

## How to use an APC UPS to shutdown vSphere environments

When you use in your environment an APC UPS with a network management card, you can communicate with it and get informations about power status.

While it's easy to install their PowerChute Network Shutdown software on physical servers, in a vSphere environment you can leverage VMware VMA (Virtual Management Appliance) to centrally manage all your ESXi servers and their shutdown behaviour, avoiding the need to install PCNS in every virtual machine.



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To complete this tutorial, you would have to fulfill the following requirements:

- *vSphere Infrastructure 5.0*
- *An APC UPS with a network management card configured in the same network of the VMA virtual appliance*

and the following software:

- *VMware VMA 5.0*
- *APC PowerChute Network Shutdown (PCNS) 3.0.1 for VMware ESXi*

Finally, these ports need to be open in your network between the UPS management card and the VMA appliance:

- *TCP 3052, 6547, 80 and UDP 3052*

In this tutorial, I used two IP addresses:

*172.16.1.221      APC Network Management Card*  
*172.16.1.222      VMware VMA appliance*

Acromyms you will find in this tutorial:

*NMC              Network Management Card*  
*PCNS            PowerChute Network Shutdown*  
*VMA              VMware Management Appliance*

***Note for vMA 5.0 update 1 or update 2!!!!***

*Please read carefully this KB article from APC:*

[\*http://nam-en.apc.com/app/answers/detail/a\\_id/11621#11621\*](http://nam-en.apc.com/app/answers/detail/a_id/11621#11621)

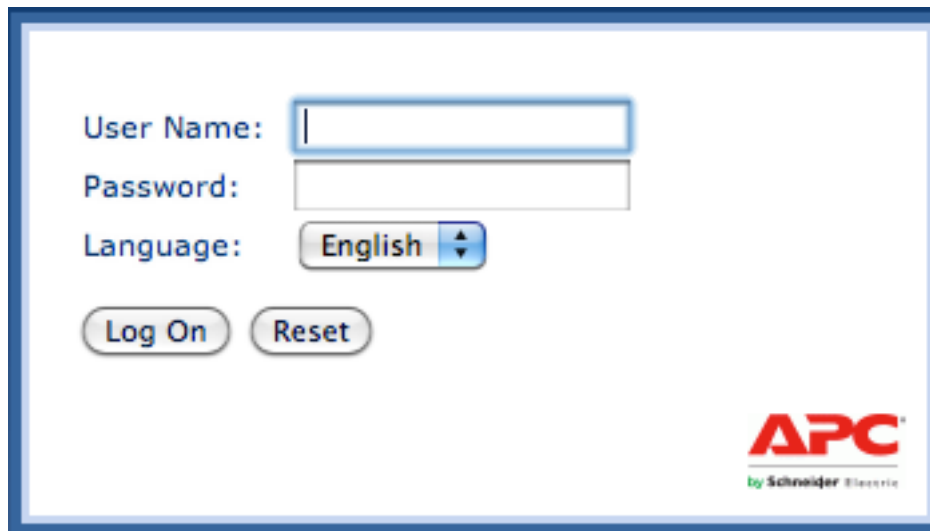
*and apply the suggested configuration changes to make PCNS work.*  
*A fix has been announced for ESXi 5.0 Update 2.*



## Configure the UPS Management Card

The network card is configured for DHCP, so first of all you will have to find aht IP address has got when it was first booted and connected to the network (usually the MAC address is written in some sticker on the card itself).

