

Eaton Intelligent Power[®] Manager

User's Guide



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1 Introduction

Intelligent Power® Manager is Eaton's power device supervision tool for IT environments.

Intelligent Power[®] Manager:

- Discovers and supervises Eaton UPSs and ePDUs connected to the network (either by means of a card or a proxy). For the detailed list of compatible solutions, please refer to the paragraph (Equipment Compatibility List) hereafter.
- Supervises the remote servers hosting the Intelligent Power Protector or Network Shutdown Module V3 application.
- Provides advanced management feature (mass configuration / mass upload/ ...) with Network Management cards: Network-MS (ex 66102 / 103006826) and Modbus-MS (ex 66103)
- Provides local computer graceful shutdown (acquisition through Network-MS (ex 66102 / 103006826) and Modbus-MS (ex 66103) Network Management Cards.

2 Installation

2.1 Installation Prerequisites

2.1.1 On the System Hosting « Intelligent Power[®] Manager »

Intelligent Power[®] Manager can be installed on Windows 2000 / XP / 2003 / Vista / 2008 / Windows 7

Notes:

For better performance with multiple nodes, we recommend a Windows server OS (that doesn't have the limitation of 10 simultaneous network connections).

To avoid network access conflicts, we advise you against installing the Power Manager on a machine that also hosts:

- a Network Management System (e.g. HP-Openview, CA Unicenter, ...)
- the Intelligent Power Protector
- the Eaton Enterprise Power Manager
- the Eaton Network Shutdown Module
- the Network Management Proxy

2.1.2 On the System that Displays Web-based Graphical User Interface

The Eaton Intelligent Power[®] Manager graphical interface can be accessed remotely using a simple Web browser. Access to this interface is secured through SSL connection (default configuration) and is also secured through Login & password.

The Intelligent Power[®] Manager graphical interface has been tested with:

- Google Chrome
- Mozilla Firefox 6
- Microsoft Internet Explorer (*) 7, 8, 9

For optimal performance, Google Chrome or Firefox 6 is recommended. For good performance Internet Explorer 7, 8 are recommended. (*) IE6 should work, however, performance is limited

2.2 Quick Start & Installation

To start in 5 minutes, please perform the following steps:

Step 1 (Installation)

On a Windows 2000/XP/2003/Vista/2008/7 machine, run the "Intelligent Power[®] Manager" package under an administrator account.



A Web browser is automatically displayed (enter **admin** as Login **/ admin** as Password and click on the **Login** button)

🗃 http://127.0.0.1:4679/default.html 🔄 💽 ОК	:
F-T•N Intelligent Power Manager	
 What is Eaton Intelligent Power Manager? Ideal for monitoring and managing multiple power and environmental devices, Intelligent Power Manager software from Eaton delivers a global view across the network from any PC with an Internet browser. Exceptionally versatile, the software is compatible with any device supporting a network interface, including other manufacturers' UPSs, environmental sensors, ePDUs, shutdown applications and more. Intelligent Power Manager also offers the ability to organize a management table by groups, centralize alarms, and maintain event logs for preventive maintenance of the entire installed equipment base. 	Login: admin Password: Login Login

Step 2 (Configuration)

When started, the application automatically performs a **Quick scan**.

 Using the Quick scan operation, you will discover through broadcast within a few seconds: Network Management Cards Network-MS (ex 66102 / 103006826) and Modbus-MS (ex 66103), PXGX2000, PXGX-UPS, ConnectUPS BD, ConnectUPS X, ConnectUPS MS, Intelligent Power Protector, Network Shutdown Module V3, new Eaton ePDU, new HP UPS Card, new Dell UPS Card, new IBM UPS Card.

The discovered nodes are displayed in **Settings** -> Auto Discovery

Some nodes might not be discovered by quick scan if they do not support that function or if they are not in the same subnet as IPM. To discover such nodes, please perform the discovery based on IP address ranges (**Range scan**)

 Using the Range Scan operation you will discover the nodes that are outside of the Network segment and nodes that are not compatible with the "Quick scan" feature.
 Refer to the Compatibility list to determine if your node supports "Quick scan" feature.

F:T•N	Intel	lige	nt F	ower Ma	nager				
Views	« @	Node L	ist						Real And
⊟ 🔄 Views		Туре	Status	Name 🔺	Description	Location	Contact		Range scan
Prode List			Ø	166.99.224.111	Windows		4	1	Ѧ Address scan
Events List			Ø	166.99.224.129	Pulsar MX Frame 16L	TEST qualif elec 4	Computer Room Mana		Set access parameters
💷 Events Calendar			0	166.99.224.136	Rack 2700	Computer Room	Computer Room Mana		🖉 Edit asset
Management Modes Settings			8	166.99.224.166	Evolution 650	Computer Room	Computer Room Mana		Remove nodes
Nodes Upgrade			Ø	166.99.224.168	Evolution 650	Computer Room	Computer Room Mana		Select all
🖃 😋 Settings			8	166.99.224.171	Evolution 650	Computer Room	Computer Room Mana		Deselect all
Auto Discovery			8	166.99.224.177	Evolution 650	Computer Room	Computer Room Mana		
- Providence - Pro			8	166.99.224.82	Evolution 650	Computer Room	Computer Room Mana		
System			Ø	166.99.224.97	PVV9130 700	Computer Room	Computer Room Mana		
Log			\otimes	APP #0001	NSM Linux	Floor 2	Arnaud		
M COOL FIST			Ø	APP #0002	NSM Linux	Floor 2	Séb	_	
			\otimes	APP #0003	NSM Linux	Floor 3	Luc		
			(APP #0004	NSM Linux	Floor 2	Arnaud		
			•	APP #0005	NSM Linux	Floor 1	Séb		
		0	Ø	PDU APHEL1 #0001	Aphel PDU212345 Ge	http://www.apheltec	info@aphel.com		
		6	Ø	PDU APHEL1 #0002	Aphel PDU212345 Ge	http://www.apheltec	info@aphel.com	-	
		14 4	Page	1 of 2 🕨 🔰	🥲 🛛 🔽 Items	per page	Displaying 1 - 25 of 29	9	
🕜 ОК: 60 🛛 🚺 \	Warning: 48	•	Critical: 3	58 🔰 🔕 Unknown	18 Last event :	16/01/09-16:08:	20 - UPS #0003 - The sy	yst	em is powered by the utility

(Optional) In Settings -> System-> Module Settings, activate the shutdown module, then in the Settings \rightarrow Shutdown page; assign the IP address of the UPS that powers the local Computer.

In the Settings -> User List page, assign the access rights through "login and password"

Step 3 (Enter the License code)

IPM monitors up to 10 devices ("UPS Web Card", "ePDU" or "IPP Shutdown Controller") without a license key. If there are more devices to be monitored an appropriate license is needed. License can be upgraded also later without reinstallation.

(Only for the "Silver" or "Gold" paid versions) In the **Settings → System → Edit system Information**, enter the license product key that is printed on the commercial CDs booklet (Inside the CD case): => ref 66925 Intelligent Power[®] Manager Silver License (11 to 100 device nodes) => ref 66926 Intelligent Power[®] Manager Gold License (101 to Unlimited devices nodes)

The nodes that are not managed due to license limitation will appear with this icon 🥙.

Step 4 (Operation)

The **Views** \rightarrow **Node List** menu item allows you to supervise the current state of the compatible power devices & applications (select a line in the list and the panels are updated with selected device information)

	 <th>Node L</th><th>ist</th><th></th><th></th><th></th><th></th><th></th><th>Selec</th><th>tion view</th><th>N</th><th></th><th></th>	Node L	ist						Selec	tion view	N									
/iews		Туре	Status	Name	Description	Location	Contact	Link	Infor	nation										
Node List			0	UPS #0001	Evolution 2200	Floor 1	Arnaud			109 #0	004									
Node Map			0	UPS #0002	Pulsar 1000 RT2U	Floor 2	Séb		•	0-3#0	Description		Evel dire							
vents			8	UPS #0003	Evolution 500	Floor 2	Luc				Location		Flo							
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anagement			8	UPS #0005	Pulsar Extreme 32000	Floor 2	Séb				Serial numb	er	0123456							
Nodes Settings			\otimes	APP #0001	NSM Linux	Floor 2	Arnaud		Chabu	~										
Nodes Upgrade			Ø	APP #0002	NSM Linux	Floor 2	Séb		Juaco	>		-								
Auto Discovery			\otimes	APP #0003	NSM Linux	Floor 3	Luc		Вура	88		On au	utomatic byp							
Actions			•	APP #0004	NSM Linux	Floor 2	Arnaud		Вура	188 Section		😲 On	manual by:							
Shutdown			(APP #0005	NSM Linux	Floor 1	Séb		Batte	rv state			Char							
Log		6	Ø	PDU APHEL1 #0001	Aphel PDU212345 Ge	http://www.aphettech	info@aphel.com		Load	level										
User List			Ø	PDU APHEL1 #0002	Aphel PDU212345 Ge	http://www.aphettech	info@aphel.com		Batte	ry capacit	y		••••••••••••••••••••••••••••••••••••••							
			Ø	PDU APHEL2 #0001	DBQ10634/5 my_devi	Floor 3	Yoann		Batte	ry run tim	э	1	38 h 53 min							
		6	Ø	PDU APHEL2 #0002	DBQ10634/5 my_devi	Floor 1	Luc		Outle	t #2										
		6	8	PDU PULIZZI1 #0001	Powerware ePDU				Outle	t#3			e							
			Ø	PDU PULIZZI1_TRI #0	Powerware ePDU				Graph	ı										
			Ø	PDU PULIZZI2 #0001	Switched ePDU	Floor 2	Yoann													
		0	Ø	PDU PULIZZI2 #0002	Switched ePDU	Floor 1	Yoann						and a							
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			8	166.99.224.166	Evolution 650	Computer Room	Computer Room M	Date:		2009	/01/16-15:27	:52	-							
			Ø	166.99.224.168	Evolution 650	Computer Room	Computer Room M	Load level			15	·%								
			Ø	166.99.224.111	Windows			Battery ca	pacity:		47	% 2009	9/01/16-15:•							
			0	166.99.224.136	Rack 2700	Computer Room	Computer Room M	Battery ru	n time:	-	5	0 s	6							
			Ø	166.99.224.97	PVV9130 700	Computer Room	Computer Room M	tana 🕟	Statu	s Date		Message								
								-		16/01/ 16/01/ 16/01/ 16/01/	09-15:43:16 09-15:39:16 09-15:35:15 09-15:34:04	The syste The syste The UPS of The syste	m is power m is power output is off m is power							

The **Views** \rightarrow **Power Source** menu item allows you to supervise the current state of the UPS that powers the server running Intelligent Power[®] Manager. This menu is available when the user has enabled the shutdown module is System Settings.

The **Events** \rightarrow **Event List** view allows you to view the device events.

The **Management** section allows you to "mass configure" and "mass upgrade" cards.

2.3 Installation Result

- If you install a new Intelligent Power[®] Manager Release without uninstalling the old one you will keep your database and your product information.
- At the end of the installation, the following shortcuts are created in the group:
 Start → Programs → Eaton → Intelligent Power Manager

Name	Description
Open Eaton Intelligent Power Manager	Starts the main "Intelligent Power [®] Manager"
	graphical interface
Start Eaton Intelligent Power Manager	Starts the service
Stop Eaton Intelligent Power Manager	Stops the service
Uninstall Eaton Intelligent Power Manager	Uninstalls the Program

 A service called « Eaton intelligent Power Manager » is also created for the Database Acquisition Engine.

This program continuously polls the status of Eaton devices and Applications connected on the network.

This service automatically starts on machine boot-up. This service provides the Web Interface.

• A System Tray Icon displays the alarms on the local computer. A right click on this icon displays the same shortcuts as in the Windows Start menu.

2.4 Uninstalling the Product

- From the Add/Remove programs item of the control panel, execute the "Eaton Intelligent Power Manager Vx.xx" package.
- You can also uninstall from the shortcuts:
 Start → Programs → Eaton → Intelligent Power Manager → Uninstall Eaton Intelligent Power Manager.

This will remove the database and the custom files if you confirm it.

2.5 Upgrading the Product

Please refer to the Checking for Upgrades Paragraph.

3 Configuration

3.1 Configure the Nodes



Each node (Network Management Card / Proxy / Application must have a valid IP address (or a DNS name) in the range that you have entered for auto-discovery. Refer to the compatibility list.

"Intelligent Power[®] Manager" automatically receives the alarms (through notification or polling) without specific configuration on the card, proxies or applications.



For SNMP communication, check the community name. Default community name is configured in Settings \rightarrow System \rightarrow Default Community Name

A specific community name can be defined for each IP range in Settings \rightarrow Auto Discovery \rightarrow Range Scan \rightarrow Password

3.2 Intelligent Power[®] Manager Settings

Start the "Intelligent Power[®] Manager" main graphical interface from the previously created shortcut, and then click on the Settings menu item.

3.2.1 Discover the nodes Connected on the Network

From the **Settings > Auto Discovery** item; the following discovery methods are available:

- Quick Scan (automatically performed when application starts)
- Range Scan
- Address Scan

Views 🔍	Node	List					Real And Antice Real Antice Re
Tiews Image: Second S	Node 1 Type Type Type Type Type Type Type Type	Status St	Name _ 166.99.224.111 166.99.224.129 166.99.224.166 166.99.224.168 166.99.224.168 166.99.224.171 169.24.171 169.24.171 169.24.171 169.92.24.171 169.92.14.11 169.92.14.11 169.92.14.11 169.92.14.11	Description Windows Pulsar MX Frame 16L Rack 2700 Evolution 650 Evolution 650 Evolution 650 Evolution 650 Evolution 650 NSM Linux NSM Linux NSM Linux Aphel PDU212345 Ge Aphel PDU212345 Ge	Location Computer Room Floor 2 Floor 2 Floor 3 Floor 3 Floor 1 http://www.aphetec http://www.aphetec	Contact Computer Room Manu Computer Room Manu Compu	

Notes:

 The Quick scan request is a Broadcast frame on 4679 IANA reserved port and 69 standard TFTP port.

Using the Quick scan operation, you will discover through broadcast within a few seconds: Network Management Cards Network-MS (ex 66102 / 103006826) and Modbus-MS (ex 66103), PXGX2000, PXGX-UPS, ConnectUPS BD, ConnectUPS X, ConnectUPS MS and Intelligent Power Protector or Network Shutdown Module V3.

- For the other nodes, please perform the discovery based on IP address ranges (Range scan) Using the Range Scan operation you will discover the nodes that are outside of the Network segment and nodes that are not compatible with the "Quick scan" feature.
- Address Scan performs a single address scan (or several IP addresses separated by ; character)

3.2.2 Configure Actions

You can define the way users will be notified when node events happen.

From the **Settings** \rightarrow **Actions** item; the following channels are available:

- E-mail
- Execute script/program
- Notification to Alarm Box available through System Tray Icon

F:T•N	Intel	ligent Power Manager		
Views	« @	Actions		Create new action
Events		Action activated Action name: Email on shutdown events Event criticalities: Ok, Warning, Critical, Communication Lost	SMTP server: smtp.server.com Login: admin Password: *****	☑ Edit selected action ☑ Test selected action
Beents Calendar G G Management ∭Nodes Settings		Event categories: Alarms From view: Node List Action type: Email	Recipient, sysaanningserver.com Digest: Every minute	Remove selected action
Nodes Upgrade Settings Auto Discovery Actions Sutdown System		Action activated Action name: Notification to Systray Event criticalities: Ok, Warning, Critical, Communication Lost Event categories: Alarma, Shutdown events From view: Node List Action type: Notification		
- User List		Action activated Action name: stop critical applications Event criticalities: Warning, Critical Event categories: All events From view: Views Action type: Script	Command: c:\database\stopdate.bat Digest: None	
🕜 ОК: 76 🛛 🕚	Warning: 69	Critical: 358 O Unknown: 18 Last event : 16/0	1/09-16:26:23 - UPS #0002 - The system is powered by the UPS battery	
		Notifications su	mmary window	

Edit action	n events Login: admin	6
Action activated*:	V	
Action name*:	Email on shutdown events	
Event criticalities*:	V 🕗 V 🖲 V 🚱 V 🛇	
Event categories*:	Shutdown events 🧳	
From view*:	Node List	~
Action type*:	Email	~
Settings		
SMTP server*:	smtp.server.com	
Login:	admin	
Password:	****	
Recipient*:	sysadmin@server.com	
Sender:	Intelligent Power Manager	
Subject: 🥖	shutdown alarm from {hostname}	
Message: 🥖	shutdown alarm from {hostname}	
Digest*:	Every minute	*
	Save Cancel	

The Create new action button will display following interface:

Note: The "*" fields are required.

