Boson®

ICND1
Lab Guide

640-822
Interconnecting Cisco Networking Devices Part 1
Version: Beta

Labs powered by

NetSim®
NETWORK SIMULATOR®

Boson®

Interconnecting Cisco Networking Devices Part 1

640-822 Lab Guide

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Boson NetSim Overview

The Boson NetSim® Network Simulator®, which includes the Boson Router Simulator®, is unique compared to all others on the market because of the functionality it supports and its features. NetSim utilizes Boson's proprietary Network Simulator, Router Simulator®, and EROUTER® software technologies, along with the Boson Virtual Packet Technology® engine, to create individual packets. These packets are routed and switched through the simulated network, allowing NetSim to build an appropriate virtual routing table and simulate true networking. Other simulation products on the market do not support this level of functionality.

NetSim is a Windows®-based product that simulates a wide variety of Cisco® routers, including the 2500 series, 2600 series, 2800 series, and 3600 series routers, as well as the Cisco Catalyst 1900 series, 2900 series, and 3500 series switches. NetSim supports multiple routing protocols, including RIP, IGRP, EIGRP, BGP, and OSPF. It supports different LAN/WAN protocols, including PPP/CHAP, ISDN, and Frame Relay. The labs in NetSim require only the devices and functionality included with NetSim—they do not require access to any external router or switch hardware. NetSim supports many, but not all, of the IOS commands available on a physical router or switch. All the commands referenced in the available labs are supported by NetSim. The labs included in this book have been selected as companions to the Boson Curriculum. However, you can perform any labs that are unlocked for additional practice.

Achieving Cisco CCENT®, CCNA®, or CCNP® certification is the goal of many people who use this product. The Boson NetSim covers not only the new SWITCH (642-813), TSHOOT (642-832), and ROUTE (642-902) certifications but also the ICND1 (640-822), ICND2 (640-816), and CCNA (640-802) certifications, among others. The included labs guide you through the configuration of routers, switches, and workstations in a variety of scenarios. Installed labs are made available (unlocked) depending on the activation key used to activate the product. All labs are downloaded and kept up to date after installation regardless of the activation key used.

Activation keys unlock labs and increase the number of available commands. Beginning with the Demo version of NetSim 8, the command set is limited to those necessary to perform the steps in the lab. For example, if you start your studies with a CCENT activation key, you will have the command set and labs available that are necessary to study for that exam. When you are ready to study for either the CCNA or CCNP exam, you will need to purchase a new activation key, deactivate NetSim, and then reactivate with the new CCNA or CCNP activation key; then, more labs and a larger command set become available.

A small lock icon is displayed next to unavailable labs. Higher-level activation keys allow you to work through all labs unlocked by lower-level activation keys. All labs are unlocked when a CCNP-level activation key is used.

After you load and complete an unlocked lab, you can use the grading function in NetSim to grade the lab so that you can determine whether you completed it correctly. As you progress through the labs, you will master the skills needed to pass the simulation questions in the Cisco certification exams. NetSim has the ability to guide and grade, and using it for practice can actually be more helpful than using real routers and switches. NetSim allows you to gain experience without requiring you to purchase expensive equipment.

The Boson NetSim can be used for additional purposes than only working through labs. The included full version of the **NetMap** tool allows you to practice designing and planning a network. This tool's functionality goes beyond that of most tools because you can actually create the router configurations that are going to be used, save those configurations, and practice using them on simulated devices.

Routing protocol implementation is one of the more challenging tasks you may encounter. Troubleshooting a production network can be a frustrating experience. Fortunately, you can **create a virtual copy of your network topology** by using the Boson NetMap and troubleshoot the problems without interfering with your production network. Although you can use NetSim as an aid in troubleshooting, you should not rely only on NetSim to make decisions about a production network, because NetSim is not designed to test real networks. Instead, it is a tool that you can use to study for Cisco certification.

In summary, Boson NetSim is a flexible and powerful product that can help you become certified and, in some cases, can be used to create a simulation of the topology of your corporate network and help you practice troubleshooting without using devices on the production network.

Using NetSim to Prepare for Your Certification

By incorporating NetSim as part of your process of achieving a Cisco certification, you can learn and master the skills necessary to help you successfully complete your certification track. The purpose of NetSim is to help you with the practical, hands-on portion of your education and to ensure that you not only understand the concepts of routing but can actually configure and implement routing on Cisco devices.

