUs must be added to Power IQ before creating an EDM. See Adding PDUs to Power IQ Management.

You can add Region, Country, Territory, City, Data Center, Floor, Room, Aisle, Row, Rack, and IT Device objects.

1. Click Add, then select the object and name it when it appears in the tab.
2. To associate PDUs in the EDM, you must add them to Power IQ first. Use the Facility Item Association menu option to find PDUs that are not yet in the EDM, and place them in the hierarchy. Power IQ automatically adds your sensors to the EDM when you associate their PDUs. And, Power IQ moves your sensors when they have the same parent as the PDU. See Automatically Associate Sensors in the EDM.

Note: Only PDUs and sensors that are unassociated will appear as options. PDUs include facility items.

To associate outlets and circuits with IT devices:

- Outlets and circuits can be associated with IT Device objects only. See Associate a Circuit or Outlet with an IT Device.

Automatically Associate Sensors in the EDM

Power IQ automatically associates your sensors into the EDM. See Enterprise Relationships and the EDM.

Every five minutes, Power IQ checks for sensors that are not part of the EDM. If the sensor's PDU is in the EDM, Power IQ adds the sensor to the PDU's parent object, usually a rack. Click Refresh in the Sites Tab to view the updated EDM.

When you associate a PDU in the EDM, Power IQ adds the sensors to the PDU's parent object.

When you remove a PDU from the EDM, Power IQ unassociates sensors that are associated with the PDU's parent object. But, any sensor that were associated to other EDM objects stay where they are.

When you move a PDU in the EDM, Power IQ moves the sensors that had the same parent to the new parent. But, any sensors that were associated to other EDM objects stay where they are.

Note: Because unassociated sensors attached to an associated PDU are re-associated every five minutes, you cannot remove a sensor from the EDM if its PDU is in the EDM.

You can also associate sensors manually and by import. See Create an EDM Manually and Import EDM Object Mappings.

Importing EDM Object Mappings

One method to create or add to an EDM is to import the objects and their mappings. These mappings are imported as one or more Comma Separated Value (CSV) files. Additional CSV files append to the EDM, except when objects are duplicated in the CSV files. In the case of duplicates, the last uploaded object updates the previous entries.

If an EDM already exists, you can export it as a single CSV file. This file can then be edited to make additions, or used as a template to create a new file. See Exporting an EDM.

For details on creating the CSV file, see **Structure of the EDM Import File**.

Note: All PDUs must be added to Power IQ first, before importing an EDM. Importing a CSV file that lists a PDU not added to Power IQ results in an error. See Adding PDUs to Power IQ Management.

To import EDM object mappings:

1. In the Settings tab, click Enterprise Relationships.
2. In the CSV Data Mapping Actions area, click Browse, and select the CSV file.
3. Click Import.

A status window indicates any issues that occurred when the upload completes. If any errors have occurred, none of the objects in the file are added. Edit the CSV file to correct any issues and try again.

CSV Columns for OUTLET Objects

A line that describes an Outlet object has the following attribute columns in this order:

- object_type - this value is always "OUTLET"
- pdu_ip - The IP address of the PDU that this is attached to.
- pdu_proxy_address - If the PDU is in a daisy-chained configuration or console server configuration, enter the PDU's position number in the chain or serial port number.
- outlet_number - The outlet number on the side of the PDU for this outlet.
- parent_object_type - This value is always "DEVICE"
- parent_external_key - The unique identifier for the DEVICE that this outlet serves.

Power IQ automatically creates Outlet objects when Raritan PX PDUs are placed under its management. If you create an Outlet object with a pdu_ip not under Power IQ management, the CSV file generates an error.

CSV Columns for PDU Objects

You must add all PDUs to Power IQ before you can map them in the EDM.

A line that describes a PDU object has the following attribute columns in this order:

- object_type - This value is always PDU.
- pdu_ip - The IP address of the PDU.

- pdu_proxy_address - If the PDU is in a daisy-chained configuration or console server configuration, enter the PDU's position number in the chain or serial port number.
- parent_object_type - One of DATA_CENTER, FLOOR, ROOM, AISLE, ROW, RACK.
- parent_external_key - The unique identifier for the parent object. It can be a name, number, or any other kind of text. This field must be unique to that parent object. Many "child" objects may have the same parent.

CSV Columns for CIRCUIT Objects

You must add all PDUs to Power IQ before you can map them in the EDM.

A line that describes a CIRCUIT object has the following attribute columns in this order:

- object_type - This value is always CIRCUIT.
- pdu_ip - The IP address of the PDU.
- pdu_proxy_address - If the PDU is in a daisy-chained configuration or console server configuration, enter the PDU's position number in the chain or serial port number.
- panel_number - If the circuit is located in a panel, enter the panel number.
- circuit_number - The circuit's number
- parent_object_type - A circuit's parent_object is always DEVICE.
- parent_external_key - The parent DEVICE's external key. This field must be unique to that parent object. Many "child" objects may have the same parent.

CSV Columns for SENSOR Objects

Sensors must have unique labels.

A line that describes a SENSOR object has the following attribute columns in this order:

- object_type: This value is always SENSOR.
- pdu_ip: The IP address of the PDU the sensor is attached to.
- pdu_proxy_address: If the PDU is in a daisy-chained configuration or console server configuration, enter the PDU's position number in the chain or serial port number.
- type: One of the following values: AIR_FLOW, AIR_PRESSURE, CONTACT_CLOSURE, HUMIDITY, MOTION_DETECTION, SMOKE, TAMPER_DETECTION, TEMPERATURE, VIBRATION, WATER.
- ordinal: The number of the sensor's position on the PDU.
- parent_object_type: A sensor's parent_object is one of the following: DATA_CENTER, FLOOR, ROOM, AISLE, ROW, RACK.
- parent_external_key: The parent DEVICE's external key. This field must be unique to that parent object. Many "child" objects may have the same parent.

Importing More than 2500 Objects

The EDM import file may contain a maximum of 2500 lines, one line per object. If you have an EDM with more than 2500 objects, create multiple CSV files.

In this case, the contents of each CSV file, and the order in which you import them is important.

All objects except for Data Center must have a valid parent when added. Importing a child object in file #1, and the parent object in file #2, results in an error.

Make sure each file contains a parent object for each object, or import all high-level parent objects first, such as Data Center and Room, then import the lower-level child objects in subsequent files.

Structure of the EDM Import File

The EDM import file must be in .CSV format.

General structure:

- One Object per line.
- All Objects except for a Data Center list another valid object as a parent.
- All Objects have a unique key for their type.

Within a single CSV file, object order is not important. All objects are processed at the same time.

The CSV file has a maximum length of 2500 lines, meaning a maximum of 2500 objects can be imported at one time. See **Importing More than 2500 Objects** for details on importing multiple files. Object order and import order are important in this case.

Object key:

- An object's unique identity is a combination of its object type and its object key, which is called an external key. This means you could have two objects with the same name, as long as they are different types of objects.

  However, if two lines are both type "DEVICE" and both have an external key "Sales1", Power IQ sees only one device object with the key "Sales1". In this case, it uses the last DEVICE object identified as "Sales1" as the description for that device.

- The columns required for each object varies, depending on the object type.
- All columns are separated by a comma.
- Most columns containing text information can be up to 64 characters long. These columns can contain any character except for a comma.
- The custom_field_1, custom_field_2, external_key and parent_external_key fields can be up to 255 characters long. These columns can contain any character except for a comma.

Note: Currently import EDM does not support objects above Data Centers i.e Region, Country, Territory, City

CSV Columns for DATA_CENTER Objects

A line that describes a Data Center object has the following attribute columns in the order listed.

All columns are separated by a comma.

Note: The attribute columns toward the end. For example: by providing the cost of energy for the data center, Power IQ can calculate the cost of running the data center in an Analytics report. Report can be filtered to include only a smaller object, such as a Rack. See **Configuring Charts**.

- object_type - this value is always "DATA_CENTER"
- external_key - The unique identifier for this object. It can be a name, number, or any other kind of text. This field must be unique.
- name - The name of the data center.
- contact_name - The name of the contact for this data center.
- contact_phone - The phone number for the contact for this data center.
- contact_email - The email address of the contact for this data center.
- company_name - The name of the company that owns this data center
- city - The city where the data center resides.
- state - The state/ province where the data center resides.
- country - The country where the data center resides.
- peak_kwh_rate - The cost per kilowatt hour during peak hours
- off_peak_kwh_rate - The cost per kilowatt hour during off-peak hours
- peak_begin - The time the peak hours begin.
- peak_end - The time the peak hours end.
- co2_factor - The co2 factor for this site. This indicates thse amount of carbon dioxide produced per kWh.
- cooling_factor - The cooling factor per kw energy used. This is the energy used for cooling, or how many kilo-watts of energy are used to cool 100 kilowatts of power consumption.
- custom_field_1 - A custom field for the user to specify.
- custom_field_2 - A second custom field for the user to specify.
- capacity - The peak capacity in kilowatts, specified with up to two decimal places.

CSV Columns for FLOOR, ROOM, AISLE, and ROW Objects

Lines that describe a Floor, Room, Aisle, or Row have the following attribute columns in this order:

- object_type - One of the following values: FLOOR, ROOM, AISLE, ROW
- external_key - The unique identifier for this object. It can be a name, number, or any other kind of text. This field must be unique.
- name - The name of the object.
- parent_object_type - One of DATA_CENTER, FLOOR, ROOM, or AISLE, as described previously.
- parent_external_key - The unique identifier for the parent object. It can be a name, number, or any other kind of text. This field must be unique to that parent object (however, many "child" objects may have the same parent).
- capacity - The peak capacity in kilowatts, specified with up to two decimal places.

CSV Columns for RACK Objects

A line that describes a Rack has the following attribute columns in this order:

- object_type - RACK
- external_key - The unique identifier for this object. It can be a name, number, or any other kind of text. This field must be unique.
- name - The name of the object.
- parent_object_type - One of DATA_CENTER, FLOOR, ROOM, AISLE, or ROW, as described previously.
- parent_external_key - The unique identifier for the parent object. It can be a name, number, or any other kind of text. This field must be unique to that parent object (however, many "child" objects may have the same parent).
- location - an optional field that can be used to identify where rack sits in a row or aisle.
- capacity - The peak capacity in kilowatts, specified with up to two decimal places.
- override_upper_critical_percent - Value to override the default upper critical percent for rack threshold. See **Set Rack Capacity and Override Threshold Percentages**.
- override_upper_warning_percent - Value to override the default upper warning percent for rack threshold. See **Set Rack Capacity and Override Threshold Percentages**.

The Rack model object is similar to the Floor, Room, Aisle and Row objects. The exception is the location value. This value is intended to make the rack easier to identify, and can be given a location value. For example: "3rd Rack" to indicate the third rack in a particular row.

It can also use some other identifying trait. For example: "Yellow" if the rack has a yellow color.

CSV Columns for DEVICE Objects

A line that describes a Device object has the following attribute columns in this order:

- object_type - this value is always "DEVICE"
- external_key - The unique identifier for this object. It can be a name, number, or any other kind of text. This field must be unique.
- name - The name of the data center.
- parent_object_type - This value is always "RACK".
- parent_external_key - The external key for the parent rack.
- customer - The customer using this device.
- device_type - The type of device. For example: "exchange server" or "test unit".
- power_rating - The power rating of this device in watts or VA.
- decommissioned - Indicates whether this device has been decommissioned or not. This value is either "true" or "false".
- custom_field_1 - A custom field for the user.
- custom_field_2 - A second custom field for the user.
- device_ip - The IP address of the device. Required when also importing a graceful shutdown command.
- shutdown_command_name - The name of the shutdown command assigned to this device. See **Add Shutdown Commands**.
- shutdown_wait_time - The number of seconds Power IQ should wait for the shutdown to complete before powering off the associated outlet. See Enable Graceful Shutdown for an IT Device.

Sample CSV for a device with a graceful shutdown command:

```
DEVICE,Device -- 54,Web Server 7,RACK,Rack -- 12,Marketing,Linux Server,,false,Dell PowerEdge R910,Tag#336549,192.168.43.142,Marketing Linux Servers Shutdown Commands,5
```

Sample CSV for a device without a graceful shutdown command:

```
DEVICE,Device -- 55,Router,RACK,Rack -- 12,Marketing,Cisco Router,,false,Cisco 7600 Router,Tag#044142,,,
```

Export an EDM

Power IQ can export the existing EDM, as well as any unmapped PDUs, circuits, and sensors, as a CSV file. Use the file to edit and re-import, as a backup, or as a template for creating a new file.

Power IQ exports all object mappings as a single CSV file, regardless of how many objects it contains. If you want to re-import a file that contains more than 2500 objects, separate them into multiple CSV files.

Note: To find unmapped PDUs, circuits, and sensors in the exported file, look for objects with a blank "parent_external_key".

1. In the Settings tab, click Application Administration > Enterprise Relationships.
2. In the CSV Data Mapping Actions panel, click Export Relationships.. The export starts immediately.

Generate a Default EDM

If you've added PDUs to Power IQ, you can generate a default EDM. You can customize the default EDM using the menu options in the Sites tab, or use export, edit the file, and re-import.

Generating a default EDM deletes all mappings already configured.

The default EDM contains:

- 1 data center
- 1 room
- 1 aisle
- 1 row per type of facility item, including CRAC, floor PDU, floor UPS, power panel, standalone meter
- 1 rack per rack PDU

1. In the Settings tab, click Appliance Administration > Enterprise Relationships.
2. Click Generate Default Enterprise Relationships in the CSV Data Mapping Actions panel.
3. Click Generate default relationships in the confirmation popup.

Note: Generating the default Enterprise Relationship Data will result in new defaults being set and all unassigned PDUs and outlets being assigned to devices and racks.

Associate a Circuit or Outlet with an IT Device

To allow for power control functions for outlets, you must associate your IT devices with their outlet. To allow for charting devices, the IT devices must be associated to their circuits or outlets.

1. In the Sites Tab, select the IT device in its rack. The IT device details tab opens.
2. In the Power Connections Panel, click Associate, then choose Outlets or Circuits.
3. The Associate Entity dialog opens. Begin typing the circuit or outlet name in the Search field. A list of unassociated circuits or outlets appears that match your search.

   Note: If a list does not appear, there are no unassociated outlets or circuits in Power IQ.

4. Select the circuit or outlet in the list, then click Add.

Note: To add a new IT Device to a rack, and associate outlets on a PDU in that rack to the device, you must have the Operator role on the parent rack.

Clear Enterprise Relationships

Clearing the enterprise relationships deletes the EDM. Deleting the EDM will disrupt all configured charts that are based on EDM relationships.

1. In the Settings tab, click Enterprise Relationships in the Data Management section.
2. In the CSV Data Mapping Actions box, click Clear Enterprise Relationships.
3. Click "Clear all enterprise relationships" in the warning message to confirm.

View Enterprise Relationship Summaries

The summary of enterprise mappings provides an overview of the EDM configured in Power IQ.

- In the Settings tab, click Appliance Administration > Enterprise Relationships. The summary is in the top left corner.

View Orphaned Systems Information

The Orphaned Systems information shows whether there are any PDUs in Power IQ that are not mapped to a parent object in the EDM. PDUs that are not in the EDM cannot be included in charts.

- In the Settings tab, click Enterprise Relationships in the Data Management section of the page.

The Orphaned Systems information is in the top right section of the page that opens.

See the table for explanations and possible action required.

	All Outlets Mapped	Some Outlets Mapped	No Outlets Mapped
PDU Mapped to the Enterprise	The number of PDUs that are mapped to a parent object, such as a rack, and have all outlets mapped to an IT device. No action is required.	The number of PDUs that are mapped to a parent object, such as a rack, and have at least one outlet mapped to an IT device. No action is required.	The number of PDUs that are mapped to a parent object, such as a rack, but do not have any outlets mapped to IT devices. No action is required.
PDU Not Mapped to the Enterprise	The number of PDUs that are not mapped to a parent object, such as a rack, but have all outlets mapped to IT devices. Action required! If you have unmapped PDUs, you must assign them to a parent object for analytics to perform correctly. See *Find Unmapped PDUs* on the next page.	The number of PDUs that are not mapped to a parent object such as a rack but have at least one outlet mapped to an IT device. Action required! If you have unmapped PDUs, you must assign them to a parent object for analytics to perform correctly. See *Find Unmapped PDUs* on the next page.	The number of PDUs that are not mapped to a parent object, such as a rack, and have zero outlets mapped to a device. Action required! If you have unmapped PDUs, you must assign them to a parent object for analytics to perform correctly. See *Find Unmapped PDUs* on the next page.

Find Unmapped PDUs

There are several ways to find unmapped PDUs so that you can map them to parent objects in the EDM.

All PDUs must be mapped to a parent object, such as a rack. PDUs that are not in the EDM cannot be included in charts.

See Viewing Orphaned Systems Information.

To find unmapped PDUs in CSV file export:

1. In the Settings tab, click Application Administration > Enterprise Relationships.
2. Click Export Relationships. Power IQ exports the enterprise data tp a CSV file.
3. In the CSV file, find the section labeled "# The following section contains the current list of PDUs and the PDU column headers for use during import."
4. In that section, find the "parent_object_type" column. Rows without data in the "parent_object_type" column are unmapped PDUs.
5. Map the unmapped PDUs to parent objects in a data center.

Alternate Method

This method maps unmapped PDUs to an "Unassigned Data Center" parent object so that you can view the PDUs in the Data Centers tab. Then, you can drag and drop the PDUs to the correct position beneath a parent object, such as a rack.

1. In the Settings tab, click Application Administration > Enterprise Relationships.
2. Click Generate Default Enterprise Relationships.
3. When the generation completes successfully, click the Sites tab and find the Unassigned Data Center.
4. Expand the Unassigned Data Center. All the previously unmapped PDUs are assigned to this data center object.
5. Drag and drop the PDU objects to assign them to the correct parent objects, such as racks, within the correct data center.
6. When you attempt to manually associate PDUs to a parent object in the Data Centers tab, only unmapped PDUs are available in the search tool.
7. In the Sites tab, select the parent object, such as a rack, that you want to associate an unmapped facility item with.
8. Right-click the facility item and select Add Item > Facility Item association.
9. In the Associate Entity dialog, select an unmapped PDU in the PDU IP Address field, and click OK. The PDU is mapped to the data center parent object.

Configure Custom Fields

The Data Center, Device, and PDU entities each contain two custom field values.

Custom fields display in the Sites Tab's hierarchy on the entity tab, for all types of custom fields. PDU custom fields also display in the Facility Items tab in the PDU Details. IT Device custom fields also display in the IT Devices tab in the Device Details. You can use custom field values as filters when configuring charts. See **Configuring Charts**.

By default, these are named:

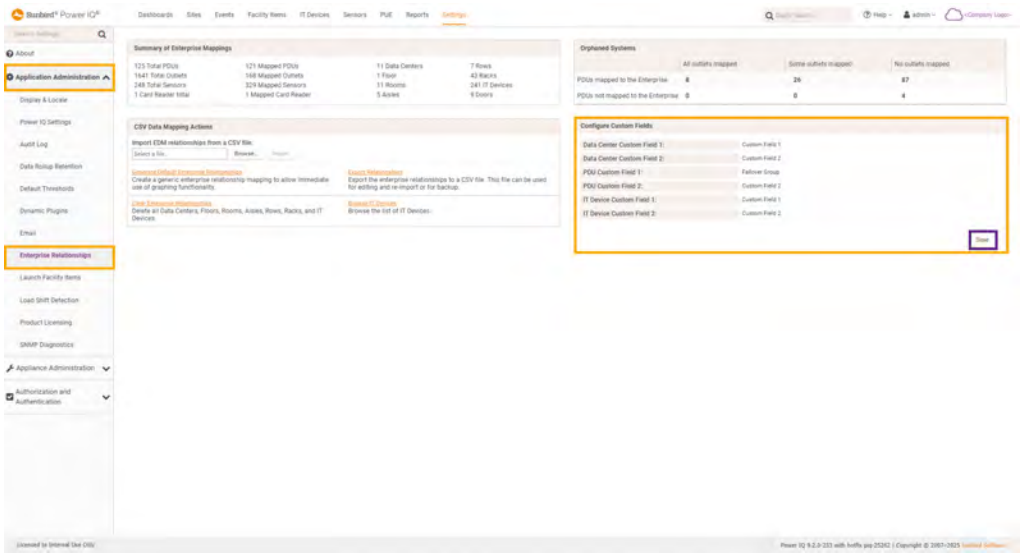
- Data Center Custom Field 1 and Data Center Custom Field 2.
- IT Device Custom Field 1 and IT Device Custom Field 2.
- PDU Custom Field 1 and PDU Custom Field 2.

Rename a field to specify the information it contains.

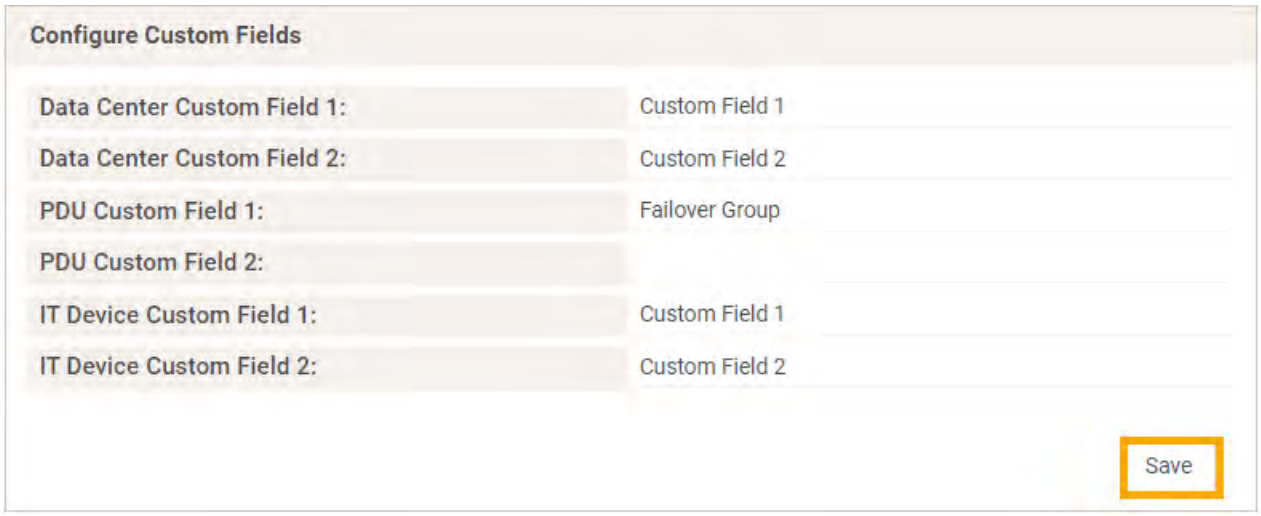
Example

To add data about the department that uses a group of devices, rename the IT Device Custom field "Department," and enter department names in the field for each device in Power IQ.

1. In the Settings tab, click Application Administration.
2. Click Enterprise Relationships..



3. In the Configure Custom Fields panel, enter the new field name next to each custom field.
4. To assign data to the field, enter the data in the newly renamed custom field in either the Sites Tab on the entity page or in the Facilitiy Items or IT Devices tabs in the details page. Data Center custom fields can only be accessed in the Sites Tab. Alternatively, you can use CSV import to update the information. See Importing EDM Object Mappings.
5. Click Save.



Note: The two custom fields for PDUs are included in email alerts.

Plugins

Power IQ uses two types of plugins to manage data center facility items: standard plugins and dynamic plugins.

Standard plugins are built in to Power IQ and provide native or "out of the box" support for devices. For more information, see *Standard Plugins* below.

Dynamic plugins enable you to add data collection support for external PDUs and facility items that Power IQ does not support by standard plugin. There are two types of dynamic plugins: structured and custom. For more information, see *Dynamic Plugins* on the facing page.

Note: During the PDU discovery process, dynamic plugins have priority over standard plugins. Therefore, if a PDU can be managed by either a dynamic or standard plugin, Power IQ will select the dynamic plugin, even if a standard plugin is available.

For a list of vendors supported by standard and dynamic plugins, see *Supported Vendors* on page 686. For complete lists of devices supported by standard and dynamic plugins, see the Sunbird Addons website.

Standard Plugins

Standard plugins are built in to Power IQ and provide native or "out of the box" support for devices. They do not have to be installed.

Users cannot add or remove standard plugins from Power IQ; however, they can create or download and install their own dynamic plugins. For more information on using dynamic plugins, see *Dynamic Plugins* on the facing page

For a list of vendors supported by standard plugins, see *Supported Vendors* on page 686. For a full list of devices supported by standard plugin, see the Standard Plugins page on the Sunbird Addons website.

Dynamic Plugins

Dynamic plugins enable you to add data collection support for external PDUs and facility items that Power IQ does not support by standard plugin.

Dynamic plugins work by mapping SNMP OIDs to Power IQ's database so that Power IQ can find and retrieve data from the device. Power IQ does not include dynamic plugins "out of the box"; rather, users may create or download and install the appropriate dynamic plugins for free from the Sunbird Addons website.

During the PDU discovery process, dynamic plugins have priority over standard plugins. Therefore, if a PDU can be managed by either a dynamic or standard plugin, Power IQ will select the dynamic plugin, even if a standard plugin is available.

There are two types of dynamic plugins: structured and custom. For more information, see *Types of Dynamic Plugins: Structured and Custom* on page 578.

The following device types are supported in each type of dynamic plugin:

- CRAC
- Floor PDU
- Floor UPS
- Power Panel
- Rack PDU
- Rack UPS
- Standalone Meter

For a list of vendors supported by existing dynamic plugins, see *Supported Vendors* on page 686. For a full list of supported devices or to download existing plugins, see the Dynamic Plugins page on the Sunbird Addons website.

Limitations of Dynamic Plugins

There are a number of limitations that should be kept in mind when managing PDUs via dynamic plugins.

- Buffered data retrieval is not supported for PDUs added with dynamic plugins.
- If the desire outcome is a dynamic plugin that only supports traps, then a structured plugin is preferred because a structured plugin can pass validation without any sensor mappings being added. On the other hand, a custom plugin requires at least one sensor mapping to pass validation.
- Under certain scenarios, depending upon what the relevant MIB supports, it may be necessary to hard code certain values in a custom dynamic plugin. For example, if it is not possible to determine from the MIB what type of external sensor is attached at a particular port, it may be necessary to hard code the sensor type to a temperature or humidity as applicable. Assume a scenario with a Rack PDU with two ports, where the custom plugin is configured with Port 1 hard coded to a temperature sensor and Port 2 to a humidity sensor. This will work for all PDUs with this specific configuration. However, if there are PDUs where Port 1 is the humidity sensor and Port 2 is temperature, then Power IQ will show misleading data. It is important to keep this information in mind and to ensure a homogenous configuration across all managed PDUs if necessary.

Types of Dynamic Plugins: Structured and Custom

There are two types of dynamic plugins: structured and custom.

The structure of the PDU's SNMP MIB typically determines whether a structured or a custom dynamic plugin is most appropriate.

Generally, if the MIB you are working with supports it, you should choose the structured dynamic plugin option.

Note: All dynamic plugins created before Power IQ release 4.1 were structured dynamic plugins. Upon upgrade, the dynamic plugin type for these existing plugins will be set to "Rack PDU." You cannot change the type, but the rest of the dynamic plugin can be edited.

Structured Dynamic Plugin

A structured dynamic plugin is derived from hierarchically structured MIBs. Typically, the values are organized in tables in the MIB. For example, a hierarchical MIB for a rack PDU typically has separate tables for elements such as inlets, circuit breakers, and outlets.

In a structured dynamic plugin, you define mappings and index mappings that represent a series of OID values to be collected. You do not have to provide a mapping for every single SNMP OID that you want Power IQ to collect. If the MIB supports values that can be retrieved that indicate the number of inlets, outlets, circuits, and so on, or if the MIB contains columnar values that can be counted, it is possible to create a structured dynamic plugin that is capable of managing a variety of PDU models. This is not possible with a custom dynamic plugin.

Custom Dynamic Plugin

A custom dynamic plugin requires a mapping for every desired reading. For example, you would map values for outlet 1 voltage, outlet 1 current, outlet 2 voltage, outlet 2 current, etc. You must manually specify each object id you want Power IQ to collect, and then map each object id into the Power IQ PDU/electrical device data model.

Custom dynamic plugins are useful when:

- You want to monitor a PDU that does not use SNMP for remote communication. These PDUs may use Modbus or Bacnet protocols for remote communication. You can monitor these PDUs with an SNMP gateway. The SNMP gateway gives the ability to convert Modbus, or other protocols, to SNMP. The custom dynamic plugin can use a combination of the SNMP OIDs and hard-coded values mapped to the data model of the PDU type to support your specific PDU. See *SNMP Gateways and Custom Dynamic Plugins* on page 684.
- The device's MIB does not contain data in tables, also known as a "flat" or "unstructured" MIB.

Mappings for Each PDU Type

This section lists the valid mappings supported by each type of PDU. Click below to jump to the appropriate section.

Note: The Index mappings listed below are supported in structured plugins only. They are not supported for custom plugins.

Common Mappings

The following mappings are supported across all the PDU types (except for Standalone Meters). All PDU types (except for Standalone Meters) may contain inlets, inlet poles, and external temperature and humidity sensors.

As outlined in the table below, Power IQ 9.1 introduces the following dynamic plug in enhancements:

- Rated amps support for inlets, circuit breakers and outlets added for both custom and structured plugins
- Residual current mappings at the inlet and inlet pole levels and the circuit and circuit pole levels
- New mappings for PDU MAC Address and PDU Serial Number

When adding a new dynamic plugin in the Settings tab, new residual current mappings are available at the inlet and inlet pole levels in the Add Another Mapping dropdown list in the Mappings section of the dynamic plugin mappings page.

For information on external temperature and humidity sensors, see *External Temperature and Humidity Sensor Mappings* on page 593.

Note: For more information on the parent/child relationships for the data model elements section, see **Data Model Elements**

In the Common Mappings table below, data model elements in **orange** are optional.

Structured Plugin Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings	Notes
PDU Name	PDU Name	
PDU Firmware	PDU Firmware	
PDU MAC Address	PDU MAC Address	Mapping for the MAC address of a facility item
PDU Serial Number	PDU Serial Number	Mapping for the serial number of a facility
Inlet Index	N/A	
Inlet Active Power	inlet[ordinal] active_power	
Inlet Apparent Power	inlet[ordinal] apparent_power	
Inlet Current	inlet[ordinal] current	
Inlet Power Factor	inlet[ordinal] power_factor	
Inlet Rated Amps		
Inlet Residual Current	inlet[ordinal] residual_current	
Inlet Voltage	inlet[ordinal] voltage	
Inlet Energy	inlet[ordinal] energy	
Inlet Pole Index	N/A	
Inlet Pole Active Power	inlet[ordinal] inletpole[ordinal] active_power	
Inlet Pole Current	inlet[ordinal] inletpole[ordinal] current	
Inlet Pole Residual Current	inlet[ordinal] inletpole[ordinal] residual_current	

Structured Plugin Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings	Notes
Inlet Pole Voltage		
Panel Index	N/A	
Panel Name	panel[ordinal] name	
Panel Inlet Index		
Panel Inlet Active Power		
Panel Inlet Apparent Power		
Panel Inlet Current		
Panel Inlet Power Factor		
Panel Inlet Voltage		
Panel Inlet Energy		
Panel Inlet Pole Index	N/A	
Panel Inlet Pole Active Power	panel[ordinal] inlet[ordinal] inletpole [ordinal active_power	
Panel Inlet Pole Current	panel[ordinal] inlet[ordinal] inletpole [ordinal] current	
Panel Inlet Pole Index	N/A	
Circuit Index	N/A	
Circuit Apparent Power	panel[ordinal] circuit[ordinal] apparent_power	
Circuit Active Power	panel[ordinal] circuit[ordinal] active_power	
Circuit Power Factor	panel[ordinal] circuit[ordinal] power_	

Structured Plugin Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings	Notes
	factor	
Circuit Voltage	panel[ordinal] circuit[ordinal] voltage	
Cricuit Breaker Rated Amps		
Circuit Current	panel[ordinal] circuit[ordinal] current	
Circuit Energy	panel[ordinal] circuit[ordinal] energy	
Circuit Pole Index	N/A	
Circuit Pole Name	panel[ordinal] circuit[ordinal] circuitpole[ordinal] name	
Circuit Pole Phase	panel[ordinal] panel[ordinal] circuit [ordinal] circuitpole[ordinal] phase	
Circuit Pole Position	panel[ordinal] circuit[ordinal] circuitpole[ordinal] position	
External Temperature and Humidity Sensors	See *External Temperature and Humidity Sensor Mappings* on page 593.	

CRAC Mappings

A CRAC may contain inlets, inlet poles and external temperature and humidity sensors.

Only the *Common Mappings* on page 579 and binary sensor mappings are supported for CRAC PDUs. For information on binary sensors, see *Binary Sensor Mappings - Custom Dynamic Plugins Only* on page 596.

Floor PDU Mappings

A Floor PDU may contain inlets, inlet poles, power panels, panel inlets, panel inlet poles, circuits, circuit poles, and external temperature and humidity sensors.

In addition to the *Common Mappings* on page 579, a Floor PDU supports:

Structured Plugin Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings	Notes
Panel Index	N/A	
Panel Name	panel[ordinal] name	
Panel Inlet Index	N/A	
Panel Inlet Active Power	panel[ordinal] inlet[ordinal] active_power	
Panel Inlet Apparent Power	panel[ordinal] inlet[ordinal] apparent_ power	
Panel Inlet Power Factor	panel[ordinal] inlet[ordinal] power_factor	
Panel Inlet Current	panel[ordinal] inlet[ordinal] current	
Panel Inlet Voltage	panel[ordinal] inlet[ordinal] voltage	
Panel Inlet Energy	panel[ordinal] inlet[ordinal] watt_hour	
Panel Inlet Pole Index	N/A	
Panel Inlet Pole Active Power	panel[ordinal] inlet[ordinal] inletpole [ordinal active_power	
Panel Inlet Pole Current	panel[ordinal] inlet[ordinal] inletpole [ordinal] current	
Panel Inlet Pole Voltage	panel[ordinal] inlet[ordinal] inletpole [ordinal] voltage	
Circuit Index	N/A	
Circuit Apparent Power	panel[ordinal] circuit[ordinal] apparent_ power	
Circuit Active Power	panel[ordinal] circuit[ordinal] active_ power	
Circuit Power Factor	panel[ordinal] circuit[ordinal] power_factor	
Circuit Voltage	panel[ordinal] circuit[ordinal] voltage	

Structured Plugin Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings	Notes
Circuit Current	panel[ordinal] circuit[ordinal] current	
Circuit Energy	panel[ordinal] circuit[ordinal] energy	
Circuit Pole Index	N/A	
Circuit Pole Name	panel[ordinal] circuit[ordinal] circuitpole [ordinal] name	
Circuit Pole Phase	panel[ordinal] panel[ordinal] circuit [ordinal] circuitpole[ordinal] phase	
Circuit Pole Position	panel[ordinal] circuit[ordinal] circuitpole [ordinal] position	
Circuit Pole Active Power	panel[ordinal] circuit[ordinal] circuitpole [ordinal] active_power	Not displayed in Power IQ, but data is rolled up to provide Circuit Active Power. Use this mapping if your PDU does not provide Active Power data at the Circuit level.
Circuit Pole Voltage	panel[ordinal] circuit[ordinal] circuitpole [ordinal] voltage	
Circuit Pole Current	panel[ordinal] circuit[ordinal] circuitpole [ordinal] current	
N/A	See *Binary Sensor Mappings - Custom Dynamic Plugins Only* on page 596.	

Floor UPS Mappings

A Floor UPS (Uninterruptible Power Supply) may contain inlets, inlet poles, circuits, circuit poles, batteries, outputs, output poles, and external temperature and humidity sensors.

In addition to the *Common Mappings* on page 579, a Floor UPS supports:

Structured Plugin Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings	Notes
Circuit Index	N/A	
Circuit Apparent Power	circuit[ordinal] apparent_power	
Circuit Active Power	circuit[ordinal] active_power	
Circuit Power Factor	circuit[ordinal] power_factor	
Circuit Voltage	circuit[ordinal] voltage	
Circuit Current	circuit[ordinal] current	
Circuit Energy	circuit[ordinal] energy	
Circuit Pole Index	N/A	
Circuit Pole Name	circuit[ordinal] circuitpole[ordinal] name	
Circuit Pole Phase	circuit[ordinal] circuitpole[ordinal] phase	
Circuit Pole Position	circuit[ordinal] circuitpole[ordinal] position	
Circuit Pole Active Power	circuit[ordinal] circuitpole[ordinal] active_power	Not displayed in Power IQ, but data is rolled up to provide Circuit Active Power. Use this mapping if your PDU does not provide Active Power data at the Circuit level.
Circuit Pole Voltage	circuit[ordinal] circuitpole[ordinal] voltage	
Circuit Pole Current	circuit[ordinal] circuitpole[ordinal] current	
Battery Index	N/A	Please note that only a single battery per UPS is currently supported. Specifying a Battery Index is not required so in most cases it is better to simply

Structured Plugin Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings	Notes
		not define a Battery Index.
Battery Capacity	battery[ordinal] capacity_percentage	
Battery Remaining Runtime	battery[ordinal] runtime_remaining	
Battery Status	battery[ordinal] status	
Battery Current	battery[ordinal] current	
Battery Voltage	battery[ordinal] voltage	
Seconds on Battery	battery[ordinal] seconds_on	
Battery Replacement Indicator	battery[ordinal] replacement_indicator	
UPS Output Index	N/A	Please note that only a single UPS output per UPS is currently supported. Specifying UPS Output Index is not required so in most cases it is better to simply not define a UPS Output Index.
UPS Output Load Percentage	ups_output[ordinal] load_percentage	
UPS Output Source	ups_output[ordinal] source	
UPS Output Pole Index	N/A	
UPS Output Pole Load Percentage	ups_output[ordinal] ups_output_pole[ordinal] load_percentage	
N/A	See *Binary Sensor Mappings - Custom Dynamic Plugins Only* on page 596.	

Power Panel Mappings

A Power Panel may contain inlets, inlet poles, circuits, circuit poles, and external temperature and humidity sensors.

In addition to the Common Mappings, a Power Panel supports:

Structured Plugin Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings	Notes
Circuit Index	N/A	
Circuit Apparent Power	circuit[ordinal] apparent_power	
Circuit Active Power	circuit[ordinal] active_power	
Circuit Power Factor	circuit[ordinal] power_factor	
Circuit Voltage	circuit[ordinal] voltage	
Circuit Current	circuit[ordinal] current	
Circuit Energy	circuit[ordinal] energy	
Circuit Pole Index	N/A	
Circuit Pole Name	circuit[ordinal] circuitpole[ordinal] name	
Circuit Pole Phase	circuit[ordinal] circuitpole[ordinal] phase	
Circuit Pole Position	circuit[ordinal] circuitpole[ordinal] position	
Circuit Pole Active Power	circuit[ordinal] circuitpole[ordinal] active_power	Not displayed in Power IQ, but data is rolled up to provide Circuit Active Power. Use this mapping if your PDU does not provide Active Power data at the Circuit level.
Circuit Pole Voltage	circuit[ordinal] circuitpole[ordinal] voltage	
Circuit Pole Current	circuit[ordinal] circuitpole[ordinal] current	

Structured Plugin Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings	Notes
N/A	See *Binary Sensor Mappings - Custom Dynamic Plugins Only* on page 596.	

Rack PDU Mappings

A Rack PDU may contain inlets, inlet poles, circuit breakers, outlets, outlet poles, and external temperature and humidity sensors.

In addition to the *Common Mappings* on page 579, a Rack PDU supports:

Structured Plugin Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings	Notes
Circuit Breaker Index	N/A	
Circuit Breaker Current	circuitbreaker[ordinal] current	
Circuit Breaker Name	circuitbreaker[ordinal] name	
Circuit Breaker State	circuitbreaker[ordinal] state	
Outlet Index	N/A	
Outlet Active Power	outlet[ordinal] active_power	
Outlet Apparent Power	outlet[ordinal] apparent_power	
Outlet Name	outlet[ordinal] name	
Outlet Power Control	outlet[ordinal] power_control	
Outlet Power Factor	outlet[ordinal] power_factor	
Outlet State	outlet[ordinal] state	
Outlet Voltage	outlet[ordinal] voltage	
Outlet Energy	outlet[ordinal] energy	

Structured Plug-in Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings	Notes
Outlet Current	outlet[ordinal] current	
Outlet Pole Index	N/A	
Outlet Pole Current	outlet[ordinal] outletpole[ordinal] current	Not displayed in Power IQ, but data is rolled up to provide Outlet Current. Use this mapping if your PDU does not provide Current data at the Outlet level. Similarly, if active or apparent power are not available at the outlet but outlet pole current and voltage are available, then outlet power will be estimated from the pole current and voltage readings.
Outlet Pole Voltage	outlet[ordinal] outletpole[ordinal] voltage	Not displayed in Power IQ, but data is rolled up to provide Outlet Voltage. Use this mapping if your PDU does not provide Voltage data at the Outlet level.
Outlet Pole Active Power	outlet[ordinal] outletpole[ordinal] active_power	Not displayed in Power IQ, but data is rolled up to provide Outlet Active Power. Use this mapping if your PDU does not provide Active Power data at the Outlet level. Please note that Power IQ will first attempt to use outlet pole current and voltage to estimate outlet power. If current and voltage are NOT available at the outlet pole level will outlet pole active power be used to estimate outlet active power.

Rack UPS Mappings

A Rack UPS may contain inlets, inlet poles, circuit breakers, outlets, outlet poles, batteries, outputs, output poles, and external temperature and humidity sensors.

In addition to the *Common Mappings* on page 579, a Rack UPS supports:

Structured Plug-in Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings	Notes
Circuit Breaker	N/A	

Structured Plugin Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings	Notes
Index		
Circuit Breaker Current	circuit_breaker[ordinal] current	
Circuit Breaker Name	circuit_breaker[ordinal] name	
Circuit Breaker State	circuit_breaker[ordinal] state	
Outlet Index	N/A	
Outlet Active Power	outlet[ordinal] active_power	
Outlet Apparent Power	outlet[ordinal] apparent_power	
Outlet Name	outlet[ordinal] name	
Outlet Power Control	outlet[ordinal] power_control	
Outlet Power Factor	outlet[ordinal] power_factor	
Outlet State	outlet[ordinal] state	
Outlet Voltage	outlet[ordinal] voltage	
Outlet Energy	outlet[ordinal] energy	
Outlet Current	outlet[ordinal] current	
Outlet Pole Index	N/A	
Outlet Pole Current	outlet[ordinal] outletpole[ordinal] current	Not displayed in Power IQ, but data is rolled up to provide Outlet Current. Use this mapping if your PDU does not provide Current data at the Outlet level. Similarly, if active or apparent power are not available at the outlet but outlet pole current and voltage are available, then outlet power will be estimated from the pole current and

Structured Plugin Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings	Notes
		voltage readings.
Outlet Pole Voltage	outlet[ordinal] outletpole[ordinal] voltage	Not displayed in Power IQ, but data is rolled up to provide Outlet Voltage. Use this mapping if your PDU does not provide Voltage data at the Outlet level.
Outlet Pole Active Power	outlet[ordinal] outletpole[ordinal] active_power	Not displayed in Power IQ, but data is rolled up to provide Outlet Active Power. Use this mapping if your PDU does not provide Active Power data at the Outlet level. Please note that Power IQ will first attempt to use outlet pole current and voltage to estimate outlet power. If current and voltage are NOT available at the outlet pole level will outlet pole active power be used to estimate outlet active power.
Battery Index	N/A	Please note that only a single battery per UPS is currently supported. Specifying a Battery Index is not required so in most cases it is better to simply not define a Battery Index.
Battery Capacity	battery[ordinal] capacity_percentage	
Battery Remaining Runtime	battery[ordinal] runtime_remaining	
Battery Status	battery[ordinal] status	
Battery Current	battery[ordinal] current	
Battery Voltage	battery[ordinal] voltage	
Seconds on Battery	battery[ordinal] seconds_on	
Battery Replacement Indicator	battery[ordinal] replacement_indicator	
UPS Output Index	N/A	Please note that only a single UPS output

Structured Plugin Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings	Notes
		per UPS is currently supported. Specifying UPS Output Index is not required so in most cases it is better to simply not define a UPS Output Index.
UPS Output Load Percentage	N/A	
UPS Output Source	N/A	
UPS Output Pole Index	N/A	
UPS Output Pole Load Percentage	N/A	

Standalone Meter Mappings

A Standalone Meter may contain circuits, circuit poles, and external temperature and humidity sensors.

For information on external temperature and humidity sensors, see *External Temperature and Humidity Sensor Mappings* on the next page.

For information on binary sensors, see *Binary Sensor Mappings - Custom Dynamic Plugins Only* on page 596.

A Standalone Meter supports:

Structured Plugin Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings	Notes
PDU Name	pdu_name	
PDU Firmware	pdu_firmware	
Circuit Index	N/A	
Circuit Apparent Power	circuit[ordinal] apparent_power	

Structured Plugin Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings	Notes
Circuit Active Power	circuit[ordinal] active_power	
Circuit Power Factor	circuit[ordinal] power_factor	
Circuit Voltage	circuit[ordinal] voltage	
Circuit Current	circuit[ordinal] current	
Circuit Energy	circuit[ordinal] energy	
Circuit Pole Index	N/A	
Circuit Pole Active Power	circuit[ordinal] circuitpole[ordinal] active_power	Not displayed in Power IQ, but data is rolled up to provide Circuit Active Power. Use this mapping if your PDU does not provide Active Power data at the Circuit level.
Circuit Pole Voltage	circuit[ordinal] circuitpole[ordinal] voltage	
Circuit Pole Current	circuit[ordinal] circuitpole[ordinal] current	
Circuit Pole Position	circuit[ordinal] circuitpole[ordinal] position	
External Temperature and Humidity Sensors	See *External Temperature and Humidity Sensor Mappings* below	
N/A	See *Binary Sensor Mappings - Custom Dynamic Plugins Only* on page 596.	

External Temperature and Humidity Sensor Mappings

Examine your MIB to determine how the external sensor data is arranged and choose the correct mapping.

Generic sensor mappings

Generic sensor mappings do not include the "temperature" or "humidity" term in the mapping. Generic sensor mappings are useful when you have an OID to determine the type of sensor, and all sensor data is encoded in a single MIB table.

In custom dynamic plugins, only the generic sensor mappings are supported.

The generic sensor mappings can be used to identify both external temperature and humidity sensors. Mappings specific to temperature and humidity are not required for custom dynamic plugins because you have the ability to control each OID that is collected, and you can hard code any value that is not available through the MIB. If the MIB does not provide a sensor type value, you must hard code it.

Structured Plugin Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings	Notes
External Sensor Index	N/A	Not supported for custom dynamic plugins
External Sensor Type	external_sensor[ordinal] type	
External Sensor Name	external_sensor[ordinal] name	
External Sensor Value	external_sensor[ordinal] value	
External Sensor Unit	external_sensor[ordinal] unit	For temperature only, specify Fahrenheit or Celsius. The unit for humidity is always assumed to be a percentage. When all readings are given in the same unit, it's often easier to set the Temperature Unit metadata value. This mapping is needed only in the unlikely case that a MIB gives some temperature readings in Fahrenheit and some in Celsius. If so, you must define this mapping for all temperature and humidity sensors identified because the plugin requires the same total number of mappings for each data model element. For example, if a plugin has five external sensor name mappings defined, then it must have exactly 0 or 5 unit mappings defined.
External Sensor Decimal Digits	external_sensor[ordinal] decimal_digits	The Decimal Digits mapping works as a multiplier. Use this mapping when the MIB table contains multiple sensor types and each type has a different scaling. If the scalings are the same, using a multiplier as needed will work, and the multiplier is applied to all sensors.

Sensor specific mappings for temperature

Use a sensor-specific mapping for temperature when all temperature readings are isolated in separate MIB tables from other sensor types, or the MIB table contains both temperature and humidity readings in each row, or a single MIB table contains both temperature and humidity readings (one reading per row) but there is no column OID that indicates the sensor type.

Note: Sensor specific mappings for temperature cannot be used in custom dynamic plugins. Use the generic sensor mappings instead.

Structured Plugin Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings
Temperature Sensor Index	N/A
Temperature Sensor Name	N/A
Temperature Sensor Value	N/A
Temperature Sensor Unit	N/A

Sensor specific mappings for humidity

Use a sensor-specific mapping for humidity when all humidity readings are isolated in separate MIB tables from other sensor types, or the MIB table contains both temperature and humidity readings in each row, or a single MIB table contains both temperature and humidity readings (one reading per row) but there is no column OID that indicates the sensor type.

Note: Sensor specific mappings for humidity cannot be used in custom dynamic plugins. Use the generic sensor mappings instead.

Structured Plugin Mapping Name	Custom Plugin Mapping Name or Data Model Element and Sensor Type Pairings
Humidity Sensor Index	N/A
Humidity Sensor Name	N/A
Humidity Sensor Value	N/A

Temperature Unit Configuration Precedence

For flexibility to support many kinds of MIB structures, there are several ways of indicating what unit temperature readings are displayed in.

They will be applied in the following order of precedence:

- If external_sensor_unit (generic) or external_sensor_temperature_unit (specific) mappings are configured and corresponding Temperature Unit (Celsius) and Temperature Unit (Farhrenheit) metadata types are configured then the unit information retrieved from the SNMP agent of the target PDU will be used to determine temperature unit.
- If a Temperature Unit metadata type is configured then it will be used to determine the temperature reading units.
- If no other means to determine temperature reading units is available then Celsius will be assumed.

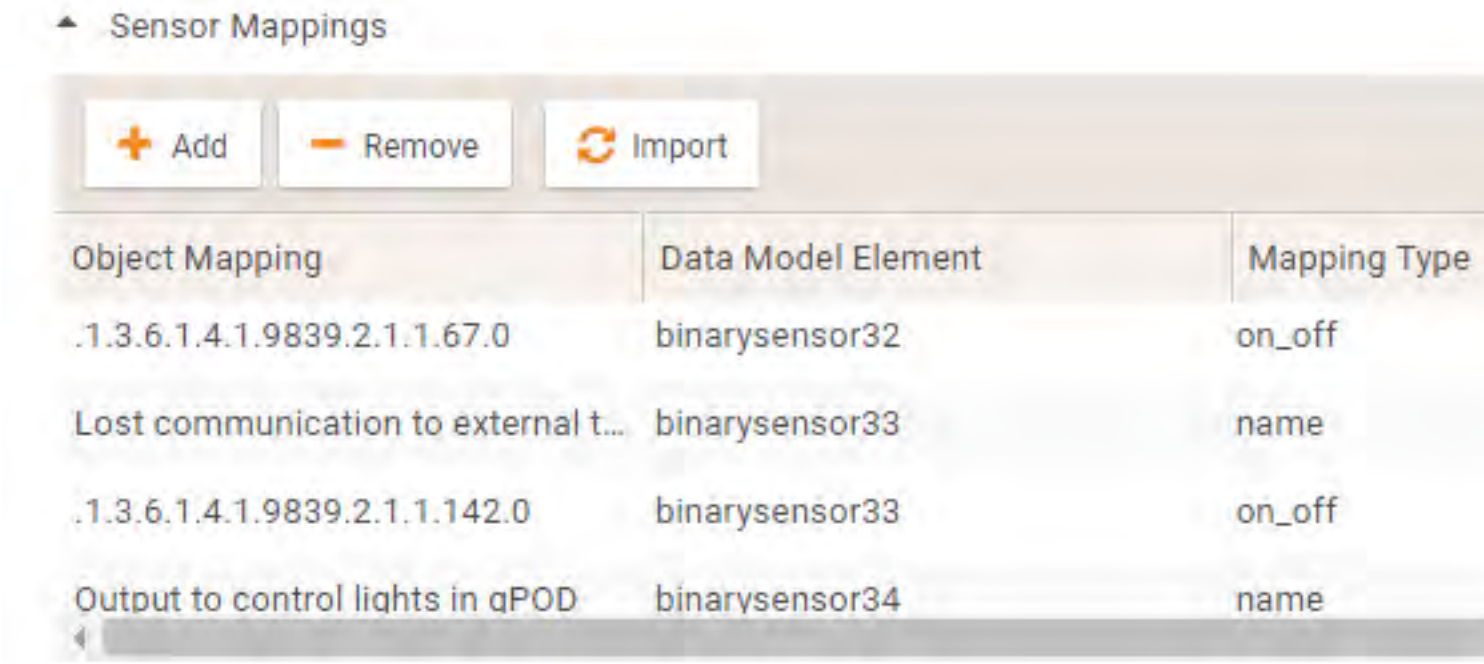
Binary Sensor Mappings - Custom Dynamic Plugins Only

Note: All PDU types except rack PDUs and rack UPSs can use binary sensors.

Only custom dynamic plugins support binary sensors. Once the metadata has been added to the Binary Sensors section, the Mapping Type will be available in the Sensor Mappings section and will be selectable via the Mapping Type dropdown when you add a new sensor mapping. Currently, water, smoke, and on_off sensors are supported. See the *Metadata for Structured and Custom Dynamic Plugins* on page 602 topic for more information.

- The Object Mapping column may be used to specify an object identifier from which the Mapping Type value is to be retrieved or a hard-coded String value (when the Mapping Type value is 'name').
- The Data Model Element column will contain a 'binarysensor[ordinal]' for a binary sensor, where the ordinal will indicate the position of the sensor relative to other binary sensors.
- The Mapping Type column for binary sensors supports two valid mapping types: 1) the binary sensor type as defined in the Binary Sensors metadata section and 2) 'name' mappings which may be used to designate the name of the sensor.

Note: Mapping types must be unique. If the MIB defines more than one set of defin



ed states for a particular sensor type, then you can create additional sensor types by appending an ordinal value to one of the supported mapping types, following the format sensortype[ordinal].

Wildcard Index Mappings - Structured Dynamic Plugins Only

Wildcard index mappings are valid for structured dynamic plugins only.

When a MIB has related OIDs grouped together and in a sequential order, but not in perfectly structured tables, wildcard index mappings can help you make the information work in a structured dynamic plugin.

Use a wildcard index mapping when you need an index and the relevant stock index mappings have already been used, or do not make sense. See *Wildcard Index Mapping Example* on the facing page.

Wildcard Index Mappings	Corresponding Variable Substitutions
Wildcard Index 1	{wildcard_one_index}
Wildcard Index 2	{wildcard_two_index}
Wildcard Index 3	{wildcard_three_index}
Wildcard Index 4	{wildcard_four_index}

Wildcard Index Mapping Example

Wildcard index mappings are useful for creating a structured dynamic plugin when the MIB is not logically organized into tables. A wildcard index mapping can be used as a substitution value in any structured dynamic plugin mapping.

For example, a structured MIB that supports outlet names and outlet current will typically have an outlet table where each row contains one outlet's name and its current (amperage) reading. However, imagine a scenario where the MIB supports outlet names and outlet current, but these values are not accessible through a table. Instead the values are organized as consecutive OIDs in the MIB.

Example:
The MIB's outlet name OIDs:

- 1.3.6.1.4.1.999.1.2.1
- 1.3.6.1.4.1.999.1.2.2
- 1.3.6.1.4.1.999.1.2.3
- 1.3.6.1.4.1.999.1.2.4

The MIB's outlet current OIDs:

- 1.3.6.1.4.1.999.1.2.5
- 1.3.6.1.4.1.999.1.2.6
- 1.3.6.1.4.1.999.1.2.7
- 1.3.6.1.4.1.999.1.2.8

The last decimal value of the OID is the "index" for that value. The index values for the outlet name OIDs are: 1,2,3,4. The index values for the outlet current OIDs are: 5,6,7,8.

With a single 'outlet_index' mapping, you could not collect both outlet name and outlet current. To solve this problem, you can use a wildcard index to generate a second series of index values needed, so that both sets of values can be collected.

The following screenshot depicts a setting of mapping

Mappings

PDU System OID:	1.3.6.1.4.1.232.165.1.2
Model OID:	1.3.6.1.4.1.232.165.1.2.6.0
PDU Name:	1.3.6.1.2.1.1.5.0
PDU Firmware:	1.3.6.1.4.1.232.165.2.1.2.1.5.{proxy_id}
Inlet Active Power:	1.3.6.1.4.1.232.165.2.3.1.1.4.1.{proxy_id}
	Multiplier: 1
Circuit Breaker Index:	1.3.6.1.4.1.232.165.2.3.1.1.5.1.{proxy_id}
	Start: 1 Step: 1 Proxied: ☐
Circuit Breaker Current:	1.3.6.1.4.1.232.165.2.3.2.1.3.{proxy_id}.{circuit_breaker_index}
	Multiplier: 1
Outlet Index:	4
	Start: 1 Step: 1 Proxied: ☐
Outlet Name:	1.3.6.1.4.1.232.165.2.3.1.1.4.7.{outlet_index}
Wildcard Index 1:	4
	Start: 5 Step: 1 Proxied: ☐
Outlet Current:	1.3.6.1.4.1.232.165.2.3.1.1.4.7.{wildcard_one_index}
	Multiplier: 1
Add Another Mapping:	Select mapping...

s that illustrate this:

Metadata for Structured and Custom Dynamic Plugins

The metadata information in this section applies to both structured and custom dynamic plugins.

Metadata Definitions

PDU manufacturers have a lot of flexibility when it comes to how they choose to implement the MIBs for their hardware. This includes the how they choose to represent status values and units for readings. In order to address this, it is necessary to "tell" PIQ how to map the values in the MIB into concrete status or unit values that PIQ understands.

For example, in the Circuit Breakers and Outlets section, it is possible to define the values that the MIB uses to indicate that a Circuit Breaker is "OK" or is "Tripped". If the MIB defines the possible circuit breaker states as Ok(1), Tripped(2), then the plugin author would add a value of 1 for metadata field 'Circuit Breaker State OK' and a value of 2 for 'Circuit Breaker State Tripped'.

Similarly, if the possible values are the strings: "OK" and "TRIPPED" then those strings should be configured.

The following Metadata groupings are available:

- Circuits Breakers and Outlets
- Environmental Sensors
- UPS Output Source
- Binary Sensors
- Battery Status
- Battery Replacement Indicator

It is possible to use a wildcard asterisk (*) character when defining a metadata value. This indicates that any value that is NOT explicitly mapped to another field within the group is to be associated to that metadata field.

Also, it is possible to define a comma separated list of values when defining a metadata value. This indicates that any of the specified values in the list are to be mapped to that metadata field.

Wildcard and comma separated list of values are supported for the following metadata groups:

- Circuits Breakers and Outlets
- UPS Output Source
- Battery Status

Note: Metadata mapping values are case sensitive.

Metadata for Circuit Breakers and Outlets

Circuit Breaker State and Outlet State Metadata

The dynamic plugin uses the Circuit Breaker State and Outlet State metadata values to interpret values retrieved from a target PDU during polling. The values entered must be based on information in the target PDU's MIB.

Example

The MIB indicates that an integer value of 1 indicates that an outlet is ON, and 2 indicates that an outlet is OFF, you must specify those values in the metadata section so that Power IQ can interpret the 1 as ON, and the 2 as OFF when those values are retrieved in polling.

Outlet Power Metadata

The dynamic plugin uses the Outlet Power metadata values when performing outlet power control on a target PDU. Some MIBs will use the same value to indicate both the outlet state and power control operations. Some MIBs use different values. All four Outlet State and Power metadata values must be configured properly for outlet power control to work.

Metadata for Environmental Sensors

In the metadata for environmental sensors, the fields work together with the mappings you add to determine your sensor types, and the units used to interpret readings. See *External Temperature and Humidity Sensor Mappings* on page 593 for details. See *External Temperature and Humidity Sensor Mappings Example Screenshots* on page 669 for examples.

- Humidity Sensor Type: When the MIB contains a single sensor reading table, and there is a value you can use to determine sensor type, use this field to set the value of the humidity sensor type.
- Temperature Sensor Type: When the MIB contains a single sensor reading table, and there is a value you can use to determine sensor type, use this field to set the value of the temperature sensor type.
- Temperature Unit: Set the value to C or F to hard code the units used to interpret readings, when the MIB does not have sensor reading unit information, or when Temperature Unit (Celsius)/Temperature Unit (Fahrenheit) values are not found in this metadata section. This field is only used when a unit's value is not specified on a per reading basis using the external_sensor_unit (generic) or external_sensor_temperature_unit (specific) mappings.
- Temperature Unit (Celsius) and Temperature Unit (Fahrenheit): These fields work with the external_sensor_unit, or external_sensor_temperature_unit mappings. Your readings unit is determined by a match between the value specified here, and the value returned from the MIB for either external_sensor_unit or external_sensor_temperature_unit.

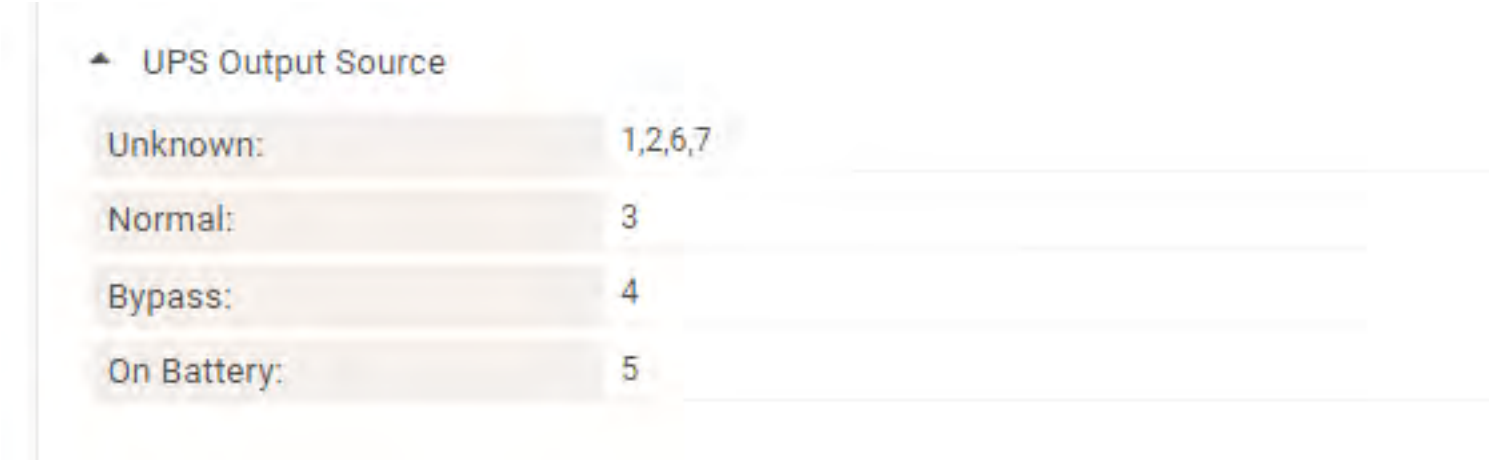
Metadata for UPS Output Source

A UPS output source value indicates the present source of output power for the UPS. PIQ supports four UPS output source values: Unknown, Normal, Bypass and OnBattery. These metadata fields work in conjunction with the UPS Output Source mapping for Floor UPS and Rack UPS devices.

