

KCA-101

FCET

### Unit - 3

Internet - Overview ✓

- Architecture ✓

- functioning ✓

- Types Basic services like www, FTP, Telnet,

- Classification Gopher, etc. Search engines, E-mail,

- Elements of (Command based) & GUI based OS

web Browsers

Internet of  
Things ✓

- Definition: ✓

- Sensors ✓

- fibre types and features ✓

- Smart Cities ✓

- Industrial Internet of Things ✓

Internet

The Internet is a worldwide interconnected network of hundreds of thousands of computers of various types that belong to multiple networks.

• Internet is a worldwide global system of interconnected computer networks.

• Internet uses the Standard Internet Protocol (TCP/IP).

• Every computer in Internet is identified by a unique IP Address.

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DATE.
- IP Address is a unique set of numbers (such as 110.22.33.114) which identifies a computer location.
  - Internet is accessible to every user all over the world.

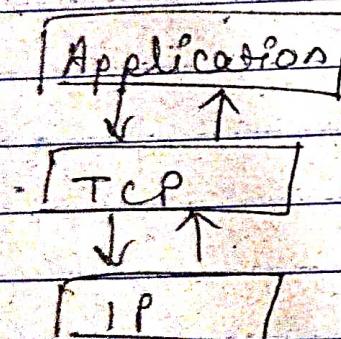
### Advantages

- Social Networking
- Education and Technology
- Entertainment
- Online Services

### Disadvantages

- Threat to personal info.
- Spreading
- Cyber Crime
- Virus Attacks

### Architecture



### functioning

Generally few main components uphold the functionality of the Internet, they are:

- i) Packets
- ii) Protocols

Packets In computer networks, a packet is a container

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Or box that carries data over a TCP/IP network and internetworks. A packet is the most fundamental logical abstraction of data that is passed over a network. A packet normally represents the smallest amount of data that can traverse over a network at a single time.

Protocols In networking, a protocol is a set of rules for formatting and processing data. Network protocols are like a common language for computers, the use of protocols enables software & hardware to communicate with each other.

## How does Internet work

- i) Connect system / PC. to router or modem to establish a connection
- ii) When you start typing something in browser, your system will push a query command to your ISP that is connected with other servers that store and process data.
- iii) Now, the web browser will start indexing the URL that you've entered and will fetch the details in numeric format.
- iv) Next, browser will send HTTP request where you are trying to reach and sends a copy of the website on the user's system.

v) Once all the data (of small packets) will be received at the user's end, ~~the~~ browser will start arranging all these small packets and later will form a collective file and then you'll be able to see the contents of that website.

## www

The World Wide Web (www) commonly known as the web. The www was initiated by CERN (European Laboratory for Nuclear Research) in 1989.

www can be defined as the collection of different websites around the world, containing different information shared via local servers.

The www is based on several different technologies: web browsers, (HTML) and (HTTP)

## FTP

File Transfer Protocol (FTP) is an internet tool provided by TCP/IP. It helps to transfer files from one computer to another by providing access to directories or folders on remote computers.

Goals of FTP are:

- It encourages the direct use of remote computers.
- It shields users from system variations.
- It promotes sharing of files and other types of data.

Telnet Telnet stands for Teletype Network. It is a type of protocol that enables one computer to connect to the local computer. It is used as a standard TCP/IP protocol for virtual terminal service which is provided by ISO.

The computer which starts the connection is known as the local computer.

The computer which is being connected to i.e. which accepts the connection known as the remote computer.

### Telnet Commands

figures

[IAC | Command code | Option code]

Interpret  
As Command

### Advantages

- Provide remote access to someone's comp. system
- Telnet saves a lot of time
- Telnet allows the user for more access with fewer problems in data transmission.

### Disadvantages

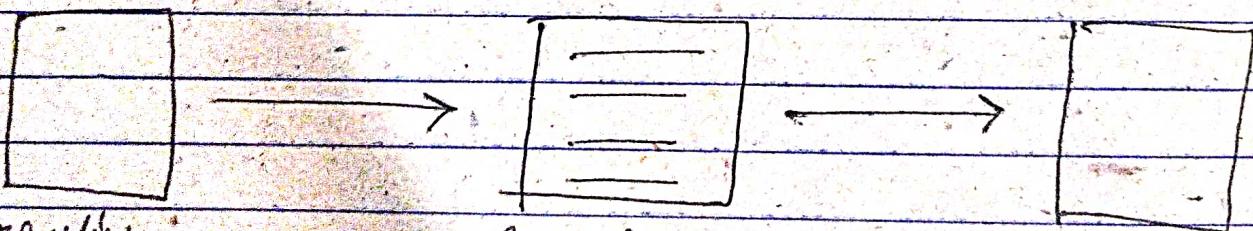
- Diff. to beginners in understanding
- Not secured, as data is send in plain text

Gopher It is a type of file retrieval protocol that provides downloadable files with some description for easy management, reusability and search of files. All the files are arranged on a remote computer in a stratified manner. Gopher is an old protocol and it is not much used nowadays.

