VMware (paid version) VMotion User manual

1. VMware vMotion introduction

- Winpower will trigger the ESXi/ESX hosts (Powered by UPS) enter maintenance mode, so as to migrate the VMs to the other online ESXi/ESX hosts After the UPS AC failing. At the End, Winpower will shut down the ESXi/ESX hosts gracefully when the time is met. If the UPS AC restore, Winpower will trigger the ESXi/ESX exit maintenance mode, so that the vCenter Server will assign the VMs go back to original ESXi/ESX hosts.
- If UPS AC restore when the VMs are migrating, the VMs will go on migrating to the other online ESXi/ESX hosts and the ESXi/ESX hosts will go on entering maintenance mode. Then the ESXi/ESX hosts will exit maintenance mode immediately, and the vCenter Server will assign the VMs go back to original ESXi/ESX hosts.
- If the VMs are migrating, but all the other ESXi/ESX hosts are offline, Winpower will shut down the ESXi/ESX hosts and synchronously shut down the VMs gracefully.
- Winpower supply two options “maintenance mode” and “shutdown mode” for ESXi/ESX hosts：
  - ✧ If just choose “maintenance mode”, ESXi/ESX hosts will enter maintenance mode and the VMs will migrate to the other online ESXi/ESX hosts, but the hosts won’t be shutdown.
  - ✧ If just choose “shutdown mode”, ESXi/ESX hosts won’t enter maintenance, but the ESXi/ESX hosts and VMs will be shutdown.
  - ✧ If both options are chosen, ESXi/ESX hosts will firstly enter maintenance and the VMs will migrate to the other online hosts. At the end, The ESXi/ESX hosts will be shutdown.

1.1 VMware vMotion precondition

Hardware：

- UPS with network management card.
- More than two VMware ESXi hosts (paid version) and vCenter Server
- Network storage Server: NAS/SAN

Software：

- VMware vCenter and VMware vSphere Client must be installed
- ESXi/ESX hosts can enter maintenance by manually
- Winpower must be installed in vCenter server or any other Windows/Linux system in the same LAN with vCenter server

1.2 Topology map

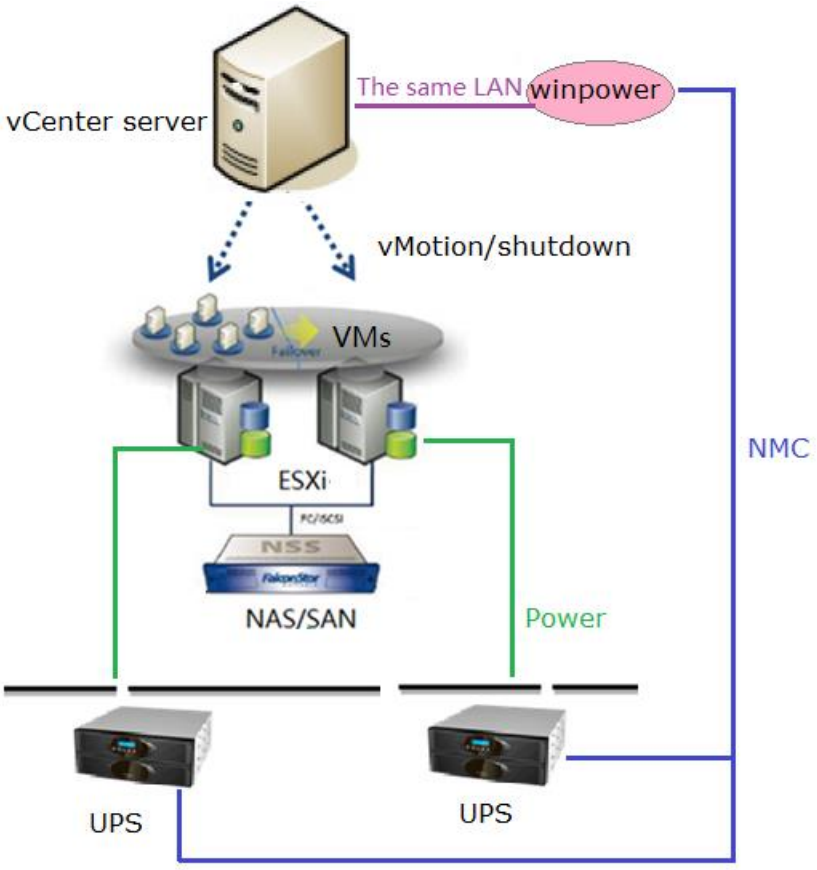

Image 1.2

2. Configuration

2.1 vCenter Server configuration

2.1.1 DRS setting

- DRS function must be enabled，choose Cluster, right click Edit Setting > Turn on VMware DRS. Click “Next” to finish open the DRS function. The DRS is enabled as default.

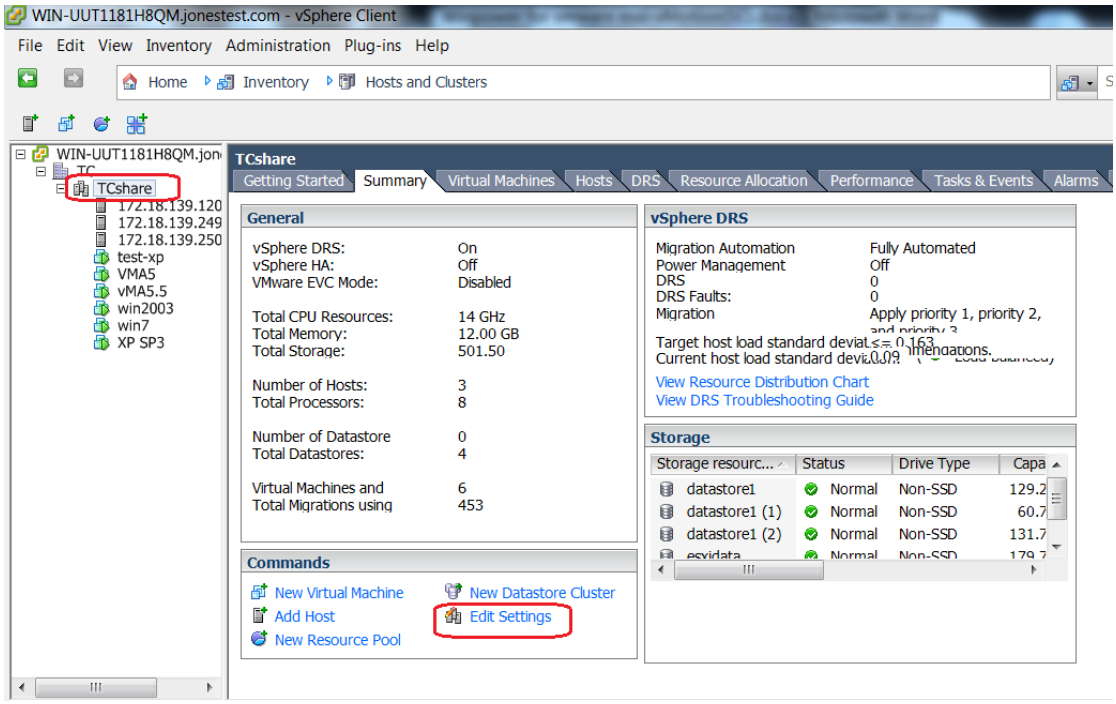

Image 2.1.1-1

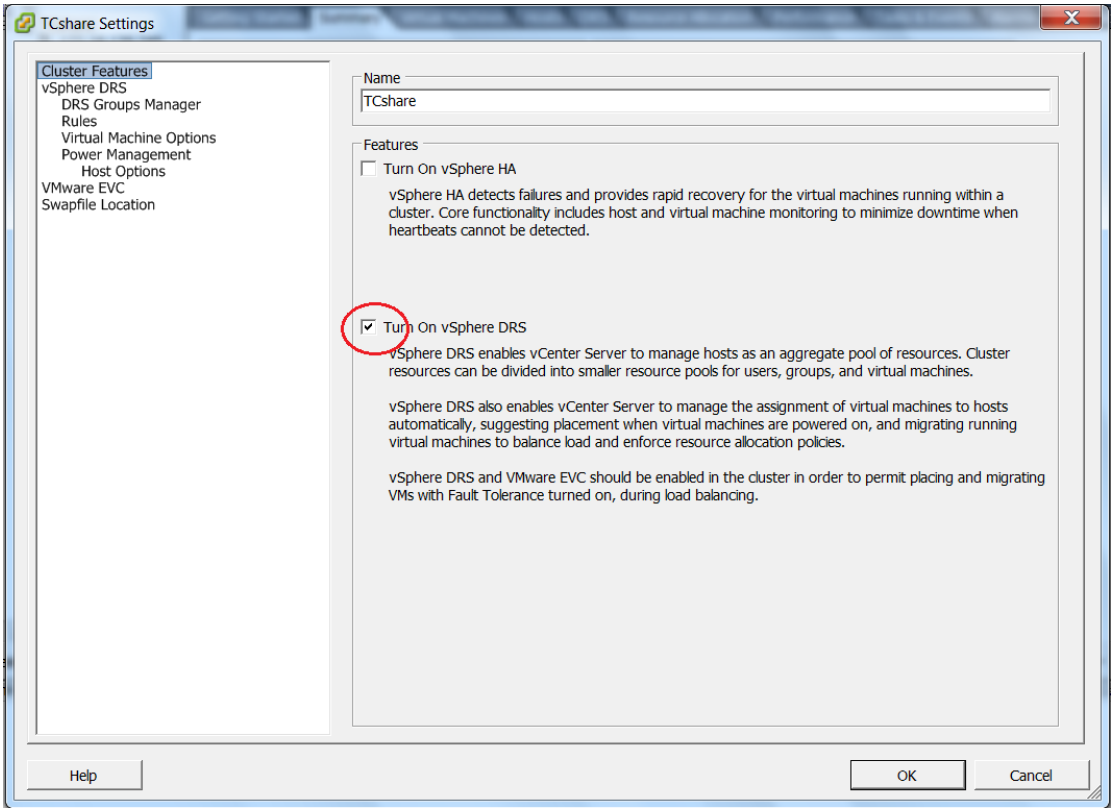

Image 2.1.1-2

2.1.2 VSphere HA setting

- HA function is optioned，You can enable or disable “Turn on vSphere HA” according to your mind as above image “Image 2.1.1-2”. Once the HA Cluster feature is enabled, VMware will disable the “Allow virtual machines to start and stop automatically with the system” function, so that VMs will not be startup when the ESXi/ESX hosts restart.

