Microsoft virtual architecture:
- Hyper-V 6.0 Manager
- Hyper-V Server (R1 & R2)
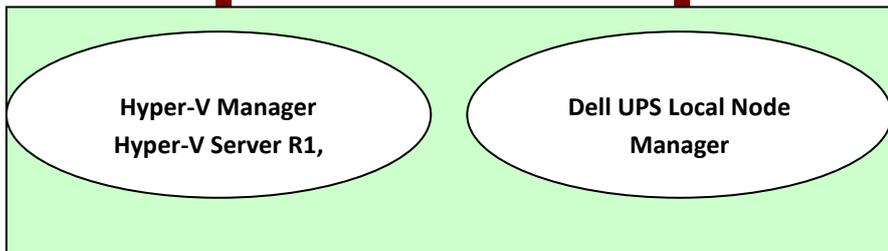
TABLE OF CONTENTS

1. INTRODUCTION

Dell is a world class supplier of hardware and software optimizing business continuity on your Microsoft virtual platforms worldwide. The system includes controlling proper boot and graceful shutdown of:

- The virtual machines hosted on a same physical machine.
- The main operating system hosting *Microsoft Hyper-V* or *Hyper-V Server*.

Dell UPS Local Node Manager is Dell's solution to automate various data security functions. It:

- Continuously waits for information from the UPS Management Card (Dell PN H910P) connected to the Dell UPS.
- Warns administrators and users if AC power fails
- Proceeds to shutdown system before the end of battery backup power is reached.
- Restarts machines when AC power restarts.

Microsoft Hyper-V (or Hyper-V Server) controls the Virtual Machine's shutdown and restart functions. **Dell UPS Local Node Manager** can be installed on the main operating system (hosting Hyper-V).

Dell UPS Local Node Manager will consolidate information from the UPS which is supplying the server. Advantages of installing our protection software on the main operating system (hosting Hyper-V) include:

- Only one deployment of **Dell ULNM** on physical machine, to manage all virtual machines.
- Silent deployment possibility.
- Dynamic management of virtual machines configuration, with a personalized script.

This manual will guide you through the installation and configuration process of the **Dell UPS Local Node Manager** on *Microsoft Hyper-V* (or *Hyper-V Server*) platform.

Dell tested virtualization security in a redundant power supply configuration, for system shutdown, electrical shutdown, and reboot.

2. INSTALLATION

This section will guide the user through the installation process of **Dell UPS Local Node Manager** on Microsoft Hyper-V architecture. Use of **Dell UPS Local Node Manager** will allow continuity of the electrical power supply to the end user's internal power system.

2.1. INSTALLATION PREREQUISITES

2.1.1. TEST CONFIGURATION WITH HYPER-V MANAGER

This procedure was validated using **Microsoft Windows 2008 Enterprise R1, R2 x64** as the main operating system (hosting **Hyper-V**). The system had the following applications installed:

- **Microsoft Hyper-V** hosting several virtual machines :
  - Windows 2000 Server SP4 and Advanced Server SP4
  - Windows Server 2003 x86/x64 R2 SP2
  - Windows Server 2008 x86/x64 SP1/SP2
  - Windows XP Professional SP2/SP3 and x64 SP2
  - Windows Vista SP1/SP2 (except Home editions)
  - Windows Seven x86/x64 (except Home editions) (Only On Server 2008 R2)
  - SUSE Linux Enterprise Server 10 SP2 & 11
  - Red Hat Enterprise Linux 5.2/5.3/5.4 x86/x64
- **Dell UPS Local Node Manager** for Windows.

2.1.2. TEST CONFIGURATION WITH HYPER-V SERVER R1 & R2

This procedure was validated using Hyper-V Server running on an x64 machine.

- **Microsoft Hyper-V Server** was hosting:
  - Windows 2000 Server SP4 and Advanced Server SP4
  - Windows Server 2003 x86/x64 R2 SP2
  - Windows Server 2008 x86/x64 SP1/SP2
  - Windows XP Professional SP2/SP3 and x64 SP2
  - Windows Vista SP1/SP2 (except Home editions)
  - Windows Seven x86/x64 (except Home editions) (Only on Hyper-V Server R2)
  - SUSE Linux Enterprise Server 10 SP2 & 11
  - Red Hat Enterprise Linux 5.2/5.3/5.4 x86/x64
- **Dell UPS Local Node Manager** for Windows.

Note: Hyper-V Server **doesn't support** *RS232* communication port; please connect the UPS through the USB link or through the Network link.

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2.2. MICROSOFT HYPER-V MANAGER / HYPER-V SERVER R1 & R2 CONFIGURATION

For the automatic OS boot on start-up, the user must configure the physical machine to allow automatic OS boot on start-up. This is found in the machine's BIOS.
For further information, see specific documentation of the physical hardware.

