

# Use Microsoft HPC Pack to Create a Windows Azure Compute Cluster

## Create an Affinity Group

*Affinity groups* group your Windows Azure services to optimize performance. All services within an affinity group will be located close to each other in the same data center.

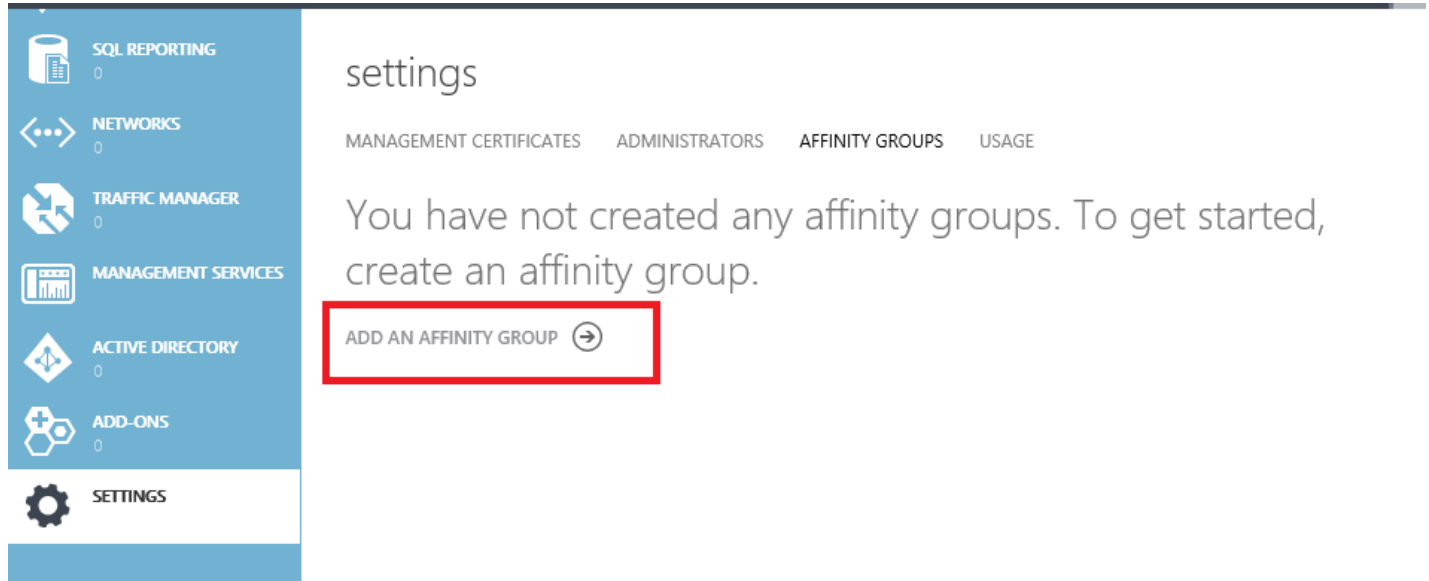
For HPC, it's especially important to use affinity groups because of how Windows Azure Data Centers are designed. Basically, Windows Azure Data Centers are built using "containers" full of clusters and racks. Each container has specific services, i.e. Compute and Storage, SQL Azure, Service Bus, Access Control Service, etc. Containers are spread across the data center, so when we subscribe or deploy a service the *Fabric Controller* (which chooses based on our solution configuration where the services should be deployed) can place our services anywhere in the data center. This means that even if we choose the same data center for all our Azure services, we cannot guarantee that the services will be physically close together. Using an Affinity Group tells the Fabric Controller that services should always be close together, thereby reducing latency and increasing performance.

### IMPORTANT

You must create the affinity group before creating any other services. Services are added to the affinity group at creation time, and once a service is created, you cannot add it to an affinity group.

Here's how you do it:

1. Log in to the [Windows Azure Management Portal](#).
2. Click the **Settings** tab, click **Affinity Groups** at the top, and click **Add** in the bottom panel.



1. Enter the affinity name and select a region.
2. Click the checkmark button to create the new affinity group.

## Specify affinity group details

NAME

hpcaffinity-group

DESCRIPTION

the hpc affinity group

REGION

East Asia



## Create a Storage Account

A *storage account* gives your applications access to Windows Azure Blob, Table, and Queue services located in a geographic region. It represents the highest level of the namespace for accessing the storage services and can contain up to 100 TB of blob, queue, and table data.

Storage costs are based on storage utilization and the number of storage transactions required to add, update, read, and delete stored data. Storage utilization is calculated based on your average usage of storage for blobs, tables, and queues during a billing period.

Create a storage account in the affinity group:

1. In the Windows Azure Management Portal, click the **Storage** tab and click **New** in the bottom panel.

NEW

COMPUTE

SQL DATABASE

QUICK CREATE

DATA SERVICES

STORAGE

APP SERVICES

HDINSIGHT PREVIEW

NETWORK SERVICES

CACHE PREVIEW

STORE PREVIEW

RECOVERY SERVICES

SQL REPORTING

URL

hpcdata

.\*.core.windows.net

LOCATION/AFFINITY GROUP

hpcaffinity-group

☒ Enable Geo-Replication

CREATE STORAGE ACCOUNT

1. Click on **Quick Create**, enter the storage URL, and select the affinity group you created in the previous step.
2. Click **Create Storage Account** to create the new account.

## Create a Windows Server 2012 Datacenter Virtual Machine

A *virtual machine (VM)* in Windows Azure is a server in the cloud that you can control and manage. After you create a virtual machine in Windows Azure, you can delete and re-create it whenever you need to, and you can access the virtual machine just like any other server. Virtual hard disks (.vhd files) are used to create a virtual machine. You can use the following types of virtual hard disks to create a virtual machine:

- We will create a Windows Server 2012 Datacenter VM from the Windows Server 2012 Datacenter image to serve as the HPC compute cluster's *head node*.

- Windows Azure

ALL ITEMS

WEB SITES

1

VIRTUAL MACHINES

14

MOBILE SERVICES

0

CLOUD SERVICES

13

SQL DATABASES

0

STORAGE

8

HDINSIGHT

1

MEDIA SERVICES

0

SERVICE BUS

0

+

NEW

virtual machines

VIRTUAL MACHINE INSTANCES

IMAGES

DISKS

NAME	STATUS	SUBSCRIPTION	LOCATION	DNS NAME
datastreamvm	Running	Azpas300A0U8655	East Asia	<a href="#">datastreamvm.cloudapp.net</a>
datastreamvm2	Running	Azpas300A0U8655	East Asia	<a href="#">datastreamvm2.cloudapp.net</a>
hpc-cluster	Starting (Provisioning)	Azpas300A0U8655	-	<a href="#">hpc-cluster.cloudapp.net</a>
ipythonmgr	Running	Azpas300A0U8655	East Asia	<a href="#">ipythonmgr.cloudapp.net</a>
msrlinuxvm	Running	Azpas300A0U8655	East Asia	<a href="#">msrlinuxvm.cloudapp.net</a>
msrwindowsvm	Running	Azpas300A0U8655	East Asia	<a href="#">msrtrainingvm.cloudapp.net</a>
pythoncluster1	Running	Azpas300A0U8655	East Asia	<a href="#">pythoncluster.cloudapp.net</a>
pythoncluster2	Running	Azpas300A0U8655	East Asia	<a href="#">pythoncluster.cloudapp.net</a>
pythoncluster20	Running	Azpas300A0U8655	East Asia	<a href="#">pythoncluer2.cloudapp.net</a>
pythoncluster21	Running	Azpas300A0U8655	East Asia	<a href="#">pythoncluer2.cloudapp.net</a>
pythoncluster22	Running	Azpas300A0U8655	East Asia	<a href="#">pythoncluer2.cloudapp.net</a>

CONNECT

RESTART

SHUT DOWN

ATTACH

DETACH DISK

CAPTURE

DELETE

1. Click on **Compute**, **Virtual Machine**, then **Quick Create**.
2. Enter the DNS name, select **Windows Server 2012 Datacenter** in the Image drop down box, select the **Large** machine size, enter the username and password you will use to connect to the VM, and select the affinity group from the drop down list.

NEW

COMPUTE

DATA SERVICES

APP SERVICES

NETWORK SERVICES

STORE PREVIEW

WEB SITE

VIRTUAL MACHINE

MOBILE SERVICE

CLOUD SERVICE

QUICK CREATE

FROM GALLERY

DNS NAME

hpc-cluster ✓

IMAGE

Windows Server 2012 ⌵

SIZE

Large (4 cores, 7 GB m) ⌵

USER NAME

azureuser

NEW PASSWORD

•••••• ✓

CONFIRM

•••••• ⌵

REGION/AFFINITY GROUP

hpcaffinity-group ⌵

CREATE A VIRTUAL MACHINE ✓

Azure will automatically provision and boot the VM once it is created. It will take a few minutes for the new VM to be provisioned. You should see your new VM in the virtual machines listing when it is done.

INFO

Creating a VM in this way accomplishes several important tasks for you automatically. First, a [virtual hard disk \(VHD\)](#) file has been created for you in [blob storage](#). When you create files in the VM, this is where they are actually stored. Secondly, a cloud service has been created for you so you can reach your VM at <http://your-vm-name.cloudapp.net/>.

- If you want other machines can manage your cluster head node, you need to add an endpoint and open port 5800. Click the endpoint tab of the virtual machine.

## hpc-cluster

DASHBOARD

MONITOR

ENDPOINTS

CONFIGURE

NAME	PROTOCOL	Text	PUBLIC PORT	PRIVATE PORT	LOAD-BALANCED SET NA...
PowerShell	TCP		5986	5986	-
Remote Desktop	TCP		61905	3389	-

- Click Add, Select "Add Standalone Endpoint".

## ADD ENDPOINT



# Add an endpoint to a virtual machine

Traffic coming to this endpoint will be sent to the virtual machine.

☒ ADD STANDALONE ENDPOINT

☐ ADD AN ENDPOINT TO AN EXISTING LOAD-BALANCED SET ?

(None)



3. Input the endpoint name, protocol, public port and private port.

## ADD ENDPOINT



# Specify the details of the endpoint

NAME

Cluster Manager

PROTOCOL

TCP

PUBLIC PORT

5800

PRIVATE PORT

5800

☐ CREATE A LOAD-BALANCED SET ?



4. Youd should also do the same steps for port 9893.

## Connect to the VM with Remote Desktop Connection

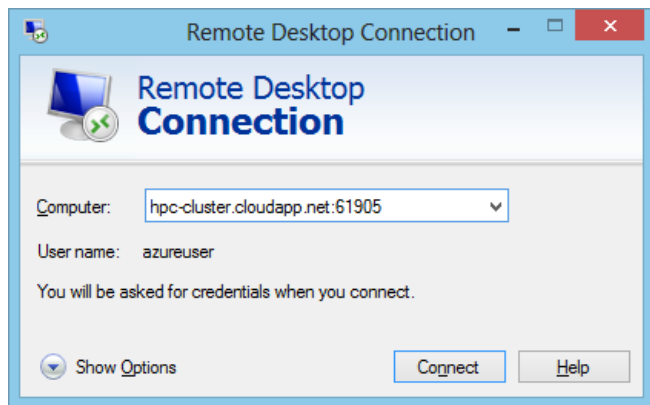
1. Once your VM has been created and started, go to the **Virtual Machines** tab and select it.

2. With the VM selected, click **Connect** in the bottom panel to download an RDP file to your local machine that tells the Remote Desktop Connection Client how to connect to the new VM.

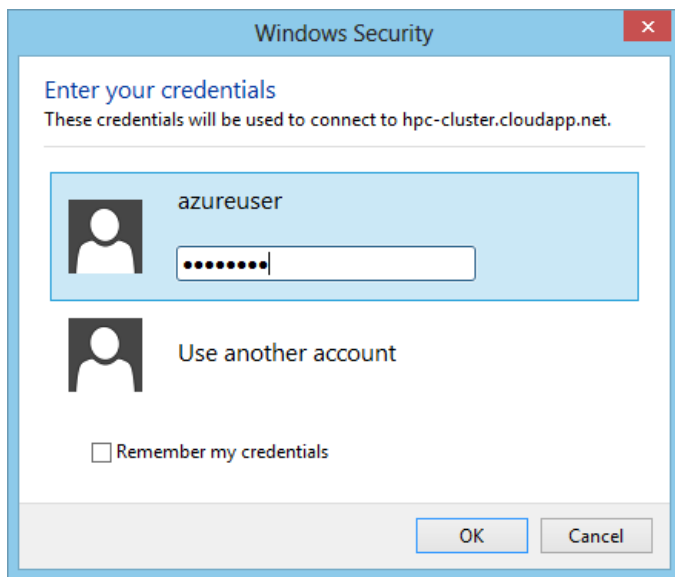
The screenshot shows the Windows Azure portal interface. On the left is a navigation pane with categories like ALL ITEMS, WEB SITES, VIRTUAL MACHINES (14), MOBILE SERVICES (0), CLOUD SERVICES (14), SQL DATABASES (0), STORAGE (8), HDINSIGHT (1), MEDIA SERVICES (0), and SERVICE BUS. The main area is titled 'virtual machines' and contains a table of 'VIRTUAL MACHINE INSTANCES'. The table has columns for NAME, STATUS, SUBSCRIPTION, and LOCATION. The 'hpc-cluster' VM is highlighted with a red box. Below the table is a toolbar with buttons: NEW, CONNECT (highlighted with a red box), RESTART, SHUT DOWN, ATTACH, DETACH DISK, CAPTURE, and DELETE.

NAME	STATUS	SUBSCRIPTION	LOCATION
datastreamvm	Running	Azpas300A0U8655	East Asia
datastreamvm2	Running	Azpas300A0U8655	East Asia
<b>hpc-cluster</b>	Running	Azpas300A0U8655	hpcaffinity-group (East Asia)
ipythonmgr	Running	Azpas300A0U8655	East Asia
msrlinuxvm	Running	Azpas300A0U8655	East Asia
msrwindowsvm	Running	Azpas300A0U8655	East Asia
pythoncluster1	Running	Azpas300A0U8655	East Asia
pythoncluster2	Running	Azpas300A0U8655	East Asia
pythoncluster20	Running	Azpas300A0U8655	East Asia
pythoncluster21	Running	Azpas300A0U8655	East Asia
pythoncluster22	Running	Azpas300A0U8655	East Asia

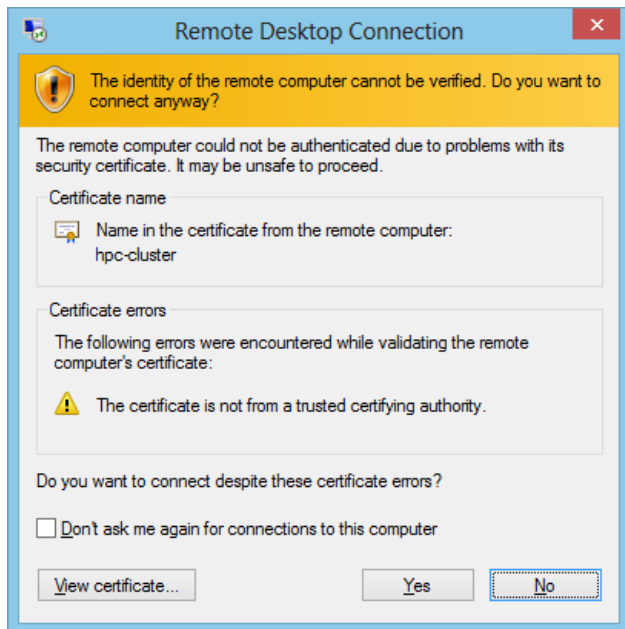
1. Double-click the RDP file to open the connection.



When prompted for credentials, enter the username and password you gave when you created the VM.



Don't worry if you see a certificate warning. Just click **Connect**.



1. The Server Manager will open automatically once you're logged in. Server Manager is your starting point for almost all management tasks in Windows Server 2012.

