PRIME COLLEGE

BSc.CSIT

ASSIGNMENT 2

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1) What is difference between internet and intranet

Internet is a worldwide/global system of interconnected computer networks. It uses the standard Internet Protocol (TCP/IP). Every computer in Internet is identified by a unique IP address. A special computer DNS is used to provide a name to the IP address so that the user can locate a computer by a name.

Intranet is the system in which multiple PCs are connected to each other. PCs in intranet are not available to the world outside the intranet. Usually each organization has its own Intranet network and members/employees of that organization can access the computers in their intranet. Each computer in Intranet is also defined by an IP address.

Difference between

Internet	Intranet
i) Internet is used to connect different network of computers simultaneously.	i) Intranet is owned by private firms.
ii) In internet, there are multiple users.	ii) In intranet, there are limited users.
iii) Internet is unsafe.	iii) Intranet is safe.
iv) Internet is a public network.	iv) Intranet is private network.
v) Anyone can access Internet.	v) Anyone cann't access.
vi) It provides unlimited information.	vi) It provides limited information

2) History of Internet

Growth of Internet can be discussed in 3 steps :-

i) Internetworking Protocol - Transmission Control Protocal / Internet Protocal - 1970s

ii) Usenet groups and Electronic mail in 1980s.

iii) World wide web (WWW) in 1990s.

US Department of Defense Advanced Research Projects Agency (DARPA) during 1970's developed the ARPANET as a WAN to connect different computers and later to connect computers on different networks (Internetworking). Internetworking became the focus of research at ARPA and led to the emergence of Internet.

DARPA goals included:

a) the ability to interconnect different types of network.

b) to connect through alternate paths if some path gets destroyed,

c) to support applications of various types like audio, video, text etc.

Based on the design goals, a protocol named TCP/IP was developed for computer communication. TCP/IP has become the protocol for Internet.

i) In late 1970s, the US National Science Foundation (NSF) designed a successor to ARPANET, called NSFNET, which was open for use to all university research groups, libaries, and museums. This allowed scientists across the country to share data and interact with each other for their research project.

Internet grew exponentially when ARPANET was interconnected

with NSFNET.

ii) In 1980s, many Internet applications like electronic mail, news-groups, file transfer facility and remote login were developed. The Electronic mail facility allowed users to compose, send and receive messages. Users having common interests could exchange messages using forums like Newsgroups. The Telnet command allowed users to login to a remote computer. The File Tranfer Protocol program was used to copy files from one computer to another on the Internet.

iii) In the early 1990s, a new application World Wide Web(www) changed the way in which Internet was used.

WWW is a system of creating, organizing, and linking documents and was created by British scientist Tim Berners Lee. A protocol based on hypertext was developed that allowed the documents and content on WWW to be connected via hyperlink.

In 1993, Marc Andreessen at the University of Illinois developed the Mosaic browser. The WWW along with the browser made it possible to set up number of web pages that may consist of text, pictures or sound, and with link to other pages.

3) The Internet Architecture

Internet is a network of interconnected networks and is designed to operate without central control. If a portion of the network fails, the connection is made through alternative paths available. The architecture of Internet is hierarchical in nature. It includes client, ISP, Regional ISP and Backbone.

(a) Client

Client (user of computer) at home or in LAN network is at the lowest level in hierarchy.

(b) Local ISP

Local ISP is at the next higher level. An ISP is an organization that has its own computers connected to the Internet and provides facility to individual users to connect to Internet through their computers. Local ISP is the local telephone company located in the telephone switching office, where the telephone of client terminals. Eg:- Nepal Telecom, World Link etc.

(c) Regional ISP

Regional ISP is next in the hierarchy. The local ISP is connected to regional ISP. The regional ISP connects the local ISP's located in various cities via routers. A router is a special hardware system consisting of a processor, memory and an I/O interface, used for the purpose of interconnecting networks. A router can interconnect networks having different technologies, different media & physical addressing schemes or frame formats.

d) Backbone

Backbone is at top of the hierarchy. Backbone operators are large corporations like AT&T which have their own server farms connected to the backbone. There are many backbones existing in the world. The backbone networks are connected to Regional ISP's with a large number of routers through high speed fiber-optics. Network Access Point (NAP) connects different backbones, so that packets travel across different backbones. If a packet at the backbone is for regional ISP connected to this backbone, the packet is sent to the closest router to be routed to local ISP and then to its destination, otherwise packet is sent to other backbone via NAP.

4) What is IP address? Difference between IPV4 and IPV6

IP address is a unique address that identifies a device on the internet or local network. IP stands for 'Internet Protocol' which is the set of rules governing the format of data sent via the internet or local network. In essence, IP addresses are the identifier that allows information to be sent between devices on network, they contain location information and make devices accessible for communication. The internet needs a way to differentiate between different computers, routers and websites. IP addresses provide a way of doing so and form an essential part of how the internet works.

An IP address is a string of numbers separated by periods.

IP address are expressed as a set of four numbers. Each no. in the set can range from 0 to 255, the full IP addressing range goes from 0.0.0.0 to 255.255.255.255.

