Lab - Trace a Route

# Objectives

* Determine network connectivity to a destination host
* Trace a route to a remote server using tracert

# Background / Scenario

Data travels from a source end device to a destination device. Route tracing software lists the path traversed by this data.

This route tracing software is typically executed at the command line as:

**tracert** <destination network name or end device address>

(Microsoft Windows systems)

or

**traceroute** <destination network name or end device address>

(UNIX, Linux systems, and Cisco devices, such as switches and routers)

Both **tracert** and **traceroute** determine the route taken by packets across an IP network.

The **tracert** (or **traceroute**) tool is often used for network troubleshooting. By showing a list of routers traversed, the user can identify the path taken to reach a particular destination on the network or across internetworks. Each router represents a point where one network connects to another network and through which the data packet was forwarded. The number of routers traversed is known as the number of hops the data traveled from source to destination.

Command-line based route tracing tools are usually embedded with the operating system of the end device. This activity should be performed on a computer that has Internet access and access to a command line.

# Required Resources

* PC with internet access

# Instructions

## Determine Network Connectivity to a Destination Host.

To trace the route to a distant network, the PC must have a working connection to the internet. Use the **ping** command to test whether a host is reachable. Packets of information are sent to the remote host with instructions to reply. The PC measures whether each packet receives a response, and how long it takes for those packets to cross the network.

* + - 1. Navigate to the Command Prompt, enter **ping www.cisco.com** to determine if it is reachable.

Text

Description automatically generated

* + - 1. Now ping one of the Regional Internet Registry (RIR) websites located in different parts of the world to determine if it is reachable:

Africa: [**www.afrinic.net**](http://www.afrinic.net)

**Text

Description automatically generated**

Australia: **www.apnic.net**

South America: **www.lacnic.net**

North America: **www.arin.net**

**Note**: At the time of writing, the European RIR www.ripe.net does not reply to ICMP echo requests.

The website you selected will be used in next part for use with the **tracert** command.

## Trace a Route to a Remote Server Using Tracert.

After you use **ping** to determine if your chosen websites are reachable, you will use **tracert** to determine the path to reach the remote server. Look closely at each network segment that is crossed.

Each hop in the **tracert** results displays the routes that the packets take when traveling to the final destination. The PC sends three ICMP echo request packets to the remote host. Each router in the path decrements the time to live (TTL) value by 1 before passing it onto the next system. To decrement is to count down. When the decremented TTL value reaches 0, the router sends an ICMP Time Exceeded message back to the source with its IP address and the current time. When the final destination is reached, an ICMP echo reply is sent to the source host.

### Trace a route to www.cisco.com.

At the prompt, trace the route to **www.cisco.com**.

C:\Users\User1> **tracert www.cisco.com**

Tracing route to e144.dscb.akamaiedge.net [23.67.208.170]

over a maximum of 30 hops:

1 1 ms <1 ms <1 ms 192.168.1.1

2 14 ms 7 ms 7 ms 10.39.0.1

3 10 ms 8 ms 7 ms 172.21.0.118

4 11 ms 11 ms 11 ms 70.169.73.196

5 10 ms 9 ms 11 ms 70.169.75.157

6 60 ms 49 ms \* 68.1.2.109

7 43 ms 39 ms 38 ms Equinix-DFW2.netarch.akamai.com [206.223.118.102]

8 33 ms 35 ms 33 ms a23-67-208-170.deploy.akamaitechnologies.com [23.67.208.170]

Trace complete.

Text

Description automatically generatedIn this example, the source host sends three ICMP echo request packets to the first hop (192.168.1.1) with the TTL value of 1. When the router 192.168.1.1 receives the echo request packets, it decrements the TTL value to 0. The router sends an ICMP Time Exceeded message back to the source. This process continues until the source host sends the last three ICMP echo request packets with TTL values of 8 (hop number 8 in the output above), which is the final destination. After the ICMP echo request packets arrive at the final destination, the router responds to the source with ICMP echo replies.

For hops 2 and 3, these IP addresses are private addresses. These routers are the typical setup for point-of-presence (POP) of ISP. The POP devices connect users to an ISP network.

### Trace a route to a RIR web site.

* + - 1. Now perform a **tracert** to one of RIR web sites from previous part.

