



Lab Design Guide



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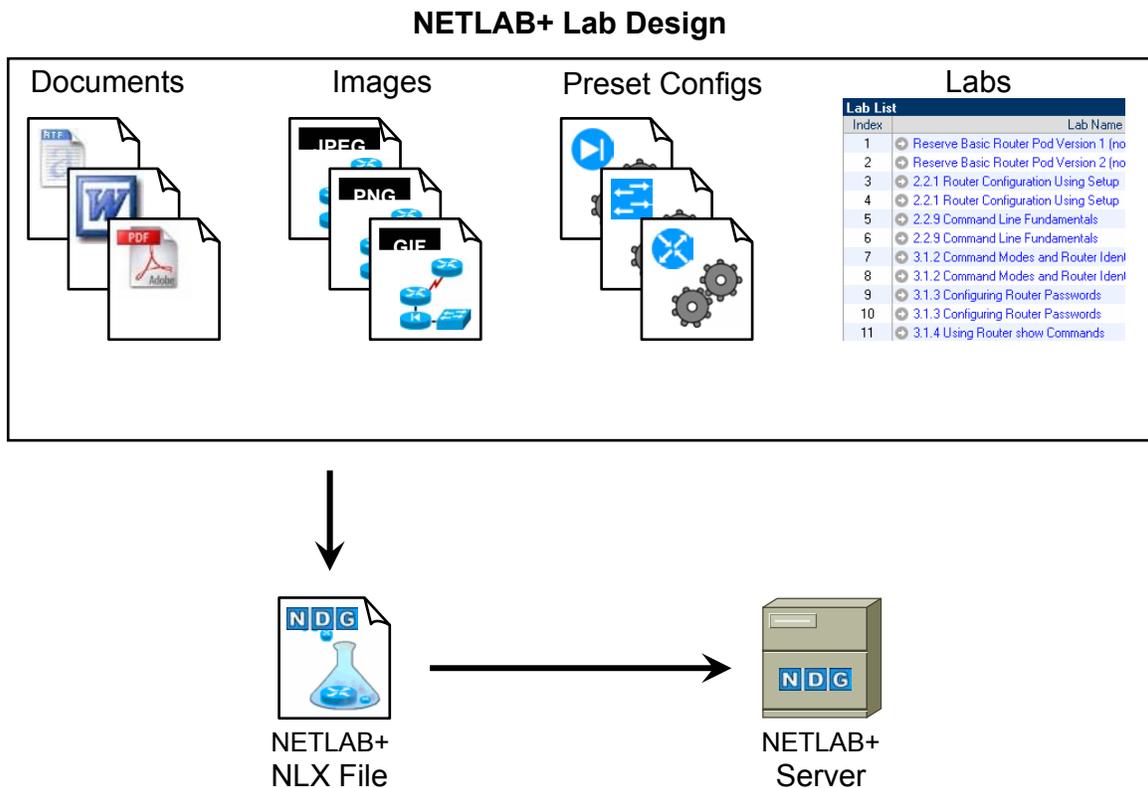
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1 Introduction

The *Lab Designer* provides a means of creating a series of custom laboratory exercises that may be made available for class use.

A lab design is a set of labs and related reference material that may include documents, images and preset configuration files for each lab exercise. This data is stored in a *Lab Design File*. Lab design files are portable. They can be shared, exported, and installed on other NETLAB+ systems. A set of options and passwords control how the lab design can be used.



2 Lab Design Files

A lab design file contains a set of labs and all related reference material. The following items are contained within a lab design file.

- Lab Exercises
- Documents
- Images
- Preset Configuration Files

2.1 Lab Exercises

Each lab design contains one or more *lab exercises*. Each lab exercise can:

- Target a specific type of equipment pod.
- Specify a document that contains instructions for completing the lab.
- Specify a topology image with “clickable hotspots” for each device or PC.
- Specify preset configuration files that are loaded into lab devices.
- Specify a *Dynamic VLAN Map* to alter the lab topology.
- Specify assessment options for online testing.
- Specify alternate device names.

Lab 2.3.1 Configuring the OSPF Routing Process

Global Lab ID CCNA3RL_00C0_F06B_B5E7_44B9_27DE_000D

Index 13

Lab Name 2.3.1 Configuring the OSPF Routing Process (required)

Pod Type AE Basic Router Pod V1

Time Limit 50 minutes

Lab Document CCNA3_lab_2_3_1_en.pdf

Topology Image two_router_ospf_area_0.png

Preset Configuration OSPF DR-BDR Configs

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

+0	+1	+2
VLAN A <input type="button" value="v"/>	VLAN A <input type="button" value="v"/>	VLAN A <input type="button" value="v"/>

Alternate Device Names

use pod device names

custom names

Device	Alternate Name
R1	DR <input type="text"/>
R2	BDR <input type="text"/>
R3	OTHER <input type="text"/>

show help tips

2.2 Documents

A document contains the instructions a user should follow to complete a lab. Users can view the document associated with a lab exercise by clicking the **Show Content** button in the lab access topology tab, or the **preview lab** link in the scheduler. NETLAB+ supports Adobe PDF, Microsoft Word, Rich Text Format, and plain text files. Adobe PDF is the preferred type because most users already have the Adobe Acrobat Reader installed. The PDF format supports text, graphics, and precise formatting.

Lab Access
INSTRUCTOR

MyNETLAB Logout
alab

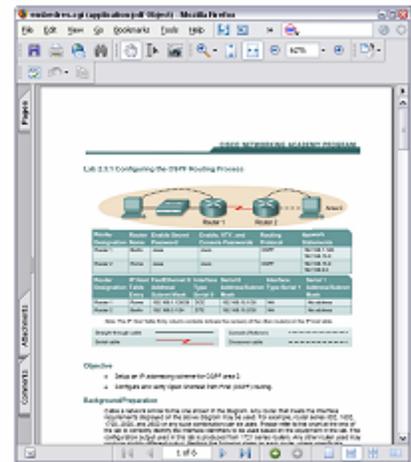
Pegasus 344 minutes remaining

Topology
Action
Status
Load
Save
Exercise

2.1.7 Configuring NAT

Show Content

Document



Scheduler
INSTRUCTOR

Available Lab Exercises

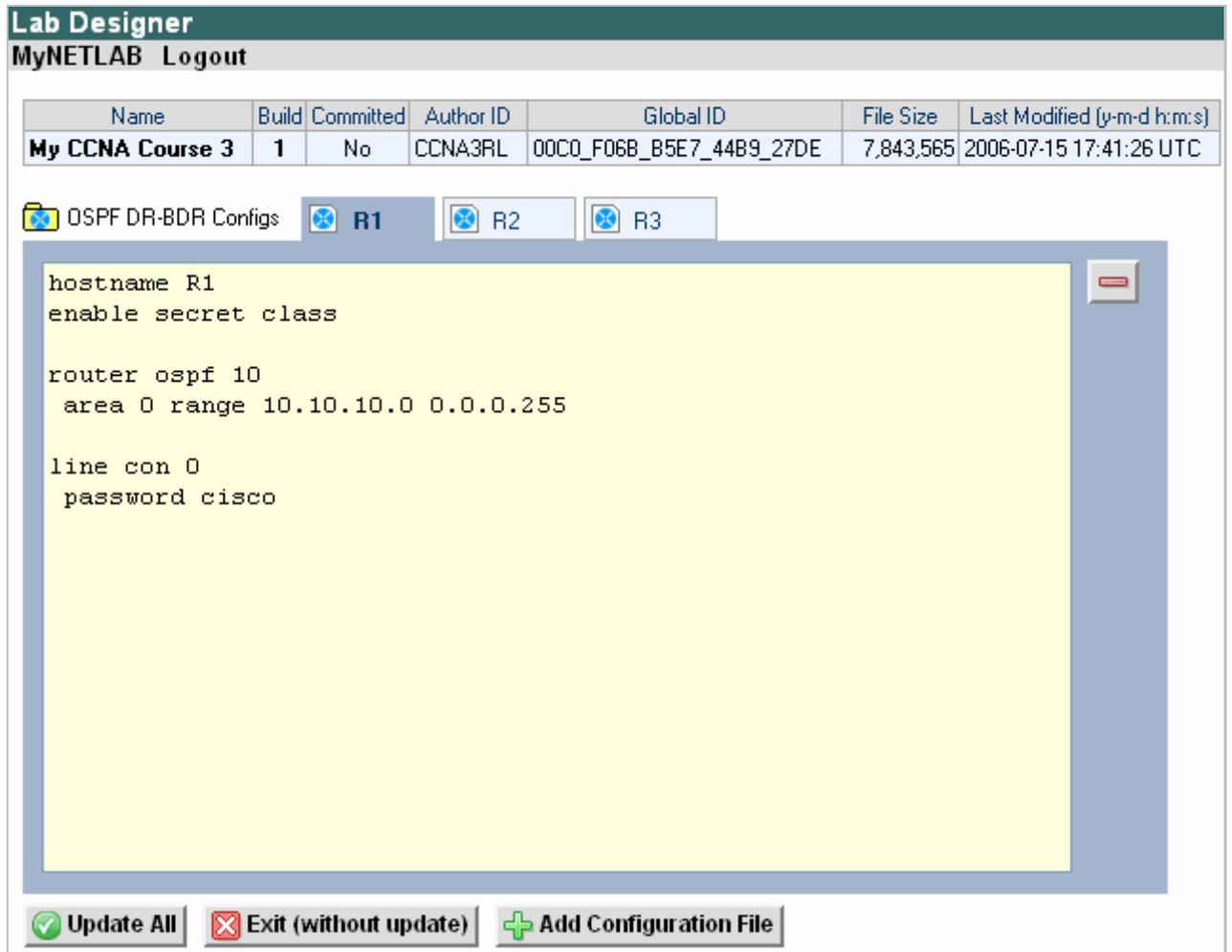
AE CCNA 2 English V3.1
PARTIAL LISTING (based on installed equipment pod types)

EXERCISE NAME	TIME LIMIT	DESCRIPTION	POD TYPE
➔ Reserve Basic Router Pod Version 2 (no lab exercise)	up to 4 hours	no preview available	BASIC ROUTER POD v2 3 Routers PC Support
➔ 2.2.1 Router Configuration Using Setup	50 min	➔ preview lab	BASIC ROUTER POD v2 3 Routers PC Support
➔ 2.2.9 Command Line Fundamentals	50 min	➔ preview lab	BASIC ROUTER POD v2 3 Routers PC Support

2.4 Preset Configuration Files

You can create preset configuration files that can be loaded into routers, switches, and firewalls at the beginning of a lab exercise.

By default, users have the option to (1) load the preset configurations specified in the lab design, (2) load configuration files from a previous lab reservation, or (3) start clean with no configuration files loaded at all. However, you may require that a certain set of configuration files always be loaded at the beginning of a particular lab exercise. This feature is useful for assessment and troubleshooting labs.



The screenshot shows the Lab Designer interface. At the top, there is a header "Lab Designer" and a sub-header "MyNETLAB Logout". Below this is a table with the following data:

Name	Build	Committed	Author ID	Global ID	File Size	Last Modified (y-m-d h:m:s)
My CCNA Course 3	1	No	CCNA3RL	00C0_F06B_B5E7_44B9_27DE	7,843,565	2006-07-15 17:41:26 UTC

Below the table, there is a folder icon labeled "OSPF DR-BDR Configs" and three tabs labeled "R1", "R2", and "R3". The "R1" tab is selected, and the configuration text is displayed in a yellow text area:

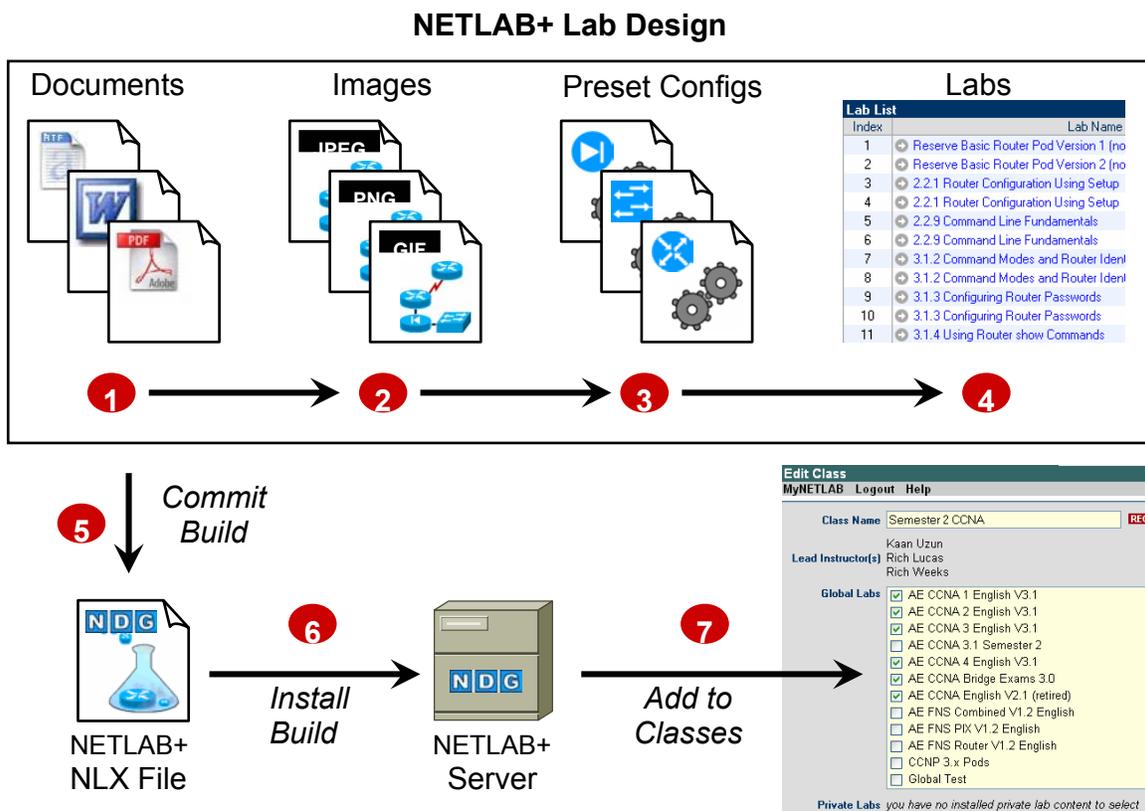
```
hostname R1
enable secret class

router ospf 10
 area 0 range 10.10.10.0 0.0.0.255

line con 0
 password cisco
```

At the bottom of the interface, there are three buttons: "Update All" (with a green checkmark icon), "Exit (without update)" (with a red X icon), and "Add Configuration File" (with a green plus icon).

3 Lab Designer Work Flow



The following steps outline the typical workflow of the lab design process.

1. **Add Documents.** Documents contain the instructions a user follows to complete a lab. A single document may be assigned to more than one lab exercise.
2. **Add Images.** A custom topology image can be displayed for each lab. A single image may be assigned to more than one lab exercise. By default, the pod's topology is displayed.
3. **Add Preset Configuration Files.** Labs can load preset configuration files into routers, switches, and firewalls at the beginning of a lab exercise. A single preset group may be assigned to more than one lab exercise.
4. **Add Lab Exercises.** The details of each lab exercise are defined in this step. Each lab may reference one of the documents, images, and preset configuration groups that were added in the previous steps.
5. **Commit Build.** When all the changes have been made, the *build* is committed. This prevents further changes to the current version of the lab design file and allows the lab design to be installed into the NETLAB+ database.

- 6. Install Build.** Lab designer produces NLX files, which behave like software source code. To use the lab design, you must install (compile) the NLX file into the NETLAB+ database.
- 7. Add to Classes.** Instructors must specifically grant access to an installed lab design by selecting it in the class profile.

4 Creating a New Lab Design

Lab Designer is started from the instructor MyNETLAB page or the administrator home page. Simply click on the Lab Designer icon or link. The first time you use lab designer, you must agree to the terms of use.

The administrator and each instructor user are given a personal folder on the server. New lab designs (NLX files) are stored here. Click on the Create button to begin a new lab design.



4.1 General Settings

The General Settings dialog will appear when you create a lab design. General settings are values that apply to the entire lab design. Each setting is described below. You can also “show help tips” by enabling the checkbox.

Lab Designer
MyNETLAB Logout

General Settings

Name Rivendale Academy CCNP Challenge (required)

Author's Lab Design ID RIVCCNP (required)

Description Rivendale CCNP labs.

