The Internet and Internet Services

Unit-08:The Internet and Internet Services (4 Hrs.)

- Introduction; History of Internet;
- Internetworking Protocol;
- The Internet Architecture;
- Managing the Internet;
- Connecting to Internet;
- Internet Connections;
- Internet Address;
- Internet Services;
- Uses of Internet;
- Introduction to Internet of Things (IoT),
- Wearable Computing, and Cloud Computing,
- Introduction to E-commerce, E-governance, and Smart City, and GIS

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INTRODUCTION:

- The computers interconnected by LAN, MAN, and WAN are able to exchange information within their networks. Computer connected to one network is able to exchange information with another computer connected to the same network.
- However, a computer connected to a particular network may need to interact with a computer connected to a different network. Internet is defined as an interconnection of networks. Internet allows computers on different kinds of networks to interact with each other.
- Any two computers, often having different software and hardware, can exchange information over the Internet, as long as they obey the technical rules of Internet communication.
- The exchange of information may be among connected computers located anywhere like military and research institutions, banks, educational institutions, public libraries, commercial sectors etc.

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HISTORY OF INTERNET:

Growth of Internet can be discussed in three steps, as follows:

1. Internetworking Protocol - Transmission Control Protocol/Internet Protocol (TCP/IP) in 1970s
2. Usenet groups and Electronic mail in 1980s
3. World Wide Web (WWW) in 1990s

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HISTORY OF INTERNET:

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:

- the ability to interconnect different types of network
- to connect through alternate paths if some path gets destroyed, and
- to support applications of various types like audio, video, text etc.

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HISTORY OF INTERNET:

- Based on the design goals, a protocol named Transmission Control Protocol/Internet Protocol (TCP/IP) was developed for computer communication. TCP/IP has become the protocol for Internet.
- 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, libraries and museums.
- This allowed scientists across the country to share data and interact with each other for their research projects.
- Internet grew exponentially when ARPANET was interconnected with NSFNET.

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HISTORY OF INTERNET:

- In 1980s, many Internet applications like electronic mail, newsgroups, 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 Transfer Protocol program was used to copy files from one computer to another on the Internet.

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HISTORY OF INTERNET:

- 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.
- Internet and WWW which are interconnection of networks, and interconnection of documents and resources, respectively, has wired the whole world together.

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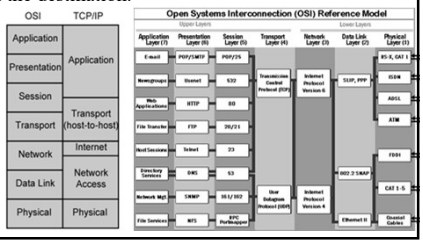
Internetworking Protocol:

TCP/IP is the communication protocol for the Internet.

- The TCP/IP protocol has two parts: TCP and IP.
- Transmission Control Protocol (TCP) provides reliable transport service, i.e. it ensures that messages sent from sender to receiver are properly routed and arrive intact at the destination.



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Internetworking Protocol: TCP

TCP converts messages into a set of packets at the source, which are then reassembled back into messages at the destination. TCP operates with the packet switching technique, which is described as follows:

- The message is divided into small packets.
- Each packet contains address, sequencing information, and error control information.
- The address is used to route the packet to its destination.
- Since multiple users can send or receive information over the same communication line, the packets can arrive out of order at the destination. The sequencing information in the packet is used to reassemble the packets in order, at their destination.
- The error control information is used to check that the packet arrived at the destination is the same as that sent from the source (i.e. has not got corrupted)

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Internetworking Protocol: IP

- Internet Protocol (IP) allows different computers to communicate by creating a network of networks.
- IP handles the dispatch of packets over the network.
- It handles the addressing of packets, and ensures that a packet reaches its destination traveling through multiple networks with multiple standards.

TCP/IP protocol makes it possible for any pair of computers connected to Internet to communicate, despite their hardware differences.

