Tracing Internet Connectivity

Objectives
- Use software that shows how data travels through the Internet.
- Use the **ping** utility to test connectivity to a remote network.
- Construct a visual map of connectivity from your network to a remote network.

Background/Preparation
In order to perform this lab, Internet connectivity is required. On a PC, open a web browser to ensure connectivity exists before beginning this lab.

This lab has an optional first step of downloading and installing a free program that can be used to determine the path a packet takes through the Internet. This program may be free, but it also may be copyrighted. Also, it may be that you are not permitted on a campus computer to download and install software. Check with the instructor or student assistant if you are unsure.

The following resources will be required:
- Windows-based computer with Internet connectivity
- Ability to download and install freeware software (optional)
- Access to the Run command

Step 1: (Optional) Download and install a free program
a.   Open a search engine such as Google (www.google.com), Yahoo (www.yahoo.com), or Search (http://search.com).

b.   Which words do you think would give you the best result if you are searching for a visual program that allows you to trace how data (a packet) travels through the Internet? Write your search words.

c.   Type the words you chose in the Search field. Locate and download the software and install it. Normally, the website has a link to the download site or you can click the words "Download" or "Download Now". When you download any freeware, remember the location on the hard drive, flash drive, or disk media where you saved the program.

d.   What is the name of the program you installed?

Step 2: Locate web sites
a.   Using the search engine again, locate five businesses with a web server, which are located in a country different from your own.
b.   Write the names of the five business web sites.
c.   Using the search engine again, locate a business in your own country that has a web site that is accessible.
d.   Write the URL of the web site. An example URL is www.cisco.com.

Step 3: (Optional) Use downloaded visual trace route tool

a.   Using the software you have downloaded and installed, use the tool to determine the path which the packet takes to reach one of the remote country destinations. Each tool normally allows you to type a URL. The program should either list or visually display the path taken by the packet.

b.   How many hops does the packet take to get from your computer to the destination computer?

c.   If your tool also provides time information, write down how long it took for the packet to reach the first hop?

d.   Use the tool to determine the path to another foreign country site.

e.   How many hops does the packet take to get from your computer to the destination computer?

f.   Use the tool to determine the path to a web site in your own country.

Step 4: Use the *tracert* command

a.   Click the **Start** button, click the **Run** option, type **cmd**, and press **Enter**. An alternate way to get to the command prompt is to click **Start > All Programs > Accessories > Command Prompt**.

b.   From the command prompt, type **tracert** and press **Enter**. Options that can be used with the **tracert** command are shown. Items shown in square brackets [ ] are optional. For example, the first option that can be used with the **tracert** command is –d. If someone was to type **tracert –d** www.cisco.com, then the command issued to the computer is to trace the route to www.cisco.com, but do not try to resolve IP addresses to names. The *target_name* parameter is mandatory (it does not have brackets around it) and it is replaced with the destination network. In the previous example of **tracert –d** www.cisco.com, www.cisco.com is the *target_name*.

c.   Which **tracert** option would be used to designate that only 5 hops could be used to search for the device address on the destination network?

d.   Write the full command that would be typed to trace a route to www.cisco.com and instruct the computer to not search for it after seven hops.

e.   Using one of the remote country destination addresses (use the same address as the one you used with the visual tool if possible) use the **tracert** command to determine how many hops it takes to reach the remote web server. Write the number of hops and the destination.

f.   The **tracert** command uses Internet Control Message Protocol (ICMP) echo request messages to determine the path to the final destination. The path displayed is a list of IP addresses assigned to routers that connect to one another to form the path. The ICMP packets contain a value called Time To Live (TTL). The TTL value is 30 by default on a Microsoft-based PC and each router through which the packet passes, decrements that value by 1 before sending the packet on to the next router in the path. When the TTL value reaches 0, the router that has the packet sends an ICMP time exceeded message back to the source.
The **tracert** command determines the path by sending the first ICMP echo request message with a TTL of 1 and then increases that TTL value by 1 until the target responds or the maximum number of hops is reached. The path is determined by examining the ICMP time exceed messages that are sent back by routers along the way and by the ICMP echo reply message that is returned from the destination. Routers that do not return the ICMP time exceed messages are shown by a row of asterisks (*).

Step 5: Use the *pathping* command

a.   A similar command that can be used on a Windows XP computer is **pathping**. This command combines the abilities of the **tracert** command with the **ping** command. From the command prompt, use the **pathping** command to determine the IP addresses of the routers used to create the packet path to an other foreign country address. An example of the **pathping** command used to trace the path to Cisco is **pathping** www.cisco.com.

b.   How many hops did the **pathping** command display to your remote destination?

c.   When do you think that you would ever use a tool like **pathping** or **tracert**?

Step 6: (Optional) Use the *whois* function

a.   Some of the freeware tools include an option to perform a **whois** function. **Whois** is a separate program or integrated with a tool similar to **tracert** or **pathping**. It displays (and sometimes has a link) who owns the web link of either the destination URL (such as cisco.com) or any of the links along the path. Explore the freeware tool that you have downloaded and installed and determine if it has a **whois** function. If it does, use it to determine who owns the domain name of one of the previous destinations used.

b.   Why would you want to use the **whois** function?

Step 7: Presenting the result

Answer all the redmarked questions, write the your answers in a Word-document and send it to your teacher.