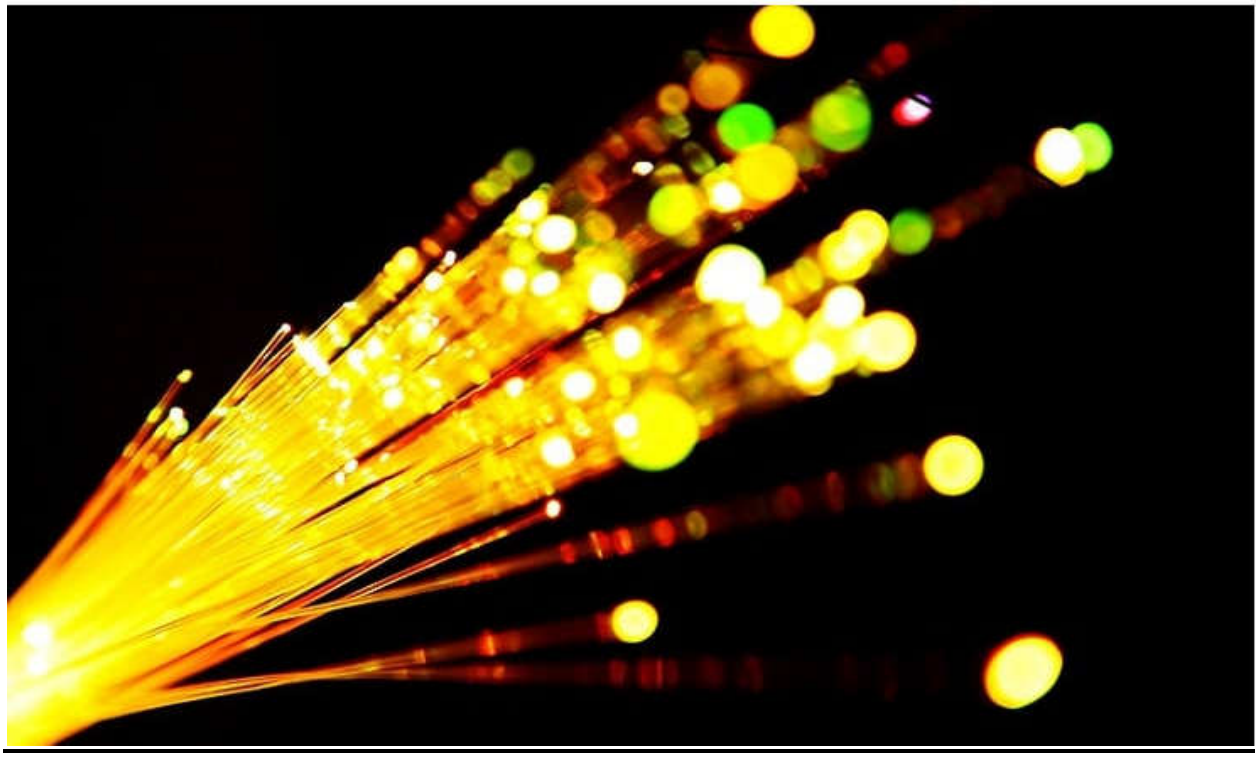
UNIT 2 : The Network Infrastructure for E-Commerce

- Introduction to Information Superhighway (I-Way),
- Components of the I-Way,
- Internet as a network infrastructure,
- Intranet, Extranet,
- Software Agents (Static and Dynamic),
- ADSL, Wi-Fi, Wide Area Wireless, UMTS (3G),LTE (4G), Bluetooth

Introduction To Information Superhighway(I-Way)



Nepal-China Information Superhighway Opens

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By NEW SPOTLIGHT ONLINE | Jan. 13, 2018, 7:34 a.m.

Introduction to I-way(Inforation Super High way)

- a telecommunications infrastructure or system (as of television, telephony, or computer networks) used for widespread and usually rapid access to information
- E-commerce needs a standard network infrastructure to transport the content
- Internet and intranet are the basic tools to implement e-commerce.
- The network infrastructure is provided by I-way or information superhighway

Compiled By:Sudip Raj Khadka

- Information superhighway can be defined as high capacity electronic pipeline that is capable of simultaneously supporting a large number of e-commerce applications and provide interactive connectivity.
- I-way network infrastructure provides a data transmission facility
- Thus information superhighway can be defined as the high capacity, electronic interactive pipeline to the consumer or business premises that is capable of supporting large number of e-commerce applications simultaneously.
- Nowadays information superhighway emerged as basic network infrastructure for all e-commerce activities due to its capability of providing integrated texts, graphics, audio and video services