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#### WARNING

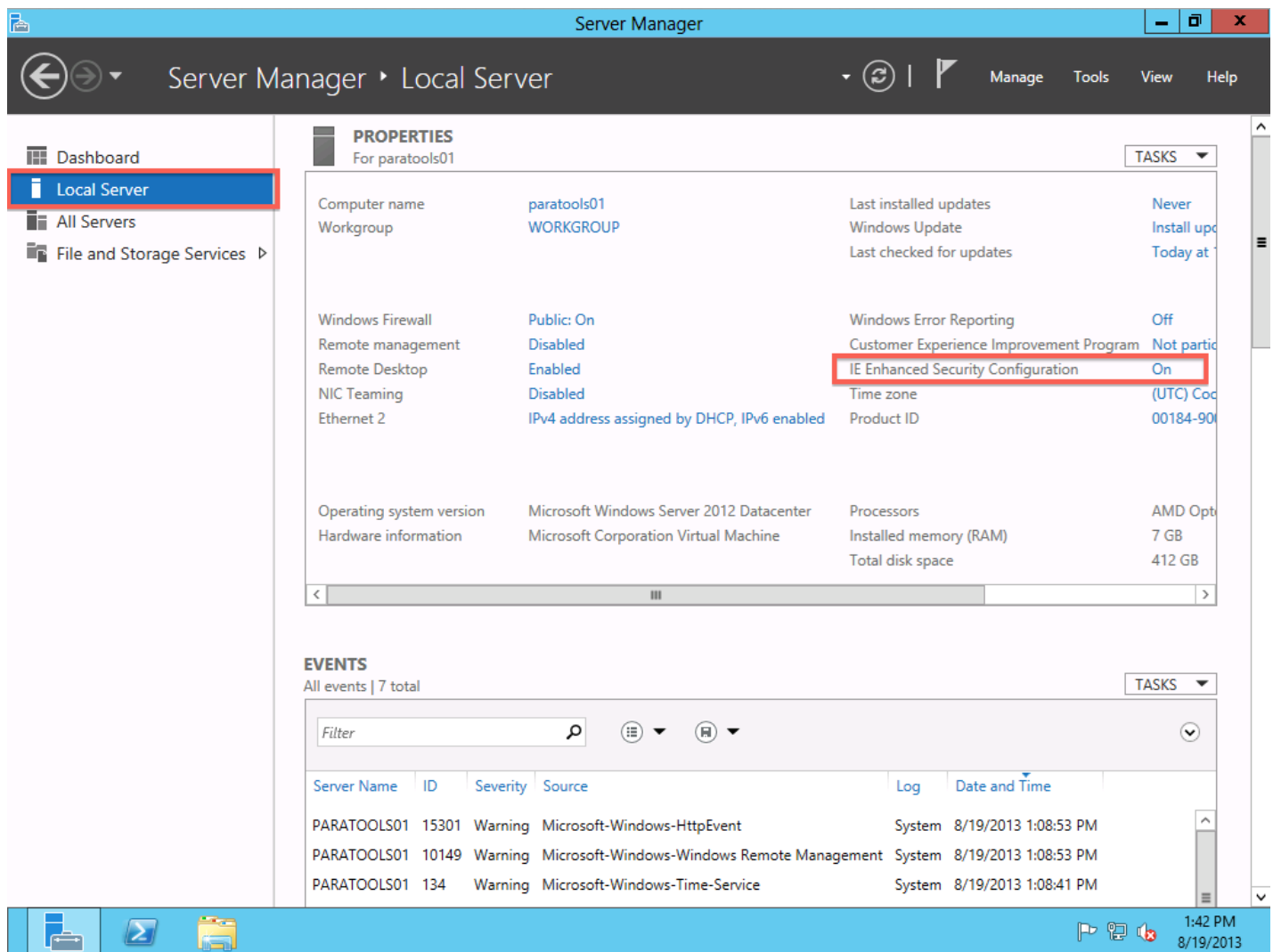
Remote Desktop Connection Client won't connect to unknown versions of Windows. If you're being adventurous and created a VM with a preview version of Windows Server then you may not be able to continue.

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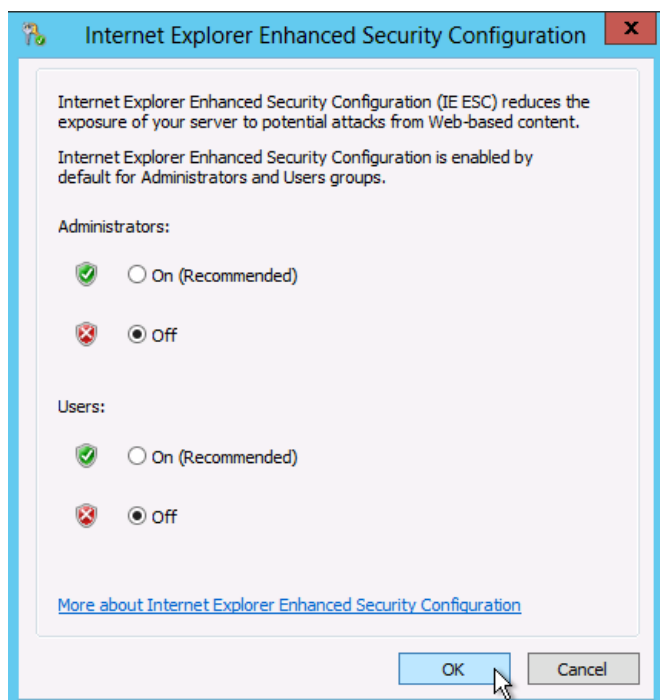
## Download Microsoft HPC Pack

We need a new Active Directory forest for your compute cluster. In fact, Microsoft HPC Pack won't install without first promoting our new Windows Server 2012 to an Active Directory domain controller and adding a domain user. Don't worry, this is easy. We'll even work in parallel by downloading Microsoft HPC Pack to the VM while we install Active Directory.

1. Before you do anything, you need to disable Internet Explorer Enhanced Security Configuration so we can download files from the Internet. In Server Manager, click on **Local Server**. In the Properties pane, click the little blue word **On** next to **IE Enhanced Security Configuration**. (You may need to scroll over if your screen resolution is low.)



Select **Off** for both Administrators and Users and click OK.



Internet Explorer Enhanced Security Configuration places your server and Internet Explorer in a configuration that decreases the exposure of your server to potential attacks that can occur through Web content and application scripts. This is a good thing for servers, but unfortunately it makes



IE effectively unusable on the Internet at large. We have to disable this feature or we won't be able to download HPC Pack from the Microsoft website. You can learn more about Enhanced Security Configuration [in this Technet article](#).

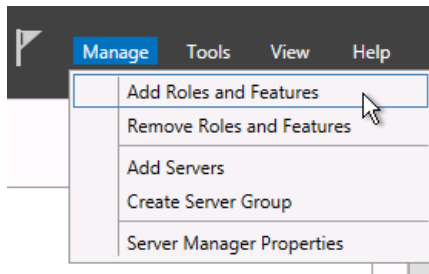
1. Once IE ESC is disabled, open Internet Explorer and go to <http://www.microsoft.com/en-us/download/details.aspx?id=36054>. Click **Download** and then click **Save** to begin the download. The file is almost 2GB large, so continue to the next step and install Active Directory while the transfer completes.



## Install the Active Directory Role

While you're waiting for HPC Pack to download to the VM, we'll go ahead and install Microsoft Active Directory in the VM and configure a new Active Directory forest for your compute cluster.

1. In the Server Manager, click on **Manage** in the top-right corner and select **Add Roles and Features**



1. Click **Next** to skip the first screen. (If you like, you may check the box at the bottom to skip this screen automatically next time.)
2. Select **Role-based or feature-based installation** and click Next.

**Add Roles and Features Wizard**

DESTINATION SERVER  
hpc-cluster

## Select installation type

Before You Begin  
**Installation Type**  
 Server Selection  
 Server Roles  
 Features  
 Confirmation  
 Results

Select the installation type. You can install roles and features on a running physical computer or virtual machine, or on an offline virtual hard disk (VHD).

- ☒ **Role-based or feature-based installation**  
Configure a single server by adding roles, role services, and features.
- ☐ **Remote Desktop Services installation**  
Install required role services for Virtual Desktop Infrastructure (VDI) to create a virtual machine-based or session-based desktop deployment.

< Previous   Next >   Install   Cancel

1. The head node will be automatically selected on the Server Selection tab. Just click **Next** to continue.

**Add Roles and Features Wizard**

DESTINATION SERVER  
hpc-cluster

## Select destination server

Before You Begin  
 Installation Type  
**Server Selection**  
 Server Roles  
 Features  
 Confirmation  
 Results

Select a server or a virtual hard disk on which to install roles and features.

- ☒ Select a server from the server pool
- ☐ Select a virtual hard disk

**Server Pool**

Filter:

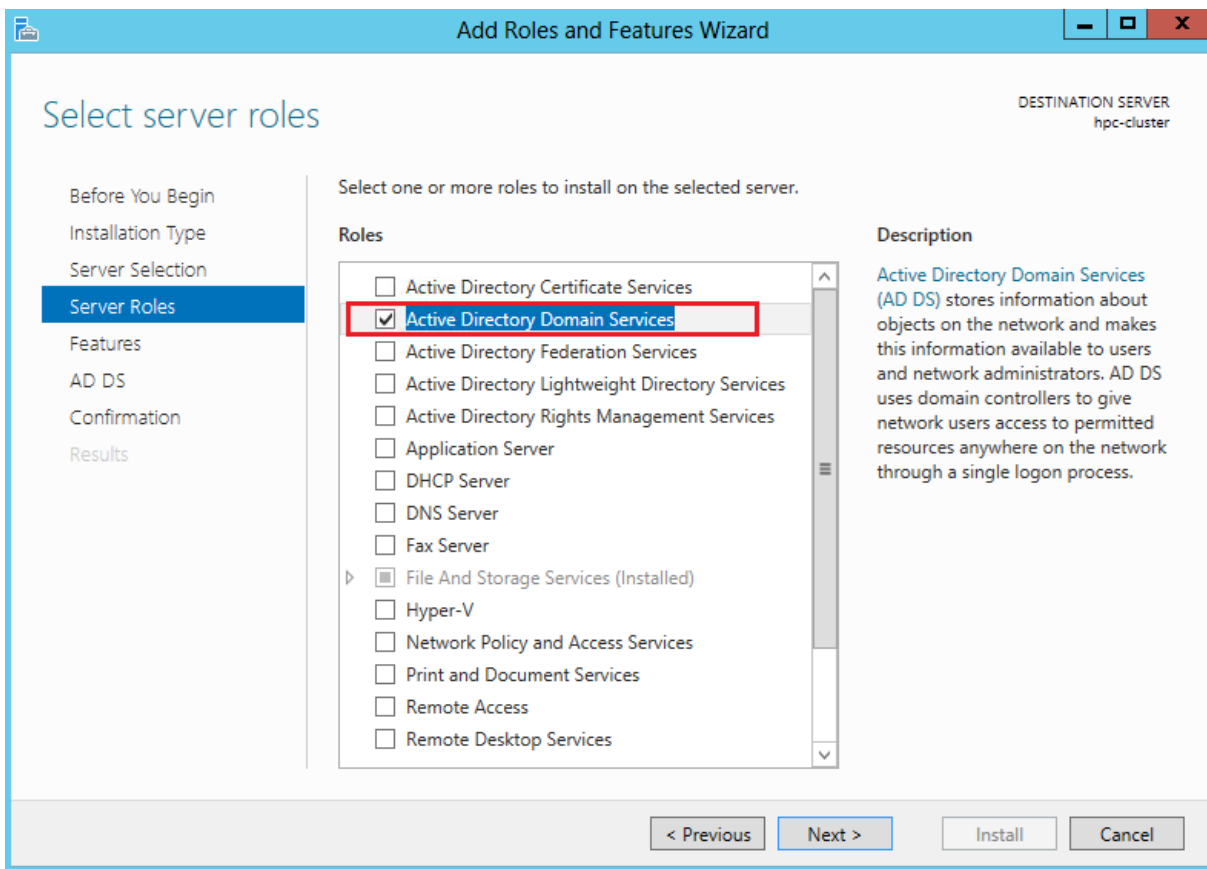
Name	IP Address	Operating System
hpc-cluster	10.24.200.52	Microsoft Windows Server 2012 Datacenter

1 Computer(s) found

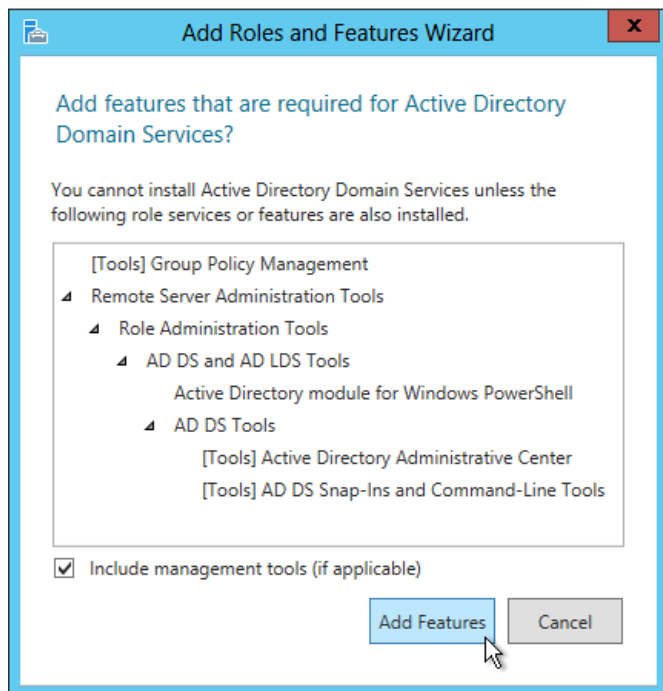
This page shows servers that are running Windows Server 2012, and that have been added by using the Add Servers command in Server Manager. Offline servers and newly-added servers from which data collection is still incomplete are not shown.

< Previous   Next >   Install   Cancel

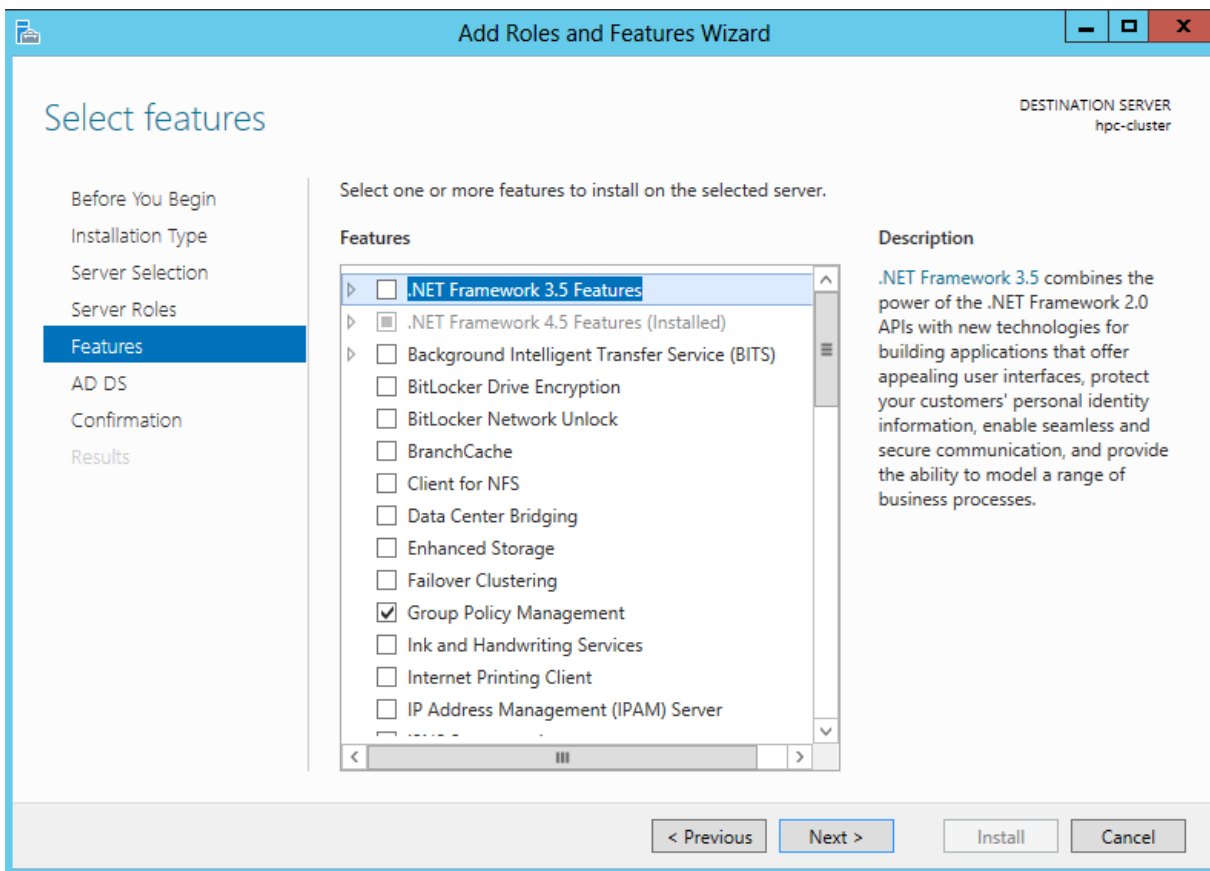
1. Check the box next to **Active Directory Domain Services** on the Server Roles tab.



