**Topic 2) Abira**

1. Explain the Client Server Mode

l<https://en.wikipedia.org/wiki/Client%E2%80%93server_model>

<https://www.techopedia.com/definition/18321/client-server-model>

<https://techterms.com/definition/p2p>

<https://www.forcepoint.com/cyber-edu/firewall>

* 1. What is the Client
     1. A client is a piece of computer hardware or software that accesses a service made available by a server. The server is often (but not always) on another computer system, in which case the client accesses the service by way of a network.
  2. What is the Server
     1. a server is a computer program or a device that provides functionality for other programs or devices, called "clients"
     2. This architecture is called the client–server model
     3. a single overall computation is distributed across multiple processes or devices
     4. Servers can provide various functionalities, often called "services", such as sharing data or resources among multiple clients, or performing computation for a client
     5. A single server can serve multiple clients, and a single client can use multiple servers
     6. A client process may run on the same device or may connect over a network to a server on a different device
  3. Provide an example of an application that uses the Client Server Model
     1. Web browsers
     2. chat applications
     3. email software

1. Explain the Peer-To-Peer Model
   1. What is a Peer
      1. "peers" are computer systems which are connected to each other via the Internet
      2. Files can be shared directly between systems on the network without the need of a central server
   2. How is it different from a Client Server Model
      1. a peer-to-peer network has no central server
      2. Each workstation on the network shares its files equally with the others
      3. The server will determine which users can access the files on the network
      4. there are separate dedicated servers and clients in a client/server network
      5. Through client workstations, users can access most files, which are generally stored on the server. The server will determine which users can access the files on the network
   3. Provide an example of an application that uses the Peer-To-Peer Model
      1. Xunlei
      2. BitComet
      3. Azureus
      4. Emule and eDonkey
      5. LimeWire
      6. WinMX
      7. Winny
2. Hyperlink
   1. What is a Hyperlink?
      1. Also referred to as a link
      2. Definition
         * a link from a hypertext file or document to another location or file, typically activated by clicking on a highlighted word or image on the screen
   2. How are Hyperlink related to Web Pages?
      1. Hyperlinks are like a shortcut to web pages
      2. E.x. you can send an email with a hyperlink in it or you want the other person to go on the webpage and all they have to do is click it
   3. How are Hyperlinks related to this PowerPoint document?
      1. We are using it as shortcuts so that you can go to whichever you need to go to
3. Packets and data
   1. What is a Data Packet?
      1. A data packet is a unit of data made into a single package that travels along a given network path
      2. they are used in Internet Protocol (IP) transmissions for data that navigates the Web, and in other kinds of networks
   2. What happens to a message (or data) when it is sent across the Internet?
      1. It is changed to binary numbers
      2. this is because data sent over the Internet (and most computer networks) are sent in manageable chunks (these chunks of data are known as packets)
      3. The packets would go through the Application Layer and continue to the TCP layer.
4. Firewalls
   1. What is a Firewall?
      1. a part of a computer system or network which is designed to block unauthorized access while permitting outward communication
   2. How does a Firewall protect your computer?
      1. A firewall is a system designed to prevent unauthorised access to or from a private computer network
      2. You need a firewall to protect your confidential information from those not authorised to access it and to protect against malicious users and accidents that originate outside your network.
   3. How does a Firewall protect remote servers?

**Topic 3) Gursimrat**

1. What does HTML stand for?

Hypertext Markup Language

1. How is HTML related to Web Pages?

HTMLs is a standardized system for tagging text files to achieve font, color, graphic, and hyperlink effects on World Wide Web pages. "an HTML file".