Author James Madison

Organization Rivendale Community College

Copyright Copyright (C) 2006, Rivendale Community College

Support URL http://ccnp.rivendalecc.edu

Note / Comment Requires Basic Router Pod V2 and Advanced Router

Cloning This lab design may be cloned

Access Private Global (if authorized by administrator)

show help tips

OK Cancel

Name. This required field is used to assign a name to the Lab Design. It may be helpful to indicate what course the lab will be used with, as part of the name or description.

Author's Lab Design ID A unique, human readable identifier. Only the characters **A-Z** and **0-9** can be used. This value is appended to the Global Lab Design ID to create a worldwide unique identifier for the lab design. **Please note, you cannot modify this value later.**
Example: "RIVUNWIRED"

Description. This optional field is used to describe the lab content. It may be helpful to indicate what course the lab will be used with, as part of the name or description.

Author. Optional field to indicate the author of the lab content.

Organization. Name of school or organization associated with the lab content.

Copyright. A place for a copyright notice (optional).

Support URL. A website URL containing additional information about the lab content (optional).

Note/Comment. Place to indicate any additional information about the lab design file, such as indicating what curriculum the lab design is being used to support.

Cloning. Enable the cloning checkbox to allow derivative works to be created from your lab design.

Access. The access setting affects which instructors and classes can use this lab design after it is installed on the system.

- A private setting allows only the original installer to use the lab design in their classes.
- A global setting allows all instructors on the system to use the lab design, provided that the system administrator specifically authorizes this. Future updates to an installed design are handled by the administrator, or an appointed trustee. By default, the original installer is the trustee. Once the administrator marks the lab design global, only they can un-install it.

4.2 Lab Designer Tabbed Interface

Once the general settings are entered, NETLAB+ will create a lab design file in your personal folder. All of the remaining tasks will be performed using the lab designer tabbed interface. The tabs are organized from left to right, in the same workflow order described in the previous section.

Lab Designer

MyNETLAB Logout

Name	Build	Committed	Author ID	Global ID	File Size	Last
Rivendale Academy CCNP Challenge	1	No	RIVCCNP	00C0_F06B_B5E7_44BB_90E8	672	2006-

Workflow

General
Documents
Images
Configs
Labs
Builds

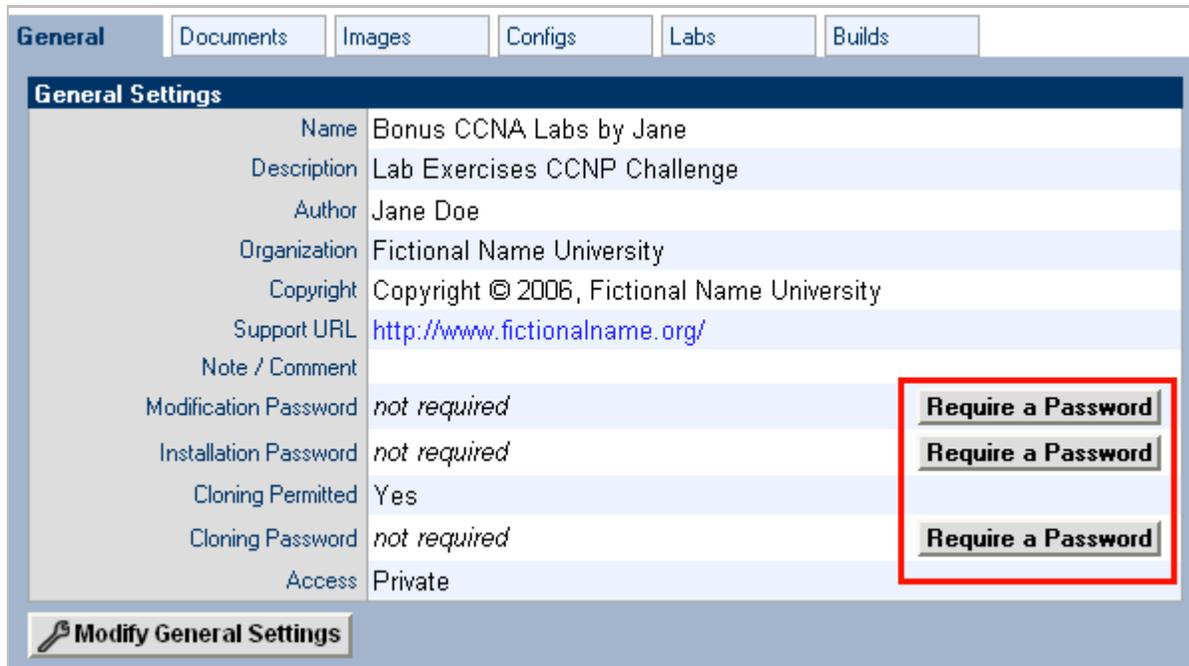
General Settings

Name	Rivendale Academy CCNP Challenge	
Description	Rivendale CCNP labs.	
Author	James Madison	
Organization	Rivendale Community College	
Copyright	Copyright (C) 2006, Rivendale Community College	
Support URL	http://ccnp.rivendalecc.edu	
Note / Comment	Requires Basic Router Pod V2 and Advanced Router pod.	
Modification Password	<i>not required</i>	Require a Password
Installation Password	<i>not required</i>	Require a Password
Cloning Permitted	No	
Cloning Password	<i>not applicable</i>	
Access	Global	

Modify General Settings

4.2.1 Enabling Password Protection

Password protection may be set for the lab design file. A Modification Password, Installation Password and/or a Cloning Password may be set as a requirement. Select the appropriate “**Require a Password**” button on the General page of the tabbed interface.



The screenshot shows the 'General Settings' tab in a web interface. The settings are as follows:

Field	Value
Name	Bonus CCNA Labs by Jane
Description	Lab Exercises CCNP Challenge
Author	Jane Doe
Organization	Fictional Name University
Copyright	Copyright © 2006, Fictional Name University
Support URL	http://www.fictionalname.org/
Note / Comment	
Modification Password	not required
Installation Password	not required
Cloning Permitted	Yes
Cloning Password	not required
Access	Private

At the bottom of the settings table, there are three buttons labeled "Require a Password", each enclosed in a red rectangular box. Below the table is a "Modify General Settings" button with a key icon.

Here, a modification password is set. Entering the correct password will be required before any changes to the lab design can be made.



The dialog box is titled "Specify a Modification Password". It contains the following text:

A **modification** password protects the design from being changed. This password will be required to modify the design. Enter the desired password twice and click OK. If a modification password is not required, click Remove Password.

Below the text are two input fields:

- Modification Password**: [*****] (required)
- Confirm Modification Password**: [*****] (required)

At the bottom of the dialog are three buttons: **OK** (with a green checkmark icon), **Remove Password** (with a red minus sign icon), and **Cancel** (with a red X icon).

Setting a Cloning Password will require the user to enter the password when selecting the Cloning option on the Build tab (See section 5.14).

Specify a Cloning Password

Enter a **cloning** password. An instructor or administrator must enter this password to create derivative works based on this lab design. If a cloning password is not required, click Remove Password.

Cloning Password (required)

Confirm Cloning Password (required)

OK
 Remove Password
 Cancel

Setting an Installation Password will require the user to enter the password when installing the lab design into the NETLAB+ database (See section 5.4).

Specify an Installation Password

If you set an **installation** password, this password will be required to install this lab design into the NETLAB+ database. Enter the desired password twice and click OK. If an installation password is not required, click Remove Password.

Installation Password (required)

Confirm Installation Password (required)

OK
 Remove Password
 Cancel

4.3 Managing Documents

A document contains the instructions a user should follow to complete a lab. A single document may be assigned to more than one lab exercise. Users can view the document associated with a lab exercise by clicking the **Show Content** button in the lab access topology tab, or the **preview lab** link in the scheduler. NETLAB+ supports Adobe PDF, Microsoft Word, Rich Text Format, and plain text files. Adobe PDF is the preferred type because most users already have the Adobe Acrobat Reader installed. The PDF format supports text, graphics, and precise formatting.

Select the documents tab on the Lab Designer page. Any documents that have already been added to the lab design file will be listed in alphabetical order. To display the contents of the file, click on the file name. The type and size of the file are listed. The number of references is a count of the lab exercises that have been associated with the document (See section 4.6.1). When a file is referenced by one or more lab exercises, it cannot be removed, the remove field will indicate **“in use”**.

General	Documents	Images	Configs	Labs	Builds
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)					
					

4.3.1 Adding a Document

Select the **Add Document** button to add a document to the lab design file. Documents are uploaded from your PC to NETLAB+, one at a time. Enter the complete path and file name, which must end with one of the supported extensions (PDF, DOC, RTF, and TXT). Select the **OK** button to upload the specified file.

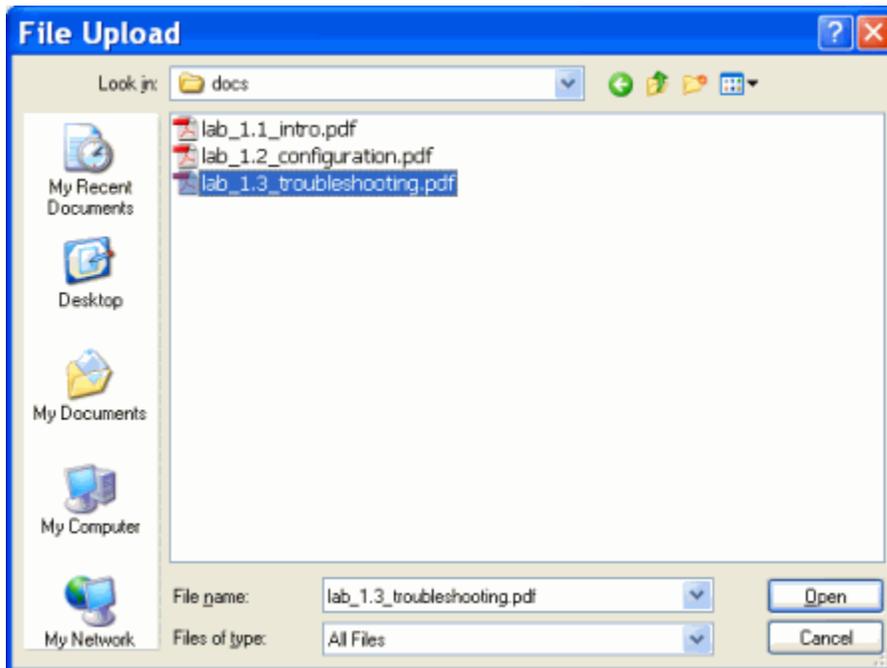
Add Document

To add a document to this lab design, specify the path to one the following file types on your PC or workstation. If the document already exists in this lab design, it is replaced.

.pdf	Adobe PDF Document
.doc	Microsoft Word Document
.rtf	Rich Text File
.txt	Plain Text File

Path to Document File

You may also add a document by selecting the **Browse** button, which will allow you to traverse your PC directory structure and select the file to upload.



4.3.2 Removing a Document

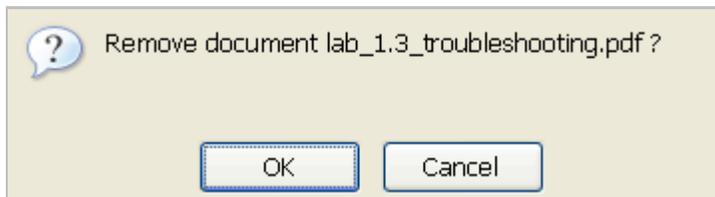
A document may be removed from the lab design if it is not designated as the lab document for a lab exercise (See section 4.6.1). In the example below, the first two documents listed have each been selected for one lab exercise, as indicated by the reference number “1”. The third document has not been referenced and may be removed by selecting the  button.

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	none		

581,346 bytes in 3 file(s)

 Add Document

Select **OK** to proceed with the deletion.



4.4 Managing Images

Each lab exercise may specify an image, which will appear in the lab access topology tab. This is optional. By default, the image associated with the pod is used.

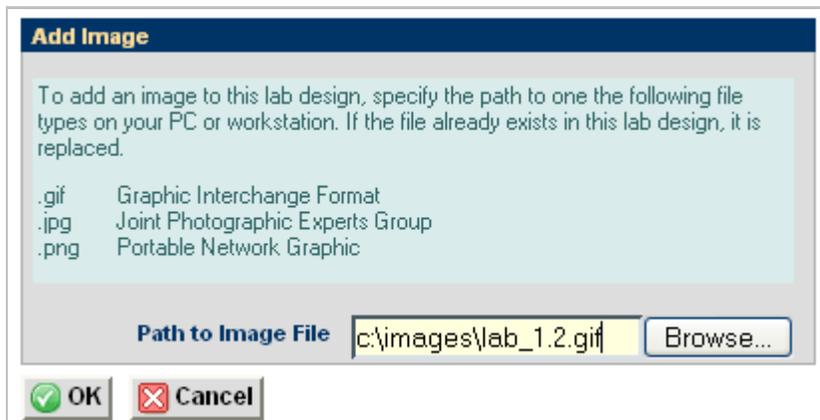
Image files (GIF, JPEG or PNG format) may be created and added to the lab design file to reflect exercise-specific information. An image may be associated with more than one lab exercise.

Select the Images tab on the Lab Designer page. Any images that have already been added to the lab design file will be listed in alphabetical order. To display the contents of the file, click on the file name. The type and size of the file are listed. The number of references is a count of the lab exercises that have been associated with the image (See section 4.6.1). When a file is referenced by one or more lab exercises, it cannot be removed, the remove field will indicate “in use”.

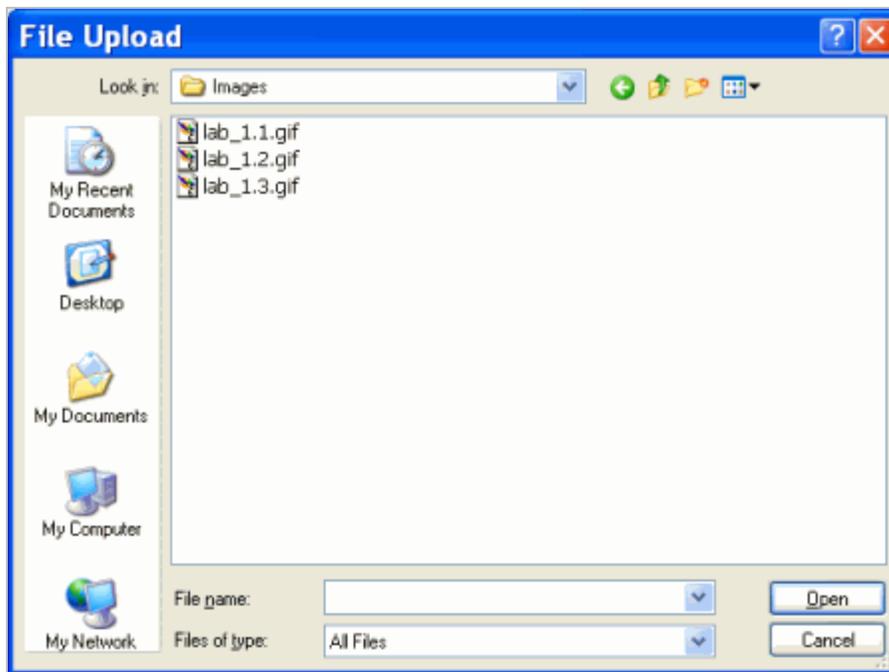
General							Documents	Images	Configs	Labs	Builds	
Images							File Name	Type	Size	Hotspots	References	Remove
+	lab_1.1.gif	Graphic Interchange Format	9,952	 2 set	1	in use						
+	lab_1.2.gif	Graphic Interchange Format	9,952	 none set	1	in use						
+	lab_1.3.gif	Graphic Interchange Format	9,952	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

4.4.1 Adding an Image

Select the **Add Image** button to add additional images to the lab design file. Image files are uploaded from your PC to NETLAB+, one at a time. Enter the complete path and file name, which must end with one of the supported extensions (GIF, JPEG, or PNG). Select the **OK** button to upload the specified image.



You may also add an image by selecting the **Browse** button, which will allow you to traverse your PC's directory structure and select the file to upload.



