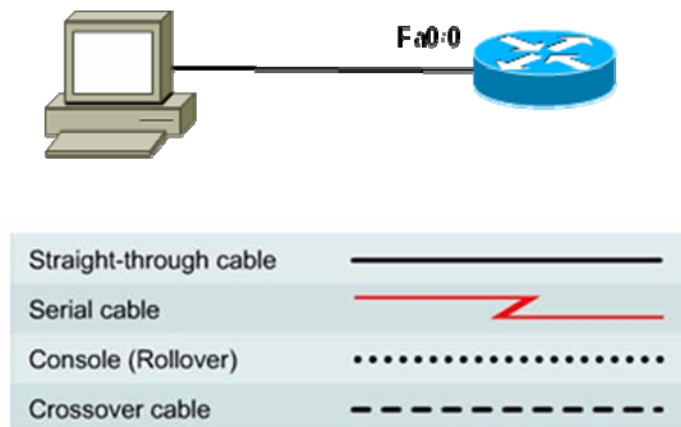


## Lab 5.2.4 Configuring Dynamic NAT with SDM



### Objectives

- Configure Network Address Translation (NAT) using Port Address Translation (PAT) on a Cisco ISR router with the Cisco SDM Basic NAT Wizard.

### Background / Preparation

Cisco Router and Security Device Manager (SDM) is a Java-based web application and a device-management tool for Cisco IOS software-based routers. SDM simplifies router and security configuration through the use of smart wizards, which allow you to deploy, configure, and monitor a Cisco router without requiring knowledge of the command line interface (CLI). SDM is supported on a wide range of Cisco routers and Cisco IOS software releases. Many newer Cisco routers come with SDM preinstalled. If you are using an 1841 router, SDM (and SDM Express) is pre-installed.

This lab assumes the use of a Cisco 1841 router. You can use another router model as long as it is capable of supporting SDM. If you are using a supported router that does not have SDM installed, you can download the latest version free of charge from <http://www.cisco.com/cgi-bin/tablebuild.pl/sdm>.

**Note:** To download the SDM application at the above URL, the instructor needs to provide a valid CCO account login ID and password. If you do not have a CCO account, go to <http://www.cisco.com/cgi-bin/login>. Under Not Registered, click Register Now to create an account.

From the SDM web page, view or download the document “Downloading and Installing Cisco Router and Security Device Manager.” This document provides instructions for installing SDM on your router. It lists specific model numbers and Cisco IOS software versions that support SDM, and the amount of memory required.

Cisco SDM is the full SDM product, and SMD Express is a subset. SDM is activated automatically when the router has been previously configured and is not in its factory default state. In this lab, you will use the Cisco SDM Basic NAT Wizard to configure NAT, using a single external global IP address. This address can support connections to the Internet from many internal private addresses.

**Note:** You must complete Lab 5.2.3, “Configuring an ISR with SDM Express,” before performing this lab. This lab assumes that the router has been previously configured with basic settings using SDM Express.

## Required Resources

The following resources are required:

- Cisco 1841 ISR router with SDM version 2.4 or later installed and with basic configuration completed
- (Optional) Other Cisco router model with SDM installed
- Windows XP computer with Internet Explorer 5.5 or later and Sun Java Runtime Environment (JRE) version 1.4.2\_05 or later (or Java Virtual Machine (JVM) 5.0.0.3810)
- Straight-through or crossover Category 5 Ethernet cable
- Access to PC network TCP/IP configuration

### Step 1: Establish a connection from the PC to the router.

- a. Power up the router.
- b. Power up the PC.
- c. Disable any popup blocker programs. Popup blockers prevent SDM windows from displaying.
- d. Connect the PC NIC to the Fast Ethernet 0/0 (Fa0/0) port on the Cisco 1841 ISR router with the Ethernet cable.

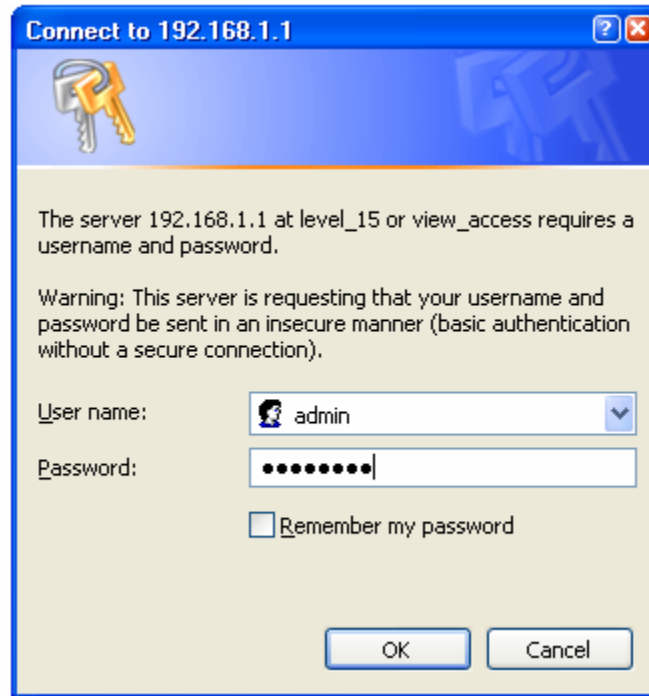
**Note:** A router other than the 1841 may require a connection to a different port to access SDM.