1. What are some examples of HTML tags used in Web Pages?

An HTML tag is a special word or letter surrounded by angle brackets, < and >. You use tags to create HTML elements, such as paragraphs or links. Examples include;

* <html>All web pages start with the html element. It’s also called the root element because it’s at the root of the tree of elements that make up a web page.
* <head> … </head> — The document head. The head element contains information about the web page, as opposed to the web page content itself. There are many elements that you can put inside the head element, such as:
* <title> … </title> — The page title: The title element contains the title of the page.
* <body> … </body> — The page’s content: The body element appears after the head element in the page. It should contain all the content of your web page: text, images, and so on

1. What are some other languages used in Web Pages?

The most common programming languages on the Web include HyperText MarkupLanguage, JavaScript, Cascading Style Sheets and PHP: Hypertext Preprocessor.Some are used in conjunction with each other while some can be used almost entirely separate from the other languages to create an interactive or static website.

1. What does a Web Browser do?

A web browser (commonly referred to as a browser) is a software application for accessing information on the World Wide Web

1. What are some common web browsers?

The most popular browsers are Chrome, Firefox, Safari, Internet Explorer, and Edge.

1. How are they different?

Chrome: created by Google, free to use, released on windows, macOS, linux, android, and iOS

Firefox: created by Mozilla foundation, free to use

Safari: created by Apple Inc, included with and exclusively on macOS and iOS

Internet Explorer: created by Microsoft, included with windows,

Microsoft Edge: created by MIcrosoft, included with Windows, available on windows, xbox, android, iOS

1. What are some other types of Web Clients?

Web client - Computer Definition. The client, or user, side of the Web. It typically refers to the Web browser in the user's machine. It may also refer to plug-ins and helper applications that enhance the browser to support special services from the site.

1. Is there any special Hardware or Software required to run a web client?

The way it works is: You (the client) run a web client on your computer—called a web browser—such as Microsoft’s Internet Explorer or Firefox. That client contacts a web server and requests information or resources. The web server locates and then sends the information to the web browser, which displays the results.

1. What happens when you browse a web page?

Each individual [web page](https://en.wikipedia.org/wiki/Web_page), image, and video is identified by a distinct Uniform Resource Locator (URL), enabling browsers to retrieve these resources from a [web server](https://en.wikipedia.org/wiki/Web_server) and display them on a user's device. A web browser is not the same thing as a [search engine](https://en.wikipedia.org/wiki/Web_search_engine), though the two are often confused. For a user, a search engine is just a website, such as [google.com](https://en.wikipedia.org/wiki/Google_Search), that stores searchable data about other websites. But to connect to a website's server and display its web pages, a user must have a web browser installed on their device.

1. What are the main steps?

When web browsers contact servers, they’re asking to be sent pages built with Hypertext Markup Language (HTML). Browsers interpret those pages and display them on your computer. They also can display applications, programs, animations, and similar material created with programming languages such as Java and ActiveX, scripting languages such as JavaScript, and techniques such as AJAX

1. What does a Web Server do?

The primary function of a web server is to store, process and deliver web pages to clients. The communication between client and server takes place using the Hypertext Transfer Protocol (HTTP).

1. Where are Web Servers located in the Network / Internet?

The web servers ( and DB servers and Mail servers, media server etc.) of any organisation are generally hosted in a special facility called a data centre. A Data Centre is a specialized facility to host computers and related components like network, storage & security devices .A company may a hire a data centre or own one. Generally websites are hosted on a set of servers called a server farm which may be located in one or multiple different data centres.

1. What special Software is needed for a Web Server?
2. What special Hardware is needed for a Web Server?

Web server can refer to hardware or software, or both of them working together.

On the hardware side, a web server is a computer that stores web server software and a website's component files (e.g. HTML documents,). It is connected to the Internet and supports physical data interchange with other devices connected to the web. On the software side, a web server includes several parts that control how web users access hosted files, at minimum an HTTP server. An HTTP server is a piece of software that understands [URLs](https://developer.mozilla.org/en-US/docs/Glossary/URL) and [HTTP](https://developer.mozilla.org/en-US/docs/Glossary/HTTP) (which is the protocol your browser uses to view webpages). It can be accessed through the domain names of websites it stores, and delivers their content to the end-user's device At the most basic level, whenever a browser needs a file which is hosted on a web server, the browser requests the file via HTTP. When the request reaches the correct web server (hardware), the HTTP server (software) accepts request, finds the requested document ,and sends it back to the browser.