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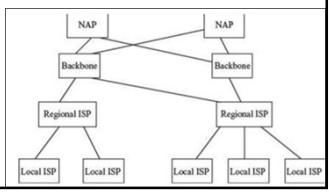
THE INTERNET ARCHITECTURE:

Internet is a network of interconnected networks and is designed to operate without a central control. If a portion of the network fails, connection is made through alternative paths available.

- Client
- Local Internet Service Provider (ISP)
- Regional ISP
- Backbone is at top of the hierarchy.
- Network Access Point (NAP)



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Managing the Internet:

Internet is not controlled by any one person or an organization. A number of organizations manage the Internet. Some of the governing bodies of the Internet and their functions are as

Governing Bodies of Internet	Functions
Internet Society (ISOC)	➢ Provides information about Internet ➢ Responsible for development of standards and protocols related to Internet
Internet Architecture Board (IAB)	➢ Advisory group of ISOC ➢ Responsible for development of Internet architecture
Internet Engineering Task Force (IETF)	➢ Community of network designers, operators, vendors, and researchers ➢ Responsible for evolution of Internet ➢ Open to all individuals

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Managing the Internet:

Governing Bodies of Internet	Functions
➢ Internet Engineering Steering Group (IESG)	➢ Reviews standards developed by IETF
➢ Internet Research Task Force (IRTF)	➢ Focuses on research towards the future of Internet (Internet protocol, architecture etc.)
➢ Internet Assigned Number Authority (IANA)	➢ Allots IP address to organizations and individuals
➢ Internet Network Information Center (InterNIC)	➢ Responsible for domain name registration
➢ World Wide Web Consortium (W3C)	➢ Responsible for development of technologies for World Wide Web

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Connecting to Internet:

To be able to connect your computer to the Internet, we require

(1) a TCP/IP enabled computer
(2) web browser software
(3) an account with an ISP
(4) a telephone line, and
(5) a modem or Network Interface Card (NIC) to connect the telephone line to the computer

A modem is a device that connects a computer to Internet. A Network Interface Card or NIC is a device that is required to connect a computer to Internet via a LAN or high-speed Internet connection like cable modem or Digital Subscriber Line (DSL). A web browser is a software that allows the user to view information on WWW. WWW is a large-scale, on-line repository of information that the users search using the web browser. Internet Explorer and Netscape Navigator are examples of web browser.

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Internet Connections:

1. Hardwired broadband access
- Dial-up access
- Integrated Services Digital Network
- Leased lines
- Cable Internet access
- Digital subscriber line (DSL, ADSL, SDSL, and VDSL)
- Fiber to the home

2. Wireless broadband access
- Satellite broadband
- Mobile broadband
- WiMAX
- Wireless ISP

Course Contents

Define internet address.

Explain physical and Logical address with example.

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Internet Address:

A computer connected to the Internet must have a unique address in order to communicate across the Internet.

Every computer or device on the internet has two types of addresses:

1. **Physical address** – Mac(media access control) address
2. Internet address(**Logical address**) – IP Address

A MAC address and an IP address each identify network devices, but they do the job at different levels.

- MAC address identifies a device to other devices on the same local network. The internet address (or IP address) identifies the device globally.
- A network packet needs both addresses to get to its destination.

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Internet Address: Physical (Mac) address

- Mac Address works in layer 2 (Data Link layer) of OSI reference model. Most devices are connected physically with Ethernet cables or wirelessly with Wi-Fi and both methods use MAC addresses to identify a device on the network.
- A MAC address consists of 12 hexadecimal digits, usually grouped into six pairs separated by hyphens. MAC addresses are available from 00-00-00-00-00-00 through FF-FF-FF-FF-FF-FF.
- The first half are vendor numbers which is the address of manufacturer (also called the OUI – Organizationally Unique Identifier), and the 2nd half is NIC serial number assigned by the manufacturer to this adapter, or station address.
- Mac number is hardcoded both into Ethernet and Wi-Fi devices during the manufacturing process.

