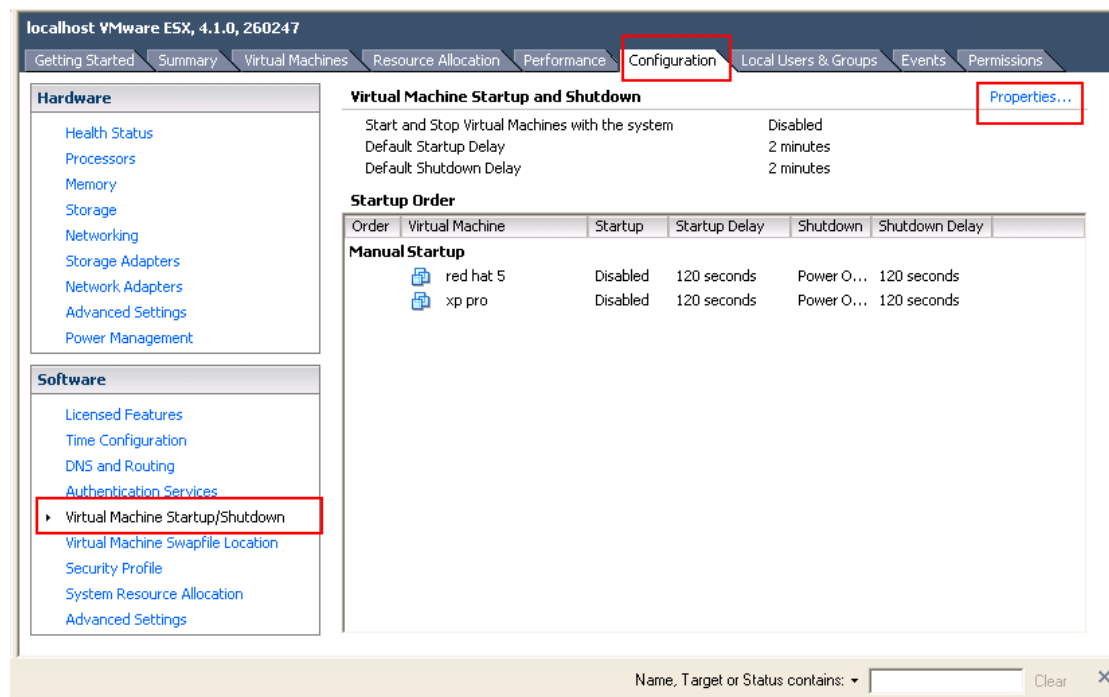


## 4 Installation and configuration for SPS in the VMware ESX

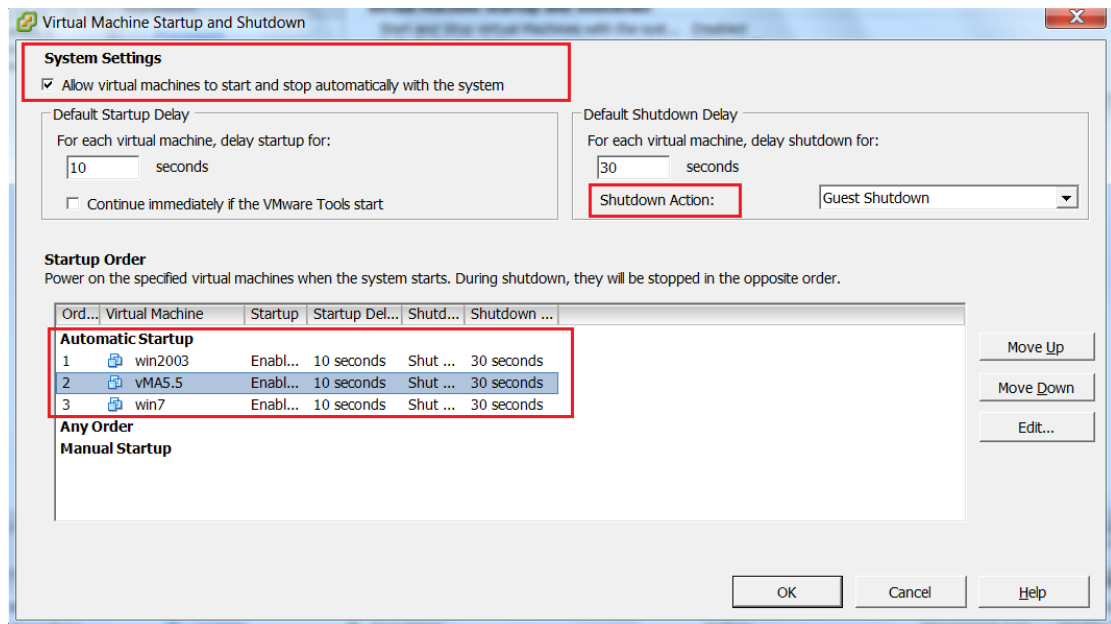
### 4.1 Configuring for VMware ESX

#### 4.1.1 Configuring VMs startup/shutdown automatically

- Start VMware Client, select Configuration -> Virtual Machine Startup/Shutdown->Properties