Events filter:

You can filter the e-mail notification according to:

- The event criticality. (Critical, Warning, Normal, Communication Lost).
- The event category (All Events, Alarms, Shutdown events, Power events, Measures). The pen icon allows editing and selecting the event category.
- The view that triggers the event.

Note on Event Criticality parameter:

With this parameter, you can filter the notification according to the event level. Refer to the event list provided below in this document. If you select "Critical" as filter you will not receive the associated "Normal" event informing that the device status changes from "Critical" to "Normal".

E-mail:

To receive emails on UPS events:

• You have to indicate the **SMTP server address** and **recipient e-mail address**. Login and password are used when SMTP server requests authentication.

For advanced use:

- You can Customize the subject e.g. if you use a third party service provider to translate e-mails into SMS.
- You can specify that you want to receive a consolidation of the alarms that occurred during a delay that you can choose (if you specify **no delay**, each alarm will generate an e-mail. With this settings you will receive more emails for the same number of events)

Execute script/program:

In order to execute a program on UPS events, the program path will be required. **Note:** The program is executed under the SYSTEM account.

 If an action (script or program) can not be executed under SYSTEM account, it is necessary to modify the execution context before it can be run. To allow a user to run specific tools and programs with permissions that are different from those assigned to the user's account use the Windows "RunAs" Command which allows you to save the password (Windows XP Service Pac 2 and more recent versions). Use the following Microsoft command: runas /profile /user:<my login> /savecred <my_program.exe>
 On first execution a password is required; it is saved for subsequent executions.

Alarm box notification:

The alarms are displayed on the local computer in an alarm box.

The status part of the alarm box is optional (It only appears if a Power Source has been declared in the Shutdown configuration)

冒 'Intelligent Power M	lanager' Notification	s _OX
Name Power Source Battery capacity Battery run time		166.99.224.107 On utility 97 % 30 min 00 s
Messages		
166.99.224.129	22/01/09-12:00:54	Bypass : Return on UPS
166.99.224.129	22/01/09-11:58:40	Communication restored with UPS
(166.99.224.129	22/01/09-11:58:37	Output on automatic bypass
166.99.224.129	22/01/09-11:57:59	Bypass : Return on UPS
166.99.224.129	22/01/09-11:57:58	Communication with device is restored
8 166.99.224.129	22/01/09-11:57:22	Communication with device has failed
8 166.99.224.129	22/01/09-11:55:19	Communication failure with UPS
8 166.99.224.4	22/01/09-11:53:24	Communication with device has failed
oli 166.99.224.4	22/01/09-11:52:53	Communication with device is restored
166.99.224.129	22/01/09-11:51:15	Communication restored with UPS

The alarm notification box is accessible from the System Tray icon. Click on the icon to open the window that displays the alarms on the local computer.

A right click on the System Tray icon provides you a fast access to following functions:

Open the notification box
Open the web interface
Start 'Intelligent Power Manager'
Stop 'Intelligent Power Manager'
Stop 'Intelligent Power Manager'

E

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If no Power source has been declared, the System Tray icon can have following states:

(blue) System Tray Icon correctly receives alarms from Intelligent Power® Mana
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(arev	Communication is los	st between System	Tray and Inte	elligent Power [®]	Manager
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If a Power source has been declared, the System Tray icon can have following states:

System Tray Icon correctly receives alarms from Intelligent Power[®] Manager (AC is present on the

	Power source)
	System Tray Icon correctly receives alarms from Intelligent Power [®] Manager (The Power Source runs in battery mode)
•	System Tray Icon correctly receives alarms from Intelligent Power [®] Manager (A Warning event occurred on Power Source)
•	System Tray Icon correctly receives alarms from Intelligent Power [®] Manager (A critical event occurred on Power Source)
\otimes	Communication with Power source has failed

Advanced events and actions customization:

In Intelligent Power® Manager installation folder, you can see a *configs/scripts* folder containing a sample user-defined action script (*sample_user_script.js*).

You have the possibility to modify this script or create new scripts that define very specific events and actions. The sample script provides details about the expected structure and syntax for defining new actions and triggers.

Advanced sound alarm customization:

To configure sound alarms on events, please configure IPM like this:

Step 1)

In C:\Program Files\Eaton\IntelligentPowerManager\configs\config.js

Change the following configuration:

```
'systray':
{
'soundAlarm': false,
'notificationIcon': true,
'notificationBox': true
}
```

into this one:

```
'systray':
{
'soundAlarm': true,
'notificationIcon': true,
'notificationBox': true
}
```

Step 2)

Close and restart the Windows user session so that this configuration is taken into account

Note:

You can change the alarm sound by setting the Windows sound preferences from Control Panel.

Sound								
Playback Recording Sounds Communications								
A sound theme is a set of sounds applied to events in Windows and programs. You can select an existing scheme or save one you have modified.								
Sound Scheme:								
Afternoon Saye As Delete								
To change sounds, click a program event in the following list and then select a sound to apply. You can save the changes as a new sound scheme.								
Program <u>Events</u> :								
Exclamation								
Exit Windows								
Low Battery Alarm								
Maximize Manu Command								
Menu Pop-up								
Play Windows Startup sound								
Coundar								
<u>2ounas:</u>								
Windows Battery Low.wav								
OK Cancel Apply								

The IPM alarms are linked to the "Low Battery Alarm" sound that you can change by selecting another wav file.

3.2.3 Configure User Accounts

Multiple user accounts can be configured.

From the Settings menu Item, select the User List item, then perform the following steps:

- Click on Add user.
- Enter the User Login and the User password.
- Select the User's Profile level. The following levels are available:
 > admin (the user will be able to access all the features)

> user (the user will only access the visualization and is not able to set changes to the system or nodes).

Click on Create new user button.

FAT•N	Intel	ligent Power Manager				
Views	« @	User list	😤 Add user			
Ciews C		Login: admin Profile: Admin Password: ****	Selft user			
 Fonds Events List Events Calendar Management Nodes Lugrade Settings Auto Discovery Actions Shutdown System 					Login: joe Profile: User Password: *****	Deselect all
Log Subser List						

User Accounts window

Intelligent Power[®] Manager contains a default Administrator profile with

- admin as login
- admin as password

It is strongly recommended to change these settings immediately after installation.

3.2.4 System settings

FIT-N Intelligent	nt Power [®] Manager	• Logout 'admin' • Help &
Views System Views System Node List About Node Map Produ Events Produ Events Calendar Views Nodes Settings Contra Nodes Settings Contra Nodes Settings Lang Actions System System Default System Autoo Interv Last Log Autoo Subser List Shute	n stem out Eston Intelligent Power Manager' oduct version: 1.20 build 070 ense: Free oduct key: rver system name: Windows IIT/6.00.02 ebste link: http://download.mgeops.com/explore/eng/network/net_sol.htm @ rtact: cation: nguage Settings nguage: [en] English an settings fan settings fan settings rvai: Every week st Update Settings rvai: Every week st Update: (10/24/11-2:49:08 pm dulles Settings nagement: Enabled tudicxion (Network Solution Only): Disabled dundancy: Disabled tudication (Network Solution Only): Disabled dundancy: Disabled	Image: The system information Image: The system information </th

System settings

Select one of the items, and then click on the corresponding button on the right.

- Edit language allows the user to change the user language. (Czech, English, French, German, Japanese, Korean, Polish, Portuguese, Russian, Simplified Chinese, Spanish, Traditional Chinese are currently supported)
- Edit community name changes the default SNMP community name for discovery (default community name is public)
- Edit updates & Check updates will provide Automatic Updates Features. This feature gives you access to Eaton software updates. Intelligent Power[®] Manager will always be up to date if you select the Check automatically option. When a new software version is detected on www.eaton.com, just follow the wizard instructions. Note: Database information will be retained with this operation.
- Modules settings will Enable / Disable the optional modules Management, Shutdown or Virtualization).

4 Supervision

4.1 Access to the monitoring interface

To monitor Eaton devices already discovered on the network, start the main "Intelligent Power[®] Manager" interface. You can access the same interface locally or remotely.

4.1.1 Local access

 From the system where the supervisor is installed, you can use the following shortcut: Start -> Programs -> Eaton -> Intelligent Power Manager ->Open Eaton Intelligent Power Manager

4.1.2 Remote access

- From a remote machine, you can type the following URL in a Web browser https://<name or IP address of computer hosting IPM>:4680/ or http://<name or IP address of computer hosting IPM>:4679/
- In SSL mode, accept the certificate (by clicking on Yes)

Securit	y Alert 🛛 🗙							
ß	Information you exchange with this site cannot be viewed or changed by others. However, there is a problem with the site's security certificate.							
	The security certificate was issued by a company you have not chosen to trust. View the certificate to determine whether you want to trust the certifying authority.							
	The security certificate date is valid.							
	The name on the security certificate is invalid or does not match the name of the site							
	Do you want to proceed?							
	Yes <u>N</u> o <u>V</u> iew Certificate							

Accepting the SSL Certificate

Enter the Login and Password

To install the certificate on IE7 for Vista, you need to perform the following steps:

> Run IE as an administrator (Right-click the desktop icon)

- > Visit the IPM site.
- > Click through the certificate error

> Click the "Certificate Error" button in the address bar.

- > Click View Certificate
- > Click Install Certificate

> Click the "Place all certificates in the following store" radio button, and choose the "Trusted Root Certification Authorities" store. If you don't do this, the certificate goes in your personal store, and it isn't trusted by IE.

4.2 Node List View

F:T•N	Intel	lige	nt P	ower Ma	nager					
Views	< 0	Node L	ist					4	Selection view	» @
🖃 😋 Views		Туре	Status	Name	Description	Location	Contact	Link	Information	
Node List				UPS #0001	Evolution 2200	Floor 1	Arnaud			
Events List			0	UPS #0002	Pulsar 1000 RT2U	Floor 2	Séb			al dias 700
🚺 Events Calendar			8	UPS #0003	Evolution 500	Floor 2	Luc		Location	Floor 1
Management Maladea Sattinga			0	UPS #0004	Evolution 500	Floor 1	Luc	D	Contact	Luc
Nodes Upgrade			8	UPS #0005	Pulsar Extreme 32000	Floor 2	Séb	D	Link Serial number	123456789
🖃 😋 Settings			8	APP #0001	NSM Linux	Floor 2	Arnaud		Chabus	
- Auto Discovery			Ø	APP #0002	NSM Linux	Floor 2	Séb		Status	
- Providence - Pro			8	APP #0003	NSM Linux	Floor 3	Luc		Bypass 😲 On automa	atic bypass
💮 System			•	APP #0004	NSM Linux	Floor 2	Arnaud		Bypass On man	ual bypass
- 🛄 Log			•	APP #0005	NSM Linux	Floor 1	Séb		Power Source	Choraina
Moser List		6	Ø	PDU APHEL1 #0001	Aphel PDU212345 Ge	http://www.apheltech	info@aphel.com		Load level	100 %
		6	Ø	PDU APHEL1 #0002	Aphel PDU212345 Ge	http://www.apheltech	info@aphel.com		Battery capacity	<u>65 %</u>
		6	Ø	PDU APHEL2 #0001	DBQ10634/5 my_devi	Floor 3	Yoann		Battery run time 138 h	53 min 20 s
		6	Ø	PDU APHEL2 #0002	DBQ10634/5 my_devi	Floor 1	Luc		Outlet #2	🖲 On
		6	8	PDU PULIZZI1 #0001	Powerware ePDU				Outlet #3	🖤 On
		0	Ø	PDU PULIZZI1_TRI #0	Powerware ePDU				Graph	- 46
		0	Ø	PDU PULIZZI2 #0001	Switched ePDU	Floor 2	Yoann			
			Ø	PDU PULIZZI2 #0002	Switched ePDU	Floor 1	Yoann			
			Ø	PDU MGE #0001	SwitchedPDU_810099	Floor 3	Yoann			
				PDU MGE #0002	SwitchedPDU_810099	Floor 2	Eric			
			8	166.99.224.166	Evolution 650	Computer Room	Computer Room M	Date:	2009/01/16-15:27:52	
			Ø	166.99.224.168	Evolution 650	Computer Room	Computer Room M	Load level:	15%	
			Ø	166.99.224.111	Windows			Battery cap	pacity: 47 % 2009/01/	16-15:49:34
			0	166.99.224.136	Rack 2700	Computer Room	Computer Room M	Battery run	n time: 50 s	- #
			Ø	166.99.224.97	PVV9130 700	Computer Room	Computer Room M	ana 🕟	Status Date Message	
			-						16/01/09-15:43:16 The system is	powered 📥
									(16/01/09-15:39:16 The system is	powered
									16/01/09-15:35:15 The UPS output	t is off
									16/01/09-15:34:04 The system is	powered
		14 4	Page	of 2 🕨 🔰 🧯	👌 🔽 Items pe	er page	Displayin	ig 1 - 25 of 23	27 0 16/01/09-15:26:03 The system is	powered
🕜 ОК: 26 🛛 🕚 '	Warning: 31		Critical: 3	50 🛛 🔕 Unknown:	10 Last event : 🕻	3 16/01/09-15:49:17	' - UPS #0003 - The	system is po	owered by the utility	

Node List

The following default columns are displayed in this page:

- Type Graphical Icon to differentiate UPS, ePDU, and software applications
- Status this icon represents the severity of the most critical event active on the monitored device;
- Name the IP address, the DNS name or user defined name
- Description the product name or description
- Location the node location
- Contact the node contact
- Link link to the device Web site (if available)

Note: You can sort your device list by clicking on the column titles (Status / Name / Description/ Location / Load Level ...).

The following possibilities are available:

- Sort ascending
- Sort Descending

0.0	Node	List								0	Selection vie	*		3
Mews.	Туря	Sister	Nore	* OS Type	Locati	en Card	ed .	Detary cape	ety.	Link	Information			
Inversion of the second			Name Otherwise Otherwise <thotherwise< th=""> <thother< th=""><th>OS Type State anandag Last descending Windows Windows</th><th></th><th></th><th>ed Jer Roon Manager Jelizzi con In Thom Manager In Roon Manager</th><th></th><th>0% 97% 0% 97% 97% 97% 97% 97% 97% 97% 97% 97% 97</th><th></th><th>Selection vie Information © 166.99 Steads Food Load Intel Codelar 1.00 2.00</th><th>224.146 Description Personation Mac Mac Mac Mac Mac Mac Mac Mac Mac Mac</th><th>Swi 16 00 bt 32005 Skin Arr erwo 10 10 10 10 10 10 10 10 10 10 10 10 10</th><th>45146 460 1912 2414 1912 2414 1912 2414 1913 2414 1914 2</th></thother<></thotherwise<>	OS Type State anandag Last descending Windows Windows			ed Jer Roon Manager Jelizzi con In Thom Manager In Roon Manager		0% 97% 0% 97% 97% 97% 97% 97% 97% 97% 97% 97% 97		Selection vie Information © 166.99 Steads Food Load Intel Codelar 1.00 2.00	224.146 Description Personation Mac Mac Mac Mac Mac Mac Mac Mac Mac Mac	Swi 16 00 bt 32005 Skin Arr erwo 10 10 10 10 10 10 10 10 10 10 10 10 10	45146 460 1912 2414 1912 2414 1912 2414 1913 2414 1914 2
	000	000	196 99 234 149 195 99 234 150 195 99 224 161	66102-4M 68102-4M 68102-4M	Campa) Access (Link. der Roum Com	ber Room Mahager ber Room Manager sdor Room Manager		90% 95% 97%	99	0 04/21/ 0 04/21/	09-11 42:05 09-11 42:05	The section	n 3 vote . 1 2 vote .

Add columns (as illustrated on following screenshot)

4.3 Flexible Panels view:

- Select one of the device/applications in the list and "detailed Panels" appears in the selection view (on the right).
- Clicking on the bar title allows you to collapse/extend the panel.
- These buttons will allow showing in the views menu or Selection view menu.
- This button allows selecting which panel you want to add in the Selection view.

-	Select panels X
	🔽 Information
¢	🔽 Status
¢	Outlets
ł	V Measures
¢	Environment
C	🔲 Graph
1	🔲 Synoptic
	V Power Source
	Powered Applications
	V Events
	Statistics
	Power Components
	Save Cancel
I	

Some of these panels are only available for specific node types.