Note: It may be required to activate Virtualization Technology Enabled (in the machine's BIOS) to run Hyper-V, in **CPU Information -> Virtualization Technology -> Enabled**

To enable graceful virtual machines shutdown, it is necessary to install on each Virtual Machine the additional program **"Guest Component Service"** included in the operating system and to configure it.

2.2.1. "GUEST COMPONENT SERVICE" INSTALLATION

- Open the Hyper-V console and start your virtual machine.
- Select the *Action tab* ➔ *insert the disk integration services*.
- Install the Service. To check that installation works fine, verify that the software is available in the Control Panel of the virtual machine ("Add / Remove Programs").

2.2.2. SERVICES CONFIGURATION

- Open Hyper-V console and select the virtual machine where the service was installed.
- Do a Right-click. Choose *Settings* ➔ *Integration Services*.
- Check the box "Operating System shutdown".

This configuration is illustrated on the following screenshot:
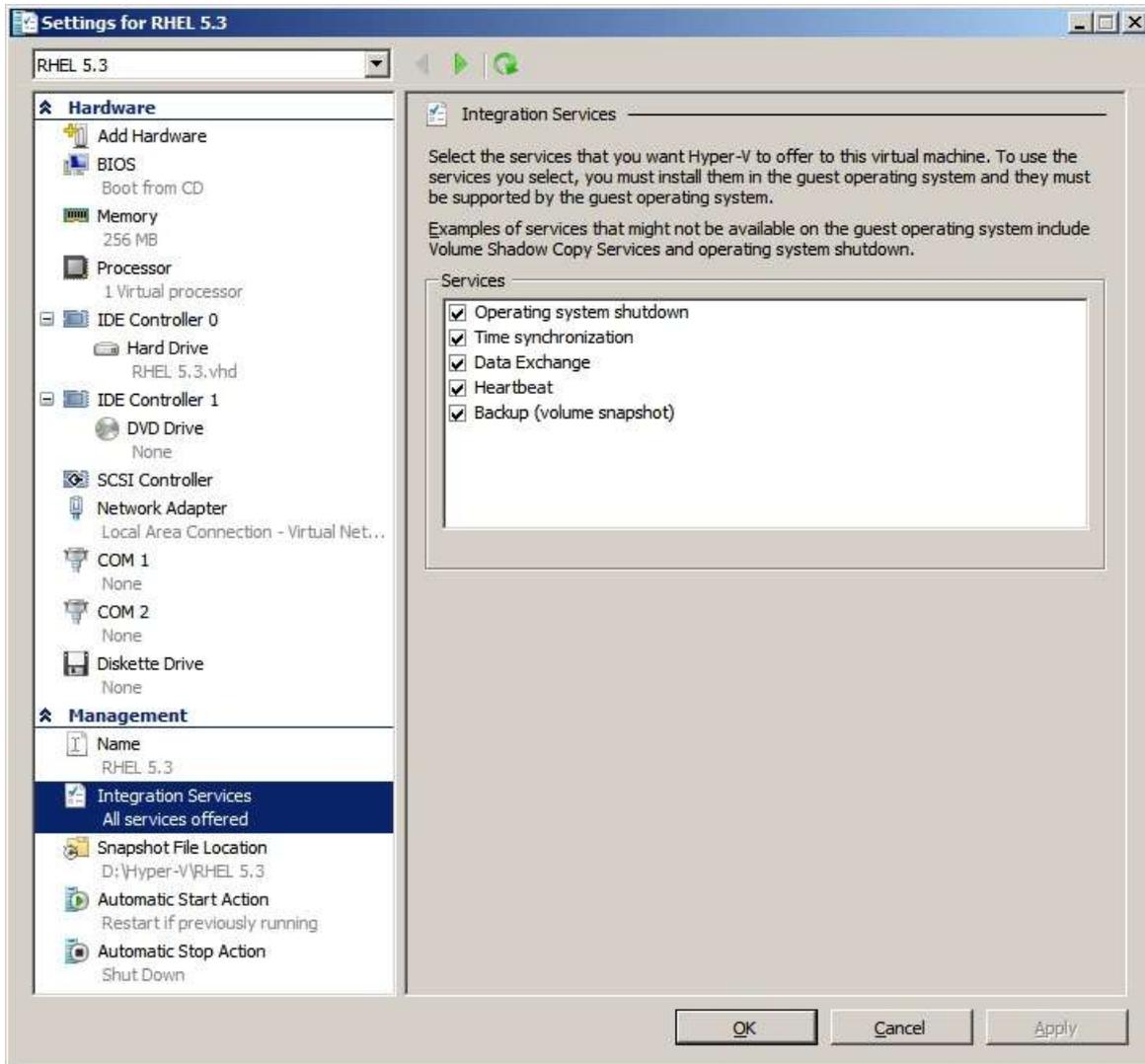
To ensure an **automatic boot** of each virtual machine when Microsoft Hyper-V starts-up, use the following procedure:
- From the "Hyper-V" manager:
  - Select the virtual Machine list
  - Select the "Virtual Machine"
  - Select *Parameters → Manage → Automatic Start Action*
  - Choose the appropriate parameters for the virtual machine that coincide with the start rules of the specific application.