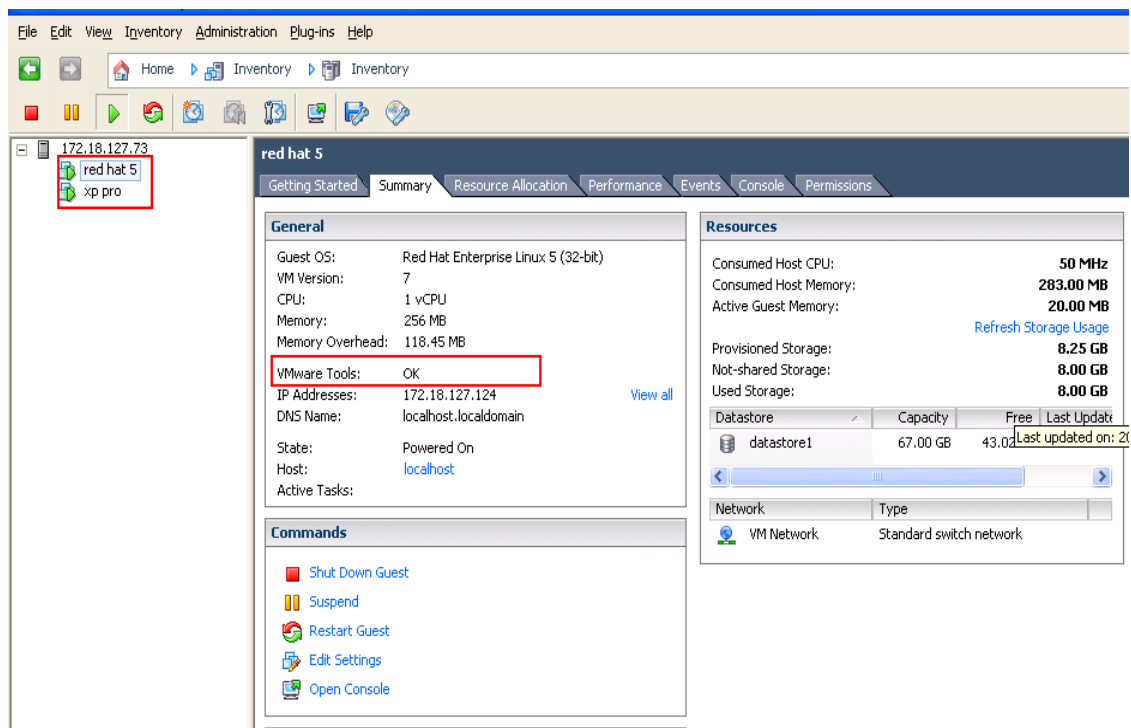


- Select Allow virtual machines to start and stop automatically with the system checkbox.  
Enter the settings as shown on the Virtual Machine Startup and Shutdown window:  
Move up the virtual machines to the Automatic Startup list.  
The virtual machines will start/stop when the host start/shutdown automatically.



### 4.1.2 VMware tools

- Install the VMware tool for each guest OS.  
Select the guest OS, click summary menu, the status for VMware tools will show OK if the VMware tools is installed successfully.



### 4.1.3 Configuring the Port

- The SPS use UDP 3034 as the communication port with NMC as default.

Note: If the UDP 3034 is captured by the other program, the number of the port will be added 1(range from 3034~3083)

- Open the UDP port by the following command:

```
esxcfg-firewall -o 3034,udp,in,SPS
```

```
esxcfg-firewall -o 3034,udp,out,SPS
```

## 4.2 Configuring the SPS

- Start the VMware Server host, refer to the chapter 3 (Linux with CUI) to finish the SPS Installation and configuration.

- Set the shutdown script for VMware ESX. The document of shutdownESX.sh is the script for shut down the virtual machines。

Enter the command: **./SPS -i**

Find the two lines in the configuration and edit it as below:

```
<EnableScript>1</EnableScript>
```

```
<Script>/opt/sps/ShutdownScript/shutdown</Script>
```

- Set the Script Max Execution Time based on the amount of Virtual machines. Set apart 30s for each virtual machine.

For example: there are ten virtual machines:

Enter the command: **./SPS -i**

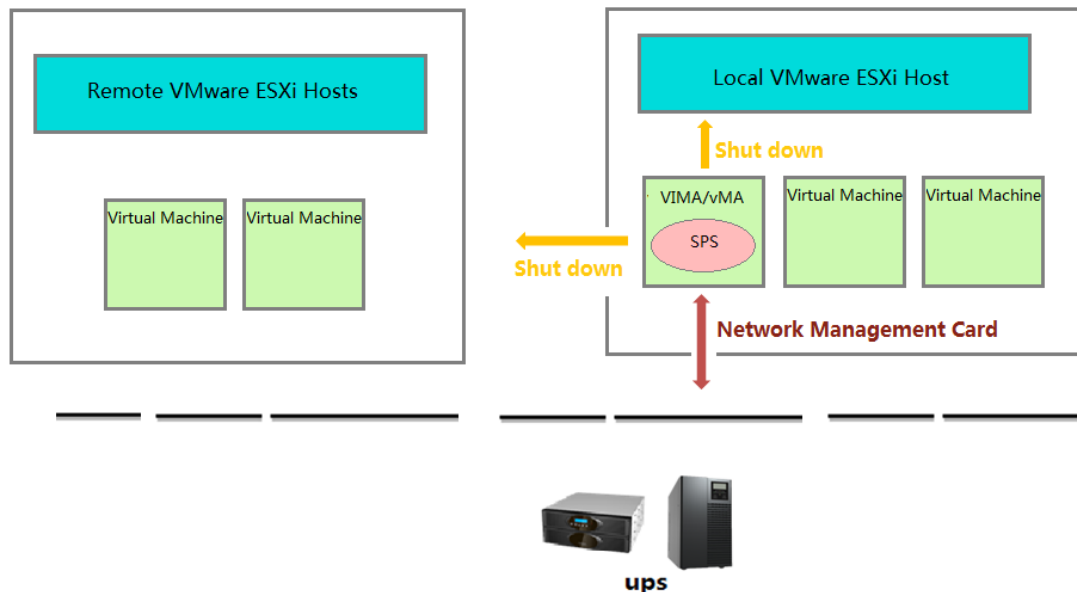
Find the line in the configuration and edit it as below:

```
<MaxScriptTime>300</MaxScriptTime>
```

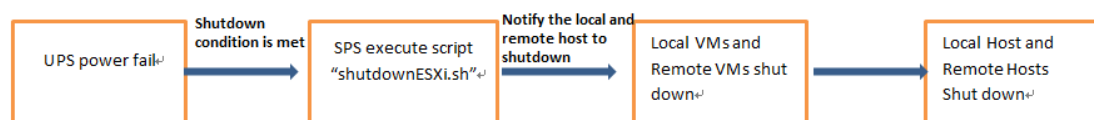
- Restart the SPS service by the command: **./SPS -r**

## 5 Installation and configuration for SPS in the VMware ESXi (paid version)

### Over viewer



### Shutdown Sequence



- The full name for the vMA is “vSphere Management Assistant”, it is released by the VMware company to manage the vSphere
- The script “shutdownESXi.sh” is used to notify the local ESXi host and the remote ESXi hosts to shut down.  
If the script “shutdownESXi.sh” is executed on the general OS, the executed permission will be refused
- The Virtual Machines on the ESXi host are shut down automatically by the ESXi host with the “Allow virtual machines to start and stop automatically with the system” function. So the local and remote ESXi hosts should enable “Allow virtual machines to start and stop automatically with the system” function. please refer to section “5.1.2 Configuring VMs startup/shutdown automatically”
- Run the config.pl to save the local and remote ESXi hosts IP address and corresponding username and password, the information is saved in the “hostlist”.  
When runs the “shutdownESXi.sh” to notify the ESXi hosts to shut down, it needs to

provide the ESXi hosts username and password to pass through the verification.

