جامعة الأهرام الكندية
AHRAM CANADIAN UNIVERSITY

Network I Lab 03

Part 01 : testing network entities Using ping and tracert from a Workstation

Objective

- Learn to use the TCP/IP Packet Internet Groper (**ping**) command from a workstation.
- Learn to use the Traceroute (**tracert**) command from a workstation.
- Observe name resolution occurrences using WINS and/or DNS servers.

Background

This lab assumes the use of any version of Windows. This is a non-destructive lab and can be done on any machine without concern of changing the system configuration. Ideally, this lab is performed in a LAN environment that connects to the Internet. It can be done from a single remote connection via a modem or DSL-type connection. The student will need the IP addresses that were recorded in the previous lab.
The instructor might also furnish additional IP addresses.
Note: Ping has been used in many DOS attacks and many school network administrators have turned off ping, echo reply, from the border routers.
If the network administrator has turned off echo reply then it is possible for a remote host to appear to be offline when the network is operational.

Step 1 Establish and verify connectivity to the Internet

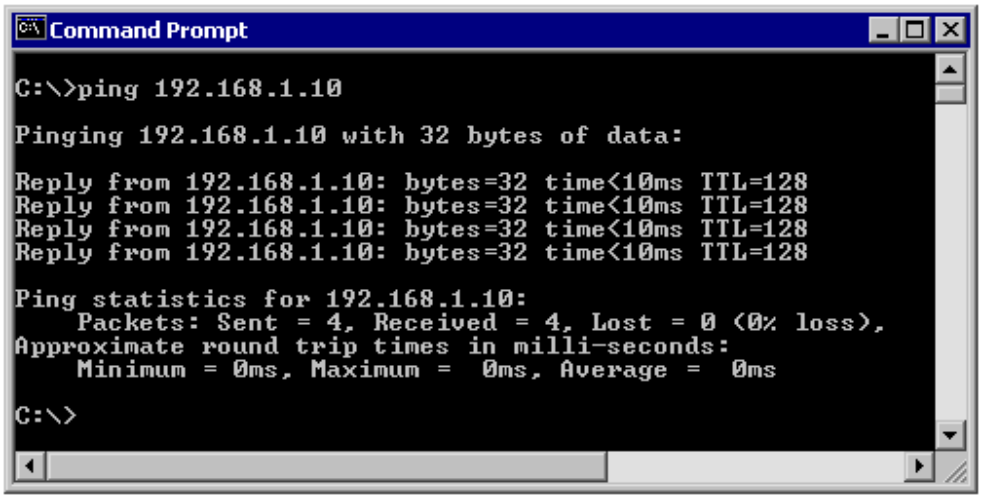
This ensures the computer has an IP address.

Step 2 Access the command prompt

Use the Start menu to open the Command Prompt window. Press
Start > **Programs** > **Accessories** > **Command Prompt** or **Start** > **Programs** > **Command Prompt**
or **Start** > **All Programs** > **Command Prompt**.

Step 3 ping the IP address of another computer

In the window, type **ping**, a space, and the IP address of a computer recorded in the previous lab.
The following figure shows the successful results of **ping** to this IP address



Ping uses the ICMP echo request and echo reply feature to test physical connectivity. Since **ping** reports on four attempts, it gives an indication of the reliability of the connection.
Look over the results and verify that the **ping** was successful. Is the **ping** successful? If not, perform appropriate troubleshooting. _____
If a second networked computer is available, try to **ping** the IP address of the second machine. Note the results. _____

Step 4 ping the IP address of the default gateway

Try to **ping** the IP address of the default gateway if one was listed in the last exercise. If the **ping** is successful, it means there is physical connectivity to the router on the local network and probably the rest of the world.

Step 5 ping the IP address of a DHCP or DNS servers

Try to **ping** the IP address of any DHCP and/or DNS servers listed in the last exercise. If this works for either server, and they are not in the network, what does this indicate?

