Powering Business Worldwide

Installing and configuring

Intelligent Power® Protector

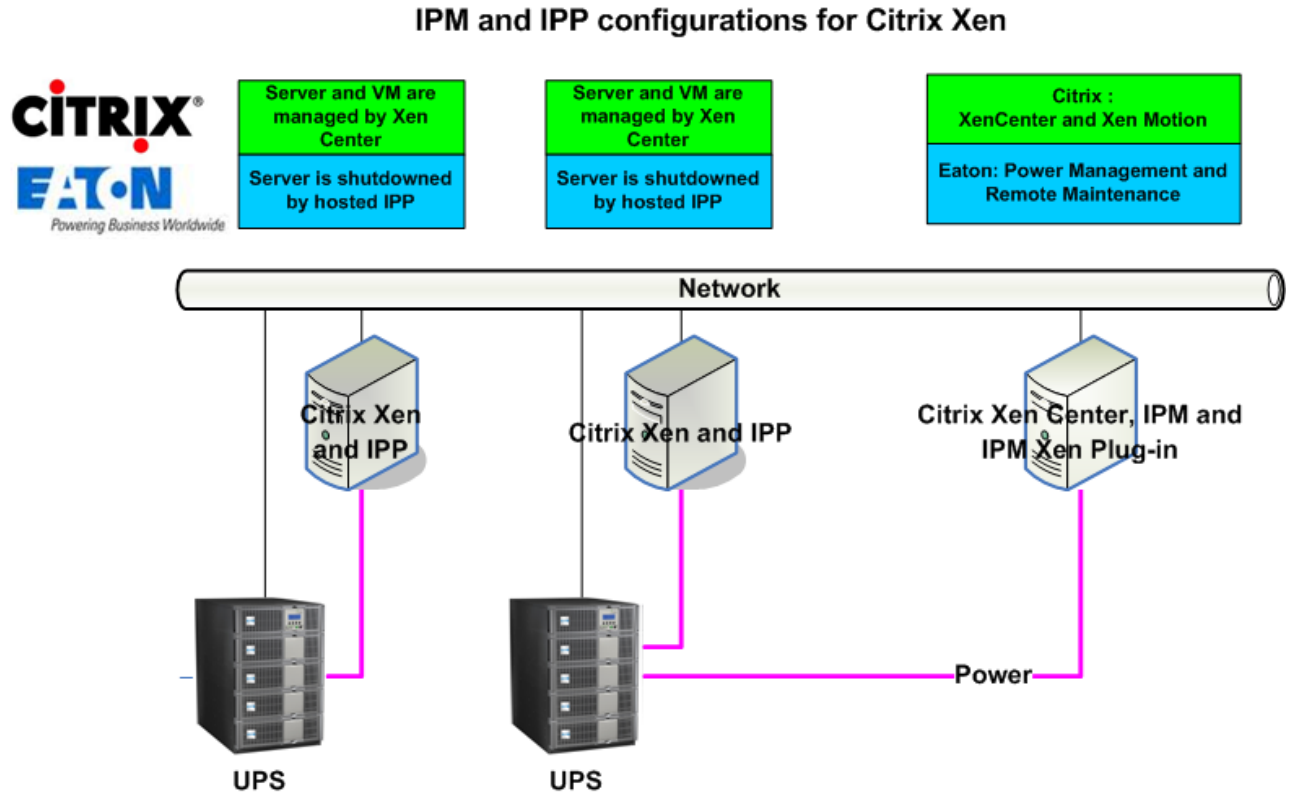
On Xen Virtualized Architecture

Citrix XenServer 5.6
OpenSource Xen 2.6 on RHEL 5
OpenSource Xen 3.2 on Debian 5.0(Lenny)

Introduction

Eaton's Intelligent Power® Protector discovers and supervises Eaton's UPSs and ePDUs connected across a network either by means of a card or proxy. It supervises the remote servers hosting the Intelligent Power® Protector. It also provides local computer graceful shutdown. The IPP interface can be accessed remotely using a web browser.

