Data Center Unified Computing Design (DCUCDv5) Lab Guide

L5559C-001
March 2013

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Table of Contents

Lab 0: Introduction to the Remote Lab System L0-1
Lab 1: Analyze the Existing Computing Solution L1-1
Lab 2: Size the Cisco UCS C-Series Solution..... L2-1
Lab 3: Size the Cisco UCS B-Series Solution..... L3-1
Lab 4: Plan the Physical Deployment L4-1
Lab 5: Design the Server Deployment for Microsoft Hyper-V (optional)..... L5-1
Lab 6: Configure Identity and Resource Pools L6-1
Lab 7: Create Logical Service Profiles from Updating Templates L7-1
Lab 8: Building a vSphere Datacenter & UCS Manager Integration..... L8-1
Lab 9: Install a Cisco Nexus 1000V VSM (Optional) L9-1
Lab 10: Configure 1000v Port Profiles (Optional)..... L10-1
Appendix A A-1
Appendix B B-1

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L0

Introduction to the Remote Lab System

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Lab Overview

The purpose of this lab is to introduce you to the features of the Global Knowledge Remote Labs system. A quick familiarization with the system will prepare you for the labs presented in this course.

This lab is broken into two parts; a group or class exercise where you will review the address chart and lab topology as well as an individual exercise where you will access the www.remotelabs.com site to create a pod specific login used for all labs throughout the week.

Your instructor will review the address chart and lab topology with you as a class. There is a set of complete addressing charts (for each chassis) in the Appendix of your lab guide.

Estimated Completion Time

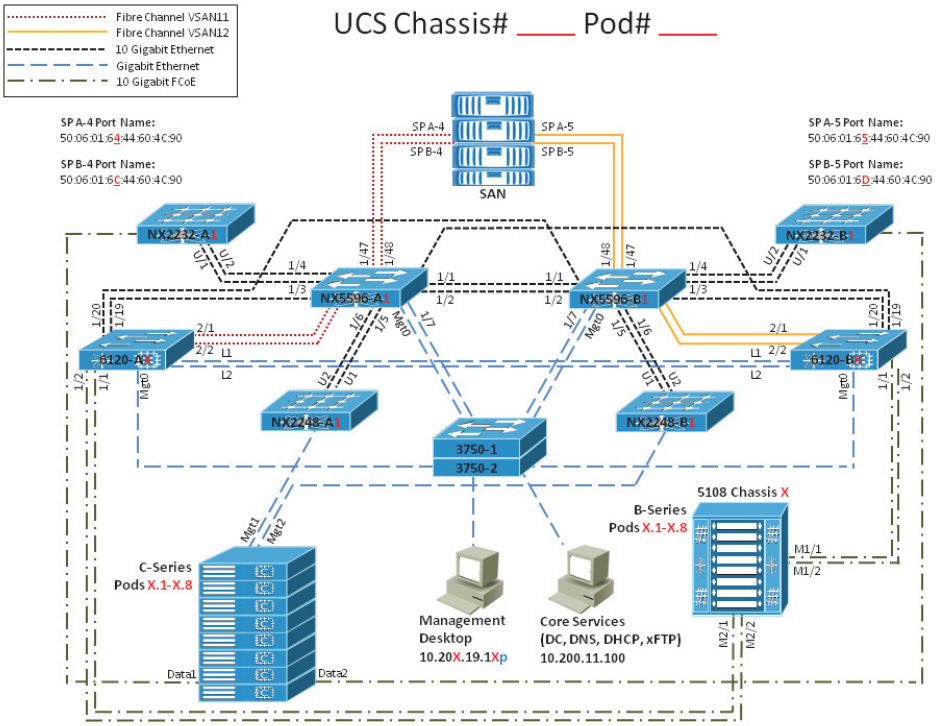
30 minutes

Lab Procedures

- Review the logical lab topology
- Understand the pod addressing format
- Logging In
- Accessing your lab equipment

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Lab Topology (leave a copy)



Lab Credentials (provided by your instructor)

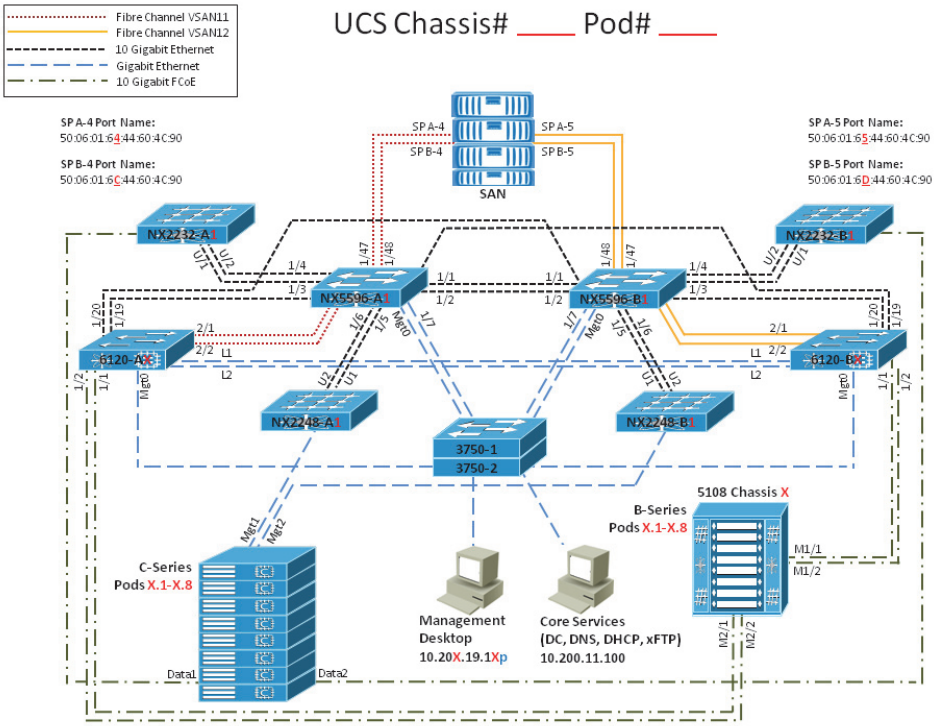
- Login Name _____
- Password _____
- Pod#/Blade# _____
- Chassis# _____
- Cluster IP Address _____

Note	Blade# = Pod# = Team#, these terms will be used interchangeably.

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Lab Topology (tear out a copy)



Lab Credentials (provided by your instructor)

- Login Name _____
- Password _____
- Pod#/Blade# _____
- Chassis# _____
- Cluster IP Address _____

Note Blade# = Pod# = Team#, these terms will be used interchangeably.

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Address & Offset assignments: Fill in your values below

MAC Assignment: Where "___" is your Chassis (X) & "___" is your Pod (P) "offset."

Pod	MAC address pool	
MAC Ex. Ch. 1, Team 5, C200, Port 0 = 00:25:B5:01:05:C0	00:25:B5:**0X**:**0P**:**[B,C][0,1]** **B = B-Series, C = C-Series** 0 = C-Series Port 0, 1 = Port 1	Max pool of 16
Your MAC here	00:25:B5:0___:0___:	Max pool of 16

Node & Port WWNs: Where "___" is your Chassis (X)& "___" is your Pod (P) "offset."

Pod	Node WWN (aka WWNN)	Port WWN (aka WWPN)
WWNs Ex. 20:**01**:00:00:**01**:**05**:0**B**:01	20:**01**:00:00:0X:**0P**:0**[B,C]**:**01** **0B = B-Series, 0C = C-Series**	20:**00**:00:00:0X:**0P**:0**[B,C]**:**01** **0B = B-Series, 0C = C-Series**
Your WWNs here	20:**01**:00:00:0__:0__:0__:**01**	20:**00**:00:00:0__:0__:0__:**01**

UUID Assignment: Where "___" is your Chassis (X) & "___" is your Pod (P) "offset." To create unique values all addresses below use your "0X" as Chassis & "0P" as Pod.

Pod	UUID prefix	UUID suffix
UUID	00000000-0000-***0X0P*** **Ex.** 00000000-0000-**0105**	***0X0P***-000000000001 **Ex. 0105**-000000000001
Your UUID here	00000000-0000-***0__0___***	***0__0__***-00000000000***1***

VSAN Assignment

Pod	FC Int.	VSAN#	VSAN	Fabric	FCoE	SAN Boot Target WWN
All Pods	fc0	11 (vHBA0)	VSAN11	A	1011	Pri 50:06:01:***64***:44:60:4C:90
	fc0	11 (vHBA0)	VSAN11	A	1011	Sec 50:06:01:***6C***:44:60:4C:90
All Pods	fc1	12 (vHBA1)	VSAN12	B	1012	Pri 50:06:01:***65***:44:60:4C:90
	fc1	12 (vHBA1)	VSAN12	B	1012	Sec 50:06:01:***6D***:44:60:4C:90

VLAN & IP address assignment: Based on your assigned Chassis (X), Pod (P), VLAN (V) number (XPV)

- VLANs (XPV): Nexus 1000V **"Control" = XP1, Ex. 481**, **"Packet" = XP2, Ex. 482**. *All pods will use **vMotion = X14, Ex. 414**, **VM traffic = X18, Ex. 418**
- IP Subnet: Subnets follow 10.Chassis# (starting at 20***X***).Pod VLAN#. Device

Chassis#	Pod#	VLANs (XPV)	IP Sub. (10.20X.PV.x)
Your; Chassis = ____	Pod = _____	VLANs =	Sub =
		VLAN = ___**1 Control**	Sub = **10.20__.__1.x**
		VLAN = ___**2 Packet**	Sub = **10.20__.__2.x**
		VLAN = ___**14 vMotion***	Sub = **10.20__.__3.x**
		VLAN = ___**18 VM traffic***	Sub = **10.20__.__4.x**

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Address & Offset assignments: Fill in your values below

MAC Assignment: Where "___" is your Chassis (X) & "___" is your Pod (P) "offset."

Pod	MAC address pool	
MAC Ex. Ch. 1, Team 5, C200, Port 0 = 00:25:B5:01:05:C0	00:25:B5:**0X**:**0P**:**[B,C][0,1]** **B = B-Series, C = C-Series** 0 = C-Series Port 0, 1 = Port 1	Max pool of 16
Your MAC here	00:25:B5:0___:0___:	Max pool of 16

Node & Port WWNs: Where "___" is your Chassis (X)& "___" is your Pod (P) "offset."

Pod	Node WWN (aka WWNN)	Port WWN (aka WWPN)
WWNs Ex. 20:**01**:00:00:**01**:**05**:0**B**:01	20:**01**:00:00:0X:**0P**:**0[B,C]**:**01** **0B = B-Series, 0C = C-Series**	20:**00**:00:00:0X:**0P**:**0[B,C]**:**01** **0B = B-Series, 0C = C-Series**
Your WWNs here	20:**01**:00:00:0__:0__:0__:**01**	20:**00**:00:00:0__:0__:0__:**01**

UUID Assignment: Where "___" is your Chassis (X) & "___" is your Pod (P) "offset." To create unique values all addresses below use your "0X" as Chassis & "0P" as Pod.

Pod	UUID prefix	UUID suffix
UUID	00000000-0000-***0X0P*** **Ex.** 00000000-0000-**0105**	***0X0P***-000000000001 **Ex. 0105**-000000000001
Your UUID here	00000000-0000-***0__0___***	***0__0__***-00000000000***1***

VSAN Assignment

Pod	FC Int.	VSAN#	VSAN	Fabric	FCoE	SAN Boot Target WWN
All Pods	fc0	11 (vHBA0)	VSAN11	A	1011	Pri 50:06:01:***64***:44:60:4C:90
	fc0	11 (vHBA0)	VSAN11	A	1011	Sec 50:06:01:***6C***:44:60:4C:90
All Pods	fc1	12 (vHBA1)	VSAN12	B	1012	Pri 50:06:01:***65***:44:60:4C:90
	fc1	12 (vHBA1)	VSAN12	B	1012	Sec 50:06:01:***6D***:44:60:4C:90

VLAN & IP address assignment: Based on your assigned Chassis (X), Pod (P), VLAN (V) number (XPV)

- VLANs (XPV): Nexus 1000V **"Control" = XP1, Ex. 481**, **"Packet" = XP2, Ex. 482**. *All pods will use **vMotion = X14, Ex. 414**, **VM traffic = X18, Ex. 418**
- IP Subnet: Subnets follow 10.Chassis# (starting at 20***X***).Pod VLAN#. Device

Chassis#	Pod#	VLANs (XPV)	IP Sub. (10.20X.PV.x)
Your; Chassis = ____	Pod = _____	VLANs =	Sub =
		VLAN = ___**1 Control**	Sub = **10.20__.__1.x**
		VLAN = ___**2 Packet**	Sub = **10.20__.__2.x**
		VLAN = ___**14 vMotion***	Sub = **10.20__.__3.x**
		VLAN = ___**18 VM traffic***	Sub = **10.20__.__4.x**

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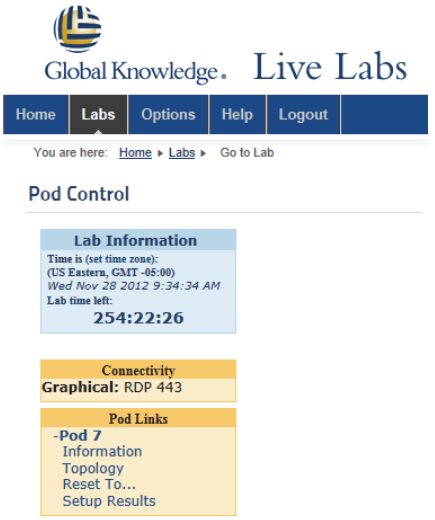
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Logging In

Initial access to the Global Knowledge Remote Labs System is performed with a web browser connection to **www.remotelabs.com**.

Task 1: Logging in

1. On your local PC, open a web browser and connect to **www.remotelabs.com**.
2. Enter your credentials (recorded on the **Lab Topology** page) and click **Log In**.
3. Take a moment to notice how the main remotelabs.com page displays several things:
   - Current lab information.
   - The current date and time, and how much time is left on your reservation.
   - Various control and help links, which will be highlighted in this lab.



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Task 2: Controlling Your Pod

One feature of the Global Knowledge Remote Labs System is the ability to reset your pod to the initial starting point of the labs for your class. Please use caution when exercising this feature. It should only be done **under the direction of your instructor**. You will be shown how to do this in this section of the lab. However, please **do not** follow through with the actual steps.

4. To control your pod, expand the pod link, so the underlying options are displayed. Click the plus symbol (+) to the left of **Pod 'n'** to expand your options.



5. First, select the **Information** link.

   5.1. The Pod Information window opens.

Note	If there are any problems with your pod, this information must be provided to the Global Knowledge Helpdesk to identify the pod which is malfunctioning.

   5.2. Close the Pod Information window.

6. Next, select the **Setup Results** link.

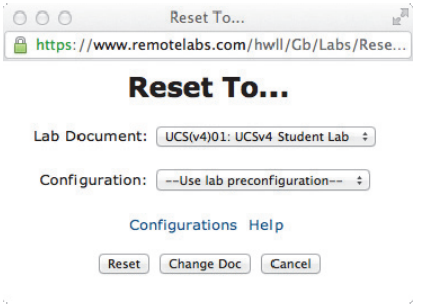
   6.1. The Setup Results window will open.

   6.2. The border color and border message you see here would come in handy when troubleshooting a lab reset issue. Remember that we are not performing lab resets now so the border color and border message will not be used here.

   6.3. Close the Setup Results window.

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7. Now, select the **Reset To…** link.



7.1. The **Reset To…** window opens. **Do not** perform the 'Reset' operation here.

7.2. Expand the **Lab Document** drop down menu. A list of all the labs for which your user id has privileges is displayed.

7.3. Once again, **do not** perform the 'Reset' operation now. Your pod should currently be prepared for either Lab 0 or Lab 1 of this class. This is the correct starting point.

7.4. Click **Cancel** to close the **Reset To…** window.

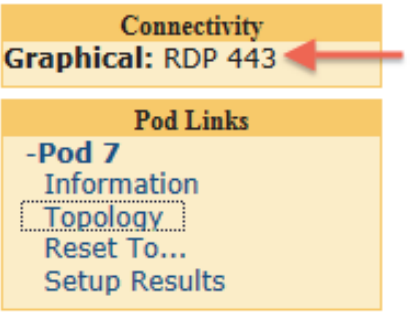
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Task 3: Accessing your lab equipment

While **control** of the pod is performed from the www.remotelabs.com web page, the actual **labs** are performed using a Remote Desktop Connection. Like in most real world environments, administrators and users don't usually interact directly with network devices. They use PC's and workstations to access network devices and network services. You will use several virtual machine instances, placed strategically around the lab network topology, to complete the administration and testing of the lab scenarios.

8. Identify the Graphical Firewall Method used for your lab connection.

   8.1. Notice under the "Connectivity" section that a Graphical Firewall option has been dynamically selected for you.



Note

RDP 443: This will still use the Remote Desktop Protocol, but it will connect to TCP port 443 instead of the RDP standard TCP 3389. This will also provide an optimal user experience and may work where standard RDP does not. It will work with most stateful firewalls.

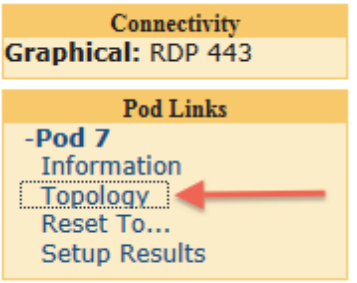
Tarantella: This option will work in most firewalled environments, even when proxy servers are used. If the other option fails, you should use this option. Tarantella is functional, but it is not as responsive as RDP, hence the user experience is diminished.

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Task 4: Connect to the Remote Lab Equipment:

9. Next we will create and save the RDP session used to remotely access and control your lab environment.

   9.1. Click the **Topology** link. Depending on whether you are using Firefox or Internet Explorer, the behavior will be slightly different.

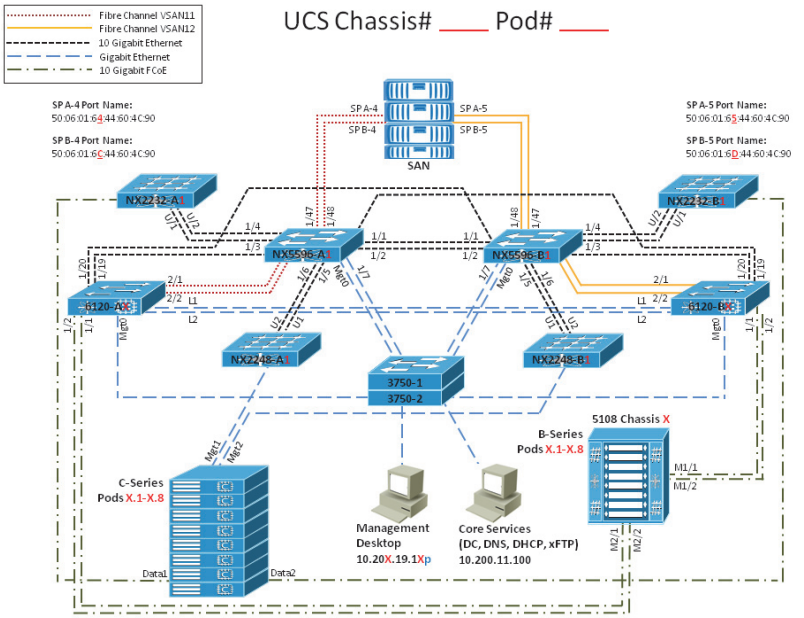


   Ex. Internet Explorer: Internet Explorer will prompt you to open or save the RDP file, choose to **Save**, and save it to your desktop. Now right click on the new "RDP" file and select **Edit**. On the **Display** tab set the display configuration to **Full Screen**, return to the **General** tab to save your settings, then click **Connect**.

10. Login to this new Remote Desktop Connection with the same credentials as those used to access www.remotelabs.com back in Task 1.

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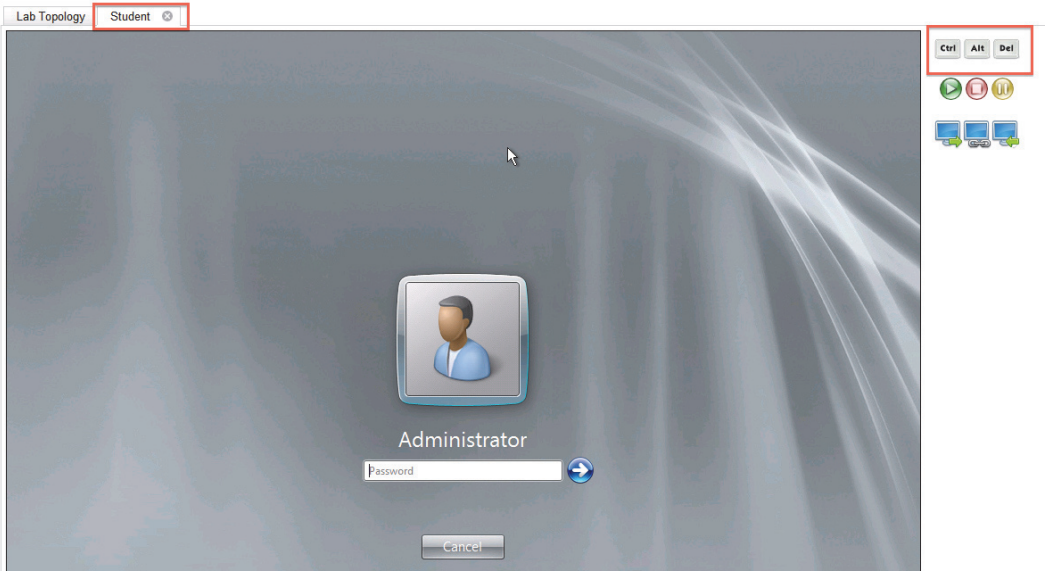
11. Once logged in you will be presented with a topology diagram. This will act **both** as a topology diagram for **reference** and as a launching point to **access** your "Student Landing Desktop." Your "Student Landing Desktop" is shown in the UCS Lab Topology Diagram simply as "Management Desktop". It is from this "Management Desktop" that all of your labs will be performed throughout the week.



12. Hover over the "Management Desktop" icon and notice how the mouse pointer turns into a hand.

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12.1. Click on the “Management Desktop” icon to open your “Student Landing Desktop” in a new **Student** tab at the top of this window.



12.2. From within the new **Student** tab click **Ctrl Alt Del**. On this, the “Management Desktop” you will login with the credentials of **Administrator** and **cisco123**.

13. Once connected you control this system as you would normally control any Windows system. For now, leave all tabs up and your connection to the remote system open.

Activity Verification

You have completed this activity when you have achieved these goals:

- Review the logical lab topology
- Understand the pod addressing format
- Accessing your lab equipment

Lab Complete

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L1

Analyze the Existing Computing Solution

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Lab Overview

In this activity, you will use the MAP Toolkit analysis and reconnaissance tool to analyze the existing computing solution.

Estimated Completion Time

1:20 minutes

Lab Procedures

In this activity, you will:

- Familiarize yourself with the MAP analysis and reconnaissance toolkit
- Review inventory information with the MAP Toolkit
- Review performance metrics of the collected inventory
- Run and examine different server consolidation scenarios

Required Resources

These are the resources and equipment that are required to complete this activity:

- Management Desktop
- MAP Toolkit

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Task 1: Import Inventory Data with the MAP Toolkit

In this task, you will use the MAP Toolkit to test two server consolidation scenarios using the existing computing solution inventory and performance metrics. This is a .bak file containing pre-filed system data (CPU, Memory, Processor & various sytem load values) that will be used to complete the rest of our design labs in this course.

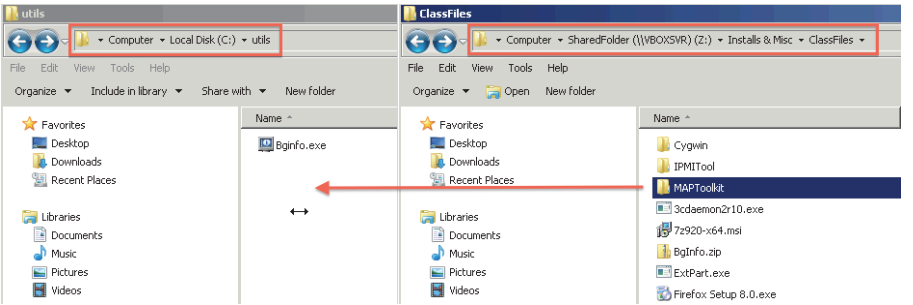
1. Before continuing with the next steps, let's take a moment to copy over the .bak file needed to seed our MAP database with discovered server information.

   1.1. Open two Explorer windows; one to the **C:\Utils** path and a second to the **Z:\Installs & Misc\ClassFiles** path.

   Click and drag (to copy) the **MAPToolkit** directory from the **Z:\Installs & Misc\ClassFiles** into the **C:\Utils**.

2. If prompted, cilck **Yes** to "merge" the two folders and **Copy and Replace** all files to overwrite any existing files.

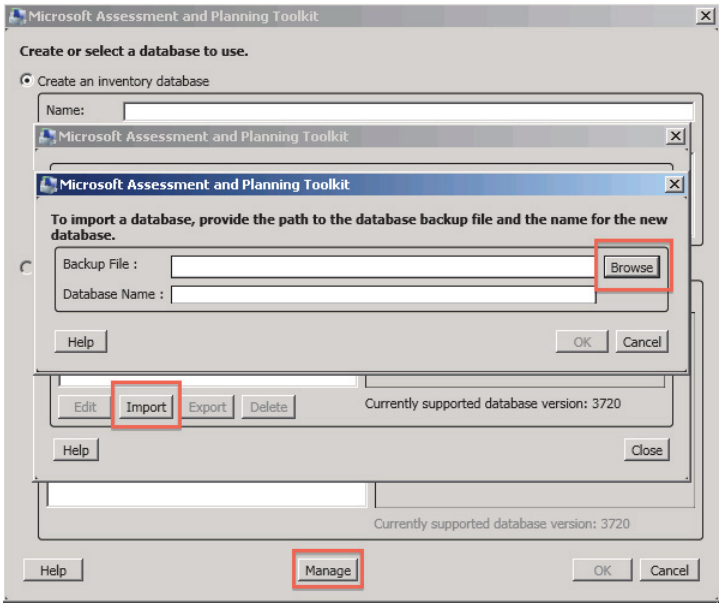
   Once the copy is complete you can close the two Explorer windows.



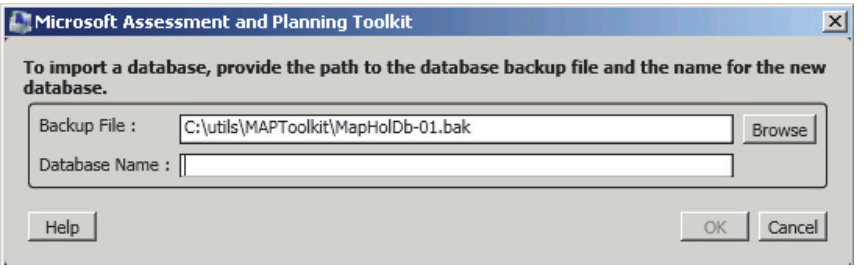
3. Open the MAP Toolkit by navigating to **Start > All Programs > Class Utilities > Microsoft Assessment and Planning Toolkit** and click on **Microsoft Assessment and Planning Toolkit**.

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4. Once the MAP Toolkit loads you should be presented with a "Create or Select a database to use." dialog, click **Manage > Import > Browse**. Image below.



5. Navigate to **C:\utils\MAPToolkit** and select the "**MapHolDb-01.bak"** file.



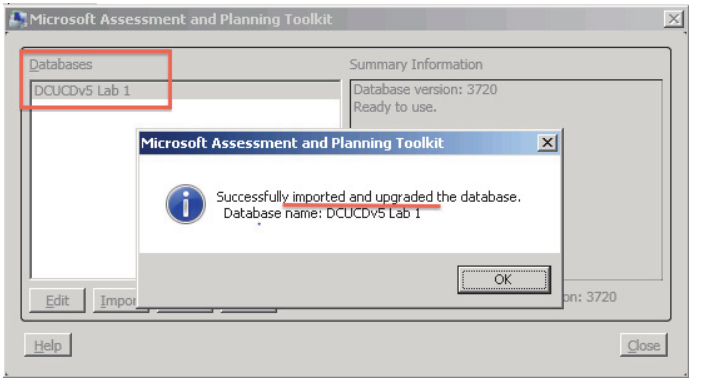
The amount of the performance data in our lab environment is not substantial. Instead of discovering our lab environment you will use a database that was prepared in advance for the following labs.

6. Give the Database a name of "DCUCDv5 Lab 1" and click **OK** to import.
7. **If** prompted to update the database information click **Yes**.

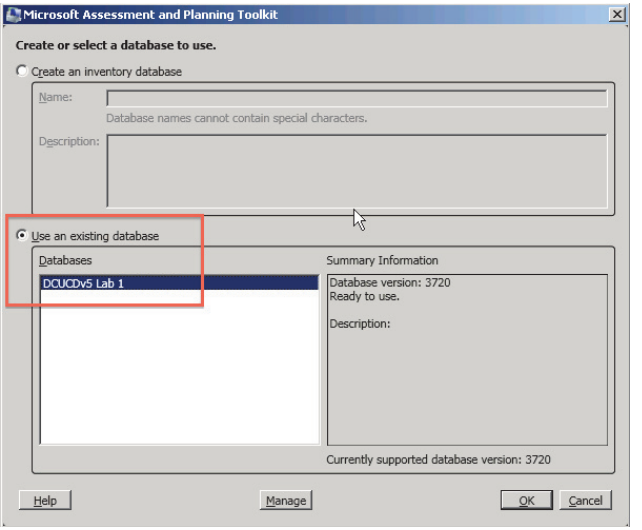
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8. Once the update process is complete click **OK**. Lastly, click **Close** to complete the database import process.

   Be aware that this seed file is over 100M. The import and update process will take a few minutes.



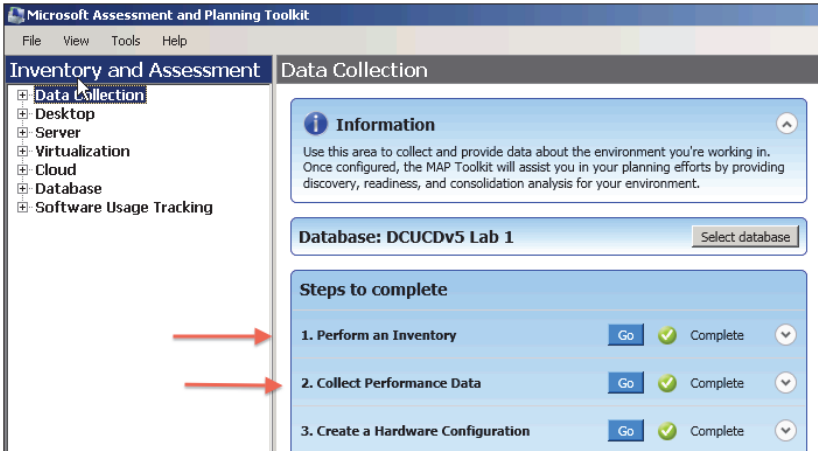
9. In the original "Create or select a database to use." screen in step 4 click the **Use an existing database** radio button and select the newly imported "DCUCDv5 Lab 1."



10. Complete the process by clicking **OK**.

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11. From the main screen, confirm that the status for "Perform an Inventory" and "Collect Performance Data" have a status of **Complete**.



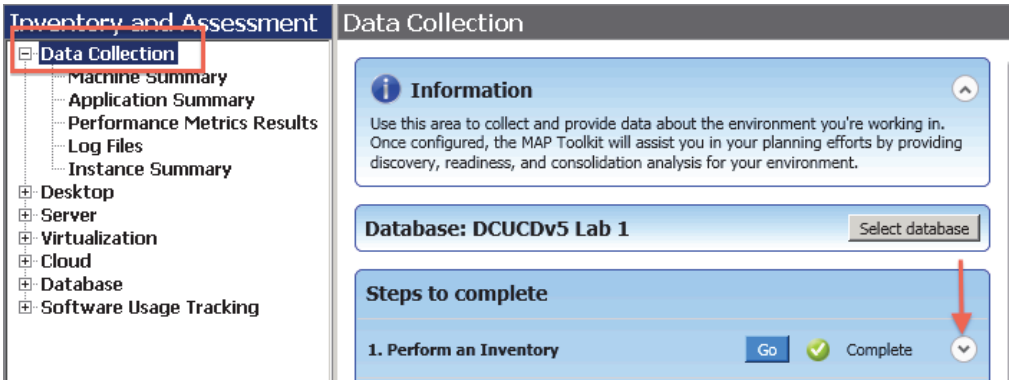
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Task 2: Review the Imported Inventory Information

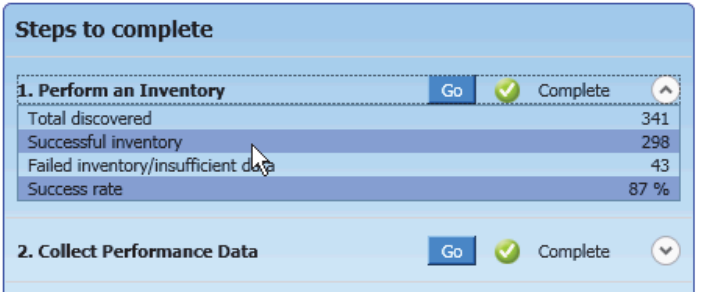
12. Before you proceed, review the inventory information by clicking on **Data Collection**.

    When the import process has finished, the detailed pane will be updated to show a graphical representation of the findings. Here, you will have an overall view of the servers that were inventoried.

13. To browse through the details and review the collected information click the arrow to the right of the **Perform an Inventory** option.



14. Here you will see the summary information about the inventory collection process (that is, the total number of discovered computers, successful and failed).



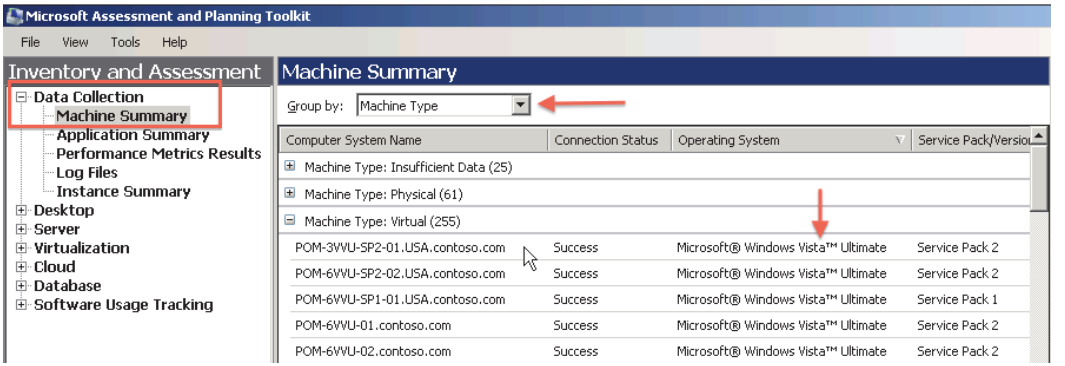
15. Next, look at the **Data Collection > Machine Summary** to review the overall information about the computers that were discovered.

16. Review the number and type of individual operating systems in the right pane. You can group the information using different criteria (that is; Machine Type, Connection Status, and Operating System) as selected in the "Group by:" drop-down list.

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17. Browse through the table on the right to review the operating system and service pack or version of the discovered computers.
18. Change the "Group by:" option to **Machine Type** and click the minus symbol (to the left of each section) to collaps each section.
19. Organize the values in each section by clicking on the column heading. This will then help you count the total number of entries for each category. Write your totals in the table below.

    Suggestion: Count the smaller number of entries (ex. Client) then subtract that number from the total for a given category. Ex. 61 Physical machines, 17 of them are clients.



Note You can move the column borders left and right to make more or less information visible for each category of discovered devices.

Computer type	Physical machine	Virtual machine	Undetermined	TOTAL
Client				
Server				
Insufficient data				
TOTAL				

Q1) What kind of environment are you analyzing?

Q2) What can you tell about the discovered computers for the summary information?

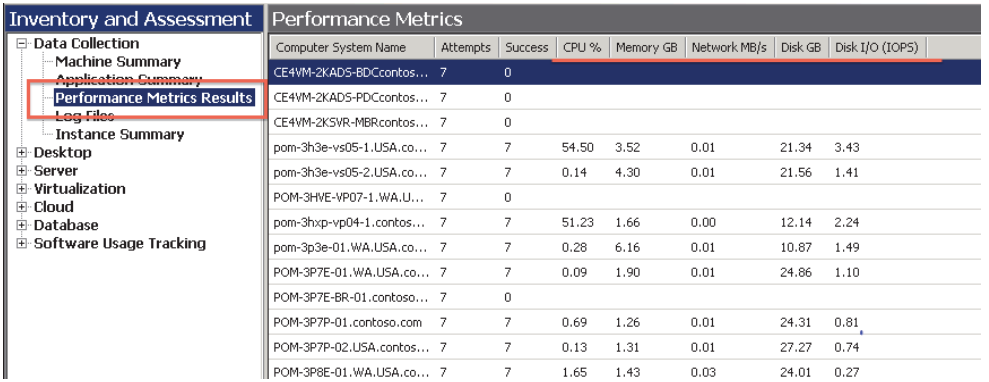
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20. Examine the application information for discovered computers in **Data Collection > Application Summary**.

21. Use this table to write down information on 3individual computers of your choosing. Be sure to note some of the more important applications running on those computers.

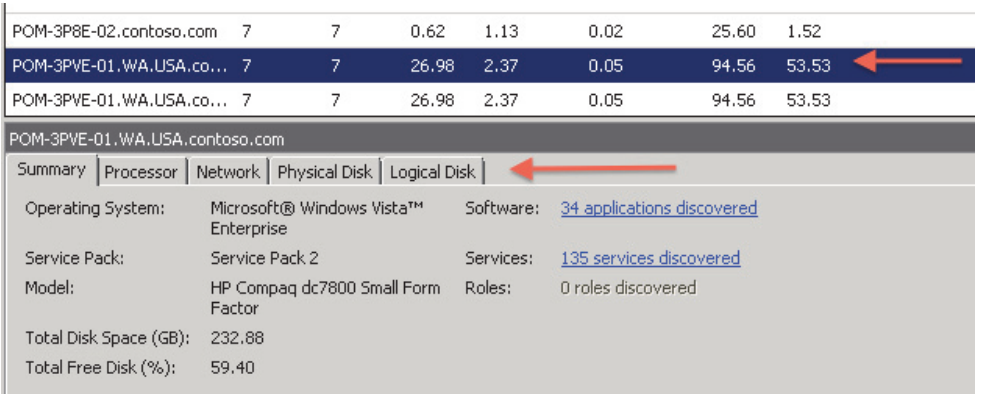
Computer	Database	VMware Management Tools	Packages and Tools

22. Review the Performance Metrics Results by navigating to **Data Collection > Performance Metrics Results**. Here you can see that the CPU utilization ratios are low on average.



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23. Click on individual computers of your choosing and note the information about the resource utilization levels for the CPU, memory, network, disk, and IOPS. The collection may be successful for some computers and unsuccessful for others. Image below.



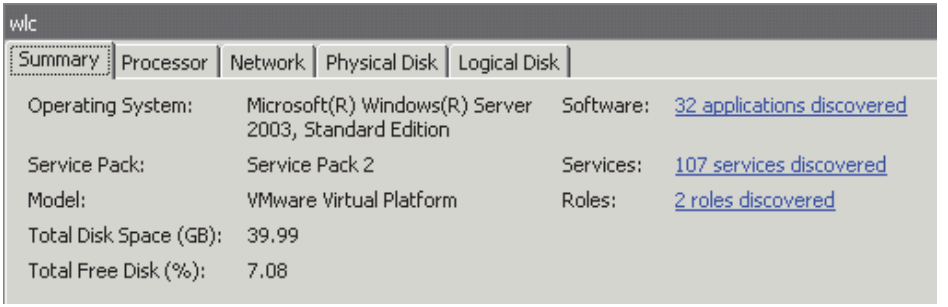
24. Use the following table to write down the collected performance metrics and to summarize the collected data.

Computer	CPU%	Memory	Network	Disk	Average IOPS
SUMMARY					

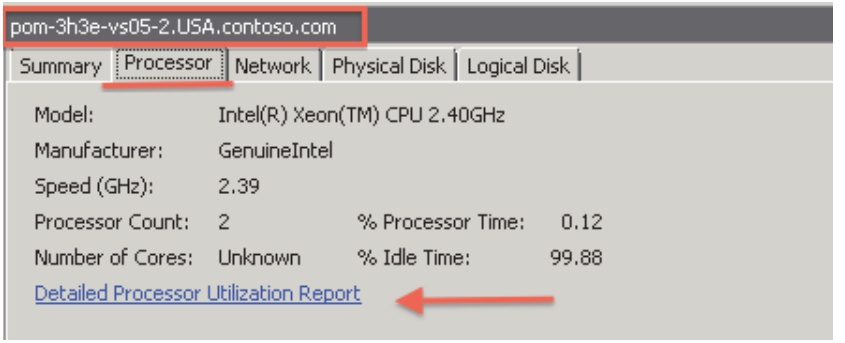
25. Review the information about the computer that is provided in the bottom part of the right pane—there are **multiple tabs** that you can browse through to examine all aspects of the computer.

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26. On the **Summary** tab, you can see the information about the operating system, the platform, the total disk space, and the total free disk space.



27. Click the link that is next to the "Software:" label (ex. "32 applications discovered") to review the information about the applications that are discovered. Repeat the step for the Services link (ex. "107 services discovered"). Here you can see the same information as in the Inventory listing.
28. Select the **Processor** tab to review the information about the CPU. You can see the general information about the CPU: the model, manufacturer, and speed in gigahertz, number of processors, and the utilization and idle times.
29. More detailed information about the processor can be obtained by choosing the **Detailed Processor Utilization Report** option. You can see that the MAP Toolkit collects several CPU performance metrics, which are then used when calculating the suggested consolidation ratio.

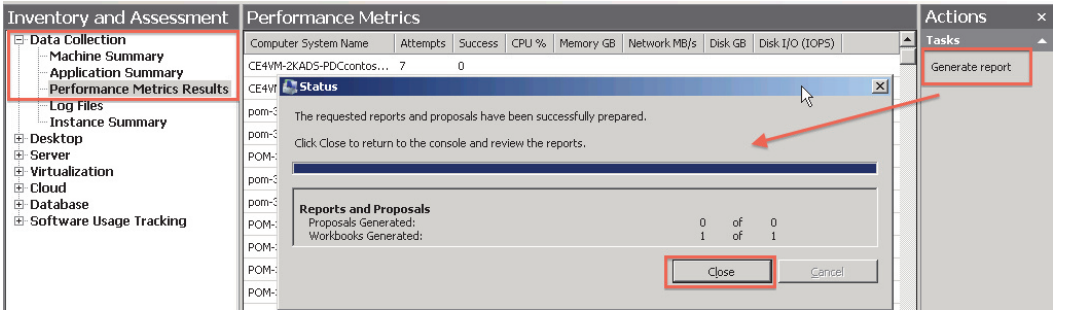


30. Close the Processor window and choose the **Network** tab to review the information for that part of your assigned computer. Here you can review the information about the network utilization from the perspective of the computer. You will see the total network traffic in bytes and packets per second as well as the amount sent and received.

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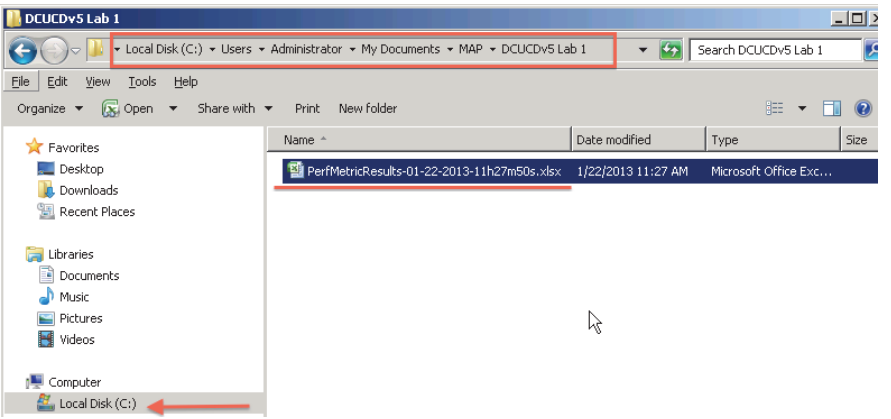
31. Finally, you can review the **Physical Disk** and **Logical Disk** tabs. These two screens give you the information about the local disk in the computer and also about all the volumes that the operating system is using.

32. To generate the Performance and Metrics report from the imported data. Look to the **Actions** pane in the top right corner and click **Generate report**.



33. Notice the MAP Toolkit starts to generate the requested report. The report is provided in an Excel spreadsheet with several workbooks. Wait for the wizard to finish with the report generation and click **Close**.

34. To view this report, open Windows Explorer or My Computer and navigate to the **C:\Users\Administrator\My Documents\MAP\DCUCDv5 Lab 1**, where the generated report is saved. You can see the report file named **PerfMetricResults-date_and_time.xlsx**.

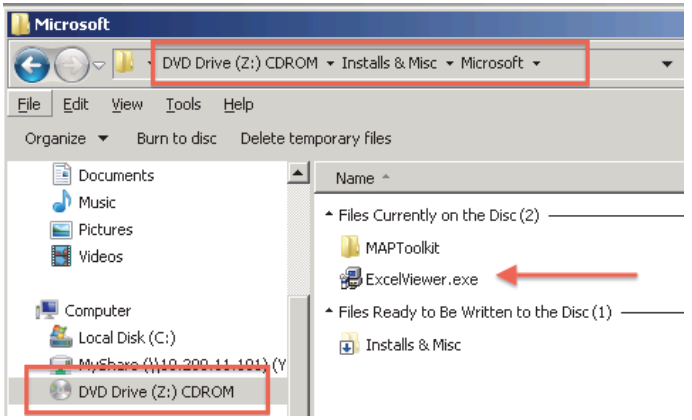


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35. If you **do see** a Microsoft Office Excel icon next to the generated report continue with the next step.

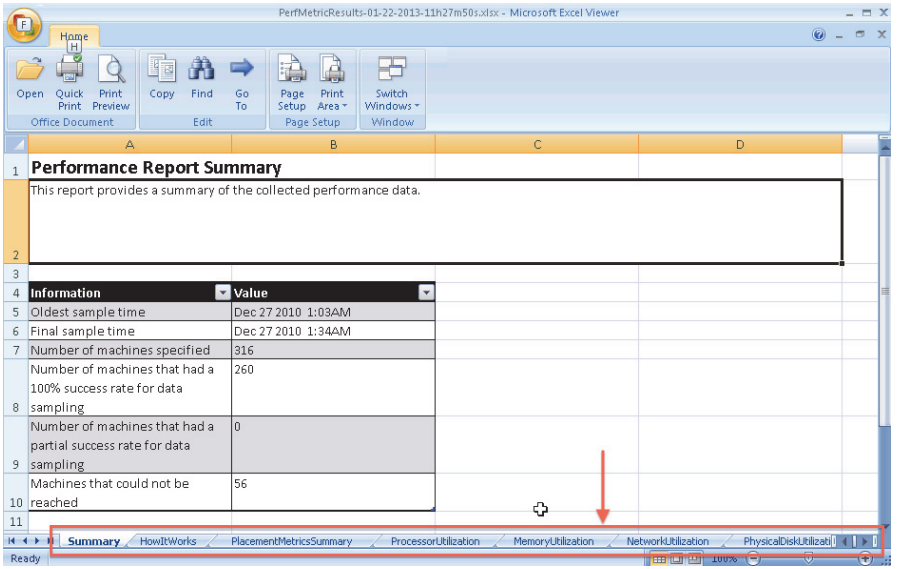
    If you **do not see** a Microsoft Office Excel icon next to the generated report this means your Management Desktop will not be able to view the report.

    To view the generated report, install the Excel viewer (**ExcelViewer.exe**) located at **Z:\Installs & Misc\Microsoft** accepting the "License Agreement" and all install defaults.



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36. Once the install is complete click once to open the generated report referenced in step 33. Pay special attention to the tabs available across the bottom of the Excel spreadsheet.

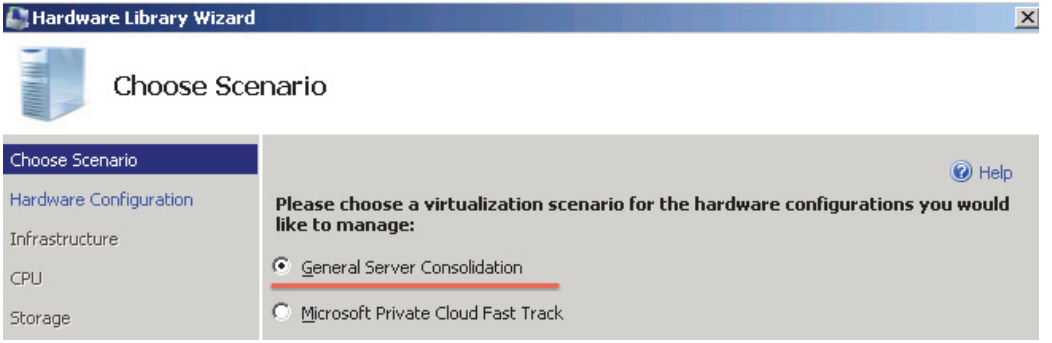


37. After reviewing the generated report close the Excel spreadsheet and all Explorer windows. Leaving open only the MAP Toolkit application.

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Task 3: Running Server Consolidation Scenarios

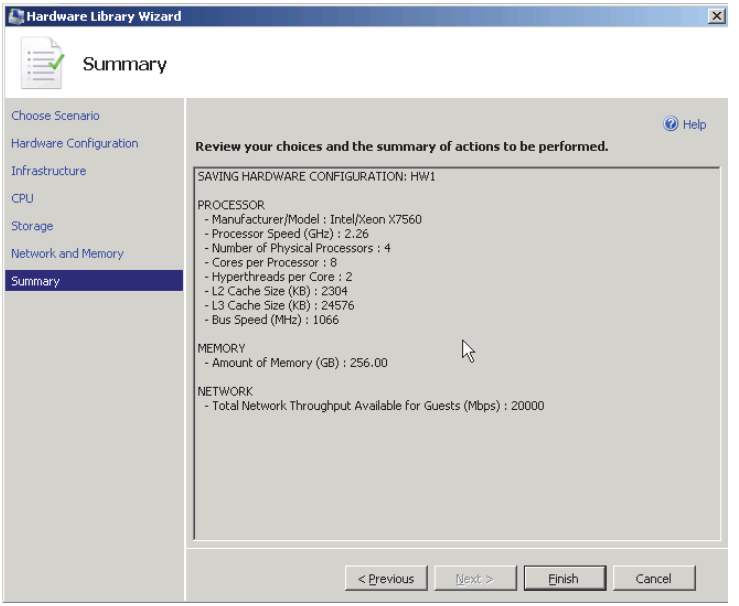
38. You will now create a new scenario that is based on the values below. To start this process a "Hardware Library" must be created. Click **Tools > Configure Hardware Library**.
39. Keep the default of "General Server Consolidation" and click **Next**.



40. On the "Hardware Configuration" screen click the **Create new** radio button, enter in a name of "HW1" and click **Next**.
41. Click **Next** on the "Create an Infrastructure (Optional)" screen to accept the defaults.

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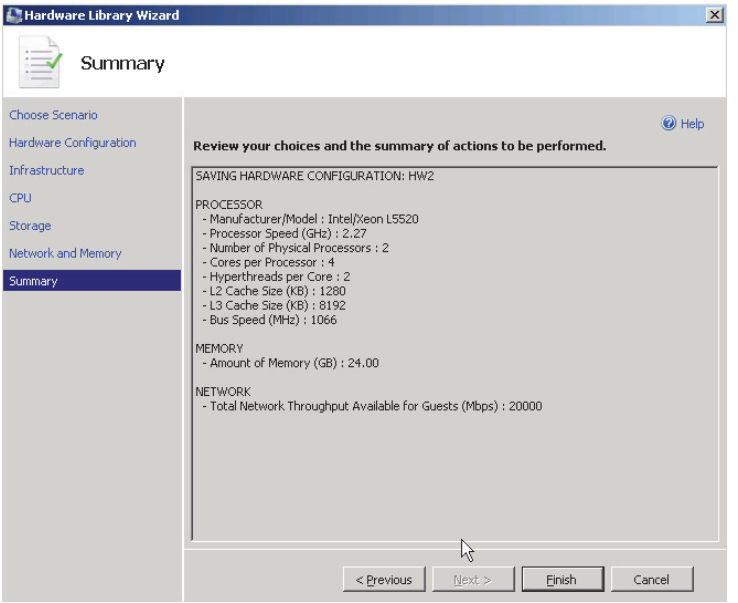
42. Use the values below to finalize the creation of your first Hardware Configuration.
    - Library name = **HW1**
        - Processor = Intel/Xeon X7560
        - Number of physical processors = 4
        - Do not consider IOPS and total available storage in assessment
        - Two NICs with 10-Gb/s speed = Total Network throughput (Mbps) 20000
        - 256 GB of memory



43. Once the wizard is complete click **Finish**.

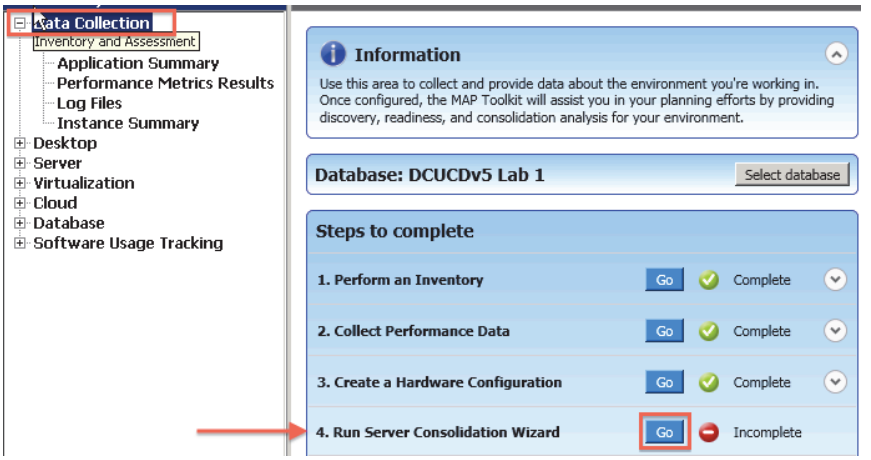
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44. Repeat steps 37 - 42 and the values below to create your 2nd Hardware Configuration.
    - Library name = **HW2**
        - Processor = Intel/Xeon L5520
        - Number of physical processors = 2
        - Do not consider IOPS and total available storage in assessment
        - Two NICs with 10-Gb/s speed = Total Network throughput (Mbps) 20000
        - 24 GB of memory



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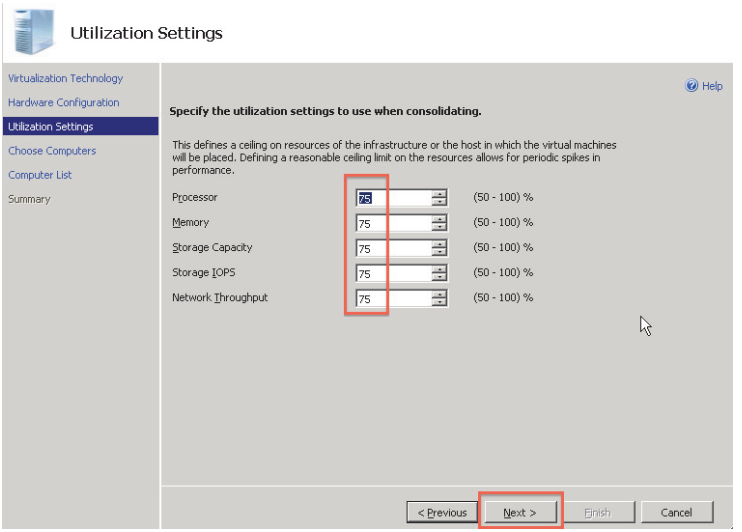
45. Next you will run two Server Consolidation scenarios that use the previously created hardware libraries. To start each consolidation scenario click on **Data Collection** and **Go** next to "Run Server Consolidation Wizard."



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46. Use the following values for the scenarios. If the individual value is not specified, leave it at its default setting.
    - Scenario 1:
        - Windows Server 2008 R2 Hyper-V
        - Library = HW1
        - Set 75% utilization for all options.

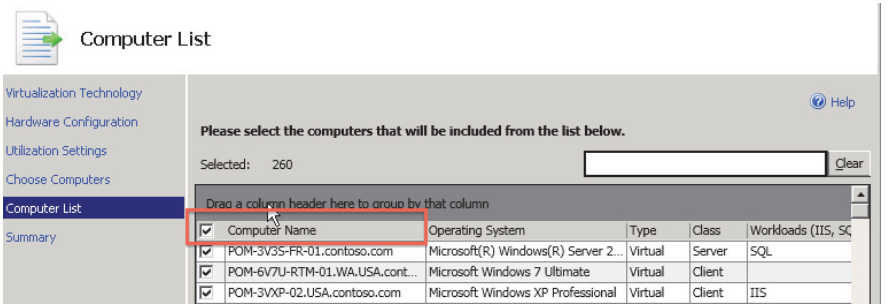
Note	The utilization settings are the maximum utilization levels of an individual host, which influences how analyzed computers (which will be VMs in the suggested solution) will be spread across the hosts.



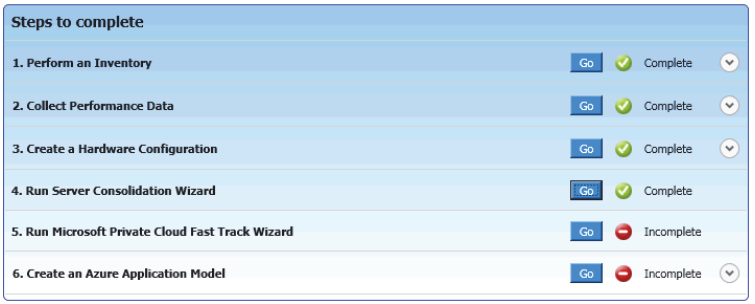
47. Select **Choose the computers from a list...** and click **Next**.

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48. To select all computers, click to place a check mark to the left of "Computer Name." Click **Next** to continue.



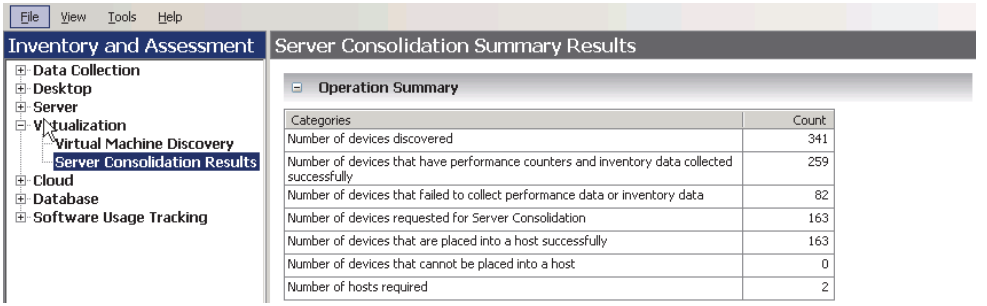
49. Review the summary information and click **Finish** to start the consolidation wizard.
50. Wait for the wizard to complete (Assessment: Completed), and then click **Close**.
51. Click on "Data Collection" and notice how the first four steps in the "Steps to complete" section are listed as "Complete."



Note	In the following steps, the actual outputs in your case might differ from the output shown in the screenshots.

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52. To review the server consolidation results navigate to **Virtualization > Server Consolidation Results**.



53. Review the summary information. Write down the values for

    Number of virtualization candidates (...devices requested for Server Consolidation)

    _____

    Number of unplaced computers (...devices that cannot be placed into a host)

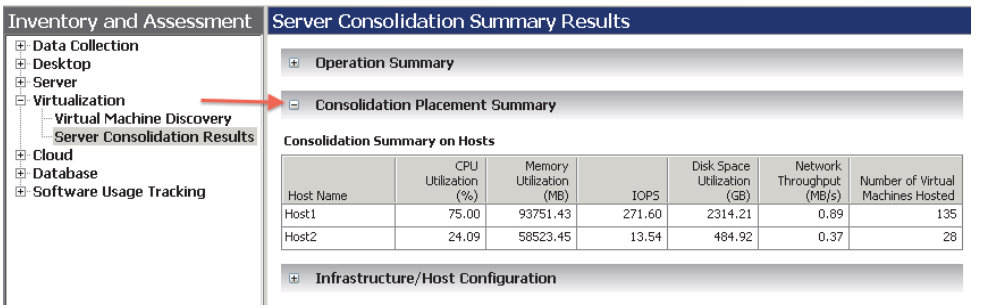
    _____

    Observe the reason for not placing some computers (ex. missing performance data)

    _____

54. You can see that the tool suggested two host systems, based on the collected performance metrics. If you look at the total performance requirements, you can come to the same conclusion.

55. Collapse all sections other than "Consolidation Placement Summary" to review the suggested consolidation ratio, using the Windows 2008 R2 SP1 Hyper-V virtualization.



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56. Examine the information in the **Infrastructure/Host Configuration** table. It shows the memory and CPU characteristics, as well as the local storage and network data. This is the information that is based on the hardware library and the maximum values that you entered.
57. Click **File > Exit** to close the MAP Toolkit application.

Activity Verification

You have completed this activity when the following goals have been achieved:

- Review the MAP Toolkit
- Import inventory data with MAP Toolkit
- Review the collected inventory data
- Collect the performance metrics for the existing environment
- Review the collected performance data
- Run the server consolidation scenarios

Lab Complete

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L2

Size the Cisco UCS C-Series Solution

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Lab Overview

In this activity, you will size the Cisco UCS C-Series server solution. This is the first step of the second phase, the plan phase, in the Cisco UCS design process. You have a customer that wants to perform a migration of the existing environment to a new Cisco UCS solution, with Microsoft Windows 2008 R2 Hyper-V as a virtualization platform. The input for this step is the result of the existing environment audit (imported data of Lab 1), which was performed with the MAP Toolkit and the information gathered in the customer design workshop.

Estimated Completion Time

35 minutes

Lab Procedures

In this activity, you will:

- Analyze results of the existing environment audit
- Run different "what-if" server consolidation scenarios
- Identify relevant requirements for a Microsoft Windows 2008 R2 SP1 Hyper-V deployment
- Create a Cisco UCS C-Series server equipment list, per requirements
- Use Cisco IMC to review assigned Cisco UCS C-Series server hardware configuration

Required Resources

These are the resources and equipment that are required to complete this activity:

- Management Desktop with MAP Toolkit installed
- Pod equipment: Cisco UCS C-Series Server

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Lab 2 Initial C-Series Implementation Sheet

The purpose of this document is to provide you with the necessary addresses to access your pod's C-Series server in Task 4.

Note The Task numbers below correspond to the Tasks where you will later use this information in the lab.

Task 4 Validate Cisco IMC BIOS Configuration:

Where **X** = Chassis#

Pod	C200 CIMC IP address 10.20X.10.11P	Subnet Mask	Gateway 10.20X.10.254
1	10.20**X**.10.111	255.255.255.0	10.20**X**.10.254
2	10.20**X**.10.112	255.255.255.0	10.20**X**.10.254
3	10.20**X**.10.113	255.255.255.0	10.20**X**.10.254
4	10.20**X**.10.114	255.255.255.0	10.20**X**.10.254
5	10.20**X**.10.115	255.255.255.0	10.20**X**.10.254
6	10.20**X**.10.116	255.255.255.0	10.20**X**.10.254
7	10.20**X**.10.117	255.255.255.0	10.20**X**.10.254
8	10.20**X**.10.118	255.255.255.0	10.20**X**.10.254

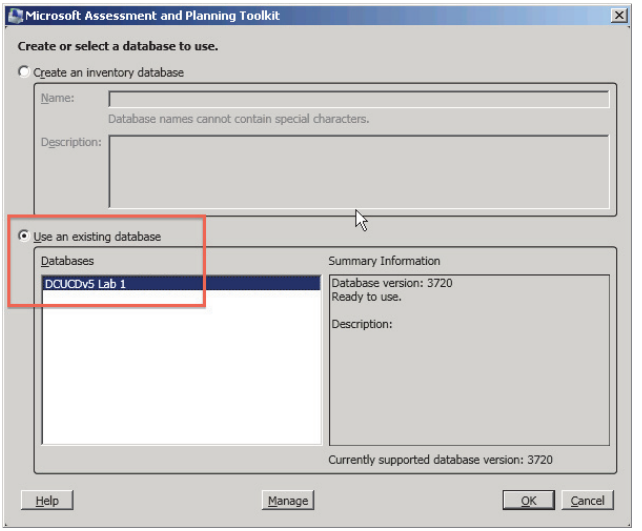
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Task 1: Analyze Audit Results

In this task, you will review and analyze the results of the audit of the existing customer environment (imported .bak file). You will use the MAP Toolkit to generate a performance and inventory report and calculate the information required for the sizing process.

1. If needed, open the MAP Toolkit again by navigating to **Start > All Programs > Class Utilities > Microsoft Assessment and Planning Toolkit** and click on **Microsoft Assessment and Planning Toolkit**.
2. In the "Create or select a database to use." screen, click the **Use an existing database** radio button and select the previously imported "DCUCDv5 Lab 1" database.



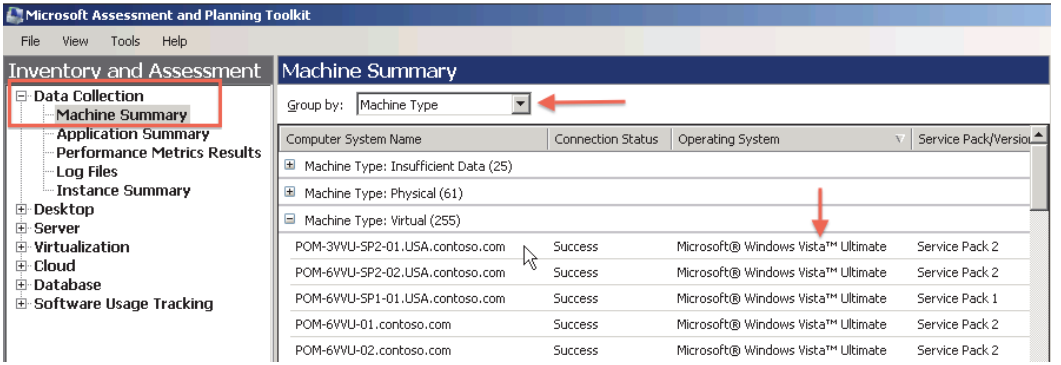
3. Complete the process by clicking **OK**.

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4. Review the **Data Collection** main screen to confirm that the status for Steps 1 and 2 (at a minimum) shows "Complete."



5. Before you proceed, review the inventory information at **Data Collection > Machine Summary**. Be sure to collapse each section (as performed in Lab 1, Task 2) to make counting the totals for each section easier.



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Use the following table to take notes about the environment that was analyzed (that is, the inventory summary results).

Inventory Summary Results

Computer	Quantity
Insufficient data	
Physical	
Virtual	
TOTAL	

6. Review the **Performance Metrics Results** in the **Data Collection > Performance Metrics Results** section. You can see that the CPU utilization ratios are low on average.

Note	Using the "Generate Report" option, outlined in Lab 1, Task 2 you can export this information from the MAP Toolkit into an Excel spreadsheet, which enables you to perform various calculations (including total, average, maximum CPU, memory, IOPS utilization, and so on).

7. To analyze the performance data, generate the report with the MAP Toolkit by selecting the **Generate report** option under the far right **Actions** pane.
8. This will generate the Excel spreadsheet with performance and inventory data that can be further manipulated (summarized, averaged, and so on). Click **Close** to close the Status dialog box.
9. To open the report, select the **View > Saved Reports and Proposals** option in the menu. Select the **PerfMetricResults-#date&time#** Excel spreadsheet from the list of reports.

Note	If you are not able to open the generated report be sure the Excel Viewer was installed in last steps of Lab 1, Task 2.

10. The generated report (Excel spreadsheet) has multiple tabs across the bottom, each with different information. Browse thru the tabs to review the information.
    - Summary
    - How It Works
    - Placement Metrics Summary
    - Processor Utilization

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- Memory Utilization
- Network Utilization
- Physical Disk Utilization
- Logical Disk Utilization
- Collection Statistics

11. Using the Excel spreadsheet, navigate to the **Placement Metrics Summary** tab to review the existing environment resource utilization levels.

    Q1) How many computers were identified as candidates to be virtualized on Hyper-V?

    Tip) Count the number of Machine Names.

    A1) _____

    Q2) Calculate and write down the resource requirements information about the virtualization candidates. This information will be used in the sizing process.

Resource Requirements

Parameter	Value
Highest average CPU utilization	
Highest maximum CPU utilization	
Highest 95th percentile CPU utilization	
Total average memory utilization (hint: summarize average memory utilization for all computers)	
Total maximum memory utilization (hint: summarize maximum memory utilization for all computers)	
Total 95th percentile memory utilization (hint: summarize 95th percentile memory utilization for all computers)	
Total average network utilization (hint: summarize average network utilization for all computers)	
Total maximum network utilization (hint: summarize maximum network utilization for all computers)	
Total 95th percentile network utilization (hint: summarize 95th percentile network utilization for all computers)	

Once you've gathered all of the information needed, close the Excel spreadsheet and Explorer window.

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Task 2: Select the Cisco UCS C-Series Server

In this task, you will use the MAP Toolkit to run server consolidation "what-if" scenarios using the existing computing solution inventory and collected performance metrics from the pre-populated database.

First, select three different base UCS C-Series server configurations per resource requirements identified in the previous task. These will be used to build the MAP Toolkit hardware library.

Next, run the Server Consolidation Wizard to calculate the number of required Hyper-V hosts.

Compare the results of server consolidation scenarios and pick a scenario for a further sizing process.

Note The MAP Toolkit 6.5 version does not yet support all the latest Intel Xeon processors, such as E5-2400, E5-2600, and E5-4600, and thus the latest M3 generation of Cisco UCS B-Series and C-Series servers. Therefore, in the "what-if" server consolidation scenarios **use the characteristics of an M2 generation** of Cisco UCS servers.

In this task you will perform the following steps:

- Discuss and create three UCS C-Series configurations within a group.
- Run the Server Consolidation Wizard for each configuration and write down the results, using the tables provided below.
  - First, create the hardware library for each identified UCS C-Series configuration, using **Data Collection > Create a Hardware Configuration**.
  - Next, run the Server Consolidation Wizard for each entry in the hardware library, using the **Run Server Consolidation Wizard** option in the right pane.
  - Review the Server Consolidation Results under the **Virtualization** option in the left pane.
- (Optional) When all groups finish their server consolidation scenarios, pick one option and present the selected option to the rest of the class for further discussion.

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Consolidation Requirements

The resource requirements were calculated in the previous task. Refer to the **last table** that you populated in the previous task.

When performing the "what-if" server consolidation scenarios, use the following information:

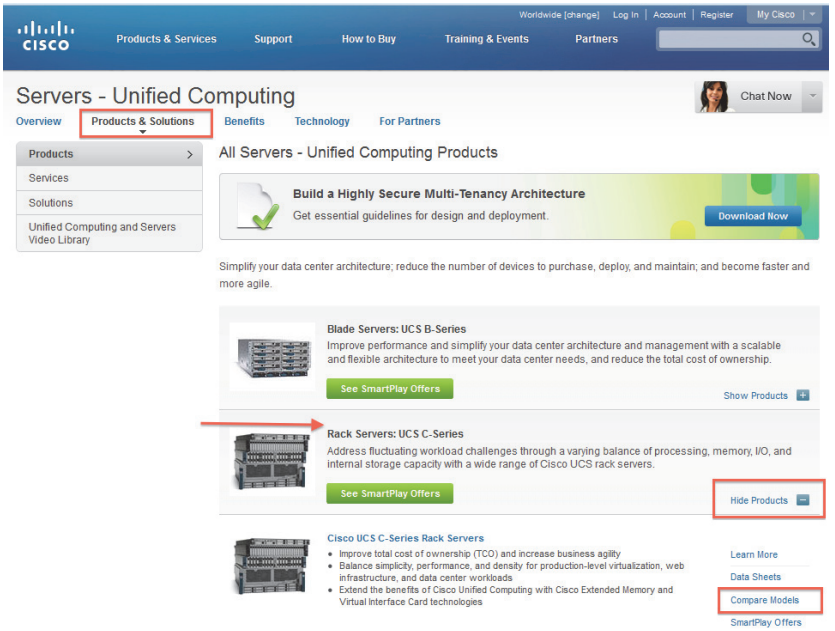
- Virtualization platform used will be Microsoft Windows 2008 R2 SP1 Hyper-V.
- Leave the Create an infrastructure (Optional) option unchecked.
- Set the Storage option at the default: Don't consider IOPS and total available storage in assessment.
- For the Total Network Throughput (Mb/s) per Host, you can assume that 6 Gb/s is enough.
- 15 percent of resources should be reserved to accommodate possible utilization spikes (that is, a maximum of 85 percent of CPU, memory, storage capacity, storage IOPS, and network throughput resources should be used for placing virtual machines on Hyper-V hosts).
- Select all of the existing computers to be virtualized and placed on Hyper-V hosts.

Note	Pay attention when entering CPU information and adjust the core and hyperthreading information per CPU specifications.

12. Using your in-class computer (personal laptop or GK provided system) open a browser and navigate to **www.cisco.com/go/ucs**.

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13. (At time of development) click on **Products & Solutions > Show Products** to the right of "Rack Servers: UCS C-Series" and finally **Compare Models**.

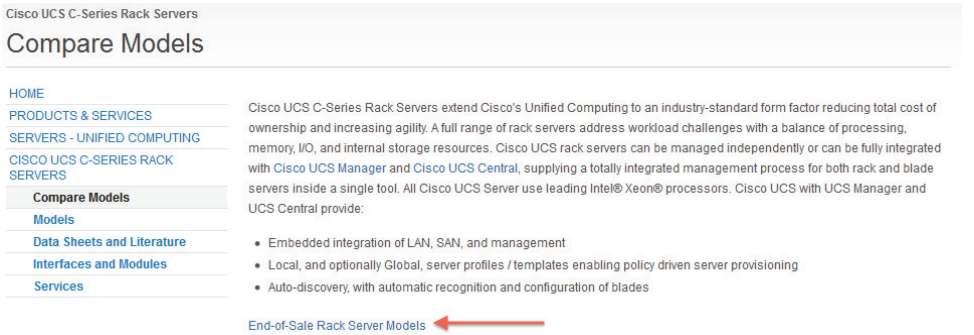


14. Use the "Product Description" to review each model.

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15. Place a check to the left of the models you want to compare. Once you've selected a minimum of 2 models click **Compare** at the top of the page.

Note	Once again, MAP Toolkit version 6.5 does not yet support all the latest Intel Xeon processors such as E5-2400, E5-2600, and E5-4600, and thus the latest UCS M3 generation. Therefore, in the "what-if" server consolidation scenarios **use the characteristics of an M2 generation** of Cisco UCS servers, this will likely mean you must click on "End-of-Sale Rack Server Models" when comparing some of your 3 options.



Keep in mind that a 2nd or 3rd scenario does not mean you must select a different C-Series model. You may adjust a previously selected C-Series RAM, CPU or other values as needed. Use the following tables to write down the results for each of the server consolidation scenarios (that is, UCS C-Series options).

Scenario #1, #2 & #3

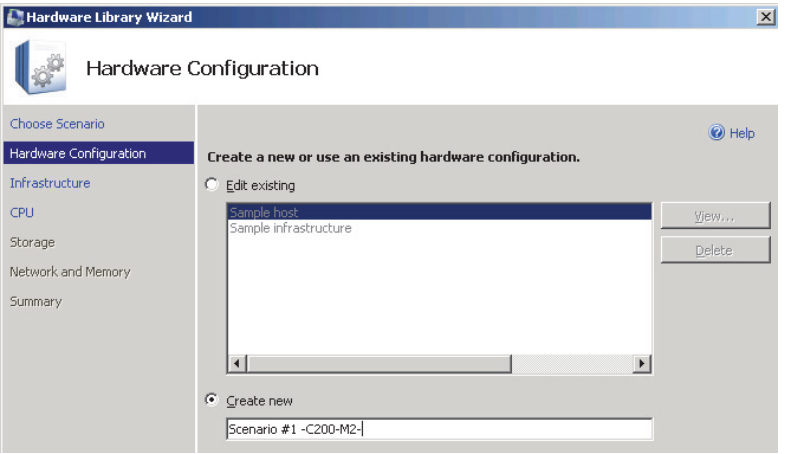
UCS C-Series Base Configuration: Pick 2 additional C-Series servers from the step above.

Parameter	**Scenario #1** (ex. C200-M2)	**Scenario #2**	**Scenario #3**
Server type	C200-M2		
CPU type	Intel Xeon X5650, 6 cores with HT		
CPU quantity	2		
Memory size	64		
Total network throughput (summary of server NICs)	6x 1GE		

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Use the following steps to create a "Hardware Library" from each of the above C-Series Base Configuration.

16. Navigate to **Tools > Configure Hardware Library**.
17. Accept the default **General Server Consolidation** option and click **Next**.
18. On the "Hardware Configuration" option click **Create new** and enter a name of "Scenario #1 -Your Model #-." Ex. **Scenario #1 -C200-M2-** and click **Next** to continue.

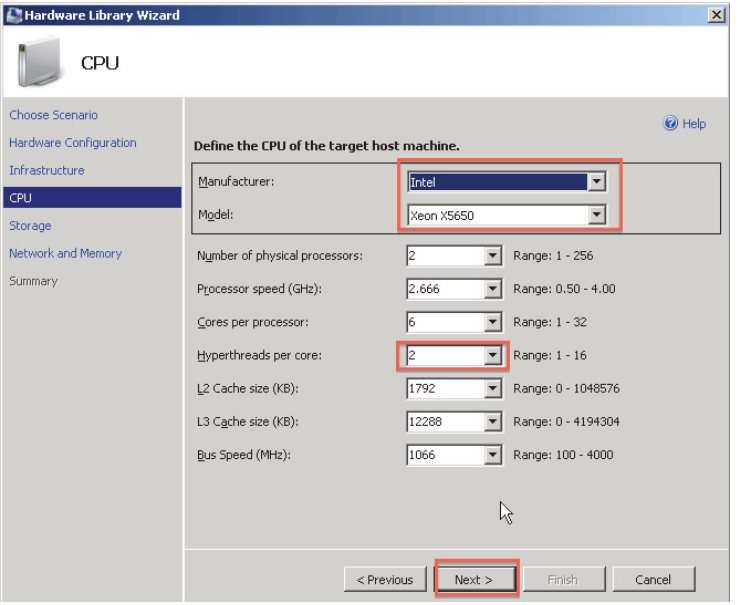


19. Click **Next** to accept the default "Infrastructure" options.

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20. Set your “CPU” values to those documented for your scenario above and click **Next**. Ex. Intel Xeon X5650.

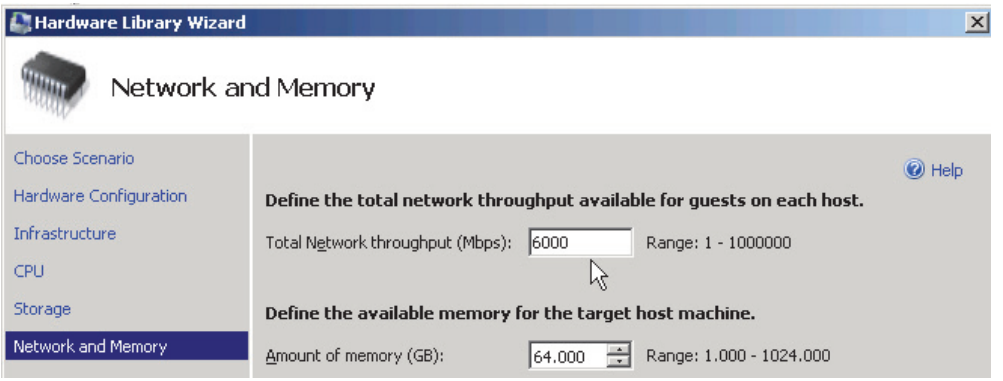
Note If the CPU has Hyperthreading enabled the “Hyperthreads per core:” value should be set at 2. See image below.



21. Click **Next** to accept the default “Storage” options.

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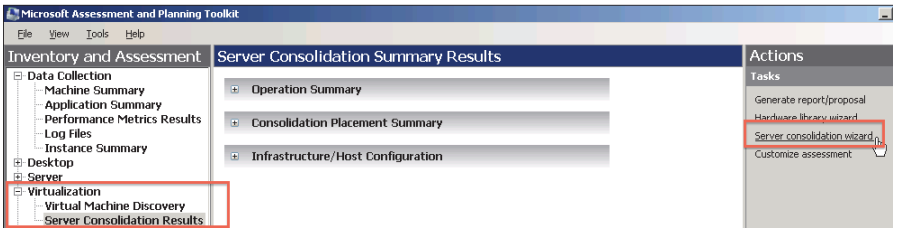
22. Use the table above to set the **Total Network Throughput (Mbps):** and **Amount of memory (GB):** then click **Next**.



23. Take your time to review the configured options as reviewed on the "Summary" page. If any values were not set properly click "Previous" and make the needed correction. Once you've confirmed the setting are correct, click **Finish** to complete the wizard.

    Now that the "Hardware Library" has been created for your first scenario we will use these definitions while calculating your "Server Consolidation" needs.

24. To run each Server Consolidation Wizard, navigate to **Virtualization > Server Consolidation Results** and click **Server Consolidation Wizard**.



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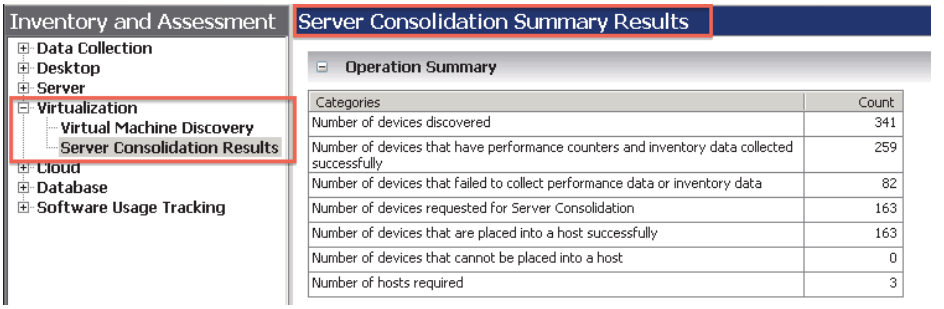
Requirements for the Server Consolidation Wizard

The resource requirements were calculated in the previous task and defined in your "Hardware Library." If needed, you can always refer back to the **last table** populated in the Task 1.

To perform each "what-if" server consolidation scenarios, we will run the "Server Consolidation Wizard" 3 times, each time using the "Hardware Library" defined for each scenario as well as the following information. Be sure to click **Next** after each category and **Finish** to finalize each run through of the wizard.

- "Virtualization Technology" = **Microsoft Windows 2008 R2 SP1 Hyper-V**
- "Hardware Configuration" = **Scenario #1 -C200-M2-**
- "Utilization Settings" = **85** percent for all values
- "Choose Computer" = **Default** "Choose the computer from a list..."
- "Computer List" = **Select all** (place a check to the left of "Computer Name")
- "Summary" = **Confirm all values** are correct and click **Finish**.

25. Once the Server Consolidation Wizard completes (Assessment: Completed) click **Close**.
26. Use the "Server Consolidation Summary Results" presented to fill in the table below.



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Server Consolidation Wizard Results:

Parameter	Scenario #1 (ex. C200-M2)	Scenario #2	Scenario #3
Total number of hosts	2		
Total number of VMs (hint: number of devices that are successfully placed into a host)	163		
Total amount of memory required (hint: total from all hosts)	149.71 GB		
Total network utilization	10.08 Mb/s		
Peak host CPU utilization (hint: max CPU util. of a host)	82.62%		
Cluster CPU utilization (hint: average of all hosts)	64.09%		
Peak host memory utilization (hint: max memory used divided by total memory of your host. Ex. 64G)	84.38%		
Cluster memory utilization (hint: average of all hosts)	77.97%		
Peak host network utilization	3.84 Mb/s		
Peak number of VMs per host	78		
Preferred choice (**Yes** or **No**)	**No**		

27. Repeat steps 20 - 30 to create a “Hardware Library” and run the “Server Consolidation Wizard” for each of your remaining scenarios.
28. Use the results of each wizard to fill in the values for scenario #2 & #3 in the table above.

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Task 3: Size the Selected Cisco UCS C-Series Server

In this **written** task, you will size the UCS C-Series server that you selected as the **preferred choice** from the previous task. Ex. Scenario #3.

If your pod needs guidance on how to complete this task you can review the answer key in Appendix A. Here you will realize that some of the values selected are truly from a design point of view and are entirely up for discussion.

This task includes the following activities:

- Review the customer requirements (listed below) gathered in the design workshop
- Size the selected Cisco UCS server and define its hardware properties
- Select the appropriate quantities of the individual server components
- Select the appropriate quantity of the servers for the solution
- Determine the number of the required LAN and SAN uplinks

In this task you will perform the following steps:

- Discuss and create the selected UCS C-Series hardware configuration within a group.
- (Optional) When all groups finish their sizing, present the UCS C-Series configuration to the rest of the class for further discussion.

Sizing Requirements

You have conducted several technical meetings to collect the necessary input data and you have used the analysis tool to collect the performance metrics. The metrics will be the basis for sizing the Cisco UCS solution.

- The customer will use Microsoft Windows 2008 R2 SP1 Hyper-V as the virtualization platform.
- The Hyper-V will be installed on the local disks in the servers and the VMs will be stored on the iSCSI attached drive array using the CSV. The local disks will also be used as a local datastore to store the ISO images for various operating systems and applications.
- The solution has to be operational even if 25 percent of total resources are lost due to some failure (25 percent of total resources must be reserved as cluster high-availability resources).

Continued on next page...

- The solution should be sized with 25 percent of extra resources for growth that is expected in the next two years.
- The iSCSI SAN environment has a dedicated segment (that is, a VLAN).

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- The iSCSI attached drive array will be attached via two interfaces to provide redundant paths to the volumes.
- The individual Hyper-V host should meet the following requirements:
  - Redundant connectivity for data and iSCSI segments
  - Connection to the following LAN segments
    - Management segment: should have dedicated NIC
    - LiveMigration segment: should have dedicated NIC
    - VM Data1, VM Data2, VM Data3 segments: can share NICs
    - iSCSI segment: should have dedicated NICs
- The physical server (not the Hyper-V hypervisor) should be managed with a separate out-of-band Ethernet connection. Redundancy is not required.
- The customer has specifically noted that rack-mount server deployment is preferred. The customer has noted that the selected solution should also be optimized for the size of the environment, particularly from the price perspective.
- The upstream LAN and SAN equipment has not yet been determined and does not influence the selection of the servers. The customer noted that LAN and SAN equipment selection will be based on the server connectivity requirements.

Task Aids

Use the following tables to write down the results of the server sizing process.

Design Workshop Requirements: Answer from the "Sizing Requirements" above.

Parameter	Value/Description
Platform	
High-availability resources	
Future growth	
Storage	
Network segments - no redundancy	
Network segments - redundancy required	
Server form factor	

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UCS C-Series Server Configuration: Use your "preferred choice" from Task 2.

Component	Selection
Server type	
Processor	
Processor quantity	
DIMM size	
DIMM quantity	
RAID controller	
Network adapter	
Network adapter quantity	
Fibre Channel adapter	
Fibre Channel adapter quantity	
Local disk type	
Local disk quantity	
Power supply	
LAN physical cabling per server	
SAN physical cabling per server	

Solution Total

Component	Quantity
Servers	
LAN physical cabling (hint: type and quantity of cabling)	
SAN physical cabling (hint: type and quantity of cabling)	

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Task 4: Validate Cisco IMC BIOS Configuration

In this task, you will use the KVM console to enter the Cisco IMC BIOS and validate the configuration.

Where **X** = Chassis#

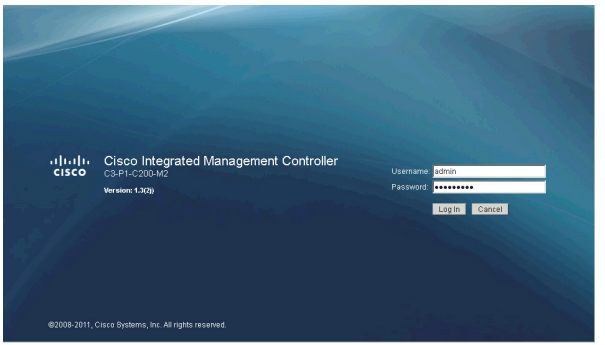
Pod	C200 CIMC IP address 10.20X.10.11P	Subnet Mask	Gateway 10.20X.10.254
1	10.20**X**.10.111	255.255.255.0	10.20**X**.10.254
2	10.20**X**.10.112	255.255.255.0	10.20**X**.10.254
3	10.20**X**.10.113	255.255.255.0	10.20**X**.10.254
4	10.20**X**.10.114	255.255.255.0	10.20**X**.10.254
5	10.20**X**.10.115	255.255.255.0	10.20**X**.10.254
6	10.20**X**.10.116	255.255.255.0	10.20**X**.10.254
7	10.20**X**.10.117	255.255.255.0	10.20**X**.10.254
8	10.20**X**.10.118	255.255.255.0	10.20**X**.10.254

29. From your Management Desktop, open a browser and browse to the Cisco IMC IP address of the C200 in your pod.

```
http://10.20X.10.11P (X = your Chassis # and P = your Pod#)
EX. http://10.201.10.118 for Chassis #1, Pod #8
```

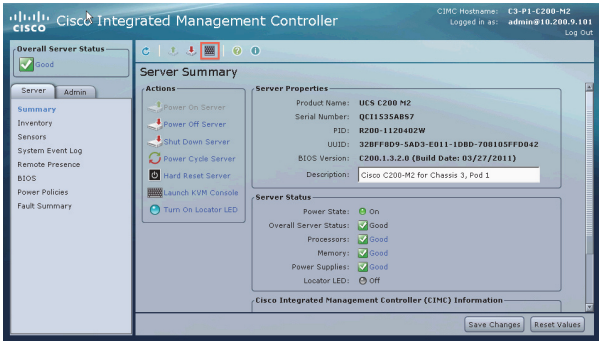
Note You may notice how the web request automatically redirected from an http connection to https. Be sure to click “Continue to this website…” to accept the self-signed certificate.

