Virtual University	**Assignment No. 01** **Sample Solution** **Semester Spring 2012** **Computer Networks – CS610**	**Total Marks: 15** **Due Date:17 April 2012**

Objective

The assignment has been designed to develop the understanding and demonstration about the concept of Trace Route command and Basics of Network Topologies in Computer Networks.

Instructions:

Please read the following instructions carefully before solving & submitting assignment:
Assignment should be in your own wordings not copied from internet, handouts or books.
It should be clear that your assignment will not get any credit (zero marks) if:

- **The assignment is submitted after due date.**
- **The submitted assignment does not open or file is corrupt.**
- **The assignment is copied (from other student or copied from handouts or internet).**
- **Student ID is not mentioned in the assignment file or name of file is other than student ID.**

For any query about the assignment, contact at CS610@vu.edu.pk

GOOD LUCK

Q.1. As you know that Tracer route is a network utility program to check the status of specific system on network, you are required to find the route of www.yahoo.com by using tracer route command explain all output provided by trace route command. [10 Marks]

Solution:
Trace route is a utility that traces a packet from your computer to an Internet host, but it will show you how many hops the packet requires to reach the host and how long each hop takes. If you're visiting a Web site and pages are appearing slowly, you can use trace route to figure out where the longest delays are occurring.
Purpose of Tracert Command: It traces out the route and permits you to access a particular server. The tracert command is a command which gives you a long list of all servers you pass through on your way to your final destination.(Maximum up to 30hops- if your route is longer than that, you are expected to give up waiting for the connection).

In this example we will trace the hops from a computer to yahoo.com:

C:\WINDOWS>tracert yahoo.com

Tracing route to yahoo.com [66.218.71.198] over a maximum of 30 hops:

1 <1 ms <1 ms <1 ms 208.170.243.1
2 44 ms 14 ms 18 ms sl-gw15-rly-6-0-1.sprintlink.net [144.232.246.165]
3 31 ms 25 ms 13 ms sl-bb22-rly-1-0.sprintlink.net [144.232.25.232]
4 21 ms 17 ms 17 ms sl-st20-ash-15-1.sprintlink.net [144.232.20.106]
5 15 ms 17 ms 19 ms so-0-0-0.edge1.Washington1.Level3.net [209.244.219.169]
6 16 ms 17 ms 15 ms so-5-0-0.gar1.Washington1.Level3.net [209.244.11.9]

7 82 ms 82 ms 82 ms so-3-0-0.mp2.SanJose1.Level3.net [64.159.1.130]
8 87 ms 87 ms 83 ms gige10-0.ipcolo3.SanJose1.Level3.net [64.159.2.41]
9 87 ms 84 ms 93 ms unknown.Level3.net [64.152.69.30]
10 90 ms 88 ms 92 ms w1.rc.vip.scd.yahoo.com [66.218.71.198]

Trace complete.

INTERPRETING THE RESULTS

Trace route allow you to see the path your packets take over the Internet. Sometimes, they will also allow you to "see" how your information traveled over the world: Many companies will name their servers based on where the server is located. From our example above, our information passed from our computer to servers in Washington DC then through servers in San Jose before reaching its destination (yahoo.com).

Trace route can show where there is a break in your connection. This allows you to determine exactly where your packets are being dropped or lost. Dropped or lost packets on a trace route will usually show as asterisks (*).

Tracer route command description of all steps

1. The first line of output is information about what you are doing; it shows the target system, that system's IP address, the maximum number of hops that will be allowed, and the size of the packets being sent.
2. Then we have one line for each system or router in the path between you and the target system. Each line shows the name of the system, the system's IP address, and three round trip times in milliseconds. The round trip times (or RTTs) tell us how long it took a packet to get from your system to that specific system and back again, called the delay between the two systems. By default, three packets are sent to each system along the route, so we get three RTTs.
3. Sometimes, a line in the output may have one or two of the times missing, with an asterisk where it should be:

Host230-142.yahoo.com (208.229.230.142) 12.619 ms * *

In this case, the machine is up and responding, but for whatever reason it did not respond to the second and third packets. This does not necessarily indicate a problem; in fact, it is usually normal, and just means that the system discarded the packet for some reason. Many systems do this normally.

4. Sometimes you will see an entry with just an IP address and no name:

207.126.101.2 (207.126.101.2) 0.858 ms 1.003 ms 1.152 ms

This simply means that a reverse DNS lookup on the address failed, so the name of the system could not be determined

5. If your trace ends in all timeouts, like this:

12. al-fa3-0-0.austtx.ixcis.net (216.140.128.242) 84.585 ms 92.399 ms 87.805 ms

13 * * *
14 * * *
15 * * *

This means that the target system could not be reached. This is possibly due to some kind of problem, but it may also be an intentional block due to a firewall or other security measures, or block by network admin and the block may affect trace route but not actual server connections.

6. A trace can end with one of several error indications indicating why the trace cannot proceed. In this example, the router is indicating that it has no route to the target host:

rbrt3.exit109.com (208.225.64.50) 35.931 ms !H * 39.970 ms !H

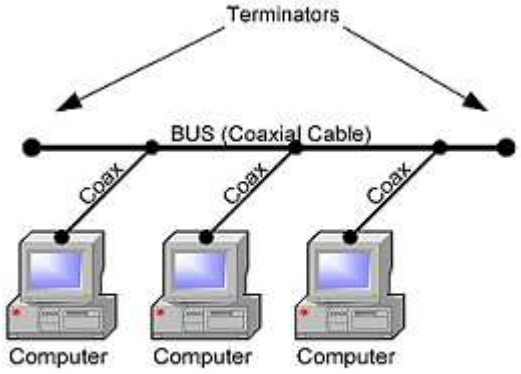
The! H is a “host unreachable” error message. (it indicates that an ICMP error message was received). The trace will stop at this point. Possible ICMP error messages of this nature include

Q.2. You have been asked to wire a conference room with seven computers for a demonstration after a day. It needs to be done quickly and with lowest possible expenses. What network topology is best suited to this situation and why? Justify your answer with solid reasons? [5 Marks]

Solution:

Preferred Topology:

Bus topology



BUS TOPOLOGY

For this type of network in conference room we will prefer Bus Topology due to following reasons.
All devices are connected to a central cable, called the bus or backbone. Bus networks are relatively inexpensive and easy to install for small networks.
Bus networks use a common backbone to connect all devices. A single cable, the backbone functions as a shared communication medium that devices attach with an interface connector. A device wanting to communicate with another device on the network sends a broadcast message onto the wire that all other devices see, but only the intended receiver actually accepts and processes the message.

- Bus network is very simple and easy to set up. If there is an urgent need to set up a network and perhaps be used on a short term basis then the Bus network is the best possibility.
- Bus networks use the least amount of cable to set up making it cost effective.
- Well suited for temporary networks that must be set up in a hurry and Easy to implement and extend.
- In Bus network if one computer fails in the network the others are still not affected and they continue to work.
- This topology is probably the cheapest network type of all to initially setup, as only one cable is used the installation is fairly simple and economical.