***Ans 1***.

Institute internal IP: using ifconfig on console : **10.5.27.228**

public IP:**203.110.246.23**

No, the public IP might be same as they are routed through a public server but inside the institute each machine has different IP address.

***Ans 2. (from wiki)***

A proxy server is a server that acts as an intermediate medium for request from clients seeking resources from other servers. A client connected to the proxy server requests some service which might be file,connection, web page, or other resource available from a different server which is facilitated by the proxy server.

Benefits of proxy server:

1) Proxy server evaluates the request from the client, simplifies it and controls its complexity before generating the services.

2) Proxy servers also helps to provide anonymity while accessing the World Wide Web.

***Ans 3.***

**Pinging google.com**

4 packets were transmitted from the ping.eu tool. The statistics is given below.

--- PING google.com (195.13.231.153) 56(84) bytes of data. ---  
--- google.com ping statistics ---

|  |  |
| --- | --- |
| packets transmitted | 4 |
| received | 4 |
| packet loss | 0 % |
| time | 3002 ms |

Success  
--- Round Trip Time (rtt) ---

|  |  |
| --- | --- |
| min | 36.865 ms |
| avg | 36.884 ms |
| max | 36.912 ms |
| mdev | 0.136 ms |

**Pinging facebook.com**

--- PING facebook.com (173.252.120.6) 56(84) bytes of data. ---  
--- facebook.com ping statistics ---

|  |  |
| --- | --- |
| packets transmitted | 4 |
| received | 4 |
| packet loss | 0 % |
| time | 3003 ms |

Success  
  
--- Round Trip Time (rtt) ---

|  |  |
| --- | --- |
| min | 110.866 ms |
| avg | 110.928 ms |
| max | 111.037 ms |
| mdev | 0.245 ms |

**Pinging 208.67.222.222**

--- 208.67.222.222 ping statistics ---

|  |  |
| --- | --- |
| packets transmitted | 4 |
| received | 4 |
| packet loss | 0 % |
| time | 3003 ms |

--- Round Trip Time (rtt) ---

|  |  |
| --- | --- |
| min | 5.302 ms |
| avg | 5.317 ms |
| max | 5.334 ms |
| mdev | 0.052 ms |

Successfully Pinged all the above sites and dns address.

**Pinging 10.3.100.207 KGP proxy server**

**--- 10.3.100.207 ping statistics ---**

|  |  |
| --- | --- |
| packets transmitted | 9 |
| received | 0 |
| packet loss | 100 % |
| time | 8039 ms |

Failed to ping

All the packets lost.

***Ans 4.***

**DNS server (from wiki)**

The Domain Name Systerm is a hierarchical distributed naming system for computers, services, or any resource connected to the internet or private network. It translates domain names, easily memorized by humans to the numerical IP addresses needed for the purpose of computer services and devices worldwide.

A DNS server is any computer registered to join the Domain Name System. A DNS server runs special-purpose networking software, features a public IP address, and contains a database network names and address for other Internet hosts.

The speed factor depends on how fast the dns server responds with the ip details. Now it is understood that the browser/system already knows the ip address of the dns servers (otherwise how would it contact them). The main factor on which the speed of the dns server depends is, that how far is it from your computer in terms of network hops. If you are somewhere in India, then a server in Singapore will be nearer than a server in the US. This distance can be found out by doing a traceroute to the target system. More the hops, farther away it is. In case of openDNS the number of Hops taken to identify the target machine takes far less effort than that of others.

**Ans 5.**

**Google.com route.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 |  |  |  | **\*** | **\*** | **\*** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2 | hos-tr4.juniper2.rz13.hetzner.de | 213.239.224.97 | de | 0.139 ms |  |  |
|  | hos-tr2.juniper1.rz13.hetzner.de | 213.239.224.33 | de | 0.309 ms |  |  |
|  | hos-tr1.juniper1.rz13.hetzner.de | 213.239.224.1 | de | 0.484 ms |  | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 3 | core21.hetzner.de | 213.239.245.81 | de | 0.543 ms |  |  |
|  | core22.hetzner.de | 213.239.245.121 | de | 0.546 ms |  |  |
|  | core21.hetzner.de | 213.239.245.81 | de | 0.543 ms |  | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4 | core4.hetzner.de | 213.239.245.18 | de | 4.815 ms |  |  |
|  | core1.hetzner.de | 213.239.245.218 | de | 4.965 ms |  |  |
|  | core4.hetzner.de | 213.239.245.14 | de | 5.118 ms |  | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 5 | juniper4.ffm.hetzner.de | 213.239.245.1 | de | 5.117 ms | 5.124 ms | 5.104 ms |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 6 | riga-sa8-ic2-crs1.telekom.lv | 80.81.194.165 | de | 37.605 ms | 37.488 ms | 37.513 ms |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 7 |  |  |  | **\*** | **\*** | **\*** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 8 |  |  |  | **\*** | **\*** | **\*** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 9 |  |  |  | **\*** | **\*** | **\*** |

No reply for 3 hops. Assuming we reached firewall.