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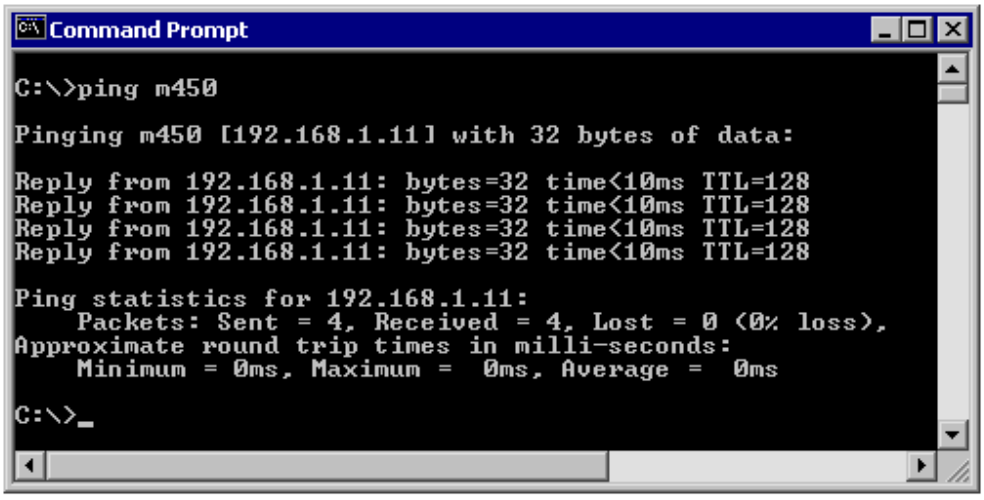
Was the **ping** successful? _____
If not, perform appropriate troubleshooting.

Step 6 ping the Loopback IP address of this computer

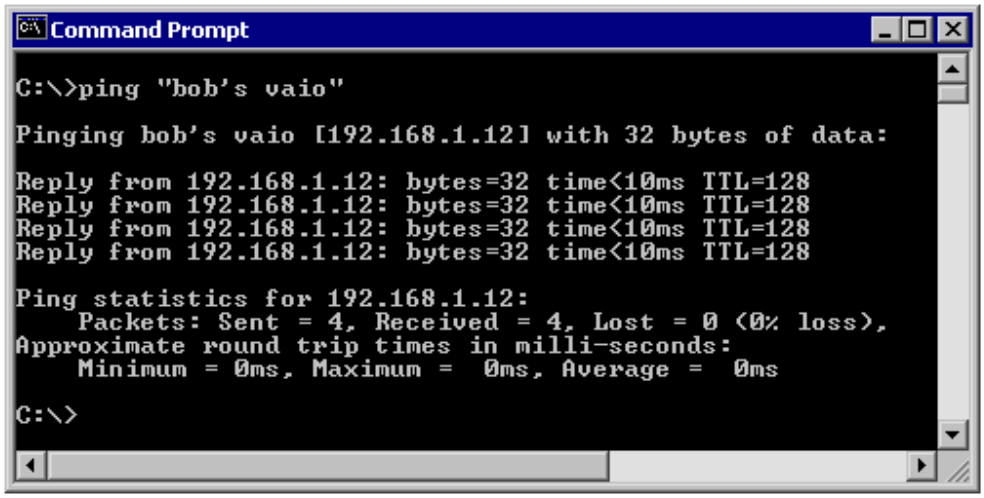
Type the following command**: ping 127.0.0.1**
The 127.0.0.0 network is reserved for loopback testing. If the **ping** is successful, then TCP/IP is properly installed and functioning on this computer.
Was the **ping** successful? _____
If not, perform appropriate troubleshooting.

Step 7 ping the hostname of another computer

Try to **ping** the hostname of the computer that was recorded in the previous lab. The figure shows the successful result of the **ping** the hostname.