4.4 Panels list:

4.4.1 Information

Information		-
Ø 166.99	.224.99	
	Description	Evolution 850
	Nominal apparent power	850 VA
	IP address	166.99.224.99
	Mac Address	D4:85:64:41:52:63
\sum	Serial number	AV2J1902F
	Class	Network Management Card / 0.01.002
	Location	1A08
	Contact	Seb
	Link	\triangleright

Information Panel

The following node information is displayed in this panel:

- 166.99.xx.yy the DNS name (or IP address) is displayed near the "status icon"
- Description the commercial product name
- Nominal apparent Power the device load capacity in VA
- IP address
 the device IP address
- Mac address
 the device MAC address
- Serial Number the device serial number (if available)
- Class the type of the card
 Location the device location (value of syslocation object or can also be configured
- in the Device page)
- Contact the device contact (value of syscontact object or can also be configured in the Device page)
- Link link to the device Web site (if available)

Note: The information displayed in this panel depends on the node capabilities.

4.4.2 Status

Status	Ξ
Battery state	🧭 Charging
Power Source	👩 On utility
Load level	0 %
Battery capacity	100 %
Battery run time	1 h 15 min 50 s
Master output: Master	配 On
Load segment #1: Group1	🖬 On
Load segment #2: Group2	🔂 On

- Power source AC Power / Battery
- Battery state Charging / Discharging / Default / Floating / Resting
- Load Level the output load level of the device
- Battery capacity Battery capacity of the device
- Battery run time the device remaining backup time
- Master Output Main output status (ON/OFF/Internal Failure/On Automatic Bypass/Manual By Pass/Overload)
- Outlet #x output outlet status (ON/OFF)

Note: The information displayed in this panel depends on the node capabilities.

4.4.3 Outlets

Outlets			
1: 💽	2: 💽	3: 📊	4: 📊
5: 📊	Outlet 2 test		
9: 💽	Factory Group 1 te	st / Load segment #2	
13: 📊	Outlet current : 0 A		
17: 💽	Outlet voltage : 235 Outlet active powe	i.16∨ r:0W	
21: 📊	Outlet apparent po Consumption since	wer:0 VA 06/01/11-11:44:55 am i	(15d23h41min) : 0 kWh

This panel displays outlet status of the selected ePDU. Notes:

- Contextual information is provided when mouse is over the outlet
- When you select an outlet in this panel, the Graph panel displays the information for this outlet. You also have to select "Outlet" information in the "Graph settings" dialog (accessible through this button in the "Graph panel")

Outlets color codes:

Symbol	Color	Description
· · ·	Green	Powered (On)
1	Red	Not powered (Off)

4.4.4 Measures

asures	
— Input —	
Input frequency	59 Hz
Input voltage	229 V
Input current	1 A
Bypass frequency	60 Hz
Bypass voltage	231 V
Bypass current	0 A
— Output —	
Battery output voltage	202 V
Output frequency	60 Hz
Output voltage	231 V
Output current	1 A
Global apparent power	0 V A
Global active power	0W

Single Phase UPS Panel

easures				
-Input				
	Phase 1	Phase 2	Phase 3	
Input current	0 A	0.22 A	0 A	
Input voltage	239.1 V	241.44 V	241.26 V	
Input active power	0 W	21 W	0 W	
Input apparent power	0 VA	49 VA	0 VA	
Input frequency			49.9 Hz	
Global apparent power Global active power			49 VA 20 W	
Phase 1 - since 06/06/11-7:04	4:55 pm		0.78 kWh	
Phase 2 - since 06/06/11-7:05		7.02 kWh		
Phase 3 - since 06/06/11-7:05	5:48 pm		1.41 kWh	
	10		40.47 MMb	

3 Phases ePDU Panel

This panel displays the selected device electrical parameters (UPS or ePDU and single phase or 3 phases) depending on the node capabilities.

4.4.5 Environment

Environment		-
Temperature		22.9 °C
Humidity		18.2 %
Input #1	Ø	Open
Input #2	Ø	Open

This panel displays the selected device sensor information: Temperature, Humidity level, Dry contact status (Open/Closed) Sensor temperature (in °C)

- Temperature
- Humidity Humidity level • •
 - Input #1 Status of first contact (open / closed)
- Input #2
- Status of second contact (open / closed)

4.4.6 Graph

Graph		
Date:	2009/01/27-15:38:20	
Input voltage:	238 V	
Load level:	44 %	
Battery capacity:	91 %	
Battery run time:	1 h 04 min 07 s	
2009/01/27-15:06:05	1	2009/01/27-16:06:05

This panel displays the graph of the main measures of the selected device.

The 💷 button allows you to maximize the graph window for better visibility.

The *w* button allows you to select the data you want to graph.

4.4.7 Synoptic



This panel displays the selected device synoptic. A tool tip is displayed when the mouse is over one of the functional block.

Synoptic Color codes:

• UPS modules:

AC/DC	DC/AC	By-Pass	Color	Description
~_	=~	-7*	Green	Status OK & Active
~_	=~~	-0*	Red	Internal fault & Inactive
~_=	=/~	-0*	Grey	Status OK & Inactive or Unknown

• Battery module:

Symbol	Color	Description
	Green	Status OK
	Orange	Battery charge is less than 50%
	Red	Battery fault or End-of-backup or End-of-battery-service-life pre-alarm
	Grey	Battery status unknown

• Electrical flows:

Symbol	Color	Description
	Yellow	Current flow through the cable
		Note: the object animation gives the direction of current flow
_	Grey	No current flow through the cable (Warning the cable may still have voltage)

• Electrical power source at UPS input:

Symbol	Color	Description
	Green	Source powered. Status OK
	Grey	Source not powered or status unknown

	Example	s of combinations between flow status and power source status:
	Green/	The electrical power source is powered and provides electrical flow
and the second second	Yellow	
	Green/	The electrical power source is powered and does not provide electrical flow
and the second second	Grey	

• Load at UPS output: (its status is linked to that of the UPS output status)

Symbol	Color	Description
	Green	Load powered and protected. Status OK
	Red	Load not powered
\land	Grey	Load status unknown

Examples of combinations between flow status and load status:

	Yellow/	Load powered and protected
and the second s	Green	
	Grey/	Load not powered
- Contraction of the second se	Red	

4.4.8 Power Source

Power Source	-
Node	166.99.250.82
Description	Evolution 850
Location	Bureau
Contact	Seb
Link	D
Load segment	Master outlet

This panel displays information on the device that powers the selected application running on the server.

4.4.9 Powered applications

Power	ed applications					Ξ
Statu	Name	Shutdown diag	Shutdown dure	Outle	t group	
Ø	166.99.250.100		2 min 00 s	1		
			Runtime to shut Shutdown dura Off time:	down: tion:	: 22 min 20 2 min 00 15 min 15)s s 5s

This panel displays information on the software applications (shutdown agents on the servers) that are powered by the selected device.

4.4.10 Events

Events			# -
Status	Date	Message	
Ø	27/01/09-15:59:22	Bypass : Return on UPS	-
•	27/01/09-15:58:45	Output on automatic bypass	
Ø	27/01/09-15:58:43	The outlet group 2 is on	
Ø	27/01/09-15:58:42	The outlet group 1 is on	
Ø	27/01/09-15:58:40	The UPS output is on	
0	27/01/09-15:58:32	The UPS output is off	

This panel displays the events list of the selected node.

4.4.11 Statistics

Statistics - 7 days		
Communication between card and	device lost	4
The UPS output is off		4
Network communication with device	e lost	3
Estimated consumption		27.54 kVA.h
Power lost count		3
Cumulated power lost time		6 min 42 s
UPS fault		3
UPS overload		1
02/17/09 - 12:00:00 am	V2	02/23/09 - 11:59:59 pm

This panel displays the statistics of the selected node.

The *w* button allows you to select the time interval for the statistics.

You can adjust the time interval by clicking on the 2 buttons with the "From" and "To" dates.

Here is the list of Statistics Computed Data:

- Apparent Consumption (or Active Consumption in next release)
- Average Apparent Power (or Average Active Power in next release)
- Power Failure Count
- Power Failure Cumulated Duration
- Battery Fault Count
- Internal Failure Count
- Overload Count
- Warning Alarm Count
- Critical Alarm Count
- Output Off Count
- Communication Lost Count

Note: This information depends on device capabilities

4.4.12 Power Components

Power	Compor	nents						-
Туре	Stat	Name	Load level		Battery capa	icity	Battery run	
	Ø			0%		100 %	1 h 15 min 5	
	Ø			6%		100 %	40 min 25 s	

This panel displays the components of your redundant UPS system if the Redundancy feature is activated. (Refer to the Redundancy chapter)

4.5 Device Supervision

The bar at the bottom is the status of nodes. For example, here:

- 14 nodes OK,
- 4 are in Warning status
- 2 are in Critical status
- 0 are in Unknown status

🕜 OK: 14	😲 Warning: 4	🜔 Critical: 2	🚫 Unknown: 0	Last event: (🔗 10/17/11 - 3:36:35 pm -	- The load segment #2 is on

4.6 Applications List View

To create a sub-view that filters applications, right click on **Node List**, then **create a Sub View** from and select **Category** as criteria to filter the nodes. It is possible to create sub views from the following information: "Category", "Contact", "Description", "IP address", "Location", Name", "Status", "Type", "User Note", "User Type".

Intelligent Power Protecto	or or Network Shutdowr	n Module V3 can l	be monitored in this View	1.

EAT-N Inte	elli	gei	nt	Power I	lanag	jer									
Views «	N	lode Li	st							٥	Select	tion view	,	3	•
🖃 😋 Views	т	ype St	atu:	Name 🔺	Descriptio	r Location	Contact	Link	User Typ	User	Inform	ation			-
Node List Category : 'Devices'			0	166.99.224.111	Windows			D				166 99 :	250 103		
Category : 'Application'	ļ		3	166.99.224.154	Windows			\triangleright			Ľ .		Description	l in a	
Power Source				166.99.224.4	Windows			\triangleright					Location	Sek	:)
Events	Ę			166.99.224.90	Windows			\triangleright					Contact	Set	2
Events List	Ţ		>	166.99.250.103	Linux	Seb	Seb						Link		·
🖃 🔄 Management										i	Status				5
- 🦻 Nodes Settings - 🚯 Nodes Upgrade											Shutd	ovvn durat	tion	2 min 00 :	в
E C Settings											Power	Source			5
Auto Discovery											Node			166.99.250.8	2
Shutdown											Descr	iption		Evolution 85	0
🚱 System											Conta	ct		Sel	a a
- 🗍 Log											Link			6)
- 🎬 User List											Load :	segment		Master outle	et 🛛
											Events	;		(#)	5
											Status	Date		Message	
											Ø	26/01/0	9-08:34:54	Communication with device is restored	
											8	26/01/0	9-08:33:22	Communication with device has failed	
	1	4 4	Pa	age 🚺 of 1 🗼 🖡	25 🖓 🖓 🕹	✓ Items	per page		Displaying 1	-5 of 5					-
🕜 OK: 410 🛛 🔋 Warning:	22	0	Iritic	al: 142 🔢 🔕 Unkn	own: 275	Last event :	(27/0)	1/09-16	5:51:07 - 16	6.99.224	99 - Com	munication	n with device	e has failed	

The following default information appears in this page:

- Type Application
- Status This icon represents the status criticality of the server.
- Name Value configured in the Applications screen (by default this is an IP address or a DNS name).
- Description
 Machine operating system.
- Power source the UPS that power the application
- Run time
 Operating time in the event of a utility supply loss.
- Shutdown duration
 Duration, in seconds, needed by the system to carry out its shutdown procedure.
- Link Link to the Web supervision interface of the Intelligent Power Protector or Network Shutdown Module V3 module.

4.7 Map View

This graphical representation allows you to organize the supervision Map using the Drag & Drop feature Select a node icon and the information will be updated on the right hand panel

4.7.1 Create a customized Map View

On the Left hand menu, Select Views -> Node Map

The Map is automatically generated (icons are automatically placed on the Map and IP address assigned) On the Node Map bar title the contextual tool button provides you the tools to modify the Map.



Change theme offers three kinds of icons representations for the user (small icons, large icons, and rack icons).

Manage backgrounds will offer you the possibility to:

- Import a new background image in the supervision tool.
- Select a background already in the supervision tool for the Map.
- Remove the background images.
- **Regroup nodes** will rearrange the icons position on the Map.

Add a label allows to create a user defined text and to place it on the Map through drag and drop.

Note: to delete a label, right click on it, then Delete.

4.7.2 Maps examples



World Map view



Country Map view



4.8 Events

4.8.1 List representation

Select the **Events -> Events List** and the following page appears:

F:T•N	Intel	liger	nt Power M	lanager			
Views	« ©	Events L	.ist			6	Acknowledge selected events
🖃 😋 Views		Status	Date 🔺	Name	Message	Ack	Acknowledge all events
Node List		•	21/01/09-08:44:28	166.99.224.129	Output on automatic bypass	✓ 1	Export logs
Power Source		8	21/01/09-08:46:22	166.99.224.4	Communication with device has failed	~	
🖃 🔂 Events		0	21/01/09-09:04:37	166.99.250.76	The outlet group 2 is off	~	
Events List		8	21/01/09-09:11:53	166.99.224.56	Communication with device has failed	~	
Management		0	21/01/09-09:15:47	166.99.250.112	Communication failure with environment sensor	~	
Nodes Settings		0	21/01/09-09:30:31	166.99.224.146	The temperature 2 is above high threshold	~	
Nodes Upgrade		0	21/01/09-09:30:31	166.99.224.146	The humidity 1 is above high threshold	~	
Auto Discovery		8	21/01/09-10:11:25	166.99.224.129	Communication with device has failed	~	
Actions		Ø	21/01/09-10:20:43	166.99.224.129	Communication with device is restored	~	
- 🍄 Shutdown		8	21/01/09-10:26:42	166.99.250.83	Communication with device has failed	~	
- 🗍 Log		Ø	21/01/09-10:27:15	166.99.250.83	Communication with device is restored	v _	
📲 User List		8	21/01/09-10:27:17	166.99.250.83	Communication failure with UPS	~	
		0	21/01/09-1 21 January	2009 10:27:17	The UPS output is off	~	
		Ø	21/01/09-10:27:36	166.99.250.83	Communication restored with UPS	~	
		Ø	21/01/09-10:27:36	166.99.250.83	The UPS output is on	~	
		8	21/01/09-10:36:02	166.99.250.83	Communication with device has failed	~	
			21/01/09-10:36:35	166.99.250.83	Communication with device is restored	J 1	
			Page 1 of 35 🕨	🔪 😂 🔽 Ite	ms per page	Displaying 1 - 25 of 852	
🕜 ОК: 0 🛛 🔋 🚺	Warning: 0	- I 🔒 🤇	Iritical: -1 🛛 🔯 Unkn	own: 0 Last event	: 🔕 27/01/09-18:09:10 - 166.99.224.95 - Com	munication with device has	; failed

Alarms list.

All new alarms are stored in this log.

You can sort the alarms according to Status, Date, Name, Message and Ack.

The following functions are available:

Acknowledge selected events will add a check box in the Ack column for selected events Acknowledge all events will add a check box in the Ack column for all events Export Logs will create a logs.csv file with the following syntax:

```
"Date";"Node";"Type";"Level";"Object";"Value";"Message";
"2009/01/27-18:35:20.840";"166.99.250.83";"Measure";"0";"UPS.PowerConverter.Input[1].Frequency";"49";"";
```

Note: Export command may take several seconds before allowing download to create logs file

Select all will select all displayed events. Deselect all will deselect all selected events.

4.8.2 Calendar representation

Select the Events -> Events Calendar and the following page appears:

In this matrix representation, each line is a week and each column is a day of the week. If you select a day or an interval (with date picker or shift+click command), events and statistics panels will give you all information for this selection and will automatically refresh when new statistics have been computed.