Components of I-Way

- There are three major category of I-Way Components as follows:
    - Network or Consumer Access Equipments
    - Access Road (Local On Ramps): Telecom based, cable TV based, wireless based, internet/intranet based
    - GIDN(Global Information Distribution Network)

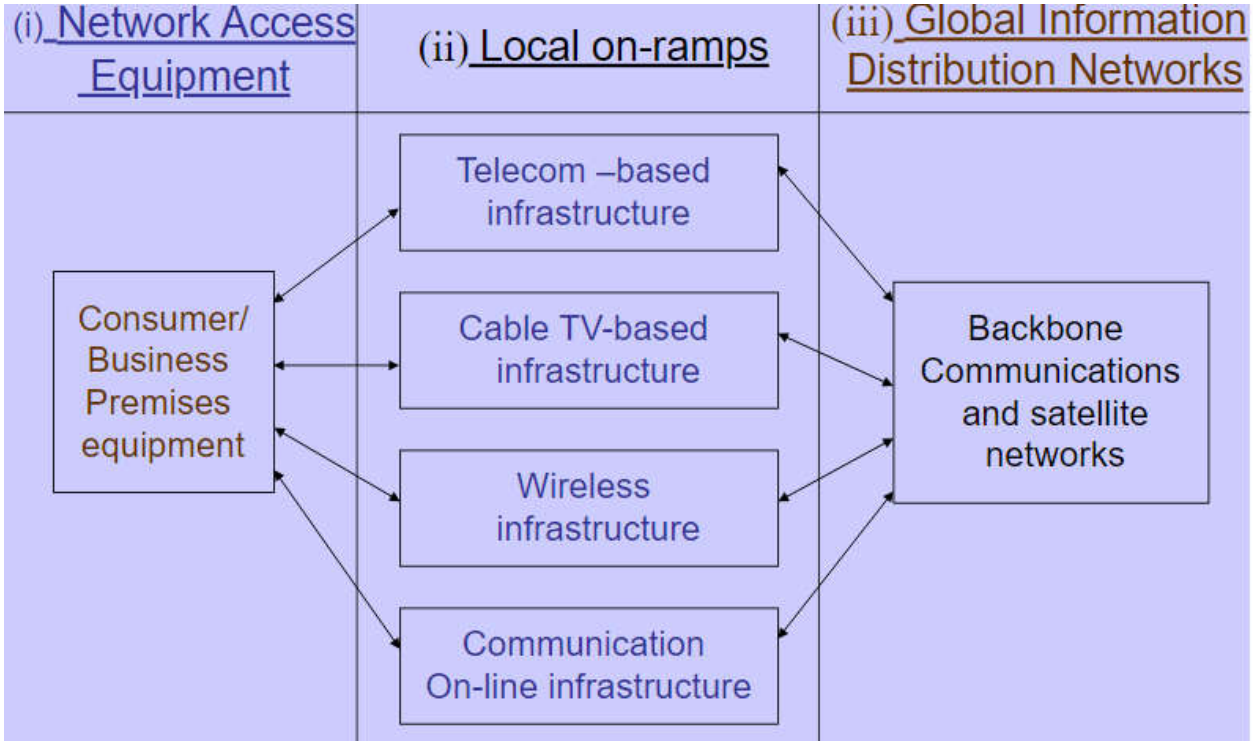


Figure: Illustrating Components of I-Way

Network or Consumer Access Equipments:

- These are the devices at consumer end and enables consumers to access the network
- It consists of hardware and software
- Hardware component includes devices such as computers, modem, router for computer network; set top box for television network.
- Software systems includes browser, OS
- These equipments are also called customer premise equipments or terminal equipments and is broadly catogrized as follows
  - Physical Device –Router ,Switch etc
  - Access Device---Computer, Setup -box ,router,etc
  - Software Platform: Browser, Operating System etc.

