



FLACKBOX
www.flackbox.com

CISCO CCNA

LAB GUIDE

NEIL ANDERSON

[Clickable Table of Contents](#)

Introduction	4
How the Lab Works.....	4
Get the Complete Course.....	4
About the Author	5
04 The IOS Operating System - Lab Exercise.....	6
11 Cisco Device Functions – Lab Exercise	20
12 The Life of a Packet - Lab Exercise	27
12 The Life of a Packet – Answer Key	29
13 The Cisco Troubleshooting Methodology - Lab Exercise	32
13 The Cisco Troubleshooting Methodology – Answer Key	34
14 Cisco Router and Switch Basics - Lab Exercise	40
14 Cisco Router and Switch Basics - Answer Key	43
15 Cisco Device Management - Lab Exercise	50
15 Cisco Device Management - Answer Key.....	53
16 Routing Fundamentals - Lab Exercise	63
16 Routing Fundamentals - Answer Key	66
17 Dynamic Routing Protocols – Lab Exercise	81
17 Dynamic Routing Protocols - Answer Key.....	86
18 Connectivity Troubleshooting – Lab Exercise	109
18 Connectivity Troubleshooting - Answer Key	111
19-1 RIP Configuration – Lab Exercise	116
19-1 RIP Configuration - Answer Key	118
20-1 EIGRP Configuration – Lab Exercise	127
20-1 EIGRP Configuration - Answer Key.....	130
21-1 OSPF Configuration – Lab Exercise	146
21-1 OSPF Configuration - Answer Key	150
23-1 VLAN and Inter-VLAN Routing Configuration – Lab Exercise.....	169
23-1 VLAN and Inter-VLAN Routing Configuration - Answer Key	172
24-1 DHCP Configuration – Lab Exercise	181
24-1 DHCP Configuration - Answer Key	184
25-1 HSRP Configuration – Lab Exercise	189
25-1 HSRP Configuration - Answer Key.....	192
26-1 Spanning Tree Troubleshooting – Lab Exercise	199
26-1 Spanning Tree Troubleshooting - Answer Key.....	202
27-1 EtherChannel Configuration – Lab Exercise.....	213

27-1 EtherChannel Configuration - Answer Key	215
28-1 Port Security Configuration Lab Exercise.....	224
28-1 Port Security Configuration Answer Key	226
29-1 ACL Configuration – Lab Exercise.....	231
29-1 ACL Configuration - Answer Key	234
30-1 NAT Configuration – Lab Exercise.....	245
30-1 NAT Configuration - Answer Key	249
31 IPv6 Addressing Configuration - Lab Exercise	260
31 IPv6 Addressing Configuration - Answer Key	262
32-1 IPv6 Routing Configuration - Lab Exercise	273
32-1 IPv6 Routing Configuration - Answer Key	277
33-1 WAN Configuration – Lab Exercise	311
33-1 WAN Configuration - Answer Key	315
34-1 BGP Configuration – Lab Exercise	325
34-1 BGP Configuration - Answer Key	327
35-1 Cisco Device Security Configuration – Lab Exercise.....	333
35-1 Cisco Device Security Configuration - Answer Key	337
36 Network Device Management – Lab Exercise.....	344
36 Network Device Management – Answer Key	346
SPECIAL OFFER – Cisco CCNA Complete Course	428
SPECIAL OFFER – AlphaPrep 10 Day Trial.....	432

Disclaimer and Copyright

The information contained in this guide is for informational purposes only. Any advice that I give is my opinion based on my own experience. You should always seek the advice of a professional before acting on something that I have published or recommended.

The material in this guide may include information, products or services by third parties. Third Party Materials comprise of the products and opinions expressed by their owners. As such, I do not assume responsibility or liability for any Third Party material or opinions. You are responsible for complying with any legal requirements such as licensing of Third Party software.

No part of this publication shall be reproduced, transmitted, or sold in whole or in part in any form, without the prior written consent of the author. All trademarks and registered trademarks appearing in this guide are the property of their respective owners.

Introduction

Thanks very much for taking the time to download this free eBook. It contains complete configuration lab exercises and solutions to help you pass the Cisco CCNA Routing and Switching 200-125 exam. You can also use it as a configuration reference for Cisco routers and switches. I hope you can make use of it to expand your networking knowledge and further your career.

How the Lab Works

I wanted to make this a completely free resource and as simple to use as possible so the free software GNS3 and Packet Tracer is used for the labs.

I've used two different software programs because GNS3 is best for the routing labs, and Packet Tracer is best for the switching labs.

