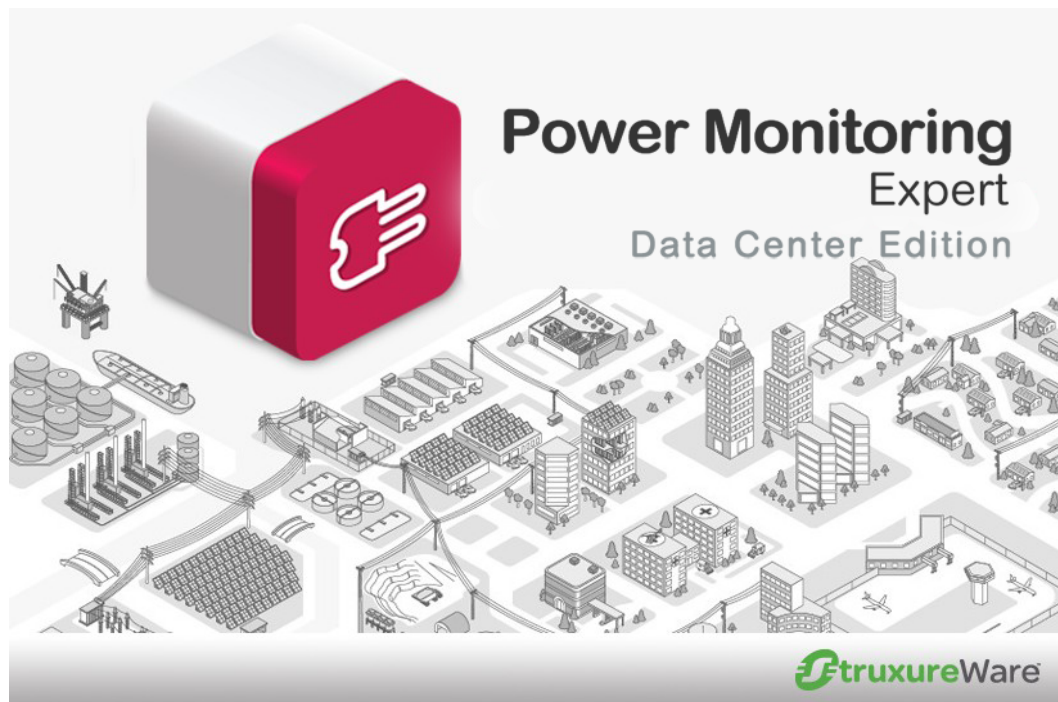


StruxureWare Power Monitoring Expert - Data Center Edition

Installation and Commissioning Guide

7EN02-0333-00

09/2013



Safety information

Important information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of either symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury. The safety alert symbol shall not be used with this signal word.

Please note

Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Safety precautions

WARNING

UNINTENDED EQUIPMENT OPERATION

- Do not use the software for critical control or protection applications where human or equipment safety relies on the operation of the control action.
- Do not use the software to control time-critical functions because communication delays can occur between the time a control is initiated and when that action is applied.
- Do not use the software to control remote equipment without securing it with an authorized access level, and without including a status object to provide feedback about the status of the control operation.

Failure to follow these instructions can result in death or serious injury.

WARNING

INACCURATE DATA RESULTS

- Do not incorrectly configure the software, as this can lead to incorrect reports and/or data results.
- Do not base your maintenance or service actions solely on messages and information displayed by the software.
- Do not rely solely on software messages and reports to determine if the system is functioning correctly or meeting all applicable standards and requirements.
- Consider the implications of unanticipated transmission delays or failures of communications links.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

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Overview

This Installation and Commissioning Guide is intended for Application Engineers, third-party Integrators, or other qualified personnel that have experience with power monitoring system applications. This document provides a high level view of the entire installation and commissioning process. This is achieved by providing detailed information on the features specific to Power Monitoring Expert - Data Center Edition, and through referencing existing documentation which describe the installation and configuration process of the various components.

Power Monitoring Expert - Data Center Edition is a focused and fully optimized power management system that actively monitors and analyzes the electrical power distribution infrastructure of a data center including MV, LV and IT floor power. It is made up of hardware, software and communication components, tied together with professional services. All elements are modular and interoperable, for better continuity of supply and easier installation.

Note

Please review the *StruxureWare Power Monitoring Expert - Data Center Edition System Design Guide* for more information about planning for and setting up your system.

This document is divided into the following sections:

Prerequisites: This section describes the items required and tasks to be completed before the installation and commissioning of the data center solution can begin.

Server Preparation This section provides instructions for the preparation of the servers required to run Power Monitoring Expert - Data Center Edition software. This section includes:

- server architecture
- server specifications
- RAID recommendations
- installation of high availability software
- setting up server redundancy
- creating and configuring virtual machines.

Software installation and commissioning: This section provides instructions regarding the installation and commissioning of the software required to implement Power Monitoring Expert - Data Center Edition. This document and related documents provide instructions for:

- SQL Server
- Power Monitoring Expert - Data Center Edition

The commissioning of the Data Center solution includes:

- Adding physical and logical devices to Management Console
- Creating and configuring Managed Circuits

- Creating, configuring, and managing hierarchies
- Creating and configuring data center VIPs
- Configuring the various data center add-on modules
- Event Notification Module (ENM) (optional)
- ETL for DCO (optional)
- ETL for 3rd party billing (optional)
- ITB Portlets (optional)
- SNMP OPC Gateway application (optional)
- StruxureWare PowerSCADA Expert 7.30 (optional)

The inclusion of PowerSCADA Expert 7.30 is part of the 'Engineered to Order' offer. Refer to *StruxureWare PowerSCADA Expert 7.30 Installation Guide*, and the *StruxureWare PowerSCADA Expert 7.30 User Guide* for additional information.

Supporting Documentation

The Data Center documentation related to the above steps are available in the following locations:

The **Documentation > Data Centers** folder on the DVD contains the following documentation:

- *StruxureWare Power Monitoring Expert - Data Center Edition Installation and Commissioning Guide*
- *StruxureWare Power Monitoring Expert - Data Center Edition User Guide*
- *Setting up PowerLogic SCADA 7.3 to use Token-Based Single Sign On for Web Reporter 7.0.x*
- *Setting up Token-Based Single Sign On for Web Reporter in StruxureWare Power Monitoring 7*
- *StruxureWare Power Monitoring - Data Center Edition Generator Test User Guide*
- *Event Notification Module Installation Guide*
- *Event Notification Module User Guide*

The **Documentation** folder on the DVD contains the following documentation:

- *StruxureWare Power Monitoring Expert 7.2 User Guide*
- *StruxureWare Power Monitoring Expert 7.2 Installation Guide*

Additionally, the Netcfg Guide, which provides information regarding TrendPoint's Netcfg application can be found at **TrendPoint > EnerSure > Software > Driver Doc** on the Power Monitoring Expert - Data Center Edition DVD.

A link to the online documentation for the ITB Portlets can be found at **ITB Portlets > ITB** on the DVD.

Additional documentation can be downloaded from the Schneider Electric Shopping Kiosk, or from the Schneider Electric website (www.schneider-electric.com). Any third party software documentation not provided here can be found through that company's website.

What's new in Power Monitoring Expert - Data Center Edition

There have been a number of changes to Power Monitoring Expert - Data Center Edition since its last release. This section describes the differences between the two versions.

Power System Monitoring and Control

- StruxureWare Power Monitoring Expert update
- StruxureWare Power Monitoring Expert and PowerSCADA Expert report and diagram integration
- Event Notification Module (ENM) update

Branch Circuit

- Branch Circuit Energy Report
- Branch Circuit Power Report
- Data hierarchies
- Energy data export to 3rd party billing system
- Branch Circuit data export to StruxureWare Data Center Operations (DCO)
- New metering hardware supported
 - TrendPoint EnerSure multi-circuit meter
 - BCPM (1-phase mode)

StruxureWare for Data Centers Dashboard

- Three Portlets added via EcoStruxure Web Services (EWS)

Additional Changes

- Event Notification Module (ENM) has become optional.
- KEPServerEX 5 (previously SNMP to OPC Gateway) has become optional.

The add-on modules that are part of Power Monitoring Expert - Data Center Edition have been renamed. The table below shows the old name and the corresponding new name for each module.

Phase 1 Module Name	Phase 2 Module Name
Power Usage Effectiveness (PUE)	Power Usage Effectiveness (PUE)
UPS Capacity Management	UPS Power
Generator Capacity Management	Generator Power
Power System Losses	Power Losses
EPSS Test	Generator Test

Support Contacts

Support for solutions is provided by Solutions Customer Support centers. All customer issues must be reported to one of these channels:

Phone:

- **NAOD:** +1 615-287-3400 (7:30 AM – 7:00 PM US-Central Time)
- **EMEAS:** +420 281 088 660 (8:30 AM – 5:30 PM Central Europe Time)
- **APOD:** +86 10 6503 7788 (8:30 AM – 5:30 PM China Standard Time)

Email: global-ems-solutions-support@schneider-electric.com

PI@net: <http://planet.schneider-electric.com/>

Prerequisites

There are a number of tasks to be completed prior to the installation and commissioning tasks involved with Power Monitoring Expert - Data Center Edition. This section identifies the actions to be completed before installation and commissioning can begin.

Before you begin

- Confirm that you have the Power Monitoring Expert 7.2 Cumulative Update 2 available. To get this update, navigate to **Solutions Expert Community > Power Solutions for Data Centers**. This is a required update for Power Monitoring Expert - Data Center Edition. Install this update after you have installed Power Monitoring Expert - Data Center Edition.
- Review the main topics in this guide. Understanding how this document is laid out can make the installation and commissioning process easier.
- Confirm that devices to be communicated with have been wired correctly.
- Confirm that the Branch Circuit Monitoring devices are communicating correctly.
- If you experience communication interruption with a device, ensure that the device has been configured correctly.
- Confirm that the TrendPoint Enersure devices have been configured correctly.
 - Have the correct channel grouping configuration that matches the electrical network. This allows circuit level real time and historical data to be calculated.
 - Enable the **current, demand, energy 1, energy 2** and **grouping interval** data logs. This allows all the reports to work correctly.

By default the channel grouping configuration are all single phase circuits and the logging configuration is disabled.

Without these changes the overall solution will not work as expected.

Note

To assist with configuring TrendPoint EnerSure devices, the Netcfg application and documentation are available by navigating to **TrendPoint > EnerSure > Software** on the Power Monitoring Expert - Data Center Edition DVD.

On-site requirements

The following is a list of things to prepare before beginning the installation and commissioning tasks for Power Monitoring Expert - Data Center Edition. These may include:

- Power Monitoring and PowerSCADA training - Experience with the installation of Schneider Electric products, such as StruxureWare Power Monitoring Expert and PowerSCADA Expert is necessary for installing and commissioning Power Monitoring Expert - Data Center Edition.

- Documentation - Primary documentation can be found in the **Documentation** folder on the Power Monitoring Expert - Data Center Edition DVD. Support and additional documentation can be downloaded from the Schneider Electric Shopping Kiosk, or from the Schneider Electric website (www.schneider-electric.com). Any third party software can be found through their respective websites.
- Software setup tools, devices, and firmware
- Cable and additional tools - Necessary to connect directly to devices for setup and troubleshooting.
- License Keys

It is also important to coordinate with the design team to get specifications of the system. These may include:

- One-line diagrams.
- UPS, Generator and server redundancy configuration.
- Specifications for diagrams that need to be developed (Vista diagrams for Power Monitoring Expert and one-line diagrams plus animated graphics for PowerSCADA Expert).
- Server setup information. (disk setup, database backup, maintenance settings)

Coordinate with the customer. The customer can provide necessary information such as:

- Network diagrams, interfaces and configuration data, including IP address ranges, and gateway or firewall information.
- Desired hierarchy configuration.
- License keys, if required.
- Site access.
- Any additional information specific to that location.

Device firmware, tools and software versions

The table below contains the names and version numbers of the software that was used during the validation of the data center solution.

Name	Version
Power Monitoring Expert	7.2
PowerSCADA Expert	7.30
Event Notification Module	7.1
Kepware KEPServerEX 5	5.12
SQL Server	Microsoft SQL Server 2008 R2
Microsoft Windows	Windows Server 2008 R2 Standard
Web Reporter Login Bypass	n/a
StruxureWare Portal	1.0.0
netcfg (TrendPoint EnerSure configuration utility)	0.5.0

The table below contains information regarding the paths available for upgrading existing versions of ION Enterprise, StruxureWare Power Monitoring, or Power Monitoring Expert. See ["Upgrading existing data center Power Monitoring software" on page 229](#) for additional information.

Installed Platform Version	Tasks Required before running Data Center Installer
SMS	Migrate to latest version of Power Monitoring Expert
ION Enterprise < 6.0	Upgrade to ION:E 6.0 SP1
ION Enterprise 6.0	Install ION Enterprise 6.0 SP1
ION Enterprise 6.0 SP1	No additional tasks required
StruxureWare Power Monitoring 7.0	Install StruxureWare Power Monitoring SP1
StruxureWare Power Monitoring 7.0.1	No additional tasks required
StruxureWare Power Monitoring Expert 7.2	None

The table below describes the dependencies that the different components of Power Monitoring Expert - Data Center Edition require to function correctly. Make sure that for each component, the requirement is met.

Component	Requirement
Event Notification Module (ENM)	OPC Server
SNMP Devices	OPC Server / SNMP to OPC Server
Branch Circuit Monitoring	Veris BCPM / TrendPoint EnerSure Devices
ETL	Compatible with Data Center Operations and 3rd party billing

Server preparation

This section discusses the recommended server specifications, RAID configurations, and server architecture that should be employed in order to support the performance demands of Power Monitoring Expert - Data Center Edition. For more information regarding the server architecture, refer to the *StruxureWare Power Monitoring Expert - Data Center Edition System Design Guide*.

Before proceeding

Before continuing with the installation and commissioning process, please ensure that the following tasks have been completed:

- All physical device connections have been tested.
- All devices are communicating properly.
- All procedures outlined in ["On-site requirements" on page 17](#) have been followed.
- All tools and equipment required are available.
- A supported operating system is installed.

Supported operating systems

The following table summarizes the 32-bit and 64-bit versions of Microsoft Windows operating systems that support Power Monitoring Expert - Data Center Edition installations. Ensure that one of these operating systems is present on any system or virtual machine that Power Monitoring Expert - Data Center Edition is to be installed. See ["Server specifications" on page 21](#) for the recommended operating system for each system.

Supported operating systems
Windows Server 2008 Standard or Enterprise SP2 (32 bit)
Windows Server 2008 Standard or Enterprise SP2 (64 bit)
Windows Server 2008 R2 Standard or Enterprise SP2

Server specifications

The recommended server specifications for Power Monitoring Expert - Data Center Edition are dependent on the number of devices attached to the system, and if the system is Configured to Order (the base offer with Power Monitoring Expert), or Engineered to Order (the advanced offer with Power Monitoring Expert and Power SCADA Expert).

Systems with up to 50 devices (Power Monitoring Expert - Data Center Edition)

Computer Type	Server
Operating System	Windows Server 2008 R2

SQL Server	2008 R2 Standard
CPU	Intel Xeon E56xx (4 core) or better
RAM	16 GB or higher
Hard Drives and RAID	RAID 1 with two groups of hard drives (total 4)

See ["Recommended RAID Configuration on Servers" on page 23](#) for more information on the recommended RAID type for this server configuration.

Systems with up to 200 devices (Power Monitoring Expert - Data Center Edition)

Computer Type	Server
Operating System	Windows Server 2008 R2
SQL Server	2008 R2 Standard
CPU	Intel Xeon E56xx (4 core), or better
RAM	24 GB or higher
Hard Drives and RAID	RAID 1 with three groups of hard drives (total 6)

See ["Recommended RAID Configuration on Servers" on page 23](#) for more information on the recommended RAID type for this server configuration.

Systems with up to 1000 devices (Power Monitoring Expert - Data Center Edition)

Computer Type	Server
Operating System	Windows Server 2008 R2
SQL Server	2008 R2 Standard
CPU	x2 Intel Xeon E5-2xxx (6 core), or better
RAM	32 GB or higher
Hard Drives and RAID	RAID 1 with three groups of hard drives. RAID 10 on one group.

See ["Recommended RAID Configuration on Servers" on page 23](#) for more information on the recommended RAID type for this server configuration.

Systems with over 1000 devices (Power Monitoring Expert - Data Center Edition and Power SCADA Expert)

Power Monitoring Expert - Data Center Edition:

Computer Type	Server
Operating System	Windows Server 2008 R2
SQL Server	2008 R2 Standard
CPU	x2 Intel Xeon E5-2xxx (6 core), or better
RAM	32 GB or higher
Hard Drives and RAID	RAID 1 with three groups of hard drives. RAID 10 on one group.

Power SCADA Expert:

Computer Type	Server
Operating System	Windows Server 2008 R2
SQL Server	2008 R2 Standard
CPU	x2 Intel Xeon E5-2xxx (6 core), or better
RAM	32 GB or higher
Hard Drives and RAID	RAID 1 with three groups of hard drives. RAID 10 on one group.

Recommended RAID Configuration on Servers

Each table below describes the recommended grouping for each system type (50, 200, 1000 devices), and provides information for the recommended distribution of the various components.

Systems with up to 50 devices - RAID 1 with four drives:

Component	Group 0 HDD1+HDD2	Group 1 HDD3+HDD4
OS ¹	✓	
tempDB ²		✓
MDF ³	✓	
LDF ⁴		✓
Backups ⁵		✓

- ¹ Includes the Operating System, page file, Power Monitoring Expert and any other applications.
- ² SQL Server temporary system database.
- ³ SQL Server main databases.
- ⁴ SQL Server transaction log files.
- ⁵ Power Monitoring Expert database backups.

Systems with up to 200 devices - RAID 1 with six drives:

Component	Group 0 HDD1+HDD2	Group 1 HDD3+HDD4	Group 2 HDD5+HDD6
OS ¹	✓		
tempDB ²	✓		
MDF ³		✓	
LDF ⁴			✓
Backups ⁵			✓

- ¹ Includes the Operating System, page file, Power Monitoring Expert and any other applications.
- ² SQL Server temporary system database.
- ³ SQL Server main databases.
- ⁴ SQL Server transaction log files.
- ⁵ Power Monitoring Expert database backups.

System with up to 1000 devices - RAID 1 with three groups, RAID 10 for 1 group. Total number of drives for this configuration: 10:

Component	Group 0	Group 1	Group 2	Group 3
	HDD1+HDD2	HDD3+HDD4	HDD5 + HDD6	HDD7 + HDD8 + HDD9 + HDD10
OS ¹	✓			
tempDB ²		✓		
MDF ³			✓	
LDF ⁴				✓
Backups ⁵				✓

- ¹ Includes the Operating System, page file, Power Monitoring Expert and any other applications.
- ² SQL Server temporary system database.
- ³ SQL Server main databases.
- ⁴ SQL Server transaction log files.
- ⁵ Power Monitoring Expert database backups.

System with over 1000 devices - RAID 1 with three groups, RAID 10 for 1 group. Total number of drives for this configuration: ten.

Component	Group 0	Group 1	Group 2	Group 3
	HDD1+HDD2	HDD3+HDD4	HDD5 + HDD6	HDD7 + HDD8 + HDD9 + HDD10
OS ¹	✓			
tempDB ²		✓		
MDF ³			✓	
LDF ⁴				✓
Backups ⁵				✓

- ¹ Includes the Operating System, page file, Power Monitoring Expert and any other applications.
- ² SQL Server temporary system database.
- ³ SQL Server main databases.
- ⁴ SQL Server transaction log files.
- ⁵ Power Monitoring Expert database backups.

The disk drives and RAID configuration of the server must be configured before any work can proceed. If you are using a redundant server configuration, this process should be carried out on one server at a time and configured the exact same way on both servers that are used as part of the high availability server group.

For instructions regarding the configuration of the RAID system, please refer to the documentation that came with your RAID components. For example, documentation for the Dell PowerEdge RAID Controller can be found at http://ftp.dell.com/manuals/all-products/esuprt_ser_stor_net/esuprt_dell_adapters/poweredge-rc-h310_User's%20Guide_en-us.pdf.

Server Architectures

Standalone servers

It is recommended that Power Monitoring Expert - Data Center Edition use a redundant server configuration, however If no redundancy is required in either Power Monitoring Expert - Data Center Edition or PowerSCADA Expert, a single standalone server can be used for each.

Power SCADA Expert redundant servers

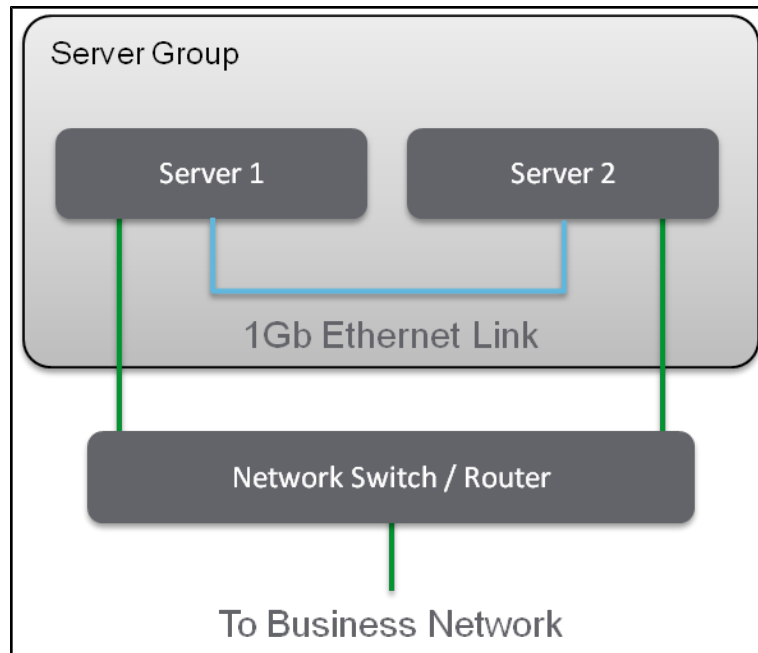
There are many redundancy configurations available in PowerSCADA Expert. These are discussed in the “PLSCADA Expert Architecture” section of the *PowerSCADA Expert Design Reference Guide*.

Redundant Servers

The recommended server architecture that can be used for Power Monitoring Expert - Data Center Edition is based on using high availability software to accomplish server level redundancy.

Servers are paired into a generalized environment by connecting one port of their Network Interface Cards (NIC) via a 1GB Ethernet link. Next, another port of the NICs is connected to an external network switch to communicate with the customer's network. Finally, the high availability software is installed on both servers simultaneously.

The software platform used for server redundancy varies from country to country but the two that have been used with Power Monitoring Expert are Stratus Avance® and everRun MX®. Avance is recommended for basic redundancy needs due to its simplicity to install and maintain. For systems that require 100% uptime, everRun MX is used. This guide refers to the Status Avance software when discussing high availability software.



Note

Although recommended, server redundancy is not required for Power Monitoring Expert - Data Center Edition to work. Follow the *StruxureWare Power Monitoring Expert 7.2 Installation Guide* for the architecture requirements.

Install the High Availability Software

If you are installing the Stratus Avance High Availability software, refer to the "Installing Avance" section of the *Stratus Avance User's Guide*. Information regarding the necessary steps to install Stratus Avance can be accessed from the Stratus Avance website at <http://advancedoc.stratus.com/usersguide/>, or in the Avance software's help system.

Once Avance has been installed on your system, log in by entering the Avance unit's IP address or host name into your browser (`http://IP_Address` or `http://host_name`, where `IP_Address` is the Avance unit's static IP address supplied during installation, and `host_name` is the fully-qualified host name assigned to that IP address).

Creating the virtual machine

Once the high availability software has been installed, create a virtual machine (VM). Refer to the documentation specific to the virtual machine application you are using.

If you are using Stratus Avance high availability software, you can create and manage your virtual machine from the **Virtual Machines** page of the Avance Management Console. Refer to the *Stratus Avance User's Guide* for information regarding the necessary steps to administrate the virtual environment within Avance.

From the Avance Management Console, click **Virtual Machines** to access the Virtual Machine page.

Configuring the virtual machine

Configuring the virtual machine includes allocating virtual CPUs, allocating memory, creating volumes and setting volume size, installing the operating system and any subsequent updates, and setting up network information. Follow the instructions for your VM software regarding configuring your virtual machine. If you are using Stratus Avance, these instructions are located in the "Provisioning Virtual Machine Resources" section of the *Stratus Avance Users Guide*.

Note

Avance includes 'para-virtualized' (PV) network and disk drivers designed to maximize Windows VM performance. These drivers are required for the proper operation of a Windows VM on an Avance system. If you receive a notification that the pv drivers are not installed, following the instructions in the "Windows Based VMs" section of the *Stratus Avance User's Guide*.

Software installation and commissioning

This section contains information regarding the installation of the various components that make up the Power Monitoring Expert - Data Center Edition solution.

Power Monitoring Expert - Data Center Edition has all the features that make up the Power Monitoring Expert software (see *StruxureWare Power Monitoring Expert 7.2 User Guide* for complete information). In addition, Power Monitoring Expert - Data Center Edition provides data center specific device drivers, equipment templates, reports, and add on modules. In addition to these components, there are other optional applications that can be installed as part of the Data Center solution. These are contained on the Power Monitoring Expert - Data Center Edition DVD.

The table below describes the various components that can be used as part of the Power Monitoring Expert - Data Center Edition solution.

Software	Additional Comments
StruxureWare Power Monitoring Expert - Data Center Edition	The Power Monitoring Expert - Data Center Edition includes: • Power Monitoring Expert • solution add-on modules • device drivers • custom reports • frameworks, • diagrams • templates
SQL Server	See "SQL Server" on page 30 for supported versions.
Microsoft Silverlight	Used by the Web Applications features.
Microsoft Excel 2007 or 2010	• Used by Reporter feature. • Used to import hierarchy content into database. • Reports feature provides option to download report as an Excel file.
Event Notification Module (ENM) 7.1 (optional)	Provides notification for power system events
ETL for DCO (optional)	Exports billing data to Data Center Operations (DCO).
ETL for 3rd party billing (optional)	Exports billing data to third party billing software.
SNMP to OPC Gateway (optional)	Provides interoperability between industrial automation and Power Monitoring Expert.
Power SCADA Expert (optional)	Used with Power Monitoring Expert for custom graphics, alarm monitoring and notification capabilities. Part of the 'Engineered to Order' option for Power Monitoring Expert - Data Center Edition
Web Reporter Login Bypass (optional)	Used to integrate Power SCADA Expert and Power Monitoring Expert. Only installed if Power SCADA Expert is installed.

SQL Server

SQL Server is a required component of the Power Monitoring Expert - Data Center Edition solution.

Power Monitoring Expert - Data Center Edition supports the following versions of SQL Server:

- SQL Server 2008 R2 Standard SP2
- SQL Server 2008 R2 Enterprise SP2
- SQL Server 2008 Standard SP3
- SQL Server 2008 Enterprise SP3.

Refer to the “Installing SQL Server” section in the *StruxureWare Power Monitoring 7.2 Installation Guide* and *Using the SQL Server 2008 R2 DVD* for information regarding the necessary steps for installing the SQL Server.

Note

If a SQL setup dialog appears asking for you to enable the .NET Framework Core Role, click **OK**. SQL Server 2008 cannot be installed without the .NET Framework.

Power Monitoring Expert - Data Center Edition

Power Monitoring Expert - Data Center Edition uses the Power Monitoring Expert platform as its base. The Data Center installation process is similar to installing Power Monitoring Expert, but with additional components specific to Data Centers as part of the installation.

The complete Power Monitoring Expert - Data Center Edition installation includes the following steps:

- Install Power Monitoring Expert - Data Center Edition. This installation includes the Power Monitoring Expert platform, and also includes solution modules, Vista diagrams, frameworks, reports, and hierarchy templates that are specific to Power Monitoring Expert - Data Center Edition.
- Install KEPServerEX 5 (previously called SNMP to OPC Gateway) (optional).
- Install ETL for Data Center Operations (DCO) (optional).
- Install ETL for 3rd party billing (optional)
- Install the Event Notification Module (ENM) (optional).
- Install ITB Portlets (optional)
- Install Power SCADA Expert (as part of the 'Engineered to Order' option)

Note

Log on to the Windows operating system as the Administrator of the system, and not as a user with administrator privileges.

For reference information regarding the installation of the Power Monitoring Expert platform, refer to the section "Power Monitoring Expert installation" in the *StruxureWare Power Monitoring Expert 7.2 Installation Guide*.

Before proceeding

Before installing and configuring Power Monitoring Expert, make sure that the following tasks have been completed:

- The tasks specified in ["Prerequisites" on page 17](#) have been performed.
- Servers have been configured as documented in ["Server Architectures" on page 25](#).
- SQL Server has been installed.
- Microsoft Silverlight has been installed.
- To use Power Monitoring Expert's **Reporter** application, or to edit hierarchy template .csv files, Microsoft Excel 2007 or 2010 are required.

Install Power Monitoring Expert - Data Center Edition

The Power Monitoring Expert - Data Center Edition installation consists of running the installer and selecting options as you proceed through the installation process. In addition to the installation of the Power Monitoring Expert platform, the Power Monitoring Expert - Data Center Edition solution includes the add on modules, custom reports, hierarchy templates, Vista diagrams, and Frameworks specific to Power Monitoring Expert - Data Center Edition.

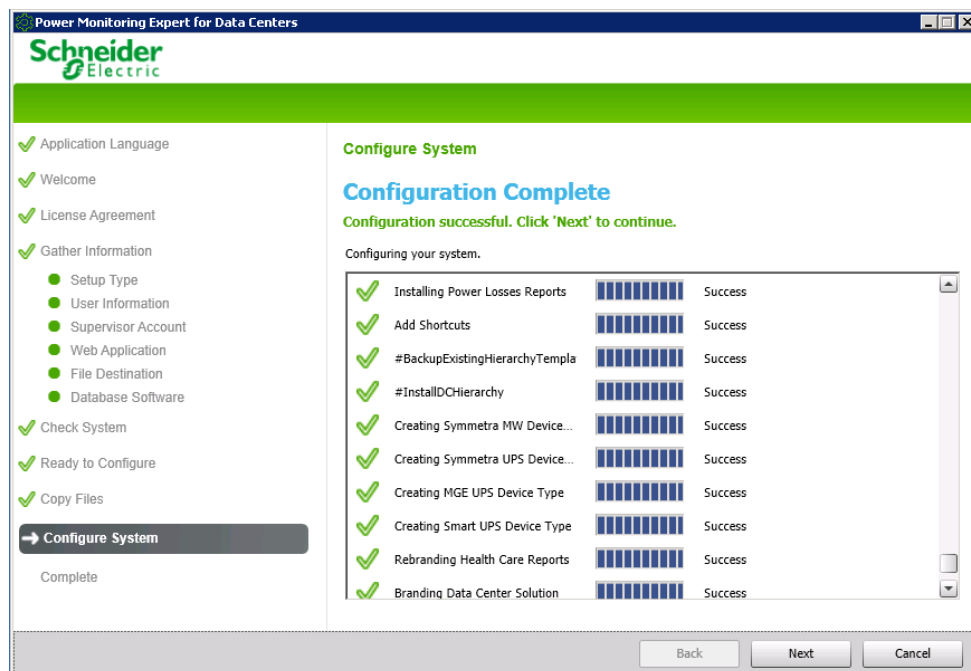
To install Power Monitoring Expert - Data Center Edition:

1. Insert the StruxureWare Power Monitoring Expert - Data Center Edition DVD into the DVD drive.
If Power Monitoring Expert - Data Center Edition does not open automatically, use Windows Explorer to navigate to the DVD drive and double-click **MainSetup.exe**. The installer launches the Power Monitoring Expert installer.
2. Follow the instructions in the *StruxureWare Power Monitoring Expert 7.2 Installation Guide*, and refer to the "Power Monitoring Expert installation" section, according to your installation requirements.

Note

The version of Power Monitoring Expert that installs as part of Power Monitoring Expert - Data Center Edition can be installed as a Standalone or Engineering Client.

Near the end of the Power Monitoring Expert installation, the installer displays the **Configure System** page, indicating each of the Power Monitoring Expert configuration actions taking place.



3. Once all configuration actions are complete, click **Next** to finish the installation. The installer displays the **Complete** page hyperlinks to open the Installation Log and start the Web Applications component, respectively.
4. Click **Close** to close the installer.

Note

After installing Power Monitoring Expert - Data Center Edition, you must install Power Monitoring Expert 7.2 Cumulative Update 2. This is a required update for Power Monitoring Expert - Data Center Edition. To get this update, navigate to the **Solutions Expert Community > Power Solutions for Data Centers**.

Post Installation Tasks

Once Power Monitoring Expert - Data Center Edition has been installed on your system, ensure that the post upgrade tasks described in the "Post Installation Tasks" section of the *StruxureWare Power Monitoring Expert 7.2 Installation Guide* have been reviewed.

Content location

Once the Power Monitoring Expert - Data Center Edition installation is complete, the content specific to Power Monitoring Expert - Data Center Edition is added to your system in the locations listed below.

Detailed information regarding the configuration of the solution modules can be found in ["Power Monitoring Expert - Data Center Edition modules" on page 91](#).

The file destination path is configured during the installation process. This is the root folder for the installed Power Monitoring Expert - Data Center Edition application. For the destination paths listed below, [path] refers to the root folder for the installed diagram, framework, or application. A typical path is C:\Program Files (x86)\Power Monitoring Expert DC Ed\.

- **Power Monitoring Expert - Data Center Edition Vista Diagrams** - [path]
 \Schneider Electric\Power Monitoring Expert DC Ed\config\diagrams\ud\DataCenter\
 - **Device Vista Diagrams** - [path]\Schneider Electric\Power Monitoring Expert DC Ed\config\diagrams\ud\default\
 - **Custom Drivers and OPC Translator files** - [path]\Schneider Electric\Power Monitoring Expert DC Ed\config\translators\ and [path]\Schneider Electric\Power Monitoring Expert DC Ed\config\translators\OPC\, respectively. Additionally, these drivers and translators are registered as devices in the ION Network database.
- **Data Center VIP and Data Center Alarming VIP** services are created and started:
 - ION Virtual Processor Service - NVIP.Data_Center
 - ION Virtual Processor Service - NVIP.Data_Center_Alarming

ION Real-time Data Service	Provides a...	Started	Automatic (D
ION Report Subscription Service	Manages r...	Started	Automatic (D
ION Site Service	Manages in...	Started	Automatic
ION Virtual Processor Service	Provides a...	Started	Automatic
ION Virtual Processor Service -NVIP.Data_Center	Provides a...	Started	Automatic
ION Virtual Processor Service -NVIP.Data_Center_Alarming	Provides a...	Started	Automatic
ION XML Subscription Service	Processes ...	Started	Automatic
ION XML Subscription Store Service	Stores sub...	Started	Automatic
IP Helper	Provides by...	Started	Automatic

- **Frameworks** - [path]\Schneider Electric\Power Monitoring Expert DC Ed\config\fmwk\DataCenter\
- **Vista Frameworks** - [path]\Schneider Electric\Power Monitoring Expert DC Ed\config\diagrams\ud\DataCenter_vista_frameworks\
- **Report Packs** are uploaded to the Reporting Server configured for Power Monitoring Expert.
- **Reporting Configuration tools** and additional files (if applicable, depending on the solution modules available) are copied to the [path]\system\bin\
- **Hierarchy Manager templates** There are two Data Center hierarchy templates copied to [path]\Schneider Electric\Power Monitoring Expert DC Ed\Applications\HierarchyManager\SampleTemplates\DataCenter.

Additionally, the default Power Monitoring Expert template is replaced with a Data Center template during installation. The original template is backed up to [path]\Applications\HierarchyManager\SampleTemplate\ExistingTemplateBackup.xml.bak.

Moving MDF and LDF to different drives

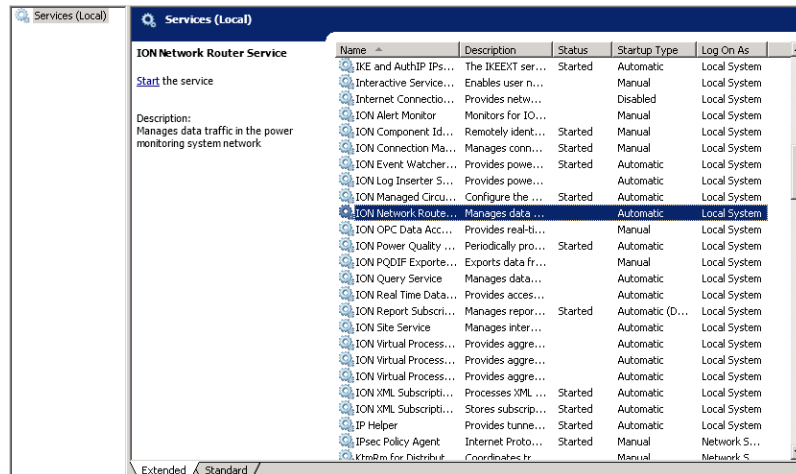
There are situations when it is beneficial to have your primary database file (.MDF) and your data log file (.LDF) on different volumes of your system. This section provides instructions for moving the .MDF and .LDF files if the database path was not already configured to another drive during the software installation process.

Ensure this operation is performed before adding any devices to Power Monitoring Expert - Data Center Edition. Make sure you are using one of the hard drive configurations listed in ["Recommended RAID Configuration on Servers" on page 23](#) that use multiple volumes.

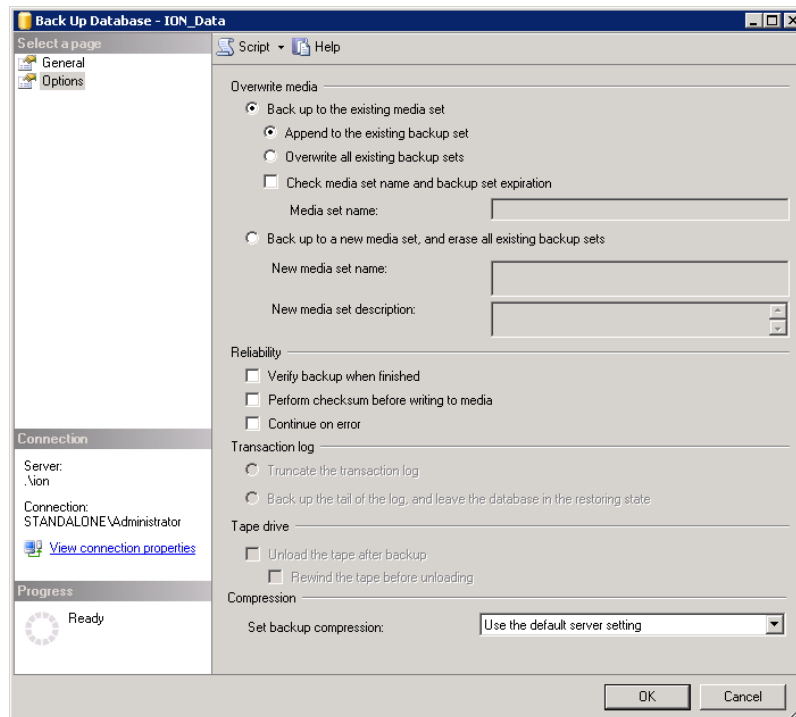
For the destination paths listed below, [path] refers to the root folder structure. A typical path is C:\Program Files (x86)\Power Monitoring Expert DC Ed\.

To move the MDF and LDF files:

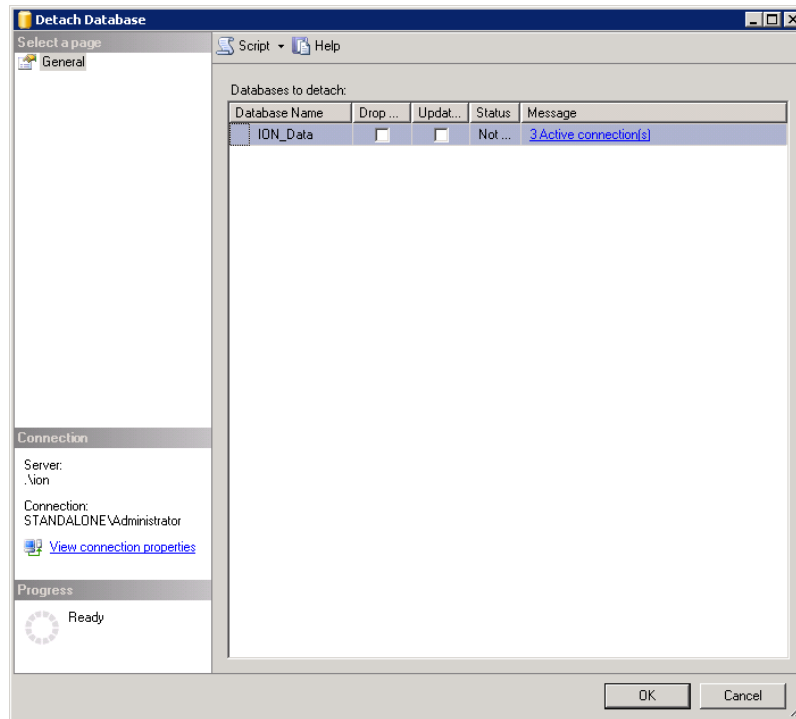
1. Stop all ION services (**Control Panel > Administrative Tools > Services**). Stop the ION Network Router Service, and this will stop few other ION services at the same time. Stop all other remaining ION Services".



- Stop all ApplicationModules services (Stopping CoreServiceHost stops the other two ApplicationModules services).
- Using SQL Server Management Studio, connect to the ION instance of the local database engine using a SQL administrator account with sysadmin privileges (such as sa). Backup ION_Data database (**Databases > ION_Data > Tasks > Back Up**). Define and make note of the location of your database backup file.



- Close all active connections.
- Detach the ION_Data database (**Databases > ION_Data > Tasks > Detach**).



6. Go to the Windows directory where the ION_Data MDF and LDF files are located. The default location is [Path] \Database\Data Move them to their new location(s).
7. In SQL Server Management Studio, attach ION_Data and ensure the file paths for the MDF and LDF are correct in the Attach Databases "Database details" section.
8. Start the ION Services.
9. Start the ApplicationModules services.
10. Check the System Log Events in Management Console.

Changing the database backup location

Ensure this operation is performed before adding any devices to Power Monitoring Expert - Data Center Edition. Make sure you are using one of the hard drive configurations listed in ["Recommended RAID Configuration on Servers" on page 23](#) that use multiple volumes.

By default, database backups are saved to [path] \Program Files\Schneider Electric\Power Monitoring Expert DC Ed\config\cfg\DBBackups. This default location is specified in the [path] \config\cfg\DbScheduledTasks\Support\Configuration.ps1 file as \$locationForBackupFiles - "cfg\DBBackups\".

To change the default location for the backup files:

1. Use Windows Explorer to create a new folder for your backup files. The folder name and location are used in the following steps.
2. Navigate to the following location under the program's root directory:
 ... \config\cfg\DbScheduledTasks\Support

3. Edit **Configuration.ps1** with a text editor and change the path information within the double quotes to specify either a fully-qualified path or a relative path for folder to be used for the backup files.

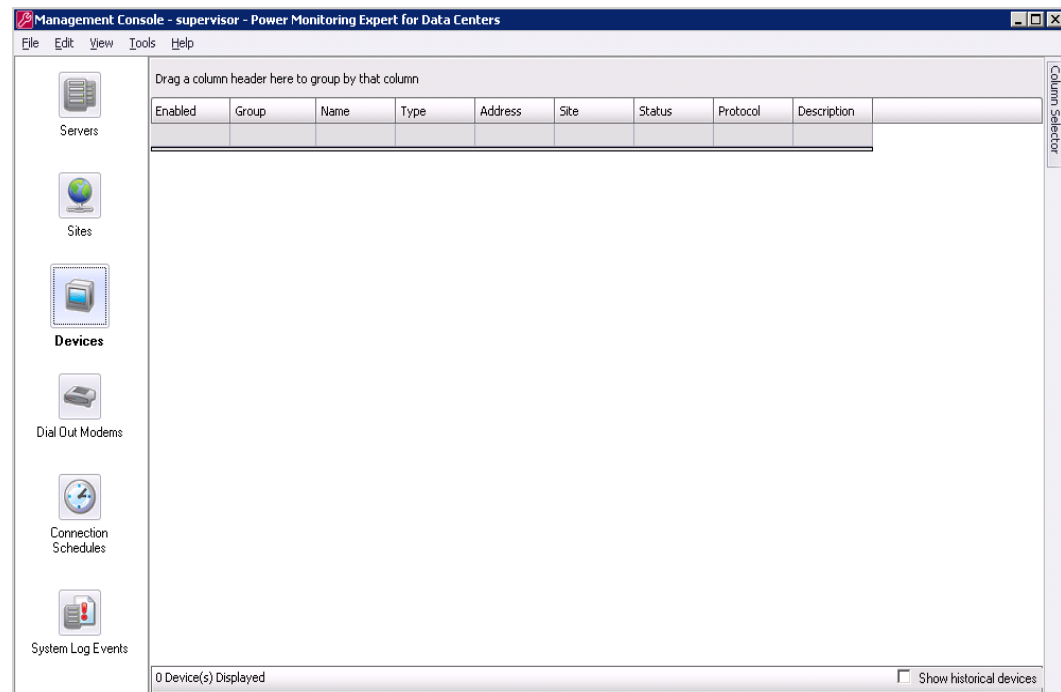
For example:

- If you created a folder named backupdirectory under the config folder in the default product install location, change the last line in the file to \$locationForBackupFiles - "backupdirectory" to indicate the relative path under the config folder for the backup location.
- You need to use a fully-qualified path if you want to use a secondary disk drive or an external drive for the backup files.

4. Save your changes and close the text editor.

Add Devices to Power Monitoring Expert

Once the Power Monitoring Expert - Data Center Edition installation has completed successfully, it is necessary to populate the system with various metering and protection devices. This is done with the Management Console application. Refer to the section "Setting up your network in Management Console" in the *StruxureWare Power Monitoring Expert 7.2 User Guide* for details on adding and configuring devices.



The servers section is configured during the software installation.

Note

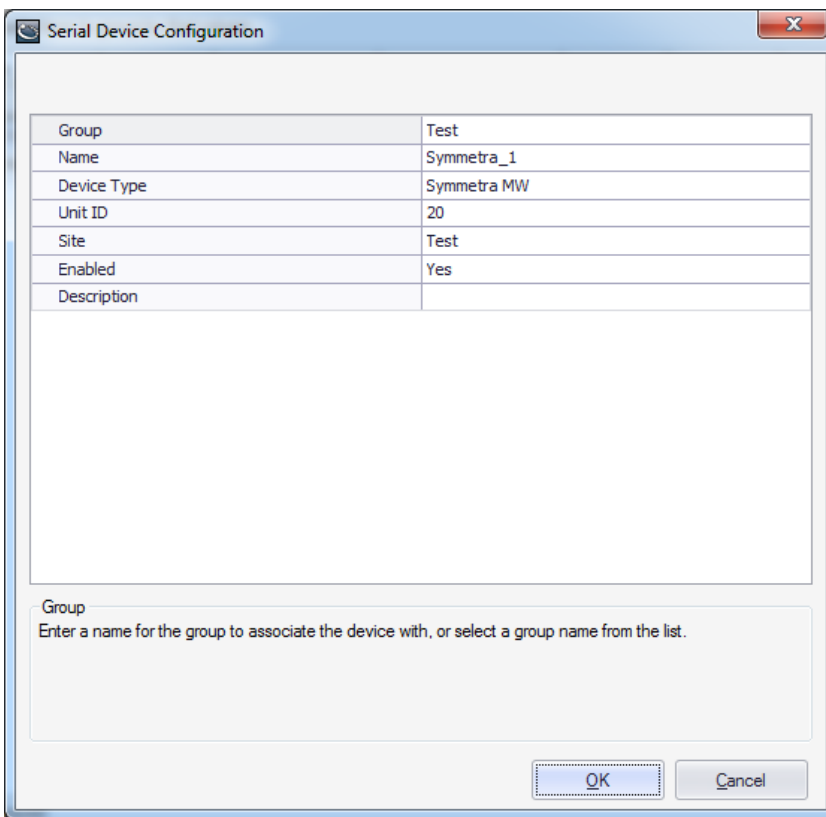
When commissioning a system, the normal process is to create a site, create the devices attached to the site, validate communications, and repeat as necessary for all remaining sites. This approach helps ensure uninterrupted communication with devices. If issues are noted during commissioning, disable either the site or device in question and continue. After the entire system is created, troubleshoot as necessary.

For the Power Monitoring Expert - Data Center Edition solution, most sites will be of the Ethernet Gateway Site type, with one OPC Site type for the SNMP-based devices. Note that devices with direct Ethernet connectivity do not have a site requirement.

When naming a site, use a convention to indicate the physical location of the site. Site names are used to indicate communications routing and by diagnostic tools, but in general do not appear in the other Power Monitoring Expert applications (e.g. Vista, Designer).

Devices in the Power Monitoring Expert - Data Center Edition solution will generally either be Serial Device on Ethernet Gateway site, Ethernet Device, or OPC Device.

A device name consists of the <Group>.<Name> fields entered in the configuration screen:



The image shows a 'Serial Device Configuration' dialog box. It contains a table with the following fields and values:

Group	Test
Name	Symmetra_1
Device Type	Symmetra MW
Unit ID	20
Site	Test
Enabled	Yes
Description	

Below the table is a 'Group' section with a text box containing the instruction: 'Enter a name for the group to associate the device with, or select a group name from the list.' At the bottom right are 'OK' and 'Cancel' buttons.

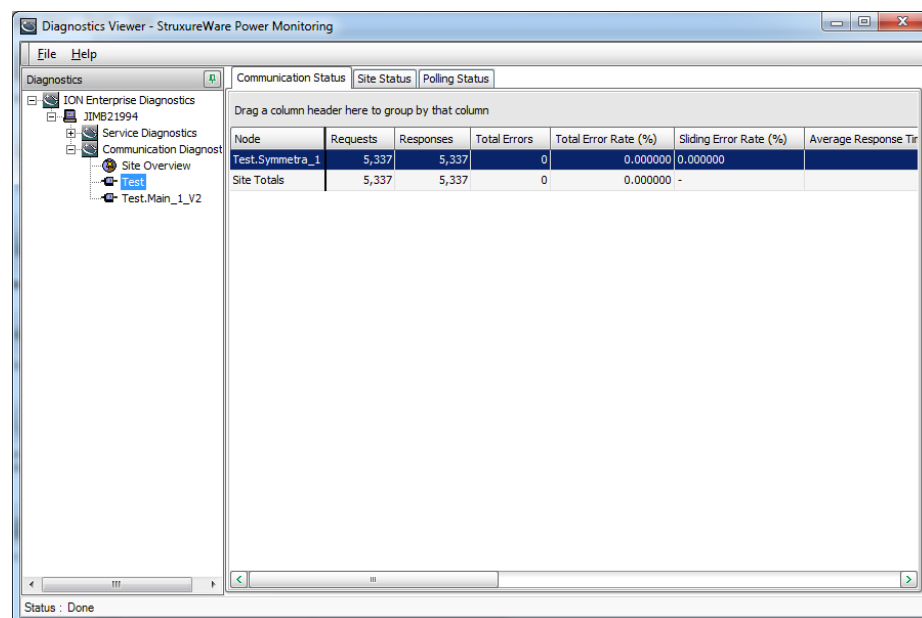
Use the Group field for large logical associations, such as MV feeders, Buildings, etc. The name field should provide appropriate information regarding physical location and/or functionality and/or device type information.

Creating multiple devices using Duplicate and Configure

If there are a large number of similar devices with similar names, which is common in Data Centers, use the **Duplicate and Configure** function in Management Console to quickly create multiple devices. Refer to the section "Management Console" in the *StruxureWare Power Monitoring Expert 7.2 User Guide* for additional information.

Using Diagnostics Viewer

Once a site and associated devices are created, use the Diagnostic Viewer tool to check communications. In Management Console, select **Tools > System > Diagnostics Viewer** to start the program.



In the left panel, expand Communication Diagnostics and select the site in question. Ensure that the value in the Total Error Rate column is below 1%. If the rate to the site or to a specific device on that site is higher, either disable the site or device until the situation has been resolved. To reset statistics, right-click and select **Reset**.

Direct connected Ethernet devices do not have sites associated and are listed directly.

Commonly used devices

Devices commonly used in Data Center systems:

- Advanced Power Quality Power Meters such as ION7650. These are normally placed at or near the incoming utility feeder. They provide information on the utility power quality, and high accuracy power and energy data for utility billing verification.
- Power Quality Power Meters such as the PM820. These are installed at key feeder locations to provide localized PQ, Power, and Energy information.

- Power Meters such as the PM5350. These are installed at feeder panel inputs to provide localized summary power and energy data at a higher accuracy, compared to trip unit supplied power and energy data.
- Protection Relays and Trip units such as SEPAMS, Masterpact Micrologic, and Compact Micrologic. These are primarily installed for feeder protection. Additionally, they provide status, event, power, energy, and current data on a per feeder basis.
- Programmable Logic Controllers (PLC). Used to provide high speed monitoring and alarming of key breakers.
- Uninterruptible Power Supplies (UPS). Access to the UPS data may be available via several methods and protocols. The Power Monitoring Expert - Data Center Edition solution provides tools and guidelines for SNMP and MODBUS.
- Branch Circuit Monitors, such as the Veris BCPM or TrendPoint EnerSure. These provide power and current data and status at the rack level.
- Devices such as Transformer Monitors and Generator Controllers that support the MODBUS communications protocol. Power Monitoring Expert include the necessary tools to create and include these devices in the system.

Load the Power Monitoring Expert - Data Center Edition VIP framework

The custom VIPs required for Power Monitoring Expert - Data Center Edition are created as part of the installation process. The remaining step is to load the Business Logic framework into the VIP. These steps must be done in the correct order to help ensure the modules are assigned the correct ID values. For complete information regarding the Designer feature, refer to the "Designer" chapter of the *StruxureWare Power Monitoring Expert 7.2 User Guide*.

WARNING

UNINTENDED EQUIPMENT OPERATION

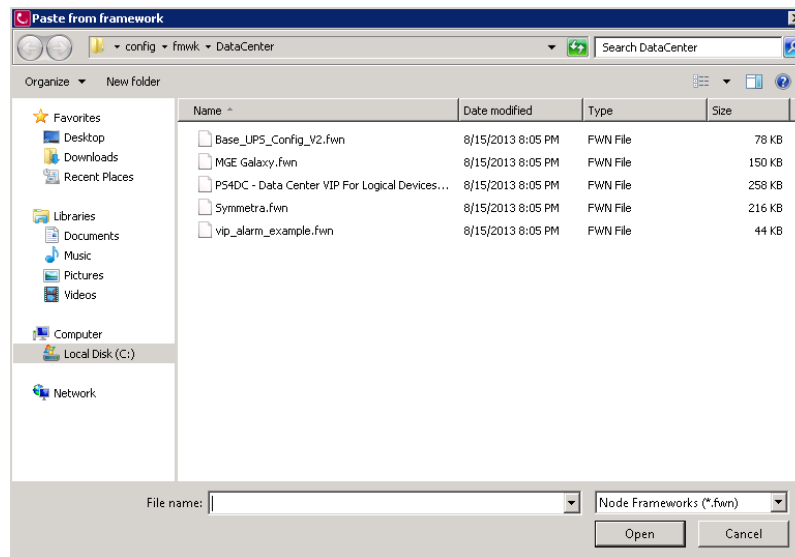
- ION modules and registers must only be configured by personnel with a thorough understanding of ION architecture and the system in which the meters and software are installed.
- Do not use the software for critical control or protection applications where human or equipment safety relies on the operation of the control action.
- Do not use the software to control time-critical functions because communication delays can occur between the time a control is initiated and when that action is applied.
- Do not use the software to control remote equipment without securing it with an authorized access level, and without including a status object to provide feedback about the status of the control operation.

Failure to follow these instructions can result in death or serious injury.

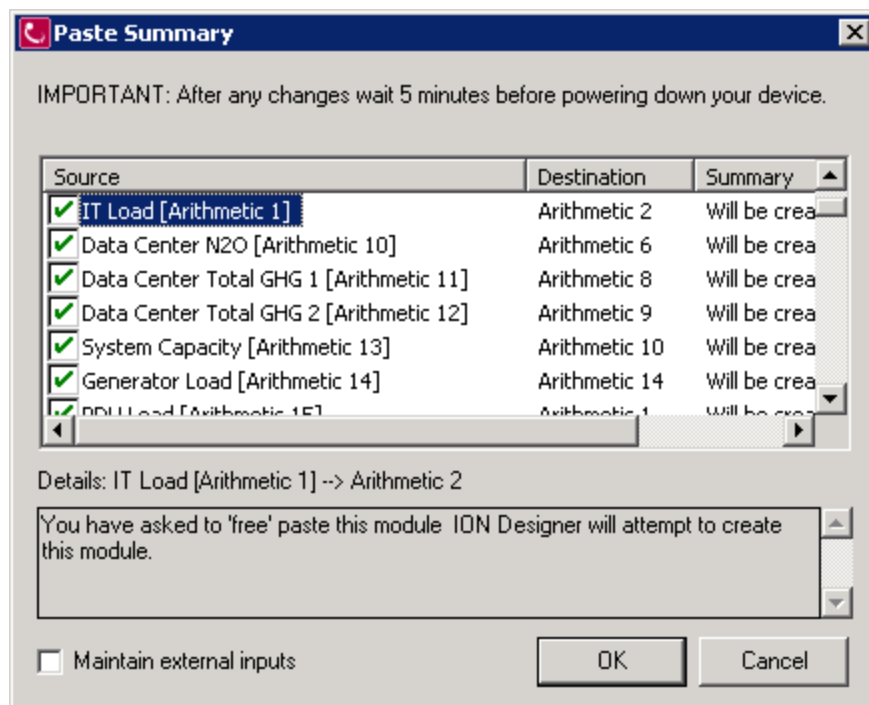
To load the framework into the VIP:

1. Start **Designer** and enter your user name and password in the fields provided.
2. Acknowledge the warning dialog box by clicking **OK**.
3. Select **File > Open**. Select the VIP.Data_Center from the **Select Node** box. Click **OK**.

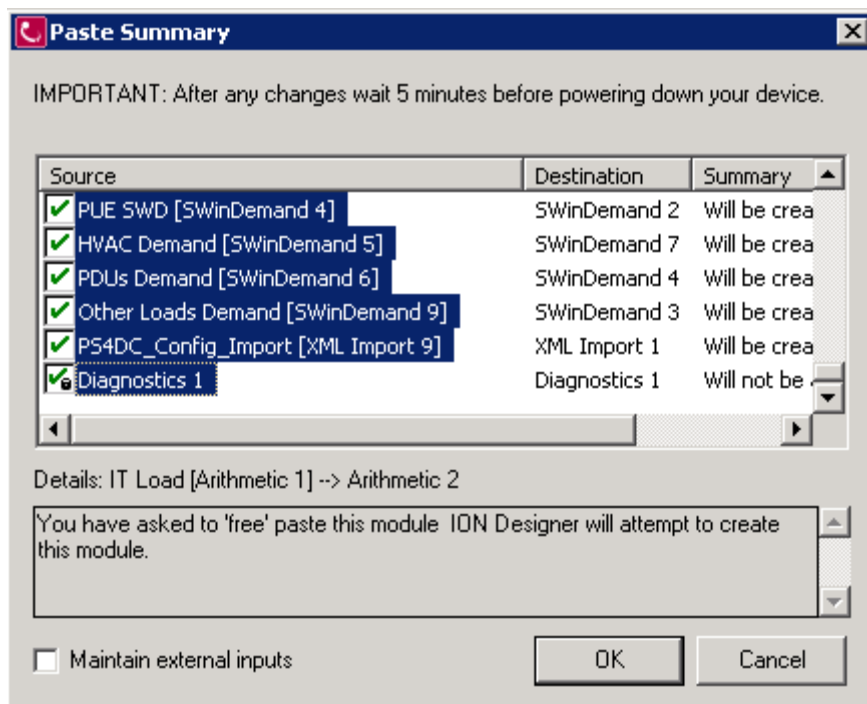
4. Select **Edit > Paste from framework**. The **Paste from Framework** screen appears.
5. Browse to C:\Program Files (x86)\Schneider Electric\Power Monitoring Expert DC Ed\config\fmwk\DataCenter and select the Power Monitoring Expert - Data Center Edition **PS4DC - Data Center VIP For Logical Devices.fwn** framework file from the DataCenter folder. Click **Open**.



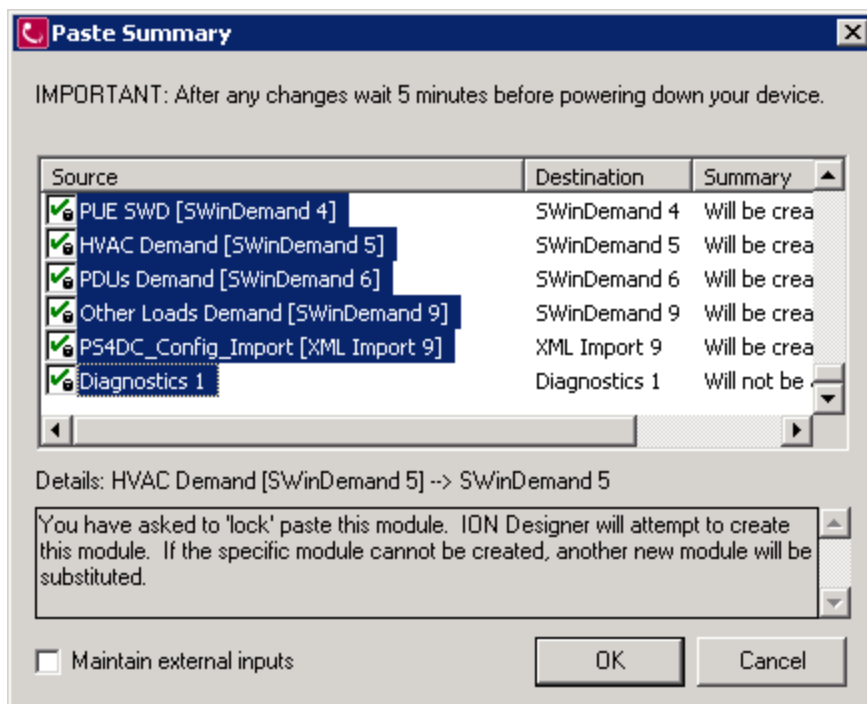
The **Paste Summary** screen appears.



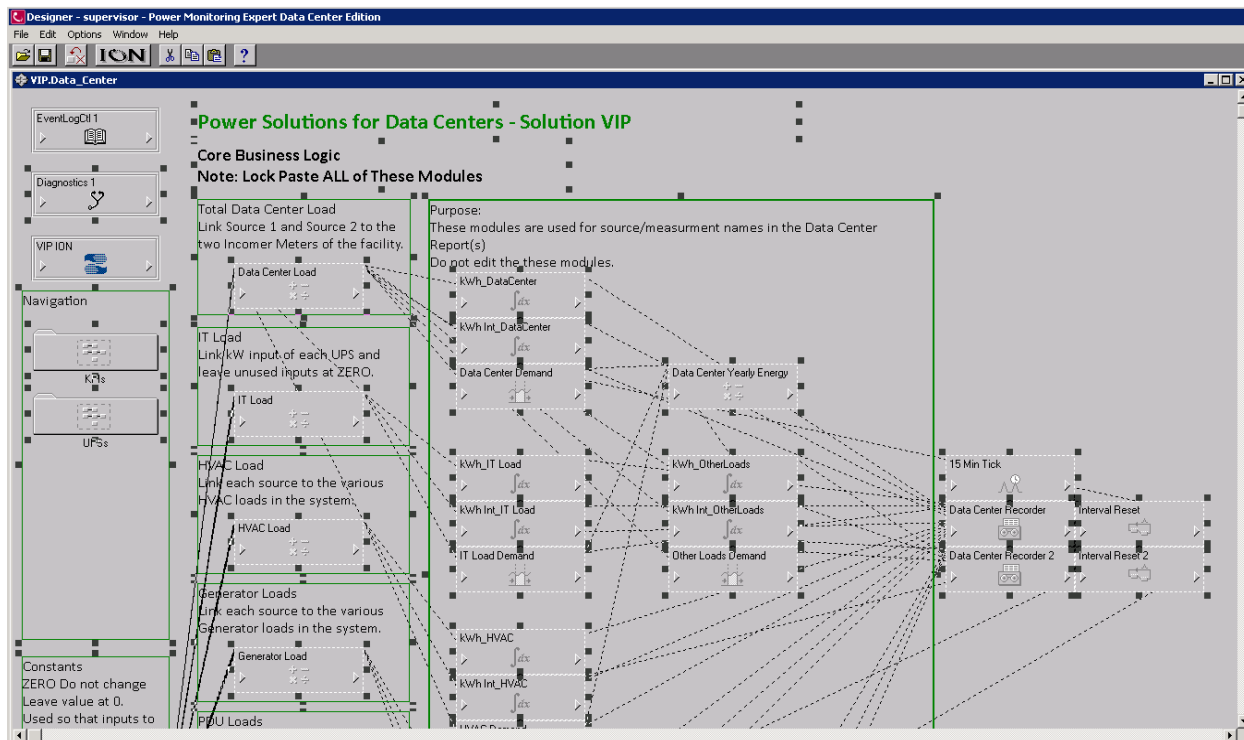
6. Select all check boxes in the **Source** column. Use **Shift+End** to select all sources quickly.