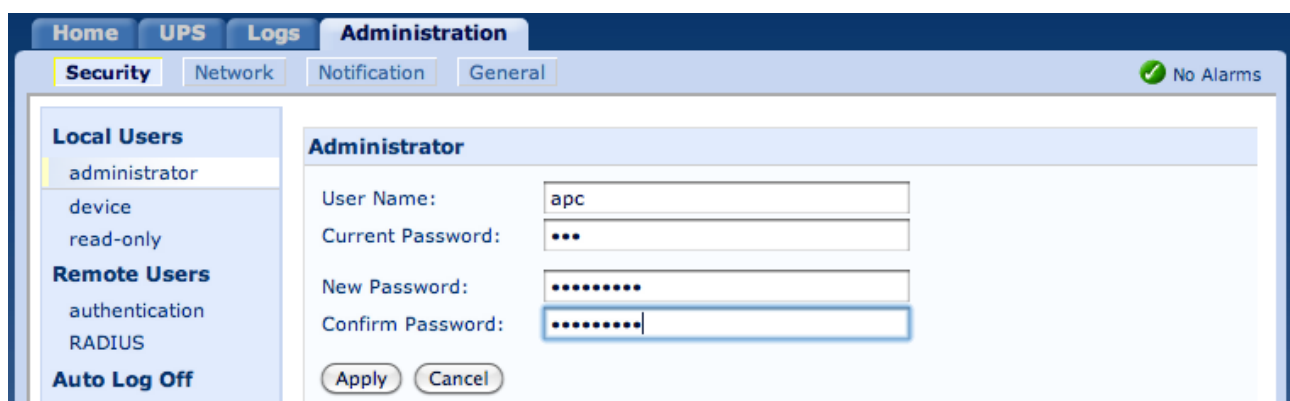
Once you are at its webpage, login with user **apc** and password **apc**.



The screenshot shows the login interface for the APC Management Card. It features a white background with a blue border. On the left, there are labels for 'User Name:', 'Password:', and 'Language:'. The 'User Name' field contains the text 'apc'. The 'Password' field is empty. The 'Language' dropdown menu is set to 'English'. Below the input fields are two buttons: 'Log On' and 'Reset'. In the bottom right corner, the APC logo is displayed, consisting of the letters 'APC' in red and 'by Schneider Electric' in green below it.

First of all, go to Administration -> Security -> Administrator and change the apc user password to something more complex.

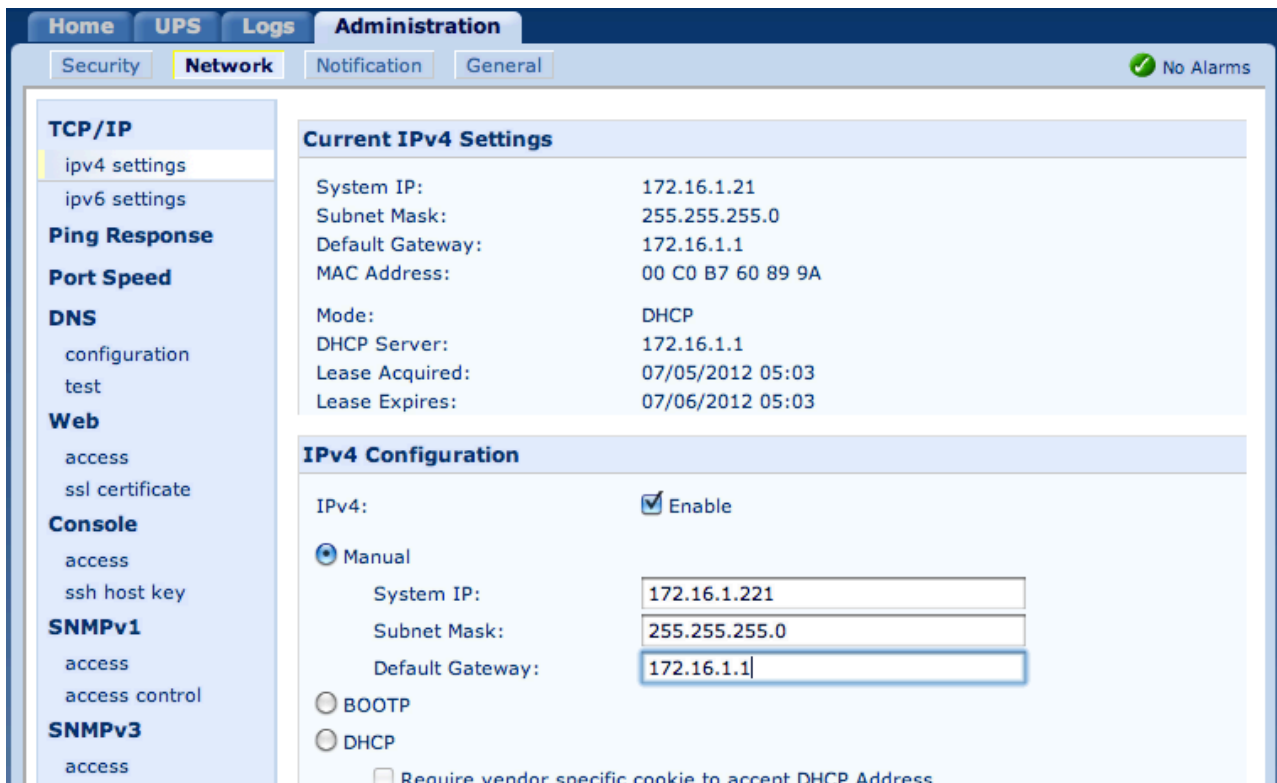
You can also change passwords for the Device-Only user named “device” and the Read-Only user named “readonly”.



