Server Technology®

Quality Rack Power Solutions

Sentry Power Manager (SPM)

Quick Start Guide

SPM Version 6.1

Instructions
This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Dangerous Voltage
This symbol is intended to alert the user to the presence of un-insulated dangerous voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

Protective Grounding Terminal
This symbol indicates a terminal that must be connected to earth ground prior to making any other connections to the equipment.

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- the customer assumes all such risks, and
- the liability of Server Technology is adequately protected under the circumstances.

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Chapter 1: Introducing Sentry Power Manager (SPM)

Welcome to Server Technology's enterprise power and energy management solution!

SPM is the appliance-based (or virtualized) software package with one central view that provides power and environmental monitoring from intelligent PDUs, including those from other manufacturers, within your networked data center.

From a single user interface, SPM has the capability to deliver detailed, rack-level device information. The visibility of dynamic operational data for PDUs in a graphical user interface (GUI) allows you to make effective uptime and energy decisions to assist in reducing enterprise operating costs and carbon footprint.

Key Product Features

SPM provides numerous features for the enterprise-wide power management of PDUs, including:

- Power monitoring at the inlet and/or outlet level.
- Power consumption for capacity planning and efficiency analysis.
- Environmental monitoring for all connected sensors.
- Green initiative support for PUE and DCeP metrics.
- Integrated API for communication with existing BMS and DCIM management systems.
- Continuous metrics at any device level.
- Remote monitoring and control over multiple data centers.
- Custom graphical workspace views created by each SPM user.
- Load-balancing of 3-phase circuits across cabinet, zone, or UPS.
- Centralized power-related alarms.
- Graphical trending reports and predictive analysis data to forecast operational conditions.

About Your Quick Start Guide

What Is It?

Your Quick Start Guide is the gateway to Server Technology's Sentry Power Manager, version 6.1.

This guide has been arranged in chapters that group the major data center operational tasks that SPM supports – just as you would use them – such as connecting, configuring, monitoring power information, receiving alerts, creating custom collections of related objects for quick administration, and analyzing dynamic device data from SPM's many available reports and trend graphs.

Your guide introduces you to this collection of primary SPM features, shows the pathname for quick location of each feature in the SPM graphical user interface, and shows the feature as illustrated in a screen sample. Further, Server Technology's recommended best practices for using these grouped operations show you the right way to get started.

In addition, you are presented with an overview of SPM's special add-on features: The RF Code Wire-free Monitoring Solution, Custom Device Templates, and Hub and Node, as well as how to purchase the required license key.

Who Is It For?

This Quick Start Guide is designed for data center personnel – at the SPM administrative and power user levels – who perform system-wide configuration and administer equipment operations in their data center using SPM, version 6.1, with networked Server Technology PRO2 and/or earlier CDU products.

The guide is also a useful starting place for SPM users responsible for monitoring power metrics, issuing outlet control actions, and performing other data center functions on networked devices.

More SPM Resources

Along with this Quick Start Guide, SPM supports users with several additional resources:

Within the SPM GUI

- **Online Help System**

  A detailed and thorough Help system has been integrated into the SPM GUI, providing functional information about SPM in numerous individual topics you can browse, as well as the right-click Help popup available at strategic places within the SPM GUI.

  To view the SPM Help system, access the SPM GUI, click Application Help in the left-pane, and then select Online Help System. Or, right-click a system object in a list (or other defined GUI area) to select the Help popup.

- **Application Help**

  Application Help is a collection of SPM product support functions and information. Included are current SPM version/build number, VMware serial number (for APPV), current product license/feature support, a link to Server Technology Technical Support, and more.

  To view Application Help, access the SPM GUI and click Application Help in the left-pane, or from an SPM window, click and select Application Help.

On the Server Technology Website

- **SPM How-To Video Demos**

  Several quick demos (about three minutes each) cover specific SPM topics with a screen simulation accompanied by step-by-step audio instructions. The how-to demos will get you up to speed fast with SPM, and they are also a convenient way to be refreshed about a topic as needed.

  SPM how-to demos can be viewed on the SPM Product Page, described as follows.

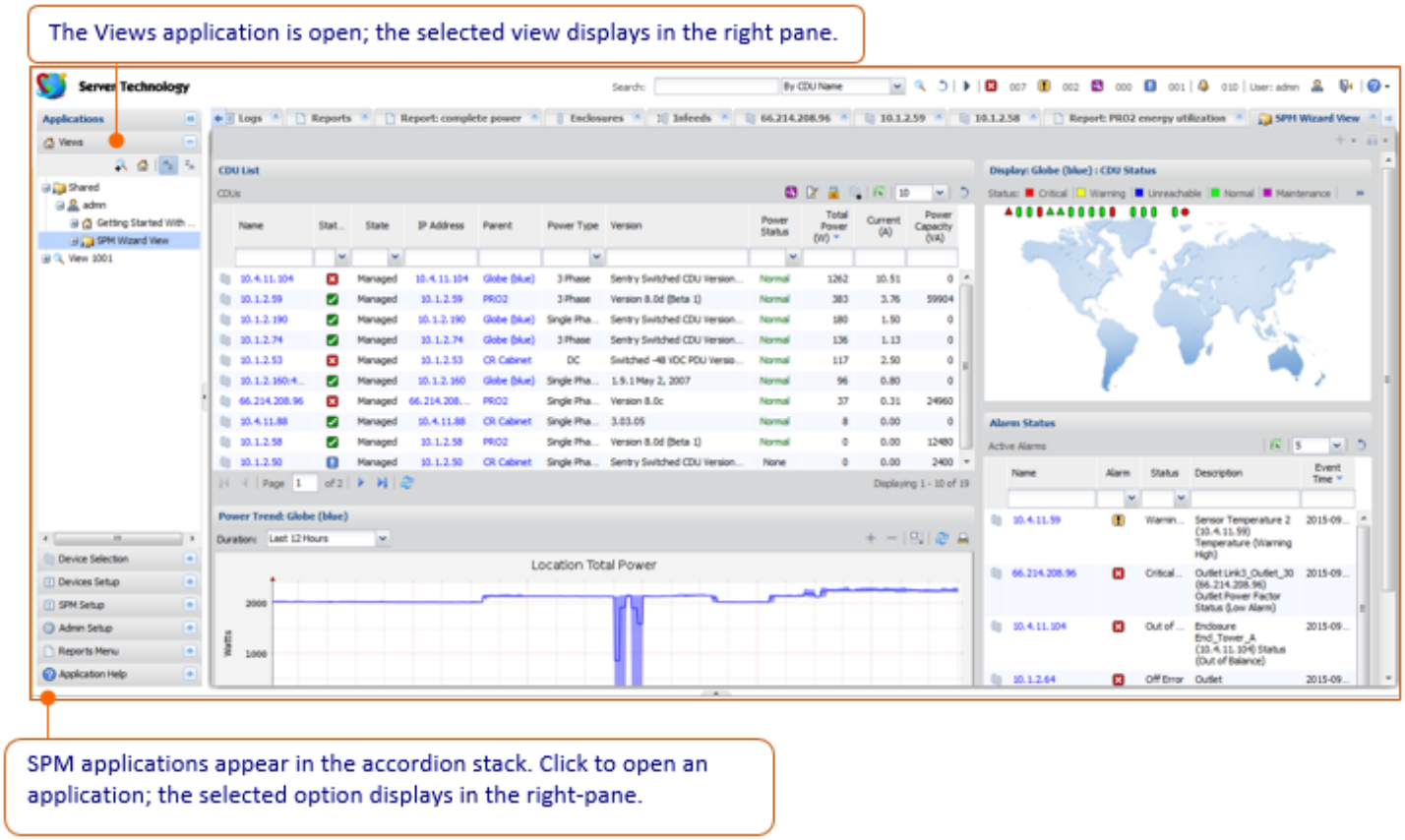
- **SPM Product Page**

  Presents SPM DCIM integrated solutions, introduces the SPM API, shows how to get a **free** SPM trial version, provides access to the Hyper***fast*** setup guides for APP, APPR, and APPV, includes a link to the release notes and technical data sheet, and more.

  To view the SPM product page, go to: https://www.servertech.com/products/sentry-power-manager

The SPM Applications

SPM provides several individual applications (designed in the left-pane of SPM main windows, and stacked as illustrated below) to use when needed, and generally in any desired order. The applications are the tools used for monitoring and managing device power and operations in the network.



Overview of SPM Applications

Application Name (top to bottom in SPM left-pane)	Description
Views	Lets you choose the type of device data you want to see in a graphical workspace with a custom layout. Views are unique for each SPM user login.
Device Selection	Provides access to the SPM system objects, such as branches, cabinets, PDUs, circuits, and more. These objects are the same ones shown in Devices Setup, but Device Selection offers the option for displaying objects within their device hierarchy.
Devices Setup	Provides access to the same SPM system objects shown in Device Selection, but only in a fixed alphabetic list without the device hierarchy option.
SPM Setup	Allows administrators (and power users) to configure SPM system tools, such as device discovery, scheduled tasks, predictive analysis parameters, SNAP, and other system options.
Admin Setup	Allows the SPM administrator to access system configuration, user management, product license, and other advanced administrator-only system-wide functions.
Reports Menu	Provides reported power and environmental data in numerous reports, graphical trend reports, system logs, alarm status/history, and SNAP status.
Application Help	Provides a collection of product support functions and product information.

Contact Technical Support

Experience Server Technology's FREE Technical Support

Server Technology understands that there are often questions when installing and/or using a new product. Free Technical Support is provided from 8 a.m. to 5 p.m. PST, Monday through Friday. After-hours service is provided to ensure your requests are handled quickly no matter what time zone or country you are located in.

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Reno, Nevada 89521 USA Fax: 775.284.2065 Email: support@servertech.com

Chapter 2: Connecting

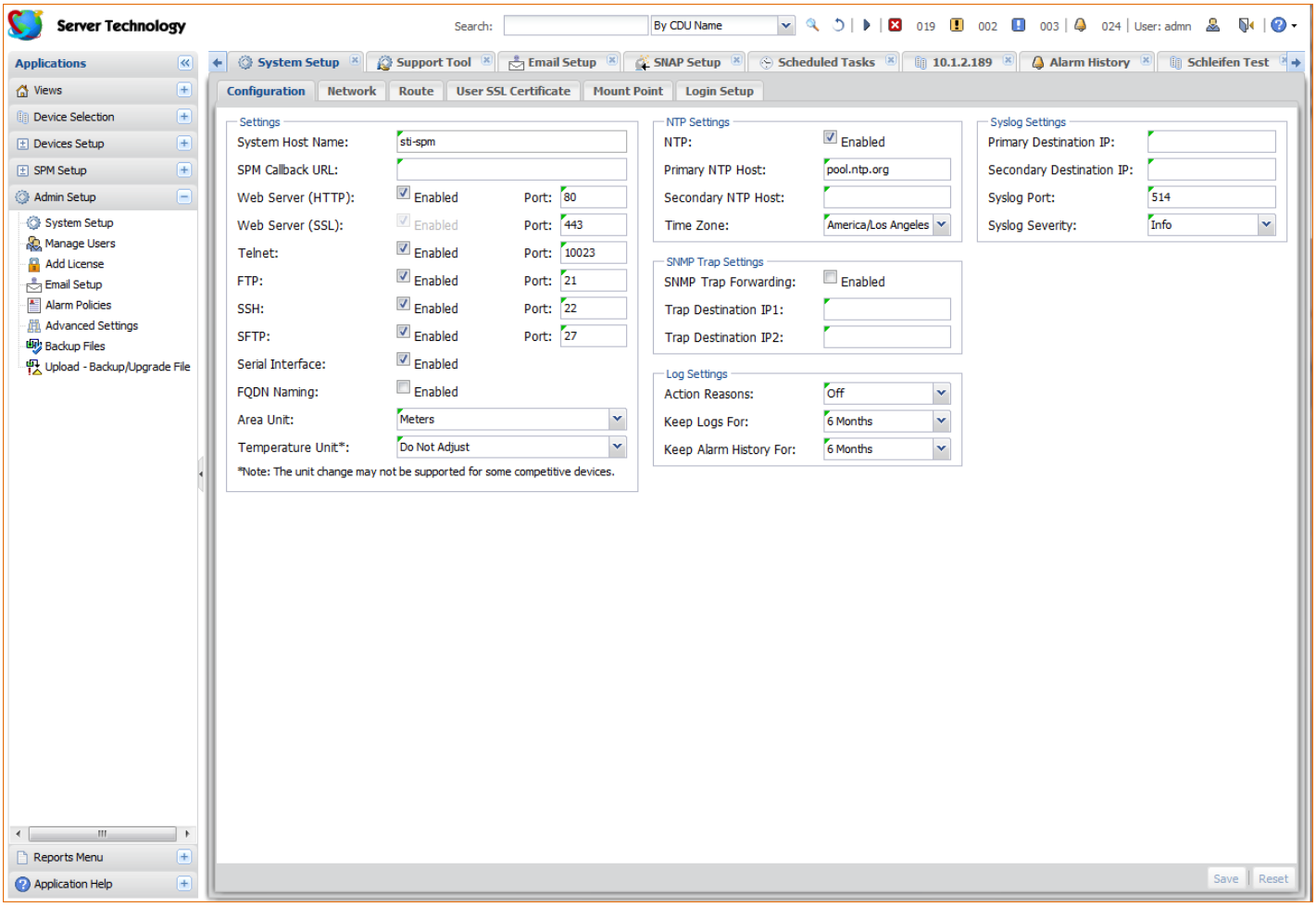
This chapter covers the several connection methods SPM uses to allow the administrator to configure system-wide parameters that include managing SPM users and maintaining system backups.

System Setup

The System Setup option gives the administrator access to settings for configuring the SPM system, network, route, user SSL certificate, mount point, and login setup.

Note: You will also notice a menu item for Advanced Settings. The recommendation is that you first review the field descriptions in the SPM online Help topic before editing any default values.

Admin Setup > System Setup



Best Practices: System Setup

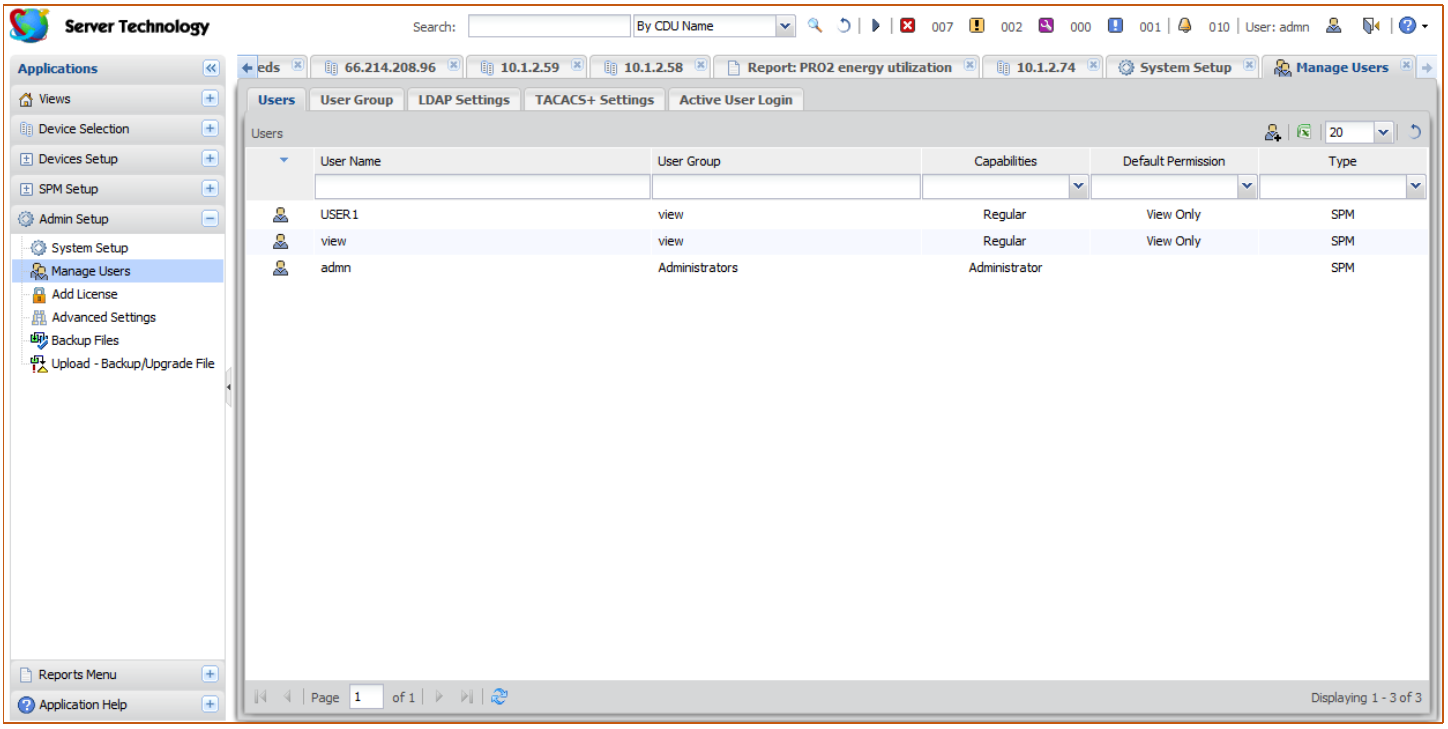
- If you do not need to record why every action was taken, turn off Action Reasons.
- For accurately dated logs, be sure to set up NTP.
- If using an older, the non-redundant SPM APP server (instead of the redundant APPR server), then setting up Syslog and Mount Point will even more important for logging and backups.

Manage Users

The Manage Users option allows the administrator to configure the parameters of SPM users, user groups, user group resource permissions, LDAP settings, and TACACS+ settings. SPM allows individual users to manage their account parameters and preferences and to change their SPM login password.

Note: The Manage Users feature is only available for administrative-level SPM user accounts.

Admin Setup > Manager Users



Best Practices: Manage Users

- Never share SPM login accounts. The default **admn** account can be deleted once another administrative-level account has been created.
- When using LDAP, remember that there must be matching groups between SPM and LDAP systems.

SPM User Capabilities

Capabilities are the predefined levels of user group access to SPM system objects as granted by the SPM administrator (or power user) to individual user groups.

SPM recognizes the following user group capabilities:

User Capability (highest to lowest)	Description
Administrator	The Administrative user group has full access for all configuration, outlet control status (On, Off, Reboot), and serial/pass-thru ports.
Power	The Power user group has the same capabilities as the Administrator user groups, but without user management capabilities.
Regular	The Regular user group has partial access for outlet control status (On, Off, Reboot), and pass-thru of assigned outlets, outlet groups, outlet clusters, and serial/pass-thru ports. The Administrator has several options for the Regular user's default access: No Access, Off, On, Outlet Control, Reboot, Setup, and View Only.

Notes:

- The SPM default administrative user is the admn user account. (There is no “i” in the admn name/password.)
- The admn user may grant full administrative access rights to other administrator user groups.
- For security it is recommended that you first use the default admn user account to grant capabilities to another administrative user group, and then associate a user with that new administrative user group. Next, use the new administrative user account to change the password for the default admn user account, or if you prefer, once the new administrative account has been created, the admn account can be deleted.

SPM Default Permissions

Default permissions are the predefined levels of access rights that a user has to specific system objects/resources as granted by the SPM administrator. Default permissions apply only to users who are members of a Regular user group, not members of an Administrative or Power user group.

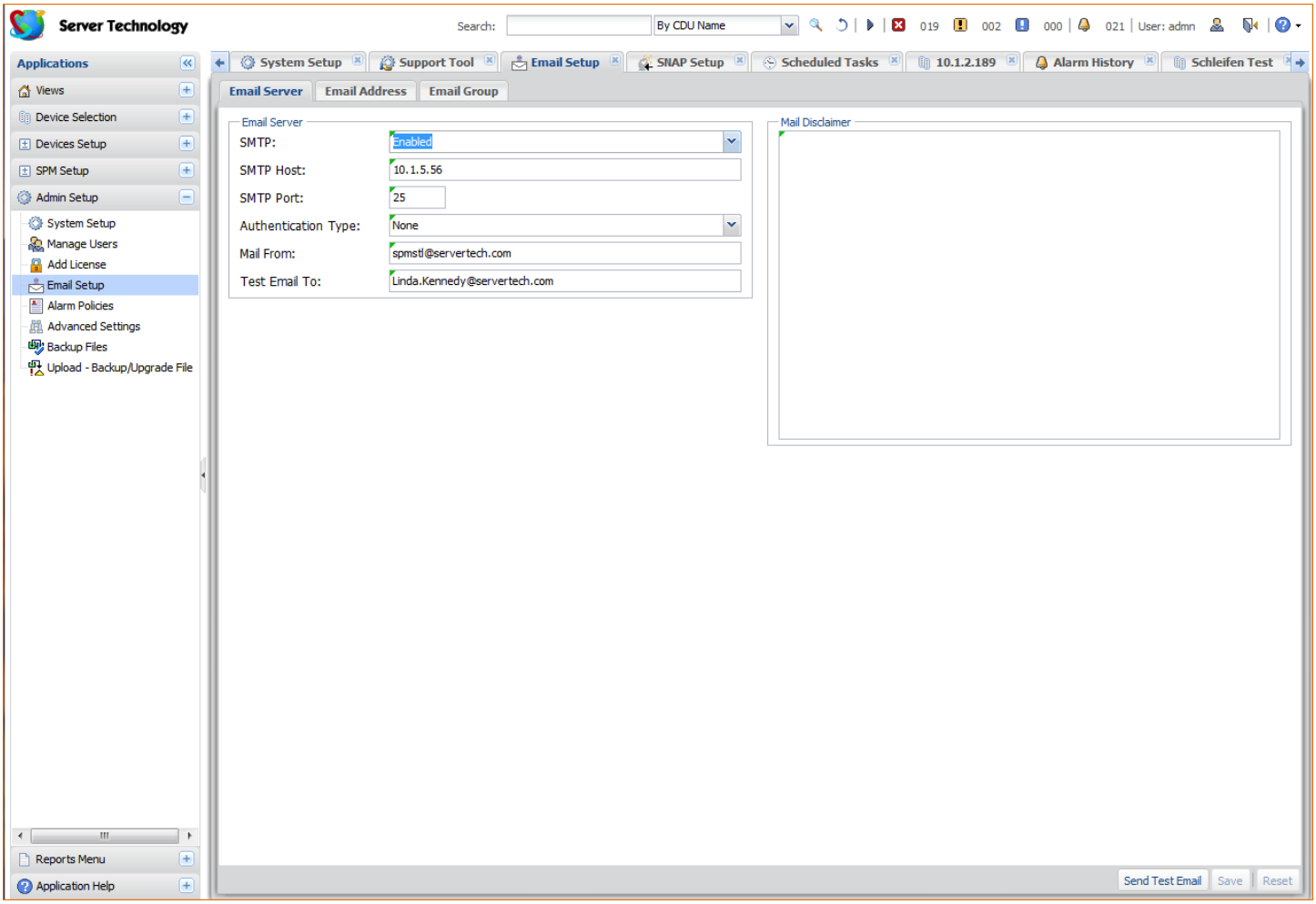
Default permissions not only apply to existing system devices, but also to all devices such as discovered PDUs, Cabinets, and Locations added afterward.