Access Road (Local On Ramps):

- These are the network infrastructure that provides linkage between businesses, homes and offices to global information distribution network.
- Access road can be divided into four categories: telecom based, cable TV based, wireless based, computer based online
- Main function of access road is to connect consumers with e-commerce applications.
- **Telecom based access road:** telecom industries provides high speed electronic pipeline which is capable for carrying large volume of audio, video and text data
- **Cable TV based access road:** cable TV system also provides high capacity broadband network infrastructure to connect large number of consumers with their system.
- **Wireless based access road:** provides network infrastructure by using radio frequencies
- **Computer based online system** (internet/intranet)

Global Information Distribution Network(GIDN)

- This network represents the infrastructure crossing the countries and continents.
- Two major technologies underpinning high speed global distribution network are
    - Fiber optic long distance network
    - Satellite network.

Intranet:

- An intranet is a private network contained within an enterprise that is used to securely share company information and computing resources among employees.
- An intranet can also be used to facilitate working in groups and teleconferences.
- Intranets increase communication within an organization by allowing employees to easily access important information, links, applications and forms as well as databases that can provide company records. Security can also be increased within the intranet by establishing a database that maintains all of the usernames of people who are allowed access to the network.
- Intranets are restricted to the internal members of an organization.
- Access to intranet is controlled through the use of username, password and firewall

Uses of the intranet

- Potential uses of an intranet include:
    - Streamlining everyday activities by making repeated tasks more feasible.
    - Centralizing and managing important information and company data in a single database.
    - Making collaboration easier since information can be shared across the entire network.
    - Providing personalized content to employees based on their role within the company.
    - Improving internal communication by making employee directories, company news and organization charts readily available.
    - Providing fast and easy access to information about company policies, benefits and updates.

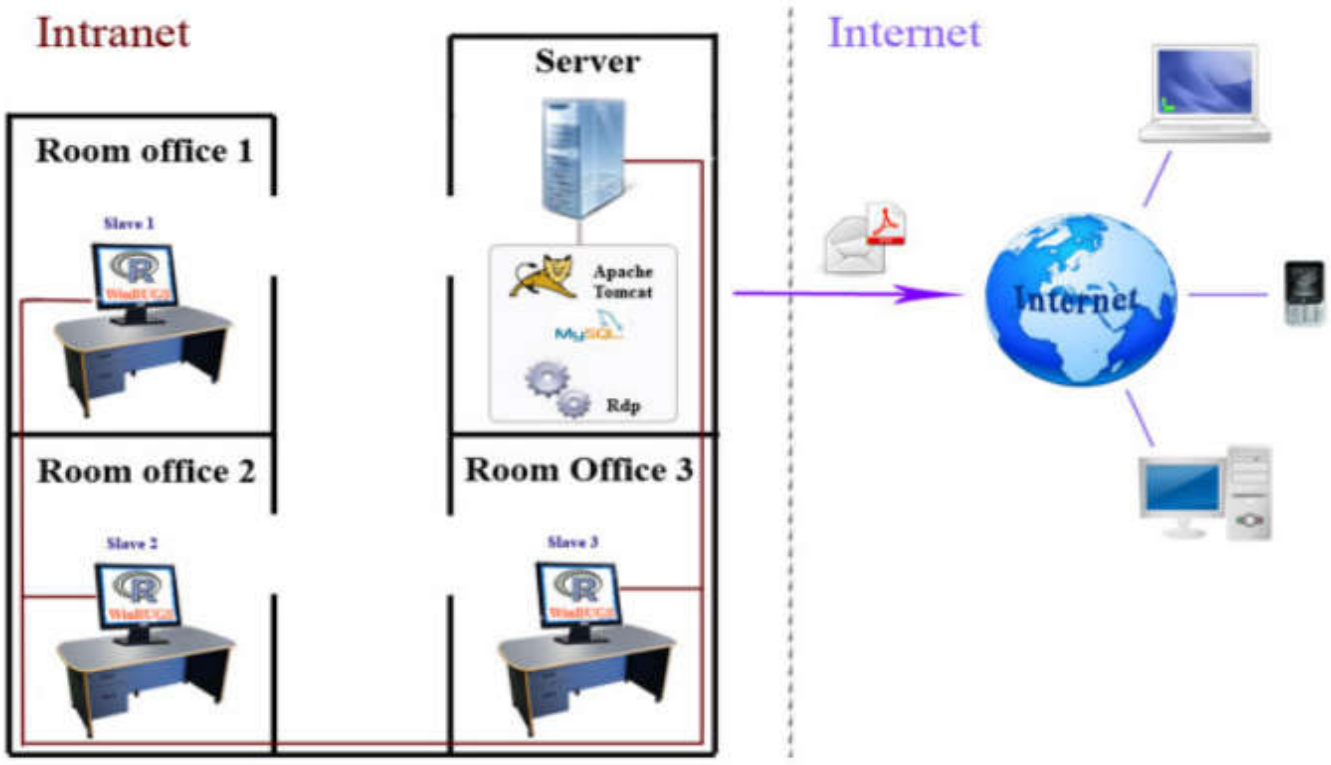


Fig illustrating Intranet and Internet

Extranet:

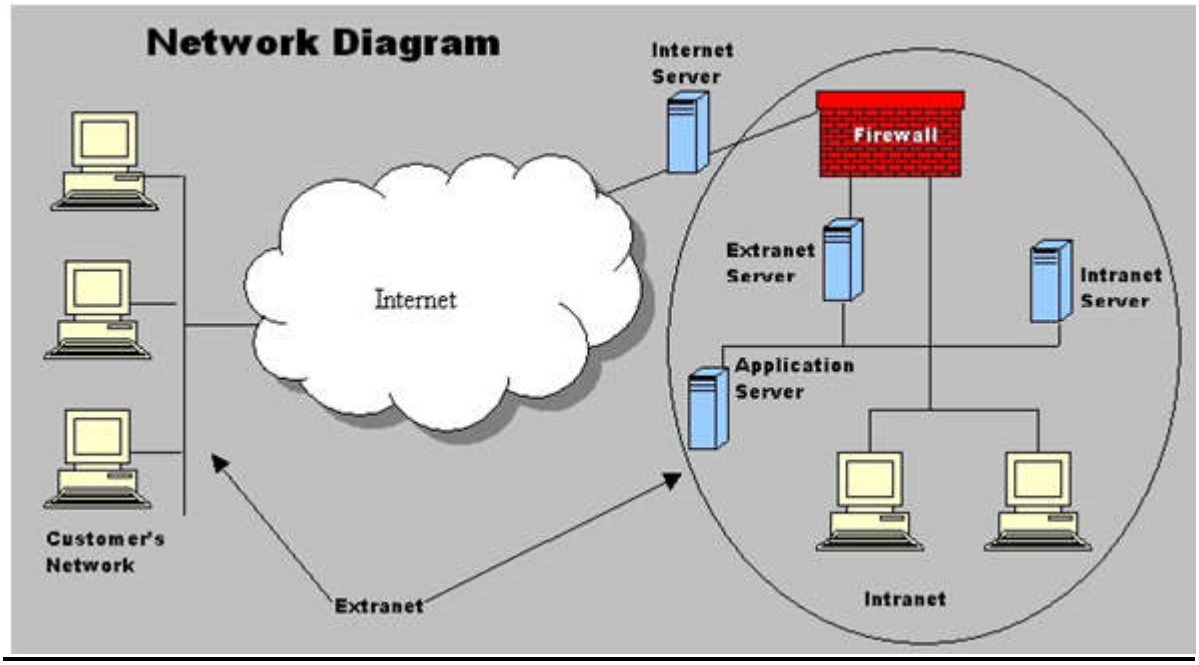


Figure :Illustrating Intranet, Extranet and Internet

- Extranet is the internal private network where limited numbers of outsiders are given access to the intranet.
- Like intranet, extranet is also based on internet and WWW technology and standards and uses TCP/IP protocol for communication
- The beauty of intranet and extranet is that they don't require any special software and hardware other than what we use for the internet
- An extranet is also defined as a controlled private network allowing customers, partners, vendors, suppliers and other businesses to gain information, typically about a specific company or educational institution, and do so without granting access to the organization's entire network.
- An extranet is often a private part of a website. It is restricted to select users through user IDs, passwords and other authentication mechanisms on a login page

Advantages of Extranet:

- **Enhanced communication:** extranet provides easy way of communication between geographically dispersed organizational branches, customers, suppliers and business partners
- **Productivity enhancement:** extranet supports the just-in-time delivery which is helpful to increase productivity of business processes
- **Business enhancement:** extranet helps to collaborate with geographically dispersed branches and it also helps to enhance relationship to customer and other stakeholders which have positive implications on business enhancement
- **Cost reduction:** helps to reduce paper cost, travel cost and administration cost by automating business activities

Internet:

- The **Internet** is a worldwide, publicly accessible series of interconnected computer networks that transmit data by packet switching using the standard Internet Protocol (IP).
- It is a **"network of networks"** that consists of millions of smaller domestic, academic, business, and government networks, which together carry various information and services, such as electronic mail, online chat, file transfer,

and the interlinked web pages and other resources of the World Wide Web (WWW).