The screenshot shows the 'Administration' section of the APC Management Card web interface. The 'Security' tab is selected, and the 'Administrator' user is chosen from the 'Local Users' list on the left. The main area displays the password change form for the 'Administrator' user. The 'User Name' field is filled with 'apc'. The 'Current Password' field contains three dots. The 'New Password' and 'Confirm Password' fields both contain seven dots. At the bottom of the form are 'Apply' and 'Cancel' buttons. The top navigation bar includes 'Home', 'UPS', 'Logs', and 'Administration'. The 'Administration' sub-menu includes 'Security', 'Network', 'Notification', and 'General'. A 'No Alarms' indicator is visible in the top right corner.

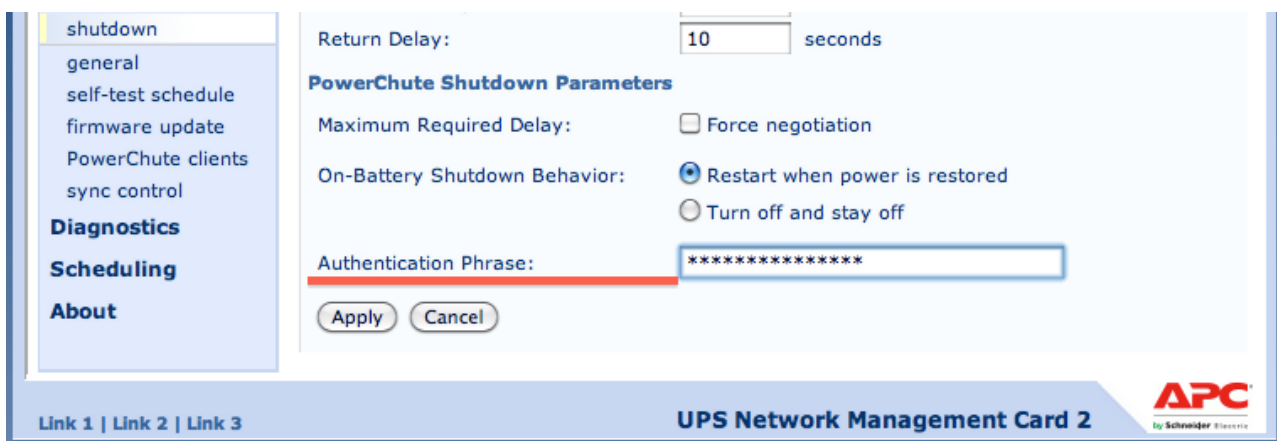
Than, go to Administration -> Network -> Ipv4 settings and assign a static address so your UPS can be contacted even if DHCP is down.





Please, also configure dns and domain settings accordingly to your network. If you want to increase security, go to the Web Access menu and force the card to listen only on the https port. Also, change the console access from telnet to ssh.