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Internet Address: **Internet address (Logical address) – IP Address**

- IP address works in Layer 3, the network layer, of the OSI reference model. The internet was initially built around IP version 4 (IPv4) and is in transition to IPv6.
- An IP address identifies a device on the global internet.
- An IPv4 address consists of 32 bits, usually written as four decimal numbers, or a dotted quad. Possible decimal values range from 000.000.000.000 through 255.255.255.255, although many possible addresses are disallowed or reserved for specific purposes.
- The address combines network identification and device identification data. The network prefix is anywhere from eight to 31 bits, and the remainder identify the device on the network.
- An IPv6 address consists of 128 bits, with the first 64 reserved for network identification and the second 64 dedicated to identifying a device on the network.
- The address is written as eight sets of four hexadecimal digits separated by colons - for example, FEDC:BA98:7654:3210:0123:4567:89AB:CDEF.

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Internet Address: **Internet address (Logical address) – IP Address** :

- A computer connected to the Internet must have a unique address in order to communicate across the Internet. Internet Protocol (IP) address is assigned uniquely to every computer connected to the Internet.
- An IP address looks like 201.54.122.107. Since IP addresses are numeric, it is difficult to remember everyone's IP address. So, instead of numeric IP address, domain name is used.
- Another difference between a MAC address and IP address is the way the addresses are assigned. An IP address is bound to a network device via software configurations, and it can be changed at any time. Local network switches maintain Address Resolution Protocol (ARP) tables that map IP addresses to MAC addresses. When a router sends the switch a packet with a destination specified by an IP address, it uses the ARP table to know which MAC address to attach to the packet when it forwards the data to the device as Ethernet frames.

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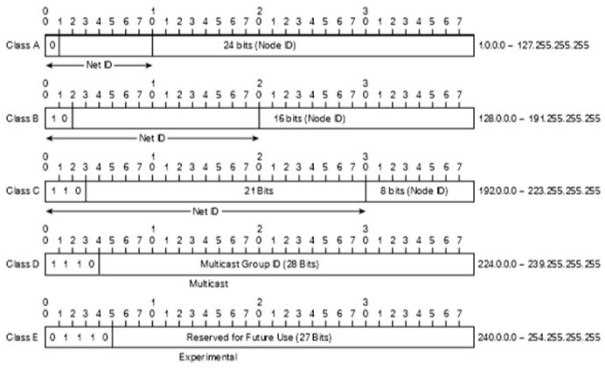
Internet Address: IP Address:



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Internet Address: IP Address:

Who provide IP Address to computer?

- If we connect to the Internet through an Internet Service Provider (ISP), temporary IP address are assigned for the duration of connection session.
- If we connect to the Internet from a local area network (LAN), computer might have a permanent IP address or it might obtain a temporary one from a DHCP (Dynamic Host Configuration Protocol) server.
- In any case, if you are connected to the Internet, your computer has a unique IP address.

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Internet Address: Domain Address:

- Domain name is a text name (string of words) corresponding to the numeric IP address of a computer on the Internet.
- Domain names are used for the convenience of the user. A domain name combines a group of hosts on the Internet (e.g. Yahoo, Google, MSN etc.), and a top level domain.

Some examples of top-level domain are as follows:

com for commercial organizations,
edu for educational institutions,
net for gateways and administrative hosts,
org for non-profit organizations,
co for companies, and
ac for academics

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Internet Address: Domain Names and Address Resolution using DNS

- Domain Name Service (DNS) is a distributed database which keeps track of computer's names and their corresponding IP addresses on the Internet.
- Many computers connected to the Internet host part of the DNS database and the software that allows others to access it. These computers are known as DNS servers.
- No DNS server contains the entire database; they only contain a subset of it. If a DNS server does not contain the domain name requested by another computer, the DNS server re-directs the requesting computer to another DNS server.