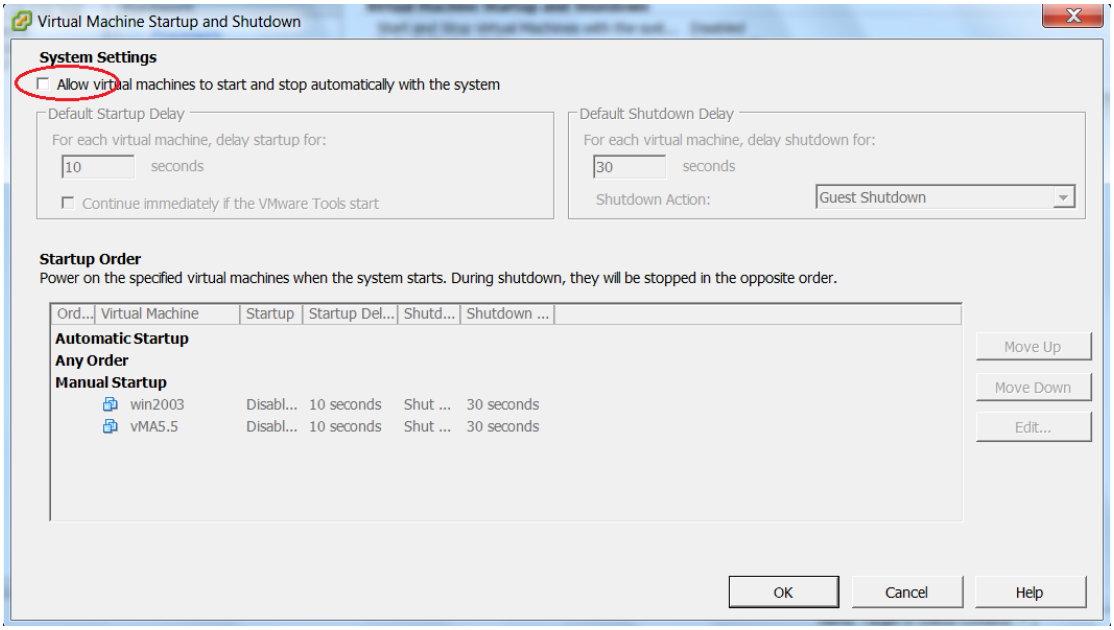

Image 2.1.2-1

- If HA feature is disabled, we advise enable “Allow virtual machines to start and stop automatically with the system” function, so that the VMs will be startup when the ESXi/ESX hosts restart.
  Start VMware client, choose the hosts (every host should be set), Select “Configuration” -> “Virtual Machine Startup/Shutdown”->”Properties”

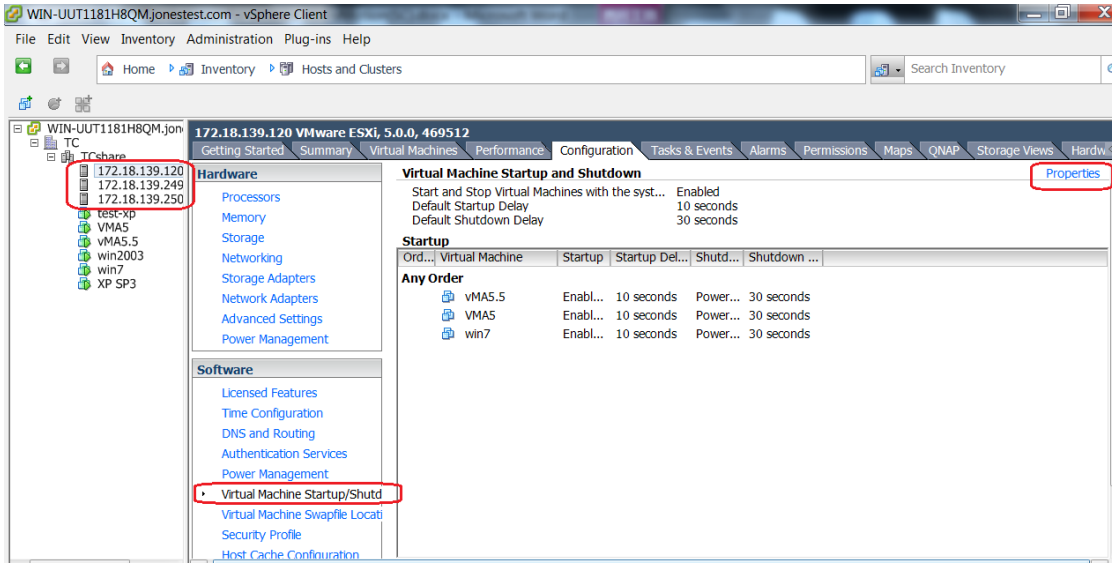

Image 2.1.2-2

Select “Allow virtual machines to start and stop automatically with the system” checkbox
Move all the VMs to “Automatic Startup” list.

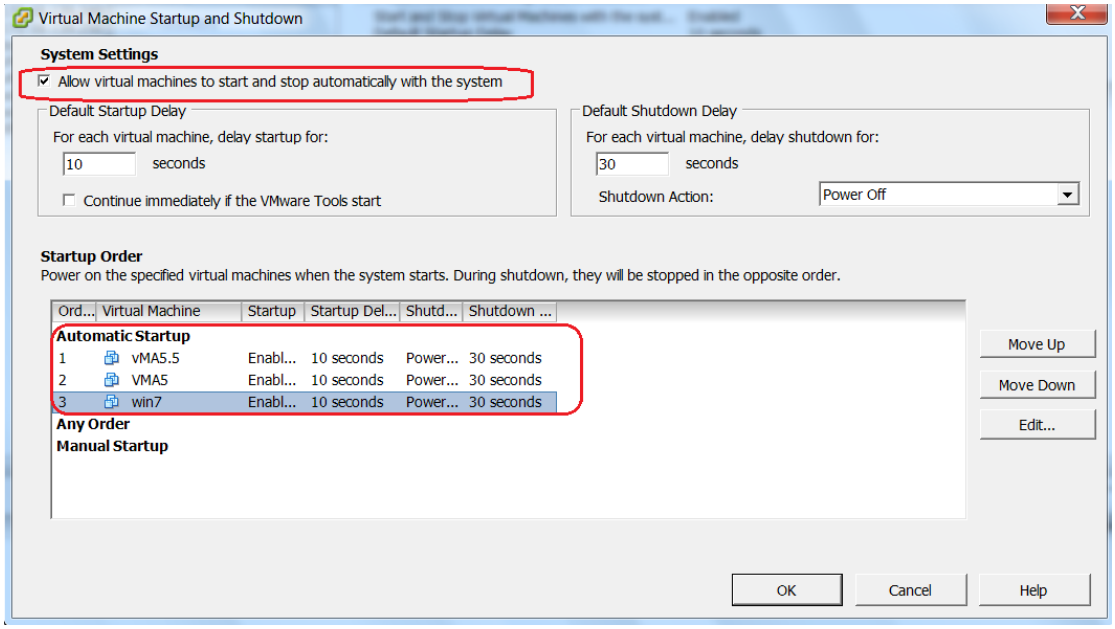

Image 2.1.2-3

2.1.3 Enter/Exit maintenance manually

- Make sure the ESXi/ESX hosts can enter maintenance mode manually
  Right click ESXi/ESX hosts， Choose “Enter Maintenance Mode”

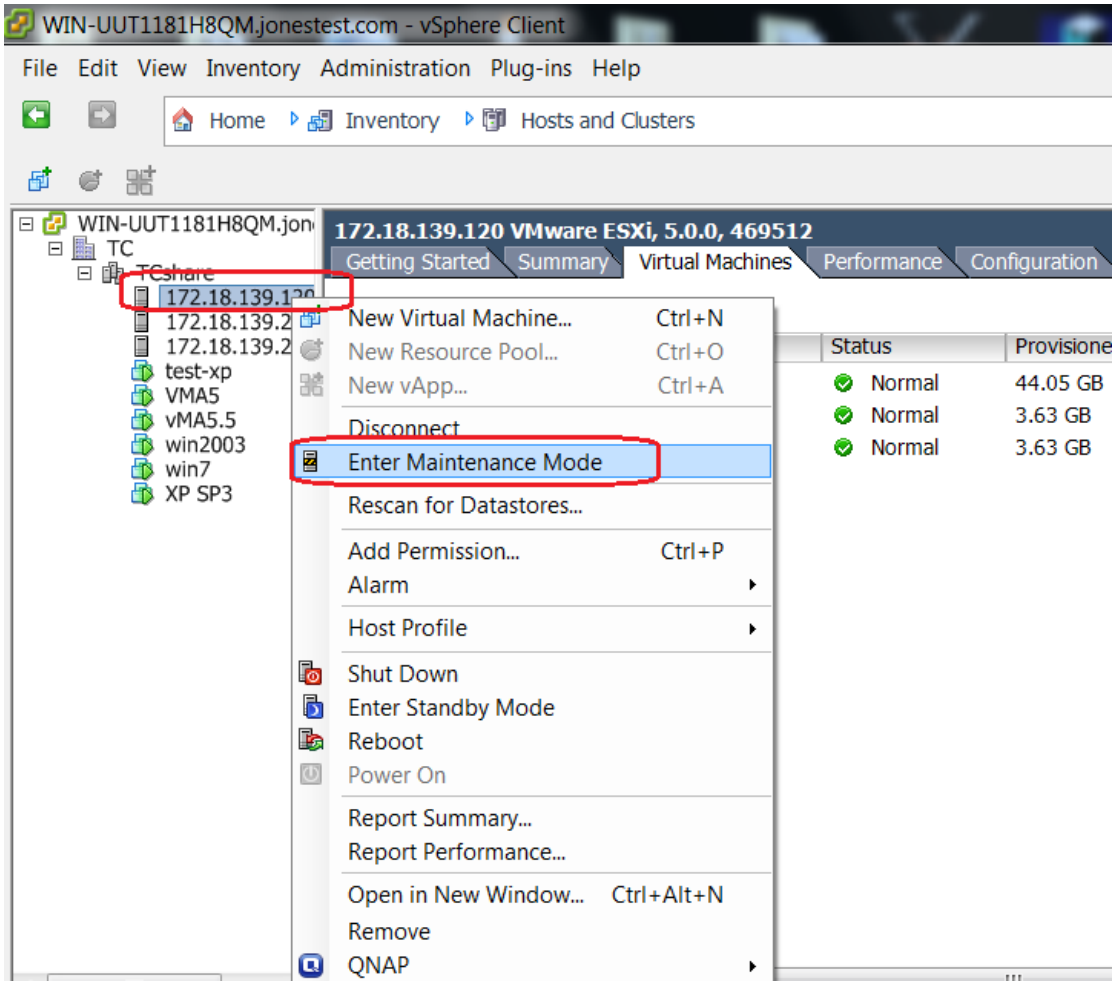

Image 2.1.3-1

- Refer to “Recent Tasks” list，the hosts can enter maintenance mode and the VMs can be migrated to the other ESXi/ESX hosts