4.4.2 Defining Hotspots

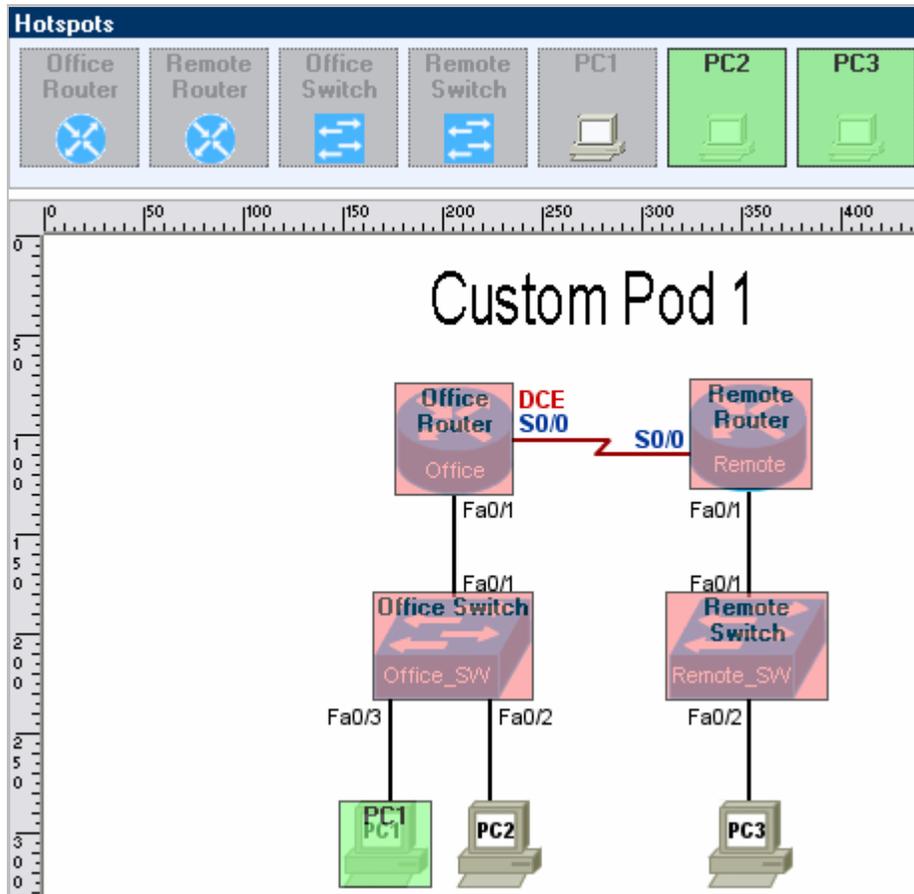
You may define clickable *hotspots* for devices and PCs shown on the image. A hotspot is an invisible rectangular area placed on top of a router, switch, firewall, or PC in the image. When a user clicks on a hotspot, NETLAB+ will launch the appropriate viewer and connect to the device.

Hotspots are dragged onto the image, placed, and sized by the user.

To define hotspots for an image, select the  button. The page will display available hotspots for the lab devices in the topology at the top of the page. Highlighted hotspots have not yet been placed on the image. You may elect to set some or all of the hotspots on the image.

Lab routers, switches and firewall hotspots are red. PC hotspots are green.

To set a hotspot for a device or remote PC, **DRAG** its square from the hotspot tray to the desired location on the image. To resize the hotspot, hold down **SHIFT** while dragging. To clear a hotspot, drag its square **OFF** of the image or back to the hotspot tray. In this example, hotspots have been set for the first five devices have not yet been set for PC2 or PC3.



4.4.3 Removing an Image

An image may be removed from the lab design if it is not designated as the topology image for a lab exercise (See section 4.6.1). In the example below, the first and third images listed have each been selected for one lab exercise, as indicated by the reference number “1”. The second image has not been referenced and may be removed by selecting the  button.

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	none		
lab_1.3.gif	Graphic Interchange Format	9,952	 3 set	1	in use	

29,856 bytes in 3 file(s)

 **Add Image**

4.5 Managing Preset Configuration Files

Lab designer allows you to create preset configuration files that can be loaded into routers, switches, and firewalls at the beginning of a lab exercise. By default, users have the option to:

- (1) Load the preset configurations specified in the lab design.
- (2) Load configuration files from a previous lab reservation.
- (3) Start clean with no configuration files loaded at all.

However, you may require that a certain set of configuration files always be loaded at the beginning of a particular lab exercise. This feature is useful for assessment and troubleshooting labs.

Configuration files for each device are organized into configuration folders, similar to the NETLAB+ file manager. A configuration folder and the files contained within can be assigned to one or more lab exercises. Please note, this is completely optional.

Select the Configs tab on the Lab Designer page. Any configuration folders that have already been added to the lab design file will be listed in alphabetical order. . The number of references is a count of the lab exercises that are using the preset configuration (See section 4.6.1). When a file is referenced by one or more lab exercises, it cannot be removed, and the remove field will indicate “**in use**”.

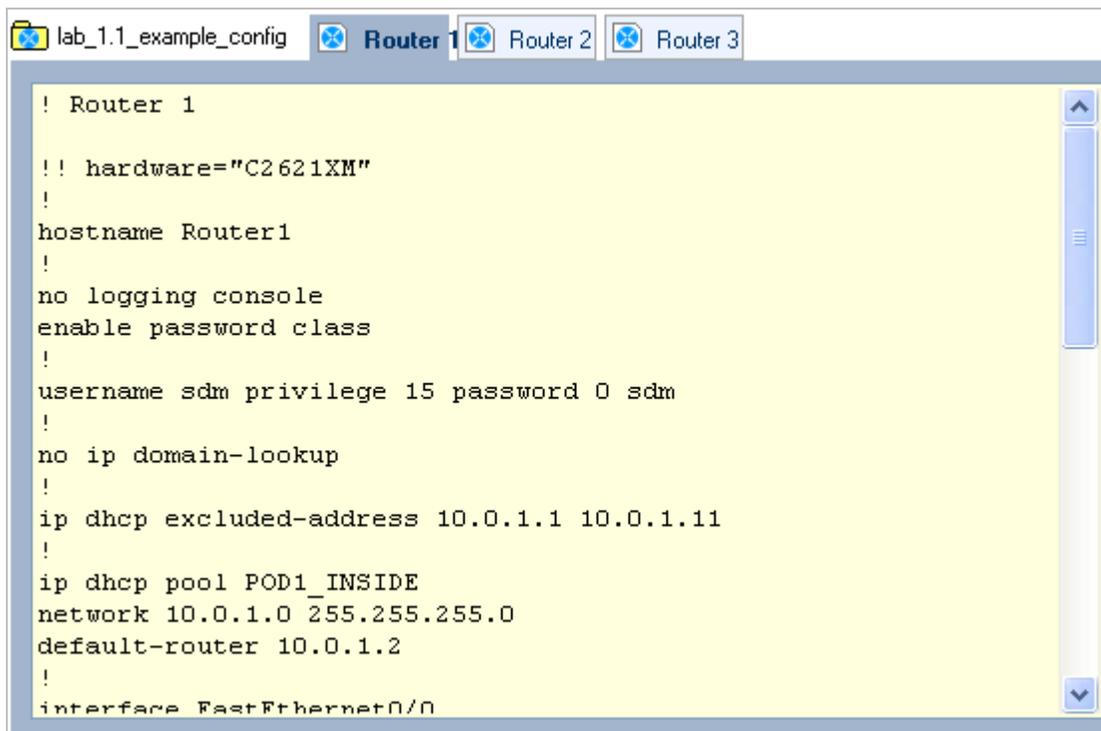
General Documents Images **Configs** Labs Builds

Preset Configuration Folders

Folder Name	References	Remove
 lab_1.1_example_config	1	in use
 lab_1.2_config	1	in use

 **Add Config Folder**

To display the contents of the folder, click on the folder name. The tabbed display shows the contents of the configuration files that are in the configuration folder.



The screenshot shows a web browser window with a tabbed interface. The active tab is labeled "Router 1". The main content area displays a configuration file for Router 1. The configuration includes hardware settings, hostname, logging, password, username, domain lookup, DHCP pool, and interface configuration.

```
! Router 1

!! hardware="C2621XM"
!
hostname Router1
!
no logging console
enable password class
!
username sdm privilege 15 password 0 sdm
!
no ip domain-lookup
!
ip dhcp excluded-address 10.0.1.1 10.0.1.11
!
ip dhcp pool POD1_INSIDE
network 10.0.1.0 255.255.255.0
default-router 10.0.1.2
!
interface FastEthernet0/0
```

4.5.1 Creating a Configuration Folder

Select the **Add Config Folder** button to add a configuration folder to the lab design file. If a pod type is selected, a configuration file for each configurable device in the topology will be created.

Add Configuration Folder

A configuration folder contains preset device configuration files that can be used for one or more labs. Specify a folder name. If you specify a pod type, an empty configuration file for each device will be also be created inside the folder.

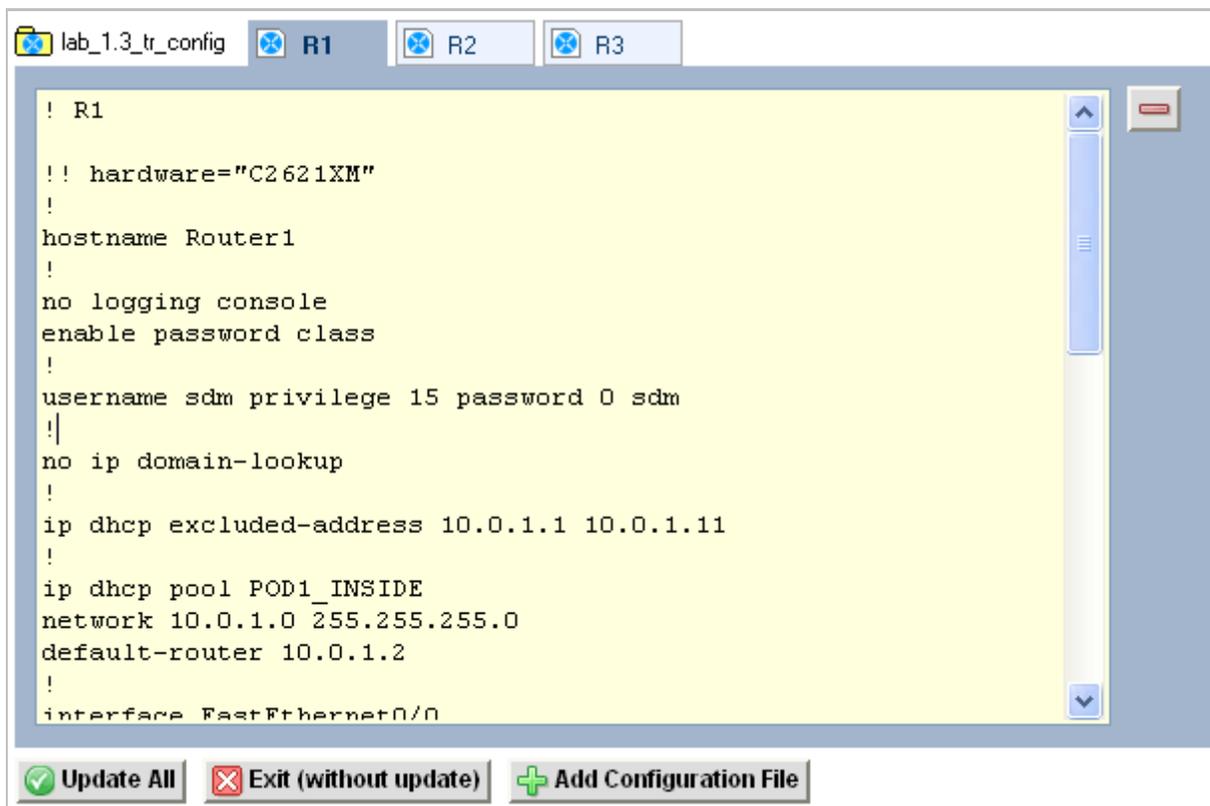
Folder Name (required)

Pod Type

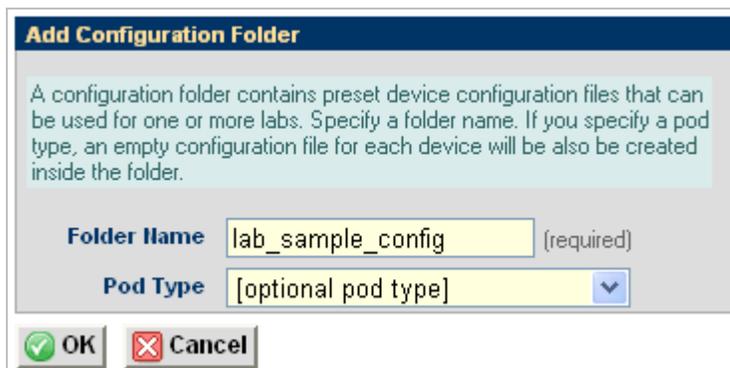
OK Cancel

- [optional pod type]
- AE Advanced Router Pod V1
- AE Advanced Switch Pod V1
- AE Basic Router Pod V1
- AE Basic Router Pod V2**
- AE Basic Switch Pod V1
- AE Basic Switch Pod V2
- AE CCNA 2.1 Pod (obsolete)
- AE Network Security Pod 2.0
- AE Security PIX Pod
- AE Security Router Pod
- C.E. IPT Pod 2

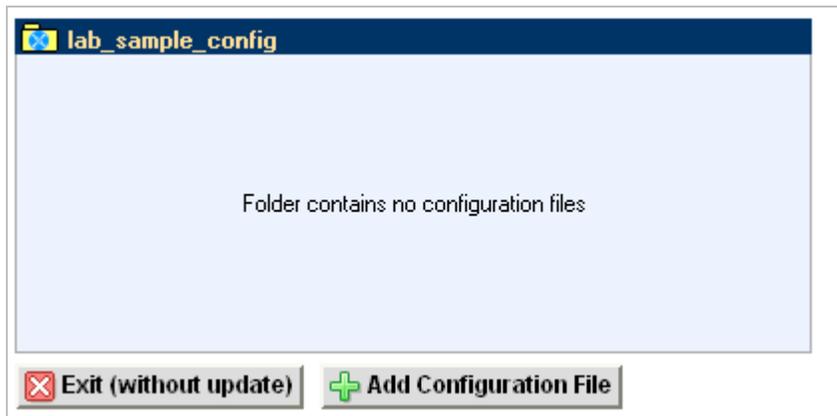
In the example above, the pod type of “AE Basic Router Pod V2” was selected. When the configuration folder name is selected on the Configs tab, a tabbed interface will show the configuration files that have been set up for each device. You may type or cut and paste IOS commands into each device-specific configuration file. Here, commands have been entered into the R1 configuration file.



A configuration folder may also be created without designating a pod type, simply enter the folder name and then click **OK** (the Pod Type field is optional).



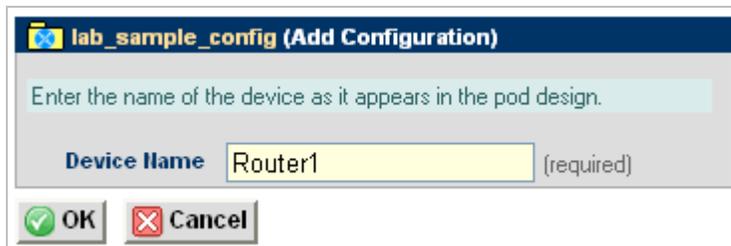
When the configuration folder name is selected on the Configs tab, the display will indicate that the folder is empty.



