

Assignment 1

TASK1

1)ping www.google.com

This sends ip packets from our machine to destination and receives them back. Also, if the server wasn't up and working, then we wouldn't have received back any package. It also tells us the RTT and ttl of the packet

2) traceroute www.google.com

This gives us a table containing the list of all the servers the ip packet went through before reaching destination.

3)arp

This gives a one to one mapping of all the ip address and respective mac address of the devices connected to the current network.

4)ifconfig

This command gives us the configuration of the network interfaces present on a device.

5)hostname

Gives the hostname of the current machine.

6)

/etc/hostname

File containing the hostname of the current device.

/etc/hosts

File containing the list of all the hostname and ip of hosts present on the current device.

/etc/resolv.conf

File contains ip of name server that can be used for dns resolution.

/etc/protocols

File contains a list off all the protocols and information such as name, number and aliases related to it.

/etc/services

File containing a list of all the services present on the current network along with port mapped to them.

TASK 2

i)

Machines hostname is Oms-MacBook-Air.local. We can get this by using the **hostname** command in the terminal.

Machine ip is 10.19.8.81 We can obtain this by using **ifconfig | grep "inet "** command in the terminal

ii)

10.196.3.250 is the next hop ip which we can get by using the **traceroute** command in the terminal.

2:4:96:9a:82:e8 is the mac address obtained by using the **arp 10.196.3.250** command in the terminal

iii)

10.250.200.3 is the dns server name. Obtained by using the information obtained from the **/etc/resolv.conf** file.

iv)

The numbers in the file **/etc/protocols** represent the protocol number of the different protocols available.

v)

ssh - 22
ftp - 21
nfs - 2049
smtp - 25

Obtained by using the **cat /etc/services | grep <protocol_name>** command in the terminal

vi)

I can get the hostname, mac address, ip address and the dns server ip address of my android phone from the settings menu.

Other directories such as **/etc/protocols**, **/etc/services** are not obtainable.

TASK 3

i)

ping www.amazon.in

64 bytes from 52.84.11.190: icmp_seq=2 ttl=245 time=27.397 ms

ping www.iitb.ac.in

Request timeout for icmp_seq 0

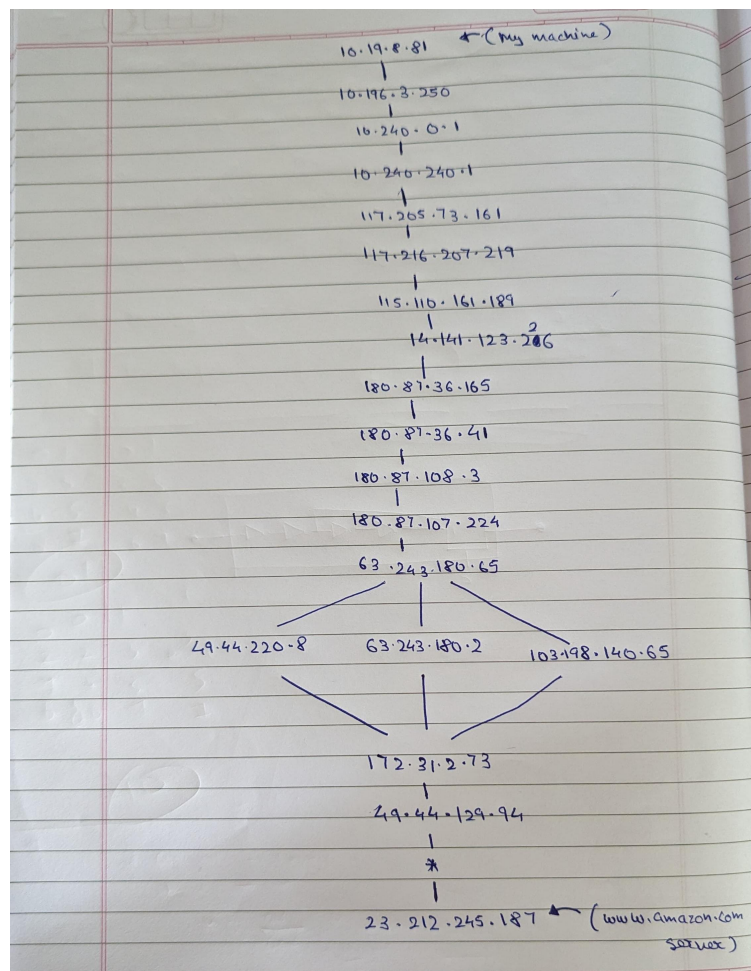
a) In case of www.amazon.in the RTT is 27.397 ms which is the amount of time it takes for the an ip packet to go from my machine to the destination and come back.