30. Log in to the Cisco IMC by using the credentials **admin** and **NXos12345**.



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31. From the summary page, click the **Launch KVM Console** link or the small **keyboard** icon directly above the words "Server Summary".



Note	The advantage of the small keyboard icon is that it is visible from any screen in the Cisco Integrated Management Controller interface.

32. If prompted, click **OK** to open the Java VM in which the KVM runs. You should see yellow text on a green background showing "No Signal". This is what displays when the server is powered down. If you see anything other than "No Signal", go to the Cisco Integrated Management Controller window (leave your existing KVM session open) and click the **Power Off Server** icon (red down arrow) next to the small keyboard icon.



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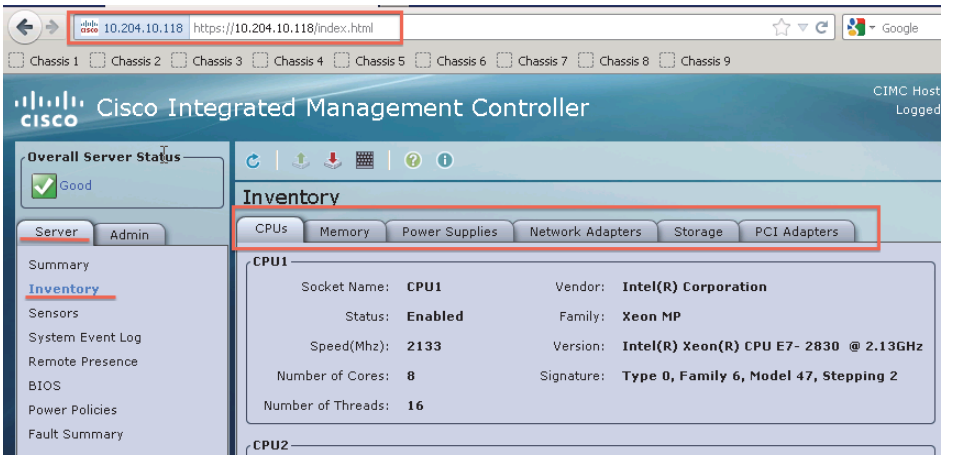
33. From the Cisco Integrated Management Controller (CIMC) summary screen, use the **Summary** option on the **Server** tab to answer the following questions.



Q3) What is the current overall status of the server?

A3)

34. Examine the server inventory by navigating to the **Server > Inventory** option. Wait for the screen to be refreshed with the server information.



Fill in the following table with the server characteristics as you review the server inventory values in the steps below.

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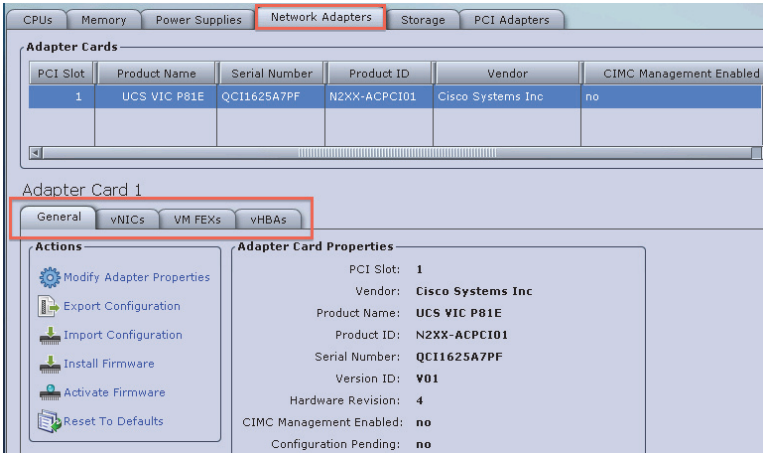
C-Series Server Inventory

Parameter	Value
Total CPU sockets quantity	
Populated CPU socket quantity.	
CPU type	
Number of cores per CPU	
Total DIMM quantity	
Populated DIMM slots quantity and names	
Individual DIMM size	
Individual DIMM channel speed	
Power supply type	
Power supply redundancy level	
Local disk quantity	
Additional adapters that are installed	
Adapter PCI slot	
Default vNIC quantity	
Default vHBA quantity	

35. You will first see the information about the server CPUs. Select the **Memory** tab in the right pane. This tab reveals the details about the server memory configuration.
36. The **Power Supplies** tab details the information about the server power supplies and the available power redundancy.
37. The **Storage** tab provides the information about the server local storage capacity, that is, the number of installed local disks. You might have no local storage installed.

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38. The **Network Adapters** tab shows the information about the PCIe expansion cards that are installed in the PCI slots. There are additional sub-tabs on the Adapters screen: General, vNICs, VM FEXs, and vHBAs tabs.



39. Using the **vNICs** tab, review the current settings of the vNICs. You can create and delete additional vNICs in this section.

40. Using the **vHBAs** tab, review the current settings of the vHBAs. You can change the vHBA settings in this section. Additionally, when selecting an individual vHBA, you can set up the boot parameters by verifying the current boot settings.

41. When you are done with the inventory, proceed to the **Sensors** option on the left pane under the **Servers** tab.



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42. In the right pane, you can examine the information about the various hardware aspects of your assigned server. Review the **Power Supply**, **Fan**, **Temperature**, **Voltage**, and **Current** tabs to check the status of the individual sensors.

    Q4) What is the status of the **power supply** sensors?

    A4)

    Q5) What is the status of the **fan** sensors?

    A5)

    Q6) What is the status of the **temperature** sensors?

    A6)

    Q7) What is the status of the **voltage** sensors?

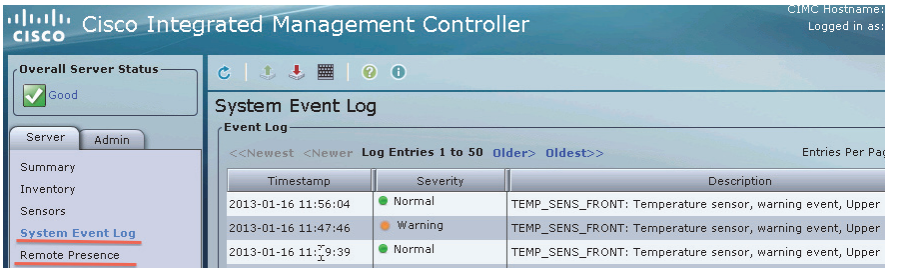
    A7)

    Q8) What is the status of the **current** sensors?

    A8)

43. Click the **System Event Log** option to examine the C-Series system log.

    You can see various system messages that are logged locally on the C-Series. If you have rebooted the server, you should be able to note the messages that are logged upon system restart.



44. The Cisco IMC allows you to control the remote KVM functionality. Click the **Remote Presence** option.

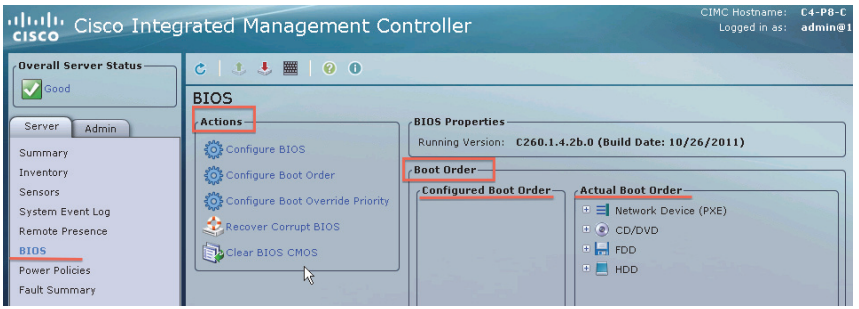
45. Review the Remote Presence right-pane subtabs: **Virtual KVM**, **Virtual Media**, and **Serial over LAN**, and complete the table with the information about the current remote presence settings:

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C-Series Server Remote Presence Settings

Parameter	Value
Virtual KVM	
Status (enabled or disabled)	
Maximum sessions	
Active sessions	
Remote port	
Video encryption	
Local server video	
Status	
Active sessions	
Virtual media encryption	
Status	
Rate in bits per second	

46. The **Virtual KVM** tab shows the general information about the remote KVM functionality.
47. The **Virtual Media** tab shows the details about the remote KVM virtual media capabilities, that is, the mapping of the local devices and ISO images.
48. The **Serial over LAN** tab shows the details about the SoL settings.
49. Click the **BIOS** option under the **Server** tab in the left pane.



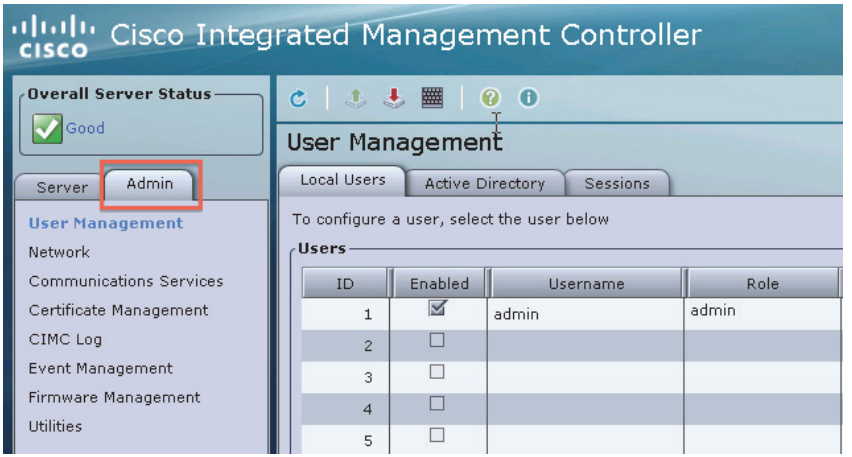
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50. Review the current actual boot order of the server and note it in the following table.

C-Series Server Boot Order

Boot Position	Device
First boot device	
Second boot device	
Third boot device	
Fourth boot device	

51. Navigate to the **Admin** tab on the left pane. Here you can review the server administrative settings that pertain to the management aspects of the server.



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52. Collect the required information to fill in the following table.

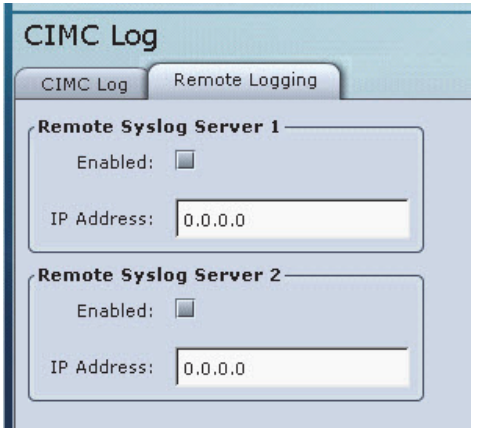
C-Series Management Network Settings

Parameter	Value
NIC mode	
NIC redundancy	
Hostname	
IP address	
Subnet mask	
Gateway	
VLAN of the management interface	
Management protocols available	
Configured communication ports for individual management protocols	
Configurable syslog server quantity	
SNMP trap destination quantity	

53. The **Network Settings** option under the **Admin** tab details the information about the management network settings. You can change the way that you are accessing the server management on the network.
54. The **Communications Services** option under the **Admin** tab has detailed information about the management protocols. You can change the management protocols settings.
55. Next, review the **SNMP** tab in the right pane.

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56. Review the **CIMC Log** options and click the **Remote Logging** tab in the right pane. You can review and change the syslog server information.



57. Review the rest of the options that are available in the Cisco IMC. Once you have finished this work, you have finished the lab exercise.

Activity Verification

You have completed this activity when you have achieved these goals:

- Review the small solution requirements
- Size the small Cisco UCS solution by using the C-Series hardware
- Review the C-Series server configuration by using Cisco IMC

Lab Complete

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L3

Size the Cisco UCS B-Series Solution

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Lab Overview

This lab is identical in structure and objectives to Lab 2, except that you will design a B-Series solution around the customer requirements.

In this activity, you will size the Cisco UCS B-Series solution. This is the second step of the second phase, the plan phase, in the Cisco UCS design process.

You have a customer that wants to perform a migration of the existing environment to a new Cisco UCS solution, with VMware vSphere 5 as a virtualization platform. The input for this step is the result of the existing environment audit, which was performed with the MAP Toolkit and the information gathered in the customer design workshop.

Additional, you will validate LAN and SAN connectivity from the IOM to the fabric interconnect and northbound Ethernet and Fibre Channel switches. Once this lab is complete your instructor will review the newly discovered UCS Topology with the entire class.

Estimated Completion Time

45 minutes

Lab Procedures

In this activity, you will:

- Analyze results of the existing environment audit
- Run different “what-if” server consolidation scenarios
- Identify relevant requirements for VMware vSphere 5 deployment
- Create a Cisco UCS B-Series equipment list per requirements
- Use Cisco UCS Manager to review the Cisco UCS B-Series server system
- Review Cisco UCS Lab Topology & Connectivity sheet
- Validate LAN (VLAN) and SAN (VSAN) connections between the Chassis IOM, Fabric Interconnects and Northbound devices.

Required Resources

These are the resources and equipment that are required to complete this activity:

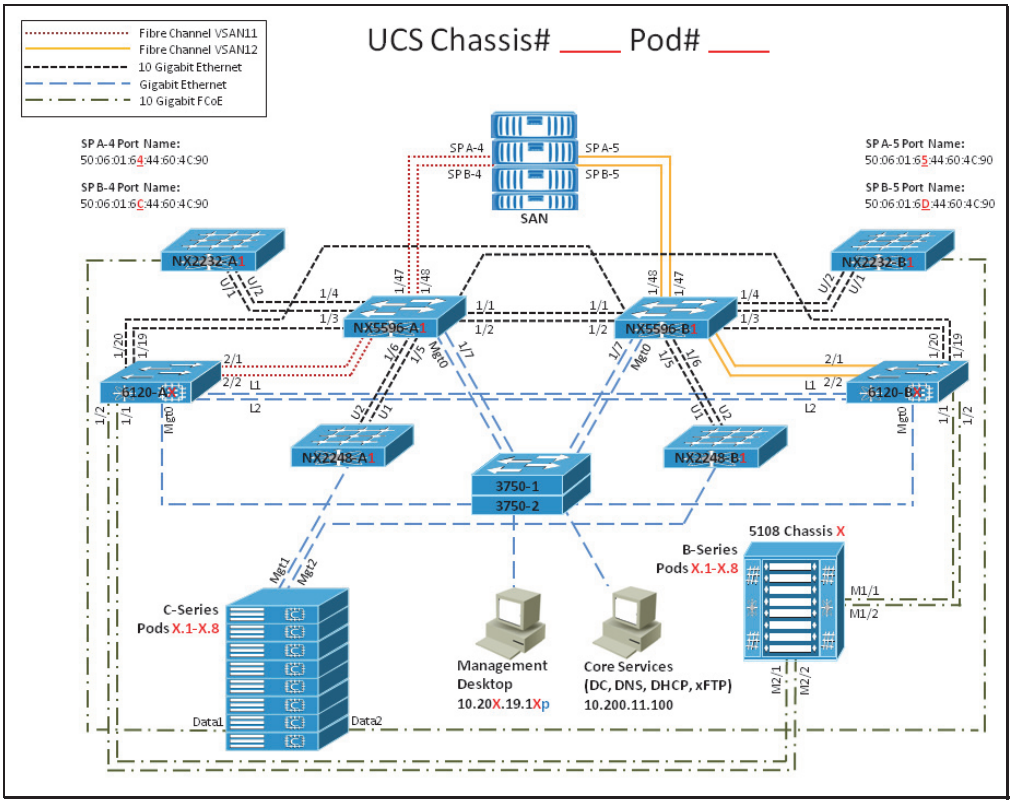
- Management Desktop
- Lab connectivity sheet

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Lab 3 Cisco UCS Lab Topology (identical to Lab 0)

The purpose of this document is to provide you with the details necessary to validate the physical and logical connectivity for LAN and SAN communication. Take some time to fully understand the traffic flow and how this document is organized, as it will be referenced often.

Note The below diagram is used for high-level reference only. If you would like to see the exact ports used for your assigned chassis flip forward in your lab guide to Appendix A. Here you will find several Topology Diagrams; one specific to each assigned chassis. Use the specific diagram for your assigned chassis.



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Lab 3 Cisco UCS Connectivity Sheet (tear out a copy, optional)

VLANs where **X** = Chassis

VLAN Name	VLAN Number	Fabric Connectivity
Chassis VLANs	**X**10, **X**14, **X**16, **X**18	A/B
default	1	A/B

VSANs

VSAN Name	VLAN Number	Fabric Connectivity	FCoE VLAN
VSAN11	11	A	1011
VSAN12	12	B	1012
Default	1	B	NA

Note The Cisco Nexus 5596 devices are configured with a vPC to the fabric interconnects. Therefore, some elements of the port channel may appear to be misconfigured.

Device Authentication where **X** = Chassis

Device	IP Address	Username	Password
Fabric Cluster IP	10.20**X**.10.1	admin	NXos12345
Fabric Interconnect A	10.20**X**.10.2	admin	NXos12345
Fabric Interconnect B	10.20**X**.10.3	admin	NXos12345
Nexus 5596 A	10.200.10.1	student	NXos12345
Nexus 5596 B	10.200.10.2	student	NXos12345

Note In our labs there is a common pair of Nexus 5596 switches serving as the **Datacenter Core**. The ports **connecting to** each 5108 chassis and stack of 8 C200-M2 servers are the same. However the ports used at the common Core will change. If interested, ask your instructor for the specific ports to which your Fabric Interconnects connect. Or you can reference Appendix A of your lab guide for a list of the physical connections used by all chassis.

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Lab 3 Cisco UCS Connectivity Sheet

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Fabric Interconnect A	10.20**X**.10.2	admin	NXos12345
Fabric Interconnect B	10.20**X**.10.3	admin	NXos12345
Nexus 5596 A	10.200.10.1	student	NXos12345
Nexus 5596 B	10.200.10.2	student	NXos12345

Note In our labs there is a common pair of Nexus 5596 switches serving as our **Datacenter Core**. The ports **connecting to** each 5108 chassis and stack of 8 C200-M2 servers are the same. However the ports used at our common Core will change. If interested, ask your instructor for the specific ports to which your Fabric Interconnets connect.

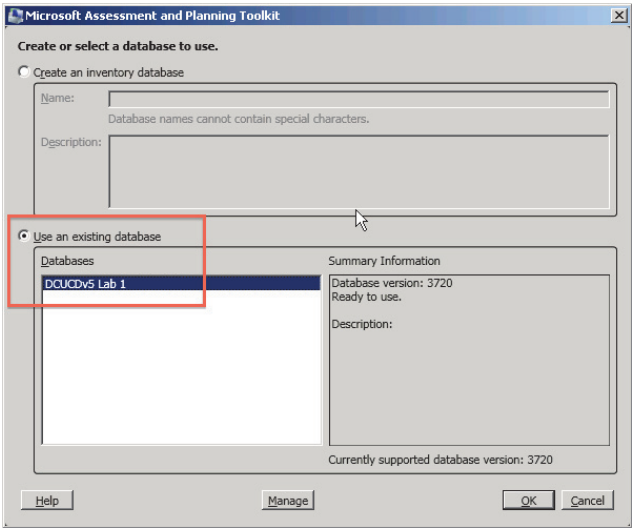
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Task 1: Analyze Audit Results

In this task, you will review and analyze the results of the audit for the existing customer environment (imported .bak file). You will use the MAP Toolkit to generate a performance and inventory report and calculate the information required for the sizing process.

Note Even though the project is about VMware vSphere virtualization, the MAP Toolkit does not support the VMware vSphere, thus Hyper-V will be used as a virtualization platform when running the "what-if" server consolidation scenarios.

1. If needed, open the MAP Toolkit again by navigating to **Start > All Programs > Class Utilities > Microsoft Assessment and Planning Toolkit** and click on **Microsoft Assessment and Planning Toolkit**.
2. In the "Create or select a database to use. " screen, click the **Use an existing database** radio button and select the previously imported "DCUCDv5 Lab 1" database.



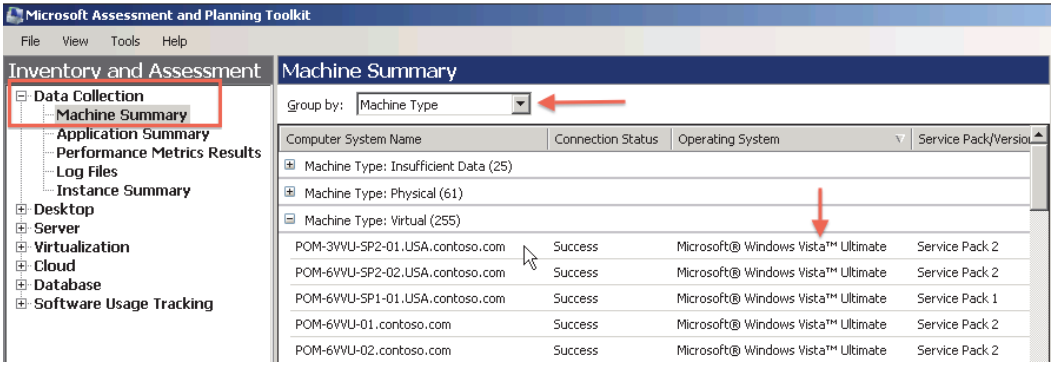
3. Complete the process by clicking **OK**.

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4. Review the **Data Collection** main screen to confirm that the status for Steps 1 and 2 (at a minimum) shows "Complete."



5. Before you proceed, review the inventory information at **Data Collection > Machine Summary**. Be sure to collapse each section (as performed in Lab 1, Task 2) to make counting the totals for each section easier.



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6. Use the following table to take notes about the environment that was analyzed (that is, the inventory summary results).

Inventory Summary Results

Computer	Quantity
Insufficient data	
Physical	
Virtual	
TOTAL	

7. Review the **Performance Metrics Results** in the **Data Collection > Performance Metrics Results** section. You can see that the CPU utilization ratios are low on average.

Note Using the "Generate Report" option, outlined in Lab 1, Task 2 you can export this information from the MAP Toolkit into an Excel spreadsheet, which enables you to perform various calculations (including total, average, maximum CPU, memory, IOPS utilization, and so on).

8. To analyze the performance data, generate the report with the MAP Toolkit by selecting the **Generate report** option under the **Actions** pane to the far right.
9. This will generate the Excel spreadsheet with performance and inventory data that can be further manipulated (summarized, averaged, and so on). Click **Close** to close the Status dialog box.
10. To open the report, select the **View > Saved Reports and Proposals** option in the menu. Select the **PerfMetricResults-#date&time#** Excel spreadsheet to open the report.

Note If you are not able to open the generated report be sure the Excel Viewer was installed in last steps of Lab 1, Task 2.

11. The generated report (Excel spreadsheet) has multiple tabs across the bottom, each with different information. Browse thru the tabs to review the information.
    - Summary
    - How It Works
    - Placement Metrics Summary
    - Processor Utilization

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- Memory Utilization
- Network Utilization
- Physical Disk Utilization
- Logical Disk Utilization
- Collection Statistics

12. Navigate to the **Placement Metrics Summary** tab to review the existing environment resource utilization levels.

    Q1) How many computers were identified as candidates to be virtualized on Hyper-V?

    Tip) Count the number of Machine Names.

    A1) _____

    Q2) Calculate and write down the resource requirements information about the virtualization candidates. This information will be used in the sizing process.

Resource Requirements

Parameter	Value
Highest average CPU utilization	
Highest maximum CPU utilization	
Highest 95th percentile CPU utilization	
Total average memory utilization (hint: summarize average memory utilization for all computers)	
Total maximum memory utilization (hint: summarize maximum memory utilization for all computers)	
Total 95th percentile memory utilization (hint: summarize 95th percentile memory utilization for all computers)	
Total average network utilization (hint: summarize average network utilization for all computers)	
Total maximum network utilization (hint: summarize maximum network utilization for all computers)	
Total 95th percentile network utilization (hint: summarize 95th percentile network utilization for all computers)	

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Task 2: Select UCS B-Series Server

In this task, you will use the MAP Toolkit to run server consolidation "what-if" scenarios using the existing computing solution inventory and collected performance metrics from the pre-populated database.

You have performed the inventory audit and have gathered the historical performance characteristics of the existing environment. Now you have to define the high level UCS B-Series server sizing design.

First, select three different base UCS B-Series server configurations, per resource requirements identified in the previous task, to build the MAP Toolkit hardware library.

Next, run the Server Consolidation Wizard to calculate the number of required VMware vSphere hosts.

Compare the results of server consolidation scenarios and pick one for further sizing process.

Note The MAP Toolkit 6.5 version does not yet support all the latest Intel Xeon processors such as E5-2400, E5-2600, and E5-4600, and thus the latest M3 generation of Cisco UCS B-Series and C-Series servers. Therefore, in the "what-if" server consolidation scenarios, use the characteristics of an M2 generation of Cisco UCS servers.

In this task you will perform the following steps:

- Discuss and create three UCS B-Series server configurations within a group.
- Run the Server Consolidation Wizard for each configuration and write down the results, using the tables provided below.
  - First, create the hardware library for each identified UCS B-Series configuration, using **Data Collection > Create a Hardware Configuration**.
  - Next, run the Server Consolidation Wizard for each entry in the hardware library, using the **Run Server Consolidation Wizard** option in the right pane.
  - Review the Server Consolidation Results under the **Virtualization** option in the left pane.
- (Optional) When all groups finish their server consolidation scenarios, pick one option and present the selected option to the rest of the class for further discussion.

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Consolidation Requirements

The resource requirements were calculated in the previous task. Refer to the **last table** that you populated in the previous task.

When performing the "what-if" server consolidation scenarios, use the following information:

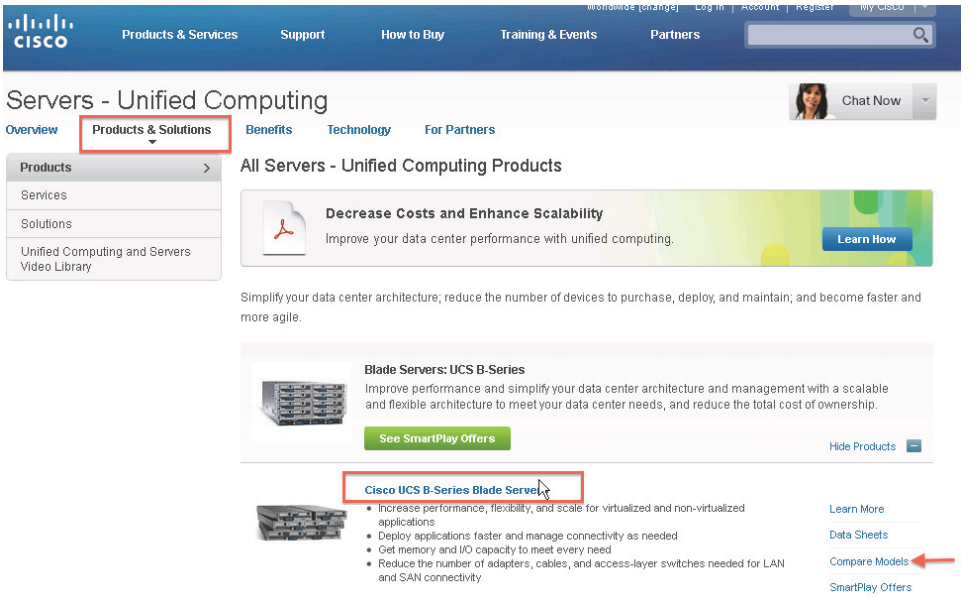
- Use Microsoft Windows 2008 R2 SP1 Hyper-V virtualization platform, because VMware vSphere is not available in the MAP Toolkit.
- Leave the Create an infrastructure (Optional) option unchecked.
- Set the Storage option at the default: Don't consider IOPS and total available storage in assessment value.
- For the Total Network Throughput (Mb/s) per host, you can assume that 20 Gb/s is enough.
- 15 percent of resources should be reserved to accommodate possible utilization spikes (that is, a maximum of 85 percent of CPU, memory, storage capacity, storage IOPS, and network throughput resources should be used for placing virtual machines on Hyper-V hosts).
- Select all of the existing computers to be virtualized and placed on Hyper-V hosts.

Note	Pay attention when entering CPU information and adjust its core and hyperthreading information per CPU specifications.

13. Using your in-class computer (personal laptop or GK provided system) open a browser and navigate to **www.cisco.com/go/ucs**.

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14. (At time of development) click on **Products & Solutions > Show Products** to the right of "Blade Servers: UCS B-Series" and finally **Compare Models**. Image below.

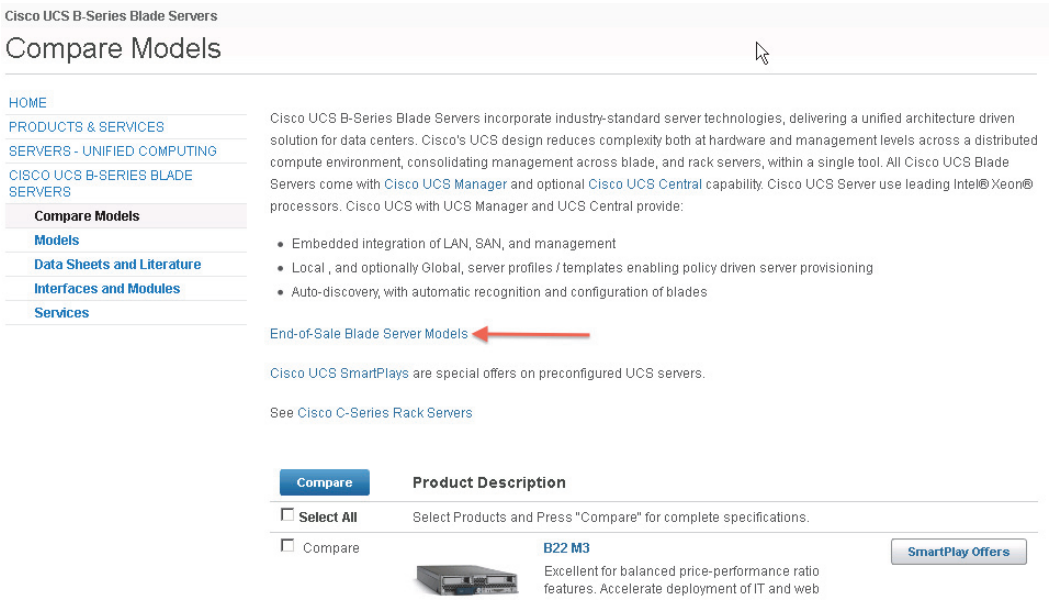


15. Use the "Product Description" to review each model.

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16. Place a check to the left of the models you want to **Compare**. Once you've selected a minimum of 2 models click **Compare** at the top of the page. Image below.

Note	Once again, MAP Toolkit version 6.5 does not yet support all the latest Intel Xeon processors such as E5-2400, E5-2600, and E5-4600, and thus the latest UCS M3 generation. Therefore, in the "what-if" server consolidation scenarios **use the characteristics of an M2 generation** of Cisco UCS servers, this will likely mean you must click on "End-of-Sale Rack Server Models" when comparing some of your 3 options.



Keep in mind that a 2nd or 3rd scenario does not mean you must select a different B-Series model. You may adjust a previously selected B-Series RAM, CPU or other values as needed. Use the following tables to write down the results for each of the server consolidation scenarios (that is, UCS B-Series options).

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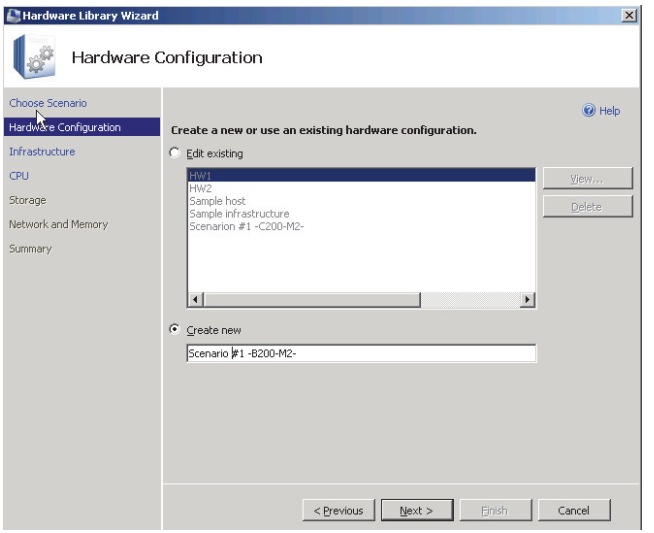
Scenario #1, #2 & #3

UCS B-Series Base Configuration: Pick 2 additional B-Series servers from the step above.

Parameter	Scenario #1 (ex. B200-M2)	Scenario #2	Scenario #3
Server type	B200-M2		
CPU type	Intel Xeon X5650, 6 cores with HT		
CPU quantity	2		
Memory size	64		
Total network throughput (summary of server NICs)	2x 10GE		

Use the following steps to create a "Hardware Library" from each of the above B-Series Base Configuration.

17. Navigate to **Tools > Configure Hardware Library**.
18. Accept the default **General Server Consolidation** option and click **Next**.
19. On the “Hardware Configuration” option click **Create new** and enter a name of “Scenario #1 -Your Model #-.” Ex. **Scenario #1 -B200-M2- and click Next to continue**.

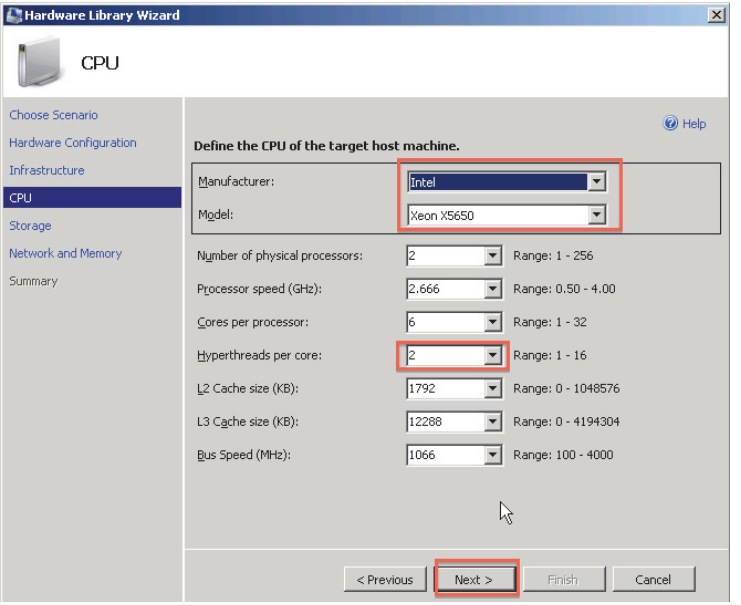


20. Click **Next** to accept the default “Infrastructure” options.

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21. Set your “CPU” values to those documented for your scenario above and click **Next**. Ex. Intel Xeon X5650. Image below.

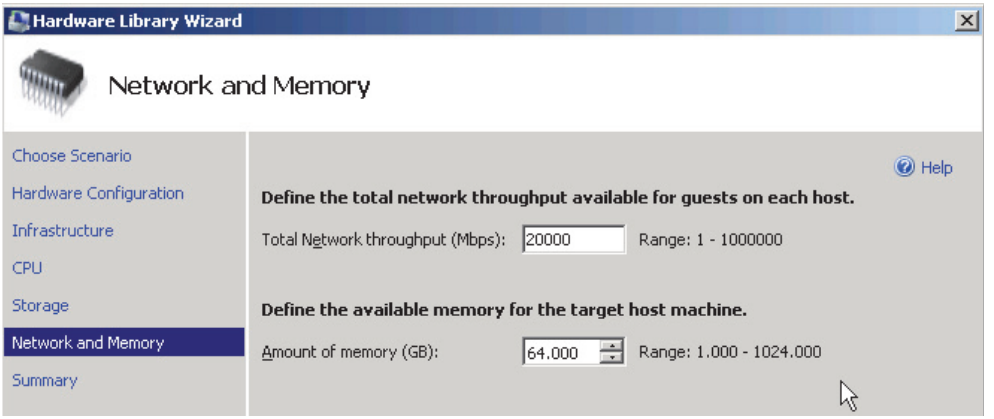
Note If the CPU has Hyperthreading enabled the “Hyperthreads per core:” value should be set at 2. Image below.



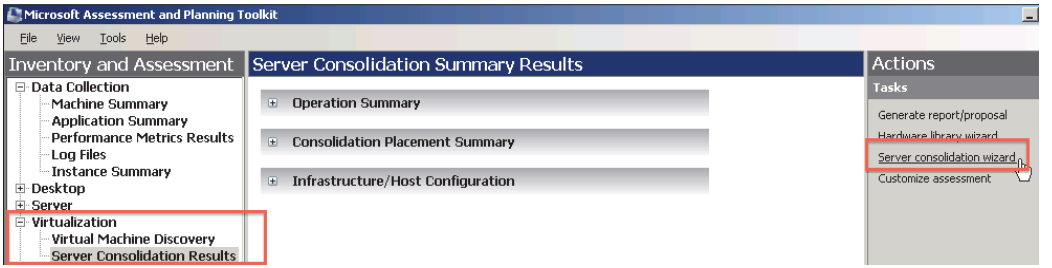
22. Click **Next** to accept the default “Storage” options.

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23. Use the table above to set the total determine the **Total Network Throughput (Mbps):** and **Amount of memory (GB):** and click **Next**.



24. Take your time to review the configured options as reviewed on the "Summary" page. If any values were not set properly click "Previous" and make the needed correction. Once you've confirmed the setting are correct, click **Finish** to complete the wizard.
25. Now that the "Hardware Library" has been created for your first scenario we will use these definitions while calculating our "Server Consolidation" needs.
26. To run each Server Consolidation Wizard, navigate to **Virtualization > Server Consolidation Results** and click **Server Consolidation Wizard**.



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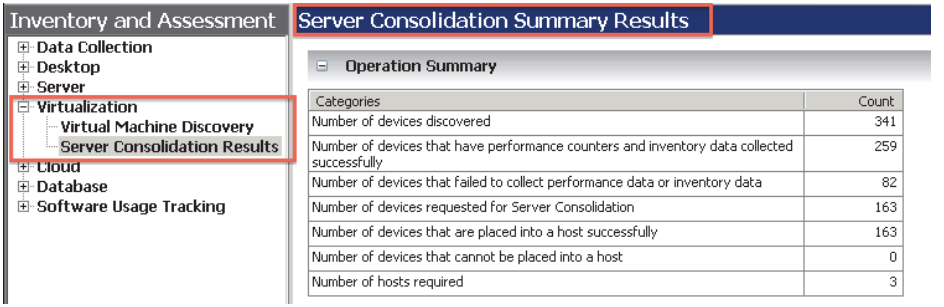
Requirements for the Server Consolidation Wizard

The resource requirements were calculated in the previous task and defined in your "Hardware Library". If needed, you can refer back to the **last table** populated in the task 1.

To perform each "what-if" server consolidation scenarios, we will run the "Server Consolidation Wizard" 3 times, each time using the "Hardware Library" defined for each scenario as well as the following information. Be sure to click **Next** after each category and **Finish** to finalize each run through of the wizard.

- "Virtualization Technology" = **Microsoft Windows 2008 R2 SP1 Hyper-V**
- "Hardware Configuration" = **Scenario #1 -B200-M2-**
- "Utilization Settings" = **85** percent for all values
- "Choose Computer"" = **Default** "Choose the computer from a list..."
- "Computer List" = **Select all** (place a check to the left of "Computer Name")
- "Summary" = **Confirm all values** are correct and click **Finish**.

27. Once the Server Consolidation Wizard completes (Assessment: Completed) click **Close**.
28. Use the "Server Consolidation Summary Results" presented to fill in the table below.



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Server Consolidation Wizard Results

Parameter	Scenario #1 (ex. B200-M2)	Scenario #2	Scenario #3
Total number of hosts	2		
Total number of VMs (hint: number of devices that are successfully placed into a host)	163		
Total amount of memory required	149.71 GB		
Total network utilization	10.08 Mb/s		
Peak host CPU utilization	82.62%		
Cluster CPU utilization	64.09%		
Peak host memory utilization	84.38%		
Cluster memory utilization	77.97%		
Peak host network utilization	3.84 Mb/s		
Peak number of VMs per host	78		
Preferred choice (**Yes** or **No**)	**No**		

29. Repeat steps 21 - 31 to create a “Hardware Library” and run the “Server Consolidation Wizard” for each of your remaining scenarios.
30. Use the results of each wizard to fill in the values for scenario #2 & #3 in the table above.

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Task 3: Size Selected UCS B-Series Server

In this **written** task, you will size the UCS B-Series server that you selected as the **preferred choice** in the previous task. Ex. Scenario #3.

This task includes the following activities:

- Review the customer requirements gathered in the design workshop
- Size the selected Cisco UCS server and define its hardware properties
- Select the appropriate quantities of the individual server components
- Select the appropriate quantity of the servers for the solution
- Design the LAN and SAN connectivity for the servers
- Determine the number of the required LAN and SAN uplinks

In this task you will perform the following steps:

- Discuss and create the selected UCS B-Series hardware configuration within a group.
- (Optional) When all groups finish their sizing, present the UCS B-Series configuration to the rest of the class for further discussion.

Sizing Requirements

You have conducted several technical meetings to collect the necessary input data, and you have used the analysis tool to collect the performance metrics. These metrics will be the basis for sizing the solution.

- The customer will be running VMware vSphere as the virtualization platform.
- The vSphere ESXi will be installed on the local disks in the servers and the VMs will be stored on the Fibre Channel attached storage drive array using the VMFS datastores. The local disks will be also used as the local datastore to store the ISO images for various operating systems and applications.
- The solution has to be operational even if 25 percent of total resources are lost due to some failure (that is, 25% of total resources must be reserved as cluster high availability resources).
- The solution should be sized with 25 percent of extra resources for growth that is expected in the next two years.
- The SAN environment consists of two fabrics:
  - SAN fabric A
  - SAN fabric B

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- The Fibre Channel attached drive array will be attached to both SAN fabrics to provide redundant paths to the LUNs. The required SAN throughput from all servers is 40 Gb/s of total Fibre Channel traffic per individual fabric.
- The individual ESXi host should meet the following requirements:
  - Available redundant connectivity for each LAN segment
  - There should be a connection to the following LAN segments:
    - Management segment: Should have dedicated NIC with redundancy
    - VMotion segment: Should have dedicated NIC with redundancy
    - FT segment: Should have dedicated NICs
    - VM Data 1, VM Data2 segments: Can share NICs via path A and path B
    - VM Data 3 segment: Should have dedicated NICs via path A and path B
  - Redundant connectivity to the SAN fabrics for the ESXi host needing redundant paths to the LUNs on the drive array
  - Three ESXi hosts need the 10 Gb/s of throughput for the combined LAN and SAN traffic up to the access layer
  - Local disks should be configured so that a failure of a single disk does not present an ESXi host failure
- The physical server (not the hypervisor) should be managed with a separate "out-of-band" Ethernet connection. Redundancy for the management access is also required.
- The customer has specifically noted that blade-server deployment is preferred. The customer has noted that the selected solution should be scalable in the future (that is, adding additional servers should not cause a major upgrade of the access LAN and SAN layer) and should require minimal management efforts.
- The upstream core LAN and SAN equipment has not yet been determined and does not influence the selection of the servers and access layer devices. The customer noted that the core LAN and SAN equipment will be selected based on the server connectivity requirements.
- For the core SAN equipment, the customer prefers using 8-Gb/s Fibre Channel interfaces because they allow more growth in the future.
- You have to select the access layer LAN and SAN devices to connect the selected quantity of ESXi hosts. The LAN and SAN uplinks have to be redundant.

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- The customer also expressed the following requirements for the connectivity:
  - The ESXi management traffic should follow a dedicated uplink when going up to the core network.
  - The VMotion traffic should use a dedicated uplink to the core network.
  - The FT traffic should use a dedicated uplink to the core network.
  - The ESXi VM Data segments 1, 2, and 3 can share the uplinks to the core network, but there have to be at least eight uplinks used.
  - Each of the uplinks has to have a redundant path available.
  - The SAN access-to-core layer connectivity should be capable of sustaining 40 Gb/s of Fibre Channel traffic.

Task Aids

Use the following tables to write down the result of the server sizing process.

Design Workshop Requirements

Parameter	Value/Description
Platform	
High-availability resources	
Future growth	
Storage	
Network segments—no redundancy	
Network segments—redundancy required	
Server form factor	

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UCS B-Series Server Configuration

Component	Selection
Server type	
Processor	
Processor quantity	
DIMM size	
DIMM quantity	
RAID controller	
Network adapter	
Network adapter quantity	
Fibre Channel adapter	
Fibre Channel adapter quantity	
Local disk type	
Local disk quantity	
Power supply	
LAN physical cabling per server	
SAN physical cabling per server	

Solution Total

Server Categories	Quantity
Servers that are required for VM deployment	
Servers that are required for future growth	
Servers that are required because of redundancy requirements	
Total number of servers that are required	

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Components of final B-Series Design

Component	Selection
LAN access layer switch	Ex. 5596UP
LAN access layer switch quantity	
SAN access layer switch	
SAN access layer switch quantity	
Type of server downlinks	
Server downlink cabling	
Server downlink quantity per switch	
Blade chassis quantity	
Blade chassis uplinks quantity	
IOM	
LAN core uplinks type	
LAN core uplinks quantity per switch	
SAN core uplinks type	
SAN core uplinks quantity per switch	
Licensing requirements	

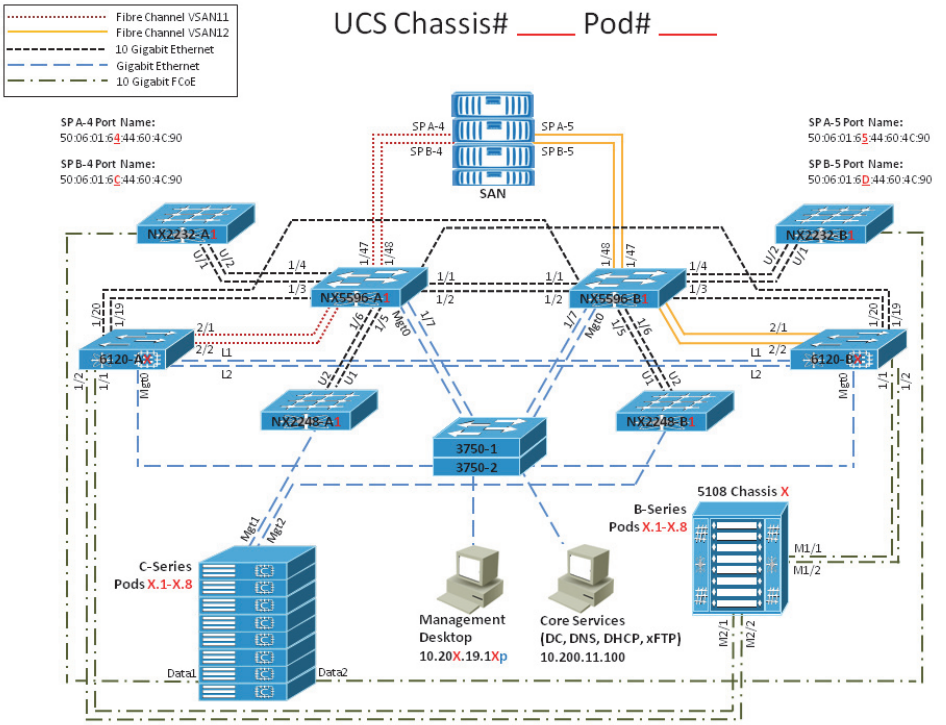
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Task 4: Validate VLAN Assignments

In this task, you will validate that all VLANs specified in the configuration sheet are present and configured for both fabrics.

Note Remember, the **Lab Topology** page and the **UCS Connectivity Sheet** from Lab 0 can be removed to avoid flipping back-and-forth in the Lab Guide.



31. Using the Quick Launch toolbar on your Management Desktop, open a browser of your choice. Notice how this icon simply opens to a blank page.



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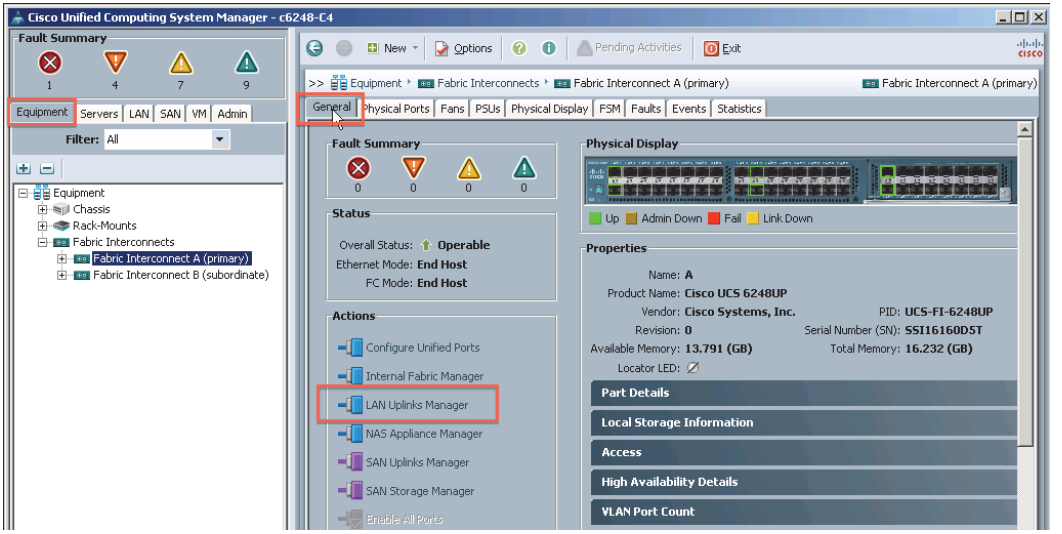
32. Enter in the proper Cluster IP Address, assigned to your pod, in the Browser's address bar. The address format would be 10.20**X**.10.1. For example, if you were assigned a Blade/Pod in Chassis **1** your Cluster IP Address would be http://10.20**1**.10.1.
33. If prompted, with a certificate warning, accept the warning to continue. Ex. Using IE you would click **Continue to this website (not recommended)**.
34. Click the **Launch UCS Manager** option.



35. If prompted, click **Yes** to accept any Java applet security warnings and **Run** to any Application digital certificate warnings.
36. When prompted, login with the username: **admin** and password: **NXos12345**.

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37. On the **Equipment** tab of the Navigation pane (far left pane), expand the **Fabric Interconnects** level and click on either one of the Fabric Interconnects. That is **Fabric Interconnect A** or **Fabric Interconnect B**.

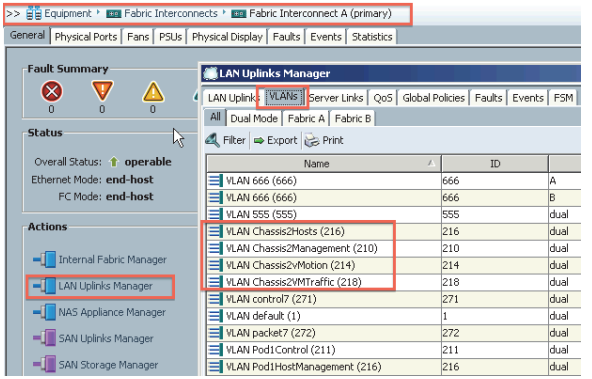


38. In the content pane (right pane), click the **General** tab and then click the **LAN Uplinks Manager** link. Image above.

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39. In LAN Uplinks Manager window, click the **VLANs** tab. Validate that at least the **Chassis#Management**, **Chassis#vMotion, Chassis#Hosts** and **Chassis#VMTraffic** VLANs (4 total) are present. The following graphic is a sample of these VLANs.

Note	If you do not have at least the above listed VLANs pre-configured as part of your Fabric please notify your instructor to create them once for the entire chassis.



40. Click the **Dual Mode** subtab below VLANs. This action displays the VLANs that were defined as common or global. This list should be identical to the **All** tab.

Note	The Fabric A and Fabric B tabs would be populated by fabric-only or fabric-specific VLANs. This Cisco UCS deployment includes only common or global VLANs.

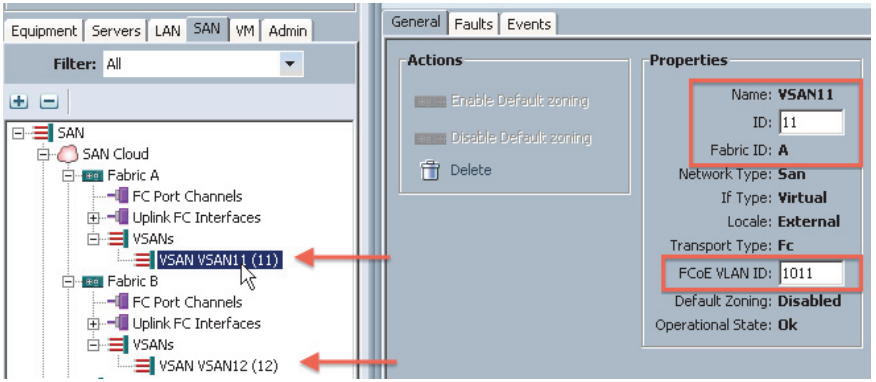
41. Click **OK** to close the LAN Uplinks Manager.

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Task 5: Validate VSAN Assignments

In this task, you will validate that all VSANs specified in the configuration sheet are present and configured for the correct fabric.

42. On the **SAN** tab of the navigation pane (far left), expand both Fabric A and Fabric B under the **SAN Cloud**. Then, expand the **VSAN** item beneath each fabric interconnect.



43. Choose **VSAN11** under Fabric Interconnect A. In the content pane (far right), validate the fabric association (**Fabric ID:A**)by using the **Configuration Sheet**. Repeat this step for **VSAN12** on Fabric Interconnect B (**Fabric ID:B**).

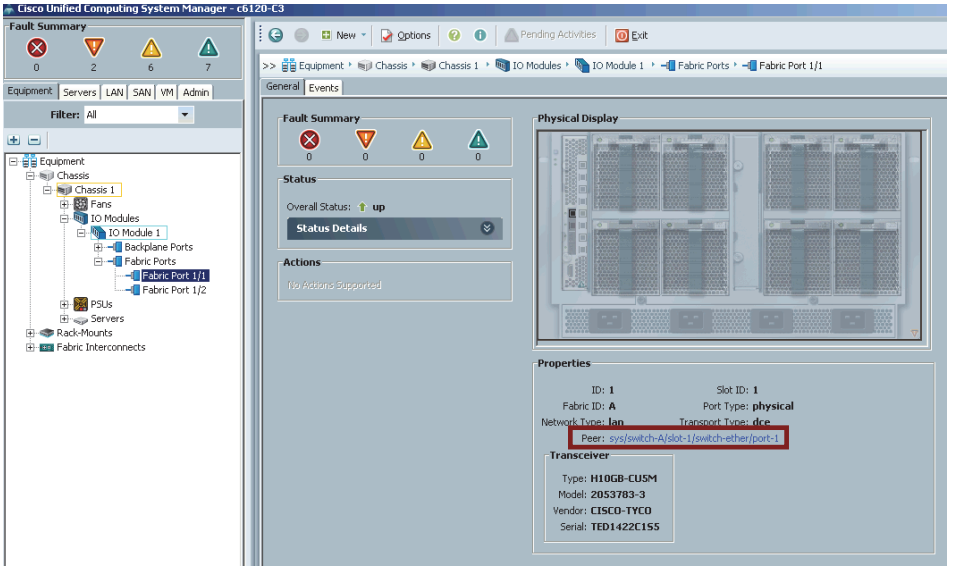
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Task 6: Validate Physical Connections from IOMs to Fabric Interconnects

In this task, you will verify that all physical connections between IOMs and Fabric Interconnects are correct.

44. From the **Equipment** tab, expand **Chassis > Chassis # > IO Modules > IO Module 1 > Fabric Ports**.

45. Choose **Fabric Port 1/1**. In the content pane (far right), notice the entry to the right of **Peer**. In this example, the display shows that IOM port 1/1 on Chassis # maps to Fabric Interconnect A port 1. Your UCS Manager should reflect the **Lab Topology** diagram.



46. Repeat this process for all IO Module ports.

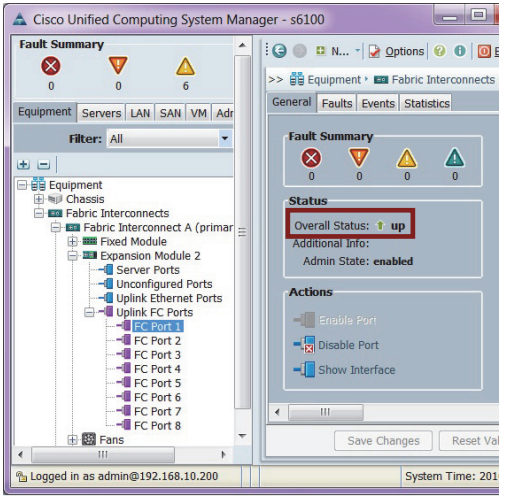
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Task 7: Validate Physical SAN Connectivity from the Fabric Interconnects to the Nexus 5596 Switches

In this task, you will validate physical SAN connectivity between the Fabric Interconnect Fibre Channel expansion module and the Nexus 5596 switch.

47. On the **Equipment** tab of the navigation pane (far left) expand **Fabric Interconnects > Fabric Interconnect A > Expansion Module 2 > Uplink FC Ports**.

48. Choose **FC Port 1**. Validate that the **Overall Status** indicates "up" in the content pane.



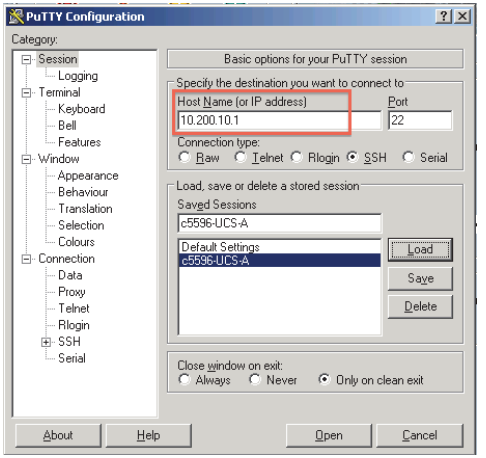
49. Next we will connect into one of the Core Nexus 5596 switches. Refer to the lab **implementation sheet** at the start of this lab (or the graphic below) for the IP address and login credentials.

50. On your Management Desktop, on the Quick Launch toolbar, click once on the PuTTY icon (image below). Double click on the saved session for "**C5596-UCS-A**." If prompted, click **Yes** to trust this host.

Device Authentication where **X** = Chassis

Device	IP Address	Username	Password
Fabric Cluster IP	10.20**X**.10.1	admin	NXos12345
Fabric Interconnect A	10.20**X**.10.2	admin	NXos12345
Fabric Interconnect B	10.20**X**.10.3	admin	NXos12345
Nexus 5596 A	10.200.10.1	student	NXos12345
Nexus 5596 B	10.200.10.2	student	NXos12345

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51. Once connected login with a username of **student** and password of **NXos12345**.
52. Use the **show interface brief** command. You should see a similar output.

Note Our environment currently has several UCS chassis connecting to a common Core of Nexus 5596 switches. This design was chosen to represent the real-world as much as possible in a learning environment. As a result the exact ports your assigned chassis uses may be different than the ports listed below.

```
c5596-UCS-A# show interface brief

--------------------------------------------------------------------------------
Interface  Vsan   Admin  Admin   Status          SFP    Oper  Oper   Port
                  Mode   Trunk                          Mode  Speed  Channel
                         Mode                                 (Gbps)
--------------------------------------------------------------------------------
fc1/27     11     F      on      up              swl    F       4    --
fc1/28     11     F      on      sfpAbsent       --     --           --
fc1/29     11     F      on      up              swl    F       4    --
fc1/30     11     F      on      up              swl    F       4    --
fc1/31     11     F      on      up              swl    F       4    --
fc1/32     11     F      on      up              swl    F       4    --
fc1/33     11     F      on      up              swl    F       4    --
fc1/34     11     F      on      up              swl    F       4    --
fc1/35     11     F      on      sfpAbsent       --     --           --
fc1/36     11     F      on      sfpAbsent       --     --           --
fc1/37     11     F      on      sfpAbsent       --     --           --
fc1/38     11     F      on      sfpAbsent       --     --           --
fc1/39     11     F      on      sfpAbsent       --     --           --
fc1/40     11     F      on      sfpAbsent       --     --           --
fc1/41     11     F      on      sfpAbsent       --     --           --
fc1/42     11     F      on      sfpAbsent       --     --           --
```

53. Repeat Task 7 on Fabric Interconnect B and the Nexus 5596 switch for Fabric B (C5596-UCS-B) until you are satisfied that the port mappings are correct.

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Note On the Nexus 5596 switch, enter the **show run interface fc1/47** (for example) command. Notice that there is no description for this port. Best practice is to use the optional Description field to indicate port mapping.

If you happen to be assigned a chassis # where these values do not match, be sure to ask your instructor “Why?”

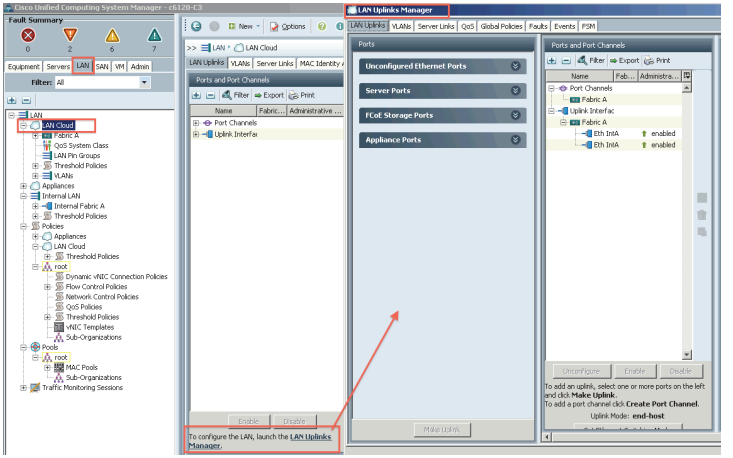
The simple answer is; different Fabrics/Chassis connect to different ports on the Core 5596 switches. You may have been assigned to a different Fabric/Chassis than the one used to create the examples in these labs.

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Task 8: Validate Physical LAN Connectivity from the Fabric Interconnects to the Nexus 5596 Switches

In this task, you will validate that all physical LAN connections between Fabric Interconnect A and the Cisco Nexus 5596 devices are correct.

54. Using Cisco UCS Manager, open the **LAN Uplinks Manager** by clicking on the **LAN** tab across the top navigation pane (far left), then click on **LAN Cloud** and finally on **LAN Uplink Manager** found across the bottom of the content pane.



55. On your **Management Desktop** open PuTTY once again to establish an SSH session to the Core C5596-UCS-A switch. To connect and login, use the credentials in the **Device Authentication** table above.

56. Use the **show cdp neighbor** command to display the mapping of Layer 2 neighbors.

```
c5596-UCS-A# show cdp neighbors
Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater,
                  V - VoIP-Phone, D - Remotely-Managed-Device,
                  s - Supports-STP-Dispute, M - Two-port Mac Relay

Device ID              Local Intrfce   Hldtme  Capability  Platform      Port ID

c5596-UCS-B(FOX1620G71 Eth1/1          170     S I s       N5K-C5596UP   Eth1/1
c5596-UCS-B(FOX1620G71 Eth1/2          120     S I s       N5K-C5596UP   Eth1/2
Core3750-L3Sw-Env2     mgmt0           177     R S I       WS-C3750G-24P Gig1/0/23
Core3750-L3Sw-Env2     Eth1/7          177     R S I       WS-C3750G-24P Gig1/0/25
c6120-C1-A(SSI15140ADB Eth1/9          142     S I s       N10-S6100     Eth1/19
c6120-C1-B(SSI15140ADB Eth1/10         142     S I s       N10-S6100     Eth1/19
c6100-C2-A(SSI15120HBN Eth1/11         175     S I s       N10-S6100     Eth1/19
c6100-C2-B(SSI15120HBN Eth1/12         175     S I s       N10-S6100     Eth1/19
c6100-C3-A(SSI14220D4R Eth1/13         164     S I s       N10-S6100     Eth1/19
c6100-C3-B(SSI14220D4R Eth1/14         164     S I s       N10-S6100     Eth1/19
```


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57. Although the Fabric Interconnects view the topology as a single port channel to each Cisco Nexus 5596 device, a vPC is configured on both northbound switches. Both Cisco Nexus 5596 devices have two interfaces (based on your pod) that are connected to each Fabric Interconnect.
58. Verify that this output is consistent with the port mapping in the lab **topology diagram**. Leave your SSH session open.

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Task 9: Validate that the Northbound L3 Switch Is Trunking All Required VLANs

In this task, you will validate that the Cisco Nexus 55596 switches are trunking the correct VLANs for Cisco Unified Computing System.

59. From the SSH session to the Cisco Nexus 5596 above (C5596-UCS-A), you can see that interfaces **Eth1/9** and **Eth1/10** are connected to Chassis 1.

Note	The interfaces mentioned above are specific to the chassis used in development. You may be assigned to a different chassis (ex. Chassis 1, 2, 3 etc). Use the complete Topology Diagrams found in Appendix A as a reference for the exact interfaces used by your assigned chassis.

60. Use the **show interface trunk module 1** command to view the allowed VLANs.

```
c5596-UCS-A# show interface trunk module 1
--------------------------------------------------------------------------------
Port          Native  Status        Port
              Vlan                  Channel
--------------------------------------------------------------------------------
Eth1/1        1       trnk-bndl      Po20
Eth1/2        1       trnk-bndl      Po20
Eth1/7        1       trunking       --
        Output omitted
Eth1/9        1       trnk-bndl      Po11
Eth1/10       1       trnk-bndl      Po12
        Output omitted
--------------------------------------------------------------------------------
Port          Vlans Allowed on Trunk
--------------------------------------------------------------------------------
Eth1/1        1-3967,4048-4093
Eth1/2        1-3967,4048-4093
Eth1/7        1-3967,4048-4093
Eth1/9        1-3967,4048-4093
Eth1/10       1-3967,4048-4093
```

61. In the output, match the VLAN range against the **UCS Connectivity Sheet**.

62. Repeat Task 9 for Nexus C5596-UCS-B.

Note	Although best practice is to limit the allowed VLAN list to the exact VLANs that are in use on the southbound switch, configuring additional VLANs for future use is common.

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Activity Verification

You have completed this activity once you have validated these configurations:

- Review the Cisco UCS B-Series solution requirements
- Size the Cisco UCS B-series solution
- The following values match the UCS Connectivity Sheet
  - All VLAN assignments
  - All VSAN assignments
  - All IOM connections
  - All physical SAN ports from the fabric interconnects to the FC module on the N5k
  - All physical LAN ports from the fabric interconnects to the northbound switch

Lab Complete

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L4

Plan the Physical Deployment

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Lab Overview

In this activity, you will use the results of the analysis and sizing phase to prepare the physical deployment plan for the small and large Cisco UCS solutions.

Estimated Completion Time

1:15 minutes

Lab Procedures

In this activity, you will:

- Use the Cisco UCS Power Calculator tool to calculate power, cooling, and weight requirements for the given Cisco UCS C- and B-Series solutions
- Propose a physical deployment plan for a given UCS C-Series and UCS B-Series solution

Required Resources

These are the resources and equipment that are required to complete this activity:

- In class, Student Computer (either your personal laptop or a computer assigned by GK)
- Internet access
- Lab results from Lab 2 & Lab 3

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Task 1: Identifying the Requirements for the Small and Large Cisco UCS Solutions

In this task, you will review the customer requirements, the results of sizing the Cisco UCS C-Series solution from Lab 2, and the results of sizing the Cisco UCS B-Series solution from Lab 3.

1. Review the results of the sizing process for the **Cisco UCS C-Series solution** that you have made in **Lab 2**. Write down the following information, which will be required for calculating the physical requirements for the solution.

C-Series Server Characteristics

Component	Selection
Server type	
Processor	
Processor quantity	
DIMM size	
DIMM quantity	
RAID controller	
Network adapter	
Network adapter quantity	
Fibre Channel adapter	
Fibre Channel adapter quantity	
Local disk type	
Local disk quantity	
Power supply	
LAN physical cabling per server	
SAN physical cabling per server	
Server quantity	

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2. Review the results of the sizing process for the **Cisco UCS B-Series solution** that you have made in **Lab 3**. Write down the following information, which will be required for calculating the physical requirements for the solution.

   Notice how there are more components (Blades, Chassis, FEX, FI, Uplinks, Core) to consider in this "Unified Fabric" approach to Datacenter networking.

B-Series Server Blade Characteristics

Component	Selection
Server type	
Processor	
Processor quantity	
DIMM size	
DIMM quantity	
Network adapter	
Network adapter quantity	
Local disk quantity	
Local disk configuration	
Server quantity	

Chassis Characteristics

Component	Selection
Blade chassis quantity (in the case of a blade-server solution)	
Blade chassis uplinks quantity	
IOM quantity	
Power redundancy per chassis	

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Fabric Interconnect Characteristics

Component	Selection
Switch type	
Switch quantity	
Type of server downlinks	
Server downlink cabling	
Server downlink quantity	
Expansion module	
LAN core uplinks type	
LAN core uplinks quantity per switch	
SAN core uplinks type	
SAN core uplinks quantity per switch	
Licensing requirements	
Power redundancy per Fabric Interconnect	

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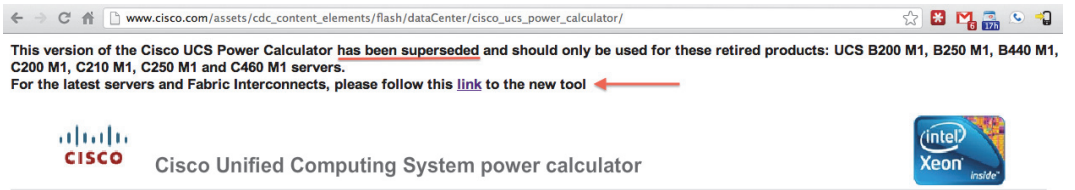
Task 2: Calculating the Physical Requirements for the Cisco UCS C-Series Solution

In this task, you will calculate the power, cooling, and weight requirements for the **Cisco UCS C-Series solution**. You will use the Cisco UCS Power Calculator tool to accomplish this goal.

3. From your in-class computer (ex. Personal laptop or GK Classroom computer), open a web browser and search for the phrase "**Cisco UCS Power Calculator**."

Note	Instead of displaying a link here in your lab guide that may have already expired it is better to familiarize yourself with the process of searching for the most recent version of this tool.

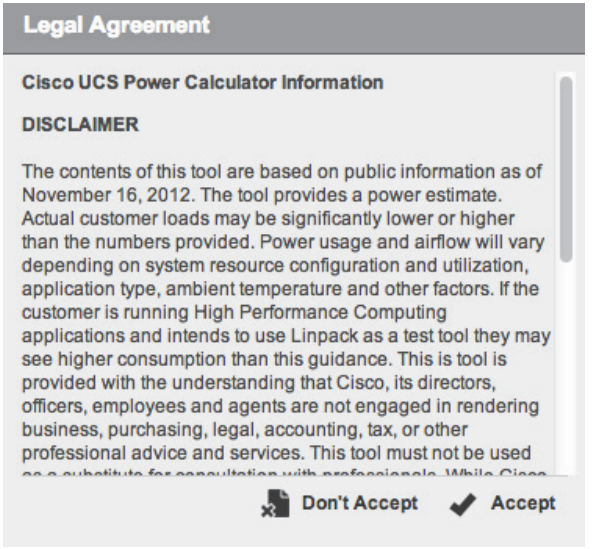
4. Depending on the search results selected you may get a tool that is **to be used only for older versions** of UCS components.



If that is the case be sure to click on the link that takes you to the new tool.

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5. Click **Accept** to agree to the Legal Agreement.



6. Review the tool options. On the **Assumptions** tab, set the "Analysis Parameters" to the following values and click **Continue**:
   - Imperial or Metric: **Metric**
   - System Load Factor: **50%**
   - Leave other values on default.

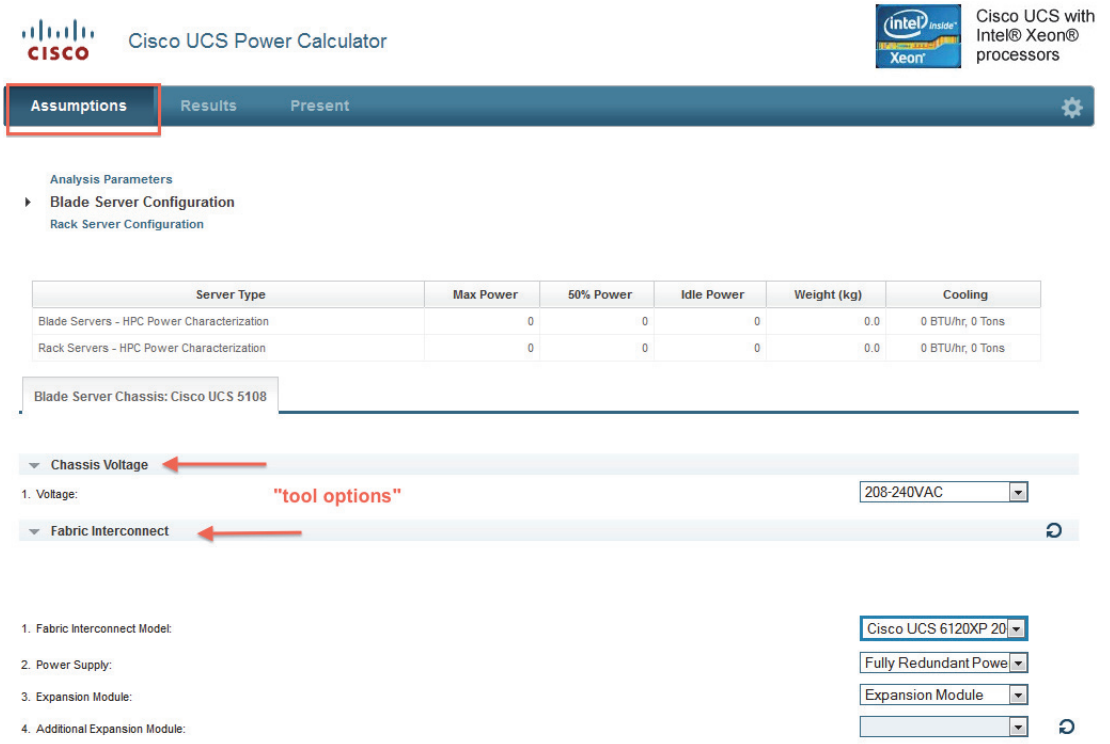
Note	In the **Assumptions** tab, you can view the results of the calculation for C-Series or B-Series solutions. In your case, the information has not yet been entered, so the values are set to 0. You can also review the **Results** tab, where you will also see that the values are set to 0.

Q1) Which parameters and values can the tool calculate for a given Cisco UCS solution?

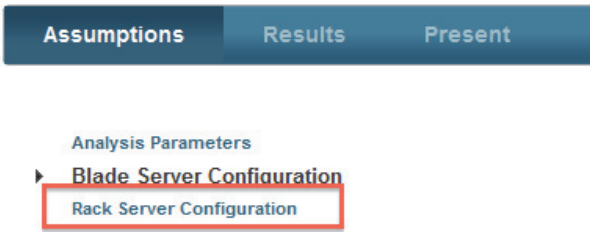
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7. Review the tool options (listed below) for the Blade Server Configuration. In the upper part of the tool, you can see the fields where you can enter values for **Chassis Voltage**, **Fabric Interconnect** and **Chassis Configuration**.

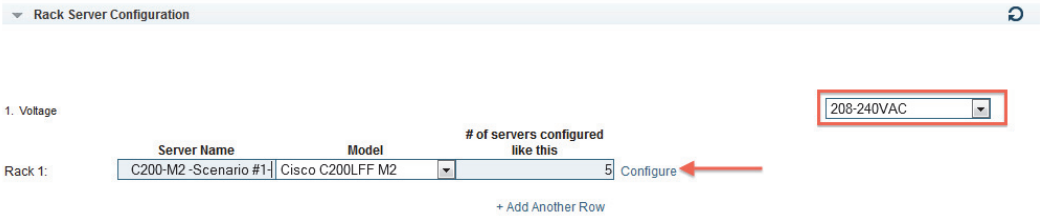


8. To enter in the information about the Cisco UCS C-Series solution, click **Assumptions** > **Rack Server Configuration**.



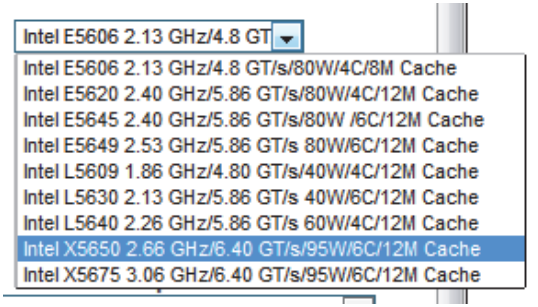
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9. In Rack Server Configuration, select the C-Series server type from step 1:
   - Enter a name of your choosing, ex. **C200-M2 -Scenario #1-**
   - Set Voltage to **208 - 240**
   - Set Server model to **Cisco C200SFF M2**
   - Set number of servers configured to **5**
10. Click **Configure** in the **Rack 1** row to enter the specifics about the selected server.



Because almost all default values are set to 0, enter the information **per the solution** that you have sized. Ex. Scenario #3.

11. Select the correct processor type.

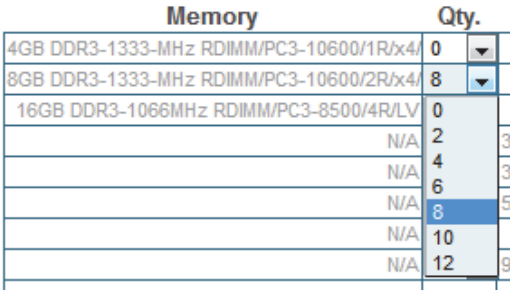


12. Next, set the processor parameters:
   - Number of Processors: **2**
   - Power Supplies: **2**
   - Raid: **None**

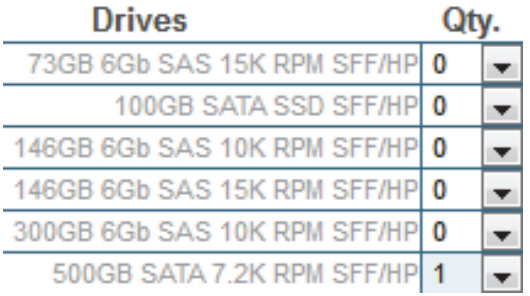
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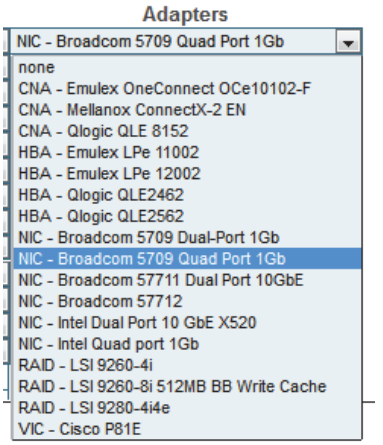
13. In the **Memory** column, select the memory DIMMS and quantity from the image below.



14. In the **Drives** column, enter the information about the local disk drives from the image below.



15. Finally, in the **Adapters** column select the type of PCIe card from the image below.



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16. Review the entered information for correctness and click **X** in the upper-right corner.
17. Select **View Results**.
18. Examine the values that are calculated for the configured servers and write them down in the table.

Results	Max Watts	50% Power	Idle Watts	Weight (kg)
Blade Servers	0	0	0	0.0
Annual Cost	$0	$0	$0	
Rack Servers	1,741	1,232	785	199.6
Annual Cost	$1,602	$1,133	$722	

Values per Server

Component	Selection
Server type	
Idle power (W)	
50% load power (W)	
Maximum power (W)	
Weight (kg)	

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Values per Solution

Component	Selection
Server type	
Server quantity	
Idle power (W)	
50% load power (W)	
Maximum power (W)	
Weight (kg)	
Cooling (BTU/hr)	

19. Calculate the required number of **racks** "Server Infrastructure" that are needed to deploy the solution, with the following facility characteristics:

    - Available maximum power per rack = **3 KW**
    - Available space per rack = **13 RUs**

    Use the table to enter the results of your calculations.

Physical Deployment Plan

Parameter	Value
Servers size	
Required power per server	
Server per rack deployed	
Power consumed by servers per rack	
Required rack quantity	

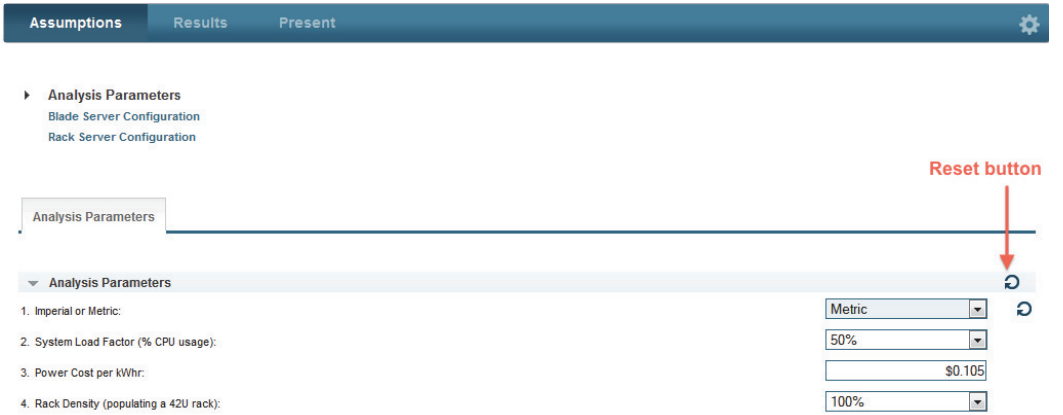
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Task 3: Calculating the Physical Requirements for the Cisco UCS B-Series Solution

In this task, you will calculate the power, cooling, and weight requirements for the **Cisco UCS B-Series solution**. You will use the Cisco UCS Power Calculator tool to accomplish that.

20. Navigate to the **Assumptions > Analysis Parameters** tab.
21. Reset the Power Calculator tool by clicking the circular arrow button in the upper-right.

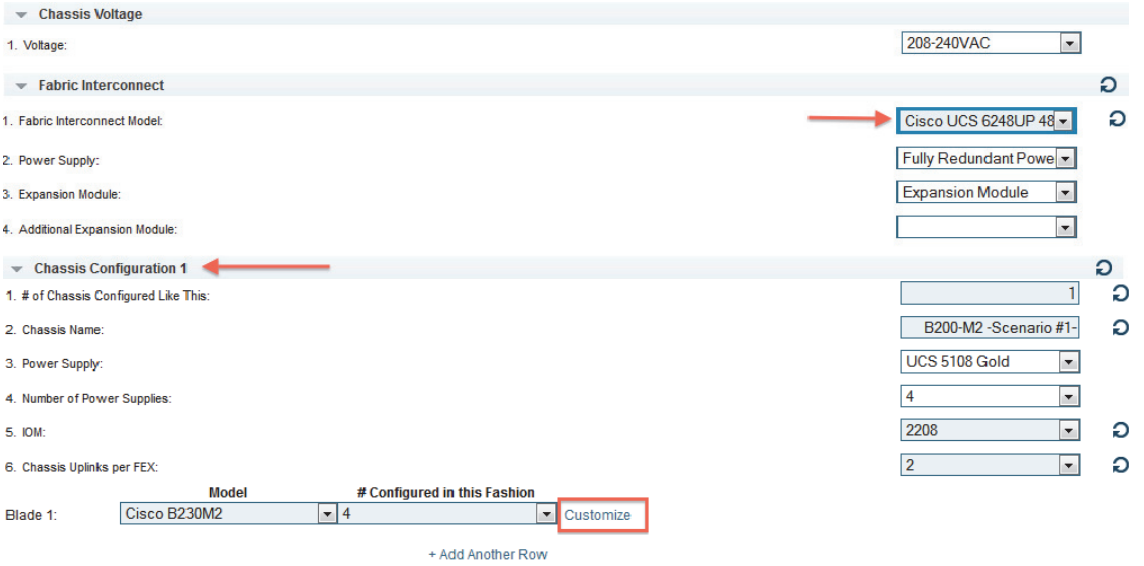
    This action sets the values to default (that is, 0). Click **OK** when you are asked to confirm the reset of all questions.



22. Once again, set the values under the **Assumptions** tab as listed and click **Continue**:
    - Imperial or Metric: **Metric**
    - System Load Factor: **50%**
    - Leave other values on default.
23. Select **Blade Server Configuration** on the **Assumption** tab. First set **Chassis Voltage** to **208-240VAC**.
24. Choose the Fabric Interconnect model **Cisco UCS 6248UP 48-port** with redundant power supply and no expansion module.
25. In **Chassis Configuration 1**, set the following parameters:
    - Number of chassis configured like this = **1**
    - Enter a name of your choosing. Ex. **B200-M2 -Scenarion #1-**
    - Number of power supplies = **4**

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- IOM = **2208**
- Number of FEX uplinks = **2**
- Number of blades = **4**
- Model for Blade 1 = **Cisco UCS B230 M2**



26. In the **Blade 1** row, choose **Customize** and set these parameters:
    - CPU = **E7-2870**
    - **Two processors**
    - **Mezzanine card M81KR**
    - **320 GB** of memory (that is, 10 32-GB DIMMs)
    - **Two internal 100-GB SSD disks**

    Review the entered configuration and confirm it by clicking **X**.
27. Click **Continue** to calculate the values.
28. Click **View Results** to review the calculated values.

    Q2) Review the configured solution and write down the physical deployment requirements for the Cisco UCS B-Series solution in the tables.

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Physical Characteristics for a Chassis with 4 Blades

Component	Selection
Chassis quantity	
Chassis PSU redundancy	
Blades per chassis	
Cable connection per IOM	
Idle power W	
50% load power W	
Maximum power W	
Weight	

Physical Characteristics for the Fabric Interconnects

Component	Selection
Switch type	
Redundancy	
Power supply redundancy	
Expansion module	
Idle power W	
50% load power W	
Maximum power W	
Idle power BTU	
50% load power BTU	
Maximum power BTU	
Weight	

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Physical Characteristics in Total

Component	Selection
Idle power W	
50% load power W	
Maximum power W	
BTU/h	
Weight	

29. Now you have to prepare the physical deployment plan, which should include the required number of rack cabinets and the scheme for populating these rack cabinets, based on the facility characteristics that are given by the customer.

30. The customer has specified the following **physical characteristics** of the facility:

    - Two racks with the following characteristics:
        - Available maximum power per individual rack cabinet = **2.5 KW**
        - Available space per rack cabinet = **15 RUs**

    Use the following table to enter the results of the calculations that you have made.

Physical Deployment Plan—Summary

Parameter	Value
Chassis size (hint: Rack Units for a 5108 chassis)	
Fabric Interconnect size	
Required power per fully populated chassis (hint: # of PS x Wattage of each PS)	
Fully populated chassis quantity (hint: Each 5108 holds 8 blades)	
Required power per semipopulated chassis	
Semipopulated chassis quantity	
Required power per 6140XP	
Required rack quantity in total	

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Physical Deployment Plan—Details

Parameter	Rack Number
UCS 6248UP A	
UCS 6248UP B	
Chassis 1	

Activity Verification

You have completed this activity when the following goals have been achieved:

- Identify the UCS C-Series solution deployment requirements.
- Identify the UCS B-Series solution deployment requirements.
- Calculate the physical requirements by using the Cisco UCS Power Calculator tool for the Cisco UCS C-Series solution.
- Calculate the physical requirements by using the Cisco UCS Power Calculator tool for the Cisco UCS B-Series solution.

Lab Complete

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L5

Design the Server Deployment for Microsoft Hyper-V (optional)

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Lab Overview

In this activity, you will configure a Cisco UCS Manager Service Profile, and supporting components to fully build a compute node that supports Microsoft Windows 2008 R2 Hyper-V. You will then use this hypervisor to create and configure virtual machines for testing.

Estimated Completion Time

1:10 minutes

Lab Procedures

In this activity, you will:

- Identify the requirements for Microsoft Windows 2008 R2 Hyper-V
- Create the service profile for Microsoft Windows 2008 R2 Hyper-V
- Boot and install Microsoft Windows 2008 R2 Hyper-V
- Examine the Microsoft Windows 2008 R2 Hyper-V configuration
- Create and verify the operation of the Hyper-V-based virtual machines

Required Resources

These are the resources and equipment that are required to complete this activity:

- Management Desktop
- Fully functioning UCS Unified Fabric which includes
  - Two Cisco UCS Fabric Interconnect switches
  - One Cisco UCS 5108 chassis
  - Two Cisco UCS Fabric Extender I/O modules
  - One Cisco UCS B-Series B200-M2 Server Blade
  - Two Nexus 5596 Core switches

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Lab Specific Addressing and Naming implementation sheet

The following addressing and naming should be used in this lab exercise.

