LAB 1: Basic Networking Tools and Traceroute

PART 1: IP and MAC Addresses, and Routing Tables

Q1)

A) Loopback address is 127.0.0.1
B) 172.20.76.151 (IPv4), which belongs to eth0 (ethernet interface)
C) We have 2 connections:
   1. lo(Loopback):
      Type: loopback
      Mac address: 00:00:00:00:00:00
      Manufacturer: ----------
      IPv4: 127.0.0.1
   2. eth0:
      Type: ethernet
      Mac address: 00:15:5d:d3:e1:7b
      Manufacturer: Microsoft corporation
      IPv4: 172.20.76.151
      IPv6: fe80::215:5dff:fed3:e17b /64

Q2)

A) IP address of this network is 172.20.76.151 and its range is 172.20.64.0 to 172.20.79.255
B) Max no. of hosts that can be uniquely addressed within this local network is 4096
C) IP address for sending broadcast messages: 172.20.79.255
D) Publicly-visible IP address: 14.139.106.150

Q3)

A) Default Gateway's IP address: 172.20.64.1. Gateway is used for entry and exit point in network traffic in different networks.
B) 172.20.64.1,0.0.0.0

```
yudie@Dell-G15:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         Dell-G15.mshome 0.0.0.0         UG    0      0        0 eth0
172.20.64.0     0.0.0.0         255.255.240.0   U     0      0        0 eth0
```

C) It means that destination is reachable on same network as source.
D) This is for automatic private IP addressing (APIPA), it indicates a network configuration issue, as the host was unable to obtain a valid IP address from a DHCP server. APIPA addresses are used for local communication within the same subnet but do not provide internet connectivity.

PART 2: PING and TRACEROUTE

Q4)

a)Approximate round trip time (for iitgoa.ac.in) is 16.404ms.

```
--- www.iitgoa.ac.in ping statistics ---
109 packets transmitted, 109 received, 0% packet loss, time 108203ms
rtt min/avg/max/mdev = 2.556/16.404/709.929/67.778 ms
```

