



## System Overview

Document Version: **2009-08-25**

This guide covers features available in NETLAB+ version **2009.R1** and later.

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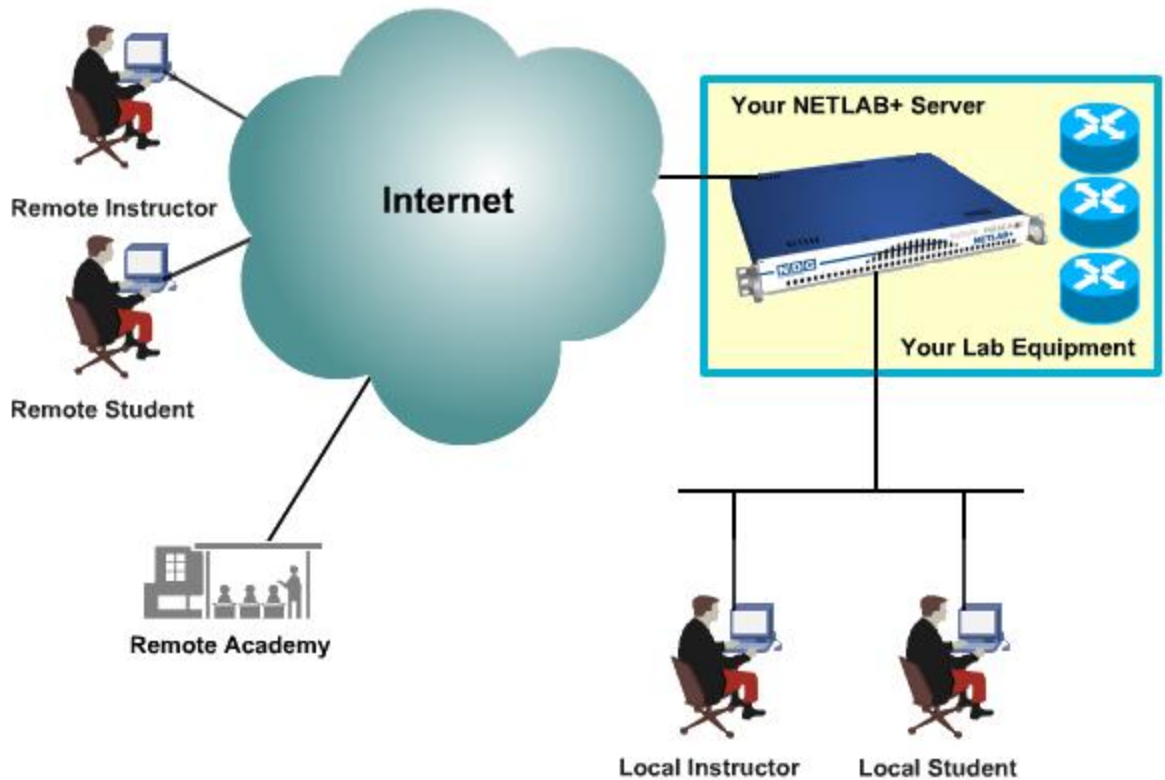
## 1 What is NETLAB+?

NETLAB+ is an Internet based network lab for instructor led training developed by Network Development Group, Inc. NETLAB+ allows organizations to use the power of the Internet to teach students by facilitating direct interaction with real network equipment. Students throughout the world have real-time access to the equipment in a training environment that is easy to manage and allows students and instructors to simultaneously share connections to the same equipment.

The NETLAB+ system is delivered as a network appliance and requires no customer knowledge of UNIX, web server software, or other system administrator functions. NETLAB+ is a turnkey product loaded and configured on a server for web-based lab access and equipment management of your Cisco routers, switches, firewalls, and PCs. NETLAB+ supports collaborative instructor-led class lectures, instructor self-preparation, student teams, and student self-study.

NETLAB+ provides a safe “sandbox” for users to schedule, configure and interact with lab equipment. All lab equipment and supporting devices are located safely behind the NETLAB+ server and not directly exposed to outside or public networks.

Automation of common tasks frees-up the instructor to focus on teaching. The NETLAB+ software will load and save device configurations, recover lost passwords, scrub equipment, and prepare the equipment for the next reservation upon completion. Remote access session sharing allows the instructor to share console access with students. The instructor can review and assess a student’s actual work on real gear during or after lab sessions. NETLAB+ will even power off the lab equipment when no upcoming reservations are scheduled. Prior to the next lab session, NETLAB+ will power the equipment on and pre-load configurations.



### The NETLAB+ product line consists of three versions:

**NETLAB Professional Edition**<sup>®</sup> is a customized remote appliance that uses your own lab topologies. NETLAB<sub>PE</sub> systems can be customized to display customer's logos and branding, text box colors, system name, and welcome message. A NETLAB<sub>PE</sub> system can host up to 150 lab devices.

**NETLAB Enterprise Edition**<sup>®</sup> is a custom-built appliance that includes all the features of a NETLAB<sub>PE</sub> system along with hardware upgrades to support the customer's unique requirements. NETLAB<sub>EE</sub> is an ideal choice for enterprise-level customers who require capabilities beyond the 150 lab device NETLAB<sub>PE</sub> limit.

**NETLAB Academy Edition**<sup>®</sup> is a remote lab appliance designed to provide online delivery of the Cisco Networking Academy Program curriculum. NETLAB<sub>AE</sub> systems provide limited customization options including the display of a custom system name and welcome message. Up to 12 equipment pods can be hosted on a single NETLAB<sub>AE</sub> system. Two of the 12 pods may be customized topologies.

## 2 Why is NETLAB+ Beneficial?

NETLAB+ provides a safe “sandbox” for users to schedule, configure and interact with lab equipment. All lab equipment and supporting devices are located safely behind the NETLAB+ server and not directly exposed to outside or public networks.

NETLAB+ has a calendar interface, which manages access to equipment bundles. Automation of common tasks frees-up the instructor to focus on teaching. The NETLAB+ software will load and save device configurations, recover lost passwords, scrub equipment, and prepare the equipment for the next reservation upon completion. Session sharing allows the instructor to share console access with students. The instructor can review and assess a student’s actual work on real gear during or after lab sessions. NETLAB+ will even power off the lab equipment when no upcoming reservations are scheduled. Prior to the next lab session, NETLAB+ will power the equipment on and pre-load configurations.

### **Training Organization Benefits:**

- Equipment Access for Blended Distance Learning
- Share Equipment Resources with Other Academies
- Potential to Access Equipment at Other Schools
- Higher Return on Equipment Investment
- Increase Student Lab Time
- Lab Management Software that Frees-up Instructors
- Host Academy curriculum
- Graphical User Interface (GUI) for System Administration

### **Instructor Benefits:**

- Automates Lab Management and Cleanup Tasks
- Equipment Access from Home for Class Preparation
- Recover Erased Flash and Passwords
- Share Sessions with Your Students
- Record and Assess Student Lab Work
- NETLAB+ will Save Configurations and Reload if Desired
- Manage Configuration Files
- Ability to Create Library of Configurations to Load

### **Student Benefits:**

- Equipment Access via the Internet
- Reinforce Skills Learned in Class
- Potential Access to Equipment at Hosting Schools
- Share Sessions with Peers and Instructors
- Review Lab Work with Instructors

## 2.1 Supporting Distance Education

NETLAB+ is ideally suited to enable training organizations to meet the needs of the increasing number of students who prefer the flexibility and cost effective advantages of online programs. Using NETLAB+ to implement remote access to IT equipment allows programs to be accessible to students across the globe. The organization's potential student population is no longer subject to geographic limitations.

As reported in the [Staying the Course: Online Education in the United States](#), 2008 survey by the Sloan Consortium<sup>TM</sup>, online enrollment rose by more than twelve percent from a year earlier. Factors such as higher fuel costs and rising unemployment have lead to an increase in students opting for online courses. Meeting the needs of this growing market is a prime consideration for all training organizations, which is especially challenging at a time when many face budgeting shortfalls.

NETLAB+ provides an effective way to make IT equipment accessible to students enrolled in a distance education program. Students accessing IT equipment through NETLAB+ benefit from the same hands-on training experience as students seated on campus. Using NETLAB+, students and instructors can share worldwide access to real networking equipment and remote PCs in a training environment that is easy to use and manage.

## 2.2 Solutions Serving Disadvantaged Students

For organizations seeking to meet the needs of the disadvantaged student population, the benefits that NETLAB+ provides by facilitating remote access to real IT equipment can be a key factor in implementing a program that is accessible to the disadvantaged student population:

- NETLAB+ is a cost effective solution that allows organizations to maximize the return on their investment in lab equipment by facilitating "24x7" access to equipment.
- Low-cost distance education programs fill a critical need by adult learners displaced from the workforce who have no access to employer-sponsored training.
- Students living in rural areas, or areas where growth and industry are depressed, may have limited access to local training programs. These students rely heavily on the availability of distance education programs and benefit significantly from programs where the costs and logistics of travel to a training center are not barriers to their success.

- A NETLAB+ system may be used serve multiple communities (schools, institutions academies, etc.). Blocks of time on equipment pods may be allocated by community to ensure that each community receives a predetermined share of lab resources. This can provide a means for organizations with limited budgets to defray expenses by sharing expenses.

## 3 NETLAB+ Features

### 3.1 Equipment Pods



A pod (or lab topology) is a single instance of a set of lab gear that students and instructors interact with during their training via the NETLAB+ system. It is a logical group of equipment that is physically interconnected and can be reserved as a single resource from the scheduler. In addition, a pod is isolated from other pods during normal operation.







NETLAB Academy Edition<sup>®</sup> users may refer to the guide written specifically for the pod-type they plan to install. Pod-specific planning and installation guides include:

- [NETLAB<sub>AE</sub> Multi-Purpose Academy Pod \(MAP\)](#)
- [NETLAB<sub>AE</sub> Network Fundamentals Pod \(NFP\)](#)
- [NETLAB<sub>AE</sub> Basic Router Pod Version 2 \(BRPv2\)](#)
- [NETLAB<sub>AE</sub> Basic Router Pod Version 1 \(BRPv1\)](#)
- [NETLAB<sub>AE</sub> Cuatro Router Pod \(CRP\)](#)
- [NETLAB<sub>AE</sub> Cuatro Switch Pod \(CSP\)](#)
- [NETLAB<sub>AE</sub> LAN Switching Pod \(LSP\)](#)
- [NETLAB<sub>AE</sub> Network Security Pod \(NSP\)](#)
- [NETLAB<sub>AE</sub> Basic Switch Pod Version 2 \(BSPv2\)](#)
- [NETLAB<sub>AE</sub> Basic Switch Pod Version 1 \(BSPv1\)](#)
- [NETLAB<sub>AE</sub> Advanced Router Pod \(ARP\)](#)
- [NETLAB<sub>AE</sub> Advanced Switch Pod \(ASP\)](#)
- [NETLAB<sub>AE</sub> Security Router Pod \(SRP\)](#)
- [NETLAB<sub>AE</sub> Security PIX Pod \(SPP\)](#)




## 3.2 Lab Access

Lab reservations are made using the scheduling system (see section 3.4). At the scheduled time, the lab session may be entered.

