



# Cisco Expressway on Virtual Machine

Installation Guide

**First Published: December 2013**

**Last Updated: June 2017**

X8.9.1





# Contents

Preface .....	5
Change History .....	5
Introduction .....	7
Installing a Virtual Machine .....	7
Recommended Platform .....	7
Co-residency Support .....	8
Note: CPU Reservation Requirement Change in X8.8 .....	8
Installation Process .....	8
Configuring the VM Host .....	8
Deploying OVA to Host Managed by vCenter .....	9
Configuring the VM Guest (vCenter) .....	14
Deploying OVA to Standalone ESXi Host .....	17
Configuring the VM Guest (ESXi Host) .....	19
Ordering and Entering Release and Option Keys .....	20
Creating a Backup of your System and Deleting Existing Snapshots .....	21
Hardware References .....	22
Serial Interface .....	22
Ethernet Interfaces (NICs) .....	22
Allocating a Virtual NIC to a Physical NIC Interface .....	22
Additional Information .....	24
Upgrading a VM Expressway .....	24
Clustering for Resilience and Capacity .....	24
Supported Features .....	24
vMotion .....	24
SAN with Fibre Interconnect .....	24
Unsupported Features .....	24
Licensing .....	25
Security Hardening .....	25
Appendix 1: Troubleshooting .....	25
Checking VMware Compatibility .....	25

VMware Checklist .....	25
Isolating a Possible Root Cause .....	26
Possible Issues .....	26
Analyzing the Cause of VMware Issues .....	27
Active Options Only Indicates '150 Traversal Calls' for Large Deployments .....	27
Restoring Default Configuration (Factory Reset) .....	28
Prerequisite Files .....	28
Performing a Reset to Default Configuration .....	28
Resetting Your Administrator Password or Root Password .....	29
Appendix 2: VM Expressway Activation Process .....	29
Appendix 3: Deploying Multiple Datastores .....	30
Cisco Legal Information .....	35
Cisco Trademark .....	35

## Preface

### Change History

**Table 1 Cisco Expressway on Virtual Machine Installation Guide Change History**

Date	Change	Reason
June 2017	Removed misleading statement about "similar environments" from introduction.	Documentation error.
January 2017	Updated to include bug fix in relation to unsupported SSH key message in Install Wizard. Wizard now displays serial and release key for reference. Added caution regarding use of backslashes or forward slashes in Name and Location field.	X8.9.1 updates.
December 2016	Updated to include new secure install wizard functionality.	X8.9 updates.
June 2016	Decreased CPU reservation for Large OVA. Mention lack of support for VMware HA and VMware snapshots.	X8.8 updates.
February 2016	Updated for X8.7.1.	Upgrade prerequisite added for Hybrid Services.
November 2015	Updated for X8.7. ESXi 6.0 support added. Virtual hardware version change 7 to 8.	
July 2015	Republished for X8.6.	
December 2014	Republished for X8.5.	
August 2014	Removed misleading RAID 5 prerequisite for UCS.	
June 2014	Republished for X8.2.	
December 2013	Initial release.	



## Introduction

Cisco Expressway (Expressway) software supports flexible deployment options and is available as a virtualized application for VMware. This enables enterprises to run Expressway on the ‘company standard’ Virtual Machine (VM) hardware platform for ease of management and deployment within an existing data center.

This deployment guide specifies:

- the VM platform requirements for Expressway
- how to load the Expressway .ova installation file
- how to install a VM
- how to troubleshoot the system, when there are issues
- supported features and limitations of support for VMware features (see [Additional Information, page 24](#))

### Using the VM .ova file for initial VM installation only

The VM Expressway is licensed using information that is generated at the time of the .ova file installation. If the .ova was installed a second time, new licensing information would be created, and to use the new VM, new release and licence keys would need to be purchased. To upgrade a VM Expressway, follow the procedure under [Upgrading a VM Expressway, page 24](#), using the .tar.gz version of the Expressway software.

After installation we recommend that you take a backup of the configuration.

**Caution: Do not take VMware snapshots of Cisco Expressway systems. The process interferes with database timing and negatively impacts performance.**

### Obtaining release keys and license keys

Licenses can be obtained after the VM Expressway is installed, using the serial number of the VM Expressway. The serial number is available from the **Option key** page and from the footer of the Expressway web interface. See [Ordering and Entering Release and Option Keys, page 20](#) for more information.

When the VM Expressway is first installed, the banner area on the web interface will display Cisco Expressway / VCS Base. After the **Expressway Series** option key has been installed the banner area will change to show Cisco Expressway-C (or Cisco Expressway-E if the **Traversal Server** option key has also been installed).

## Installing a Virtual Machine

The sections below list the recommended platform and specifications-based system requirements, and describe the VM installation process. The requirements outlined below refer to the minimum requirements for Expressway version X8.9. The minimum requirements for future Expressway software releases may differ and you should refer to the release notes or administrator guide to ensure that pre-requisites are met.

## Recommended Platform

See [http://docwiki.cisco.com/wiki/Virtualization\\_for\\_Cisco\\_Expressway](http://docwiki.cisco.com/wiki/Virtualization_for_Cisco_Expressway) for the current list of supported UCS Tested Reference Configurations and specs-based supported platforms.

Ensure that:

- VT is enabled in the BIOS before installing VMware ESXi
- the VM host “Virtual Machine Startup/Shutdown” is configured to “Allow Virtual machines to start and stop automatically with the system”, and that the VM Expressway has been moved to the Automatic startup section

If using a UCS Tested Reference Configuration or specifications-based system, the minimum requirements are:

## Installing a Virtual Machine

**Table 2 Required Minimum Specifications by Deployment Size**

Deployment size	vCPU	Reserved CPU resource <a href="#">Note</a>	Reserved RAM	Disk space	NIC
Small (for BE 6000 platform)	2 core	3600 MHz (2 x 1.8 GHz)	4 GB	132 GB	1 Gb
Medium (typical installation, can also be on BE6000)	2 core	4800 MHz (2 x 2.4 GHz)	6 GB	132 GB	1 Gb
Large (extra performance and scalability capabilities)	8 core	25600 MHz (8 x 3.2 GHz) <a href="#">Note</a>	8 GB	132 GB	10 Gb

For all deployment sizes, you need:

- VM host operational and running ESXi 5.0 (Update 1), ESXi 5.1, ESXi 5.5, or ESXi 6.0
  - Note:** As of X8.7, the virtual hardware version of Expressway has changed from 7 to 8. This change means that ESX/ ESXi version 4.x is explicitly not supported as a platform for Expressway VMs running X8.7.
- vCenter or vSphere client operational
- Reserved RAM, CPU, and NIC as per table above

When using vSphere client, configure the network properties through the console.

## Co-residency Support

The Expressway can co-reside with applications (any other VMs occupying same host) subject to the following conditions:

- no oversubscription of CPU: 1:1 allocation of vCPU to physical cores must be used
- no oversubscription of RAM: 1:1 allocation of vRAM to physical memory
- no oversubscription of NIC: The Expressway handles large volumes of data, much of which is for real-time communications, and it needs dedicated access to all the bandwidth specified for its interfaces.
 

For example, you should not assume that four co-resident small Expressway VMs can handle the expected load if there is only a 1 Gbps physical interface on the host. In this example, none of the VMs meet the required minimum specification.
- sharing disk storage subsystem is supported subject to correct performance (latency, bandwidth) characteristics

## Note: CPU Reservation Requirement Change in X8.8

The Large Expressway VM CPU reservation requirement has been reduced from 25600 MHz to 16000 MHz. This means that two Large Expressway VMs can now comfortably co-reside on a UCS server with two eight-core 3.2 GHz processors, when hyperthreading is enabled. This was not previously possible because the higher reservation requirement, added to the CPU requirement for the hypervisor, exceeded the total processing power of the host.

The new reservation does not limit the maximum Expressway CPU speed; the Expressway can use the headroom provided by the higher specification host.

## Installation Process

This process guides you through installing the Expressway VM using vCenter or vSphere client.

## Configuring the VM Host

Ensure that the VM host is configured with a valid NTP server - the same NTP server that will be specified in Expressway.



## Installing a Virtual Machine

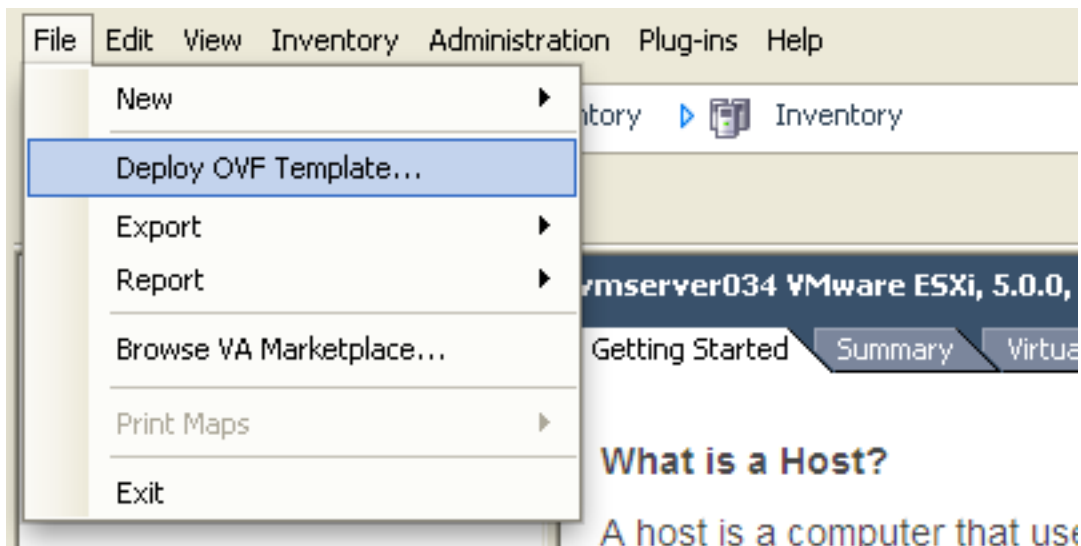
1. Select the host.
2. Go to the **Configuration** tab.
3. Select **Time configuration**.
4. Select **Properties**.  
If the date and time were red on the previous page, set the date and time manually to the current time.
5. Click **Options**.
6. Select **NTP Settings**.
7. Click **Add**.
8. Enter the IP address of the NTP server.
9. Click **OK**.
10. Select the **Restart NTP service to apply changes** check box.
11. Click **OK**.
12. Click **OK**.

The following section describes how to deploy the ova to host using vCenter. If you are using vSphere, skip this section and go to [Deploying OVA to Standalone ESXi Host, page 17](#).