Then, you will need to configure the authentication phrase. Go to UPS -> Configuration -> shutdown and configure a new authentication phrase. Remember it must be between 15-32 characters.



## Deploy and configure VMA

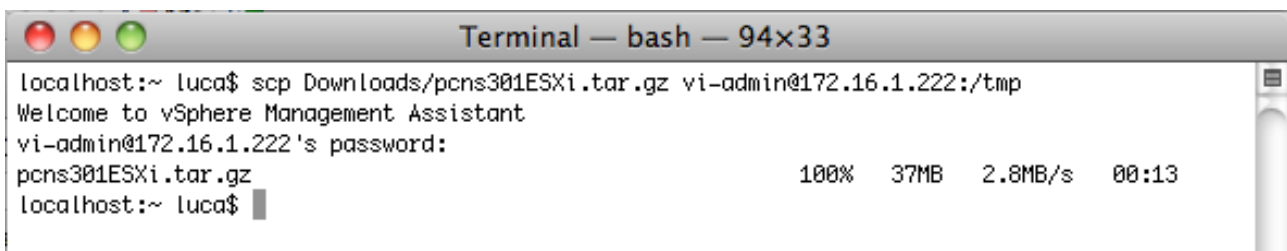
Your first step is to deploy the VMA into your vSphere environment assigning it an IP address. In this tutorial it will be 172.16.1.222. How to deploy an OVF template in vSphere is outside of the scope of this tutorial, there are many blog posts around on how to deploy and configure VMA appliance.

Once the VMA is setup and started, you can manage it via ssh rather than the vClient console. VMA 5 has ssh enabled, you can anyway check if it's enabled and started with these two commands:

```
vi-admin@record:~> chkconfig --list sshd
sshd          0:off 1:off 2:off 3:on  4:off 5:on  6:off
vi-admin@record:~> sudo service sshd status
Checking for service sshd
vi-admin@record:~> _
```

## Install Powerchute Network Shutdown for ESXi

After you remotely login via ssh using the vi-admin user, you can upload via scp the downloaded PCNS installer. You can upload the file named [pcns301ESXi.tar.gz](#) in a temporary location like /tmp:



```
Terminal — bash — 94x33
localhost:~ luca$ scp Downloads/pcns301ESXi.tar.gz vi-admin@172.16.1.222:/tmp
Welcome to vSphere Management Assistant
vi-admin@172.16.1.222's password:
pcns301ESXi.tar.gz          100%  37MB  2.8MB/s  00:13
localhost:~ luca$
```

Then, via ssh, you start the installation of PCNS:

```
cd /tmp
sudo tar -zxvf pcns301ESXi.tar.gz
```

you will end up having a new directory named /tmp/ESXi. Go there and run the installer:

```
cd ESXi
sudo chmod 777 install_en.sh
sudo ./install_en.sh
```



```
Terminal — ssh — 117x26
vi-admin@record:/tmp/ESXi> sudo ./install_en.sh
-----
PowerChute Network Shutdown 3.0.1 for VMware ESXi
Copyright (c) 1999-2012 Schneider Electric.
All Rights Reserved.
-----

OS=VIMA
Initializing ...

Press any key to display End User License Agreement
█
```

accept all the default answer, also for the bundled Java package installation. During the installation, you will be asked to add the first ESXi server to be managed, you can enter its information or skip this step and add it later:

```
In order for PCNS to shutdown the ESXi host, it must be added as a target server.
Please enter ESXi host IP (XXX.XXX.XXX.XXX) or (q) to skip:
172.16.1.211
Please enter ESXi host username:
root
Please enter ESXi host password:
Adding target server...
172.16.1.211 ESXi
Successfully added ESXi host to target server list.

Configuring uninstall script ...
Setup the m11.cfg file

PowerChute Network Shutdown, v3.0.1
Copyright (c) 1999-2012, Schneider Electric. All Rights Reserved.
Startup completed.

Installation has completed.
PowerChute Network Shutdown can be accessed through your browser at https://<your_server_ip_address>:6547
Please complete the configuration wizard so that PowerChute Network Shutdown can protect your server.
```