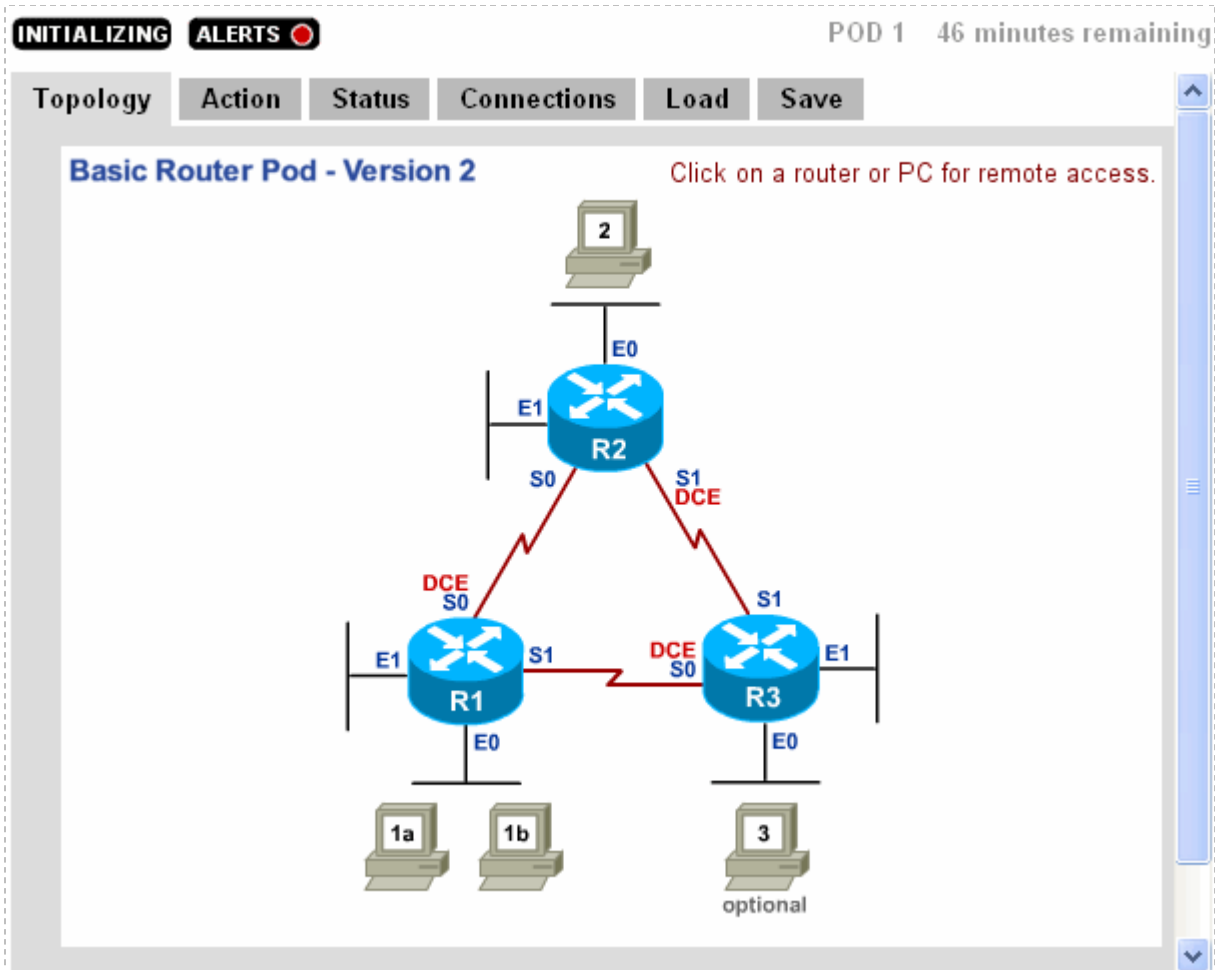
LAB RESERVATIONS			
ID	DATE / TIME	DESCRIPTION	POD
<a href="#">919</a>	<b>HOW</b> TODAY 11:30PM - Tue Feb 14, 2006 12:30AM <input type="button" value="ENTER LAB"/>	 Team A: Ann Dole, John Smith, Mary Smith Class: CCNP Fall Class Reserve Basic Router Pod Version 2 (no exercise)	<b>POD 1</b> <b>BASIC ROUTER POD v2</b>  3 Routers PC Support
<a href="#">920</a>	<b>HOW</b> TODAY 11:30PM - Tue Feb 14, 2006 12:30AM <input type="button" value="ENTER LAB"/>	 Team C: Bob Miller, Ida Lerner Class: CCNP Fall Class Reserve Basic Switch Pod Version 2 (no exercise)	<b>POD 2</b> <b>BASIC SWITCH POD v2</b>  1 Router, 2 Switches PC Support
<a href="#">922</a>	Tue Feb 14, 2006 9:00AM - 10:30AM	 Class: CCNP Fall Class Instructors: Jane Doe	<b>POD 1</b> <b>BASIC ROUTER POD v2</b>  3 Routers PC Support

The **Lab Access** Page displays the name of the pod, number of minutes remaining in the lab session, and the user name (student or instructor). The page is divided into several tabbed sections, allowing users to easily access all of NETLAB+'s functions. The **Topology**, **Action**, **Status**, **Connections**, **Load**, **Save** and **Exercise** sections can be accessed by selecting the section name on the tab.

Lab Access		INSTRUCTOR
MyNETLAB	Logout	 <b>janedoe</b>
POD 1		44 minutes remaining <input type="button" value="WE'RE DONE"/>
<b>Topology</b>	<b>Action</b>	<b>Status</b>
<b>Connections</b>	<b>Load</b>	<b>Save</b>
<b>Exercise</b>		

### 3.2.1 Topology Tab

The **Topology** tab displays the lab topology including the IP addressing scheme and physical or logical connections. You may click on all devices configured for direct access to establish direct console or GUI access.



For this example, console access has been opened to ROUTER1, where you may enter commands. In NETLAB+, you may share the console port with other users.

If you are using the NETLAB+ CLI Terminal as the remote terminal application to communicate with certain lab equipment, you may click on any of the buttons on the button bar at the bottom of the screen to invoke special NETLAB+ features. For example, clicking on the Control button allows you to take control of the session, other users can see what you are typing, but cannot type at the same time. These commands may also be conveniently entered using keyboard shortcuts. Use of the NETLAB+ CLI Terminal is optional; users may configure NETLAB+ to the terminal application preference and settings of their choice.

```
*** you are connected to R1
*** press ~? for help

*** janedoe is now controlling all input to the connection

*** you are connected to R1
*** your terminal has control of the connection
*** input from other users is disabled
*** press ~? for help

*** janedoe released control of the connection

*** you are connected to R1
*** press ~? for help
```

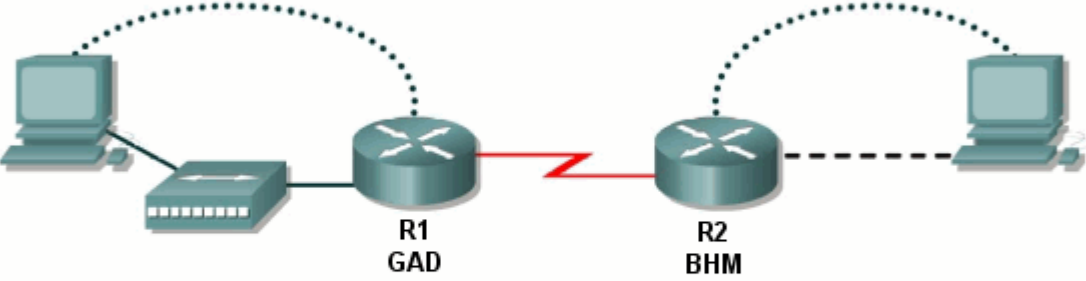
Disconnect Control Pause History Who Status Break Tilde Color Font Help Clipboard

N D G NETLAB janedoe POD 1 R1 connected

In this example, a lab reservation was made to perform a lab exercise, (see section 0). The topology page displays graphics specific to the selected lab exercise, devices may be accessed by clicking the graphic of the device.

**Topology**   **Action**   **Status**   **Connections**   **Load**   **Save**

Click on the terminal or router icons to open console connections to the routers.



R1  
GAD

R2  
BHM

This lab is using a NETLAB Basic Router Pod.  
Router R3 is not used in this lab.

Click the Show Lab Content button below to view the instructions for this lab.  
The instructions are in PDF format and require the Adobe Acrobat Reader.

**1.2.3 Review of Basic Router Configuration with RIP**   [Show Lab Content](#)

Another example of the Topology tab for a lab reservation to perform a lab exercise.

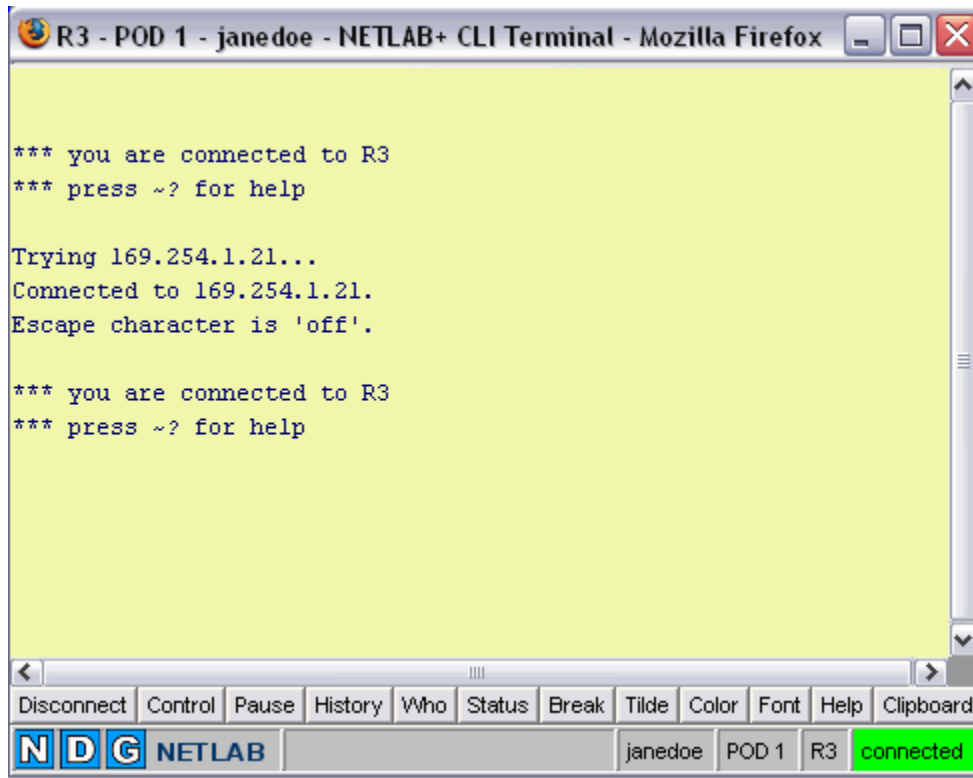
**Topology**   **Action**   **Status**   **Connections**   **Load**   **Save**

Click on the router or terminal icons to open console connections to the routers.

Click the Show Lab Content button below to view the instructions for this lab.  
The instructions are in PDF format and require Adobe Acrobat Reader.

**2.3.6 Propagate Default Route Information in an OSPF Domain**   [Show Lab Content](#)

Here, we will open a connection to R3 by clicking on the device.



### 3.2.2 Action Tab

The **Action** tab provides a convenient method to power off, power on, power recycle, scrub devices (return them to clean state) or perform automatic password recovery. Actions may be performed on single devices or the entire pod simultaneously.






Topology	Action	Status	Connections	Load	Save	Exercise
<b>NAME</b>	<b>TYPE</b>	<b>ACTION</b>			<b>ACTION ON ENTIRE POD</b>	
R1	Cisco 1841 (S0/1/x)	-select-			-select-	
R2	Cisco 2801/2811 (S0/1/x)	-select-				
R3	Cisco 2801/2811 (S0/1/x)	power off				
PC1a	Linux	power on				
PC1b	Other	power recycle				
		scrub device				
		password recover				

For automated operations to work properly, please use the following passwords for lab routers, switches, and firewalls:

console: **cisco**    enable secret: **class**

### 3.2.3 Status Tab

The current status of all devices in the topology is displayed on the **Status** tab. For reservations that are instructor-led or team sessions, other users will be attached to devices during a lab session, and the number of users will be displayed. You can also access a device by clicking the device name.