SPM recognizes the following default permissions:

User Access Level (highest to lowest)	Description
No Access	User has no access to any of the SPM system objects.
Off	User has partial access for control (Off), status and pass-thru of assigned outlets. Off is available only to SPM system objects that contain outlets.
On	User has partial access for control (On) status and pass-thru of assigned outlets, groups, and serial/pass-thru ports. On is available only to SPM system objects that contain outlets.
Outlet Control	User has full outlet control access. Outlet Control is available only to SPM system objects that contain outlets.
Reboot	User has partial access for control (Reboot) status, and pass-thru of assigned outlets, groups, and serial/pass-thru ports. Reboot is available only to SPM system objects that contain outlets.
Setup	User has full Administrator access to the CDU.
View Only	User has data view access only. User cannot save changes and user cannot perform actions on SPM system objects.

Email Setup

The Email Setup option gives the administrator access to configure the SMTP server communication pathway, to insert the email addresses of personnel involved in SPM alert management (also see Chapter 5), and to define email groups as shortcuts.

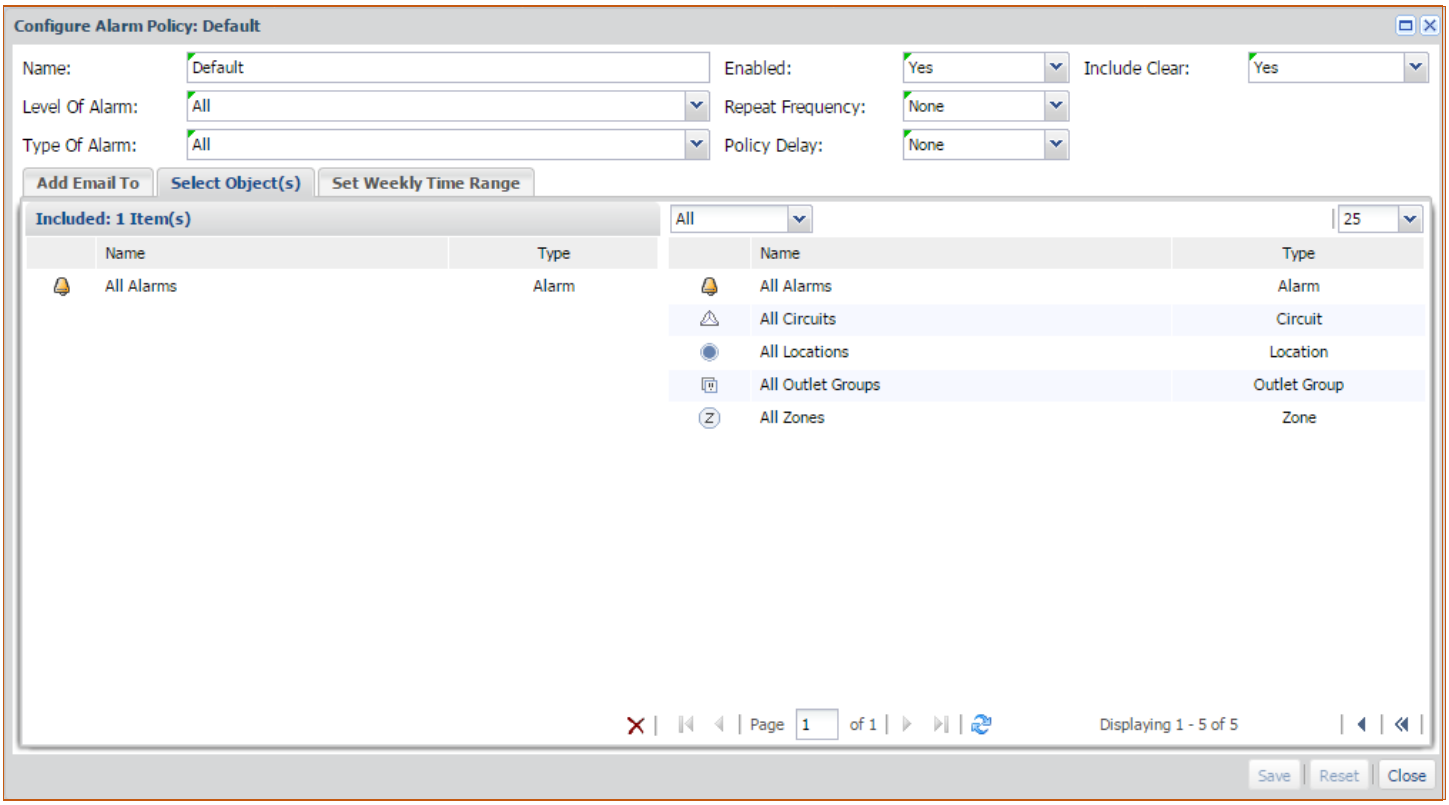


Best Practices: Email Setup

- Set up this section now, but wait to enable the email server until after setting Alerting (Chapter 5), as desired.
- Be sure to use the Send Test Email button to confirm your settings.
- Email groups are most convenient when you do not have access to make them at the email server.

Alarm Policies

The Alarm Policies option requires completion of the Email Setup. The alarm policies you set up provide a method to filter alarms based on level and type, a method to delay and escalate alarms, and a method to schedule personal responsibility.



Best Practices: Alarm Policies

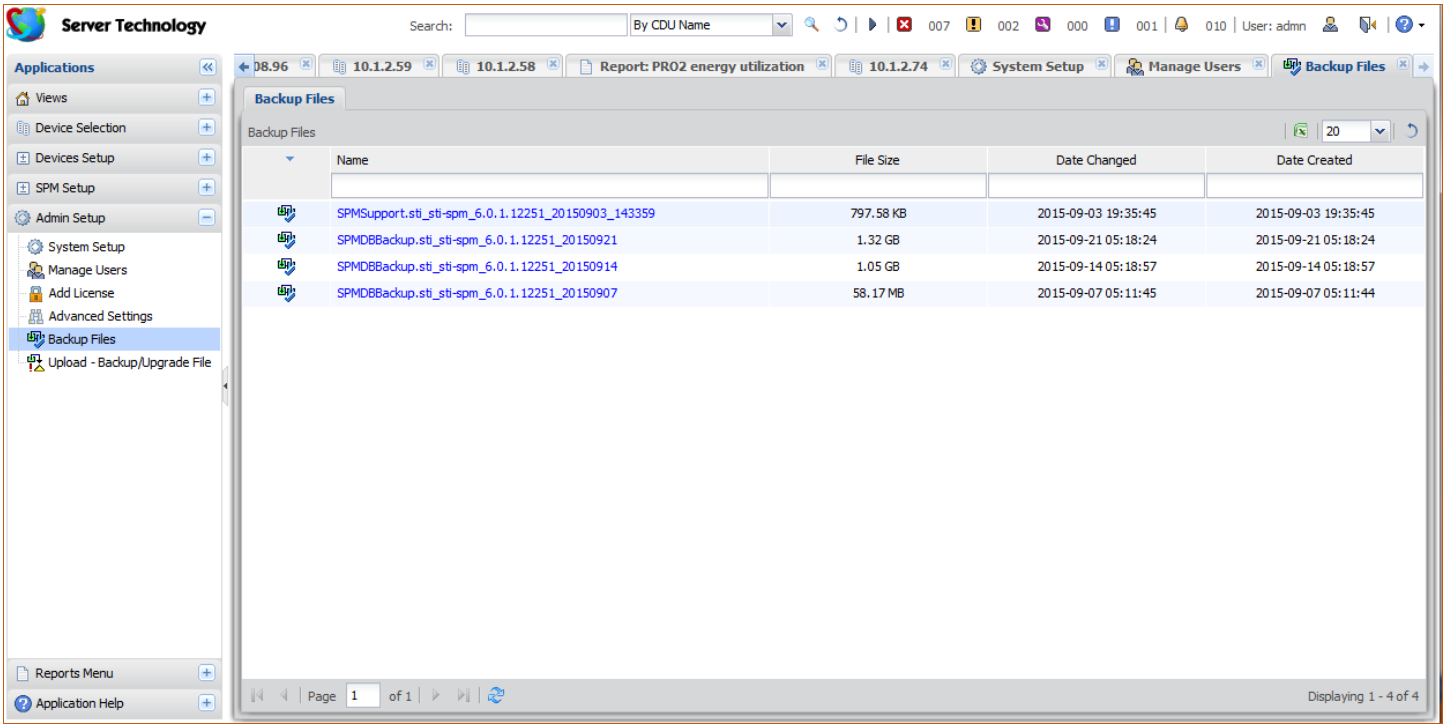
- Be sure to get your primary administrator email added to the default policy right away.
- Be careful with changes to the default policy.
- Watch for gaps in coverage of alerts in terms of time range and locations.

Backup Files

The Backup Files option is a list populated by every immediate or task-scheduled backup of SPM. Once a backup file is displayed in the list (as shown below), the file can be downloaded to the local or network drives of your choice. If ever needed at a later time, the SPM system can be restored from one of the saved backup files.

Support packs for troubleshooting purposes will also be saved in Backup Files for easy downloading.

Admin Setup > Backup Files



Best Practices: Backup Files

- If using either one of the SPM server appliances (APP or APPR) or a small-scale VMware system, it is important to regularly download the backup – or otherwise configure a mount point – to allow for rebuild of the SPM system in cases of total hardware failure.
- Before every SPM upgrade, manually trigger a backup to run and then download it from the SPM.

Chapter 3: Configuring PDUs

This chapter covers SPM's regular sampling, or polling, of operational status and measurement values from networked devices, and presents how PDUs are configured – individually in SPM, and also by using the SNAP tool for mass PDU parameter updates.

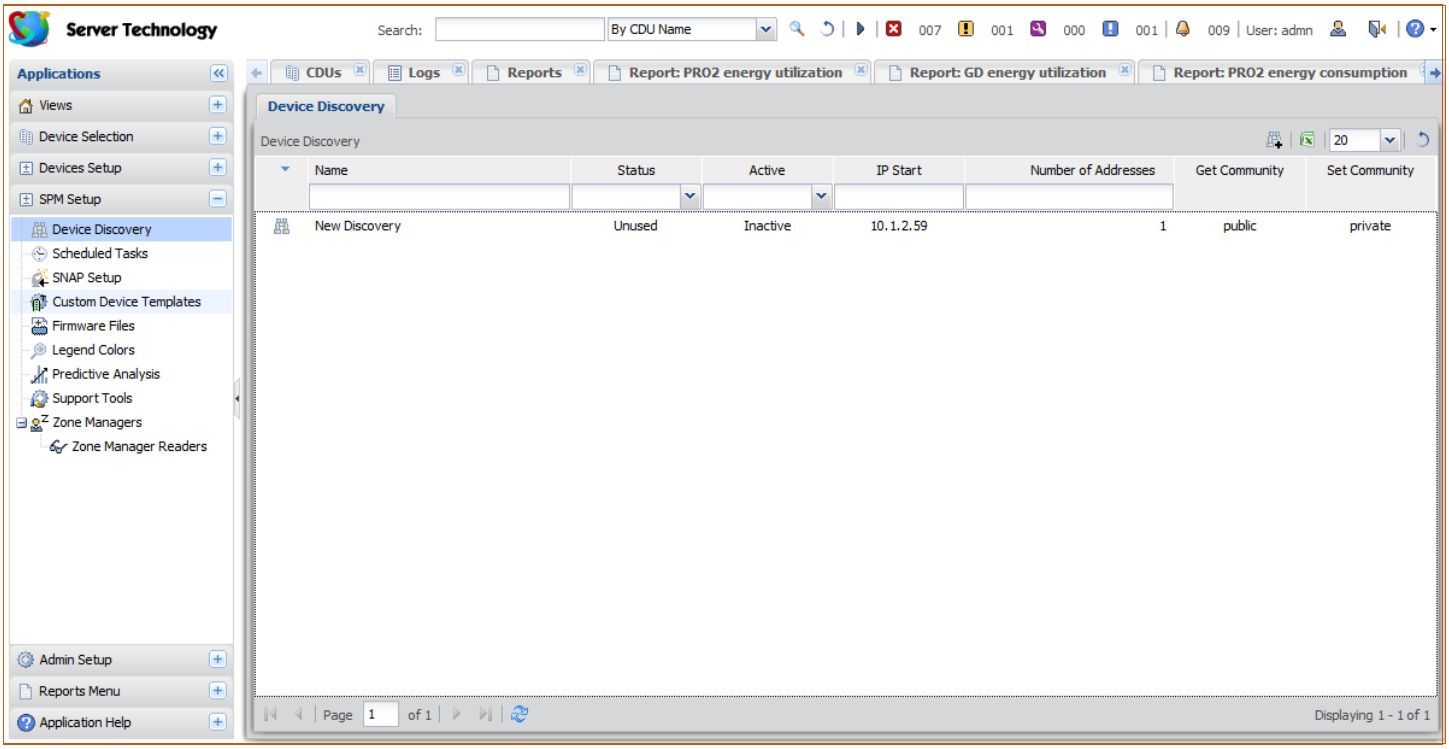
First, for SPM to communicate with a device and report its dynamic data, the device must be discovered by SPM in the network.

Device Discovery

The Device Discovery feature defines the parameters to add (discover) a device to the network, allowing specific PDUs to be recognized by SPM for communication through SPM and inclusion in the SPM system.

You can discover a single device or a range of devices, and you have the choice to run the discovery immediately or hold the discovery to be run later. You can also discover devices manually, or even set up a discovery to be run on a schedule using the Scheduled Tasks option.

SPM Setup > Device Discovery



Best Practices: Device Discovery

- Server Technology PDUs have a default SNMP setting of v2c enabled, get community of "public", and set community as blank. Within the new device discovery, the SNMP settings can be edited through SNAP. At a minimum, the set community should be configured this way.
- If installing SPM early in the PDU deployment process, it is especially valuable to set up the discovery as a scheduled task to begin polling data from PDUs as soon as possible.

Note: The PDUs, along with the cabinets and locations described in the next chapter, can be added using the embedded Bulk Setup spreadsheet tool.

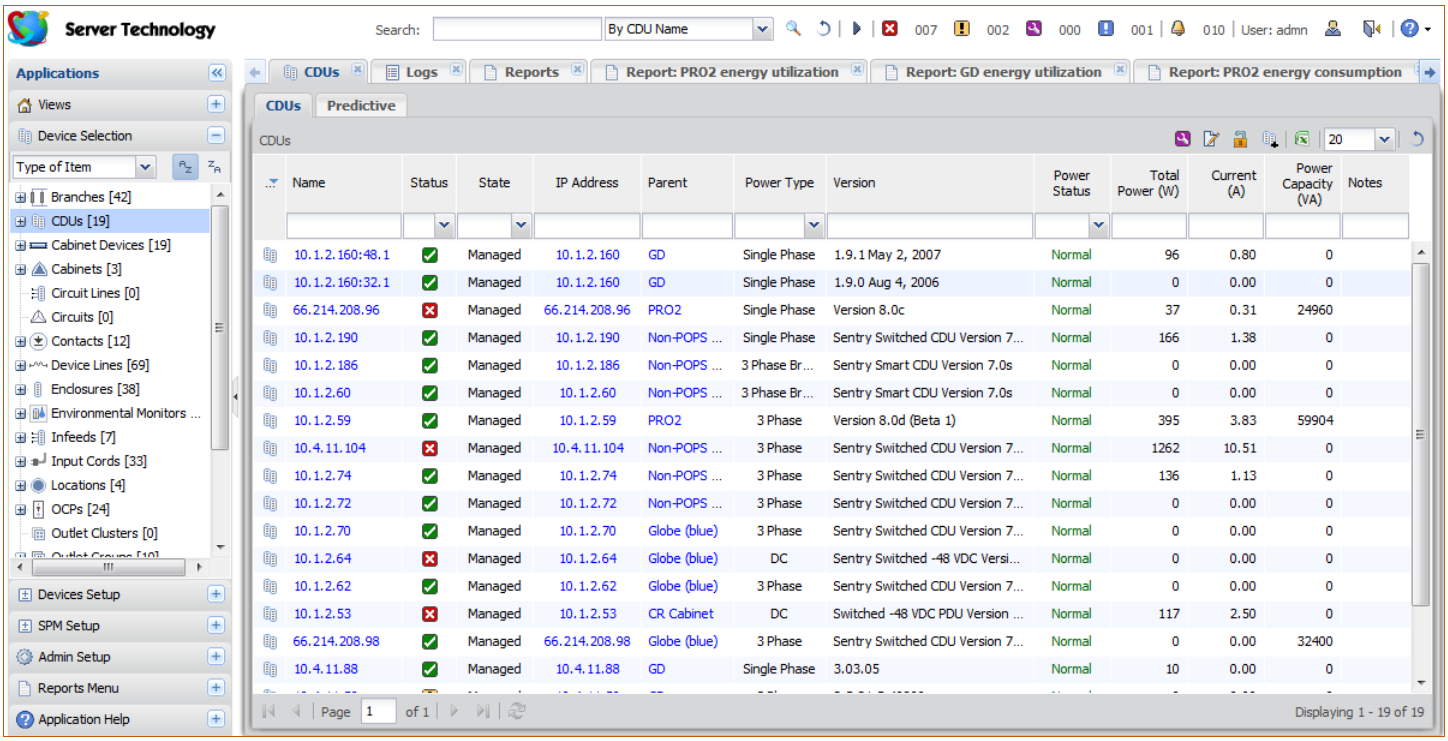
Cabinet Distribution Units (CDUs)

The CDUs option allows the management of cabinet/rack PDUs, including PRO2, as well as devices from many other equipment manufacturers.

In addition, other user-defined networked devices can be managed via the optional, key-activated feature Custom Device Templates.

Configuration of a PDU includes the setting of values for all device areas, such as environment, infeeds, outlets, thresholds, predictive power data, SNMP parameters, and the setup of SNAP templates to configure firmware parameters.

Device Selection > CDUs



Best Practices: Cabinet Distribution Units (CDUs)

- The name “CDU” is a catch-all term that refers to devices on a single IP address. This could be one to four Server Technology PDUs, a PDU from another manufacturer, or a device built within SPM using the Custom Device Templates tool. Keep the “CDU” terminology in mind as you proceed to the Alerting chapter in this guide where PDU measurement-based areas are presented.

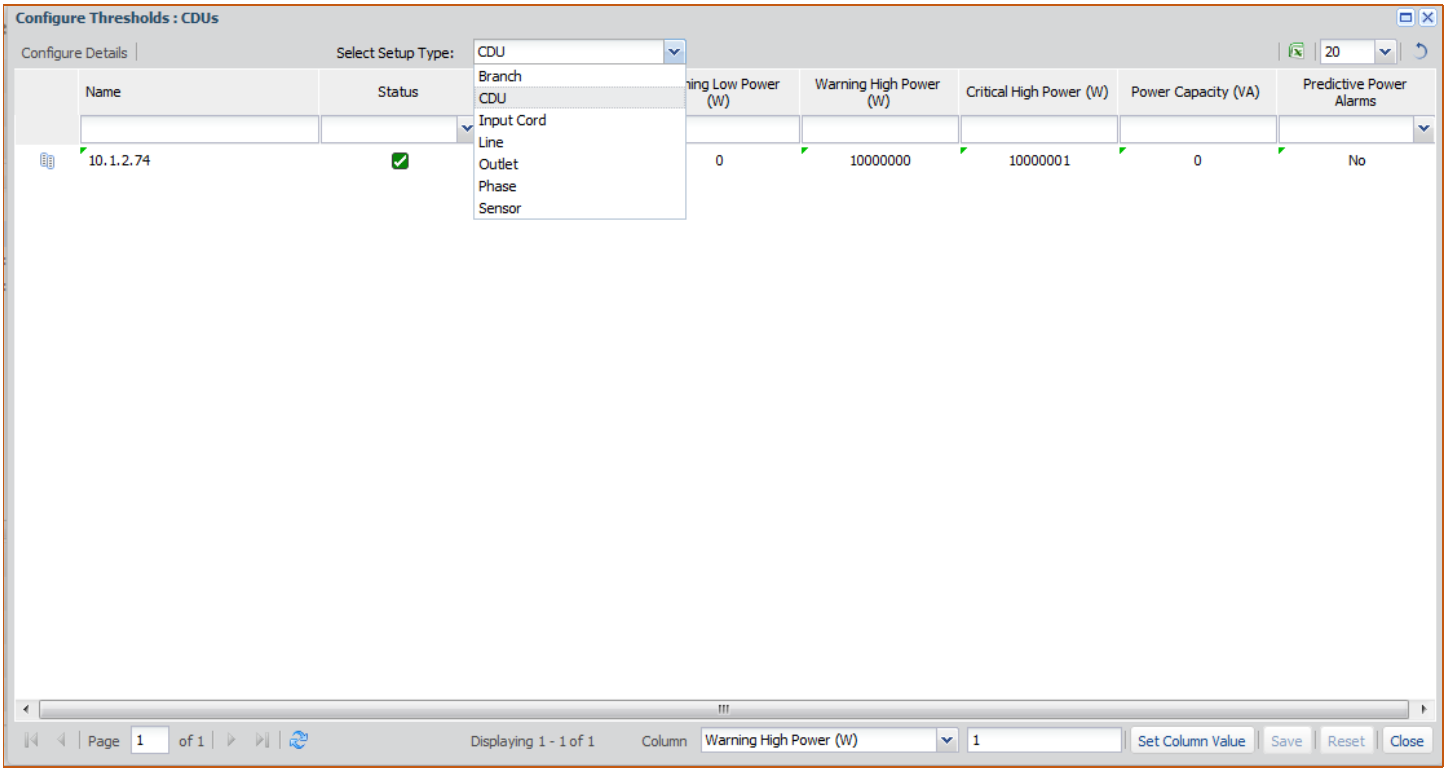
Configuring CDUs

Many parameters are available in SPM for CDU configuration, including setting the high/low critical/warning power (W) thresholds of the CDU, the power capacity (VA), and predictive power alarms. The configuration of branch, cord, line outlet, phase, and sensor is covered in the Alerting chapter of this guide.

In addition, you can specify parameters for a CDU Trend report, edit the CDU's name, and determine which cabinet or location will be the CDU's parent device.

Configuration values can be applied to an individual CDU or to multiple selected CDUs at one time.

Device Selection > CDUs > Configure Thresholds: CDUs



Best Practices: Configuring CDUs

- A common installation will have a master and an expansion PDU per cabinet for power redundancy. This is identified by SPM as one single CDU, for which the overall threshold is equivalent to the cabinet overall threshold. At this level, setting alerts becomes unnecessary.
- Remember that thresholds need to be set as truly desired for alerting. If the cabinet has two master PDUs, power thresholds can be set here at Configuring CDUs to allow for altering when one power feed is lost.
- Always set the names of CDUs and other system components with consideration for how those names should look for reporting and alerting purposes. For example, the CDU name could be changed to reflect the location and cabinet in which the CDU is installed.

PDU Settings

From the drop-down menu shown in the previous “Configure Thresholds: CDUs” screen example, select a configuration setup type and the related configuration window will be displayed.

PDU settings can be changed as follows:

This configuration menu option …	… allows editing for these PDU parameters:
Branch	CDU name
CDU	CDU name, low/high critical/warning power (W), power capacity (VA), and specify predictive power alarms.
Input Cord	CDU name, input cord active power hysteresis (W), input cord apparent power hysteresis (W), input cord power factor hysteresis, and out-of-balance hysteresis (%).
Line	CDU name, and line current hysteresis (A).
Outlet	CDU name, sequence interval(s), reboot delay(s), outlet current hysteresis (A), outlet active power hysteresis (W), and outlet power factor hysteresis (numeric).
Phase	Phase voltage hysteresis (V) and phase power factor hysteresis (numeric).
Sensor	Temperature hysteresis (numeric) and humidity hysteresis (numeric).