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Internet Services:

1. World Wide Web (WWW)
2. Electronic Mail
   - E-mail Address
   - E-mail Message Format
   - E-mail Services
   - How E-mail Works
3. File Transfer Protocol (FTP)
   - How FTP Works
4. Terminal Network (Telnet)
5. News
6. Internet Relay Chat (IRC)

Computer Networks and Internet Services

Questions:

- What is the purpose of Network Access Point (NAP)?
- Name some organizations that manage the Internet.
- What is the purpose of sequencing and error control information in a packet sent by TCP over the Internet?
- What is the need of the IP address? What does an IP address look like? Give an example. What is the range of numbers used to write an IP address?
- What is the need of a domain name? Name five top-level domains. Give two examples of domain names. What is the purpose of the DNS server?
- Name the services provided by the Internet. What is the significance of the name World Wide Web?
- What is the use of hyperlink? Differentiate between homepage and web page.
- What is the function of web server? What is the use of web browser?
- What is a web portal? How is a web portal different from a web site?

Computer Networks and Internet Services

Questions:

- What is the purpose of URL? Explain the syntax of URL? Explain the parts of the following URL:http://www. niit.com/mainpage
- How is URL different from domain name?
- List four features of e-mail? Explain the syntax of e-mail address with example.
- What is the difference between Cc and Bcc in an e-mail header?
- Differentiate between application based e-mail and web based e-mail?
- Explain the working of e-mail.
- What information is stored in the e-mail header?
- What is the significance of the SMTP, POP3, and IMAP servers in context of the e-mail?
- When do you use FTP? List the goals of FTP.
- Explain the working of the FTP client-server. When is anonymous login used in FTP?
- What is the use of telnet? How is FTP different from telnet?
- What is the purpose of news service on the Internet?
- What is the use of IRC? How is chat different from e-mail?

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Internet Services: World Wide Web (WWW)

- WWW (also called as Web) is a large scale, online store of information. It is a system of creating, organizing, and linking of documents.
- Information is stored on WWW as a collection of documents that are interconnected with each other via links.
- The interconnected documents may be located on one or more than one computer, worldwide, thus, the name world wide web.

The features of WWW and terms linked to WWW are given below

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World Wide Web (WWW)

- Hypertext format
- HyperText Markup Language (HTML)
- Hyperlink
- HyperText Transfer Protocol (HTTP)
- Web page
- Web site
- Homepage
- Web Server
- Uploading/Downloading
- Web browser
- Uniform Resource Locator (URL)
- web portal

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Internet Services: World Wide Web (WWW)

The documents on web are created in hypertext format. Hypertext facilitates linking of documents.

- The language used to create a hypertext format document is HyperText Markup Language (HTML). HTML allows the designer of the document to include text, pictures, video, images, sound, graphics, movies etc., and also to link contents on the same document or different documents using a hyperlink.
- The hypertext format document is transferred on the Web using HyperText Transfer Protocol (HTTP).
- A single hypertext document is called a Web page.
- A group of related web pages is called a Web site. A web site displays related information on a specific topic.

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Internet Services: World Wide Web (WWW)

- The first web page or main page of a website is called Homepage.
- The web pages are stored on the Internet on the Web Server. Web servers are host computers that can store thousands of web pages.
- The process of storing a web page on a web server is called uploading.
- The process of retrieving a web page from a web server onto the user's computer is downloading.
- The web pages stored on web server on the Internet, can be viewed from the user's computer using a tool called Web browser.
- Every web page is identified on Internet by its address, also called Uniform Resource Locator (URL).
- A web portal is a web site that presents information from different sources and makes them available in a unified way. A web portal enables the user to search for any type of information from a single location, i.e. the home page of the web portal. A web portal generally consists of a search engine, e-mail service, news, advertisements, and an extensive list of links to other sites.

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Internet Service: How WWW works?