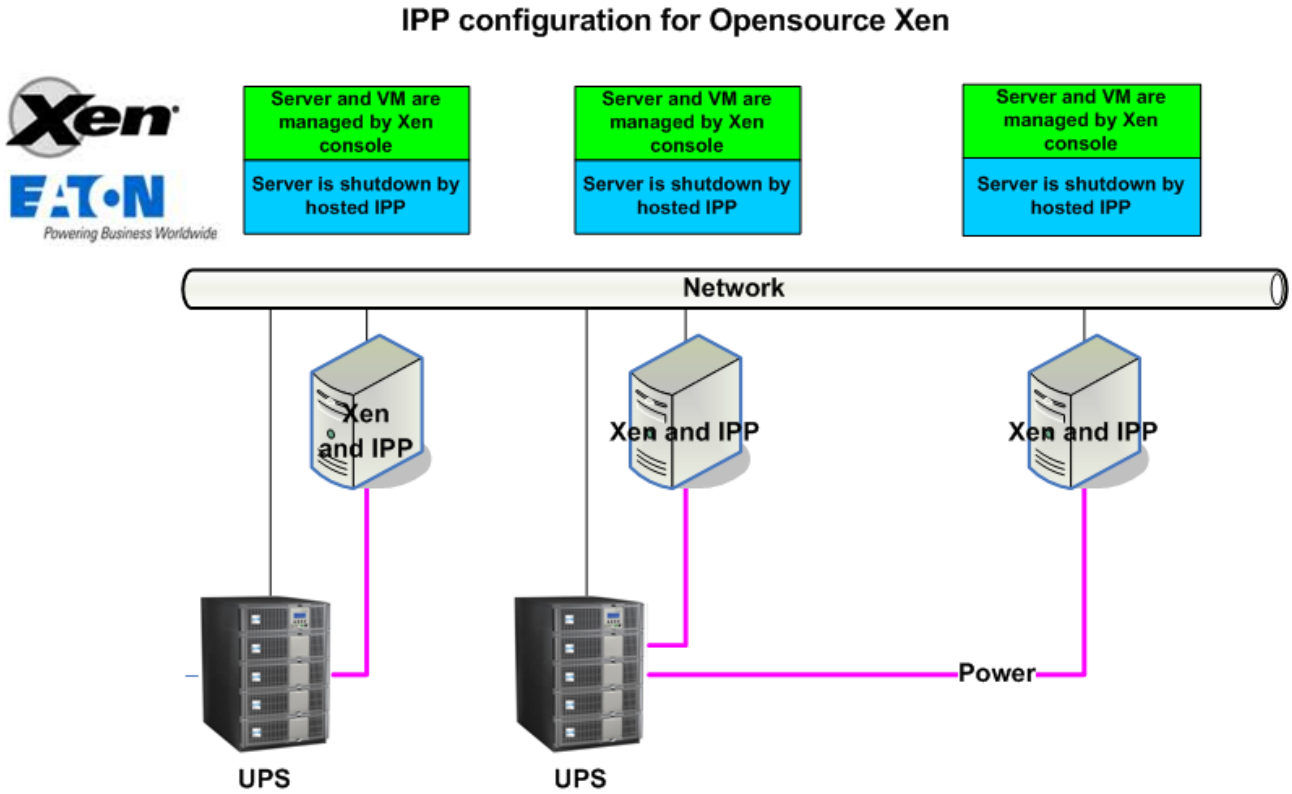
Our objective is to provide a virtualization support for Eaton's power protection software – Intelligent Power® Protector. So, the purpose of this document is to understand the installation and configuration of IPP on Xen virtualization environment. This has been tested upon different Xen environments. For more information, refer appendix A.



Eaton provides 2 solutions for Citrix Xen that are illustrated on the previous 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 this document).
- **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 (with IPM 1.25)
This solution is ideal for biggest infrastructures working through Xen Center
This solution is described in IPM Xen Center Plug-in user manual (User Guide for configuration of IPM and XenCenter)