- e. Configure the IP address of the PC as 192.168.1.2, with a subnet mask of 255.255.255.0.
- f. SDM does not load automatically on the router. You must open a web browser to access SDM at <http://192.168.1.1>.

**Note:** If the browser cannot connect, check the cabling and connections and make sure that the PC IP configuration is correct. If the router was not previously configured, it may still be in the default state with an IP address of 10.10.10.1 on the Fa0/0 interface. Try setting the IP address of the PC to 10.10.10.2, with a subnet mask of 255.255.255.248. Then connect to <http://10.10.10.1> using the browser. If you have difficulty with this procedure, ask the instructor for assistance.

**Note:** If the startup-config is erased from the router, SDM no longer comes up by default when the router is restarted. In this case, a basic router configuration must be rebuilt using Cisco IOS commands. See the procedure at the end of this lab or contact the instructor.

- g. In the **Connect to** dialog box, enter **admin** for the username, and **cisco123** for the password. The login ID was configured in the previous lab. Click **OK**. The main SDM web application starts. You are prompted to use HTTPS. Click **Cancel**. In the Security Warning window, click **Yes** to trust the Cisco application.

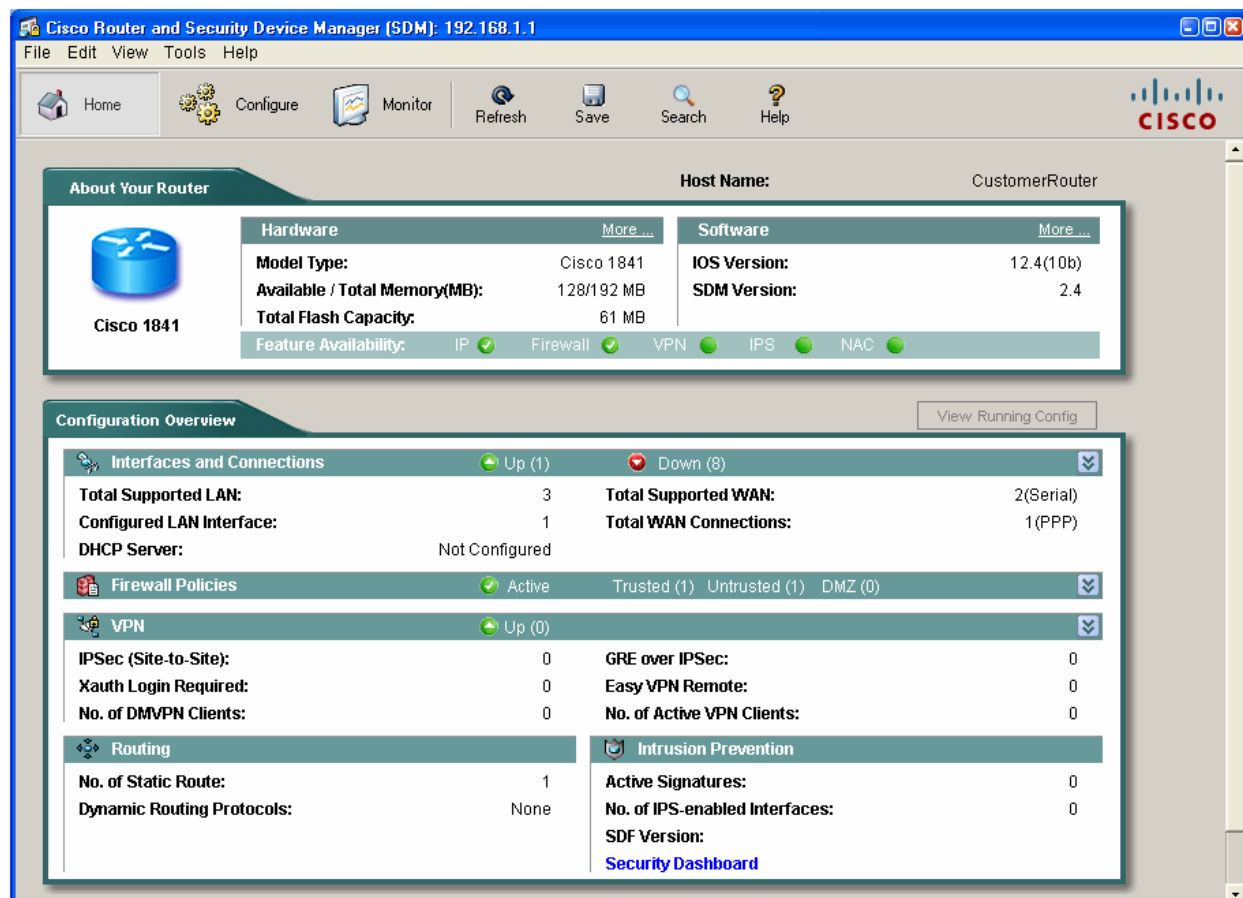


- h. Verify that you are using version 2.4 or later of SDM. The initial SDM screen that displays immediately after the login shows the version that you are using. It is also displayed on the main SDM screen as shown below, along with the Cisco IOS software version.

**Note:** If the version is not 2.4 or later, notify the instructor before continuing with this lab. You must download the latest zip file from the SDM web page and save it to the PC. From the Tools menu of the SDM GUI, choose **Update SDM** to specify the location of the zip file and install the update.