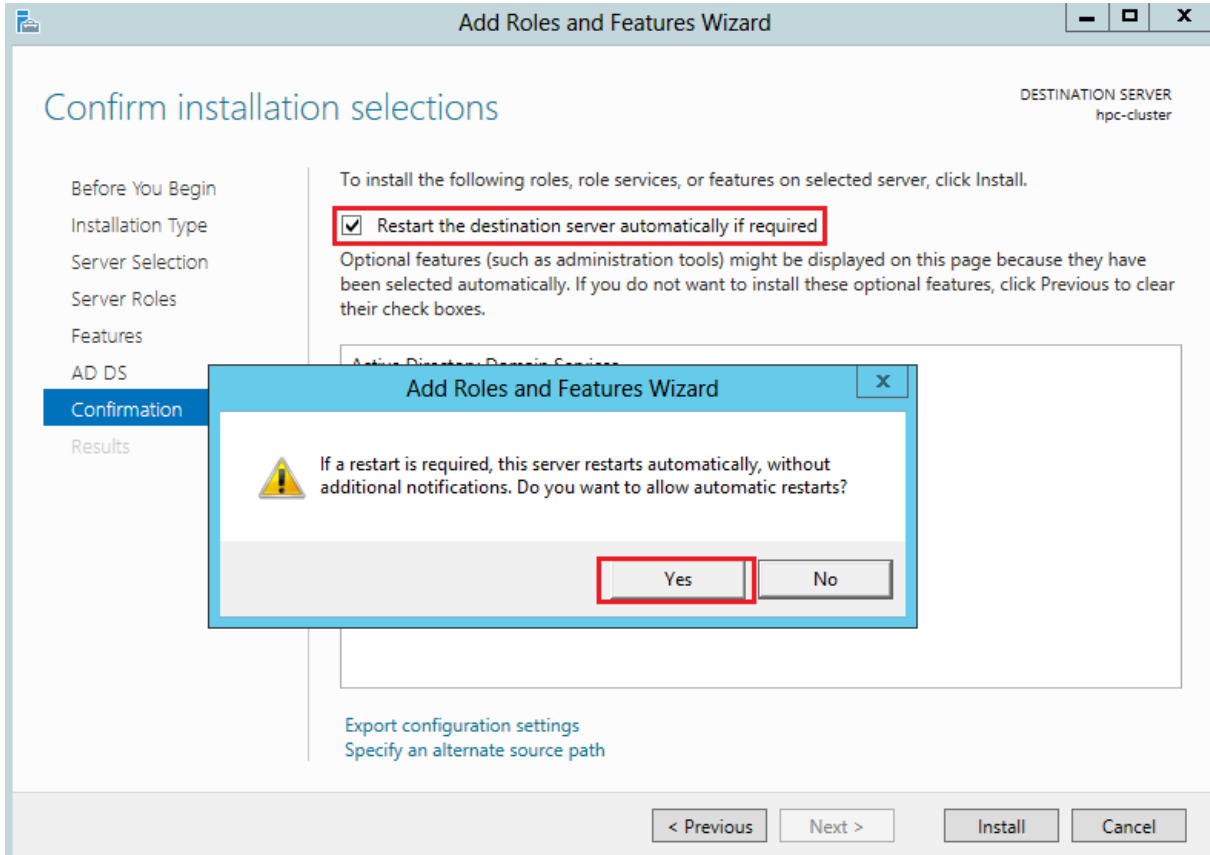
Several features must also be installed to add the Active Directory role. Click **Add Features** on the popup box to continue.



1. Click **Next** on the Features tab. All the features you need have already been selected.



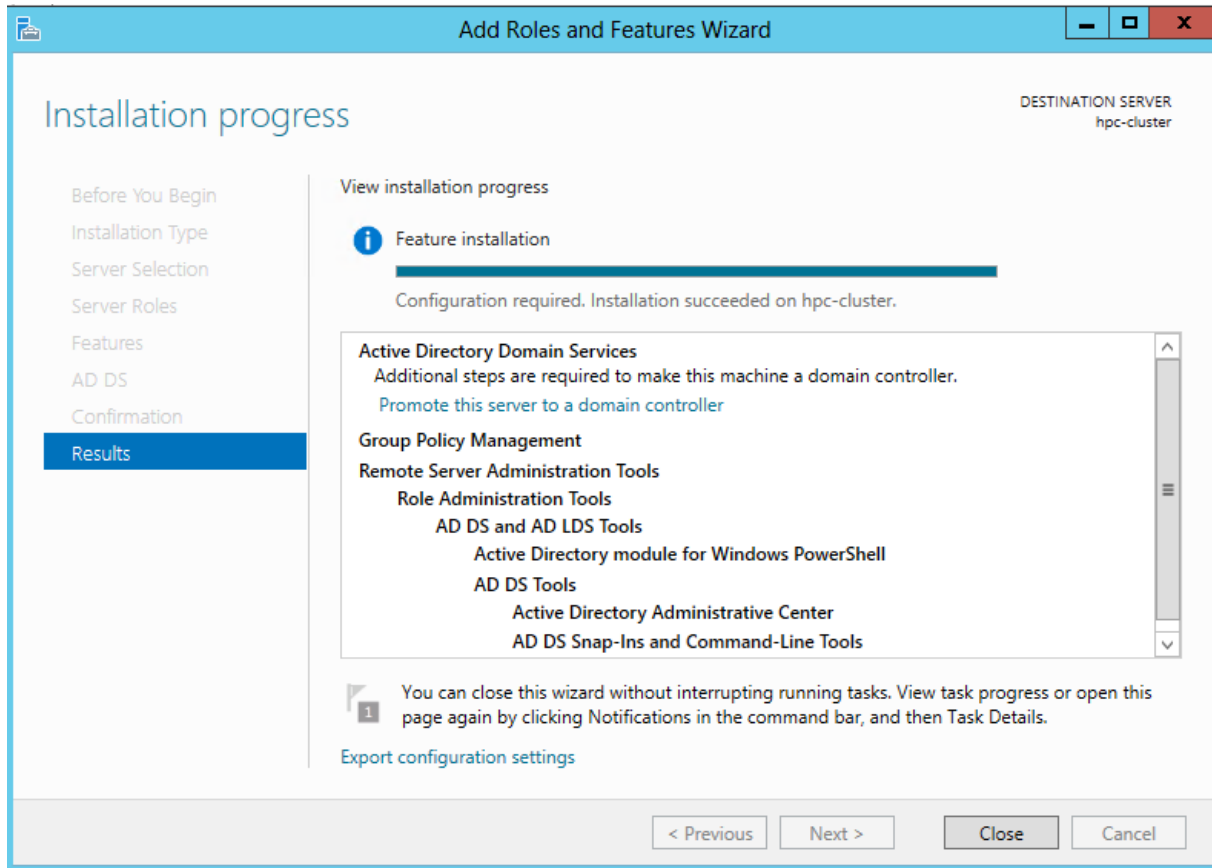
1. Click **Next** until you reach the Confirmation tab. On the Confirmation tab, check the box labeled **Restart the destination server automatically if required** and confirm by clicking **Yes** on the popup box.



1. Click **Install** to begin the installation process. This will take several minutes, so go grab a coffee or check your e-mail or something. Note that you may be disconnected from the VM when it restarts. Don't worry, if you get disconnected just double-click the RDP file we downloaded

earlier to reconnect.

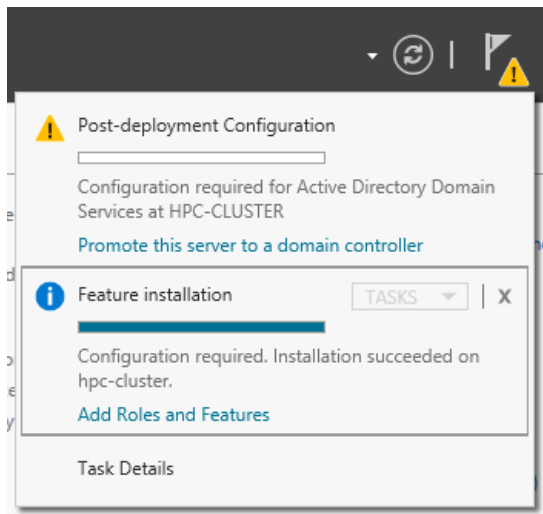
2. Click **Close** to close the installation progress window.



## Promote the Server to a Domain Controller

We need to establish a new Active Directory domain for the HPC cluster. To do that, we will promote the Windows Server 2012 VM to an Active Directory domain controller

1. After Active Directory installation is complete, you'll see a yellow sign appear in the notifications area of the Server Manager. Click on it and select **Promote this server to a domain controller**



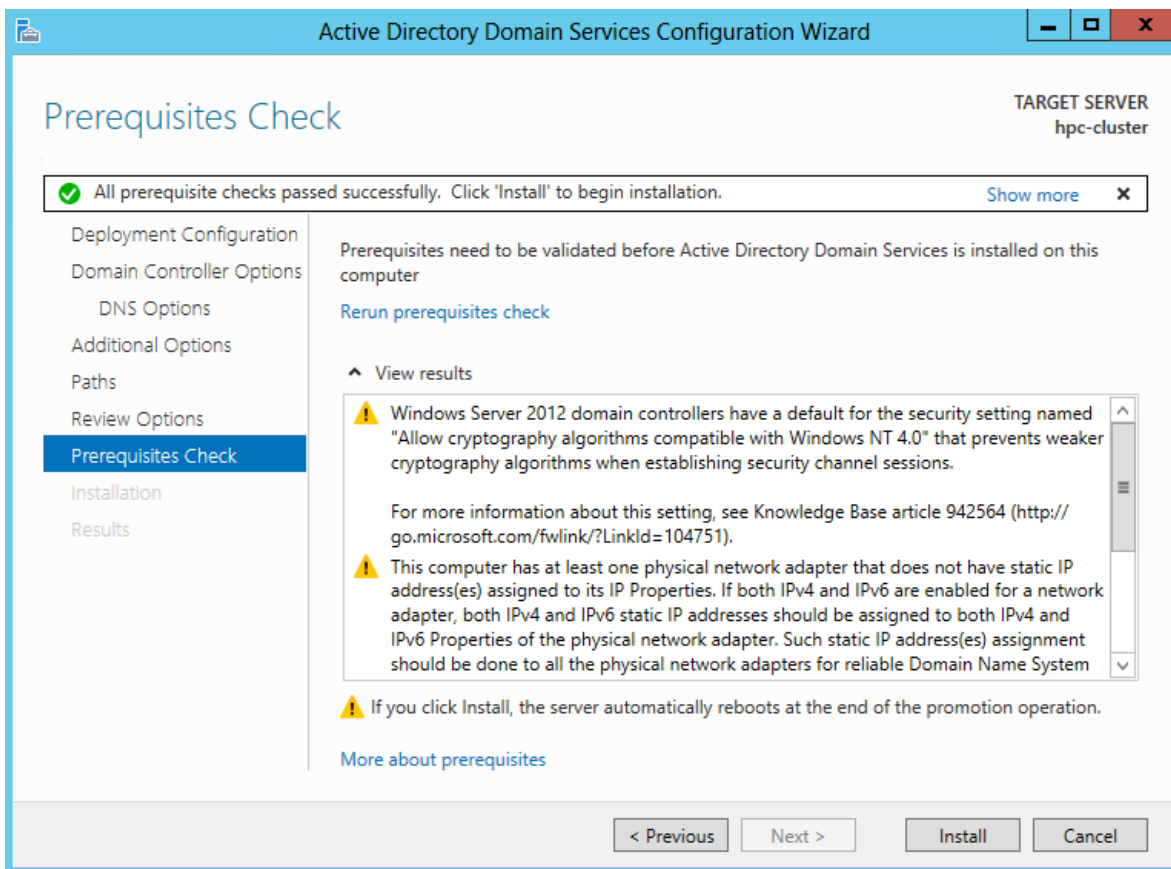
1. Select **Add a new forest**, specify the root domain name with a ".local" top-level domain (TLD) and click Next.

The screenshot shows the 'Active Directory Domain Services Configuration Wizard' window. The title bar includes the Windows logo, the text 'Active Directory Domain Services Configuration Wizard', and standard window controls. The main window has a blue header with the title 'Deployment Configuration' and a 'TARGET SERVER' label with the value 'hpc-cluster'. On the left is a navigation pane with the following items: 'Deployment Configuration' (highlighted in blue), 'Domain Controller Options', 'Additional Options', 'Paths', 'Review Options', 'Prerequisites Check', 'Installation', and 'Results'. The main content area is titled 'Select the deployment operation' and contains three radio buttons: 'Add a domain controller to an existing domain', 'Add a new domain to an existing forest', and 'Add a new forest' (which is selected and highlighted with a red rectangle). Below this is a section titled 'Specify the domain information for this operation' with a label 'Root domain name:' and a text input field containing 'hpc-cluster.local' (also highlighted with a red rectangle). At the bottom of the main content area is a link 'More about deployment configurations'. The bottom of the window features a grey bar with four buttons: '< Previous', 'Next >', 'Install', and 'Cancel'.

1. Wait for the Domain Controller Options tab to load, then enter the DSRM password and click Next.

The screenshot shows the 'Active Directory Domain Services Configuration Wizard' window, now on the 'Domain Controller Options' tab. The title bar is the same. The main window has a blue header with the title 'Domain Controller Options' and the same 'TARGET SERVER' label 'hpc-cluster'. The navigation pane on the left now has 'Domain Controller Options' highlighted in blue, with 'Deployment Configuration' below it. The main content area is titled 'Select functional level of the new forest and root domain' and contains two dropdown menus: 'Forest functional level:' and 'Domain functional level:', both set to 'Windows Server 2012'. Below this is a section titled 'Specify domain controller capabilities' with three checkboxes: 'Domain Name System (DNS) server' (checked), 'Global Catalog (GC)' (checked), and 'Read only domain controller (RODC)' (unchecked). The next section is 'Type the Directory Services Restore Mode (DSRM) password', which contains two password input fields labeled 'Password:' and 'Confirm password:', both filled with dots. At the bottom of the main content area is a link 'More about domain controller options'. The bottom of the window features a grey bar with four buttons: '< Previous', 'Next >', 'Install', and 'Cancel'.

1. Click **Next** until you reach the Prerequisites Check tab. Don't worry about the warnings, just click **Install** to begin the installation. Installation will take several minutes and may reboot the server a few times so this is a great chance to get another coffee.



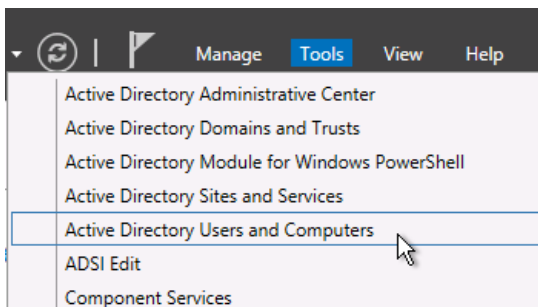
#### NOTE

If the VM restarts then your Remote Desktop Connection window will close. If that happens, wait a few minutes to give the server a chance to boot up and then double-click the RDP file again to reopen the connection. If the connection fails, wait a few more minutes. It may take some time for the reboot to complete.

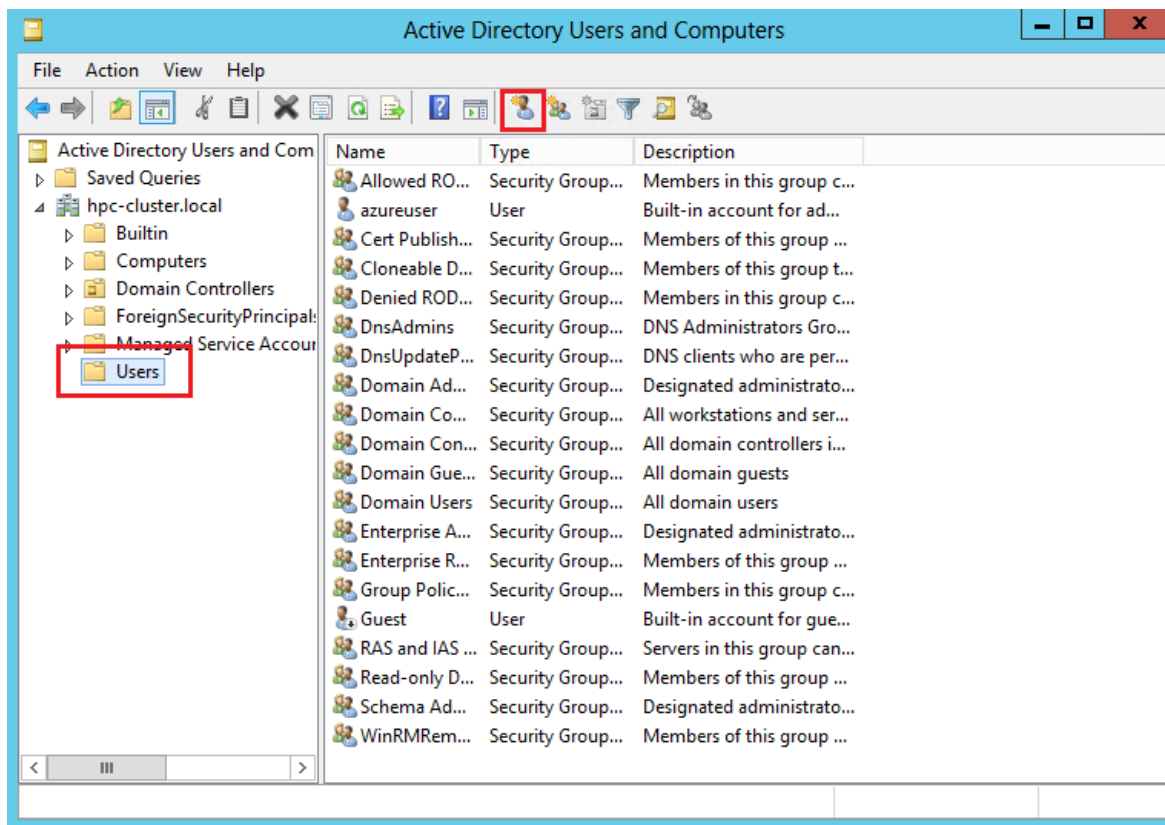
## Add a Domain User Account

Microsoft HPC Pack needs to be installed from a domain user account, so we'll add a new administrator account to our new Active Directory domain.

1. Once the server has finished the promotion process, click on **Tools** in upper right corner of the Server Manager and select **Active Directory Users and Computers**.



1. In the Active Directory Users and Computers window, expand the domain name on the left side and select the **Users** container. Click the icon in the toolbar to add a new domain user.



