Basic Router Pod – Version 2 BETA

Planning and Installation Guide

For Cisco Networking Academy® CCNA & CCNP Curriculum

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NETLAB Academy Edition features two variations of the Basic Router Pod. You may implement either pod type based on available resources.

- **Version 2** (this guide) **supports remote PCs** using VMware GSX**.**
- **Version 1** (separate guide) **does not support PCs**.

PART 1 – PLANNING

1   Introduction

Did you see the video? NDG features a flash video at
www.netdevgroup.com/ae/brpv2.htm that provides a good introduction to this pod.

The NETLAB_AE Basic Router Pod, Version 2 (V2), is a versatile 3 router pod that
supports many CCNA and CCNP lab exercise.

NETLAB Academy Edition features two variations of the Basic Router Pod. You may
implement either pod type based on available resources.

- **Version 2** (this guide) **supports remote PCs** using VMware GSX**.**
- **Version 1** (separate guide) **does not support PCs**.
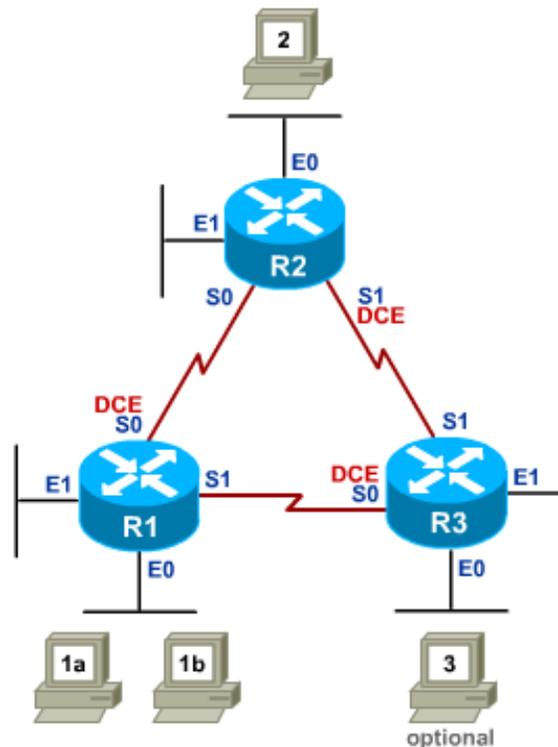
You may have up to eight (8) Basic Router Pod V2 per NETLAB_AE system.

Basic Router Pod V2 features direct access to router consoles. Integration with a separate
VMware GSX server supports up to 4 virtual PCs. NETLAB_AE can provide remote access
to the keyboard, video, and mouse of VMware virtual machines in the pod.

NETLAB_AE users in a team or instructor-led class can share access to a device console or
PC.

1.1   Deviations

Remote users may get confused by local deviations from the standard curriculum and labs. The curriculum is relatively complex and offers many opportunities to "make adjustments to the labs". If your NETLAB~AE~ pods will be made accessible outside your local Academy, you should carefully consider the impact of deviations and substitutions.

Even if your user community is local or relatively small, we recommend that you (1) document the specifics of your pods and (2) use the NETLAB~AE~ *News and Announcements* feature to point users to your documentation.

1.2   Remote PC Support

The Basic Router Pod V2 supports up to 4 remote PCs. Three are required. The fourth is optional. NETLAB~AE~ allows three alternative settings for each:

- **Direct/VMware**. The PC is implemented as a VMware GSX virtual machine.
  - Users can control the keyboard, video, and mouse.
  - Users can power on, shutdown, reboot, and revert to a clean state.
  - Users can have administrator rights.

- **Indirect**. The PC is implemented, but not managed by NETLAB~AE~.
  - Users may be able to interact with the PC, but cannot access the keyboard, video, or mouse through NETLAB~AE~.

- **Absent**. The PC is not implemented.

These options are fully explained in the *NETLAB+ Remote PC Guide*. Direct/VMware offers complete administrative access on the remote PC and offers the greatest support for labs. To learn more about VMware GSX, please visit the company's web site at http://www.vmware.com.

Please Note: Direct/Standalone (as described in the Remote PC Guide) is not supported on this pod.

1.3   Dynamic Topologies

Basic Router Pod V2 features dynamic topologies. NETLAB~AE~ can alter the topology and reposition PC's by manipulating VLANs on the control switch. This is done automatically based on the selected lab exercise. Instructors can change exercises and topologies during instructor led class reservations.

2   Lab Device Requirements

Lab devices are part of the topology and users can interact with them either directly or indirectly.

The equipment listed in subsequent sections is derived from the official Academy spreadsheet **CCNAConfigurationandPricingGuide.xls** (August 2005).

Other equipment may work if it is supported by NETLAB~AE~ and can meet the minimum requirements for feature sets, interfaces, IOS, RAM, and Flash. A list of NETLAB~AE~ supported lab equipment can be found on the NDG website. Please note, compatibility with NETLAB~AE~ does not guarantee compatibility with the Academy labs.

2.1   Routers R1, R2, and R3

Recommended Routers	Ethernet Ports Required	Serial Port Module
Cisco 1841	2	WIC 2A/S or 2T
Cisco 2801	2	WIC 2A/S or 2T
Cisco 2811	2	WIC 2A/S or 2T
Cisco 2621XM	2	WIC 2A/S or 2T
Cisco 17xx	**router not supported**	

2.2   PCs and Servers

Basic Router Pod V2 supports 4 VMware GSX virtual machines. VMware GSX is installed on a separate server. The *NETLAB+ Remote PC Guide* contains general information for setting up a VMware server.

Based on the lab requirements, we recommend implementing PC1a, PC2a, and PC2. PC3 is optional.

The following operating system choices are typical based on the curriculum. These choices are not mandatory; you can make substitutions provided:

(1) VMware GSX supports the operating system (as a "guest").
(2) Your choices are compatible with the curriculum.

Virtual Machine	Recommended O/S	Functions
PC1a	Windows XP	Student PC, client activities
PC1b	Windows XP	Student PC, client activities
PC2	Windows XP	Student PC, client activities
PC3	Windows XP	**Optional**, client activities

3   Control Device Requirements

NETLAB$_{AE}$ *control devices* provide internal connectivity, console access, and managed power. Control devices are dynamically managed by NETLAB$_{AE}$ and are not accessible or configurable by lab users.

⇒ The *NETLAB+ Administrator Guide* explains how to add, change, or delete control devices.

The Basic Router Pod V2 requires the following control device resources:

Control Device Resource	Quantity Required
Control Switch	**6** consecutive ports **1** reserved port (VMware server)
Access Server	**3** lines
Switched Outlet Devices	**3** outlets

3.1   Control Switch Overview

NETLAB$_{AE}$ uses a control switch to provide connectivity between devices in the Basic Router Pod V2 and VMware server(s). This pod requires **6 consecutive ports** on a supported control switch (other than a Catalyst 1900 series).
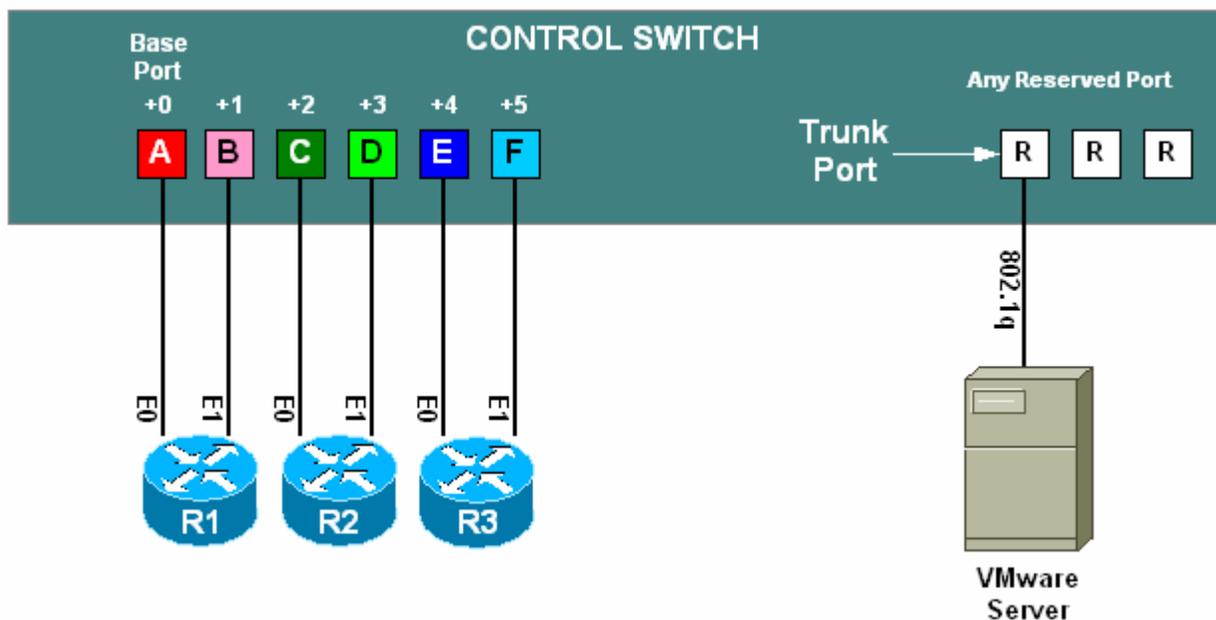
Ports are labeled **+0** to **+5** in the diagram and are relative to the *base port*. These ports must be consecutive on the same control switch. As with all pods, you choose a base port for the pod during pod installation (section 5). A control switch can support multiple pods. To determine the actual port numbers used for this pod, add the base port number to the relative port numbers shown in the diagram. For example, if the base port is 5, the actual port numbers will be 5 to 10.