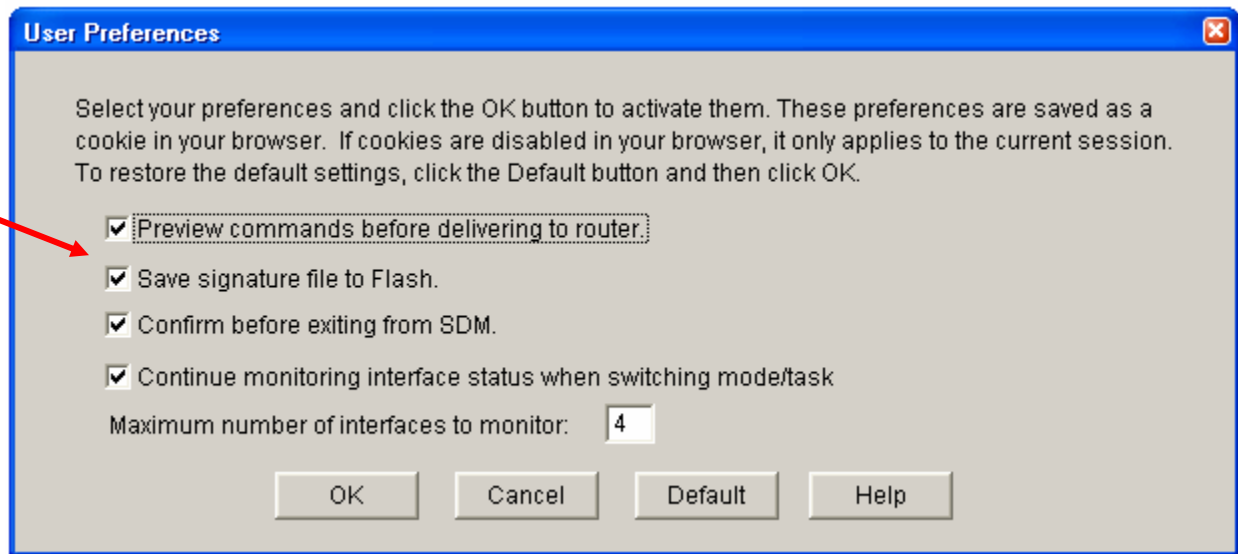
## CCNA Discovery

### Working at a Small-to-Medium Business or ISP



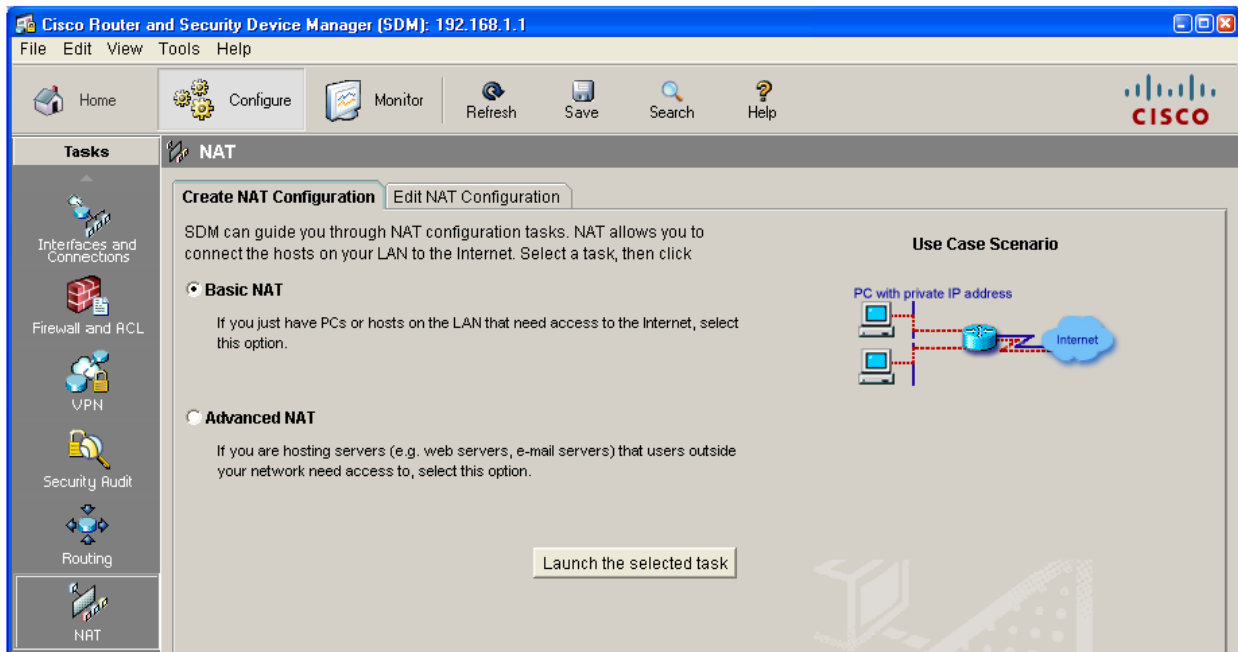
### Step 2: Configure SDM to show the Cisco IOS CLI commands.

- From the Edit menu in the main SDM window, choose **Preferences**.
- Check the **Preview commands before delivering to router** box. When this option is checked, you can view the Cisco IOS CLI configuration commands before they are sent to the router, which is a good way to learn about the commands used.