- The local and remote ESXi hosts will accept the shutdown notification from vMA with right password and take effect to shut down

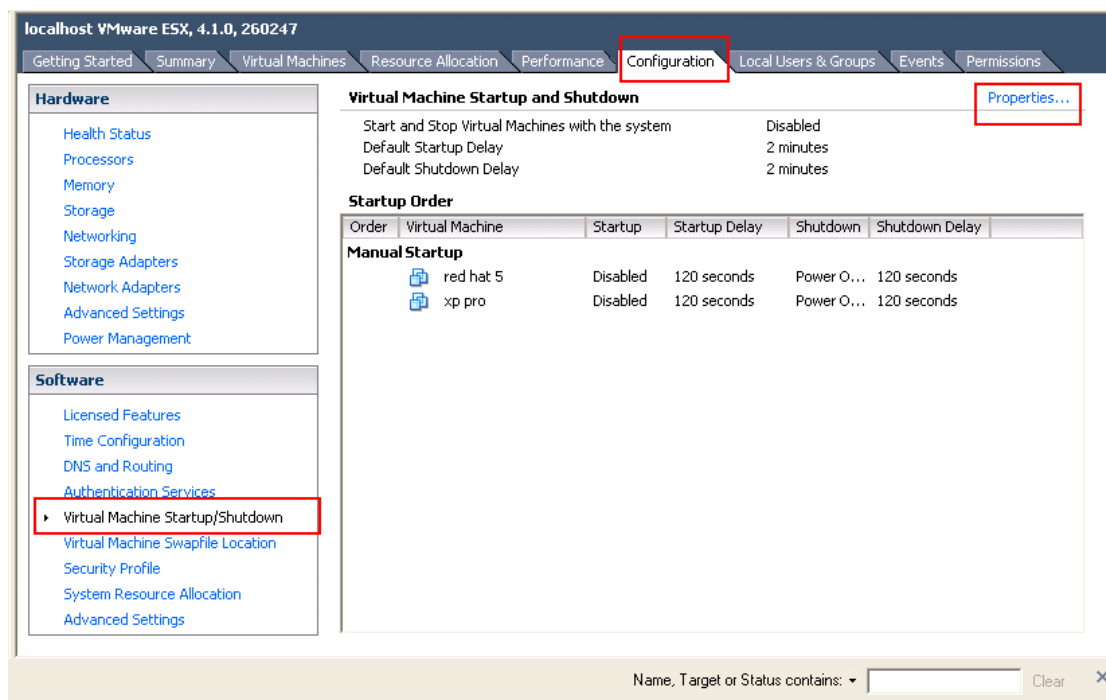
## 5.1 Configuring for VMware ESXi

### 5.1.1 Installing and configuring the VMA

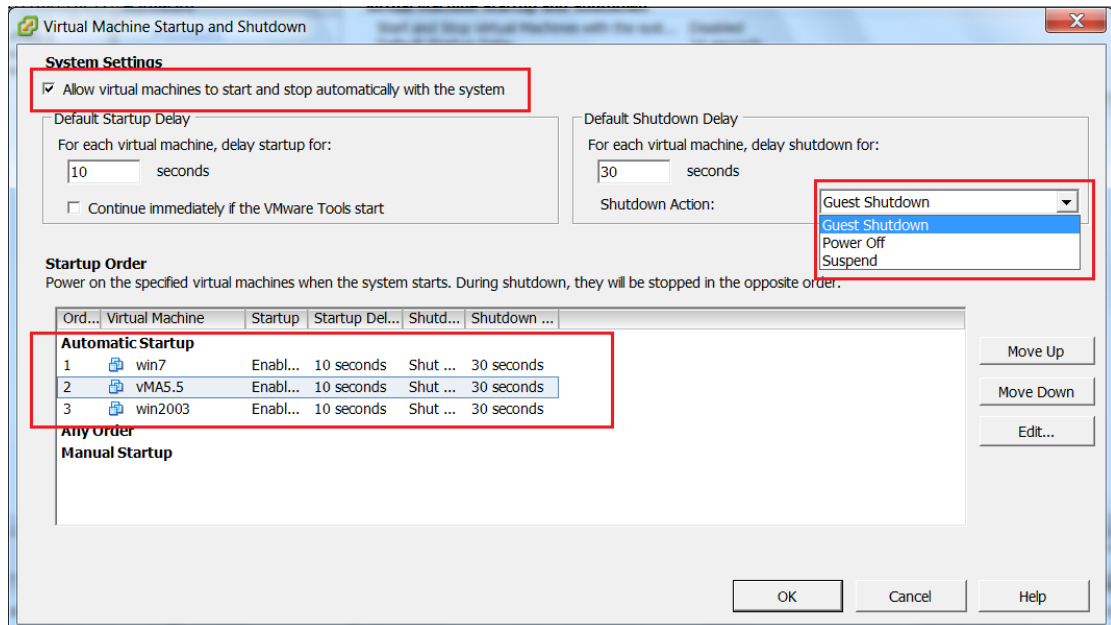
- Go to the website :<http://www.vmware.com/support/developer/vima/>  
Download the VMA, and extract it, the format for the VMA document is \*.OVF.
- Start the VMware Client, select File > Deploy OVF Template, click the browse button, select the OVF document.
- Start VMA, the default user name is vi-admin. Set the password for the first login.

### 5.1.2 Configuring VMs startup/shutdown automatically

- Start VMware Client, select Configuration -> Virtual Machine Startup/Shutdown->Properties



- Select Allow virtual machines to start and stop automatically with the system checkbox.  
Enter the settings as shown on the Virtual Machine Startup and Shutdown window:  
Move up the virtual machines to the Automatic Startup list  
The virtual machines will start/stop when the host start/shutdown automatically.

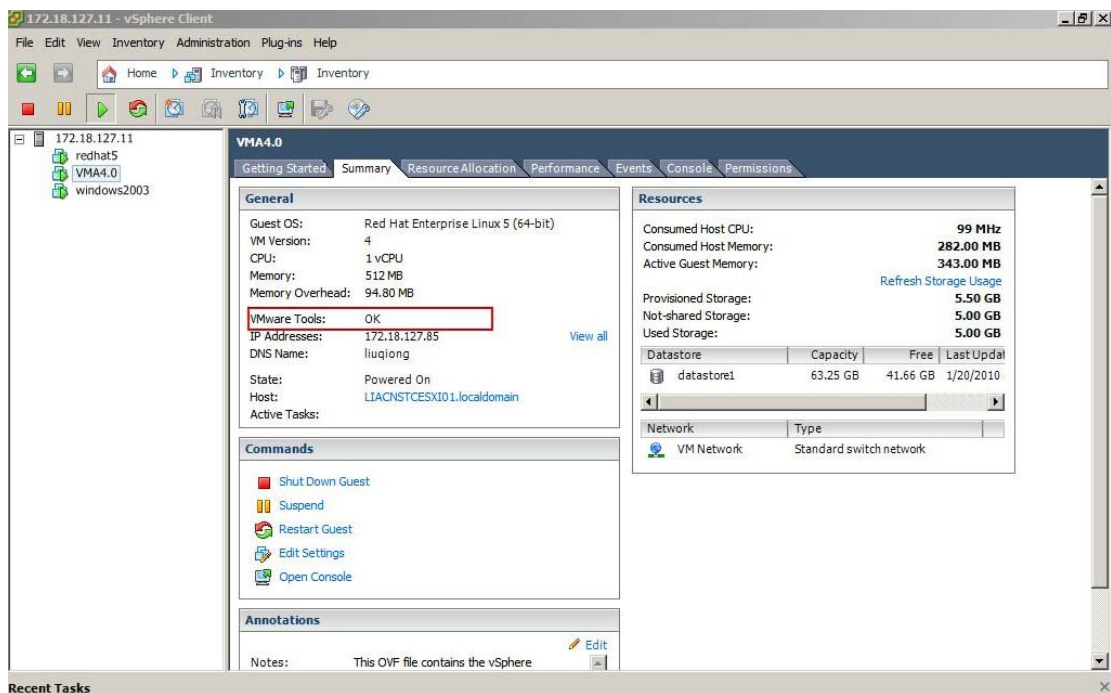


Note: if the “Guest shutdown” is selected in the “Shutdown Action”, make sure the VMware tools are installed for each virtual machine. If the “Power off” is selected in the “Shutdown Action”, the VMware tools are not needed for the virtual machine.