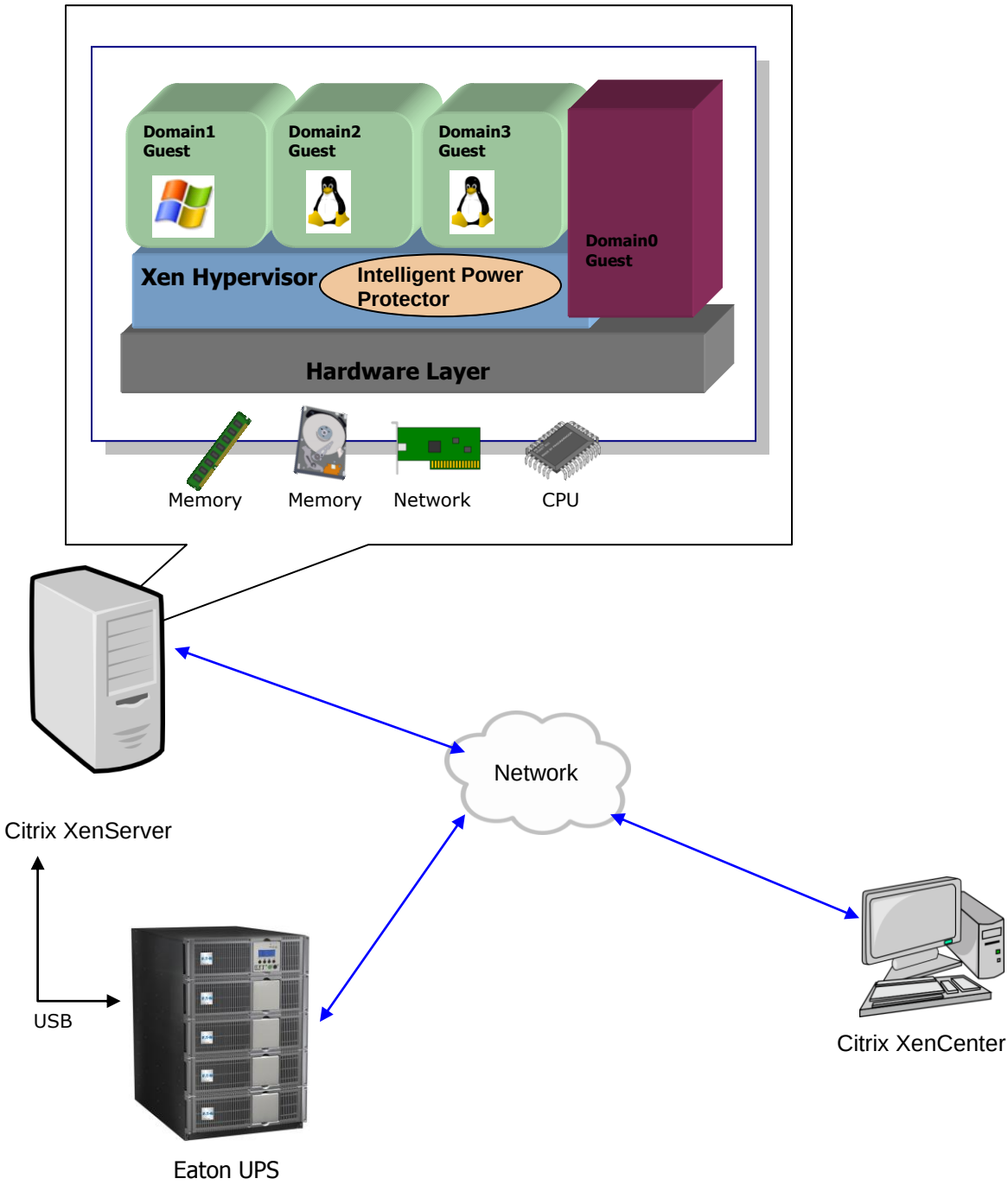


Eaton provides following solution for Opensource Xen that is illustrated on the previous architecture diagram:

- It provides graceful shutdown for Xen. IPP is installed on each Xen system.
  This solution doesn't require Xen Center management software
  (Refer to this document).