Overview of SNAP

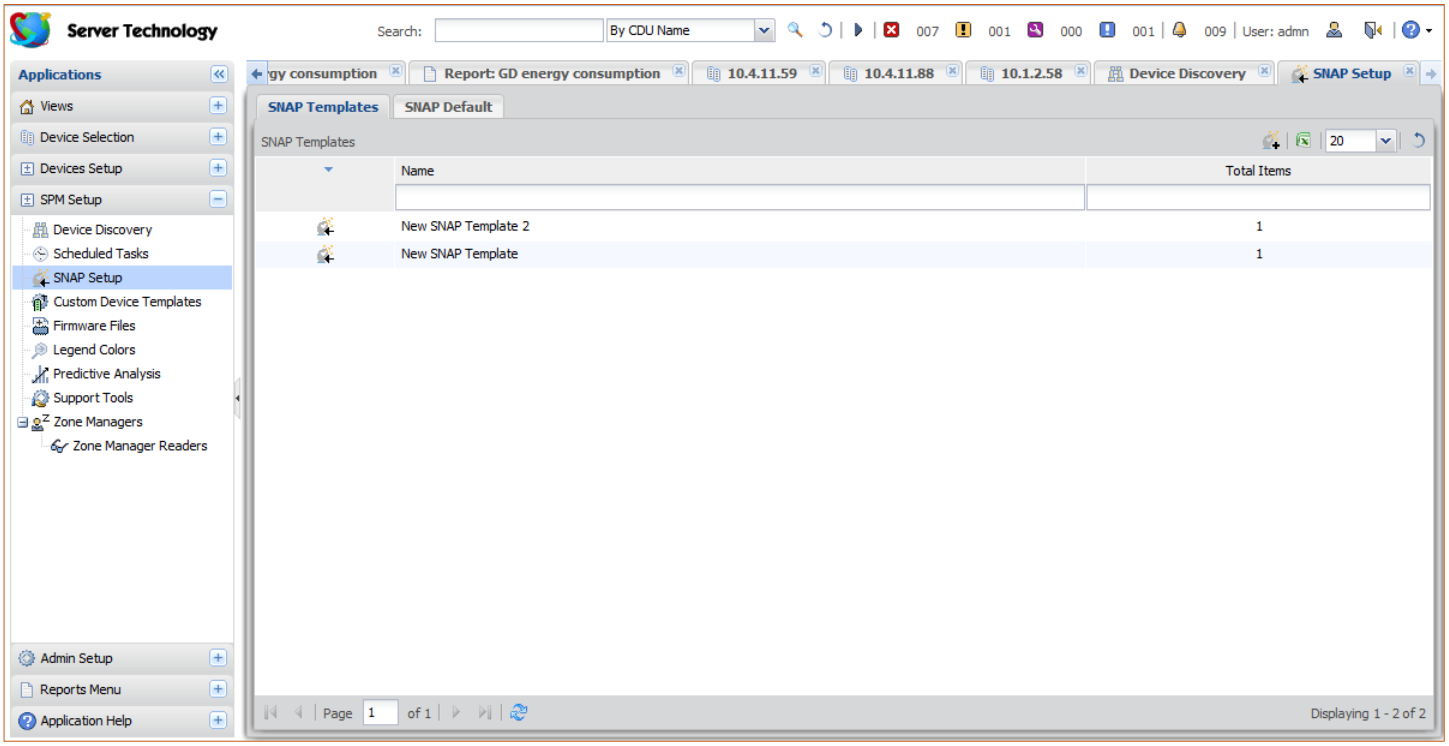
The SNAP option allows the administrator (and power user) to quickly push the numerous and latest values of PDU parameters to discovered network devices that are in normal operating status and communicating with SPM.

Note: SNAP is available only for Server Technology PDUs with firmware version 6.1 or later.

SNAP works directly from within the SPM user interface, allowing a SNAP template to be created with user-customized parameter values.

These values can then be applied to a single PDU or multiple PDUs, or applied to all PDUs within a named SPM parent-level cabinet, location, or zone.

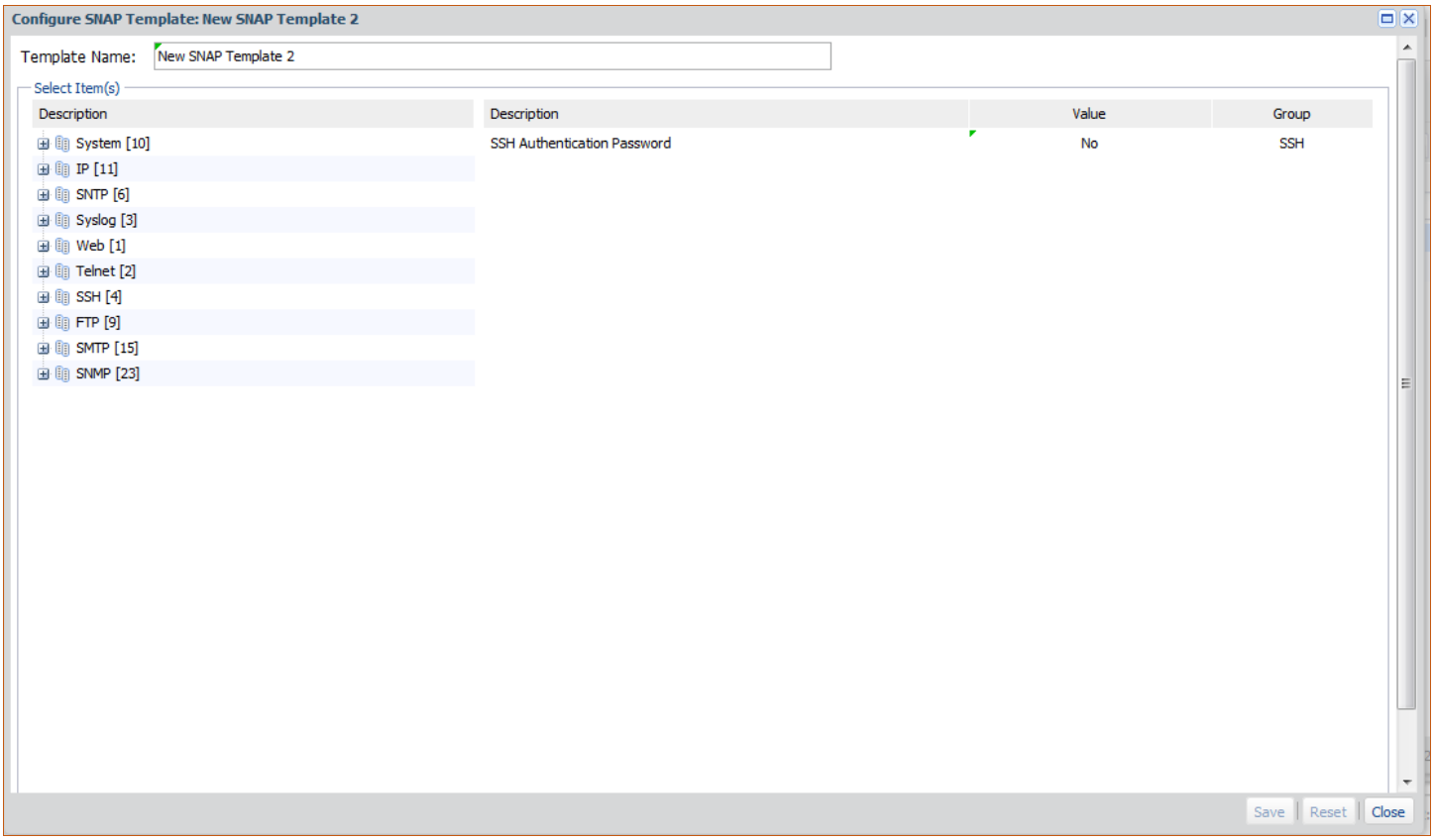
SPM Setup > SNAP Setup



About the SNAP Template

A SNAP template is SPM's mirror-image of a large subset of the overall PDU firmware parameters. These are the same PDU parameters configured using the firmware's Web Interface or Command Line Interface, available through SNAP for editing directly in the SPM GUI.

SPM Setup > SNAP Setup



When network PDUs are discovered by SPM, the SNAP tab shows the parameter values exactly as they have been set in the PDU itself.

All necessary PDU parameters are provided by default in SPM in the SNAP default template. You can then edit parameters in the default template, which will be used as initial settings for the creation of new templates.

You can also create and use a SNAP template based on existing PDUs. Prior to mass configuration updates, you have the option to protect your settings on designated units from the mass update.

By applying the SNAP template to a cabinet, location, or zone, you will mass-apply the updates to all PDUs within those parent-level objects.

Best Practices: SNAP

- Take the time to set up the SNAP default template as desired to cover the most standard configurations for your PDUs.
- SNAP is a powerful tool! Always double-check the parameters being configured by the SNAP template **before** clicking the Apply button.
- Set up an "SNMP" template for SNAP execution upon discovery of new PDUs. Adding the set community for SNMPv2c allows for changing names and thresholds within the PDUs. Alternatively, set up SNMPv3 in this manner for more secure communication.

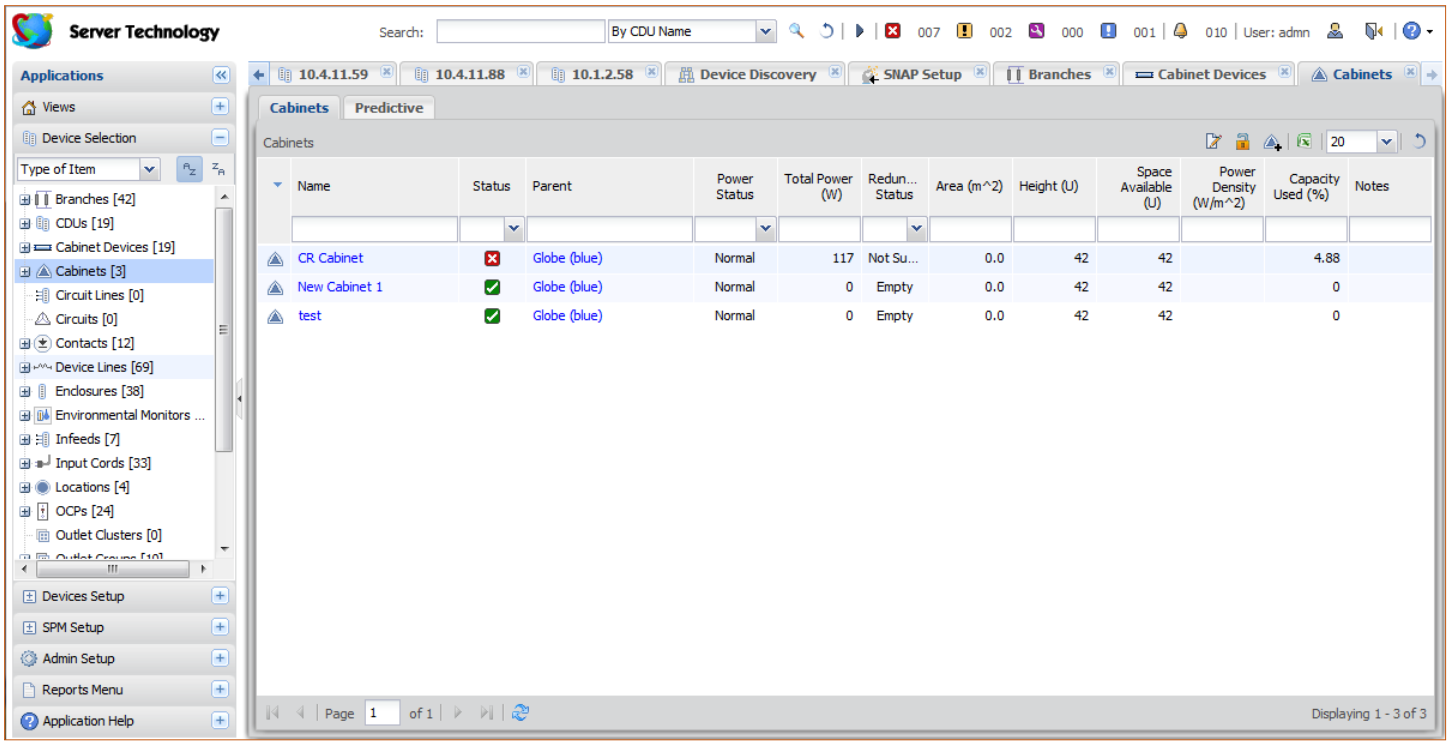
Chapter 4: Visualizing

This chapter covers how you view the PDUs within named cabinets and locations, monitor numerous operational metrics, and drill-down to specific device details that assist in effective power management.

Cabinets

The Cabinets option allows the management of user-defined cabinets that contain PDUs and other devices. Cabinet configuration allows the setting of cabinet thresholds for power, capacity, and load measurements, as well as viewing operational information and generating trend reports. The Cabinets application also provides options for power modifier and cabinet redundancy.

Device Selection > Cabinets



Power Modifier

The value you enter for Power Modifier is the known unmonitored power usage from your own history of device data. SPM tracks the value (if any) in the Power Modifier field (the static value in Watts that you enter for a cabinet), and then lets you view power usage for all units in that cabinet as part of the total power displayed in the cabinet reports.

Cabinet Redundancy

The Cabinet Redundancy option makes it easy to verify the power load in a cabinet (both A and B power sides of a PDU). You can see the load against the electrical safety rating. If power is lost, the color-coded bar chart shows the power you have in the moment compared to the capacity of the cabinet and its safety rating. In the event of a power failure in either the A or B power sides of the cabinet, the dynamic and readily available graphical information assists you in keeping cabinet operations uninterrupted, and prevents tripping a breaker and losing both sides of power.

Best Practices: Cabinets

- For a more detailed graphical view, create cabinets even when PDUs are not yet installed.
- Cabinet thresholds for power usage are often more understandable than the variable “CDU” total power thresholds. Use the 80% rule for warning level and 90% for critical level.

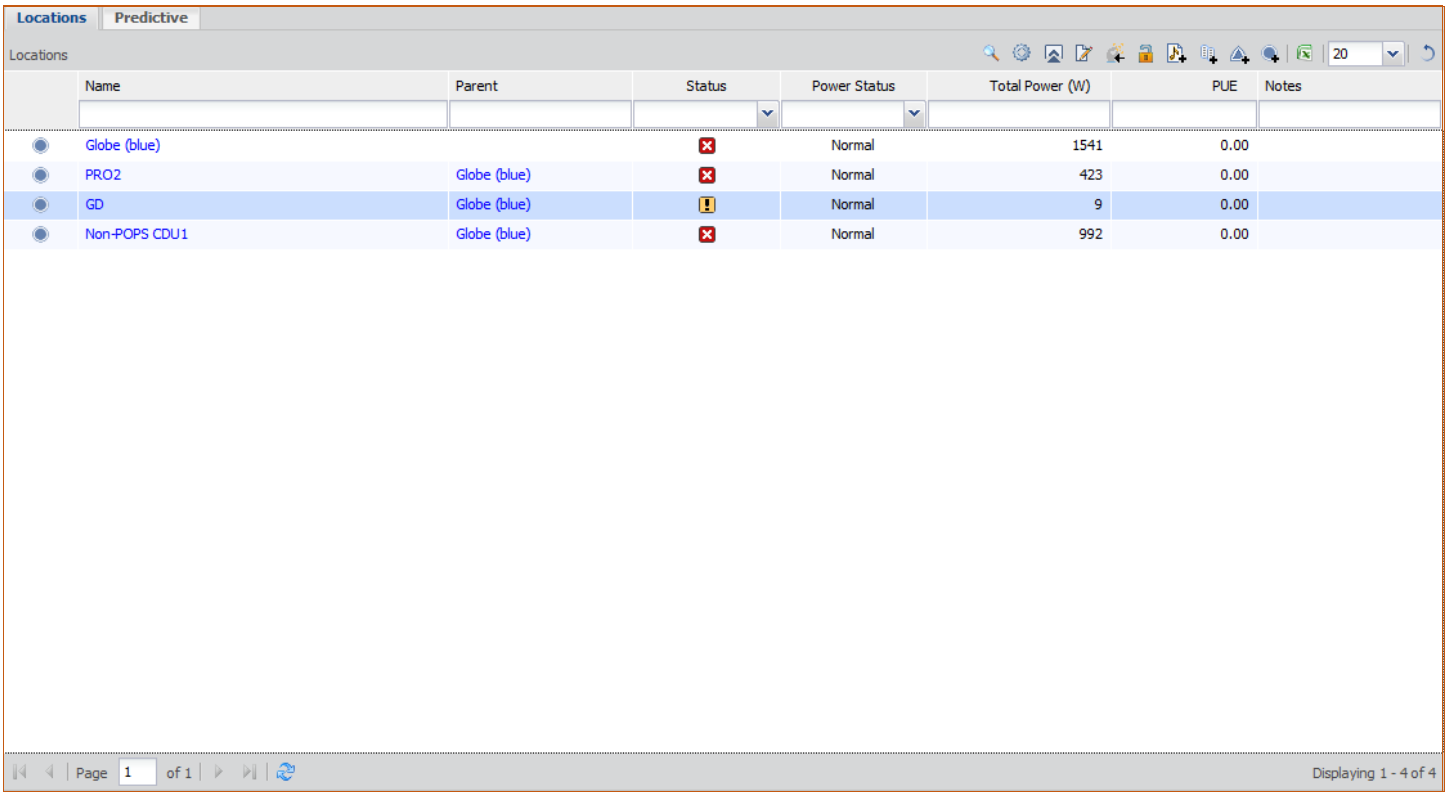
Locations

The Locations option allows the graphical management of network devices on a user-selected image file, such as a building, state map, city, room, floor, or any image that represents the data center layout.

Locations are the background in the Views application upon which the administrator builds a graphic representation of the facility using color-coded device icons for at-a-glance graphical monitoring of network operations.

The Locations window displays current status and other dynamic operational parameters for each named location.

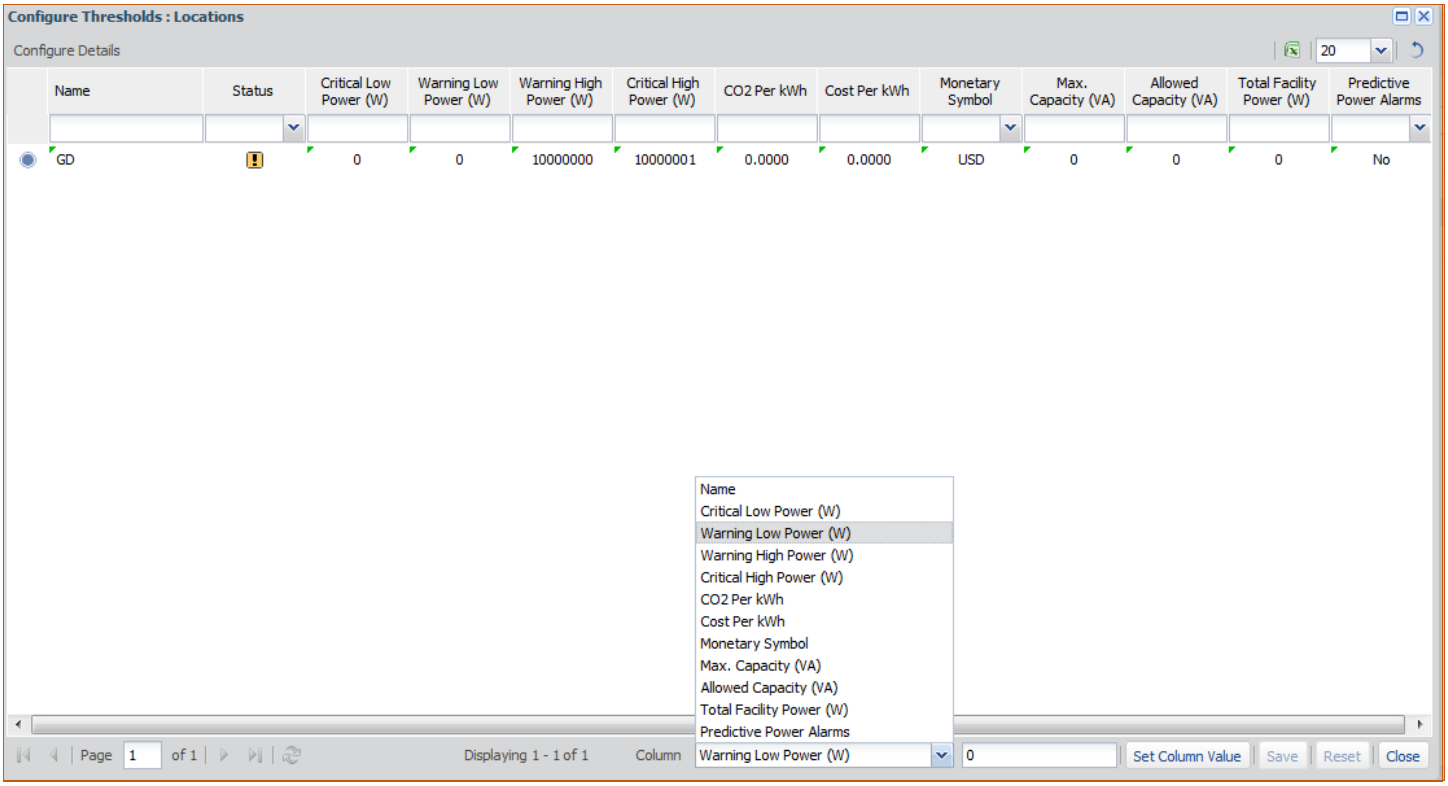
Device Selection > Locations



Configuring Locations

Numerous location parameters are available for configuration. You can set values for a location's critical/warning low/high power (W), the CO2 and cost per kWh, monetary symbol, maximum/allowed capacity (VA), total facility power, and the setting of predictive alarms.

Device Selection > Locations > Configure Thresholds: Locations



Best Practices: Locations

- Keep the background images simple. Too many details like text or extraneous outlines make for cluttered views of status screens.
- Create only necessary levels. For example, if your organization has multiple sites that reside entirely within one city, make that city the top level location.
- Use the shortcut buttons "X", "Y", "W", and "H" to position or size all cabinet icons within the map.
- Setting thresholds at the Location level allows for predictive trending.
- Make early decisions on CO2 and Cost to ensure the accumulated data is relevant when you need it.

Chapter 5: Alerting

This chapter covers the alerting features SPM provides for monitoring and configuring the measurement-based areas of the PDU. For example, you can receive alerts for breaker or fuse errors per branch, for notification of the operational status of environmental monitors and various sensors, as well as for overload on power (device) lines.