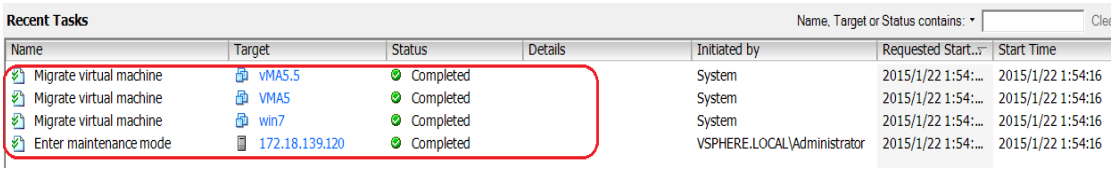

Image 2.1.3-2

- Right click ESXi/ESX hosts，Choose “Exit Maintenance Mode”, the ESXi/ESX will exit maintenance mode and the vCenter Server will assign the VMs go back to hosts

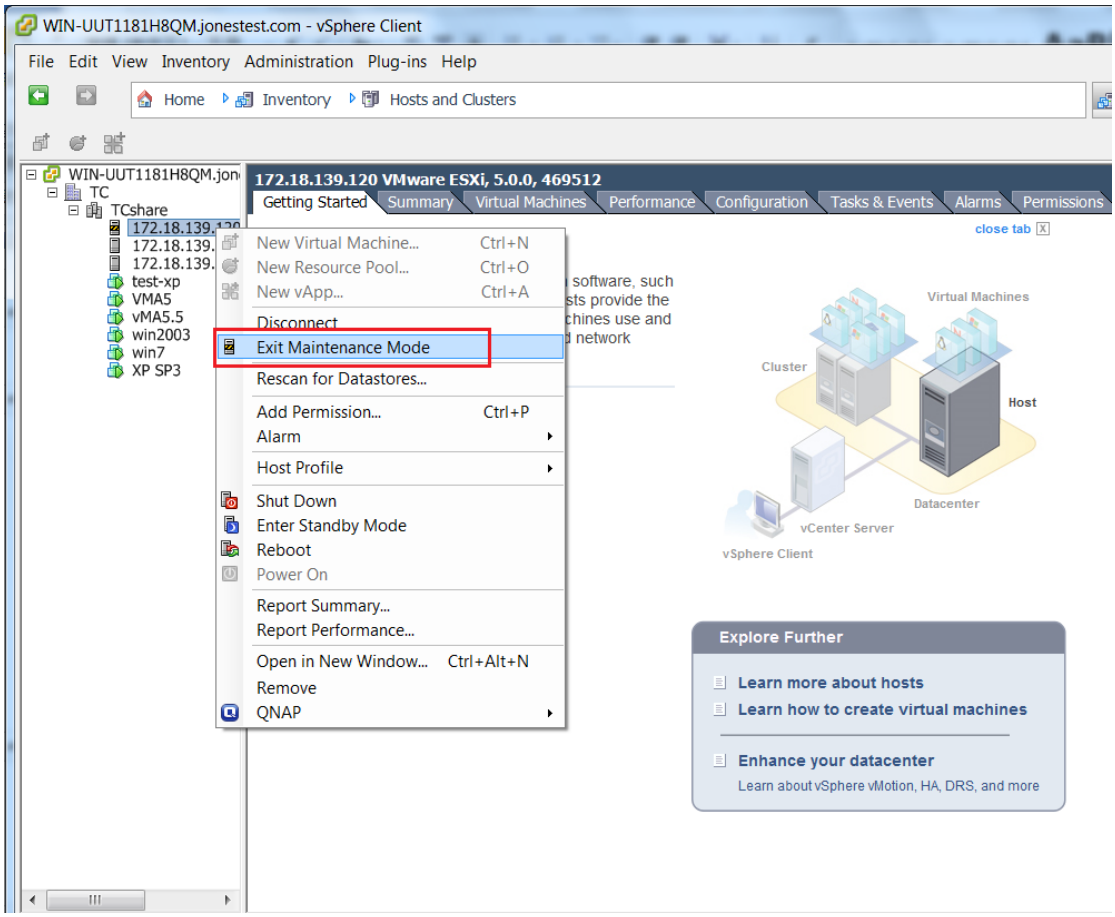

Image 2.1.3-3

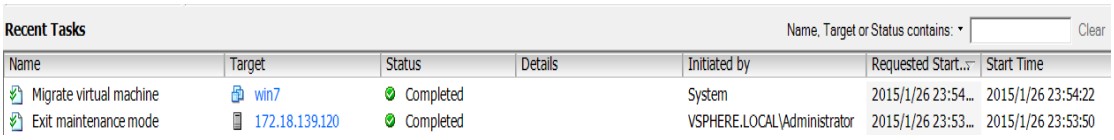

Image 2.1.3-4

2.2 Winpower configuration

2.2.1 Add vCenter server

- Open Winpower manager, click “System”->“Act as Administrator”. Input the administrator password.
- Click “VMotion” node，click “Add” button

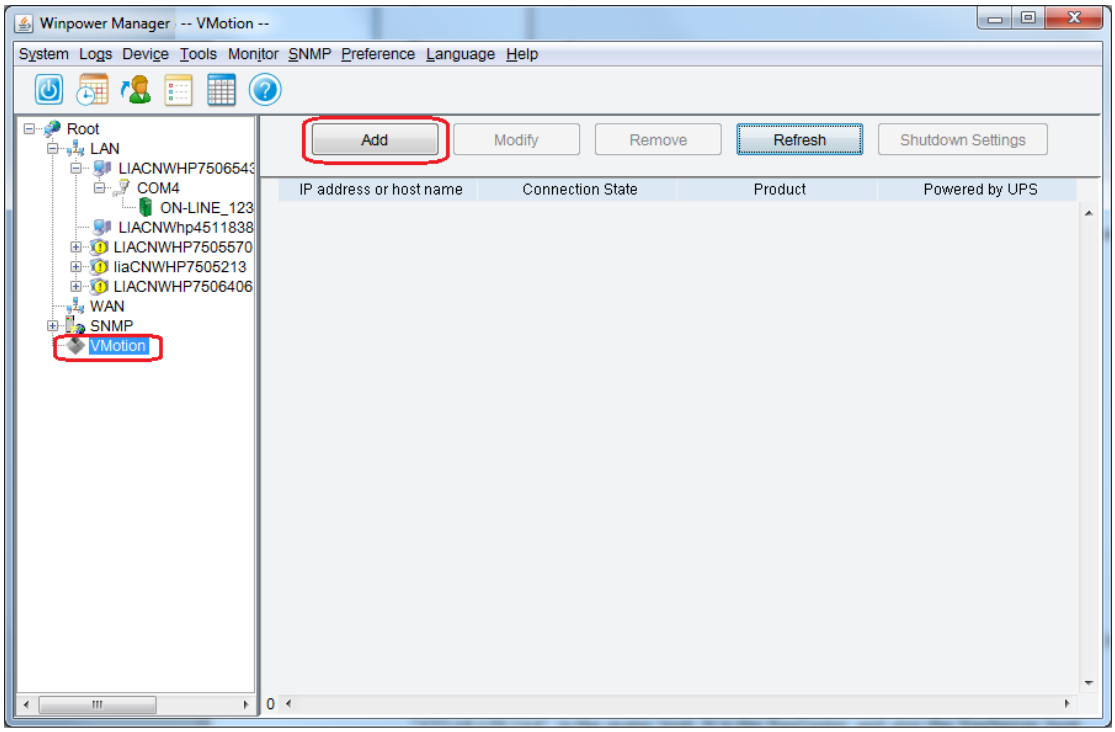

Image 2.2.1-1

- Choose “VMware vCenter” in “Product”, Input the vCenter server IP, user name, password in “Add VMware vCenter” dialog

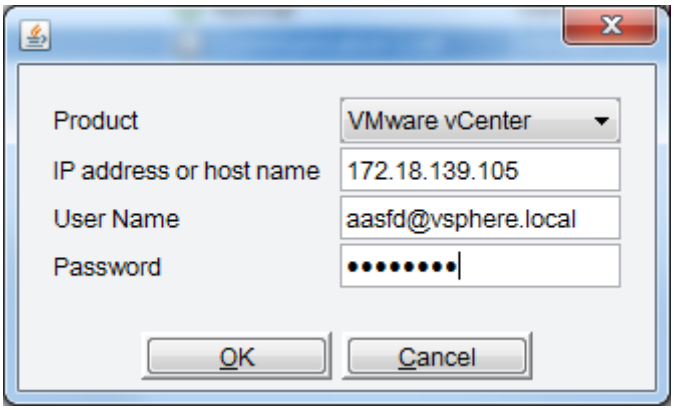

Image 2.2.1-2

2.2.2 Check vCenter server

- The vCenter server and the ESXi/ESX hosts in vCenter server will be listed under the “VMotion” node after adding the vCenter server

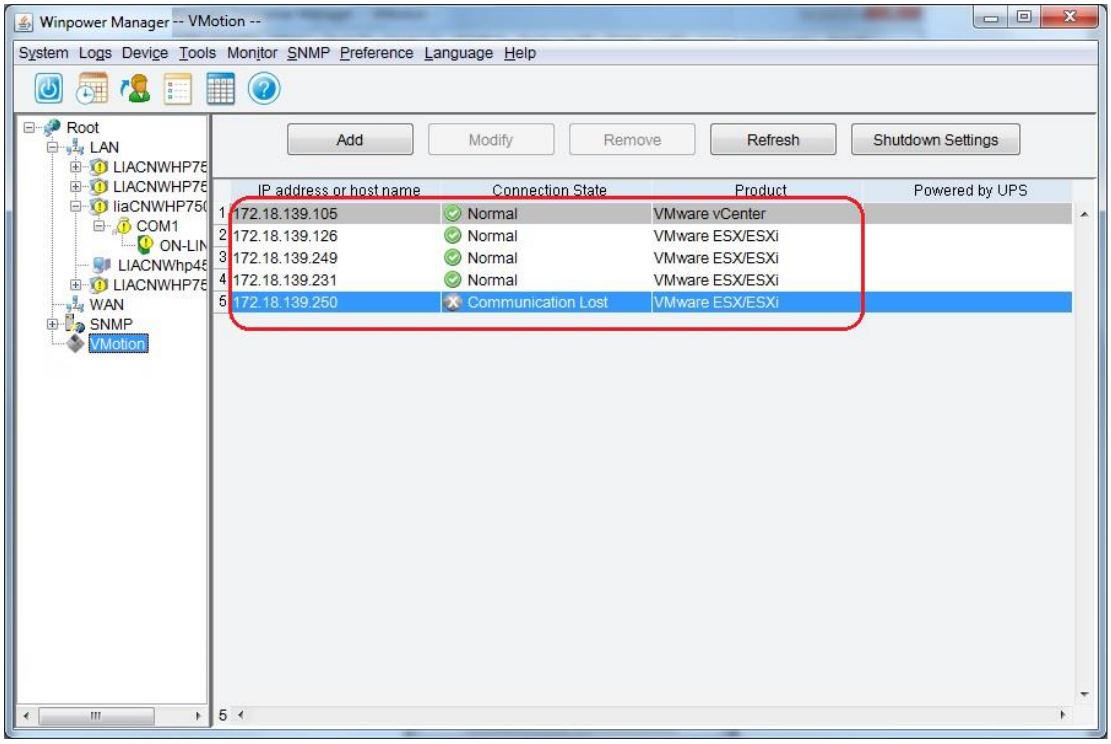

Image 2.2.2

Parameters	Define
IP address	List the vCenter server IP and ESXi/ESX hosts IP in vCenter server
Connection status	List vCenter server and ESXi/ESX hosts connection status. The status refresh every 30s
Powered by	List ESXi/ESX hosts powered by which UPS, depending on NMC IP
Product	There are two products: VMware ESXi/ESX and VMware vCenter

2.2.3 Shutdown Setting

- Choose “SNMP” node，click“SNMP”->“Search Device”，Input NMC start IP and end IP, search the NMC.