1. Citrix Xen

Citrix XenServer Architecture



1.1. Citrix XenServer configuration

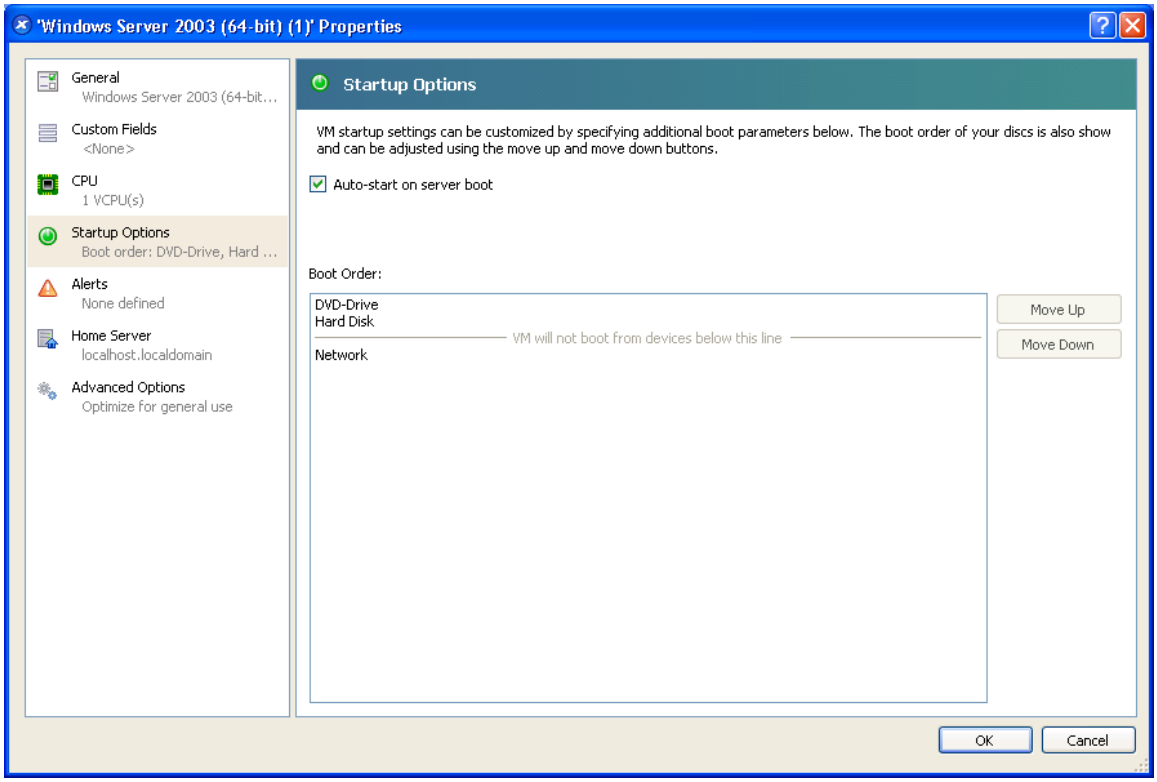
Before installing Eaton IPP on Citrix XenServer host, following configurations have to be made:

- Hardware support for virtualization must be enabled on the Host. This is an option in the BIOS. It is possible your BIOS might have virtualization support disabled. Consult your BIOS documentation for more details.

- For automatic OS boot on startup, you must configure the physical machine to do the same. This setting is present in BIOS. For further information, see specific technical hardware documentation.

- In XenServer, to allow virtual machines to function properly, it is recommended that **PV Tools (XenTools) should be installed** on each virtual machine. For further information, see the appropriate XenServer Installation guide.

XenCenter is an administrative console which monitors and manages XenServer hosts and guest machines. To make every virtual machine start automatically, select the check box (it is located in properties of every virtual machine) in **XenCenter** for the option “Allow virtual machines to start and stop automatically with the system”.



1.2. Prerequisites to install IPP on Citrix XenServer 5.6 x86 machine:

1. XenServer host having 5 MB free space.
2. IPP installation packages on XenServer

Notes:
1. XenServer and XenCenter should be of same version. For compatibility issues, refer XenServer installation guide
2. To allow a graceful shutdown of the Virtual machines, you have to install PV Tools (XenTools) on each virtual machine.
3. In case of resource pools, if the slave machine goes down, then master machine will continue functioning. But if we shutdown master machine, all the guest machine in that pool will go down and the pool will be out of action until master is rebooted.

1.3. IPP Installation

1.3.1. Hardware Architecture

The prerequisites for Intelligent Power® Protector installation are described in the "Intelligent Power Protector – User Manual" chapter: “Installation Prerequisites“. (http://pqsoftware.eaton.com/)

For UPS systems compatibility, please refer to the chapter “Appendix -> Compatibility List”

1.3.2. Network architecture

All hardware elements must have an operational network configuration that allows them to communicate freely with each other.

Please make sure that the following TCP/UDP ports are enabled on XenSever Firewall

- Connections on tcp port **4679** and **4680** to enable a remote access for supervision and configuration through Web Browser. These ports are reserved at IANA (http://www.iana.org).
- Connections through TCP port **80**. It must be opened as a destination port (for output) on the machine hosting Intelligent Power Protector.