Task 1 Hyper-V UUID Assignment

X = Chassis number

Pod	UUID Prefix	UUID Suffix
1	00000000-0000-0**X**01	0**X**01-000000000001
2	00000000-0000-0**X**02	0**X**02-000000000001
3	00000000-0000-0**X**03	0**X**03-000000000001
4	00000000-0000-0**X**04	0**X**04-000000000001
5	00000000-0000-0**X**05	0**X**05-000000000001
6	00000000-0000-0**X**06	0**X**06-000000000001
7	00000000-0000-0**X**07	0**X**07-000000000001
8	00000000-0000-0**X**08	0**X**08-000000000001

Hyper-V vHBA Configuration

X = Chassis number

Pod	vHBA	nWWN	pWWN	Fabric
1	hbaBoot	20:01:00:00:0**X**:0**1**:0B:01	20:00:00:00:0**X**:0**1**:0B:01	A
2	hbaBoot	20:01:00:00:0**X**:0**2**:0B:01	20:00:00:00:0**X**:0**2**:0B:01	A
3	hbaBoot	20:01:00:00:0**X**:0**3**:0B:01	20:00:00:00:0**X**:0**3**:0B:01	A
4	hbaBoot	20:01:00:00:0**X**:0**4**:0B:01	20:00:00:00:0**X**:0**4**:0B:01	A
5	hbaBoot	20:01:00:00:0**X**:0**5**:0B:01	20:00:00:00:0**X**:0**5**:0B:01	A
6	hbaBoot	20:01:00:00:0**X**:0**6**:0B:01	20:00:00:00:0**X**:0**6**:0B:01	A
7	hbaBoot	20:01:00:00:0**X**:0**7**:0B:01	20:00:00:00:0**X**:0**7**:0B:01	A
8	hbaBoot	20:01:00:00:0**X**:0**8**:0B:01	20:00:00:00:0**X**:0**8**:0B:01	A

VSANs

P = Pod number

VSAN	Fabric	VSAN Number	FCoE VLAN ID
SANFabricA-Pod**P**	A	11	1011
SANFabricB-Pod**P**	B	12	1012

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Hyper-V vNIC Configuration

X = Chassis number & **P** = Team number

vNIC	VLANs	MAC Address	Primary Fabric	Failover	Native VLAN
nicMgmt	Chassis**X**Management	00:25:B5:0**X**:0**P**:**P**1	A	Yes	Yes
nicCluster	Chassis**X**Hosts	00:25:B5:0**X**:0**P**:**P**2	A	Yes	No
nicData	**XP**1, **XP**2	00:25:B5:0**X**:0**P**:**P**3	B	Yes	No

LAN Pin Groups

P = Pod number

Name	s6100-A Uplink	s6100-B Uplink	vNIC (assign to vNIC)
Pod**P**-10G	Port-Channel 1	Port-Channel 2	nicMgmt, nicCluster
Pod**P**-1G	Port-Channel 1	Port-Channel 2	nicData

Hyper-V SAN Boot Configuration

Pod	HBA	Boot Target pWWN	Boot Target LUN
All Pods	hbaBoot	Pri: 50:06:01:**64**:44:60:4C:90	0
	hbaBoot	Sec: 50:06:01:**6C**:44:60:4C:90	0

VLANs and IP Addressing

X = Chassis number & **P** = Pod number

Ex. Chassis **3**, Pod **4** = **3**10, **3**16, **34**1 & **34**2

VLAN	VLAN Number	IP Subnet	Fabric
*Chassis**X**Management	***X**10	10.20**X**.10.0/24	A, B
*Chassis**X**Hosts	***X**16	10.20**X**.16.0/24	A, B
Pod**P**-Data1	**XP**1	10.20**X**.**P**1.0/24	A, B
Pod**P**-Data2	**XP**2	10.20**X**.**P**2.0/24	A, B

*This VLAN is common to all pods and is already created for you. Simply select this VLAN during vNIC configuration.

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Hyper-V Management Access

- **X** = Chassis number & **P** = Pod number
- Default gateway = 10.20**X**.16.254

Pod	nicMgmt	nicCluster	nicData
1	10.20**X**.10.5**P**	10.20**X**.16.5**P**	
2	10.20**X**.10.5**P**	10.20**X**.16.5**P**	
3	10.20**X**.10.5**P**	10.20**X**.16.5**P**	
4	10.20**X**.10.5**P**	10.20**X**.16.5**P**	
5	10.20**X**.10.5**P**	10.20**X**.16.5**P**	
6	10.20**X**.10.5**P**	10.20**X**.16.5**P**	
7	10.20**X**.10.5**P**	10.20**X**.16.5**P**	
8	10.20**X**.10.5**P**	10.20**X**.16.5**P**	
	• Subnet mask: 255.255.255.0 • Default Gateway: 10.20**X**.10.254 • DNS suffix: ucseduc.com	• Subnet mask: 255.255.255.0 • Default Gateway: Leave Blank	

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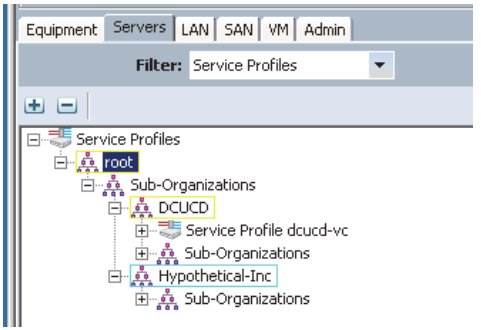
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Task 1: Creating a Cisco UCS Service Profile for Hyper-V Deployment

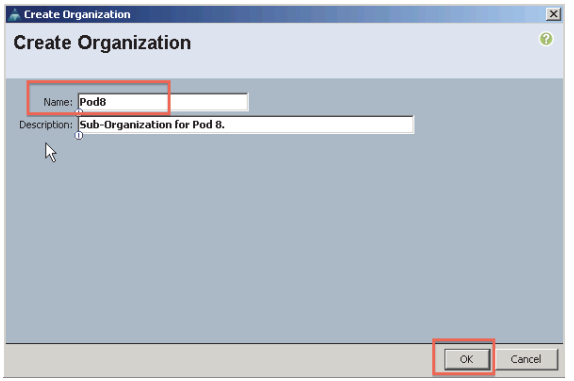
In this task, you will create a service profile for Hyper-V deployment.

Note	You will conduct this task on Cisco UCS equipment that is shared by the pods. For that reason, you will not change any parameters if not required by the task.

1. As outlined in Lab 3, Task 4, log into the Cisco UCS Manager using **admin** and **NXos12345**.
2. Select the **Servers** tab in the left navigation pane and navigate to **Service Profiles > root > Sub-Organizations > DCUCD > Sub-Organizations**.

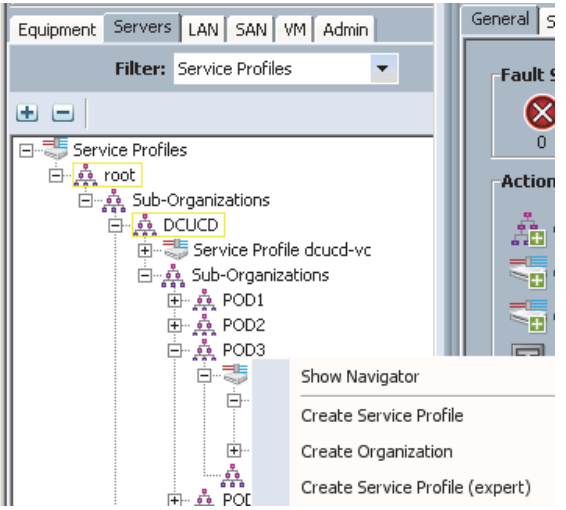


3. Right-click on "Sub-Organizations" and select **Create Organization**.
4. Name this new sub-organization Pod**P** where **P** = your Pod#. Ex. Pod**8**.



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5. Click **OK** to finalize the creation and **OK** again to confirm.
6. Expand "Sub-Organization" and right-click your newly created **PodP** organization (where **P** is your Pod number). Click the **Create Service Profile (expert)** option from the menu.



7. Enter a Service Profile name of "bhv-**P"** (where **P** is your Pod number).
8. In the UUID section, select the option of **all X's** under "Manual using OUI."

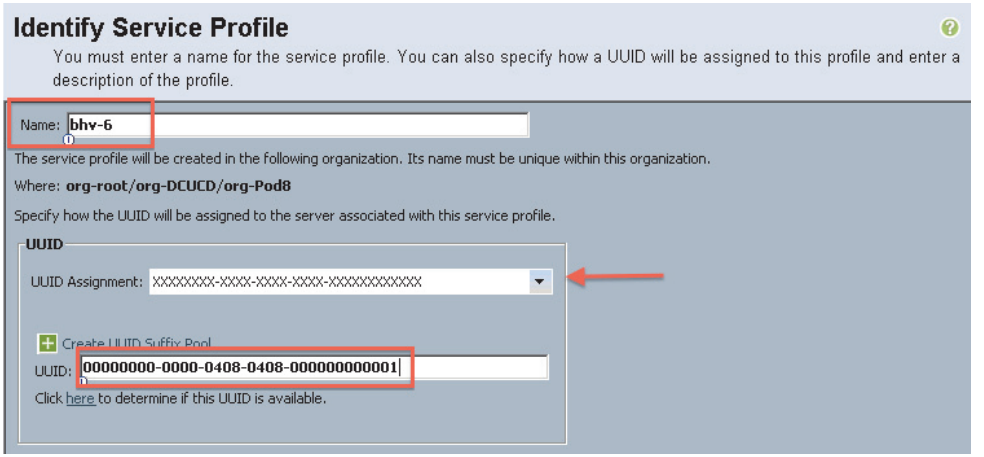
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9. Use the table below to enter in the UUID prefix then suffix values.

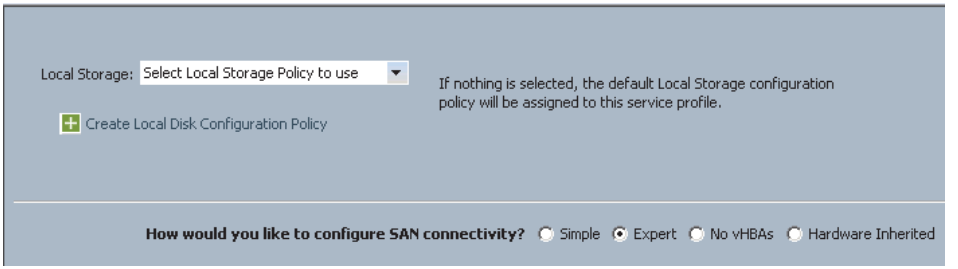
   X = Chassis number

Pod	UUID Prefix	UUID Suffix
1	00000000-0000-0**X**01	0**X**01-000000000001
2	00000000-0000-0**X**02	0**X**02-000000000001
3	00000000-0000-0**X**03	0**X**03-000000000001
4	00000000-0000-0**X**04	0**X**04-000000000001
5	00000000-0000-0**X**05	0**X**05-000000000001
6	00000000-0000-0**X**06	0**X**06-000000000001
7	00000000-0000-0**X**07	0**X**07-000000000001
8	00000000-0000-0**X**08	0**X**08-000000000001

10. When finished click **Next** to continue.



11. On the "Storage" screen, select **Expert** mode for configuring "SAN connectivity."

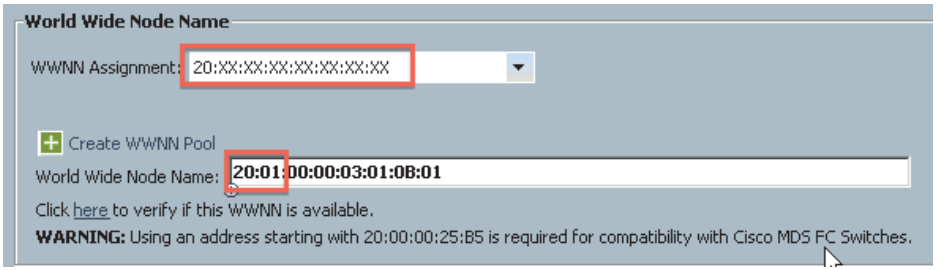


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12. Enter the **WWNN** in the provided field by choosing **20:XX:XX:XX:XX:XX:XX:XX** under the "Manual using OUI" option. Use the table below to enter in your specific WWNs.

X = Chassis number

Pod	vHBA	WWNN	WWPN	Fabric
1	hbaBoot	20:01:00:00:0**X**:**01**:0B:01	20:00:00:00:0**X**:**01**:0B:01	A
2	hbaBoot	20:01:00:00:0**X**:**02**:0B:01	20:00:00:00:0**X**:**02**:0B:01	A
3	hbaBoot	20:01:00:00:0**X**:**03**:0B:01	20:00:00:00:0**X**:**03**:0B:01	A
4	hbaBoot	20:01:00:00:0**X**:**04**:0B:01	20:00:00:00:0**X**:**04**:0B:01	A
5	hbaBoot	20:01:00:00:0**X**:**05**:0B:01	20:00:00:00:0**X**:**05**:0B:01	A
6	hbaBoot	20:01:00:00:0**X**:**06**:0B:01	20:00:00:00:0**X**:**06**:0B:01	A
7	hbaBoot	20:01:00:00:0**X**:**07**:0B:01	20:00:00:00:0**X**:**07**:0B:01	A
8	hbaBoot	20:01:00:00:0**X**:**08**:0B:01	20:00:00:00:0**X**:**08**:0B:01	A



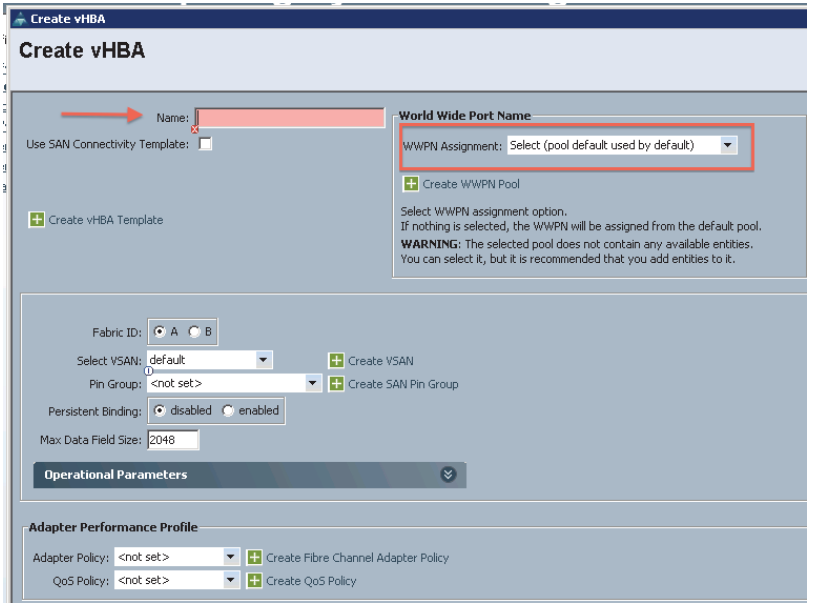
Note This warning comes about from Cisco enforcing the "Standardized NAA WWN formats." This is a Type 1, Type 2 & Type 5 NAA WWN formatted address.

13. You will need to create the HBA that will be used for accessing the LUNs on the drive array. Click the **Add** button at the **bottom** of this dialog box.



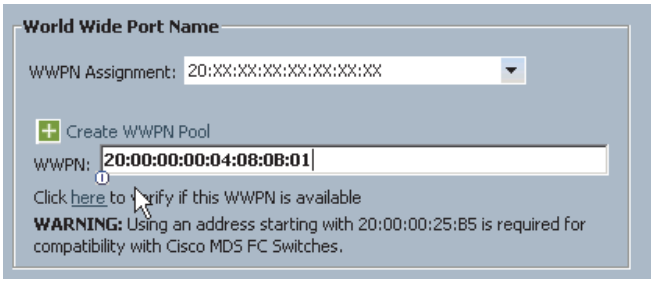
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14. In the "Create vHBA" dialog, use the table above to configure a vHBA name of **hbaBoot** and set your **WWPN** address.



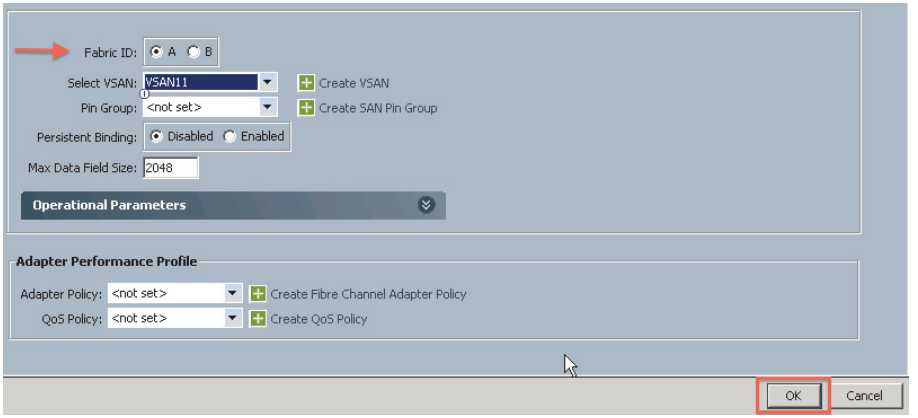
15. When configuring the **WWPN** assignments, choose **20:XX:XX:XX:XX:XX:XX:XX** under the "**Manual using OUI**" option from the WWPN Assignment drop-down menu.

16. Use the table above (at step 12) to enter in your specific WWPNs.

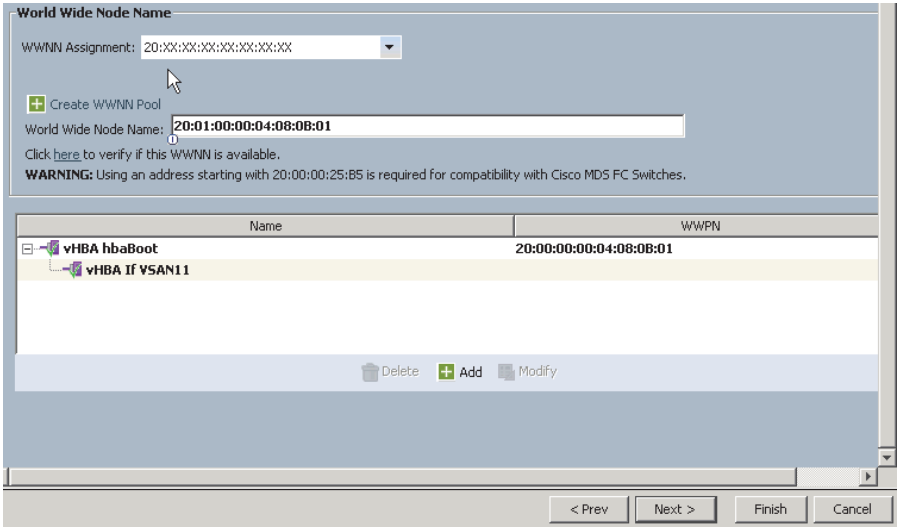


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17. Select a "Fabric ID:" of **A** and set the "Select VSAN:" value to **VSAN 11**. Leave all other values at their default settings.
18. Confirm the HBA creation by clicking **OK**.

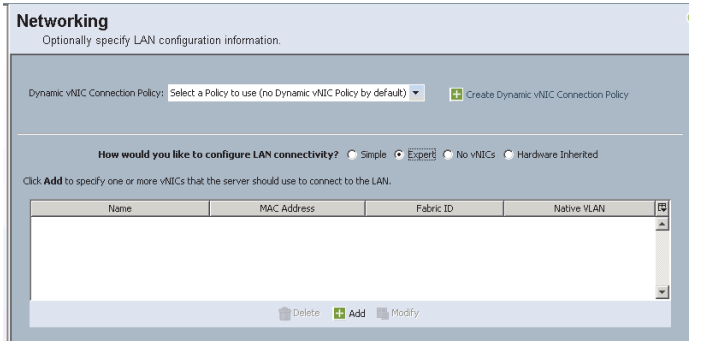


19. The "hbaBoot" vHBA is created and is now shown in the table of HBAs with the WWPN address and the SAN fabric as specified in the tables above. Click **Next** to proceed with the service profile creation.



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20. In the "Networking" dialog, set the configuration mode to **Expert** so that you may enable the configuration of multiple vNICs.

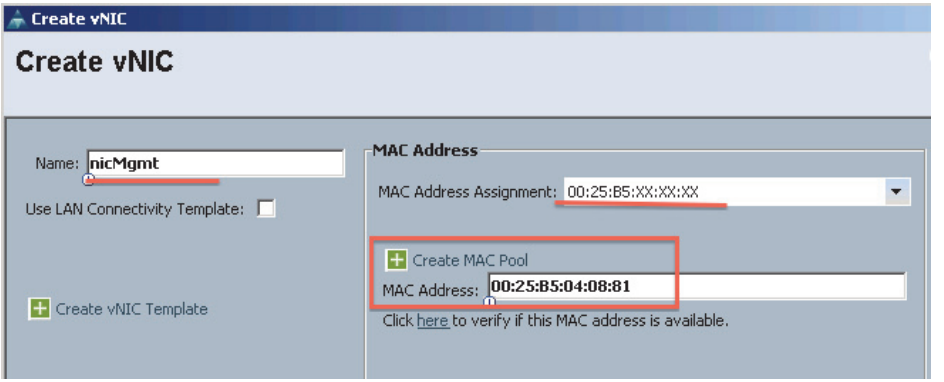


21. Click the **Add** button to add the first vNIC. In the "Name" field, enter **nicMgmt** as specified in the table below.

X = Chassis number & **P** = Pod number

vNIC Name	VLANs	MAC Address	Primary Fabric	Failover	Native VLAN
nicMgmt	Chassis**X**Management	00:25:B5:0**X**:0**P**:**P**1	A	Yes	Yes
nicCluster	Chassis**X**Hosts	00:25:B5:0**X**:0**P**:**P**2	A	Yes	No
nicData	**XP**1, **XP**2	00:25:B5:0**X**:0**P**:**P**3	B	Yes	No

22. Enter the name and the MAC address first. For the MAC address, select the "00:25:B5:XX:XX:XX" option under "**Manual using OUI**".



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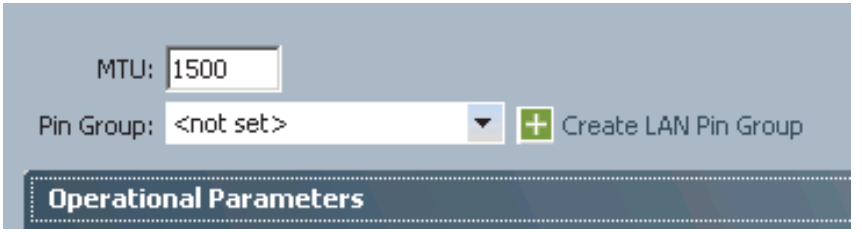
Note	Some VLANs are common to all pods and have already been created for you. It's these types of VLANs that you will **simply pick** from the list. While other VLANs are specific to just your pod and must be created in the following steps.

For this 1st vNIC you will simply select an already created VLAN (ChassisXManagement) used for managing all servers in a chassis.

23. For the "nicMgmt" vNIC simply click to place a check next to the "**ChassisXManagement**" VLAN. Remember X is your Chassis #. Ex. "Chassis3Management". Be sure to **also set** the "ChassisXManagement" VLAN as the "Native VLAN." Image below.

Note	Next we will implement "Administrative Traffic Engineering"; that is, different traffic leaving the Cisco UCS Fabric should follow different uplinks. The management and cluster segments traffic should traverse 10 Gigabit Ethernet uplinks, while the data segments traffic should follow the 1 Gigabit Ethernet uplink that is dedicated to your pod.

24. Create the LAN pin groups by clicking the **Create LAN Pin Group** link.



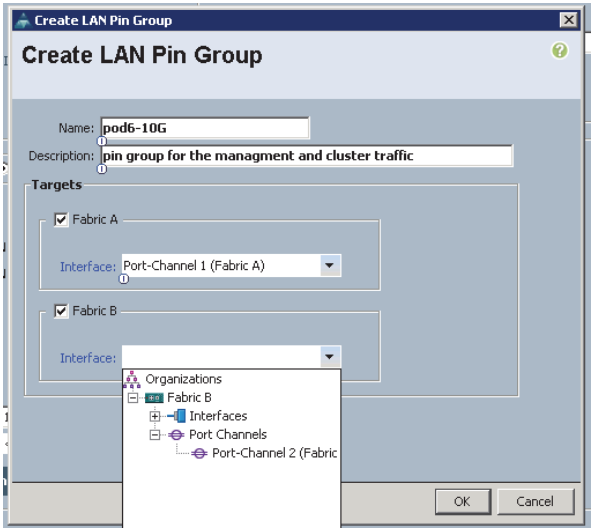
25. In this dialog box, you will enter the individual pin group information. Start by creating the pin group for the 10 Gigabit Ethernet uplink. Use the information that is provided in the table below.

P = Pod number

Name	Fabric A Uplink	Fabric B Uplink	vNIC (assign to vNIC)
Pod**P**-10G	Port-Channel 1	Port-Channel 2	nicMgmt, nicCluster
Pod**P**-1G	Port-Channel 1	Port-Channel 2	nicData

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26. Click **OK** after the values for each pin-group have been configured and **OK** again to confirm the creation of the new pin-group.

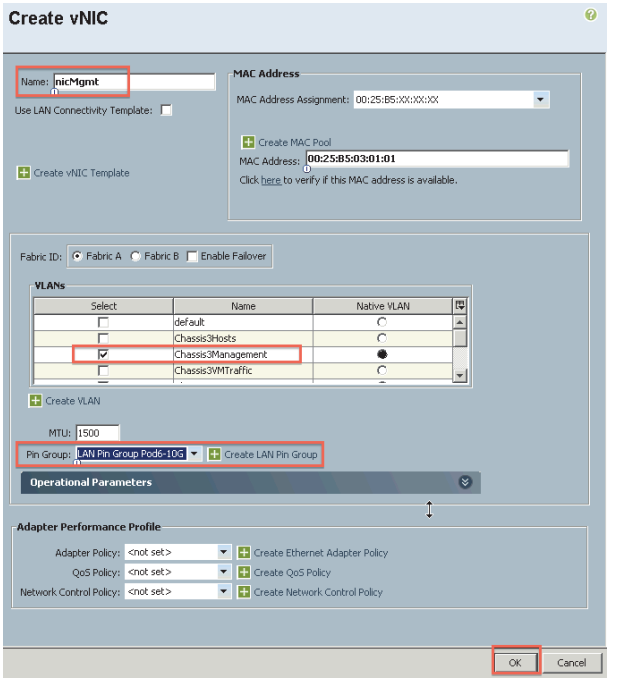


27. Repeat steps 24 - 26 to create a 2nd pin-group titled "Pod**P**-1G". Keeping in mind that **P** is your Pod#.

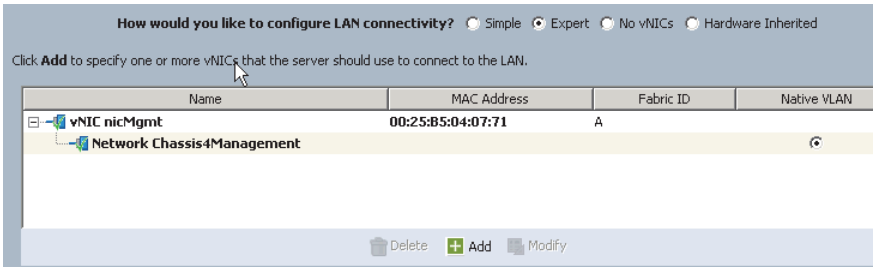
    The steps above are simply to create the pin-groups and assign their paths when traveling over the Fabric. We will assign the pin-groups to vNICs in the following steps.

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28. Select the "Pod**P**-10G" pin-group for the vNIC "**nicMgmt**".



29. Leave all other vNIC parameters at their default values and click **OK** to initiate the vNIC creation. You should now see the newly created vNIC in the table of vNICs.



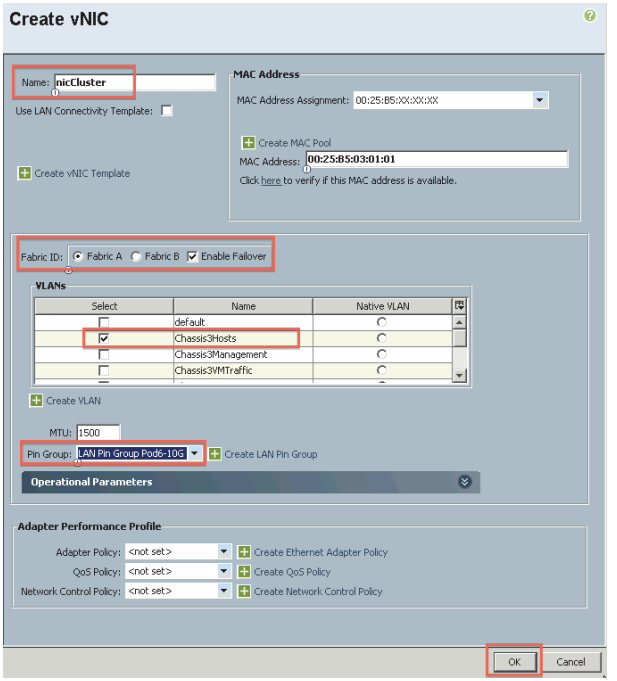
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30. Repeat steps 21 – 29 to create another vNIC named **nicCluster** and connect to the already created "Chassis**X**Hosts" VLAN.

    Keep in mind that **X** is your assigned Chassis #. Ex. Chassis**3**Hosts. Be sure to reference the configuration parameters from the table below.

    X = Chassis number & **P** = Team number

vNIC Name	VLANs	MAC Address	Primary Fabric	Failover	Native VLAN
nicMgmt	Chassis**X**Management	00:25:B5:0**X**:0**P**:**P**1	A	Yes	Yes
nicCluster	Chassis**X**Hosts	00:25:B5:0**X**:0**P**:**P**2	A	Yes	No
nicData	**XP**1, **XP**2	00:25:B5:0**X**:0**P**:**P**3	B	Yes	No



31. Repeat steps 21 – 29 to create another vNIC named **nicData**.

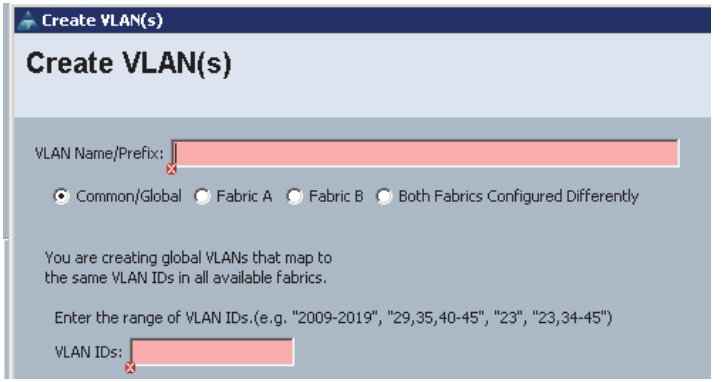
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Note During the vNIC configuration process you will create the VLANs needed in the steps below. These VLANs will be used by the Hyper-V vNICs.

For the VLAN list (ex. Pod6-Data1 & Pod6-Data2), consult the "VLANs and IP Addressing" table below.

These VLANs could be created separatly and outside of the vNIC creation process or, as we're doing here, during the vNIC creation.

32. Click the **Create VLAN** button to be presented with the Create VLAN(s) dialog box.



33. First, enter Pod**P**-Data1 (where **P** = your Pod #) in the VLAN Name/Prefix field. This VLAN will be used to remotely access and manage the Hyper-V host.Set the VLAN to be **Common/Global**.

Note We set the VLAN to be Common/Global here so it is presented on both fabrics with the same ID. This is all to make the Cisco UCS hardware-based fabric failover possible.

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34. Enter in the first VLAN number as indicated in the table below. Ex. Chassis 3, Pod6-Data1 will be 361 (**XP**1).

VLAN	VLAN Number	IP Subnet	Fabric
*Chassis**X**Management	***X**10	10.20**X**.10.0/24	A, B
*Chassis**X**Hosts	***X**16	10.20**X**.16.0/24	A, B
Pod**P**-Data1	**XP**1	10.20**X**.**P**1.0/24	A, B
Pod**P**-Data2	**XP**2	10.20**X**.**P**2.0/24	A, B

*This VLAN is common to all pods and is already created for you. Simply select this VLAN during vNIC configuration.

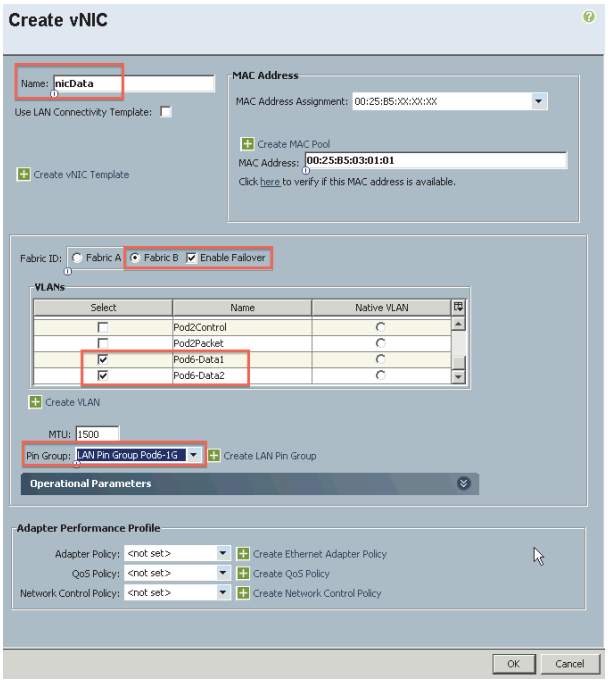
35. Click **OK** to create the VLAN and **OK** again to confirm the VLAN creation.
36. **Repeat the process** for the 2nd VLANs listed in the table.
37. Now we can finalize the creation of the vNIC titled "**nicData**". Here you will select both the "Pod**P**-Data1" & "Pod**P**-Data2" VLANs created.

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38. Next you will set the VLAN and fabric characteristics (Primary Fabric, Failover & Native VLAN) of the vNIC per the information in the table below (same table as found at step 16 & 25) and click **OK** to finalize the vNIC confirguration.

X = Chassis number & **P** = Team number

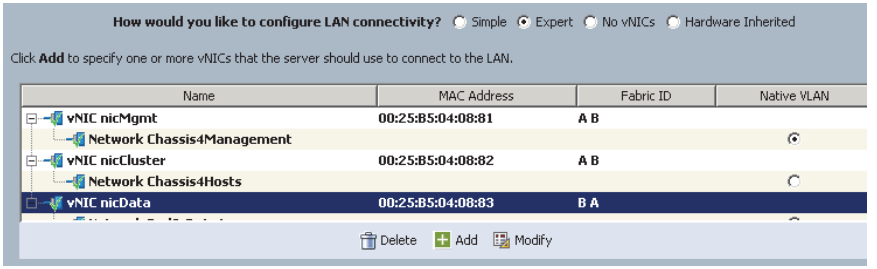
vNIC Name	VLANs	MAC Address	Primary Fabric	Failover	Native VLAN
nicMgmt	Chassis**X**Management	00:25:B5:0**X**:0**P**:**P**1	A	Yes	Yes
nicCluster	Chassis**X**Hosts	00:25:B5:0**X**:0**P**:**P**2	A	Yes	No
nicData	**XP**1, **XP**2	00:25:B5:0**X**:0**P**:**P**3	B	Yes	No



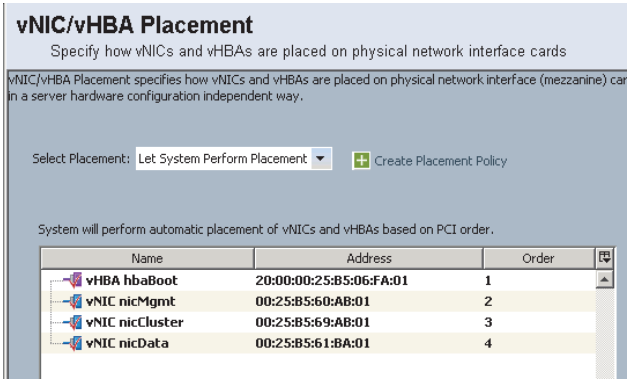
Note With the above steps, you have successfully implemented “Administrative Traffic Engineering”. Specifically; the Management and Cluster segment traffic will traverse 10 Gigabit Ethernet uplinks, whereas the Data (ex. –Data1 & -Data2) segment traffic will follow the 1 Gigabit Ethernet uplink. Specific traffic types take engineered paths.

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39. When you are finished with the vNIC creation, you should see all three vNICs as presented in the vNIC table below. Click **Next** to continue.



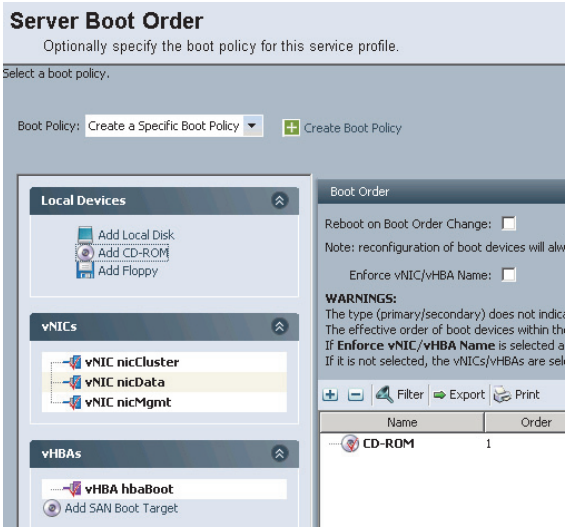
40. Leave the vNIC/vHBA Placement options at the default values. Verify again that you have specified all the required vHBAs and vNICs, then click **Next**.



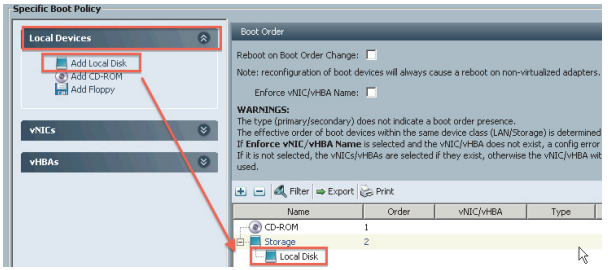
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41. The "Server Boot Order" option specifies the boot order policy that is used by the blade that has the assigned service profile. From the Boot Policy drop-down list choose **Create a Specific Boot Policy** and add the following options in the following order:
    - **CD-ROM** from the list of the local devices
    - **Local Disk** to install Hyper-V on the internal HDD

    41.1. Click **Add CD-ROM** to set the CD-ROM as the first boot device.



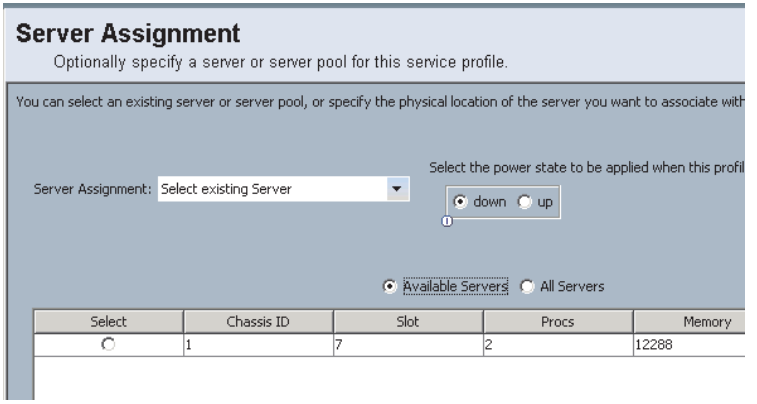
    41.2. Then, click **Add Local Disk** option.



42. Verify that you have configured the proper boot policy and click **Next** to proceed.
43. Click **Next** to accept the default values for the "Maintenance Policy".
44. The Hyper-V service profile is almost configured completely. Now you have to assign the server blade to this newly created service profile. First, set the power state of the applied profile to **Down** to prevent the server from being powered on and wasting electricity.

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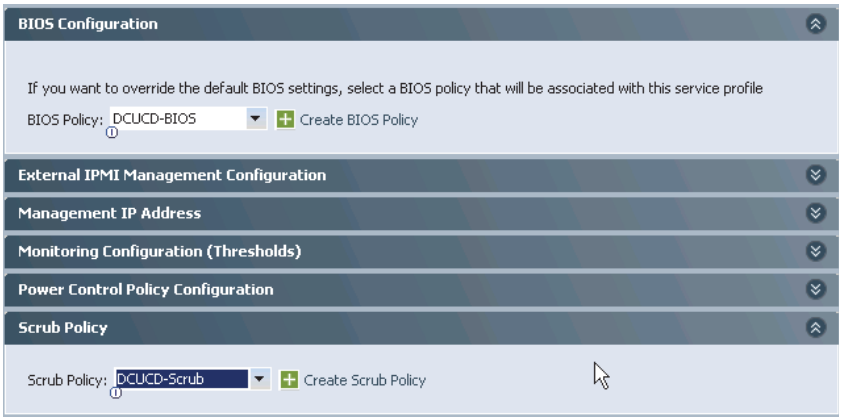
45. Choose the **Select Existing Server** option from the "Server Assignment" drop-down menu and then select the server blade that is assigned to your Pod#. Click **Next** to proceed to the final configuration screen.



Note If the server blade that is assigned to your pod is not available, start another Cisco UCS Manager instance, log in, and navigate to the **Equipment** tab. Expand the organizational structure in the left pane and choose your assigned server blade. You will probably see that the server blade is already associated with another service profile. Disassociate that service profile to make the server blade available for your Hyper-V service profile. Keep in mind that you have to wait for the disassociation process to be completed before associating your Hyper-V service profile with the blade.

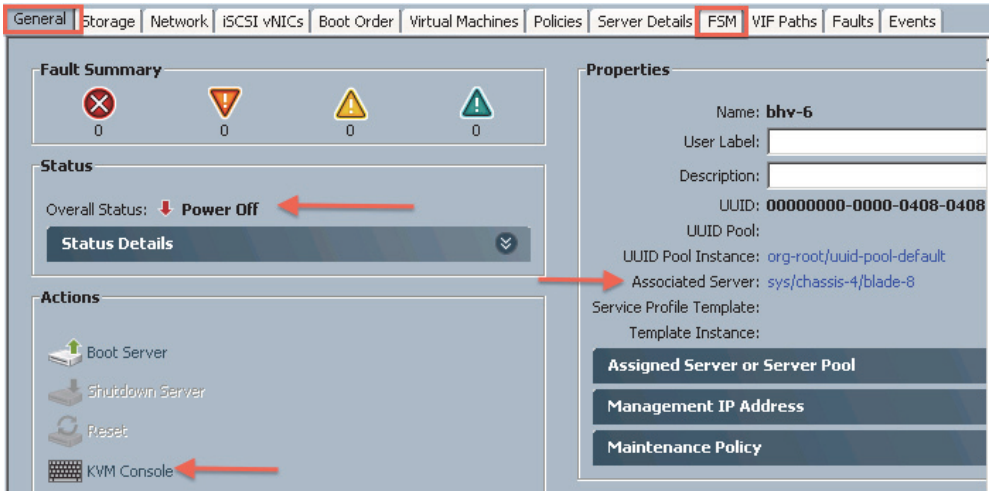
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46. The final configuration parameters that you need to apply are the Scrub and BIOS policies. Both have been preconfigured so you can select them:
    - In the **BIOS Policy** drop-down menu, choose **DCUCD-BIOS**.
    - In the **Scrub Policy** drop-down menu, choose **DCUCD-Scrub**.



47. Click **Finish** to complete the service profile creation and **Yes** to acknowledge the "create:" messgages and initiate the association with the selected server blade. Finally click **OK** to confirm creation.

48. Click on your newly created service profile. On the **General** tab, you can observe how the service profile is applied to the server blade. Additionally, you launch the **KVM Console**, or navigate to the **FSM** tab to see the current configuration operations being performed.



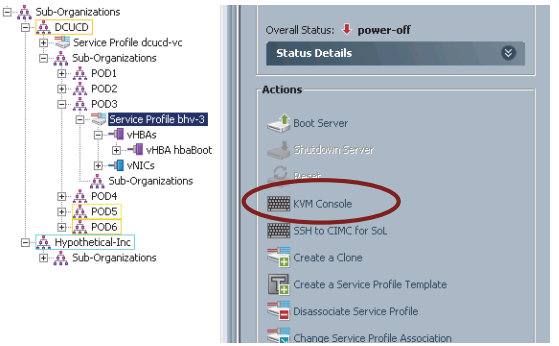
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Task 2: Install Hyper-V Server 2012 (on Local disk)

In this task, you will install and boot your Hyper-V host from locally attached storage, explore its configuration options, and create VMs used for testing.

Note You will conduct this task on Cisco UCS equipment that is shared by the pods. For that reason, you will not change any parameters if not required by the task.

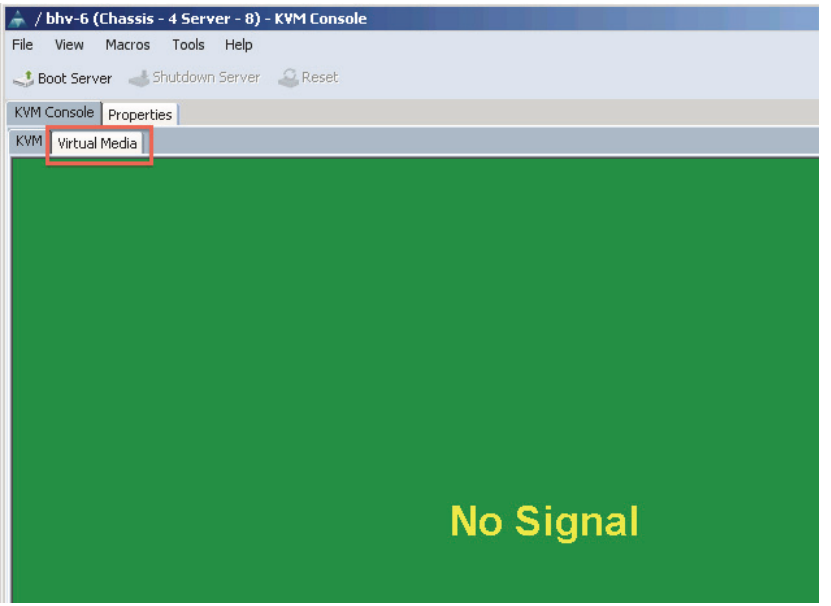
49. Navigate to the newly created Hyper-V service profile (ex. hvb-**P** where **P** = Pod number) within the left pane under **Service Profiles > root > Sub-Organizations > DCUCD > Sub-Organizations > PodP**
50. Click the **KVM Console** link within the **Actions** section in the right pane. Accept any digital certificate and Java applet signature warnings.



Note Remember, the configured power state is set to down, the blade is shut down and is ready to be booted.

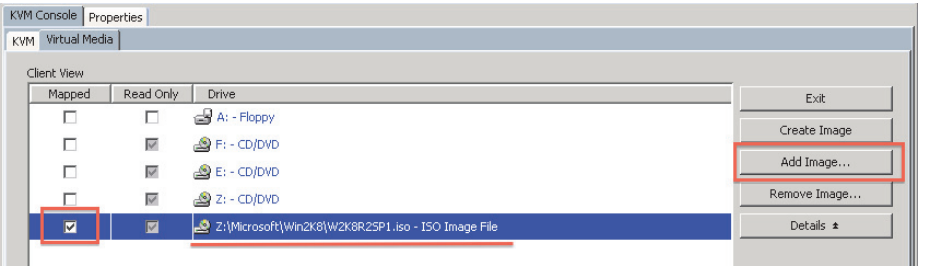
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51. To prepare for the Hyper-V installation, let's start by attaching the install ISO as "Virtual Media". Click on the **Virtual Media** tab.



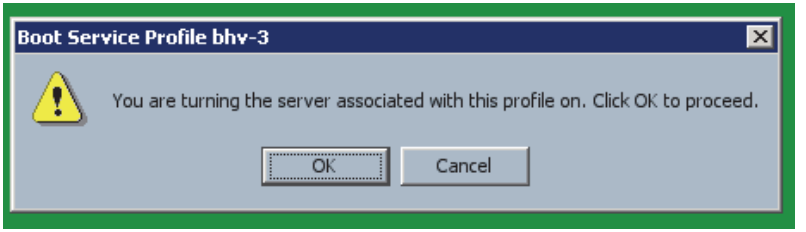
52. Click on **Add Image…** and navigate to (Look in:) **Z:\Microsoft\ Win2K8**. Finally select the "**W2K8R2SP1.iso**" file and click **Open**.

53. To make the ISO available to the blade server click to place a check in the "Mapped" check-box next to the newly added image.



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54. Click the **Boot Server** button and click **OK** to confirm that you want to boot the server blade.



55. Be sure to watch the boot process. When the Cisco logo appears press the **F6** key to enter into the boot selection menu.

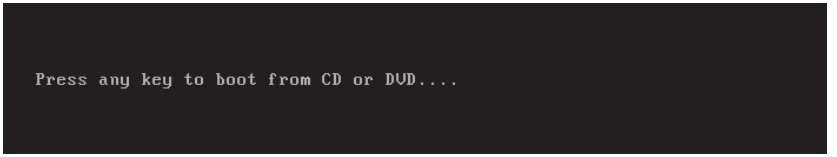


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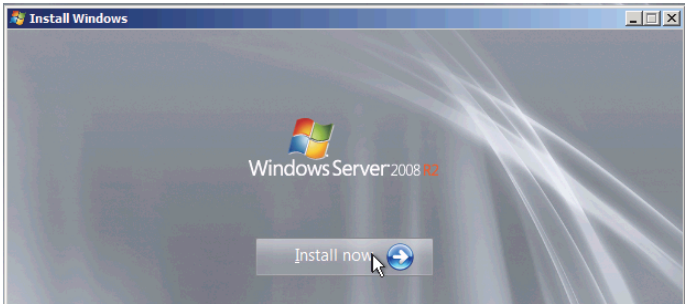
56. Here you will select the **Cisco Virtual CD/DVD 1.22** option to book from the newly mapped Hyper-V Install ISO.



57. As the screen prompts you, press any key to boot from the install media.

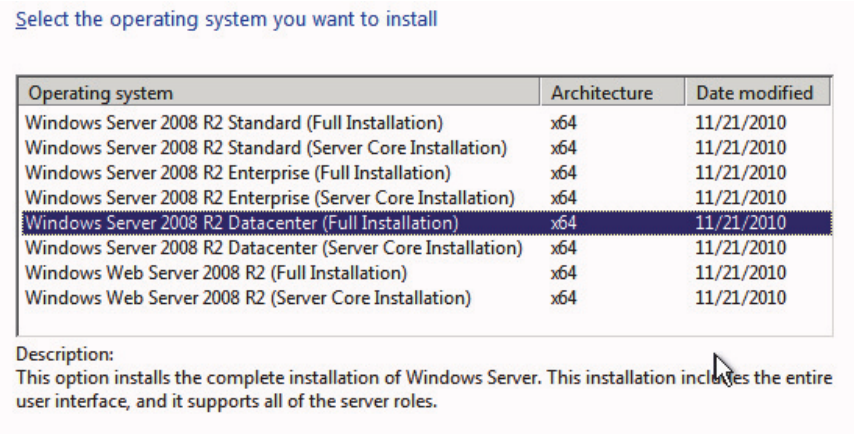


58. At the initial "Install Windows" screen, select the defaults for Language, Time and Keyboard settings then click **Next** to continue. Lastly click **Install Now**.



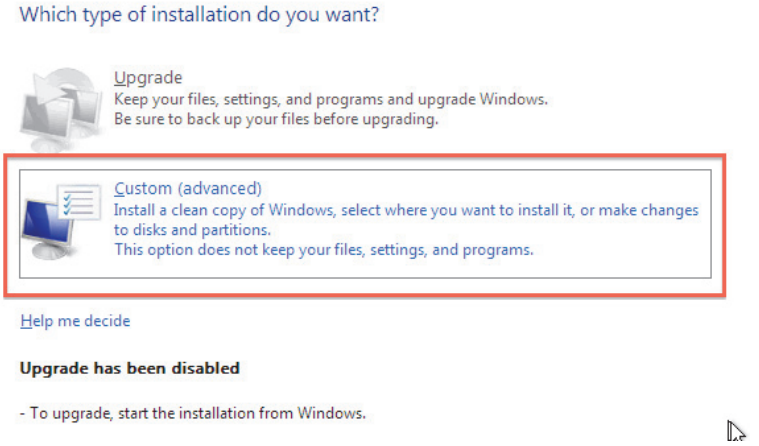
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59. When prompted to "Select the operating system you want to install" click **Windows 2008 R2 Datacenter (Full Installation)** and click **Next**.



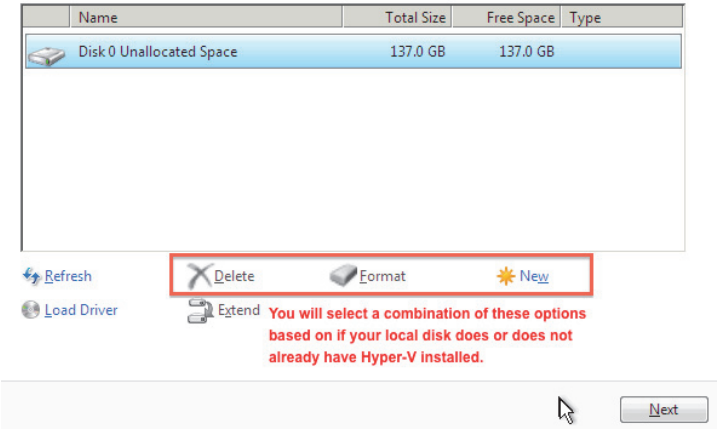
60. Click "I accept the license terms" and **Next** to continue.

61. On the "Install Windows" screen, click **Custom (advanced)** to "Install a clean copy of Windows…"

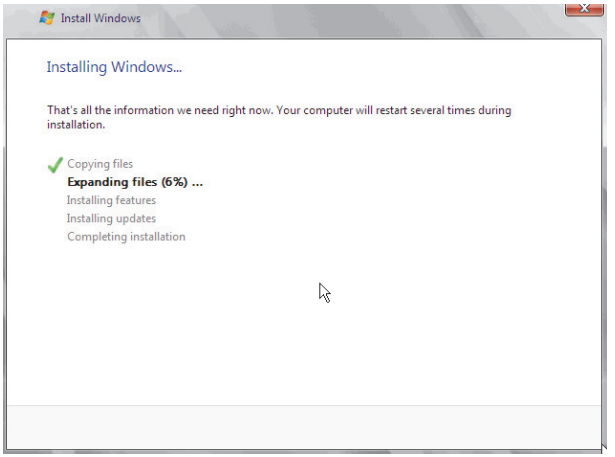


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Note	If "**New**" is not an option this means Windows is already installed on the local drive. Instead click "**Advanced Options**" so you may "Delete," create a "New" partition and "Format" to continue.



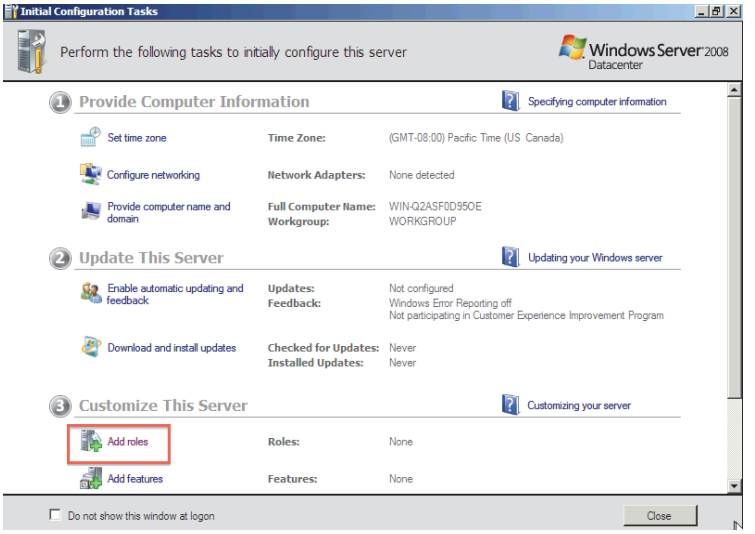
62. When asked "Where do you want to install Windows?" select your local disk, "**Disk 0.**"
63. Click **Drive Options** and then **New** to create a new partition. Be sure to select the full amount of available space (ex. 286102 MB).
64. Wait patiently during the "Installing Windows…" process.
65. Ask your instructor if this would be a good time to continue with lecture or take a break.



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66. Once prompted to change the users password "…before logging on the first time." click **OK** and set the password to **NXos12345**. Finalize the process by clicking **OK** to confirm the password change.

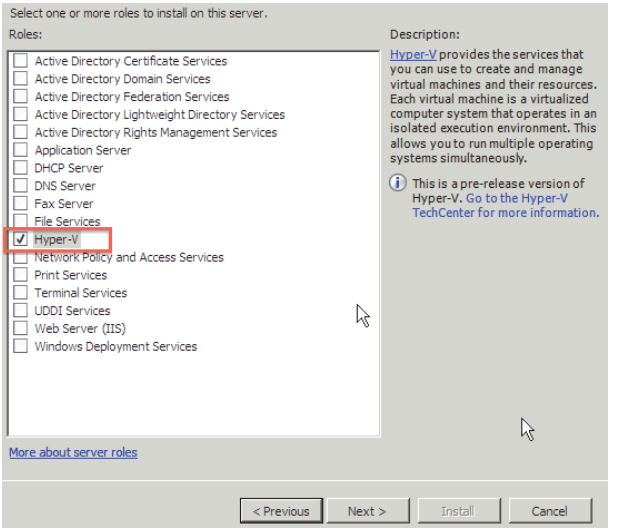
67. Once installation is complete and you're presented with the "Initial Configuration Tasks" dialog, click **Add roles**.



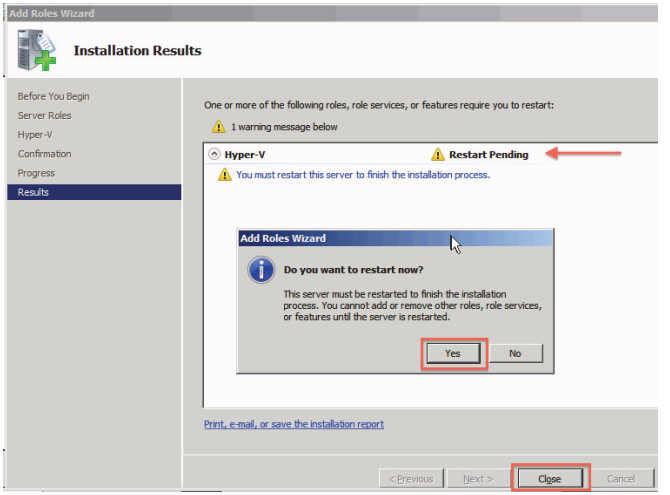
68. Once the "Add Roles Wizard" begins click **Next** to continue.

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69. From the list of "Roles:" click **Hyper-V** and then **Next**.

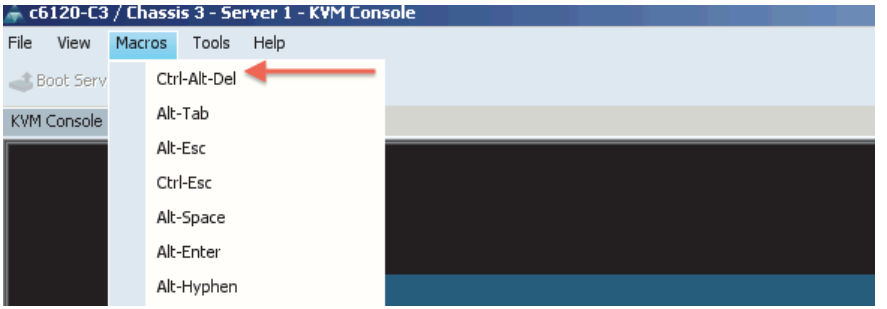


70. If interested, take a moment to read the "Introduction to Hyper-V" screen, then click **Next** to continue.
71. Finalize the role installation by clicking **Install**.
72. Once the installation is complete click **Close** and **Yes** to "restart now."

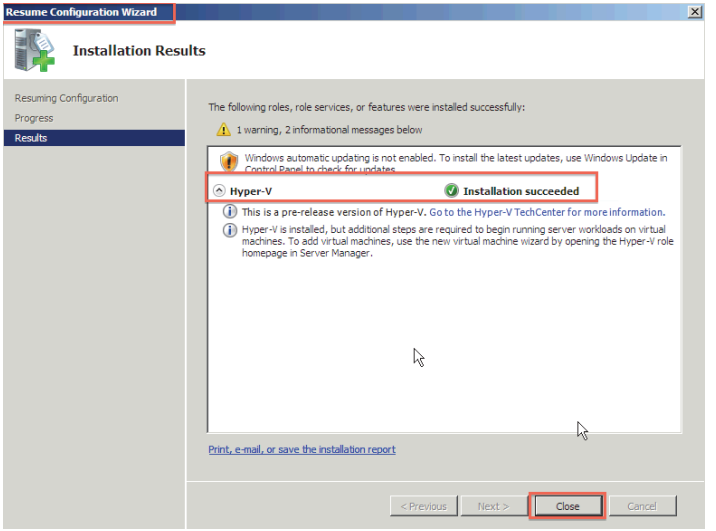


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73. After the server has fully booted and you are presented with "Press CTRL+ALT+DELETE to log on" select **Marcos > Ctrl-Alt-Del** to send the key sequence to the host. Login using **Administrator** and **NXos12345**.



74. Once presented with the "Installation Succeeded" status to the right of "Hyper-V," click **Close** to close the "Installation Results" window.



75. Close the "Server Manager" interface as well by clicking on the **X** in the upper right-hand corner.

Note	Once your W2K8 Hyper-V server is installed, the Hyper-V role added and your system is rebooted it's now time to configure network connectivity and create virtual machines.

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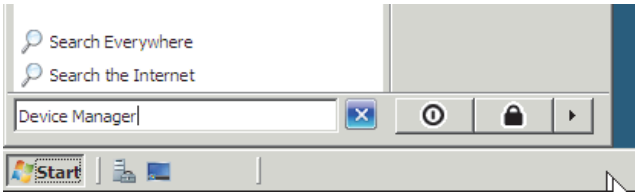
Task 3: Installing the necessary drivers

In order to fully use our available hardware we need to install Windows specific drivers for our B200-M2 server blade. These drivers can be obtained from Cisco and are specific to your blade model and installed adapters.

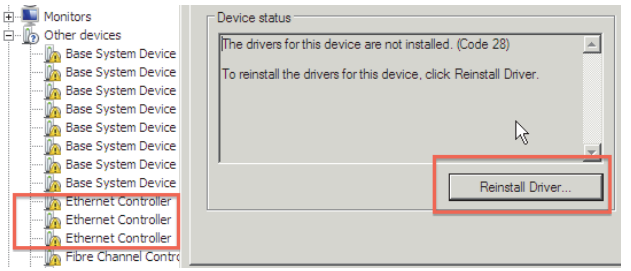
76. We start by mounting the drivers ISO downloaded from Cisco as a virtual CD-ROM attached to the server. Repeat **Task 2, Steps 52 - 54** to open your "Virtual Media Session" manager and mount the **Z:\Microsoft\ucs-bxxx-OSDRIVERS.2.0.1f.iso**.

Note	You may need to un-map the existing Windows 2008 installer ISO used in the previous step to install Hyper-V.

77. We will use "Device Manager" to install the drivers needed. Switch back to your Server screen by cicking on the **KVM** tab, then click on **Start** and type **Device Manager** in the search bar. Finally, press **Enter**.



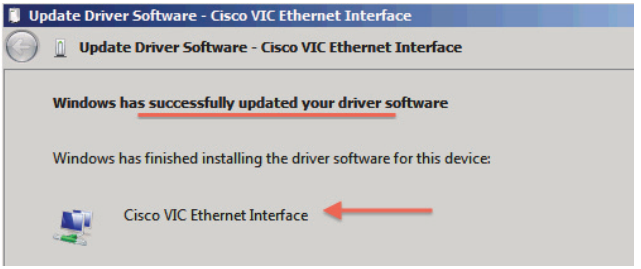
78. Once Device Manager opens, navigate down to "Other Devices." Notice how there are, at minumum 3 "Ethernet Controller" entries and 1 "Fibre Channel Controller" listed. These are the 3 vNICS and 1 vHBA created in the Service Profile of this blade. Double click on each Ethernet Controller and click **Update Driver**.



79. Click **Browse my computer for driver software** and type **D:\Windows** in the search path. Click **Next** to continue.

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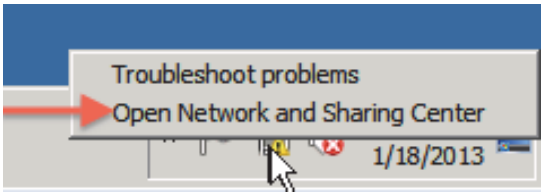
80. Once the driver was "…successfully updated" click **Close** in the "Update Driver Software" dialog and **Close** again in the "Ethernet Controller Properties" dialog.



81. Repeat the last three steps for the remaining "Ethernet Controllers" and "Fibre Channel Controller."
82. Once complete be sure to close Device Manager.
83. Once you've complete the update drivers process notice how the devices previously listed under "Other drvices" now appear in the proper category and are ready for use.



84. Now that drivers for the vNICs have been installed, let's configure network connectivity. Right-click on the "Network Connection status" icon in your System Tray (bottom right-hand corner of the screen) and select **Open Network and Sharing Center**.

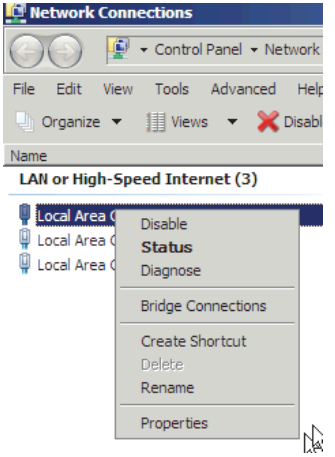


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85. Click on **Change Adapter Settings** to see a list of your 3 installed vNICs.

    Rememeber: **X** = Chassis # and **P** = Pod #. The order of the NICs listed here corresponds to the order they were defined in the Service Profile; **nicMgmt** (carrying VLAN **X**10), **nicCluster** (carrying VLAN **X**16) and **nicData** (carrying Pod**P**-Data1 = VLAN **XP**1 & Pod**P**-Data2 = VLAN **XP**2).

86. Right-Click on the first listed "Local Area Connection…" and select **Properties**.



87. Select "Internet Protocol Version 4 (TCP/IPv4)" and click **Properties**.

88. Click **Use the following IP address** and set the IP Address parameters to the value listed in the table below. Ex. 10.20**X**.16.5**P**/24. Click **OK** and then **Close** when finished.

    X = Chassis number & **P** = Pod number

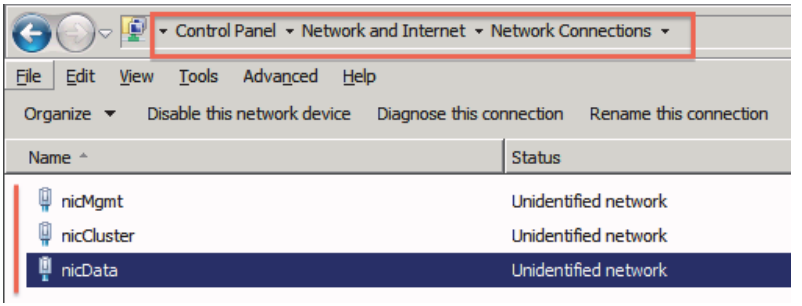
Pod	nicMgmt	nicCluster	nicData
1	10.20**X**.10.5**P**	10.20**X**.16.5**P**	NA
2	10.20**X**.10.5**P**	10.20**X**.16.5**P**	NA
3	10.20**X**.10.5**P**	10.20**X**.16.5**P**	NA
4	10.20**X**.10.5**P**	10.20**X**.16.5**P**	NA
5	10.20**X**.10.5**P**	10.20**X**.16.5**P**	NA
6	10.20**X**.10.5**P**	10.20**X**.16.5**P**	NA
7	10.20**X**.10.5**P**	10.20**X**.16.5**P**	NA
8	10.20**X**.10.5**P**	10.20**X**.16.5**P**	NA
	• Subnet mask: 255.255.255.0 • Default Gateway: 10.20**X**.10.254 • DNS server: 10.200.11.100 • DNS suffix: **ucseduc.com** Under Advanced > DNS	• Subnet mask: 255.255.255.0 • Default Gateway: Leave Blank	

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89. Finally, right-click on your Local Area Connection again and click **Rename**. Enter in the name of your specific NIC per the title of the columns in the table above. Ex. **nicMgmt**.

Note	The "nicData" network adapter is simply a physical connection that caries packets from your Virtual Machines. As a result and is not configured directly with any IP settings.

90. To configure the remaining NICs, repeat steps 87 – 90 for **nicCluster** and **nicData**.



91. Using the **ipconfig /all** command from a command prompt, examine the details of individual NICs. Use the table provided here to collect the information about the NICs that are available.

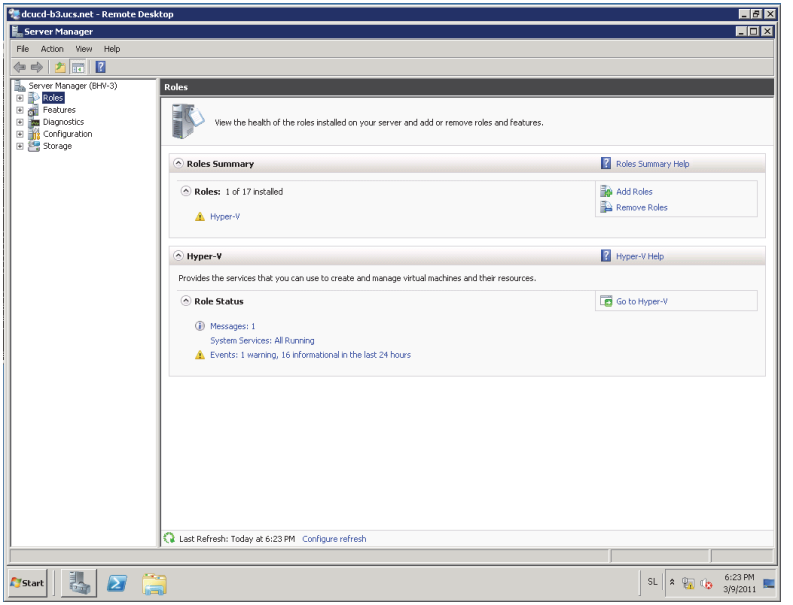
Microsoft Windows 2008 Hyper-V NICs

Name	Status	Device Name	Service Profile NIC	MAC Address

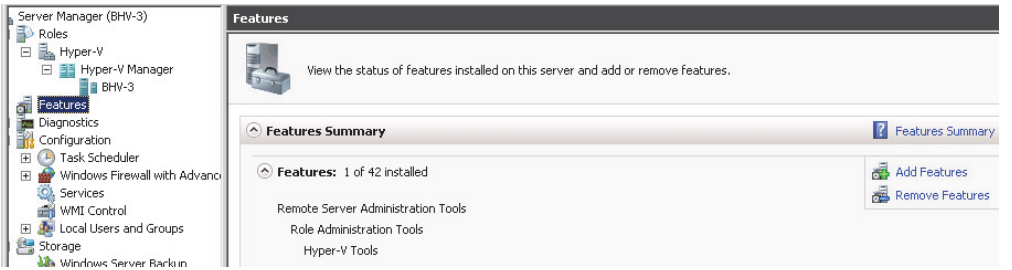
Be sure to confirm the NICs identity by looking at their MAC addresses. These would be the individual MAC addresses defined in the service profile.

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92. Next we will investigate the Hyper-V role settings and create/manage virtual machines. Start by opening **Server Manager**, this is the first icon in the Quick Launch toolbar (bottom left-hand corner).



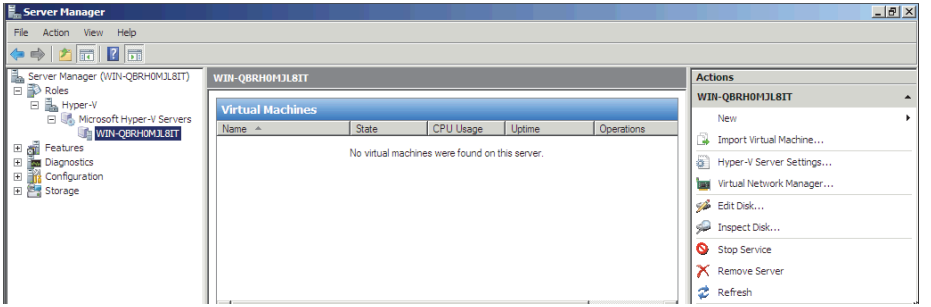
93. Click the **Features** option in the left pane to examine the features and roles that are enabled on your Hyper-V host. Notice that "Hyper-V tools" are listed.



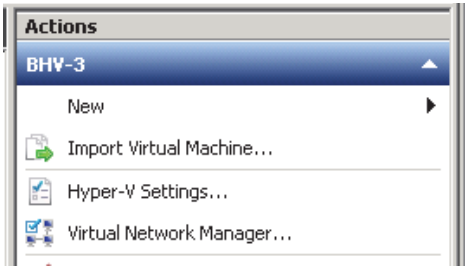
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94. Browse through the left pane, and expand **Roles > Hyper-V > Hyper-V Manager**. Click on the listed server to connect directly to your Hyper-V host.

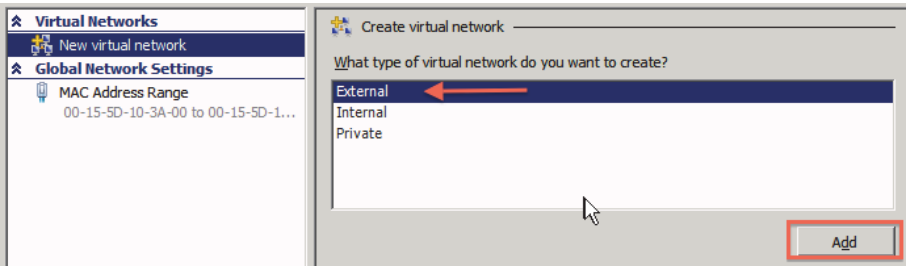
    If the snap-in does not load, you may need to click on **Hyper-V Manager > Connect to Server…** in the upper right-hand corner and chose "Local Computer".



95. Here we will configure the Hyper-V virtual network settings. Start by selecting the **Virtual Network Manager** option in the "Actions" pane to the far right.

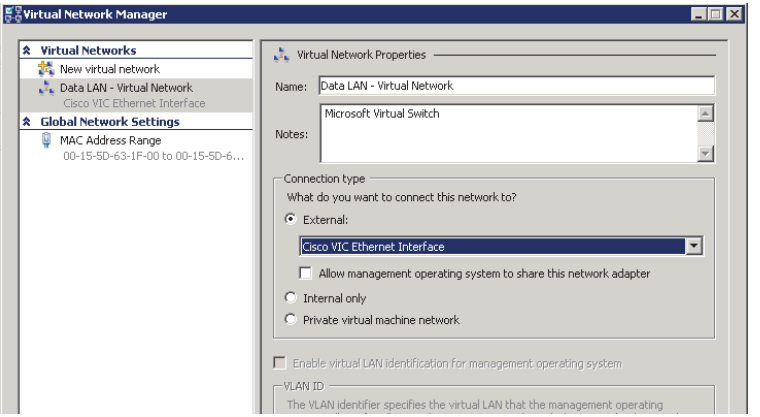


96. Select **External** as the "…type of virtual network," then click **Add**.



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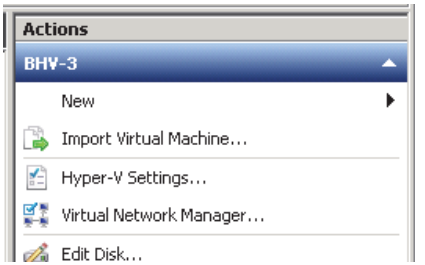
97. Name your new virtual network **Data LAN – Virtual Network** and ensure the "Connection type" is External with "Cisco VIC Ethernet Interface" selected as depicted in the graphic below.



98. Click **OK** and **Yes** to finalize the new virtual network settings.

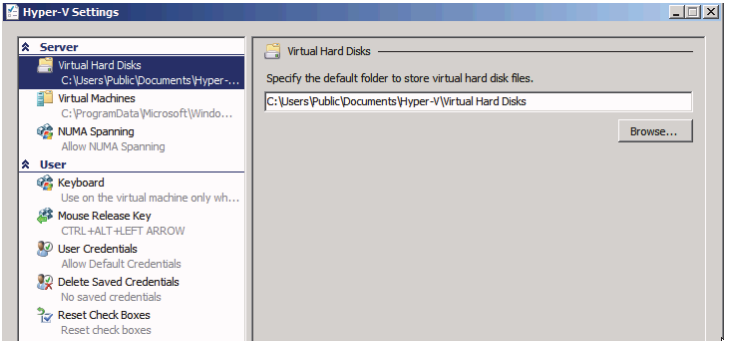
Note	If you do not see the **OK**, **Cancel** & **Apply** options at the bottom of this dialog, you may need to increase the resolution of **both** your Management Desktop and Hyper-V host KVM window. If you still do not see the **OK, Cancel** & **Apply** options close and restart the "Virtual Network Manager" wizard.

99. Before creating the virtual machines, explore the host configuration. Choose the **Hyper-V Settings** option in the **Actions** pane on the right.



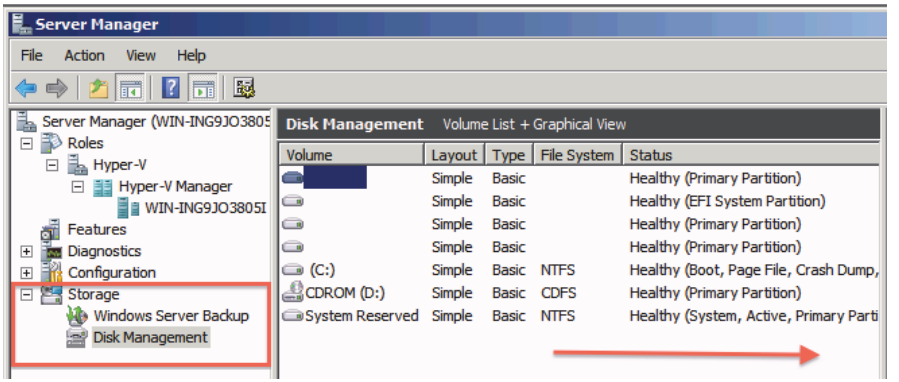
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100. This interface allows you to review the host settings. For example, the VMs virtual hard disks (VHDs) and virtual machines are stored in the C:\Users\Public\Documents\Hyper-V\Virtual Hard Disks path.



101. Take a moment to explore the settings and options for your Hyper-V host within the "Hyper-V Settings" window then click **OK** to return to main "Server Manager" screen.

102. Expand the **Storage** option in the left pane and choose the **Disk Management**. Review the host storage configuration, paying close attention to the **Capacity** and **Free Space** values. Use the following table to note the disk information.



Microsoft Windows 2008 R2 Hyper-V Disk Information

Disk Type & Letter	Capacity	Free Space

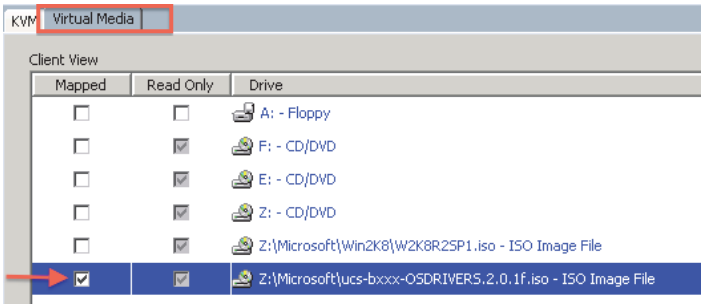
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Task 4: Creating Running Hyper-V-Hosted Virtual Machines

Now that the Hyper-V role is installed, it is time to create virtual machines.

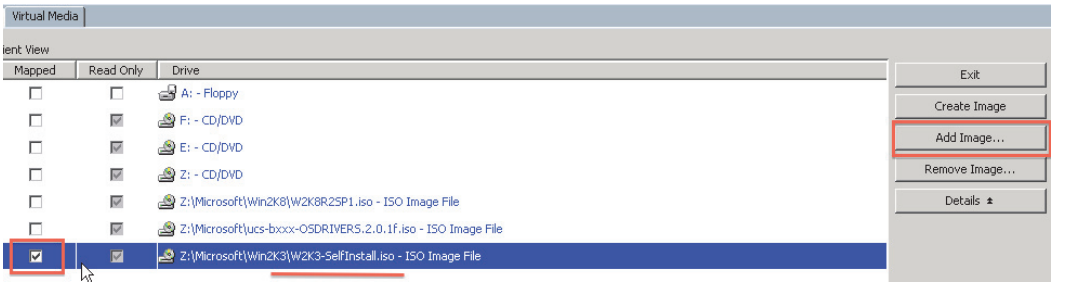
Note	For performance reasons, create one virtual machine at a time before moving on to the next virtual machine.

103. To prepare your host for the new virtual machines you need to make available the Guest Operating System used during installation. Click on the **Virtual Media** tab in the Hyper-V host KVM window.



104. Click once to remove the check mark next to the previously used UCS Drivers ISO. This will unmap the virtual media. Click **Yes** to confirm the umapping.

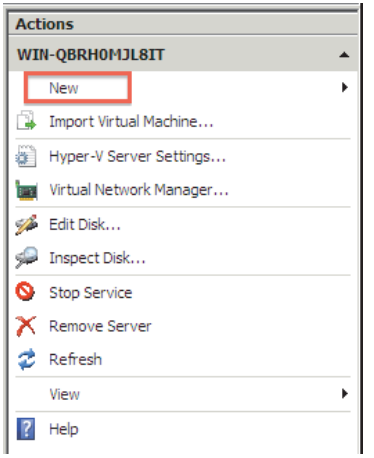
105. To add a new virtual media image click **Add Image...** Navigate to **Z:\Microsoft\Win2K3** and double-click **W2K3-SelfInstall.iso**. Finalize the process by adding a check mark in the mapped column next to the newly added image.



106. Next, click on the **KVM** tab and close the new "AutoPlay" dialog. Now you can continue with the virtual machine creation process.

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107. Start by navigating to your host listed under **Roles > Hyper-V > Hyper-V Manager**. Click on **New > Virtual Machine** in the upper right-hand corner of Server Manager.

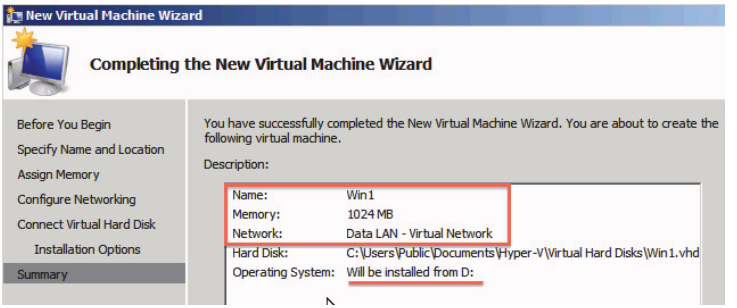


108. Use the "New Virtual Machine wizard" to create the following VMs. Pay close attention to the virtual machine settins defined throughout the table below. Click **Next** after each setting, once the settings are confirmed, click **Finish**.

VM Name	Memory (MB)	Connection:	VHD size (GB)
Win1	1024	Data LAN - Virtual Network	10
Win2	1024	Data LAN - Virtual Network	10

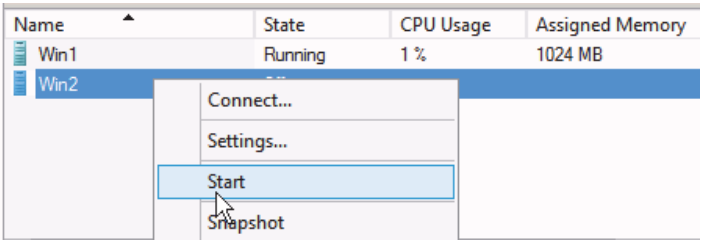
Additional details needed to define virtual machines:

- "Install an operating system from a boot CD/DVD-ROM"
- Select "Physical CD/DVD drive:" and click **D:**
- The default Self Install password for thie ISO is "vmware." Change to **NXos12345**



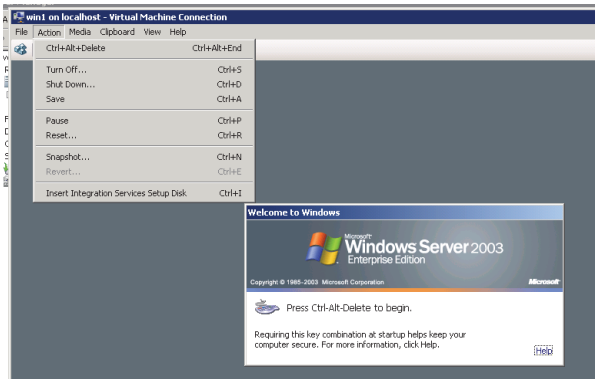
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109. Right-click the individual VM and choose the **Start** option from the menu. Repeat the process for each VM individually. The "Self Install" ISO, defined during VM creation process, will perform an unattended install of Windows 2003 Enterprise with SP2.



Note	For performance reasons, create one virtual machine at a time before moving on to the next virtual machine.

110. Once the self install process is complete, right-click once again on the VM and click **Connect** to open a console to the individual VM.
111. To login select **Ctrl+Alt+Delete** from the **Actions** menu and enter credentials of **Administrator** and **vmware**.

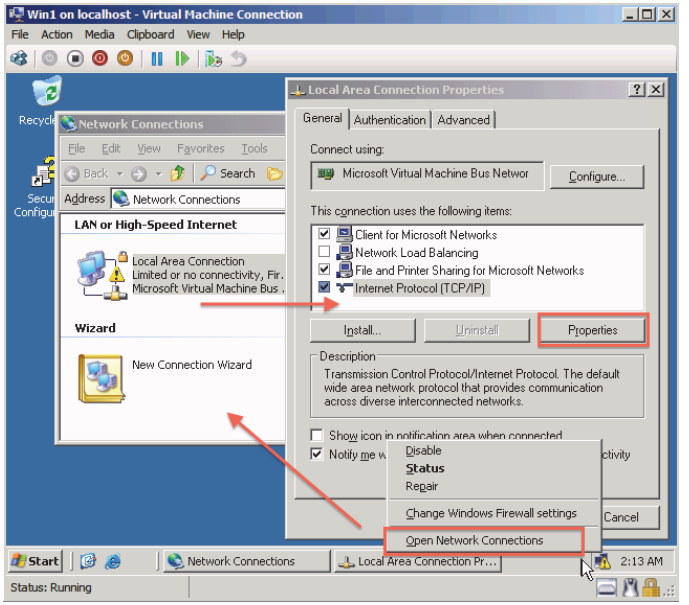


112. Take a moment to change the Administrator password to **NXos12345** by, once again, issuing a **Ctrl+Alt+Delete** from the **Action** menu of the "Virtual Machine Connection" window. Click on **Change Password** in the "Windows Security" dialog box.
113. Before your Network Adapter (and other virtualized hardware) is available for configuration you must install the drivers for this virtual hardware, also known as virtual machine "Integration Services". To start the install click **Actions > Insert Integration Services Setup Disk**. Once complete click **Yes** to reboot your VM.

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114. Log in to each of your VMs using **Administrator** and **NXos12345**. Use the steps outlined in the image and table below to assign IP address parameter and verify MAC address values. You will need this information to perform various tests.



115. Once the configuration process is complete, use the **ipconfig /all** command to verify the configured IP address and gather your MAC address.

Hyper-V Virtual Machine NIC Configuration

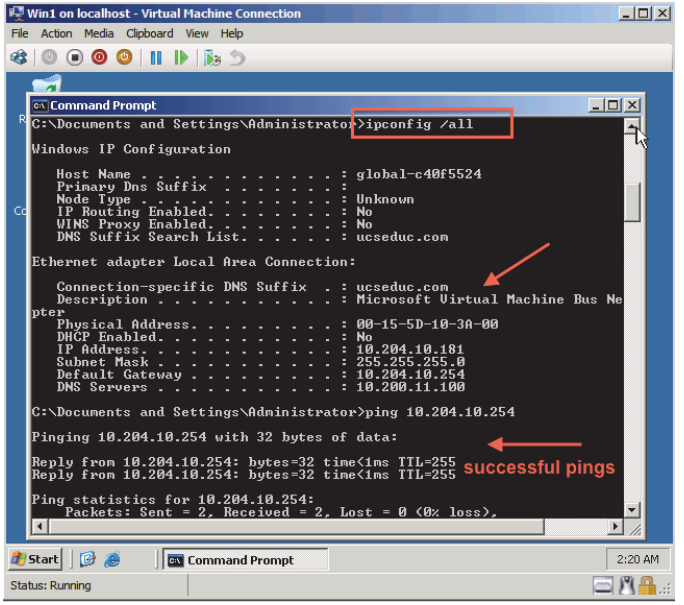
Where **X** = Chassis #, **P** = Pod #, **V** = VM #

ex. 10.203.10.112 = Chassis 3, Pod 1, Win2 VM

VM	IP Address (default gateway 10.20X.10.254)	MAC Address (write yours here)
Win1	10.20**X**.10.1**PV**/24	
Win2	10.20**X**.10.1**PV**/24	

* All VMs use **10.200.11.100** for DNS and a DNS suffix of **ucseduc.com**.

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116. Test the IP connectivity between the VMs with **ping** and **tracert** commands. Write the connectivity test results in the following table.

Virtual Machine Connectivity Test

VM	Can ping Default Gateway at 10.20x.10.254	Can ping other VM (ex. Win2 VM)
Win1		
Win2		

Note	If your pings fail take a moment to disable the “Windows Firewall” or specifically allow bi-directional pings. This option can be found at **Start > Control Panel > Windows Firewall**.

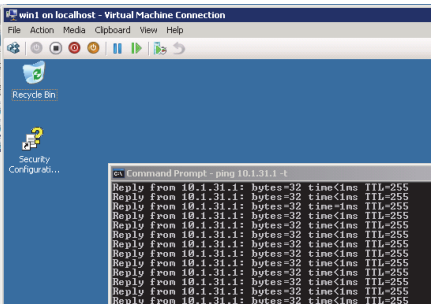
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Task 5: Testing UCS Service Profile Reconfiguration

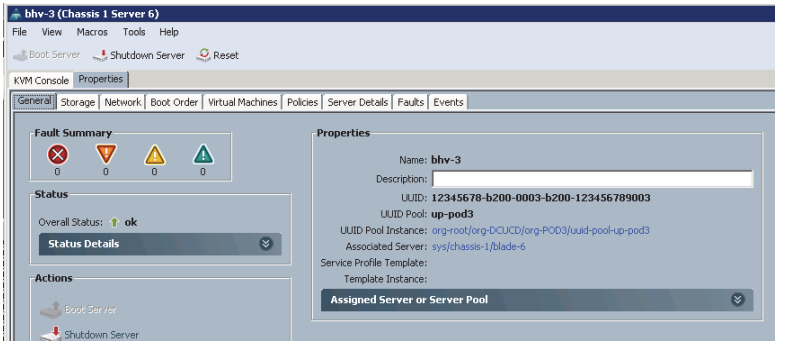
In this task, you will reconfigure the Hyper-V host **nicData** vNIC. You will remove a VLAN and later add it back, reconfigure a LAN pin group, and examine how such reconfiguration influences server operation.

Note You will conduct this task on Cisco UCS equipment that is shared by the pods. For that reason, you will not change any parameters if not required by the task.

117. Before modifying the vNIC configuration, execute a continuous ping from the **Win1 VM** to its default gateway. Ex. **ping -t 10.20X.10.254**.