b)(for instagram.com) is 30.504ms

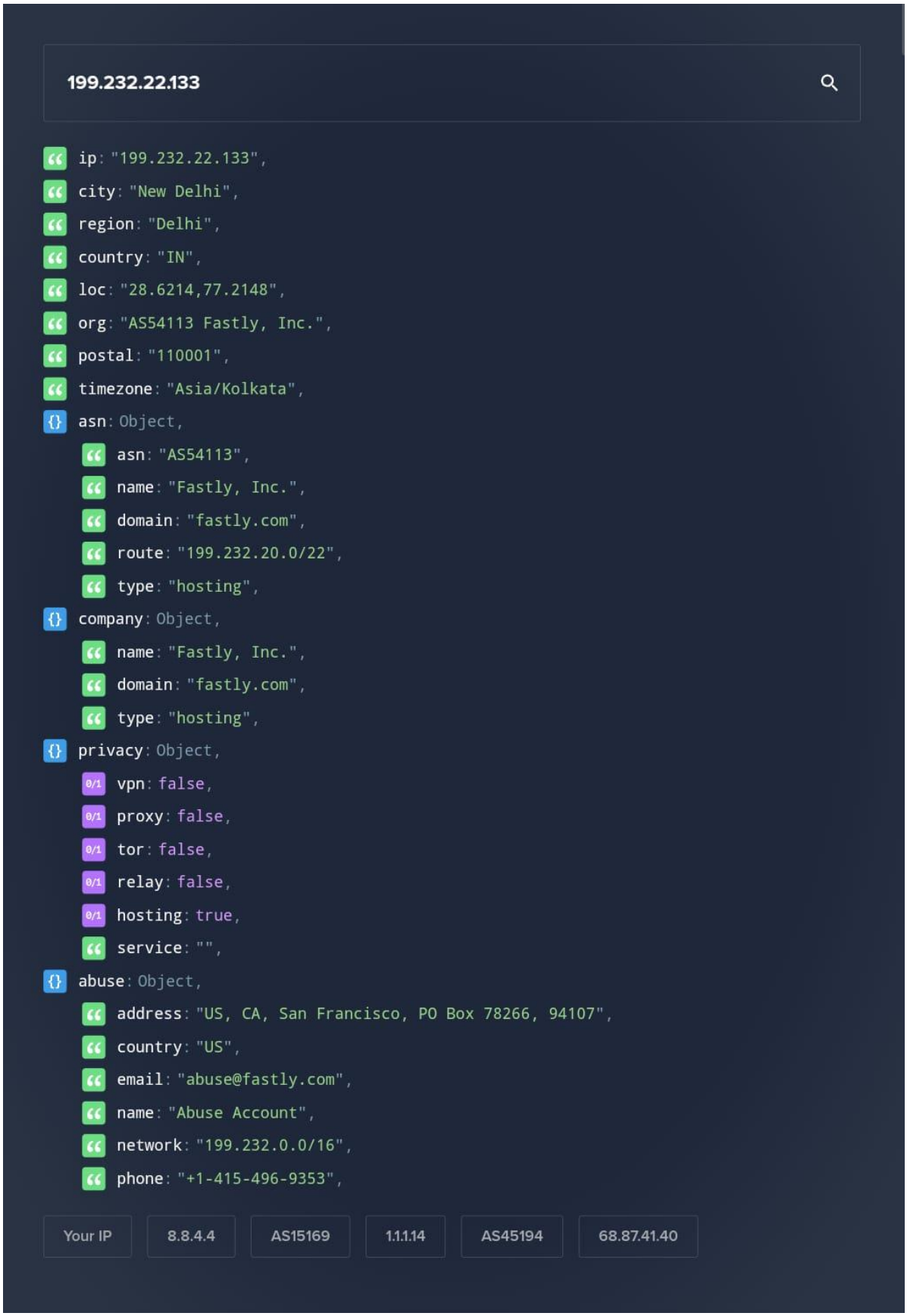
```
--- instagram.com ping statistics ---
36 packets transmitted, 36 received, 0% packet loss, time 36707ms
rtt min/avg/max/mdev = 24.425/30.504/57.662/8.508 ms
```

Q5) It operates by sending packets with gradually increasing TTL values. Each router along the path decreases TTL by one. When the TTL reaches 0 ,then router drops the packets and sends message and router IP address back to the source. Like this sending multiple packets traceroute maps the network path by identifying the each router in the path.