Configuration to enable communication between Intelligent Power Protector and NMC (Network Management Card)

```
iptables -I OUTPUT -p tcp --dport 80 -j ACCEPT
iptables -I INPUT -p tcp --dport 4679 -j ACCEPT
iptables -I INPUT -p tcp --dport 4680 -j ACCEPT
iptables -I INPUT -p udp --dport 4679 -j ACCEPT
iptables -I INPUT -p udp --dport 4680 -j ACCEPT
iptables -I OUTPUT -p udp --dport 4679 -j ACCEPT
iptables -I OUTPUT -p udp --dport 4680 -j ACCEPT
service iptables save
iptables-save
```

Configuration to enable communication between Intelligent Power Protector and Connect UPS BD/XSlot/PXGX2000:

```
iptables -I OUTPUT -p tcp --dport 80 -j ACCEPT
iptables -I INPUT -p tcp --dport 4679 -j ACCEPT
iptables -I INPUT -p tcp --dport 4680 -j ACCEPT
iptables -I INPUT -p udp --dport 2844 -j ACCEPT
iptables -I INPUT -p udp --dport 2845 -j ACCEPT
iptables -I OUTPUT -p udp --dport 2844 -j ACCEPT
iptables -I OUTPUT -p udp --dport 2845 -j ACCEPT
service iptables save
iptables-save
```

1.3.3. Installation

Download the latest version of Intelligent Power Protector for Linux from Eaton web site. During installation of this package on host it will automatically detect Linux Server.

Note: **With IPP version 1.20, you don't need to download a separate Xen shutdown script anymore. The Xen shutdown feature is now integrated in standard IPP 1.20 shutdown script.**

- Download the latest version of Intelligent Power Protector, available on Eaton's website, in downloads section:

  See http://pqsoftware.eaton.com/

  Then:
  > select "Network solution".
  > select "Linux" as Operating System

- Download Intelligent Power Protector **v1.20,** rpm Software Installer **x86** « ipp-linux-x_xx_xxx-i386.rpm ».

- Upload the package on your Xen environment

To install IPP package:

Install Intelligent Power Protector rpm package on XenServer by following command.

```
rpm –i ipp-linux-x_xx_xxx-i386.rpm
```

For silent installation process, please refer to Intelligent Power Protector manual.

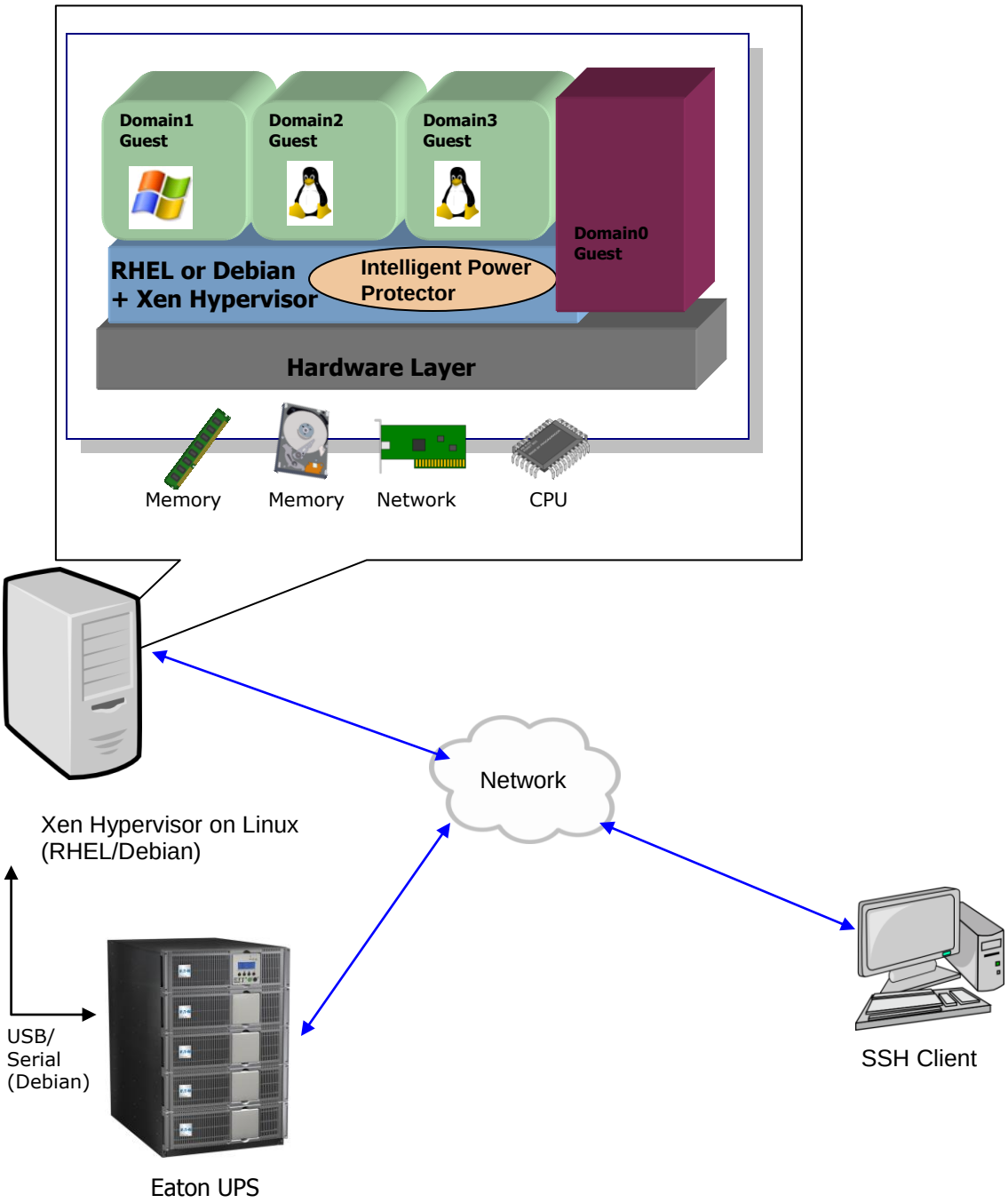
- At the end, connect to Intelligent Power Protector using your web browser by typing :