The plugin author should map each of the output source values in the target UPS' MIB to one of the PIQ supported values. For example, consider the upsOutputSource OID from the standard UPS MIB:

```
upsOutputSource OBJECT-TYPE
    SYNTAX     INTEGER {
        other(1),
        none(2),
        normal(3),
        bypass(4),
        battery(5),
        booster(6),
        reducer(7)
    }
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
            "The present source of output power.  The enumeration
            none(2) indicates that there is no source of output
            power (and therefore no output power), for example,
            the system has opened the output breaker."
    ::= { upsOutput 1 }
```

In this case, an appropriate set of mappings might be:



or, using the wildcard for the Unknown field will get the same result and protect against possible future enhancements to the MIB which may introduce new status values:

Metadata for Binary Sensors

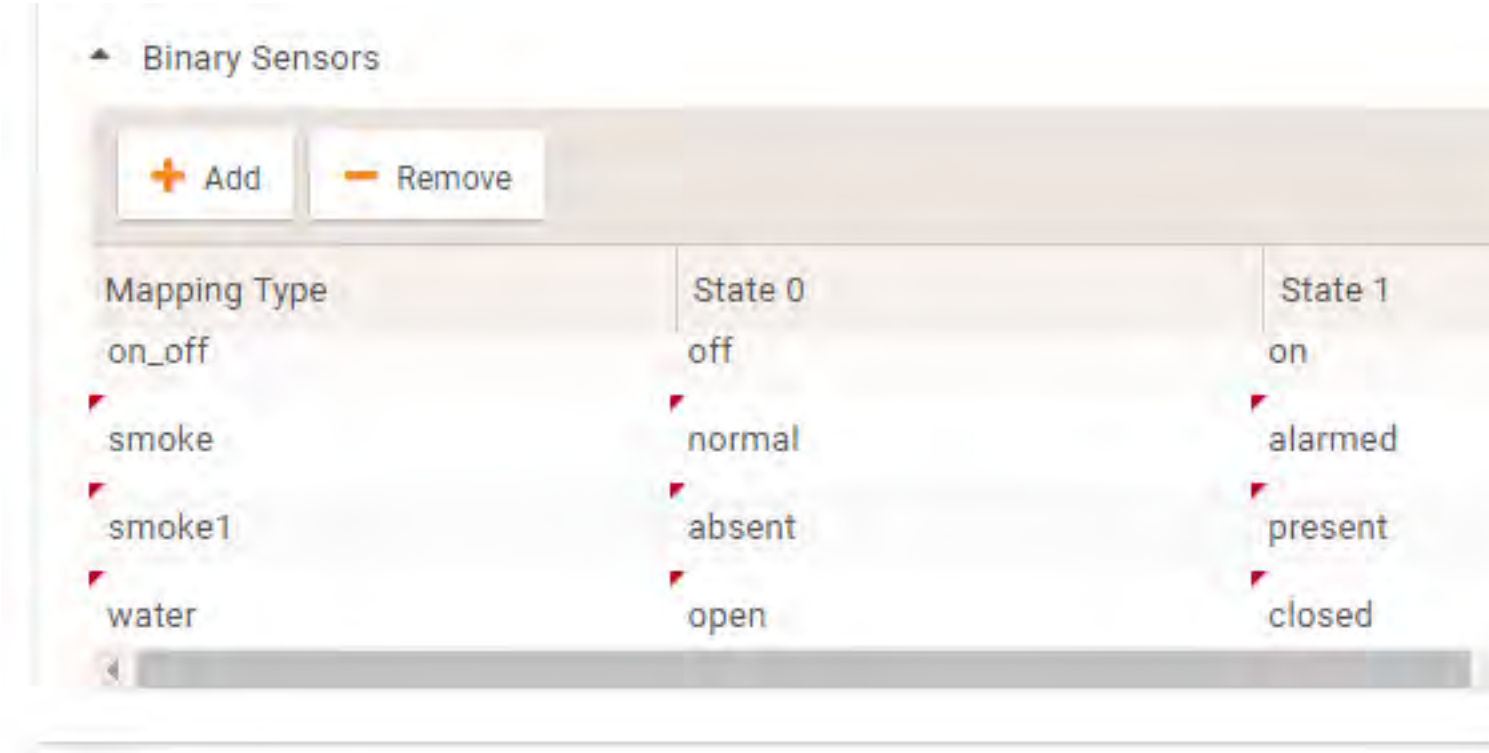
In Power IQ 6.0.2, custom dynamic plugins have been enhanced to support binary sensors to help you better track the environmental conditions in your data center. The currently supported mapping types are as follows:

Mapping Type	Description
water	For water leak alarm status
smoke	For fire or smoke alarm status
on_off	For on/ off status of floor PDUs and in-row cooling fans or for Running/ Stop status of CRAH units

A section for Binary Sensors has been added to the Metadata section of the Edit Custom Dynamic Plugin page. Dynamic plugin authors can add the Mapping Type and indicate the State 0 and State 1 values based on the supported MIB values:

- State 0: Represents an Off or Normal state. Example relevant values include: 0, false, absent, not_detected, open, off, normal, not_tripped, unlocked, and inactive.
- State 1: Represents an On or Alarmed state. Example relevant values include: 1, true, present, detected, closed, on, alarmed, tripped, locked, and active.

Note: Mapping types must be unique. If the MIB defines more than one set of defined states for a particular sensor type, then you can create additional sensor types by appending an ordinal value to one of the supported mapping types, following the format sensortype[ordinal]. For example: smoke, smoke1, water, water1, or on_off, on_off1.



For information on binary sensor mappings, see *Binary Sensor Mappings - Custom Dynamic Plugins Only* on page 596.

Metadata for Battery Status

A UPS battery status value indicates the present status of the UPS battery. PIQ supports five UPS battery status values: Unknown, Normal, Low, Depleted and Fault Condition. These Metadata fields work in conjunction with the Battery Status mapping for Floor UPS and Rack UPS equipment.

The plugin author should map each of the UPS battery source values in the target UPS' MIB to one of the PIQ supported values. For example, consider the upsBatteryStatus OID from the standard UPS MIB:

```
upsBatteryStatus OBJECT-TYPE
    SYNTAX     INTEGER {
        unknown(1),
        batteryNormal(2),
        batteryLow(3),
        batteryDepleted(4)
    }
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
            "The indication of the capacity remaining in the UPS
            system's batteries.   A value of batteryNormal
            indicates that the remaining run-time is greater than
            upsConfigLowBattTime.  A value of batteryLow indicates
            that the remaining battery run-time is less than or
            equal to upsConfigLowBattTime.  A value of
            batteryDepleted indicates that the UPS will be unable
            to sustain the present load when and if the utility
            power is lost (including the possibility that the
            utility power is currently absent and the UPS is
            unable to sustain the output)."
    ::= { upsBattery 1 }
```

In this case, an appropriate set of mappings would be:

Metadata for Battery Replacement Indicator

The battery replacement indicator indicates whether or not the battery of a UPS is no longer functioning properly and needs to be replaced. There are two available metadata fields: True and False. These metadata fields work in conjunction with the Battery Replacement Indicator mapping for Floor UPS and Rack UPS equipment.

The plugin author must inspect the MIB supported by the UPS and determine what value indicates that the battery needs to be replaced and specify that value for the True field. Similarly, whatever MIB value indicates that the battery does NOT need to be replaced must be specified as the value for the False field.

For example, if the MIB specifies that a value of 0 indicates that the UPS battery is normal and a value of 1 indicates that the UPS battery has issues and needs to be replaced, then the mappings would look like:

Trap Support in Dynamic Plugins - Structured or Custom

Trap support applies to both structured and custom dynamic plugins.

Power IQ can convert incoming SNMPv1 and SNMPv2/v3 traps from a PDU managed with a dynamic plugin into a Power IQ event. To support this ability, you must add trap mappings to your dynamic plugin.

Note: Trap mapping is supported for proxied PDUs only when managed through custom dynamic plugins. Each proxied PDU is managed by a unique dynamic plugin mapping. You must add an event filter on whatever trap parameter uniquely identifies the proxied PDU which is the target of the event.

Note: Trap mapping is not supported for proxied PDUs managed through a structured dynamic plugin mapping.

Traps can be mapped to one of these events:

- genericInfo
- genericWarning
- genericCritical

The Power IQ events are generic. Because of this, it is necessary to define event summary text for each trap mapping to give meaning to the event.

Most of the information passed in an SNMP trap is encoded in what are called variable bindings, or "varbinds" for short. Variable bindings are a key value pair, where the key is an object identifier and the value is typically an integer or string. In this guide, for simplicity, trap variable bindings are referred to as trap parameters.

When configuring a trap mapping in Power IQ, the event summary text supports parameter expansion for any SNMP trap parameter contained in the trap. This means any relevant information encoded in a trap's parameters may be displayed in the Power IQ event listing or event details pages through the event summary text. See *Trap Mapping Variables and Format* on page 614

The best practice is to create a detailed, meaningful event summary text. Use filtering to map traps with values matching the filter to a specific event severity level and summary text.

When defining trap filters, you can define a regular expression in place of the trap filter value. You will need to check the Enable regular expression matching checkbox to use a regular expression as a trap filter value.

Note: To avoid duplication of an active event when using a regular expression in place of the trap filter value, you can define regular expression named capture groups. To be considered duplicates, the following criteria must be met for both the active event and the new event: 1) the trap mappings (including matching any specified regular expressions) must match, and 2) all named capture group values (if in use) must match between the new and active events.

For examples, see:

- *Example: Trap Mapping with Filters* on page 625
- *Example: Event Summary Message with Variables* on page 627
- Traps can also be added to custom dynamic plugins based on SNMP-gateway managed devices. There are some setup requirements. See *Example: Trap Mapping with Filters for Babel Buster SPX SNMP Gateway* on page 629

Identify Trap OIDs and Parameters

To create a dynamic plugin with trap support, follow this process to prepare your trap mappings.

- Identify the trap OIDs that you are interested in mapping.
- Identify the key parameters in each trap that will be used to create event filters and the event summary text in the trap mapping.

Trap OIDs

- Trap OIDs are used to identity the alarm or condition being reported. When creating the trap mapping in the dynamic plugin, you will specify the trap OID:
- The trap OID is specified in the Enterprise OID field for an SNMPv2/v3 trap.
- The trap OID is specified in the Enterprise OID and Enterprise Specific ID field for an SNMPv1 trap.

Trap Parameters

- Trap parameters are typically useful for:
  - uniquely identifying the alarm or condition which is being reported. This is necessary if a single trap can actually describe more than one alarm or condition.
  - providing sensor reading values and possibly the threshold value that was exceeded
  - uniquely identifying the specific PDU that the alarm pertains to in a proxied or gateway scenario. Custom mappings only.
  - any other trap details that may be useful to the Power IQ user

Tools To Help With Trap Mapping

A number of tools can be useful while trying to learn enough about a PDU's traps and their parameters to be able to define trap mappings in Power IQ.

- The vendor's MIB.

  The MIB defines the traps that the device can generate, as well as the variable bindings, that is, trap parameters, that will be sent in each trap. The order of the parameters is specified in the MIB as well. Parameter order is important because you must know the order to define the parameter expansion values in the event summary text. The event summary text defines the message that will be generated for the Power IQ event that the trap is mapped to.

- A MIB browser.

  A MIB browser, such as the free iReasoning MIB browser, is useful for viewing the contents of the MIB, and it has a trap receiver that you can use to listen for and decode SNMPv1 and SNMPv2/v3 traps. One good method is to first configure your PDU to sent traps to the computer running the iReasoning browser, and then cause the alarm condition that generates the trap. The iReasoning browser receives and decodes the trap. You can see exactly what traps your PDU is generating, what parameters are being sent, and in what order.

  See *Use a MIB Browser* on page 635

Trap OID Wildcards

An OID wildcard is an asterisk (*) used in place of an object-identifer decimal value in an event filter OID value. OID wildcards are useful when a trap parameter's OID value contains an index value, and the trap mapping being defined should apply to all index values.

For example, assume that a type of PDU can generate an 'outletSensorChange' trap. This trap can be used to indicate an over current or an over voltage condition on an outlet. One of the trap's parameters indicates whether the alarm is for an "over current" or an "over voltage" condition. The OID associated with this trap parameter has a decimal value that indicates the outlet number that the alarm pertains to. The OIDs for this scenario would look similar to these sample OIDs:

- Outlet 1: 1.3.6.1.4.1.9999.1.9.1
- Outlet 2: 1.3.6.1.4.1.9999.1.9.2

  and so on, up to the final outlet

- Outlet 30: 1.3.6.1.4.1.9999.1.9.30

Instead of creating a separate trap mapping in PIQ for each and every outlet, use the OID wildcard in place of the index parameter and specify a filter with the OID:

- 1.3.6.1.4.1.9999.1.9.*

The filter will include all outlets without needing to map a trap for each outlet.

See *Example: Trap Mapping with Filters for Babel Buster SPX SNMP Gateway* on page 629.

Trap Filter Regular Expressions (Wildcards)

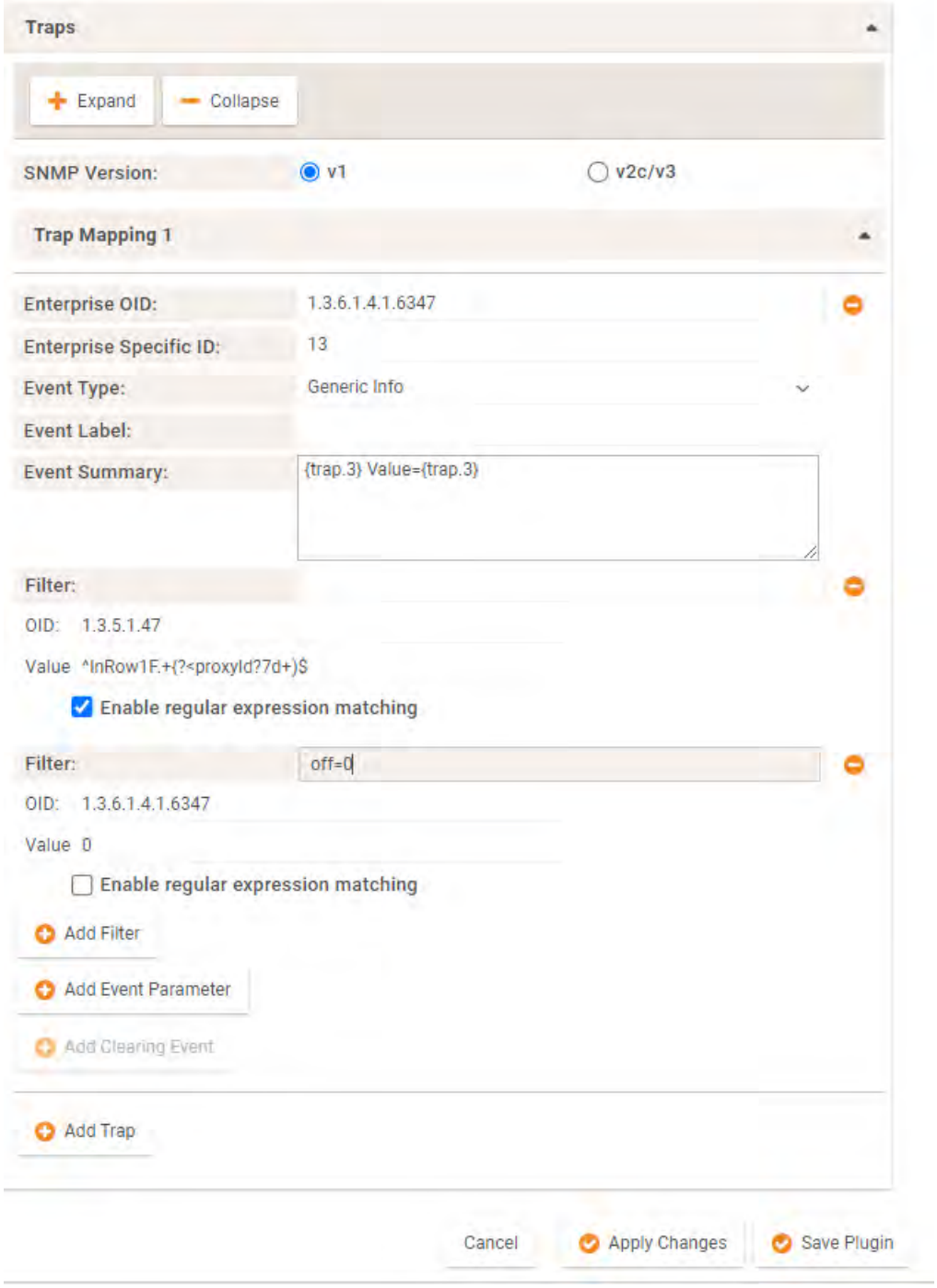
When defining trap filters, you can define a regular expression in place of the trap filter value. This serves as a way to add wildcards to trap filters and provides flexibility to handle unique traps.

You will need to check the **Enable regular expression matching** checkbox to use a regular expression as a trap filter value.

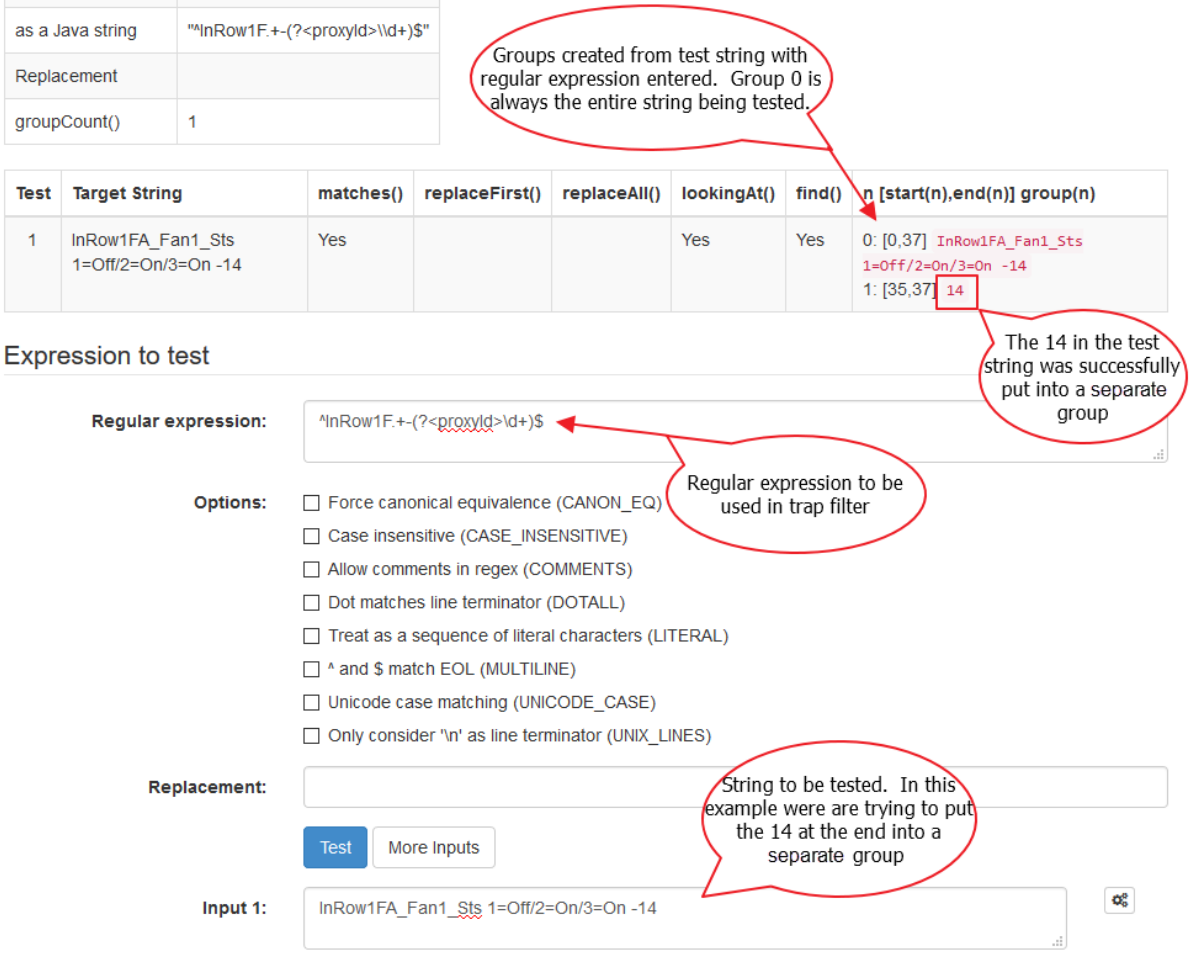
In the example shown below the proxy id for the facility device is being returned at the end of the trap varbind string.

- String returned in varbind: InRow1FA_Fan1_Sts 1=Off/2=On/3=On -**14**

We want to filter the value at the end of the varbind string to match the proxy id used for that device.


Traps
Expand
Collapse
SNMP Version:
v1
v2c/v3
Trap Mapping 1
Enterprise OID:
1.3.6.1.4.1.6347
Enterprise Specific ID:
13
Event Type:
Generic Info
Event Label:
Event Summary:
{trap.3} Value={trap.3}
Filter:
OID: 1.3.5.1.47
Value ^InRow1F.+(?<proxyId?7d+)$
Enable regular expression matching
Filter:
off=0
OID: 1.3.6.1.4.1.6347
Value 0
Enable regular expression matching
Add Filter
Add Event Parameter
Add Clearing Event
Add Trap
Cancel
Apply Changes
Save Plugin

Regular Expression	^InRow1F.+-(?<proxyId>\d+)$
as a Java string	"^InRow1F.+-(?<proxyId>\\d+)$"
Replacement	
groupCount()	1



Additional Resources

Regular Expression Test Page for Java

List of expression syntax commands

Trap Mapping Variables and Format

When creating trap mappings in Power IQ, the event summary message is important to give a detailed description of the event that occurred.

To create the most useful event summary text, you can write a message that uses parameter expansion for any SNMP trap parameter contained in the trap.

Identify the trap parameters you want to include in your message. Use a trap receiver to view the list of parameters. Identify the parameters by number using the format shown.

The following format is supported: {trap.1}, {trap.2} and so on.

For example, the following table shows the first five trap parameters (varbinds) for a Raritan PX2 'inletSensorStateChange' trap. Two sets of parameters are shown to demonstrate how the SNMPv1 format trap works differently from the SNMPv2/v3 format trap. Note that this is for illustration purposes only--a PX2 PDU cannot be configured to send SNMPv1 traps.

SNMPv2/v3 traps will always have a timestamp and a trap OID parameter as the first two parameters in the trap. SNMPv1 traps do not. If the MIB indicates that a particular trap has five parameters, when it is sent as an SNMPv2/v3 trap, it will actually have seven parameters.

Number	SNMPv1 Parameters	SNMPv2/v3 Parameters	Expansion Value
1	pduName	Timestamp	{trap.1}
2	pduNumber	Trap OID	{trap.2}
3	pxInetAddressType	pduName	{trap.3}
4	pxInetAddress	pduNumber	{trap.4}
5	inletLabel	pxInetAddressType	{trap.5}

See *Example: Event Summary Message with Variables* on page 627.

Duplicate Trap Handling

Some PDU SNMP agents send more than one trap for the same condition.

Power IQ checks if each newly created event matches an existing active event in the database. If there is already an active event, the new event will be discarded. This prevents duplicate notifications for the same underlying condition.

Event Clearing

In PIQ 7.1 (& later) it is possible to configure trap mappings such that the events generated support automatic clearing. There are two new elements within trap mapping configuration that make this possible: *event parameter mappings and event labels*.

Event Parameter Mappings

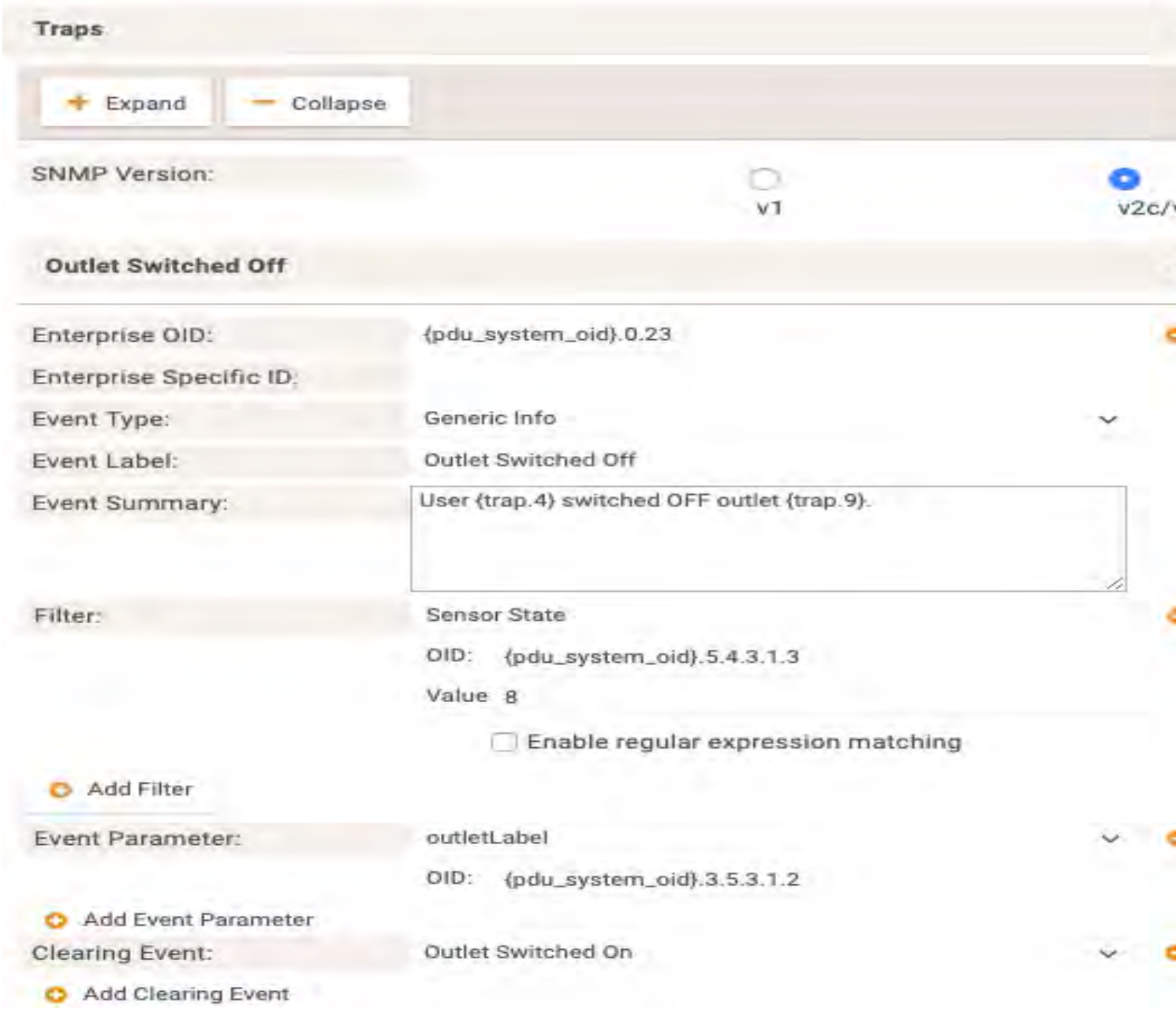
Event parameters are key/value pairs that are associated with PIQ events and contain meta data that is necessary for performing PDU element association (ie, associating the event to the proper target object in PIQ) and event correlation (ie, event clearing and de-duplication).

There are a limited number of event parameter keys that are currently supported. They are:

Event Parameter Key	Description	Format
inletLabel	Identifies specific inlet	String: I1,I2,..In
lineLabel	Identifies specific line	String: L1,L2,L3 or L1-L2,L2-L3,L1-L3
inletPoleNumber	Identifies specific inlet pole	Integer: 1,2,..n
cbLabel	Identifies specific circuit breaker	String: CB1,CB2,...CBn
outletLabel	Identifies specific outlet	Integer: 1,2,..n
outletPoleNumber	Identifies specific outlet pole	Integer: 1,2,..n
externalSensorNumber	Identifies specific external sensor	Integer: 1,2,..n
externalSensorName	Identifies specific external sensor based on user assigned name	String
externalSensorType	Identifies the type of external sensor. Varbind value must match one of the configured	String

Event Parameter Key	Description	Format
	external sensor temp/ humidity meta data values.	
circuitNumber	Identifies a specific circuit	Integer: 1..n
circuitPoleNumber	Identifies a specific circuit pole	Integer: 1..n

When configuring trap mappings there is a new *Add Event Parameter* button which may be used to add an event parameter mapping. A drop-down is provided to permit selection of the desired event parameter key. In the example below, an *outletLabel* event parameter key has been added. The *OID* identifies the variable binding whose value will be associated with the *outletLabel* key and subsequently used for identification and correlation during event processing.]



By adding event parameter mappings it is possible to get more granular control over what PIQ identifies as a duplicate event. Consider the *Outlet Switched Off* trap from our example. Prior to this feature as soon as there was one active event for ANY outlet any subsequent events would be discarded as duplicates. By specifying an *outletLabel* event parameter any unique event (as determined by the *outletLabel* value) will no longer be discarded as a duplicate.

Also, with respect to external sensor events, provided there is a match, any defined externalSensor* event parameters will be used to associate the resulting event to the external sensor EDM object rather than to the source PDU which generated the trap.

Note that within a given trap mapping, once an event parameter has been selected it will be removed from the drop-down list.

Event parameter mapping values will appear on the event details page in the PIQ UI along with any SNMP variable binding values that are sent with any given trap.

Event Labels

Trap mappings now support an Event Label field which allow a dynamic plugin author to create a event label string which identifies the event. This string value must be:

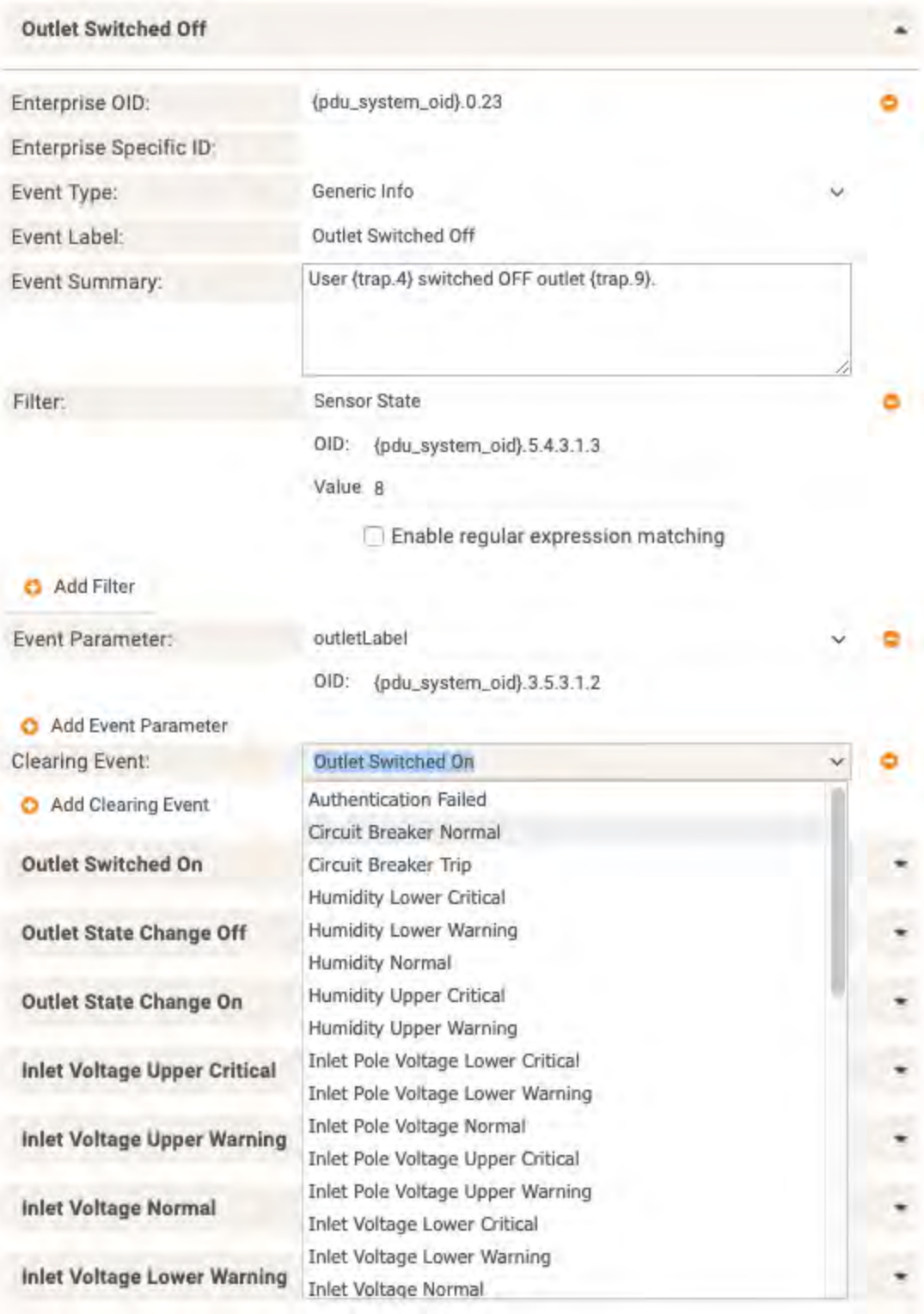
- unique within any given dynamic plugin
- no longer than 64 characters

The event label field provides a more descriptive, user-friendly name and will appear in the PIQ UI in place of the generic event text that is displayed currently. This is true on the event listing page as well as on the event details page.

Please note that event labels are not required and existing trap mappings will continue to function as before if an event label is not provided.

Clearing Event Labels

Once at least one trap mapping has an event label defined, the *Add Clearing Event* button is enabled. Clicking the *Add Clearing Event* button adds a clearing event field and the plugin author can choose the corresponding clearing event from a drop down list of configured event labels. In the example below the *Outlet Switched On* event is selected as a clearing event for the *Outlet Switched Off* event.


Outlet Switched Off
Enterprise OID: {pdu_system_oid}.0.23
Enterprise Specific ID:
Event Type: Generic Info
Event Label: Outlet Switched Off
Event Summary: User {trap.4} switched OFF outlet {trap.9}.
Filter: Sensor State
OID: {pdu_system_oid}.5.4.3.1.3
Value 8
Enable regular expression matching
Add Filter
Event Parameter: outletLabel
OID: {pdu_system_oid}.3.5.3.1.2
Add Event Parameter
Clearing Event: Outlet Switched On
Add Clearing Event
Outlet Switched On
Outlet State Change Off
Outlet State Change On
Inlet Voltage Upper Critical
Inlet Voltage Upper Warning
Inlet Voltage Normal
Inlet Voltage Lower Warning
Authentication Failed
Circuit Breaker Normal
Circuit Breaker Trip
Humidity Lower Critical
Humidity Lower Warning
Humidity Normal
Humidity Upper Critical
Humidity Upper Warning
Inlet Pole Voltage Lower Critical
Inlet Pole Voltage Lower Warning
Inlet Pole Voltage Normal
Inlet Pole Voltage Upper Critical
Inlet Pole Voltage Upper Warning
Inlet Voltage Lower Critical
Inlet Voltage Lower Warning
Inlet Voltage Normal

Event Clearing Detail

An active event is considered a match for (or a duplicate of) a new event based on the following criteria:

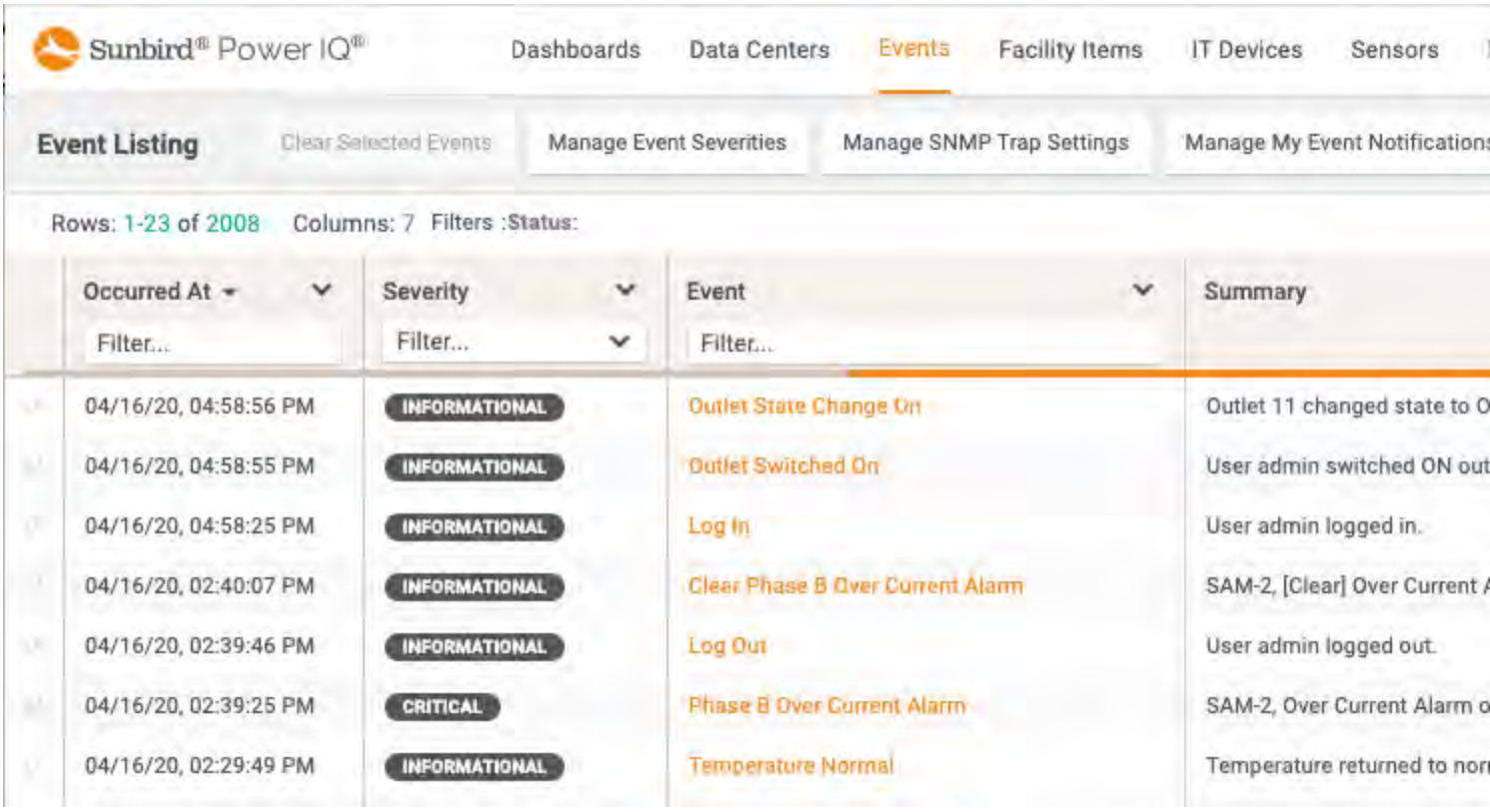
- event type (genericInfo, genericWarning, genericCritical)
- trap OID
- target of the event (ie, PDU element: PDU, inlet, outlet CB, external sensor, etc...)
- sensor type (ie, current, voltage, onOff, temperature, humidity, etc..)
- for generic events, elements from the dynamic plugin trap mapping:
    - o user defined trap filters
    - o user defined event parameters
    - o user defined clearing events

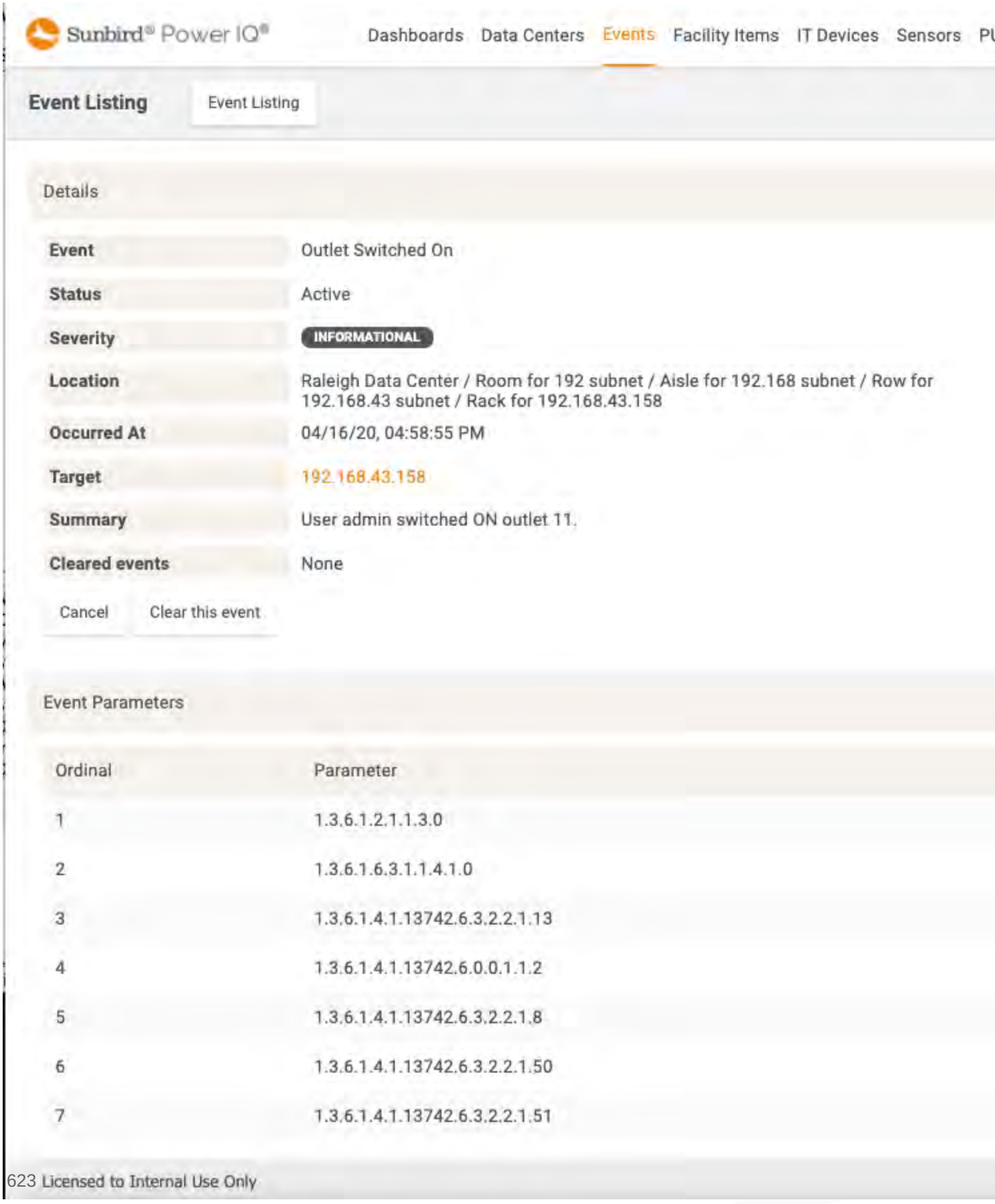
Event Listing and Detail Page Changes

Prior to 7.1.0, the *Event (Name)* field on the event listing and event detail pages simply showed one of the following generic event names for events generated by the dynamic plugin:

- *Informational Event*
- *Warning Event*
- *Critical Event*

In 7.1.0 and later the *Event (Name)* field now displays the user-defined event label when available rather than its corresponding generic event name. From our example, the user will see *Outlet Switched On* instead of *Informational Event.* If no event label is defined the generic event name will continue to be used as the event name.


Sunbird® Power IQ®
Dashboards
Data Centers
Events
Facility Items
IT Devices
Sensors
Event Listing
Clear Selected Events
Manage Event Severities
Manage SNMP Trap Settings
Manage My Event Notifications
Rows: 1-23 of 2008
Columns: 7
Filters :Status:
Occurred At
Severity
Event
Summary
Filter...
04/16/20, 04:58:56 PM
INFORMATIONAL
Outlet State Change On
Outlet 11 changed state to O
04/16/20, 04:58:55 PM
INFORMATIONAL
Outlet Switched On
User admin switched ON out
04/16/20, 04:58:25 PM
INFORMATIONAL
Log In
User admin logged in.
04/16/20, 02:40:07 PM
INFORMATIONAL
Clear Phase B Over Current Alarm
SAM-2, [Clear] Over Current A
04/16/20, 02:39:46 PM
INFORMATIONAL
Log Out
User admin logged out.
04/16/20, 02:39:25 PM
CRITICAL
Phase B Over Current Alarm
SAM-2, Over Current Alarm o
04/16/20, 02:29:49 PM
INFORMATIONAL
Temperature Normal
Temperature returned to nor



Please note that when sorting by Event (Name) on the event listing page generic events created by the dynamic plugin wil continue to be sorted based on the generic event names and therefore may appear out of order.

Expand/ Collapse Configured Trap Mappings

The dynamic plugin UI can be cumbersome to navigate because of the number of sections and mappings that a dynamic plugin can contain. The Traps portion of the dynamic plugin UI can be particularly easy to get lost in when there are a significant number of traps supported.

In 7.1.0 we added the ability to expand or collapse configured trap mappings. This will help plugin authors significantly as they work to add event clearing support to their existing mappings and develop new mappings.

By default, when a plugin mapping is edited, all existing trap mappings will be collapsed and only the trap mappings' event label will be displayed. Clicking the + will expand the selected trap mapping. If no event label is defined an auto-generated trap mapping descriptor will be generated using the format: *Trap Mapping [ordinal]*

Upgrading PIQ With Existing Trap Mapping Definitions

In a PIQ upgrade scenario where a PIQ system with existing dynamic plugin mappings is upgraded to PIQ 7.1.0 (or later) there are a few considerations to make note of.

If existing trap mapping definitions are not updated to take advantage of event clearing then trap to event conversion will remain unchanged after the upgrade.

After adding event clearing configuration to an existing trap mapping the plugin author should manually clear any matching active events to ensure that any newly generated matching events are not erroneously identified as a duplicate and discarded.

Example: Trap Mapping with Filters

This example uses Raritan PX2 details as a reference. Dynamic plugins are not needed for PX2 PDUs.

In this example, assume a dynamic plugin has been created for a Raritan PX2 PDU. The dynamic plugin will support trap mapping for one trap, with filtering added to create events with two severity levels.

Example Goal:

- To add trap mappings that show a Warning level event when the PX2's inlet sensor state is above the upper warning level, and to show a Critical level event when the inlet sensor state is above the upper critical level.

PX2 MIB - Trap Information

```
inletSensorStateChange          NOTIFICATION-TYPE
                        OBJECTS {
                              pduName,
                              pduNumber,
                             pxInetAddressType,
                              pxInetIPAddress,
                              inletLabel,
                              typeOfSensor,
                           measurementsInletSensorTimeStamp,
                           measurementsInletSensorValue ,
                           measurementsInletSensorState ,
                              oldSensorState,
                              sysContact,
                              sysName,
                              sysLocation  }
                        STATUS current
                        DESCRIPTION
                          "Inlet Sensor State Change"
                        ::= { traps 61 }
```

Steps:

1. Select SNMP v2c.
2. To add the Critical level mapping, click Add Trap, and add the Enterprise OID for the "inletSensorStateChange" trap for the PDU. Use the {pdu_system_oid} variable if desired.

3. Select Generic Critical for the Event Type.
4. Write an event summary message that describes the critical event. Use variables for the trap parameters to be included. The trap parameters expand when the message displays in the event details.

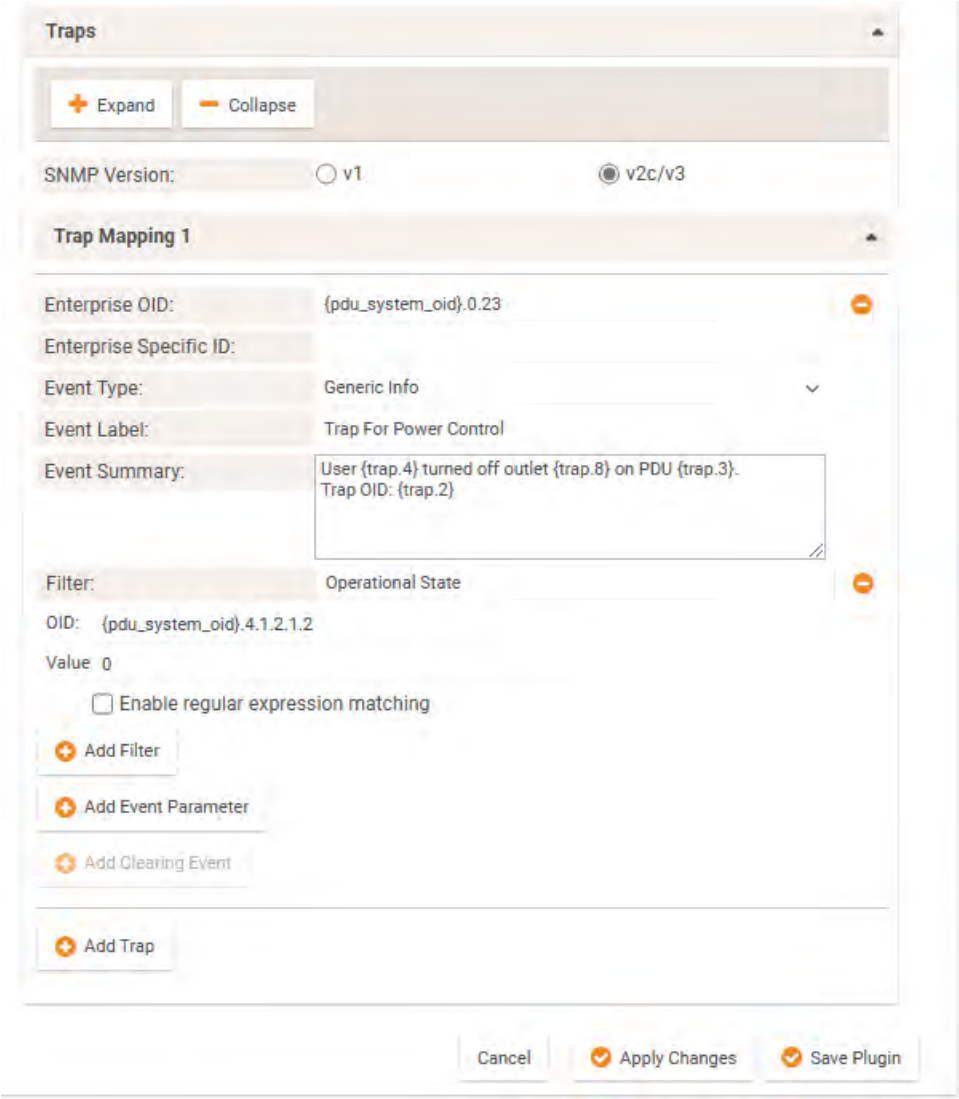
   For example, the first variable specified in the MIB for this trap is 'pduName'. This is the user-assigned name of the PDU that generated the trap. This example shows an SNMPv2 trap, so the 'pduName' variable is sent as the third variable in the trap. The first two varbinds of all SNMPv2 traps are 'timestamp' and 'trap oid'. See Identify Trap OIDs and Parameters and Trap Mapping Variables and Format.
5. To make sure that only critical-level, inlet state events are mapped to this message, add a filter that looks for the "above upper critical" value for the inlet sensor state. Click Add Filter. Enter a descriptive name for the filter. Enter the OID for Inlet Sensor State, then enter the value for a critical event. This filter requires a value of "6", which means "AboveUpperCritical".

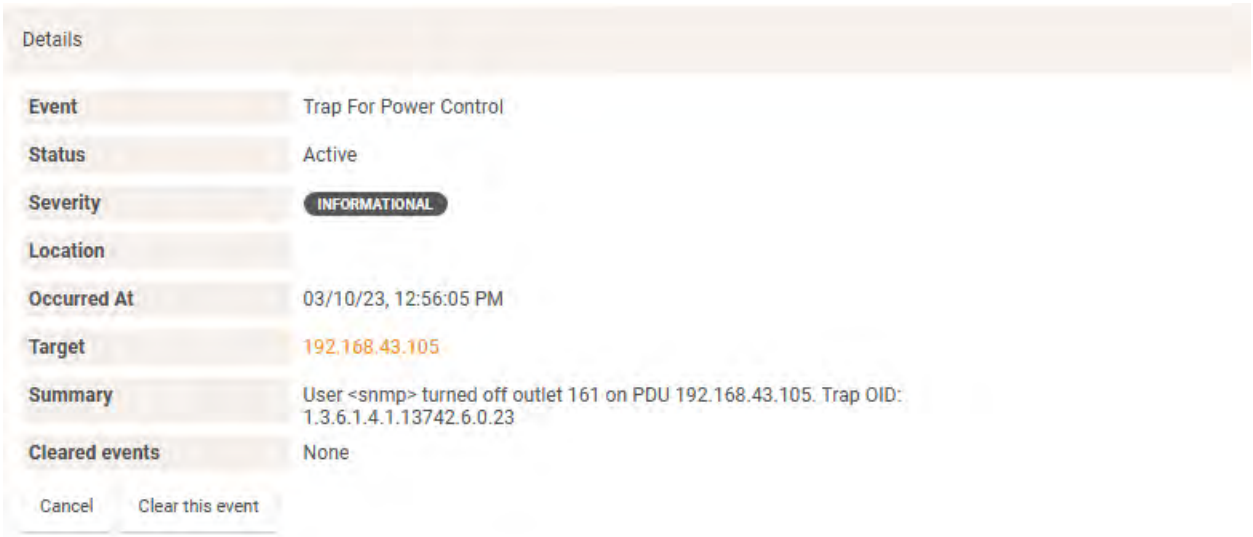
To add the Warning level trapping, repeat the Add Trap and Add Filter process, with these changes:

- Event Type: Generic Warning
- Event Summary: write text to describe warning condition, rather than critical
- Filter Value: change from "6" to "5". A value of "5" for inlet sensor state means "AboveUpperWarning".

Example: Event Summary Message with Variables

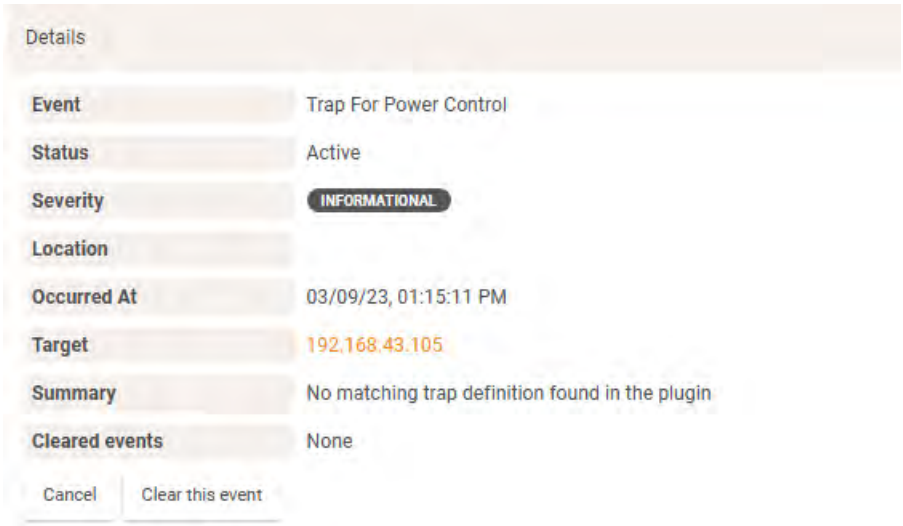
This example diaplays a trap mapping with trap parameters as variables in the Event Summary message, and the resulting Event Details with complete summary shown.





The event summary text that is displayed in the Events tab list and in the event details is generated at the time of the event creation. Any configured {trap.N} substitutions defined in the event summary text of the matching trap mapping are expanded from the event's SNMP parameter values.

If event summary text cannot be generated because the relevant trap mapping was deleted or modified such that it is no longer a match, then an error message displays, indicating that no matching trap mapping could be found.



Example: Trap Mapping with Filters for Babel Buster SPX SNMP Gateway

Power IQ can receive threshold traps from SNMP gateways, such as Babel Buster, and convert them into meaningful events.

You must configure the Babel Buster to send traps before the traps can be mapped in the dynamic plugin.

To configure a Babel Buster device to generate traps that can be converted to Power IQ events, you must:

- Create uniquely named events
- Configure threshold rules for the event
- Associate the event with a register you want to monitor the value of

See *Tips for Babel Buster Configuration* on page 631.

Example:

- To configure the dynamic plugin to be capable of mapping these traps to Power IQ events, follow these examples. Check the numbers in the screenshot with the list that follows for an example of each item.

SNMP Version:	○ v1

Trap Mapping 1

Enterprise OID:	1.3.6.1.4.1.3815.1.2.2.2.0.1
Enterprise Specific ID:	
Event Type:	Generic Critical
Event Label:	
Event Summary:	SAM-1, 3-Phase Over Power Alarm: RegNum={trap.3}, EventName={trap.6}, RegName={trap.5}, RegData={trap.4}, EventTestType={trap.7}, EventTestVal={trap.8}, EventState={trap.9}
Filter:	Event Name OID: 1.3.6.1.4.1.3815.1.2.2.1.2.1.1.5.*.0 Value SAM-1, 3-Ph Pwr Ovr Alrm ☐ Enable regular expression matching
Filter:	Register Number OID: 1.3.6.1.4.1.3815.1.2.2.1.2.1.1.2.*.0 Value 2 ☐ Enable regular expression matching
Filter:	Event State OID: 1.3.6.1.4.1.3815.1.2.2.1.2.1.1.8.*.0 Value 1 ☐ Enable regular expression matching

Add Filter

1. Configure the Enterprise OID with the Babel Buster 'eventStateChange' trap OID: 1.3.6.1.4.1.3815.1.2.2.2.0.1

   Babel Buster only supports a single trap OID, so the enterprise trap OID will always have this value for any threshold trap you configure.
2. Select the appropriate Event Type based on the alarm condition being reported by the specific trap you are mapping.
3. Configure meaningful Event Summary text using desired trap parameter expansion elements: {trap.1}, {trap.2} ...{trap.N}

   See *Trap Mapping Variables and Format* on page 614.
4. Add an Event Name filter. Use the unique event name as configured on the Babel Buster as the filter's Value.

   Each filter OID must be specified such that it is an exact match for the OID of the targeted trap parameter.

   One or more asterisks (*) may be substituted in any position in the OID in place of a decimal value. This asterisk acts as a wildcard and will cause the Power IQ trap handler to ignore that particular portion of the OID when performing matching. See *Trap OID Wildcards* on page 611.

   This is helpful in the Babel Buster scenario because the second to last decimal value is an 'eventIndex' value which indicates the row in 'eventTable' in the Babel Buster MIB. The 'eventIndex' value is dynamic and will change based on the Babel Buster configuration. Specifying an asterisk in your filter OID mappings will prevent your configuration from having to be modified in the event that the Babel Buster threshold configuration changes in the future.
5. Add a 'Register Number' filter. Use the number of the register associated with the threshold configured on the Babel Buster as the Filter's Value. This step is optional if the 'Event Name' filter value is unique.
6. Add an 'Event State' filter. The event state trap parameter value indicates whether the alarm condition is active (asserted) or not active (de-asserted). An event state value of (1) indicates an active event, and a value of (0) indicates that the condition is not active. This means that an event state value of (0) indicates that the alarm condition has been cleared.

   A common scenario would be to create two trap mappings for each Babel Buster Action Rule or Event Name. One trap mapping would be used to map the active trap, where EventState value is 1, and one trap mapping would be used to map the clearing trap, where EventState value is 0.

Tips for Babel Buster Configuration

BabelBuster Event State Change reference information: eventStateChange

Babel Buster devices allow you to configure a named threshold that will generate an eventStateChange trap.

Trap

```
eventStateChange    NOTIFICATION-TYPE
   OBJECTS {
      eventRegNum,
      eventRegName,
      eventRegData,
      eventName,
```

```
    eventTestType,
    eventTestVal,
    eventState
  }
  STATUS       current
  DESCRIPTION
    "This trap is sent when an event changes state
    if notifications are enabled for the object that changed."
  ::= { bbx2Traps 1 }
```

VariablesEdit section

eventRegNum - (Integer) Register number referenced by this event.

eventRegName - (DisplayString) Name of register referenced by this event.

eventRegData - (DisplayString) Floating point ASCII string representation of register data.

eventName - (DisplayString) Name given to this event for identification purposes.

eventTestType - (Integer - undefined(0), greaterThan(1), greaterOrEqual(2), lessThan(3), lessOrEqual(4), equal(5), notEqual(6)) Event test type, comparision of register data against test value.

eventTestVal - (DisplayString) Floating point ASCII string representation of event test value.

eventState - (Integer - false(0), true(1)) State of event, true means register meets test defined by threshold rule, true may imply alarm condition active

Structured Dynamic Plugins

Requirements

- MIB file for the device you want to manage. See *Find the MIB File* on the facing page.
- Ability to correctly identify OIDs in a MIB file.

Find the MIB File

To add a PDU using dynamic plugins, you must have the MIB file for the PDU.

To find the MIB file:

MIBs are usually available in one of the following locations.:

- The product interface. For example, Raritan PX PDUs have a menu option to save the MIB file.

Note: PX PDUs are supported. You do not need to add dynamic plugins for Raritan PDUs.

- The product's website.

  The product's technical support department.

Use a MIB Browser

A MIB browser is useful when creating your dynamic plugins. When adding traps to dynamic plugins, a trap receiver is also helpful.

iReasoning MIB Browser free personal edition is suggested. iReasoning also includes a trap receiver.

See *Identify Trap OIDs and Parameters* on page 610 for details on using a MIB browser to help with trap mapping.

Go to http://ireasoning.com/download.shtml.

Identify the OIDs for Mapping

Power IQ provides the ability to map OIDs for many components, attributes, and details of power devices. Power IQ can collect and display data from the device based on the mappings you provide.