IPv4 & IPv6

IPv4 is an IP version widely used to identify devices on a network using an addressing system. It was the first version of IP deployed for production in the ARPANET in 1983. It uses a 32-bit address scheme to store 2^{32} addresses.

IPv6 is the most recent version. This new IP address version is being deployed to fulfill the need for more Internet address. IPv6 is also called IPng (Internet Protocol next generation)

Difference

IPv4	IPv6
i) IPv4 is 32-bit IP address length.	i) IPv6 is 128-bit IP address length.
ii) It is a numeric addressing method	ii) It is an alphanumeric addressing method (hexa decimal)
iii) Binary bits are separated by a dot (.)	iii) Binary bits are separated by a colon (:)
iv) It supports VLSM (Variable Length Subnet Mask).	iv) It doesn't support VLSM.
v) It uses ARP (Address Resolution Protocol to map to MAC address.	v) It uses NDP (Neighbour Discovery Protocol) to map to MAC address.
vi) Security feature is dependent on application.	vi) IPSEC is inbuilt security feature in the IPv6 protocol.
vii) It supports Manual & DHCP address configuration.	vii) It supports Auto & renumbering address configuration.

5) What is Email and how Email works?

Electronic mail (E-mail) is an electronic message transmitted over a network from one user to another. E-mail is a text-based mail consisting of lines of text, and can include attachments such as audio messages, pictures and documents. Ray Tomlinson is called as the father of the email system, and he sent a communication between two computer systems for ARPANET. The email was sent by Ray Tomlinson in 1971. Tomlinson sent the email to himself as a test e-mail message.

How E-mail works

The e-mail works on the client-server model. E-mail clients are the users who wish to use the e-mail facility. The basic functionality of the client includes: create new emails, display and store received e-mails, address list of contacts etc. Both, the sender of e-mails and the recipient of email are e-mail clients. Email server is a combination of processes running on a server with a large storage capacity: a list of users and roles, and the capacity to receive, send and store emails and attachments. These servers are designed to operate without constant user intervention. The e-mail client interacts with the e-mail server to send or receive e-mail. Most email servers provide emails service by running two separate processes on the same machine - Post Office Protocol 3 (POP3) and Simple Mail Transfer Protocol (SMTP). Some e-mails servers also run another process on the machine Internet Message Access Protocol (IMAP).

SMTP is used to send email from the client to server from one server to another server. POP3 is used by client for application based e-mail to access mail from the server. IMAP is used by client for web-based email to access mail on server.

The email client-server work as follows:

The clients connect to e-mail server when the user wants to send, check or receive e-mail. The client connects to the server on two TCP/IP ports: ① SMTP on port 25, and ② POP3 on port 110 or IMAP on port 143.

SMTP server accepts outgoing email from client (sender e-mail client). Next, the SMTP server checks the e-mail address at which e-mail has to be delivered (recipient e-mail client). If the recipient e-mail client resides on the same SMTP server, then the e-mail is sent to the local POP or IMAP server, otherwise the email is sent to another SMTP server so that it reaches the recipient e-mail client's SMTP server.

POP3 stores e-mail for a client on a remote server. When the client gets connected to server, the e-mail messages are downloaded from POP3 server to client's computer.

IMAP also stores e-mails on a remote server. However, the e-mails message are not downloaded to the client's computer. The user manipulates the e-mail messages directly on the e-mail server.

The POP3/IMAP and SMTP are linked by an internal mail delivery machanism that moves mail between the POP3/IMAP and SMTP servers.

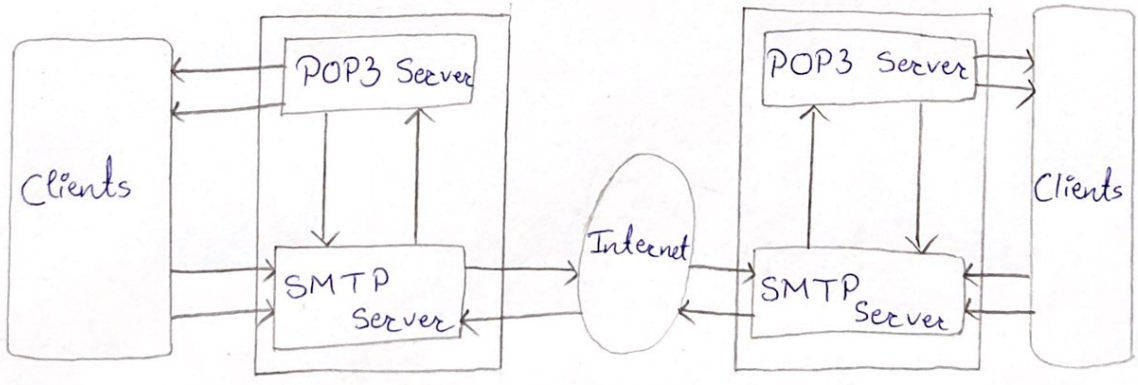

Fig: Interaction between E-mail Client & Server