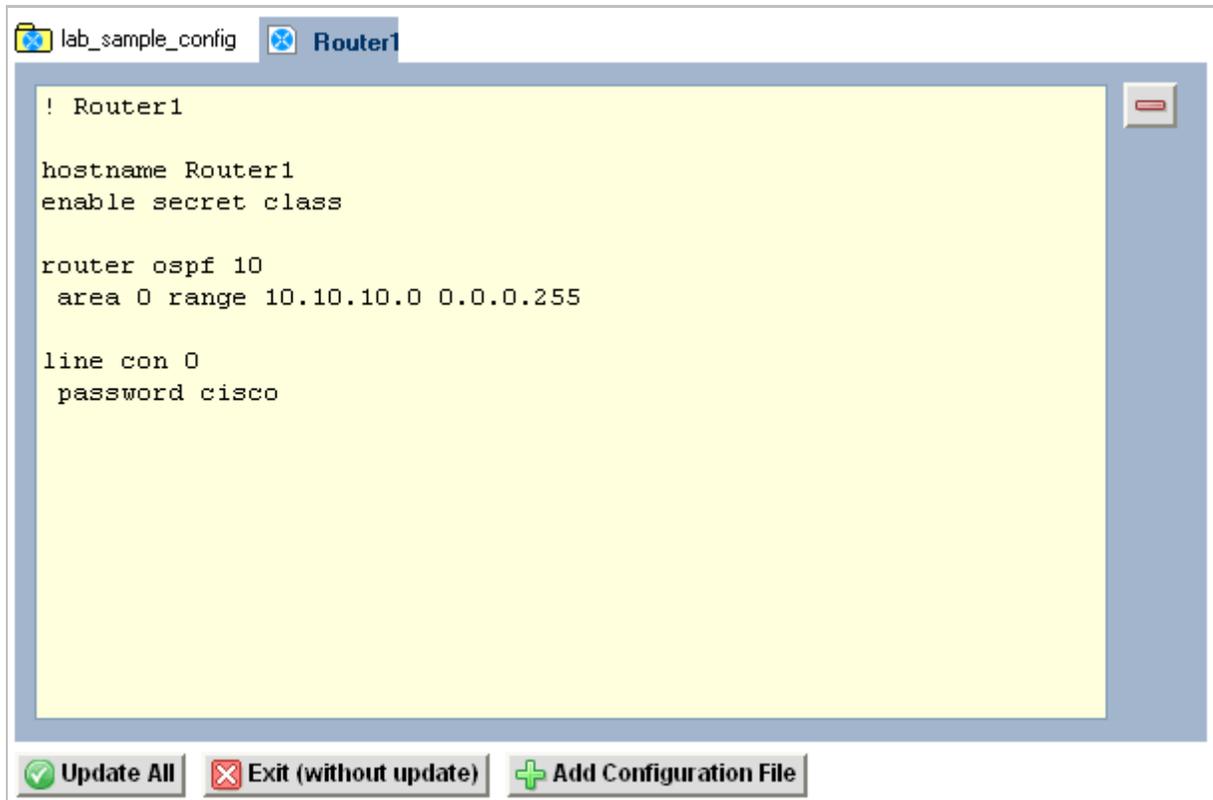
4.5.2 Adding a Single Configuration File

Select the **Add configuration file** button to add a new file to the folder. Enter the name of the device as it appears in the pod design and select **OK**.

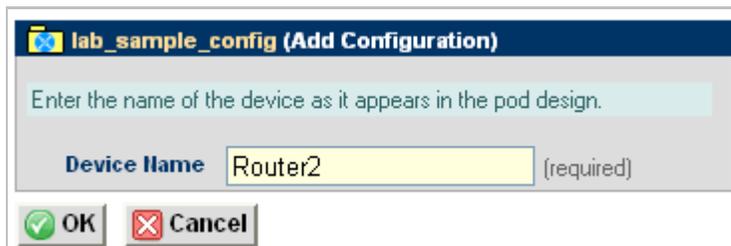
This value is case-sensitive. NETLAB+ only loads configuration files whose names exactly match the device names in the pod.



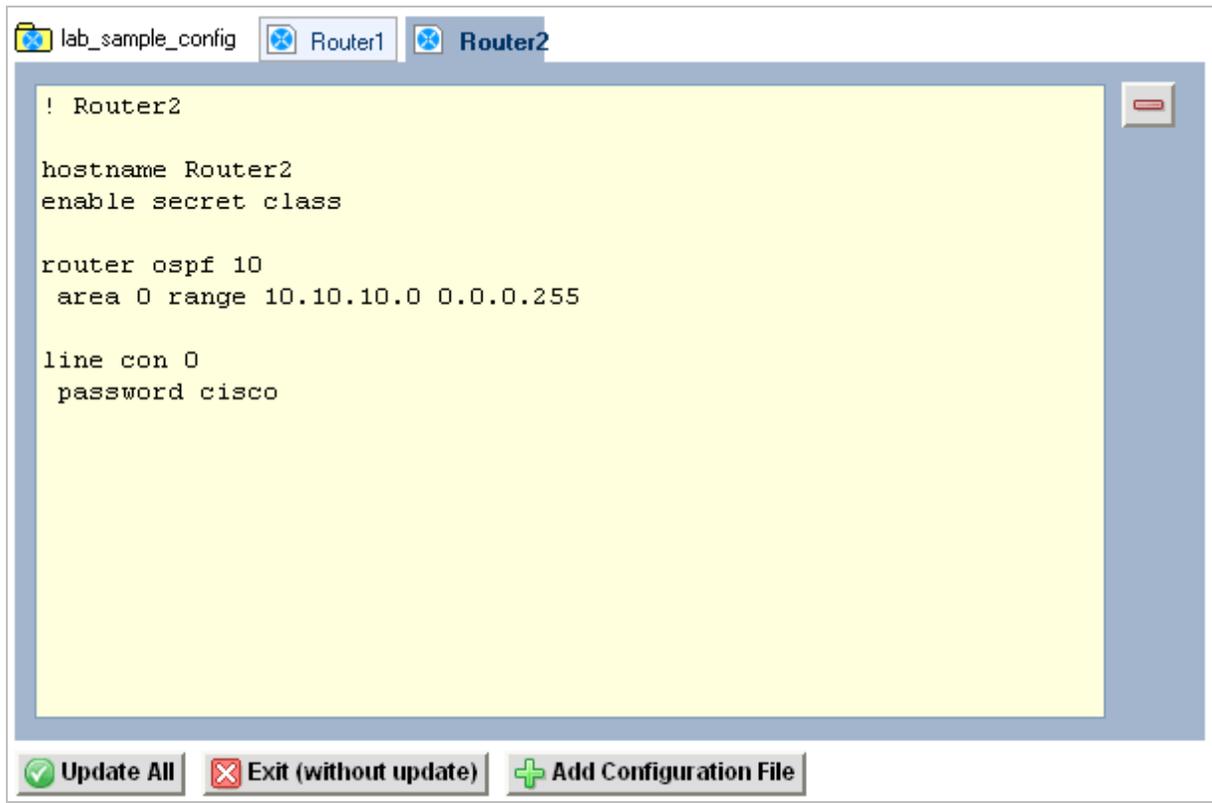
A tabbed interface will show the configuration file with the device name. You may type or cut and paste IOS commands into configuration file. Here, commands have been entered into the Router1 configuration file.



You may create additional configuration files by again selecting the **Add Configuration File** button. Enter the device name and select **OK**.



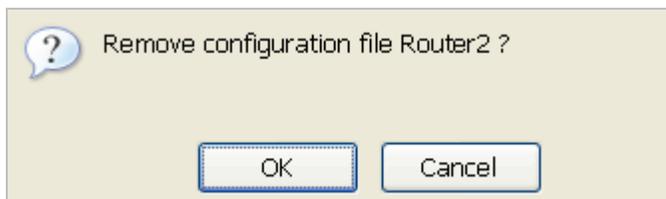
The configuration file “Router2” is now available on the tabbed interface. You may move from one configuration file to another by clicking on the file name displayed on the tab.



You must select the **Update All** button to save all changes and close the folder.

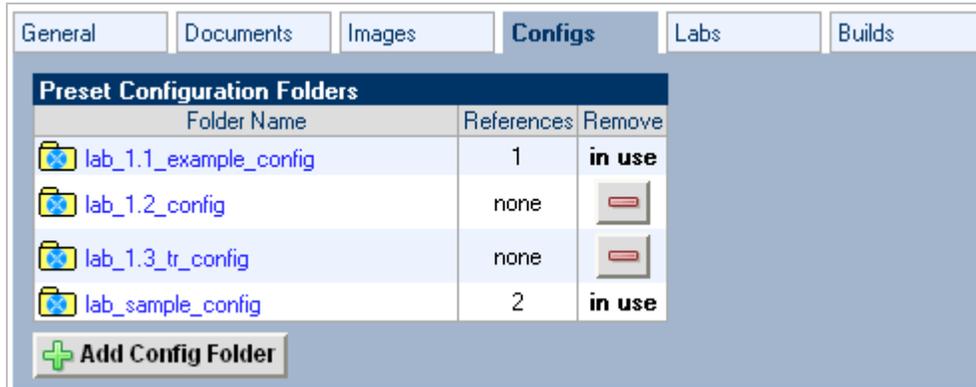
4.5.3 Removing a Single Configuration File

To remove a configuration file select the  button located on the right border of the currently displayed configuration file (See picture in previous section). Select **OK** to proceed with the deletion.



4.5.4 Removing a Configuration Folder

A configuration folder may be removed from the lab design if it is not designated as the preset configuration for a lab exercise (See section 4.6.1). In the example below, the first and fourth folders listed have each been selected for at least one lab exercise, as indicated by the reference numbers listed in the references column. The second and third folders have not been referenced and may be removed by selecting the  button.



Select **OK** to proceed with the deletion.

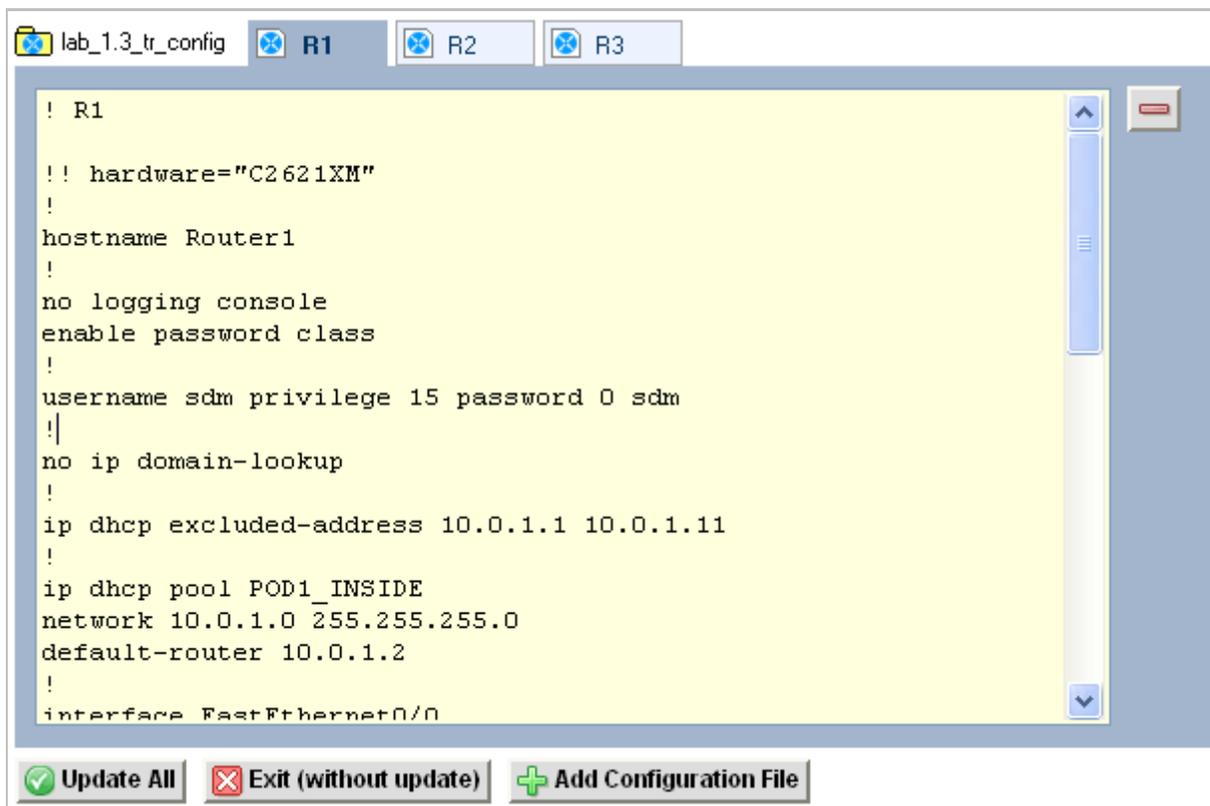


4.5.5 Interface Name Translation Feature

NETLAB+ interface name translation is an optional feature that allows configuration files to be loaded by NETLAB+, without errors, on different pods with different router types. This setting is currently supported on managed routers, and ignored by managed switches and firewalls. As a configuration is loaded, NETLAB+ will substitute the correct interface names for the actual router types being used (if necessary). To do this, NETLAB+ maintains a fixed table of interface names that should be present on each supported router model. Currently, this table supports two Ethernet and two serial interfaces.

Interface name translation requires administrators to ensure that each router's interface names are specified in the NETLAB_{AE} supported router list: <http://www.netdevgroup.com/ae/labdevices.htm#routers>. This may influence serial WIC type and slot.

You can enable interface name translation in your preset configuration files if your labs target NETLAB_{AE} pods, and/or your pods use the same Ethernet and serial interfaces listed in the link above.



```
! R1
!! hardware="C2621XM"
!
hostname Router1
!
no logging console
enable password class
!
username sdm privilege 15 password 0 sdm
!
no ip domain-lookup
!
ip dhcp excluded-address 10.0.1.1 10.0.1.11
!
ip dhcp pool POD1_INSIDE
network 10.0.1.0 255.255.255.0
default-router 10.0.1.2
!
interface FastEthernet0/0
```

To enable interface name translation, perform the following two steps in each preset configuration file:

Step 1. Add the following comment line at the very top of the configuration file. Note, there are two explanation points (!!). This tells NETLAB+ that the interface names in your configuration file are based on a Cisco 2621 router.

```
!! hardware="C2621"
```

Step 2. Adjust your interface commands to use the following interface names. Do not abbreviate, they must be typed **EXACTLY** as shown below:

```
interface FastEthernet0/0
interface FastEthernet0/1
interface Serial0/0
interface Serial0/1
```

NETLAB+ administrators: Always try to use identical hardware across multiple pods. This way, the interface names will not be a factor during automated load and save operations.

4.6 Managing Lab Exercises

Each lab design contains one or more *lab exercises*. Each lab exercise appears in the lab catalog when a user schedules a lab, provided that the pod type specified in the lab design is available. Each lab exercise can:

- Target a specific type of equipment pod.
- Specify a document, which contains instructions for completing the lab.
- Specify a topology image with “clickable hotspots” for each device or PC.
- Specify preset configuration files, which are loaded into lab devices.
- Specify a *Dynamic VLAN Map* to alter the lab topology.
- Specify assessment options for online testing.
- Specify alternate device names.

Lab exercises are displayed on the Labs tab of the lab design page. The exercises are listed in order according to the value of the index field, which may be modified as needed.

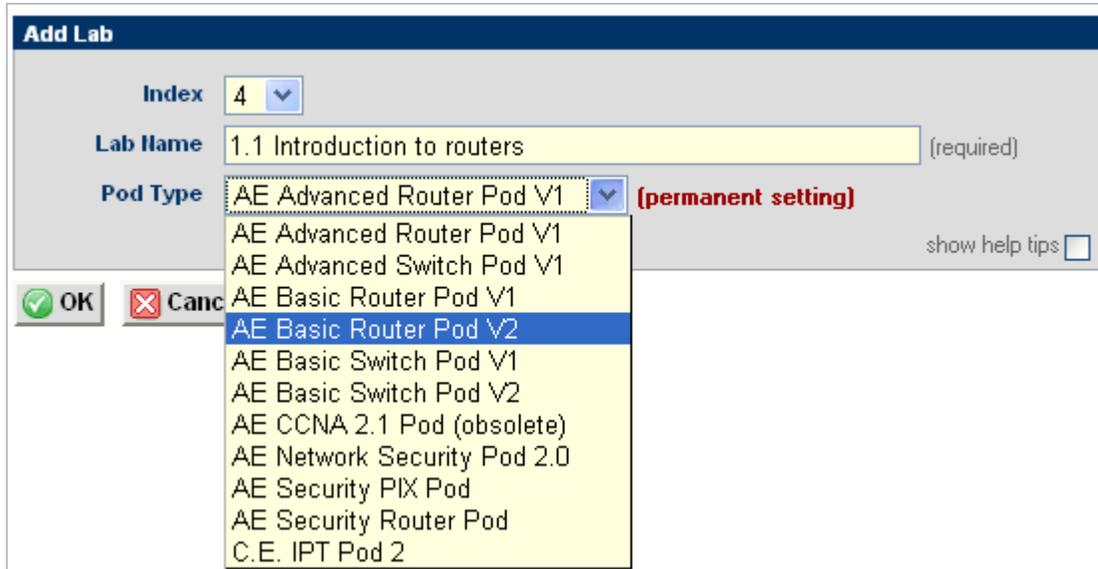


Index	Lab Name	Pod Type
1	1.1 Introduction to routers	AE Basic Router Pod V2
2	1.2 Configuration Basics	AE Basic Router Pod V2
3	1.3 Troubleshooting	AE Advanced Router Pod V1



4.6.1 Creating a Lab Exercise

To add a lab exercise, select the **Add Lab** button. Enter a name for the lab exercise, you may find it helpful to adopt a numeric sequence as part of your naming convention to clearly indicate the order in which the lab exercises should be performed. Select the pod type for the lab, this value cannot be modified.