Topology	Action	Status	Connections	Load	Save	Exercise
<b>DEVICE</b>	<b>TYPE</b>	<b>POWER</b>	<b>USERS</b>	<b>STATUS</b>		
R1	Cisco 1841 (S0/1/x)	 ON	2	normal		
R2	Cisco 2801/2811 (S0/1/x)	 ON	0	normal		
R3	Cisco 2801/2811 (S0/1/x)	 ON	0	normal		
PC1a	Linux	 ON	1	online		
PC1b	Other	 ON	0	online		
PC2				not implemented in this pod		
PC3				not implemented in this pod		


CLICK ON THE DEVICE NAME TO OPEN A CONNECTION

### 3.2.4 Connections Tab

Device connections are shown on the **Connections** tab. For reservations that are instructor-led or team sessions, other users will be attached to devices during a lab session and their User Id and Names are displayed. Each user attached to the device is assigned a *Priority* to determine who can assert exclusive control over the devices when more than one user is sharing the device's console port. Instructors have priority over students. NETLAB+ automated operations have priority over both instructors and students. This tab also contains a button to **Drop My Connections** that allows connected users to quickly disconnect from all devices. Connections to devices can be made from this tab by clicking the device name.



Topology	Action	Status	Connections	Load	Save	Exercise
DEVICE	TYPE	USER ID	NAME	PRIORITY		
R1	Cisco 1841 (S0/1/x)	jdoue2006 jsmith	Jane Doe John Smith	3 1		
R2	Cisco 2801/2811 (S0/1/x)	-	-	-		
R3	Cisco 2801/2811 (S0/1/x)	-	-	-		
PC1a	Linux	jsmith	John Smith			
PC1b	Other	-	-	-		

CLICK ON THE DEVICE NAME TO OPEN A CONNECTION

 Drop My Connections

### 3.2.5 Load Tab

The **Load** tab is used to load saved configuration files into one or more console based devices. These saved configuration files can be the result of a previously saved session, or files created and edited offline. The file path is displayed at the top of the directory list. The top level folders allow for separation between personal and class files (see section 3.8).

Topology	Action	Status	Connections	Load	Save	Exercise
Top Level Folders Accessible by jdoue2006						
NAME						TYPE
 My Personal Folder (jdoue2006)						folder
 My Class Folders						folder
<p>For automated operations to work properly, please use the following passwords for lab routers, switches, and firewalls:</p> <p>console: <b>cisco</b>    enable secret: <b>class</b></p>						



### 3.2.6 Save Tab

The **Save** tab is used to save the configuration files of one or more console based devices into selected folders that reside on the NETLAB+ server. Configurations can be saved at any point in the lab reservation. There are two options when saving configuration files. A configuration folder can be created to hold the configuration files for all devices or files for specific devices can be saved individually. To manage configuration files, please refer to section [3.8](#)).

DEVICE	FILE NAME
R1	R1
R2	R2
R3	R3

Overwrite existing configurations

For automated operations to work properly, please use the following passwords for lab routers, switches, and firewalls:  
console: **cisco** enable secret: **class**

### 3.2.7 Exercise Tab

For lab reservations that have been scheduled as instructor-led training sessions, (see section 3.4), there is an additional tab, the **Exercise** tab.

The Exercise tab allows instructors to select lab exercises during the lab reservation. The current lab exercise is displayed at the top.

The screenshot shows a web interface with a tabbed menu at the top containing: Topology, Action, Status, Connections, Load, Save, and Exercise. The Exercise tab is active. Below the tabs, a dark blue header reads "Current Lab Exercise". Underneath, a yellow highlighted row displays "1.2.3 Review of Basic Router Configuration with RIP" with a "Show Content" button to its right. A scrollable list box below contains the following items:

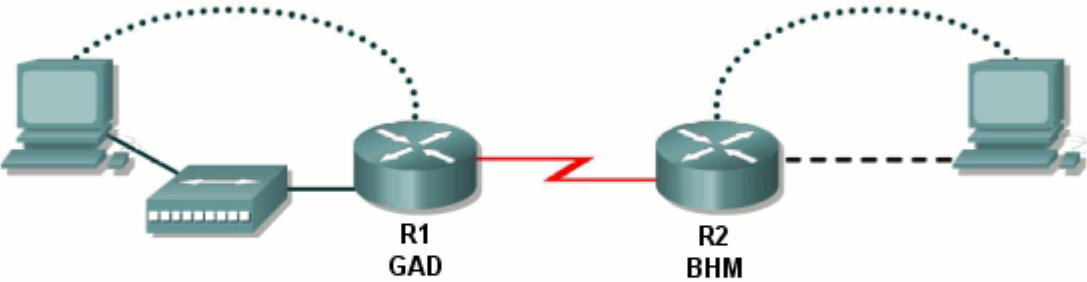
- 1.2.3 Review of Basic Router Configuration with RIP (highlighted)
- 1.2.4 Converting RIP v1 to RIP v2
- 1.2.5 Verifying RIP v2 Configuration
- 1.2.6 Troubleshooting RIP v2 using Debug
- 2.3.1 Configuring OSPF
- 2.3.2 Configuring OSPF with Loopback Addresses
- 2.3.3 Modifying OSPF Cost Metric
- 2.3.4 Configuring OSPF Authentication
- 2.3.5 Configuring OSPF Timers
- 2.3.6 Propagate Default Route Information in an OSPF Domain

Below the list is a checked checkbox labeled "Load default configuration files for exercise (if any)". At the bottom is a "Change Exercise" button.

The Topology page shows information for the current exercise.

**Topology**   **Action**   **Status**   **Connections**   **Load**   **Save**   **Exercise**

Click on the terminal or router icons to open console connections to the routers.



This lab is using a NETLAB Basic Router Pod.  
Router R3 is not used in this lab.

Click the Show Lab Content button below to view the instructions for this lab.  
The instructions are in PDF format and require the Adobe Acrobat Reader.

**1.2.3 Review of Basic Router Configuration with RIP**   [Show Lab Content](#)

The instructor may return to the Exercise tab at any time during the lab session and select another lab exercise.

Topology	Action	Status	Connections	Load	Save	Exercise
----------	--------	--------	-------------	------	------	----------

Current Lab Exercise

2.3.6 Propagate Default Route Information in an OSPF Domain Show Content

2.3.6 Propagate Default Route Information in an OSPF Domain

2.3.1 Configuring OSPF

2.3.2 Configuring OSPF with Loopback Addresses

2.3.3 Modifying OSPF Cost Metric

2.3.4 Configuring OSPF Authentication

2.3.5 Configuring OSPF Timers

3.2.1 Configuring EIGRP

3.2.3 Verifying Basic EIGRP

5.2.2 Configuring Frame Relay PVC

Reserve Basic Router Pod (no exercise)

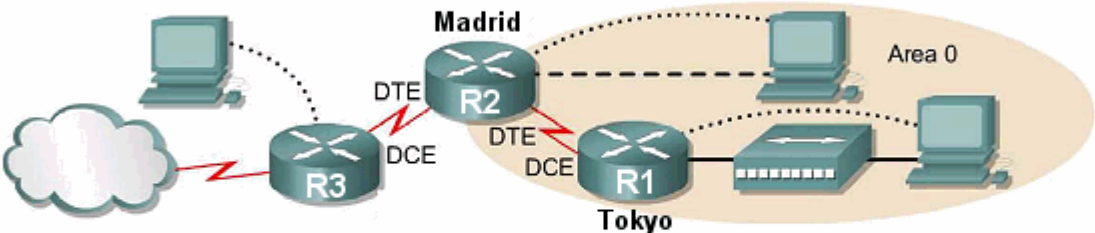
Load default configuration files for exercise (if any)

Change Exercise

The Topology page will be updated with graphics for the new exercise.

Topology	Action	Status	Connections	Load	Save	Exercise
----------	--------	--------	-------------	------	------	----------

Click on the router or terminal icons to open console connections to the routers.



Click the Show Lab Content button below to view the instructions for this lab. The instructions are in PDF format and require Adobe Acrobat Reader.

2.3.6 Propagate Default Route Information in an OSPF Domain

Show Lab Content

### 3.3 Remote PCs

A lab topology may include a *Remote PC*, a remotely accessible PC or server resource on your NETLAB Academy Edition® or NETLAB Professional Edition™ system.

NETLAB+'s remote PC technology allows you to add PCs to your lab pods. Remote PCs include the following features:

- Access to PCs is controlled by the scheduler.
- Instructors and students can share a session and collaborate.
- PC access is point-and-click through your web browser, like any other lab device. A built-in terminal application is provided, so there is no special client software to download.
- NETLAB+ technology proxies all remote access sessions over the TCP port(s) selected by the administrator. You will not have to open multiple IP addresses or ports on your firewall or expose PCs to the public network.
- PCs can be restored to a clean state after a lab reservation.

NETLAB+ supports three kinds of remote PCs, or the option not to implement a particular PC.

- **Direct/VMware.** The PC is implemented using supported [VMware Inc.](#) virtualization products.
  - 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.
- **Direct/Standalone.** The PC is implemented on a standalone machine, or a virtual product emulating a standalone machine.
  - Users can control the keyboard, video, and mouse.
  - Users can revert to a clean state by rebooting.
  - Users have limited rights (administrative access not recommended).
- **Indirect.** The PC is implemented, but not managed by NETLAB+.
  - Users may be able to interact with the PC, but cannot access the keyboard, video, or mouse through NETLAB+.
- **Absent.** The PC is not implemented.

NETLAB+ works in conjunction with certain VMware products to provide the following benefits:

- The keyboard, video and mouse of each virtual machine can be accessed without a “backdoor” network or interface on the virtual machine.
- All access to a virtual machine is proxied through NETLAB+ and the VMware host system, similar to KVM-over-IP hardware solutions.
- NETLAB+ supports *revert to snapshot*. Changes to a virtual machine can be discarded at the end of a lab reservation, returning the PC to a clean state.
- Users can have administrative privileges on a virtual machine without risk.
- NETLAB+ integrates with the VMware API. Users may power on, power off, and revert to clean state (scrub) from the NETLAB+ web interface.
- Users can shutdown and reboot a virtual machine during the lab, without losing changes.
- Virtual network interfaces on a virtual machine can be tied to real networks in the lab (requires 802.1q NIC on the VMware host system).

### 3.4 Scheduler



NETLAB+ includes a scheduling feature to facilitate scheduled access to lab equipment. Equipment can be scheduled for either classroom lectures or student lab time.

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. Instructors have several options available to them as to the type of lab session they may schedule. The scheduling options available to students will depend on the Self Study Access Options selected for the class (see section 0).



**Reserve instructor-led training time for a class.** Use this option for lecturing or guiding a whole class of students. With this option, you and a designated class will share the same lab reservation time.



**Reserve self-study time for teams.** Use this option for allowing your class to work as teams. With this kind of reservation, you can allow your students to share lab time as teams. You can edit team assignments through the Class Manager pages.



**Reserve self-study time for individual learners.** This is a good option to allow students in your class to work as individuals. With this option, you can designate a student to work on a specific exercise or free time to gain practice.



**Reserve an equipment pod for your own use.** This is an ideal option for using lab equipment for your own practice. You can also use this kind of reservation when you want to update your lab equipment, or you want to move the lab equipment around. The reservation process is similar to the other kinds of reservations described above.



**Reserve lab time in a class that you are attending as a learner.** As an instructor, you may be enrolled in a class where you are attending as a learner. You participate in the class identically to other students that are enrolled in the class. Use this option to reserve lab time as a learner in a class. The lead instructor of the class will have the option of participating in the reservation.

After a scheduling option has been selected, the reservation calendar will be displayed, where a reservation time may be selected.