OIDs are documented in a product's MIB file.

In SNMP, the object identifier (OID) that uniquely identifies the make and model of an SNMP-managed device is the MIB-II System Object Identifier, commonly referred to as "sysObjectID", which is 1.3.6.1.2.1.1.2.0.

Within Power IQ, the value for "sysObjectID" is referred to as the "PDU System OID".

For example, the sysObjectID or "PDU System OID" for a Raritan model PX PDU is "1.3.6.1.4.1.13742.4". The "PDU System OID" is commonly used as the prefix for additional OIDs used to retrieve PDU attribute and component information.

See *Mappings for Each PDU Type* on page 579 for lists of values that you can map from your PDU to Power IQ.

For each feature that you want to map, you must find the OID, and enter it in the mapping form to create the dynamic plugin. See *Creating a Custom Mapping Dynamic Plugin* on page 648.

Creating a Structured Dynamic Plugin

Select the data you want to collect from your PDU and add the OID mappings for it to create the structured dynamic plugin.

When adding OIDs, you can use variables to simplify data entry and reduce errors. You must use the correct formatting, which is validated when you click Apply Changes or Save Plugin. See *OID Variables and Format* on page 639 for details.

For a full list of available data you can map, see *Mappings for Each PDU Type* on page 579.

For help with mapping external sensors on rack PDUs, see *External Temperature and Humidity Sensor Mappings* on page 593.

For help with mapping traps, see *Trap Support in Dynamic Plugins - Structured or Custom* on page 609.

1. In the Settings tab, click Application Administration > Dynamic Plugins
2. In the Dynamic Plugins panel, click Add, then select the type of device you want to create a plugin for: CRAC, Floor PDU, Floor UPS, Power Panel, Rack PDU, Standalone Meter.

   Note: Do not select Custom when using a structured MIB to create the plugin. See Creating a Custom Mapping Dynamic Plugin on page 648.
3. For environmental sensor aggregators, use Rack PDU.
4. Type cannot be changed once the dynamic plugin is created.
5. The new dynamic plugin page displays. Enter a name to identify this dynamic plugin, in the Name field. Use lowercase letters and underscores only.
6. Enter a description to identify this dynamic plugin in the Description field.
7. Enter the manufacturer of the device you want to add using this dynamic plugin in the Manufacturer field.
8. The Model Name Filter field can be used to define a string value which will be used as a filter to determine which PDU models will be managed by the plugin mapping. This is useful when the vendor's MIB supports multiple models and it is not possible to design a single plugin mapping capable of supporting them all. This is also useful when a standard plugin exists but one or more models have been encountered which are not managed by it in a satisfactory manner. Normally, model name comparisons must be an exact match for the plugin mapping to be selected. However, a trailing asterisk character in the model name value is treated as a wildcard and may be used to have the plugin mapping used with more than one model name. For example, a Model Name Filter value of "PX2-1000" will only match PDUs with a model name of PX2-1000. However, a Model Name Filter value of "PX2-*" will match on model names PX2-1000, PX2-2000, etc.
9. For Plugin State, select one of the following states:
   a. Discovery Enabled: Plugins in the Discovery Enabled state are considered for discovery of new facility items.
   b. Discovery Disabled: Plugins in the Discovery Disabled state are not considered for discovery of new facility items.
10. For Phase, select Automatic to allow Power IQ to determine the phase of the device by counting the number of poles on the inlets. Or, make a selection to hard-code the phase as Single Phase or Three Phase.

11. Check the Always Use SNMPv1 checkbox if the target device only supports SNMPv1. Leave the checkbox blank to use the default, SNMPv2/v3 communication.
12. In the Metadata section, enter the value used in the MIB to indicate each status or control value. Common MIB value pairs are Yes/No, On/Off, 1/2. See *Metadata for Circuit Breakers and Outlets* on page 602 for details.
    - Circuit Breaker State OK
    - Circuit Breaker State Tripped
    - Outlet State On
    - Outlet State Off
    - Outlet Power On
    - Outlet Power Off
13. Enter values for the Environmental Sensors Metadata. These values work with external sensor mappings. See *Metadata for Environmental Sensors* on page 603 for details.
14. If needed, enter values for the UPS Output Source Metadata. These values work with the UPS Output Source mapping. See *Metadata for UPS Output Source* on page 603 for details.
15. If needed, enter values for the Battery Status Metadata. These values work with the Battery Status mapping. See *Metadata for Battery Status* on page 606 for details.
16. If needed, enter values for the Battery Replacement Indicator Metadata. These values work with the Battery Replacement Indicator mapping. See *Metadata for Battery Replacement Indicator* on page 607 for details.
17. Enter the PDU System OID and PDU Model OID for the devices that will use this dynamic plugin. See *OID Variables and Format* on the next page for details. Required. See Step 7 for the Model Filtering field, if you expect multiple models to be returned.
18. To add features of the PDU, select an item from the "Add another mapping" drop-down list, then click Add. These links contain the list of supported mappings for each device type.
    - *CRAC Mappings* on page 582
    - *Floor PDU Mappings* on page 582
    - *Floor UPS Mappings* on page 584
    - *Power Panel Mappings* on page 587
    - *Rack PDU Mappings* on page 588
    - *Rack UPS Mappings* on page 589
    - *Standalone Meter Mappings* on page 592
    - *Wildcard Index Mappings - Structured Dynamic Plugins Only* on page 597
19. For each mapping you add, enter the OID. If the MIB does not have an OID for an Index item, enter an integer value, or a columnar OID whose rows will be SNMP walked during polling to determine the PDU element's count. See *Index Mapping Format* on page 642 for details about mapping indices.

    Some mappings require extra information, below the main mapping field.

20. Start and Step for Index mappings:
    a. Some MIBs number indices starting at a number other than 1, and in increments greater than 1. If your MIB shows this, enter the starting number in the Start field, and the increment in the Step field.
21. Proxied checkbox for Index mappings:
    a. Select the Proxied checkbox when a columnar OID is entered.
22. Multipliers for measurement mappings:
    a. Power IQ expects power readings to be in the following units: Amps, Volts, Watts, VoltAmps, Degrees Fahrenheit/Celsius, and so on.

Many MIBs report power readings in different units than what Power IQ requires. The multiplier field is used to scale the retrieved readings to the units required.

Example

If the MIB reports readings in KiloWatts a multiplier value of 1000 must be specified to scale KiloWatts to Watts. A value of 5KW reported by the SNMP agent is converted to 5000 Watts when the multiplier is applied.

23. To add mappings for traps sent by the PDU, select SNMP Version, v1 or v2c, then click Add Trap to display the fields. To add multiple traps, click Add Trap to display another set of fields.
24. For SNMP v1 traps, enter the Enterprise OID and the Enterprise Specific ID for the trap. For SNMP v2 traps, only the Enterprise OID for the trap is required.
25. Select the generic event this trap will map to: Generic Info, Generic Warning, Generic Critical.
26. In the Event Summary, write the message that will appear in the event details. Use the trap's parameters as variables to create a complete, detailed summary of the event. See *Trap Mapping Variables and Format* on page 614 for syntax. See *Example: Event Summary Message with Variables* on page 627 for a sample summary.
27. To filter the incoming traps, click Add Filter to display the fields. If a trap defined by the PDU's MIB can describe multiple alarm conditions, and you would like to map an incoming trap to one of several Power IQ events based on a specific alarm condition, then you must define event filters. The filters determine which Power IQ event an incoming trap should be mapped to.
    a. Enter a name for the filter.
    b. Enter OID of the trap parameter that this filter applies to.
    c. Enter the value that the trap parameter must match. The trap parameter value must match exactly to be considered a match.

    See *Example: Trap Mapping with Filters* on page 625.
28. When you've finished with mappings, click Create Plugin.
29. Add the PDU that uses the dynamic plugin. See *Add PDUs to Power IQ* on page 743and *Check PDUs Added with Dynamic Plugins* on page 678.

OID Variables and Format

When creating a dynamic plugin mapping in Power IQ, there are a number of variable substitutions that are supported to assist with generating the desired set of Object Identifiers (OIDs) at poll time.

For example, consider the PDU System OID for a Raritan PX1 PDU which is 1.3.6.1.4.1.13742.

Virtually all OIDs from the Raritan PX1 MIB will have this identical prefix. Rather than specifying this prefix for all OIDs it is possible to simply use the variable substitution {pdu_system_oid} in the OID definition when creating the mapping. Then, at poll time, the "{pdu_system_oid}" text will be replaced with the "1.3.6.1.4.1.13742" prefix to arrive at the complete OID.

The following variable substitutions are supported.

OID	Variable	Notes
PDU System OID	{pdu_system_oid}	
PDU Proxy Index	{proxy_id}	
Circuit Breaker Index	{circuit_breaker_index}	
Inlet Index	{inlet_index}	
Inlet Pole Index	{inlet_pole_index}	
Outlet Index	{outlet_index}	
Outlet Pole Index	{outlet_pole_index}	
Panel Index	{panel_index}	
Panel Inlet Index	{panel_inlet_index}	
Panel Inlet Pole Index	{panel_inlet_pole_index}	
Circuit Index	{circuit_index}	
Circuit Pole Index	{circuit_pole_index}	
Battery Index	{battery_index}	Although the *Battery Index* mapping is available, only a single battery per UPS is currently supported. Specifying a *Battery Index* is not required so in most cases it is better to simply not define a *Battery Index*.

OID	Variable	Notes
UPS Output Index	{ups_output_index}	Although the *UPS Output Index* mapping is available, only a single UPS output per UPS is currently supported. Specifying *UPS Output Index* is not required so in most cases it is better to simply not define a *UPS Output Index*.
UPS Output Pole Index	{ups_output_pole_index}	
Sensor Indexes	{external_sensor_index} {external_sensor_temperature_index} {external_sensor_humidity_index}	
Wildcard Indexes	{wildcard_one_index} {wildcard_two_index} {wildcard_three_index} {wildcard_four_index}	

To use a variable in an OID, substitute the variable text for the numbers. You must use the curly brackets before and after, and the period after the final bracket. Follow the examples in the table.

OID with variable substitution	Fully Expanded OIDs
{pdu_system_oid}.1.1.13.0	PDU Name for a PX1: 1.3.6.1.4.1.13743.4.1.1.13.0
{pdu_system_oid}.1.1.1.0	PDU Firmware for a PX1 1.3.6.1.4.1.13743.4.1.1.1.0
{pdu_system_oid}.1.2.2.1.7.{outlet_index}	Outlet Active Power OIDs for an 8-outlet PX1 1.3.6.1.4.1.13742.4.1.2.2.1.7.1 1.3.6.1.4.1.13742.4.1.2.2.1.7.2

OID with variable substitution	Fully Expanded OIDs
	1.3.6.1.4.1.13742.4.1.2.2.1.7.3
	1.3.6.1.4.1.13742.4.1.2.2.1.7.4
	1.3.6.1.4.1.13742.4.1.2.2.1.7.5
	1.3.6.1.4.1.13742.4.1.2.2.1.7.6
	1.3.6.1.4.1.13742.4.1.2.2.1.7.7
	1.3.6.1.4.1.13742.4.1.2.2.1.7.8

Index Mapping Format

Structured dynamic plugins use index mappings to determine the number of PDU elements that a particular PDU has. PDU elements are inlets, inlet poles, circuit breakers, outlets, and so on.

There are 3 options for specifying index mapping values.

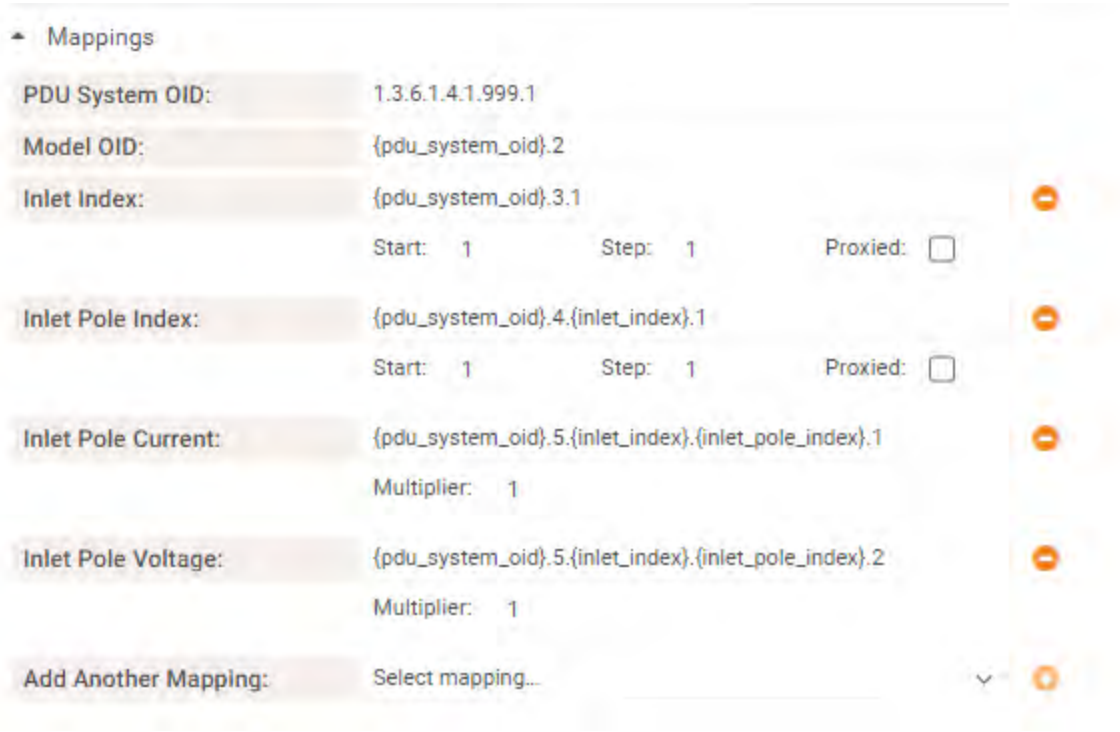
- SNMP OID: Specify an SNMP OID whose retrieved value indicates the PDU element's count.
- Proxied (Columnar OID): Specify a columnar OID and check the “proxied” option in the UI. At poll time, an SNMP walk will be performed on the columnar OID to determine how many rows there are and that count will be used as the PDU element’s count.
- Hard-coded Integer: Specify a hard-coded integer value to indicate the PDU element's count.

The advantage of the first two options is that a single dynamic plugin is capable of supporting a variety of different PDU models with different numbers of inlets, inlet poles, circuit breakers, outlets, and so on.

If the MIB supports a simple count object identifier, then the first option is the easiest and preferred.

Please note that it is possible to define an index mapping in terms of another defined index mapping via variable substitution. For example, let’s assume that a PDU has multiple inlets and each inlet can have a different inlet pole count (i.e., some single phase and some three phase). In this scenario, it is not possible to simply hard code a value or rely on a single retrieved count value because each inlet can have a different number of poles.

Let’s say that the MIB defines a table that contains the number of inlet poles at each inlet with the inlet as the index to the table. Similarly, inlet pole current and voltage are available in another table, which is indexed by inlet ordinal and inlet pole ordinal. The mapping for this scenario could look like the following:



In some cases, the MIB may not define an OID whose value indicates the PDU element's count. If the relevant PDU element information is contained within a table, it is possible to specify a columnar SNMP OID from the desired MIB table and check the "proxied" option when you configure the plugin in Power IQ. During polling, Power IQ will perform an SNMP walk of all the rows of the specified table and use the count of the number of rows as the PDU element's count.

If the MIB does not define OIDs that can be used to determine the count dynamically, you must provide a hard-coded integer value. In this case, the dynamic plugin will likely only work for a specific model. You may also need to specify a Model name filter to ensure the dynamic plugin is only used with the appropriate model type.

Find a count object in the MIB that specifies the number of a particular component, such as outlets, that the target PDU has. Specify the OID for the count as the value of the index.

When an OID is a scalar object, that is, not part of a table, add a ".0" to the end of the OID.

Example

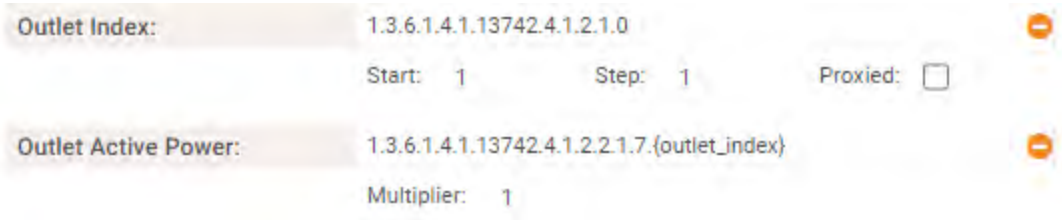
The Raritan PX MIB supports an "outletCount" object with an OID of 1.3.6.1.4.1.13742.4.1.2.1.

Add a ".0" to the end of the OID to arrive at an OID of 1.3.6.1.4.1.13742.4.1.2.1.0.

Power IQ can then use this OID to perform an SNMP get request for the number of outlets on a specific PDU.

To map this value in the dynamic plugin, enter "1.3.6.1.4.1.13742.4.1.2.1.0" in the Outlet Index field.

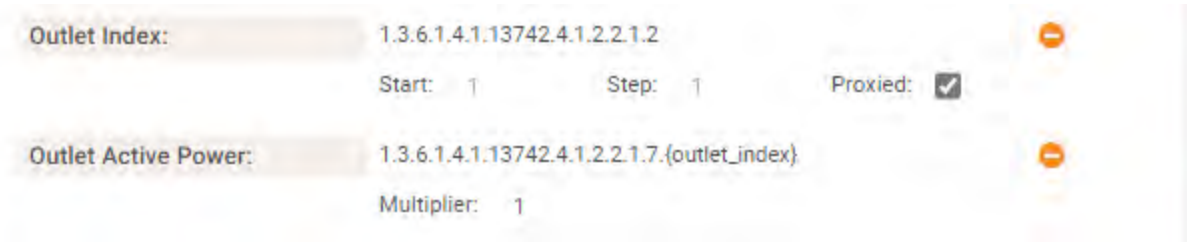
Example



Staying with the previous example of the Raritan PX MIB, assume that the “outletCount” object was not available. Any of the columns from the private.enterprises.raritan.board.pdu.outlets.outletTable.outletEntry object can be used to determine the number of rows in the table, and therefore the number of outlets on the PDU.

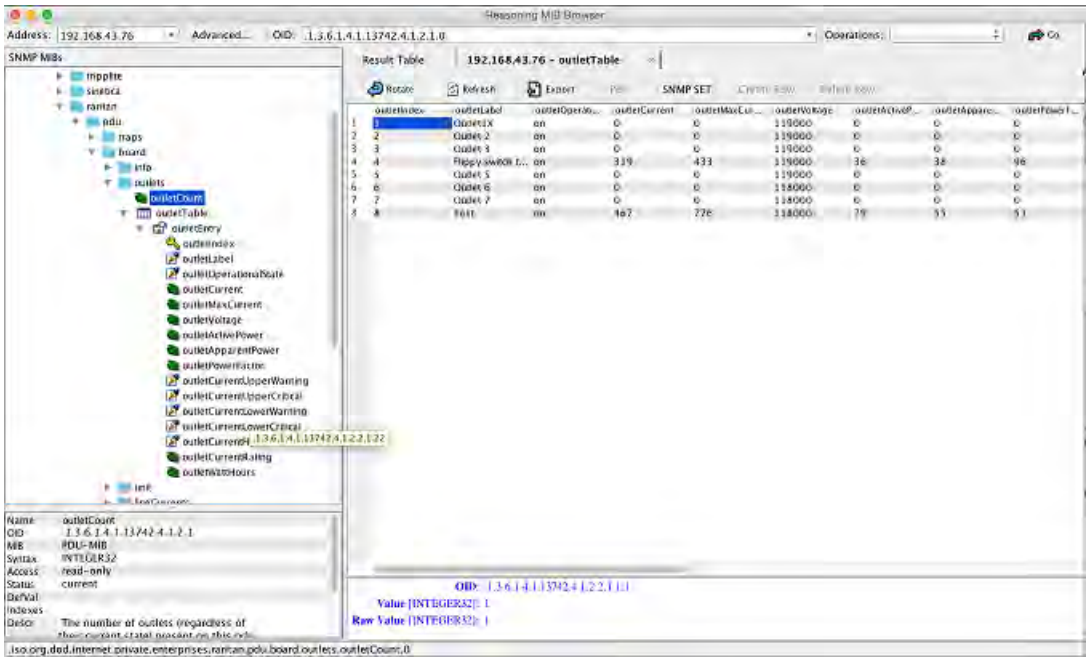
- The first accessible column in the “outletEntry” object is “outletLabel”, whose OID is 1.3.6.1.4.1.13742.4.1.2.2.1.2.
- Power IQ can use this OID to perform an SNMP walk of all the entries in the outlet table and determine the number of outlets on a specific PDU.
- To map this value in the dynamic plugin, enter “1.3.6.1.4.1.13742.4.1.2.2.1.2" in the Outlet Index field, and check the “Proxied” checkbox.

Example



The iReasoning MIB browser is useful when inspecting the objects in a MIB to determine what information is exposed and available for use in your dynamic plugin mapping.

For example, this screenshot shows the “outlets” portion of the Raritan PX1 MIB and a table view of the outletTable of an 8 outlet PX1 PDU.


Reasoning MIB Browser
Address: 192.168.43.76
Advanced...
OID: .1.3.6.1.4.1.13742.4.1.2.1.0
Operations:
SNMP MIBs
Result Table
192.168.43.76 - outletTable
Rotate
Refresh
Export
SNMP SET
outletCount
outletTable
outletEntry
outletIndex
outletLabel
outletOperationalState
outletCurrent
outletMaxCurrent
outletVoltage
outletActivePower
outletApparentPower
outletPowerFactor
outletCurrentUpperWarning
outletCurrentUpperCritical
outletCurrentLowerWarning
outletCurrentLowerCritical
outletCurrentRating
outletWattHours
Name outletCount
OID .1.3.6.1.4.1.13742.4.1.2.1
MIB PDU-MIB
Syntax INTEGER32
Access read-only
Status current
DefVal
Indexes
Descr The number of outlets (regardless of
OID: .1.3.6.1.4.1.13742.4.1.2.1.1.1
Value [INTEGER32]: 1
Raw Value [INTEGER32]: 1
.iso.org.dod.internet.private.enterprises.raritan.pdu.board.outlets.outletCount.0

Custom Mapping Dynamic Plugins

Requirements:

- For custom mappings based on flat MIBs:
  - MIB file for the device you want to manage. See *Find the MIB File* on page 634.
  - Ability to correctly identify OIDs in a MIB file.
- For custom mappings based on SNMP-gateway managed devices:
  - A SNMP gateway device that converts Modbus/Bacnet to SNMP
  - A list of the registers for the PDU you want to manage. See *Find the Modbus Register List* on the next page.
  - Ability to correctly convert the registers to SNMP OIDs, using your SNMP-gateway device

Find the Modbus Register List

To add a Modbus device using a custom mapping dynamic plugin, you must have the register list for the device.

- Modbus register lists are usually available in one of the following locations.
- The product's user guide
- The product's website.
- The product's technical support department.

Creating a Custom Mapping Dynamic Plugin

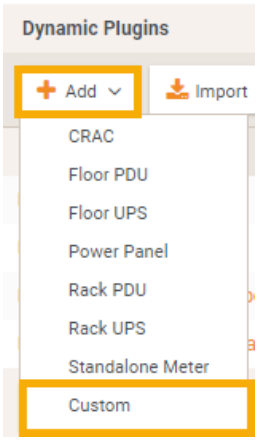
1. In the Settings tab, click Dynamic Plugins in the Appliance Administration section.
2. Click Add, then click Custom. Do not select the type of device now.

   The new dynamic plugin page displays.

3. Enter a name to identify this dynamic plugin, in the Name field. Use lowercase letters and underscores only.

   Tip for SNMP gateway use cases: When you have multiple devices using the same gateway, include proxy information in the name. This will help you identify the correct plugin when adding devices. See Proxy ID field.

4. Enter a description to identify this dynamic plugin in the Description field.
5. Enter the manufacturer of the device you want to add using this dynamic plugin in the Manufacturer field.
6. The Model Name Filter field can be used to define a string value which will be used as a filter to determine which PDU models will be managed by the plugin mapping. This is useful when the vendor's MIB supports multiple models and it is not possible to design a single plugin mapping capable of supporting them all. This is also useful when a standard plugin exists but one or more models have been encountered which are not managed by it in a satisfactory manner. Normally, model name comparisons must be an exact match for the plugin mapping to be selected. However, a trailing asterisk character in the model name value is treated as a wildcard and may be used to have the plugin mapping used with more than one model name. For example, a Model Name Filter value of "PX2-1000" will only match PDUs with a model name of PX2-1000. However, a Model Name Filter value of "PX2-*" will match on model names PX2-1000, PX2-2000, etc.

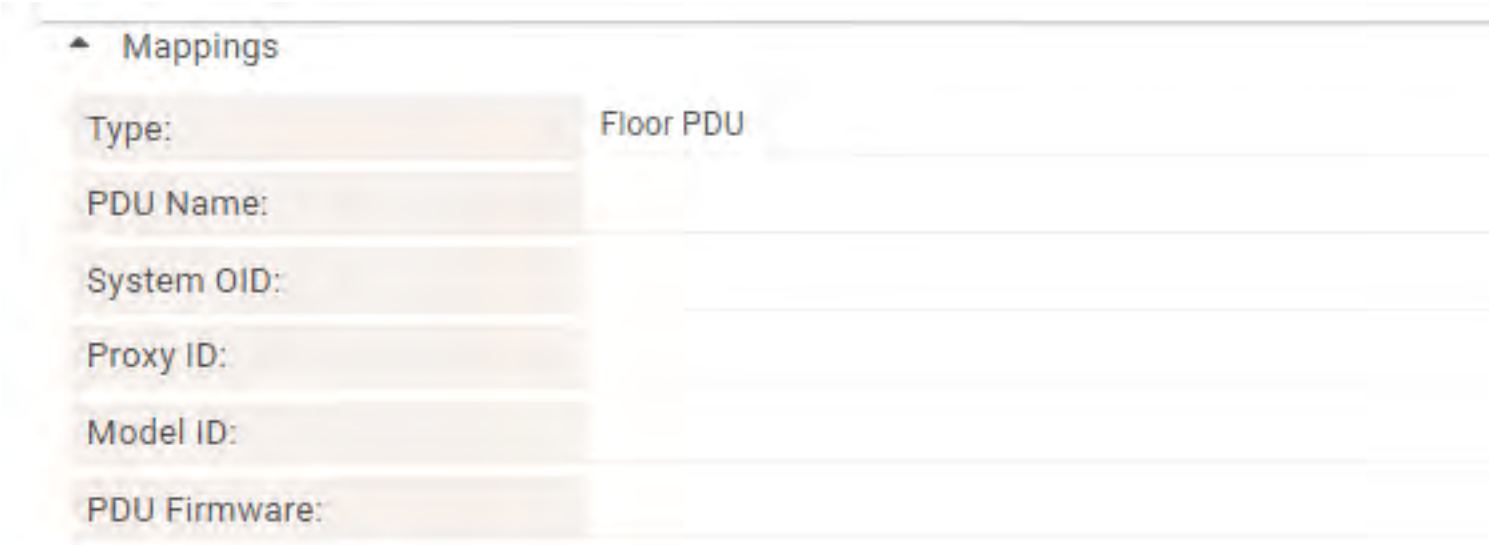


7. Check the Always Use SNMPv1 checkbox if the target PDU only supports SNMPv1. Leave the checkbox blank to use the default, SNMPv2/v3 communication.
8. In the Metadata section, enter the value used in the MIB to indicate each status or control value. Common MIB value pairs are Yes/No, On/Off, 1/2. See *Metadata for Circuit Breakers and Outlets* on page 602 for details.
   - Circuit Breaker State OK
   - Circuit Breaker State Tripped
   - Outlet State On
   - Outlet State Off
   - Outlet Power On
   - Outlet Power Off

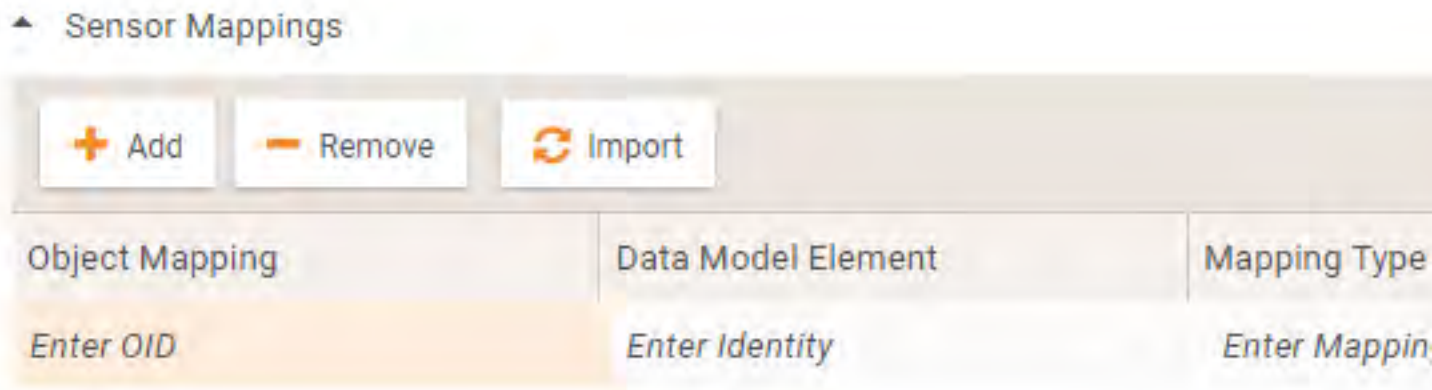
9. Enter values for the Environmental Sensors Metadata. These values work with external sensor mappings. See *Metadata for Environmental Sensors* on page 603 for details.

10. If needed, enter values for the UPS Output Source Metadata. These values work with the UPS Output Source mapping. See *Metadata for UPS Output Source* on page 603 for details.
11. If needed, enter values for the Battery Status Metadata. These values work with the Battery Status mapping. See *Metadata for Battery Status* on page 606 for details.
12. If needed, enter values for the Battery Replacement Indicator Metadata. These values work with the Battery Replacement Indicator mapping. See *Metadata for Battery Replacement Indicator* on page 607 for details.

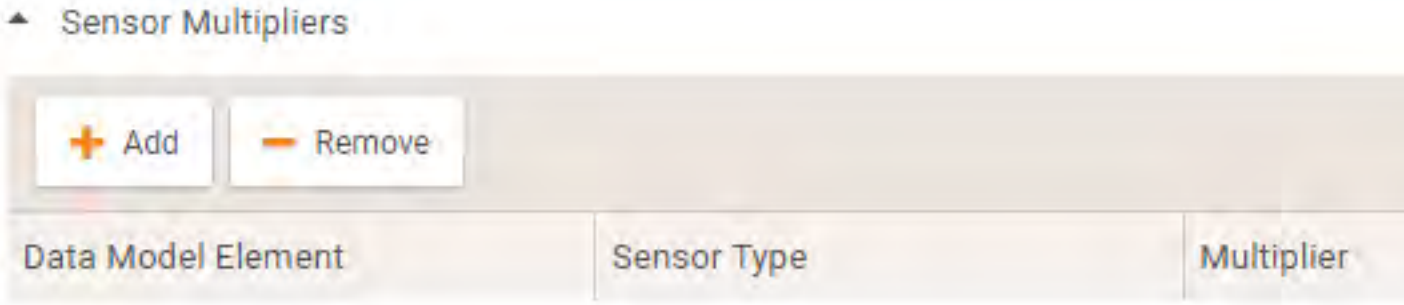
13. In the Mappings section, select the type of device: CRAC, Floor PDU, Floor UPS, Power Panel, Rack PDU, Standalone Meter.
14. Type cannot be changed once the plugin is created.



15. Enter the device's name in the PDU Name field.
16. Enter the System OID for the PDU.
17. For SNMP gateway use cases, enter the gateway's System OID.
18. The Proxy ID field is used to identify PDUs in daisy chained configurations, or managed by a serial device. In an SNMP gateway use case, use this field to assign a proxy id to each PDU managed by the gateway. Best practice is to start with 1 for gateways, entering a unique proxy id for each PDU managed through the gateway.
19. Note: When you add the PDUs managed by the SNMP gateway to Power IQ, you will indicate the proxy index for each one. This is how Power IQ differentiates the separate PDUs behind the same IP address.
20. Enter the PDU Model OID for the PDU that will use this dynamic plugin. Required. See Step 7 for the Model Filtering field, if the MIB you are working with supports multiple models, and you want to limit this custom mapping to a specific model. Hard code a value if the MIB does not provide a value.
21. Enter an OID for the firmware version in the PDU Firmware field.
22. Enter or import Custom Mappings. See *Sensor Mappings* on page 653.



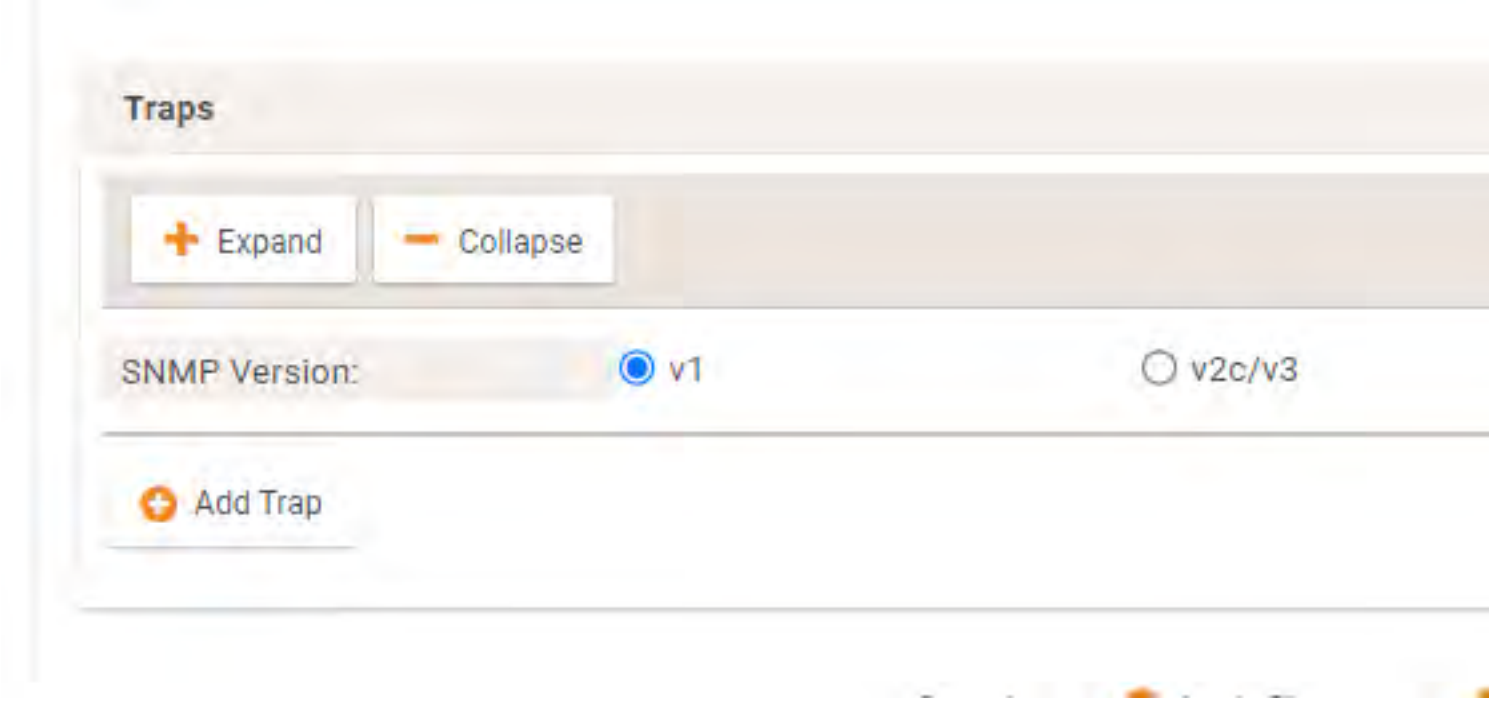
23. Enter Sensor Multipliers. See *Sensor Multipliers* on page 659.



24. To add mappings for traps sent by the PDU, select SNMP Version, v1 or v2c/v3, then click Add Trap to display the fields. To add multiple traps, click Add Trap to display another set of fields.
25. For SNMP v1 traps, enter the Enterprise OID and the Enterprise Specific ID for the trap. For SNMP v2/v3 traps, only the Enterprise OID for the trap is required.
26. Select the generic event this trap will map to: Generic Info, Generic Warning, Generic Critical.
27. In the Event Summary, write the message that will appear in the event details. Use the trap's parameters as variables to create a complete, detailed summary of the event. See *Trap Mapping Variables and Format* on page 614 for syntax. See *Example: Event Summary Message with Variables* on page 627 for a sample summary.
28. To filter the incoming traps, click Add Filter to display the fields. If a trap defined by the PDU's MIB can describe multiple alarm conditions, and you would like to map an incoming trap to one of several Power IQ events based on a specific alarm condition, then you must define event filters. The filters determine which Power IQ event an incoming trap should be mapped to.
29. Enter a name for the filter.
30. Enter OID of the trap parameter that this filter applies to.
31. Enter the value that the trap parameter must match. The trap parameter value must match exactly to be considered a match.

    See *Example: Trap Mapping with Filters* on page 625.

    See *Example: Trap Mapping with Filters for Babel Buster SPX SNMP Gateway* on page 629.



Note: For a given data model element and sensor mapping, Power IQ does not support a mix of static and variable mappings. It is not possible to mix static and variable mappings, the mappings must be all static or all variable.

32. When you've finished with mappings, multipliers, and traps, click Create Plugin.
33. Add the PDU that uses the dynamic plugin. See *Add PDUs to Power IQ* on page 743
34. See *Check PDUs Added with Dynamic Plugins* on page 678.

Sensor Mappings

Sensor mappings are used in the custom dynamic plugin to identify each power sensor, or data point, you want Power IQ to support for your PDU.

Sensor mappings can be entered manually, by entering and selecting values. Or, you can create a CSV file with the information formatted correctly, and import the file.

To understand sensor mappings and view instructions for manual entry, see:

- *Data Model Element* below
- *Mapping Type* on page 655
- *Custom Dynamic Plugin Example Screenshots* on page 662

To see instructions and an example of the CSV file for importing mappings, see:

- *Sensor Mapping CSV Import File Structure* on page 658

To see rules that apply to mappings, see:

- *Additional Custom Mapping Rules* on page 660

Object Mapping

The object Mapping is the SNMP OID for the sensor, such as an attribute or reading, you want to collect.

In some cases, when an OID is not available in the MIB, you can hard code a value.

Valid values:

- SNMP OID for the sensor

  OR

- A hard-coded value for some sensor types. See *Mapping Type* on page 655.

Hard code a value when an OID is not available in the MIB. You can hard code circuit pole phase, circuit pole position on a panel, names, and any sensor type where a positive decimal number value would be returned. Hard coding for numeric values makes sense in some cases, such as voltage. Some other numeric values, such as active power, may be hard coded but will not result in meaningful data.

Data Model Element

The data model element specifies where this sensor is associated in the model of the PDU.

Each device type support different data model elements. The data model elements have hierarchical parent-child relationships. See *Data Model Elements by PDU Type* on the facing page.

You must identify the precise association of each sensor.

To identify the data model element:

1. In the list of data model elements, find the data model element you want to associate a sensor type with. See *Data Model Elements by PDU Type* below.
2. Append the number of the element to the end of each element's name. Leave one space between elements.

Example

```
panel2 circuit10 circuitpole3
```

An amperage sensor for pole 3 on circuit 10 of a Floor PDU's second panel.

Data Model Elements by PDU Type

Data model elements have hierarchical parent-child relationships.

Rules for all PDU types:

- A panel may directly contain inlets and circuits or circuitpoles
- An inlet must contain at least one inletpole. See *Additional Custom Mapping Rules* on page 660 for an example mapping to follow when a device does not have inletpoles.
- An outlet may contain outletpoles
- A circuit may contain circuitpoles
- A ups output may contain ups output_poles
- CRAC
  - inlet
  - inlet inletpole
  - externalsensor
- FLOOR_PDU
  - inlet
  - inlet inletpole
  - panel
  - panel inlet
  - panel inlet inletpole
  - panel circuit
  - panel circuit circuitpole
  - panel circuitpole
  - circuit
  - circuit circuitpole
  - circuitpole
  - externalsensor
- FLOOR_UPS
  - inlet
  - inlet inletpole
  - circuit
  - circuit circuitpole
  - battery
  - ups_output
  - ups_output_pole
  - externalsensor

- POWER_PANEL
  - inlet
  - inlet inletpole
  - circuit
  - circuit circuitpole
  - circuitpole
  - externalsensor
- RACK_PDU
  - inlet
  - inlet inletpole
  - circuitbreaker
  - outlet
  - outlet outletpole
  - battery
  - ups_output
  - ups_output_pole
  - externalsensor
- RACK_UPS
  - inlet
  - inlet inletpole
  - circuitbreaker
  - outlet
  - outlet outletpole
  - battery
  - ups_output
  - ups_output_pole
  - externalsensor
- STANDALONE_METER
  - circuit
  - circuit circuitpole
  - externalsensor

Mapping Type

The mapping type identifies the type of reading expected from the sensor.

Valid values	Valid for these data model elements	Valid hard coded value in Object Identifier Field
active_power	inlet, inletpole, outlet, circuit, circuitpole	positive decimal number
apparent_	inlet, outlet, circuit	positive decimal number

Valid values	Valid for these data model elements	Valid hard coded value in Object Identifier Field
power		
current	inlet, outlet, circuit, any pole, battery	positive decimal number
decimal_digits	external sensor	positive decimal number used to scale external sensor readings
name	outlet, circuit, circuitpole, circuitbreaker	name of the data model element
phase	circuitpole	L1, L2, L3 A, B, C X, Y, Z 1,2,3 See Set Phase Labels for Circuit Pole Phase.
position	circuitpole	Number greater than 0. Specifies the circuit pole position on the panel.
power_control	outlet	Hard coding not supported for power control.
power_factor	inlet, outlet, circuit	positive decimal number between 0 - 1. Example: Power factor 98%is hard coded as .98. 100%is 1.0.
state	outlet, circuit breaker	Hard coded value must match the configured metadata value. See *Metadata for Circuit Breakers and Outlets* on page 602.
type	externalsensor	Example: T for Temperature, H for Humidity. Hard coded value must match the configured metadata value for Humidity Sensor Type or Temperature Sensor Type. See *Metadata for Environmental Sensors* on page 603.
unit	externalsensor	Example: C for Celsius. Hard coded value must match the configured metadata value for Temperature Unit (Celsius) or Temperature Unit (Fahrenheit).

Valid values	Valid for these data model elements	Valid hard coded value in Object Identifier Field
		See *Metadata for Environmental Sensors* on page 603.
value	externalsensor	decimal number
voltage	inlet, outlet, circuit, any pole, battery	positive decimal number
watt_hour	inlet, panelinlet, circuit, outlet	positive decimal number
load_percentage	ups_output, ups_output_pole	Percentage of UPS power capacity currently being used. Positive number between 0 and 100 (inclusive).
source	ups_output	Source of UPS output power. Hard coded value must match a configured metadata value. See *Metadata for UPS Output Source* on page 603 for details.
status	battery	Battery health status. Hard coded value must match a configured metadata value. See *Metadata for Battery Status* on page 606.
replacement	battery	Indicates whether or not the battery needs to be replaced. Hard coded value must match a configured metadata value. See *Metadata for Battery Replacement Indicator* on page 607 for details.
capacity_percentage	battery	Battery charge remaining expressed as percentage of full charge. Positive number between 0 and 100 (inclusive).
runtime_remaining	battery	Time to battery depletion under present load conditions (in minutes). Positive number.
seconds_on	battery	Elapsed time since the UPS last switched to battery power (in seconds). Positive number.

Sensor Mapping CSV Import File Structure

To include sensor mappings for a custom dynamic plugin, you may import a CSV file containing the information, instead of entering and selecting the information manually.

These links include instructions and valid values for each column:

- *Data Model Element* on page 653
- *Mapping Type* on page 655

To import the sensor mapping CSV file:

1. In the custom plugin form, click Import in the Sensor Mappings section.
2. Select the file and click Upload. If the file validates, the entries appear in the fields.
3. The structure of the CSV file:
    - One line per sensor mappinig
    - No header row
    - Each line has only the value columns, in the following order

Column 1: Object Identifier	Column 2: Data Model Element	Column 3: Sensor Type

Example

A	B	C
1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.25	Circuit1	active power
1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.24	Circuit1	watt hour
HVAC Feed	Circuit1	name
1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.7	Circuit1 CircuitPole1	current
1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.8	Circuit1 CircuitPole2	current
1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.9	Circuit1 CircuitPole3	current
1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.6	Circuit1 CircuitPole4	current
1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.10	Circuit1 CircuitPole1	voltage
1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.11	Circuit1 CircuitPole2	voltage
1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.12	Circuit1 CircuitPole3	voltage
1.3.6.1.4.1.3815.1.2.2.1.1.1.1.2.12	Circuit1 CircuitPole4	voltage
A	Circuit1 CircuitPole1	phase
B	Circuit1 CircuitPole2	phase
C	Circuit1 CircuitPole3	phase
N	Circuit1 CircuitPole4	phase
HVAC Feed Pole1	Circuit1 CircuitPole1	name
HVAC Feed Pole2	Circuit1 CircuitPole2	name
HVAC Feed Pole3	Circuit1 CircuitPole3	name
HVAC Feed Neutral Pole	Circuit1 CircuitPole4	name

Sensor Multipliers

Power IQ expects power readings to be in the following units: Amps, Volts, Watts, VoltAmps, Degrees Fahrenheit/Celsius, and so on.

Many MIBs report power readings in different units than what Power IQ requires. The multiplier field is used to scale the retrieved readings to the units required.

1. In the custom dynamic plugin form, click Add to add a row to the Sensor Multipliers list.

   The list has three fields for each entry.
2. Double-click the Data Element and Sensor Type fields to access a drop-down list of values.
3. Double-click the Multiplier field to access a text field.

Data Element	Sensor Type:	Multiplier Value:
Select the data model element this multiplier is used on.	Select the sensor type this multiplier is used on.	Enter the decimal value the dynamic plugin will use to normalize the readings into units supported by Power IQ.
circuit circuit_pole_position circuit_pole_phase circuit_breaker circuit_breaker_pole inlet inlet_pole outlet outlet_pole external_sensor panel_inlet panel_inlet_pole	active_power apparent_power current power_factor voltage watt_hour value	For example: If an active power sensor OID returns a value of 5 kilowatts, enter a multiplier of 1000 to normalize to 5000 watts.

Data Element	Sensor Type:	Multiplier Value:
ups_output ups_output_pole	load_percentage	Percentage of UPS power capacity currently being used. Positive number between 0 and 100 (inclusive). For example if sensor reports value of 0.50 (meaning 50%), specify multiplier of 100.
battery	current voltage	Specify multiplier to normalize sensor reading to Amps or Volts.
battery	capacity_percentage	Battery charge remaining expressed as percentage of full charge. For example if sensor reports value of 0.50 (meaning 50%), specify multiplier of 100.
battery	runtime_remaining	Time to battery depletion under present load conditions (in minutes). For example, if sensor reports remaining runtime in seconds, specify a multiplier of 0.0167 to normalize reading to minutes.
battery	seconds_on	Elapsed time since the UPS last switched to battery power (in seconds). For example, if sensor reports time on battery in minutes, specify a multiplier of 60 to normalize reading to seconds.

Additional Custom Mapping Rules

When creating your plugin, remember these additional rules to ensure your plugin validates, and that you get the best possible data collection.

Make sure you correctly map the phase of your circuit poles to the phase of the building.

Add inlet poles in order (A, B, C).

In a group of like elements, for example, inlet_poles, each element must have the same type of sensors mapped, and must indicate the same total number of the element.

Example
:If an inlet_pole has voltage mapped, than all inlet_poles for that plugin must have voltage mapped.

Example
If there are mappings for 3 voltage sensors for 'inlet_pole' then there must be exactly 3 current sensors configured,

or 0 current sensors if current readings are not desired or available.

For a given sensor type and data model element, all mappings must be OIDs or hard-coded. A mix is not permitted.

PDU Proxy_Index substitution supports daisy-chained PDUs.

Every inlet must have at least one inlet pole. For devices that do not provide inlet pole level data, the inlet data for current, active_power, and voltage can be represented as an inlet pole instead.

Example

A device only provides inlet level data, but to meet the requirement for an inlet pole, the mappings should be modified as in this example:

- inletX inletpole1 voltage
- inletX inletpole1 current
- inletX inletpole1 active_power
- inletX energy
- inletX apparent_power
- inletX watt_hour

Showing Accurate Circuit Pole Positions

To show accurate circuit pole positions, add the OIDs for each pole to the custom mapping in the correct order, or hard code the circuit pole positions in the custom mapping.

Custom Dynamic Plugin Example Screenshots

This custom dynamic plugin example shows a Babel Buster SNMP gateway managing a Schneider PowerLogic PM710 standalone meter.

Edit Dynamic Plugin for Custom

Name:	bb_pm710_custom_fpdu_2pnl_pnl1_3ckt_pnl2_4ckt_proxy_undefined_trap
Description:	BB-PM710
Manufacturer:	Schneider Electric
Model Name Filter:	

☑ Always use SNMPv1

Metadata

▲ Circuits and Outlets

Circuit Breaker State OK:	
Circuit Breaker State Tripped:	
Outlet State On:	
Outlet State Off:	
Outlet Power On:	
Outlet Power Off:	

▲ Environment Sensors

Humidity Sensor Type:	
Temperature Sensor Type:	
Temperature Unit:	C
Temperature Unit (Celsius):	
Temperature Unit (Fahrenheit):	

Mappings

Type:	Standalone Meter
PDU Name:	bb_pm710_sam1
System OID:	1.3.6.1.4.1.3815.2.2.2.1
Proxy ID:	1
Model ID:	model69
PDU Firmware:	firmware69

Sensor Mappings

Add Remove Import

Object Mapping	Data Model Element	Mapping
1.3.6.1.4.1.3815.1.2.2.1.1.1.1.1.2.8	circuit1 circuitpole1	voltage
1.3.6.1.4.1.3815.1.2.2.1.1.1.1.1.2.9	circuit1 circuitpole2	voltage
1.3.6.1.4.1.3815.1.2.2.1.1.1.1.1.2....	circuit1 circuitpole3	voltage
1.3.6.1.4.1.3815.1.2.2.1.1.1.1.1.2	circuit1	power_fa

▲ Sensor Mappings

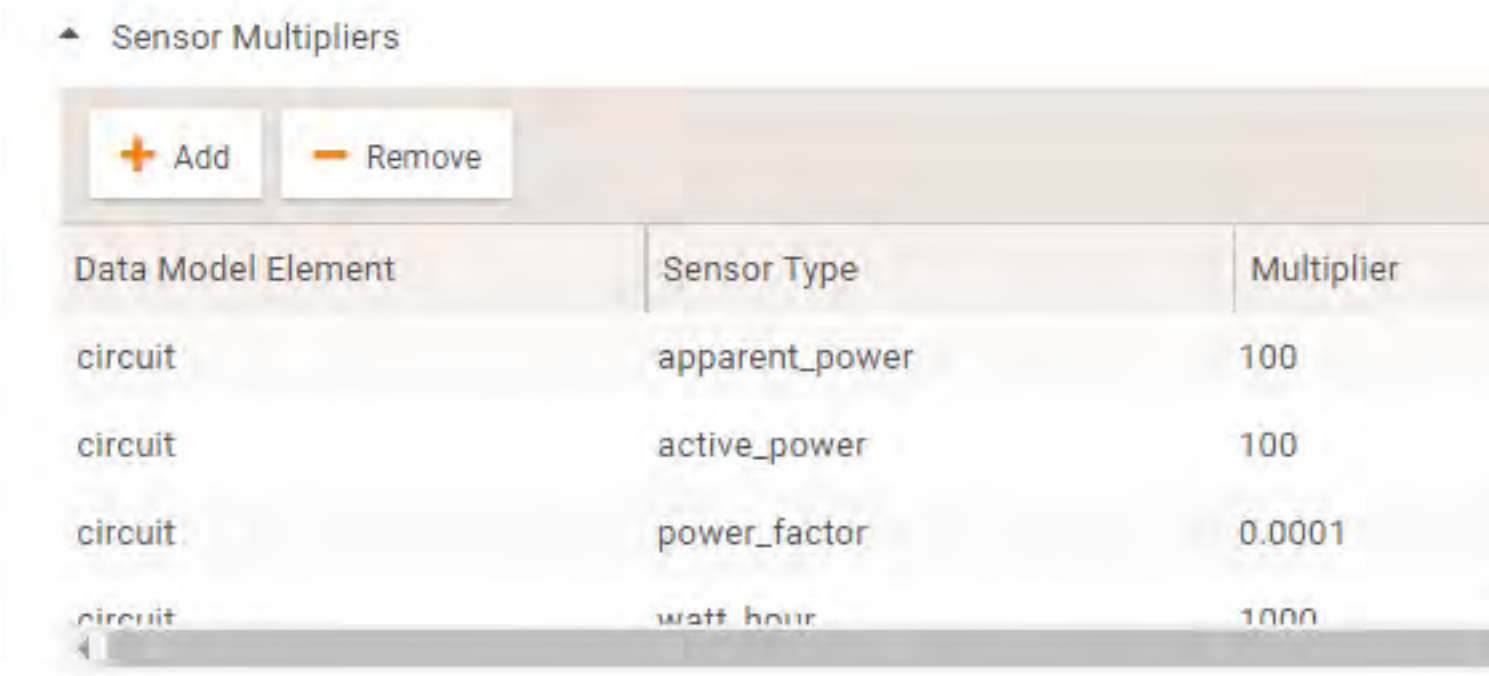
+ Add — Remove ↻ Import

Object Mapping	Data Model Element	Mapping Type
PDU-1 Main P3	circuit1 circuitpole3	name
A	circuit1 circuitpole1	phase
B	circuit1 circuitpole2	phase
C	circuit1 circuitpole3	phase

▲ Sensor Mappings

+ Add — Remove ↻ Import

Object Mapping	Data Model Element	Mapping Ty
1.3.6.1.4.1.3815.1.2.2.1.1.1.1.1.2.4	circuit1 circuitpole1	current
1.3.6.1.4.1.3815.1.2.2.1.1.1.1.1.2.5	circuit1 circuitpole2	current
1.3.6.1.4.1.3815.1.2.2.1.1.1.1.1.2.6	circuit1 circuitpole3	current

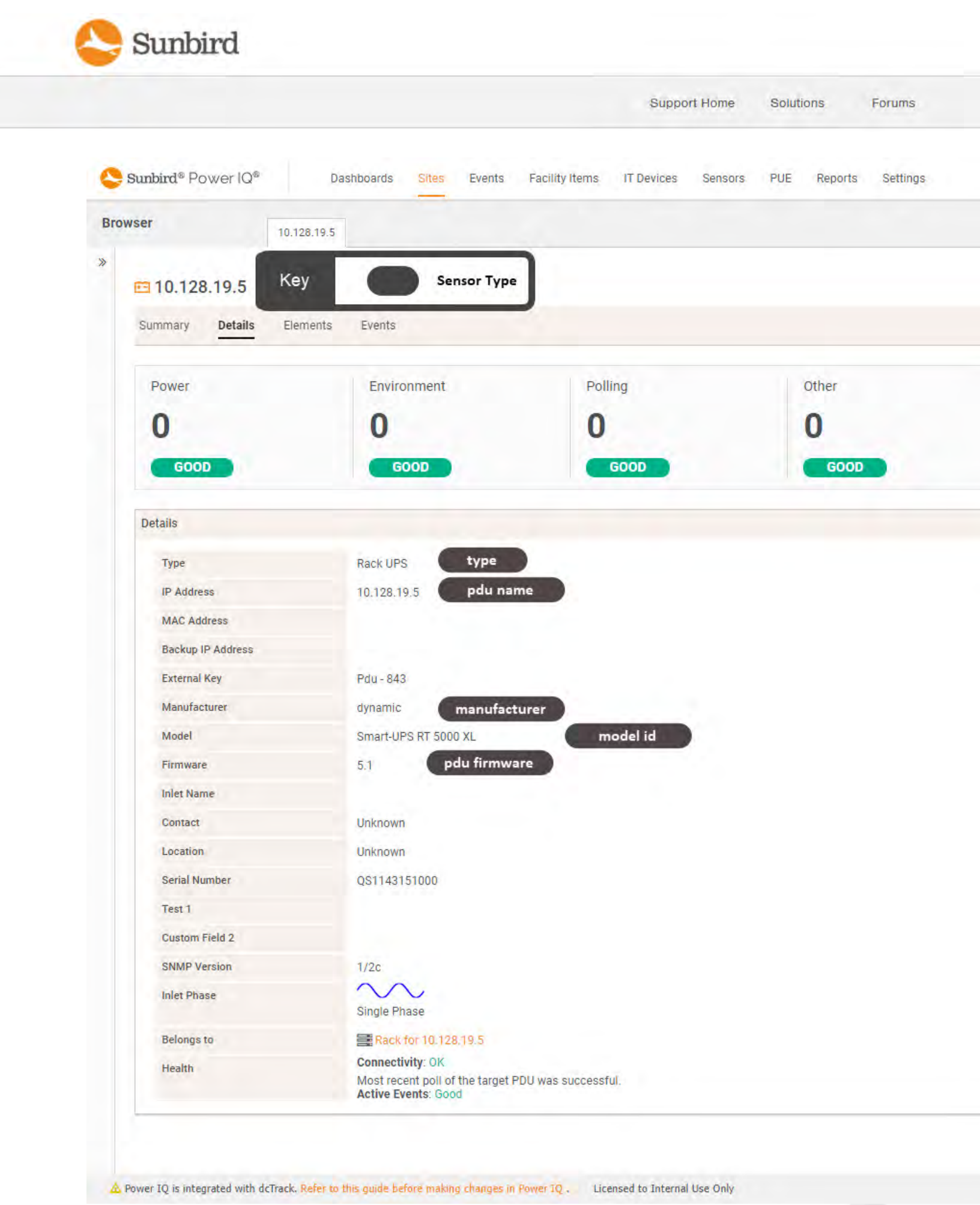


Custom Dynamic Plugin Mapping Example - UPS

This custom dynamic plugin example shows the data model element, sensor type, and object mapping value syntax on a sample UPS Sites Tab tab.

The object mapping value refers to a value entered for the environmental metadata when the dynamic plugin is edited or created. For more information, see *Metadata for Structured and Custom Dynamic Plugins* on page 602.

Note: The data in this example is provided for educational purposes only and does not represent output from an actual UPS. For help with interpreting the mappings or creating your dynamic plugin, contact Sunbird Technical Support.