The screenshot shows the 'Add Lab' dialog box with the following fields and options:

- Index:** A dropdown menu set to '4'.
- Lab Name:** A text input field containing '1.1 Introduction to routers' with a '(required)' label to its right.
- Pod Type:** A dropdown menu with a list of options. The current selection is 'AE Advanced Router Pod V1', which is marked as a '(permanent setting)'. The dropdown list includes:
 - AE Advanced Router Pod V1
 - AE Advanced Switch Pod V1
 - AE Basic Router Pod V1
 - AE Basic Router Pod V2
 - AE Basic Switch Pod V1
 - AE Basic Switch Pod V2
 - AE CCNA 2.1 Pod (obsolete)
 - AE Network Security Pod 2.0
 - AE Security PIX Pod
 - AE Security Router Pod
 - C.E. IPT Pod 2
- Buttons:** 'OK' (with a green checkmark icon) and 'Cancel' (with a red X icon).
- Additional:** A 'show help tips' checkbox is located to the right of the Pod Type dropdown.

Select values for the details of the lab exercise on the page displayed next. Each field is described below. Descriptions of each field may be displayed on the page by selecting the “**show help tips**” checkbox in the lower right corner of 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	<input checked="" type="checkbox"/> always load the specified preset configuration <input type="checkbox"/> disable lab preview feature <input type="checkbox"/> disable lab selection from ILT exercise tab <input type="checkbox"/> disable configuration load tab and features <input type="checkbox"/> disable configuration save tab and features <input type="checkbox"/> disable the action tab and its features <input type="checkbox"/> disable automated scrub feature from action tab <input type="checkbox"/> disable password recovery feature from action tab <input type="checkbox"/> disable power control features from action tab		
VLAN Map	<input checked="" type="radio"/> use pod default <input type="radio"/> custom map		
Alternate Device Names	<input checked="" type="radio"/> use pod device names <input type="radio"/> custom names		

show help tips

Index. The index number indicates the order in which lab exercises are listed. Accepting the default will display lab exercises in the order that they are entered into the system. Modifying the index number allows you to manipulate the order in which lab exercises are displayed. The index values of the other lab exercises present in the lab design will be updated to accommodate your modification.

Lab Name. A unique lab name must be assigned to each lab exercise. You may edit the lab name on this page.

Pod Type. Labs exercises are assigned to the appropriate pod type. NETLAB_{AE} users may select one of their Academy pod topologies, or a custom pod that has been installed using the **Pod Designer**. Please refer to the *NETLAB+ Pod Design Guide* for details. The selected pod type for a lab exercise cannot be modified.

Time Limit. The amount of time that will be made available to users who make a reservation to perform the lab exercise. An additional 10 minutes used by the NETLAB+ system to “clean up” at the end of a lab reservation is added to this time for the total time scheduled for the lab reservation.

Lab Document. Any documentation file that has been added to the lab design file can be associated with a lab exercise. (PDF, DOC, RTF or TXT format). A lab document may be associated with more than one lab exercise.

Topology Image. The image file (GIF, JPEG or PNG format) that will be displayed on the Topology Tab when performing the lab exercise. Images 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.

Preset Configuration. This option allows the selection of a configuration folder, which contains configuration files specific to the devices in the pod that can be loaded at the start of the lab reservation. The configuration folder may be associated with more than one lab exercise.

Assessment Options. Selection of these options restrict the features made available to users during a lab reservation.

- **Always load the specified preset configuration.** If this option is selected, preset configurations are always loaded. Otherwise, users may choose whether or not to load the configuration files at the time the lab reservation is made.
- **Disable lab preview feature.** If selected, the lab document (instructions) cannot be previewed before the lab begins.
- **Disable lab selection from ILT exercise tab.** Prevents instructors from seeing or loading this exercise during ILT lab reservations.
- **Disable configuration load tab and features.** Prevents students from loading their saved configuration files during this lab.
- **Disable configuration save tab and features.** Prevents students from saving their configurations to their personal NETLAB+ file space during the lab reservation. NETLAB+ will still save their configurations in the archive at the end of the reservations.
- **Disable the action tab and its features.** Prevents students from performing any NETLAB+ automated actions during the lab.

- **Disable automated scrub feature from action tab.** Prevents students from performing an automated lab reset during the lab.
- **Disable password recovery feature from action tab.** Prevents students from performing an automated password recovery during the lab.
- **Disable power control features from action tab.** Prevents students from control automated power outlets during the lab.

VLAN Map. This option provides a means of manipulating VLANs on NETLAB+ control switches to accommodate specific lab exercise requirements. VLAN mapping is a powerful NETLAB+ feature that allows each lab exercise to dynamically reconfigure a lab topology, thereby increasing the number of labs that can be performed on a single physical lab topology.

Each pod design has a *Default VLAN Map*. The lab exercise setting “use pod default” causes the default VLAN map to be applied to the pod at the beginning of a lab reservation. Alternatively, the lab exercise may choose the “custom map” setting, allowing the lab exercise to specify its own VLAN map. This flexibility is called *dynamic VLAN mapping* and is described in detail in section 6.

Each control switch port is given a relative port number (+0, +1, etc.) since the actual control switch ports cannot be determined at design time. Each port can have one of the following settings:

- **VLAN (letter).** At the beginning of the lab exercises, the control switch port will be turned on and set to the VLAN indicated by letter. The actual VLAN number used cannot be determined at design time, therefore letters are used.
- **OFF.** This value causes the control switch port to be turned off at the beginning of the lab exercise. It may be turned on if NETLAB+ needs to recover an erased software image.
- **STATIC.** This value indicates that the control switch port is statically configured by the administrator. NETLAB+ will not change the administrative state (on/off), will not change the VLAN, nor any other setting on the port. Typically, you should use the static setting only if the default VLAN map in the pod design also uses static.

Alternate Device Names. This option is used to allow the display of any device names that may be helpful to have displayed and associated with the lab devices as defined in the documentation specific to the lab exercise.

4.6.2 Modifying a Lab Exercise

To modify any of the settings selected for a lab exercise, select the Lab Name of the exercise listed on the Labs section of the tabbed interface (See section 4.6). Please refer to section 4.6.1 for a description of each field on the page. Field descriptions can be displayed on the page by checking the **show help tips** checkbox in the lower right corner of the page.

The value for Pod Type cannot be changed. If a pod type is selected in error, simply create a new lab exercise record with the correct pod type.

Lab 1.2 Configuration Basics

Global Lab ID JDOE2006_00C0_F06B_B5E7_44BA_64B4_0002

Index 2

Lab Name 1.2 Configuration Basics (required)

Pod Type AE Basic Router Pod V2

Time Limit up to class maximum

Lab Document lab_1.2_configuration.pdf

Topology Image use pod topology image

Preset Configuration lab_sample_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

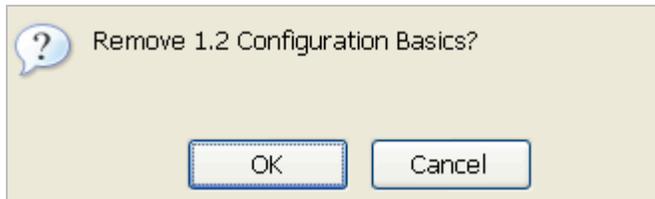
custom names

show help tips

Select **OK** to save your modifications.

4.6.3 Removing a Lab Exercise

A lab exercise may be removed from the lab design by selecting the  button on the lab exercise edit page (see picture in previous section). If there are scheduled reservations using the lab exercise, the reservations will be modified to simple reservations with no associated exercise.



Select **OK** to proceed with the deletion.

4.7 Relationship Between Classes, Lab Exercises, Reservations, and Pods

All lab reservations are associated with a particular class. The only exception is when an instructor chooses to reserve a pod for personal use.

NETLAB+ only provides access to the pod types that are relevant to the class.

The following rules determine which pods on the system are made available to a class for scheduling.

- (1) Consider ONLY lab designs that are selected in the class settings.
- (2) Consider ALL lab exercises resulting from rule 1.
- (3) Consider ONLY the pod types required by the lab exercises determined in step 2.
- (4) Consider ONLY the pods that are installed and online.
- (5) Consider community based pod rules have been established by the administrator that may restrict access to a particular pod.

Because of rule 3 and 4, NETLAB+ will only list lab exercises for which the required pod type is available. Per rule 5, NETLAB+ may restrict access to a particular pod altogether, or at certain times.

4.7.1 Creating Lab Exercises for Simple Pod Reservations

Section 4.7 outlined rules that determine which pods can be used by a class. Rule 1 and 2 imply that a class can only access a particular type of pod, if and only if the pod type is referenced in at least one lab exercise from a lab design selected for that class. Therefore, it is often desirable to create a lab exercise that allows a class to reserve a particular type of pod. This exercise will typically have no lab activity and will use the settings shown here:

Lab Reserve Basic Router Pod V2 (no lab exercise)
Global Lab ID CCNA3RL_00C0_F06B_B5E7_44B9_27DE_0004
Index 1 ▾
Lab Name Reserve Basic Router Pod V2 (no lab exercise) (required)
Pod Type AE Basic Router Pod V2
Time Limit up to class maximum ▾
Lab Document none ▾
Topology Image use pod topology image ▾
Preset Configuration none ▾
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

4.8 Closing a Lab Design

When you are done making changes to a lab design, click on the **Close Lab Design** button at the bottom of the tabbed interface. This will ensure that all changes are saved and the file is unlocked.

The screenshot shows a web interface with a tabbed menu at the top containing 'General', 'Documents', 'Images', 'Configs', 'Labs', and 'Builds'. The 'General' tab is active, displaying a 'General Settings' section with a table of configuration options. At the bottom of the interface, there are two buttons: 'Close Lab Design' (with a red 'X' icon) and 'Modify Design' (with a key icon). The 'Close Lab Design' button is highlighted with a red rectangular border.

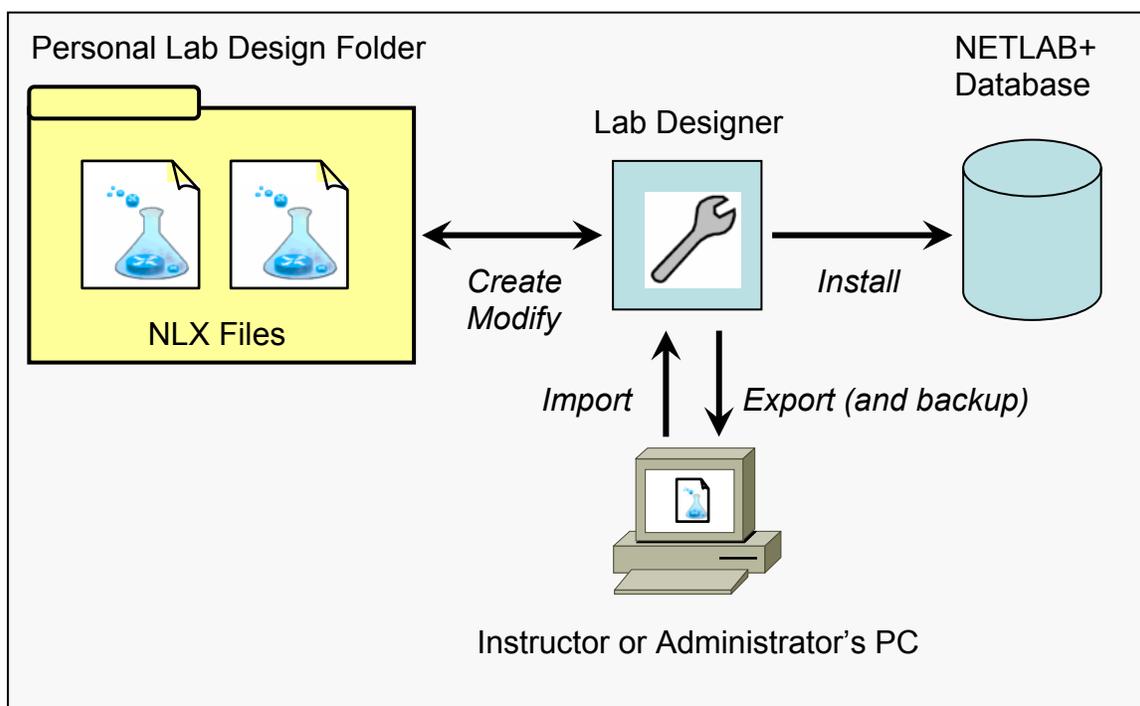
General Settings	
Name	Fall CCNA Class
Description	Lab Exercises for Fall CCNA Class
Author	Jane Doe
Organization	Fictional Name University
Copyright	Copyright © 2006, Fictional Name University
Support URL	http://www.fictionalname.org/
Note / Comment	
Modification Password	<i>not required</i>
Installation Password	<i>not required</i>
Cloning Permitted	Yes
Cloning Password	<i>not required</i>
Access	Global

5 Working With Lab Design Files and Builds

Lab designer does not install lab exercises and materials directly into the NETLAB+ database. Rather, it produces an NLX file, which acts like “source code”. The lab exercises, documents, images, and preset configurations make up the source files and materials contained within an NLX file. The administrator and each instructor have a personal folder in which NLX files are stored and manipulated by the lab designer. NLX files can be exported to your PC, shared with others, and transferred to other NETLAB+ systems.

The NLX file format has built in version control. Each version is called a *build*. Builds are managed from the build tab. When all desired changes have been made to the NLX file, the build is *committed*. Only a committed build can be *installed* into the NETLAB+ database, which allows the lab exercises in the lab design to be used by one or more classes.



A new build must be created to make further changes to the lab design. All changes must be made to the NLX file. You cannot directly modify lab exercises and materials directly in the NETLAB+ database. Therefore, it is important to export, backup and protect your NLX files.

Always keep backup copies of your lab designs. Lab design files are not automatically backed up by the system. If your account is deleted, your personal lab design folder is also deleted. The export function is used to make backups and is described in section 5.7.

When you are done working with a lab design, always click on the **Close Lab Design** button at the bottom of the tabbed interface. This will ensure that all changes are saved and the file is unlocked.

5.1 The Build Tab

Many of the tasks described in this section are managed from the build tab. A set of buttons for different actions will appear on the right side of the build tab. The buttons shown on the build tab will vary depending on the state of the build, and if the NLX file is being modified.

Lab Designer
MyNETLAB Logout

Name	Build	Committed	Author ID	Global ID	File Size	Last Modified
Rivendale Academy CCNP Challenge	2	No	RIVCCNP	00C0_F06B_B5E7_44BB_90E8	694	2006-07-17 16:09:56 UTC

General Documents Images Configs Labs **Builds**

Build	Description
2	Created 2006-07-17 16:09:56 UTC by Rich Lucas (rlucas) on 0000 0000 0000
1	Committed 2006-07-17 16:09:43 UTC by Rich Lucas (rlucas) on 0000 0000 0000

Commit
Export
Delete

5.2 Modifying a Build

To modify a build, click on the Modify Design Button at the bottom of the tabbed interface. Once you are modifying a build, you can make changes to almost all of the settings contained within the design file.

- If you are already modifying, the Modify Design button will not appear.
- If the current build is committed, you must create a new build as described in section [5.13](#) before changes can be made.

Lab Designer
MyNETLAB Logout

Name	Build	Committed	Author ID	Global ID	File Size
Rivendale Academy CCNP Challenge	2	No	RIVCCNP	00C0_F06B_B5E7_44BB_90E8	64

General Documents Images Configs Labs **Builds**

Builds

Build	Description
2	Created 2006-07-17 16:09:56 UTC by Rich Lucas (rlucas) on 0000 0000 0000
1	Committed 2006-07-17 16:09:43 UTC by Rich Lucas (rlucas) on 0000 0000 0000

Export Delete

Close Lab Design **Modify Design** *button does not appear if the design file is already being modified*

If a modification password is assigned to the design file, you will be asked to provide the correct password before modification is allowed.