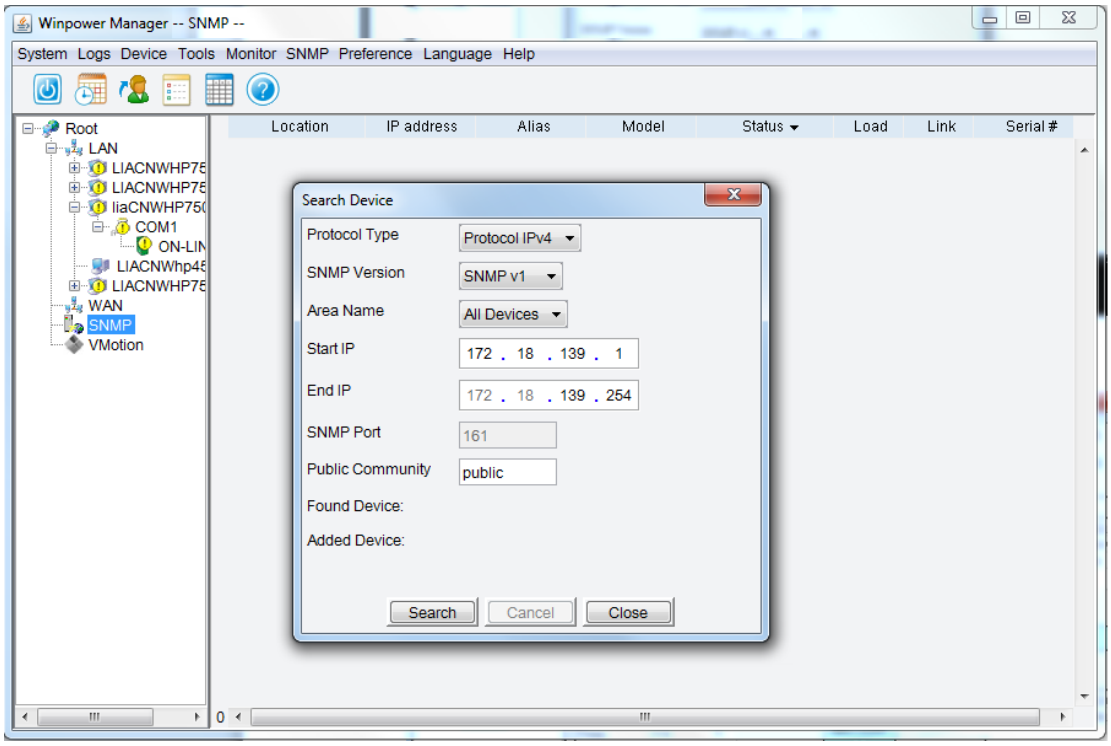

Image 2.2.3-1

- The NMC cards are added under the “SNMP” node as below:

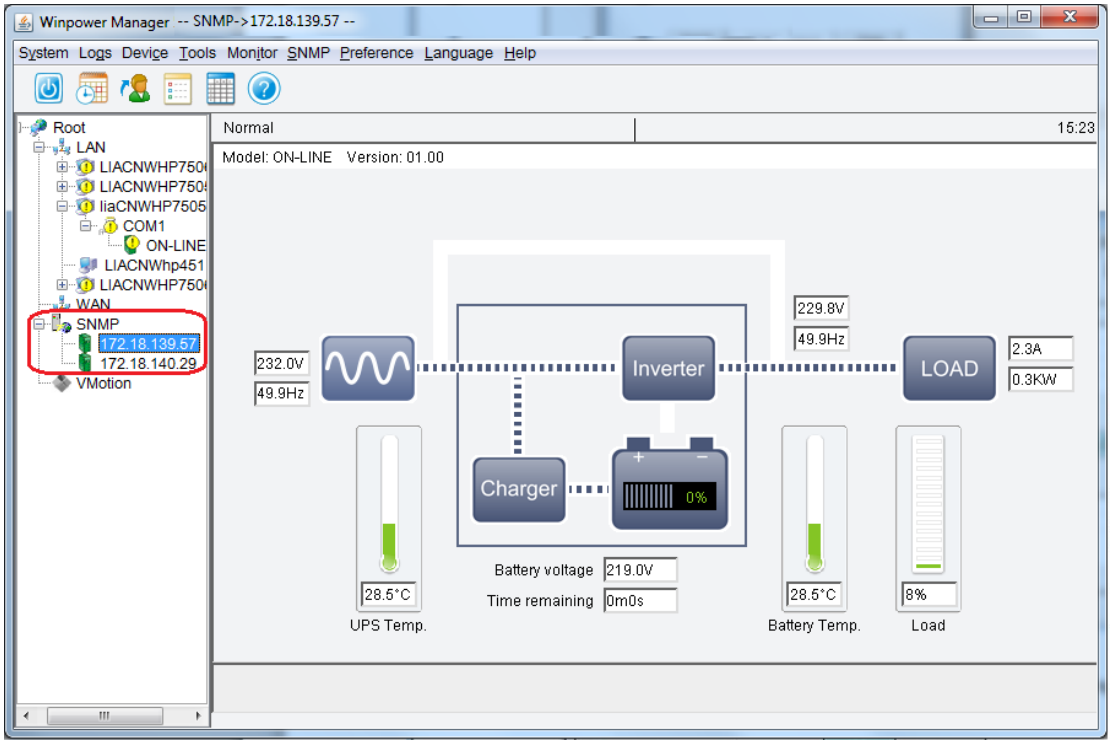

Image 2.2.3-2

- Choose the ESXi/ESX hosts under the “VMotion” node, click “Shutdown Settings” button

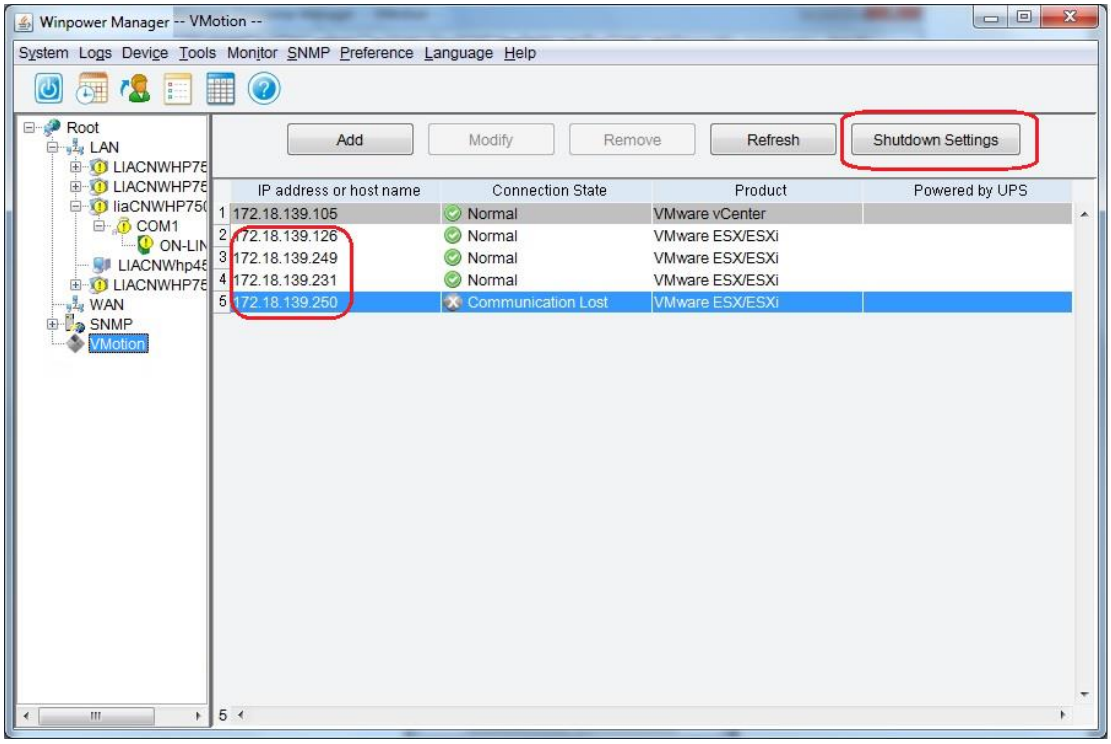

Image 2.2.3-3

- Open the “Shutdown Setting” dialog, the NMC in the “Powered by UPS” list is as same as the NMC under the “SNMP” tree node

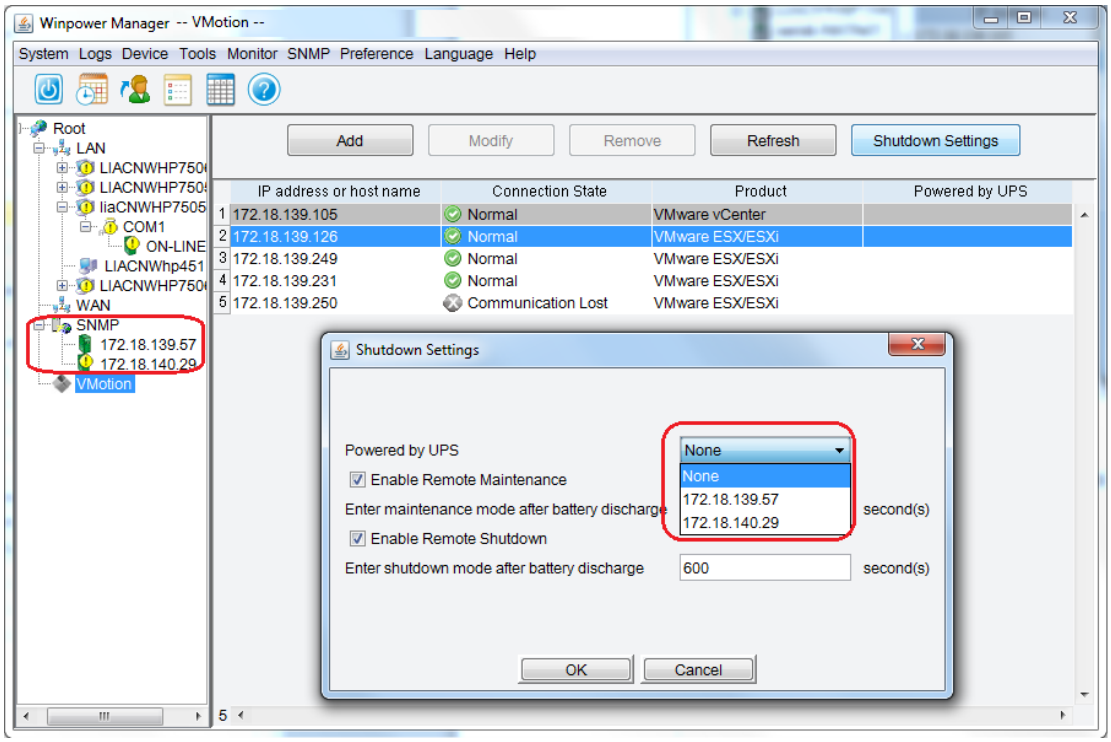

Image 2.2.3-4

- “Shutdown Setting” parameters as below:

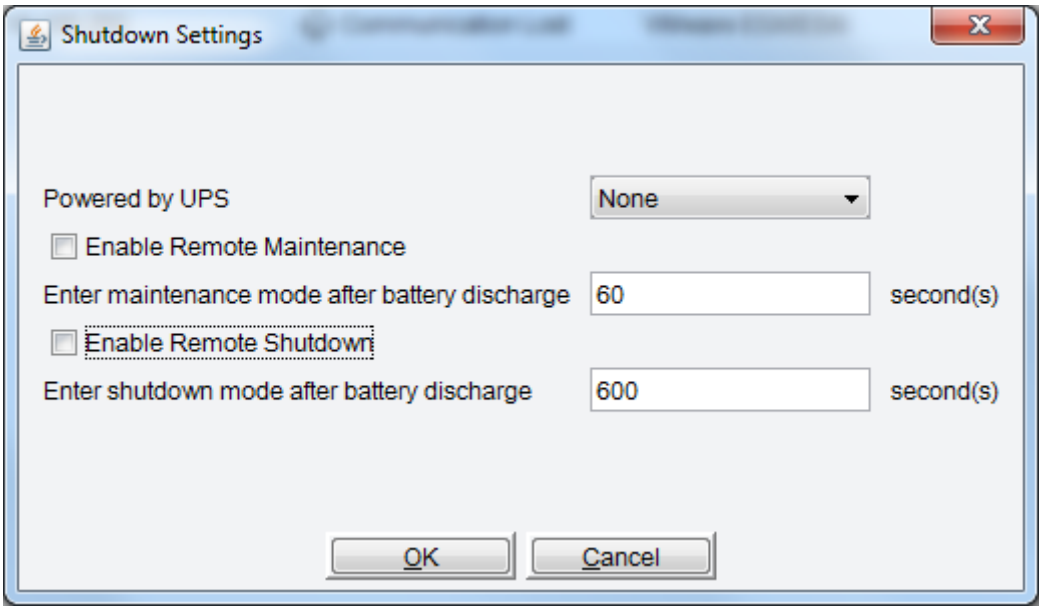

Image 2.2.3-5

Parameters	Define
Powered by UPS	This parameter identifies the ESXi/ESX hosts powered by which UPS, depending on NMC IP. The NMC in the "Powered by UPS" list must already exist in "SNMP" tree node.
Enable Remote Maintenance	If the option is enabled, the ESXi/ESX will enter maintenance mode when the time is reached.
Enter maintenance mode after battery discharge	Set the timer for the ESXi/ESX enter maintenance mode After UPS AC failing
Enable Remote Shutdown	If the option is enabled, the ESXi/ESX hosts will enter shutdown mode when the time is reached. ➢ If the "Enable Remote Maintenance" is checked and the ESXi/ESX hosts enter maintenance successfully, Winpower will shut down the hosts gracefully. ➢ If the "Enable Remote Maintenance" is checked but the ESXi/ESX hosts enter maintenance unsuccessfully, Winpower will shut down the hosts and VMs gracefully. ➢ If the "Enable Remote Maintenance" is unchecked, Winpower will shut down the hosts and VMs gracefully.
Enter shutdown mode after battery discharge	Set the timer for the ESXi/ESX enter shutdown mode After UPS AC failing ➢ If the "Enable Remote Maintenance" is checked, the "Shutdown Timer" should be longer than "Maintenance mode Timer" ➢ If the "Enable Remote Maintenance" is

	unchecked, you can set the “Shutdown Timer” as your needs

2.3 NMC configure

2.3.1 UPS shutdown timer

- Open NMC web, Click “UPS Management” -> “UPS shutdown”
  For the “AC Failed” Actions，We advise choose “Client&UPS Shutdown” option，so that when the timer is met，NMC will shut down the UPS. If choose “Client” option, the UPS will discharge until battery low when AC fail.
  For the “AC Failed” Warning period, the default timer is 900s. After the UPS AC fail for “Warning Period” time, The UPS shutdown (“UPS Shutdown Delay” timer) begin counting down.
- For example, the “Warning Period” is 900S and the “UPS Shutdown Delay” is 120S as below image:
  After UPS AC fail for 900S, the UPS shutdown count down. After AC failing 1020S (900+120) s, the UPS shut down
  For more info, please refer to NMC user manual <<Network Management Card User Manual.doc>>

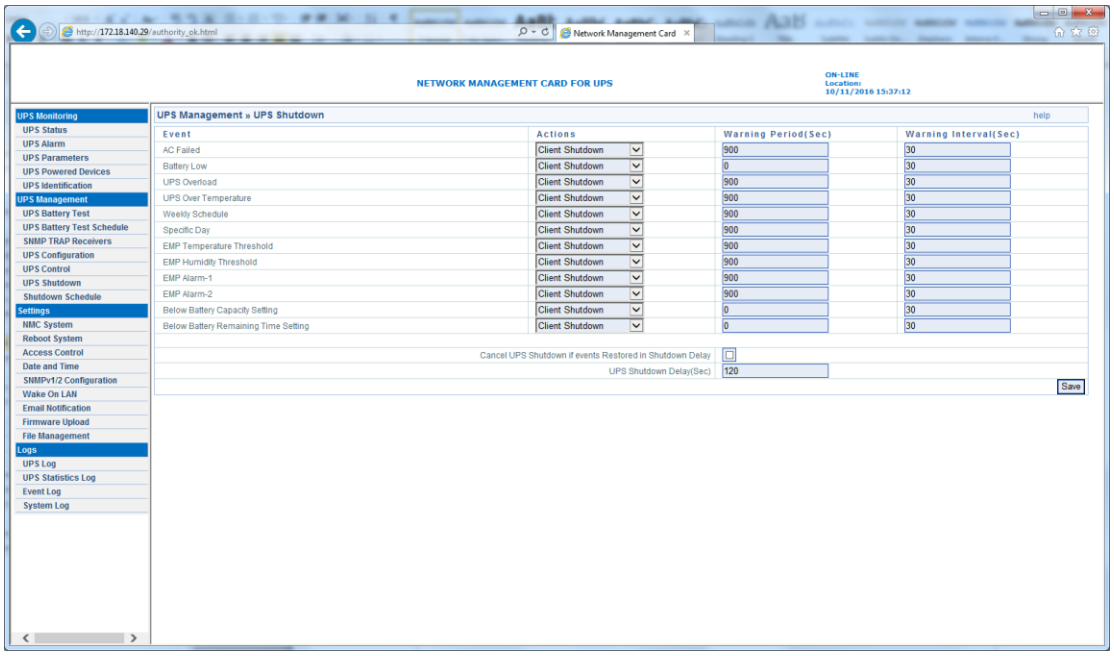

Image 2.3.1

2.3.2 Winpower timer and NMC timer

- Winpower maintenance time and shutdown time for vMotion should be shorter than

NMC “Warning Period”

For example: If the NMC shutdown setting is as the above image “Image 2.3.1” and the “Warning Period” for “AC Failed” is 900s, then the maintenance time and shutdown time should be shorter than 900s, so as to the UPS reserve enough time for VMware vMotion.

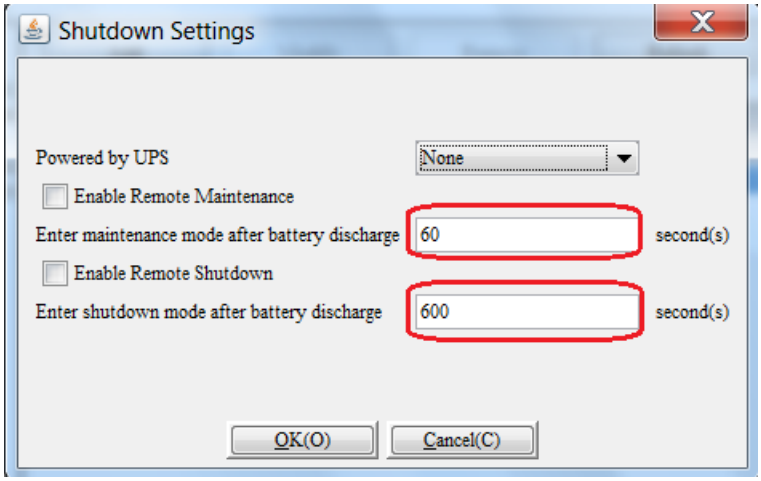

Image 2.3.2

3. Shutdown testing

3.1 ESXi/ESX shutdown Action reflected table

HA function in vCenter	Remote Maintenance in Winpower	Remote Shutdown in Winpower	VMs Action	Hosts Action	VMs action After hosts restart
Disable	Enable	Enable	VMs migrates to the other available host	Hosts enter maintenance mode first, then shut down	Depends on the VMs startup/shutdown configuration (Refer to section 2.1.2)
Disable	Disable	Enable	Shut down	Shut down	Depends on the VMs startup/shutdown configuration (Refer to section 2.1.2)
Disable	Enable	Disable	VMs migrates to the other available host	Hosts enter maintenance mode first, crash at the end	Depends on the VMs startup/shutdown configuration (Refer to section 2.1.2)
Disable	Disable	Disable	Crash	Crash	Depends on the VMs startup/shutdown configuration (Refer to section 2.1.2)
Enable	Enable	Enable	VMs migrates to the other available host	Hosts enter maintenance mode first, then shut down	VMs shutdown
Enable	Disable	Enable	Shut down	Shut down	VMs shutdown
Enable	Enable	Disable	VMs migrates to the other available	Hosts enter maintenance mode first, crash at the	VMs shutdown

			host	end	
Enable	Disable	Disable	Crash	Crash	VMs shutdown

3.2 Simulate shutdown testing

Test environment:

There are two ESXi hosts, two pieces of UPS and two pieces of NMC

ESXi1connect with UPS1, ESXi2 connect with UPS2

UPS1 connect with NMC1, UPS2 connect with NMC2

- NMC web: The shutdown setting for the two NMC is as below image.
  "Warning Period" for the "AC failed" is three minutes (180s)
  "UPS shutdown delay" time is two minutes (120s)

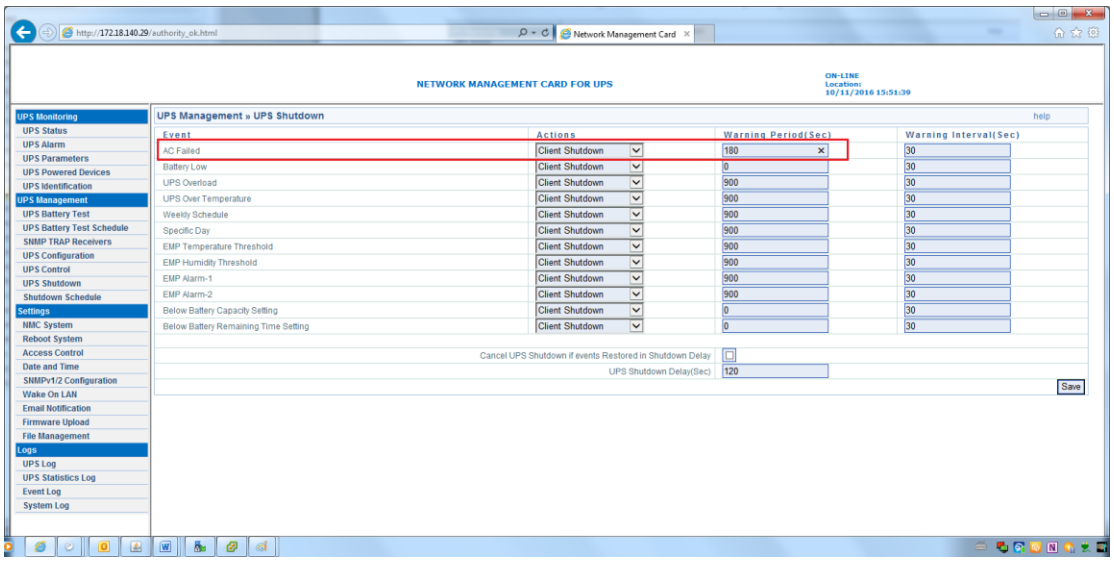

Image 3.2-1

- Winpower: ESXi1 powered by UPS1, maintenance time is 1 minute, shutdown time is 2 minutes

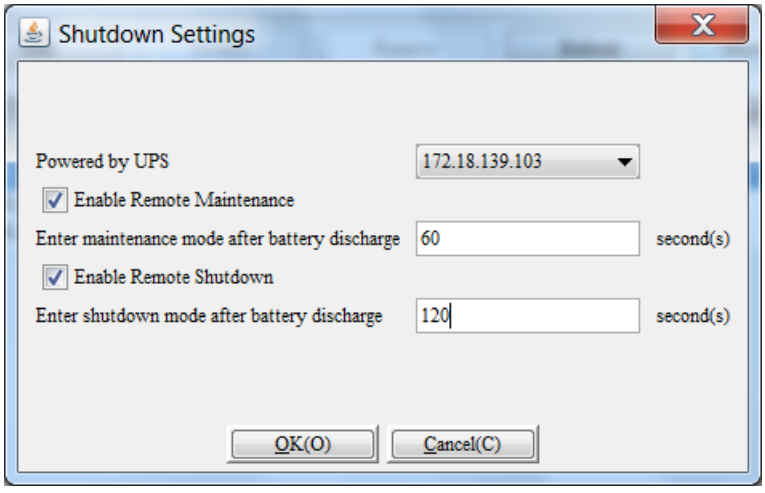

Image 3.2-2

- Winpower: ESXi2 powered by UPS2, maintenance time is 1 minute, shutdown time is 2

minutes

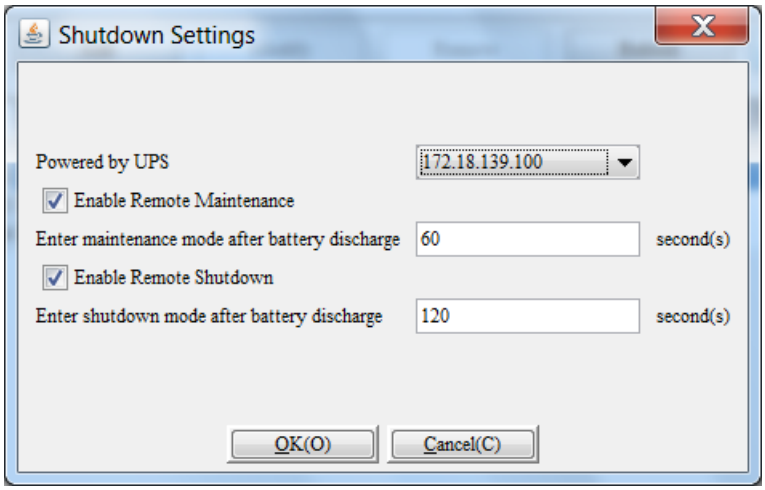

Image 3.2-3

3.2.1 Case one

- Test result：
- After UPS1 AC failing for one minute, ESXi1 enter maintenance mode, the VMs migrate to ESXi2
- After UPS1 AC failing for two minutes, ESXi1 shut down
- After UPS1 AC failing for three minutes, UPS1 shutdown counter down
- After UPS1 AC failing for five minutes, UPS1 shut down
- After UPS1 AC restoring, ESXi1 start up and exit maintenance mode，vCenter Server assign VMs go back to ESXi1 from ESXi2

3.2.2 Case two

- Test result：
- After UPS1 AC failing for one minute, ESXi1 enter maintenance mode, the VMs migrate to ESXi2
- If the UPS1 AC restore when the VMs are migrating, the VMs go on migrating and the ESXi1 go on entering maintenance mode. But the ESXi1 will exit maintenance instantly and the vCenter Server will assign VMs go back to ESXi1 from ESXi2
- UPS1 is online, ESXi1 works fine.

3.2.3 Case three

- Test result：
- UPS1 AC fail, UPS2 AC fail
- After one minute, ESXi1 enter maintenance mode, the VMs migrate to ESXi2.
  ESXi2 enter maintenance mode, but there are no available hosts, so ESXi2 enter

maintenance mode failed

- After two minutes, ESXi1 shut down, then VMs on the ESXi2 shut down, finally ESXi2 shut down
- After five minutes, UPS1 and UPS2 shut down
- UPS1 and UPS2 AC restore, ESXi1 start up and exit maintenance mode, ESXi2 startup and work fine

4. Protect vCenter Server

4.1 Protect vCenter Server via Winpower

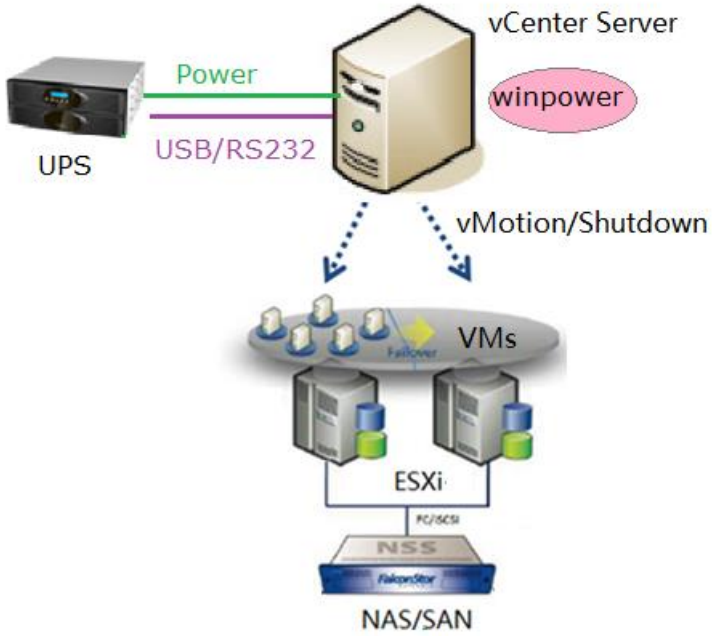

Image 4.1-1

- Winpower is installed on vCenter server， UPS is connected with vCenter server via USB/RS232
  Auto search UPS firstly, then set the shutdown parameters
  For more info about Winpower shutdown, please refer to Winpower user manual<<UserManual.doc>>

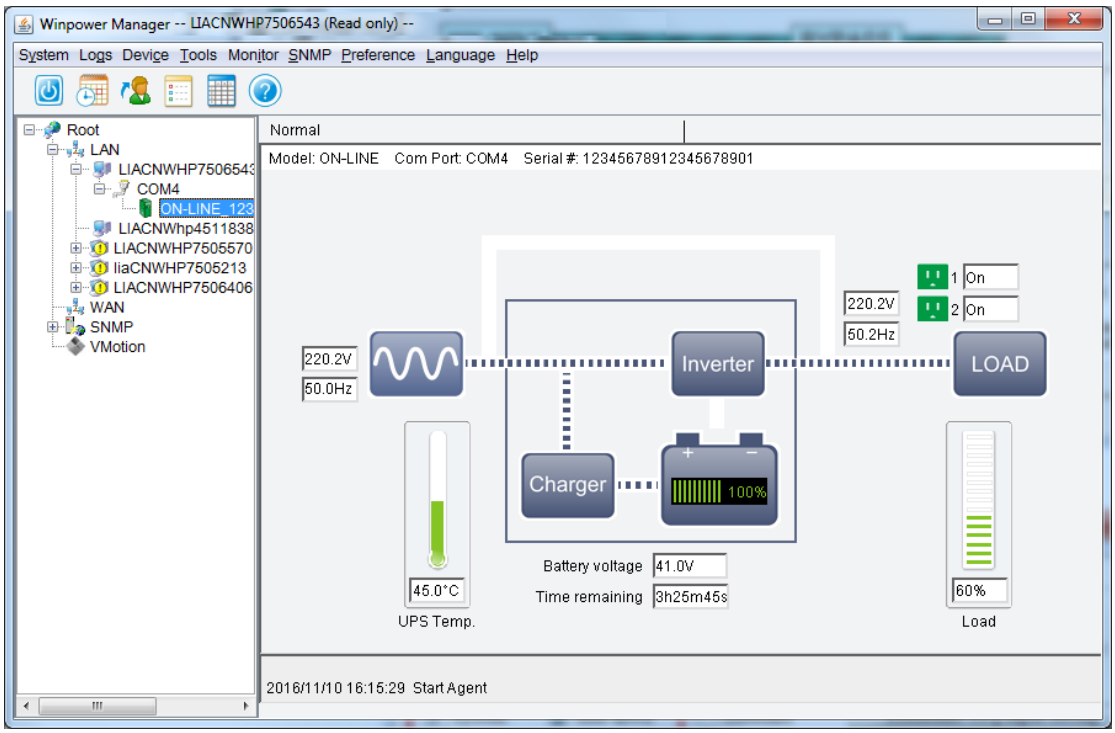
Winpower Manager -- LIACNWHP7506543 (Read only) --
System Logs Device Tools Monitor SNMP Preference Language Help
Root
LAN
LIACNWHP7506543
COM4
ON-LINE_123
LIACNWhp4511838
LIACNWHP7505570
liaCNWHP7505213
LIACNWHP7506406
WAN
SNMP
VMotion
Normal
Model: ON-LINE Com Port: COM4 Serial #: 12345678912345678901
220.2V
50.0Hz
Inverter
220.2V
50.2Hz
1 On
2 On
LOAD
Charger
100%
45.0°C
UPS Temp.
Battery voltage 41.0V
Time remaining 3h25m45s
60%
Load
2016/11/10 16:15:29 Start Agent