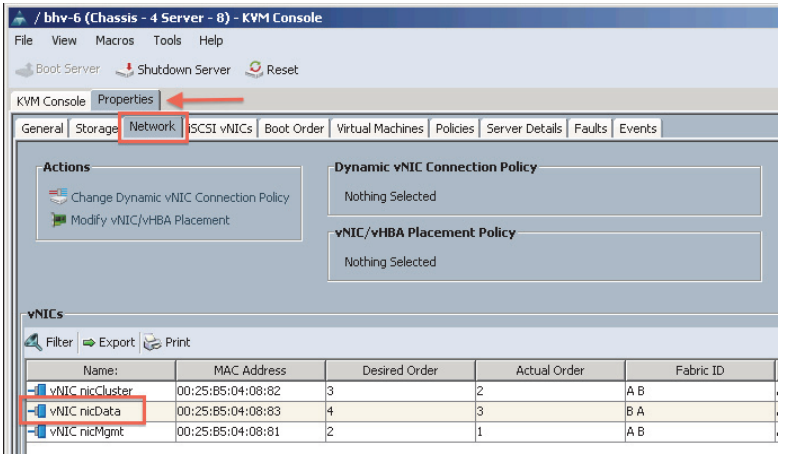


118. Using the **KVM console** of your Hyper-V service profile, click on the **Properties** tab.



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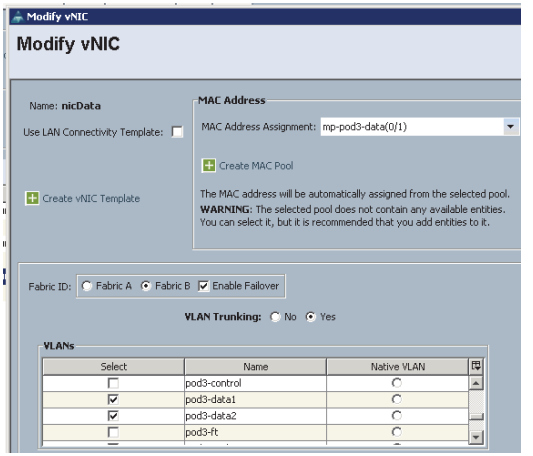
119. Navigate to the **Network** tab and select the **nicData** vNIC.



120. Click **Modify** at the bottom of the vNIC table to modify the **nicData** vNIC properties. Remember, this was the adapter that simply passed VM packets.



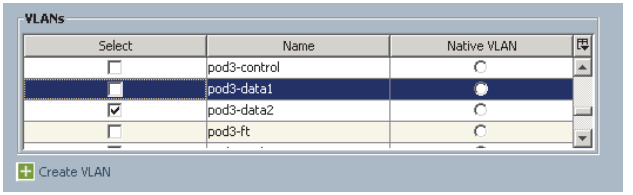
121. In the "Modify vNIC" dialog box, locate the **VLANs** table.



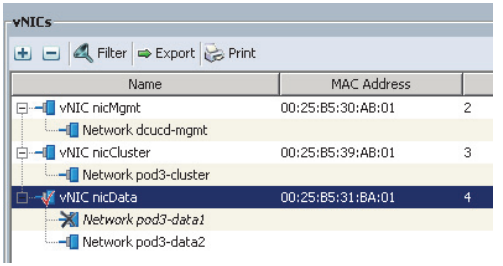
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122. **Deselect** the Pod**P**-Data1 (where **P** = your Pod#) VLAN and click **OK** to confirm the configuration change.

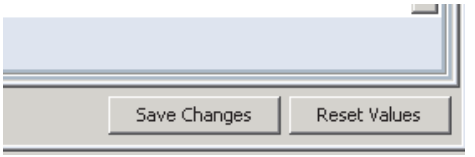
Is the ping from the Win1 VM still operational? **Yes** or **No** and **Why**? Answers will follow.



123. Examine the vNICs table. Note that the Pod**P**-Data1 VLAN is marked for deletion.



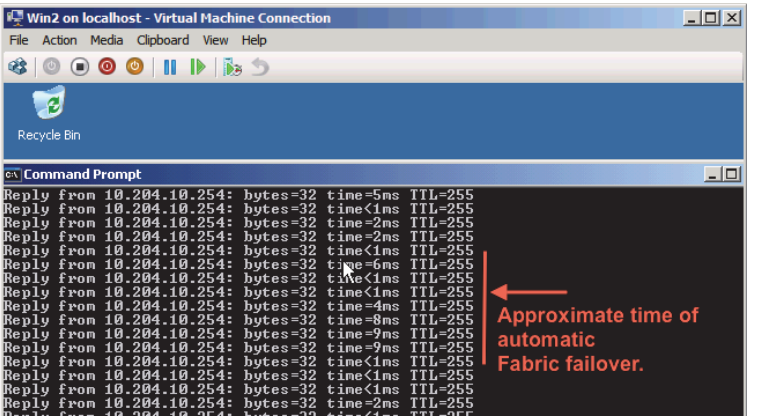
124. The network traffic would not be impated until you commit the configuration changes. To do so click the **Save Changes** button.



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125. Normally, if the vNIC was not configured for "Failover" the continuous ping from the Win1 VM would ceased to operate. However the failover option was configured for this vNIC back in Task 1, Step 38.

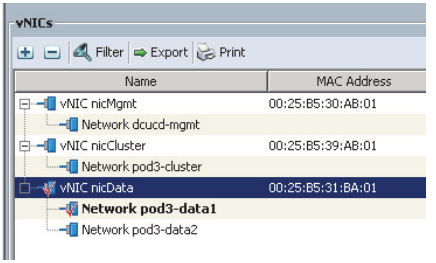
Nevertheless, there was a slight interruption in connectivity that would impart response time.



Why did the ping from the Win1 VM experience an increase in response time?

Did the UCS hardware-based fabric failover for **nicData** fail? **Yes** or **No** and **Why**?

126. Add back the Pod**P**-Data1 VLAN to the **nicData** vNIC and observe what happens with the continuous ping from Win1 VM.



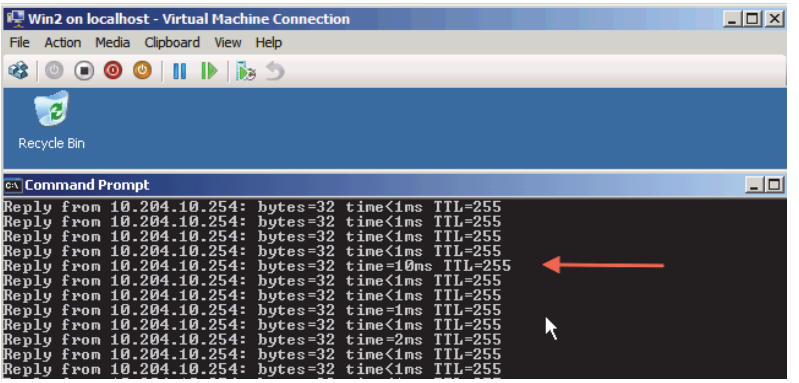
Did the ping from the Win1 VM experience any changes?

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127. Enter the Pod**P**-Data1 vNIC configuration again. This time you will change the LAN pin group. Set the pin group to Pod**P**-10G, where **P** is your Pod number. Apply the configuration and observe the continuous ping.

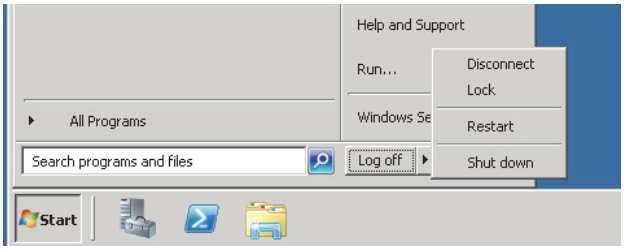


128. Once again, you can see the response time increase on a couple of pings.



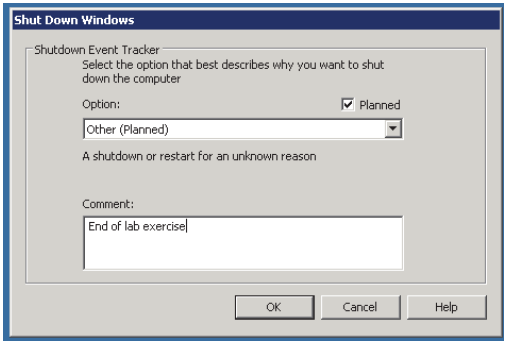
129. **Only** once your testing is complete and you are clear on the expected output continue with the following steps to shut down your Hyper-V host and delete the associated Service Profile.

130. Shut down your Hyper-V host by selecting **Start > Shut down**.

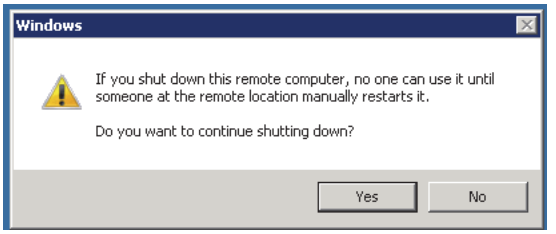


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131. When asked for confirmation, enter **End of lab exercise** in the field that is presented.



132. Confirm the shutdown action by clicking on **Yes** to continue.



133. Navigate to the **Servers** tab in the UCS Manager. Right click the "bhv-**P**" service profile and select the **Delete** option to remove the service profile. When prompted, confirm the delete action.

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Activity Verification

You have completed this activity when the following goals have been achieved:

- Create a Hyper-V service profile
- Create assigned VLANs and VSANs
- Create LAN pin groups
- Create vNICs for your Hyper-V LAN connectivity
- Create a vHBA for your Hyper-V SAN connectivity
- Create a boot policy in real time for your Hyper-V
- Install and Boot the Hyper-V host
- Explore the Hyper-V configuration and operation
- Explore and test network connectivity

Lab Complete

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L6

Configure Identity and Resource Pools

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Lab Overview

In this activity, you will configure identity pools, resource pools and policies to be used by service profiles in the next lab.

Estimated Completion Time

45 minutes

Lab Procedures

In this activity, you will:

- Create UUID, MAC and WWN identity pools
- Create Resource Pools
- Create a Qualification Policy

Required Resources

These are the resources and equipment that are required to complete this activity:

- Management Desktop
- Lab Identity and Resource Pools implementation sheet

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Lab 6 Identity and Resource Pools implementation sheet

Note The Task numbers below correspond to the Tasks where you will later use this information in the lab.

Task 1 Configure Pod-Specific VLANs: Where X = Chassis

Pod	VLAN Prefix	Management	Control	Packet	vMotion	Host Management	VM Traffic
1	Pod1	***X**10	**X**11	**X**12	***X**14	***X**16	***X**18
2	Pod2	***X**10	**X**21	**X**22	***X**14	***X**16	***X**18
3	Pod3	***X**10	**X**31	**X**32	***X**14	***X**16	***X**18
4	Pod4	***X**10	**X**41	**X**42	***X**14	***X**16	***X**18
5	Pod5	***X**10	**X**51	**X**52	***X**14	***X**16	***X**18
6	Pod6	***X**10	**X**61	**X**62	***X**14	***X**16	***X**18
7	Pod7	***X**10	**X**71	**X**72	***X**14	***X**16	***X**18
8	Pod8	***X**10 *All Pods use same value	**X**81	**X**82	***X**14 *All Pods use same value	***X**16 *All Pods use same value	***X**18 *All Pods use same value
			Each Pod creates their own VLAN				

Task 2 Configure UUID Prefix & Suffix Pools: Where X = Chassis

Pod	Org	UUID Pool Name	UUID Prefix	UUID Suffix	Size
1	Pod1	Pod1UUID	00000000-0000-**0X01**	**0X01**-000000000001	2
2	Pod2	Pod2UUID	00000000-0000-**0X02**	**0X02**-000000000001	2
3	Pod3	Pod3UUID	00000000-0000-**0X03**	**0X03**-000000000001	2
4	Pod4	Pod4UUID	00000000-0000-**0X04**	**0X04**-000000000001	2
5	Pod5	Pod5UUID	00000000-0000-**0X05**	**0X05**-000000000001	2
6	Pod6	Pod6UUID	00000000-0000-**0X06**	**0X06**-000000000001	2
7	Pod7	Pod7UUID	00000000-0000-**0X07**	**0X07**-000000000001	2
8	Pod8	Pod8UUID	00000000-0000-**0X08**	**0X08**-000000000001	2

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Task 3 Configure MAC Pools: Where X = Chassis

Pod	Org	MAC Pool Name	MAC Address	Size
1	Pod1	Pod1MAC	00:25:B5:0**X**:0**1**:**B0**	16
2	Pod2	Pod2MAC	00:25:B5:0**X**:0**2**:**B0**	16
3	Pod3	Pod3MAC	00:25:B5:0**X**:0**3**:**B0**	16
4	Pod4	Pod4MAC	00:25:B5:0**X**:0**4**:**B0**	16
5	Pod5	Pod5MAC	00:25:B5:0**X**:0**5**:**B0**	16
6	Pod6	Pod6MAC	00:25:B5:0**X**:0**6**:**B0**	16
7	Pod7	Pod7MAC	00:25:B5:0**X**:0**7**:**B0**	16
8	Pod8	Pod8MAC	00:25:B5:0**X**:0**8**:**B0**	16

Task 4 Configure WWNN (aka Node WWN) Pools:

Where **X** = Chassis #, **P** = Pod# and **B** = is an actual B for your B-Series

Pod	Org	WWNN Pool Name	WWNN prefix	Size
1	Pod1	Pod1WWNN	20:0**1**:00:00:0**X**:0**P**:0**B**:0**1**	1
2	Pod2	Pod2WWNN	20:0**1**:00:00:0**X**:0**P**:0**B**:0**1**	1
3	Pod3	Pod3WWNN	20:0**1**:00:00:0**X**:0**P**:0**B**:0**1**	1
4	Pod4	Pod4WWNN	20:0**1**:00:00:0**X**:0**P**:0**B**:0**1**	1
5	Pod5	Pod5WWNN	20:0**1**:00:00:0**X**:0**P**:0**B**:0**1**	1
6	Pod6	Pod6WWNN	20:0**1**:00:00:0**X**:0**P**:0**B**:0**1**	1
7	Pod7	Pod7WWNN	20:0**1**:00:00:0**X**:0**P**:0**B**:0**1**	1
8	Pod8	Pod8WWNN	20:0**1**:00:00:0**X**:0**P**:0**B**:0**1**	1

Task 5 Configure WWPN (aka Port WWN) Pool:

Where **X** = Chassis #, **P** = Pod# and **B** = is an actual B for your B-Series

Pod	Org	WWPN Pool Name	WWPN prefix	Size
1	Pod1	Pod1WWPN	20:0**0**:00:00:0**X**:0**P**:0**B**:0**1**	2
2	Pod2	Pod2WWPN	20:0**0**:00:00:0**X**:0**P**:0**B**:0**1**	2
3	Pod3	Pod3WWPN	20:0**0**:00:00:0**X**:0**P**:0**B**:0**1**	2
4	Pod4	Pod4WWPN	20:0**0**:00:00:0**X**:0**P**:0**B**:0**1**	2
5	Pod5	Pod5WWPN	20:0**0**:00:00:0**X**:0**P**:0**B**:0**1**	2
6	Pod6	Pod6WWPN	20:0**0**:00:00:0**X**:0**P**:0**B**:0**1**	2
7	Pod7	Pod7WWPN	20:0**0**:00:00:0**X**:0**P**:0**B**:0**1**	2
8	Pod8	Pod8WWPN	20:0**0**:00:00:0**X**:0**P**:0**B**:0**1**	2

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Task 6 Configure Server Pool Qualification Policy

Pod	Org	Server Pool Name	Qualification Name	Server Pool Policy	Blade	Size
1	Pod1	Pod1Server	Pod1QUAL	Pod1POLICY	1	1
2	Pod2	Pod2Server	Pod2QUAL	Pod2POLICY	2	1
3	Pod3	Pod3Server	Pod3QUAL	Pod3POLICY	3	1
4	Pod4	Pod4Server	Pod4QUAL	Pod4POLICY	4	1
5	Pod5	Pod5Server	Pod5QUAL	Pod5POLICY	5	1
6	Pod6	Pod6Server	Pod6QUAL	Pod6POLICY	6	1
7	Pod7	Pod7Server	Pod7QUAL	Pod7POLICY	7	1
8	Pod8	Pod8Server	Pod8QUAL	Pod8POLICY	8	1

Task 7 Validate QoS, Configure Adapter, Scrub, and QoS Policies

Pod	Org	Adapter Policy Name	RSS Status	Failback Timer	Scrub Policy Name	QoS Policy Name
1	Pod1	Pod1Adapter	Enabled	2	Pod1Scrub	Pod1QoS
2	Pod2	Pod2Adapter	Enabled	2	Pod2Scrub	Pod2QoS
3	Pod3	Pod3Adapter	Enabled	2	Pod3Scrub	Pod3QoS
4	Pod4	Pod4Adapter	Enabled	2	Pod4Scrub	Pod4QoS
5	Pod5	Pod5Adapter	Enabled	2	Pod5Scrub	Pod5QoS
6	Pod6	Pod6Adapter	Enabled	2	Pod6Scrub	Pod6QoS
7	Pod7	Pod7Adapter	Enabled	2	Pod7Scrub	Pod7QoS
8	Pod8	Pod8Adapter	Enabled	2	Pod8Scrub	Pod8QoS

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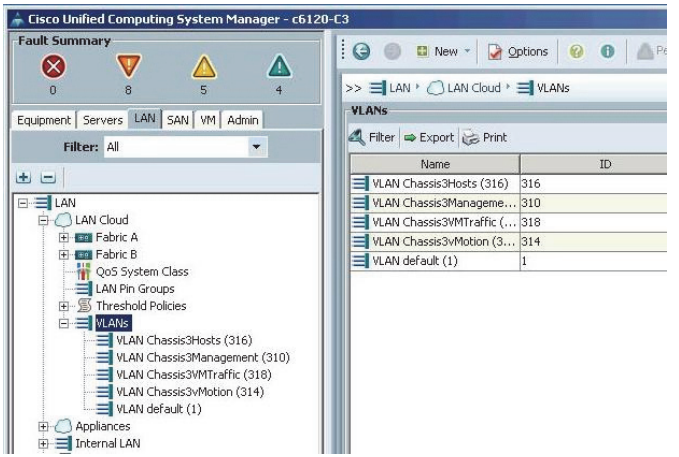
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Task 1: Configure Pod-Specific VLANs

In this task, you will configure the named VLANs that are required by VMware ESXi.

Note The values and screen shots used in all tasks of this lab are based on an example Chassis # and Pod #. Be sure to use the values that are associated with your assigned chassis and pod. These values are found in the implementation sheet (above) and in Lab 0.

1. In Cisco UCS Manager, choose the **LAN** tab.
2. Click the plus symbol (+) to the left of **LAN** and once again to the left of **LAN Cloud** to expand the list.



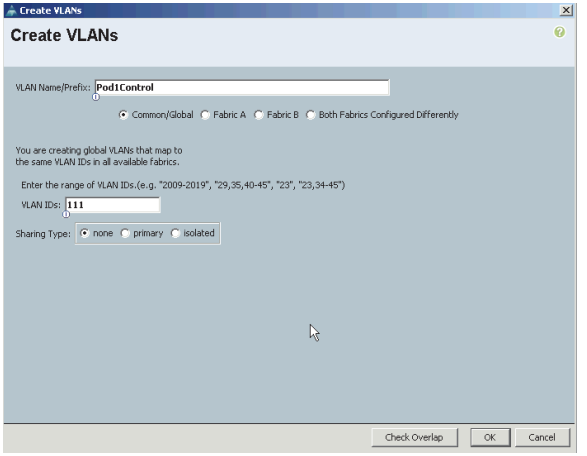
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3. Right-click **VLANs** and then click **Create VLAN(s)** from the drop-down list.

Note You are only creating your pod specific **Control** and **Packet** VLANs. The Management, vMotion, HostManagement and VMTraffic VLANs were already created for you.

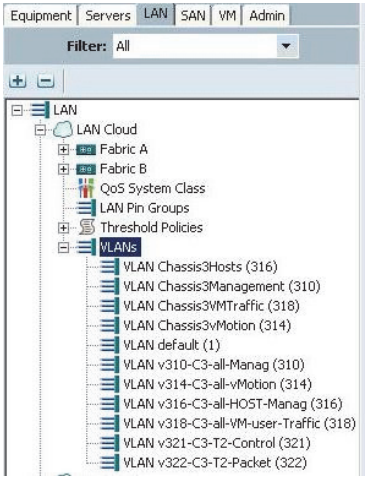
Pod	VLAN Prefix	Management	Control	Packet	vMotion	Host Management	VM Traffic
1	Pod1	***X**10	**X**11	**X**12	***X**14	***X**16	***X**18
2	Pod2	***X**10	**X**21	**X**22	***X**14	***X**16	***X**18
3	Pod3	***X**10	**X**31	**X**32	***X**14	***X**16	***X**18
4	Pod4	***X**10	**X**41	**X**42	***X**14	***X**16	***X**18
5	Pod5	***X**10	**X**51	**X**52	***X**14	***X**16	***X**18
6	Pod6	***X**10	**X**61	**X**62	***X**14	***X**16	***X**18
7	Pod7	***X**10	**X**71	**X**72	***X**14	***X**16	***X**18
8	Pod8	***X**10 *All Pods use same value	**X**81	**X**82	***X**14 *All Pods use same value	***X**16 *All Pods use same value	***X**18 *All Pods use same value
			Each Pod creates their own VLAN				

4. Use the "VLAN Prefix" (ex. Pod7Control) in the table above to name your VLANs. Remember X = Chassis #.



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5. Once complete click **OK** to finalize the VLAN creation and **OK** again to acknowledge.
6. Repeat Steps 3–5 to create your **Packet** VLAN.



Note	Do not use the VLAN names and numbers that are called out in the figure above, unless you are assigned the specific chassis and pod referenced in the figure. Instead, refer to the implementation sheet for your pod-specific naming and numbering.

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Task 2: Configure UUID Prefix and Suffix Pools

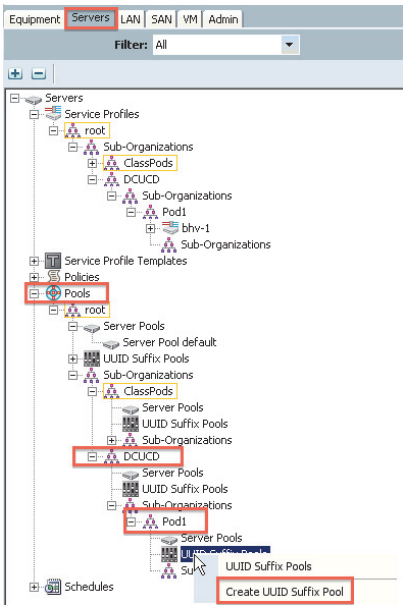
In this task, you will configure UUID pools to be used later by service profile templates.

Note The examples that are used in all tasks of this lab are based on a sample pod. Be sure to use the values that are associated with your assigned pod, according to the implementation sheet.

7. In Cisco UCS Manager, choose the **Servers** tab.
8. Expand **Pools > Root > Sub-Organizations > DCUCD> Sub-Organizations > *Your Pod* > UUID Suffix Pools**.

Note If your Pod organization does not appear beneath **DCUCD**, as listed above, take a moment to create a Sub-Organization by right-clicking on **Sub-Organization** under "DCUCD" and selecting **Create Organization**.

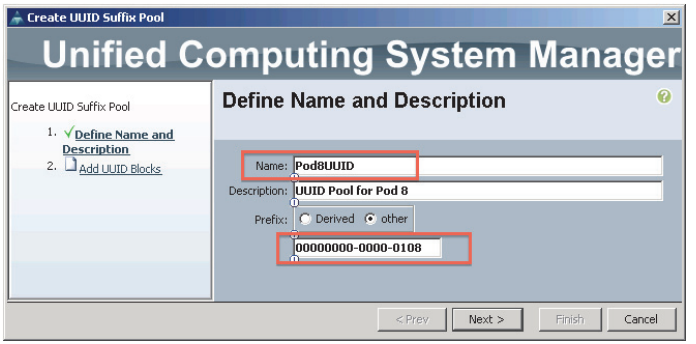
9. Right-click **UUID Suffix Pools** and choose **Create UUID Suffix Pool**.



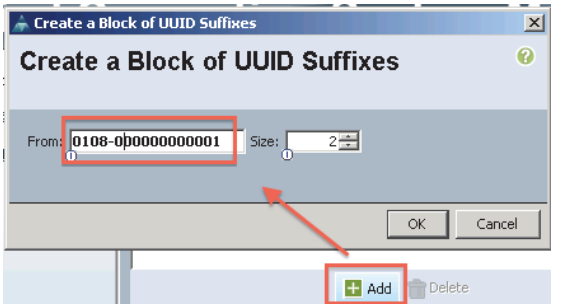
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Pod	Org	UUID Pool Name	UUID Prefix	UUID Suffix	Size
1	Pod1	Pod1UUID	00000000-0000-**0X01**	**0X01**-000000000001	2
2	Pod2	Pod2UUID	00000000-0000-**0X02**	**0X02**-000000000001	2
3	Pod3	Pod3UUID	00000000-0000-**0X03**	**0X03**-000000000001	2
4	Pod4	Pod4UUID	00000000-0000-**0X04**	**0X04**-000000000001	2
5	Pod5	Pod5UUID	00000000-0000-**0X05**	**0X05**-000000000001	2
6	Pod6	Pod6UUID	00000000-0000-**0X06**	**0X06**-000000000001	2
7	Pod7	Pod7UUID	00000000-0000-**0X07**	**0X07**-000000000001	2
8	Pod8	Pod8UUID	00000000-0000-**0X08**	**0X08**-000000000001	2

10. In the UUID creation wizard, enter the name of the UUID pool, according to the table above. Remember X = Chassis #. You may also enter an optional description.
11. Click the Prefix radio button named **other** and enter the UUID prefix, according to the table above.



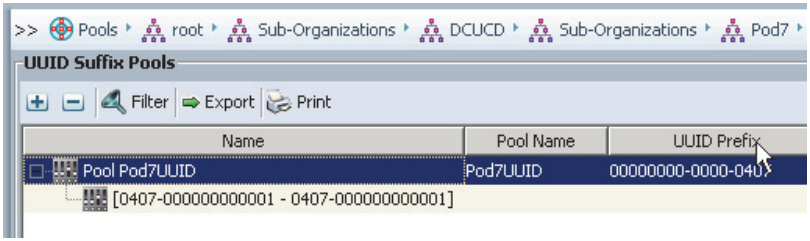
12. Click **Next** to continue.
13. Click the plus symbol (+) and enter the UUID suffix and pool size for your pod. Click **OK**.



14. Click **Finish** to complete the wizard and **OK** to confirm the creation.

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15. Expand the new UUID pool to view the details of the newly created pool.

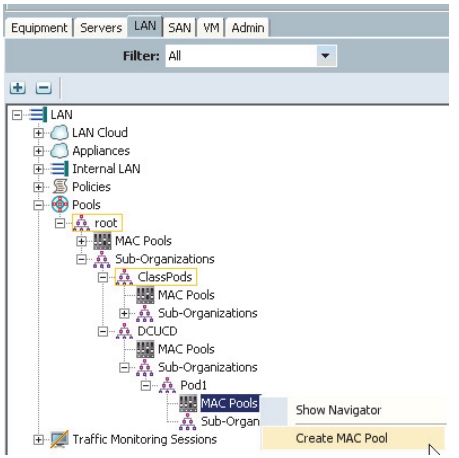


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Task 3: Configure MAC Pools

In this task, you will configure MAC addresses that will be consumed by service profile templates.

16. In Cisco UCS Manager, choose the **LAN** tab.
17. Expand **Pools > Root > Sub-Organizations > DCUCD> Sub-Organizations > *Your Pod* > MAC Pools**.

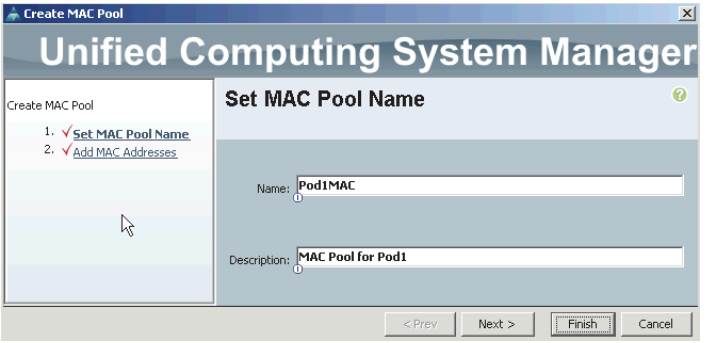


18. Right-click **MAC Pools** and choose **Create MAC Pool**.

Pod	Org	MAC Pool Name	MAC Address	Size
1	Pod1	Pod1MAC	00:25:B5:0**X**:01:**B1**	16
2	Pod2	Pod2MAC	00:25:B5:0**X**:02:**B1**	16
3	Pod3	Pod3MAC	00:25:B5:0**X**:03:**B1**	16
4	Pod4	Pod4MAC	00:25:B5:0**X**:04:**B1**	16
5	Pod5	Pod5MAC	00:25:B5:0**X**:05:**B1**	16
6	Pod6	Pod6MAC	00:25:B5:0**X**:06:**B1**	16
7	Pod7	Pod7MAC	00:25:B5:0**X**:07:**B1**	16
8	Pod8	Pod8MAC	00:25:B5:0**X**:08:**B1**	16

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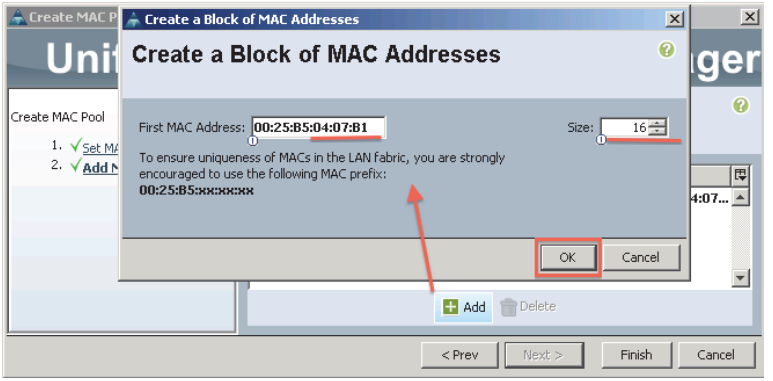
19. In the MAC Pool creation wizard, enter the name of the MAC pool, according to the table above. Remember, X = Chassis #. You may also enter an optional description.



20. Click **Next** to continue.

21. Click the plus symbol (+), enter the MAC suffix for your pod, and then click **OK**. Observe that the MAC pool wizard automatically provides the first 3 bytes of the MAC address.

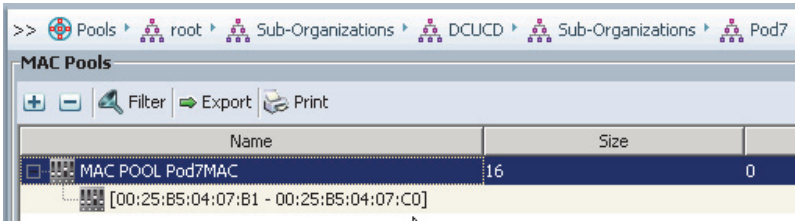
Note The following two windows are examples used in lab. Be sure to reference the lab Implementation Sheet to find your exact address.



22. Click **Finish** to complete the wizard and **OK** to confirm the creation.

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23. Expand the new MAC pool to view the details of the newly created pool.

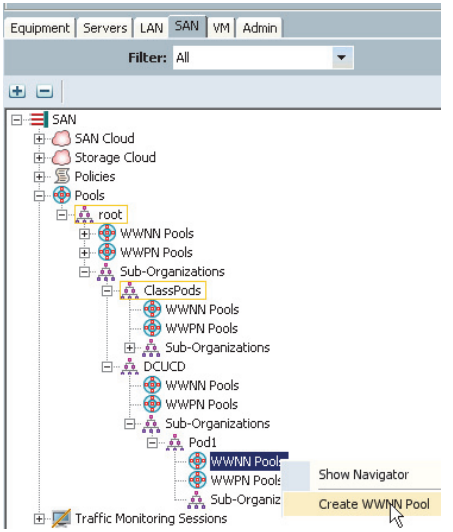


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Task 4: Configure WWNN Pools

In this task, you will configure WWNNs that will be consumed by service profile templates.

24. In Cisco UCS Manager, choose the **SAN** tab.
25. Expand **Pools > Root > Sub-Organizations > DCUCD > Sub-Organizations > *Your Pod* > WWNN Pools**.
26. Right-click **WWNN Pools** and choose Create WWNN Pool.

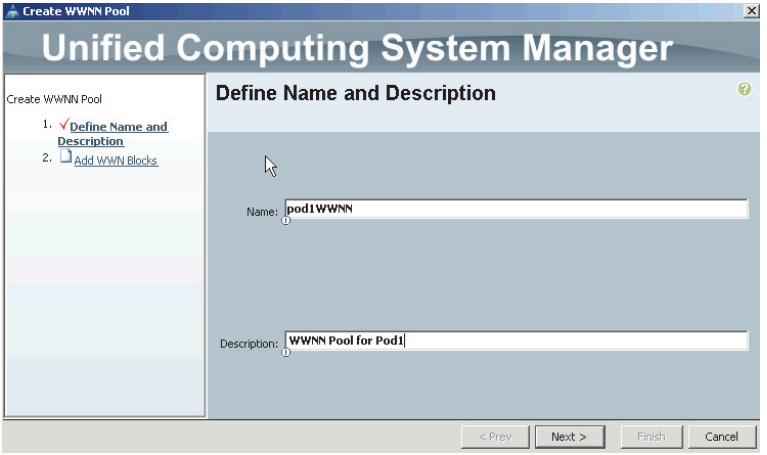


27. In the WWNN pool creation wizard, enter the name of the WWNN pool, according to the table below. Remember **X** = Chassis #, **P** = Pod and **B** is an actual B for your B-Series blade. You can also enter an optional description.

Pod	Org	WWNN Pool Name	WWNN prefix	Size
1	Pod1	Pod1WWNN	20:01:00:00:0**X**:01:0**B**:**01**	1
2	Pod2	Pod2WWNN	20:01:00:00:0**X**:02:0**B**:**01**	1
3	Pod3	Pod3WWNN	20:01:00:00:0**X**:03:0**B**:**01**	1
4	Pod4	Pod4WWNN	20:01:00:00:0**X**:04:0**B**:**01**	1
5	Pod5	Pod5WWNN	20:01:00:00:0**X**:05:0**B**:**01**	1
6	Pod6	Pod6WWNN	20:01:00:00:0**X**:06:0**B**:**01**	1
7	Pod7	Pod7WWNN	20:01:00:00:0**X**:07:0**B**:**01**	1
8	Pod8	Pod8WWNN	20:01:00:00:0**X**:08:0**B**:**01**	1

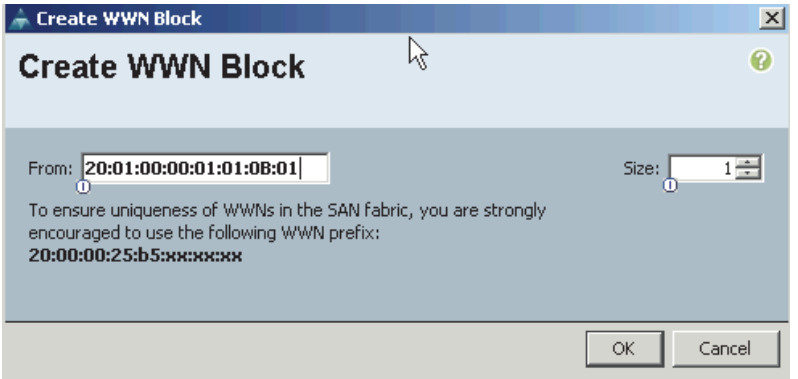
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28. Click **Next** to continue.
29. Click the plus symbol (+), enter the WWNN prefix for your pod, and then click **OK**. Observe that the WWNN pool wizard automatically provides the first 5 bytes of the WWNN address.

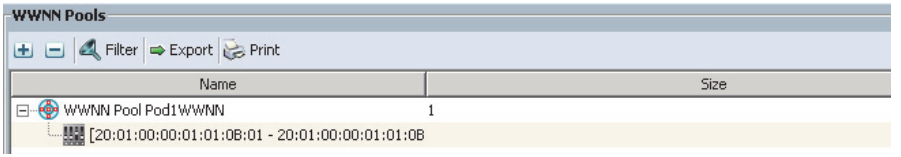
Note	For consistency in our lab environment, we are going to override the default value and not use the prefix “encouraged”.



30. Click **Finish** to complete the wizard and **OK** to confirm the creation.

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31. Expand the new WWNN pool to view the details of the newly created pool. Notice the "Assigned" column; this is especially useful for troubleshooting as needed.

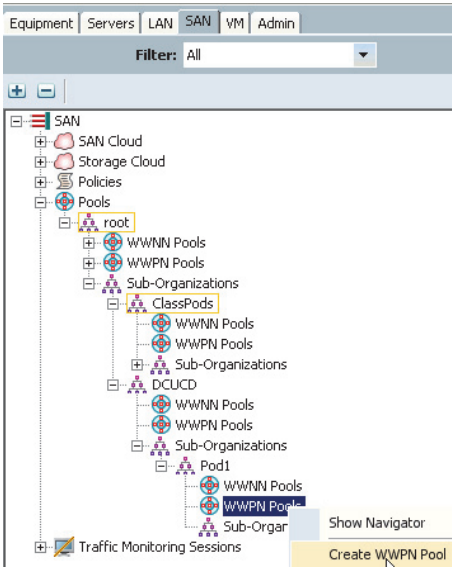


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Task 5: Configure WWPN Pools

In this task, you will configure WWPNs that will be consumed by service profile templates.

32. In Cisco UCS Manager, choose the **SAN** tab.
33. Expand **Pools > Root > Sub-Organizations > DCUCD > Sub-Organizations > *Your Pod* > WWPN Pools**.
34. Right-click **WWPN Pools** and choose **Create WWPN Pool**.

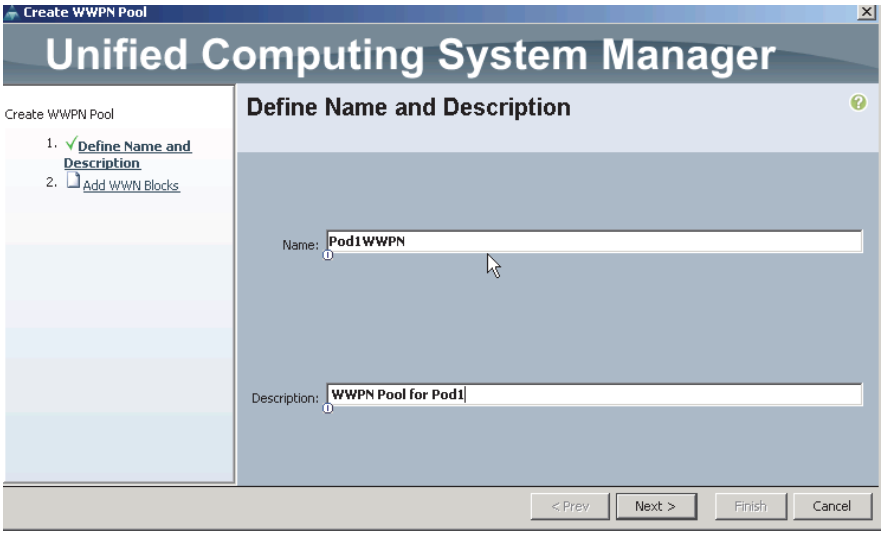


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35. In the WWPN pool creation wizard, enter the name of the WWPN pool, according to the table below.

    Remember **X** = Chassis #, **P** = Pod and **B** is an actual B for your B-Series blade. You may also enter an optional description.

Pod	Org	WWPN Pool Name	WWPN prefix	Size
1	Pod1	Pod1WWPN	20:0**0**:00:00:0**X**:0**1**:0**B**:0**1**	2
2	Pod2	Pod2WWPN	20:0**0**:00:00:0**X**:0**2**:0**B**:0**1**	2
3	Pod3	Pod3WWPN	20:0**0**:00:00:0**X**:0**3**:0**B**:0**1**	2
4	Pod4	Pod4WWPN	20:0**0**:00:00:0**X**:0**4**:0**B**:0**1**	2
5	Pod5	Pod5WWPN	20:0**0**:00:00:0**X**:0**5**:0**B**:0**1**	2
6	Pod6	Pod6WWPN	20:0**0**:00:00:0**X**:0**6**:0**B**:0**1**	2
7	Pod7	Pod7WWPN	20:0**0**:00:00:0**X**:0**7**:0**B**:0**1**	2
8	Pod8	Pod8WWPN	20:0**0**:00:00:0**X**:0**8**:0**B**:0**1**	2



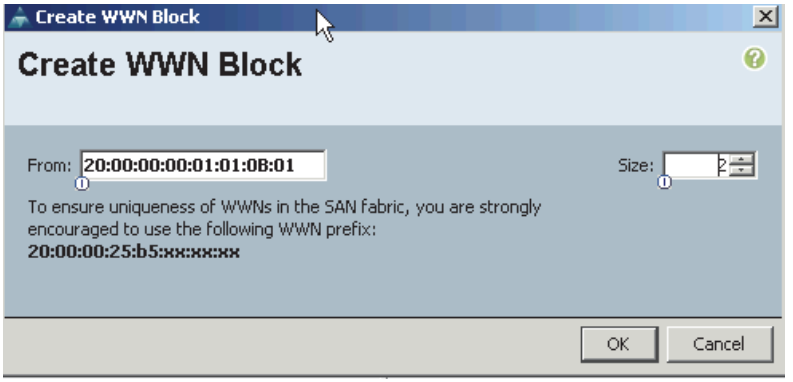
36. Click **Next** to continue.

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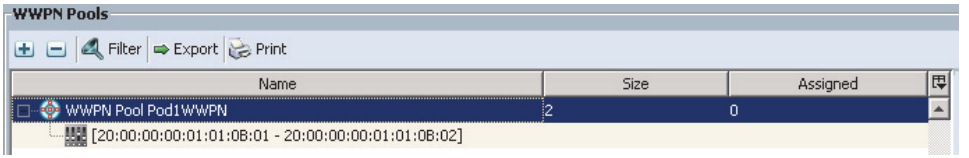
37. Click the plus symbol (+) and enter the WWPN suffix and pool size for your pod. Click **OK**.

    Observe how the WWPN pool wizard automatically provided the first 5 bytes of the WWPN address.

Note	Just as with the WWNN, we will not use the pre-filled “encouraged” values here.



38. Click **Finish** to complete the wizard and **OK** to confirm creation.
39. Expand the new WWPN pool to view the details of the newly created pool.

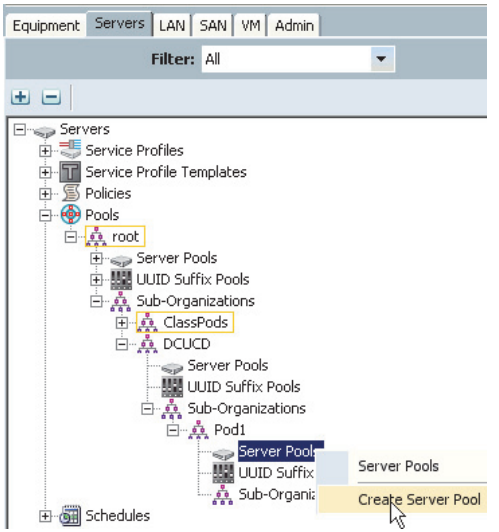


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Task 6: Configure Server Pool Qualification Policy

In this task, you will configure and test a server pool qualification policy to automatically populate a server pool with your assigned blade server.

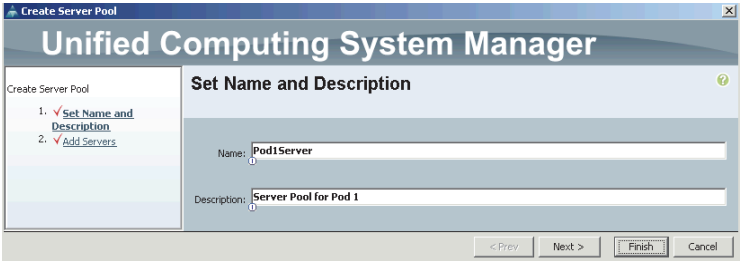
40. In Cisco UCS Manager, choose the **Servers** tab.
41. Expand **Pools > Root > Sub-Organizations > DCUCD > Sub-Organizations > *Your Pod* > Server Pools**.
42. Right-click **Server Pools** and choose **Create Server Pool**.



43. In the Server pool creation wizard, enter the name of the server pool, according to the table below. You can also enter an optional description.

Pod	Org	Server Pool Name	Qualification Name	Server Pool Policy	Blade	Size
1	Pod1	Pod1Server	Pod1QUAL	Pod1POLICY	1	1
2	Pod2	Pod2Server	Pod2QUAL	Pod2POLICY	2	1
3	Pod3	Pod3Server	Pod3QUAL	Pod3POLICY	3	1
4	Pod4	Pod4Server	Pod4QUAL	Pod4POLICY	4	1
5	Pod5	Pod5Server	Pod5QUAL	Pod5POLICY	5	1
6	Pod6	Pod6Server	Pod6QUAL	Pod6POLICY	6	1
7	Pod7	Pod7Server	Pod7QUAL	Pod7POLICY	7	1
8	Pod8	Pod8Server	Pod8QUAL	Pod8POLICY	8	1

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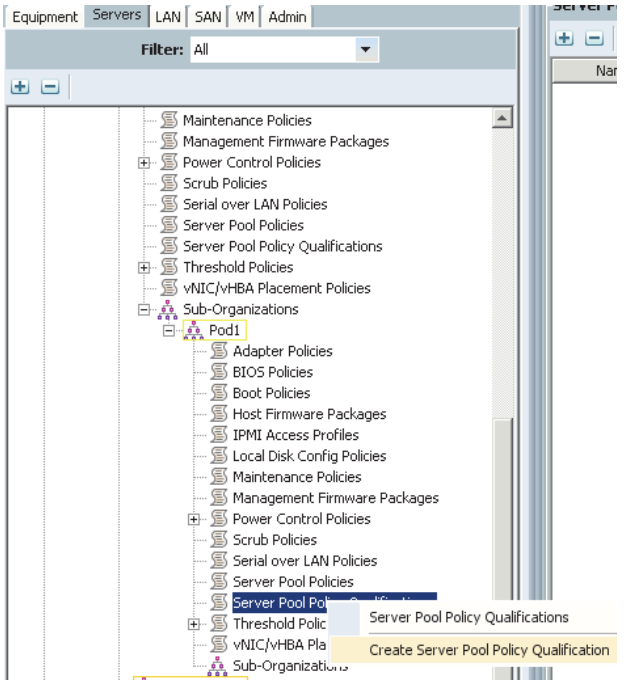
44. Click **Next** to continue.
45. Click **Finish** to complete the wizard and **OK** to confirm creation.

Note	We will not add servers directly to the newly created pool. Instead we will create a Server Pool Qualification policy in the next step and use this policy to decide which server will be placed into which pool.

46. In the **Servers** tab, expand **Policies > Root > Sub-Organizations > DCUCD > Sub-Organizations > *Your Pod* > Server Pool Policy Qualifications**.

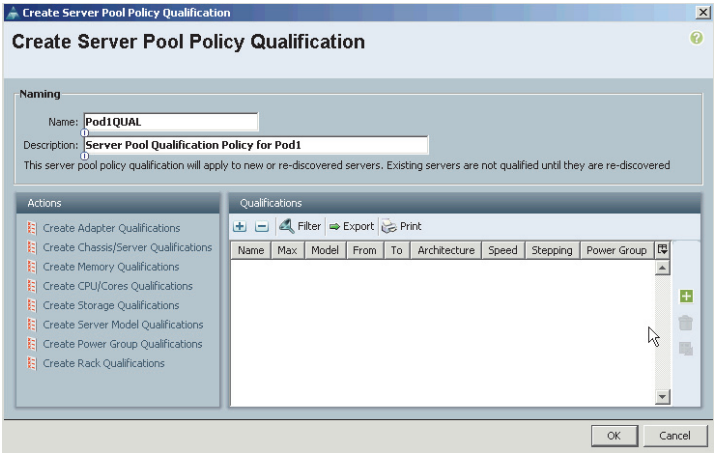
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47. Right-click **Server Pool Policy Qualifications** and choose **Create Server Pool Policy Qualification**.



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48. In the Server Pool Policy Qualification creation wizard, enter the name of the server pool qualification policy, according to the table above. You may also enter an optional description.

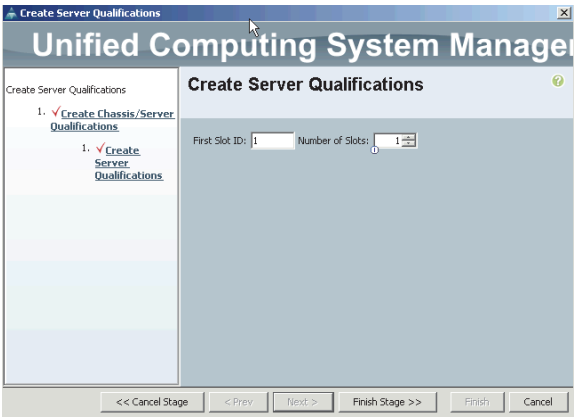


49. In the Actions panel, click the **Create Chassis/Server Qualifications** link.

50. Be sure your chassis # is in the "First Chassis ID" field under "Chassis Qualifications". The default value will only work if you've been assigned chassis #1.

51. Click the plus symbol (+) to configure a new policy.

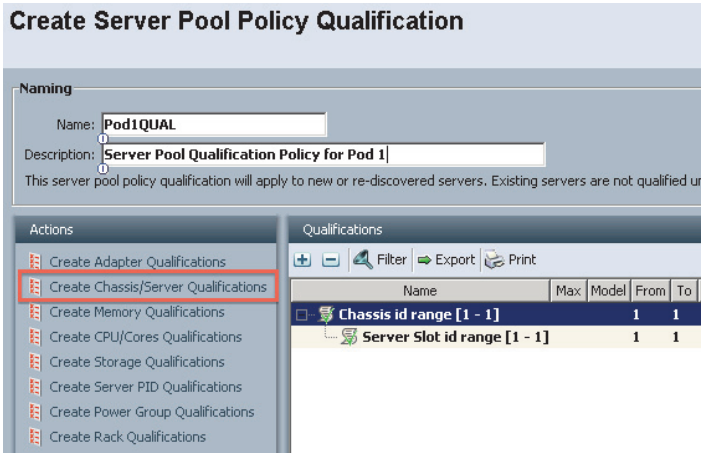
Note	To define a range of chassis you could enter a starting chassis number and finish with how many chassis the selection would span.



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52. The **First Slot ID** value corresponds to your blade number from the table above.
53. Click **Finish Stage** and then **Finish** to add your blade to the selection criteria.

    In the example below we have a chassis policy starting at chassis #1 and only selecting 1 chassis. Additionally we have a blade policy starting at blade #1 and only selecting 1 blade. This policy will precisely choose Chassis 1, Blade 1.

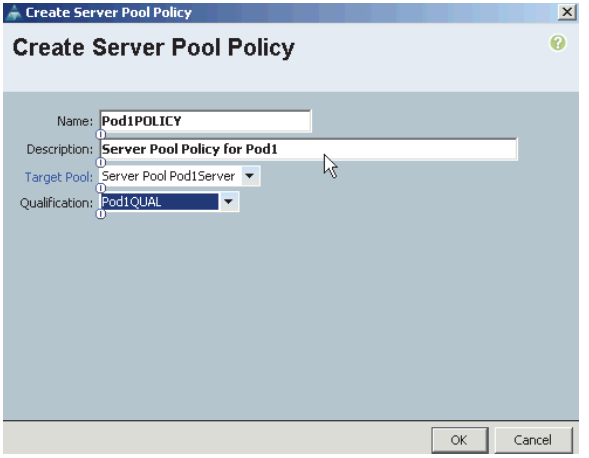


54. In the "Create Server Pool Policy Qualification" window, expand the “chassis id range…” to verify that your blade appears in the Qualifications panel.
55. Click **OK** to finish the qualification policy and **OK** again to confirm creation.
56. From the navigation pane, right-click **Server Pool Policies** and choose **Create Server Pool Policy**.
57. Enter the “Server Pool Policy” name from the table below. You may also enter an optional description.

Pod	Org	Server Pool Name	Qualification Name	Server Pool Policy	Blade	Size
1	Pod1	Pod1Server	Pod1QUAL	Pod1POLICY	1	1
2	Pod2	Pod2Server	Pod2QUAL	Pod2POLICY	2	1
3	Pod3	Pod3Server	Pod3QUAL	Pod3POLICY	3	1
4	Pod4	Pod4Server	Pod4QUAL	Pod4POLICY	4	1
5	Pod5	Pod5Server	Pod5QUAL	Pod5POLICY	5	1
6	Pod6	Pod6Server	Pod6QUAL	Pod6POLICY	6	1
7	Pod7	Pod7Server	Pod7QUAL	Pod7POLICY	7	1
8	Pod8	Pod8Server	Pod8QUAL	Pod8POLICY	8	1

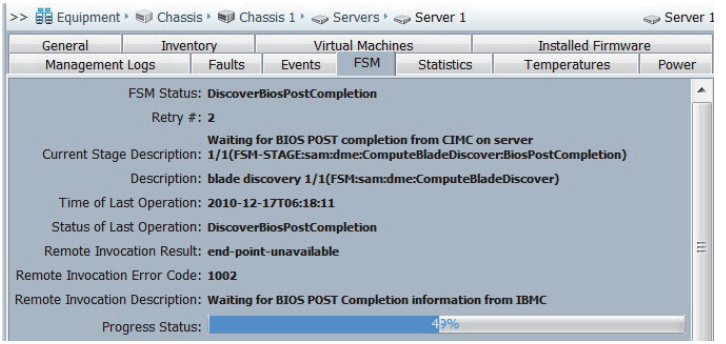
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58. Choose your Target Pool and Qualification values (created above) from the drop-down list and then click **OK** to finish and **OK** again to confirm creation.



Note	Because pool qualification policies are evaluated only when a server is initially or later acknowledged by the chassis, you must re-acknowledge your blade.

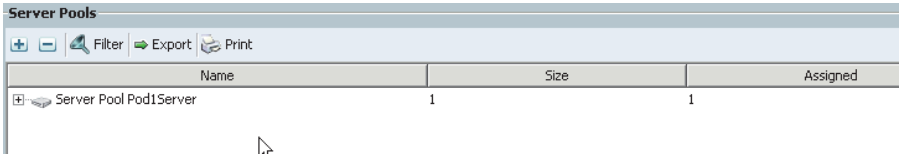
59. Choose the **Equipment** tab in Cisco UCS Manager.
60. Expand **Equipment > Chassis > Chassis X > Servers**. Where **X** = Chassis #.
61. Right-click your assigned server, select **Server Maintenance**, choose **Re-acknowledge** and click **OK** from the pop-up menu. Click **Yes** to confirm that you want to reboot the server and **OK** to confirm the action.
62. Click the **FSM** tab in the content pane to observe Cisco UCS Manager adding the server into inventory.



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63. When the FSM status reaches 100 percent, return to the Servers tab in the navigation pane and expand **Pools > Root > Sub-Organizations > DCUCD > Sub-Organizations > *Your Pod* > Server Pools**.

64. In the content pane, expand your server pool. Assuming that the qualification policy is configured correctly, you should see your assigned server as a member of the pool.



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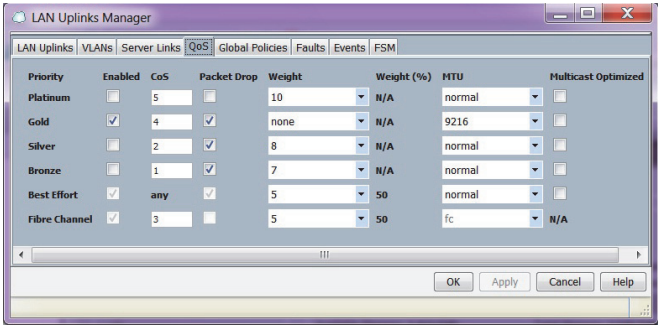
Task 7: Validate QoS, Configure Adapter, Scrub, and QoS Policies

In this task, you will verify that global QoS allows Ethernet jumbo frames. Additionally you will configure adapter, scrub, and QoS policies.

65. In **Cisco UCS Manager**, choose the **Equipment** tab and expand **Equipment > Fabric Interconnects > Fabric Interconnect A**.
66. In the content pane, click the **LAN Uplinks Manager** link.
67. Choose the **QoS** tab.

Note Because QoS is a global setting that applies to both fabric interconnects, the QoS setting was preconfigured for you. The Gold QoS Priority is disabled by default.

68. Verify that the **Gold** priority is enabled, **Packet Drop** is checked, **Weight** is none, and **MTU** is 9216.

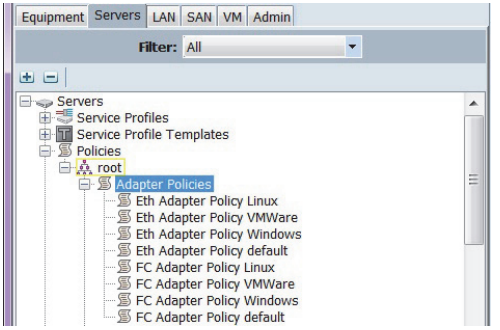


69. Click **OK** to close the LAN Uplinks Manager.
70. In the **Servers** tab, expand **Policies > Root > Adapter Policies**.

Note Observe the default adapter policies that can be applied to a service profile. These policies define adapter settings that are generally desirable for Linux, Windows, and VMware. If a service profile does not explicitly choose an adapter policy, then the default adapter policy is applied to that service profile. Adapter policies for Ethernet and Fibre Channel are individually configurable.

Because these policies are created at the root level of the organizational hierarchy, they can be consumed by service profiles in any sub-organization.

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71. In the **Servers** tab, expand **Policies > Root > Sub-Organizations > DCUCD > Sub-Organizations >** ***Your Pod*** **> Adapter Policies**.

72. Right-click **Adapter Policies** in your organization and choose **Create Ethernet Adapter Policy**.

Pod	Org	Adapter Policy Name	RSS Status	Failback Timer	Scrub Policy Name	QoS Policy Name
1	Pod1	Pod1Adapter	Enabled	2	Pod1Scrub	Pod1QoS
2	Pod2	Pod2Adapter	Enabled	2	Pod2Scrub	Pod2QoS
3	Pod3	Pod3Adapter	Enabled	2	Pod3Scrub	Pod3QoS
4	Pod4	Pod4Adapter	Enabled	2	Pod4Scrub	Pod4QoS
5	Pod5	Pod5Adapter	Enabled	2	Pod5Scrub	Pod5QoS
6	Pod6	Pod6Adapter	Enabled	2	Pod6Scrub	Pod6QoS
7	Pod7	Pod7Adapter	Enabled	2	Pod7Scrub	Pod7QoS
8	Pod8	Pod8Adapter	Enabled	2	Pod8Scrub	Pod8QoS

73. Enter the adapter policy name from the table above. You may also enter an optional description.

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74. Expand **Options** and click the **enabled** radio button for Receive Side Scaling (RSS) and set the Failback Timeout to 2 seconds.



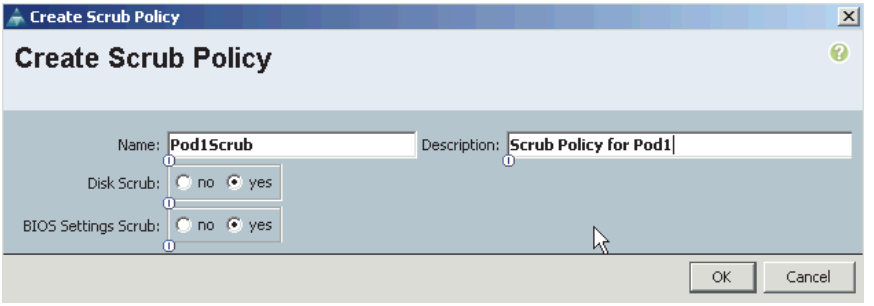
75. Click **OK** to save your new adapter policy and **OK** again to confirm creation.

Note	The QoS setting and adapter policy will be selected in the service profile template that you create in Lab 4. Any service policies that are created from the template will inherit the QoS setting and adapter policy.

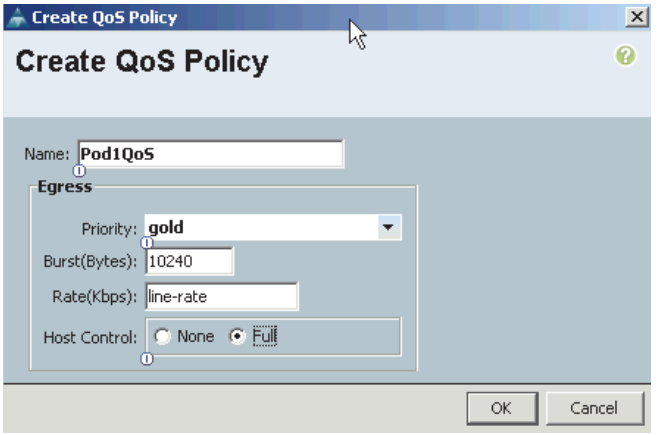
76. While still under the policies of your organization in the navigation window, right-click **Scrub Policies** and choose **Create Scrub Policy** from the pop-up menu.
77. Name the scrub policy according to the table above.
78. Choose the **Yes** radio button for **Disk Scrub** and **BIOS Settings Scrub**.

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79. Click **OK** to save the new policy and **OK** again to confirm creation.



80. In the **LAN** tab, expand **Policies > Root > Sub-Organizations > DCUCD > Sub-Organizations > *Your Pod* > QoS Policies**.
81. Right-click **QoS Policies** in your organization and choose **Create QoS Policy**.
82. Use the table above to determine your policy name.
83. Choose **Gold** from the Priority drop-down menu. Click the **Full** radio button for Host Control.



84. Click **OK** to save the policy and **OK** again to confirm creation.

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Activity Verification

You have completed this activity when you have achieved these goals:

- You have created your pod-specific VLANs
- You have created your assigned UUID pool with two UUIDs.
- You have created your assigned MAC pool with two MAC addresses.
- You have created your assigned WWNN pool with one WWNN.
- You have created your assigned WWPN pool with two WWPN.
- You have created and tested a server pool qualification policy.
- You have validated QoS settings and configured adapter, scrub, and QoS policies.

Lab Complete

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L7

Create Logical Service Profiles from Updating Templates

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Lab Overview

In this activity, you will configure service profile templates that will be used later to generate service profiles. All service profiles will use servers and identities that are drawn from the pools created earlier.

Estimated Completion Time

45 minutes

Lab Procedures

- Create vNIC and vHBA Templates for Your Organization
- Create a Service Profile Template for Your Organization
- Create a Service Profile from the Updating Template
- Add IPMI Policy to Updating Template
- Install VMware ESXi (on Fibre Channel LUN or Local Disk)

Required Resources

These are the resources and equipment that are required to complete this activity:

- Management Desktop
- Lab implementation sheet

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Lab 7 Logical Service Profiles Implementation Sheet

Note The Task numbers below correspond to the Tasks where you will later use this information in the lab.

Task 1 Create vNIC and vHBA Templates for Your Organization

Pod	Org	vNIC-A Name	vNIC-B Name	vHBA-A Name	vHBA-B Name
1	Pod1	Pod1vNIC-A	Pod1vNIC-B	Pod1vHBA-A	Pod1vHBA-B
2	Pod2	Pod2vNIC-A	Pod2vNIC-B	Pod2vHBA-A	Pod2vHBA-B
3	Pod3	Pod3vNIC-A	Pod3vNIC-B	Pod3vHBA-A	Pod3vHBA-B
4	Pod4	Pod4vNIC-A	Pod4vNIC-B	Pod4vHBA-A	Pod4vHBA-B
5	Pod5	Pod5vNIC-A	Pod5vNIC-B	Pod5vHBA-A	Pod5vHBA-B
6	Pod6	Pod6vNIC-A	Pod6vNIC-B	Pod6vHBA-A	Pod6vHBA-B
7	Pod7	Pod7vNIC-A	Pod7vNIC-B	Pod7vHBA-A	Pod7vHBA-B
8	Pod8	Pod8vNIC-A	Pod8vNIC-B	Pod8vHBA-A	Pod8vHBA-B

Task 2 Create a Service Profile Template for Your Organization

Pod	Org	Template	vHBA0 Target WWPN	vHBA1 Target WWPN	LUN
1	Pod1	Pod1Template	Pri 50:06:01:***64***:44:60:4C:90 Sec 50:06:01:***6C***:44:60:4C:90	Pri 50:06:01:***65***:44:60:4C:90 Sec 50:06:01:***6D***:44:60:4C:90	0 0
2	Pod2	Pod2Template	Pri 50:06:01:***64***:44:60:4C:90 Sec 50:06:01:***6C***:44:60:4C:90	Pri 50:06:01:***65***:44:60:4C:90 Sec 50:06:01:***6D***:44:60:4C:90	0 0
3	Pod3	Pod3Template	Pri 50:06:01:***64***:44:60:4C:90 Sec 50:06:01:***6C***:44:60:4C:90	Pri 50:06:01:***65***:44:60:4C:90 Sec 50:06:01:***6D***:44:60:4C:90	0 0
4	Pod4	Pod4Template	Pri 50:06:01:***64***:44:60:4C:90 Sec 50:06:01:***6C***:44:60:4C:90	Pri 50:06:01:***65***:44:60:4C:90 Sec 50:06:01:***6D***:44:60:4C:90	0 0
5	Pod5	Pod5Template	Pri 50:06:01:***64***:44:60:4C:90 Sec 50:06:01:***6C***:44:60:4C:90	Pri 50:06:01:***65***:44:60:4C:90 Sec 50:06:01:***6D***:44:60:4C:90	0 0
6	Pod6	Pod6Template	Pri 50:06:01:***64***:44:60:4C:90 Sec 50:06:01:***6C***:44:60:4C:90	Pri 50:06:01:***65***:44:60:4C:90 Sec 50:06:01:***6D***:44:60:4C:90	0 0
7	Pod7	Pod7Template	Pri 50:06:01:***64***:44:60:4C:90 Sec 50:06:01:***6C***:44:60:4C:90	Pri 50:06:01:***65***:44:60:4C:90 Sec 50:06:01:***6D***:44:60:4C:90	0 0
8	Pod8	Pod8Template	Pri 50:06:01:***64***:44:60:4C:90 Sec 50:06:01:***6C***:44:60:4C:90	Pri 50:06:01:***65***:44:60:4C:90 Sec 50:06:01:***6D***:44:60:4C:90	0 0

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Task 3 Create a Service Profile from the Updating Template

Pod	Org	Service Profile Prefix	Number
1	Pod1	Pod1SP	1
2	Pod2	Pod2SP	1
3	Pod3	Pod3SP	1
4	Pod4	Pod4SP	1
5	Pod5	Pod5SP	1
6	Pod6	Pod6SP	1
7	Pod7	Pod7SP	1
8	Pod8	Pod8SP	1

Task 4 Create IPMI Policy

Pod	Policy Name	IPMI Username	IPMI Password
1	Pod1IPMI	IPMIUser1	NXos12345
2	Pod2IPMI	IPMIUser2	NXos12345
3	Pod3IPMI	IPMIUser3	NXos12345
4	Pod4IPMI	IPMIUser4	NXos12345
5	Pod5IPMI	IPMIUser5	NXos12345
6	Pod6IPMI	IPMIUser6	NXos12345
7	Pod7IPMI	IPMIUser7	NXos12345
8	Pod8IPMI	IPMIUser8	NXos12345

Task 5 Install VMware ESXi on FC LUN

Where **X** = Chassis# & **P** = Pod#

Pod	ESXi Hostname	IP Address	Gateway	VLAN
1	**CX**-P1-B-ESXi.ucseduc.com	10.20**X**.16.21/24 - 10.20**X**.16.1**P** = C200 (Lab 1) - 10.20**X**.16.2**P** = B200 (Lab 4) - 10.20**X**.16.3P = ESXi as VM	10.20**X**.16.254	**X**16
2	**CX**-P2-B-ESXi.ucseduc.com	10.20**X**.16.22/24	10.20**X**.16.254	**X**16
3	**CX**-P3-B-ESXi.ucseduc.com	10.20**X**.16.23/24	10.20**X**.16.254	**X**16
4	**CX**-P4-B-ESXi.ucseduc.com	10.20**X**.16.24/24	10.20**X**.16.254	**X**16
5	**CX**-P5-B-ESXi.ucseduc.com	10.20**X**.16.25/24	10.20**X**.16.254	**X**16
6	**CX**-P6-B-ESXi.ucseduc.com	10.20**X**.16.26/24	10.20**X**.16.254	**X**16
7	**CX**-P7-B-ESXi.ucseduc.com	10.20**X**.16.27/24	10.20**X**.16.254	**X**16
8	**CX**-P8-B-ESXi.ucseduc.com	10.20**X**.16.28/24	10.20**X**.16.254	**X**16

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Task 1: Create vNIC and vHBA Templates for Your Organization

In this task, you will configure updating vNIC and vHBA templates that leverage the pooled resources, identities, and policies created in Lab 6.

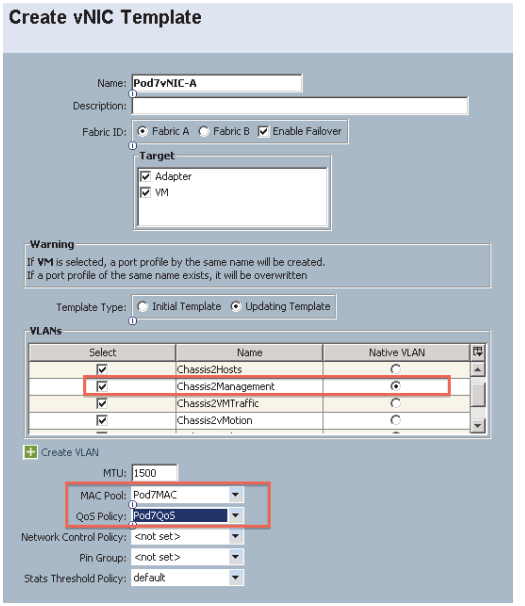
1. In Cisco UCS Manager, choose the **LAN** tab and expand **LAN > Policies > Root > Sub-Organizations > DCUCD > Sub-Organizations >** ***Your Pod***.
2. Right-click **vNIC Templates** and choose **Create vNIC Template**.

Pod	Org	vNIC-A Name	vNIC-B Name
1	Pod1	Pod1vNIC-A	Pod1vNIC-B
2	Pod2	Pod2vNIC-A	Pod2vNIC-B
3	Pod3	Pod3vNIC-A	Pod3vNIC-B
4	Pod4	Pod4vNIC-A	Pod4vNIC-B
5	Pod5	Pod5vNIC-A	Pod5vNIC-B
6	Pod6	Pod6vNIC-A	Pod6vNIC-B
7	Pod7	Pod7vNIC-A	Pod7vNIC-B
8	Pod8	Pod8vNIC-A	Pod8vNIC-B

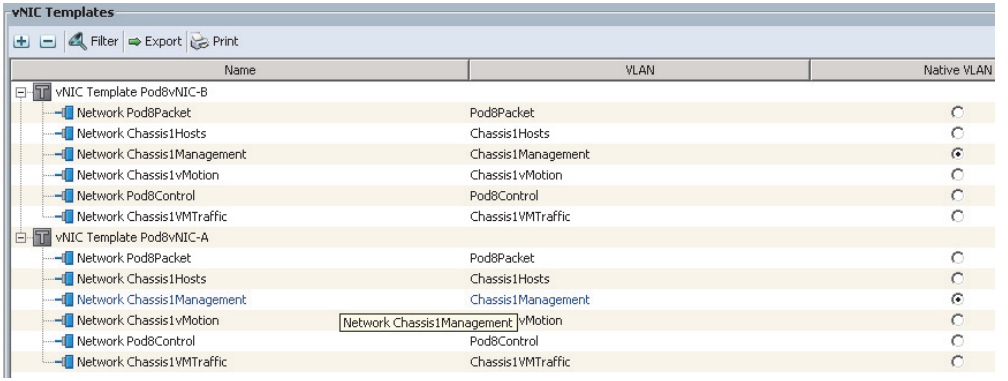
3. Name the template, based on the **vNIC-A** name in the table above.
4. Choose the **Fabric A** radio button.
5. Check the **Enable Failover** check box.
6. Set the Template Type to **Updating Template**.
7. Choose the following six Chassis and pod-specific VLANs. Remember **X** is your Chassis# and **P** is your Pod#.
   - **ChassisXHosts**
   - **ChassisXManagement**
   - **ChassisXVMTraffic**
   - **ChassisXvMotion**
   - **PodPControl**
   - **PodPPacket**
8. Be sure to select your **ChassisXManagement** VLAN (ex. Chassis2Management) as the **Native VLAN**, and remember **X** is your assigned **Chassis** #.

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9. Choose your pod-specific MAC Pool and QoS Policy from the drop-down menus.



10. Click the **OK** button to complete the wizard and **OK** again to confirm creation.
11. Repeat Steps 2 through 10 to create the vNIC-B template. This time, choose the **Fabric B** radio button.

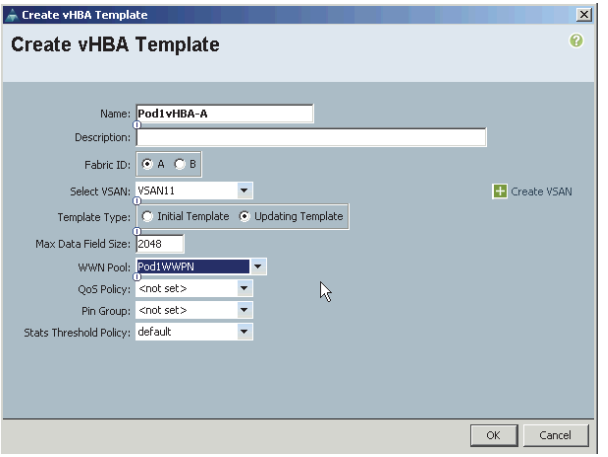


12. In Cisco UCS Manager, choose the **SAN** tab and expand **Policies > Root > Sub-Organizations > DCUCD > Sub-Organizations > *Your Pod***.
13. Right-click **vHBA Templates** and choose **Create vHBA Template**.

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Pod	Org	vHBA-A Name	vHBA-B Name
1	Pod1	Pod1vHBA-A	Pod1vHBA-B
2	Pod2	Pod2vHBA-A	Pod2vHBA-B
3	Pod3	Pod3vHBA-A	Pod3vHBA-B
4	Pod4	Pod4vHBA-A	Pod4vHBA-B
5	Pod5	Pod5vHBA-A	Pod5vHBA-B
6	Pod6	Pod6vHBA-A	Pod6vHBA-B
7	Pod7	Pod7vHBA-A	Pod7vHBA-B
8	Pod8	Pod8vHBA-A	Pod8vHBA-B

14. Name the template, based on the **vHBA-A** name in the table above.
15. Choose the **Fabric A** radio button, note that at this time there is no hardware failover option.
16. Choose **VSAN 11** from the "Select VSAN" drop-down list.
17. Set the "Template Type" to **Updating Template**.
18. Choose your pod-specific WWN Pool from the drop-down menu.
19. Click the **OK** button to complete the wizard and **OK** again to confirm creation.



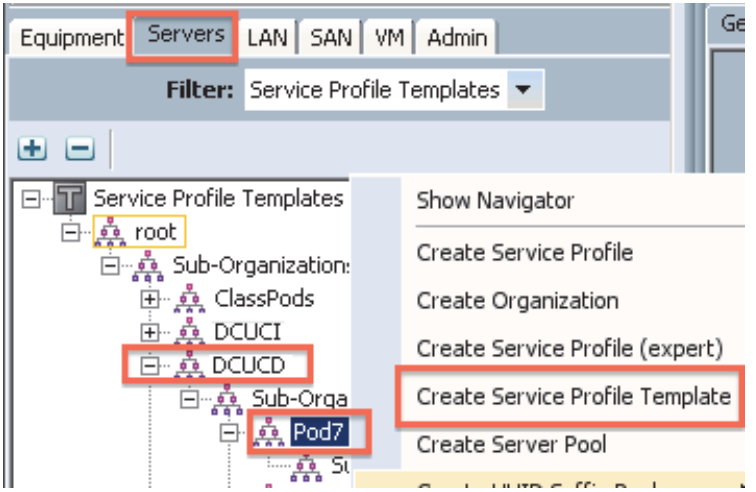
20. Repeat steps 13 through 19 to create the **vHBA-B** template for **Fabric B**, which uses **VSAN12**.

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Task 2: Create a Service Profile Template for Your Organization

In this task, you will configure an updating service profile template that leverages the pooled resources and identities that you created in Lab 6.

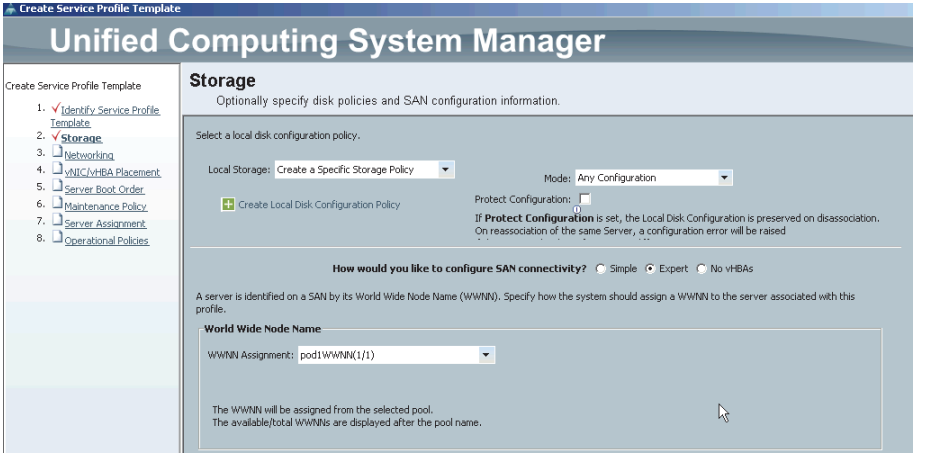
21. In Cisco UCS Manager, choose the **Servers** tab and expand **Servers > Service Profile Templates > Root > Sub-Organizations > DCUCD > Sub-Organizations > *Your Pod.***
22. Right-click your Pod**P** organization and choose **Create Service Profile Template** from the pop-up menu.



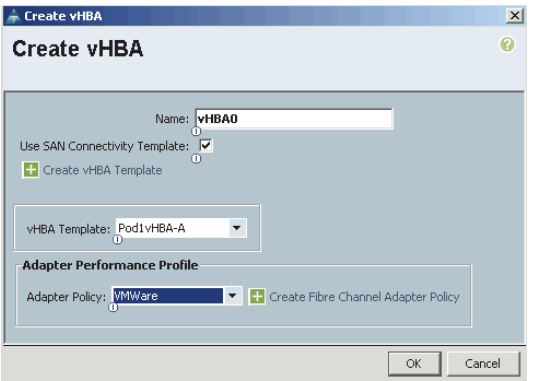
23. Use the **PodPTemplate** (where P = Pod#, ex. Pod8Template) to name your template.
24. Choose the **Updating Template** radio button for Type of template.
25. From the **UUID Assignment** drop-down menu, choose the UUID pool that you created in lab 6.
26. Click **Next** to continue.
27. From the **Local Storage** drop-down menu, choose **Create a Specific Storage Policy**.
28. Uncheck the **Protect Configuration** check box. If this step is skipped, service profile association might fail.
29. Choose the **Expert** radio button for "How would you like to configure SAN connectivity?"

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30. In the **World Wide Node Name** drop-down menu, choose the WWNN pool that you created in Lab 6.



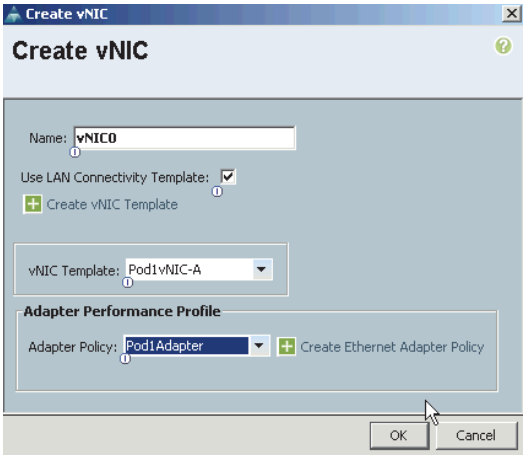
31. Click the plus symbol (+) to create the vHBA for fabric A.
32. Name the first vHBA **vHBA0**.
33. Check the **Use SAN Connectivity Template** check box and choose your pod-specific vHBA template for fabric A (vHBA0, ex. Pod8vHBA-A).
34. Choose **VMWare** from the **Adapter Performance Profile** drop-down menu.
35. Click **OK** to save the vHBA definition.



36. Repeat steps 31–35 to configure a 2nd adapter named **vHBA1** which will use the **vHBA-B** template and be connected to fabric B.

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37. Click **Next** to continue.
38. Leave the "Dynamic vNIC Connection Policy" at default.
39. Choose the **Expert** radio button for "How would you like to configure LAN connectivity?"
40. Click the plus symbol (+) to create the first vNIC.
41. Name the vNIC **vNIC0**.
42. Check the **Use LAN Connectivity Template** check box.
43. Choose the pod-specific **vNIC Template** from the drop-down menu (PodPvNIC-A).
44. Choose the pod-specific **Adapter Policy** from the drop-down menu.



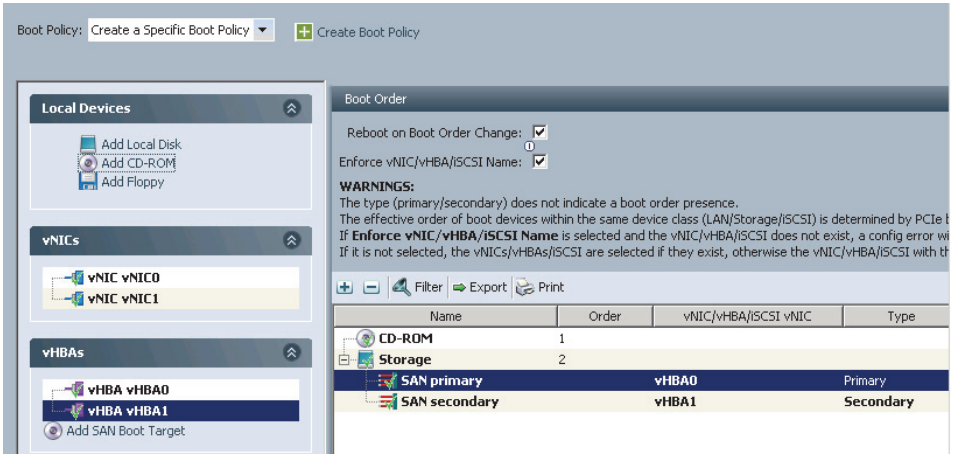
45. Click **OK** to commit the configuration.
46. Repeat steps 40 – 45 to configure **vNIC1** which will use your **PodPvNIC-B** template and **PodPAdapter** (ex. Pod8vNIC-B and Pod8Adapter) adapter policy.
47. Click **Next** to continue.
48. On the vNIC/vHBA Placement screen, accept the defaults and click **Next** to continue.
49. From the Boot Policy drop-down menu, choose **Create a Specific Boot Policy**.

Note	An image of the completed "Boot Policy" configuration is can be found at step 60.

50. Check the check box to the right of **Reboot on Boot Order Change** and **Enforce vNIC/vHBA/iSCSI Name**.
51. In the **Local Devices** panel, click **Add CD-ROM** to put it at the top of the boot order.

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52. In the vHBAs panel, click and drag **vHBA0** beneath the CD-ROM in the boot order.
53. In the pop-up window, confirm that the **Primary** radio button is selected, then click **OK**.
54. Click and drag **vHBA1** underneath vHBA0 in the boot order, vHBA1 will automatically be selected as the **secondary**. There is no pop-up menu.



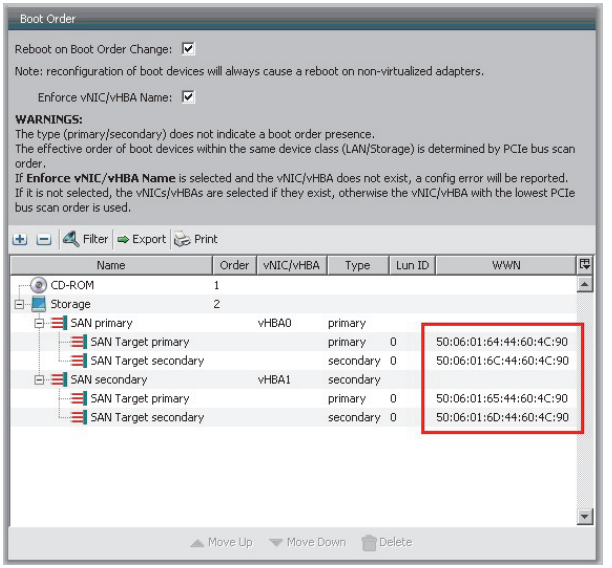
55. Select **vHBA0** and click the **Add SAN Boot Target** link beneath the vHBA panel.

Pod	vHBA0 Target WWPN	vHBA1 Target WWPN	LUN
All	Pri 50:06:01:***64***:44:60:4C:90	Pri 50:06:01:***65***:44:60:4C:90	0
	Sec 50:06:01:***6C***:44:60:4C:90	Sec 50:06:01:***6D***:44:60:4C:90	0

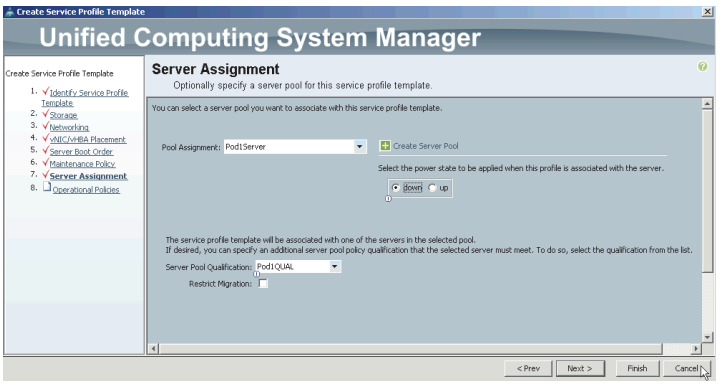
56. First select **Add SAN Boot Target to SAN Primary** and enter in the **vHBA0 Target WWPN** (listed as **Pri**mary) and LUN ID 0 per the table above. To finalize click **OK**.
57. Once again, select **vHBA0** and click the **Add SAN Boot Target** link beneath the vHBA panel. Select "**Add San Boot Target To SAN primary.**" This time notice how you're taken directly to the "Add SAN Boot Target" form and "secondary" is already selected but grayed out.
58. Enter in the **vHBA0 Target WWPN** (listed as **Sec**ondary) and LUN ID 0 per the table above and click **OK** to finalize.
59. Repeat steps 55 and 58 for **vHBA1**. Be sure to use the **vHBA1 Target WWPN** values listed in the table above.

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60. **All Pods** "Boot Order" configurations should appear **exactly** as listed in the figure below.

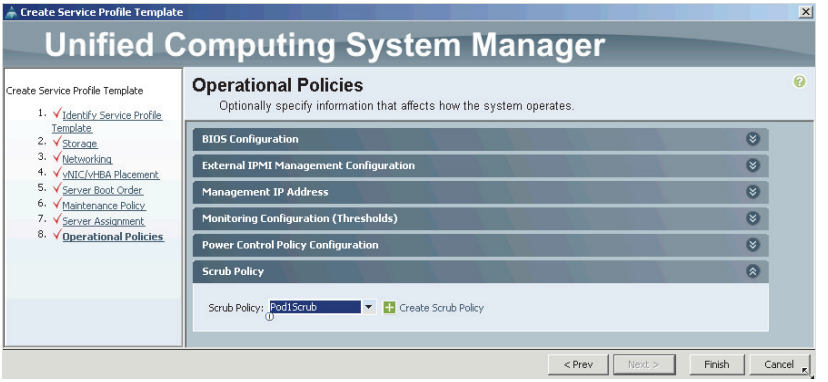


61. Click **Next** to continue.
62. Accept the default setting for the "Maintenance Policy" and click **Next**.
63. On the **Server Assignment** screen, choose your server pool from the **Pool Assignment** drop-down list.
64. Set the power state radio button to **Down**.
65. Choose your server qualification policy from the **Server Pool Qualification** drop-down list.

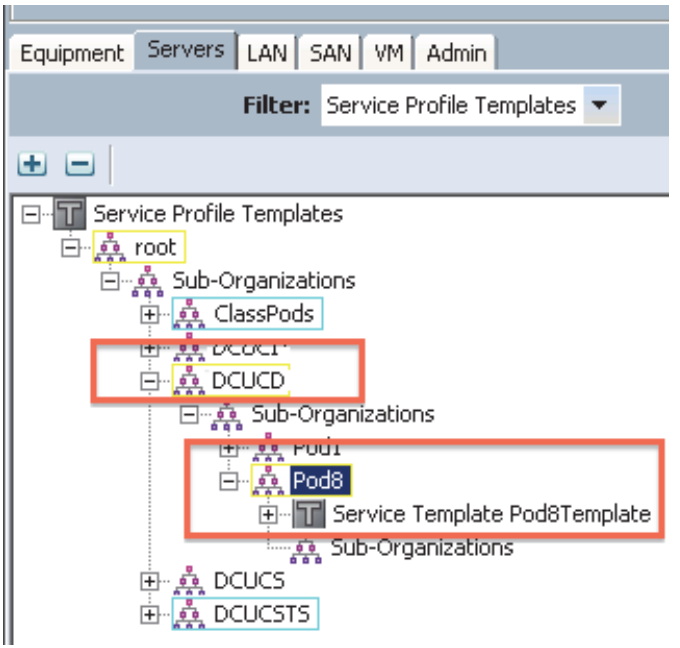


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66. Click **Next** to continue.
67. In the **Operational Policies screen**, click the down-arrow icon to expand Scrub Policy.
68. Choose your scrub policy from the drop-down list.



69. Click **Finish** and **OK** to complete the creation of your service profile template.
70. Your completed service profile template will appear beneath your organization.