**Scheduler** INSTRUCTOR

MyNETLAB Logout jdoe2006

February 2006						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

Now Showing

**Wednesday**

**February**

**8**

**2006**

Today's Date and Local Time

[February 7, 2006](#)

**4:01 PM**

Eastern Time (US & Canada)

Select a pod and reservation time for class **CCNP Fall Class** by clicking on a

	<b>POD 1</b>
	<b>BASIC ROUTER POD v2</b>
	3 Routers PC Support
12am	+
	+
1am	+
	+
2am	+
	+
3am	+
	+
4am	+
	+
5am	+
	+



### 3.5 Community Management

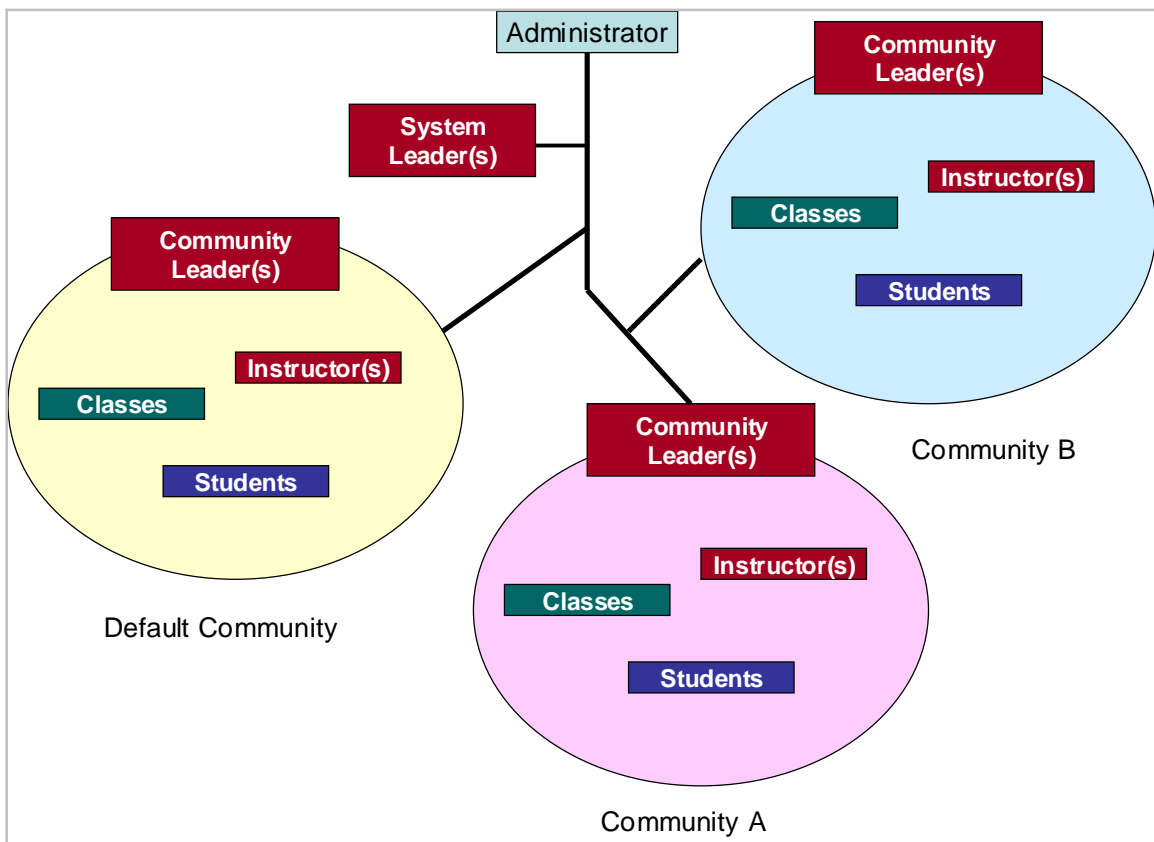


A *community* is a distinct group of instructors, students, and classes. Instructors may only manage students and classes within their own community. Each community reflects a separate autonomous group using the NETLAB+ system. There is no sharing of accounts or class records between communities.

The ability to support multiple communities on NETLAB+ is designed to facilitate the sharing of a NETLAB+ system among several different groups (schools, institutions academies, etc.). Blocks of time on equipment pods may be allocated by community to ensure that each community receives a predetermined share of lab resources.

For NETLAB<sub>AE</sub>, each Academy using your system should be defined as a community. If the system is being used by a single Academy, the default community assignment should be used.

Multiple communities are optional. Keep in mind that each instructor, student and class can belong to only one community. If you do not wish to use communities, all of your accounts and classes must reside in the default community.



### 3.6 Class Management



Class information is entered into the NETLAB+ system using the **Manage Classes** function. You can place your students into teams to share lab time when needed. See the Manage Classes section of the [NETLAB+ Administrator Guide](#) for details on selecting appropriate settings for a class. (see picture on next page).

<b>Class Name</b>	CCNP Fall Class	<b>REQ</b>
<b>Lead Instructor(s)</b>	Jane Doe	
<b>Global Labs</b>	<input checked="" type="checkbox"/> AE CCNA 1 English V3.1 <input checked="" type="checkbox"/> AE CCNA 2 English V3.1 <input checked="" type="checkbox"/> AE CCNA 3 English V3.1 <input type="checkbox"/> AE CCNA 4 English V3.1 <input type="checkbox"/> AE CCNA Bridge Exams 3.0 <input type="checkbox"/> AE CCNA English V2.1 (retired) <input checked="" type="checkbox"/> AE CCNA Pod Reservations (no labs) <input type="checkbox"/> AE CCNP BCMSN V5.0 English <input type="checkbox"/> AE CCNP BCMSN V5.0 Skills Exams English <input type="checkbox"/> AE CCNP BSCI V5.0 English <input type="checkbox"/> AE CCNP ISCW V5.0 English <input checked="" type="checkbox"/> AE CCNP ONT V5.0 English <input checked="" type="checkbox"/> AE CCNP Pod Reservations (no labs) <input type="checkbox"/> AE FNS Combined V1.2 English <input checked="" type="checkbox"/> AE FNS PIX V1.2 English <input checked="" type="checkbox"/> AE FNS Router V1.2 English	
<b>Private Labs</b>	<i>you have no installed private lab content to select</i>	
<b>Starting Date</b>	<input checked="" type="radio"/> None <input type="radio"/> Date Jun 26 2008	
<b>Ending Date</b>	<input checked="" type="radio"/> None <input type="radio"/> Date Jun 26 2009	
<b>Self Study Lab Access</b>	<input checked="" type="checkbox"/> Allow individuals to schedule lab time <input type="checkbox"/> Allow teams to schedule lab time	
<b>Predetermined Lab Time Limits</b>	<input checked="" type="radio"/> Enforce lab author's time limits (if any) <input type="radio"/> Do not enforce lab author's time limits	
<b>Preferred Maximum Length of Reservation</b>	3.0 hours (community maximum is 4.0 hours)	
<b>Preferred Minimum Time Between Reservations</b>	4 hours (community minimum is 3 hours)	
<b>Console Password (Cisco devices)</b>	cisco	
<b>Enable Password (Cisco devices)</b>	class	
<b>E-mail Configs/Logs</b>	<input checked="" type="radio"/> No <input type="radio"/> To lead instructors upon completion	
<b>Retain Configs/Logs</b>	<input checked="" type="checkbox"/> Instructor-led reservations <input checked="" type="checkbox"/> Individual or team reservations	
<b>Retention Period</b>	1 year	

### 3.6.1 Self Study Lab Access Options

Instructors may choose to allow individual students and/or student teams to schedule their own lab sessions by selecting **Self Study Lab Access** options. All individuals in the class roster must be assigned to a team in order to use the team scheduling option. See the Manage Classes section of the [NETLAB+ Administrator Guide](#) for details.

<b>Self Study Lab Access</b>	<input checked="" type="checkbox"/> Allow individuals to schedule lab time <input checked="" type="checkbox"/> Allow teams to schedule lab time
------------------------------	--

### 3.6.2 Restricting Self Study Access

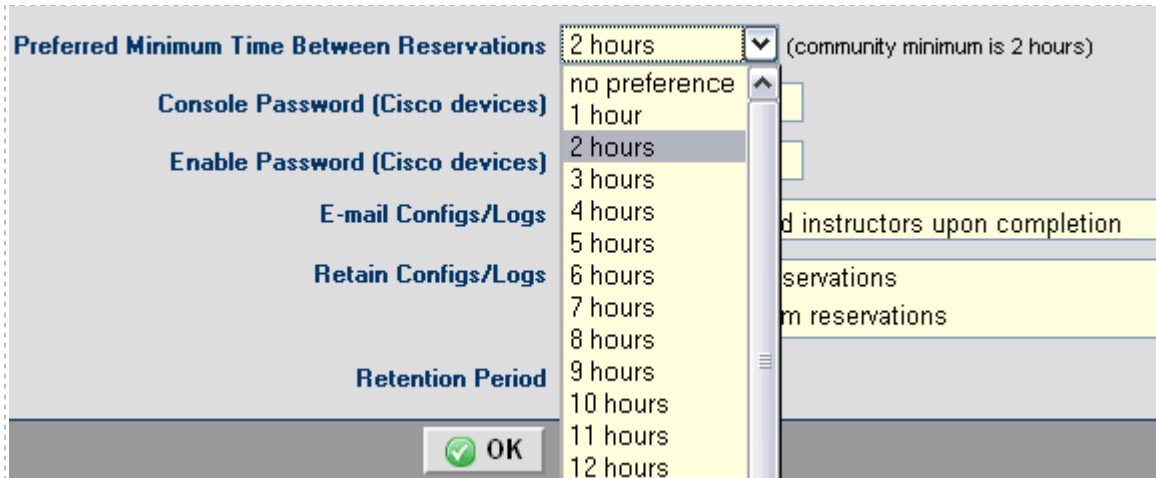
The **Preferred Maximum Length of Reservation** sets the maximum length (in hours) of an individual or team lab reservation. Lab exercises can also have a time limit. The lower of the two times is used. The maximum time lengths of lab reservations for all classes within a community are subject to community maximums, if a community maximum has been set.

Lead instructors and instructor-led reservations are not bound by this restriction

<b>Preferred Maximum Length of Reservation</b>	4.0 hours	(community maximum is 3.0 hours)
<b>Preferred Minimum Time Between Reservations</b>	no preference	(community minimum is 2 hours)
<b>Console Password (Cisco devices)</b>	<input type="checkbox"/>	
<b>Enable Password (Cisco devices)</b>	<input type="checkbox"/>	
<b>E-mail Configs/Logs</b>	<input type="checkbox"/>	Lead instructors upon completion
<b>Retain Configs/Logs</b>	<input type="checkbox"/>	Lead instructors upon completion
<b>Retention Period</b>	<input type="checkbox"/>	Lead instructors upon completion
<input checked="" type="button" value="OK"/>		

Use the **Preferred Minimum Time between Reservations** to set the minimum amount of time between successive reservations made by an individual or team. This setting can be used to prevent excessive scheduling of labs. For example, a setting of **2 hours** prevents the same individual or team from scheduling lab exercises less than 2 hours apart. The default value, **no preference** will allow a student or team to make unlimited reservations. The minimum time between reservations for all classes within a community is subject to community minimums, if a community minimum has been set

Lead instructors and instructor-led reservations are not bound by this restriction.



### 3.7 Account Management




Account information for both student and instructor accounts is entered into the NETLAB+ system using the **Manage Accounts** function. At least one instructor account must be setup by the NETLAB+ Administrator in order to access the scheduler for lab reservations.


A student account should be created for each student to allow them to participate in labs as part of an instructor-led session, a team session, or an individual reservation. Please see the Manage Accounts section of the [NETLAB+ Administrator Guide](#) for details.