I've provided a lab startup file for each exercise which loads in either GNS3 or Packet Tracer so you can get up and running with the labs immediately. A download link is provided at the start of each exercise.

(You can alternatively use your own physical lab if you have one by cabling it as shown in the lab topology diagram for each exercise.)

Please watch my short free course showing how to install and use Packet Tracer and GNS3 first if you haven't used the software before:

[GNS3 and Packet Tracer Installation course](#)

Please note that I don't provide support for GNS or Packet Tracer, they have their own dedicated teams which are available through their support forums:

[GNS3 Support](#) | [Cisco Support](#)

If you find any errors in the book, please let me know so I can correct them. You can email me at neil@flackbox.com

Get the Complete Course

The lab exercises here can be used on their own or as a complement to my [Cisco CCNA 200-125 Complete course](#). It has the highest review ratings of any CCNA course online and includes over 30 hours of video tutorials, flashcards and hands-on lab exercises. You can shortcut your path to getting CCNA certified by getting the course for only \$10 USD (that's a massive 97% discount) with this link:

<https://www.udemy.com/ccna-complete/?couponCode=DISCOUNTCEB>

For practice tests I recommend [AlphaPrep](#). They partner with Cisco and the CCNA test provider Pearson to bring you the most accurate preparation tests, and their advanced test engine lets you know when you're ready for the exam. [Click here for a 10 day trial.](#)

About the Author



I'm Neil Anderson, you can visit my blog at <https://www.flackbox.com> to learn about Cloud and Data Center technologies.

The main focus of my current role is delivery of technical training and development of course content for large enterprise and service provider customers such as Cisco, NetApp, Verizon and IBM.

I dropped out of school with no qualifications or future plans at the age of 15. When I got a little bit older and wiser I realised I should make a career for myself so I learned about IT technologies through books and online resources. It's my

passion now to help others do the same.

Connect with me on social media:



04 The IOS Operating System - Lab Exercise

This lab explores basic navigation of the Cisco IOS operating system CLI (Command Line Interface). Only a single device is required.

This lab is a guided walkthrough of the IOS command line interface. Exercises for later sections will be split into two parts - first the tasks for you to complete on your own (without step by step instructions), and then an answer key showing you the solution.

Load the Startup Configuration

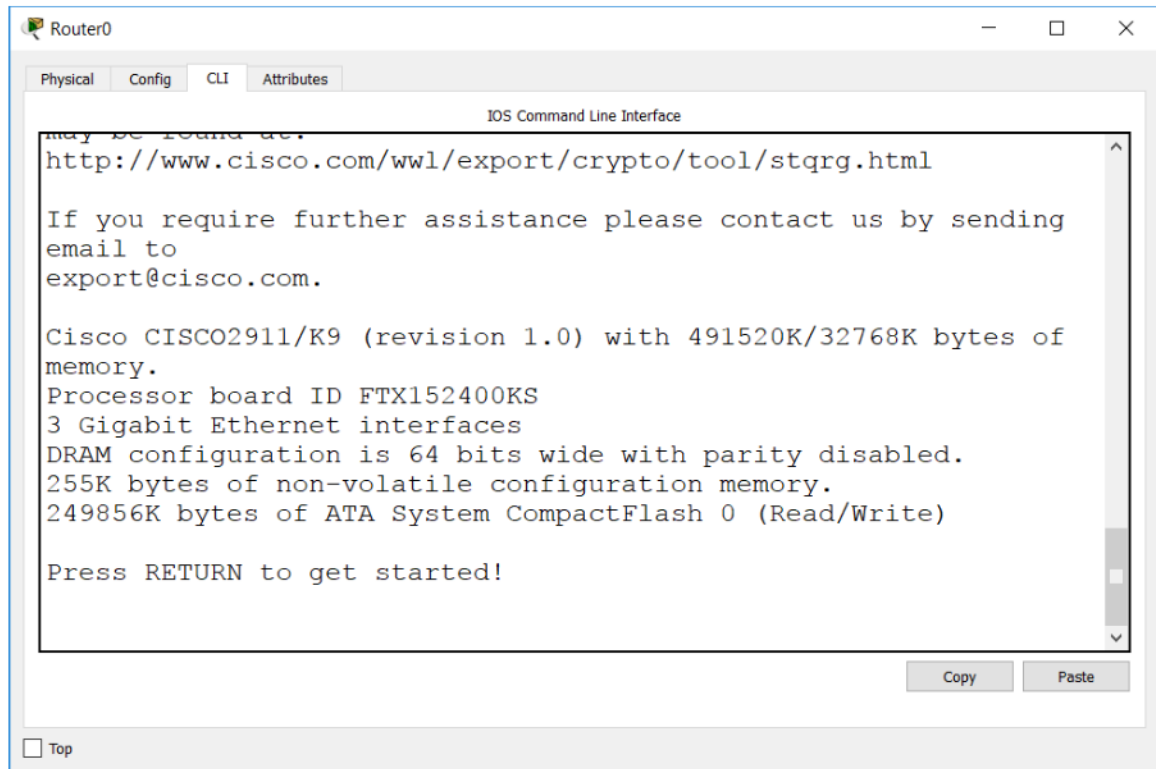
[Download the '04 The IOS Operating System.pkt' file here.](#) Open in Packet Tracer to load the lab.