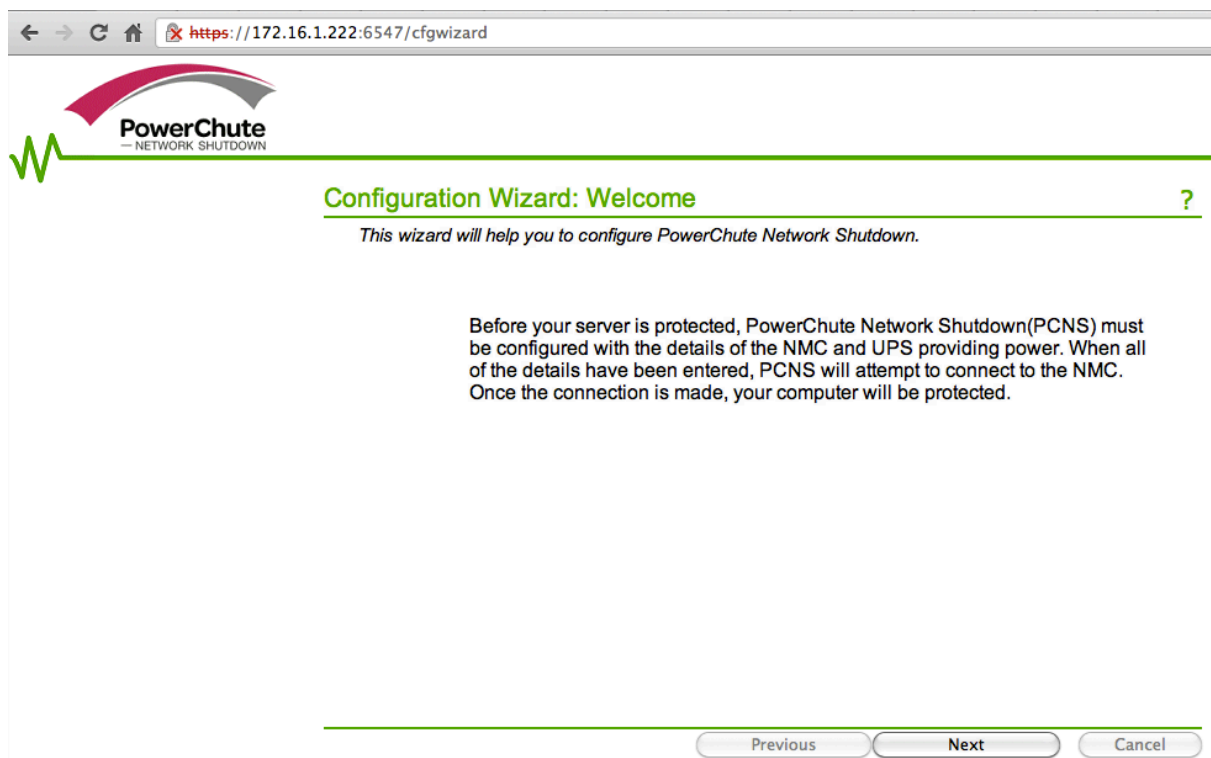


## Powerchute Configuration Wizard

As suggested by the installation wizard, from here you need to login at the Powerchute webserver to complete the configuration. Open a browser to the address:

[https://<your\\_server\\_ip\\_address>:6547](https://<your_server_ip_address>:6547)

And follow the wizard.



In the next page, you will be asked for the credentials needed by PCNS to communicate with the NMC:





### Configuration Wizard: Security



Configure the security information

User Name:

*This must be the username used to log on to the Network Management Card (NMC) Web UI. It is used both to communicate with the NMC, and to log into PCNS*

Password:

*This password will be used to log into PCNS. Password must be between 3-32 characters.*

Authentication Phrase:

*This must match the PowerChute authentication phrase configured on the NMC. Auth Phrase note must be between 15-32 characters.*

Previous

Next

Cancel

You will use the administrator user “apc” with its configured password, and the Authentication Phrase you configured earlier in this tutorial.