FAT•N	Intel	ligen	t Pov	ver I	/lanag	jer								
Views	« @	Events Ca	lendar							Selection	n view			»
🖃 😋 Views		Week 🔻	Sunday	Monday	Tuesday	Wednes	Thursday	Friday	Saturday	Events				=
Node List		8 (02/20		•	•					Status	Date	Name	Message	Ack
Events				8	0					8	02/23/09-6:12:1	166.99.224.154	Communication with device ha	. 🔺
Events List		7 (02/20		D	ate: February	23, 2009	0 🕄	0 🕄		8	02/23/09-5:58:5	166.99.224.136	Communication failure with UPS	
Events Calendar					50 50					•	02/23/09-5:58:5	166.99.224.136	The UPS output is off	
Management					58					8	02/23/09-5:00:5	166.99.224.129	Communication with device ha	
Nodes Upgrade										0	02/23/09-4:48:4	166.99.224.129	Communication with device is	
🖃 😋 Settings										8	02/23/09-4:43:3	166.99.224.129	Communication with device ha	
- Auto Discovery										0	02/23/09-4:34:2	166.99.224.129	Communication with device is	
- @ Shutdown										0	02/23/09-4:27:5	166.99.224.129	Communication with device ha	
System										0	02/23/09-4:17:2	166.99.224.129	Communication with device is	
- 🛄 Log										0	02/23/09-4:13:5	166.99.224.129	Communication with device ha	
CSEF LISE										0	02/23/09-4:01:2	166.99.224.129	The UPS output is off	
										0	02/23/09-4:01:2	166.99.224.129	Communication failure with UPS	
										0	02/23/09-4:01:2	166.99.224.129	Communication with device is	
										0	02/23/09-3:58:2	166.99.224.170	Communication with device ha	
											02/23/09-3:56:4	166.99.224.170	Communication restored with	-
										Statistics	- 02/23/09			
										Network of Communic The UPS of Estimated Power los Cumulated UPS fault UPS over	communication with de cation between card a output is off i consumption st count d power lost time load	evice lost ind device lost		36 22 22 57.33 kVA.h 3 6 min 42 s 3 1

4.8.3 Nodes Events list

The icons in the different views represent the event severity.

Event status
Normal. With this event, the device is coming back to a normal status.
Event list (UPSs, ePDUs, Applications, Generic devices):
 Communication with device is restored Communication restored with UPS The system is powered by the utility The UPS output is on Communication restored with UPS Battery OK UPS returns to normal load
 UPS OK Bypass : Return on UPS End of low battery alarm The outlet group 1 is on The outlet group 2 is on Communication failure with environment sensor Communication restored with environment sensor

۲

A

- Temperature is in normal range
- Input #x on
- Input #x off
- End of warning alarm
- End of critical alarm
- Redundancy restored
- Protection restored

Event list (ePDUs specific):

- The input frequency is in normal range
- The input temperature is in normal range
- The input voltage is in normal range
- The input {x} is in normal load
- The section {x} current is in normal range
- The section {x} voltage is in normal range
- The outlet group {x} current is in normal range
- The outlet group {x} is in normal load
- The outlet group {x} is on
- The phase {x} output load is in normal range
- The output frequency is in normal range
- The output load is in normal range
- The output voltage is in normal range

Warning. A problem occurred on the device. Your application is still protected.

Event list (UPSs, ePDUs, Applications, Generic devices):

- The system is powered by the UPS battery
- Output on automatic bypass
- Output on manual bypass
- Humidity is below low threshold
- Humidity is above high threshold
- Temperature is below low threshold
- Temperature is above high threshold
- Warning Alarm (a generic Warning alarm is active on the device)
- The device is under its load alarm threshold
- The device is over its load alarm threshold
- Protection lost
- Redundancy lost
- Shutdown in {time}
- Remote Communication Error (remote communication or configuration issue is detected)

Critical. A serious problem occurred on the device. This problem requires an immediate action. Your application might NOT BE powered anymore.

Event list (UPSs, ePDUs, Applications, Generic devices):

- The UPS output is off
- The outlet group 1 is off
- The outlet group 2 is off
- Battery fault
- UPS overload
- UPS fault
- Low battery alarm
- Applications must stop immediately...
- System shutdown in progress...
- Critical alarm (a generic Critical alarm is active on the device)

Event list (ePDUs specific):

- The input frequency is out of range
- The input temperature is above high threshold
- The input temperature is below low threshold
- The input voltage is above high threshold
- The input voltage is below low threshold
- The input {x} is overload
- The section {x} current is too high
- The section {x} current is too low
- The section {x} voltage is too high
- The section {x} voltage is too low
- The outlet group {x} current is too high
- The outlet group {x} current is too low
- The outlet group {x} is overload
- The outlet group {x} is off
- The phase {x} output is overload
- The output frequency is out of range
- The output is overload
- The output voltage is above high threshold
- The output voltage is below low threshold

Communication lost

Event list:

Communication failure with Device or Application

Device is not managed

Your device is not managed due to license limitation. Please go to Settings -> System page to enter a Silver or Gold license code.

4.9 Launching Device or application Web interface

From the **Status** panel, you can access the Web Page for Eaton cards or applications including a built-in web server. Click on the web **Link** associated to this blue icon (http access) or this yellow one (https access).

Faten Powering Business Worldwidt		Network Management Card	Power Xpert®		Gateway time: 12/50/2010 15:35:30 UTC
UPS	UPS Properties		Help THE REAL TO MANY	FALON	12/00/2010 16:05:30 CET
GPS Properties JPS Control Weakly Schedule Shukdown Personatione	Pulsar M 2290 Carte 16 Mo	AC Output Videge 251 V Current 62 A Frequency 50.04/z	Power Xpert Gateway Card - Peretrower 5125 Load Septembril 1	Powerware 5125	Vou tocation Zonate 30 second automfest
Logs and Nothication Veasurements Event Log System Log Employtication		Load kee 0 % Apparate Newer 0 0 kA Active Rever 0 0 kA	- Alarna Casa Segment 2 - Alarna Casa Alarna - Loga	Identification Identification Identification/General Inf Attached Dences, Battery Last Replaced Date	semation None Not Set
Contraction Contraction	Power source :	AC Power	Event	Date Last Serviced	No: Set
Settings 0 Network	Output load level :	111111111 0%	- Configuration	Installation Date: Low Runtime Alarm Setocist	Not Set 3 minutes
System Notified Applications Access Central Time	Output :	 Master: On Group1: On Group2: On 	Access Control Nations Date/firm Email Collector Email Collector Email	Nominal Input Frequency Nominal Input Votage: Nominal Output Frequency:	60 herts 230 voto 60 herts
Firmware Upload	Dattery		Madous TCP Stance	Nominal Output Voltage.	230 vots
Environment	Battery load level :	100% Charging	UPS NetWatch	Output VA Racing	1 3000 valt-ampores
0 Status	Remaining backup time	5 h 02 mn 43 s	Test and Central Scheduled Shutdown	Output Watts Rating	2700 watta
Settings	Battery status	DK	Save and Restore	Pat Number:	06147155-5591
C Log	Last update : 2008/10/08 11:25:28		Logan as User	Identification/System Cor	figuration

Opening different Web interfaces from Intelligent Power® Manager

4.10 Defining sub views



When you have to monitor large configurations, it is helpful to define several sub views and then filter the nodes or events in theses categories.

You can select many criteria in order to organize your tree (i.e. geographical, organizational, by status...).

- Select a view in the left menu (e.g. Devices)
- Right click on this view and the following contextual menu appears.



- Click on **Create a sub view from** ... and follow the instructions.
- To filter the nodes in this sub view, right click on a line of the **Node List** area and edit a **Filter View**.

Add rule Delete rule Object Operation Value Category / Type = Devices (DEV)	iew filter rules	COMPULER RUL CI		(
Object Operation Value Category / Type = Devices (DEV)	Add rule Delete rule			
Category / Type = Devices (DEV)	Object	Operation	Value	
	Category / Type	=	Devices (DEV)	
Location contains Coomputer Room	Location	contains	Coomputer Room	
		Save	Cancel	

- To add a filtering rule, click on the Add rule button then key in the Object, Operation and Values.
- With this filter you will view the **Devices** whose **Location** field contains the value "**Computer Room**".

4.11 Sharing sub views

A customized sub view is "attached" to the user that created it. It is private (marked with a small man on the icon of the sub view). If the owner of the sub view wants to allow the use of the sub view by the other users, he needs to share the view.

A Right-Click on the view allows you to open the contextual menu:



Customizing a view cancels the sharing of this view. For the use of this view by all the users, the owner of the view must share it again.

5 Shutdown

5.1 Introduction

Intelligent Power[®] Manager provides **local computer graceful shutdown** (acquisition through Network-MS (ex 66102 / 103006826) PXGX2000, PXGX-UPS, ConnectUPS BD, ConnectUPS X and Modbus-MS (ex 66103), USB, RS232)

This Shutdown feature can be Enabled / Disabled from the Settings -> System -> Modules Settings

5.2 Shutdown Configuration

- Login with an administrator user profile
- From the **Settings** menu Item, select the **Shutdown** item:



To configure, perform the following actions:

- Click on Edit Power Source configuration.
- In the Power source field select the UPS that powers the computer hosting Intelligent Power[®] Manager.
- Check other parameters.
- Click on Save.

Notes:

- Please refer to the Intelligent Power Protector User Manual for a detailed description of the shutdown feature.
- Shutdown through Hibernate: If available with your operating system, it is better to use the hibernation feature (available from Windows 2000) as there are a number of advantages. When the computer is shutting down all work in progress and system information are automatically saved to the disk. The computer itself is also de-energized. When mains power returns, all the applications reopen exactly as they were and the user placed back in their work environment...
 The Hibernate function must first have been activated in the operating system (In the power options on the Windows control panel -> Hibernate tab).

Note: If you select hibernate, but your computer does not have this function, Intelligent Power[®] Manager will still protect the installation by carrying out the normal (default) shutdown.

5.3 Power Source View

When **Shutdown** feature is configured, from the **Views** menu Item, select the **Power Source** item. You will be able:

• To supervise the information from the UPS that powers the Intelligent Power[®] Manager computer.

Tieses	× 0 Power Source				
 Yeeks Yeeks Yeeks Power Source Power Source	VIII Peaker Source Information and Status Image: Source Image: Source Image: Source Image: Source Description Note Address Control Description Note Address Control Description Note Address Control Description Index source Bidlary state Localiswal Index codput Codel #2 Codel #2 Codel #2 Codel #2 Symptic Line Interactive UPS Image: Code applicatione	Computer Room Monager Computer Room Monager	Stach 2009/01/30-11 +2:55 Events Status Date 0 01:0002-10:55:03 em 0 01:0002-10:55:03 em 0 01:0002-10:55:03 em 0 01:0002-10:55:03 em 0 01:0002-10:55:00 em	Message Communication with device to restored Communication with device to settled The UPS output is on Communication nationed with UPS The UPS output is en Communication halve with UPS The UPS output is en Communication halve with UPS Communication with device is restored	a - 2004/01/10-12-42-55 A

• To drag and drop the panels in this window.

5.4 Shutdown Sequence

You will find more details on "Shutdown Sequence" and "Shutdown Use case" in Intelligent Power[®] Protector user's manual.

Notes:

- IPM can acquire shutdown alarms from IPP with the "Shutdown Controller" enabled.
- You can not enable the "Shutdown Controller" feature in IPM.

6 Advanced Management

6.1 Nodes Settings

6.1.1 Single node Configuration Display

Intelligent Power[®] Manager can display the card/application configuration. Proceed as follows: • Select one card from the list.

- After a few seconds, on the right hand, the Node configuration panel is updated.
- Use the Configurations-> Export Configuration file to export this configuration to a file.

esis	11.0	nodet	61					- 4	Node configuration			
(C) Views		Type	Statut	Name	Description	Ches	Accest	Line :	A-1 1 185 99-250.00 · brittenin	ir	Carligastic	
In Those List		13	0	168 89 224 95	Windows	Network Shutdown Mo			a history California	Create new configura	ation from	
Bull Prove Mag		0	0	168.89.224.164	Winikowis:	Network Stubilized Mo	0	69		Non-sile surf gurgest		
Evente		13		100.00 214 143	B dow 1000 8170	Methoda & Manufactured C		(3)	Heatname	Report of the Automation		
g g Goards Lid		in in	ě	100.00.004.0	Windows	Methodal Challenge Mo		0	FAdress	Description and the problem of		
Management .							-8	0	Subret Mater	tapor cariganant	24	
Wholes Settings		v	0	168.99.224.11	Wendowro.	Network Shateland Mo	æ	69	Dateway	Espox carrigutation of	(NR) LL	
Hoder Upgrade		8	0	168.89.253.82	Evolution 050	Network Hemigement C	A	B	Dominin Hame	ups.dometr.com	10	
Settings		0	0	168.89.268.82	Evolution 1150	Network Interrepetient C		®	DHCP:	Bisabled	100	
Aduro		8	0	168.39 234 135		Network Management C		69	Primary DRS server	151,118,124,13	- E1	
Patition		-	-						Secondary 045 server	151.118.534.17	(2)	
(P System									SMTP Server (anwi):	surpresses	- EE	
gue un									SMIP AURWRICHDE	awabeo	-82	
		System Settings #										
									Access Control #			
									- • Shutdown Scheckde /			
									- MIS /			
										Teaste all	10	
									Application name:		11	
									Hostnese or # addees:		ET .	
									Trip Controlley:		12	
									Sevents	1 - Wanning	11	
									Time Settings /			
										Tottale ell	11	
									Time synchronization	Autometic	83	
									MIP server	orpserver	£3	
									Timepore	CHIT	E1	
									Une Devight Saving Time:	Disabled	10	
									Contract of the second s			
									a decision a			

6.1.2 Single Card settings

Intelligent Power[®] Manager can configure a single card. Proceed as follows:

- Login with an **administrator** profile.
- Select one card from the list.
- From the Node List button 🥘 -> Set Login Parameters, enter the card Login and Password.
 - The access status changes from Access Denied (🧟) to Access OK (🖓).
 - After a few seconds, the Node configuration panel is updated.

Click on the Edit button
 [or load a previously created configuration].
 In the Configuration Window check the parameters you want to change and fill in the new values.

Network Settings Configuration			×
Hostname:	ups101		
IP Address:	166.99.224.129		
Subnet Mask:	255.255.0.0		
Gateway:	166.99.224.1		
Domain Name:	ups.domain.com		
DHCP:	Enabled	~	
Primary DNS server:	151.110.134.13		
Secondary DNS server:	151.110.134.17		
SMTP Server (email):	mysmtpserver		
SMTP Authentication:	Disabled	× 🗆	
	Apply	Cancel	

- Apply the changes.
- The parameters that have different values on the cards and on the configuration to apply have the following sign "≠".
- Then select the parameters you want to synchronize (with the check box).
- Then click on **Synchronize** button.

Note:

Some advanced parameters details are not displayed in the IPM **Node configuration** screen. You need to change the advanced parameters details directly on one device and then synchronize the configuration from this device to other devices.

On next screenshot, we provide a typical example with ePDU Power Schedule configuration. The details of Power Schedule1 to Power Schedule 8 are available from the device web interface. Checking all the "Power Schedule X- advanced parameters" will synchronize all the advanced parameters details of the category.

🕒 Power Schedule 🖉 🚽	
	Select all
Power schedule 1 - name:	Power Schedule 1 📃
Power schedule 1 - advanced parameters:	\checkmark
Power schedule 2 - name:	Dower Schedule 2
Power schedule 2 - advanced paramete Advanced para	neters are not displayed. See device re details.
Power schedule 3 - name:	Power schedule 3
Power schedule 3 - advanced parameters:	
Power schedule 4 - name:	Power Schedule 4 📃
Power schedule 4 - advanced parameters:	\checkmark
Power schedule 5 - name:	Power Schedule 5 📃
Power schedule 5 - advanced parameters:	\checkmark
Power schedule 6 - name:	Power Schedule 6 📃
Power schedule 6 - advanced parameters:	
Power schedule 7 - name:	Power Schedule 7 📃
Power schedule 7 - advanced parameters:	
Power schedule 8 - name:	Power Schedule 8 📃
Power schedule 8 - advanced parameters:	

6.1.3 Multiple Cards Configurations Synchronization

Intelligent Power[®] Manager can synchronize multiple cards configurations. Proceed as follows:

- Select several cards from the list.
- From the Node List button 🙆 -> Set Login Parameters, enter the card Login and Password.
- The access status changes from: Access Denied (📽) to Access OK (🔗).
- After a few seconds, the **Node configuration** panel is updated.
- From the combo box select the configuration that will be the model [or Click on the Edit button

- The parameters that have different values on the cards have following sign " \neq ".
- Select the parameters you want to synchronize (with the check box). Click on **Synchronize** button.