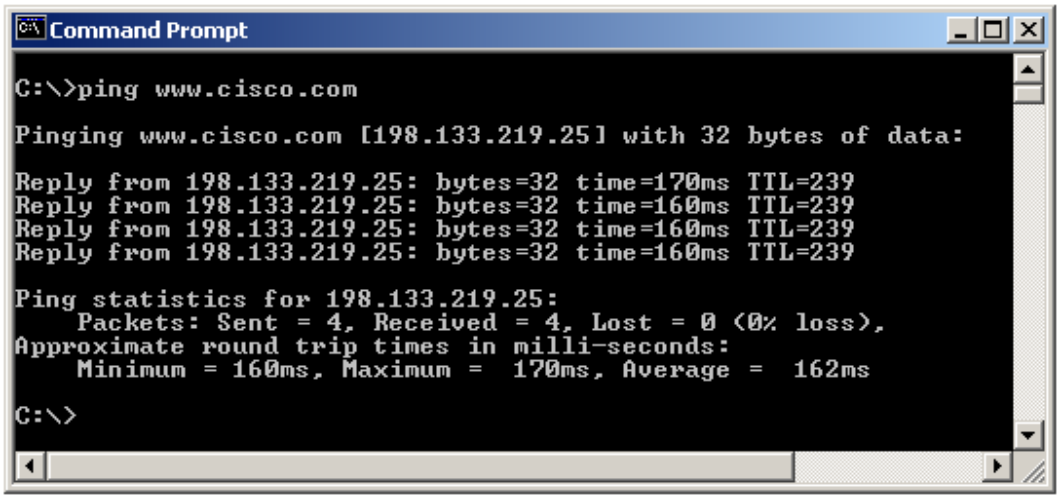


Look over the results. Notice that the first line of output shows the host name, m450 in the example, followed by the IP address. This means the computer was able to resolve the host name to an IP address. Without name resolution, the **ping** would have failed because TCP/IP only understands valid IP addresses, not names.
If the **ping** was successful, it means that connectivity and discovery of IP addresses can be done with only a hostname.
In fact, this is how many early networks communicated. If successful, then **ping** a hostname also shows that there is probably a WINS server working on the network.
WINS servers or a local "lmhosts" file resolve computer host names to IP addresses.
If the **ping** fails, then chances are there is no NetBIOS name to IP addresses resolution running.
Note: It would not be uncommon for a Windows 2000 or XP networks to not support this feature.
It is an old technology and often unnecessary.
If the last **ping** worked, try to **ping** the hostname of any another computer on the local network.
The following figure shows the possible results.
Note: The name had to be typed in quotes because the command language did not like the space in the name.



Step 8 ping a web site

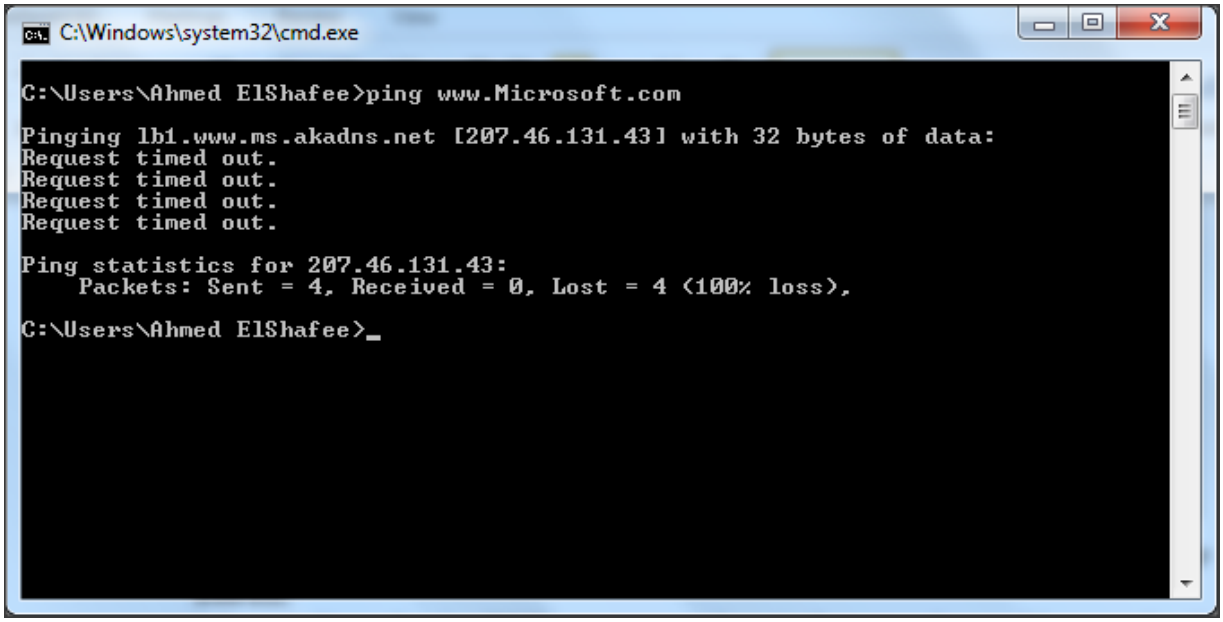
Type the following command: **ping** www.acucsit.info



The first output line shows the Fully Qualified Domain Name (FQDN) followed by the IP address.
A Domain Name Service (DNS) server somewhere in the network was able to resolve the name to an IP address.
DNS servers resolve domain names, not hostnames, to IP addresses.
Without this name resolution, the **ping** would have failed because TCP/IP only understands valid IP addresses.
It would not be possible to use the web browser without this name resolution.
With DNS, connectivity to computers on the Internet can be verified using a familiar web address, or domain name, without having to know the actual IP address.
If the nearest DNS server does not know the IP address, the server asks a DNS server higher in the Internet structure.