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Reports
Settings
Browser
10.128.19.5
10.128.19.5
Key
Sensor Type
Summary
Details
Elements
Events
Power
0
GOOD
Environment
0
GOOD
Polling
0
GOOD
Other
0
GOOD
Details
Type
Rack UPS
type
IP Address
10.128.19.5
pdu name
MAC Address
Backup IP Address
External Key
Pdu - 843
Manufacturer
dynamic
manufacturer
Model
Smart-UPS RT 5000 XL
model id
Firmware
5.1
pdu firmware
Inlet Name
Contact
Unknown
Location
Unknown
Serial Number
QS1143151000
Test 1
Custom Field 2
SNMP Version
1/2c
Inlet Phase
Single Phase
Belongs to
Rack for 10.128.19.5
Health
Connectivity: OK
Most recent poll of the target PDU was successful.
Active Events: Good
Power IQ is integrated with dcTrack. Refer to this guide before making changes in Power IQ .
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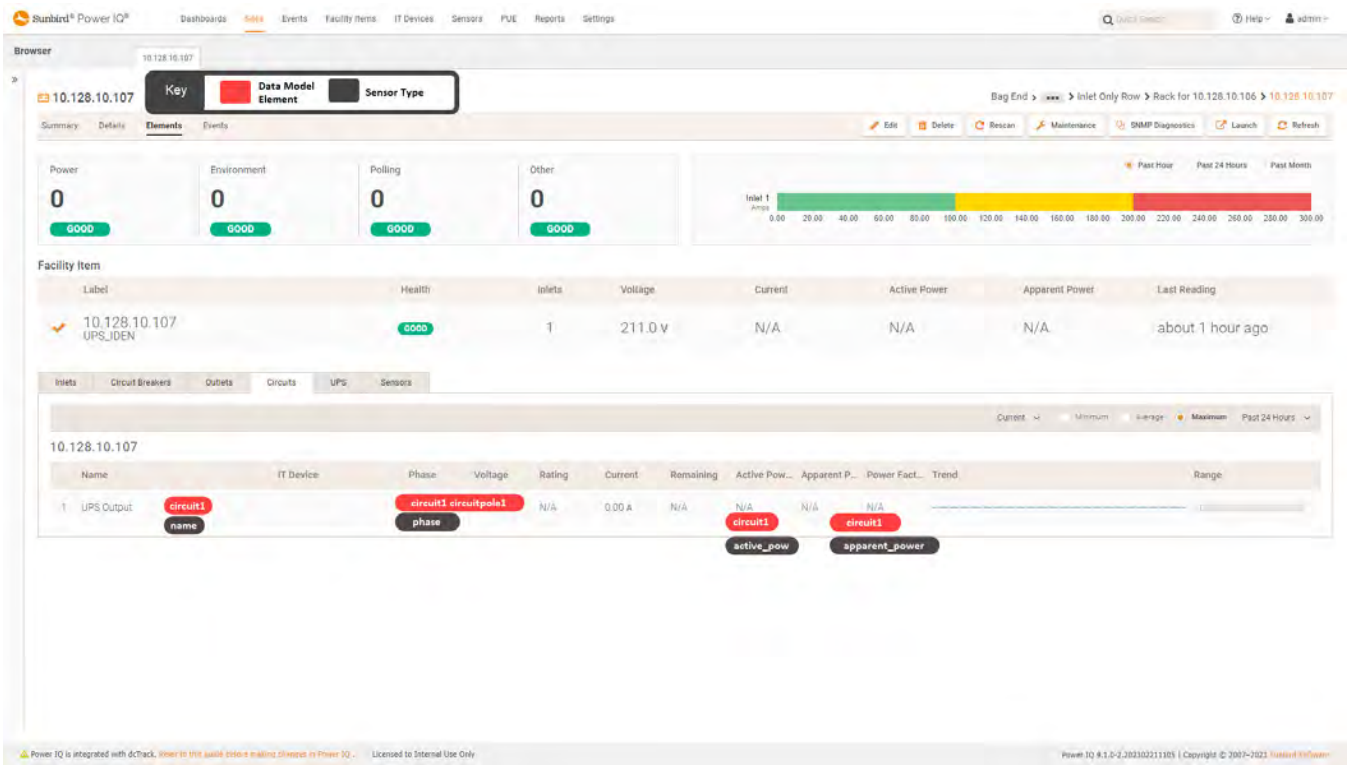
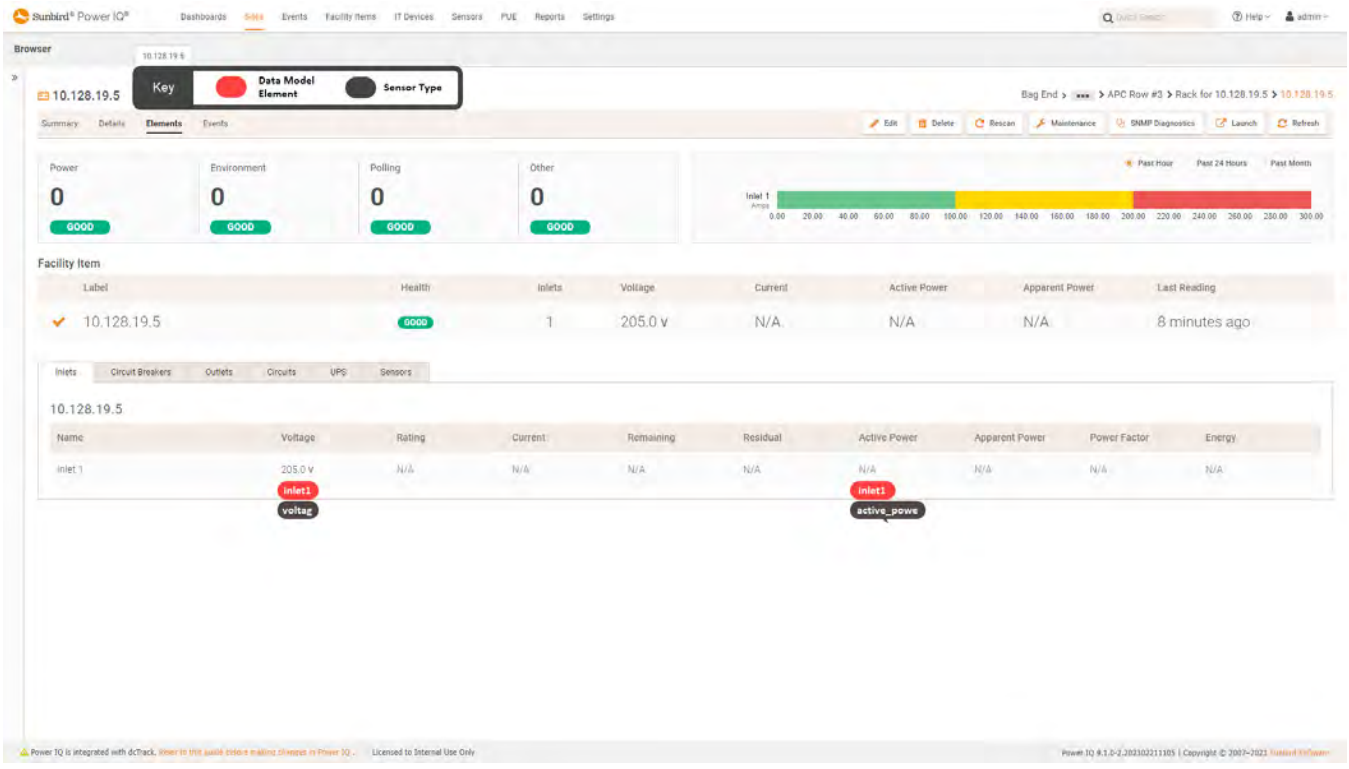

Sunbird® Power IQ®
Dashboards
Events
Facility Items
IT Devices
Sensors
PUE
Reports
Settings
Browser
10.128.10.107
Key
Data Model Element
Sensor Type
Summary
Details
Elements
Events
Edit
Delete
Rescan
Maintenance
SNMP Diagnostics
Launch
Refresh
Power
0
GOOD
Environment
0
GOOD
Polling
0
GOOD
Other
0
GOOD
Past Hour
Past 24 Hours
Past Month
Facility Item
Label
Health
Inlets
Voltage
Current
Active Power
Apparent Power
Last Reading
10.128.10.107
UPS_IDEN
GOOD
1
211.0 v
N/A
N/A
N/A
about 1 hour ago
Inlets
Circuit Breakers
Outlets
Circuits
UPS
Sensors
10.128.10.107
Name
IT Device
Phase
Voltage
Rating
Current
Remaining
Active Pow...
Apparent P...
Power Fact...
Trend
Range
UPS Output
circuit1
name
circuit1 circuitpole1
phase
N/A
0.00 A
circuit1
active_pow
circuit1
apparent_power


Sunbird® Power IQ®
Dashboards
Events
Facility Items
IT Devices
Sensors
PUE
Reports
Settings
Browser
10.128.19.5
Key
Data Model Element
Sensor Type
Summary
Details
Elements
Events
Edit
Delete
Rescan
Maintenance
SNMP Diagnostics
Launch
Refresh
Power
0
GOOD
Environment
0
GOOD
Polling
0
GOOD
Other
0
GOOD
Past Hour
Past 24 Hours
Past Month
Facility Item
Label
Health
Inlets
Voltage
Current
Active Power
Apparent Power
Last Reading
10.128.19.5
GOOD
1
205.0 v
N/A
N/A
N/A
8 minutes ago
Inlets
Circuit Breakers
Outlets
Circuits
UPS
Sensors
10.128.19.5
Name
Voltage
Rating
Current
Remaining
Residual
Active Power
Apparent Power
Power Factor
Energy
Inlet 1
205.0 v
inlet1
voltag
N/A
inlet1
active_powe

External Temperature and Humidity Sensor Mappings Example Screenshots

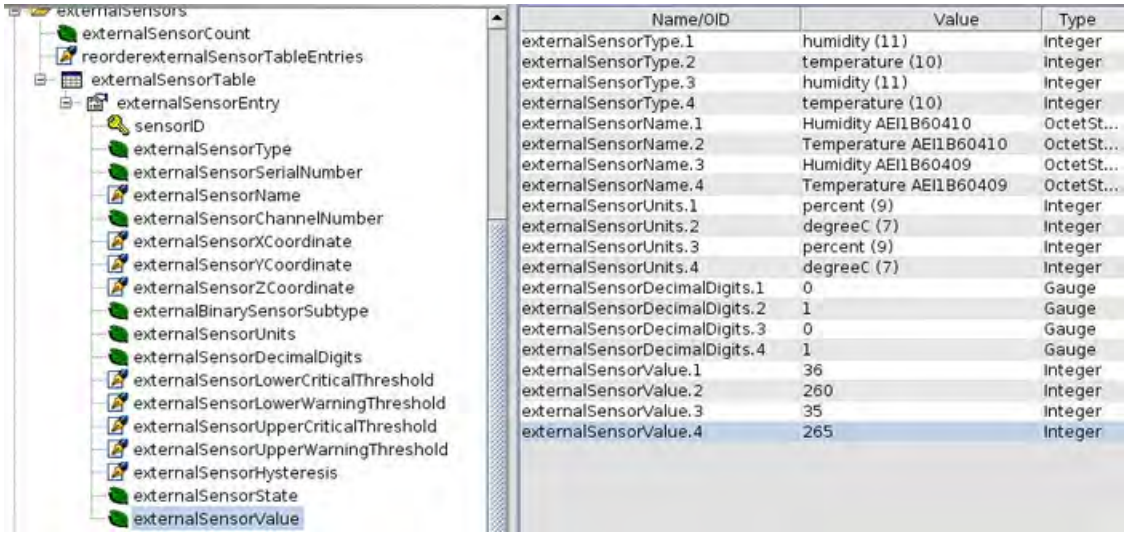
If temperature and humidity sensor information is available in a single table AND there is a way to uniquely determine the type of the sensor:

If temperature and humidity information is available is a single table AND there is an OID that can be queried to determine the type of the sensor, use the generic set of external_sensor_* mappings to collect sensor data.

Example

A PX1 192.168.45.236 has environmental sensor data available in a single table called 'externalSensors'. There is an OID 'externalSensorType' that determines the type of each sensor. In this scenario, the generic set of external_sensor_* mappings can collect the environmental sensor data.

For example, a
MIB for the PX1:



Name/OID	Value	Type
externalSensorType.1	humidity (11)	Integer
externalSensorType.2	temperature (10)	Integer
externalSensorType.3	humidity (11)	Integer
externalSensorType.4	temperature (10)	Integer
externalSensorName.1	Humidity AEI1B60410	OctetSt...
externalSensorName.2	Temperature AEI1B60410	OctetSt...
externalSensorName.3	Humidity AEI1B60409	OctetSt...
externalSensorName.4	Temperature AEI1B60409	OctetSt...
externalSensorUnits.1	percent (9)	Integer
externalSensorUnits.2	degreeC (7)	Integer
externalSensorUnits.3	percent (9)	Integer
externalSensorUnits.4	degreeC (7)	Integer
externalSensorDecimalDigits.1	0	Gauge
externalSensorDecimalDigits.2	1	Gauge
externalSensorDecimalDigits.3	0	Gauge
externalSensorDecimalDigits.4	1	Gauge
externalSensorValue.1	36	Integer
externalSensorValue.2	260	Integer
externalSensorValue.3	35	Integer
externalSensorValue.4	265	Integer

Sensor Metadata and Mappings Using the PX1 MIB:

Temperature Unit:	F
Temperature Unit (Celsius):	
Temperature Unit (Fahrenheit):	

▼ UPS Output Source

▼ Battery Status

▼ Battery Replacement Indicator

▲ Binary Sensors

+ Add − Remove

Mapping Type	State 0	State 1

▲ Mappings

PDU System OID:	1.3.6.1.4.1.13742.4
Model OID:	{pdu_system_oid}.1.1.12.0
External Sensor Index:	{pdu_system_oid}.3.1.0

Start: 1 Step: 1 Proxied: ☐

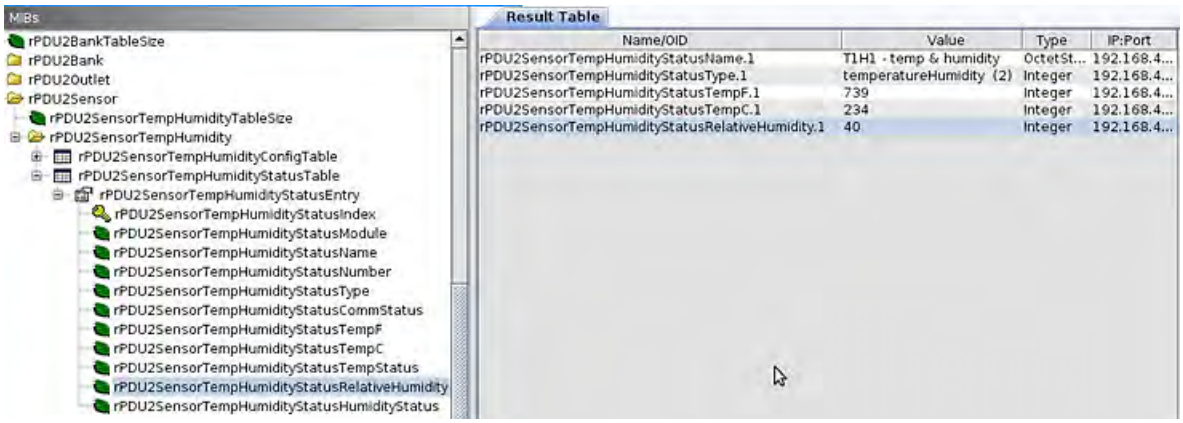
If there is no OID to determine the sensor type, but there are separate OIDs for temperature and humidity sensor values:

- When the temperature and humidity sensor information is available in a single table AND there is no OID to determine the sensor type, BUT there are separate OIDs for temperature and humidity sensor values, use the temperature_sensor_* and humidity_sensor_* mappings to collect sensor data.

Example

An APC 192.168.42.216-1 has one environmental probe that has both temperature and humidity sensors. The information is available in a single table and there are separate OIDs for temperature and humidity readings. In this scenario, the temperature_sensor_* and humidity_sensor_* mappings can collect the sensor data.

MIB for the APC:



Sensor Metadata and Mappings Using the APC MIB:

▲ Mappings

PDU System OID:	1.3.6.1.4.1.318.1.3.4.6
Model OID:	1.3.6.1.4.1.318.1.1.26.2.1.8.{proxy_id}
Humidity Sensor Index:	1.3.6.1.4.1.318.1.1.26.10.1.0
	Start: 1 Step: 1 Proxied: ☐
Humidity Sensor Name:	1.3.6.1.4.1.318.1.1.26.10.2.2.1.3.{external_sensor_humidity_inc
Humidity Sensor Value:	1.3.6.1.4.1.318.1.1.26.10.2.2.1.10.{external_sensor_humidity_i
	Multiplier: 1
Temperature Sensor Index:	1.3.6.1.4.1.318.1.1.26.10.1.0
	Start: 1 Step: 1 Proxied: ☐
Temperature Sensor Name:	1.3.6.1.4.1.318.1.1.26.10.2.2.1.3.{external_sensor_temperature
Temperature Sensor Value:	1.3.6.1.4.1.318.1.1.26.10.2.2.1.7.{external_sensor_temperature
	Multiplier: 0.1

How Power IQ Associates Facility Items with a Structured or Custom Plugin

During the discovery process, facility items are automatically associated with the appropriate plugin. Power IQ will check all available plugins. The appropriate plugin is selected from among the available plugins based on system ID (sysId), proxy ID, and/or model.

The tables below explain how Power IQ associates facility items with structured or custom plugins.

Structured Plugin Associations

Criteria	Result
The plugin has the same sysID and model as the target device	Plugin is an exact match for the target device. With an exact match found, Power IQ will associate the target device with the plugin and not check additional available plugins.
The plugin has the same sysID as the target device but the model is not specified	The plugin is a candidate to manage the target device, but Power IQ will continue to check additional plugins for an exact match.

Custom Plugin Associations

Criteria	Result
The plugin has the same sysID, proxy ID, and model as the target device	The plugin is an exact match for the target device. With an exact match found, Power IQ will associate the target device with the plugin and not check additional available plugins.
The plugin has the same sysID and model as the target device but the plugin's proxy ID is not specified and the target device's proxy ID is null	The plugin is an exact match for the target device. With an exact match found, Power IQ will associate the target device with the plugin and not check additional available plugins.
The plugin has the same sysID and model as the target device but the plugin's proxy ID is not specified and the target device's proxy ID is not null	The plugin is a candidate to manage the target device, but Power IQ will continue to check additional plugins for an exact match.
The plugin has the same sysID and proxy ID as the target device but the model is not specified	The plugin is a candidate to manage the target device, but Power IQ will continue to check additional plugins for an exact match.
The plugin has the same sysID as the target device but the model and proxy ID are not spe-	The plugin is a candidate to manage the target device, but Power IQ will continue to check additional plugins for an exact

Criteria	Result
cified	match.

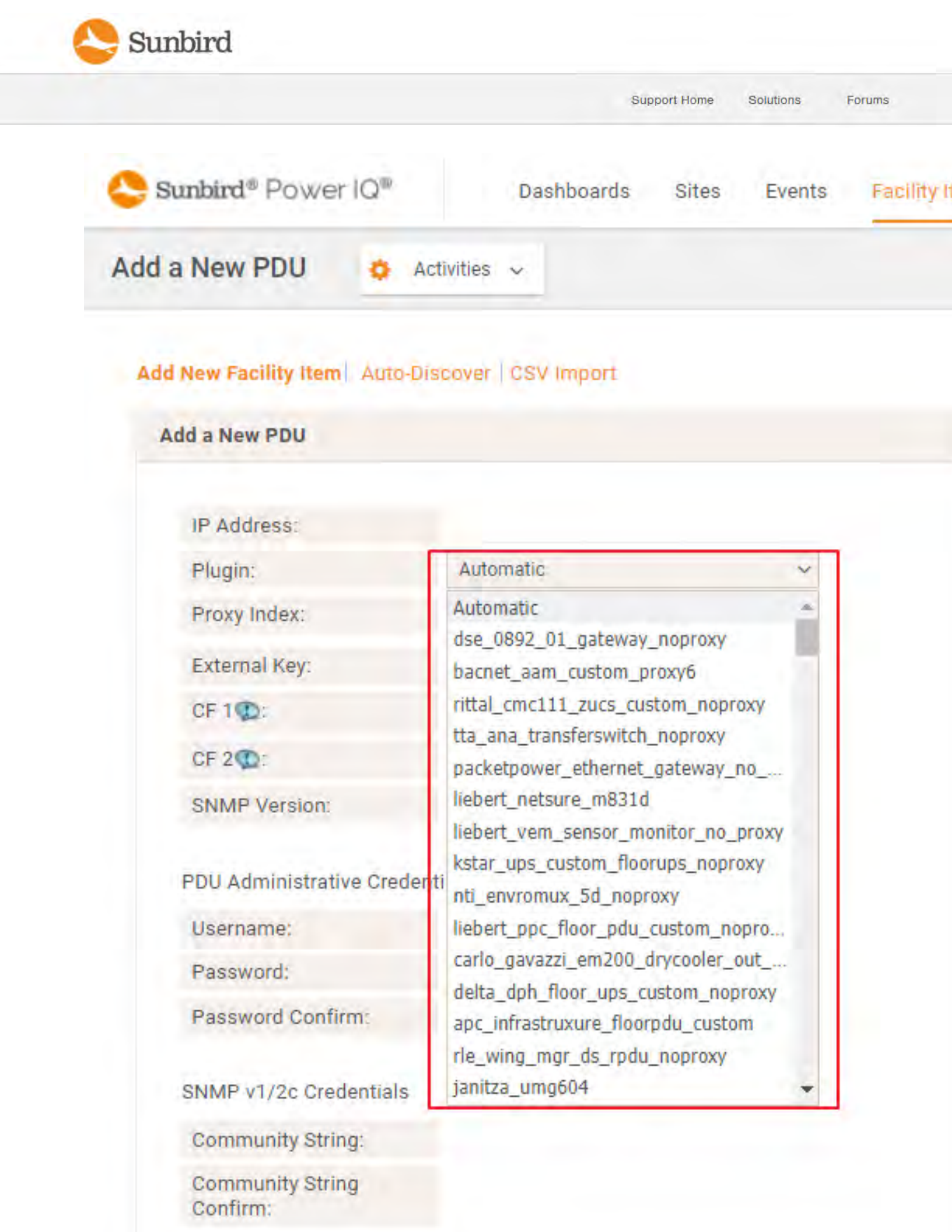
Add PDUs with Custom Dynamic Plugins

When adding a PDU that uses a custom dynamic plugin, use the same Add a PDU feature as any other addition. See *Add PDUs to Power IQ* on page 743.

When Power IQ detects that there is at least one custom dynamic plugin configured, a Plugin drop-down field displays.

Automatic: Use Automatic to allow Power IQ to determine the correct plugin for the PDU you are adding. Automatic attempts to find an exact match between the PDU and the plugin for SysObjectID, PDU Model name, and Proxy ID.

If there is no exact match, but several dynamic plugins are eligible to manage the PDU, based on sysObjectID, then Power IQ selects from among the eligible plugins. If automatic mode does not select the desired dynamic plugin, delete the PDU and add it again, selecting the specific custom dynamic plugin from the list.


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility It
Add a New PDU
Activities
Add New Facility Item
Auto-Discover
CSV Import
Add a New PDU
IP Address:
Plugin:
Automatic
Proxy Index:
External Key:
CF 1:
CF 2:
SNMP Version:
PDU Administrative Credenti
Username:
Password:
Password Confirm:
SNMP v1/2c Credentials
Community String:
Community String Confirm:
Automatic
dse_0892_01_gateway_noproxy
bacnet_aam_custom_proxy6
rittal_cmc111_zucs_custom_noproxy
tta_ana_transferswitch_noproxy
packetpower_ethernet_gateway_no_...
liebert_netsure_m831d
liebert_vem_sensor_monitor_no_proxy
kstar_ups_custom_floorups_noproxy
nti_envromux_5d_noproxy
liebert_ppc_floor_pdu_custom_nopro...
carlo_gavazzi_em200_drycooler_out_...
delta_dph_floor_ups_custom_noproxy
apc_infrastruxure_floorpdu_custom
rle_wing_mgr_ds_rpdu_noproxy
janitza_umg604

Alternatively, select the specific custom dynamic plugin from the list.

For more information, see *How Power IQ Associates Facility Items with a Structured or Custom Plugin* on page 673.

Check PDUs Added with Dynamic Plugins

After you add a PDU using a dynamic plugin, you should check the data collected to verify accuracy.

1. In the Facility Items tab, click the PDU link. The PDU details page entity tab opens.
2. Examine the page to verify that all the data you created mappings for is available. If you do not see data you expected, check your mappings.
3. Check power measurement values to make sure that multipliers were entered correctly.
4. If you see issues, check all mappings and the log file to troubleshoot.
5. In the Settings tab, click Dynamic Plugins in the Appliance Administration section.
6. Click View Log.

Viewing PDUs Using a Dynamic Plugin

When a dynamic plugin is in use, you can view the PDUs that are associated with it.

1. In the Settings tab, click Dynamic Plugins in the Appliance Administration section.
2. All dynamic plugins display in a list. In the PDU Count column, the number link shows how many PDUs use this dynamic plugin. Click the link to view a list of the PDUs associated with the plugin.

Troubleshooting Dynamic Plugins

For each scenario, check the Dynamic Plugin Log file to help troubleshoot errors.

Add PDU fails with error "Unmanageable", or PDU connectivity is "Unmanageable":

The wrong PDU System OID, or the wrong PDU Model OID is specified in the dynamic plugin.

- Dynamic Plugin Log file excerpt sample when PDU System OID is wrong:

```
2011-05-12 13:44:40,394 INFO [DiscoverTask-192.168.100.100] PduDiscovery: sup-
portsSystemObjectId: target sysObjectId=1.3.6.1.4.1.13742.4 2011-05-12
13:44:40,450 INFO [DiscoverTask-192.168.100.100] PduDiscovery: sup-
portsSystemObjectId: no dynamic plugin capable of managing PDU w/ sysObjectID
1.3.6.1.4.1.13742.4
```

- Dynamic Plugin Log file excerpt sample when PDU Model OID is wrong:

```
2011-05-12 12:23:36,836 INFO [DefaultUDPTransportMapping_127.0.0.1/0] Snm-
pUtils: onResponse: got an exception varbind for oid
1.3.6.1.4.1.13742.4.1.1.120.0, 2011-05-12 12:23:36,836 WARN [DiscoverTask-
192.168.100.100] PduDiscovery: getModelName: failed to retrieve model name 2011-
05-12 12:23:36,837 INFO [DiscoverTask-192.168.100.100] PduDiscovery: discover:
Model Name not Found
```

- Information on PDU details page is wrong or missing:

  If adding the PDU is successful, but information on the PDU details page is missing or wrong, an incorrect OID for outlet active power may be specified in the dynamic plugin, for example.

- Dynamic Plugin Log file excerpt sample when Outlet Active Power is wrong:

```
2011-05-12 14:14:24,647 INFO [DefaultUDPTransportMapping_127.0.0.1/0] Snm-
pUtils: onResponse: got an exception varbind for oid
1.3.6.1.4.1.13742.4.1.2.2.1.56.1, 2011-05-12 14:14:24,647 INFO
[DefaultUDPTransportMapping_127.0.0.1/0] SnmpUtils: onResponse: got an exception
varbind for oid 1.3.6.1.4.1.13742.4.1.2.2.1.56.2, 2011-05-12 14:14:24,647 INFO
[DefaultUDPTransportMapping_127.0.0.1/0] SnmpUtils: onResponse: got an exception
varbind for oid 1.3.6.1.4.1.13742.4.1.2.2.1.56.3, 2011-05-12 14:14:24,647 INFO
[DefaultUDPTransportMapping_127.0.0.1/0] SnmpUtils: onResponse: got an exception
varbind for oid 1.3.6.1.4.1.13742.4.1.2.2.1.56.4, 2011-05-12 14:14:24,647 INFO
[DefaultUDPTransportMapping_127.0.0.1/0] SnmpUtils: onResponse: got an exception
varbind for oid 1.3.6.1.4.1.13742.4.1.2.2.1.56.5, 2011-05-12 14:14:24,647
```

```
INFO  [DefaultUDPTransportMapping_127.0.0.1/0] SnmpUtils: onResponse: got an excep-
tion varbind for oid 1.3.6.1.4.1.13742.4.1.2.2.1.56.6,    2011-05-12 14:14:24,647
INFO  [DefaultUDPTransportMapping_127.0.0.1/0] SnmpUtils: onResponse: got an excep-
tion varbind for oid 1.3.6.1.4.1.13742.4.1.2.2.1.56.7,    2011-05-12 14:14:24,648
INFO  [DefaultUDPTransportMapping_127.0.0.1/0] SnmpUtils: onResponse: got an excep-
tion varbind for oid 1.3.6.1.4.1.13742.4.1.2.2.1.56.8,    2011-05-12 14:14:24,648
WARN  [PollScheduler Scheduler-10 Pool-fiber09] SnmpOutletCollector: collect:
failed to retrieve data for mapping symbol 'outlet_active_power'
```

- Add PDU fails with error "Application Error" or PDU connectivity is "Application Error":

  The dynamic plugin encountered an unexpected error that it cannot recover from while attempting to add the PDU to Power IQ. The PDU health shows as Critical in this case, if the PDU is added.

  When the PDU state is "Application Error", this may indicate that one or more index mappings is failing to resolve. Check the dynamic plugin log output for mapping resolution errors.

When to Delete and Rediscover a PDU Using a Dynamic Plugin

Certain changes, either to a PDU, or to a plugin, may require you to delete and rediscover the PDU.

- Change mapping and PDU enters "Application Error" state.
- Change mapping and the new mapping is not reflected in the PDU's details or Sites Tab tab. For example, changes to multiplier, sensor unit, number of circuit poles.

Troubleshooting Dynamic Plugin Trap Mapping

Problem: An incoming trap is mapped to the wrong event in Power IQ:

When mapping an incoming SNMP trap to a dynamic plugin trap mapping, Power IQ always takes the FIRST possible match. The dynamic plugin UI will attempt to alert a plugin author of duplicate trap mappings but it is possible for the author to configure multiple trap mappings that match a particular trap. This may occur when OID wildcards (*) are used.

To resolve, verify that the trap mappings are unique with the plugin.

Problem: In a custom dynamic plugin with proxied PDUs, such as in a Babel Buster gateway scenario, an incoming trap is associated to the wrong PDU:

The incoming trap will have the IP address of the proxy and Power IQ must determine which of the proxied PDUs the trap is actually for. Power IQ iterates through each of the custom plugin's trap mappings used to manage the proxied PDUs and will take the FIRST possible match.

To resolve, verify that the configured trap mappings are unique across each of the proxy's custom plugins.

Problem: The event summary text for a particular event on the event listing or event details is not available:

Check the dynamic plugin to determine if the relevant trap mapping has been modified or deleted. Either scenario will prevent Power IQ from generating the desired event summary text when requested.

SNMP Gateways and Custom Dynamic Plugins

The custom dynamic plugin works with SNMP-gateway devices to convert other protocols, such as Modbus or Bacnet, to SNMP. The SNMP gateway allows you to get the information you need to monitor an inteligent power device that does not have an SNMP agent. Examples of SNMP gateways include Control Solutions Babel Buster SPX and FieldServer DCC1075 gateways.

Example

Modbus can communicate data about your PDU. Each piece of data has a 16-bit integer register, and each register has an address. A Modbus register address is similar to an SNMP OID. Each uniquely identifies a data point.

A SNMP-gateway works with Modbus devices in a serial primary-extension setup. The gateway device polls the extension devices, reads the register data back, and stores it into the gateway device. The gateway makes the register data available as SNMP OIDs.

Configuring the SNMP Gateway

Configuring your SNMP gateway device to prepare for creating a custom dynamic plugin should include:

- Getting the Modbus register list for the PDU you want to monitor from the PDU manufacturer.
- Configuring the gateway with the necessary registers to allow for data collection. This may include mappings for line to line voltages, active power, apparent power, power factor, pole current, and other types supported by Power IQ.
- Using your gateway to convert the registers to SNMP OIDs.
- Understanding the units that each data point is reported in. The register list will specify the scaling factor for each value. For example, watts or kilowatts, degrees or degrees multiplied by 100.

Importing and Exporting Plugin Files

Once you have created a dynamic plugin, you can export it to a .JSON file. Use the file to share the plugin with another Power IQ installation by importing it there. Or, use the file as a template to edit to create other dynamic plugins, and re-import.

1. In the Settings tab, click Dynamic Plugins in the Appliance Administration section.
2. The list of dynamic plugins displays. Click Download on the plugin you want to export.
3. Open or save the file.

   Only .JSON files can be imported.

4. In the Settings tab, click Dynamic Plugins in the Appliance Administration section.
5. Click Import, then click Browse and select the .JSON file. Click Import.

   When the file imports, it displays in the list.

Supported Vendors

The table below summarizes the list of vendors whose products are currently supported in Power IQ by standard and/or dynamic plugin.

For a full list of supported models or to download plugins for Power IQ, visit addons.sunbirddcim.com.

For a list of supported events, see *Supported Events* on page 210.

Vendor Name	Supported via Standard Plugin	Supported via Dynamic Plugin
APC	X	X
Aphel	X	
Avocent	X	
Baytech	X	X
Chatsworth Products, Inc.	X	X
Cisco Energywise	X	
Climanveneta		X
Cmatic		X

Vendor Name	Supported via Standard Plugin	Supported via Dynamic Plugin
Control Solutions, Inc.		X
Cyberex		X
CyberSwitching	X	
Cyclades	X	
Eaton	X	X
Emerson		X
FieldServer		X
Geist	X	X
Gude		X
HP	X	X
HW Group		X
IBM		X
Janitza		X
Knurr	X	
Legrand		X
Liebert	X	X
Masterguard		X
Measurelogic		X
Mitsubishi Electric		X
MRV	X	
Netbotz	X	

Vendor Name	Supported via Standard Plugin	Supported via Dynamic Plugin
Northern Design		X
NTI	X	X
Obvius	X	
Oracle		X
Panduit	X	X
PDI		X
Raritan	X	X
Riello		X
Rittal	X	X
RLE		X
RT Systems	X	
Schleifenbauer	X	X
Schneider Electric	X	X
Server Tech	X	X
Sinetica	X	
Socomec		X
SquareD		X
Starline	X	X
Stulz		X
Toshiba		X
Tripp Lite	X	

Vendor Name	Supported via Standard Plugin	Supported via Dynamic Plugin
Unite Technologies	X	
United Power		X
Universal Electric	X	X
USV-Masterguard		X
Vertiv	X	

Security and Encryption

Installing an HTTPS Certificate

A PEM file upload is required to replace the current certificate and private key. The PEM file needs to contain both an RSA private key and an X509 certificate.

Note: Power IQ does not provide a Certificate Signing Request (CSR). OpenSSL or any other utility can be used to generate CSR. Power IQ does not use encrypted private keys. You must remove the password from the Private key before it can be used. To remove the encryption from the key, issue a command like: "openssl rsa -in server.key -out server2.key". Use "server2.key" when using openSSL utility.

It is not required to provide root certificate of CA signing Power IQ certificate signing request (CSR).

Step 1: Generate a private key

This example procedure is for generating a private key using OpenSSL on a Linux server.

This command creates an RSA key with Triple DES 1024 byte encryption.

```
openssl genrsa -des3 -out server.key 2048
```

Remember the key password from this command.

Generate a Certificate Signing Request. Be prepared to complete the following information:

- private key password
- two character country code
- full state or province name
- city name
- company name
- organizational unit or leave it blank
- servers common name or fully qualified domain name
- admin email address
- other attributes can be left blank

1. Create the request.

```
openssl req -new -key server.key -out server.csr
```

2. Display the CSR request.

```
cat server.csr
```

3. Copy the CSR request and send it to the certificate authority to be signed. Make sure to copy everything between the first "-----" and the last "-----".
4. Submit CSR to certificate authority and receive signed X.509 certificate.
5. Modify the server key to remove the password.

```
cp server.key server.key.secureopenssl rsa -in server.key.secure -out server.key
```

Warning: The server.key file must be kept private and secure. If this key file is compromised, the certificate should be removed and then reissued.

6. Create PEM file.
7. The PEM file should contain both the RSA private key without password and the X.509 certificate.
8. Concatenate the unprotected private key to the signed X.509 certificate file from the top level certificate authority.
9. Use this file in the upload in Step 2.

Step 2: Upload the PEM file to Power IQ:

You may want to manually load the certificate in your browser first to prevent issues while everything loads and refreshes in Power IQ. If you see any issues, such as bad labels or a partially loaded UI, refresh your browser to resolve.

1. In the Settings tab, click HTTPS Certificate in the Security and Encryption section.
2. If uploaded, the currently HTTPS certificate displays. To replace it or add a new certificate, click Browse and select the PEM file.
3. Click Upload.

Restrict Web and Shell Access Based on IP Address

To increase security, Power IQ can be configured to restrict web interface and SSH access by IP address.

- When trusted hosts are specified, Power IQ blocks attempts to connect from addresses not specified.
- When no hosts are specified, ports 22, 80, 443, 5432 are open to all hosts.

1. In the Settings tab, click IP based Access Control in the Security and Encryption section.

   The global options will override any options that allow access to the SSH and ODBC service.

   - Allow ICMP ping responses
   - Block all SSH access
   - Block all ODBC access: See ODBC Access.
2. Identify the hosts to allow access to in the Trusted Hosts fields.

   You can enter an IP address, or a subnet using CIDR notation such as 192.168.45.0/24.
3. For each address, select how it is permitted to access Power IQ.
4. Select the Enable SSH to allow SSH access checkbox.
5. Select the Enable HTTP/HTTPS checkbox to enable access through the web interface.
6. Select Enable ODBC to allow third party access.
7. Click Save.

Configuring Password Requirements

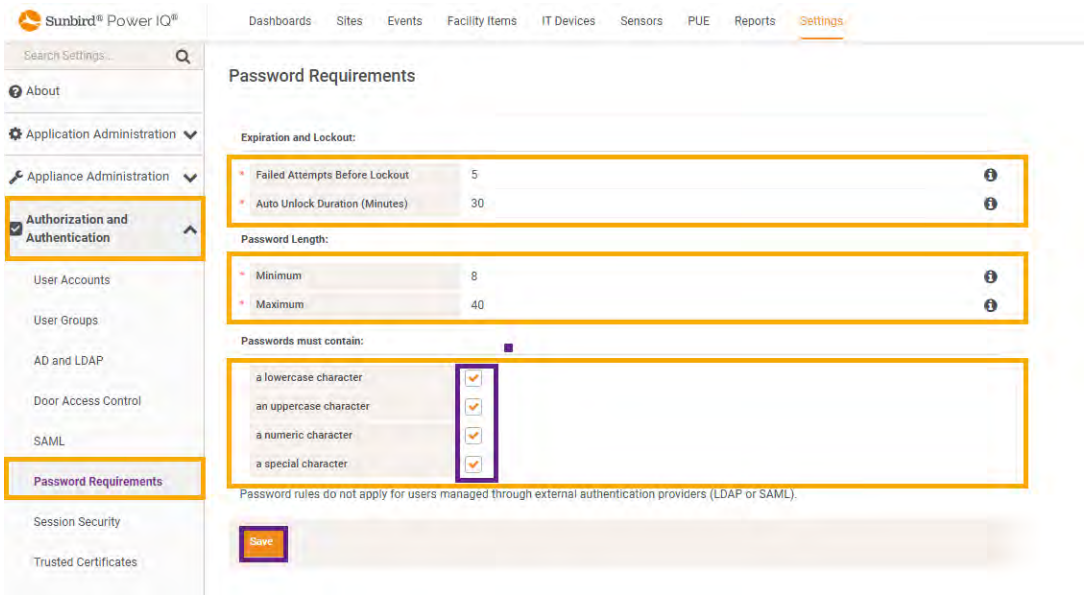
To specify password strength for Power IQ users, select from a list of password requirements. Users that are locally authenticated will be required to use passwords that comply with the settings. For example, you may require that all passwords contain a number and are longer than 8 characters.

Password requirements apply to locally authenticated users only. If LDAP is enabled, the password requirements selected are not followed.

Changes to the password requirements apply only to future new and changed passwords. Users whose passwords were created before the password requirement change will not be forced to change passwords to comply with the requirements.

Power IQ 9.2.0 enables administrators to configure an account lock-out feature based on incorrect password attempts. You can configure the number of failed attempts a user is given before they are locked out of the system. You can also configure whether the Account should be unlocked after a pre-defined period or must be unlocked by an Administrator.

1. In the Settings tab, click Authorization & Authentication > Password Requirements.
2. In the Failed Attempts Before Lockout field, type the number of failed login attempts that must occur before the users account is locked out. If set to 0 there is no limit so bad attempts will never cause the user to be locked out. The maximum accepted value is 10.
3. In the Minimum Password Length field, select the minimum number of characters a password must include.
4. In the Maximum Password Length field, select the maximum number of characters a password may include.
5. Select the checkboxes for each requirement you want included in locally-authenticated user passwords.
    - a lowercase character: Password must contain any lowercase letter.
    - an uppercase character: Password must contain any capital letter.
    - a numeric character: Password must contain a number.
    - a special character: Password must contain any special character, including: ~!@#$%^&*()_+{}|:"<>?/.,';][=-\`
6. Click Save.



Note: Password rules do not apply for users managed through external authentication providers (LDAP or SAML).

Encrypting Data Backup Files

Power IQ encrypts data backup files using a GnuPG/PGP public key that you generate.

You can generate PGP Encryption Keys using free tools. Go to https://www.gnupg.org and look for a binary for your operating system on the Downloads page.

Important! Make sure to save both the public and private keys that you generate. You need the public key for backup file encryption and the private key for backup file decryption. See **Decrypt Backup Files Before Restoring**

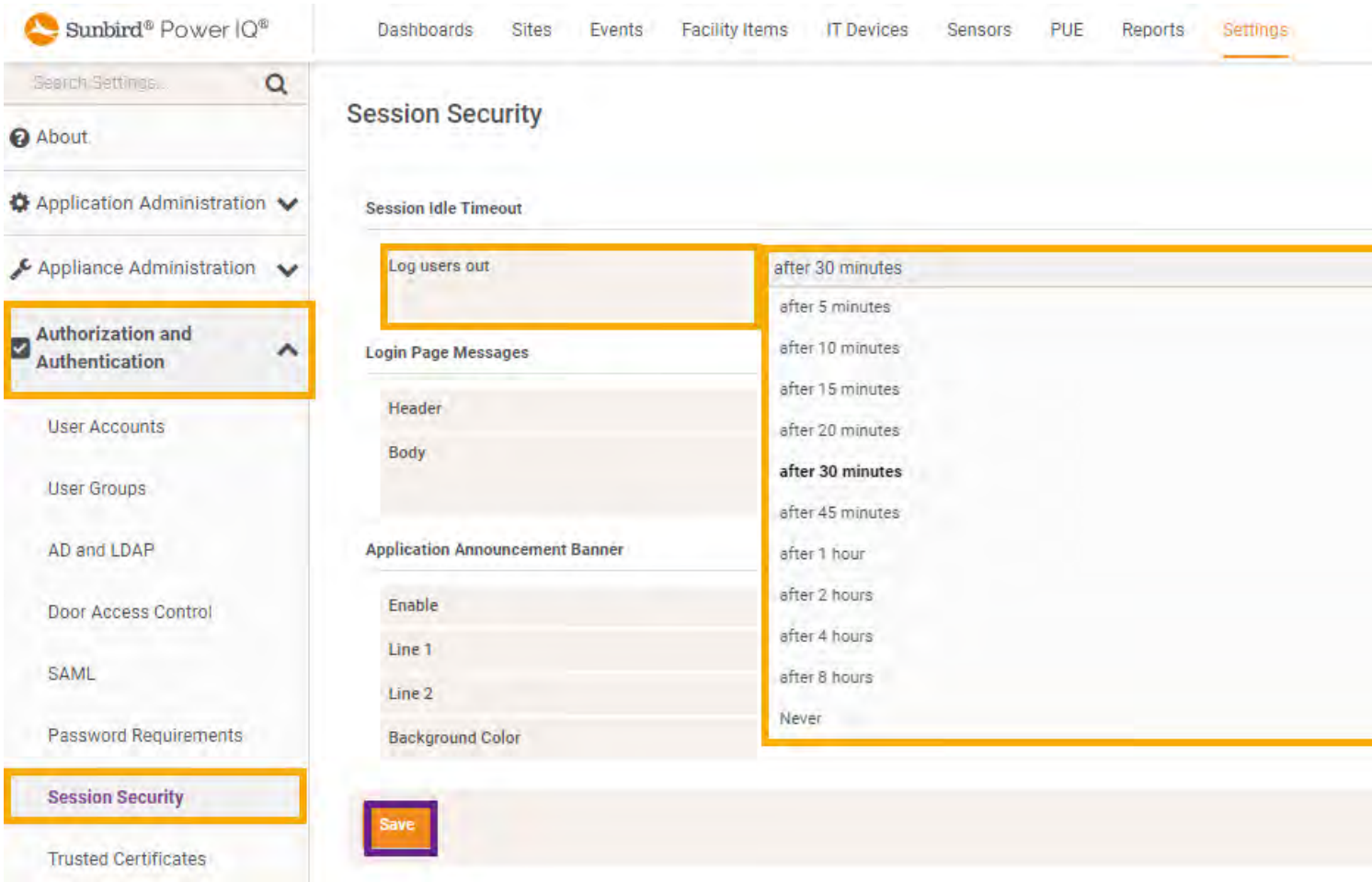
1. In the Settings tab, click Data Backup Encryption in the Security and Encryption section.
2. Select the Encrypt Backups checkbox in the Data backup Encryption Configuration panel..
3. Click Browse, then select and upload a GnuPG/PGP Public Key to Power IQ.
4. Click Save.

Configure Web User Session Timeouts/ Session Idle Timeout

You can set Power IQ to log out any web users who have been inactive for a certain period of time.

1. In the Settings tab, click Authorization and Authentication > Session Security.
2. In the Session Idle Timeout panel, select a time from the "Log users out" drop-down. The time indicates how long users can remain idle on the Power IQ web interface before being logged out. Select Never to disable this feature.
3. Click Save.

Note: Changes will be effective after logoff/login.

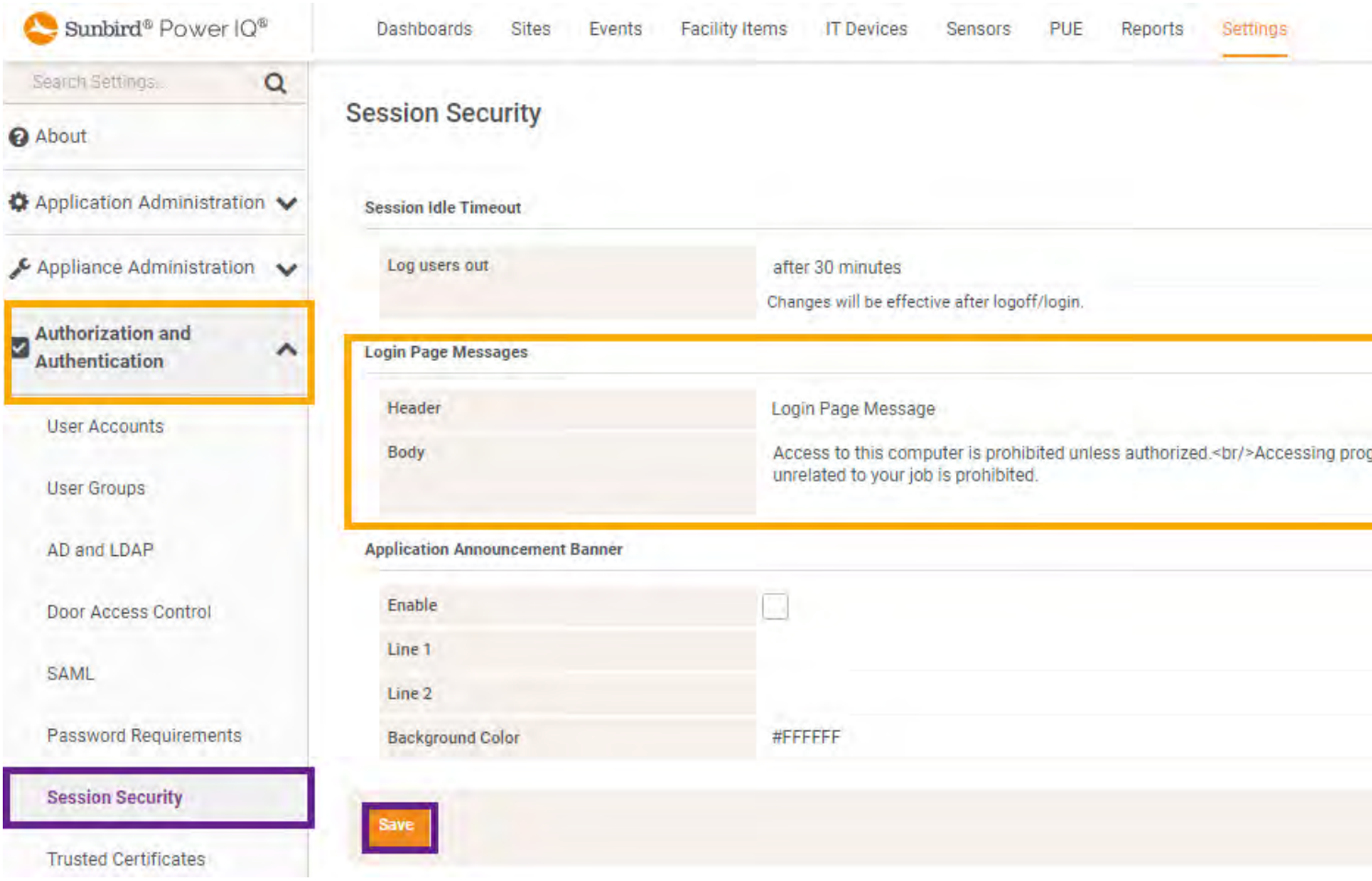


Configuring the Login Page Messages

The authorization warning message/ login page message displays on the Power IQ login page. You can change the default message.

Warning: Do not use html scripts in the message. Some scripts could cause the system to lock you out.

1. In the Settings tab, click Authorization and Authentication > Session Security.
2. In the Login Page Message panel, enter the message you want to display on the login page.
   - Header: Text entered in this field displays on the login page in a bold font, as the heading to the message
   - Body: Text entered in this field displays in a normal font, as the main content of the message.
   - Allowed html tags: strong, em, a, font
   - Allowed html attributes: href, title, color
3. Click Save. Log out of Power IQ to return to the login page and view the message.



Maintenance Tasks

Power IQ enables you to manage a number of maintenance tasks for your facility Irems.

Upgrade Power IQ to a Fenced Release

The following are general steps for upgrading Power IQ.

Note: Always follow the upgrade path, and other release specific instructions outlined in the release notes of the relevant release

The following are general steps for upgrading Power IQ.

1. Ensure that your existing system is on a release that can be upgraded (Check the upgrade path in the release notes or contact tech support at tech@sunbirddcim.com or via the Sunbird Support Portal.
2. Create a new system with the *.iso installations instructions for the new version
3. If Power IQ is integrated with dcTrack, disable the Power IQ integration in dcTrack.
4. Power off the existing Power IQ system
5. Restore the saved backup into the new system
6. Do sanity/smoke testing to ensure there is no need to revert back to the prior system If all tests pass, re-enable the integration points (and update the IP addresses as needed in other systems that are integrated with Power IQ).
7. If using dcTrack, also update the IP Address for Power IQ in dcTrack and re-enable the Power IQ to dcTrack integrationIf using an external integration with Power IQ, such as those that would access Power IQ via the API or ODBC interfaces, disable these integrations.Create a new backup of your existing Power IQ and download it.
8. If testing fails, collect logs to provide to sunbird tech support. Power down, and turn off the prior system and re-enable integrations with that system. contact Sunbird Technical Support at tech@sunbirddcim.com or via the Sunbird Support Portal.

Manage Removed or Out of Service Item

Once an item is physically removed, replaced, or being maintained, you can mark it as removed or out of service, rather than deleting it from Power IQ, so that its historic data remains available in Power IQ.

The facility items that can be marked as removed or out of service are facility items, IT devices, and sensors.

Power IQ provides two states for marking a facility item that is not in service: Maintenance and Decommissioned. For more information, see Maintenance Mode and Decommission a Facility Item respectively.

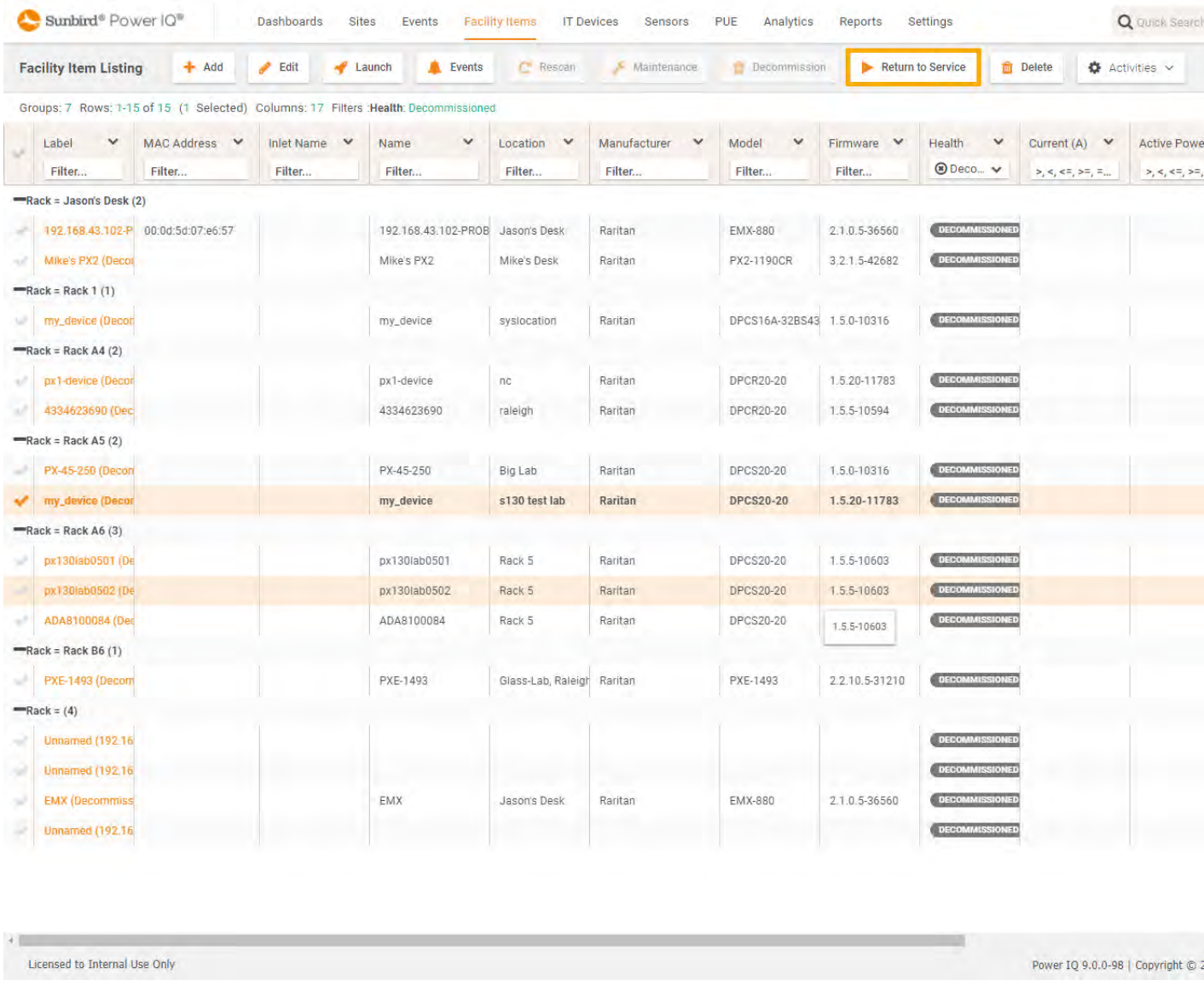
For IT devices and sensors, only the decommissioning option is available. They do not have the maintenance mode state in Power IQ.

Decommissioning a facility item is the first step when you physically remove, replace, or hot-swap it with another one. To perform a technology refresh or to replace a PDU/facility item with another item using the same IP, first decommission the PDU/Facility item, then add the new PDU/facility item with the same IP. See Decommission a Facility Item Decommissioning in Power IQ

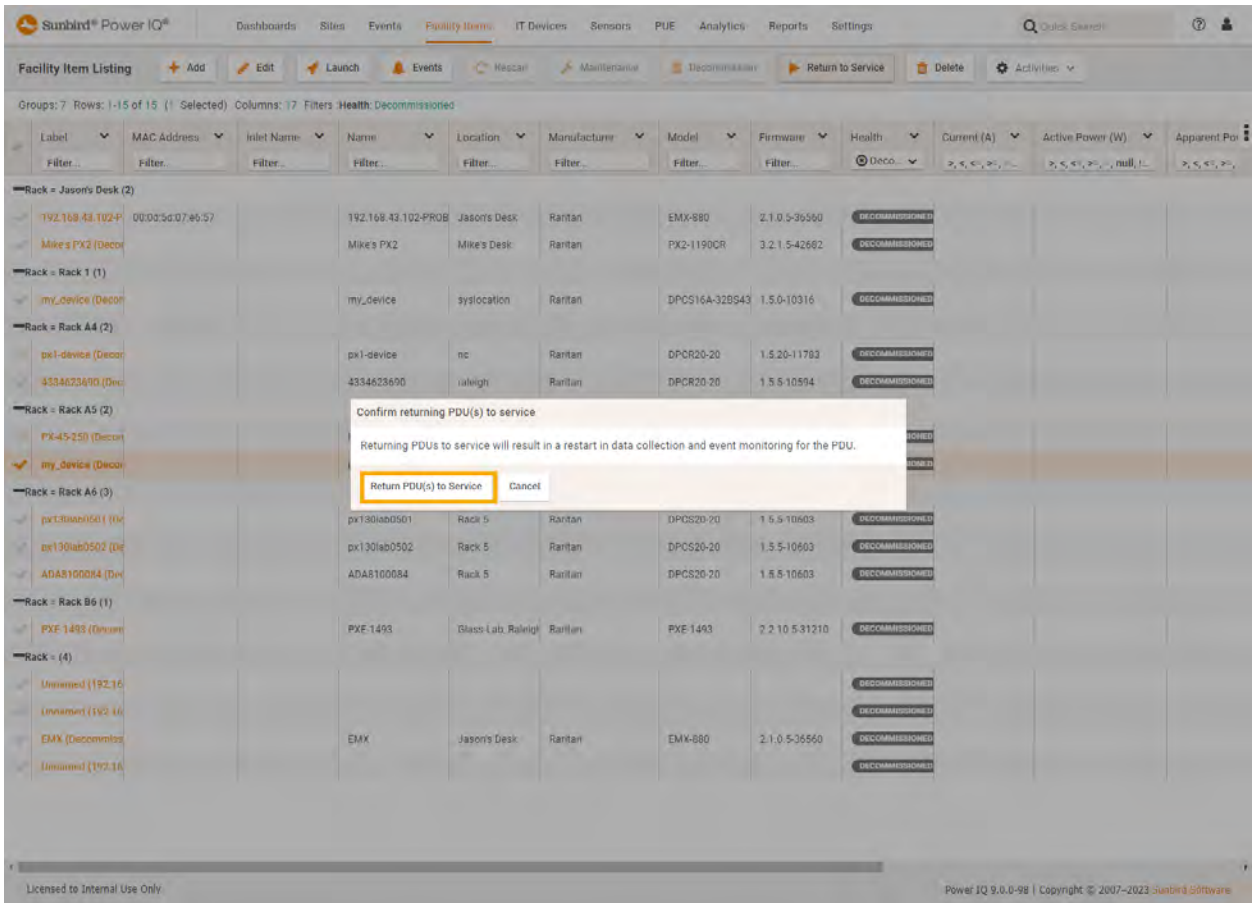
Return a Facility Item to Service

You can restore a Facility Item to service from being decommissioned or in maintenance from the Facility Items list.

1. In the Facility Items tab > Facility Items list, select the PDUs you would like to return to service. Click the Return to Service link.



2. On the confirmation popup, click the Return PDU(s) to Service button.



3. The selected items will be returned to service.Click the Dismiss button to dismiss the status popup.
4. When the task is completed, click the OK button.
5. The Items are returned to Service

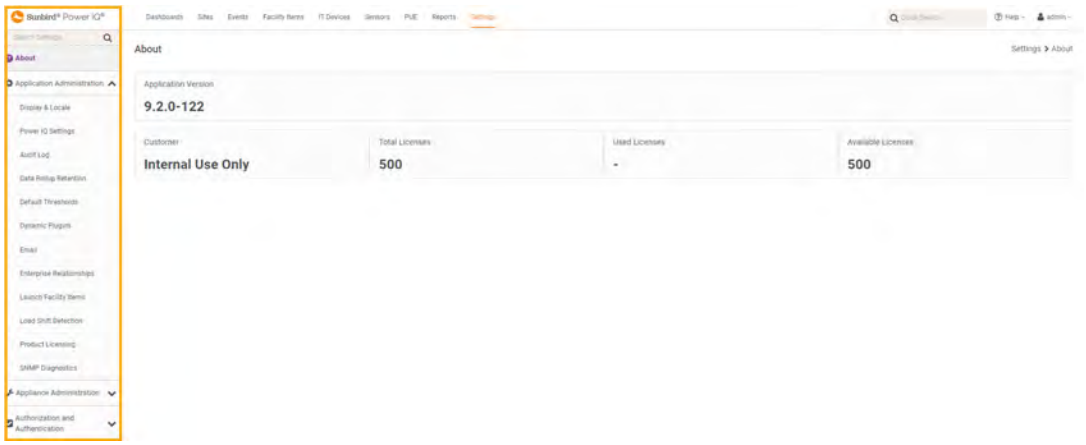
Rack, Rack PDU, IT Device and Door entity tabs in the Sites Tab have buttons in their toolbars for “Return to Service” (if decommissioned or in maintenance mode) and “Decommission” (if in service).

To decommission or return a facility item to service from a facility Item Sites entity tab, click the appropriate button

Settings

Power IQ displays different options in the Settings Tab based on your user role. Administrators view one settings tab, and all other users view a Settings tab specific to individual user settings. This section includes content relevant to both groups of users

The Settings tab for administrators has a left side navigation panel. This panel provides logical groupings for all the settings features allowing administrators to quickly navigate to the required feature. Features previously displayed on a single page with multiple panels requiring you to search for the desired feature, are now rendered as logically grouped menu options.



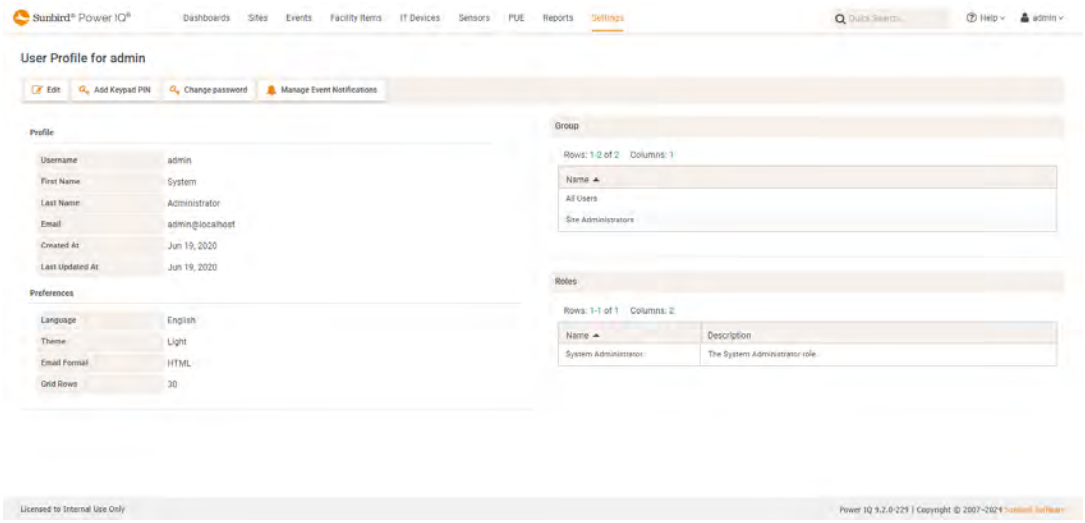
The following table summarizes the options available in the Admin Settings menu

	Settings Menu Options	
Heading	**Option/Information**	**User Action/Description**
About	• Application Version • Customer	Click to view information about Power IQ and view appliance service, including the controls to shut down and restart Power IQ.
Application Administration	• Display & Locale • Power IQ Settings • Audit Log • Data Rollup Retention • Default Thresholds • Dynamic Plugins • Email • Enterprise Relationships	Click to Administer Settings, Upgrades, censing Audit Logs, Dynamic Plugins and Thresholds

	Settings Menu Options	
Heading	**Option/Information**	**User Action/Description**
	• Launch Facility Items • Load Shift Detection • Product Licensing • SNMP Diagnostic	
Appliance Administration	• Appliance Services • Data Backups • HTTPS Certificate • IP Based Access Controll • Log Forwarding • ODBC Access • Product Upgrade • SNMP Settings • Time Settings	
Authorization and Authentication	• User Accounts • User Groups • AD and LDAP • Door Access Control • SAML • Password Requirements • Session Security • Trusted Certificates	Click to add, delete, assign roles and groups

The Settings tab for all non-admin users displays the User Information panel for the logged-in user. For more information see *Edit Your User Information (Non-Administrators)* on the facing page

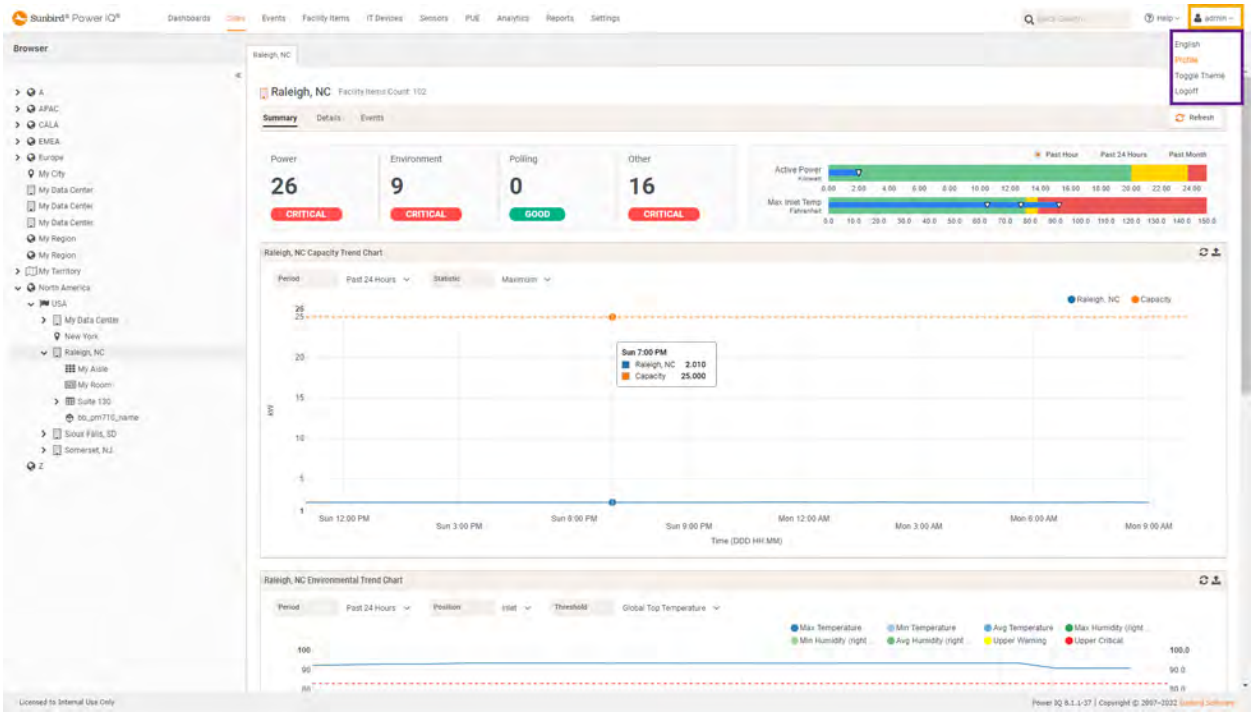
Edit Your User Information (Non-Administrators)



Note: Information on the Groups and Global Roles tabs is not editable by non-Administrators.