Please refer to the official website for more VMware tools information.

If the OS is Windows, right click one of the VMs, click **Guest -> Install/Upgrade VMware Tools**

After the VMware tools installation, the VMware tools status will be changed to “OK” from the Summary



### 5.1.3 Configuring the port

- The SPS use UDP 3034 as the communication port with NMC as default.  
The port is opened as default in the vMA.  
Note: If the UDP 3034 is captured by the other program, the value of the port will be added 1(range from 3034~3083)
- Neglect this step unless the port is disabled:  
**iptables -I INPUT -p udp --dport 3034 -j ACCEPT**  
**iptables -I OUTPUT -p udp --dport 3034 -j ACCEPT**  
**/etc/rc.d/init.d/iptables save (for the ESXi 5.5 and later, this command can be neglected)**

## 5.2 SPS Configuration

- Start VMA, refer to the chapter 3 (Linux with CUI) to finish the SPS Installation and configuration.  
Note: please add with “sudo” if the user isn’t root user.  
For example: (the NMC IP address is 172.18.139.60)
  1. Enter the /opt/sps directory, start the SPS service by the command: **sudo ./SPSService**
  2. Open the configuration document by the command: **sudo ./SPS -i**  
Input the password: **admin**
  3. Add the NMC IP address  
<RemoteList>  
    <Remote name="172.18.139.60" serv="2993" model=""/>  
</RemoteList>

```

VMA5.5
Getting Started Summary Resource Allocation Performance Events Console Permissions

<RemoteList>
  <Remote name="172.18.139.60" serv="2993" model=""/>
  <Cluster name=""/>
</RemoteList>
<AcFail>1</AcFail>
<BatteryLow>1</BatteryLow>
<Overload>0</Overload>
<OverTp>0</OverTp>
<EMPTp>0</EMPTp>
<EMPHum>0</EMPHum>
<EMPct1>0</EMPct1>
<EMPct2>0</EMPct2>
<WSS>1</WSS>
<SSS>1</SSS>
<Capacity>1</Capacity>
<RemainTime>1</RemainTime>
<Alias>localhost.localhost</Alias>
<CancelIf>0</CancelIf>
<ShutDelay>0</ShutDelay>
<EnableScript>1</EnableScript>
<Script>/opt/sps/ShutdownScript/shutdownESXi.sh</Script>
<MaxScriptTime>60</MaxScriptTime>
<Action>1</Action>
<Pwd>YWRtaW4= </Pwd>
  
```

4. Restart the SPS Service by the command: **sudo ./SPS -r**
5. List the added NMC by the command: **sudo ./SPS -l**

```

VMA5.5
Getting Started Summary Resource Allocation Performance Events Console Permissions

localhost:/opt/sps # ./SPS
Usage: SPS [-h] [-v] [-S] [-X] [-s] [-x] [-r] [-l] [-i] [-p] [-c]
-h, --help      print this help message
-v, --version   print product version
-S             start System Protect Service at next boot
-X             don't start System Protect Service at next boot
-s, --start    start System Protect Service now
-x, --exit     stop System Protect Service
-r, --restart  restart System Protect Service
-l, --list     list all remote information
-i            modify configuration
-p            view the configuration
-c            change password

localhost:/opt/sps # ./SPS -l
172.18.139.60
Device Mode:
IP Address: 172.18.139.60
Host Name: Unknown
Connection Status: Connected
Shutdown Status: Normal
UPS Shutdown Delay: 120s

localhost:/opt/sps # _
  
```

- The config.pl is used to add the local ESXi host and remote ESXi hosts to be shutdown. Go to the "ShutdownScript" subdirectory: **cd /opt/sps/ShutdownScript**



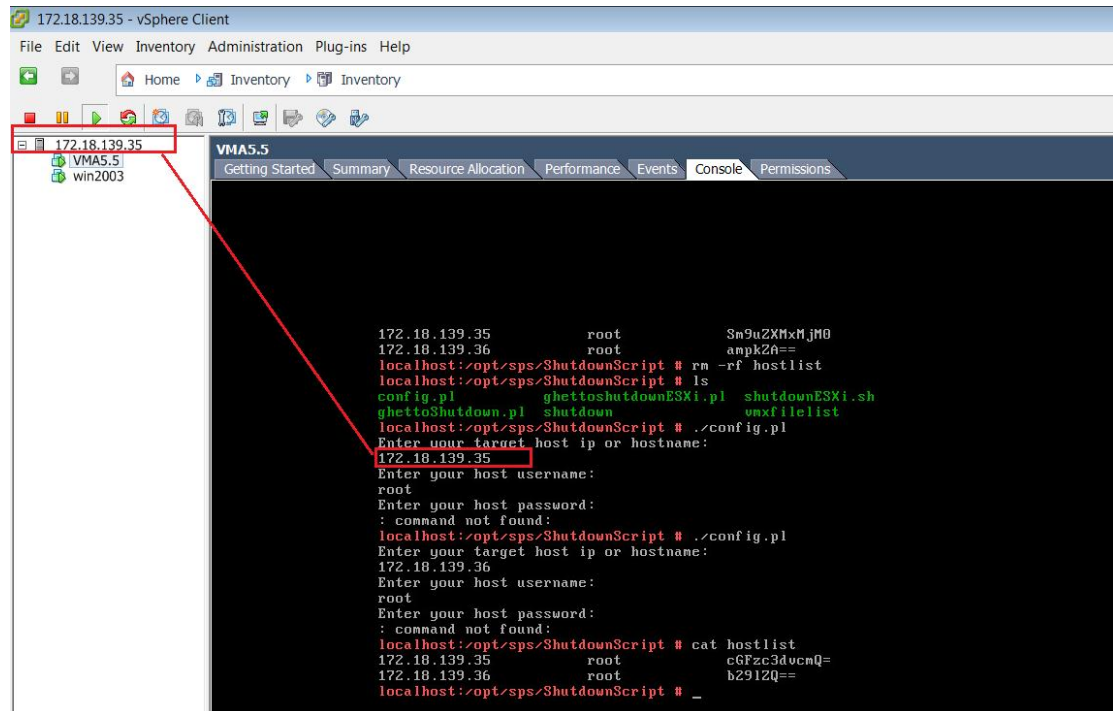
## System Protect Software User Manual

Enter the command: **sudo ./config.pl**

Input the target VMware ESXi local host IP (or hostname), username, password. SPS supports multi-hosts shutdown.