1. Give the user a first name and a user name and click **Next**.

New Object - User

Create in: hpc-cluster.local/Users

First name: hpcuser Initials:

Last name:

Full name: hpcuser

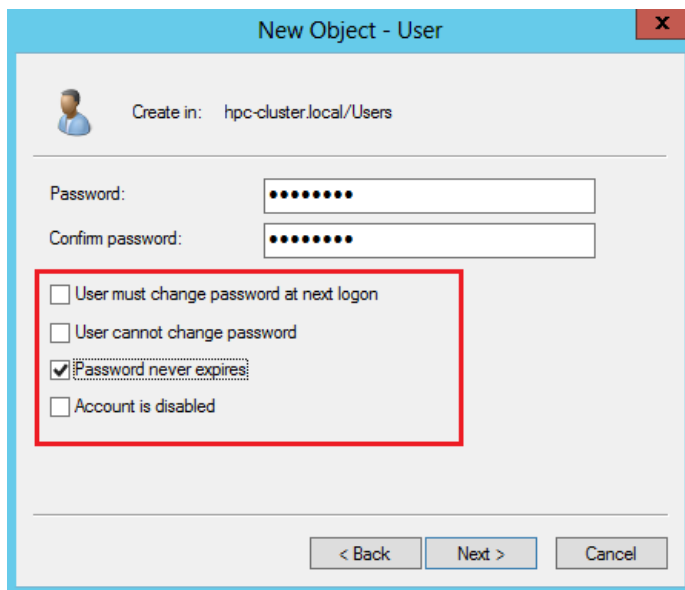
User logon name: hpcuser @hpc-cluster.local

User logon name (pre-Windows 2000): HPC-CLUSTER0\hpcuser

< Back Next > Cancel

1. Set the user's password, select the check boxes as shown, and click **Next**.





**New Object - User**

Create in: hpc-cluster.local/Users

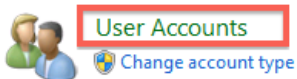
Password: [masked]

Confirm password: [masked]

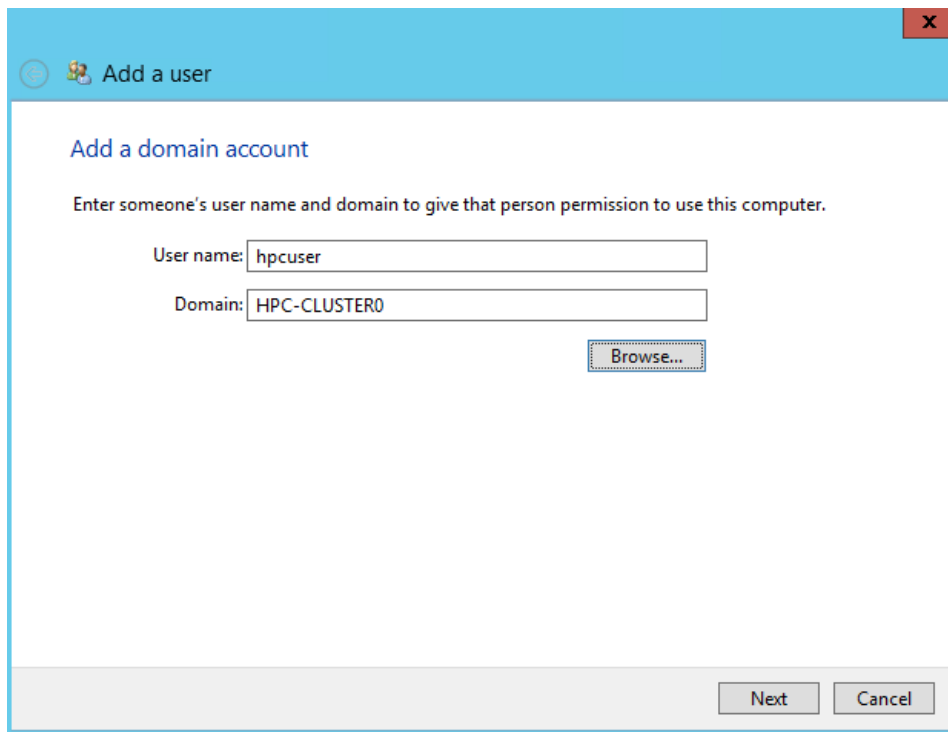
☐ User must change password at next logon  
☐ User cannot change password  
☒ Password never expires  
☐ Account is disabled

< Back   Next >   Cancel

1. Click **Finish** on the final screen to create the user. Close the Active Directory Users and Computers window.
2. We will be logging in to the VM as this user so we need to give this user permission to access the server as an administrator. Open the control panel and click on **User Accounts**, then click on **Give other users access to this computer**.



1. Click the **Add...** button. Enter the domain user's username and the name of the Active Directory Domain and click **Next**.



**Add a user**

Add a domain account

Enter someone's user name and domain to give that person permission to use this computer.

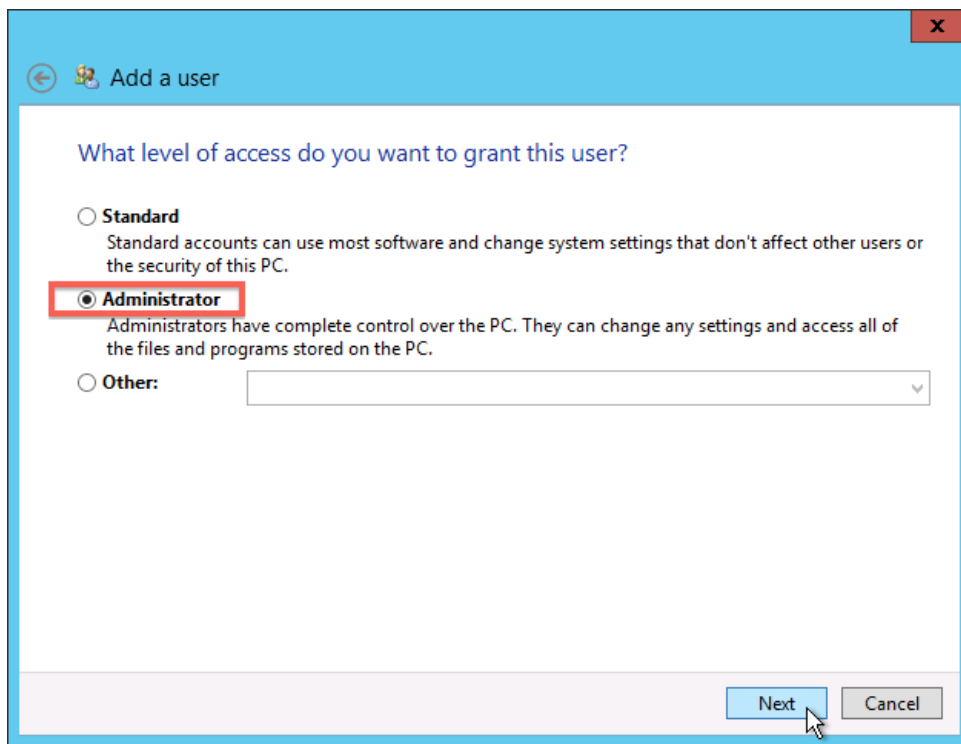
User name: hpcuser

Domain: HPC-CLUSTER0

Browse...

Next   Cancel

1. Select **Administrator** to give the domain user administrative privileges and click **Next**.



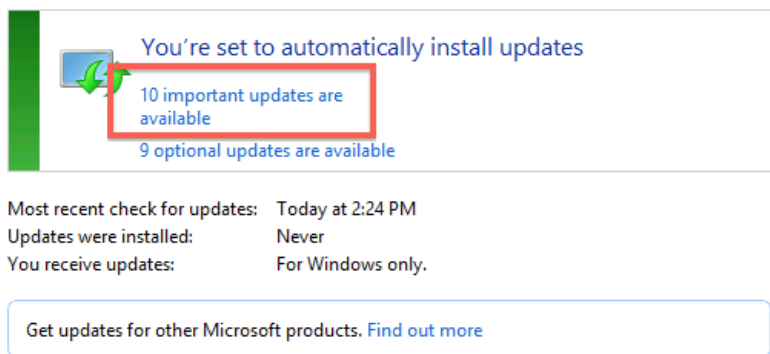
1. Click **Finish** to close the Add a user wizard window and then click **OK** to close the User Accounts window.

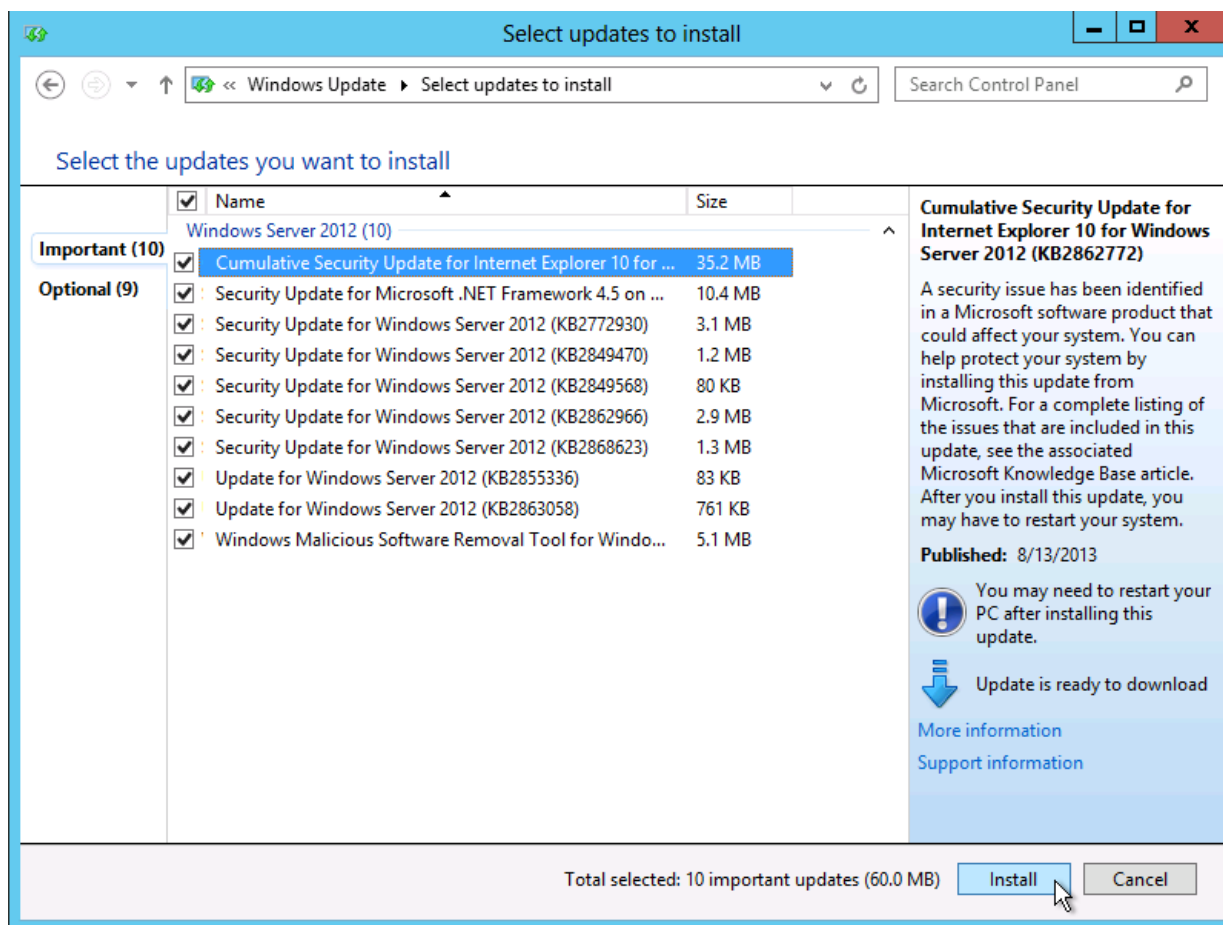
## Install All Critical and Important Updates

You're almost there, but before we can install Microsoft HPC Pack we need to make sure that all services are up to date. Part of the HPC Pack installation process is to install various prerequisites and some of these prerequisites will fail to install if critical updates are not installed.

1. Open the control panel. Click on **System and Security** and then click on **Windows Update**.
2. If important or critical updates are available, click the label listing the updates to open the update window, then click **Install** to begin the installation process. Wait for installation to complete.

### Windows Update



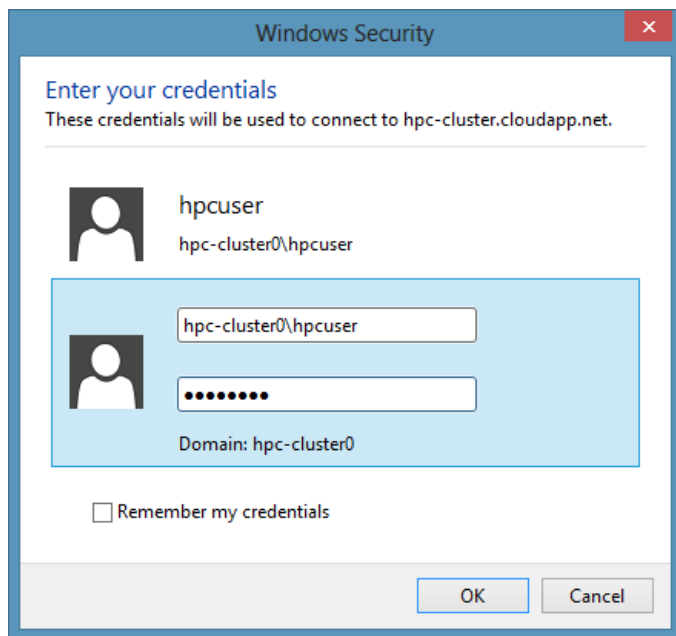


1. Once installation is complete, restart the computer. Remote Desktop Connection will disconnect, so double-click the RDP file to reconnect to the VM.
2. Once you're reconnected, check again for critical and important updates. Continue to install updates and reboot until no more updates are available.

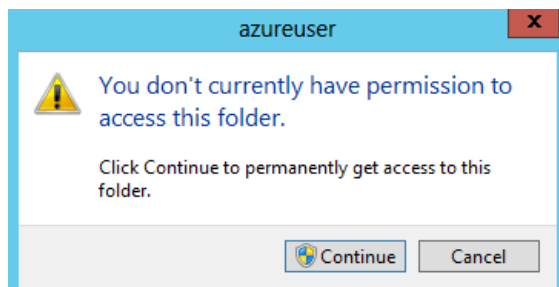
## Install Microsoft HPC Pack

We're ready to install Microsoft HPC Pack! The installation must be performed as a domain user, so disconnect from the virtual machine now.

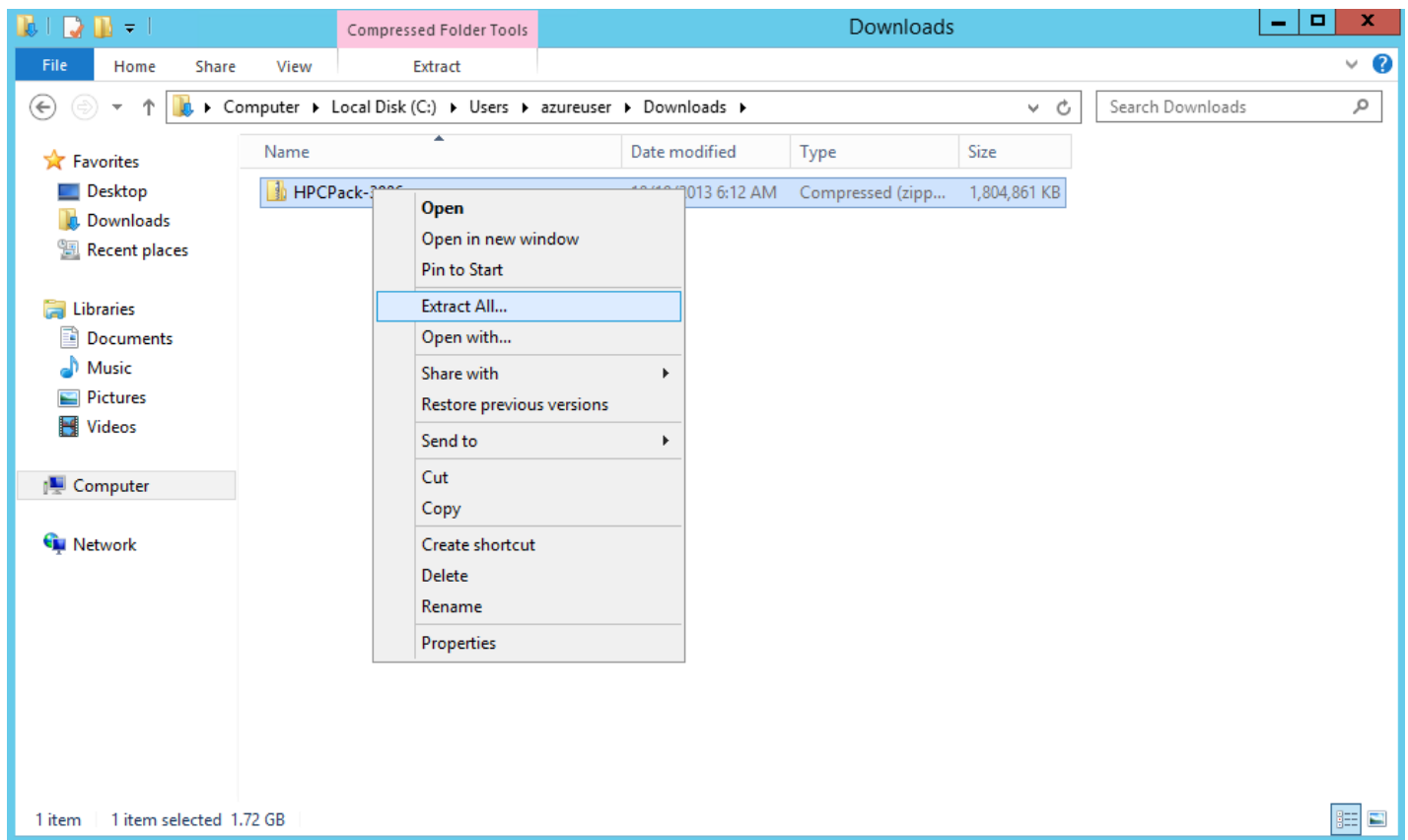
1. Reconnect to the VM and log in with the domain account we created earlier. The is *not* the same account we have been using up to this point. If you're connecting from a Mac, be sure to change the domain to the NetBIOS name of your Active Directory domain.



