



# **Computer Networks**

## **Phase 3 - Connecting Multiple Networks**

### **Projeto ISEL 2023/24 — LEETC**

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# Acronyms list

API	Application Programming Interface
CLI	Command Line Interface
CMD	Command Prompt
GUI	Graphical User Interface
HTTP	Hyper Text Transfer Protocol
HTTPS	Hyper Text Transfer Protocol Secure
IP	Internet Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
LAN	Local Area Network
OS	Operating System
OSS	openSUSE
PC	Personal Computer
PHP	PHP: Hypertext Preprocessor
SSL	Secure Sockets Layer
TCP	Transmission Control Protocol
TLS	Transport Layer Security
TUI	Terminal User Interface
UDP	User Datagram Protocol
VPN	Virtual Private Network
WWW	World Wide Web
XAMPP	Cross-Platform, Apache, MySQL, PHP, and Perl

# Glossary

**Apache2**

An opensource HTTP web server.

**Bit**

A unit of information in computing and digital communications. The bit represents a logical state with one of two possible values, 0 or 1 (other representations such as *true* / *false* are also valid).

**Byte**

Also a unit of digital information, consists of 8 bits.

**Broadcast**

A method of transferring a message to all recipients simultaneously.

**Browser**

A browser is a internet navigation software. It comes in multiple flavours, nowadays the big three are Microsoft Edge, Mozilla Firefox and Google Chrome.

**Cisco Packet Tracer**

A cross-platform visual network simulation tool.

**Command Prompt**

The default command-line interpreter for Windows operating systems.

**Firewall**

A barrier between networks. Controls inbound and outbound traffic.

**Gateway**

A network gateway provides a connection between networks and devices. Known as protocol translation gateways or mapping gateways, can perform protocol conversions to connect networks with different network protocol technologies.

**LibreWolf**

An internet browser based on Mozilla's Firefox. It's primary purpose is to allow privacy, and with it comes security. It achieves this by removing telemetry and data collection.

**Linux**

Open-source Unix-like operating systems based on the Linux kernel.

**MariaDB**

A community-developed fork of MySQL database server.

**openSUSE Tumbleweed**

An openSUSE (OSS) is an open-source community driven Linux-based distribution sponsored by SUSE Software Solutions. Tumbleweed is a rolling release version allowing for up-to-date software releases.

**Operating system**

A program that manages a computer's resources from software to hardware.

**Ping**

A software utility used to test the reachability of a host on an IP network.

**Tracert**

Or **tracert** in unix and linux systems, is a computer network diagnostic command for displaying possible routes and measuring transit delays of packets across an IP network.

**Ipconfig**

Or **ifconfig** in unix and linux systems, is a console application program that displays all current TCP/IP network configuration values.

**Python**

Python is a high-level programming language, object-oriented.

**Perl**

A high-level, general-purpose, interpreted, dynamic programming language

**Rolling release distribution**

A distribution where it's software release cycle is more frequent than those of Long Term Support (LTS). It's up to the Linux-based distributor to guarantee the testing of a package.

**Router**

A networking device that forwards data packets between computer networks, including internet-works such as the global Internet.

**Switch**

A networking hardware that connects devices on a computer network by using packet switching to receive and forward data to the destination device.

**Socket**

A network socket serves as an endpoint for sending and receiving data across the network.

**Subnet Mask**

Is a logical subdivision of an IP network.

**Unix**

Is a family of multitasking, multi-user computer operating systems that derive from the original AT&T Unix.

**VPN**

A private network creating a secure connection between a device and a network.

**Windows**

Microsoft's operating system. First released in 1985 as a Graphical User Interface (GUI) for MS-DOS, continued to evolve with it's latest version being 11. Due to it's nature, it's not recommended for server production environment.

**Wireshark**

Wireshark is a network protocol analyser software. Allows traffic capture between a computer and a network.

**XAMPP**

A software package environment collection containing Apache2 webserver, MariaDB database, PHP and Perl.



# Chapter 1

## Introduction

For this phase we're going to expand on the previous phase 2 outline.

Conveniently taking advantage of the work already performed, it's time to execute it. If only it were that simple. As we'll see, firstly correcting the IP assignments to meet the right standards, then re-applying those new IP addresses to the network.

## Chapter 2

### Phase 3

Taking information from the previous phase 2 project, this is what we're re-applying:

- IP range: 192.168.**GROUP NUMBER**.0.
- Commands:
  - ping: to test connectivity between devices over IP.
  - tracer: diagnostic command for displaying possible routes, also measures transit delay of packages across IP.
  - ipconfig: console application program of some computer operating systems that displays all current TCP/IP network configuration values. Unix and linux equivalent is *ifconfig*.

Now for the specific requirements in phase 3. Most of it was already accomplished in phase 2. The mathematical formula is still valid here:

$$Clients_{LAN_A} = \max \left( 20, \left( \sum_{k=0}^n studentnumber_k \right) \bmod 100 \right) \quad \Leftrightarrow \quad Clients_{LAN_A} = 48$$

$$Clients_{LAN_B} = \frac{Clients_{LAN_A}}{2} \quad \Leftrightarrow \quad Clients_{LAN_B} = 27$$

What about our network diagram? Well, it's still pretty much the same with only one small caveat, static routes.

This circuit must obey the subsequent rules:

- Connection between LAN's A and B to LAN Servers always go through router R1 to router R2.
- LAN's A and B with outside destination always use the router R1 and router R0 path.
- LAN server to the outside must go through router R2 and router R0.

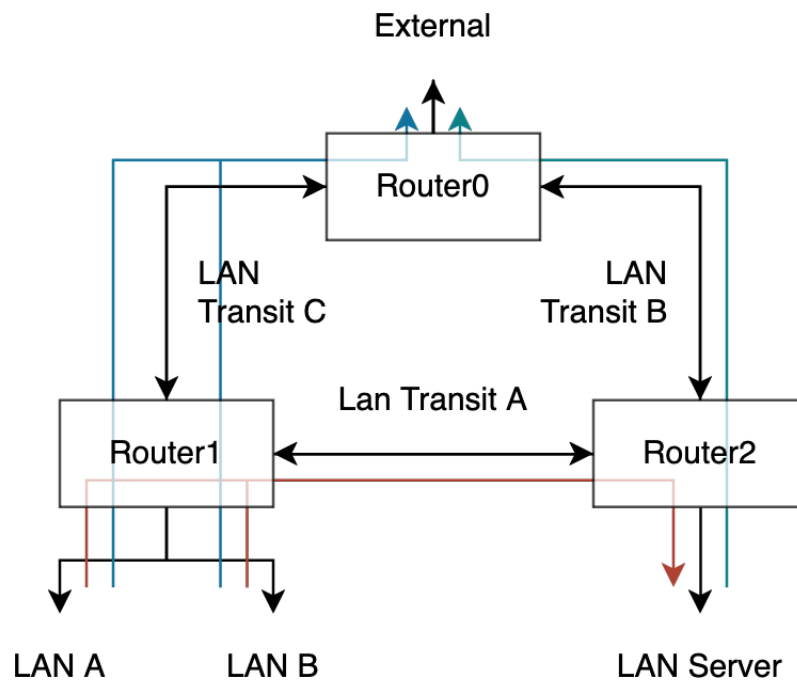


Figure 2.1: Phase 3 simplified network diagram

Router	From	To	Network	Via	Through
R1	LAN A / LAN B	LAN Servers Any	192.168.7.0/25 8.8.8.8/30	192.168.7.254 192.168.7.249	R1 > R2 > R0
R2	LAN Servers	LAN A LAN B Any	192.168.7.128/26 192.168.7.192/27 8.8.8.8/30	192.168.7.253 192.168.7.245	R2 > R1 > R0
R0	Any	LAN A LAN B LAN Servers	192.168.7.128/26 192.168.7.192/27 192.168.7.0/25	192.168.7.250 192.168.7.246	R0 > R1 > R2

Table 2.1: Static routes table

## 2.1 Outline

Previously the subdivision was performed by opening with the lowest subdivision, /30, then expanding till /25.

However, this was inappropriate due to best practices rules which assert that network subdivision starts with the largest network, /25, and then continues till the smallest network, /30.

And so, here are the results:

Subnet	IP															
	0	127	128	191	192	223	224	239	240	243	244	247	248	251	252	255
/30																
/30																
/30																

[illegible]

Name	Network	Usable IPs	Router	Broadcast	Subnet Mask	Populated
		192.168.7.			255.255.255.	
LAN Server	0	1 - 125	126	127	128	126
LAN A	128	129 - 189	190	191	192	48
LAN B	192	193 - 221	222	223	224	27
Unused remaining	224	225 - 238		239		0
	240	241 - 242		243		0
LAN Transit C	244	245 - 246		247	252	2
LAN Transit B	248	249 - 250		251	252	2
LAN Transit A	252	253 - 254		255	252	2

Name	Ports Link		Network	IP	Gateway	Subnet Mask
	From	To				
PC0 Laptop0	Fa0	Sw0 Fa0/2	LAN A	129	190	192
	Fa0	Sw0 Fa0/3		130		
PC1 Laptop1	Fa0	Sw1 Fa0/2	LAN B	193	222	224
	Fa0	Sw1 Fa0/3		194		
R0	Fa0/0	Fa0/0	External			
	Fa4/0	R2 Fa4/0	LAN Transit C	245		252
	Fa5/0	R1 Fa5/0	LAN Transit B	249		
R1	Fa0/0	Sw0 Fa0/1	LAN A	190		192
	Fa1/0	Sw1 Fa0/1	LAN B	222		224
	Fa4/0	R2 Fa5/0	LAN Transit A	253		252
	Fa5/0	R1 Fa4/0	LAN Transit B	250		
	R2	Fa0/0	Sw2 Fa0/4	LAN Server	126	

Table 2.4 continued from previous page

Name	Ports Link		Network	IP	Gateway	Subnet Mask
	From	To				
	Fa4/0	R0 Fa4/0	LAN Transit C	246		
	Fa5/0	R1 Fa4/0	LAN Transit A	254		252
<b>HTTP-Server</b>	Fa0	Sw2 Fa0/1		3		
<b>DNS-Server</b>	Fa0	Sw2 Fa0/2	LAN Server	2	126	128
<b>DHCP-Server</b>	Fa0	Sw2 Fa0/3		1		
<b>Sw0</b>	Fa0/1	R1 Fa0/0				
	Fa0/2	PC0	LAN A			
	Fa0/3	Laptop0				
<b>Sw1</b>	Fa0/1	R1 Fa1/0				
	Fa0/2	PC1	LAN B			
	Fa0/3	Laptop1				
<b>Sw2</b>	Fa0/1	HTTP-Server				
	Fa0/2	DNS-Server	LAN Server			
	Fa0/3	DHCP-Server				
	Fa0/4	R2 Fa0/0				

Table 2.4: IP configuration table

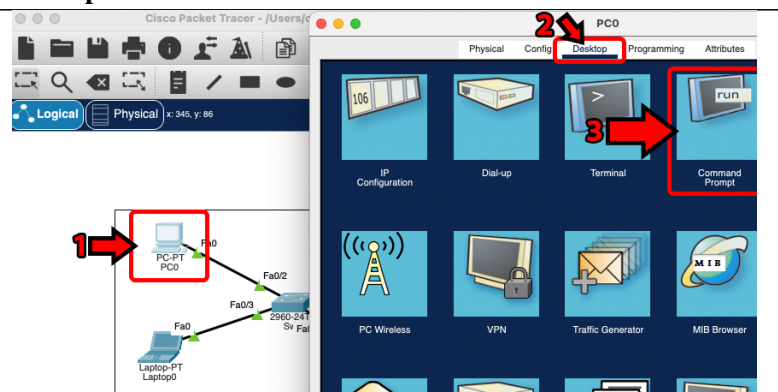
Beautifully charted. Let's implement it with our favorite tool, Cisco Packet Trace.

## 2.2 Configuring devices

### Steps

To configure the IP on a device we must **single-click** in the intended device (1), go to the *desktop* tab (2) and select *IP Configuration* (3).

### Example

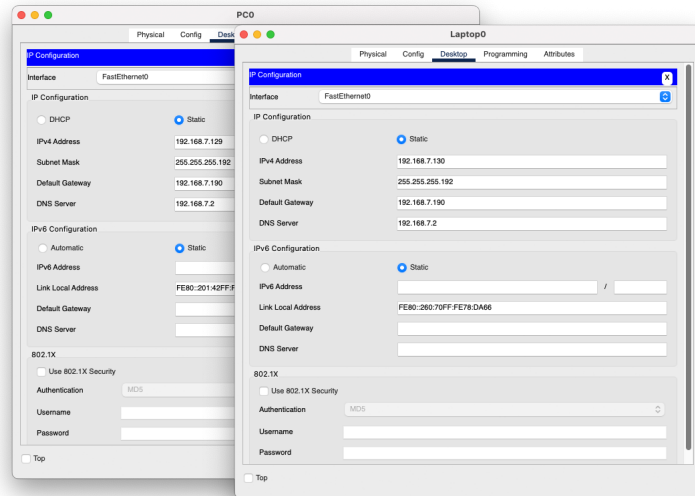


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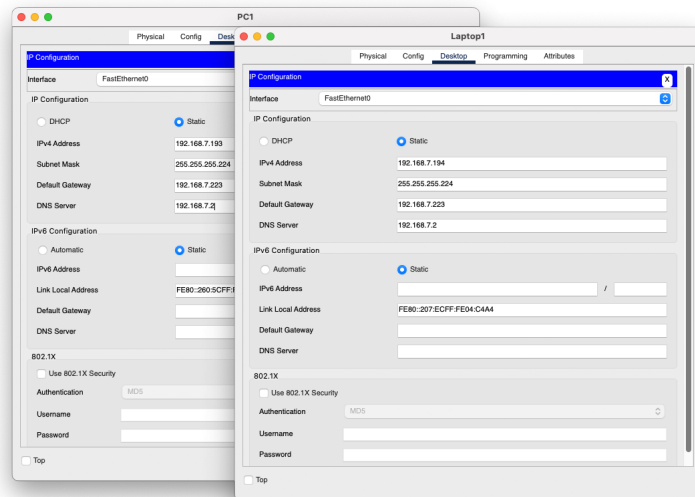
**Table 2.5 continued from previous page**  
**Example**

## Steps

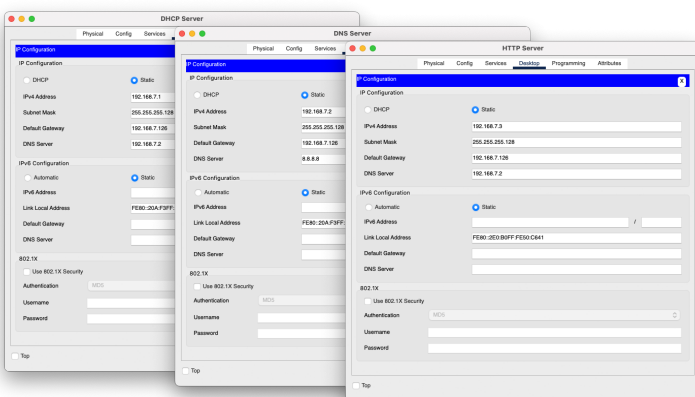
IP configuration for LAN A, PC0 and Laptop0.



IP configuration for LAN B, PC1 and Laptop1.



IP configuration for LAN Servers, DHCP-Server, DNS-Server and HTTP-Server.



**Table 2.5: Cisco Packet Tracer IP device guide**

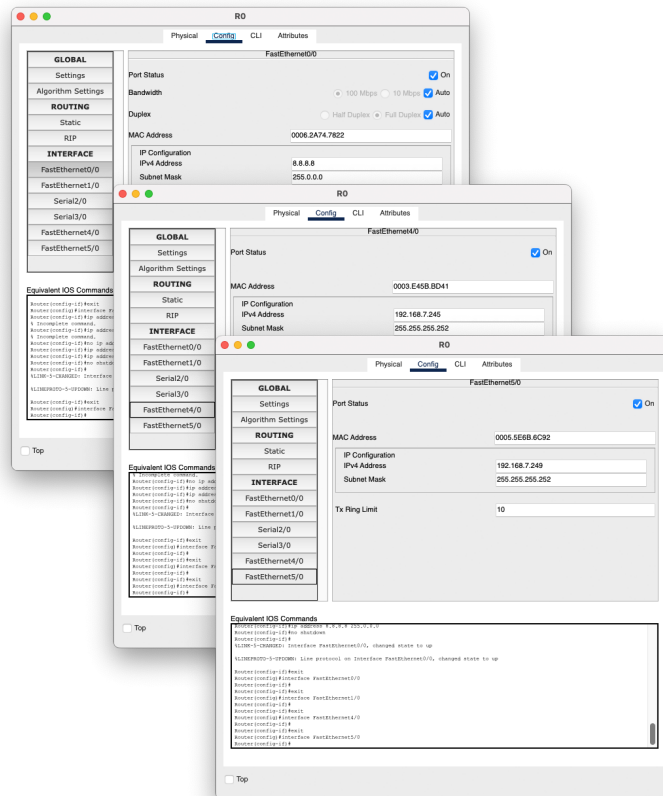
## 2.3 Configuring routers

For the router there's two options, both valid and exhibited in the report. The graphical user interface (GUI) in the right and the command line interface (CLI) in the output subsection. Going by the GUI it's crystal clear, just input the necessary IP and subnet mask. And also the static routes.

### Steps

### Example

IP configuration for Router 0.

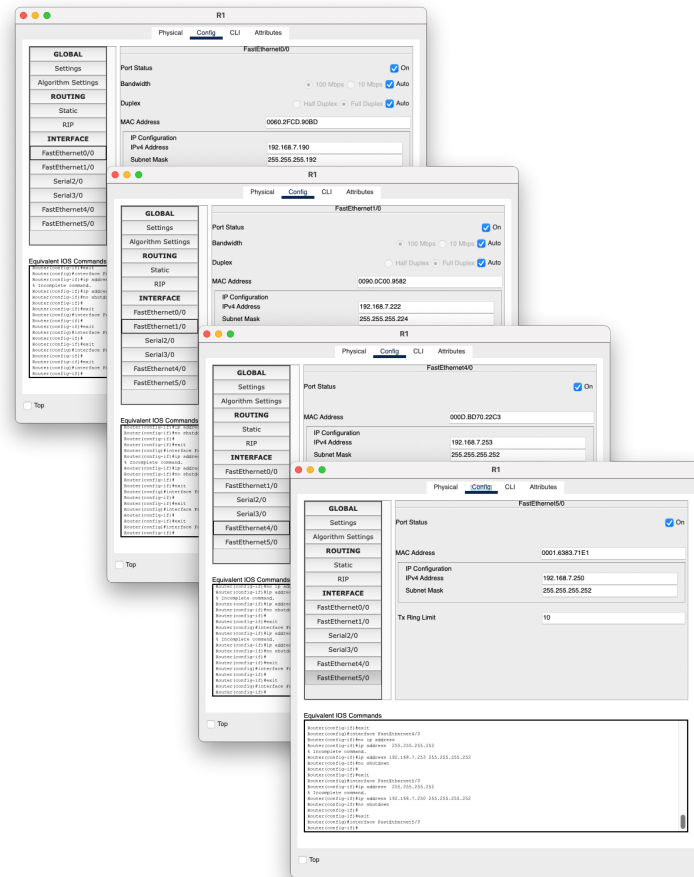


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Table 2.6 continued from previous page  
Example

Steps

IP configuration for Router 1.



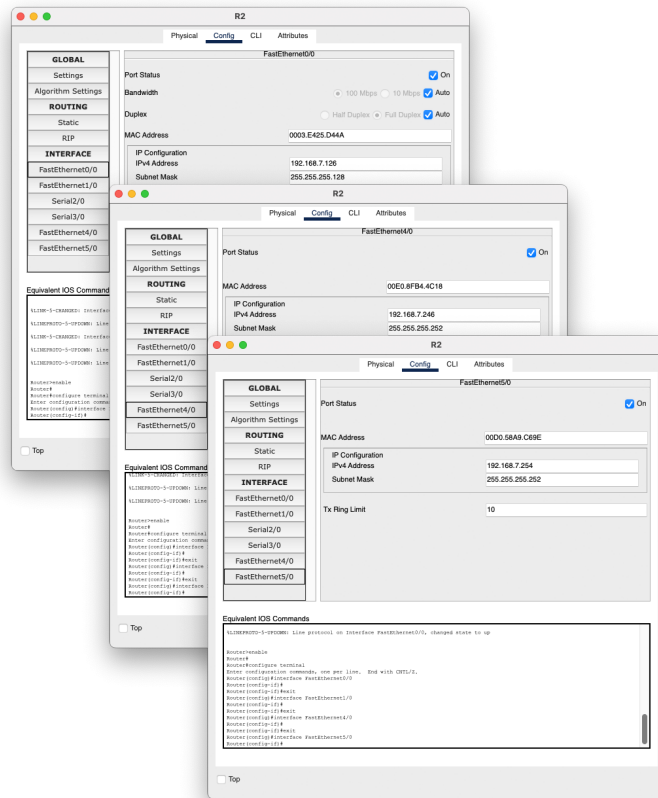
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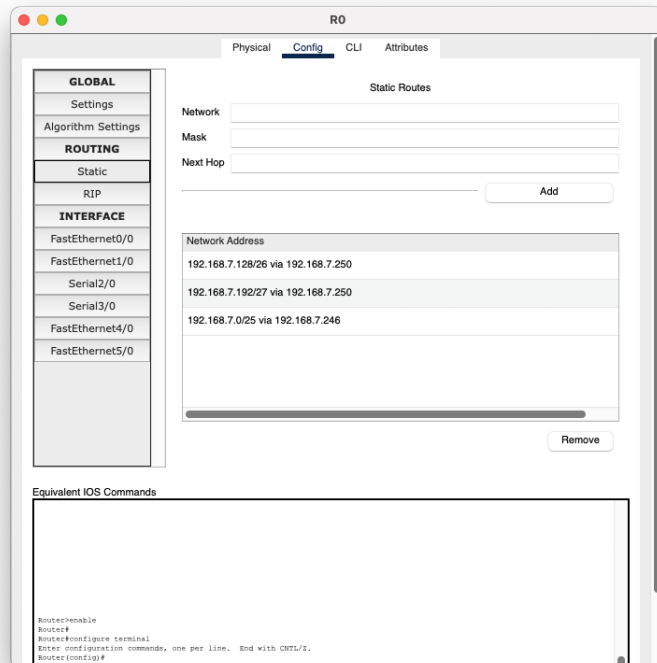
**Table 2.6 continued from previous page**  
**Example**

## Steps

IP configuration for Router 2.



Static routes for Router 0.