F:T·N Int	ellige	nt P	ower Ma	nager								5	
Vacwo	0 Node L	ad.					_	8 Poder	unfiguration				1
Marxw (C) Water (C) Service (C) Water (C) Wate			Name 160,0912405 160,0912405 10019822443 1001982244 16059922411 1605992241 1605992243 160599224433	Description Westwore Extend 002181300 Windows Windows Excluden 1950 Excluden 1950 Excluden 1950 Excluden 1950	Cane No. Anth Madour - Ma Network Management 2 Network Shaloo - Ha Network Shaloo - Ha Network Shaloo - Ha Network Management 2 Network Management 2	Access A vir A vi		Produce P	unifyeration	er Sunchronize	Tosole 1 100.99.224.133 255.255.255.050 105.01.254.13 151.490.4324.13 151.490.4324.17 emispectate Disabled		

6.2 Nodes Upgrade

6.2.1 Upload Device Firmware

From the **Management** menu Item, select the **Nodes Upgrade** item.

Refer to the Network cards release notes to determine the latest Firmware release compatible with the Hardware revision.

B Node List									0	Selection view		10 4
B Mode List	Туре	Statue	Name	Upgrade status	Char	Acce		Link		Personalist		1
Power Source		0	156.99.224.111		hietwork Shiddown Moulule / 3.10	A		۲				Personal -
Bie Node Mep		0	166.99.224.95	<u>A</u>	Network Shiddown Module / 3.20			0		Fie	Date	Import firmward file
Diverts		0	166.99.224.154		Network Shuldown Module / 3.20	R.	admin	0		hinc_fatin	200	Export ferenare file
Events Calendar	0	0	166.99 224 153	0	Network Management Cand JFA			0				Renove Finavore Pile
	0	0	166.99.224.70	0	Network Management Card / 1.0 bt	R		0				Upload firmwere to nodes
Nodes Upgrade		0	165.93.224.4	4	Network Shuddown Module / 3.20			•				
3 Gatings		0	166.99 224.11	<u>A</u>	Network Shutdown Module / 3 20			0				
Auto Discovery		0	esprive5900070 euro adieth.o	A	Network Studdown Module 23.10			0				
P Stutzkewn	0	0	166.99 250.02	0	Network Nanagement Card 700	R	admin	0				
@System	0	0	166.99 250.03	0	Network Nanagement Card J 820	,o	admin	0				
Liner Lint	0	0	155.99 224.115	0	Network Management Card J1 Dtrl	R		•				
	0	0	155.99.224.133	0	Network Nanagaraant Card J GAbri	<i>,</i> 0	admin	0				

Perform this procedure to upload a Device firmware:

- Select the cards in the List.
- From the Node List button <a> Set Login Parameters, enter the card Login and Password.

The access status changes from: Access Denied (🍭) to Access OK (🔗).

- From the Firmware -> Import Firmware File... list box; the uploading window appears.
 > Click Browse ... to select the firmware from a disk accessible from the computer.
 > Click Import.
- Click on Firmware -> Upload Firmware to nodes.
- The cards will be updated with the firmware selected.

6.2.2 Upgrade applications

From the **Management** menu Item, select the **Nodes Upgrade** item:

F:T•N	Intel	ligent	t Pow	/er Manager								
Views	« ©	Node List						_	_	۲	Selection view	» @
🖃 😋 Views		Туре	Status	Name	Upgrade status	Class	Acce	ss	Link		Applications update	Ξ
			Ø	166.99.224.111		Network Shutdown Module / 3.10	À		\bigcirc		Undete entretering	Undete
🕀 📲 Node Map			8	166.99.224.95	Δ	Network Shutdown Module / 3.20			\triangleright		update selected hodes	Opdate
Events		4	8	166.99.224.154	<u>A</u>	Network Shutdown Module / 3.20	À	admin	\triangleright			
Events Calendar			8	166.99.224.153	0	Network Management Card / FA			Þ			
Management Management		1	0	166.99.224.70	0	Network Management Card / 1.0 b1	æ		\triangleright			
Nodes Upgrade			Ø	166.99.224.4	Δ	Network Shutdown Module / 3.20			\bigcirc			
🖃 🔄 Settings			Ø	166.99.224.11	Δ	Network Shutdown Module / 3.20			\bigcirc			
Auto Discovery			Ø	espfiwe5900370.euro.ad.etn.c	۰ <u>۸</u>	Network Shutdown Module / 3.10			Þ			
Shutdown			Ø	166.99.250.82	0	Network Management Card / EB	æ	admin	\bigcirc			
- 🥵 System			Ø	166.99.250.83	0	Network Management Card / EB	P	admin	\triangleright			
Ser List		3	8	166.99.224.115	0	Network Management Card / 1.0 b1	æ		Þ			

Perform this procedure to update the applications:

- Select the applications in the **Node List**
- from the Node List button 🙆 -> Set Login Parameters, enter the access Login and Password
- The access status changes from: Access Denied 🦧 to Access OK 🤌
- From the Applications update panel, click on Update
- The status of the Applications with respect to the version is updated.

7 Virtualization Module

7.1 Introduction

The IPM Virtualization Module for VMware, Microsoft and Citrix requires a network shutdown environment. The UPS has to be connected through a network interface (e.g. NMC) and the protection software (IPP) has to be configured in order to communicate with this network interface. Each peer-to-peer interface (i.e. USB/RS232) between IPP and the UPS doesn't allow using this virtualization module.

The IPM Virtualization Module will retrieve information from the Hypervisor (e.g. ESX, ESXi, XenServer, ...) or Manager (vSphere, SCVMM, ...).

IPM will execute advanced features on UPS Power Events:

- Trigger the move of the Virtual Machines to other servers (Put the VM host in maintenance mode).
 => The data center will benefit with this zero down-time feature.
- Trigger Shutdown of the VM Host with VCenter (With SCVMM this feature is done by IPP).
 - => The data center will benefit from servers graceful shutdown.

7.2 Eaton Virtualization solutions for VMware, Microsoft, Citrix and Opensource Xen, KVM

7.2.1 Eaton solutions for VMware

IPM and IPP configurations for VMware



Eaton provides 3 solutions for VMware that are illustrated on the above architecture diagram:

1. the first one provides ESXi * server graceful shutdown. IPP is installed on a VIMA/vMA (one instance of IPP per ESXi).

This solution is the best one when => vCenter Server is not available for management of hosts => Number of ESXi is Limited

paid ESXi version only. Free version cannot be shutdown because of VMware restrictions. (Refer to the IPP Appendix document: IPP Installation and Configuration Guide VMware ESXi virtual architecture).

the second one provides ESX server graceful shutdown. IPP is installed on each ESX operating system.

This solution is the best one when: => vCenter Server is not available for management of hosts => Number of ESX is Limited (Refer to the IPP Appendix document: User manual extension for VMware ESX 4.0).

- 3. the third one is for multiple ESX and ESXi servers (paid version only).
 - It provides following features
 - => Remote graceful Shutdown of multiple ESX/ESXi servers and hosted VMs.
 - => ESX/ESXi Remote maintenance (vMotion)
 - => an IPM Plug-in is created in vCenter
 - => UPS events are accessible through vCenter

This solution is ideal for biggest infrastructures working through vCenter server This solution is described in this chapter of the IPM user manual.

7.2.2 Eaton solutions for Microsoft



IPM and IPP configurations for Microsoft

For Microsoft, Eaton provides 2 solutions that are illustrated on the above architecture diagram:

1. the first one provides graceful shutdown for Hyper V server or Hyper V on 2008. IPP is installed on each Microsoft operating system.

This solution doesn't require SCVMM management software

(Refer to the IPP Appendix document: User manual extension for Hyper-V and HyperV server).

 the second one is for multiple Hyper V and Hyper-V servers It provides following feature:
 => Hyper-V/Hyper-V server Remote maintenance to trigger VM Live Migration. This solution is ideal for biggest infrastructures working through SCVMM server This solution is described in this IPM user manual.

7.2.3 Eaton solutions for Citrix Xen



IPM and IPP configurations for Citrix Xen

For Citrix, Eaton provides 2 solutions that are illustrated on the above architecture diagram:

- the first one provides graceful shutdown for Citrix Xen. IPP is installed on each Citrix Xen system. This solution doesn't require Xen Center management software
 (Refer to the IPP Appendix document: Installing and configuring Intelligent Power® Protector Op.
 - (Refer to the IPP Appendix document: Installing and configuring Intelligent Power® Protector On Xen Virtualized Architecture).
- 2. the second one is for multiple Xen servers It provides following feature:
 => Xen server Remote maintenance to trigger VM Xen Motion.
 => Xen server Remote shutdown This solution is ideal for biggest infrastructures working through Xen Center Since IPM1.25 this solution is now integrated in IPM and described in the appendix chapter of this manual.

7.2.4 Eaton solutions for Opensource Xen

IPP configuration for Opensource Xen



Eaton provides following solution for Open source Xen that is illustrated on the above architecture diagram:

 It provides graceful shutdown for Xen. IPP is installed on each Xen system. (Refer to the IPP Appendix document: Installing and configuring Intelligent Power® Protector On Xen Virtualized Architecture).

7.2.5 Eaton solutions for Redhat KVM or Opensource KVM



IPP configuration for Redhat KVM or Opensource KVM

Eaton provides following solution for Redhat KVM and Open source KVM that is illustrated on the above architecture diagram:

• It provides graceful shutdown for KVM. IPP is installed on each KVM system.

(Refer to the IPP Appendix document: Installing and configuring Intelligent Power® Protector On KVM Virtualized Architecture).

7.2.6 Eaton solutions for Citrix XenClient



IPM and IPP configurations for Citrix Xen Client

Eaton provides following solution for Citrix XenClient that is illustrated on the above architecture diagram:

It provides graceful shutdown for XenClient. IPP is installed on each XenClient system or on each Virtual Machine.

(Refer to the IPP Appendix document: Installing and configuring Intelligent Power® Protector On XenClient Virtualized Architecture).

7.3 Tested environments

Eaton has validated the Virtualization Module in following environments. Other environment may also be compatible with Virtualization Module but are not officially tested.

7.3.1 VMware

- vCenter 5.0 on Windows server 2008 x64 and Windows server 2008 R2 x64, Windows server 2003 x64, Windows server 2003 R2 x64,
- vCenter Server 4.1/4.0 on Windows Server 2008 R2, 2008 Enterprise 64 bits, 2008 Standard 32 bits and 2003 64bits
- ESXi 5.0/4.1/4.0 (remote shutdown from IPM or with IPP on vMA)
- ESX 4.1/4.0 (shutdown with IPP on core OS)

Note: if your installation just has a limited number of ESXi Servers and if you don't use Cluster features, you don't need IPM remote shutdown feature. To protect your ESXi Server you can install IPP on a vMA/VIMA, please refer to the IPP Appendix.

7.3.2 Microsoft

- SCVMM on Windows Server 2008 R2
- Windows Server 2008 R2 with IPP

7.3.3 Citrix

- XenServer 5.6 and 6.0.0
- XenCenter 5.6 and 6.0.0

7.4 Enabling the Virtualization Module

To enable the virtualization module you must go to the "System" -> "Module Settings" panel and enable it as shown in the following screenshot:

Edit modules settings	×
📝 Management	
🔄 Shutdown	
Virtualization (Network Solution Only)	
Redundancy	
Save Cancel	

7.5 VMware Supervisors Prerequisites

The virtualization module requires the following prerequisites:

- VMware vCenter and vSphere Client installed.
 Note that vCenter and IPM could be installed on the same server (or on a VM/Server on the network).
- To provide the VM graceful shutdown, you have to install VMware tools on each VM
- To provide the VM graceful shutdown, you have to install VM ware tools on each size JPM 1.25, the vSphere SPK for Partie participation and the second second
- Since IPM 1.25, the vSphere SDK for Perl is no more required.

You must also have a knowledge / experience with IPM software and VMware Infrastructure.

7.6 Citrix Supervisors Prerequisites

The virtualization module needs following prerequisites:

- XenCenter installed to manage the XenServers
- To provide the VM graceful shutdown, you have to install Xen tools on each VM

7.7 Microsoft Supervisors Prerequisites

The virtualization module needs following prerequisites:

- The Powershell Snapin for SCVMM. To get it, either
 => install the VMM console on the machine hosting IPM
 => or install IPM on the machine hosting SCVMM.
- The server hosting IPM must be on the same Windows Domain than SCVMM Server
- The server hosting IPM must enable the execution of third party scripts on the local machine (minimum access "Remote Signed") (examples: Set-ExecutionPolicy RemoteSigned). The next screenshot displays the parameters after the configuration example.

🗷 Administrator: Windows PowerShell - Virtual Machine Manager	
PS C:\Windows\system32> set-ExecutionPolicy RemoteSigned	▲
Execution Policy Change The execution policy helps protect you from scripts that you do Changing the execution policy might expose you to the security in the about_Execution_Policies help topic. Do you want to char policy? [Y] Yes [N] No [S] Suspend [?] Help (default is "Y"): PS C:\Windows\system32> get-ExecutionPolicy -L) not trust. risks described ge the execution
Scope	ExecutionPolicy
MachinePolicy UserPolicy Process CurrentUser LocalMachine PS C:\Windows\system32>	Undefined Undefined Undefined Undefined RemoteSigned
	•

7.8 Adding Manager or Hypervisor List

7.8.1 Introduction

Steps:

- Enable the virtualization module (as explained previously).
- Then a new Virtualization menu entry automatically appears in the "Settings" menu.
- Click on this new Virtualization menu entry
- You can Add Manager or Hypervisor List on the right panel.

F:T•N Intell	igent Power [®] Manager	• Logout 'admin' • Help &
Views 🔍 🔕	Virtualization	Add Manager or Hypervisor List
G Ciews Node List G Power Source ↓ C Power Components	Image: With the second seco	Carlet Manager or Hypervisor List
Events	WMware ESX/ESXi 1 Hostname or IP address: ESX1	
Events List	Microsoft SCVMM Hostname or IP address: 166.12.23.24	
Management Modes Settings Nodes Upgrade Setting	VMware vCenter Hostname or IP address: 166.78.3.4 Username: admin Password: ***** VCenter Plugin: Registered	
- Auto Discovery 	Citrix XenCenter XenCenter Plugin: Disabled	
Virtualization	Citrix XenServer Hostname or IP address: 166.23.45.34	
- [] Log - 1 User List		

- To Edit or Remove, Managers or Hypervisors, you have to select a line in the center panel first.
- In the next paragraphs, we explain how to add different kinds of Managers and Hypervisors.

7.8.2 Adding a vCenter Server Manager

To add a new VMware vCenter, complete the following fields.

Add Manager or Hyper	visor List 🛛 🗙
Product:	VMware vCenter 🗸 🗸
Hostname or IP address:	10.0.12.52
Username:	root
Password:	•••••
vCenter Plugin:	
Save	Cancel

- Product
- The type (VMware vCenter)
- Hostname or IP address The VMware vCenter Hostname or IP address.
- Username
 The VMware vCenter Administrator Username
- Password
- The VMware vCenter Administrator Osemane The VMware vCenter Administrator Password.

vCenter Plugin
 Installs and configures the Intelligent Power manager Plug-in into vCenter.
 Please consult the Appendix1 in this user manual when using this feature.

Click on **Save** after the fields are updated.

Note: When configuring the Login and Password, we recommend using the IPM Web interface through https. Using http is also possible but the Password is sent to the local or remote server in clear. In both cases, the password is stored encrypted in IPM and never resent on the Client side. The encrypted password is stored in the following configuration file (\$IPMFolder\$\configs\vmconfig.js).

7.8.3 Adding a SCVMM Manager

To add a new Microsoft SCVMM, complete the fields below:

Add Manager or Hyperv	risor List 🛛 🗙
Product:	Microsoft SCVMM
Hostname or IP address:	
Save	Cancel

Product

The type (Microsoft SCVMM)

Hostname or IP address The Microsoft SCVMM Hostname or IP address.

Click on Save after the fields are updated.

7.8.4 Adding a VMware ESX/ESXi Hypervisor List

To add a new VMware ESX/ESXi List, complete the fields below:

Add Manager	or Hyper	visor List	×
Product:		VMware ESX/ESXi	~
Hostname or address:	IP	10.0.12.12,10.0.12.13	
	Save	Cancel	

Product

The type (VMware ESX/ESXi)

Hostname or IP address The List of VMware ESX/ESXi Hostname or IP address.

7.8.5 Adding a Citrix XenServer Hypervisor List

To add a new Citrix XenServer List, complete the fields below:

Add Manager or Hyper	visor List 🛛 🗙
Product:	Citrix XenServer
Hostname or IP address:	10.0.12.14,10.0.12.15
Save	Cancel

Product

The type (Citrix XenServer)

Hostname or IP address The List of Citrix XenServer Hostname or IP address.