- Hold the **Shift** key and left-click on the green check box of any source. Each check box will now have a lock symbol.



- Scroll through the list and ensure all sources have the lock symbol, then click **OK**.
You should now see the framework as shown below.



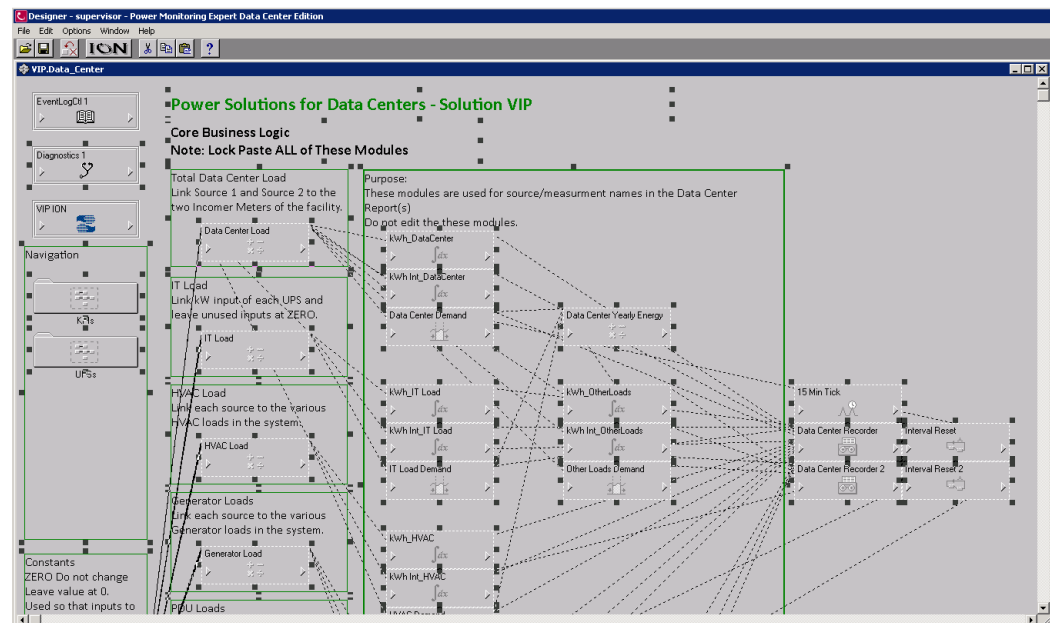
9. Click the **Save** icon.

Configure the Data Center VIPs

Connect the VIP Registers

Once the Data Center VIP has been created, it is necessary to link (connect to) the various types of data sources as shown below to bring in real-time data. Data sources include:

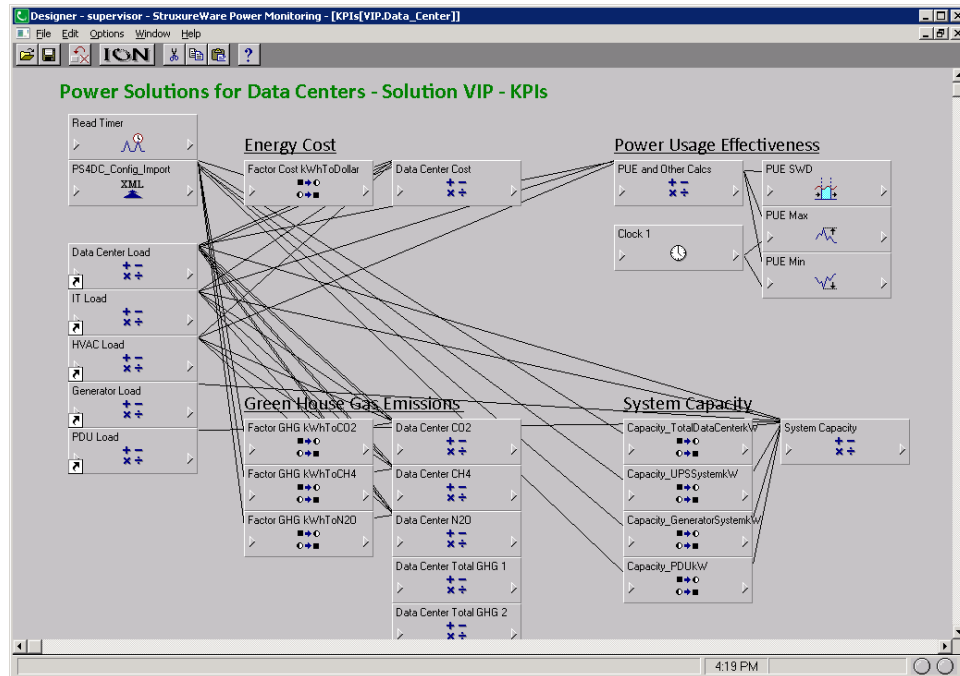
- Data Center incomers
- IT Load
- HVAC loads
- Generators
- PDUs



Link the data sources to the appropriate Arithmetic Module that aggregates (sums) the data. Be sure that all unused inputs are linked to the “zero” value, as unlinked inputs will cause a “N/A” output.

Update the XML Configuration file

The Power Monitoring Expert - Data Center Edition VIP refers to an xml file named “PS4DC_Config.xml” in order to import data, such as the electricity rate and system capacity limits. In order for the KPI screens to make sense for each customer, these values must be changed to match their facility. The file’s registers are linked to the VIP through an XML Import Module in the KPIs section of the VIP, as illustrated in the figure below.



PS4DC_Config.xml is an xml configuration file, and is installed as part of the Data Centers installation process. It is located in the ...\\config\\diagrams\\ud\\DataCenter\\KPIs folder. To edit the file, open it in a text editor and edit the "Value" tag, as illustrated below.

```

1  <?xml version="1.0" encoding="UTF-8" standalone="yes" ?>
2  <PS4DC xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
3    <Register>
4      <ID>1</ID>
5      <Type>External Numeric</Type>
6      <Label>ElectricityRate</Label>
7      <Value>0.1</Value>
8    </Register>
9    <Register>
10     <ID>2</ID>
11     <Type>External Numeric</Type>
12     <Label>GHG - kWh to CO2 Factor</Label>
13     <Value>0.83</Value>
14   </Register>
15   <Register>
16     <ID>3</ID>
17     <Type>External Numeric</Type>
18     <Label>GHG - kWh to CH4 Factor</Label>
19     <Value>0.000009959</Value>
20   </Register>
21   <Register>
22     <ID>4</ID>
23     <Type>External Numeric</Type>
24     <Label>GHG - kWh to N2O Factor</Label>
25     <Value>0.00001383</Value>
  
```

For more information on the configuration of the VIP using Designer, refer to the "Designer" chapter of *StruxureWare Power Monitoring Expert 7.2 User Guide*.

Note

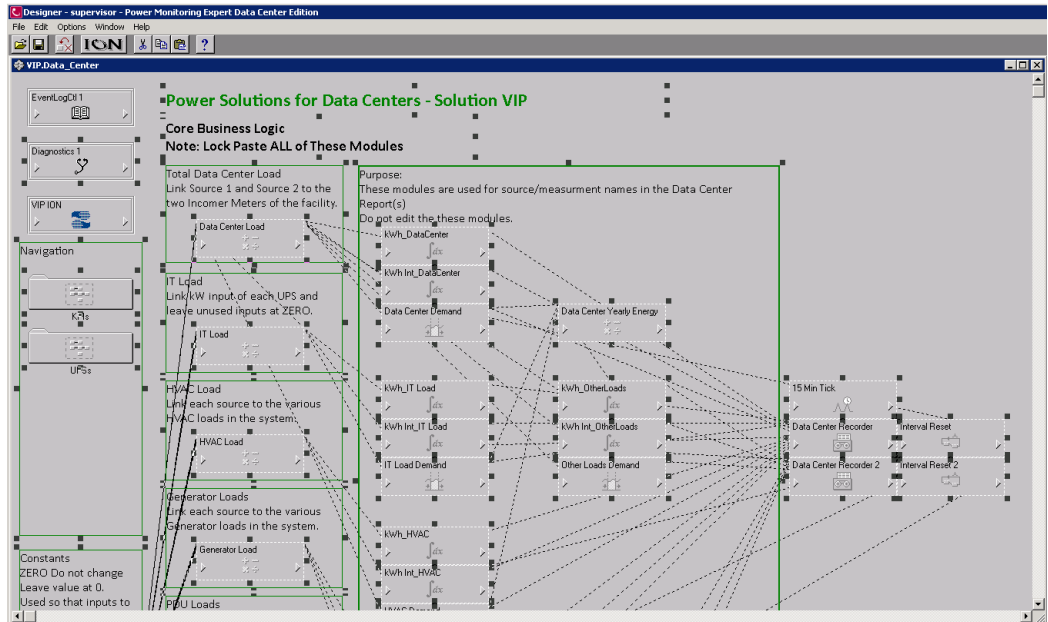
To implement real-time energy costs or emissions factor, you can develop a script using a visual basic script or other technique that writes to the xml file in the specified format.

Updating the XML Import Module path information

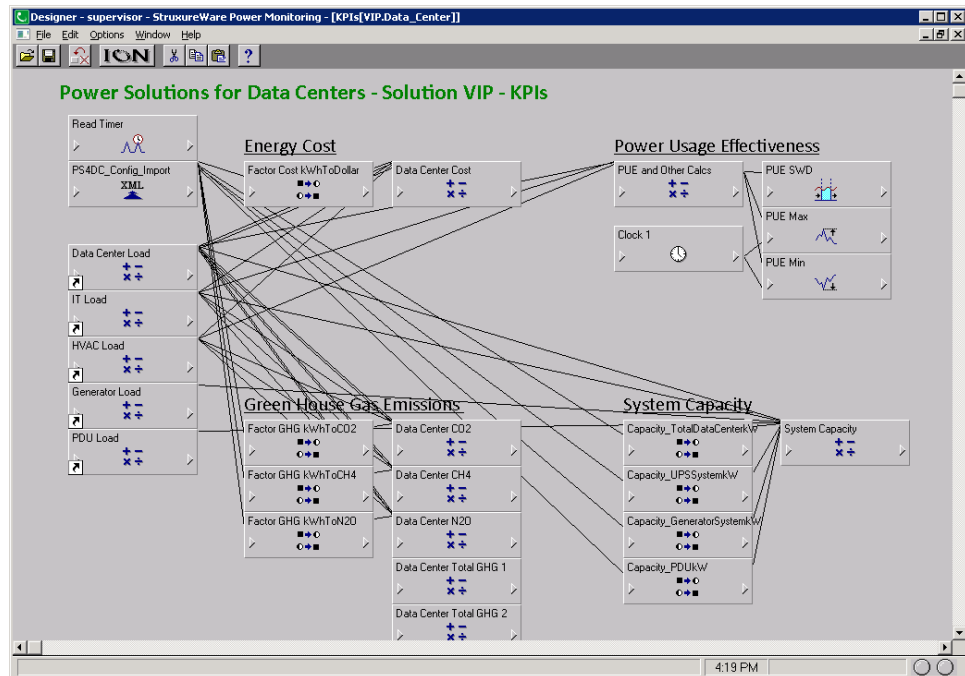
The XML import module requires the correct path information to properly link to the XML file.

To update the path information for the module:

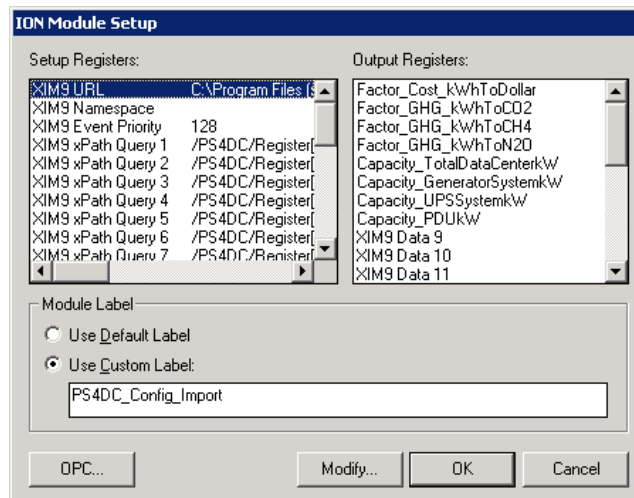
1. Open Designer, click **File > Open**, and select VIP.Data_Center from the list of nodes. The Power Solutions for Data Centers - Solution VIP appears.



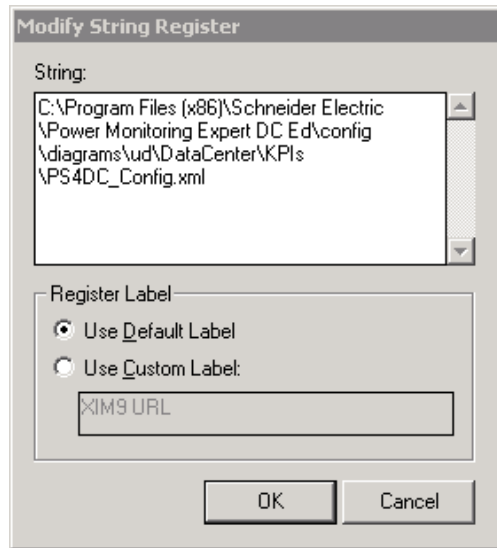
2. In the Navigation box, double-click the KPIs module.



- Right-click the PS4DC_Config_import module. The ION Module Setup dialog appears.



- Select XIM9 URL from the Setup Register list and click **Modify**,....



5. Provide the path information to the PS4DC_Config.xml file.

The default location for a new installation is C:\Program Files (x86)\Schneider Electric\Power Monitoring Expert DC Ed\config\diagrams\ud\DataCenter\KPIs\PS4DC_Config.xml.

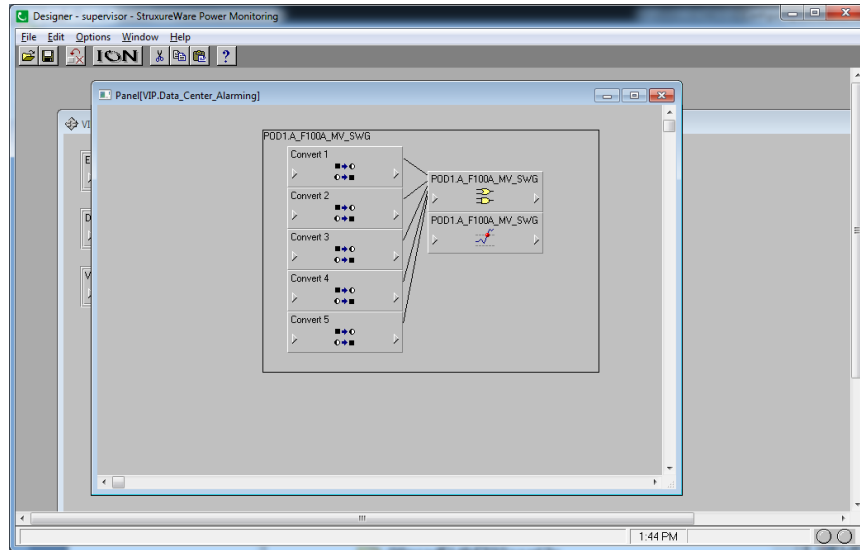
The default location for an upgrade installation is C:\Program Files (x86)\Schneider Electric\ION Enterprise\config\diagrams\ud\DataCenter\KPIs\PS4DC_Config.xml

Create an Alarming VIP

To provide over-view or summary alarms, it is necessary to use a VIP. For ease of maintenance, it is recommended to create a separate VIP for these alarms.

1. Create a new VIP by running the command:

```
< .../system/bin/vip.exe -Service -NVIP.Data_Center_Alarming. This registers the VIP as a Windows service.
```
2. Open Computer/Services and start the service VIP.Data_Center_Alarming.
3. Open the VIP.Data_Center_Alarming in Designer and paste the vip_alarm_example.fwn framework.



4. Link the input of each convert module to each alarm point of interest in a particular piece of equipment.
5. Repeat for each piece of equipment in the facility.
6. Link the output summary alarm of the AND/OR module to the “Status Panel” vista diagram as well as any other diagram where the “status” of the equipment is shown.

Notice in this example:

- a. One aspect of ION Module behavior is if any Input is N/A (Not Available), the Output is N/A. To prevent one device from blocking an aggregated or summary Alarm, a Convert Module should be used. For each register being monitored, create a Convert Module. Configure the Convert Module to change a Not Available (N/A) value to 1. If a device goes offline, this will trigger the aggregated alarm to inform the user.
- b. Use a setpoint to generate events. The events threshold can be configured for filtering in the alarm viewer and event notification module.
- c. Follow the example framework and create summary (panel) alarms for the system being configured.

Create the Logical Devices

To present the information from the VIP.Data_Center, a number of logical devices can be created using the included SQL scripts.

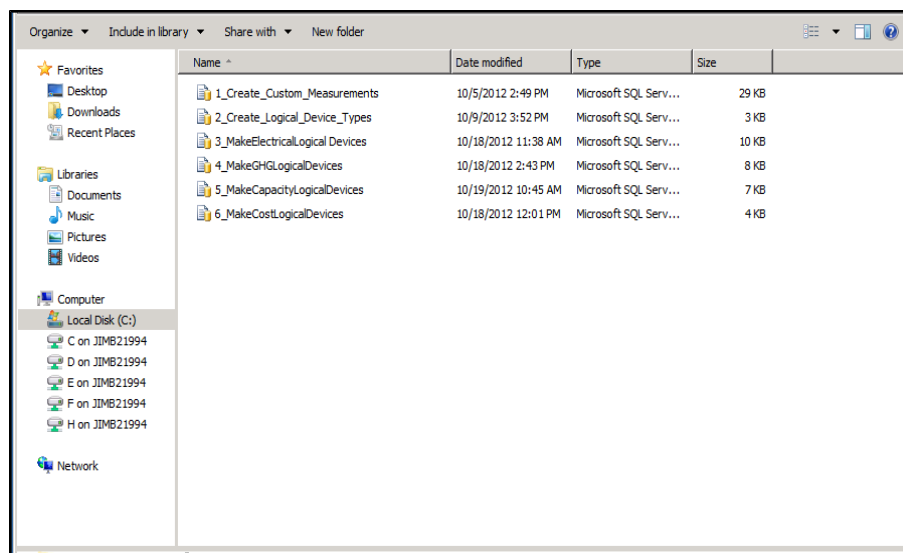
Logical devices are a feature of Power Monitoring Expert and are used to group data in logical associations.

In Power Monitoring Expert - Data Center Edition, logical devices are used to present the data from the VIP.Data_Center KPI values in a more intuitive manner than linking directly to the values in the VIP.Data_Center.

Logical devices are not included as devices in the device licensing count.

The necessary SQL scripts are located in the ...\\Schneider Electric\\Power Monitoring Expert DC Ed\\Diagnostic\\DataCenter\\LogicalDevices\\SQL folder.

There are six SQL scripts, as shown below.



These scripts must be run in the order indicated by their file name. Run the scripts using SQL Server Management Studio. Right click the script and select **Open with > SSMS - SQL Server Management Studio** from the drop down list. Restart ION Network Router Service to restart all ION services.

The scripts create five logical device types and the appropriate custom measurements. The device types are:

DC_Elec
DC_GHG
DC_PUE
DC_Capacity
DC_Costs

The scripts create 16 logical devices, as shown below.

Management Console - supervisor - StruxureWare Power Monitoring

File Edit View Tools Help

Drag a column header here to group by that column

Enabled	Name	Type	Address	Site	Status	Protocol	Description
✓	Data_Center.IT_Load	DC_Elec	n/a	n/a	n/a	n/a	n/a
✓	Data_Center.Total_Load	DC_Elec	n/a	n/a	n/a	n/a	n/a
✓	Data_Center.PDU_Load	DC_Elec	n/a	n/a	n/a	n/a	n/a
✓	Data_Center.Gen_Loads	DC_Elec	n/a	n/a	n/a	n/a	n/a
✓	Data_Center.OtherLoads	DC_Elec	n/a	n/a	n/a	n/a	n/a
✓	Data_Center.Total_GHG	DC_GHG	n/a	n/a	n/a	n/a	n/a
✓	Data_Center.IT_GHG	DC_GHG	n/a	n/a	n/a	n/a	n/a
✓	Data_Center.HVAC_GHG	DC_GHG	n/a	n/a	n/a	n/a	n/a
✓	Data_Center.PUE	DC_PUE	n/a	n/a	n/a	n/a	n/a
✓	Data_Center.PDU_Capacity	DC_Capacity	n/a	n/a	n/a	n/a	n/a
✓	Data_Center.IT_Capacity	DC_Capacity	n/a	n/a	n/a	n/a	n/a
✓	Data_Center.Total_Capacity	DC_Capacity	n/a	n/a	n/a	n/a	n/a
✓	Data_Center.Gen_Capacity	DC_Capacity	n/a	n/a	n/a	n/a	n/a
✓	Data_Center.Total_Costs	DC_Costs	n/a	n/a	n/a	n/a	n/a
✓	Data_Center.IT_Costs	DC_Costs	n/a	n/a	n/a	n/a	n/a
✓	Data_Center.HVAC_Costs	DC_Costs	n/a	n/a	n/a	n/a	n/a

16 Device(s) Displayed

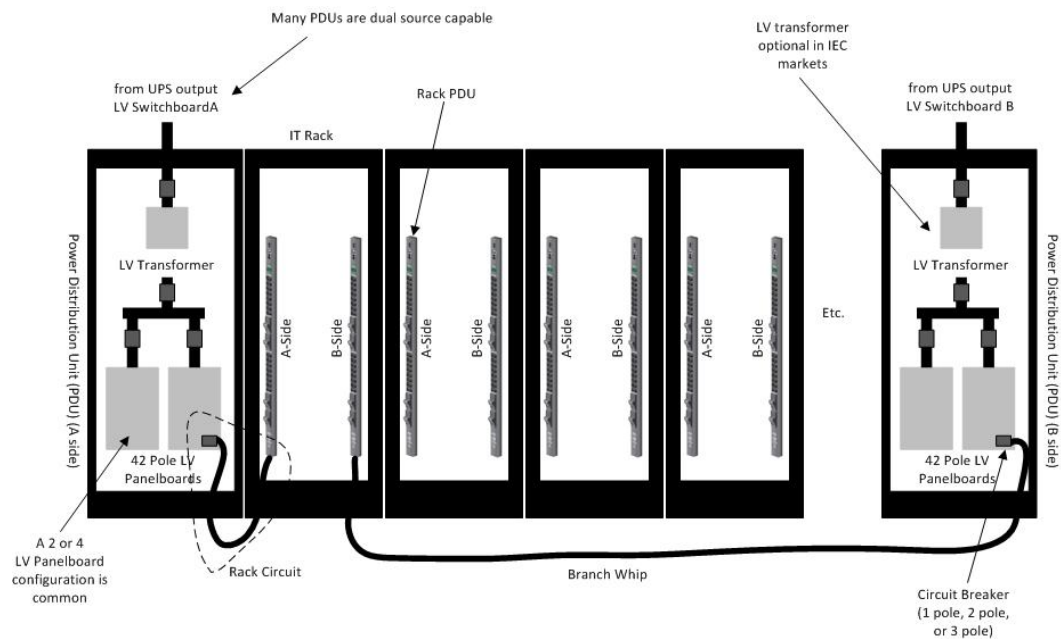
The included Vista Data Center KPI files are linked to these devices. If it is necessary to change the device names, the Vista drawings must be edited as well.

Branch Circuit Monitoring

Power Monitoring Expert - Data Center Edition provides the ability to automatically organize branch circuits meter data into virtual branch circuits. This includes the ability to support 1-pole, 2-pole & 3-pole breakers in a PDU/RPP/Busway with mixed breaker types. It lets you organize and manage the relationships between branch circuits, PDUs, RPP, Busway, IT Rack & IT Customers.

Power Monitoring Expert - Data Center Edition supports the following branch circuit devices:

- PM5350
- Veris BCPM
- TrendPoint EnerSure



Managed circuits

Managed circuits are created in Power Monitoring Expert in the Management Console feature. The managed circuit feature allows you to create devices that represent the circuits or channels of a multi-circuit device. This allows you to treat each circuit as a source for both real time and historical data in the system. For additional information regarding the creation of managed circuits, refer to the chapter "Management Console" in the *StruxureWare Power Monitoring Expert 7.2 User Guide*.

Note

This feature must be run on each device after it is setup in Management Console and must be rerun after every device configuration change. Performing this operation helps to reduce the risk of losing data associated with the device.

Creating managed circuits

To create Managed Circuits for Power Monitoring Expert - Data Center Edition:

1. Open Management Console.
2. Click the **Sites** icon. If no sites have been created, create a site as described in the "Management Console" section of the *StruxureWare Power Monitoring Expert 7.2 User Guide*.
3. Click the **Devices** icon from the System Setup pane.
4. Right-click in the display window, select **New**, and select one of the options from the drop-down list. The configuration window appears.
5. Fill in the **Group**, **Name**, **Device Type** (for example, BCPM), **Unit ID** and **Site** information. Click **OK**. The device is added to the grid. Confirm that the device is communicating.
6. Right-click on the device and select **Configure Managed Circuits** option.
7. Click **OK** in the dialog to proceed with the configuration. When the configuration is complete, an expand control (+) appears beside the device. Click the control (plus sign) to expand the entry to display the circuits associated with the multi-circuit device.

Normally, when configuring a system for the first time, there can be many managed circuits to add at one time. Rather than add each circuit one at a time, Power Monitoring Expert allows you to add large number of circuits at once.

Creating multiple devices

In many cases, there are a large number of managed circuits to be created at once. In an initial commissioning of a system, the recommended approach is to perform a batch setup of devices using the **Duplicate and Configure** function. For additional information, refer to the "Setting up large systems" section of the *StruxureWare Power Monitoring Expert 7.2 User Guide*.

To create multiple devices:

1. Create a managed circuit as described in ["Branch Circuit Monitoring" on page 53](#). Use a naming scheme that provides information regarding the device location, and can be set up in a sequential order.
2. Right-click the managed circuit and select **Duplicate and Configure** from the drop-down list. The Duplicate and Configure interface appears.
3. Configure the names for the duplicate devices. In the Configure Names area, the device name is displayed. Each letter and number is selectable. A group of numbers is treated as a single entity. For example, in the name "MY8600" the entities you can select are "M", "Y" and "8600". Leading zeroes are also supported, so you can set sequences such as "01, 02, 03" or "001, 002, 003".
4. Click **Duplicate** once you have finished configuring names. The duplicated devices appear in the Table Editing area of the window. The first device in the list is the original device. The remaining devices are the duplicates. Asterisks next to the device names indicate pending changes that have not yet been saved.

5. Click **Apply** to save your changes and continue editing devices, click **OK** to save your changes and return to Management Console, or click **Revert** to undo unsaved changes.

Configuring multiple devices using Configure Managed Circuits

When you have finished creating multiple physical devices, you can configure them as multiple managed circuits.

Select all of the physical devices to configure. Right-click the selected managed circuits and select **Configure Managed Circuits**. Click **OK** in the dialog to proceed with the configuration.

When completed, you can expand the managed circuit entries to display the associated circuits.

Making changes to managed circuits

When a branch circuit changes, either by physically replacing or reconfiguring the device, ensure that the managed circuits associated with the device are updated to reflect the change. If this operation is not performed, data provided from this device may not be associated with proper Node.

The basic workflow is as follows:

1. Make changes to the circuit. Depending on the device, this could be a reconfiguration of the device through a configuration utility, or by physically switching the existing circuit with another.
2. Wait for the configuration change to be recognized by the system (approx 10 minutes).
3. Update Managed Circuits by going into Management Console, right-clicking the device, and select **Configure Managed Circuits**. When the operation is complete, confirm that the update has been made by expanding the multi-circuit device entry and locating the changed circuit. Any circuits that were not reconfigured should remain unchanged after running the **Configure Managed Circuits** feature.

Note

Ensure that the time between making changes to a circuit and reconfiguring Managed Circuits is as short as possible. This can assist in making sure the data being logged by that circuit is associated with the correct entry in Power Monitoring Expert.

4. Update the Hierarchy in Power Monitoring Expert by going into Hierarchy Manager. Locate the Node associated with the circuit, click **Edit** and update the Node references to include the reconfigured device.

Renaming a managed circuit

Complete the following steps to change the display name of a device. The system (internal) name is not affected by this name change.

1. Right-click the device name in the Devices pane of Management Console and select **Rename** in the menu to open the Rename Device dialog.

2. Enter the new name for the device.

The appearance of the exclamation icon to the right of the field indicates that there are instructions or messages associated with the device name. Hover over the icon to display the text and take appropriate action.

3. Click **OK** to rename the device.

Note that you cannot change the name of individual managed circuits, or delete individual circuits through this interface.

As with renaming any other device, there are several things to note:

- Complete any configuration tasks in progress, such as working in Designer, before changing names.
- Restart any open components such as Vista, Designer, or Web Applications after the name or group change has been completed to refresh the names that appears.

Vista Diagrams

The Power Monitoring Expert - Data Center Edition Solution provides a number of Vista diagrams. The KPI Vista diagrams are designed to work directly with the Power Monitoring Expert - Data Center Edition VIP Framework, and the logical devices created in ["Create the Logical Devices " on page 51](#).

The other supplied Vista diagrams, such as one-line, equipment, etc., are example diagrams and should be used as a starting point for system configuration. The screens will have to be modified to reflect the actual implementation. Since these diagrams cannot be preconfigured with data objects; it is necessary to link actual system data registers when doing system configuration. In some cases, the supplied Vista screens will have static text objects that will be replaced with actual data registers

Refer to ["Power Monitoring Expert - Data Center Edition Vista screens" on page 59](#) for details on the use of the supplied Vista drawings.

Power Monitoring Expert - Data Center Edition Vista screens

Vista offers graphical views of your entire power system from real-time metered data to historical information from the networked database. It analyzes data and events, reports equipment status, and provides control capabilities.

 WARNING
UNINTENDED EQUIPMENT OPERATION Do not use StruxureWare Power Monitoring Expert software for critical control or protection applications where human or equipment safety relies on the operation of the control action. Failure to follow these instructions can result in death or serious injury.

The *StruxureWare Power Monitoring Expert 7.2 User Guide* "Vista" chapter provides example Vista screens for use in a data center implementation. The screens are in five logical groups:

- ["KPIs" on page 62](#)
- ["One-Lines" on page 64](#)
- ["Equipment" on page 65](#)
- ["Floor Plan" on page 72](#)
- ["Status Panel" on page 73](#)

The *StruxureWare Power Monitoring Expert 7.2 User Guide* "Vista" chapter also provides Navigation symbols. It is recommended that you provide a vertical navigation panel to move between the sections.

Introduction

The Vista application of Power Monitoring Expert has two purposes:

- It is the design tool for developing user screens to organize and present the information from the Power Monitoring Expert system.
- It functions as the "thick" client with full features such as security, operations auditing, remote control operations, animation, etc.

The Vista screens are also used for the "thin" client functionality presented in the **Diagrams** tab in the Power Monitoring Expert Web Client.

For complete instructions regarding the Vista feature, refer to the "Vista" chapter of the *StruxureWare Power Monitoring Expert 7.2 User Guide*.

Design Workflow

Use the following workflow when working with Vista:

1. Design a diagram hierarchy.
2. Determine the primary display device.
3. Design diagrams as needed. Use Vista and text editing where applicable.
4. Verify the diagrams in the **Diagrams** tab in the Power Monitoring Expert Web Client.

Validate data sources displayed against physical devices.

Diagram Tree

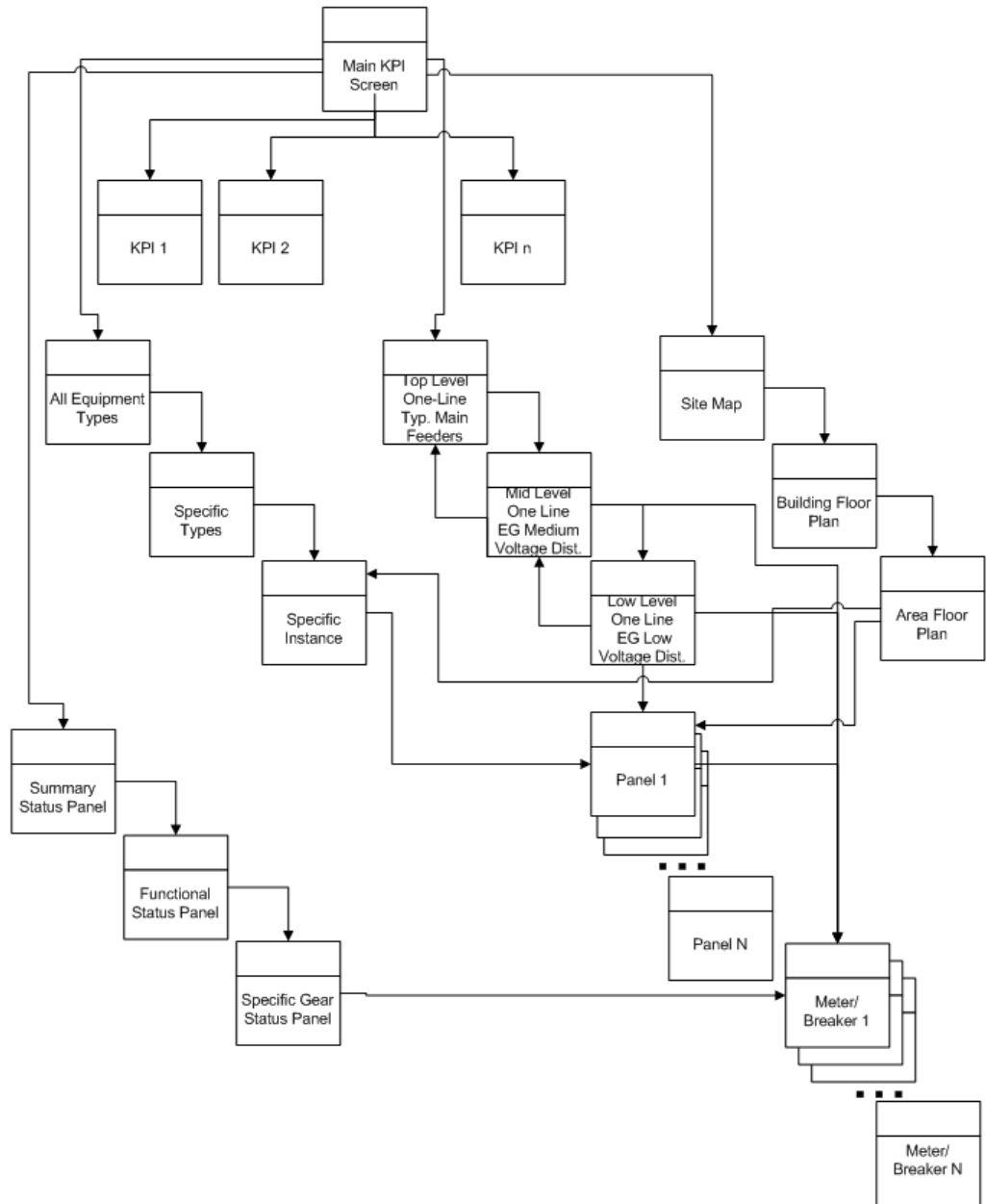
Vista diagrams are usually linked in a tree-like fashion. It is vital during a commissioning to have a tree designed before actually creating diagrams.

The tree design assists in determining the number of custom screens to be developed for a project. Screen design is one of the single largest tasks in a system deployment.

Having a diagram tree in place before beginning screen development assists in navigational requirements between screens and the amount of information on any one screen.

Good screen tree and screen design is a balance between having enough information on a screen and having a hierarchy that is too deep (too many “clicks” required to get to a device level screen).

The sample hierarchy diagram below is based on sample screens created for a 10MW data center. Note that there are linkages horizontally across sections as well as vertically within a section. It does not show all possible paths between levels or sections.



Design Requirements

Data screens are typically available to a number of users throughout a facility. Users may view screens with Vista as a thick client or, more commonly, using the **Diagrams** tab in the Power Monitoring Expert Web Client as a thin client.

Primary Display Device

When designing a Vista screen the size of the screen (in pixels) must match the primary display device. The example screens provided with the Power Monitoring Expert - Data Center Edition solution are sized so that they fit on a 720p HD TV which is commonly used in

operations rooms and kiosks. This sizing also works well on laptop screens. They are also sized for viewing with the Web as opposed to using Vista as the client. By sizing correctly, the screen can be used without the need for horizontal or vertical scroll bars.

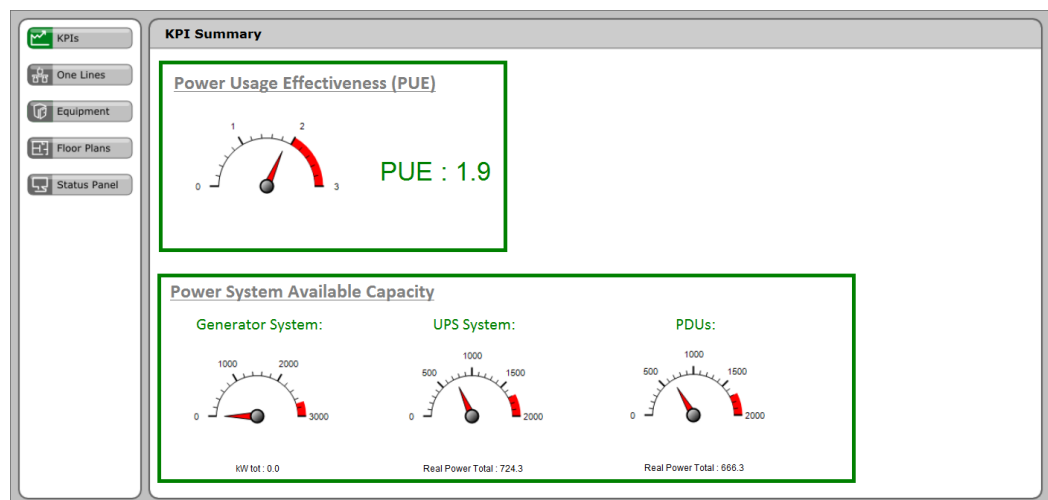
For a Vista diagram with a resolution of 1280 x 720 pixels, the remaining screen space for placing data objects is approximately 1276 x 585 pixels. Keeping this in mind, the screens can be drawn so that no scroll bars are needed. This is especially important for displaying the Vista diagram on a touch screen LCD monitor using thin client (Internet Explorer). This is regularly validated during the design phase by opening the screens in the Diagrams tab in the Power Monitoring Expert Web Client on a target display. Checking the screens also shows any minor graphical issues that can occur between the Vista display and Internet Explorer such as small alignment issues, etc.

KPIs

The KPI screen for the Data Center shows system performance data for the main KPIs. Some examples are Power Usage Effectiveness (PUE) and the Power System Available Capacity. Note that data for these screens is not simple device data, i.e. is not directly provided by the metering device. Instead it requires use of the VIP functionality included in Power Monitoring Expert - Data Center Edition to aggregate data and performs the needed calculations.

See the *StruxureWare Power Monitoring Expert 7.2 User Guide* “Designer” chapter for information regarding the use of the VIP.

After configuring the numeric object boxes, clicking on the KPI boxes can take you to a configuration screen with more detail of that KPI, including links to KPI specific reports.

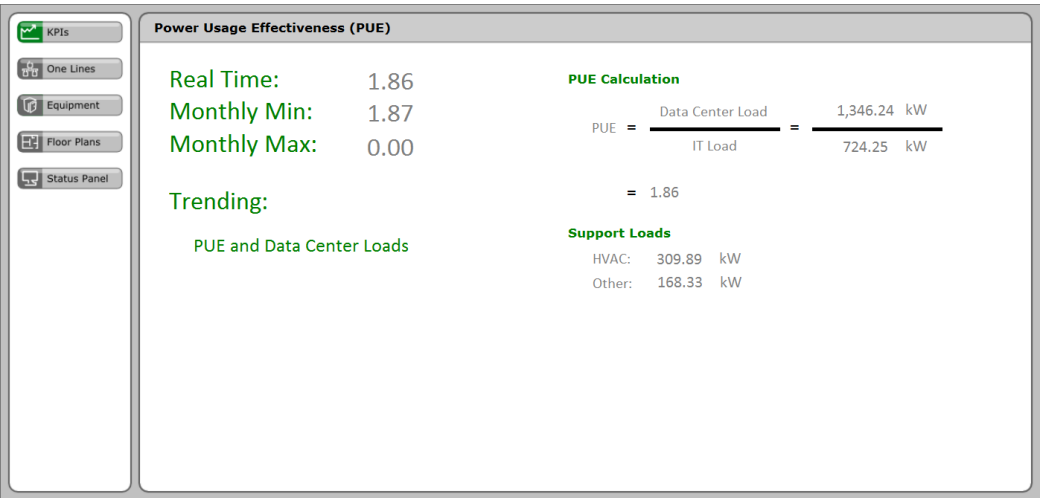


Power Usage Effectiveness (PUE) KPI

The PUE KPI shows how efficiently the Data Center uses its power. PUE is the ration of the total amount of power used by a computer Data Center facility to the power delivered to computing equipment as shown in the formula below. An ideal, yet unachievable PUE is equal to one (1). This would be the scenario where all the power that the facility is consuming is used by the IT load.

$$PUE = \frac{\text{Total Data Center Load}}{\text{IT Load}}$$

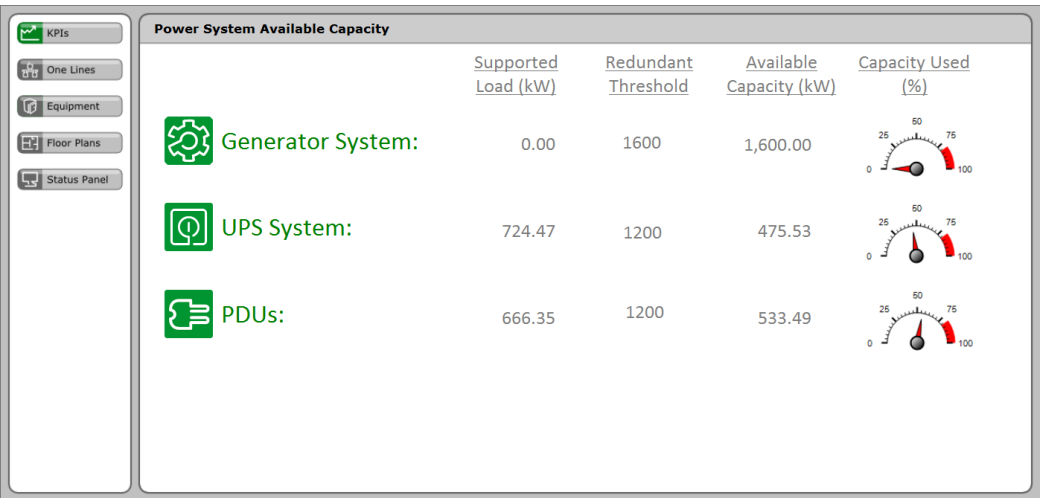
Right-click the PUE numeric object, click the **Action** tab on the Numeric Object Configuration dialog, select the **Open User Diagram** option, click **Browse**, and select the PUE.dgm file. Click **OK**. When you double click the PUE numeric object, you open to the detail screen that shows the standard industry formula for calculating PUE as shown below. All these data points are calculated in VIP.



Power System Available Capacity KPI

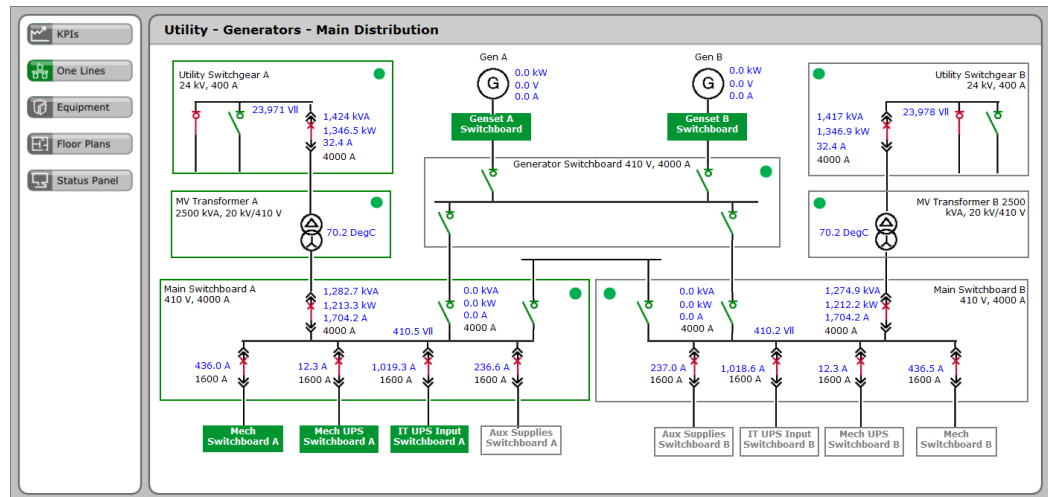
The Power System Available Capacity KPI shows the capacity of the power in the Data Center and allows the user to monitor whether or not they have reached the technical limits of their system.

Clicking the Power System Available Capacity box opens the details page that shows the total consumption of kW for the Data Center, Generators, UPS system and PDUs available. It also provides the information in percentages. All this information is calculated in VIP.



One-Lines

The second selection option for the Data Center Vista diagram is the One-Line. Clicking the One-Line button on the left menu opens up the main one-line diagram of the facility. One-Lines provide a graphical representation of electrical power/energy and status of the electrical distribution system. The best practice is to take a tree structure approach and provide more detail as the user clicks “down” into the system. This reduces visual overload and also has an impact on the perceived performance.



The main one-line diagram page should give the user a bird's eye view of the distribution system. The real-time screens provide a number of ways to view key system information.

All the custom Vista diagrams are located at [Path]
 \config\diagrams\ud\DataCenters.

The custom images are located at [Path]\config\diagrams\images\DataCenters.

To show the data on the VISTA pages, the user needs to manually connect all the Vista objects (Numeric object, Grouping object, etc.) to their appropriate devices. For more information on how to connect the objects to devices in the system, please refer to the *StruxureWare Power Monitoring Expert 7.2 User Guide* “Vista” chapter for details on how to link the objects in Vista.

Similar to the Vista diagram tree described in the above section and illustrated in the sample tree diagram in ["Diagram Tree" on page 60](#), the best practice is to use the same idea for the one-line diagram. The top level screen is typically the bird's eye view of the distribution where the user can easily click to a specific section of the system network.

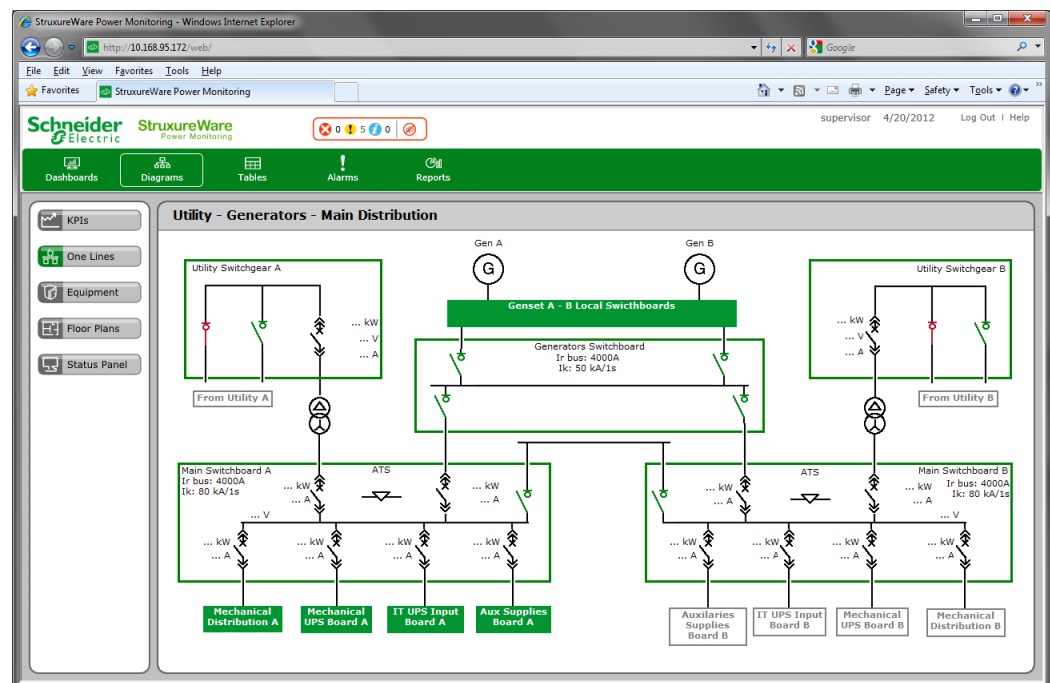
It is recommended during a commissioning to have a tree designed before actually creating the one-line diagrams. The hierarchy design assists in determining the number of custom one-line screens being developed for a project, and screen design is one of the largest tasks in a system deployment. Having a diagram hierarchy in place before beginning screen development will assist in screen design with regards to navigational requirements between screens and the amount of information on any one screen.

The one-line diagram usually will display the real-time data, breaker/switch status, etc. The numeric object in Vista can be used to display the real-time data. Please refer to the *StruxureWare Power Monitoring Expert 7.2 User Guide* “Vista” chapter for details on how to setup numeric object in vista. For equipment images such as switches, generators, bus bars, UPSs, transformers, etc., the user can browse to their Power Monitoring Expert folder, i.e. [Path]\config\diagrams\images\.

The images render nicely on a 720p HD TV, which is commonly used in operations rooms and kiosks. This sizing also works well on laptop screens.

When designing Vista screens with data from multiple sources, such as one-line screens, consider the use of a VIP as a data caching mechanism. Have specific data linked into a VIP and have the Vista diagram poll the VIP. This improves screen loads since the screen is only referencing one source.

When initially viewed with Vista or the Diagrams tab in the Power Monitoring Expert Web Client, the system has to create requests for each device and wait for the responses. While for this many devices performance is most likely to be acceptable by using a VIP, as a data cache, the initial screen load is much faster.

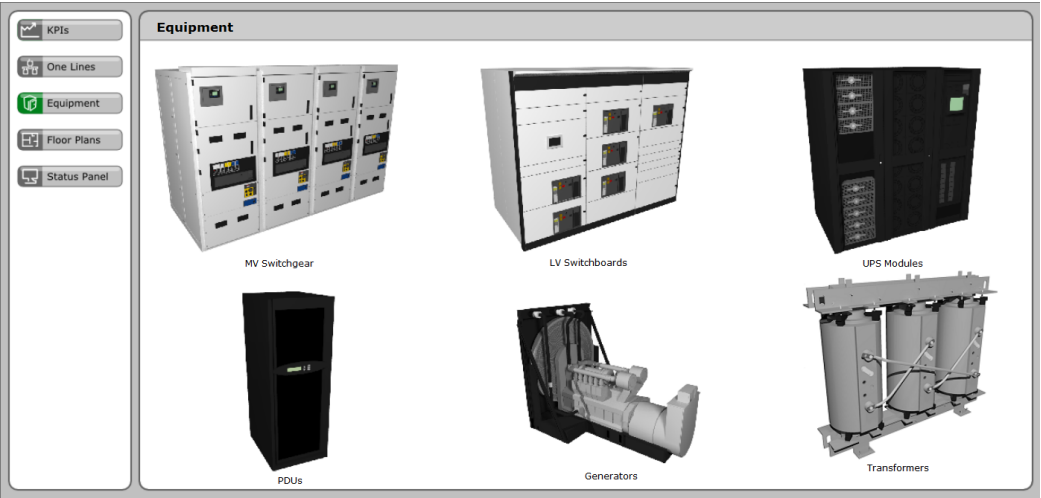


Equipment

The Equipment screens show the interconnection between the electrical distribution power equipment. Each piece of equipment is shown with an image and placed in the hierarchy similar (if not the same as) the electrical single line. Each equipment icon links to the equipment details page. Each equipment icon has to be linked manually to appropriate equipment in the Management Console.

The Equipment images are located in the folder: [Path]
\\config\\diagrams\\images\\DataCenters\\Equipment.

The image below shows an example of the Equipment screen in Vista. An icon for each type of equipment in the system is displayed.



Clicking any of the images causes the equipment detail page to open. When you click on the Generators image for example, all the generators available in the system are displayed.



The equipment detail page shows all the generators and their real time data. Use the table below as an example of what to include on each type of diagram.

Equipment Name	Information to Include
MV Switchgear	Averages/Totals Voltage (Vll) Current (A) Power (kW) Power Factor (pf) Alarms Summary Alarm
MV Transformer	Averages/Totals Voltage (Vll) Current (A) Power (kW) Power Factor (pf) THD If Available Oil Temperature Alarms Summary Alarm
Unit Substation	Averages/Totals Voltage (Vll) Current (A) Power (kW) Power Factor (pf) Transformer Temperature
Generator	Averages/Totals Voltage (Vll) Current (A) Active Power (kW) Power Factor (pf) Frequency (Hz) If Available Winding Temperature Exhaust Temperature Alarms Summary Alarm
LV Switchgear/Switchboard	Averages/Totals Voltage (Vll) Current (A) Power (kW) Alarms Summary Alarm
UPS	Averages/Totals Input/Output Voltage (Vll) Current (A) Power (kW) Power Efficiency (%) Power Losses (kW) Available Capacity (%) accounting for redundancy Alarms Summary Alarm

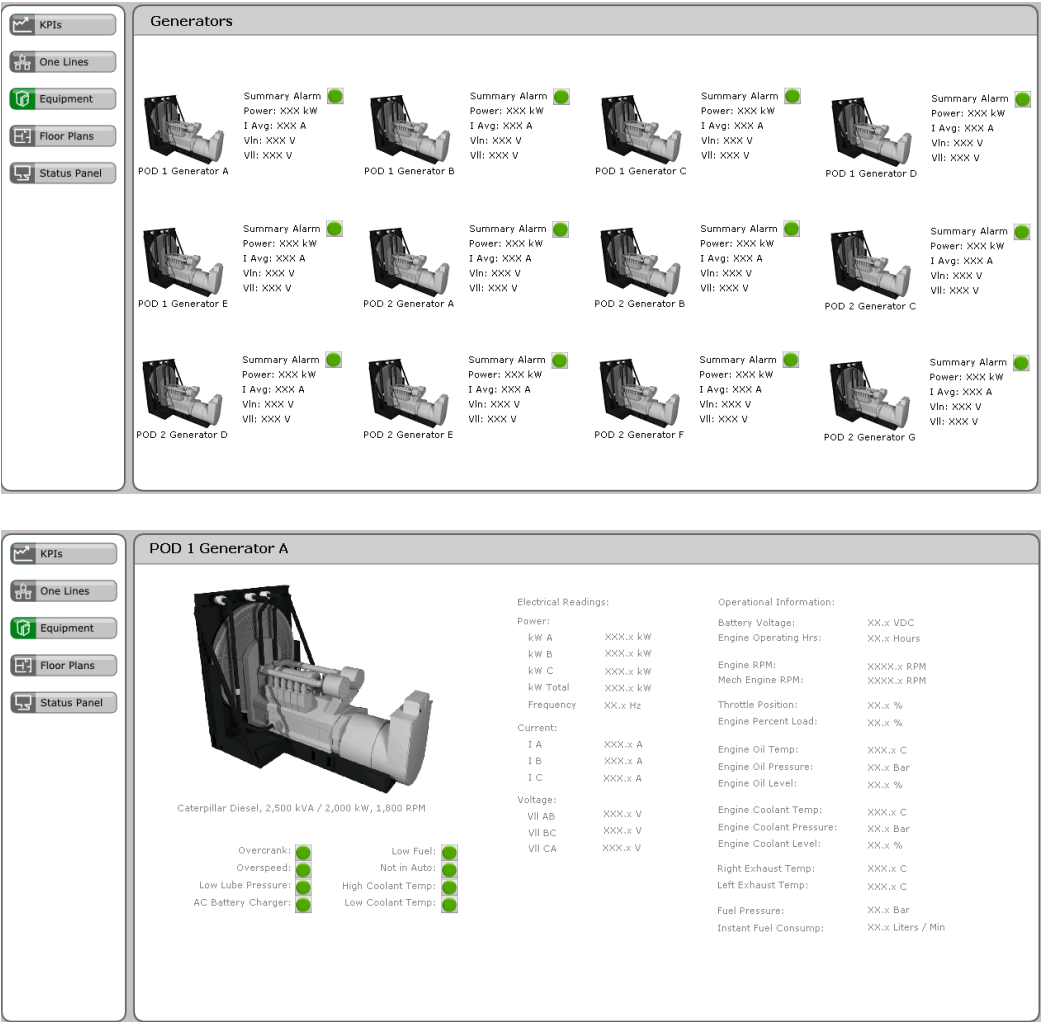
Equipment Name	Information to Include
LV Panelboard	Averages/Totals Voltage (Vll) Current (A) Power (kW)
PDU	Averages/Totals (main) Voltage (Vll & Vln) Current (A) Power (kW) Power Factor (pf) THD With Static Transfer Switch (STS) Same measurements as above, but for both Source 1 and Source 2 Alarms Summary Alarm
RPP	Averages/Totals Voltage (Vll & Vln) Current (A) Power (kW)
LV Busway	Status (for the feeder) Breaker Status (open/closed animation) Averages/Totals (for the feeder) Voltage (Vll & Vln) Current (A) Power (kW) Power Factor (pf) THD Averages/Totals (for each PIU) Voltage (Vll & Vln) Current (A) Power (kW) Alarms Summary alarm for the busway

Equipment Detail

The equipment detail screen is linked with the Equipment screen. Clicking on any of the equipment icons will open up the equipment detail screen.

These screens display the details relating to each piece of equipment. This includes an image of the equipment, small single line (if applicable), information for each electrical section (breaker, disconnect switch, bus bar, etc.), and all alarm points.

A link to each of the default diagrams of each meter/protection device that make up the piece of equipment is also provided.



When you click on the equipment icon , the software provides specific equipment information. Refer to the table below for the information to show on the equipment detail page.

Equipment Name	Information to Include
MV Switchgear	Status Breaker Status (open/closed animation on mini-single line) Averages/Totals Voltage (V) Phase Current (A) Breaker Rating % Breaker Rating Bus Loading (%) Active Power (kW) Power Factor (pf)

Equipment Name	Information to Include
MV Transformer	Averages/Totals Voltage (Vll) Phase Current (A) Active Power (kW) Reactive Power (kW) Apparent Power (kW) Power Factor (pf) THD If Available Winding Temperature Oil Temperature Alarms Over Temperature Overload (Current)
Unit Substation	Status Breaker Status for each breaker in substation (open/closed animation on mini-single line) Averages/Totals Voltage (Vll) Phase Current (A) Breaker Rating % Breaker Rating Bus Loading (%) Active Power (kW) Power Factor (pf) Alarms Breaker Status of each breaker in substation (open/closed)
Generator	Status Breaker Status for each breaker in substation (open/closed animation on mini-single line) Averages/Totals Voltage (Vll) Phase Current (A) Active Power (kW) Power Factor (pf) Frequency (Hz) If Available Winding Temperature Exhaust Temperature Alarms Breaker Status of each breaker in substation (open/closed)

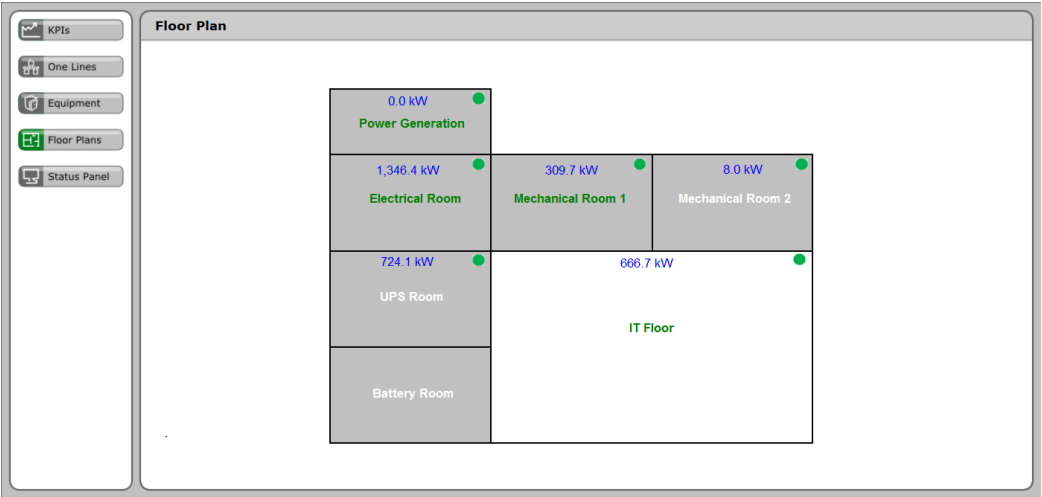
Equipment Name	Information to Include
LV Switchgear/Switchboard	Status Breaker Status for each breaker in substation (open/closed animation on mini-single line) Averages/Totals Voltage (Vll) Phase Current (A) Breaker Rating % Breaker Rating Active Power (kW) Power Factor (pf) Alarms Breaker Status of each breaker in substation (open/closed)
UPS	Status UPS Status - Online - Static ByPass - Manual ByPass Averages/Totals Input/Output Voltage (Vll) Phase Current (A) Active Power (kW) Power Efficiency (%) Power Losses (kW) Available Capacity (%) Power Factor (pf) Alarms All available alarms (depend on unit)
LV Panelboard	None

Equipment Name	Information to Include
PDU	Status Breaker Status (open/closed animation on mini-single line) Averages/Totals (main) Voltage (Vll & Vln) Current (A) Breaker Rating % Breaker Rating Power (kW) Power Loading for the Transformer (%) Power Factor (pf) THD With Static Transfer Switch (STS) Same measurements as above, but for both Source 1 and Source 2 With Transformer % Transformer Rating Average/Totals (by panel or output breaker) Current (A) Breaker Rating % Breaker Rating Power (kW)
RPP	Averages/Totals Per Panel Voltage (Vll % Vln) Current (A) % Breaker Rating
LV Busway	Averages/Totals (by breaker for the PIU) Voltage (Vll & Vln) Current (A) Breaker Rating % Breaker Rating Power (kW) Alarms Alarm for each breaker in the PIU

Floor Plan

Floor plan diagrams allow the user to view information based on actual physical location within their facility. This is useful in large multi building campuses and also when equipment naming makes it difficult to determine actual equipment location.

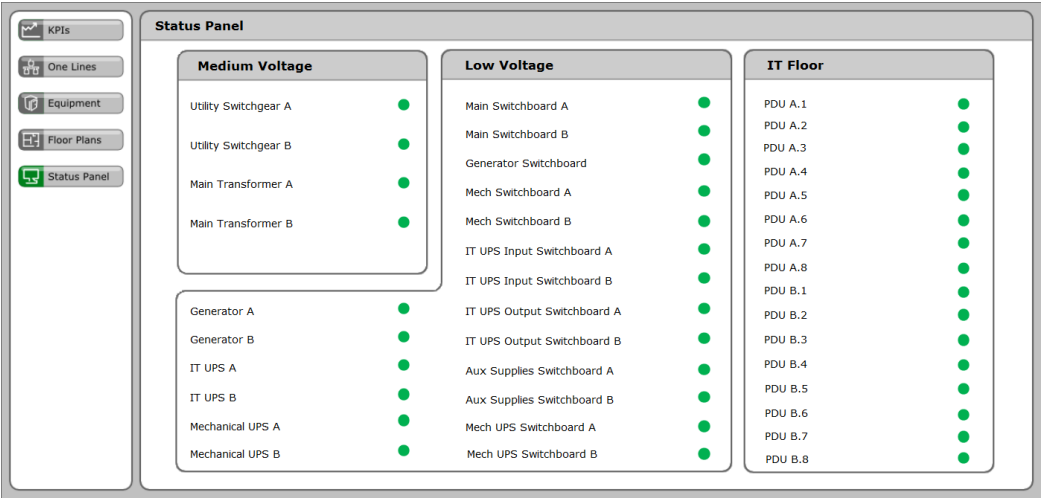
The diagram below shows the default floor plan in Vista. Each zone can have multiple pages drilling down to the equipment level. It is recommended to plan and design the hierarchy on paper and then implement it in Vista. The zones can be divided into Floors, LV, MV, PDU, etc.. The zones will vary for different users depending on how they want to see. Therefore, it is recommended to plan and design the hierarchy before actually implementing it.