## Deploying OVA to Host Managed by vCenter

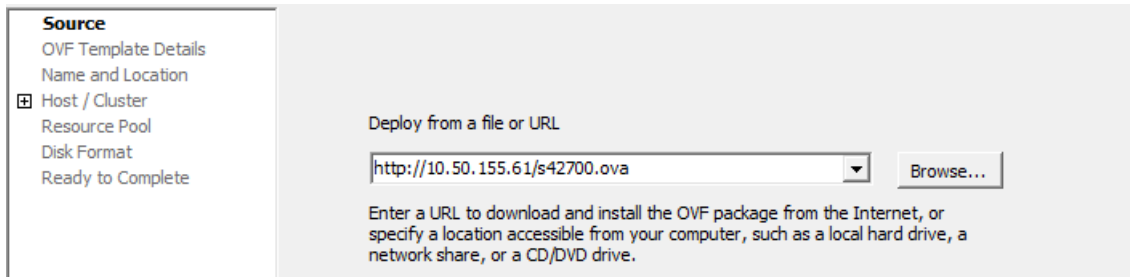
These instructions represent a typical installation. The Deploy OVF Template wizard dynamically changes to reflect host configuration.

1. If the .ova file is already preloaded onto the ESXi Host datastore (for example, in Cisco Business Edition 6000 deployments):
  - a. Using a web browser, go to `https://<VMwareHost>/folder` supplying any required credentials (typically the same username and password as used to log into vCenter).
  - b. Navigate through the index of datacenters to find the .ova file you want to deploy from the datastore.
  - c. Right click on the .ova file and select **Copy Link Location**.  
(If the .ova file is not preloaded on the datastore, you can select and upload it in the following steps.)
2. Log in to vCenter to access the ESXi Host.
3. Select **File > Deploy OVF Template**.



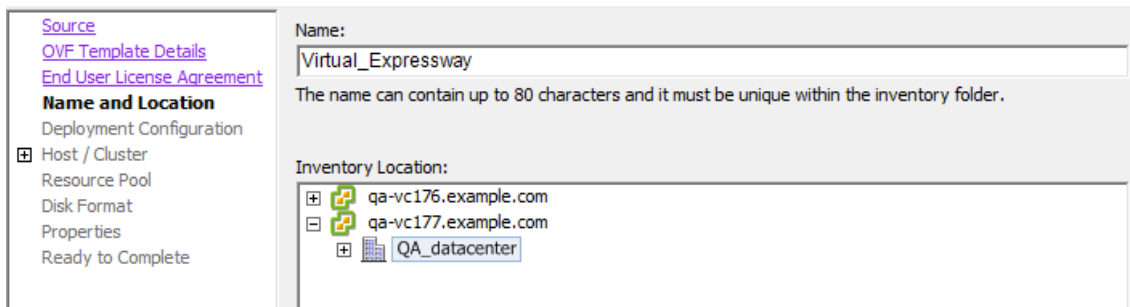
## Installing a Virtual Machine

4. On the **Source** page, identify where the .ova file is located, and then click **Next**.
  - If the .ova file is already preloaded onto the ESXi Host datastore, paste the URL you copied from step 1 above. You may have to re-enter username and password credentials so that vCenter can access the web server.
  - If the .ova file is not preloaded on the datastore, **Browse** to the location of the .ova file.



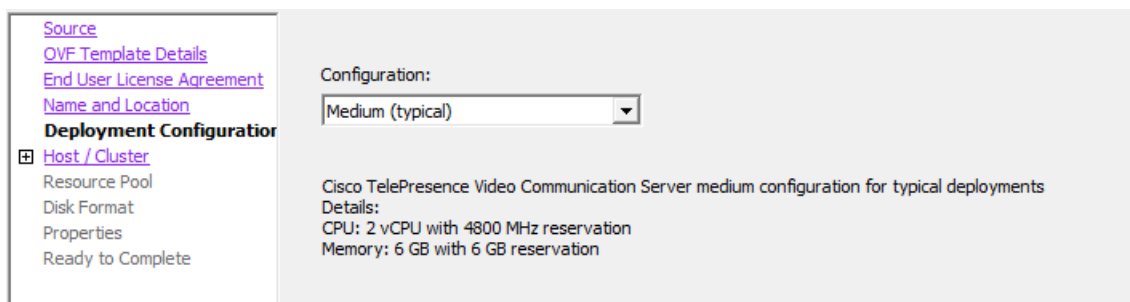
5. On the **OVF Template Details** page, check that the Publisher certificate is valid and click **Next**.
6. On the **End User License Agreement** page:
  - a. Read the EULA
  - b. If you accept the EULA, click **Accept** then **Next**.
7. On the **Name and Location** page enter a **Name** for this Expressway VM guest, for example "Virtual\_Expressway" and click **Next**.

**Important!** When deploying a VM to ESXi version 6.0 or later, you must not use a backslash or forward slash in the Name and Location field as the characters are unsupported and it can cause errors during the deployment. You must remove the slash from the default name of Cisco Expressway/VCS Base.



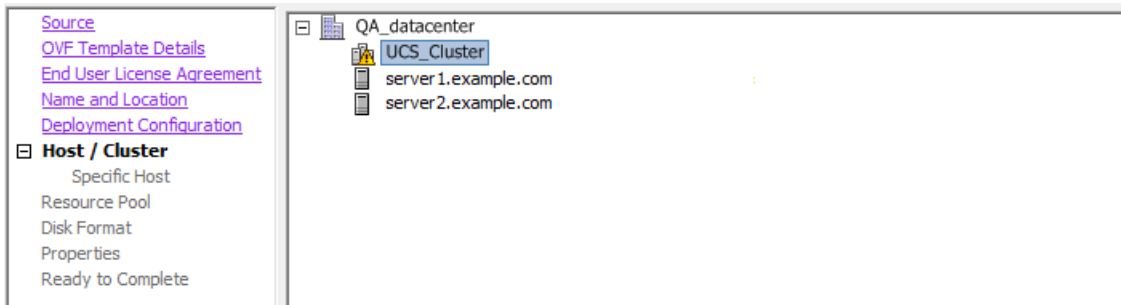
8. On the **Deployment Configuration** page, select the appropriately sized deployment:
  - a. Select *Small*, *Medium* or *Large* depending on the capabilities of the VMware host.
 

The default is *Medium*. See [Recommended Platform, page 7](#) for details about resource requirements. If the VMware host has insufficient resources, the virtual Expressway will fail to power on / boot.
  - b. Click **Next**.

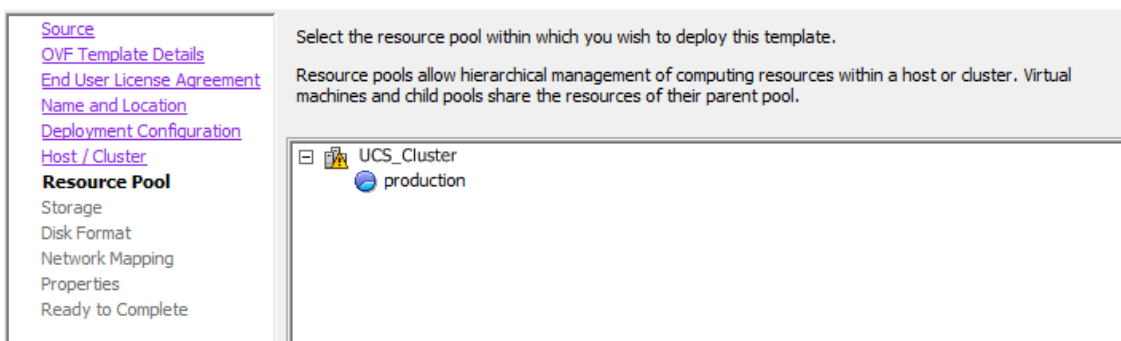


## Installing a Virtual Machine

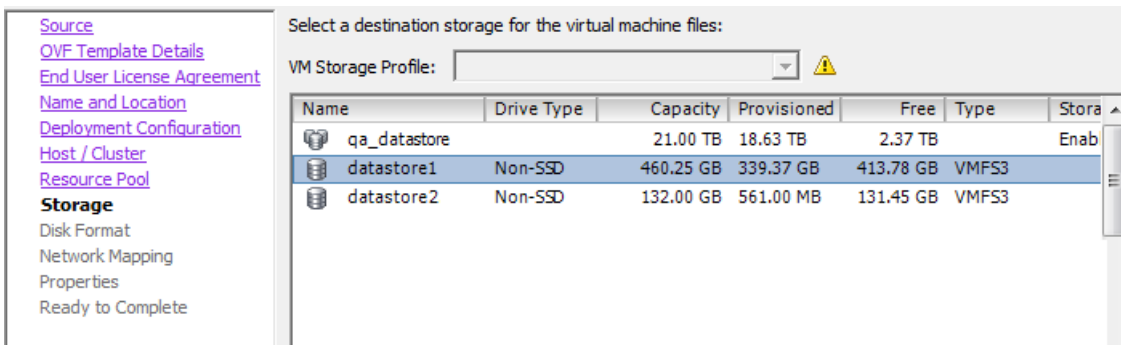
9. On the **Host / Cluster** page, select where you want to run the virtual Expressway and click **Next**.



10. On the **Resource Pool** page, select where you want to run the virtual Expressway and click **Next**.

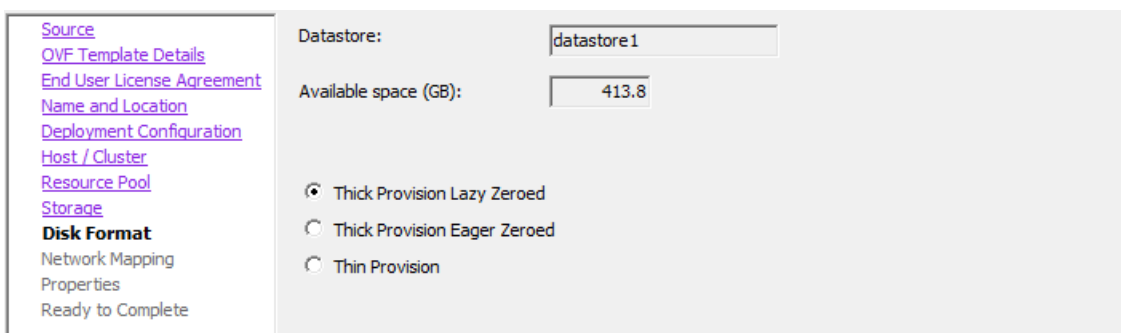


11. On the **Storage** page, select the location onto which the virtual Expressway will be deployed and click **Next**.



12. On the **Disk Format** page, ensure that the default disk format of **Thick Provision Lazy Zeroed** is selected and then click **Next**.

**Thin Provision** is not supported as VM performance may degrade during resizing of a partition.



Installing a Virtual Machine

13. On the **Network Mapping** page, select the network mapping that applies to your infrastructure (the default is **VM Network**) and then click **Next**.