7.8.6 Adding a XenCenter

As Citrix XenCenter is a Client and not a Manager, we add the possibility to install a plug-in on the system where XenCenter is installed.

This plug-in enables the user to use IPM into XenCenter.

Add Manager or Hyper	visor List	×
Product:	Citrix XenCenter	~
XenCenter Plugin:		
Save	Cancel	

(Refer to the following appendix: "Configuring the XenCenter Plug-in)

7.9 Configuring Hypervisors (ESX/ESXi Server, XenServer)

7.9.1 Introduction

If you previously "Added a Manager" in IPM:

- Once you have entered the correct information for the manager, IPM connects to the manager (vCenter or SCVMM).
- IPM automatically retrieves the VMHost information and creates new nodes in IPM for each VMhost
- IPM automatically creates two different types of nodes that will be described after (you can see the new node in the Node List)
- You can now proceed to the Maintenance and Shutdown configuration step

If you previously "Added an Hypervisor List" in IPM:

• Once you have "Added a new list of Hypervisor", IPM creates new nodes and waits for the credential.

- We explain on the next chapter how to configure the credentials for hypervisors (ESX/ESXi, XenServer)
- IPM creates two different types of nodes that will be described after (you can see the new node in the Node List)

I		IP or Address	VMware ESXi 4.1.0 buil	VMware	م پ	\triangleright
----------	--	---------------	------------------------	--------	--------	------------------

7.9.2 Credential configuration for the Hypervisors (ESX/ESXi, XenServer)

• You have to configure the node credential in the Node Configuration Panel.

🔺 System Settings 🖉 👘 👘		
	Select all	
(System access) Login:	root	
(System access) Password:	****	
UPS Contact:		
UPS Location:		

- Once you have entered the correct information, IPM will retrieve Hypervisors information.
- You can now proceed to the Maintenance and Shutdown configuration step

7.10 Configuring Maintenance and Shutdown

7.10.1 Introduction

Once you have entered the correct credential information for your Managers and Hypervisors, you
have to configure the Maintenance and Shutdown sequences according to the availability needs of
your IT infrastructure when power fails. There are two types of VMHost nodes as explained in
following sections.

7.10.2 The VMhost has No IPP

There is no IPP installed on the server that is hosting the Hypervisor (VMHost). In such case the Shutdown is remotely done by IPM. **Only with VMware hypervisors and Citrix XenServer, this shutdown configuration is used**.

In this case, the node has both the functionalities of remote maintenance mode and remote shutdown . You can configure the node and add a Power Source in the Node Configuration Panel shown below.

🔺 Shutdown Settings 🦉 ——————		
Shacdown Sectings P		
	Select all	
Remote Maintenance:	Maintenance Disabled	
Maintenance Timer:	-1 second(s)	
Remote Shutdown:	Shutdown Disabled	
Remote Shutdown of the Virtual Machines:	Disabled	
Power source:		
Load segment:	Master output	
Master - Shutdown duration:	120 second(s)	
Master - Shutdown after value:	-1 second(s)	

After Configuration (Please, refer to Nodes Settings paragraph to use the configuration interface.)

🗆 📥 Shutdown Settings 🥖 👘 👘		
	Select all	
Remote Maintenance:	Maintenance Enabled 📃	
Maintenance Timer:	10 second(s)	
Remote Shutdown:	Shutdown Enabled 📃	
Remote Shutdown of the Virtual Machines:	Enabled	
Power source:	166.99.250.26	
Load segment:	Master output 📃	
Master - Shutdown duration:	120 second(s)	
Master - Shutdown after value:	60 second(s)	

Parameters	Values	Description
Remote Maintenance	Enabled, Disabled	When enabled, it allows the server management tool to move the virtual machines from this server to another server in case of "UPS on battery state" and "Maintenance Timer elapsed"
Maintenance timer	User to Type a value	Time elapsed "on battery state" before the IPM triggers the state of the Hypervisor to change to maintenance mode
Remote Shutdown	Enabled, Disabled	When enabled, it allows IPM to gracefully shutdown this server in case of "UPS on battery state" and Shutdown criteria reached
Remote Shutdown of the Virtual Machines	Enabled, Disabled	Enables the IPM to shutdown the Virtual Machines before host gets shutdown and restart the VMs when the host restarts

.

PowerSource	IP address of UPS	The UPS powering this server. This node should exist in IPM
Load segment	Master, Load Segment1, Load Segment2	UPS load segment powering the server
Master – Shutdown duration	User to Type a value	This is a Server Shutdown criteria is the time needed for the server to shutdown gracefully
Master – Shutdown after value	User to Type a value	This is a Server Shutdown criteria is the time elapsed "on battery state" before graceful Shutdown. This timer must be greater than the maintenance timer. "-1" value means that timer is disabled

Note:

- The Remote Shutdown functionality is reserved for VMware ESX/ESXi and Citrix XenServer nodes. • (Microsoft Hyper-V benefits from local IPP shutdown).
- The Remote Shutdown of the Virtual Machines is supported on VMware ESX/ESXi •
- The Maintenance Timer must be less than the Shutdown after value

7.10.3 IPM detects IPP running on the VMHost

There is an IPP installed on the server that is hosting the Hypervisor (VMHost). In such case the Shutdown is done by this IPP.

In this case, the node contains both parameter types:

- The remote maintenance mode feature parameters. •
- The IPP shutdown parameters (as an IPP will perform locally the shutdown). • Note: all the parameters are retrieved from the IPP, and you will configure the IPP from IPM in this Node Configuration Panel.

Please, refer to Nodes Settings paragraph to use the configuration interface.

	<u>Toqqle all</u>
Remote Maintenance:	Maintenance Disabled
Maintenance Timer:	-1 second(s)
Power source:	166.99.250.26
_oad segment:	Master output
(NMC access) Login:	unknown
NMC access) Password:	unknown
Master - Shutdown duration:	120 second(s)
vlaster - Shutdown after value:	-1 second(s)
Power source shutoff:	Enabled

 Remote Maintenance 	Enabled or Disabled (When enabled, it allows the server management tool to move the virtual machines from this server to another server in case of "UPS on battery state" and Maintenance Timer elapsed).
 Maintenance timer 	Time elapsed "on battery state" before the IPM script changes the state of the Hypervisor to maintenance mode. "-1" value means that timer is disabled. Please refers to <u>Appendix: Configuring Maintenance mode and</u> <u>vMotion with vCenter</u> and <u>Appendix: Configuring Maintenance</u> <u>mode and LiveMigration with SCVMM</u>
 PowerSource 	The UPS powering this server.
Load segment	UPS load segment powering the server.
(NMC access) Login/Password:	The Network Management Card Login/Password that allows IPP software to control NMC shutdown sequence.
 Master – Shutdown duration 	Server Shutdown criteria (time needed for server graceful shutdown).
 Master – Shutdown after value 	Server Shutdown criteria (time elapsed "on battery state" before graceful Shutdown) (This timer must be greater than the maintenance timer). "-1" value means that timer is disabled
 Power source shutoff 	Disabled (Enabled is used only for server connected with UPS though RS232 or USB. Virtualization behavior requires Ethernet connectivity (NMC card).

Note: If you install an IPP on the VMHost after the IPM node has been created:

- Delete the node in IPM,
- Rediscover the node with the "Address Scan" in the Auto Discovery panel,
- IPM will create the right node type and retrieve both the VMHost information and the IPP information.

8 Redundancy

8.1 Introduction

Intelligent Power[®] Manager can supervise composite devices. Composite devices are virtual nodes composed of UPSs mounted with specific redundancy topologies (*Redundant Supplies, Hot Standby* or *Static Transfer Switch* for two components and *Parallel* for two or more components) and a dedicated redundancy level.

This Redundancy feature has to be Enabled from the **Settings** -> **System** -> **Modules Settings** Intelligent Power Manager will then:

- Supervise composite devices (if Redundancy feature is activated)
- Shutdown IPM computer when powered by several UPSs (if shutdown feature is also activated).

Edit modules settings	×
🔽 Management	
Shutdown	
Virtualization (Network Solution Only)	
Redundancy	
Save	

Here are illustrated the electrical redundancy topologies:

• Redundant Supplies (dual feed or triple feed or ...)



Hot Standby



- UPS 1
 STS

 UPS 2
 STS 1

 UPS 1
 STS 1

 UPS 2
 STS 1

 UPS 2
 STS 1
- Static Transfer Switch for two components

• Parallel for two or more components



8.2 Redundancy configuration

- Login with an administrator user profile
- Select two or more nodes and click on the "Set composite device" menu item:

Views	« @	Node Li	st						A Quick scan
Views	« @	Node Li Type (1) (1) (1) (2)	st Status Ø Ø	Name All South and All South	Mac Address 00:22:19:FF:8E:5E 00:22:19:FF:8E:72 00:20:85:FD:76:08	Class DELL Network Mana Network Managemen Network Managemen	Location Computer Room Computer Room	Contact Computer Room Man Computer Room Man	Quick scan Address(es) scan Address(es) scan
Settings			0		00:20:85:FD:F6:2C 00:22:19:FF:8E:79	Network Managemen DELL Network Mana	Computer Room Computer Room	Computer Room Man Computer Room Man	CEdit node information
- @ Shutdown - @ System - I Log			0		00:20:85:FB:56:1E	ConnectUPS Web/SN Network Managemen	IE LAB 9130 DUBAI c Computer Room	Jerome Veyrier Computer Room Man	Select all Coselect all
🚰 User List		3	0		00:06:23:00:1E:7F	Network Managemen	Eric Office	Eric	Set as power source

 In the dialog box, enter redundancy mode and level, eventually specify a device name Device name: User name of the composite device Redundancy mode: Refer to the Introduction chapter to select the correct electrical topology (Parallel / Redundant Supplies / Hot Standby / Static Transfer Switch) Redundancy Level: It is the minimal number of redundant UPSs powering your system:

The default value is 0. If you set this parameter to a higher level you will receive the Redundancy Lost alarm when you don't have enough redundant UPSs.

Views 🔍 💩	Node L	Node List							Ruick scan		
Views	Туре	Status	Name		Mac Address		Class	Location	Con	tact	ARange scan
Power Source Power Components		Ø			00:22:19:FF:8	E:5E	DELL Network Mana				Address(es) scan
Events		Ø		-	00:22:19:FF:8	E:72	Network Managemen	Computer Room	Corr	nputer Room Man	
Events List		Ø	1.10000	1.50	00:20:85:FD:7	6:08	Network Managemen	Computer Room	Corr	nputer Room Man	Set node access parameters
Events Calendar		Ø	010101	Set com	posite device				X	uter Room Man	CEdit node information
Auto Discovery		Ø		Device r	name:	My_n	edundant_System			uter Room Man	Remove nodes
- Chutolog		Ø	1	Redund	ancy mode:	Redu	ndant Supplies		-		Select all
System		Ø	·)	Redund	ancy level:	1			1	ie Veyrier	Deselect all
Log		0	-*					_		uter Room Man	
- 🔗 User List		0	101 11 014				Save Cancel				Provident Set as power source
										<u> </u>	Set composite device

- Then the new node is created.
- You can see it in the "Auto discovery" node list:

You can select it as power source.

You can edit composite device properties by selecting it in the discovery view then click again on the "Set composite device" menu item.

If you select components of a composite device and click on the "Set composite device" menu item again, properties of existing composite device are shown; no new composite device is created so no composite device duplication is possible.

The created "Virtual Power Source" is counted as a node for the licensing node limitation.

8.3 Redundancy views

8.3.1 Redundancy view in Node List

FAT•N I	ntell	igent	Pow	ver® Man	ager		• Logout • Help 💣	'admin'		Loo
Views	« @	Node Lis	t			۲	Selectio	on view		»ø
Views		Туре 🔺	Status	Name	Description		Informat	ion		
Power Source		-			Windows NT/5 01 /	03	🔗 M	/ VPS		
-C Power Component	ts		0		Windows NT/6.01.	00			Virtual Pov	ver
Node Map		-			Windows NT/5.01.	03		Description	n Sour	rce
Events List					Windows NT/5.01.	03		F Redundan mode	cy Para	illel
Events Calendar		10 10	•		Linux/2 6 32 29-0 3	2		Redundan	су	1
Management					Linux/2.6.18-128 E	sx	Chabur			
Nodes Upgrade			8		DBQ10634/5 ePDU	т	Status			
Settings					Eaton ePDU MA 1P	IN	Status	Date	Message	
Auto Discovery			•		Eaton ePDU AM 1P	IN		06/14/11-10:28:0) Sensor contact 'l	
P Shutdown			Ø	-	Eaton ePDU MA 1P	IN	l õ	06/14/11-10:28:0) Sensor contact 'l	=
System			0		Eaton ePDU MA 1P	IN ≣	Ő	06/14/11-10:28:0) Communication r	-
User List			8		Evolution 650		L.			-
_			8		Evolution 850					
			0		Evolution 850					
			Ø		Evolution 650					
			Ø		MX Frame 16U		Power Co	Chatua Nama	Lord Dottory	
			0		5130 RT 1250		Type	Status Name	Load Battery	
			Ø		Evolution 850			0		-
		1	Ø	-	Evolution 650		3	V		
			Ø	My VPS	Virtual Power Sour	rce 🗸				
		14 4	Page 1	of1 ▶ ▶ á	25 VDBtelasiper1pa	ĝ ≜ of 21				~
🕜 ОК: 10	😲 Warnii	ng: 5	0	Critical: 2	🚫 Unknown: 1 🛛 Las	st event:	06/14	4/11 - 1:34:09 pm	Commu	inication

When a composite device is selected in the *node list*, the user can view it in the *selection view*, with following information:

- Dedicated states in "Information" and "Status" panels.
- The "*Events*" panel shows events from the composite devices and all its child components.
- A dedicated *"Power components"* panel displays component states including load level and battery run time.

8.3.2 Composite device in *Power source view*

When *"Redundancy and shutdown"* module are activated, a composite device can be selected as power source. The user can show it in the *"Power Source"* view.

In this case, *Information*", "Status", "Events" and "Power components" panels are displayed with specifics data.



8.3.3 Power components sub view

When "*Redundancy and shutdown*" module are activated, a new view called "*Power components*" is available as a sub view of "*Power source*". This view shows a list of nodes with their properties but just with components of the selected power source if it is a composite device.

Views < 🕹	Noc	ie L	.ist					۲	Selection view	» (
🖃 🔄 Views	Тур	e	Stat	Name	Description	Location	Contact	Link	Information	
Real Power Source	G	1	0	· > 61 · · ·	Evolution 850	Computer Room	Computer Room			
- C Power Components		5		And a strategy and	Evolution 650	Fric Office	Fric	0		
Events	U	J	V		Evolution 000	Life Office	LING		Description	Evolution 850
Events List									Nominal apparent power	850 VA
Events Calendar									IP address	166.99.224.100
🖃 😋 Settings									Mac Address	00:20:85:FB:56:1E
- 🛵 Auto Discovery									Serial number	AV2H370PD
Actions									Class	Network Management Card / HB
- 🎡 Shutdown									Contact	Computer Room Menager
System									Link	Compater Hoom Manager
Log									ALC: IN	
- 🆓 User List									Status	Θ
									Battery state	🕥 Charging
									Power Source	👩 On utility
									Load level	0 %
									Battery capacity	100 %
									Battery run time	1 h 15 min 50 s
									Master output: Master	🐨 On
									Load segment #1: Group1	🐻 On
									Load segment #2: Group2	🐨 On
									Measures	-
									Input frequency	49 Hz
									Input voltage	232 ∨
									Battery output voltage	27.4
									Output frequency	27 V 49 Hz
									Output voltage	233 V
									Output current	0 A
									Global apparent power Global active power	21 VA
	M	4	Pag	e 1 of 1 🕨	1 25	 Items per page 	Displaying 1	- 2 of 2	Sional delive power	014

8.4 Redundancy use case (if shutdown is activated)

We describe several typical use cases that will help you to configure properly the redundant shutdown sequence according to your needs.

Use Case #1: The user wants to have the longest backup time with the redundant configuration

 \Rightarrow This is the default IPM configuration.

The next screenshot illustrates this IPM default configuration available from Settings -> Shutdown - > Edit Shutdown Configuration.