- The **Internet and the World Wide Web** are not synonymous.
- The Internet is a collection of interconnected *computer networks*, linked by copper wires, fiber-optic cables, wireless connections, etc.
- In contrast, the Web is a collection of interconnected documents and other *resources*, linked by hyperlinks and URLs. The World Wide Web is one of the services accessible via the Internet, along with various others including e-mail, file sharing, online gaming etc .

The Internet and its Characteristics

- The Internet by the late 1990s has evolved into a complex environment. Originally a military communication's network it is now routinely used for five types of operations:
    1. long-distance transactions (e.g. e-commerce, form-filling, remote work, entertainment)
    2. interpersonal communication;
    3. data storage;
    4. research (i.e. data finding);
    5. remote data access and downloading.
- The Internet is a dynamic and mercurial system endowed with a number of traits as follows :

1. **Technological neutrality.** The Internet joins together computers of various sizes and architectures. They may run on various operating systems and utilize a great variety of communication links.
2. **Built-in piecemeal change and evolution**: The Internet is not a one-off development. It is an energetic, polycentric, complex, growing, and self-refining system. It is a network which is geared to expansion and growth. It is a system which scales up extremely well.
3. **Robustness and reliability:** designed to eliminate errors, to handle unexpected interruptions and interferences, to advise users of encountered difficulties and to recover gracefully from any disasters and down-times.

4. **Low cost:** The Internet makes new uses of old technologies (standalone computers, operating systems, telecommunication networks). Whenever possible, Internet operations piggyback on already existing solutions. They rely on modularised, configurable, easy-to-replace, and easy-to-upgrade off-the-shelf software and hardware.
5. **Ubiquity:** The robustness, modularisation and low cost of the system is coupled with the growing densities of dedicated computer lines, network backbones, as well as wired and wireless phone networks. This means that Internet-enabled tools are deployed in ever growing numbers in an ever widening range of environments

Internet as a Network Infrastructure:

- Internet is a meta-network, that is, network of networks that span the globe
- It is difficult to give an exact count of the number of networks or users that comprise the internet, but it is easily in the thousands and millions respectively.
- The internet employs a set of standardized protocols which allow for the sharing of resources among different kinds of computer that communicate with each other on the network.
- These standards are sometime referred to as the internet protocol suite.
- The internet provides the network infrastructure upon which e-business is build
- The **Business Area Network (BAN)** the network infrastructure that is used to interconnect businesses
- The internet and its related technologies can make customers the focal point of the business
- The internet, intranet and extranet creates new channel for interactive communication within a company, with customers and with suppliers, business partners and others in the external environment.

- This will enable continuous interaction with customers by the most business functions in product development, marketing , delivery service and technical support.