This configuration is illustrated on the following screenshot:
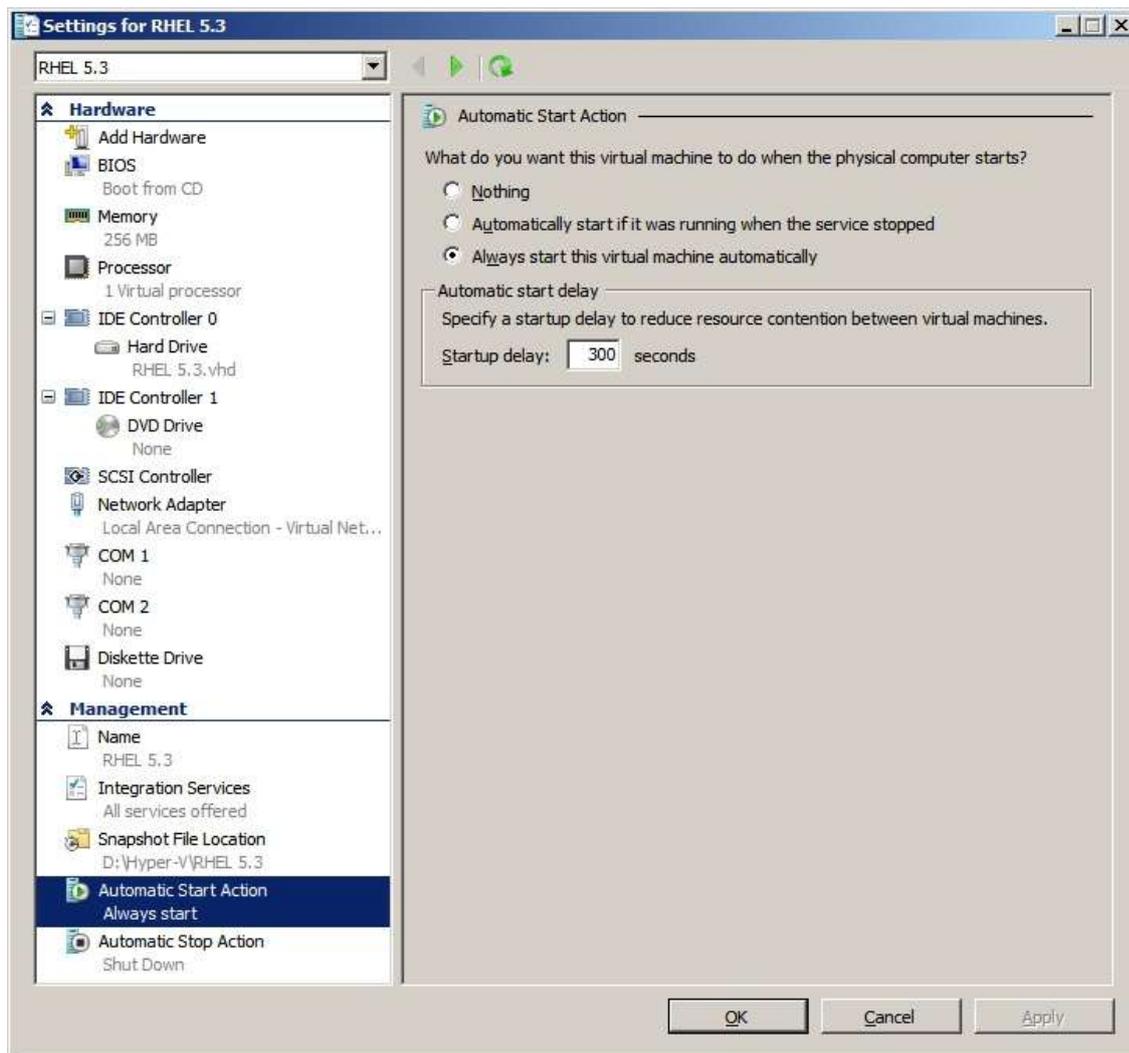
Follow this procedure to ensure an **automatic graceful shutdown** of each virtual machine when Microsoft Hyper-V stops:

- From the "Hyper-V" manager:
  - Select the virtual Machine list,
  - Select the "Virtual Machine"
  - Select *Parameters → Management → Automatic Stop Actions*,
  - Choose the appropriate parameters for the virtual machine, to fit with shutdown rules of the specific application