Using SNMP, NETLAB$_{AE}$ will automatically setup VLANs and configure ports on the control switch. These VLANs are depicted as letters "A" through "F" and represent one subnet in the topology. Each NETLAB$_{AE}$ pod has a unique *VLAN pool* and the actual VLAN numbers will be unique for each NETLAB$_{AE}$ pod. This is to avoid conflict between pods.

One "reserved" port on the control switch connects to an 802.1q NIC card on the VMware GSX server. This allows devices in the pod to communicate with virtual machines.
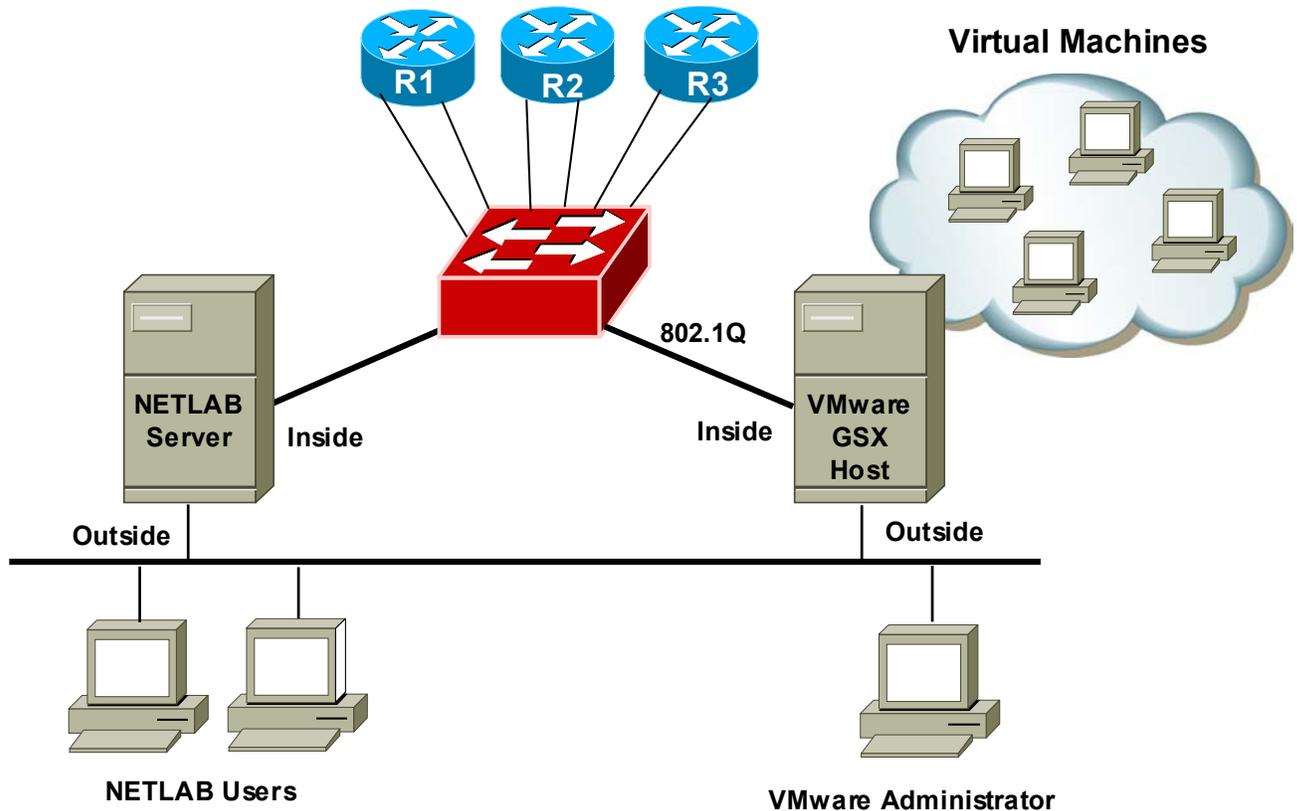
The reserved port may be located on a different control switch, provided that all links between control switches are also configured as 802.1q trunks and all VLANs are allowed. You may also have more than one VMware GSX server and virtual machines in the pod can be located on different GSX servers. For more details, please see section 7.

3.2   Access Server Ports

Access servers provide console connections to lab routers so that users can access them from NETLAB$_{AE}$.   Users do not communicate directly with the access server. Rather, all connections are proxied through NETLAB$_{AE}$.

The Basic Router Pod V2 requires **3** access server ports. **These ports do not have to be consecutive, and can span multiple access servers.**
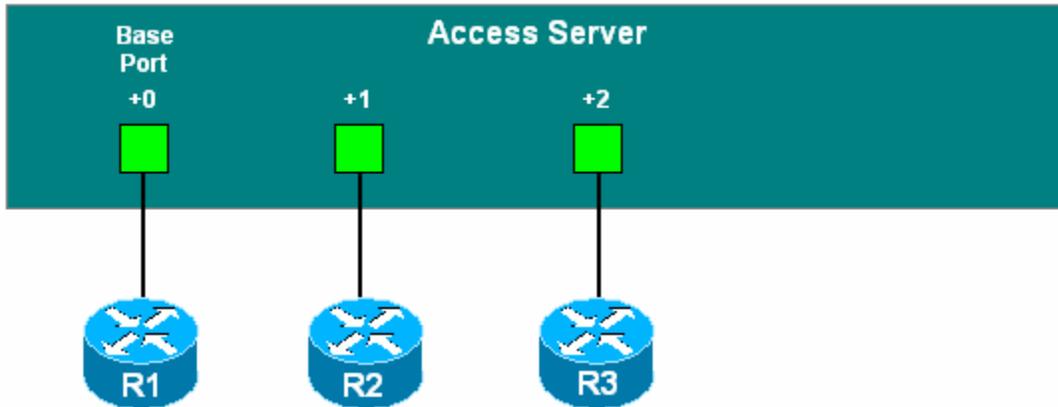
3.3   Switched Outlets

Switched outlets provide managed electrical power, allowing NETLAB$_{AE}$ and users to turn lab equipment on and off. The Basic Router Pod V2 requires **3** switched outlets, one for each router.