Also, you can input the target VMware remote ESXi hosts IP (or hostname), username, password.

For example: 172.18.139.35 and 172.18.139.36 will be added:



Note: SPS supports multi-hosts shutdown, but the local and remote ESXi hosts should enable “Allow virtual machines to start and stop automatically with the system” function, please refer to section “5.1.2 Configuring VMs startup/shutdown automatically”.

The VMware host information will be saved in `hostlist` document.

Enter the command: **cat hostlist**, get the input hosts information

Note: The password will be encrypted.

```
localhost:/opt/sps/ShutdownScript # cat hostlist
172.18.139.35      root      cGFzc3ducmlQ=
172.18.139.36      root      b291ZQ==
```

- Set the shutdown script for VMware ESXi. The `shutdownESXi.sh` is the script to shut down the ESXi hosts.

Enter the command: **sudo ./SPS -i**

Find the two lines in the configuration and edit it as below:

`<EnableScript>1</EnableScript>`

`<Script>/opt/sps/ShutdownScript/shutdownESXi.sh</Script>`

- Set the Script Max Execution time. Time based on the amount of Virtual machines.  
For example: set the max script time to 1 minute

## System Protect Software User Manual

---

Enter the command: **sudo ./SPS -i**

Find the line in the configuration and edit it as below:

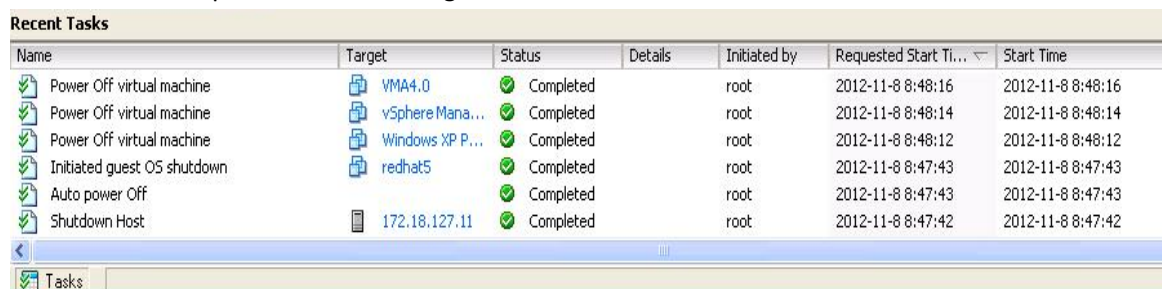
<MaxScriptTime>**60**</MaxScriptTime>

- Restart the SPS service, enter the command : **sudo ./SPS -r**
- The time sequence for host and VMs shutdown can be seen by VMware client.

**cd /opt/sps/ShutdownScript**

Please run the script “**sudo ./shutdownESXi.sh**” first to check if the setting is correct and check if the local and remote ESXi hosts and VMs can be shut down

The shutdown sequence as below image:

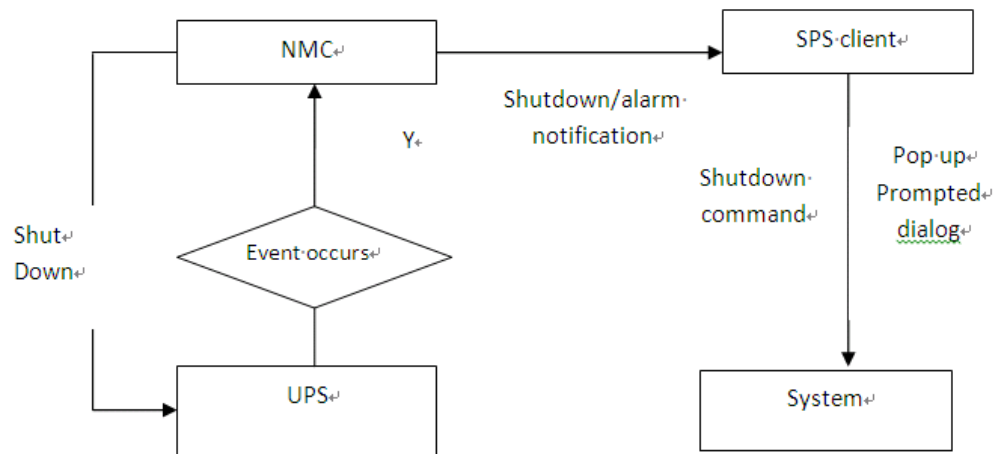


The screenshot shows the 'Recent Tasks' window in the VMware vSphere Client. It displays a list of tasks performed by the root user, all of which are completed. The tasks include powering off three virtual machines (VMA4.0, vSphere Mana..., and Windows XP P...), initiating a guest OS shutdown for redhat5, auto power off, and finally shutting down the host at IP 172.18.127.11. The start times for the tasks are sequential, ending at 2012-11-8 8:47:42.

Name	Target	Status	Details	Initiated by	Requested Start Time	Start Time
Power Off virtual machine	VMA4.0	Completed		root	2012-11-8 8:48:16	2012-11-8 8:48:16
Power Off virtual machine	vSphere Mana...	Completed		root	2012-11-8 8:48:14	2012-11-8 8:48:14
Power Off virtual machine	Windows XP P...	Completed		root	2012-11-8 8:48:12	2012-11-8 8:48:12
Initiated guest OS shutdown	redhat5	Completed		root	2012-11-8 8:47:43	2012-11-8 8:47:43
Auto power Off		Completed		root	2012-11-8 8:47:43	2012-11-8 8:47:43
Shutdown Host	172.18.127.11	Completed		root	2012-11-8 8:47:42	2012-11-8 8:47:42

## 8 Shutdown Operation

### 8.1 Shutdown flow chart



### 8.2 Shutdown setting (NMC Webpage Side)

#### 8.2.1 Shutdown actions setting

- Open the NMC website, select UPS Management ->UPS shutdown, and check the Actions setting.

UPS Management » UPS Shutdown	
Event	Actions
AC Failed	Disable
Battery Low	Disable
UPS Overload	Warning
UPS Over Temperature	Client Shutdown
	Client&UPS Shutdown

There are four definers for Actions:

Action	Definition
Disable	The NMC will not send the alarm and shutdown notification to the SPS client, when the events occur.
Warning	The NMC will send the alarm notification to the SPS client, when the events occur.