Step 9 ping the Microsoft web site

a. Type the following command: **ping www.microsoft.com**



Notice that the DNS server was able to resolve the name to an IP address, but there is no response.

Some Microsoft routers are configured to ignore **ping** requests. This is a frequently implemented
security measure.

ping some other domain names and record the results. For example, **ping www.msn.de**

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Step 10 Trace the route to the Cisco web site

Type **tracert www.cisco.com** and press **Enter**

tracert is TCP/IP abbreviation for trace route. The preceding figure shows the successful result when running **tracert** from 6th October city in Egypt.

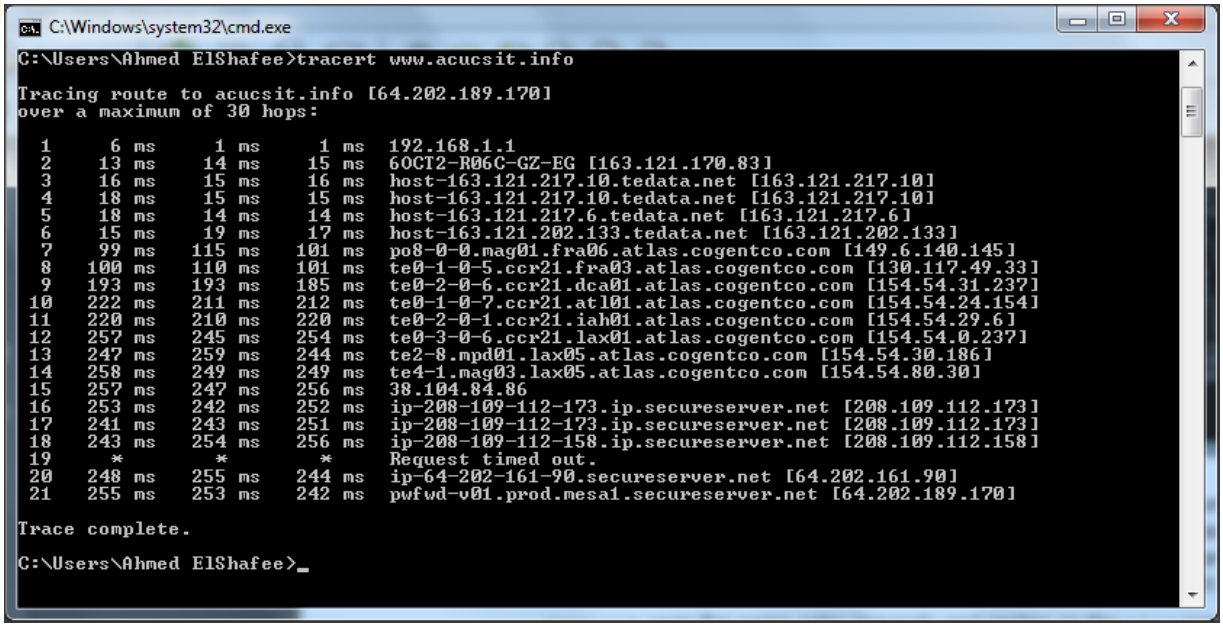
The first output line shows the FQDN followed by the IP address.

Therefore, a DNS server was able to resolve the name to an IP address.

Then there are listings of all routers the **tracert** requests had to pass through to get to the destination.

tracert uses the same echo requests and replies as the **ping** command but in a slightly different way. Observe that **tracert** actually contacted each router three times. Compare the results to determine the consistency of the route. Notice in the above example that there were relatively long delays after router 11 and 13, possibly due to congestion. The main thing is that there seems to be relatively consistent connectivity.

Each router represents a point where one network connects to another network and the packet was forwarded through.