Map the networks used in this OVF template to networks in your inventory

Source Networks	Destination Networks
VM Network	VM Network

[Source](#)  
[OVF Template Details](#)  
[End User License Agreement](#)  
[Name and Location](#)  
[Deployment Configuration](#)  
[Host / Cluster](#)  
[Resource Pool](#)  
[Storage](#)  
[Disk Format](#)  
**Network Mapping**  
Properties  
Ready to Complete

## Installing a Virtual Machine

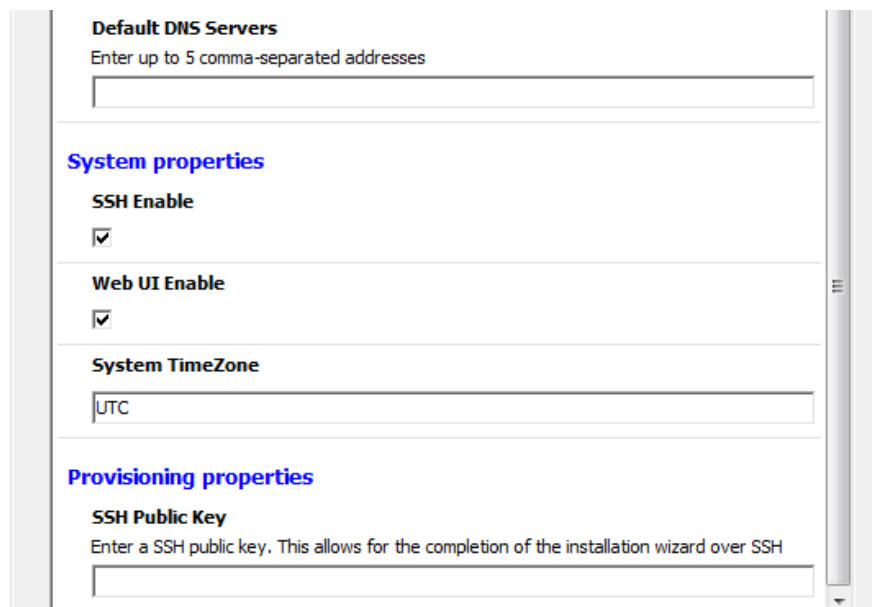
14. On the **Properties** page, configure the network properties of the virtual Expressway and click **Next**.

The properties you can set include the Expressway's IPv4 and IPv6 settings, the timezone, hostname and domain, up to five NTP servers, and up to five DNS servers. You can also enter an RSA SSH public key to securely set the root and admin passwords via SSH. If you do not enter a public key, you must set the passwords during the Install Wizard process.

The screenshot shows the 'Network properties' configuration page. On the left, a sidebar contains a list of navigation links: Source, OVF Template Details, End User License Agreement, Name and Location, Deployment Configuration, Host / Cluster, Resource Pool, Storage, Disk Format, Network Mapping, Properties (highlighted), and Ready to Complete. The main content area is titled 'Network properties' and contains the following fields:

- IPv4 Enable:** A checked checkbox.
- IPv4 Address:** A text input field containing '192 . 168 . 0 . 100'.
- IPv4 Netmask:** A text input field containing '255 . 255 . 255 . 0'.
- IPv4 Gateway:** A text input field containing '192 . 168 . 0 . 1'.
- IPv6 Enable:** An unchecked checkbox.
- IPv6 Address:** An empty text input field.
- IPv6 Gateway:** An empty text input field.
- System Hostname:** An empty text input field.
- System Domain Name:** A text input field with the instruction 'Hostname.Domain must match the DNS record for this system's FQDN' above it.
- NTP Servers:** A text input field with the instruction 'Enter up to 5 comma-separated addresses' above it.

## Installing a Virtual Machine



The screenshot shows a configuration window for a virtual machine. It is divided into several sections:

- Default DNS Servers:** A text input field with the instruction "Enter up to 5 comma-separated addresses".
- System properties:**
  - SSH Enable:** A checked checkbox.
  - Web UI Enable:** A checked checkbox.
  - System TimeZone:** A text input field containing "UTC".
- Provisioning properties:**
  - SSH Public Key:** A text input field with the instruction "Enter a SSH public key. This allows for the completion of the installation wizard over SSH".

15. On the **Ready to Complete** page:
  - a. Confirm the deployment settings.
  - b. Select the **Power on after deployment** check box.
  - c. Click **Finish**.

The installation process will begin and a progress bar will be displayed.

The Expressway ova is now deployed as a Guest on the VM Host.

## Configuring the VM Guest (vCenter)

These instructions describe how to set the root and admin password over SSH if you entered an RSA SSH public key in the **VM Properties** page - used primarily for automated deployments - or using the Install Wizard.

**Note:** You can ignore any floppy read errors that appear, as they are not relevant to this deployment mode.

### Set the Root and Admin Password Using SSH

1. You will be taken to an SSH daemon.
2. Connect as wizard on port 5022 (for example: `ssh wizard@10.0.0.1 -p 5022`).

## Installing a Virtual Machine

```
*****
Installation Wizard for Cisco Expressway/VCS Base

If you encounter issues or enter incorrect
information during the wizard you can press
Ctrl+D to restart

Some questions may also support Tab completion
*****
ip_tables: (C) 2000-2006 Netfilter Core Team
vmxnet3 0000:0b:00.0 eth0: intr type 3, mode 0, 3 vectors allocated
vmxnet3 0000:0b:00.0 eth0: NIC Link is Up 10000 Mbps
8021q: adding VLAN 0 to HW filter on device eth0

Starting SSH daemon on 10.50.156.150:5022 for automated deployment
Please connect as user 'wizard' to continue
e.g. ssh wizard@10.50.156.150 -p 5022
```

3. Follow the prompt to set `admin.password` and `root.password`.

```
>>> Installation Wizard for Cisco Expressway/VCS Base

This shell is intended for completing automated deployments and expects a
JSON encoded structure containing the remaining configuration that needs
to be set.

Example input: {"admin.password": "w6djqiAgmmAMbrH0", "root.password": "FkSZ95KL865Q15/T"}
Example response: {"status": "success", "detail": "Configuration complete"}

Required configuration keys: ['admin.password', 'root.password']

$ □
```

## Installing a Virtual Machine

- The Expressway will apply the configuration and reboot.

```
cisco login: Starting xmlapiadapter
Starting tandberg
Upgrade in process. Not starting crl_updater
Starting vmttoolsd
Fri Oct 7 11:54:57 UTC 2016 S98vmttoolsd startup Failed rc 1!
Starting migrate
<131>Oct 7 11:54:58 ttupgrade: UTCTime="2016-10-07-11:54:58" Event="upgrade" De
tail="Running 10-migrate"
<131>Oct 7 11:55:01 ttupgrade: UTCTime="2016-10-07-11:55:01" Event="upgrade" De
tail="Running 20-cdbtransforms-precuil.py"
<131>Oct 7 11:55:01 ttupgrade: UTCTime="2016-10-07-11:55:01" Event="upgrade" De
tail="Running 50-cdbtransforms.py"
<131>Oct 7 11:55:02 ttupgrade: UTCTime="2016-10-07-11:55:02" Event="upgrade" De
tail="Running 50-tandberg-update.php"
<131>Oct 7 11:55:22 ttupgrade: UTCTime="2016-10-07-11:55:22" Event="upgrade" De
tail="Running 80-cdbtransforms-postcuil.py"
<131>Oct 7 11:55:22 ttupgrade: UTCTime="2016-10-07-11:55:22" Event="upgrade" De
tail="Running 90-delete-upgrade-config"
<131>Oct 7 11:55:22 ttupgrade: UTCTime="2016-10-07-11:55:22" Event="upgrade" De
tail="Running 99-tidy-persistent-directory"
Starting restmanager
Starting svmttoolsd
_
```

You should now be able to access the Expressway using a web browser.

You can now order your release key; see [Ordering and Entering Release and Option Keys](#), page 20.

#### Set the Root and Admin Password Using the Install Wizard

- Select the VM guest and then select the **Console** tab.
- You are taken to the Install Wizard.
- Enter and confirm your root and admin password.

```
Root password:
Please confirm the password:
Admin password:
Please confirm the password:

Installation wizard complete
Press Enter to continue the boot and apply the configuration _
```

- Press **Enter** to apply the configuration.



## Installing a Virtual Machine

5. The Expressway will apply the configuration and reboot.

```
cisco login: Starting xmlapiadapter
Starting tandberg
Upgrade in process. Not starting crl_updater
Starting vmtoolsd
Fri Oct 7 11:54:57 UTC 2016 S980vmtoolsd startup Failed rc 1!
Starting migrate
<131>Oct 7 11:54:58 ttupgrade: UTCTime="2016-10-07-11:54:58" Event="upgrade" De
tail="Running 10-migrate"
<131>Oct 7 11:55:01 ttupgrade: UTCTime="2016-10-07-11:55:01" Event="upgrade" De
tail="Running 20-cdbtransforms-precuil.py"
<131>Oct 7 11:55:01 ttupgrade: UTCTime="2016-10-07-11:55:01" Event="upgrade" De
tail="Running 50-cdbtransforms.py"
<131>Oct 7 11:55:02 ttupgrade: UTCTime="2016-10-07-11:55:02" Event="upgrade" De
tail="Running 50-tandberg-update.php"
<131>Oct 7 11:55:22 ttupgrade: UTCTime="2016-10-07-11:55:22" Event="upgrade" De
tail="Running 80-cdbtransforms-postcuil.py"
<131>Oct 7 11:55:22 ttupgrade: UTCTime="2016-10-07-11:55:22" Event="upgrade" De
tail="Running 90-delete-upgrade-config"
<131>Oct 7 11:55:22 ttupgrade: UTCTime="2016-10-07-11:55:22" Event="upgrade" De
tail="Running 99-tidy-persistent-directory"
Starting restmanager
Starting vmtoolsd
_
```

You should now be able to access the Expressway using a web browser.

You can now order your release key; see [Ordering and Entering Release and Option Keys, page 20](#).

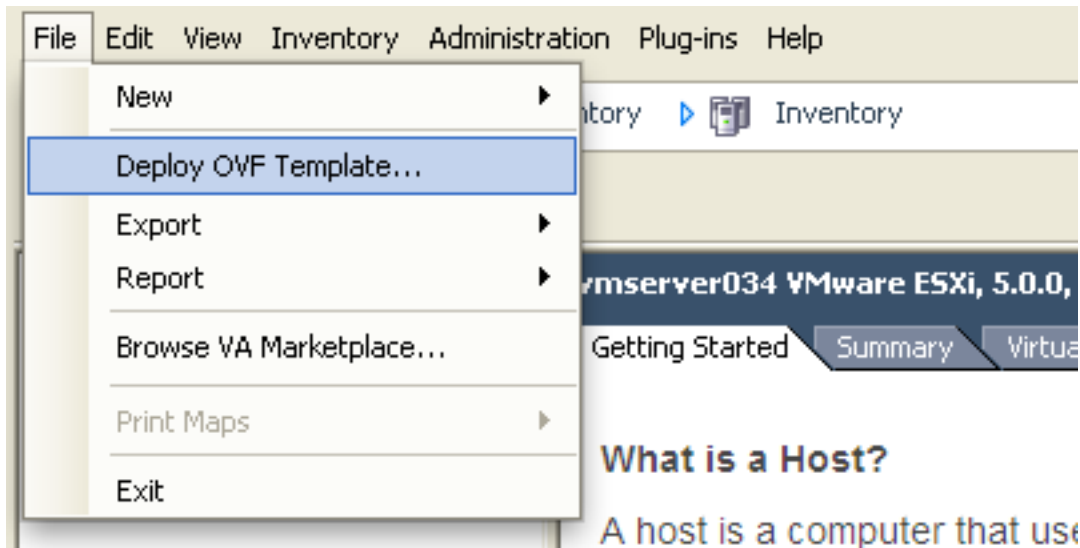
## Deploying OVA to Standalone ESXi Host

These instructions represent a typical installation. The Deploy OVF Template wizard dynamically changes to reflect host configuration.