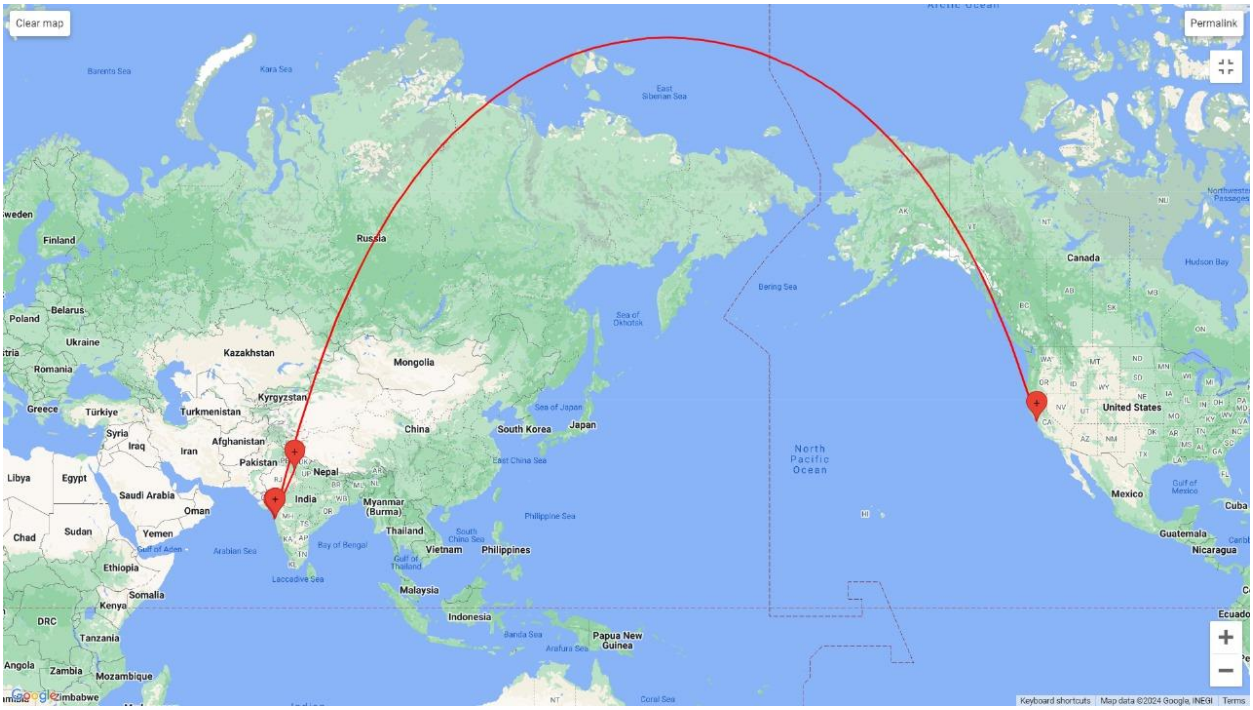
Q6)

A) www.stanford.edu , IP address:199.232.22.133
B) Total hops taken: 30
C) It indicates lack of response which can be due to firewalls, routers configuration
D) traceroute -q 5 www.stanford.edu
E) avg round-trip delay : 61.064 ms.

F)


199.232.22.133
ip: "199.232.22.133",
city: "New Delhi",
region: "Delhi",
country: "IN",
loc: "28.6214,77.2148",
org: "AS54113 Fastly, Inc.",
postal: "110001",
timezone: "Asia/Kolkata",
asn: Object,
asn: "AS54113",
name: "Fastly, Inc.",
domain: "fastly.com",
route: "199.232.20.0/22",
type: "hosting",
company: Object,
name: "Fastly, Inc.",
domain: "fastly.com",
type: "hosting",
privacy: Object,
vpn: false,
proxy: false,
tor: false,
relay: false,
hosting: true,
service: "",
abuse: Object,
address: "US, CA, San Francisco, PO Box 78266, 94107",
country: "US",
email: "abuse@fastly.com",
name: "Abuse Account",
network: "199.232.0.0/16",
phone: "+1-415-496-9353",
Your IP
8.8.4.4
AS15169
1.1.1.14
AS45194
68.87.41.40

G)


Clear map
Permalink
Barents Sea
Kara Sea
East Siberian Sea
Finland
Russia
Canada
Hudson Bay
Bering Sea
Sea of Okhotsk
Poland
Belarus
Ukraine
Romania
Kazakhstan
Mongolia
Greece
Türkiye
Turkmenistan
Kyrgyzstan
Syria
Iraq
Iran
Afghanistan
Pakistan
China
South Korea
Japan
Sea of Japan
East China Sea
North Pacific Ocean
United States
Libya
Egypt
Saudi Arabia
Oman
Nepal
India
Myanmar (Burma)
Thailand
Vietnam
Philippines
Philippine Sea
South China Sea
Gulf of Thailand
Bay of Bengal
Arabian Sea
Laccadive Sea
Mexico
Gulf of Mexico
Cuba
Guatemala
Nicaragua
Chad
Sudan
Yemen
Gulf of Aden
Ethiopia
Somalia
Kenya
DRC
Tanzania
Malaysia
Indonesia
Banda Sea
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