Outlets do not have to be consecutive and may span multiple switched outlet devices (i.e. APC7900 or APC7920).
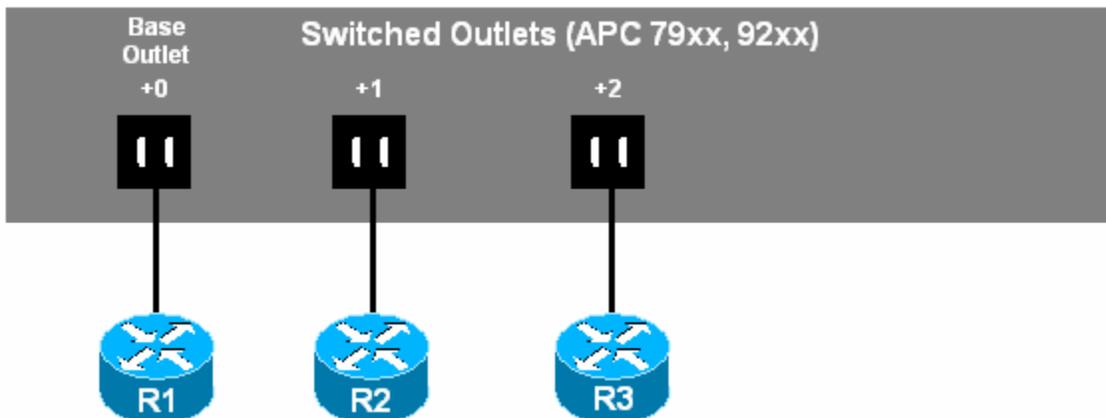
PART 2 – IMPLEMENTATION

4   Pre-requisites

This section covers tasks that should be executed prior to adding a Basic Router Pod V2.

4.1   Understanding VMware GSX and Virtual Machines

The *NETLAB+ Remote PC Guide* contains essential information for setting up a VMware GSX server and virtual machines. It should be used in conjunction with this guide.

4.2   Setup Control Devices

Using the guidelines in section 3, decide which control switch ports, access server ports, and switched outlets you will use for your Basic Router Pod V2. Add control devices if necessary. Control device configuration is documented in the *NETLAB+ Administrator Guide.*

4.3   Upload IOS Images

Upload the IOS images for the lab routers. NETLAB$_{AE}$ will recover these images on the devices if they are erased from flash.
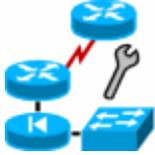
4.4   Disable User Logins (optional)

You must take all equipment pods offline to add pods or configure control devices. You may wish to disable user logins during this time.

5   Adding the Pod

This section walks you through the process of adding a Basic Router Pod V2 using the NETLAB_AE New Pod Wizard.

5.1   Start the New Pod Wizard

Login to the administrator account.

Select Equipment Pods.

Select ⬇ Take All OFFLINE if any of the pods are online. Caution: this will cancel any reservations in progress.

Select ➕ Add a Pod.

The New Pod Wizard will now help you add an equipment pod to your system.

5.2   Add a Basic Router Pod V2

When prompted, select Basic Router Pod v2.

BASIC ROUTER POD v2
3 Routers
PC Support

5.3   Select Control Switch and Ports

Basic Router Pod V2 requires **6 consecutive control switch ports**. NETLAB_AE will present a list of the control switches on your system. Switches that meet the port requirement can be selected. Choose one control switch for your new pod.

SELECT	ID	SWITCH TYPE	PORTS THAT ARE FREE	COMMENT
INELIGIBLE	1	Catalyst 2950-24	NONE	NO FREE PORTS
INELIGIBLE	2	Catalyst 2950-24	PORT 15-20	NOT ENOUGH CONSECUTIVE PORTS
⦿	3	Catalyst 2950-24	PORT 1-20	OK TO USE

➡ Next   ⬅ Back   ❌ Cancel

Next, select the ports you want to use.

You have chosen control switch 3.

A Basic Router Pod (Version 2) requires 6 consecutive control switch ports.

Which free 6-port range would you like to use? Ports 1 to 6

Next   Back   Cancel

5.4   Select Access Server(s) and Ports

Basic Router Pod V2 pod requires **3 access server ports**.

It is a good idea to use consecutive ports on one access server if possible. This practice will make it easier to cable and troubleshoot. If consecutive ports are not available, you can use non-consecutive ports, on different access servers if necessary.

Use the physical port numbers shown on the access server. Some models start at port 1 (Cisco 2509 and 2511) and others start at port 0 (Cisco NM-16A and NM-32A modules).

NETLAB_{AE} allows you to choose consecutive ports on one access server, or you can choose "Let me pick" to select an access server and port for each router.

ACCESS SERVERS		
ID	TTPE	PORTS THAT ARE FREE
1	Cisco 2511-RJ	10-16
2	NM-32A Module in Cisco Router	0-5, 9-18, 21-31
3	Cisco 2509-RJ	7-8

A Basic Router Pod (Version 2) requires **3** access server ports.

◉ Use 3 consecutive ports on access server 1 starting at port 10
○ Let me pick the access server and ports for each device

Next   Back   Cancel

"Let me pick", allows you to make granular selections and split ports among several access servers.

SELECT AN ACCESS SERVER AND PORT FOR EACH LAB DEVICE		
LAB DEVICE	ACCESS SERVER (ID)	PORT
R1	1	10
R2	1	11
R3	1	12

Next   Back   Cancel

5.5   Select Switched Outlets

Basic Router Pod V2 Pod requires **3 switched outlets**.

It is a good idea to use consecutive outlets on one switched outlet device (SOD) if possible. This practice will make it easier to cable and troubleshoot. If consecutive outlets are not available, you may use non-consecutive outlets, spanning multiple SODs if necessary.

5	APC 7900 Switched Rack PDU	1-8
6	APC 7900 Switched Rack PDU	1-8
7	APC 7900 Switched Rack PDU	1-8
8	APC 7900 Switched Rack PDU	1-8

A Basic Router Pod (Version 2) requires **3** switched outlets.

◉ Use 3 consecutive outlets on switched outlet device 6 starting at outlet 1
○ Let me pick select outlets for each device manually

Next   Back   Cancel

"Let me Pick", will allow you to make granular selections.

SELECT A SWITCHED OUTLET FOR EACH LAB DEVICE		
LAB DEVICE	SOD	OUTLET
R1	6	1
R2	6	2
R3	6	3

Next   Back   Cancel

5.6   Select Device Types

Select the router models you are going to deploy.

$\Rightarrow$ Your selections are used to assign the appropriate NETLAB$_{AE}$ device driver.

$\Rightarrow$ Improper selections may cause errors.

$\Rightarrow$ NETLAB$_{AE}$ may offer selections that do not support the curriculum. See section 2 for a list of recommended devices for this pod.

SELECT A MODEL FOR EACH LAB DEVICE		
LAB DEVICE	TYPE	MODEL
R1	Router	Cisco 2800 (S0/0/x)
R2	Router	Cisco 1841 (S0/0/x)
R3	Router	Cisco 1841 (S0/0/x)

⇨ Next   ⇦ Back   ❌ Cancel

5.7   Select Software Images and Recovery Options

NETLAB$_{AE}$ scrubs each router at the end of lab reservation or upon request. During a scrub, NETLAB$_{AE}$ can recover an IOS image if it has been erased from flash.

SELECT AN IMAGE AND RECOVERY OPTIONS FOR EACH LAB DEVICE			
DEVICE	TYPE	SOFTWARE IMAGE	RECOVER USING SPECIFIED IMAGE
R1	Cisco 2800 (S0/0/x)	c2801-ipbase-mz.123-14.T5.bin	if specified image not in flash
R2	Cisco 1841 (S0/0/x)	c1841-ipbase-mz.123-14.T5.bin	if specified image not in flash
R3	Cisco 1841 (S0/0/x)	c1841-ipbase-mz.123-14.T5.bin	if specified image not in flash

if specified image not in flash
if no image in flash (erased)
never (device may become unusable)

⇨ Next   ⇦ Back   ☒ Cancel

You have three choices for flash recovery:

Recovery Using Specified Image	During A Scrub Operation…
If specified image not in flash	Restores the selected software image if that image is not in flash.
If no image in flash (erased)	Restores the selected software image if there are no .bin images in flash. No action is taken if flash contains a .bin image (even if it is not the specified one).
Never (device may become unusable)	NETLAB$_{AE}$ will take no action if the flash does not contain a bootable image. In this case, NETLAB$_{AE}$ automated boot process will fail and manual restoration of IOS will be required.

⇒ If you select an automatic recovery option, you must also select a software image supported by the curriculum (see section 2).

5.8   Select PC Options

In this task, you will select an ID, type, access method, and operating system for your PCs and servers.

The example below shows the typical settings for a VMware GSX setup. We have chosen not to implement PC3 in this example, so the type is set to ABSENT.

Figure 5.8.1 – Typical remote PC settings

The following TYPE and ACCESS combinations correspond to the documentation.

Please Note: the default TYPE settings is STANDALONE. This setting is not supported in the Basic Router Pod V2. You must change the default setting.