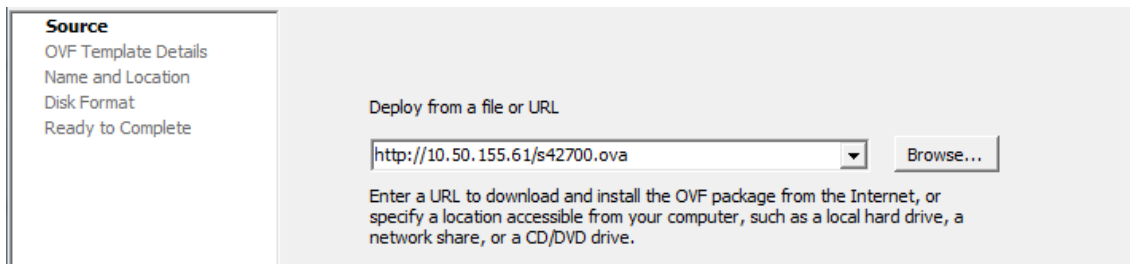
1. If the .ova file is already preloaded onto the ESXi Host datastore (for example, in Cisco Business Edition 6000 deployments):
  - a. Using a web browser, go to `https://<VMwareHost>/folder` supplying any required credentials (typically the same username and password as used to log into the vSphere client).
  - b. Navigate through the index of datacenters to find the .ova file you want to deploy from the datastore.
  - c. Right click on the .ova file and select **Copy Link Location**.

(If the .ova file is not preloaded on the datastore, you can select and upload it in the following steps.)
2. Log in to the vSphere client to access the ESXi Host.

## Installing a Virtual Machine

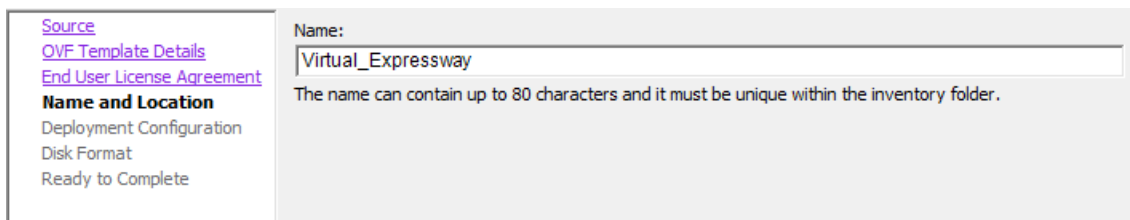
3. Select **File > Deploy OVF Template**.

4. On the **Source** page, identify where the .ova file is located, and then click **Next**.
  - If the .ova file is already preloaded onto the ESXi Host datastore, paste the URL you copied from step 1 above. You may have to re-enter username and password credentials so that the vSphere client can access the web server.
  - If the .ova file is not preloaded on the datastore, **Browse** to the location of the .ova file.



5. On the **OVF Template Details** page, check that the Publisher certificate is valid and click **Next**.
6. On the **End User License Agreement** page:
  - a. Read the EULA
  - b. If you accept the EULA, click **Accept** then **Next**.
7. On the **Name and Location** page enter a **Name** for this Expressway VM guest, for example "Virtual\_Expressway" and click **Next**.

**Important!** When deploying a VM to ESXi version 6.0 or later, you must not use a backslash or forward slash in the Name and Location field as the characters are unsupported and it can cause errors during the deployment. You must remove the slash from the default name of Cisco Expressway/VCS Base.



## Installing a Virtual Machine

8. On the **Deployment Configuration** page, select the appropriately sized deployment:
  - a. Select *Small*, *Medium* or *Large* depending on the capabilities of the VMware host.

The default is *Medium*. See [Recommended Platform, page 7](#) for details about resource requirements. If the VMware host has insufficient resources, the virtual Expressway will fail to power on / boot.

- b. Click **Next**.

9. On the **Disk Format** page, ensure that the default disk format of **Thick Provision Lazy Zeroed** is selected and then click **Next**.

**Thin Provision** is not supported as VM performance may degrade during resizing of a partition.

10. On the **Ready to Complete** page:
  - a. Confirm the deployment settings.
  - b. Select the **Power on after deployment** check box.
  - c. Click **Finish**.

The installation process will begin and a progress bar will be displayed.

The Expressway ova is now deployed as a guest on the VM Host.

## Configuring the VM Guest (ESXi Host)

These instructions describe how to configure the VM Guest as a standalone host using the Install Wizard.

### Note:

- If you encounter issues or enter incorrect information during the wizard you can press Ctrl+D to restart.
- Ignore any warning about an unsupported SSH public key type and an RSA key being required. From X8.9.1 onwards this issue has been addressed.
- The pre-X8.9 default passwords of the admin and root accounts are well known. You must use strong passwords for these accounts. If your new system is on X8.9 or later, you must supply non-default passwords.
- The default timezone is UTC but you can search for your desired timezone. You can also change it later in the web interface by going to **System > Time**.
- The default values support tab completion.
- From X8.9.1 onwards the Install Wizard displays the serial number and release key, if available, for reference.

## Ordering and Entering Release and Option Keys

1. Select the VM guest and then select the **Console** tab.  
The VM guest will take some time to boot, create its second hard disk partition and then reboot to the Install Wizard.
2. Follow the prompts given by the Install Wizard to specify the following:
  - Whether you want to use IPv4, IPv6 or Both.
  - The LAN 1 IPv4 subnet mask of the Expressway (if you have selected IPv4).
  - The IP address of the default gateway of the Expressway.
  - The root password.
  - The admin password.
  - Whether you want to enable the web UI.
  - Whether you want to use SSH to administer the Expressway.
  - The timezone.
3. After the wizard is finished the following message will appear:  
Installation wizard complete  
Press Enter to continue the boot and apply the configuration.  
Press **Enter**.
4. After it has applied the configuration and rebooted, the Expressway is ready to use. You should now be able to access the Expressway using a web browser.

You can now order your release key; see [Ordering and Entering Release and Option Keys, page 20](#).

## Ordering and Entering Release and Option Keys

After the Expressway ova has been deployed as a Guest on the VM Host, and you have set the root and admin passwords, you should be able to access the Expressway through a web browser and order your release key.

1. Log in to the Expressway through a web browser, with username `admin` and password that you set.
2. Follow the service setup wizard to define the purpose of the system, apply the release and options keys, then restart the system.  
  
The wizard helps you through the configuration described in the rest of this topic, so you can ignore the rest of the topic if you are using the wizard.  
  
If you do not want the wizard to guide you, click **Skip Service Setup Wizard**, then follow the rest of these instructions.
3. Get release and option keys:
  - a. Go to the **Option keys** page (**Maintenance > Option keys**).
  - b. Copy the **Serial number**.
  - c. Use this serial number to order release and option keys for this VM Expressway.  
For full details on obtaining your release and option keys, see [Appendix 2: VM Expressway Activation Process, page 29](#).

When you have the release and option keys:

---

## Creating a Backup of your System and Deleting Existing Snapshots

1. Log in to the Expressway via a web browser as admin.
2. Enter the release and option keys:
  - a. Go to the **Option keys** page (**Maintenance > Option keys**).
  - b. Enter the release key provided in the **Release key** field.
  - c. Click **Set release key**.
  - d. For each option key provided:
    1. Enter the option key value in the **Add option key** field.
    2. Click **Add option**.
3. Reboot the Expressway to activate the licenses:
  - a. Go to the **Restart options** page (**Maintenance > Restart options**).
  - b. Click **Reboot**.
4. After the reboot, log in to the web interface and configure the Expressway, including DNS, NTP, zones, search rules and so on as required.

Follow the [Expressway Basic Configuration Deployment Guide](#) to guide you through configuring this VM Expressway ready for operation.
5. After the Expressway has been configured it is good practice to backup the Expressway configuration using the Expressway backup facility.

## Creating a Backup of your System and Deleting Existing Snapshots

We do not support VMware snapshots of your Expressway. The process interferes with database timing and can negatively affect performance.

After installation, we instead recommend that you regularly create backups of your configuration.

To create a backup:

1. Go to **Maintenance > Maintenance Mode** and switch **Maintenance Mode On**.
2. Go to **Maintenance > Backup and Restore**.
3. You can optionally add a password for your backup file.
4. Click *Create system backup file*.
5. Save the backup file.

**Note:** When you restore your system from a backup, it will not include any Active Directory credentials and you will need to add them in order to gain access to the Active Directory domain.

To delete existing snapshots:

1. Make a backup of your configuration (see above).
2. Shutdown the Expressway. Go to **Maintenance > Restart Options** and click *Shutdown*.
3. Click *OK* to shut down the system.
4. Power off the VM.
5. Right-click on the VM and select *Manage Snapshots*.
6. In the **Snapshot Manager**, select *Delete All Snapshots*.
7. Click *Yes* in the confirmation dialog box.
8. Click *Close* to exit the Snapshot Manager.

## Hardware References

### Serial Interface

A VM Expressway has no physical serial interface; the serial interface is accessible through the console tab of the VM guest.

You can use CTRL+ALT to exit from the Console window (this is identified in the bottom right corner of the vSphere Client window).

### Ethernet Interfaces (NICs)

In VM Expressway the LAN interfaces are Virtual NICs. Appropriate drivers are set up as VM Expressway is installed; configuration of IP addresses is carried out through the standard Expressway interface.