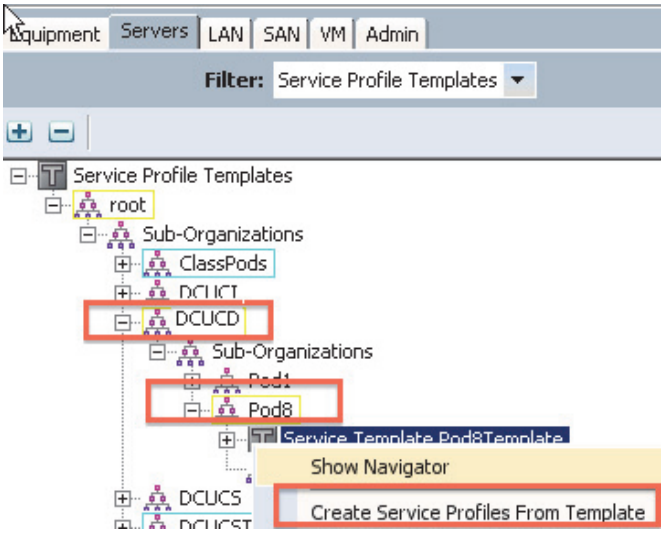


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Task 3: Create a Service Profile from the Updating Template

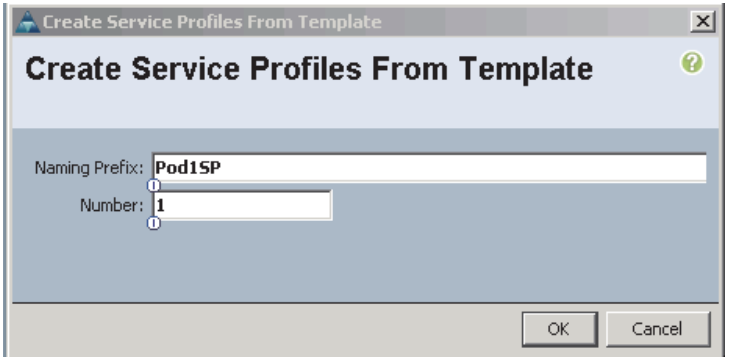
In this task, you will spawn a service profile from the service profile template that you created in Task 2.

71. Right-click your service profile template and choose **Create Service Profiles From Template**.



72. In the pop-up box, enter a name using the Pod**P**SP format (where **P** = Pod 8, ex. Pod1SP) and a number of 1 to create a single Service Profile from this template.

73. Click **OK** to generate the new service profile and **OK** again to confirm creation.

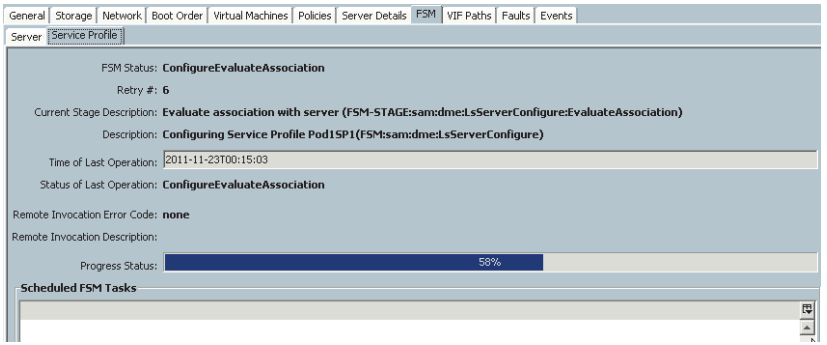


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74. On the **Servers** tab, expand **Servers > Service Profiles > Root > Sub-Organizations > DCUCD > Sub-Organizations > *Your Pod***.

75. Click the name of your newly created service profile in the navigation pane. In the content pane, click the **FSM** > **Service Profile** tab.

76. Observe the process of service profile association. This process should take about 5 minutes to reach 100 percent.



77. In the content pane, click the **General** tab, and validate your server indicates power-off in the Status area.

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Task 4: Install VMware ESXi v5.0 (on Fibre Channel LUN or Local disk)

In this task, you will validate your Service Profile configuration by installing and SAN booting VMware ESXi.

All labs are tested and operational on vSphere v5.0. It is **recommended** that you install vSphere v5.0.

78. On the **Servers** tab in the Navigation pane, locate and click on your service profile.
79. In the Content pane (to the right) and on the **General** tab click the **KVM Console** link to open a KVM window. Be sure to accept all Java applet certificate warnings.
80. In the KVM console, click the **Virtual Media** tab.
81. From the **Virtual Media** tab, click **Add Image** button. (read sub steps fully) **If** you would like to

    81.1. Install vSphere **v5.0** then, navigate to: **Z:\VMware\vShpere5\ESXi5-469512-P81E-v1.5.0.7.iso** and click **Open**.

    81.2. Install vSphere **v5.1** then, navigate to: **Z:\VMware\vShpere5.1\VMware-VMvisor-Installer-5.1.0-799733.x86_64.iso** and click **Open.**

Note vSphere 5.1 was release late 2012. Many of you may be moving to or have already standardized on version 5.1. If you are interested in setting up your UCS lab environment using VMware's vSphere 5.1 then you've come to the right class.

Use the steps in Appendix B for the vSphere v4.1.

Keep some details in mind; **A)** the screen shots and install options will certainly be different. If needed, ask your instructor for help. **B)** in later labs you must be sure to install the consistent vSphere software versions. Ex. vCenter and vSphere client specific to the version of vSphere you chose and **C)** while adding ESXi hosts to your configuration you must work with other vSphere hosts of the same version, either from your pod or a partner pod.

---

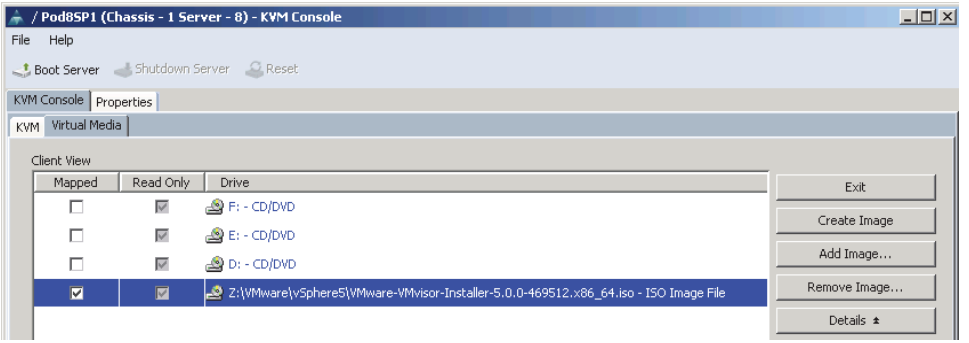
82. When the new virtual device appears, click the check box under the **Mapped** column. The ISO file now appears as an available CD/DVD drive to the server.
83. Click on the **KVM** tab to prepare for the vSphere install process.

Note Remember to leave the "Virtual Media Session" window open. Closing it will un-map your virtual media.

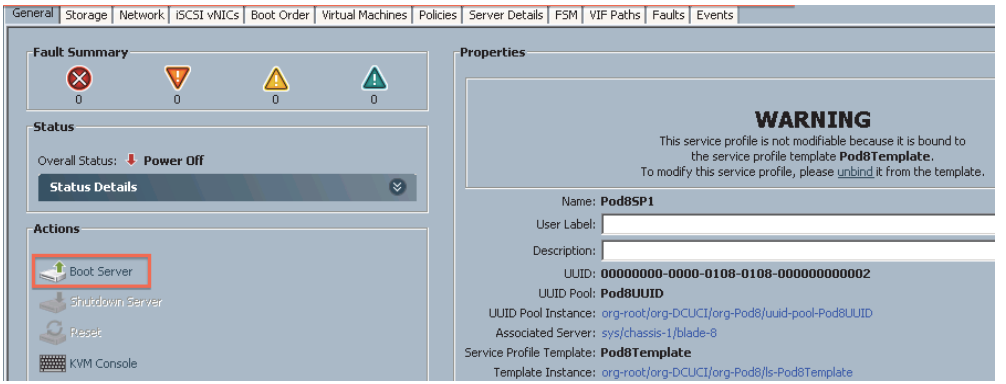
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84. Back in your browser window and in the Actions panel of the UCS manager content pane, click the **Boot Server** link to boot the server.

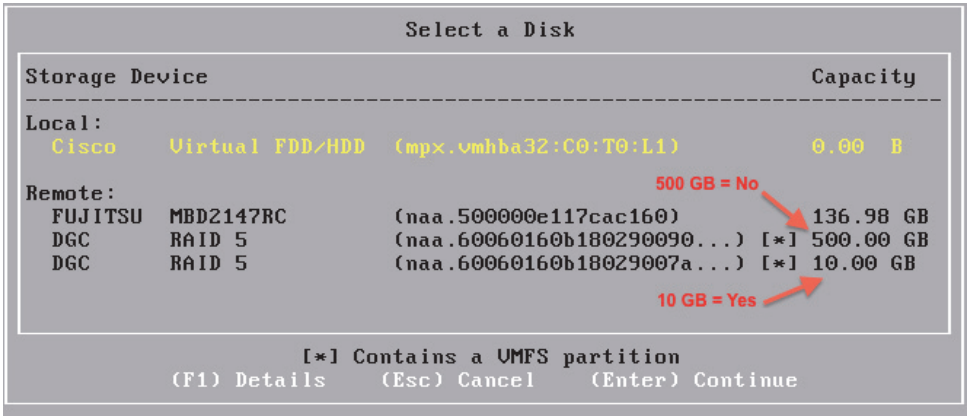


85. When the Cisco BIOS screen appears, press the **Esc** key to enable viewing POST messages.
86. In a few minutes, the VMware ESXi boot menu will appear. You can either wait 6 seconds for the installer to load automatically, or press the **Enter** key.
87. The installer will take about 2 minutes to load. Press the **Enter** key to begin installation.
88. On the EULA page, press the **F11** key to proceed.

Note	In the following “Storage Device” list, the **500GB** LUN is a VMFS shared datastore for vMotion. If listed **do not** choose the **500GB** LUN.

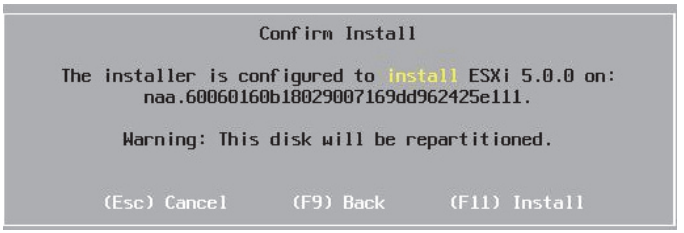
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89. At the "Select a Disk" screen, be sure to select your **Remote, DGC, RAID 5, 10G** LUN.



Note	If you wanted to install to the local disk (ex. above 136GB Fujitsu) you will have to modify the Service Profile to include the local disk as a boot option. Be sure to go back to Task 2, Steps 52 - 60 and select **Add Local Disk** under Local Devices. **CD-ROM** and **Local Disk** should be your only options configured. Keep in mind that you may only have a Local Disk **or** SAN boot policy for a Service Profile. Not both.

90. If there is an existing partition from a previous install, using your spacebar select "**Install ESXi, overwrite VMFS datastore**," press the **spacebar** to select the "Install" option and then press the **Enter** key to confirm overwriting the existing partition.
91. Accept the "**US Default**" keyboard option and press **Enter**.
92. Enter and confirm a password of **NXos12345** and press **Enter**.
93. At the Confirm Install screen, press the **F11** key.



94. When the installation is complete, the installer prompts you to press the **Enter** key and remove installation media. Once you press the Enter key, the KVM Virtual Media automatically un-maps the ESXi ISO image.

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95. In a few minutes, you should see the hypervisor loading. When the ESXi home screen appears, press **F2** to begin configuring the hypervisor.
96. At the authentication screen, enter a password of **NXos12345** and press the **Enter** key.
97. **If** (because of a type-o in an earlier step) you need to use the **Change Password** option note how it is selected by default on the "System Customization" screen. Only if you need to change or re-enter your password, press the **Enter** key to enter and confirm the password of **NXos12345**.
98. Once you have completed the **New Password** and **Confirm Password** fields press the **Enter** key. This action returns you to the System Customization screen.
99. Press the down-arrow key to choose the **Configure Management Network** element and then press the **Enter** key.
100. Choose **Network Adapters** and press the **Enter** key. Use the spacebar to choose the first network adapter and then press the **Enter** key to return to System Configuration.

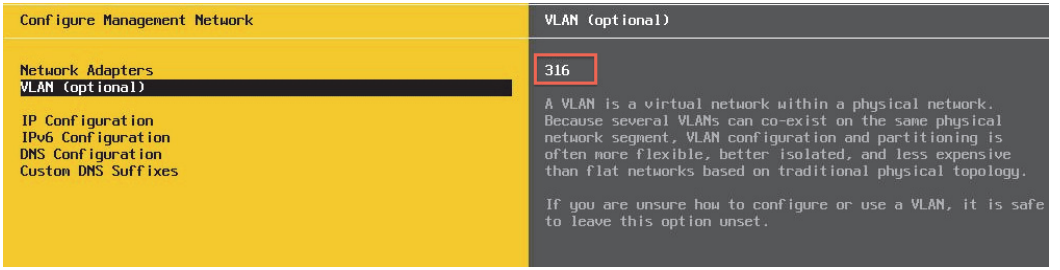


101. Press the down-arrow key to choose **VLAN (optional)** and press the **Enter** key. Enter the VLAN value of X16 (where X = Chassis#, ex. 316) and press the **Enter** key to return to System Configuration.

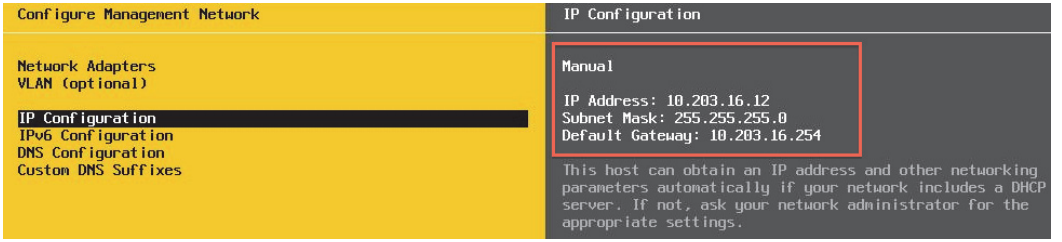
Pod	ESXi Hostname	IP Address	Gateway	VLAN
1	**CX**-P1-B-ESXi.ucseduc.com	10.20**X**.16.21/24 - 10.20**X**.16.1**P** = C200 (Appx. A) - 10.20**X**.16.2**P** = B200 (this lab) - 10.20**X**.16.3**P** = ESXi as VM	10.20**X**.16.254	**X**16
2	**CX**-P2-B-ESXi.ucseduc.com	10.20**X**.16.22/24	10.20**X**.16.254	**X**16
3	**CX**-P3-B-ESXi.ucseduc.com	10.20**X**.16.23/24	10.20**X**.16.254	**X**16
4	**CX**-P4-B-ESXi.ucseduc.com	10.20**X**.16.24/24	10.20**X**.16.254	**X**16
5	**CX**-P5-B-ESXi.ucseduc.com	10.20**X**.16.25/24	10.20**X**.16.254	**X**16
6	**CX**-P6-B-ESXi.ucseduc.com	10.20**X**.16.26/24	10.20**X**.16.254	**X**16
7	**CX**-P7-B-ESXi.ucseduc.com	10.20**X**.16.27/24	10.20**X**.16.254	**X**16
8	**CX**-P8-B-ESXi.ucseduc.com	10.20**X**.16.28/24	10.20**X**.16.254	**X**16

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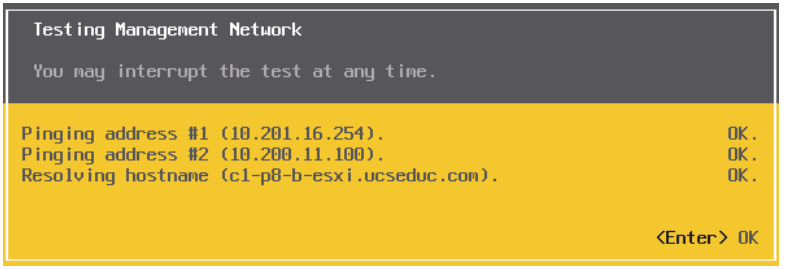
102. Press the **down**-arrow key to choose **IP Configuration** and press the **Enter** key.
103. Press the down-arrow key to choose **Set Static IP Address and Network Configuration** and press the spacebar to enable that option.
104. Use the table above to enter your pod-specific IP address, subnet mask, and default gateway, and then press the **Enter** key to return to the Configure Management Network screen.



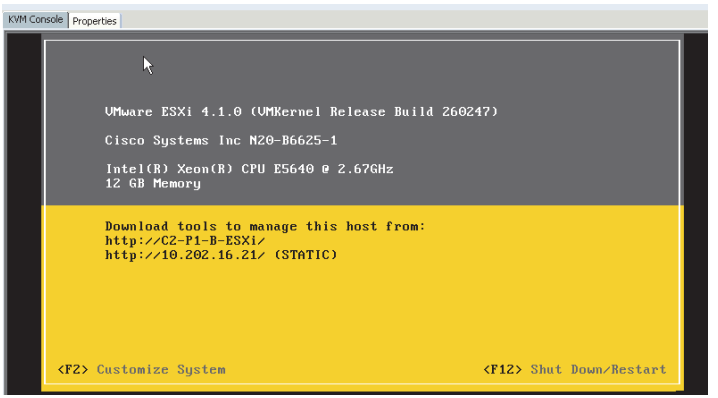
105. Press the down-arrow key to choose **DNS Configuration** and press the **Enter** key.
106. Enter **10.200.11.100** as your primary DNS server. Use the down-arrow key to choose Hostname. Enter the pod-specific hostname from the table above and then press the **Enter** key to return to the Configure Management Network screen.
107. Press the down-arrow once again to **Custom DNS Suffixes** and press **Enter**. Enter in **ucseduc.com** in the **Suffixes:** field and press **Enter** to finalize the settings.
108. Press the **Esc** key to exit configuration of the management network.
109. Press the **Y** key to accept the changes and restart the management network.
110. Press the down-arrow key to choose the **Test Management Network** element on the System Configuration screen.

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111. On the Test Management Network screen, press the **Enter** key. You should see OK as the result code from pinging the default gateway, DNS server, and test resolution of the ESXi server hostname. If any of the tests fails, contact your instructor.



112. Once the Management Network tests are complete press **Enter** to exit back to the System Customization screen.
113. Press **Esc** one last time to logout of the Direct Console User Interface (aka the DCUI).
114. Once properly configured, your ESXi host login screen should resemble the figure below.



Activity Verification

You have completed this activity when you have achieved these goals:

- You have created a service profile template that is based on pools that were created under the pod that is assigned to your organization.
- You have generated a service profile from an updating template and observed the association process.
- You have installed, SAN booted, and configured VMware ESXi.

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Lab Complete

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L8

Building a vSphere Datacenter & UCS Manager Integration

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Lab Overview

In this activity, you will build a vSphere Datacenter cluster to prepare for the installation of the Cisco Nexus 1000V vDS as well as configure integration between UCS Manager and your vCenter Server.

Estimated Completion Time

120 minutes

Lab Procedures

In this activity, you will:

- Install VMware's vSphere Client and vCenter Server
- Attach to your newly installed vCenter Server
- Create a New Datacenter and Add ESXi Hosts and VMs
- Configure a VMware vNetworks Standard Switch (vSS) and Test vMotion
- Provision VMware integration with the UCS Manager wizard

Required Resources

These are the resources and equipment that are required to complete this activity:

- Management Desktop
- Lab implementation sheet
- Lab reference guide

Note In this lab you must install the vCenter Server and vSphere Client specific to your ESXi installation. If you installed ESXi v5.0 in lab 4 (Task 5) then you will continue with these steps as listed. If you want to install ESXi v4.1 (B-Series only) or v5.1 (C & B-Series) then you must install a compatible version of vCenter Server and vSphere Client below.

If needed, the installation process for vSphere v4.1 can be found in Appendix B.

The installation process for vSphere v5.1 is very similar to vSphere v5.0. The following steps and instructions will be sufficient to guide you through the process. Ask your instructor if you have any questions.

Lastly, all labs are tested and operational on vSphere v5.0. It is **recommended** that you install vSphere v5.0.

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Lab 8: Create a Data-Center Cluster in VMware vCenter Implementation Sheet

Note The Task numbers below correspond to the Tasks where you will later use this information in the lab.

Task 2 Create a New Datacenter and Add ESXi Hosts and VMs

Where **X** = Chassis #

Pod	Data Center	B200-M2 Host	vCenter Server
1	DC1	**CX**-P1-B-ESXi.ucseduc.com	vCenter**CX**P1
2	DC2	**CX**-P2-B-ESXi.ucseduc.com	vCenter**CX**P2
3	DC3	**CX**-P3-B-ESXi.ucseduc.com	vCenter**CX**P3
4	DC4	**CX**-P4-B-ESXi.ucseduc.com	vCenter**CX**P4
5	DC5	**CX**-P5-B-ESXi.ucseduc.com	vCenter**CX**P5
6	DC6	**CX**-P6-B-ESXi.ucseduc.com	vCenter**CX**P6
7	DC7	**CX**-P7-B-ESXi.ucseduc.com	vCenter**CX**P7
8	DC8	**CX**-P8-B-ESXi.ucseduc.com	vCenter**CX**P8

Task 5 Configure vSwitch and Test vMotion

Where **X** = Chassis #

Pod	vCenter Server	Datacenter	Host Management	vMotion	VMTraffic
1	vCenter**CX**P1	DC1	**X**16	**X**14	**X**18
2	vCenter**CX**P2	DC2	**X**16	**X**14	**X**18
3	vCenter**CX**P3	DC3	**X**16	**X**14	**X**18
4	vCenter**CX**P4	DC4	**X**16	**X**14	**X**18
5	vCenter**CX**P5	DC5	**X**16	**X**14	**X**18
6	vCenter**CX**P6	DC6	**X**16	**X**14	**X**18
7	vCenter**CX**P7	DC5	**X**16	**X**14	**X**18
8	vCenter**CX**P8	DC6	**X**16	**X**14	**X**18

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Task 1: Install VMware's vSphere Client and vCenter Server

In the task, you will do a default installation of VMware's vSphere Client and vCenter Server onto your Management Desktop.

Note Here you must install the vCenter Server and vSphere Client specific to your ESXi installation. If you installed ESXi v5.0 in lab 7 (Task 4) then you will continue with these steps as listed. If you want to install ESXi v4.1 (B-Series only) or v5.1 (C & B-Series) then you must install a compatible version of vCenter Server and vSphere Client below. **If needed**, the installation process for vSphere v4.1 can be found in Appendix B.

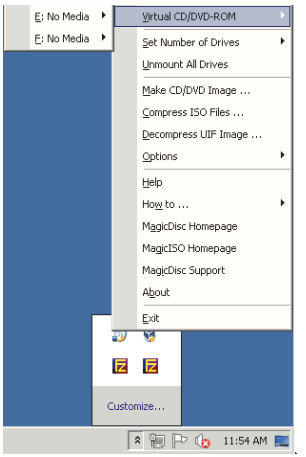
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1. Using MagicDisk, you will mount the VMware Install Manager (**VIM**) that includes, among other items, the vCenter Server and vSphere Client.

   1.1. MagicDisk should already be loaded and in the System Tray (bottom right-hand corner of your desktop). If not, click on MagicDisk in the Quick Launch toolbar.



   1.2. Locate and right-click on the MagicDisk icon in the System Tray (bottom right-hand corner of your desktop). Select **Virtual CD/DVD-ROM>E: No Media>Mount**.



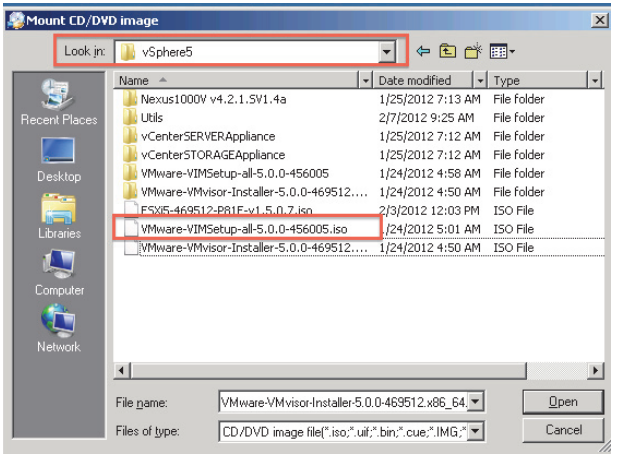
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1.3. Read all sub steps fully before continuing, for vSphere version

1.3.1. 5.0, navigate to **Computer > (Z:): > \VMware\vSphere5** and select the **VMware-VIMSetup-all-5.0.0-456005.iso** file.

1.3.2. 5.1, navigate to **Computer > (Z:): > \VMware\vSphere5.1** and select the **VMware-VIMSetup-all-5.1.0-880471.iso** file.

Note For faster performance you may want to copy the above file to your Management Desktop so you can mount and run the installer from there.



Note To install vCenter Server and vSphere client for vSphere v4.1 reference the steps in Appendix B. **A consistent version** (ESXi, vSphere Client, vCenter Server & vSphere Update Manager) must be installed. Said another way, the same version must be selected for the steps at the end of lab 7 and this entire lab, lab 8.

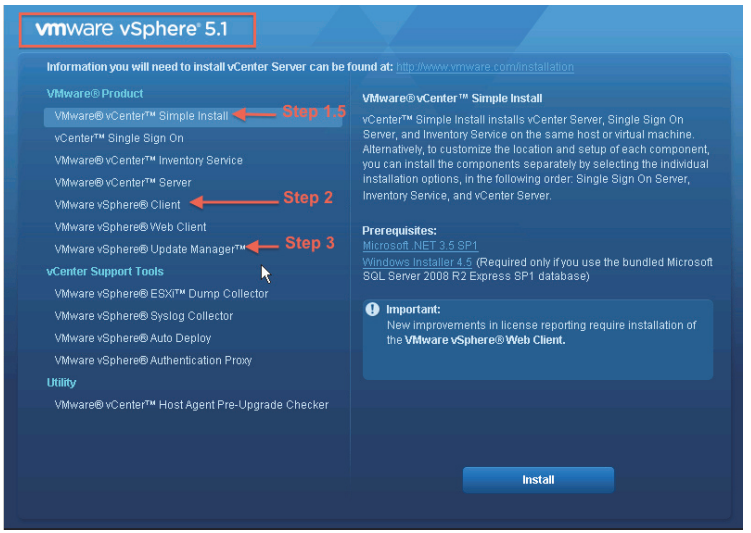
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1.4. Once the .iso is mounted AutoRun.exe should automatically present an "Install or run…" list of options. Click on "**Run autorun.exe…**". **If not**, click once on "**Computer**" and again on the **E:** drive.



1.5. Next you will see the "VMware vCenter Installer" screen with install options. Click on **vCenter Server** under "VMware Product Installers" and then **Install**.

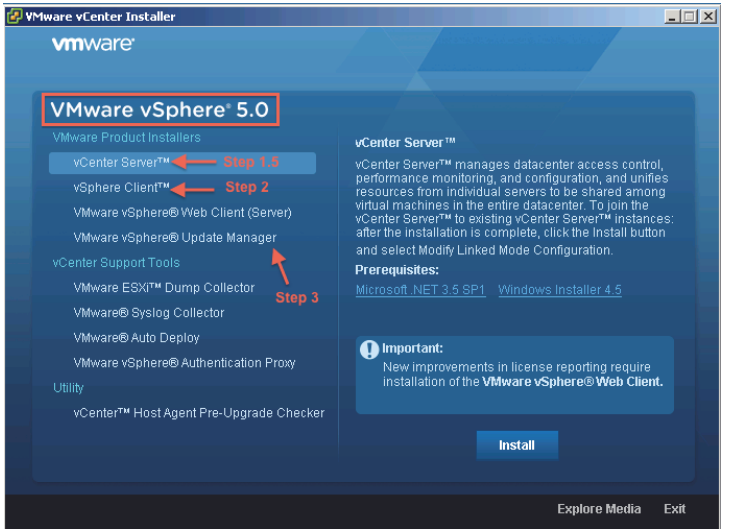
If installing vSphere v5.1... (if not, continue to step 1.6)



- Select "VMware vCenter Simple Install"
- Click **OK** to acknowledge the "Automatic discovery" notice.
- Accept all defaults and set all passwords to **!NXos12345**
- Single Sign-on Local System FQDN: **vCenterC#P#.ucseduc.com** (ex. vCenterC1P7.ucseduc.com)

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If installing vSphere v5.0...



1.6. Accept all default values during the installation. Agree to the "terms of the license agreement" and use **"GK Student"** and **"UCS"** in the "Customer Information" fields. A license is not required. All new installs have a 60-day full featured evaluation period that you will use this week in your labs.

2. Navigate back to the "VMware vCenter Installer" screen (listed in Step 1.5) and click on the **vSphere Client** option and then **Install**. Accept all default values during the installation and use **GK Student** and **UCS** in the "Customer Information" fields.

Note	If a version of vSphere Client is already present on your Management Desktop this would be a version compatible with vSphere 4.1, **not** vSphere 5. Since we are using vSphere v5 you must install a new vSphere Client for version 5.

3. Next, install vCenter Update Manager (affectionately known as VUM). Once again navigate to the "VMware Install Manager" screen (listed in Step 1.5) and click on **vCenter Update Manager** and click **Install**.
4. Reference your vCenter Server by the Host name (ex. vCenterC4P8.ucseduc.com). When prompted for vCenter Server credentials, use a username of **Administrator** and password of **cisco123**. Click **Next** to continue.
5. As before, accept all default value during the installation and select **Install a Microsoft SQL Server 2008 Express...** option under Database options. Click **Next** to continue and **Yes** to delete the existing database, **if** needed.

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6. On the "VMware vCenter Update Manager Port Settings" page, click the down-arrow and select **10.20X.19.1XP** as "Specify how this VMware vCenter Update Manager should be identified…". Click **Next** to continue accepting **all** remaining default options.

   Remember: **X** = Chassis # and **P** = Pod #.

7. Once the install of VUM is complete you can finally close the "VMware vCenter Installer" window.

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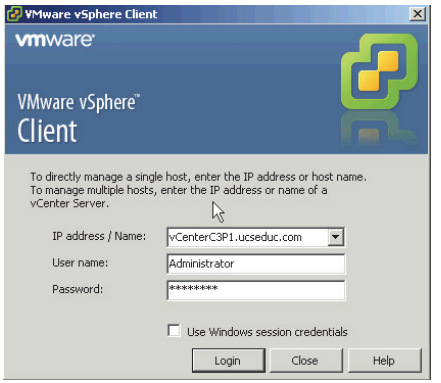
Task 2: Create a New Datacenter and Add ESXi Hosts and VMs

In this task, you will create a new Datacenter, import your ESXi hosts and create VMs.

Remember, **X** = Chassis#.

Pod	Data Center	B200-M2 Host	vCenter Server
1	DC1	**CX**-P1-B-ESXi.ucseduc.com	vCenter**CX**P1
2	DC2	**CX**-P2-B-ESXi.ucseduc.com	vCenter**CX**P2
3	DC3	**CX**-P3-B-ESXi.ucseduc.com	vCenter**CX**P3
4	DC4	**CX**-P4-B-ESXi.ucseduc.com	vCenter**CX**P4
5	DC5	**CX**-P5-B-ESXi.ucseduc.com	vCenter**CX**P5
6	DC6	**CX**-P6-B-ESXi.ucseduc.com	vCenter**CX**P6
7	DC7	**CX**-P7-B-ESXi.ucseduc.com	vCenter**CX**P7
8	DC8	**CX**-P8-B-ESXi.ucseduc.com	vCenter**CX**P8

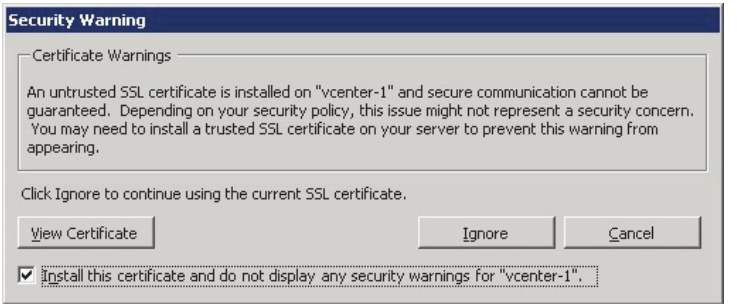
8. From your Management Desktop, click on the **VMware vSphere Client** icon and connect to your pod-specific vCenter hostname, as indicated in the table above (ex. vCenterC2P7.ucseduc.com). Authenticate with the username **Administrator** and password **cisco123**.



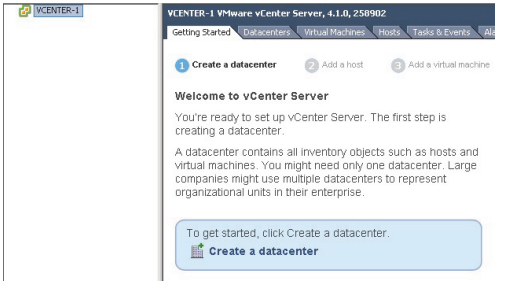
Note Instead you could click on “Use Windows session credentials” if you logged into your management desktop using the same credentials that will properly authenticate you to your vCenter Server. This is a great way to re-use your already authenticated Server session.

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9. In the Security Warning dialog box, click the **Install this Certificate and Do Not Display Any Security Warnings** check box to install the certificate, and then click the **Ignore** button to continue.



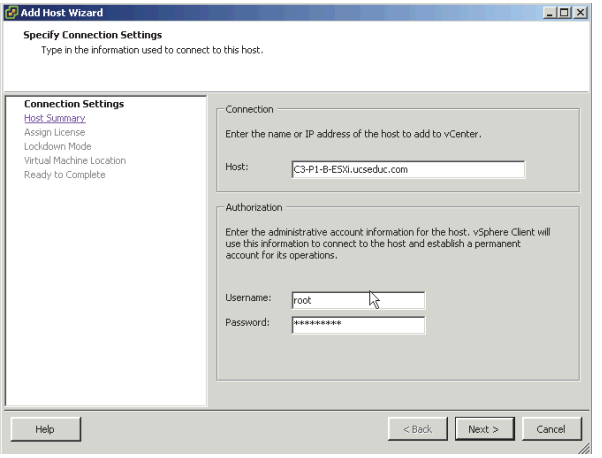
10. Click the **OK** button on the Evaluation License notice.
11. In the **Getting Started** tab of the vCenter content pane, click the **Create datacenter** link.
12. Name your datacenter, based on the table above. Ex. “DC1” for Pod 1.



13. Right-click the new datacenter in the vCenter navigation pane, then click the **Add Host** option.

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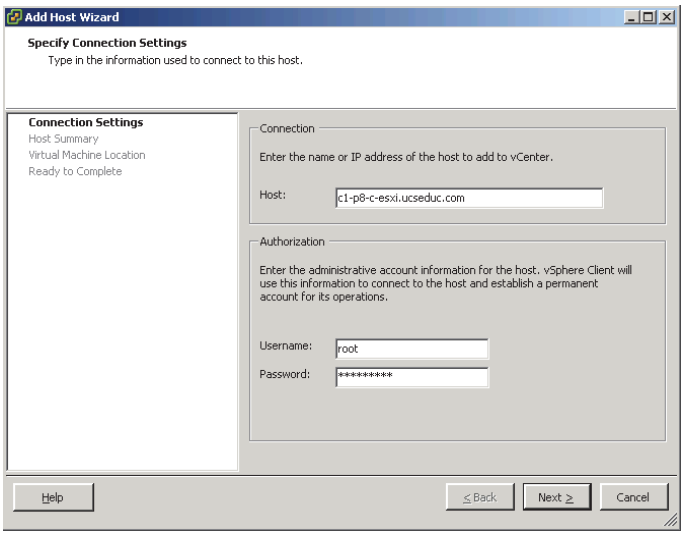
14. Enter the pod-specific hostname of your B-Series ESXi host (ex. C1-P8-B-ESXi.ucseduc.com), a username of **root** and password of **NXos12345**.



15. Click **Next** to add your host the **Yes** to accept the "Security Alert."
16. On the "Host Information" screen, verify that the hostname being imported is correct, and then click the **Next** button.
17. At the "Assign License" screen, click the **Next** button to continue using the evaluation license.
18. Click the **Next** button to leave Lockdown mode disabled.
19. Finally, click the **Next** button to install the ESXi host into your newly created datacenter (ex. DC1), and then click the **Finish** button to complete the Add Host wizard.
20. You should now see your host under your recently created Datacenter object.

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21. Repeat steps 13 - 20 to add another host to your newly created vSphere Datacenter. This 2nd host could be your C-Series from Appendix A, Lab 3 or a neighboring B-Series in your class. In the graphic below we're adding the C-Series server installed in Appendix A, Lab 3.



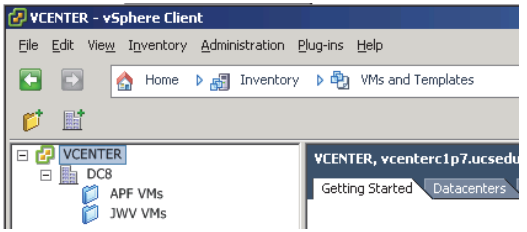
22. Select your B-Series host in the content pane, and choose the **Configuration** tab across the top.
23. In the Hardware panel, click the **Storage** link.
24. In the Datastores list, you **may** need to click the blue **Refresh** link in the upper-right portion of the screen.
25. Verify that the **VM_Storage** datastore is now visible.
26. Next we will create a VM that will be used later for testing. Before we begin the Virtual Machine creation process right-click on the **VM_Storage** datastore and chose **Browse Datastore**. Verify that there is an **Installs\Microsoft** directory on your "VM_Storage" datastore and that the "**W2K3-SelfInstall.iso**" file is in this directory.

Note	If this file is not present notify your instructor to copy said file from the **Z:\Microsoft\Win2K3** directory to **VM_Storage > Installs > Microsoft**.

27. Now let's create an organizational structure of folders within vCenter. Navigate to **Home > Inventory > VMs and Templates**. Right click on your Pods Datacenter object (ex. DC1) and click **New Folder**.

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28. Name the new folder using your initials ending with "VMs." Ex. "**JWV VMs**."



29. Start the VM creation process by right-clicking on the newly created folder and select **New Virtual Machine**.

30. Create the new virtual machine with the following parameters. Click **Next** after each selection and **Finish** to complete the New Virtual Machine wizard.

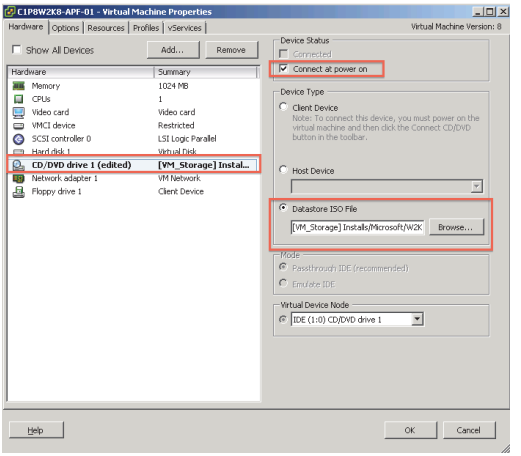
    When finished there should be a total of 2 VMs for every pod.

Configuration	Typical
Name and Location	**Name**: C#P#W2K3-*YourInitials*-01 **Location**: Ex. JWV VMs
Host/Cluster	Your B-Series ESXi host added **earlier**
Datastore	VM_Storage
Guest Operating System	Microsoft Windows Server 2003 (32-bit)
Networking	-default, you will change later-
Virtual Disk Size **Virtual Disk Type**	10GB Thin Provision

31. Once the new VM is created, right-click and select **Edit Settings**. Click once on the **CD/DVD Drive 1** and select **Datastore ISO File** under Device Type.

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32. Click **Browse**, navigate to **VM_Storage\Installs\Microsoft**, select **W2K3-SelfInstall.iso** file and click **OK**. Complete the process by placing a check next to **Connect at power on** under **Device Status**.



Note This process is similar to the steps we take in the physical world to force the physical server hardware to boot into BIOS so we can direct the server to then boot from the physical media in the CD-ROM drive. In our case we are simply directing the VM to boot into BIOS so we can instruct it to boot from the newly mapped ISO file.

33. Click **OK** to finalize the changes to your newly created VM.
34. Now it's time to power on our newly created VM. To do this right-click on the VM, navigate to **Power** and click **Power On**.
35. Open a console window by right-clicking on the VM and selecting **Open Console**.
36. Notice the VM boot and automatically complete a Windows Server 2003 installation. This is the benefit of using the Self Install ISO.

    Your job for this step is to sit patiently while the installation completes. This may be a good time to **either ask** your instructor if lecture will resume or if you should take a quick 5 min break.
37. Take a moment to install VMware Tools for your new VM. From the menu bar, click on **VM > Guest > Install/Upgrade VMware Tools**. Click **OK** to acknowledge the message and accept all install default. Use your **Tab** key to move from option-to-option, your **space bar** to select and the **Enter** key to make a selection. This will be better than using the mouse.

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Note	You may be happy to know that one of the many benefits to installing VMware Tools is better mouse performance.

38. Once the installation is complete click **Finish** and **Yes** to reboot your VM.
39. Once the reboot completes you have a newly install Windows Server 2003 VM. To login, click on **VM > Guest > Send Ctrl + Alt + del**. Login with **Administrator** and **vmware** as the default set of credentials.
40. From the console window close the **Manage Your Server** application. Once again click on **VM > Guest > Send Ctrl + Alt + del**. Click on **Change Password**, enter in the Old Password of **vmware** and **NXos12345** in the **New** and **Confirm** password fields.



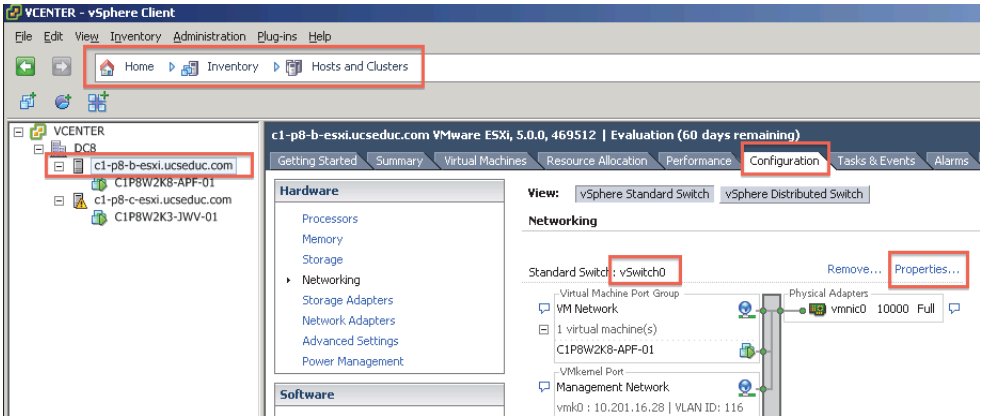
41. Once complete click **OK** and **Cancel** to exit out of the "Change Password" window.

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Task 3: Configure vSwitch and Test vMotion

In this task, you will create port profiles to enable networking in the virtual switch and test vMotion.

42. Navigate to **Home > Inventory > Hosts and Cluster**, choose your B-Series ESXi host in the navigation pane.
43. In the content pane, choose the **Configuration** tab.
44. In the Hardware panel, click the **Networking** link.
45. Click the blue **Properties** link to edit "vSwitch0".



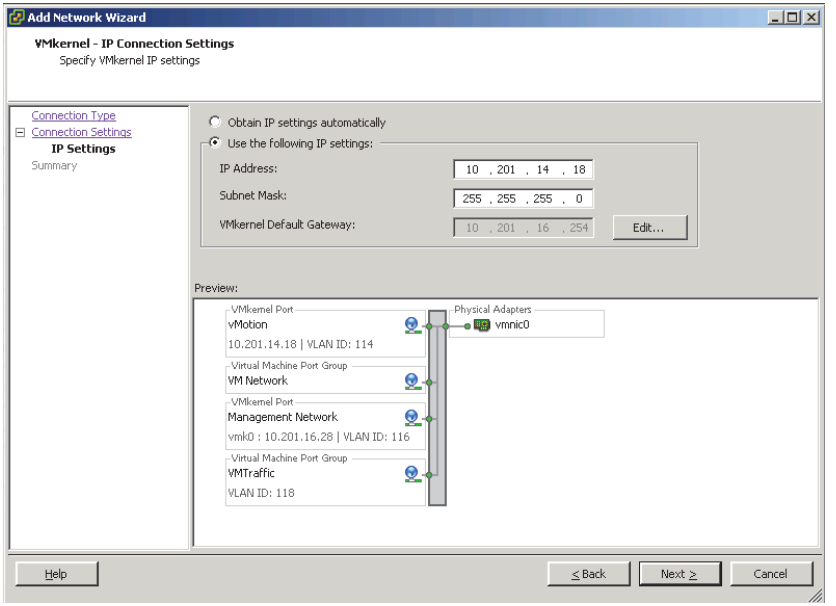
46. In the "vSwitch0 Properties" window, click the **Add** button to add a new port group.
47. For the new port group, choose **Virtual Machin**e as the "Connection Type" and click **Next**.

Pod	vCenter Server	Datacenter	Host Management	vMotion	VMTraffic
1	vCenter**CX**P1	DC1	**X**16	**X**14	**X**18
2	vCenter**CX**P2	DC2	**X**16	**X**14	**X**18
3	vCenter**CX**P3	DC3	**X**16	**X**14	**X**18
4	vCenter**CX**P4	DC4	**X**16	**X**14	**X**18
5	vCenter**CX**P5	DC5	**X**16	**X**14	**X**18
6	vCenter**CX**P6	DC6	**X**16	**X**14	**X**18
7	vCenter**CX**P7	DC5	**X**16	**X**14	**X**18
8	vCenter**CX**P8	DC6	**X**16	**X**14	**X**18

48. Give this new port group a "Network Label" of **VMTraffic** and set the VLAN ID according to the table above (ex. 118). Click **Next** and **Finished** to finalize the creation of your new port group.

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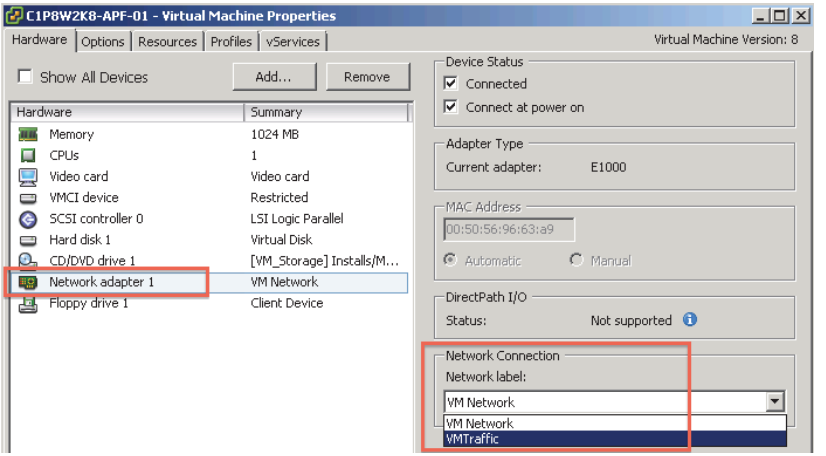
49. Again, in the vSwitch0 properties window, click the **Add** button to add a new port group.
50. For this new port group, be sure to select the **VMKernel** "Connection Type" and click **Next**. Set the "Network Label" to **vMotion** and VLAN ID as specified in the table above (ex. 114). Check the **Use this port group for vMotion** check box. Click **Next**.
51. In the "VMKernel – IP Connection Settings" window, all Pods should use their Pod specific IP address 10.20**X**.14.1**P** (where **X** = Chassis# and **P** = Pod#) and a subnet mask of **255.255.255.0**. Click **Next** and **Finish** to finalize the creation of the port group and **Close** to exit the "vSwitch0 Properties" dialog.



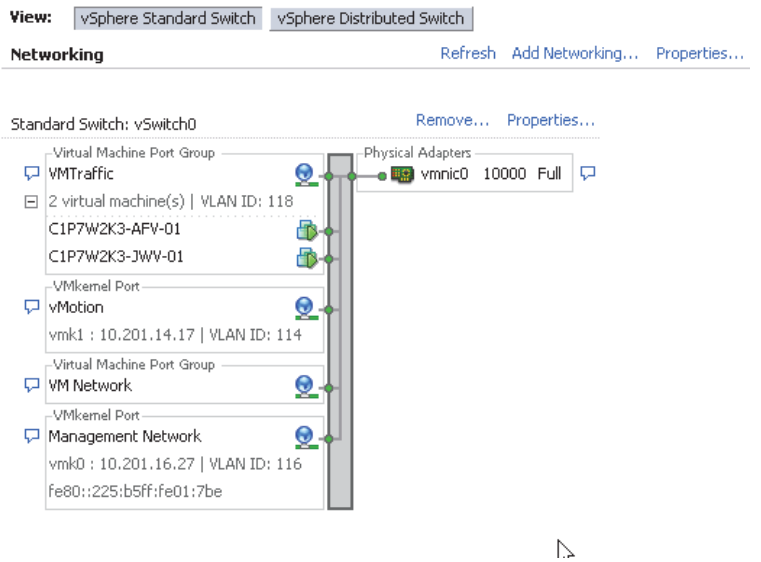
52. Repeat Steps 42 – 52 for any other hosts (ex. C-Series from Lab 1 or B-Series in other Pods) in your vSphere Datacenter. Once again, in the "VMKernel – IP Connection Settings" window, for your second host, all Pods should use an IP address of 10.20**X**.14.2**P**/255.255.255.0 (where **X** = Chassis# and **P** = Pod#).
53. Move your VMs to the newly created "VMTraffic" port group by right-clicking on each of your created VMs (individually) and select **Edit Settings**.

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54. Select the "Network Adapter 1" entry from the list of Hardware, change the "Network Label" to **VMTraffic** and click **OK**. Be sure to repeat this for each of your Pod's VMs.



55. Your vSwitch0 configuration should closely match this figure.



Complete steps 56 – 64 **only if** you're using your C and & B-Series servers together. If using two or more B-Series hosts only, continue with step 65.

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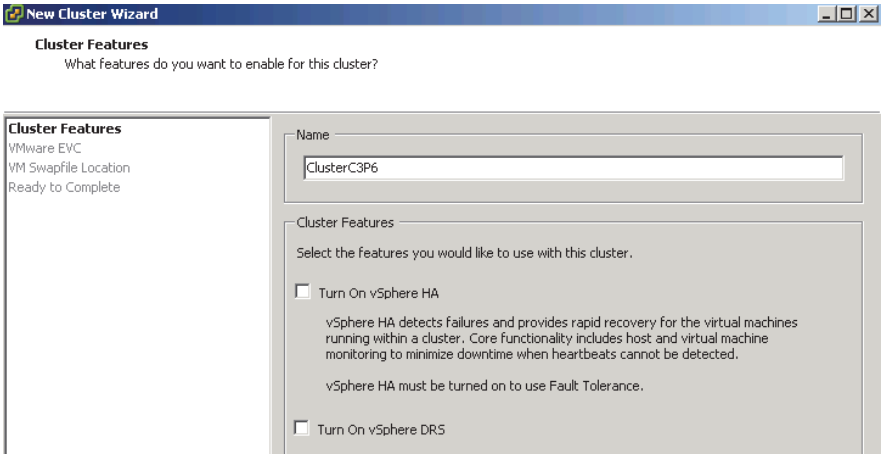
The following steps are **only to be performed if** you are using your C-Series (vSphere 5 and above only) and B-Series servers together as a source and/or destination for vMotion.

These servers and their CPUs are slightly different. Even though they may support many of the same CPU features they do not necessarily support said features using the same instruction sets. This difference in instruction sets will cause vMotion Compatibility Check (and vMotion) to fail. You can check this for each of your Servers at

- **C-Series**: from within **CIMC, Server > Inventory > CPU**. Ex. Xeon X5570.
- **B-Series**: from within **UCSM, Equipment > Chassis > Chassis 3 > Servers > Server #** the **Inventory** and then **CPU** tab. Ex. Xeon E5640.

The solution, as this is a common occurrence, is to create a Cluster from within vSphere and enable VMware's EVC (Enhanced vMotion Compatibility).

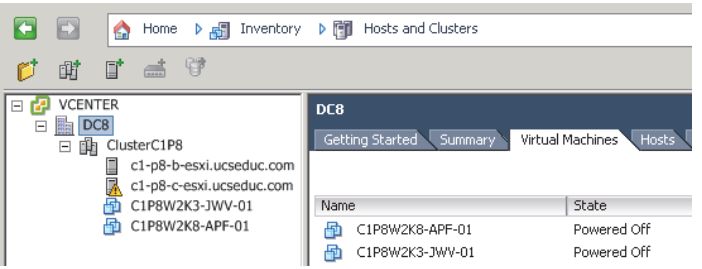
56. Ensure all of your VMs are currently powered off. If not, power them off now.
57. Right-click on your Datacenter object (ex. DC6) and select **New Cluster**.
58. Name your Cluster object **ClusterC#P#** (ex. ClusterC1P8) and click **Next**.



59. On the VMware EVC page click **Enable EVC for Intel® Hosts** and click **Next**.
60. Click **Next** to accept all remaining default Cluster values and **Finish** to finalize the Cluster creation.

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61. Click and drag each of your ESXi hosts into the newly created vSphere Cluster.

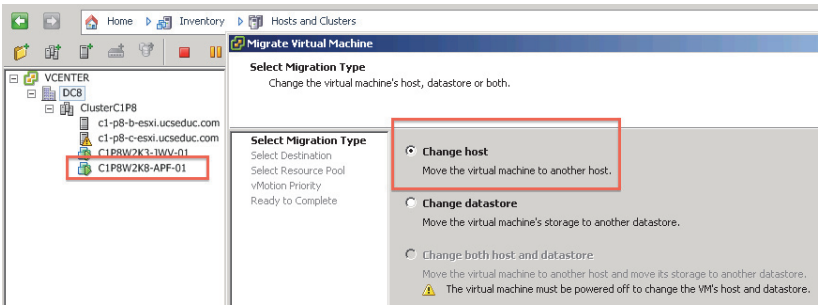


62. Being that your VMs were powered off while creating the vSphere Cluster, we have to power them on here. Do so by selecting each VM and clicking the green play button.
63. Right-click on each VM once again and select **Open Console**.
64. Press **Ctrl-Alt-Insert** to access the login screen. Authenticate as **Administrator** with password **NXos12345**.
65. From within your Virtual Machine console, open a DOS window and ping your default gateway using the "until stopped" option. For example **ping 10.20X.18.254 -t**.

Note If your pings do not work check the following…
- IP address settings (IP Address, Subnet Mask, Default Gateway)
- Virtual Machine Network Settings
- Personal Firewall allows "inbound ICMP echo"

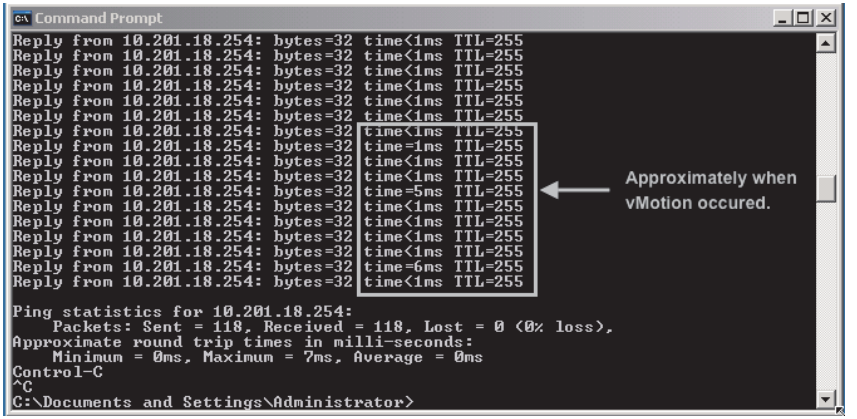
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66. In the following steps we will test vMotion. Right-click (from within the vSphere Client) your Windows VM and choose **Migrate** from the drop-down menu.
67. In the "Select Migration Type" screen, choose the **Change Host** radio button and then click the **Next** button.



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68. In the "Select Destination" screen, choose the second ESXi (ex. your pod's C-Series or a neighboring pod's B or C-Series) host and click the **Next** button.
69. In the "vMotion Priority" screen, accept the default **"High Priority (recommended)"** radio button and then click the **Next** button.
70. In the "Ready to Complete" screen, review the information and then click the **Finish** button.
71. Return to the opened console for this VM and verify that your pings are still pinging. This means you never loss connectivity during the live migration of your virtual machine.



Note If all parameter above (VMkernel, vMotion, Virtual Machine Network) were configured properly your VM should continue to ping its default gateway, often times not even losing a single ping.

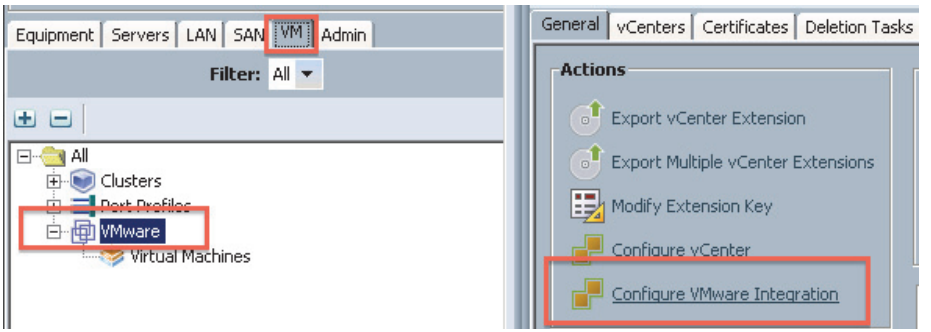
Even a difference in the spelling of a Port Group (ex. VMTraffic vs. VM Traffic) would cause the vMotion process to fail its validation check.

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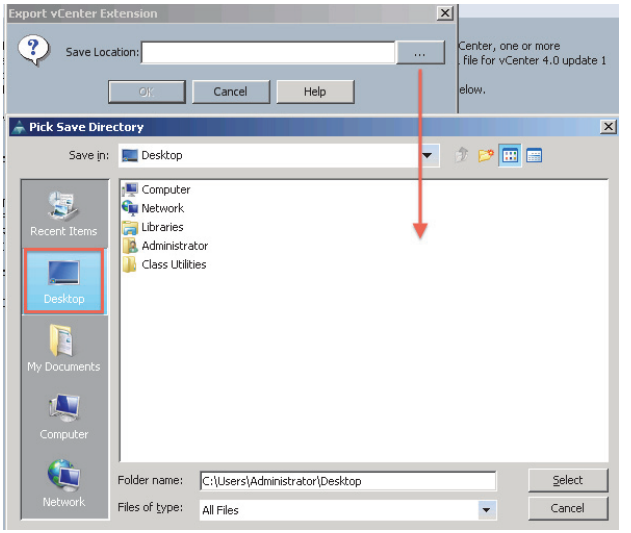
Task 4: Enable Cisco's UCS Manager and VMware's vSphere integration

In this task you will link UCS Manager together with your vCenter Server. This allows Datacenter administrators to manage the Cisco UCS components (ex. Virtual Switches & Virtual Adapters) of a vSphere environment from the familiar UCS Manager interface.

72. Select the **VM** tab and click on **VMWare**. From the **General** tab (default) click **Configure VMware Integration**.



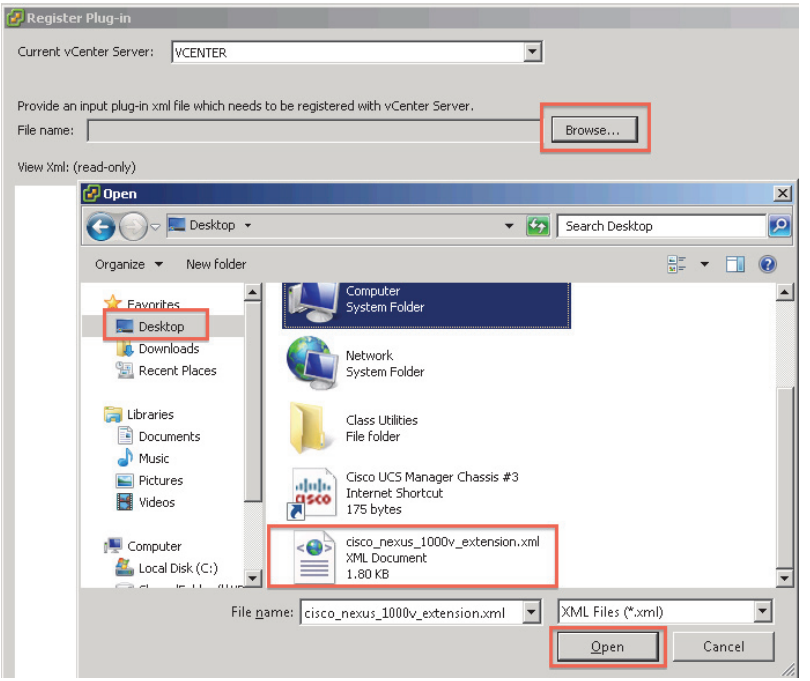
73. Click **Export** to download the Cisco UCS Manager extension file.
74. Click the browse (…) button, set the location to your Desktop and click **Select**.
75. Click **OK** to export the extension and **OK** again to confirm the export.



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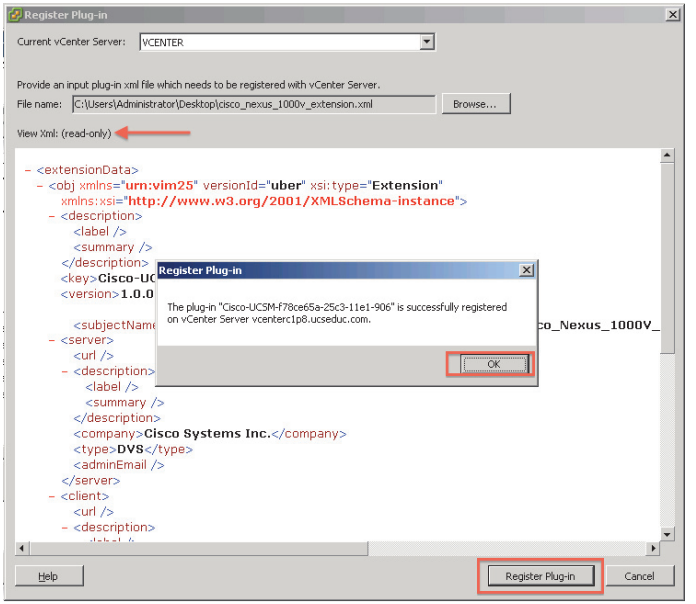
76. Navigate to your vSphere Client (be sure to leave UCS Manager open and on the "Configure VMware Integration" wizard up). From the menu bar, click on **Plug-ins > Manage Plug-ins...**

77. In the white space (not on an existing Plug-in) of the "Plug-in Manager" window Right click, then select **New Plug-in...** and click **Browse**. Using the Browse window click on "Desktop" and select the extension you downloaded in the step above.



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78. Once the XML data of the extension is visible in the "View Xml:" pane click **Register Plug-in** to complete the registration. Finally click **Ignore** to accept the untrusted certificate and **OK** to acknowledge the successful registration.



79. You should now see a new "Cisco-UCSM..." entry under "Available Plug-ins." This indicates the plug-in was properly registered. No further steps are needed. Click **Close** to return to the main interface of your vSphere Client.

    Let's return to UCS Manager and complete the "Configure VMware Integration" wizard. See image below.

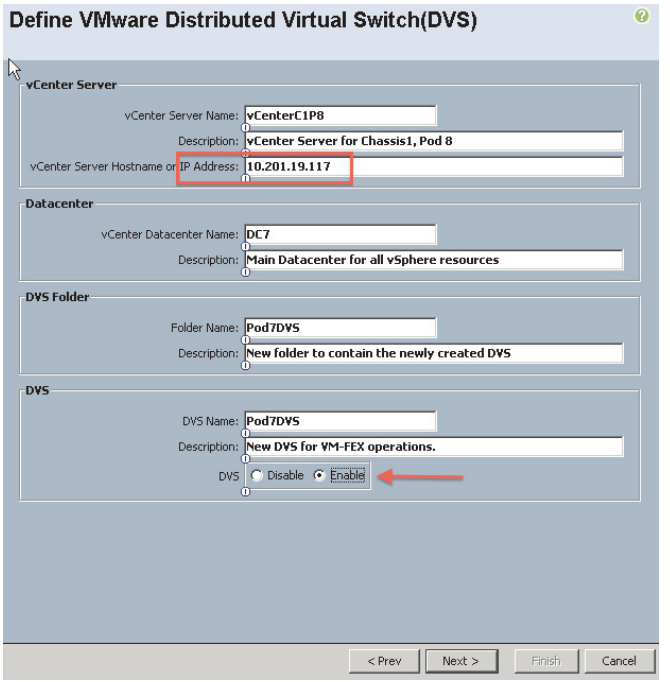
80. To continue with this wizard, click **Next** on the "Install Plug-in on vCenter Server." screen.

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81. Use the table below to complete the "Define VMware Distributed Virtual Switch" step of the "Configure VMware Integration" wizard. Remember **X** = Chassis#, **P** = Pod#.

Pod	vCenter Server Name	vCenter Server IP	vCenter Datacenter Name	DVS Folder Name	DVS Name
1	vCenter**XP**	10.20**X**.19.1**X1**	DC**P**	Pod**1**DVSFolder	Pod**1**DVS
2	vCenter**XP**	10.20**X**.19.1**X2**	DC**P**	Pod**2**DVSFolder	Pod**2**DVS
3	vCenter**XP**	10.20**X**.19.1**X3**	DC**P**	Pod**3**DVSFolder	Pod**3**DVS
4	vCenter**XP**	10.20**X**.19.1**X4**	DC**P**	Pod**4**DVSFolder	Pod**4**DVS
5	vCenter**XP**	10.20**X**.19.1**X5**	DC**P**	Pod**5**DVSFolder	Pod**5**DVS
6	vCenter**XP**	10.20**X**.19.1**X6**	DC**P**	Pod**6**DVSFolder	Pod**6**DVS
7	vCenter**XP**	10.20**X**.19.1**X7**	DC**P**	Pod**7**DVSFolder	Pod**7**DVS
8	vCenter**XP**	10.20**X**.19.1**X8**	DC**P**	Pod**8**DVSFolder	Pod**8**DVS

82. Be sure to set the "DVS" parameter to **Enable** and click **Next**.

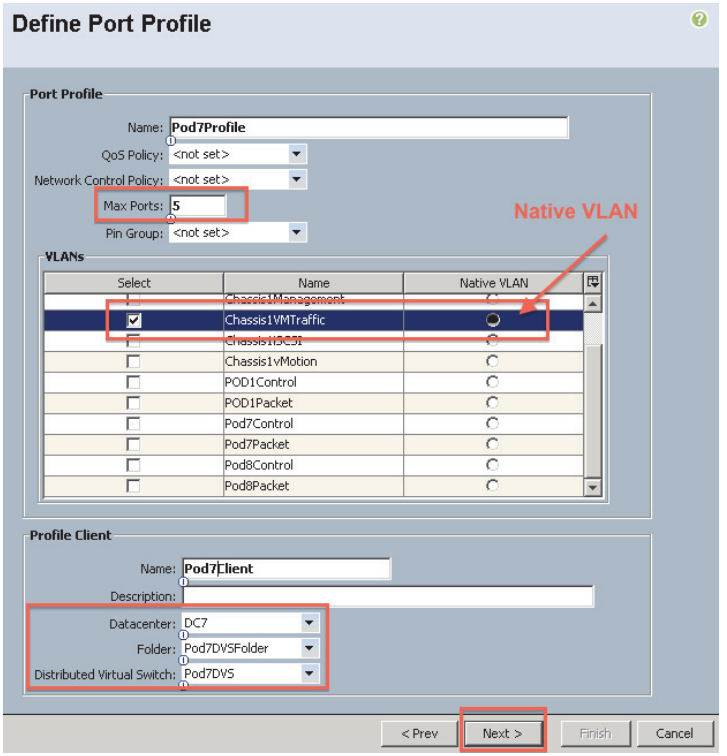


83. Set the Port Profile Name to **PodPProfile** (ex. Pod7Profile).
84. Set Max Ports to 5.
85. Select your Chassis wide **ChassisXVMTraffic** VLAN and set it as the **Native VLAN**.

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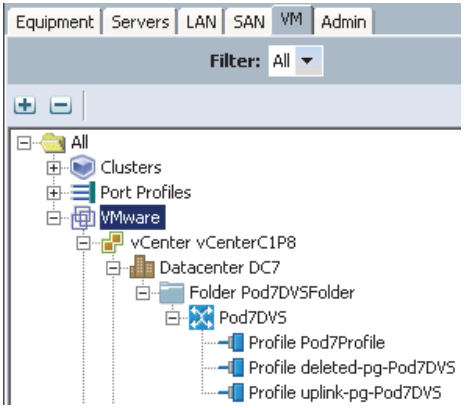
86. Enter in a Profile Client Name as **PodPClient** (ex. Pod7Client). From the drop-down menus, select your Pod specific Datacenter:, Folder:, and Distributed Virtual Switch: values and click **Next** to continue. See image below.



87. On the "Apply Port Profiles to..." screen click **Finish** to complete the wizard and **OK** to confirm successful creation.

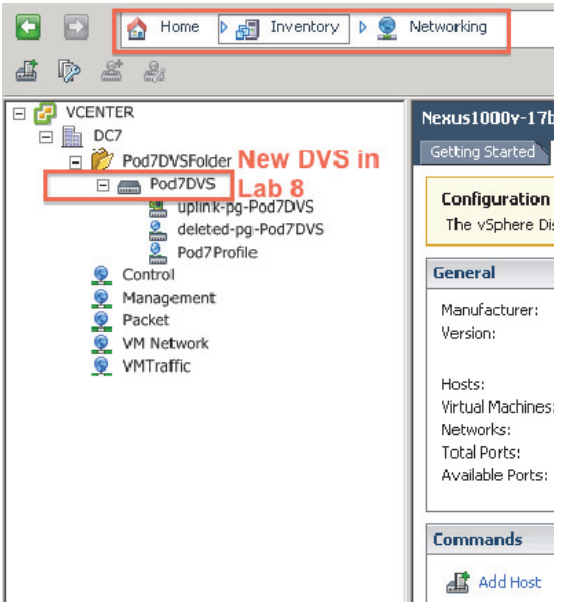
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88. Expand all of the subsections of "VMware" in the **VM** tab. Select your port profile (ex. Pod7DVS) and notice the newly created DVS.



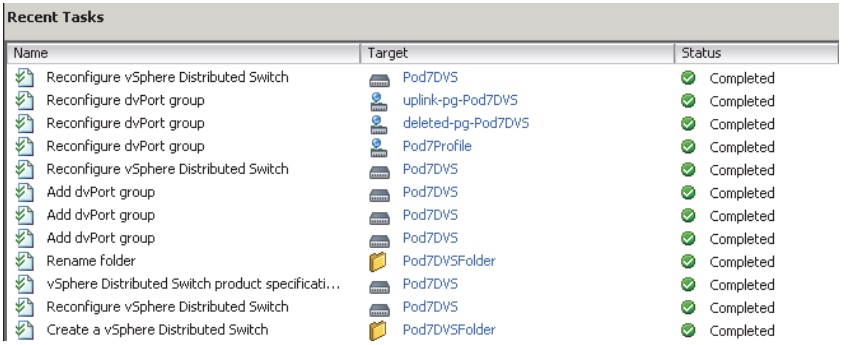
The real test is to see all of the Networking components created in your vSphere environment through the newly configured UCS Manager to vSphere Integration.

89. Return to your vSphere Client and navigate to **Home > Inventory > Networking** and verify that a new DVS is created.

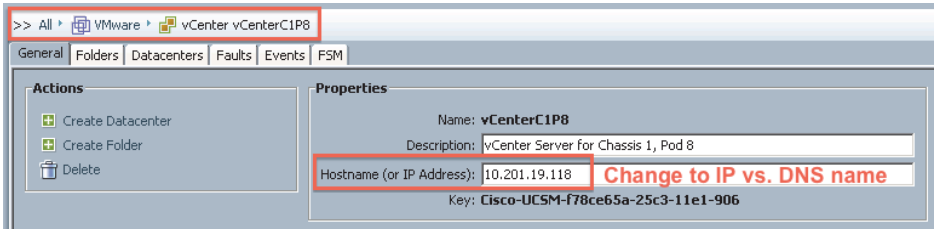


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90. Observe in "Recent Tasks" the messages for the creation of the DVS.



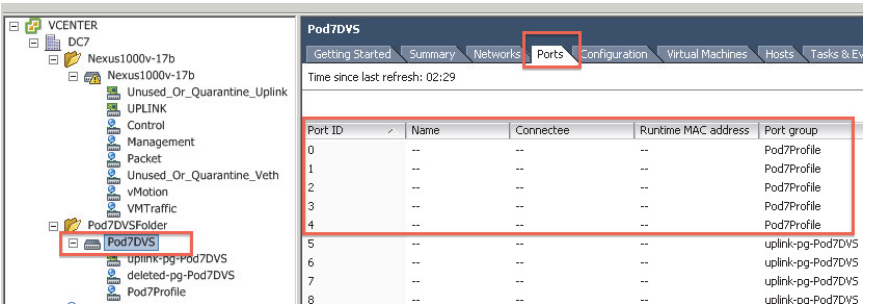
Note In the real world, there **may** be times when you will need to change the vCenter Server identifier from the DNS name to the actual IP address. Check the **FSM** tab of your defined vCenter Server for errors when attempting to communicate with the vCenter Server service.



91. One last verification step would be to check the ports of your newly configured DVS. To do this select, using your vSphere Client, select your Pod**P**DVS (ex. Pod7DVS) and click the **Ports** tab.

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92. Notice how only the first 5 ports are configured and are part of the Pod**P**Profile (ex. Pod7Profile) port group. These values (quantity of 5 & port group name of "PodPProfile") come from the details we provided the wizard in step 48.



Activity Verification

You have completed this activity when you have achieved these goals:

- You have created and powered on VM to test connectivity.
- You have configured a new Datacenter and added both ESXi hosts.
- You have configured the needed vSS on both hosts and tested vMotion.
- Enable Cisco's UCS Manager and VMware's vSphere integration.
- Confirm integration between Cisco's UCS Manager and VMware's vSphere.

Lab Complete

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L9

Install a Cisco Nexus 1000V VSM (Optional)

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Lab Overview

In this activity, you will install and configure a Cisco Nexus 1000V VSM in your newly installed vSphere environment.

Estimated Completion Time

120 minutes

Lab Procedures

In this activity, you will:

- Configure vSwitch with Control, Management and Packet VLANs
- Deploy VSM from an .ova File
- Configure the Primary VSM

Required Resources

These are the resources and equipment that are required to complete this activity:

- Management Desktop
- Implementation sheet

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Lab 9 Implementation Sheet

Note The Task numbers here correspond to the Tasks where you will use this information later in the lab.

Task 1 Configure Nexus 1000V VLANs

Where **X** = Chassis #

*All Pods use same value

Pod	Data Center	Control	Management	Packet
1	DC1	**X**11	***X**10	**X**12
2	DC2	**X**21	***X**10	**X**22
3	DC3	**X**31	***X**10	**X**32
4	DC4	**X**41	***X**10	**X**42
5	DC5	**X**51	***X**10	**X**52
6	DC6	**X**61	***X**10	**X**62
7	DC7	**X**71	***X**10	**X**72
8	DC8	**X**81	***X**10	**X**82

Task 2 Deploy VSM from .OVA File

Where **X** = Chassis #

*All Pods use same value

Pod	VSM Name	VSM IP	Control	Management	Packet
1	VSM**X**1	10.20**X**.10.61	**X**11	***X**10	**X**12
2	VSM**X**2	10.20**X**.10.62	**X**21	***X**10	**X**22
3	VSM**X**3	10.20**X**.10.63	**X**31	***X**10	**X**32
4	VSM**X**4	10.20**X**.10.64	**X**41	***X**10	**X**42
5	VSM**X**5	10.20**X**.10.65	**X**51	***X**10	**X**52
6	VSM**X**6	10.20**X**.10.66	**X**61	***X**10	**X**62
7	VSM**X**7	10.20**X**.10.67	**X**71	***X**10	**X**72
8	VSM**X**8	10.20**X**.10.68	**X**81	***X**10	**X**82

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Task 3: Configure the Primary VSM

Where **X** = Chassis #

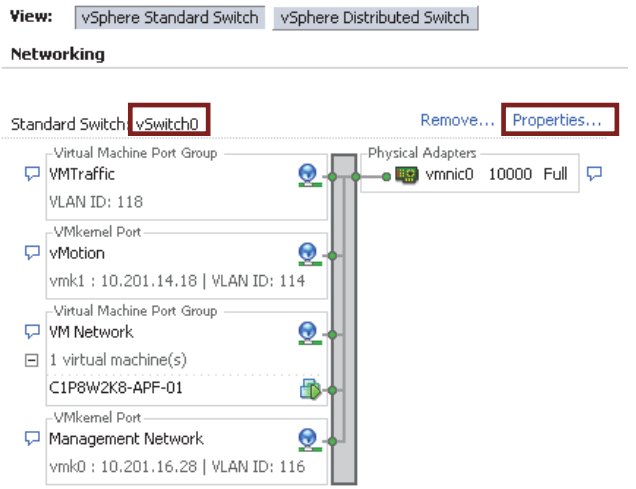
Pod	Switch Name	Admin Password	VSM Domain ID	Native VLAN
1	Nexus1000v-**X**1	NXos12345	**X**1	1
2	Nexus1000v-**X**2	NXos12345	**X**2	1
3	Nexus1000v-**X**3	NXos12345	**X**3	1
4	Nexus1000v-**X**4	NXos12345	**X**4	1
5	Nexus1000v-**X**5	NXos12345	**X**5	1
6	Nexus1000v-**X**6	NXos12345	**X**6	1
7	Nexus1000v-**X**7	NXos12345	**X**7	1
8	Nexus1000v-**X**8	NXos12345	**X**8	1

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Task 1: Configure vSwitch with Control, Packet, and Management VLANs

The Nexus 1000V uses 3 key interfaces for communication. Those are the Control, Management and Packet interfaces. In this task, you will create port groups in the vSwitch to support the 3 interfaces needed by the VSM until the Distributed Virtual Switch (DVS) is created (in optional lab 10).

1. Using your vSphere Client, navigate to **Home > Inventory > Hosts and Clusters**.
2. Click on your B-Series ESXi host and then click the **Configuration** tab.
3. In the "Hardware" section of the content pane, click the **Networking** link.
4. In the "Virtual Switch" view, click the **Properties** link for **vSwitch0**.



5. In the "vSwitch0 Properties" window, click the **Add** button.

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6. In the "Add Network Wizard" window, click the **Next** button to leave the Connection Type as **Virtual Machine**.

Pod	Data Center	Control	Management	Packet
1	DC1	**X**11	***X**10	**X**12
2	DC2	**X**21	***X**10	**X**22
3	DC3	**X**31	***X**10	**X**32
4	DC4	**X**41	***X**10	**X**42
5	DC5	**X**51	***X**10	**X**52
6	DC6	**X**61	***X**10	**X**62
7	DC7	**X**71	***X**10	**X**72
8	DC8	**X**81	***X**10	**X**82

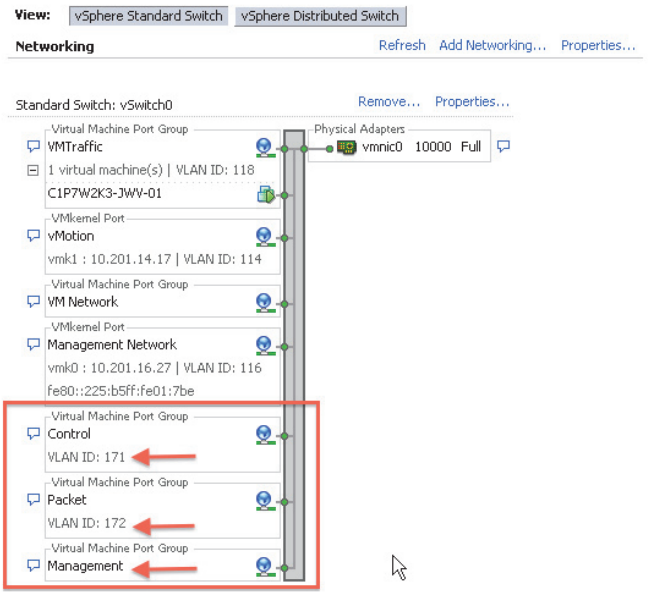
7. Enter **Control** in the "Network Label" text field of the port group.
8. In the "VLAN ID" field, enter the pod-specific VLAN according to the table above and then click the **Next** button. Finalize the "Add Network Wizard" by clicking **Finish**.
9. Read all sub-steps fully before making configuration changes.
   - 9.1. Repeat steps 5 through 8 for the **Management** port group and again for the **Packet** port group. In the end you would have created Control, Management & Packet.
   - 9.2. On your B-Series Host **do not** configure the VLAN number (ex. 110) for the Management port group **only**.
   - 9.3. On your C-Series Host **be sure** to configure the VLAN number (ex. 110) for the Management port group **as well**.

Note The need for configuring or not configuring the VLAN number between your B-Series and C-Series hosts goes all the way back to Lab 3. Here you configured the system VLANs for your vNICs and set the Management VLAN as the Native VLAN. However your C-Series do not have the same Native VLAN value specified, hence the need for a slightly different configuration.

10. Review the settings (graphic below), and then click **Close** to exit the "vSwitch0 Properties" interface.
11. Repeat Steps 1 through 10 for all other ESXi host you would like to include. Be careful to use the same port group names and VLAN IDs as you did for your first ESXi host.

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12. Your vSwitch0 configuration should *closely* match the following figure. Focus on the port group Name and VLAN ID. This diagram is from a B-Series ESXi host.



Note	You may notice how the number of Port Groups we have here match the number of VLANs we selected when creating our vNIC Template in Lab 7. Other than the "VM Network" port group, which is default on all ESXi hosts, there is a one-for-one matching between our physical UCS Networking configuration (6 VLANs) and the virtual VMware Networking configuration (6 port groups).

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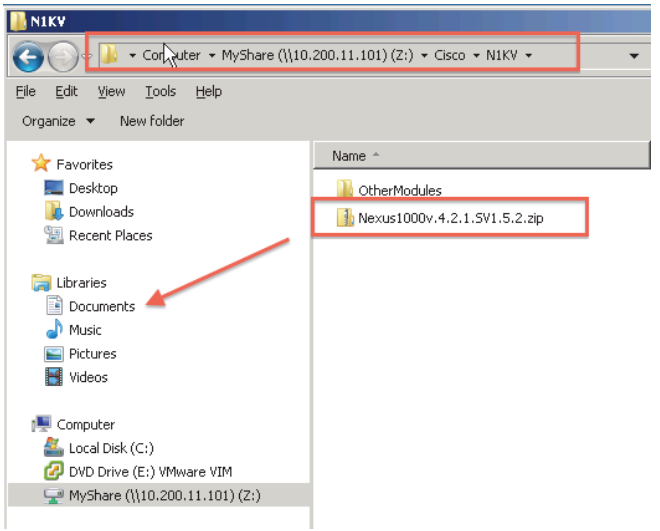
Task 2: Prepare for VSM deployment

In this task, you will install the VSM VM from an .ova file on your Management Desktop.

Note	Only one Nexus 1000V Supervisor Module (VSM) will be deployed in this lab. When working in pairs only one pod member will perform the following steps. Ex. Deploy the VSM only to your B-Series ESXi host.

Before we can deploy the VSM as an .ova file we need to organize our file system. This is an involved process that can be easily confused. Take your time, read the steps fully and ask your instructor for help as needed.

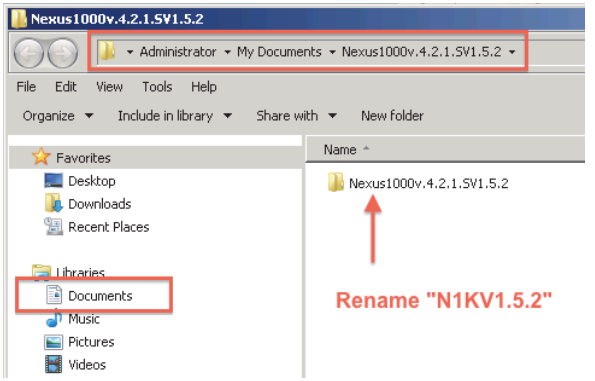
13. First let's copy the Nexus 1000v files from the SAN to your Management Desktop. Click on the "Computer" icon on your Desktop and navigate to **Z:\Cisco\N1KV**.
14. Drag the "Nexus1000v4.2.1.SV***1.5.2***.zip" file to **Documents** on your Local Computer.



15. Click on "Document" (where the .zip file was copied) and right-click on the newly copied Nexus1000v4.2.1.SV***1.5.2***.zip file. Select **7-Zip > Extract Files...** and click on **OK**.

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16. Click once on the newly extracted "Nexus1000v.4.2.1.SV1.5.2" folder.
17. Right-click on the sub-folder with the same name and click **Rename**. Enter a new and simple name of "**N1KV1.5.2**."



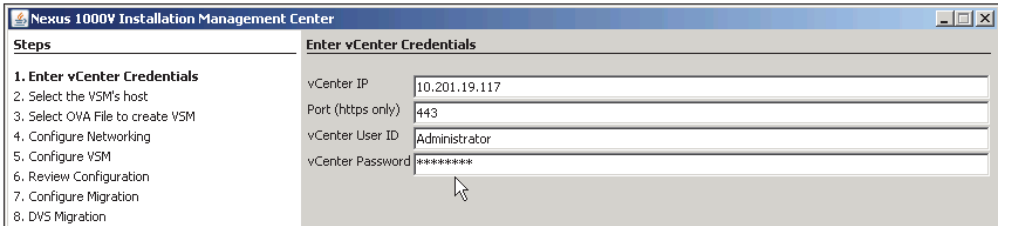
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Task 3: Deploy and Configure the Primary VSM

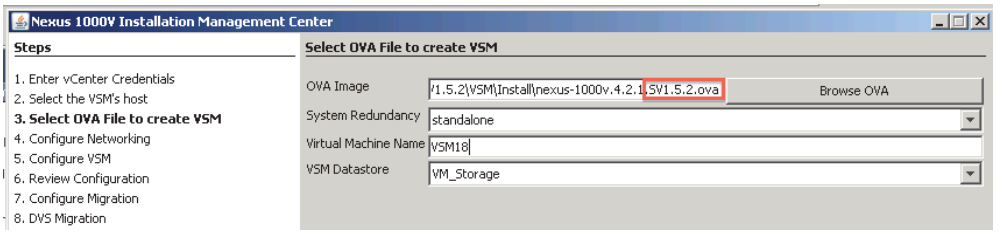
In this task, you will deploy and configure the recently extracted VSM.

Note The Nexus 1000v **v1.5** introduces a new way to deploy Virtual Supervisor Modules (VSMs). This application is called the "Nexus 1000v Installation Management Center."

18. To launch the "...Installation Management Center" use **Explorer** and navigate to **Computer > Documents > Nexus1000v4.2.1.SV*1.5.2* > N1KV1.5.2 > VSM > Installer_App** and click on "Nexus1000V-install.jar."
19. In the "Enter VSM Credentials" screen of the Management Center wizard, enter **10.20X.19.1XP** (ex. **10.201.19.117**) as your "vCenter IP" (where X = Chassis # and P = Pod #) and a "vCenter User ID" of **Administrator** with a "vCenter password" of **cisco123**. Then click **Next**.



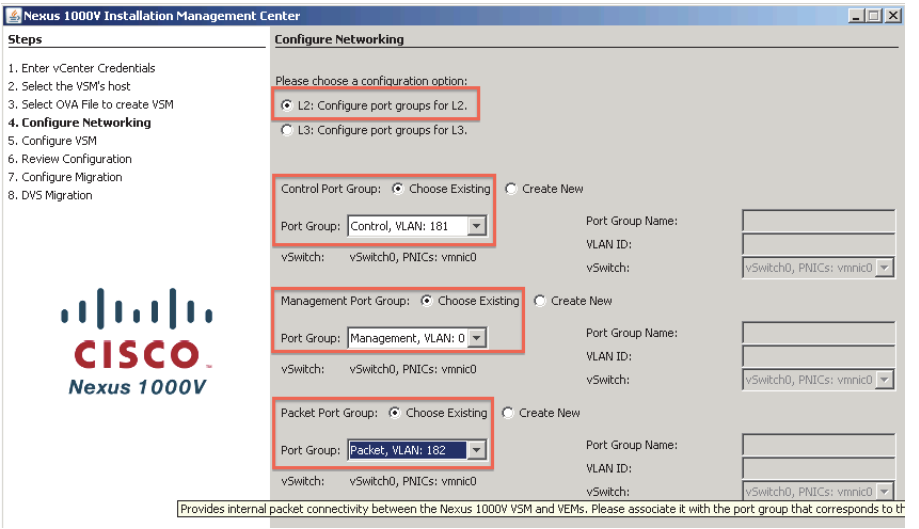
20. In the "Select the VSM's Host" screen of the Cisco Nexus 1000V configuration wizard, highlight your B-Series ESXi host (ex. c3-p1-**b**-esxi.ucseduc.com) and click **Next**.
21. In the "Select OVA File to create VSM" screen click **Browse OVA** and navigate to **My Documents > Nexus1000v4.2.1.SV*1.5.2* > N1KV*1.5.2* > VSM > Install**. Choose the **nexus-1000v.4.2.1.SV1.5.2.ova** and click **Open**.
22. Select **standalone** as your "System Redundancy" option.
23. Enter a "Virtual Machine Name" of **VSMXP** (where **X** = Chassis & **P** = Pod, ex. VSM18), the "VSM Datastore" as **VM_Storage** and click **Next**.



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24. On the "Configure Networking" screen, select **L2: Configure Ports for L2** radio button.

25. Select the appropriate port groups for the **Control**, **Management**, and **Packet** port groups. Click **Next** to continue.