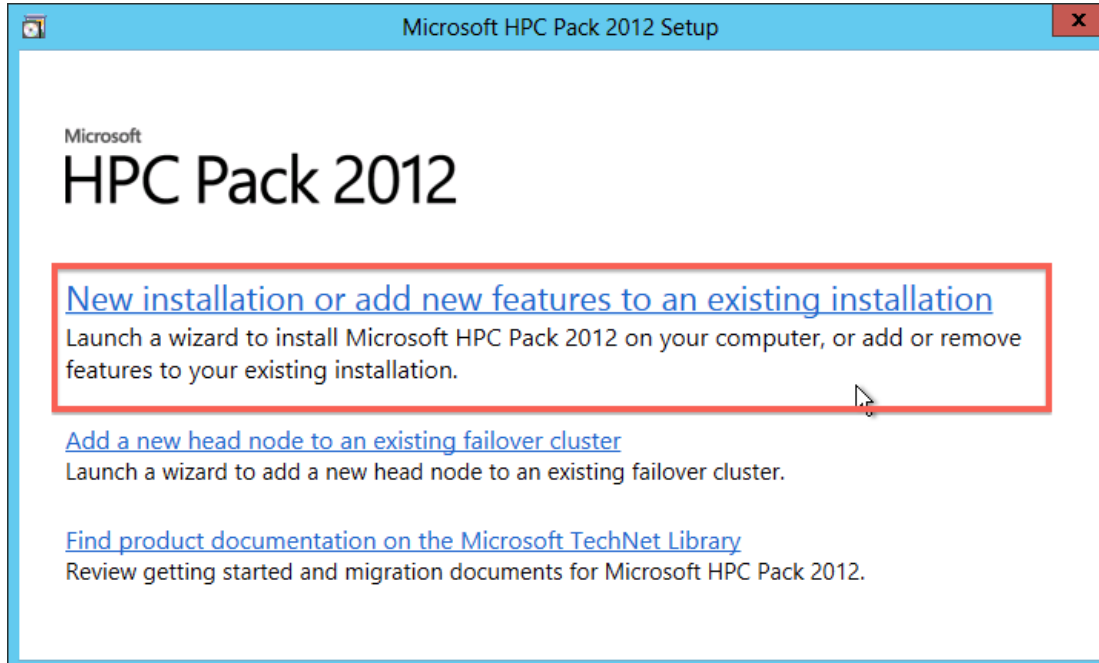
1. Once you're logged in as the domain user, open Explorer and navigate to C:\Users\<local-user-name>\Downloads. If you are told you don't have access to the folder, just click **Continue** to get access.



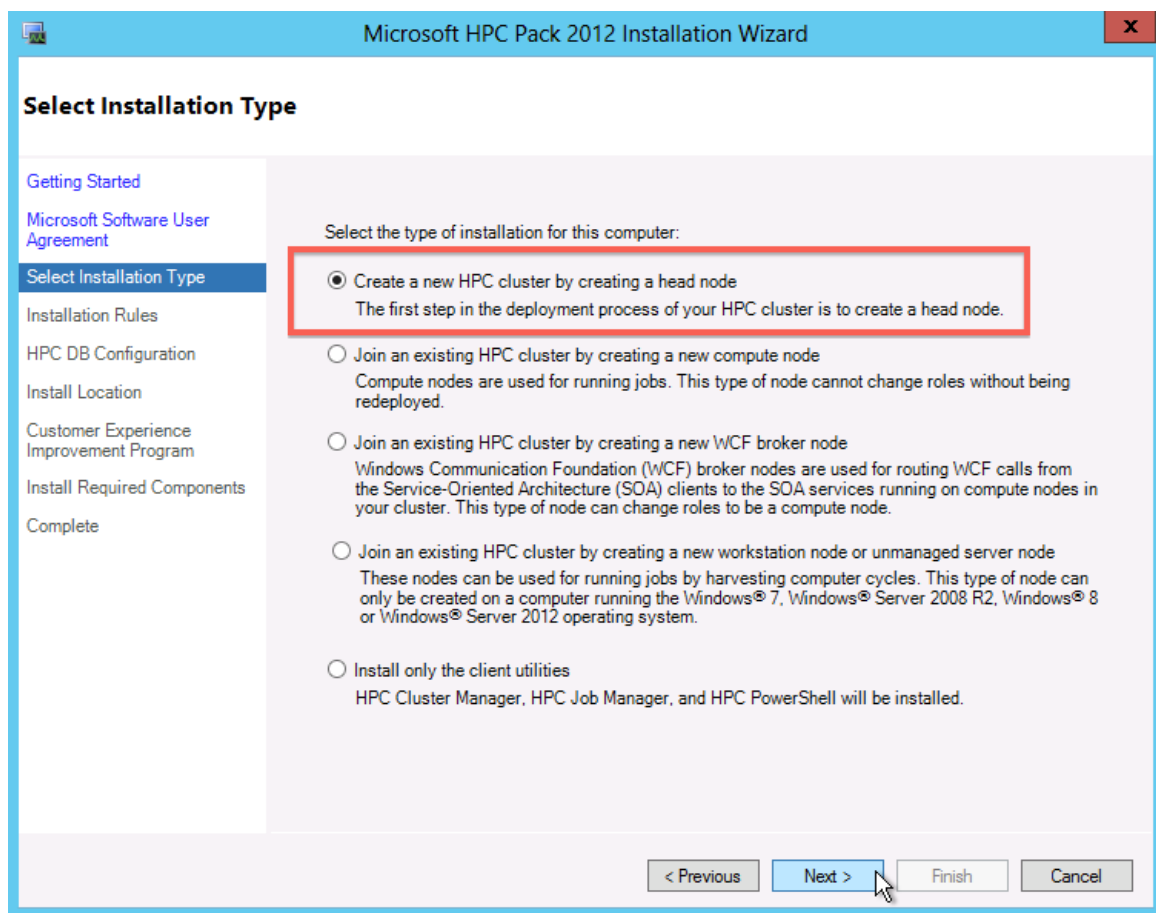
1. Locate the compressed file we downloaded earlier and right-click it. Select **Extract All...** then click the **Extract** button to unpack the file. It will take a few minutes to unpack everything.



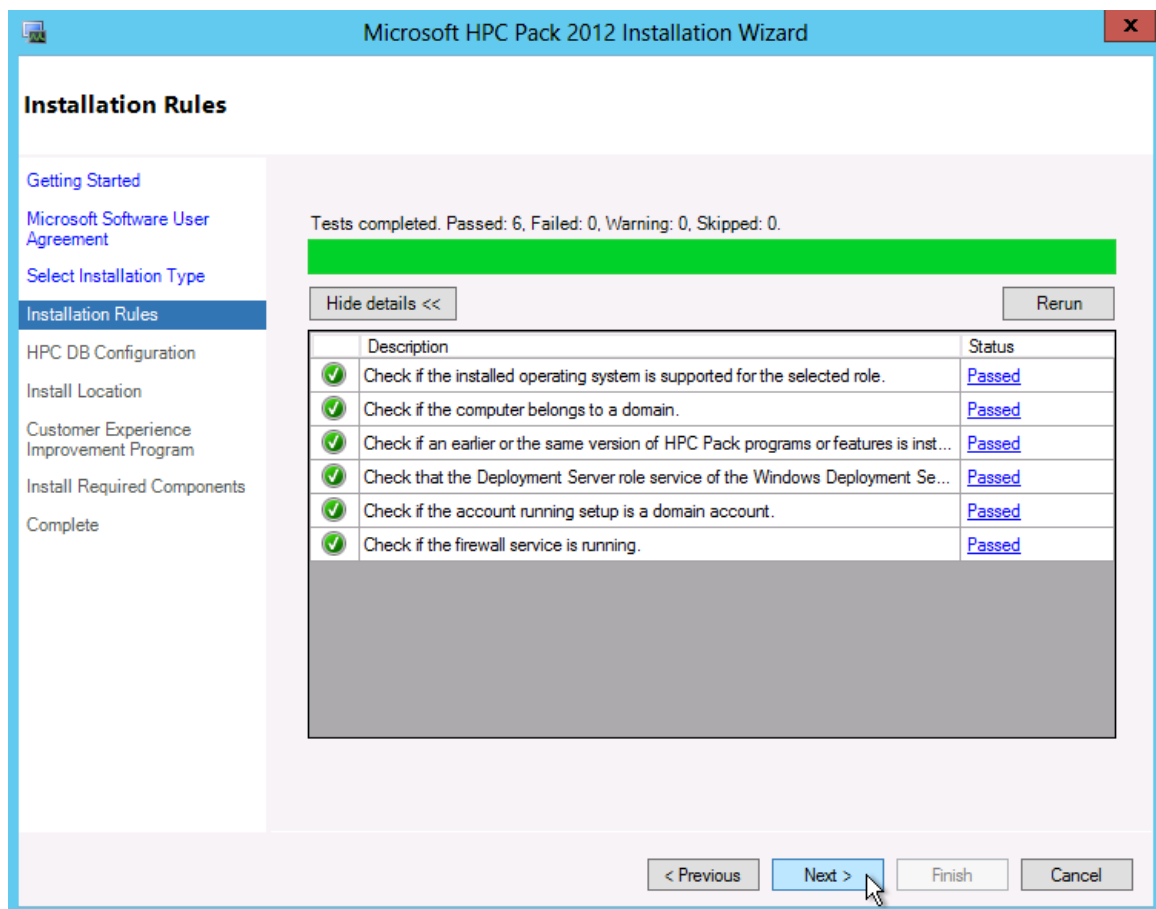
1. After the files are extracted, double click the **HPC Pack** folder and then double click **setup** to begin installation.
2. Click on **New installation or add new features to an existing installation**.



1. Click **Next**, then check the box to accept the license agreement and click **Next**.
2. Select **Create a new HPC cluster by creating a head node** and click **Next**.



1. The installer will run a few prerequisite checks. Click **Next** if all checks pass. Otherwise, go back in this tutorial and make sure you have followed all steps exactly.



1. Make sure **Head Node** is selected for all HPC databases and click **Next**.

The screenshot shows the 'HPC DB Configuration' step of the Microsoft HPC Pack 2012 Installation Wizard. The left sidebar contains a list of steps: Getting Started, Microsoft Software User Agreement, Select Installation Type, Installation Rules, HPC DB Configuration (highlighted), Local Database Setting, Local Database Folders, Install Location, Customer Experience Improvement Program, Install Required Components, and Complete. The main area contains text explaining that HPC databases can be installed on the head node or remote servers, and that remote servers must be running Microsoft SQL Server 2008 R2 or 2012. Below this is a table for selecting the installation location for each HPC database.

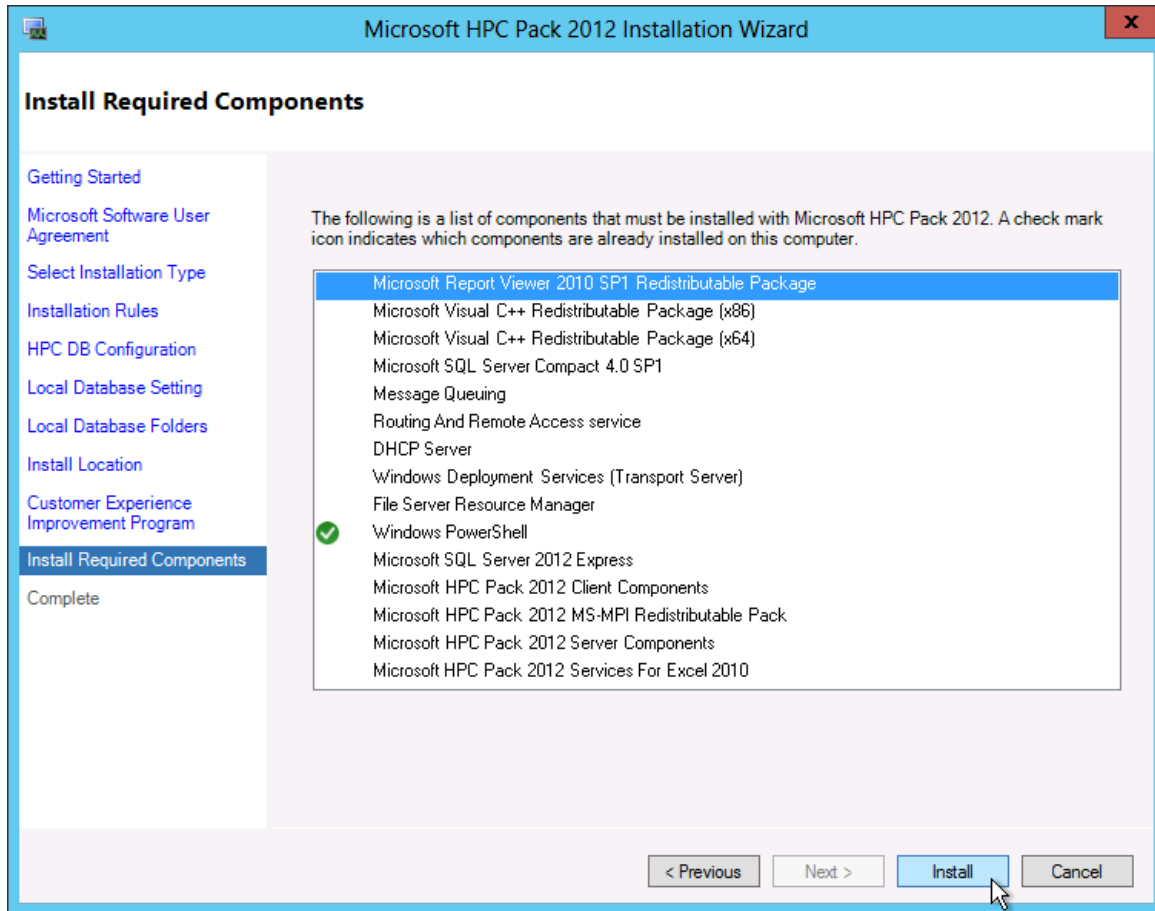
HPC Database	Head Node	Remote Server
Cluster management	<input checked="" type="radio"/>	<input type="radio"/>
Job scheduling	<input checked="" type="radio"/>	<input type="radio"/>
Reporting	<input checked="" type="radio"/>	<input type="radio"/>
Diagnostics	<input checked="" type="radio"/>	<input type="radio"/>
Monitoring	<input checked="" type="radio"/>	<input type="radio"/>

At the bottom, there are four buttons: '< Previous', 'Next >' (highlighted with a mouse cursor), 'Finish', and 'Cancel'.

1. Click **Next** on the following tabs until you reach the Customer Experience Improvement Program tab. Select either option and click **Next**.

The screenshot shows the 'Customer Experience Improvement Program' step of the Microsoft HPC Pack 2012 Installation Wizard. The left sidebar is the same as the previous step, but 'Customer Experience Improvement Program' is now highlighted. The main area contains text explaining the program's purpose and a choice to participate. Below the text are two radio button options: 'Yes, I want to anonymously participate in the program (recommended)' and 'No, thank you'. A mouse cursor is pointing at the 'No, thank you' option. At the bottom, there are four buttons: '< Previous', 'Next >' (highlighted with a mouse cursor), 'Finish', and 'Cancel'.

1. Click **Install** on the Install Required Components tab. If you have followed this tutorial exactly you should see that only the Windows PowerShell prerequisite has been installed so far. The installation process will take several minutes. Take another coffee break!