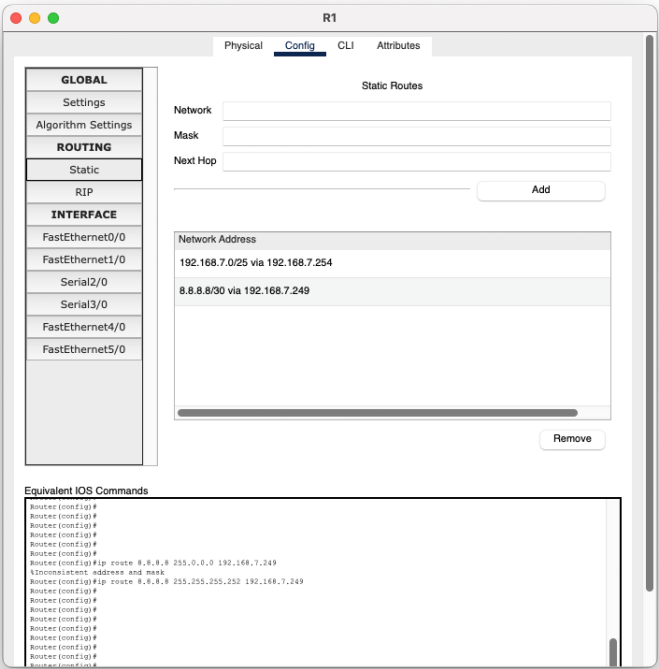
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Table 2.6 continued from previous page

Example

Steps

Static routes for Router 1.



Static routes for Router 2.

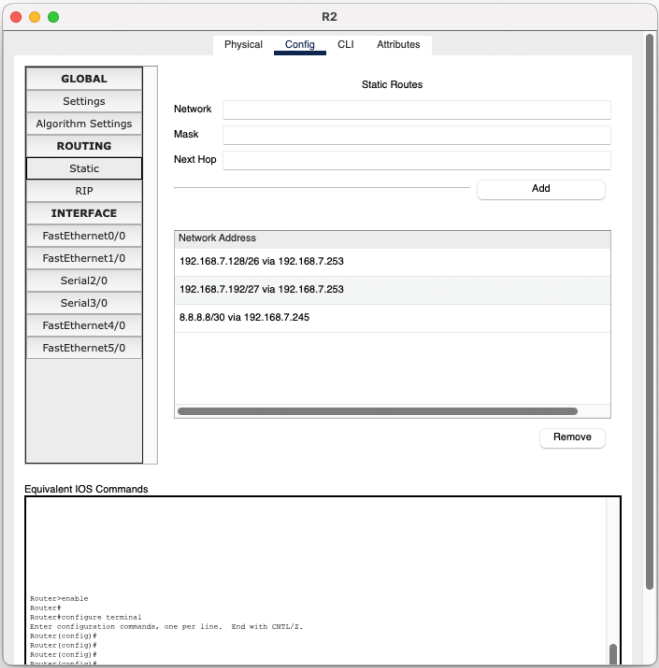


Table 2.6: Cisco Packet Tracer IP router guide

## 2.4 Testing connectivity

After applying the configuration, we must test our network by running diagnostic commands. First arp, then ping, then arp again and finally tracer<sup>1</sup>:

Ping	Trace Route	Device
arp -a	arp -a	ARP Table
ping 192.168.7.129	tracert 192.168.7.129	PC0
ping 192.168.7.130	tracert 192.168.7.130	Laptop0
ping 192.168.7.193	tracert 192.168.7.193	PC1
ping 192.168.7.194	tracert 192.168.7.194	Laptop1
ping 192.168.7.1	tracert 192.168.7.1	DHCP-Server
ping 192.168.7.2	tracert 192.168.7.2	DNS-Server
ping 192.168.7.3	tracert 192.168.7.3	HTTP-Server
ping 8.8.8.8	tracert 8.8.8.8	R0
ping 192.168.7.245	tracert 192.168.7.245	R0
ping 192.168.7.249	tracert 192.168.7.249	R0
ping 192.168.7.190	tracert 192.168.7.190	R1
ping 192.168.7.222	tracert 192.168.7.222	R1
ping 192.168.7.253	tracert 192.168.7.253	R1
ping 192.168.7.250	tracert 192.168.7.250	R1
ping 192.168.7.126	tracert 192.168.7.126	R2
ping 192.168.7.246	tracert 192.168.7.246	R2
ping 192.168.7.254	tracert 192.168.7.254	R2

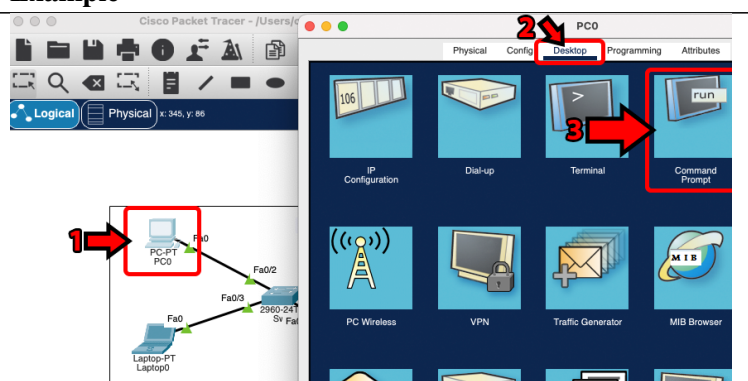
Table 2.7: CLI commands

Since not everything fit in the images, their respective outputs are in the outputs subsection attesting to what was performed.

### Steps

To test the connection from devices we select a device by **single-clicking** it (1), go to the *desktop* tab (2) and select *Command Prompt* (3).

### Example



Continued on next page

<sup>1</sup>Excluding commands to the device itself.

## Steps

The image shows a Windows laptop with two terminal windows open. The top window, titled "Laptop0", has tabs for "Physical", "Config", "Desktop", "Programming", and "Attributes". The bottom window, titled "Command Prompt", has a close button in the top right corner. Both windows display the same command sequence and output:

```
tracert route to 192.168.7.254 over 30 hops
  0  ms  0  ms  0  ms  192.168.7.190
  2  ms  0  ms  0  ms  192.168.7.254
Tracer complete.
C:\>tracert 192.168.7.254

tracert route to 192.168.7.254 over 30 hops
  0  ms  0  ms  0  ms  192.168.7.190
  2  ms  0  ms  0  ms  192.168.7.190
  3  ms  0  ms  0  ms  Request timed out.
  4  ms  0  ms  0  ms  Request timed out.
  5  ms  0  ms  0  ms  Request timed out.
  6  ms  0  ms  0  ms  Request timed out.
  7  ms  0  ms  0  ms  Request timed out.
  8  ms  0  ms  0  ms  Request timed out.
  9  ms  0  ms  0  ms  Request timed out.
 10  ms  0  ms  0  ms  Request timed out.
 11  ms  0  ms  0  ms  Request timed out.
 12  ms  0  ms  0  ms  Request timed out.
 13  ms  0  ms  0  ms  Request timed out.
 14  ms  0  ms  0  ms  Request timed out.
 15  ms  0  ms  0  ms  Request timed out.
 16  ms  0  ms  0  ms  Request timed out.
 17  ms  0  ms  0  ms  Request timed out.
 18  ms  0  ms  0  ms  Request timed out.
 19  ms  0  ms  0  ms  Request timed out.
 20  ms  0  ms  0  ms  Request timed out.
 21  ms  0  ms  0  ms  Request timed out.
 22  ms  0  ms  0  ms  Request timed out.
 23  ms  0  ms  0  ms  Request timed out.
 24  ms  0  ms  0  ms  Request timed out.
 25  ms  0  ms  0  ms  Request timed out.
 26  ms  0  ms  0  ms  Request timed out.
 27  ms  0  ms  0  ms  Request timed out.
 28  ms  0  ms  0  ms  Request timed out.
 29  ms  0  ms  0  ms  Request timed out.
 30  ms  0  ms  0  ms  Request timed out.
Tracer complete.
C:\>tracert 192.168.7.254

tracert route to 192.168.7.254 over 30 hops
  0  ms  0  ms  0  ms  192.168.7.190
  2  ms  0  ms  0  ms  192.168.7.254
Tracer complete.
C:\>
```

The image shows a Windows desktop with two Cisco Packet Tracer windows open. The top window, titled 'Laptop1', has tabs for Physical, Config, Desktop, Programming, and Attributes. The 'Desktop' tab is selected, displaying a 'Command Prompt' window. The bottom window, titled 'PC1', also has a 'Command Prompt' window open. Both windows show the output of a network connectivity test, including IP addresses and ping results.

**Top Window (Laptop1) Command Prompt:**

```

C:\ProgramData\Cisco\Packets>tracert -d 192.168.7.224 over 30 hops:
  0  ms  0  ms  0  ms  0  ms  192.168.7.224
  1  ms  0  ms  0  ms  0  ms  192.168.7.222
  2  ms  0  ms  0  ms  0  ms  192.168.7.118
Tracer complete.
C:\ProgramData\Cisco\Packets>tracert -d 192.168.7.224 over 30 hops:
  0  ms  0  ms  0  ms  0  ms  192.168.7.224
  1  ms  0  ms  0  ms  0  ms  192.168.7.222
  2  ms  0  ms  0  ms  0  ms  192.168.7.222
  3  ms  0  ms  0  ms  0  ms  Request timed out.
  4  ms  0  ms  0  ms  0  ms  Request timed out.
  5  ms  0  ms  0  ms  0  ms  Request timed out.
  6  ms  0  ms  0  ms  0  ms  Request timed out.
  7  ms  2  ms  0  ms  0  ms  Request timed out.
  8  ms  0  ms  0  ms  0  ms  Request timed out.
  9  ms  0  ms  0  ms  0  ms  Request timed out.
 10  ms  0  ms  0  ms  0  ms  Request timed out.
 11  ms  0  ms  0  ms  0  ms  Request timed out.
 12  ms  0  ms  0  ms  0  ms  Request timed out.
 13  ms  0  ms  0  ms  0  ms  Request timed out.
 14  ms  0  ms  0  ms  0  ms  Request timed out.
 15  ms  0  ms  0  ms  0  ms  Request timed out.
 16  ms  0  ms  0  ms  0  ms  Request timed out.
 17  ms  0  ms  0  ms  0  ms  Request timed out.
 18  ms  0  ms  0  ms  0  ms  Request timed out.
 19  ms  0  ms  0  ms  0  ms  Request timed out.
 20  ms  0  ms  0  ms  0  ms  Request timed out.
 21  ms  0  ms  0  ms  0  ms  Request timed out.
 22  ms  0  ms  0  ms  1  ms  Request timed out.
 23  ms  0  ms  0  ms  0  ms  Request timed out.
 24  ms  0  ms  0  ms  0  ms  Request timed out.
 25  ms  0  ms  0  ms  0  ms  Request timed out.
 26  ms  0  ms  0  ms  0  ms  Request timed out.
 27  ms  0  ms  0  ms  0  ms  Request timed out.
 28  ms  0  ms  0  ms  0  ms  Request timed out.
 29  ms  0  ms  0  ms  0  ms  Request timed out.
 30  ms  0  ms  0  ms  0  ms  Request timed out.
Tracer complete.
C:\ProgramData\Cisco\Packets>tracert -d 192.168.7.224 over 30 hops:
  0  ms  0  ms  0  ms  0  ms  192.168.7.224
  1  ms  0  ms  0  ms  0  ms  192.168.7.222
  2  ms  0  ms  0  ms  0  ms  192.168.7.224
Tracer complete.
C:\ProgramData\Cisco\Packets>

```

**Bottom Window (PC1) Command Prompt:**

```

C:\ProgramData\Cisco\Packets>tracert -d 192.168.7.224 over 30 hops:
  0  ms  0  ms  0  ms  0  ms  192.168.7.224
  1  ms  0  ms  0  ms  0  ms  192.168.7.222
  2  ms  0  ms  0  ms  0  ms  192.168.7.224
Tracer complete.
C:\ProgramData\Cisco\Packets>

```

[illegible]

---

*Computer Networks, Phase 3 - Connecting Multiple Networks*

## Table 2.8 continued from previous page

### Example

#### Steps

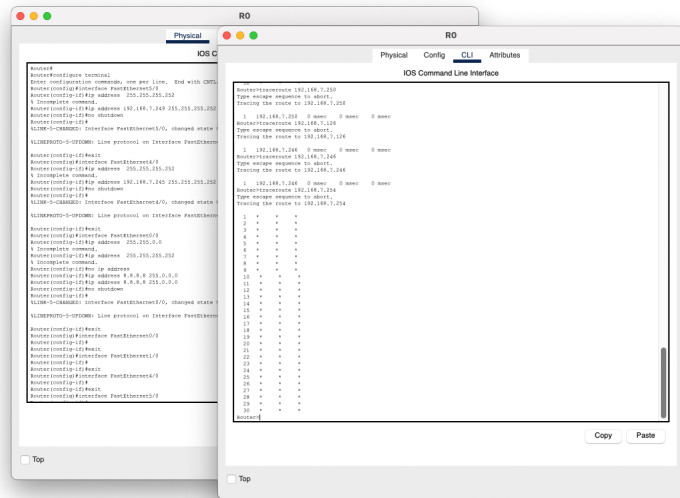
Table 2.8: Cisco Packet Tracer CLI device guide

To test the connection from routers we select a router by **single-clicking**, go to the *CLI tab*, input **exit** until **router>** is shown, insted of **router#**.

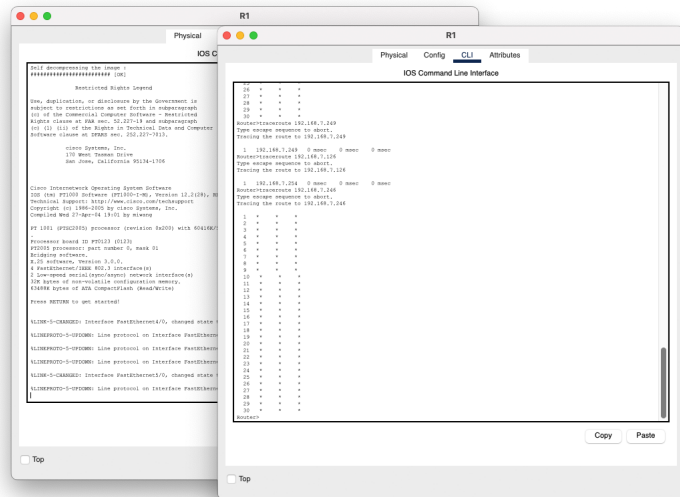
#### Steps

#### Example

From router R0 viewpoint.



From router R1 viewpoint.

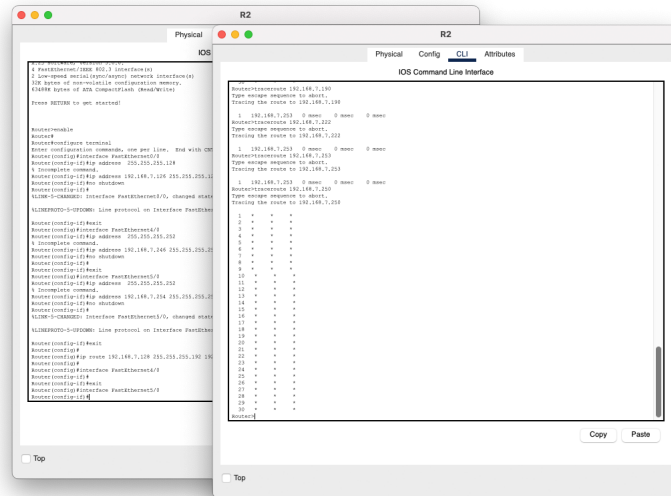


Continued on next page

**Table 2.9 continued from previous page**  
**Example**

**Steps**

From router R2 viewpoint.



**Table 2.9: Cisco Packet Tracer CLI router guide**

## 2.5 Command line outputs

To not over saturate the report, the outputs displayed only refer to one device per network. The others are in the [A.1](#) section from the appendix [A](#).

```

1 Cisco Packet Tracer PC Command Line 1.0
2 C:\>arp -a
3 No ARP Entries Found
4
5 C:\>ping 192.168.7.130
6
7 Pinging 192.168.7.130 with 32 bytes of data:
8
9 Reply from 192.168.7.130: bytes=32 time<1ms TTL=128
10 Reply from 192.168.7.130: bytes=32 time<1ms TTL=128
11 Reply from 192.168.7.130: bytes=32 time<1ms TTL=128
12 Reply from 192.168.7.130: bytes=32 time<1ms TTL=128
13
14 Ping statistics for 192.168.7.130:
15     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
16     Approximate round trip times in milli-seconds:
17         Minimum = 0ms, Maximum = 0ms, Average = 0ms
18
19 C:\>ping 192.168.7.193
20
21 Pinging 192.168.7.193 with 32 bytes of data:
22
23 Request timed out.
24 Reply from 192.168.7.193: bytes=32 time=26ms TTL=127
25 Reply from 192.168.7.193: bytes=32 time<1ms TTL=127
26 Reply from 192.168.7.193: bytes=32 time<1ms TTL=127
27
28 Ping statistics for 192.168.7.193:
29     Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
30     Approximate round trip times in milli-seconds:
31         Minimum = 0ms, Maximum = 26ms, Average = 8ms
32

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33 C:\>ping 192.168.7.194
34
35 Pinging 192.168.7.194 with 32 bytes of data:
36
37 Request timed out.
38 Reply from 192.168.7.194: bytes=32 time<1ms TTL=127
39 Reply from 192.168.7.194: bytes=32 time<1ms TTL=127
40 Reply from 192.168.7.194: bytes=32 time<1ms TTL=127
41
42 Ping statistics for 192.168.7.194:
43     Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
44     Approximate round trip times in milli-seconds:
45         Minimum = 0ms, Maximum = 0ms, Average = 0ms
46
47 C:\>ping 192.168.7.1
48
49 Pinging 192.168.7.1 with 32 bytes of data:
50
51 Request timed out.
52 Request timed out.
53 Reply from 192.168.7.1: bytes=32 time<1ms TTL=126
54 Reply from 192.168.7.1: bytes=32 time=40ms TTL=126
55
56 Ping statistics for 192.168.7.1:
57     Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
58     Approximate round trip times in milli-seconds:
59         Minimum = 0ms, Maximum = 40ms, Average = 20ms
60
61 C:\>ping 192.168.7.2
62
63 Pinging 192.168.7.2 with 32 bytes of data:
64
65 Request timed out.
66 Reply from 192.168.7.2: bytes=32 time<1ms TTL=126
67 Reply from 192.168.7.2: bytes=32 time<1ms TTL=126
68 Reply from 192.168.7.2: bytes=32 time<1ms TTL=126
69
70 Ping statistics for 192.168.7.2:
71     Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
72     Approximate round trip times in milli-seconds:
73         Minimum = 0ms, Maximum = 0ms, Average = 0ms
74
75 C:\>ping 8.8.8.8
76
77 Pinging 8.8.8.8 with 32 bytes of data:
78
79 Request timed out.
80 Reply from 8.8.8.8: bytes=32 time=1ms TTL=254
81 Reply from 8.8.8.8: bytes=32 time=23ms TTL=254
82 Reply from 8.8.8.8: bytes=32 time=1ms TTL=254
83
84 Ping statistics for 8.8.8.8:
85     Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
86     Approximate round trip times in milli-seconds:
87         Minimum = 1ms, Maximum = 23ms, Average = 8ms
88
89 C:\>ping 192.168.7.245
90
91 Pinging 192.168.7.245 with 32 bytes of data:
92
93 Reply from 192.168.7.190: Destination host unreachable.
94 Reply from 192.168.7.190: Destination host unreachable.
95 Request timed out.
96 Reply from 192.168.7.190: Destination host unreachable.
97
98 Ping statistics for 192.168.7.245:
99     Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
100
101 C:\>ping 192.168.7.249
102
103 Pinging 192.168.7.249 with 32 bytes of data:
104
105 Reply from 192.168.7.249: bytes=32 time<1ms TTL=254

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106 Reply from 192.168.7.249: bytes=32 time<1ms TTL=254
107 Reply from 192.168.7.249: bytes=32 time=25ms TTL=254
108 Reply from 192.168.7.249: bytes=32 time<1ms TTL=254
109
110 Ping statistics for 192.168.7.249:
111     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
112     Approximate round trip times in milli-seconds:
113         Minimum = 0ms, Maximum = 25ms, Average = 6ms
114
115 C:\>ping 192.168.7.190
116
117 Pinging 192.168.7.190 with 32 bytes of data:
118
119 Reply from 192.168.7.190: bytes=32 time<1ms TTL=255
120 Reply from 192.168.7.190: bytes=32 time<1ms TTL=255
121 Reply from 192.168.7.190: bytes=32 time<1ms TTL=255
122 Reply from 192.168.7.190: bytes=32 time<1ms TTL=255
123
124 Ping statistics for 192.168.7.190:
125     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
126     Approximate round trip times in milli-seconds:
127         Minimum = 0ms, Maximum = 0ms, Average = 0ms
128
129 C:\>ping 192.168.7.222
130
131 Pinging 192.168.7.222 with 32 bytes of data:
132
133 Reply from 192.168.7.222: bytes=32 time<1ms TTL=255
134 Reply from 192.168.7.222: bytes=32 time<1ms TTL=255
135 Reply from 192.168.7.222: bytes=32 time<1ms TTL=255
136 Reply from 192.168.7.222: bytes=32 time<1ms TTL=255
137
138 Ping statistics for 192.168.7.222:
139     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
140     Approximate round trip times in milli-seconds:
141         Minimum = 0ms, Maximum = 0ms, Average = 0ms
142
143 C:\>ping 192.168.7.253
144
145 Pinging 192.168.7.253 with 32 bytes of data:
146
147 Reply from 192.168.7.253: bytes=32 time<1ms TTL=255
148 Reply from 192.168.7.253: bytes=32 time<1ms TTL=255
149 Reply from 192.168.7.253: bytes=32 time<1ms TTL=255
150 Reply from 192.168.7.253: bytes=32 time<1ms TTL=255
151
152 Ping statistics for 192.168.7.253:
153     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
154     Approximate round trip times in milli-seconds:
155         Minimum = 0ms, Maximum = 0ms, Average = 0ms
156
157 C:\>ping 192.168.7.250
158
159 Pinging 192.168.7.250 with 32 bytes of data:
160
161 Reply from 192.168.7.250: bytes=32 time<1ms TTL=255
162 Reply from 192.168.7.250: bytes=32 time<1ms TTL=255
163 Reply from 192.168.7.250: bytes=32 time<1ms TTL=255
164 Reply from 192.168.7.250: bytes=32 time<1ms TTL=255
165
166 Ping statistics for 192.168.7.250:
167     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
168     Approximate round trip times in milli-seconds:
169         Minimum = 0ms, Maximum = 0ms, Average = 0ms
170
171 C:\>ping 192.168.7.126
172
173 Pinging 192.168.7.126 with 32 bytes of data:
174
175 Reply from 192.168.7.126: bytes=32 time<1ms TTL=254
176 Reply from 192.168.7.126: bytes=32 time<1ms TTL=254
177 Reply from 192.168.7.126: bytes=32 time<1ms TTL=254
178 Reply from 192.168.7.126: bytes=32 time=25ms TTL=254

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179
180 Ping statistics for 192.168.7.126:
181     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
182     Approximate round trip times in milli-seconds:
183         Minimum = 0ms, Maximum = 25ms, Average = 6ms
184
185 C:\>ping 192.168.7.246
186
187 Pinging 192.168.7.246 with 32 bytes of data:
188
189 Reply from 192.168.7.190: Destination host unreachable.
190 Request timed out.
191 Reply from 192.168.7.190: Destination host unreachable.
192 Reply from 192.168.7.190: Destination host unreachable.
193
194 Ping statistics for 192.168.7.246:
195     Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
196
197 C:\>ping 192.168.7.254
198
199 Pinging 192.168.7.254 with 32 bytes of data:
200
201 Reply from 192.168.7.254: bytes=32 time<1ms TTL=254
202 Reply from 192.168.7.254: bytes=32 time<1ms TTL=254
203 Reply from 192.168.7.254: bytes=32 time<1ms TTL=254
204 Reply from 192.168.7.254: bytes=32 time<1ms TTL=254
205
206 Ping statistics for 192.168.7.254:
207     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
208     Approximate round trip times in milli-seconds:
209         Minimum = 0ms, Maximum = 0ms, Average = 0ms
210
211 C:\>arp -a
212     Internet Address      Physical Address      Type
213     192.168.7.130         0060.7078.da66       dynamic
214     192.168.7.190         0060.2fcd.90bd       dynamic
215
216 C:\>tracert 192.168.7.130
217
218 Tracing route to 192.168.7.130 over a maximum of 30 hops:
219
220   1    0 ms      0 ms      0 ms      192.168.7.130
221
222 Trace complete.
223
224 C:\>tracert 192.168.7.193
225
226 Tracing route to 192.168.7.193 over a maximum of 30 hops:
227
228   1    0 ms      0 ms      0 ms      192.168.7.190
229   2    0 ms      0 ms      1 ms      192.168.7.193
230
231 Trace complete.
232
233 C:\>tracert 192.168.7.194
234
235 Tracing route to 192.168.7.194 over a maximum of 30 hops:
236
237   1    0 ms      0 ms      0 ms      192.168.7.190
238   2    0 ms      0 ms      0 ms      192.168.7.194
239
240 Trace complete.
241
242 C:\>tracert 192.168.7.1
243
244 Tracing route to 192.168.7.1 over a maximum of 30 hops:
245
246   1    0 ms      0 ms      0 ms      192.168.7.190
247   2    0 ms      0 ms      0 ms      192.168.7.254
248   3    0 ms      0 ms      0 ms      192.168.7.1
249
250 Trace complete.
251

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252 C:\>tracert 192.168.7.2
253
254 Tracing route to 192.168.7.2 over a maximum of 30 hops:
255
256 1 0 ms 0 ms 0 ms 192.168.7.190
257 2 0 ms 0 ms 0 ms 192.168.7.254
258 3 0 ms 0 ms 0 ms 192.168.7.2
259
260 Trace complete.
261
262 C:\>tracert 192.168.7.3
263
264 Tracing route to 192.168.7.3 over a maximum of 30 hops:
265
266 1 0 ms 0 ms 0 ms 192.168.7.190
267 2 0 ms 0 ms 0 ms 192.168.7.254
268 3 0 ms 0 ms 0 ms 192.168.7.3
269
270 Trace complete.
271
272 C:\>tracert 8.8.8.8
273
274 Tracing route to 8.8.8.8 over a maximum of 30 hops:
275
276 1 0 ms 0 ms 1 ms 192.168.7.190
277 2 0 ms 0 ms 0 ms 8.8.8.8
278
279 Trace complete.
280
281 C:\>tracert 192.168.7.245
282
283 Tracing route to 192.168.7.245 over a maximum of 30 hops:
284
285 1 0 ms 0 ms 0 ms 192.168.7.190
286 2 0 ms * 0 ms 192.168.7.190
287 3 * 0 ms * Request timed out.
288 4 0 ms * 0 ms 192.168.7.190
289 5 * 0 ms * Request timed out.
290 6 0 ms * 0 ms 192.168.7.190
291 7 * 0 ms * Request timed out.
292 8 0 ms * 0 ms 192.168.7.190
293 9 * 0 ms * Request timed out.
294 10 0 ms * 0 ms 192.168.7.190
295 11 * 0 ms * Request timed out.
296 12 0 ms * 0 ms 192.168.7.190
297 13 * 0 ms * Request timed out.
298 14 0 ms * 0 ms 192.168.7.190
299 15 * 0 ms * Request timed out.
300 16 0 ms * 0 ms 192.168.7.190
301 17 * 0 ms * Request timed out.
302 18 0 ms * 0 ms 192.168.7.190
303 19 * 0 ms * Request timed out.
304 20 0 ms * 0 ms 192.168.7.190
305 21 * 1 ms * Request timed out.
306 22 0 ms * 0 ms 192.168.7.190
307 23 * 0 ms * Request timed out.
308 24 0 ms * 0 ms 192.168.7.190
309 25 * 0 ms * Request timed out.
310 26 0 ms * 0 ms 192.168.7.190
311 27 * 8 ms * Request timed out.
312 28 0 ms * 0 ms 192.168.7.190
313 29 * 0 ms * Request timed out.
314 30 0 ms * 0 ms 192.168.7.190
315
316 Trace complete.
317
318 C:\>tracert 192.168.7.249
319
320 Tracing route to 192.168.7.249 over a maximum of 30 hops:
321
322 1 0 ms 0 ms 0 ms 192.168.7.190
323 2 0 ms 0 ms 0 ms 192.168.7.249
324