Status Panel

The Status Panel provides a simple graphical view of the operating state of the electrical system. This allows a user to quickly determine if there are any problems and provides a hierarchy of status panels showing where or what may be of concern. The Status Panel can be used to show all equipment summary alarms

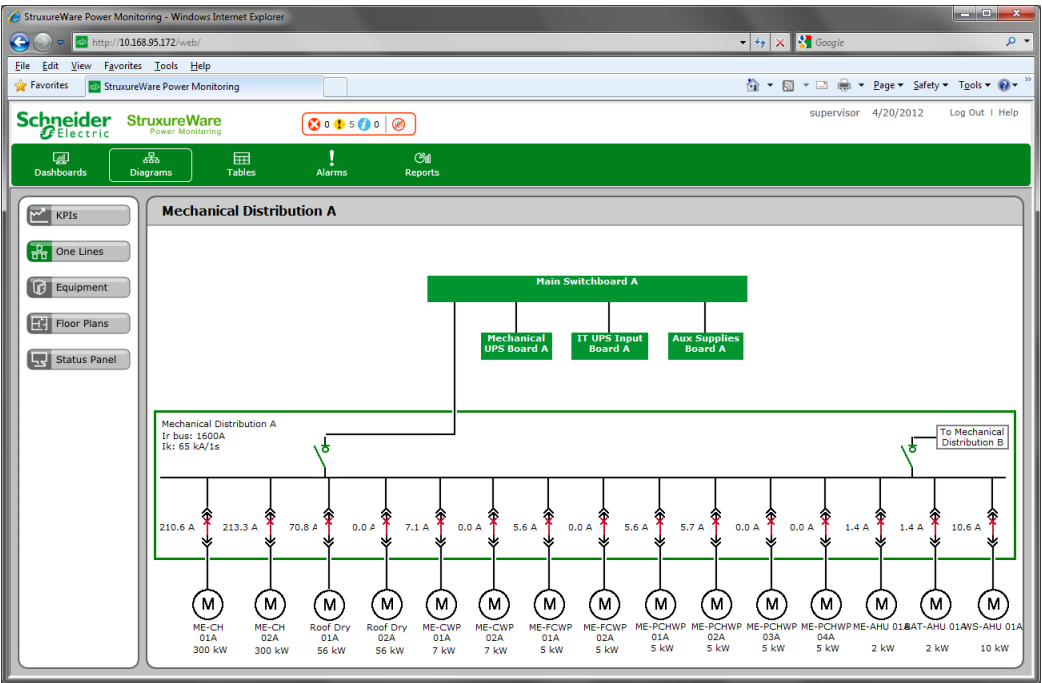
The Status Panel can be classified based on LV, MV, or IT load as shown in the figure below.



Text Editing Vista Drawings

Vista drawing files are saved as XML files that can be edited using an appropriate text editor such as Notepad. This functionality is very useful if the system has a large number of screens that are similar but linked to different devices as part of object linking via system device names. This is common in Data Center design. It is important to plan ahead regarding the device names and the diagram hierarchy.

As an example, refer to the architecture shown below.



There are two identical ITS UPS Output Switchboards, A and B. When creating and naming the devices in the Management Console, the breakers could be named UPS_Output_A_Brkr_XX and UPS_Output_B_Brkr_XX, and the PDUs named PDU_A_X and PDU_B_X. Using Vista, a drawing for the A side is created and saved as UPS_Out_SW_A.dwg. Using a text editor, modify the .cfg file with search and replace so that the device names now reflect the B side and saved with a different name. This is much faster than editing the links in Vista. For larger systems with many common diagrams, the time savings is significant. It is important to plan ahead regarding the device names and the diagram hierarchy.

Use the table below as a reference of what to include on each diagram.

	Single Line	Equipment Pages	Equipment Details
	These screens are meant to mimic an actual single line diagram for the facility. The navigation through the screens will be the same as navigating through the single line drawings of the facility.	These screens that visually indicate the interconnection between the electrical distribution power equipment. Each piece of equipment will be shown with a picture and placed in the hierarchy similar (if not the same as) the electrical single line. Each equipment icon will link to the equipment details page.	These screens display the details pertaining to each piece of equipment. This includes a picture of the equipment, small single line (if applicable), information for each electrical section (ex: breaker, disconnect switch, bus bar) and all alarm points. A link to each of the default diagrams of each meter/protection device that make up the piece of equipment will be provided.

	Single Line	Equipment Pages	Equipment Details
MV Switchgear	Status Breaker Status (open/closed animation) Averages/Totals Voltage (Vll) Current (A) Power (kW) Power Factor (pf)	Averages/Totals Voltage (Vll) Current (A) Power (kW) Power Factor (pf) Alarms Summary Alarm	Status Breaker Status (open/closed animation on mini-single line) Averages/Totals Voltage (Vll) Phase Current (A) Breaker Rating % Breaker Rating Bus Loading (%) Active Power (kW) Power Factor (pf)
MV Transformer	Averages/Totals Temperature	Averages/Totals Voltage (Vll) Current (A) Power (kW) Power Factor (pf) THD If Available Oil Temperature Alarms Summary Alarm	Averages/Totals Voltage (Vll) Phase Current (A) Active Power (kW) Reactive Power (kW) Apparent Power (kW) Power Factor (pf) THD If Available Winding Temperature Oil Temperature Alarms Over Temperature Overload (Current)
Unit Substation	Status Breaker Status (open/closed animation) Averages/Totals Voltage (Vll) Current (A) Power (kW) Power Factor (pf)	Averages/Totals Voltage (Vll) Current (A) Power (kW) Power Factor (pf) Transformer Temperature	Status Breaker Status for each breaker in substation (open/closed animation on mini-single line) Averages/Totals Voltage (Vll) Phase Current (A) Breaker Rating % Breaker Rating Bus Loading (%) Active Power (kW) Power Factor (pf) Alarms Breaker Status of each breaker in substation (open/closed)

	Single Line	Equipment Pages	Equipment Details
Generator	Status Breaker Status (open/closed animation) Averages/Totals Voltage (Vll) Current (A) Active Power (kW) Power Factor (pf) Frequency (Hz)	Averages/Totals Voltage (Vll) Current (A) Active Power (kW) Power Factor (pf) Frequency (Hz) If Available Winding Temperature Exhaust Temperature Alarms Summary Alarm	Status Breaker Status for each breaker in substation (open/closed animation on mini-single line) Averages/Totals Voltage (Vll) Phase Current (A) Active Power (kW) Power Factor (pf) Frequency (Hz) If Available Winding Temperature Exhaust Temperature Alarms Breaker Status of each breaker in substation (open/closed)
LV Switchgear/ Switchboard	Status Breaker Status (open/closed animation) Averages/Totals Voltage (Vll) Current (A) Power (kW)	Averages/Totals Voltage (Vll) Current (A) Power (kW) Alarms Summary Alarm	Status Breaker Status for each breaker in substation (open/closed animation on mini-single line) Averages/Totals Voltage (Vll) Phase Current (A) Breaker Rating % Breaker Rating Active Power (kW) Power Factor (pf) Alarms Breaker Status of each breaker in substation (open/closed)
UPS	Status UPS Status - Online - Static ByPass - Manual ByPass UPS Summary Alarm Averages/Totals Input/Output Voltage (Vll) Current (A) Power (kW) Power Efficiency (%) Power Losses (kW)	Averages/Totals Input/Output Voltage (Vll) Current (A) Power (kW) Power Efficiency (%) Power Losses (kW) Available Capacity (%) accounting for redundancy Alarms Summary Alarm	Status UPS Status - Online - Static ByPass - Manual ByPass Averages/Totals Input/Output Voltage (Vll) Phase Current (A) Active Power (kW) Power Efficiency (%) Power Losses (kW) Available Capacity (%) Power Factor (pf) Alarms All available alarms (depend on unit)

	Single Line	Equipment Pages	Equipment Details
LV Panelboard	Averages/Totals Voltage (Vll) Current (A) Power (kW)	Averages/Totals Voltage (Vll) Current (A) Power (kW)	None
PDU	Averages/Totals Voltage (Vll & Vln) Current (A) Power (kW) Power Factor (pf) THD With Static Transfer Switch (STS) Same measurements as above, but for both Source 1 and Source 2	Averages/Totals (main) Voltage (Vll & Vln) Current (A) Power (kW) Power Factor (pf) THD With Static Transfer Switch (STS) Same measurements as above, but for both Source 1 and Source 2 Alarms Summary Alarm	Status Breaker Status (open/closed animation on mini-single line) Averages/Totals (main) Voltage (Vll & Vln) Current (A) Breaker Rating % Breaker Rating Power (kW) Power Loading for the Transformer (%) Power Factor (pf) THD With Static Transfer Switch (STS) Same measurements as above, but for both Source 1 and Source 2 With Transformer % Transformer Rating Average/Totals (by panel or output breaker) Current (A) Breaker Rating % Breaker Rating Power (kW)
RPP	Averages/Totals Voltage (Vll & Vln) Current (A) Power (kW)	Averages/Totals Voltage (Vll & Vln) Current (A) Power (kW)	Averages/Totals Per Panel Voltage (Vll & Vln) Current (A) % Breaker Rating

	Single Line	Equipment Pages	Equipment Details
LV Busway	Status (for the feeder) Breaker Status (open/closed animation)	Status (for the feeder) Breaker Status (open/closed animation)	Averages/Totals (by breaker for the PIU) Voltage (Vll & Vln) Current (A) Breaker Rating % Breaker Rating Power (kW)
	Averages/Totals (for the feeder) Voltage (Vll & Vln) Current (A) Power (kW) Power Factor (pf) THD	Averages/Totals (for the feeder) Voltage (Vll & Vln) Current (A) Power (kW) Power Factor (pf) THD	Alarms Alarm for each breaker in the PIU
	Averages/Totals (for each PIU) Voltage (Vll & Vln) Current (A) Power (kW)	Averages/Totals (for each PIU) Voltage (Vll & Vln) Current (A) Power (kW)	
		Alarms Summary alarm for the bus way	

Vista drawing functionality

Vista has limited drawing functionality. There is no image editing tool available in Vista. Third-party software can be used to modify existing images or draw new images. Microsoft Visio is the recommended tool.

- When working in Vista, keep in mind the following items:
- There is no rotate/flip option in Vista.
- The Ordering of objects is limited to "Send to back" (i.e., two layers only). If two objects are placed on top of one another, then only the top object is active in the **Diagrams** tab in the Power Monitoring Expert Web Client.
- The use of text boxes and grouped objects in close proximity will affect navigation in some instances. For example, a text box is used to visually surround a number of objects. In the same location, a Grouping Object with no image is placed to use for screen navigation. If the text box is layered above the Grouping Object, then navigation will not work in the **Diagrams** tab in the Power Monitoring Expert Web Client.
- An object's (numeric, grouping, image, etc.) reference point is its upper left corner.
- Graphic objects are bit maps and have no transparency. An object that is 50 x 50 pixels covers that entire area, even if it is mostly white on a white background.

Hierarchies

Depending on the number of devices you are currently monitoring, organizing the data coming from those devices can be a difficult task. The Hierarchy Manager feature allows you to organize the devices in Power Monitoring Expert by defining their relationships and displaying them in an easy to understand way. Once these relationships have been created, energy data can be grouped and summarized and used in the Dashboard application and in several default and custom reports including the Branch Circuit Power and Energy reports used in Power Monitoring Expert - Data Center Edition.

There are several tasks to perform when creating a hierarchy:

- Confirm the correct hierarchy template is in the system. Change template if necessary.
- Configure the hierarchy template (optional).
- Enter initial hierarchy information using the Hierarchy Configuration Tool. (this step is normally used when first commissioning the system)
- Keep the hierarchy up to date using the Hierarchy Manager feature in Power Monitoring Expert.

Configuring a data center hierarchy template

There are situations where the hierarchy templates included with the Power Monitoring Expert - Data Center Edition require modification to make the template more compatible with an organization's structure. This process involves the editing of the hierarchy template. The hierarchy template is an xml file that defines the Nodes, attributes, and relationships that are displayed in the Hierarchy Manager application. This xml file can be edited to add new tabs, redefine the relationships between the different Nodes, and modify the properties used to define the characteristics of each Node instance.

Instructions regarding editing the default template are located in the *Hierarchy Configuration Guide*. There is also a sample data center template xml file in ["Modifying a hierarchy template" on page 237](#), along with instructions specific to the data center based xml hierarchy template.

Note

Existing hierarchy Node types, attributes, relationships, and views are required for certain features of Power Monitoring Expert to work correctly. Removing or modifying any of these template components can result in inaccurate reports or dashboard displays.

The Hierarchy Configuration Tool

The Hierarchy Configuration Tool is used to import and export hierarchy content and hierarchy template files. It is the recommended method for entering large amounts of hierarchy information, usually during initial system commissioning. For additional information regarding the Hierarchy Configuration Tool, refer to the *Hierarchy Configuration Guide*.

Before you begin

The initial hierarchy information configuration is normally done with the Hierarchy Configuration Tool. Before starting the hierarchy creation process, make sure the following tasks have been completed:

- Make sure all devices, logical devices, and managed circuits you want associated in a hierarchy have been created in Management Console and are communicating properly.
- If you have modified the hierarchy template, make sure it has been saved and successfully imported into the system.
- Before modifying a hierarchy template or csv file, make a copy to work on. Do not make changes to the original.
- Decide ahead of time the configuration details for the hierarchy. Determine the naming convention, what devices are to be associated with each node instance, and how the different elements are grouped together.

Switching templates

Before importing hierarchy content into the system, confirm the template currently installed in the system is the one best suited to your needs. Navigate to **Management Console > Tools > Hierarchy Manager** and look at the Node types that make up the currently installed template. If you need to change the template, the Hierarchy Configuration Tool can be used to import a new hierarchy template into your system. To determine if the current template is the best suited, open Hierarchy Manager by navigating to **Management Console > Tools > Hierarchy Manager**. From here, you can examine the template's Node types. If there is existing hierarchy configuration content on your system, you can remove it by running the Delete config command in the Hierarchy Configuration Utility.

Deleting hierarchy configuration

The delete config command allows you to remove all hierarchy configuration content such as names and properties from Hierarchy Manager, allowing you to start fresh with new content.

NOTICE

LOSS OF HIERARCHY CONFIGURATION

Performing this operation permanently removes configuration content from the system. Ensure that this operation is necessary before proceeding. This procedure cannot be undone.

Failure to follow these instructions can result in a loss of data.

To delete the current hierarchy configuration:

1. Open a Command Prompt window.
2. Navigate to the folder where the Hierarchy Configuration Utility is located. The default location is C:\Program Files (x86)\Schneider Electric\Power Monitoring Expert DC Ed\Applications\bin.
3. Type `HierarchyConfig.exe delete config`. Type yes when prompted. The utility deletes all hierarchy configuration content. To confirm, open Hierarchy Manager. There should be no hierarchy content displayed.
4. Export a CSV file and populate with configuration content as required.

To import a new hierarchy template file into Power Monitoring Expert:

1. Open a Command Prompt window. Click **Start > Run**, and type `cmd` or `cmd32`, or if applicable, click the **Command Prompt** icon.
2. Navigate to the folder where the Hierarchy Configuration Utility is located. The default location is C:\Program Files (x86)\Schneider Electric\Power Monitoring Expert DC Ed\Applications\bin.
3. Type `HierarchyConfig.exe import template <file path>\<file name>`, where `<file path>` is the location of the xml file, and `<file name>` is the name of the xml file to be imported. To switch to the alternate Data Center template (Customer/Circuit template) using the default path, type `HierarchyConfig.exe import template C:\Program Files (x86)\Schneider Electric\Power Monitoring Expert DC Ed\Applications\Hierarchy Manager\Sample Templates\DataCenter\CustomerCircuitTemplate.xml`.

Adding hierarchy information

When performing an initial system configuration, hierarchy information can be imported into the Power Monitoring Expert platform by entering the hierarchy content into a comma separated value (csv) file. This file is exported from Power Monitoring Expert using the Hierarchy Configuration tool, modified using a spreadsheet application such as Microsoft Excel, then imported back into the system.

Example CSV files for bulk configuration

Included on the Power Monitoring Expert - Data Center Edition DVD are two example csv files that demonstrate the methods used in larger systems to import hierarchy content. The two files are located in the Documentation > DataCenter folder.

The first file, `Example_Hierarchy_Bulk_Config_Import_CircuitRackTenant.csv` is for the circuit, rack, tenant hierarchy view, while the second file `Hierarchy_Bulk_Config_Import_ElectricalEquipment.csv` provides an ElectricalEquipment view. It is strongly recommended not to modify the views at this time.

When reviewing these csv files, make note of these items:

- In the Circuit Rack Tenant csv file, the Devices full name and the corresponding Circuits name columns may not always match up.

- It is important to match the names in the hierarchy to the names in Data Center Operations. This is important for billing purposes.

Naming convention for Node types

To help ensure the proper sorting of Node types that use numeric identifiers (circuit 1, circuit 2, etc), it is recommended that the identifier number be preceded with a number of zeroes that corresponds to the total number of instances of the Node type.

For example, if you had 100 entries in the Circuits Node type, the numbering convention would be Circuit 001, Circuit 002, Circuit 003, and so on.

Note

This method of importing hierarchy information should not be used to modify an existing hierarchy configuration. See ["Using Hierarchy Manager" on page 83](#) for information regarding editing an existing hierarchy.

To begin, export the csv file from Power Monitoring Expert. This file contains device and Node names that are used to organize the hierarchy and create references between the devices and Node instances.

To export a .csv file with the Hierarchy Configuration Tool:

1. Open a Command Prompt window. Click **Start > Run**, and type `cmd` or `cmd32`, or if applicable, click the **Command Prompt** icon.
2. Navigate to the folder where the Hierarchy Configuration Utility is located. The default location is C:\Program Files (x86)\Schneider Electric\Power Monitoring Expert DC Ed\Applications\bin.
3. Type `HierarchyConfig.exe export config <file path>\<file name>`, where `<file path>` is the location you want the .csv file to be saved to, and `<file name>` is the name of the .csv file. If you do not specify a file path, the current directory is used. You must provide a file name that includes the .csv extension.

Note

If the .csv file name contains spaces, enclose the file path and file name in quotation marks. For example, `HierarchyConfig.exe export config "C:\test file.csv"`.

4. Navigate to the directory that contains the csv file and open it.

You can edit the csv file with a spreadsheet program like Microsoft Excel. The csv file has a list of unassigned devices and a column header that represents the nodes in the system. See "Configuring the csv file" from the *Hierarchy Configuration Guide* for additional information regarding how to add hierarchy content to the Excel spreadsheet.
5. Provide information required for each heading. This is where you can establish which device is associated with each Node and how the different instances relate to one another. For headings that represent a check box, type True for the checked instances.
6. Save the file, making sure to preserve the .csv format, and exit.

After adding the hierarchy information to the csv file, import that content into the system. This operation is performed by the Hierarchy Configuration Utility's import config feature.

NOTICE

LOSS OF CONFIGURATION CONTENT

Importing a CSV file overwrites any existing hierarchy content in the system. Confirm this operation before proceeding.

Failure to follow can result in a loss of data.

To import a csv file with the Hierarchy Configuration Utility:

1. Open a Command Prompt window. Click **Start > Run**, and type `cmd` or `cmd32`.
2. Navigate to the folder where the Hierarchy Configuration Utility is located. The default location is `C:\Program Files (x86)\Schneider Electric\Power Monitoring Expert DC Ed\Applications\bin`.
3. Type `HierarchyConfig.exe import config <file path>\<file name>`, where `<file path>` is the location of the file you are importing, and `<file name>` is the name of the .csv file to be imported. If you do not specify a file path, the current directory is used. You must provide a file name that includes the .csv extension.

The utility provides feedback for each stage of the import. If the import operation was unsuccessful, the utility provides information about possible reasons why the import was unsuccessful.

Once the csv content has been imported into the system, verify the content by opening the Hierarchy Manager application from the **Management Console > Tools** menu of Power Monitoring Expert. If there are changes that need to be made, make the changes using the Hierarchy Manager feature.

Using Hierarchy Manager

Once the initial hierarchy configuration is complete, additional changes to the hierarchy can be made through the Hierarchy Manager feature in Power Monitoring Expert. These changes can be anything from adding a new customer, moving an existing customer to a new location, or replacing a device.

To add information to a template using Hierarchy Manager:

1. Navigate to **Management Console > Tools > Hierarchy Manager**.
2. Provide Operator-level or Supervisor-level username and password. Click **OK**. The Hierarchy Manager window appears.

The screenshot shows the 'Hierarchy Manager' application window. At the top, there are five tabs: 'Circuits', 'Racks', 'Customers', 'Electrical Incomers', and 'Electrical Equipment'. The 'Circuits' tab is currently selected. Below the tabs, there are three buttons: 'Add', 'Edit', and 'Delete'. Below these buttons is a table with the following columns: 'Name', 'Rack Circuit', 'Breaker Rating', 'Rack', and 'Devices'. Each column has a filter input field. The table is currently empty. At the bottom right of the window, the version number '1.0.0.0' is displayed.

Along the top of the Hierarchy Manager window there are a collection of tabs, each one representing a different Node. Each tab has three controls:

- Add:** Create a new Node instance.
- Edit:** Modify the information contained in an existing Node instance.
- Delete:** Remove a Node instance from Hierarchy Manager

Add

- Click one of the tabs. A grid displaying a list of Node instances appears.
- Click **Add** to enter a new instance for this Node. The **Properties** dialog for this Node type appears.

The screenshot shows the 'Properties' dialog box. It has a title bar with a close button. The dialog is divided into two main sections. The left section contains two text input fields: 'Name' (with a red 'Required' label) and 'Breaker Rating'. The right section contains two tables. The top table is titled 'Rack' and has columns 'Name', 'Start Date', and 'End Date'. It has 'Add', 'Edit', and 'Delete' buttons above it. The bottom table is titled 'Devices' and has the same columns. It also has 'Add', 'Edit', and 'Delete' buttons above it. At the bottom of the dialog are 'OK' and 'Cancel' buttons. There are small asterisks and 'start of day' text next to the 'Start Date' and 'End Date' columns in both tables.

3. Provide the instance name in the **Name** field. Fill in any additional information fields as required.

Each Properties dialog contains a grid for each associated Node. In the case of the **Circuit** Node, it contains grids for the **Rack** and **Devices** Nodes.

4. Click **Add** for each grid to add instances of that Node type. This creates the reference between the Node instances. In this case, a reference to a **Rack** Node instance is created.

	Name ▾	Customer	Circuits
	<Filter>	<Filter>	<Filter>
☐	Rack1		
☐	Rack2		
☐	Rack3		
☐	Rack4		

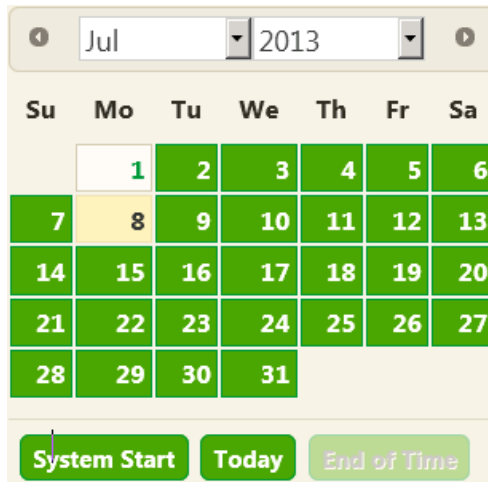
From: System Start To: End of Time
* start of day

OK Cancel

5. From the grid, select the items to reference this Node instance.

It is in this window that you can set the start and end dates for this association. If you have an environment where things are constantly changing, such as customers moving in and out or devices being assigned and reassigned, then you need the ability to set start and end dates for your devices and Node instances.

6. Click in the **From** field or the **Calendar** icon. Select the start date from the calendar.



7. Click in the **To** field or on the **Calendar** icon. Select the end date from the calendar. If you do not know the end date, you can leave this field for now and edit at a later time.
8. Click **OK** to return to the **Properties** window.
You can also edit an existing reference from the grid. You can change the start and end dates of the Node instance reference.
9. Select an item from the grid and click **Edit**.
10. Click the **From** or **To** fields or their **Calendar** icon and change the start or end dates.
11. Click **OK** to return to the **Properties** window.
You can also remove a reference from the grid. Deleting a reference permanently removes it from the item history. If the item is required for reporting purposes, do not delete the item. Use **Edit** and change the end date.
12. Select an item from the grid and click **Delete**. Review the Delete dialog message. Click **Yes** to delete the item.
13. Click **OK** to return to the Node grid.

Edit

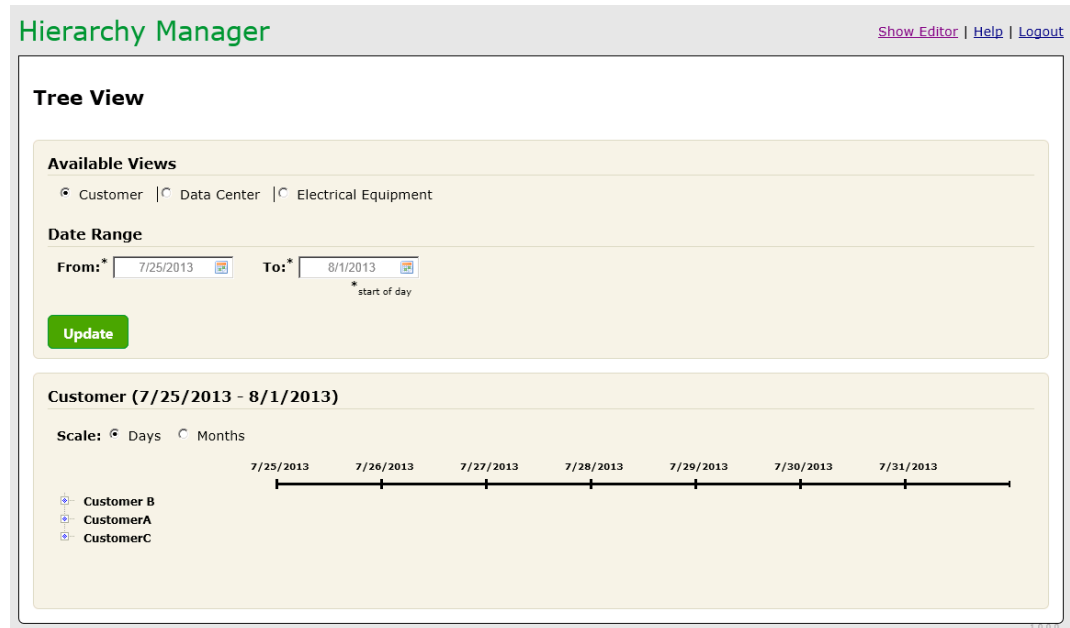
To modify the information contained in a Node, select a tab, select an item from the grid, and click **Edit**. You can change the Node instance name and other fields, and add, edit or delete the referenced Nodes in the same way as described in the Add section.

Delete

To delete a Node instance, select a tab, select an item from the grid and click **Delete**. This option removes the item and the item's history. If you require the item in a report, do not delete the item. Click **Yes** on the **Delete** dialog to delete the item.

Show Views

Display the view of a hierarchy by clicking the **Show Views** link. This link provides a visualization of the different levels of the hierarchy, and the date range for each entry of the hierarchy.



Available Views: Use this section to switch between different views when there is more than one view available. The available views are determined by the hierarchy template.

Date Range: Use the **To** and **From** fields to select the date range to display the hierarchy.

Update Tree Click **Update Tree** when any changes to the date range, scale, or available view are made.

Scale: Select **Days** or **Months** to provide the appropriate scale to the hierarchy view.

Beside each hierarchy level is a bar that indicates when in the date range the Node was part of the hierarchy. If the bar has a rounded edge, the Node reference has an end date within the date range. If the bar has a square edge, the Node reference continues beyond the date range.

If you do not see a node in the hierarchy view, make sure the date range includes the date that Node was part of the hierarchy. Hovering the pointer over a hierarchy entry provides the date range for that entry.

Software licenses

The installed software includes a 90-day trial license for all features of the product. You must activate valid purchased software licenses within 90 days, otherwise some software functionality is disabled.

NOTICE

LOSS OF COMMUNICATION

- Be sure to activate product and component licenses prior to the expiry of the trial license.
- Ensure that you activate sufficient licenses for the components in your system.

Failure to follow these instructions can result in loss of data.

In addition to the licenses necessary for the features in Power Monitoring Expert, you also need to purchase and activate licenses for the various components that make up Power Monitoring Expert - Data Center Edition. These components are:

Equipment Maintenance

- Generator Performance Configuration Tool
- Generator Activity Report
- Generator Battery Health Report
- Generator Battery Health Export
- Generator Test Report

Power Loading and Balancing

- Generator Power Configuration Utility
- Generator Power Report
- UPS Power Configuration Utility
- UPS Power Report
- Branch Circuit Power Report

Power Distribution Efficiency

- Power Losses Configuration Utility
- Power Losses Report
- PUE Summary Report

Energy Billing Support

- Branch Circuit Energy Report

When your order is processed, a software license Entitlement Certificate is sent by email from softwarelicensing@ca.schneider-electric.com. (You may need to change the settings in your email application to ensure that this email arrives in your inbox and is not routed to your spam folder.)

To activate your software licenses:

1. Locate your Entitlement Certificate email.
2. Open the Schneider Electric Floating License Manager from **Start > All Programs > Schneider Electric**.
3. Click **Activate** to open the Activation Method dialog.
4. Choose one of the available activation methods and follow the detailed instructions provided in the dialog.

Note that you can activate Power Monitoring Expert or Power Monitoring Expert - Data Center Edition software licenses over the Internet or by email. Phone activation is not available at this time.

5. Follow the directions on the Activation ID page of the dialog and enter the Activation IDs referenced in your Entitlement Certificate.
6. Click **Finish** to complete the process.

Refer to the online help in Schneider Electric Floating License Manager for additional information.

Power Monitoring Expert - Data Center Edition modules

In addition to the Power Monitoring Expert software, Power Monitoring Expert - Data Center Edition is made up of different modules to assist in monitoring and analyzing the electrical power distribution infrastructure of your data center.

Note

Depending on your current licensing agreement for Power Monitoring Expert - Data Center Edition, you may see zero, one, or more modules available for configuration. You can add licenses for additional modules at any time. Consult your Schneider Electric representative for more information.

The following topics provide specific information regarding the features and configuration of the Power Monitoring Expert - Data Center Edition modules:

Equipment Maintenance

- ["Generator Test "](#)

Power Balancing and Loading:

- ["Branch Circuit Power Report"](#)
- ["UPS Power "](#)
- ["Generator Power"](#)

Power Distribution Efficiency

- ["Power Losses"](#)
- ["Power Usage Effectiveness \(PUE\)"](#)

Energy Billing Support

- ["Branch Circuit Energy Report" on page 151](#)
- Branch Circuit Energy Export

If upgrading from the phase one version of Power Monitoring Expert - Data Center Edition, the modules will automatically be updated. In some cases, the name of the module has changed from the phase one version. The name changes for the modules are described in the following table.

Phase 1 module name	Phase 2 module name
Power Usage Effectiveness (PUE)	Power Usage Effectiveness (PUE)
UPS Capacity Management	UPS Power
Generator Capacity Management	Generator Power
Power System Losses	Power Losses
EPSS Test	Generator Test

Generator Test

The Generator Test is one of the optional add-on modules that make up the Power Monitoring Expert - Data Center Edition solution. The Generator Performance Configuration Tool is used to monitor various aspects of a generator system, and create reports that can help to determine if a generator is in an adequate state to generate electrical power during a utility outage.

Generator Test provides these features and capabilities:

- **Generator Performance Configuration Tool** - displays Test, Load Shedding, and Power Outage run activities stored in the system history.
- **Generator Load Report** - use this report to create a summary graph of electrical data during a generator run. The report includes a load curve, minimum-maximum-average load summary, and other electrical details.
- **Generator Test Report** - use this report to evaluate the overall condition of the system.
- **Battery Health Report** - use this report to monitor the condition of the generator starting batteries.
- **Generator Activity Report** - use this report to show the test run hours and other test run data for generators. This information helps verify information for EPA compliance.

Refer to the *StruxureWare Power Monitoring Expert - Data Center Edition Generator Test User Guide* for information regarding this utility as well as the Data Collector utility.

Generator Power

The Generator Power module allows you to create, edit, and manage one or more generator systems that will be used for reporting on the power capacity of those systems.

The Generator Power window consists of a single panel that contains a grid area and an editor area. The grid area is empty initially but will be populated with entries you create through the editor area. Use the editor area to define the settings for new items, or to update the settings for an item that you select in the grid area.

The generator system is the logical system configuration that will be used for reporting power capacity.

This configuration utility allows you to create, edit, and manage one or more generator systems that will be used for reporting on the power capacity of those systems.

Generator System Redundancy Types

You can create a generator system to achieve power redundancy for IT equipment loads in different ways, depending on how the generators are grouped together and how they are connected to the equipment power supplies. This configuration tool supports several industry standard configurations.

The generator system supports the following redundancy design types:

"N Type"

"N+1 Type"

"N+2 Type"

"2N Type"

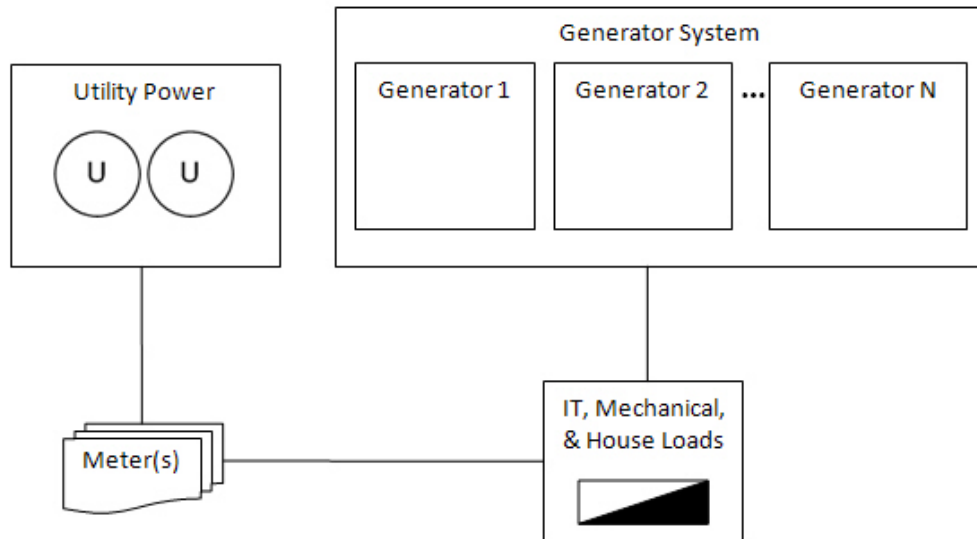
"2(N+1) Type"

"2(N+2) Type"

Before a Generator Power Report can be produced, you need to define a generator system in the Generator Power Configuration Utility.

N Type

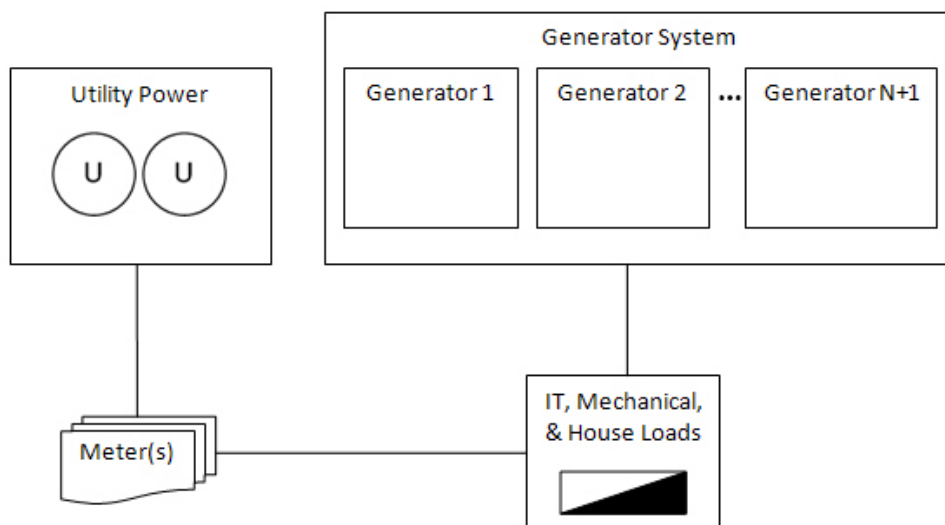
The N system configuration is for one or more generators that work together to supply power to the IT load, when the utility or utilities' power is unavailable. There is no redundancy. The intention is to size the generator system to match the peak IT load on the utility power.



N+1 Type

The N+1 system configuration is for one or more generators that work together to supply power to the IT load. There is simple generator redundancy in that one of the generators can stop functioning or be taken off-line, in the event that the utility power is interrupted. The load is spread among all generators, but the peak load is such that if one generator stops working, the others will be able to assume its load. Another way to look at it is, N generators will be able to support the peak IT load. If the peak IT load is more than N can support, then system design redundancy will be lost.

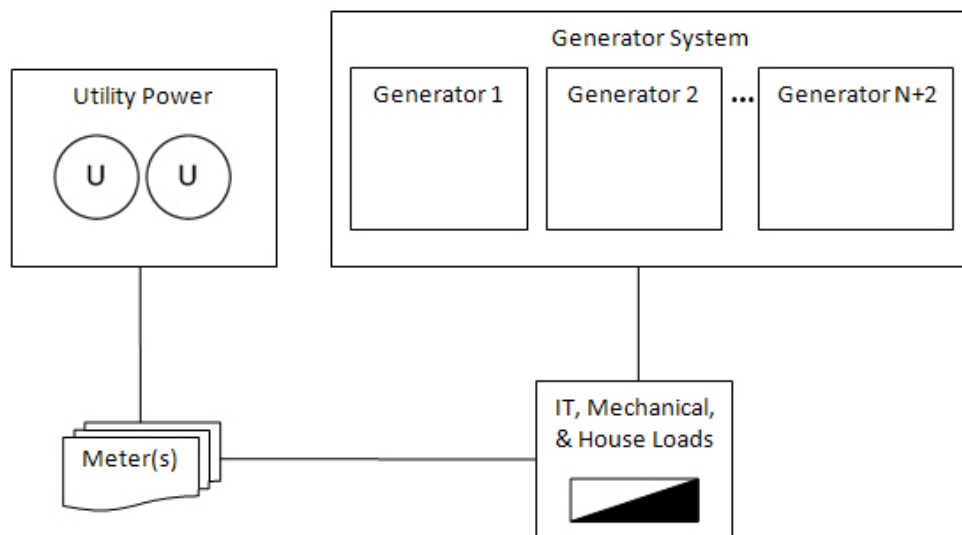
For example, if three generators are connected to the IT loads, in an N+1 system, the peak utility load must not exceed the non-redundant capacity of two of the generators. If it does, the designed redundancy will be lost.



N+2 Type

The N+2 system configuration is for a group of generators that work together to supply power to a medium voltage substation and is then distributed to low voltage loads. There is simple generator redundancy in that any two of the generators can stop functioning or be taken off-line, in the event that the utility power is interrupted. The load is spread among all generators, but the utility peak load is such that if two generators stop working, the others will be able to assume their load. Another way to look at it is, N generators will be able to support the peak utility load. If the peak utility load is more than N can support, then system design redundancy will be lost.

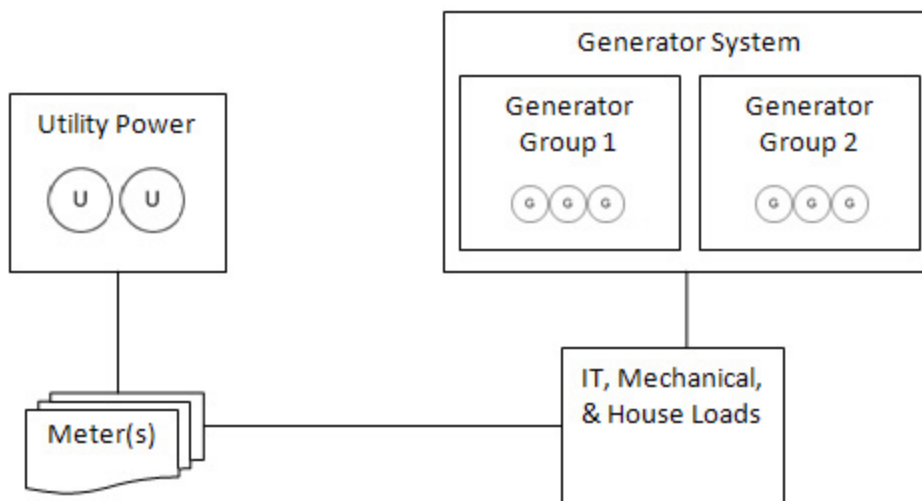
For example, if five generators are connected to the IT loads, in an N+2 system, the peak utility load must not exceed the non-redundant capacity of three of the generators. If it does, the designed redundancy will be lost.



2N Type

The 2N system configuration is for two groups of generators that supply power to the IT loads. In a 2N system, an entire group of generators can stop functioning or be taken off-line and the equipment will still be supplied with power, in the event that the utility power is interrupted. The load is spread among all generators, but the peak load is such that, if an entire group of generators stop working, the remaining generators will be able to assume the entire load. Another way to look at it is, N generators will be able to support the peak utility load. If the peak utility load is more than N can support, then system design redundancy will be lost.

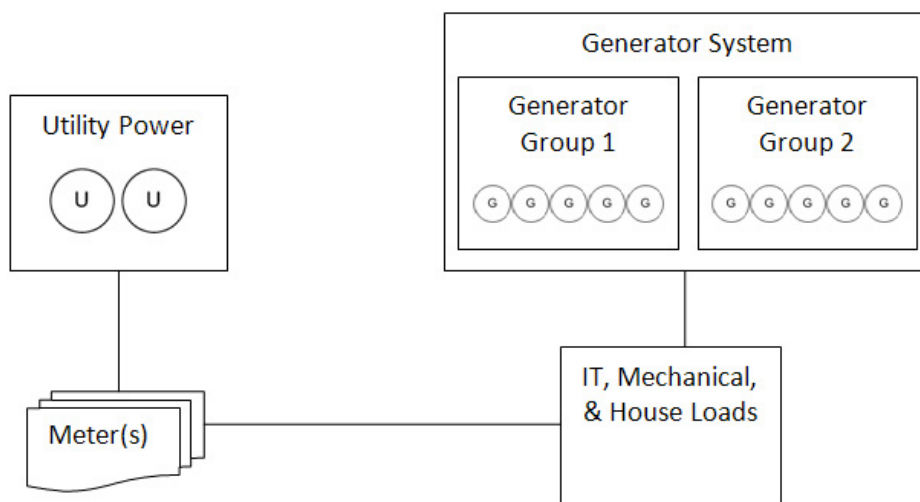
In this example, there are two groups with three generators in each. In a 2N configuration, one group of generators can go offline and the system will still have the designed redundancy. Therefore, the value for N is three. So, the total peak utility load cannot exceed the derated nameplate of three of the generators.



2(N+1) Type

The 2(N+1) system configuration is for two groups of generators that supply power to the IT loads. In an 2(N+1) system, an entire group of generators plus one more generator from each of the remaining groups can stop functioning or be taken off-line, and the equipment will still be supplied with power, in the event that the utility power is interrupted. The load is spread among all generators, but the peak load is such that if an entire group's worth of generators goes offline, plus one more from each of the other groups stop working, the remaining generators will be able to assume the entire load. Another way to look at it is, N generators will be able to support the peak utility load. If the peak utility load is more than N can support, then system design redundancy will be lost.

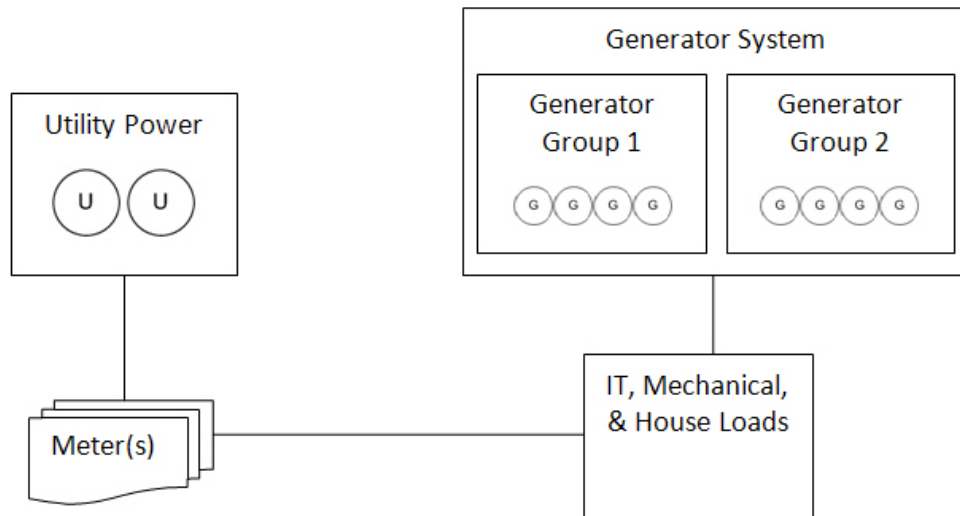
In this example, there are two groups with five generators in each. In a 2(N+1) configuration, one group of generators can go offline, plus one more generator from the remaining group and the system will still have the designed redundancy. Therefore, the value for N is four. So, the total peak utility load cannot exceed the derated nameplate of four of the generators.



2(N+2) Type

The 2(N+2) system configuration is for two groups of generators that supply power to the IT loads. In an 2(N+2) system, an entire group of generators plus two more generators from each of the remaining groups can stop functioning or be taken off-line and the equipment will still be supplied with power, in the event that the utility power is interrupted. The load is spread among all generators, but the peak load is such that if an entire group's worth of generators goes offline, plus two more from each of the other groups goes offline, the remaining generators will be able to assume the entire load. Another way to look at it is, N generators will be able to support the peak utility load. If the peak utility load is more than N can support, then system design redundancy will be lost.

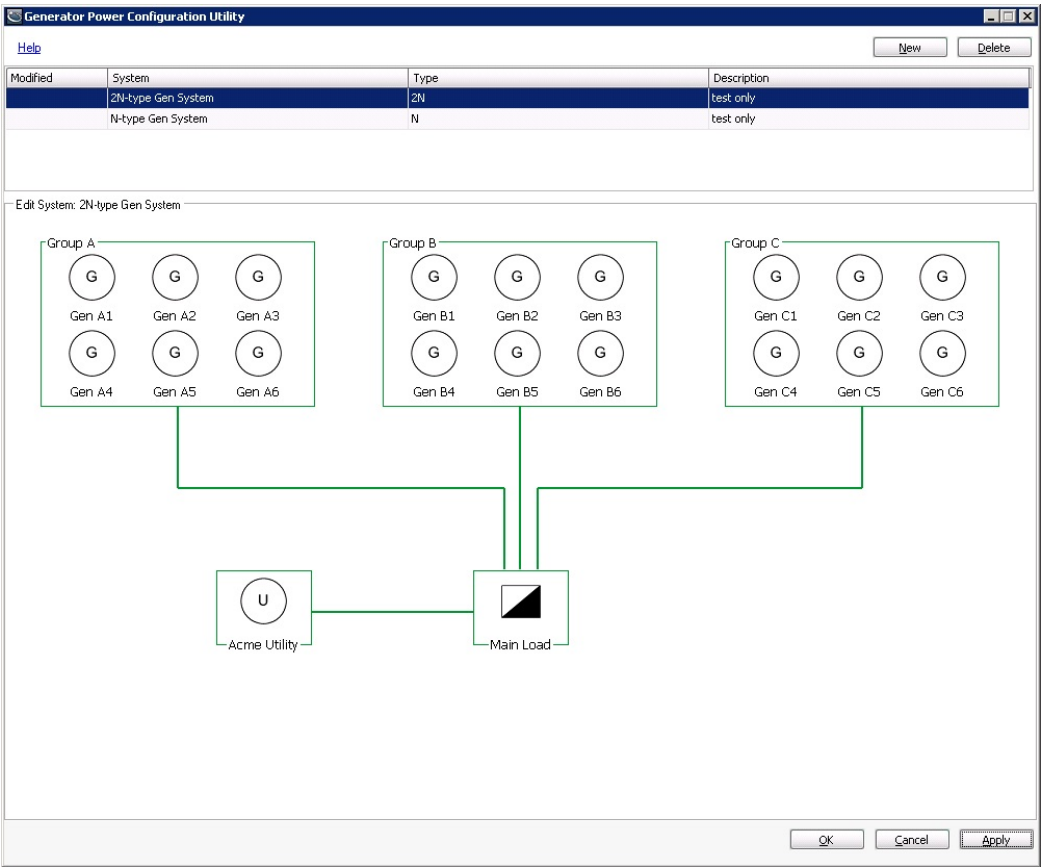
In this example, there are two groups with four generators in each. In a 2(N+2) configuration one group of generators can stop working, plus two more generators from the remaining group and the system will still have the designed redundancy. Therefore, the value for N is two. So, the total peak utility load cannot exceed the derated nameplate of two of the generators.



Define Generator Systems

The generator system is the logical system configuration that will be used for reporting power capacity.

The following image is an example of the Generator Power Configuration Utility with a sample generator system selected.



Control	Description
Help	Opens the help for the utility.
New	Creates a new entry in the grid.
Delete	Deletes the selected entry from the grid.
OK	Saves all changes and exits the utility.
Cancel	Exits the utility without saving changes.
Apply	Saves all changes and leaves the utility open.

Grid Area Columns	Description
Modified	Displays a status symbol for the record.
+ (plus)	A new entry.
* (asterisk)	An existing entry has been modified.
! (exclamation mark)	The entry is incorrect.
System	Displays the system name.
Type	Displays the Generator system type (N, 2N, N+2, etc)
Description	Displays a description of the system

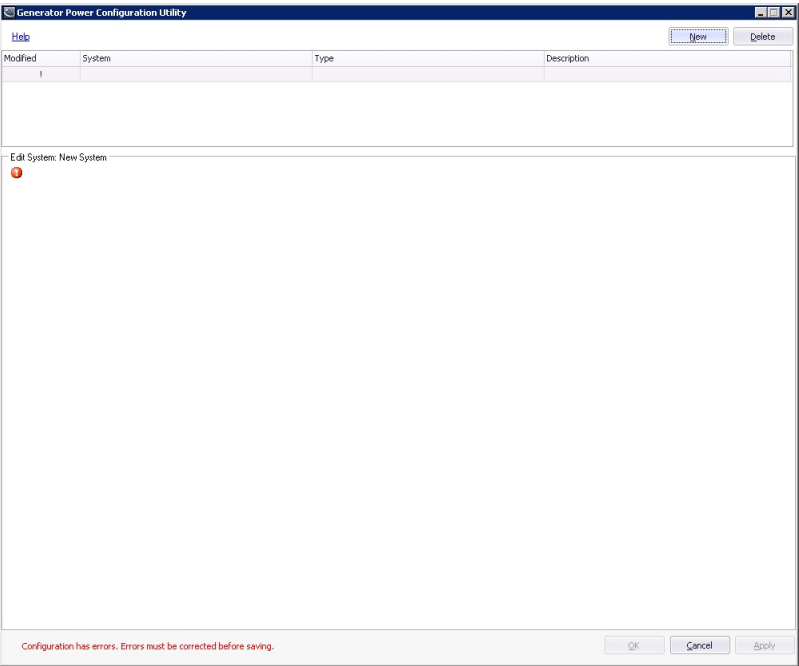
To start the Generator Power Configuration Utility, either:

- Double-click the **Generator Power Configuration Utility** icon located in the **Power Monitoring Expert DC Ed** folder on the desktop,
- or

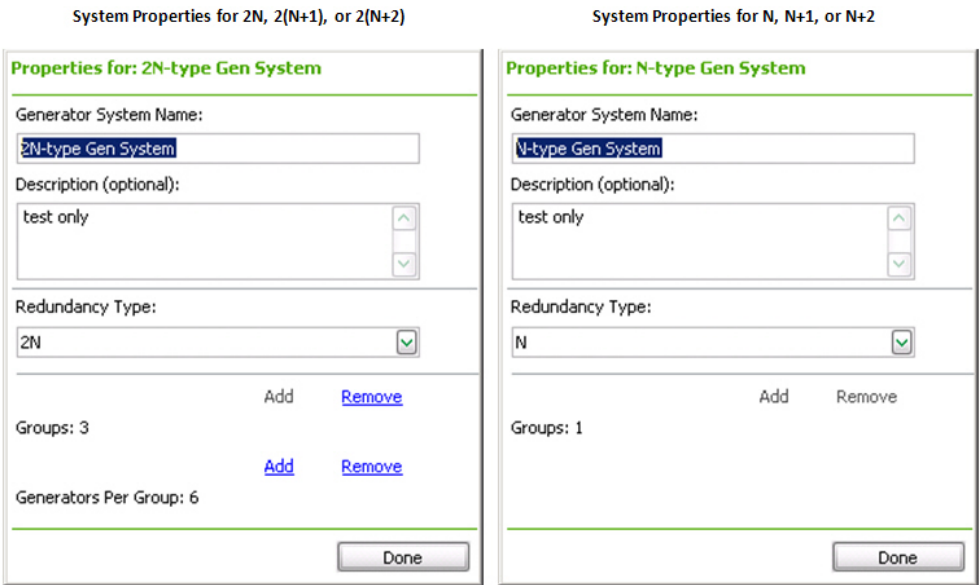
- Click **Start > All Programs > Schneider Electric > Power Monitoring Expert DC Ed > Generator Power Configuration Utility**.

To define a new generator system:

1. Click **New**. The Edit System: New System area appears below the grid.



2. Click anywhere in the editor area. The Properties screen appears.



3. Complete the details for the generator system:
 - a. **Generator System Name:** Enter a name for the generator system. Each generator system must have a unique name.
 - b. **Description:** Enter a description for the generator system. This field is optional.

- c. **Redundancy Type:** Select the redundancy type for the generator system. The different redundancy types are explained in ["Generator System Redundancy Types" on page 93](#).
- d. **Groups:** Shows the number of generator groups contained in the generator system. Click **Add** to add groups to the generator system. Click **Remove** to delete groups.
- e. **Generators Per Group:** Shows the number of generators in each generator group in the system. Click **Add** to add generators to the group. Click **Remove** to delete generators.

This property is only available when the system redundancy type is 2N, 2(N+1) or 2(N+2). To define the number of generators for a system with redundancy type N, N+1 or N+2, use the generator group properties. See ["Define Generator Groups" on page 100](#) for more information.

- 4. Click **Done** to save the generator system.

Once complete, you can configure the other components of the system:

["Define Generator Groups"](#)

["Define Generators"](#)

["Define Loads"](#)

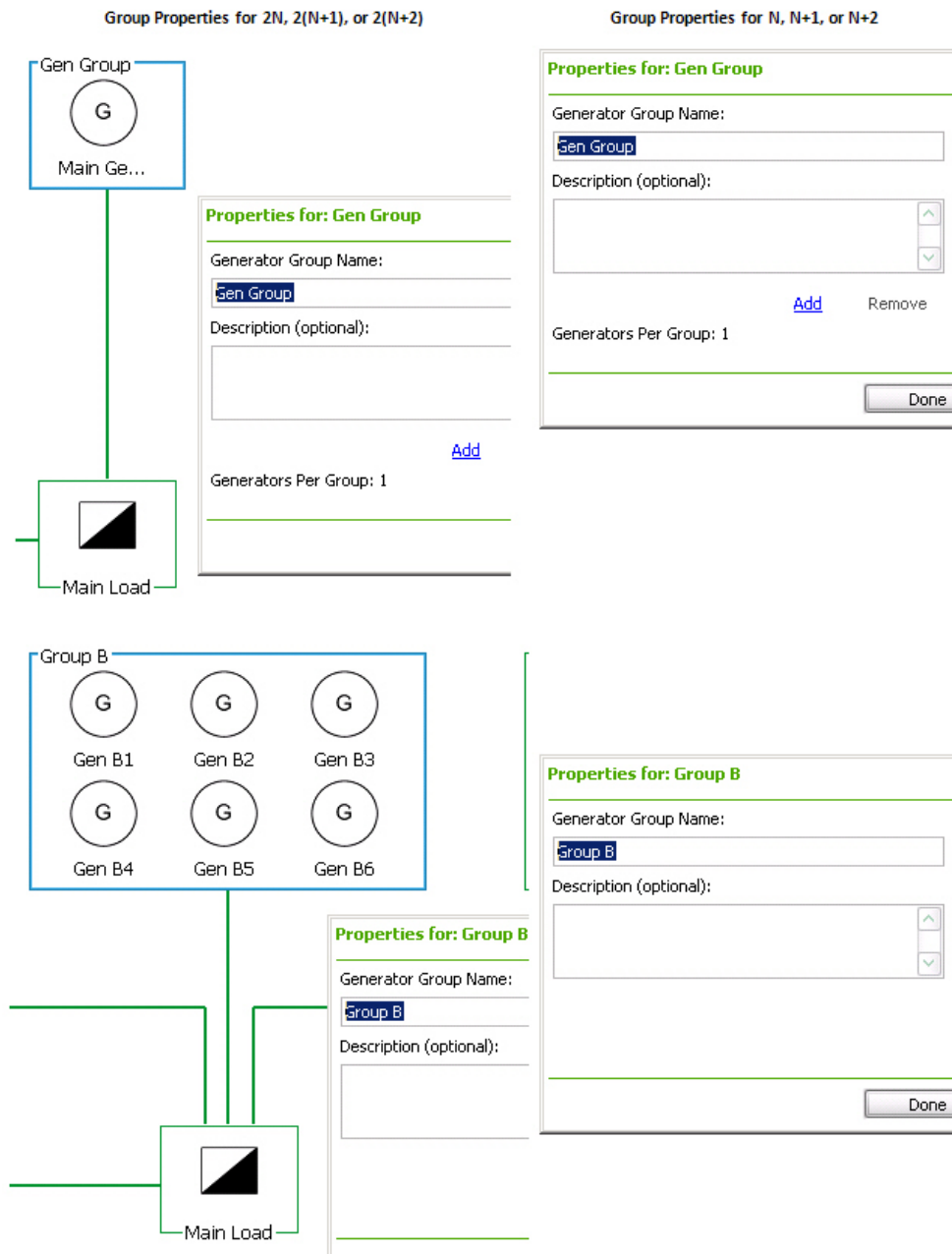
["Define Utilities"](#)

Define Generator Groups

A generator group represents a logical grouping of generators. The system contains at least one group and can contain multiple groups. Depending on the system type, the group properties may be different, as shown below. See ["Configuration Restrictions" on page 104](#) for more information.

To define the properties for a generator group:

1. Click on the group object border. The Properties screen appears.



2. Complete the details for the generator group:

- a. **Generator Group Name:** Enter a name for the group.

Each generator group must have a unique name.

- b. **Description:** Enter a description for the group. This field is optional.

- c. **Generators Per Group:** Click **Add** to increase the number of generators in the group. Click **Remove** to decrease the number. This property is available only for system redundancy types N, N+1 or N+2.

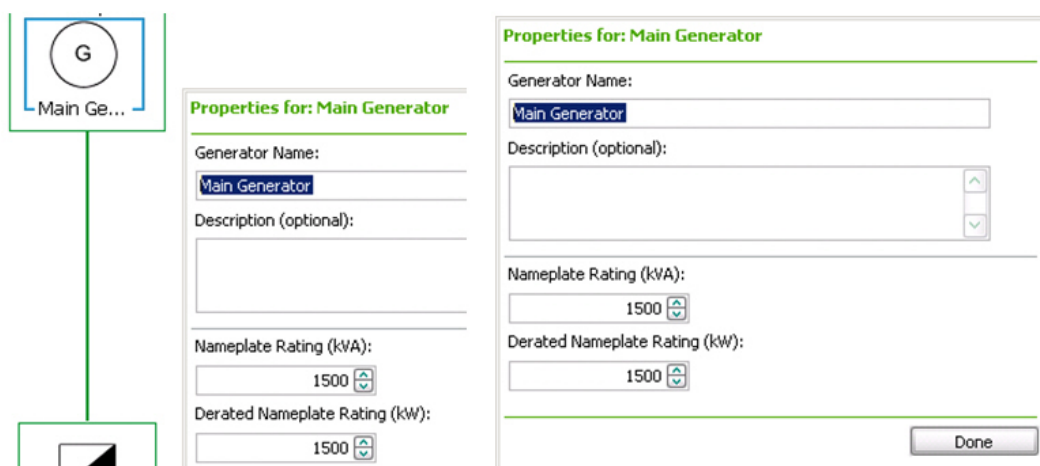
3. Click **Done** to save the generator group.

Define Generators

A generator represents an actual generator device in the data center. A group contains at least one generator and can contain multiple generators. For some system types, each group must contain the same number of generators. See ["Configuration Restrictions" on page 104](#) for more information.

To define a generator:

1. Click on the generator object border. The selected generator will be highlighted in blue and the Properties screen appears.



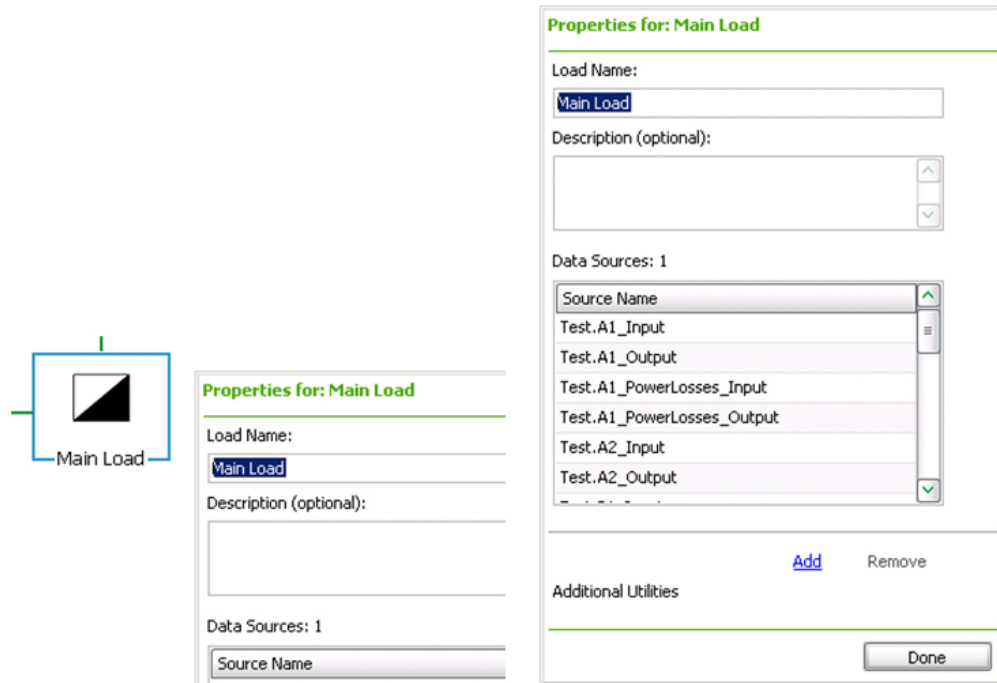
2. Complete the details for the generator:
 - a. **Generator Name:** Enter the name for the generator.
This name must be unique for each generator in the system.
 - b. **Description:** Enter a description for the generator. This field is optional.
 - c. **Nameplate Rating (kVA):** Enter the maximum output power (kVA) of the generator.
This value must be greater than zero.
 - d. **Derated Nameplate Rating (kW):** Enter the maximum power capacity (kW) that the generator is expected to support. This value must be equal or less than the nameplate rating value, and greater than zero.
3. Click **Done** to save the generator.

Define Loads

A load represents the logical load attached to a generator group. Each generator system must have only one load. See ["Configuration Restrictions" on page 104](#) for more information.

To define a generator load:

1. Click the generator load element in the system diagram. The Properties screen appears.



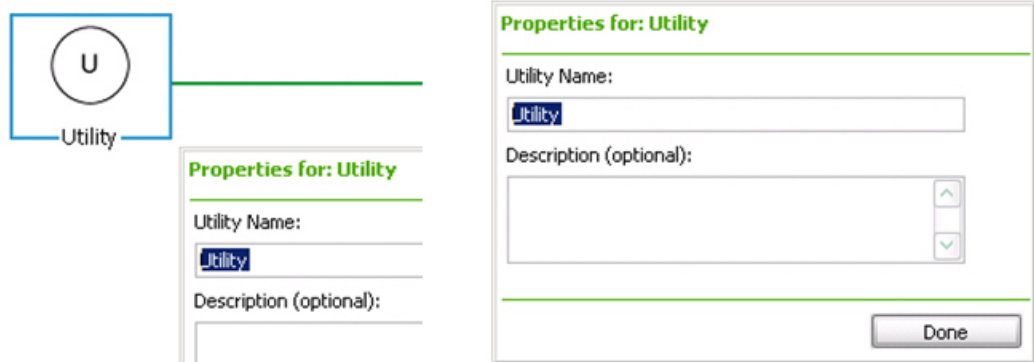
2. Complete the details for the generator load:
 - a. **Load Name:** Enter a name for the load.
 - b. **Description:** Enter a description for the load. This field is optional.
 - c. **Data Source:** Select one or more meter sources where load data is logged for this load.
 - d. **Additional Utilities:** Click **Add** to increase the number of utility objects for the load.
Click **Remove** to decrease the number of utility objects.
3. Click **Done** to save the generator load.

