

CS 315: Computer Networks Lab
Spring 2024-25, IIT Dharwad
Assignment-1
Introduction to Networking Tools
January 06, 2025

Lab Instructions

- Please leave your bags near the lab 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 are the next hop router's IP and MAC addresses? 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 port number is 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 on 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 the 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.