Step 11 Trace other IP addresses or domain names

Try **tracert** on other domain names or IP addresses and record the results. An example is **tracert www.msn.de.**

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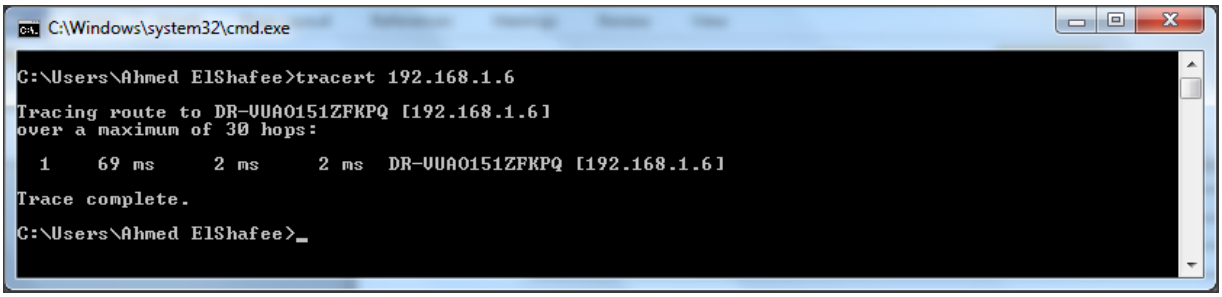
Step 12 Trace a local host name or IP address

Try using the **tracert** command with a local host name or IP address. It should not take long because the trace does not pass through any routers.



Reflection

If the above steps are successful and **ping** or **tracert** can verify connectivity with an Internet Web site, what does this indicate about the computer configuration and about routers between the computer and the web site? What, if anything, is the default gateway doing?

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Part 02: Basic Cable Testing

Objective

• Use a simple cable tester to verify whether a straight-through or crossover cable is good or bad.
• Use the Fluke 620 advanced cable tester to test cables for length and connectivity.

Background

Work with several cables that have already been made.
Test them for basic continuity, breaks in wires, shorts, two or more wires touching, using a basic cable tester.
In future labs similar cables will be created.

Simple Cable Testers: There are a number of basic cable testers available for less than U.S. $100.
They usually consist of one or two small boxes with RJ-45 jacks.
Plug the cables to be tested the RJ- 45 jacks.
Many models are designed to test only Ethernet UTP cable. Both ends of the cable are plugged in to the proper jacks.
The tester will test all eight wires and indicate whether the cable is good or bad.
Simple testers may have only a single light to indicate the cable is good or bad.
Other testers may have eight lights to indicate which wire is bad.
The testers have internal batteries to do continuity checks on the wires.

Advanced Cable Testers: Advanced cable testers, such as the Fluke 620 LAN CableMeter®, perform basic cable testing functions and more. The Fluke 620 Advanced cable testers can cost from hundreds to thousands of U.S. dollars. Advanced cable testers will be used in future labs to do wire connectivity of all LAN cable types.
This rugged tester can measure cable length, test for faults and show the distance to the defect. Open faults include opens, shorts, reversed, crossed, or split pairs.
Each 620 LAN CableMeter comes with one cable identifier.
The Fluke 620 is more advanced because it performs more functions:
• Requires only single-person verification
• Tests all LAN cable types, UTP, STP, FTP, Coax
• Detects a multitude of wiring problems including open, short, crossed, reversed, split pair
• Locates wiring or connection errors
• Measures cable length
Prior to starting the lab, the teacher or lab assistant should have basic cable testers or Fluke Cable meters available for each team of students. Also provided should be various

lengths of wire with induced problems. Work in teams of two. The following resources will be required:

- Basic cable tester
- Advanced cable tester, Fluke 620 or an equivalent
- Two good Category 5 or higher cables, one crossover and one straight-through
- Two bad Category 5 or higher cables, one with a break and one with a short. Use different colors or labels.

Step 1 Test the Cables

Simple cable tester: Refer to the instructions from the manufacturer. Insert the ends of the cable to be tested into the jacks according to the instructions.

Note: This test does not verify that the pins are connected correctly from one end to the other.

For each test, insert the cable into the RJ-45 jack(s) of the cable tester. Record the results in the following table.

	Color or cable number	Category type	Straight-through or crossover?	Length of cable	Test results Pass / Fail
Cable #1					
Cable #2					
Cable #3					
Cable #4					