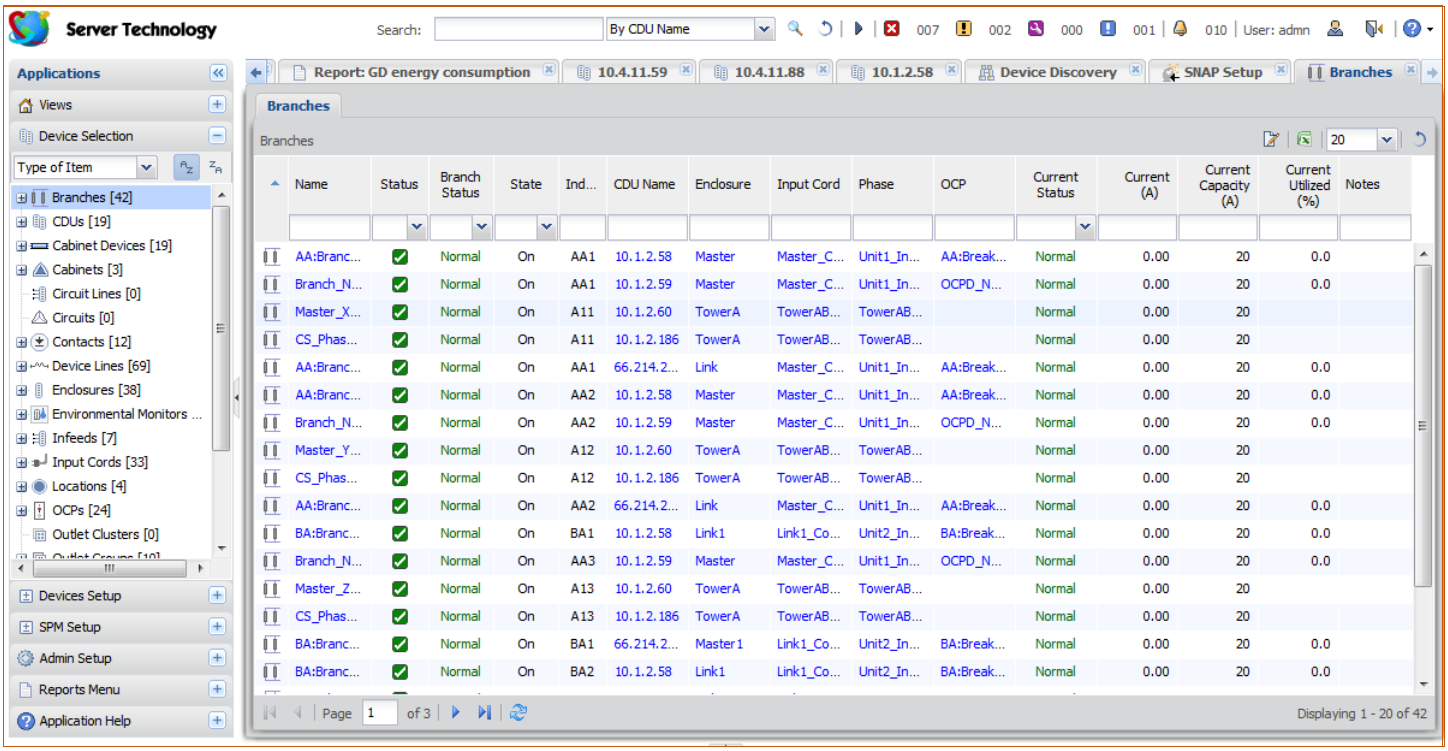
Several functional areas of SPM work in conjunction to provide a comprehensive alerting system: Branches, Contacts, Device Lines, Environmental Monitors (EMCUs), Input Cords, Over-Current Protectors (OCPs), Outlets, Phases, and Sensors. These features are dependent upon the specific model of PDU being monitored. Not all features are available on all models.

Branches

The Branches application supports branch current monitoring for measuring, reporting, and alerting (in amps) breaker or fuse errors per branch. Up to six branches are supported for both Switched and Smart PRO2 units to provide notification of overload or breaker trips.

A branch originates with the PDU as its outlet sections, and as such, a branch is a fixed part of the PDU. Therefore, you cannot create a new branch in SPM. The branches for PDUs are automatically detected by SPM upon a discovery (or by adding a new device). When branches are present, SPM will display the Branches option.

Device Selection > Branches



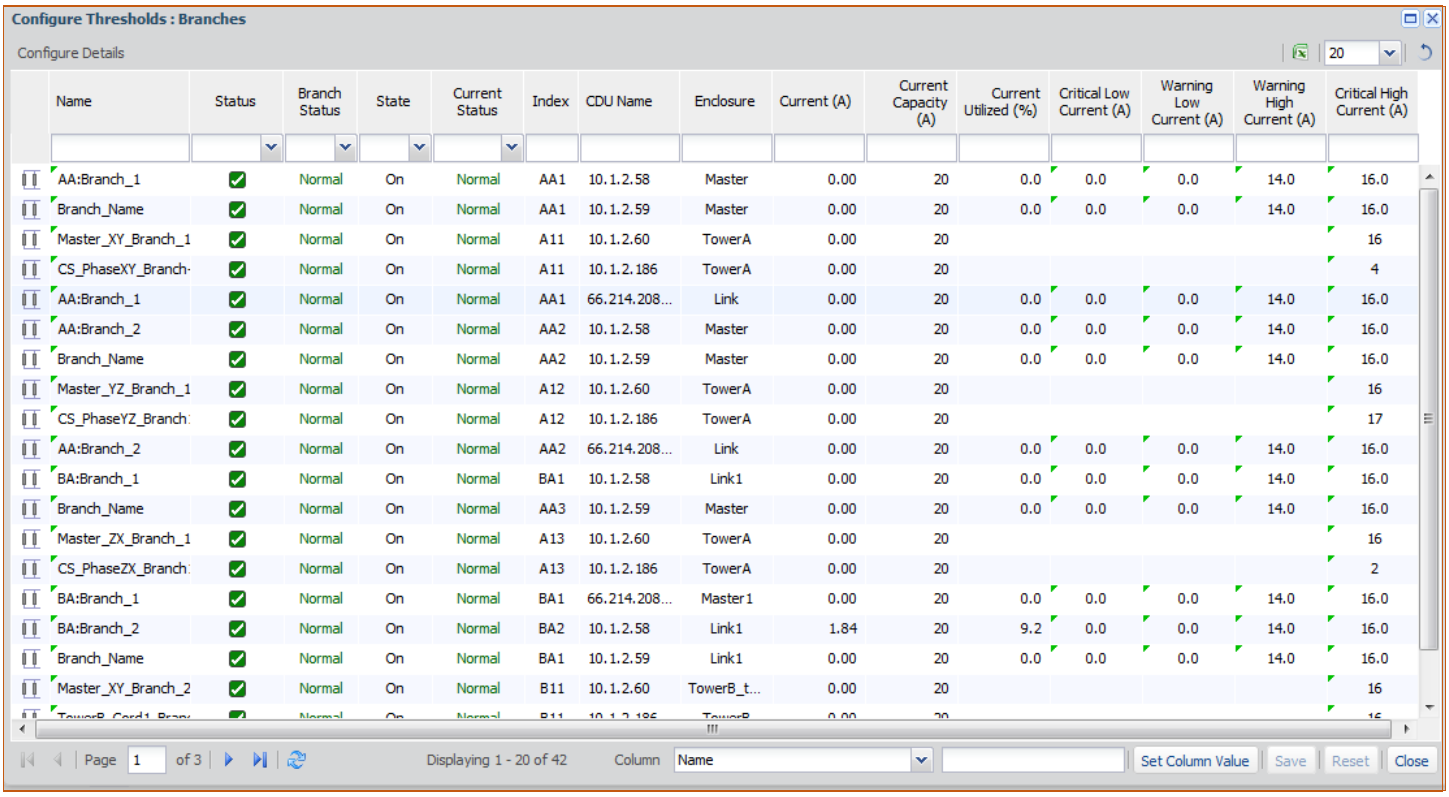
Configuring Branches

To configure a branch, you can set multiple load levels for low/high warning/critical values (A) for branch current thresholds, plus the branch name can be edited.

Branch thresholds are automatically affected by certain changes to the OCP current capacity, based on the North American 80% rule.

Note: For certain CDUs running firmware version 7.1 or earlier, internally defined “infeeds” are mapped to SPM into the Branches option.

Device Selection > Branches > Configure Thresholds: Branches



Name	Status	Branch Status	State	Current Status	Index	CDU Name	Enclosure	Current (A)	Current Capacity (A)	Current Utilized (%)	Critical Low Current (A)	Warning Low Current (A)	Warning High Current (A)	Critical High Current (A)
AA:Branch_1	✓	Normal	On	Normal	AA1	10.1.2.58	Master	0.00	20	0.0	0.0	0.0	14.0	16.0
Branch_Name	✓	Normal	On	Normal	AA1	10.1.2.59	Master	0.00	20	0.0	0.0	0.0	14.0	16.0
Master_XY_Branch_1	✓	Normal	On	Normal	A11	10.1.2.60	TowerA	0.00	20					16
CS_PhaseXY_Branch·	✓	Normal	On	Normal	A11	10.1.2.186	TowerA	0.00	20					4
AA:Branch_1	✓	Normal	On	Normal	AA1	66.214.208...	Link	0.00	20	0.0	0.0	0.0	14.0	16.0
AA:Branch_2	✓	Normal	On	Normal	AA2	10.1.2.58	Master	0.00	20	0.0	0.0	0.0	14.0	16.0
Branch_Name	✓	Normal	On	Normal	AA2	10.1.2.59	Master	0.00	20	0.0	0.0	0.0	14.0	16.0
Master_YZ_Branch_1	✓	Normal	On	Normal	A12	10.1.2.60	TowerA	0.00	20					16
CS_PhaseYZ_Branch:	✓	Normal	On	Normal	A12	10.1.2.186	TowerA	0.00	20					17
AA:Branch_2	✓	Normal	On	Normal	AA2	66.214.208...	Link	0.00	20	0.0	0.0	0.0	14.0	16.0
BA:Branch_1	✓	Normal	On	Normal	BA1	10.1.2.58	Link1	0.00	20	0.0	0.0	0.0	14.0	16.0
Branch_Name	✓	Normal	On	Normal	AA3	10.1.2.59	Master	0.00	20	0.0	0.0	0.0	14.0	16.0
Master_ZX_Branch_1	✓	Normal	On	Normal	A13	10.1.2.60	TowerA	0.00	20					16
CS_PhaseZX_Branch:	✓	Normal	On	Normal	A13	10.1.2.186	TowerA	0.00	20					2
BA:Branch_1	✓	Normal	On	Normal	BA1	66.214.208...	Master1	0.00	20	0.0	0.0	0.0	14.0	16.0
BA:Branch_2	✓	Normal	On	Normal	BA2	10.1.2.58	Link1	1.84	20	9.2	0.0	0.0	14.0	16.0
Branch_Name	✓	Normal	On	Normal	BA1	10.1.2.59	Link1	0.00	20	0.0	0.0	0.0	14.0	16.0
Master_XY_Branch_2	✓	Normal	On	Normal	B11	10.1.2.60	TowerB_t...	0.00	20					16

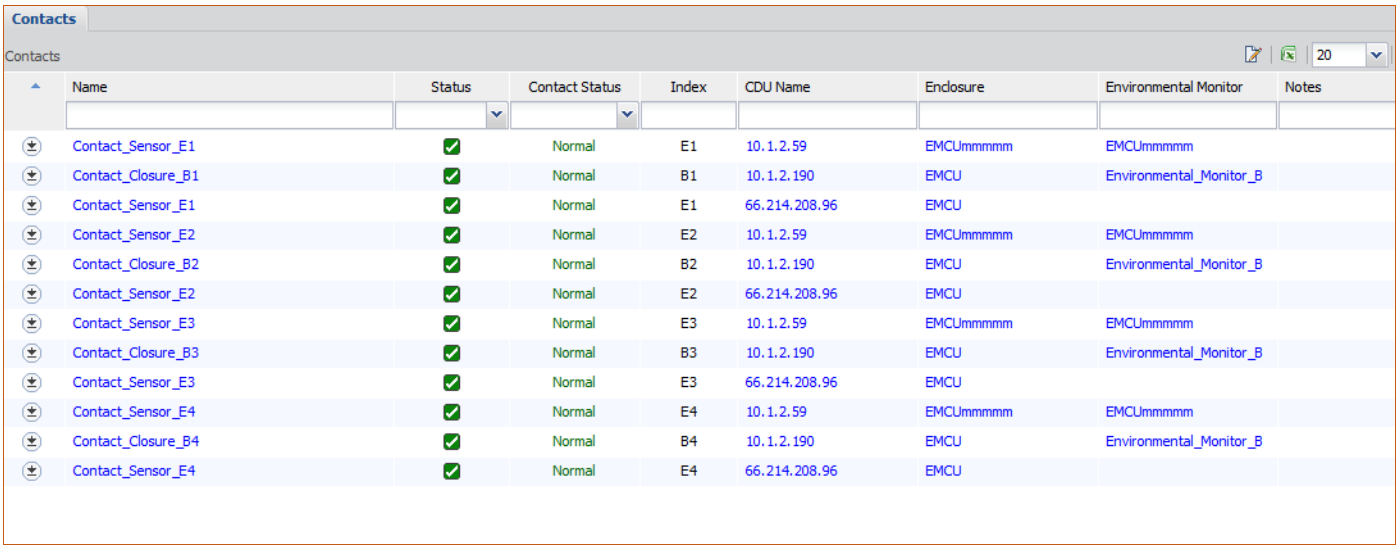
Best Practices: Branches

- Leave the capacity of various items as they are by default. For example, the OCP current capacity of 20A based on the installed breaker or fuse.
- Only reduce the alert high threshold levels after understanding that there are no “normal” conditions that exceed that value. In other words, do not create nuisance alarms.
- Wait to set any alert low threshold levels until after there is sufficient data in the system to help understand what is “normal”.
- Use the Set Column Value option for mass configuration.

Contacts

The Contacts option displays status of the environmental monitor and operational information when monitoring contact closure sensors. A discovered PDU, or an environmental monitor on the PDU, must have a connected contact closure or the Contacts option will not display in SPM.

Device Selection > Contacts



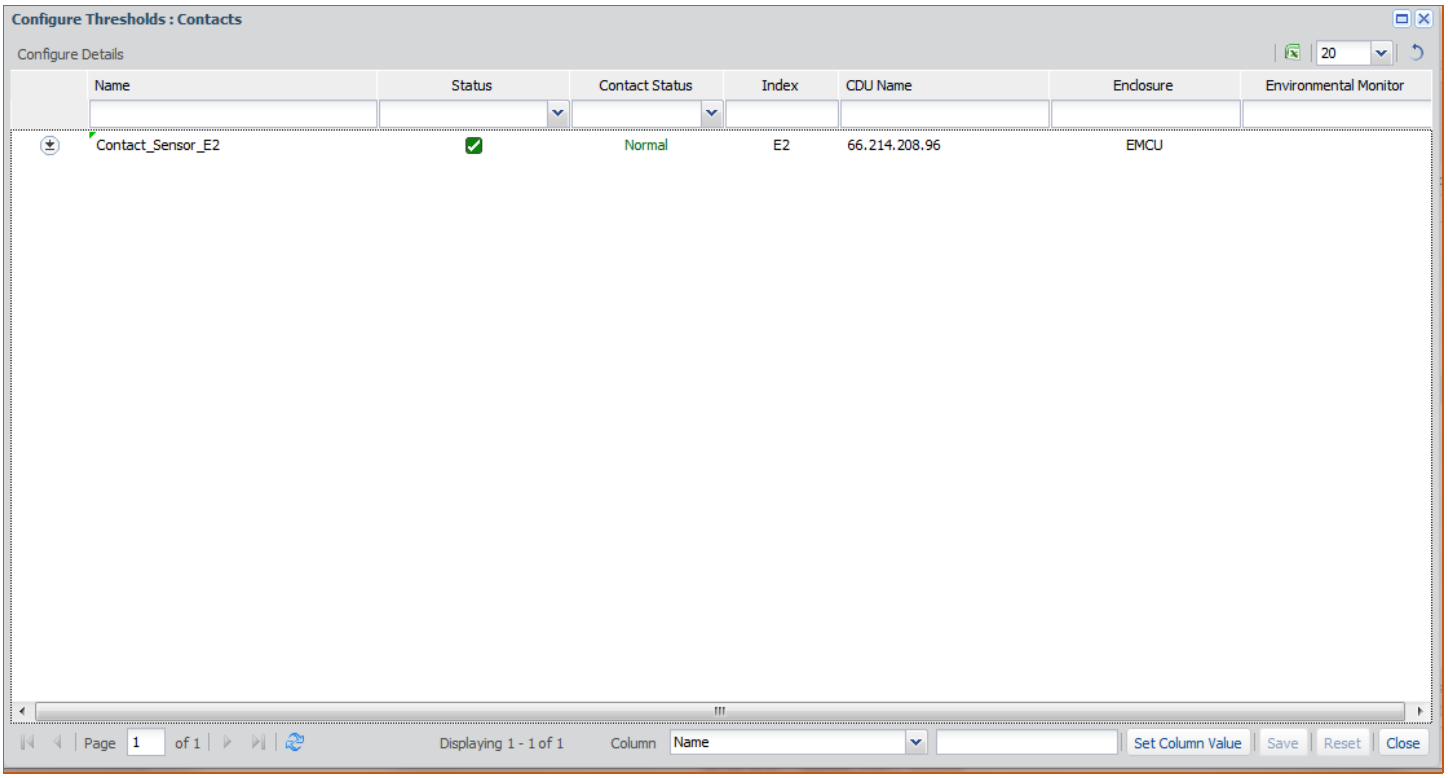
Contacts

Contacts

Name	Status	Contact Status	Index	CDU Name	Enclosure	Environmental Monitor	Notes
Contact_Sensor_E1	✓	Normal	E1	10.1.2.59	EMCUmmmmm	EMCUmmmmm	
Contact_Closure_B1	✓	Normal	B1	10.1.2.190	EMCU	Environmental_Monitor_B	
Contact_Sensor_E1	✓	Normal	E1	66.214.208.96	EMCU		
Contact_Sensor_E2	✓	Normal	E2	10.1.2.59	EMCUmmmmm	EMCUmmmmm	
Contact_Closure_B2	✓	Normal	B2	10.1.2.190	EMCU	Environmental_Monitor_B	
Contact_Sensor_E2	✓	Normal	E2	66.214.208.96	EMCU		
Contact_Sensor_E3	✓	Normal	E3	10.1.2.59	EMCUmmmmm	EMCUmmmmm	
Contact_Closure_B3	✓	Normal	B3	10.1.2.190	EMCU	Environmental_Monitor_B	
Contact_Sensor_E3	✓	Normal	E3	66.214.208.96	EMCU		
Contact_Sensor_E4	✓	Normal	E4	10.1.2.59	EMCUmmmmm	EMCUmmmmm	
Contact_Closure_B4	✓	Normal	B4	10.1.2.190	EMCU	Environmental_Monitor_B	
Contact_Sensor_E4	✓	Normal	E4	66.214.208.96	EMCU		

Device Selection > Contacts > Configure Thresholds: Contacts

The only contact parameter that can be edited is the contact name.



Configure Thresholds : Contacts

Configure Details

Name	Status	Contact Status	Index	CDU Name	Enclosure	Environmental Monitor
Contact_Sensor_E2	✓	Normal	E2	66.214.208.96	EMCU	

Page 1 of 1 Displaying 1 - 1 of 1 Column Name Set Column Value Save Reset Close

Device Lines

The Device Lines option displays detailed operational information about the power lines to the PDU. Where applicable, a PDU will have between one and six lines.

A device line originates with the PDU as its power line, and as such, a device line is a fixed part of the PDU. Therefore, you cannot create a new device line in SPM. The device lines for PDUs are automatically detected by SPM upon a discovery (or by adding a new device). When device lines are present, SPM will display the Device Lines option.

Note: For certain CDUs running firmware version 7.1 or earlier, internally defined “infeeds” are mapped to SPM into the Device Lines option.

Device Selection > Device Lines

Device Lines

Device Lines 20

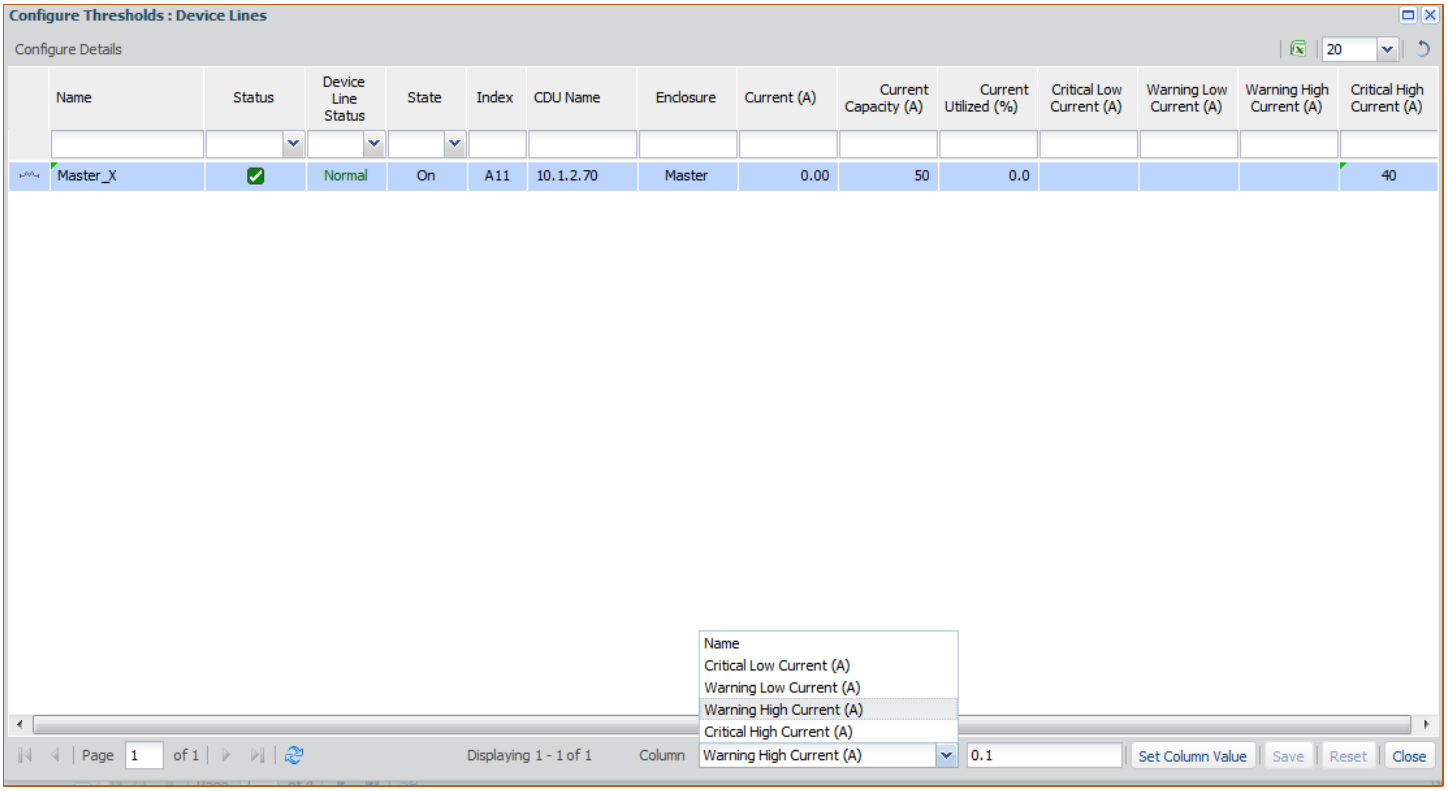
Name	Status	Device Line Status	State	Index	CDU Name	Enclosure	Input Cord	Current Status	Current (A)	Current Capacity (A)	Current Utilized (%)	Notes
AA:L	✓	Normal	On	AA1	10.1.2.58	Master	Master_Cord_A	Normal	0.00	30	0.0	
Master	✓	Normal	Unknown	A11	10.1.2.50	Master	Master_Cord1	None		20		
TowerA_Infe...	✓	Normal	On	A11	66.214.208.98	TowerA	TowerA_Cord1	Normal	0.00	30	0.0	
TowerA_Infe...	✓	Normal	On	A11	10.1.2.53	TowerA	TowerA_Cord1	None	0.00			
Link_A_X	✓	Normal	On	A11	10.1.2.62	Link_A	Link_A_Cord1	Normal	0.00	60	0.0	
TowerA_Infe...	✓	Normal	On	A11	10.1.2.64	TowerA	TowerA_Cord1	None	0.00			
Master_X	✓	Normal	On	A11	10.1.2.70	Master	Master_Cord1	Normal	0.00	50	0.0	
Master_X	✓	Normal	On	A11	10.1.2.72	Master	Master_Cord1	Normal	0.00	30	0.0	
Master_X	✓	Normal	On	A11	10.1.2.74	Master	Master_Cord1	Normal	0.00	30	0.0	
TowerA_Infe...	✓	Normal	On	A11	10.4.11.104	Encl_Tower_A	Encl_Tower_A...	Normal	3.25	30	10.8	
AA:L1	✓	Normal	On	AA1	10.1.2.59	Master	Master_Cord_A	Normal	0.00	24	0.0	
TowerAB_Cor...	!	None	Unknown	A11	10.1.2.60	TowerA	TowerAB_Cor...	None	0.00	20	0.0	
TowerAB_Cor...	!	None	Unknown	A11	10.1.2.186	TowerA	TowerAB_Cor...	None	0.00	20	0.0	
TowerA_Infe...	✓	Normal	On	A11	10.1.2.190	TowerA	TowerA_Cord1	Normal	1.38	20	6.9	
AA:L1	✓	Normal	On	AA1	66.214.208.96	Link	Master_Cord_...	Normal	0.00	30	0.0	
BA:L	✓	Normal	On	BA1	10.1.2.58	Link1	Link1_Cord_A	Normal	0.00	30	0.0	
TowerA_Infe...	✓	Normal	On	A12	66.214.208.98	TowerA	TowerA_Cord1	Normal	0.00	30	0.0	
TowerA_Infe...	✓	Normal	On	A21	10.1.2.53	TowerA	TowerA_Cord2	None	2.50			
Link_A_Y	✓	Normal	On	A12	10.1.2.62	Link_A	Link_A_Cord1	Normal	0.00	60	0.0	
TowerA_Infe...	✓	Normal	On	A21	10.1.2.64	TowerA	TowerA_Cord2	None	0.00			

Configuring Device Lines

If a PDU's device lines are discovered by SPM, you can configure critical/warning low/high current (A), and change the name of the device line.