## System Protect Software User Manual

Client Shutdown	The NMC will send the alarm and shutdown notification to the SPS client, when the events occur.
Client &UPS Shutdown	The NMC will send the alarm and shutdown notification to the SPS client when the events occur. Besides, the NMC will send the shutdown command to the UPS.

Note: Please select the action to “Client Shutdown” or “Client &UPS Shutdown”, so that the SPS client can be shut down gracefully by the NMC.

### 8.2.2 Warning Period and Warning Interval Setting

- Open the NMC website, select UPS Management ->UPS shutdown. Check the “Warning Period” setting and “Warning Interval”.

UPS Management » UPS Shutdown <span>help</span>			
Event	Actions	Warning Period (Sec)	Warning Interval (Sec)
AC Failed	Client&UPS Shutdown ▼	30	10

For example:

The Warning Period is set to 30S and the Warning Interval is set to 10S.

The NMC will send the “AC fail” notification to the SPS client every 10 seconds and will last about 30 seconds. The NMC will notify the SPS client to shut down after AC failing for 30S.

### 8.2.3 UPS Shutdown Delay Setting

- Open the NMC website, select UPS Management ->UPS shutdown. Check the UPS Shutdown Delay setting.

UPS Management » UPS Shutdown <span>help</span>			
Event	Actions	Warning Period (Sec)	Warning Interval (Sec)
AC Failed	Client&UPS Shutdown ▼	900	30
Battery Low	Client&UPS Shutdown ▼	0	30
UPS Overload	Client&UPS Shutdown ▼	900	30
UPS Over Temperature	Client&UPS Shutdown ▼	900	30
Weekly Schedule	Client Shutdown ▼	900	30
Specific Day	Client&UPS Shutdown ▼	900	30
EMP Temperature Threshold	Client Shutdown ▼	900	30
EMP Humidity Threshold	Client Shutdown ▼	900	30
EMP Alarm-1	Client Shutdown ▼	900	30
EMP Alarm-2	Client Shutdown ▼	900	30
Below Battery Capacity Setting	Client&UPS Shutdown ▼	900	30
Cancel UPS Shutdown if events Restored in Shutdown Delay		<input type="checkbox"/>	
UPS Shutdown Delay(Sec)		120	
<span>Save</span>			

The UPS will be shut down after the “Warning Period” plus “UPS Shutdown Delay”, if the action is “Client &UPS Shutdown”.

By the default, the UPS shutdown delay timer is 120 seconds.

## System Protect Software User Manual

For example:

AC failed Event, the “Warning Period” is 900S and the “UPS Shutdown Delay” is 120S

The UPS will be shut down after AC failing for 1020S (900S+120S).

- Make sure the time for “UPS Shutdown Delay” should be longer than the timer for SPS client “Shutdown delay” plus SPS “Script MAX Execution time”, or else the warning dialog will pop up that the time is unreasonable in SPS client.

For example:

The SPS Shutdown delay timer is 90 seconds and the Script Max Execution Time is 60 seconds. The total time value is 150seconds (90S+60S) in SPS client.

But the UPS shutdown Delay time is 120 seconds in NMC webpage side. The UPS shutdown Delay time is shorter than the 150 seconds, so the alarm dialog will pop up that the time is unreasonable.

Local Configuration

Alias: LIACNWH7501365.napa.ad.etn.com Default

System Shutdown Options

☐ Cancel Shutdown if events Restored in Shutdown

Shutdown Delay: 90 Sec.

☒ Run Script Before Shutdown

File Path: E:\test.bat ...

Script Max Execution Time: 60 Sec.

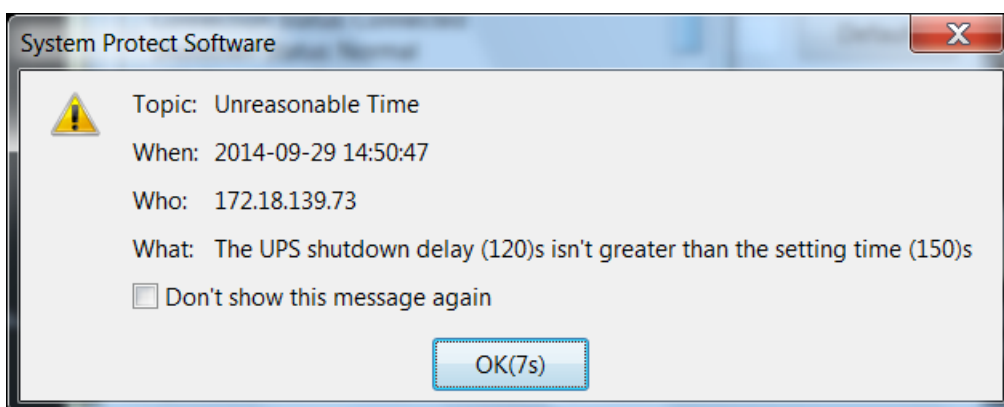
Action

☐ Event Warning

☒ Shutdown

☐ Sleep

OK Cancel Apply



## 8.2.4 Cancel UPS Shutdown if events restored in Shutdown Delay

Open the NMC website, select UPS Management ->UPS shutdown, enable/disable the checkbox for “Cancel UPS shutdown if events restored in Shutdown Delay”.

UPS Management » UPS Shutdown <span style="float: right;">help</span>			
Event	Actions	Warning Period (Sec)	Warning Interval (Sec)
AC Failed	Client&UPS Shutdown ▼	900	30
Battery Low	Client&UPS Shutdown ▼	0	30
UPS Overload	Client&UPS Shutdown ▼	900	30
UPS Over Temperature	Client&UPS Shutdown ▼	900	30
Weekly Schedule	Client Shutdown ▼	900	30
Specific Day	Client&UPS Shutdown ▼	900	30
EMP Temperature Threshold	Client Shutdown ▼	900	30
EMP Humidity Threshold	Client Shutdown ▼	900	30
EMP Alarm-1	Client Shutdown ▼	900	30
EMP Alarm-2	Client Shutdown ▼	900	30
Below Battery Capacity Setting	Client&UPS Shutdown ▼	900	30
Cancel UPS Shutdown if events Restored in Shutdown Delay		<input type="checkbox"/>	
UPS Shutdown Delay(Sec)		120	
<a href="#">Save</a>			

- Select the checkbox:  
If the events restore after the events occur for “Warning Period” time, the NMC will cancel the UPS shutdown command and cancel the SPS client shutdown notification
- Unselect the checkbox:  
Even If the events restore after the events occur for “Warning Period” time, the NMC still send the shutdown notification to the UPS and SPS client if the event restored during the “UPS Shutdown Delay” timer.
- For example:  
AC failed Event, the “Warning Period” is 900S and the “UPS Shutdown Delay” is 120S, select “Cancel UPS shutdown if events restored in Shutdown Delay” checkbox.  
After AC failing for 900S, then the AC restore, the NMC will cancel the UPS shutdown command and cancel the SPS client shutdown notification

## 8.3 Shutdown order

### 8.3.1 Shutdown continue if events restored

For example:

- NMC webpage side:  
Set the action to “Client &UPS Shutdown”, set the “warning period” to 30s, set the “UPS Shutdown Delay” to 120s. Unselect the “Cancel UPS shutdown if event restored” checkbox.