To implement…	Set TYPE to…	Set ACCESS to…
Direct/VMware	VMWARE	VNC
Direct/Standalone (not supported in this pod)	STANDALONE	VNC
Indirect	(any)	INDIRECT
Absent (no PC)	ABSENT	n/a

5.9   VMware Settings

Please enter the following settings for your **VMware GSX** virtual machines.

- **IP Address**. The IP address of the VMware GSX host and the address used for accessing the VMware management API.
- **Username**. The username of the host account used for controlling the virtual machine through the VMware API.
- **Password**. The password of the host account.
- **Configuration File**. The full path of the virtual machine's configuration file (for example, C:\Virtual Machines\POD_1 PC_3\winXPpro.vmx)

VMWARE GSX VIRTUAL MACHINE SETTINGS

PC ID	PC NAME	IP ADDRESS	USERNAME	PASSWORD	CONFIGURATION FILE
5	PC1a	10.0.0.25	NETLAB	NETLAB	C:\Virtual Machines\POD_7\PC1a\WinX
13	PC1b	10.0.0.25	NETLAB	NETLAB	C:\Virtual Machines\POD_7\PC1b\WinX
14	PC2	10.0.0.25	NETLAB	NETLAB	C:\Virtual Machines\POD_7\PC2\WinXP

Next   Back   Cancel

5.10   Select a Pod ID

Each pod is assigned a unique numeric ID.

Please select a Pod ID.

Pod ID: 7

Next   Back   Cancel

5.11   Select a Pod Name

Each pod can have a unique name. This name will appear in the scheduler, along with the pod type.

Pod Name: Galactica

Next   Back   Cancel

5.12   Verify Your Settings

At this point NETLAB_AE has added the pod to its database. However, the pod has not been brought online yet. You will want to cable up the pod, configure PCs, and run a pod test before bringing the pod online. These tasks are discussed in the remaining sections.
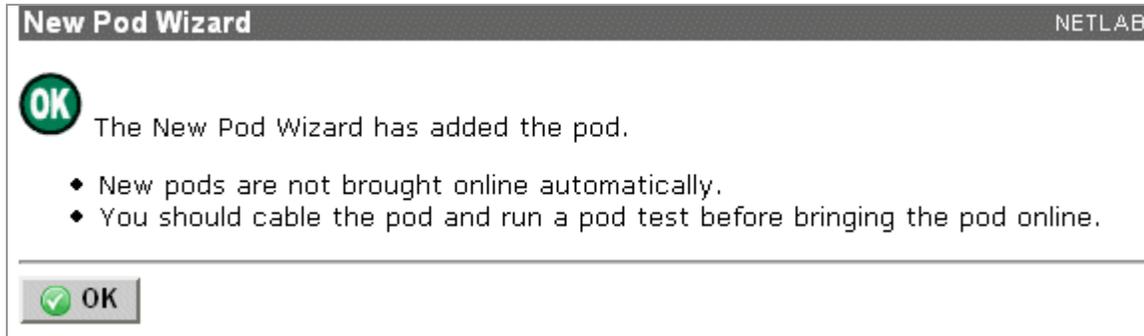
After you click OK, the new pod will appear in the list of equipment pods.

Click on the magnifier button or pod ID to manage you new pod.

NETLAB$_{AE}$ will display the status of the pod and the high-level settings for each device, PC, and control switch.

POD 7 - STATUS

POD ID	POD NAME	STATUS	ACTIVITY	POD TYPE
7	POD 7	🔴 OFFLINE	IDLE	**BASIC ROUTER POD v2** 3 Routers PC Support

POD 7 - ROUTERS, SWITCHES, AND FIREWALLS (click on the GO buttons to reconfigure devices)

GO	NAME	TYPE	ACCESS PORTS	SWITCHED APC OUTLETS	SOFTWARE IMAGE
🔍	✳ R1	Cisco 2800 (S0/0/x)	AS 1 PORT 10	SOD 6 OUTLET 1	c2801-ipbase-mz.123-14.T5.bin
🔍	✳ R2	Cisco 1841 (S0/0/x)	AS 1 PORT 11	SOD 6 OUTLET 2	c1841-ipbase-mz.123-14.T5.bin
🔍	✳ R3	Cisco 1841 (S0/0/x)	AS 1 PORT 12	SOD 6 OUTLET 3	c1841-ipbase-mz.123-14.T5.bin

POD 7 - PCs AND SERVERS (click the GO buttons to reconfigure)

GO	NAME	PC ID	STATUS	TYPE	ACCESS	CONTROL IP	OPERATING SYSTEM
🔍	🖥 PC1a	5	ONLINE	VMWARE	VNC	10.0.0.25	Windows XP
🔍	🖥 PC1b	13	ONLINE	VMWARE	VNC	10.0.0.25	Windows XP
🔍	🖥 PC2	14	ONLINE	VMWARE	VNC	10.0.0.25	Windows XP
🔍	🖥 PC3	15	ONLINE	ABSENT	NULL		

POD 7 - CONTROL SWITCH

SWITCH ID	POD PORT RANGE	BASE VLAN	VLAN POOL	
🔀 3	1-6	160	160-165	

6   Cable the Pod

Use the NETLAB$_{AE}$ cable chart feature to help you connect the lab devices in your pod.
The chart is generated in real-time and contains port-specific information based on your
current lab device and control device settings. The cable chart function is accessed from
the pod management page.

⬆ Online	Bring this pod ONLINE and make it available for reservations.
∿ Test	Tell me if this pod is working properly.
🖵 Cable	Show me how to cable this pod.
⊟ Delete	Remove this pod from NETLAB.

CABLE CHART FOR POD 7

R1 (Cisco 2800 (S0/0/x))

CONNECT FROM	USING CABLE	CONNECT TO	
FastEthernet0/0	CAT-5 Straight Through	C/S 3	Port 1
FastEthernet0/1	CAT-5 Straight Through	C/S 3	Port 2
Console	Console Cable	A/S 1	Port 10
Power	Power Cord	SOD 6	Outlet 1
Serial0/0/0 DCE	Back-to-back serial cables	R2	Serial0 DTE
Serial0/0/1 DTE	Back-to-back serial cables	R3	Serial0 DCE

R2 (Cisco 1841 (S0/0/x))

CONNECT FROM	USING CABLE	CONNECT TO	
FastEthernet0/0	CAT-5 Straight Through	C/S 3	Port 3
FastEthernet0/1	CAT-5 Straight Through	C/S 3	Port 4
Console	Console Cable	A/S 1	Port 11
Power	Power Cord	SOD 6	Outlet 2
Serial0/0/0 DTE	Back-to-back serial cables	R1	Serial0 DCE
Serial0/0/1 DCE	Back-to-back serial cables	R3	Serial1 DTE

R3 (Cisco 1841 (S0/0/x))

CONNECT FROM	USING CABLE	CONNECT TO	
FastEthernet0/0	CAT-5 Straight Through	C/S 3	Port 5
FastEthernet0/1	CAT-5 Straight Through	C/S 3	Port 6