```

```

325 Trace complete.
326
327 C:\>tracert 192.168.7.190
328
329 Tracing route to 192.168.7.190 over a maximum of 30 hops:
330
331 1 0 ms 0 ms 0 ms 192.168.7.190
332
333 Trace complete.
334
335 C:\>tracert 192.168.7.222
336
337 Tracing route to 192.168.7.222 over a maximum of 30 hops:
338
339 1 0 ms 0 ms 0 ms 192.168.7.222
340
341 Trace complete.
342
343 C:\>tracert 192.168.7.253
344
345 Tracing route to 192.168.7.253 over a maximum of 30 hops:
346
347 1 0 ms 0 ms 0 ms 192.168.7.253
348
349 Trace complete.
350
351 C:\>tracert 192.168.7.250
352
353 Tracing route to 192.168.7.250 over a maximum of 30 hops:
354
355 1 0 ms 0 ms 0 ms 192.168.7.250
356
357 Trace complete.
358
359 C:\>tracert 192.168.7.126
360
361 Tracing route to 192.168.7.126 over a maximum of 30 hops:
362
363 1 0 ms 0 ms 0 ms 192.168.7.190
364 2 0 ms 0 ms 0 ms 192.168.7.126
365
366 Trace complete.
367
368 C:\>tracert 192.168.7.246
369
370 Tracing route to 192.168.7.246 over a maximum of 30 hops:
371
372 1 0 ms 0 ms 0 ms 192.168.7.190
373 2 0 ms * 0 ms 192.168.7.190
374 3 * 0 ms * Request timed out.
375 4 0 ms * 0 ms 192.168.7.190
376 5 * 0 ms * Request timed out.
377 6 0 ms * 0 ms 192.168.7.190
378 7 * 0 ms * Request timed out.
379 8 0 ms * 0 ms 192.168.7.190
380 9 * 0 ms * Request timed out.
381 10 0 ms * 0 ms 192.168.7.190
382 11 * 0 ms * Request timed out.
383 12 0 ms * 0 ms 192.168.7.190
384 13 * 0 ms * Request timed out.
385 14 0 ms * 0 ms 192.168.7.190
386 15 * 0 ms * Request timed out.
387 16 0 ms * 0 ms 192.168.7.190
388 17 * 0 ms * Request timed out.
389 18 0 ms * 0 ms 192.168.7.190
390 19 * 0 ms * Request timed out.
391 20 0 ms * 0 ms 192.168.7.190
392 21 * 0 ms * Request timed out.
393 22 0 ms * 0 ms 192.168.7.190
394 23 * 0 ms * Request timed out.
395 24 0 ms * 0 ms 192.168.7.190
396 25 * 0 ms * Request timed out.
397 26 0 ms * 0 ms 192.168.7.190

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```

398 27 * 0 ms * Request timed out.
399 28 0 ms * 0 ms 192.168.7.190
400 29 * 0 ms * Request timed out.
401 30 0 ms * 0 ms 192.168.7.190
402
403 Trace complete.
404
405 C:\>tracert 192.168.7.254
406
407 Tracing route to 192.168.7.254 over a maximum of 30 hops:
408
409 1 0 ms 0 ms 0 ms 192.168.7.190
410 2 0 ms 0 ms 0 ms 192.168.7.254
411
412 Trace complete.
413
414 C:\>

```

Listing 2.1: PC0 output (LAN A)

```

1
2 Cisco Packet Tracer PC Command Line 1.0
3 C:\>arp -a
4 Internet Address Physical Address Type
5 192.168.7.193 0060.5c73.18bd dynamic
6
7 C:\>ping 192.168.7.129
8
9 Pinging 192.168.7.129 with 32 bytes of data:
10
11 Request timed out.
12 Reply from 192.168.7.129: bytes=32 time<1ms TTL=127
13 Reply from 192.168.7.129: bytes=32 time=25ms TTL=127
14 Reply from 192.168.7.129: bytes=32 time<1ms TTL=127
15
16 Ping statistics for 192.168.7.129:
17 Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
18 Approximate round trip times in milli-seconds:
19 Minimum = 0ms, Maximum = 25ms, Average = 8ms
20
21 C:\>ping 192.168.7.130
22
23 Pinging 192.168.7.130 with 32 bytes of data:
24
25 Reply from 192.168.7.130: bytes=32 time=5ms TTL=127
26 Reply from 192.168.7.130: bytes=32 time<1ms TTL=127
27 Reply from 192.168.7.130: bytes=32 time=1ms TTL=127
28 Reply from 192.168.7.130: bytes=32 time<1ms TTL=127
29
30 Ping statistics for 192.168.7.130:
31 Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
32 Approximate round trip times in milli-seconds:
33 Minimum = 0ms, Maximum = 5ms, Average = 1ms
34
35 C:\>ping 192.168.7.193
36
37 Pinging 192.168.7.193 with 32 bytes of data:
38
39 Reply from 192.168.7.193: bytes=32 time<1ms TTL=128
40 Reply from 192.168.7.193: bytes=32 time<1ms TTL=128
41 Reply from 192.168.7.193: bytes=32 time<1ms TTL=128
42 Reply from 192.168.7.193: bytes=32 time=34ms TTL=128
43
44 Ping statistics for 192.168.7.193:
45 Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
46 Approximate round trip times in milli-seconds:
47 Minimum = 0ms, Maximum = 34ms, Average = 8ms
48
49 C:\>ping 192.168.7.1
50

```

```

51 Pinging 192.168.7.1 with 32 bytes of data:
52
53 Reply from 192.168.7.1: bytes=32 time=8ms TTL=126
54 Reply from 192.168.7.1: bytes=32 time<1ms TTL=126
55 Reply from 192.168.7.1: bytes=32 time<1ms TTL=126
56 Reply from 192.168.7.1: bytes=32 time<1ms TTL=126
57
58 Ping statistics for 192.168.7.1:
59     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
60 Approximate round trip times in milli-seconds:
61     Minimum = 0ms, Maximum = 8ms, Average = 2ms
62
63 C:\>ping 192.168.7.2
64
65 Pinging 192.168.7.2 with 32 bytes of data:
66
67 Reply from 192.168.7.2: bytes=32 time<1ms TTL=126
68 Reply from 192.168.7.2: bytes=32 time<1ms TTL=126
69 Reply from 192.168.7.2: bytes=32 time<1ms TTL=126
70 Reply from 192.168.7.2: bytes=32 time<1ms TTL=126
71
72 Ping statistics for 192.168.7.2:
73     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
74 Approximate round trip times in milli-seconds:
75     Minimum = 0ms, Maximum = 0ms, Average = 0ms
76
77 C:\>ping 192.168.7.3
78
79 Pinging 192.168.7.3 with 32 bytes of data:
80
81 Reply from 192.168.7.3: bytes=32 time<1ms TTL=126
82 Reply from 192.168.7.3: bytes=32 time=5ms TTL=126
83 Reply from 192.168.7.3: bytes=32 time<1ms TTL=126
84 Reply from 192.168.7.3: bytes=32 time<1ms TTL=126
85
86 Ping statistics for 192.168.7.3:
87     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
88 Approximate round trip times in milli-seconds:
89     Minimum = 0ms, Maximum = 5ms, Average = 1ms
90
91 C:\>ping 8.8.8.8
92
93 Pinging 8.8.8.8 with 32 bytes of data:
94
95 Reply from 8.8.8.8: bytes=32 time<1ms TTL=254
96 Reply from 8.8.8.8: bytes=32 time<1ms TTL=254
97 Reply from 8.8.8.8: bytes=32 time<1ms TTL=254
98 Reply from 8.8.8.8: bytes=32 time<1ms TTL=254
99
100 Ping statistics for 8.8.8.8:
101     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
102 Approximate round trip times in milli-seconds:
103     Minimum = 0ms, Maximum = 0ms, Average = 0ms
104
105 C:\>ping 192.168.7.245
106
107 Pinging 192.168.7.245 with 32 bytes of data:
108
109 Reply from 192.168.7.222: Destination host unreachable.
110 Reply from 192.168.7.222: Destination host unreachable.
111 Reply from 192.168.7.222: Destination host unreachable.
112 Reply from 192.168.7.222: Destination host unreachable.
113
114 Ping statistics for 192.168.7.245:
115     Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
116
117 C:\>ping 192.168.7.249
118
119 Pinging 192.168.7.249 with 32 bytes of data:
120
121 Reply from 192.168.7.249: bytes=32 time<1ms TTL=254
122 Reply from 192.168.7.249: bytes=32 time<1ms TTL=254
123 Reply from 192.168.7.249: bytes=32 time<1ms TTL=254

```

```

124 Reply from 192.168.7.249: bytes=32 time<1ms TTL=254
125
126 Ping statistics for 192.168.7.249:
127     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
128     Approximate round trip times in milli-seconds:
129         Minimum = 0ms, Maximum = 0ms, Average = 0ms
130
131 C:\>ping 192.168.7.190
132
133 Pinging 192.168.7.190 with 32 bytes of data:
134
135 Reply from 192.168.7.190: bytes=32 time<1ms TTL=255
136 Reply from 192.168.7.190: bytes=32 time=6ms TTL=255
137 Reply from 192.168.7.190: bytes=32 time<1ms TTL=255
138 Reply from 192.168.7.190: bytes=32 time<1ms TTL=255
139
140 Ping statistics for 192.168.7.190:
141     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
142     Approximate round trip times in milli-seconds:
143         Minimum = 0ms, Maximum = 6ms, Average = 1ms
144
145 C:\>ping 192.168.7.253
146
147 Pinging 192.168.7.253 with 32 bytes of data:
148
149 Reply from 192.168.7.253: bytes=32 time<1ms TTL=255
150 Reply from 192.168.7.253: bytes=32 time<1ms TTL=255
151 Reply from 192.168.7.253: bytes=32 time<1ms TTL=255
152 Reply from 192.168.7.253: bytes=32 time<1ms TTL=255
153
154 Ping statistics for 192.168.7.253:
155     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
156     Approximate round trip times in milli-seconds:
157         Minimum = 0ms, Maximum = 0ms, Average = 0ms
158
159 C:\>ping 192.168.7.250
160
161 Pinging 192.168.7.250 with 32 bytes of data:
162
163 Reply from 192.168.7.250: bytes=32 time<1ms TTL=255
164 Reply from 192.168.7.250: bytes=32 time<1ms TTL=255
165 Reply from 192.168.7.250: bytes=32 time<1ms TTL=255
166 Reply from 192.168.7.250: bytes=32 time<1ms TTL=255
167
168 Ping statistics for 192.168.7.250:
169     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
170     Approximate round trip times in milli-seconds:
171         Minimum = 0ms, Maximum = 0ms, Average = 0ms
172
173 C:\>ping 192.168.7.126
174
175 Pinging 192.168.7.126 with 32 bytes of data:
176
177 Reply from 192.168.7.126: bytes=32 time<1ms TTL=254
178 Reply from 192.168.7.126: bytes=32 time=1ms TTL=254
179 Reply from 192.168.7.126: bytes=32 time<1ms TTL=254
180 Reply from 192.168.7.126: bytes=32 time<1ms TTL=254
181
182 Ping statistics for 192.168.7.126:
183     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
184     Approximate round trip times in milli-seconds:
185         Minimum = 0ms, Maximum = 1ms, Average = 0ms
186
187 C:\>ping 192.168.7.246
188
189 Pinging 192.168.7.246 with 32 bytes of data:
190
191 Reply from 192.168.7.222: Destination host unreachable.
192 Reply from 192.168.7.222: Destination host unreachable.
193 Request timed out.
194 Reply from 192.168.7.222: Destination host unreachable.
195
196 Ping statistics for 192.168.7.246:

```

```

197     Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
198
199 C:\>ping 192.168.7.254
200
201 Pinging 192.168.7.254 with 32 bytes of data:
202
203 Reply from 192.168.7.254: bytes=32 time<1ms TTL=254
204 Reply from 192.168.7.254: bytes=32 time<1ms TTL=254
205 Reply from 192.168.7.254: bytes=32 time=26ms TTL=254
206 Reply from 192.168.7.254: bytes=32 time<1ms TTL=254
207
208 Ping statistics for 192.168.7.254:
209     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
210     Approximate round trip times in milli-seconds:
211         Minimum = 0ms, Maximum = 26ms, Average = 6ms
212
213 C:\>arp -a
214     Internet Address      Physical Address      Type
215     192.168.7.193         0060.5c73.18bd       dynamic
216     192.168.7.222         0090.0c00.9582       dynamic
217
218 C:\>tracert 192.168.7.129
219
220 Tracing route to 192.168.7.129 over a maximum of 30 hops:
221
222     1    0 ms      0 ms      0 ms      192.168.7.222
223     2    0 ms      0 ms      0 ms      192.168.7.129
224
225 Trace complete.
226
227 C:\>tracert 192.168.7.130
228
229 Tracing route to 192.168.7.130 over a maximum of 30 hops:
230
231     1    0 ms      0 ms      0 ms      192.168.7.222
232     2    0 ms      0 ms      0 ms      192.168.7.130
233
234 Trace complete.
235
236 C:\>tracert 192.168.7.193
237
238 Tracing route to 192.168.7.193 over a maximum of 30 hops:
239
240     1    0 ms      0 ms      0 ms      192.168.7.193
241
242 Trace complete.
243
244 C:\>tracert 192.168.7.1
245
246 Tracing route to 192.168.7.1 over a maximum of 30 hops:
247
248     1    0 ms      0 ms      0 ms      192.168.7.222
249     2    0 ms      0 ms      8 ms      192.168.7.254
250     3    0 ms      0 ms     17 ms      192.168.7.1
251
252 Trace complete.
253
254 C:\>tracert 192.168.7.2
255
256 Tracing route to 192.168.7.2 over a maximum of 30 hops:
257
258     1    0 ms      0 ms      0 ms      192.168.7.222
259     2    0 ms      0 ms     11 ms      192.168.7.254
260     3    0 ms      0 ms      0 ms      192.168.7.2
261
262 Trace complete.
263
264 C:\>tracert 192.168.7.3
265
266 Tracing route to 192.168.7.3 over a maximum of 30 hops:
267
268     1    0 ms      0 ms      0 ms      192.168.7.222
269     2    0 ms      0 ms      0 ms      192.168.7.254

```

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270     3    0 ms    0 ms    0 ms    192.168.7.3
271
272 Trace complete.
273
274 C:\>tracert 8.8.8.8
275
276 Tracing route to 8.8.8.8 over a maximum of 30 hops:
277
278     1    0 ms    0 ms    0 ms    192.168.7.222
279     2    0 ms    0 ms    0 ms    8.8.8.8
280
281 Trace complete.
282
283 C:\>tracert 192.168.7.245
284
285 Tracing route to 192.168.7.245 over a maximum of 30 hops:
286
287     1    0 ms    0 ms    0 ms    192.168.7.222
288     2    0 ms    *        0 ms    192.168.7.222
289     3    *        0 ms    *        Request timed out.
290     4    0 ms    *        0 ms    192.168.7.222
291     5    *        0 ms    *        Request timed out.
292     6    0 ms    *        0 ms    192.168.7.222
293     7    *        0 ms    *        Request timed out.
294     8    0 ms    *        0 ms    192.168.7.222
295     9    *        0 ms    *        Request timed out.
296    10    0 ms    *        0 ms    192.168.7.222
297    11    *        0 ms    *        Request timed out.
298    12    0 ms    *        0 ms    192.168.7.222
299    13    *        0 ms    *        Request timed out.
300    14    0 ms    *        0 ms    192.168.7.222
301    15    *        0 ms    *        Request timed out.
302    16    15 ms   *        0 ms    192.168.7.222
303    17    *        0 ms    *        Request timed out.
304    18    0 ms    *        0 ms    192.168.7.222
305    19    *        0 ms    *        Request timed out.
306    20    0 ms    *        0 ms    192.168.7.222
307    21    *        0 ms    *        Request timed out.
308    22    0 ms    *        0 ms    192.168.7.222
309    23    *        0 ms    *        Request timed out.
310    24    0 ms    *        0 ms    192.168.7.222
311    25    *        0 ms    *        Request timed out.
312    26    0 ms    *        0 ms    192.168.7.222
313    27    *        0 ms    *        Request timed out.
314    28    0 ms    *        0 ms    192.168.7.222
315    29    *        0 ms    *        Request timed out.
316    30    0 ms    *        0 ms    192.168.7.222
317
318 Trace complete.
319
320 C:\>tracert 192.168.7.249
321
322 Tracing route to 192.168.7.249 over a maximum of 30 hops:
323
324     1    0 ms    0 ms    0 ms    192.168.7.222
325     2    0 ms    0 ms    0 ms    192.168.7.249
326
327 Trace complete.
328
329 C:\>tracert 192.168.7.190
330
331 Tracing route to 192.168.7.190 over a maximum of 30 hops:
332
333     1    0 ms    0 ms    0 ms    192.168.7.190
334
335 Trace complete.
336
337 C:\>tracert 192.168.7.222
338
339 Tracing route to 192.168.7.222 over a maximum of 30 hops:
340
341     1    0 ms    0 ms    0 ms    192.168.7.222
342

```



```

343 Trace complete.
344
345 C:\>tracert 192.168.7.253
346
347 Tracing route to 192.168.7.253 over a maximum of 30 hops:
348
349 1 0 ms 0 ms 0 ms 192.168.7.253
350
351 Trace complete.
352
353 C:\>tracert 192.168.7.250
354
355 Tracing route to 192.168.7.250 over a maximum of 30 hops:
356
357 1 0 ms 0 ms 0 ms 192.168.7.250
358
359 Trace complete.
360
361 C:\>tracert 192.168.7.126
362
363 Tracing route to 192.168.7.126 over a maximum of 30 hops:
364
365 1 0 ms 0 ms 0 ms 192.168.7.222
366 2 0 ms 0 ms 0 ms 192.168.7.126
367
368 Trace complete.
369
370 C:\>tracert 192.168.7.246
371
372 Tracing route to 192.168.7.246 over a maximum of 30 hops:
373
374 1 0 ms 0 ms 0 ms 192.168.7.222
375 2 0 ms * 0 ms 192.168.7.222
376 3 * 0 ms * Request timed out.
377 4 0 ms * 0 ms 192.168.7.222
378 5 * 0 ms * Request timed out.
379 6 0 ms * 0 ms 192.168.7.222
380 7 * 2 ms * Request timed out.
381 8 0 ms * 0 ms 192.168.7.222
382 9 * 0 ms * Request timed out.
383 10 0 ms * 0 ms 192.168.7.222
384 11 * 0 ms * Request timed out.
385 12 0 ms * 0 ms 192.168.7.222
386 13 * 0 ms * Request timed out.
387 14 0 ms * 0 ms 192.168.7.222
388 15 * 0 ms * Request timed out.
389 16 0 ms * 0 ms 192.168.7.222
390 17 * 0 ms * Request timed out.
391 18 0 ms * 0 ms 192.168.7.222
392 19 * 0 ms * Request timed out.
393 20 0 ms * 0 ms 192.168.7.222
394 21 * 0 ms * Request timed out.
395 22 0 ms * 1 ms 192.168.7.222
396 23 * 0 ms * Request timed out.
397 24 0 ms * 0 ms 192.168.7.222
398 25 * 0 ms * Request timed out.
399 26 0 ms * 0 ms 192.168.7.222
400 27 * 0 ms * Request timed out.
401 28 0 ms * 0 ms 192.168.7.222
402 29 * 0 ms * Request timed out.
403 30 0 ms * 0 ms 192.168.7.222
404
405 Trace complete.
406
407 C:\>tracert 192.168.7.254
408
409 Tracing route to 192.168.7.254 over a maximum of 30 hops:
410
411 1 0 ms 0 ms 0 ms 192.168.7.222
412 2 0 ms 0 ms 0 ms 192.168.7.254
413
414 Trace complete.
415

```

## Listing 2.2: Laptop1 output (LAN B)