Configuration values can be applied to an individual device line or to multiple selected device lines at one time.

Device Selection > Device Lines > Configure Thresholds: Device Lines



From the Column menu shown in the example above, select a device line configuration area, and the related configuration window displays for editing.

Best Practices: Device Lines

- The Device Line alert is one of the most important alerts for the management of uptime in the data center. The default setting follows the North American 80% rule, such that a "30A" circuit alerts at 24A on any line. When installing a pair of PDUs for power redundancy, set the alert level to 40% to provide the most conservative uptime protection.

- To provide clear understanding of alerts or reports, name the device lines based on any existing upstream circuit name or the cabinet name.

Environmental Monitors

The Environmental Monitors option displays status and operational information about the PDU's embedded environmental monitor or attached EMCU, which can be useful for managing network assets.

Included are metrics for monitoring water and analog-to-digital (ADC) sensors – if these sensors are connected to the EMCU. Water sensors will have either Normal or Alarm status; they have no other states or value ranges.

Device Selection > Environmental Monitors

Environmental Monitors

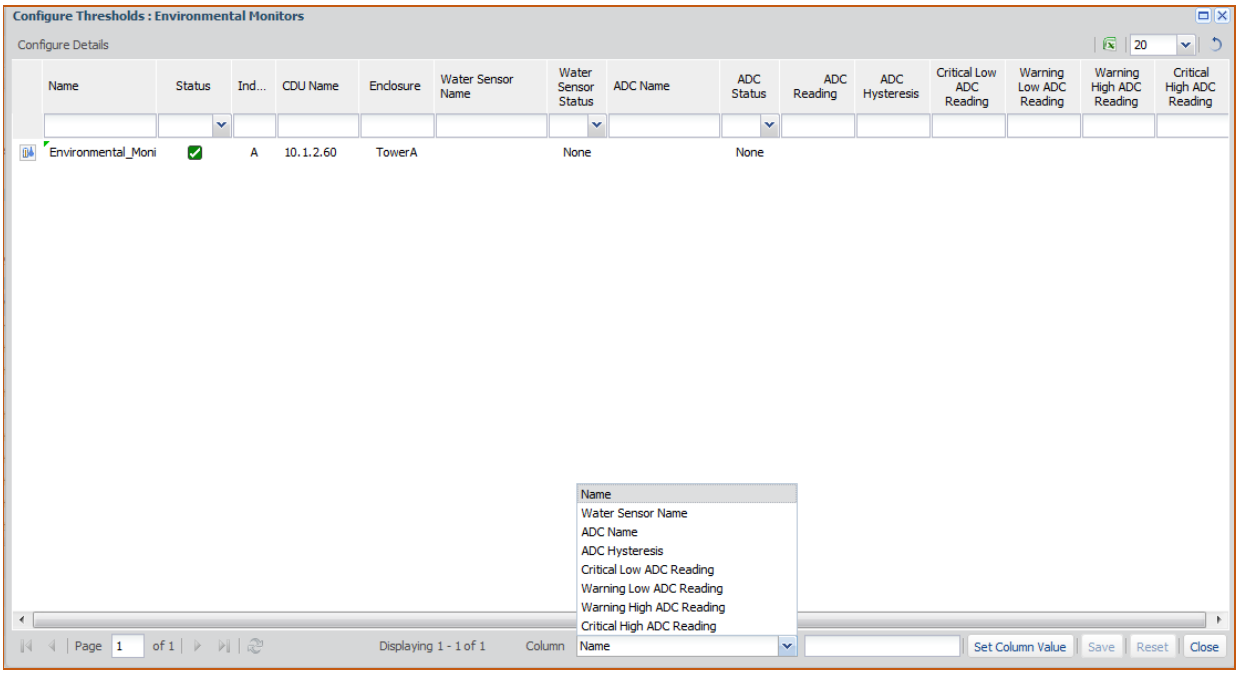
Environmental Monitors

Name	Status	Index	CDU Name	Enclosure	Water Sensor Name	Water Sensor Status	ADC Name	ADC Reading	ADC Status	Notes
Environmental_Monitor_A		A	10.1.2.50	Master		None			None	
Environmental_Monitor_A	✔	A	66.214.208.98	TowerA		None			None	
Environmental_Monitor_A	✔	A	10.1.2.53	TowerA		None			None	
Environmental_Monitor_A	✔	A	10.1.2.62	Link_A		None			None	
Environmental_Monitor_AG	✔	A	10.1.2.64	TowerA		None			None	
Environmental_Monitor_A	✔	A	10.1.2.70	Master		None			None	
Environmental_Monitor_A	✔	A	10.1.2.72	Master		None			None	
Environmental_Monitor_A	✔	A	10.1.2.74	Master		None			None	
Environmental_Monitor_Aa	✔	A	10.4.11.104	Encl_Tower_A		None			None	
EMCUmmmmm	✔	E	10.1.2.59	EMCUmmmmm	Water_Sensor_...	Normal	ADC_Sensor_E1	40	Normal	
Environmental_Monitor_A	✔	A	10.1.2.60	TowerA		None			None	
Environmental_Monitor_A	✔	A	10.1.2.186	TowerA		None			None	
Environmental_Monitor_A	✔	A	10.1.2.190	TowerA		None			None	
	✔	E	66.214.208.96	EMCU	Water_Sensor_...	Normal	ADC_Sensor_E1	52	Normal	
Environmental_Monitor_B	✔	B	10.1.2.190	EMCU	Water_Sensor_B	Normal	ADC_B	45	Normal	

Configuring Environmental Monitors

If an ADC sensor or water sensor is connected to the EMCU, you will be able to configure low/high critical/warning ADC readings and hysteresis, as well as edit the ADC name. You can also edit ADC and water sensor name.

Device Selection > Environmental Monitors > Configure Thresholds: Environmental Monitors



From the Column menu shown in the example above, select a sensor configuration area, and the related configuration window displays for editing.

Input Cords

The Input Cord option displays hardware specifications and the latest infeed status and operational metrics for all cords in the SPM system.

Included are several power measurements for power capacity (VA), cord apparent power (VA), power factor (if present), and cord 3-phase out-of-balance level (%).

Device lines and phases in the PDU are part of the input cord itself.

Note: The inlet type, frequency, power capacity, and energy rating of the cord were determined for the PRO2 product at factory assembly and cannot be user-edited.

Device Selection > Input Cords

Input Cords

Input Cords

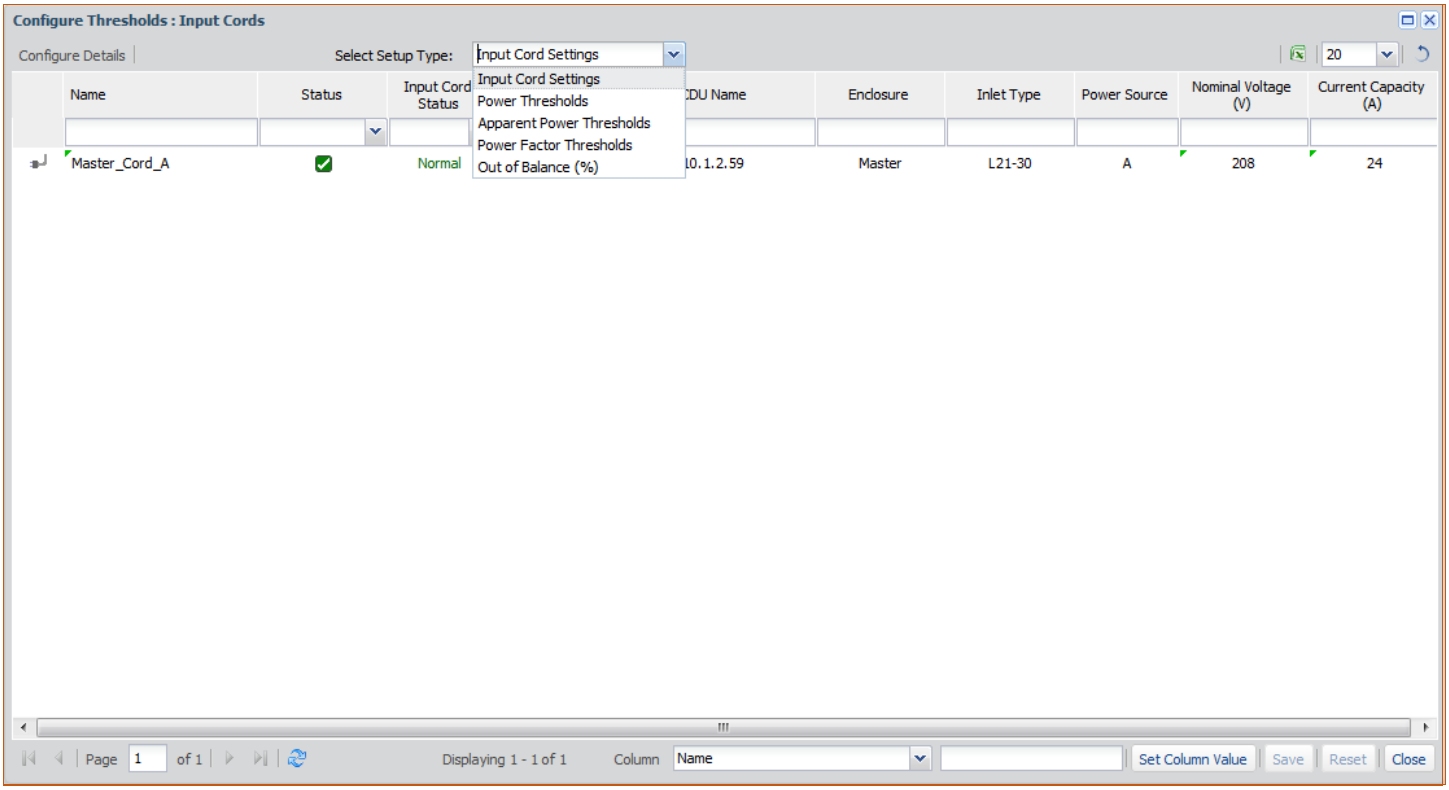
Name	Stat...	Input Cord Status	State	In...	CDU Name	Enclosure	Inlet Type	Power Source	Freque... (Hz)	Power Capacity (VA)	Power Status	Power (W)	Power Utilized (%VA)	Energy (kWh)	Apparent Power (VA)	Power Factor	Out of Balance (%)	Note
Master_Cord_A	✓	Normal	On	AA	10.1.2.58	Master	L6-30P	B	60	6240	Normal	0	0.0	640.5	0			
Master_Cord1	!	None	Unkn...	A1	10.1.2.50	Master		A	60	2400	None		0.0	111.5	0			
TowerA_Cord1	!	None	Unkn...	A1	66.214....	TowerA		A	60	10800	None	0	0.0	0.0	0			
TowerA_Cord1	!	None	Unkn...	A1	10.1.2.53	TowerA		A			None			0.0				
Link_A_Cord1	!	None	Unkn...	A1	10.1.2.62	Link_A		A		21615	None	0	0.0	0.0	0	1.00		
TowerA_Cord1	!	None	Unkn...	A1	10.1.2.64	TowerA		A			None			0.0				
Master_Cord1	!	None	Unkn...	A1	10.1.2.70	Master		A		18013	None	0	0.0	0.0	0	1.00		
Master_Cord1	!	None	Unkn...	A1	10.1.2.72	Master		A		10808	None	0	0.0	0.0	0	1.00		
Master_Cord1	!	None	Unkn...	A1	10.1.2.74	Master		A		10808	None	76	0.7	0.0	76	1.00		
Encl_Tower_A_...	!	None	Unkn...	A1	10.4.11....	Encl_To...		A		10808	None	810	7.5	0.0	810	1.00		
Master_Cord_A	✓	Normal	On	AA	10.1.2.59	Master	L21-30	A	60	14976	Normal	0	0.0	0.0	0		0.0	
TowerAB_Cord1	!	None	Unkn...	A1	10.1.2.60	TowerA		A			None	0		0.0	0	1.00		
TowerAB_Cord1	!	None	Unkn...	A1	10.1.2.1...	TowerA		A			None	0		0.0	0	0.90		
TowerA_Cord1	!	None	Unkn...	A1	10.1.2.1...	TowerA		A		2400	None	166	6.9	0.0	166	1.00		
Master_Cord_A's	✓	Normal	On	AA	66.214....	Link	L6-30P	A	60	6240	Normal	0	0.0	670.4	0			
Link1_Cord_A	✓	Normal	On	BA	10.1.2.58	Link1	L6-30P	B	60	6240	Normal	0	0.0	314.7	0			
TowerB_Cord1	!	None	Unkn...	B1	66.214....	TowerB		B	60	21600	None	0	0.0	0.0	0			
TowerA_Cord2	!	None	Unkn...	A2	10.1.2.53	TowerA		B			None	117		0.0				
Link_B_Cord1	!	None	Unkn...	B1	10.1.2.62	Link_B		B		21615	None	0	0.0	0.0	0	1.00		
TowerA_Cord2	!	None	Unkn...	A2	10.1.2.64	TowerA		B			None			0.0				

Configuring Input Cords

Multiple levels of low/high warning/alarm can be set for input cords. Configuration affects setting thresholds for cord power, cord apparent power, and power factor. For 3-phase systems, load balancing can also be configured.

Configuration values can be applied to an individual cord or to multiple selected cords at one time.

Device Selection > Input Cords > Configure Thresholds: Input Cords



From the drop-down menu shown in the example above, select a configuration setup type to display the related configuration window.

Input cord settings can be changed as follows:

This configuration menu option …	… allows editing for these input cord parameters:
Input Cord Settings	Cord name, nominal voltage (V), and current capacity (A). The nominal voltage is the mid-point value for input cord monitoring.
Power Thresholds	Cord name, critical low/high power (W), and warning low/high power (W).
Apparent Power Thresholds	Cord name, critical low/high apparent power (VA), and warning low/high apparent power (W).
Power Factor Thresholds	Cord name, critical low power factor (numeric), and warning low power factor (numeric).
Out-of-Balance (%)	Cord name, warning high out-of-balance (%) and critical high out-of-balance (%). The out-of-balance value is the percent power different between the phases of a cord.

Best Practices: Input Cords

- Maintain default alert levels until after sufficient trending can be recorded to determine what is considered “normal” behavior.
- Name the input cords based on an existing upstream circuit name or the cabinet name to provide clear understanding of alerts or reports.

Over-Current Protectors (OCPs)

The OCPs option reports a failed OCP for both PRO2 Switched and Smart products via the branch current monitoring capability of the PRO2. This allows you to monitor the operating condition of the reported OCP type as displayed, either a breaker or a fuse.

A discovered PDU must include an OCP or the OCPs option will not be available in SPM.

Device Selection > OCPs

OCPs

Name	Status	OCP Status	State	Index	CDU Name	Enclosure	Input Cord	Branch Type	Current Capacity (A)
AA:Breaker_1	✓	Normal	Unknown	AA1	10.1.2.58	Master	Master_Cord_A	Breaker	20
OCPD_Name	✓	Normal	Unknown	AA1	10.1.2.59	Master	Master_Cord_A	Breaker	20
AA:Breaker_1	✓	Normal	Unknown	AA1	66.214.208.96	Link	Master_Cord_A's	Breaker	20
AA:Breaker_2	✓	Normal	Unknown	AA2	10.1.2.58	Master	Master_Cord_A	Breaker	20
OCPD_Name	✓	Normal	Unknown	AA2	10.1.2.59	Master	Master_Cord_A	Breaker	20
AA:Breaker_2	✓	Normal	Unknown	AA2	66.214.208.96	Link	Master_Cord_A's	Breaker	20
BA:Breaker_1	✓	Normal	Unknown	BA1	10.1.2.58	Link1	Link1_Cord_A	Breaker	20
OCPD_Name	✓	Normal	Unknown	AA3	10.1.2.59	Master	Master_Cord_A	Breaker	20
BA:Breaker_1	✓	Normal	Unknown	BA1	66.214.208.96	Master1	Link1_Cord_A	Breaker	20
BA:Breaker_2	✓	Normal	Unknown	BA2	10.1.2.58	Link1	Link1_Cord_A	Breaker	20
OCPD_Name	✓	Normal	Unknown	BA1	10.1.2.59	Link1	Link1_Cord_A	Breaker	20
BA:Breaker_2	✓	Normal	Unknown	BA2	66.214.208.96	Master1	Link1_Cord_A	Breaker	20
OCPD_Name	✓	Normal	Unknown	BA2	10.1.2.59	Link1	Link1_Cord_A	Breaker	20
CA:Breaker_1	✓	Normal	Unknown	CA1	66.214.208.96	Link2	Link2_Cord_A	Breaker	20

Configuring OCPs

You can set the Current Capacity (A) for the OCP as its maximum current load. The name of the OCP can also be edited. If an OCP is connected to the PRO2, branch values will affect the setting on the OCP. Note that not all PDUs have a monitored OCP.

Device Selection > OCPs > Configure Thresholds: OCPs

Configure Thresholds : OCPs

Configure Details

Name	Status	OCP Status	State	Index	CDU Name	Enclosure	Input Cord	Current Capacity (A)
AA:Breaker_2	✓	Normal	Unknown	AA2	66.214.208.96	Link	Master_Cord_A's	20

Best Practices: OCPs

- Leave the current capacity at its factory default value.

Outlets

Depending on specific features of certain PDUs; for example, Switching or POPS, the Outlets option displays all outlets for discovered PDUs in SPM and provides operational status for outlet power monitoring, the issuing of outlet command control (On/Off/Reboot), and the setting of outlet threshold values, including user group permissions for the outlets.

Also provided is a fast drill-down (by clicking a specific outlet name in the Outlets list) to show additional, detailed operational data.

Device Selection > Outlets

Outlets | Outlet Control

Outlets

Name	Index	Status	Outlet Status	State	CDU Name	Socket Type	Current Status	Current (A)	Current Capacity (A)	Voltage (V)	Power Capacity (VA)	Power Status	Power (W)	Apparent Power (VA)	Power Factor	Crest Factor	Energy (kWh)	Reactan
Master_Outlet_1	AA1	✔	Normal	On	10.1.2.58	C19	None		20			None					0.0	N/A
A1	A1	!	None	Unknown	10.1.2.50		None		20			None					0.0	N/A
Outlet1-HS	01	✔	On	Unknown	10.4.11.59		Normal	0.00	12	240.0		None	0	0	1.00		0.0	N/A
MOD 1 Outlet 1	01	✔	Locked...	Unknown	10.4.11.88		Normal	0.00		203.7		None	0	0	0.00		0.0	N/A
TowerA_Infeed...	AA1	✔	On	On	66.214.208.98		Normal	0.00	20	237.9		None	0	0			0.0	N/A
Outlet1	AA1	✖	Off Error	Off	10.1.2.53		Normal	0.00	0	47.0		None	0	0	0.00		0.0	N/A
Link_A_XY_1	AA1	✔	On	On	10.1.2.62		Normal	0.00	20	207.0		None	0	0			0.0	N/A
ZWWWWWWW...	AA1	✔	On	On	10.1.2.64		Normal	0.00	0	480.0		None	0	0	0.00		0.0	N/A
Master_XY_1	AA1	✔	On	On	10.1.2.70		Normal	0.00	20	205.7		None	0	0			0.0	N/A
Master_XY_1	AA1	✔	On	On	10.1.2.72		None		0			None					0.0	N/A
Master_XY_1	AA1	✔	On	On	10.1.2.74		None		0			None					0.0	N/A
TowerA_Infeed...	AA1	✔	Off	Off	10.4.11.104		None		0			None					0.0	N/A
Master_Outlet_1	AA1	✔	Normal	On	10.1.2.59	C19	Normal	0.00	20	206.0	4160	Normal	0	0			0.0	Unknow
UnitA_InfeedA_...	AA1	!	None	Unknown	10.1.2.60		None					None					0.0	N/A
UnitA_InfeedA_...	AA1	!	None	Unknown	10.1.2.186		None					None					0.0	N/A
TowerA_Outlet1	A1	✔	On	On	10.1.2.190		None		0			None					0.0	N/A
Master_Outlet_1	AA1	✔	Normal	On	66.214.208.96	C19	Normal	0.00	20	205.4	4160	Normal	0	0			0.0	Unknow
i32A_1	01	✔	On	Unknown	10.1.2.160:32.1		None					None					0.0	N/A
i48A_1	01	✔	On	Unknown	10.1.2.160:48.1		None					None					0.0	N/A
Master_Outlet_2	AA2	✔	Normal	On	10.1.2.58	C13	None		15			None					0.0	N/A

The operating status of all discovered outlets should be Normal. If necessary, drill-down to view operational details for an outlet in a warning or critical condition.