**Topic 3: SOURCES**

<https://www.elated.com/first-10-html-tags/>

<https://smallbusiness.chron.com/programming-language-primarily-used-web-26635.html>

<https://en.wikipedia.org/wiki/Web_browser>

<https://en.wikipedia.org/wiki/Comparison_of_web_browsers>

<https://en.wikipedia.org/wiki/Web_server>

<https://vanseodesign.com/web-design/browser-requests/>

<https://developer.mozilla.org/en-US/docs/Learn/Common_questions/What_is_a_web_server>

Topic 4) Khushi

4.1) What is a Domain Name?

•What is a Domain Name?

A domain name is a label that identifies a network domain: a distinct group of computers under a central administration or authority. Within the Internet, domain names are formed by the rules and procedures of the Domain Name System. Any name registered in the DNS is a domain name.

•How are Domain Names related to Web Pages?

Domain names are used in URLs to identify particular Web pages. ... Because the Internet is based on IP addresses, not domain names, every Web server requires a Domain Name System (DNS) server to translate domain names into IP addresses.

•How does my computer find and use Domain Names?

Domain Names and URLs. ... The domain name is one of the pieces inside of a URL. It is also the most easily recognized part of the entire address. When computer users type a web address directly into the field at the top of their browser window, it initiates a process of locating the page requested.

4.2) What is an IP Address?

•What is an IP Address?

An Internet Protocol address is a numerical label assigned to each device connected to a computer network that uses the Internet Protocol for communication. An IP address serves two principal functions: host or network interface identification and location addressing.

•What is the difference between IPv4 and IPv6?

The Difference Between IPv4 and IPv6 Addresses. An IP address is binary numbers but can be stored as text for human readers. For example, a 32-bit numeric address (IPv4) is written in decimal as four numbers separated by periods. ... IPv6 addresses are 128-bit IP address written in hexadecimal and separated by colons.

•How does my computer convert a Domain Name to an IP Address?

The process of finding the host name (or domain name) from an IP address involves sending a message to the IP address and requesting the computer located at that IP address to return its name. Usually this will be the same as the domain name.

4.3) Who Controls Domain Names?

•Who Owns and Controls Domain Names and IP Addresses?

The Internet Assigned Numbers Authority (IANA) is a function of ICANN, a nonprofit private American corporation that oversees global IP address allocation, autonomous system number allocation, root zone management in the Domain Name System (DNS), media types, and other Internet Protocol-related symbols and Internet ...

•How can I register a Domain Name for my own use?

Getting a domain name involves registering the name you want with an organisation called ICANN through a domain name registrar. For example, if you choose a name like "example.com", you will have to go to a registrar, pay a registration fee that costs around US$10 to US$35 for that name.

Topic 5

**Downloaded Mail**

What is SMTP / POP3?

What are some common Mail Clients

What are some advantages of downloaded mail?

**Web Based Mail**

What are some common Browser Based Mail Services

What are some advantages of browser based mail?

**Mail Servers: Khushi**

Where is mail stored in the Internet?

How is mail delivered across the Internet?

Sending and receiving mail. To send Internet e-mail, requires an Internet connection and access to a mail server. ... The SMTP protocol is used to both send and receive email messages over the Internet. When a message is sent, the mail client sends the message to the SMTP server.

[https://www.mailenable.com/documentation/10.0/.../How\_Internet\_Email\_Works.html](https://www.mailenable.com/documentation/10.0/Enterprise/How_Internet_Email_Works.html)

What special Hardware & Software is required for a mail server?