Enter New Account Information					
<b>Add to Community</b>		XYZ Technical College			
<b>Initial Password</b>		<input type="password" value="*.*.*.*.*"/>			
<b>Retype Initial Password</b>		<input type="password" value="*.*.*.*.*"/>			
	User ID	Name	Type	E-mail Address (optional)	Status
1	<input type="text" value="Adole"/>	<input type="text" value="Ann Dole"/>	<input type="text" value="instructor"/>	<input type="text" value="adole@fictionalname.org"/>	Enter new user or leave blank
2	<input type="text" value="jdoe2006"/>	<input type="text" value="Jane Doe"/>	<input type="text" value="instructor"/>	<input type="text" value="jdoe@fictionalname.org"/>	Enter new user or leave blank
3	<input type="text" value="msmith"/>	<input type="text" value="Mary Smith"/>	<input type="text" value="student"/>	<input type="text" value="msmith@fictionalname.org"/>	Enter new user or leave blank
4	<input type="text" value="bmiller"/>	<input type="text" value="Bob Miller"/>	<input type="text" value="student"/>	<input type="text" value="bmiller@fictionalname.org"/>	Enter new user or leave blank
5	<input type="text"/>	<input type="text"/>	<input type="text" value="student"/>	<input type="text"/>	Enter new user or leave blank

### 3.8 File Management

The File Manager is used to view add, change, or delete configuration files and folders. NETLAB+ can upload and download *configuration files* to devices in the lab. These files are stored in NETLAB+'s *file system*.

 Configuration Files contain the actual device configurations.



 Ordinary Folders may contain other ordinary folders, configuration folders, and configuration files.



 Configuration Folders are special folders used for 'Load All' and 'Save All' operations.


- When you issue a 'Load All' request to NETLAB+, you are requesting that the entire equipment pod be loaded with configuration files from a named configuration folder. Any configuration files whose file name matches the name of the device are loaded into the device. Configuration files whose names do not match a device name are not loaded in a 'Load All' operation.
- When you issue a 'Save All' request to NETLAB+, you are requesting that the configuration of each device in the equipment pod be saved. NETLAB+ will create a configuration folder using the name specified and create a configuration for each device in this folder. The name of each configuration file will match the name of the device from which it was saved.

The top level folders allow for separation between personal and class files. The top level folders cannot be modified.

#### My Configuration Files

-  Clicking on a folder file changes the current folder
-  Clicking on a configuration file opens the file for viewing or editing

Top Level Folders Accessible by jdoe2006	
NAME	TYPE
 My Personal Folder (jdoe2006)	folder
 My Class Folders	folder

 Due to access restrictions, you can not create, modify or delete files and folders here.

[← Return to MyNETLAB](#)

Selecting the **My Class Folders** link will display file folders for shared files and system files for each class. Here we'll select the shared files folder for the CCNP Fall Class

My Class Folders (jdoe2006)	
NAME	TYPE
<i>go up one level</i>	folder
CCNA 101 Shared Files	folder
CCNA 101 System Files	folder
<b>CCNP Fall Class Shared Files</b>	folder
CCNP Fall Class System Files	folder
fall ccna Shared Files	folder
FNS Class Shared Files	folder
FNS Class System Files	folder
FNS review class Shared Files	folder
FNS review class System Files	folder
spring ccna Shared Files	folder

**My Top Level Folders**

Due to access restrictions, you can not create, modify or delete files and folders here.

The files in the class shared folder may be accessed by the students enrolled in the class. Students may view files, copy files, and load devices with configuration files and folders. Students do not have access to add, edit or delete items in the class shared folder.

CURRENT FOLDER: <b>CCNP Fall Class Shared Files</b>				
SELECT	NAME	TYPE	SIZE	UPDATED
	<i>go up one level</i>			
<input type="checkbox"/>	Configs Exercise 1	config folder		Fri Feb 10, 2006 11:13AM
<input type="checkbox"/>	Configs Exercise 2	config folder		Fri Feb 10, 2006 3:26PM
<input type="checkbox"/>	CCNP Test Commands	config	26	Thu Feb 9, 2006 11:36AM
<input type="checkbox"/>	R1	config	813	Fri Feb 10, 2006 3:16PM

**<- perform action on this folder ->**  **My Top Level Folders**



### 3.9 Student Assessment

The NETLAB+ Log Viewer allows an instructor to review the final configuration files and device output (logs) from a lab reservation. Using this tool, an instructor can rapidly assess how a student or team arrived at a solution. NETLAB+ records every keystroke and router output of lab sessions. The instructor may also receive this information by e-mail.

The screenshot shows the 'Log Viewer' interface. At the top, it says 'Log Viewer' and 'MyNETLAB Logout'. On the right, it identifies the user as 'INSTRUCTOR' 'i' 'jdoe2006'. The left sidebar contains navigation links: 'Summary' (selected), 'Command Index', 'Final Configs', 'R1', 'R2', 'R3', 'Session Logs', 'R1', 'R2', 'R3', and a 'Back' button. The main content area displays a 'SUMMARY' table with the following data:

SUMMARY	
Reservation ID	892
Date/Time	Mon Feb 6, 2006 6:00PM
Class	CCNP Fall Class
User Name	Mary Smith (msmith)
Status	completed

Below the table, the text reads: 'Use the navigation links on the left to see the details of this lab.'

For routers, switches, and firewalls, NETLAB+ provides a command index. The index lists the sequence of commands that were entered during the lab, across all devices, in chronological order. You may click on each command to view the resulting output in the corresponding log file. This tool sorts through all logs, highlights the commands entered by the student, and allows you to quickly assess the student's work.

The following example demonstrates the configuration of a serial link. Router R1 was configured first, followed by R2. Student “jsmith” did all of the work, and it took him about 2½ minutes. By clicking on the “ip address” in the command index, NETLAB+ automatically loads the session log for R2 into the bottom window and advances to the “ip address” command. NETLAB+ automatically highlights all user input. By clicking on the last “no shut” command, you could easily determine that the link came up and the student has successfully accomplished the task.

Summary  
**Command Index**

---

Final Configs

- ▶ R1
- ▶ R2
- ▶ R3

Session Logs

- ▶ R1
- ▶ R2
- ▶ R3

[← Back](#)

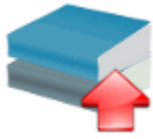
COMMAND INDEX			
H:M:S	USER	DEVICE	COMMAND
00:13:03	jsmith	R1	<b>ena</b>
00:13:07	jsmith	R1	<b>conf t</b>
00:13:17	jsmith	R1	<b>hostname R1</b>
00:13:28	jsmith	R1	<b>int serial 0</b>
00:13:54	jsmith	R1	<b>ip address 10.0.0.1 255.255.255.0</b>
00:14:04	jsmith	R1	<b>clock rate 56000</b>
00:14:10	jsmith	R1	<b>no shutdown</b>
00:14:11	jsmith	R1	<b>ena</b>
00:15:53	jsmith	R2	<b>ena</b>
00:15:57	jsmith	R2	<b>conf t</b>
00:16:10	jsmith	R2	<b>hostname R2</b>
00:16:17	jsmith	R2	<b>int serial 0</b>
00:16:35	jsmith	R2	<b>ip address 10.0.0.2 255.255.255.0</b>
00:16:42	jsmith	R2	<b>no shut</b>
00:17:52	jsmith	R2	<b>end</b>

Session log for R2 (partial)

```

R2 (config-if)#ip address 10.0.0.2 255.255.255.0
R2 (config-if)#no shut
R2 (config-if)#end
R2#
00:13:51: %SYS-5-CONFIG_I: Configured from console
```

### 3.10 Host Curriculum



NETLAB<sub>AE</sub> can provide web hosting for the Cisco Networking Academy curriculum. Administrators can install and serve Cisco Networking Academy curriculum modules on the NETLAB<sub>AE</sub> system. The currently installed curriculum modules are displayed:

The following curriculum has been authorized for your community.

CURRICULUM LIST		
SUBJECT	LANGUAGE	COMMENTS
▶ CCNA Exploration Routing 4.0	English	
▶ CCNA1 version 3.1	English	
▶ Networking for Home and Small Businesses 4.0	English	

Please refer to the [NETLAB+ Administrator Guide](#) for details.

### 3.11 Academy Sharing Portal



The NETLAB<sub>AE</sub> license allows your Academy to share access to your system with other Cisco Networking Academies. You can also charge cost recovery (within the guidelines of the Cisco Networking Academy Program).

Participation in the sharing portal is optional. This service is provided at no additional cost to NETLAB<sub>AE</sub> customers with a current maintenance agreement. Academies that are not current on their maintenance agreement will need to update their maintenance agreement in order for their information to be displayed on the portal.

#### Hosting Academies

The Academies below have indicated that they are willing to share time on their NETLAB<sub>AE</sub> system. Please direct inquiries to the contacts listed below.

Academy Name	Pod Types Available	Contact Information	Comments
Generic University	Basic Router Pod v1 (no PCs) Advanced Router Pod	Jane Doe janedoe@fictionalname.net 555-5555	We charge a small cost recovery fee that is based on the total number of participating Academies. Our goal is to keep the cost below \$125 USD per year.

A complete list of participating Academies is available on the [Academy Sharing Portal](#).



















### 3.12 Web-Based Administration

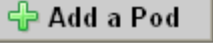
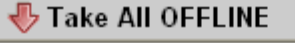
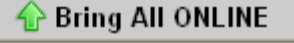
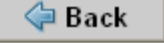
The web-based interface allows the administrator to easily monitor and maintain the NETLAB+ server and devices.





### 3.12.1 Pod Management

New pods are added to NETLAB+ via the **Equipment Pods** administrator page. Information for each pod is displayed.







EXISTING PODS (click on the GO buttons to manage a pod)					
GO	ID	POD TYPE	POD NAME	STATUS	ACTIVITY
	<a href="#">1</a>	 <b>BASIC ROUTER POD</b> 3 Routers	POD 1	 OFFLINE	IDLE
	<a href="#">2</a>	 <b>ADVANCED ROUTER POD</b> Frame / ISDN / Dial	Atlantia	 OFFLINE	IDLE
	<a href="#">3</a>	 <b>ADVANCED SWITCH POD</b> 3 Routers 5 Switches	Pacifica	 OFFLINE	IDLE
	<a href="#">4</a>	 <b>BASIC SWITCH POD</b> 1 Router 2 Switches	Redstar	 OFFLINE	IDLE
	<a href="#">5</a>	 <b>SECURITY ROUTER POD</b> 2 Firewall Routers PCs & Servers	Galactica	 ONLINE	IDLE
	<a href="#">6</a>	 <b>SECURITY PIX POD</b> 2 PIX Firewalls PCs & Servers	Pegasus	 ONLINE	IDLE

 **Add a Pod**
 **Take All OFFLINE**
 **Bring All ONLINE**
 **Back**











The **Pod Management** page displays detailed information and the high-level settings for each device, PC and control switch.

POD 5 - STATUS						
POD ID	POD NAME	STATUS	ACTIVITY	POD TYPE		
5	Galactica	 OFFLINE	IDLE	<b>SECURITY ROUTER POD</b>  2 Firewall Routers PCs & Servers		



  

POD 5 - ROUTERS, SWITCHES, AND FIREWALLS (click on the GO buttons to reconfigure devices)						
GO	NAME	TYPE	 ACCESS PORTS	 SWITCHED OUTLETS	SOFTWARE IMAGE	
	 ROUTER1	Cisco 2621XM	AS 2 PORT 1	SOD 3 OUTLET 1	c2600-advipservicesk9-mz.123-7.T7.bin	
	 ROUTER2	Cisco 2621XM	AS 2 PORT 2	SOD 3 OUTLET 2	c2600-advipservicesk9-mz.123-7.T7.bin	





  

POD 5 - PCs AND SERVERS (click the GO buttons to reconfigure)						
GO	NAME	PC ID	TYPE	ACCESS	CONTROL IP	OPERATING SYSTEM
	 BB	2	STANDALONE	VNC	169.254.0.2	Windows XP
	 PC_1	3	STANDALONE	VNC	169.254.0.3	Windows 2003 Server
	 IS_1	4	STANDALONE	INDIRECT		Linux
	 PC_2	5	STANDALONE	VNC	169.254.0.5	Windows 2003 Server
	 IS_2	6	STANDALONE	INDIRECT		Linux

POD 5 - CONTROL SWITCH (click on the GO button to reconfigure control switch parameters)					
GO	SWITCH ID	POD PORT RANGE	BASE VLAN	VLAN POOL	
	 3	1-10	140	140-146	

Pod management options provide a convenient means to bring a pod online, test a pod, provide cabling information and remove a pod from the system.