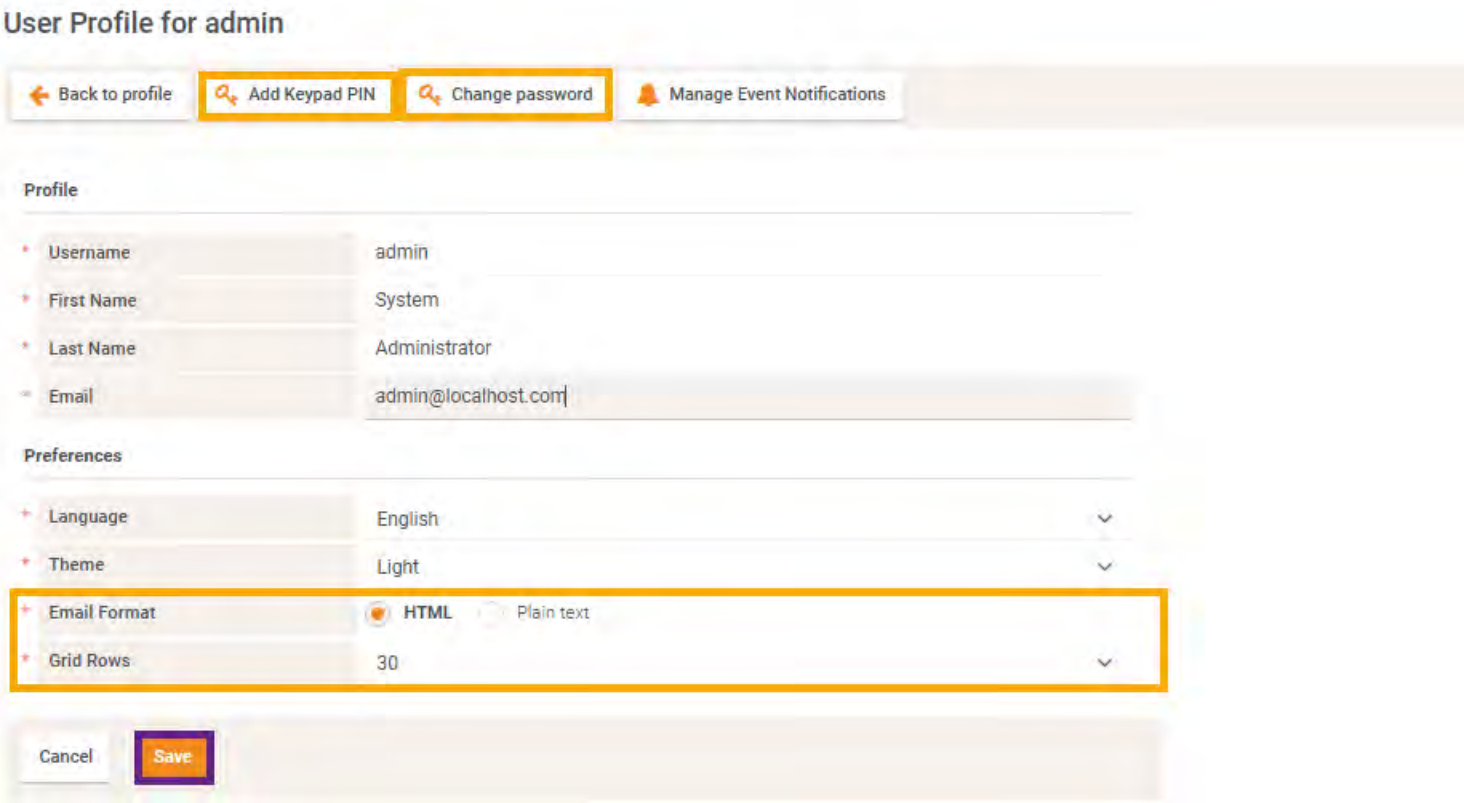
To edit your user information:

1. In Power IQ, click the user icon in the upper right corner of the screen to access the user profile menu.



2. The User Profile drop-down menu displays. Proceed to step 4

3. Alternatively, click the Settings tab
4. Select Profile from the drop-down menu. The User Information panel displays in the Settings tab.
5. In the User Profile panel, click in each field to change your preferencesthe information you wish to change. You may change your Password by clicking Change Password. See the table below for information on the options contained in each tab.
6. Click Edit to enter edit mode
7. Edit your first name, last name and email address as needed.
8. To manage event notifications, select Manage Event Notifications and modify your event filters as necessary.
9. To manage your grid rows and email format, select your desired options in the user profile table.
10. To add a Key pad pin, click Add Keypad PIN, complete the dialog and click Save.
11. Click Save.

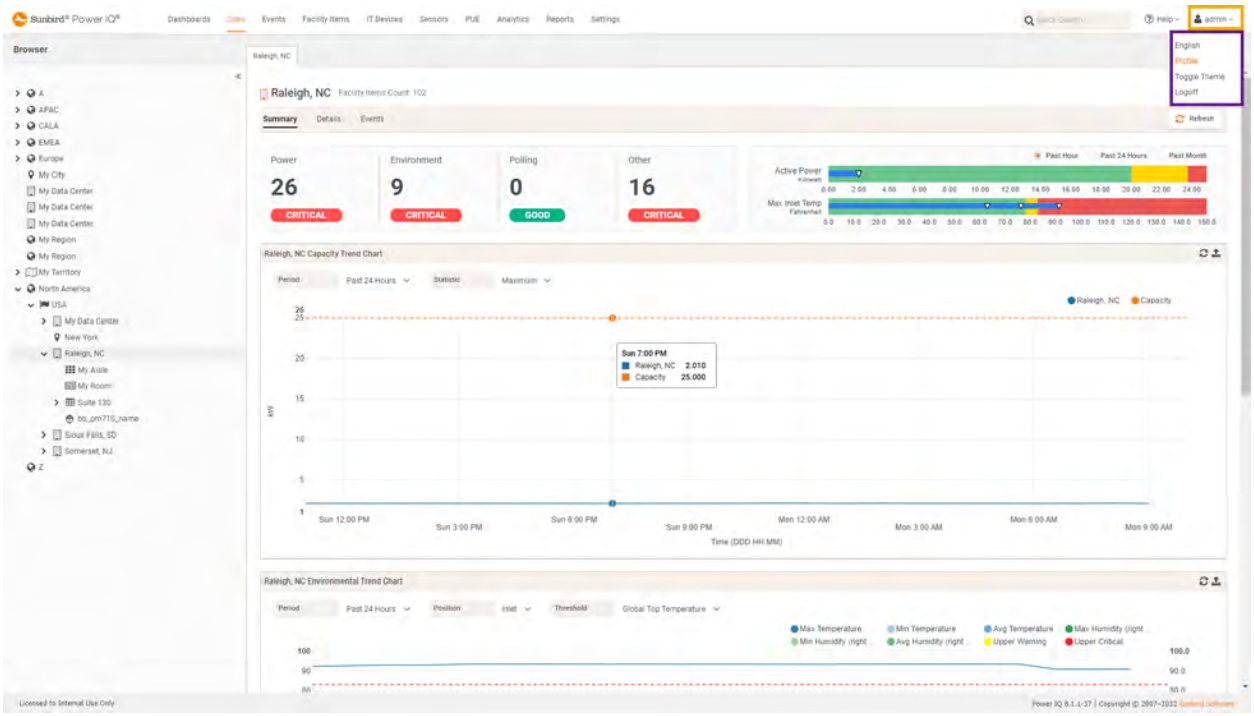


User Profile Menu

The User Profile menu provide one-click access to enable you to:

- Change your language preference
- Edit your user profile

Click the user icon in the upper right corner of the screen to access the user profile menu:



The following table summarizes the options available in the User Profile menu

User Profile Menu Options	
Option	**User Action/Description**
Language	Change/select your preferred language.
Profile	Access your User Information Panel in the Settings tab, where you can edit your user preferences..
Logoff	Log out of Power IQ

Language and localization

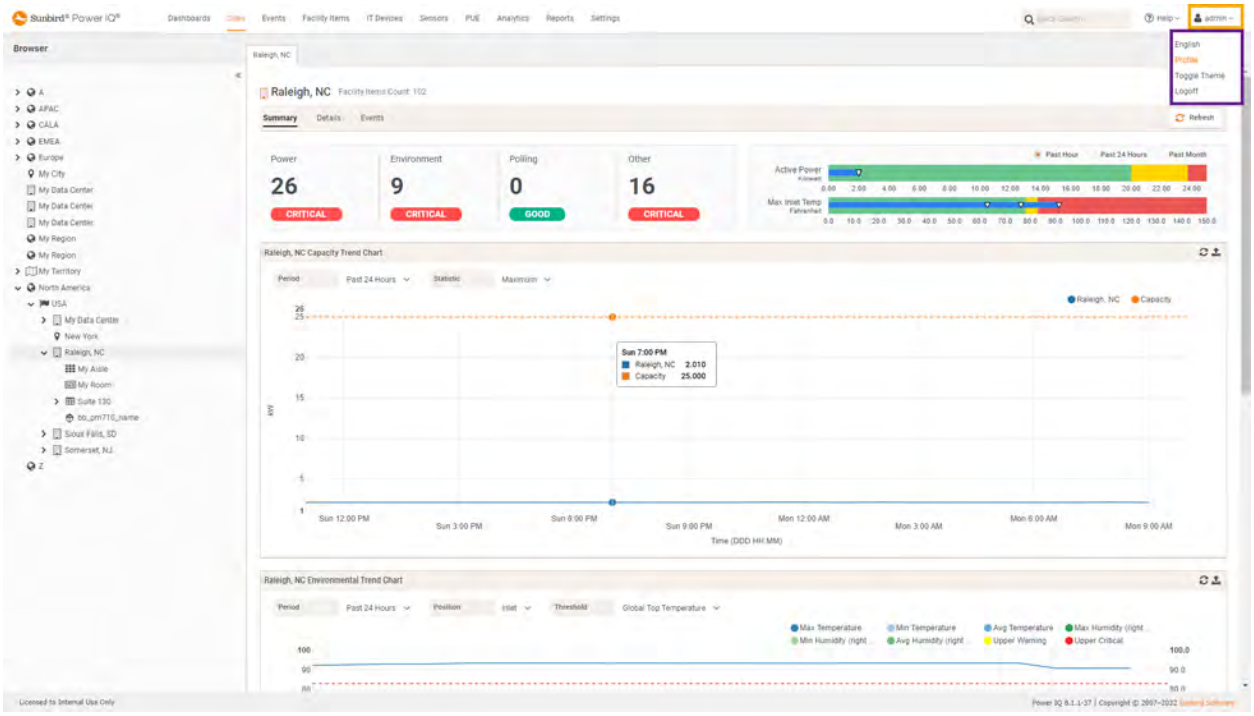
Power IQ supports UI localization in the following languages:

- English
- Japanese
- German,

- Simplified Chinese
- French
- Turkish

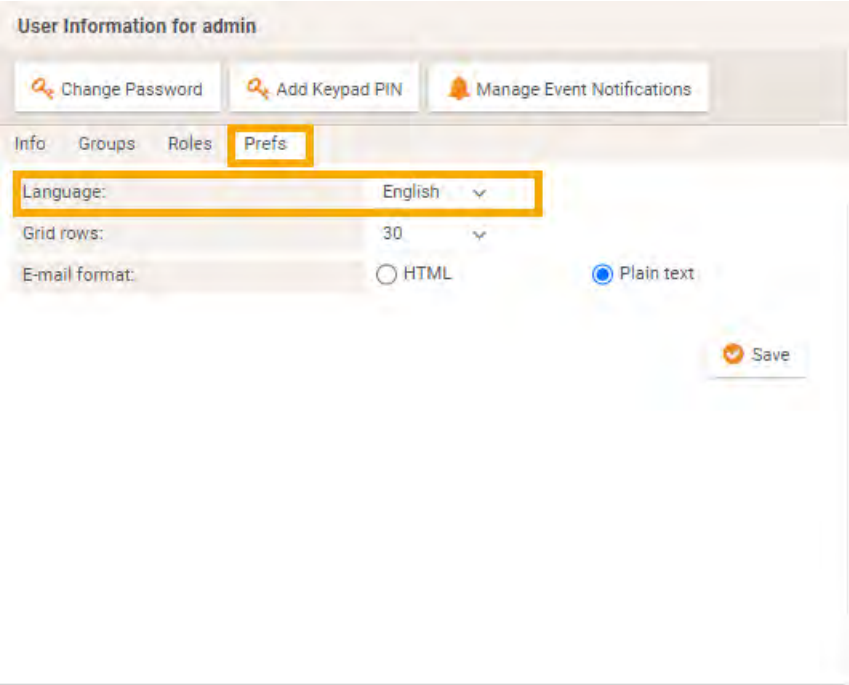
To change your language preference:

1. In the Web Client, click the user profile icon in the upper right corner of the page to display the User Profile menu..



2. The User Profile drop-down menu displays.
3. Select the Profile option from the drop-down menu. The User Information panel displays in the Settings tab

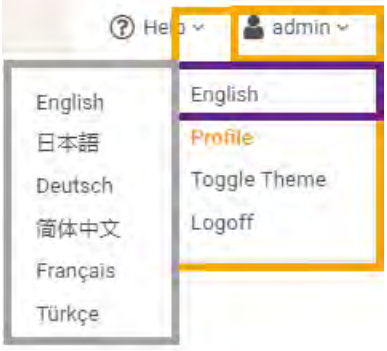
4. On the User Information panel, select the Preferences tab to change your default language.



3. Edit your information, then click Save.
4. Click the Save button on the User Information page, then click OK on the Success message.

Alternatively, to change your language preference:

1. In the Web Client, click the user icon in the upper right corner of the page.
2. Click the first option to display the language menu.
3. Select your preferred language from the language menu.



The languages listed in order are as follows

- English
- Japanese
- German
- Simplified Chinese

- French
- Turkish

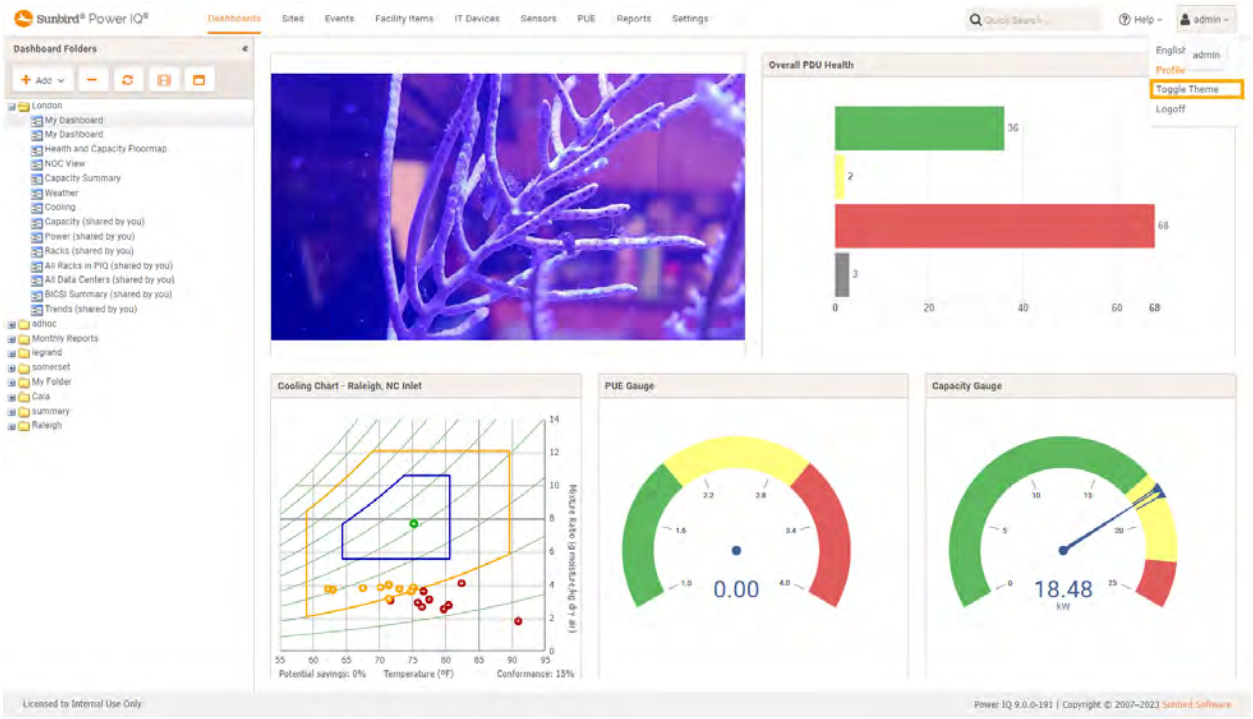
Configure the theme in Power IQ: Dark or Light Mode

The Power IQ application can be viewed in one of two themes: dark or light mode . Both modes are designed to highlight logical next step buttons, icons and menu items, as well as provide greater feature access from the tool bar eliminating extra clicks.

Note: Dark mode is not supported in IE11 due to limitations in IE11.

To toggle between Light Mode and Dark Mode:

1. Click to "Toggle Theme" menu option to toggle between Light and Dark modes.




Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Reports
Settings
Help
admin
Dashboard Folders
Add
London
My Dashboard
My Dashboard
Health and Capacity Floormap
NOC View
Capacity Summary
Weather
Cooling
Capacity (shared by you)
Power (shared by you)
Racks (shared by you)
All Racks in PIQ (shared by you)
All Data Centers (shared by you)
BICSI Summary (shared by you)
Trends (shared by you)
adhoc
Monthly Reports
legrand
somerset
My Folder
Cata
summary
Raleigh
Overall PDU Health
36
2
68
3
0
20
40
60
68
English
Profile
Toggle Theme
Logoff
Cooling Chart - Raleigh, NC Inlet
Moisture ratio (g moisture)/(kg dry air)
Potential savings: 0%
Temperature (°F)
Conformance: 15%
PUE Gauge
0.00
Capacity Gauge
18.48
kW
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Additional Configuration Tasks

This section includes information on configuring additional features of PowerIQ, including data rollup retention, enterprise power, event management, and graceful shutdown.

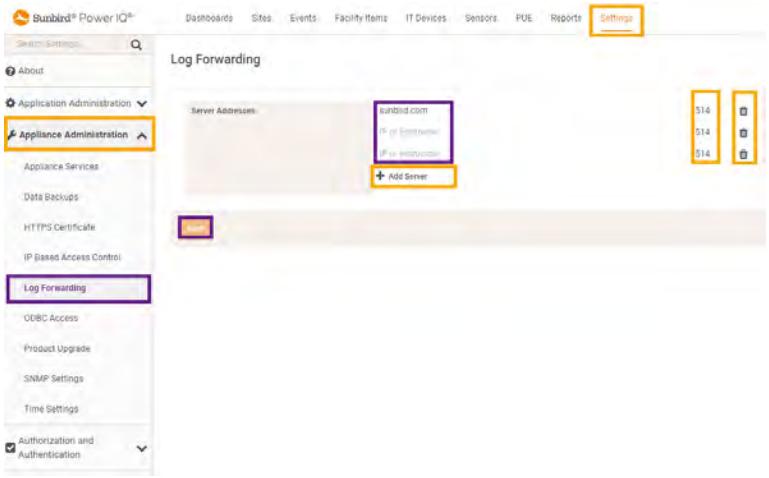
For more information on a specific configuration task, see the associated topic.

Configure Logging through Syslog

External Syslog servers can be used to record events occurring on Power IQ. Using a Syslog provides a separate external log of events.

All servers listed under Current Syslog Destinations record events on Power IQ. Recorded events include new users, configuration changes, and failed login attempts.

1. In the Settings tab, click Appliance Administration > Log Forwarding.
2. In the Log forwarding panel, click Add Server, then type the IP address or hostname.of a Syslog server in the table.
3. In the port field to the right of each server IP or domain name, enter a custom IP.
4. To delete a server, click the trashcan icon to the right of the server.



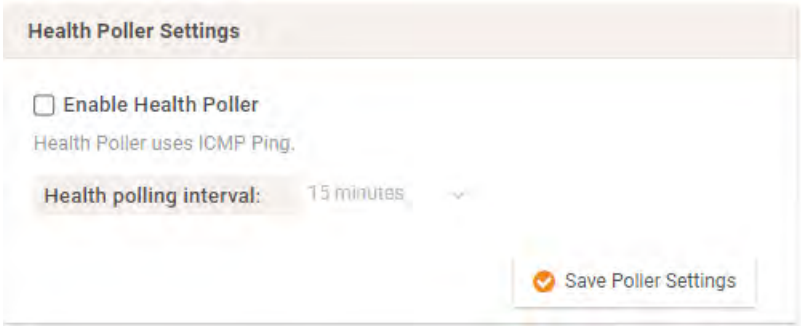
Configure Health Polling

Enabling the Health Poller allows Power IQ to get information on PDU health more quickly than using the Data Poller alone. The Health Poller pings PDUs to verify that they are network-reachable. The Data Poller records whether PDUs successfully respond to data collection attempts. Power IQ uses this combined information to update the PDU Health status, and to create events when the connectivity of a PDU changes. See *PDU Connectivity Status Changes* on page 717.

The Health Poller uses ICMP Ping. You can configure the ping intervals to poll PDUs from every 15 seconds, up to every hour. All PDUs will be pinged at the selected interval. If a PDU does not respond, the ping is retried twice by default, with a timeout as configured in the advanced settings. See *Advanced Health Polling Settings* on the next page.

Note: ICMP echo and reply packets exchanges must be allowed in the firewall before enabling Health Poller.

1. In the Settings tab, click Power IQ Settings in the Appliance Administration section.
2. In the Health Poller Settings panel, check the Enable Health Poller checkbox to start the pings.
3. Select the ping frequency in the Health polling interval field. The interval selected must be less than, or equal to the Data Poller interval.
4. Click the Save Poller Settings button.



Advanced Health Polling Settings

WARNING: Advanced Data and Health Polling Settings, including Advanced SNMP Settings, Advanced ICMP Settings, and Advanced Thread Pooling Settings, should only be used with Sunbird Technical Support guidance, or by expert users. Changes to these values can negatively affect Power IQ performance, or result in loss of data.

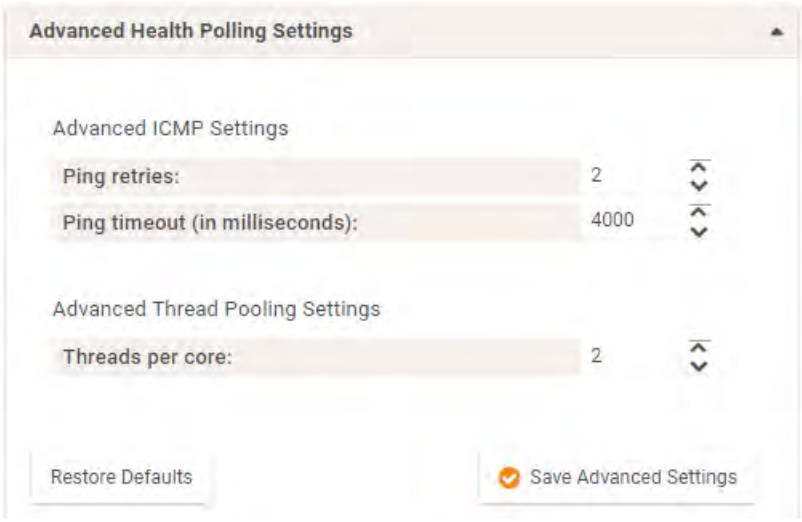
The default settings are shown.

Advanced ICMP Settings:

- Ping retries: Possible range 0-5. Default 2.
- Ping timeout (in milliseconds): Possible range 500-8000. Default is 4000.

Advanced Thread Pooling Settings:

- See **Advanced Thread Pooling Settings.**



Advanced Thread Pooling Settings

Warning! The configured thread pool settings determine how many Power IQ resources are allocated to polling PDUs. The default settings are designed to work for most use cases and should not need to be changed. If you are experiencing performance issues related to polling, Sunbird Technical Support can work with you to determine if changing the thread pool settings will be beneficial.

Warning! Do not change these settings without the guidance of Sunbird Technical Support.

- Threads per core: If dynamic sizing is disabled, this value will be used to calculate thread pool size. (default value: 10) This parameter affects poller operation when dynamic thread pool sizing is enabled or disabled.
- Maximum size of dynamic thread pool: Defines the maximum possible size of the dynamic poller thread pool. (default: 500 threads)
- Dynamic thread pool size: Dynamically calculated ideal thread pool size (default: 0)
- Maximum CPU utilization: Target CPU utilization for polling PDUs. (default: .80)
- Dynamic restart threshold: Defines how large the delta between the configured max pool size and the calculated ideal pool size must be before a Poller JVM restart is justified. (default: 5)
- Minimum time between restarts (in minutes): Defines minimum time between Poller restarts due to thread pool resizing (default: 1440, that is, only allow Poller to restart once every 24 hours to adjust thread pool size)
- Interval between thread pool evaluations (in minutes): Defines how frequently the Poller service will evaluate the thread pool size to determine if resizing is needed. (default: 60)
- Low water mark: Thread pool scheduler low water mark. Low water mark controls how aggressively threads are removed from the thread pool. This water mark represents the ratio of threads to items in the queue. The higher the value the more likely a thread will be removed from the pool. (default: .01)
- High water mark: Thread pool scheduler high water mark. High water mark controls how aggressively threads are added to the thread pool. This water mark represents the ratio of threads to items in the queue. The smaller the value the more likely a thread will be added to the pool. (default: .10)
- **Data Poller only**. Maximum number of active database connections: Upper limit on number of database connections that may be used by the poller thread pool. (default: 450) This parameter affects poller operation when dynamic thread pool sizing is enabled or disabled.

PDU Connectivity Status Changes

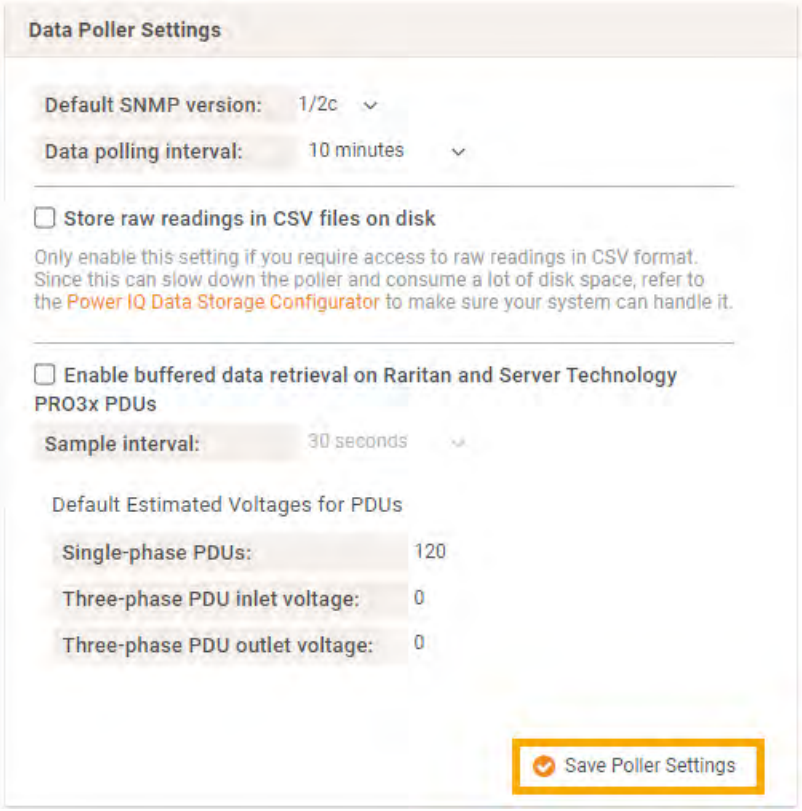
The PDU connectivity status will change based on the PDU response or lack of response to the Health and Data Pollers. Data Polling is enabled automatically, but you must enable the Health Poller manually.

See PDU Connectivity Health Statuses and PDU Connectivity Lost and Restored Events.

Configure Polling Intervals

At each polling interval Power IQ collects data from PDUs under its management.

1. In the Settings tab, click Power IQ Settings in the Appliance Administration section.
2. In the Data Poller Settings or Health Poller Settings panels, select a time period from the Polling interval drop-down list. The time period indicates how much time passes before Power IQ starts a new polling cycle
3. Click the Save Poller Settings button.



Note: When managing a large number of PDUs you may need to configure a longer time period for the polling interval. Setting a longer time period helps ensure that all PDUs are polled within a given cycle. A warning message appears if Power IQ is unable to poll all PDUs within the configured time period. See Recommended Polling Intervals on the next page for details on settings that help Power IQ poll faster.

Recommended Polling Intervals

The optimal polling interval depends on your business needs, the number of PDUs you have deployed, their types and the platform you are running Power IQ on. Outlet metered PDUs are a larger system load than unit-level metered PDUs. Some PDUs have a unique feature to store readings. Storing readings gives you the added flexibility to set a poll rate and a sample rate.

Start with a longer polling and sample interval to ensure system operation. Gradually shorten the polling and sample interval as business needs require.

Your actual results may vary based upon local conditions. PDUs that provide less data tend to have a lower system load. You can therefore likely poll those PDUs at the stated sample rate for a given configuration.

To allow faster polling, disable the storage of raw sensor readings in CSV files to the Power IQ disk. Disabling this setting allows Power IQ to poll more devices at a faster polling interval, but you won't have access to raw readings in CSV format. See Configuring Raw Sensor Readings Storage for details.

See Configuring Polling Intervals for details on changing these settings.

Polling Intervals with buffered data retrieval:

Number of PDUs	Sample Rate	Polling Interval	Memory
1,000 outlet metered PDUs	5 minutes	30 minutes	8 GB RAM
1,500 outlet metered PDUs	5 minutes	30 minutes	16 GB RAM
2,000 outlet metered PDUs	5 minutes	30 minutes	24 GB RAM
3,200 unit metered PDUs	10 minutes	30 minutes	8 GB RAM

Polling Intervals without buffered data retrieval:

Number of PDUs	Polling Interval	Memory
2,100 outlet metered PDUs	10 minutes	8 GB RAM

Configure Raw Sensor Readings Storage

Power IQ retains a maximum of eight full days of compressed CSV files depending on available disk space. Power IQ can poll at faster rates than older Power IQ releases. The more sensor readings that Power IQ collects, the more likely it becomes that the disk partition where these CSV files are stored will run out of space. This could prevent the Power IQ poller from functioning properly.

In Power IQ, if you require access to the raw sensor readings in CSV format, you must enable this feature. Depending on your Power IQ polling configuration, such as number of managed PDUs, polling interval, sample rate, Power IQ may not be able to store eight full days of readings. In some configurations, it may not be possible to write sensor readings to CSV because the number of raw sensor readings in a day will consume too much disk space.

If you do not require access to raw sensor readings in CSV format, the feature should remain disabled. Disabling this feature will improve the performance of the Power IQ poller and will free system resources for other tasks.

When the feature is disabled, you can still access two hours of raw sensor data stored in the database before values are rolled up, and the raw data deleted from the database. This raw sensor data can be retrieved using ODBC access and reporting tools. See Appendix A: ODBC Access.

See Data Storage Configuration Calculator for details on a tool you can use to determine if your system configuration is compatible with writing raw sensor readings to CSV.

See Enable or Disable Storing Raw Readings in CSV Files on Disk for instructions on changing the setting.

Enable or Disable Storing Raw Readings in CSV Files on Disk

Depending on your configuration, storage of raw sensor readings in CSV files may not be supported, and could lead to performance issues with the Power IQ poller.

Use the Power IQ data storage configuration calculator tool to determine if storage of raw sensor readings is supported with your configuration.

You can download the data storage configuration calculator from the support portal

Data Storage Configuration Calculator

The Data Storage Configuration Calculator is a tool that can help you determine if storing raw readings in CSV files is supported for your configuration.

You can download the data storage configuration calculator at http://support.sunbirddcim.com/support/solutions/articles/6000055029-tools-

Buffered Data Retrieval

Important: The PDU system clock must be set and configured correctly in order to ensure proper data reporting to Power IQ.

Raritan PX PDUs version 1.2.5 and higher have the ability to temporarily buffer power measurements. This allows Power IQ to receive more data with less frequent polling. Enabling buffered data retrieval instructs Power IQ to retrieve these buffered measurements instead of collecting a single point of data at the time of polling. This results in increased efficiency when gathering data from Raritan PX PDUs.

See Enabling Buffered Data Retrieval from Raritan PX 1.2.5 or Higher for instruction on enabling the feature.

You must set a Sample Interval when using buffered data retrieval. The polling interval controls how often Power IQ requests buffered data from Raritan PX PDUs, the sample interval controls how granular the buffered data is.

Example:

With a polling interval of 1 hour, and a sample interval of 1 minute, Raritan PX PDUs under Power IQ management collect measurements each minute and store the data in the Raritan PX's data buffer. Every hour, Power IQ then retrieves the data buffer with the last hour's measurements from each Raritan PX.

Shorter sample intervals cause Raritan PX PDUs to fill their buffers more quickly. As a result, Power IQ may limit the polling interval to prevent data loss due to filled buffers.

When buffered data retrieval is in use, Power IQ polls other PDUs that do not support this feature at the Sample Interval. This helps maintain a consistent granularity of measurements across all readings.

The Buffered Data Retrieval feature may consume the space available for data storage rapidly since it allows Power IQ to retrieve a great deal of data at once.

Note: To configure Raritan PX sampling rates, Power IQ must have SNMP write access to those PDUs. First make sure the Raritan PX SNMP agents are enabled. Then ensure that they have been added to Power IQ management using an SNMP community string that has write access.

Set Polling Intervals and Sample Rates at Even Multiples

Set your sample rate at even multiple of your polling interval, when data buffering is enabled. This enables Power IQ to collect an even number of data points.

Enable Buffered Data Retrieval from Raritan PX 1.2.5 or Higher

Note: All Power IQs using buffered data retrieval that are polling the same PDU must use the same Sample Interval setting to prevent each instance of Power IQ from attempting to change the sample interval to its own setting.

See Buffered Data Retrieval for more details.

To retrieve buffered data from Raritan PX 1.2.5 or higher:

Make sure that Raritan PX PDUs have been added to Power IQ with a Write Community String, or buffered data retrieval will not work. See Editing PDUs under Power IQ Management for details on editing PDU credentials.

1. In the Settings tab, click Power IQ Settings in the Appliance Administration Section.
2. In the Data Polling Settings panel, select the Enable buffered data retrieval on Raritan and Server Technology PRO3x PDUs checkbox.
3. Select a sample period from the Sample Interval drop-down list. This configures the sample interval that Raritan PX PDUs use to buffer power measurements.

Example

If 1 minute is selected, every minute a Raritan PX PDU takes a power measurement and stores it in its internal buffer for retrieval.

Note: The polling interval and sample interval should not be set to the same time period. Set the polling interval to a longer time period than the sample interval. For example: 30 minute polling interval with a 10 minute sample interval. See Configuring Polling Intervals.

4. Click the Save Poller Settings button.

External Sensor Data from Raritan PX

Raritan PX model PDUs version 1.6 and higher support buffered data for external sensors.

For Raritan PX model PDU versions earlier than 1.6, external sensor data is not recorded at the sample interval when Buffered Data Retrieval is enabled. The external sensor data is recorded at the polling interval.

Use NTP Servers with Buffered Data Retrieval

If you enable Buffered Data Retrieval, Raritan strongly suggests enabling NTP and configuring Power IQ and your Raritan PX PDUs to use the same NTP servers. This ensures that all recorded data is in sync, whether generated by Power IQ or Raritan PX.

Difference in time between Power IQ and PDUs can cause incorrect values on the capacity gauges on the dashboard.

Advanced Data Polling Settings

WARNING: Advanced Data and Health Polling Settings, including Advanced SNMP Settings, Advanced ICMP Settings, and Advanced Thread Pooling Settings, should only be used with Sunbird Technical Support guidance, or by expert users. Changes to these values can negatively affect Power IQ performance, or result in loss of data.

If you have PDUs in the "Connectivity: Data Collection Failed" state, changing the default SNMP settings may help. Do not proceed without Sunbird Technical Support guidance. See Troubleshooting Connectivity: Data Collection Failed Status in PDUs for details on possible causes. See Advanced SNMP Settings for details on the settings.

Advanced SNMP Settings

Changing the SNMP settings may help if you have too many PDUs in "Connectivity: Data Collection Failed" state.

See Troubleshooting "Connectivity: Data Collection Failed" Status in PDUs for details on possible causes and other solutions.

Warning: You should only change these settings if you are an expert SNMP user, or with Technical Support's help. Changes to these values can negatively affect Power IQ performance, or result in loss of data.

Recommended changes:

- Increase how many times Power IQ will attempt an individual SNMP request and how long Power IQ will wait for an individual SNMP request. A poll of a PDU can potentially involve hundreds of individual SNMP requests. It is recommended to gradually increase the "Read timeout" and Retries settings and allow several poll intervals to pass to gauge the impact of the change before making additional changes.
- If you see a large number of unexplained outages for Raritan PX1 or PX2 PDUs, it may also be necessary to decrease the "Maximum rows per request (PX)" setting. In a small number of cases the default value of 10 may result in SNMP response packets that are too large for customer networks to handle correctly due to packet fragmentation. This is related to PDUs being managed remotely over a WAN. Decreasing this value results in some loss of efficiency because Power IQ has to send more SNMP requests to the target PDU, given that a smaller set of data is sent back in each SNMP response.

By default, Power IQ uses the following default SNMP settings:

- Read timeout: 5000 milliseconds
- Write timeout: 5000 milliseconds
- SNMPv3 timeout: 20000 milliseconds
- Retries: 2
- Total number of attempts= retries + 1. The default number of attempts is 3.
- Maximum rows per request (default): 1. his value is used for non-Raritan PDUs
- Maximum columns per request (default): 5=. This value is used for non-Raritan PDUs
- Maximum rows per request (PX): 10. This value is used for Raritan PDUs
- Maximum columns per request (PX): 15. This value is used for Raritan PDUs

Advanced Thread Pooling Settings

Warning! The configured thread pool settings determine how many Power IQ resources are allocated to polling PDUs. The default settings are designed to work for most use cases and should not need to be changed. If you are experiencing performance issues related to polling, Sunbird Technical Support can work with you to determine if changing the thread pool settings will be beneficial.

Warning! Do not change these settings without the guidance of Sunbird Technical Support.

- Threads per core: If dynamic sizing is disabled, this value will be used to calculate thread pool size. (default value: 10) This parameter affects poller operation when dynamic thread pool sizing is enabled or disabled.
- Maximum size of dynamic thread pool: Defines the maximum possible size of the dynamic poller thread pool. (default: 225 threads)
- Dynamic thread pool size: Dynamically calculated ideal thread pool size (default: 0)
- Maximum CPU utilization: Target CPU utilization for polling PDUs. (default: .80)
- Dynamic restart threshold: Defines how large the delta between the configured max pool size and the calculated ideal pool size must be before a Poller JVM restart is justified. (default: 5)
- Minimum time between restarts (in minutes): Defines minimum time between Poller restarts due to thread pool resizing (default: 1440, that is, only allow Poller to restart once every 24 hours to adjust thread pool size)
- Interval between thread pool evaluations (in minutes): Defines how frequently the Poller service will evaluate the thread pool size to determine if resizing is needed. (default: 60)
- Low water mark: Thread pool scheduler low water mark. Low water mark controls how aggressively threads are removed from the thread pool. This water mark represents the ratio of threads to items in the queue. The higher the value the more likely a thread will be removed from the pool. (default: .01)
- High water mark: Thread pool scheduler high water mark. High water mark controls how aggressively threads are added to the thread pool. This water mark represents the ratio of threads to items in the queue. The smaller the value the more likely a thread will be added to the pool. (default: .10)
- **Data Poller only**. Maximum number of active database connections: Upper limit on number of database connections that may be used by the poller thread pool. (default: 350) This parameter affects poller operation when dynamic thread pool sizing is enabled or disabled.

Troubleshooting "Connectivity: Data Collection Failed" Status in PDUs

A PDU in "Connectivity: Data Collection Failed" state usually has one of these problems.

1. The user has configured Power IQ with the wrong community string for the PDU.
2. There is a network connectivity issue between Power IQ and the PDU.
3. The PDU is powered off or not connected to the network.

If you have checked and corrected these problems, and the status does not change, there may be an SNMP setting that is causing the problem. These problems are much less common. These problems may be solved by changing the

SNMP settings, but you should only change these settings if you are an expert SNMP user, or with Technical Support's help. See Advanced SNMP Settings.

1. The configured SNMP timeout and retry value are insufficient for your use case.

   Example

   You need to manage remote PDUs over a WAN. Network latency or bandwidth do not work well with the default SNMP settings, resulting in a large number of SNMP timeouts that show up as "Connectivity: Data Collection Failed" state PDUs.

2. The SNMP agent on the PDU is not responding to requests. The PDU's processor may be busy handling other tasks and is temporarily unable to respond to SNMP requests.

Set the Default SNMP Version for PDUs

1. In the Settings tab click Power IQ Settings in the Appliance Administration section.
2. In the Polling Settings panel, select 1/2c or 3 as the default SNMP version for new PDUs added to Power IQ.
3. Click the Save Poller Settings button.
4. You can change the default value when you add the PDU.

SNMPv3 May Require Longer Polling Interval

Enabling SNMPv3 represents about twice the load on Power IQ as SNMPv1/2.

You may need to increase the polling interval to enable Power IQ to poll all pdus when SNMPv3 is enabled.

See Setting the Default SNMP Version for PDUs.

See Configuring Polling Intervals.

SNMPv3 User Security Model (USM)

According to the SNMPv3 specification, PIQ must maintain an SNMPv3 User Security Model (USM) which maintains a list of all known SNMPv3 user configuration information including user names, authentication and privacy protocol and associated passkeys. With most SNMPv3 communication, using the same user name associated with different auth and privacy settings is not an issue as the USM takes into account the SNMPv3 engine ID of the SNMP agent running on the target facility item. However, in the case of SNMPv3 Informs (ie., acknowledged traps) the authoritative SNMP agent is the PIQ server and thus PIQ's engine ID is used for PIQ's trap service USM. Therefore to properly handle SNMP Informs each set of SNMPv3 credentials associated with a particular user name must be identical. Otherwise Inform notifications may be dropped because they will fail to be authenticated when received by PIQ and PIQ will waste unnecessary cycles processing user entry updates within the Trap service's USM.

We will consider two scenarios.

First, consider a scenario in which the customer has an environment in which all facility items managed by PIQ utilize the same SNMPv3 configuration. That is all facility items utilize the same authentication level and authentication and privacy protocols and passkeys. In this scenario all the facility items may be configured using the same SNMPv3 user name.

Alternatively, consider a scenario where a customer has both ServerTech Sentry4 and Raritan PX2 PDUs. Let's assume that the ServerTech PDUs are configured with the following SNMPv3 settings:

user name: user1

security level: authpriv

authentication protocol: SHA

authentication passkey: authpass

privacy protocol: DES

authentication passkey: privpass

The PX2 PDUs are configured similarly but utilize the privacy protocol of AES rather than DES. So, the PX2 PDUs should be configured with a different user name as follows:

user name: user2

security level: authpriv

authentication protocol: SHA

authentication passkey: authpass

privacy protocol: AES

authentication passkey: privpass

As long as facility items with distinct SNMPv3 settings are configured with unique user names, then SNMPv3 Informs will be authenticated correctly by PIQ and PIQ will not spend any unnecessary cycles processing conflicting USM user entries.

Set Default Estimated Voltages

Power IQ can estimate active power for PDUs that do not directly provide Active Power measurements.

If a PDU does not provide one of the following values, the default estimated voltage will be applied.

- Inlet Voltage
- Outlet Voltage
- Active Power

This default value can be changed per PDU, in the Edit PDU page. These voltage values are only editable when they are NOT coming from the PDU. See Configuring Estimated Voltages.

1. In the Settings tab, click Power IQ Settings.
2. In the Polling Settings box, enter a default estimated voltage for single phase PDUs and a default estimated inlet and outlet voltage for three phase PDUs. Optional.
3. Click Save Poller Settings.

Note on Geist and Rittal PDUs

Geist and Rittal PDUs are marked as single or three phase at the second polling interval after discovery.

If a PDU is not marked after two polls, mark the phase manually.

Configure Polling Path Redundancy (Backup IP Address Support) for PDUs

Power IQ supporst Polling Path Redundancy, configuration of a backup (secondary or redundant) IP address that can be used for polling and data collection in case the primary IP address that the user adds a PDU with is unavailable to Power IQ. Whenever a PDU is not reachable through its primary IP address, Power IQ will try to reach the PDU using its backup IP address.

Backup IP addresses can be added to PDUs through the following methods:

- Redundant IP addresses can be added to existing PDUs by editing the PDU Sites Tab tab. For more information, see *Add, Edit, or Delete a Backup IP Address for an Existing PDU* on page 734.
- Redundant IP addresses can also be added to new PDUs at the time they are created. For more information, see *Add a New PDU and Specifying a Backup IP Address* below.
- Redundant IP addresses can be added through CSV import. For more information, see *Bulk Adding, Editing, or Deleting Backup IP Addresses Using CSV Import* on page 736.

Both IPv4 and IPv6 IP addresses are supported. Users can manually add no more than one backup IP address to each PDU.

View a Backup IP Address

A PDU's backup (secondary or redundant) IP address is listed on the PDU's Sites entity tab.

1. In the Facility Items tab, click the PDU whose backup IP address you want to view. Doing so will take you to the PDU's tab in the Sites tab.
2. On the PDU tab in the Sites tab, click the Details sub tab.
3. The backup IP address is displayed in the Facility Item's Details panel if available.

Note: The backup IP address will be displayed only if it is manually entered by the user ***and*** *the Show Facility Item Name option is selected for Facility Item Labels under Display Settings (click the Settings tab > Application Settings > Display Settings > Show Facility Item IP Address). Otherwise, the Backup IP Address field in the Details section of the PDU's Sites entity tab will remain blank.*

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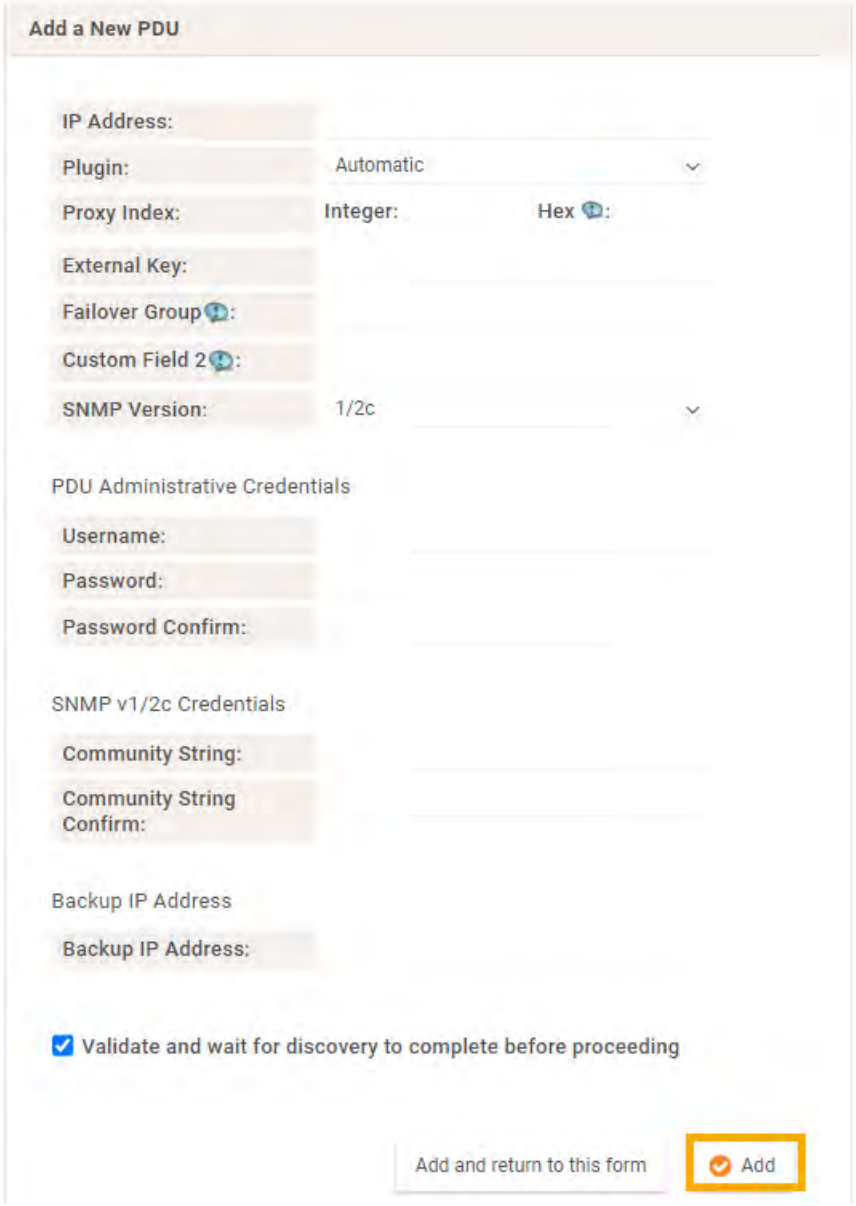
Add a New PDU and Specifying a Backup IP Address

A backup (secondary or redundant) IP address can be added when you add a new PDU to Power IQ.

1. In the Facility Items tab, click the Add button above the Facility Items List. The Add a New PDU Page displays.
2. Enter the relevant details in each field.
3. In the Backup IP section, enter the backup IP address. Note: Both IPv4 and IPv6 addresses are supported.



4. Click the Add button to add the PDU. A dialog indicating that the PDU is being added will appear.

Note: You can specify only one backup IP address manually.

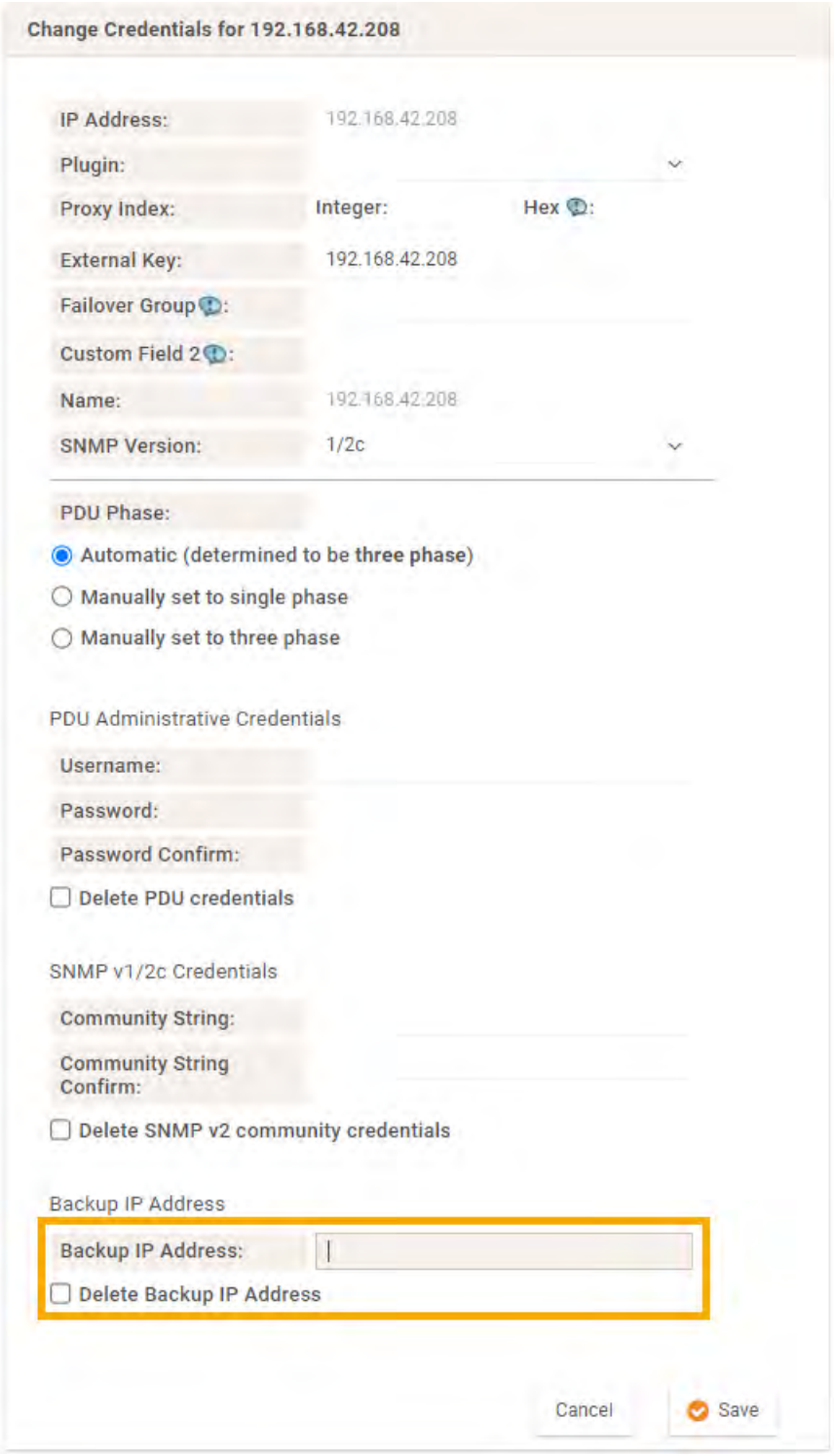
Add, Edit, or Delete a Backup IP Address for an Existing PDU

The backup (secondary or redundant) IP address can be added, edited, or deleted for an existing PDU manually by the user through Power IQ.

1. In the Facility Items tab, click on the PDU whose back IP you want to add or edit. The PDU's Sites entity tab will appear.
2. On the Sites entity tab, click Edit. The Change Credentials for PDU (Edit) page will appear.
3. In the Backup IP section, make the appropriate change.

    a. Add a new backup IP address by typing it in the Backup IP Address field.
    b. Edit the existing backup IP address by making your changes in the Backup IP Address field.

c. Delete the backup IP address by checking the Delete Backup IP Address box.



d. Click the Save button to save your changes and return to the Sites entity tab.

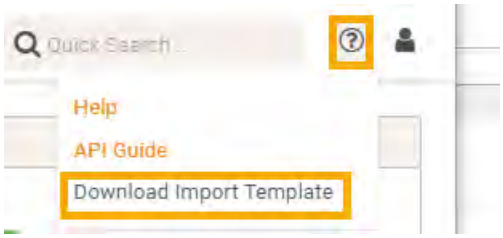
Note: You can specify only one backup IP address manually.

Note: You also can add backup IP addresses in bulk via CSV import. For more information, see Bulk Adding, Editing, or Deleting Backup IP Addresses Using CSV Import below.

Bulk Adding, Editing, or Deleting Backup IP Addresses Using CSV Import

Backup (secondary or redundant) IP addresses can be added in bulk via CSV Import.

1. From the Help menu, download the Import file template.



2. Open the file.
3. In the Step 1: Add PDUs worksheet in the CSV file, add backup IP addresses to the desired PDUs. The backup IP addresses are entered in the Backup IP Address column.
4. Back on the Import PDUs page, use the Browse dialog to select your CSV file.
5. Click Import PDUs.

You also can configure backup IP addresses for individual PDUs on the PDU's Sites entity tab. For more information, see *Add, Edit, or Delete a Backup IP Address for an Existing PDU* on page 734.

Note: In the Step 1: Add PDUs worksheet, the Backup IP Address column is located between the Proxy Index and PX User Name column.

Note on Bulk Editing and Deleting: If you import through CSV a PDU that already exists and has a backup IP address specified in Power IQ, the existing backup IP address will be overwritten with the backup IP address specified in the CSV. If a backup IP address is not specified in the CSV file for a PDU that already exists and has a backup IP address specified in Power IQ, then the backup IP address will be deleted for that PDU.

Trap Support for Backup IP Addresses

If Power IQ receives a trap from a backup (secondary or redundant) IP address, Power IQ associates the trap with the IP address of the primary PDU so the trap will display as if it is coming from the primary PDU.

When Power IQ loses connectivity with the primary and begins polling the backup IP address, Power IQ will create a timestamped, Warning-severity event called “Failover IP address in use” with the summary description, “Data collection is being performed using a failover IP address.” The target will be the primary IP address and/or the PDU name.

Note: To clear the Failover event, Power IQ must lose connectivity with the backup IP address and connectivity to the primary IP address must be restored.

Polling Path Redundancy for Chatsworth PDUs (Secure Array Support)

This section highlights support considerations for Power IQ's Polling Path Redundancy specific to Chatsworth Products, Inc. (CPI) PDUs and Secure Array IP Consolidation, which enables users to link up to 32 PDUs under a single IP address using standard Ethernet cables.

When you add a supported Chatsworth PDU, Power IQ will find the backup (secondary or redundant) IP address configured for the unit automatically.

For Chatsworth PDUs, you can have up to two backup IP addresses: one automatically discovered and one manually entered. The manually entered backup IP address will be displayed on the PDU's Sites Tab tab.

If there are multiple backup IP addresses associated with a PDU, there is no specific polling order. If the primary is unavailable, the backup will be the IP address that is found first. When the primary becomes available, Power IQ will switch to the primary.

Due to hardware limitations for the PDUs, there could be a delay of 2-7 minutes before the primary and backup PDUs recognize that they have lost connectivity with each other, so multiple polls may occur before Power IQ switches to the backup IP address. In the interim after the primary becomes unavailable and before Power IQ switches to the backup IP address, the PDU will display a unit health state.

If both the primary and alternate units are unavailable to Power IQ, after approximately one hour (depending on your poller configuration settings), a Data Connectivity: Lost communication event will be created.

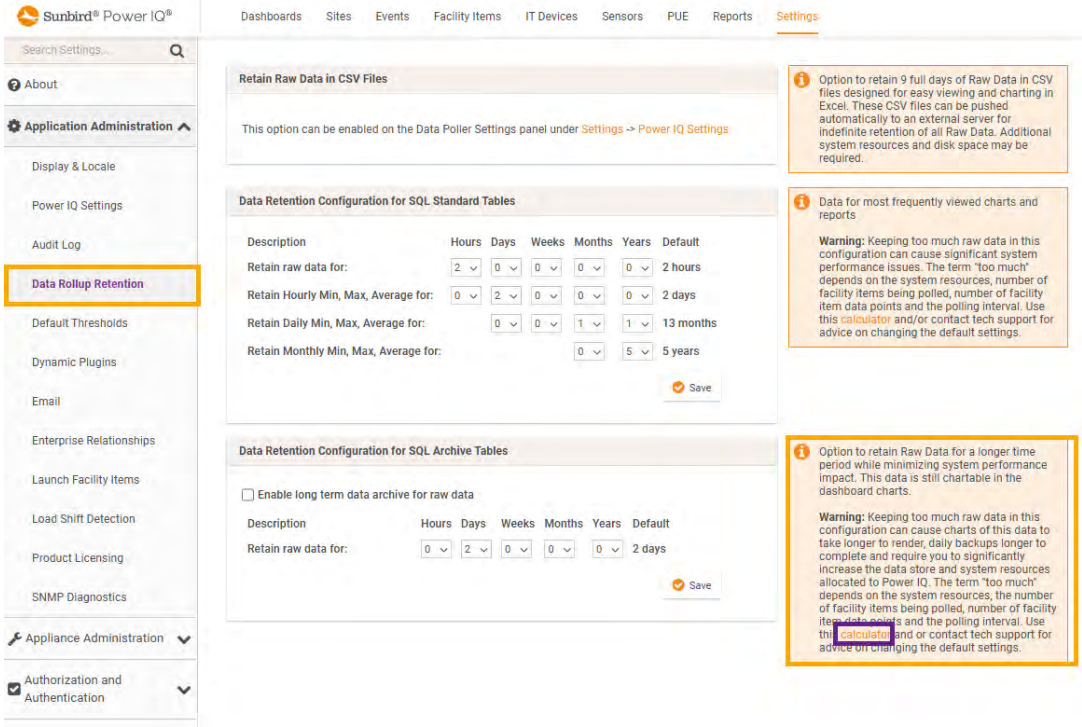
For more information on Polling Path Redundancy, see *Configure Polling Path Redundancy (Backup IP Address Support) for PDUs* on page 732.