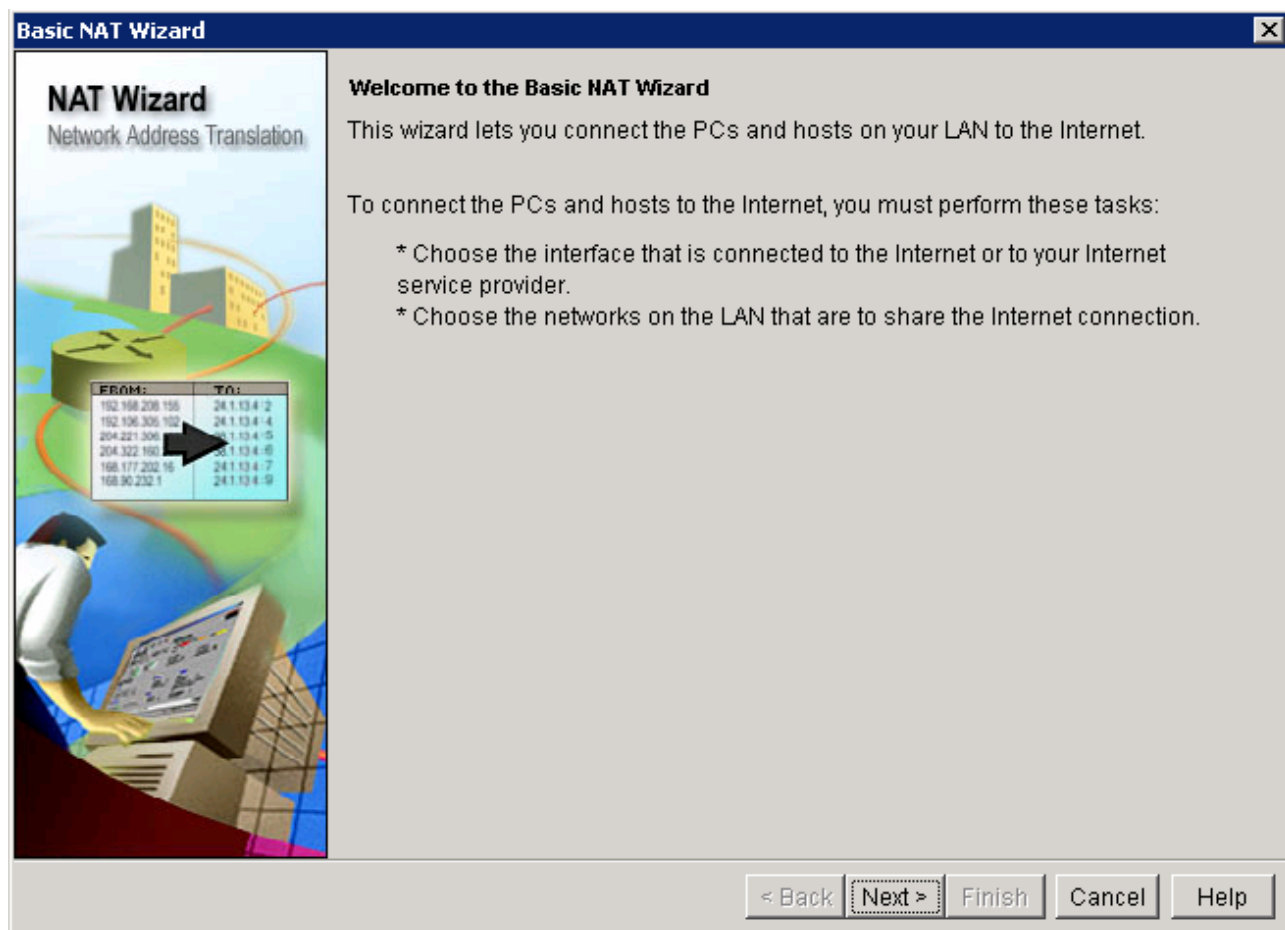


### Step 3: Launch the Basic NAT wizard.

- a. From the Configure menu, click the **NAT** button to view the NAT configuration page. Click the **Basic NAT** radio button, and then click **Launch the selected task**.



- b. In the Welcome to the Basic NAT Wizard window, click **Next**.



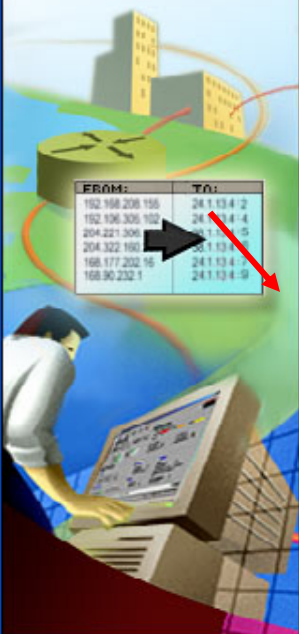
**Step 4: Select the WAN interface for NAT.**

- a. Choose the WAN interface Serial0/0/0 from the list. Check the box for the IP address range that represents the internal network of 192.168.1.0 to 192.168.1.255. This is the range that requires conversion using the NAT process.

Basic NAT Wizard

NAT Wizard

Network Address Translation



FROM:	TO:
192.168.200.195	24.1.13.4-2
192.168.200.192	24.1.13.4-4
204.221.309	24.1.13.4-5
204.322.180	24.1.13.4-6
168.177.202.16	24.1.13.4-7
168.90.232.1	24.1.13.4-8

Sharing the Internet Connection

If this router has a connection to the Internet, specify how you want PCs and hosts on the LAN to share this connection.

Choose the interface that connects to the Internet or your Internet service provider:  
Serial0/0/0 Details...

The following ranges of IP addresses are allocated to networks directly connected to the router. Check the box next to each network that is to share the connection that you specified:

	IP address range	Connected Through	Comment
<input checked="" type="checkbox"/>	192.168.1.0 to 192.168.1.255	FastEthernet0/0	
<input type="checkbox"/>	209.165.200.224 to 209.165.200.255	Serial0/0/0	