Password Required

 This file is password protected. Before changes are allowed, you must supply the **current** modification password.

Enter the current modification password: (required)

OK Cancel

5.3 Committing a Build

The NLX file format has built in version control. Each version is called a *build*. Builds are managed from the build tab. When all desired changes have been made to the NLX file, the build is *committed*. Only a committed build can be *installed* into the NETLAB+ database, which allows the lab exercises in the lab design to be used by one or more classes.

To commit the current build, click on the Commit button in the build tab.

You must be modifying the design file in order for the Commit button to appear.

Lab Designer
MyNETLAB Logout

Name	Build	Committed	Author ID	Global ID	File Size	Last M
Rivendale Academy CCNP Challenge	2	No	RIVCCNP	00C0_F06B_B5E7_44BB_90E8	694	2006-0

General Documents Images Configs Labs **Builds**

Builds

Build	Description
2	Created 2006-07-17 16:09:56 UTC by Rich Lucas (rlucas) on 0000 0000 0000
1	Committed 2006-07-17 16:09:43 UTC by Rich Lucas (rlucas) on 0000 0000 0000

Commit Export Delete

 **Commit build ?**

- Once committed, this design cannot be changed without creating a new build.

Commit Cancel

After confirming the commit, further changes to the build will be locked out. You can now install the build in the NETLAB+ database.

5.4 Installing a Build

Before a lab design can be used by classes, it must be installed into the NETLAB+ database. If the current build is committed, an install button will appear on the build tab.

To install the current build, click on the install button located on the build tab.

General Documents Images Configs Labs **Builds**

Builds

Build	Description
2	Committed 2006-07-17 18:23:48 UTC by Rich Lucas (rlucas) on 0000 0000 0000
1	Committed 2006-07-17 16:09:43 UTC by Rich Lucas (rlucas) on 0000 0000 0000

Install New Build Export Delete

Complete the configuration dialog:



- NETLAB+ will not install the current build if it is already installed.
- NETLAB+ will display a warning message if you are about to install a build that is older than the currently installed build.
- If the lab design requires an installation password, you will be required to enter the correct password at this time. (See section 4.2.1)
- If a lab design was made *global* by the administrator, you must be the appointed *trustee* in order to install a new build (See section 5.10)

Once you have installed your lab design it becomes an asset that your classes can use and rely upon. As always, it is important to keep a backup copy of the lab design. You will need the lab design file if you want to make changes. Please see section 5.7.

Please note that only one instance of a lab design can only be installed on a NETLAB+ system. The global feature (described in section 5.10) can be used when you wish to make your lab design available to all instructors on the system. Currently, a private lab design cannot be installed and used by more than one instructor. However, if two or more instructors are leads in the same class, each instructor may contribute their private lab designs to the class.

5.5 Enabling a Lab Design in a Class

Once a lab design is installed, it may be used by one or more classes. By default, a lab design is *private*. Only the instructor who installs a private lab design can assign it to their classes. A *global* lab design can be used by any class on the system. Global lab designs are discussed in section 5.10.

To use a lab design, open the Class Manager from the instructor MyNETLAB page, or the administrator home page. Next, select and edit the class that requires access to the lab design. You must be a class lead, or have appropriate rights to edit the class settings.

NETLAB+ will separately list global lab and private lab designs. Check the boxes associated with the lab designs you wish to enable. Click the OK button to save your selections. By checking the box, you will authorize the class to use the lab exercises and documents contained within. Keep in mind that access to certain pods and lab exercises is governed by the rules described in section 4.7.

Edit Class INSTRUCTOR

MyNETLAB Logout Help iDoe2006

- ◆ Edit the information for this class, then click OK.
- ◆ For help with the form, click Help on the menu bar.

Class Name **REQ**

Lead Instructor(s)
Ann Dole
Jane Doe

Global Labs

- AE CCNA 1 English V3.1
- AE CCNA 2 English V3.1
- AE CCNA 3 English V3.1
- AE CCNA 3.1 Semester 2
- AE CCNA 4 English V3.1
- AE CCNA Bridge Exams 3.0
- AE CCNA English V2.1 (retired)
- AE FNS Combined V1.2 English
- AE FNS PIX V1.2 English
- AE FNS Router V1.2 English
- CCNP 3.x Pods
- Fall CCNA Class
- Global Test

Private Labs

- Bonus CCNA Labs by Jane
- CCNP Challenge

Starting Date None Date Jul 29 2006

If there is more than one lead instructor in the class, each lead can select and enable their own private lab designs in that class. Only the instructor that installed the lab design can enable it. Once enabled, all lead instructors in the class will see the selection in the list of private labs. In addition, any class lead can disable that selection. However, once disabled, it can only be re-enabled by the instructor who installed it.

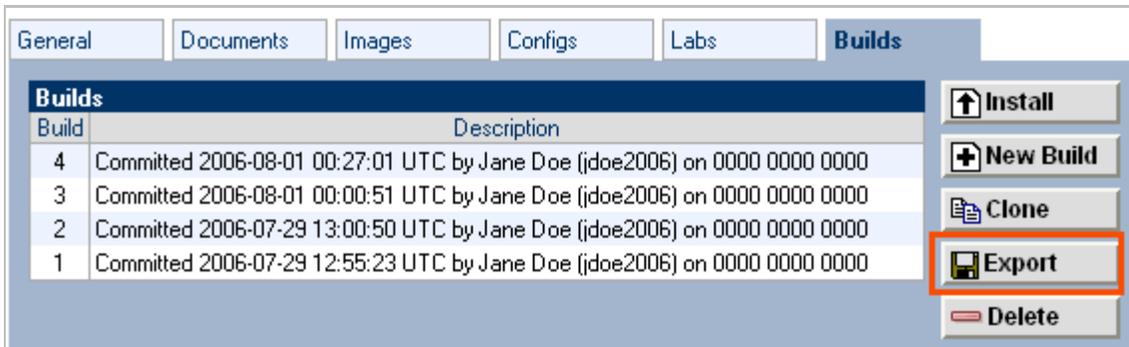
5.6 Disabling a Lab Design in a Class

To disable a lab design in a class, you edit the class settings as described in section 5.5, and then uncheck the box associated with the lab design. Any class lead can disable a lab design. However, once a private lab design is disabled, it can only be re-enabled by the instructor who installed it.

5.7 Exporting and Backing Up Lab Design Files

The export function downloads a copy of a lab design from your personal lab design folder on the NETLAB+ server, to your local PC. You can use the export function to make a backup copy of your lab designs. Similarly, you can use the import function (see 5.8) to restore a lab design. Import and Export can be used to share lab designs with other users and/or other NETLAB+ systems. However, only one instance of a lab design can be installed per system (see 5.4).

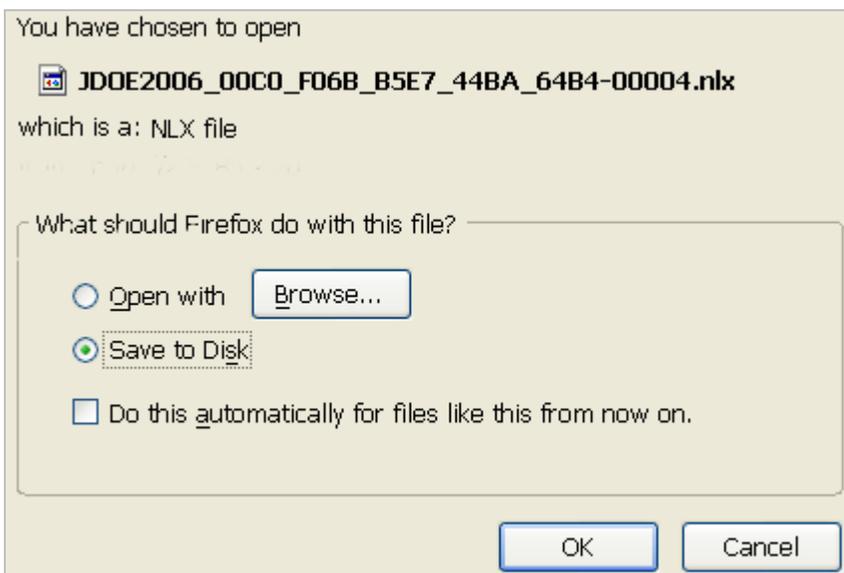
The Export function is available on the Build tab. Select the **Export** button.



To proceed, select the **Begin File Download** button.

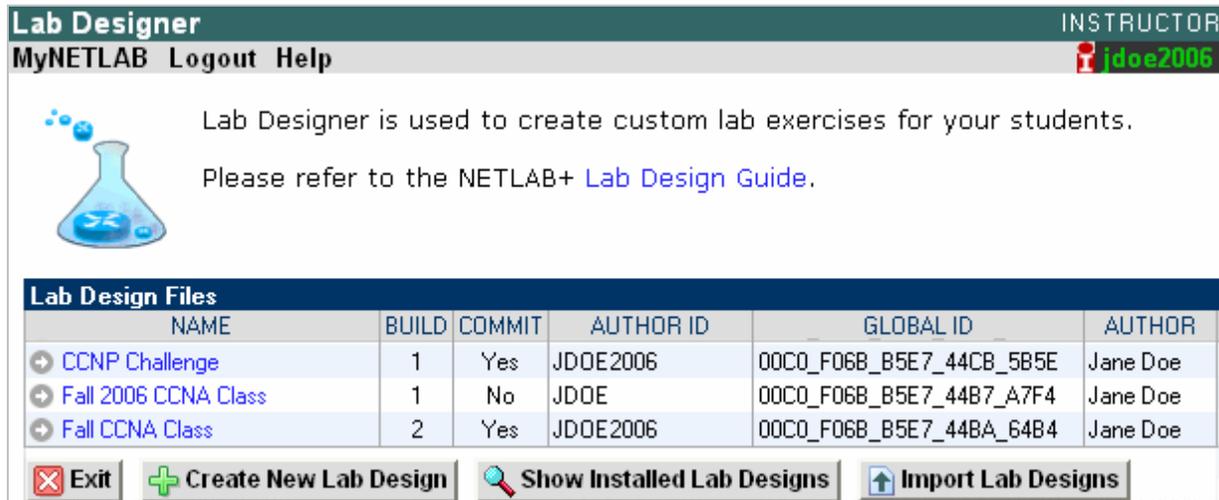


The options to save the exported file will vary with your selection of browser settings.



5.8 Importing and Restoring Lab Design Files

The import function uploads a copy of a lab design on your local PC, to your personal lab design folder on the NETLAB+ server. Import is the opposite of export. You can use the import function to restore a backup copy of your lab designs. Import and Export can be used to share lab designs with other users and/or other NETLAB+ systems. However, only one instance of a lab design can be installed per system (see 5.4).



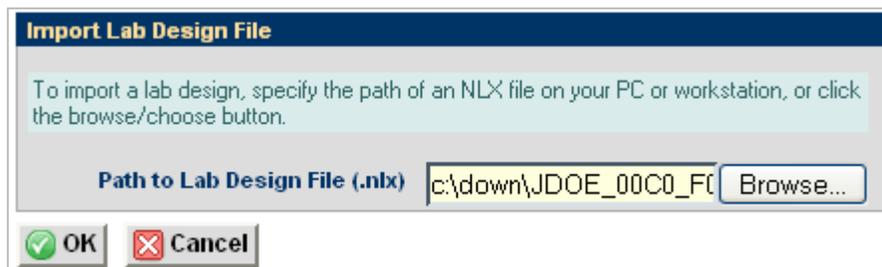
Lab Designer INSTRUCTOR
MyNETLAB Logout Help jdoe2006

Lab Designer is used to create custom lab exercises for your students.
Please refer to the NETLAB+ [Lab Design Guide](#).

NAME	BUILD	COMMIT	AUTHOR ID	GLOBAL ID	AUTHOR
CCNP Challenge	1	Yes	JDOE2006	00C0_F06B_B5E7_44CB_5B5E	Jane Doe
Fall 2006 CCNA Class	1	No	JDOE	00C0_F06B_B5E7_44B7_A7F4	Jane Doe
Fall CCNA Class	2	Yes	JDOE2006	00C0_F06B_B5E7_44BA_64B4	Jane Doe

Exit Create New Lab Design Show Installed Lab Designs Import Lab Designs

Select the **Import Lab Designs** button located at the bottom of the main Lab Designer page. You may enter in the complete path and file name, which must end with the **NLX** extension. Select the **OK** button to upload the specified lab design.

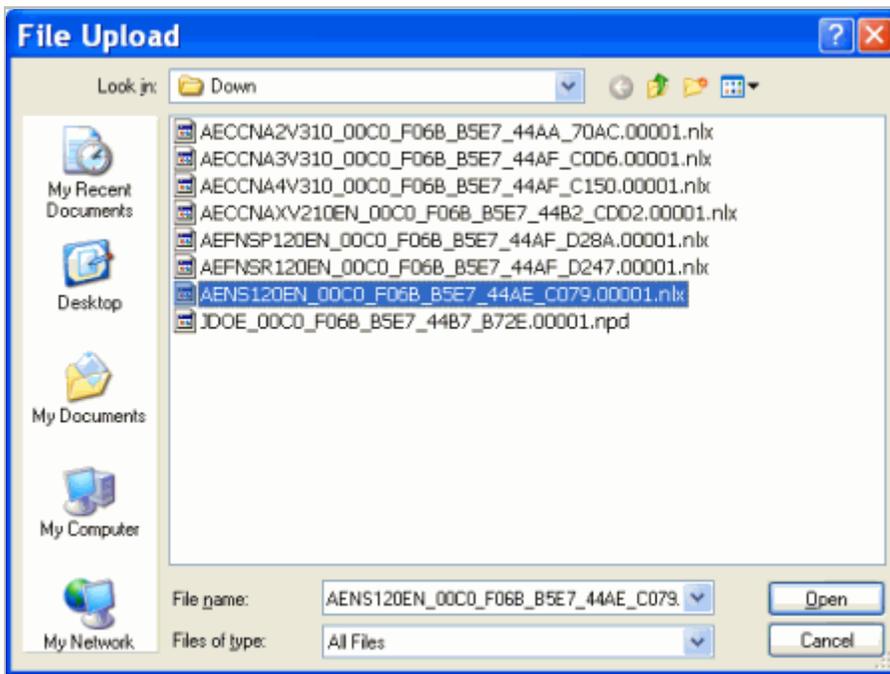


Import Lab Design File

To import a lab design, specify the path of an NLX file on your PC or workstation, or click the browse/choose button.

Path to Lab Design File (.nlx)

You may also import a lab design by selecting the **Browse** button, which will allow you to traverse your directory structure and select the file to upload.



5.9 Viewing a List of Installed Lab Designs

To see a list of the lab designs that are installed on your NETLAB+ system, select the **Show Installed Lab Designs** button located at the bottom of the main Lab Designer page (See section 5.8).