Image 4.1-2

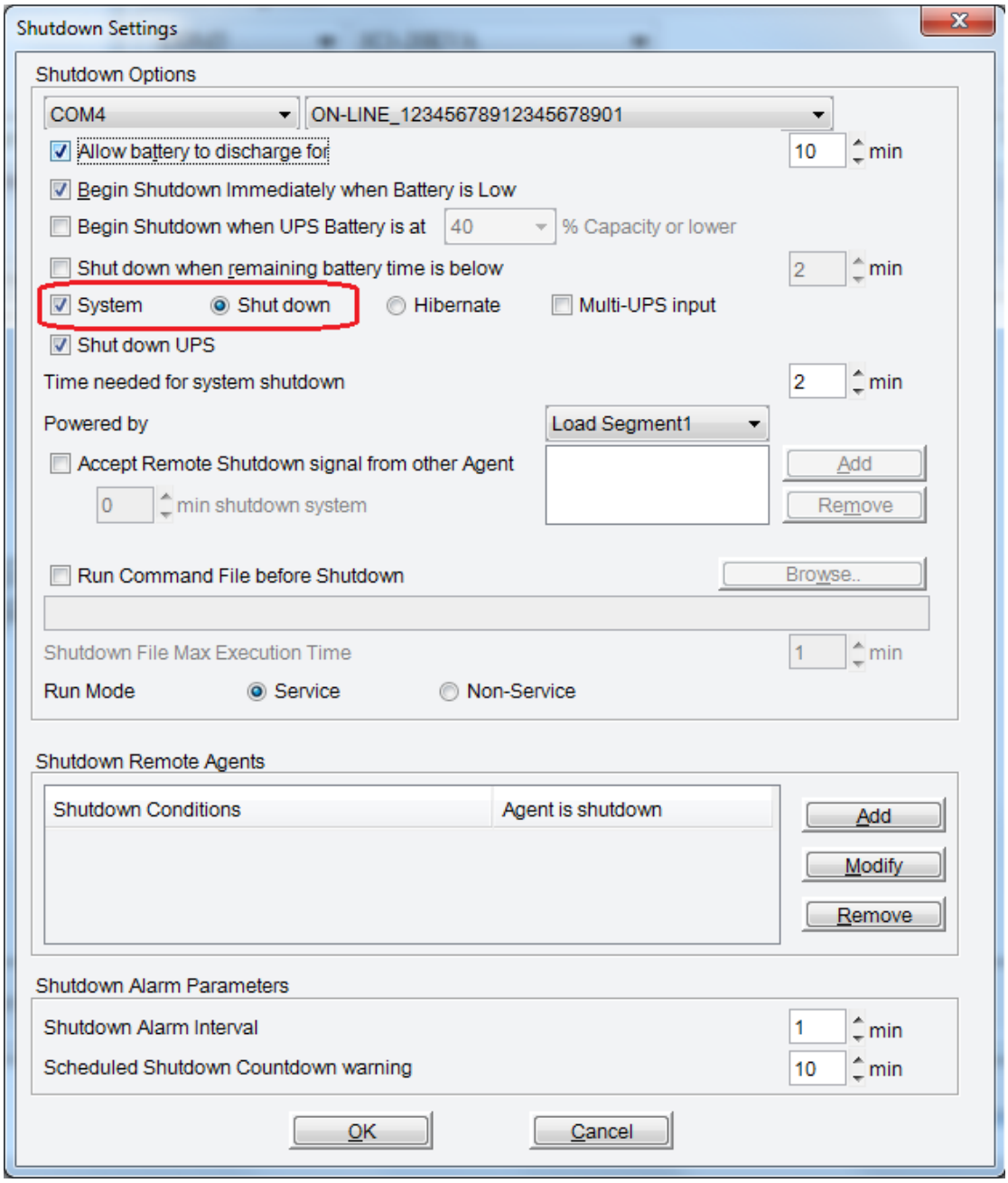
Shutdown Settings
Shutdown Options
COM4
ON-LINE_12345678912345678901
Allow battery to discharge for
10
min
Begin Shutdown Immediately when Battery is Low
Begin Shutdown when UPS Battery is at
40
% Capacity or lower
Shut down when remaining battery time is below
2
min
System
Shut down
Hibernate
Multi-UPS input
Shut down UPS
Time needed for system shutdown
2
min
Powered by
Load Segment1
Accept Remote Shutdown signal from other Agent
Add
0
min shutdown system
Remove
Run Command File before Shutdown
Browse..
Shutdown File Max Execution Time
1
min
Run Mode
Service
Non-Service
Shutdown Remote Agents
Shutdown Conditions
Agent is shutdown
Add
Modify
Remove
Shutdown Alarm Parameters
Shutdown Alarm Interval
1
min
Scheduled Shutdown Countdown warning
10
min
OK
Cancel

Image 4.1-3

4.2 Protect vCenter Server via SPS

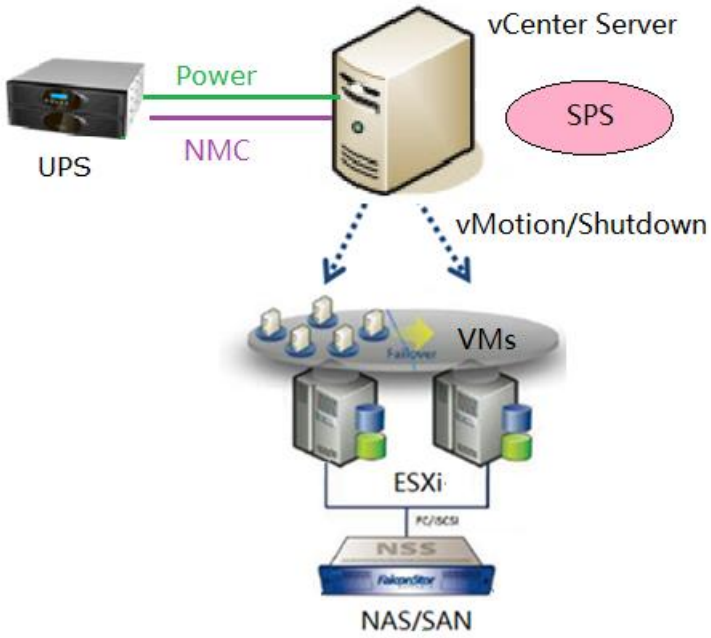

Image 4.2-1

- SPS is installed on vCenter server， UPS is connected with NMC, Add NMC in SPS
  When the UPS AC fail, the NMC will send the shutdown notification to SPS, the SPS will send shutdown command to vCenter server
  For more info about SPS shutdown, please refer to SPS user manual<< System Protect Software User Manual.doc >>
  For more info about NMC shutdown, please refer to NMC user manual<< Network Management Card User Manual.doc >>

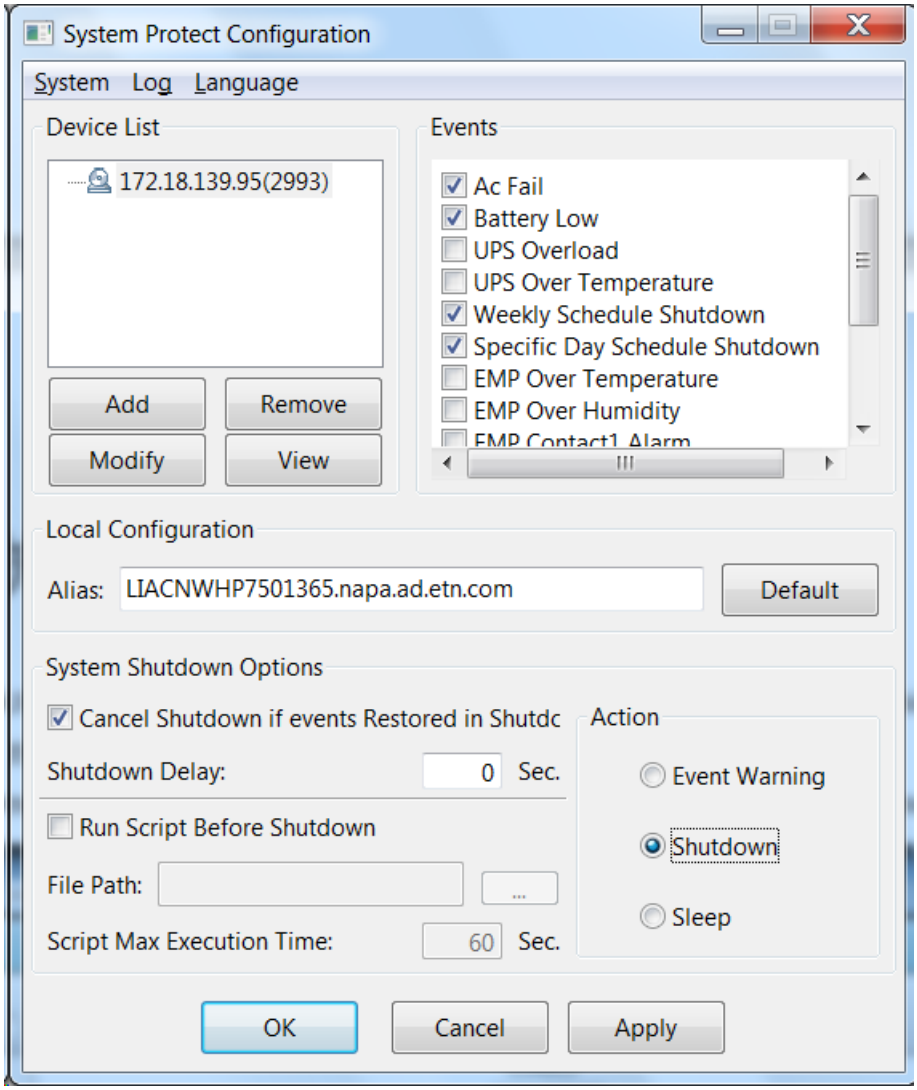
System Protect Configuration
System
Log
Language
Device List
172.18.139.95(2993)
Add
Remove
Modify
View
Events
Ac Fail
Battery Low
UPS Overload
UPS Over Temperature
Weekly Schedule Shutdown
Specific Day Schedule Shutdown
EMP Over Temperature
EMP Over Humidity
Local Configuration
Alias:
LIACNWHP7501365.napa.ad.etn.com
Default
System Shutdown Options
Cancel Shutdown if events Restored in Shutdc
Shutdown Delay:
0
Sec.
Run Script Before Shutdown
File Path:
Script Max Execution Time:
60
Sec.
Action
Event Warning
Shutdown
Sleep
OK
Cancel
Apply