When type a URL into a web browser, works as below:

- If the URL contains a domain name, the browser first connects to a domain name server and retrieves the corresponding IP address for the web server.
- The web browser connects to the web server and sends an HTTP request (via the protocol stack) for the desired web page.
- The web server receives the request and checks for the desired page. If the page exists, the web server sends it. If the server cannot find the requested page, it will send an HTTP 404 error message. (404 means 'Page Not Found')
- The web browser receives the page back and the connection is closed.
- The browser then parses through the page and looks for other page elements it needs to complete the web page. These usually include images, applets, etc.
- For each element needed, the browser makes additional connections and HTTP requests to the server for each element.
- When the browser has finished loading all images, applets, etc. the page will be completely loaded in the browser window.

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Electronic Mail: 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. The features of e-mail are as follows:

- E-mail can be sent to one person or more than one person at the same time.
- Communicating via e-mail does not require physical presence of the recipient. The recipient can open the e-mail at his/her convenience.
- Since messages are transmitted electronically, e-mail is a fast way to communicate with the people in your office or to people located in a distant country, as compared to postal system.
- E-mail messages can be sent at any time of the day.
- A copy of e-mail message that the sender has sent is available on the senders computer for later reference.
- In addition to sending messages, e-mail is an ideal method for sending documents already on the computer, as attachments.
- E-mail has features of the regular postal service. The sender of e-mail gets the e-mail address of the recipient, composes the message and sends it. The recipient of e-mail can read the mail, forward it or reply back. The recipient can also store the e-mail or delete it.

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E-mail Message Format:

The e-mail message consists of two parts-header and body. The header contains information about the message, such as:

- **From**—Sender's e-mail address.
- **To**—Recipient's e-mail address.
- Date—When the e-mail was sent.
- Subject—The topic of the message.
- Cc—Addresses where carbon copies of the same e-mail will be sent. The recipients of e-mail can see all e-mail addresses to which the copies have been sent.
- Bcc—Addresses where Blind carbon copies (Bcc) of the same e-mail will be sent. The recipients of e-mail do not know that the same e-mail has been sent to other e-mail addresses.
- The **size** of e-mail.

The body contains the text of the message and any attachments to be sent.

Course Contents

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. Both, the sender of e-mail and the recipient of e-mail are e-mail clients.
- E-mail server is a combination of processes running on a server with a large storage capacity- a list of users and rules, and the capability 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 email services by running two separate processes on the same machine-Post Office Protocol 3 (**POP3**) and Simple Mail Transfer Protocol (**SMTP**). Some e-mail servers also run another process on the machine—Internet Message Access Protocol (IMAP) (Microsoft Exchange Server & Exchange ActiveSync)
- SMTP is used to send e-mail from the client to server and 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 e-mail to access mail on server.

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How E-mail Works:

The e-mail client-server work as follows:

- The client connects to e-mail server when the user wants to send, check or receive email. 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 e-mail 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-mail messages 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 mechanism that moves mail between the POP3/IMAP and SMTP servers.

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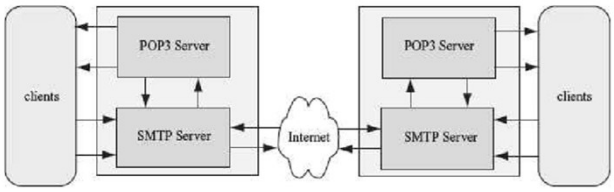
How E-mail Works:



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File Transfer Protocol (FTP):

FTP is an Internet tool used for copying files from one computer to another. It gives access to directories or folders on remote computers, and allows software, data and text files to be transferred between different kinds of computers. Using a FTP program or a web browser, the user can log onto an FTP host computer over Internet and copy files onto their own computer.

The goals of FTP are as follows:

- FTP promotes sharing of files, articles, and other types of data.
- FTP encourages indirect use of remote computers.
- Heterogeneous systems use different operating systems, character sets, directory structures, file structures and formats. FTP shields users from these variations and transfers data reliably and efficiently.
- Universities and software companies use FTP host computers to provide visitors with access to data.