VM Expressway allocates 3 virtual NICs:

- the first is used for the standard LAN 1 interface
- the second is used if Dual Network interfaces is enabled (LAN 2)
- the third is reserved for future use

### Allocating a Virtual NIC to a Physical NIC Interface

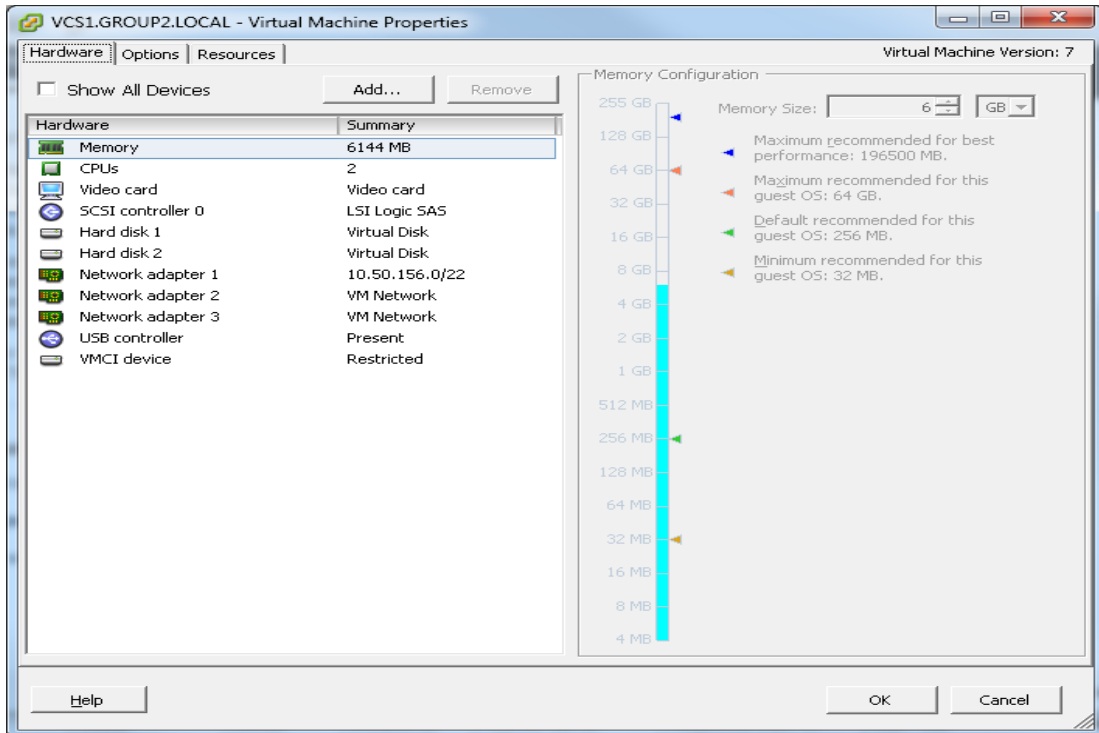
Virtual NICs can be assigned to physical interfaces as follows:

1. Ensure that the physical NIC on the VM host is connected and operational.
2. Set up or check that there are Virtual Switches (vNetwork Distributed Switches) for each physical NIC. (Select the host on which the VM Expressway will run, select the **Configuration** tab and select **Networking**.)
3. Ensure that there is at least one Virtual Machine Port Group (with associated VLAN IDs) set up for each physical NIC.

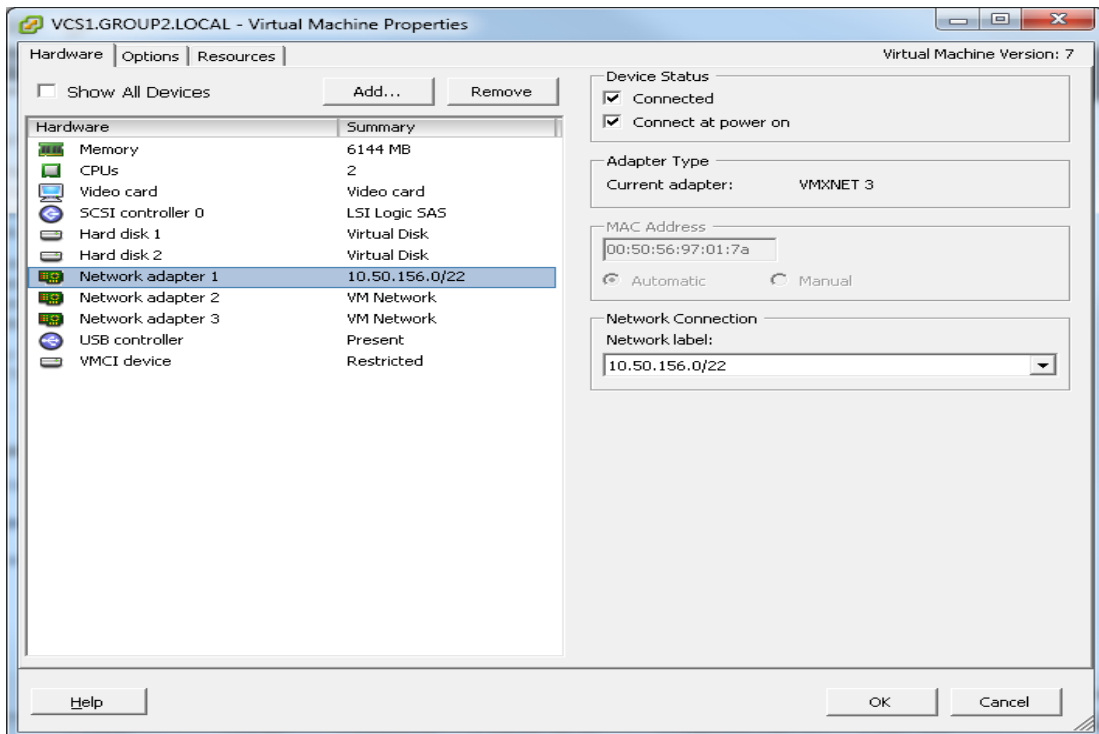
To add a new Virtual Machine Port Group:

- a. Click **Properties** on the appropriate Virtual Switch or vNetwork Distributed Switch.
  - b. Follow the network wizard.
4. Note the name of a Virtual Machine Port Group connecting to the required NIC.

5. Select the VM guest; right click it and select **Edit settings...**



6. Select the required network adaptor (Network adaptor 1 = LAN 1, Network adaptor 2 = LAN 2).



7. Select the appropriate Network label (Virtual Machine Port Group) to associate the Expressway LAN interface with the required physical NIC.

8. After a few seconds the Expressway will be able to communicate over the physical interface.

## Additional Information

### Upgrading a VM Expressway

#### Read this before you begin

- To avoid any performance degradation we recommend that you upgrade the Expressway while the system is inactive.
- If your Expressway is registered for Hybrid Services: Your Management Connector must be up to date before you upgrade your Expressway. You must authorize and accept any upgrades advertised by the Cisco Collaboration Cloud before attempting to upgrade.
- If the Expressway is part of a cluster or is using provisioning or FindMe, follow the relevant *Expressway Cluster Deployment Guide* instead of this procedure.

#### Upgrade procedure

When upgrading a VM Expressway you must use a .tar.gz file (available from the software download site), not an .ova file:

1. Log in to the Expressway VM web interface as an administrator.
2. Backup the Expressway from the **Backup** page (**Maintenance > Backup and restore**).
3. Upgrade the Expressway from the **Upgrade** page (**Maintenance > Upgrade**).

### Clustering for Resilience and Capacity

When clustering VM Expressways it is strongly recommended to use at least two physical hardware hosts – clustered Expressways are designed to support resilience and capacity.

To support hardware resilience, Expressway peers must run on at least two different hardware platforms.

Each and every Expressway peer in a cluster must be within a 15ms hop (30ms round trip delay) of each and every other Expressway in or to be added to the cluster.

### Supported Features

#### vMotion

If you need to move Expressway to a new host you must perform a host migration via vMotion.

There may be glitches (packet loss/jitter) in media for calls that are interworked by Expressway as the VM is moved. We recommend that a vMotion move is carried out when there is low call activity on the VM Expressway.

#### SAN with Fibre Interconnect

Use of a SAN with Fibre interconnect, rather than a NAS, is recommended in order to maximize the transfer speed.

### Unsupported Features

#### VMware Fault Tolerant Mode

VMware fault tolerant mode is not supported (because the Expressway uses multiple cores).



## Appendix 1: Troubleshooting

### VMware HA

We do not support VMware High Availability. We recommend clustering for resilience. If you need to move a virtual Expressway, you can use vMotion.

### VMware Snapshots

We do not support VMware snapshots. We recommend you take regular backups of the Expressway instead.

## Licensing

If you copy the VM, the Expressway serial number will change and the existing license keys will be invalidated. If you need to move Expressway to a new host you must perform a host migration via vMotion.

## Security Hardening

Information on how to deploy and operate VMware products in a secure manner is available from the [VMware Security Hardening Guides](#).

## Appendix 1: Troubleshooting

This section contains information to help in troubleshooting system issues.

### Checking VMware Compatibility

If you are using third party hardware for hosting the VM Expressway application, check the hardware compatibility. This can be done using the VMware compatibility guide tool available from <http://www.vmware.com/resources/compatibility/search.php>.

### VMware Checklist

1. Check the accessibility to the VM host server (by ping, physical console access, ssh remote access, KVM-over-IP console, and so on).
2. Check the network connectivity of the VMkernel (by executing the `vmkping` command using Tech Support Mode to verify network connectivity from the VMkernel NIC level).
3. If you are having problems connecting to the vSphere Client management console, execute the command `/sbin/services.sh` from an SSH session to restart the ESXi management agent.
4. Check the utilization of the VM host server (CPU utilization, memory utilization, disk access speed, storage access speed, network access status, power utilization, and so on).

If any specific application causes high utilization, stop or restart this application to isolate the overall VM host performance level. Alternatively execute the command `esxtop` from Tech Support Mode to list all system processes running on the ESXi host application.

5. Check the ESXi server file log (hostd.logs) under the folder `/var/log/vmware`.  
This log contains common error logs such as iSCSI naming error, authentication error, host convertibility error, and so on.
6. Verify that there is adequate disk space available on the physical volume that stores the database files, and free up disk space if necessary.
7. Validate the authentication to the vCenter Server database. The vCenter Server service may not be able to authenticate with the database if:
  - a. There are permission issues with the database when importing from one instance to another.
  - b. The password on the account you are using to authenticate to the database has changed but the password in the registry has not changed as well.
  - c. The vCenter Server database user is not granted correct permissions.

## Isolating a Possible Root Cause

Potential issue area	What to look for
Storage	<p>Look for the VM store application image stored either on the local drive, SAN or NFS. VMs often freeze or hang up if the application failed to access the storage. Possible error messages are:</p> <ul style="list-style-type: none"> <li>■ vCenter Server does not start</li> <li>■ vCenter Server is slow to respond</li> <li>■ vCenter Server fails after an indefinite amount of time</li> </ul>
Network	<p>Any network failure or locking causes a connection failure between the VM and the virtual network. Also, if using NFS or iSCSI, storage may cause application failures because the application cannot access the file system.</p>
DNS	<p>DNS server failures or communication failures between DNS and the VM server may cause the VMware application or the VM Expressway application to fail.</p>
vCenter Server	<p>If vCenter is not operating properly, even though the VM Expressway application is still up and running, you may lose connection to the VM Expressway application from the network.</p>
Host application	<p>Check any critical alarms on the VM application for events on the host or application level (check the event information from vSphere Client).</p>

## Possible Issues

### Medium OVA fails to install on UCS host with 2 \* 2.4 GHz CPU

Prior to X8.7.1, the OVA file CPU reservation requirement was strictly enforced at 4800 MHz. Natural variations in hardware means that some UCS tested reference configurations with 2 \* 2.4 GHz cores, including some BE6000 options, were not providing exactly 4800 MHz, and the OVA would not install.