Define Utilities

A utility represents the logical utility provider that feeds a particular load under normal operation. This logical utility has no functional purpose in the calculations for power redundancy. It is used to provide a more complete diagram representation for the generator system. A system may have one or two utilities represented in the diagram.

To define a utility:

1. Click the utility element in the diagram. The Properties screen appears.



2. Complete the details for the utility:
 - a. **Utility Name:** Enter a name for the utility.
 - b. **Description:** Enter a description for the utility. This field is optional.
3. Click **Done** to save the utility.

Once the configuration of the generators, loads, and utilities are complete, click **Apply** to save, or click **OK** to save the configuration and exit the utility.

Configuration Restrictions

The configuration tool enforces certain rules when creating a generator system, group, or generator:

- **Generator System**
 - Name must be unique.
 - One or more systems are allowed.
- **Generator Groups**
 - Name must be unique.
 - At least one group must be present in each system.
 - All groups are connected to the same load.
 - For N, N+1, and N+2 system types:
 - Only one group is allowed.

Each generator in the group must have the same nameplate rating (kVA) value.

Each generator in the group must have the same derated nameplate rating (kW) value.

- For 2N, 2(N+1) and 2(N+2) system types:
 - Up to three groups are allowed.

All groups must have the same number of generators.

All generators in the groups must have the same nameplate rating (kVA) value.

All generators in the groups must have the same derated nameplate rating (kW) value.

- **Generators**
 - Name must be unique.
 - At least one generator must be present in each group.
 - A maximum of 12 generators is allowed in each group.

UPS Power

The UPS Power module allows you to create, edit, and manage one or more UPS systems that will be used for reporting on the power capacity of those systems. The UPS Power window contains a grid area and an editor area. The grid area is initially empty but will be populated with entries you create. The editor area displays the configuration diagrams and allows you to define and modify the configurations.

The UPS system consists of UPS groups, modules, and loads. The configuration utility provides a way to organize the components of the system graphically and define properties for each component.

UPS System Redundancy Types

You can create a UPS system to achieve power redundancy for IT equipment loads in different ways, depending on how the UPS units are grouped together and how they are connected to the equipment power supplies. This configuration tool supports several industry standard configurations.

The UPS system supports the following redundancy design types:

"N Type"

"N+1 Type"

"N+2 Type"

"2N Type"

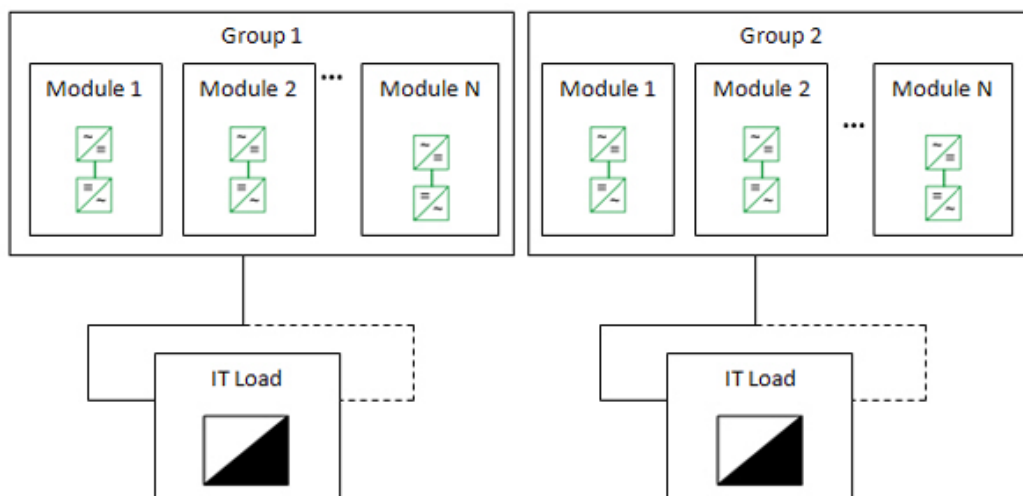
"UPS Power "

"UPS Power "

N Type

The N system configuration is for one or more UPS modules which work together to supply power to the IT load. There is no redundancy, except optionally to the second power supply of each piece of equipment.

Each UPS system with an N configuration can have multiple UPS groups, where each group is connected to a different load. The number of modules within each UPS group can be different. Within each group, all UPS modules must have the same derated nameplate rating value (kW).

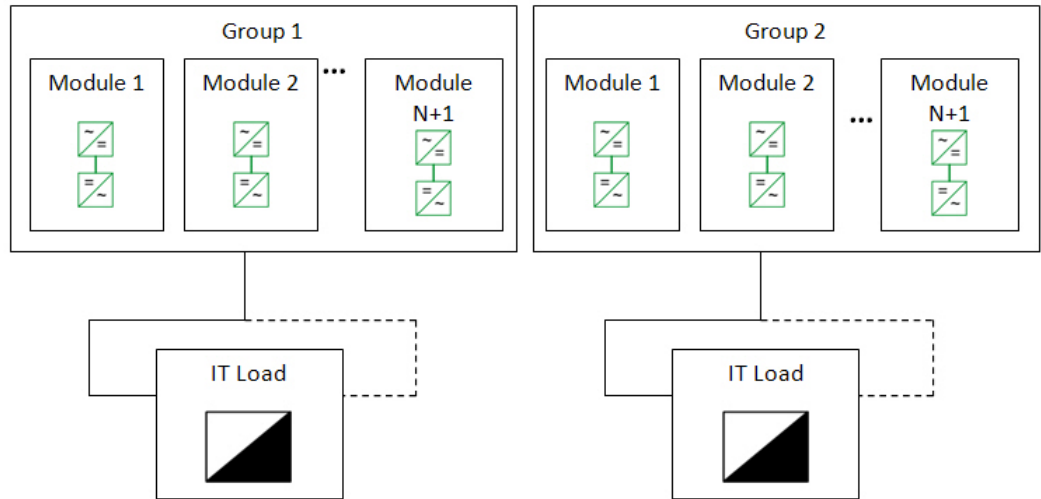


N+1 Type

The N+1 system configuration is for one or more UPS modules that work together to supply power to the IT load. There is simple module redundancy in that one of the modules can be rendered inoperative or be taken off-line. The load is spread among all remaining UPS modules, but the peak load is such that if one module stops working, the others will be able to assume its load. Another way to look at it is, N UPS modules will be able to support the peak IT load. If the peak IT load is more than N can support, then system design redundancy will be lost.

There is the option to connect the system of modules to the second power supply of each piece of equipment, but both power supplies are connected to the group of UPS modules.

Each UPS system with an N+1 configuration can have multiple UPS groups, where each group is connected to a different load. The number of modules within each UPS group can be different. The modules within a UPS group must have the same derated nameplate rating value (kW).

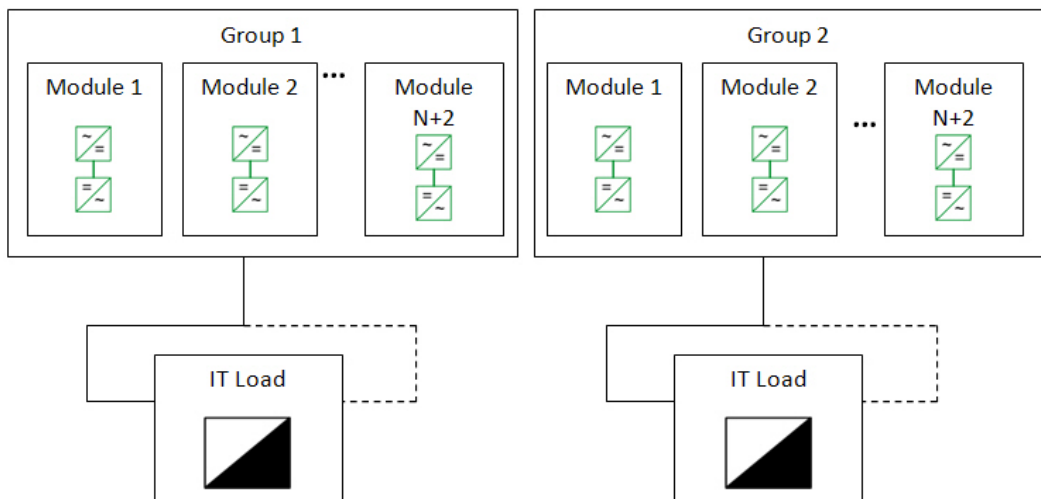


N+2 Type

The N+2 system configuration is for a group of UPS modules that work together to supply power to the IT load. There is simple module redundancy in that any two of the modules can be rendered inoperative or be taken off-line. The load is spread among all remaining UPS modules, but the peak load is such that if two modules stop working, the others will be able to assume their load. Another way to look at it is, N UPS modules will be able to support the peak IT load. If the peak IT load is more than N can support, then system design redundancy will be lost. An example of an N+2 system is five UPS modules connected to the IT load, but the peak IT load never exceeds the capacity of three of the UPS modules.

There is the option to connect the system of modules to the second power supply of each piece of equipment, but both power supplies are connected to the group of UPS modules.

Each UPS system with an N+2 configuration can have multiple UPS groups, where each group is connected to a different load. The number of modules within each UPS group can be different. The modules within a UPS group must have the same derated nameplate rating value (kW).

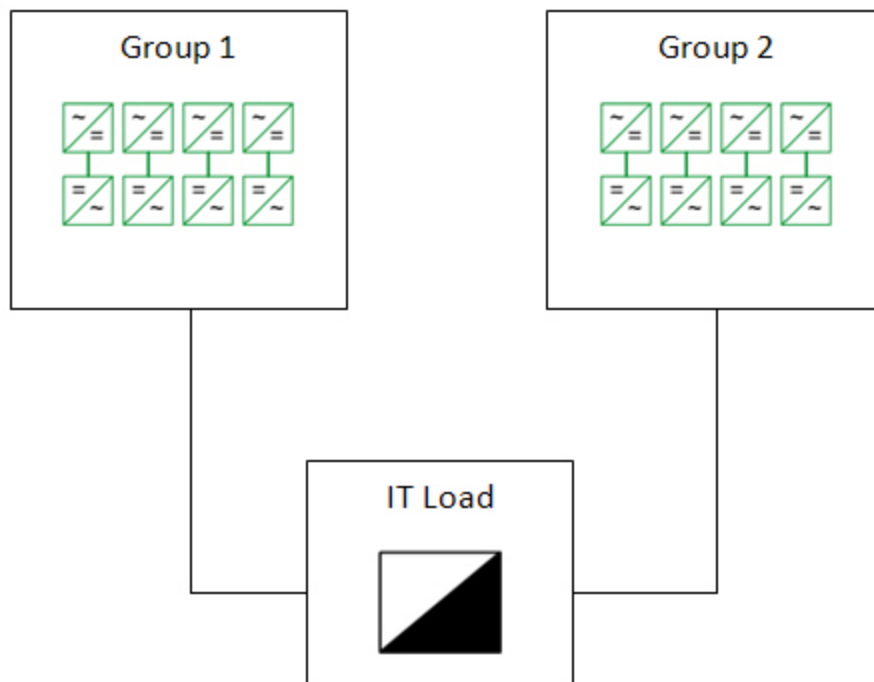


2N Type

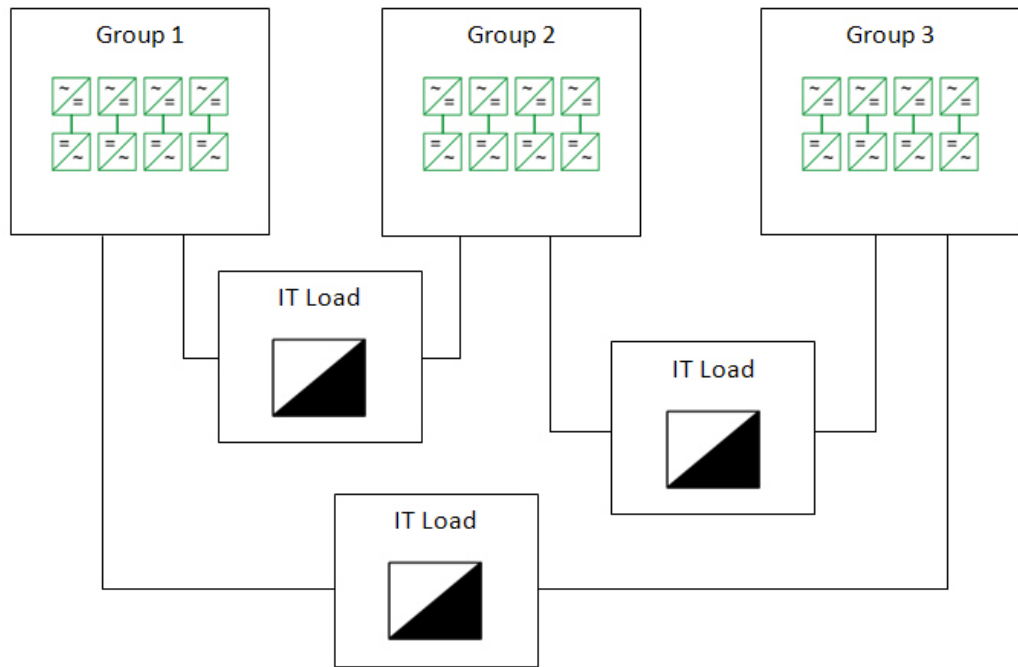
The 2N system configuration is for two or three groups of UPS modules that supply power to two different power supplies in each IT load. For redundancy, an entire UPS group can stop working or be taken off-line, and the IT equipment will still be supplied with power. It also means that either one of the two power supplies in an IT load can be rendered inoperative. The load is spread among all UPS modules, but the peak load is such that if an entire group's worth of modules are not working, the remaining modules will be able to assume their load. Another way to look at it is, N UPS modules will be able to support the peak IT load. If the peak IT load is more than N can support, then system design redundancy will be lost.

Each UPS system with a 2N configuration can have two or three UPS groups. If there are two groups, both of them must be connected to the same load. If there are three groups, then there are three separate loads and each group is connected to two of the loads. The number of modules within each UPS group in a UPS system must be the same in a 2N configuration. Additionally, all UPS modules within a UPS group must have the same derated nameplate rating value (kW).

In the first example, there are two groups with four UPS modules each. In a 2N configuration, one group can stop working and the system will still have the designed redundancy. Therefore, the value for N is four. So, the total IT load cannot exceed the derated nameplate rating of four of the UPS modules.



In the second example, there are three groups with four UPS modules each. In a 2N configuration, one group's worth of UPS modules can be rendered inoperative and the system will still have the designed redundancy. Therefore, the value for N is eight. So, the total IT load (for all three IT load groups shown below) cannot exceed the derated nameplate rating of eight of the UPS modules.

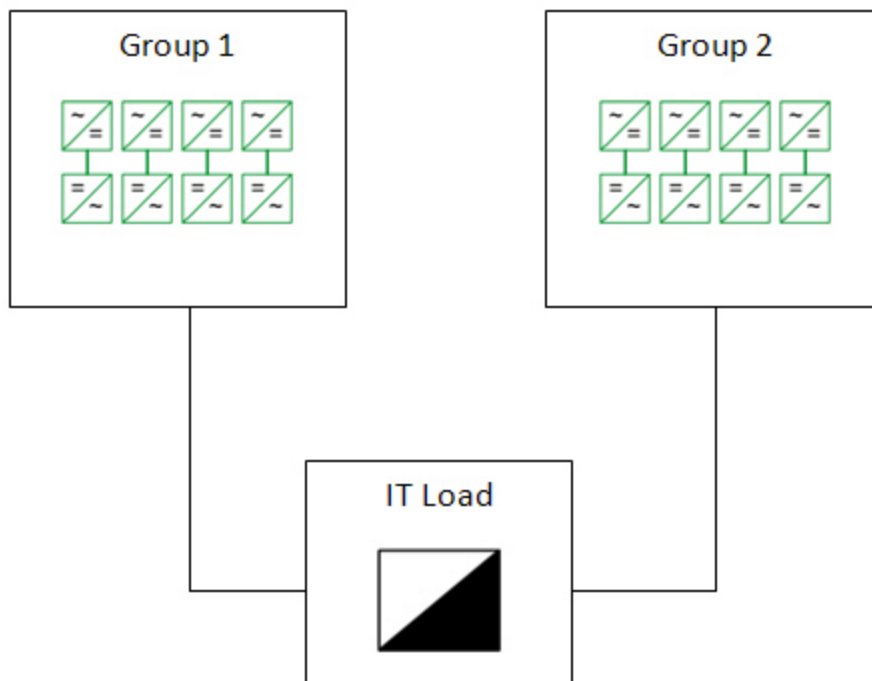


2(N+1) Type

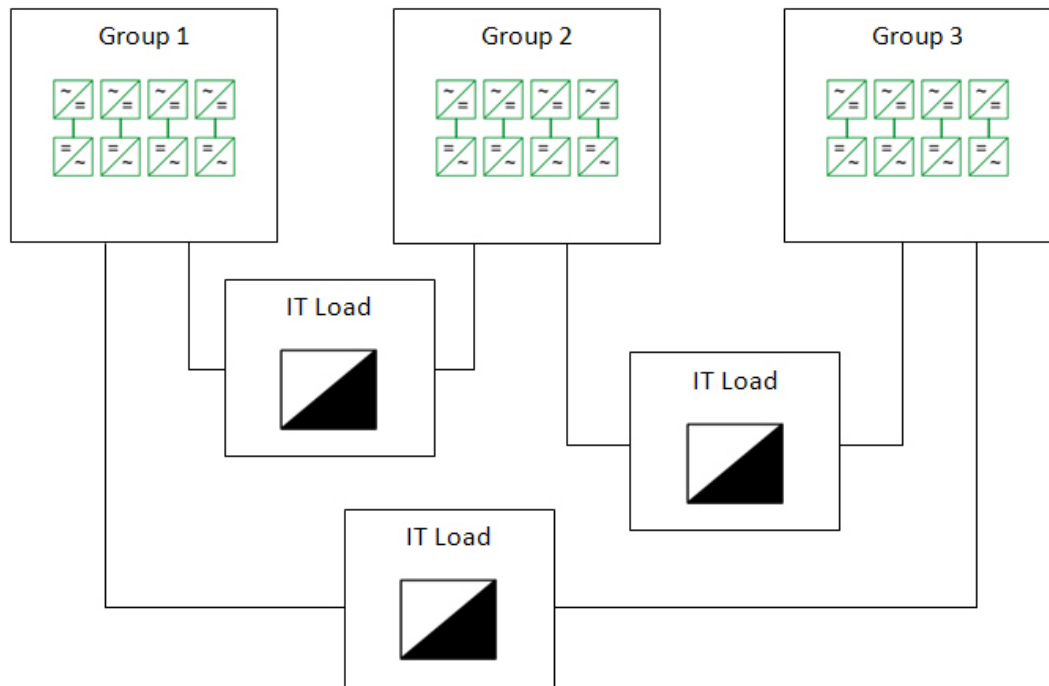
The 2(N+1) system configuration is for two or three groups of UPS modules that supply power to two different power supplies in each IT load. The redundancy provided means that an entire group of UPS modules, plus one more module from the remaining groups, can stop working or be taken off-line, and the IT equipment will still be supplied with power. It also means that either one of the two power supplies in an IT load can be rendered inoperative. The load is spread among all UPS modules, but the peak load is such that if an entire group's worth of modules be rendered inoperative, plus one more from each other group, the remaining modules will be able to assume their load. Another way to look at it is, N UPS modules will be able to support the peak IT load. If the peak IT load is more than N can support, then system design redundancy will be lost.

Each UPS system with a 2(N+1) configuration can have two or three UPS groups. If there are two groups, both of them must be connected to the same load. If there are three groups, then there are three separate loads and each group is connected to two of the loads. The number of modules within each UPS group in a UPS system must be the same in a 2(N+1) configuration. Additionally, all UPS modules within a UPS group must have the same derated nameplate rating value (kW).

In the first example, there are two groups with four UPS modules in each group. One group plus one UPS module from the other group can be rendered inoperative, and the system will still have the designed redundancy. Therefore, the value for N is three. So, the total IT load cannot exceed the derated nameplate rating of three of the UPS modules.



In the second example, there are three groups with four UPS modules in each group. One group plus one module from each of the other two groups can stop working and the system will still have the designed redundancy. Therefore, the value for N is six. So, the total IT load (for all three IT load groups shown below) cannot exceed the derated nameplate rating of six of the UPS modules.

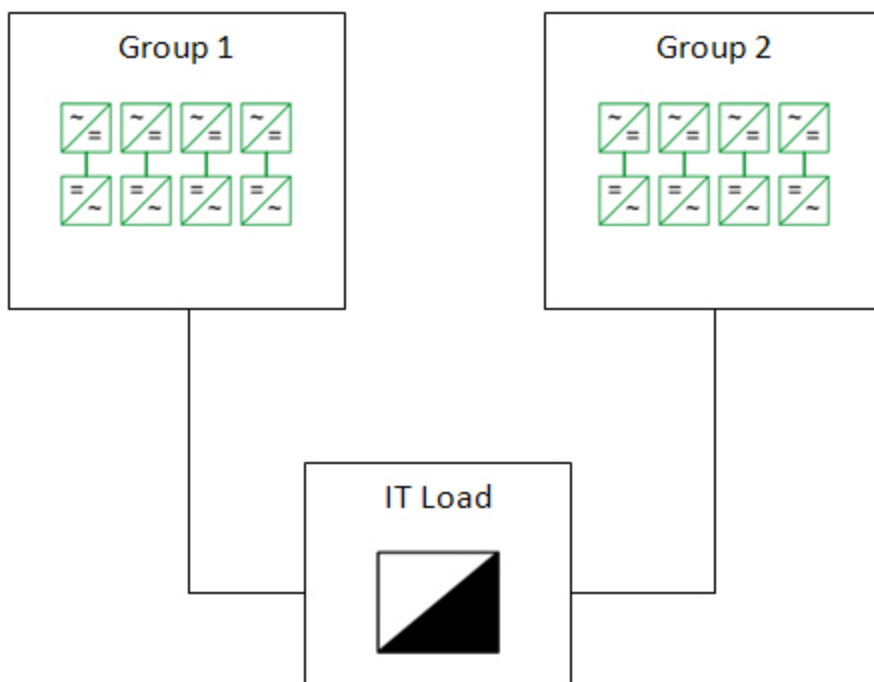


2(N+2) Type

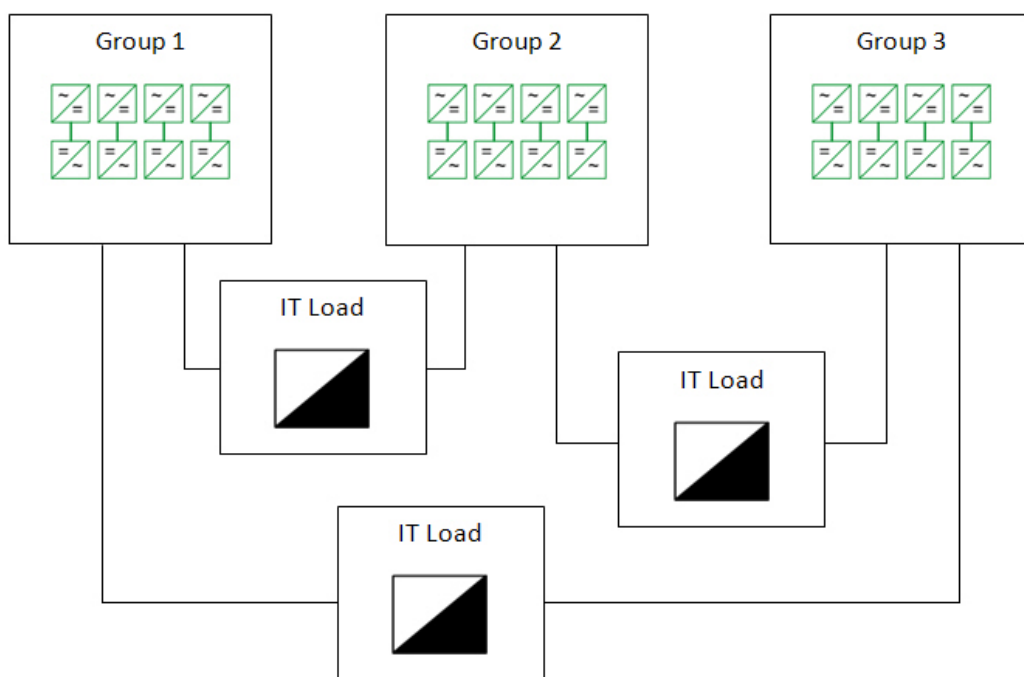
The 2(N+2) system configuration is for two or three groups of UPS modules that supply power to two different power supplies in each IT load. The redundancy provided means that an entire group of UPS modules, plus two more modules from the remaining groups, can stop working or be taken off-line and the IT equipment will still be supplied with power. It also means that either one of the two power supplies in an IT load can stop working. The load is spread among all UPS modules, but the peak load is such that, if an entire group stops working, plus two more from the other group, the remaining modules will be able to assume their load. Another way to look at it is, N UPS modules will be able to support the peak IT load. If the peak IT load is more than N can support, then system design redundancy will be lost.

Each UPS system with a 2(N+2) configuration can have two or three UPS groups. If there are two groups, both of them must be connected to the same IT load. If there are three groups, then there are three separate loads and each group is connected to two of the loads. The number of modules within each UPS group must be the same. All UPS modules within a group must have the same derated nameplate rating value (kW).

In the first example, there are two groups with four UPS modules each. One group can be rendered inoperative, plus two more UPS modules from the other group and the system will still have the designed redundancy. Therefore, the value for N is two. The total IT load cannot exceed the derated nameplate rating of two of the UPS modules.



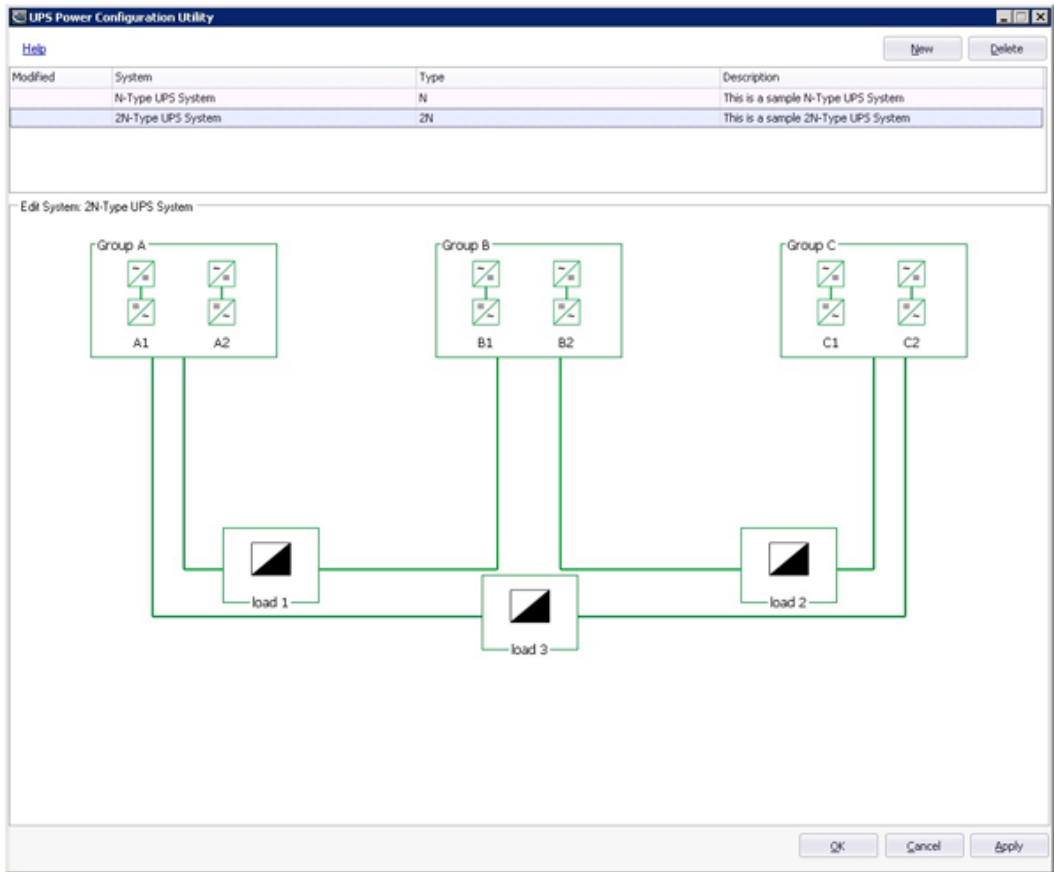
In the second example, there are three groups with four UPS modules each. One group plus two modules from each of the other two groups can stop working, and the system will still have the designed redundancy. Therefore, the value for N is four. So, the total IT load cannot exceed the derated nameplate rating of four of the UPS modules.



Define UPS Systems

The UPS system is the logical system configuration that will be used for reporting power capacity.

The following image is an example of the UPS Power Configuration Utility with a sample generator system selected.



Control	Description
Help	Opens the help for the utility.
New	Creates a new entry in the grid.
Delete	Deletes the selected entry from the grid.
OK	Saves all changes and exits the utility.
Cancel	Exits the utility without saving changes.
Apply	Saves all changes and leaves the utility open.

Grid Area Columns	Description
Modified	Displays a status symbol for the record.
+ (plus)	A new entry.
* (asterisk)	An existing entry has been modified.
! (exclamation mark)	The entry is incorrect.

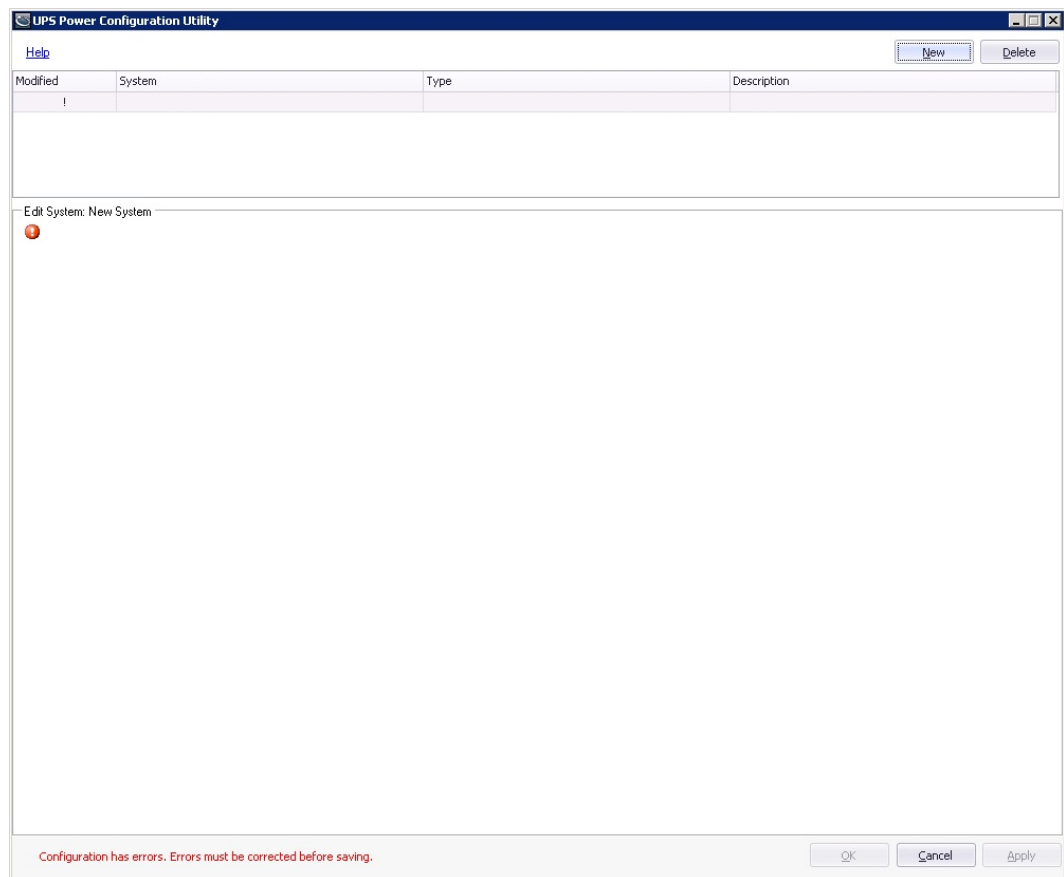
Grid Area Columns	Description
System	Displays the system name.
Type	Displays the UPS system type (N, 2N, N+2, etc)
Description	Displays a description of the system

To start the UPS Power Configuration Utility:

- Double-click the **UPS Power Configuration Utility** icon in the **Power Monitoring Expert DC Ed** folder located on the desktop,
- or
- Click **Start > All Programs > Schneider Electric StruxureWare Power Monitoring Expert DC Ed > UPS Power Configuration Utility**.

To define a new UPS system:

1. Click **New**. The Edit System: New System area appears below the grid.



2. Click anywhere in the editor area. The Properties screen appears.

System Properties for 2N, 2(N+1), or 2(N+2)

Properties for: 2N-Type UPS System

System Name:

Description (optional):

Redundancy Type:

Add [Remove](#)

Groups: 3

[Add](#) [Remove](#)

Modules Per Group: 2

[Done](#)

System Properties for N, N+1, or N+2

Properties for: N-Type UPS System

System Name:

Description (optional):

Redundancy Type:

[Add](#) [Remove](#)

Groups: 2

[Done](#)

3. Complete the details for the UPS system:

- a. **System Name:** Enter a name for the UPS system. Each UPS system must have a unique name.
- b. **Description:** Enter a description for the UPS system. This field is optional.
- c. **Redundancy Type:** Select the redundancy type for the UPS system. The different redundancy types are explained in ["UPS System Redundancy Types" on page 105](#).
- d. **Groups:** Shows the number of UPS groups contained in the UPS system. Click **Add** to add groups to the UPS system. Click **Remove** to delete groups.
- e. **Modules Per Group:** Shows the number of UPS modules in each group in the system. Click **Add** to add UPS modules to the group. Click **Remove** to delete modules. This property is only available when the system redundancy type is 2N, 2(N+1) or 2(N+2). To define the number of modules for a system with redundancy type N, N+1 or N+2, use the UPS group properties. See ["Define UPS Loads" on page 118](#) for more information.

4. Click **Done** to save the UPS system.

Now you can configure the other components of the system:

["Define UPS Groups"](#)

["Define UPS Modules"](#)

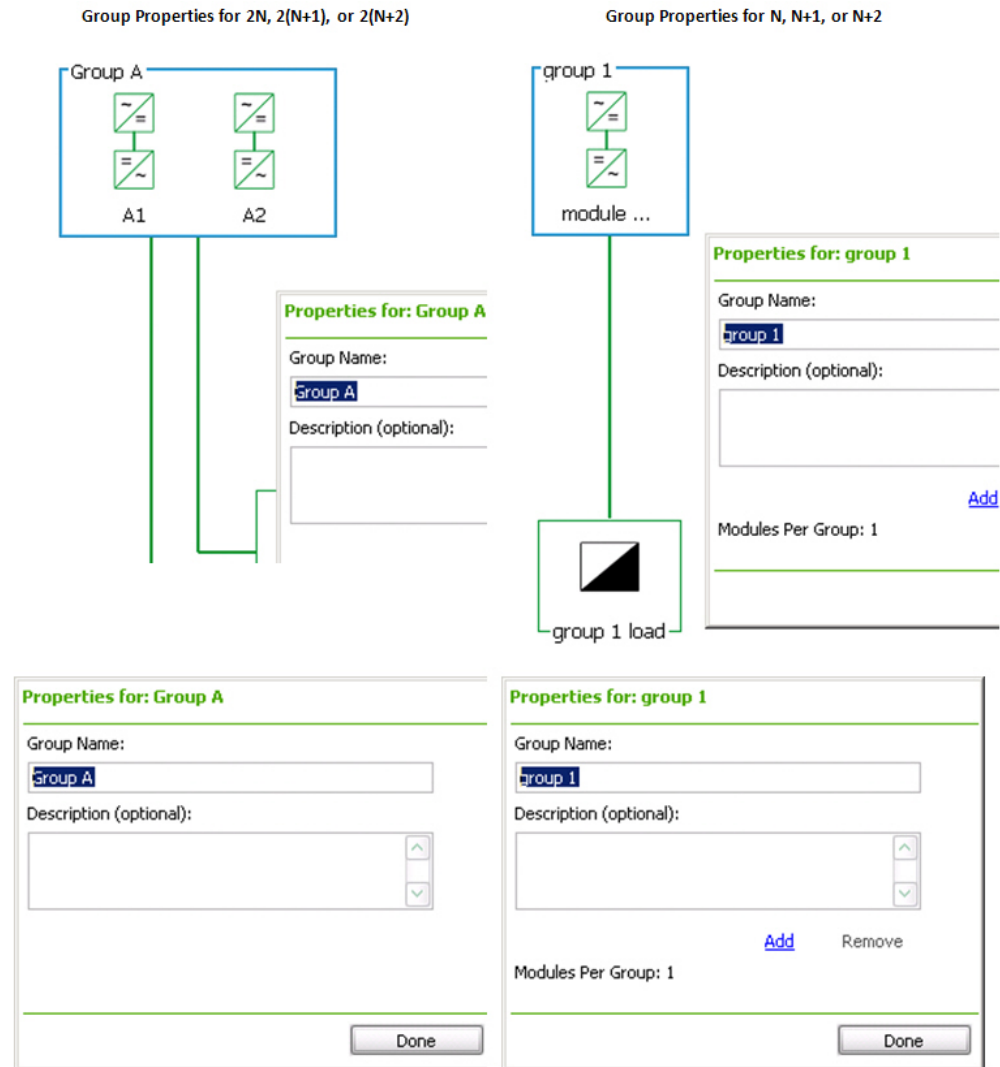
["Define UPS Loads"](#)

Define UPS Groups

A UPS group represents a logical grouping of UPS modules. The system contains at least one group and can contain multiple groups. Depending on the system type, the group properties may be different, as shown below. See ["Configuration Restrictions" on page 118](#) for more information.

To define the properties for a UPS group:

1. Click on the group object border. The Properties screen appears.



2. Complete the details for the UPS group:
 - a. **Group Name:** Enter a name for the group. Each UPS group must have a unique name.
 - b. **Description:** Enter a description for the group. This field is optional.
 - c. **Modules Per Group:** Click **Add** to increase the number of UPS modules in the group. Click **Remove** to decrease the number. This property is available only for system redundancy types N, N+1 or N+2.

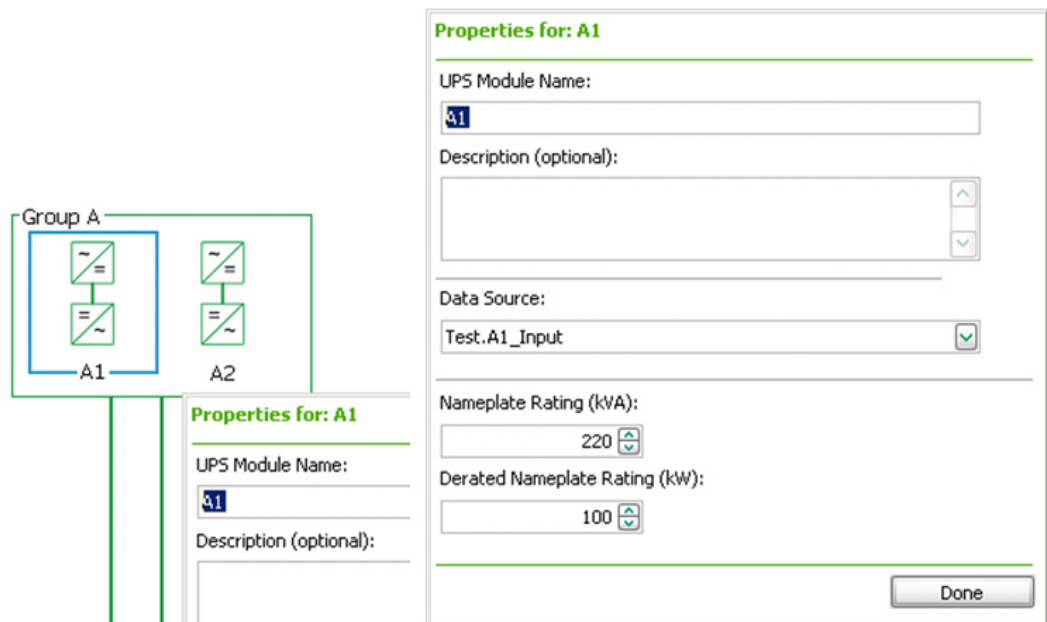
3. Click **Done** to save the UPS group.

Define UPS Modules

A UPS module represents an actual UPS device in the data center. A group contains at least one UPS module and can contain multiple modules. For some system types, each group must contain the same number of UPS modules. See [Configuration Restrictions](#) for more information.

To define a UPS module:

1. Click on the module object border. The selected module will be highlighted in blue and the Properties screen appears.



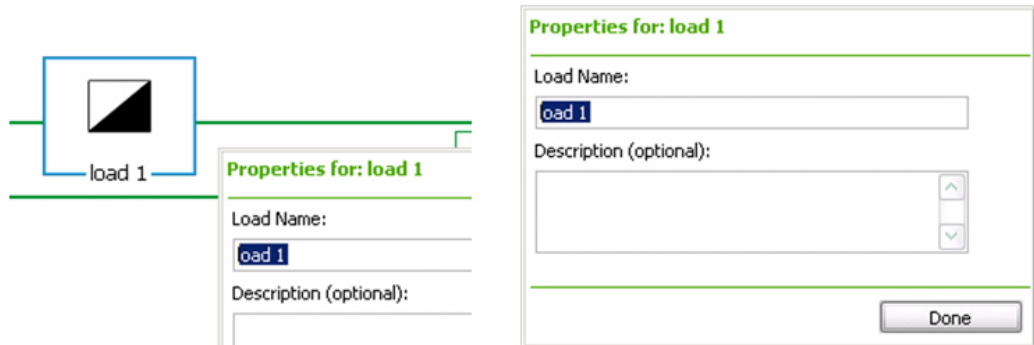
2. Complete the details for the UPS module:
 - a. **UPS Module Name:** Enter the name for the module. This name must be unique for each UPS module in the system.
 - b. **Description:** Enter a description for the module. This field is optional.
 - c. **Data Source:** Select the meter source in Power Monitoring Expert where load data is logged for the UPS module. The source must be unique for each UPS module.
 - d. **Nameplate Rating (kVA):** Enter the maximum output power (kVA) of the UPS module. This value must be greater than zero.
 - e. **Derated Nameplate Rating (kW):** Enter the maximum power capacity (kW) that the UPS module is expected to support. This value must be equal or less than the nameplate rating value, and greater than zero.
3. Click **Done** to save the UPS module.

Define UPS Loads

A UPS load represents the logical load attached to a UPS group. This logical load has no functional purpose in the calculations for power redundancy. The UPS load is used only to provide a more complete diagram representation for the UPS system.

To define a UPS load:

1. Click the UPS load element in the system diagram. The Properties screen appears.



2. Complete the details for the UPS load:
 - a. **Load Name:** Enter a name for the load.
 - b. **Description:** Enter a description for the load. This field is optional.
3. Click **Done** to save the UPS load.

Configuration Restrictions

The configuration tool enforces certain rules when you creating UPS systems, groups and modules:

- **UPS System**

- Name must be unique.
- One or more systems are allowed.

- **UPS Groups**

- Name must be unique.
- At least one group must be present in each system.
- A maximum of three groups are allowed in each system.
- For N, N+1, and N+2 system types:

Each group in the system may have a different number of UPS modules.

Each UPS module in the group must have the same nameplate rating (kVA) value.

Each UPS module in the group must have the same derated nameplate rating (kW) value

Each group is connected to one load only. No other group can be connected to the same load.

- For 2N, 2(N+1) and 2(N+2) system types:

All groups must have the same number of UPS modules.

All UPS modules in the groups must have the same nameplate rating (kVA) value.

All UPS modules in the groups must have the same derated nameplate rating (kW) value.

Depending on the number of groups present in the system, a load may be shared by two groups. See the ["UPS System Redundancy Types" on page 105](#) for more information.

- **UPS Modules**

- Name must be unique.
- At least one module must be present in each group.
- A maximum of 12 modules is allowed in each group.

Power Losses

The Power Losses Module allows you to create, edit, and manage the different logical sources, such as transformers or UPS modules monitoring devices that make up the power losses system. It is this system that will be used for reporting on its losses.

The Power Losses Configuration Utility window consists of two tabs labeled **Transformers** and **UPS Modules**. Each tab contains a grid area and an editor area. The grid area is empty initially but is populated with entries you create through the editor area. Use the editor area to define the settings for new items, or to update the settings for an item that you select in the grid area.

Before a Power Losses Report can be produced, you need to define a power losses system. You do this in the Power Losses Configuration Utility.

The following image is an example of the Power Losses Configuration Utility.

Control	Description
Help	Opens the help for the utility.
New	Creates a new entry in the grid.
Delete	Deletes the selected entry from the grid.
OK	Saves all changes and exits the utility.
Cancel	Exits the utility without saving changes.
Apply	Saves all changes and leaves the utility open.
Grid Area Columns	
Description	
Modified	Displays a status symbol for the record.
+ (plus)	A new entry.
* (asterisk)	An existing entry has been modified.
! (exclamation mark)	The entry is incorrect.

Define the Power Losses Components

To start the Power Losses Configuration Utility, either:

- Double-click the **Power Losses Configuration Utility** icon located in the **Power Monitoring Expert DC Ed** folder,
- or
- Click **Start > All Programs > Schneider Electric > StruxureWare Power Monitoring Expert DC Ed > Power Losses Configuration Utility**.

Select the appropriate tab to define the following power losses components:

["Define a Transformer"](#)

["Define UPS Modules"](#)

Define a Transformer

To create or update components representing the transformers used in your power losses system:

1. Select the **Transformers** tab.
2. Click **New**. The Edit fields are enabled.

The screenshot shows the 'Power Losses Configuration Utility' window with the 'Transformers' tab selected. At the top, there are 'New' and 'Delete' buttons. Below them is a table with the following columns: 'Modified', 'Name', 'Description', 'Input Side Meter', 'Output Side Meter', and 'Type'. The table is currently empty. Below the table, a message states 'No Transformer selected'. Under this message, there are several input fields: 'Name' (a text box), 'Description' (a text box with a scroll bar), 'Input Side Meter Source' (a dropdown menu set to 'Unassigned'), 'Output Side Meter Source' (a dropdown menu set to 'Unassigned'), and 'Low Voltage/Medium Voltage' (a dropdown menu set to 'Low Voltage'). At the bottom right of the window are 'OK', 'Cancel', and 'Apply' buttons.

3. Define the transformer:
 - a. **Name:** Enter a unique name for the transformer.
 - b. **Description:** Enter a description for the transformer (e.g. make, model). This field is optional.
 - c. **Input Side Meter Source:** Select a source name from the drop-down list. The source represents the Power Monitoring Expert device that records the electrical data from the input side of the transformer. See ["Reporting Measurements" on page 139](#) for more information.
 - d. **Output Side Meter Source:** Select a source name from the dropdown list. The source represents the Power Monitoring Expert device that records the electrical data from the output side of the transformer. See ["Reporting Measurements" on page 139](#) for more information.
 - e. **Low Voltage/Medium Voltage:** Select Low Voltage or Medium Voltage from the drop-down list to indicate the transformer voltage rating type.

The screenshot shows the 'Power Losses Configuration Utility' window with the 'Transformers' tab selected. The window contains a table with the following data:

Modified	Name	Description	Input Side Meter	Output Side Meter	Type
+	Transformer Test		MAIN.DP_1	MAIN.DP_7	Low Voltage

Below the table is the 'Edit: New Transformer' form with the following fields:

- Name: Transformer Test
- Description: (empty text box)
- Input Side Meter Source: MAIN.DP_1
- Output Side Meter Source: MAIN.DP_7
- Low Voltage/Medium Voltage: Low Voltage

Buttons for 'New', 'Delete', 'OK', 'Cancel', and 'Apply' are visible.

4. Click **OK** to save the transformer.

Define UPS Modules

To create or update components representing the UPS modules used in your power losses system:

1. Select the **UPS Modules** tab.
2. Click **New**. The Edit fields are enabled.
3. Define the UPS module:
 - a. **Name:** Enter a unique name for the UPS module.
 - b. **Description:** Enter a description for the UPS module (e.g. make, model). This field is optional.
 - c. **Input Side Meter Source:** Select a source name from the drop-down list. The source represents the Power Monitoring Expert device that records the electrical data from the input side of the UPS module. See ["Reporting Measurements" on page 139](#) for more information.
 - d. **Output Side Meter Source:** Select a source name from the drop-down list. The source represents the Power Monitoring Expert device that records the electrical data from the output side of the UPS module. See ["Reporting Measurements" on page 139](#) for more information.

The screenshot shows the 'Power Losses Configuration Utility' window with the 'UPS Modules' tab selected. At the top, there are 'Transformers' and 'UPS Modules' tabs, a 'Help' link, and 'New' and 'Delete' buttons. Below is a table with the following data:

Modified	Name	Description	Input Side Meter	Output Side Meter
	UPS1	TestAuto -UPS1	Warp.ATSTwo	Warp.ATSTwo
	UPS2	TestAuto -UPS2	PAV.ATS_1	PAV.ATS_2

Below the table is an 'Edit: UPS1' section with the following fields:

- Name: UPS1
- Description: TestAuto -UPS1
- Input Side Meter Source: Warp.ATSTwo
- Output Side Meter Source: Warp.ATSTwo

At the bottom right are 'OK', 'Cancel', and 'Apply' buttons.

- Click **OK** to save the UPS module.

Configuration Restrictions

The configuration tool enforces certain rules when you create a power losses system:

- **All Devices**
 - Name must be unique.
 - A meter source must be assigned only once to a particular device.
- **Transformers**
 - Zero, one, or more low voltage transformers may be present in the power losses system.
 - Zero, one, or more medium voltage transformers may be present in the power losses system.
- **UPS Modules**
 - Zero, one, or more UPS modules may be present in the power losses system.

Data Center Reports

In addition to the default Power Monitoring Expert - Data Center Edition includes several reports to help customers manage the different systems that make up Power Monitoring Expert - Data Center Edition. The reports are available in the Reports module of the Web Applications module. For additional information regarding reports, refer to the Reports section of the Web Applications help system.

WARNING

INCORRECT REPORT RESULTS

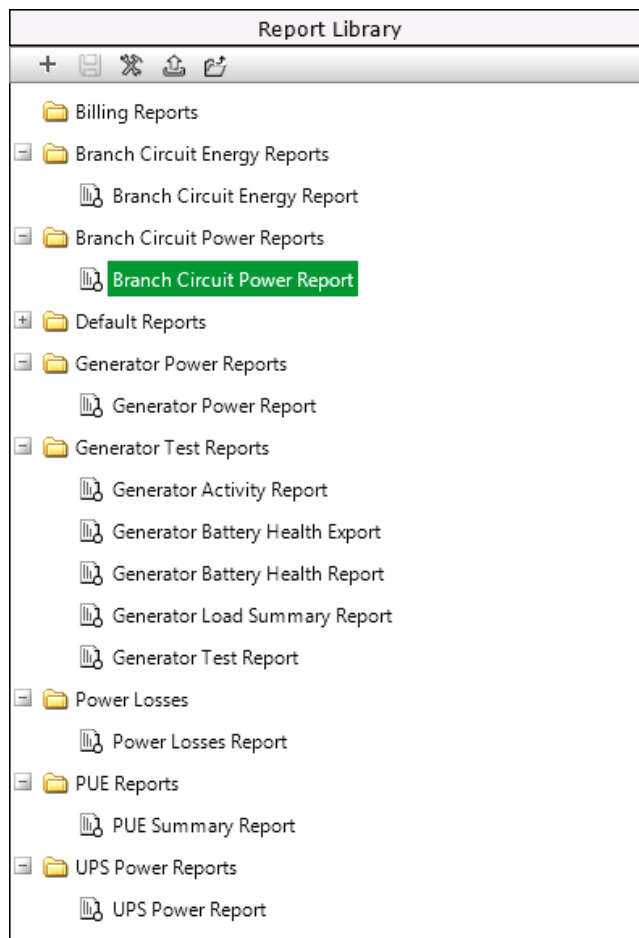
- Do not incorrectly configure the software, as this can lead to incorrect reports and/or data results.
- Do not base your maintenance or service actions solely on messages and information displayed by the software.
- Use system reports as a supplement to proper workplace practices or equipment maintenance, not as a substitute.
- Do not rely solely on software messages and reports to determine if the system is functioning correctly or meeting all applicable standards and requirements.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The Data Center Reports consist of the following reports:

- **Generator Power Report** - See ["Generator Power Report" on page 125](#)
- **Power Losses Report** - See ["Power Losses Report" on page 136](#)
- **UPS Report** - See ["UPS Power Report" on page 130](#)
- **PUE Summary Report** - See ["Power Usage Effectiveness \(PUE\)" on page 142](#)
- **Generator Activity Report** - See "Generator Activity Report" in the *StruxureWare Power Monitoring Expert - Data Center Edition Generator Test User Guide*
- **Generator Battery Health Export** - See "Generator Battery Health Export" in the *StruxureWare Power Monitoring Expert - Data Center Edition Generator Test User Guide*
- **Generator Battery Health Report** - See "Generator Battery Health Report" in the *StruxureWare Power Monitoring Expert - Data Center Edition Generator Test User Guide*
- **Generator Test Report** - See "Generator Test Report" in the *StruxureWare Power Monitoring Expert - Data Center Edition Generator Test User Guide*
- **Branch Circuit Power Report** - See ["Branch Circuit Power Report" on page 147](#)
- **Branch Circuit Energy Report** - See ["Branch Circuit Energy Report" on page 151](#)

To access the Report Library, open the StruxureWare Power Monitoring Expert DC Ed folder, open the Web Applications feature, enter your User Name and Password, and click the **Reports** tab. Click the arrow on the right side of the Reports window to open the Report Library.

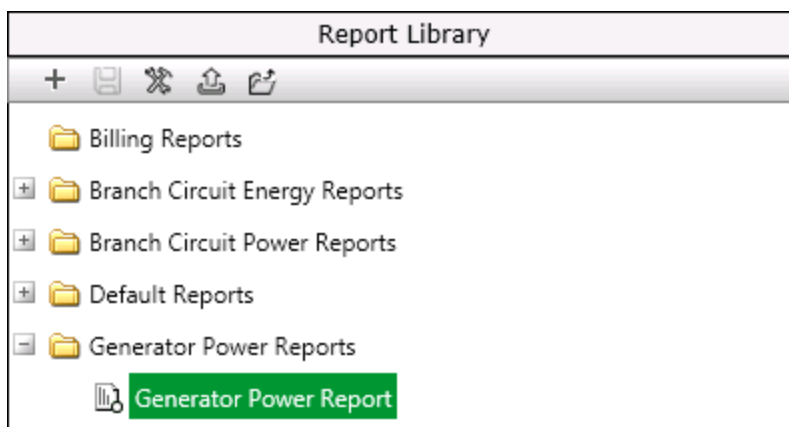


Generator Power Report

The Generator Power Report data depends on the selections you make while configuring the report and the contents of the Power Monitoring Expert database. See ["Capacity Measurements" on page 128](#) for more details on the Generator Power report data.

To configure and run a report:

1. Log in to the Power Monitoring Expert **Web Application**.
2. Click the **Reports** icon.
3. Under Generator Power Reports, click **Generator Power Report**.

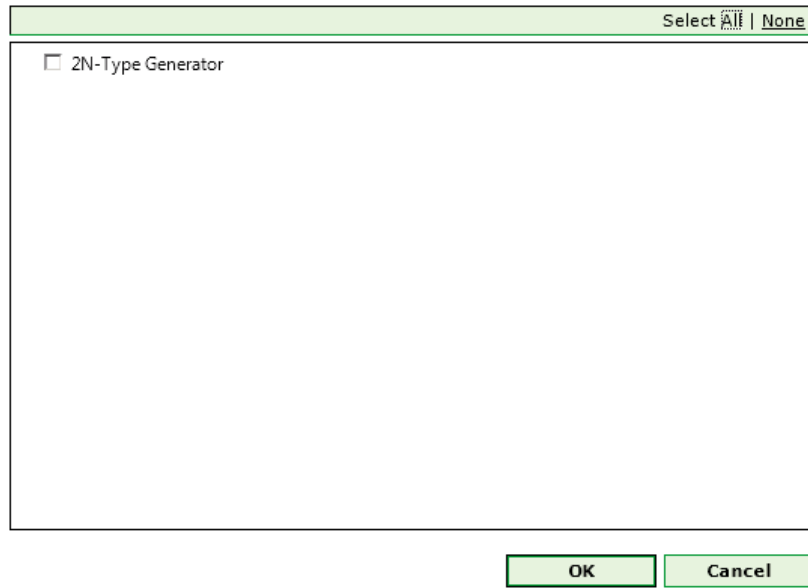


The report template appears.

The screenshot shows the 'Generator Power Report' configuration form. It has a title bar 'Generator Power Report'. The form contains several fields and options: 'Title' (text box with 'Generator Power'), 'Facility Name' (text box with 'Data Center'), 'Facility Location' (text box), 'Report Data' (button labeled 'Select Generator Systems'), 'Reporting Period' (dropdown menu with 'Last 7 Days' selected, and a date range '[start of day 7/24/2013 to end of day 7/30/2013]'), 'Aggregation Period' (dropdown menu with 'Daily' selected), 'Include Data Tables' (radio buttons for 'Yes' and 'No', with 'Yes' selected), 'Show Data Warnings' (radio buttons for 'Yes' and 'No', with 'Yes' selected), and 'Report Help' (a link labeled 'Help...'). At the bottom of the form is a green button labeled 'Generate Report'.

4. Complete the details for the report:

- **Title:** Enter a title for the report.
- **Facility Name:** Enter the name of your data center facility.
- **Facility Location:** Enter a name for your data center facility location. This field is optional.
- **Report Data:** Select one or more system configurations to use in the report:
 - Click **Select Generator Systems**. The Selector screen appears with the generator systems you set up in the Configuration Utility.



- Select one or more generator systems.
 - Click **OK** to save your selection.
 - **Reporting Period:** Set the reporting period for the report. Also select whether you want the report timestamps to be in Server Local Time or UTC (Universal Time).
 - **Aggregation Period:** Set the interval frequency for aggregating the report data.
 - **Include Data Tables:** Select **Yes** to include a section for capacity data in the report. Select **No** to exclude capacity data.
 - **Show Data Warnings:** Select **Yes** to include data warnings in the report. Select **No** to exclude data warnings from the report.
 - **Report Help:** Opens the online help for this report.
5. Click **Generate Report** to create the Generator Power Report.

After you generate the report, you can save it with some or all of the inputs defined. See ["Managing the Generator Power Report" on page 127](#) for more information.

Managing the Generator Power Report

The Manage Reports dialog provides options to manage, share, and subscribe to reports.

Open the dialog by clicking the Manage icon at the top of the Report Library pane. The following options are available:

- **Manage** – create a new folder, delete or rename a folder or report, or move or copy a report from one folder to another.
- **Share** – make a report available to a user or group.
- **Subscribe** – generate a report on a defined schedule or when system events or device alarms occur, and distribute it via email or send to a file share or a printer.

Refer to the Report management, sharing and subscriptions section of the Web Application help file for additional information.

Save the Generator Power Report

After you generate a Generator Power Report, you can save it with some or all of the inputs defined.

1. Click the Save icon  at the top of the Report Library window. The **Save Report** dialog appears.
2. In the Save Report dialog, enter the name of the report file in the **Name:** field. The default name is the report name.
3. Select the checkboxes for the inputs you want to save with the report. The next time you generate the saved report, you must specify the inputs that were not saved.
4. Click **OK**. The report is saved with the selected inputs. The saved report title now appears in the Report Library in the Generator Power Reports folder.

To retrieve the report, locate the report in the Report Library list and double-click to open.

Capacity Measurements

The Generator Power Report uses a priority table to determine which measurement to use for querying power data for a load.

The table is stored in the Power Monitoring Expert database, and consists of a list of measurement IDs with a priority value for each measurement. When the report is querying for data, it iterates through the measurement list according to the priority and queries the database for load data. Once data is found, it is returned in the report.

By default, the table GEN_CapacityMeasurement holds four known measurements:

Priority	Measurement ID	Measurement Name
1	116	Active Power Sliding Window Demand Delivered
2	107	Active Power Sliding Window Demand Delivered-Received
3	128	Active Power Mean
4	193	Active Power

Measurement ID	Devices Found
116	ION7650
107	ION7650, Modbus devices: BCPM, CM2000, CM3000, CM4000, Micrologic A and E (for CompactNSX breakers), EM5600, Micrologic E, H, P (for Masterpact breakers), PM1200 and PM800
128	ION7650
193	Modbus devices: CM2000, CM3000, CM4000, Micrologic A and E (for CompactNSX breakers), EM5600, Micrologic E, H, P (for Masterpact breakers), PM1200, PM800, Sepam 40 series and Sepam 80 series

Calculations

Use the following calculations to determine the Number of Generators Required for Redundancy Design Limit, Redundancy Design Limits, Derated Nameplate Ratings, and Peak Load and Available Capacity.

Number of Generators Required for Redundancy Design Limit

The system configuration defines N, or the number of generators required for Redundancy Design Limit. This number is required for calculating Redundancy Design Limit, which is part of the graphical and tabular output in the Generator Power Report.

The formulas for N that apply to a generator system are as follows:

For N Redundancy Type

$$N = \text{Total number of generators}$$

For N+1 Redundancy Type

$$N = (\text{Total number of generators}) - 1$$

For N+2 Redundancy Type

$$N = (\text{Total number of generators}) - 2$$

For 2N Redundancy Type

$$N = [(\text{Total number of generators}) / (\text{number of groups})] * (\text{number of groups} - 1)$$

For 2(N+1) Redundancy Type

$$N = [((\text{Total number of generators}) / (\text{number of groups}) - 1) * (\text{number of groups} - 1)]$$

For 2(N+2) Redundancy Type

$$N = [((\text{Total number of generators}) / (\text{number of groups}) - 2) * (\text{number of groups} - 1)]$$

Redundancy Design Limits

The calculated value for Redundancy Design Limits will be represented as a red line in the Load Charts of the Generator Power Report:

For all Redundancy Types, except N Type:

*Redundancy Design Limit of System (kW) = N * (sum of the Derated Nameplate value of the generators in the system / total number of generators in system)*

For N Redundancy Type

Redundancy Design Limit of System (kW) = Derated Nameplate Rating of System (kW)

Derated Nameplate Ratings

The calculated value for Derated Nameplate Rating will be represented as a black line in the Load Charts of the Generator Power Report:

*Derated Nameplate Rating of System (kW) = (Derated Nameplate Rating value of a single generator in the system) * (number of generators in the system)*

Peak Load and Available Capacity

The calculated value for Peak Load and Available Capacity will be represented as a dark green column and a light green column respectively, in the Load Charts of the Generator Power Report:

Peak Load of System (kW) = Peak value, by the aggregation period, from the load in the system over the user selected reporting period. This is determined by aggregating the power values at each interval for all the system's load meters.

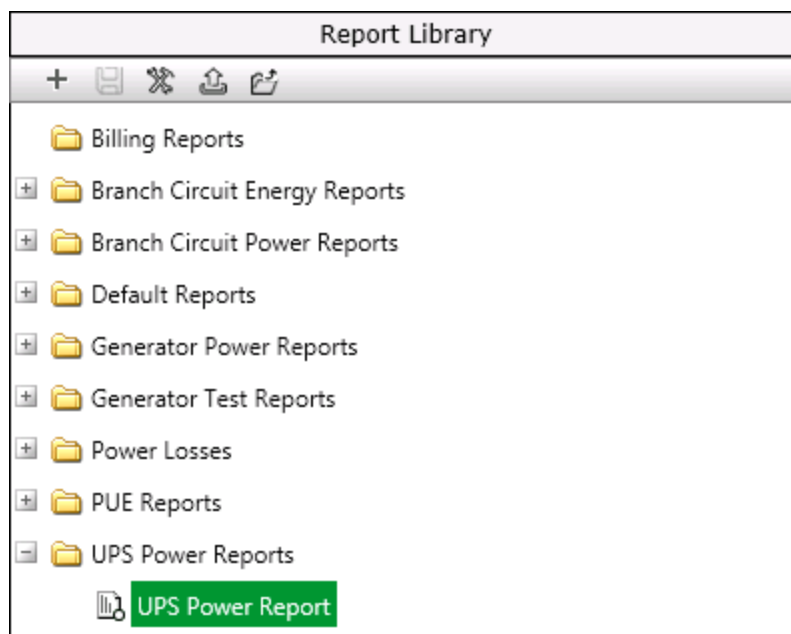
Available Power Capacity of System (kW) = Redundancy Design Limit of System (kW) – Peak Load of System (kW)

UPS Power Report

The UPS Power Report data depends on the selections you make while configuring the report and the contents of the Power Monitoring Expert database. See ["Capacity Measurements" on page 133](#) for more details on report data.

To configure and run a report:

1. Log in to the Power Monitoring Expert **Web Applications**.
2. Click the **Reports** icon.
3. Under UPS Power Reports, click **UPS Power Report**.