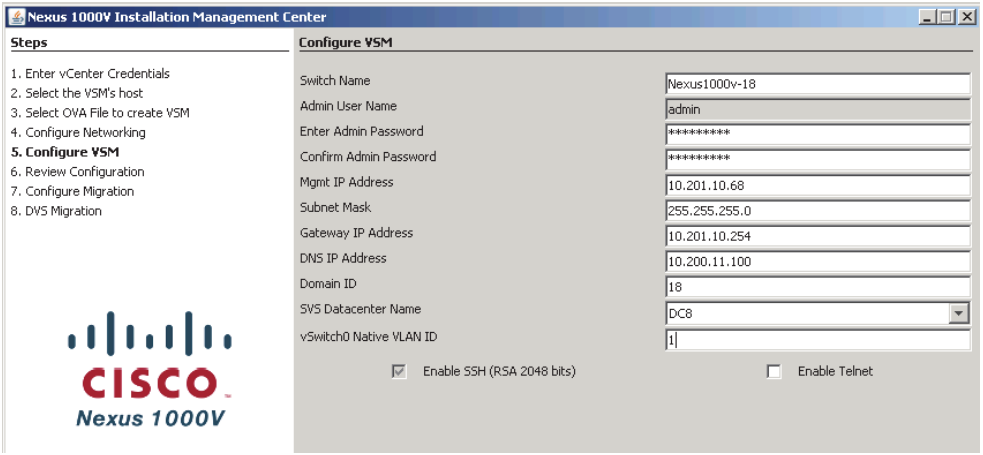
Note This is a very important step, so take your time and consult your instructor if you have any questions. Click the **Next** button to continue.

26. In the "Configure VSM" screen of the Cisco Nexus 1000V configuration wizard, you will enter pod-specific values for the Switch Name, Admin password, SVS Domain ID, and native VLAN fields, according to the table below.

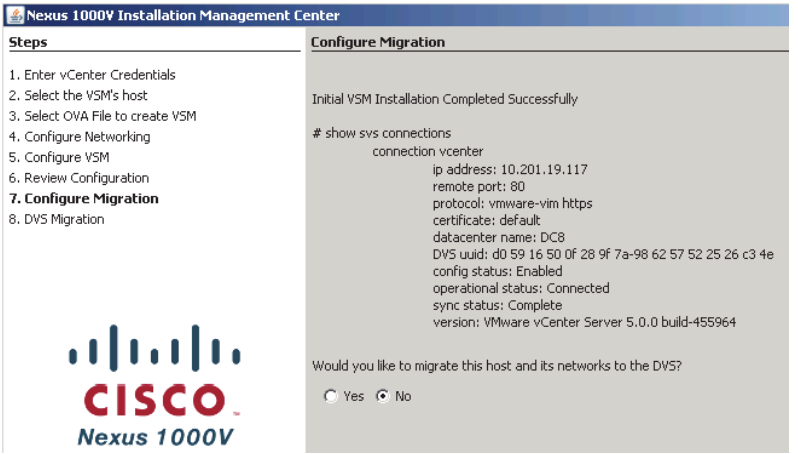
    All pods use **255.255.255.0** as a subnet mask, **10.20X.10.254** as their default gateway and **10.200.11.100** for a DNS server. When you are finished, click the **Next** button.

Pod	Switch Name	Admin Password	Management IP address	VSM Domain ID	Native VLAN
1	Nexus1000v-**X**1	NXos12345	10.20**X**.10.61	**X**1	1
2	Nexus1000v-**X**2	NXos12345	10.20**X**.10.62	**X**2	1
3	Nexus1000v-**X**3	NXos12345	10.20**X**.10.63	**X**3	1
4	Nexus1000v-**X**4	NXos12345	10.20**X**.10.64	**X**4	1
5	Nexus1000v-**X**5	NXos12345	10.20**X**.10.65	**X**5	1
6	Nexus1000v-**X**6	NXos12345	10.20**X**.10.66	**X**6	1
7	Nexus1000v-**X**7	NXos12345	10.20**X**.10.67	**X**7	1
8	Nexus1000v-**X**8	NXos12345	10.20**X**.10.68	**X**8	1

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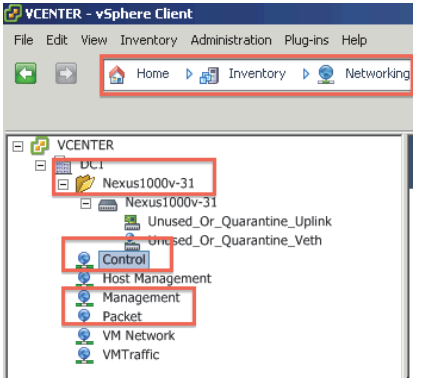
27. On the "Review Configuration" page, take your time to review all details for accuracy against the table above. To finalize the configuration and deploy your selected options to the VSM VM click **Next**. This process may take as much as 10 minutes.
28. In the "Configure Migration" screen leave the default selection of **No** to migrate host networking and click **Finish**. We will migrate your hosts over to this new DVS in lab 7.



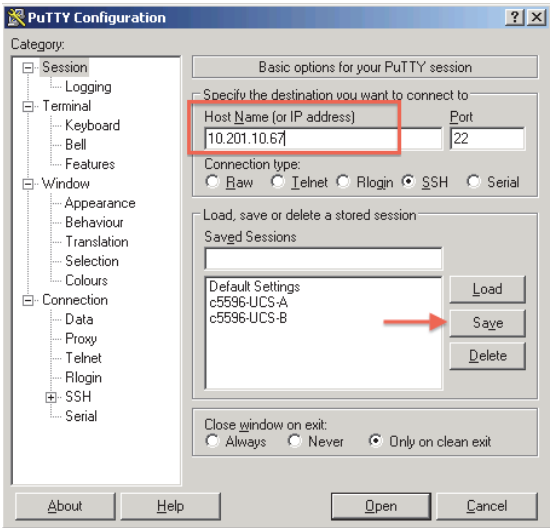
29. In the Summary screen, click the **Close** button.

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30. To verify that the Cisco Nexus 1000V DVS object was created in vCenter, use your vSphere Client to navigate to **Home > Inventory > Networking** and locate the new "Nexus 1000v-XP" vNetworks Distributed Switch (aka DVS).



31. From your Management Desktop, use PuTTY to SSH to the Management IP address of your VSM (ex. 10.20**X**.10.6**P**).



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32. On the VSM, log in as the **admin** user with a password of **NXos12345** and enter the "**show svs connections**" command to display the connection between the VSM and vCenter.

```
Nexus1000-1# show svs connections
connection vcenter:
    ip address: 10.20X.19.1XP        ← Your vCenter Server (Management Desktop)
    remote port: 80
    protocol: vmware-vim https
    certificate: default
    datacenter name: DC#
    admin:
    DVS uuid: cb a0 18 50 b2 01 f9 44-ef 0c 97 4f a6 bd 97 3a
    config status: Enabled
    operational status: Connected
    sync status: Complete
    version: VMware vCenter Server 5.0.0 build-455964
```

Activity Verification

You have completed this activity when you have achieved these goals:

- You have successfully imported the vCenter VM into your Cisco UCS B-Series ESXi host.
- You have configured a port profile to support external communications for vCenter.
- You have powered on vCenter VM and validated services.
- You have configured a new data center and added both ESXi hosts.
- You have configured vSwitch on both hosts and tested vMotion.

Lab Complete

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L10

Configure 1000v Port Profiles (Optional)

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Lab Overview

In this activity, you will configure port profiles on the VSM and publish them as port groups to vCenter.

Estimated Completion Time

60 minutes

Lab Procedures

In this activity, you will:

- Configure VLANs and Uplink Port Profile in the VSM
- Configure Control, Management, and Packet vEthernet Port Profiles
- Configure vMotion and VMTraffic vEthernet Port Profiles
- Add ESXi Hosts to the DVS
- Migrate Windows VMs from a vSS to vDS

Required Resources

These are the resources and equipment that are required to complete this activity:

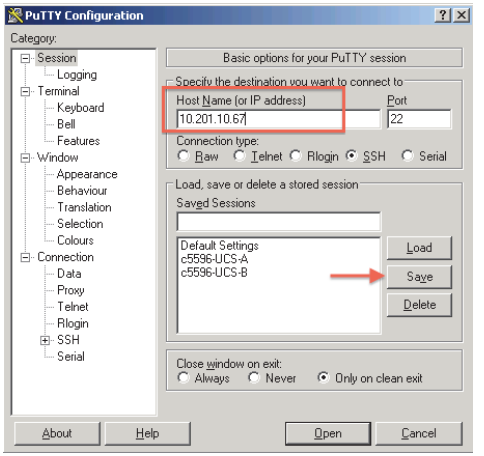
- Management Desktop
- Lab reference guide

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Task 1: Configure VLANs and Uplink Port Profile in the VSM

In this task, you will configure VLANs and an uplink port profile on the VSM. It is the "uplink" port-profile type that will ultimately connect us to the physical world, South bound.

Remember; **X** = Chassis# and **P** = Pod#.



1. From your PuTTY session (opened in lab 9), enter the following commands to configure the following VLANS in the VSM; Control (**XP1, ex 271**), Management (**X10, ex 210**), Packet (**XP2, ex 272**), VMTraffic (**X18, ex 218**), and vMotion (**X14, ex 214**).

   Remember; **X** = Chassis# and **P** = Pod#. The following examples will use Chassis 2, Pod 7. The names we will use below are not required, but they do make the configuration easier to read.

```
Nexus1000v-27# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Nexus1000v-27(config)# vlan 271
Nexus1000v-27(config-vlan)# name Control
Nexus1000v-27(config-vlan)# vlan 210
Nexus1000v-27(config-vlan)# name Management
Nexus1000v-27(config-vlan)# vlan 272
Nexus1000v-27(config-vlan)# name Packet
Nexus1000v-27(config-vlan)# vlan 214
Nexus1000v-27(config-vlan)# name vMotion
Nexus1000v-27(config-vlan)# vlan 218
Nexus1000v-27(config-vlan)# name VMTraffic
Nexus1000v-27(config-vlan)# exit
```


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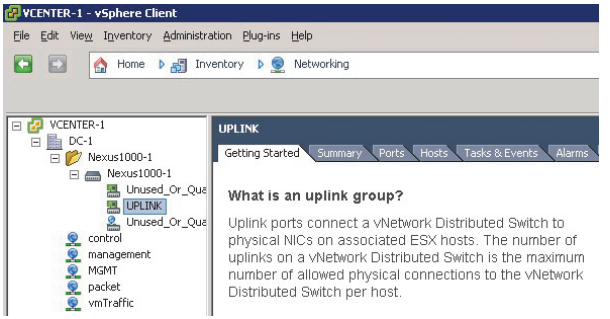
2. Enter the following commands in the VSM console to create the uplink port profile. Use your Chassis# and Pod# number in place of "X" & "P" in the VLAN numbers. Just as you did in the step above.

```
Nexus1000v-27(config)# port-profile type ethernet UPLINK
Nexus1000v-27(config-port-prof)# switchport mode trunk
Nexus1000v-27(config-port-prof)# switchport trunk allowed vlan 271, 210, 272, 214, 218
Nexus1000v-27(config-port-prof)# switchport trunk native vlan 1
Nexus1000v-27(config-port-prof)# no shutdown
Nexus1000v-27(config-port-prof)# system vlan 271, 210, 272
Nexus1000v-27(config-port-prof)# vmware port-group
Nexus1000v-27(config-port-prof)# state enabled
```

3. Enter the following command in the VSM console to save your running configuration:

   copy run start

4. Verify that the "UPLINK" port profile was pushed to your vCenter Server configuration, by going to the **Home > Inventory > Networking** view and selecting your DVS. You should see the profiles that you created on the **Networks** tab.



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Task 2: Configure Control, Management, and Packet vEthernet Port Profiles

In this task, you will configure the Control, Management, and Packet port profiles that are required for proper VSM-to-VEM communications.

Remember; **X** = Chassis# and **P** = Pod#.

A refresher; **Control** = VSM to VEM communications & NetFlow statistics, **Management** = VSM to vCenter communication and **Packet** = VSM to VEM for CDP, LACP & ICMP.

5. Use the following commands to create a port profile that is called **Control** (**XP1**) on your VSM.

```
Nexus1000v-27(config-port-prof)# config t
Nexus1000v-27(config)# port-profile type vethernet Control
Nexus1000v-27(config-port-prof)# vmware port-group
Nexus1000v-27(config-port-prof)# switchport mode access
Nexus1000v-27(config-port-prof)# switchport access vlan 271
Nexus1000v-27(config-port-prof)# no shutdown
Nexus1000v-27(config-port-prof)# system vlan 271
Nexus1000v-27(config-port-prof)# state enabled
```

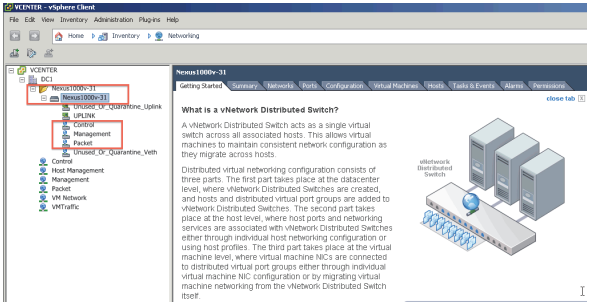
6. Use the following commands to create a port profile that is called **Management** (**X10**).

```
Nexus1000v-27(config)# port-profile type vethernet Management
Nexus1000v-27(config-port-prof)# vmware port-group
Nexus1000v-27(config-port-prof)# switchport mode access
Nexus1000v-27(config-port-prof)# switchport access vlan 210
Nexus1000v-27(config-port-prof)# no shutdown
Nexus1000v-27(config-port-prof)# system vlan 210
Nexus1000v-27(config-port-prof)# state enabled
```

7. Use the following commands to create a port profile that is called **Packet** (**CP2**).

```
Nexus1000v-27(config)# port-profile type vethernet Packet
Nexus1000v-27(config-port-prof)# vmware port-group
Nexus1000v-27(config-port-prof)# switchport mode access
Nexus1000v-27(config-port-prof)# switchport access vlan 272
Nexus1000v-27(config-port-prof)# no shutdown
Nexus1000v-27(config-port-prof)# system vlan 272
Nexus1000v-27(config-port-prof)# state enabled
```


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Take a moment to look through the information in the “Recent Tasks” pane at the bottom of your vSphere Client. Here you can see a history of the port groups created within vCenter while at the command line of your Nexus 1000v VSM.

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Task 3: Configure vMotion, VMTraffic vEthernet Port Profiles

In this task, you will configure the port profiles that are required for vMotion and VM connectivity. Notice how we do not use the "system vlan" parameter here. These port profiles are North bound or VM facing and will be used by our VMs to access the network.

8. Use the following commands to create a port profile that is called **vMotion** (**X14**) and again for **VMTraffic** (**X18**).

```
Nexus1000v-27(config-port-prof)# port-profile type vethernet vMotion
Nexus1000v-27(config-port-prof)# vmware port-group
Nexus1000v-27(config-port-prof)# switchport mode access
Nexus1000v-27(config-port-prof)# switchport access vlan 214
Nexus1000v-27(config-port-prof)# no shut
Nexus1000v-27(config-port-prof)# state enabled
Nexus1000v-27(config-port-prof)#
Nexus1000v-27(config-port-prof)# port-profile type vethernet VMTraffic
Nexus1000v-27(config-port-prof)# vmware port-group
Nexus1000v-27(config-port-prof)# switchport mode access
Nexus1000v-27(config-port-prof)# switchport access vlan 218
Nexus1000v-27(config-port-prof)# no shutdown
Nexus1000v-27(config-port-prof)# state enabled
Nexus1000v-27(config-port-prof)# end
Nexus1000v-27# copy run start
[########################################] 100%
```

9. Copy the running configuration to the startup configuration:

   copy run start

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Task 4: Add ESXi Hosts to the DVS

In this task, you will configure your ESXi hosts to use the newly created Nexus 1000V Distributed Virtual Switch (DVS) instead of the vNetworks Standard Switch.

For the initial deployment of the VEM on ESXi we will use a Manual/CLI based deployment. Let's start by enabling Remote Tech Support mode on our ESXi host. This approach is useful if the Graphical/Automated approach, which uses VUM, fails to properly deploy the VEM to the specified hosts.

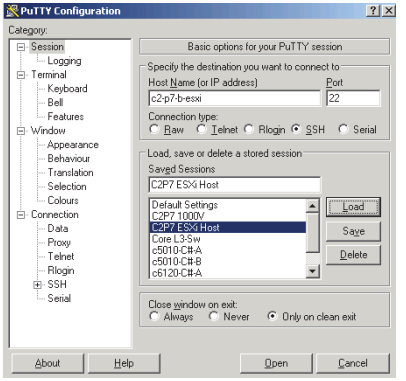
10. Using UCS Manager (B-Series) or CIMC (C-Series), return to the "KVM Console" of your ESXi host. Press **F2** and login with **root** and **NXos12345**.
11. Using your keyboard, arrow down to **Troubleshooting Options**, press **Enter** to view the "Troubleshooting Mode Options". Arrow down and press **Enter** to **Enable SSH**.



Note	For security reasons, even VMware suggests you enable SSH access into your hosts only when needed and disable said protocol once access is complete.

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12. From your Management Desktop open PuTTY and create a new SSH connection to your ESXi host (ex. DNS name C#-P#-B-ESXi).



13. Double click on this newly created SSH session and click **Yes** to accept the hosts Public Key.

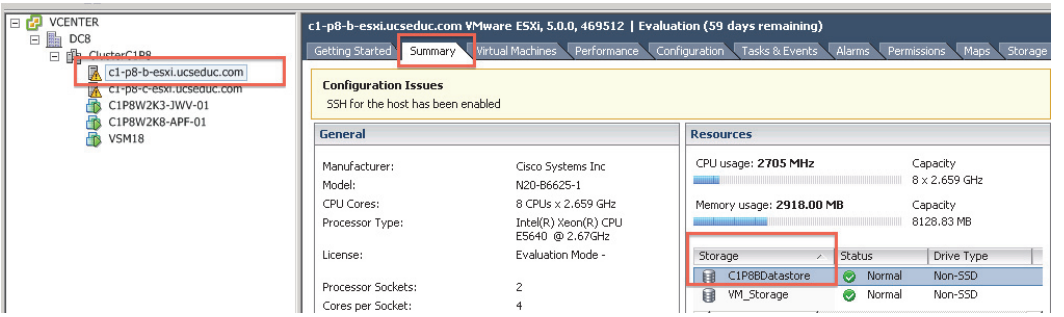
14. Once prompted login with **root** and **NXos12345**.

    Now that we can access our host directly via SSH, let's copy the necessary Nexus 1000V install files to a local datastore on your host.

15. Using your vSphere Client, navigate to **Home > Inventory > Hosts and Clusters**. Click on your host and navigate to the **Summary** tab.

16. Navigate over to the **Storage** section of the **Summary** tab and right click on the local datastore (this will be either your **5 or 10.00 GB** datastore), click **Rename**. This is the host's local datastore. Rename this datastore to **C#P#*B*Datastore** or **C#P#*C*Datastore**.

    Being that this environment and all hosts are centrally managed by a vCenter Server, it is necessary to uniquely identify each hosts datastore. Be sure to use a **B** = B-Series or a **C** = C-Series when renaming your hosts local datastore above.



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17. Right-click on this newly renamed datastore and select **Browse Datastore**. Click the **Upload files to this datastore** icon and select **Upload Folder**.
18. In the "Browse For Folder" interface navigate to **Libraries > Document > My Documents > Nexus1000v4.2.1.SV1.5.2 > N1KV1.5.2**, select the "**VEM**" directory and click **OK**.
19. Click **Yes** at the "Upload/Download Operation Warning" and watch as the files are uploaded. Once the upload is complete close the **Datastore Browser** window.

Note	While going through the following commands keep in mind the **tab** key can be used to complete a directory path, command or filename as needed. For example, you can type in **Nexus** (case sensitive) and press the **tab** key to complete the full path to the Nexus 1000V directory name. This "tab complete" feature will come in handy soon.

20. Return to the PuTTY session connecting you to your ESXi host (re-open a session if needed). Using the **cd vmfs/volumes/C#P#*B*Datastore/VEM** command, change the local patch to the newly copied Nexus 1000V files.

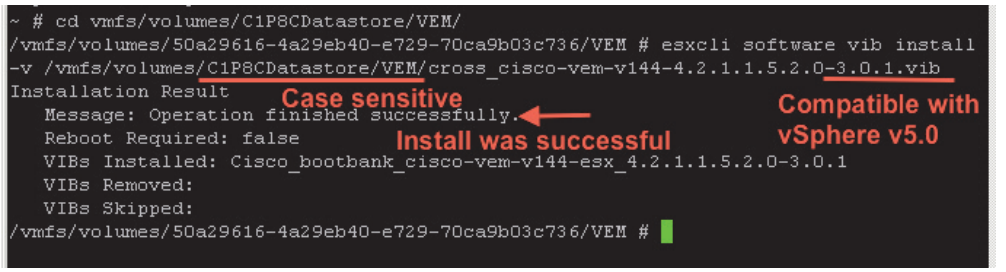
    Remember, the directory path and filenames **are case sensitive**.

21. Read all sub steps before proceeding. If you installed vSphere version

    21.1. **5.0** in Lab 7 (**if not** skip to step 21.2), use the following command to manually install the Nexus 1000v Virtual Ethernet Module (VEM). This is all one command.

    Remember, the tab key is your friend.

```
esxcli software vib install -v /vmfs/volumes/C#P#BDatastore/VEM/cross_cisco-vem-
v144-4.2.1.1.5.2.0-3.0.1.vib
```



    21.2. **5.1** in Lab 4, use the following command to manually install the Nexus 1000v Virtual Ethernet Module (VEM). This is all one command.

    Remember, the tab key is your friend.

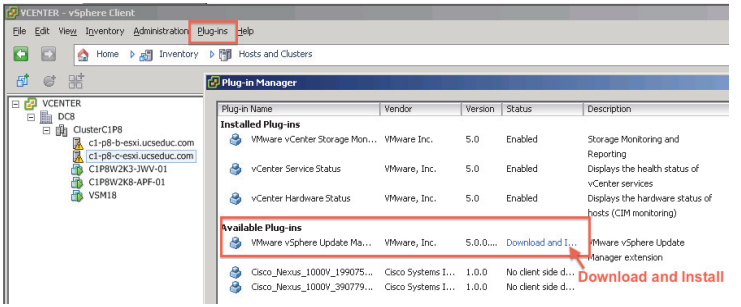
```
esxcli software vib install -v /vmfs/volumes/C#P#BDatastore/VEM/cross_cisco-vem-
v144-4.2.1.1.5.2.0-3.1.2.vib
```


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22. Repeat steps 10 - 21 for the C-Series ESXi host in your Pod. Ex. C#-P#-C-ESXi.

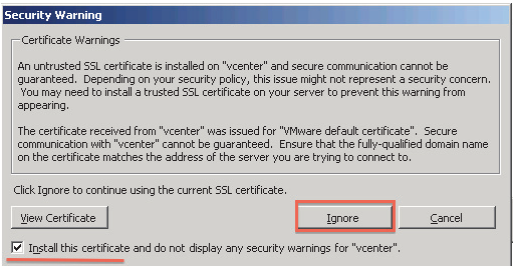
    Congratulations; you just completed the process of **manually** installing/deploying a VEM to an ESXi host. Now let's update the VEM using the automated VUM deployment process.

23. Navigate back to your vSphere Client, click the **Plug-ins** menu and choose **Manage Plug-ins…**



24. In the "Available Plug-ins" section, click the blue "Download and Install" link to the right of VMware Update Manager Plug-ins and then follow the wizard, accepting all defaults.

25. Once the VUM Plug-in installation is complete click to check "**Install this certificate...**" and **Ignore** to accept the vCenter Server's SSL certificate.

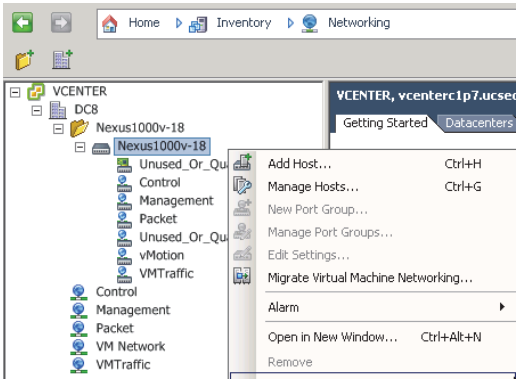


    Do not install the Cisco Nexus 1000V plug-in as it will generate errors and is not needed.

26. Once complete, close the "Plug-in Manager" window and navigate to **Home > Inventory > Networking**.

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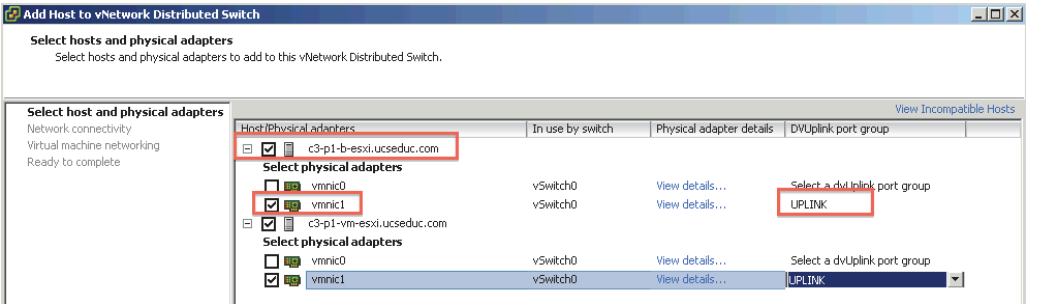
27. Right-click your VSM (named "Nexus1000v-**XP**", ex. Nexus1000v-18) in the content pane and choose **Add Host**.



28. In the Select "Host and Physical Adapters" screen, click the check box next to your B-Series (only B-Series for this step).

29. Choose the check box next to the adapter that corresponds to **vmnic1**, and then choose **UPLINK** from the DVUplink port group drop-down list.

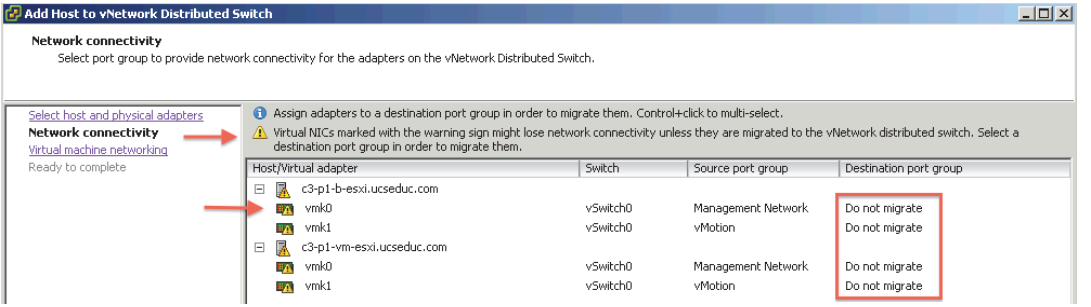
Note	Be sure to **only select your vmnic1** adapter. If the wrong NIC/adapter is selected in this step you will lose management connectivity to your host. If this happens, the only way to regain communications would be via the DCUI.



30. Click **Next**.

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31. At the "Network Connectivity" screen, click the **Next** button, without changing any options. You should **not** migrate the virtual adapters that are connected to vSwitch0.



32. At the "Migrate virtual machine networking" screen, click the **Next** button to **leave** DVS port profile assignment **for later in the lab**.
33. Click the **Finish** button to complete the wizard.

Note VUM might take a few minutes to install the VEMs. Be patient. If you receive a "Cannot complete…" error message verify VUM was installed in Lab 8, Task 1, Step 3 and the Plug-in was properly installed in Task 4 of this lab. You can also change the way VUM communicates with vCenter; from using a DNS name to IP address. This setting can be found at **Home > Solutions and Applications >Update Manager > Configuration**.

---

34. Click the **Hosts** tab in the content pane to verify that your B-Series host has been added.
35. Log in to your VSM console and use the **show module** command to verify that the VEMs installed properly.
36. When installed, the VEMs should report into the VSM as modules on your Cisco Nexus 1000V switch.

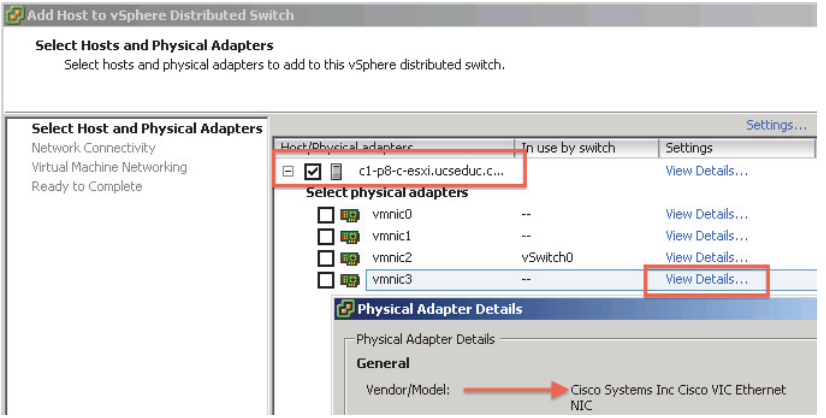
```
Nexus1000v-27# show module
Mod  Ports  Module-Type                      Model              Status
---  -----  -------------------------------  -----------------  ------------
1    0      Virtual Supervisor Module        Nexus1000V         active *
3    248    Virtual Ethernet Module          NA                 ok
Mod  Sw               Hw
---  ---------------  ------------------------------------------------
1    4.2(1)SV1(5.2)   0.0
3    4.2(1)SV1(5.2)   VMware ESXi 5.0.0 Releasebuild-469512 (3.0)

--- output omitted ---
```


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```
Mod  Server-IP        Server-UUID                           Server-Name
---  ---------------  ------------------------------------  --------------------
1    10.20X.10.6P     NA                                    NA
3    10.20X.10.2P     00000000-0000-1010-0000-000000000002  c#-p#-b-esxi.ucseduc.
```

37. Repeat steps 26 - 36 to add your C-Series host to the new Nexus 1000v DVS. On step 29, use the "View Details" option to verify that you select the "Cisco Systems Inc Cisco VIC Ethernet NIC" that is **not** connected to vSwitch0.

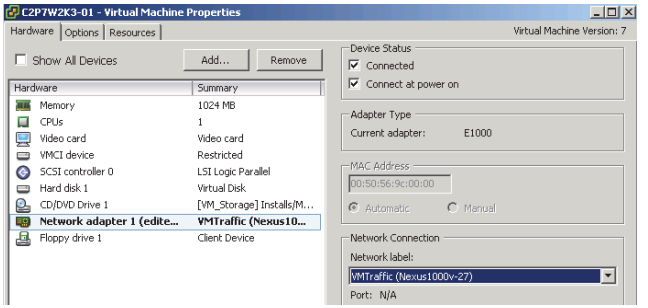


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Task 5: Migrate Windows VMs from vSwitch to DVS

In this task, you will configure your Windows VMs to use the Cisco Nexus 1000V DVS.

38. Using your vSphere Client, navigate to **Home > Inventory > Host and Cluster**, right-click, individually, on each of your Windows VM and choose **Edit Settings**.
39. On the **Hardware** tab select **Network Adapter 1**. To the right, under "Network Connection" change the "Network label:" to **VMTraffic (Nexus1000v-XP)**. Click **OK** to finalize your changes.



40. Once again, right-click on your Windows VM that currently **resides on your B-Series host** (seen on the "Summary" tab when the VM is selected), this time select **Open Console**.
41. If needed log into the desktop of your Windows VM. Open a "Command Prompt" and refresh your DHCP assigned address by issuing the **ipconfig /renew** command.
42. Validate connectivity by attempting to **ping** various addresses throughout the lab environment; both on and off of your own subnet.

    An example would be your default gateway of 10.20**X**.18.254 and the Lab DNS Server at 10.200.11.100.
43. Once you are satisfied with the level of VM connectivity, leave your VMs console window open.

Activity Verification

You have completed this activity when you have achieved these goals:

- Configured VLANs and Uplink Port Profile in the VSM
- Configured Control, Management, and Packet vEthernet Port Profiles
- Configured vMotion, VMTraffic vEthernet Port Profiles
- Added ESXi Hosts to the DVS
- Migrated Windows VMs from vSwitch to DVS

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Lab Complete

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A

Appendix A

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Appendix A: Contents

In this Appendix, you will find:

- Lab answer key
- Complete Chassis and Pod addressing charts
- Resolve Blade to Service Profile assignments
- Resolve the KVM Console “Login Failure” error
- Moving a Team’s Desktop to a Workgroup (from the Domain)
- Optional Labs
  - Appendix Lab #1: Initial Cisco UCS B-Series Configuration
  - Appendix Lab #2: Examining LAN & SAN Connectivity
  - Appendix Lab #3: Initial Cisco UCS C-Series Configuration

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Answer Key

The correct answers and expected solutions for the activities that are described in this guide appear here.

Lab 1 Answer Key: Analyze the Existing Computing Solution

When you complete this activity, your configuration will be similar to the results here, with differences that are specific to your device or workgroup:

Task 1: Collect Inventory Data with the MAP Toolkit

There is no specific solution for this task. To complete this task, simply follow the instructions and verification steps as described in the lab activity.

Task 2: Review the Collected Inventory Information

Note The results collected in your case may differ from the information presented below.

When you complete this task, your configuration will be similar to the results here, with differences that are specific to your device or workgroup:

The existing environment is composed of virtual computers. The type for some of these virtual computers could not be determined by the inventory process.

There are at least four Windows Server 2003 Standard Edition servers and there are four of unknown types.

Computer	Database	VMware Management Tools	Packages and Tools
wlc	Microsoft SQL Server 2008 R2 PostgreSQL	VMware vSphere CLI VMware vSphere Client VMware Tools	Java 6 Microsoft .NET Framework Microsoft Assessment and Planning Toolkit Wireshark

Task 3: Collect Performance Data with the Analysis Tool

There is no specific solution for this task. To complete this task, simply follow the instructions and verification steps as described in the lab activity.

Task 4: Review the Collected Performance Data

When you complete this task, your configuration will be similar to the results here, with differences that are specific to your device or workgroup:

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Note Your numbers, values and results may vary.

Computer	CPU (%)	Memory (GB)	Network (MB/s)	Disk (GB)	Average Disk I/O (IOPS)
wlc	4,15	0,45	0	37,98	13,64
wlc	3,54	0,54	0	37,98	32,66
wlc	24,62	0,47	0	18,95	6,80
SUMMARY	32,31	1,46	0.06	94,91	53,1

Based on the collected data and the summarized performance, a single server with the following characteristics would suffice for the environment:

Note Depending on your numbers, the solution might be different.

- Single CPU
- 12 GB of memory to easily host analyzed VMs and hypervisor
- Two Ethernet NICs for redundancy, and 100 Mb/s would be enough
- 100-GB+ disk for VM datastore as well as additional space for the hypervisor, which translates into 300-GB disk that would be more than enough

A typically 300-GB disk with the average seek latency of 3 ms and 10,000 rpm has on average 160 IOPS, which would be sufficient for the example above

Task 5: Running the Server Consolidation Scenario

There is no specific solution for this task. To complete this task, simply follow the instructions and verification steps as described in the lab activity.

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Lab 2 Answer Key: Size the Cisco UCS C-series Solution

When you complete this activity, your configuration will be similar to the results here, with differences that are specific to your device or workgroup:

Task 1: Analyze Audit Results

When you complete this task, your configuration will be similar to the results here, with differences that are specific to your device or workgroup:

Note Your number may vary.

Inventory Summary Results

Computer	Quantity
Insufficient data	25
Physical	61
Virtual	255
TOTAL	341

260 computers were identified as candidates for virtualization.

Resource Requirements

Parameter	Value
Highest average CPU utilization	82.17%
Highest maximum CPU utilization	85.92%
Highest 95th percentile CPU utilization	85.92%
Total average memory utilization (hint: summarize average memory utilization for all computers)	539.08 GB
Total maximum memory utilization (hint: summarize maximum memory utilization for all computers)	540.31 GB
Total 95th percentile memory utilization (hint: summarize 95th percentile memory utilization for all computers)	540.31 GB

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Total average network utilization (hint: summarize average network utilization for all computers)	28.72 Mb/s
Total maximum network utilization (hint: summarize maximum network utilization for all computers)	50.72 Mb/s
Total 95th percentile network utilization (hint: summarize 95th percentile network utilization for all computers)	50.72 Mb/s

Task 2: Select UCS C-Series Server

The following three scenarios are just examples and are available for the discussion purpose. The instructor and students can use this information in class for live discussion.

Note The MAP Toolkit 6.5 version does not yet support all the latest Intel Xeon processors such as E5-2400, E5-2600, and E5-4600, and thus the latest M3 generation of Cisco UCS B- and C-series servers. Therefore for the example server consolidation scenarios, the M2 generation of Cisco UCS servers was used.

Scenario #1

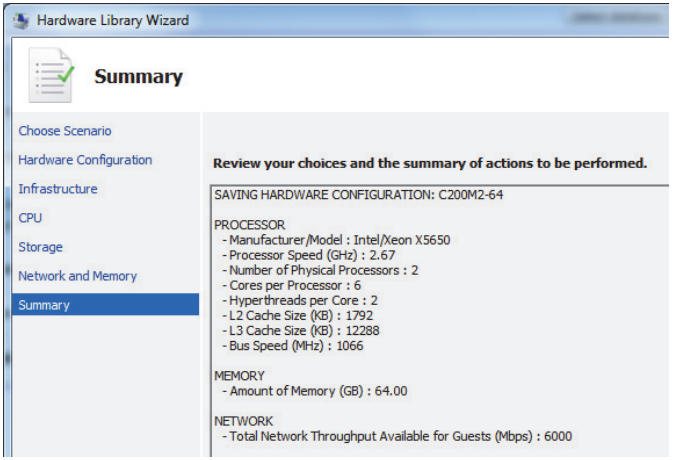
In this example scenario, the following C-Series server base configuration is used.

UCS C-Series Base Configuration

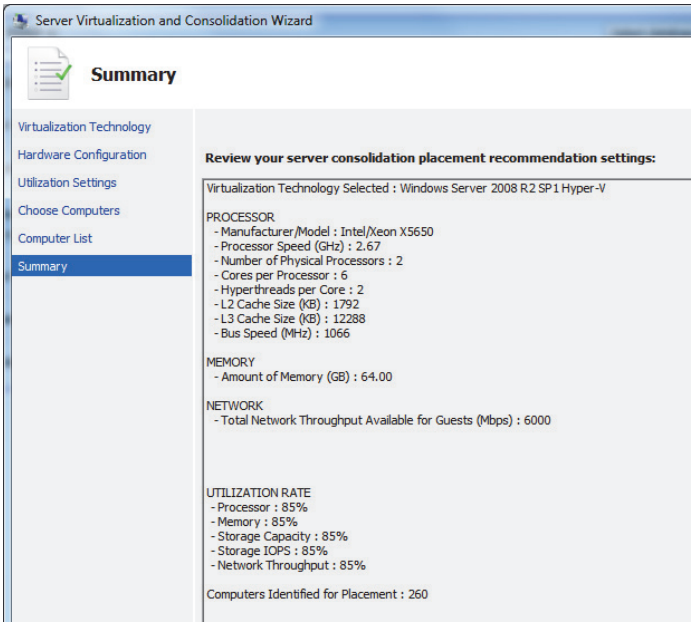
Parameter	Value
Server type	C200 M2
CPU type	Intel Xeon X5650, 6 cores with HT
CPU quantity per host	2
Memory size per host	64
Total network throughput (i.e. summary of NICs in the server)	6x 1GE

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The following hardware library is created for Scenario #1 UCS C-Series server.

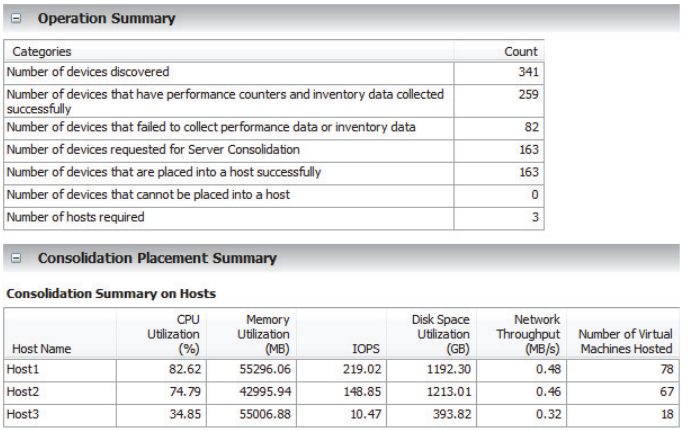


The following scheme shows Scenario #1 server virtualization and consolidation wizard summary.



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The following scheme shows Scenario #1 server virtualization and consolidation wizard results.



Operation Summary

Categories	Count
Number of devices discovered	341
Number of devices that have performance counters and inventory data collected successfully	259
Number of devices that failed to collect performance data or inventory data	82
Number of devices requested for Server Consolidation	163
Number of devices that are placed into a host successfully	163
Number of devices that cannot be placed into a host	0
Number of hosts required	3

Consolidation Placement Summary

Consolidation Summary on Hosts

Host Name	CPU Utilization (%)	Memory Utilization (MB)	IOPS	Disk Space Utilization (GB)	Network Throughput (MB/s)	Number of Virtual Machines Hosted
Host1	82.62	55296.06	219.02	1192.30	0.48	78
Host2	74.79	42995.94	148.85	1213.01	0.46	67
Host3	34.85	55006.88	10.47	393.82	0.32	18

Server Consolidation Wizard Result

Parameter	Value
Total number of hosts	3
Total number of VMs (hint: number of devices that are placed into a host successfully)	163
Total amount of memory required	149.71 GB
Total network utilization	10.08 Mb/s
Peak host CPU utilization	82.62%
Cluster CPU utilization	64.09%
Peak host memory utilization	84.38%
Cluster memory utilization	77.97%
Peak host network utilization	3.84 Mb/s
Peak number of VMs per host	78

Note The total amount of memory (150 GB) differs from what was calculated in the previous task (540.31 GB), because not all computers could be successfully placed on the Hyper-V hosts (163 VMs versus 260 candidate VMs).

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Scenario #1 summary:

- 3 Hyper-V hosts are required.
- Approximately 150 GB of memory is required, 192 GB is available (3 x 64 GB)
- Peak host CPU utilization (82.62%) is near the maximum resource utilization (85%).
- Total clusterwide CPU utilization is 64.09%.
- Peak host memory utilization of 84.38% is close to the maximum resource utilization level (85%).
- Total clusterwide memory utilization is 77.97%.

The solution is interesting from the perspective of total resource utilization. That is, not many physical resources are idle (except for 15%, which is required to be reserved for spikes and thus is typically idle).

Note From the scenarios presented, this scenario is selected as a preferred solution.

Scenario #2

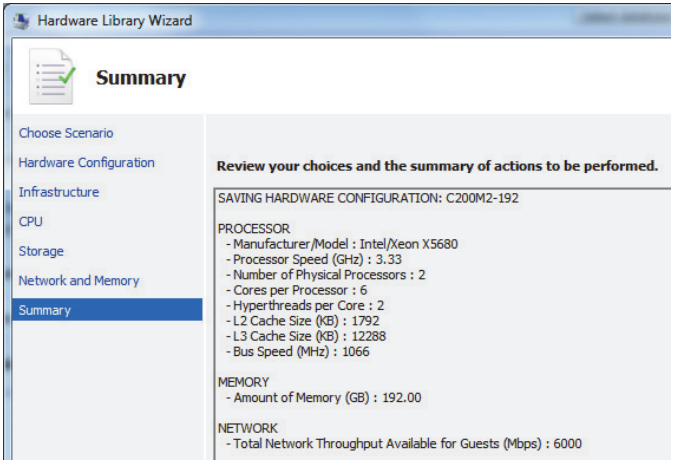
In this example scenario, the following C-Series server base configuration is used.

UCS C-Series Base Configuration

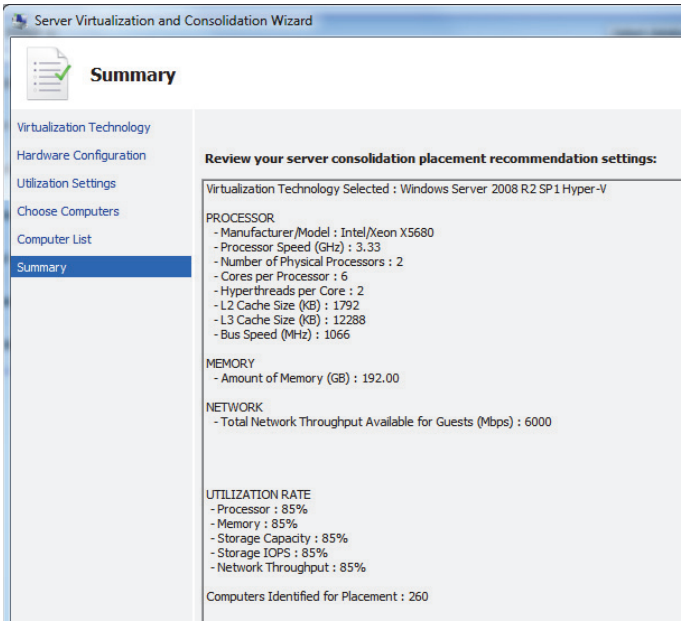
Parameter	Value
Server type	C200 M2
CPU type	Intel Xeon X5680, 6 cores with HT
CPU quantity per host	2
Memory size per host	192
Total network throughput (summary of NICs in the server)	6 x 1 Gigabit Ethernet

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The following hardware library is created for Scenario #2 UCS C-Series server.

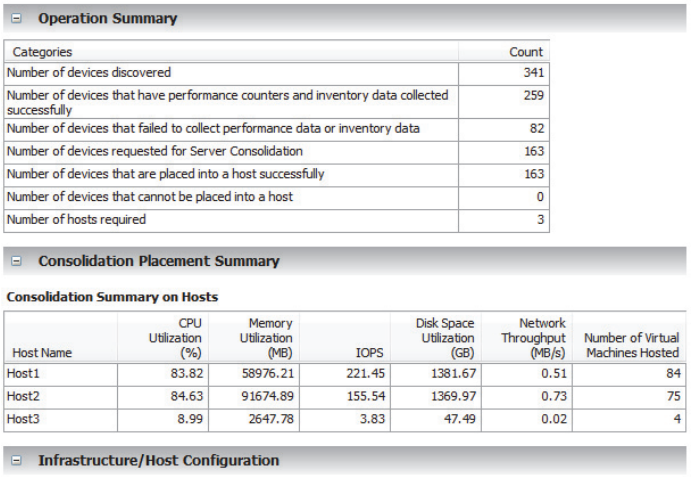


The following figure shows the Scenario #2 server virtualization and consolidation wizard summary.



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The following figure shows the Scenario #2 server virtualization and consolidation wizard results.



Operation Summary

Categories	Count
Number of devices discovered	341
Number of devices that have performance counters and inventory data collected successfully	259
Number of devices that failed to collect performance data or inventory data	82
Number of devices requested for Server Consolidation	163
Number of devices that are placed into a host successfully	163
Number of devices that cannot be placed into a host	0
Number of hosts required	3

Consolidation Placement Summary

Consolidation Summary on Hosts

Host Name	CPU Utilization (%)	Memory Utilization (MB)	IOPS	Disk Space Utilization (GB)	Network Throughput (MB/s)	Number of Virtual Machines Hosted
Host1	83.82	58976.21	221.45	1381.67	0.51	84
Host2	84.63	91674.89	155.54	1369.97	0.73	75
Host3	8.99	2647.78	3.83	47.49	0.02	4

Infrastructure/Host Configuration

Server Consolidation Wizard Result

Parameter	Value
Total number of hosts	3
Total number of VMs (hint – number of devices that are placed into a host successfully)	163
Total amount of memory required	149.71 GB
Total network utilization	10.08 Mb/s
Peak host CPU utilization	84.63%
Cluster CPU utilization	59.15%
Peak host memory utilization	46.63%
Cluster memory utilization	25.99%
Peak host network utilization	5.84 Mb/s
Peak number of VMs per host	84

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Note	The total amount of memory differs from what was calculated in the previous task because not all computers could be successfully placed on the Hyper-V hosts (163 VMs versus 260 candidate VMs).

Scenario #2 summary:

- Three Hyper-V hosts are required.
- Approximately 150 GB of memory is required, 576 GB is available (3 x 192 GB).
- Peak host CPU utilization (84.63%) is near the maximum resource utilization (85%).
- Total clusterwide CPU utilization is 46.63%.
- Peak host memory utilization of 46.63% is only about a half of the maximum resource utilization level (85%).
- Total clusterwide memory utilization is only 25.99%.

The solution is not interesting from the perspective of total resource utilization because many resources would be idle. Memory utilization is very low, at a quarter of the total amount, and CPU utilization is also low at half of total CPU performances available.

Scenario #3

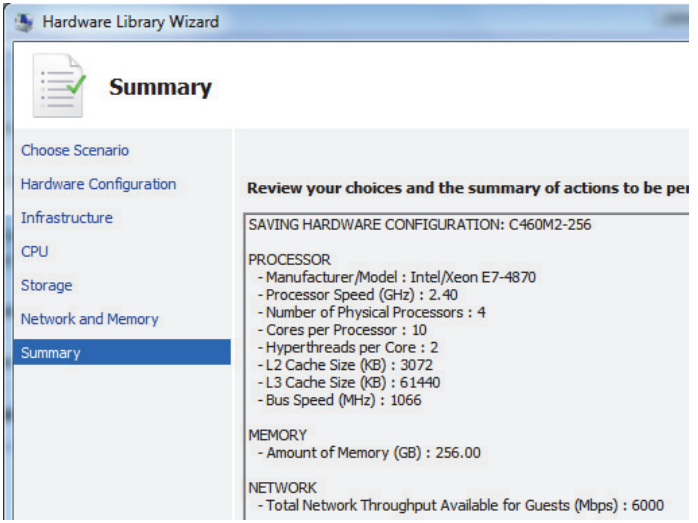
In the first example, the following C-Series server base configuration is used.

UCS C-Series Base Configuration

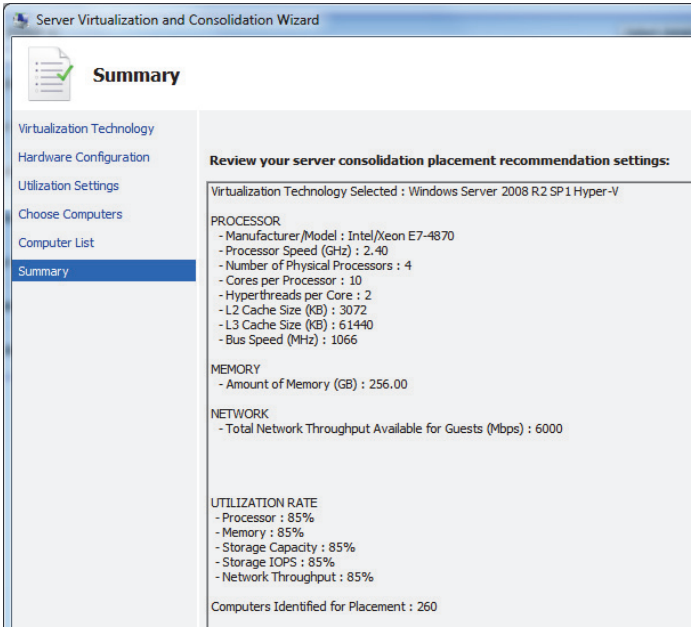
Parameter	Value
Server type	C460 M2
CPU type	Intel Xeon E7-4870, 10 cores with HT
CPU quantity per host	4
Memory size per host	256 GB
Total network throughput (i.e. summary of NICs in the server)	6 x 1 Gigabit Ethernet

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The following hardware library is created for Scenario #3 UCS C-Series server.

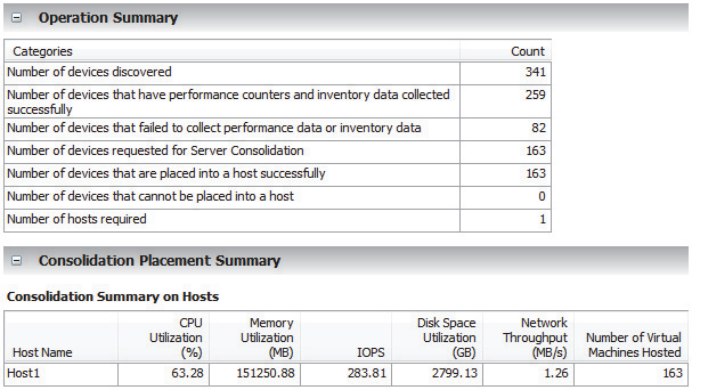


The following figure shows the Scenario #3 server virtualization and consolidation wizard summary.



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The following figure shows the Scenario #3 server virtualization and consolidation wizard results.



Operation Summary

Categories	Count
Number of devices discovered	341
Number of devices that have performance counters and inventory data collected successfully	259
Number of devices that failed to collect performance data or inventory data	82
Number of devices requested for Server Consolidation	163
Number of devices that are placed into a host successfully	163
Number of devices that cannot be placed into a host	0
Number of hosts required	1

Consolidation Placement Summary

Consolidation Summary on Hosts

Host Name	CPU Utilization (%)	Memory Utilization (MB)	IOPS	Disk Space Utilization (GB)	Network Throughput (MB/s)	Number of Virtual Machines Hosted
Host1	63.28	151250.88	283.81	2799.13	1.26	163

Server Consolidation Wizard Result

Parameter	Value
Total number of hosts	1
Total number of VMs (hint: number of devices that are successfully placed into a host)	163
Total amount of memory required	147.71 GB
Total network utilization	10.08 Mb/s
Peak host CPU utilization	63.28%
Cluster CPU utilization	63.28%
Peak host memory utilization	57.70%
Cluster memory utilization	57.70%
Peak host network utilization	10.08 Mb/s
Peak number of VMs per host	163

Note The total amount of memory differs from the previous two scenarios because there is less overhead related to the hypervisor, because there is single host required.

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Scenario #3 summary:

- One Hyper-V host is required.
- Approximately 148 GB of memory is required, and 2566 GB is available (1 x 256 GB).
- Peak host CPU utilization (63.28%) is 3/4 of planned maximum resource utilization (85%).
- Total clusterwide CPU utilization is also 63.28%.
- Peak host memory utilization is 57.70%, which is approximately 3/4 of the maximum resource utilization level (85%).
- Total clusterwide memory utilization is also 57.70%.
- The solution might be interesting from the perspective of total resource utilization, because the utilization level is moderate. There is one downside to the solution: the fault domain size is large, and if a single host fails, all VMs are lost (and would be restarted in a high-availability cluster).

Task 3: Size-Selected UCS C-Series Server

The following example is based on Scenario #1 from the previous task, presented in the answer key. This is just an example and is available for discussion purposes. The instructor and students can use this information in class for live discussion.

Design Workshop Requirements

Parameter	Value/Description
Platform	Microsoft Windows 2008 R2 SP1 Hyper-V
High-availability resources	25% reserved
Future growth	25% in two years
Storage	iSCSI attached
Network segments—no redundancy	3 (1 is the server management)
Network segments—redundancy required	2
Server form factor	Rack-mount

The server sizing is done for the UCS C-Series C200 M2 server with 64 GB of memory and two Intel Xeon X5650 processors.

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UCS C-Series Server Configuration

Component	Selection
Server type	C200 M2
Processor	Intel Xeon X5650
Processor quantity	2
DIMM size	8 GB DIMM (price/performance criteria)
DIMM quantity	8
RAID controller	—
Network adapter	4-port Ethernet NIC with iSCSI offload because there will be only Ethernet traffic and iSCSI will be used for storage access (e.g. Broadcom NetXtreme II 5709)
Network adapter quantity	1
Fibre Channel adapter	—
Fibre Channel adapter quantity	—
Local disk type	Any local SAS or SATA disk e.g. 500GB SATA 7200rpm
Local disk quantity	2, for RAID1 redundancy
Power supply	2 power supplies
LAN physical cabling per server	5x UTP cable
SAN physical cabling per server	2x UTP for iSCSI NICs

The following quantities have been selected for the solution that is based on the following information:

- Three Hyper-V hosts are required to host the VMs.
- An additional 25% of resources have to be available for future growth, so an additional physical server was added (25% of 3 servers equals 3/4 of a server).

An additional 25% percent of resources are required to fulfill the redundancy requirements (25% of 4 servers equals 1 additional server).

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Solution Total

Component	Quantity
Servers	5
LAN physical cabling	25x UTP cable
SAN physical cabling	10x UTP cable for iSCSI NICs

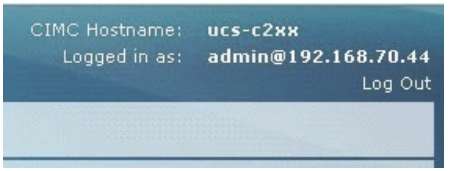
Task 4: Examining the Cisco UCS C-Series Configuration by Using Cisco IMC

C-Series Server Information

The following values may differ from those available with your equipment.

Parameter	Value
Server type	UCS C200 M2
Management MAC address	Depends on the assigned server (for example, pod 3, 192.168.10.43)
Firmware version	1.4(1a)

You can see the IP address with which you are logged in. The IP address is in the upper-right corner of the Cisco IMC window. The IP address depends on your assigned pod. In the example below, the IP address is 192.168.70.44.



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1. If the server is operational, the overall status is good.

C-Series Server Inventory

The following is the inventory of the C-Series server. Your values might be different from the values in the table.

Parameter	Value
Total CPU sockets quantity	2
Populated CPU socket quantity	2
CPU type	2.13-GHz Intel Xeon E5506
Number of cores per CPU	4
Total DIMM quantity	12
Populated DIMM slots quantity and names	2: DIMM_A1, DIMM_D1
Individual DIMM size	4 GB
Individual DIMM channel speed	1333 MHz
Power supply type	650 W
Power supply redundancy level	Not available: single power supply installed
Local disk quantity	1
Additional adapters that are installed	Cisco UCS VIC P81E
Adapter PCI slot	1
Default vNIC quantity	2
Default vHBA quantity	2

2. The status of the power supply sensors is normal.
3. The status of the fan sensors is normal.
4. The status of the temperature sensors is normal.
5. The status of the voltage sensors is normal.
6. The status of the current sensors is normal.

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C-Series Server Remote Presence Settings

The following table lists the remote presence settings. The actual values might be different in your case.

Parameter	Value
Virtual KVM	
Status (enabled or disabled)	Enabled
Maximum sessions	4
Active sessions	1
Remote port	2068
Video encryption	Disabled
Local server video	Enabled
Virtual Media	
Status	Enabled
Active sessions	0
Virtual media encryption	Disabled
Serial over LAN	
Status	Enabled
Rate in bits per second	115.2 kb/s

C-Series Server Boot Order

The following table lists the actual boot order. The actual values might be different in your case.

Boot Position	Device
First boot device	CD/DVD
Second boot device	FDD
Third boot device	Network device (PXE)
Fourth boot device	Internal EFI Shell

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C-Series Management Network Settings

The following table lists the management network settings. The actual values might be different in your case.

Parameter	Value
NIC mode	Shared LOM
NIC redundancy	None
Hostname	ucs-c2xx-m2
IP address	192.168.10.41
Subnet mask	255.255.255.0
Gateway	192.168.10.254
VLAN of the management interface	n/a, because the VLAN tagging is disabled
Management protocols available	HTTP, HTTPS, SSH, XML API, IPMI
Configured communication ports for individual management protocols	HTTP = 80 HTTPS = 443 SSH = 22
Configurable syslog server quantity	2
SNMP trap destination quantity	4

Lab 3 Answer Key: Size the Cisco UCS B-Series Solution

When you complete this activity, your configuration will be similar to the results here, with differences that are specific to your device or workgroup:

Task 1: Analyze Audit Results

When you complete this task, your configuration will be similar to the results here, with differences that are specific to your device or workgroup:

Note Your number may vary.

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Inventory Summary Results

Computer	Quantity
Insufficient data	19
Physical	69
Virtual	365
TOTAL	453

65 computers were identified as candidates for virtualization.

Resource Requirements

Parameter	Value
Highest average CPU utilization	52.31%
Highest maximum CPU utilization	56.21%
Highest 95th percentile CPU utilization	53.74%
Total average memory utilization (hint: summarize average memory utilization for all computers)	541.9 GB
Total maximum memory utilization (hint: summarize maximum memory utilization for all computers)	545.32 GB
Total 95th percentile memory utilization (hint: summarize 95th percentile memory utilization for all computers)	543.65 GB
Total average network utilization (hint: summarize average network utilization for all computers)	70.72 Mb/s
Total maximum network utilization (hint: summarize maximum network utilization for all computers)	204.16Mb/s
Total 95th percentile network utilization (hint: summarize 95th percentile network utilization for all computers)	88.96Mb/s

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Task 2: Select UCS B-Series Server

The following three scenarios are just examples and are available for discussion purposes. The instructor and students can use this information in class for live discussion.

Note The MAP Toolkit 6.5 version does not yet support all the latest Intel Xeon processors such as E5-2400, E5-2600, and E5-4600, and thus the latest M3 generation of Cisco UCS B- and C-Series servers. Therefore, for the example server consolidation scenarios, the M2 generation of Cisco UCS servers was used.

Scenario #1

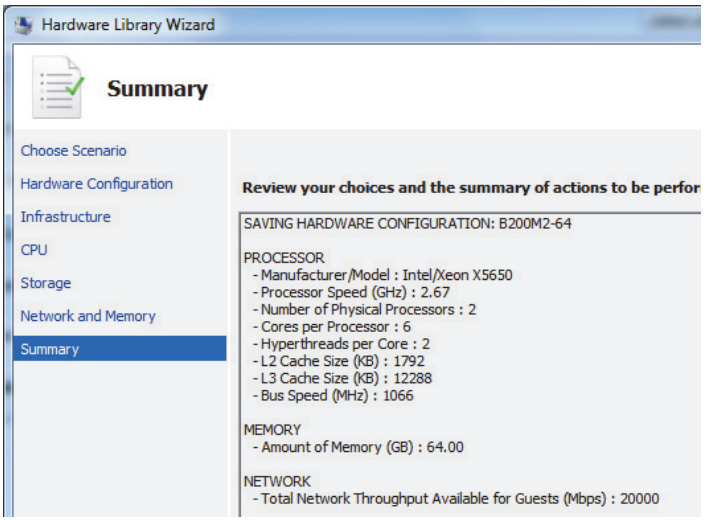
In this example scenario, the following B-Series server base configuration is used.

UCS B-Series Base Configuration

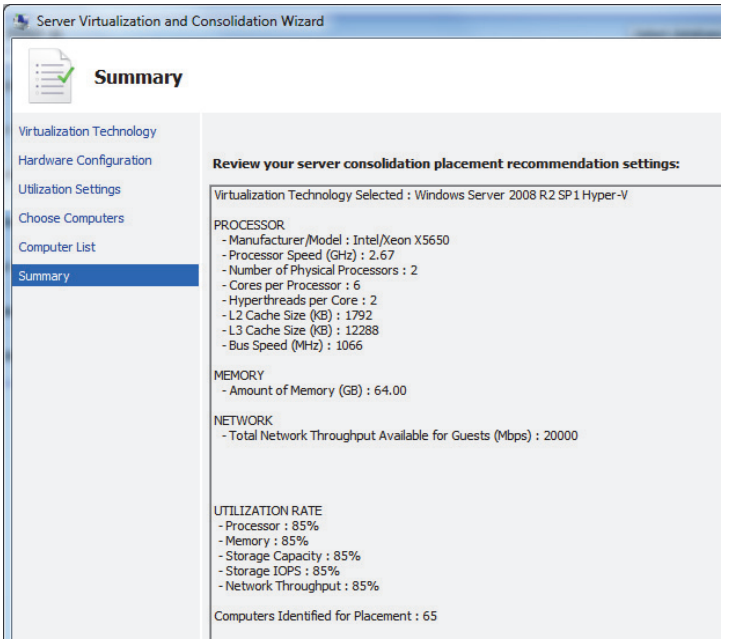
Parameter	Value
Server type	B200 M2
CPU type	Intel Xeon X5650, 6 cores with HT
CPU quantity per host	2
Memory size per host	64
Total network throughput (summary of NICs in the server)	2 x 10 Gigabit Ethernet

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The following hardware library is created for Scenario #1 UCS B-series server.



The following figure shows the Scenario #1 server virtualization and consolidation wizard summary.



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The following figure shows the Scenario #1 server virtualization and consolidation wizard results.

Operation Summary

Categories	Count
Number of devices discovered	453
Number of devices that have performance counters and inventory data collected successfully	65
Number of devices that failed to collect performance data or inventory data	388
Number of devices requested for Server Consolidation	65
Number of devices that are placed into a host successfully	65
Number of devices that cannot be placed into a host	0
Number of hosts required	11

Consolidation Placement Summary

Consolidation Summary on Hosts

Host Name	CPU Utilization (%)	Memory Utilization (MB)	IOPS	Disk Space Utilization (GB)	Network Throughput (MB/s)	Number of Virtual Machines Hosted
Host1	7.01	53265.15	133.97	177.10	2.44	4
Host2	16.51	53191.68	123.68	331.28	0.92	6
Host3	10.96	55464.28	1021.05	826.89	1.69	8
Host4	8.24	52432.04	155.85	914.61	0.34	3
Host5	10.20	53622.07	228.54	1351.51	0.85	4
Host6	7.98	53218.93	142.05	1137.77	0.20	5
Host7	11.34	53420.86	144.23	1070.20	0.36	9
Host8	6.63	53315.79	163.11	844.18	0.36	3
Host9	12.72	52808.80	92.79	882.97	2.91	5
Host10	11.65	53583.33	16.80	200.96	0.76	3
Host11	7.96	33068.61	87.58	429.77	0.12	15

Server Consolidation Wizard Result

Parameter	Value
Total number of hosts	11
Total number of VMs (hint – number of devices that are placed into a host successfully)	65
Total amount of memory required	554.09 GB
Total network utilization	87.6 Mb/s
Peak host CPU utilization	16.51%
Cluster CPU utilization	10.11%
Peak host memory utilization	84.63%
Cluster memory utilization	78.71%

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Peak host network utilization	23.28 Mb/s
Peak number of VMs per host	15

Scenario #1 summary:

- 11 VMware vSphere hosts are required.
- Approximately 554 GB of memory is required, 704 GB is available (11 x 64 GB).
- Peak host CPU utilization (16.51%) is far from the maximum resource utilization (85%).
- Total clusterwide CPU utilization is 10.11% .
- Peak host memory utilization of 84.63% is very close to maximum resource utilization level (85%).

Total clusterwide memory utilization is 78.71%.

Note From the scenarios presented, this scenario is selected as preferred solution.

Scenario #2

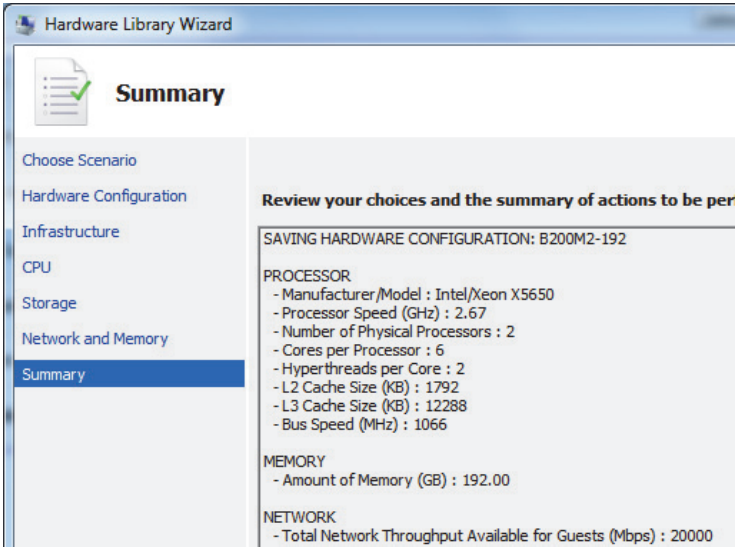
In this example scenario, the following B-Series server base configuration is used.

UCS B-Series Base Configuration

Parameter	Value
Server type	B200 M2
CPU type	Intel Xeon X5650, 6 cores with HT
CPU quantity per host	2
Memory size per host	192 GB
Total network throughput (i.e. summary of NICs in the server)	2 x 10 Gigabit Ethernet

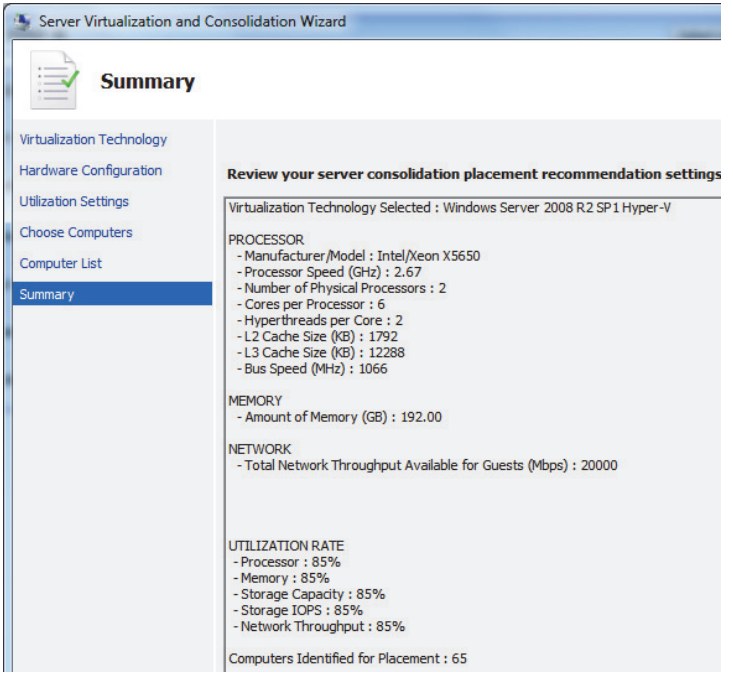
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The following hardware library is created for Scenario #2 UCS B-Series server.



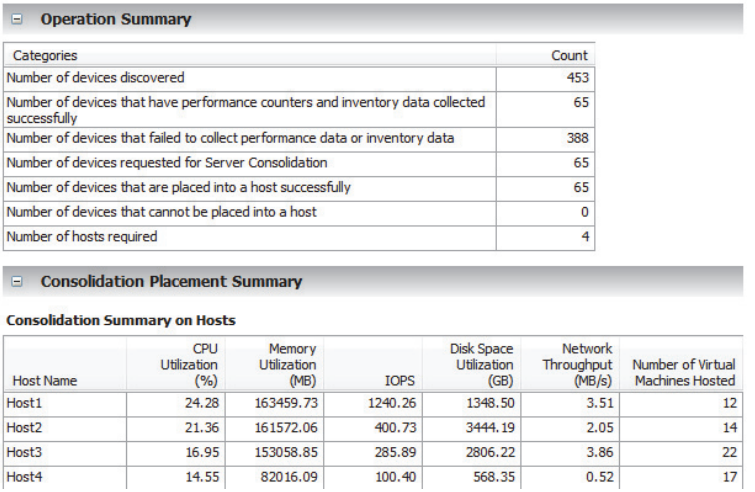
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The following figure shows the Scenario #2 server virtualization and consolidation wizard summary.



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The following figure shows the Scenario #2 server virtualization and consolidation wizard results.



Operation Summary

Categories	Count
Number of devices discovered	453
Number of devices that have performance counters and inventory data collected successfully	65
Number of devices that failed to collect performance data or inventory data	388
Number of devices requested for Server Consolidation	65
Number of devices that are placed into a host successfully	65
Number of devices that cannot be placed into a host	0
Number of hosts required	4

Consolidation Placement Summary

Consolidation Summary on Hosts

Host Name	CPU Utilization (%)	Memory Utilization (MB)	IOPS	Disk Space Utilization (GB)	Network Throughput (MB/s)	Number of Virtual Machines Hosted
Host1	24.28	163459.73	1240.26	1348.50	3.51	12
Host2	21.36	161572.06	400.73	3444.19	2.05	14
Host3	16.95	153058.85	285.89	2806.22	3.86	22
Host4	14.55	82016.09	100.40	568.35	0.52	17

Server Consolidation Wizard Result

Parameter	Value
Total number of hosts	4
Total number of VMs (hint – number of devices that are placed into a host successfully)	65
Total amount of memory required	546.98 GB
Total network utilization	79.52 Mb/s
Peak host CPU utilization	24.28%
Cluster CPU utilization	19.29%
Peak host memory utilization	83.14%
Cluster memory utilization	71.22%
Peak host network utilization	79.52 Mb/s
Peak number of VMs per host	22

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Scenario #2 summary:

- Four VMware vSphere hosts are required.
- Approximately 547 GB of memory is required, 768 GB is available (4 x 192 GB).
- Peak host CPU utilization (24.28%) is far from maximum resource utilization (85%).
- Total clusterwide CPU utilization is19.29%.
- Peak host memory utilization of 83.14% is almost at the maximum resource utilization level (85%).
- Total clusterwide memory utilization is only 71.22%.

Scenario #3

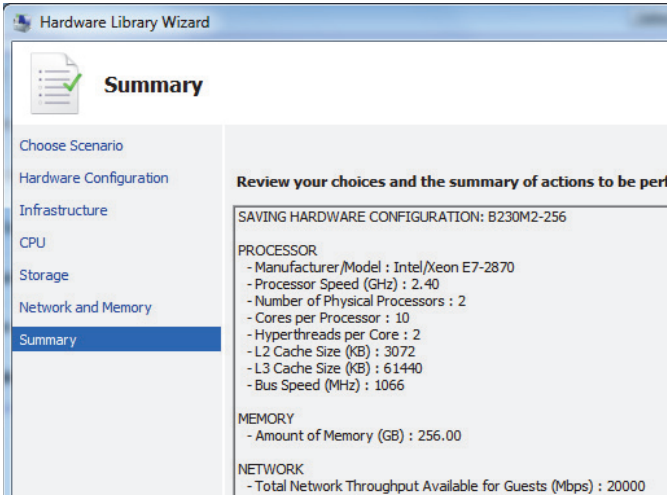
In the first example, the following B-Series server base configuration is used.

UCS B-Series Base Configuration

Parameter	Value
Server type	B230 M2
CPU type	Intel Xeon E7-2870
CPU quantity per host	2
Memory size per host	256 GB
Total network throughput (summary of NICs in the server)	2 x 10 Gigabit Ethernet

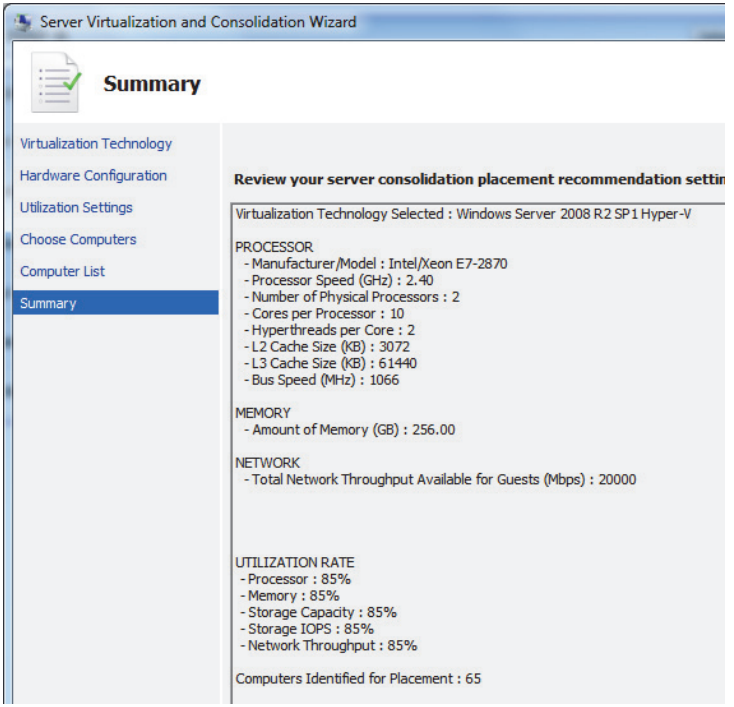
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The following hardware library is created for Scenario #3 UCS C-Series server.



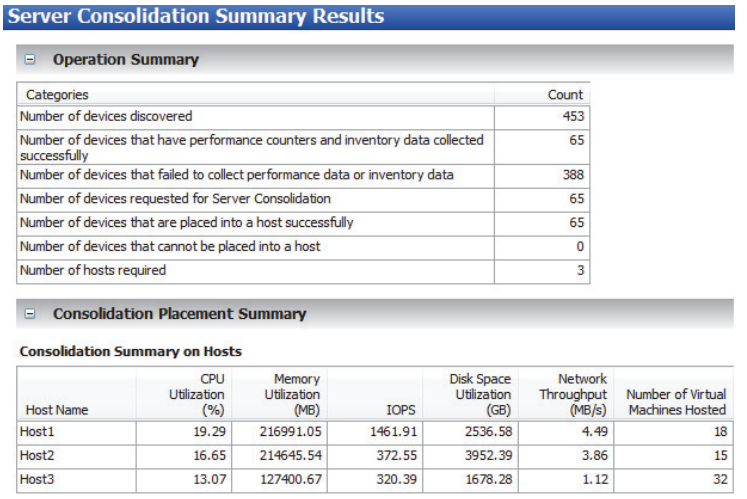
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The following figure shows the Scenario #3 server virtualization and consolidation wizard summary.



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The following figure shows the Scenario #3 server virtualization and consolidation wizard results.



Server Consolidation Summary Results

Operation Summary

Categories	Count
Number of devices discovered	453
Number of devices that have performance counters and inventory data collected successfully	65
Number of devices that failed to collect performance data or inventory data	388
Number of devices requested for Server Consolidation	65
Number of devices that are placed into a host successfully	65
Number of devices that cannot be placed into a host	0
Number of hosts required	3

Consolidation Placement Summary

Consolidation Summary on Hosts

Host Name	CPU Utilization (%)	Memory Utilization (MB)	IOPS	Disk Space Utilization (GB)	Network Throughput (MB/s)	Number of Virtual Machines Hosted
Host1	19.29	216991.05	1461.91	2536.58	4.49	18
Host2	16.65	214645.54	372.55	3952.39	3.86	15
Host3	13.07	127400.67	320.39	1678.28	1.12	32

Server Consolidation Wizard Result

Parameter	Value
Total number of hosts	3
Total number of VMs (hint – number of devices that are placed into a host successfully)	65
Total amount of memory required	545.93 GB
Total network utilization	75.76 Mb/s
Peak host CPU utilization	19.29%
Cluster CPU utilization	16.34%
Peak host memory utilization	82.76%
Cluster memory utilization	71.09%
Peak host network utilization	75.76%
Peak number of VMs per host	32

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Note The total amount of memory differs from the previous two scenarios because there is less overhead related to the hypervisor, because there is a single host required.

Scenario #3 summary:

- Three VMware vSphere hosts are required.
- Approximately 545.93 GB of memory is required, 768 GB is available (3 x 256 GB).
- Peak host CPU utilization (19.29%) is far from the maximum resource utilization (85%).
- Total clusterwide CPU utilization is 16.34%.
- Peak host memory utilization of 82.76% is almost the maximum resource utilization level (85%).

Total clusterwide memory utilization is also 71.09%.

Scenario Selection

The three scenarios are almost the same from the point of memory resource utilization. But there are fewer hosts and a better virtualization ratio with the last two scenarios. The UCS B230M2 with 256 GB of memory solution is selected in this example (Scenario #3) because this blade has additional DIMMs for future memory expansion, if necessary.

Task 3: Size Selected UCS B-Series Server

The following example is based on Scenario #3 from the previous task, presented in the answer key. This is just an example and is available for discussion purposes. The instructor and students can use this information in class for live discussion.

Design Workshop Requirements

Parameter	Value/Description
Platform	VMware vSphere 5
High-availability resources	25% reserved
Future growth	25% in two years
Storage	FC attached
Network segments—no redundancy	-
Network segments—redundancy required	5

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FC segments—redundancy required	1
Server form factor	Blade server

The server sizing is done for the UCS B-Series B230 M2 server with 256 GB of memory and two Intel Xeon E7-2870 processors. To meet the redundancy requirements, the server blades are equipped with additional memory (64 GB of additional memory per server) because the CPU utilization level is low enough. Thus the individual server at the end has 320 GB of memory.

UCS B-Series Server Configuration

Component	Selection
Server type	B230 M2
Processor	Intel Xeon E7-2870
Processor quantity	2
DIMM size	32 GB DIMM (size requirement)
DIMM quantity	10
RAID controller	—
Network adapter	Cisco VIC M81KR is selected because it can be used to create multiple NIC and HBA adapters as required by the solution (that is,.8 NICs and 2 HBAs)
Network adapter quantity	1
Fibre Channel adapter	FCoE is used
Fibre Channel adapter quantity	FCoE is used
Local disk type	Any local disk (for example, 2 x 100-Gb/s SSD
Local disk quantity	2, for RAID1 redundancy

The following quantities have been selected for the solution that is based on the following information:

- Three VMware ESXi hosts are required to host the VMs.
- An additional 25% of resources must be available for future growth, so an additional memory was added to each server (that is, 25% of the initial 256 GB servers equals 64 GB).

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An additional 25% percent of resources are required to fulfill the redundancy requirements, thus an additional server is added.

Solution Total

Server Categories	Quantity
Servers that are required for VM deployment	3
Servers that are required for future growth	none, memory added to initial servers
Servers that are required because of redundancy requirements	1
Total number of servers that are required	4

You must also select the access layer LAN and SAN equipment that is used for connecting all the interfaces of the servers that you have selected.

LAN and SAN Access Layer Sizing

The following quantities have been selected for the solution that is based on the requirements:

- UCS B-Series has been selected because it provides a single management point for all the servers in the system.
- Four server blades must be deployed, which results in a single chassis that is required for the solution. Four free blade slots can be used for future growth.
- Four individual VMware ESXi hosts can share 10-GB LAN and SAN throughput to the access layer. Redundant connectivity is required.
  - Two 2208 IOMs are used to achieve proper redundancy.
  - A fully populated chassis in the future with eight blades results in two 10-GB server downlinks per IOM.
  - Two server downlinks are used per chassis per IOM.
- The core LAN uplink requirements are derived from the individual segment connectivity requirement. The Management, VMotion, and FT segments require their own dedicated uplinks, whereas VM Data segments can share the uplinks, but the requirement is to have at least eight uplinks.
  - Ten 10 Gigabit Ethernet uplinks are required per fabric switch (1+1+1+8).

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- The core SAN uplink requirements are derived from the SAN traffic throughput requirement from the server perspective. The uplinks should be capable of sustaining 40 Gb/s of Fibre Channel traffic. Two options are the following:
  - 10 4-Gb/s Fibre Channel uplinks
  - 5 8-Gb/s Fibre Channel uplinks

Because the customer prefers 8-Gb/s Fibre Channel interfaces, the second option is selected.

- For the Fabric Interconnect selection, the following criteria are used:
  - The deployment requires proper redundancy. A NIC failover on the Cisco UCS will be used for Management and VMotion segments.
  - Two Cisco UCS 6200 Fabric Interconnects will be used to build dual-fabric deployment.
  - Altogether 12 10 Gigabit Ethernet interfaces are required per switch (2 for chassis connectivity, 10 for LAN uplinks).
  - Altogether, five 8-Gb/s Fibre Channel interfaces are required per switch (you will use unified ports, no need for additional expansion modules).
  - A total of 17 ports will be used per fabric interconnect, which requires adding 5 port licenses.
  - The system has to be scalable for future growth, so server blades should be added without having to do major LAN and SAN upgrades.
  - The Cisco UCS 6248UP is selected because it has enough 10 Gigabit Ethernet interfaces. It also supports unified ports for Fibre Channel connectivity.

Component	Selection
LAN access layer switch	6248UP fabric interconnect
LAN access layer switch quantity	2
SAN access layer switch	Integrated with 6248UP
SAN access layer switch quantity	—
Type of server downlinks	10 Gigabit Ethernet with FCoE support
Server downlink cabling	5-m passive twinax
Server downlink quantity per switch	2
Blade chassis quantity	1
Blade chassis uplinks quantity	2 per IOM

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IOM	2208XP
LAN core uplinks type	10 Gigabit Ethernet
LAN core uplinks quantity per switch	10
SAN core uplinks type	8G FC
SAN core uplinks quantity per switch	5
Licensing requirements	Licenses for 5 more UP ports (12 are licensed by default but 17 are required for the solution)

Task 4: Examining the Cisco UCS Cluster Configuration

Note When you complete this activity, your answers will be similar to the results here, with differences that are specific to your device or pod.

The basic management information is the following:

- Fabric Interconnect A out-of-band management IP address: 10.20X.10.2
- Fabric interconnect B out-of-band management IP address: 10.20X.10.3
- The mask is /24 for both.

The gateway is 10.20X.10.254 for both.

The HA configuration is set to CLUSTER.

The cluster name is s6100.

Task 5: Examining Cisco UCS Fabric Interconnect Switches

Note The actual hardware configuration in your lab might be different from the configuration that is described here.

Each Cisco UCS Fabric Interconnect switch has 20 ports on the fixed module and 8 Fibre Channel ports on the expansion module.

The total memory size is 3.549 GB.

The high availability state is UP, the cluster link state is FULL, and the Cisco UCS Fabric Interconnect A switch role in the cluster is PRIMARY.

A single 8-port 4-Gb Fibre Channel expansion module is installed.

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Eight ports—Ports 1 through 6 and Ports 19 and 20—are used for LAN uplink connectivity.

Four ports—Port 11, Port 12, Port 13, Port 14—are configured as server ports.

Eight Fibre Channel ports—Fibre Channel Port1 through Fibre Channel Port 8—are used for SAN uplink connectivity on the expansion module.

Eight ports—Ports 7 through 10 and Ports 15 through 18—are unconfigured and thus are available for future use.

Task 6: Examining the Cisco UCS Chassis

Note The actual hardware configuration in your lab might be different from the configuration that is described here.

The chassis ID is X.

The chassis can hold a maximum of eight half-size server blades.

The chassis can have maximum of four power supplies. The power redundancy scheme is COMPUTE_PSUREDUNDANCY_N+1.

Eight fan modules are installed and operational.

Task 7: Examining the Cisco UCS I/O Modules

Note The actual hardware configuration in your lab might be different from the configuration that is described here.

The I/O module part name is Cisco UCS 2104XP.

Four fabric ports—Fabric Port 1/1 through Fabric Port 1/4—are available and used for the Fabric Interconnect switch connectivity.

Eight backplane ports—Backplane Port 1/1 through Backplane Port 1/8—are available for the blade-server connectivity.

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Task 8: Examining the Cisco UCS Server Blades

Note The actual hardware configuration in your lab might be different from the configuration that is described here.

The server blade type is the Cisco UCS B200 M2.

The server blade is equipped with two processors.

An individual processor has four cores.

The server blade is equipped with 16 GB of memory.

The server blade has one adapter.

The management IP address of the assigned server blade is 10.20X.10.5X. The Cisco UCS assigns the management IP address upon the server blade discovery.

DIMM slots 3, 5, 9, and 11 are populated.

The individual DIMM module is 4 GB.

The server blade is equipped with Intel Xeon X5570 processors.

The processor architecture is Xeon and the speed is 2.933 GHz.

The server blade is equipped with two 146-GB hard drives.

The interface adapter type is a dual-port Cisco UCS M81KR. It supports 10 Gigabit Ethernet and 4-Gb Fibre Channel interfaces.

Lab 4 Answer Key: Plan the Physical Deployment

Task 1: Identifying the Requirements for the Cisco UCS C- and B-Series Solutions

C-Series Server Characteristics

The following server characteristics have been determined in the analysis phase.

Component	Selection
Server type	C200 M2
Size	1 RU
Processor	Intel Xeon X5650
Processor quantity	2
DIMM size	8 GB

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DIMM quantity	8
RAID controller	—
Network adapter	Broadcom NetXtreme II 5709
Network adapter quantity	1
Local disk type	500-GB SATA 7200 rpm
Local disk quantity	1
Power supply	2
LAN physical cabling per server	5x UTP
SAN physical cabling per server	2x UTP
Server quantity	5

B-Series Server Blade Characteristics

Component	Selection
Server type	UCS B230 M2
Size	Single half-width slot
Processor	Intel Xeon E7-2870
Processor quantity	2
DIMM size	32 GB
DIMM quantity	10
Network adapter	Cisco UCS M81KR VIC
Network adapter quantity	1
Local disk quantity	2 x 100 GB SSD
Local disk configuration	RAID 1
Server quantity	4

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Chassis Characteristics

Component	Selection
Blade chassis quantity (in case of blade server solution)	1
Blade chassis uplinks quantity	2 per IOM
IOM quantity	2
Power redundancy per chassis	N+1

Fabric Interconnect Characteristics

Component	Selection
Switch type	UCS 6248UP Fabric Interconnect
Switch quantity	2
Type of server downlinks	10 Gb/s with FCoE support
Server downlink cabling	5-m passive twinax
Server downlink quantity	4
Expansion module	-
LAN core uplinks type	10 Gigabit Ethernet
LAN core uplinks quantity per switch	12
SAN core uplinks type	8-Gb/s Fibre Channel
SAN core uplinks quantity per switch	5
Licensing requirements	Licenses for 5 more 10G DCB ports (12 are licensed by default but 17 are required for the solution)
Power redundancy per Fabric Interconnect	N+1

The tool can calculate the power consumption, cooling capacity, and weight for the B-Series and C-Series solutions.

The power and cooling requirements are calculated for idle power, 50% load power, and maximum power.

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Task 2: Calculating the Physical Requirements for the Cisco UCS C-Series Solution

Values per Server

Component	Selection
Server type	C200 M2 rack-mount server
Idle power (W)	161
50% load power (W)	288
Maximum power (W)	413
Weight (kg)	15 kg

Values per Solution

Component	Selection
Server type	C200 M2 rack-mount server
Server quantity	5
Idle power (W)	807
50% load power (W)	1,442
Maximum power (W)	2,067
Weight (kg)	74.8
Cooling (BTU/hr)	4,920

Physical Deployment Plan

The calculation below has considered the following parameters:

- The C200M2 size is 1 RU.
- The maximum power consumption per server for a given solution is 413 W. The maximum power consumption has been taken into account to prevent server outages due to sudden load increases.
- With the given constraints—3 kW per rack and 13 RUs of free space—all five servers can be installed in a single rack.

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One rack is required to install the servers.

Parameter	Value
Server size	1 RU
Required power per server	413 W
Server per rack deployed	5
Power consumed by servers per rack	2,067 W
Required rack quantity	1

Task 3: Calculating the Physical Requirements for the Cisco UCS B-Series Solution

Physical Characteristics: Chassis with 4 Blades

Component	Selection
Chassis quantity	1
Chassis PSU redundancy	N+1
Blades per chassis	4
Cable connection per IOM	2
Idle power (W)	1,235
50% load power (W)	1,853
Maximum power(W)	2,471
Weight (kg)	148.3
Cooling (BTU/h)	6,323

Physical Characteristics for the Fabric Interconnects

Component	Selection
Switch type	UCS 6248UP
Redundancy	Yes
Power supply redundancy	Yes

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Expansion module	-
Idle power (W)	500
50% load power (W)	599
Maximum power(W)	700
Weight (kg)	31.8
Cooling (BTU/h)	2,044

Physical Characteristics in Total

Component	Selection
Idle power (W)	1,735
50% load power (W)	2,452
Maximum power(W)	3,171
Weight (kg)	180.1
Cooling (BTU/h)	8366

Physical Deployment Plan: Summary

The following physical deployment plan takes into account the maximum load requirements.

Parameter	Value
Chassis size	6 RUs
Fabric Interconnect size	2 RUs
Required power for chassis with 4 blades (W)	2,471
Required power per 6248UP (W)	700
Required rack quantity in total	2

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Physical Deployment Plan: Details

Parameter	Rack Number
UCS 6248UP A	1
UCS 6248UP B	1
Chassis 1—4 servers	2

We will need two racks.

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Complete Pod and Team addressing charts

Yes, the addressing charts found in Lab 0 can be confusing. So we decided to list all addresses needed for all pods through the class. Highlight and double-check your addresses below.

VSAN Assignment: Chassis #1

Pod	VSAN ID	VSAN Name	Fabric A/B	FCoE VLAN	SAN Boot Target WWN
All Pods	11 (vHBA0)	VSAN11	A	1011	Pri 50:06:01:***64***:44:60:4C:90 Sec 50:06:01:***6C***:44:60:4C:90
All Pods	12 (vHBA1)	VSAN12	B	1012	Pri 50:06:01:***65***:44:60:4C:90 Sec 50:06:01:***6D***:44:60:4C:90

WWxN Assignment: Chassis #1

Pod	WWNN	WWPN
Pod**1**	20:0**1**:00:00:0**1**:0**1**:0**B or C**:0**1**	20:0**0**:00:00:0**1**:0**1**:0**B or C**:0**1**
Pod**2**	20:0**1**:00:00:0**1**:0**2**:0**B or C**:0**1**	20:0**0**:00:00:0**1**:0**2**:0**B or C**:0**1**
Pod**3**	20:0**1**:00:00:0**1**:0**3**:0**B or C**:0**1**	20:0**0**:00:00:0**1**:0**3**:0**B or C**:0**1**
Pod**4**	20:0**1**:00:00:0**1**:0**4**:0**B or C**:0**1**	20:0**0**:00:00:0**1**:0**4**:0**B or C**:0**1**
Pod**5**	20:0**1**:00:00:0**1**:0**5**:0**B or C**:0**1**	20:0**0**:00:00:0**1**:0**5**:0**B or C**:0**1**
Pod**6**	20:0**1**:00:00:0**1**:0**6**:0**B or C**:0**1**	20:0**0**:00:00:0**1**:0**6**:0**B or C**:0**1**
Pod**7**	20:0**1**:00:00:0**1**:0**7**:0**B or C**:0**1**	20:0**0**:00:00:0**1**:0**7**:0**B or C**:0**1**
Pod**8**	20:0**1**:00:00:0**1**:0**8**:0**B or C**:0**1**	20:0**0**:00:00:0**1**:0**8**:0**B or C**:0**1**

MAC & UUID Assignment: Chassis #1

Pod	MAC	UUID Prefix / Suffix
Pod**1**	00:25:B5:0**1**:0**1**:**B|C, 0|1**	00000000-0000-**0101** / **0101**-000000000001
Pod**2**	00:25:B5:0**1**:0**2**:**B|C, 0|1**	00000000-0000-**0102** / **0102**-000000000001
Pod**3**	00:25:B5:0**1**:0**3**:**B|C, 0|1**	00000000-0000-**0103** / **0103**-000000000001
Pod**4**	00:25:B5:0**1**:0**4**:**B|C, 0|1**	00000000-0000-**0104** / **0104**-000000000001
Pod**5**	00:25:B5:0**1**:0**5**:**B|C, 0|1**	00000000-0000-**0105** / **0105**-000000000001

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Pod**6**	00:25:B5:0**1**:0**6**:**B|C, 0|1**	00000000-0000-**0106** / **0106**-000000000001
Pod**7**	00:25:B5:0**1**:0**7**:**B|C, 0|1**	00000000-0000-**0107** / **0107**-000000000001
Pod**8**	00:25:B5:0**1**:0**8**:**B|C, 0|1**	00000000-0000-**0108** / **0108**-000000000001

VSAN Assignment: Chassis #2

Pod	VSAN ID	VSAN Name	Fabric A/B	FCoE VLAN	SAN Boot Target WWN
All Pods	11 (vHBA0)	VSAN11	A	1011	Pri 50:06:01:***64***:44:60:4C:90 Sec 50:06:01:***6C***:44:60:4C:90
All Pods	12 (vHBA1)	VSAN12	B	1012	Pri 50:06:01:***65***:44:60:4C:90 Sec 50:06:01:***6D***:44:60:4C:90

WWxN Assignment: Chassis #2

Pod	WWNN	WWPN
Pod**1**	20:0**1**:00:00:0**2**:0**1**:0**B or C**:0**1**	20:0**0**:00:00:0**2**:0**1**:0**B or C**:0**1**
Pod**2**	20:0**1**:00:00:0**2**:0**2**:0**B or C**:0**1**	20:0**0**:00:00:0**2**:0**2**:0**B or C**:0**1**
Pod**3**	20:0**1**:00:00:0**2**:0**3**:0**B or C**:0**1**	20:0**0**:00:00:0**2**:0**3**:0**B or C**:0**1**
Pod**4**	20:0**1**:00:00:0**2**:0**4**:0**B or C**:0**1**	20:0**0**:00:00:0**2**:0**4**:0**B or C**:0**1**
Pod**5**	20:0**1**:00:00:0**2**:0**5**:0**B or C**:0**1**	20:0**0**:00:00:0**2**:0**5**:0**B or C**:0**1**
Pod**6**	20:0**1**:00:00:0**2**:0**6**:0**B or C**:0**1**	20:0**0**:00:00:0**2**:0**6**:0**B or C**:0**1**
Pod**7**	20:0**1**:00:00:0**2**:0**7**:0**B or C**:0**1**	20:0**0**:00:00:0**2**:0**7**:0**B or C**:0**1**
Pod**8**	20:0**1**:00:00:0**2**:0**8**:0**B or C**:0**1**	20:0**0**:00:00:0**2**:0**8**:0**B or C**:0**1**

MAC Assignment: Chassis #2

Pod	MAC	UUID Prefix / Suffix
Pod**1**	00:25:B5:0**2**:0**1**:**B|C, 0|1**	00000000-0000-**0201** / **0201**-000000000001
Pod**2**	00:25:B5:0**2**:0**2**:**B|C, 0|1**	00000000-0000-**0202** / **0202**-000000000001
Pod**3**	00:25:B5:0**2**:0**3**:**B|C, 0|1**	00000000-0000-**0203** / **0203**-000000000001
Pod**4**	00:25:B5:0**2**:0**4**:**B|C, 0|1**	00000000-0000-**0204** / **0204**-000000000001
Pod**5**	00:25:B5:0**2**:0**5**:**B|C, 0|1**	00000000-0000-**0205** / **0205**-000000000001
Pod**6**	00:25:B5:0**2**:0**6**:**B|C, 0|1**	00000000-0000-**0206** / **0206**-000000000001

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Pod**7**	00:25:B5:0**2**:0**7**:**B|C, 0|1**	00000000-0000-**0207** / **0207**-000000000001
Pod**8**	00:25:B5:0**2**:0**8**:**B|C, 0|1**	00000000-0000-**0208** / **0208**-000000000001

VSAN Assignment: Chassis #3

Pod	VSAN ID	VSAN Name	Fabric A/B	FCoE VLAN	SAN Boot Target WWN
All Pods	11 (vHBA0)	VSAN11	A	1011	Pri 50:06:01:***64***:44:60:4C:90 Sec 50:06:01:***6C***:44:60:4C:90
All Pods	12 (vHBA1)	VSAN12	B	1012	Pri 50:06:01:***65***:44:60:4C:90 Sec 50:06:01:***6D***:44:60:4C:90

WWxN Assignment: Chassis #3

Pod	WWNN	WWPN
Pod**1**	20:0**1**:00:00:0**3**:0**1**:0**B or C**:0**1**	20:0**0**:00:00:0**3**:0**1**:0**B or C**:0**1**
Pod**2**	20:0**1**:00:00:0**3**:0**2**:0**B or C**:0**1**	20:0**0**:00:00:0**3**:0**2**:0**B or C**:0**1**
Pod**3**	20:0**1**:00:00:0**3**:0**3**:0**B or C**:0**1**	20:0**0**:00:00:0**3**:0**3**:0**B or C**:0**1**
Pod**4**	20:0**1**:00:00:0**3**:0**4**:0**B or C**:0**1**	20:0**0**:00:00:0**3**:0**4**:0**B or C**:0**1**
Pod**5**	20:0**1**:00:00:0**3**:0**5**:0**B or C**:0**1**	20:0**0**:00:00:0**3**:0**5**:0**B or C**:0**1**
Pod**6**	20:0**1**:00:00:0**3**:0**6**:0**B or C**:0**1**	20:0**0**:00:00:0**3**:0**6**:0**B or C**:0**1**
Pod**7**	20:0**1**:00:00:0**3**:0**7**:0**B or C**:0**1**	20:0**0**:00:00:0**3**:0**7**:0**B or C**:0**1**
Pod**8**	20:0**1**:00:00:0**3**:0**8**:0**B or C**:0**1**	20:0**0**:00:00:0**3**:0**8**:0**B or C**:0**1**

MAC Assignment: Chassis #3

Pod	MAC	UUID Prefix / Suffix
Pod**1**	00:25:B5:0**3**:0**1**:**B|C, 0|1**	00000000-0000-**0301** / **0301**-000000000001
Pod**2**	00:25:B5: 0**3**:0**2**: **B|C, 0|1**	00000000-0000-**0302** / **0302**-000000000001
Pod**3**	00:25:B5: 0**3**:0**3**: **B|C, 0|1**	00000000-0000-**0303** / **0303**-000000000001
Pod**4**	00:25:B5: 0**3**:0**4**: **B|C, 0|1**	00000000-0000-**0304** / **0304**-000000000001
Pod**5**	00:25:B5: 0**3**:0**5**: **B|C, 0|1**	00000000-0000-**0305** / **0305**-000000000001

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Pod**6**	00:25:B5: 0**3**:0**6**: **B|C, 0|1**	00000000-0000-**0306** / **0306**-000000000001
Pod**7**	00:25:B5: 0**3**:0**7**: **B|C, 0|1**	00000000-0000-**0307** / **0307**-000000000001
Pod**8**	00:25:B5: 0**3**:0**8**: **B|C, 0|1**	00000000-0000-**0308** / **0308**-000000000001

VSAN Assignment: Chassis #4

Pod	VSAN ID	VSAN Name	Fabric A/B	FCoE VLAN	SAN Boot Target WWN
All Pods	11 (vHBA0)	VSAN11	A	1011	Pri 50:06:01:***64***:44:60:4C:90 Sec 50:06:01:***6C***:44:60:4C:90
All Pods	12 (vHBA1)	VSAN12	B	1012	Pri 50:06:01:***65***:44:60:4C:90 Sec 50:06:01:***6D***:44:60:4C:90

WWxN Assignment: Chassis #4

Pod	WWNN	WWPN
Pod**1**	20:0**1**:00:00:0**4**:0**1**:0**B or C**:0**1**	20:0**0**:00:00:0**4**:0**1**:0**B or C**:0**1**
Pod**2**	20:0**1**:00:00:0**4**:0**2**:0**B or C**:0**1**	20:0**0**:00:00:0**4**:0**2**:0**B or C**:0**1**
Pod**3**	20:0**1**:00:00:0**4**:0**3**:0**B or C**:0**1**	20:0**0**:00:00:0**4**:0**3**:0**B or C**:0**1**
Pod**4**	20:0**1**:00:00:0**4**:0**4**:0**B or C**:0**1**	20:0**0**:00:00:0**4**:0**4**:0**B or C**:0**1**
Pod**5**	20:0**1**:00:00:0**4**:0**5**:0**B or C**:0**1**	20:0**0**:00:00:0**4**:0**5**:0**B or C**:0**1**
Pod**6**	20:0**1**:00:00:0**4**:0**6**:0**B or C**:0**1**	20:0**0**:00:00:0**4**:0**6**:0**B or C**:0**1**
Pod**7**	20:0**1**:00:00:0**4**:0**7**:0**B or C**:0**1**	20:0**0**:00:00:0**4**:0**7**:0**B or C**:0**1**
Pod**8**	20:0**1**:00:00:0**4**:0**8**:0**B or C**:0**1**	20:0**0**:00:00:0**4**:0**8**:0**B or C**:0**1**

MAC Assignment: Chassis #4

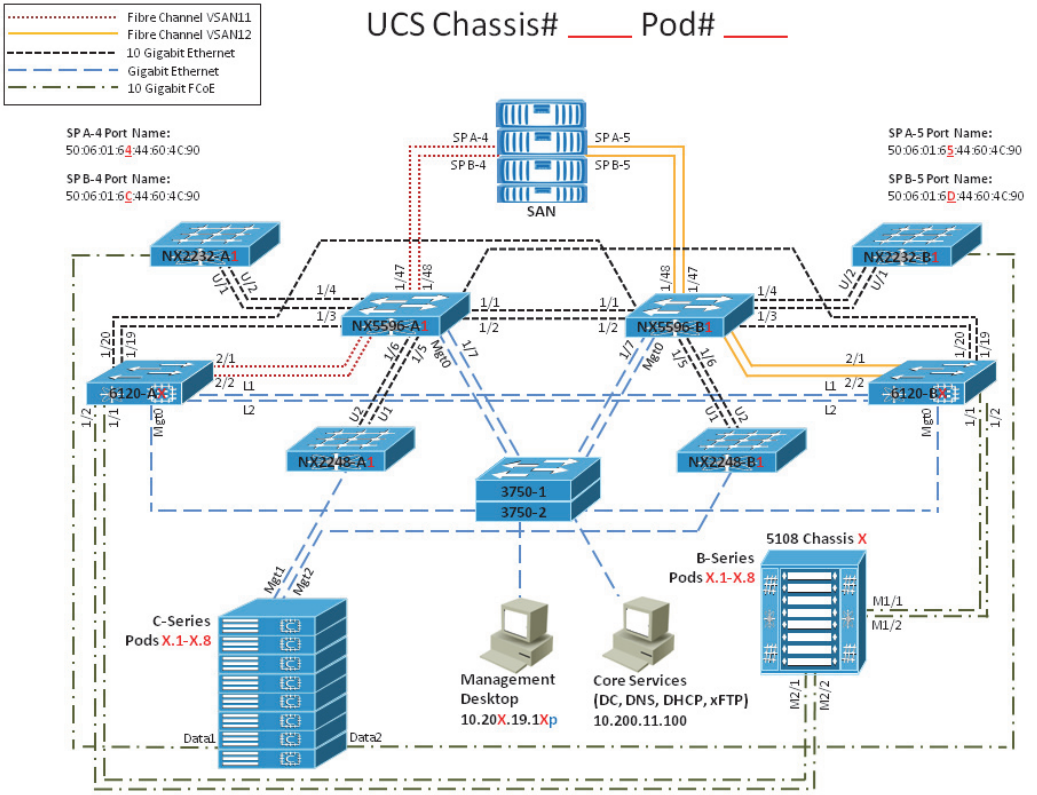
Pod	MAC	UUID Prefix / Suffix
Pod**1**	00:25:B5:0**4**:0**1**:**B|C, 0|1**	00000000-0000-**0401** / **0401**-000000000001
Pod**2**	00:25:B5: 0**4**:0**2**: **B|C, 0|1**	00000000-0000-**0402** / **0402**-000000000001
Pod**3**	00:25:B5: 0**4**:0**3**: **B|C, 0|1**	00000000-0000-**0403** / **0403**-000000000001
Pod**4**	00:25:B5: 0**4**:0**4**: **B|C, 0|1**	00000000-0000-**0404** / **0404**-000000000001
Pod**5**	00:25:B5: 0**4**:0**5**: **B|C, 0|1**	00000000-0000-**0405** / **0405**-000000000001
Pod**6**	00:25:B5: 0**4**:0**6**: **B|C, 0|1**	00000000-0000-**0406** / **0406**-000000000001

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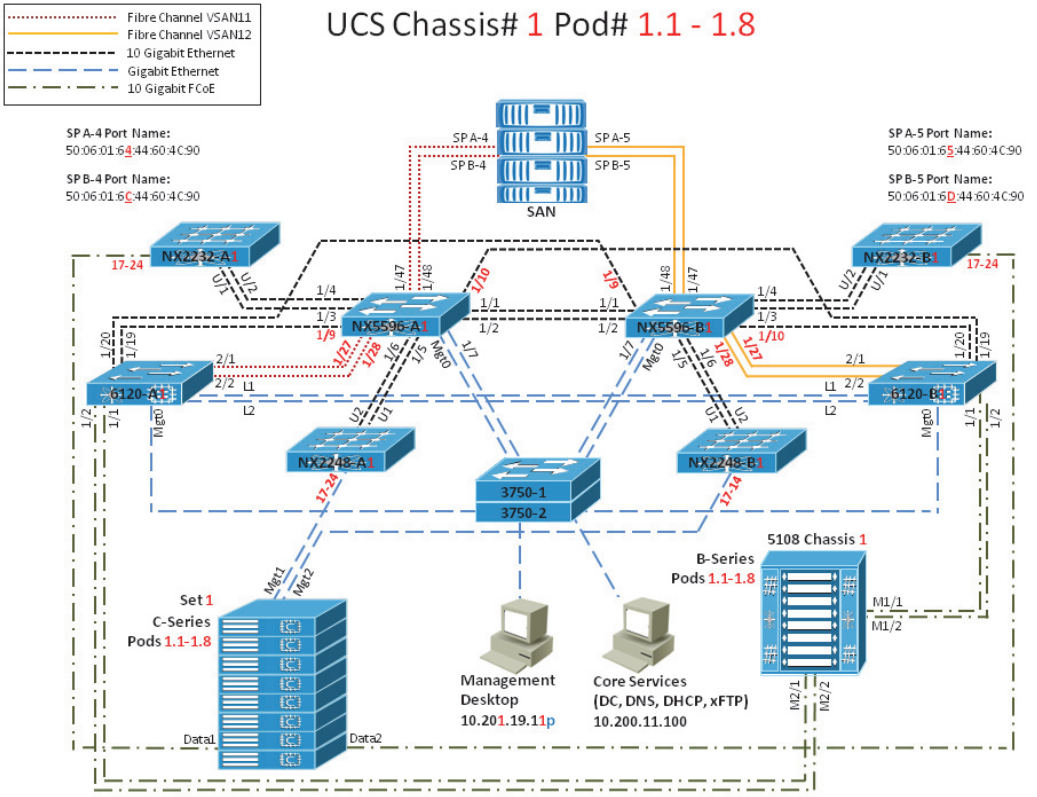
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Pod**7**	00:25:B5: 0**4**:0**7**: **B|C, 0|1**	00000000-0000-**0407** / **0407**-000000000001
Pod**8**	00:25:B5: 0**4**:0**8**: **B|C, 0|1**	00000000-0000-**0408** / **0408**-000000000001

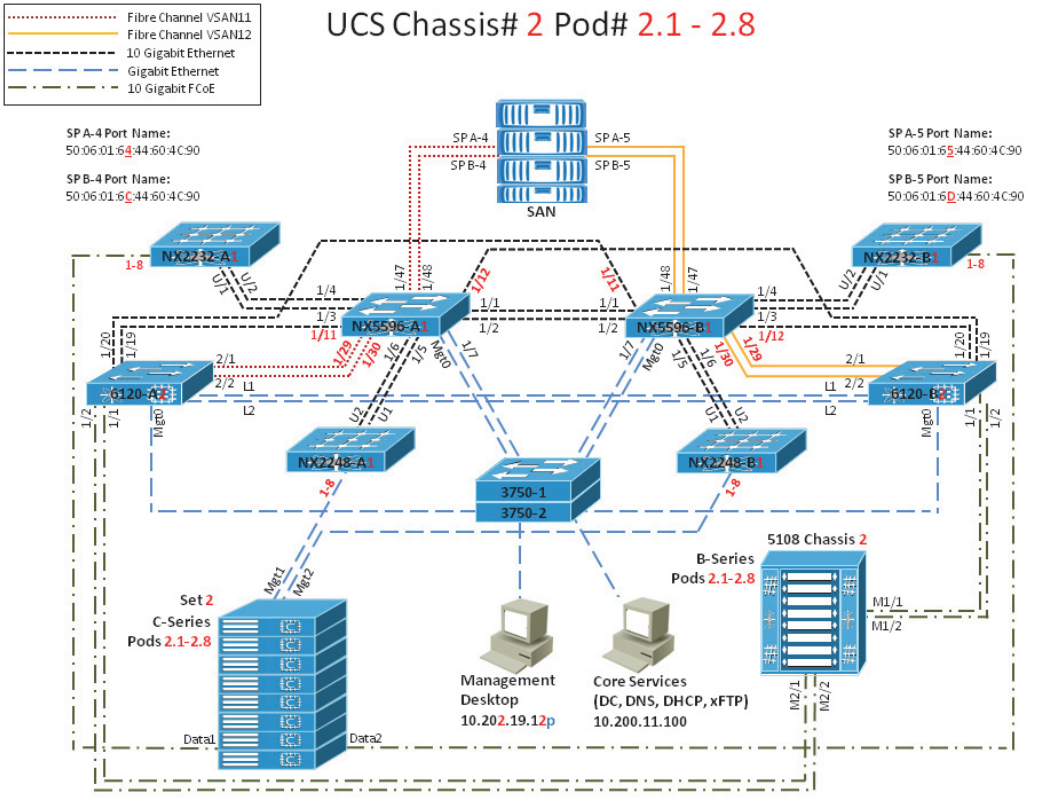
Topology Diagram, All Chassis



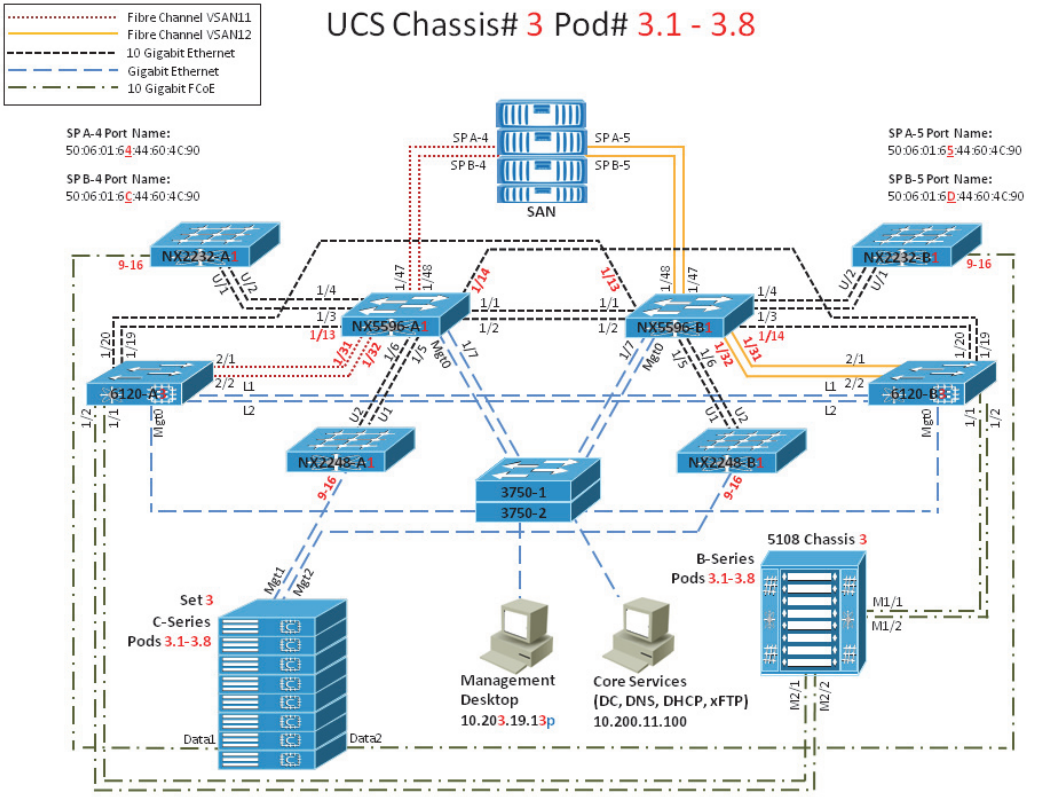
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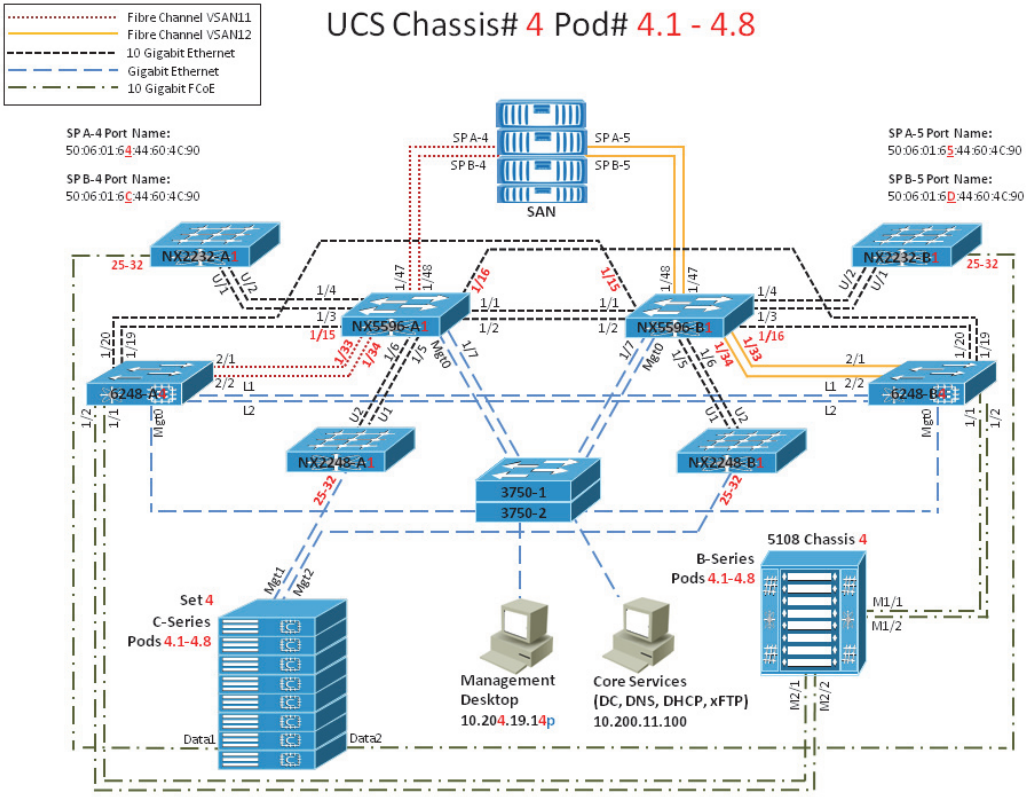
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Resolve Blade to Service Profile assignments

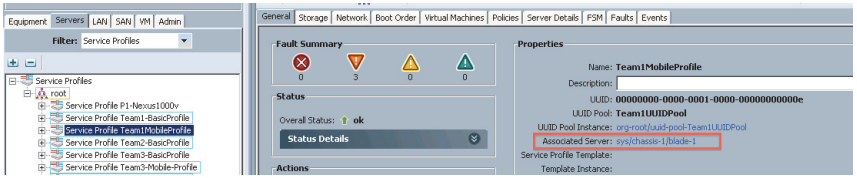
There will come a time (or times) when the blade server you would like to assign to a specific Service Profile is already assigned to a different Service Profile. As you already know there is a one-to-one assignment between blade servers and Service Profiles. However that fact does not soften the blow when you just want to complete the assignment.

The following short steps will show you how to find out which blade server is assigned to which Service Profile so you may re-associate the two components in the desired pairing.

7. To find out which Service Profile may be assigned to which blade server, navigate to the **Server** tab > **Service Profiles** > **root** and click on your Service Profile.

   7.1. If you were more interested in this same scenario but from a blade servers perspective then you would simple navigate to the **Equipment** tab > **Chassis** > **Chassis 1** > **Servers** and pick your blade server of interest.

8. Once you click on your Service Profile, click on the **General** tab and take note of the "Associated Server" value under the **Properties** section.



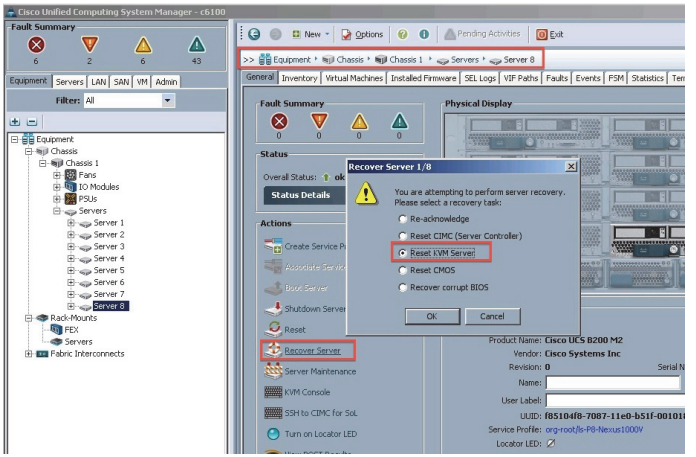
9. If needed you can "Disassociate" or "Change Service Profile Association" if needed from under the **Actions** section of this same tab.

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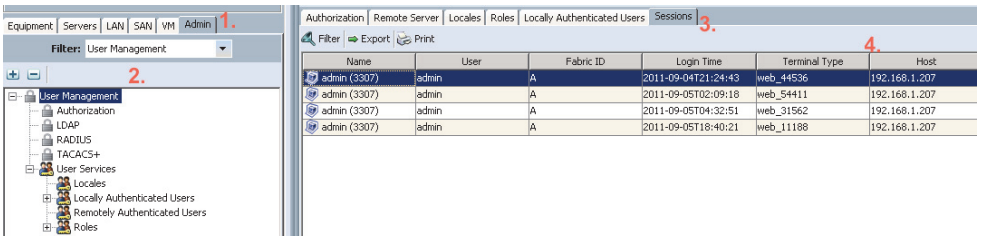
Resolve the KVM Console “Login Failure” error

Problem: From time-to-time throughout your labs, when trying to access the KVM Console of your blade or service profile, you may get a “Login Failure” error message. This is cause by the maximum number of simultaneous Admin sessions to the chassis being exceeded at that point-in-time. Here are 3 possible solutions and in the desired order of preference.

Solution #1: Navigate to your Server/Blade within UCS Manager. For example, **Chassis>Chassis1>Servers>Server 8**. Once there click on **Recover Server** and select **Reset KVM Server**.

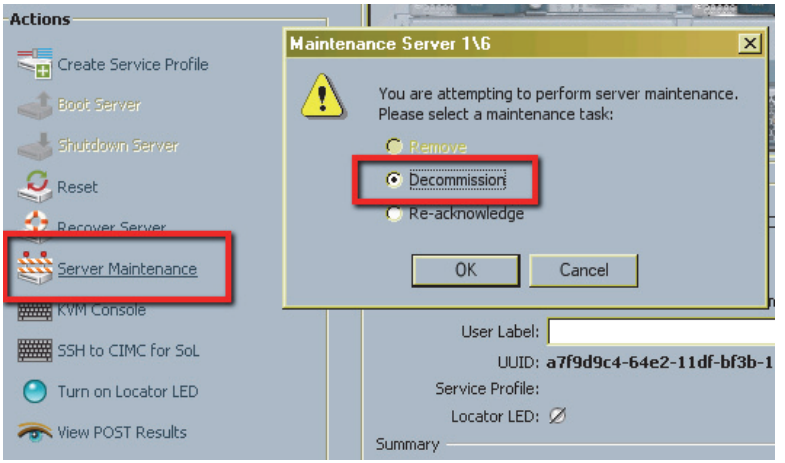


Solution #2: This can also be done in the **Admin** tab > **User Management** > **Sessions** (in the content pane). Click on the entry with *your IP Address* in the “Host” column and click on the trashcan. However, use caution, if multiple classes are running is would be easy to erroneously kill an IP address that was being used by another pod/class while thinking it was your address.



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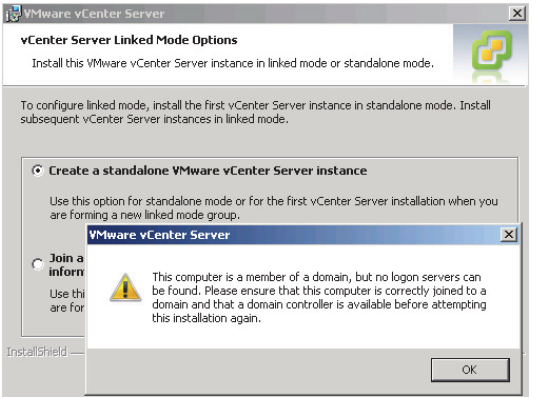
Solution #3: Navigate to the **Equipment** tab and down to your assigned blade. On the **General** tab select **Server Maintenance** and **Decommission**. Once this process is complete, right click on the slot and select **Re-acknowledge Server**. This will clear the IP Address associated with the KVM Console. An example of these steps can be found in Lab 1, Task 5, Step 10.



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Moving a Team's Desktop to a Workgroup (from a Domain)

If during the installation of your vCenter Server you receive the following error message…



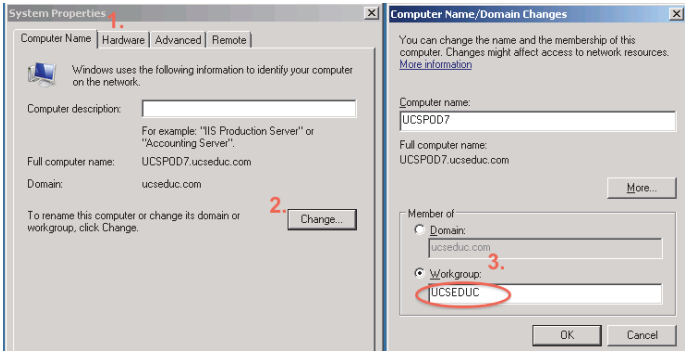
It will be necessary to remove your Team Desktop from its currently assigned Domain to a Workgroup. Here are those steps.

10. Click **OK** to acknowledge the error and **Cancel**, followed by **Yes** and finally **Finish** to terminate the install process.
11. To remove the Team Desktop from the Domain, click on **Start**, then right-click on **Computer** and finally click **Properties**.
12. In the "System" window click on **Change Settings** in the "Computer name, domain, and workgroup settings" section.

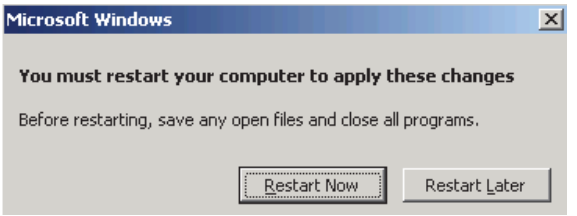


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13. In the “System Properties” windows, on the “Computer Name” tab click on **Change**. Here we will select the “Workgroup” radio button and type in a Workgroup name of **UCSEDUC**. This is the same name as the domain but without the **.com**.



14. Click **OK** to confirm the changes, **OK** again to acknowledge the need for the Local Administrators login credentials.
15. When prompted for the credentials, use a username of **Administrator** and password of **cisco123**.
16. Finally, click **OK** when welcomed to the “UCSEDUC” workgroup and **OK** a 4th time to acknowledge the need to reboot.
17. To complete this entire process click **Close** and **Restart Now**. Once the Team Desktop reboots, login with the same **Administrator** and **cisco123** set of credentials used above.



Congratulations, your Team’s Desktop is now part of the “UCSEDUC” workgroup and able to continue with the installation of your vCenter Server.

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L1

Initial Cisco UCS B-Series Configuration

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Lab Overview

In this activity, you will configure and test Syslog, Smart Call Home, and SNMPv3.

Estimated Completion Time

30 minutes

Lab Procedures

In this activity, you will:

- Generate and Observe Major Alarms and Recovery
- Disable Local Console Logging
- Configure Syslog
- Configure Smart Call Home
- Configure and Test SNMPv3

Required Resources

- These are the resources and equipment that are required to complete this activity:
- Management Desktop
- Cisco UCS reporting implementation sheet

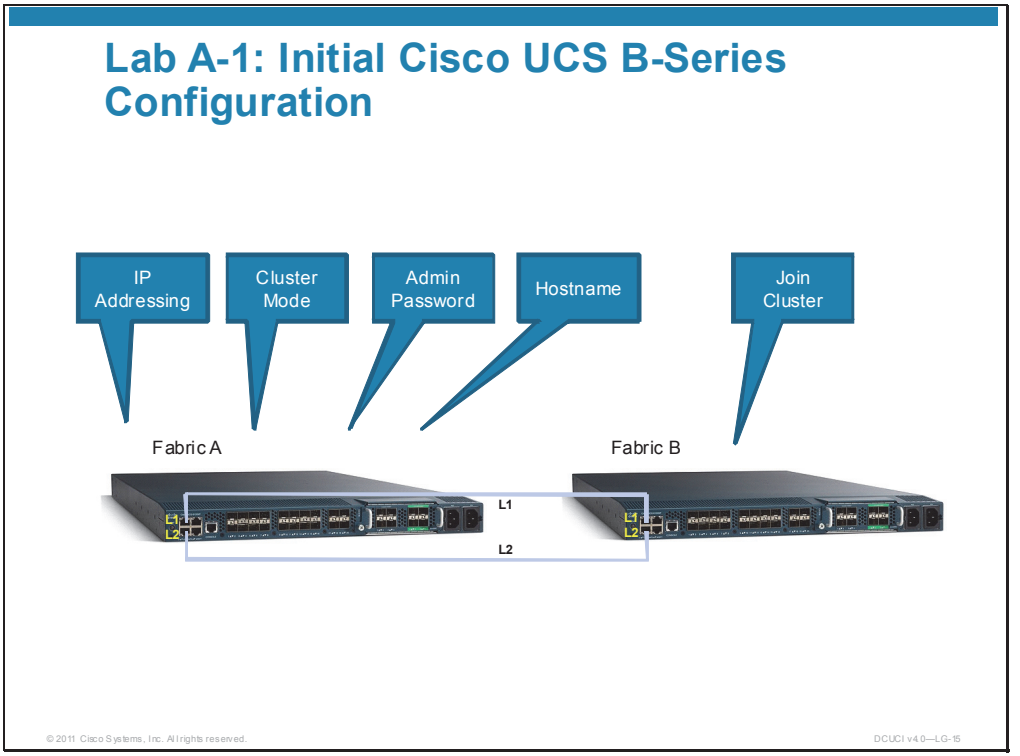
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Initial Cisco UCS B-Series Configuration

This lab provides a reference of the process of initializing a fabric for first use. In this activity, you are presented with a guided demonstration to illustrate initial setup of the Cisco 6100 Series fabric interconnects. This appendix is a useful reference during installations. ***Please do not perform this lab in class*** as we all use the same fabric and doing so would sever all communications to this fabric for all classes on said fabric.

Visual Objective

The figure illustrates what you will accomplish in this activity.



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Task 1: Complete Cisco UCS 6100 Initial Configuration

In this task, you will complete the initial configuration of a Cisco UCS 6100 Fabric Interconnect and establish a cluster relationship between two Cisco UCS 6100 Fabric Interconnects.

18. Choose the console method of initial configuration.