**9 hops taken, 3 has been blocked by firewall. Routing is done in Germany based server.**

**Facebook.com traceroute**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 |  |  |  | **\*** | **\*** | **\*** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2 | hos-tr3.juniper2.rz13.hetzner.de | 213.239.224.65 | de | 1.580 ms |  |  |
|  | hos-tr2.juniper1.rz13.hetzner.de | 213.239.224.33 | de | 0.145 ms |  |  |
|  | hos-tr4.juniper2.rz13.hetzner.de | 213.239.224.97 | de | 1.611 ms |  | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 3 | core21.hetzner.de | 213.239.245.81 | de | 0.224 ms | 0.216 ms |  |
|  | core22.hetzner.de | 213.239.245.121 | de | 0.220 ms |  | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 4 | core1.hetzner.de | 213.239.245.218 | de | 4.835 ms | 4.899 ms | 4.890 ms |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 5 | juniper1.ffm.hetzner.de | 213.239.245.5 | de | 4.872 ms | 4.963 ms | 4.867 ms |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 6 | ae1.br01.fra1.tfbnw.net | 80.81.194.40 | de | 4.947 ms | 4.948 ms | 4.939 ms |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 7 | be2.bb01.fra2.tfbnw.net | 31.13.27.203 | ie | 111.674 ms | 106.868 ms |  |
|  | be2.bb02.fra2.tfbnw.net | 31.13.27.205 | ie | 113.015 ms |  | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 8 | ae12.bb01.ams2.tfbnw.net | 74.119.78.40 | us | 28.741 ms | 24.987 ms | 24.972 ms |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 9 | ae8.bb01.lhr2.tfbnw.net | 31.13.30.195 | ie | 16.868 ms | 16.913 ms | 16.951 ms |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 10 | be14.bb01.ewr2.tfbnw.net | 74.119.78.142 | us | 109.849 ms | 112.770 ms |  |
|  | be11.bb01.ewr2.tfbnw.net | 31.13.30.98 | ie | 110.966 ms |  | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 11 | be44.bb02.iad3.tfbnw.net | 31.13.26.5 | ie | 111.420 ms | 107.798 ms | 107.674 ms |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 12 | be14.bb02.frc3.tfbnw.net | 31.13.24.38 | ie | 108.772 ms |  |  |
|  | ae12.bb03.frc3.tfbnw.net | 31.13.24.88 | ie | 143.718 ms |  |  |
|  | be24.bb02.frc3.tfbnw.net | 173.252.64.206 | us | 112.804 ms |  | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 13 | ae63.dr04.frc3.tfbnw.net | 173.252.65.123 | us | 109.045 ms | 110.461 ms |  |
|  | ae61.dr03.frc3.tfbnw.net | 173.252.64.65 | us | 112.274 ms |  | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 14 |  |  |  | **\*** | **\*** | **\*** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 15 |  |  |  | **\*** | **\*** | **\*** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 16 | edge-star-shv-12-frc3.facebook.com | 173.252.120.6 | us | 106.381 ms | 115.291 ms | 108.596 ms |

**16 Hops taken, Initial hops were from Germany based server, then it went to Ireland based server and then toggled between the Ireland and US based servers, Finally ending in US based server.**

**Tracing route of 8.8.8.8**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | 1 |  |  |  | **\*** | **\*** | **\*** |      |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | 2 | hos-tr4.juniper2.rz13.hetzner.de | 213.239.224.97 | de | 31.722 ms | 31.836 ms |  | |  | hos-tr2.juniper1.rz13.hetzner.de | 213.239.224.33 | de | 110.418 ms |  | |      |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | 3 | core21.hetzner.de | 213.239.245.81 | de | 0.409 ms | 0.300 ms |  | |  | core22.hetzner.de | 213.239.245.121 | de | 0.192 ms |  | |      |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | 4 | core4.hetzner.de | 213.239.245.14 | de | 5.878 ms |  |  | |  | core4.hetzner.de | 213.239.245.18 | de | 4.788 ms |  |  | |  | core4.hetzner.de | 213.239.245.14 | de | 5.878 ms |  | |      |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | 5 | juniper1.ffm.hetzner.de | 213.239.245.5 | de | 4.871 ms |  |  | |  | juniper4.ffm.hetzner.de | 213.239.245.1 | de | 4.906 ms | 4.891 ms |  |      |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | 6 | de-cix20.net.google.com | 80.81.193.108 | de | 5.099 ms | 5.191 ms |  | |  | google.fra.ecix.net | 62.69.146.14 | de | 5.286 ms |  | |      |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | 7 |  |  |  | **\*** | **\*** | **\*** |      |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | 8 |  |  |  | **\*** | **\*** | **\*** |      |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | 9 | google-public-dns-a.google.com | 8.8.8.8 | us | 6.899 ms | 6.656 ms | 5.570 ms | |
| Other functions: |