We recommend installing an X8.7.1 (or later) OVA if you encounter this issue with an earlier version.

### VM image fails to boot

If the VM image fails to boot, check the VT (Virtualization Technology) setting in BIOS. This needs to be enabled for hosting VMs. If it is not set, set it and re-install ESXi then load the .ova file.

### Expressway application fails to start

Look at the /tmp/hwfail file – its content will indicate any violations in the installation.

For example, Expressway reserves 3 virtual NICs – these are required in the Expressway, do not try deleting one or more of them otherwise hwfail will be created and the VM Expressway will not run.

### Configured NTP does not work

For NTP to work on Expressway, the same NTP must also be configured on the VM host.

### Guest console in vSphere 5 fails to run on some Microsoft platforms

When attempting to open a console screen from vSphere for the VM:

- Error message: “The VMRC console has disconnected...attempting to reconnect.”
- Screen remains black

The following operating systems are at risk:

## Appendix 1: Troubleshooting

- Windows 7 64 bit – reported on VMware forum (<http://communities.vmware.com/thread/333026>)
- Windows Server 2008 R2 (64-bit) – found by use

**Web page/IP address unreachable after OVA deployment**

This issue can be caused by a cache issue in the gateway switch.

To resolve, access vCenter, go to the console and ping the gateway: `ping <gateway_ip_address>`.

**Web page unreachable while taking snapshot**

When taking a snapshot, the entire state of the virtual machine is stunned (paused) so snapshot files can be written to disk.

To resolve, shut down the VM before taking snapshots.

For more information about taking snapshots refer to VMware's article, [Taking a snapshot with virtual machine memory renders the virtual machine to an inactive state while the memory is written to disk \(1013163\)](#).

**Clustering status incorrect after recreating a VM within a cluster**

When recreating a VM within a cluster, the cluster must be broken and recreated for it to function correctly.

To resolve, take the following steps:

1. Back up the existing configuration from the original node you want to recreate.
2. Upgrade all nodes to X8.9.
3. Shut down guest on the original node.
4. Start up a new VM using the X8.9 .ova file and give it the same IP address as the original node.
5. Power on the new VM and assign it a new release key.
6. Restore the backup configuration from the original node onto the new VM.
7. Rebuild the cluster and add the cluster configuration on the other nodes.
8. After approximately 10 minutes, clustering status on the **Status > Clustering page** should accurately indicate a normal status for the cluster.

**Raid controller synchronization**

If the VMware system is synchronizing its RAID disks, disk performance is seriously degraded. It is strongly recommended that Expressway is not installed or run on VM platforms where RAID disks are in a degraded or synchronizing state.

## Analyzing the Cause of VMware Issues

If VMware is causing problems on the Expressway host, you are initially recommended to collect logs from the host for analysis:

1. Using the vSphere client (or the vCenter Server managing this ESXi host) connect to the ESXi host on which the Expressway is running.
2. Go to **File > Export > Export System logs**, choose the appropriate ESXi host and go with the default settings.

After you have downloaded the logs analyze them, or have them analyzed to determine the issue.

More information on exporting logs can be found at

[http://kb.vmware.com/selfservice/microsites/search.do?language=en\\_US&cmd=displayKC&externalId=653](http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=653).

## Active Options Only Indicates '150 Traversal Calls' for Large Deployments

To utilize the Large scale capabilities (500 traversal calls) of the Expressway, the VM platform must have an active 10Gb network connection.

## Restoring Default Configuration (Factory Reset)

Very rarely, it may become necessary to run the “factory-reset” script on your system. This reinstalls the software image and resets the configuration to the functional minimum.

**Note:** Restoring the default configuration causes the system to use its current default values, which may be different from the previously configured values, particularly if the system has been upgraded from an older version. In particular this may affect port settings, such as multiplexed media ports. After restoring the default configuration you may want to reset those port settings to match the expected behavior of your firewall.

### Prerequisite Files

The `factory-reset` procedure described below rebuilds the system based on the most recent successfully-installed software image. The files that are used for this reinstallation are stored in the `/mnt/harddisk/factory-reset/` folder on the system. These files are:

- A text file containing just the 16-character Release Key, named `rk`
- A file containing the software image in tar.gz format, named `tandberg-image.tar.gz`

In some cases (most commonly a fresh VM installation that has not been upgraded), these files will not be present on the system. If so, these files must first be put in place using SCP as root.

### Performing a Reset to Default Configuration

The following procedure must be performed from the serial console. This is because the network settings will be rewritten, so any SSH session used to initiate the reset would be dropped and the output of the procedure would not be seen.

The process takes approximately 20 minutes.

1. Log in to the system as `root`.
2. Type `factory-reset`
3. Answer the questions as required:

The recommended responses will reset the system completely to a factory default state.

Prompt	Recommended response
Keep option keys [YES/NO]?	NO
Keep FIPS140 configuration [YES/NO]?	NO
Keep IP configuration [YES/NO]?	NO
Keep ssh keys [YES/NO]?	NO
Keep ssl certificates and keys [YES/NO]?	NO
Keep root and admin passwords [YES/NO]?	NO
Save log files [YES/NO]?	NO

4. Confirm that you want to proceed.
5. After the serial boots, you will be taken to the Install Wizard. Some of the questions in the wizard may be skipped depending on your responses in step 3.

**Note:** If you were using FIPS140 and you wish to enable it again see the relevant section in the *Cisco Expressway Administration Guide* on the [Maintain and Operate Guides](#) page.

## Resetting Your Administrator Password or Root Password

If you have forgotten the password for either an administrator account or the **root** account and you are using a VM (Virtual Machine) Expressway, you can reset it using the following procedure:

1. Open the vSphere client.
2. Click on the link **Launch Console**.
2. Reboot the Expressway.
3. In the vSphere console log in with the username **pwrec**. No password is required.
4. When prompted, select the account (**root** or the username of the administrator account) whose password you want to change.
5. You will be prompted for a new password.

The **pwrec** account is only active for one minute following a reboot. After that time you will have to reboot the system again to reset the password.

## Appendix 2: VM Expressway Activation Process

After you have installed the Cisco Expressway VM, you can use this procedure to activate your Cisco Expressway software. If you're using the service setup wizard, you can ignore this topic. The wizard guides you through completing this configuration.

1. You will have received your Product Authorization Keys (PAKs) via email. The Expressway software can be downloaded from the link contained in your email or from <http://software.cisco.com/download/navigator.html>.

You need to select and install **Cisco TelePresence Video Communication Server (VCS)** software. After you have completed this procedure, including the installation of the **Expressway Series** key, the web interface will change to indicate **Cisco Expressway**.

2. After the VM software is installed, retrieve the 8 character serial number from the **Option keys** page (**Maintenance > Option keys**) or from the bottom right hand corner of the web interface.

The screenshot shows the 'Option keys' page in the Cisco Expressway web interface. The page has a breadcrumb trail: 'You are here: Maintenance > Option keys'. Below the breadcrumb is a table with columns 'Key' and 'Description'. There are buttons for 'Delete', 'Select all', and 'Unselect all'. The table contains two rows: 'System information' and 'Software option'. The 'System information' row has 'Hardware serial number' (with a red box around the value 'XXXXXXXX') and 'Active options' (Encryption, Interworking). The 'Software option' row has 'Add option key' with a text input field and an 'Add option' button. The footer of the page shows: 'User: admin Access: Read-write System host name: int-sc-taa22 System time: 12:06 GMT Language: en\_US S/N: XXXXXXXX Version: X8.1'. A red box highlights the serial number 'XXXXXXXX' in the footer.

## Appendix 3: Deploying Multiple Datastores

3. Register your software and feature PAKs at the customer licensing portal to retrieve your **Release** key and any relevant **Option** keys:
  - a. Go to [www.cisco.com/go/license](http://www.cisco.com/go/license) and sign in.
  - b. If necessary, click **Continue to Product License Registration**.
  - c. Follow the onscreen instructions to register your software PAK (with a part number prefix of LIC-SW-EXP), utilizing the product serial number obtained from the previous step.
  - d. Continue to register any applicable feature PAK.

You will shortly receive 2 emails containing your Release and Option keys.

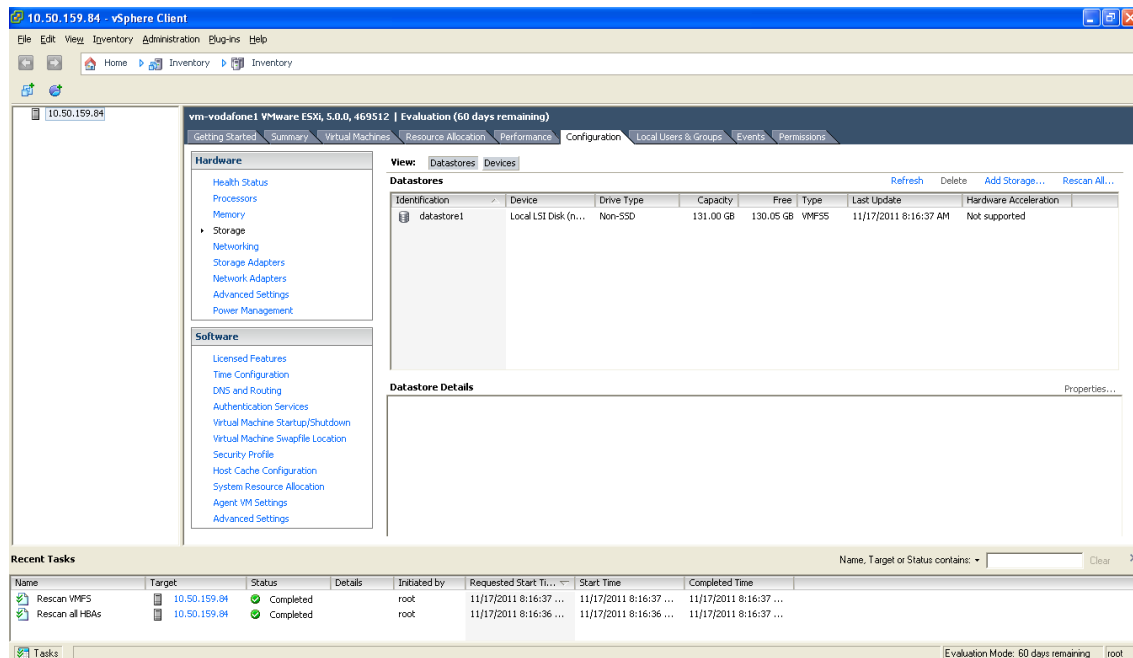
4. Enter your **Release key** and any **Option keys** on the **Option keys** page (**Maintenance > Option keys**) on the Expressway web interface.
5. Restart the Expressway (**Maintenance > Restart options**).