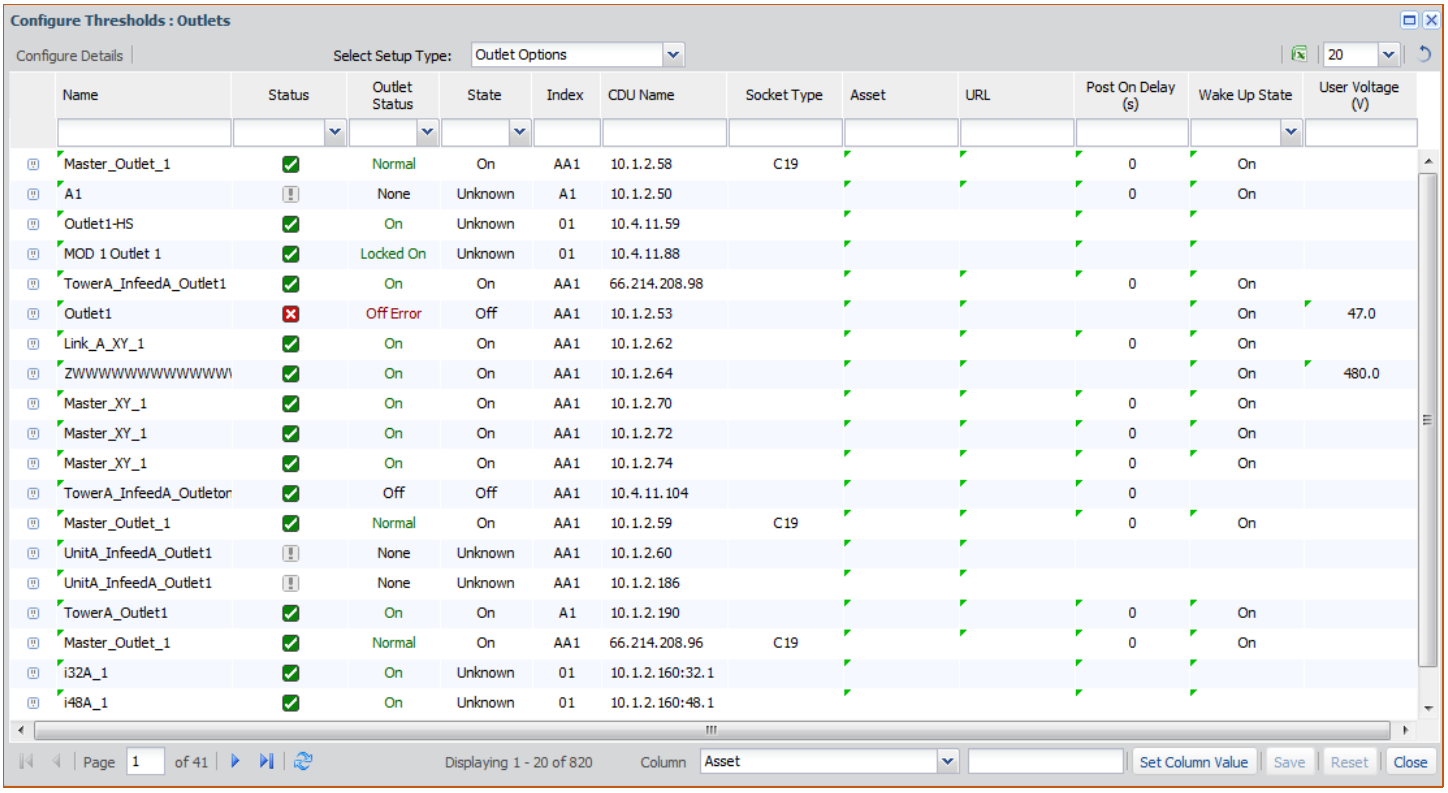
Note that the outlet's identification number (Index) and socket type are determined at factory assembly and cannot be user-configured.

Configuring Outlets

To configure an outlet, you can identify the outlet by name and also set values for post-on delay, wake up state, and user voltage. In addition, you can set a threshold range for critical low/high outlet current (A) and specify parameters for an outlet Trend report.

To track network devices for asset management, an asset tag and URL can be provided for specific outlets. Configuration values can be applied to an individual outlet or to multiple selected outlets at one time.

Device Selection > Outlets > Configure Thresholds: Outlets



Name	Status	Outlet Status	State	Index	CDU Name	Socket Type	Asset	URL	Post On Delay (s)	Wake Up State	User Voltage (V)
Master_Outlet_1	✓	Normal	On	AA1	10.1.2.58	C19			0	On	
A1	!	None	Unknown	A1	10.1.2.50				0	On	
Outlet1-HS	✓	On	Unknown	01	10.4.11.59						
MOD 1 Outlet 1	✓	Locked On	Unknown	01	10.4.11.88						
TowerA_InfeedA_Outlet1	✓	On	On	AA1	66.214.208.98				0	On	
Outlet1	✗	Off Error	Off	AA1	10.1.2.53					On	47.0
Link_A_XY_1	✓	On	On	AA1	10.1.2.62				0	On	
ZWWWWWWWWWWW\	✓	On	On	AA1	10.1.2.64					On	480.0
Master_XY_1	✓	On	On	AA1	10.1.2.70				0	On	
Master_XY_1	✓	On	On	AA1	10.1.2.72				0	On	
Master_XY_1	✓	On	On	AA1	10.1.2.74				0	On	
TowerA_InfeedA_Outletor	✓	Off	Off	AA1	10.4.11.104				0		
Master_Outlet_1	✓	Normal	On	AA1	10.1.2.59	C19			0	On	
UnitA_InfeedA_Outlet1	!	None	Unknown	AA1	10.1.2.60						
UnitA_InfeedA_Outlet1	!	None	Unknown	AA1	10.1.2.186						
TowerA_Outlet1	✓	On	On	A1	10.1.2.190				0	On	
Master_Outlet_1	✓	Normal	On	AA1	66.214.208.96	C19			0	On	
i32A_1	✓	On	Unknown	01	10.1.2.160:32.1						
i48A_1	✓	On	Unknown	01	10.1.2.160:48.1						

Best Practices: Outlets

- There is no need to change the names of outlets. A better practice would be to create cabinet devices, as the most current IT equipment is designed with multiple power supplies.
- Maintain default alert levels until after sufficient trending can be recorded to determine what is considered “normal” behavior.

Phases

The Phases option provides data for each phase of a multi-phase cord, including phase status, phase voltage, and power factor.

A phase originates with the PDU as its output circuit, and as such, a phase is a fixed part of the PDU. Therefore, ou cannot create a new phase in SPM. The phases for PDUs are automatically detected by SPM upon a discovery, or by adding a new device. When phases are present, SPM will display the Phases option.

Note: For certain CDUs running firmware version 7.1 or earlier, internally defined “infeeds” are mapped to SPM into the Phases option.

Device Selection > Phases

Phases

Phases

Name	Status	Index	Phase Status	State	CDU Name	Enclosure	Input Cord	Current (A)	Power (W)	Apparent Power (VA)	Crest Factor	Energy (kWh)	Voltage Status	Voltage (V)	Voltage Deviation (%)	Power Factor	Reactance
Unit1_Inp...	✓	AA1	Normal	On	10.1.2.58	Master	Master_C...	0.00	0	0		640.5	Normal	207.0	-0.5		Unknown
Master_Co...	!	A11	None	Unknown	10.1.2.50	Master	Master_C...			0		111.5	None				Unknown
TowerA_C...	!	A11	None	Unknown	66.214.208...	TowerA	TowerA_C...	0.00	0	0		0.0	None	239.0			Unknown
Unit1_Inp...	✓	AA1	Normal	On	10.1.2.59	Master	Master_C...	0.00	0	0		0.0	Normal	207.1	-0.5		Unknown
TowerAB_...	!	A11	None	Unknown	10.1.2.60	TowerA	TowerAB_...	0.00	0	0		0.0	None	208.0		1.00	N/A
TowerAB_...	!	A11	None	Unknown	10.1.2.186	TowerA	TowerAB_...	0.00	0	0		0.0	None	208.0		0.90	N/A
TowerA_C...	!	A11	None	Unknown	10.1.2.190	TowerA	TowerA_C...	1.38	166	166		0.0	None	120.0		1.00	N/A
Unit1_Inp...	✓	AA1	Normal	On	66.214.208...	Link	Master_C...	0.00	0	0		670.4	Normal	206.4	-0.8		Unknown
Unit2_Inp...	✓	BA1	Normal	On	10.1.2.58	Link1	Link1_Cor...	1.88	388	389	1.7	349.9	Normal	206.7	-0.7	1.00	Resistive
TowerA_C...	!	A12	None	Unknown	66.214.208...	TowerA	TowerA_C...	0.00	0	0		0.0	None	240.8			Unknown
Unit1_Inp...	✓	AA2	Normal	On	10.1.2.59	Master	Master_C...	0.00	0	0		0.0	Normal	208.4	0.1		Unknown
TowerAB_...	!	A12	None	Unknown	10.1.2.60	TowerA	TowerAB_...	0.00	0	0		0.0	None	208.0		1.00	N/A
TowerAB_...	!	A12	None	Unknown	10.1.2.186	TowerA	TowerAB_...	0.00	0	0		0.0	None	208.0		0.90	N/A
Unit2_Inp...	✓	BA1	Normal	On	66.214.208...	Master1	Link1_Cor...	0.00	0	0		952.1	Normal	206.4	-0.8		Unknown
TowerA_C...	!	A13	None	Unknown	66.214.208...	TowerA	TowerA_C...	0.00	0	0		0.0	None	240.9			Unknown
Unit1_Inp...	✓	AA3	Normal	On	10.1.2.59	Master	Master_C...	0.00	0	0		0.0	Normal	205.8	-1.1		Unknown
TowerAB_...	!	A13	None	Unknown	10.1.2.60	TowerA	TowerAB_...	0.00	0	0		0.0	None	208.0		1.00	N/A
TowerAB_...	!	A13	None	Unknown	10.1.2.186	TowerA	TowerAB_...	0.00	0	0		0.0	None	208.0		0.90	N/A
Unit3_Inp...	✓	CA1	Normal	On	66.214.208...	Link2	Link2_Cor...	0.00	0	0		1088.6	Normal	206.4	-0.8		Unknown
TowerB_C...	!	B11	None	Unknown	66.214.208...	TowerB	TowerB_C...	0.00	0	0		0.0	None	239.2			Unknown

Configuring Phases

To configure a phase, you can edit the name of the phase and determine a threshold range for critical low/high phase voltage and for critical low/warning power factor. Phase voltage minimum and maximum values will vary by product. Configuration values can be applied to an individual phase or to multiple selected phases at one time.

Best Practices:

- Name the phases based on any existing upstream circuit name or the cabinet name to provide clear understanding of alerts or reports.
- Maintain default alert levels until after sufficient trending can be recorded to determine what is considered “normal” behavior.

Device Selection > Phases > Configure Thresholds: Phases

Configure Thresholds : Phases

Configure Details

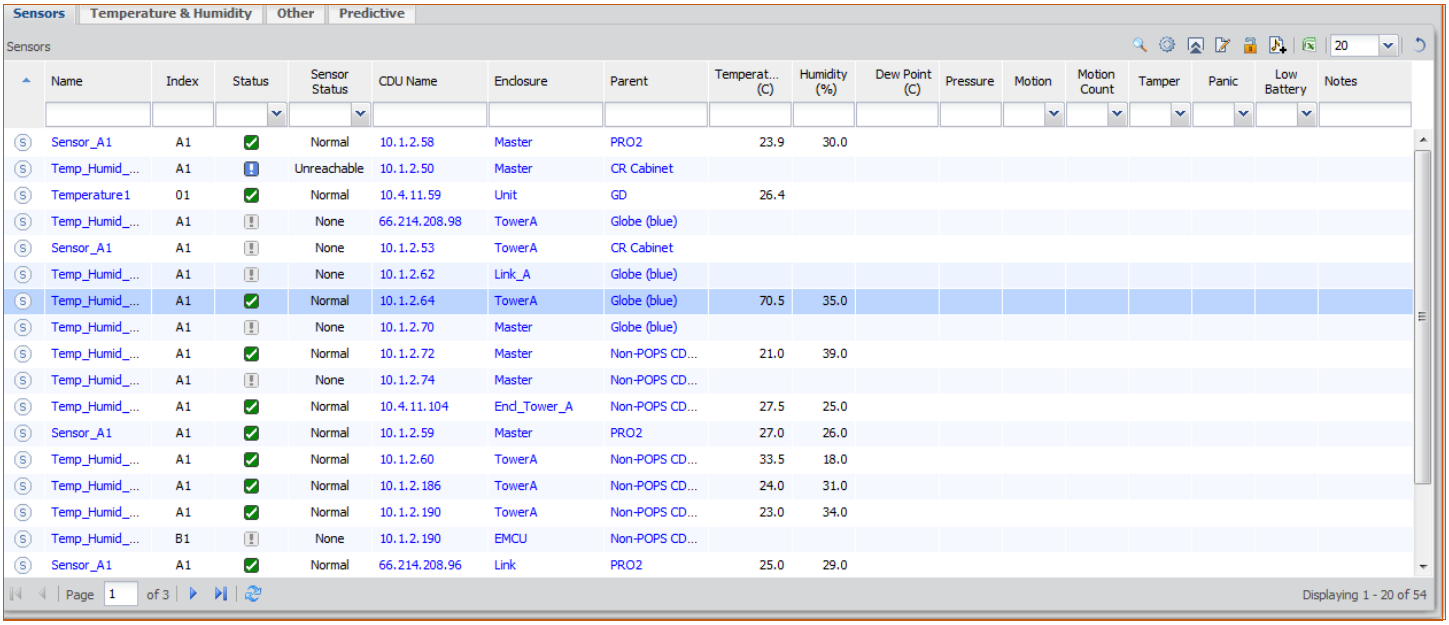
Name	Status	Phase Status	State	In...	CDU Name	Enclosure	Voltage Status	Voltage (V)	Critical Low Voltage	Warning Low Voltage	Warning High Voltage	Critical High Voltage	Power Factor Status	Power Factor	Critical Low Power Factor	Warning Low Power Factor
Unit1_InputCord1_	✓	Normal	On	AA1	10.1.2.58	Master	Normal	206.3	187.2	197.6	218.4	228.8	Normal		0.70	0.80
Master_Cord1_Pha		None	Unkn...	A11	10.1.2.50	Master	None						None			
TowerA_Cord1_Ph		None	Unkn...	A11	66.214.2...	TowerA	None	238.5					None			
Unit1_InputCord1_	✓	Normal	On	AA1	10.1.2.59	Master	Normal	206.5	187.2	197.6	218.4	228.8	Normal		0.70	0.82
TowerAB_Cord1_P		None	Unkn...	A11	10.1.2.60	TowerA	None	208.0					None	1.00		
TowerAB_Cord1_P		None	Unkn...	A11	10.1.2.186	TowerA	None	208.0					None	0.90		
TowerA_Cord1_Ph		None	Unkn...	A11	10.1.2.190	TowerA	None	120.0					None	1.00		
Unit1_InputCord1_	✓	Normal	On	AA1	66.214.2...	Link	Normal	205.7	187.2	197.6	218.4	228.8	Normal		0.70	0.80
Unit2_InputCord1_	✓	Normal	On	BA1	10.1.2.58	Link1	Normal	205.9	187.2	197.6	218.4	228.8	Normal	1.00	0.70	0.80
TowerA_Cord1_Ph		None	Unkn...	A12	66.214.2...	TowerA	None	240.5					None			
Unit1_InputCord1_	✓	Normal	On	AA2	10.1.2.59	Master	Normal	208.2	187.2	197.6	218.4	228.8	Normal		0.70	0.82
TowerAB_Cord1_P		None	Unkn...	A12	10.1.2.60	TowerA	None	208.0					None	1.00		
TowerAB_Cord1_P		None	Unkn...	A12	10.1.2.186	TowerA	None	208.0					None	0.90		
Unit2_InputCord1_	✓	Normal	On	BA1	66.214.2...	Master1	Normal	205.7	187.2	197.6	218.4	228.8	Normal		0.70	0.80
TowerA_Cord1_Ph		None	Unkn...	A13	66.214.2...	TowerA	None	240.5					None			
Unit1_InputCord1_	✓	Normal	On	AA3	10.1.2.59	Master	Normal	205.8	187.2	197.6	218.4	228.8	Normal		0.70	0.82
TowerAB_Cord1_P		None	Unkn...	A13	10.1.2.60	TowerA	None	208.0					None	1.00		
TowerAB_Cord1_P		None	Unkn...	A13	10.1.2.186	TowerA	None	208.0					None	0.90		

Page 1 of 2 Displaying 1 - 20 of 35 Column Name Set Column Value Save Reset Close

Sensors

The Sensors option provides a quick view of the current operating status of environmental sensors. For the Sensors option to display in SPM, a discovered PDU or environmental monitor must be connected to a sensor.

Device Selection > Sensors



Sensors | Temperature & Humidity | Other | Predictive

Sensors

Name	Index	Status	Sensor Status	CDU Name	Enclosure	Parent	Temperat... (C)	Humidity (%)	Dew Point (C)	Pressure	Motion	Motion Count	Tamper	Panic	Low Battery	Notes
Sensor_A1	A1		Normal	10.1.2.58	Master	PRO2	23.9	30.0								
Temp_Humid_...	A1		Unreachable	10.1.2.50	Master	CR Cabinet										
Temperature1	01		Normal	10.4.11.59	Unit	GD	26.4									
Temp_Humid_...	A1		None	66.214.208.98	TowerA	Globe (blue)										
Sensor_A1	A1		None	10.1.2.53	TowerA	CR Cabinet										
Temp_Humid_...	A1		None	10.1.2.62	Link_A	Globe (blue)										
Temp_Humid_...	A1		Normal	10.1.2.64	TowerA	Globe (blue)	70.5	35.0								
Temp_Humid_...	A1		None	10.1.2.70	Master	Globe (blue)										
Temp_Humid_...	A1		Normal	10.1.2.72	Master	Non-POPS CD...	21.0	39.0								
Temp_Humid_...	A1		None	10.1.2.74	Master	Non-POPS CD...										
Temp_Humid_...	A1		Normal	10.4.11.104	Encl_Tower_A	Non-POPS CD...	27.5	25.0								
Sensor_A1	A1		Normal	10.1.2.59	Master	PRO2	27.0	26.0								
Temp_Humid_...	A1		Normal	10.1.2.60	TowerA	Non-POPS CD...	33.5	18.0								
Temp_Humid_...	A1		Normal	10.1.2.186	TowerA	Non-POPS CD...	24.0	31.0								
Temp_Humid_...	A1		Normal	10.1.2.190	TowerA	Non-POPS CD...	23.0	34.0								
Temp_Humid_...	B1		None	10.1.2.190	EMCU	Non-POPS CD...										
Sensor_A1	A1		Normal	66.214.208.96	Link	PRO2	25.0	29.0								

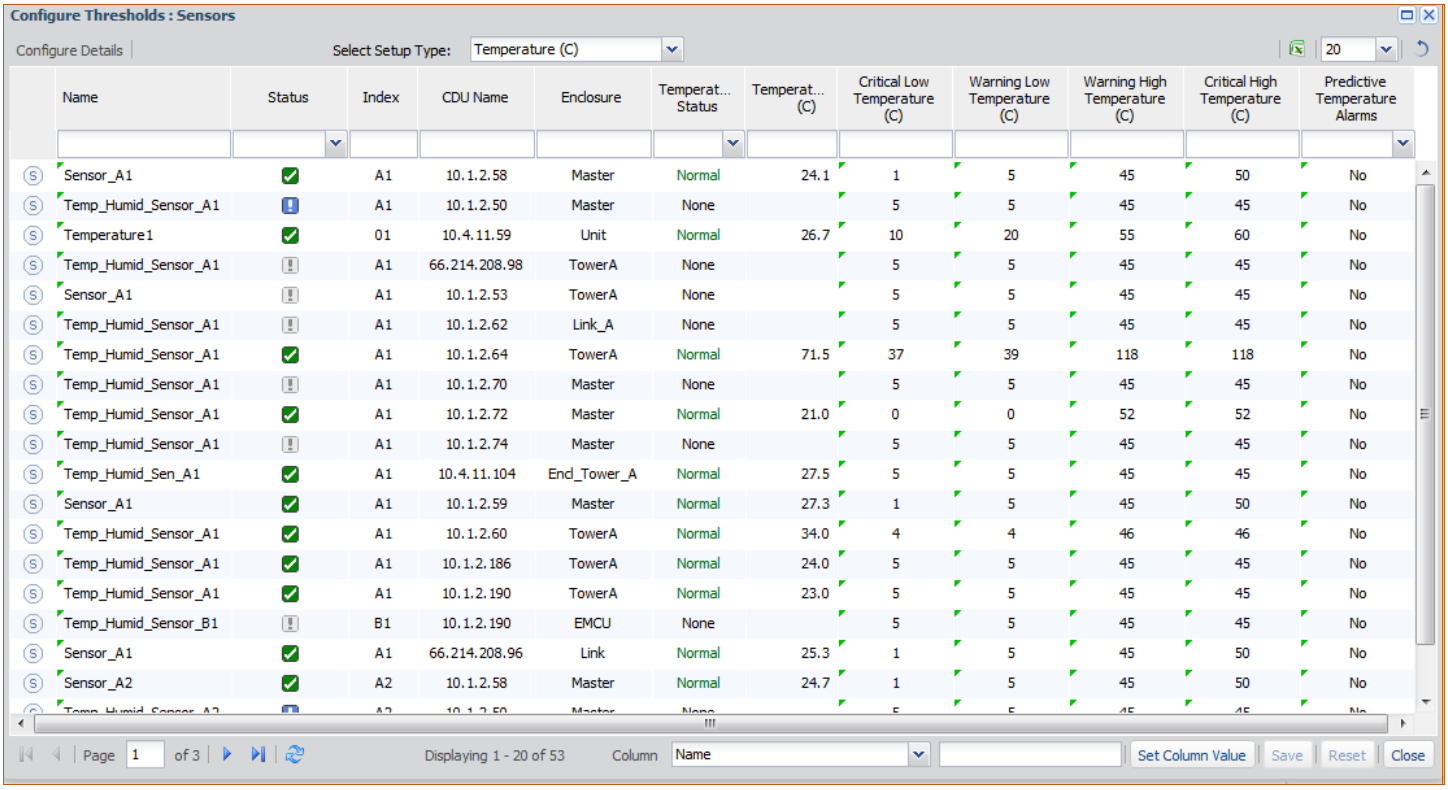
Page 1 of 3 — Displaying 1 - 20 of 54

Configuring Sensors

To configure a sensor, you can set system-wide low/high temperature/humidity thresholds, choose a predictive temperature warning alarm, and edit the name of a sensor.

Configuration values can be applied to an individual sensor or to multiple selected sensors at one time.

