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

Acronyms 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

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 how the 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*.

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”.

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:

```
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
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
```
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 PCONS to shutdown the ESXi host, it must be added as a target server.
Please enter ESXi host IP (100.100.100.10) 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 m1.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:8547
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

And follow the wizard.

In the next page, you will be asked for the credentials needed by PCNS to communicate with the NMC:
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:
After all the settings have been configured, you can apply them and complete the wizard:

![Configuration Wizard: Confirm](image)

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

![Configuration Wizard: Applying Changes](image)

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

![PowerChute Network Shutdown Clients](image)
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 redirected to the web interface. Here there are basically two sections you will have to look at:

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

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

  ```shell
  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:

  ```shell
  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:

  ```shell
  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 ESXi server, go to Configuration -> Virtual Machine Startup/Shutdown and enable this feature.

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