

# CSE-556 Internetworking Fall 2002

## Laboratory Assignment 1

### Objective

The objective of this laboratory assignment is to get you familiar with the basic TCP/IP network configuration parameters and various network troubleshooting utilities.

### Theory

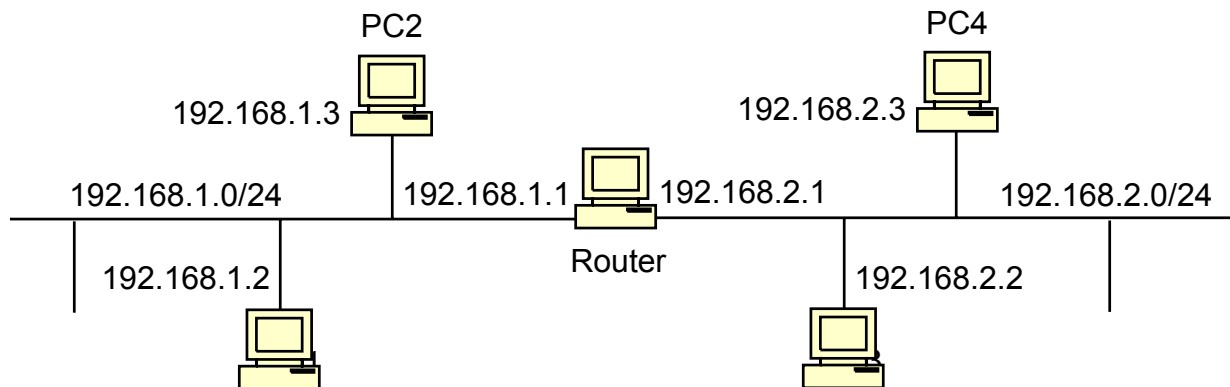
A TCP/IP host requires at least the following configuration parameters for proper operation:

1. IP Address
2. Subnet Mask
3. Default Gateway
4. Hostname and Domain Name
5. DNS Server Address

Depending on the operating system, there are various methods and commands to assign these configuration parameters manually. Alternatively these parameters can be assigned automatically using a service called DHCP.

IP Version 4 addresses are 32-bits long and contain a network part and a host part. The subnet mask is also a 32-bit number and specifies how long the network part is, within the IP address. The Default gateway is the router to be used for all IP networks for which there is no specific entry in the host routing table. The routing table is a database maintained at each IP host containing the networks which are reachable and the next hop routers to use for each of those networks. The hostname is a human-friendly identifier that can be used to refer to a host instead of its IP address. The domain name is a suffix to be added to the hostname to create a globally unique identifier for the host. The DNS server provides name resolution services to TCP/IP hosts. Before the DNS hosts relied on the `/etc/hosts` file exclusively to provide name resolution.

The figure below shows an example TCP/IP internetwork.





5. Use traceroute utility to see the routes your packets are taking to the hosts in other subnets and record your output.
  
6. Now remove all the specific route entries to the 10.X.0.0 networks and add just a default gateway entry using 10.X.100.100 as the default gateway. Check the connectivity between hosts in different segments.
  
7. Now update your hosts file to contain the name of each of the hosts in the lab and see if you can access those hosts using their hostnames instead of IP addresses. Why or why not?
  
8. Use different options available with the ping and traceroute commands. What is the purpose and benefit of the option setting response timeout value?
  
9. Using arp command find and note the MAC address of the other host in your subnet and your default gateway.

## **Questions**

Answer the following questions:

1. What is the subnet mask for your subnet 10.X.0.0?
2. What is the broadcast IP address for your subnet 10.X.0.0?
3. Which layer does the MAC address belong to? What is the MAC address of your host NIC?
4. What is the MAC address of 10.X.100.100?
5. How many bits long is a MAC address? What will be the future size of MAC addresses? How many unique MAC addresses could exist currently?
6. What is the default timeout for the arp cache in your system?
7. What is the purpose of -s option with the arp command?
8. How is the domain name set on a Linux host?
9. What is the IP address for the hostname "localhost"?
10. What is the loopback IP address and what is its purpose?