```

1 Cisco Packet Tracer SERVER Command Line 1.0
2 C:\>arp -a
3   Internet Address      Physical Address      Type
4   192.168.7.126         0003.e425.d44a       dynamic
5
6 C:\>ping 192.168.7.129
7
8 Pinging 192.168.7.129 with 32 bytes of data:
9
10 Reply from 192.168.7.129: bytes=32 time<1ms TTL=126
11 Reply from 192.168.7.129: bytes=32 time<1ms TTL=126
12 Reply from 192.168.7.129: bytes=32 time<1ms TTL=126
13 Reply from 192.168.7.129: bytes=32 time<1ms TTL=126
14
15 Ping statistics for 192.168.7.129:
16     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
17     Approximate round trip times in milli-seconds:
18         Minimum = 0ms, Maximum = 0ms, Average = 0ms
19
20 C:\>ping 192.168.7.130
21
22 Pinging 192.168.7.130 with 32 bytes of data:
23
24 Reply from 192.168.7.130: bytes=32 time<1ms TTL=126
25 Reply from 192.168.7.130: bytes=32 time<1ms TTL=126
26 Reply from 192.168.7.130: bytes=32 time<1ms TTL=126
27 Reply from 192.168.7.130: bytes=32 time=1ms TTL=126
28
29 Ping statistics for 192.168.7.130:
30     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
31     Approximate round trip times in milli-seconds:
32         Minimum = 0ms, Maximum = 1ms, Average = 0ms
33
34 C:\>ping 192.168.7.193
35
36 Pinging 192.168.7.193 with 32 bytes of data:
37
38 Reply from 192.168.7.193: bytes=32 time=1ms TTL=126
39 Reply from 192.168.7.193: bytes=32 time<1ms TTL=126
40 Reply from 192.168.7.193: bytes=32 time<1ms TTL=126
41 Reply from 192.168.7.193: bytes=32 time<1ms TTL=126
42
43 Ping statistics for 192.168.7.193:
44     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
45     Approximate round trip times in milli-seconds:
46         Minimum = 0ms, Maximum = 1ms, Average = 0ms
47
48 C:\>ping 192.168.7.194
49
50 Pinging 192.168.7.194 with 32 bytes of data:
51
52 Reply from 192.168.7.194: bytes=32 time<1ms TTL=126
53 Reply from 192.168.7.194: bytes=32 time<1ms TTL=126
54 Reply from 192.168.7.194: bytes=32 time<1ms TTL=126
55 Reply from 192.168.7.194: bytes=32 time<1ms TTL=126
56
57 Ping statistics for 192.168.7.194:
58     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
59     Approximate round trip times in milli-seconds:
60         Minimum = 0ms, Maximum = 0ms, Average = 0ms
61
62 C:\>ping 192.168.7.2
63
64 Pinging 192.168.7.2 with 32 bytes of data:
65
66 Reply from 192.168.7.2: bytes=32 time=12ms TTL=128

```

```

67 Reply from 192.168.7.2: bytes=32 time=4ms TTL=128
68 Reply from 192.168.7.2: bytes=32 time<1ms TTL=128
69 Reply from 192.168.7.2: bytes=32 time<1ms TTL=128
70
71 Ping statistics for 192.168.7.2:
72     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
73     Approximate round trip times in milli-seconds:
74         Minimum = 0ms, Maximum = 12ms, Average = 4ms
75
76 C:\>ping 192.168.7.3
77
78 Pinging 192.168.7.3 with 32 bytes of data:
79
80 Reply from 192.168.7.3: bytes=32 time<1ms TTL=128
81 Reply from 192.168.7.3: bytes=32 time<1ms TTL=128
82 Reply from 192.168.7.3: bytes=32 time<1ms TTL=128
83 Reply from 192.168.7.3: bytes=32 time<1ms TTL=128
84
85 Ping statistics for 192.168.7.3:
86     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
87     Approximate round trip times in milli-seconds:
88         Minimum = 0ms, Maximum = 0ms, Average = 0ms
89
90 C:\>ping 8.8.8.8
91
92 Pinging 8.8.8.8 with 32 bytes of data:
93
94 Request timed out.
95 Reply from 8.8.8.8: bytes=32 time<1ms TTL=254
96 Reply from 8.8.8.8: bytes=32 time<1ms TTL=254
97 Reply from 8.8.8.8: bytes=32 time<1ms TTL=254
98
99 Ping statistics for 8.8.8.8:
100     Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
101     Approximate round trip times in milli-seconds:
102         Minimum = 0ms, Maximum = 0ms, Average = 0ms
103
104 C:\>ping 192.168.7.245
105
106 Pinging 192.168.7.245 with 32 bytes of data:
107
108 Reply from 192.168.7.245: bytes=32 time<1ms TTL=254
109 Reply from 192.168.7.245: bytes=32 time<1ms TTL=254
110 Reply from 192.168.7.245: bytes=32 time<1ms TTL=254
111 Reply from 192.168.7.245: bytes=32 time<1ms TTL=254
112
113 Ping statistics for 192.168.7.245:
114     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
115     Approximate round trip times in milli-seconds:
116         Minimum = 0ms, Maximum = 0ms, Average = 0ms
117
118 C:\>ping 192.168.7.249
119
120 Pinging 192.168.7.249 with 32 bytes of data:
121
122 Reply from 192.168.7.126: Destination host unreachable.
123 Request timed out.
124 Reply from 192.168.7.126: Destination host unreachable.
125 Request timed out.
126
127 Ping statistics for 192.168.7.249:
128     Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
129
130 C:\>ping 192.168.7.190
131
132 Pinging 192.168.7.190 with 32 bytes of data:
133
134 Reply from 192.168.7.190: bytes=32 time=5ms TTL=254
135 Reply from 192.168.7.190: bytes=32 time=1ms TTL=254
136 Reply from 192.168.7.190: bytes=32 time<1ms TTL=254
137 Reply from 192.168.7.190: bytes=32 time<1ms TTL=254
138
139 Ping statistics for 192.168.7.190:

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140     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
141 Approximate round trip times in milli-seconds:
142     Minimum = 0ms, Maximum = 5ms, Average = 1ms
143
144 C:\>ping 192.168.7.222
145
146 Pinging 192.168.7.222 with 32 bytes of data:
147
148 Reply from 192.168.7.222: bytes=32 time<1ms TTL=254
149 Reply from 192.168.7.222: bytes=32 time<1ms TTL=254
150 Reply from 192.168.7.222: bytes=32 time<1ms TTL=254
151 Reply from 192.168.7.222: bytes=32 time<1ms TTL=254
152
153 Ping statistics for 192.168.7.222:
154     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
155 Approximate round trip times in milli-seconds:
156     Minimum = 0ms, Maximum = 0ms, Average = 0ms
157
158 C:\>ping 192.168.7.253
159
160 Pinging 192.168.7.253 with 32 bytes of data:
161
162 Reply from 192.168.7.253: bytes=32 time<1ms TTL=254
163 Reply from 192.168.7.253: bytes=32 time<1ms TTL=254
164 Reply from 192.168.7.253: bytes=32 time<1ms TTL=254
165 Reply from 192.168.7.253: bytes=32 time<1ms TTL=254
166
167 Ping statistics for 192.168.7.253:
168     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
169 Approximate round trip times in milli-seconds:
170     Minimum = 0ms, Maximum = 0ms, Average = 0ms
171
172 C:\>ping 192.168.7.250
173
174 Pinging 192.168.7.250 with 32 bytes of data:
175
176 Reply from 192.168.7.126: Destination host unreachable.
177 Request timed out.
178 Reply from 192.168.7.126: Destination host unreachable.
179 Reply from 192.168.7.126: Destination host unreachable.
180
181 Ping statistics for 192.168.7.250:
182     Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
183
184 C:\>ping 192.168.7.126
185
186 Pinging 192.168.7.126 with 32 bytes of data:
187
188 Reply from 192.168.7.126: bytes=32 time<1ms TTL=255
189 Reply from 192.168.7.126: bytes=32 time<1ms TTL=255
190 Reply from 192.168.7.126: bytes=32 time<1ms TTL=255
191 Reply from 192.168.7.126: bytes=32 time<1ms TTL=255
192
193 Ping statistics for 192.168.7.126:
194     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
195 Approximate round trip times in milli-seconds:
196     Minimum = 0ms, Maximum = 0ms, Average = 0ms
197
198 C:\>ping 192.168.7.246
199
200 Pinging 192.168.7.246 with 32 bytes of data:
201
202 Reply from 192.168.7.246: bytes=32 time<1ms TTL=255
203 Reply from 192.168.7.246: bytes=32 time<1ms TTL=255
204 Reply from 192.168.7.246: bytes=32 time<1ms TTL=255
205 Reply from 192.168.7.246: bytes=32 time<1ms TTL=255
206
207 Ping statistics for 192.168.7.246:
208     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
209 Approximate round trip times in milli-seconds:
210     Minimum = 0ms, Maximum = 0ms, Average = 0ms
211
212 C:\>ping 192.168.7.254

```

```

213
214 Pinging 192.168.7.254 with 32 bytes of data:
215
216 Reply from 192.168.7.254: bytes=32 time<1ms TTL=255
217 Reply from 192.168.7.254: bytes=32 time<1ms TTL=255
218 Reply from 192.168.7.254: bytes=32 time=7ms TTL=255
219 Reply from 192.168.7.254: bytes=32 time<1ms TTL=255
220
221 Ping statistics for 192.168.7.254:
222     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
223     Approximate round trip times in milli-seconds:
224         Minimum = 0ms, Maximum = 7ms, Average = 1ms
225
226 C:\>arp -a
227     Internet Address      Physical Address      Type
228     192.168.7.2           000a.f362.26dd       dynamic
229     192.168.7.3           00e0.b050.c641       dynamic
230     192.168.7.126         0003.e425.d44a       dynamic
231
232 C:\>tracert 192.168.7.129
233
234 Tracing route to 192.168.7.129 over a maximum of 30 hops:
235
236   1    0 ms      0 ms      0 ms      192.168.7.126
237   2    0 ms      0 ms      0 ms      192.168.7.253
238   3    0 ms      0 ms      0 ms      192.168.7.129
239
240 Trace complete.
241
242 C:\>tracert 192.168.7.130
243
244 Tracing route to 192.168.7.130 over a maximum of 30 hops:
245
246   1    0 ms      0 ms      0 ms      192.168.7.126
247   2    0 ms      0 ms      0 ms      192.168.7.253
248   3    0 ms      0 ms      0 ms      192.168.7.130
249
250 Trace complete.
251
252 C:\>tracert 192.168.7.193
253
254 Tracing route to 192.168.7.193 over a maximum of 30 hops:
255
256   1    0 ms      0 ms      0 ms      192.168.7.126
257   2    0 ms      0 ms      0 ms      192.168.7.253
258   3    0 ms      0 ms      0 ms      192.168.7.193
259
260 Trace complete.
261
262 C:\>tracert 192.168.7.194
263
264 Tracing route to 192.168.7.194 over a maximum of 30 hops:
265
266   1    0 ms      0 ms      0 ms      192.168.7.126
267   2    0 ms      0 ms      0 ms      192.168.7.253
268   3    0 ms      0 ms      0 ms      192.168.7.194
269
270 Trace complete.
271
272 C:\>tracert 192.168.7.2
273
274 Tracing route to 192.168.7.2 over a maximum of 30 hops:
275
276   1    0 ms      0 ms      0 ms      192.168.7.2
277
278 Trace complete.
279
280 C:\>tracert 192.168.7.3
281
282 Tracing route to 192.168.7.3 over a maximum of 30 hops:
283
284   1    0 ms      0 ms      0 ms      192.168.7.3
285

```

```

286 Trace complete.
287
288 C:\>tracert 8.8.8.8
289
290 Tracing route to 8.8.8.8 over a maximum of 30 hops:
291
292 1 0 ms 0 ms 0 ms 192.168.7.126
293 2 0 ms 0 ms 0 ms 8.8.8.8
294
295 Trace complete.
296
297 C:\>tracert 192.168.7.245
298
299 Tracing route to 192.168.7.245 over a maximum of 30 hops:
300
301 1 0 ms 0 ms 1 ms 192.168.7.126
302 2 0 ms 0 ms 0 ms 192.168.7.245
303
304 Trace complete.
305
306 C:\>tracert 192.168.7.249
307
308 Tracing route to 192.168.7.249 over a maximum of 30 hops:
309
310 1 0 ms 0 ms 0 ms 192.168.7.126
311 2 0 ms * 0 ms 192.168.7.126
312 3 * 0 ms * Request timed out.
313 4 0 ms * 0 ms 192.168.7.126
314 5 * 0 ms * Request timed out.
315 6 0 ms * 0 ms 192.168.7.126
316 7 * 0 ms * Request timed out.
317 8 0 ms * 0 ms 192.168.7.126
318 9 * 0 ms * Request timed out.
319 10 0 ms * 0 ms 192.168.7.126
320 11 * 0 ms * Request timed out.
321 12 0 ms * 0 ms 192.168.7.126
322 13 * 0 ms * Request timed out.
323 14 0 ms * 0 ms 192.168.7.126
324 15 * 0 ms * Request timed out.
325 16 0 ms * 0 ms 192.168.7.126
326 17 * 0 ms * Request timed out.
327 18 0 ms * 0 ms 192.168.7.126
328 19 * 0 ms * Request timed out.
329 20 0 ms * 0 ms 192.168.7.126
330 21 * 0 ms * Request timed out.
331 22 0 ms * 0 ms 192.168.7.126
332 23 * 0 ms * Request timed out.
333 24 0 ms * 0 ms 192.168.7.126
334 25 * 0 ms * Request timed out.
335 26 0 ms * 0 ms 192.168.7.126
336 27 * 0 ms * Request timed out.
337 28 14 ms * 0 ms 192.168.7.126
338 29 * 0 ms * Request timed out.
339 30 0 ms * 0 ms 192.168.7.126
340
341 Trace complete.
342
343 C:\>tracert 192.168.7.190
344
345 Tracing route to 192.168.7.190 over a maximum of 30 hops:
346
347 1 0 ms 0 ms 0 ms 192.168.7.126
348 2 0 ms 0 ms 0 ms 192.168.7.190
349
350 Trace complete.
351
352 C:\>tracert 192.168.7.222
353
354 Tracing route to 192.168.7.222 over a maximum of 30 hops:
355
356 1 0 ms 0 ms 0 ms 192.168.7.126
357 2 0 ms 0 ms 0 ms 192.168.7.222
358

```

```

359 Trace complete.
360
361 C:\>tracert 192.168.7.253
362
363 Tracing route to 192.168.7.253 over a maximum of 30 hops:
364
365     1    0 ms      0 ms      0 ms      192.168.7.126
366     2    0 ms      0 ms      0 ms      192.168.7.253
367
368 Trace complete.
369
370 C:\>tracert 192.168.7.250
371
372 Tracing route to 192.168.7.250 over a maximum of 30 hops:
373
374     1    0 ms      1 ms      0 ms      192.168.7.126
375     2    0 ms      *          0 ms      192.168.7.126
376     3    *          0 ms      *          Request timed out.
377     4    0 ms      *          0 ms      192.168.7.126
378     5    *          0 ms      *          Request timed out.
379     6    0 ms      *          0 ms      192.168.7.126
380     7    *          0 ms      *          Request timed out.
381     8    0 ms      *          0 ms      192.168.7.126
382     9    *          0 ms      *          Request timed out.
383    10    0 ms      *          0 ms      192.168.7.126
384    11    *          0 ms      *          Request timed out.
385    12    0 ms      *          0 ms      192.168.7.126
386    13    *          0 ms      *          Request timed out.
387    14    0 ms      *          0 ms      192.168.7.126
388    15    *          0 ms      *          Request timed out.
389    16    0 ms      *          0 ms      192.168.7.126
390    17    *          0 ms      *          Request timed out.
391    18    0 ms      *          0 ms      192.168.7.126
392    19    *          0 ms      *          Request timed out.
393    20    0 ms      *          0 ms      192.168.7.126
394    21    *          0 ms      *          Request timed out.
395    22    0 ms      *          0 ms      192.168.7.126
396    23    *          0 ms      *          Request timed out.
397    24    0 ms      *          0 ms      192.168.7.126
398    25    *          0 ms      *          Request timed out.
399    26    0 ms      *          0 ms      192.168.7.126
400    27    *          0 ms      *          Request timed out.
401    28    0 ms      *          0 ms      192.168.7.126
402    29    *          0 ms      *          Request timed out.
403    30    0 ms      *          0 ms      192.168.7.126
404
405 Trace complete.
406
407 C:\>tracert 192.168.7.126
408
409 Tracing route to 192.168.7.126 over a maximum of 30 hops:
410
411     1    0 ms      0 ms      0 ms      192.168.7.126
412
413 Trace complete.
414
415 C:\>tracert 192.168.7.246
416
417 Tracing route to 192.168.7.246 over a maximum of 30 hops:
418
419     1    0 ms      0 ms      0 ms      192.168.7.246
420
421 Trace complete.
422
423 C:\>tracert 192.168.7.254
424
425 Tracing route to 192.168.7.254 over a maximum of 30 hops:
426
427     1    0 ms      0 ms      0 ms      192.168.7.254
428
429 Trace complete.
430
431 C:\>

```

---

### Listing 2.3: DHCP-Server output (LAN Servers)

```
1 System Bootstrap, Version 12.1(3r)T2, RELEASE SOFTWARE (fc1)
2 Copyright (c) 2000 by cisco Systems, Inc.
3 PT 1001 (PTSC2005) processor (revision 0x200) with 60416K/5120K bytes of memory
4
5 Readonly ROMMON initialized
6
7 Self decompressing the image :
8 ##### [OK]
9
10             Restricted Rights Legend
11
12 Use, duplication, or disclosure by the Government is
13 subject to restrictions as set forth in subparagraph
14 (c) of the Commercial Computer Software - Restricted
15 Rights clause at FAR sec. 52.227-19 and subparagraph
16 (c) (1) (ii) of the Rights in Technical Data and Computer
17 Software clause at DFARS sec. 252.227-7013.
18
19             cisco Systems, Inc.
20             170 West Tasman Drive
21             San Jose, California 95134-1706
22
23
24
25 Cisco Internetwork Operating System Software
26 IOS (tm) PT1000 Software (PT1000-I-M), Version 12.2(28), RELEASE SOFTWARE (fc5)
27 Technical Support: http://www.cisco.com/techsupport
28 Copyright (c) 1986-2005 by cisco Systems, Inc.
29 Compiled Wed 27-Apr-04 19:01 by miwang
30
31 PT 1001 (PTSC2005) processor (revision 0x200) with 60416K/5120K bytes of memory
32 .
33 Processor board ID PT0123 (0123)
34 PT2005 processor: part number 0, mask 01
35 Bridging software.
36 X.25 software, Version 3.0.0.
37 4 FastEthernet/IEEE 802.3 interface(s)
38 2 Low-speed serial(sync/async) network interface(s)
39 32K bytes of non-volatile configuration memory.
40 63488K bytes of ATA CompactFlash (Read/Write)
41
42 Press RETURN to get started!
43
44
45
46 Router>enable
47 Router#
48 Router#configure terminal
49 Enter configuration commands, one per line. End with CNTL/Z.
50 Router(config)#interface FastEthernet5/0
51 Router(config-if)#ip address 192.168.7.249 255.255.255.252
52 Router(config-if)#no shutdown
53 Router(config-if)#
54 %LINK-5-CHANGED: Interface FastEthernet5/0, changed state to up
55
56 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet5/0, changed state to up
57
58 Router(config-if)#exit
59 Router(config)#interface FastEthernet4/0
60 Router(config-if)#ip address 192.168.7.245 255.255.255.252
61 Router(config-if)#no shutdown
62 Router(config-if)#
63 %LINK-5-CHANGED: Interface FastEthernet4/0, changed state to up
64
65 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet4/0, changed state to up
66
67 Router(config-if)#exit
```



```

68 Router(config)#interface FastEthernet0/0
69 Router(config-if)#ip address 8.8.8.8 255.0.0.0
70 Router(config-if)#no shutdown
71 %LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
72
73 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
74 Router(config)#ip route 192.168.7.128 255.255.255.192 192.168.7.250
75 Router(config)#ip route 192.168.7.192 255.255.255.224 192.168.7.250
76 Router(config)#ip route 192.168.7.0 255.255.255.128 192.168.7.246
77 Router(config)#
78
79 Router>ping 192.168.7.129
80
81 Type escape sequence to abort.
82 Sending 5, 100-byte ICMP Echos to 192.168.7.129, timeout is 2 seconds:
83 !!!!!
84 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/1/6 ms
85
86 Router>ping 192.168.7.130
87
88 Type escape sequence to abort.
89 Sending 5, 100-byte ICMP Echos to 192.168.7.130, timeout is 2 seconds:
90 !!!!!
91 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
92
93 Router>ping 192.168.7.193
94
95 Type escape sequence to abort.
96 Sending 5, 100-byte ICMP Echos to 192.168.7.193, timeout is 2 seconds:
97 !!!!!
98 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
99
100 Router>ping 192.168.7.194
101
102 Type escape sequence to abort.
103 Sending 5, 100-byte ICMP Echos to 192.168.7.194, timeout is 2 seconds:
104 !!!!!
105 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms
106
107 Router>ping 192.168.7.1
108
109 Type escape sequence to abort.
110 Sending 5, 100-byte ICMP Echos to 192.168.7.1, timeout is 2 seconds:
111 .!!!!
112 Success rate is 80 percent (4/5), round-trip min/avg/max = 0/8/35 ms
113
114 Router>ping 192.168.7.2
115
116 Type escape sequence to abort.
117 Sending 5, 100-byte ICMP Echos to 192.168.7.2, timeout is 2 seconds:
118 !!!!!
119 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
120
121 Router>ping 192.168.7.3
122
123 Type escape sequence to abort.
124 Sending 5, 100-byte ICMP Echos to 192.168.7.3, timeout is 2 seconds:
125 !!!!!
126 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
127
128 Router>ping 192.168.7.190
129
130 Type escape sequence to abort.
131 Sending 5, 100-byte ICMP Echos to 192.168.7.190, timeout is 2 seconds:
132 !!!!!
133 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
134
135 Router>ping 192.168.7.222
136
137 Type escape sequence to abort.
138 Sending 5, 100-byte ICMP Echos to 192.168.7.222, timeout is 2 seconds:
139 !!!!!
140 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/7/36 ms

```