This configuration is illustrated on the following screenshot:
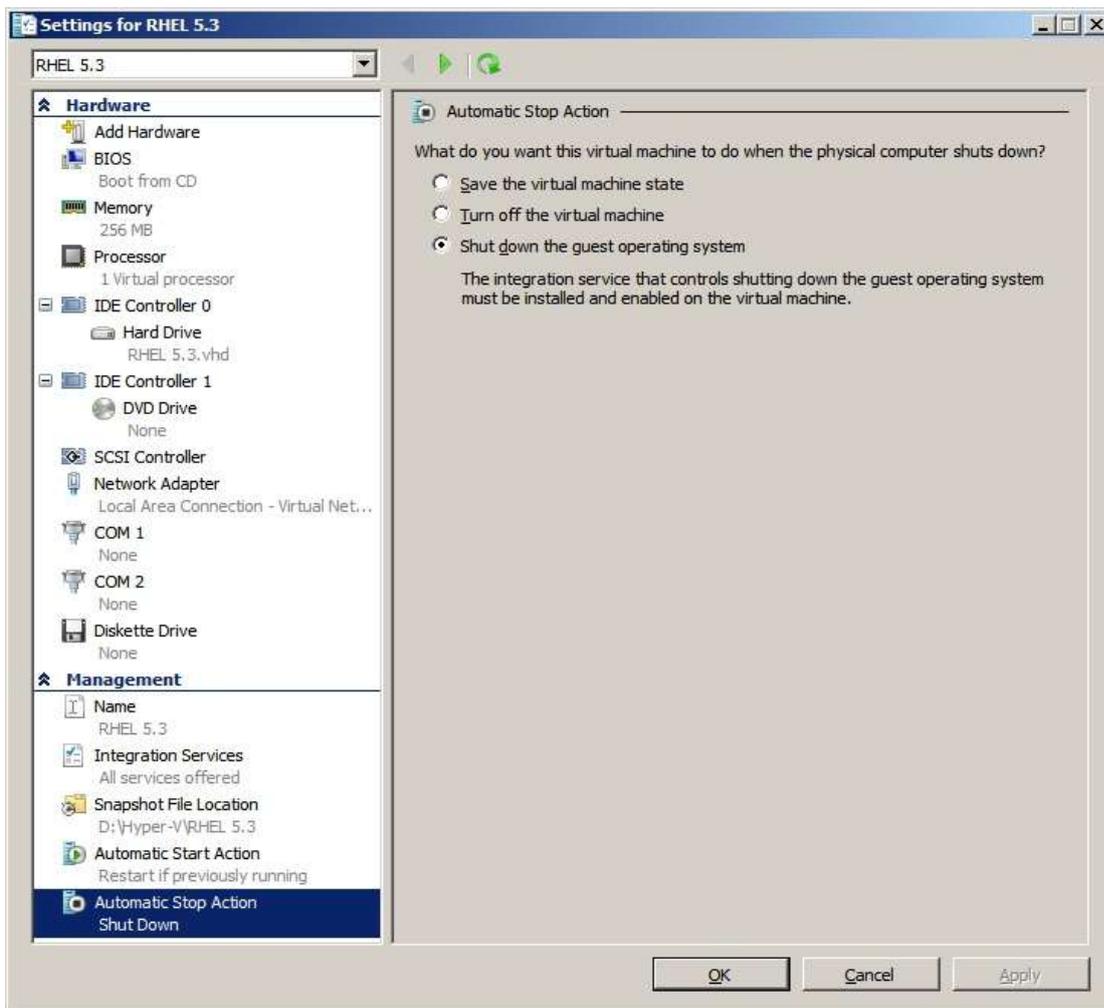
<u>Note:</u> With Windows Hyper-V Server, this configuration will be done remotely.
MMC Microsoft console is installed on a remote computer running Windows 2008 Server or Vista
SP1.
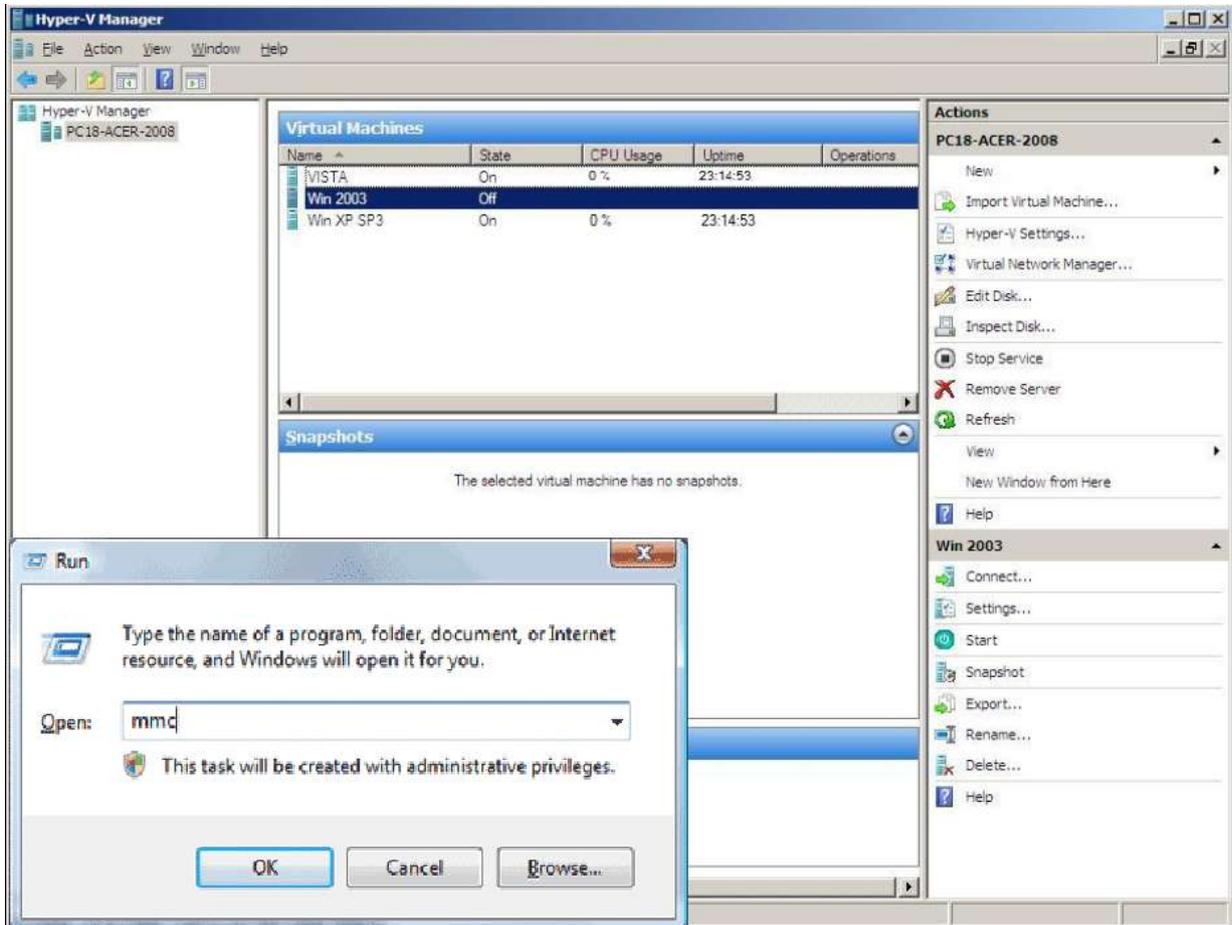
2.3. DELL HARDWARE ARCHITECTURE