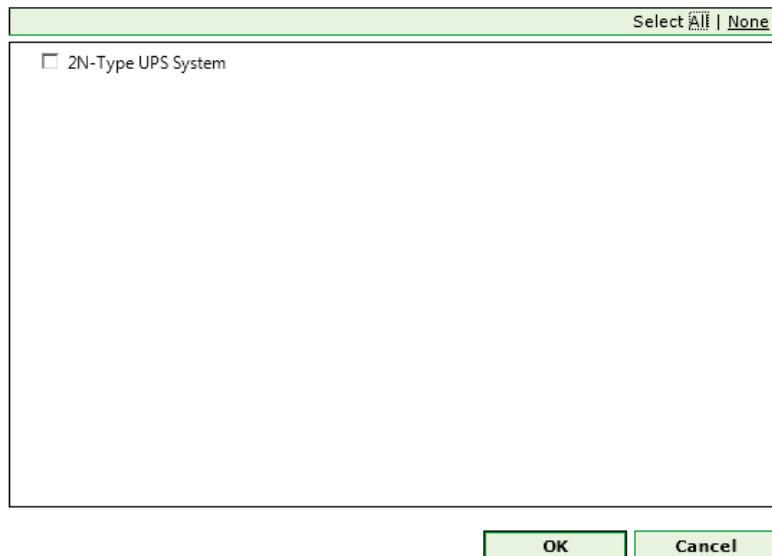


The report template appears.

UPS Power Report	
Title	Ups Power
Facility Name	Data Center
Facility Location	
Report Data	Select UPS Systems Test_UPS3
Reporting Period	Last 7 Days [start of day 7/27/2013 to end of day 8/2/2013]
Aggregation Period	Daily
Include Data Tables	☒ Yes ☐ No
Show Data Warnings	☒ Yes ☐ No
Report Help	Help...
Generate Report	

Complete the details for the report:

- **Title:** Enter a title for the report.
 - **Facility Name:** Enter the name of your data center facility.
 - **Facility Location:** Enter a name for your data center facility location. This field is optional.
 - **Report Data:** Select one or more system configurations to use in the report:
4. Click **Select UPS Systems**. The Selector screen appears with the UPS systems you set up in the Configuration Utility.



5. Select one or more UPS systems.
6. Click **OK** to save your selection.
7. Complete the remaining configuration details for the report:

Reporting Period: Set the reporting period for the report. Also select whether you want the report timestamps to be in Server Local Time or UTC (Universal Time).

Aggregation Period: Set the interval frequency for aggregating the report data.

Include Data Tables: Select **Yes** to include a section for capacity data in the report. Select **No** to exclude capacity data.

Show Data Warnings: Select **Yes** to include data warnings in the report. Select **No** to exclude data warnings from the report.

Report Help: Opens the online help for this report.

Click **Generate Report** to create the UPS Power Report.

After you generate the report, you can save it with some or all of the inputs defined. See ["Managing the UPS Power Report" on page 132](#) for more information.

Managing the UPS Power Report

The Manage Reports dialog provides options to manage, share, and subscribe to reports.

Open the dialog by clicking the Manage icon at the top of the Report Library pane. The following options are available:

- **Manage** – create a new folder, delete or rename a folder or report, or move or copy a report from one folder to another.
- **Share** – make a report available to a user or group.

- **Subscribe** – generate a report on a defined schedule or when system events or device alarms occur, and distribute it via email or send to a file share or a printer.

Refer to the Report management, sharing and subscriptions section of the Web Application help file for additional information.

Save the UPS Power Report

After you generate a UPS Power Report, you can save it with some or all of the inputs defined.

1. Click the Save icon  at the top of the Report Library window. The **Save Report** dialog appears.
2. In the Save Report dialog, enter the name of the report file in the **Name:** field. The default name is the report name.
3. Select the checkboxes for the inputs you want to save with the report. The next time you generate the saved report, you must specify the inputs that were not saved.
4. Click **OK**. The report is saved with the selected inputs. The saved report title now appears in the Report Library in the Generator Power Reports folder.

To retrieve the report, locate the report in the Report Library list and double-click to open.

Capacity Measurements

The UPS Power Report uses a priority table to determine which measurement to use for querying power data for a UPS module.

The table is stored in the Power Monitoring Expert database, and consists of a list of measurement IDs with a priority value for each measurement. When the report is querying for data, it iterates through the measurement list according to the priority and queries the database for load data. Once data is found, it is returned in the report.

By default, the table UPS_CapacityMeasurement holds four known measurements:

Priority	Measurement ID	Measurement Name
1	116	Active Power Sliding Window Demand Delivered
2	107	Active Power Sliding Window Demand Delivered-Received
3	128	Active Power Mean
4	193	Active Power

Measurement ID	Devices Found
116	ION7650
107	ION7650, Modbus devices: BCPM, CM2000, CM3000, CM4000, Micrologic A and E (for CompactNSX breakers), EM5600, Micrologic E, H, P (for Masterpact breakers), PM1200 and PM800
128	ION7650
193	Modbus devices: CM2000, CM3000, CM4000, Micrologic A and E (for CompactNSX breakers), EM5600, Micrologic E, H, P (for Masterpact breakers), PM1200, PM800, Sepam 40 series and Sepam 80 series

Calculations

Use the following calculations to determine the "Number of modules required for Redundancy Design Limit", "Redundancy Design Limits", "Derated Nameplate Ratings", and "Peak Load and Available Capacity".

Number of modules required for Redundancy Design Limit

The system configuration defines N, or the number of generators required for Redundancy Design Limit. This number is required for calculating Redundancy Design Limit, which is part of the graphical and tabular output in the Generator Power Report.

The formulas for N that apply to a generator system are as follows:

For N Redundancy Type

$$N = \text{Total number of modules}$$

For N+1 Redundancy Type

$$N = (\text{Total number of modules}) - 1$$

For N+2 Redundancy Type

$$N = (\text{Total number of modules}) - 2$$

For 2N Redundancy Type

$$N = [(\text{Total number of modules}) / (\text{number of groups})] * (\text{number of groups} - 1)$$

For 2(N+1) Redundancy Type

$$N = [((\text{Total number of modules}) / (\text{number of groups})) - 1] * (\text{number of groups} - 1)$$

For 2(N+2) Redundancy Type

$$N = [((\text{Total number of modules}) / (\text{number of groups})) - 2] * (\text{number of groups} - 1)$$

Redundancy Design Limits

The calculated value for Redundancy Design Limits will be represented as a red line in the Load Charts of the UPS Power Report:

For UPS Systems:

For all Redundancy Types, except N Type:

$$\text{Redundancy Design Limit of System (kW)} = N * (\text{Derated Nameplate Rating value of a single UPS module in the system})$$

For N Redundancy Type

$$\text{Redundancy Design Limit of System (kW)} = \text{Derated Nameplate Rating of System (kW)}$$

For UPS Groups:

For all Redundancy Types, except N Type:

*Redundancy Design Limit of Group (kW) = (Redundancy Design Limit of Group (kW) *
(number of modules in the group)*

For N Redundancy Type

Redundancy Design Limit of Group (kW) = Derated Nameplate Rating of Group (kW)

For UPS Modules:

For all Redundancy Types, except N Type:

*Redundancy Design Limit of Module (kW) = (Redundancy Design Limit of Module (kW) /
(number of modules in the system)*

For N Redundancy Type

Redundancy Design Limit of Module (kW) = Derated Nameplate Rating of Module (kW)

Derated Nameplate Ratings

The calculated value for Derated Nameplate Rating will be represented as a black line in the Load Charts of the UPS Power Report:

For UPS Systems:

*Derated Nameplate Rating of System (kW) = (Derated Nameplate Rating value of a single
UPS module in the system) * (number of modules in the system)*

For UPS Groups:

*Derated Nameplate Rating of Group (kW) = (Derated Nameplate Rating value of a single
UPS module in the system) * (number of modules in the system)*

For UPS Modules:

*Derated Nameplate Rating of Module (kW) = Derated Nameplate Rating value for the UPS
module*

Peak Load and Available Capacity

The calculated value for Peak Load and Available Capacity will be represented as a dark green column and a light green column respectively, in the Load Charts of the UPS Power Report:

For UPS systems:

*Peak Load of System (kW) = Peak value, by the aggregation period, from all the UPS
modules in the system over the user selected reporting period. This is determined by
aggregating the power values at each interval for all the system's UPS module meters.*

*Available Power Capacity of System (kW) = Redundancy Design Limit of System (kW) –
Peak Load of System (kW)*

For UPS Groups:

*Peak Load of Group (kW) = Sum of the loads of the UPS modules in the UPS group
coincident with the System Peak Load timestamp*

Available Power Capacity of Group (kW) = Redundancy Design Limit of Group (kW) – Peak Load of Group (kW)

For UPS Modules:

Peak Load of Group (kW) = Sum of the loads of the UPS modules in the UPS group coincident with the System Peak Load timestamp

Available Power Capacity of Group (kW) = Redundancy Design Limit of Group (kW) – Peak Load of Group (kW)

Power Losses Report

The Power Losses Report data depends on the selections you make while configuring the report and the contents of the Power Monitoring Expert database.

To configure and run a report:

1. Log in to the Power Monitoring Expert **Web Applications**.
2. Click the **Reports** icon.
3. Under Power Losses, click **Power Losses Report**.

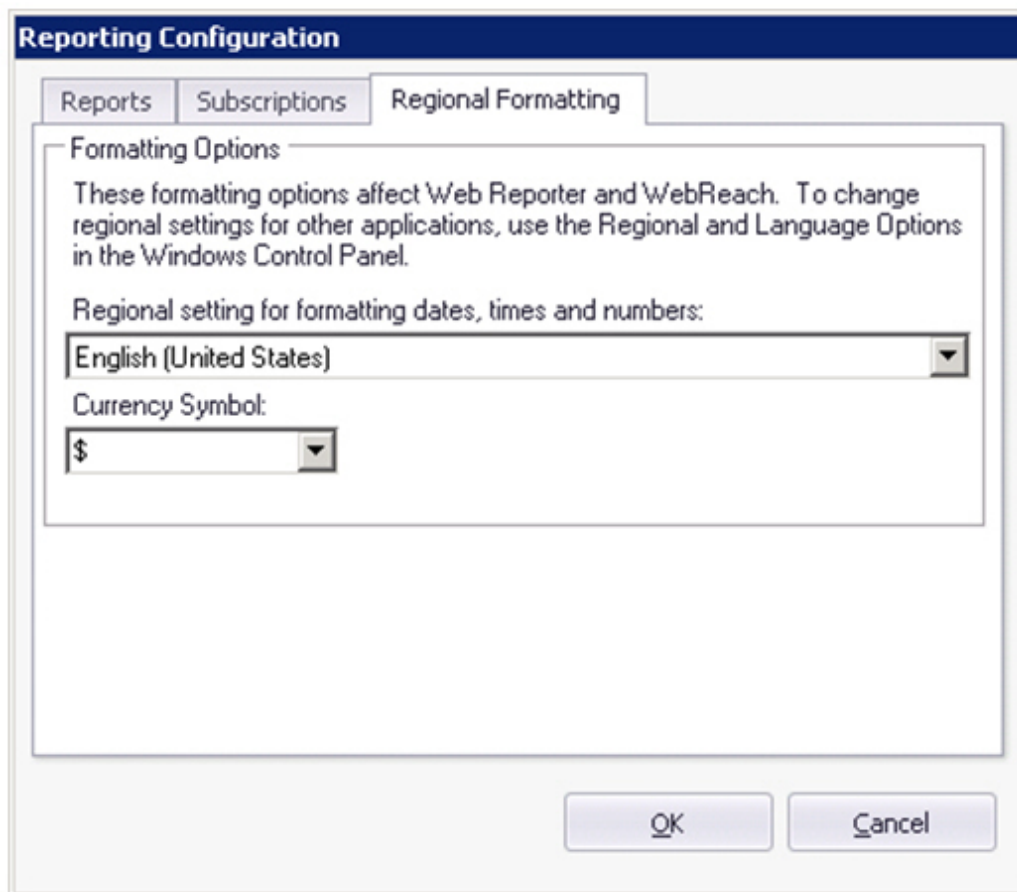


The report template appears.

Power Losses Report	
Title	Power Losses
Facility Name	Data Center
Facility Location	
Reporting Period	Last 7 Days [start of day 10/19/2012 to end of day 10/25/2012] Server Local Time
Aggregation Period	Daily
Energy Cost (per kWh)	1.00 (in \$)
Include Data Tables	☐ Yes ☒ No
Show Data Warnings	☐ Yes ☒ No
Report Help	Help...
Generate Report	

4. Complete the details for the report:

- **Title:** Enter a title for the report.
- **Facility Name:** Enter the name of your data center facility.
- **Facility Location:** Enter a name for your data center facility location. This field is optional.
- **Reporting Period:** Set the reporting period for the report. Also select whether you want the report timestamps to be in Server Local Time or UTC (Universal Time).
- **Aggregation Period:** Set the interval frequency for aggregating the report data.
- **Energy Cost (per kWh):** Enter the appropriate value for the blended cost of energy. This value is used in the calculations for cost of losses in the report. Only numeric values with up to two decimal places will be used in the report.
- The currency symbol used to display the cost values is set in the **Management Console** application **Reporting Configuration** tool. On the **Regional Formatting** tab, select a **Currency Symbol** from the dropdown list.



- **Include Data Table:** Select **Yes** to include a section for capacity data in the report. Select **No** to exclude capacity data.
 - **Show Data Warnings:** Select **Yes** to include data warnings in the report. Select **No** to exclude data warnings from the report.
 - **Report Help:** Opens the online help for this report.
5. Click **Generate Report** to create the Power Losses Report.

After you generate the report, you can save it with some or all of the inputs defined. See ["Save a Report" on page 138](#) for more information.

Save a Report

After you generate a Power Losses Report, you can save it with some or all of the inputs defined.

To save a report:

1. Click the Save icon  at the top of the Report Library window. The **Save Report** dialog appears.

2. In the Save Report dialog, enter the name of the report file in the **Name:** field. The default name is the report name.
3. Select the checkboxes for the inputs you want to save with the report. The next time you generate the saved report, you must specify the inputs that were not saved.
4. Click **OK**. The report is saved with the selected inputs. The saved report title now appears in the Report Library in the Power Losses folder.

To retrieve the report, locate the report in the Report Library list and double-click.

Reporting Measurements

The Power Losses Report uses a priority table to determine which measurement to use for querying energy and power data for the different devices defined in the power losses system.

The table is stored in the Power Monitoring Expert database, and consists of a list of measurement IDs with a priority value for each measurement. When the report is querying for data, it iterates through the measurement list according to the priority and queries the database for the specific type of data. Once data is found, it is returned in the report.

The report also looks for different types of logical measurements, catalogued in a separate Measurements table.

By default, the table PSL_PSLMeasurementCategory holds two known measurements:

Category ID	Category Name
1	Power
2	Energy

By default the table PSL_PSLMeasurementPriorityMapping holds the following information:

Category ID	Physical ID	Priority	(Physical) Measurement Name
1	116	1	Active Power Sliding Window Demand Delivered
1	107	2	Active Power Sliding Window Demand Delivered-Received
1	128	3	Active Power Mean
1	193	4	Active Power
2	129	1	Active Energy Delivered
2	135	2	Active Energy Delivered-Received
3	25	1	Current Total Harmonic Distortion Phase A Mean
3	527	2	Current Total Harmonic Distortion Phase A
4	30	1	Current Total Harmonic Distortion Phase B Mean
4	528	2	Current Total Harmonic Distortion Phase B
5	35	1	Current Total Harmonic Distortion Phase C Mean
5	529	2	Current Total Harmonic Distortion Phase C
6	13	1	Current Phase Average Sliding Window Demand Delivered
6	12	2	Current Phase Average Mean
6	182	3	Current Phase Average
7	170	1	Average Voltage Line-to-Line Mean
7	537	2	Average Voltage Line-to-Line
8	151	1	Power Factor Mean*
8	210	2	Power Factor Signed

*This measurement was named 'Power Factor Signed Mean' in SPM versions prior to 7.0

Devices that provide *Power* measurements:

Measurement ID	Devices Found
116	ION7650
107	ION7650, Modbus devices: BCPM, CM2000, CM3000, CM4000, Micrologic A and E (for CompactNSX breakers), EM5600, Micrologic E, H, P (for Masterpact breakers), PM1200 and PM800
128	ION7650
193	Modbus devices: CM2000, CM3000, CM4000, Micrologic A and E (for CompactNSX breakers), EM5600, Micrologic E, H, P (for Masterpact breakers), PM1200, PM800, Sepam 40 series and Sepam 80 series

Devices that provide *Energy* measurements:

Measurement ID	Devices Found
129	ION7650
135	ION7650, Modbus devices: BCPM and Micrologic E (for Masterpact breakers)

Devices that provide *Current Phase Average* measurements:

Measurement ID	Devices Found
13	---
12	ION7650
182	ION7650 Modbus devices: CM2000, CM3000, CM4000, Micrologic A and E (for CompactNSX breakers), DM6200, EM5600, Micrologic E, H, P (for Masterpact breakers), PM1200, PM200, PM700 and PM800

Devices that provide *Average Voltage Phase to Phase* measurements

:

Measurement ID	Devices Found
170	ION7650
537	ION7650 Modbus devices: BCPM, CM2000, CM3000, CM4000, Micrologic A and E (for CompactNSX breakers), DM6200, Micrologic E, H, P (for Masterpact breakers), PM1200, PM200, PM700 and PM800

Devices that provide *Power Factor Signed* measurements:

Measurement ID	Devices Found
151	ION7330, ION7350, ION 8800
210	ION7650 Modbus devices: CM2000, CM3000, CM4000, Micrologic A and E (for CompactNSX breakers), EM5600, Micrologic E, H, P (for Masterpact breakers), PM200, PM700, PM800, Sepam 40 series and Sepam 80 series

Power Loss, Cost of Power Loss, and Efficiency Calculations

Use the following calculations to determine power loss, cost of power loss, and efficiency for the different devices in the power losses system.

Transformers (Low Voltage and Medium Voltage)

- **Average Transformer Power Losses (kW)** = (Average of Power values, by aggregation period, for the input meter) – (Average of Power values, by aggregation period, for the output meter) over the user-selected reporting period.
- **Cost of Transformer Power Losses** = [Transformer Energy Losses (kWh) * (User-defined Energy Cost)] over the user-selected reporting period.
 - where **Transformer Energy Losses (kWh)** = (Energy Usage, by aggregation period, for the input meter) - (Energy Usage, by aggregation period, for the output meter)
 - where **Energy Usage By Aggregation Period (kWh)** = (Active Energy reading from the last interval of the aggregation period) - (Active Energy reading from the first interval of the aggregation period)

- **Transformer Efficiency (%)** = $\{[(\text{Average of Power value, by aggregation period, for the output meter}) / (\text{Average of Power values, by aggregation period, for the input meter})] * 100\}$ over the user-selected reporting period.

See ["Reporting Measurements" on page 139](#) for more information about the different measurement priorities used for Power and Energy Measurements.

UPS Modules

- **Average UPS Module Power Losses (kW)** = (Average of Power values, by aggregation period, for the input meter) – (Average of Power values, by aggregation period, for the output meter) over the user-selected reporting period.
- **Cost of UPS Module Power Losses** = [UPS Module Energy Losses (kWh) * (User-defined Energy Cost)] over the user-selected reporting period.
- where **UPS Module Energy Losses (kWh)** = (Energy Usage, by aggregation period, for the input meter) - (Energy Usage, by aggregation period, for the output meter)
 - where **Energy Usage By Aggregation Period (kWh)** = (Active Energy reading from the last interval of the aggregation period) - (Active Energy reading from the first interval of the aggregation period)
- **UPS Module Efficiency (%)** = $\{[(\text{Average of Power value, by aggregation period, for the output meter}) / (\text{Average of Power values, by aggregation period, for the input meter})] * 100\}$ over the user-selected reporting period.

See ["Power Losses Report" on page 136](#) for more information about Aggregation Period, Reporting Period and Energy Cost.

See ["Reporting Measurements" on page 139](#) for more information about the different measurement priorities used for Power and Energy Measurements.

Power Usage Effectiveness (PUE)

The Power Usage Effectiveness (PUE) Summary Report is an optional module that consists of a single-page report that displays PUE and average power consumed for a data center facility, along with average power consumed for the IT equipment running in the facility. Additionally, two graphical trends are displayed that correspond to the facility PUE values and to the energy consumption of the facility.

This section provides an overview of the Power Usage Effectiveness (PUE) module and includes:

- definitions of some of the terms associated with PUE
- PUE report configuration
- calculations used to generate the PUE report.

Terms and Definitions

- **PUE** - Power Usage Effectiveness, defined as a ratio between the total power consumed by a data center facility and the power consumed by the IT equipment that runs in the facility. For example, a PUE value of 2.0 indicates that for every watt of IT equipment power consumed, an additional watt is consumed to operate the facility that houses the equipment (e.g. equipment cooling, power distribution to the equipment).
- **Total Data Center Power** - Represents all the power consumed by the data center facility at one point in time. This value should represent an instantaneous power consumption value.
- **Total Data Center Energy** - Represents all the energy used by the data center facility for a given time interval. This value typically represents a 15-minute energy usage value.
- **Total IT Equipment Power** - Represents all the power consumed by the IT equipment used in a data center facility at one point in time. This value should represent an instantaneous power consumption value.
- **Total IT Equipment Energy** - Represents all the energy used by the IT equipment in the data center facility for a given time interval. This value typically represents a 15-minute energy usage value.
- **Support** - Represents the overhead amount of energy or power required to operate the data center, which does not account for IT equipment power consumption. This value represents the data center power distribution losses, as well as the power consumed to cool down the data center facility.

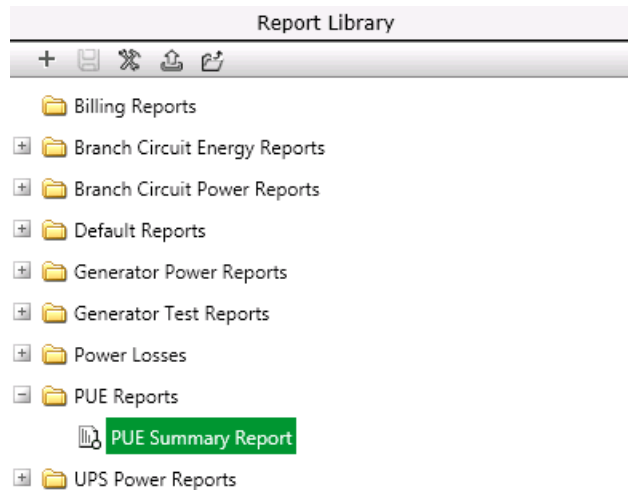
Prerequisites

Before a PUE Summary Report can be successfully generated, the following prerequisites must be met:

- Power Monitoring Expert - Data Center Edition is installed and operational. The PUE module is part of this installation.
- The proper licensing is obtained for this module.
- Reporter is installed and functional.
- The Power Monitoring Expert database contains Total Data Center Power and Total Data Center Energy data, as well as Total IT Equipment Power and Total IT Equipment Energy, as defined in the previous section.
- The PUE Summary Report Pack is installed and operational.

Configure the PUE Summary Report

1. Log in to **Web Applications**.
2. Click the **Reports** icon.
3. Under PUE Reports, click **PUE Summary Report**.



The report template appears.

PUE Summary Report	
Title	PUE Summary
Data Center Source	Select Source None Selected
Data Center Power Measurement	Select Measurement None Selected
Data Center Energy Measurement	Select Measurement None Selected
IT Equipment Source	Select Source None Selected
IT Equipment Power Measurement	Select Measurement None Selected
IT Equipment Energy Measurement	Select Measurement None Selected
PUE Category	0
Report End Date	Today [start of day 9/16/2013 to end of day 9/16/2013] Server Local Time
ShowDataWarning	☒ Yes ☐ No
Report Help	Help...
Generate Report	

4. Complete the details for the report.

- **Report Title:** Enter a title for the report.
- **Data Center Source:** Click **Select Source** to choose a single source to represent the entire data center facility.
- **Data Center Power Measurement:** Click **Select Measurement** to choose the measurement for instantaneous power consumption for the entire data center.
- **Data Center Energy Measurement:** Click **Select Measurement** to choose the measurement for interval energy usage for the entire data center. This will typically be a 15-minute interval value.
- **IT Equipment Source:** Click **Select Source** to choose the single source that represents all the IT equipment operated in the data center facility.

- **IT Equipment Power Measurement:** Click **Select Measurement** to choose the measurement for instantaneous power consumption for all the IT equipment used.
- **IT Equipment Energy Measurement:** Click **Select Measurement** to choose the measurement for interval energy usage for all the IT equipment used. This will typically be a 15-minute interval value.

Note

Confirm that the Data Center source and the IT Equipment source entries are correct before generating a report. If these entries are not correct, the generated report can contain inaccurate information.

- **PUE Category:** Select a number for the report category. The value appears as a label below the report title. The label will be "Category n", where "n" represents the number selected.

Category 1 is measured at the UPSs, and category 2 is measured at the PDUs. Category 0 and 3 are not included in the PUE Report.
 - **Report End Date:** Select either **Today** or **Fixed Date** for the data you want to generate in the report.

If using a Fixed Date, enter the desired date in the end date box.

Select either **Server Local Time** or **UTC** (Coordinated Universal Time) from the drop-down list.
 - **Show Data Warning:** Select **Yes** to include any data warnings on the report, or **No** to not include any warnings.
 - **Report Help:** Opens the online help for this report.
5. Click **Generate Report** to create the PUE Summary Report.

Save the PUE Summary Report

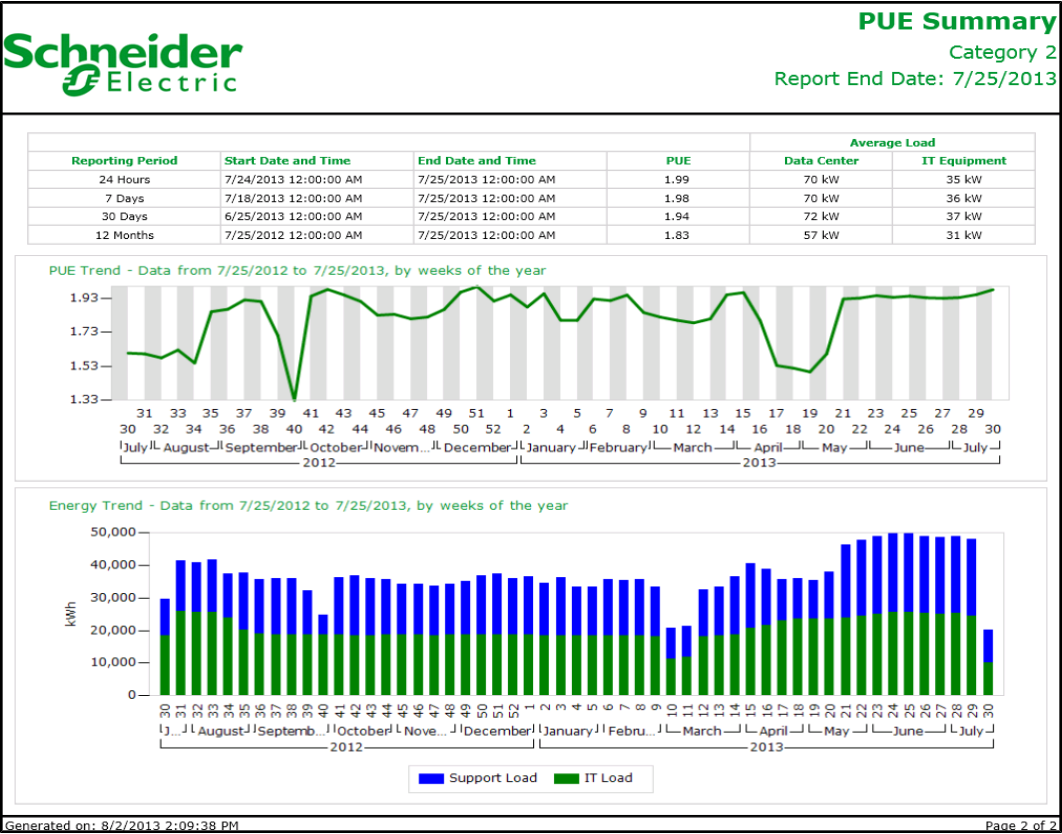
After you generate a PUE Summary Report, you can save it with some or all of the inputs defined.

1. Click the Save icon  at the top of the Report Library window. The **Save Report** dialog appears.
2. In the Save Report dialog, enter the name of the report file in the **Name:** field. The default name is the report name.
3. Select the checkboxes for the inputs you want to save with the report. The next time you generate the saved report, you must specify the inputs that were not saved.
4. Click **OK**. The report is saved with the selected inputs. The saved report title now appears in the Report Library in the PUE Reports folder.

To retrieve the report, locate the report in the Report Library list and double-click to open.

PUE Summary Report Example

The sections and content contained in the PUE Summary Report depend on the selections made in the PUE Summary Report template and the contents of the Power Monitoring Expert database. See the following sample report.



Calculations

In this sample, all time periods are based on July 25, 2013.

24 Hours	7 Days	30 Days	Last 12 Months
From July 24 12:00AM until July 25 12:00AM	From July 18 12:00AM until July 25 12:00AM	From June 25 12:00AM until July 25 12:00AM	From July 25, 2012 12:00AM until July 25, 2013 12:00AM

The values in the table below are calculated as follows:

Reporting Period	Start Date and Time	End Date and Time	PUE	Average Load	
				Data Center	IT Equipment
24 Hours	7/24/2013 12:00:00 AM	7/25/2013 12:00:00 AM	1.99	70 kW	35 kW
7 Days	7/18/2013 12:00:00 AM	7/25/2013 12:00:00 AM	1.98	70 kW	36 kW
30 Days	6/25/2013 12:00:00 AM	7/25/2013 12:00:00 AM	1.94	72 kW	37 kW
12 Months	7/25/2012 12:00:00 AM	7/25/2013 12:00:00 AM	1.83	57 kW	31 kW

PUE – The ratio between the data center and IT equipment energy measurement values. This value is calculated for each of the required time periods by the following formula:

PUE =

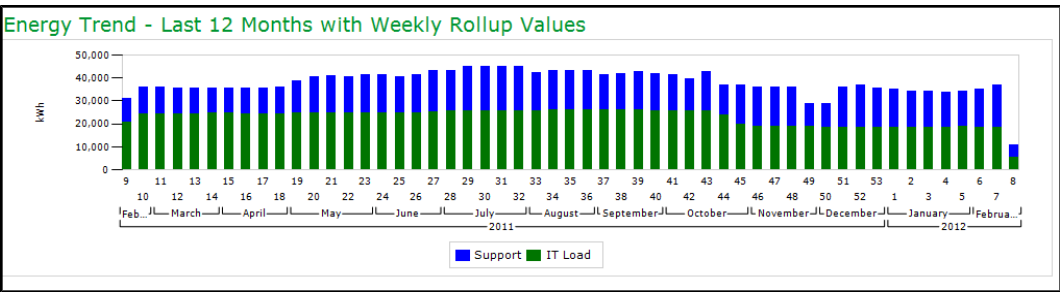
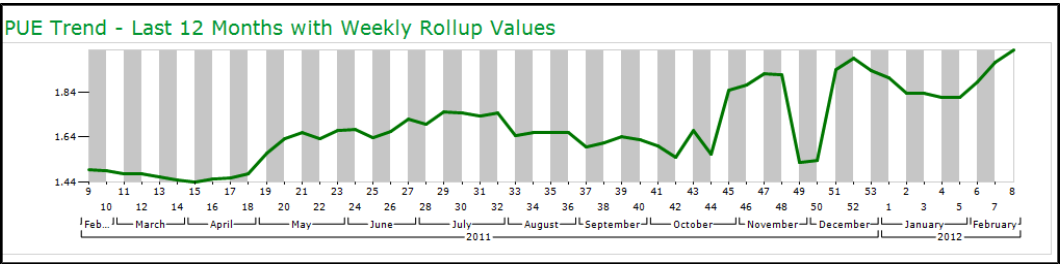
Sum of Data Center Energy

Sum of IT Equipment Energy

IT Equipment – The average of the IT equipment power measurement values for each of the time periods.

Data Center - The average of the data center power measurement values for each of the time periods.

The values displayed in the charts below are calculated as follows:



PUE Trend - The weekly PUE values are calculated by the following formula where N represents a week of the year:

PUE week N =	Sum [Data Center Energy] week N
	Sum [IT Equipment Energy] week N

Energy Trend - The weekly energy values for IT equipment and support are calculated by the following formulas where N represents a week of the year:

IT Equipment Energy week N = Sum [IT Equipment Energy] week N

Support Energy week N = Sum [Data Center Energy] week N - Sum [IT Equipment Energy] week N

Branch Circuit Power Report

The Branch Circuit Power report is used by data center facility operators to generate a report that describes the average and maximum loading for branch circuits within the data center facility, as well as the percentage load compared to the breaker size.

This section describes the procedures involved in creating a report, how the reports are used, examples of the generated report, and the managing and saving of the report.

The Branch Circuit Power Report is used for:

- Proactive capacity management
- Incident investigation
- Customer expansion planning
- SLA management

Prerequisites

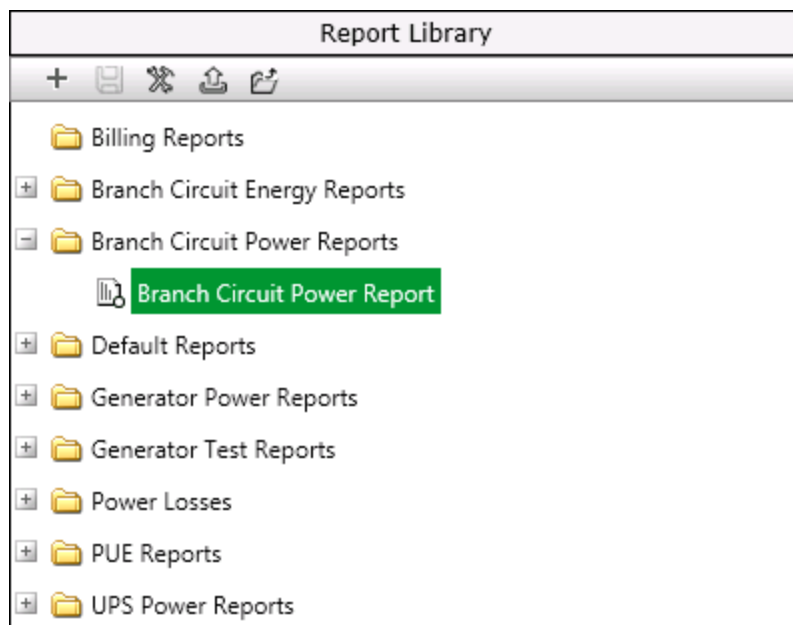
Before configuring the Branch Circuit Power Report, confirm the following conditions have been met:

- The correct hierarchy template is loaded into Power Monitoring Expert - Data Center Edition
- The hierarchy has been successfully configured.
- The Branch Circuit Power Report has been successfully added to the Report Library.

Configure and run the Branch Circuit Power Report

To configure and run a report:

1. Log in to the Power Monitoring Expert Web Application.
2. Click the **Reports** icon.
3. Under the Branch Circuit Reports folder, click **Branch Circuit Power Report**.



The report template appears.

Branch Circuit Power Report

Title:	Branch Circuit Power
Facility Name:	
Facility Location:	
Customers:	Select Customers No customers selected
Reporting Period:	Today [start of day 9/18/2013 to end of day 9/18/2013] Server Local Time
Primary Sort:	Customers
Show Errors:	☒ Yes ☐ No
Report Help	Help...

4. Complete the details for the report:

- **Title:** Enter a title for the report.
- **Facility Name:** Enter the name of the data center facility.
- **Facility Location:** Enter a name for your data center facility location. This is an optional field.
- **Customers:** Click the **Select Customers** field. When the dialog appears, select the customers that you want to have appear on the report from the list. Click **Select All** to select all the customers on the list. Click **None** to unselect all the customers. Click **OK**.

[Select All](#) | [None](#)

☒ Customer 1

☐ Customer 2

☐ Customer 3

☐ Customer 4

- **Reporting Period:** Select the reporting period from the drop-down list, and select whether you want the report timestamps to be in Server Local Time or UTC (Universal Time).

- **Primary Sort:** Select the primary sort column from the drop-down list. This determines which is the primary sort column for the report (customer, rack or circuit). Depending on the hierarchy which has been configured, it could also just contain (customer, circuit).
 - **Show Errors:** Select **Yes** to include error messages in the report, or **No** to exclude them.
 - **Report Help:** Opens the online help for this report.
5. Click **Generate Report** to create the Branch Circuit Power Report.

Branch Circuit Power Report example

The Branch Circuit Power Report data depends on the selections you make while configuring the report and the contents of the Power Monitoring Expert - Data Center Edition database.

Customer	Rack	Branch Circuit	Breaker Size (A)	Avg Loading (A)	Avg Loading (kW)	Avg Loading (%)	Max Loading (A)	Max Loading (kW)	Max Loading (%)
Customer 1	R10A	Bus01_PIU04_01	20	0.0**	0.0**	0**	0.0**	0.0**	0**
Customer 1	R11A	Bus01_PIU04_02	20	0.0**	0.0**	0**	0.0**	0.0**	0**
Customer 1	R12A	Bus01_PIU04_03	20	0.0**	0.0**	0**	0.0**	0.0**	0**
Customer 1	R10A	Bus02_PIU04_01	30	0.0**	0.0**	0**	0.0**	0.0**	0**
Customer 1	R11A	Bus02_PIU04_02	20	0.0**	0.0**	0**	0.0**	0.0**	0**
Customer 1	R12A	Bus02_PIU04_03	20	0.0**	0.0**	0**	0.0**	0.0**	0**
Customer 1	R12A	Bus03_PIU04_03	20	0.0**	0.0**	0**	0.0**	0.0**	0**

* Value estimated
 ** Value based on incomplete data
 *** Expected value missing

Generated on: 8/6/2013 12:56:20 PM Page 1 of 1

Save the Branch Circuit Power Report

After you generate a Branch Circuit Power Report, you can save it with some or all of the inputs defined.

1. Click the **Save** icon  at the top of the Report Library window. The **Save Report** dialog appears.
2. In the Save Report dialog, enter the name of the report file in the **Name:** field. The default name is the report name.
3. Select the checkboxes for the inputs you want to save with the report. The next time you generate the saved report, you must specify the inputs that were not saved.
4. Click **OK**. The report is saved with the selected inputs. The saved report title now appears in the Report Library in the Branch Circuit Power Reports folder.

To retrieve the report, locate the report in the Report Library list and double-click to open.

Managing the Branch Circuit Power Report

The Manage Reports dialog provides options to manage, share, and subscribe to reports.

Open the dialog by clicking the Manage icon at the top of the Report Library pane. The following options are available:

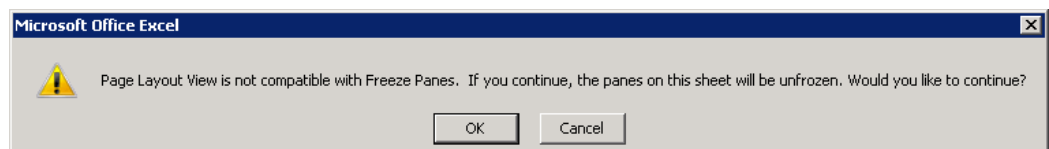
- **Manage** – create a new folder, delete or rename a folder or report, or move or copy a report from one folder to another.
- **Share** – make a report available to a user or group.
- **Subscribe** – generate a report on a defined schedule or when system events or device alarms occur, and distribute it via email or send to a file share or a printer.

Refer to the Report management, sharing and subscriptions section of the Web Application help file for additional information.

Exposing the footer on exported Excel reports

When the Branch Circuit Power report is generated and exported as an Excel document, the footer portion of the spreadsheet is hidden. There are two methods available to display the report header:

1. Open the Branch Circuit Energy spreadsheet in Excel.
2. Click the **Insert** tab.
3. In the Text section of the **Insert** ribbon, click **Header & Footer**. When the Excel dialog appears, click **OK**.
- or -
4. Click the **View** tab.
5. In the Workbook Views section of the **View** ribbon, change the workbook view from **Normal** to **Page Layout**. When the Excel dialog appears, click **OK**.



Repeat these steps each additional worksheet.

Branch Circuit Energy Report

The Branch Circuit Energy Report is used by data center operators to generate a report that provides information regarding energy usage for customers within the data center facility. The Hierarchy feature of Power Monitoring Expert - Data Center Edition must be configured prior to generating this report, as it is used to provide data.

This section describes the Branch Circuit Energy Report, the procedures involved in setting up the report, how the reports are used, examples of the generated reports, and the managing and saving of the reports.

The Branch Circuit Energy Report is used for:

- Troubleshooting billing system
- Billing system export (for csv export)
- Customer specific energy usage

Prerequisites

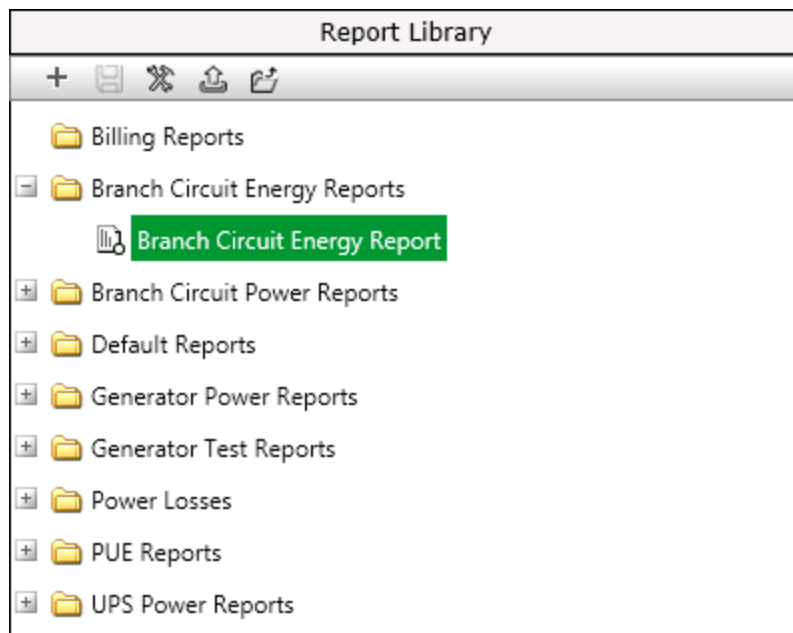
Before configuring the Branch Circuit Energy Report, confirm the following conditions have been met:

- The correct hierarchy template is loaded into Power Monitoring Expert - Data Center Edition
- The hierarchy has been successfully configured.
- The Branch Circuit Energy Report has been successfully added to the Report Library.

Configuring the Branch Circuit Energy Report

To configure and generate a Branch Circuit Energy report:

1. Log in to the Power Monitoring Expert Web Application.
2. Click the **Reports** icon.
3. Under the Branch Circuit Reports folder, click **Branch Circuit Energy Report**.



The report template appears.

Branch Circuit Energy Report

Title:	Branch Circuit Energy
Facility Name:	
Facility Location:	
Customers:	Select Customers No customers selected
Reporting Period:	Last 7 Days [start of day 9/7/2013 to end of day 9/13/2013] Server Local Time
Report Type:	Summary
Timestamp Coincidence:	with Customer Peak
Display Billing ID:	☐ Yes ☒ No
Show Errors:	☒ Yes ☐ No
Report Help	Help...

4. Complete the details for the report:

- **Title:** Enter a title for the report.
- **Facility Name:** Enter the name of the data center facility.
- **Facility Location:** Enter a name for your data center facility location. This is an optional field.
- **Customers:** Click the **Select Customers** field. When the dialog appears, select the customers that you want to have appear on the report from the list. **Click Select All** to select all the customers on the list. Click **None** to unselect all the customers. Click **OK**.

☒ Customer 1
☐ Customer 2
☐ Customer 3
☐ Customer 4

- **Reporting Period:** Select the reporting period from the drop-down list, and select whether you want the report timestamps to be in Server Local Time or UTC (Universal Time).
- **Report Type:** Select either Summary or Detail report from the drop-down list.
 - **Summary:** Shows only the aggregated values for all racks/circuits for a given tenant.
 - **Detail:** Shows the aggregated value as well as child values of the racks and circuits.

- **Timestamp Coincidence:** Select with Customer Peak or with Data Center Peak from the drop-down list.
 - **Display Billing ID:** Click Yes to show an alpha numeric billing ID for a tenant which can be used by third party billing engine.
 - **Show Errors:** Select **Yes** to include error messages in the report, or **No** to exclude them.
 - **Report Help:** Opens the online help for this report.
5. Click **Generate Report** to create the Branch Circuit Energy Report.

Branch Circuit Energy Report Example

The Branch Circuit Energy Report data depends on the selections you make while configuring the report and the contents of the Power Monitoring Expert - Data Center Edition database.



Branch Circuit Energy
 Facility A
 Victoria, British Columbia

Peak Demand Timestamp: Calculated by Customer
 7/31/2013 12:00:00 AM - 8/7/2013 12:00:00 AM (Server Local)

Customer Summary

Data Warnings
 No data warnings.

Customer	Time Range	Energy (kWh)	Peak Demand (kW)	Peak Current (A)	Peak Timestamp
Customer 1	7/31/2013 - 8/7/2013	4,233.6**	25.2	210.0	7/31/2013 12:15:00 AM**

* Value estimated
 ** Value based on incomplete data
 *** Expected value missing

Generated on: 8/6/2013 12:26:41 PM
 Page 1 of 1

Save the Branch Circuit Energy Report

After you generate a Branch Circuit Energy Report, you can save it with some or all of the inputs defined.

1. Click the **Save** icon  at the top of the Report Library window. The **Save Report** dialog appears.
2. In the Save Report dialog, enter the name of the report file in the **Name:** field. The default name is the report name.
3. Select the checkboxes for the inputs you want to save with the report. The next time you generate the saved report, you must specify the inputs that were not saved.
4. Click **OK**. The report is saved with the selected inputs. The saved report title now appears in the Report Library in the Branch Circuit Energy Reports folder.

To retrieve the report, locate the report in the Report Library list and double-click to open.

Managing the Branch Circuit Energy Report

The Manage Reports dialog provides options to manage, share, and subscribe to reports.

Open the dialog by clicking the Manage icon at the top of the Report Library pane. The following options are available:

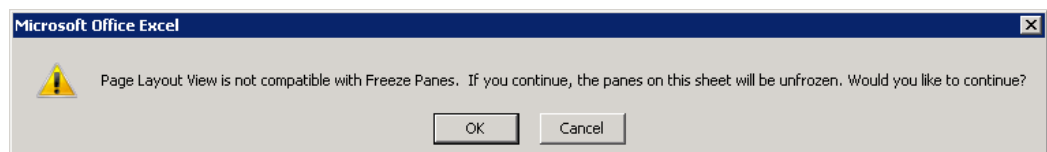
- **Manage** – create a new folder, delete or rename a folder or report, or move or copy a report from one folder to another.
- **Share** – make a report available to a user or group.
- **Subscribe** – generate a report on a defined schedule or when system events or device alarms occur, and distribute it via email or send to a file share or a printer.

Refer to the Report management, sharing and subscriptions section of the Web Application help file for additional information.

Exposing the footer on exported Excel reports

When the Branch Circuit Energy report is generated and exported as an Excel document, the footer portion of the spreadsheet is hidden. There are two methods available to display the report header:

1. Open the Branch Circuit Energy spreadsheet in Excel.
2. Click the **Insert** tab.
3. In the Text section of the **Insert** ribbon, click **Header & Footer**. When the Excel dialog appears, click **OK**.
- or -
4. Click the **View** tab.
5. In the Workbook Views section of the **View** ribbon, change the workbook view from **Normal** to **Page Layout**. When the Excel dialog appears, click **OK**.



Repeat these steps each additional worksheet.

Report considerations

This section provides additional information regarding the usage and generation of reports in Power Monitoring Expert - Data Center Edition.

Stopping a report

There are situations when it is necessary to stop a report part way through the generation process. If the current report is not shut down properly, it continues to run in the background, which can result in a decrease of system performance.

The recommended method to stopping a report is to stop and restart the ION AppPool task. This stops the report generation in progress and allows you to configure and run a new report.

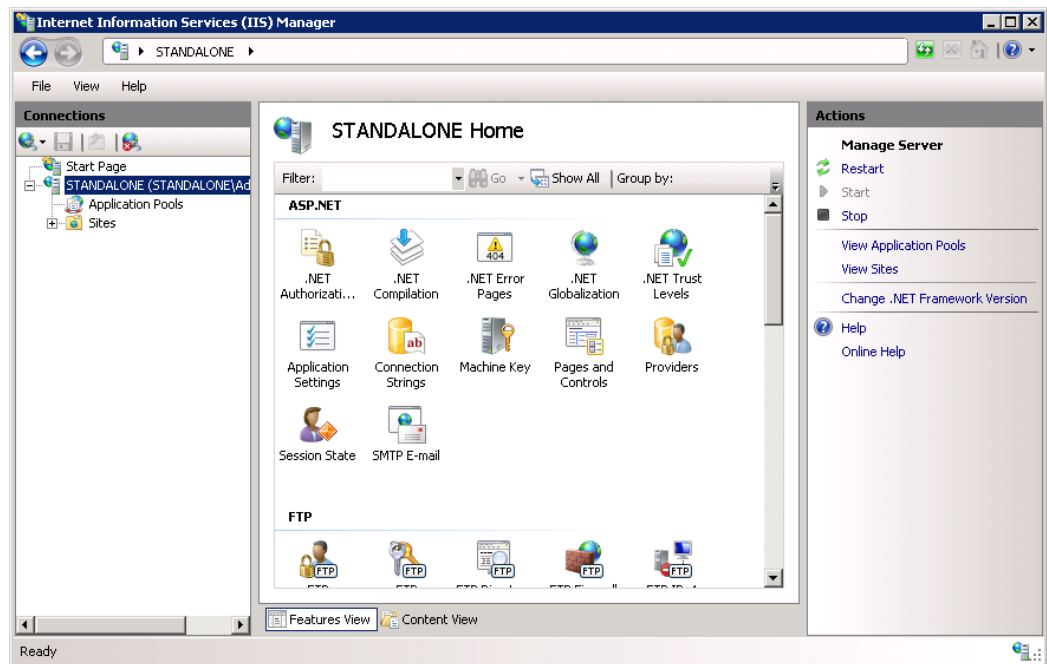
Note

These instructions can only be performed by a system administrator who has access to IIS on the Application Server, either through direct access to the server, or by a Remote Desktop connection between a client and the Application Server.

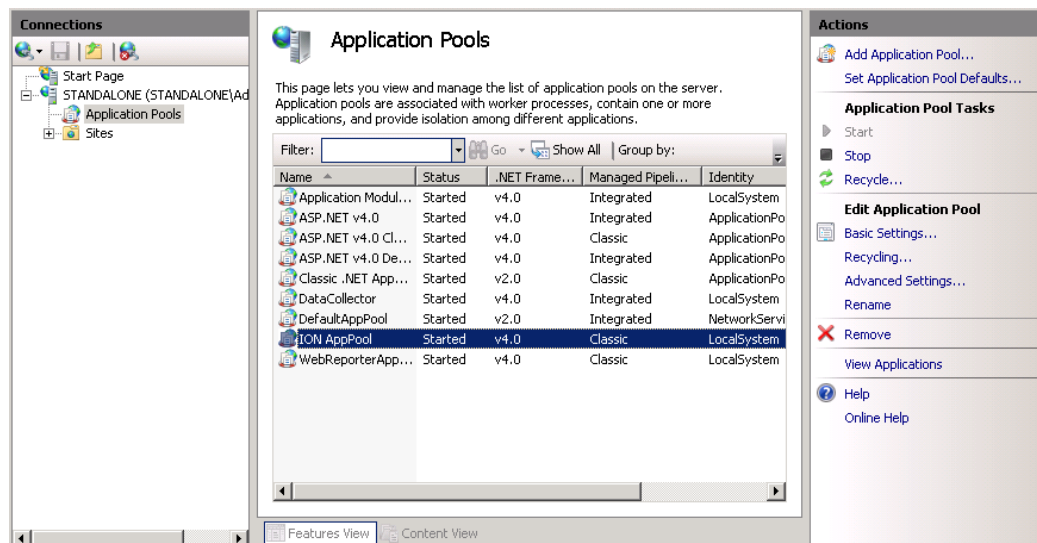
Additionally, stopping and restarting the AppPool task will stop all report generation processes. Confirm there are no additional reports being generated by other users before completing this operation.

To stop a report from generating:

1. While the report is generating, navigate to **Start > All Programs > Administrative Tools > Internet Information Services (IIS) Manager**. The IIS Manager opens.

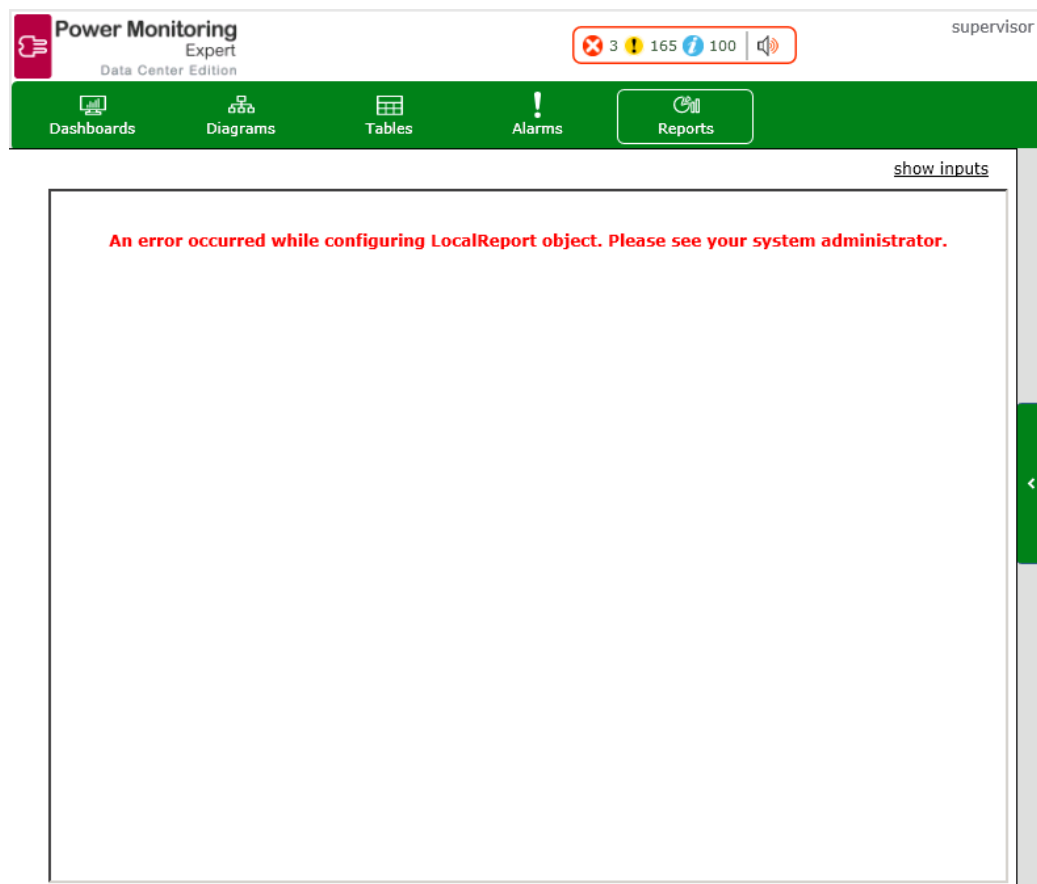


2. Click the Expand button  beside your system name. Click **Application Pools**.



3. Select **ION AppPool** from the list. Click **Stop** from Application Pool Tasks. The ION AppPool status changes to **Stopped**.

A message appears in the report window. This message is an expected behavior and indicates the report generation process has been stopped.



- Click **Start** from Application Pool Tasks and wait until the ION AppPool status changes to **Started**.

You can now configure and run a new report.

Report settings

While working with larger data sets, it is possible for the Branch Circuit Reports to timeout before they can be successfully generated. The recommended process is to increase the timeout value for the report generation process. This section describes the recommended values for different data set sizes and the process involved with increasing these values in the database.

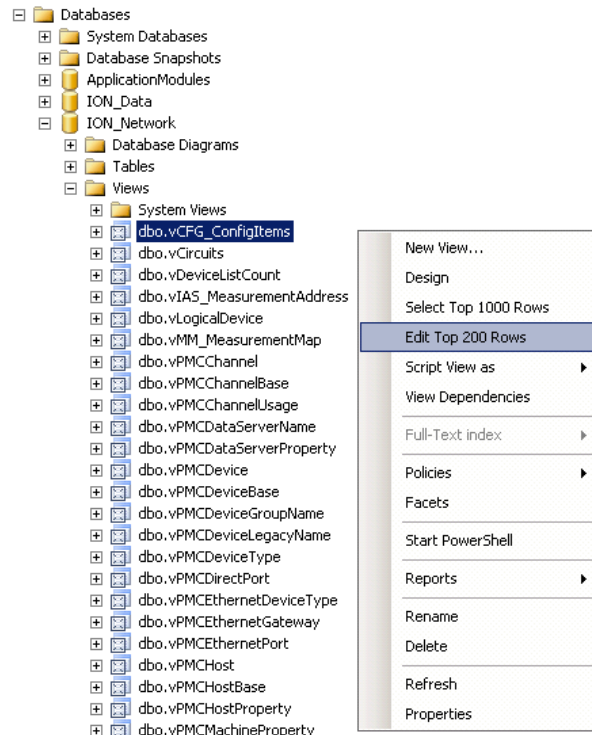
The default timeout for reports in Power Monitoring Expert is 300 seconds. This timeout value can be increased up to the recommended timeout value of 600 seconds for medium sized data sets (5000 circuits or less) using the Management Console feature.

For data sets larger than 5000 circuits, you can change the timeout by increasing the values in the Power Monitoring Expert database.

When generating the Branch Circuit Reports, it is recommended that a timeout value of at least 1200 seconds be implemented for configurations of 8000 circuits or more.

To adjust the timeout values in the database:

- Open SQL Server Management Studio and provide credentials for the Power Monitoring Expert database.
- In the **Object Explorer** pane, navigate to **Databases > ION_Network > Views**.



3. Right-click `dbo. vCFG_Config_Items` and select **Edit top 200 Rows**.
4. Change the number in the Value column for the following items:
 - `ReportViewExecutionTimeout`
 - `DatabaseCommandTimeout`
 - `WebServiceProxyTimeout`

Do not change the number in the `DefaultValue` column.

	Module	Category	Item	Value	DefaultValue
	Reporting	General Settings	EmailSMTPServer		
	Reporting	General Settings	EmailFromDisplayName		
	Reporting	General Settings	EmailFromAddress		
	Reporting	General Settings	FileshareOverwrite	0	0
	Reporting	General Settings	DatabaseIdentifier	ION_Database	ION_Database
	Reporting	General Settings	WebServiceUrl	http://STANDAL...	http://[ServerN...
	Reporting	General Settings	DefaultGroupingThreshold	50	50
	Reporting	General Settings	PQCharacteristicMeasurements	Voltage Disturba...	Voltage Disturba...
	Reporting	General Settings	LogDiagnosticMessages	0	0
	Reporting	General Settings	ReportViewExecutionTimeout	300	300
	Reporting	General Settings	DatabaseCommandTimeout	315	315
▶	Reporting	General Settings	WebServiceProxyTimeout	330	330
	Reporting	General Settings	PQEventRetryTimeoutMinutes	60	60
	Reporting	General Settings	BatchReportRenderTimeout	600	600
	Reporting	General Settings	WaveformThresholdInMilliseconds	500	500
	Reporting	General Settings	EnergyCost_kWh	Active Energy D...	Active Energy D...
	Reporting	General Settings	EnergyCost_kVARh	Reactive Energy...	Reactive Energy...
	Reporting	General Settings	EnergyCost_kVAh	Apparent Energ...	Apparent Energ...
	Reporting	General Settings	EnergyCost_kW	Active Power Sli...	Active Power Sli...
	Reporting	General Settings	EnergyCost_kVAR	Reactive Power ...	Reactive Power ...
	Reporting	General Settings	EnergyCost_kVA	Apparent Power...	Apparent Power...
	Reporting	General Settings	LoadProfileDemand_Active	Active Power Sli...	Active Power Sli...
	Reporting	General Settings	LoadProfileDemand_Reactive	Reactive Power ...	Reactive Power ...
	Reporting	General Settings	LoadProfileDemand_Apparent	Apparent Power...	Apparent Power...
	Reporting	General Settings	LoadProfilePower_Active	Active Power	Active Power
	Reporting	General Settings	LoadProfilePower_Reactive	Reactive Power	Reactive Power
	Reporting	General Settings	LoadProfilePower_Apparent	Apparent Power	Apparent Power

Now when generating reports in Power Monitoring Expert - Data Center Edition, the new timeout values will apply.

To reduce the amount of time required to generate the reports, it is recommended that the Branch Circuit Reports to be run with one customer per report, and a maximum of 250 circuits per report. An additional increase in the report timeout value is required for generating reports larger than the recommended values.

Disable Application Modules Security Check (Report Performance Improvement)

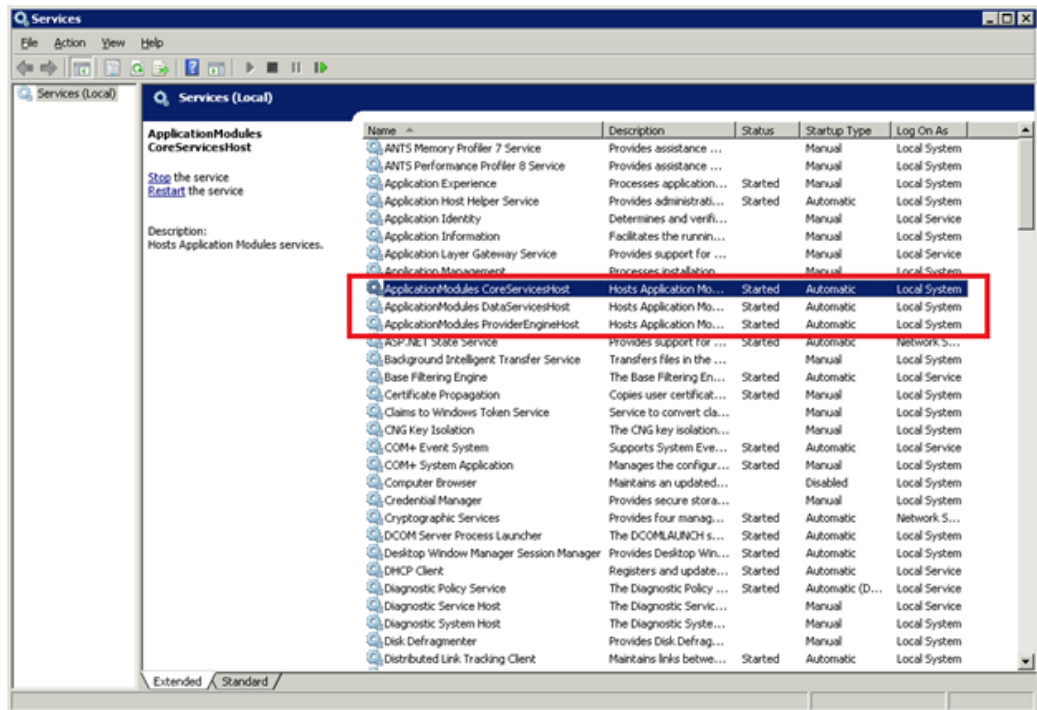
This set of instructions disables the application modules security checks which can improve the performance of report generation.

Note

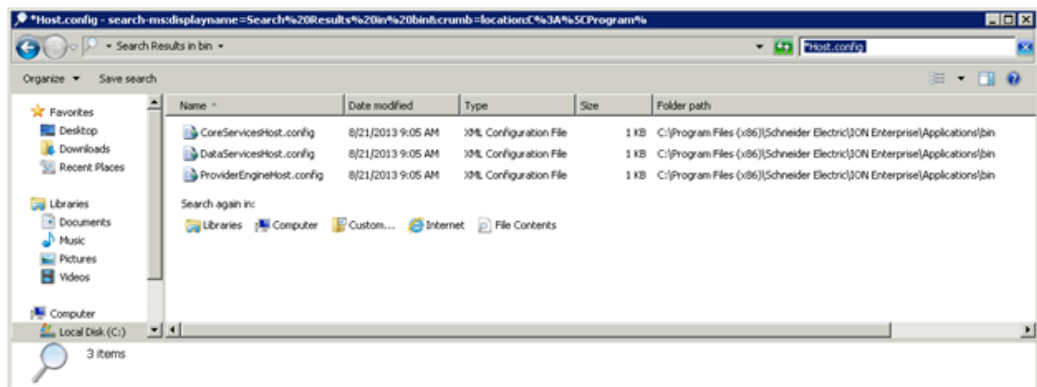
This procedure should only be applied when operating within a secure network environment; it is only recommended for Data center solutions at this time.