**Cloud Based Storage**

What are some Cloud Storage Services (applications) ?

What are some advantages of cloud based storage over local storage?

**File Servers**

What special Hardware & Software is required for a file server?

**What is a Database?**

What is SQL?

[SQL (pronounced "ess-que-el") stands for Structured Query Language. SQL is used to communicate with a database. According to ANSI (American National Standards Institute), it is the standard language for relational database management systems.](http://www.sqlcourse.com/intro.html)

[SQL is a domain-specific language used in programming and designed for managing data held in a relational database management system, or for stream processing in a relational data stream management system.](https://en.wikipedia.org/wiki/SQL)

What type of information is stored in a database?

[Data, in the context of databases, refers to all the single items that are stored in a database, either individually or as a set. Data in a database is primarily stored in database tables, which are organized into columns that dictate the data types stored therein.](https://www.techopedia.com/definition/15/data-databases)

[SQL data types can be broadly divided into following categories.](https://www.journaldev.com/16774/sql-data-types)

* [Numeric data types such as int, tinyint, bigint, float, real etc.](https://www.journaldev.com/16774/sql-data-types)
* [Date and Time data types such as Date, Time, Datetime etc.](https://www.journaldev.com/16774/sql-data-types)
* [Character and String data types such as char, varchar, text etc.](https://www.journaldev.com/16774/sql-data-types)
* [Unicode character string data types, for example nchar, nvarchar, ntext etc.](https://www.journaldev.com/16774/sql-data-types)
* [Binary data types such as binary, varbinary etc.](https://www.journaldev.com/16774/sql-data-types)
* [Miscellaneous data types – clob, blob, xml, cursor, table etc.](https://www.journaldev.com/16774/sql-data-types)

How are databases used and combined with web pages?

[One of the most common types of dynamic web pages is the database driven type. This means that you have a web page that grabs information from a database (the web page is connected to the database by programming,) and inserts that information into the web page each time it is loaded.](https://www.killersites.com/articles/articles_databaseDrivenSites.htm)

**Database Servers**

What are some common Database products?

* [Tools and Languages.](https://www.oracle.com/database/products.html)
* [Management Solutions.](https://www.oracle.com/database/products.html)
* [Security Solutions.](https://www.oracle.com/database/products.html)
* [Upgrades and Migrations.](https://www.oracle.com/database/products.html)

What special Hardware & Software is required for a database server?

[There is no official minimum for the hardware requirements that are needed to host the Sana Commerce webshop. The hardware specifications will change under the influence of different factors that should be taken into account. To make the best estimation of the hardware specifications for the web and database server where Sana Commerce will be hosted the following questions should be answered:](https://help.sana-commerce.com/sana-commerce-83/installation/setup-web-and-database-server/hardware-requirements-for-web-and-database-servers)

* [High-traffic or low-traffic webshop](https://help.sana-commerce.com/sana-commerce-83/installation/setup-web-and-database-server/hardware-requirements-for-web-and-database-servers)
* [Number of visitors per day/month](https://help.sana-commerce.com/sana-commerce-83/installation/setup-web-and-database-server/hardware-requirements-for-web-and-database-servers)
* [Maximum number of simultaneous visitors](https://help.sana-commerce.com/sana-commerce-83/installation/setup-web-and-database-server/hardware-requirements-for-web-and-database-servers)
* [Maximum number of order lines in the shopping basket](https://help.sana-commerce.com/sana-commerce-83/installation/setup-web-and-database-server/hardware-requirements-for-web-and-database-servers)
* [Number of simultaneous orders](https://help.sana-commerce.com/sana-commerce-83/installation/setup-web-and-database-server/hardware-requirements-for-web-and-database-servers)
* [Size and complexity of the products catalog (number of products, product categories, attributes)](https://help.sana-commerce.com/sana-commerce-83/installation/setup-web-and-database-server/hardware-requirements-for-web-and-database-servers)
* [Number of articles in the webshop](https://help.sana-commerce.com/sana-commerce-83/installation/setup-web-and-database-server/hardware-requirements-for-web-and-database-servers)
* [Number of search queries](https://help.sana-commerce.com/sana-commerce-83/installation/setup-web-and-database-server/hardware-requirements-for-web-and-database-servers)
* [Size of the database](https://help.sana-commerce.com/sana-commerce-83/installation/setup-web-and-database-server/hardware-requirements-for-web-and-database-servers)