Mastering Cisco networking involves two fundamental tasks:

1. Learn the theory of routers and switches.
2. Gain the hands-on experience of implementing that theory by configuring the devices in a network and testing them in a lab.

Self-studying for a Cisco certification can be a daunting task. The amount of information a CCNA candidate is required to know and the skills that candidate is required to possess are quite extensive. To begin learning the theory of configuring a network, you can find a good reference book or listen to an instructor. But a reference book might not be enough. The book will not give you the practical, hands-on experience of routing and switching that you can learn from NetSim—experience that will help you build on the theoretical knowledge you learned from the reference book.

Real equipment gives you the ability to practice on actual routers and switches, but it also is a very costly way to practice and leaves a lot of room for error. The Boson NetSim, on the other hand, is an excellent tool to help you prepare for the CCNA (www.boson.com/certification/CCNA) and CCNP (www.boson.com/certification/CCNP) exams. NetSim simulates the behavior of a network and does not just return preprogrammed responses to expected command inputs. It allows you to create virtual packets and virtual frames that will be routed and switched through the simulated network. Aside from physically plugging in the cables and listening to the fan noise, your experience with the simulated network will be much the same as your experience with a fully functional lab rack without the expense of the hardware. NetSim will enable you to practice various configurations and master helpful skills.

Once you feel you have mastered the theory and the practical labs, you can test your knowledge by using the Boson ExSim-Max practice exam products available at the ExSim-Max home page (www.boson.com/exsim-max-practice-exams). Boson ExSim-Max practice exam products can include complex multiple-choice questions, drag-and-drop questions, Boson NetSimX simulation questions, and trouble tickets which simulate the questions you will see on the live exam.

The Boson NetSim Network Simulator is the most comprehensive product on the market for learning how to configure a Cisco router. The Boson NetSim will not only help you become certified, it will actually help you learn and understand how to configure routers, switches, and networks.

For more information on how to use NetSim 8, please read the NetSim 8 User Manual by clicking **Help** > **User Manual** from within NetSim 8 or by downloading the User Manual from the following link:

http://www.boson.com/Files/Support/NetSim-8-User-Manual.pdf

# Accessing NetSim 8 in the Classroom – Boson LS Client

If you are using NetSim 8 in the classroom, it should already be installed on your classroom workstation. You should perform the following steps to configure NetSim 8 to access the NetSim License Server.

As a student using NetSim 8 at a learning institution, you should launch NetSim 8 from the Start menu by clicking **Boson Software** > **Boson NetSim 8.0** > **Boson NetSim LS Client**. This will enable you to configure NetSim 8 to authenticate with the Boson NetSim License Server.

Configuring NetSim 8 to Authenticate with the Boson NetSim License Server

Note: Prior to using the Boson NetSim Client, you may need to associate your Boson.com account information with Boson NetSim. If you receive an activation key from your learning institution, activate Boson NetSim on your personal computer after creating a Boson.com account. Your network administrator/instructor can then add you as an authorized user to the license server application. You may need to provide your learning institution with the e-mail address associated with your Boson.com account. You should not give your Boson.com account password to your instructor or learning institution. Your instructor will assign you a password that he or she has configured on the License Server, which you will need for step 3 below.

1. Run the Boson NetSim LS Client by clicking **Start** > **All Programs** > **Boson Software** > **Boson NetSim 8** > **Boson NetSim LS Client**.

2. In the **Boson NetSim - License Agreement** dialog box, select **Yes** to agree to the **Authorized User Agreement**. If you do not agree to the Authorized User Agreement, you will not be able to use the Boson NetSim 8 client.