To disable the application modules security check:

1. Shut down the three AppMods services: ProviderEngineHost, DataServicesHost and CoreServicesHost.

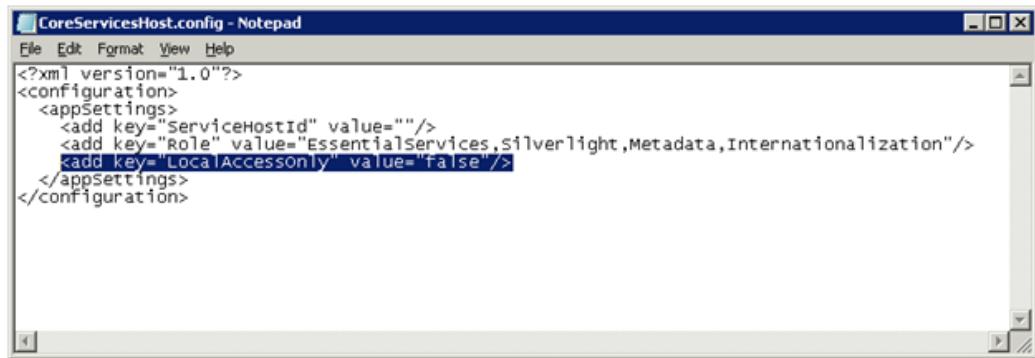


2. Navigate to [path]\Applications\bin folder and locate the following three files: ProviderEngineHost.config, DataServicesHost.config, CoreServicesHost.config.



3. Add the following entry to all three files at the end of the <appSettings> element within the XML: <add key="LocalAccessOnly" value="false"/>.

The following is an example of what the CoreServicesHost.config file should look like after the modification to the file:



4. Restart the three AppMods services. The security check should now be disabled on your system.

Portlets

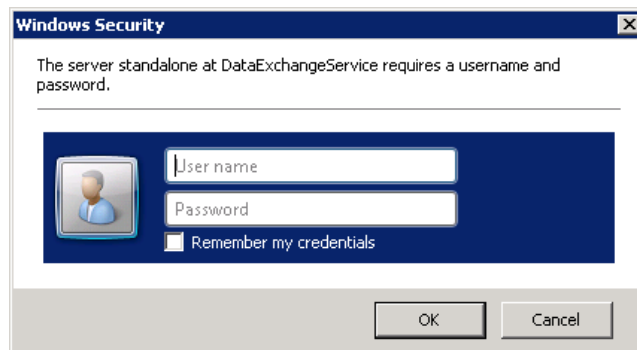
Power Monitoring Expert - Data Center Edition supports the Schneider Electric StruxureWare for Data Centers Portal (or dashboard) by providing several portlets that deliver information relevant to the power management of a data center in an easy to read form. The portlets created for data centers include:

- **Power Usage Effectiveness** - Displays a simple numeric display of the PUE value.
- **Power Loading** - Displays a simple numeric display of Data Center power.
- **% Power Capacity Used** - Displays power as a percentage of equipment capacity.

Before installing and configuring the portlets, you must first create the DataExchange Service and enable the EcoStruxure Web Service (EWS).

Create a DataExchange Service

1. In your browser, enter `http://MachineName/ews/dataexchange.svc`, replacing MachineName with the name of your machine. A Windows Security dialog appears.



2. Provide your Power Monitoring Expert Supervisor-level User name and Password in the appropriate fields. Click **OK**. The DataExchange Service window appears, indicating that the service has been created.

DataExchange Service

You have created a service.

To test this service, you will need to create a client and use it to call the service. You can do this using the svcutil.exe tool from the command line with the following syntax:

```
svcutil.exe http://standalone/EWS/DataExchange.svc?wsdl
```

This will generate a configuration file and a code file that contains the client class. Add the two files to your client application and use the generated client class to call the Service. For example:

C#

```
class Test
{
    static void Main()
    {
        DataExchangeClient client = new DataExchangeClient();

        // Use the 'client' variable to call operations on the service.

        // Always close the client.
        client.Close();
    }
}
```

Visual Basic

```
Class Test
    Shared Sub Main()
        Dim client As DataExchangeClient = New DataExchangeClient()
        ' Use the 'client' variable to call operations on the service.

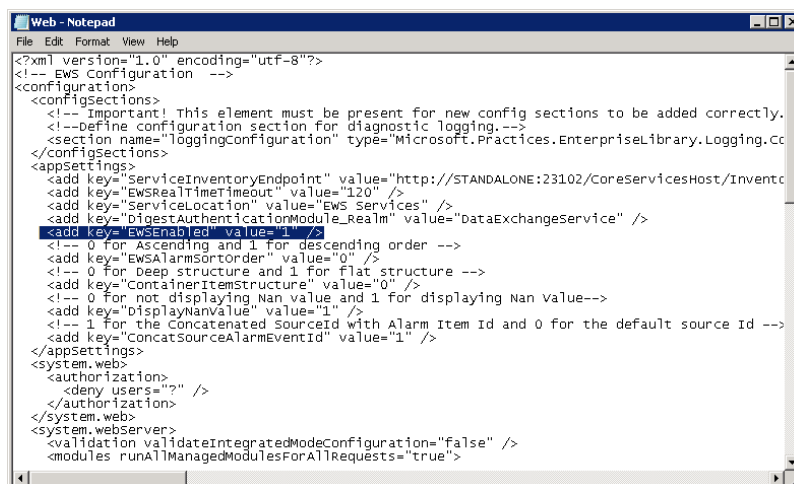
        ' Always close the client.
        client.Close()
    End Sub
End Class
```

Enabling the EcoStruxure Web Service

Once the DataExchange Service has been created, you can enable the EcoStruxure Web Service (EWS). EWS defines an interface for data exchange between systems. For the Portlets feature, this allows the data from your devices to be presented in a high level format that is easy to read.

To enable the EWS:

1. Navigate to ...\\Power Monitoring Expert DC Ed\\Applications\\EWS\\ and open the Web.config file with a text editor.
2. Locate the EWSEnabled key in the file (Click Ctrl + F and enter **EWSEnabled** in the search string).



3. Change the EWSEnabled value to '1'.
4. Save the Web.config file.

Install StruxureWare Portal

To install the StruxureWare Portal:

1. Open the Power Monitoring Expert - Data Center Edition DVD and navigate to **ITB Portlets > StruxureWarePortal-1.0.0**.
2. Double-click **StruxureWarePortal-1.0.0**. The StruxureWare Portal welcome screen appears.
3. Click **Next**.
4. **Choose Components**: On this screen, select the components you want to install. All components are selected by default. To clear a component from the list, select the checkbox beside the component. When finished, click **Next**.
5. **Choose Install Location**: Click **Install** to install StruxureWare Portal to the default location. To select a different location, click the **Browse** button and select a new location. Click **Install**.
6. Click **Finish** on the **Completing the StruxureWare Portal Setup** page.

Configure Portlets

In addition to these configuration instructions, complete documentation regarding the StruxureWare portal can be found on the Power Monitoring Expert - Data Center Edition DVD in the **ITB Portlets** folder.

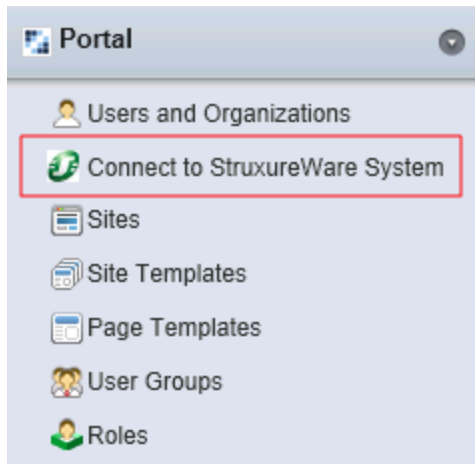
Once you have installed the StruxureWare Portal, you can begin the configuring the Portlets.

1. In your browser, type `http://MachineName:8080`, replacing `MachineName` with the name of your system. The StruxureWare Portal welcome page appears.

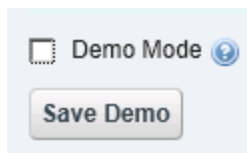


2. Sign in to the portal by clicking **Sign In** in the top right corner. Use **test** as the default screen name and password. Click **OK**.
3. Click **Go To > Control Panel** in the top right corner.

4. In the left menu, select **Portal > Connect to StruxureWare System**.



5. Uncheck the **Demo Mode** option and click **Save Demo**.



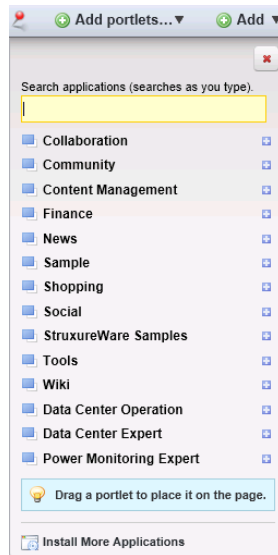
6. From the Connect to StruxureWare System screen, click **Add StruxureWare System**. The Connect to StruxureWare System screen appears.

 A screenshot of the 'Connect to StruxureWare System' form. It contains several input fields: 'Service provider' (a dropdown menu currently showing 'EcoStruxure Web Services'), 'Endpoint name', 'Endpoint URL', 'User Name', 'Password', and 'Description' (a text area). At the bottom, there are 'Save' and 'Close' buttons.

7. Select **EcoStruxure Web Services** from the drop down list.
8. Enter your Endpoint name in the **Endpoint Name** field.
9. Enter the Endpoint URL in the applicable field. This is the URL to the EWS server. For example, `http://MachineName/ews/dataexchange.svc`, replacing MachineName with the name of your system.
10. Enter your Power Monitoring Expert - Data Center Edition user name and password in the applicable fields. Click **Save**.
11. Click **Back to StruxureWare Portal** to return to the StruxureWare Portal page.

Adding a new portlet

1. Click **Add portlets**, located in the top left side of the StruxureWare Portal page.



2. Expand the Power Monitoring Expert option from the list. The portlets most commonly associated with data centers are **Power Usage Effectiveness**, **Power Loading**, and **% Power Capacity Used**.
3. Click **Add** to select a portlet from the list, or click the portlet and drag it onto the StruxureWare Portal page.
4. Click the **Options** icon in the portlet tool bar (this icon is visible when hovering the mouse over it), select the **Preferences** option.
5. When you have finished adding the portlets to the page, add the StruxureWare Portal page to your browser favorites list.

ETL Administration Tool for Data Center Operations

The Extract Transform Load (ETL) Engine is used to extract data from one application and perform a transformation on that data so it can then be loaded into another application. In this case electrical data is extracted from Power Monitoring Expert - Data Center Edition and transformed into a format that can be used by Data Center Operations (DCO).

WARNING

INACCURATE DATA RESULTS

- Do not incorrectly configure the software, as this can lead to incorrect reports and/or data results.
- Do not base your maintenance or service actions solely on messages and information passed from the ETL Administration Tool.
- Do not rely solely on software messages and reports created from data passed from the ETL Administration Tool to determine if the system is functioning correctly or meeting all applicable standards and requirements.
- Consider the implications of unanticipated transmission delays or failures of communications links.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Installing the ETL Administration Tool (Data Center Operations)

To install ETL Administration Tool (Data Center Operations):

1. Open the Power Monitoring Expert - Data Center Edition DVD and navigate to **ETL > Data Center Operation > Installer > MainSetup**.
2. Double-click **MainSetup**. The **ETL 3.0: PME 7.2 DC Edition to DCO 7.3.0 Export** installer window appears.
3. **Application Language:** Select your preferred application language from the drop-down list and click **Next**.
4. **Welcome screen:** Review the steps and click **Next**.
5. **License Agreement:** Read the End User License Agreement (EULA) and if you accept the terms of the agreement, click **I Agree** to proceed.
6. **Setup Type:** ETL 3.0: PME DC Edition can only be installed with the **Standalone Server** option. Click **Next**.

7. **File Destination:** Click **Next** to install ETL 3.0: PME DC Edition to the default location. To select a different location, click the **Browse** button and select a new location. Click **OK**.
8. **Check System:** The installer checks the operating system. If there is an issue, the installer notifies you to correct it.
9. **Ready to Configure:** The configuration choices are displayed before being installed. Ensure that all items are correct before proceeding. Click **Back** to move back through the installer and change any items.
10. Click **Install** to continue. The **Copy Files** screen appears and the ETL files are copied to the system.
11. **Configure System:** The selected configuration settings are applied.
12. **Complete:** The Complete page appears after the install is successful. Click **Installation Log** to view details recorded for the installation process.
13. Click **Close** to finish.

To launch the ETL application, double click the StruxureWare ETL 3.0 for Data Centers (DCO) shortcut on the desktop, or select **Start > Schneider Electric > StruxureWare Power Monitoring Expert DC Ed > ETL Administration Tool (DCO)**.

Configuring the ETL Administration tool

ETL is used to extract data from one application and perform a transformation on that data so it can then be loaded into another application. For data centers, consumption, demand, and current data is extracted from Power Monitoring Expert - Data Center Edition and transformed into a format that can be used by Data Center Operation (DCO).

To do this, the Extract Transform Load engine (ETL) uses an Extract Task to extract the source quantity data from the StruxureWare Power Monitoring Expert - Data Center Edition database, a Transform task and a Load Task to write directly into the DCO staging database. This section provides information regarding the configuration of an ETL job for to be used with

Prerequisites

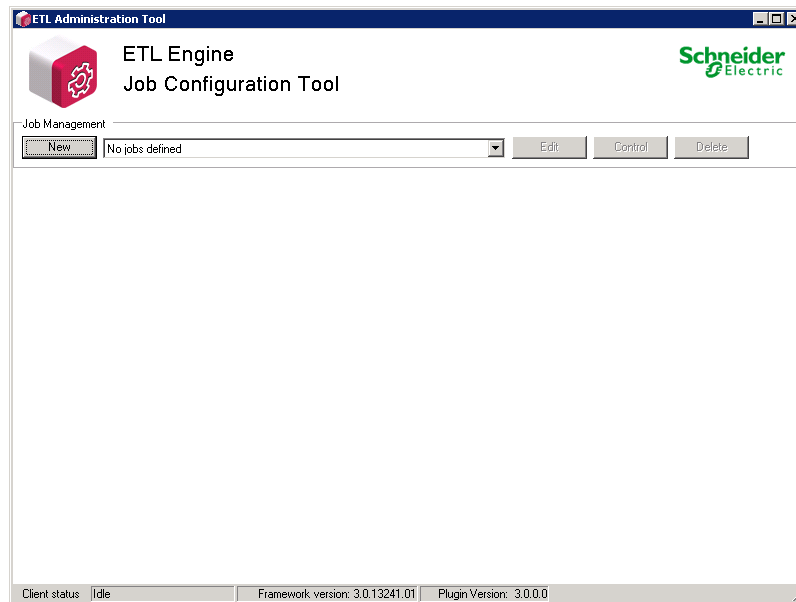
Before configuring the ETL Administration Tool, ensure that:

- ETL is properly installed.
- Access to the DCO application, including the staging database, is available
- All devices have been added to the system.
- Your Hierarchy has been configured correctly.

Creating an Data Center Operations ETL job

To create a DCO ETL job :

1. Open ETL by navigating to **Start > All Programs > Schneider Electric > StruxureWare Power Monitoring Expert DC Ed > ETL Administration Tool (DCO)**.



2. Click **New** to create a new ETL job.
3. Enter the name of the job in the **Name** field.

Job Details

Job | Tasks | Mappings | Positions | Logging | Advanced

Name:

Sleep Time Between Execution: (in seconds when running as a service)

4. Click the **Tasks** tab. The Tasks page appears.
5. Select **Extract** from the **Select Category** drop-down menu.
6. Select **PowerMonitoringExpertDataCenterHierarchyExtractTask** from the **Select Type** drop-down menu and click **Add**. The extract task name and description appear under the Extract heading.

Job Details

Job | Tasks | Mappings | Positions | Logging | Advanced

Select Category:

Select Type:

Name	Description
Extract	
Power Monitoring Data Center Hierarchy Extract Task	Power Monitoring Data Center Hierarchy Extract Task

7. Select **Transform** from the **Select Category** drop-down menu.
8. Select **DcoTransformTask** and click **Add**.

Job Details

Job Tasks Mappings Positions Logging Advanced

Select Category: Transform

Select Type: DcoTransformTask Add

Name	Description
Extract	
Power Monitoring Data Center Hierarchy Extract Task	Power Monitoring Data Center Hierarchy Extract Task
Transform	
DCO Transform Task	DCO Transform Task

9. Select **Load** from the **Select Category** drop-down menu.

10. Select **DcoLoadTask** and click **Add**.

Job Details

Job Tasks Mappings Positions Logging Advanced

Select Category: Load

Select Type: DcoLoadTask Add

Name	Description
Extract	
Power Monitoring Data Center Hierarchy Extract Task	Power Monitoring Data Center Hierarchy Extract Task
Transform	
DCO Transform Task	DCO Transform Task
Load	
DCO Load Task	Loads data into a DCO staging database.

To view the ETL output, you can add **HTMLFileLoadTask** instead and open the output file in Internet Explorer.

Note

To view the output using the HTMLFileLoadTask, you must manually map sources and quantities.

11. Configure the Extract Task settings. See ["Configuring the ETL Extract task" on page 173](#) for details.

12. Click **Apply** to save without exiting the job, or click **OK** to save and exit the job.

Tip

When creating a new job in ETL, you can clone an existing job, rather than making one from scratch. To clone a job, select an existing job from the **Job Management** drop-down list. Click the **Edit** button. In the **Job** tab, change the name to reflect the new job. Click the **Task** tab and edit the new job as necessary. When you click **Apply** or **OK** from any tab location, the job saves under the new name. Sources and quantities are carried over from the original job. It is recommended that you clear the mapping settings from the cloned job.

To remove a task from a job

Select the applicable job from the **Job Management** drop-down list and click **Edit**.

1. Click the **Tasks** tab.
2. Highlight the task you want to remove from the left pane.
3. Click the **Delete** icon .
4. Click **OK** to save and exit job.

Configuring the ETL Extract task

Once the Extract Task has been added to the job, it must be configured. Click on the extract task to bring up the list of configurable settings. Click on each setting name to change the value. Some settings are configured by typing in a value, while others are configured by selecting an option from a drop-down list.

Setting Name	Description	Setting Parameters / Recommended Values
Database		
Database Connection String	A Database Connection String	Modify the string to represent your system configuration settings.
Misc		
Hierarchy View #1	Name of the first hierarchy to query for nodes to export.	Electrical Equipment
Hierarchy View #2	Name of the second hierarchy to query	Customer
Limit Quantities to know list?	Set to True to show quantities that are known quantities for Energy, Power, and Current. Set to False to show all quantities.	True
Maximum data queries per pair	Only becomes active when initial query for a source quantity pair returns no data. When active, the task queries against an earlier time range. If no data is found, the query moves back to an earlier time range up to a maximum number of times specified in this task setting.	7
Query Window Size (in hours)	The size of the query in hours. Used in conjunction with Maximum data queries per pair task setting.	50

Configuring the ETL Load Task

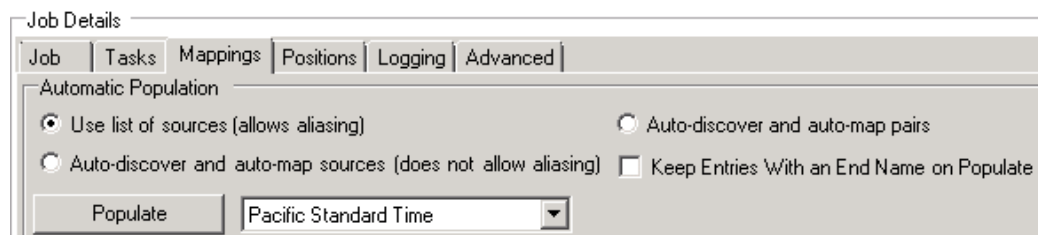
Once the Load task has been added, the DCO Staging database connection string must be configured. To configure this string, click in the connection string field, or click the Edit icon at the end of the default database connection string, and modify the parameters to match your system.

```
Server=127.0.0.1;  
Port=5432;UserId=ETL;Password=ETL;Database=DCOStaging;
```

This connection string is an example. The appropriate values for the target DCO Staging database must be filled in. Contact your DCO staging database administrator to retrieve these details.

Mapping configuration

1. Click the **Mappings** tab.
2. Select the **Auto-discover and auto-map pairs** option. This is the recommended approach for most cases. Choosing this option tells the job to automatically discover all hierarchy nodes with a device attached. This is limited to the two hierarchy views specified in the extract task settings. Alternatively, you can select the **Use list of sources (allows aliasing)** option and click **Recommended Pairs**. Choosing this option returns the sources and quantities available at the time you clicked the **Recommended Pairs** button. To discover additional sources and quantities, you must click **Recommended Pairs** again.



Click **OK** when finished.

Logging set up

The Logging feature allows you to enable the various logs where ETL writes the information regarding the status of your ETL job. These logs can assist in tracking down the cause of an unsuccessful ETL job.

To enable the ETL logs:

1. Run ETL.
2. Select the applicable job from the **Job Management** drop-down list and click **Edit**.
3. Click the **Logging** tab. The Logging page appears.
4. Select the **Enabled** checkbox for the Trace Log, Error Log, and Customer Log as required.

5. Click **OK** when finished to exit the job.

To switch between jobs

1. Use the **OK** button at the bottom right to save and exit the current job.
2. Select the job in the drop down at the top
3. Click **Edit**.

To run a job

To set the job to run once:

1. Select the job to run from the **Job Management** drop-down list.
2. Click **Control**.
3. Click the **Run Once** button.

You can also set the job to run as a service. Using this method, the job automatically runs at set times based on the settings provided in the **Job** and **Tasks** tabs. Ensure the following tasks have been completed before setting the job as a service:

- In the **Job** tab, review the Sleep Time Between Execution value (in seconds).
- Make sure the two connections strings (one for extract, one for load) are set correctly.

To set the job to run as a service:

1. Select the job to run from the **Job Management** drop-down list.
2. Click **Control**.
3. Click **Register**. ETL creates a registered service under the job name. Click **OK** in the dialog when it appears.
4. Click **Start/Continue**.

The job sleeps for a fixed amount of time between runs. This amount of time is configurable in the Sleep Time between Execution, located in the Job tab when editing a job.

Confirming the ETL job

If the ETL Engine returns a **Job execution failed** message, click the **Open Log Folder** button in the dialog and open the error log. Locate the timestamp that corresponds to your job and review the log. Based on this information, make the appropriate changes to the job and run the job again.

If you encounter the **53300: Too many connections for role** message, contact your DCO staging database administrator to determine the connection limit. The connection limit can change from one DCO installation to another. In cases of tightly constrained connection limits, you may be able to limit the number of connections used at any given time by reducing the Thread Pool Size value of your job. The Thread Pool Size is configurable on the **Advanced** tab when editing a job.

Job	Tasks	Mappings	Positions	Logging	Advanced
-----	-------	----------	-----------	---------	----------

Data Pipeline Size:

Thread Pool Size:

ETL Administration Tool for third party billing

The Extract Transform Load (ETL) Engine is used to extract data from one application, perform a transformation on that data so it can then be loaded into another application. In this case data is being extracted from Power Monitoring Expert - Data Center Edition and configured into a format that can be used by a third party billing application.

WARNING

INACCURATE DATA RESULTS

- Do not incorrectly configure the software, as this can lead to incorrect reports and/or data results.
- Do not base your maintenance or service actions solely on messages and information passed from the ETL Administration Tool.
- Do not rely solely on software messages and reports created from data passed from the ETL Administration Tool to determine if the system is functioning correctly or meeting all applicable standards and requirements.
- Consider the implications of unanticipated transmission delays or failures of communications links.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Installing the ETL Administration Tool (Billing Export)

To install ETL for third party billing:

1. Open the Power Monitoring Expert - Data Center Edition DVD and navigate to **ETL > Third Party Billing> Installer > MainSetup**.
2. Double-click **MainSetup**. The ETL for Data Centers installer window appears.
3. **Application Language:** Select your preferred application language from the drop-down list and click **Next**.
4. **Welcome screen:** Review the steps and click **Next**.
5. **License Agreement:** Read the End User License Agreement (EULA) and if you accept the terms of the agreement, click **I Agree** to proceed.
6. **Setup Type:** ETL for Third Party Billing can only be installed with the **Standalone Server** option. Click **Next**.
7. **File Destination:** Click **Next** to install ETL to the default location. To select a different location, click the **Browse** button and select a new location. Click **OK**.
8. **Check System:** The installer checks the operating system. If there is an issue, the installer notifies you to correct it.

9. **Ready to Configure:** The configuration choices are displayed before being installed. Ensure that all items are correct before proceeding. Click **Back** to move back through the installer and change any items.
10. Click **Install** to continue. The **Copy Files** screen appears and the ETL files are copied to the system.
11. **Configure System:** The selected configuration settings are applied.
12. **Complete:** The Complete page appears after the install is successful. Click **Installation Log** to view details recorded for the installation process.
13. Click **Close** to finish.

Configuring ETL for third party billing

To be used by a third party billing application, for example EnergyCap, the data extracted from the Power Monitoring Expert database must be converted into a usable format. To do this, the Extract Transform Load engine (ETL) uses an Extract Task to extract the source quantity data from the database, and a Load Task to write the data into a file that can be used by the billing software. This section provides information regarding the configuration of an ETL job for converting device data into a csv file.

Prerequisites

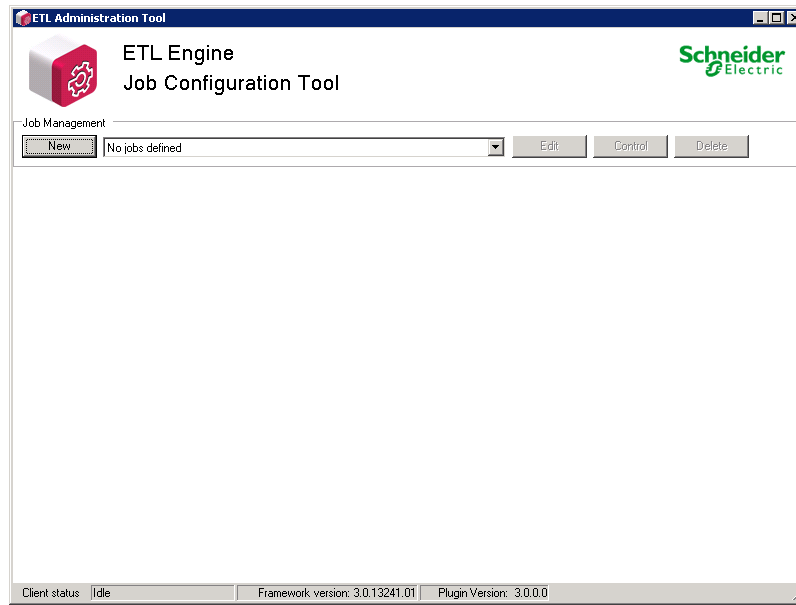
Before configuring the ETL Administration Tool, ensure that:

- ETL is properly installed.
- All devices have been added to the system.
- Your Hierarchy has been configured correctly.

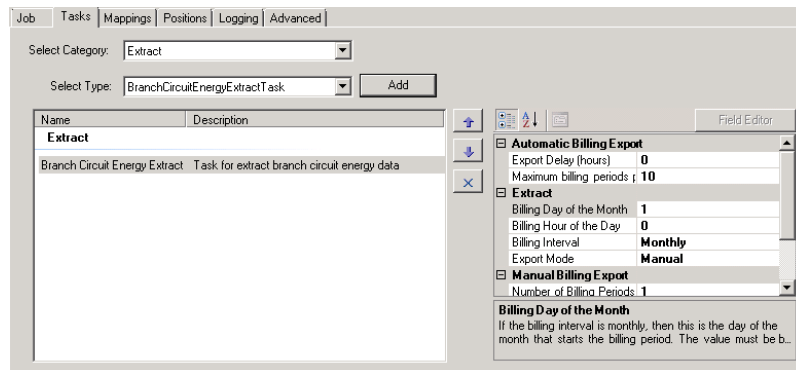
Creating an Power Monitoring Expert ETL job

To create an ETL job :

1. Navigate to **Start > All Programs > Schneider Electric > StruxureWare Power Monitoring Expert DC Ed > ETL Administration Tool (Billing Export)**. The ETL Administration Tool opens.



2. Click **New**. The Job page appears.
3. Enter the name of the job in the **Name** field. If you are running the job as a service, review the value for the Sleep Time Between Execution, as this value determines the length of time between jobs when run as a service.
4. Click the **Tasks** tab. The Tasks page appears.
5. Select **Extract** from the **Select Category** drop-down menu.
6. Select BranchCircuitEnergyExtractTask from the **Select Type** drop-down menu.
7. Click **Add**. The BranchCircuitEnergyExtractTask appears under the Extract heading.



8. Configure the extract task settings. See ["Configuring the billing extract task" on page 180](#) for more information.
9. Select **Load** from the **Select Category** drop-down menu.
10. Select EnergyCapPairsLoadTask from the **Select Type** drop-down menu.
11. Click **Add**. The EnergyCapPairsLoadTask appears under the Load heading.

12. Configure the Load Task settings. See ["Configuring the billing load task" on page 181](#) for additional information.

13. Click **Apply** to save without exiting the job, or click **OK** to save and exit the job.

Tip

When creating a new job in ETL, you can clone an existing job, rather than making one from scratch. To clone a job, select an existing job from the **Job Management** drop-down menu. Click the **Edit** button. In the **Job** tab, change the name to reflect the new job. Click the **Task** tab and edit the new job as necessary. When you click **Apply** or **OK** from any tab location, the job saves under the new name.

Configuring the billing extract task

Once the Power Monitoring Expert Extract Task has been added to the job, it must be configured. Click on the extract task to bring up the list of configurable settings. Click on each setting name to change the value. Some settings are configured by typing in a value, while others are configured by selecting an option from a drop-down list.

Setting Name	Description	Setting Parameters / Recommended Values
Automatic Billing Export		
Export Delay (Hours)	The number of hours to wait after the end of the billing period before performing an export.	Enter whole number value 0 or higher.
Maximum billing periods per export	The maximum number of billing periods, per source that are exported in a single ETL run	Enter whole number value greater than 0
Extract		
Billing Day of the Month	The day of the month that starts the billing period, if billing period is monthly (Value is between 1-31).	Enter number between 1-31.
Billing Hour of the Day	The hour of the day the billing period starts (Value is between 0-23). Partial hours can use a decimal value (for example, 10.5 represents 10:30)	Enter the hour. Use decimal value for partial hours.
Billing Interval	Billing interval is either monthly or daily. The value is aggregated up to the billing interval.	Select Monthly or Daily from the drop-down list

Setting Name	Description	Setting Parameters / Recommended Values
Export Mode	Sets the task mode. Manual billing uses the Manual Billing Export settings and position counters are not updated. Automatic mode uses Automatic Billing Export Settings and position counters are updated.	Use the Manual Export to rerun a bill, use the Automatic export to automatically export a bill on a monthly basis. Select Manual or Automatic from the drop-down list.
Manual Billing Export		
Number of Billing Periods to Export	The number of billing periods (days or months) to export, beginning at the Start Date.	Enter whole number, greater than zero
Start Date	Sets the start the range to export in local time. This is an optional setting.	Enter date in YYYY-MM-DD format.
Misc		
ThreadingMode	Extract and Load ThreadingModes entries must match.	Normally left on the MultipleSQPairsPerThread

Configuring the billing load task

Once the EnergyCapPairsLoadTask has been added, it must be configured. Click on the load task to bring up the list of configurable settings. Click on each description name to change the value. Some settings are configured by typing in a value, while others are configured by selecting an option from a drop-down list.

The table below shows the name, description, and the setting parameters or recommended value for each setting.

Load task settings

Setting Name	Description	Setting Parameters / Recommended Setting
CSV Load		
Header Row	Include a header row with standard names as part of the CSV file.	Select True or False from drop-down list.
Primary Drop Box	Primary path to save the output to.	Enter save location or click [...] to browse for the location folder.
Secondary Drop Box	Secondary path to save a copy of the output to	Enter save location or click [...] to browse for the location folder.
Use UTC Date	Output the dates in UTC format	Select True or False from drop-down list.
Misc		
ThreadingMode	Load and Extract ThreadingMode entries must match.	

Mapping configuration

1. Click the **Mappings** tab. The Mappings page appears.

ETL Engine Job Configuration Tool

Job Management: New, Refresh default, F5, Cancel, Delete

Job Details: Job | Tasks | Mappings | Positions | Logging | Advanced

Automatic Population

☒ Use list of sources (allows aliasing)

☐ Auto-discover and submap sources (does not allow aliasing) ☐ Keep Entries With an End Name on Populate

Populate: Pacific Standard Time

Mapping Definitions

Source Mappings

Type	Start Name	End Name	Timezone

Quantity Mappings

StartID	Start Name	End Name	Scaling

Add Selected Pairs | Recommend Pairs | Add new pairs only

Source Mappings

Type	Start Name	End Name	Timezone

Associated Quantities

StartID	Start Name	End Name	Scaling

Client status: Idle Framework version: 3.0.13241.01 Plugin Version: 3.0.0.0

- Under the Automatic Population heading, select the **Use list of sources (allows aliasing)** option and click **Populate**. This displays a list of customers under the Source Mappings section, and the three topics (Consumption, Demand, and Current) in the Quantity Mappings section.

Mapping Definitions

Source Mappings

Type	Start Name	End Name	Timezone
	Customer 1	Customer 1	Pacific Standard Time
	Customer 4	Customer 4	Pacific Standard Time
	Customer 3	Customer 3	Pacific Standard Time

Quantity Mappings

StartID	Start Name	End Name	Scaling
1021	Consumption	Consumption	1
3400002	Demand	Demand	1
3400475	Current	Current	1

Add Selected Pairs | Recommend Pairs | Add new pairs only

- Select the customers to export, along with the topics, and click **Add Selected Pairs**. You can also click **Recommend Pairs** to select all customers.

Consumption and Demand topics should always be selected, while the Current topic is optional. If the Consumption and Demand topics are not selected, the export will not succeed.

Initializing the Position Counters

- Click the **Positions** tab:
- Set the **Initial Value** to the a date in the first billing period you want to export using the YYYY-MM-DD date format. Click **Initialize**.

You should see a row for each customer selected in the mappings tab. The Key is a long string that represents the customer node in the hierarchy.

Logging set up

The Logging feature allows you to enable the various logs where ETL writes the information regarding the status of your ETL job. These logs can assist in tracking down the cause of an unsuccessful ETL job.

To enable the ETL logs:

1. Select the applicable job in ETL from the drop-down menu and click **Edit**.
2. Click the **Logging** tab. The Logging page appears.
3. Select the **Enabled** checkbox for the Trace Log, Error Log, and Customer Log as required.
4. Click **OK** when finished to save and exit the job.

To switch between jobs:

1. Use the **OK** button at the bottom right to save and exit the current job.
2. Select the job in the drop down at the top
3. Click **Edit**.

To remove a task from a job

Select the applicable job from the **Job Management** drop-down list and click **Edit**.

1. Click the **Tasks** tab.
2. Highlight the task you want to remove from the left pane.
3. Click the **Delete** icon .
4. press **OK** to save and exit job.

To run a job

To set the job to run once:

1. Select the job to run from the **Job Management** drop-down list.
2. Click **Control**.
3. Click the **Run Once** button.

You can also set the job to run as a service. Using this method, the job automatically runs at set times based on the settings provided in the **Job** and **Tasks** tabs. Ensure the following tasks have been completed before setting the job as a service:

- In the **Job** tab, set the Sleep Time Between Execution value (in seconds).
- In the Extract task, the Export Mode is set to **Automatic**.
- In the Extract task, the Billing Day of the Month, Billing Hour of the Day, and the Billing Interval settings are configured to how and when you want the job to run.
- In the Load task, the Primary Drop Box location is set correctly.

To set the job to run as a service:

1. Select the job to run from the **Job Management** drop-down list.
2. Click **Control**.
3. Click **Register**. ETL creates a registered service under the job name. Click **OK** in the dialog when it appears.
4. Click **Start/Continue**.

The csv files are generated on a regular schedule and can be found in the location set in the Primary Drop Box setting.

Confirming the ETL job

If the ETL Engine returns a **Job execution failed** message, click the **Open Log Folder** button in the dialog and open the error log. Locate the timestamp that corresponds to your job and review the log. Based on this information, make the appropriate changes to the job and run the job again.

Navigate to the location set in the Primary Drop Box setting to confirm the csv files are being generated and sent to the correct location.

KEPServerEX5

This section describes the configuration of the KEPServerEX5 application. The SNMP to OPC Gateway installation is an optional procedure for the Power Monitoring Expert - Data Center Edition solution.

KEPServerEX5 is a software based server designed for connectivity and provides interoperability between industrial automation and the enterprise system. OPC is not a native protocol for Schneider Electric devices. However, Power Monitoring Expert can act as a translator and host metering data as an OPC server as well as an OPC client.

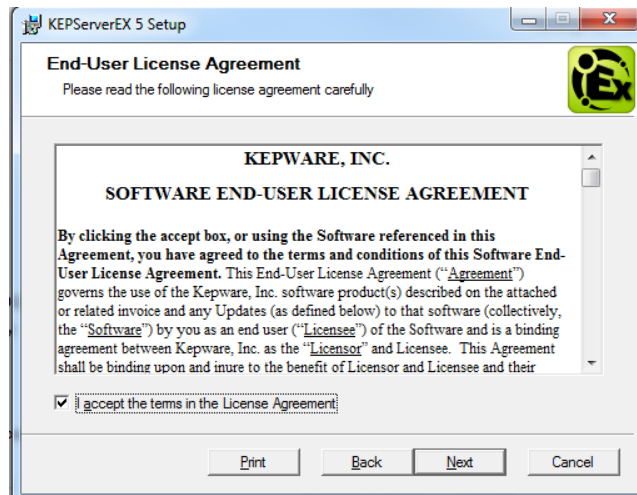
Install KEPServerEx 5

To install KepServerEx 5:

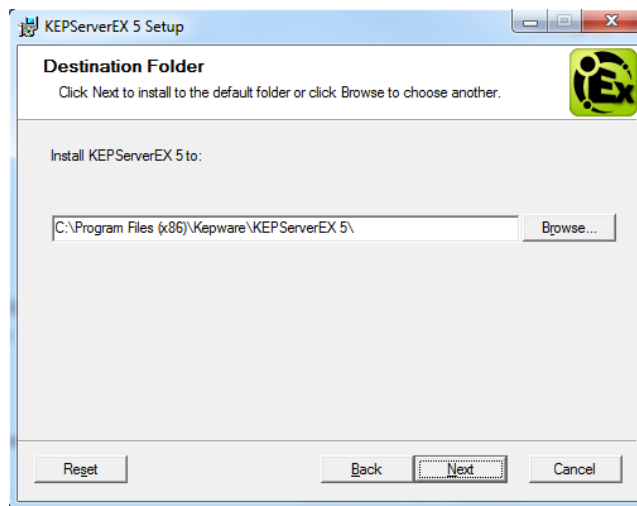
1. Open the Power Monitoring Expert - Data Center Edition DVD and navigate to **Keeware > SNMP To OPC Gateway > Installer**.
2. Double-click KEPServerEX5. The KEPServerEX 5 Setup Wizard screen appears. Click **Next**.



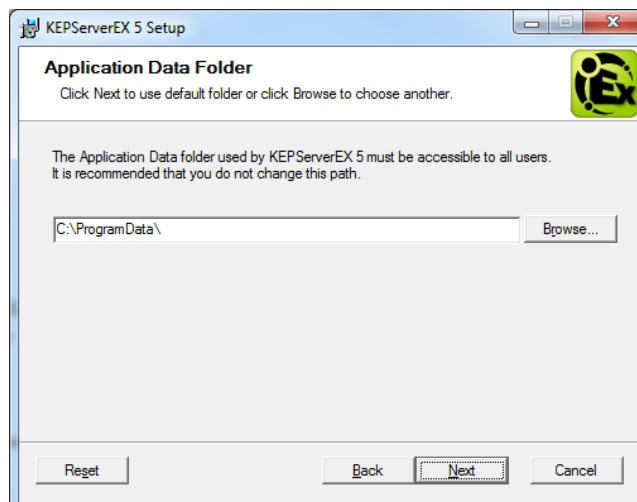
3. Select **I accept the terms in the License Agreement** . Click **Next**.



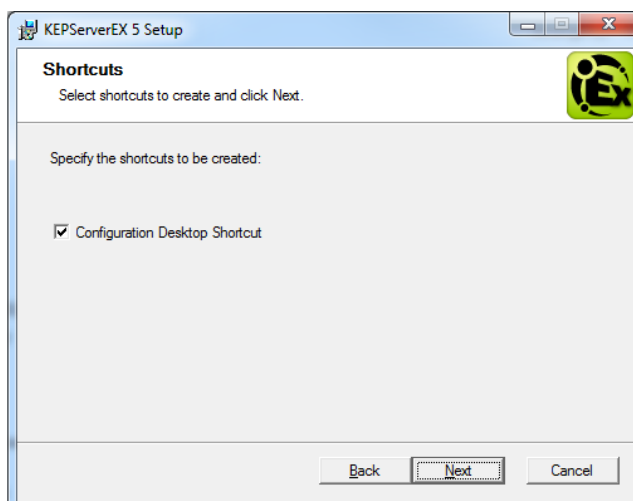
4. Keep the default destination folder path or enter a new location and click **Next**.



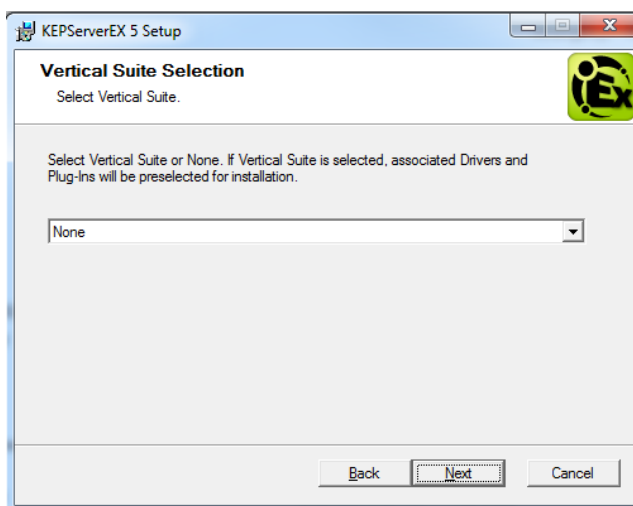
5. Keep the default application folder path or enter a new location and click **Next**.



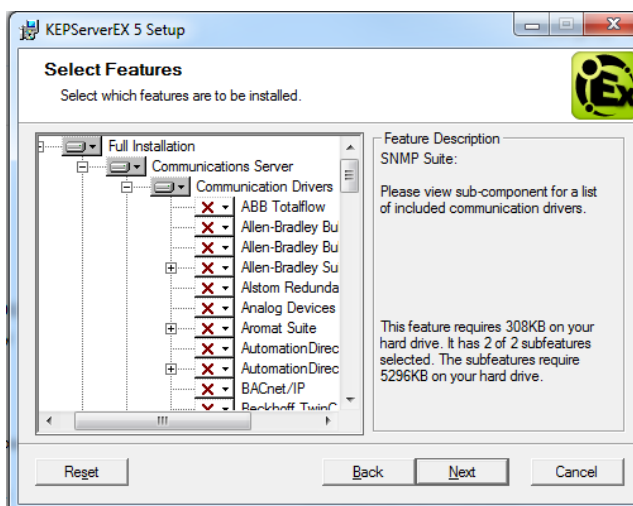
6. Leave the **Configuration Desktop Shortcut** option checked and click **Next**.

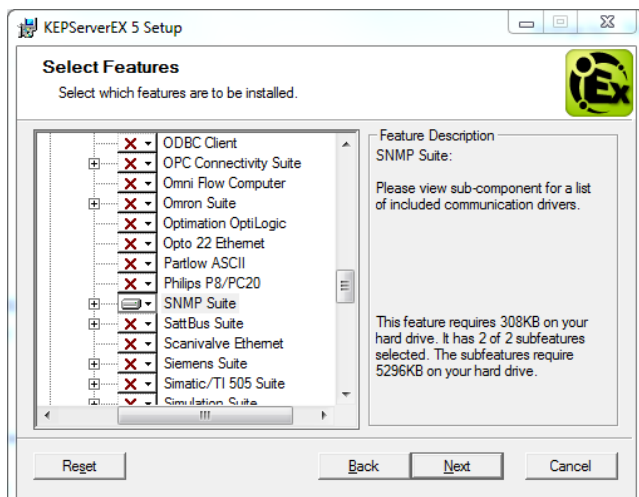


7. Select **None** from the drop-down list. Click **Next**.

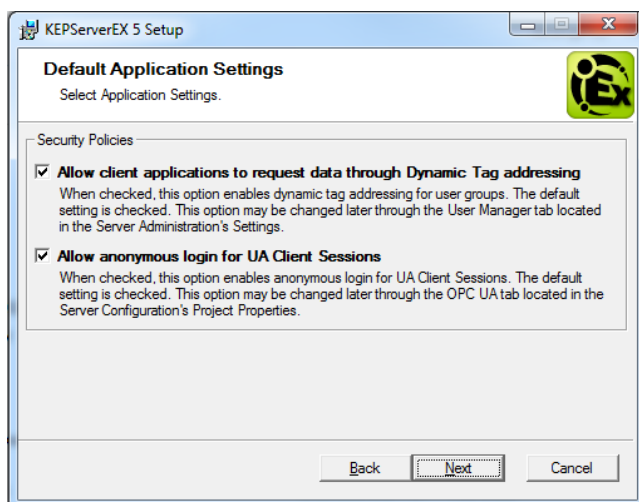


8. Expand **Communication Server > Communication Drivers**. Click on the **X** next to **SNMP Suite** and select **Will be installed on local hard drive**. Click **Next**.

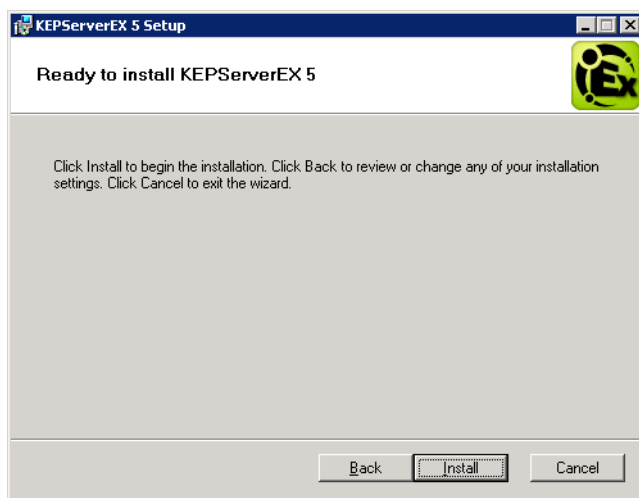




9. Leave the default settings for the Default Application Settings. Click **Next**.



10. Click **Install** to begin the installation, or click **Back** to review or change your installation settings.



11. Click **Finish** to complete the installation.



After the installation is complete, the application license must be activated.

Note

At any time, you can right click the KEPServerEX icon  and select **Help** from the menu. This provides a help file for the various features and components that make up the KEPServerEX application.

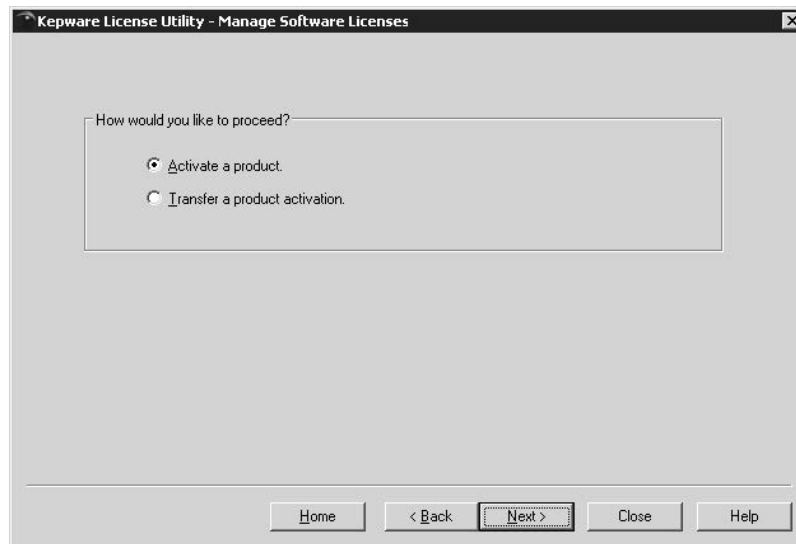
Activating Kepware license

To activate the Kepware license:

1. Open the license utility by right-clicking the KEPServerEX icon  located in the system tray, and selecting **License Utility** from the option list. Select **Manage Software Licenses** from the drop-down list. Click **Next**.



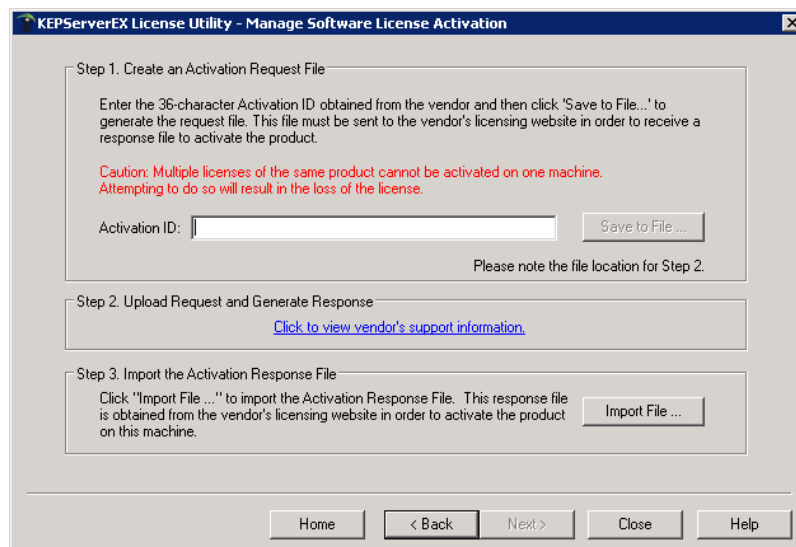
2. Select **Activate a product** and click **Next**.



3. Enter the Activation ID assigned by Kepware with the purchased product in the **Create an Activation Request File** section. Click **Save to File**.

Note

An Internet connection is required to activate a license. If the computer that the activated license will run on does not have Internet access, you must copy the activation request file to a computer that does in order to login to the web-based license portal and generate the activation response file. Both the activation request file and the activation response file must be processed via the License Utility on the Host Machine.



The License Utility displays a **Save As** dialog, allowing you to save the generated activation request file.

4. Save the activation request file, making note of its location as it will be sent to the Kepware's licensing portal in the next step.

Note

The default filename for the activation request file is activation_request.txt. You may rename this to anything you like. Renaming can make it easier to manage your license activations, especially if you are activating more than one product at one time.

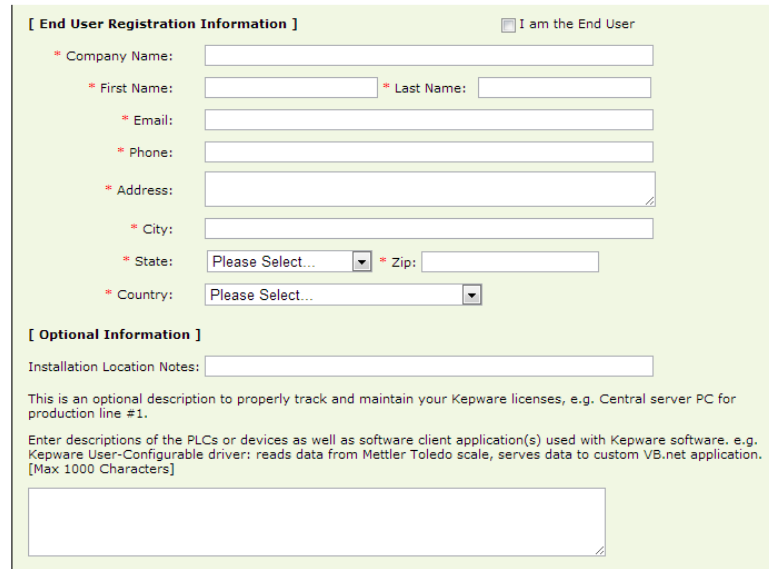
Do not follow **Step 2 Upload Request and Generate Response**, as the url does not work. Instead, follow the procedures below.

For these steps, you must have a PC with Internet access to the web. If your PC does not have internet access, refer to the frequently asked questions for instructions.

5. Open a web browser. Go to <https://my.kepware.com/mykepware/>. Once there, create an account. Click **Sign up here**. Fill in the registration information. It is recommended that you use your own contact information because the customer may get contacted by Kepware if you put their contact information in. You have the option at a later point to uniquely identify the license with the customer.
6. Under License Management Tools in the My Kepware portal, click on the **Activate Product License** link. Fill in the required fields on the activation form.



7. Fill in the customer's information in the sections shown below.



[End User Registration Information] ☐ I am the End User

* Company Name:

* First Name: * Last Name:

* Email:

* Phone:

* Address:

* City:

* State: Please Select... * Zip:

* Country: Please Select...

[Optional Information]

Installation Location Notes:

This is an optional description to properly track and maintain your Kepware licenses, e.g. Central server PC for production line #1.

Enter descriptions of the PLCs or devices as well as software client application(s) used with Kepware software. e.g. Kepware User-Configurable driver: reads data from Mettler Toledo scale, serves data to custom VB.net application. [Max 1000 Characters]

8. For the Activation ID, use the serial number included with your SNMP OPC software. It should look like 5CF9E0CD-FAEA-36C6-8EF9-2B4CDE4FAD50.
9. Browse to the activation request file saved in Step 4 and click **Generate Activation Response File**. Upon successfully processing the activation request file a download link is displayed at the top of the page. Click on this link to download the activation response file. Save the activation response file, making note of its location.

Note

The default filename for the activation response file is response.txt. You may rename this to anything you like. Renaming can make it easier to manage your license activations, especially if you are activating more than one product at one time.

10. Return to the **License Utility** and click **Import File** located on the Manage Software License Activation page. Browse to the **Activation Response File** you received from the online license management tool, and click **Open**.
11. Stop and start the service. From the taskbar, right-click the KEPServerEx icon . Select **Stop runtime Service** from the list. Right-click the icon again and select **Start Runtime Service**.

Upon successful activation, the View Licenses page will be displayed in the License Utility showing the licensing information for the products activated.

Frequently asked questions

How do I activate if the system is not connected to the internet?

Run the license utility on the PC on the server. Copy the activation_request.txt file onto a USB drive, take it to PC with internet access, and then activate as normal starting at step 6.

When I get to the end of registration, there is no FINISH button. How do I exit the utility?

Close the utility. Do not click **Back** or you will lose your activation.

Configure KEPServerEX 5

Overview

The workflow for having data from an SNMP enabled device imported into Power Monitoring Expert - Data Center Edition is:

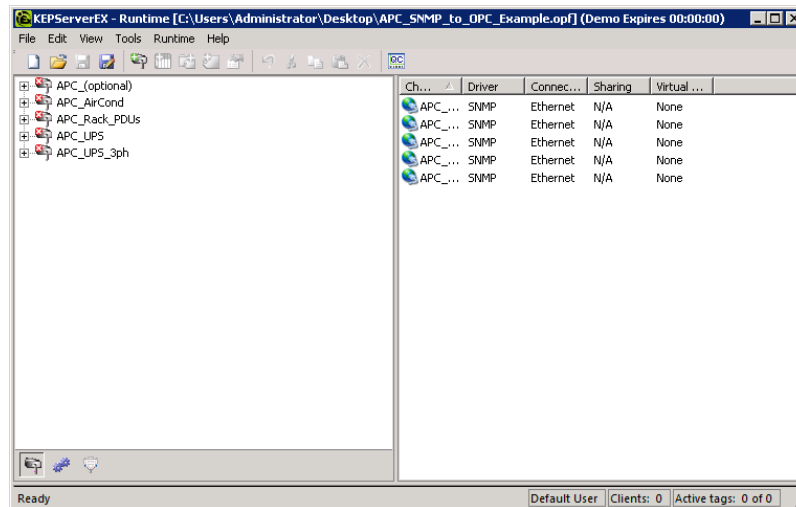
1. Install and configure Power Monitoring Expert - Data Center Edition.
2. Install the KEPServerEX 5 application.
3. Configure the KEPServerEX 5 application.
4. Use the application to create a device with mappings of the SNMP OIDS to OPC tags.
5. Create an OPC translator file for OPC client functionality.
6. Create the VIP framework that reads the OPC data and performs any desired PC logging and calculations.
7. Create the Vista diagrams to display the data either directly from the KEPServerEX 5 Server or from the VIP framework.

Example Configuration

To provide context and a starting point for new configurations of KEPServerEX 5, an example configuration is provided with Power Monitoring Expert - Data Center Edition. This example file is located in **Keeware > SNMP to OPC Gateway > Installer** on the Power Monitoring Expert - Data Center Edition DVD.

To open the APC_SNMP_to_OPC_Example.opf file in KEPServerEX 5:

1. Double-click the **KePServerEX5 Configuration** shortcut on the desktop. The KEPServerEX - Runtime window appears.
2. Click **File > Open** and navigate to **Keeware > SNMP to OPC Gateway > Installer** on the Power Monitoring Expert - Data Center Edition DVD.
3. Select APC_SNMP_to_OPC_Example.opf and click **Open**. Click **Yes, Update** on the KEPServerEX dialog when it appears. The example configuration appears.

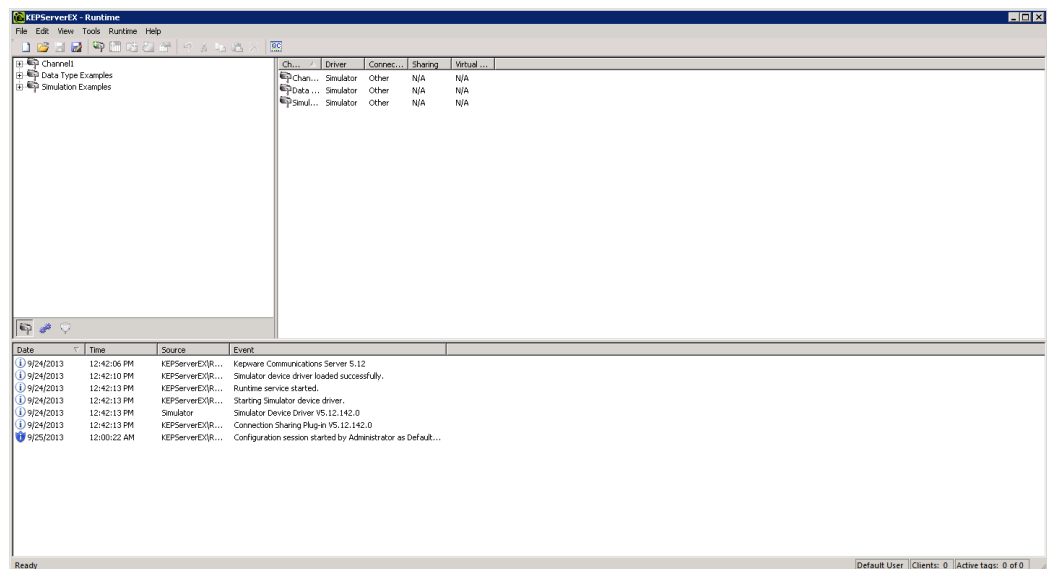


Configuring KEPServerEX 5

To configure the KEPServerEX 5, first create the OPC channel and then add the necessary devices. A channel in the KEPServerEX5 Server is analogous to a site in Power Monitoring Expert.

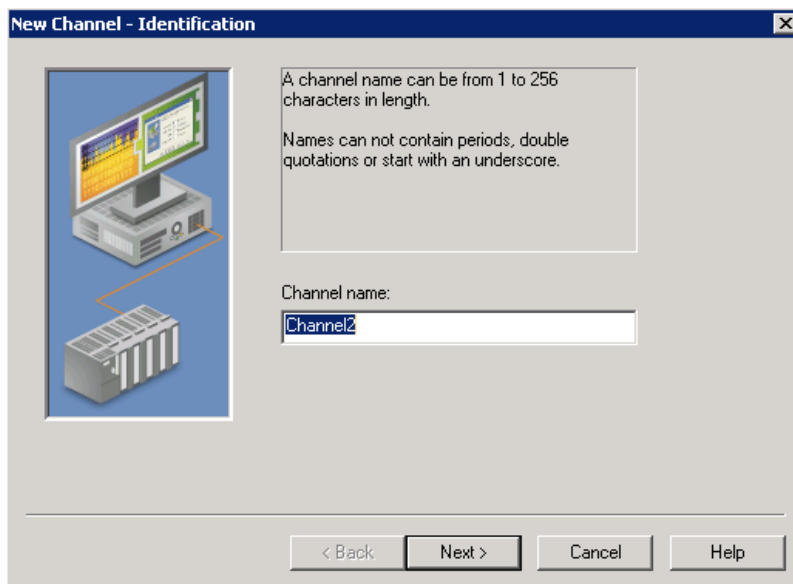
Create an OPC Channel

1. Start the KEPServerEX 5 application by navigating to **All Programs > Kepware > KEPServerEX 5** and start the KEPServerEX 5 Configuration feature. The KEPServerEX - Runtime screen appears.

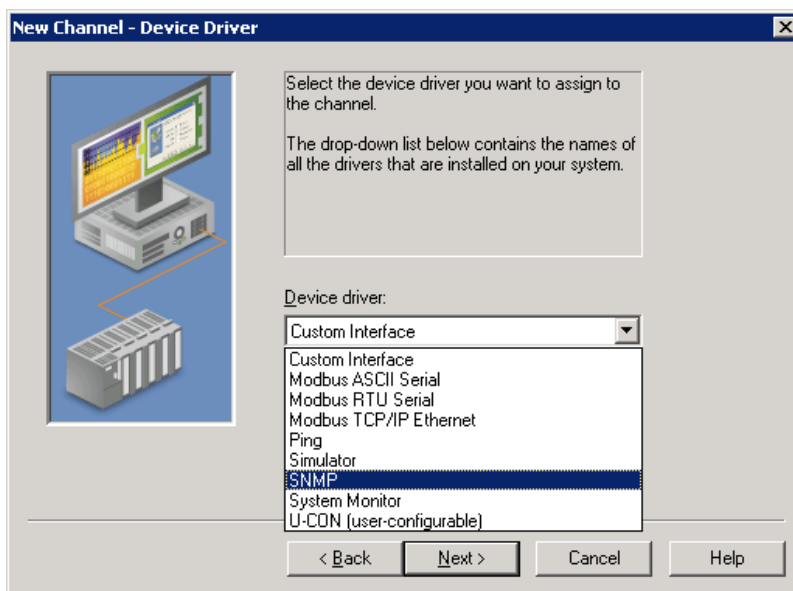


2. Right-click in the left pane and click **New Channel**. The **New Channel** wizard appears.
3. Enter a name for the channel and click **Next**.

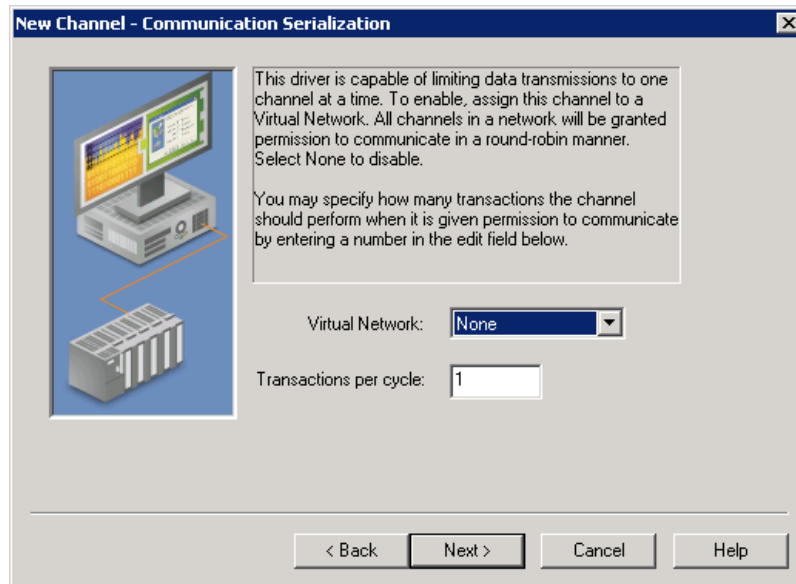
This name will become part of the fully qualified OPC tag that Power Monitoring Expert uses for device addressing. Do not use spaces in the name.