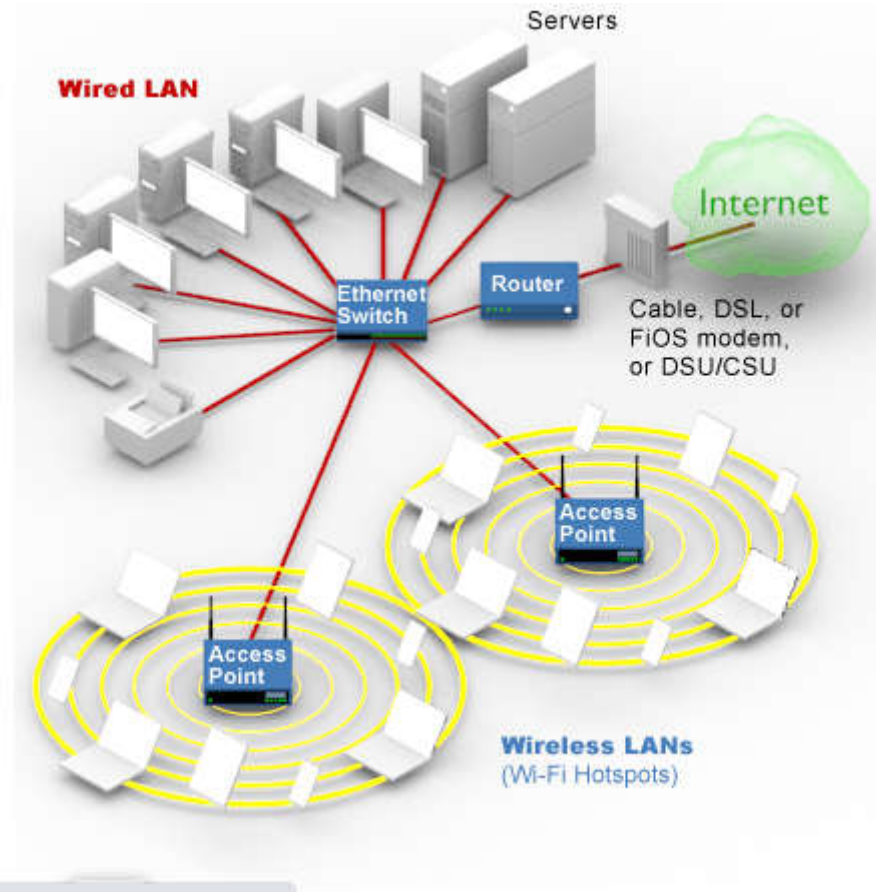


Figure :Illustrating Business Area Network

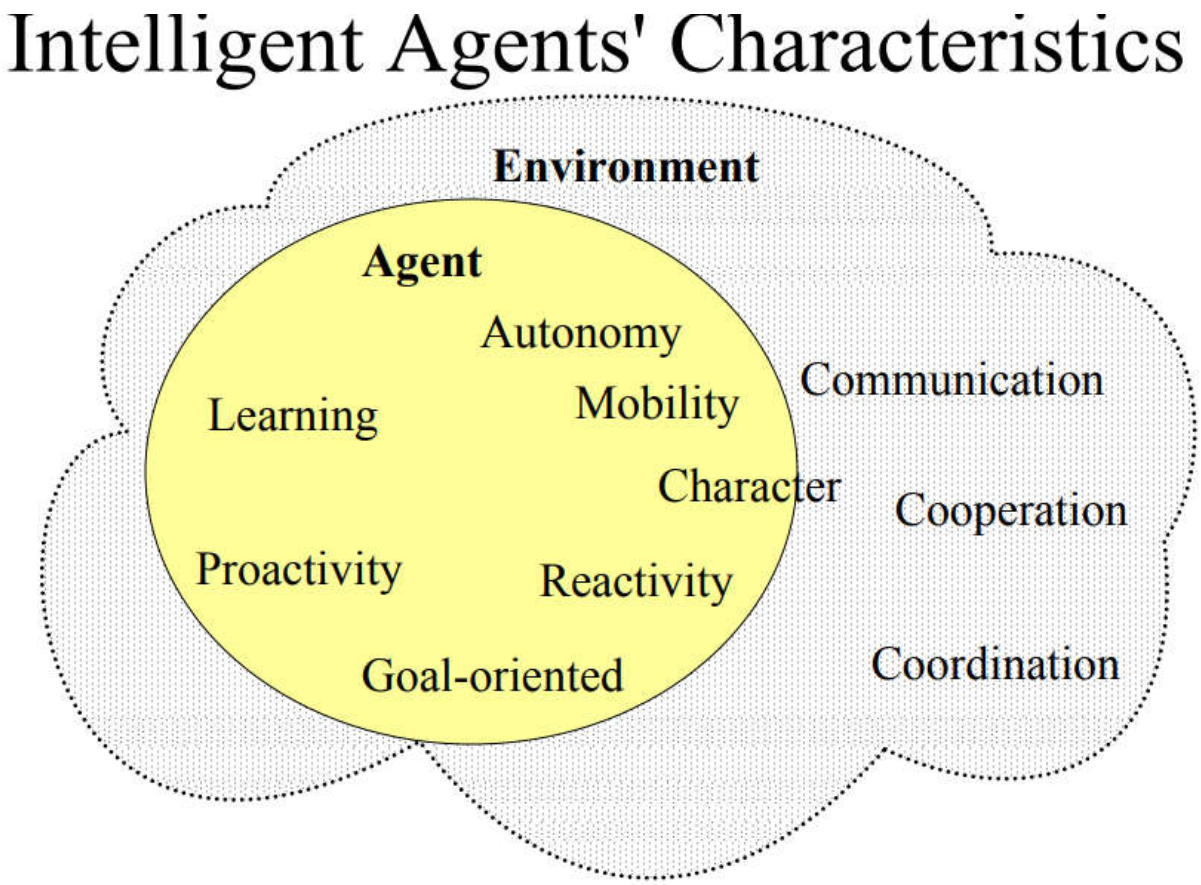
Software Agent:

- In computer science, a software agent is a computer program that acts for a user or other program in a relationship of agency
- A Software Agent (or Autonomous Agent or Intelligent Agent) is a computer program which works toward goals (as opposed to discrete tasks) in a dynamic environment (where change is the norm) on behalf of another

entity (human or computational), possibly over an extended period of time, without continuous direct supervision or control, and exhibits a significant degree of flexibility and even creativity in how it seeks to transform goals into action tasks.