Global Installed Lab Designs						
NAME	BUILD	GLOBAL ID	AUTHOR/ORG	TRUSTEE	USED	
➔ AE CCNA 1 English V3.1	1	AECCNA1V310_00C0_F06B_B5E7_44B2_63E7	Jane Doe Fictional Name University	n/a	15	
➔ AE CCNA 2 English V3.1	3	AECCNA2V310_00C0_F06B_B5E7_44AA_70AC	Jane Doe Fictional Name University	n/a	15	
➔ AE CCNA 3 English V3.1	1	AECCNA3V310_00C0_F06B_B5E7_44AF_C0D6	Jane Doe Fictional Name University	n/a	15	
➔ AE CCNA 3.1 Semester 2	4	AECCNA310S3_00C0_F06B_B5E7_4496_CAA8	Jane Doe Fictional Name University	jdoe2006	0	
➔ AE CCNA 4 English V3.1	1	AECCNA4V310_00C0_F06B_B5E7_44AF_C150	Jane Doe Fictional Name University	n/a	15	
➔ AE CCNA Bridge Exams 3.0	1	AECCNABA30_00C0_F06B_B5E7_44B2_6EA0	Jane Doe Fictional Name University	n/a	15	
➔ AE CCNA English V2.1 (retired)	2	AECCNAxV210EN_00C0_F06B_B5E7_44B2_CDD2	Jane Doe Fictional Name University	n/a	15	
➔ AE FNS Combined V1.2 English	1	AENS120EN_00C0_F06B_B5E7_44AE_C079	Jane Doe Fictional Name University	n/a	0	
➔ AE FNS PIX V1.2 English	1	AEFNSP120EN_00C0_F06B_B5E7_44AF_D28A	Jane Doe Fictional Name University	n/a	0	
➔ AE FNS Router V1.2 English	1	AEFNSR120EN_00C0_F06B_B5E7_44AF_D247	Jane Doe Fictional Name University	n/a	0	
➔ CCNP 3.x Pods	1	AECCNP3xPODS_00C0_F06B_B5E7_44B6_7070	Jane Doe Fictional Name University	n/a	0	
➔ Fall CCNA Class	2	JDOE2006_00C0_F06B_B5E7_44BA_64B4	Jane Doe Fictional Name University	n/a	0	
➔ Global Test	1	GLOWORM_00C0_F06B_B5E7_44A7_E071	Jane Doe Fictional Name University	n/a	0	

Private Installed Lab Designs						
NAME	BUILD	GLOBAL ID	AUTHOR/ORG	TRUSTEE	USED	
➔ Bonus CCNA Labs by Jane	1	JDOE2006_00C0_F06B_B5E7_44CB_5FA2	Jane Doe Fictional Name University	jdoe2006	1	
➔ CCNP Challenge	1	JDOE2006_00C0_F06B_B5E7_44CB_5B5E	Jane Doe Fictional Name University	jdoe2006	0	

5.10 Making a Lab Design Global

The global feature can be used to make your lab design available to all instructors on the system. Global access is a mutual agreement between the lab designer and the system administrator. Once both parties agree to share a lab design, the administrator can appoint a *trustee* to manage further updates to the lab content. Only the trustee may update global content. Only the administrator may uninstall global content.

Step 1. Set the access setting to **global** in the general settings tab. This step is done in lab designer.

General Settings

Name Rivendale Academy CCNP Challenge (required)

Description Rivendale CCNP labs.

Author James Madison

Organization Rivendale Community College

Copyright Copyright (C) 2006, Rivendale Community College

Support URL http://ccnp.rivendalecc.edu

Note / Comment Requires Basic Router Pod V2 and Advanced Router

Cloning This lab design may be cloned

Step 1. **Access** Private Global (if authorized by administrator)

show help tips

Step 2. Commit the lab design and install it in the NETLAB+ database. This can be done from any instructor account or the administrator account. The lab design must be in the personal lab design folder of the account. The design will be installed privately until the administrator completes the next steps.

The next steps must be completed by the **administrator** from the administrator account.

Step 3. Open the lab designer tool from the administrator home page.

Step 4. Click on the **Show Installed Lab Designs** button.

Step 5. Locate and access the lab design in the **private** lab designs table.

Step 6. If the lab designer has completed step 1, the lab design will be global eligible, and the Make Global button will appear (see the example below). Click this button and confirm.

The lab design will remain public as long as it is installed. To make it private again, the design must be removed and reinstalled.

CAUTION: You cannot modify a lab design directly in the NETLAB+ database. Future modifications will require the lab design file, which is like source code. Since you are about to make this lab design global, please make sure you have coordinated with the author and/or your appointed trustee. Ideally, the administrator and/or trustee should have 1) a backup copy of the exported lab design, 2) the modification password, and 3) the installation password.

Installed Lab Design	
Name	Rivendale Academy CCNP Challenge
Build	7
Author ID	RIVCCNP
Global ID	00CD_F06B_B5E7_44BB_90E8
Description	Rivendale CCNP labs.
Author	James Madison
Organization	Rivendale Community College
Copyright	Copyright (C) 2006, Rivendale Community College
Support URL	http://ccnp.rivendalecc.edu
Note / Comment	Requires Basic Router Pod V2 and Advanced Router pod.
Access	Private, global eligible Make Global
Trustee	Rich Lucas (rlucas)
Can Uninstall	Yes, by the trustee only

 Exit

Step 8. Once the design is global, the administrator becomes the default trustee. If you want to delegate this responsibility, set a new trustee. This is described in the next section.

5.11 Setting and Changing the Trustee

Only the designated trustee can install updates to a globally installed lab design. The trustee can only be changed from the administrator account. The administrator can appoint any instructor, or himself as trustee. To perform further updates, the trustee must have the lab design file (NLX) in their account's personal lab design folder.

If the trustee's NETLAB+ account is deleted, the administrator will become the trustee.

Step 1. Login to the administrator account and access the lab designer tool from the administrator home page.

Step 2. Click on the **Show Installed Lab Designs** button.

Step 3. Locate and access the lab design in the **global** lab designs table.

Step 4. Refer to the illustration below. Click on the **Change Trustee** button.

Installed Lab Design	
Name	Rivendale Academy CCNP Challenge
Build	7
Author ID	RIVCCNP
Global ID	00C0_F06B_B5E7_44BB_90E8
Description	Rivendale CCNP labs.
Author	James Madison
Organization	Rivendale Community College
Copyright	Copyright (C) 2006, Rivendale Community College
Support URL	http://ccnp.rivendalecc.edu
Note / Comment	Requires Basic Router Pod V2 and Advanced Router pod.
Access	Global
Trustee	administrator Change Trustee
Can Uninstall	Yes, administrator only Uninstall

Step 5. Appoint an eligible trustee from the account list.

Eligible Trustees		
USER ID	ACCOUNT NAME	COMMUNITY
↔ administrator	NETLAB+ administrator	
↔ Adole	Ann Dole	XYZ Technical College
↔ jdoe2006	Jane Doe	XYZ Technical College
↔ scorpio	Rob Scorpio	XYZ Technical College
↔ wsamuels	Will Samuels	NDG
↔ xyzinst	XYZ Instructor	XYZ Technical College

✖ Cancel

5.12 Uninstalling a Lab Design From the NETLAB+ Database

Lab designs may be uninstalled from the NETLAB+ database. Once a lab design is uninstalled, it will no longer be available for use by classes where this lab design had been selected. Select the name of the lab to uninstall from the list of installed lab designs (See section 5.9). The **Uninstall** button will be displayed only if the user has the authority to delete the lab design.

Installed Lab Design	
Name	Bonus CCNA Labs by Jane
Build	1
Author ID	JDOE2006
Global ID	00C0_F06B_B5E7_44CB_5FA2
Description	Lab Exercises CCNP Challenge
Author	Jane Doe
Organization	Fictional Name University
Copyright	Copyright © 2006, Fictional Name University
Support URL	http://www.fictionalname.org/
Note / Comment	
Access	Private
Trustee	Jane Doe (jdoe2006)
Can Uninstall	Yes

Keep in mind that once a lab design is uninstalled it will be removed from any classes that the lab design has been selected for use. If there are scheduled reservations for lab exercises from this lab design, the reservations will be modified to simple reservations with no associated exercise.

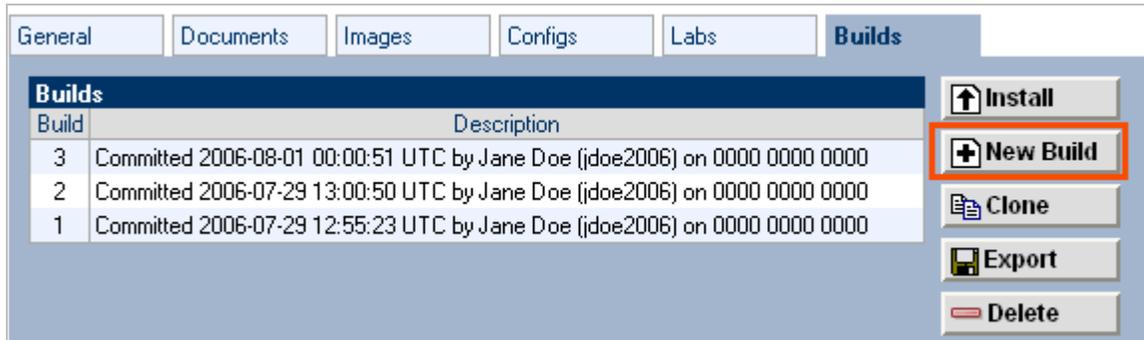
 **Remove lab design "Bonus CCNA Labs by Jane" ?**

- ◆ This lab design will be removed from any classes that are using it.
- ◆ Any scheduled labs using this design will be converted to simple pod reservations with no lab exercises.

Select the **OK** button to proceed with the uninstall of the lab design.

5.13 Creating a New Build

The NLX file format has built in version control. Each version is called a *build*. A new build must be created to make further changes to a lab design. All changes must be made to the NLX file. You cannot directly modify lab exercises and materials in the NETLAB+ database. Once a build is committed, no further modifications may be made. In order to make additional changes to the lab design, a new build must be created.



The **New Build** button will be available on the build tab only if the current build has been committed. Select the checkbox to **remove lab design files from previous builds** if you wish to have the previous builds for this lab design deleted from your lab design personal folder on the NETLAB+ server.

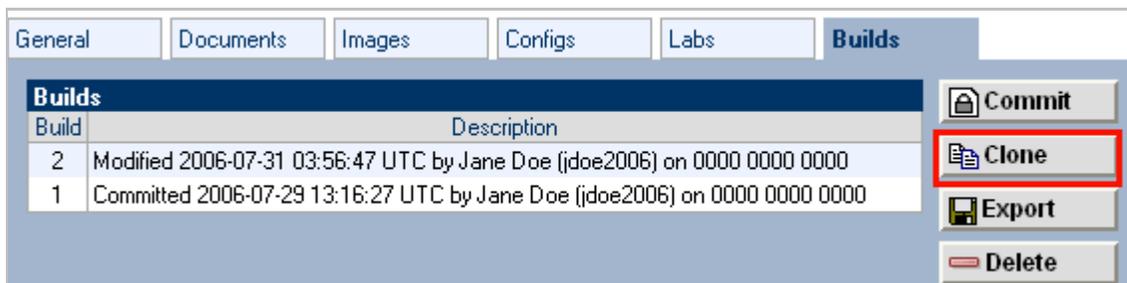
You may wish to keep your previous build should any circumstance cause you to decide not to proceed with the installation of the changes you plan to make to the lab design.



Select **OK** to proceed with the new build.

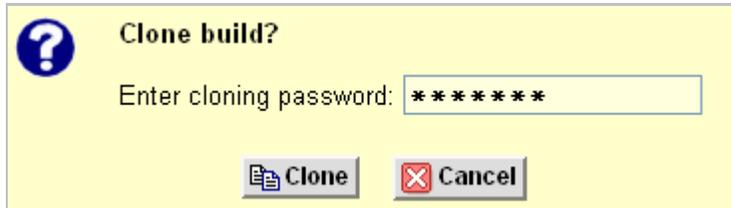
5.14 Cloning a Build

Use the clone feature to create derivative works based on a lab design. The cloning feature must be enabled in the general settings.



Please Note: The clone button does not appear if cloning permitted is not checked in the design.

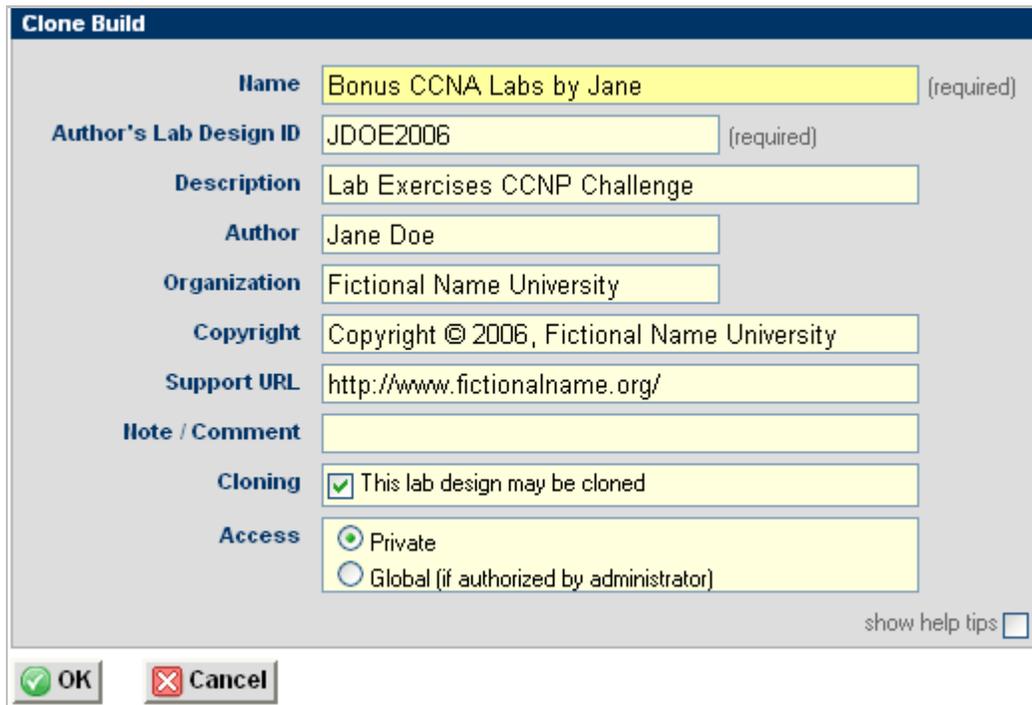
If a Cloning password requirement has been set, the password must be entered in order to proceed.



A dialog box titled "Clone build?" with a question mark icon. It contains a text input field labeled "Enter cloning password:" with the text "*****" inside. Below the input field are two buttons: "Clone" with a document icon and "Cancel" with a red X icon.

You will be required to enter a new Lab Design ID and modify the lab design name in order to create the clone (See section 4.1). A description of the fields on the page may be displayed on the page by selecting the “**show help tips**” checkbox in the lower right corner of the page.

A cloned lab design is a derivative work, not an exact copy. NETLAB+ automatically assigns a new globally unique ID number to the clone. Each lab exercise also has a unique identity from the original.



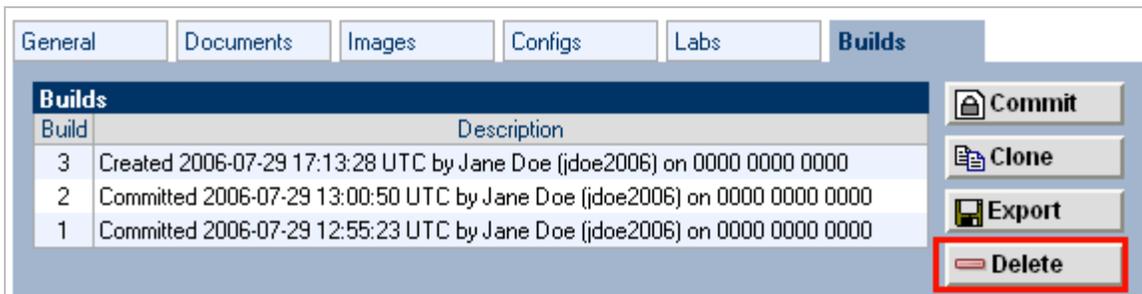
A form titled "Clone Build" with a dark blue header. The form contains several fields and a checkbox:

- Name:** Bonus CCNA Labs by Jane (required)
- Author's Lab Design ID:** JDOE2006 (required)
- Description:** Lab Exercises CCNP Challenge
- Author:** Jane Doe
- Organization:** Fictional Name University
- Copyright:** Copyright © 2006, Fictional Name University
- Support URL:** http://www.fictionalname.org/
- Note / Comment:** (empty text area)
- Cloning:** This lab design may be cloned
- Access:** Private, Global (if authorized by administrator)

At the bottom right of the form is a checkbox labeled "show help tips". At the bottom left are two buttons: "OK" with a green checkmark and "Cancel" with a red X.

5.15 Deleting a Lab Design From Your Personal Folder

To delete a lab design file from your personal folder, select the Delete button located on the build tab.



Please note that deleting the design file does not automatically delete the lab design from your NETLAB+ system database. To proceed with the deletion, select the **Delete File** button.