```

141
142 Router>ping 192.168.7.253
143
144 Type escape sequence to abort.
145 Sending 5, 100-byte ICMP Echos to 192.168.7.253, timeout is 2 seconds:
146 .....
147 Success rate is 0 percent (0/5)
148
149 Router>ping 192.168.7.250
150
151 Type escape sequence to abort.
152 Sending 5, 100-byte ICMP Echos to 192.168.7.250, timeout is 2 seconds:
153 !!!!!
154 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
155
156 Router>ping 192.168.7.126
157
158 Type escape sequence to abort.
159 Sending 5, 100-byte ICMP Echos to 192.168.7.126, timeout is 2 seconds:
160 !!!!!
161 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
162
163 Router>ping 192.168.7.246
164
165 Type escape sequence to abort.
166 Sending 5, 100-byte ICMP Echos to 192.168.7.246, timeout is 2 seconds:
167 !!!!!
168 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
169
170 Router>ping 192.168.7.254
171
172 Type escape sequence to abort.
173 Sending 5, 100-byte ICMP Echos to 192.168.7.254, timeout is 2 seconds:
174 .....
175 Success rate is 0 percent (0/5)
176
177 Router>traceroute 192.168.7.129
178 Type escape sequence to abort.
179 Tracing the route to 192.168.7.129
180
181  1  192.168.7.250  0 msec  0 msec  0 msec
182  2  192.168.7.129  0 msec  0 msec  0 msec
183 Router>traceroute 192.168.7.130
184 Type escape sequence to abort.
185 Tracing the route to 192.168.7.130
186
187  1  192.168.7.250  6 msec  0 msec  0 msec
188  2  192.168.7.130  0 msec  0 msec  0 msec
189 Router>traceroute 192.168.7.193
190 Type escape sequence to abort.
191 Tracing the route to 192.168.7.193
192
193  1  192.168.7.250  0 msec  0 msec  0 msec
194  2  192.168.7.193  0 msec  0 msec  0 msec
195 Router>traceroute 192.168.7.194
196 Type escape sequence to abort.
197 Tracing the route to 192.168.7.194
198
199  1  192.168.7.250  0 msec  0 msec  0 msec
200  2  192.168.7.194  0 msec  0 msec  0 msec
201 Router>traceroute 192.168.7.1
202 Type escape sequence to abort.
203 Tracing the route to 192.168.7.1
204
205  1  192.168.7.246  0 msec  0 msec  0 msec
206  2  192.168.7.1    0 msec  0 msec  0 msec
207 Router>traceroute 192.168.7.2
208 Type escape sequence to abort.
209 Tracing the route to 192.168.7.2
210
211  1  192.168.7.246  0 msec  0 msec  0 msec
212  2  192.168.7.2    0 msec  0 msec  0 msec
213 Router>traceroute 192.168.7.3

```

```

214 Type escape sequence to abort.
215 Tracing the route to 192.168.7.3
216
217 1 192.168.7.246 0 msec 0 msec 0 msec
218 2 192.168.7.3 0 msec 0 msec 0 msec
219 Router>traceroute 192.168.7.190
220 Type escape sequence to abort.
221 Tracing the route to 192.168.7.190
222
223 1 192.168.7.250 0 msec 0 msec 0 msec
224 Router>traceroute 192.168.7.222
225 Type escape sequence to abort.
226 Tracing the route to 192.168.7.222
227
228 1 192.168.7.250 0 msec 0 msec 0 msec
229 Router>traceroute 192.168.7.253
230 Type escape sequence to abort.
231 Tracing the route to 192.168.7.253
232
233 1 * * *
234 2 * * *
235 3 * * *
236 4 * * *
237 5 * * *
238 6 * * *
239 7 * * *
240 8 * * *
241 9 * * *
242 10 * * *
243 11 * * *
244 12 * * *
245 13 * * *
246 14 * * *
247 15 * * *
248 16 * * *
249 17 * * *
250 18 * * *
251 19 * * *
252 20 * * *
253 21 * * *
254 22 * * *
255 23 * * *
256 24 * * *
257 25 * * *
258 26 * * *
259 27 * * *
260 28 * * *
261 29 * * *
262 30 * * *
263 Router>traceroute 192.168.7.250
264 Type escape sequence to abort.
265 Tracing the route to 192.168.7.250
266
267 1 192.168.7.250 0 msec 0 msec 0 msec
268 Router>traceroute 192.168.7.126
269 Type escape sequence to abort.
270 Tracing the route to 192.168.7.126
271
272 1 192.168.7.246 0 msec 0 msec 0 msec
273 Router>traceroute 192.168.7.246
274 Type escape sequence to abort.
275 Tracing the route to 192.168.7.246
276
277 1 192.168.7.246 0 msec 0 msec 0 msec
278 Router>traceroute 192.168.7.254
279 Type escape sequence to abort.
280 Tracing the route to 192.168.7.254
281
282 1 * * *
283 2 * * *
284 3 * * *
285 4 * * *
286 5 * * *

```

```

287 6 * * *
288 7 * * *
289 8 * * *
290 9 * * *
291 10 * * *
292 11 * * *
293 12 * * *
294 13 * * *
295 14 * * *
296 15 * * *
297 16 * * *
298 17 * * *
299 18 * * *
300 19 * * *
301 20 * * *
302 21 * * *
303 22 * * *
304 23 * * *
305 24 * * *
306 25 * * *
307 26 * * *
308 27 * * *
309 28 * * *
310 29 * * *
311 30 * * *
312 Router>

```

Listing 2.4: Router 0 output

```

1 System Bootstrap, Version 12.1(3r)T2, RELEASE SOFTWARE (fc1)
2 Copyright (c) 2000 by cisco Systems, Inc.
3 PT 1001 (PTSC2005) processor (revision 0x200) with 60416K/5120K bytes of memory
4
5 Readonly ROMMON initialized
6
7 Self decompressing the image :
8 ##### [OK]
9
10 Restricted Rights Legend
11
12 Use, duplication, or disclosure by the Government is
13 subject to restrictions as set forth in subparagraph
14 (c) of the Commercial Computer Software - Restricted
15 Rights clause at FAR sec. 52.227-19 and subparagraph
16 (c) (1) (ii) of the Rights in Technical Data and Computer
17 Software clause at DFARS sec. 252.227-7013.
18
19 cisco Systems, Inc.
20 170 West Tasman Drive
21 San Jose, California 95134-1706
22
23
24
25 Cisco Internetwork Operating System Software
26 IOS (tm) PT1000 Software (PT1000-I-M), Version 12.2(28), RELEASE SOFTWARE (fc5)
27 Technical Support: http://www.cisco.com/techsupport
28 Copyright (c) 1986-2005 by cisco Systems, Inc.
29 Compiled Wed 27-Apr-04 19:01 by miwang
30
31 PT 1001 (PTSC2005) processor (revision 0x200) with 60416K/5120K bytes of memory
32 .
33 Processor board ID PT0123 (0123)
34 PT2005 processor: part number 0, mask 01
35 Bridging software.
36 X.25 software, Version 3.0.0.
37 4 FastEthernet/IEEE 802.3 interface(s)
38 2 Low-speed serial(sync/async) network interface(s)
39 32K bytes of non-volatile configuration memory.
40 63488K bytes of ATA CompactFlash (Read/Write)
41

```

```

42 Press RETURN to get started!
43
44
45
46 Router>enable
47 Router#
48 Router#configure terminal
49 Enter configuration commands, one per line. End with CNTL/Z.
50 Router(config)#interface FastEthernet0/0
51 Router(config-if)#ip address 192.168.7.190 255.255.255.192
52 Router(config-if)#no shutdown
53 Router(config-if)#
54 %LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
55
56 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
57
58 Router(config-if)#exit
59 Router(config)#interface FastEthernet1/0
60 Router(config-if)#ip address 192.168.7.222 255.255.255.224
61 Router(config-if)#no shutdown
62 Router(config-if)#
63 %LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up
64
65 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up
66
67 Router(config-if)#exit
68 Router(config)#interface FastEthernet4/0
69 Router(config-if)#ip address 192.168.7.253 255.255.255.252
70 Router(config-if)#no shutdown
71 Router(config-if)#
72 %LINK-5-CHANGED: Interface FastEthernet4/0, changed state to up
73
74 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet4/0, changed state to up
75
76 Router(config-if)#exit
77 Router(config)#interface FastEthernet5/0
78 Router(config-if)#ip address 192.168.7.250 255.255.255.252
79 Router(config-if)#no shutdown
80 Router(config-if)#
81 %LINK-5-CHANGED: Interface FastEthernet5/0, changed state to up
82
83 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet5/0, changed state to up
84
85 Router(config)#
86 Router(config)#ip route 192.168.7.0 255.255.255.128 192.168.7.254
87 Router(config)#ip route 8.8.8.8 255.255.255.252 192.168.7.249
88
89 Router>ping 192.168.7.129
90
91 Type escape sequence to abort.
92 Sending 5, 100-byte ICMP Echos to 192.168.7.129, timeout is 2 seconds:
93 .!!!!
94 Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/0 ms
95
96 Router>ping 192.168.7.130
97
98 Type escape sequence to abort.
99 Sending 5, 100-byte ICMP Echos to 192.168.7.130, timeout is 2 seconds:
100 .!!!!
101 Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/1 ms
102
103 Router>ping 192.168.7.193
104
105 Type escape sequence to abort.
106 Sending 5, 100-byte ICMP Echos to 192.168.7.193, timeout is 2 seconds:
107 .!!!!
108 Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/0 ms
109
110 Router>ping 192.168.7.194
111
112 Type escape sequence to abort.
113 Sending 5, 100-byte ICMP Echos to 192.168.7.194, timeout is 2 seconds:
114 .!!!!

```

```

115 Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/0 ms
116
117 Router>ping 192.168.7.1
118
119 Type escape sequence to abort.
120 Sending 5, 100-byte ICMP Echos to 192.168.7.1, timeout is 2 seconds:
121 ..!!!
122 Success rate is 60 percent (3/5), round-trip min/avg/max = 0/0/0 ms
123
124 Router>ping 192.168.7.2
125
126 Type escape sequence to abort.
127 Sending 5, 100-byte ICMP Echos to 192.168.7.2, timeout is 2 seconds:
128 .!!!!
129 Success rate is 80 percent (4/5), round-trip min/avg/max = 0/1/5 ms
130
131 Router>ping 192.168.7.3
132
133 Type escape sequence to abort.
134 Sending 5, 100-byte ICMP Echos to 192.168.7.3, timeout is 2 seconds:
135 .!!!!
136 Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/0 ms
137
138 Router>ping 8.8.8.8
139
140 Type escape sequence to abort.
141 Sending 5, 100-byte ICMP Echos to 8.8.8.8, timeout is 2 seconds:
142 .!!!!
143 Success rate is 80 percent (4/5), round-trip min/avg/max = 0/0/0 ms
144
145 Router>ping 192.168.7.245
146
147 Type escape sequence to abort.
148 Sending 5, 100-byte ICMP Echos to 192.168.7.245, timeout is 2 seconds:
149 .....
150 Success rate is 0 percent (0/5)
151
152 Router>ping 192.168.7.249
153
154 Type escape sequence to abort.
155 Sending 5, 100-byte ICMP Echos to 192.168.7.249, timeout is 2 seconds:
156 !!!!!
157 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
158
159 Router>ping 192.168.7.126
160
161 Type escape sequence to abort.
162 Sending 5, 100-byte ICMP Echos to 192.168.7.126, timeout is 2 seconds:
163 !!!!!
164 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
165
166 Router>ping 192.168.7.246
167
168 Type escape sequence to abort.
169 Sending 5, 100-byte ICMP Echos to 192.168.7.246, timeout is 2 seconds:
170 .....
171 Success rate is 0 percent (0/5)
172
173 Router>traceroute 192.168.7.129
174 Type escape sequence to abort.
175 Tracing the route to 192.168.7.129
176
177  1    192.168.7.129    0 msec    0 msec    0 msec
178 Router>traceroute 192.168.7.130
179 Type escape sequence to abort.
180 Tracing the route to 192.168.7.130
181
182  1    192.168.7.130    0 msec    0 msec    0 msec
183 Router>traceroute 192.168.7.193
184 Type escape sequence to abort.
185 Tracing the route to 192.168.7.193
186
187  1    192.168.7.193    0 msec    0 msec    0 msec

```

```

188 Router>traceroute 192.168.7.194
189 Type escape sequence to abort.
190 Tracing the route to 192.168.7.194
191
192 1 192.168.7.194 0 msec 0 msec 0 msec
193 Router>traceroute 192.168.7.1
194 Type escape sequence to abort.
195 Tracing the route to 192.168.7.1
196
197 1 192.168.7.254 0 msec 0 msec 0 msec
198 2 192.168.7.1 0 msec 0 msec 0 msec
199 Router>traceroute 192.168.7.2
200 Type escape sequence to abort.
201 Tracing the route to 192.168.7.2
202
203 1 192.168.7.254 0 msec 0 msec 0 msec
204 2 192.168.7.2 0 msec 0 msec 0 msec
205 Router>traceroute 192.168.7.3
206 Type escape sequence to abort.
207 Tracing the route to 192.168.7.3
208
209 1 192.168.7.254 0 msec 0 msec 19 msec
210 2 192.168.7.3 0 msec 0 msec 0 msec
211 Router>traceroute 8.8.8.8
212 Type escape sequence to abort.
213 Tracing the route to 8.8.8.8
214
215 1 192.168.7.249 0 msec 0 msec 0 msec
216 Router>traceroute 192.168.7.245
217 Type escape sequence to abort.
218 Tracing the route to 192.168.7.245
219
220 1 * * *
221 2 * * *
222 3 * * *
223 4 * * *
224 5 * * *
225 6 * * *
226 7 * * *
227 8 * * *
228 9 * * *
229 10 * * *
230 11 * * *
231 12 * * *
232 13 * * *
233 14 * * *
234 15 * * *
235 16 * * *
236 17 * * *
237 18 * * *
238 19 * * *
239 20 * * *
240 21 * * *
241 22 * * *
242 23 * * *
243 24 * * *
244 25 * * *
245 26 * * *
246 27 * * *
247 28 * * *
248 29 * * *
249 30 * * *
250 Router>traceroute 192.168.7.249
251 Type escape sequence to abort.
252 Tracing the route to 192.168.7.249
253
254 1 192.168.7.249 0 msec 0 msec 0 msec
255 Router>traceroute 192.168.7.126
256 Type escape sequence to abort.
257 Tracing the route to 192.168.7.126
258
259 1 192.168.7.254 0 msec 0 msec 0 msec
260 Router>traceroute 192.168.7.246

```

```

261 Type escape sequence to abort.
262 Tracing the route to 192.168.7.246
263
264  1  *      *      *
265  2  *      *      *
266  3  *      *      *
267  4  *      *      *
268  5  *      *      *
269  6  *      *      *
270  7  *      *      *
271  8  *      *      *
272  9  *      *      *
273 10  *      *      *
274 11  *      *      *
275 12  *      *      *
276 13  *      *      *
277 14  *      *      *
278 15  *      *      *
279 16  *      *      *
280 17  *      *      *
281 18  *      *      *
282 19  *      *      *
283 20  *      *      *
284 21  *      *      *
285 22  *      *      *
286 23  *      *      *
287 24  *      *      *
288 25  *      *      *
289 26  *      *      *
290 27  *      *      *
291 28  *      *      *
292 29  *      *      *
293 30  *      *      *
294 Router>

```

Listing 2.5: Router 1 output

```

1  System Bootstrap, Version 12.1(3r)T2, RELEASE SOFTWARE (fc1)
2  Copyright (c) 2000 by cisco Systems, Inc.
3  PT 1001 (PTSC2005) processor (revision 0x200) with 60416K/5120K bytes of memory
4
5  Readonly ROMMON initialized
6
7  Self decompressing the image :
8  ##### [OK]
9
10         Restricted Rights Legend
11
12  Use, duplication, or disclosure by the Government is
13  subject to restrictions as set forth in subparagraph
14  (c) of the Commercial Computer Software - Restricted
15  Rights clause at FAR sec. 52.227-19 and subparagraph
16  (c) (1) (ii) of the Rights in Technical Data and Computer
17  Software clause at DFARS sec. 252.227-7013.
18
19         cisco Systems, Inc.
20         170 West Tasman Drive
21         San Jose, California 95134-1706
22
23
24
25  Cisco Internetwork Operating System Software
26  IOS (tm) PT1000 Software (PT1000-I-M), Version 12.2(28), RELEASE SOFTWARE (fc5)
27  Technical Support: http://www.cisco.com/techsupport
28  Copyright (c) 1986-2005 by cisco Systems, Inc.
29  Compiled Wed 27-Apr-04 19:01 by miwang
30
31  PT 1001 (PTSC2005) processor (revision 0x200) with 60416K/5120K bytes of memory
32  .
33  Processor board ID PT0123 (0123)

```



```

34 PT2005 processor: part number 0, mask 01
35 Bridging software.
36 X.25 software, Version 3.0.0.
37 4 FastEthernet/IEEE 802.3 interface(s)
38 2 Low-speed serial(sync/async) network interface(s)
39 32K bytes of non-volatile configuration memory.
40 63488K bytes of ATA CompactFlash (Read/Write)
41
42 Press RETURN to get started!
43
44
45
46 Router>enable
47 Router#
48 Router#configure terminal
49 Enter configuration commands, one per line. End with CNTL/Z.
50 Router(config)#interface FastEthernet0/0
51 Router(config-if)#ip address 192.168.7.126 255.255.255.128
52 Router(config-if)#no shutdown
53 Router(config-if)#
54 %LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
55
56 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
57
58 Router(config-if)#exit
59 Router(config)#interface FastEthernet4/0
60 Router(config-if)#ip address 192.168.7.246 255.255.255.252
61 Router(config-if)#no shutdown
62 Router(config-if)#
63 Router(config-if)#exit
64 Router(config)#interface FastEthernet5/0
65 Router(config-if)#ip address 192.168.7.254 255.255.255.252
66 Router(config-if)#no shutdown
67 Router(config-if)#
68 %LINK-5-CHANGED: Interface FastEthernet5/0, changed state to up
69
70 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet5/0, changed state to up
71 Router(config-if)#exit
72 Router(config)#
73 Router(config)#ip route 192.168.7.128 255.255.255.192 192.168.7.253
74 Router(config)#ip route 192.168.7.192 255.255.255.224 192.168.7.253
75 Router(config)#ip route 8.8.8.8 255.255.255.252 192.168.7.245
76 Router(config)#
77
78 Router>ping 192.168.7.129
79
80 Type escape sequence to abort.
81 Sending 5, 100-byte ICMP Echos to 192.168.7.129, timeout is 2 seconds:
82 !!!!!
83 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/4/24 ms
84
85 Router>ping 192.168.7.130
86
87 Type escape sequence to abort.
88 Sending 5, 100-byte ICMP Echos to 192.168.7.130, timeout is 2 seconds:
89 !!!!!
90 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
91
92 Router>ping 192.168.7.193
93
94 Type escape sequence to abort.
95 Sending 5, 100-byte ICMP Echos to 192.168.7.193, timeout is 2 seconds:
96 !!!!!
97 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
98
99 Router>ping 192.168.7.194
100
101 Type escape sequence to abort.
102 Sending 5, 100-byte ICMP Echos to 192.168.7.194, timeout is 2 seconds:
103 !!!!!
104 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
105
106 Router>ping 192.168.7.1

```

```

107
108 Type escape sequence to abort.
109 Sending 5, 100-byte ICMP Echos to 192.168.7.1, timeout is 2 seconds:
110 !!!!!
111 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1 ms
112
113 Router>ping 192.168.7.2
114
115 Type escape sequence to abort.
116 Sending 5, 100-byte ICMP Echos to 192.168.7.2, timeout is 2 seconds:
117 !!!!!
118 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
119
120 Router>ping 192.168.7.3
121
122 Type escape sequence to abort.
123 Sending 5, 100-byte ICMP Echos to 192.168.7.3, timeout is 2 seconds:
124 !!!!!
125 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
126
127 Router>ping 8.8.8.8
128
129 Type escape sequence to abort.
130 Sending 5, 100-byte ICMP Echos to 8.8.8.8, timeout is 2 seconds:
131 !!!!!
132 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
133
134 Router>ping 192.168.7.245
135
136 Type escape sequence to abort.
137 Sending 5, 100-byte ICMP Echos to 192.168.7.245, timeout is 2 seconds:
138 !!!!!
139 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/3/18 ms
140
141 Router>ping 192.168.7.249
142
143 Type escape sequence to abort.
144 Sending 5, 100-byte ICMP Echos to 192.168.7.249, timeout is 2 seconds:
145 .....
146 Success rate is 0 percent (0/5)
147
148 Router>ping 192.168.7.190
149
150 Type escape sequence to abort.
151 Sending 5, 100-byte ICMP Echos to 192.168.7.190, timeout is 2 seconds:
152 !!!!!
153 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
154
155 Router>ping 192.168.7.222
156
157 Type escape sequence to abort.
158 Sending 5, 100-byte ICMP Echos to 192.168.7.222, timeout is 2 seconds:
159 !!!!!
160 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
161
162 Router>ping 192.168.7.253
163
164 Type escape sequence to abort.
165 Sending 5, 100-byte ICMP Echos to 192.168.7.253, timeout is 2 seconds:
166 !!!!!
167 Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
168
169 Router>ping 192.168.7.250
170
171 Type escape sequence to abort.
172 Sending 5, 100-byte ICMP Echos to 192.168.7.250, timeout is 2 seconds:
173 .....
174 Success rate is 0 percent (0/5)
175
176 Router>traceroute 192.168.7.129
177 Type escape sequence to abort.
178 Tracing the route to 192.168.7.129
179

```

```

180 1 192.168.7.253 0 msec 0 msec 0 msec
181 2 192.168.7.129 0 msec 7 msec 0 msec
182 Router>traceroute 192.168.7.130
183 Type escape sequence to abort.
184 Tracing the route to 192.168.7.130
185
186 1 192.168.7.253 0 msec 0 msec 0 msec
187 2 192.168.7.130 7 msec 0 msec 0 msec
188 Router>traceroute 192.168.7.193
189 Type escape sequence to abort.
190 Tracing the route to 192.168.7.193
191
192 1 192.168.7.253 0 msec 0 msec 0 msec
193 2 192.168.7.193 0 msec 0 msec 0 msec
194 Router>traceroute 192.168.7.194
195 Type escape sequence to abort.
196 Tracing the route to 192.168.7.194
197
198 1 192.168.7.253 14 msec 0 msec 16 msec
199 2 192.168.7.194 0 msec 0 msec 0 msec
200 Router>traceroute 192.168.7.1
201 Type escape sequence to abort.
202 Tracing the route to 192.168.7.1
203
204 1 192.168.7.1 0 msec 14 msec 17 msec
205 Router>traceroute 192.168.7.2
206 Type escape sequence to abort.
207 Tracing the route to 192.168.7.2
208
209 1 192.168.7.2 0 msec 0 msec 0 msec
210 Router>traceroute 192.168.7.3
211 Type escape sequence to abort.
212 Tracing the route to 192.168.7.3
213
214 1 192.168.7.3 0 msec 0 msec 0 msec
215 Router>traceroute 8.8.8.8
216 Type escape sequence to abort.
217 Tracing the route to 8.8.8.8
218
219 1 192.168.7.245 0 msec 0 msec 0 msec
220 Router>traceroute 192.168.7.245
221 Type escape sequence to abort.
222 Tracing the route to 192.168.7.245
223
224 1 192.168.7.245 0 msec 0 msec 0 msec
225 Router>traceroute 192.168.7.249
226 Type escape sequence to abort.
227 Tracing the route to 192.168.7.249
228
229 1 * * *
230 2 * * *
231 3 * * *
232 4 * * *
233 5 * * *
234 6 * * *
235 7 * * *
236 8 * * *
237 9 * * *
238 10 * * *
239 11 * * *
240 12 * * *
241 13 * * *
242 14 * * *
243 15 * * *
244 16 * * *
245 17 * * *
246 18 * * *
247 19 * * *
248 20 * * *
249 21 * * *
250 22 * * *
251 23 * * *
252 24 * * *

```