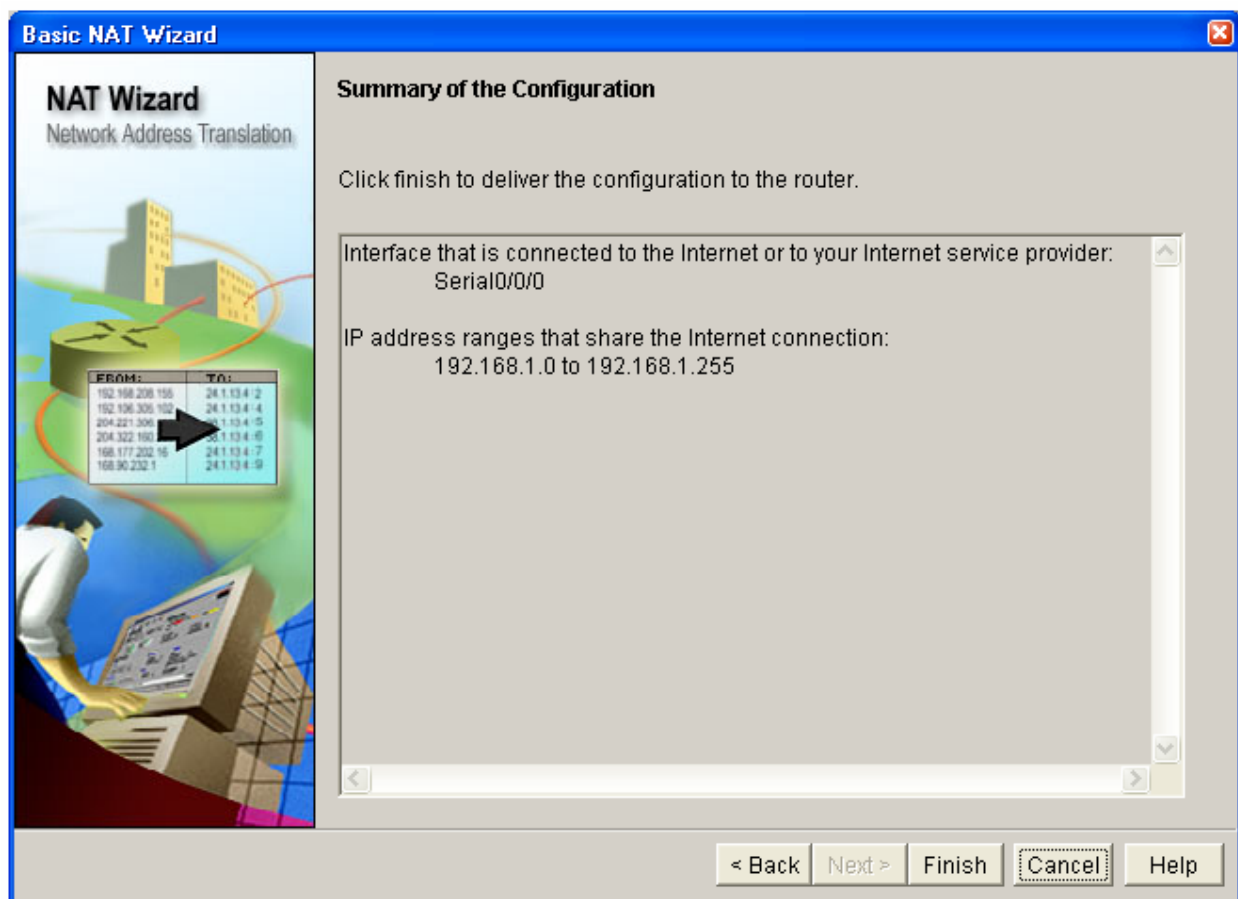
Note: To configure NAT on an interface marked as Designated, exit this wizard, click Edit NAT Configuration, and uncheck that interface in the Designate NAT Interfaces window. For details see help.

< Back Next > Finish Cancel Help

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- b. Click **Next** and, once you have read the Summary of the Configuration, click **Finish**.