 <b>Online</b>	Bring this pod ONLINE and make it available for reservations.
 <b>Test</b>	Tell me if this pod is working properly.
 <b>Cable</b>	Show me how to cable this pod.
 <b>Delete</b>	Remove this pod from NETLAB.









Built-in diagnostics help you get your equipment pods up and running quickly.

**Pod Test**

NETLAB 3.6.0

**Admin**
administrator

**TESTING POD 5**

DEVICE	TYPE	TEST	STATUS	DETAILS
 Control Switch 3	Catalyst 3550-24		<span style="color: green;">●</span> PASSED	3 test(s) passed, device looks good
 ROUTER1	Cisco 2621XM	CONSOLE	<span style="color: gray;">⌚</span> RUNNING	recover console test
 ROUTER2	Cisco 2621XM	CONSOLE	<span style="color: gray;">⌚</span> RUNNING	recover console test
 BB	STANDALONE		<span style="color: green;">●</span> PASSED	2 test(s) passed, device looks good
 PC_1	STANDALONE		<span style="color: green;">●</span> 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.

### 3.12.2 Control Device Management


NETLAB+ provides configuration tools that help administrators setup their *control devices*. Control devices are explained in section 0. Configuration of your access servers and control switches is performed automatically using SNMP.






### Control Switches

Control switches provide internal connectivity between NETLAB, access servers, remote PCs, and switched outlet devices.



### Access Servers


Access servers provide console connections to lab routers, lab switches, and lab firewall devices so that users can access these devices from NETLAB.






### Switched Outlets

Switched outlets provide managed electrical power, allowing NETLAB and users to turn lab equipment on and off.





Control devices can now be managed individually. You can add, change, or delete control switches, access servers, and switched outlet devices as needed.


**CONTROL SWITCH 1**
IP ADDRESS **169.254.1.11**
**Catalyst 2950-24**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P1	P1	P1	F	F	F	P4	P4	P4	F	F	F	R	R	R	R	R	R	R	R	R	R	R	R

	Port is free and not assigned to any pods
	Port is assigned to equipment pod with pod ID of n
	Port is reserved for connections to NETLAB, control switches, access servers, and switched outlet devices

Several management options are available for each control device:

-  **Configure**
 Allows you to configure IOS software or switched outlet devices. NETLAB+ now automates many configuration tasks using SNMP.
-  **Test**
 Perform a test to determine if the control device is configured and working properly. *Screen shot.*
-  **Modify**
 Edit the information for a control device, such as switch type or reserved port assignments.
-  **Delete**
 Remove a control device from NETLAB+.

### 3.12.3 Lab Designer



The Lab Designer provides a means of creating a series of custom laboratory exercises that may be made available for class use. The Lab Designer tool allows input of user-supplied information that may include documentation files (PDF, DOC, RTF or TXT format), images (GIF, JPEG or PNG format) and configuration files for each lab exercise.

You may select one of your current Academy pod topologies, or a custom pod that has been installed on your system using the **Pod Designer** (see below).

The Lab Designer builds a *Lab Design File* (\*.nlx) which contains all user-supplied data. After a lab design file has been built and exported, it may be uploaded to the system by the Administrator and made available for use.

**Lab Designer**
INSTRUCTOR

MyNETLAB Logout
 jdoe2006

Name	Build	Committed	Author ID	Global ID	File Size	Last Modified [y-m-d h:m:s]
Fall CCNA Class	1	No	JDOE2006	00C0_F06B_B5E7_44BA_64B4	618,062	2006-07-16 19:14:02 UTC

General

Documents

Images

Configs

Labs

Builds

**General Settings**




Name	Fall CCNA Class
Description	Lab Exercises for Fall CCNA Class
Author	Jane Doe
Organization	Fictional Name University
Copyright	Copyright © 2006, Fictional Name University
Support URL	<a href="http://www.fictionalname.org/">http://www.fictionalname.org/</a>
Note / Comment	
Modification Password	<i>not required</i>
Installation Password	<i>not required</i>
Cloning Permitted	Yes
Cloning Password	<i>not required</i>
Access	Global
Managed Content (NDG)	No

Documentation files (PDF, DOC, RTF or TXT format) may be added to the lab design file and be associated with a lab exercise. A lab document may be associated with more than one lab exercise.

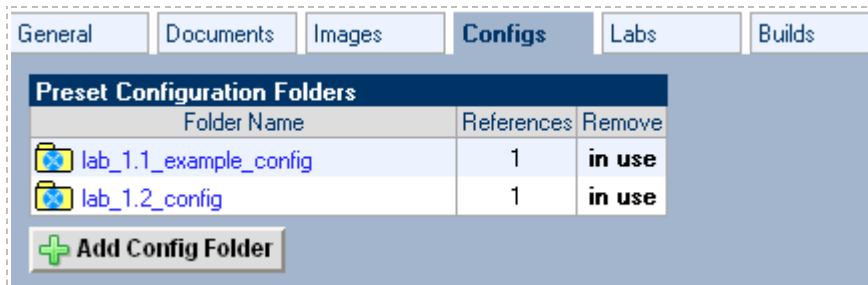
Documents					
File Name	Type	Size	References	Remove	
lab_1.1_intro.pdf	Adobe PDF Document	193,782	1	in use	
lab_1.2_configuration.pdf	Adobe PDF Document	193,782	1	in use	
lab_1.3_troubleshooting.pdf	Adobe PDF Document	193,782	1	in use	
581,346 bytes in 3 file(s)					
+ Add Document					

Image files (GIF, JPEG or PNG format) may be created and added to the lab design file to reflect exercise-specific information. An image may be associated with more than one lab exercise. Alternatively, you may use the default image associated with the pod design.

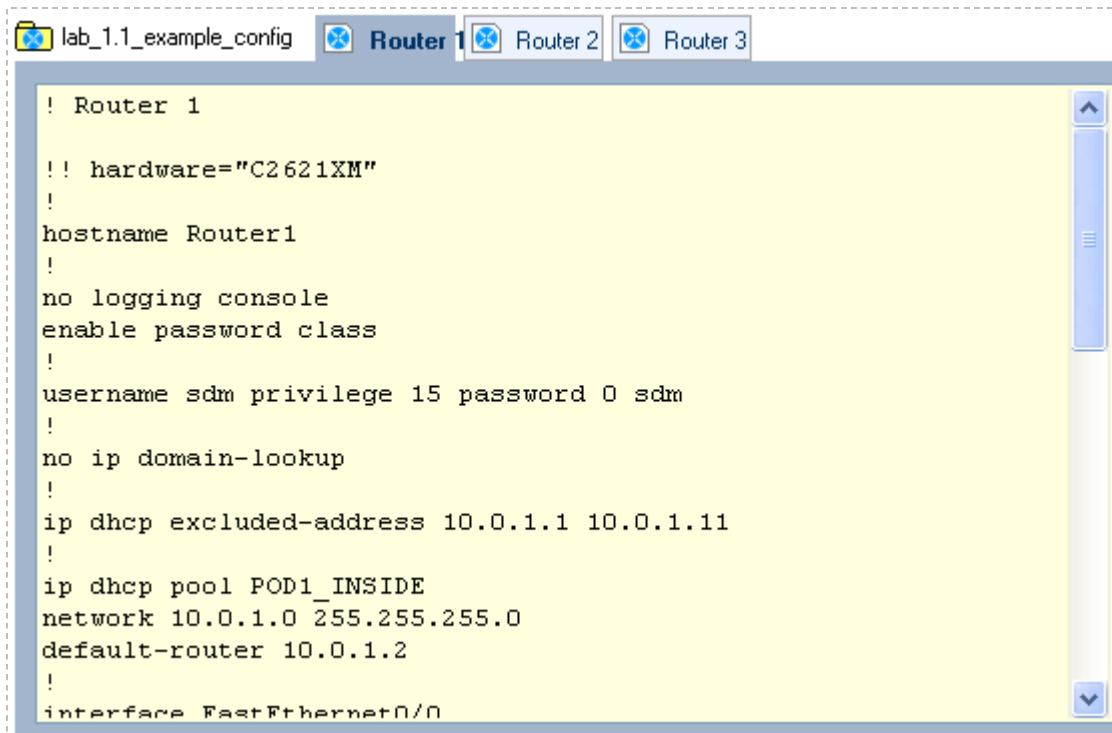
*Hotspots* are clickable regions that may be set to define areas on the topology image, which may be selected to access the device represented during a lab reservation. See the Pod Designer section below for further discussion of hotspots.

Images						
File Name	Type	Size	Hotspots	References	Remove	
lab_1.1.gif	Graphic Interchange Format	9,952	 2 set	1	in use	
lab_1.2.gif	Graphic Interchange Format	9,952	 none set	1	in use	
lab_1.3.gif	Graphic Interchange Format	9,952	 3 set	1	in use	
29,856 bytes in 3 file(s)						
+ Add Image						

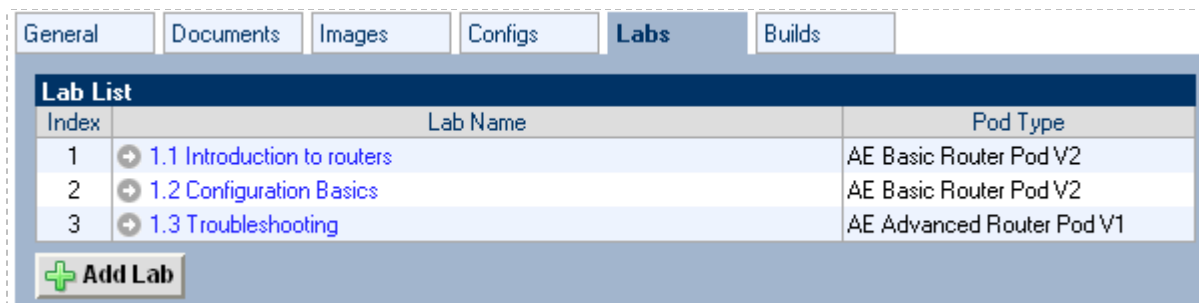
Configuration folders may be added to the lab design file using the **Configs** tab. The configuration folder may be associated with more than one lab exercise.



Configuration folders contain configuration files specific to the devices in the topology that can be loaded at the start of the lab reservation.



A series of lab exercises are easily added to the lab design using the **Labs** tab. Each lab exercise may be assigned to any available pod-type.



Options are selected for each lab exercise. Lab documents, images and configuration folders may be associated with the lab exercise by selecting the appropriate settings on the page.

**Lab 1.1 Introduction to routers**  
**Global Lab ID** JDOE2006\_00C0\_F06B\_B5E7\_44BA\_64B4\_0001  
**Index** 1  
**Lab Name** 1.1 Introduction to routers  
(required)  
**Pod Type** AE Basic Router Pod V2  
**Time Limit** 50 minutes  
**Lab Document** lab\_1.1\_intro.pdf  
**Topology Image** lab\_1.1.gif  
**Preset Configuration** lab\_1.1\_example\_config  
**Assessment Options**  
 always load the specified preset configuration  
 disable lab preview feature  
 disable lab selection from ILT exercise tab  
 disable configuration load tab and features  
 disable configuration save tab and features  
 disable the action tab and its features  
 disable automated scrub feature from action tab  
 disable password recovery feature from action tab  
 disable power control features from action tab  
**VLAN Map**  
 use pod default  
 custom map  
**Alternate Device Names**  
 use pod device names  
 custom names

### 3.12.4 Pod Designer



The addition of the Pod Designer feature brings a completely new level of flexibility to the NETLAB+ system. The Pod Designer is used to create custom pods.

The maximum number of pods that may be included on a single NETLAB Academy Edition system has been increased from 10 pods to 12 pods. NETLAB<sub>AE</sub> allows a maximum of two of the 12 pods to be custom pods created with the Pod Designer.

The Pod Designer builds a *Pod Design File* (\*.npd) which contains all user-supplied data. After a pod design file has been built, it may be installed in the NETLAB+ system database by the Administrator and made available for use. Pod design files may also be exported and installed on other NETLAB+ systems.