The prerequisites for **Dell UPS Local Node Manager** installation are described in the "**Dell UPS Local Node Manager** – User Guide" chapter: "Installation Prerequisites". (http://www.dellups.com/)

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

2.4. NETWORK ARCHITECTURE

All hardware elements must have an operational network configuration that allows free dialog amongst each other.

Connections through the following ports must be authorized within the firewall of the main operating system:

- 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 must be opened as a destination port (for output) on the machine hosting **Dell UPS Local Node Manager**. (To enable communication between **Dell UPS Local Node Manager** and Network Management Card).

To configure network parameters of the main **operating system**, please refer to its user manual.

2.5. INSTALLING DELL ULNM ON HYPER-V SERVER R1 & R2 AND WINDOWS SERVER 2008 R2 (HYPER-V MANAGER)

- Download the latest version of **Dell UPS Local Node Manager** Windows version package from Dell's website : http://www.dellups.com/ and choose the version windows of **Dell ULNM**
- Copy the package on your system.
- Execute the package from the DOS Windows command and Go to the directory where you placed **Dell UPS Local Node Manager.**

To start the installer in graphical mode, type:

- `ulnm_win_x_xx_xxx.exe –install`

To start ULNM, type:

- `ulnm_win_x_xx_xxx.exe`
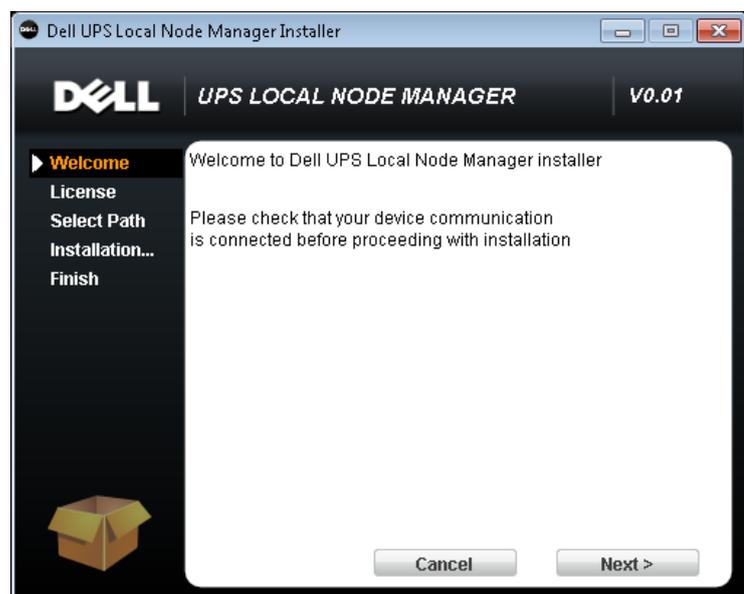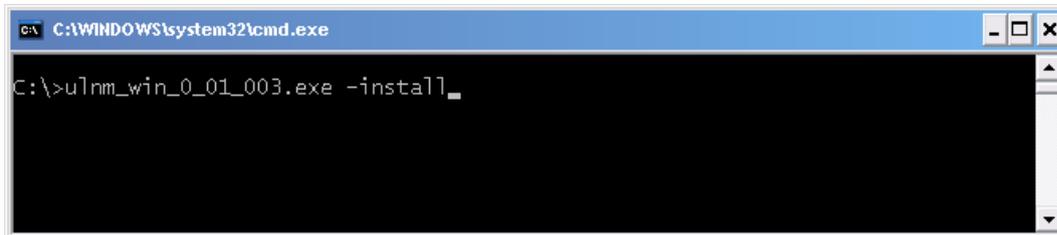
To start the installer in silent mode, type:

- `ulnm_win_x_xx_xxx.exe –install –silent`

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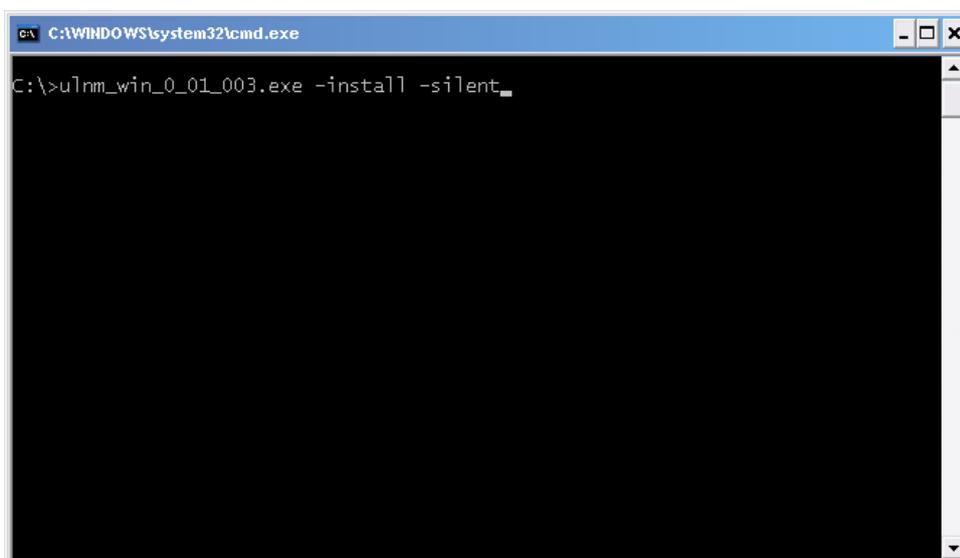
At the end of the installation it is possible to access to the **Dell ULNM** web interface.

2.6. UNINSTALLING DELL ULNM

To uninstall **Dell ULNM** from the DOS Window, go to the directory where you have installed the **Dell USP Local Node Manager**. (Default installation path is ***C:\Program Files\Dell\UPSLocalNodeManager***)

To uninstall in graphical mode, type:

- `ulnm_win_x_xx_xxx.exe –uninstall`

 To uninstall in silent mode, type:

- `ulnm_win_x_xx_xxx.exe –uninstall –silent`

2.7. USEFUL COMMANDS

Useful Commands to list Windows services activated:

- `net start`

2.8. ALARMS RECEPTION

When there is a UPS status change, a notification window displays the alarms:
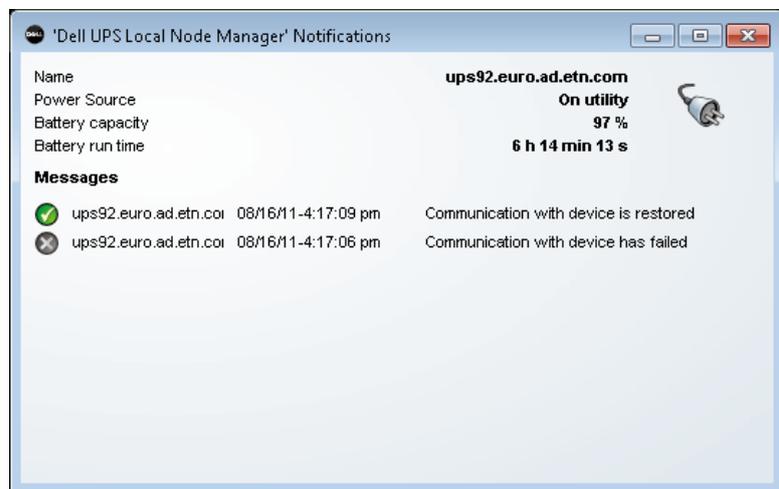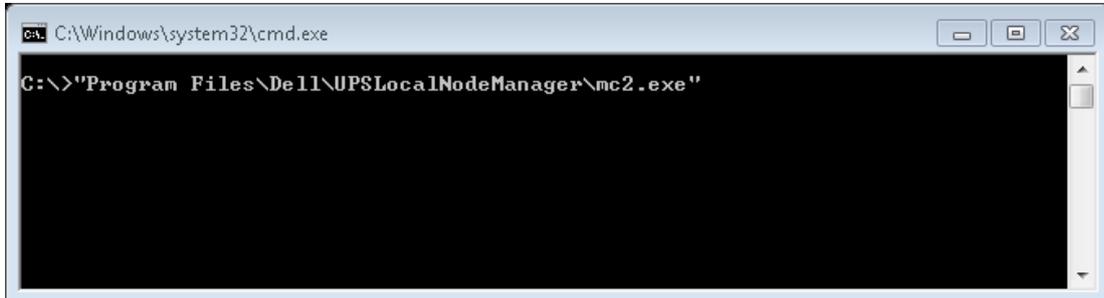
2.9. USING DELL ULNM WITH HYPER-V SERVER R1 & R2 OR HYPER-V MANAGER