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How FTP Works:

FTP works on the client-server model. FTP client is a program running on the user's computer that enables the user to talk to, and get files from remote computers. FTP server is the remote computer or the host computer from which files are accessed by the FTP client. The FTP client-server works as follows:

- The FTP client gives the ftp command with the address of FTP server, using a URL. For example, ftp://ftp.cs.vu.nl
- When the FTP client gets connected to FTP server, the user enters the User Login and password. A user can login to a FTP server even if they don't have an account on the FTP server. For this, the user uses the anonymous login.
- FTP server verifies the User Login and password to allow the FTP client to access its files.
- FTP client looks in the directory for files in the FTP server.
- FTP client gets the requested file(s) and quits.

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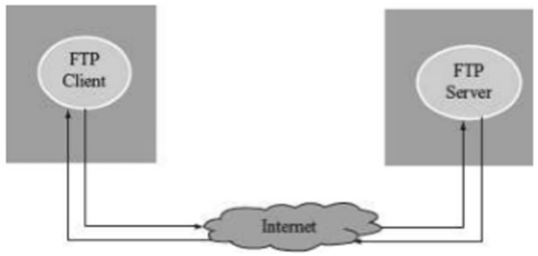
How FTP Works:



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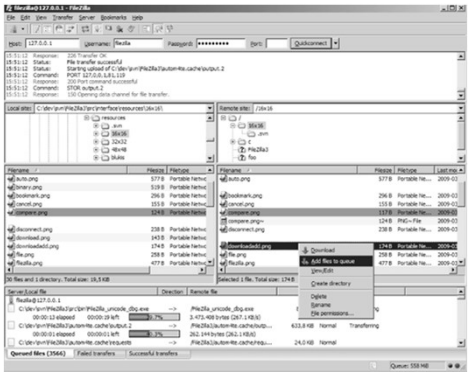

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Uses of Internet:

Internet is used for different purposes by different people. Some uses of the Internet are listed below:

- E-Commerce (auction, buying, selling products etc.)
- Research (on-line journals, magazines, information etc.)
- Education (e-learning courses, virtual classroom, distance learning)
- E-Governance (online filing of application (Income Tax), on-line application forms etc.)
- On-line ticket booking (airplane tickets, rail tickets, cinema hall tickets etc.)
- On-line payments (credit card payments etc.)
- Video conferencing
- Exchange of views, music, files, mails, folders, data, information etc.
- Outsourcing jobs (work flow software)
- Social networking (sites like Facebook, LinkedIn, twitter, Orkut
- E-Telephony (sites like skype)

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Introduction to Internet of Things (IoT):

- The Internet of Things(IoT) is the extension of internet connectivity into physical devices. These "smart" and "connected" devices communicate over the internet. Due to this connection, they can be remotely monitored and controlled.
- Internet of Things (IoT) is the networking of physical objects that contain electronics embedded within their architecture in order to communicate and sense interactions amongst each other or with respect to the external environment.
- In the upcoming years, IoT-based technology will offer advanced levels of services and practically change the way people lead their daily lives.
- Advancements in medicine, power, gene therapies, agriculture, smart cities, and smart homes are just a very few of the categorical examples where IoT is strongly established.

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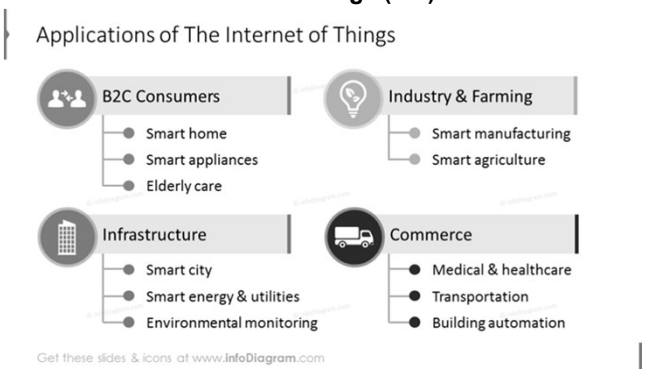
Introduction to Internet of Things (IoT):



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Introduction to Internet of Things (IoT):