Only one restart is required after the release key and option keys have been entered.

## Appendix 3: Deploying Multiple Datastores

This process should be carried out during the initial build of the VM host, if the VM host has two or more RAID arrays of disk storage. This configuration enables vSphere / vCenter to know about all the datastores.

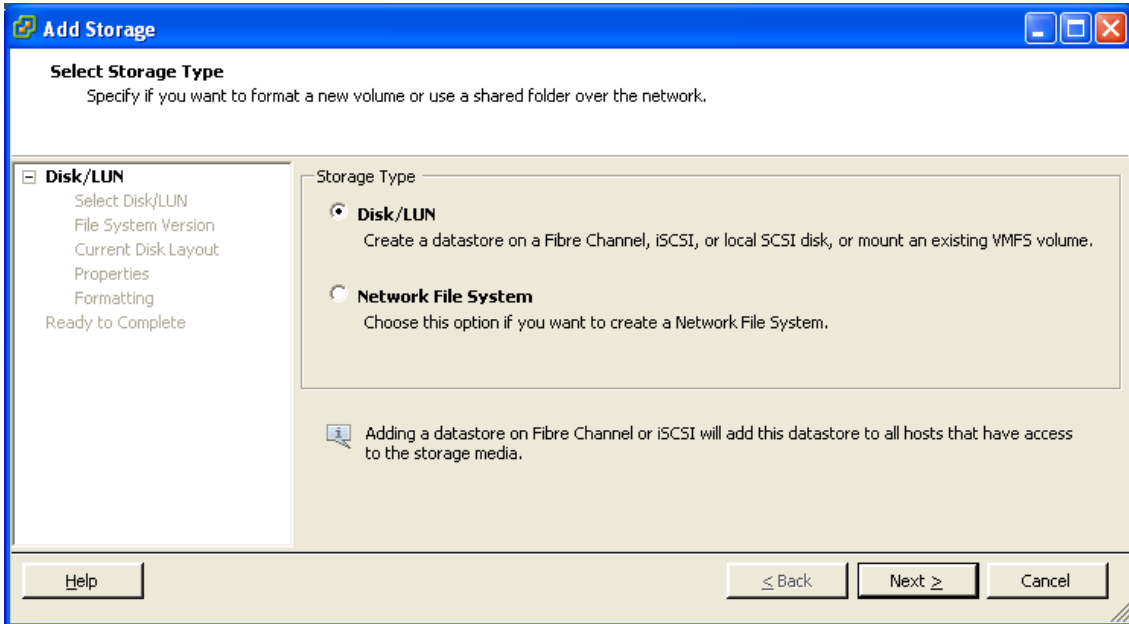
1. From vSphere or vCenter Inventory list select the relevant Host.
2. Select the **Configuration** tab.
3. Select **Storage**.



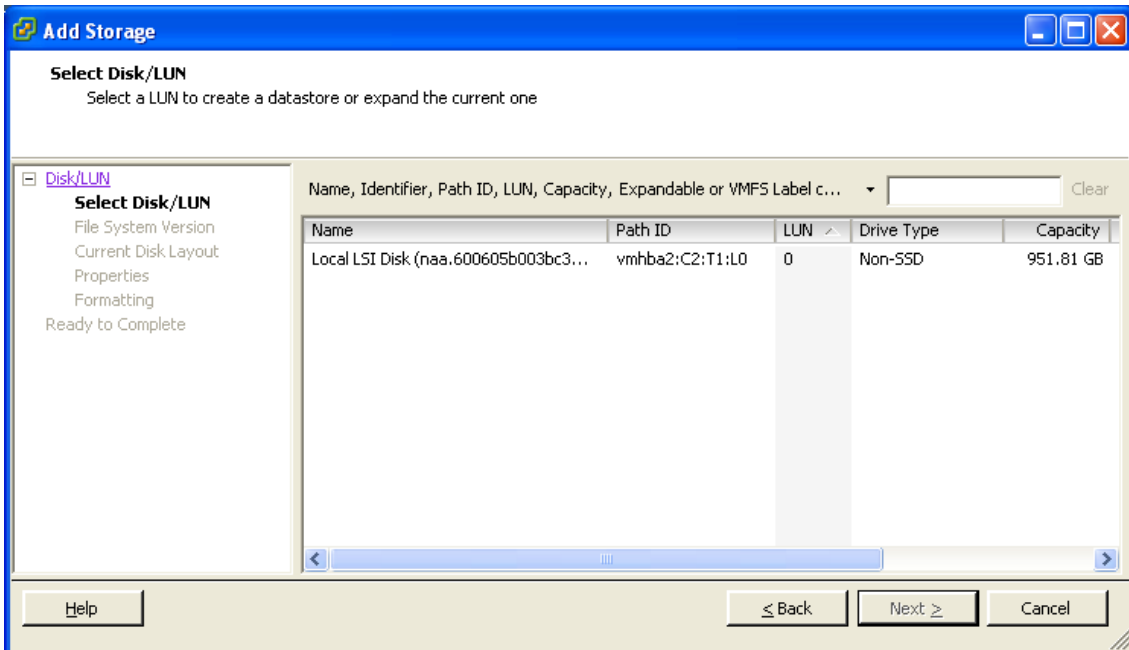
4. Select **Add Storage ...** (on the right hand side window).