After **DELL ULNM** installation, follow these 3 steps to use **DELL ULNM** or refer to the **DELL ULNM** User Guide.

2.9.1. STEP 1 (ACCESS)

Local access (for Hyper-V Manager on Windows 2008)
- From the system where Power Protector is installed, you can use the following shortcut: Start -> Programs -> Dell -> Power Protector ->Open Dell Power Protector

Remote access (for Hyper-V Server or Hyper-V Manager on Windows 2008)
- From a remote machine, you can type the following URL in a Web browser
  http://<name or IP address of computer hosting **Dell ULNM**>:4679/
  Or
  https://<name or IP address of computer hosting **Dell ULNM**>:4680/
- In SSL mode, accept the certificate (by clicking on Yes)
  (enter admin as Login / admin as Password and click on the Login button)
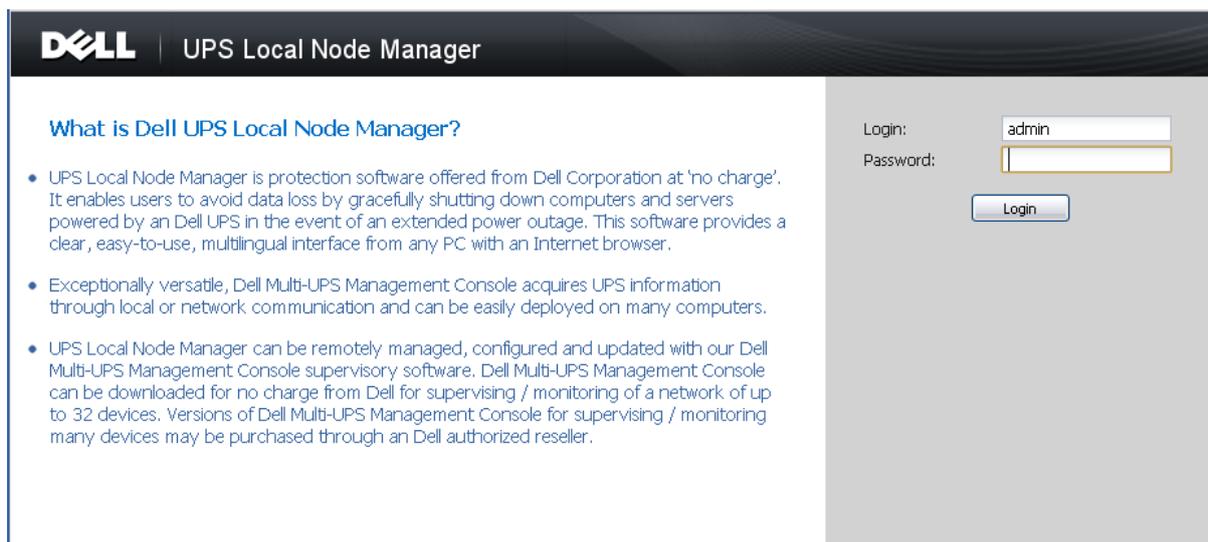
2.9.2. STEP 2 (CONFIGURATION)

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 (Dell UPS Management Card H910P)
    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.