There are four main components used in IoT:

1. Low-power embedded systems: Less battery consumption, high performance are the inverse factors play a significant role during the design of electronic systems.
2. Cloud computing: Data collected through IoT devices is massive and this data has to be stored on a reliable storage server for cloud computing. The data is processed and learned, giving more room for us to discover where things like electrical faults/errors are within the system.
3. Availability of big data: We know that IoT relies heavily on sensors, especially real-time. As these electronic devices spread throughout every field, their usage is going to trigger a massive change of big data.
4. Networking connection: In order to communicate, internet connectivity is a must where each physical object is represented by an IP address.

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Wearable Computing:

- Wearable computing is a term that refers to computer-powered devices or equipment that can be worn by a user, including clothing, watches, glasses, shoes and similar items.
- Wearable computing devices can range from providing very specific, limited features like heart rate monitoring and pedometer capabilities to advanced "smart" functions and features similar to those a smartphone or smartwatch offers.
- These more advanced wearable computing devices can typically enable the wearer to take and view pictures or video, read text messages and emails, respond to voice commands, browse the web and more.
- While wearable computing devices are only just now starting to emerge from the realm of science fiction into reality, rumored devices like Google Glasses and the Apple iWatch may soon bring advanced wearable computing devices into the mainstream.

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Cloud Computing:

- Cloud computing basically means computing on the Internet. Connecting to the cloud represents connecting to the Internet and is made easier through the advances in wireless technology.
- In cloud services, the data center operates like the Internet and computing resources are accessed and shared as virtual resources in a secure and scalable manner.
- In a simple description, cloud computing refers to taking services ("cloud services") and moving them outside an organizations firewall on shared systems.
- In the cloud system, applications and services are accessed via the web, instead of a computer hard drive. The services are delivered and used over the Internet where a charge is paid by cloud customer typically on an "as-needed, pay-per-use" business model. The benefit is that the cloud infrastructure is managed by the cloud provider, not the individual cloud customer.

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Introduction to E-commerce:

E-commerce involves buying and selling of products and services, electronically via internet. E-commerce involves any business transaction executed electronically between parties. It uses Internet and Web for doing the business. It uses services like e-mail, workflow software tools, Intranet, and, the e-payment services.

The parties involved in e-commerce may be of the following kinds:

- Business and Business (B2B). A data processing company handling data services for a company.
- Business and Consumers (B2C).
- Consumers and Consumers (C2C). A customer selling goods to another customer, like in e-bay.com.
- Business and the public sector, and, consumers and the public sector.

- E-commerce web sites are like on-line market places where you can sell and buy items, and facilitate it by advertising your product, establishing newsgroups and blogs, posting job-oriented resumes etc.
- The on-line shopping is a fast growing segment as consumers are becoming more confident to use it, with the widespread use of the Internet.

The Internet and Internet Services

Things to consider for e-commerce business:

There are several issues that you should consider before selling your goods and services via internet.

- Planning for e-commerce
- Choose the right website hosting and ISP provider
- Options for connecting to the Internet
- Best practice in web design
- Create an online shop for sales and marketing
- Accepting online payments
- Develop an e-marketing plan

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Who is involved in an ecommerce business ?

Depending upon the scale and complexity of the proposed e-commerce system, ranges of specialists required and have experiences of:

- Servers Microsoft, Lynux, Sun etc(File, Communication and database server)
- Firewalls and security
- Graphic design and production
- HTML and XML coding
- Programming languages
- Database technologies

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E-governance:

- Electronic governance or e-governance or Digital Governance is the application of information and communication technology (ICT) for delivering government services, exchange of information, communication transactions, integration of various stand-alone systems between government to citizen (G2C), government-to-business (G2B), government-to- government (G2G)
- The two main objectives of E-governance is to restore the democracy to its true meaning with the help of improvisation of the participation of the citizen in the governing process by giving feedback and access to information and overall participation of the citizen in the decision making.
- The main objective of e-Governance is delivering or exchanging the information, enhancing the business transactions, giving better services to the citizens and handle the various interactions within and across the government and business organizations.