```

253      25 *      *      *
254      26 *      *      *
255      27 *      *      *
256      28 *      *      *
257      29 *      *      *
258      30 *      *      *
259 Router>traceroute 192.168.7.190
260 Type escape sequence to abort.
261 Tracing the route to 192.168.7.190
262
263      1  192.168.7.253  0 msec    0 msec    0 msec
264 Router>traceroute 192.168.7.222
265 Type escape sequence to abort.
266 Tracing the route to 192.168.7.222
267
268      1  192.168.7.253  0 msec    0 msec    0 msec
269 Router>traceroute 192.168.7.253
270 Type escape sequence to abort.
271 Tracing the route to 192.168.7.253
272
273      1  192.168.7.253  0 msec    0 msec    0 msec
274 Router>traceroute 192.168.7.250
275 Type escape sequence to abort.
276 Tracing the route to 192.168.7.250
277
278      1 *      *      *
279      2 *      *      *
280      3 *      *      *
281      4 *      *      *
282      5 *      *      *
283      6 *      *      *
284      7 *      *      *
285      8 *      *      *
286      9 *      *      *
287     10 *      *      *
288     11 *      *      *
289     12 *      *      *
290     13 *      *      *
291     14 *      *      *
292     15 *      *      *
293     16 *      *      *
294     17 *      *      *
295     18 *      *      *
296     19 *      *      *
297     20 *      *      *
298     21 *      *      *
299     22 *      *      *
300     23 *      *      *
301     24 *      *      *
302     25 *      *      *
303     26 *      *      *
304     27 *      *      *
305     28 *      *      *
306     29 *      *      *
307     30 *      *      *
308 Router>

```

Listing 2.6: Router 2 output

## Chapter 3

# Issues and fixes

### **Cisco Packet Tracer in MacOS:**

\*STILL\* no solution was found to deal with those annoying popups that takes primary focus over other windows, even using the latest version.

### **Misinterpretation of NATs:**

Initially thought that static routes were meant to allow a certain network to go through another address. As it turned out it's quite the opposite, it should be understood as ***I want to access LAN X from Router Y going through Router Z.***

## Chapter 4

# Conclusions

We can actually see that everything complies with what was required.

LAN A and B can only reach LAN Servers going through Router 1 and Router 2. They reach the outside through Router 1 and Router 0.

LAN Servers reach LANs A and B through Router 2 and Router 1. External connections go over Router 2 and Router 0.

This is possible because there isn't a static router designed to allow Router 1 to communicate with Router 0 with the intent to connect to LAN Servers.

All of this is clear when reviewing the outputs. Most prominent with the *Destination host unreachable* from ping and tracert's thirty retries outputting *Request timed out* (or even the unmistakable hops taken when tracert is successful).

# Appendix A

## Outputs

### A.1 Command line encore

```
1 Cisco Packet Tracer PC Command Line 1.0
2 C:\>arp -a
3 No ARP Entries Found
4 C:\>ping 192.168.7.129
5
6 Pinging 192.168.7.129 with 32 bytes of data:
7
8 Request timed out.
9 Request timed out.
10 Reply from 192.168.7.129: bytes=32 time<1ms TTL=128
11 Reply from 192.168.7.129: bytes=32 time<1ms TTL=128
12
13 Ping statistics for 192.168.7.129:
14     Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
15     Approximate round trip times in milli-seconds:
16         Minimum = 0ms, Maximum = 0ms, Average = 0ms
17
18 C:\>ping 192.168.7.193
19
20 Pinging 192.168.7.193 with 32 bytes of data:
21
22 Reply from 192.168.7.193: bytes=32 time<1ms TTL=127
23 Reply from 192.168.7.193: bytes=32 time<1ms TTL=127
24 Reply from 192.168.7.193: bytes=32 time<1ms TTL=127
25 Reply from 192.168.7.193: bytes=32 time<1ms TTL=127
26
27 Ping statistics for 192.168.7.193:
28     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
29     Approximate round trip times in milli-seconds:
30         Minimum = 0ms, Maximum = 0ms, Average = 0ms
31
32 C:\>ping 192.168.7.194
33
34 Pinging 192.168.7.194 with 32 bytes of data:
35
36 Reply from 192.168.7.194: bytes=32 time<1ms TTL=127
37 Reply from 192.168.7.194: bytes=32 time<1ms TTL=127
38 Reply from 192.168.7.194: bytes=32 time<1ms TTL=127
39 Reply from 192.168.7.194: bytes=32 time<1ms TTL=127
40
41 Ping statistics for 192.168.7.194:
42     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
43     Approximate round trip times in milli-seconds:
44         Minimum = 0ms, Maximum = 0ms, Average = 0ms
45
46 C:\>ping 192.168.7.1
47
48 Pinging 192.168.7.1 with 32 bytes of data:
```

```

49
50 Reply from 192.168.7.1: bytes=32 time=1ms TTL=126
51 Reply from 192.168.7.1: bytes=32 time<1ms TTL=126
52 Reply from 192.168.7.1: bytes=32 time<1ms TTL=126
53 Reply from 192.168.7.1: bytes=32 time<1ms TTL=126
54
55 Ping statistics for 192.168.7.1:
56     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
57 Approximate round trip times in milli-seconds:
58     Minimum = 0ms, Maximum = 1ms, Average = 0ms
59
60 C:\>ping 192.168.7.2
61
62 Pinging 192.168.7.2 with 32 bytes of data:
63
64 Reply from 192.168.7.2: bytes=32 time<1ms TTL=126
65 Reply from 192.168.7.2: bytes=32 time<1ms TTL=126
66 Reply from 192.168.7.2: bytes=32 time=24ms TTL=126
67 Reply from 192.168.7.2: bytes=32 time<1ms TTL=126
68
69 Ping statistics for 192.168.7.2:
70     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
71 Approximate round trip times in milli-seconds:
72     Minimum = 0ms, Maximum = 24ms, Average = 6ms
73
74 C:\>ping 192.168.7.3
75
76 Pinging 192.168.7.3 with 32 bytes of data:
77
78 Request timed out.
79 Reply from 192.168.7.3: bytes=32 time=24ms TTL=126
80 Reply from 192.168.7.3: bytes=32 time<1ms TTL=126
81 Reply from 192.168.7.3: bytes=32 time<1ms TTL=126
82
83 Ping statistics for 192.168.7.3:
84     Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
85 Approximate round trip times in milli-seconds:
86     Minimum = 0ms, Maximum = 24ms, Average = 8ms
87
88 C:\>ping 8.8.8.8
89
90 Pinging 8.8.8.8 with 32 bytes of data:
91
92 Reply from 8.8.8.8: bytes=32 time<1ms TTL=254
93 Reply from 8.8.8.8: bytes=32 time<1ms TTL=254
94 Reply from 8.8.8.8: bytes=32 time<1ms TTL=254
95 Reply from 8.8.8.8: bytes=32 time<1ms TTL=254
96
97 Ping statistics for 8.8.8.8:
98     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
99 Approximate round trip times in milli-seconds:
100     Minimum = 0ms, Maximum = 0ms, Average = 0ms
101
102 C:\>ping 192.168.7.245
103
104 Pinging 192.168.7.245 with 32 bytes of data:
105
106 Reply from 192.168.7.190: Destination host unreachable.
107 Reply from 192.168.7.190: Destination host unreachable.
108 Request timed out.
109 Reply from 192.168.7.190: Destination host unreachable.
110
111 Ping statistics for 192.168.7.245:
112     Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
113
114 C:\>ping 192.168.7.249
115
116 Pinging 192.168.7.249 with 32 bytes of data:
117
118 Reply from 192.168.7.249: bytes=32 time<1ms TTL=254
119 Reply from 192.168.7.249: bytes=32 time<1ms TTL=254
120 Reply from 192.168.7.249: bytes=32 time<1ms TTL=254
121 Reply from 192.168.7.249: bytes=32 time<1ms TTL=254

```



```

122
123 Ping statistics for 192.168.7.249:
124     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
125     Approximate round trip times in milli-seconds:
126         Minimum = 0ms, Maximum = 0ms, Average = 0ms
127
128 C:\>ping 192.168.7.190
129
130 Pinging 192.168.7.190 with 32 bytes of data:
131
132 Reply from 192.168.7.190: bytes=32 time<1ms TTL=255
133 Reply from 192.168.7.190: bytes=32 time<1ms TTL=255
134 Reply from 192.168.7.190: bytes=32 time<1ms TTL=255
135 Reply from 192.168.7.190: bytes=32 time<1ms TTL=255
136
137 Ping statistics for 192.168.7.190:
138     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
139     Approximate round trip times in milli-seconds:
140         Minimum = 0ms, Maximum = 0ms, Average = 0ms
141
142 C:\>ping 192.168.7.222
143
144 Pinging 192.168.7.222 with 32 bytes of data:
145
146 Reply from 192.168.7.222: bytes=32 time<1ms TTL=255
147 Reply from 192.168.7.222: bytes=32 time=7ms TTL=255
148 Reply from 192.168.7.222: bytes=32 time<1ms TTL=255
149 Reply from 192.168.7.222: bytes=32 time<1ms TTL=255
150
151 Ping statistics for 192.168.7.222:
152     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
153     Approximate round trip times in milli-seconds:
154         Minimum = 0ms, Maximum = 7ms, Average = 1ms
155
156 C:\>ping 192.168.7.253
157
158 Pinging 192.168.7.253 with 32 bytes of data:
159
160 Reply from 192.168.7.253: bytes=32 time<1ms TTL=255
161 Reply from 192.168.7.253: bytes=32 time<1ms TTL=255
162 Reply from 192.168.7.253: bytes=32 time<1ms TTL=255
163 Reply from 192.168.7.253: bytes=32 time<1ms TTL=255
164
165 Ping statistics for 192.168.7.253:
166     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
167     Approximate round trip times in milli-seconds:
168         Minimum = 0ms, Maximum = 0ms, Average = 0ms
169
170 C:\>ping 192.168.7.250
171
172 Pinging 192.168.7.250 with 32 bytes of data:
173
174 Reply from 192.168.7.250: bytes=32 time<1ms TTL=255
175 Reply from 192.168.7.250: bytes=32 time<1ms TTL=255
176 Reply from 192.168.7.250: bytes=32 time<1ms TTL=255
177 Reply from 192.168.7.250: bytes=32 time<1ms TTL=255
178
179 Ping statistics for 192.168.7.250:
180     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
181     Approximate round trip times in milli-seconds:
182         Minimum = 0ms, Maximum = 0ms, Average = 0ms
183
184 C:\>ping 192.168.7.126
185
186 Pinging 192.168.7.126 with 32 bytes of data:
187
188 Reply from 192.168.7.126: bytes=32 time<1ms TTL=254
189 Reply from 192.168.7.126: bytes=32 time<1ms TTL=254
190 Reply from 192.168.7.126: bytes=32 time<1ms TTL=254
191 Reply from 192.168.7.126: bytes=32 time<1ms TTL=254
192
193 Ping statistics for 192.168.7.126:
194     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

```

```

195 Approximate round trip times in milli-seconds:
196     Minimum = 0ms, Maximum = 0ms, Average = 0ms
197
198 C:\>ping 192.168.7.246
199
200 Pinging 192.168.7.246 with 32 bytes of data:
201
202 Reply from 192.168.7.190: Destination host unreachable.
203 Reply from 192.168.7.190: Destination host unreachable.
204 Reply from 192.168.7.190: Destination host unreachable.
205 Reply from 192.168.7.190: Destination host unreachable.
206
207 Ping statistics for 192.168.7.246:
208     Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
209
210 C:\>ping 192.168.7.254
211
212 Pinging 192.168.7.254 with 32 bytes of data:
213
214 Reply from 192.168.7.254: bytes=32 time<1ms TTL=254
215 Reply from 192.168.7.254: bytes=32 time=1ms TTL=254
216 Reply from 192.168.7.254: bytes=32 time<1ms TTL=254
217 Reply from 192.168.7.254: bytes=32 time<1ms TTL=254
218
219 Ping statistics for 192.168.7.254:
220     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
221 Approximate round trip times in milli-seconds:
222     Minimum = 0ms, Maximum = 1ms, Average = 0ms
223
224 C:\>arp -a
225     Internet Address      Physical Address      Type
226     192.168.7.129         0001.429b.91a6       dynamic
227     192.168.7.190         0060.2fcd.90bd       dynamic
228
229 C:\>tracert 192.168.7.129
230
231 Tracing route to 192.168.7.129 over a maximum of 30 hops:
232
233   1    0 ms      0 ms      0 ms      192.168.7.129
234
235 Trace complete.
236
237 C:\>tracert 192.168.7.193
238
239 Tracing route to 192.168.7.193 over a maximum of 30 hops:
240
241   1    0 ms      0 ms      0 ms      192.168.7.190
242   2    0 ms      0 ms      0 ms      192.168.7.193
243
244 Trace complete.
245
246 C:\>tracert 192.168.7.194
247
248 Tracing route to 192.168.7.194 over a maximum of 30 hops:
249
250   1    0 ms      0 ms      0 ms      192.168.7.190
251   2    0 ms      0 ms      0 ms      192.168.7.194
252
253 Trace complete.
254
255 C:\>tracert 192.168.7.1
256
257 Tracing route to 192.168.7.1 over a maximum of 30 hops:
258
259   1    0 ms      0 ms      0 ms      192.168.7.190
260   2    0 ms      0 ms      0 ms      192.168.7.254
261   3    0 ms      0 ms      0 ms      192.168.7.1
262
263 Trace complete.
264
265 C:\>tracert 192.168.7.2
266
267 Tracing route to 192.168.7.2 over a maximum of 30 hops:

```

```

268
269     1    0 ms    0 ms    0 ms    192.168.7.190
270     2    0 ms    0 ms    0 ms    192.168.7.254
271     3    0 ms    0 ms    0 ms    192.168.7.2
272
273 Trace complete.
274
275 C:\>tracert 192.168.7.3
276
277 Tracing route to 192.168.7.3 over a maximum of 30 hops:
278
279     1    0 ms    0 ms    18 ms    192.168.7.190
280     2    1 ms    0 ms    0 ms    192.168.7.254
281     3    0 ms    0 ms    0 ms    192.168.7.3
282
283 Trace complete.
284
285 C:\>tracert 8.8.8.8
286
287 Tracing route to 8.8.8.8 over a maximum of 30 hops:
288
289     1    0 ms    0 ms    0 ms    192.168.7.190
290     2    0 ms    0 ms    0 ms    8.8.8.8
291
292 Trace complete.
293
294 C:\>tracert 192.168.7.245
295
296 Tracing route to 192.168.7.245 over a maximum of 30 hops:
297
298     1    0 ms    0 ms    0 ms    192.168.7.190
299     2    0 ms    *      0 ms    192.168.7.190
300     3    *      0 ms    *      Request timed out.
301     4    0 ms    *      0 ms    192.168.7.190
302     5    *      0 ms    *      Request timed out.
303     6    0 ms    *      0 ms    192.168.7.190
304     7    *      0 ms    *      Request timed out.
305     8    0 ms    *      7 ms    192.168.7.190
306     9    *      0 ms    *      Request timed out.
307    10    0 ms    *      0 ms    192.168.7.190
308    11    *      0 ms    *      Request timed out.
309    12    0 ms    *      0 ms    192.168.7.190
310    13    *      0 ms    *      Request timed out.
311    14    0 ms    *      0 ms    192.168.7.190
312    15    *      0 ms    *      Request timed out.
313    16    0 ms    *      0 ms    192.168.7.190
314    17    *      0 ms    *      Request timed out.
315    18    0 ms    *      0 ms    192.168.7.190
316    19    *      0 ms    *      Request timed out.
317    20    0 ms    *      0 ms    192.168.7.190
318    21    *      0 ms    *      Request timed out.
319    22    0 ms    *      0 ms    192.168.7.190
320    23    *      0 ms    *      Request timed out.
321    24    0 ms    *      0 ms    192.168.7.190
322    25    *      0 ms    *      Request timed out.
323    26    0 ms    *      0 ms    192.168.7.190
324    27    *      0 ms    *      Request timed out.
325    28    0 ms    *      0 ms    192.168.7.190
326    29    *      0 ms    *      Request timed out.
327    30    0 ms    *      0 ms    192.168.7.190
328
329 Trace complete.
330
331 C:\>tracert 192.168.7.249
332
333 Tracing route to 192.168.7.249 over a maximum of 30 hops:
334
335     1    0 ms    0 ms    3 ms    192.168.7.190
336     2    0 ms    1 ms    0 ms    192.168.7.249
337
338 Trace complete.
339
340 C:\>tracert 192.168.7.190

```

```

341
342 Tracing route to 192.168.7.190 over a maximum of 30 hops:
343
344     1    0 ms      0 ms      0 ms      192.168.7.190
345
346 Trace complete.
347
348 C:\>tracert 192.168.7.222
349
350 Tracing route to 192.168.7.222 over a maximum of 30 hops:
351
352     1    0 ms      17 ms      0 ms      192.168.7.222
353
354 Trace complete.
355
356 C:\>tracert 192.168.7.253
357
358 Tracing route to 192.168.7.253 over a maximum of 30 hops:
359
360     1    0 ms      0 ms      0 ms      192.168.7.253
361
362 Trace complete.
363
364 C:\>tracert 192.168.7.250
365
366 Tracing route to 192.168.7.250 over a maximum of 30 hops:
367
368     1    0 ms      0 ms      0 ms      192.168.7.250
369
370 Trace complete.
371
372 C:\>tracert 192.168.7.126
373
374 Tracing route to 192.168.7.126 over a maximum of 30 hops:
375
376     1    0 ms      0 ms      0 ms      192.168.7.190
377     2    6 ms      0 ms      0 ms      192.168.7.126
378
379 Trace complete.
380
381 C:\>tracert 192.168.7.246
382
383 Tracing route to 192.168.7.246 over a maximum of 30 hops:
384
385     1    0 ms      0 ms      0 ms      192.168.7.190
386     2    0 ms      *          *          192.168.7.190
387     3    *          0 ms      *          Request timed out.
388     4    0 ms      *          0 ms      192.168.7.190
389     5    *          0 ms      *          Request timed out.
390     6    0 ms      *          12 ms     192.168.7.190
391     7    *          0 ms      *          Request timed out.
392     8    0 ms      *          0 ms      192.168.7.190
393     9    *          0 ms      *          Request timed out.
394    10    0 ms      *          0 ms      192.168.7.190
395    11    *          0 ms      *          Request timed out.
396    12    0 ms      *          0 ms      192.168.7.190
397    13    *          0 ms      *          Request timed out.
398    14    0 ms      *          0 ms      192.168.7.190
399    15    *          0 ms      *          Request timed out.
400    16    13 ms     *          0 ms      192.168.7.190
401    17    *          0 ms      *          Request timed out.
402    18    0 ms      *          0 ms      192.168.7.190
403    19    *          0 ms      *          Request timed out.
404    20    0 ms      *          0 ms      192.168.7.190
405    21    *          0 ms      *          Request timed out.
406    22    0 ms      *          0 ms      192.168.7.190
407    23    *          0 ms      *          Request timed out.
408    24    0 ms      *          0 ms      192.168.7.190
409    25    *          0 ms      *          Request timed out.
410    26    0 ms      *          0 ms      192.168.7.190
411    27    *          0 ms      *          Request timed out.
412    28    0 ms      *          0 ms      192.168.7.190
413    29    *          0 ms      *          Request timed out.

```

```

414      30    0 ms      *          0 ms      192.168.7.190
415
416 Trace complete.
417
418 C:\>tracert 192.168.7.254
419
420 Tracing route to 192.168.7.254 over a maximum of 30 hops:
421
422     1    0 ms      0 ms      0 ms      192.168.7.190
423     2    0 ms      0 ms      0 ms      192.168.7.254
424
425 Trace complete.
426
427 C:\>

```

Listing A.1: Laptop0 output

```

1 Cisco Packet Tracer PC Command Line 1.0
2 C:\>arp -a
3 No ARP Entries Found
4 C:\>ping 192.168.7.129
5
6 Pinging 192.168.7.129 with 32 bytes of data:
7
8 Request timed out.
9 Request timed out.
10 Reply from 192.168.7.129: bytes=32 time<1ms TTL=127
11 Reply from 192.168.7.129: bytes=32 time<1ms TTL=127
12
13 Ping statistics for 192.168.7.129:
14     Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
15     Approximate round trip times in milli-seconds:
16         Minimum = 0ms, Maximum = 0ms, Average = 0ms
17
18 C:\>ping 192.168.7.130
19
20 Pinging 192.168.7.130 with 32 bytes of data:
21
22 Request timed out.
23 Reply from 192.168.7.130: bytes=32 time<1ms TTL=127
24 Reply from 192.168.7.130: bytes=32 time<1ms TTL=127
25 Reply from 192.168.7.130: bytes=32 time<1ms TTL=127
26
27 Ping statistics for 192.168.7.130:
28     Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
29     Approximate round trip times in milli-seconds:
30         Minimum = 0ms, Maximum = 0ms, Average = 0ms
31
32 C:\>ping 192.168.7.194
33
34 Pinging 192.168.7.194 with 32 bytes of data:
35
36 Reply from 192.168.7.194: bytes=32 time<1ms TTL=128
37 Reply from 192.168.7.194: bytes=32 time<1ms TTL=128
38 Reply from 192.168.7.194: bytes=32 time<1ms TTL=128
39 Reply from 192.168.7.194: bytes=32 time<1ms TTL=128
40
41 Ping statistics for 192.168.7.194:
42     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
43     Approximate round trip times in milli-seconds:
44         Minimum = 0ms, Maximum = 0ms, Average = 0ms
45
46 C:\>ping 192.168.7.1
47
48 Pinging 192.168.7.1 with 32 bytes of data:
49
50 Request timed out.
51 Request timed out.
52 Reply from 192.168.7.1: bytes=32 time<1ms TTL=126
53 Reply from 192.168.7.1: bytes=32 time<1ms TTL=126

```