Device Selection > Sensors > Configure Thresholds: Sensors



Name	Status	Index	CDU Name	Enclosure	Temperat... Status	Temperat... (C)	Critical Low Temperature (C)	Warning Low Temperature (C)	Warning High Temperature (C)	Critical High Temperature (C)	Predictive Temperature Alarms
Sensor_A1		A1	10.1.2.58	Master	Normal	24.1	1	5	45	50	No
Temp_Humid_Sensor_A1		A1	10.1.2.50	Master	None		5	5	45	45	No
Temperature1		01	10.4.11.59	Unit	Normal	26.7	10	20	55	60	No
Temp_Humid_Sensor_A1		A1	66.214.208.98	TowerA	None		5	5	45	45	No
Sensor_A1		A1	10.1.2.53	TowerA	None		5	5	45	45	No
Temp_Humid_Sensor_A1		A1	10.1.2.62	Link_A	None		5	5	45	45	No
Temp_Humid_Sensor_A1		A1	10.1.2.64	TowerA	Normal	71.5	37	39	118	118	No
Temp_Humid_Sensor_A1		A1	10.1.2.70	Master	None		5	5	45	45	No
Temp_Humid_Sensor_A1		A1	10.1.2.72	Master	Normal	21.0	0	0	52	52	No
Temp_Humid_Sensor_A1		A1	10.1.2.74	Master	None		5	5	45	45	No
Temp_Humid_Sen_A1		A1	10.4.11.104	Encl_Tower_A	Normal	27.5	5	5	45	45	No
Sensor_A1		A1	10.1.2.59	Master	Normal	27.3	1	5	45	50	No
Temp_Humid_Sensor_A1		A1	10.1.2.60	TowerA	Normal	34.0	4	4	46	46	No
Temp_Humid_Sensor_A1		A1	10.1.2.186	TowerA	Normal	24.0	5	5	45	45	No
Temp_Humid_Sensor_A1		A1	10.1.2.190	TowerA	Normal	23.0	5	5	45	45	No
Temp_Humid_Sensor_B1		B1	10.1.2.190	EMCU	None		5	5	45	45	No
Sensor_A1		A1	66.214.208.96	Link	Normal	25.3	1	5	45	50	No
Sensor_A2		A2	10.1.2.58	Master	Normal	24.7	1	5	45	50	No

Best Practices: Sensors

- Name the sensors based on the cabinet name and position within that cabinet to provide clear understanding of alerts or reports.
- Do not set overly tight alert levels until after sufficient trending can be recorded to determine what is considered “normal” behavior.

Chapter 6: Aggregating

This chapter covers the aggregation of data that SPM offers to allow you to name a custom collection of related system objects and then monitor, report, control, and configure all objects in that collection at one time. SPM's capability to group objects for administration is a fast and flexible way to arrange and manage areas that are unique to your data center.

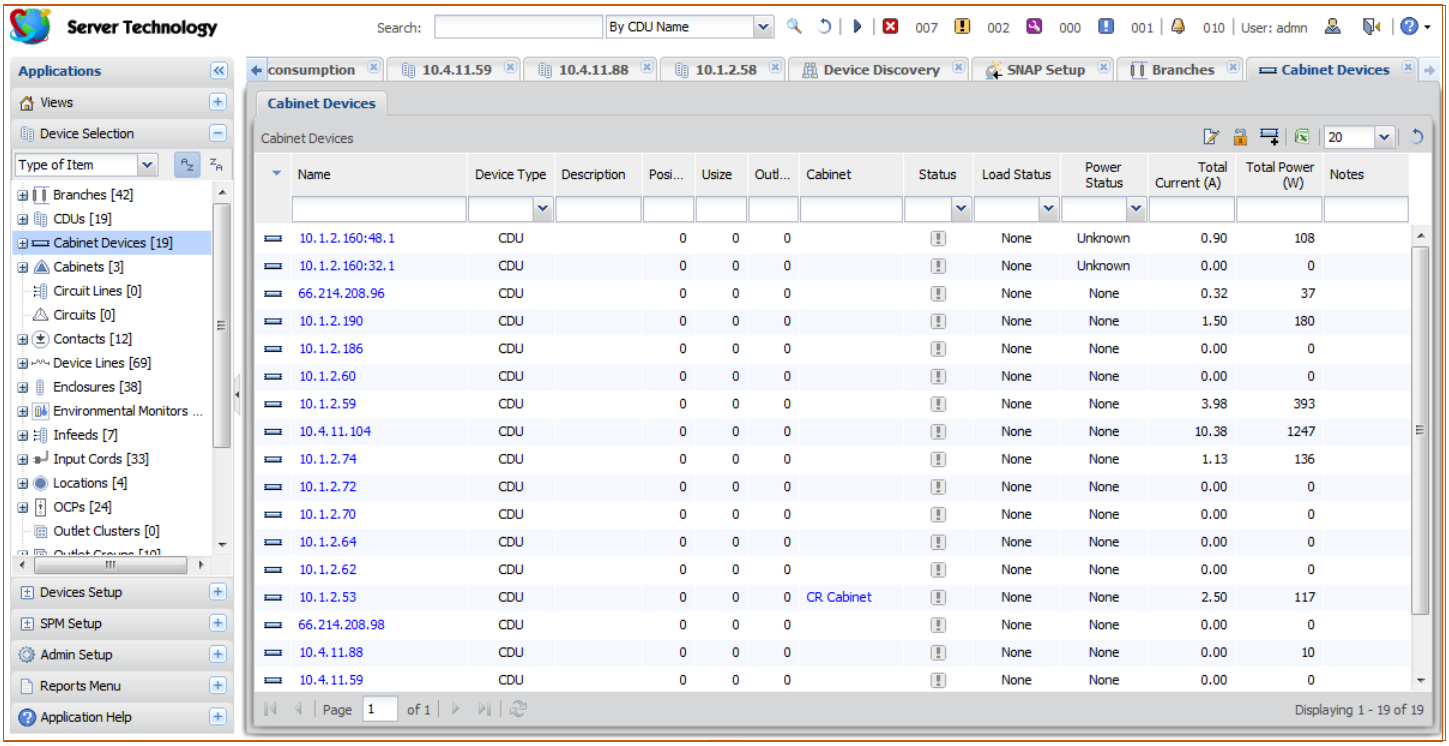
Cabinet Devices

The Cabinet Devices option allows the administrator to name a collection of cabinet-contained devices types within a specific cabinet. The collection of cabinet devices is an accurate and easy way for a cabinet to monitor device-level power and environmental data, especially for devices that typically cannot be measured easily.

By using cabinet devices, power management is placed directly within the equipment rack, which assists in data center efficiency, cost savings, and capacity planning.

You can run reports on cabinet devices to show the U space used, cabinet redundancy, and inventory of cabinet devices.

Device Selection > Cabinet Devices



Cabinet Device Objects

SPM allows the following object types to be collected and monitored within a cabinet device. These objects include servers, power meters, environmental units, and other device types.

Best Practices: Cabinet Device Objects

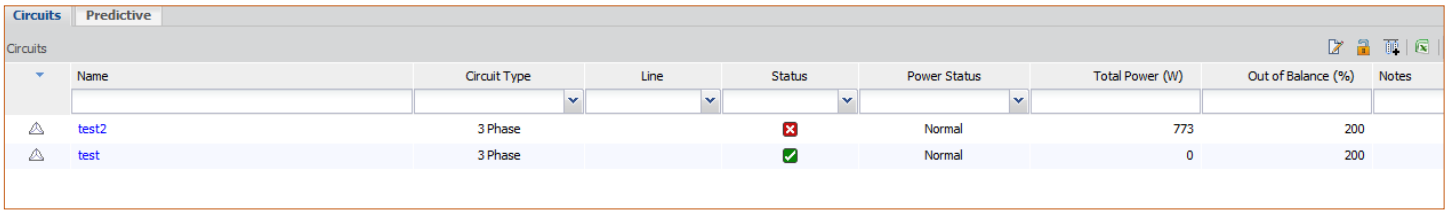
- With Switchable-PDU outlets, it is important to be sure of what you are turning on or off. Take the time to catalog and configure Cabinet Devices at the outset and at the time of equipment deployment.
- Use POPS outlet measurement PDUs to provide guidance for future equipment decisions.

Circuits

The Circuit option allows you to collect power lines across the data center and name your line collection as a unique circuit. Using this application allows you to define the physical infrastructure of power systems that feed your PDUs, regardless of which breakers are targeted by the collected lines. SPM refers to the power lines within your defined circuit collection as "circuit lines".

When using the Circuits option, you can easily determine an out-of-balance condition in a 3-phase system.

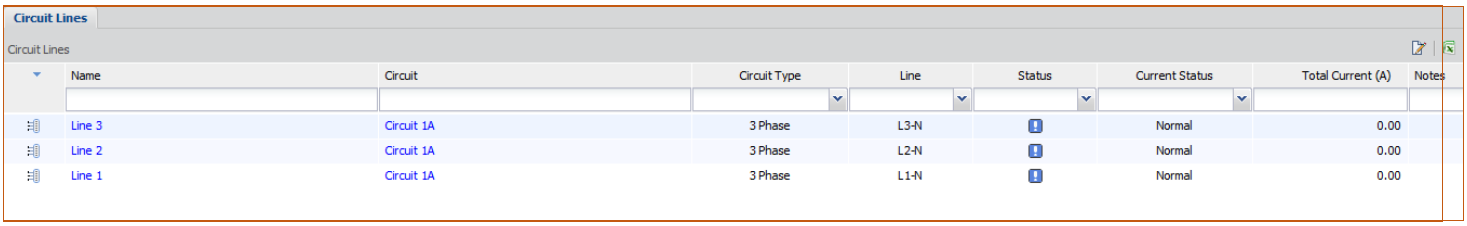
Device Selection > Circuits



Circuit Lines

The power lines within your defined circuit are referred to as “circuit lines”, and these lines only display in the Circuit Lines window if you first created a circuit and then included named power lines in the circuit.

Device Selection > Circuits > Circuit Lines



Best Practices: Circuits

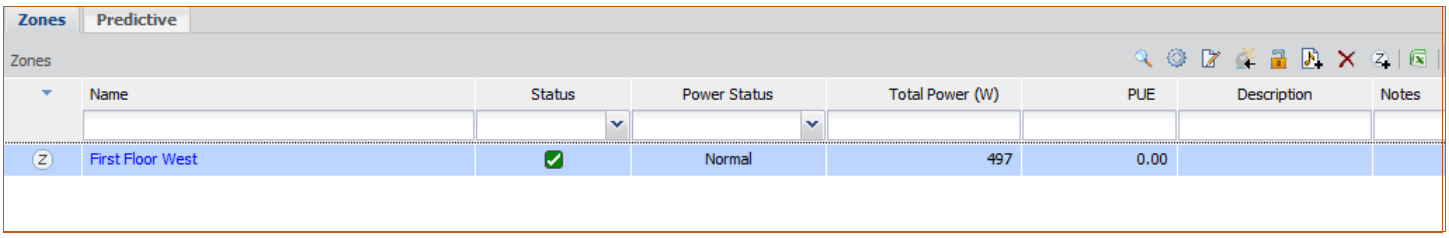
- Set Circuit Line current thresholds based on the ratings of upstream circuit devices, such as RPP or floor PDU.

Zones

The Zones option offers an additional way to group PDUs or cabinets (virtually, in a named zone) for viewing and trending, regardless of the physical locations of the devices.

Note: Only PDUs and cabinets can be grouped in a zone. However, PDUs and cabinets cannot be mixed together in the same zone.

Device Selection > Zones



Best Practices: Zones

- Create zones for common physical location, common functional types, common project ownership, configuration needs, or any other commonality.
- Create zones early for best future data analysis.

Chapter 7: Analyzing

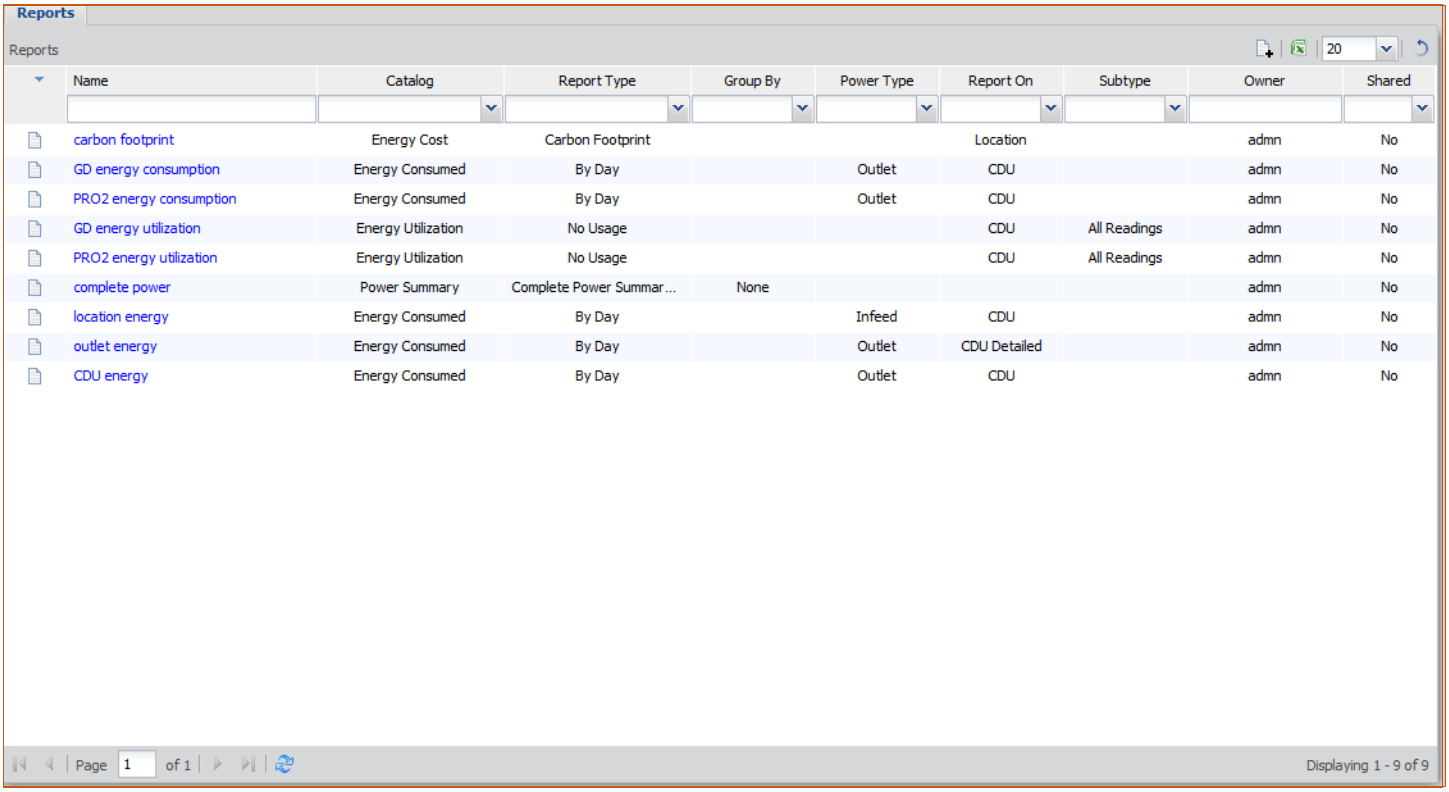
This chapter covers the reports, trends, and task scheduler that SPM provides for the analysis of power metrics as well as the dynamic operating condition of networked devices.

Reports

The Reports option provides numerous types of reports you can choose for power, environmental data, and more, with user-specified parameters to customize each report, such as the reporting time frame and any object grouping preferences. All reports allow the grouping by a named zone, and you have the option to share any report with other SPM users.

Reports show data collected from PDU readings; therefore, data must be available in the device for the report you want to run or the report will be blank.

Reports Menu > Reports



Reports

Reports

Name	Catalog	Report Type	Group By	Power Type	Report On	Subtype	Owner	Shared
carbon footprint	Energy Cost	Carbon Footprint			Location		admn	No
GD energy consumption	Energy Consumed	By Day		Outlet	CDU		admn	No
PRO2 energy consumption	Energy Consumed	By Day		Outlet	CDU		admn	No
GD energy utilization	Energy Utilization	No Usage			CDU	All Readings	admn	No
PRO2 energy utilization	Energy Utilization	No Usage			CDU	All Readings	admn	No
complete power	Power Summary	Complete Power Summar...	None				admn	No
location energy	Energy Consumed	By Day		Infeed	CDU		admn	No
outlet energy	Energy Consumed	By Day		Outlet	CDU Detailed		admn	No
CDU energy	Energy Consumed	By Day		Outlet	CDU		admn	No

Page 1 of 1

Displaying 1 - 9 of 9

Best Practices: Reports

- Create and run the Inventory report to access characteristics of discovered PDUs, including the firmware version.
- Create and run the Cabinet Redundancy report to check for any initial risks against uptime.
- Create the Energy Consumed (by Month) report to begin efficiency and cost analysis over time.
- Share your reports, rather than having other users create duplicates.

Trends

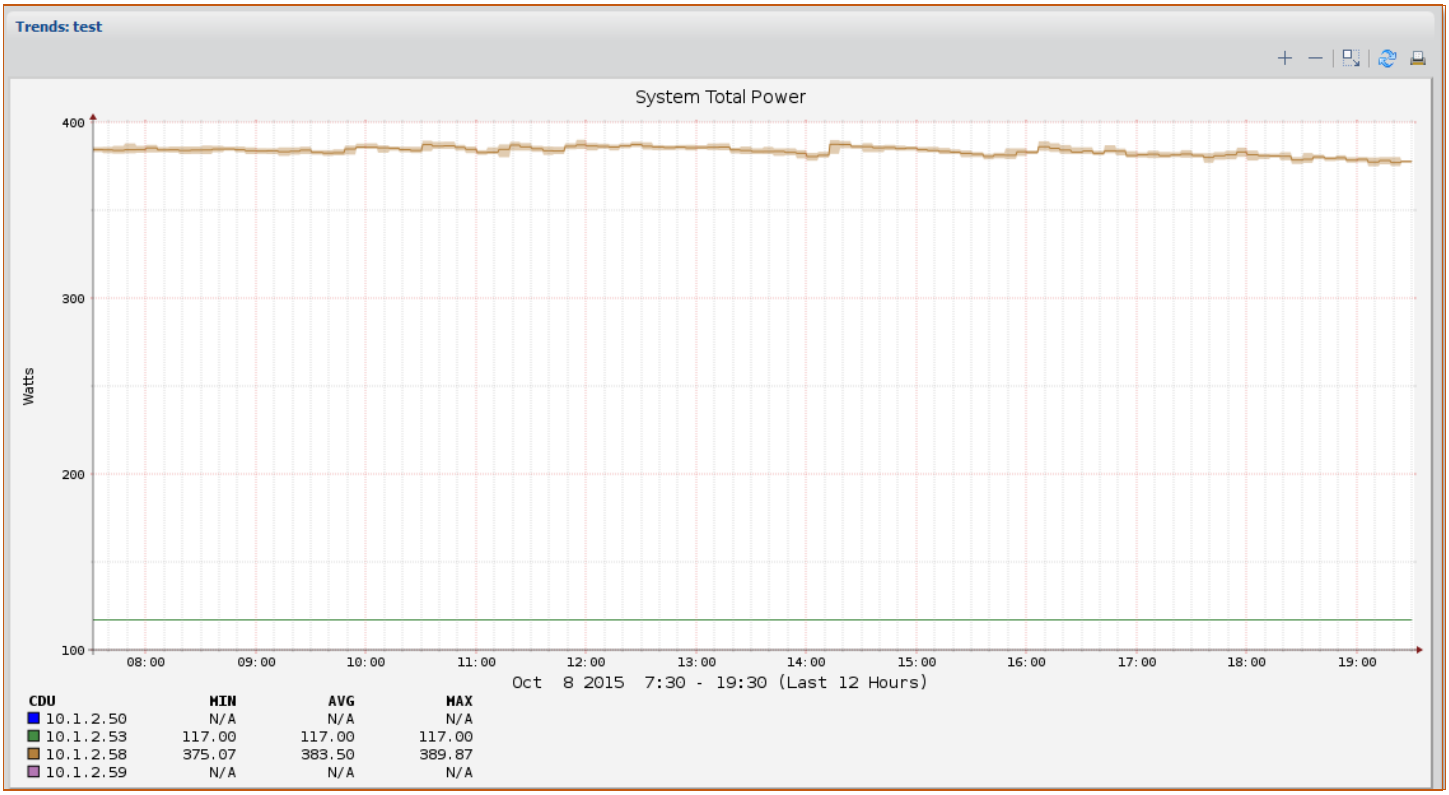
The Trends option generates graphical reports based on specific parameters from available PDU hardware readings. Trend graphs show power trending information (automatically reloaded) for your networked PDUs over a specified time frame.

A trend report collects a significant amount of on-going data from PDUs as a useful tool for troubleshooting networked systems and forecasting device operations. For example, advanced trend features allow for trending with overlaid time period/offset, as well as trending with overlaid types (trend groups).

In addition, an advanced Trend feature, Predictive Analysis, uses patterns and conditions from historical trend reports to predict future risks and opportunities about device performance.

Trend reports do not report “0” (zero) values. A gap displayed in the Trend report is a reporting time interval when there were no available readings from the PDU. If a load or the power is reported as “0”, a trend report will not be generated.

Reports Menu > Trends



Best Practices: Trends

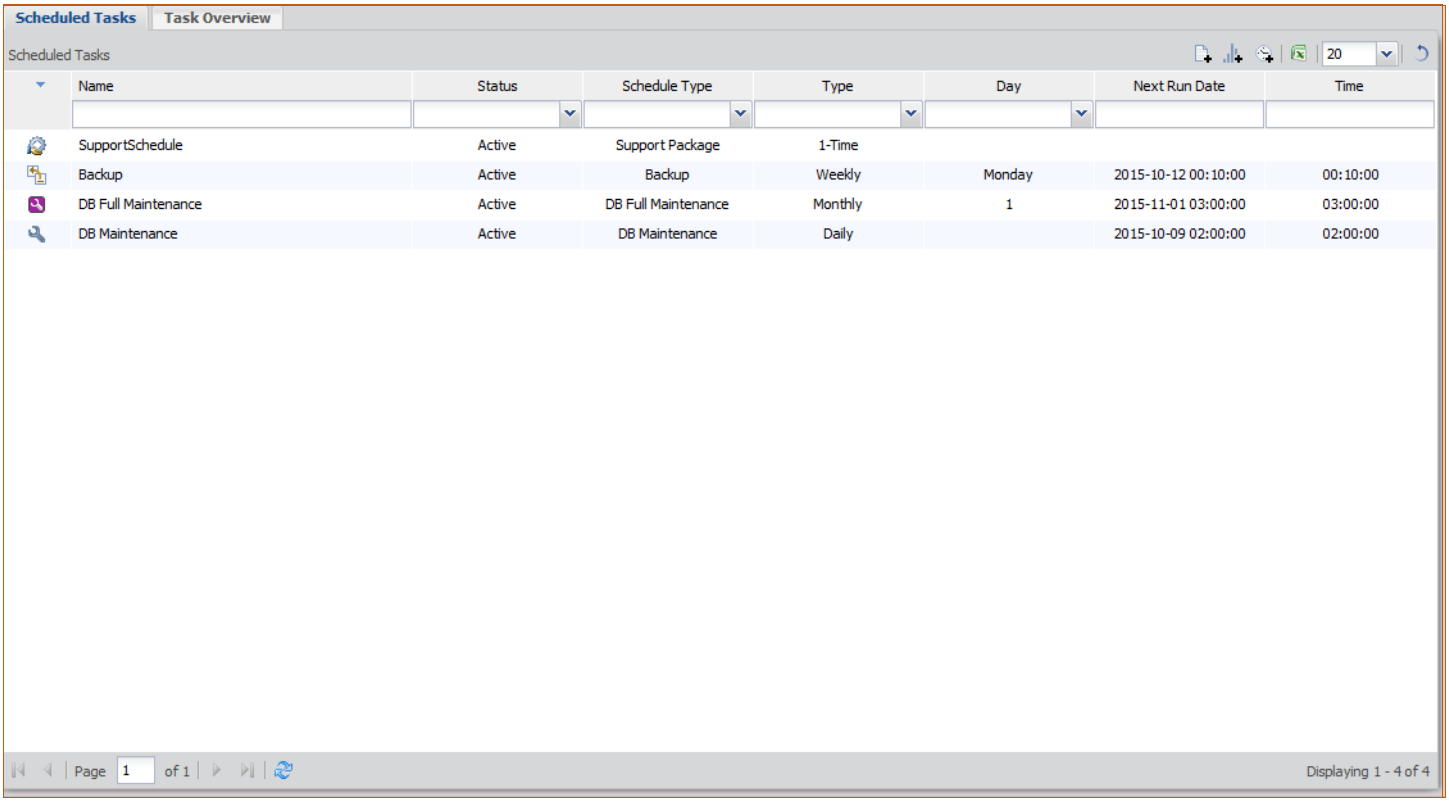
- To avoid confusion and clutter on the trend report, do not trend more than about eight items at a time.
- Build zones first and then group cabinet data together in a zone for more convenient analysis.
- Share your trends, rather than having other users create duplicates.