http://<@IP-or-name-of-XenServer>:4679 (For a HTTP access)
https://<@ IP-or-name-of-XenServer>:4680 (For a HTTPS access)

- Now Intelligent Power Protector interface will be displayed (refer to Chapter 3 “Using IPP”)

2. Xen on RHEL 5 and Debian 5.0 (Lenny)

Xen Architecture on RHEL 5 and Debian 5.0



2.1. Xen Domain0 configuration

Before installing Eaton IPP on RHEL/Debian Lenny where Xen Domain0 is enabled, the following configurations have to be made:

- Hardware support for virtualization must be enabled on the host. This is an option in the BIOS. It is possible your BIOS might have virtualization support disabled. Consult your BIOS documentation for more details.

- For automatic OS boot on startup, you must configure the physical machine to do the same. This setting is present in BIOS. For further information, see specific technical hardware documentation.

- In order to allow windows virtual machines to function properly, it is recommended that **GPL Para virtualized (PV) drivers** should be installed on each windows virtual machine.

2.2. Prerequisites to install IPP on Xen enabled on RHEL5 /Debian 5.0 (Lenny)

1. Xen hypervisor (on RHEL/Debian) having minimum 5 MB free space.
2. IPP installation packages on RHEL/Debian.

Notes:

1. To allow a graceful shutdown of guest virtual machines, you have to install GPL PV drivers on each virtual machine.
2. UPSs through RS232 connectivity will not be supported on RHEL5 as serial ports are used by Xen.

2.3. IPP Installation

2.3.1. Hardware Architecture

The prerequisites for Intelligent Power Protector installation are described in the "Intelligent Power Protector – User Manual" chapter: “Installation Prerequisites“. (http://pqsoftware.eaton.com/)

For UPS systems compatibility, please refer to the chapter “Appendix -> Compatibility List”

2.3.2. Network architecture

All hardware elements must have an operational network configuration that allows them to communicate freely with each other.

Please make sure that the following TCP/UDP ports are enabled on XenSever/Xen hypervisor Firewall

- Connections on tcp port **4679** and **4680** to enable a remote access for supervision and configuration through Web Browser. These ports are reserved at IANA (http://www.iana.org).
- Connections through TCP port **80**. It must be opened as a destination port (for output) on the machine hosting Intelligent Power Protector.

Configuration to enable communication between Intelligent Power Protector and NMC (Network Management Card)

```
iptables -I OUTPUT -p tcp --dport 80 -j ACCEPT
iptables -I INPUT -p tcp --dport 4679 -j ACCEPT
iptables -I INPUT -p tcp --dport 4680 -j ACCEPT
iptables -I INPUT -p udp --dport 4679 -j ACCEPT
iptables -I INPUT -p udp --dport 4680 -j ACCEPT
iptables -I OUTPUT -p udp --dport 4679 -j ACCEPT
iptables -I OUTPUT -p udp --dport 4680 -j ACCEPT
service iptables save
iptables-save
```

Configuration to enable communication between Intelligent Power Protector and Connect UPS BD/XSlot/PXGX2000:

```
iptables -I OUTPUT -p tcp --dport 80 -j ACCEPT
iptables -I INPUT -p tcp --dport 4679 -j ACCEPT
iptables -I INPUT -p tcp --dport 4680 -j ACCEPT
iptables -I INPUT -p udp --dport 2844 -j ACCEPT
iptables -I INPUT -p udp --dport 2845 -j ACCEPT
iptables -I OUTPUT -p udp --dport 2844 -j ACCEPT
iptables -I OUTPUT -p udp --dport 2845 -j ACCEPT
service iptables save
iptables-save
```

2.3.3. Installation

Download the latest version of Intelligent Power Protector for Linux from Eaton web site.