UPS Management » UPS Shutdown			
Event	Actions	Warning Period (Sec)	Warning Interval (Sec)
AC Failed	Client&UPS Shutdown	30	10
Battery Low	Client&UPS Shutdown	30	10
UPS Overload	Client&UPS Shutdown	30	10
UPS Over Temperature	Client&UPS Shutdown	30	10
Weekly Schedule	Client&UPS Shutdown	30	10
Specific Day	Client&UPS Shutdown	30	10
EMP Temperature Threshold	Client&UPS Shutdown	30	10
EMP Humidity Threshold	Client&UPS Shutdown	30	10
EMP Alarm-1	Client&UPS Shutdown	30	10
EMP Alarm-2	Client&UPS Shutdown	30	10

☐ Cancel UPS Shutdown if events Restored in Shutdown Delay

UPS Shutdown Delay(Sec)

Save

- SPS client side:  
Set the Shutdown Delay to 60s, set "Script Max Execution Time" to 40s, unselect "Cancel Shutdown if events restored in Shutdown Delay" checkbox.

Local Configuration

Alias:  Default

System Shutdown Options

☐ Cancel Shutdown if events Restored in Shutdown Delay

Shutdown Delay:  Sec.

☒ Run Script Before Shutdown

File Path:  ...

Script Max Execution Time:  Sec.

☐ Event Warning  
☒ Shutdown  
☐ Sleep

OK Cancel Apply

- Shutdown order:
  - When AC fails, the NMC send the warning to SPS client. SPS will pop up warning dialog, this process will last 30S.
  - After AC failing for 30S, the SPS client and UPS begin to shutdown count down. After SPS client counting down for 60S, SPS begins to execute the shutdown script  
Note: Even if the AC restore during the shutdown counting down, the SPS client still continue to shut down.
  - After executing the shutdown script for 40S, SPS client begins to shut down.
  - After UPS counting down for 120S, the UPS begins to shut down  
Note: Even if the AC restore during the UPS counting down, the UPS still continue to shut down

- The system and UPS will cancel shutdown if the AC restore before AC failing for 30S.

## 8.3.2 Shutdown discontinue if events restored

For example:

- NMC webpage side:

Set the action to Client & UPS Shutdown, set the warning period to 30s, set the UPS shutdown Delay to 120s. Select the Cancel UPS shutdown if event restored checkbox.

UPS Management » UPS Shutdown <span>help</span>			
Event	Actions	Warning Period (Sec)	Warning Interval (Sec)
AC Failed	Client&UPS Shutdown ▼	30	10
Battery Low	Client&UPS Shutdown ▼	30	10
UPS Overload	Client&UPS Shutdown ▼	30	10
UPS Over Temperature	Client&UPS Shutdown ▼	30	10
Weekly Schedule	Client&UPS Shutdown ▼	30	10
Specific Day	Client&UPS Shutdown ▼	30	10
EMP Temperature Threshold	Client&UPS Shutdown ▼	30	10
EMP Humidity Threshold	Client&UPS Shutdown ▼	30	10
EMP Alarm-1	Client&UPS Shutdown ▼	30	10
EMP Alarm-2	Client&UPS Shutdown ▼	30	10

Cancel UPS Shutdown if events Restored in Shutdown Delay	<input checked="" type="checkbox"/>
UPS Shutdown Delay(Sec)	120

**Save**

- SPS client side:

Set the Shutdown Delay to 60s, set Script Max Execution Time to 40s.

Select Cancel Shutdown if events restored in Shutdown Delay.

Local Configuration

Alias:  Default

System Shutdown Options

☒ Cancel Shutdown if events Restored in Shutdown Delay

Shutdown Delay:  Sec.

☒ Run Script Before Shutdown

File Path:

Script Max Execution Time:  Sec.

Action

☐ Event Warning
 ☒ Shutdown
 ☐ Sleep

OK

Cancel

Apply

- Shutdown order:

- When AC fails, the NMC send the warning to SPS client. SPS client will pop up warning dialog, this process will last 30S.
- After AC failing for 30S, the UPS and SPS client begin to shutdown count down. After SPS



client counting down for 60S, SPS begins to execute the shutdown script

Note: If the AC restore during the SPS client shutdown counting down, the system cancel to shut down.

3. After executing the shutdown script for 40S, SPS client begins to shut down.

4. After UPS counting down for 120S, the UPS begins to shut down

Note: If the AC restore during the UPS counting down, the UPS will cancel to shut down

5. The SPS client and UPS will cancel shutdown if the AC restore before AC failing for 30S.

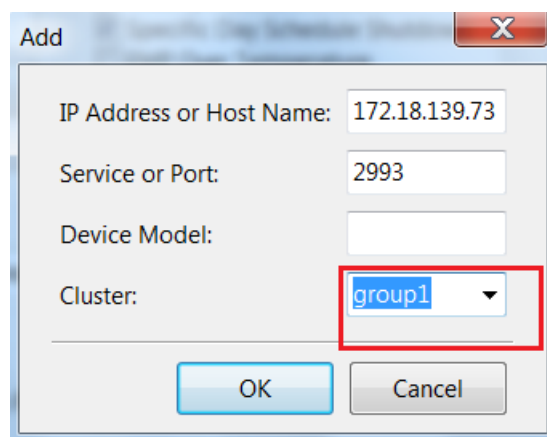
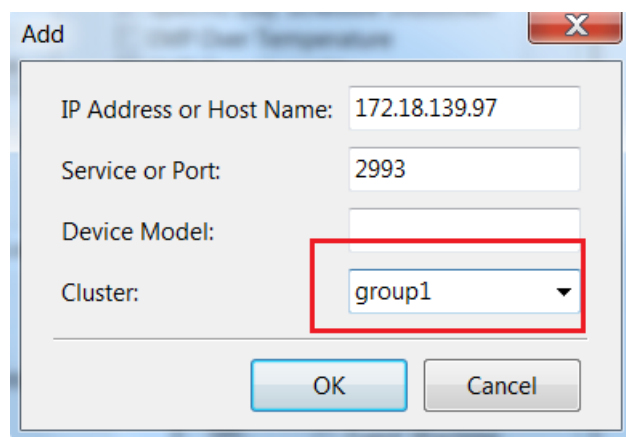
### 8.4 Redundant UPS Input shutdown

- For a computer powered by more than one NMC UPS, we can add them into a cluster. The system will start to shut down when the shutdown conditions are all met for the devices under the group1.