3. Your instructor will provide you with the settings you need to enter in the **Boson NetSim Client** dialog box. Enter the IP address (or computer name if the client computer and the license server are on a Windows-based network) and the port number of the computer running the NetSim License Server software. Enter the user name/password combination for authentication to the server. The user name will be the login information you used to establish an account with Boson.com, or the user name provided by your instructor. Enter the password assigned to you by your network administrator/instructor.
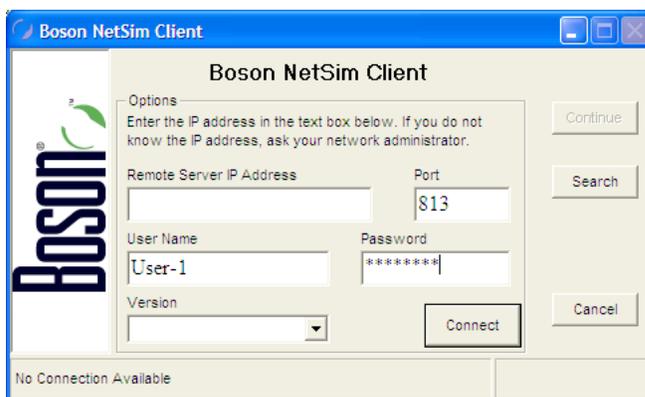
4.   Select either **CCNA 8.0** or **CCNP 8.0** from the **Version** drop-down list; the version you select must match the version that is the current license type configured on the NetSim License Server.
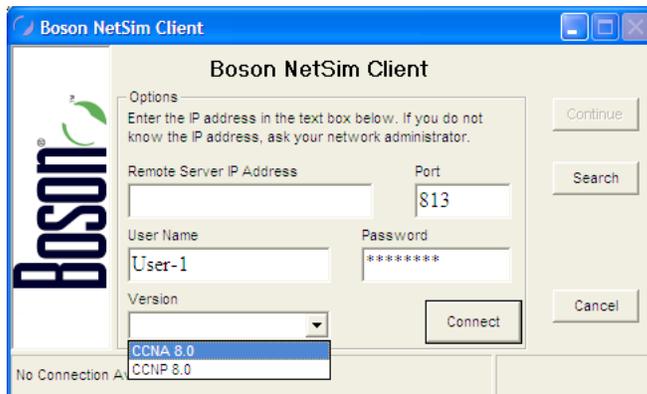
5.   Click **Connect**.

6.   If a license is available on the license server, the **Continue** button will be enabled. Click the **Continue** button to start using the Boson NetSim.

For additional information on using Boson NetSim 8, please consult the Boson NetSim 8 User Manual on Boson.com or click **Help** > **User Manual**.

Loading a Lab

1.   You can begin a preloaded Boson NetSim lab by performing one of the following tasks:

   •   Expand the **Labs** panel; then, on the **Standard Lab Packs** tab of the **Labs** panel, double-click the lab you want to open.

   •   Click to highlight a lab, then click **Lab** > **Load**.

   •   Select a lab from the list of **Recent Labs** on the **Home** tab, and click **Yes** to open the lab.

2.   After you have loaded a lab, click the **Lab Instructions** tab on the **Home** panel and read through the lab instructions.

3.   From the **Devices** drop-down menu on the **Consoles** panel, select the device(s) that you need to configure in order to complete the lab and follow the steps in the lab. You can also select the device you want to configure by clicking the **NetMap** tab, right-clicking the device, and selecting **Configure in Simulator**.

4.   When you have completed the lab, click **Lab** > **Grade Lab** to ensure that you have completed it successfully.

5.   You can choose to save your single device configuration or multiple device configurations by selecting the appropriate option in the **Console** menu.

You might also be instructed to open labs from a custom lab pack. If any custom labs are available, they will be on the **Custom Lab Packs** tab of the **Labs** panel. To open a custom lab, double-click the lab you want to load.

Using NetSim 8 at Home – Single User

The following steps are for installation and activation for a single user license and should not be performed on a classroom workstation.

Downloading and Installing NetSim 8

You can download NetSim 8 from the Boson.com downloads page (account required):

http://www.boson.com/download

You must have a Boson account to download the NetSim Demo. To create a free account, visit the Boson Online Account page (https://www.boson..com/acocunt/default.aspx) and enter a valid e-mail address to begin creating an account.

You should download the NetSim 8 installer to your computer before beginning the installation. It is recommended that you disable antivirus and firewall software while installing and activating NetSim 8 and then reactivate when the installation is complete. Double-click the downloaded installation file to begin the installation, and perform the steps described in the prompts during installation.