Please Note: virtual machine information will not appear on the cable chart. Refer to
section 7 for configuration instructions.
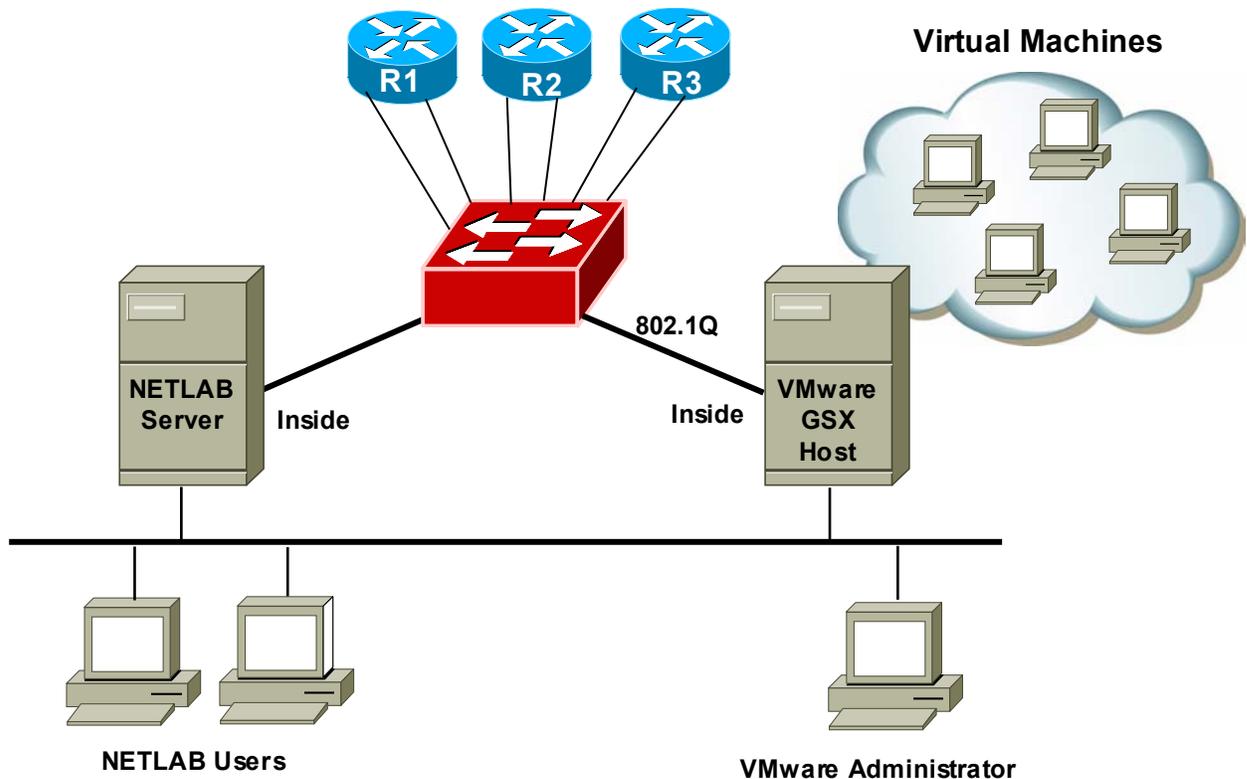
7   Configuring VMware and Virtual Machines

The *NETLAB+ Remote PC Guide* explains how to set up VMware GSX server and virtual machines. Please review the pod-specific information in this section and apply it to the general information in the *NETLAB+ Remote PC Guide*. Please note, only the sections referring to VMware are relevant; Basic Router Pod V2 does not support standalone PC's.

After you load applications or make changes to a PC, be sure to take a VMware snapshot. NETLAB_{AE} instructs VMware to "revert" to the snapshot at the end of each lab reservation. Any changes made after a snapshot are lost.

Please Note: The IP addresses and/or default gateways of each PC may vary. Depending on your snapshots, the student may need to adjust IP settings to reflect the lab.

7.1   Connecting Virtual Machines to the Pod

Virtual Machines must communicate with routers in the pod. Control switches provide the connection point. In the recommended configuration (below), the VMware server is equipped with an inside and outside interface. The inside interface is configured for 802.1Q connects to a reserved port on a control switch. Traffic between virtual machines and devices in the pod traverse the VMware server inside interface. Preferably, the VMware server should connect to the same control switch as the pod.

7.2   VMware Virtual Switches and VLANs

VMware GSX virtual network adapters and virtual LAN switches (VMnets) are used to connect virtual machines to the pod. Basic Router Pod V2 uses **2 VMnets** in the required configuration, **3 VMnets** when the optional PC3 is implemented. Since VMware GSX supports 10 virtual switches, it is possible to host up to 3 complete Basic Router Pods on a single VMware GSX server. Without PC3, it is possible to host up to 5 pods.

Each virtual switch is mapped to a specific VLAN and bound to the VMware inside 802.1Q NIC card. The actual VLAN numbers used are based on the pod's ID number.

PC1a and PC1b share a common VMnet and VLAN.
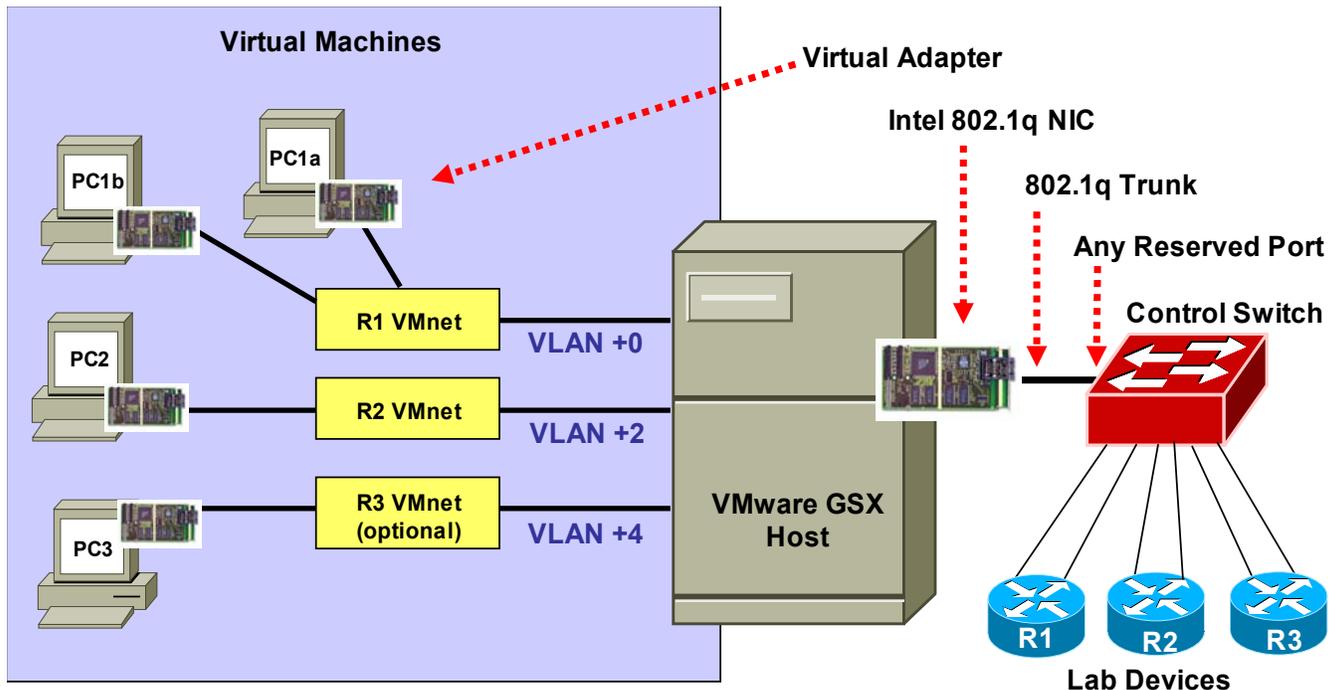
Each NETLAB_{AE} pod is automatically assigned a pool of unique VLAN numbers. You must determine which VLAN numbers correspond to each virtual switch on the VMware server.

First, determine the base VLAN for the pod you are setting up. This is shown on the pod management page. From the administrative account, go to <u>Equipment Pods</u> and select the pod from the list. Obtain the BASE VLAN from the CONTROL SWITCH table.

POD 7 - CONTROL SWITCH			
SWITCH ID	POD PORT RANGE	BASE VLAN	VLAN POOL
3	1-6	160	160-165

In this example, pod 7 uses VLANs 160-165. The base VLAN is 160.

Next, determine the actual VLAN number for each virtual network by adding the base VLAN to the offsets in the table below.

Virtual Machines	Virtual Switch (VMnet)	Offset (add to base VLAN)	Actual VLAN	Example
PC1a PC1b	R1 VMnet	+ 0	= _____	160 + 0 = 160
PC2	R2 VMnet	+ 2	= _____	160 + 2 = 162
PC3	R3 VMnet (optional)	+ 4	= _____	160 + 4 = 164

7.3 Configure VMware Server Inside Port

Refer to section 6 of the *NETLAB+ Remote PC Guide.* Create the VLANs (calculated above) on the VMware server's inside 802.1Q NIC.