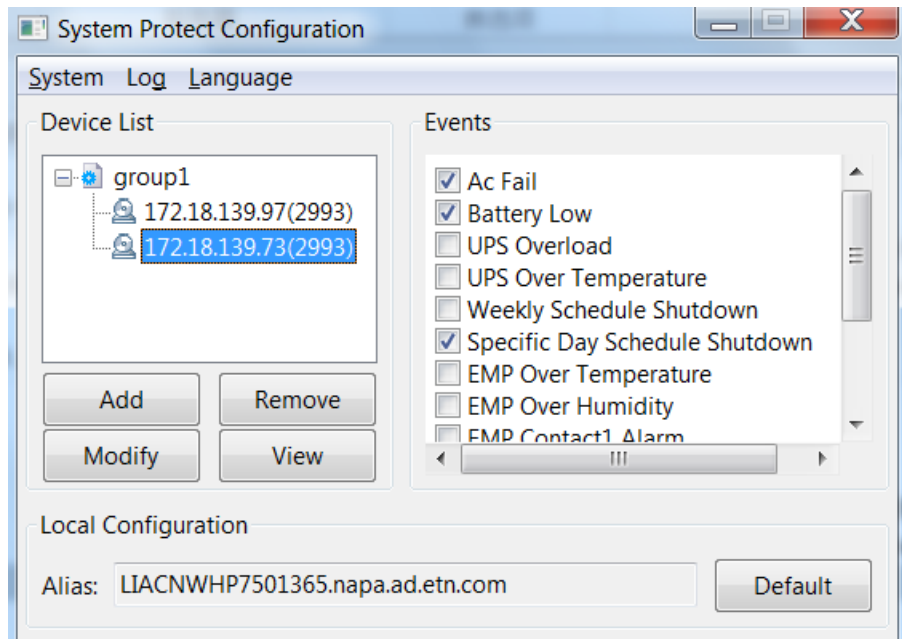
Enter the IP address of NMC via click "Add" button on the screen of SPS.

Enter a Cluster name, for example, group1.

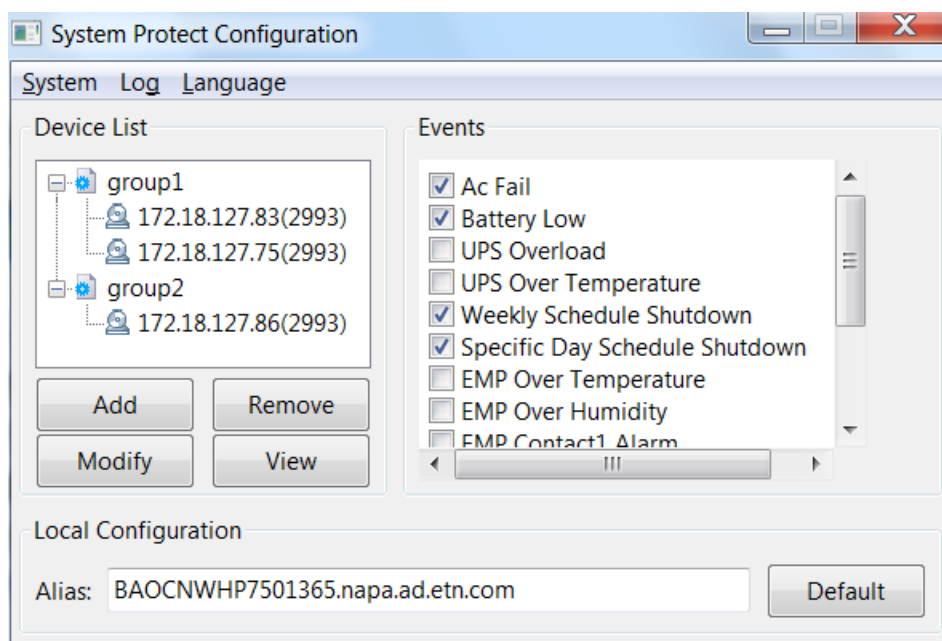
Add the two NMC IP address, and enter the same Cluster name.



The NMC UPSs that under the same Cluster will become the same group



- Multi-groups are supported.  
The system will be shutdown whenever any of the group is met the shutdown condition

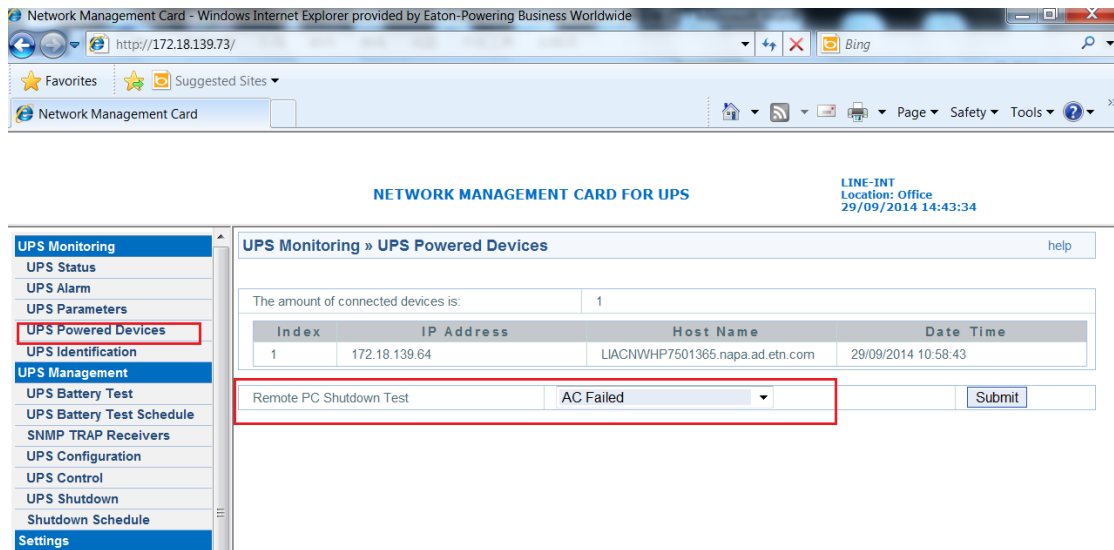


## 8.5 Simulate shutdown by event

Before doing this simulate test, please make sure the system is not running with critical mission, and is allowed to shut down for a while.

Open the NMC website, select UPS Management -> UPS Powered Devices.

# System Protect Software User Manual



- The server for the SPS client will be added to the “UPS Powered Devices” table if the communication is established between the SPS and NMC.
- Select the event in the “Remote PC Shutdown Test” drop list, click submit button, the NMC will send the warning and shutdown notification to the SPS client.
- The SPS will show the alarms dialog and shutdown/sleep the computer.
- After the test, wait for “UPS Shutdown Delay” time (120S as default, refer to section 8.2.3), then turn on the computer system.