Africa: [**www.afrinic.net**](http://www.afrinic.net)

Text

Description automatically generated

Australia: **www.apnic.net**

South America: **www.lacnic.net**

North America: **www.arin.net**

* + - 1. A web-based **whois** tool is found at <http://whois.domaintools.com/>. It can be used to determine the domains traveled from the source to destination.

#### Question:

List the domains below from your tracert results using a web-based whois tool, such as <http://whois.domaintools.com/>.

Domain Name: afrinic.net  
Registry Domain ID: 5272549\_DOMAIN\_NET-VRSN  
Registrar WHOIS Server: whois.gandi.net  
Registrar URL: http://www.gandi.net  
Updated Date: 2021-08-09T16:06:09Z  
Creation Date: 1999-04-14T00:00:00Z  
Registrar Registration Expiration Date: 2023-04-14T04:00:00Z  
Registrar: GANDI SAS  
Registrar IANA ID: 81  
Registrar Abuse Contact Email: [](https://reversewhois.domaintools.com/?email=5349ebc5d0f514a93f68574c1a646458)  
Registrar Abuse Contact Phone: +33.170377661  
Reseller:   
Domain Status: clientDeleteProhibited http://www.icann.org/epp#clientDeleteProhibited  
Domain Status: clientTransferProhibited http://www.icann.org/epp#clientTransferProhibited  
Domain Status:   
Domain Status:   
Domain Status:   
Registry Registrant ID: REDACTED FOR PRIVACY  
Registrant Name: REDACTED FOR PRIVACY  
Registrant Organization: AfriNIC Ltd.  
Registrant Street: REDACTED FOR PRIVACY  
Registrant City: REDACTED FOR PRIVACY  
Registrant State/Province:   
Registrant Postal Code: REDACTED FOR PRIVACY  
Registrant Country: MU  
Registrant Phone: REDACTED FOR PRIVACY  
Registrant Phone Ext:  
Registrant Fax: REDACTED FOR PRIVACY  
Registrant Fax Ext:  
Registrant Email: [](https://reversewhois.domaintools.com/?email=9c64d3d0d2a850783e3f6f4ef7833acb)  
Registry Admin ID: REDACTED FOR PRIVACY  
Admin Name: REDACTED FOR PRIVACY  
Admin Organization: REDACTED FOR PRIVACY  
Admin Street: REDACTED FOR PRIVACY  
Admin City: REDACTED FOR PRIVACY  
Admin State/Province: REDACTED FOR PRIVACY  
Admin Postal Code: REDACTED FOR PRIVACY  
Admin Country: REDACTED FOR PRIVACY  
Admin Phone: REDACTED FOR PRIVACY  
Admin Phone Ext:  
Admin Fax: REDACTED FOR PRIVACY  
Admin Fax Ext:  
Admin Email: [](https://reversewhois.domaintools.com/?email=e06d0638da7b8c7e27ad0ce069e55774)  
Registry Tech ID:   
Tech Name: AFRINIC DNSMasters  
Tech Organization: AfriNIC  
Tech Street: 11th Floor, Standard Chartered Tower  
Tech City: Ebene  
Tech State/Province:   
Tech Postal Code: 72201  
Tech Country: MU  
Tech Phone: +230.59438680  
Tech Phone Ext:  
Tech Fax: +230.4666758  
Tech Fax Ext:  
Tech Email: [](https://reversewhois.domaintools.com/?email=50131c49741dae69d09c571203d95fcd)  
Name Server: NS1.AFRINIC.NET  
Name Server: AFRINIC.AUTHDNS.RIPE.NET  
Name Server: RIRNS.ARIN.NET  
Name Server: NS2.AFRINIC.NET  
Name Server: NS4.APNIC.NET  
Name Server: NS3.AFRINIC.NET  
Name Server:   
Name Server:   
Name Server:   
Name Server:   
DNSSEC: signedDelegation  
URL of the ICANN WHOIS Data Problem Reporting System: http://wdprs.internic.net/  
  
For more information on Whois status codes, please visit  
https://www.icann.org/epp  
  
Reseller Email:   
Reseller URL:

Type your answers here.

# Answer Key

## Determine Network Connectivity to a Destination Host.

## Trace a Route to a Remote Server Using Tracert.

### Trace a route to www.cisco.com.

### Trace a route to a RIR web site.

List the domains below from your tracert results using a web-based whois tool, such as <http://whois.domaintools.com/>.

Answers will vary. Some of the example domains are cox.net, level3.com, and registro.br.

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