```

54
55 Ping statistics for 192.168.7.1:
56     Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
57     Approximate round trip times in milli-seconds:
58         Minimum = 0ms, Maximum = 0ms, Average = 0ms
59
60 C:\>ping 192.168.7.2
61
62 Pinging 192.168.7.2 with 32 bytes of data:
63
64 Request timed out.
65 Reply from 192.168.7.2: bytes=32 time<1ms TTL=126
66 Reply from 192.168.7.2: bytes=32 time<1ms TTL=126
67 Reply from 192.168.7.2: bytes=32 time<1ms TTL=126
68
69 Ping statistics for 192.168.7.2:
70     Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
71     Approximate round trip times in milli-seconds:
72         Minimum = 0ms, Maximum = 0ms, Average = 0ms
73
74 C:\>ping 192.168.7.3
75
76 Pinging 192.168.7.3 with 32 bytes of data:
77
78 Request timed out.
79 Reply from 192.168.7.3: bytes=32 time<1ms TTL=126
80 Reply from 192.168.7.3: bytes=32 time<1ms TTL=126
81 Reply from 192.168.7.3: bytes=32 time<1ms TTL=126
82
83 Ping statistics for 192.168.7.3:
84     Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
85     Approximate round trip times in milli-seconds:
86         Minimum = 0ms, Maximum = 0ms, Average = 0ms
87
88 C:\>ping 192.168.7.245
89
90 Pinging 192.168.7.245 with 32 bytes of data:
91
92 Reply from 192.168.7.222: Destination host unreachable.
93 Reply from 192.168.7.222: Destination host unreachable.
94 Request timed out.
95 Reply from 192.168.7.222: Destination host unreachable.
96
97 Ping statistics for 192.168.7.245:
98     Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
99
100 C:\>ping 192.168.7.249
101
102 Pinging 192.168.7.249 with 32 bytes of data:
103
104 Request timed out.
105 Reply from 192.168.7.249: bytes=32 time<1ms TTL=254
106 Reply from 192.168.7.249: bytes=32 time=26ms TTL=254
107 Reply from 192.168.7.249: bytes=32 time<1ms TTL=254
108
109 Ping statistics for 192.168.7.249:
110     Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
111     Approximate round trip times in milli-seconds:
112         Minimum = 0ms, Maximum = 26ms, Average = 8ms
113
114 C:\>ping 192.168.7.190
115
116 Pinging 192.168.7.190 with 32 bytes of data:
117
118 Reply from 192.168.7.190: bytes=32 time<1ms TTL=255
119 Reply from 192.168.7.190: bytes=32 time<1ms TTL=255
120 Reply from 192.168.7.190: bytes=32 time<1ms TTL=255
121 Reply from 192.168.7.190: bytes=32 time<1ms TTL=255
122
123 Ping statistics for 192.168.7.190:
124     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
125     Approximate round trip times in milli-seconds:
126         Minimum = 0ms, Maximum = 0ms, Average = 0ms

```

```

127
128 C:\>ping 192.168.7.222
129
130 Pinging 192.168.7.222 with 32 bytes of data:
131
132 Reply from 192.168.7.222: bytes=32 time<1ms TTL=255
133 Reply from 192.168.7.222: bytes=32 time<1ms TTL=255
134 Reply from 192.168.7.222: bytes=32 time<1ms TTL=255
135 Reply from 192.168.7.222: bytes=32 time<1ms TTL=255
136
137 Ping statistics for 192.168.7.222:
138     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
139     Approximate round trip times in milli-seconds:
140         Minimum = 0ms, Maximum = 0ms, Average = 0ms
141
142 C:\>ping 192.168.7.253
143
144 Pinging 192.168.7.253 with 32 bytes of data:
145
146 Reply from 192.168.7.253: bytes=32 time=5ms TTL=255
147 Reply from 192.168.7.253: bytes=32 time<1ms TTL=255
148 Reply from 192.168.7.253: bytes=32 time<1ms TTL=255
149 Reply from 192.168.7.253: bytes=32 time<1ms TTL=255
150
151 Ping statistics for 192.168.7.253:
152     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
153     Approximate round trip times in milli-seconds:
154         Minimum = 0ms, Maximum = 5ms, Average = 1ms
155
156 C:\>ping 192.168.7.250
157
158 Pinging 192.168.7.250 with 32 bytes of data:
159
160 Reply from 192.168.7.250: bytes=32 time<1ms TTL=255
161 Reply from 192.168.7.250: bytes=32 time<1ms TTL=255
162 Reply from 192.168.7.250: bytes=32 time<1ms TTL=255
163 Reply from 192.168.7.250: bytes=32 time<1ms TTL=255
164
165 Ping statistics for 192.168.7.250:
166     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
167     Approximate round trip times in milli-seconds:
168         Minimum = 0ms, Maximum = 0ms, Average = 0ms
169
170 C:\>ping 192.168.7.126
171
172 Pinging 192.168.7.126 with 32 bytes of data:
173
174 Reply from 192.168.7.126: bytes=32 time<1ms TTL=254
175 Reply from 192.168.7.126: bytes=32 time<1ms TTL=254
176 Reply from 192.168.7.126: bytes=32 time<1ms TTL=254
177 Reply from 192.168.7.126: bytes=32 time<1ms TTL=254
178
179 Ping statistics for 192.168.7.126:
180     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
181     Approximate round trip times in milli-seconds:
182         Minimum = 0ms, Maximum = 0ms, Average = 0ms
183
184 C:\>ping 192.168.7.246
185
186 Pinging 192.168.7.246 with 32 bytes of data:
187
188 Reply from 192.168.7.222: Destination host unreachable.
189 Request timed out.
190 Reply from 192.168.7.222: Destination host unreachable.
191 Request timed out.
192
193 Ping statistics for 192.168.7.246:
194     Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
195
196 C:\>arp -a
197     Internet Address      Physical Address      Type
198     192.168.7.194         0007.ec04.c4a4       dynamic
199     192.168.7.222         0090.0c00.9582       dynamic

```

```

200
201 C:\>tracert 192.168.7.129
202
203 Tracing route to 192.168.7.129 over a maximum of 30 hops:
204
205     1    5 ms      0 ms      0 ms      192.168.7.222
206     2    0 ms      0 ms      0 ms      192.168.7.129
207
208 Trace complete.
209
210 C:\>tracert 192.168.7.130
211
212 Tracing route to 192.168.7.130 over a maximum of 30 hops:
213
214     1    0 ms      0 ms      0 ms      192.168.7.222
215     2    0 ms      0 ms      0 ms      192.168.7.130
216
217 Trace complete.
218
219 C:\>tracert 192.168.7.194
220
221 Tracing route to 192.168.7.194 over a maximum of 30 hops:
222
223     1    0 ms      0 ms      0 ms      192.168.7.194
224
225 Trace complete.
226
227 C:\>tracert 192.168.7.1
228
229 Tracing route to 192.168.7.1 over a maximum of 30 hops:
230
231     1    0 ms      0 ms      0 ms      192.168.7.222
232     2    0 ms      0 ms      0 ms      192.168.7.254
233     3    0 ms      0 ms      0 ms      192.168.7.1
234
235 Trace complete.
236
237 C:\>tracert 192.168.7.2
238
239 Tracing route to 192.168.7.2 over a maximum of 30 hops:
240
241     1    0 ms      0 ms      0 ms      192.168.7.222
242     2    0 ms      0 ms      0 ms      192.168.7.254
243     3    0 ms      0 ms      0 ms      192.168.7.2
244
245 Trace complete.
246
247 C:\>tracert 192.168.7.3
248
249 Tracing route to 192.168.7.3 over a maximum of 30 hops:
250
251     1    0 ms      0 ms      0 ms      192.168.7.222
252     2    0 ms      0 ms      0 ms      192.168.7.254
253     3    0 ms      0 ms      0 ms      192.168.7.3
254
255 Trace complete.
256
257 C:\>tracert 8.8.8.8
258
259 Tracing route to 8.8.8.8 over a maximum of 30 hops:
260
261     1    0 ms      0 ms      0 ms      192.168.7.222
262     2    0 ms      0 ms      0 ms      8.8.8.8
263
264 Trace complete.
265
266 C:\>tracert 192.168.7.245
267
268 Tracing route to 192.168.7.245 over a maximum of 30 hops:
269
270     1    0 ms      0 ms      0 ms      192.168.7.222
271     2    0 ms      *          0 ms      192.168.7.222
272     3    *          0 ms      *          Request timed out.

```



```

273 4 0 ms * 0 ms 192.168.7.222
274 5 * 0 ms * Request timed out.
275 6 0 ms * 0 ms 192.168.7.222
276 7 * 13 ms * Request timed out.
277 8 0 ms * 0 ms 192.168.7.222
278 9 * 0 ms * Request timed out.
279 10 0 ms * 3 ms 192.168.7.222
280 11 * 0 ms * Request timed out.
281 12 0 ms * 0 ms 192.168.7.222
282 13 * 0 ms * Request timed out.
283 14 0 ms * 0 ms 192.168.7.222
284 15 * 0 ms * Request timed out.
285 16 0 ms * 0 ms 192.168.7.222
286 17 * 0 ms * Request timed out.
287 18 0 ms * 0 ms 192.168.7.222
288 19 * 0 ms * Request timed out.
289 20 0 ms * 0 ms 192.168.7.222
290 21 * 0 ms * Request timed out.
291 22 0 ms * 0 ms 192.168.7.222
292 23 * 0 ms * Request timed out.
293 24 0 ms * 0 ms 192.168.7.222
294 25 * 0 ms * Request timed out.
295 26 0 ms * 0 ms 192.168.7.222
296 27 * 0 ms * Request timed out.
297 28 0 ms * 0 ms 192.168.7.222
298 29 * 0 ms * Request timed out.
299 30 0 ms * 0 ms 192.168.7.222
300
301 Trace complete.
302
303 C:\>tracert 192.168.7.249
304
305 Tracing route to 192.168.7.249 over a maximum of 30 hops:
306
307 1 0 ms 0 ms 0 ms 192.168.7.222
308 2 0 ms 0 ms 0 ms 192.168.7.249
309
310 Trace complete.
311
312 C:\>tracert 192.168.7.190
313
314 Tracing route to 192.168.7.190 over a maximum of 30 hops:
315
316 1 0 ms 0 ms 0 ms 192.168.7.190
317
318 Trace complete.
319
320 C:\>tracert 192.168.7.222
321
322 Tracing route to 192.168.7.222 over a maximum of 30 hops:
323
324 1 0 ms 0 ms 0 ms 192.168.7.222
325
326 Trace complete.
327
328 C:\>tracert 192.168.7.253
329
330 Tracing route to 192.168.7.253 over a maximum of 30 hops:
331
332 1 0 ms 0 ms 0 ms 192.168.7.253
333
334 Trace complete.
335
336 C:\>tracert 192.168.7.250
337
338 Tracing route to 192.168.7.250 over a maximum of 30 hops:
339
340 1 0 ms 0 ms 0 ms 192.168.7.250
341
342 Trace complete.
343
344 C:\>tracert 192.168.7.126
345

```

```

346 Tracing route to 192.168.7.126 over a maximum of 30 hops:
347
348 1 0 ms 0 ms 0 ms 192.168.7.222
349 2 0 ms 0 ms 0 ms 192.168.7.126
350
351 Trace complete.
352
353 C:\>tracert 192.168.7.246
354
355 Tracing route to 192.168.7.246 over a maximum of 30 hops:
356
357 1 0 ms 0 ms 0 ms 192.168.7.222
358 2 0 ms * 0 ms 192.168.7.222
359 3 * 0 ms * Request timed out.
360 4 0 ms * 0 ms 192.168.7.222
361 5 * 0 ms * Request timed out.
362 6 0 ms * 0 ms 192.168.7.222
363 7 * 6 ms * Request timed out.
364 8 0 ms * 0 ms 192.168.7.222
365 9 * 0 ms * Request timed out.
366 10 0 ms * 0 ms 192.168.7.222
367 11 * 0 ms * Request timed out.
368 12 0 ms * 0 ms 192.168.7.222
369 13 * 0 ms * Request timed out.
370 14 0 ms * 0 ms 192.168.7.222
371 15 * 0 ms * Request timed out.
372 16 0 ms * 0 ms 192.168.7.222
373 17 * 0 ms * Request timed out.
374 18 0 ms * 0 ms 192.168.7.222
375 19 * 0 ms * Request timed out.
376 20 0 ms * 0 ms 192.168.7.222
377 21 * 0 ms * Request timed out.
378 22 0 ms * 0 ms 192.168.7.222
379 23 * 0 ms * Request timed out.
380 24 0 ms * 0 ms 192.168.7.222
381 25 * 0 ms * Request timed out.
382 26 0 ms * 0 ms 192.168.7.222
383 27 * 6 ms * Request timed out.
384 28 0 ms * 0 ms 192.168.7.222
385 29 * 0 ms * Request timed out.
386 30 0 ms * 0 ms 192.168.7.222
387
388 Trace complete.
389
390 C:\>tracert 192.168.7.254
391
392 Tracing route to 192.168.7.254 over a maximum of 30 hops:
393
394 1 0 ms 0 ms 0 ms 192.168.7.222
395 2 0 ms 0 ms 0 ms 192.168.7.254
396
397 Trace complete.
398
399 C:\>

```

Listing A.2: PC1 output

```

1 Cisco Packet Tracer PC Command Line 1.0
2 C:\>arp -a
3 No ARP Entries Found
4
5 C:\>ping 192.168.7.129
6
7 Pinging 192.168.7.129 with 32 bytes of data:
8
9 Reply from 192.168.7.129: bytes=32 time=7ms TTL=126
10 Reply from 192.168.7.129: bytes=32 time<1ms TTL=126
11 Reply from 192.168.7.129: bytes=32 time<1ms TTL=126
12 Reply from 192.168.7.129: bytes=32 time<1ms TTL=126
13

```

```

14 Ping statistics for 192.168.7.129:
15     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
16     Approximate round trip times in milli-seconds:
17         Minimum = 0ms, Maximum = 7ms, Average = 1ms
18
19 C:\>ping 192.168.7.130
20
21 Pinging 192.168.7.130 with 32 bytes of data:
22
23 Reply from 192.168.7.130: bytes=32 time<1ms TTL=126
24 Reply from 192.168.7.130: bytes=32 time<1ms TTL=126
25 Reply from 192.168.7.130: bytes=32 time<1ms TTL=126
26 Reply from 192.168.7.130: bytes=32 time=1ms TTL=126
27
28 Ping statistics for 192.168.7.130:
29     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
30     Approximate round trip times in milli-seconds:
31         Minimum = 0ms, Maximum = 1ms, Average = 0ms
32
33 C:\>ping 192.168.7.193
34
35 Pinging 192.168.7.193 with 32 bytes of data:
36
37 Reply from 192.168.7.193: bytes=32 time<1ms TTL=126
38 Reply from 192.168.7.193: bytes=32 time<1ms TTL=126
39 Reply from 192.168.7.193: bytes=32 time=1ms TTL=126
40 Reply from 192.168.7.193: bytes=32 time<1ms TTL=126
41
42 Ping statistics for 192.168.7.193:
43     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
44     Approximate round trip times in milli-seconds:
45         Minimum = 0ms, Maximum = 1ms, Average = 0ms
46
47 C:\>ping 192.168.7.194
48
49 Pinging 192.168.7.194 with 32 bytes of data:
50
51 Reply from 192.168.7.194: bytes=32 time<1ms TTL=126
52 Reply from 192.168.7.194: bytes=32 time=7ms TTL=126
53 Reply from 192.168.7.194: bytes=32 time<1ms TTL=126
54 Reply from 192.168.7.194: bytes=32 time=32ms TTL=126
55
56 Ping statistics for 192.168.7.194:
57     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
58     Approximate round trip times in milli-seconds:
59         Minimum = 0ms, Maximum = 32ms, Average = 9ms
60
61 C:\>ping 192.168.7.1
62
63 Pinging 192.168.7.1 with 32 bytes of data:
64
65 Reply from 192.168.7.1: bytes=32 time<1ms TTL=128
66 Reply from 192.168.7.1: bytes=32 time<1ms TTL=128
67 Reply from 192.168.7.1: bytes=32 time<1ms TTL=128
68 Reply from 192.168.7.1: bytes=32 time<1ms TTL=128
69
70 Ping statistics for 192.168.7.1:
71     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
72     Approximate round trip times in milli-seconds:
73         Minimum = 0ms, Maximum = 0ms, Average = 0ms
74
75 C:\>ping 192.168.7.3
76
77 Pinging 192.168.7.3 with 32 bytes of data:
78
79 Reply from 192.168.7.3: bytes=32 time<1ms TTL=128
80 Reply from 192.168.7.3: bytes=32 time<1ms TTL=128
81 Reply from 192.168.7.3: bytes=32 time<1ms TTL=128
82 Reply from 192.168.7.3: bytes=32 time=31ms TTL=128
83
84 Ping statistics for 192.168.7.3:
85     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
86     Approximate round trip times in milli-seconds:

```

```

87     Minimum = 0ms, Maximum = 31ms, Average = 7ms
88
89 C:\>ping 8.8.8.8
90
91 Pinging 8.8.8.8 with 32 bytes of data:
92
93 Reply from 8.8.8.8: bytes=32 time=5ms TTL=254
94 Reply from 8.8.8.8: bytes=32 time<1ms TTL=254
95 Reply from 8.8.8.8: bytes=32 time=6ms TTL=254
96 Reply from 8.8.8.8: bytes=32 time<1ms TTL=254
97
98 Ping statistics for 8.8.8.8:
99     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
100 Approximate round trip times in milli-seconds:
101     Minimum = 0ms, Maximum = 6ms, Average = 2ms
102
103 C:\>ping 192.168.7.245
104
105 Pinging 192.168.7.245 with 32 bytes of data:
106
107 Reply from 192.168.7.245: bytes=32 time<1ms TTL=254
108 Reply from 192.168.7.245: bytes=32 time=6ms TTL=254
109 Reply from 192.168.7.245: bytes=32 time<1ms TTL=254
110 Reply from 192.168.7.245: bytes=32 time<1ms TTL=254
111
112 Ping statistics for 192.168.7.245:
113     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
114 Approximate round trip times in milli-seconds:
115     Minimum = 0ms, Maximum = 6ms, Average = 1ms
116
117 C:\>ping 192.168.7.249
118
119 Pinging 192.168.7.249 with 32 bytes of data:
120
121 Reply from 192.168.7.126: Destination host unreachable.
122 Reply from 192.168.7.126: Destination host unreachable.
123 Request timed out.
124 Reply from 192.168.7.126: Destination host unreachable.
125
126 Ping statistics for 192.168.7.249:
127     Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
128
129 C:\>ping 192.168.7.190
130
131 Pinging 192.168.7.190 with 32 bytes of data:
132
133 Reply from 192.168.7.190: bytes=32 time<1ms TTL=254
134 Reply from 192.168.7.190: bytes=32 time<1ms TTL=254
135 Reply from 192.168.7.190: bytes=32 time<1ms TTL=254
136 Reply from 192.168.7.190: bytes=32 time=37ms TTL=254
137
138 Ping statistics for 192.168.7.190:
139     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
140 Approximate round trip times in milli-seconds:
141     Minimum = 0ms, Maximum = 37ms, Average = 9ms
142
143 C:\>ping 192.168.7.222
144
145 Pinging 192.168.7.222 with 32 bytes of data:
146
147 Reply from 192.168.7.222: bytes=32 time<1ms TTL=254
148 Reply from 192.168.7.222: bytes=32 time<1ms TTL=254
149 Reply from 192.168.7.222: bytes=32 time<1ms TTL=254
150 Reply from 192.168.7.222: bytes=32 time<1ms TTL=254
151
152 Ping statistics for 192.168.7.222:
153     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
154 Approximate round trip times in milli-seconds:
155     Minimum = 0ms, Maximum = 0ms, Average = 0ms
156
157 C:\>ping 192.168.7.253
158
159 Pinging 192.168.7.253 with 32 bytes of data:

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160
161 Reply from 192.168.7.253: bytes=32 time<1ms TTL=254
162 Reply from 192.168.7.253: bytes=32 time<1ms TTL=254
163 Reply from 192.168.7.253: bytes=32 time<1ms TTL=254
164 Reply from 192.168.7.253: bytes=32 time<1ms TTL=254
165
166 Ping statistics for 192.168.7.253:
167     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
168     Approximate round trip times in milli-seconds:
169         Minimum = 0ms, Maximum = 0ms, Average = 0ms
170
171 C:\>ping 192.168.7.250
172
173 Pinging 192.168.7.250 with 32 bytes of data:
174
175 Reply from 192.168.7.126: Destination host unreachable.
176 Reply from 192.168.7.126: Destination host unreachable.
177 Reply from 192.168.7.126: Destination host unreachable.
178 Reply from 192.168.7.126: Destination host unreachable.
179
180 Ping statistics for 192.168.7.250:
181     Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
182
183 C:\>ping 192.168.7.126
184
185 Pinging 192.168.7.126 with 32 bytes of data:
186
187 Reply from 192.168.7.126: bytes=32 time<1ms TTL=255
188 Reply from 192.168.7.126: bytes=32 time<1ms TTL=255
189 Reply from 192.168.7.126: bytes=32 time<1ms TTL=255
190 Reply from 192.168.7.126: bytes=32 time<1ms TTL=255
191
192 Ping statistics for 192.168.7.126:
193     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
194     Approximate round trip times in milli-seconds:
195         Minimum = 0ms, Maximum = 0ms, Average = 0ms
196
197 C:\>ping 192.168.7.246
198
199 Pinging 192.168.7.246 with 32 bytes of data:
200
201 Reply from 192.168.7.246: bytes=32 time<1ms TTL=255
202 Reply from 192.168.7.246: bytes=32 time<1ms TTL=255
203 Reply from 192.168.7.246: bytes=32 time<1ms TTL=255
204 Reply from 192.168.7.246: bytes=32 time<1ms TTL=255
205
206 Ping statistics for 192.168.7.246:
207     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
208     Approximate round trip times in milli-seconds:
209         Minimum = 0ms, Maximum = 0ms, Average = 0ms
210
211 C:\>ping 192.168.7.254
212
213 Pinging 192.168.7.254 with 32 bytes of data:
214
215 Reply from 192.168.7.254: bytes=32 time<1ms TTL=255
216 Reply from 192.168.7.254: bytes=32 time<1ms TTL=255
217 Reply from 192.168.7.254: bytes=32 time<1ms TTL=255
218 Reply from 192.168.7.254: bytes=32 time<1ms TTL=255
219
220 Ping statistics for 192.168.7.254:
221     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
222     Approximate round trip times in milli-seconds:
223         Minimum = 0ms, Maximum = 0ms, Average = 0ms
224
225 C:\>
226
227
228
229
230
231
232

```

```

233
234
235
236
237
238 C:\>arp -a
239     Internet Address      Physical Address      Type
240     192.168.7.1           000a.f36e.27e5       dynamic
241     192.168.7.3           00e0.b050.c641       dynamic
242     192.168.7.126         0003.e425.d44a       dynamic
243
244 C:\>tracert 192.168.7.129
245
246 Tracing route to 192.168.7.129 over a maximum of 30 hops:
247
248   1    0 ms      0 ms      0 ms      192.168.7.126
249   2    0 ms      0 ms      0 ms      192.168.7.253
250   3    0 ms      0 ms      0 ms      192.168.7.129
251
252 Trace complete.
253
254 C:\>tracert 192.168.7.130
255
256 Tracing route to 192.168.7.130 over a maximum of 30 hops:
257
258   1    0 ms      0 ms      0 ms      192.168.7.126
259   2    0 ms      0 ms      0 ms      192.168.7.253
260   3    1 ms      0 ms      0 ms      192.168.7.130
261
262 Trace complete.
263
264 C:\>tracert 192.168.7.193
265
266 Tracing route to 192.168.7.193 over a maximum of 30 hops:
267
268   1    0 ms      0 ms      0 ms      192.168.7.126
269   2    0 ms      0 ms      0 ms      192.168.7.253
270   3    0 ms      0 ms      0 ms      192.168.7.193
271
272 Trace complete.
273
274 C:\>tracert 192.168.7.194
275
276 Tracing route to 192.168.7.194 over a maximum of 30 hops:
277
278   1    0 ms      17 ms     0 ms      192.168.7.126
279   2    0 ms      0 ms      0 ms      192.168.7.253
280   3    0 ms      0 ms      0 ms      192.168.7.194
281
282 Trace complete.
283
284 C:\>tracert 192.168.7.1
285
286 Tracing route to 192.168.7.1 over a maximum of 30 hops:
287
288   1    0 ms      0 ms      0 ms      192.168.7.1
289
290 Trace complete.
291
292 C:\>tracert 192.168.7.3
293
294 Tracing route to 192.168.7.3 over a maximum of 30 hops:
295
296   1    0 ms      0 ms      14 ms     192.168.7.3
297
298 Trace complete.
299
300 C:\>tracert 8.8.8.8
301
302 Tracing route to 8.8.8.8 over a maximum of 30 hops:
303
304   1    0 ms      0 ms      0 ms      192.168.7.126
305   2    0 ms      0 ms      0 ms      8.8.8.8

```