```
System is coming up ... Please wait ...
nohup: appending output to 'nohup.out'
 ---- Basic System Configuration Dialog ----

This setup utility will guide you through the basic configuration of the system.
Only minimal configuration including IP connectivity to the Fabric interconnect and
its clustering mode is performed through these steps.

Type Ctrl-C at any time to abort configuration and reboot system.
To back track or make modifications to already entered values, complete input till
end of section and answer no when prompted to apply configuration.

Enter the configuration method. (console/gui) ? console
```

19. Specify that you will be setting up the system manually (as opposed to restoring from a backup) and set the admin password.

```
Enter the setup mode; setup newly or restore from backup. (setup/restore) ? setup

You have chosen to setup a new Fabric interconnect. Continue? (y/n): y

Enter the password for "admin": cisco12345
Confirm the password for "admin": cisco12345
```

20. Set the cluster configuration options. For the first switch, use "A." For the second switch, use "B."

> **Note** The system name will apply to both nodes—the fabric designator (A or B) will be appended to form the hostname.

```
Do you want to create a new cluster on this Fabric interconnect (select 'no' for
standalone setup or if you want this switch to be added to an existing cluster)?
(yes/no) [n]: y

Enter the switch fabric (A/B) []: A
Enter the system name: s6100
```

21. Set the management IP configuration options. Each fabric interconnect has a unique IP address as well as a shared cluster address.

```
Physical Switch Mgmt0 IPv4 address : 192.168.10.101

Physical Switch Mgmt0 IPv4 netmask : 255.255.255.0

IPv4 address of the default gateway : 192.168.10.254
```


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```
Cluster IPv4 address : 192.168.10.200

Configure the DNS Server IPv4 address? (yes/no) [n]: n

Configure the default domain name? (yes/no) [n]: n
```

22. Confirm the configuration information and apply it.

```
Following configurations will be applied:

Switch Fabric=A
System Name=s6100
Physical Switch Mgmt0 IP Address=192.168.10.101
Physical Switch Mgmt0 IP Netmask=255.255.255.0
Default Gateway=192.168.10.254

Cluster Enabled=yes
Cluster IP Address=192.168.10.200

Apply and save the configuration (select 'no' if you want to re-enter)? (yes/no):
yes
Applying configuration. Please wait.
```

23. Log in to the switch and view the cluster status.

```
s6100-A login: admin
Password: cisco12345
Cisco UCS 6100 Series Fabric Interconnect

TAC support: http://www.cisco.com/tac

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…
s6100-A# show cluster state
Cluster Id: 0x2ebe725040b711de-0x92a7000decb21744

A: UP, ELECTION IN PROGRESS, (Management services: UP)
B: UNRESPONSIVE, INAPPLICABLE, (Management services: UNRESPONSIVE)

HA NOT READY:
No chassis configured
WARNING: Failover cannot start, chassis configuration is incomplete
```

24. Complete the initial configuration on fabric interconnect B. When starting, that fabric interconnect should detect the presence of the cluster.

```
System is coming up ... Please wait ...
nohup: appending output to 'nohup.out'

 ---- Basic System Configuration Dialog ----

This setup utility will guide you through the basic configuration of the system.
Only minimal configuration including IP connectivity to the Fabric interconnect and
its clustering mode is performed through these steps.

Type Ctrl-C at any time to abort configuration and reboot system.
To back track or make modifications to already entered values, complete input till
end of section and answer no when prompted to apply configuration.
```


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```
Enter the configuration method. (console/gui) ? console
Installer has detected the presence of a peer Fabric interconnect. This Fabric
interconnect will be added to the cluster. Continue (y/n) ? y
```

25. Provide the admin password to the first switch and the local unique IP address for this fabric interconnect. All of the other configuration options will be replicated from the first switch.

```
Enter the admin password of the peer Fabric interconnect:
Connecting to peer Fabric interconnect... done
Retrieving config from peer Fabric interconnect... done
Peer Fabric interconnect Mgmt0 IP Address: 192.168.10.101
Peer Fabric interconnect Mgmt0 IP Netmask: 255.255.255.0
Cluster IP address : 192.168.10.200
Physical Switch Mgmt0 IPv4 address : 192.168.10.102
Apply and save the configuration (select 'no' if you want to re-enter)? (yes/no):
yes
```

26. Log in and display the cluster status.

```
s6100-B login: admin
Password: cisco12345
Cisco UCS 6100 Series Fabric Interconnect

TAC support: http://www.cisco.com/tac

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…
s6100-B# show cluster state
Cluster Id: 0x2ebe725040b711de-0x92a7000decb21744

B: UP, SUBORDINATE
A: UP, PRIMARY

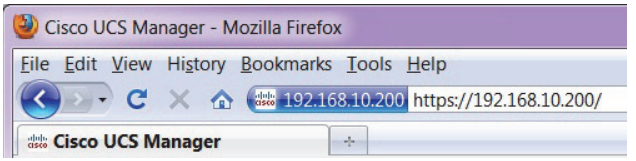
HA NOT READY:
No chassis configured
```

Task 2: Configure Server Ports to Allow Chassis Discovery

In this task, you will configure four of the fixed 10 GB ports as server ports that connect to the IOM on the chassis.

27. Log in to the Cisco UCS Manager GUI to complete the initial configuration. Direct a web browser to the cluster IP address that was specified in the earlier task.

28. Click the **Launch** link to start the Cisco UCS Manager application.



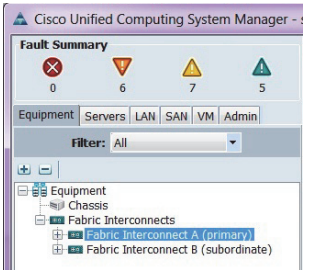
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Note It is normal to receive a security error in your browser. The root certificate of Cisco UCS Manager is a self-signed certificate and is not in the root certificate store of your browser.



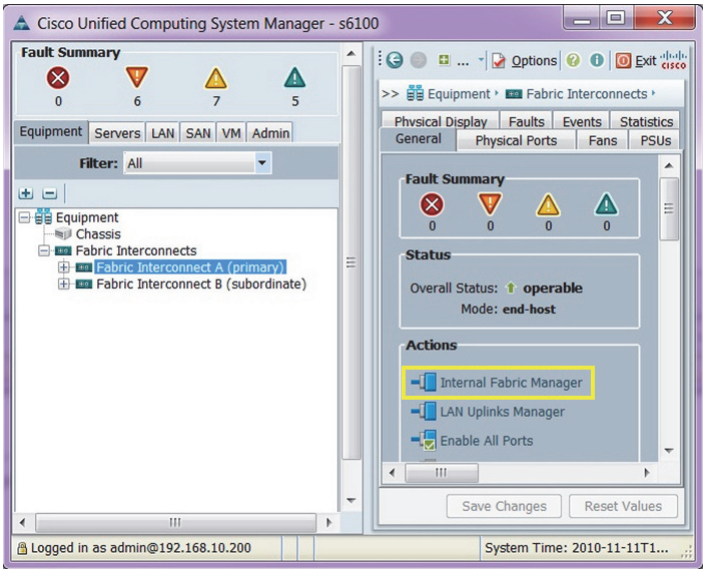
29. Log in by using the username **admin** and the password **cisco12345**, entered during the setup wizard.

Note Note that in the Equipment tab, both fabric interconnects are visible, with no chassis. Recall that the default state of all interfaces on the fabric interconnects is the unconfigured state.

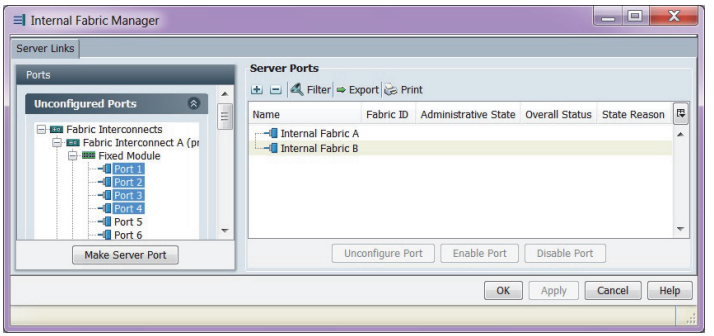


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30. Before the chassis is manageable and the cluster becomes fully operational, each fabric interconnect must have at least one active link to the chassis. Expand **Fabric Interconnect A** in the Equipment tab of the navigation pane. In the content pane, click the **Internal Fabric Manager** link.

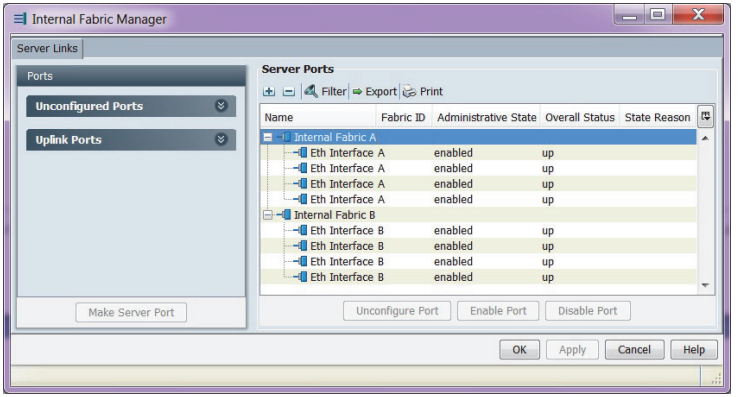


31. Click the double down-arrow to expand the list of unconfigured ports. Choose ports 1 through 4 by pressing **Ctrl** while clicking each port in turn. Click **Make Server Port**. Scroll down the list to fabric interconnect B and make ports 1 through 4 server ports.

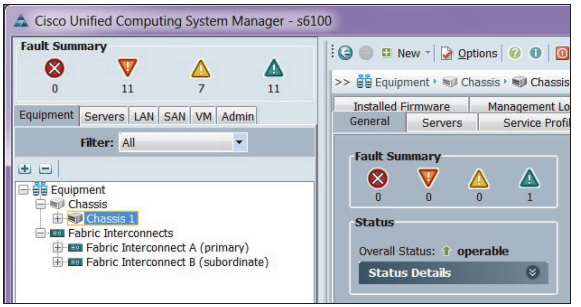


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32. Ports 1 through 4 and fabric interconnects A and B now appear as server ports. Click **OK** to close the Internal Fabric Manager.



Chassis 1 has been discovered and is now visible in the Equipment tab.



33. Return to the CLI and check the cluster status again. It might take as much as 30 seconds before the CLI reports that the cluster is operational.

```
s6100-A# show cluster state
Cluster Id: 0x2ebe725040b711de-0x92a7000decb21744

A: UP, PRIMARY
B: UP, SUBORDINATE
HA NOT READY:
No chassis configured

s6100-A# show cluster state
Cluster Id: 0xdc25b7d840bb11de-0xba02000decb21744

A: UP, PRIMARY
B: UP, SUBORDINATE

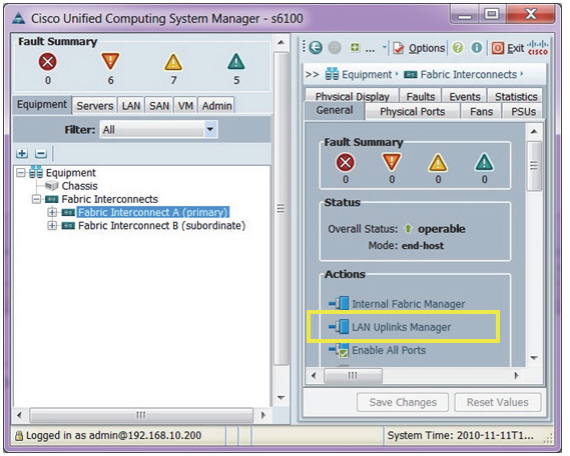
HA READY
```


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Task 3: Configure Uplink Ports to Northbound Communications

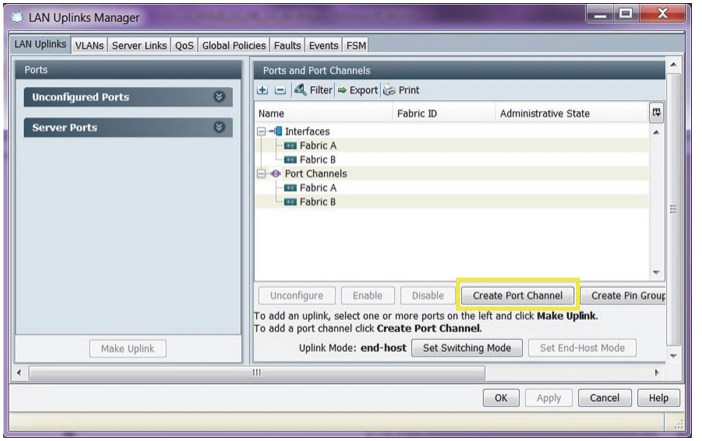
In this task, you will configure two port channels to provide a communication path from the fabric interconnects to the aggregation and core layers of the data center network. This is often referred to as northbound communication. Communication from the fabric interconnects to the IOMs is referred to as southbound.

34. Configuring uplink ports is similar to configuring server ports. Choose either fabric interconnect in the Equipment tab of the navigation pane. Click the **LAN Uplinks Manager** link.

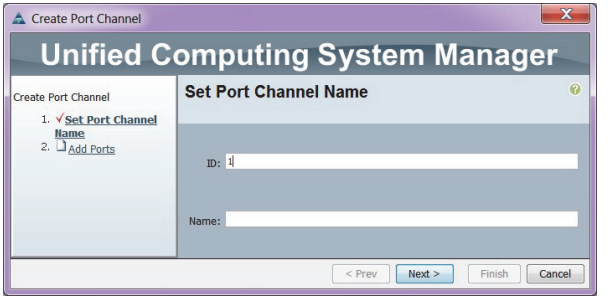


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35. Instead of creating individual links, create a two-interface port channel on each fabric interconnect. Click **Create Port Channel** to begin the wizard. You are presented with the choice of Fabric A or Fabric B. Choose **Fabric A** to create the first port channel on Fabric A.

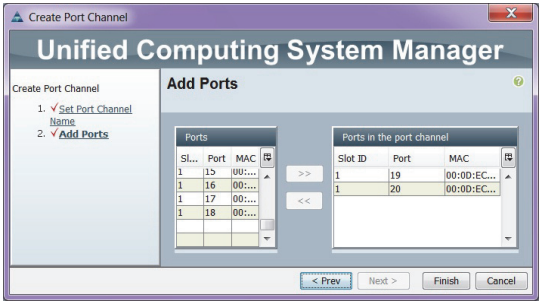


36. On the first screen of the port channel creation wizard, enter a port channel ID of 1, and then click **Next**.

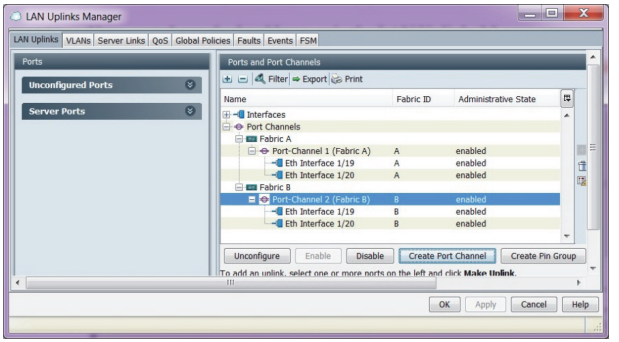


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37. Press **Ctrl** and choose ports 19 and 20 from the port list. Click **>>** to add the ports to the port channel. Click **Finish** to end the wizard. Repeat these steps to create a port channel with ports 19 and 20 on Fabric B.



38. Your port channels should appear in the LAN Uplinks Manager. Choose each port channel and then click **Enable** to complete the process.



39. Click **OK** to close the LAN Uplinks Manager.

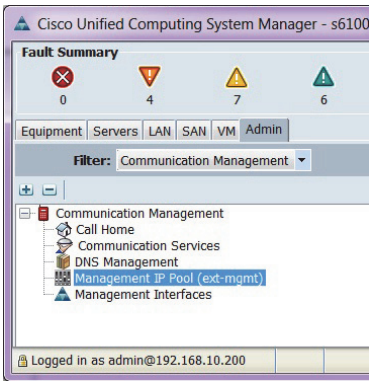
Task 4: Configure IP Communication to Cisco IMC

In this task, you will configure a pool of IP addresses that will be assigned to the Cisco IMC on each server blade.

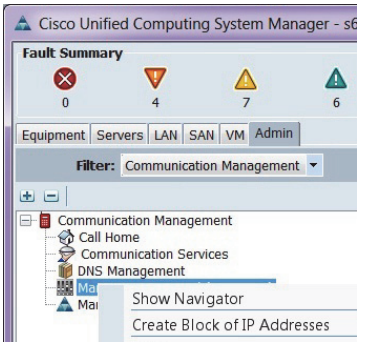
Note To avoid confusion when using the term Cisco IMC, it is important to consider the context in which it is used. In the context of Cisco UCS C-Series Rack-Mount Servers, Cisco IMC refers to the configuration user interface. In the context of Cisco UCS B-Series devices, Cisco IMC refers to the chip on the server motherboard that provides access to KVM, IPMI, and SoL services. In earlier versions of the documentation, the Cisco IMC was called the BMC.

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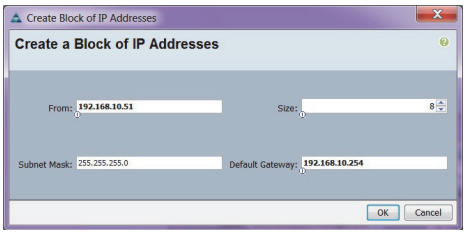
40. Navigate to the Admin tab and choose the Communications Management filter from the drop-down list. Choose the **Management IP Pool** icon.



41. Right-click Management IP Pool and choose Create Block of IP Addresses.



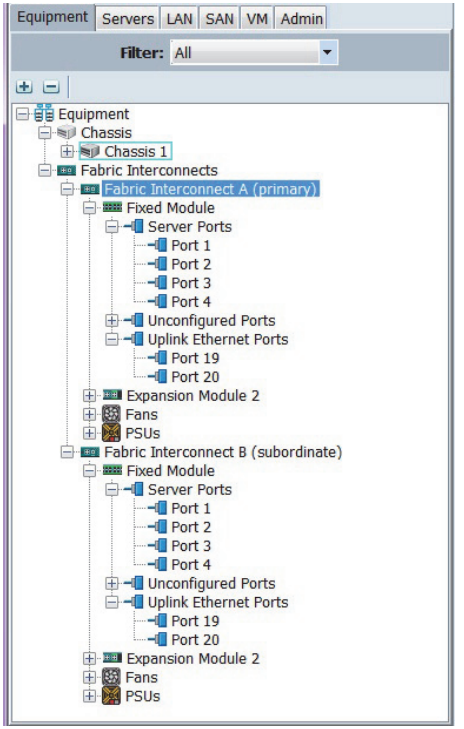
42. Create a block of eight addresses starting at 192.168.10.51 and then click **OK**.



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Activity Verification

When you complete this activity, your network topology should be like the following:



Lab Complete

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L2

Examining LAN & SAN Connectivity

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Lab Overview

In this activity, you will observe the UCS LAN & SAN connectivity from the Nexus 5010 series Core Switch.

Estimated Completion Time

45 minutes

Lab Procedures

In this activity, you will:

- Explore firmware management options in Cisco UCS Manager
- Update the firmware on a CIMC
- Update the firmware on an interface card
- Explain how to update the firmware on an I/O module and a Fabric Interconnect

Required Resources

These are the resources and equipment that are required to complete this activity:

- (2) UCS 6100 Fabric Interconnects
- Configured UCS environment
- Network access to Device Manager

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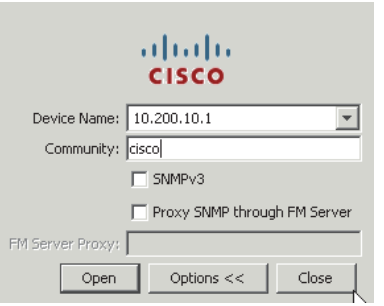
Task 1: Connect to Nexus and Examine SAN

In this task, you will explore the manner in which the blade server communicates with devices outside of Cisco UCS.

43. Minimize the Cisco UCS Manager windows, if any. Find the Cisco Device Manager icon on your student desktop and double-click it.



44. Enter Device Name of **10.20C.10.1** if your Team/Pod # is odd, **10.20C.10.2** if your Team/Pod # is even. You may need to click the options button to ensure that SNMPv3 is not checked. Enter a community name of **cisco**. Click **Open**.

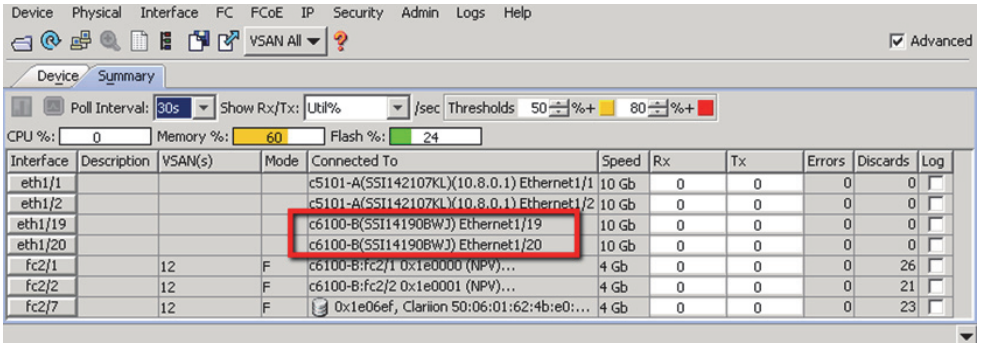


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Note You likely received a version notification stating how an upgrade to Cisco's Device Manager needs to be upgraded. This is because our Nexus 5Ks are running an updated release of NX-OS v5.1.(3) which requires Device Manager v5.2.2 while you Management Desktop has an older version of 5.0.x. Let's perform a very real-work upgrade to Device Manager v5.2.2.

Currently and moving forward, Device Manager is no longer packaged with the Nexus 5K NX-OS. However it is a component installed with Data Center Network Manager. So we will perform an upgrade to the Data Center Network Manager installed on your Management Desktop.

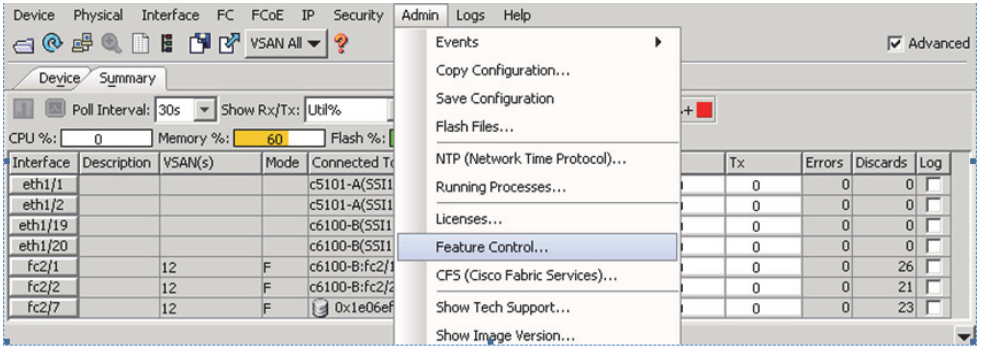
45. Navigate to "Z:\Installs\NX-OS Revs" path and click the **dcnm-installer-windows-k9.5.2.2.exe**.
46. On the "Introduction" screen of the installer click **Next**. Click **Next** once again on the "Installation Help" screen and finally click **Express (with Default Options)** on the "Choose Install Folder" screen.
47. Once the upgrade is complete, you may have noticed how the original "Cisco Device Manager" icon is now gone. To re-open Device Manager navigate to **Start > All Programs > Cisco DCNM Server** and click on **Cisco Device Manager**.
48. Click the **Summary** tab. Note connected interfaces. Specifically, note that the switch is reporting which Fabric Interconnect is visible. When you are finished on this tab, return to the **Device** tab.



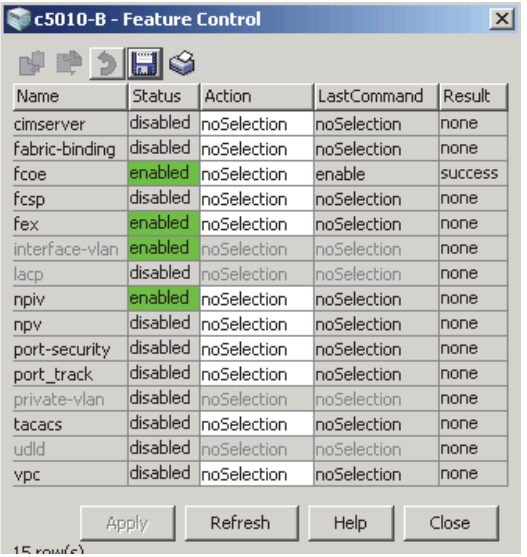
49. The text in the "Connected To" field for the Fabric Interconnects is being returned by the Fabric Interconnect during the login process. This is useful information for mapping connections or troubleshooting connection problems.

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50. Click **Admin** and **Feature Control**.



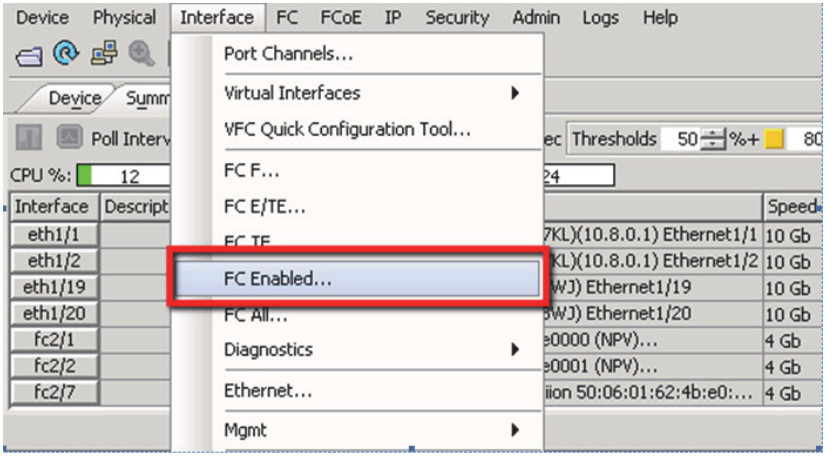
51. Find the line **npiv**. NPIV is the feature on the switch that supports multiple Fibre Channel devices logging in through the same physical port. Note that the feature is enabled.



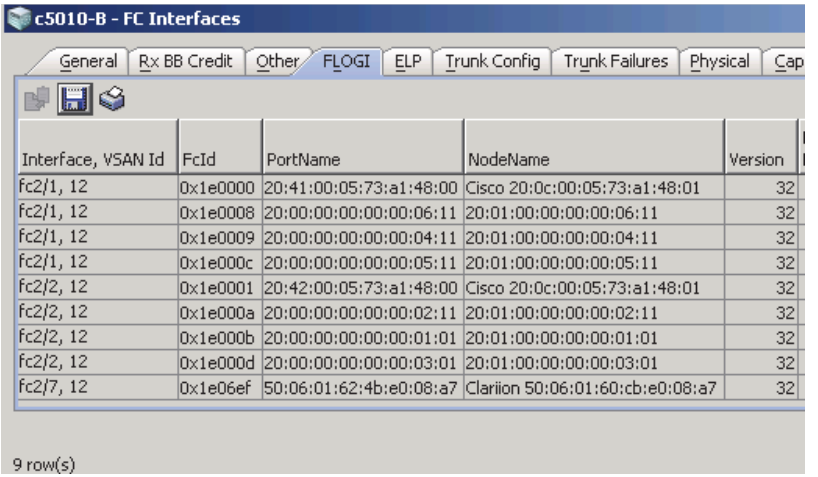
52. Close the **Feature Control** window.

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53. Click **Interface** and **FC Enabled**.



54. Choose the **FLOGI** tab. Find your server's virtualized WWPN and WWNN and note the physical interface that it is logged into. There may be several other teams that are WWNNs logged into the same physical interface. Click **Close**.

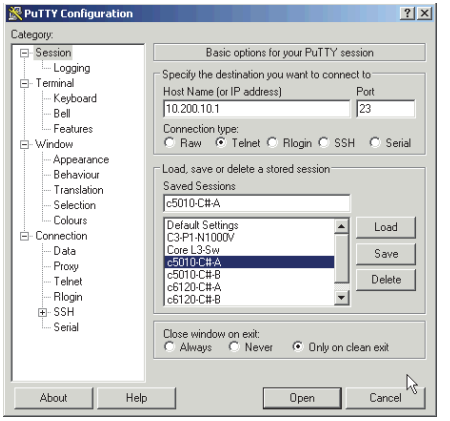


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Task 2: Connect to Nexus CLI and Examine LAN

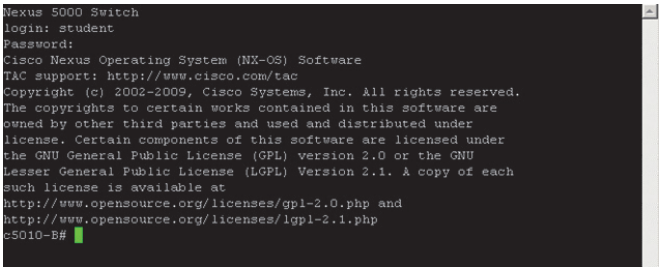
55. Find and double-click the **putty.exe** icon on your student desktop.

56. Use PuTTY to Telnet 10.200.10.1 if your pod # is odd, 10.200.10.2 if your pod # is even. Enter the IP address, Select Telnet and click **Open**.



Note	The following images are for illustration purpose only. The actual IP address your test server will be different.

57. Log into the switch by using the username of **student** and password of **NXos12345**.



58. Open a Command Windows on your Linux server, type ‘ifconfig’ to view ip address of your server.

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59. From the PuTTY session into your Nexus 5010 Core switch, ping the IP address of your ESXi host.

```
c5010-B# ping 10.4.0.20
PING 10.4.0.20 (10.4.0.20): 56 data bytes
Request 0 timed out
64 bytes from 10.4.0.20: icmp_seq=1 ttl=63 time=1.143 ms
64 bytes from 10.4.0.20: icmp_seq=2 ttl=63 time=0.889 ms
64 bytes from 10.4.0.20: icmp_seq=3 ttl=63 time=0.838 ms
64 bytes from 10.4.0.20: icmp_seq=4 ttl=63 time=0.926 ms
```

60. Enter **sh mac address-table**.