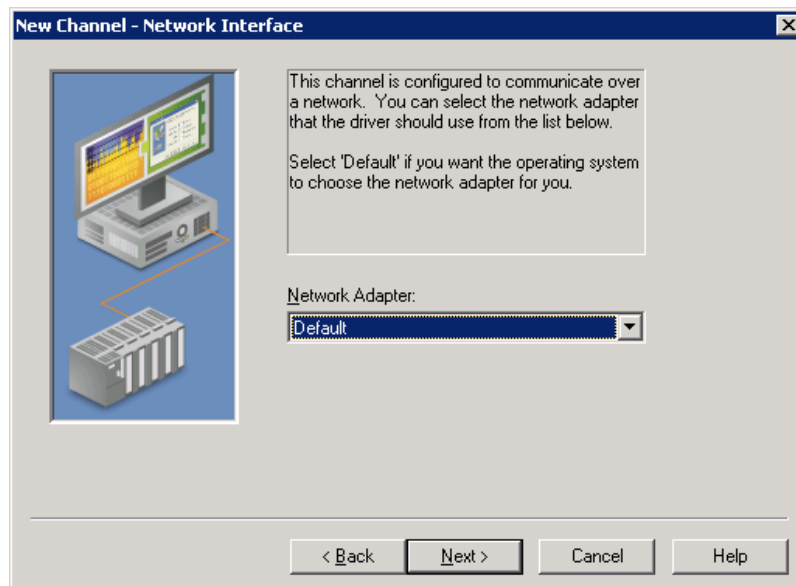
4. In the **Device driver** list, select **SNMP** and click **Next**.



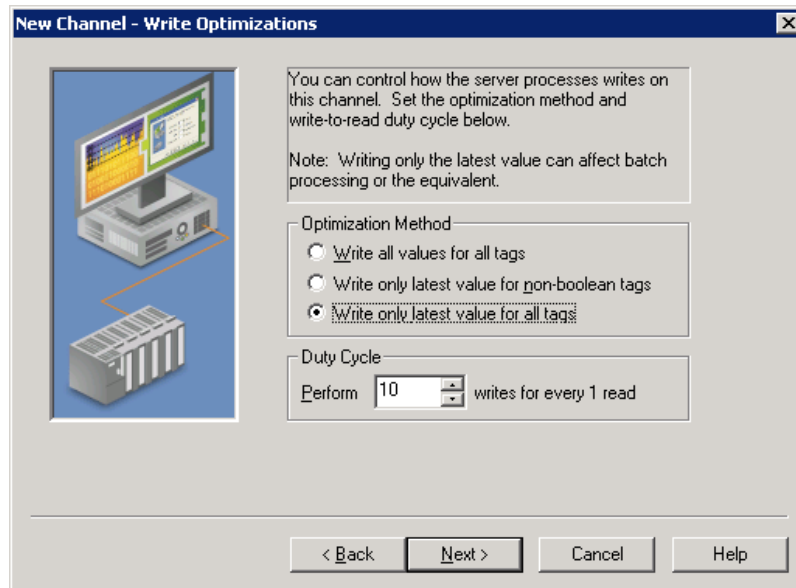
5. In the **Virtual Network** field, you can limit data transmissions to one channel and assign that channel to a virtual network. Select a network from the drop-down list. Specify how many transactions the channel should perform per cycle in the **Transactions per cycle** field.



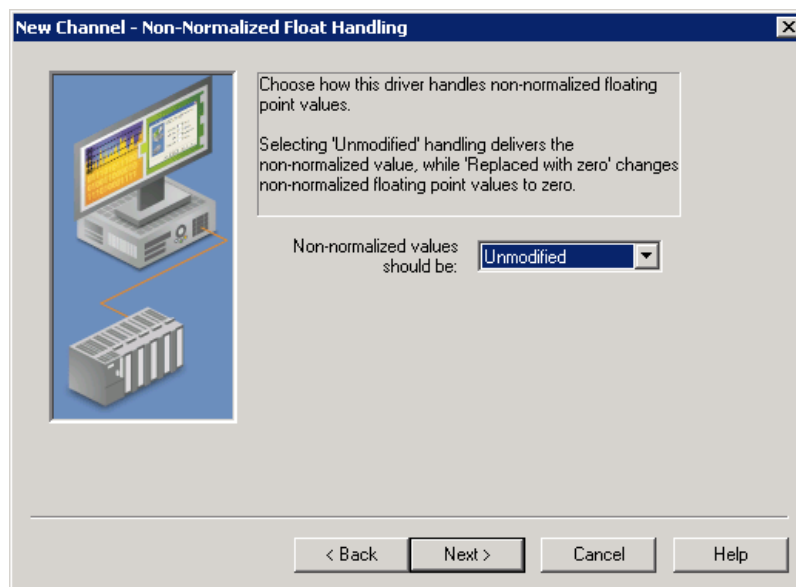
6. In the **Network Adapter** field, select the type of adapter:
 - If the computer has a single network adapter, leave this setting at **Default**.
 - If the system has multiple network adapters and the SNMP network is connected to a specific adapter, choose the appropriate adapter from the list.



7. Click **Next**.
8. Leave the **Optimization Method** option at the default "Write only latest values for all tags" and click **Next**.



9. Select **Unmodified** or **Replace with zero** from the **Non-normalized values should be:** drop-down list.



10. In the **Summary** screen, review the settings and click **Finish**.

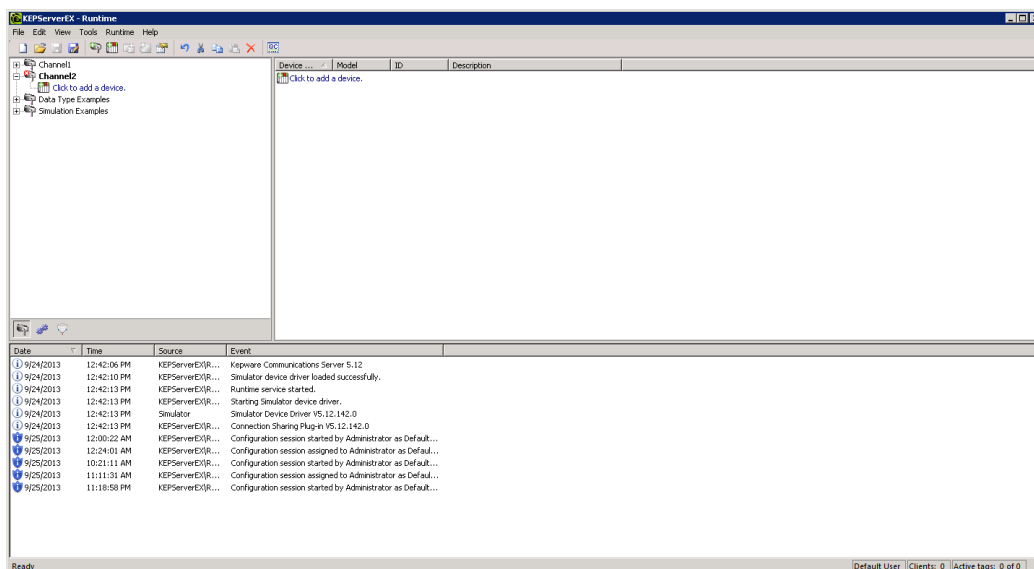
You have now added a channel and can add devices to it. The **KEPServerEX - Runtime** screen appears.

Refer to the KEPServerEX 5 help for more information about channels.

Create new OPC devices

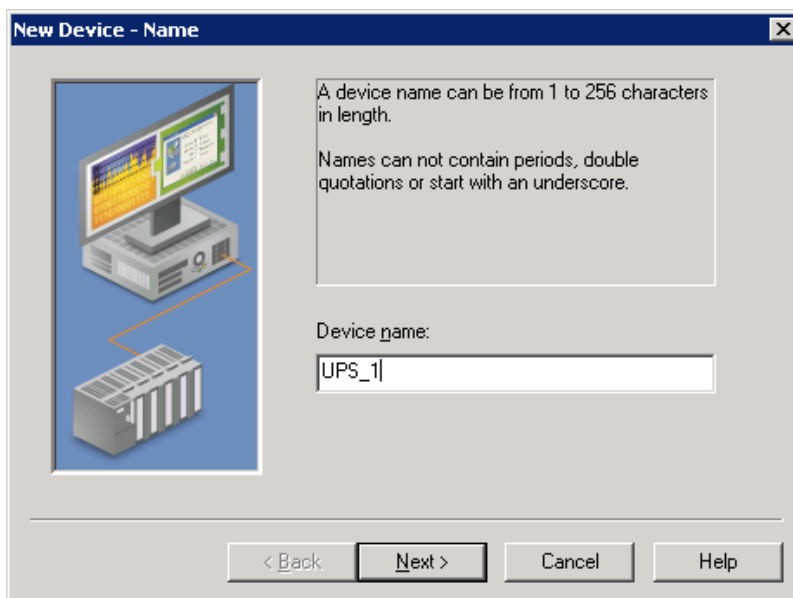
After creating a channel, add or create a new OPC device in the KEPServerEX 5 application.

1. In the left pane, expand the channel and click the **Click to add a device** link. You can also right-click the channel and select **New Device**.

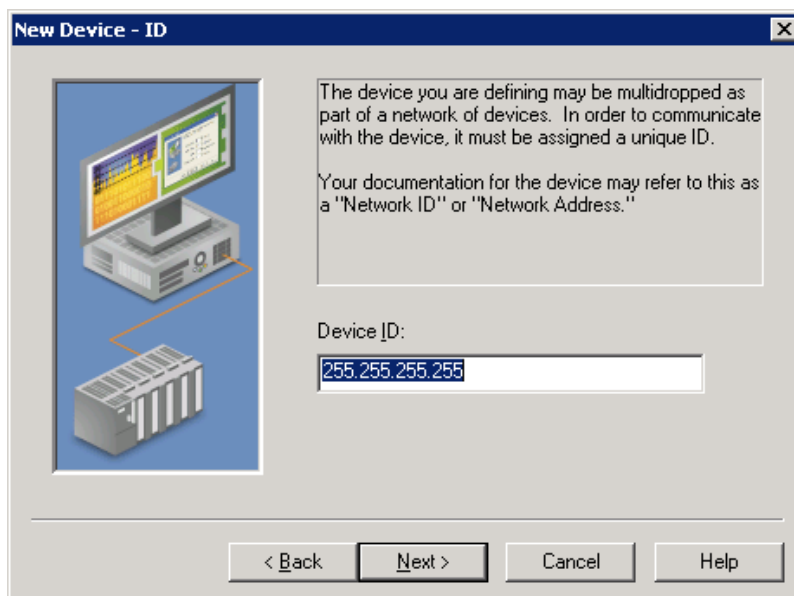


The **New Device** wizard appears.

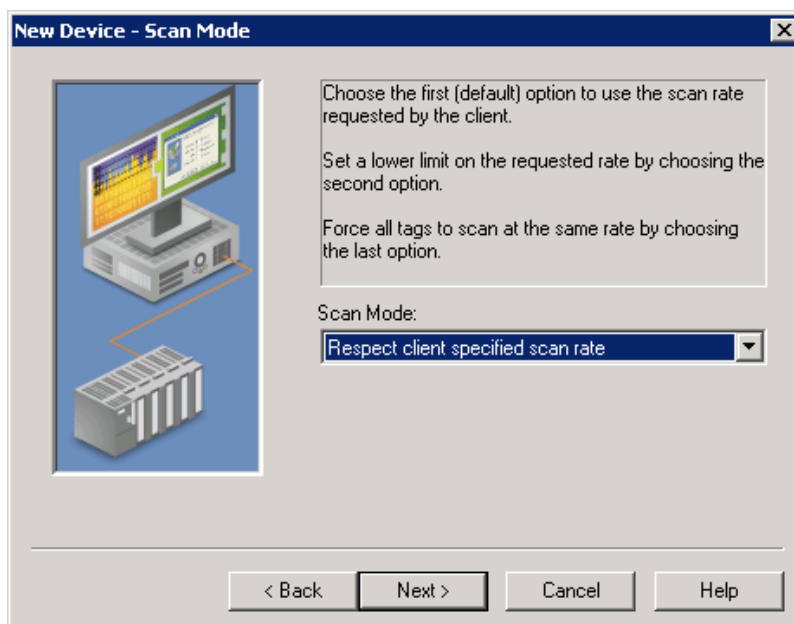
2. Enter a device name. Power Monitoring Expert uses this name as an address field. Click **Next**.



3. In the **Device ID** field, enter the IP address of the device. Click **Next**.



4. Select a Scan Mode from the drop-down list. Click **Next**.



Do not change the default settings on the next two screens.

New Device - Timing

The device you are defining has communications timing parameters that you can configure.



Connect timeout: seconds

Request timeout: milliseconds

Fail after: successive timeouts

Inter-request delay: milliseconds

< Back Next > Cancel Help

New Device - Auto-Demotion

You can demote a device for a specific period upon communications failures. During this time no read request (writes if applicable) will be sent to the device. Demoting a failed device will prevent stalling communications with other devices on the channel.



☐ Enable auto device demotion on communication failures

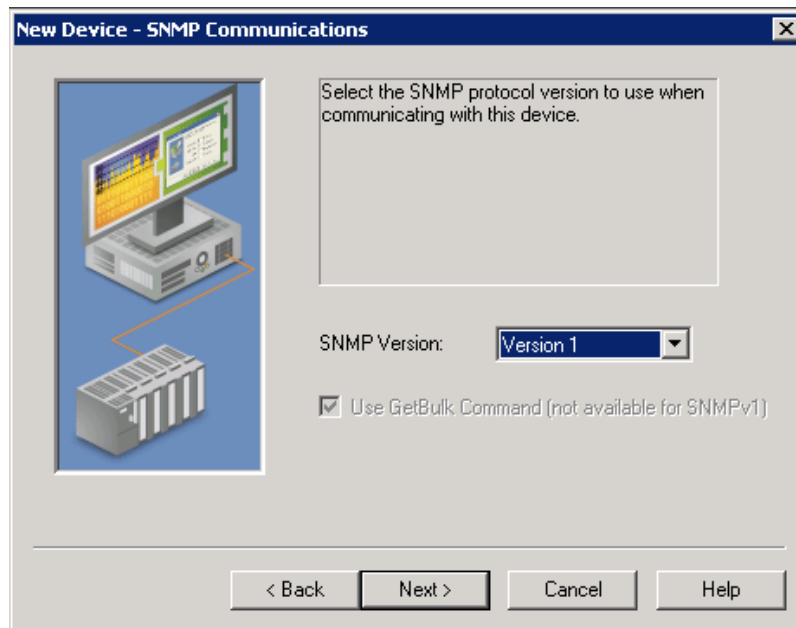
Demote after: successive failures

Demote for: milliseconds

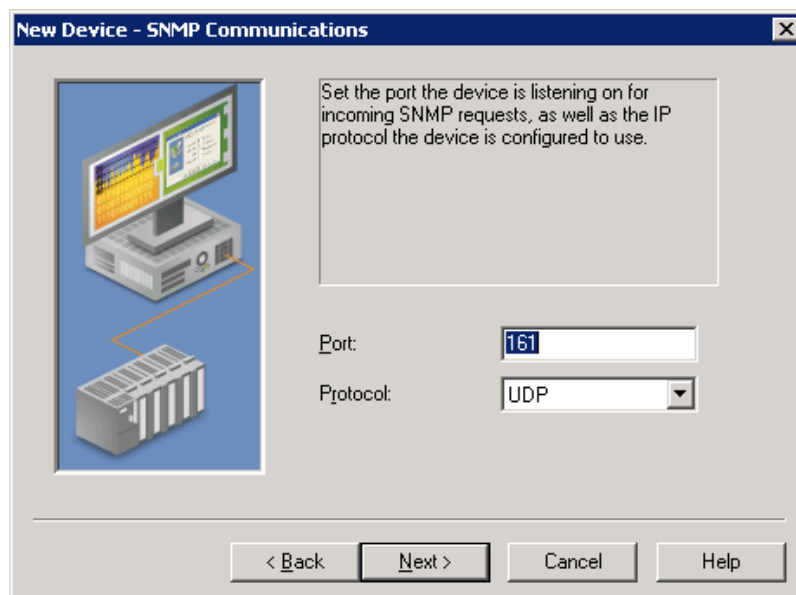
☐ Discard write requests during the demotion period

< Back Next > Cancel Help

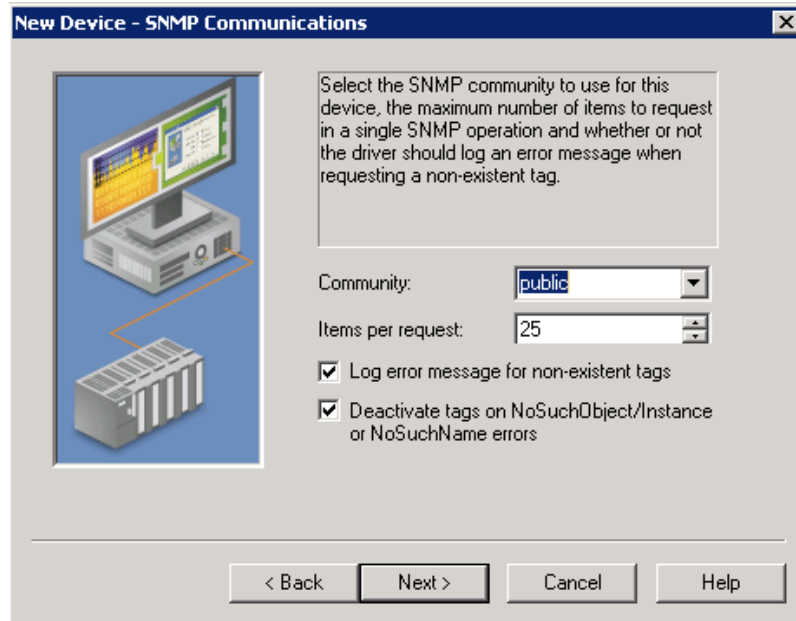
5. In the **SNMP Version** field, select "Version 1". Click **Next**.
Some devices support higher versions, but "Version 1" works for all devices.



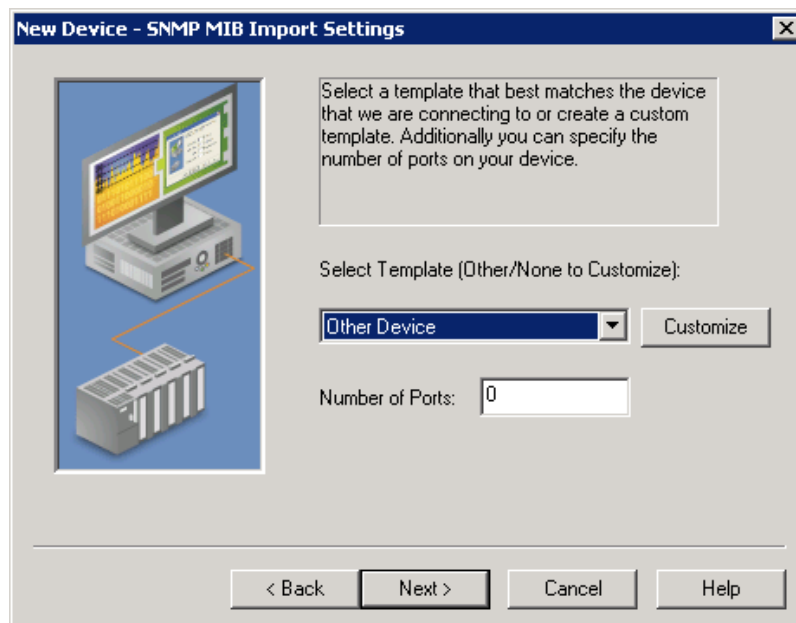
6. Leave the **Port** and **Protocol** settings at the default values. Click **Next**.



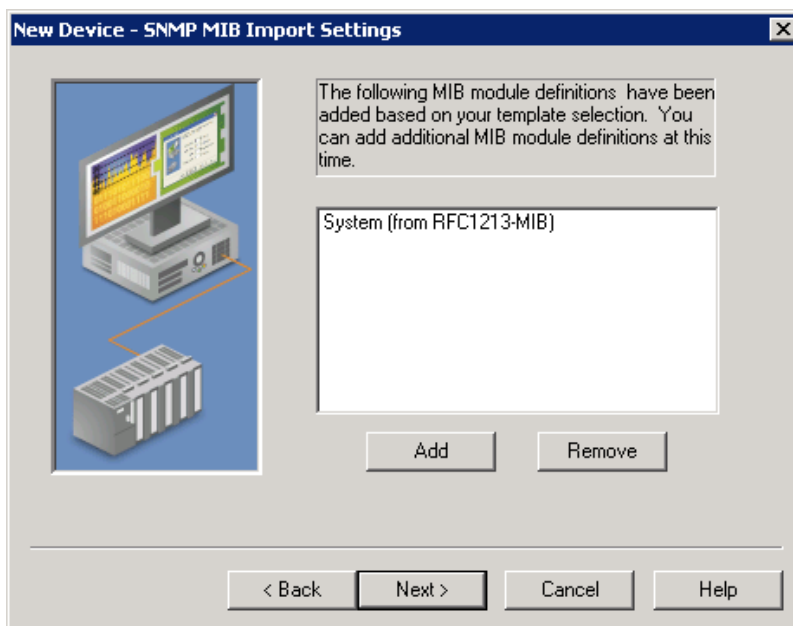
7. Leave all settings at their default values. Click **Next**.



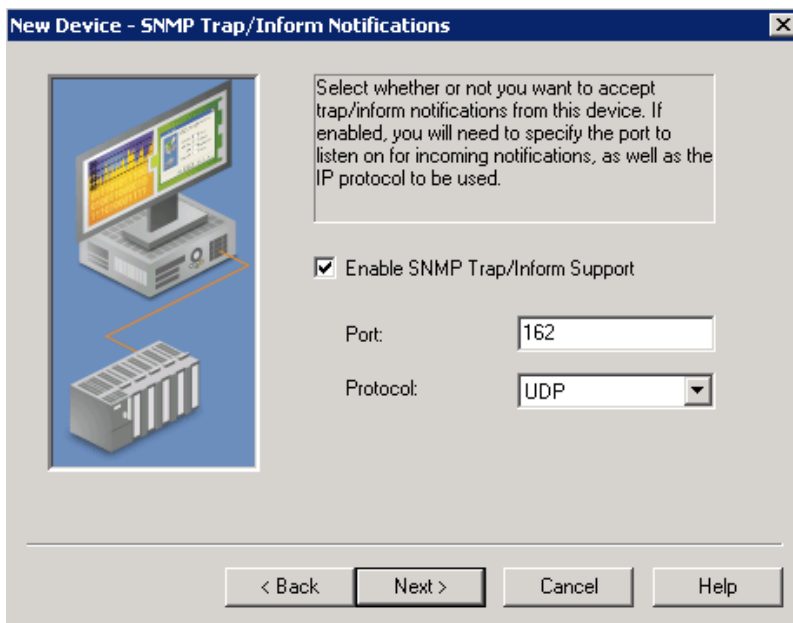
8. In the **SNMP MIB Import Settings** screen, select the **Other Device** template. Click **Next**.



9. Add a new MIB module definition by clicking **Add**, and selecting a module from the list and clicking **OK**. Click **Next**.



10. Leave the **Enable SNMP Trap/Inform Support**, **Port**, and **Protocol** fields at their default settings. Click **Next**.



11. Leave the **Community**, **Number of Events**, and the **Number of Fields** fields at their default settings.

New Device - SNMP Trap/Inform Notifications



Specify if you want to limit trap/inform notifications to a certain community or leave blank to accept from any community. In addition, specify the maximum number of trap/inform events to buffer along with the maximum number of fields per event.

Community:

Number of Events:

Number of Fields:

< Back Next > Cancel Help

12. Leave the **Enable Network Analyst Tags** option at the default setting, disabled. Click **Next**.

New Device - Network Analyst



Select whether or not you want to enable network analyst tags. These tags provide real-time bandwidth utilization statistics for network switch devices. These tags are available for network switches only.

☐ Enable Network Analyst Tags

Number of Ports:

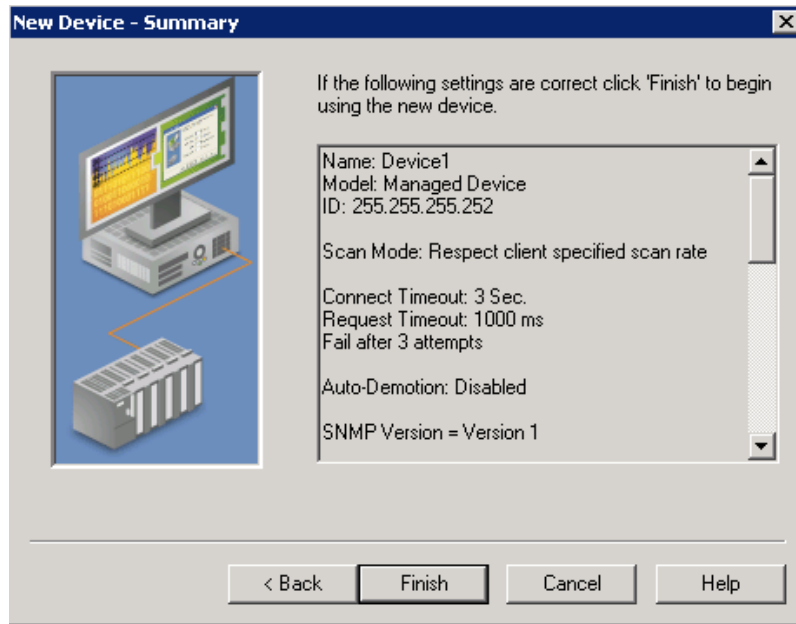
Port Offset:

Port Status 0 Limit (% BU):

Port Status 1 Limit (% BU):

< Back Next > Cancel Help

13. In the **Summary** screen, click **Finish** to complete the device configuration.



The new device is added to the Gateway application.

14. Repeat the above steps for additional devices.

Refer to the KEPServerEX5 help for more information about devices.

Adding OPC TAGs to the new device

After adding a device, map SNMP OIDs to OPC Tags.

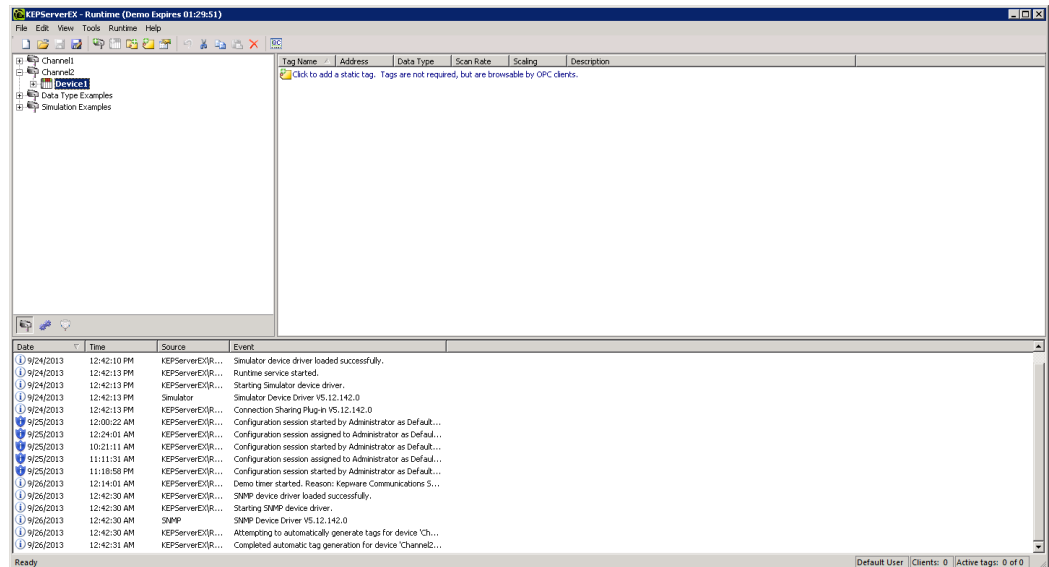
Note:

OPC Tag names may contain any standard character: A-Z, a-z, 0-9 and the underscore "_" character.

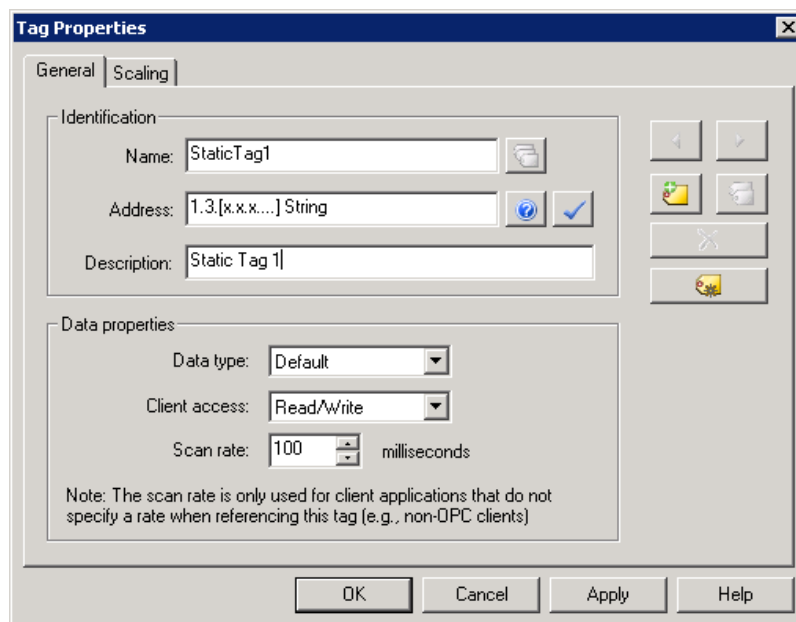
Tag names for a device must be unique. For example, the file cannot contain multiple tags called "Current Phase A" for a multi-circuit PDU.

Tag names are not directly seen by the Power Monitoring Expert system because they are mapped to registers through a translator. Therefore a tag does not have to follow a standard naming convention.

1. In the right pane click the **Click to add a static tag** link.



The Tag Properties screen appears. This is the OPC tag editor.



2. Complete the fields for a new tag:

- **Name:** OPC Tag name which will be used by the Power Monitoring Expert OPC Client system.
- **Address:** This is the SNMP OID provided by the device manufacturer.
- **Description:** Not used by Power Monitoring Expert but useful for documentation and trouble shooting.
- **Data Type:** Should match the SNMP register being read but note that Power Monitoring Expert does not support char or strings as data types. All ION Registers created in the translator files (to be discussed later) will be an external numeric type which is floating point. All other registers will cast to floating point, that is short, long, etc.

- **Client Access:** The Power Monitoring Expert OPC client system only support OPC reads.
- **Scan Rate:** Leave at the default value.

3. Click **OK**.

Repeat these steps to add all desired OPC Tags.

Note

OPC Tags can be placed in logical groups for ease of use and maintenance. Refer to the application online help for details on how to use logical groups. If you use groups, the group name becomes part of the fully qualified OPC Tag name.

Adding a large number of tags

If you need to add a significant number of OPC Tags to a device it may be easier to create a list of all the tags in a CSV file. You can then use the CSV Import feature of the Gateway application to add all the tags to the application.

1. Create a single tag as described above.
2. In the KEPServerEX - Runtime screen, right-click on the device icon and select **Export CSV**.
3. Name and save the file to an appropriate location.
4. Open the file with Excel.
5. You can use the advanced editing functions in Excel, such as auto fill, cut and paste, to populate the appropriate columns in the file.

Note

OPC Tag names may contain any standard character: A-Z, a-z, 0-9 and the underscore "_" character.

Tag names for a device must be unique. For example, the file cannot contain multiple tags called "Current Phase A" for a multi-circuit PDU.

Tag names are not directly seen by the Power Monitoring Expert systems because they are mapped to registers through translator files. Therefore a tag does not have to follow a standard naming convention.

6. Save the file in Excel as a .csv file.
7. In the KEPServerEX application, right-click on the device and select **Import CSV**.
8. Select the new .csv file. The tags for that device will be loaded.
9. After creating all the required SNMP – OPC Tags, save the project.

Creating additional Devices of the Same Type

To create additional devices with the same mapping:

1. In the left pane, click on the device you want to copy and select the **Edit > Copy** menu.

2. Click on the channel and select the **Edit > Paste** menu. The **Device Properties** screen appears.

The screenshot shows the 'Device Properties' dialog box with the 'General' tab selected. The 'Channel Assignment' section shows 'Name: Channel5' and 'Driver: SNMP'. The 'Device' section shows 'Name: Device1', 'Model: Managed Device' (selected from a dropdown), and 'ID: 255.255.255.252'. The 'Enable data collection' checkbox is checked, and the 'Simulate Device' checkbox is unchecked. The 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

3. Edit the new device name and device ID.
4. Leave all other settings at the default value.
5. Click **OK**.

Test device SNMP-OPC mappings

The KEServerEX 5 application has a Quick Client utility to allow for testing of the KEServerEX 5 configuration. In the KEServerEX 5 help, refer to “Designing a Project” and “Testing the Project” topics for details on using the Quick Client Utility.

For a small number of registers, start the “Quick Client” while using the KEServerEX 5 Configuration application. In the KEServerEX - Runtime screen, click **Tools > Launch OPC Quick Client**.

In this mode the “Quick Client” automatically attempts to connect to all defined devices and load all SNMP-OPC registers. If there are a large number of registers defined this can take a significant amount of time.

For a large number of devices or registers, start the “Quick Client” separately and manually configure the connections for the devices. From the Windows Start menu, go to:

- **All Programs > Kepware > KEServerEX 5 > OPC Quick Client.**

Create StruxureWare Device Translator Files for an OPC Device

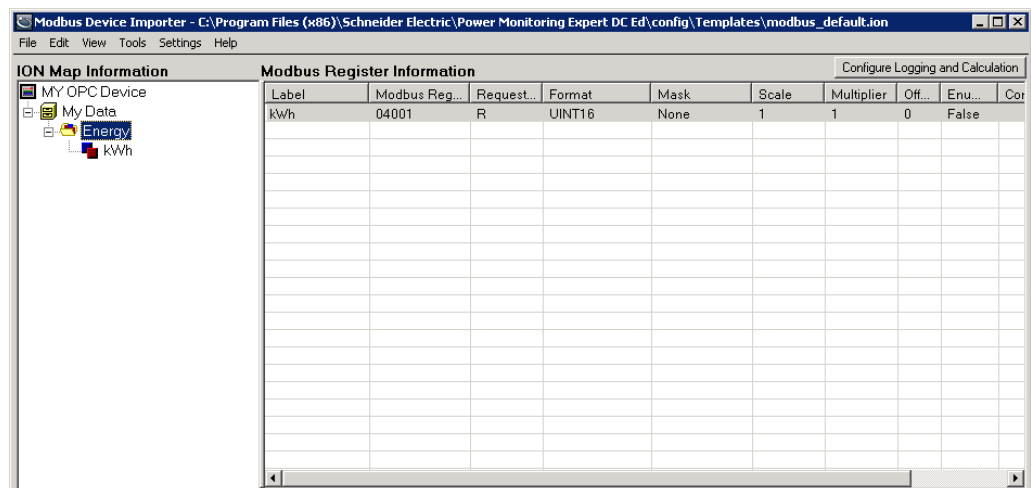
To create the OPC device type, two translator files must be created. At this time there is no tool available to create an OPC device type. However it is possible to use the Modbus Device Importer (MDI) application to create the two files used by a translator:

- <name>.ion which has the ION managers, names and handle data
- <name>.xml which has the protocol register to ION Handle mappings

The .xml file is edited from the Modbus format to the OPC format while the .ion file is left unchanged.

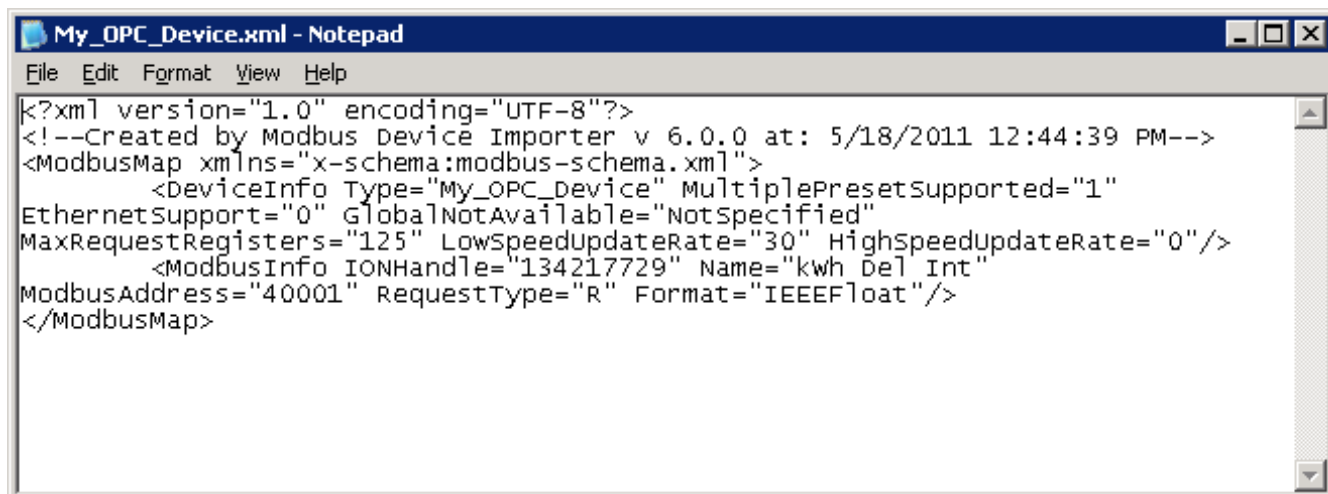
For instructions on using MDI refer to the "Modbus Device Importer" chapter of the *StruxureWare Power Monitoring Expert 7.2 User Guide*.

1. Start the ModBus Device Importer application. The default location is C:\Program Files (x86)\Schneider Electric\Power Monitoring Expert DC Ed\system\bin\ModbusDeviceImporter.exe.
2. Create a device in the MDI, with Managers, and so on.



3. Save the configuration. In this example MDI creates the My_OPC_Device.ion and My_OPC_Device.xml file in this folder:

```
<Power Monitoring root>\config\templates
```
4. Open the My_OPC_Device.xml in a text editor such as Notepad.



```

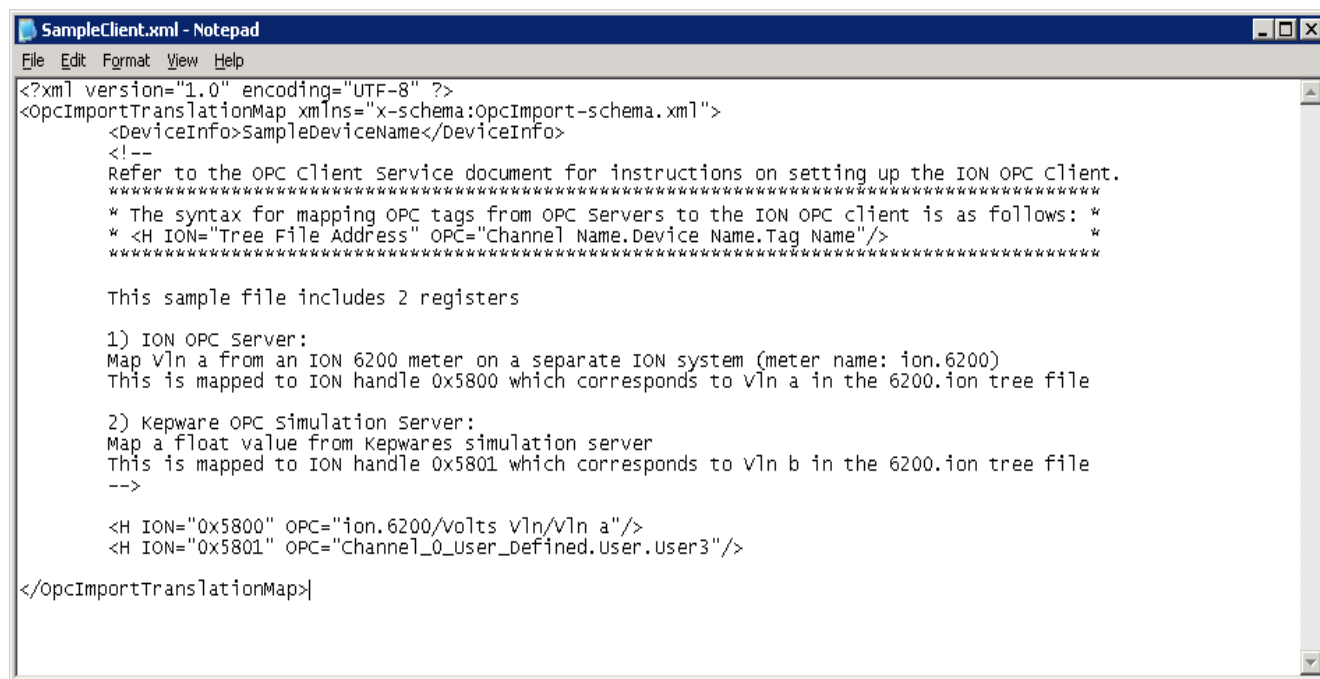
My_OPC_Device.xml - Notepad
File Edit Format View Help
<?xml version="1.0" encoding="UTF-8"?>
<!--Created by Modbus Device Importer v 6.0.0 at: 5/18/2011 12:44:39 PM-->
<ModbusMap xmlns="x-schema:modbus-schema.xml">
  <DeviceInfo Type="My_OPC_Device" MultiplePresetsSupported="1"
EthernetSupport="0" GlobalNotAvailable="NotSpecified"
MaxRequestRegisters="125" LowSpeedUpdateRate="30" HighSpeedUpdateRate="0"/>
  <ModbusInfo IONHandle="134217729" Name="kwh Del Int"
ModbusAddress="40001" RequestType="R" Format="IEEEFloat"/>
</ModbusMap>

```

The key information in the file is the ION Handle. In this example, the entry is IONHandle="134217729" and this is mapped to ION=134217729 for the OPC .xml file.

An example OPC .xml file is in the folder:

<Power Monitoring root>\config\translators\OPC



```

SampleClient.xml - Notepad
File Edit Format View Help
<?xml version="1.0" encoding="UTF-8" ?>
<OpCImportTranslationMap xmlns="x-schema:OpCImport-schema.xml">
  <DeviceInfo>SampleDeviceName</DeviceInfo>
  <!--
Refer to the OPC client service document for instructions on setting up the ION OPC client.
*****
* The syntax for mapping OPC tags from OPC Servers to the ION OPC client is as follows: *
* <H ION="Tree File Address" OPC="Channel Name.Device Name.Tag Name"/> *
*****

This sample file includes 2 registers

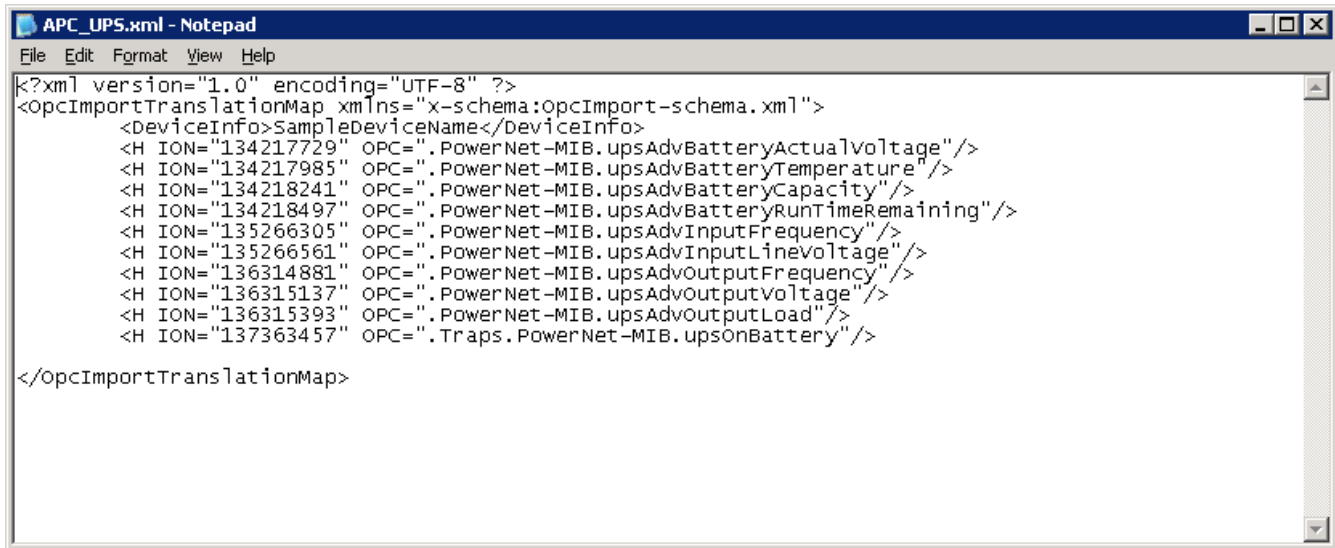
1) ION OPC Server:
Map vIn a from an ION 6200 meter on a separate ION system (meter name: ion.6200)
This is mapped to ION handle 0x5800 which corresponds to vIn a in the 6200.ion tree file

2) Kepware OPC Simulation Server:
Map a float value from Kepwares simulation server
This is mapped to ION handle 0x5801 which corresponds to vIn b in the 6200.ion tree file
-->

<H ION="0x5800" OPC="ion.6200/volts vIn/vIn a"/>
<H ION="0x5801" OPC="Channel_0_User_Defined.User.User3"/>
</OpCImportTranslationMap>

```

5. Edit the My_OPC_Client.xml to match the sample file format, such as:



The OPC Tag field should be the Tag_Name as created earlier.

In this example the OPC Tag name includes a tag grouping name, "PowerNet-MIB". The example mapping created earlier does not use this grouping.

6. Save the My_OPC_Device.ion and My_OPC_Device.xml files in the folder:

```
<Power Monitoring root>\config\translators\OPC
```

Real time device configuration

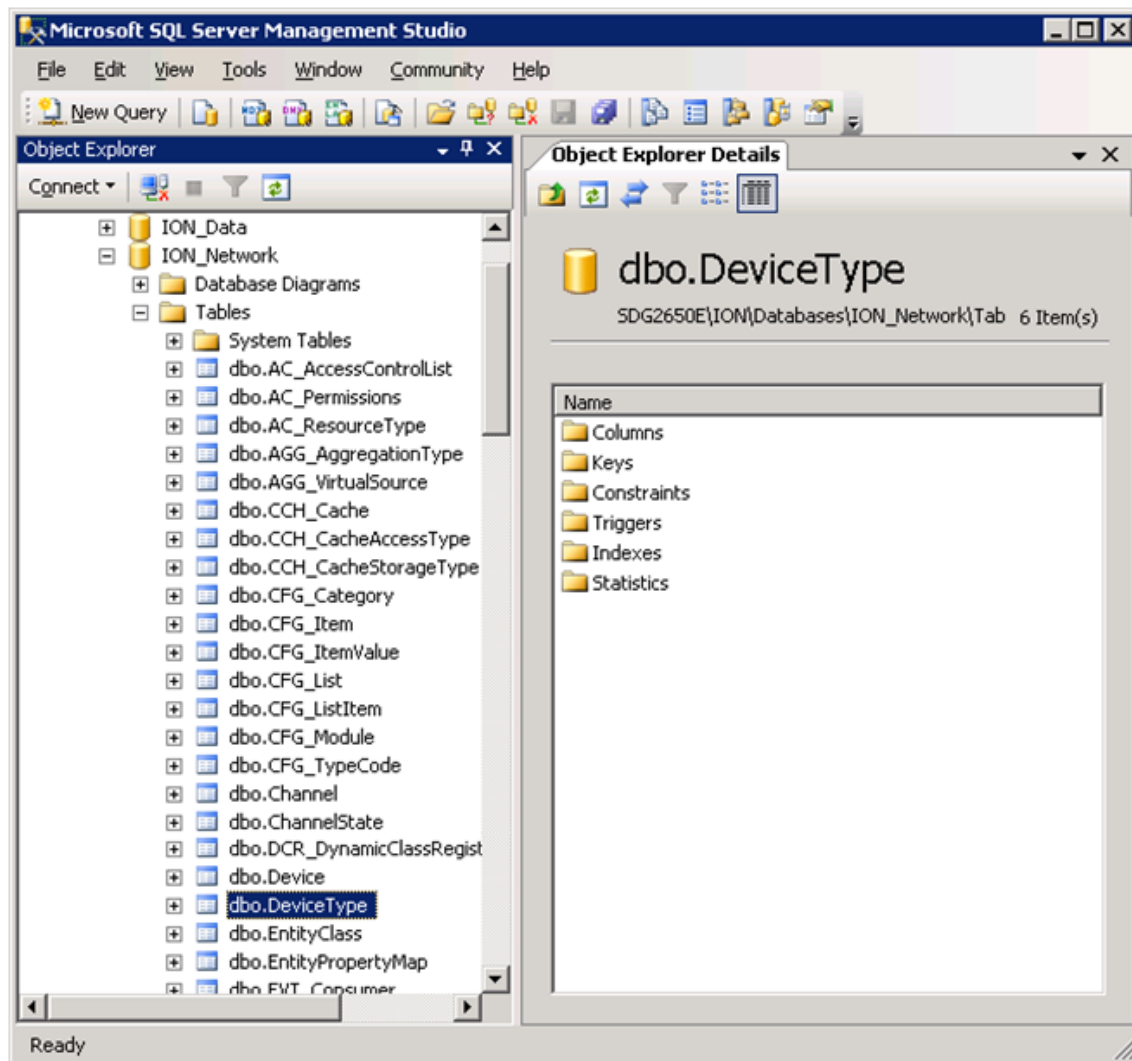
Refer to the knowledge base article "OPC Client and ION Enterprise" for the details of using the OPC Client functionality of Power Monitoring Expert.

Create an OPC device type

You perform these steps in SQL Server Management Studio.

1. Copy the provided files My_OPC_Device.ion and My_OPC_Device.xml to:

```
<Power Monitoring root>\config\translators\OPC
```
2. In SQL Server Management Studio, open the ION_Network database.



3. In the Tables folder, open the dbo.DeviceType table.

4. Run the following SQL script to create the OPC device type.

Change `My_OPC_Device` (and `.ion` and `.xml` files) to the actual name of the device:

```
USE ION_Network
```

```
INSERT INTO dbo.DeviceType
```

```
(Type, DisplayName, TreeFile, MapFile, EthernetSupport,
SecurityModules, UsesFlashFile, IONBufferSize_Bytes, TranslatorID,
UnsolicitedTickPeriod_ms)
```

```
values
```

```
('My_OPC_Device',
```

```
'My_OPC_Device',
```



```
'OPC\My_OPC_Device.ion',  
'OPC\My_OPC_Device.xml',  
0,0,'False',4096,21,0)
```

Create an OPC Site in the Management Console

Perform these steps in Power Monitoring Expert Management Console.

1. Open the Management Console and click **Sites**.
2. Right-click in main pane and select **New > OPC Site**. The **OPC Site Configuration** screen appears.

Items in red are mandatory	
Name	
Address	
Computer	STANDALONE
Enabled	Yes
Description	

Name
Enter a name to identify the site.

OK Cancel

3. Enter the **Name**, such as DATACENTER.
4. Enter the address in the following form:
`opcda://<OPC_Server>/Kepware.KEPServerEX.V5`, where `<OPC_Server>` is the server name, such as SDG2650E.

The spelling and syntax of the address must be correct, for example:

```
opcda://SDG2650E/Kepware.KEPServerEX.V5
```

5. Click **OK** to save the new OPC site.

Add OPC Devices in the Management Console

Perform these steps in Power Monitoring Expert Management Console.

1. In Management Console click **Devices**.
2. Right-click in the main pane and select **New > OPC Device**. The **OPC Device Configuration** screen appears.

OPC Device Configuration

Items in red are mandatory

Group	
Name	
Device Type	
Site	
Address	
Enabled	Yes
Description	

Group

Enter a name for the group to associate the device with, or select a group name from the list.

OK Cancel

3. Enter or select the group name, such as APC.
4. Enter a device name, such as UPS4.
5. Select the device type you created in ["Create an OPC device type" on page 211](#).
6. Select the OPC site you created in the previous section.
7. Enter the OPC address for the device in the form <Channel>.<Device>. The address is a concatenation of the site name with the device address.

Note

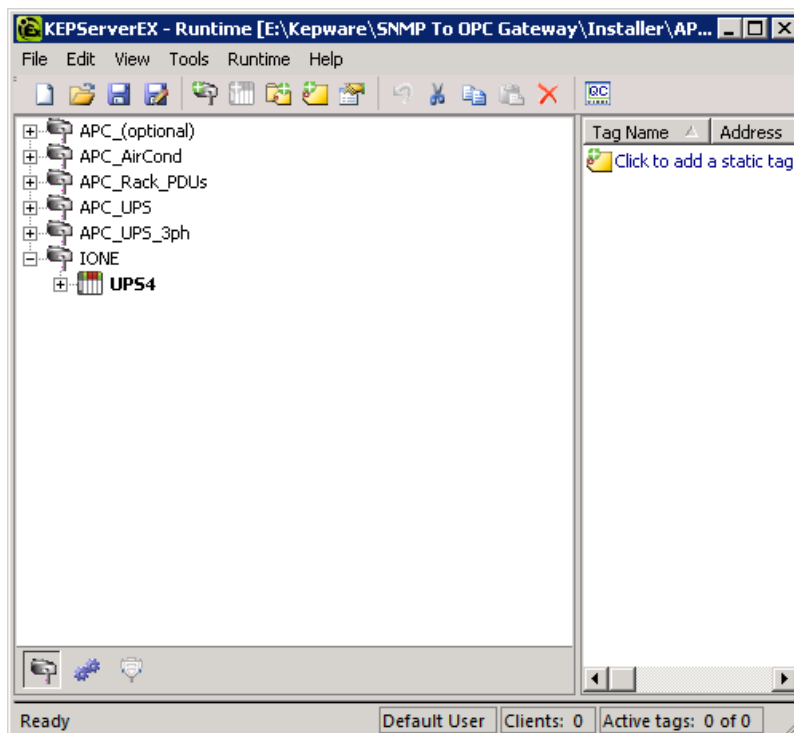
The address must match the name created in the KEPServerEX Application.

8. Click **OK**. The real-time OPC device is added to the system.

Example

For example, in the KEPServerEX -Runtime screen, the address of UPS4 is IONE.UPS4.
The full OPC address is:

```
//SDG2650E/Kepware.KEPServerEX.V5.IONE.UPS4
```



Note

The address to a specific tag is contained in the <device>.xml file and includes the tag group name, if used.

Any incorrect entries or changes in the OPC addressing schema could cause any of the following:

- The site becomes unavailable.
- The device becomes unavailable.
- Data becomes unavailable.

Event Notification Module

The Event Notification Module (ENM) is an optional high priority alarming module that provides notification of power incidents to designated people in your facility, regardless of their location. ENM delivers alerts of power system events to the mobile device or email of designated users to help them quickly identify system abnormalities and take appropriate action.

Install the Event Notification Module

The Event Notification Module is an optional feature which must be manually installed after Power Monitoring Expert - Data Center Edition. The following is a brief description of the steps necessary to install the Event Notification Module from the Power Monitoring Expert - Data Center Edition DVD. For a complete description, refer to the *Event Notification Module Installation Guide*.

To install the Event Notification Module:

1. Navigate to **Event Notification Module > Installer > MainSetup** on the Power Monitoring Expert - Data Center Edition DVD.
2. Double-click **MainSetup**. The Event Notification Module installer appears.
3. **License Agreement:** Read the End User License Agreement (EULA) and if you accept the terms of the agreement, click **I Agree** to proceed.
4. **Setup Type:** Select **Event Notification Module – Complete** and click **Next**.

Note

Database and Application Server installations are not used in Power Monitoring Expert - Data Center Edition

5. **File Destination:** Click **Next** to install ENM to the default location. To select a different location, click the Browse button and select a new location. Click **Next**.
6. **Database Server:** The local database instance is selected by default. The format displayed is `machine name\database instance`. Ensure it is correct. If you change the Authentication entry to SQL Server Authentication, enter the **Username** and **Password** login credentials associated with the database and click **Next**.
7. **Citect Credentials:** Enter the credentials for PowerSCADA if this component is part of the server configuration.
8. **Database Maintenance Credentials:** Enter the Windows administrator login credentials associated with the machine that ENM is being installed on.

The username and password credentials are verified before moving to the next screen. If the verification is not successful, confirm your credentials, provide the login credentials again.
9. **Backup Location:** Click **Next** to use the default destination folder for the backup location, or click the Browse button and select a new location. Click **Next**.

10. **Check System:** The installer verifies that the requirements are met. If there are any issues, the installer notifies you to correct the issue.
11. **Ready to Configure:** The configuration choices are displayed before being installed. Ensure that all items are correct before proceeding.
12. Click **Back** to correct any items.
13. Click **Install** to continue. The **Copy Files** screen appears and the Event Notification Module files are copied to the machine.
14. **Advosol OPC Core Component:** When prompted, accept the license agreement for Advosol OPC Core Component. Click **Next** then **Finish** to complete the installation. This component must be installed.
15. **Configure System:** The selected configuration settings are applied.
16. **Complete:** The Configuration Complete page appears after the install is successful. Click **Next**.
17. Click **Installation Logs** to view details recorded for the installation process.
18. Click **Close** to finish.

The StruxureWare Solutions shortcut is added to the Windows Desktop. Double-click to open the Event Notification Module application.

The Event Notification Module requires a license activation.

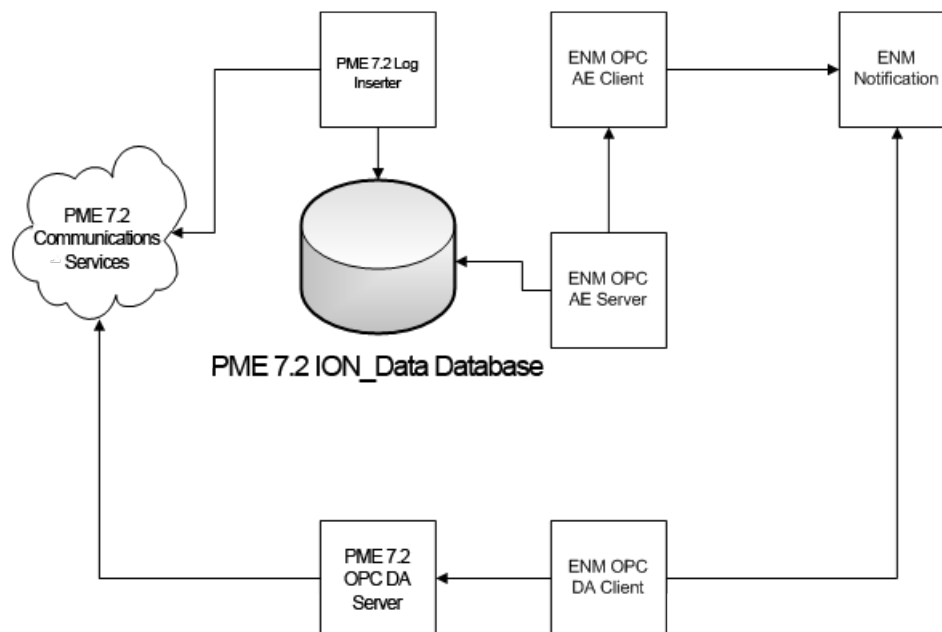
This web application uses Microsoft Internet Explorer 8. For clients using Internet Explorer 9 or later, it may be possible to use the browser's compatibility view to emulate the Internet Explorer 8 environment.

For information regarding the configuration of the Event Notification Module, refer to the *Event Notification Module User Guide*.

Configure the Event Notification Module

The ENM can access Alarm and Event information through two methods:

- By querying the Power Monitoring Expert Database,
- By directly querying a device connected to Power Monitoring Expert.



1. Key alarms should be configured to use the OPC Data Acquisition (DA) mechanism, as response times are faster. Key alarms should be polled from devices that have direct Ethernet connectivity. In the Power Monitoring Expert - Data Center Edition recommended architecture, PLCs are used for all critical alarms and ModbusTCP is used to poll them.
2. Other alarms should be configured via the OPC Alarm and Event (AE) / Database query mechanism. This methodology does not generate the additional communications traffic that may slow response times for other activities.

Refer to the *Event Notification Module User Guide* for information regarding the configuring the alarms in an appropriate manner.

Event/Priority alarms for managed circuits and downstream sources

When an alarm occurs in a BCPM downstream channel or managed circuit, two set of events be seen; one from the parent source with priority 0 and one from the downstream source itself with its appropriate priority. To avoid processing both copies of the alarm in ENM, it is necessary to configure filters in ENM Setup to receive only alarm notifications within the specified range. In this case the filters are used to ignore the event with priority 0 captured associated with the parent source.

Every time a device is added in Management Console, **Apply changes** in OPC Server Configuration must be executed for the nodes to appear in the list. This applies to reconfiguration of some devices as well. For example, when reconfiguring circuits to have a different numbers of poles on Enersure BCPM devices, because new sources may be created that ENM needs to detect. In addition, if managed circuits are configured it is necessary to reconfigure them after updating the device's configuration. For additional information, refer to ["Managed circuits" on page 53](#).

After adding a new device in Management Console or reconfiguring an existing Enersure BCPM or similar device, complete the following steps in ENM Setup:

1. Click **Apply Changes** in the OPC Server configuration.
2. Locate the filter in filter configuration and select the new node.
3. Click **Save Filter**.
4. Restart the ENM system services.

Alarm Priority Reference

The alarm priorities below apply to the EnerSure BCPM devices. These can be used when configuring alarm filters to exclude unwanted alarms.

Device	Value
EnerSure BCPM	
Voltage Alarms	64
Current alarms	64
Trip/off alarms	200
HiHI alarms	175
Hi alarms	128
Parent device alarm copies	0

PowerSCADA Expert

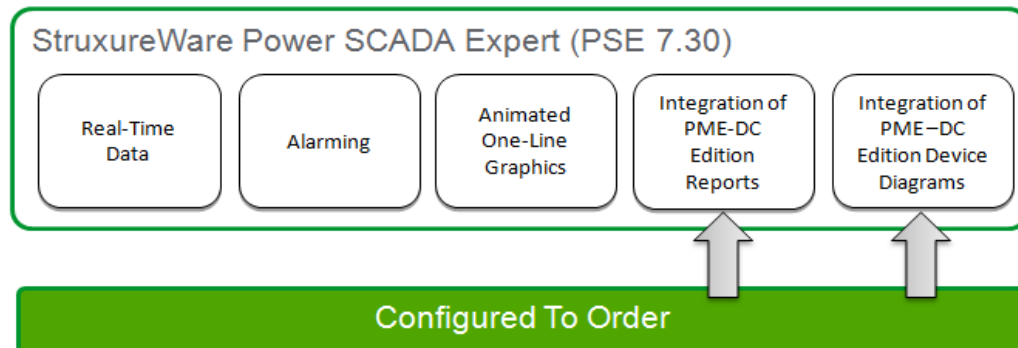
PowerSCADA Expert is a SCADA based power monitoring solution that provides a high performance interface for displaying instantaneous measurements and alarm status. When used with Power Monitoring Expert - Data Center Edition, PowerSCADA Expert is used for its custom graphics and alarm monitoring and notification capabilities, while Power Monitoring Expert is used for historical data logging, reporting, and device-level diagrams.

The addition of PowerSCADA Expert to the Configured to Order option represents the Power Monitoring Expert - Data Center Edition Engineered to Order option, and can be deployed when certain criteria are met. See the "When to Use Engineered to Order" section of the *StruxureWare Power Monitoring Expert - Data Center Edition Design Guide* for information regarding when Engineered to Order is a valid deployment option.

This section provides reference points for installing PowerSCADA Expert 7.30, a high level overview of the process involved with creating a PowerSCADA Expert Project, and information regarding the integration of Power Monitoring Expert and PowerSCADA Expert.

Note

The installation and configuration of PowerSCADA Expert requires advanced knowledge and should only be attempted by personnel with proper training.



Devices are added to both the Power Monitoring Expert and PowerSCADA Expert systems. The base module and any optional modules must also be configured so that the web reports and default device diagrams can be integrated into the PowerSCADA Expert graphics screens. Device diagrams from Power Monitoring Expert can be integrated if access to the historical data logs is required but this is not necessary and will likely be at the customer's request. See ["Integrate device diagrams from Power Monitoring Expert - Data Center Edition into PowerSCADA Expert" on page 226](#) for details.

The Vista diagram templates used to build One-Line, Equipment, and KPI screens in the Configured to Order option are not used in the Engineered to Order option. Screen development is done in PowerSCADA Expert in this case. Template screens for

PowerSCADA Expert are not included in this release of Power Monitoring Expert - Data Center Edition, but the graphics library in Power Monitoring Expert can be used when building out PowerSCADA Expert graphics screens.

Power Monitoring Expert logs historical and power quality data from the meters. Trending for tags in PowerSCADA Device Profiles can be removed completely with Power Monitoring Expert acting as the historical data collector, however it is up to the customer if they want the ability to view trend data in Power Monitoring Expert.

The communications load on devices where Power Monitoring Expert and PowerSCADA Expert are making requests should be carefully considered. Test results can be provided to help understand the impact of multi-masters. The gateway used for serial devices with multi-masters is important and will be discussed as well.