Activating NetSim 8 – Single User

When you first open NetSim, you will be presented with a **Product Activation** dialog box. Enter your e-mail address, password, and registration key; this information should be in the purchase receipt you received via e-mail, or you can find the receipt online on your Boson Online Account page (https://www.boson.com/Account/Default.aspx). If you are a student, you might receive this information from your learning institution or your instructor. You must have an active Internet connection in order to activate the full version of NetSim.
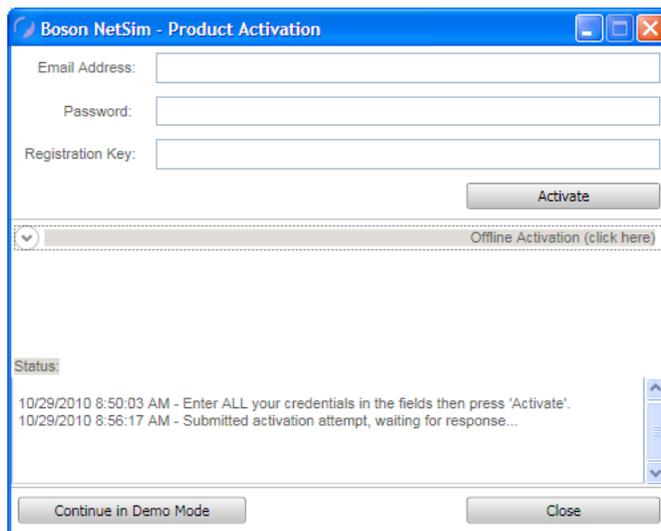
After a successful activation, the lab packs will be updated and NetSim will be ready for you to use. Installed labs are made available (unlocked) depending on the activation key used to activate the product. A small lock icon is displayed next to unavailable labs. To make additional labs available, you will need to purchase a new activation key, deactivate NetSim, and then reactivate with the new activation key; then, more labs and a larger command set become available. Please review the steps to deactivate NetSim 8 in the NetSim 8 User Manual.

If you have not purchased an activation key for NetSim or received an activation key from your learning institution, you will not be able to activate the full version of NetSim on your personal computer. However, you can choose to continue in Demo mode. When you are running the Demo mode, only the demo lab and a limited set of commands are functional. To purchase the full version of NetSim, visit the About NetSim page (www.boson.com/support/netsim-support-topics) of our Web site.

Loading a Lab

You can open NetSim from the shortcut installed during the download or from the Start menu by clicking **Boson Software** > **Boson NetSim 8.0** > **Boson NetSim.** If you are a student using NetSim 8 at a learning institution, you should launch NetSim 8 from the Start menu by clicking **Boson Software** > **Boson NetSim 8.0** > **Boson NetSim LS Client**. This will enable you to configure NetSim 8 to authenticate with the Boson NetSim License Server.

1.   You can begin a preloaded Boson NetSim lab by performing one of the following tasks:

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   •   Click to highlight a lab, then click **Lab** > **Load**.

   •   Select a lab from the list of **Recent Labs** on the **Home** tab, and click **Yes** to open the lab.

2.   After you have loaded a lab, click the **Lab Instructions** tab on the **Home** panel and read through the lab instructions.

3.   From the **Devices** drop-down menu on the **Consoles** panel, select the device(s) that you need to configure in order to complete the lab and follow the steps in the lab. You can also select the device you want to configure by clicking the **NetMap** tab, right-clicking the device, and selecting **Configure in Simulator**.

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Module 5

Sequential Lab: Telnet
Stand-Alone Lab: Saving Router Configurations
Stand-Alone Lab: Cisco Discovery Protocol on a Router
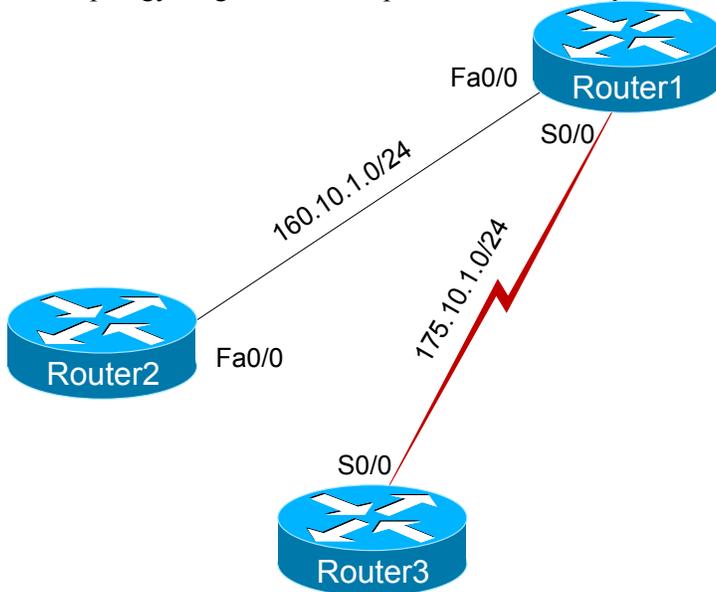**Stand-Alone Lab:** Backup Using TFTP

Sequential Lab: Telnet

Objective

Practice connecting to one router from another by using Telnet. Use the CTRL+SHIFT+6 then X key combination to suspend Telnet sessions, and use basic **show** commands to display active Telnet sessions.