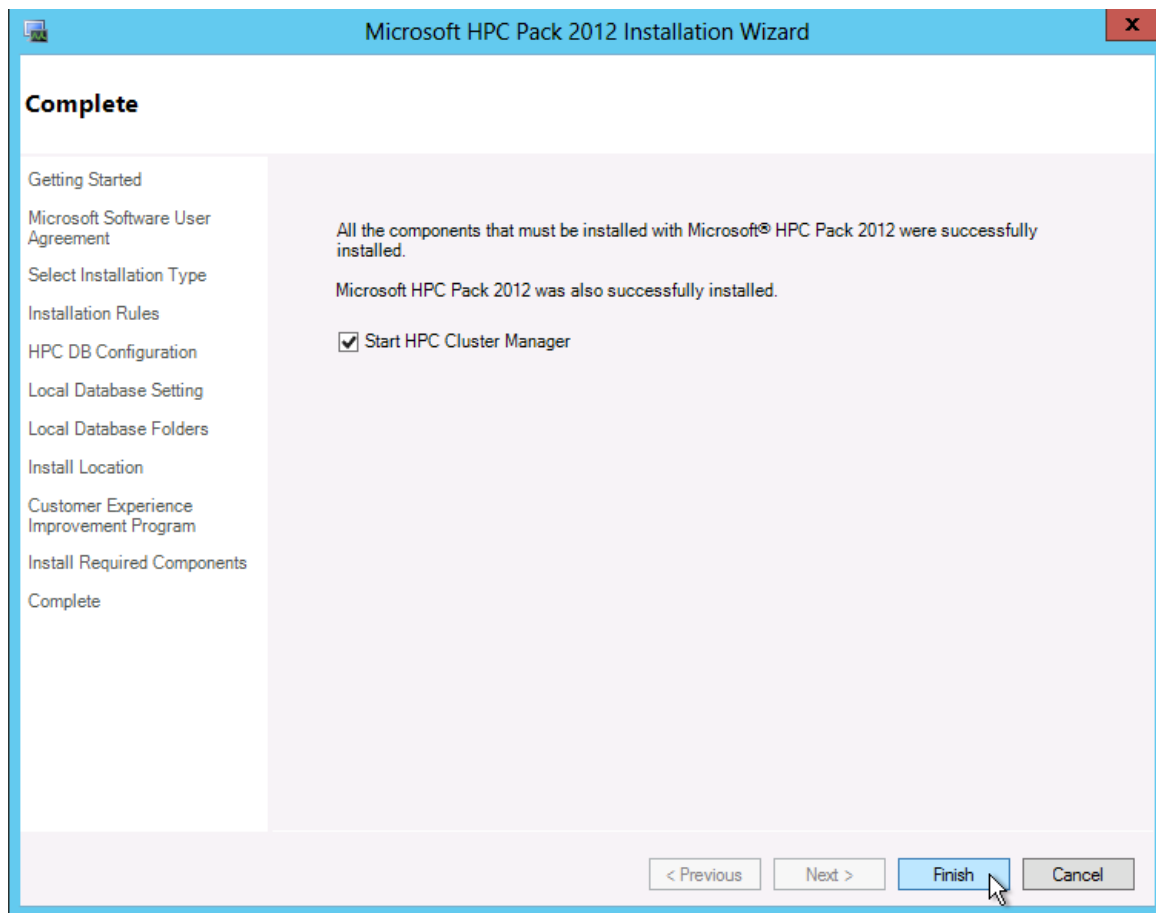
## IMPORTANT

You may see an error like the one below during the installation process. If so, reboot the VM and restart the HPC Pack installation using exactly the same steps as before. It may take a few attempts, but it will eventually work. Don't forget to log back in as the domain user when you reconnect!



1. Click **Finish** to start the HPC Cluster Manager after the installation completes.

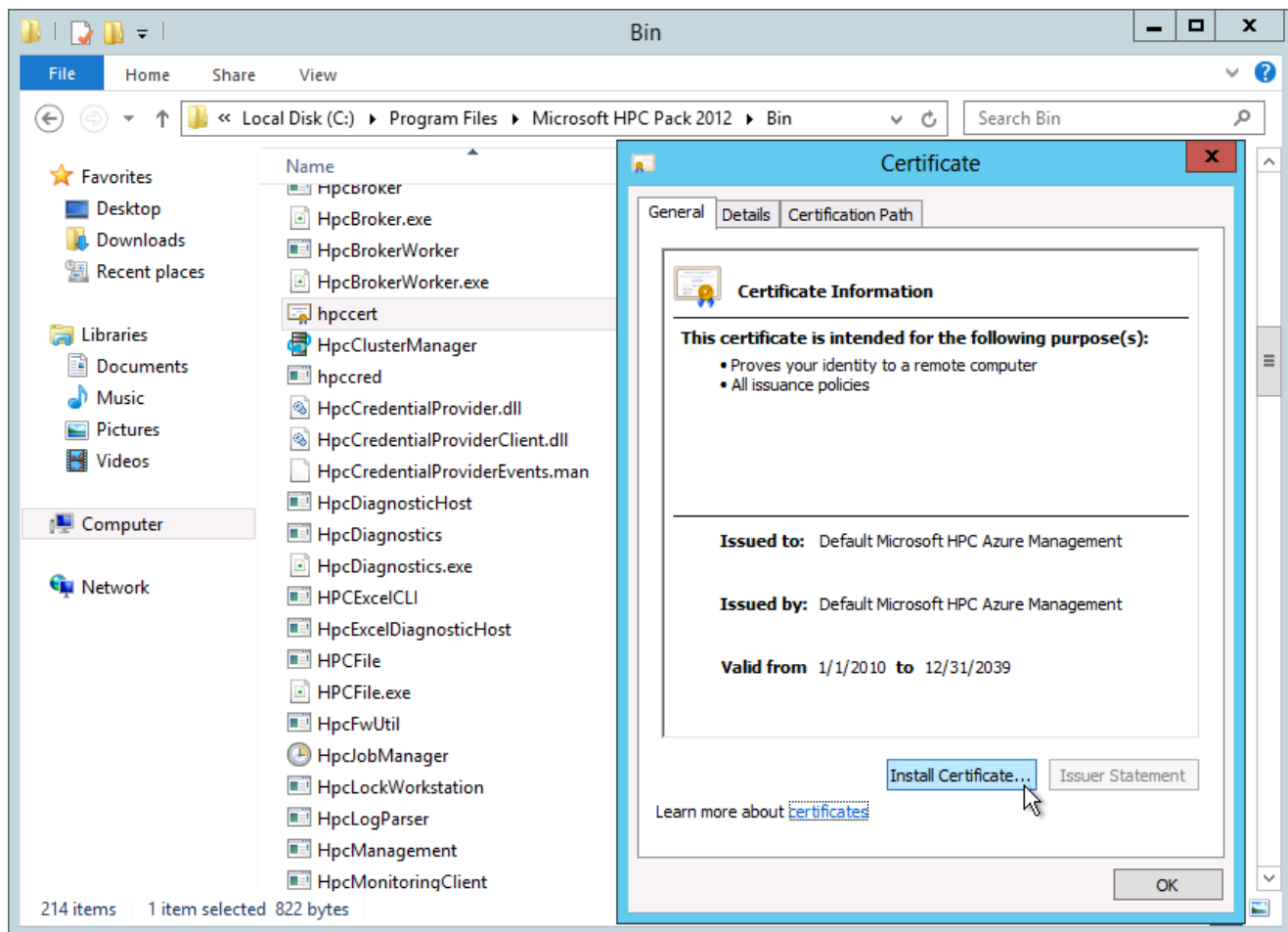




## Upload the HPC Pack Management Certificate

We need a Windows Azure management certificate to authenticate the HPC cluster head node to Windows Azure so it can provision compute nodes. The Default Microsoft HPC Azure Management certificate is generated automatically on the head node when HPC Pack is installed. This certificate is self-signed and unique to your installation of HPC Pack, so all we need to do is upload the certificate to the Windows Azure Management Portal.

1. Navigate to **C:\Program Files\Microsoft HPC Pack 2012\Bin** and locate the **hpccert** file.
2. Double-click the hpccert file and click the **Install Certificate...** button.



1. Select **Local Machine** and click **Next**.



1. Click **Next** to let the wizard automatically select the certificate store.
2. Click **Finish** to import the certificate.

3. In the VM, log in to the [Windows Azure Management Portal](#).
4. Click on the **Settings** tab to display management certificates associated with your subscription.
5. Click on **Upload**, use the file selection box to select the certificate file you copied from the VM, and click the check button to upload and add the management certificate. You may use the same certificate that you just imported. The default, hpc.cert.cer is in C:\Program Files\Microsoft HPC Pack 2012\Bin on the Head node VM.

Windows Azure | haojuns@hotmail.com

settings

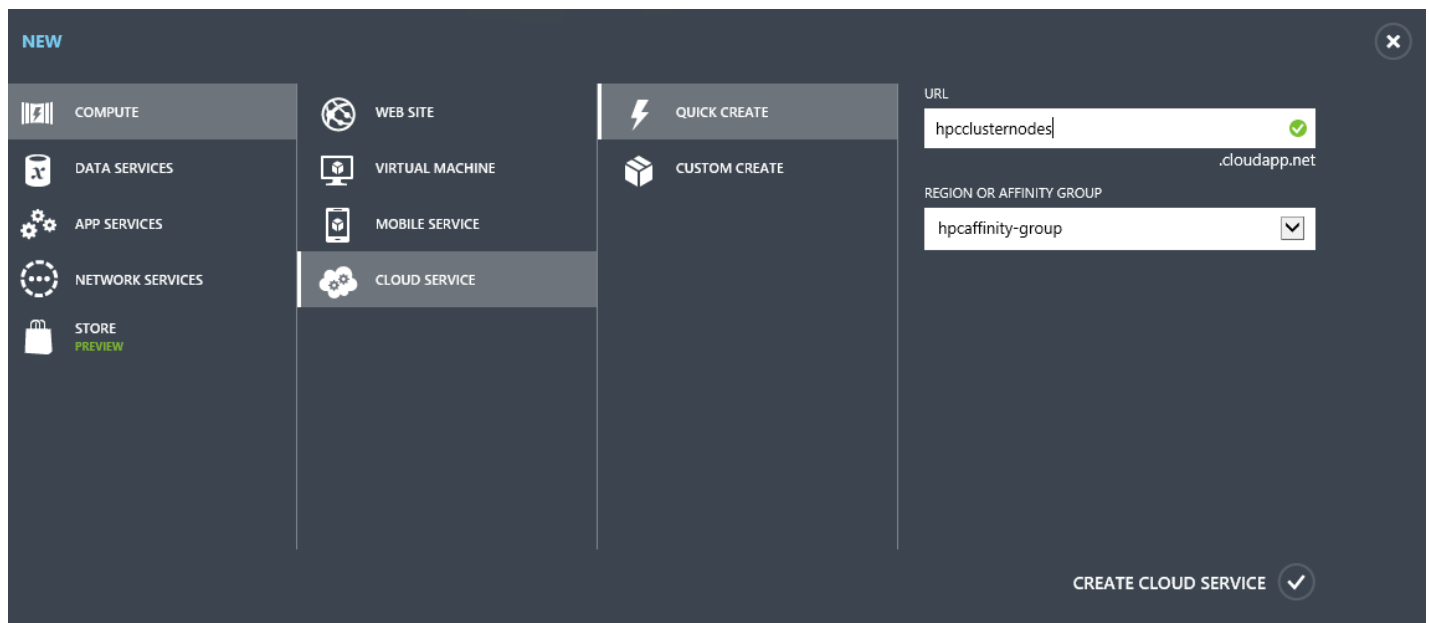
MANAGEMENT CERTIFICATES ADMINISTRATORS AFFINITY GROUPS USAGE

NAME	STATUS	SUBSCRIPTION	SUBSCRIPTION ID	THUMBPRINT
Trainer	✓ Created	Azpas300A0U8655	531bc0ce-9be2-4ece-9120-8ba16d6e0e55	C18E4D9AE6AC
Azpas300A0U8655-10-5-2013-crede...	✓ Created	Azpas300A0U8655	531bc0ce-9be2-4ece-9120-8ba16d6e0e55	453775E7A0F5
training.com	✓ Created	Azpas300A0U8655	531bc0ce-9be2-4ece-9120-8ba16d6e0e55	80B86586F527I
Visual Studio Ultimate with MSDN-P...	✓ Created	Azpas300A0U8655	531bc0ce-9be2-4ece-9120-8ba16d6e0e55	886901659BB5I
Azpas300A0U8655-10-17-2013-cred...	✓ Created	Azpas300A0U8655	531bc0ce-9be2-4ece-9120-8ba16d6e0e55	1D053157EF0C
Default Microsoft HPC Azure Manag...	✓ Created	Azpas300A0U8655	531bc0ce-9be2-4ece-9120-8ba16d6e0e55	1B2F6C4F080B

+ NEW | UPLOAD | DELETE

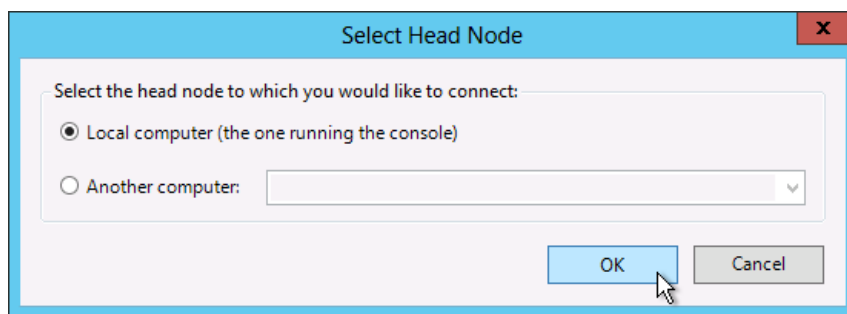
## Create Cloud Service Azure Compute Nodes

1. Log in to the [Windows Azure Management Portal](#).
2. Click on **New** in the bottom panel.
3. Click on **Compute, Cloud Service, Quick Create**.
4. Enter the URL and click **Create Cloud Service**

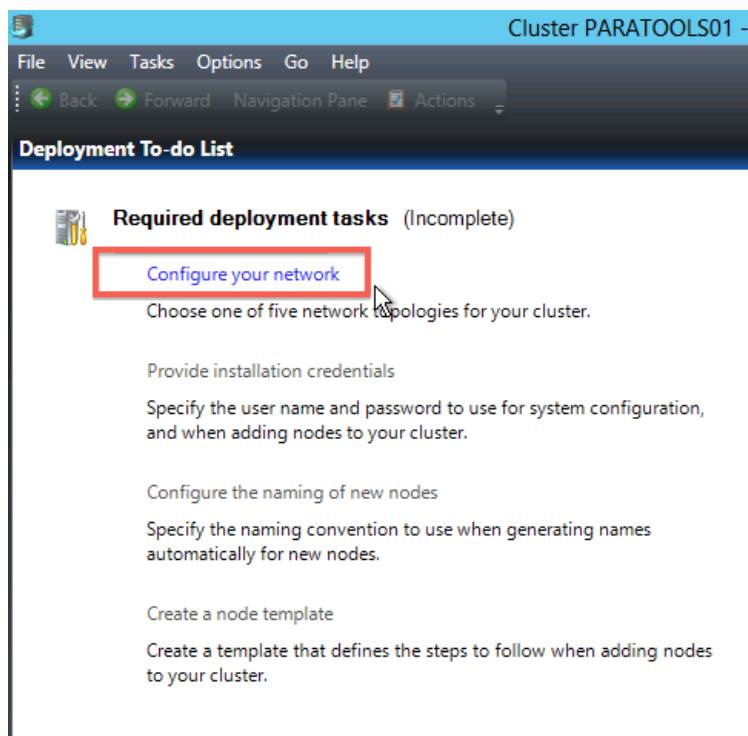


## Configure Microsoft HPC Pack

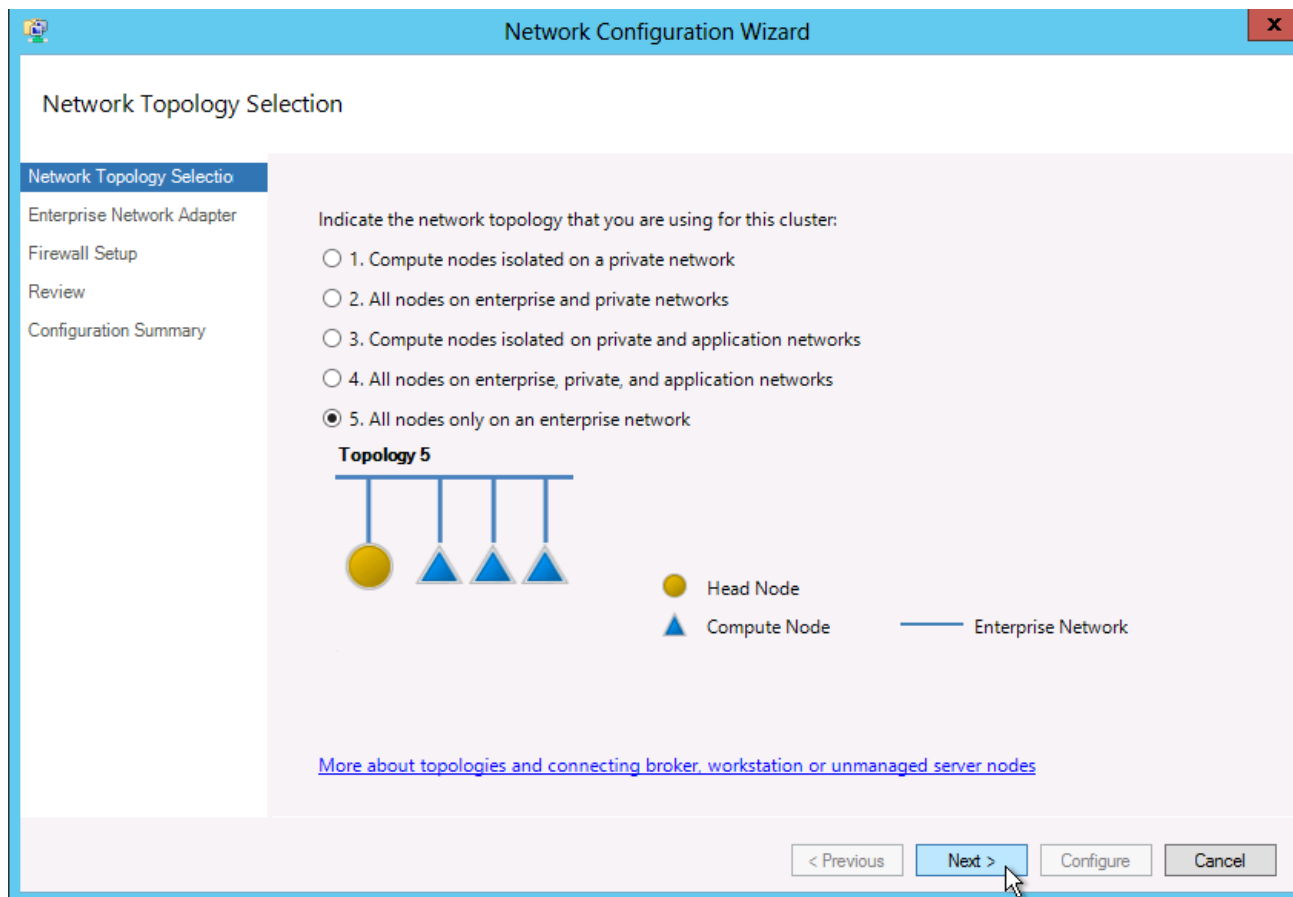
1. On the VM, open the Cluster Manager. In the popup box, select the local computer and click **OK**.