Appendix 3: Deploying Multiple Datastores

5. Select **Disk/LUN** and click **Next**.

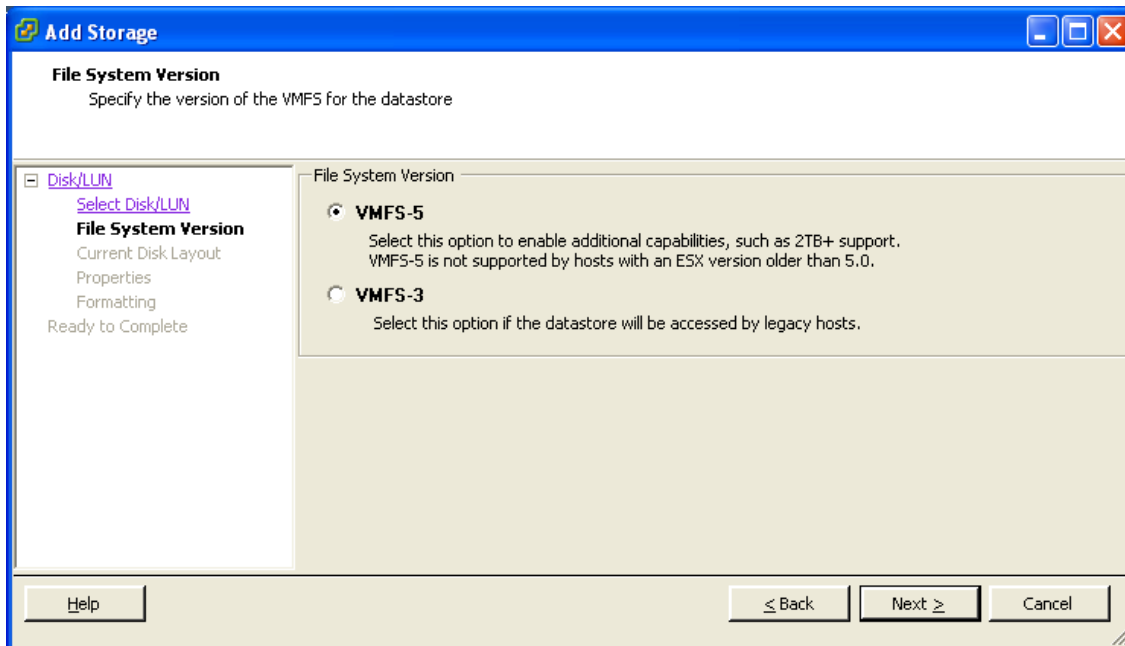


6. Under **Disk/LUN** select the required Disc/LUN from the list presented and click **Next**.

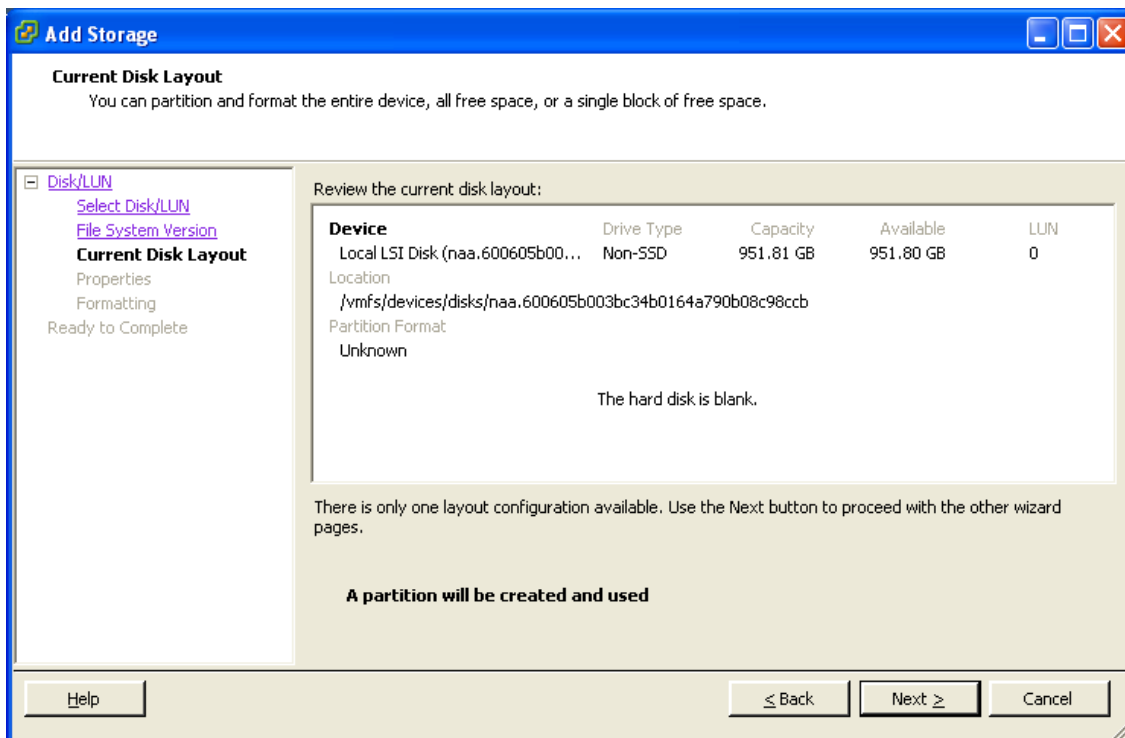


## Appendix 3: Deploying Multiple Datastores

7. On the **File System Version** page select **VMFS-5** and then click **Next**.



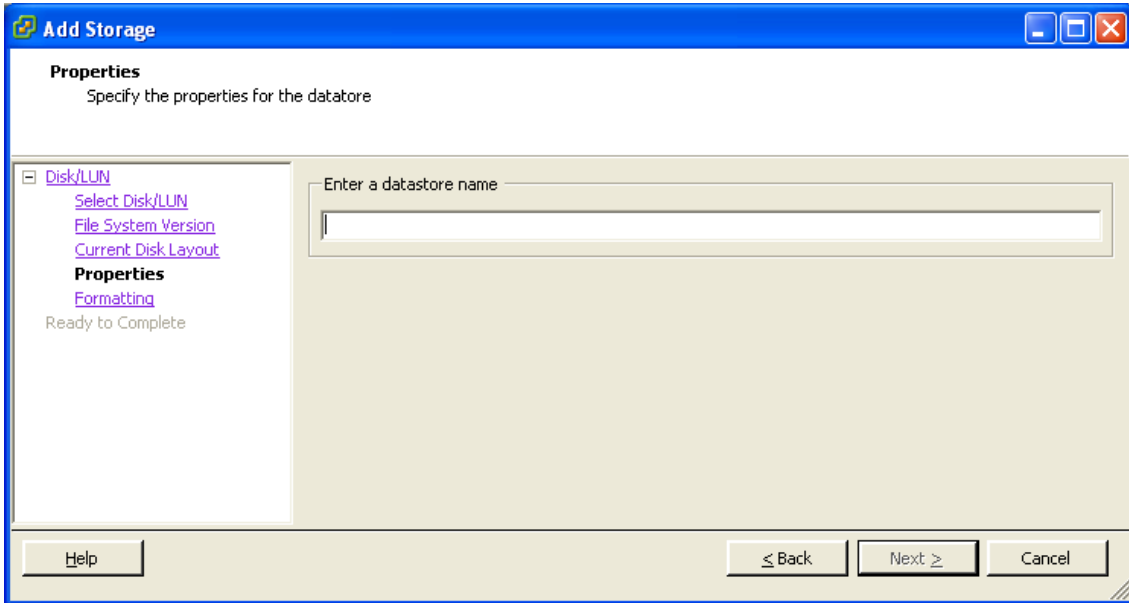
8. On the **Current Disk Layout** page verify the details and then click **Next**.



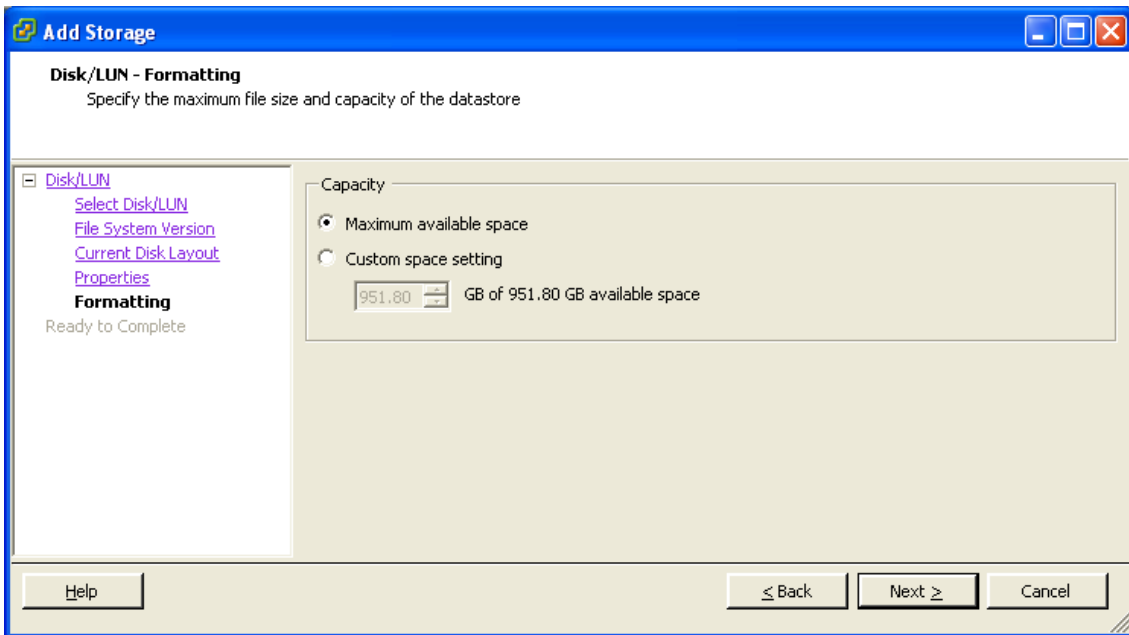


Appendix 3: Deploying Multiple Datastores

9. On the **Properties** page enter a name for the new datastore and then click **Next**.

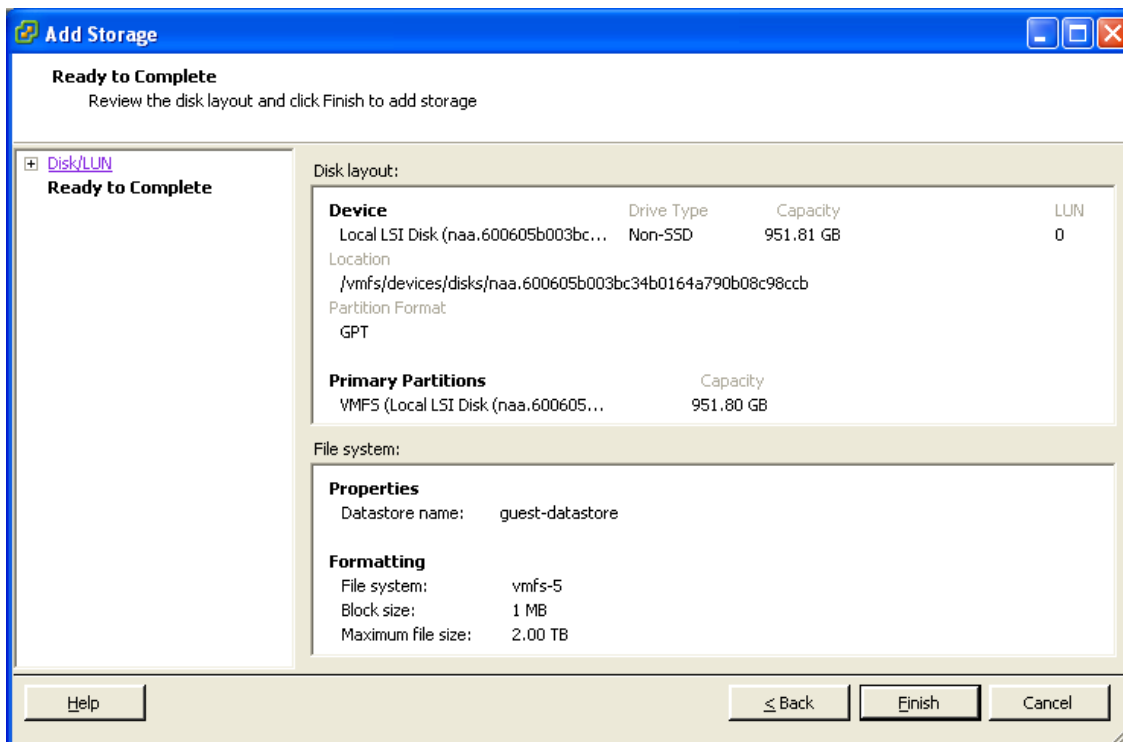


10. On the **Formatting** page select **Maximum available space** and then click **Next**.

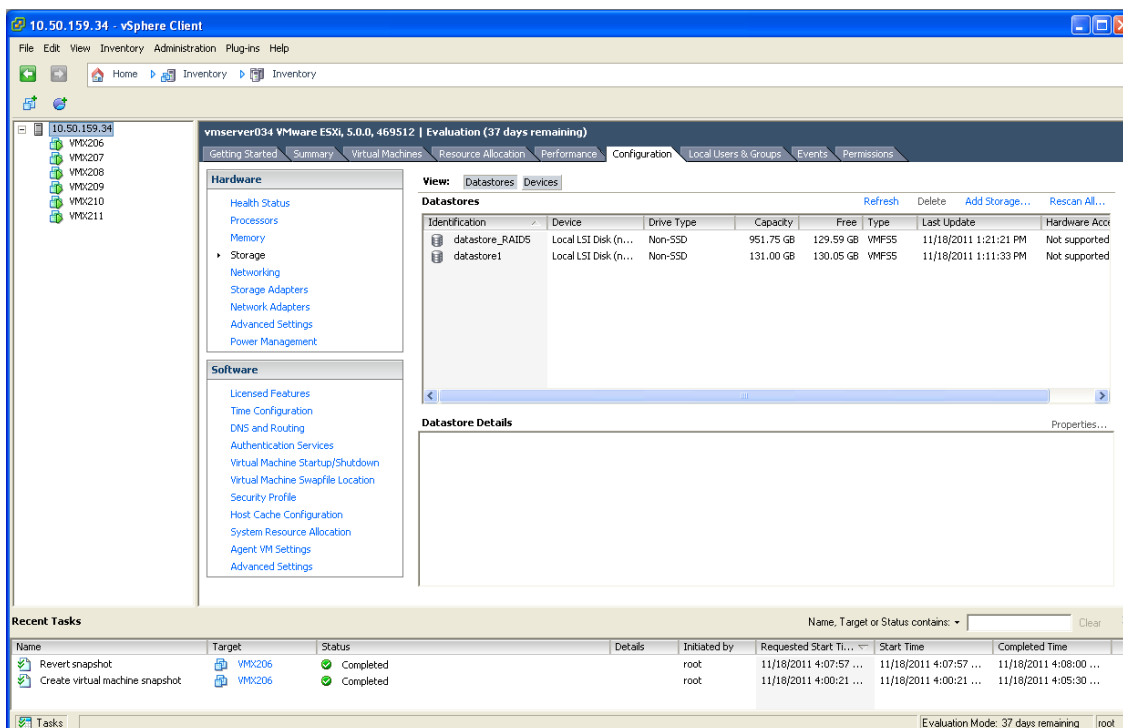


## Appendix 3: Deploying Multiple Datastores

- On the **Ready to Complete** page verify the details and then click **Finish**.



- Wait for the Create VMFS Datastore task to complete.
- On completion, the new datastore will be listed under the **Storage** section.



## Cisco Legal Information

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

All printed copies and duplicate soft copies are considered un-Controlled copies and the original on-line version should be referred to for latest version.

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco website at [www.cisco.com/go/offices](http://www.cisco.com/go/offices).

© 2017 Cisco Systems, Inc. All rights reserved.

## Cisco Trademark

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: [www.cisco.com/go/trademarks](http://www.cisco.com/go/trademarks). Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1110R)