```
c5010-B# show mac-address-table
VLAN      MAC Address       Type    Age       Port
---------+-----------------+-------+---------+--------
1         0005.73a1.481a    dynamic 0         Eth1/19
1         0005.73a1.481b    dynamic 10        Eth1/20
1         0005.9b25.e008    dynamic 0         Eth1/1
10        0005.9b25.e008    dynamic 0         Eth1/1
20        0005.9b25.e008    dynamic 0         Eth1/1
30        0005.9b25.e008    dynamic 0         Eth1/1
40        0005.9b25.e008    dynamic 0         Eth1/1
40        0025.b500.0401    dynamic 70        Eth1/1
```

61. Look at the output from the previous command. You should see an entry with the Cisco UCS OUI (0025.b5, in this format) and a value from the MAC address pool that you created in the previous exercise
62. Spend a few minutes running **show** commands against other VLANs, the physical port with which your MAC address is associated, and so on. Some examples would be:

    show running-conf interface *ethx/y*
63. Type **exit** to log out of the switch and close the PuTTY window.
64. Return to Cisco UCS Manager and disassociate your service profile from the physical blade.

Lab Complete

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L3

Initial Cisco UCS C-Series Configuration

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Lab Overview

Complete this lab activity to practice what you learned in the related lesson.

Estimated Completion Time

35 minutes

Lab Procedures

In this activity, you will:

- Perform initial configuration of the Cisco UCS C Series
- Perform initial configuration of Cisco IMC, IPMI, and SoL.
- Install and boot VMware ESXi from SAN and create a RAID array with local disks.

Required Resources

These are the resources and equipment that are required to complete this activity:

- Management Desktop
- Lab implementation sheet
- Lab reference guide

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Lab 1 Initial C-Series Implementation Sheet

The purpose of this document is to provide you with the necessary information to properly address the P81E VIC for LAN and SAN communication. Each pod will need to configure their C-Series with 2 x MAC addresses, 2 x WWPNs and 1 x WWNN.

The Task numbers here correspond to the Tasks where you will use this information later in the lab.

Task 1 Validate Cisco IMC BIOS Configuration:

Where X=Chassis#

Pod	C200 CIMC IP address 10.20X.10.11P	Subnet Mask	Gateway 10.20C.10.254
1	10.20**X**.10.111	255.255.255.0	10.20**X**.10.254
2	10.20**X**.10.112	255.255.255.0	10.20**X**.10.254
3	10.20**X**.10.113	255.255.255.0	10.20**X**.10.254
4	10.20**X**.10.114	255.255.255.0	10.20**X**.10.254
5	10.20**X**.10.115	255.255.255.0	10.20**X**.10.254
6	10.20**X**.10.116	255.255.255.0	10.20**X**.10.254
7	10.20**X**.10.117	255.255.255.0	10.20**X**.10.254
8	10.20**X**.10.118	255.255.255.0	10.20**X**.10.254

Task 5 & 6 C-Series MAC, WWNN, and WWPN Addresses

Where **X**=Chassis#, , **[0,1]** = Port 0 or Port 1

Pod	MAC Address: 00:25:B5:0**X**:0**T**:**C0**	Node WWN: (aka WWNN) 20:**01**:00:00:0**X**:0**T**:0**C**:**00**	Port WWN: (aka WWPN) 20:**00**:00:00:0**X**:0**T**:0**C**:0**[0,1]**
1	00:25:B5:0**X**:**01**:**C0**	20:**01**:00:00:0**X**:**01**:0C:**00**	20:**00**:00:00:0**X**:**01**:0**C**:**00**
	00:25:B5:0**X**:**01**:**C1**		20:**00**:00:00:0**X**:**01**:0**C**:**01**
2	00:25:B5:0**X**:**02**:**C0**	20:**01**:00:00:0**X**:**02**:0C:**00**	20:**00**:00:00:0**X**:**02**:0**C**:**00**
	00:25:B5:0**X**:**02**:**C1**		20:**00**:00:00:0**X**:**02**:0**C**:**01**
3	00:25:B5:0**X**:**03**:**C0**	20:**01**:00:00:0**X**:**03**:0**C**:**00**	20:**00**:00:00:0**X**:**03**:0**C**:**00**
	00:25:B5:0**X**:**03**:**C1**		20:**00**:00:00:0**X**:**03**:0**C**:**01**
4	00:25:B5:0**X**:**04**:**C0**	20:**01**:00:00:0**X**:**04**:0**C**:**00**	20:**00**:00:00:0**X**:**04**:0**C**:**00**
	00:25:B5:0**X**:**04**:**C1**		20:**00**:00:00:0**X**:**04**:0**C**:**01**
5	00:25:B5:0**X**:**05**:**C0**	20:**01**:00:00:0**X**:**05**:0**C**:**00**	20:**00**:00:00:0**X**:**05**:0**C**:**00**
	00:25:B5:0**X**:**05**:**C1**		20:**00**:00:00:0**X**:**05**:0**C**:**01**
6	00:25:B5:0**X**:**06**:**C0**	20:**01**:00:00:0**X**:**06**:0**C**:**00**	20:**00**:00:00:0**X**:**06**:0**C**:**00**
	00:25:B5:0**X**:**06**:**C1**		20:**00**:00:00:0**X**:**06**:0**C**:**01**

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7	00:25:B5:0**X**:0**7**:**C0**	20:0**1**:00:00:0**X**:0**7**:0**C**:0**0**	20:0**0**:00:00:0**X**:0**7**:0**C**:0**0**
	00:25:B5:0**X**:0**7**:**C1**		20:0**0**:00:00:0**X**:0**7**:0**C**:0**1**
8	00:25:B5:0**X**:0**8**:**C0**	20:0**1**:00:00:0**X**:0**8**:0**C**:0**0**	20:0**0**:00:00:0**X**:0**8**:0**C**:0**0**
	00:25:B5:0**X**:0**8**:**C1**		20:0**0**:00:00:0**X**:0**8**:0**C**:0**1**

Task 7 C-Series Boot Target Addresses All servers use “LUN 0” as their boot LUN.

Team/Pod	FC Int.	Boot Table Index #	LUN #	Boot Target WWPN
All	fc0	0	0	Pri 50:06:01:***64***:44:60:4C:90
	fc0	1	0	Sec 50:06:01:***6C***:44:60:4C:90
All	fc1	0	0	Pri 50:06:01:***65***:44:60:4C:90
	fc1	1	0	Sec 50:06:01:***6D***:44:60:4C:90

VSANs

vHBA Name	VSAN Number	Default VLAN (FCoE VLAN)
fc0	11	1011
fc1	12	1012

Task 8 VMware ESXi Configuration

Where **X**=Chassis#

Team/Pod	Hostname: C#-P#-S-OS	IP Address/Mask 10.20X.16.1T/24	Gateway 10.20C.110.254	VLAN
1	**C#**-P1-C-ESXi.ucseduc.com	10.20**X**.16.11 /24	10.20**X**.16.254	**X**16
2	**C#**-P2-C-ESXi.ucseduc.com	10.20**X**.16.12 /24	10.20**X**.16.254	**X**16
3	**C#**-P3-C-ESXi.ucseduc.com	10.20**X**.16.13 /24	10.20**X**.16.254	**X**16
4	**C#**-P4-C-ESXi.ucseduc.com	10.20**X**.16.14 /24	10.20**X**.16.254	**X**16
5	**C#**-P5-C-ESXi.ucseduc.com	10.20**X**.16.15 /24	10.20**X**.16.254	**X**16
6	**C#**-P6-C-ESXi.ucseduc.com	10.20**X**.16.16 /24	10.20**X**.16.254	**X**16
7	**C#**-P7-C-ESXi.ucseduc.com	10.20**X**.16.17 /24	10.20**X**.16.254	**X**16
8	**C#**-P8-C-ESXi.ucseduc.com	10.20**X**.16.18 /24	10.20**X**.16.254	**X**16

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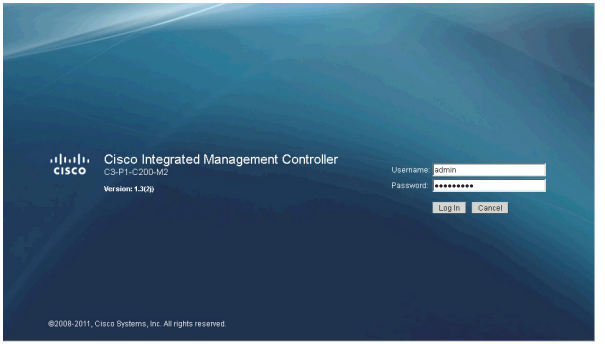
Task 1: Validate Cisco IMC BIOS Configuration

In this task, you will use the KVM console to enter the Cisco IMC BIOS and validate the configuration.

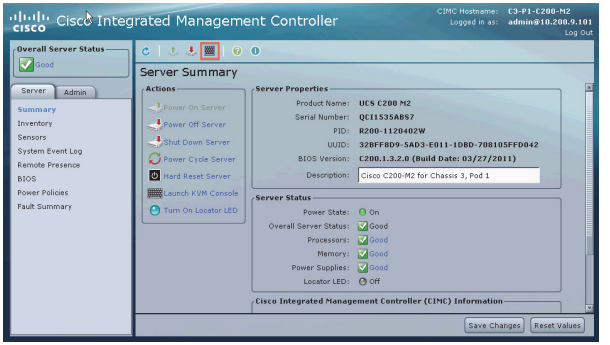
65. Browse to the Cisco IMC IP address of the C200 in your pod.

    http://10.20**X**.10.11T (where "**X**" is your chassis # and "**P**" is your Pod#)

66. Log in to the Cisco IMC by using the credentials **admin** and **NXos12345**.



67. From the summary page, click the Launch KVM Console link or the small keyboard icon directly above the words "Server Summary".



Note	The advantage of the small keyboard icon is that it is visible from any screen in the Cisco Integrated Management Controller interface.

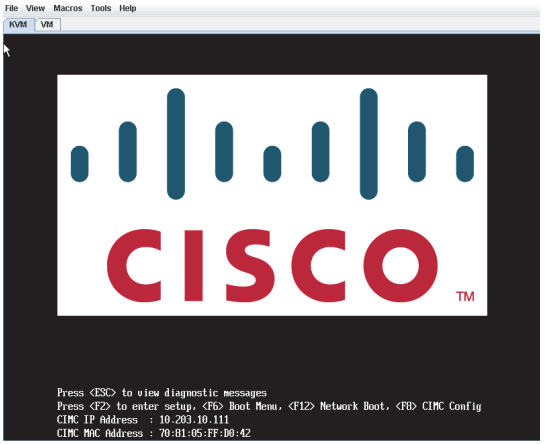
68. If prompted, click **OK** to open the Java VM that the KVM runs inside. You should see yellow text on a green background showing "No Signal". This is what displays when the

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server is powered down. If you see anything other than "No Signal", go to the Cisco Integrated Management Controller window and click the **Power Off Server** link icon (red down arrow) next to the small keyboard icon above the Actions area of the CIMC window.

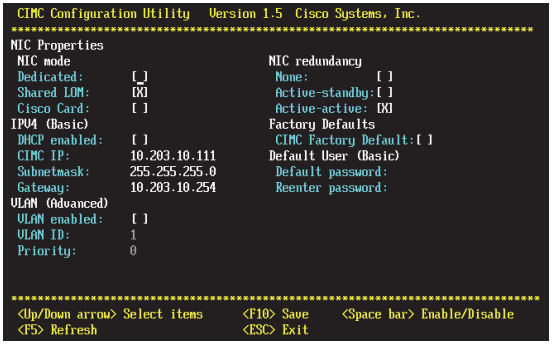
69. From the Cisco Integrated Management Controller (CIMC) summary screen, click the **Power On Server** link (green up arrow) next to the small keyboard icon above the Actions area of the CIMC window. Click **OK** when prompted to confirm powering on the server. Switch to the KVM console window and observe the server booting.

70. When the Cisco BIOS banner appears, press **F8** to enter the CIMC configuration Utility.



71. Verify the following settings:

- NIC mode **Share LOM** is selected.
- NIC redundancy **Active-active** is selected.
- DHCP is disabled (de-selected).
- CIMC IP, Subnetmask, and Gateway match the **Implementation Sheet**.



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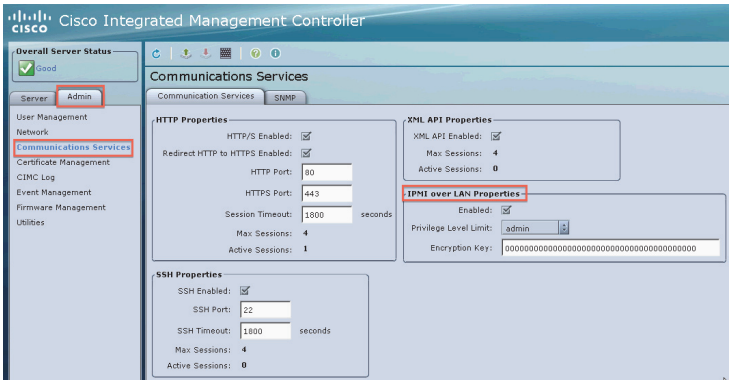
Note Do not make any changes to the Cisco IMC BIOS settings. To configure the Cisco IMC BIOS on a new, unconfigured server, you must plug a USB keyboard and VGA monitor directly into either the rear panel connectors or the front panel dongle.

72. Press **ESC** to exit the Cisco IMC BIOS. Once again, click the **Power Off Server** link from the CIMC window.

Task 2: Configure IPMI and SoL

In this task, you will use the Cisco IMC to configure IPMI and SoL.

73. From the **Admin tab** of the Cisco Integrated Management Controller window, click the **Communications Services** link.



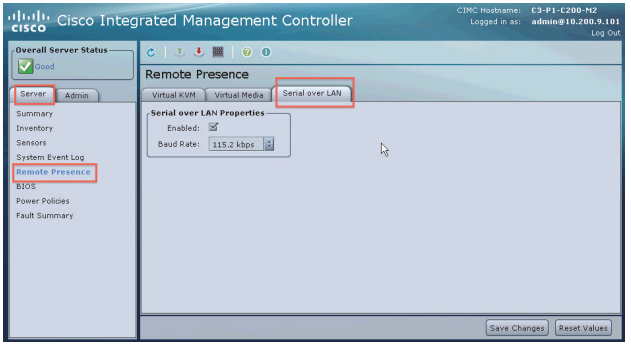
74. Verify under "IPMI over LAN Properties" that **Enabled** is selected. Most IPMI tools include the ability to encrypt IPMI management traffic. The value of the Encryption Key field must match the value that is used in your IPMI tool. For our class, all 0's is correct.

Note IPMI is enabled by default with Admin privileges and no encryption. Refer to the security policy of your organization for guidance on whether the IPMI setting should be changed or disabled altogether.

75. From the **Server** tab of CIMC window, click the **Remote Presence** link.

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76. In the content pane, click the **Serial over LAN** tab.

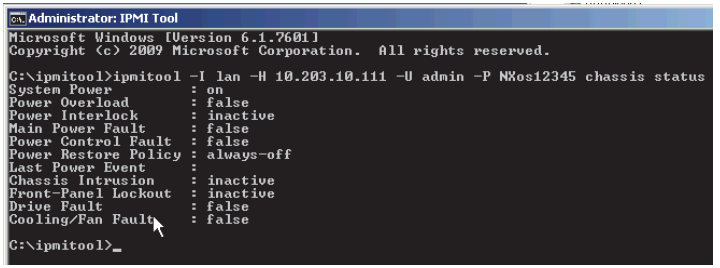


77. Check the **Enabled** check box to enable SoL.
78. If needed, set the serial baud rate to 115.2 kbs from the drop-down menu.
79. Click **Save Changes**.

Task 3: Use IPMI Tool to Access CIMC Data

In this task, you will use IPMI Tool to poll data from the CIMC.

80. Using your pod's Management Desktop navigate to **Start > All Programs > Class Utilities** and click on the **IPMI Tool** icon.
81. Enter (yes - case is important, mind the -I, LAN, -H) **ipmitool -I lan -H 10.20C.10.11P -U admin -P NXos12345 chassis status**.

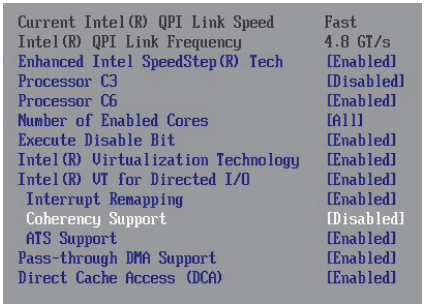


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Task 4: Configure Cisco UCS C-Series BIOS for Performance and Virtualization

In this task, you will configure C200 BIOS settings that will increase performance for VMware's ESXi.

82. From your Management Desktop navigate back to the CIMC window.
83. Open a remote KVM console session to your server. If you performed Step 8 in Task 1, you should see a green screen indicating that the server is powered off. You will press **F2** to force the server into the BIOS setup during boot up.
84. Click on **Summary** from under the **Server** tab in the navigation pane. Click the **Power On Server** link. If your server is already powered on click the **Power Cycle Server** option, this is not an available option (icon) above the Actions area.
85. When the Cisco BIOS screen appears, press **F2** to enter BIOS setup.
86. From the **Main** tab use the right-arrow key on your keyboard to move to the **Advanced** tab in BIOS setup.
87. Use the down-arrow key to highlight **Processor Configuration** then press **Enter**.
88. Validate that all of the changeable processor options except for "Processor C3" and "Coherency Support" are **Enabled**. Scroll down using your arrow keys if needed. If a value needs to be changed, press **Enter** and use the up- or down-arrow keys to make a selection.
89. If you make changes press **Enter** to commit the value.



90. Press **ESC** to return to the **Advanced** tab.
91. If you made changes to any of the BIOS settings, press **F10** to save and exit. This action will reboot your C200.
92. From the CIMC browser interface, power down the server.

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Task 5: Configure vNICs for the P81E VIC

In this task, you will create vNIC definitions for the **P81E** VIC.

93. From the CIMC window power on the server. If the server is powered down, you will not be able to configure the P81E VIC.
94. From the **Server** tab in the navigation pane, click the **Inventory** link.
95. In the content pane, choose the **Network Adapters** tab.

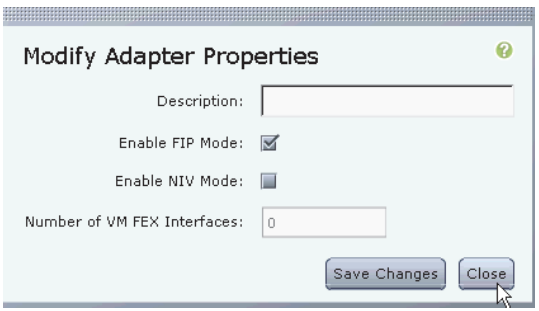


96. The **General** subtab displays information about installed NICs. It also displays part numbers and administrative status of the installed network adapters.

Note The addressing details in the graphics to follow are for illustration purposes only. Be sure to set your specific WWNN, WWPN, MAC address and VLAN values found on the **Implementation Sheet** at the beginning of this lab.

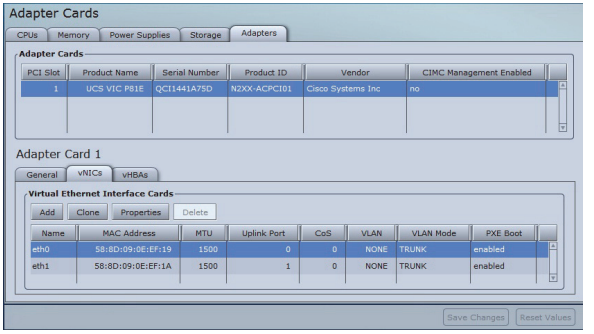
---

97. In the Actions panel under the **General** tab, click the **Modify Adapter Properties** link. If needed select the **Enable FIP Mode** check box and click the **Save Changes** button.

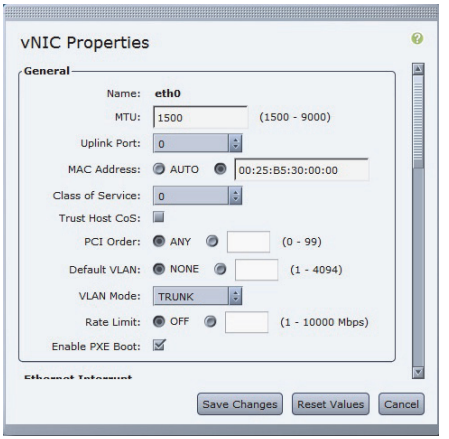


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98. Navigate to the **vNICS** subtab select eth1 or eth0 and then click **Properties** to configure the adapter.



99. Using the implementation sheet found at the beginning of this lab, configure an "eth0" and "eth1" interface using your pod-specific MAC address.



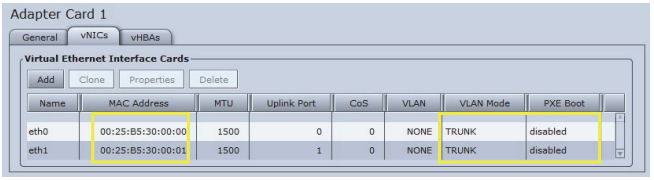
100. Validate that **VLAN Mode** is set to "Trunk", and disable **Enable PXE Boot** by unchecking the check box. The other default settings should be changed only to align with IT policy or to meet operating system-specific requirements.

101. Click **Save Changes** to commit the changes.

102. Repeat Steps 6 through 9 on interface **eth1**.

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103. Validate the changes in the vNICs section of the content pane.

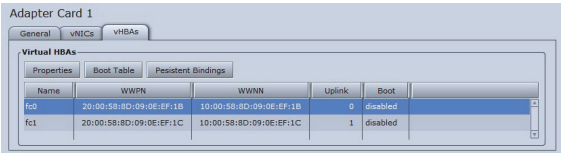


Task 6: Assign WWNs to the P81E VIC

In this task, you will create vHBA definitions for the P81E VIC.

Note The addressing details in the graphics to follow are for illustration purposes only. Be sure to set your specific WWNN, WWPN, MAC address and VLAN values found on the **Implementation Sheet** at the beginning of this lab.

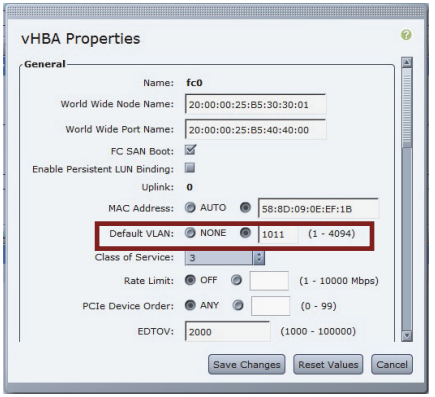
104. Click the **vHBAs** subtab and choose interface **fc0**.



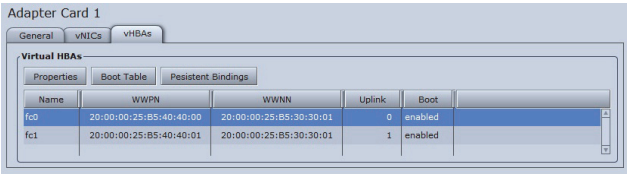
105. Click **Properties** to configure the Fibre Channel interface.
106. Refer to the implementation sheet and change the pod-specific WWNN and WWPN addresses. If these addresses are misconfigured, SAN boot will fail.
107. Click the **FC SAN Boot** check box to enable SAN boot on this interface.
108. Click the **default VLAN** for FCoE (fc0 1011 and fc1 1012).
109. The other default settings should be changed only to align with IT policy or to meet operating system-specific requirements.

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110. Click **Save Changes** to commit the change.



111. Repeat Steps 1 through 6 on interface **fc1** to configure the interface with your pod-specific WWNs.



112. Validate the changes in the vHBA section of the content pane.

Note A single WWNN represents the P81E CNA, but each vHBA port requires a unique WWPN.

The graphics used here are for illustration purposes only. Be sure to set your specific WWNN, WWPN, MAC address and VLAN values found on the **Implementation Sheet** at the beginning of this lab.

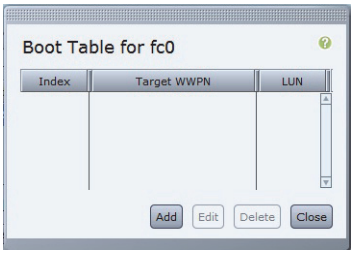
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Task 7: Configure a Fibre Channel Boot Target

In this task, you will configure the SAN boot target and verify the boot order.

113. Choose **interface fc0** and then click **Boot Table** option.

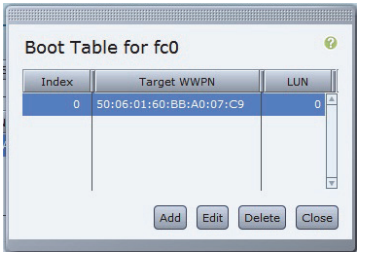


114. Click **Add** to add a SAN boot target.

115. Using values from the implementation sheet, enter the pod-specific boot target WWPN and LUN ID of 0, and then click **Add Boot Entry** to commit the change.



116. The new boot entry should appear in the Boot Table for interface fc0.



117. Click **Close** to finish.

118. Repeat Steps 1 through 5 for interface **fc1**, using the WWPN value and LUN ID for the secondary boot target as indicated in the implementation sheet.

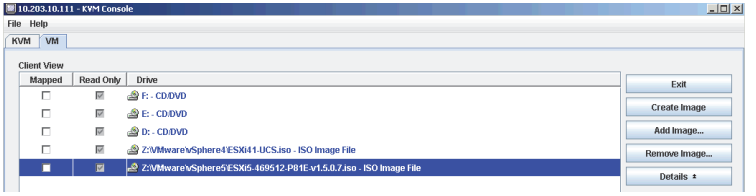
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119. From the **Server** tab in the **Navigation** pane, click the **Summary** link.
120. In the **Content** pane, choose the **Power Off Server** link and then click the **OK** button in the pop-up dialog box.

Task 8: Install VMware ESXi 5 on Fibre Channel LUN

In this task, you will validate your SAN configuration by installing and SAN-booting VMware ESXi 4.1.

121. Open a KVM window by clicking on the keyboard icon.
122. From the KVM console, click VM Tab to manage the virtual media.
123. From the VM tab, click **Add Image**. Navigate to (Look In:) the **Z:\VMware\vShpere5\ESXi5-469512-P81E-v1.5.0.7.iso** and click **Open**.



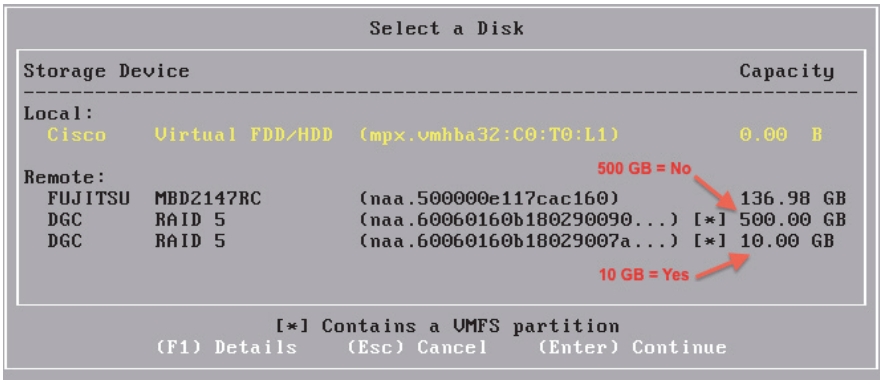
124. When the new drive appears, click the check box to its left, under the **Mapped** column. The ISO file will now appear as a physical DVD to the server. Do not close the "Virtual Media Session" or it will "disconnect" said virtual media.
125. From the Cisco IMC, click the Power On Server link to boot the server.
126. When the Cisco BIOS screen appears, press F6 to select the Boot Device.
127. Using your arrow keys, navigate down and select "Cisco Virtual CD/DVD 1/22".
128. In a couple of minutes, the VMware ESXi boot menu will appear. Either wait a few seconds for the installer to load automatically, or press the **Enter** key.
129. It will take about 2 minutes for the installer to load. Press the **Enter** key to begin installation.
130. On the EULA page, press the **F11** key to proceed.

Note	The graphics used here are for illustration purposes only. Be sure to set your Pod specific IP address values found on the Implementation Sheet at the beginning of this lab.

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131. At the Select a Disk screen, choose the **10 GB LUN**, highlighted in yellow.

Note	If you do not see the 500 GB **and** 10 GB LUNs, alert your instructor.

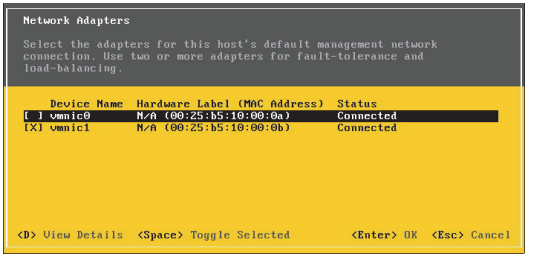


Note	The 500 GB LUN is VMFS shared storage for vMotion. **Do not choose the 500 GB LUN.**

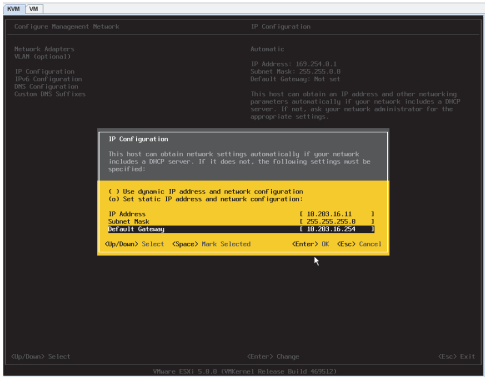
132. At the "Select a disk to install or upgrade" screen, press the **Enter** key.
133. Accept the default "US Default" keyboard layout.
134. Enter and confirm the **Root password:** as **NXos12345**.
135. At the next "Confirm Install" screen, press the **F11** key.
136. When the installation is complete, the installer prompts you to press the **Enter** key and remove installation media. Don't worry, the KVM Virtual Media automatically unmaps the ESXi ISO image for you.
137. In a few minutes, you should see the hypervisor loading. When the ESXi home screen appears, press the **F2** to (Customize System/View Logs) begin configuring the hypervisor, your newly installed ESXi host.
138. At the authentication screen, enter a password of **NXos12345** and press the **Enter** key.
139. If (because of a type-o in an earlier step) you need to use the **Change Password** option is selected by default on the "System Customization" screen. Press the **Enter** key to enter and confirm the password as **NXos12345** in the **New Password** and **Confirm Password** fields, and then press the **Enter** key. This action returns you to the System Customization screen.
140. Press the down-arrow key to choose the **Configure Management Network** option and then press the **Enter** key.

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141. Press the **Enter** key to select **Network Adapters**. Use the space bar key to choose both network adapters with the custom MAC addresses you set and then press the **Enter** key to return to System Configuration.



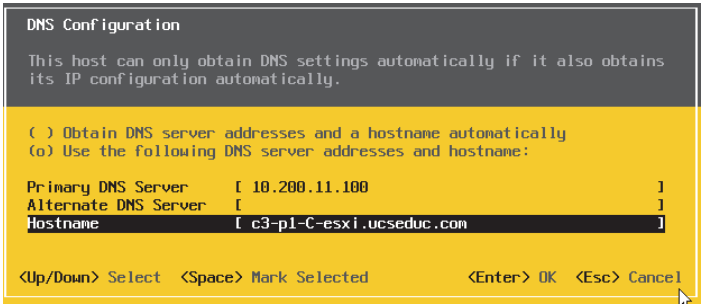
142. Press the down-arrow key to choose **VLAN (optional)** and press the **Enter** key. Enter the VLAN value from the lab **implementation sheet** and press the **Enter** key to return to System Configuration.
143. Press the down-arrow key to choose **IP Configuration** and press the **Enter** key.
144. Choose Set static IP address and network configuration: and press the spacebar to enable it.
145. Use the lab **implementation sheet** to enter your pod-specific IP address, subnet mask, and default gateway, and then press the **Enter** key to return to the Configure Management Network screen.



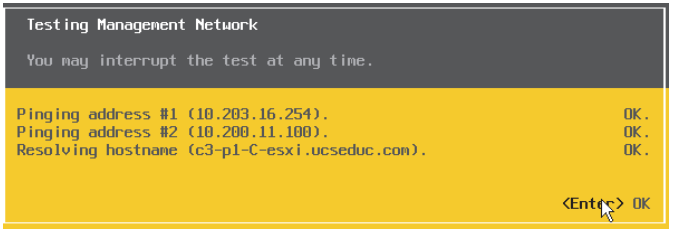
146. Press the down-arrow key to choose **DNS Configuration** and press the **Enter** key.

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147. Enter **10.200.11.100** as your primary DNS server. Use the down-arrow key to choose **Hostname**. Enter the pod-specific hostname from the lab **implementation sheet** and then press the **Enter** key to return to the "Configure Management Network" screen.



148. On the "Configure Management Network" screen, press the down-arrow and choose **Custom DNS Suffixes**, and then press **Enter**.
149. Enter in **ucseduc.com** in the "Suffixes:" field.
150. Press the **Esc** key to exit configuration of the management network.
151. Press the **Y** key to accept the management network configuration.
152. Press the down-arrow key to choose the **Test Management Network** element on the System Configuration screen.
153. On the Test Management Network screen, press the **Enter** key. You should see **OK** as the result code from pinging the default gateway, DNS server, and test resolution of the ESXi server hostname. If any of the tests fails, contact your instructor.



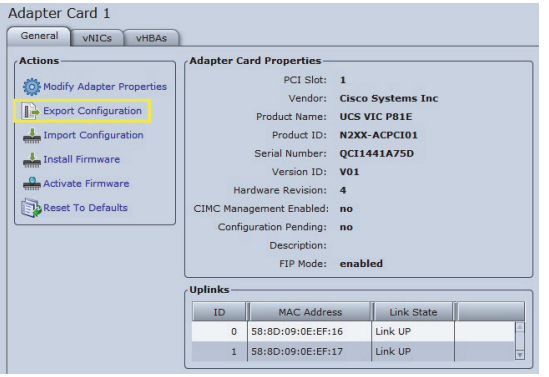
Task 9: Back Up and Restore the P81E Configuration

In this task, you will explore the backup and restore operations for the VIC configuration.

154. On your Management Desktop, verify that SolarWinds TFTP Server is running. If not, navigate to **Start > All Programs > Class Utilities** and click on "TFTP Server".
155. On the **Network Adapters** tab in the Inventory, choose the **General** subtab.

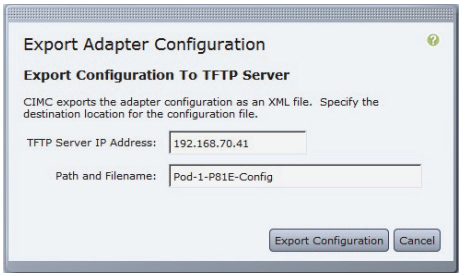
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156. In the Actions section of the content pane, click the **Export Configuration** link.



Note	The graphics used here are for illustration purposes only. Be sure to set your Pod specific IP address values found on the **Implementation Sheet** at the beginning of this lab.

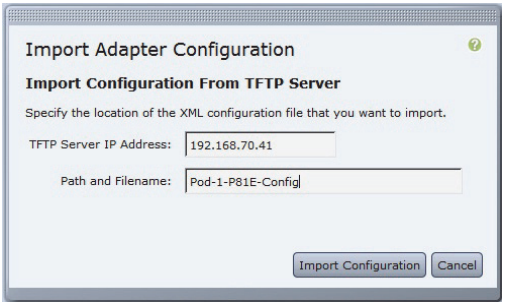
157. In the pop-up window, enter the IP address of your Management Desktop and the filename **Pod-P-P81E-Config** (where **P** is your pod number).



158. Click **Export Configuration** to start the transfer.
159. Another pop-up window should indicate "Export Successful." Click **Finish** to complete the operation.
160. To simulate the process of recovering from a deleted or corrupted adapter profile, click the **Reset to Defaults** link in the Actions panel.
161. Click **OK** in the pop-up that asks you to verify the operation.
162. Click the **vNICs** and **vHBAs** tabs to verify that the locally administered MAC addresses, WWNs, and boot table are back at their default values.

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163. Click the **Import Configuration** link in the Actions panel.
164. In the pop-up window, enter the IP address of the TFTP server and the filename for your pod.



165. Click **Import Configuration**.
166. Another pop-up window should alert you that the import was successful. Click **Finish** to complete the operation.
167. Click the **vNICs** and **vHBAs** tabs and verify that the configuration was restored, based on the addresses in the lab **Configuration Sheet**.

Activity Verification

You have completed this activity when you have achieved these goals:

- You have entered the Cisco IMC BIOS and validated the settings.
- You have configured IPMI and used IPMItool to successfully poll chassis status.
- You have configured SoL support.
- You have validated server BIOS settings for virtualization in performance.
- You have configured vNICs for the P81E and assigned WWNN and WWPNs.
- You have configured SAN boot target.
- You have successfully installed, configured, and SAN booted VMware ESXi.
- You have backed up and restored the P81E configuration from a TFTP server.

Lab Complete

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B

Appendix B

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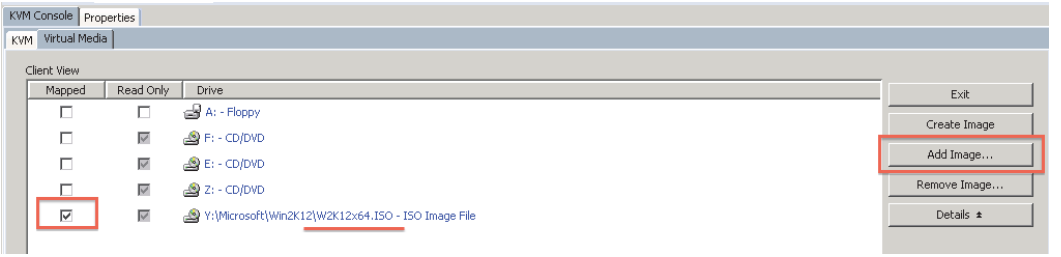
Appendix B: Contents

In this Appendix, you will find:

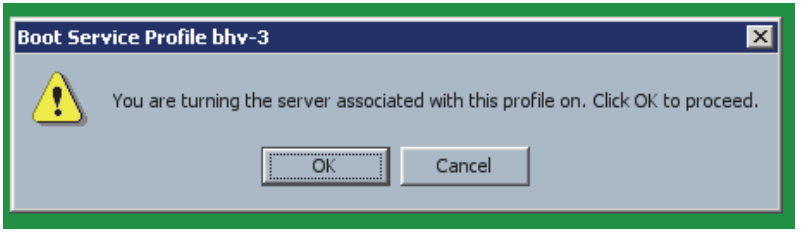
- Microsoft Hyper-V Server 2012
- vSphere v4.1 installation steps
- vSphere v5.1 installation steps

Task 2: Install Hyper-V Server 2012 (on Local disk)

1. Click on **Add Image…** and navigate to (Look in:) **Y:\Microsoft\ Win2K12**. Finally select the "**W2K12x64.iso**" file and click **Open**.
2. To make the ISO available to the blade server click to place a check in the "Mapped" check-box next to the newly added image.



3. Click the **Boot Server** button and click **OK** to confirm that you want to boot the server blade.



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4. Click the **KVM** tab to watch the boot process. When the Cisco logo appears press the **F6** key to enter into the boot selection menu.

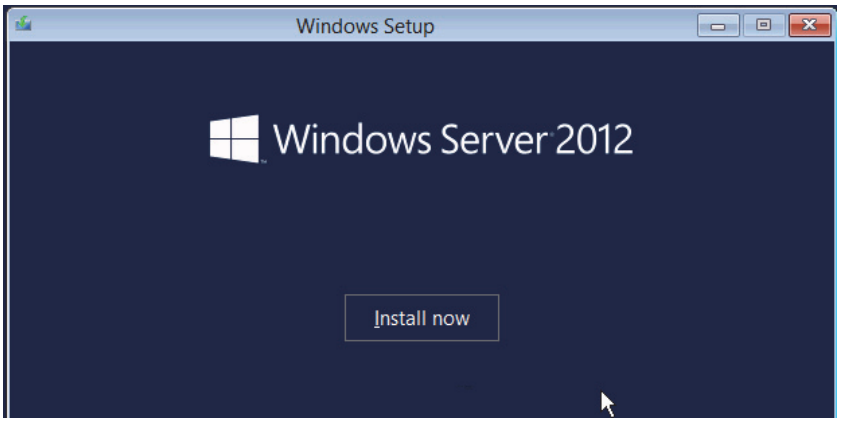


5. Here you will select the **Cisco Virtual CD/DVD 1.22** option to book from the newly mapped Hyper-V Install ISO.

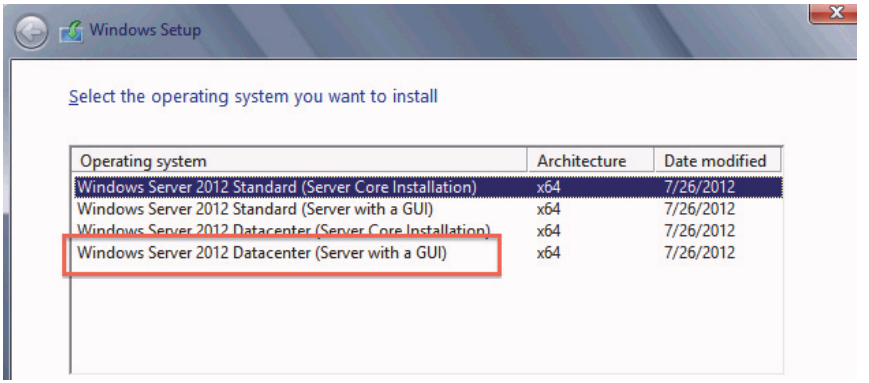


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6. At the initial "Install Windows" screen, select the defaults for Language, Time and Keyboard settings then click **Next** to continue. Lastly click **Install Now**.



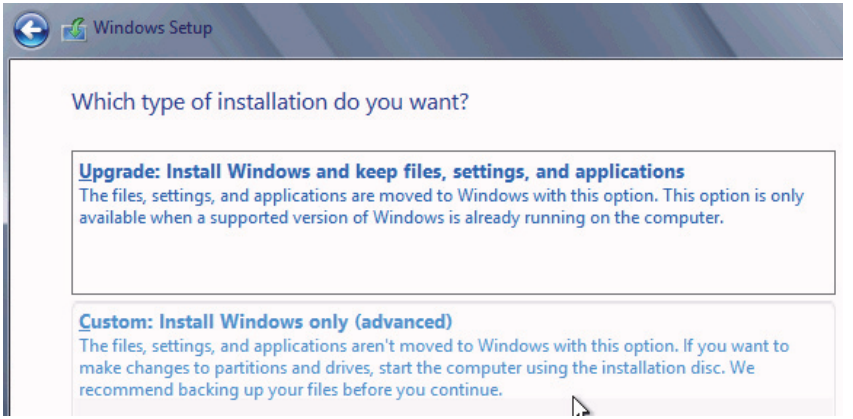
7. When prompted to "Select the operating system you want to install" click **Windows 2012 Datacenter (Server with a GUI)** and click **Next**.



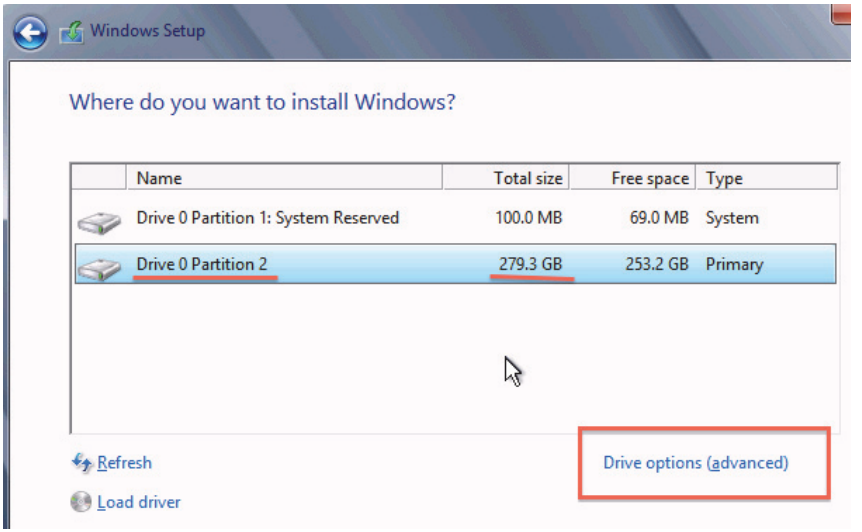
8. Click "I accept the license terms" and **Next** to continue.

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9. On the "Install Windows" screen, click **Custom: Install Windows Only (advanced)** to "Install a clean copy of Windows…"



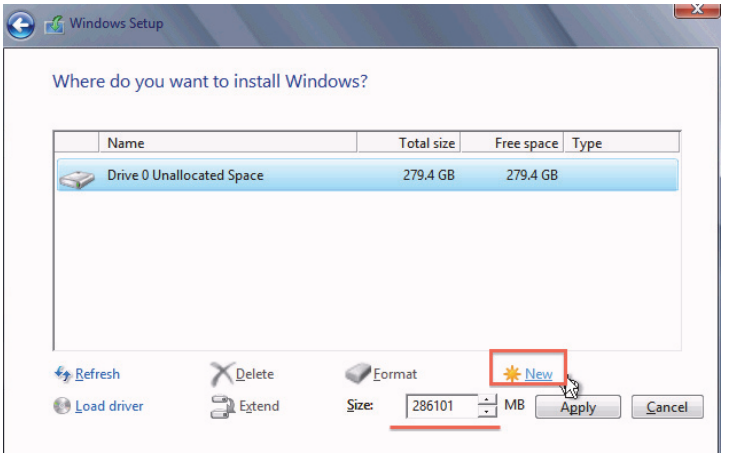
10. When asked "Where do you want to install Windows?" select your local disk, "**Disk 0 Partition 2**."



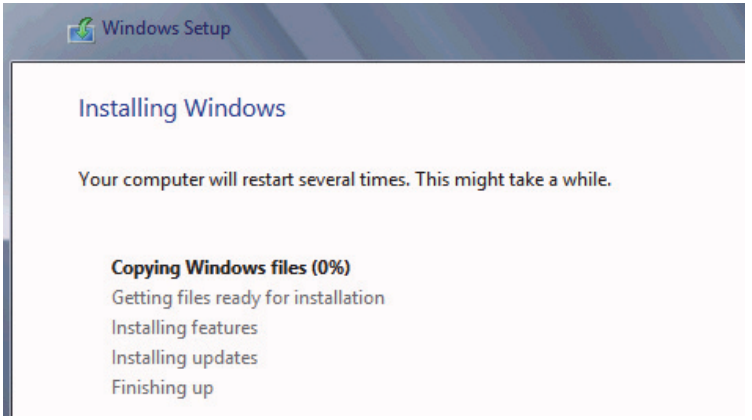
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11. Click **Drive Options (advanced)** and then **New** to create a new partition. Be sure to select the full amount of available space (ex. 286102 MB).

Note	If "**New**" is not an option this means Windows is already installed on the local drive. Instead you may need to "Delete," create a "New" partition and "Format" to continue.



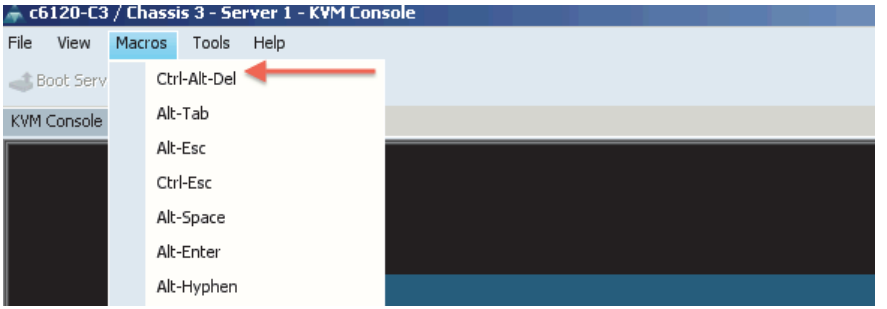
12. Wait patiently during the "Installing Windows…" process.
13. Ask your instructor of this would be a good time to continue with lecture or take a break.



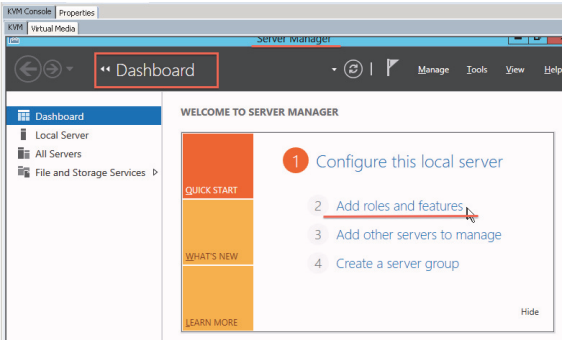
14. Once prompted to change the users password in the Settings dialog, set and confirm a password of **NXos12345**. Finalize the process by clicking **Finish**.

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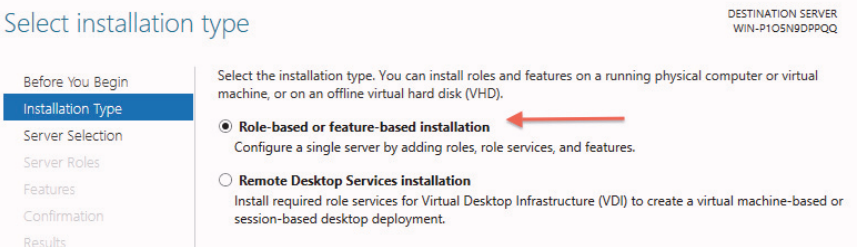
15. Once installation is complete and you're presented with the "Press Ctrl-Alt-Delete to sign in" click **Macros > Ctrl-Alt-Del** from the menu bar of the KVM window.



16. When prompted, login with **Administrator** and **NXos12345**.
17. In the Server Manager > Dashboard window, click **Add roles and features**.

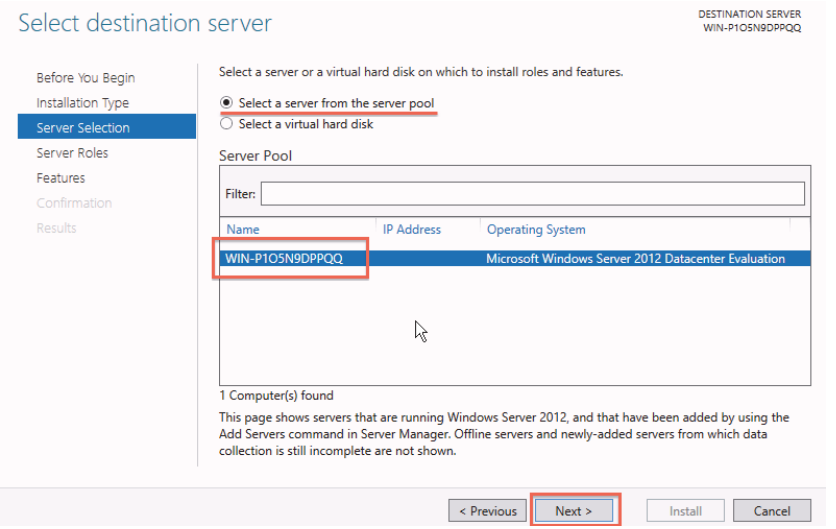


18. Once the "Add Roles and Features Wizard" begins click **Next** to continue.
19. Select "**Role-based or feature-based installation**" and click **Next** to continue.

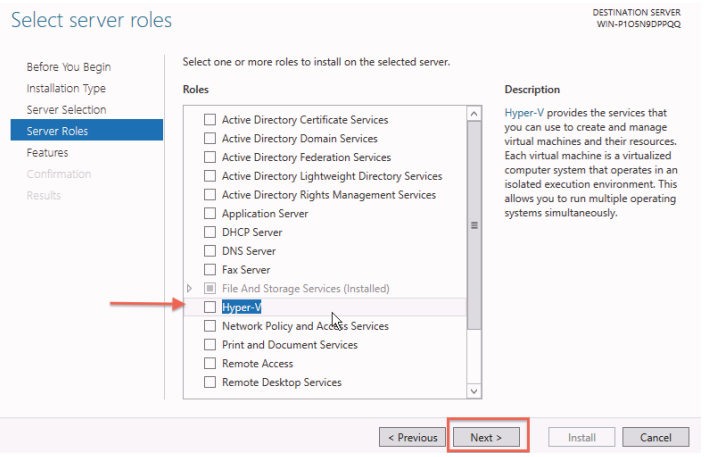


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20. On the "Select destination server" screen, click **Select a server from the server pool**, click your Hyper-V host and click **Next** to continue.



21. From the list of "Roles:" click **Hyper-V** and then **Next**.

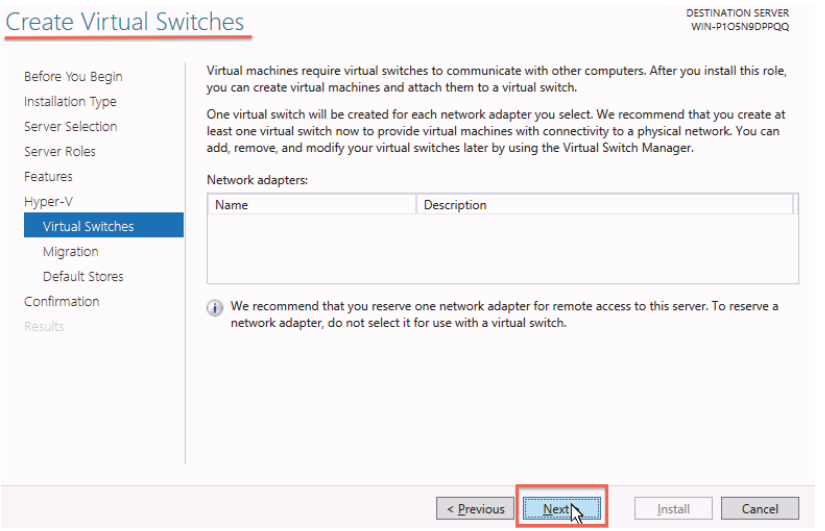


22. Click **Add Features** to acknowledge the additional features needed to complete the Hyper-V installation.

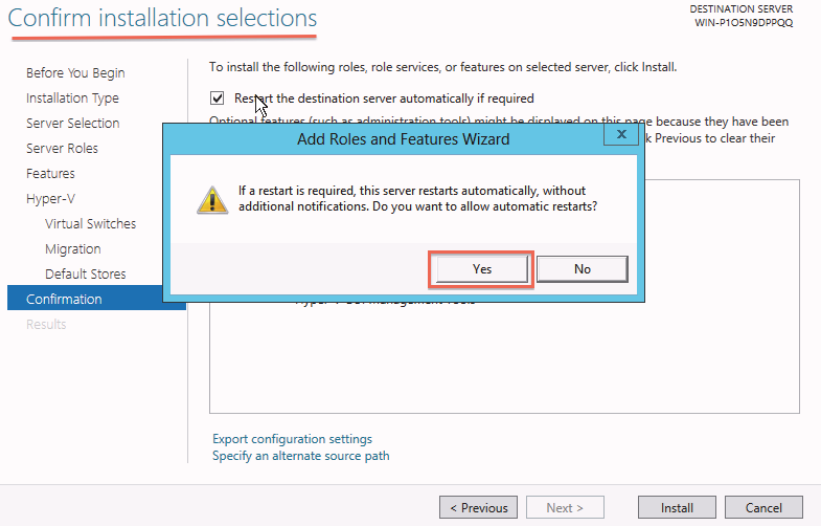
23. If interested, take a moment to read the Hyper-V "Description" paragraph to the right of the list of server roles and click **Next** to continue.

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24. Remember; the wizard started here was the "Add roles and features" wizard. Click **Next** to skip the installation of any "features" at this time.
25. Click **Next** on the "Create Virtual Switches" and "Virtual Machine Migration" dialogs to skip these advanced configuration options at this time.

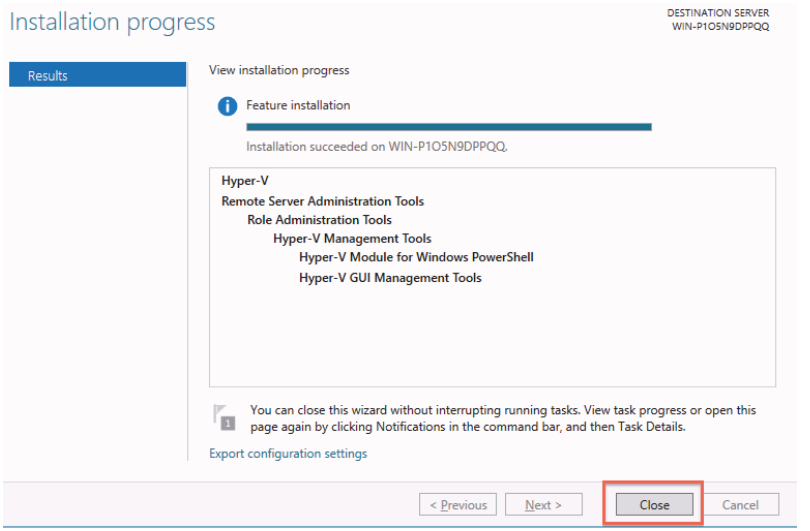


26. Click **Next** to accept the default location for the "Default Stores" settings.
27. Click **Yes** to accept automatic restart of the host to install this new role.



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28. Finalize the role installation by clicking **Install**.
29. Once the installation is complete click **Close**.



Task 3: Installing the necessary drivers

In order to fully use our available hardware we need to install Windows specific drivers for our B200-M2 server blade. These drivers can be obtained from Cisco and are specific to your blade model and installed adapters.

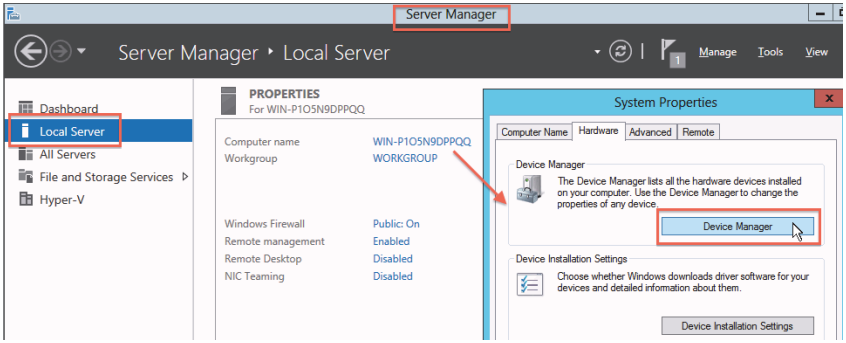
30. We start by mounting the drivers ISO downloaded from Cisco as a virtual CD-ROM attached to the server. Repeat **Steps 1 & 2** to open your "Virtual Media Session" manager and mount the **Z:\Windows\ucs-bxxx-OSDRIVERS.2.0.1f.iso**.

Note	You may need to un-map the existing Windows Server 2012 installer ISO used in the previous step to install Hyper-V.

31. In the "Server Manager" interface click on **Local Server**, then right-click on your hosts "Computer Name." From the drop-down menu click **Properties**.

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32. Navigate to the “Hardware” tab and click **Device Manager**.



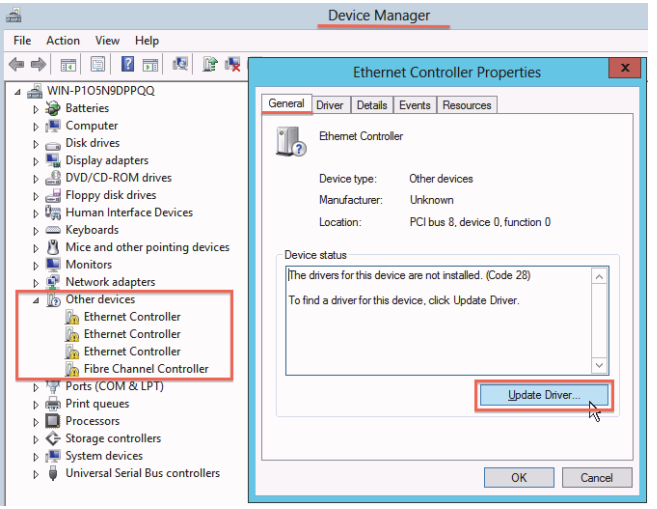
Note	You should have a minimum of 4 hardware entries under "Other devices." These are the 3 x vNICs and 1 x vHBA given to the Hyper-V host through its Service Profile.

33. Double click each entry and from the **General** tab click once on **Update Drivers...**

Note	Once your W2K12 Hyper-V server is installed, the Hyper-V role added and your system is rebooted it is now time to configure network connectivity and create virtual machines.

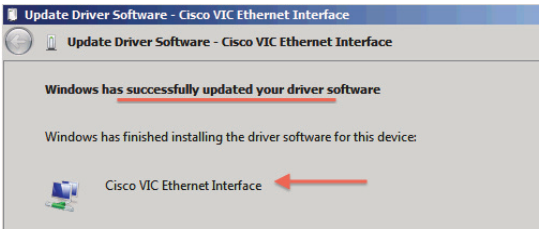
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34. Once Device Manager opens, navigate down to "Other Devices." Notice how there are, at minimum 3 "Ethernet Controller" entries and 1 "Fibre Channel Controller" listed. These are the 3 vNICS and 1 vHBA created in the Service Profile of this blade. Double click on each Ethernet Controller and click **Update Driver**.



35. Click **Browse my computer for driver software** and type **E:\Windows** in the search path. Click **Next** to continue.

36. Once the driver was "…successfully updated" click **Close** in the "Update Driver Software" dialog and **Close** again in the "Ethernet Controller Properties" dialog.



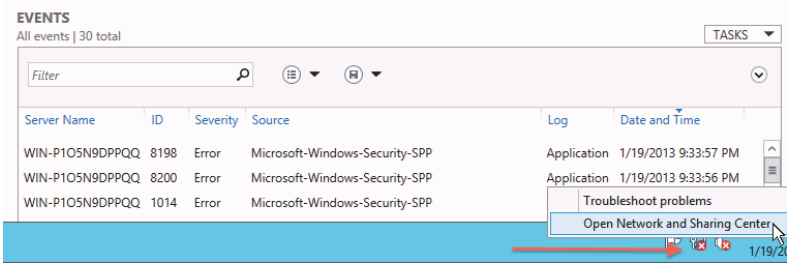
37. Repeat the last three steps for the remaining "Ethernet Controllers" and "Fibre Channel Controller."

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38. Once you've completed the update drivers process notice how the devices previously listed under "Other devices" now appear in the proper category and are ready for use.



39. Now that drivers for the vNICs have been installed, let's configure network connectivity. Right-click on "Network Connection status" icon in your System Tray (bottom right-hand corner of the screen) and select **Open Network and Sharing Center**.

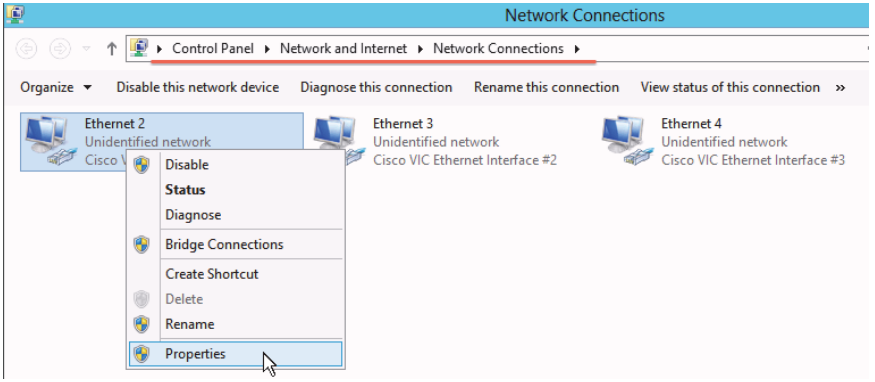


40. Click on **Change Adapter Settings** to see a list of your 3 installed vNICs.

    Remember: **X** = Chassis # and **P** = Pod #. The order of the NICs listed here corresponds to the order they were defined in the Service Profile; **nicMgmt** (carrying VLAN **X**10), **nicCluster** (carrying VLAN **X**16) and **nicData** (carrying Pod**P**-Data1 = VLAN **XP**1 & Pod**P**-Data2 = VLAN **XP**2).

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41. Right-Click on the first listed “Local Area Connection…” and select **Properties**.



42. Select “Internet Protocol Version 4 (TCP/IPv4)” and click **Properties**.

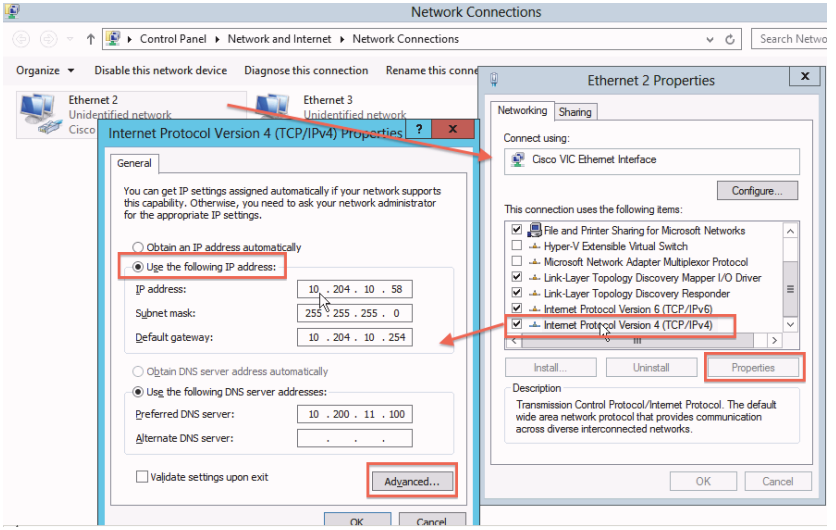
43. Click “Use the following IP address” and set the IP Address parameters to the value listed in the table below. Ex. 10.20**X**.16.5**P**/24. Click **OK** and then **Close** when finished.

    See image below.

    X = Chassis number & **P** = Pod number

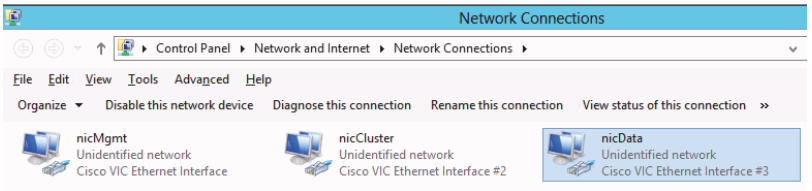
Pod	nicMgmt	nicCluster	nicData
1	10.20**X**.10.5**P**	10.20**X**.16.5**P**	NA
2	10.20**X**.10.5**P**	10.20**X**.16.5**P**	NA
3	10.20**X**.10.5**P**	10.20**X**.16.5**P**	NA
4	10.20**X**.10.5**P**	10.20**X**.16.5**P**	NA
5	10.20**X**.10.5**P**	10.20**X**.16.5**P**	NA
6	10.20**X**.10.5**P**	10.20**X**.16.5**P**	NA
7	10.20**X**.10.5**P**	10.20**X**.16.5**P**	NA
8	10.20**X**.10.5**P**	10.20**X**.16.5**P**	NA
	• Subnet mask: 255.255.255.0 • Default Gateway: 10.20**X**.10.254 • DNS server: 10.200.11.100 • DNS suffix: **ucseduc.com** Under Advanced > DNS	• Subnet mask: 255.255.255.0 • Default Gateway: Leave Blank	

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44. Finally, right-click on your Local Area Connection again and click **Rename**. Enter in the name of your specific NIC per the title of the columns in the table above. Ex. **nicMgmt.**

45. To configure the remaining NICs, repeat steps 86 – 89 for **nicCluster** and **nicData**.



46. Using the **ipconfig /all** command from a command prompt, examine the details of individual NICs. Use the table provided here to collect the information about the NICs that are available.

Microsoft Windows 2012 Hyper-V NICs

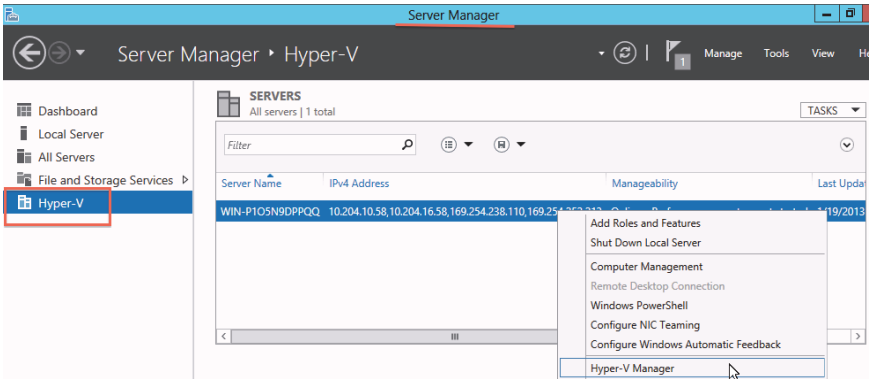
Name	Status	Device Name	Service Profile NIC	MAC Address

47. Be sure to confirm the NICs identity by looking at their MAC addresses. These would be the individual MAC addresses defined in the service profile.

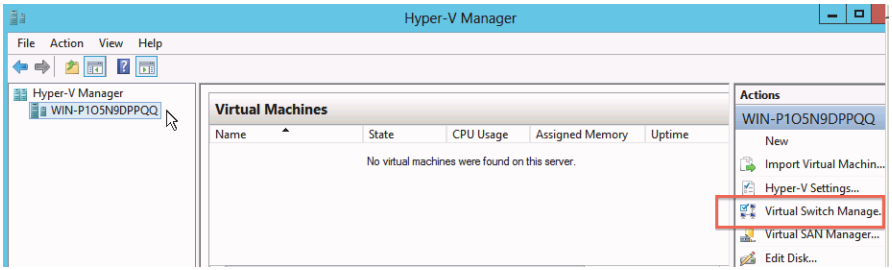
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48. Next we will investigate the Hyper-V role settings and create/manage virtual machines. Start by returning to **Server Manager** and click **Hyper-V** in the left column.

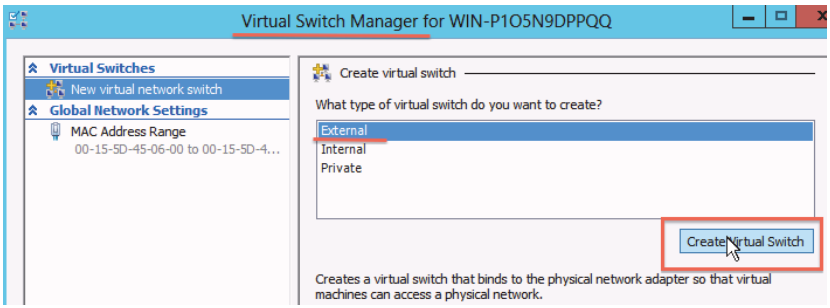
49. Right-click on your host listed in the center and click **Hyper-V Manager**.



50. Here we will configure the Hyper-V virtual network settings. Start by selecting the **Virtual Switch Manager** option in the "Actions" pane to the far right.

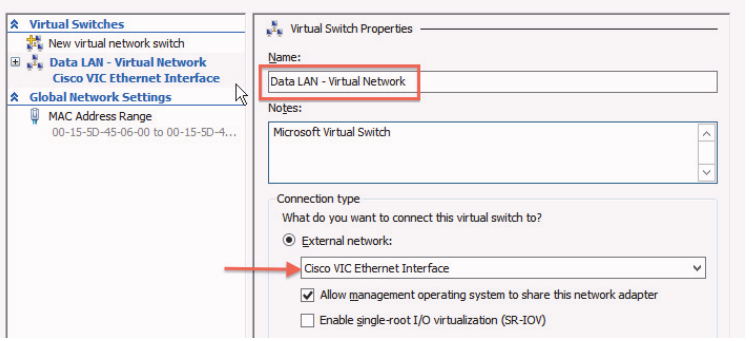


51. Select **External** as the "…type of virtual network" and then click **Add**.



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52. Name your new virtual network “Data LAN – Virtual Network” and ensure the “Connection type” is External with “Cisco VIC Ethernet Interface” selected as depicted in the graphic below.



53. Click **OK** and **Yes** to finalize the new virtual network settings.

Note	If you do not see the **OK**, **Cancel** & **Apply** options at the bottom of this dialog, you may need to increase the resolution of **both** your Management Desktop and Hyper-V host KVM window.

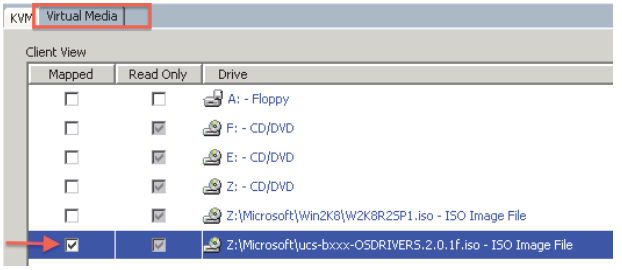
Task 4: Creating Running Hyper-V-Hosted Virtual Machines

Now that the Hyper-V role is installed, we need to create virtual machines.

Note	For performance reasons, create one virtual machine at a time before moving on to the next virtual machine.

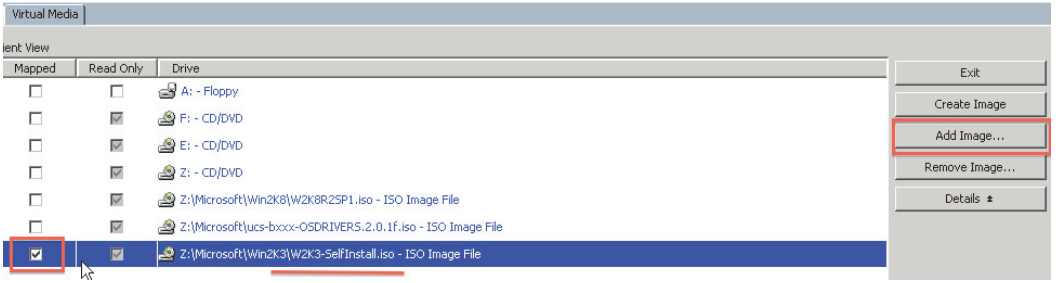
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54. To prepare your host for the new virtual machines we need to make available the Guest Operating System used during installation. Click on the Virtual Media tab in the Hyper-V host KVM window.



55. Click once to remove the check mark next to the previously used UCS Drivers ISO. This will unmap the virtual media. Click **Yes** to confirm the umapping.

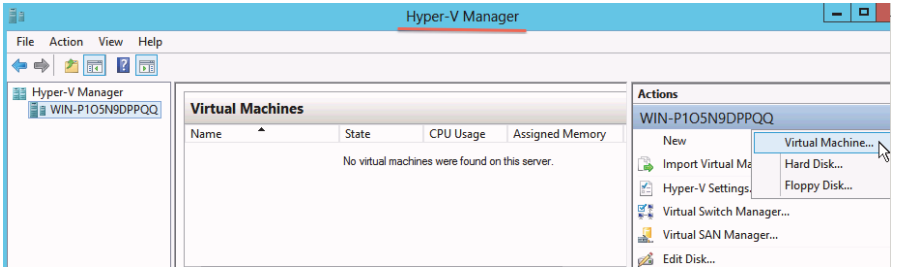
56. To add a new virtual media image click Add Image... and navigate to **Z:\Windows\Win2K3\W2K3-SelfInstall.iso**. Finalize the process by adding a check mark in the mapped column next to the newly added image.



57. Next, click on the **KVM** tab and close the new "AutoPlay" dialog. Now you can continue with the virtual machine creation process.

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58. From within "Hyper-V Manager", click on **New > Virtual Machine…** in the upper right-hand corner.



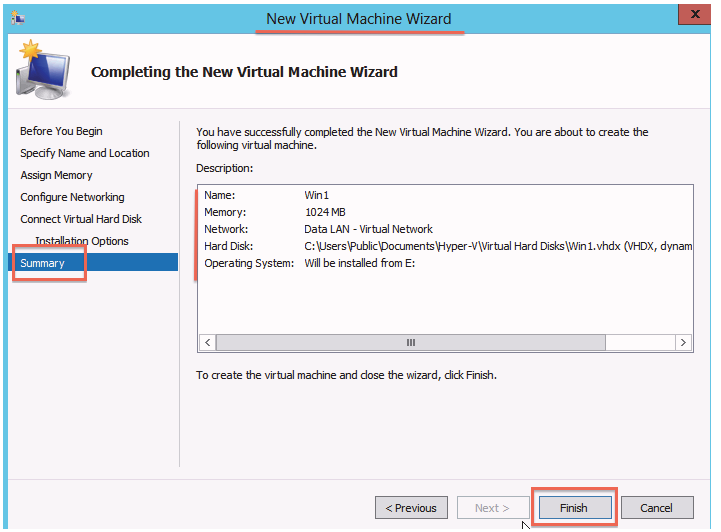
59. Use the "New Virtual Machine wizard" to create the following VMs. Pay close attention to the virtual machine settings defined throughout the table below. Click **Next** after each setting, once the settings are confirmed, click **Finish**.

See image below.

VM Name	Memory (MB)	Connection:	VHD size (GB)
Win1	1024	Data LAN - Virtual Network	10
Win2	1024	Data LAN - Virtual Network	10

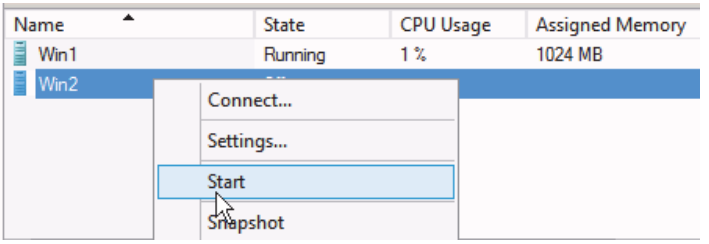
Additional details needed to define virtual machines:

- "Install an operating system from a boot CD/DVD-ROM"
- Select "Physical CD/DVD drive:" and click **E:**
- The default Self Install password for thie ISO is "vmware." Change to **NXos12345**



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60. Right-click the individual VM and choose the **Start** option from the menu. Repeat the process for each VM individually. The "Self Install" ISO, defined during VM creation process, will perform an unattended install of Windows 2003 Enterprise with SP2.



Note	For performance reasons, create one virtual machine at a time before moving on to the next virtual machine.

61. Now **return to Lab 5, Task 4, Step 110** to complete the UCS Manager Service Profile reconfiguration.

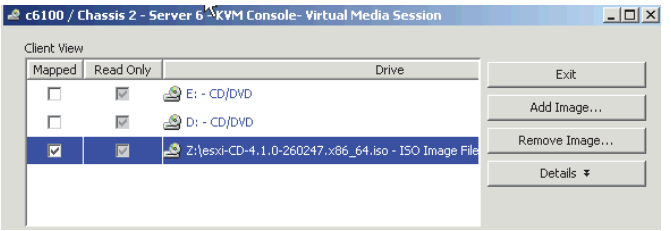
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Install VMware ESXi v4.1

In this task, you will validate your Service Profile configuration by installing and SAN booting VMware ESXi.

62. On the **Servers** tab in the Navigation pane, locate and click on your service profile.
63. In the Content pane (to the right) and on the **General** tab click the **KVM Console** link to open a KVM window.
64. In the KVM console, click the **Virtual Media** tab.
65. When the Virtual Media dialog box opens, click the **Add Image** button. Navigate to (Look in:) **Z:\VMware\vSphere4** and choose the **esxi-CD-4.1.0-260247.x86_64.iso** file and click **Open**.
66. When the new virtual device appears, click the check box under the **Mapped** column. The ISO file now appears as an available CD/DVD drive to the server.

Note Remember to leave the "Virtual Media Session" window open. Closing it will un-map your virtual media.



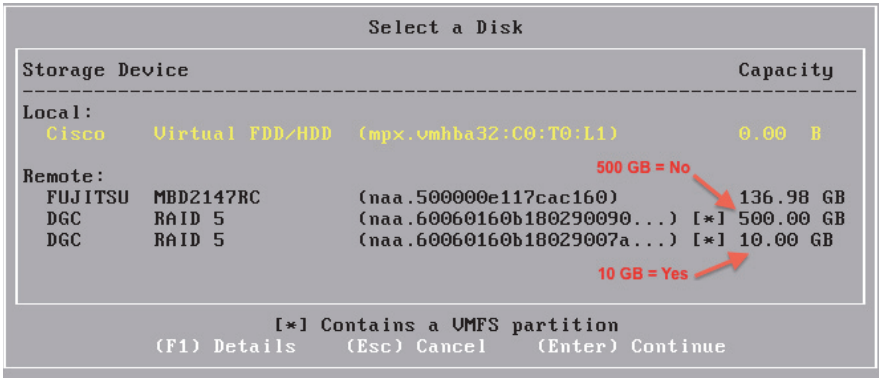
67. In the Actions panel of the UCS manager content pane, click the **Boot Server** link to boot the server.
68. When the Cisco BIOS screen appears, press the **Esc** key to enable viewing POST messages.
69. In about 2 minutes, the VMware ESXi boot menu will appear. You can either wait 6 seconds for the installer to load automatically, or press the **Enter** key.
70. The installer will take about 2 minutes to load. Press the **Enter** key to begin installation.
71. On the EULA page, press the **F11** key to proceed.

Note In the following "Storage Device" list, the 500 GB LUN is a VMFS shared datastore for vMotion. If listed **do not** choose the 500 GB LUN.

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72. At the "Select a Disk" screen, be sure to select your **Remote, DGC, RAID 5, 10G** LUN.



Note If you wanted to install to the local disk (ex. above 136GB Fujitsu) you will have to modify the Service Profile to include the local disk as a boot option. Be sure to go back to Task 2, Steps 32 - 39 and select **Add Local Disk** under Local Devices. Keep in mind that you may only have a Local Disk **or** SAN boot policy for a Service Profile. Not both.

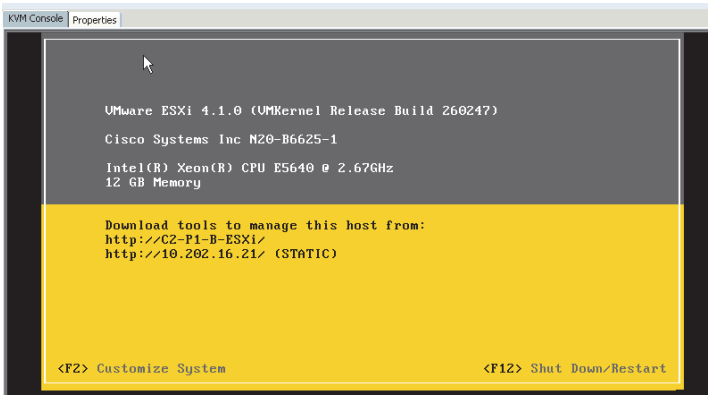
73. If there is an existing partition from a previous install, press the **Enter** key to confirm overwriting the existing partition.
74. At the Confirm Install screen, press the **F11** key.
75. When the installation is complete, the installer prompts you to press the **Enter** key and remove installation media. Once you press the Enter key, the KVM Virtual Media automatically un-maps the ESXi ISO image.
76. In about 3 minutes, you should see the hypervisor loading. When the ESXi home screen appears, press **F2** to begin configuring the hypervisor.
77. At the authentication screen, press the **Enter** key. The password is initially null for the root user.
78. The **Change Password** element is selected on the **System Configuration** screen.
79. Press the **Enter** key to change the default password. Enter **NXos12345** in the New Password and Confirm Password fields and then press the **Enter** key. This action will return you to the System Configuration screen
80. Press the down-arrow key to choose the **Configure Management Network** element and then press the **Enter** key.
81. Choose **Network Adapters** and press the **Enter** key. Use the spacebar to choose **both** network adapters and then press the **Enter** key to return to System Configuration.

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82. Press the down-arrow key to choose **VLAN (optional)** and press the **Enter** key. Enter the VLAN value (ex. 216) from the lab **implementation sheet** and press the **Enter** key to return to System Configuration.
83. Press the **down**-arrow key to choose **IP Configuration** and press the **Enter** key.
84. Press the down-arrow key to choose **Set Static IP Address and Network Configuration** and press the spacebar to enable that option.
85. Use the lab **implementation sheet** to enter your pod-specific IP address, subnet mask, and default gateway, and then press the **Enter** key to return to the Configure Management Network screen.
86. Press the down-arrow key to choose **DNS Configuration** and press the **Enter** key.
87. Enter **10.200.11.100** as your primary DNS server. Use the down-arrow key to choose Hostname. Enter the pod-specific hostname from the lab **implementation sheet**, and then press the **Enter** key to return to the Configure Management Network screen.
88. Press the down-arrow once again to **Custom DNS Suffixes** and press **Enter**. Enter in **ucseduc.com** in the **Suffixes:** field and press **Enter** to finalize the settings.
89. Press the **Esc** key to exit configuration of the management network.
90. Press the **Y** key to accept the changes and restart the management network.
91. Press the down-arrow key to choose the **Test Management Network** element on the System Configuration screen.
92. On the Test Management Network screen, press the **Enter** key. You should see OK as the result code from pinging the default gateway, DNS server, and test resolution of the ESXi server hostname. If any of the tests fails, contact your instructor.
93. Once the Management Network tests are complete press **Enter** to exit back to the System Customization screen.
94. Press **Esc** one last time to logout of the Direct Console User Interface (aka the DCUI).

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95. Once properly configured, your ESXi host login screen should resemble the figure below.



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Lab 5: Create a Data-Center Cluster in VMware vCenter Implementation Sheet

Note The Task numbers below correspond to the Tasks where you will later use this information in the lab.

Task 2 Create a New Datacenter and Add ESXi Hosts and VMs

Where **X** = Chassis #

Pod	Data Center	B200-M2 Host	vCenter Server
1	DC1	**CX**-P1-B-ESXi.ucseduc.com	vCenter**CX**P1
2	DC2	**CX**-P2-B-ESXi.ucseduc.com	vCenter**CX**P2
3	DC3	**CX**-P3-B-ESXi.ucseduc.com	vCenter**CX**P3
4	DC4	**CX**-P4-B-ESXi.ucseduc.com	vCenter**CX**P4
5	DC5	**CX**-P5-B-ESXi.ucseduc.com	vCenter**CX**P5
6	DC6	**CX**-P6-B-ESXi.ucseduc.com	vCenter**CX**P6
7	DC7	**CX**-P7-B-ESXi.ucseduc.com	vCenter**CX**P7
8	DC8	**CX**-P8-B-ESXi.ucseduc.com	vCenter**CX**P8

Task 5 Configure vSwitch and Test vMotion

Where **X** = Chassis #

Pod	vCenter Server	Data Center	Host Management	vMotion	VMTraffic
1	vCenter**CX**P1	DC1	**X**16	**X**14	**X**18
2	vCenter**CX**P2	DC2	**X**16	**X**14	**X**18
3	vCenter**CX**P3	DC3	**X**16	**X**14	**X**18
4	vCenter**CX**P4	DC4	**X**16	**X**14	**X**18
5	vCenter**CX**P5	DC5	**X**16	**X**14	**X**18
6	vCenter**CX**P6	DC6	**X**16	**X**14	**X**18
7	vCenter**CX**P7	DC5	**X**16	**X**14	**X**18
8	vCenter**CX**P8	DC6	**X**16	**X**14	**X**18

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Task 1: Install VMware's vSphere Client and vCenter Server

In the task, you will do a default installation of VMware's vSphere Client and vCenter Server onto your Management Desktop.

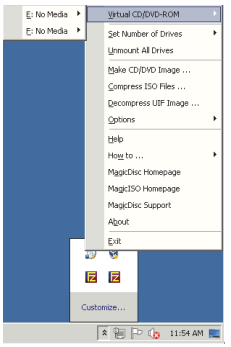
Note Here you must install the vCenter Server and vSphere Client specific to your ESXi installation. If you installed ESXi v4.1 in lab 4 (Task 5, Step 104) then you will continue with these steps as listed. If you opted to install ESXi v5 then you will install a compatible version of vCenter Server and vSphere Client below.

96. Using MagicDisk, we will mount the VMware Install Manager that includes, among other items, the vCenter Server and vSphere Client.

    96.1. MagicDisk should already be loaded and in the System Tray (bottom right-hand corner of your desktop). If not, click on MagicDisk in the Quick Launch toolbar.

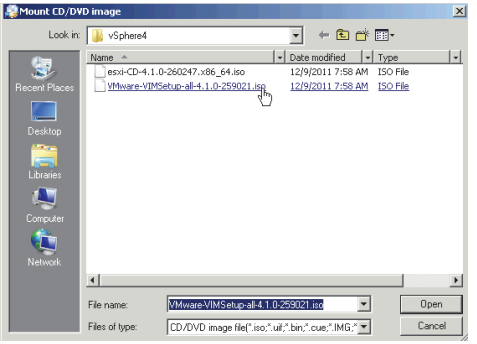


    96.2. Locate and right-click on the MagicDisk icon in the System Tray (bottom right-hand corner of your desktop). Select **Virtual CD/DVD-ROM>E: No Media>Mount**.



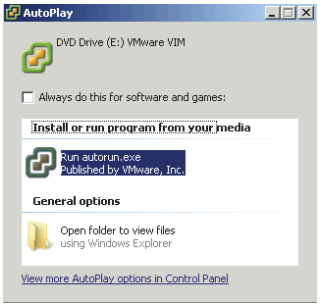
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96.3. Navigate to **Computer > (\\VBOXSVR) (Z:): > \VMware\vSphere4** and select the **VMware-VIMSetup-all-4.1.0-259021.iso** file.



Note To install vCenter Server and vSphere client v5 navigate to the following path and file **Z:\VMware\vSphere5\Mware-VIMsetup-all-5.0.0-456005.iso**. When using vSphere v5 your screen shots will vary. Ask your instructor if you need guidance during the installation.

96.4. Once the .iso is mounted AutoRun.exe should automatically present an "Install or run…" list of options. Click on "**Run autorun.exe…**".



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96.5. Next you will see the "VMware Install Manager" screen with install options. Click on **vCenter Server** under "VMware Product Installers".



96.6. Accept all default values during the installation. Agree to the "terms of the license agreement" and use "**GK Student**" and "**UCS**" in the "Customer Information" fields.

Note There are two potential snags you may encounter during installations;

If your vCenter Server installation fails to complete due to a communications error with the local Domain controller(s) simply remove your "Team Desktop" from its current Domain and add it to the Workgroup with the same name as the original Domain. Steps for this process can be found in Appendix A.

If your vCenter Server installation fails to complete due to detecting a conflicting Web Server (such as IIS) right-click on **Computer** and navigate to **Manage > Roles**. Under the **Web Servers (IIS) > Role Services** section, click on "Remove Role Services" to the right. Accept all defaults to fully remove the Web Server service.

---

97. Only if you do not have the vSphere Client already installed on your Management Desktop will you navigate back to the "VMware Install Manager" screen (listed in Step 1.5) and click on the **vSphere Client** option. Accept all default values during the installation and use **GK Student** and **UCS** in the "Customer Information" fields.

Note If a version of vSphere Client is already present on your Management Desktop this would be a version compatible with vSphere 4.1, **not** vSphere 5. If you decided to conduct these labs using vSphere v5 you must install the vSphere Client for version 5.

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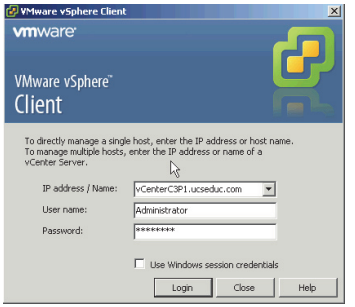
98. Finally, we will install vCenter Update Manager (affectionately known as VUM). Once again navigate to the "VMware Install Manager" screen (listed in Step 1e) and click on **vCenter Update Manager**.
99. Reference your vCenter Server by the DNS name listed in the **implementation sheet** (ex. vCenterC2P7). When prompted for vCenter Server credentials, use a username of **Administrator** and password of **cisco123**. Click **Next** to continue.
100. As before, accept all default value during the installation and select **Install a Microsoft SQL Server 2005 Express...** option under Database options. Click **Next** to continue and **Yes** to delete the existing database.
101. On the "VMware vCenter Update Manager Port Settings" page, click the down-arrow and select **vcenter** as "…how this VMware vCenter Update Manager should be identified…". Click **Next** to continue accepting all remaining default options.
102. While this application is installing, move on to Task 2. Once complete you can finally close the VMware Install Manager window.
103. As one final check, let's verify the status of the services needed by your vCenter Server. On the Management Desktop, right-click **Computer** and then click **Manage**.
104. Click the plus symbol (+) next to **Configuration** and then click **Services**.
105. In the Services list to the right, verify that the **VMware vCenter Update Manager, VMware VirtualCenter Management Webservices**, and **VMware VirtualCenter Server** services are running. If not, you might need to manually start them.
106. Once the above services and state have been verified you can close the Server Manager.

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Task 2: Create a New Datacenter and Add ESXi Hosts and VMs

In this task, you will create a new data center in vCenter and import your ESXi hosts and Windows VMs.

107. From your Management Desktop, close and re-open the **VMware vSphere Client** and connect to your pod-specific vCenter hostname, as indicated in the **implementation sheet** (ex. vCenterC2P7). Authenticate with the username **Administrator** and password **cisco123**.



Note	You could also click on “Use Windows session credentials” if you logged into your management desktop using the same credentials that will properly authenticate you to your vCenter Server. This is a great way to re-use your authenticated session.

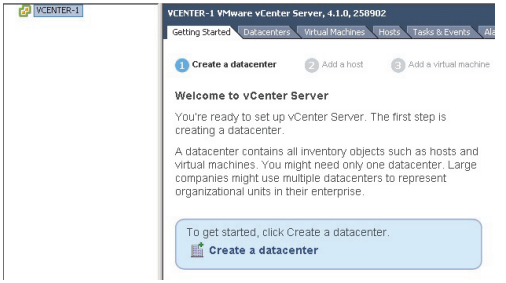
108. In the Security Warning dialog box, click the **Install this Certificate and Do Not Display Any Security Warnings** check box to install the certificate, and then click the **Ignore** button to continue.



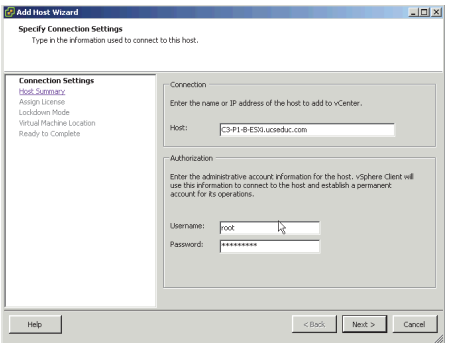
109. Click the **OK** button on the Evaluation License warning.
110. In the **Getting Started** tab of the vCenter content pane, click the **Create datacenter** link.

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111. Name your datacenter, based on the lab implementation sheet. Ex. “DC1” for Pod 1.



112. Right-click the new data center in the vCenter navigation pane, then click the **Add Host** option.
113. Enter the pod-specific hostname of your B-Series ESXi host, a username of **root** and password of **NXos12345**.



114. Click the **Yes** button in the “Security Alert” dialog box to accept.
115. On the “Host Information” screen, verify that the hostname being imported is correct, and then click the **Next** button.
116. At the “Assign License” screen, click the **Next** button to continue using the evaluation license.
117. Click the **Next** button to leave Lockdown mode disabled.
118. Finally, click the **Next** button to install the ESXi host in your newly created datacenter (ex. DC1), and then click the **Finish** button to complete the Add Host wizard.
119. You should now see your host under your recently created Datacenter object.
120. Repeat steps 17 - 24 to add another host to your newly created vSphere Datacenter. This 2nd host could be your C-Series from Lab 1 or a neighboring B-Series in your class.

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121. Select your B-Series host in the content pane, and choose the **Configuration** tab.
122. In the Hardware panel, click the **Storage** link.
123. In the Datastores list, right-click the blue **Refresh** link in the upper-right portion of the screen.
124. The **VM_Storage** datastore should now be visible.
125. Next we will create a base VM that may be used later as a Template for creating future VMs for lab use. Before we begin the Virtual Machine creation process right-click on the **VM_Storage** datastore and chose **Browse Datastore**. Verify that there is an **Installs\Microsoft** directory on your VM_Storage datastore and that the "**W2K3-SelfInstall.iso**" file is in this directory.

Note	If not notify your instructor to copy said file from the **Z:\Microsoft\Win2K3** directory to the **VM_Storage** datastore.

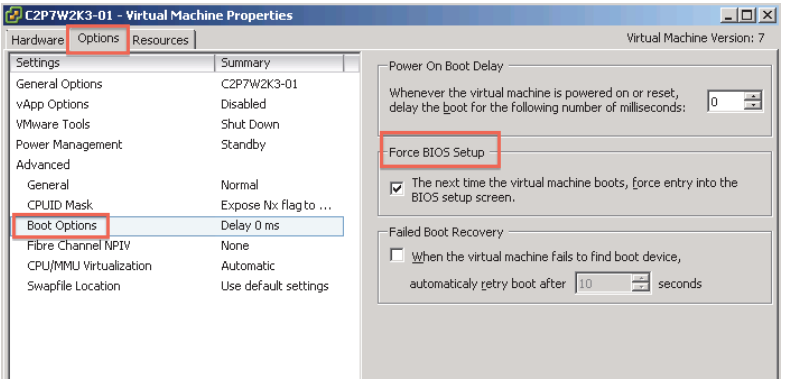
126. Before we start creating VMs, let's create an organizational structure within vCenter. Navigate to **Home > Inventory > VMs and Templates**. Right click on your Pods Datacenter object (ex. DC1) and click **New Folder**.
127. Name your new folder using your initials ending with "VMs." Ex. "**JXD VMs**".
128. Now, to start the VM creation process right-click on your newly created folder and select **New Virtual Machine**.
129. Create your new virtual machine with the following parameters. Click **Next** after each selection and **Finish** to complete the New Virtual Machine wizard.

Configuration	Typical
Name and Location	**Name**: C#P#W2K3-01 **Inventory Location**: Ex. JXD VMs
Host/Cluster	Your ESXi host added above
Datastore	VM_Storage
Guest Operating System	Microsoft Windows Server 2003 (32-bit)
Networking	-default, will change later-
Virtual Disk Size **Virtual Disk Type**	10GB Thin Provisioning

130. Once your new VM is created, right-click and select **Edit Settings**. Click once on the **CD/DVD Drive 1** and select **Datastore ISO File** under Device Type.
131. Click **Browse**, navigate to **VM_Storage\Installs\Microsoft**, select **W2K3-SelfInstall.iso** file and click **OK**. Complete the process by placing a check next to **Connect at power on** under **Device Status**.

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132. We have one last step before we can start the OS installation for our new VM and that is to configure the VM to boot from the newly mapped virtual CD-ROM (ISO file). To do this select the **Options** tab, click **Boot Options** and click to place a check under **Force BIOS Setup**.



Note This process is similar to the steps we take in the physical world to force the physical server hardware to boot into BIOS so we can direct the server to then boot from the physical media in the CD-ROM drive. In our case we are simply directing the VM to boot into BIOS so we can instruct it to boot from the newly mapped ISO file.

133. Click **OK** to finalize the changes to your newly created VM.
134. Now it's time to power on our newly created VM. To do this right-click on the VM, navigate to **Power** and click **Power On**.
135. Open a console window by right-clicking on the VM and selecting **Open Console**. Remember, we forced the VM to boot into BIOS back in step 23.
136. Using the arrow keys on your keyboard, navigate over to the **Boot** option. Now navigate down to **CD-ROM Drive** and use your (+) **plus key** to place the CD-ROM option at the top of the list.
137. Complete this process by pressing **F10** to **Save and Exit** and finally selecting **Yes** to **Save configuration changes**.
138. With the console windows still open you will notice the VM reboot and automatically complete a Windows Server 2003 installation. This is the benefit of using the Self Install ISO. Your job for this step is to sit patiently while the installation completes. This may be a good time to take a quick 5 min break.
139. Take a moment to install VMware Tools for your new VM. From the menu bar, click on **VM > Guest > Install/Upgrade VMware Tools**. Click **OK** to acknowledge the message and accept all install default.

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140. During the setup of the Hardware Acceleration, take your time and follow the steps outlined in the **HWAccel.txt** file that is displayed by the VMware Tools installation process.

Note	You may be happy to know that one of the many benefits to installing VMware Tools is better mouse performance.

141. Once the installation is complete click **Finish** and **Yes** to reboot your VM.
142. Once the reboot completes you have a newly install Windows Server 2003 VM. To login, click on **VM > Guest > Send Ctrl + Alt + del**. Login with **Administrator** and **vmware** as the default set of credentials.
143. From the console window close the **Manage Your Server** application. Once again click on **VM > Guest > Send Ctrl + Alt + del**. Click on **Change Password**, enter in the Old Password of **vmware** and **NXos12345** in the **New** and **Confirm** password fields.
144. Once complete exit out of the Change Password process.
145. Now that you are familiar with the New Virtual Machine wizard and how to use the Self Install ISO to ease the Windows Server installation process, repeat steps 33 – 49 to create 2 additional VMs; first a **C#P#W2K3b** (ex. C2P7W2K3b) VM and then a **C#P#W2K3c** VM.

    If there is available lab time and you would like to explore some of the advance deployment feature of VMware's vSphere try the following; 1) Create a Template from your original **C#P#W2K3-01** VM, 2) Load the Windows 2003 SysPrep files (located at **Z:\Installs & Misc\VMWare\Sysprep**) to the proper location on your vCenter Server and 3) Deploy your 2 additional VMs via SysPrep and this newly created Template.

    If needed ask your instructor for assistance.

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Note Our network infrastructure (VLANs, IP Addressing and Routing) was designed to allow all hosts and VMs to communicate with one another within the same chassis. This allows each pod to communicate with both of their hosts (C & B-Series) and all of their VMs. Additionally, this approach also allows each Pod's hosts and VMs to communicate with every other Pod's hosts and VMs.

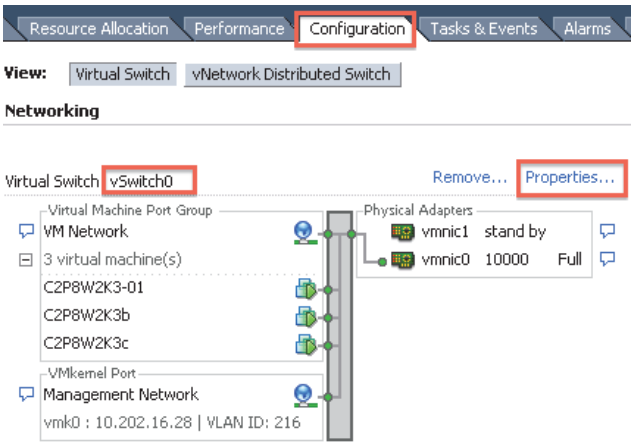
Translated; when you "Add a Host" in Step 6 you can point to your own Pod's C (vSphere 5 only) or B-Series, or any other Pod's C (vSphere 5 only) or B-Series servers. For example, if your pod did not want to do the C-Series lab on Monday then feel free to ask another Pod to work together with their B-Series servers.

You want to get real fancy? Experiment with creating a VM that is an ESXi host and performing some of the labs with that host VM as part of your infrastructure. But if class time is limited let's save that fun until Friday.

Task 3: Configure vSwitch and Test vMotion

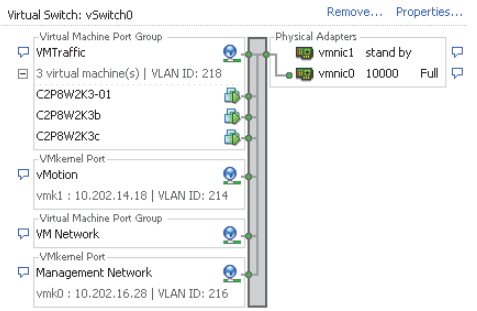
In this task, you will create port profiles to enable networking in the virtual switch and test vMotion.

146. Navigate to Home > Inventory > Hosts and Cluster, choose your B-Series ESXi host in the navigation pane.
147. In the content pane, choose the **Configuration** tab.
148. In the Hardware panel, click the **Networking** link.
149. Click the blue **Properties** link to edit "vSwitch0".



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150. In the "vSwitch0 Properties" window, click the **Add** button to add a new port group named "VMTraffic".
151. For the new "VMTraffic" port group, choose **Virtual Machine** as the "Connection Type" and click **Next**.
152. Give this new port group a "Network Label" of **VMTraffic** and set the VLAN according to the lab implementation sheet for Task 5. Click **Next** and **Finished** to finalize the creation of your new port group.
153. Again, in the vSwitch0 properties window, click the **Add** button to add a new port group named **vMotion**.
154. For the "vMotion" port group, be sure to select the **VMKernel** "Connection Type" and click **Next**. Set the VLAN as specified in the lab implementation sheet, and check the **Use this port group for vMotion** check box. Click **Next**.
155. In the "VMKernel – IP Connection Settings" window, all Team/Pods should use their Pod specific IP address 10.20**C**.14.1**T** and a subnet mask of **255.255.255.0**. Click **Next** and **Finish** to finalize the creation of the port group.
156. Repeat Steps 51 through 60 for any other hosts (ex. C-Series from Lab 1, B-Series in other Teams or even a ESXi Host VM) in your vSphere Datacenter. Once again, in the "VMKernel – IP Connection Settings" window, for your second host, all Team/Pods should use an IP address of 10.20**C**.14.2**T**/255.255.255.0.
157. Once complete click **Close** to exit the "vSwitch 0 Properties" screen.
158. Move your VMs to the newly created "VMTraffic" port group. Right-click on each of your two imported VMs (individually) and select **Edit Settings**.
159. Select the "Network Adapter 1" entry from the list of Hardware, change the "Network Label" to **VMTraffic** and click **OK**. Be sure to repeat this for each of your Pod's VMs.
160. Your vSwitch0 configuration should closely match this figure.



Complete steps 66 – 70 only if you're using your C and & B-Series servers together.

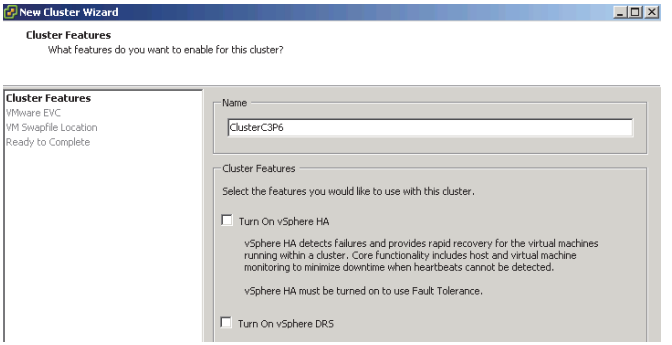
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The following steps are only to be performed if you are using your C-Series (vSphere 5 only) and B-Series servers together as a source and/or destination for vMotion. These servers and their CPUs are slightly different. Even though they may support many of the same CPU features they do not necessarily support said features using the same instruction sets. This difference in instruction sets will cause vMotion Compatibility Check (and vMotion) to fail. You can check this for each of your Servers at

- **C-Series**: from within **CIMC, Server > Inventory > CPU**. Ex. Xeon X5570.
- **B-Series**: from within **UCSM, Equipment > Chassis > Chassis 3 > Servers > Server #** the **Inventory** and then **CPU** tab. Ex. Xeon E5640.

The solution, as this is a common occurrence, is to create a Cluster from within vSphere and enable VMware's EVC (Enhanced vMotion Compatibility).

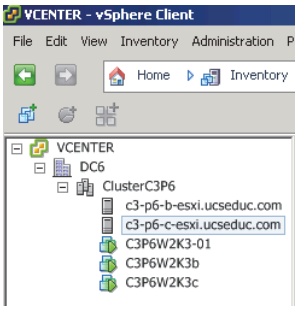
161. Ensure all of your VMs are currently powered off. If not, power them off now.
162. Right-click on your Datacenter object (ex. DC6) and select **New Cluster**.
163. Name your Cluster object **ClusterC#P#** and click **Next**.



164. On the VMware EVC page click **Enable EVC for Intel® Hosts** and click **Next**. Click **Next** to accept all remaining default Cluster values and **Finish** to finalize the Cluster creation.

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165. Click and drag each of your ESXi hosts into the newly created vSphere Cluster.



166. Being that your VMs were powered off while creating the vSphere Cluster, we have to power them on here. Do so by selecting each VM and clicking the green play button.

Note	If your VMs are powered on, open a command prompt from within the VM and renew the IP address lease with the **ipconfig /renew** command.

167. Right-click on each VM once again and select **Open Console**.
168. Press **Ctrl-Alt-Insert** to access the login screen. Authenticate as **Administrator** with password **NXos12345**.
169. Open a DOS window and ping your default gateway using the "until stopped" option. For example **ping 10.20X.18.254 -t**.

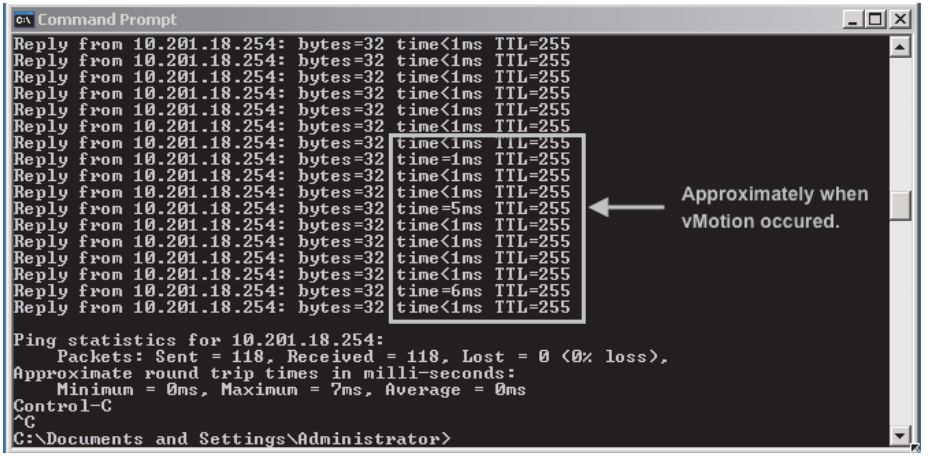
Note	If your pings do not work check the following… - IP address settings (IP Address, Subnet Mask, Default Gateway) - Virtual Machine Network Settings - Personal Firewall allows "inbound ICMP echo"

170. In the following steps we will test vMotion. This process requires you to have two or more hosts in your vCenter datacenter. If you have additional ESXi host in your datacenter, right-click (from within the vSphere Client) your Windows VM and choose **Migrate** from the drop-down menu.
171. In the "Select Migration Type" screen, choose the **Change Host** radio button and then click the **Next** button.
172. In the "Select Destination" screen, choose the second ESXi (ex. your pod's C-Series or a neighboring pod's B or C-Series) host and click the **Next** button.

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173. In the "vMotion Priority" screen, accept the default "**High Priority (recommended)**" radio button and then click the **Next** button.

174. In the "Ready to Complete" screen, review the information and then click the **Finish** button.



Note If all parameter above (VMkernel, vMotion, Virtual Machine Network) were configured properly your VM should continue to ping its default gateway, often times not even losing a single ping.

Even a difference in the spelling of a Port Group (ex. VMTraffic vs. VM Traffic) would cause the vMotion process to fail its validation check.

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