Although it is possible to bind an IP address, mask, and gateway to each VLAN on the server's inside NIC, you should not do so. The VLANs created on the server act as a layer 2 conduit between lab devices and virtual machines. Binding layer 3 information to the VLAN interfaces on the server adapter may cause unpredictable routing and/or leakage to outside networks.
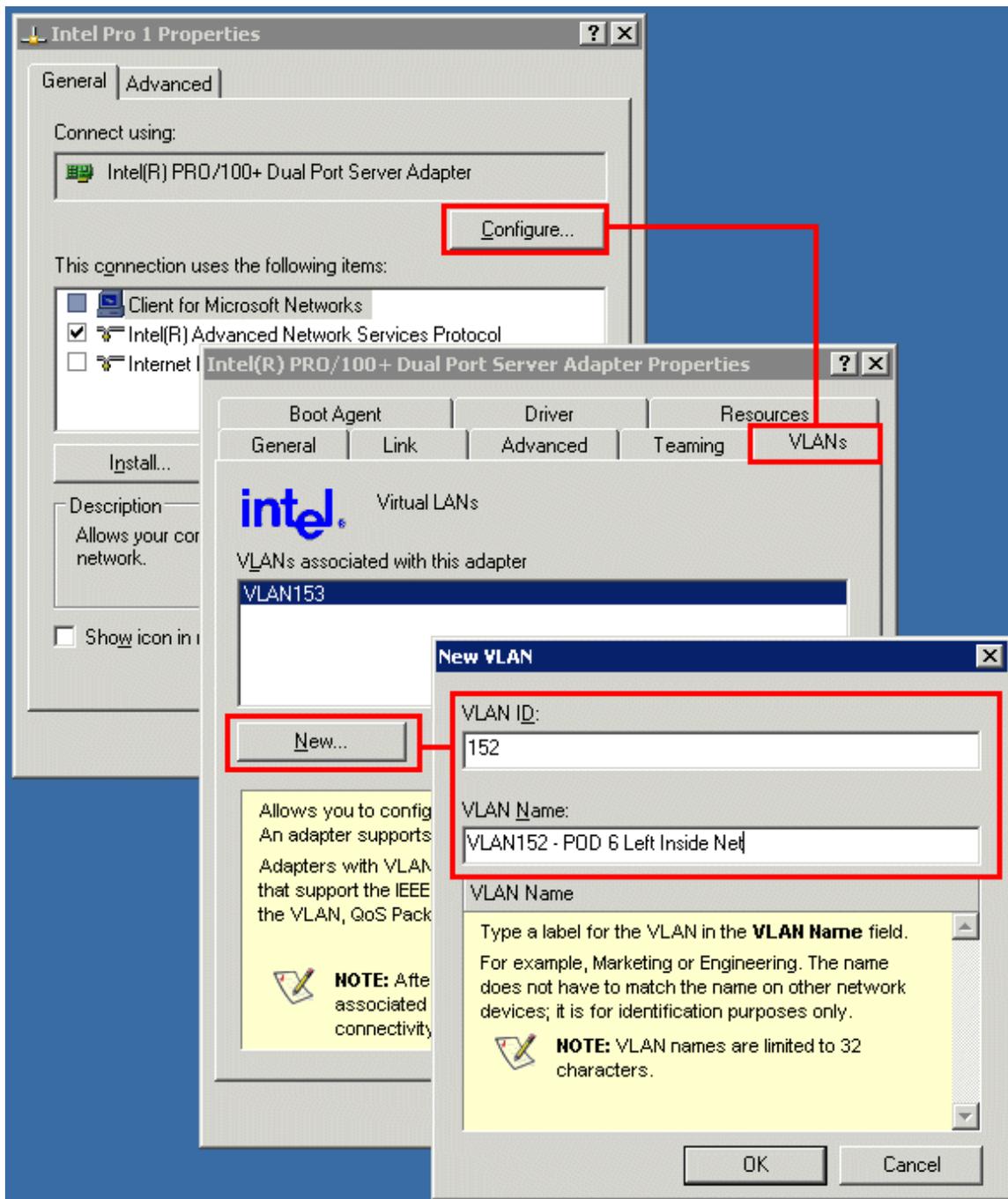
7.4   Create Virtual Switches (VMnet)

Refer to section 6 of the *NETLAB+ Remote PC Guide.* Create the virtual switches and bind them to the VLANs created in the previous section.

It does not matter which VMnet number you use. By default, VMnet0, VMnet1, and VMnet8 are reserved for special functions in VMware. However, you can convert these into ordinary VMnets to use with pods. This is explained in Appendix A of the *NETLAB+ Remote PC Guide*.
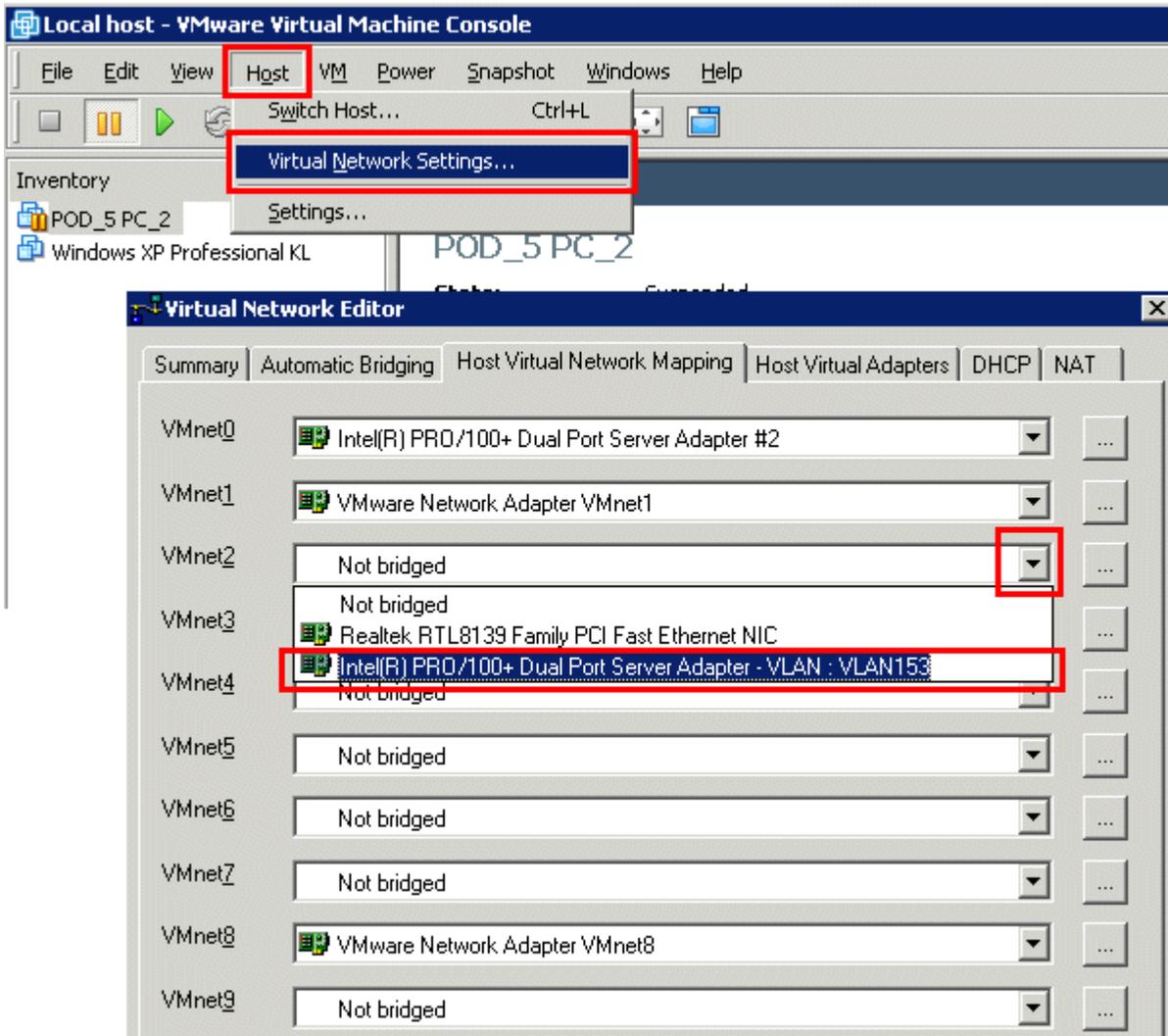
7.5   Binding Virtual Machines to Virtual Switches (VMnet)

Refer to section 7 of the *NETLAB+ Remote PC Guide*. In the last section, you associated a specific VLAN with a virtual switch (VMnet). When you create a virtual machine, you must bind it to the correct virtual switch (and by association, VLAN).