```

306
307 Trace complete.
308
309 C:\>tracert 192.168.7.245
310
311 Tracing route to 192.168.7.245 over a maximum of 30 hops:
312
313 1 0 ms 0 ms 0 ms 192.168.7.126
314 2 1 ms 0 ms 0 ms 192.168.7.245
315
316 Trace complete.
317
318 C:\>tracert 192.168.7.249
319
320 Tracing route to 192.168.7.249 over a maximum of 30 hops:
321
322 1 0 ms 2 ms 0 ms 192.168.7.126
323 2 0 ms * 0 ms 192.168.7.126
324 3 * 0 ms * Request timed out.
325 4 15 ms * 0 ms 192.168.7.126
326 5 * 18 ms * Request timed out.
327 6 0 ms * 0 ms 192.168.7.126
328 7 * 0 ms * Request timed out.
329 8 0 ms * 0 ms 192.168.7.126
330 9 * 0 ms * Request timed out.
331 10 0 ms * 0 ms 192.168.7.126
332 11 * 0 ms * Request timed out.
333 12 0 ms * 0 ms 192.168.7.126
334 13 * 0 ms * Request timed out.
335 14 0 ms * 0 ms 192.168.7.126
336 15 * 0 ms * Request timed out.
337 16 0 ms * 0 ms 192.168.7.126
338 17 * 0 ms * Request timed out.
339 18 0 ms * 0 ms 192.168.7.126
340 19 * 0 ms * Request timed out.
341 20 0 ms * 0 ms 192.168.7.126
342 21 * 0 ms * Request timed out.
343 22 0 ms * 0 ms 192.168.7.126
344 23 * 0 ms * Request timed out.
345 24 0 ms * 10 ms 192.168.7.126
346 25 * 10 ms * Request timed out.
347 26 0 ms * 0 ms 192.168.7.126
348 27 * 0 ms * Request timed out.
349 28 0 ms * 0 ms 192.168.7.126
350 29 * 13 ms * Request timed out.
351 30 0 ms * 0 ms 192.168.7.126
352
353 Trace complete.
354
355 C:\>tracert 192.168.7.222
356
357 Tracing route to 192.168.7.222 over a maximum of 30 hops:
358
359 1 0 ms 0 ms 0 ms 192.168.7.126
360 2 0 ms 0 ms 0 ms 192.168.7.222
361
362 Trace complete.
363
364 C:\>tracert 192.168.7.253
365
366 Tracing route to 192.168.7.253 over a maximum of 30 hops:
367
368 1 0 ms 0 ms 0 ms 192.168.7.126
369 2 0 ms 0 ms 0 ms 192.168.7.253
370
371 Trace complete.
372
373 C:\>tracert 192.168.7.250
374
375 Tracing route to 192.168.7.250 over a maximum of 30 hops:
376
377 1 0 ms 0 ms 0 ms 192.168.7.126
378 2 0 ms * 0 ms 192.168.7.126

```

```

379 3 * 0 ms * Request timed out.
380 4 0 ms * 0 ms 192.168.7.126
381 5 * 0 ms * Request timed out.
382 6 0 ms * 0 ms 192.168.7.126
383 7 * 0 ms * Request timed out.
384 8 0 ms * 0 ms 192.168.7.126
385 9 * 0 ms * Request timed out.
386 10 0 ms * 0 ms 192.168.7.126
387 11 * 0 ms * Request timed out.
388 12 0 ms * 0 ms 192.168.7.126
389 13 * 0 ms * Request timed out.
390 14 0 ms * 0 ms 192.168.7.126
391 15 * 0 ms * Request timed out.
392 16 0 ms * 0 ms 192.168.7.126
393 17 * 0 ms * Request timed out.
394 18 0 ms * 0 ms 192.168.7.126
395 19 * 0 ms * Request timed out.
396 20 32 ms 0 ms 5 ms 192.168.7.126
397 21 4 ms 18 ms 1 ms 192.168.7.126
398 22 0 ms 8 ms 43 ms 192.168.7.126
399 23 * 6 ms * Request timed out.
400 24 0 ms * 0 ms 192.168.7.126
401 25 * 6 ms * Request timed out.
402 26 0 ms * 0 ms 192.168.7.126
403 27 * 0 ms * Request timed out.
404 28 0 ms * 0 ms 192.168.7.126
405 29 * 0 ms * Request timed out.
406 30 0 ms * 0 ms 192.168.7.126
407
408 Trace complete.
409
410 C:\>tracert 192.168.7.126
411
412 Tracing route to 192.168.7.126 over a maximum of 30 hops:
413
414 1 0 ms 0 ms 0 ms 192.168.7.126
415
416 Trace complete.
417
418 C:\>tracert 192.168.7.246
419
420 Tracing route to 192.168.7.246 over a maximum of 30 hops:
421
422 1 0 ms 0 ms 0 ms 192.168.7.246
423
424 Trace complete.
425
426 C:\>tracert 192.168.7.254
427
428 Tracing route to 192.168.7.254 over a maximum of 30 hops:
429
430 1 0 ms 0 ms 0 ms 192.168.7.254
431
432 Trace complete.
433
434 C:\>

```

Listing A.3: DNS-Server output

```

1 Cisco Packet Tracer SERVER Command Line 1.0
2 C:\>arp -a
3 Internet Address Physical Address Type
4 192.168.7.1 000a.f36e.27e5 dynamic
5 192.168.7.2 000a.f362.26dd dynamic
6 192.168.7.126 0003.e425.d44a dynamic
7
8 C:\>ping 192.168.7.129
9
10 Pinging 192.168.7.129 with 32 bytes of data:
11

```



```

12 Reply from 192.168.7.129: bytes=32 time<1ms TTL=126
13 Reply from 192.168.7.129: bytes=32 time=1ms TTL=126
14 Reply from 192.168.7.129: bytes=32 time<1ms TTL=126
15 Reply from 192.168.7.129: bytes=32 time<1ms TTL=126
16
17 Ping statistics for 192.168.7.129:
18     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
19     Approximate round trip times in milli-seconds:
20         Minimum = 0ms, Maximum = 1ms, Average = 0ms
21
22 C:\>ping 192.168.7.130
23
24 Pinging 192.168.7.130 with 32 bytes of data:
25
26 Reply from 192.168.7.130: bytes=32 time<1ms TTL=126
27 Reply from 192.168.7.130: bytes=32 time<1ms TTL=126
28 Reply from 192.168.7.130: bytes=32 time<1ms TTL=126
29 Reply from 192.168.7.130: bytes=32 time<1ms TTL=126
30
31 Ping statistics for 192.168.7.130:
32     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
33     Approximate round trip times in milli-seconds:
34         Minimum = 0ms, Maximum = 0ms, Average = 0ms
35
36 C:\>ping 192.168.7.193
37
38 Pinging 192.168.7.193 with 32 bytes of data:
39
40 Reply from 192.168.7.193: bytes=32 time<1ms TTL=126
41 Reply from 192.168.7.193: bytes=32 time=1ms TTL=126
42 Reply from 192.168.7.193: bytes=32 time<1ms TTL=126
43 Reply from 192.168.7.193: bytes=32 time<1ms TTL=126
44
45 Ping statistics for 192.168.7.193:
46     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
47     Approximate round trip times in milli-seconds:
48         Minimum = 0ms, Maximum = 1ms, Average = 0ms
49
50 C:\>ping 192.168.7.194
51
52 Pinging 192.168.7.194 with 32 bytes of data:
53
54 Reply from 192.168.7.194: bytes=32 time<1ms TTL=126
55 Reply from 192.168.7.194: bytes=32 time<1ms TTL=126
56 Reply from 192.168.7.194: bytes=32 time<1ms TTL=126
57 Reply from 192.168.7.194: bytes=32 time<1ms TTL=126
58
59 Ping statistics for 192.168.7.194:
60     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
61     Approximate round trip times in milli-seconds:
62         Minimum = 0ms, Maximum = 0ms, Average = 0ms
63
64 C:\>ping 192.168.7.1
65
66 Pinging 192.168.7.1 with 32 bytes of data:
67
68 Reply from 192.168.7.1: bytes=32 time=26ms TTL=128
69 Reply from 192.168.7.1: bytes=32 time<1ms TTL=128
70 Reply from 192.168.7.1: bytes=32 time<1ms TTL=128
71 Reply from 192.168.7.1: bytes=32 time<1ms TTL=128
72
73 Ping statistics for 192.168.7.1:
74     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
75     Approximate round trip times in milli-seconds:
76         Minimum = 0ms, Maximum = 26ms, Average = 6ms
77
78 C:\>ping 192.168.7.2
79
80 Pinging 192.168.7.2 with 32 bytes of data:
81
82 Reply from 192.168.7.2: bytes=32 time=21ms TTL=128
83 Reply from 192.168.7.2: bytes=32 time<1ms TTL=128
84 Reply from 192.168.7.2: bytes=32 time<1ms TTL=128

```

```

85 Reply from 192.168.7.2: bytes=32 time<1ms TTL=128
86
87 Ping statistics for 192.168.7.2:
88     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
89     Approximate round trip times in milli-seconds:
90         Minimum = 0ms, Maximum = 21ms, Average = 5ms
91
92 C:\>ping 8.8.8.8
93
94 Pinging 8.8.8.8 with 32 bytes of data:
95
96 Reply from 8.8.8.8: bytes=32 time<1ms TTL=254
97 Reply from 8.8.8.8: bytes=32 time<1ms TTL=254
98 Reply from 8.8.8.8: bytes=32 time<1ms TTL=254
99 Reply from 8.8.8.8: bytes=32 time<1ms TTL=254
100
101 Ping statistics for 8.8.8.8:
102     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
103     Approximate round trip times in milli-seconds:
104         Minimum = 0ms, Maximum = 0ms, Average = 0ms
105
106 C:\>ping 192.168.7.245
107
108 Pinging 192.168.7.245 with 32 bytes of data:
109
110 Reply from 192.168.7.245: bytes=32 time<1ms TTL=254
111 Reply from 192.168.7.245: bytes=32 time<1ms TTL=254
112 Reply from 192.168.7.245: bytes=32 time<1ms TTL=254
113 Reply from 192.168.7.245: bytes=32 time<1ms TTL=254
114
115 Ping statistics for 192.168.7.245:
116     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
117     Approximate round trip times in milli-seconds:
118         Minimum = 0ms, Maximum = 0ms, Average = 0ms
119
120 C:\>ping 192.168.7.249
121
122 Pinging 192.168.7.249 with 32 bytes of data:
123
124 Reply from 192.168.7.126: Destination host unreachable.
125 Request timed out.
126 Reply from 192.168.7.126: Destination host unreachable.
127 Reply from 192.168.7.126: Destination host unreachable.
128
129 Ping statistics for 192.168.7.249:
130     Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
131
132 C:\>ping 192.168.7.190
133
134 Pinging 192.168.7.190 with 32 bytes of data:
135
136 Reply from 192.168.7.190: bytes=32 time<1ms TTL=254
137 Reply from 192.168.7.190: bytes=32 time<1ms TTL=254
138 Reply from 192.168.7.190: bytes=32 time<1ms TTL=254
139 Reply from 192.168.7.190: bytes=32 time<1ms TTL=254
140
141 Ping statistics for 192.168.7.190:
142     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
143     Approximate round trip times in milli-seconds:
144         Minimum = 0ms, Maximum = 0ms, Average = 0ms
145
146 C:\>ping 192.168.7.222
147
148 Pinging 192.168.7.222 with 32 bytes of data:
149
150 Reply from 192.168.7.222: bytes=32 time<1ms TTL=254
151 Reply from 192.168.7.222: bytes=32 time<1ms TTL=254
152 Reply from 192.168.7.222: bytes=32 time<1ms TTL=254
153 Reply from 192.168.7.222: bytes=32 time<1ms TTL=254
154
155 Ping statistics for 192.168.7.222:
156     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
157     Approximate round trip times in milli-seconds:

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158     Minimum = 0ms, Maximum = 1ms, Average = 0ms
159
160 C:\>ping 192.168.7.253
161
162 Pinging 192.168.7.253 with 32 bytes of data:
163
164 Reply from 192.168.7.253: bytes=32 time<1ms TTL=254
165 Reply from 192.168.7.253: bytes=32 time<1ms TTL=254
166 Reply from 192.168.7.253: bytes=32 time<1ms TTL=254
167 Reply from 192.168.7.253: bytes=32 time<1ms TTL=254
168
169 Ping statistics for 192.168.7.253:
170     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
171     Approximate round trip times in milli-seconds:
172         Minimum = 0ms, Maximum = 0ms, Average = 0ms
173
174 C:\>ping 192.168.7.250
175
176 Pinging 192.168.7.250 with 32 bytes of data:
177
178 Reply from 192.168.7.126: Destination host unreachable.
179 Reply from 192.168.7.126: Destination host unreachable.
180 Request timed out.
181 Reply from 192.168.7.126: Destination host unreachable.
182
183 Ping statistics for 192.168.7.250:
184     Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
185
186 C:\>ping 192.168.7.126
187
188 Pinging 192.168.7.126 with 32 bytes of data:
189
190 Reply from 192.168.7.126: bytes=32 time<1ms TTL=255
191 Reply from 192.168.7.126: bytes=32 time<1ms TTL=255
192 Reply from 192.168.7.126: bytes=32 time<1ms TTL=255
193 Reply from 192.168.7.126: bytes=32 time<1ms TTL=255
194
195 Ping statistics for 192.168.7.126:
196     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
197     Approximate round trip times in milli-seconds:
198         Minimum = 0ms, Maximum = 0ms, Average = 0ms
199
200 C:\>ping 192.168.7.246
201
202 Pinging 192.168.7.246 with 32 bytes of data:
203
204 Reply from 192.168.7.246: bytes=32 time<1ms TTL=255
205 Reply from 192.168.7.246: bytes=32 time<1ms TTL=255
206 Reply from 192.168.7.246: bytes=32 time<1ms TTL=255
207 Reply from 192.168.7.246: bytes=32 time=34ms TTL=255
208
209 Ping statistics for 192.168.7.246:
210     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
211     Approximate round trip times in milli-seconds:
212         Minimum = 0ms, Maximum = 34ms, Average = 8ms
213
214 C:\>ping 192.168.7.254
215
216 Pinging 192.168.7.254 with 32 bytes of data:
217
218 Reply from 192.168.7.254: bytes=32 time<1ms TTL=255
219 Reply from 192.168.7.254: bytes=32 time<1ms TTL=255
220 Reply from 192.168.7.254: bytes=32 time<1ms TTL=255
221 Reply from 192.168.7.254: bytes=32 time<1ms TTL=255
222
223 Ping statistics for 192.168.7.254:
224     Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
225     Approximate round trip times in milli-seconds:
226         Minimum = 0ms, Maximum = 0ms, Average = 0ms
227
228 C:\>arp -a
229     Internet Address      Physical Address      Type
230     192.168.7.1           000a.f36e.27e5       dynamic

```

```

231 192.168.7.2          000a.f362.26dd      dynamic
232 192.168.7.126       0003.e425.d44a      dynamic
233
234 C:\>tracert 192.168.7.129
235
236 Tracing route to 192.168.7.129 over a maximum of 30 hops:
237
238 1  0 ms      0 ms      0 ms      192.168.7.126
239 2  0 ms      0 ms      0 ms      192.168.7.253
240 3  0 ms      0 ms      0 ms      192.168.7.129
241
242 Trace complete.
243
244 C:\>tracert 192.168.7.130
245
246 Tracing route to 192.168.7.130 over a maximum of 30 hops:
247
248 1  14 ms     0 ms      0 ms      192.168.7.126
249 2  0 ms      0 ms      0 ms      192.168.7.253
250 3  0 ms      0 ms      0 ms      192.168.7.130
251
252 Trace complete.
253
254 C:\>tracert 192.168.7.193
255
256 Tracing route to 192.168.7.193 over a maximum of 30 hops:
257
258 1  0 ms      0 ms      0 ms      192.168.7.126
259 2  0 ms      0 ms      0 ms      192.168.7.253
260 3  0 ms      0 ms      0 ms      192.168.7.193
261
262 Trace complete.
263
264 C:\>tracert 192.168.7.194
265
266 Tracing route to 192.168.7.194 over a maximum of 30 hops:
267
268 1  0 ms      0 ms      0 ms      192.168.7.126
269 2  0 ms      0 ms      0 ms      192.168.7.253
270 3  0 ms      0 ms      0 ms      192.168.7.194
271
272 Trace complete.
273
274 C:\>tracert 192.168.7.1
275
276 Tracing route to 192.168.7.1 over a maximum of 30 hops:
277
278 1  0 ms      0 ms      0 ms      192.168.7.1
279
280 Trace complete.
281
282 C:\>tracert 192.168.7.2
283
284 Tracing route to 192.168.7.2 over a maximum of 30 hops:
285
286 1  0 ms      0 ms      0 ms      192.168.7.2
287
288 Trace complete.
289
290 C:\>tracert 8.8.8.8
291
292 Tracing route to 8.8.8.8 over a maximum of 30 hops:
293
294 1  0 ms      0 ms      0 ms      192.168.7.126
295 2  0 ms      0 ms      0 ms      8.8.8.8
296
297 Trace complete.
298
299 C:\>tracert 192.168.7.245
300
301 Tracing route to 192.168.7.245 over a maximum of 30 hops:
302
303 1  0 ms      0 ms      0 ms      192.168.7.126

```

```

304      2    0 ms      0 ms      0 ms      192.168.7.245
305
306 Trace complete.
307
308 C:\>tracert 192.168.7.249
309
310 Tracing route to 192.168.7.249 over a maximum of 30 hops:
311
312  1    0 ms      0 ms      0 ms      192.168.7.126
313  2    0 ms      *          0 ms      192.168.7.126
314  3    *          0 ms      *          Request timed out.
315  4    0 ms      *          0 ms      192.168.7.126
316  5    *          0 ms      *          Request timed out.
317  6    0 ms      *          0 ms      192.168.7.126
318  7    *          0 ms      *          Request timed out.
319  8    0 ms      *          0 ms      192.168.7.126
320  9    *          0 ms      *          Request timed out.
321 10    0 ms      *          11 ms     192.168.7.126
322 11    *          0 ms      *          Request timed out.
323 12    0 ms      *          0 ms      192.168.7.126
324 13    *          0 ms      *          Request timed out.
325 14    0 ms      *          0 ms      192.168.7.126
326 15    *          0 ms      *          Request timed out.
327 16    0 ms      *          0 ms      192.168.7.126
328 17    *          0 ms      *          Request timed out.
329 18    0 ms      *          0 ms      192.168.7.126
330 19    *          0 ms      *          Request timed out.
331 20    0 ms      *          0 ms      192.168.7.126
332 21    *          0 ms      *          Request timed out.
333 22    11 ms     *          0 ms      192.168.7.126
334 23    *          0 ms      *          Request timed out.
335 24    0 ms      *          11 ms     192.168.7.126
336 25    *          0 ms      *          Request timed out.
337 26    0 ms      *          0 ms      192.168.7.126
338 27    *          0 ms      *          Request timed out.
339 28    0 ms      *          0 ms      192.168.7.126
340 29    *          0 ms      *          Request timed out.
341 30    0 ms      *          0 ms      192.168.7.126
342
343 Trace complete.
344
345 C:\>tracert 192.168.7.190
346
347 Tracing route to 192.168.7.190 over a maximum of 30 hops:
348
349  1    0 ms      0 ms      0 ms      192.168.7.126
350  2    0 ms      0 ms      1 ms      192.168.7.190
351
352 Trace complete.
353
354 C:\>tracert 192.168.7.222
355
356 Tracing route to 192.168.7.222 over a maximum of 30 hops:
357
358  1    12 ms     0 ms      0 ms      192.168.7.126
359  2    0 ms      0 ms      0 ms      192.168.7.222
360
361 Trace complete.
362
363 C:\>tracert 192.168.7.253
364
365 Tracing route to 192.168.7.253 over a maximum of 30 hops:
366
367  1    0 ms      0 ms      0 ms      192.168.7.126
368  2    0 ms      0 ms      0 ms      192.168.7.253
369
370 Trace complete.
371
372 C:\>tracert 192.168.7.250
373
374 Tracing route to 192.168.7.250 over a maximum of 30 hops:
375
376  1    0 ms      0 ms      0 ms      192.168.7.126

```

```

377 2 0 ms * 0 ms 192.168.7.126
378 3 * 0 ms * Request timed out.
379 4 0 ms * 0 ms 192.168.7.126
380 5 * 0 ms * Request timed out.
381 6 0 ms * 0 ms 192.168.7.126
382 7 * 0 ms * Request timed out.
383 8 0 ms * 1 ms 192.168.7.126
384 9 * 0 ms * Request timed out.
385 10 0 ms * 0 ms 192.168.7.126
386 11 * 0 ms * Request timed out.
387 12 0 ms * 0 ms 192.168.7.126
388 13 * 0 ms * Request timed out.
389 14 0 ms * 0 ms 192.168.7.126
390 15 * 0 ms * Request timed out.
391 16 0 ms * 0 ms 192.168.7.126
392 17 * 0 ms * Request timed out.
393 18 0 ms * 0 ms 192.168.7.126
394 19 * 0 ms * Request timed out.
395 20 0 ms * 0 ms 192.168.7.126
396 21 * 0 ms * Request timed out.
397 22 0 ms * 0 ms 192.168.7.126
398 23 * 11 ms * Request timed out.
399 24 0 ms * 0 ms 192.168.7.126
400 25 * 0 ms * Request timed out.
401 26 0 ms * 0 ms 192.168.7.126
402 27 * 0 ms * Request timed out.
403 28 0 ms * 0 ms 192.168.7.126
404 29 * 0 ms * Request timed out.
405 30 0 ms * 0 ms 192.168.7.126
406
407 Trace complete.
408
409 C:\>tracert 192.168.7.246
410
411 Tracing route to 192.168.7.246 over a maximum of 30 hops:
412
413 1 0 ms 0 ms 0 ms 192.168.7.246
414
415 Trace complete.
416
417 C:\>tracert 192.168.7.254
418
419 Tracing route to 192.168.7.254 over a maximum of 30 hops:
420
421 1 0 ms 1 ms 0 ms 192.168.7.254
422
423 Trace complete.
424
425 C:\>

```

Listing A.4: HTTP-Server output