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E-governance:

- Governance is about how local public bodies and partnerships ensure that they are doing the right things, in the right way, for the right people in a timely inclusive, open, honest and accountable manner.
- It comprises the systems and processes for the direction and control of local authorities through which they account to, engage with and lead their communities"

The Internet and Internet Services

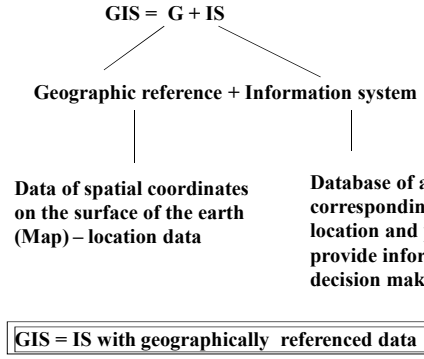
Smart City:

A smart city is a designation given to a city that incorporates information and communication technologies (ICT) to enhance the quality and performance of urban services such as energy, transportation and utilities in order to reduce resource consumption, wastage and overall costs.

To improve urban living and to optimize their resources, cities are folding internet-connected devices into streetlights, municipal infrastructure, parking meters, and more, composing what could be called the "technological" portion of a smart city. Smart cities are using the Internet of Things (IoT) to improve the quality of life for their citizens.

The Internet and Internet Services

GIS: What is GIS ?



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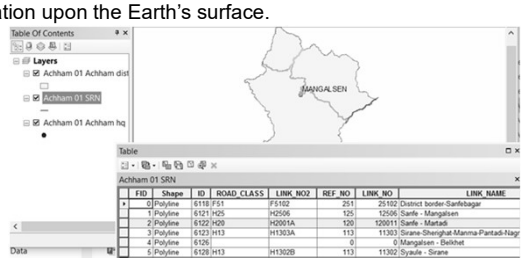
GIS: What is GIS ?

A geographic information system (GIS) is the system that captures, stores, analyzes, manages, and presents data with reference to geographic location data.

GIS is concerned with spatial or geographic data which refers to data that has a location upon the Earth's surface.



The Internet and Internet Services

GIS: Why use GIS?

A GIS can be used to do the following:

- **Merges** diverse data sources – project specific information, socio-economic, census, statistical and spatial base data such as administrative boundaries, roads, cities, infrastructure, etc.
- **Manage all diverse data sources to prepare map, graph and reports** and to report management for decision making process.
- **Visualizes** and **disseminates** information.
- **Analyses** data, **illustrates** trends, growth, and generates value added outputs.
- Reveals important **spatial** relationships that facilitate understanding.

So GIS provides a platform for project **planning**, **monitoring, reporting and data sharing** for decision making process**.**

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GIS: Basic GIS Function?

- **Data input**
  - Graphic data: digitized, converted from existing data
  - Attribute data: keyed-in, loaded from existing data files
- **Data storage and manipulation**
  - File management, Editing, Geoprocessing (clip, merge, etc), reclassification
- **Data analysis**
  - Database query, Spatial analysis, Modeling
- **Data output or display**
  - Maps, Reports, Tables, Graphs

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GIS: Scope of GIS

- Land registration system
- Utilities such as Water supply, Electricity, Telephone, Irrigation networks
- Topographical database
- Forestry planning management
- Transportation networks
- Land use and land cover planning
- Urban planning
- Natural resource planning
- Disaster management and mitigation
- Environment impact studies

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GIS: Geographical Data

1. Spatial data

- Point Object: School, hospital, settlement, bridge, tap stands etc
- Line objects: Roads, Drain, Canal, Electric line, W/S pipe lines, etc
- Polygon Objects: Forest, Lake, Cultivates area etc

2. Non-spatial (Attribute data) - Like as Excel or Dbase

- These are the properties of the spatial data. Each component has number of important properties which is presented in tabular form and also called attributes.