Please watch my short free course showing how to install and use Packet Tracer and GNS3 first if you haven't used the software before:

[GNS3 and Packet Tracer Installation course](#)

Connect To Your Device

Click on Router0 and then the CLI tab to access the console.



Press Return to get started, then enter Privileged Exec mode.

```
Router>enable
Router#
```

Reboot the device.

```
Router#reload
Proceed with reload? [confirm]
```

Observe the device going through the bootup process in the command line output. This is possible because we are using a console connection (we could not see this if we connected to an IP address on the device.)

If prompted to enter the initial configuration dialog after the device has booted up, enter 'no'.

```
Would you like to enter the initial configuration dialog? [yes/no]:
no
```

Explore User Exec Mode and CLI command help

Notice that you are in User Exec mode as indicated by the 'Router>' prompt. ('Router' will be replaced with the device hostname after you configure one.)

```
Router>
```

Enter a question mark to explore the commands that are available in User Exec mode.

```
Router>?  
Exec commands:  
<1-99> Session number to resume  
connect Open a terminal connection  
disable Turn off privileged commands  
disconnect Disconnect an existing network connection  
enable Turn on privileged commands  
exit Exit from the EXEC  
logout Exit from the EXEC  
ping Send echo messages  
resume Resume an active network connection  
show Show running system information  
ssh Open a secure shell client connection  
telnet Open a telnet connection  
terminal Set terminal line parameters  
traceroute Trace route to destination
```

Only a very limited set of informational commands are available in User Exec mode and we won't typically be working here.

Enter the 'show run' command.

```
RouterX>show run  
^  
% Invalid input detected at '^' marker.
```

'show run' is a valid command but should be run at Privileged Exec mode, not User Exec, so the command fails.

This is the most common issue to trip up beginners at the IOS command line. If you see the 'invalid input' error then check you are at the correct level for the command you are trying to run.

Exploring Privileged Exec (Enable) Mode and Context Sensitive Help

Enter Privileged Exec mode. This mode is often commonly known as Enable mode. Notice that the prompt changes to 'Router#'

```
Router>enable  
Router#
```

Drop back to User Exec mode.

```
Router#disable  
Router>
```

Go back to Privileged Exec mode by using shortened command abbreviation.

```
Router>en  
Router#
```

Command abbreviation only works when you enter letters which could only match one unique command. Attempt to return to User Exec mode by entering the command 'di'

```
Router#di  
% Ambiguous command: "di"
```

Check to see all the possible commands which begin with the letters 'di'

```
Router#di?  
dir  disable  disconnect
```

We can see that the shortest combination we could use for Disable would be 'disa'

We can access detailed informational and debug output in Privileged Exec mode.

Check to see all commands that begin with 'sh'

```
Router#sh?
```

```
Show
```

'show' is the only command that begins with 'sh' so we can use that as the abbreviation.

Enter 'sh ?' to see all available show commands. Notice that we have now included a space before the question mark. This enters context sensitive help for the 'show' command.

```
Router#sh ?
aaa Show AAA values
access-lists List access lists
arp Arp table
cdp CDP information
class-map Show QoS Class Map
clock Display the system clock
controllers Interface controllers status
crypto Encryption module
debugging State of each debugging option
dhcp Dynamic Host Configuration Protocol status
dot11 IEEE 802.11 show information
file Show filesystem information
flash: display information about flash: file system
flow Flow information
frame-relay Frame-Relay information
history Display the session command history
hosts IP domain-name, lookup style, nameservers, and host
table
interfaces Interface status and configuration
ip IP information
ipv6 IPv6 information
license Show license information
line TTY line information
--More--
```

Press the Enter key when you see '—More—' to cycle through the additional output one line at a time.

```
- Output truncated -
history Display the session command history
hosts IP domain-name, lookup style, nameservers, and host
table
interfaces Interface status and configuration
```