Search Engines Search engines are programs that allow users to search and retrieve information from the vast amount of content available on the Internet. They use algorithms to index and rank web pages based on relevance to a user's query.

Popular search engines are - Google, Bing, Yahoo.

## How do Search Engines Work



Crawling

Indexing

Ranking

Google bots search the web for fresh material by crawling new pages

The Google Index is used to organise, categorise, and store the info. that the bots have identified

which pages appear in the SERPs and in what order are determined by the Google ranking algorithm

*[Handwritten stamp]*

Crawling: Search engines have a number of computer programs that are responsible for finding information that is publicly available on the Internet. The crawler scans the web and creates a list of all available websites.

Indexing: Information identified by the crawler needs to be organised, sorted and sorted so that it can be processed later by the ranking algorithm. Search engines don't store all the info. in your index, but they keep things like the title and description of the page.

Ranking: Rankly is the position by which your website is listed in any search engine. There are three steps in which how ranking works.

Step 1: Analyse user query

Step 2: Find matching pages

Step 3: Present the results to the users.

### Components of Search Engine

- i) Web Crawler
- ii) Database
- iii) Search Interface

For more, can write "Uses of Search Engine", "How do we use a search engine".

E-mail known as electronic mail, is a method of exchanging messages over the Internet.

### Bases of e-mail

- i) An email address: This is a unique identifier for each user, typically in the format of name@domain.com
- ii) An email client: This is a software client program used to send, receive and manage emails, such as Gmail, Outlook, or Apple Mail.
- iii) An email server: This is a computer system responsible for storing and forwarding emails to their intended recipients.

To send an e-mail:

- i) Compose a new message in your email client
- ii) Enter the recipient's email address in the "To" field.
- iii) Add a subject line to summarize the content of the message.
- iv) Write the body of the message.
- v) Attach any relevant files if needed.
- vi) Click "Send" to deliver the message to the recipient's email server.
- vii) Email also includes cc, bcc, reply, reply all, forward option to manage conversation.

### Advantages

- i) Convenient and fast communication
- ii) Easy to store and search for past messages

- iii) Can send & receive attachments like docs, pics, etc.
- iv) Cost-effective compared to traditional mail & fax.
- v) Available 24/7

### Disadvantages

- i) Risk of spam & phishing attacks
- ii) Technical issues such as server outage, can disrupt email service.
- iii) Potential for miscommunication due to lack of tone and body language in written messages.

\* Web Browsers - is a software application for retrieving, presenting and traversing information resources on www.  
Tim Berners Lee

History The first web browser, www was invented in 1990 by N. Mosaic, released in 1993 is considered the first popular web browser to combine a graphical user interface with the ability to display text and images on the same page. Then came Netscape Navigator in 1994 quickly became the most popular browser as it introduced 100s new features such as URL Bar & Bookmarks. In 1995 Internet Explorer came and achieved dominance due to its pre-installation in Windows OS.

Types : Graphical, Text-Based, Mobile

Graphical Browsers: display images as well as text, render web pages visually appealing to users.

Ex - Firefox, Google Chrome

Text Based Browsers: These browsers rely on text alone, offering fast and lightweight method of browsing the web.

Ex - Lynx, Links, w3m, etc.

Mobile Browsers: specially for mobile devices, these browsers optimise web pages for smaller screens and touch interaction.

Ex - Google Chrome, Opera Mini, etc.

### How Web Browsers Work

- ① Requesting a web page
- ② Rendering the page
- ③ User Interaction

### Security and Privacy Concerns with Web Browsers

- Data Privacy
- Security Vulnerabilities
- Encryption and HTTPS

IoT network of interconnected devices that are embedded with sensors, software and other technologies to exchange and analyse data with minimal human intervention.

OR  
It refers to interconnectness of physical devices, such as appliances and vehicles that are embedded with software, sensors and connectivity which enables them objects to connect and exchange data.

Key Components of IoT

- i) Sensor or Device
- ii) Connectivity
- iii) Data processing / Cloud Computing
- iv) Interface

Sensors Sensors are the major part of any IoT application.  
It is a physical device that measures and

Sensors gather data from the physical world, measuring parameters like temperature, humidity or motion. Actuators respond to this data by performing actions, such as adjusting settings or triggering responses.

### Types of Sensors

- Temperature
- Image
- Light, Humidity
- Obstacle Infrared
- Pressure
- Humidity

Smart Cities: A city isn't smart because it uses technology.  
A city is smart because it uses technology to make its citizens' lives better.

A smart city is an urban area that uses technology to collect data about its citizens and how they interact with

public services, infrastructure and environment. The goal of a smart city is to improve the quality of life, efficiency, sustainability and innovation of its residents.

### Need of Smart City

- i) Efficiency
- ii) Sustainability
- iii) Improved Quality of life

### Advantages

- Innovation in Economic Growth
- Enhanced Mobility
- Citizen Engagement

### Introduction to the Industrial Internet of Things (IIoT)

The Industrial Internet of Things (IIoT) is a network of interconnected devices, machines and systems that harness data to enhance industrial processes and operations. It allows for real-time monitoring, automation and predictive maintenance, leading to increased efficiency and productivity.