Scheduling

The Schedule Tasks option defines and schedules certain SPM system events to run automatically on a future date, or to run on a recurring basis, as user-specified.

An example of a scheduled task would be to set up the outlet command action Off, On, or Reboot to be issued on one or more outlets – or on an outlet group, outlet cluster, or cabinet device – to automatically run at the same time each week for the specified outlets.

SPM Setup > Scheduled Tasks



Name	Status	Schedule Type	Type	Day	Next Run Date	Time
SupportSchedule	Active	Support Package	1-Time			
Backup	Active	Backup	Weekly	Monday	2015-10-12 00:10:00	00:10:00
DB Full Maintenance	Active	DB Full Maintenance	Monthly	1	2015-11-01 03:00:00	03:00:00
DB Maintenance	Active	DB Maintenance	Daily		2015-10-09 02:00:00	02:00:00

Available Scheduled Tasks

SPM allows the following tasks to be scheduled, based on your defined run parameters:

- Backup: Back up of the SPM system
- Cabinet Device: Issue outlet action Off, On, or Reboot to specified outlets collected in a cabinet device,
- Database Maintenance: Run selective SPM functions in database maintenance.
- Database Full Maintenance: Run all SPM functions in database maintenance.
- Device Discovery: Discover specified network devices.
- Email Report: Run one of the user reports at a designated time.
- Email Trend: Run one of the graphical trend reports at a designated time.
- Outlet Actions: Issue outlet action Off, On, or Reboot to selected outlets.
- Outlet Cluster: Issue outlet action Off, On, or Reboot to specified outlet clusters.
- Outlet Group: Issue outlet action Off, On, or Reboot to specified outlet groups.

Best Practices: Scheduling

- Create a task to email Cabinet Redundancy and Energy (by Month) to yourself a the first of each month.
- Leave the database maintenance tasks as is, but set the backup task as desired. The database backup includes both data collection and all system setup work.

Chapter 8: Tying It All Together

This chapter covers how the Views application allows you to pull together a customized and graphical layout of the key SPM areas presented in this guide, as well as many other SPM functions for monitoring device metrics and managing the equipment network.

Views

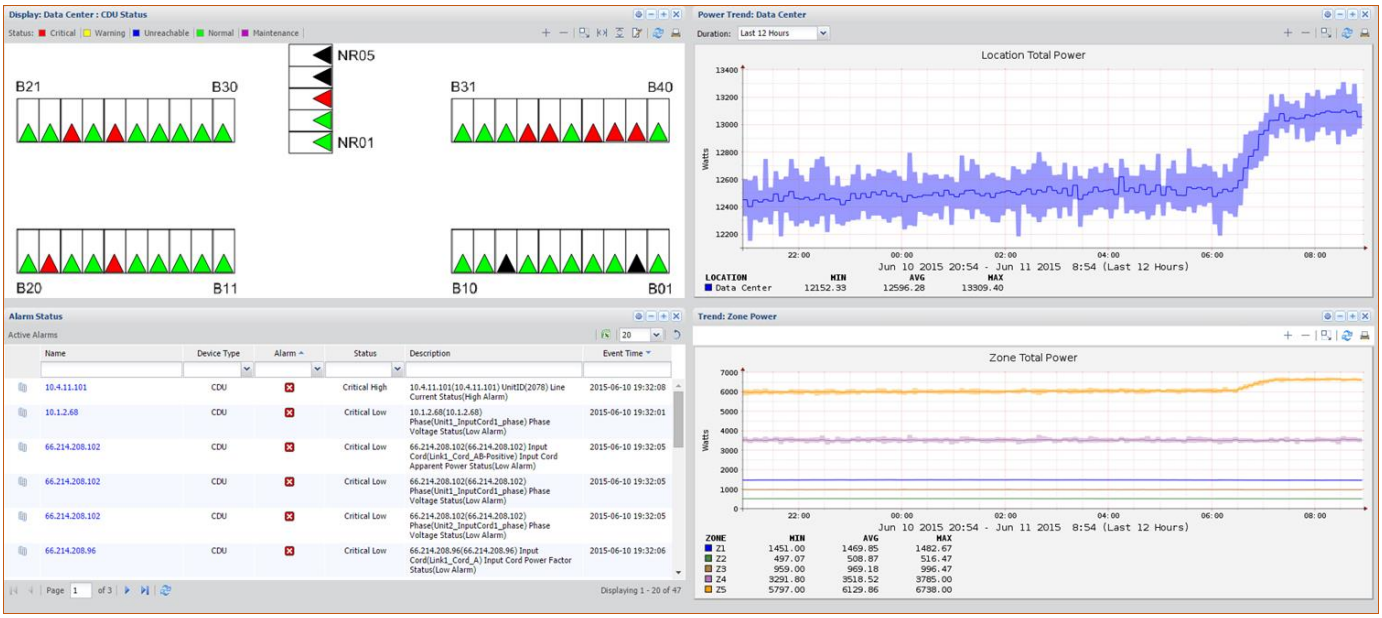
The Views application lets you choose the type of SPM device data you want to see and places that data in a graphical workspace according to your own layout preferences.

Views is the go-to place in SPM for a fast, color-coded, and graphical overview of device operational information, just as you want to monitor it. Each user can create a custom view that SPM saves and displays for the user's login.

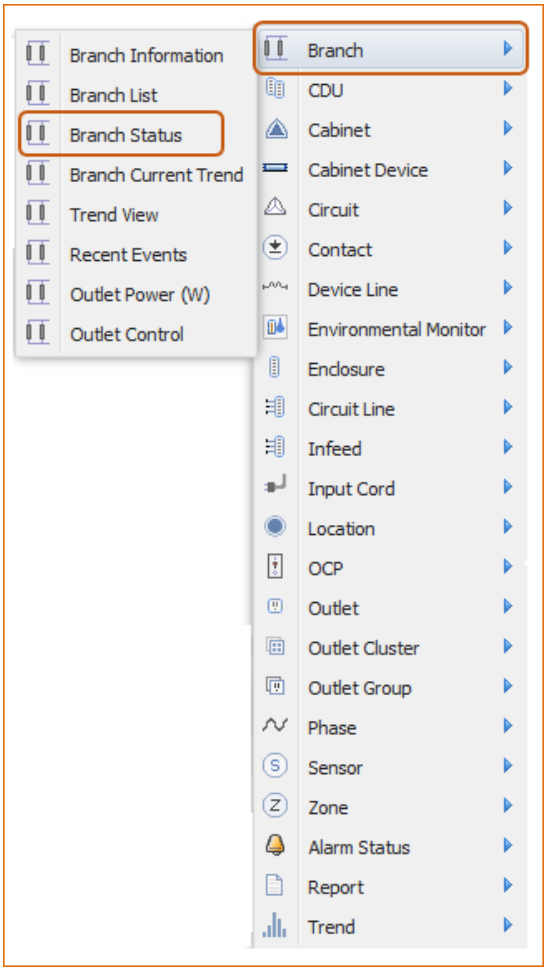
Also provided is the SPM Wizard View to get you up and running fast with an SPM device discovery that automatically populates a new View page with a few standard device information panels.

In addition, when you create several different views pages, you can run a slideshow of all views for quick monitoring.

SPM > Views > [user-named view]



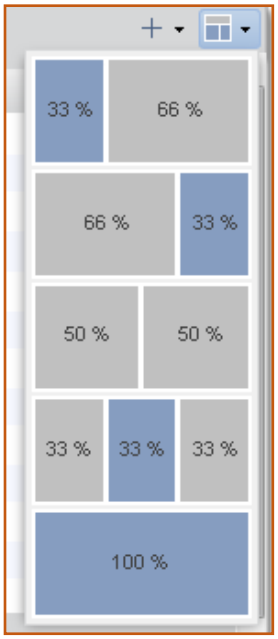
Add Device Information Panels



The Views workspace is made up of your preferred device information panels.

Click the Add Panel drop-down menu to select a system object, such as Branch in this example, and from its sub-menu, select a specific panel, such as Branch Status, to be displayed on your Views page.

Choose a Workspace Layout



The size and position of device panels on the Views workspace can be customized for your user login.

Click the Set Layout drop-down menu to select the preferred arrangement for panel size and position on your Views page.

Best Practices: Views

- Share your views, rather than having other users create duplicates.
- Keep the views to just a few panels and create multiple views for use in the Views Slideshow feature.
- Consider creating views of one-panel-per-view for slideshows run on NOC screens.

Chapter 9: Special Features

This chapter is an overview of the special, add-on features SPM offers as optional and separately-purchased license key applications. For SPM to display these features and their related windows in the user interface, the special features must be purchased separately from SPM and then activated by individual license key.

RF Code Wire-Free Monitoring Solution

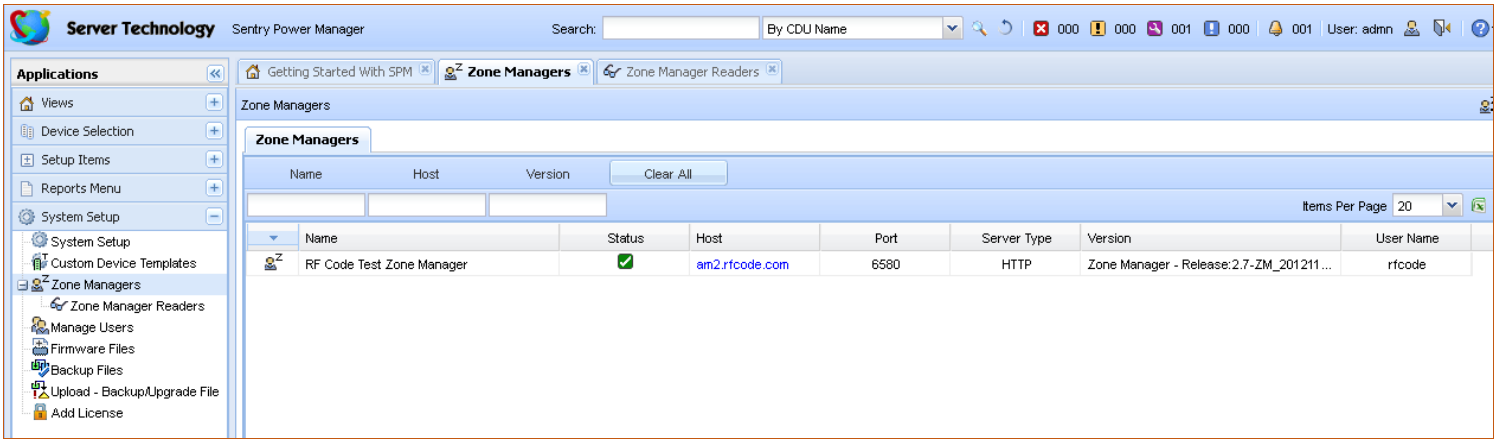
The Wire-Free Monitoring Solution integrates Server Technology's intelligent PDUs and SPM with RF Code's comprehensive Zone Manager system of software-driven sensor devices for real-time, environmental reporting.

The result is intelligent monitoring that has the capability of transmitting critical environmental data over a flexible, cost-effective, and wire-free infrastructure for better management and control of power and operational costs.

This solution includes visibility into the following RF Code components:

- Small, battery-powered, wire-free sensor tags.
- Networked readers that receive sensor data.
- The Zone Manager that collects and organizes information.

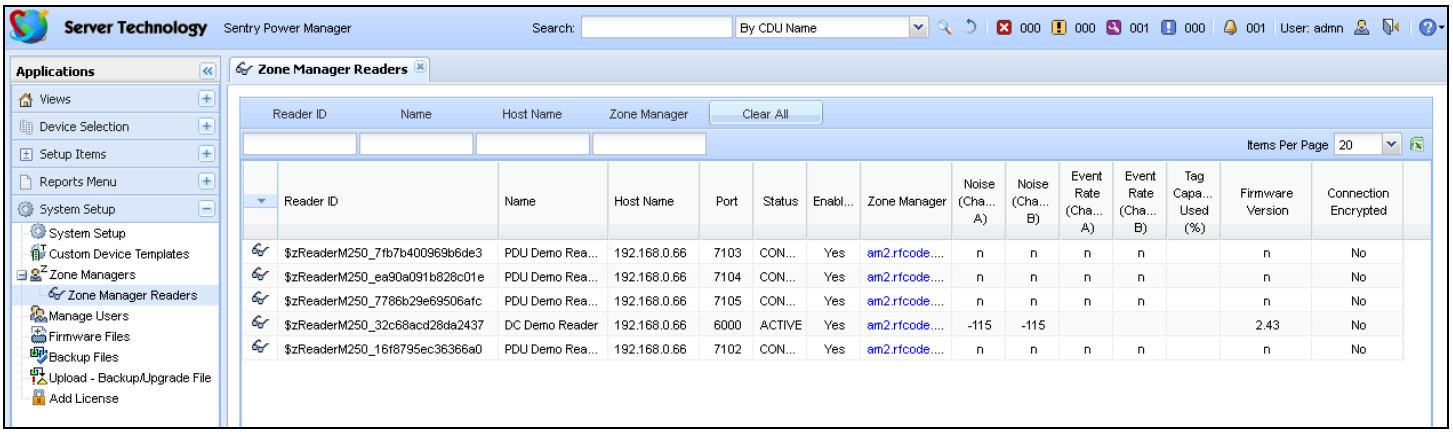
SPM Setup > Zone Managers



Zone Manager Readers

Active RF Code readers for the wireless monitoring solution are automatically added to the SPM user interface by the Zone Manager when communication begins with SPM. The readers are placed in the Zone Manager Readers list.

SPM Setup > Zone Managers > Zone Manager Readers



Custom Device Templates

The Custom Device Templates feature allows communication, tracking, and reporting for any SNMP-enabled device within SPM. This feature has the capability of tracking data center power from within SPM using measurements from an unsupported device, like a UPS. The benefit of using Custom Device Templates is the convenience of adding individual infeeds and outlets directly to SPM one at a time, as needed.

A new custom template can be created and configured with template values for numerous device attributes. When adding the new device to SPM, you apply the specific attributes to the new device. This allows the custom device values to be tracked and monitored in several places throughout the SPM interface.

SPM Setup > Custom Device Templates

Supported Values

SPM supports three groups of values so you can apply a value that is unique to your custom device:

Custom Device Value Group	Applied Attributes
Whole Device Level	Device model, version, serial number, power type, total power (watts), manufacturer custom text (any string value you want to track), and a maximum of three custom numeric fields (any numeric value you want to track).
Infeed	Index, name, current (amps), power (watts), voltage (volts), apparent power (volt-amps), and power factor (%).
Outlet	Index, name, current (amps), power (watts), voltage (volts), apparent power (volt-amps), and power factor (%).

Best Practices: Custom Device Templates

- To confirm your SNMP OID configuration is correct, after the configuration, verify that the data being polled by SPM matches the device interface data.

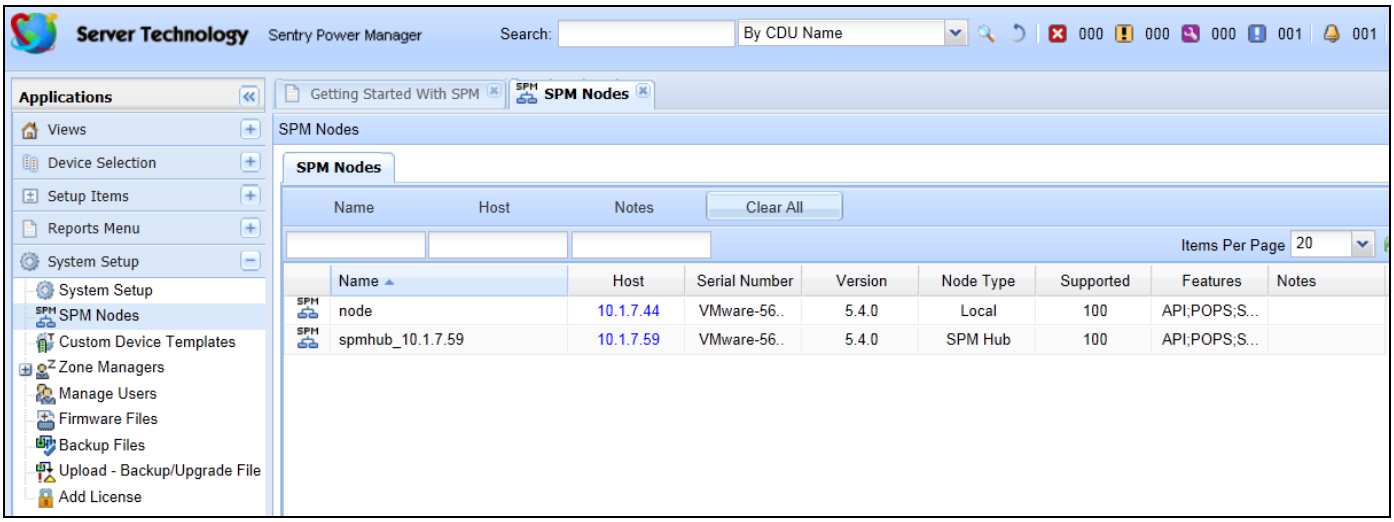
Hub and Node

The Hub and Node feature allows multiple SPM systems to be connected to each other. One of the systems in the connection (the hub) gathers and displays information about the other systems (the nodes). As the hub monitors key information for each node in the connection, each node continues to perform on its own as a fully functional and complete SPM system.

Note: The Hub and Node feature is not designed for redundancy or as a fail-over mode for multiple SPM systems.

When the Hub and Node feature is activated, the SPM Nodes list shows all connected SPM systems. The hub is listed with all of its connected nodes, and the nodes are listed with their hub.

SPM Setup > SPM Nodes



System Definitions

These terms describe the type of Hub and Node systems available in SPM:

- **Hub:** An SPM system that can manage other SPM systems, called nodes.
- **Node:** An SPM system that be managed by another single SPM system, called the hub.
- **Partial Sync:** The limited hub operation that only collects frequently-updated PDU values from the node. These partial sync values can include alarms, power, load, and energy.
- **Standalone:** An SPM system that cannot be used as a hub or a node, or be managed by a hub. To allow a standalone SPM system to become a hub (or a node), a separate license key must be applied to the standalone SPM system.
- **Sync/Full Sync:** The hub operation that collects PDU information from the node.

Best Practices: Hub and Node

Hub and Node is best used when:

- Multiple data centers need to be viewed under a single-pane-of-glass.
- Latency between sites is excessive.
- Extreme numbers of PDUs need to be monitored.

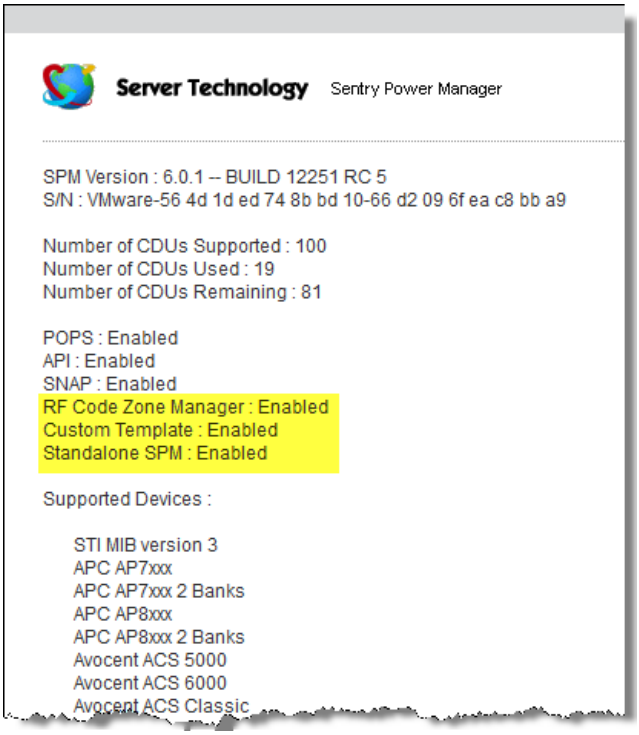
Obtain a Feature License Key

SPM offers special features as optional and separately-purchased applications. Each feature is activated by an individual license key. To purchase a license key for one or more SPM features, contact your Server Technology representative at:

1-800-835-1515 (domestic), ++0 (1) 775.284.2000 (international), or sales@servertech.com

When activated by the key provided by Server Technology, the SPM window (shown below) at **Application Help > Product License** displays the Enabled status for the active feature(s).

In this example, the following Product License window highlights the RF Code Zone Manager and Custom Device Templates (Custom Template) as enabled features. Note that the enabled Standalone SPM simply means the current SPM system does not have the Hub and Node feature activated.



Appendix A: Product Information

Warranty

For Server Technology warranty information, visit our website: www.servertech.com

Contact Technical Support

Experience Server Technology's FREE Technical Support

Server Technology understands that there are often questions when installing and/or using a new product. Free Technical Support is provided from 8 a.m. to 5 p.m. PST, Monday through Friday. After-hours service is provided to ensure your requests are handled quickly no matter what time zone or country you are located in.

Server Technology, Inc.

1040 Sandhill Drive	Tel:	1-800-835-1515	Web:	www.servertech.com
Reno, Nevada 89521 USA	Fax:	775.284.2065	Email:	support@servertech.com

Return Merchandise Authorization (RMA)

If you have a product that is not functioning properly and needs technical assistance or repair, see the Server Technology **Return Merchandise Authorization** process at: www.servertech.com

Interested in learning more about how Server Technology can help you manage and distribute power in your datacenter?
Visit us online at: **www.servertech.com/products/**

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