Edit shutdown configuration						
- Shutdown						
Shutdown timer (second(s)):	None					
Shutdown duration (second(s)):	120					
Shutdown type:	Hibernate 💌					
Shutdown script:						
	Save Cancel					

⇒ This is the default configuration on NMC e.g. with Network-MS (ex 66102 / 103006826) and Modbus-MS (ex 66103), NMC default shutdown configuration is available from UPS-> Shutdown Configuration as illustrated on next screenshot:

UPS	Shutdown Param	eters					ŀ	leip
UPS Properties UPS Control Weekly Schedule Shittlown Peremeters	Pulsar M 2200						Compute	∍r Roor
	Output	On battery		System Shu	tdown		Restart	
Logs and Hotification Measurements Event Log System Log Email Notification	© Master	Shutdown If Remaining time under: 180 If Capacity under: 20 Catter: 30	sec % min	Shutdown duration : 1	120 sec	If Capacity exceeds:	15	%
Settings Network System	© Group1	Switch Off after: 900 if Capacity under: 75	sec %	Shutdown duration :	120 sec	Switch On after:	30	sec
 Notified Applications Access Control Time Firmware Upload 	Group2	Switch Off after: 1800 if Capacity under: 68	sec %	Shutdown duration :	120 sec	Switch On after:	18	sec
	Save modified settin	Show advanced parameters			Save			

Network Management Card

⇔ e.g. with ConnectUPS-X Slot or ConnectUPS-BD, NMC default shutdown configuration is available from Configuration-> UPS Shutdown and Restart Settings as illustrated on next screenshot:

Ť		ConnectUPS [™] Web/SNMP	FAT•N		10/17/2011 16:20:01 UPS Location:		
Su	mmary	UPS History	Configuration <u>Control</u>		ered Clients	<u>Language</u>	Help
UPS EN	rent Actions utdown and l	UPS Shutdown and Restart Settings UPS Restart Settings:	Shutdown Schedule Web/SIIMP	Card Configuration SIIM	2 Trap Receivers Ema	<u>il Hotification Da</u>	<u>te and Time Help</u>
Load Segment	Load Segment Name	Load Segment to Turn Off following OS Shutdown (Yes/No)	Delay Before Segment Turns Off follow Shutdowi (30 - 3600 Sec	ing the start of the Client's OS 1 <i>onds)</i>	Load Segment to Restart AC Li (Yes/	following the return of ine No)	Delay Before Segment Restart (30 - 3600 Seconds)
1	Segment 1	Yes	30		Yes	S	30
2	Segment 2	Yes	30		Yes	s	30
			Become Supe	ruser			

Use Case #2: The user wants to have a shutdown after a predefined time of 10 mins. The shutdown has to occur even if only one UPS is on battery.

=> In this case, each server can have its own shutdown timer (10 mins, 8 mins, 6 mins...)

⇒ The user has to configure a shutdown timer of 10 mins in IPM

The next screenshot illustrates this IPM default configuration available from **Settings -> Shutdown -** > Edit Shutdown Configuration.

Edit shutdown configuration						
Shutdown timer (second(s)):	600					
Shutdown duration (second(s)):	120					
Shutdown type:	Hibernate 💙					
Shutdown script:						
	Save Cancel					

⇒ this is the default configuration on NMC (refer to previous use case)

Use Case #3: The user wants to have a shutdown starting 10 mins from the last detected Utility failure event. (We have 2 UPSs, one of them is redundant) => In this case, all servers shutdown at the same time.

- ⇒ This is the default IPM configuration
- The user has to configure a shutdown timer of 10 mins in all the NMCs In this case, the last UPS will send the shutdown order after 10 min. if it runs on battery. If the last UPS never run on battery, the first UPS will simply shutdown at the end of autonomy and the last UPS will take the load.(if it has the capacity, otherwise the shutdown will occur sooner) NMC Shutdown configuration is available from UPS-> Shutdown Configuration as illustrated on next screenshot:

Eaton Intelligent Power[®] Manager – User's Guide – / AH-1.26

Powering Business Worldwi	de		Networl	k Management Card			
JPS	Shutdown Parameters						
UPS Properties UPS Control Weekly Schedule Shutdown Parameters	Evolution 850						
	Output	On batte	ery	System Shu	tdown		Restart
ogs and Notification		Shutdown					
Measurements		if Remaining 180	sec				
Event Log		time under:		Shutdown duration : 120 s	sec	If Capacity	0 %
System Log	Master	if Capacity under: 20	%			exceeds:	
Email Notification		after: 10	nin				
attinge		Switch Off				Switch On	
historia		after: 65535	sec	Shutdown duration : 120 :	sec	after:	30 s
Network	Group1	if Conceitu under:	×				
System		in capacity under:	70				
Notified Applications		Switch Off				Switch On	
Access Control		-0		Churchelanum elemetica y 400		-4	20
SNMP	Group2	aner: 65535	sec	Shutdown duration : 120	sec	anter.	30 8
Time		if Capacity under: 0	%				
Firmware Upload							
	Save modified settings : ConnectUPS [™] Web/SNMP	FAT•	N	10/17/2011 16:2 UPS Location:	Save		
Summary	UPS History	Configuration	<u>Control</u>	Registered Clients	<u>Languag</u>	e	Help
AC Fail Event Action	UPS Shutdown and Restart Settings	UPS Studiown schedule Delay Before First AC Fail Warn Warning Interval (0-9999 Seco	webisinin Card Configuration ing Message (0-999 Seconds, ads, 0 =No Message Repeat)	ni <u>Silinir Hap kecelvers</u> D =No Message) 10 60	Email noulleation	Date and Time	neip
Loa	d Segment Load Segment Name Notify	Client OS to Shutdown on an AC F	ailure Number of Seconds the	AC Failure must last before Clien	t is notified to start OS Shute	lown	
	A Segment 4	(Yes/No)		(1 - 21600 Seconds)			
	2 Segment 2	Yes		600			
		C	Become Superuser				

Use Case #4: The user wants to have a shutdown when the remaining time of the last UPS is 10 minutes => In this case, each server can have its own shutdown duration (10 mins, 8 mins, 3 mins...)

- ⇒ The user has to configure a shutdown duration of 10 mins in IPM
 - The next screenshot illustrates this IPM default configuration available from Settings -> Shutdown > Edit Shutdown Configuration.

Edit shutdown configuration	×
Shutdown timer (second(s)):	None
Shutdown duration (second(s)):	600
Shutdown type:	Hibernate 🔽
Shutdown script:	
	[Sava] [Canad]
	Cancer

⇒ This is the default configuration on NMC (refer to previous use case)
8.5 Redundancy advanced behavior example

For the following tables we take a parallel UPS configuration with 4 UPSs (Each UPS is 20 kW) For this parallel topology, the Load can vary between 0 and 80 KW.



Redundancy alarm Management with 4 modules:

According to the user defined "Redundancy Level" and the "Load", we detail following information:

- R is the number of redundant UPSs
- Status of Redundancy lost alarm

Load / Redundancy Level	Load < 20 KW	20 KW < Load < 40 KW	40 KW < Load < 60 KW	60 KW < Load < 80 KW
0	R=3	R=2	R=1	R=0
1	R=3	R=2	R=1	R=0 → Redundancy Lost active
2	R=3	R=2	R=1 → Redundancy Lost active	R=0 → Redundancy Lost active
3	R=3	R=2 → Redundancy Lost active	R=1 → Redundancy Lost active	R=0 → Redundancy Lost active

Protection alarm Management with 4 modules:

According to the "Load" and the "Number of failed UPSs", we detail following information:

- P is the number of UPSs protecting the load
- R is the number of redundant UPSs
- Status of Protection lost alarm

Load / Failures	Load < 20 KW	20 KW < Load < 40 KW	40 KW < Load < 60 KW	60 KW < Load < 80 KW
No failure.	P=4; R=3	P=4; R=2	P=4; R=1	P=4; R=0
1 failure.	P=3; R=2	P=3; R=1	P=3; R=0	P=3; R=0 → Protection Lost active
2 failures.	P=2; R=1	P=2; R=0	P=2; R=0 → Protection Lost active	P=2; R=0 → Protection Lost active
3 failures.	P=1; R=0	P=1; R=0 → Protection Lost active	P=1; R=0 \rightarrow Protection Lost active	P=1; R=0 → Protection Lost active
4 failures.	P=0; R=0 → Protection Lost active	P=0; R=0 → Protection Lost active	P=0; R=0 → Protection Lost active	P=0; R=0 → Protection Lost active

8.6 Redundancy compatibility list

Eaton has tested in redundant mode following UPSs and topologies Other topologies or UPSs may work but have not been tested

UPS	Parallel	Multiple Feed	Hot Standby	STS
9120, 9130, 9135	NA	✓NET ✓USB	NA	✓NET ✓USB
Eaton 5PX, Evolution, Evolution S	NA	✓NET ✓USB	NA	✓NET ✓USB
Pulsar 700 / 1500 (Intl. & US)	NA	✓NET ✓USB	NA	✓NET ✓USB
Pulsar M / EX	NA	✓NET ✓USB	NA	✓NET ✓USB
Pulsar MX 1+1	✓NET	NA	NA	NA
Pulsar MX Frame 16 U	NA	✓NET ✓USB	NA	✓NET ✓USB
EX RT	NA	✓NET	✓NET (*)	✓NET

UPS Compatibility List for Redundancy on 1-phase UPSs

UPS	Parallel	Multiple Feed	Hot Standby	STS
Blade UPS	✓NET	✓NET	NA	NA
9x55 (9155 and 9355)	✓NET	✓NET	NA	NA
9390	✓NET	✓NET	NA	NA
9395	✓NET	✓NET	NA	NA
Eaton 9E Essential	NA	✓NET	NA	NA

UPS Compatibility List for Redundancy on 3-phases UPSs

✓NET:	Acquisition through the Network Card
✓USB:	Acquisition through USB
NA:	Not Applicable
✓NET (*):	Behavior has been implemented, but has not been tested
()	, , , , , , , , , , , , , , , , , , ,

9 Compatibility List

Eaton has tested the compatibility of Eaton Power Manager with the following devices and applications.

Note: If a Device doesn't support the Quick Scan feature it can be supervised if "Address Scan" or "Range Scan" operations are performed.

9.1 Eaton Devices

Eaton equipment designation	Туре	Features	Illustration
Network Management Card Minislot SNMP/Web – Network-MS (ex 66102) And associated Environment Sensor	UPS Option Card Eaton Pulsar	Quick Scan Supervision Management Shutdown	
Network Management Card & Modbus/JBus – Modbus-MS (ex 66103) (through Ethernet Network) And associated Environment Sensor 66846	UPS Option Card Eaton Pulsar	Quick Scan Supervision Management Shutdown	-
ConnectUPS- Minislot Network Management Card / Network-MS (ex 103006826)	UPS Option Card Eaton Powerware	Quick Scan Supervision Management Shutdown	
ConnectUPS-BD Web /SNMP	UPS Option Card Eaton Powerware	Quick Scan Supervision Shutdown (**)	· ·
ConnectUPS-XSlot Web /SNMP/xHubCard (*)	UPS Option Card Eaton Powerware	Quick Scan Supervision Shutdown (**)	100.
PXGX2000 (*)	UPS Option Card Eaton Powerware	Quick Scan Supervision Shutdown (**)	
PXGX-UPS Card	UPS Option Card Eaton	Quick Scan Supervision Shutdown	
Eaton Advanced ePDU (Europe = Switched (SW), Advanced Monitored (AM) and Managed (MA) / US= Advanced Monitored (AM) and Managed (MA))	ePDU Integrated Communication Card	Quick Scan (v 1.20) Supervision (v1.20) Management (v 1.25)	did to the state of the
Eaton ePDU Monitored & Advanced Monitored	PDU Integrated Communication Card	Supervision	

Eaton ePDU Managed	PDU Integrated Communication Card	Supervision	ST IS
Eaton ePDU Switched	PDU Integrated Communication Card	Supervision	
MGE Switched PDU NM - 68130 / 68134/56132/56134/56136/56138 MGE AmpMeter PDU NM - 68152/ 56134/56144	PDU Integrated Communication Card	Supervision	
MGE Midspan NM - 66892	Midspan Integrated Communication Card	Supervision	
Computers (Windows - Linux) hosting the IPP Shutdown Controller	UPS Proxy (Shutdown Controller)	Quick Scan Supervision Management Shutdown	
MGE Network Management Proxy(Windows) XML-Agent	UPS Proxy (legacy)	Supervision	
Computers (Windows) hosting the application LanSafe Web View	UPS Proxy (legacy)	Supervision	
MGE Network Management Card MiniSlot SNMP/Web – 66244 And associated Environment Sensor	UPS Option Card (legacy)	Supervision	
Network Management Card Transverse SNMP/Web – 66074 And associated Environment Sensor	UPS Option Card (Legacy)	Supervision	PTI ST

(*)With Intelligent Power Manager 1.10, the Eaton Powerware 3 phase UPSs compatibility is officially available according to the following solution:

- Cards: ConnectUPS-X v4.30 or PXGX2000 v1.20
- UPSs: Blade UPS, PW9155 Dual Phase, PW9355 10-30 kVA, PW9390 40-160kVA, PW9395 225-1100kVA & SBM
- Known limitation: PW9315 will not be supported by this 1.10 release.

(**)This feature is only available if you install IPM 1.14 on a computer that is NOT hosting a previous IPM release.

If you have upgraded IPM from 1.XX to 1.14 release and want to use this feature, please proceed as follows:

- => Stop IPM service
- => Remove (or rename) the configuration file: configs/config.js
- => Start IPM service
- => If needed, reconfigure system parameters

9.2 Applications on Computers

Applications designation	Features	
Computers (Windows/Linux) hosting the application Intelligent Power Protector	Quick Scan Supervision Management	
Computers (Windows/Linux/Mac) hosting the application Network Shutdown Module V3.xx	Quick Scan Supervision Management	

9.3 Eaton Serial line Devices

Eaton Equipment designation	Connectivity
Eaton Powerware series:	USB or RS232
3105, 5110, 5115, 5130, 9130, 9135, 9140 and legacy 9120, 9125	
Eaton Powerware series:	RS232 only
BladeUPS, 5125, 9155, 9355, 9390, 9395	
Eaton Pulsar Series:	USB or RS232
Evolution 650 / 850 / 1150 / S 1250 / 1550 / S 1750 / 2000 / S 2500 / S 3000	
Pulsar 700 / 1000 / 1500 / 1000 RT2U / 1500 RT2U (intl. & US Models)	
Pulsar M / EX	
Eaton 5PX	
Pulsar MX & Pulsar MX Frame 16 U / MX	
Eaton Pulsar Series:	RS232 only
EX RT	
Comet EX RT 1:1 / 3:1 / EX 5 RT (Asia/Pacific)	

Notes:

- XSlot-USB Module for Powerware series is unsupported by Intelligent Power® Manager 1.12
- Ellipse ASR 600/750/1000/1500 USBS, Ellipse MAX, Protection Station, Protection Center, NOVA AVR, are currently supported by Personal Solution Pac software.

9.4 Other Devices

Equipment designation	Card/ proxy	Features	
HP UPS Network Module Minislot (AF465A)	Network Card	Quick Scan Supervision	
			invent
Dell Network UPS Card (H910P)	Network Card	Quick Scan Supervision	Dell

IBM UPS Network Management Card (46M4110)	Network Card	Quick Scan Supervision	IBM.
APC UPSs	APC Network Management Card	Supervision	
All IETF MIB enabled UPSs (RFC1628) e.g. Liebert,		Supervision	STANDARD IETF UPS MIB 1.3.6.1.2.1.33.xx
PowerDsine series 6000	Card		
Servertech sentry models	PDU Integrated		
	Communication Card		Ø RESEREE :

9.5 Performances

To provide a performance evaluation Eaton has tested the following two configurations:

Test with Machine 1 (server Dell PowerEdge 2900)

- CPU: Intel Xeon 5130 Dual Core @2GHz
- Memory: 2Go DDR2 @666MHz
- HDD: 2 HDDs 67GB 7200 rpm RAID 0 (Mirroring)
- OS: Windows Server 2008 64 bits

Test conditions during 40 hours:

- 1300 nodes (including ~50 real), mainly IPMs, and some NSM and NMC.
- Average CPU load: 20~30%
- Memory load: 200~300MB

Test with Machine 2 (typical PC)

- CPU : Intel Core2 Duo 6600 @2.4GHz
- Memory: 2Go DDR2
- HDD: 1 HDD 220 GB 7200 rpm
- OS : Windows Vista Enterprise 32 bits

Test conditions during 40 hours:

- 1000 nodes (including ~50 real), mainly IPMs, and some NSM and NMC.
- Average CPU load: ~ 60%
- Memory load: 200~300MB

Note that these tests have been performed on Windows server Operating System. The Windows 2003 or 2008 Operating Systems don't have the limitation of 10 simultaneous connections.