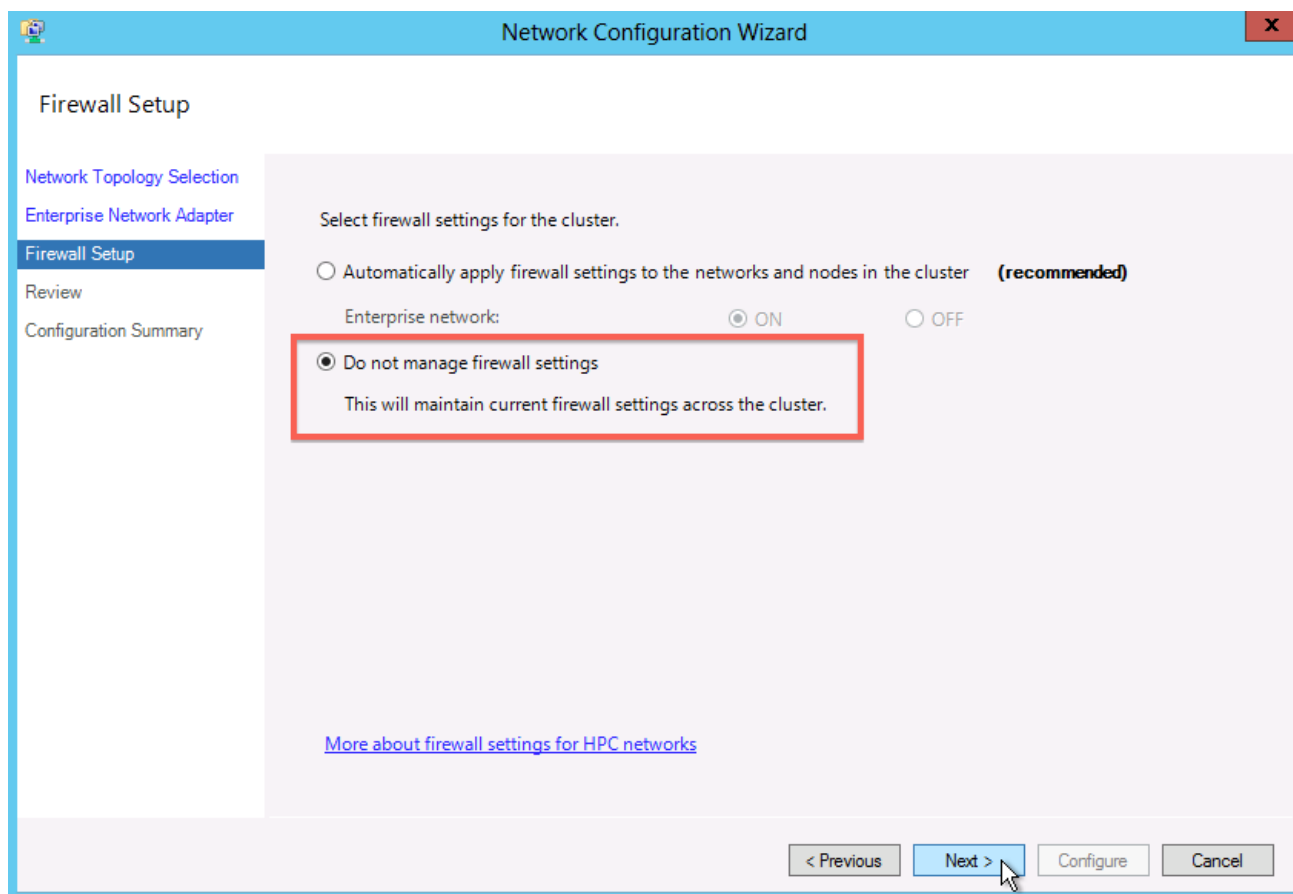
1. Click on **Configure your network** in the Required deployment tasks section of the Cluster Manager window.




1. Select the fifth cluster topology **All nodes only on an enterprise network** and click **Next**.





1. Click **Next** on the Enterprise Network Adapter tab to accept the default configuration.
2. Select **Do not manage firewall settings** on the Firewall Setup tab and click **Next**.



1. Click **Configure** on the Review tab to begin the configuration process.
2. Click **Finish** to end the configuration process.
3. Click on **Provide installation credentials** in the Required deployment tasks section of the Cluster Manager window.

 **Required deployment tasks** (Incomplete)

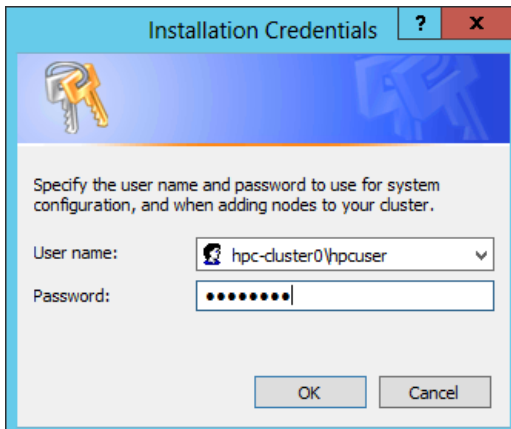
 [Configure your network](#)  
Choose one of five network topologies for your cluster.

 [Provide installation credentials](#)  
Specify the user name and password to use for system configuration, and when adding nodes to your cluster.

[Configure the naming of new nodes](#)  
Specify the naming convention to use when generating names automatically for new nodes.


[Create a node template](#)  
Create a template that defines the steps to follow when adding nodes to your cluster.


1. Enter the username and password of the domain user and click **OK**. You will need to enter the fully qualified user name as shown in the example image.





The dialog box is titled "Installation Credentials" with a question mark and a close button (X) in the top right corner. It features a blue header with a key icon. The main content area is white and contains the text: "Specify the user name and password to use for system configuration, and when adding nodes to your cluster." Below this text are two input fields. The "User name:" field has a dropdown menu showing "hpc-cluster0\hpcuser". The "Password:" field is a text box with masked characters (dots). At the bottom of the dialog are "OK" and "Cancel" buttons.

1. Click on **Configure the naming of new nodes** in the Required deployment tasks section of the Cluster Manager window.

 **Required deployment tasks** (Incomplete)

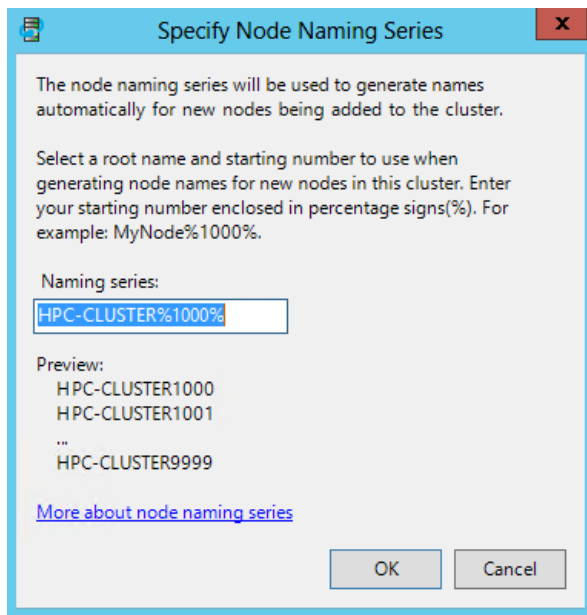
 [Configure your network](#)  
Choose one of five network topologies for your cluster.

 [Provide installation credentials](#)  
Specify the user name and password to use for system configuration, and when adding nodes to your cluster.

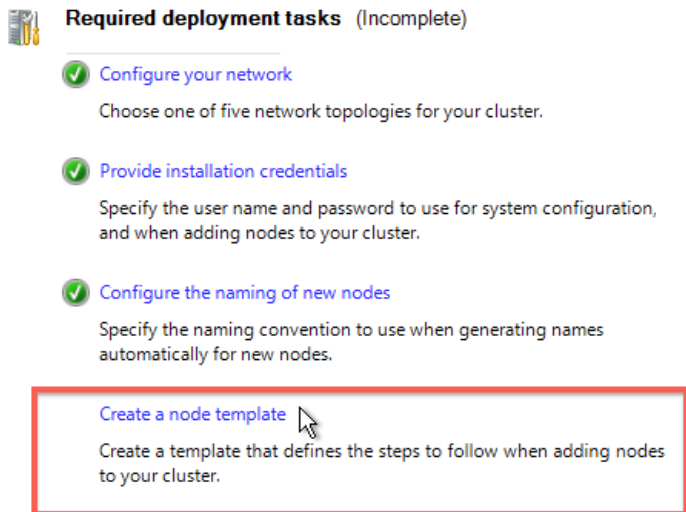
 [Configure the naming of new nodes](#)  
Specify the naming convention to use when generating names automatically for new nodes.

[Create a node template](#)  
Create a template that defines the steps to follow when adding nodes to your cluster.

1. Click **OK** To accept the default naming series.



1. Click on **Create a node template** in the Required deployment tasks section of the Cluster Manager window.



1. Select **Windows Azure node template** and click **Next**.

Create Node Template Wizard

## Choose Node Template Type

Choose Node Template Type

Specify Template Name

Provide Subscription Information

Provide Service Information

Specify Proxy Nodes

Specify Node Role

Mount Application VHD

Specify Startup Script

Set Up Windows Azure Virtual Network

Configure Remote Desktop Credentials

Configure Availability Policy

Review

This wizard guides you through the process of generating a node template. You can use node templates to deploy nodes.

First, choose which kind of node template you want to create.

☐ Compute node template

☐ Broker node template

☐ Workstation node and unmanaged server node template

☒ Windows Azure node template

[More about node templates](#)

< Previous Next > Create Cancel

1. Click **Next** to accept the default template name.
2. On the Subscription Information tab, copy your subscription ID and the management certificate fingerprint into their respective boxes and click **Next**. You can find this information on the **Setting** tab of the Windows Azure Management Portal. Be careful to copy the subscription ID and certificate fingerprint in full! You may need to resize the columns in the management portal to see the whole field.



Windows Azure

jlinford@paratools.com

ALL ITEMS

WEB SITES  
0

VIRTUAL MACHINES  
2

MOBILE SERVICES  
0

CLOUD SERVICES  
4

SOL DATABASES  
4

STORAGE  
20

HDINSIGHT  
0

SOL REPORTING  
0

MEDIA SERVICES  
0

SERVICE BUS

NAME	STATUS	SUBSCRIPTION	SUBSCRIPTION ID	THUMBPRINT
AzureSampleService Management Certificate	Created	Subscription-1	NST17NB-4564-WL2...	22F04B4540279C9450F74E329E
AzureSampleService Management Certificate	Created	Subscription-1	NST17NB-4564-WL2...	54B8B8B1310540D0C45A989C
AzureSampleService Management Certificate	Created	Subscription-1	NST17NB-4564-WL2...	38B1114077B4F04485F5CE94D
AzureSampleService Management Certificate	Created	Subscription-1	NST17NB-4564-WL2...	8EAC4771CE31B4115B475149C
AzureSampleService Management Certificate	Created	Subscription-1	NST17NB-4564-WL2...	A0B071334AC33D1527424B04
AzureSampleService Management Certificate	Created	Subscription-1	NST17NB-4564-WL2...	AB744D94B7704B4F0C4B76571
AzureSampleService Management Certificate	Created	Subscription-1	NST17NB-4564-WL2...	C4B7D4A4C72B1554A1A2C6BDE
be5541e3-7a89-4900-b6be-df3b64bb2680	Created	Subscription-1	NST17NB-4564-WL2...	14435B5F1C3E4B4B7C0B17B5
CloudZync MSDN-Windows Azure MSDN - ...	Created	Subscription-1	NST17NB-4564-WL2...	817E1C10445B4B4B7C0B17B5
Default Microsoft HPC Azure Management	Created	Subscription-1	NST17NB-4564-WL2...	87710F445B4B4B7C0B17B5
Default Microsoft HPC Azure Management	Created	Subscription-1	NST17NB-4564-WL2...	87710F445B4B4B7C0B17B5
elastacloud	Created	Subscription-1	NST17NB-4564-WL2...	87710F445B4B4B7C0B17B5
MODISAzure-WA TPM Subscription-Subscri...	Created	Subscription-1	NST17NB-4564-WL2...	3E3F13C7445B4B4B7C0B17B5
Subscription-1-12-26-2012-credentials	Created	Subscription-1	NST17NB-4564-WL2...	1F0C1B5C1F0C1B5C1F0C1B5C
Subscription-1-12-28-2012-credentials	Created	Subscription-1	NST17NB-4564-WL2...	4B07F1A4C71A4C71A4C71A4C
Subscription-1-12-3-2012-credentials	Created	Subscription-1	NST17NB-4564-WL2...	1F0C1B5C1F0C1B5C1F0C1B5C

NEW

UPLOAD

DELETE

1 ?

Create Node Template Wizard

Provide Subscription Information

Choose Node Template Type

Specify Template Name

Provide Subscription Information

Provide Service Information

Specify Proxy Nodes

Specify Node Role

Mount Application VHD

Specify Startup Script

Set Up Windows Azure Virtual Network

Configure Remote Desktop Credentials

Configure Availability Policy

Review

Provide information about the Windows Azure subscription that should be used to deploy the nodes. Click Next to retrieve information about available services and storage accounts.

Subscription ID:

Management certificate:

Browse...

[More about Windows Azure subscription information](#)  
[Go online to read the Microsoft Windows Azure Privacy Statement](#)

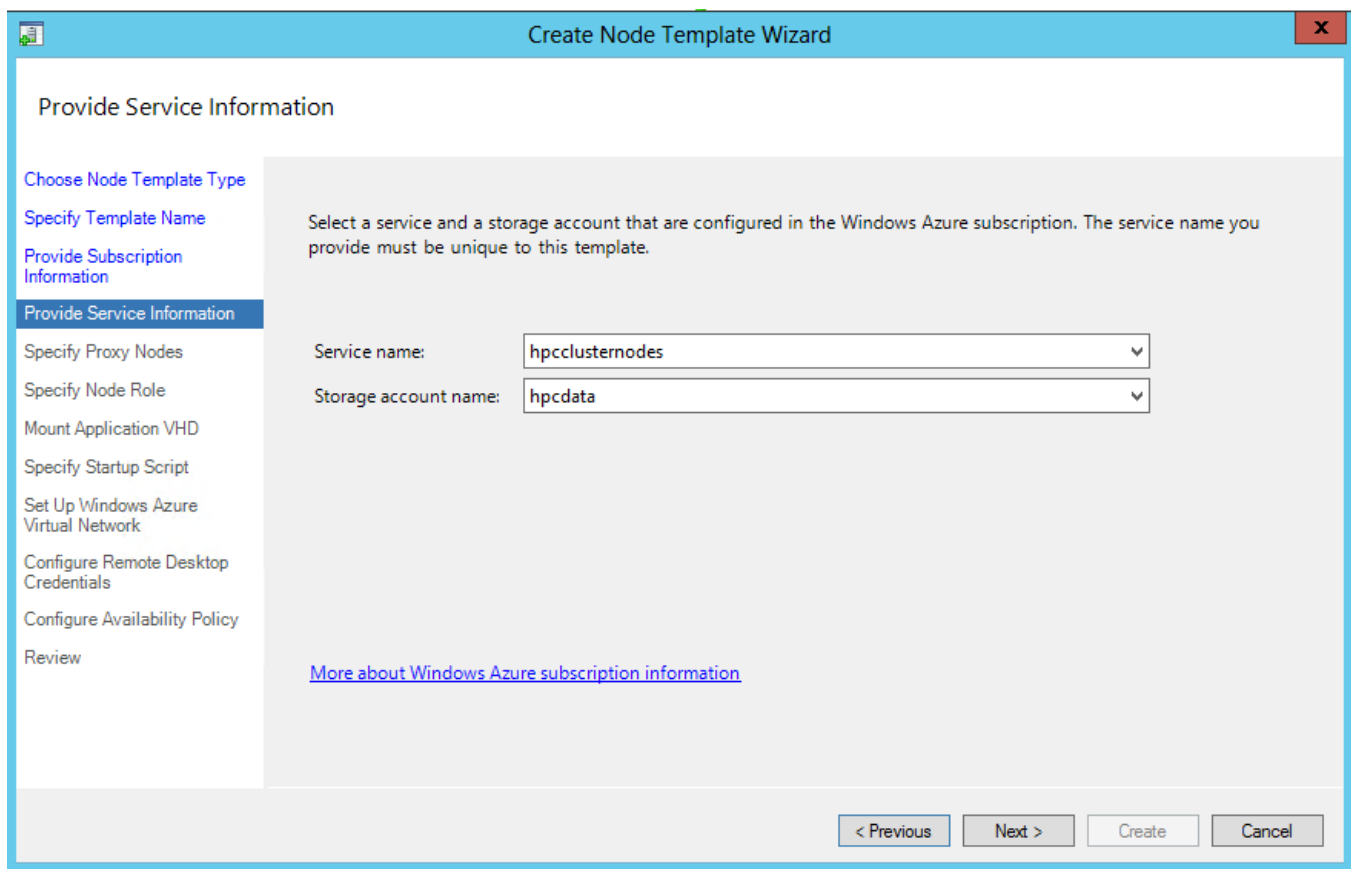
< Previous

Next >

Create

Cancel

1. In the Service name drop-down box, select the cloud service we created earlier. Similarly, select the storage service we created earlier in the Storage account name drop-down. Click **Next**.