In case of www.iitb.ac.in since the server for that particular domain does not respond, there was a timeout since the packet never came back.

b) www.amazon.in 's server exists and responds to the (ICMP) packet sent by the ping commands and hence the packet came back where as www.iitb.ac.in 's server did not respond to the sent package, hence the packet never came back and hence we don't have any RTT information on that package.

ii)

a)



The **tracert** command send 3 different packets to each of the routers that come in between source and destination. Hence, we get three different ttl for each of the packets for a specific router. When we have *, it shows that specific router is not configured to respond to the packet sent by **tracert** command.

b) Use **tracert -m 24 www.amazon.in** ; here the max number of hops are set to 24.

c) Whenever we use **traceroute**, three different packets are sent to each servers coming in between the machine and the final(destination) server. Hence, we get 3 different RTT for each of the sent package.

d) TTL stands for time to live, which tells us the max time(i.e the number of hops) the packet will survive before it gets discarded.

CS 315: Computer Networks Lab
Spring 2022-23, IIT Dharwad
Assignment-1
Introduction to Networking Tools
January 03, 2023

Lab Instructions

- Please leave your bags on the Iron shelf near the SP16 entrance.
- Login to the Ubuntu OS on your machine. The login credentials are as follows:
 - Username: user
 - Password: 123456
- Mark your attendance in the attendance sheet before leaving the lab.
- Handle the lab resources with utmost care.
- Please go through the following exercises in today's lab.
- It is recommended that you complete all the following exercises during the lab slot itself.
- If you face any difficulties, please feel free to seek help online or from your peers or TAs.
- After finishing all exercises, please carry your solutions with you (via email/pen drive) for future reference, and delete the files from the desktop.

Task 1. Background

In this experiment, you will learn about some network communication utilities in Linux. When you work in a distributed environment, you need to communicate with remote users and you also need to access remote Unix machines. There are several Unix utilities that help users compute in a networked, distributed environment.

Study the following commands/utilities and learn how to use them : **ping, route, traceroute, arp, ifconfig, hostname**

Try out the following and write your understanding of the output:

(i) \$ ping www.google.com

(ii) \$ traceroute www.google.com

(iii) \$ arp

(iv) \$ ifconfig

(v) \$ hostname

(vi) Look at the following files in your linux system and write what the files are for?

/etc/hostname;

/etc/hosts;

/etc/resolv.conf;

/etc/protocols;

/etc/services

(Note : You can run the unix command with man to get the information regarding the command. Ex: man ifconfig)

Task 2. Warm-up Questions

- (i) What is your machine's hostname and IP address? How did you get this information?
- (ii) What is the next hop router's IP address and MAC address? How did you get this information?
- (iii) What is the local DNS server's IP address? How did you get this information?
- (iv) What do the numbers in the file `/etc/protocols` represent?
- (v) What is the port number associated with applications: ssh, ftp, nfs, smtp (email)? How did you get this information?
- (vi) How many of these questions can you answer for the phone running on android/ios?

Task 3. Questions

- (i) The Unix utility Ping can be used to find the RTT to various Internet hosts. Read the man page for ping, and use it to find the RTT to the following websites.

www.amazon.in and www.iitb.ac.in

Answer the following:

- (a) Explain the results that you obtain; For example, the success and failure of the Ping,
 - (b) What are the reasons for the values of RTTs that you see?
- (ii) Read the man page for the Unix utility Traceroute and use it for the website www.amazon.in.

Answer the following:

- (a) Explain what you see. Whenever successful, draw a network map from your machine to the destination, which includes the hop addresses obtained from Traceroute.
 - (b) How can you change the maximum hop number?
 - (c) What do the three timestamps signify in the result of Traceroute?
 - (d) What is the use of TTL (Time To Live) field in ICMP packets?

Submission Guidelines:

- Write your answers in a single text/doc file, and submit its PDF named after your IIT Dharwad roll number, which contains the answers for all the questions of Task-1, 2 & 3.