

## Activity 2.2.5: Using NeoTrace™ to View Internetworks

### Learning Objectives

- Explain the use of route tracing programs, such as `tracert` and NeoTrace.
- Use `tracert` and NeoTrace to trace a route from its PC to a distant server.
- Describe the interconnected and global nature of the Internet with respect to data flow.

### Background

Route tracing computer software is a utility that lists the networks data has to traverse from the user's originating end device to a distant destination network.

This network tool is typically executed at the command line as:

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

(Unix and similar systems)

or

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

(MS Windows systems)

and determines the route taken by packets across an IP network.

The `tracert` (or `tracert`) tool is often used for network troubleshooting. By showing a list of routers traversed, it allows the user to 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 the packet was forwarded through. The number of routers is known as the number of "hops" the data traveled from source to destination.

The displayed list can help identify data flow problems when trying to access a service such as a website. It can also be useful when performing tasks such as downloading data. If there are multiple websites (mirrors) available for the same file of data, one can trace each mirror to get a good idea of which mirror would be the fastest to use.

However, it should be noted that because of the "meshed" nature of the interconnected networks that make up the Internet and the Internet Protocol's ability to select different pathways over which to send packets, two trace routes between the same source and destination conducted some time apart may produce different results.

Tools such as these are usually embedded with the operating system of the end device.

Others such as NeoTrace™ are proprietary programs that provide extra information. NeoTrace uses available online information to display graphically the route traced on a global map, for example.

### Scenario

Using an Internet connection, you will use two routing tracing programs to examine the Internet pathway to destination networks.

This activity should be performed on a computer that has Internet access and access to a command line. First, you will use the Windows embedded `tracert` utility and then the more enhanced NeoTrace program. This lab assumes the installation of NeoTrace.

## Task 1: Trace Route to Remote Server.

### Step 1: Trace the route to a distant network.

To trace the route to a distant network, the PC being used must have a working connection to the class/lab network.

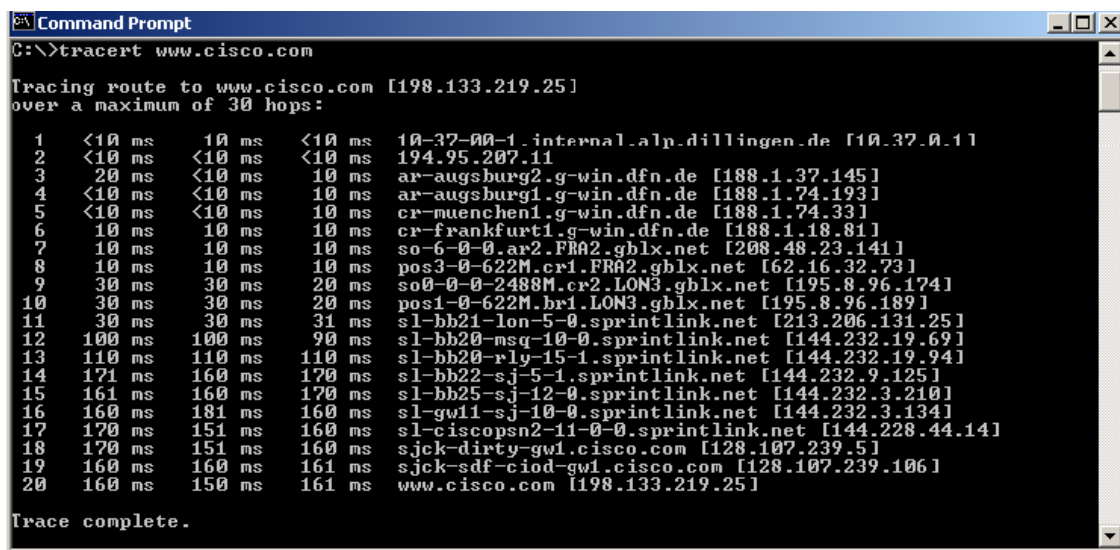
1. At the command line prompt, type: `tracert www.cisco.com`

The first output line should show the Fully Qualified Domain Name (FQDN) followed by the IP address. The Lab Domain Name Service (DNS) server was able to resolve the name to an IP address. Without this name resolution, the `tracert` would have failed, because this tool operates at the TCP/IP layers that only understand valid IP addresses.

If DNS is not available, the IP address of the destination device has to be entered after the `tracert` command instead of the server name.