After choosing the best scenario describing your UPS electrical configuration (single UPS, redundant or parallel), you will need to configure PCNS to communicate with the NMC by setting up its parameters as shown here:



### Configuration Wizard: UPS Details



PCNS needs some details in order to connect to the NMC

NMC Protocol:

*This is the protocol that the NMC uses for its web UI. This can be configured through the NMC.*

NMC Port:

*This is the port that the NMC uses for its web UI. This is usually determined by the protocol, but can be set to other values through the NMC.*

NMC IP address:

*If the address entered is not for the NMC installed in the UPS supplying power to your PowerChute server, PCNS may connect, but your computer will not be protected.*

Previous

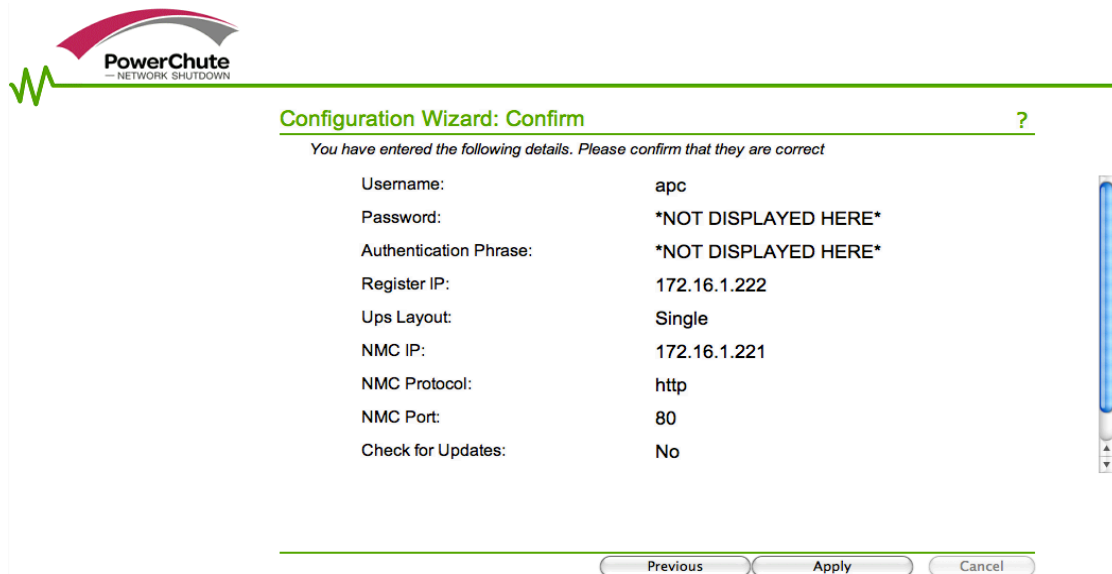
Next

Cancel

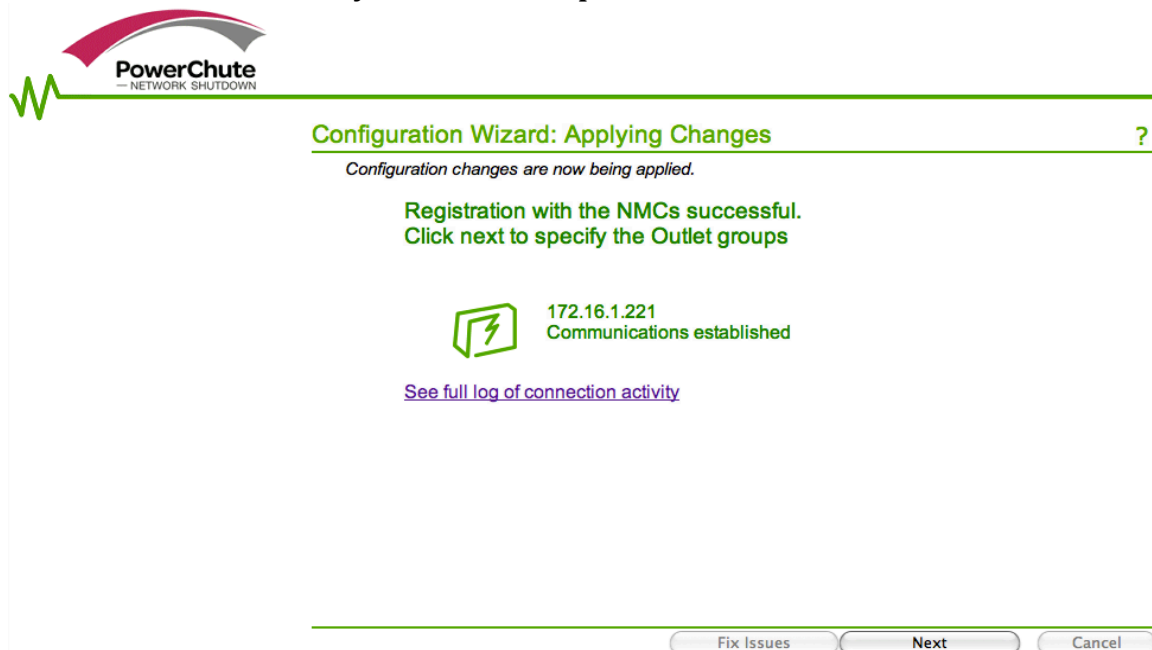




After all the settings has been configured, you can apply them and complete the wizard:



After about a minute, you will end up with this confirmation screen:



You can confirm the registration of Powerchute Network Shutdown has been completed in the NMC, under UPS -> Configuration -> PowerChute Clients:



After a couple more screens, the wizard will be completed and PCNS will be configured.

## PowerChute Network Shutdown web interface

After the wizard, you will automatically be redirected to the web interface. Here there are basically two sections you will have to look at:

**PowerChute** NETWORK SHUTDOWN vma

**Configure Events** ?

*The table below identifies how PowerChute Network Shutdown will respond to UPS events. Select an icon to see the details of the event.*

Events	Log Event	Notify Users	Run Command File	Shut Down System
UPS: On Battery	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Input Power: Restored	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Runtime: Exceeded	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Runtime: Normal Again	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Battery: Discharged	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Battery: Recharged	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communication: Lost while on Battery	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communication: NMC cannot communicate with the UPS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communication: PowerChute cannot communicate with the NMC	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communication: Established	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UPS Temperature: Overheated	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UPS Temperature: Normal Again	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UPS: Overloaded	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UPS Overload: Corrected	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

This is the configure events page for all PCNS clients. To see a full list of configurable and non-configurable event view PCNS help.

**PowerChute** NETWORK SHUTDOWN vma

**Configure Shutdown** ?

*When PowerChute shuts down your operating system, it will use these settings. Use the Configure Events page to select which events will cause the system to shut down. The server will always shut down if the battery is too low.*

Yes, I want to notify a user.

Notify all users

Notify only this user:

Send notification again this often (seconds):

Run this command file (full name):

The command file needs this much time to complete (seconds):

**NOTE:** The UPS Low-Battery Duration must be greater than or equal to the time PCNS requires for safe shutdown. See the [online help](#) for information on how PCNS calculates the time it requires for shutdown.

Turn off this servers Outlet Group at the UPS after the shutdown finishes.

Turn off the UPS after the shutdown finishes (This is dependent on the UPS model and/or shutdown mode enabled for the UPS).

Do not turn off UPS.

**NOTE:** If the shutdown is due to a power failure, the UPS can be configured to automatically restart when power is restored. Please verify this configuration at the individual UPS Network Management Card(s).

This is the configure shutdown page for all PCNS clients.