**Create Node Template Wizard**

**Provide Service Information**

Choose Node Template Type  
Specify Template Name  
Provide Subscription Information  
**Provide Service Information**  
Specify Proxy Nodes  
Specify Node Role  
Mount Application VHD  
Specify Startup Script  
Set Up Windows Azure Virtual Network  
Configure Remote Desktop Credentials  
Configure Availability Policy  
Review

Select a service and a storage account that are configured in the Windows Azure subscription. The service name you provide must be unique to this template.

Service name:

Storage account name:

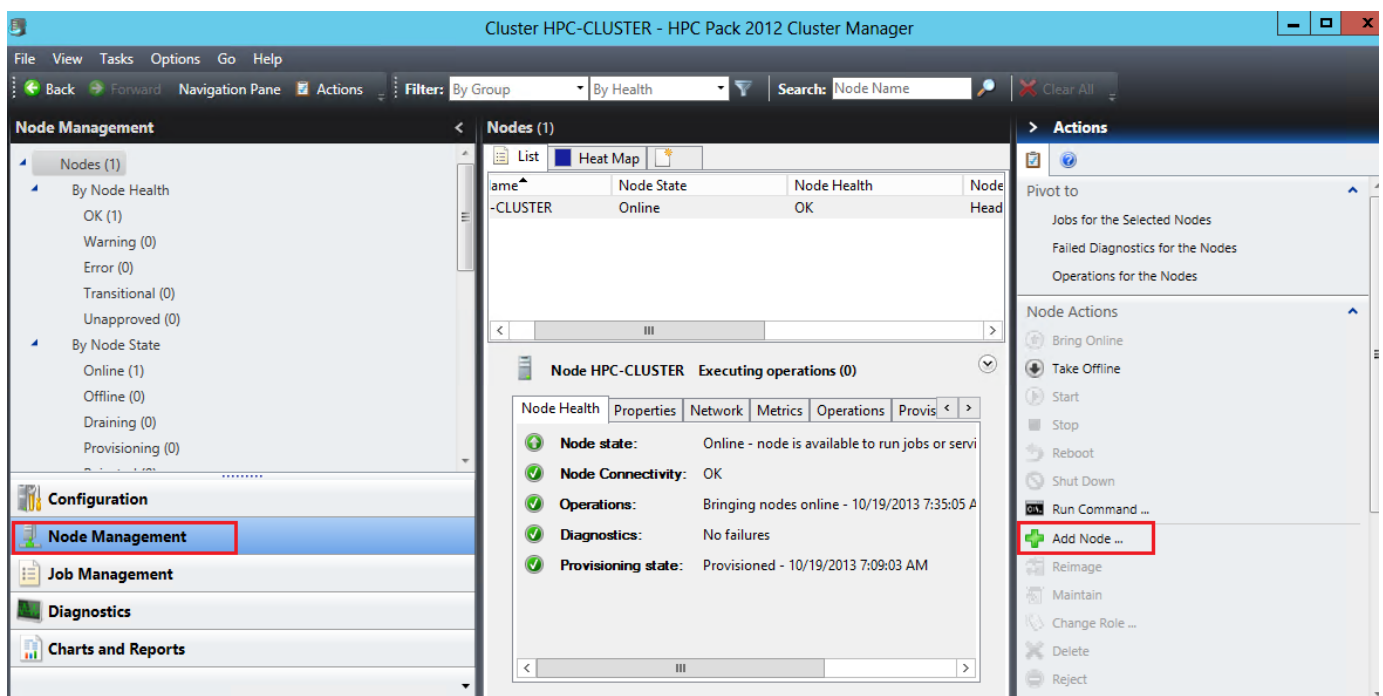
[More about Windows Azure subscription information](#)

< Previous   Next >   Create   Cancel

1. Click **Next** to accept the default settings on every tab until you come to the Review tab.
2. Click **Create** to create the node template.

## Create nodes

1. We can create some nodes manually. Click *Node Management* tab and *Add Node* on the right.



Cluster HPC-CLUSTER - HPC Pack 2012 Cluster Manager

File View Tasks Options Go Help

Back Forward Navigation Pane Actions Filter: By Group By Health Search: Node Name Clear All

**Node Management**

- Nodes (1)
  - By Node Health
    - OK (1)
    - Warning (0)
    - Error (0)
    - Transitional (0)
    - Unapproved (0)
  - By Node State
    - Online (1)
    - Offline (0)
    - Draining (0)
    - Provisioning (0)
- Configuration
- Node Management**
- Job Management
- Diagnostics
- Charts and Reports

**Nodes (1)**

Name	Node State	Node Health	Node Head
-CLUSTER	Online	OK	

**Node HPC-CLUSTER** Executing operations (0)

Node Health	Properties	Network	Metrics	Operations	Provis
Node state:	Online - node is available to run jobs or servi				
Node Connectivity:	OK				
Operations:	Bringing nodes online - 10/19/2013 7:35:05 A				
Diagnostics:	No failures				
Provisioning state:	Provisioned - 10/19/2013 7:09:03 AM				

**Actions**

Pivot to

- Jobs for the Selected Nodes
- Failed Diagnostics for the Nodes
- Operations for the Nodes

**Node Actions**

- Bring Online
- Take Offline
- Start
- Stop
- Reboot
- Shut Down
- Run Command ...
- Add Node ...**
- Reimage
- Maintain
- Change Role ...
- Delete
- Reject

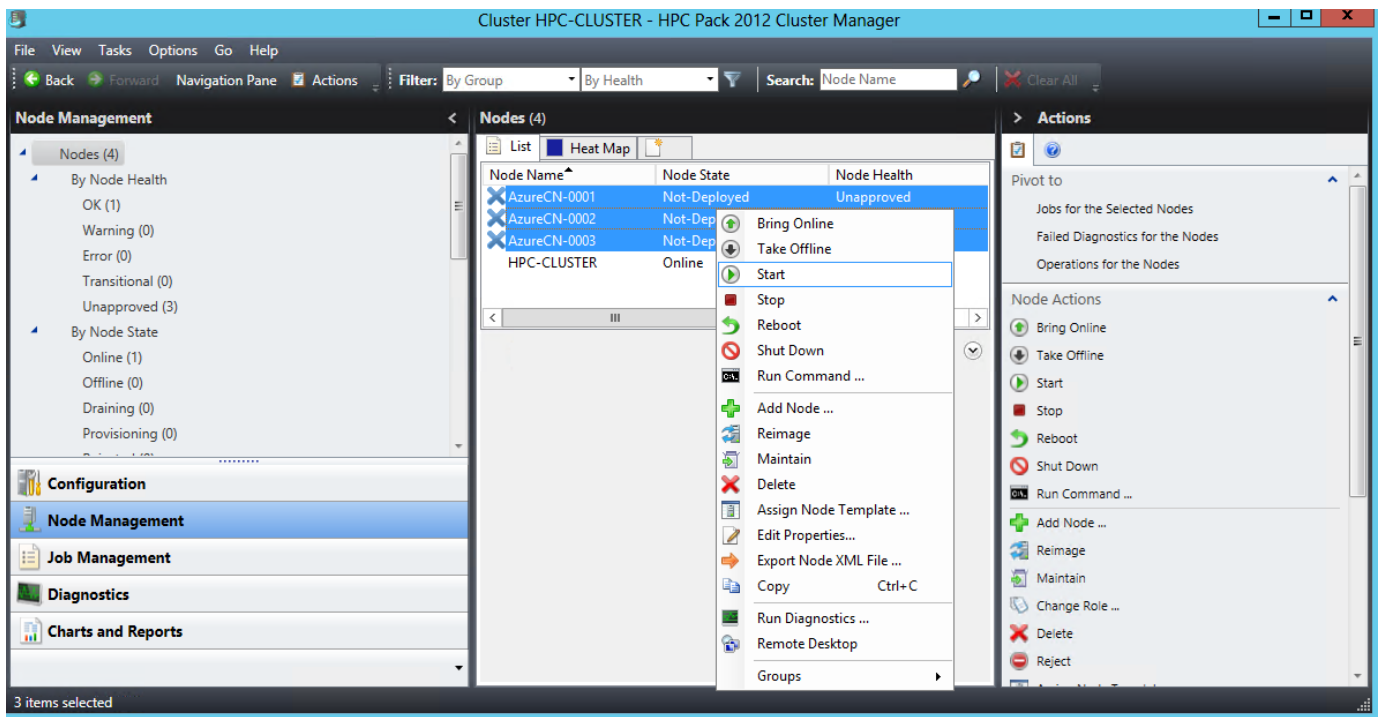
2. In the Select Deploy Method tab, select *Add Windows Azure nodes*.

The screenshot shows the 'Add Node Wizard' window with the title bar 'Add Node Wizard'. The main heading is 'Select Deployment Method'. On the left, there is a sidebar with three items: 'Select Deployment Method' (highlighted), 'Specify New Nodes', and 'Summary'. The main content area contains the text: 'This wizard will guide you through the process of adding nodes to your cluster. Select how you want to add nodes:'. Below this are five radio button options: 'Deploy nodes from bare metal using an operating system image', 'Import nodes from a node XML file', 'Add compute nodes or broker nodes that have already been configured', 'Add workstation nodes and unmanaged server nodes that have already been configured', and 'Add Windows Azure nodes' (which is selected). At the bottom left of the main area is a link: '[More about adding nodes to a cluster](#)'. At the bottom right are four buttons: '< Previous', 'Next >', 'Finish', and 'Cancel'.

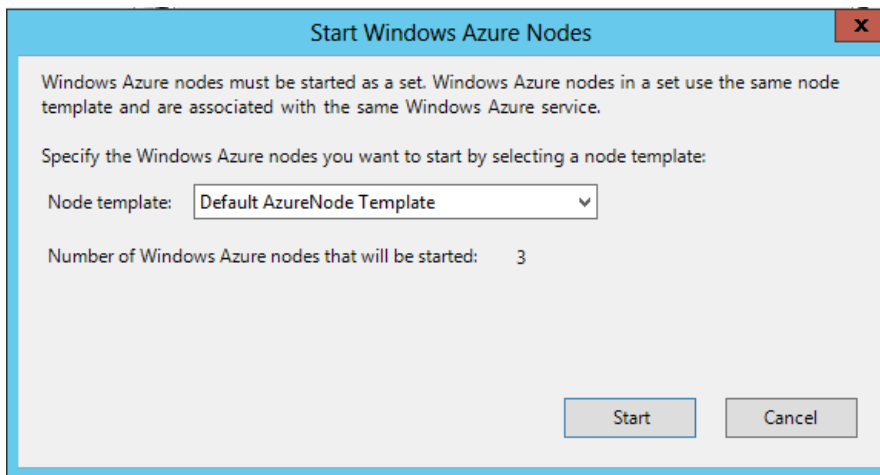
3. Then we choose the Windows Azure node template, number of Windows Azure nodes and the size of the node.

The screenshot shows the 'Add Node Wizard' window with the title bar 'Add Node Wizard'. The main heading is 'Specify New Nodes'. On the left, there is a sidebar with three items: 'Select Deployment Method', 'Specify New Nodes' (highlighted), and 'Summary'. The main content area contains the text: 'Select a Windows Azure node template, the size of the nodes, and the number of nodes that you want to add to the cluster. Then click Next.' Below this are three input fields: 'Windows Azure node template:' with a dropdown menu showing 'Default AzureNode Template', 'Number of Windows Azure nodes:' with a text box containing '3' and up/down arrows, and 'Size of Windows Azure nodes:' with a dropdown menu showing 'Medium'. Below these fields is an information icon (i) followed by the text: 'Windows Azure nodes deployed using a specific node template define a set of Windows Azure nodes. Windows Azure nodes in a set are managed as a set. You cannot start, stop, or delete individual Windows Azure nodes.' At the bottom left of the main area is a link: '[More about using Windows Azure nodes](#)'. At the bottom right are four buttons: '< Previous', 'Next >', 'Finish', and 'Cancel'.

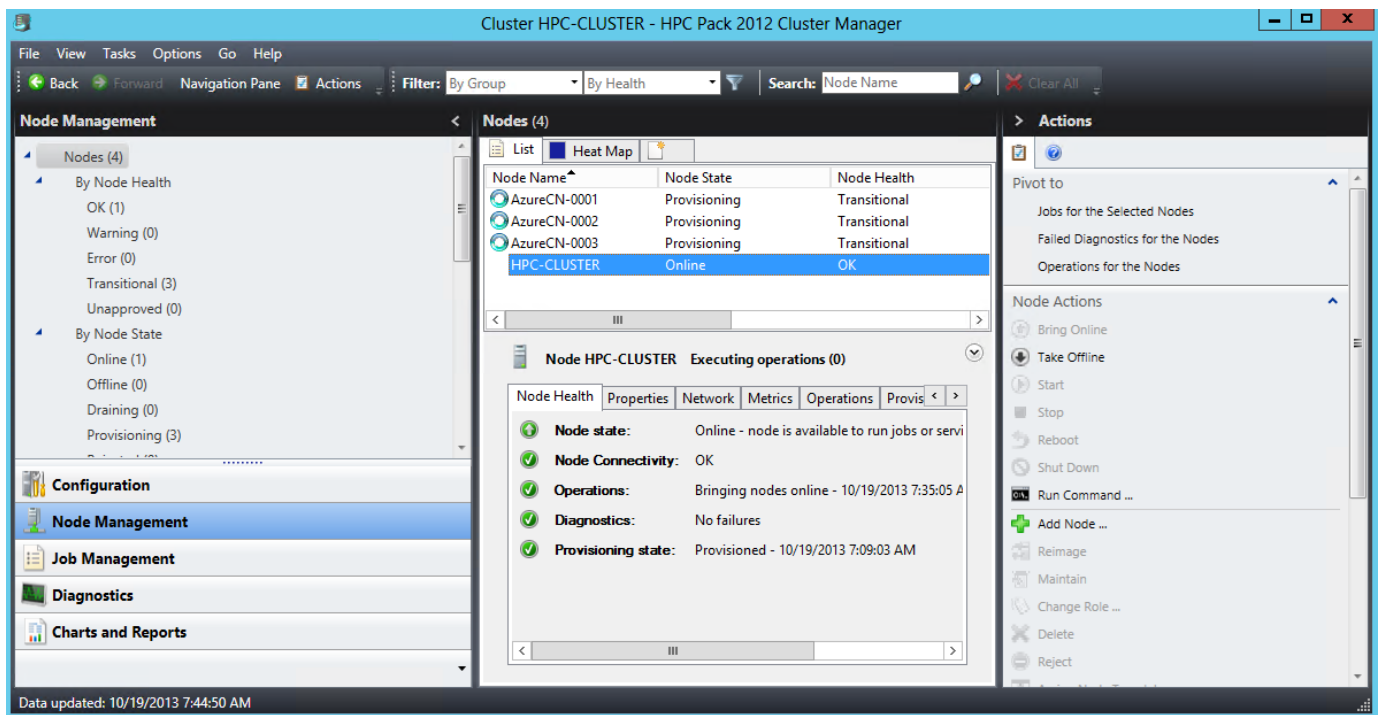
4. Then click Finish. You will see those nodes are not deployed. We can select those nodes, right click *Start*.



5. In the Start Windows Azure Nodes window, just select the node template and click Start button.



6. Then the cluster manager will provision those 3 machines in pre-configured cloud service.



- Let's go to the Windows Azure Management Portal, and we can see hpc worker machines and proxy machines are being deployed in the cloud service.

- azure4research-blast
- datastreamvm
- datastreamvm2
- hpc-cluster
- ipythonmgr
- msrlinuxvm
- msrtrainingvm
- pythoncluer2
- pythoncluster
- pythonstoragevm
- streamdatavm
- test-storm
- test-storm2
- vmazuredata

## hpcclusternodes

[DASHBOARD](#)
[MONITOR](#)
[CONFIGURE](#)
[SCALE](#)
[PREVIEW](#)
[INSTANCES](#)
[LINKED RESOURCES](#)
[CERTIFICATES](#)

**PRODUCTION** **STAGING**

NAME	STATUS	ROLE	SIZE	UPDATE DOMAIN	F...
HpcMediumWorker_IN_0	✓ Running	HpcMediumWorker	Medium	0	0
HpcMediumWorker_IN_1	✓ Running	HpcMediumWorker	Medium	1	1
HpcMediumWorker_IN_2	✓ Running	HpcMediumWorker	Medium	1	0
HpcProxy_IN_0	✓ Running	HpcProxy	Medium	0	0
HpcProxy_IN_1	✓ Running	HpcProxy	Medium	1	1

## Summary

**Congratulations!** You have successfully installed Microsoft HPC Pack on a Windows Azure Virtual Machine and are ready to deploy computing clusters on Windows Azure.

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