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

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2.9.3. 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 **Dell UPS Local Node Manager**.
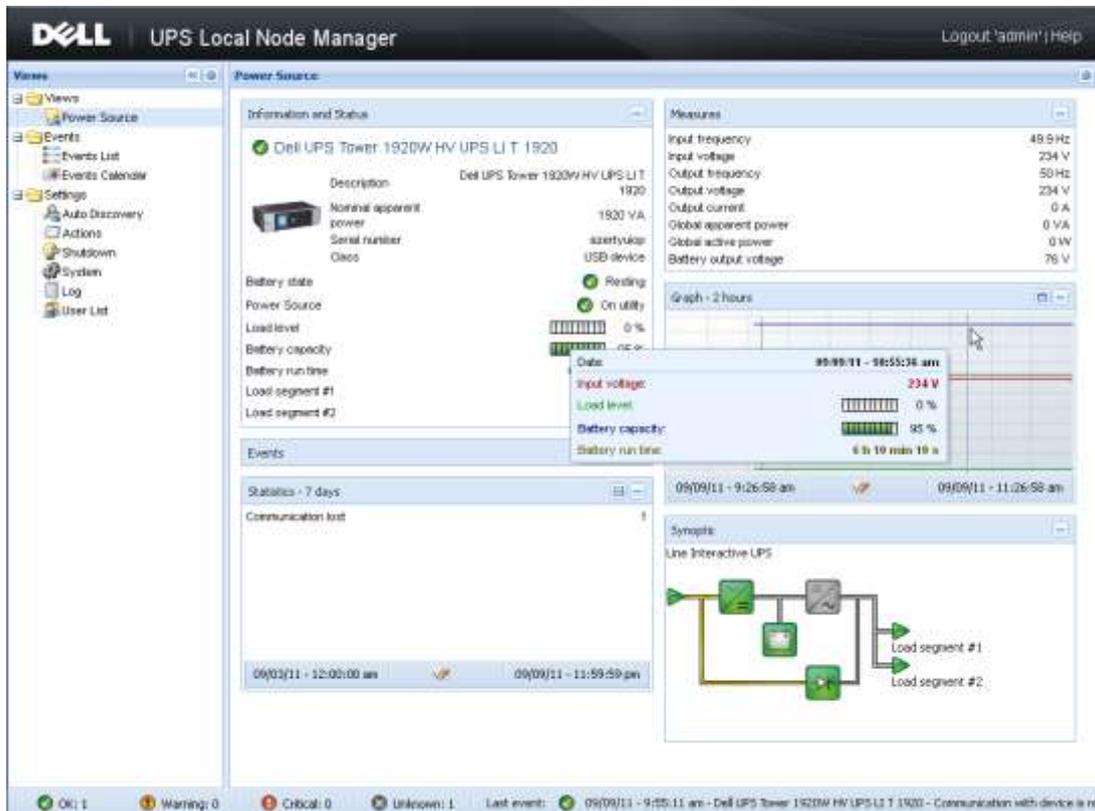
The *Events* → *Event List* view allows you to view the device events.

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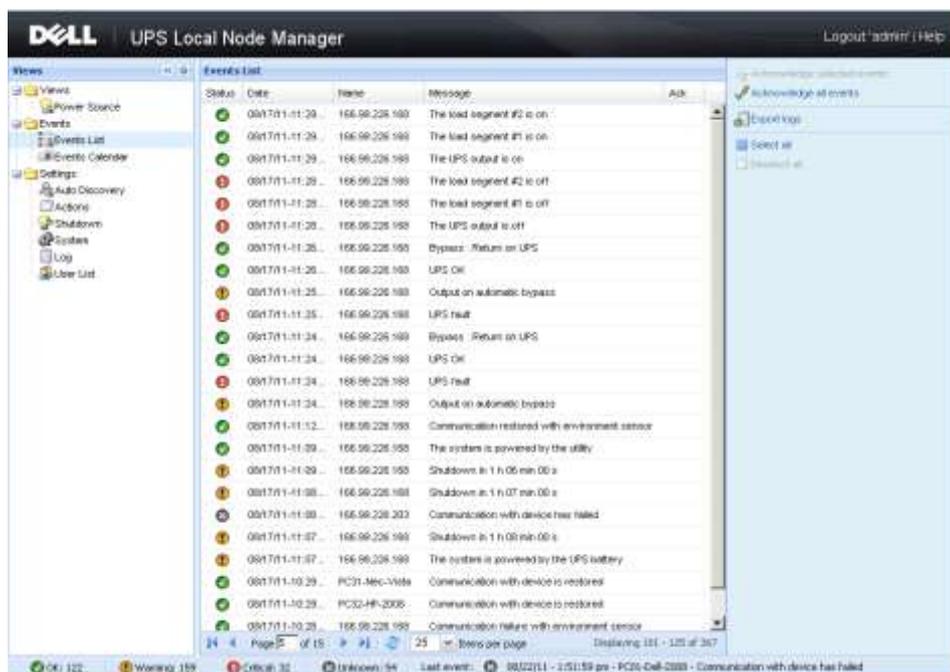
3. APPENDIX

3.1. REFERENCES

- **USP Local Node Manager USER GUIDE:**
    - http://www.dellups.com

- **Dell** software **download page:**
    - http://www.dellups.com

- *Microsoft Hyper-V* **reference documents**:
    - http://www.microsoft.com/windowsserver2008/en/us/hyperv.aspx