For more information on Chatsworth PDU support in Power IQ, see *Native Support for Chatsworth eConnect PDUs* on page 436.

Data Storage Configuration Calculator

The Data Storage Configuration Calculator is a tool that can help you determine if storing raw readings in CSV files is supported for your configuration.

You can download the data storage calculator directly here or in Power IQ from the Data Rollup Retention tab under the Settings tab > Application Administration > Data Rollup Retention.



Support for IPv6

- You can assign Power IQ an IPv6 address.
- Power IQ supports IPv6 communication for the following functions.
- Add PDUs with IPv6 addresses
- Add PDUs with IPv6 addresses using CSV import
- Add IT devices with IPv6 addresses
- Enable access controls using IPv6 address
- Use SNMP diagnostics over IPv6 network.
- Allow IPv6 hosts to connect to the ODBC database
- Configuring NTP servers with IPv6 addresses
- Do network diagnostics using ping, traceroute over IPv6 network. Serial console only.
- Enable static routes using IPv6 addresses. Serial console only.

Valid IPv6 Address Formats

Power IQ accepts IPv6 addresses written in any of the valid formats.

IPv6 addresses need to be enclosed in square brackets when used in the browser.

These examples show several valid versions of the same IPv6 address, and one invalid example.

Valid IPv6 address formats:

- FE00:0000:0000:0001:0000:0000:0000:0056
- FE00::1:0:0:0:56
- FE00:0:0:1::56
- In a browser: https://[FE07:2fa:6cff:2113::101]/loginInvalid IPv6 address formats:

Note: The :: abbreviation, meaning one or more quartets of all 0s, cannot be used twice.

- The abbreviation FE00::1::56 is not valid.

PDU Autodiscovery

Autodiscover PDUs on your network to quickly add them to Power IQ.

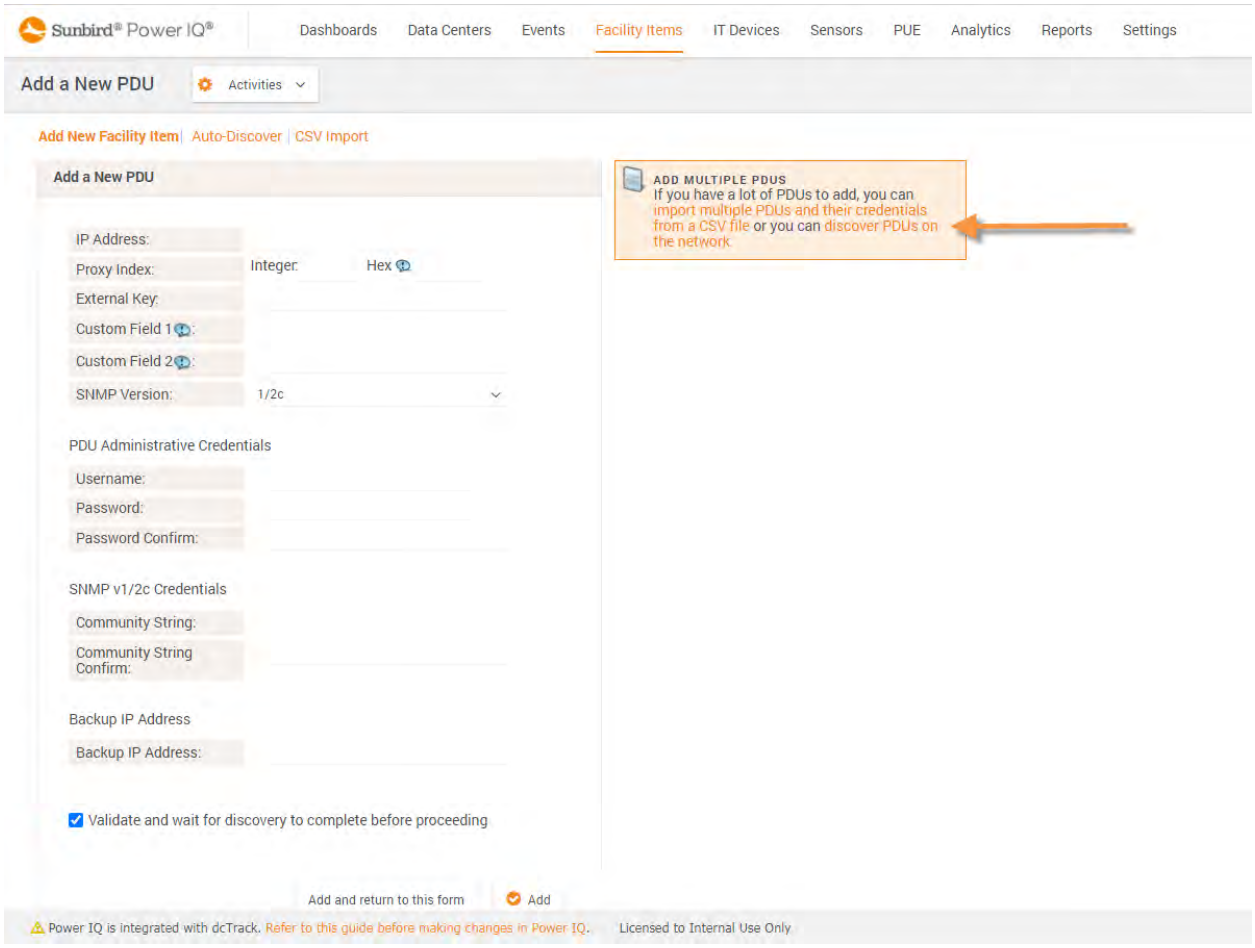
To use this feature:

- PDUs must be set on the network with an IP address.
- PDUs must be configured with SNMP v1, v2 or v3
- PDUs can be on multiple subnets.
- The SNMP configuration may differ among the PDUs (for example community strings).

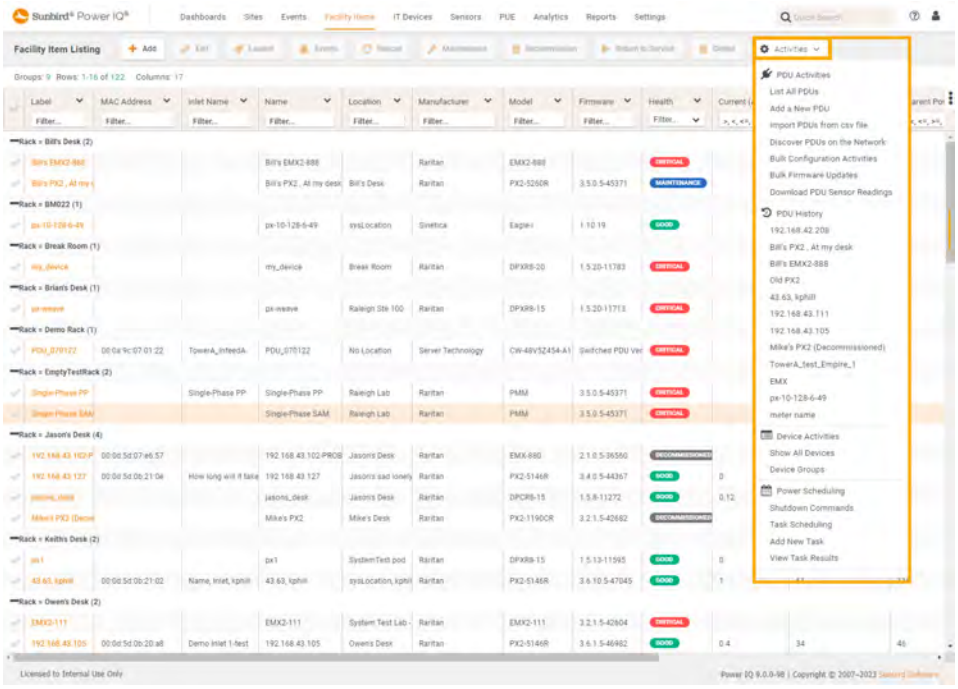
Note: The auto-discovery feature for Server Technology PDUs only works for Sentry3 CDUs and Sentry4 PRO1/PRO2 devices. This feature auto-adds the daisy-chained PDUs when the primary one is added. It does not work for the newer PRO3X and PRO4X units, due to changes in the firmware of the PDUs.

Note: If you do not have enough licenses, you receive an error message indicating you've exceeded the license. You cannot add PDUs without purchasing additional licenses.

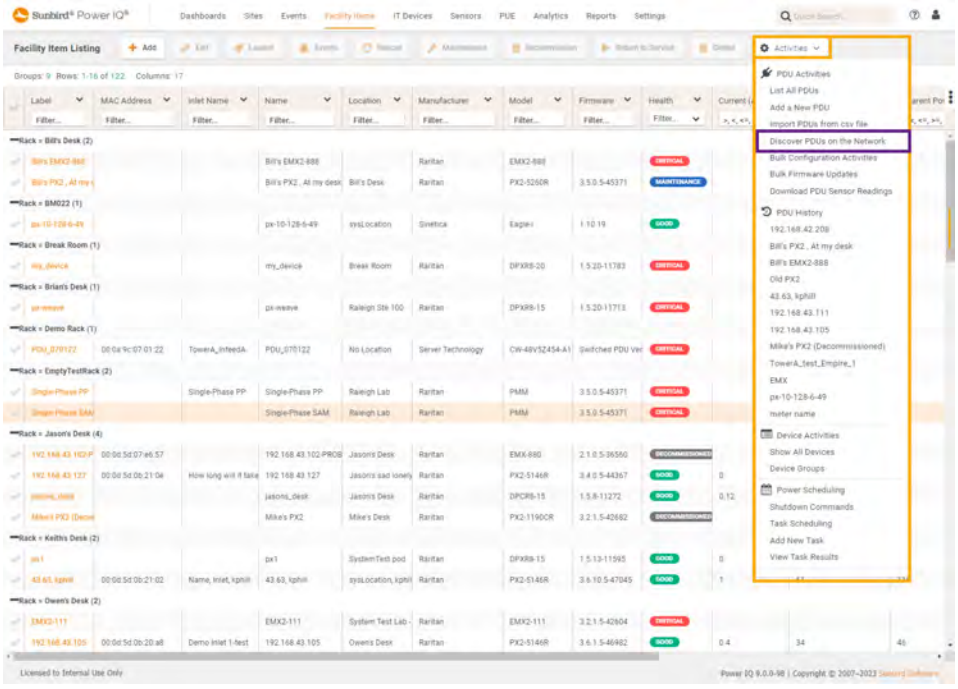
1. On the Add PDUs page, click Discover PDUs on the network to open the PDU Autodiscovery page.



1. Click the Activities button The Activities menu displays



2. Select **Discover PDUs on the Network**.



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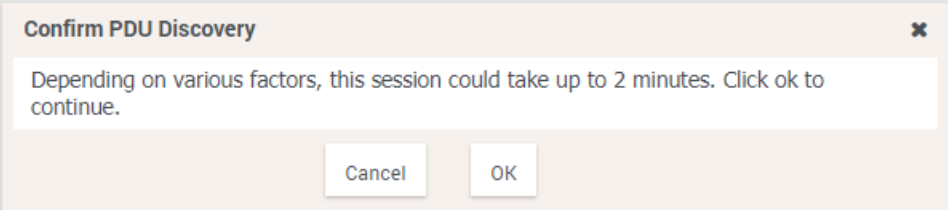
2. The Discover PDUs on the Network page displays. Enter the required information.

3. Enter the Starting IP Address.
4. Enter the Quantity. This is the number of PDUs in the specific string that you want to discover.
5. Select the SNMP version.
6. Enter PDU access credentials.
7. Enter the community string of the PDUs, if applicable.
8. Click **Start Discovery**.
9. When prompted, confirm you want to begin.

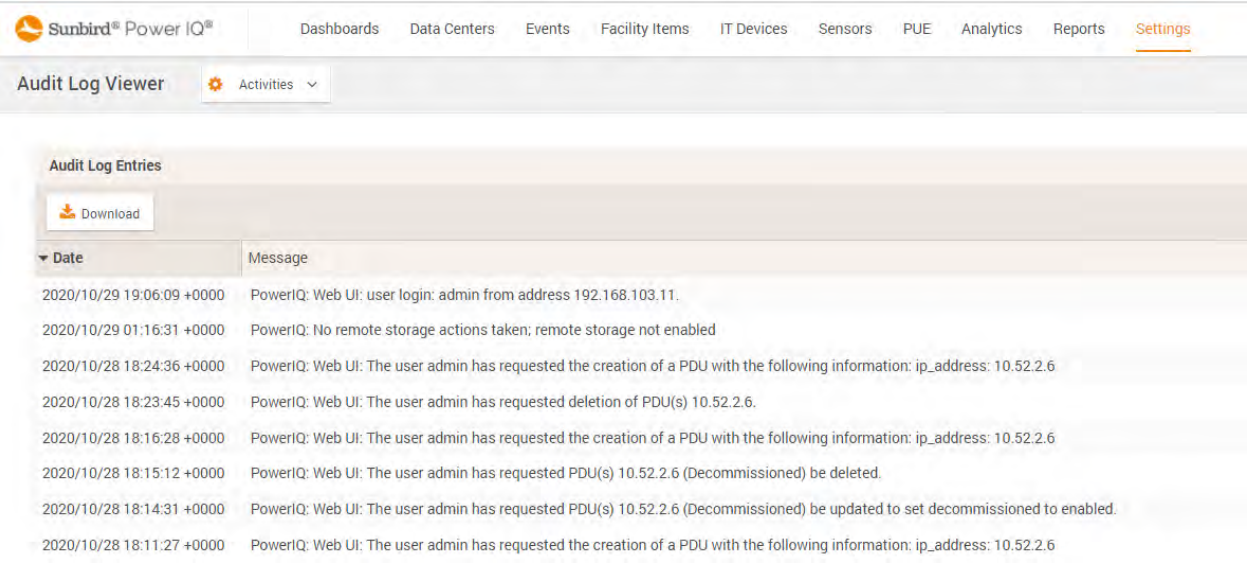


Note: To stop autodiscovery once it has begun, you must restart the poller.

Note: If the autodiscovery process is interrupted, the event is recorded in the audit log.

Autodiscovery runs in the background and you can work in other screens while it runs.

PDUs located by autodiscovery are listed on the PDUs page.



Add PDUs to Power IQ

Once Power IQ is configured, add PDUs. Power IQ can then gather data from these PDUs. If you're adding a PDU that uses a custom dynamic plugin, see *Adding PDUs with Custom Dynamic Plugins* in the online help or user guide.

You can also add PDUs to Power IQ by uploading a CSV file containing the information. See *Adding PDUs in Bulk with CSV Files*.

1. In the Facility Items tab, click Add. The Add a New PDU panel displays.
2. In the Add a New PDU panel, enter the IP address of the PDU.
3. Optional: If the PDU is in a daisy-chained configuration or console server configuration, enter the PDU's position number in the chain or serial port number in the Proxy Index fields.
   For PDUs that use the MAC address as a proxy index, enter the last six digits of the address separated by a colon (for example: 01:89:ab).

   You can also specify branch circuit monitors using the Proxy Index field.

   Leave this value blank if the PDU does not support or is not using this configuration.

Note: As a best practice when renaming outlets and other objects in the EDM in Power IQ, Sunbird recommends exporting the current data to a CSV file that you can edit and then import. This will ensure that the Proxy Index value corresponds to the correct integer representation for the MAC.

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4. Enter an asset tag number or other asset management code in the External Key field. Optional.
5. Enter data in Custom Field 1 and Custom Field 2. Optional. The labels may have been changed in Power IQ to identify these fields.
6. If the PDU is a Raritan PX-series or Server Technology PDU, enter a valid Username and Password for the PDU in the PDU Administrative Credentials section. Re-enter the password in the Password Confirm field. Optional.
7. Select the SNMP Version.

- For SNMP version 1/2c PDUs, enter an SNMP Community String that has at least READ permissions to this PDU. This enables polling the PDU for data. Enter an SNMP community string that has both READ and WRITE permissions to the PDU to enable power control, outlet naming, sensor naming, and buffered data retrieval.
- For SNMP version 3 PDUs, enter the Username and select an Authorization Level. The authorization levels are:
  - noAuthNoPriv - No Authentication Passkey, No Encoding Passkey
  - authNoPriv - Authentication Passkey, No Encoding Passkey
  - authPriv - Authentication Passkey, Encoding Passkey

a. Depending on the Authorization Level selected, you must enter additional credentials for Authorization and Privacy.
b. Authorization Protocol: Select MD5 or SHA.
c. Enter the PDU's Authorization Passkey, then re-enter the passkey in the Authorization Passkey Confirm field.
d. Privacy Protocol: Select DES or AES.
e. Enter the PDU's Privacy Passkey, then re-enter the passkey in the Privacy Passkey Confirm field.

Note: You must enable the SNMP agent on all PDUs added to Power IQ.

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8. Select "Validate and wait for discovery to complete before proceeding" to check credentials and view the discovery process status as you add this PDU. Optional.

Note: When Power IQ discovers a primary Server Technology PDU, its daisy-chained PDUs will also be discovered and added to the Facility Items list. If the daisy-chained PDUs are already in Power IQ, those PDUs will not be rediscovered and will retain their PDU IDs.

9. Click Add.

Note: PDU discovery is complete once the PDU model type is determined. SNMP fields such as contact or location values are not determined until this device is polled for the first time.

Once added, the PDU appears in the Facility Items List. Power IQ begins polling the PDU for sensor data. You can configure how often Power IQ polls PDU.

Note: If you change the administrator password used by Power IQ for a Server Technology PDU through the PDU UI, you must restart the PDU to ensure that the Server Technology SNAP API will correctly authenticate requests from Power IQ. However, if you change the administrator password through the Power IQ UI, Power IQ will restart the PDU without any additional action by the user.

Note: Adding Raritan PX3 Linked or ServerTech PRO3x Linked PDUs to Power IQ requires that the user and password be the same on the master and linked units as shown below in the snip from a PDU.csv import file:

Raritan PX3 linked
192.168.45.230,1,,admin,drag0n,private,false
192.168.45.230,2,,admin,drag0n,private,false
192.168.45.230,3,,admin,drag0n,private,false
ServerTech PRO3x linked
192.168.46.207,1,,admn,admn,private,false
192.168.46.207,2,,admn,admn,private,false

Discovery Progress Status

Viewing the discovery process displays a status result for each PDU. See **PDU Connectivity Health Statuses**.

Validate PDU Credentials

When adding PDUs to Power IQ individually, you can specify whether the admin credentials are validated.

Check the "Validate and wait for discovery to complete before proceeding" checkbox on the Add a New PDU page. See **Adding PDUs to Power IQ** for details on adding PDUs.

When you specify validation, the PDU will not be added if the credentials are incorrect. If you opt not to validate, all PDUs will be added, and those added with incorrect credentials will trigger an event called PDUCredentialsInvalid.

When adding PDUs to Power IQ with a CSV file, the admin credentials are not validated before the PDU is added. When credentials are found to be incorrect, an event is logged.

Power IQ can poll PDUs without the correct credentials. You cannot upgrade PDUs or use bulk configuration without the correct credentials.

Edit PDUs Under Power IQ Management

Editing a PDU allows you to reconfigure the SNMP community string for a PDU, or change the username and password used to access that PDU.

If you need to maintain the PDU or physically remove it without deleting its data from Power IQ, you have to edit the PDU to change its connectivity state. See *Manage Removed or Out of Service Item* on page 699.

1. In the Facility Items tab, click a PDU to open the PDU's Sites Entity tab.
2. Click Details.
3. Click Edit.
4. Make your changes to field by clicking in the field.
5. Enter an asset tag number or other asset management code in the External Key field. Optional.
6. To set the PDU to the maintenance mode, select the Maintenance Mode checkbobutton. To decommission the PDU, select the Decommissioned button. If both checkboxes are selected, the PDU is considered decommissioned.
7. Enter data in Custom Field 1 and Custom Field 2. Optional. The labels may have been changed in Power IQ to identify these fields.
8. Select the SNMP Version. Then, use the fields that display to enter the credentials. To delete previous credentials for either SNMP version, select the "Delete SNMP v2 community credentials" checkbox.

- For SNMP version 1/2c PDUs, enter an SNMP Community String that has at least READ permissions to this PDU. Use an SNMP community string that has both READ and WRITE permissions to the PDU to enable power control, outlet renaming, and buffered data retrieval. Re-enter the string in the Community String Confirm field.
- For SNMP version 3 PDUs, enter the Username and select an Authorization Level. The authorization levels are:
    - noAuthNoPriv: No Authentication Passkey, No Encoding Passkey
    - authNoPriv: Authentication Passkey, No Encoding Passkey
    - authPriv: Authentication Passkey, Encoding Passkey

    a. Depending on the Authorization Level selected, you must enter additional credentials for Authorization and Privacy.
    b. Authorization Protocol: Select MD5 or SHA.
    c. Enter the PDU's Authorization Passkey, then re-enter the passkey in the Authorization Passkey Confirm field.
    d. Privacy Protocol: Select DES or AES.
    e. Enter the PDU's Privacy Passkey, then re-enter the passkey in the Privacy Passkey Confirm field.

7. PDU Phase:
    - When Power IQ can detect the phase, the Automatic option is selected, and the phase displays. For example, "Automatic (determined to be single phase)."
    - When a PDU does not report phase, the Ignored option is selected. You can keep this setting to ignore phase, or set the phase manually.
    - To set the phase manually, either if it cannot be determined automatically, or is incorrect, select the "Manually set to single phase" or "Manually set to three phase" option.
8. If the PDU is a Raritan PX/PX2/PX3/EMX or a Server Technology PDU, enter a valid Username and Password for the PDU in the PDU Administrative Credentials section. Re-enter the password in the Password Confirm field. Leave the fields blank to keep using the password already configured. If you want to use a blank password, select the "Delete PX credentials" checkbox. Optional.

9. Enter the backup IP address. Optional. Leave the field blank if not using a backup IP address. To delete an existing backup IP address, check the "Delete Backup IP Address" checkbox.
10. Click the Save button.

Note: If you change the administrator password used by Power IQ for a Server Technology PDU through the PDU UI, you must restart the PDU to ensure that the Server Technology SNAP API will correctly authenticate requests from Power IQ. However, if you change the administrator password through the Power IQ UI, Power IQ will restart the PDU without any additional action by the user.

Configure Estimated Voltages

Power IQ can estimate Active Power for PDUs that do not directly provide Active Power measurements.

If a PDU does not provide one of the following values, the default estimated voltage will be applied. See *Set Default Estimated Voltages* on page 731.

- Inlet Voltage
- Outlet Voltage
- Active Power

These voltage values are only editable when they are NOT coming from the PDU.

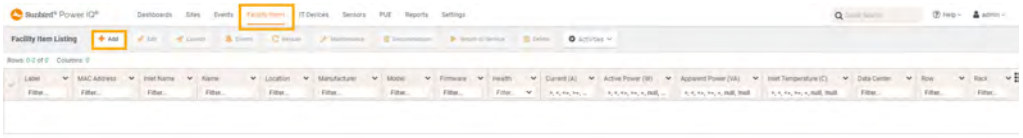
1. In the Facility Items tab, select a PDU then the PDU's Details tab
2. For three-phase PDUs, enter the voltages in the Manually Configured Inlet Voltage and Manually Configured Outlet Voltage fields.
3. For single-phase PDUs, enter the inlet voltage in the Manually Configured Voltage field.

   If no value is entered, the default value is used.
4. Click the Save button.

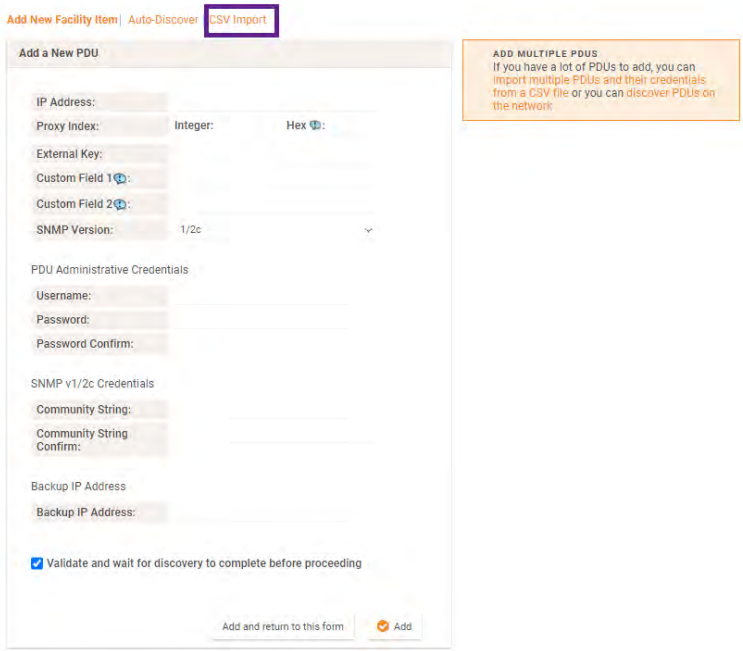
Add Facility Items in Bulk with CSV

If you have several PDUs to add and configure, you can import multiple PDUs and their credentials via CSV.

1. Click Add in the Facilities Tab.

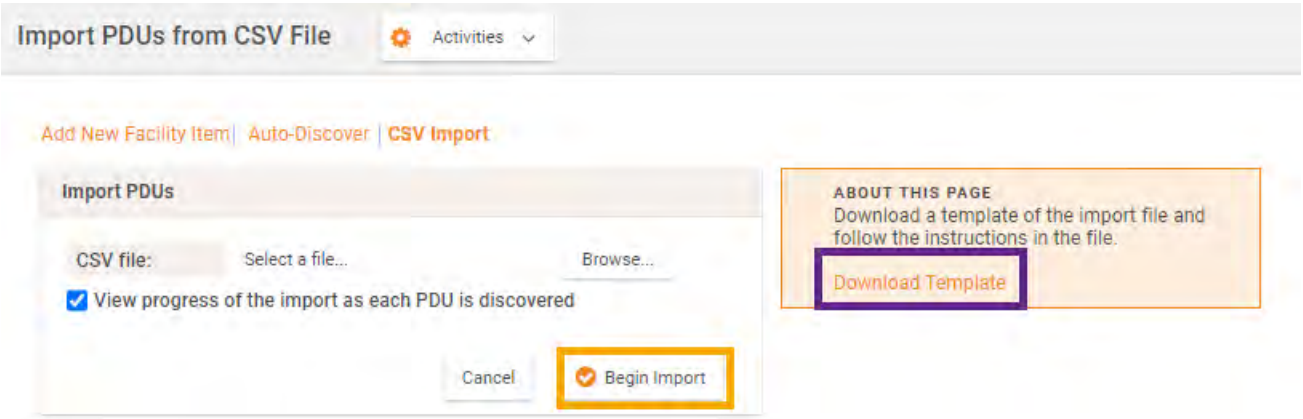


2. The Add a New PDU Page displays. On the Add a New PDU Page, click CSV Import



3. The Import PDUs from CSV File page displays.

4. Click Download Template to download the import template.



5. Follow the instructions in the file to populate the import template.
6. Click Brows to locate your Import File.
7. Click Begin Import to import your PDUs.

Structure of the Add PDUs CSV File

The structure of the CSV file is as follows:

- One line per PDU to import.
- No header row.
- Each line has only the following value columns, in the following order:
    1. IP address
    2. Proxy index: If the PDU is in a daisy-chained configuration or console server configuration, enter the PDU's position number in the chain or serial port number. See Proxy Index Details. For PDUs that use the MAC address as a proxy index, enter the last six digits of the address separated by a colon (for example: 01:89:ab).

    Leave blank if not configuring a backup IP address.

    3. Backup IP Address

    Leave blank if the PDU is not in this type of configuration.

    4. Raritan PX username
    5. Raritan PX password

    Leave the Raritan PX username and Raritan PX password fields blank for other PDUs.

    6. SNMP Community String

    Leave the SNMP Community String blank if it does not apply for a PDU.

    Note: When adding PDUs via CSV import, you must always specify the community string when applicable. The CSV import feature does not assume the community string if none is specified. Power IQ will not inject the public community string if none is entered.

7. SNMPv3 enabled: true or false.

Leave columns 8-13 blank if SNMPv3 is set to false.

8. SNMPv3 username
9. SNMPv3 authorization level: noAuthNoPriv, authNoPriv or authPriv.
10. Authorization protocol: MD5 or SHA.
11. Authorization passkey: no commas allowed
12. Privacy protocol: DES or AES
13. Privacy passkey: no commas allowed
14. External key
15. Custom field 1
16. Custom field 2

For example:

Example

```
192.168.43.184,,,admin,raritan,private

192.168.44.101,,,,,PDUread
```

The first line in this example represents a Raritan PX PDU. The second line represents a PDU from another vendor. Uploading this CSV file would instruct Power IQ to add two PDUs to management. The first PDU is located at 192.168.43.184, and uses the login/password combination admin/raritan for authentication. Its SNMP Community String is set to private. The second PDU is located at 192.168.44.101 and does not use a user name and password for authentication. Its SNMP Community String is set to PDUread.

Note: When a Server Technology primary PDU is imported into Power IQ via CSV import, its daisy-chained PDUs will also be imported. However, a CSV import file with only daisy-chained PDUs will not result in the import of the primary PDU.

Proxy Index Details

For stand-alone PDUs, the proxy index field should be left blank.

For PDUs acting in a daisy-chain, or for PDUs that are being proxied through another PDU, the proxy index field should contain the number of the PDU's position.

For daisy chained systems, the proxy index field should be set to the PDU's position within the chain. The head-end or primary system should have a proxy index value of 1. The second system in the chain would have a proxy address of 2 and so on.

For PDUs that use the MAC address as a proxy index, enter the last six digits of the address separated by a colon (for example: 01:89:ab).

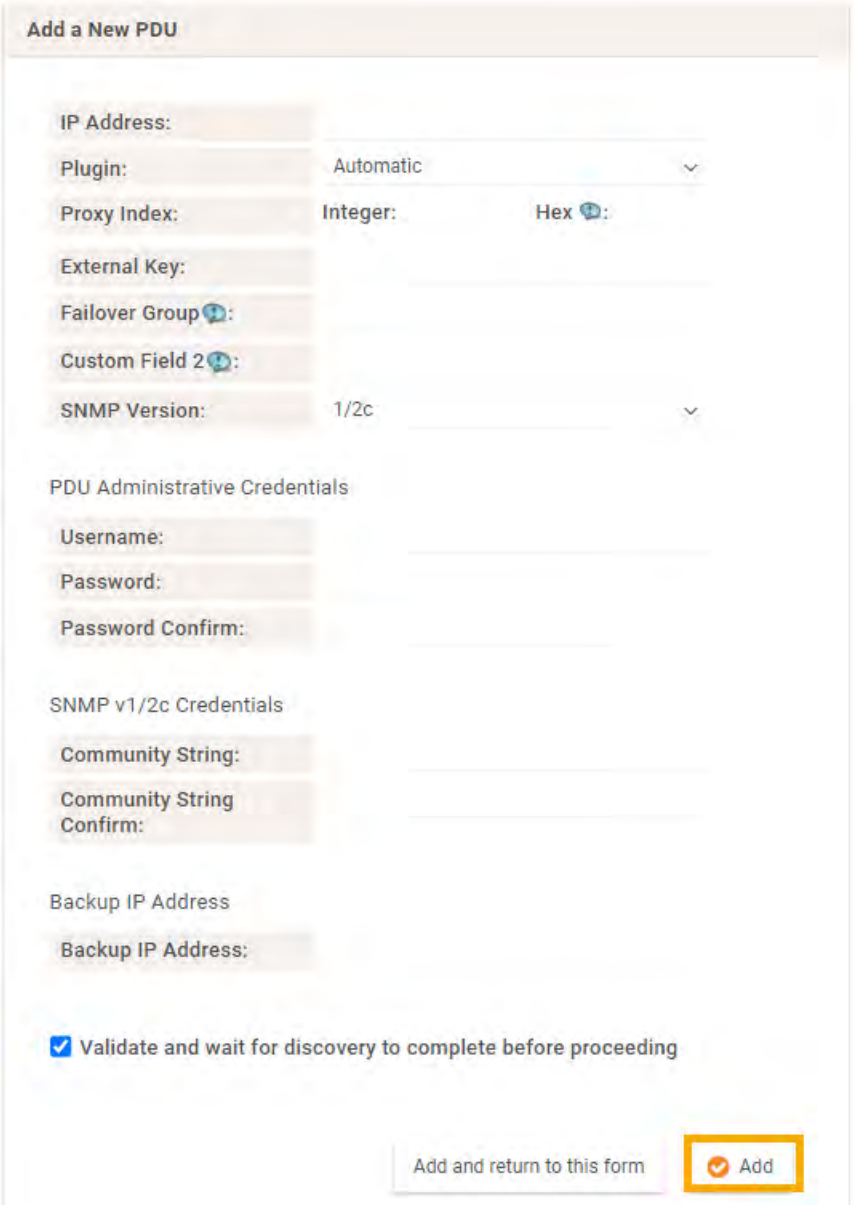
For element managed systems, such as PDUs behind a serial proxy, the proxy index field should contain the serial port number to which the PDU is attached on the management console.

Add Raritan Power Meter and Power Meter Branch Circuit Monitor (BCM)

You can add a Raritan Power Meter and Power Meter Branch Circuit Monitor (PMM and PMB) to Power IQ the same way you add a PDU.

1. Add the meter using the IP address of the Power Meter Controller (PMC) module.
2. If your PMC manages more than one PMM/PMB, enter the dip-switch setting as the Proxy Index to identify the correct module. Power IQ checks which modules are connected to your PMC to determine how to add the unit.
    - If Power IQ discovers the PMM alone, it is added as a Standalone Power Meter.
    - If Power IQ discovers the PMM with the PMB connected, it is added as a Power Panel.
    - Power IQ discovers new circuits automatically, but does not recognize other changes made in the PMC interface. Decommission and add the unit again to get the updated configuration.

- Asset management strips and environmental sensors connected to Raritan Power Meters are not supported in Power IQ 5.0.



3. Press the Save button

Add Raritan EMX

You can add a Raritan EMX to Power IQ the same way you add a PDU. All information in this help that refers to PDUs can be applied to EMX, with a few exceptions.

Power IQ collects and displays sensor and asset strip data from a EMX in the same way as other PDUs with attached sensors or asset strips. EMX does not have any outlets.

You cannot upgrade or use bulk configuration for EMX through Power IQ.

Add MRV PDUs

For MRV PDUs, make sure you have configured the get and set clients with the same community string, and use that community string when adding the PDU to Power IQ.

Add Rack Transfer Switches

You can add a supported Rack Transfer Switch to Power IQ the same way you add a PDU.

You can upgrade or use bulk configuration for Raritan PX3TS transfer switches through Power IQ.

Add Veris Branch Circuit Monitors with Acquisuite

Use the Add a PDU function to add a Veris branch circuit monitor (BCM) connected to a Veris or Obvius Acquisuite modbus to Power IQ.

For more information, see *Add PDUs to Power IQ* on page 743.

Specify the following information when adding the Veris BCM to ensure Power IQ connects to the correct panel.

Field name in Add a PDU page	Modbus/BCM information
IP Address	IP address of the Acquisuite modbus.
Proxy Index **REQUIRED**	Device number of the BCM panel. Example: The device number of the panel as configured in the Acquisuite. This information can be found in the Acquisuite web client.

Each panel displays as a PDU with up to 42 outlets. Each branch displays as an outlet.

Each single-phase branch is monitored independently as a single-phase circuit.

Groupings into multi-phase circuits is not supported.

Add PDUs Managed by Dominion SX

You can add PDUs that are managed by a Dominion SX serial console to Power IQ.

Specify the following information when adding the PDU to ensure Power IQ connects to the correct SX-managed PDU.

See *Add PDUs to Power IQ* on page 743

Field name in Add a PDU page	Modbus/BCM information
IP Address	IP address of the Dominion SX
Proxy Index	Dominion SX port number that the PDU is connected to
PDU Administrative Credentials Username, Password, Password Confirm	Dominion SX username and password
SNMP fields	Leave blank.

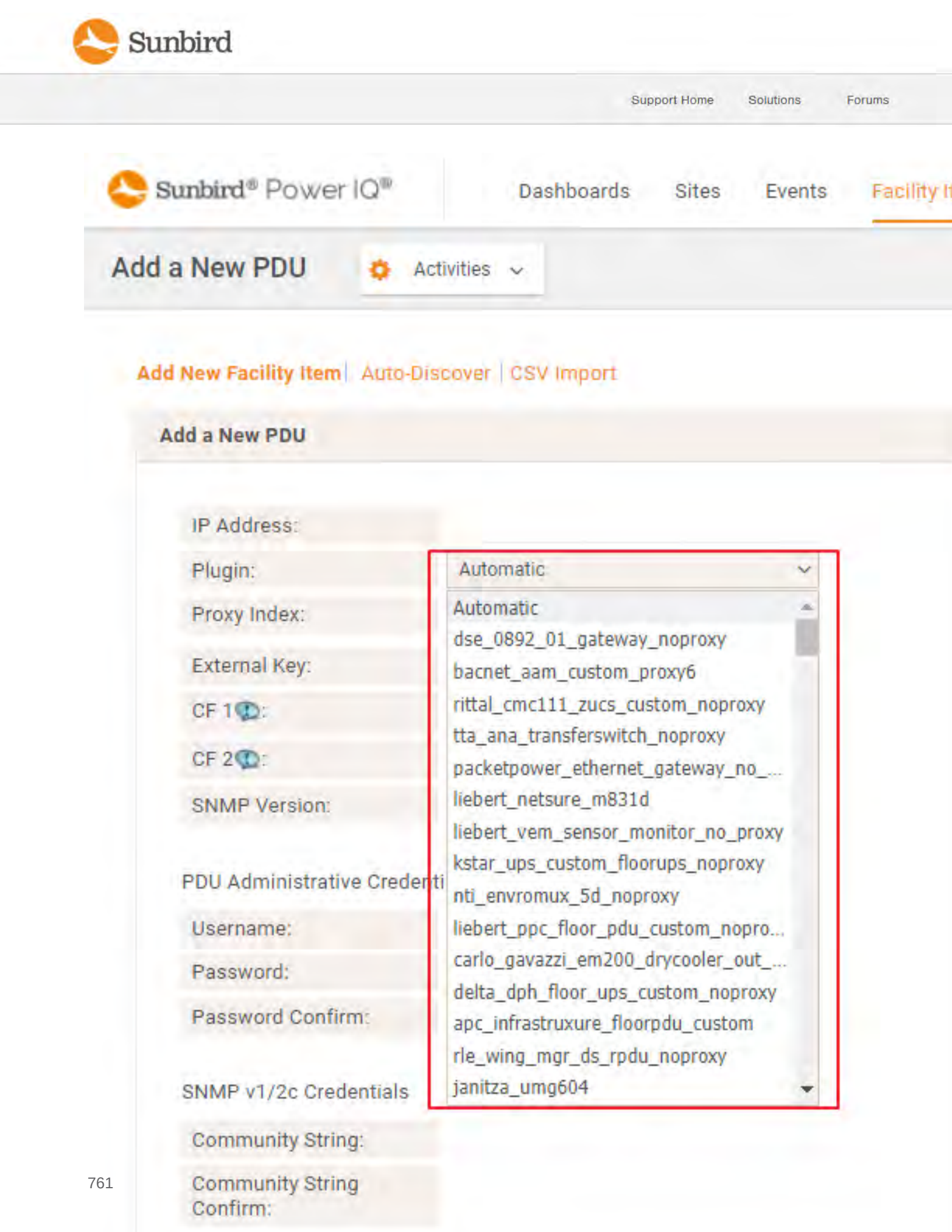
Add PDUs with Custom Dynamic Plugins

When adding a PDU that uses a custom dynamic plugin, use the same Add a PDU feature as any other addition. See *Add PDUs to Power IQ* on page 743.

When Power IQ detects that there is at least one custom dynamic plugin configured, a Plugin drop-down field displays.

Automatic: Use Automatic to allow Power IQ to determine the correct plugin for the PDU you are adding. Automatic attempts to find an exact match between the PDU and the plugin for SysObjectID, PDU Model name, and Proxy ID.

If there is no exact match, but several dynamic plugins are eligible to manage the PDU, based on sysObjectID, then Power IQ selects from among the eligible plugins. If automatic mode does not select the desired dynamic plugin, delete the PDU and add it again, selecting the specific custom dynamic plugin from the list.


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility It
Add a New PDU
Activities
Add New Facility Item
Auto-Discover
CSV Import
Add a New PDU
IP Address:
Plugin:
Automatic
Proxy Index:
External Key:
CF 1:
CF 2:
SNMP Version:
PDU Administrative Credenti
Username:
Password:
Password Confirm:
SNMP v1/2c Credentials
Community String:
Community String Confirm:
Automatic
dse_0892_01_gateway_noproxy
bacnet_aam_custom_proxy6
rittal_cmc111_zucs_custom_noproxy
tta_ana_transferswitch_noproxy
packetpower_ethernet_gateway_no_...
liebert_netsure_m831d
liebert_vem_sensor_monitor_no_proxy
kstar_ups_custom_floorups_noproxy
nti_envromux_5d_noproxy
liebert_ppc_floor_pdu_custom_nopro...
carlo_gavazzi_em200_drycooler_out_...
delta_dph_floor_ups_custom_noproxy
apc_infrastruxure_floorpdu_custom
rle_wing_mgr_ds_rpdu_noproxy
janitza_umg604

Alternatively, select the specific custom dynamic plugin from the list.

For more information, see *How Power IQ Associates Facility Items with a Structured or Custom Plugin* on page 673.

Add Raritan PDUs in Cascading Modes (Port Forwarding Configuration and Bridging Modes)

Raritan PDUs can be cascaded via USB cables to share an Ethernet connection. The first PDU in the chain is the primary device, and all PDUs connected to it are extension devices.

Power IQ USB-cascading chains have been tested with a total of eight PDUs, however there is no upper limit to the number of devices in the chain.

Note: When upgrading PDUs in Bridging mode, start with the PDU furthest from the primary .

Note: Power IQ only recognizes Raritan PX2 and "PX3" PDU models in a USB-cascading chain. For details, see the Overview of the Cascading Modes in the PX2-3 Online help

Chains can be built using USB, network or a mixture of both. It is transparent to Power IQ, i.e. Power IQ can not see how the chain is built, it still supports any of those chains.

Add primary and extension PDUs in Port Forwarding mode the same way you add a standalone Raritan PDU. See *Add PDUs to Power IQ* on page 743.

Power IQ includes built-in validations and protections, and displays notification messages when the port forwarding configuration order is changed.

Specify the following information when adding primary and extension PDUs in Port Forwarding mode:

Field name in Add a PDU page	Primary PDU	Extension PDU
IP Address	IP address of the primary PDU	Same IP address as the primary PDU
Proxy Index **REQUIRED**	1	8
External Key	Any unique entry different from the IP address	Any unique entry different from the IP address
PDU Administrative Credentials Username, Password, Password Confirm	The primary PDU's credentials	The extension PDU's credentials
SNMP fields	The primary PDU's SNMP strings	The extension PDU's SNMP strings

Add Server Technology PDUs

Many Server Technology PDUs follow a configuration with a primary PDU and daisy-chained PDUs. This configuration is handled in Power IQ as follows:

When adding PDUs through the Power IQ GUI, when Power IQ discovers a primary Server Technology PDU, its daisy-chained PDUs will also be discovered and added to the Facility Items list. If the daisy-chained PDUs are already in Power IQ, those PDUs will not be rediscovered and will retain their PDU IDs.

Autodiscovery of Server Technology PDUs

When Server Technology Sentry3 CDU and Sentry4 PRO1/PRO2 primary PDU are autodiscovered within an IP address range using Power IQ's autodiscovery feature, the daisy-chained PDUs attached to the primary are also discovered as separate units, starting at Proxy Index 2. The feature also applies when a Server Technology primary PDU is added either manually or through CSV import.

Add Server Technology PDUs via CSV Import

When a Server Technology primary PDU is imported into Power IQ via CSV import, its daisy-chained PDUs will also be imported. However, a CSV import file with only daisy-chained PDUs will not result in the import of the primary PDU.

Server Technology PDU Names in Power IQ

In naming PDUs, Power IQ typically uses a PDU's sysName value as is commonly seen on the SNMP MIB to display the PDU name in the GUI. However, to improve identification of daisy-chained Server Technology PDUs, Power IQ now uses the the sysName value for primary PDUs and the PDU's Tower Name for the daisy-chained Server Technology PDUs.

For the primary PDU:

- Power IQ displays the sysName value
- When you changes the PDU Name in Power IQ, Power IQ updates both the sysName value and the Tower Name for that PDU

For the daisy-chained PDUs:

- Power IQ displays the Tower name value for each PDU
- When you changes the PDU Name in Power IQ, Power IQ only updates the Tower Name for that PDU

Server Technology PDU Firmware Version and X.509 Certificate Issues

This section covers potential issues related to Server Technology PDU firmware versions and X.509 security certifications. It provides recommendations to avoid or address these issues on Server Technology PDUs.

Power IQ supports discovery and data collection for Server Technology PDUs running pre-v7.0m firmware. However, some new features, including administrator credential validation, bulk configuration, and firmware upgrades are supported for PDUs running only v7.0m or higher firmware.

On Server Technology PDU's running v7 firmware, Power IQ will generate an "Admin Credentials Invalid" event and display the PDU in a Warning state for the following reasons:

- Credentials don’t match those of an "Administrator" user on the PDU
- PDU is running pre-v7.0m firmware
- PDU has an older X.509 certificate that was generated with an older encryption protocol that is no longer considered secure. As a result, Power IQ is not able to authenticate their administrator credentials. Refer to the recommendations section for instructions on how to generate a new certificate on the PDU.

Recommendations for Server Technology PDUs in Power IQ 6.2

Sunbird makes the following recommendations to customers to address these issues:

1. Prior to upgrading to Power IQ 6.2, upgrade all Server Technology PDUs to the latest available firmware (at a minimum v7.0m).

After upgrading the Server Technology PDU firmware, you should generate a new X.509 certificate for any Server Technology PDU which was purchased prior to 2016 and has never had a new certificate generated.

To do so, log in to the Server Technology PDU web GUI. Then navigate to Tools > Restart and initiate a system restart the PDU with the "Restart and generate a new X.509 certificate" option. Please refer to your ServerTech PDU documentation for further instructions.

2. After upgrading to Power IQ 6.2, update your Server Technology PDU administrator credentials.

After upgrading to Power IQ 6.2, you should update the configuration of all your Server Technology PDUs that are managed in Power IQ to include administrator credentials. This is required to be able to take advantage of all the new Server Technology related functionality in Power IQ 6.2.

Note: If you change the administrator password used by Power IQ on a Server Technology PDU through the PDU UI, you must restart the PDU to ensure that the Server Technology SNAP API will correctly authenticate requests from Power IQ. However, if you change the administrator password through the Power IQ UI, Power IQ will restart the PDU without any additional action by the user.

Bulk Configuration of PDUs

Bulk configuration capabilities in Power IQ are supported for Chatsworth, Raritan and Server Technology PDUs.

Requirements for Bulk Configuration

Bulk configuration is supported for Raritan and Server Technology PDUs only.

NOTE: For Raritan PX2s, the Bulk Configuration feature can be used to copy configuration files to other PX devices of the same model and firmware version. On Raritan PX2s running firmware 2.5.30 or higher, the model is considered the same when the only differences are the length of the line cord (option A or L), the color of the line cord (Option B), or the PDU Color (option K).

- Each PDU must be configured with an IP address and be under Power IQ management.
- A configuration backup file from a configured Raritan or Server Technology PDU.

Note: Power IQ does not support PX2/PX3/PX4/EMX/PRO3X/PRO4x password protected encrypted bulk configuration files for Power IQ bulk configuation upload.

Note: Bulk Configuration files stored on the system will not execute on PDUs with recent firmware upgrades. Bulk configuration requires that the traget PDUs have the same firmware revsion as the revsion stored in the bulk config file.

Note: Bulk configuration templates should be limited to operate on no more than 500 PDUs.

View a Saved/Current Templat

View saved templates to verify and edit their details before executing a plan.

1. In the Facility Items tab, select Activities > Bulk Configuration Activities.
2. On the Bulk Configuration Activities page, select Manage Bulk Configuration Templates. The Templates page displays a list of saved/current templates.

Edit a Saved Template

Saved templates can be edited to change actions, add or remove PDUs, or change the configuration file.

You can only edit templates that you created.

1. In the Facility Items tab, select Activities > Bulk Configuration Activities.
2. On the Bulk Configuration Activities page, select Manage Bulk Configuration Templates. The Templates page displays a list of saved/current templates.
3. To edit an existing template, select the template.
4. Click the Next button to advance to the Template Actions page to select the PDUs to add to your template and the actions that you want to include in your template. Power IQ will filter the list of PDU
5. Click the Save button in each panel to save your changes.

Run a Saved Bulk Configuration Template

1. In the Facility Items tab, select Activities > Bulk Configuration Activities.
2. On the Bulk Configuration Activities page, select Manage Bulk Configuration Templates. The Templates page displays a list of saved/current templates.
3. To edit an existing template. select the template.
4. Click Next to advance to the Template Actions page to add new actions to the template, if desired. Click Save for each action added.
5. Click Run *View the Status of Bulk Configuration Templates* on the next page

See *View the Status of Bulk Configuration Templates* on the next page

See *View Completed Bulk Configuration Templates* on page 772 for details on checking completed rollouts.

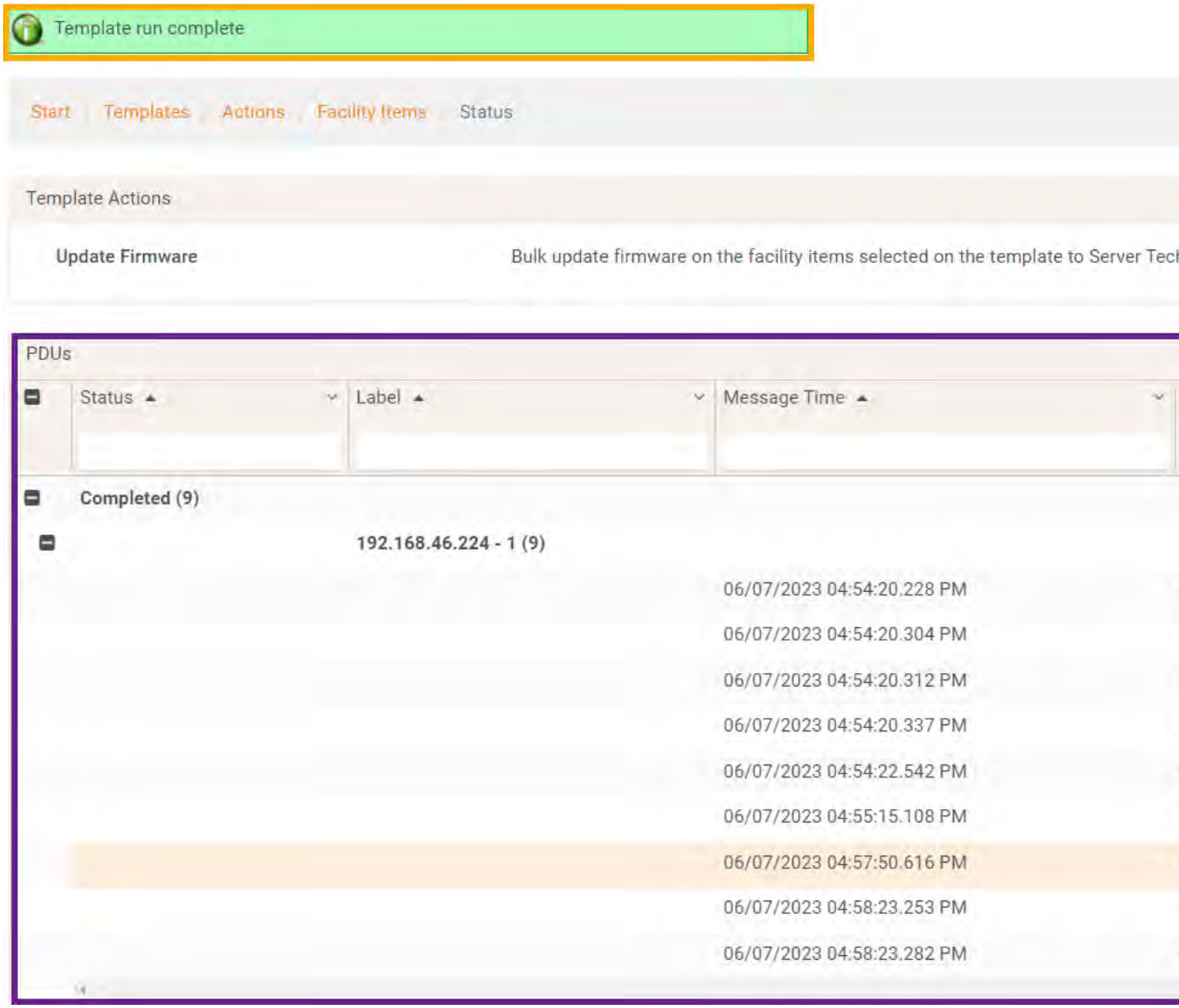
Template Timing

Each PDU configuration takes approximately 30 seconds.

View the Status of Bulk Configuration Templates

The status page for templates displays after you run the template.

The PDUs panel on the Status page displays a status and message for each selected PDU



View Completed Bulk Configuration Templates

When a Bulk Configuration Template has been executed, you can view the details of the template status and the results of each PDU included in the template.

1. In the Facility Items tab, select Activities > Bulk Configuration Activities.
2. On the Bulk Configuration Activities page, select Manage Bulk Configuration Templates.
3. Select a Bulk Configuration Template you executed and click Run History.
4. The Run History table displays. The Run History table lists the completed Bulk Configuration Templates with reports for each completed run. Additionally, the Latest Run State column in the Templates table indicates which templates were completed successfully.
5. To view more details for a template, select the template, then click Run History. The Report column in the Run History table provides links for you to download the Run history reports.

Start Templates

Templates

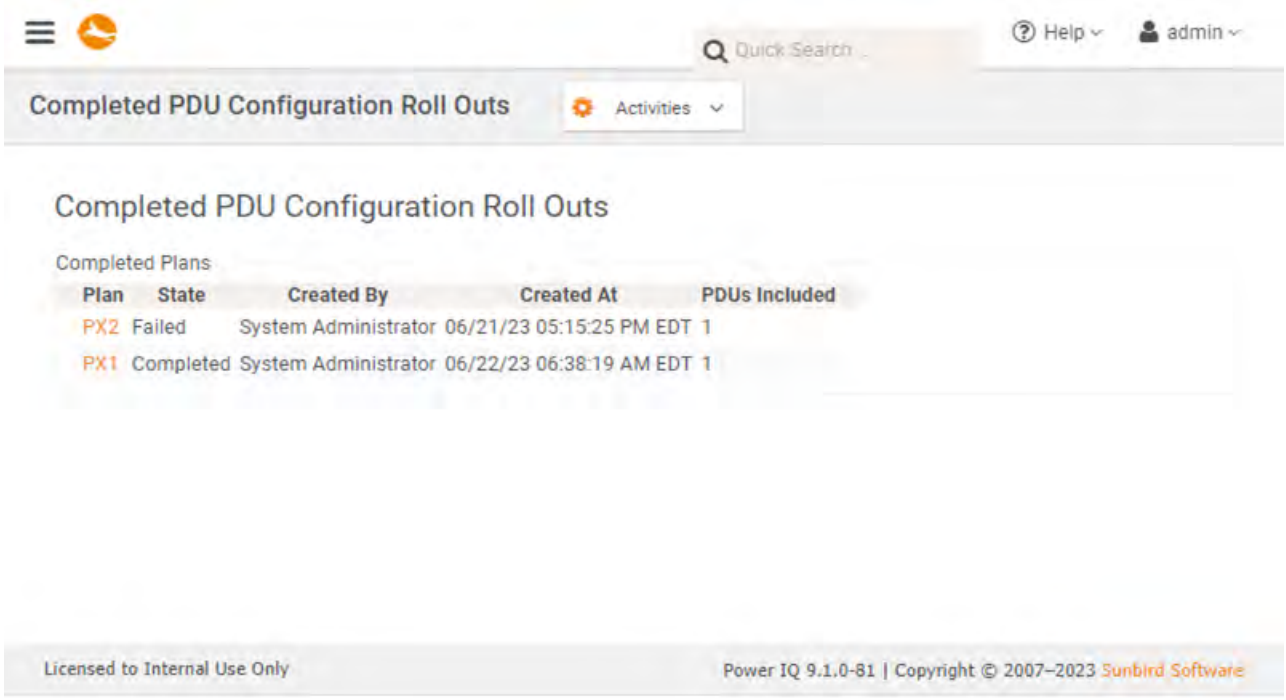
Add Copy Rename Delete Run History

Name	Summary	Creator
Firmware Update of All V8 ServerTech P...	**ServerTech Firmware Upgrade version p...**	**admin**
Password and SNMP Community String ...	Bulk Template created by user: admin	admin
Configuration for new PDU Deplooyment	Used for Raleigh Data Center	admin
Firmware and PW Update	Bulk Template created by user: admin	admin
Password Change	Bulk Template created by user: admin	admin
Set Trap Destination on Starline Meters	Bulk Template created by user: admin	admin
Firmware Update of All V8 ServerTech P...	ServerTech Firmware Upgrade version pr...	admin
09/22/2022 11:37:07.861 AM - Bulk Tem...	Bulk Template created by user: admin	admin
Firmware and PW Update copy	Bulk Template created by user: admin	admin
09/22/2022 12:52:22.105 PM - Bulk Tem...	Bulk Template created by user: admin	admin
Firmware Update of All V8 ServerTech P...	ServerTech Firmware Upgrade version pr...	admin
02/08/2023 08:53:06.855 AM - Bulk Tem...	Bulk Template created by user: admin	admin
Firmware Update of All V8 ServerTech P...	ServerTech Firmware Upgrade version pr...	admin
Firmware Update of All V8 ServerTech P...	ServerTech Firmware Upgrade version pr...	admin
02/09/2023 01:16:28.935 PM - Bulk Tem...	Bulk Template created by user: admin	admin
02/15/2023 11:49:15.941 AM - Bulk Tem...	Bulk Template created by user: admin	admin

View Completed Legacy Rollout Plans

Legacy roll-out Plans are old roll-out plans that have been brought forward into your Power IQ system via system upgrade or backup restore. These roll-out plans are for historical purposes only and can not be re-executed

1. In the Facility Items tab, select Activities > Bulk Configuration Activities.
2. On the Bulk Configuration Activities page, select Legacy Clone and Restore Configurations. The Completed PDU Configuration Roll Outs table displays. Proceed to Step 4.



3. To view legacy firmware update plans, select Legacy Firmware Updates on the Bulk Configuration Activities page

4. Click the link for the plan you executed to view the plan summary page. At the top of the page, a status message is displayed. The message will vary based on the status of the plan.
5. If the plan completed successfully, a success is displayed at the top of the plan details.
6. The list of PDUs included in the plan includes a Success or Failure message.
7. Click View detailed rollout status messages for more information about each PDU.

Manage Uploaded Configuration Files

You can upload different configuration files for use in rollout plans, and view previously uploaded configurations.

Configuration files are .DAT files. Configuration files are created by backing up a Raritan or Server Technology facility item.

1. In the Facility Items tab, select Activities > Bulk Configuration Activities.
2. On the Bulk Configuration Activities page, select Manage Bulk Configuration Templates. The Templates page displays a list of saved/current templates.
3. To edit an existing template. select the template.
4. Click the Next button to advance to the Template Actions page to select the PDUs to add to your template and the actions that you want to include in your template. Power IQ will filter the list of PDU
5. In the Firmware Update Panel, click the Upload button to upload new firmware.
6. To edit a firmware file, select the file and click Edit button.
7. To delete a firmware file, select the file and click the delete button.
8. Click the Save button to save your changes.

Manage Bulk Configuration Templates

Bulk configuration templates are used to make configuration changes to one or more facility items in Power IQ. These templates are useful for making changes on facility items in bulk, without logging in to each device individually. Template also save time when you need to repeat the same action every so often (for example, changing the passwords on your facility items every six months.)

You can change the administrator password, trap destinations, and SNMP settings using bulk configuration templates. Click the links below for detailed instructions for completing each action.

- *Update Firmware for Facility Items in Bulk* on page 778
- *Change the Administrator Password for Facility Items in Bulk* on page 780
- *Set Power IQ as the SNMP Trap Destination for Facility Items in Bulk* on page 784
- *Configure SNMP Settings for Facility Items in Bulk* on page 786

To use bulk configuration template to make changes across a range of facility items:

1. Create a new template or edit an existing template
2. Make your desired updates in the appropriate sections for one or more of the above actions.
3. Select the facility items that you would like to update.
4. Run the template.

Bulk configuration template can be created, edited, copied and deleted through Power IQ. You can also run an existing template and view its run history. For more information, see *Bulk Configuration Template Activities* on the facing page

To manage bulk configuration templates:

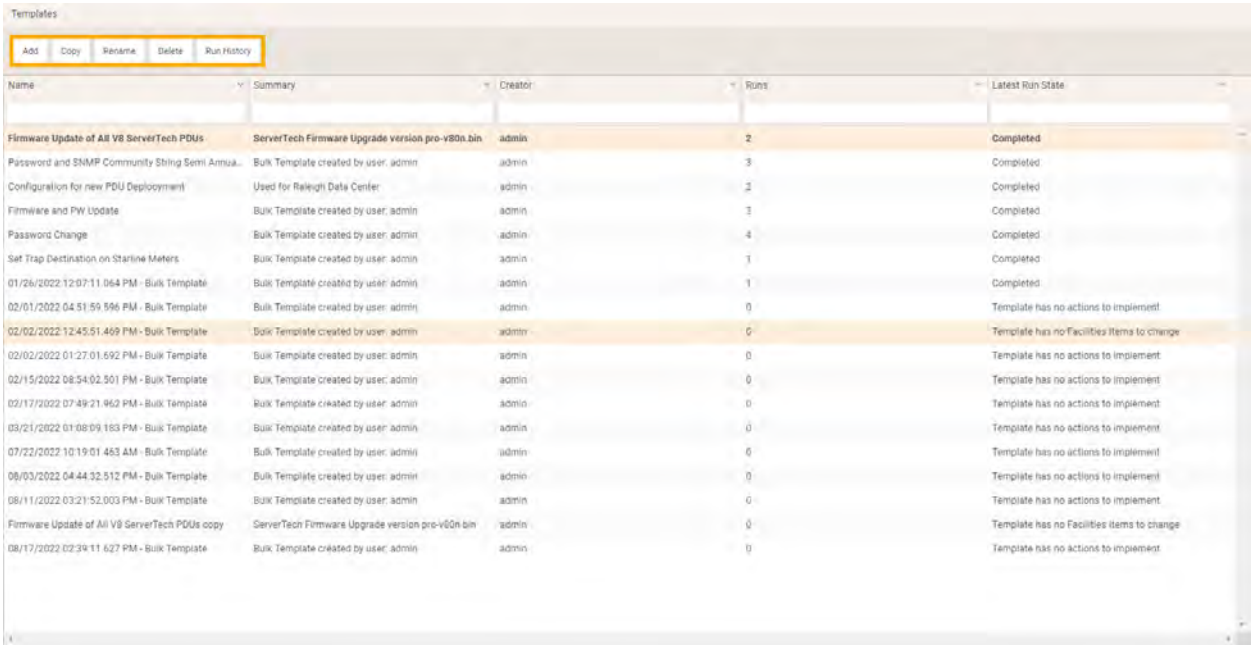
template

Bulk Configuration Template Activities

The following actions are available on the Templates page for managing bulk configuration templates. Click each link for detailed instructions.