The Configured to Order option can also include the Event Notification Module (installed on the Power Monitoring Expert Server or VM). When PowerSCADA Expert is added, and Alarm Notification is required, the Event Notification Module should be configured with the OPC Server available in PowerSCADA Expert. Refer to the *Event Notification Module User Guide* for additional information.

Install PowerSCADA Expert 7.30

For details regarding the installation procedures for PowerSCADA Expert 7.30, please refer to the *PowerSCADA Expert 7.30 Installation and Commissioning Guide*.

Create a PowerSCADA Expert project

This section provides a high level view of the steps involved in creating a PowerSCADA Expert project. For detailed information regarding the components used in creating a PowerSCADA project, refer to the PowerSCADA Expert 7.30 online help. This will be required throughout much of this section to provide additional information.

Note

These procedures should only be performed by qualified personnel with a full understanding of the system and the results of any modifications.

Before you begin

Several items are required before you are able to create a PowerSCADA project. These should be made available to you prior to creating the project. These items include:

- A one line diagram.
- A network drawing showing how the devices are wired.
- A list of all the devices and device types with corresponding device names to be used in SCADA.

Creating a PowerSCADA project

The project is created in Citect Explorer. There are two starter projects included in PowerSCADA Expert in the **Starter** folder. For more information on creating the project and the starter projects see the help file in Citect Explorer: **Help > PC Based Help > Using PowerSCADA Expert > Administering Projects**.

Create Custom Devices for PowerSCADA Expert

Standard device types for Micrologics, Sepams, PM meters etc. are installed and available in PowerSCADA Expert. However, a project may contain custom device types (Alarming PLCs or Third Party Devices). The Modbus registers for custom devices are required in order to build the device types.

The Profile Editor is used to build Custom Device Types. The Profile Editor help has a section “Add, Edit, or Delete a Device Type” under **Profile Editor > Define Device Types and Tags** which explains how this is done.

Create Device Profiles

Device Profiles are an important part of the installation. The device profiles determine the number of registers that are polled on each device. This can have a large impact on real-time data and alarm performance. The goal should be to only include registers that are required by the customer.

The Profile Editor help file contains the instructions on creating device profiles: **The Profile Editor > Create Device Profiles**.

Export Device Profiles to Project

The Profile Editor must be used to export the device profile information for each device type into the project. There is a file in each project called equipment.profiles that contains the information for each device type. The export writes to this file.

For help on exporting a project, see the **Profile Editor Help > The Profile Editor > Import and Export Projects**.

Create Custom Device Popups or WebReach Diagrams

Standard device popups are included in PowerSCADA Expert. These can be used to display more real-time data or the alarms for a device. Popups can be created for any custom devices as well, using the included templates as a starting point.

As an alternative, the Device Diagrams can be integrated into PowerSCADA Expert real-time screens. This is easy to accomplish if the Equipment Name for the device in PowerSCADA Expert is made to match the Group.DeviceName entered.

Create Graphic Screens

The Citect Graphics Builder is used to build out the real-time screens based on the customer's electrical one-line. Page templates are provided along with a library of circuit breaker, busbar, transformer, etc. genies. In the help menu from the Profile Editor there is thorough documentation around PowerSCADA Expert graphics. See "Graphics: the Design Time Environment" section.

Appendix 1 in the Profile Editor help menu lists and describes all the Genies available for graphics screen creation. The configuration menus for each Genie is described in the "Graphics: the Design Time Environment" > **Use PowerSCADA Expert One-Lines > Genies** section.

Advanced one line creation

In order for the Genies to animate, the Advanced One-Line process must be configured to start at runtime (see "Start and Stop AdvOneLine.exe" section in Profile Editor help). There is also a "One-Line Configuration Utility" available in the tools menu of Citect Project Editor. This tool helps create the AdvOneLine.csv file that is required for one-line animation.

Database Creation

This involves having the correct device profiles and adding Devices to the project using either the Profile Wizard (one device at a time) or through the Automation Interface. For information on using the Automation Interface see the Profiles Editor help menu: Profile Wizard > Use the Wizard to Add and Remove Devices > Add Multiple Devices through the Automation Interface section.

Enter Tags into Graphics screens

Once the devices have been added to the project, the tags are now available to be entered into the graphics screens. This is done in Graphics Builder.

Graphic Screens Testing

The graphics screens need to be tested to ensure the busbar colors and genie animations all work. There is a memory mode feature that allows the screens to be tested without having to connect to live meters. The online help available through Citect Explorer has a section explaining memory mode: Using PowerSCADA Expert > Communicating with I/O Devices > Using Memory Mode.

Install Web Reporter Login Bypass

Web Reporter Login Bypass allows you to access Web Reporter web pages in without having to go through the standard Power Monitoring Expert authentication process.

The Web Reporter bypass application is an optional installation used when PowerSCADA Expert is installed as part of the Engineered to Order option. This feature hosts the Power Monitoring Expert Reporter application within the PowerSCADA Expert web interface.

To install Web Reporter Bypass:

1. Open the Power Monitoring Expert - Data Center Edition DVD and navigate to **PSE Integration > PME Web Reporter > Single Sign On > Installer**.
2. Double-click **MainSetup**. The Web Reporter Login Bypass installer screen appears.
3. **Welcome screen**: Review the steps and click **Next**.
4. **License Agreement**: Read the End User License Agreement (EULA) and if you accept the terms of the agreement, click **I Agree** to proceed.
5. **Setup Type**: The Web Reporter Bypass can only be installed with the **Standalone Server** option. Click **Next**.
6. **Check System**: The installer confirms the version of Power Monitoring Expert. If there is an issue, the installer notifies you to correct it.
7. **Ready to Configure**: The configuration choices are displayed before being installed. Ensure that all items are correct before proceeding.
8. Click **Back** to correct any items.
9. Click **Install** to continue. The **Copy Files** screen appears and the Web Reporter Bypass files are copied to the machine.
10. **Configure System**: The selected configuration settings are applied.
11. **Complete**: The **Configuration Complete** page appears after the install is successful. Click **Next**.
12. Click **Installation Log** to view details recorded for the installation process.
13. Click **Close** to finish.

To uninstall Web Reporter Login Bypass, run the installer and click **Remove**. Click **Yes** when the Confirmation dialog appears.

Note

If you are uninstalling Power Monitoring Expert - Data Center Edition and Web Reporter Login Bypass, uninstall Web Reporter Login Bypass first. Removing Power Monitoring Expert - Data Center Edition first can result in an unsuccessful removal of Web Reporter Login Bypass.

For instructions regarding the setting up PowerSCADA 7.30 to link to Power Monitoring Expert, review the documents *Setting up Token-Based Single Sign On for Web Reporter in StruxureWare Power Monitoring 7.2*, and *Setting up PowerLogic SCADA 7.30 to use Token-Based Single Sign On for Web Reporter 7.2*. These documents are located at **Documentation > DataCenter** on the Power Monitoring Expert - Data Center Edition DVD, or by navigating to **PSE Integration > PME Web Reporter > Single Sign On > Installer > Documentation** on the Power Monitoring Expert - Data Center Edition DVD.

Integrate device diagrams from Power Monitoring Expert - Data Center Edition into PowerSCADA Expert

Once you have PowerSCADA Expert installed as part of the Engineered to Order option, it is possible to integrate the device diagrams created in Power Monitoring Expert - Data Center Edition. This section describes the steps required to perform this operation.

These steps require that you make the equipment name in PowerSCADA Expert equivalent to the group.device name in Power Monitoring Expert - Data Center Edition.

To integrate device diagrams into PowerSCADA Expert:

1. Add the following CiCode to the Citect Editor, replacing MachineName with the name of the Power Monitoring Expert server:

```
FUNCTION
ShowWebReach(STRING deviceName)

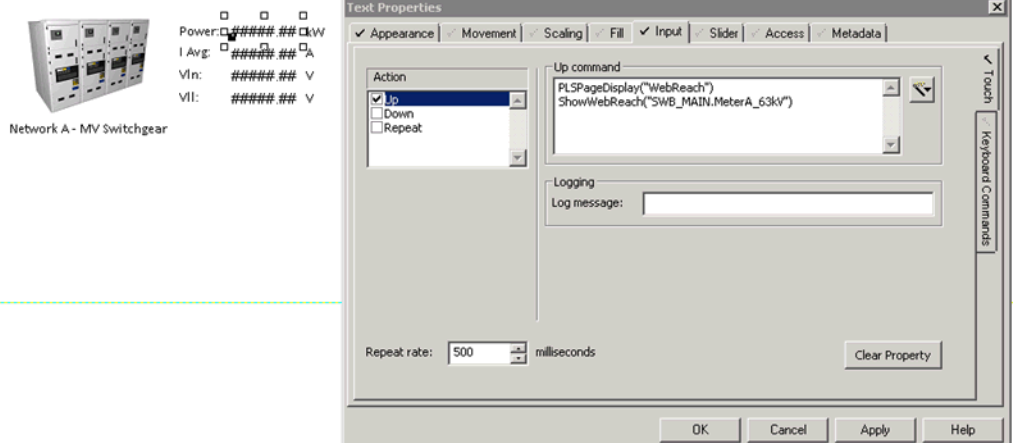
STRING webReachURL

webReachURL = http://[MachineName]/ION/default.aspx?dgm=OPEN_TEMPLATE_DIAGRAM&node="
+ deviceName

_OBJECTCallMethod(ObjectByName("AN502"),"Navigate2",webReachURL);
END
```

2. Create the graphics page with the ActiveX control to display WebReach pages. This process is described in the "Add a WebBrowser to a PowerSCADA Expert Page" section of the document *Setting up StruxureWare PowerSCADA Expert 7.30 to use Web Reporter Login Bypass in StruxureWare Power Monitoring Expert 7.2*.

The ShowWebReach function and WebReach graphics page can now be called from other graphic screens.



3. If the WebReach device diagram is not displayed, confirm the correct url is being used in the CiCode file by comparing it to the default diagram list for devices. Instructions for generating this list are located in the ["Generating a list of Default Diagrams for Devices" on page 255](#). If a discrepancy is found between the CiCode url and the diagram list, change the url found in the CiCode.

It is also possible to hide the Back to Network button from the device diagrams. Search for the KB article *Hide the Back to Network button when integrating PME device diagrams into PSE* for the instructions required to perform this operation.

Appendix A: Upgrading existing data center Power Monitoring software

This section provides information on upgrading your existing data center power monitoring software.

The *StruxureWare Power Monitoring Expert 7.2 User Guide* contains information regarding the upgrading of a database to the latest database schema.

Other upgrade documents include:

- StruxureWare Power Monitoring Side-By-Side Quick Start
- StruxureWare Power Monitoring Side-By-Side Upgrade Guide
- StruxureWare Power Monitoring Database Upgrade FAQ
- StruxureWare Power Monitoring Expert SQL Server 2005 Standard Edition Upgrade Guide
- StruxureWare Power Monitoring Expert - Data Center Edition Upgrade Paths

The table below provides information regarding the upgrade paths for the different versions of ION Enterprise and StruxureWare Power Monitoring to Power Monitoring Expert.

Installed Platform Version	Tasks Required before running Data Center Installer
SMS	Migrated to latest release of Power Monitoring Expert
ION Enterprise > 6.0	Upgrade to ION:E 6.0 SP1
ION Enterprise 6.0	Install SP1
ION Enterprise 6.0 SP1	No tasks required
StruxureWare Power Monitoring 7.0	Install SP1
StruxureWare Power Monitoring 7.0.1	No tasks required
StruxureWare Power Monitoring Expert 7.2	No tasks required

The installer will install Power Monitoring Expert - Data Center Edition on supported platforms where a previous version of the Data Center solution has already been installed.

Upgrading from a previous version of Data Center

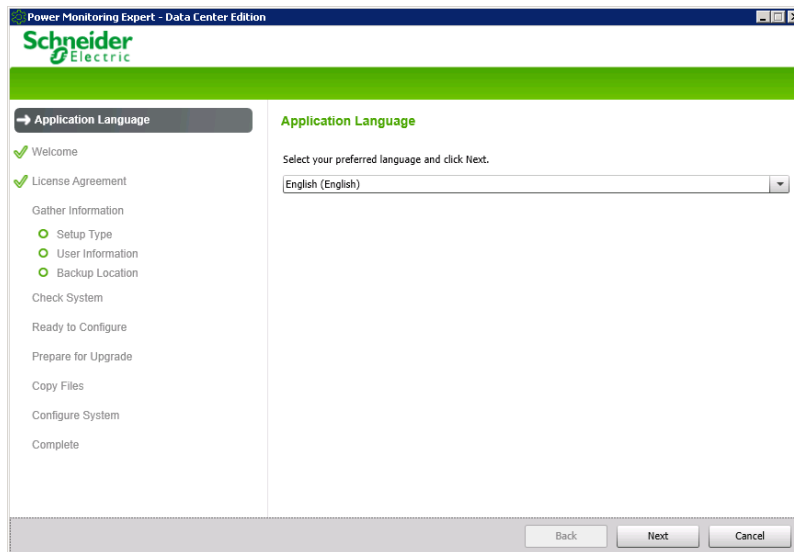
There are a number of differences between the previous and current versions of the Power Monitoring Expert - Data Center Edition software. The installer for Power Monitoring Expert - Data Center Edition detects and upgrades the previous version of the solution.

To upgrade to Power Monitoring Expert - Data Center Edition:

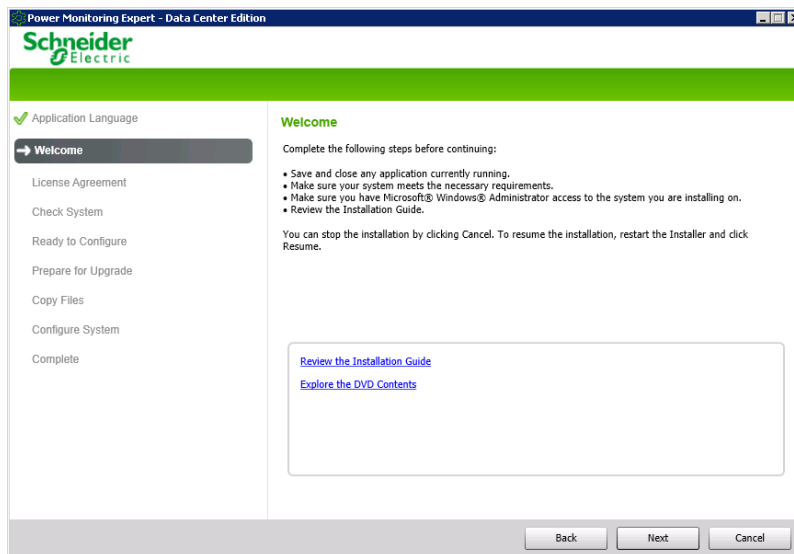
1. Insert the StruxureWare Power Monitoring Expert - Data Center Edition DVD into the DVD drive.

If Power Monitoring Expert - Data Center Edition does not open automatically, use Windows Explorer to navigate to the DVD drive and double-click **MainSetup.exe**. This launches the standard Power Monitoring Expert - Data Center Edition installer.

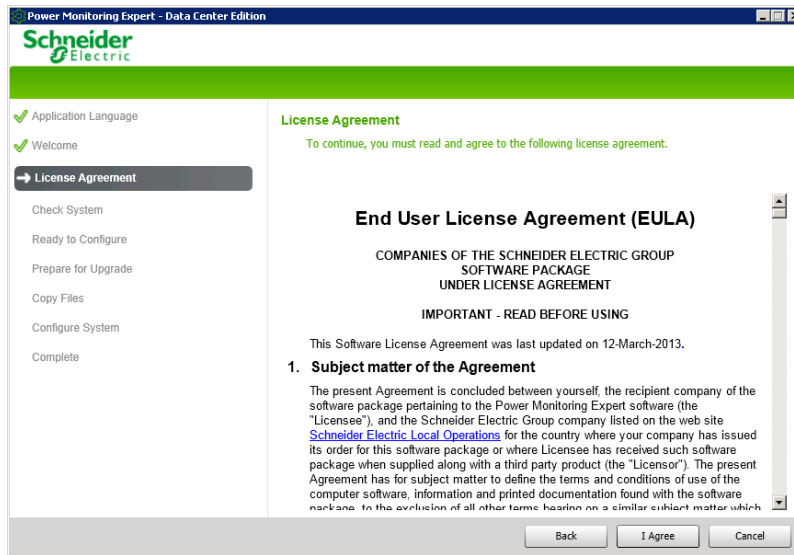
2. **Application Language:** Select your preferred application language from the drop down list and click **Next**.



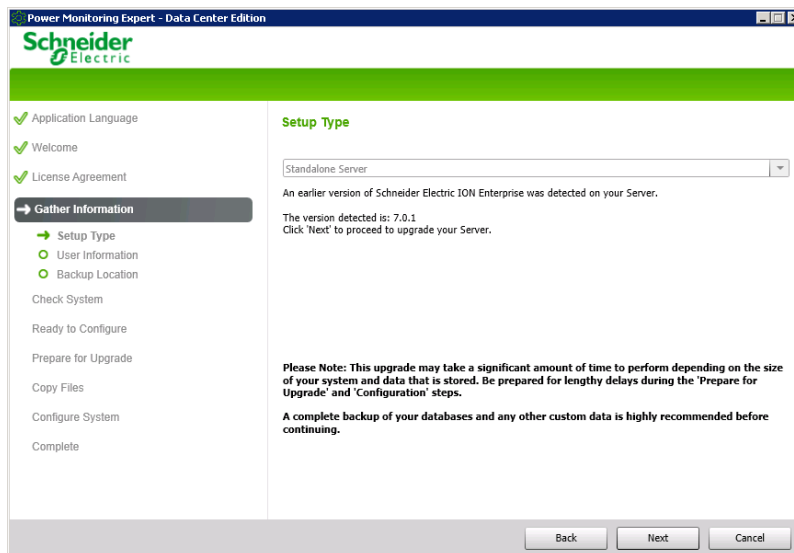
3. **Welcome page:** Review the items on the **Welcome** page and click **Next**.



4. **License Agreement:** Read the End User License Agreement (EULA) and if you accept the terms of the agreement, click **I Agree** to proceed.



5. **Setup Type:** The Power Monitoring Expert - Data Center Edition installer identifies an earlier version of the software installed on the system. Click **Next** to proceed with the upgrade.



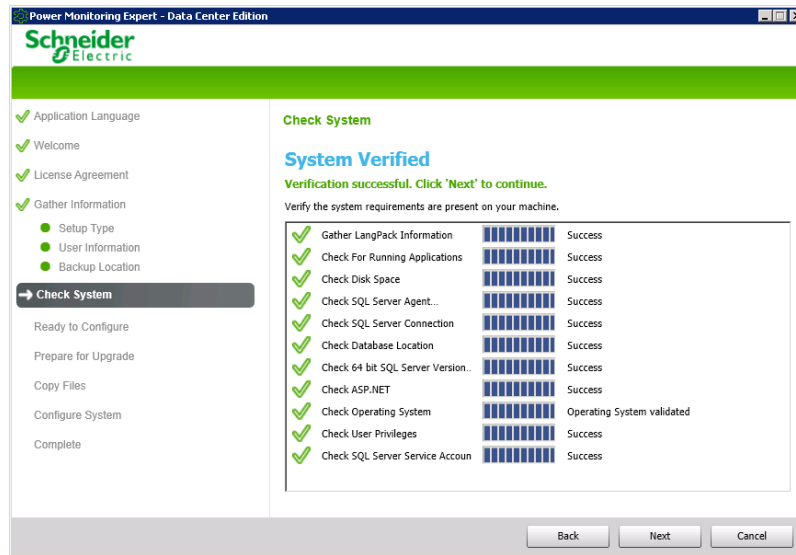
6. **User Information:** Provide your User name and Company Name and click **Next**.

The screenshot shows the 'User Information' step of the installer. The left sidebar lists the installation steps: Application Language, Welcome, License Agreement, Gather Information (selected), Setup Type, User Information, Backup Location, Check System, Ready to Configure, Prepare for Upgrade, Copy Files, Configure System, and Complete. The main area is titled 'User Information' and contains the instruction: 'Enter the user name, company name, and the product key if applicable.' Below this, there are two input fields: 'User Name' with the value 'SE' and 'Company Name' with the value 'Schneider Electric'. At the bottom right are 'Back', 'Next', and 'Cancel' buttons.

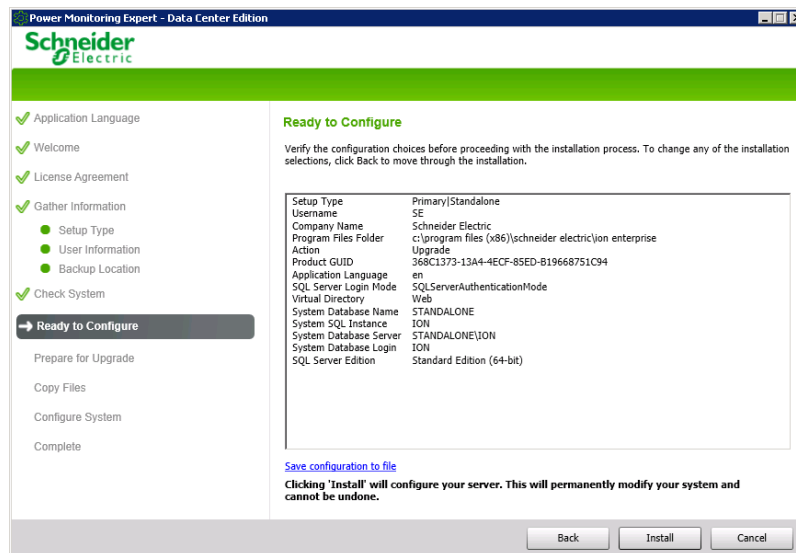
7. **Backup Location:** The installer creates a backup of the current database. Keep the default backup folder location or enter a new location and click **Next**.

The screenshot shows the 'Backup Location' step of the installer. The left sidebar is the same as in the previous step, but 'Backup Location' is now selected. The main area is titled 'Backup Location' and contains the instruction: 'Select the destination folder for your database backup. This is the location where product folders and files are installed.' Below this, there is a text box containing the default path: 'c:\program files (x86)\schneider electric\ion enterprise\DB\DBBackup\'. To the right of the text box is a browse button (...). At the bottom right are 'Back', 'Next', and 'Cancel' buttons.

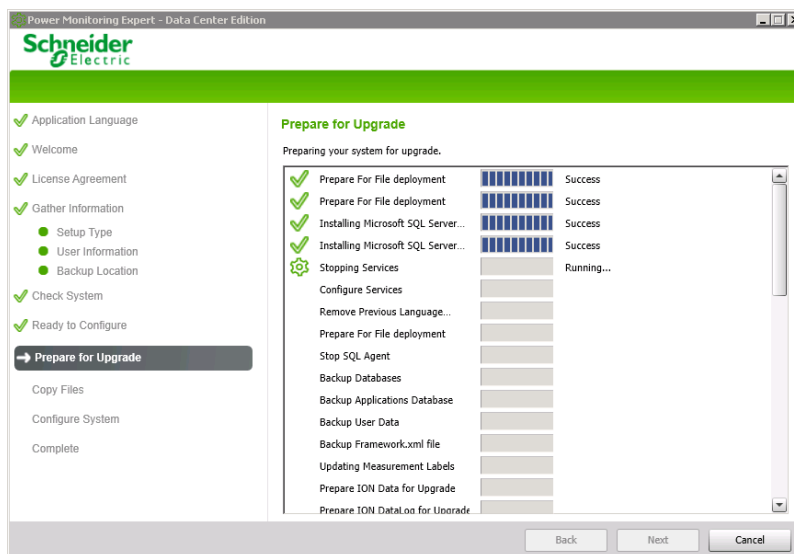
8. **Check System:** Wait for the installer to verify that the mandatory prerequisites have been met. If a problem occurs during the system check, the item is identified. Clicking on the item displays additional information about the situation. Click **Next** when the **System Verified** message is displayed.



9. **Ready to Configure:** This summarizes the configuration selections. Review these selections and click **Install** to begin the installation. Click **Back** to move back through the installer to modify your choices.

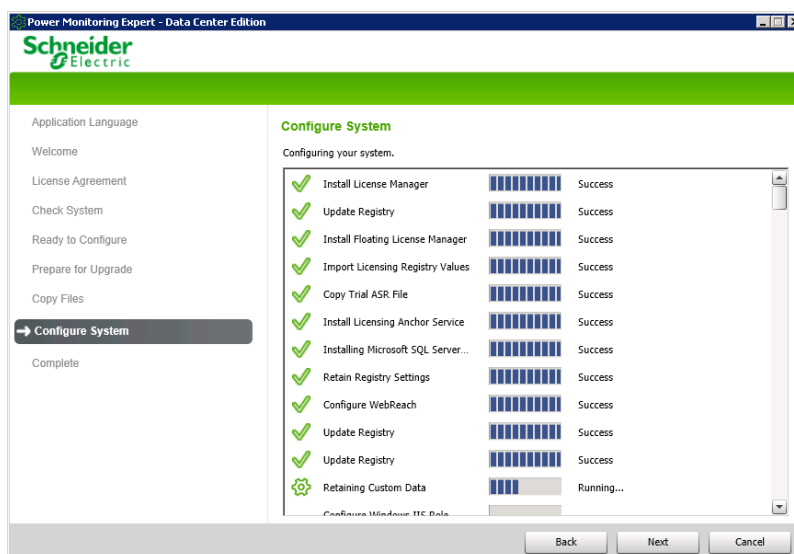


10. **Prepare for Upgrade:** The installer shows the status of each upgrade step. If a step is not successful, an X appears in a column to the left of the item and you are given an option to continue with the installation or cancel the install process. Click **Next** when the upgrade process is complete.



Once the upgrade is complete, there are several differences between the previous version of Power Solutions for Data Centers, and Power Monitoring Expert - Data Center Edition. The various utilities and modules are now located in the StruxureWare Power Monitoring Expert DC Ed folder located on the desktop. The icon style and name of the original module have been changed.

11. **Copy Files:** This page displays the file copy progress. When the operation is complete, click **Next**. The **Configure System** page opens.



The **Configure System** page indicates each of the configuration actions taking place during the installation. If a configuration step is not successful, an X appears in a column to the left of the item and you are given an option to continue with the installation or to cancel the install process. You can also click the link on the message text on the right of the item to display instructions for resolving the unsuccessful configuration step.

Click **Next** when the configuration process ends to open the **Complete** page.

12. **Complete:** The Complete page contains links that open the Installation Log and Start the Web Applications component.

The Installation Log summarizes the processing that took place during the installation process. (The installation log can be accessed at a later time in the SetupLogs folder.) Click the Web Application link to verify that Web Applications component launches successfully in a browser.

13. Click **Close** to close the installer.

Post upgrade tasks

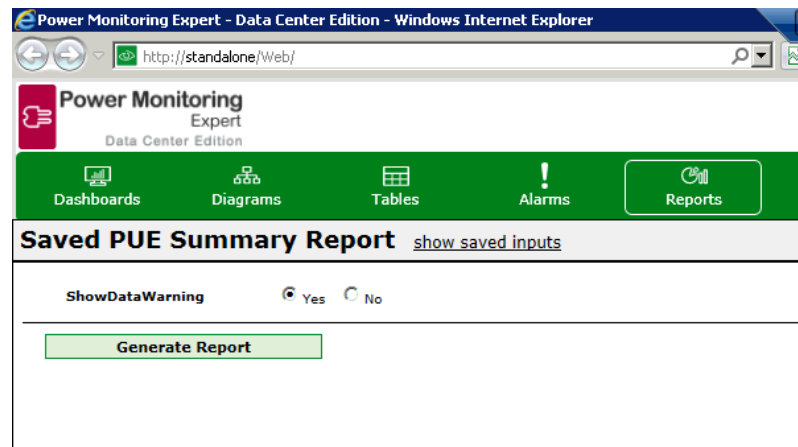
Once your system has been upgraded to the latest version of Power Monitoring Expert - Data Center Edition, ensure that post upgrade tasks described in the *StruxureWare Power Monitoring Expert 7.2 Installation Guide* have been reviewed, as well as the Update PUE Reports task described below:

Update PUE Reports

The PUE report configuration page has been modified in the new version of Power Monitoring Expert - Data Center Edition. During the upgrade process, any saved reports have been preserved, and subscriptions to these reports are still valid, but you must define a value for the new parameter **Show Data Warnings**.

To update existing PUE reports:

1. Navigate to **Web Applications**, click the **Reports** tab, and open a previously saved PUE Report from the **Report Library** pane. The saved report opens displaying the ShowDataWarning parameter. Select **Yes** or **No**, then click **Generate Report**.



2. Once the report has generated, save the report by clicking the **Save** icon .
3. Perform this operation for all previously saved PUE reports.

Appendix B: Modifying a hierarchy template

Power Monitoring Expert comes with several standard default hierarchy templates for use in a Data Center environment. However, there are situations where the default template provided with Power Monitoring Expert require modification to more accurately represent a specific organization. This section discusses the layout of the hierarchy template xml file, and how to edit the template to be used by your organization.

This section contains the example xml file that comes pre-installed with Power Monitoring Expert - Data Center Edition. This template contains Tenants, Racks, Circuits, Electrical Incomers, and Electrical Equipment, but the process described here can be used to modify any hierarchy template file.

Prerequisites

Make sure you have completed the tasks described in this list before you begin.

- Decide the layout that represents the best method of modeling your organization. Is this going to be a representation based on the physical layout of your facility? An electrical layout? A representation designed to assist with customer billing?
 - Determine the number of levels for the hierarchy.
 - Determine the naming convention for the tabs, views, etc.
 - Determine the relationships between levels.
 - Determine which levels connect to a device.
- Find a text or code editing application.
 - The xml files can be modified by using many different text or code editors. Source editors such as Notepad++ make editing the template xml files a much easier task.
- Locate the xml file. You can export the currently installed template using the Hierarchy Config Utility, copy an xml template from [...Schneider Electric\Power Monitoring Expert DC Ed\Applications\HierarchyManager\SampleTemplates\DataCenter], or copy the template content from this guide and paste it into your editor.
- Some Node types are necessary for certain reports to provide usable and accurate information. Ensure that you do not remove or replace those items that are required for report generation. Removing or modifying certain Nodes can result in inaccurate report results.

The table below identifies and describes the various elements that make up the template xml file.

Tag	Description	Example
<Template>	Contains template namespace information	<Template version="1.0" xmlns="uri:application-modules/power/model/template#">

Tag	Description	Example
<Types>	Container tag for Type and Attribute elements	<Types> </Types>
<Type>	Defines elements that define characteristics used by the node. Each type represents a tab in Hierarchy Manager.	<Type displayName="Circuits" .../>
<Attribute>	Defines the characteristics used in each type.	<Attribute displayName="Name" dataType="String" uri="uri:application-modules/power/model/attribute#name" />
<Reference>	Used to create relationships between nodes. For a relationship to exist between nodes, Each Type element must contain reference information for every other element it is associated with.	<Reference displayName="Rack" isReverse="false" target="uri:application-modules/power/model/type#rack" uri="uri:application-modules/power/model/relation#powers" />
<Views>	Contains elements that define how the Node types are presented in different hierarchical views.	<Views> </Views>
<View>	Specifies the node type the view start at. Contains Relation elements.	<View displayName="Tenant Rack Circuit" rootNodeTypeUri="uri:application-modules/power/model/type#tenant" >
<Relation>	Contained in a View element, defines the order that the node types are displayed in.	Relation follow="uri:application-modules/power/model/relation#owns" reverse="false"> <Value uri="uri:application-modules/power/model/attribute#name" label="Rack"/> </Relation>

Modifying the xml elements

This section explains each element in the template file and how to change the generic template into one that represents a model of your organization.

<Template>

The template element contains namespace information, and does not require any modification.

```
<Template version="1.0" xmlns="uri:application-modules/power/model/template#">
```

<Types>

This is a containment tag for all Type elements. Make sure any Type elements are inside this containment tag.

```

<Types>
  <Type displayName="Circuits" uri="uri:application-modules/power/model/type#circuit" >
    <Attribute displayName="Name" dataType="String" uri=
      "uri:application-modules/power/model/attribute#name" />
    <Attribute displayName="Rack Circuit" dataType="Boolean" uri=
      "uri:application-modules/power/model/attribute#rackCircuit" />
    <Attribute displayName="Breaker Rating" dataType="Number" uri=
      "uri:application-modules/power/model/attribute#breakerRating" />
    <Reference displayName="Rack" isReverse="false" target=
      "uri:application-modules/power/model/type#rack"
      uri="uri:application-modules/power/model/relation#powers" />
    <!-- parent node -->
    <Reference displayName="Devices" isReverse="false" target=
      "uri:application-modules/power/model/type#device"
      uri="uri:application-modules/power/model/relation#meteredBy" />
    <!-- child node -->
  </Type>
  <Type displayName="Racks" uri="uri:application-modules/power/model/type#rack" >
    <Attribute displayName="Name" dataType="String" uri=
      "uri:application-modules/power/model/attribute#name" />
    <Reference displayName="Customer" isReverse="true" target=
      "uri:application-modules/power/model/type#tenant"
      uri="uri:application-modules/power/model/relation#owns" />
    <!-- parent node -->
    <Reference displayName="Circuits" isReverse="true" target=
      "uri:application-modules/power/model/type#circuit"
      uri="uri:application-modules/power/model/relation#powers" />
    <!-- child node -->
  </Type>
</Types>

```

<Type>

The <Type> tag contains all the information required to define the Node. Each defined Type adds a tab in Hierarchy Manager. The name that is defined with the displayName is the tab name in Hierarchy Manager, and is displayed as part of the header in an exported csv file. The <Type> tag also contains one or more <Attribute> and <Reference> tags.

To change the tab name in Hierarchy Manager, modify the display name in the template file.

```

<Type displayName="Racks" uri="uri:application-modules/power/model/type#rack" >
  <Attribute displayName="Name" dataType="String" uri=
    "uri:application-modules/power/model/attribute#name" />
  <Reference displayName="Customer" isReverse="true" target=
    "uri:application-modules/power/model/type#tenant"
    uri="uri:application-modules/power/model/relation#owns" />
  <!-- parent node -->
  <Reference displayName="Circuits" isReverse="true" target=
    "uri:application-modules/power/model/type#circuit"
    uri="uri:application-modules/power/model/relation#powers" />
  <!-- child node -->
</Type>

```

```

<Type displayname="level_1" uri= "uri:application-
modules/power/model/type#level_1">

```

becomes

```
<Type displayname="Racks" uri="uri:application-
modules/power/model/type#rack">
```

Continue changing the display name for each type. To add a completely new type, copy an existing type, paste it within the <Types> element and modify as necessary.

<Attribute>

The <Attribute> tag defines the characteristics of the type. These characteristics could be things like name, floor number, or breaker ratings, depending on the template layout. The dataType is different depending on what the attribute field contains. There must be at least one Name attribute that is defined by the user for each row added in a tab. The name attribute must have the uri uri:application-modules/power/model/relation#name

- dataType="String" - For short blocks of text (e.g. name)
- dataType="LongText" - For long blocks of text (e.g. notes, contact information)
- dataType="Number" - For numeric fields (e.g. breaker rating in Amps)
- dataType="Boolean" - For checkboxes (e.g. Rack Circuit)

```
<Attribute displayName="Name" dataType="String" uri=
"uri:application-modules/power/model/attribute#name" />
```

To add an attribute to a tab, determine the characteristic you need to capture with that attribute, determine the appropriate dataType, and create the attribute. To define the name characteristic for a type, you can create an attribute similar to this:

```
<Attribute displayName="Name" dataType="String"
uri="uri:application-modules/power/model/attribute#name" />
```

<Reference>

The <Reference> tag is used to define the interaction between types. Each Type can have references to other types. To have this reference, the target field must match the uri of an existing Type.

- If the referenced type is a parent, there is either no isReverse condition, or isReverse is set to "false"
- If the referenced type is a child, isReverse is set to "true".
- Each type with a reference to a type must have a corresponding reference in the related type. For example, For the level_1 and level_2 types to be related, each must have a reference that corresponds to the other.

```
<Reference displayName="Customer" isReverse="true" target=
"uri:application-modules/power/model/type#tenant"
| uri="uri:application-modules/power/model/relation#owns" />
```

To establish the relationship between two types, create a reference element for each type. Each reference element must contain the displayName of the type it is related to. It must also contain if it is a parent or a child. To establish a relationship between a Circuit type and a Rack type, add the following reference to the Racks type:

```
<Reference displayName="Circuits" isReverse="true"
target="uri:application-
modules/power/model/type#circuit"uri="uri:application-
modules/power/model/relation#powers" />
```

and the following reference to the Circuits type:

```
<Reference displayName="Rack" isReverse="false"
target="uri:application-
modules/power/model/type#rack"uri="uri:application-
modules/power/model/relation#powers" />
```

A physical device, logical device, or measured circuit can be associated with any type. To configure a type to connect with a device, create a Reference tag similar to the example below:

```
<Reference displayName="Devices" isReverse="false"
target="uri:application-
modules/power/model/type#device"uri="uri:application-
modules/power/model/relation#meteredBy" />
```

The last portion of the Reference element provides a relation name, which is used in the Relation element when defining the view structure of a hierarchy.

<Views>

This is a containment tag for all View elements. Make sure any View elements are inside this containment tag.

<View>

The <View> tag is used to define how a hierarchy can be viewed in Power Monitoring Expert. These different views provide different ways that a hierarchy can be displayed, or different ways the device data associated with the hierarchy types can be grouped together. The <View> tag groups together the Relation elements in the order the view appears in.

```
<View displayName="Electrical Equipment" rootNodeTypeUri=
"uri:application-modules/power/model/type#equipment" >
  <Value uri="uri:application-modules/power/model/attribute#name" label="Electrical
Equipment"/>
  <Value uri="uri:application-modules/power/model/attribute#type" label="Equipment
Type"/>
  <Value uri="uri:application-modules/power/model/attribute#type" label="Location"/>
  <Relation follow="uri:application-modules/power/model/relation#meteredBy" reverse=
"false">
    <Value uri="uri:application-modules/power/model/attribute#name" label="Device"/>
  </Relation>
</View>
```

The view displayName is defined here, and is displayed in the Available Views window of Hierarchy Manager. The view is also used when selecting a data source in the Dashboards and Reports features.

<Relation>

The <Relation> tag is used to establish how the different views of the hierarchy are structured. The initial relation is defined in the Reference element.

```
<Relation follow="uri:application-modules/power/model/relation#meteredBy" reverse="false">
  <Value uri="uri:application-modules/power/model/attribute#name" label="Device"/>
</Relation>
```

Additional Notes

If you do not require all the levels provided in the example template, you can comment out the types you do not need, from the bottom type up. Commenting out the type, rather than just deleting the type preserves the structure of the template file and allows you to reinstate the type with a minimum of effort. Put the comment tags `<!-- <Type>...</Type> -->` around the Type element to comment it out. Remove the comment tags to restore the type.

If your template contains multiple view elements, and you want to remove one or more of them, you can also wrap the comment tags around the applicable View tags. Remove the comment tags to restore the View elements.

When importing the xml file, the Hierarchy Config Utility performs a validation test on the file. If the file validation is not successful, the utility will not import the file and provides information regarding where the validation process was stopped. Check for any discrepancies in the file, save the changes and reimport the file.

Default Data Center Template

```

<Template version="1.0" xmlns="uri:application-modules/power/model/template#">

<Types>

<Type displayName="Circuits" uri="uri:application-modules/power/model/type#circuit" >
<Attribute displayName="Name" dataType="String" uri="uri:application-modules/power/model/attribute#name"
/>
<Attribute displayName="Rack Circuit" dataType="Boolean" uri="uri:application-
modules/power/model/attribute#rackCircuit" />
<Attribute displayName="Breaker Rating" dataType="Number" uri="uri:application-
modules/power/model/attribute#breakerRating" />
<Reference displayName="Rack" isReverse="false" target="uri:application-modules/power/model/type#rack"
uri="uri:application-modules/power/model/relation#powers" />
<!-- parent node -->
<Reference displayName="Devices" isReverse="false" target="uri:application-
modules/power/model/type#device" uri="uri:application-modules/power/model/relation#meteredBy" />
<!-- child node -->
</Type>

<Type displayName="Racks" uri="uri:application-modules/power/model/type#rack" >
<Attribute displayName="Name" dataType="String" uri="uri:application-modules/power/model/attribute#name"
/> <Reference displayName="Customer" isReverse="true" target="uri:application-
modules/power/model/type#tenant" uri="uri:application-modules/power/model/relation#owns" />
<!-- parent node -->
<Reference displayName="Circuits" isReverse="true" target="uri:application-
modules/power/model/type#circuit" uri="uri:application-modules/power/model/relation#powers" />
<!-- child node -->
</Type>

<Type displayName="Customers" uri="uri:application-modules/power/model/type#tenant" >
<Attribute displayName="Name" dataType="String" uri="uri:application-modules/power/model/attribute#name"
/>
<Attribute displayName="Contact" dataType="LongText" uri="uri:application-
modules/power/model/attribute#contact" />
<Attribute displayName="BillingID" dataType="String" uri="uri:application-
modules/power/model/attribute#billingid" />
<Reference displayName="Racks" isReverse="false" target="uri:application-modules/power/model/type#rack"
uri="uri:application-modules/power/model/relation#owns" />
<!-- child node -->
</Type>

<Type displayName="Electrical Incomers" uri="uri:application-modules/power/model/type#incomers" >
<Attribute displayName="Name" dataType="String" uri="uri:application-modules/power/model/attribute#name"
/> <Reference displayName="Devices" isReverse="false" target="uri:application-
modules/power/model/type#device" uri="uri:application-modules/power/model/relation#meteredBy" />
<!-- child node -->
</Type>

<Type displayName="Electrical Equipment" uri="uri:application-modules/power/model/type#equipment" >
<Attribute displayName="Name" dataType="String" uri="uri:application-modules/power/model/attribute#name"
/>
<Attribute displayName="Equipment Type" dataType="LongText" uri="uri:application-
modules/power/model/attribute#type" />
<Attribute displayName="Location" dataType="LongText" uri="uri:application-
modules/power/model/attribute#location" />
<Reference displayName="Devices" isReverse="false" target="uri:application-
modules/power/model/type#device" uri="uri:application-modules/power/model/relation#meteredBy" />
<!-- child node -->
</Type>

```

```
</Types>
<Views>
<View displayName="Tenant Rack Circuit" rootNodeTypeUri="uri:application-
modules/power/model/type#tenant" >
<Value uri="uri:application-modules/power/model/attribute#name" label="Tenant"/> <Relation
follow="uri:application-modules/power/model/relation#owns" reverse="false"> <Value uri="uri:application-
modules/power/model/attribute#name" label="Rack"/> </Relation>
<Relation follow="uri:application-modules/power/model/relation#powers" reverse="true"> <Value
uri="uri:application-modules/power/model/attribute#name" label="Circuit"/> </Relation>
<Relation follow="uri:application-modules/power/model/relation#meteredBy" reverse="false"> <Value
uri="uri:application-modules/power/model/attribute#name" label="Device"/> </Relation>
</View>
<View displayName="Electrical Incomers" rootNodeTypeUri="uri:application-
modules/power/model/type#incomers" >
<Value uri="uri:application-modules/power/model/attribute#name" label="Electrical Incomers"/>
<Relation follow="uri:application-modules/power/model/relation#meteredBy" reverse="false">
<Value uri="uri:application-modules/power/model/attribute#name" label="Device"/>
</Relation>
</View>
<View displayName="Electrical Equipment" rootNodeTypeUri="uri:application-
modules/power/model/type#equipment" >
<Value uri="uri:application-modules/power/model/attribute#name" label="Electrical Equipment"/>
<Value uri="uri:application-modules/power/model/attribute#type" label="Equipment Type"/>
<Value uri="uri:application-modules/power/model/attribute#type" label="Location"/>
<Relation follow="uri:application-modules/power/model/relation#meteredBy" reverse="false">
<Value uri="uri:application-modules/power/model/attribute#name" label="Device"/>
</Relation>
</View>
</Views>
</Template>
```


Appendix C: Performance Considerations

Most delays are due to device response latencies. The problems with poorly operating or poorly configured devices are magnified when they are in a serial loop. Devices connected directly by Ethernet respond very quickly in comparison to devices with a serial connection. The following sections discuss the various areas that can affect system performance.

Number of Devices on a serial loop

Background

There are limits which must be observed with serial communication via RS-232 or RS-485. These limits include the number of meters that can be contained in one loop, the speed at which the communication can occur, and the length of cabling allowed in the loop. There are hard limits for the protocol such as, there should be no more than 32 devices in a serial loop, and RS-232 cables cannot be more than 50 feet long. Since all the devices share the line and only one device can communicate at a time, the point at which performance will be impacted will probably occur long before the hard limits are reached. The more data that needs to be collected (i.e. because the meter is collecting a lot of data or there are a lot of meters in the chain), the fewer number of devices should be allowed on the loop and the shorter the loop needs to be if quick performance is required.

Symptoms

The real-time response (as seen in OPC clients, Vista and VIPs) from a device(s) is very slow (stale data, "yellow boxes") and/or recent log data does not appear in reports or Vista. Some devices may be worse than others.

Diagnosis

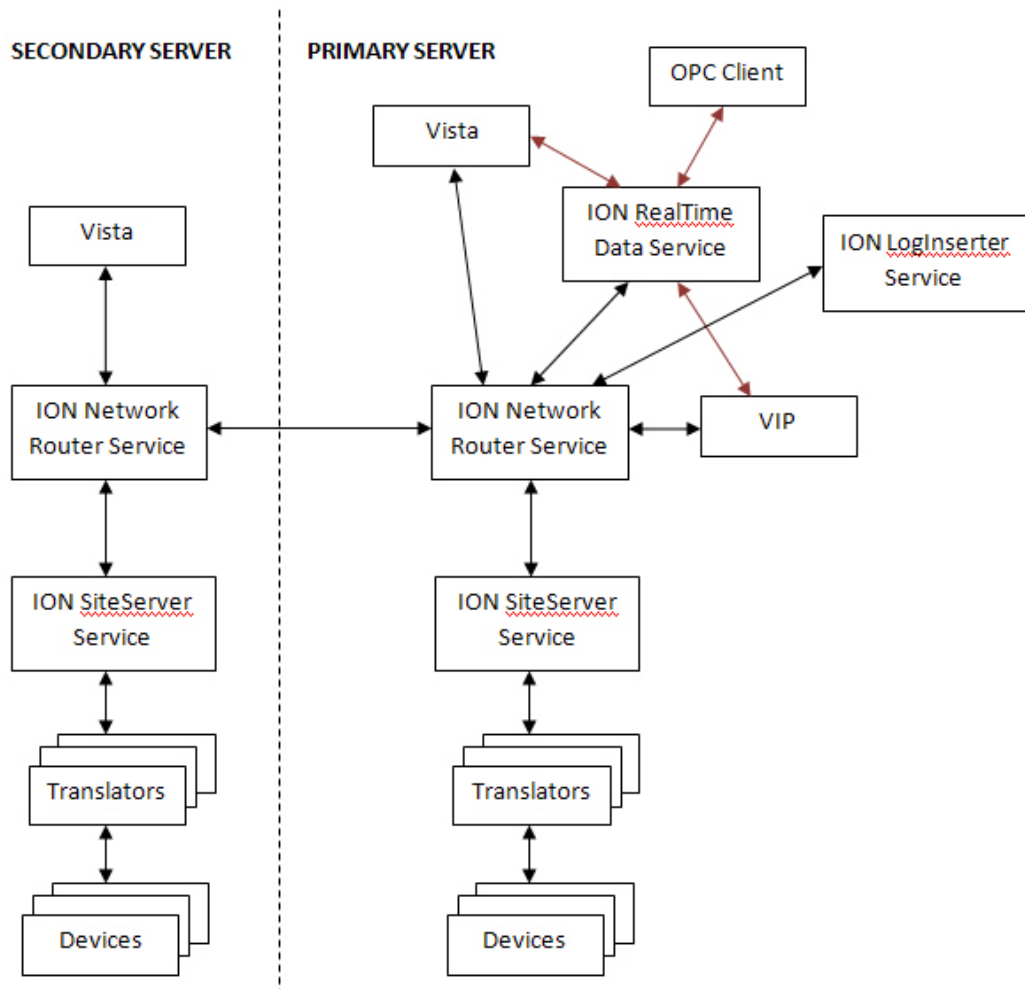
Check the number of devices on each serial loop. Check the Power Monitoring Expert Diagnostics Viewer to see the number of bad/missed responses for the devices in the longest loops. See if they have more problems than devices in shorter loops.

Solution

It may be necessary to break long chains of serial devices in one loop into smaller loops. Power Monitoring Expert may start running into issues with too many devices on one loop. The precise number depends on the type of device (how much data is being logged), the "horsepower" of the Power Monitoring Expert server(s) hardware and network, and the size of the system (how many devices overall). This is particularly true for large devices that collect a lot of data.

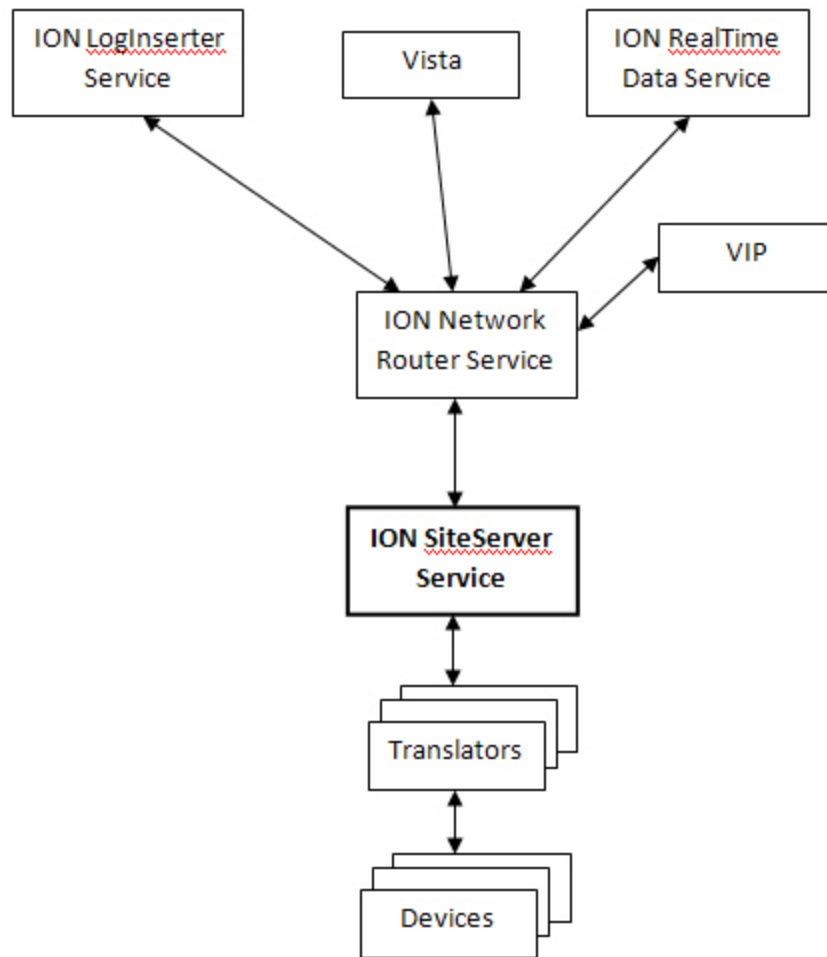
Interaction of Power Monitoring Expert Services

An overview of the interaction of StruxureWare Power Monitoring IONLogInserter, IONRealTime Data, and IONSiteServer services is shown below.



ION Site Server

IONLogInserter service, IONRealTime Data service, Vista and the VIP all communicate with the IONSiteServer service via the IONNetwork Router Service. The ION Network Service only passes messages (IONprograms) back and forth. This is depicted in the diagram below.



Vista and the VIP only directly communicate with IONSiteServer service for non-real-time values, such as setup register changes. Therefore, not many requests come directly to the IONSiteServer service from Vista and VIPs.

IONLogInserter service sends requests to the IONSiteServer service asking it to retrieve data from the meters. It requests position counts to let IONLogInserter know if there are new logs on a device that need to be collected. It also sends a request for the aggregate setup count that will tell it if setup changes have occurred. Finally it sends requests for data records. Polling and aggregate counter requests are sent in the same packets, so there is minimal additional overhead.

IONRealTime Data service sends requests for real-time data that its clients (Vista, VIP, OCP Client) have requested of it.

The IONSiteServer service has a pool of threads it manages. It uses these threads to service requests. IONSiteServer also has a queue of requests for each site. IONSiteServer allocates a thread to a site and sends a request from that site's queue to the translator. It waits for a response or timeout. It sends responses to the appropriate requestor via the IONNetwork Router service. IONSiteServer will wait the amount of time specified by the configurable

parameter “Receive Timeout” for a response from a device before tracking the attempt and then moving on to a new request for that site. The thread is unallocated and put back in the thread pool. Then the thread gets reallocated to a new site and a new request from the site’s IONSiteServer queue.

IONSiteServer retries sending requests to a device that did not respond the number of times specified by the configurable parameter “Attempt Increment” before it reports an unsuccessful attempt. The attempt is logged in the System Log. IONSiteServer also tracks the number of times there is an unsuccessful attempt to communicate with a device. After the number of attempts specified by the configurable parameter called “Maximum Attempt Multiple” have occurred, IONSiteServer will consider the device offline. For example, assume the “Attempt Increment” parameter is set to three and the “Maximum Attempt Multiple” parameter is set to two. After three attempts to send a request to a device without a response before the specified time out, the IONSiteServer service will log an unsuccessful attempt. After doing this a second time and getting another unsuccessful attempt, the device will be marked offline.

No new attempts to connect to a device in the offline state will be made until the time specified by the configurable parameter “Offline Timeout Period” has elapsed.

The number of threads available for use by IONSiteServer is a configurable parameter called “ConnectedThreadPoolSize.” Ideally, as long as the server CPU(s) can handle it, there will be as many threads allocated as there are sites in the system. For large systems (more than 100 sites), it may decrease performance or make the system unstable if this number is too large (exceeds 100). It depends on the hardware (CPUs, memory, speed of subsystems, etc.). Experimentation may be required for more than 100 sites, but care should be used for any number over 200.

Although technically the IONRealTime Data Service and IONLogInserter both use hybrid programs for polling requests, they are not true one-shot requests. These hybrid programs are one-shots that are processed in the High, Medium, or Low Polling Program queues so that in effect, they run at a lower priority than true one-shots. By default, all Polling Program clients are set to a low frequency.

ION Log Inserter Service

The Log Inserter is a component that is used to upload and store historical data captured by power meter devices and VIPs. Data is retrieved via the classical ION communications architecture using the ION protocol. Data can be stored in any SQL Server database supporting the ION_Data schema.



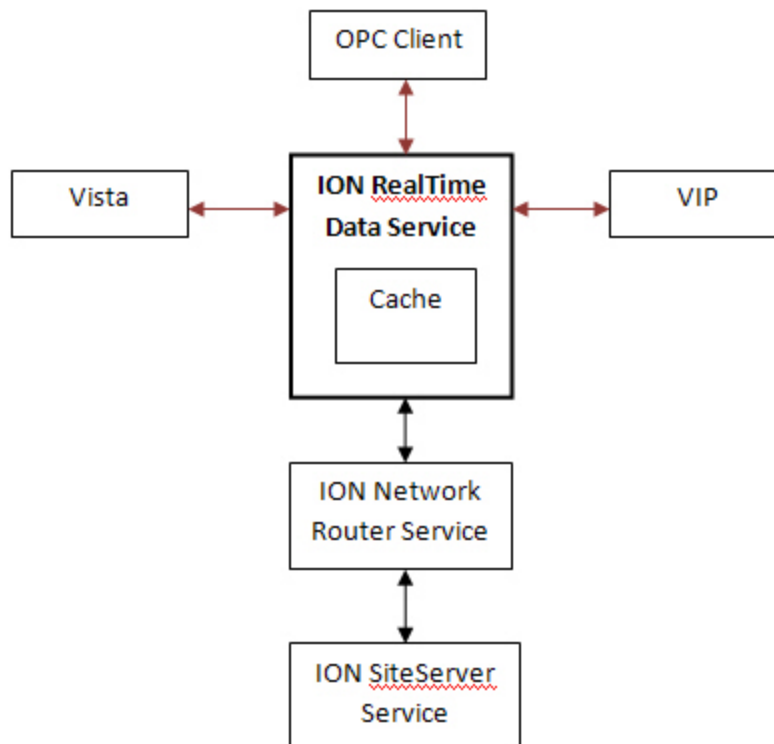
VIP

A VIP acts as both a client and a server. As a client, it collects data from meters via the IONRealTime Data service. This data can be monitored or used in calculations to produce new data that can, in turn, be logged. As a server, a VIP behaves just like any meter in the system. Real-time data can be viewed in Vista or requested via OPC, and historical data can be uploaded and stored by the IONLogInserter process.

Typically, a VIP requests data from the IONRealTime Data service. In this case, the VIP is the client.

IONRealTime Data Service

The IONRealTime Data service acts as a request aggregation, caching, and proxy layer for all realtime clients in the Power Monitoring Expert - Data Center Edition system. It receives requests for real-time registers, aggregates other requests for the same device, and periodically requests an update from the device via the host IONSiteServer instance. It also periodically responds to the requesting clients with the current values from its cache. Clients of this service are Vista, the **Diagrams** tab in the Power Monitoring Expert Web Client, any OPC clients, and any VIP instances. The IONRealTime Data service cache contains the value of all the real-time data registers that the clients actively need.



The clients use a subscription mechanism to read real-time data from the IONRealTime Data service. The rate at which a Vista or a diagram in the Diagrams tab in the Power Monitoring Expert Web Client requests updates is set in each Vista diagram. When a diagram is opened, it requests updates to the real-time values at that rate. By default, this rate is five seconds. The VIP setup contains a parameter called "Client polling period" that is the rate at which VIPs request updates for each real-time value in the VIP. By default, the value is two seconds.

The IONRealTime Data service responds to each client request with whatever value is in its cache.

The IONRealTime Data service sends one-shot programs which contain a request to update multiple real-time values for the IONSiteServer service, so that it can update its cache. It generates these requests as frequently as the client with the lowest polling period for the real-time registers requests, typically at a rate that will satisfy all of its clients. The IONSiteServer service will attempt to service these requests as quickly as they are received. However, it is possible for the cache to be updated less frequently than the client requests.

Note that the technology used for communication between IONRealTime Data service and its clients is .NET Remoting.

RS-232 communications

RS-232 is one of the simplest communications network, allowing you to connect to one device using a maximum cable length of 15 m (50 ft). To connect to more than one device, you need to convert this standard to RS-485.

RS-485 communications

There are a number of items to pay attention to when maintaining a high performance system:

- Keep serial loops as short as possible.
- Have a minimum baud rate of 19.2k.
- Keep the number of devices in a serial loop under ten when using ION protocol, and six when using Modbus.
- Disable devices that are not presently commissioned or functional (for example physically not connected devices).
- Device logging is preferable to software-based logging. If on-board logging is not available, use of a data logger (for example, EGX 300), especially on a serial loop can increase the system performance.
- If possible, connect high-end PQ meters which can generate events and waveforms directly to the Ethernet. If this is not possible, try to isolate them to a smaller serial loop (one or two devices, for example).
- Do not log measurements that are not needed.
- When using StruxureWare Power Monitoring as an OPC server, disable tags that are not needed.
- For devices/sites that are not used for real-time data, use Connection Schedules.

- If you require high-speed performance from your devices, connect them directly to Ethernet.
- For custom built 3rd party Modbus devices, adjust Maximum number of registers for a single request as well as Requested update period available in Modbus Device Importer accordingly for optimum performance. See "Chapter 7: Modbus Device Importer" of the StruxureWare Power Monitoring User Guide for additional information.

Appendix D: Modifying report colors and logos

Power Monitoring Expert provides a method for modifying the look and feel of the reports in Web Reporter, including changing the color and the logo displayed on the generated report. This section describes how to customize each of these items.

Modifying report colors

Report RDL [Type 1]

To modify the color of the generated report output, find the following section in the report RDL and modify the hex values for the light, medium and dark variants of the color enumeration specified by the CurrentColorScheme const value:

```
*****
'set color scheme here
Private Const CurrentColorScheme As ColorScheme = ColorScheme.Green
*****

*****

'Color schemes
Private Enum ColorScheme
    Red = 1
    Green = 2
    Blue = 3
    Yellow = 4
End Enum

'Red color scheme
Private Const RedDark As String = "#930000"
Private Const RedMedium As String = "#E5C3C3"
Private Const RedLight As String = "#FFE8E8"

'Blue color scheme
Private Const BlueDark As String = "#003F3F"
Private Const BlueMedium As String = "#C9CCD3"
Private Const BlueLight As String = "#E5ECFF"

'Green color scheme
Private Const GreenDark As String = "#009530"
Private Const GreenMedium As String = "#C3E5A0"
Private Const GreenLight As String = "#E6F2DA"

'Yellow color scheme
Private Const YellowDark As String = "#FF9100"
Private Const YellowMedium As String = "#FFD45E"
Private Const YellowLight As String = "#FFF3C4"
*****
```

In this report type, it is not possible to change the color of the header text.

Report RDL [Type 2]

To modify the color of the generated report output, find the following section in the report RDL and modify the hex values for the header text, and the light, medium and dark variants of the color specified by the m_HeaderTextColour, m_DarkColour, m_MediumColour and m_LightColour variables:

```
Private Function SetColourScheme() As Boolean
m_HeaderTextColour = "#FFFFFF"

Dim allColours = Report.Parameters!ReportColours.Value
Dim colourArray(3) As String
colourArray = Split(allColours, ",")

m_DarkColour = "#737373"
m_MediumColour = "#999999"
m_LightColour = "#CCCCCC"
Return True

End Function
```

Report Logo

For all reports, overwrite the "Report-Logo.jpg" image in the report folder with the new image. The default report logo image is 250 X 100 pixels, so the replacement image should adhere to those dimensions for best results.

Appendix E: Generating a list of Default Diagrams for Devices

This section outlines how to generate a list of devices in Power Monitoring Expert, and for each device the URL to the device diagram in WebReach.

To generate the list of default diagrams:

1. Log into SQL Server using SQL Server Management Studio (SSMS).
2. Switch to the ION_Network database
3. Paste the following query into SSMS:

```
SELECT
'http://XXXXXXXXXXXX/lon/default.aspx?dgm=OPEN_TEMPLATE_DIAGRAM&node='+ Name
FROM
dbo.device
ORDER BY
Name
```

Where XXXXXXXXXXXX is the name of your web server.

1. Execute the query. Your results should be similar to the image below:

	(No column name)
1	http://PmeServer/lon/default.aspx?dgm=OPEN_TEMPLATE_DIAGRAM&node=Fuel.FuelDevice
2	http://PmeServer/lon/default.aspx?dgm=OPEN_TEMPLATE_DIAGRAM&node=MAIN.DP_1
3	http://PmeServer/lon/default.aspx?dgm=OPEN_TEMPLATE_DIAGRAM&node=MAIN.DP_7
4	http://PmeServer/lon/default.aspx?dgm=OPEN_TEMPLATE_DIAGRAM&node=MAIN.DP_8
5	http://PmeServer/lon/default.aspx?dgm=OPEN_TEMPLATE_DIAGRAM&node=MAIN.ED_MDP_480
6	http://PmeServer/lon/default.aspx?dgm=OPEN_TEMPLATE_DIAGRAM&node=MAIN.GE_VERSAMAX
7	http://PmeServer/lon/default.aspx?dgm=OPEN_TEMPLATE_DIAGRAM&node=MAIN.GEN_1
8	http://PmeServer/lon/default.aspx?dgm=OPEN_TEMPLATE_DIAGRAM&node=MAIN.GEN_2
9	http://PmeServer/lon/default.aspx?dgm=OPEN_TEMPLATE_DIAGRAM&node=MAIN.GEN_3
10	http://PmeServer/lon/default.aspx?dgm=OPEN_TEMPLATE_DIAGRAM&node=MAIN.TS_1
11	http://PmeServer/lon/default.aspx?dgm=OPEN_TEMPLATE_DIAGRAM&node=MAIN.TS_10
12	http://PmeServer/lon/default.aspx?dgm=OPEN_TEMPLATE_DIAGRAM&node=MAIN.TS_10A
13	http://PmeServer/lon/default.aspx?dgm=OPEN_TEMPLATE_DIAGRAM&node=MAIN.TS_10B
14	http://PmeServer/lon/default.aspx?dgm=OPEN_TEMPLATE_DIAGRAM&node=MAIN.TS_11
15	http://PmeServer/lon/default.aspx?dgm=OPEN_TEMPLATE_DIAGRAM&node=MAIN.TS_11A
16	http://PmeServer/lon/default.aspx?dgm=OPEN_TEMPLATE_DIAGRAM&node=MAIN.TS_12

2. Save the results by either performing a copy-and-paste, or right-click on the results and select **Save results as...** to save it as CSV or other format.

You can see what device each URL is associated with by looking at the end of the URL. In the example above, the first row ends with “node=Fuel.FuelDevice”. The name of the device is “Fuel.FuelDevice”.

Note

Some devices may not have a device diagram. In these cases you will get a message indicating there is no diagram.

Power Monitoring Expert - Data Center Edition
Installation and Commissioning Guide

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