## Add ESXi servers to the VMA

During the installation of the PCNS software, you added your first ESXi server to the list of managed hypervisors.

If you have multiple servers you should add all of them to the VMA.

- Login into the VMA with the **vi-admin** user and run **sudo -s** (or prepend sudo to all the following commands)

- **vifp listservers** will show you the already configured ESXi server

```
vma:/home/vi-admin # vifp listservers
172.16.1.211    ESXi _
```

- **vifp addserver <ESXi management interface>**

You will be asked for the ESXi root password:

```
vma:/home/vi-admin # vifp addserver 172.16.1.212
root@172.16.1.212 's password:
```

- the new list of servers will show you all the ESXi servers:

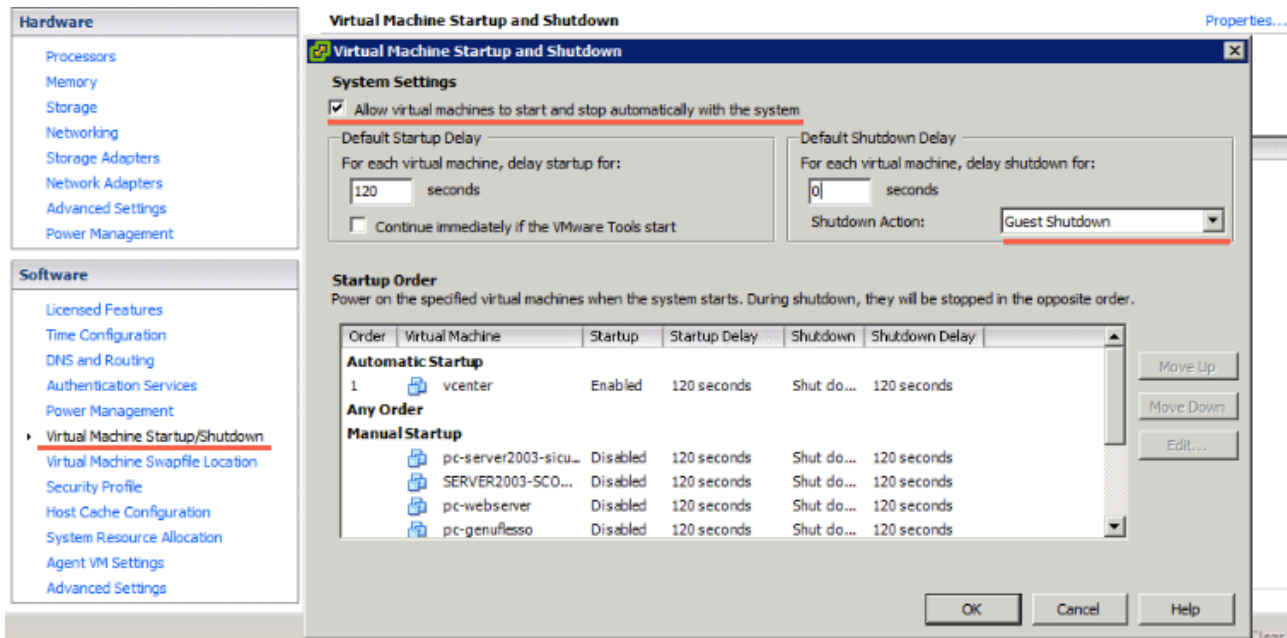
```
vma:/home/vi-admin # vifp listservers
172.16.1.211    ESXi
172.16.1.212    ESXi _
```

- Finally, you need to add the server to the fasspass list. The command is **vifptarget -s <server name or ipaddress>**.



## Configure shutdown behaviour of your VMs inside ESXi

Last, you will have to configure your ESXi servers to shutdown every VM they are running. To do so, once connected via vClient to the ESXi server, go to Configuration -> Virtual Machine Startup/Shutdown and enable this feature.



If you have VMware Tools installed on all your VMs, it is better to use Guest Shutdown as the shutdown action so the guests can be powered off gracefully.