- Is simply defined as a a persistent, goal – oriented and intelligent computer program that reacts to its environment and runs without continuous direct supervision to perform some function for an end user or another program
- Here the term persistent refers that the program can outlive its creator process
- Typical tasks that are performed by software agent includes locating and retrieving information, filtering e-mail, scheduling etc
- **A simpler, more structured definition is to say that a software agent is a computer program that exhibits the characteristics of agency or software agency**
- Software agent acts on behalf of human users to perform information gathering task such as locating and accessing information from various sources, filtering unwanted information and providing decision support
- Software agents are different from conventional programs in the sense that software agents works with goal in mind while conventional programs executes program stored in memory
- There are a number of different software agents, including:
    - **Buyer Agents or Shopping Bots:** These agents revolve around retrieving network information related to good and services.
    - **User or Personal Agents:** These agents perform a variety of tasks such as filling out forms, acting as opponents in games, assembling customized reports and checking email, among other tasks.
    - **Monitoring and Surveillance Agents:** These agents observe and report on equipment.

- **Data-Mining Agents:** These agents find trends and patterns in many different sources and allow users to sort through the data to find the information they are seeking.



Static and Dynamic Software agent:

- Resides on a server and provides a expert advice or service locally
- It uses embedded knowledge to process the incoming information
- Mail agent and filtering agent are the examples of static agent
- Mail agents are responsible for replying e-mail automatically and filtering agents are responsible for processing a large volume of information and extracting summary information from it.

Dynamic Agent:

- Executes on a remote computer and then return results to the computer
- Dynamic agents are also called mobile or roaming agent.
- Software agents that search the internet and returns the cheapest product of a particular brand is an example of a dynamic agent.
- The static and dynamic agent need to collaborate with each other in order to perform a complex task.

- ADSL, Wi-Fi, Wide Area Wireless(wimax), UMTS (3G),LTE (4G), Bluetooth

ADSL(Asymmetric Digital Subscriber Line)

- **A***symmetric* **d***igital* **s***ubscriber* **l***ine* (ADSL) is a type of DSL broadband communications technology used for connecting to the Internet.
- ADSL allows more data to be sent over existing copper telephone lines (POTS), when compared to traditional modem lines.
- A special filter, called a microfilter***(Splitter)***, is installed on a subscriber's telephone line to allow both ADSL and regular voice (telephone) services to be used at the same time.
- ADSL requires a special ADSL modem and subscribers must be in close geographical locations to the provider's central

office to receive ADSL service. Typically this distance is within a radius of 2 to 2.5 miles.

- ADSL supports data rates of from 1.5 to 9 Mbps when receiving data (known as the downstream rate) and from 16 to 640 Kbps when sending data (known as the upstream rate).

Advantages of ADSL

- Asymmetric Digital Subscriber Line (ADSL) offers high-speed connection, You can use the phone line while connected
- It presents a fixed monthly cost
- It has good value for the money, there is no extra wiring, ADSL uses the existing phone line, and it has lower pings in online games.
- Asymmetric Digital Subscriber Line (ADSL) does not present more dropped connections, You can talk on the phone when you surf through the Internet because the voice and data work in separate bands which implies a separate channel.

Disadvantages of ADSL:

- Asymmetric Digital Subscriber Line (ADSL) service is not available everywhere, It works better when closer to the ISP's central office.
- It offers variable speeds depending upon the time of the day, It presents faster download than upload.
- The line testing takes a long time.
- The home user contends at 50:1, you may share your 512 Kbps with 49 other people, giving you 10Kbps
- ADSL is affected by the number of people are using your line in the certain area.
- The connection is faster to download (receive the data) than to send the information.

Assignment:

wi-Fi, Wide Area Wireless (wi-max), UMTS (3G),LTE (4G), Bluetooth

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