**Pod Designer**
INSTRUCTOR

MyNETLAB Logout
 **jd0e2006**

Name	Build	Committed	Author ID	Global ID	File Size	Last Modified (y-m-d h:m:s)
<b>Custom Pod 1</b>	<b>1</b>	No	JDOE	00C0_F068_B5E7_44B7_B72E	832	2006-07-14 15:25:39 UTC

**General**

Image

Control

Device

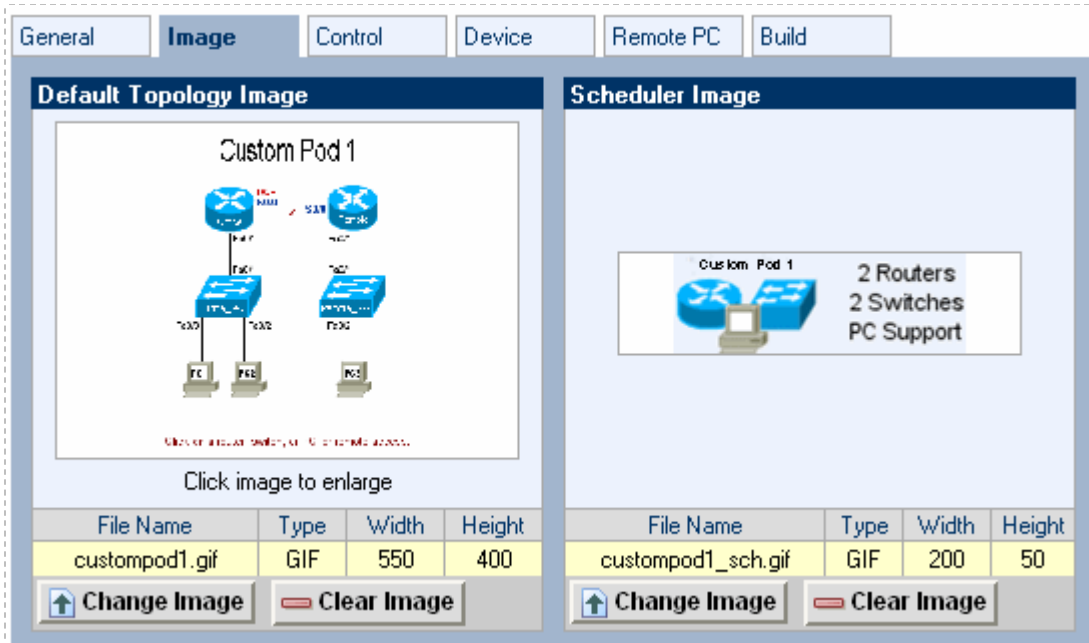
Remote PC

Build

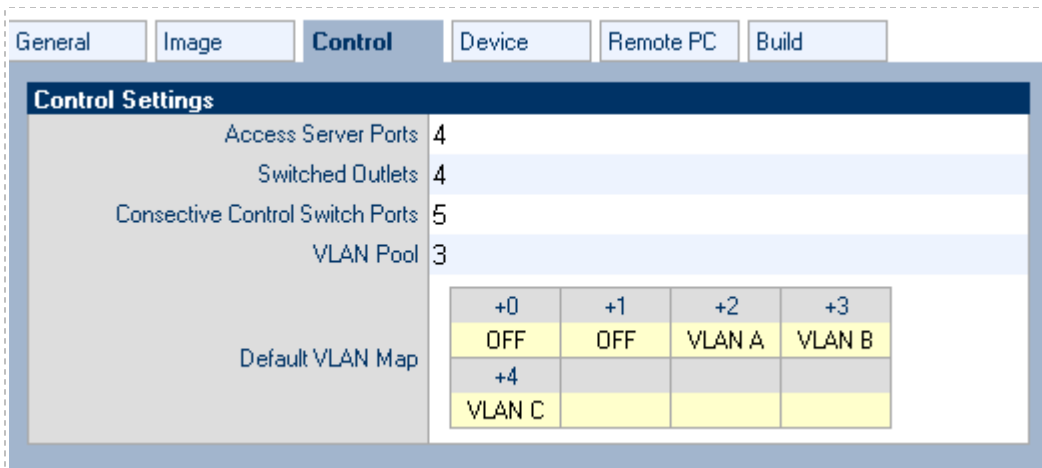
**General Settings**

Name	Custom Pod 1
Description	New Pod for Fictional University
Author	Jane Doe
Organization	Fictional Name University
Copyright	Copyright © 2006, Fictional University
Support URL	<a href="http://www.fictionalname.org">http://www.fictionalname.org</a>
Note / Comment	
Modification Password	<i>not required</i>
Installation Password	<i>not required</i>
Cloning Permitted	No
Cloning Password	<i>not applicable</i>
Removable (NDG)	No
Academy Edition Pod (NDG)	No
Max per System (NDG)	unrestricted









The Pod Designer tool includes options to define image files (GIF, JPEG or PNG) to be used as the Default Topology Image (seen on the Topology Tab during a lab reservation) and Scheduler Image (thumbnail display on the Scheduler).





All necessary control device settings are entered into the **Control** tab.











Lab devices in the topology are defined on the **Device** tab section of the Pod Designer.

Devices									
Edit	Index	Type	Name	Hotspot	CS +	AS +	SD +	INX	Cables
	1		Office	176,73,235,132	0	0	0	No	<a href="#">view/set</a>
	2		Remote	324,72,383,131	1	1	1	No	<a href="#">view/set</a>
	3		Office_SW	165,181,244,232	2	2	2	No	<a href="#">view/set</a>
	4		Remote_SW	313,182,392,232	4	3	3	No	<a href="#">view/set</a>

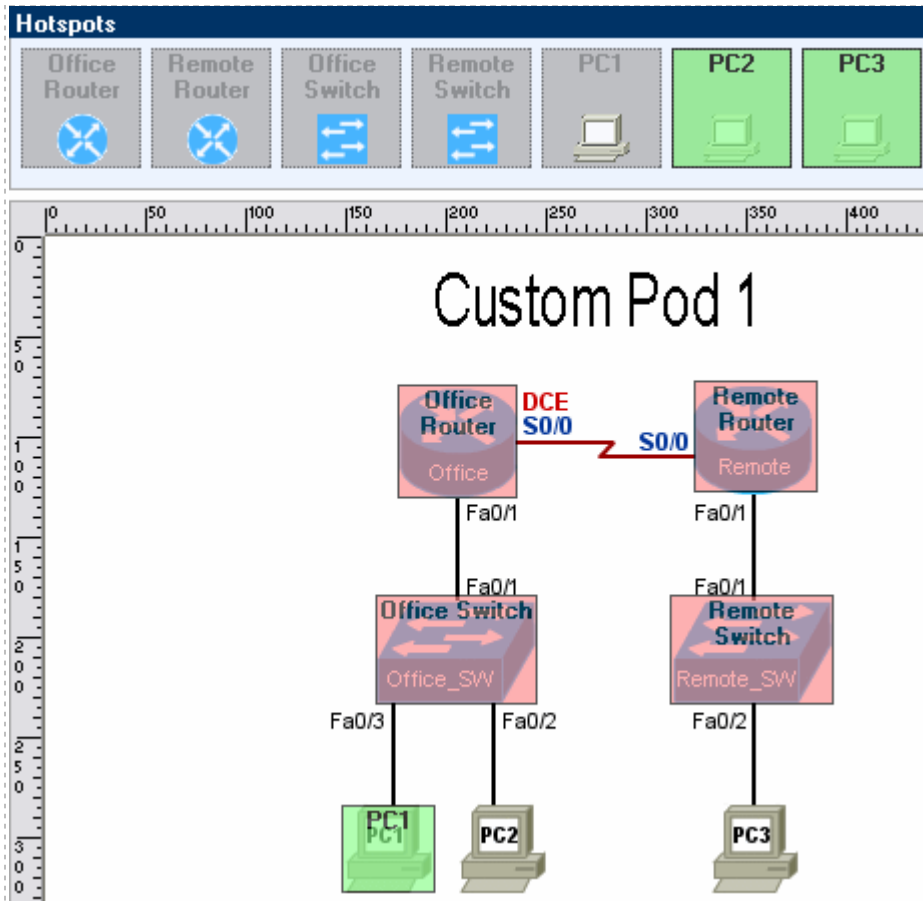
Remote PCs are defined on the **Remote PC** tab.

Remote PC					
Edit	Index	Icon	Name	Hotspot	
	1		PC1	147,281,196,331	
	2		PC2	205,281,253,331	
	3		PC3	331,281,377,332	



Both the Pod Designer and Lab Designer feature a way to create *Hotspots* on topology images. Hotspots are clickable regions that may be set to define areas on the topology image, which may be selected to access the device represented during a lab reservation. Hotspots are dragged onto the topology image, placed, and sized by the user. In this example, hotspots have been set for the first five devices but have not yet been set for PC2 or PC3.



### 3.12.5 Automatic System Backups

NETLAB+ Central Services stores backup files of the data necessary to rebuild your NETLAB+ system, to be used only in the case of a catastrophic event such as system disk failure. System backups will be done transparently by the NETLAB+ system, provided that Backup Service has been selected.



NETLAB stores its data in an SQL database. The NETLAB backup service will send a daily backup of the database to the NETLAB central support site. This information can be used to reconstruct your NETLAB system in the event of a hard disk failure.

The following table lists the backups on file with the NETLAB central support site. The support site retains the last 5 backups.

Backups On File With Central Support Site		
Date/Time (UTC)	Backup ID	Size (Compressed)
2009-02-10 09:14:29	252112	99566
2009-02-09 09:14:29	251956	99434
2009-02-08 09:14:30	251807	99440
2009-02-07 09:14:30	251655	99433
2009-02-06 09:14:30	251504	95431

### 3.12.6 Automatic Software Updates



NETLAB+ uses the Internet to download and upgrade the system software if Software Update Service is enabled. Software Update Service will contact Central Support on a regular basis. If a software upgrade is available, it will be downloaded and installed when the lab is not in use.

### 3.12.7 Automatic Time Synchronization



NETLAB+ Time Service will update its system clock on a daily basis, if Time Service is enabled. The clock is synchronized with NETLAB+ Central Services to ensure that the NETLAB+ server maintains accurate time settings.

## 4 How Does NETLAB+ Operate?

The NETLAB+ server can best be described as a *proxy server*. All connections to lab equipment flow through the NETLAB+ system.

The NETLAB+ server has two Ethernet network interfaces:

- The *outside* interface (Ethernet 0) attaches to your network and faces towards lab users.
- The *inside* interface (Ethernet 1) attaches to a NETLAB+ control switch and faces your lab equipment and various control devices.

All user connections are proxied (not routed) between the outside interface and the inside interface. No connections are allowed unless the user is attending an active lab reservation.

Because all connections are proxied (not routed), you only have to open one IP address and two TCP ports to provide access to NETLAB+ and all of the lab equipment behind it.

## 4.1 Ports and Firewall Requirements

NETLAB+ only requires one IP address and three inbound TCP ports for all inbound connections. NETLAB+ also initiates outbound traffic on ports that are normally open.