**9 hops, initially route accessed in Germany based server, then it went to US based public DNS offered by Google.**

***Ans 6.***

**Firewall**

In computing, a **firewall** is a network security system that controls the incoming and outgoing network traffic based on an applied rule set. A firewall establishes a barrier between a trusted, secure internal network and another network (e.g., the Internet) that is assumed not to be secure and trusted.

Network layer firewalls, also called packet filters, operate at a relatively low level of the TCP/IP protocol stack, not allowing packets to pass through the firewall unless they match the established rule set. The firewall administrator may define the rules; or default rules may apply.

The ping request to IITKGP internal proxy server is rejected due to the firewall rejecting requests to access the institute PC network from outside. Internally the rule is there to accept the request.

**Ans 7.**

**Using Ping from console to reach the same server we get the following result.**

**Sending 64 bytes of data**

20 packets transmitted, 20 received, 0% packet loss, time 19009ms

Round Trip Time

min : 0.780

avg.:0.835

max:0.982

It is having less than 1ms to send 64 bytes if data internally which tells us the speed with which we can send the data.

**Sending 120 bytes of data**

Round Trip Time

min : 0.730

avg.:0.847

max:0.963

**Sending 256 bytes of data**

Round Trip Time

min : 0.800

avg.:0.872

max:0.932

**Sending 512 bytes of data**

Round Trip Time

min : 0.895

avg.:0.945

max:1.037

**Sending 1024 bytes of data**

Round Trip Time

min : 1.033

avg.:1.110

max:1.427

**Sending 2048 bytes of data**

Round Trip Time

min : 1.207

avg.:1.270

max:1.385

**Sending 4096 bytes of data**

Round Trip Time

min : 1.558

avg.:1.676

max:2.322

***Ans. 7***

**Dns Lookup request for google.com**

Two of the Ips returned are

Address: 195.13.231.163 Name: google.com  
Address: 195.13.231.167 Name: google.com

**DNS lookup request for facebook.com**

only one IP

Name: facebook.com Address: 173.252.120.6

**Ans 8.**

In computer networking, a *port* is an application-specific or process-specific software construct serving as a communications endpoint in a computer's host operating system. The purpose of ports is to uniquely identify different applications or processes running on a single computer and thereby enable them to share a single physical connection to a packet-switched network like the Internet. In the context of the Internet Protocol, a port is associated with an IP address of the host, as well as the type of protocol used for communication.

**Http Port: 80, 8080 (occasionally)**

**Https: 443**

**SSH: 22**

**Ans 9.**

**In IIT KGP (iitkgp.ac.in) port 8080, 443, and 22 are closed. Port 80 is open**

**Ans 10.**

**Hypertext Transfer Protocol (HTTP)** is a protocol used in networking. When you type any web address in your web browser, your browser acts as a client, and the computer having the requested information acts as a server. When client requests for any information from the server, it uses HTTP protocol to do so. The server responds back to the client after the request completes. The response comes in the form of web page which you see just after typing the web address and press “Enter”.

Hypertext Transfer Protocol Secure (HTTPS) is a combination of two different protocols. It is more secure way to access the web. It is combination of Hypertext Transfer Protocol (HTTPS) and SSL/TLS protocol. It is more secure way to sending request to server from a client, also the communication is purely encrypted which means no one can know what you are looking for. This kind of communication is used for accessing those websites where security is required. For HTTPS connection, public key trusted and signed certificate is required for the server. These certificate comes either free or it costs few dollars depends on the signing authority.

**Ans 11.**

Registrant email: [head@cc.iitkgp.ernet.in](mailto:head@cc.iitkgp.ernet.in) using whois tool from ping.eu

**Ans 12**

Also known as local host.

In computer networking, **localhost**means *this computer*. It is a hostname that the computer's software and users may employ to access the computer's own network services via its loopback  network interface. Using the loopback interface bypasses local network interface hardware.