- *Adding a Bulk Configuration Template* below
- *Editing a Bulk Configuration Template* below
- *Copying a Bulk Configuration Template* on the next page
- *Deleting a Bulk Configuration Template* on the next page
- *Viewing Run History* on page 778

To initiate each action, click on their respective links in the top bar on the Templates page in the Power IQ GUI.



Adding a Bulk Configuration Template

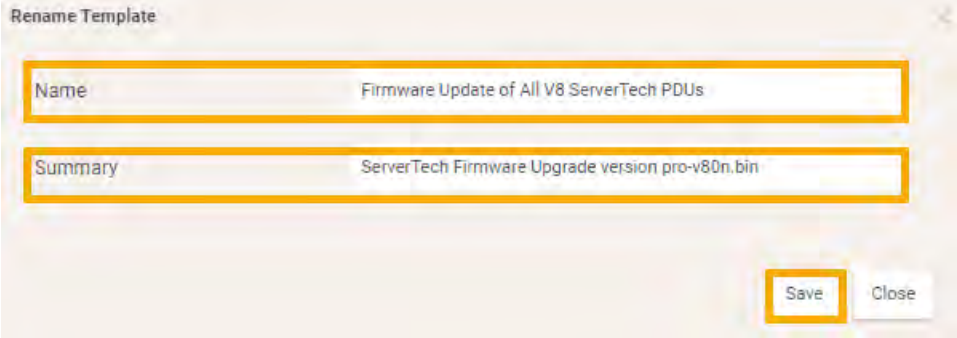
To add a bulk configuration template, click the Add link on the Bulk Configuration Templates page. A new template will automatically be created, and you will be direction to the Actions page.

Note: To edit the plan's name or summary, return to the Templates page, select the plan, and click the Rename button.

Editing a Bulk Configuration Template

Two types of edits are available for bulk configuration templates:

1. Edit the template name and summary: To edit the template's name or summary, select the template and click the Rename button. Make your desired changes in the Name and Summary fields in the Rename dialog.



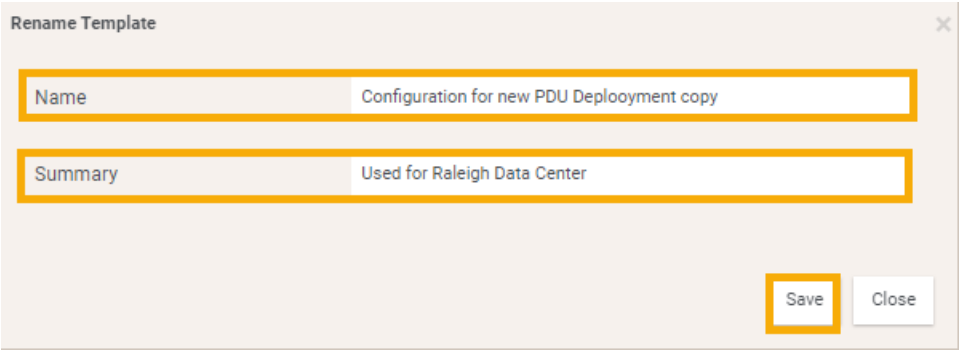
2. Edit the template actions: To edit the actions performed when the template is executed, select the template and click the Next button.
    a. On the Actions page, click the Reset button under any action to remove that action from the template. Click the Save button in the appropriate action panel to save your changes.
    b. On the Add PDUs page, add or remove desired PDUs.
    c. Click the Run button to run the template.

Copying a Bulk Configuration Template

Copying a bulk configuration template can save time when you are creating multiple templates or plans with the same actions.

To copy a bulk configuration template:

1. Select the template you want to copy.
2. Click the Copy link on the Templates page. The Rename dialog displays pre-populated with the original template's name, time- and date-stamped and appended with "copy." The Summary will be the same as the original template.



3. Change the name and summary as desired.

The new template will appear in the Templates list.

Deleting a Bulk Configuration Template

Clean up your templates list by deleting old or unused bulk configuration templates/plans.

To delete a bulk configuration template:

1. On the Templates page, select the template you want to delete.
2. Click the Delete button.

3. When prompted, click the Yes button to confirm the deletion.

The template will be removed from the Templates list.

Running a Bulk Configuration Template

1. Running a bulk configuration template or plan enables you to re-run the template as-is, without making changes to it.
2. To run a bulk configuration template:
3. Select the template you want to run.
4. Click the Run link on the Template page.
5. A dialog will display asking you to confirm that you want to apply the settings to selected facility items on the template. Click the Yes button to proceed. Click the No button to cancel.
6. If you select Yes, you will be redirected to the live status page. A success message will display once the run has completed.

Viewing Run History

You can view the run history for a specific bulk configuration template or plan within Power IQ. You can also view the reports for specific dates and times from the Run History page. Reports are created automatically when a template has been run. If a template has not been run, you will not be able to view its run history.

For detailed instructions, see *View the Run History and Report for a Bulk Configuration Template* on page 793

Update Firmware for Facility Items in Bulk

System Administrators can update firmware for Raritan and Server Technology facility items in bulk.

Updating firmware for one or more Raritan and Server Technology facility items requires creating a new bulk configuration template or editing an existing template for uploading or selecting the firmware, selecting the desired facility items, and then running the plan to update the facility items with the new firmware.

For the change to take place, the facility item must have the administrator credentials set in Power IQ.

Note: Before performing bulk configuration actions on PDUs, Sunbird recommends putting them into Maintenance Mode. This will prevent events related to lost connectivity and admin credential checks from being generated while the actions are running. After the bulk configuration template has completed, be sure to take the PDUs out of Maintenance Mode by using the Return to Service option.

Note: When upgrading PDUs in Bridging mode, start with the PDU furthest from the primary.

Note: Power IQ waits 25 minutes before timing out on firmware upgrades. Power IQ does not re-attempt firmware upgrades.

Note: Older Legrand controllers have less RAM than newer ones, which can create an issue when upgrading the firmware on the older controllers with newer firmware. To address this challenge, Raritan added an option that will shut down some services to free up RAM and allow the upgrade to run. Power IQ will automatically enable this option when appropriate.

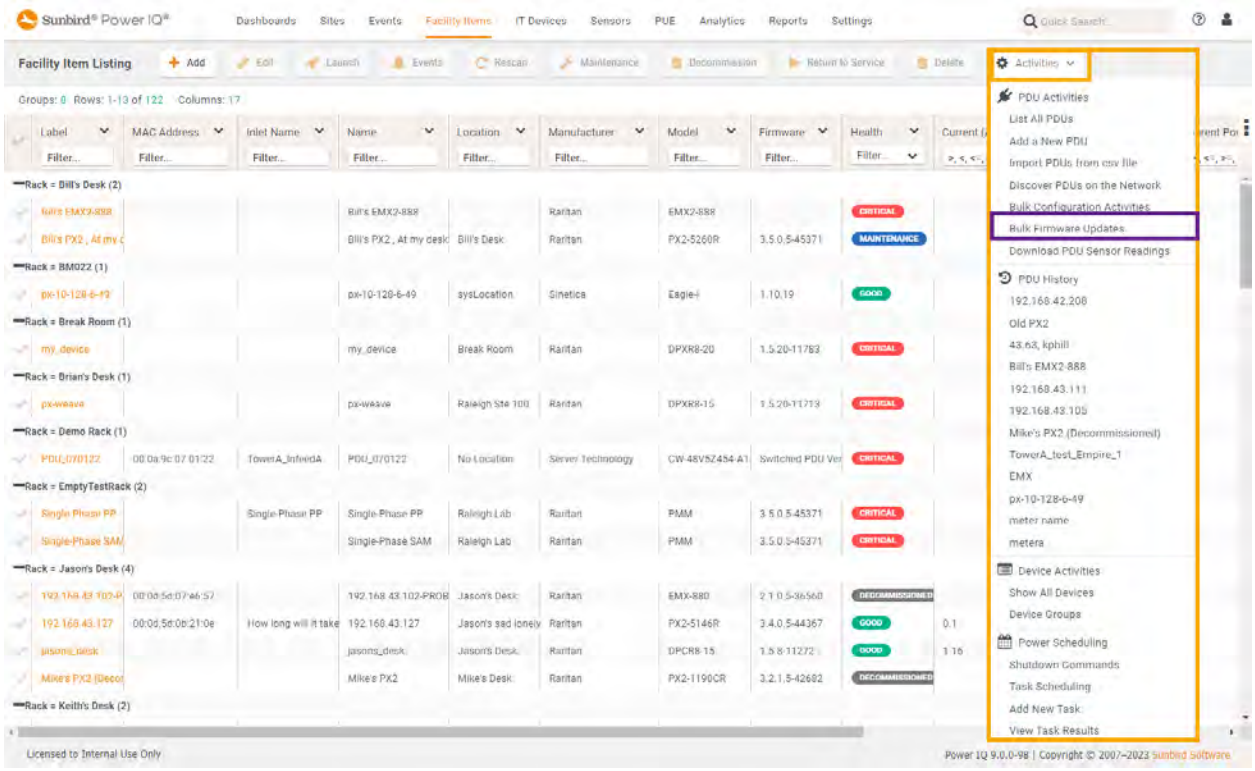
Note: Legrand is introducing a new 64 bit controller for their Generation 4 PDUs (PX4\PRO4x). Sunbird supports firmware upgrades for it and older versions. Legrand will offer three types of firmware: 32 bit version, 64 bit version, and a

combined image that contains both the 32 bit and 64 bit ones. Power IQ allows all three firmware versions (32 bit, 64 bit, and combined 32\64 bit) images to be pushed out. Legrand recommends using the combined image for upgrades.

Note: This feature is supported only for the following models: Raritan PX2, PX3, PX4 and EMX facility items and Server Technology Sentry3, Sentry4, PRO3X, and PRO4X facility items and Chatsworth rack PDUsChatsworth UPSs are not supported.

Procedure to Update Firmware in BulkTo update firmware:

1. In the Facility Items tab, select Activities > Bulk Firmware Updates



2. On the Bulk Configuration Activities page, select Manage Bulk Configuration Templates. The Templates page displays a list of saved/current templates
3. Click Add to add a new template or select an existing template.
4. Click Next.
5. The Actions page displays.
6. In the Firmware Update section, select a firmware version from the table. You can only select one firmware version at a time.
7. Click Save in the Firmware section to save your changes.

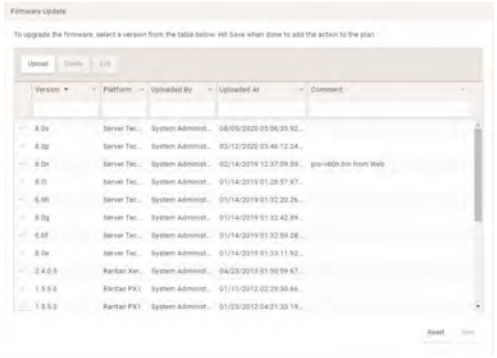
Note: On the Actions page, you can also update passwords, set Power IQ as a trap destination, and configure SNMP community credentials without the need to create a new plan. For more information, see Change the Administrator Password for Facility Items in Bulk on the facing page, Set Power IQ as the SNMP Trap

Destination for Facility Items in Bulk on page 784 and Configure SNMP Settings for Facility Items in Bulk on page 786 respectively.

8. Click Next.
9. Select your desired PDUs from the list of available PDUs and click Add PDUs to add your desired PDUs to the selected PDUs. If you have selected an ineligible PDU based on your current configuration, you will need to either change the configuration or remove the ineligible PDUs.

Note: Since Power IQ only communicates with the primary PDU in the chain, Power IQ will only display the primary Server Technology PDUs in the list of available PDUs. When you successfully change the password on a primary Server Technology PDU, Power IQ will internally update the username and password for the PDU Administrative Account on the daisy-chained PDUs to the same credentials. Updates to both the primary and daisy-chained PDUs are captured in the Power IQ audit log.

Note: You can also review the template actions in the Template Actions section at the top of the page. The Template Actions section will also note the supported facility items for each action.



10. Click Run.

Upon completion, the firmware is updated.

Change the Administrator Password for Facility Items in Bulk

System Administrators can change the administrator password (used by Power IQ to poll facility items) on Raritan and Server Technology facility items, provided they have the current password.

Changing the administrator password for one or more Raritan and Server Technology facility items requires creating a new bulk configuration template/plan or editing an existing template for updating the password, verifying the old and new passwords, selecting the desired facility items, and then running the plan to update the facility items with the new password.

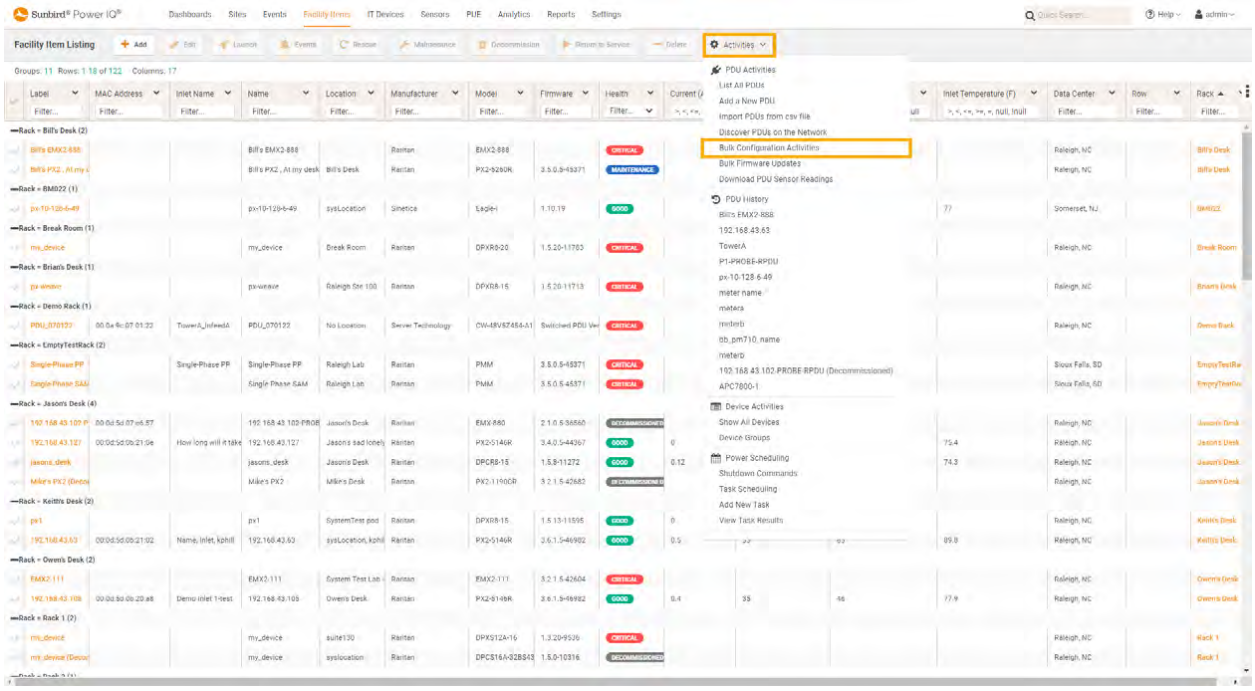
For the change to take place, the facility item must have the administrator credentials set in Power IQ. A successful password change will set the new password in both Power IQ and the facility item. The change will not take effect if the credentials for the user who is initiating the change are incorrect or outdated.

Note: Before performing bulk configuration actions on PDUs, Sunbird recommends putting them into Maintenance Mode. This will prevent events related to lost connectivity and admin credential checks from being generated while the

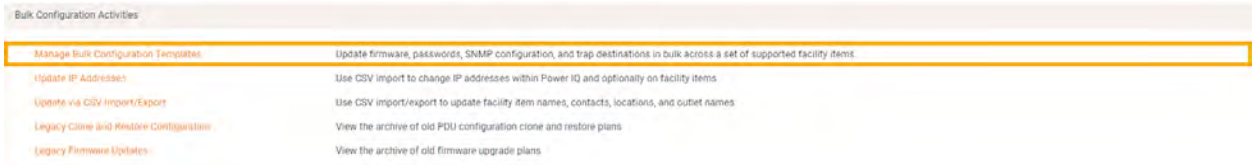
actions are running. After the bulk configuration plan has completed, be sure take the PDUs out of Maintenance Mode by using the Return to Service option.

To change the administrator password:

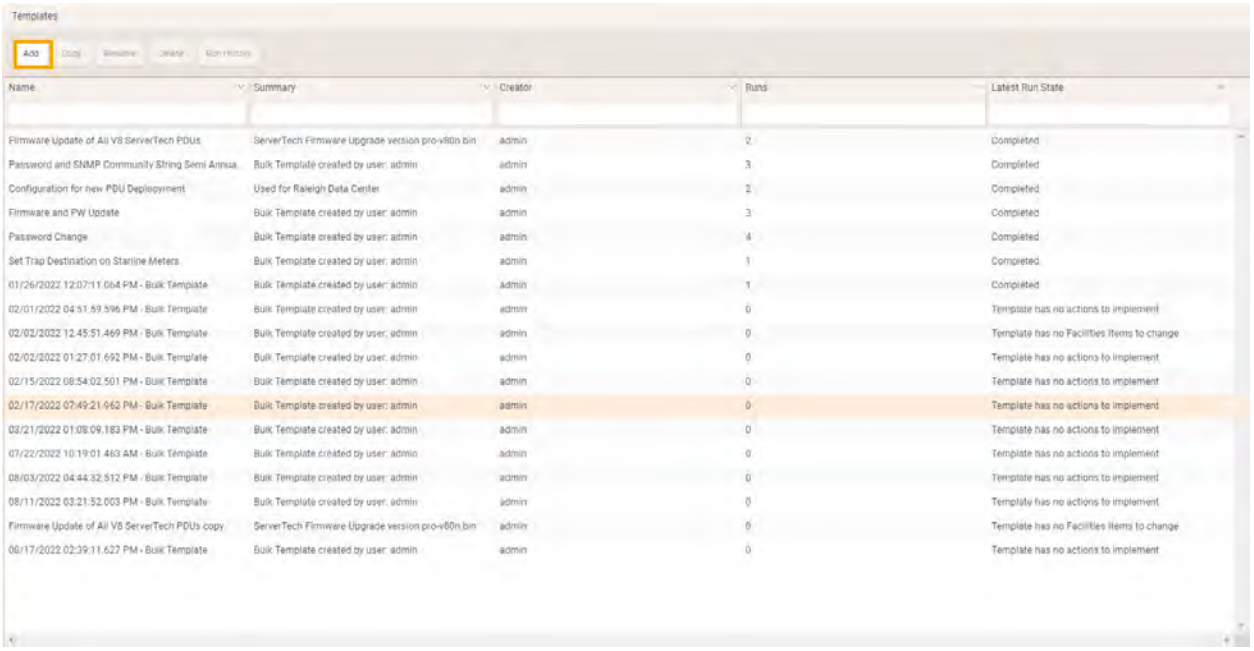
1. In the Facility Items tab, select Activities > Bulk Configuration Activities.



2. On the Bulk Configuration Activities page, select Manage Bulk Configuration Templates

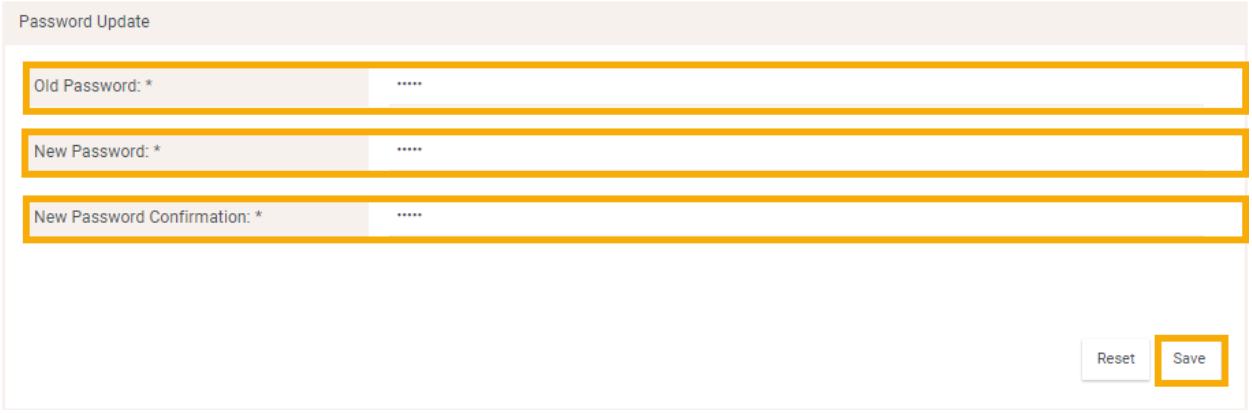


3. On the Templates page, select the existing template you would like to run or click the Add button to create a new template. Templates can be filtered based on the following criteria: Name, Summary, Creator, Number of Runs, and Latest Run State.



Note: If you click the Add button, a new template will automatically be created, and you will be directed to the Actions page, without clicking the Next button. Proceed to Step 6. To edit the template's name or summary, return to the Templates page, select the template, and click the Edit link.

4. Click the Next button. The Actions page displays.
5. In the Password Update panel, provide the old password and desired new password in the appropriate fields.



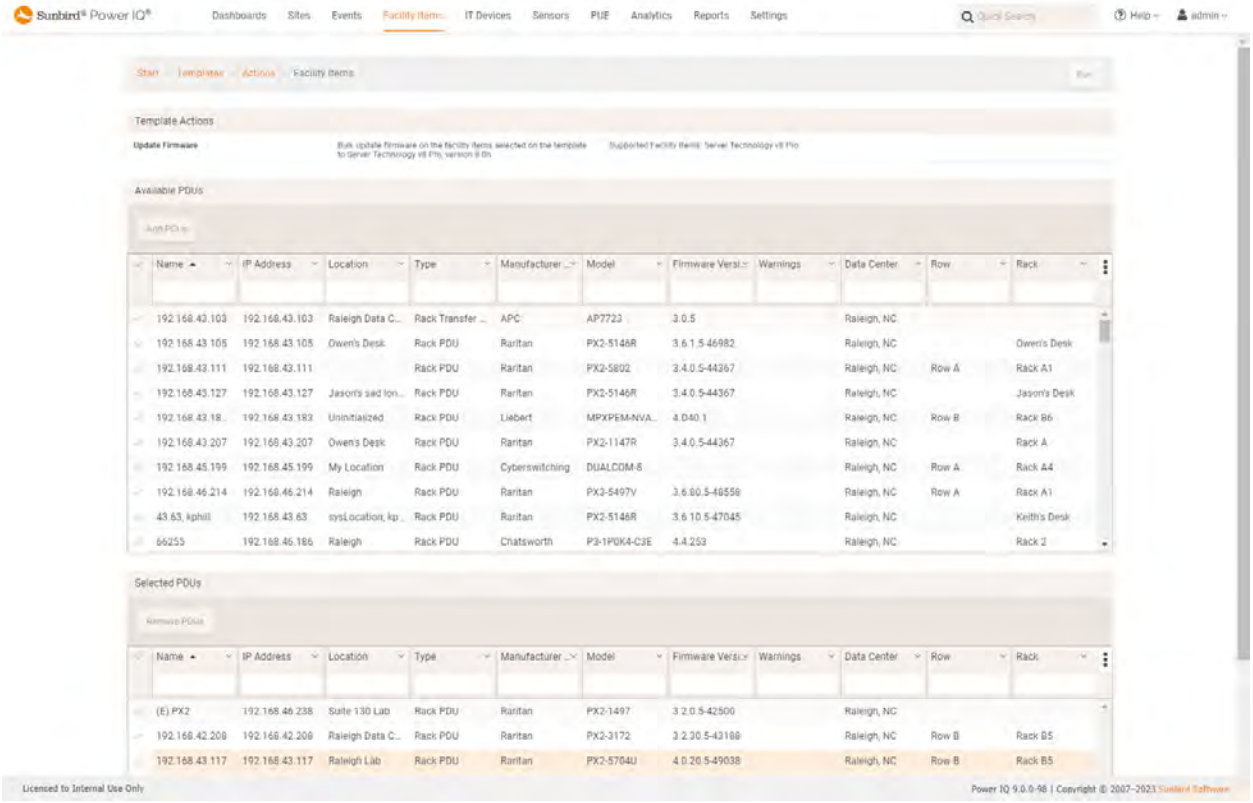
6. Click the Save button in the Password Update section to save your changes. If successful, a success message will display.

Note: On the Actions page, you can also update firmware, set Power IQ as a trap destination, and configure SNMP community credentials without the need to create a new plan. For more information, see Update Firmware for Facility Items in Bulk on page 778, Set Power IQ as the SNMP Trap Destination for Facility Items in Bulk on page 784 and Configure SNMP Settings for Facility Items in Bulk on page 786 respectively.

7. Click the Next link in the upper right corner.
8. Select your desired PDUs from the list of available PDUs and click the Add PDUs link to add your desired PDUs to the selected PDUs.

Note: Since Power IQ only communicates with the primary PDU in the chain, Power IQ will only display the primary Server Technology PDUs in the list of available PDUs. When you successfully change the password on a primary Server Technology PDU, Power IQ will internally update the username and password for the PDU Administrative Account on the daisy-chained PDUs to the same credentials. Updates to both the primary and daisy-chained PDUs are captured in the Power IQ audit log.

Note: You can also review the template actions in the Template Actions section at the top of the page.



9. Click the Run button.

Upon completion, the password updates.

Note: This feature is supported only for Raritan PX2, PX3, PX4, and EMX facility items and Server Technology Sentry3, Sentry4, PRO3X, and PRO4X facility items and Chatsworth facility items.

Note: If you change the administrator password used by Power IQ for a Server Technology PDU through the PDU UI, you must restart the PDU to ensure that the Server Technology SNAP API will correctly authenticate requests from Power IQ. However, if you change the administrator password through the Power IQ UI, Power IQ will restart the PDU without any additional action by the user.

Set Power IQ as the SNMP Trap Destination for Facility Items in Bulk

System Administrators can set Power IQ as the SNMP trap destination on Raritan and Server Technology facility items. Setting Power IQ as an SNMP trap destination for one or more Raritan or Server Technology facility items requires creating a new bulk configuration template/plan or editing an existing template, enabling traps, setting the host to a Power IQ IP address, selecting the desired facility items, and then running the template to update the facility items with the new trap destination.

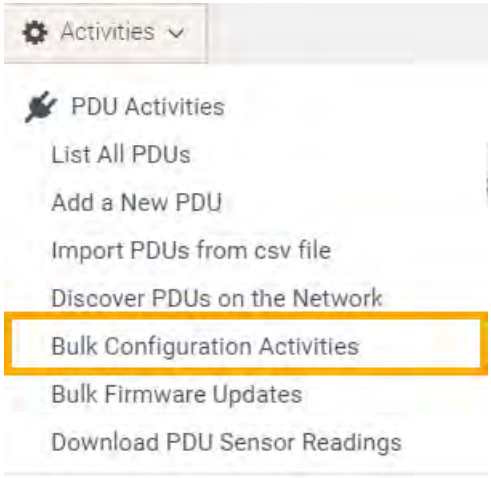
When you enable traps in Power IQ, Power IQ uses the SNMP credentials configured for the target PDU to set the SNMP credentials on the PDU. These credentials must match for Power IQ to receive, authenticate and decrypt incoming traps. Power IQ also enables either SNMPv2 or SNMPv3 trap notifications, varying by how you configured the target PDU in Power IQ. If you configured the PDU for SNMPv3, Power IQ enables SNMPv3 notifications. If the PDU is configured for SNMPv2, Power IQ enables SNMPv2 notifications.

Note: Power IQ does not support the ability to set the SNMP notification type to v2Inform or v3Inform.

Note: The trap port and community string on the facility item should be set to 162 and "public," respectively.

To set Power IQ as the SNMP trap destination:

1. In the Facility Items tab, select Activities > Bulk Configuration Activities.



2. On the Bulk Configuration Activities panel, select Manage Bulk Configuration Templates.
3. On the Templates table, select the existing template you want to run or click Add to create a new template. You can filter templates based on the following: Name, Summary, Creator, Number of Runs, and Latest Run State.

   Note: If you click Add, a new template is automatically created, and you are direction to the Actions page, without clicking Next. Proceed to Step 6. To edit the template's name or summary, return to the Templates page, select the template, and click the Edit link.

4. Click Next. The Actions panel displays.

5. In the Change Trap Destinations panel, use the Enable Traps drop-down to enable, disable, or leave traps unchanged. Select from Enable, Disable, or Unchanged respectively.

   Note: The Host 2 IP Address is supported for Server Technology PDUs and for SNMPv2c on Raritan PDUs. The Host 3 IP Address is supported for SNMPv2c on Raritan PDUs.

6. For one or more hosts, use the Host dropdown to select an IP address for Power IQ or to type in an IP address for another system. Both IPv4 and IPv6 addresses are supported. You can specify up to three hosts. To remove a host, select the Clear option.
7. Click Save in the Change Trap Destinations panel to save your changes. If successful, a success message displays.

   Note: On the Actions page, you can also change the administrator password and configure SNMP community credentials without the need to create a new plan. For more information, see Change the Administrator Password for Facility Items in Bulk on page 780 and Configure SNMP Settings for Facility Items in Bulk on the facing page respectively.

   Note: We strongly recommend that you ensure that one of the host destinations is set to Power IQ's IP Address so that Power IQ can report on the events.

8. Click Next in the upper right corner.
9. Select your desired PDUs from the list of available PDUs and click the Add PDUs link to add your desired PDUs to the selected PDUs.

   Note: Since Power IQ only communicates with the primary PDU in the chain, Power IQ will only display the primary Server Technology PDUs in the list of available PDUs. When you successfully change the password on a primary Server Technology PDU, Power IQ will internally update the username and password for the PDU Administrative Account on the daisy-chained PDUs to the same credentials. Updates to both the primary and daisy-chained PDUs are captured in the Power IQ audit log.

   Note: You can also review the plan actions in the Template Actions section at the top of the page.

10. Click Run.

Upon completion, the trap destinations are updated.

Note: When running bulk configuration templates, if both SNMP settings and trap destinations are configured in the same template, SNMP settings are configured before trap destinations are configured. As a result, the SNMP configuration on the PDU and as known to Power IQ will be set to its target state prior to the trap destinations being updated to ensure that trap destinations are changed accurately.

Note: You may need to enable the SNMP agent on Server Technology PDUs for the traps to be handled appropriately. If you disable traps on a Server Technology PDU, you will need to re-enter the hosts values to enable traps at a later date.

Note: This feature is supported only for Raritan PX2, PX3, and EMX and Server Technology facility items.

Configure SNMP Settings for Facility Items in Bulk

System Administrators can configure SNMP community credentials on Raritan, Chatsworth and Server Technology facility items in Power IQ.

Configuring SNMP community credentials for Power IQ polling for one or more Raritan, Chatsworth and Server Technology facility items requires creating a new bulk configuration template/plan or editing an existing template, specifying SNMP v1/v2 or SNMP v3 settings, updating the appropriate fields, selecting the desired facility items, and then running the plan to update the facility items with the new teconfiguration.

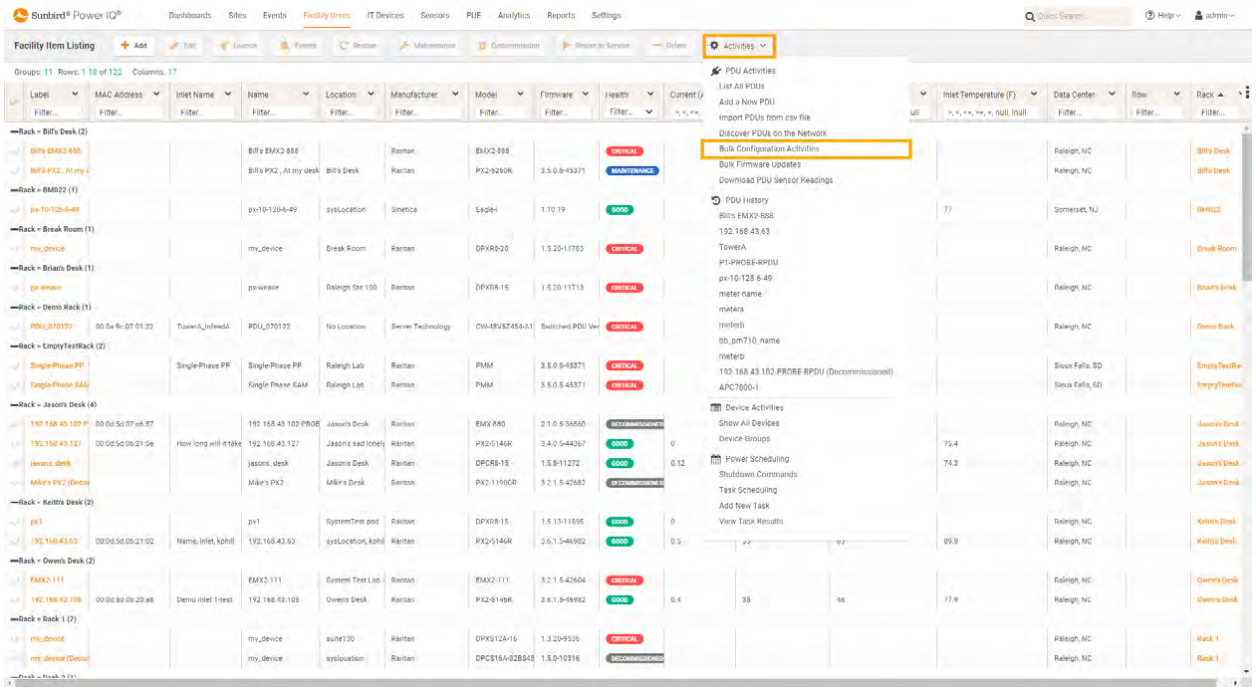
Note: if you are changing the SNMP type, you should also include a Trap Destination action in the plan so that Power IQ can update the trap type on the PDU.

Note: Before performing bulk configuration actions on PDUs, Sunbird recommends putting them into Maintenance Mode. This will prevent events related to lost connectivity and admin credential checks from being generated while the actions are running. After the bulk configuration plan has completed, be sure take the PDUs out of Maintenance Mode by using the Return to Service option.

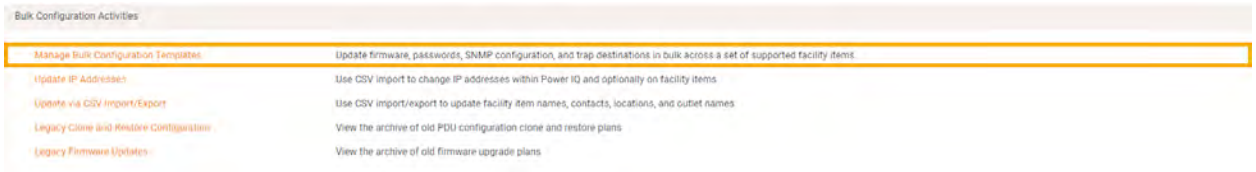
Note: Chatsworth facility items cannot support both SNMPv2 and SNMPv3 polling simultaneously. A warning message will display if you attempt to configure both v1/v2c and v3 credentials for Chatsworth facility items.

To configure SNMP community settings:

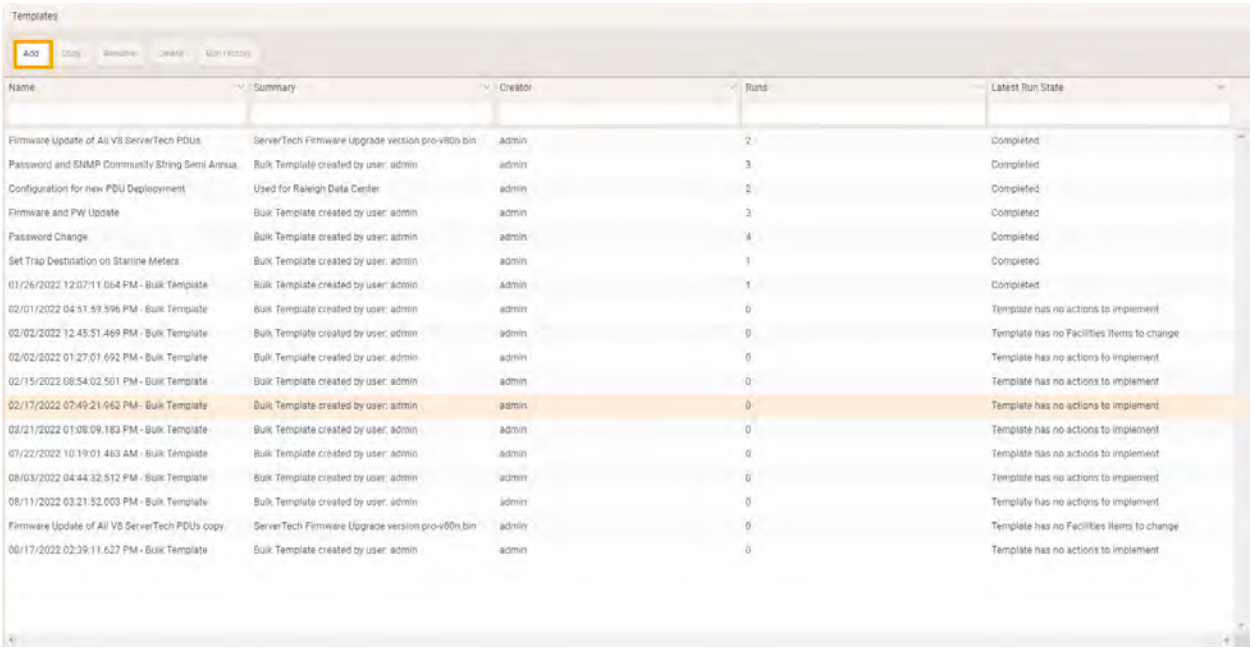
1. In the Facility Items tab, select Activities > Bulk Configuration Activities.
In the Facility Items tab, select Activities > Bulk Configuration Activities.



2. On the Bulk Configuration Activities page, select Manage Bulk Configuration Templates.



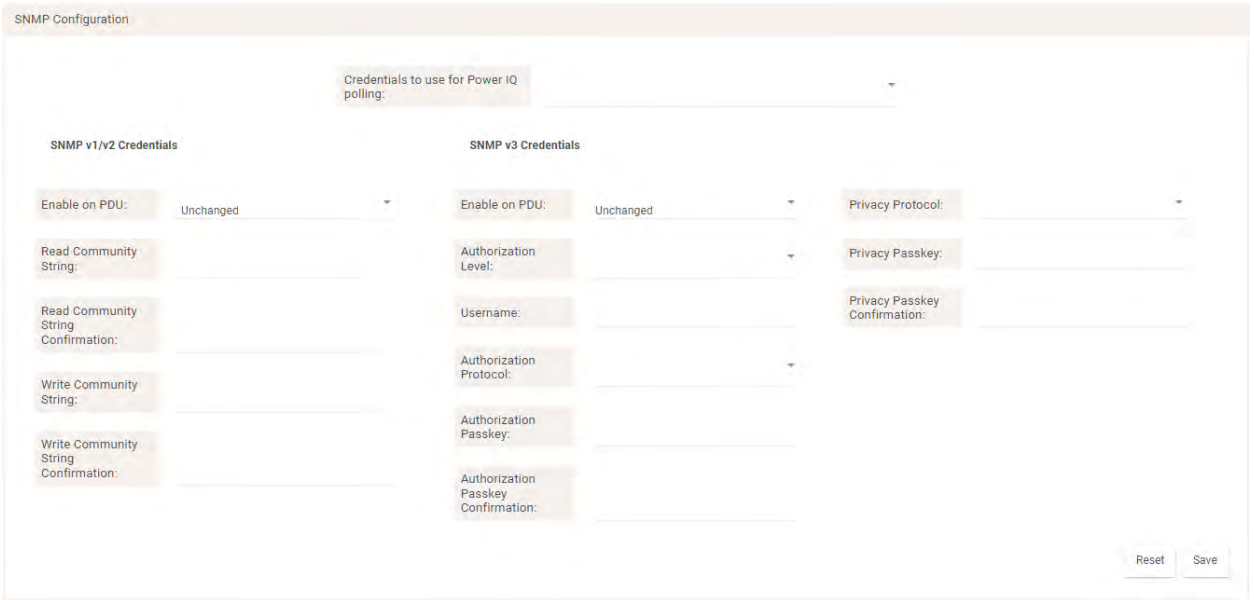
3. On the Templates page, select the existing template you would like to run or click Add to create a new template. Templates can be filtered based on the following criteria: Name, Summary, Creator, Number of Runs, and Latest Run State.



Note: If you click Add, a new template will automatically be created, and you will be directed to the Actions page, without clicking Next . Proceed to Step 6. To edit the template's name or summary, return to the Templates page, select the template, and click the Edit link.

4. Click Next. The Actions page displays.

5. In the SNMP Configuration panel on the Actions Page, use the Credentials to Use for Power IQ Polling drop-down to select the SNMP type. Select from Read Community, Write Community (SNMP v1/v2) or SNMP v3.



Note: Power IQ 9.0.0 support configuring the SHA authentication protocol and the AES privacy protocol when configuring SNMPv3 settings via bulk configuration on Server Technology Sentry3 and Sentry4 PDUs.

6. In either the SNMP v1/v2 or SNMP v3 section, use the Enable on PDU dropdown to enable, disable, or leave the settings unchanged. Select from Enable, Disable, or Unchanged respectively. (Note: Chatsworth PDUs cannot support both SNMPv2 and SNMPv3 polling simultaneously. A warning message will display if you attemp to configure both v1/v2c and v3 credentials for Chatsworth PDUs.)
7. If you choose Read Community or Write Community from the Credentials to Use for Power IQ Polling dropdown, you must provide the Read Community String or Write Community String in the appropriate fields. (required)
8. If you choose SNMP v3 from the Credentials to Use for Power IQ Polling dropdown, you will need to provide the following (the required settings will vary based on your selection):
    a. Username
    b. Authentication Level (Select from noAuthNoPriv, authNoPriv, or authPriv)
    c. Authentication Protocol (Select from MD5 or SHA. Note that SHA is not supported for Server Technology PDUs, only Chatsworth and Raritan PDUs.)
    d. Authentication Passkey
    e. Privacy Protocol (Select from AES or DES. Note that AES is not supported for Server Technology PDUs, only Chatsworth and Raritan PDUs.)
    f. Privacy Passkey
9. Click Save in the SNMP Configuration panel to save your changes. If successful, a success message will display.

Note: On the Actions page, you can also update firmware, set Power IQ as a trap destination, and change the administrator password without the need to create a new plan. For more information, see Update Firmware for Facility Items in Bulk on page 778, Set Power IQ as the SNMP Trap Destination for Facility Items in Bulk on page 784, and Change the Administrator Password for Facility Items in Bulk on page 780 respectively.

10. Click the Next link in the upper right corner.
11. Select your desired PDUs from the list of available PDUs and click the Add PDUs link to add your desired PDUs to the selected PDUs.
12.

Note: If you add Chatsworth facility items to your plan that are part of a secure array, you must add both the primary and alternate facility items in order for secure array failover to function properly. Power IQ will provide the option to add the missing alternate facility items, change the configuration, or remove the facility items.

Note: Since Power IQ only communicates with the primary PDU in the chain, Power IQ will only display the primary Server Technology PDUs in the list of available PDUs. When you successfully change the password on a primary Server Technology PDU, Power IQ will internally update the username and password for the PDU Administrative Account on the daisy-chained PDUs to the same credentials. Updates to both the primary and daisy-chained PDUs are captured in the Power IQ audit log.

Note: You can also review the template actions in the Template Actions section at the top of the page.

13. Click Run.

Upon completion, the SNMP configuration will be updated.

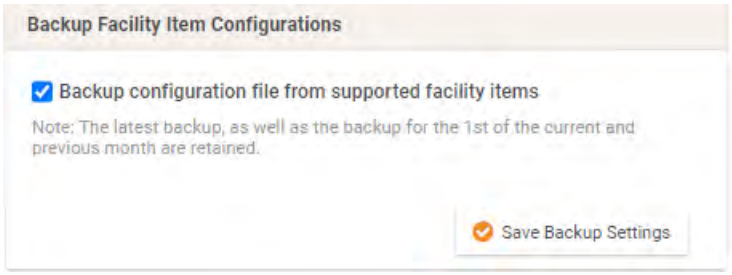
Note: When running bulk configuration templates, if both SNMP settings and trap destinations are configured in the same template, SNMP settings are configured before trap destinations are configured. As a result, the SNMP configuration on the PDU and as known to Power IQ will be set to its target state prior to the trap destinations being updated to ensure that trap destinations are changed accurately.

Note: This feature is supported only for Chatsworth facility items running firmware version 4.4 or higher, Raritan PX2, PX3, and EMX and Server Technology facility items.

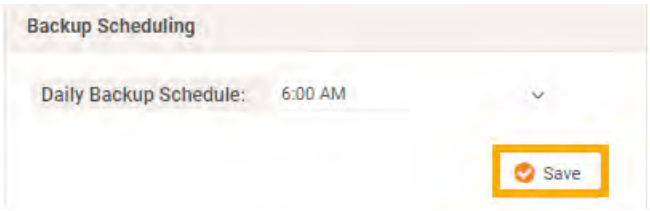
Clone and Restore Sever Technology and Raritan Device Configurations

The following information applies to all Raritan devices and Server Technology version 8.x devices. The devices to be configured must be of the same make, model and firmware of the configuration source device.

- Power IQ automatically collects each device's Configuration File, if this feature is enabled. In the Settings tab, click the Power IQ Settings tab in the Appliance Administration section. Check Backup configuration file from supported facility items checkbox.

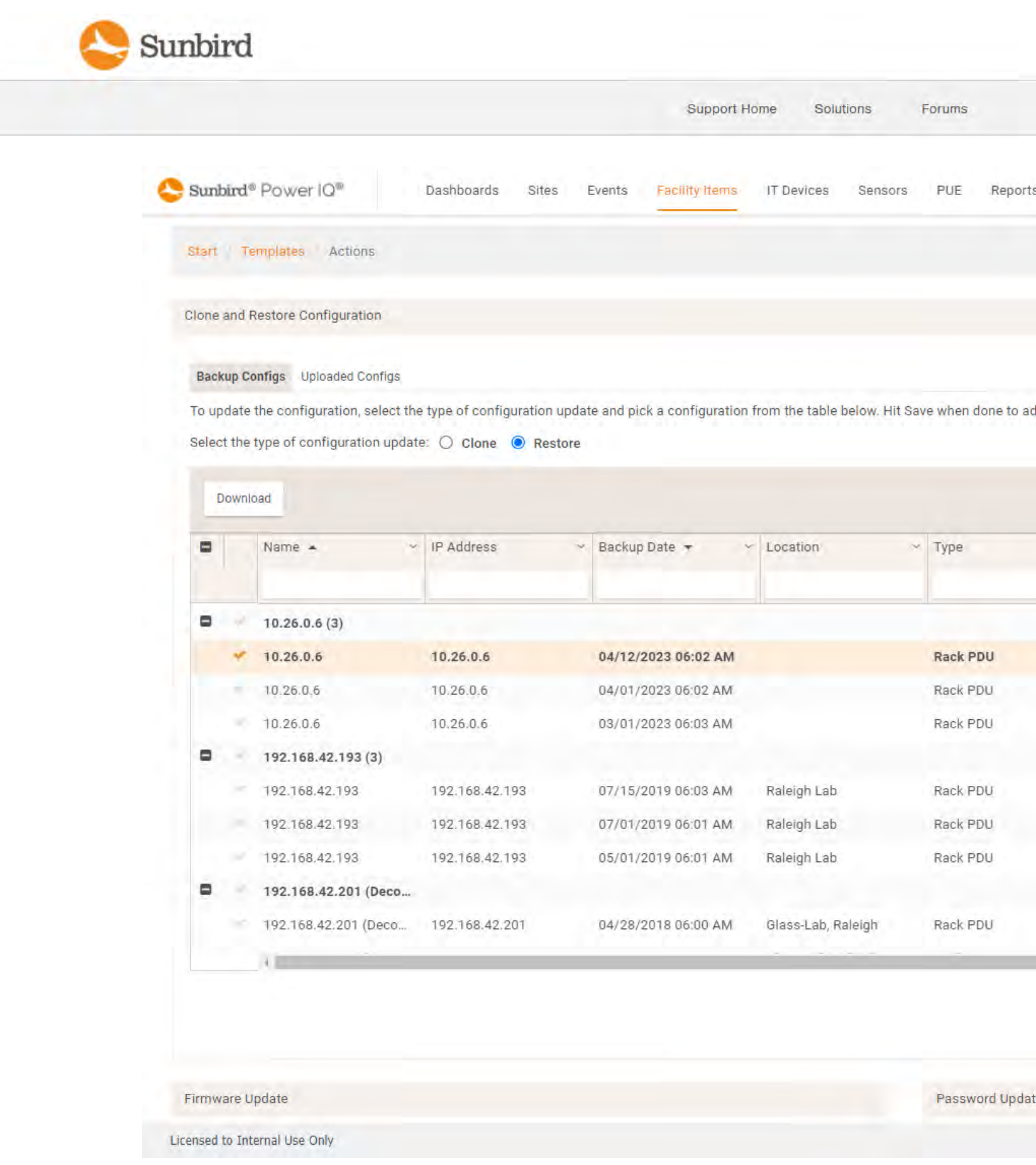


- It collects it at the admin configurable Power IQ full system back-up time. In the Settings tab; click Data Backups in the Data Management section. Set the time you want in the Back up Scheduling panel at the bottom.



- Three "Configuration Files" are retained for each device: Today's back-up, the first calendar day of the current month and the first calendar day of last month.
- The Raritan "Configuration File" file does NOT contain any Device Specific Information like the following list:
  - Device name
  - SNMP system name, contact and location

    - Part of network settings (IP address, gateway, netmask and so on)
    - Device logs
    - Names, states and values of environmental sensors and actuators
    - TLS certificate
    - Server monitoring entries
    - Asset strip names and rack unit names
    - Outlet names and states
- The Server Technology Configuration File contains all settings for a complete restore of a device. Power IQ removes the Device Specific Information when you select the clone operation.
- The Server Technology Configuration File is an editable text file. You can download it from a Server Tech device GUI and edit it in note pad to include only the settings you want to change on one or more devices. You can then upload it to Power IQ via the “Uploaded Config” page. It will be saved as a template you can use in plan to “Clone” or “Restore” only the specific settings to one or more devices.


Sunbird
Support Home
Solutions
Forums
Sunbird® Power IQ®
Dashboards
Sites
Events
Facility Items
IT Devices
Sensors
PUE
Reports
Start
Templates
Actions
Clone and Restore Configuration
Backup Configs
Uploaded Configs
To update the configuration, select the type of configuration update and pick a configuration from the table below. Hit Save when done to ad
Select the type of configuration update:
Clone
Restore
Download
Name
IP Address
Backup Date
Location
Type
10.26.0.6 (3)
10.26.0.6
10.26.0.6
04/12/2023 06:02 AM
Rack PDU
10.26.0.6
10.26.0.6
04/01/2023 06:02 AM
Rack PDU
10.26.0.6
10.26.0.6
03/01/2023 06:03 AM
Rack PDU
192.168.42.193 (3)
192.168.42.193
192.168.42.193
07/15/2019 06:03 AM
Raleigh Lab
Rack PDU
192.168.42.193
192.168.42.193
07/01/2019 06:01 AM
Raleigh Lab
Rack PDU
192.168.42.193
192.168.42.193
05/01/2019 06:01 AM
Raleigh Lab
Rack PDU
192.168.42.201 (Deco...
192.168.42.201 (Deco...
192.168.42.201
04/28/2018 06:00 AM
Glass-Lab, Raleigh
Rack PDU
Firmware Update
Password Updat
Licensed to Internal Use Only

- Steps:
  1. Click the Facility Items tab
  2. Select “Bulk Configuration Activities” from the “Activities” drop down
  3. Click “Manage Bulk Configuration Templates” link
  4. Click “Add” button to create a template
  5. Filter the table and select the “Device Configuration” file you was to use by clicking the check symbol. Only one file can be selected at a time.
  6. Select the “Restore “ radio button to push the “Configuration” to one device or “Clone” operation to push to one or more devices.
  7. Click the “Save” button at the bottom of the panel to save your selection.
  8. Click the “Next” button in the upper right of the page. You will be presented with a table of target devices to select from.
  9. Filter the table and select one or more devices as appropriate.
  10. Click the “Add PDUs” button to add them to the plan. Devices in the plan are shown in the second table.
  11. Click the “Next ” button in the upper right of the page when you are happy with your plan and what it to run. You can run and export a report of the operation.

Note: The device from the selected “Configuration” is automatically included to the list so you will need to remove it if you don’t want to restore/clone the configuration to it.

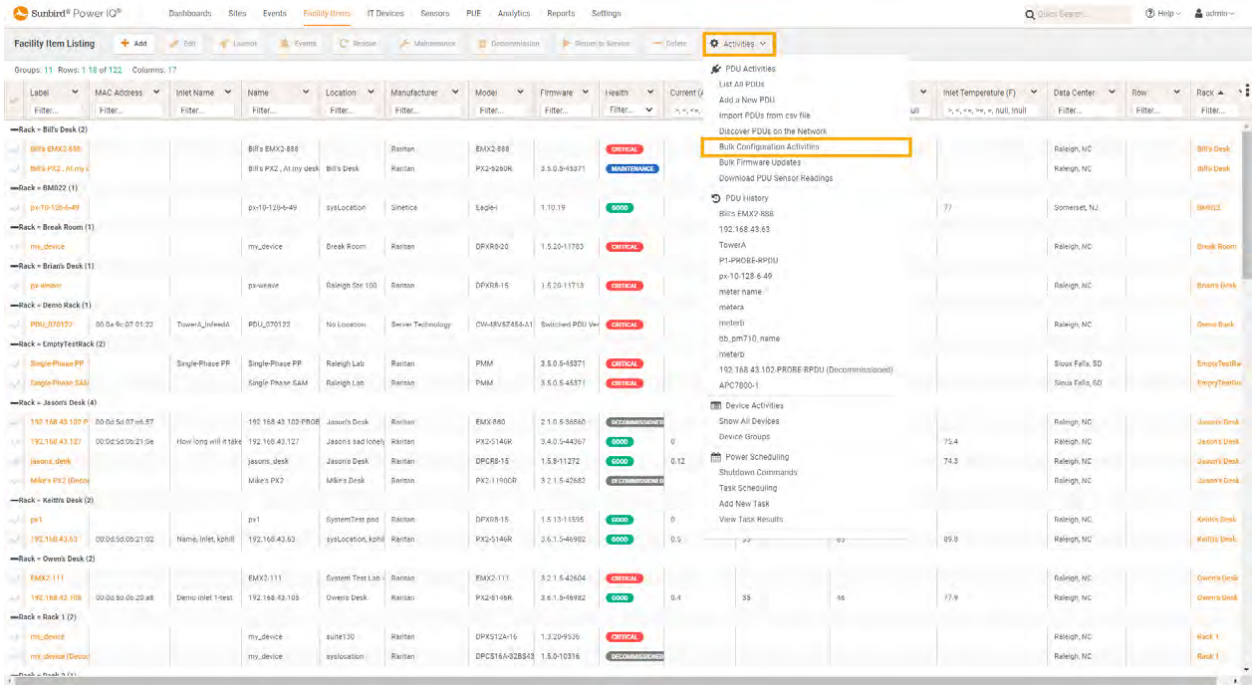
Note: Power IQ does not support PX2/PX3/PX4/EMX/PRO3X/PRO4x password protected encrypted bulk configuration files for Power IQ bulk configuation upload.

View the Run History and Report for a Bulk Configuration Template

You can view the run history for a specific bulk configuration template or plan within Power IQ. You can also view the reports for specific dates and times from the Run History page. Reports are created automatically when a template has been run. If a template has not been run, you will not be able to view its run history.

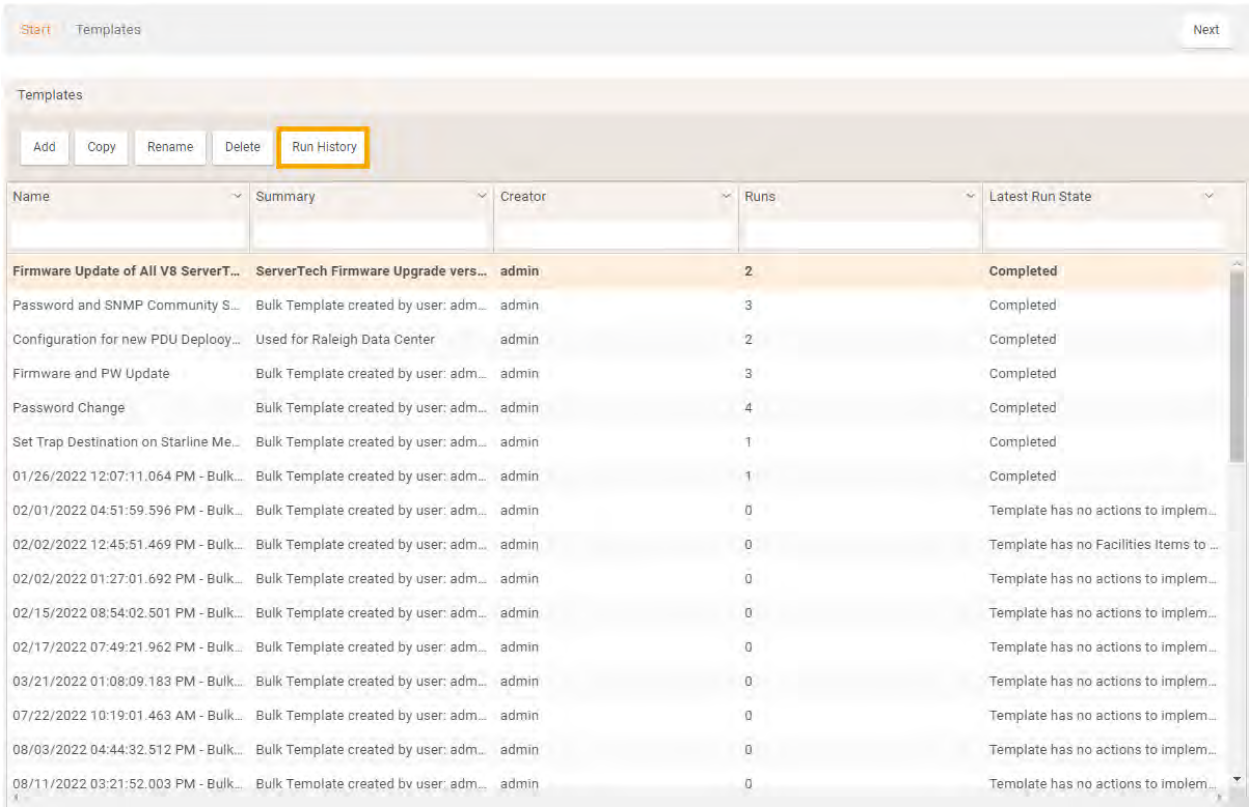
To view the run history for a specific template:

1. In the Facility Items tab, select Activities > Bulk Configuration Activities.



2. On the Bulk Configuration Activities page, select Manage Bulk Configuration Templates.

3. On the Templates page, select the existing template you would like to view the run history for.



4. Click the Run History button to view the run history page.

On the Run History page, you can select the template report you would like to view by clicking the Report link in the far right column of the report you would like to view. Reports can be filtered by the following:

- State
- Summary
- Start Date and Time
- Completion Date and Time

The following screenshot shows an example template report for updating a password.

Each report includes the following sections:

Actions

The Actions section provides titles and descriptions for the actions performed (e.g., Update Password).

Summary

The Summary section provides the dates and times the actions were completed. It also indicates who ranthe template and the number of facility items that were included and updated in the plan.

Details

The Details section provides date- and time-stamped messages for each facility item that indicate the state of each facility item as the plan is executed (e.g., Waiting to run, Started tasks).

Reports also can be exported to PDF by clicking the Export as PDF link on the Report page

CSV Summary Report

A downloadable CSV summary report is also available by clicking the Summary Report link on the Run History page. This report can be used for sorting and filtering the data in Excel and for emailing to others on your team.

The CSV file captures PDU information and whether the desired actions were completed successfully. It includes the following columns:

- Label: The IP address or host name of the PDU
- Name: The name of the PDU
- Location: The location of the PDU
- Manufacturer: The manufacturer or make of the PDU
- Model: The model of the PDU
- Password Update: Indicates the status of the action: Success, Fail, or Warning (completed but with errors or warnings)
- Firmware Update: Indicates the status of the action: Success, Fail, or Warning (completed but with errors or warnings)
- Trap Destinations: Indicates the status of the action: Success, Fail, or Warning (completed but with errors or warnings)
- SNMP Configuration: Indicates the status of the action: Success, Fail, or Warning (completed but with errors or warnings)

The order of the actions may vary by which action were included in the template. For example, if only the Password Update action was included, only the Password Update column would be included in the report.

Back Up Facility Item Configuration Files

Users can clone and restore facility item configuration files in Power IQ.

When enabled, backups are made automatically as part of the scheduled database backup. The most recent backup, as well as the backups from the first days of the current and previous months, will be retained.

If you selected a configuration file that was a backup of a facility item, by default that facility item will be added to the selected PDUs list when running the plan.