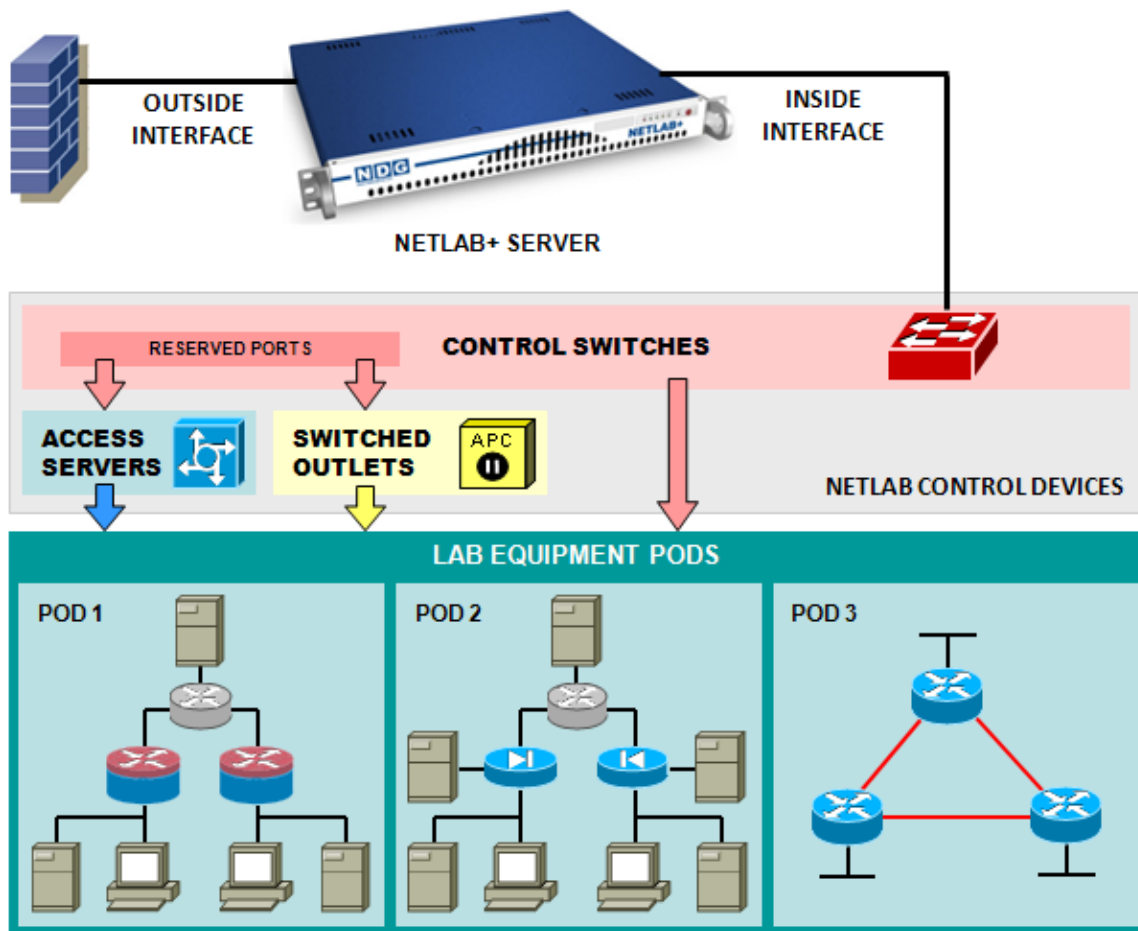
Outside to Inside Firewall Requirements	
TCP 80	Provides HTTP access to the NETLAB+ web interface.
TCP 2201 (or selected alternate(s))	Factory default setting which provides remote access for proxied connections to lab equipment. Proxy servers are not supported. The administrator may change this port and/or add additional ports for remote users/sites that block port 2201 outbound.
TCP 22	Provides SSH for NDG technical support. Contact NDG technical support to obtain the source IP address.

Inside to Outside Firewall Requirements	
TCP 80	Allows the NETLAB+ server to connect to NETLAB+'s central support services (time, status, backup, software upgrades).
UDP 53	Provides DNS lookups. You do not have to open UDP 53 in the firewall if you configure NETLAB+ to use a local DNS inside the firewall.
TCP 25	Provides SMTP outbound mail. You do not have to open TCP 25 in the firewall if you configure NETLAB+ to use a local SMTP mail server inside the firewall.
PING	NETLAB+ uses ICMP echo for some diagnostic tests, although this is not critical to its operation.

## 4.2 The Control Plane

The NETLAB+ *control plane* forms the foundation needed to interconnect various components of the NETLAB+ system. The control plane consists of devices that are required in order for NETLAB+ to function, but are not accessible to students and instructors.

Control devices may be control switches, access servers, or switched outlet devices.



*Control switches* provide internal connectivity between NETLAB+, access servers, remote PC's, and switched outlet devices. The control switch also provides a network path for NETLAB+ to download IOS images to Cisco lab devices in the event flash has been erased (or the correct image is not installed).

*Access servers* provide console connections to lab routers, lab switches, and lab firewall devices so that users can access these devices from NETLAB+.

*Switched outlets* provide managed electrical power, allowing NETLAB+ and users to turn lab equipment on and off.

NETLAB Academy Edition® users may refer to the Port Requirements Reference Table (below) for the control device port requirements of each pod type. Each pod type requires control switch ports, access server ports, and switched outlets.

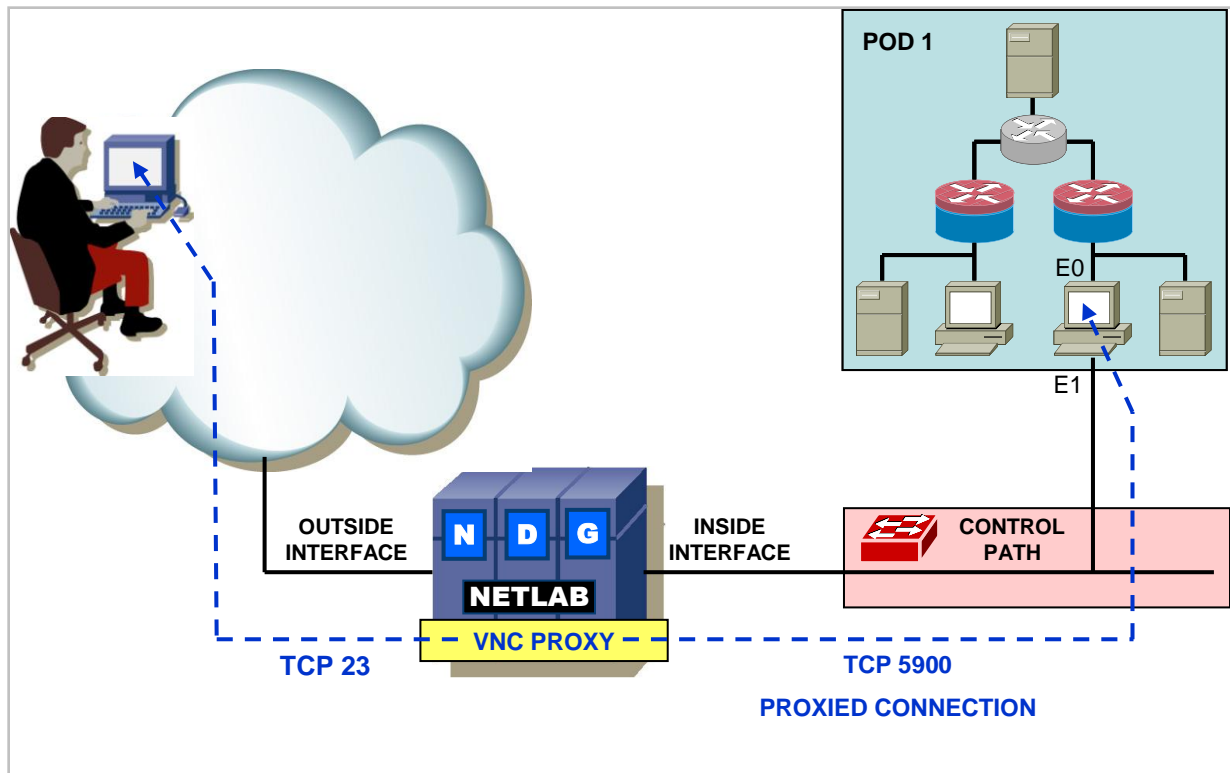
Port Requirements Reference Table				
Pod Types	Control Switch		Access Server Ports	Switched Outlets
	Pod Ports	Reserved Ports		
Basic Router Pod	3	0	3	3
Basic Switch Pod	3	0	3	3
Advanced Router Pod	3	0	3	3
Advanced Switch Pod	8	0	8	8
Security Router Pod (FNSR)	10	3	2	2
Security PIX Pod (FNSP)	14	3	2	2
CCNA 2.1 Pod	6	0	6	6
Custom Pod (NETLAB <sub>PE</sub> )	As needed based on your unique requirements			

Control switch ports are broken down into *pod ports* and *reserved ports*.

*Pod ports* connect lab equipment to NETLAB+. During normal operation, pod ports are automatically placed in unique or common VLANs to simulate one or more Ethernet segments required by the topology of the pod. In the event that NETLAB+ must download an IOS image to a lab device, NETLAB+ will temporarily place the device in VLAN 1 so that it can access the NETLAB+ TFTP server. Pod ports must be consecutive and reside on the same switch. A single control switch can have pod ports for several pods, as long as all pod ports are consecutive on the switch.

The *reserved ports* on a control switch provide the framework to interconnect NETLAB+ and control devices. Reserved ports are usually trunks or access ports in VLAN 1, but may be used for other functions as well. A reserved port is never allocated to equipment pods, thus the name “reserved”.

Reserved ports are also used by standalone remote PCs in conjunction with Virtual Network Computing (VNC). VNC provides a method to remotely access the keyboard, video, and mouse. A remote PC that offers VNC typically has two network interfaces. One interface connects to the lab topology; the other connects to a reserved port on a control switch. The VNC connection traverses the control plane and is proxied back to a terminal application on the user’s workstation.



The installation of the devices of the NETLAB+ control plane is explained in detail in the "Installing the Control Plane" section of the [NETLAB+ Installation Guide](#).

## 5 NETLAB+ Documentation Resources

Documentation resources include the guides listed below. These guides and others may be accessed from the [NETLAB+ Documentation](#) page. Additional resources are available on the [NETLAB+ Support](#) page.

- [NETLAB+ Instructor Guide](#)
- [NETLAB+ Student Guide](#)
- [NETLAB+ Installation Guide](#)
- [NETLAB+ Administrator Guide](#)
- [NETLAB+ Remote PC Guide for VMware Server Implementation Using VMware ESXi Version 3.5](#)
- [NETLAB+ Remote PC Guide for VMware Server Implementation Using VMware Server 2.x](#)
- [NETLAB+ Remote PC Guide for VMware Server Implementation Using VMware Server 1.x and GSX](#)
- [NETLAB+ Remote PC Guide for Standalone Implementation](#)
- [NETLAB+ Pod Design Guide](#)
- [NETLAB+ Lab Design Guide](#)
- [NETLAB+ Product Summary](#)

*NETLAB Academy Edition<sup>®</sup> users may refer to the guide written specifically for the pod-type they plan to install. Pod-specific guides include:*

- [NETLAB<sub>AE</sub> Multi-Purpose Academy Pod \(MAP\)](#)
- [NETLAB<sub>AE</sub> Network Fundamentals Pod \(NFP\)](#)
- [NETLAB<sub>AE</sub> Basic Router Pod Version 2 \(BRPv2\)](#)
- [NETLAB<sub>AE</sub> Basic Router Pod Version 1 \(BRPv1\)](#)
- [NETLAB<sub>AE</sub> Cuatro Router Pod \(CRP\)](#)
- [NETLAB<sub>AE</sub> Cuatro Switch Pod \(CSP\)](#)
- [NETLAB<sub>AE</sub> LAN Switching Pod \(LSP\)](#)
- [NETLAB<sub>AE</sub> Network Security Pod \(NSP\)](#)
- [NETLAB<sub>AE</sub> Basic Switch Pod Version 2 \(BSPv2\)](#)
- [NETLAB<sub>AE</sub> Basic Switch Pod Version 1 \(BSPv1\)](#)
- [NETLAB<sub>AE</sub> Advanced Router Pod \(ARP\)](#)
- [NETLAB<sub>AE</sub> Advanced Switch Pod \(ASP\)](#)
- [NETLAB<sub>AE</sub> Security Router Pod \(SRP\)](#)
- [NETLAB<sub>AE</sub> Security PIX Pod \(SPP\)](#)