Note: **With IPP version 1.20, you don't need to download a separate Xen shutdown script anymore. The Xen shutdown feature is now integrated in standard IPP 1.20 shutdown script.**

- Download the latest version of Intelligent Power Protector, available on Eaton's website, in downloads section:

See http://pqsoftware.eaton.com/

Then:
> select "Network solution".
> select "Linux" as Operating System

- For RHEL5 x86_64
  Download Intelligent Power Protector **v1.20,** rpm Software Installer **x86_64** for Red Hat « ipp-linux-x_xx_xxx-x86_64.rpm ».

- For Debian Lenny

  Download Intelligent Power Protector **v1.20,** deb Software Installer **x86_64** for Debian « ipp-linux-x_xx_xxx-x86_64.deb ».

- Upload the package on your Xen environment

To install IPP package:

For RHEL

```
rpm -i ipp-linux-x_xx_xxx-i386.rpm
```

For Debian

```
dpkg -i ipp-linux-x_xx_xxx-i386.deb
```

For silent installation process, please refer to Intelligent Power Protector manual.

- At the end, connect to Intelligent Power Protector using your web browser by typing :

  http://<@IP-or-name-of-XenServer>:4679 (For a HTTP access)
  https://<@ IP-or-name-of-XenServer>:4680 (For a HTTPS access)

- If because of systems setting, file execute permission gets changed. You need to give execute permissions to Xen shutdown script.

- Now Intelligent Power Protector interface will be displayed. (refer now to next Chapter)

3. Using IPP

After IPP installation, follow these 3 steps to use IPP. For more information about IPP refer to the IPP User Manual

3.1. Step 1 (Access)

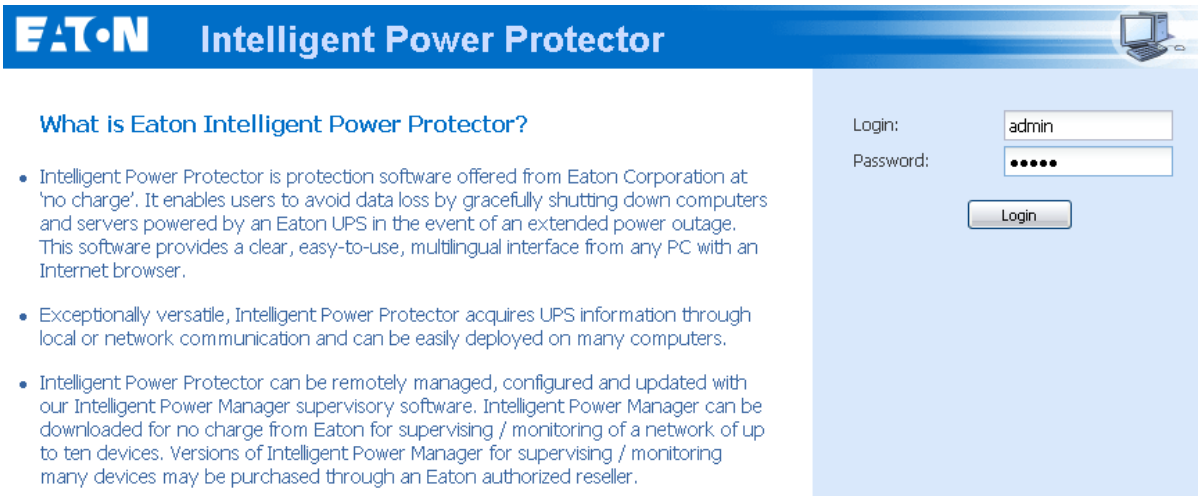
Remote access (for XenServer)

From a remote machine, you can type the following URL in a Web browser

https://<name or IP address of Server hosting IPP>:4680/
Or
http://<name or IP address of Server hosting IPP>:4679/

In SSL mode, accept the certificate (by clicking on Yes)

(Enter **admin** as Login **/ admin** as Password and click on the **Login** button)



3.2. Step 2 (Configuration)

When started, the application automatically performs a **Quick scan**.
Using the Quick scan operation, you will discover:

=>Serial line connected UPSs (RS232 or USB)

The discovered UPS connected through (RS232 or USB) is automatically assigned as the Power source (the Status icon is Green)

=> Networked UPSs *through broadcast within a few seconds (Network Management Cards Network-MS (ex 66102)*

The discovered UPS connected through (Network) are not automatically assigned as the Power source (You have to select the node and click on the button **Set as Power Source** the icon becomes Green )

The discovered nodes are displayed in **Settings → Auto Discovery**

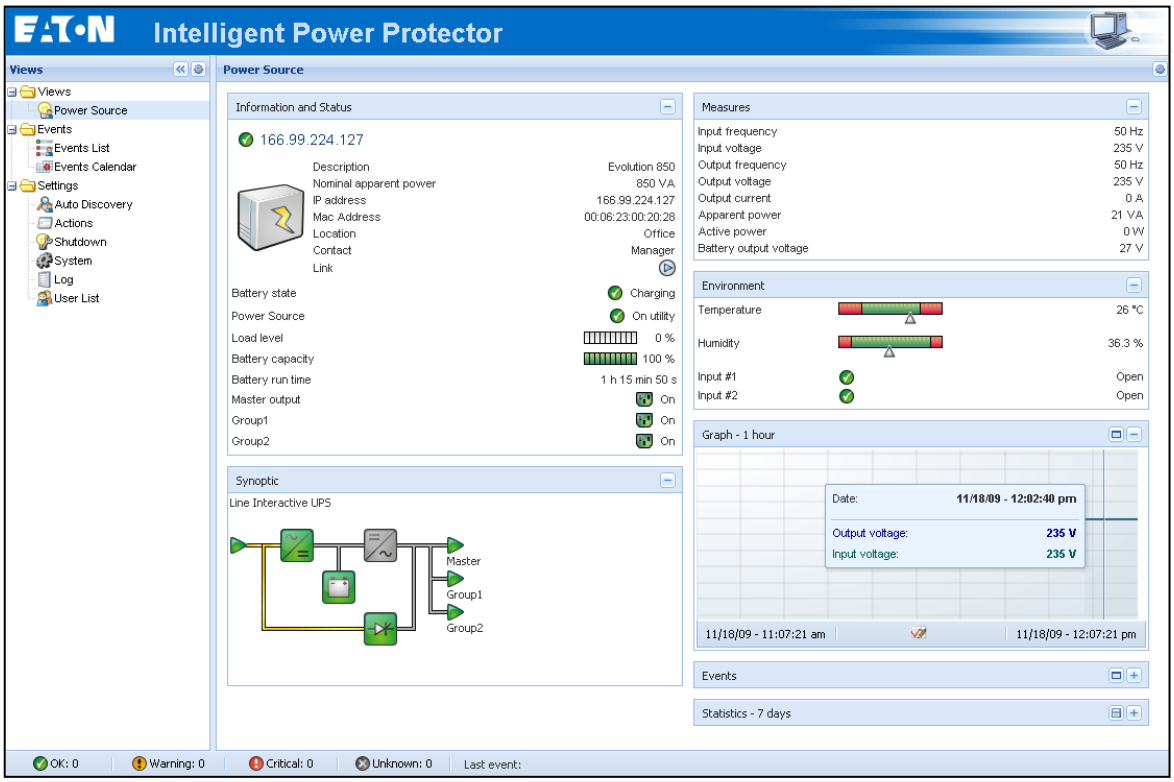
For the other nodes, please perform the discovery based on IP address ranges (**Range scan**)

- *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.*
  In the **Settings → Shutdown** page, assign the IP address of the UPS that powers the local Computer.
  With IPP 1.20 version the standard shutdown feature now integrates XEN shutdown.
  Please refer to IPP user manual for shutdown settings if needed.

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

3.3. Step 3 (Operation)

The **Views → Power Source** menu item (optional) allows you to supervise the current state of the UPS that powers the server running Intelligent Power® Protector



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

4. References

1. http://www.xen.org/files/Marketing/WhatisXen.pdf -
2. http://www.howtoforge.com/virtualization-with-xenserver-5.5.0
3. http://docs.vmd.citrix.com/XenServer/4.0.1/reference/ch05s04.html

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5. Appendix A

Tested Setup:

The installation and configuration of IPP has been tested upon following Xen environment:

1. Citrix XenServer 5.6 x86
2. RedHat 5 x86_64
3. Debian 5.0 (Lenny) x86_64