9.6 Network Ports

Here is the list of Network ports used by IPM and IPP:

Protocol	Mode/Port	NMC	PXGX2000, PXGX-UPS, Connect UPS BD, Connect UPS XSlot	IPP with Shutdown controller	IPP	IPM
SMTP	TCP/25	OUT	OUT	OUT	OUT	OUT
DHCP/BOOTP	UDP/67	OUT	OUT	х	Х	х
TFTP	UDP/69	IN	Х	OUT	OUT	OUT
HTTP	TCP/80	IN	IN	OUT	OUT	OUT
NTP	UDP/123	OUT	OUT	х	х	х
SNMP	UDP/161	IN	IN	OUT	OUT	OUT
SNMP Traps	UDP/162	OUT	OUT	х	х	х
UNMP	UDP/200	х	OUT	IN/OUT	IN/OUT	IN/OUT
HTTPS	TCP/443	IN	IN	OUT	OUT	OUT
EATON Supervision EATON Notification	TCP/4679	х	X	IN/OUT	IN/OUT	IN/OUT
Broadcast	UDP/4679	IN/OUT	Х	IN/OUT	IN/OUT	IN/OUT
EATON SSL Supervision	TCP/4680	х	Х	IN/OUT	IN/OUT	IN/OUT
EATON Alarms Broadcast	UDP/4680	OUT	Х	IN	IN	IN
EATON Connected Alarms	TCP/5000	IN	Х	OUT	OUT	OUT
EATON Connected Alarms	TCP/5001	х	Х	IN	OUT	OUT

10 FAQ and Error messages

In the HTML pages

Cannot display the UPS properties page. HTTP 404 error with IE. **Solution:** Check the URL entered. > https://<name or IP of the computer hosting IPM>:4680/ or > http://<name or IP of the computer hosting IPM>:4679/

11 Glossary

IP address

When TCP/IP is installed on a computer, an address is assigned to the system. Each address is unique and is made up of four numbers, each between 0 and 256 (e.g. 168.8.156.210).

Network Management Proxy

Network Management Proxy is used to control a UPS and connect it to the TCP/IP network.

NMS (Network Management System)

The NMS supervises SNMP devices connected to the TCP-IP Network.

Network Shutdown Module

The Network Shutdown Module is a software module that uses the information transmitted by the Network Management Card/Proxy to inform computer users on the current status of the electrical power supplied to the computer.

If the supply of the electrical power from the UPS is at risk, the Network Shutdown Module initiates an orderly shutdown of the computer under the most secure conditions possible.

SSL (Secure Socket Layer, created by Netscape):

A solution for securing transactions over the internet. SSL is a communication protocol that authenticates the data exchanged, as well as ensuring its confidentiality and integrity. The protocol uses a recognized encryption method, the **RSA algorithm with a public key** (where RSA means Rivest, Shamir and Adleman, the inventors). An RSA key is the result of operations involving prime numbers. SSL is built into the Internet browsers on the market. The padlock in the bottom of your browser screen is automatically displayed if the server sending information uses SSL.

TCP/IP (Transmission Control Protocol / Internet Protocol):

Family of protocols for the transport and network layers.

12 Acknowledgements

Huge thanks from the Eaton software development team to the following projects:

Spider Monkey

Ext JS

SQLite

The SQLite Project http://www.sqlite.org/. Their generous donation of the source code to the public domain helped us for this project.

Open SSL

- This IPM product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (<u>http://www.openssl.org/</u>)"
- This IPP product includes cryptographic software written by Eric Young (eay@cryptsoft.com)
- This IPP product includes software written by Tim Hudson (tih@cryptsoft.com)

Lib USB

Net SNMP

The full License version for each of these projects is available from Intelligent Power Protector (Settings -> System -> About)

13 Appendix 1: Configuring the IPM vCenter Plug-in

13.1 Introduction

VMware's vCenter Server platform forms the foundation for virtualization management. It provides management of hosts and Virtual machines from a single console. To further unlock the power of VMware's management system, VMware has provided a facility to extend the functionality of VMware vCenter.

Various useful applications can be attached to vCenter to make it more useful. **Eaton vCenter Plug-in also called "vCenter Intelligent Power Manager Plug-in"** is a very easy to use and deploy Plug-in to manage IPM from vCenter. This plug-in provides the possibility to integrate Intelligent Power Manager (IPM) with vCenter environment. Once the plug-in is registered, a tab in vCenter will open IPM and allow users to configure and manage IPM from vCenter environment.

The VMware plug-in allow also the creation of new type of events that can be trig type of alarms.

13.2 Checking that IPM Plug-in is registered in vCenter

In the vSphere Client, click on Plug-ins -> Manage Plug-in ...

PU2INWHP9000432 - vSphere Client File Edit View Inventory Administration Plug-ins Home Home Home Inventor Manage Plug-ins... Search Inventory

Intelligent Power Plug-in vCenter can be seen in the Plug-in Manager

🔗 Plug-in Manager						
	Plug-in Name	Vendor	Version	Status	Description	^
Installed Plug-ins						
	NMware vCenter Storage Monitoring Service	VMware Inc.	5.0	Enabled	Storage Monitoring and Reporting	
	🤌 vCenter Intelligent Power Manager Plug-in	Eaton	1.25	Enabled	Management and control of power distribution	=
	i vCenter Hardware Status	VMware, Inc.	5.0	Enabled	Displays the hardware status of hosts (CIM monitoring)	
	in the service Status Status	VMware, Inc.	5.0	Enabled	Displays the health status of vCenter services	
Available Plug-ins						
	In the second se	VMware, Inc.	1.0.1	No client side d	vCenter Operations Standard	~
	<				>	
	Help				Close	

13.1 Events and Alarms

Once the "vCenter Intelligent Power Manager Plug-in" is registered, IPM creates a new alarm "Host UPS PowerFailure (On Battery)" that is triggered from power event.

💇 Host UPS PowerFailure (On Battery) 👩 This object 🛛 Alarm that triggers if host is on Power Failure (Power Events sended by Intelligent Power Manager)

13.2 Using IPM through vCenter

The "Eaton Power Manager" tab will now be visible in the vCenter Server Console and in the root folder IPM is now available and is fully functional with the vSphere Client. To learn more about the features and usage of IPM, please consult the IPM User Manual. The IPM screen is shown below, note the "Eaton Power Manager" tab on the top is selected.

VCenterServer, VMware vCenter Server, 4.0.0, 162856 Getting Started Datacenters Virtual Machines Hosts Tasks & Events Alarms Permissions Maps Eaton Power Manager					
F:T•N Intelligent Power Manager					
 What is Eaton Intelligent Power Manager? Ideal for monitoring and managing multiple power and environmental devices, Intelligent Power Manager software from Eaton delivers a global view across the network from any PC with an Internet browser. Exceptionally versatile, the software is compatible with any device supporting a network interface, including other manufacturers' UPSs, environmental sensors, ePDUs, shutdown applications and more. Intelligent Power Manager also offers the ability to organize a management table by groups, centralize alarms, and maintain event logs for preventive maintenance of the entire installed equipment base. 	Login: Password:	Login			

14 Appendix 2: Configuring the XenCenter Plug-in

14.1 Prerequisites

The only prerequisite is to have IPM installed on the same machine as XenCenter.

14.1 Check XenCenter Plug-in Installation

In the virtualization panel, you have to check the box "XenCenter Plugin" to install XenCenter Plug-in.

Add Manager or Hypervisor List 🛛 🗙					
Product:	Citrix XenCenter	~			
XenCenter Plugin:					
Save	Cancel				

You will see the Plugin in XenCenter => Tools => Plugins. (see below) If not, please Scan the Plug-in directory.

Plugins	?×			
This dialog shows the list of Plugins in the Plugin directory.				
To enable a Plugin select its checkbox.				
Eaton				
Intelligent Power Manager				
/ Details				
Re-Scan Plugin Directory	ancel			

14.1 Using IPM through XenCenter

Once the Plug-in is installed, you can see on the XenCenter level a tab named "Intelligent Power Manager"

🗴 XenCenter	
Home Search Tags Intelligent Power Manager Logs	
F -T•N Intelligent Power [®] Manager	
 What is Eaton Intelligent Power Manager? Ideal for monitoring and managing multiple power and environmental devices, Intelligent Power Manager software from Eaton delivers a global view across the network from any PC with an Internet browser. Exceptionally versatile, the software is compatible with any device supporting a network interface, including other manufacturers' UPSs, environmental sensors, ePDUs, shutdown applications and more. Intelligent Power Manager also offers the ability to organize a management table by groups, centralize alarms, and maintain event logs for preventive maintenance of the entire installed equipment base. 	Login: admin Password: Login

15 Appendix 3: Configuring Maintenance mode and vMotion with vCenter

15.1 Prerequisites

All Virtual Machine images have to be installed and configured on a file server. (Please refer to VMware user documentation listed in <u>Appendix VMware references</u>)

15.2 Introduction

The Dynamic Resource Scheduler (DRS) application from VMware is used to provide load balancing within the IT network. In particular, DRS is used to ensure the right resource capacity is available for the data center load. A second application called vMotion in conjunction with DRS will enact movement of Virtual machines from physical server to physical server in order to provide the best load balance.

The DPM application (Distributed Power Manager) will help maximize data center electrical power efficiency by checking DRS for physical server utilization then using vMotion, will move Virtual machines to servers in order to fully unload servers than idle them or power them down for maximum power savings.

Eaton uses the same vMotion capability when a UPS is in a critical power situation to move virtual machines off of a server that has a critical power situation. Intelligent Power Manager will now write alarms/alerts into vCenter, which, in turn, will trigger vMotion.

VMware uses the term 'setting a server into Maintenance mode' to trigger the vMotion. It is called this because before performing maintenance on server, the data center manager needs to clear the Virtual Machines from the server.

15.3 Concept of Maintenance Mode

Both standalone hosts, and hosts within a cluster, support the maintenance mode. Only ESX/ESXi Server 3.0 and later supports maintenance mode for standalone hosts.

A host enters or leaves maintenance mode only as the result of a user request. If the host is in a cluster when it enters maintenance mode, the user is given the option to evacuate powered-off virtual machines. If this option is selected, each powered-off virtual machine is migrated to another host, unless there is no compatible host available for the virtual machine in the cluster. While in maintenance mode, the host does not allow deployment or 'power-on' of a virtual machine. Virtual machines that are running on a host entering maintenance mode need to be either migrated to another host or shut down (either manually or automatically by DRS).

When no more running virtual machines are on the host, the host's icon changes to include 'under maintenance' designation and the host's Summary panel indicates the new state. The default automation mode of a virtual machine determines its behavior when the host (in a DRS cluster) it is running on enters maintenance mode:

- Any fully automated virtual machine is migrated automatically.
- For a partially automated or manual virtual machine, a recommendation for further user action is generated and displayed.

15.4 Configuring maintenance mode behavior in vCenter

To configure the maintenance mode feature behavior, we provide here a simple configuration example:

Enable the DRS in "Fully Automated" automation level with following steps:

- Open the vCenter server in a vSphere client.
- Right click on your Cluster > Edit Setting > Turn on VMware DRS. Click on next with all default values and finish.

Notes:

- With this example you choose to migrate all the virtual machines from this server to another server of the same cluster.
- You have the possibility to define other behaviors according to your needs

15.5 Configuration Test

To test the installation, please perform a power failure on the UPS and check on vSphere client that the corresponding ESX/ESXi host enters in Maintenance mode after the "Maintenance mode timer".

16 Appendix 4: VMware vCenter HA (High Availability)

Once the HA Cluster feature is enabled, VMware disables the automatic startup and shutdown functionality when a Hypervisor is shutdown.

IPM features for HA mode:

IPM will continue to move the VM from one server to the others, if the all the servers are powered by • different UPSs with different power source. (as illustrated on below picture)



- IPM continues to protect the Hypervisor also when power fails. •
- Due to the deactivation of the automatic startup and shutdown, at the end of Utility failure sequence, • all the virtual machine will "Power Off". => To prevent this VM "Power off", you have two solutions:
 - - 1) Configure the VMware ESX/ESXi nodes in IPM to shutdown the VMs (Remote Shutdown of the Virtual Machines Setting) (Recommended solution)
 - Install an IPP on each VM (This is not an optimized solution). 2) You have to take care that when VMs move, the IPP still links to the same UPS power source.

Table configuration/behavior:

Case	Remote Shutdown	Remote Shutdown Type of the Virtual Machines	HA in vCenter	What happens to VMs	What happens to Hypervisor	Comments
1	Enabled	Enabled	Enabled	Shutdown	Shutdown	Valid configuration
2	Enabled	Enabled	Disabled	Shutdown	Shutdown	Valid configuration (anyway, more reliable to let VMware shutdown its own VMs)
3	Enabled	Disabled	Enabled	Crash	Shutdown	Hypervisor will shutdown without the VMs
4	Enabled	Disabled	Disabled	Crash/Shutdown	Shutdown	Depending if the Startup/shutdown of the virtual machines is configured
5	Disabled	Enabled	Enabled	Crash	Crash	IPM do nothing
6	Disabled	Enabled	Disabled	Crash	Crash	IPM do nothing
7	Disabled	Disabled	Enabled	Crash	Crash	IPM do nothing
8	Disabled	Disabled	Disabled	Crash	Crash	IPM do nothing

Reference:

• You can see on the link below the VMware note about the deactivation of the Automatic Startup/Shutdown when creating a VMware HA Cluster.

Creating a vSphere HA Cluster

17 Appendix 5: Configuring Maintenance mode and LiveMigration with SCVMM

17.1 Maintenance Mode

In Virtual Machine Manager (VMM) 2008 R2, you can start *maintenance mode* for a virtual machine host anytime that you need to perform maintenance tasks on the physical host, such as applying security updates or replacing hardware on the physical host computer.

When you start maintenance mode on a Windows-based host, VMM automatically does the following:

- On a stand-alone host, places all running virtual machines into a saved state.
- On a Windows-based host cluster that is capable of live migration, gives you the option to do one of the following:
 - Live migrate all running highly available virtual machines to other hosts in the cluster, and place any running virtual machines that are not highly available in a saved state.
 - o Place all running virtual machines into a saved state.

(Please refer to Microsoft user documentation listed in Appendix Microsoft references)

17.2 What is Live Migration

Live migration is a Hyper-V feature in Windows Server 2008 R2, which requires the failover clustering feature to be added and configured on the servers running Hyper-V. Live migration allows you to transparently move running virtual machines from one node of the failover cluster to another node in the same cluster without a dropped network connection or perceived downtime. In addition, failover clustering requires shared storage for the cluster nodes. This can include an iSCSI or Fiber-Channel Storage Area Network (SAN). All virtual machines are stored in the shared storage area, and the running virtual machine state is managed by one of the nodes. (Please refer to Microsoft user documentation listed in <u>Appendix Microsoft references</u>)

17.3 Configuration Test

To test the installation, please perform a power failure on the UPS and check on SCVMM console that the corresponding Hyper-V host enters in Maintenance mode after the "Maintenance mode timer".

Hyper-V machines have to be started before the machine that is hosting the SCVMM.

SCVMM service needs some time to refresh its status. If the starting sequence is not correct, the Hyper-V will stay in Maintenance mode

18 Appendix 6 VMware references

18.1 Eaton and Virtualization

Please visit http://www.eaton.com/virtualization

18.2 VMware ESX configuration

Please visit http://www.vmware.com/support/

18.3 vCenter Server (VMware Supervisor)

Please visit <u>http://www.vmware.com/products/vcenter/</u> for more information about download and installation of vCenter Server

Please visit also <u>http://www.vmware.com/products/drs/</u> for more information about Distributed Resource Scheduler

18.4 vSphere SDK for Perl

Please visit <u>http://www.vmware.com/support/developer/viperltoolkit/</u> for more information about download and installation of vSphere SDK for Perl.

19 Appendix 7 Microsoft Hyper-V references

19.1 Eaton and Virtualization

Please visit http://www.eaton.com/virtualization

19.2 Microsoft TechNet Library

See the Microsoft TechNet Library for more information http://technet.microsoft.com/en-us/library/default.aspx

19.3 About Maintenance Mode

http://technet.microsoft.com/en-us/library/ee236481.aspx

19.4 Requirements for using live migration

See the link below about "Hyper-V Live Migration FAQ"

http://technet.microsoft.com/en-us/library/ff715313%28WS.10%29.aspx