Lab Topology

The Topology diagram below represents the NetMap in the Simulator.

Command Summary

Command	Description
configure terminal	enters global configuration mode from privileged EXEC mode
disconnect {*ip-address* | **console**}	closes an active console port or Telnet session
enable	enters privileged EXEC mode
line vty 0 4	enters configuration mode for virtual terminal (Telnet) lines
login	enables password checking
password *password*	specifies the password that is required for a user to log in
show sessions	displays information about local-area transport (LAT), Telnet, or rlogin connections
show users	displays users currently logged in to the router
telnet *ip-address*	starts the terminal emulation program from a PC, router, or switch that permits you to access devices remotely over the network

Lab Tasks

1. Enable Telnet access on Router3.

    ```
    Router3>enable
    Password:cisco
    Router3#configure terminal
    Router3(config)#line vty 0 4
    Router3(config-line)#login
    Router3(config-line)#password cisco
    ```

2. From Router1, telnet to Router2 (160.10.1.2). Once you have accessed Router2, issue the **show users** command. This command shows which remote users are connected to this local router. You should see Router1's IP address (160.10.1.1) as the user that has connected into Router2 using Telnet.

    ```
    Password:cisco
    Router1>enable
    Password:cisco
    Router1#telnet 160.10.1.2
    Password:cisco
    Router2>
    Router2>show users
    ```

    The following is sample output from the **show users** command:

    ```
    Router2>show users
        Line       User     Host(s)              Idle        Location
        0 con 0             idle                 00:00:12
    *   1 vty 1             idle                 00:00:00    160.10.1.1
    ```

3. Suspend your Telnet session to Router2 by pressing CTRL+SHIFT+6 then X. You should return to Router1 without breaking the active Telnet session. Issue the **show sessions** command on Router1. This command shows what active, but suspended, sessions exist with other routers.

    ```
    Router2>CTRL+SHIFT+6 X
    Router1#
    Router1#show sessions
    ```

    The following is sample output from the **show sessions** command:

    ```
    Router1#show sessions
    Conn Host          Address          Byte  Idle Conn Name
    *  1 160.10.1.2      160.10.1.2            0     9 160.10.1.2
    ```

4. Telnet from Router1 to Router3. Suspend the session, and return to Router1. Issue the **show sessions** command. You should now see two suspended sessions: one to Router2 (160.10.1.2) and one to Router3 (175.10.1.2).

```
Router1#telnet 175.10.1.2
Password:cisco
Router3>
Router3>CTRL+SHIFT+6 X
Router1#
Router1#show sessions
```

The following is sample output from the **show sessions** command:

```
Router1#show sessions
Conn Host          Address          Byte  Idle Conn Name
*  1 160.10.1.2      160.10.1.2            0     9 160.10.1.2
*  2 175.10.1.2      175.10.1.2            0     9 175.10.1.2
```

5. Disconnect the two suspended sessions on Router1. The number used in the **disconnect** command comes from the leftmost column in the **show sessions** output. Issue the **show sessions** command again to see if the suspended Telnet sessions have disappeared.

```
Router1#disconnect 2
Closing connection to 175.10.1.2
Router1#disconnect 1
Closing connection to 160.10.1.2
```

The following is sample output from the **show sessions** command:

```
Router1#show sessions
% No connections open
```

Sample Configuration Script

Router3	Router3 (continued)
Router3#show running-config Building configuration... Current configuration : 763 bytes ! Version 12.3 service timestamps debug uptime service timestamps log uptime no service password-encryption ! hostname Router3 ip cef ! enable secret 5 sdf6978yhg$jnb76sd ! ip subnet-zero ! interface Serial0/0 ip address 175.10.1.2 255.255.255.0 no ip directed-broadcast ! interface Serial0/1 ip address 180.10.1.1 255.255.255.0 no ip directed-broadcast clock rate 64000 !	interface FastEthernet0/0 no ip address no ip directed-broadcast ! interface FastEthernet0/1 ip address 197.10.1.1 255.255.255.0 no ip directed-broadcast ! ip classless no ip http server ! line con 0 line aux 0 line vty 0 4 login password cisco ! no scheduler allocate end

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