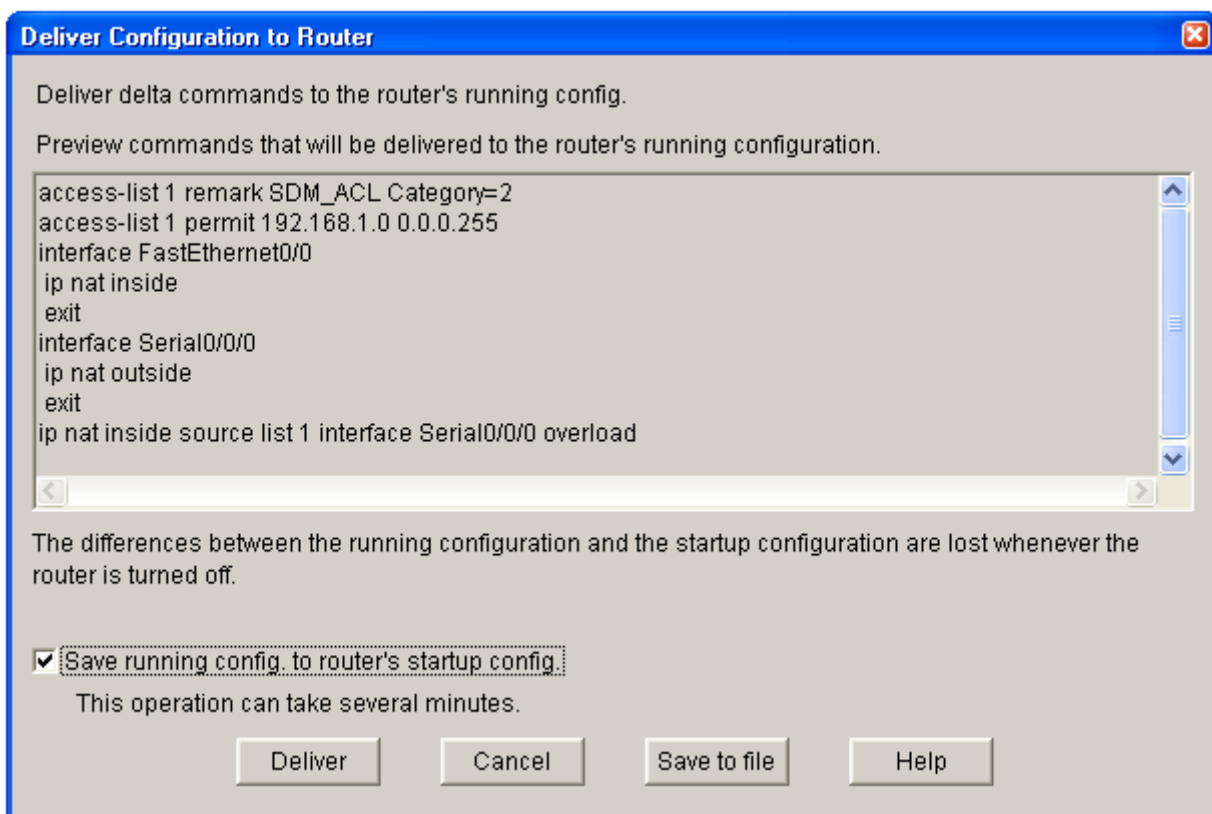


- c. In the **Deliver Configuration to Router** window, review the CLI commands that were generated by the SDM. These are the commands that are delivered to the router to configure NAT. The commands can also be manually entered from the CLI to accomplish the same task. Check the box for **Save running config to router's startup config**.

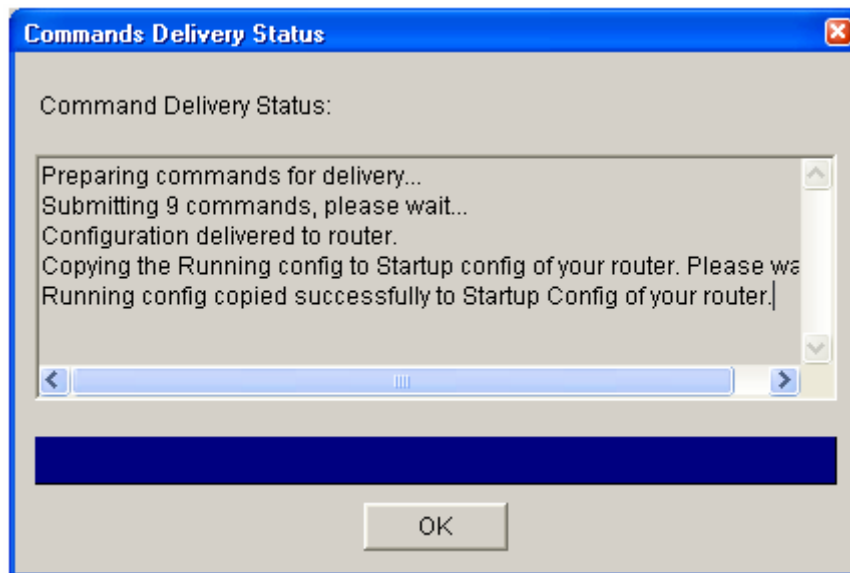
**Note:** By default, the commands that you just generated only update the running configuration file when delivered. If the router is restarted, the changes you made are lost. Checking this box updates the startup config file so that when the router is restarted, it loads the new commands into the running config.

If you choose to not save the commands to the startup config at this time, use the **File > Write to Startup config** option in SDM or use the **copy running-config startup-config** command from the CLI using a terminal or Telnet session.

