

CS315: Assignment-1

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Task-1:

1. \$ ping www.google.com

ping is a command used to test the connection between two computers. The *ping* command measures the time it takes for a signal to be sent from a start position to the destination + the time the signal takes to reach back to the start position from the destination. *ping* works with IPv4 as well as IPv6.

2. \$ traceroute www.google.com

traceroute tracks the route packets take from an IP network to a given host. This command can check the network issues.

3. \$ arp

arp manipulates or shows the IPv4 network neighbor cache (*Address Resolution Protocol* cache) in the kernel. It can add entries to the table, delete them, and display the current content on the local computer.

4. \$ ifconfig

ifconfig (Interface configurator) command is used to initialize an interface, assign an IP address, and enable or disable the interface on demand. Using this command, we can check the IP and MAC addresses assigned to the interface. Once the IP address is assigned, the *ifconfig* command is usually only needed when debugging, or system tuning is needed.

5. \$ hostname

It is used to display the system's DNS (Domain Name System) name and to display or set its hostname or NIS domain name.

6.

a. `/etc/hostname`;

The file contains the hostname of the system

b. `/etc/hosts`;

This file has the translation from hostnames or domain names to IP Addresses. This is an operating system file.

c. `/etc/resolv.conf`;

This is a dynamic *resolv.conf* file for connecting local clients to the system-resolved internal DNS stub resolver. This file lists all configured search domains. It Lists nameservers that are used by your host for DNS resolution.

d. `/etc/protocols`;

The file contains information regarding the known protocol. The format of the information is

official_protocol_name protocol_number aliases.

e. `/etc/services`

This file contains a list of network services and ports mapped to them.

Task-2:

- I. What is your machine's hostname and IP address? How did you get this information?

Hostname: *shahil-patel*

IP-addresses: *127.0.0.1*

Command used to get hostname: *hostname*

Command used to get IP-addresses: *ifconfig -a*

- II. What is the next hop router's IP and MAC addresses? How did you get this information?

Next hop router's IP address: *10.196.3.250*

MAC address: *f2:ad:d6:6f:0f:de*

Command to get the next hop router's address: *traceroute* www.google.com
(the 1st address in the list will be the just next hop router's address).

Command to get MAC address: *arp*

- III. What is the local DNS server's IP address? How did you get this information?

DNS servers' IP address: *127.0.0.53*

Command used to get the information: *cat /etc/resolv.conf*

IV. What do the numbers in the file */etc/protocols* represent?

The numbers represent the *protocol_number* used to identify the protocol in the layer above IP to which the data should be passed.

V. What is the port number associated with applications: ssh, ftp, nfs, smtp (email)? How did you get this information?

SSH port no.: **22**

(command used to get the port no.: *grep ssh /etc/services*)

FTP port no.: **21**

(command used to get the port no.: *grep ftp /etc/services*)

NFS port no.: **2049**

(command used to get the port no. *grep nfs /etc/services*)

SMTP port no.: **25**

(command used to get the port no. *grep smtp /etc/services*)

VI. How many of these questions can you answer for the phone running on android/ios?

As Android and ios are operating systems that can be used in networking, we can answer all the questions, such as getting the IP address of the network, the MAC address of the device, getting the hostname of the device, and more.

So, we can answer all the above questions for android and ios.

Task-3:

(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

RTT is round-trip time, which means the time it takes for the signal to be sent plus the amount of time it takes to receive the signal back.

For www.amazon.in, all the packets are received and the loss is 0%, so we have a successful ping also; the RTT is as follows:

Minimum RTT: 39.524 ms

Maximum RTT: 73.160 ms

Average RTT: 42.946 ms

For www.iitb.ac.in there will be 100% packet loss as the website is not open network to ping, so we won't be able to determine the RTT for the same.

(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.

Ans: We get the sequence of the IP address of the hops from the local machine to the destination. However, the request for the traceroute is unsuccessful.

(b) How can you change the maximum hop number?

Ans: *tracerout -max-hop=<number of hops> www.amazon.in*

(c) What do the three timestamps signify in the result of Traceroute?

Ans: The 3 timestamps determine the RTT for the request.

(d) What is the use of the TTL (Time To Live) field in ICMP packets?

Ans: TTL (Time to live) in networking stops data packets from flowing forever over the network. TTL regulates data caching and improves application speed. Hence, the data packets have a limited time to live which is measured in no. of hops the packets is transferred.