2. Examine the output displayed.

How many hops between the source and destination? \_\_\_\_\_



```
Command Prompt
C:\>tracert www.cisco.com

Tracing route to www.cisco.com [198.133.219.25]
over a maximum of 30 hops:
  0  <10 ms    <10 ms    <10 ms    10-37-00-1.internal.alp.dillingen.de [10.37.0.1]
  1  <10 ms    <10 ms    <10 ms    194.95.207.11
  2  <10 ms    <10 ms    <10 ms    ar-augsburg2.g-win.dfn.de [188.1.37.145]
  3  <10 ms    <10 ms    <10 ms    ar-augsburg1.g-win.dfn.de [188.1.74.193]
  4  <10 ms    <10 ms    <10 ms    cr-muenchen1.g-win.dfn.de [188.1.74.33]
  5  <10 ms    <10 ms    <10 ms    cr-frankfurt1.g-win.dfn.de [188.1.18.81]
  6  10 ms     10 ms     10 ms     so-6-0-0.ar2.FRA2.gblx.net [208.48.23.141]
  7  10 ms     10 ms     10 ms     pos3-0-622M.cr1.FRA2.gblx.net [62.16.32.73]
  8  30 ms     30 ms     30 ms     so0-0-0-2488M.cr2.LON3.gblx.net [195.8.96.174]
  9  30 ms     30 ms     30 ms     pos1-0-622M.br1.LON3.gblx.net [195.8.96.189]
 10  30 ms     30 ms     30 ms     sl-bb21-lon-5-0.sprintlink.net [213.206.131.25]
 11  100 ms    100 ms    100 ms    sl-bb20-msq-10-0.sprintlink.net [144.232.19.69]
 12  110 ms    110 ms    110 ms    sl-bb20-rlj-15-1.sprintlink.net [144.232.19.94]
 13  171 ms    160 ms    170 ms    sl-bb22-sj-5-1.sprintlink.net [144.232.9.125]
 14  161 ms    160 ms    170 ms    sl-bb25-sj-12-0.sprintlink.net [144.232.3.210]
 15  160 ms    181 ms    160 ms    sl-gw11-sj-10-0.sprintlink.net [144.232.3.134]
 16  170 ms    151 ms    160 ms    sl-ciscopsn2-11-0-0.sprintlink.net [144.228.44.14]
 17  170 ms    151 ms    160 ms    sjck-dirty-gw1.cisco.com [128.107.239.5]
 18  160 ms    160 ms    161 ms    sjck-sdf-ciod-gw1.cisco.com [128.107.239.106]
 19  160 ms    150 ms    161 ms    www.cisco.com [198.133.219.25]
 20  160 ms    150 ms    161 ms    www.cisco.com [198.133.219.25]

Trace complete.
```

Figure 1. `tracert` Command

Figure 1 shows the successful result when running:

`tracert www.cisco.com`

from a location in Bavaria, Germany.

The first output line shows the FQDN, followed by the IP address. Therefore, a DNS server was able to resolve the name to an IP address. Then there are listings of all routers through which the `tracert` requests had to pass to get to the destination.

3. Try the same trace route on a PC connected to the Internet, and examine your output.

Number of hops to `www.cisco.com`: \_\_\_\_\_

### Step 2: Try another trace route on the same PC, and examine your output.

Destination URL: \_\_\_\_\_

Destination IP Address: \_\_\_\_\_

## Task 2: Trace Route using NeoTrace.

1. Launch the NeoTrace program.
2. On the **View** menu, choose **Options**. Click the **Map** tab and in the **Home Location** section click the **Set Home Location** button.
3. Follow the instructions to select your country and location in your country.  
Alternatively, you can click the **Advanced** button, which enables you to enter the precise latitude and longitude of your location. See the Challenge section of Activity 1.2.5(1).
4. Enter "www.cisco.com" in the **Target** field and click **Go**.
5. From the **View** menu, **List View** displays the list of routers similar to **tracert**.  
**Node View** from the **View** menu displays the connections graphically with symbols.  
**Map View** on the **View** menu displays the links and routers in their geographic location on a global map.
6. Select each view in turn and note the differences and similarities.
7. Try a number of different URLs and view the routes to those destinations.

## Task 3: Reflection

Review the purpose and usefulness of trace route programs.

Relate the displays of the output of NeoTrace to the concept of interconnected networks and the global nature of the Internet.

## Task 4: Challenge

Consider and discuss possible network security issues that could arise from the use of programs like traceroute and NeoTrace. Consider what technical details are revealed and how perhaps this information could be misused.

## Task 5: Clean Up

Exit the NeoTrace program.

Unless instructed otherwise by your instructor, properly shut down the computer.