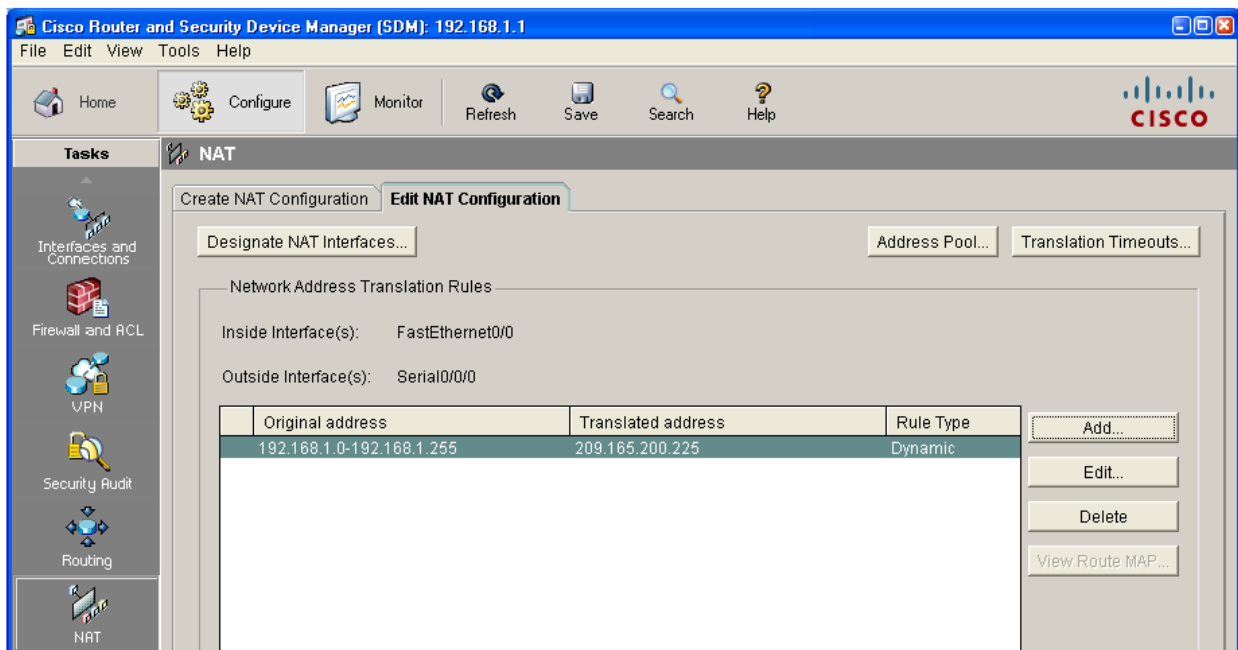
- d. Click **Deliver** to finish configuring the router.



- e. In the **Commands Delivery Status** window, notice the text that says that the running config was successfully copied to the startup config. Click **OK** to exit the Basic NAT wizard.



- f. The final NAT screen shows that the inside interface is Fa0/0 and the outside interface is S0/0/0. The internal private (original) addresses are translated dynamically to the external public address.



**Step 5: Reflection**

- a. If a PC or a LAN within an organization does not require Internet access, what is one way to stop the PC from gaining access to the Internet?

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- b. What are some advantages and disadvantages of using SDM to configure NAT compared to the CLI?

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- c. Why is the default to only update the running configuration file when delivered? Why not always update the startup config file? What are the advantages and disadvantages of one over the other?

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## Basic Cisco IOS Configuration to Bring Up SDM

If the startup config is erased in an SDM router, SDM no longer comes up by default when the router is restarted. It is then necessary to build a basic config as follows. Further details regarding the setup and use of SDM can be found in the SDM Quick Start Guide

[http://www.cisco.com/en/US/products/sw/secursw/ps5318/products\\_quick\\_start09186a0080511c89.html#wp44788](http://www.cisco.com/en/US/products/sw/secursw/ps5318/products_quick_start09186a0080511c89.html#wp44788)

1) Set the router Fa0/0 IP address. (This is the interface that a PC connects to using a browser to bring up SDM. The PC IP address should be set to 10.10.10.2 255.255.255.248.)

**Note:** An SDM router other than the 1841 may require a connection to a different port to access SDM.

```
Router(config)#interface Fa0/0
Router(config-if)#ip address 10.10.10.1 255.255.255.248
Router(config-if)#no shutdown
```

2) Enable the HTTP/HTTPS server of the router.

```
Router(config)#ip http server
Router(config)#ip http secure-server
Router(config)#ip http authentication local
```

3) Create a user account with privilege level 15 (enable privileges). Replace *username* and *password* with the username and password that you want to configure.

```
Router(config)#username <username> privilege 15 password 0 <password>
```

4) Configure SSH and Telnet for local login and privilege level 15.

```
Router(config)#line vty 0 4
Router(config-line)#privilege level 15
Router(config-line)#login local
Router(config-line)#transport input telnet
Router(config-line)#transport input telnet ssh
Router(config-line)#exit
```