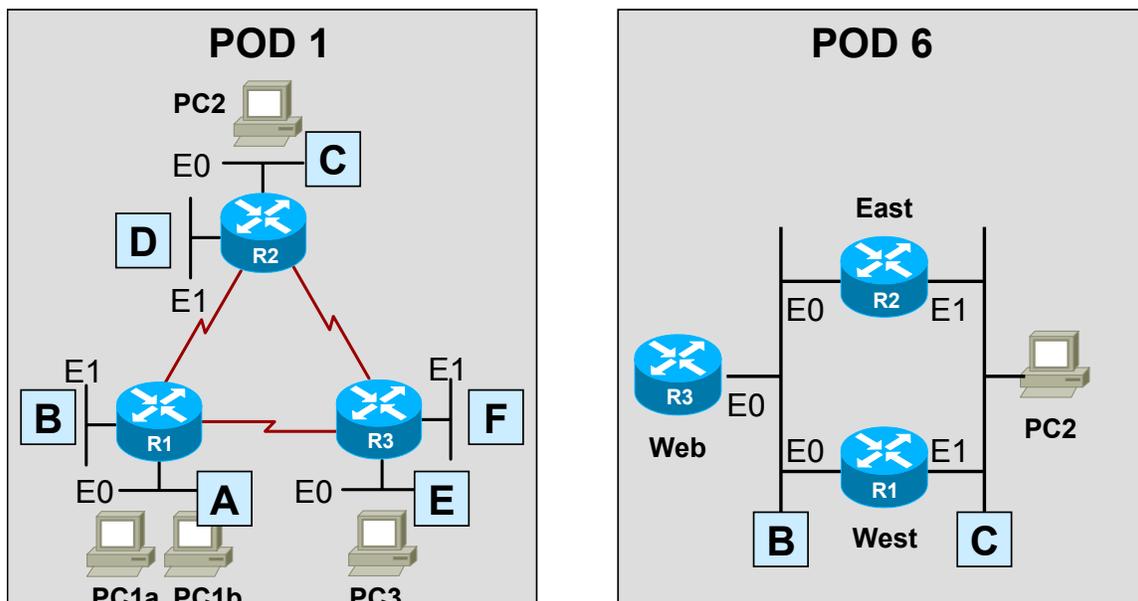


6 Dynamic VLAN Maps

Every pod design that contains lab devices has exactly one VLAN map. By default, this VLAN map is applied to the pod at the beginning of a lab reservation. However, you may also specify a different VLAN map for each lab exercise (using lab designer). Each exercise may specify its own VLAN map, or simply use the default VLAN map specified in the pod design. This flexibility is called *dynamic VLAN mapping*.

By using different VLAN maps in your lab exercises, you can make logical alterations to the lab topology without changing the cabling of the pod (which is always fixed). If the pod is designed to take advantage of VLAN maps, it may be possible to perform many more labs than could be done with static mapping and/or direct connections between lab devices. By decreasing the number of physical lab topologies required, the potential cost of lab equipment to teach a curriculum is greatly reduced.

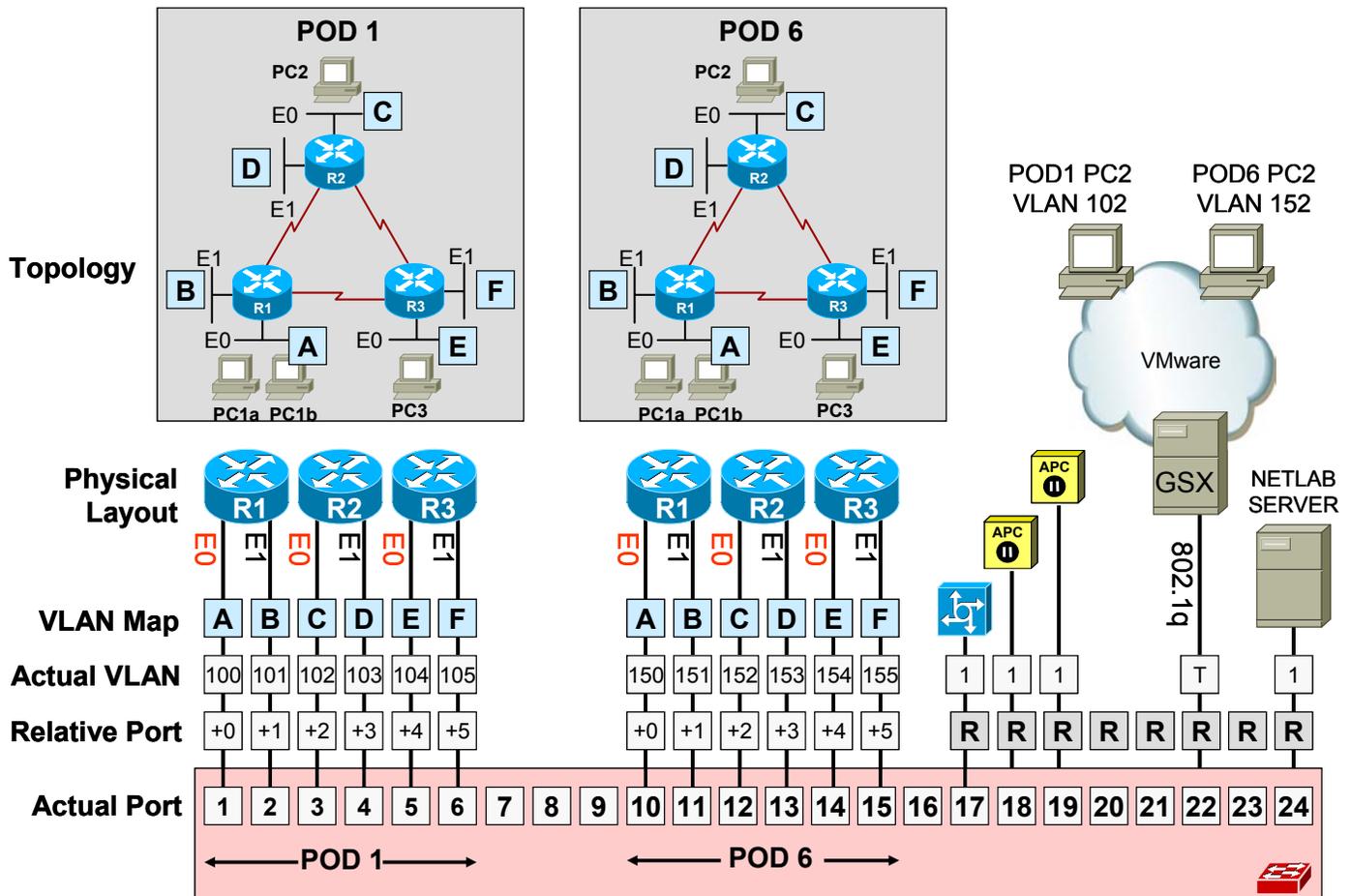
Consider the two pods below. Both pods are actually both NETLAB_{AE} Basic Router Pod Version 2 pods and are physically wired as such. However, pod 6 has loaded an “HSRP” lab exercise that uses a dynamic VLAN map. The pod 6 topology will behave much differently than its pod 1 counterpart for the duration of the lab exercise. The lab exercise also presents the topology picture shown for pod 6, so the user actually sees the modified topology. The only difference between pod 1 and pod 6 is the VLAN map.



Router	Interface	Pod 1 Default VLAN Map	Pod 6 Using HSRP VLAN Map
R1	E0	A	B
R1	E1	B	C
R2	E0	C	B
R2	E1	D	C
R3	E0	E	B
R3	E1	F	OFF

6.1 Understanding VLAN Maps

For this discussion please refer to the picture below. The purpose of VLAN maps may be somewhat difficult to understand at first. However, by the end of section, you will discover that VLAN maps are a very powerful tool that can dramatically increase the number of labs that can be performed on a single pod design, thereby decreasing the overall cost of lab equipment.



During normal operation, *pod ports* on the NETLAB+ *control switch* can be set to OFF, statically configured, or placed in a control switch VLAN to simulate one or more Ethernet segments required by the topology of the pod.

VLANs on the control switch are used to simulate LAN segments. Each pod in NETLAB+ is given a set of VLANs called the *VLAN pool*. The size of the VLAN pool is determined at design time by the pod designer, based on how many simulated LAN segments are desired.

A *default VLAN map* is assigned to each pod design. If a lab exercise does not specify a custom VLAN map, NETLAB+ will use the default VLAN map. The VLAN map is loaded at the beginning of the lab exercise, or when an instructor loads a different exercise during an instructor-led training reservation.

Since the actual VLAN numbers must be unique in each pod, the actual VLAN numbers cannot be determined at design time. Therefore, the pod designer and lab designer tools use *relative VLANs* (A, B, C..., etc). The actual VLAN numbers for each VLAN are determined when the administrator configures an instance of the pod design. Relative port numbers (+0, +1, +2, etc) are also used in the pod design for the same reason.

The lab designer is usually not required to know how the relative VLANs (letters) map to the actual VLAN numbers. You do however need to know how the pod designer has mapped the physical connections between Ethernet ports on the lab devices and control switch. The person who created the pod design should provide this in the form of documentation.

If you are writing lab exercises for the standard NETLAB_{AE} pods, you can obtain this data from the NDG website: <http://www.netdevgroup.com/ae/brpv2.htm>. Please follow the “Specifications and Requirements” link for each pod type.

Ports in a VLAN map do not need to be assigned to a VLAN. Alternatively, the port may be turned OFF, or STATIC. A setting of static instructs NETLAB+ not to manipulate the port. A static port might be configured as a trunk to a special unmanaged router, or other special device.

The example above shows the VLAN map for a NETLAB_{AE} Basic Router Pod (version 2). The VLAN pool size for this pod design is 6 (VLAN A to VLAN F). This provides a unique simulated LAN segment for each router port on R1, R2, and R3.

The actual VLAN numbers that were assigned to pod 1 and pod 6 by NETLAB+ are also shown. Notice how they are different between the two pods. This is necessary to prevent devices in each pod from seeing each other.

Because each control switch port is placed in a unique VLAN, each LAN segment behaves as a separate routed segment as shown in the Topology diagrams.

For more information about VLAN mapping theory, please refer the *NETLAB+ Pod Design Guide*.

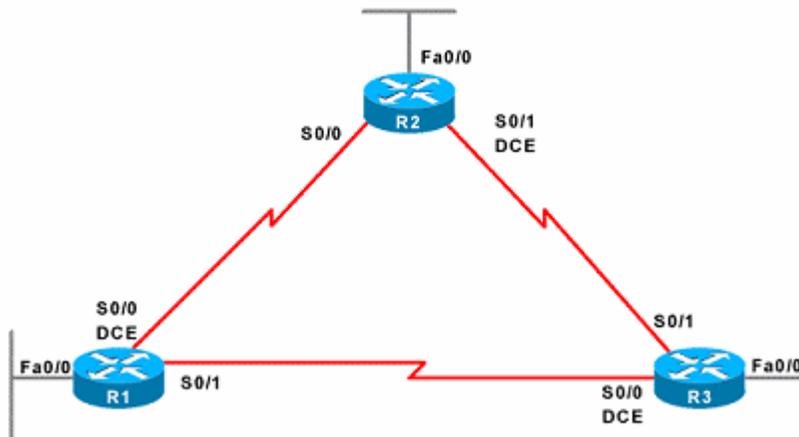
6.2 Creating a Custom VLAN Map

To create a custom VLAN map for a lab exercise, you must first obtain the following information from the pod designer:

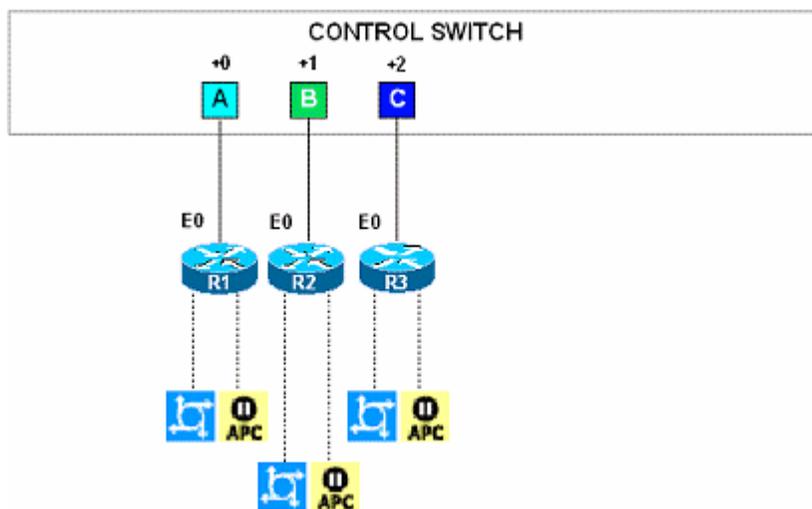
- The relative mapping of Ethernet ports between lab devices and control switch
- The default VLAN map.
- The size of the VLAN pool.

If you are writing lab exercises for the standard NETLAB_{AE} pods, you can obtain the necessary mapping information from the NDG website: <http://www.netdevgroup.com/ae/brpv2.htm>. Please follow the “Specifications and Requirements” link for each pod type.

Example. In the following example we create a custom VLAN map for an OSPF lab. The lab exercise targets the NETLAB_{AE} Basic Router Pod Version 1. The normal topology of the pod looks like this:

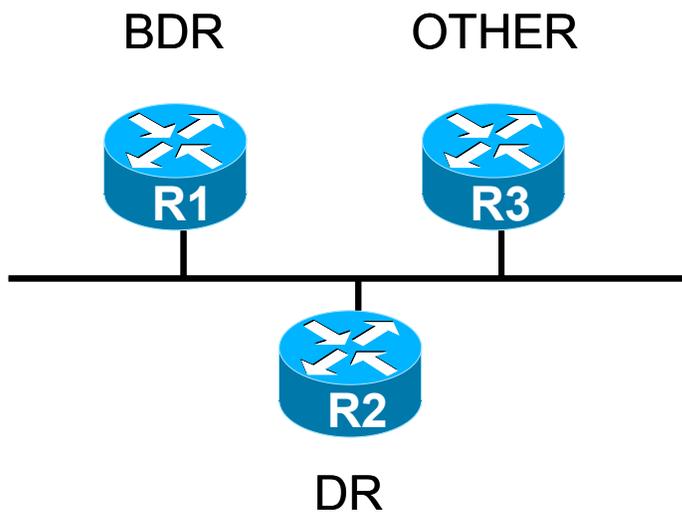


By default, each router has a stub Ethernet connected to the FastEthernet0/0 port. Each of these Ethernet ports connects to the control switch as follows:



The default VLAN map for this pod places each Ethernet port on the router in its own VLAN. These are VLAN A, VLAN B, and VLAN C, respectively. The actual VLAN numbers used cannot be determined at design time, and will be different for every pod. However, since the relative VLANs (A, B, C) are different, we are assured that the topology will behave as shown in the picture above.

For our OSPF lab, we want each router to be connected to the same LAN segment. The serial links are not used. The following image depicts the desired topology and behavior. We will import this picture into the lab design and assign it to this exercise (otherwise the user would see the default image for the Basic Router Pod, which does not reflect the modified topology).



Lab Custom OSPF Lab

Global Lab ID: CCNA3RL_00C0_F06B_B5E7_44B9_27DE_00C0

Index: 58

Lab Name: Custom OSPF Lab

Pod Type: AE Basic Router Pod V1

Time Limit: up to class maximum

Lab Document: none

Topology Image: custom_ospf_pic.gif

Preset Configuration: none

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

+0: VLAN A | +1: VLAN A | +2: VLAN A

Alternate Device Names

use pod device names

custom names

Device	Alternate Name
R1	BDR
R2	DR
R3	OTHER

By creating a custom VLAN map in the OSPF lab exercise, we can place each router on the same LAN segment by placing all three Ethernet ports in the same VLAN. We will use VLAN A for all three routers. VLAN B or VLAN C could also be used, as long as they are all set to the same value in this case.

Each control switch port is given a relative port number (+0, +1, +2, etc.) since the actual control switch ports cannot be determined at design time. Each port can have one of the following settings:

- **VLAN (letter).** At the beginning of the lab exercises, the control switch port will be turned on and set to the VLAN indicated by letter. The actual VLAN number used cannot be determined at design time, therefore letters are used.
- **OFF.** This value causes the control switch port to be turned off at the beginning of the lab exercise. It may be turned on if NETLAB+ needs to recover an erased software image.
- **STATIC.** This value indicates that the control switch port is statically configured by the administrator. NETLAB+ will not change the administrative state (on/off), will not change the VLAN, nor any other setting on the port. Typically, you should use the static setting only if the default VLAN map in the pod design also uses static.

In our example exercise, we also created a custom topology image with hotspots for this lab exercise. The user will see `custom_ospf_pic.gif` instead of the default topology image for the Basic Router Pod Version 1. Without the custom image, the user would not have any visual indication that the topology of the lab has changed. We also assigned alternate device names, which will appear on the various lab access tabs.