Image 4.2-2

5. Protect NAS/SAN（NAS QNAP TS-269 pro as example）

5.1 Over viewer

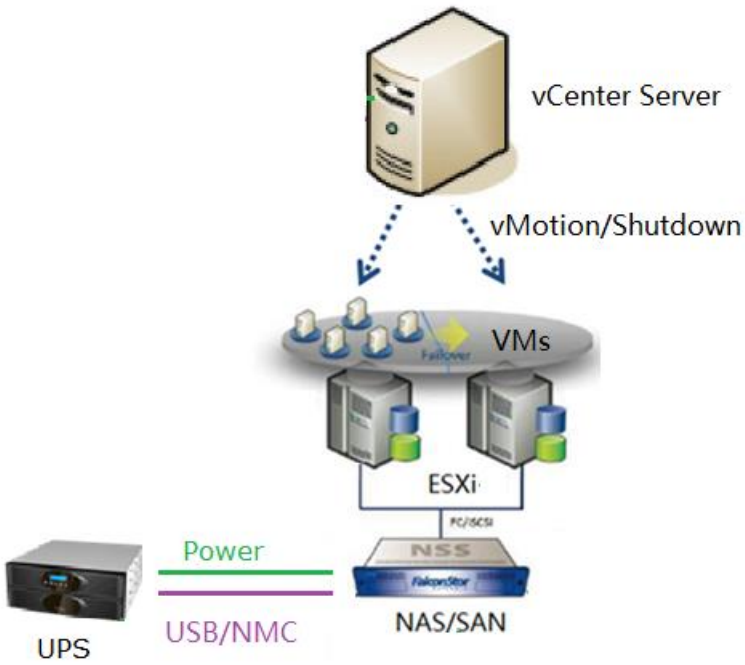

Image 5.1

5.2 Protect NAS/SAN via SNMP

Note：Please purchase NAS/SAN attachment with “USB/SNMP” function

- NAS/SAN is powered by UPS，UPS is connected with NMC
- Open NAS Web， click “External Device”->“UPS”, choose “UPS with SNMP management” in the “Protocol”, input NMC IP, set the shutdown condition

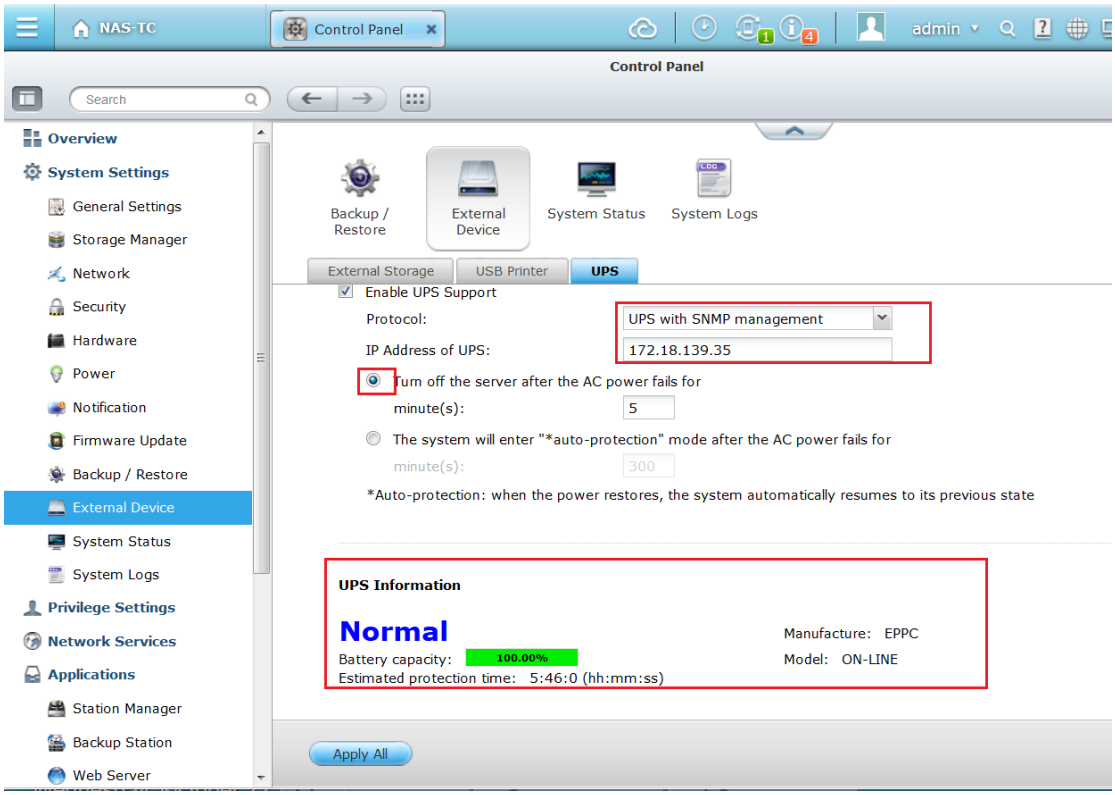

Image 5.2-1

- NAS server will be shut down after UPS AC failing for 5 minutes. You can check the system logs also.
  The system logs recorded “Power loss detected on UPS. System would be shut down after 5 minutes”

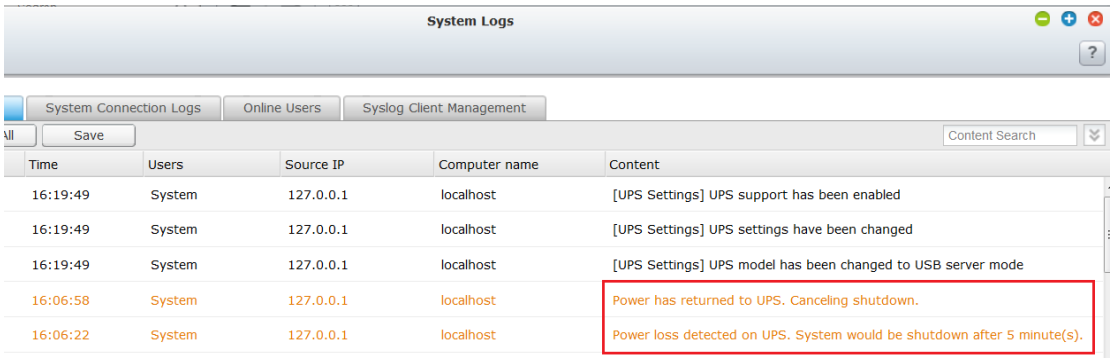

Image 5.2-2

5.3 Protect NAS/SAN via USB

Note：Please purchase NAS/SAN attachment with “USB/SNMP” function

- NAS/SAN is powered by UPS，UPS is connected with NAS/SAN via USB
- Please take priority of purchasing HID Power Device UPS, because only partly Q1 UPS are supported. Following Q1 UPS are passed our testing:
  PID/VID: 0665/5161, 06da/0003, 06da/0004
- Open NAS Web，choose “External Device”->“UPS”, UPS will be detected automatically
  Set the shutdown condition.

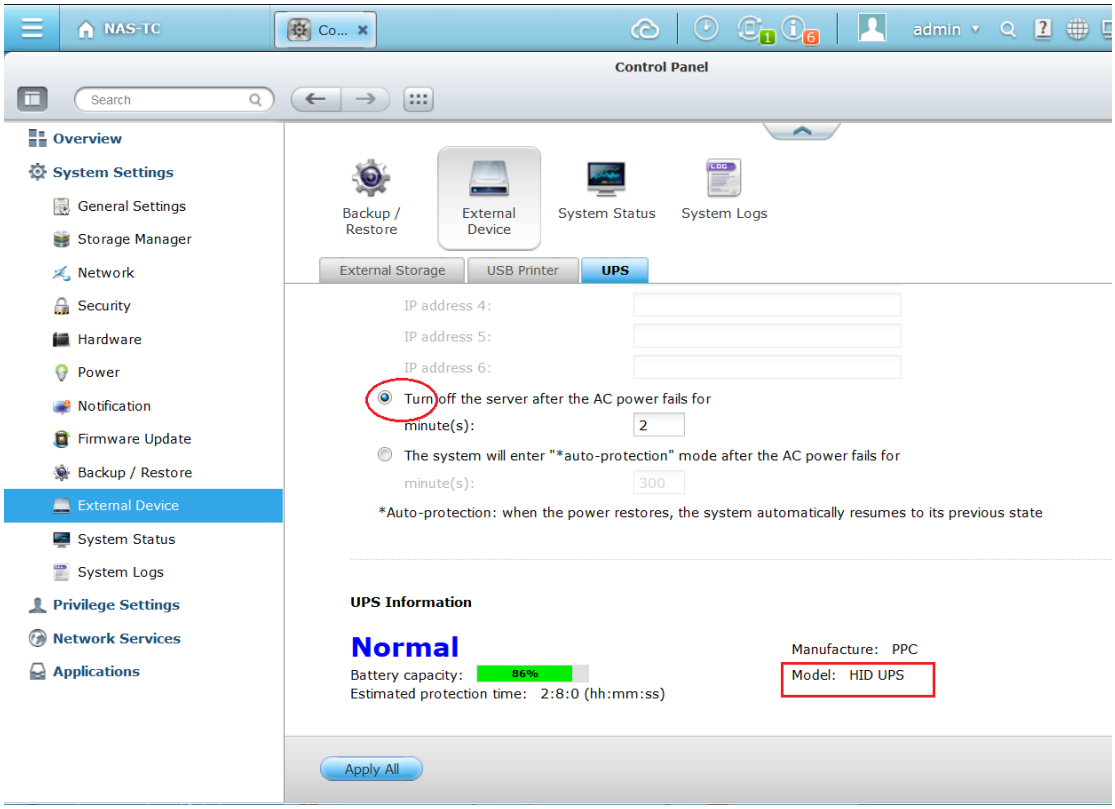

Image 5.3

- NAS will be shut down after UPS AC failing for 2 minutes.