Virtual Machines	Virtual Switch (VMnet)	Offset (add to base VLAN)	Actual VLAN	Example
PC1a PC1b	R1 VMnet	+ 0	= _____	160 + 0 = 160
PC2	R2 VMnet	+ 2	= _____	160 + 2 = 162
PC3	R3 VMnet (optional)	+ 4	= _____	160 + 4 = 164
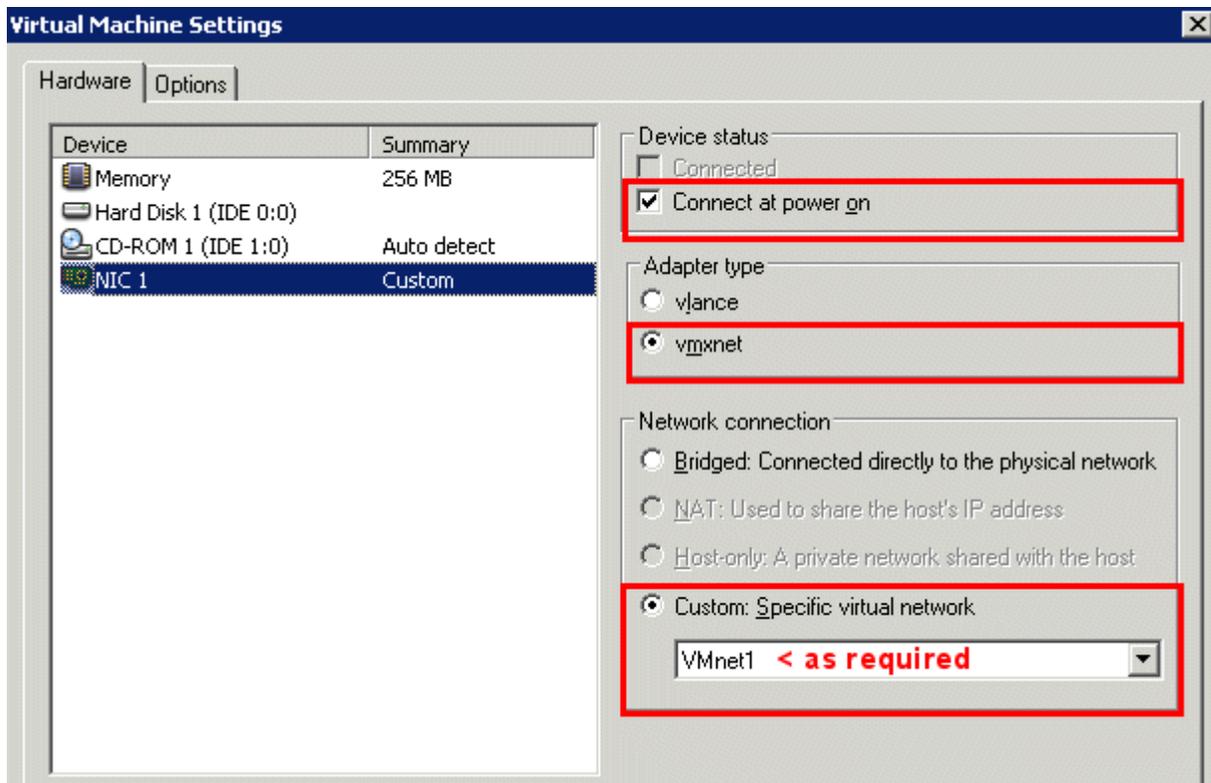
7.6   Configuring the Control Switch for VMware

One "reserved" port on the control switch connects to an 802.1q NIC card on the VMware GSX server. This allows devices in the pod to communicate with virtual machines. The reserved port should be configured as an 802.1q trunk port.
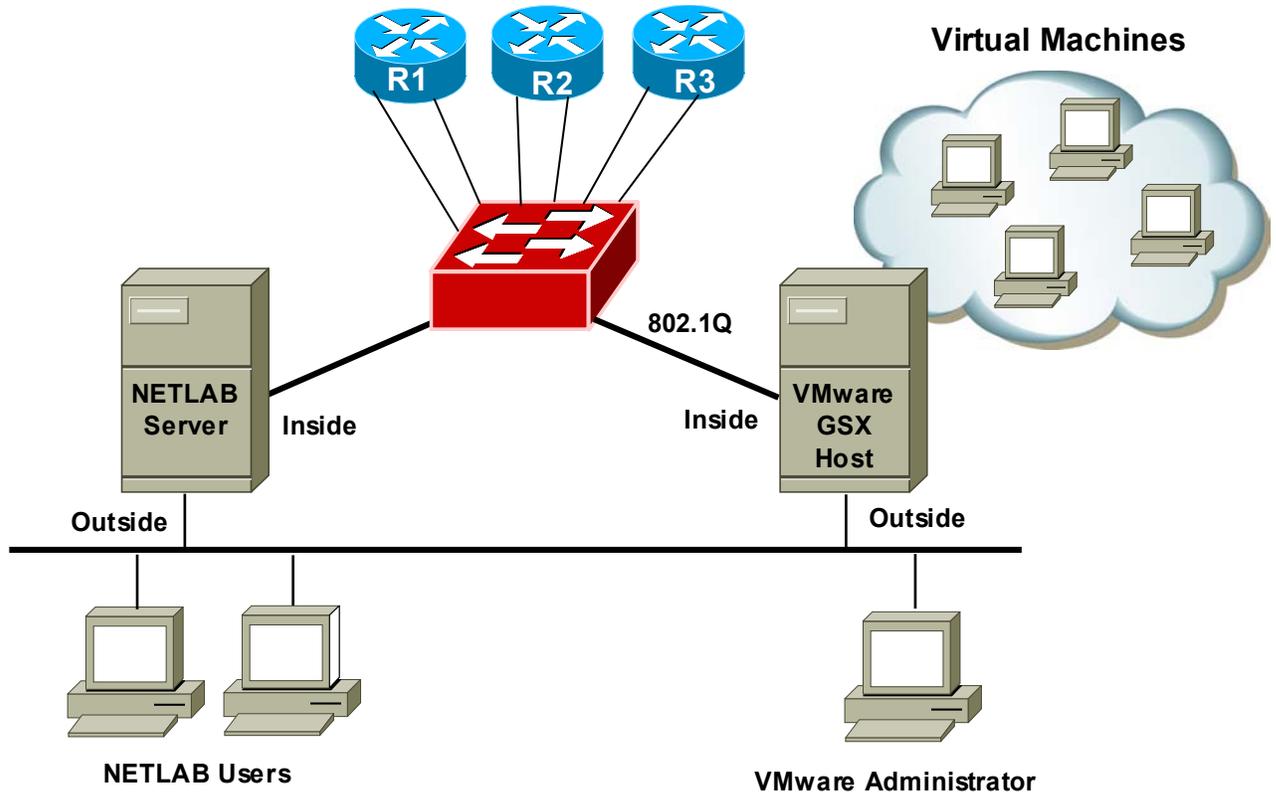
Once you have allocated a reserved port on the control switch, connect the VMware server inside NIC using a straight through CAT5 cable. Configure the switch port as a trunk and allow only the VLANs that were bound to the VMnets. If your VMware server hosts virtual machines for more than one pod, allow all the relevant VLANs for each pod.

Note: the control switch console password is **router**. The enable secret password is **cisco**. These passwords are used by NETLAB+ automation and technical support - please do not change them.

Example switch port configuration. Interface number and VLANs will vary.

```
interface FastEthernet0/23
 switchport mode trunk
 switchport trunk allowed vlan 160,162,164
 switchport nonegotiate
 no switchport access vlan
 no shutdown
```

7.7   VMware Server(s) on Different Control Switch

The reserved port may be located on a different control switch, provided that all links between control switches are also configured as 802.1q trunks and all VLANs are allowed. You may also have more than one VMware GSX server. Virtual machines in the pod can be located on different GSX servers.