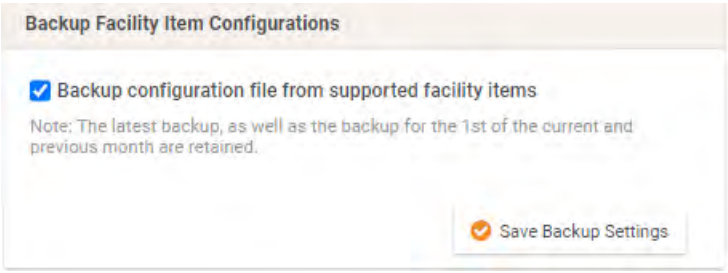
The backup and the date and time when captured will be displayed on the Choose a PDU Configuration page when editing a plan or creating a new plan.

Note: Users can backup and restore PDU configuration files for Raritan PX1, PX2, PX3, PX4, EMX PDUs and Server Technology Sentry4, PRO3X and PRO4X only.

Enable/ Disable Facility Item Configuration Backups

System Administrators can enable or disable backing up of facility item configurations through the Settings tab.

To enable or disable this feature, check or uncheck the “Backup configuration files from supported facility items” check-box under Settings > Appliance Administration > Power IQ Settings > Backup Facility Item Configurations.



By default, the box will be checked.

Note: The most recent backup, as well as the backups from the first days of the current and previous months, are retained.

Clone and Restore Facility Item Configuration Files

Bulk configuration files can be cloned or restored to facility items in the Clone and Restore Configuration panel when creating a new bulk configuration template or editing an existing template.

The Choose a PDU Configuration File page is the second step in the rollout plan wizard (after naming the plan). It can also be accessed by clicking the Choose a configuration file link (next to PDU Configuration file) on a plan summary page. For more information, see Plan a New Rollout.

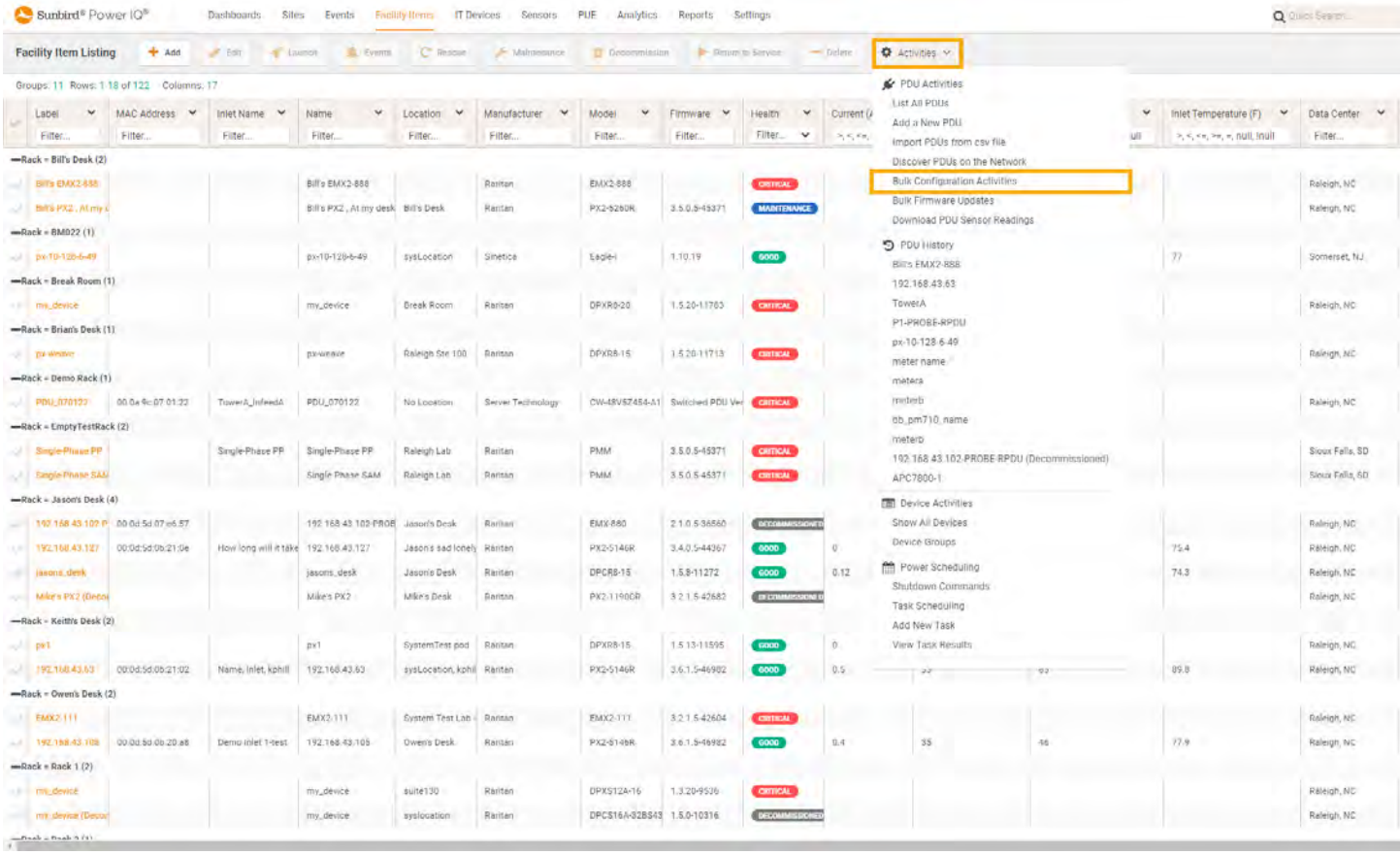
Backup files are listed in the first tab on the page. Backup files can be grouped, sorted and filtered by any of the following:

- Name
- IP Address
- Location
- Type
- Manufacturer
- Model
- Data Center
- Floor
- Room
- Aisle
- Row
- Rack

- PDU
- Backup Date

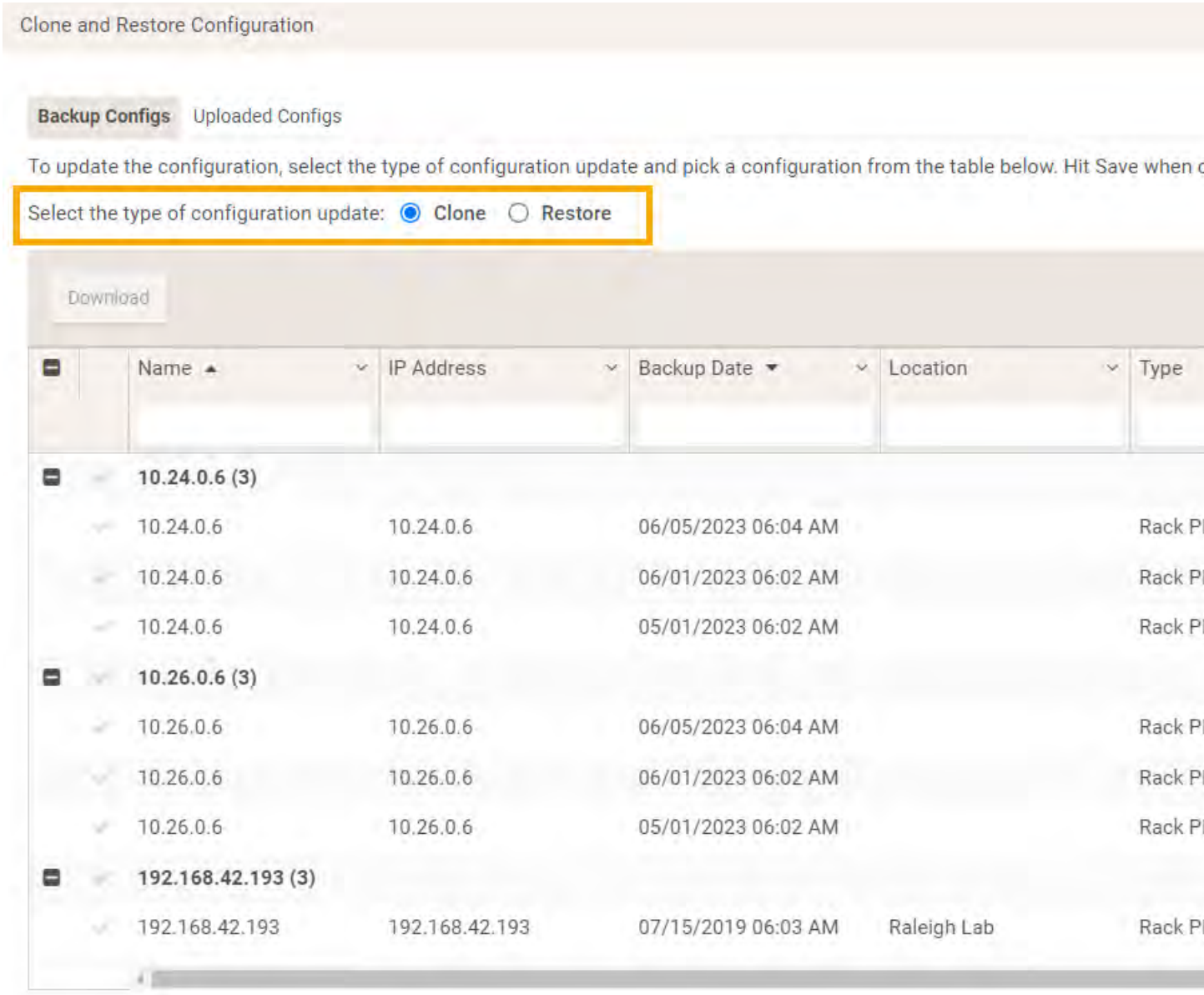
To clone or restore a backup configuration file to a PDU:

1. In the Facility Items tab, select Activities > Bulk Configuration Activities.



2. On the Bulk Configuration Activities page, select Manage Bulk Configuration Templates. The Templates panel displays.
3. On the Templates panel, select the template you would like to edit or click **Add**.

4. On the Template Actions page, in the Clone and Restore Configuration panel, select the type of configuration update you want to make: Clone or Restore.



5. In the Clone and Restore Configuration panel, select the desired configuration file from the configuration table. You must select a file to continue.
6. Click Save.
7. Click Next.

8. Select your desired PDUs from the available PDUs panel. If you selected a configuration file that was a backup of a facility item, you will be asked if you want to add the missing PDU to the selected PDUs list.
9. Click Run to run the template.
10. Click Yes on the Confirm template popup to confirm the template.
11. The Status page displays.

To upload a file in the Clone and Restore Configuration panel:

1. Click the Upload Configs tab.
2. Click Upload. The Configuration File Upload pop-up displays.
3. Provide the following: Model Name, Manufacturer, File Upload
4. Click Browse to select your desired configuration file.
5. Click Open to upload the file.
6. Once the file is uploaded, you can select it from the config file table.
7. Select the desired configuration file.
8. Click Submit to upload your file.
9. The config file is added to the bottom of the table

Note: You can also upload a new configuration file on the PDU Configuration Files page (under Activities > Manage Uploaded Configuration Files).

Bulk Change PDU IP Addresses and View Run History Reports

You can update the IP addresses of multiple PDUs, including facility items such as Floor PDUs, Floor UPS, Power Panels, and so on, using a CSV import. This is useful if you need to repartition a network and move PDUs from one sub-net to another.

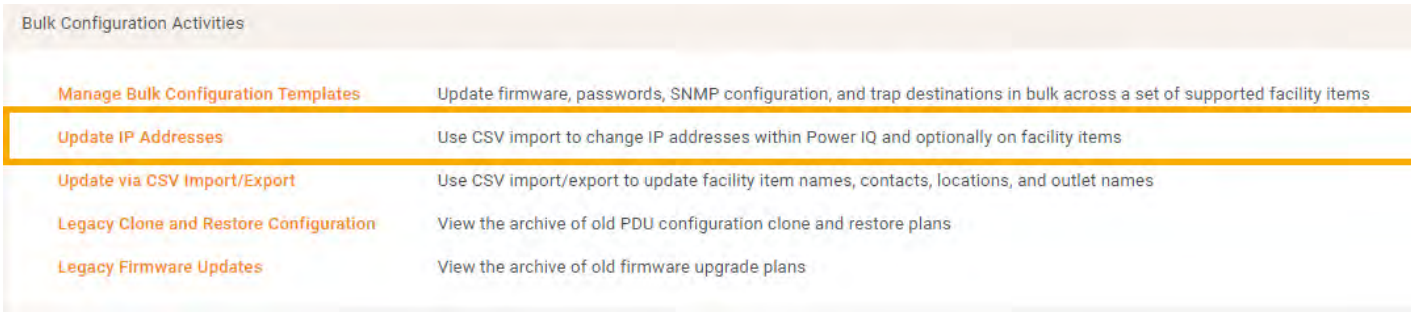
- Power IQ will report lost connectivity events until the systems are aligned after the bulk IP address change is complete.
- Polling will be interrupted by the bulk IP address change.
- The CSV file is validated at import.
- IP addresses must be properly formatted.
- IPv4 and IPv6 addresses are supported.
- Existing IP addresses cannot be reused as new IP addresses.
- If the existing IP address in your CSV file is not found in Power IQ, that change is rejected.
- New IP addresses that already exist in Power IQ are rejected.

Note: For Chatsworth facility items, if you wish to use an IPv6 address, ensure that an IPv4 address is not specified for the facility item. Chatsworth facility items will not accept an IPv6 address if an IPv4 address is available.

Create and Upload the CSV Import File to Change PDU IP Addresses in Bulk

Create the CSV import file. See *Bulk Change PDU IP Address File Requirements* on the facing page.

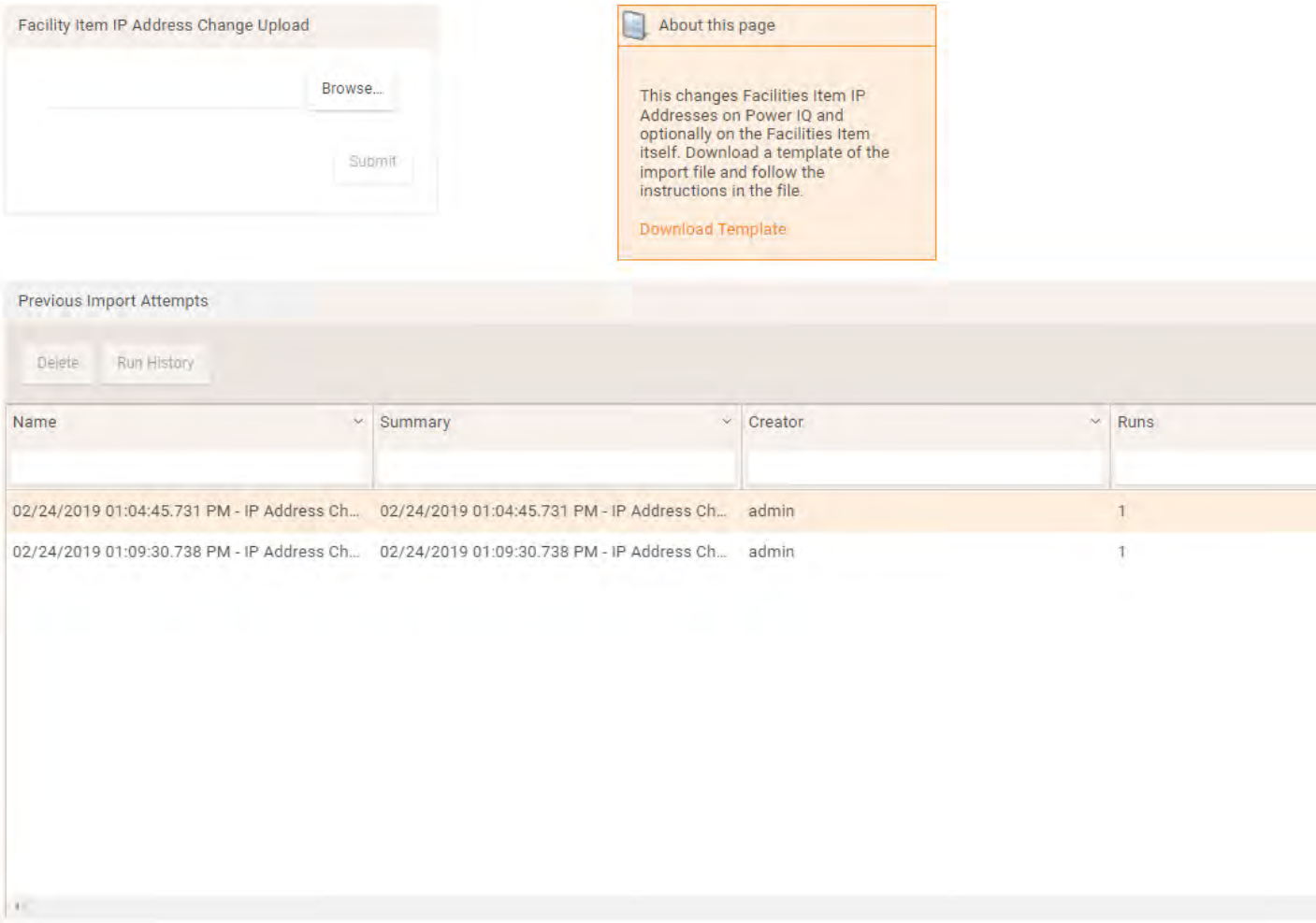
1. In the Facility Items tab, select the Activities menu > Bulk Configuration Activities.
2. From the list of Bulk Configuration Activities, select Update IP Addresses.



3. In the Facility Item IP Address Change Upload section, click Browse.
4. Select the CSV file
5. Click the Submit button.

- If the upload is successful, Power IQ displays the Live Status page, which displays the status of each operation.
- If any changes fail, an error is displayed in the Import page, and nothing is imported. Correct the errors in the file, and try the import again.

- A history of previous import attempts can be viewed in the Previous Import Attempts section.



Bulk Change PDU IP Address File Requirements

The CSV import file for changing PDU IP address should follow this format.

Column A	Column B	Column C	Column D	Column E
Old IP address	New IP address	Change on Power IQ AND Facilities Item	New Subnet mask	New Gateway

To help you create the CSV file, you can download the IP_Address_change_upload_template file from the Facility Item IP Address Change Upload page in Power IQ, then follow the instructions in the file to edit the file to prepare it for import.

1. In the Facility Items tab, select Activities > Bulk Configuration Activities.
2. Select Bulk Update IP in Power IQ.
3. Click the Next button.
4. In the Facility Item IP Address Change Upload section, click the Download Template link.
5. Save or open the file using the dialog that appears.
6. Edit the exported file to contain the following:
    a. Column A: Old IP addresses (required)
    b. Column B: New IP addresses (required)
    c. Column C: Whether the change should take place on Power IQ only or on both Power IQ and the facility item itself (required). Choose from POWERIQ or BOTH for each PDU.

    Note: The BOTH option, which allows you to change IP addresses on both Power IQ and the facility item, is supported for Raritan PX2, PX3, EMX PDUs, Chatsworth facility items running firmware version 4.4 and higher and Server Technology PDUs only. However, you can change IP addresses for non-Raritan and non-ServerTech PDUs in Power IQ only using this feature.

    d. Column D: New subnet mask of the new IP address (required for BOTH; should not be included for POWERIQ)
    e. Column E: New gateway/router for the facility item (required for BOTH; should not be included for POWERIQ)
7. Save the file.
8. Upload the file on the Facility Item IP Address Change Upload page.

Note: For Chatsworth PDUs, the network settings will revert after a few seconds unless the "Manually Configure IPv4" and the "Manually Configure IPv6" settings are enabled via the PDU GUI.

Viewing a Bulk Change PDU IP Address Import Attempt Run History

You can view the run history of a previous PDU IP address change and its associated report via the Facility Item IP Address Change Upload page. This is useful when looking for a summary of previous changes or to confirm that a change has been made.

To view the run history for a specific plan:

1. In the Facility Items tab, choose Activities > Bulk Configuration Activities.
2. Select Update IP Addresses.
3. Click the Next button.
4. In the Facility Item IP Address Change Upload section, under Previous Import Attempts, select the previous import attempt whose run history you want to view.
5. Click the Run History link to view the run history page. To delete a previous import attempt, select the previous import attempt you want to delete, and click the Delete link.

On the Run History page, you can select the report you would like to view by clicking the Report link in the far right column of the import attempt you would like to view. The contents of the Run History table can be filtered by the following:

- State
- Summary

- Start Date
- End Date

Plan Reports

Report

The following screenshot shows an example plan report for updating an IP address.

Report for 12/19/2017 10:35:21.341 AM - IP Address Change

Summary: 12/19/2017 10:35:21.341 AM - IP Address Change for user: admin
Created By: admin

Actions

Title	Description
Change Address of PDUs on PowerIQ	Change the IP Address of PDUs within PowerIQ

Summary

			Facility Items		
Started At	**Completed At**	**Run By**	**Count**	**Updated**	**Failed**
12/19/2017 10:35:21.378 AM	12/19/2017 10:35:22.416 AM	admin	0	1	0

Details

Facility Item	Message Time	Message
192.168.43.117 -> 10.129.1.117		
	12/19/2017 10:35:21.491 AM	Waiting to run
	12/19/2017 10:35:21.543 AM	Started tasks
	12/19/2017 10:35:21.646 AM	Succesfully updated IP Address of facilities item in PowerIQ.

Each report includes the following sections:

Actions

The Actions section provides titles and descriptions for the actions performed (e.g., Change the IP Address of PDUs on Power IQ).

Summary

The Summary section provides the dates and times the actions were completed. It also indicates who executed the plan and the number of facility items that were included and updated in the plan.

Details

The Details section provides date- and time-stamped messages for each facility item that indicate the state of each facility item as the plan is executed (e.g., Waiting to run, Started tasks).

Reports also can be exported to PDF.

PDU Outlet Naming and Setting System Attributes

Power IQ enables you to export all the current PDU Outlet and System Attribute names to a CSV file that you can edit, and then re-import new names. See *Naming Outlets in Bulk with CSV Files* on page 808. Change individual names manually by clicking a field and editing. See *Naming Individual Outlets* on the next page.

Raritan PDU outlet names can be up to 32 characters in length, with no character restrictions. See the manufacturer's specification for naming requirements for other brands of PDUs.

Note: PDUs must be configured in Power IQ with an SNMP community string that has write-level access to allow outlet naming.

The following PDUs have manufacturer limitations that affect renaming via SNMP: Outlet and system attribute naming is not available via SNMP for Avocent or Geist PDUs. Outlet naming via SNMP is not available for Tripp Lite PDUs or the Eaton Pulluzi model PDU. The standard Eaton model does support outlet naming. System attribute naming via SNMP is not available for Baytech PDUs. Names for Servertech PDUs cannot contain spaces. Setting the MIB-II sysContact value is not supported for Chatsworth (CPI) PDUs. When importing Chatsworth PDUs via CSV import, leave the sysContact value blank.

Naming Individual Outlets

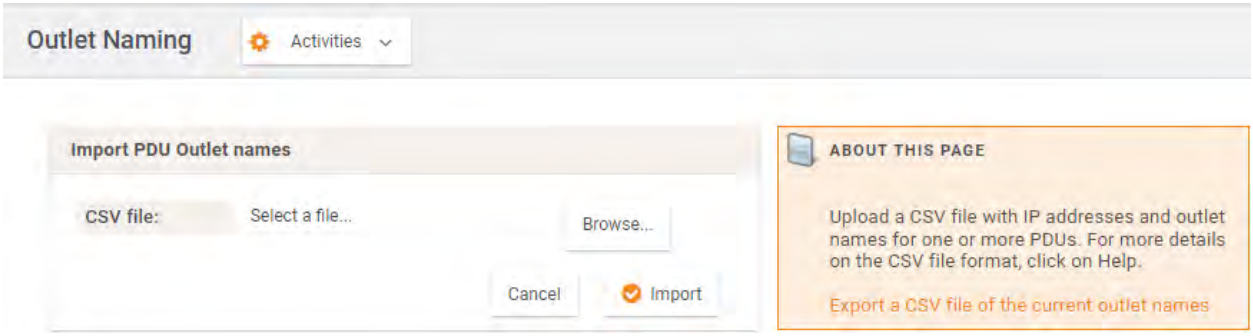
1. In the Facility Items tab, click the link for a PDU to open the Sites Tab tab.
2. Scroll down to the Outlets list.
3. Double-click the outlet name, then enter the new name in the field. Use only UTF-8 characters.
4. Press Enter to save the name.

The names are written back to the PDU. If you connect to the PDU directly, the outlets appear there with their new names.

Naming Outlets in Bulk with CSV Files

When you import an outlet name CSV file, Power IQ names the outlets according to the values in the file. The names are written back to the PDU. If you connect to the PDU directly, the outlets appear there with their new names.

1. In the Facility Items tab, choose Activities > Bulk Configuration Activities.
2. From the list of Bulk Configuration Activities, select Update via CSV Import/Export.
3. Click Next.
4. In the Import PDU Outlet Names section, click Browse to select your updated CSV file.
5. Click Import to initiate the file import.



You can export a CSV file of the current outlet names from the Import PDU Outlet Names page. For more information, see *Exporting Outlet Names to a CSV File* on page 811

For details on creating the outlet name CSV file, see *Structure of the Outlet Name CSV File* on page 810.

Setting SNMP System Attributes for PDUs

In addition to naming the outlets of PDUs, the Outlet Names CSV file can be used to set three SNMP system attributes. These attributes are SYS_CONTACT, SYS_NAME and SYS_LOCATION. These settings are optional values in the CSV file.

1. SYS_CONTACT: is used to identify a person to contact regarding the PDU. For example, the IT administrator.
2. SYS_NAME: is used to set the name of the PDU.
3. SYS_LOCATION: is used to describe where the PDU is located. For example, "Sales Rack - Server Closet 2."

Note: Setting SNMP system attributes is not available for Raritan PX versions lower than 1.3, Baytech, Eaton, Geist, Liebert, or Avocent PDUs. Leave these fields blank for those PDUs.

Structure of the Outlet Name CSV File

The CSV file used for outlet naming and setting SNMP system attributes uses the following structure. There is one facility item per line/row.

Use only UTF-8 characters.

Note: The following facility items have manufacturer limitations that affect renaming via SNMP: Outlet and system attribute naming is not available via SNMP for Avocent or Geist facility items. Outlet naming via SNMP is not available for Tripp Lite facility items or the Eaton Pulluzi model facility item. The standard Eaton model does support outlet naming. System attribute naming via SNMP is not available for Baytech facility items. Names for Servertech facility items cannot contain spaces. Setting SNMP system attributes is not available for Raritan PX versions lower than 1.3, Baytech, Eaton, Geist, Liebert, or Avocent facility items. Leave these fields blank for those facility items.

- The first column is an IP address identifying a facility item.
- The second column is the Proxy Index value. Leave this value blank if the facility item does not support or is not using this configuration. You cannot change the Proxy Index value via CSV import. See Proxy Index Details.
- **Optional** The third column is the SNMP SYS_CONTACT value..
- **Optional** The fourth column is for the SNMP SYS_NAME value.
- **Optional** The fifth column is for the SNMP SYS_LOCATION value.

Each value/column following the SYS_LOCATION represents an outlet on that facility item. Outlets start at 1 and increase sequentially with each column.

These values indicate only what is changed by the naming operation:

If an IP address does not appear in the file, no naming operations occur on that facility item.

If an outlet value is blank, its name does not change.

Example:

```
192.168.77.102,,Michael,Test PX2,RACK1,KVMSwitch1,KVMSwitch2,,Sales FTP Server
```

A facility item at 192.168.77.102 would receive the system name "Test PX2". Its first outlet would be renamed to "KVMSwitch1" and its second outlet renamed to "KVMSwitch2." The third outlet would not be renamed. The fourth outlet would be renamed to "Sales FTP Server."

Note: For proxy indexed facility items, such as those in daisy chains for the BCM2 modules, the pduName will be updated in place of the sysName.

Exporting Outlet Names to a CSV File

You can export the outlet names in Power IQ to a CSV file.

You can edit the file to change outlet names, then import it. See *Naming Outlets in Bulk with CSV Files* on page 808.

Note: The following PDUs have manufacturer limitations that affect renaming via SNMP: Outlet and system attribute naming is not available via SNMP for Avocent or Geist PDUs. Outlet naming via SNMP is not available for Tripp Lite PDUs or the Eaton Pulluzi model PDU. The standard Eaton model does support outlet naming. System attribute naming via SNMP is not available for Baytech PDUs. Names for Servertech PDUs cannot contain spaces. Setting SNMP system attributes is not available for Raritan PX versions lower than 1.3, Baytech, Eaton, Geist, Liebert, or Avocent PDUs. Leave these fields blank for those PDUs.

1. In the Facility Items tab, select Activities > Bulk Configuration Activities.
2. Click the Update via CSV Import/Export link.
3. Click the Export a CSV file of the current outlet names link.
4. In the Save As... dialog, provide a name for the CSV file.
5. Click the Save button.

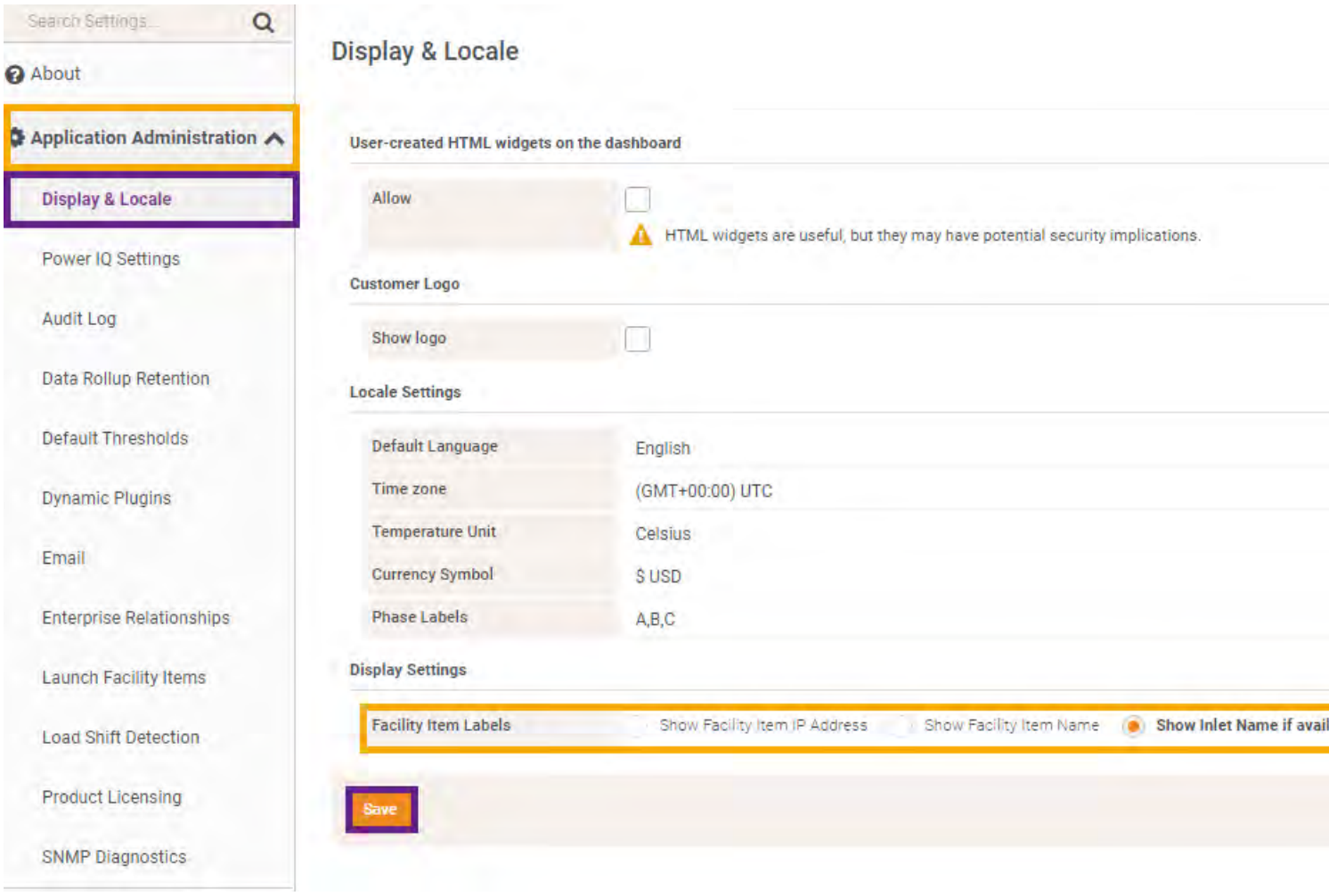
Configure Facility Item Display Settings - View Facility Items by IP or Name

Select whether you want all facility items in the system to be identified by facility item name or IP address in the Settings tab. This setting affects all pages where facility items are listed, and is used in email notifications when identifying facility items. This setting applies to all users in the system.

Facility item names are retrieved from the facility item, via SNMP, NOT from the network. Facility item name is not guaranteed to be unique. If a facility item name is not available, the facility item label is set to "Unnamed" and the IP address is included.

The facility item display setting affects the Quick Search feature. If IP address is selected in the display settings, you can search facility items by either name or IP address. If facility item name is selected, only searching by facility item name is permitted. Devices can always be searched by either name or IP address regardless of the facility item display preference.

1. In the Settings tab, click Application Administration > Display & Locale
2. In the Display & Locale tab, select Show Facility Item IP Address or Show Facility Item Name, then click Save.

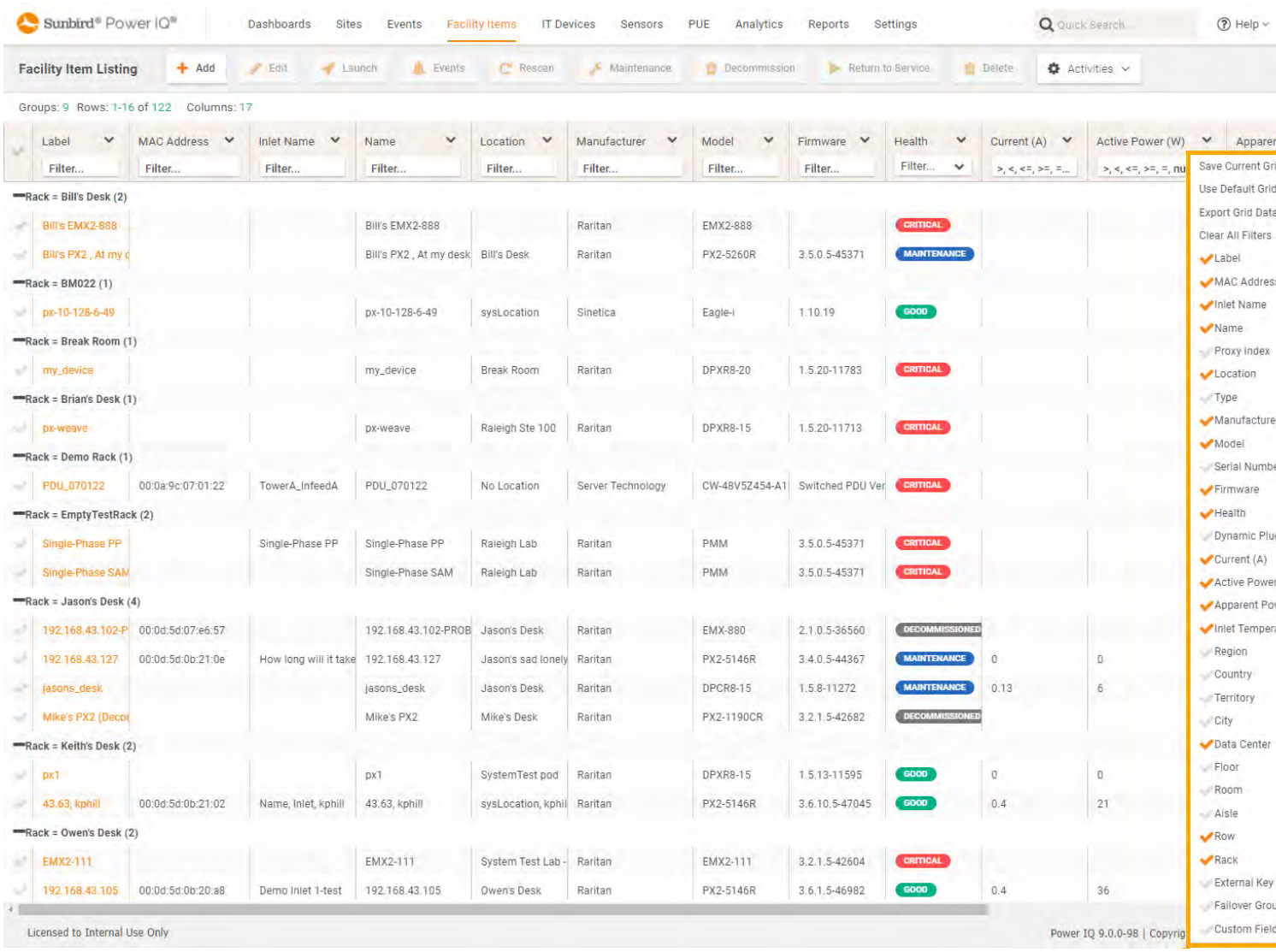

Search Settings...
About
Application Administration
Display & Locale
Power IQ Settings
Audit Log
Data Rollup Retention
Default Thresholds
Dynamic Plugins
Email
Enterprise Relationships
Launch Facility Items
Load Shift Detection
Product Licensing
SNMP Diagnostics
Display & Locale
User-created HTML widgets on the dashboard
Allow
HTML widgets are useful, but they may have potential security implications.
Customer Logo
Show logo
Locale Settings
Default Language
English
Time zone
(GMT+00:00) UTC
Temperature Unit
Celsius
Currency Symbol
$ USD
Phase Labels
A,B,C
Display Settings
Facility Item Labels
Show Facility Item IP Address
Show Facility Item Name
Show Inlet Name if avail
Save

Customize Your View of Facility Items, IT Devices, and Events

Each user can save their own customized views of Facility Items, IT Devices, and Events lists in Power IQ. Once you save a customized view, it is retained even if you leave the tab and return, or use a different browser or client.

Note: If you open the Facility Items List by clicking on a health chart, your view will be filtered by the chart. For example, click the red bar of a health chart to view only the items with red health status.

1. In the Facility Items, IT Devices, or Events tab, drag and drop columns to customize your view. Hover the mouse on a column heading then click the arrow to view a drop-down list of other options. You can hide or show each column, set the ascending or descending order of data, or enter a search term to filter the column to include only items that match the search term.
    - See *Filter the Events List* on page 292.
    - See *Filter the Facility Items List* on page 369.
2. Click the Panel Options button in the upper right corner of the list view, then select Save Current Grid Configuration to save your view.



3. In the Facility Items, IT Devices, or Events tab, click the Panel Options button in the upper right corner of the list view, then select Use Default Grid Configuration to revert to the default configuration.

Configure the SNMP Agent for Server Performance Monitoring

Power IQ allows server monitoring for the CPU, memory, and other performance indicators and makes this data available to third-party monitoring systems.

Power IQ's SNMP agent works out of the box and is enabled by default, without additional configuration required.

SNMP agent will listen for incoming requests on the default SNMP UDP port 161. The default SNMP port is not configurable.

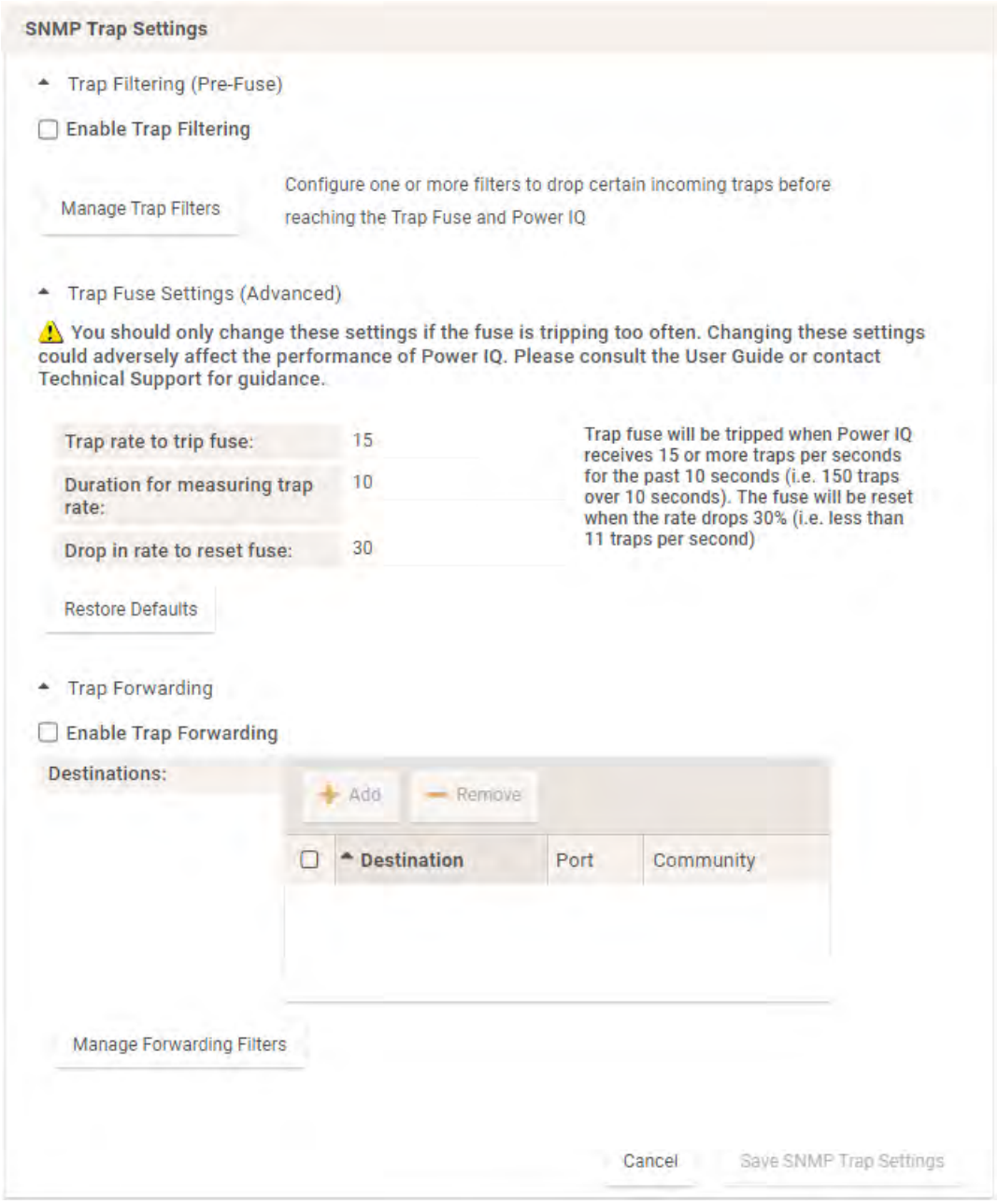
Only SNMPv1/SNMPv2c requests are supported. SNMP traps are not supported.

Editing SNMP Agent Settings

System Administrators can enable/disable the SNMP agent and make changes to the SNMP agent settings via the UI.

1. To access the SNMP Agent settings panel, click the Settings tab > Server Settings.
2. Check/uncheck the Enable SNMP v1/v2c box to enable/disable the SNMP agent. By default, the Enable SNMP v1/v2c checkbox is unchecked.
3. In the Read Community String field, enter the read-only community string. This field is required. The default is public.
4. Under MIB-II System Group, enter the System Contact, System Name, and System Location if needed.
    a. The System Contact default value is root@localhost.
    b. The System Name default is Sunbird Power IQ.
    c. The System Location default is null and will display in the UI as unknown.
5. Click the Save button to save your changes.

Note: The maximum length of the text fields in the SNMP settings is 255 characters.



Note: Power IQ will log in the system audit log when the SNMP agent has been enabled or disabled.

MIB-II Host Resources Performance Metrics

The table below summarizes performance indicators from the MIB-II Host Resources MIB that are exposed by the SNMP agent:

Category	Object Name
System Information (e.g., sysUpTime, Number of users, Number of system processes)	hrSystem
Device Information (e.g., Device types, Processors, NICs)	hrDevice: hrDeviceTable
CPU Utilization/Processor Load	hrDevice: hrProcessorTable
Network and Partition Table Information	hrDevice: hrNetworkTable, hrPartitionTable
Memory and Disk Usage	hrStorage
Running processes	hrSWRun, hwSWRunPerf
Installed software	hrSWInstalledTable

Note: MIB-II system values are not currently configurable via the Power IQ user interface. Users who prefer to customize these values should contact Sunbird Technical Support for assistance.

Support and Licensing

This section covers topics related to licensing and features that help Technical Support diagnose problem.

Save Support Logs

The support logs may help Technical Support find the problem.

1. In the Settings tab, click Appliance Administration > Appliance Services.
2. In the Support panel, click Download System Logs or .Download diagnostics

Enable or Disable the Console Accounts for Support

Power IQ has the "sunbird" user account in place for Sunbird use when supporting the product. You may be asked to access the console as the "config" user to enable this account during the support process. You cannot change the password for this account. When disabled, there is no external access to the system using this account.

New installations of Power IQ have this account disabled by default. Upgrading will not change the enable/disable status of this account.

Note: Upgrading the system will reset the sunbird user account password to the default password.

Troubleshooting

The following links may be helpful when troubleshooting specific Power IQ features:

- *Troubleshooting Connectivity Health* on page 433
- *Troubleshooting Dynamic Plugins* on page 680
- *Troubleshooting Dynamic Plugin Trap Mapping* on page 683

For additional assistance, login to the Sunbird Support Portal or contact tech@sunbirddcim.com

Appendix A: ODBC Access

Power IQ's ODBC interface allows ODBC compliant applications access to the power data of managed devices. For example, an ODBC compliant reporting application like Crystal Reports can access Power IQ data to create customized reports.

The Power IQ ODBC server listens on TCP Port 5432

Roll-up tables summarize data over one hour, twenty four hours, and one month. Upon summarization, detailed readings are purged. For example, when you create a daily roll-up, the hourly poll data is purged from the database. You can configure the data retention settings. See Configuring Data Rollup Retention.

Power IQ's ODBC Interface is backed by a PostgreSQL database.

Appendix A: Frequently Asked

Questions

Security Questions

Question	Answer
Are failed login attempts recorded?	The audit log records all login attempts. You can also configure Power IQ to send syslog notifications for entries in the audit log.
Does Power IQ support LDAP lock-out settings?	Power IQ respects the lock-out settings of an LDAP server. If a user attempts multiple invalid logins, and the LDAP server sets the account to be blocked, Power IQ no longer allows access.
Do session timeouts work in an LDAP setting?	Session timeouts are applicable to LDAP users and local users.

PDU Questions

Question	Answer
What should I do if the status of my PDU says "Degraded."	Check to see if the SNMP agent is enabled on the PDU. If enabled, check to see if the matching SNMP read strings are configured for the PDU and Power IQ. Check to see if you are running the latest PX firmware. For Raritan PX PDUs. If you have enabled Buffered Data Collection, make sure the PX has been configured with an SNMP write string. For Raritan PX PDUs. Reduce the poll rate or increase the number of CPUs (VMware).
How do I configure my MRV PDU so that it will work with Power IQ's power control feature?	Make sure that the SNMP community string you use to configure the MRV PDU in Power IQ supports both SNMP v1 and v2c Gets and Sets. The community string must be configured for v1 and v2c access in both the Get Clients section and the Set Clients section on the MRV PDU.

Unable to Collect IPv4 Routing Table

The error "Unable to collect IPv4 routing table" may display when you attempt to launch a Power IQ virtual machine with multiple NIC cards, using ESXi 5.1.

Renaming two files may be a workaround to this VMware Tools issue.

```
mv /usr/lib/vmware-tools/plugins32/vmsvc/libtimeSync.so  /usr/lib/vmware-tools/plu-
gins32/vmsvc/libtimeSync.so.renamedmv /usr/lib/vmware-
tools/plugins64/vmsvc/libtimeSync.so  /usr/lib/vmware-tools/plu-
gins64/vmsvc/libtimeSync.so.renamed
```

Appendix B: Floor Map Drawing Files

To create floor map drawing files for Power IQ, you may find the dcTrack drawing file templates useful. This appendix contains information about downloading and using those templates.

Because a dcTrack floor map may require more information in the drawing file than a Power IQ floor map, you'll notice extra details in the template.

Chapter C Power IQ Floor Map Drawing Files Must:

- Be in .DWG file format and created using either AutoCAD® 2012 (and earlier) or Microsoft Visio®.Only .DWG files can be uploaded to the application.

  Note: Drawings created in AutoCAD 2018-2019 are supported by Power IQ 9.2 and later.

- Represent a data center, floor or room in your EDM.
- Contain all racks that you want to display in the floor map.
- Include unique rack names that are exactly the same as the rack names in the EDM in Power IQ. Duplicate rack names will not work.
- Follow all drawing file requirements in either Microsoft Visio or AutoCAD. See Microsoft Visio Drawing File Requirements and AutoCAD Drawing File Requirements.

Terminology - Objects vs. Shapes

When discussing drawing files, 'objects' refers to graphical representations of cabinets, floor PDUs, UPS units and CRAC units in an AutoCAD drawing file and when explaining uploads to the application.

'Shapes' is used when referring to these same items in a Microsoft Visio drawing file.

Create Drawing Files or Download Templates

For the floor map widget, you can:

- Use Your Existing Drawing Files

  Use your existing .DWG drawing files as long as they are created using a supported version of Microsoft Visio® or AutoCAD®.

- Download Drawing File Templates

  Sunbird provides generic Microsoft Visio and AutoCAD drawing file templates.

  The templates include -

Layers for buildings, row labels, cabinet (rack) shapes, floor PDU shapes, UPS shapes and CRAC shapes.

Note: You are not required to create a layer for each of these elements and shapes in a drawing a file.

The Visio drawing file template provides predefined layers with various drawing shapes and elements.

Use the templates to create your drawing file or use them as examples to follow.

Whether you use your own file or a Sunbird template, review the information in this section to help ensure your file is formatted correctly.

See Microsoft Visio Drawing File Requirements or AutoCAD Drawing File Requirements.

- **Visio Stencil**

  A Visio stencil with Sunbird designed shapes and connectors is available as a download from the Sunbird support portal.

  This stencil is designed for both Power IQ and dcTrack use. Use the stencil with the Sunbird Visio templates, or with your own Visio files.

Download the templates and/or stencils from the support portal.

Note: The stencil can be used for dcTrack or Power IQ drawings.

Microsoft Visio Drawing File Requirements

The following Microsoft Visio drawing file requirements must be met to successfully save the file in AutoCAD file format (.DWG), and visualize the floor map properly in the Power IQ Web Client and Classic View once the drawing file is uploaded.

- The file must be converted to a .DWG file to upload it to Power IQ.
- Shapes in Visio represent objects on a floor map in Power IQ.
- Shape Outline Requirements - Visio Files
- A shape's border must be closed
- Unless a shape is on a layer, the border outline can be black or any other color of your choosing.

For more information on border color when working with layers, see Shape Border Layer Requirements - Visio Files.

Shape Fill Requirements - Visio Files

- Each shape created in a Microsoft Visio file must use a solid fill color.
- The fill color *cannot* be 01:White.

Aside from the colors used by the objects on the floor map generated from the drawing file, the shape's fill color does not impact Power IQ.

Add a Fill Color to a Visio Shape

1. In the Microsoft Visio file, right-click the shape and select Format > Fill.

   Tip: Select multiple shapes at once and apply a fill at the same time.

2. Select a color from the Color drop-down, or apply a custom color.
3. Select 01:Solid from the Pattern drop-down. Even if it is selected by default, you must click on it to apply it.
4. Click OK to apply the fill and close the dialog.

Shape Name Requirements for Power IQ - Visio Files

- The rack shapes in your drawing file must include unique rack names that are exactly the same as the rack names in the EDM in Power IQ. Duplicate rack names will not work.
- Facility item shapes in your drawing file must also include unique names that are the same as the facility items in the EDM. Power IQ supports the following facility items:
  - CRAC
  - Floor PDU
  - Floor UPS
  - Power panel
  - Standalone meter
- All racks and facility items in the drawing file will be synced to the EDM.
- Give each shape a unique name that matches the name in the EDM using the Text tool, or entering it directly into the shape.
- Shape names cannot contain the characters ' \ ? &

Add Text to a Visio Shape

1. Double-click on the object to put it in edit mode.
2. Type the text ID, or use the Text Tool to add a text box and type the ID.
3. Make sure the text box is inside the floor plan shape.

Shape Border Layer Naming Requirements - Visio Files

- Do not begin Microsoft Visio® layer names with the word "dcTrack" unless you are directed to do so.
- Microsoft Visio layer names cannot contain spaces. Use underscores or dashes to separate words if needed. For example, Layer1, Layer-1, or Layer_1
- Shape Border Layer Requirements - Visio Files
- When using layers in a Microsoft Visio drawing file, a shape on a layer cannot have a black border.
- If it does, when the file is converted from a .VSD file to a .DWG AutoCAD file and then uploaded to Power IQ, the shape's fill is changed to black even if another fill color is applied to it.

  For example, you create a rectangle with a black border and blue fill on a layer in a Visio file to represent a CRAC unit object on the floor map.

- When the file is converted to a .DWG and then uploaded to Power IQ, when the CRAC unit object appears on the floor map in Power IQ its fill is black, not blue.
- Avoid this by setting the shape's fill, border and layer to the same color - see Set a Shape's Border, Fill and Visio Layer to the Same Color.

Set a Shape's Border, Fill and Visio Layer to the Same Color

1. In Microsoft Visio, select View > Layer Properties. The Layer Properties dialog appears.
2. Create a new layer for the objects by selecting the New... button, naming the layer in the New Layer dialog and clicking OK.

   Visio layer names cannot contain spaces. Use underscores or dashes if spaces are required.

   Important: Do not begin Visio layer names with the word "dcTrack" unless you are directed to do so.
3. In the Layer Properties dialog, locate the row containing the layer you just created, then click on the layer's field under the Color column. A checkmark appears in the field.
4. Select a color for the layer from the "Layer color:" drop-down, then click Apply.

   The color is applied to the layer, and the Color field changes to the selected color.
5. Alternatively, create a custom color.
6. Click OK.

   Next, assign the shape to the layer.
7. Right-click on the shape, then click Format > Layer to open the Layers dialog.
8. Select the layer, then click OK.

   The shape is assigned to the layer, and its border and fill are the same color as the layer.

   Since the shape and layer colors are the same, in order to see the shape, a negative (or inverse) image may be displayed.

   If this is the case, the shape may appear as if it has no fill even though it does.
9. Finally, verify only the shape(s) you want are assigned to the layer.
10. Click View > Toolbars then check the Format Shape option to enable that Format Shape toolbar.
11. Click on an object that is on the layer you just created. The layer is displayed in the Layer drop-down on the Format Shape toolbar.

Note: If you want shapes to have a black border even though their border and fill color are the same as their layer, there is a workaround. See Create a Border for Visio Shapes on a Layer (Workaround) (on page 463)

Create a Border for Visio Shapes on a Layer (Workaround)

Once a shape's border and fill are changed to the same color as the layer, the shapes do not have a black border to define them from each other in the Microsoft Visio file.

If you want the Visio shapes to use a border that is a different color than the fill, do the following as a workaround.

- Draw an additional rectangle that has no fill (Pattern = None) around each object that is not assigned to a layer (Layer = { No Layer}).

Note: This is similar to the way it would be done in AutoCAD, where the rectangle and the hatch are two separate objects.

- To easily distinguish classes of objects, create separate layers and colors for each type of floor-standing object in the data center such as a cabinet, floor PDU, CRAC or UPS.
- Text labels should be modified if the text wraps to multiple lines. Text wrapping causes AutoCAD to insert a dash at the end of each line.

The workaround to this issue is to size the text box of the label to be wide enough so that the text does not wrap. Reducing the font size also helps prevent wrapping.

AutoCAD Drawing File Requirements

Following are Power IQ's minimum, AutoCAD drawing file requirements.

Object Outlines - AutoCAD Files

- An object's outline must be closed

Object Name Requirements for Power IQ - AutoCAD Files

- The rack shapes in your drawing file must include unique rack names that are exactly the same as the rack names in the EDM in Power IQ. Duplicate rack names will not work.
- Facility item shapes in your drawing file must also include unique names that are the same as the facility items in the EDM. Power IQ supports the following facility items:
  - CRAC
  - Floor PDU
  - Floor UPS
  - Power panel
  - Standalone meter
- All racks and facility items in the drawing file will be synced to the EDM.
- Give each object a unique name that matches the name in the EDM
- Object names cannot contain the characters ' \ ? &

Drawing File Layer Requirements - AutoCAD Files

- Do not begin AutoCAD® layer names with the word "dcTrack" unless you are directed to do so.

AutoCAD Drawing Object File Recommendations

- When using AutoCAD to create your floor map drawings, follow these recommendations.
- Rack Object Recommendations - AutoCAD Drawing Files
- Rack Object - Commands
- Use the Pline command or the Rectangle command to draw a rack outline
- Make the Pline width of a rack outline equal to 0.75” or 1”
- When creating a rack with a curved front, use a single Pline and draw the rack starting at the center rear.
- Then, to create the curved front, draw several shorter straight lines while varying the angle each time to achieve the curved look.

Rack Object - Layers

- Draw rack outlines on separate layers in the drawing file to make future modifications and global changes easier.
    - Object Outline Recommendations - AutoCAD Drawing Files
    - Object Outline - Command: Create objects using a polyline
    - Object Outline - Layer: Create the object outline on a different layer than the hatch
    - Object Outline - Color: Set the color of the object outline by layer
    - Object Outline - Command
    - Create objects using a polyline
    - Object Outline - Layers
- Create the object outline on a different layer than the hatch
    - Object Outline - Color
- Set the color of the object outline by layer
    - Object Hatch Recommendations - AutoCAD Drawing Files
    - Object Hatch - Layer: Draw solid hatches on separate layers in the drawing file so it is easier to make future modifications and global changes.
- Create the hatch on a different layer than the object outline
    - Object Hatch - Pattern: Use a solid pattern for the hatch within an outline.
    - Object Hatch - Color: Set the color of the hatch by layer
- Sunbird recommends using the following colors for hatch layers:
    - Color 81 for a cabinet Solid Hatch
    - Color 254 for PDU and CRAC Solid Hatches
    - Color 151 for PT Solid Hatches
    - Object Hatch - Layers
- Draw solid hatches on separate layers in the drawing file so it is easier to make future modifications and global changes.
- Create the hatch on a different layer than the object outline

Object Hatch - Pattern

- Use a solid pattern for the hatch within an outline

Object Hatch - Color

- Set the color of the hatch by layer
- Sunbird recommends using the following colors for hatch layers:
  - Color 81 for a cabinet Solid Hatch
  - Color 254 for PDU and CRAC Solid Hatches
  - Color 151 for PT Solid Hatches

Object Label and Text Recommendations - AutoCAD Drawing Files

- Names must be unique within each drawing file for each location. For more information, see Object Name Requirements - AutoCAD Files.
  - Object Labels - Layers: Draw object labels on separate layers in the drawing file so it is easier to make future modifications and global changes.
  - Object Labels - Text Formatting: Object labels should use Arial Bold set to 9 inch height. The text height assumes the AutoCAD drawing is drawn on a 1:1 scale.
- Use Multiline Text for object labels, and make sure they are contained within the object outline.
- Create either a Standard Text label or Multiline Text label to identify each data center row represented in the drawing file.
  - Cabinet Labels - Position in Row: Since Power IQ does not pull cabinet row position information from drawing files during the sync AutoCAD drawing file process, the cabinet label can contain any number.

    This means numbers that appear in cabinet labels can be part of the cabinet name, or used to represent the cabinet's position in the data center row.
- Once cabinets are added by syncing a drawing file, their row position can be assigned manually. Row positions are assigned on a cabinet's item page in the Web Client.

Example

A cabinet labeled "CAB1" in a drawing is can be assigned to position 4 of a row on its item page by selecting from the Position in Row drop-down.

- Row Labels - Row Label Drop-Down: The row label in the drawing file should match a selection available in the Row Label drop-down on the Create New Item page in the Power IQ Web Client.

  Select the row when creating a new cabinet for the data center location represented by the drawing file.

Object Labels - Text Formatting

Object labels should use Arial Bold set to 9 inch height. The text height assumes the AutoCAD® drawing is drawn on a 1:1 scale

- Use Multiline Text for object labels, and make sure they are contained within the object outline
- Create either a Standard Text label or Multiline Text label to identify each data center row represented in the drawing file

  See Object Name Requirements for Power IQ - AutoCAD Files

Appendix C: Feature Compatibility

Sunbird Software is a vendor-agnostic solution that works with the rack PDUs you have. As the software partner of Raritan, Server Technology, Legrand, and Chatsworth Products, Sunbird offers additional functionality for the rack PDUs manufactured by these brands. The following table provides a comprehensive overview of the key features that Power IQ supports for each vendor as of version 9.0.1:

Power IQ Feature	Raritan PX3/PX4	Server Technology PRO4X	Server Technology PRO3X	Server Technology Sentry4	Server Technology Sentry3	Chatsworth Products (CPI)	All Rack PDUVendors
Collect Sensor Data	X	X	X	X	X	X	X
Receive Traps	X	X	X	X	X	X	X
Power Control	X	X	X	X	X	X	X
Bulk Update PDU Names	X	X	X	X	X	X	X
Bulk Update Sensor Names	X	X	X	X	X	X	X
Bulk Update PDU Location	X	X	X	X	X	X	X
Bulk Update PDU Contact	X	X	X	X	X	X	X

Power IQ Feature	Rar-itan PX3/P-X4	Server Tech-nology PRO4X	Server Tech-nology PRO3X	Server Tech-nology Sentry4	Server Tech-nology Sentry3	Chats-worth Product-s (CPI)	All Rack PDUVen-dors
Bulk Update PDU Outlet Names	X	X	X	X	X	X	X
Bulk Firm-ware Updates	X	X	X	X	X	X	
Bulk Set Trap Destin-ation	X	X	X	X	X	X	
Bulk Update SNMP Con-fig	X	X	X	X	X	X	
Bulk Update Password	X	X	X	X	X	X	
Bulk IP Address Change	X	X	X	X	X	X	
Collect Daily Con-fig Backup	X	X	X	X			
Restore/Cl-one Config	X	X	X	X			

Power IQ Feature	Rar-itan PX3/P-X4	Server Tech-nology PRO4X	Server Tech-nology PRO3X	Server Tech-nology Sentry4	Server Tech-nology Sentry3	Chats-worth Product-s (CPI)	All Rack PDUVen-dors
SNMP Informs	XX	X	X				
Stored Buffer Data Retrieval	X	X	X				
Door Access Authorized By Power IQ	X	X				X	
Door Access Authorized By Facility Item	X	X					

Note on Door Lock Support: Power IQ supports two authorization methods for door access control. The Facility Items push method only applies to the specified Legrand PDUs. See Configure the Door Access Control Authorization Method on page 393. for more information.