**Alternate Configuration
VMware Server(s) on Different Control Switches**
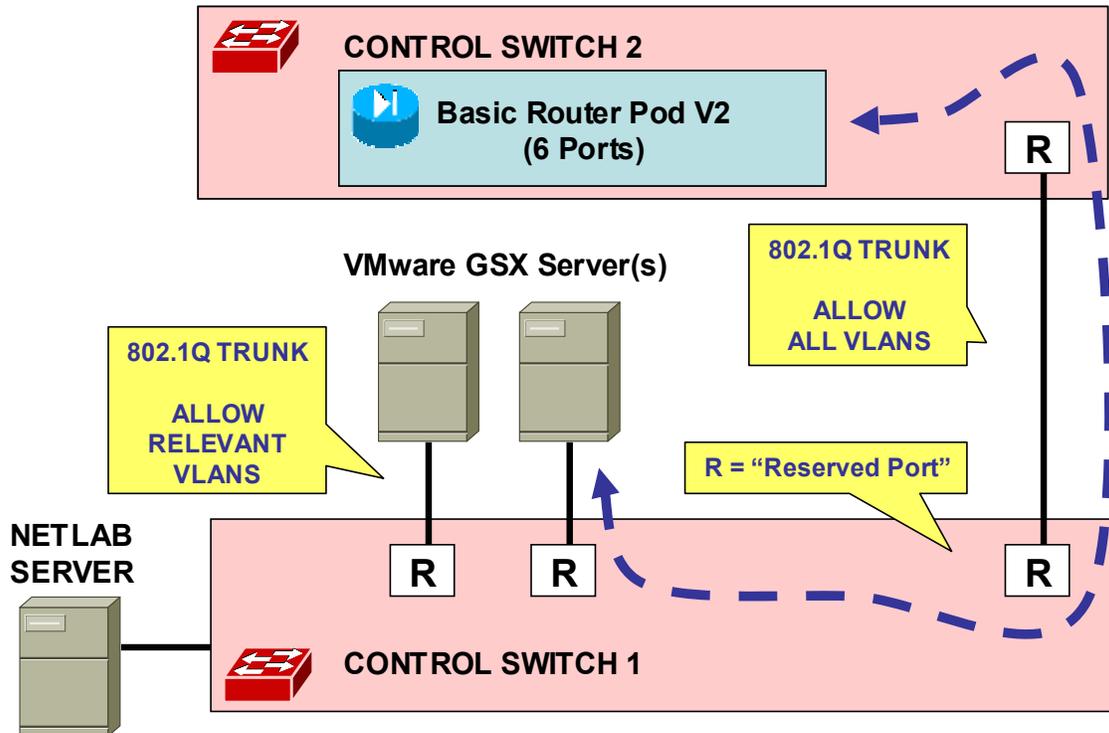
Ports connecting to VMware servers should only allow the VLANs associated with the pods being served. In addition, "switchport nonegotiate" should be used to suppress Dynamic Trunk Protocol (DTP):

```
interface FastEthernet0/23
 switchport mode trunk
 switchport trunk allowed vlan 160,162,164
 switchport nonegotiate
 no switchport access vlan
 no shutdown
```

Ports connecting control switches together, allow all VLANs and DTP:

```
interface FastEthernet0/24
 switchport mode trunk
 no switchport access vlan
 switchport trunk allowed vlan all
 no shutdown
```

8   Testing the Pod

After all routers and virtual machines have been installed, you should run a pod test to verify that your pod is working. The pod test will detect common configuration and cabling problems.

⬆ Online	Bring this pod ONLINE and make it available for reservations.
∿ Test	Tell me if this pod is working properly.
⊡ Cable	Show me how to cable this pod.

⇒ Some tests may take a long time. During the BOOTIOS test, NETLAB_AE may have to load the specified IOS image if it is not in flash. Some images are very large and can take up to 30 minutes to program into flash memory.

If you cannot resolve an issue and decide to contact technical support, please cut and paste the text from the POD TEST LOG and include with your e-mail.

Pod Test   NETLAB 3.6.0
Admin   administrator

TESTING POD 5

DEVICE	TYPE	TEST	STATUS	DETAILS
Control Switch 3	Catalyst 3550-24		◯ PASSED	3 test(s) passed, device looks good
ROUTER1	Cisco 2621XM	CONSOLE	◯ RUNNING	recover console test
ROUTER2	Cisco 2621XM	CONSOLE	◯ RUNNING	recover console test
BB	STANDALONE		◯ PASSED	2 test(s) passed, device looks good
PC_1	STANDALONE		◯ PASSED	2 test(s) passed, device looks good
IS_1	STANDALONE		SKIPPED	◆ This PC is not managed by NETLAB ◆ It is assumed to be working
PC_2	STANDALONE		SKIPPED	◆ This PC is administratively OFFLINE
IS_2	ABSENT		SKIPPED	◆ This PC is not implemented

POD TEST LOG

[00:07] PC3: Testing remote PC software and API - PASS
[00:07] PC3: Pinging PC at 169.254.0.3 - PASS
[00:05] PC2: Testing remote PC software and API - PASS
[00:05] PC2: Pinging PC at 169.254.0.2 - PASS
[00:03] CS3: Applying pod VLAN map on control switch 3 - PASS
[00:03] CS3: Setting up VLAN pool on control switch 3 - PASS

■■■■■■■   **TESTING IN PROGRESS**   ⊠ STOP

IMPORTANT: Use the STOP button to the right if you want to stop the pod test.

9   Finishing Up

9.1   Bring the Pod(s) Back Online

Now you can bring the pod online and make it available for lab reservations. You can bring just this pod online by clicking the ⬆ Online button under Management Options.

Pod 5 -- Management Options

⬆ Online	Bring this pod ONLINE and make it available for reservations.
⋀ Test	Tell me if this pod is working properly.
▭ Cable	Show me how to cable this pod.
▬ Delete	Remove this pod from NETLAB.

Alternatively, you can click ⬆ Bring All ONLINE on the Equipment Pods page. Choose this option when you have no more additions or modifications to pods or control devices and you wish to put all pods into service.

Equipment Pods   NETLAB 3.6.0
Admin   administrator

Equipment pods contain the lab devices that are accessed by users.

EXISTING PODS   (click on the GO buttons to manage a pod)

GO	ID	POD TYPE	POD NAME	STATUS	ACTIVITY
🔍	3	BASIC SWITCH POD 1 Router 2 Switches	POD 3	⬤ OFFLINE	IDLE
🔍	5	SECURITY ROUTER POD 2 Firewall Routers PCs & Servers	Galactica	⬤ OFFLINE	IDLE

✚ Add a Pod	⬇ Take All OFFLINE	⬆ Bring All ONLINE	◁ Back
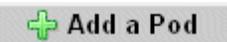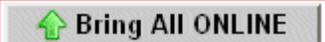
9.2   Enable Basic Router Pod V2 Exercises

To make Basic Router Pod V2 available to classes and students, you must enable the corresponding lab exercise content in each new or existing class.

To add or edit class information, log into NETLAB$_{AE}$ using your instructor account. See the Instructor Accounts section of the *NETLAB+ Administrator Guide* for details.

Select **Class** from the menu bar at the top of the MyNETLAB page, or the link in the body of the page.

The Class Manager page will be displayed.

Select to add a new class or select an existing class from the class list by clicking on a class name.

CISCO NETWORKING ACADEMY PROGRAM - MY ACADEMY					
CLASS NAME	INSTRUCTOR	STUDENTS	TYPE	START DATE	END DATE
2002 Semester 2	Jane Doe	2	CNAP	Jan 25, 2002	Jan 25, 2003
Antonio's FNS Class	Antonio Labmeister	2	CNAP	Feb 17, 2005	Feb 17, 2006

Be sure to check CCNA, CCNP, or both in each class you wish to offer the Basic Router Pod Version 2 and associated labs.

9.3   Schedule a Lab Reservation for Your New Pod

To schedule a lab reservation, select **Scheduler** from the menu bar or the link on the body of the MyNETLAB page.

The Scheduler Options screen will be displayed. Detailed descriptions of the scheduler options are available by selecting **Help** on the menu bar. In this example, we will reserve an equipment pod for your own use.

Select **OK** to proceed to the reservation calendar.

Please Note: The selection of pods depicted may be different from the pods available at your site.

The reservation time area may be scrolled up and down. Scroll to the bottom to display the color legend.

⊕ Select an available time, and the Reserve Instructor Access Time page will be displayed.

Review the details of the reservation and select **Confirm Reservation**. You can return to the reservation calendar to see your lab reservation on the time reservation portion. Remember, you may need to scroll the page to see your information.
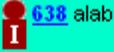
For more information on scheduling reservations, see the Scheduler section of the *NETLAB+ Instructor Guide*.