|  |  |
| --- | --- |
| [**Software**](https://www.ibm.com/support/knowledgecenter/en/SSYQ72_10.0.4/com.ibm.help.suiteinstall1004.serversysreq.doc/C_SpendApplicationServers.html) | [**Requirements**](https://www.ibm.com/support/knowledgecenter/en/SSYQ72_10.0.4/com.ibm.help.suiteinstall1004.serversysreq.doc/C_SpendApplicationServers.html) |
| [Database server](https://www.ibm.com/support/knowledgecenter/en/SSYQ72_10.0.4/com.ibm.help.suiteinstall1004.serversysreq.doc/C_SpendApplicationServers.html) | [MySQL Community Server 5.5.41 (64-bit)](https://www.ibm.com/support/knowledgecenter/en/SSYQ72_10.0.4/com.ibm.help.suiteinstall1004.serversysreq.doc/C_SpendApplicationServers.html) |
| [Operating system](https://www.ibm.com/support/knowledgecenter/en/SSYQ72_10.0.4/com.ibm.help.suiteinstall1004.serversysreq.doc/C_SpendApplicationServers.html) | * [Red Hat Enterprise Linux 5.7, 5.11, 6.0, or 6.6](https://www.ibm.com/support/knowledgecenter/en/SSYQ72_10.0.4/com.ibm.help.suiteinstall1004.serversysreq.doc/C_SpendApplicationServers.html) * [Windows Server 2008 R2 x86-64](https://www.ibm.com/support/knowledgecenter/en/SSYQ72_10.0.4/com.ibm.help.suiteinstall1004.serversysreq.doc/C_SpendApplicationServers.html) * [Windows 2012 Standard Edition x86-64](https://www.ibm.com/support/knowledgecenter/en/SSYQ72_10.0.4/com.ibm.help.suiteinstall1004.serversysreq.doc/C_SpendApplicationServers.html) |

**Other Servers**

Describe some other types of internet servers not covered by the slides above.

[Proxy Server](https://www.webopedia.com/quick_ref/servers.asp)

[A proxy server sits between a client program (typically a Web browser) and an external server (typically another server on the Web) to filter requests, improve performance, and share connections.](https://www.webopedia.com/quick_ref/servers.asp)

[Mail Server](https://www.webopedia.com/quick_ref/servers.asp)

[Almost as ubiquitous and crucial as Web servers, mail servers move and store mail over corporate networks (via LANs and WANs) and across the Internet.](https://www.webopedia.com/quick_ref/servers.asp)

[Server Platforms](https://www.webopedia.com/quick_ref/servers.asp)

[A term often used synonymously with operating system, a platform is the underlying hardware or software for a system and is thus the engine that drives the server.](https://www.webopedia.com/quick_ref/servers.asp)

[Web Server](https://www.webopedia.com/quick_ref/servers.asp)

[At its core, a Web server serves static content to a Web browser by loading a file from a disk and serving it across the network to a user's Web browser. This entire exchange is mediated by the browser and server talking to each other using HTTP.](https://www.webopedia.com/quick_ref/servers.asp)

[Application Server](https://www.webopedia.com/quick_ref/servers.asp)

[Sometimes referred to as a type of middleware, application servers occupy a large chunk of computing territory between database servers and the end user, and they often connect the two.](https://www.webopedia.com/quick_ref/servers.asp)

[Real-Time Communication Server](https://www.webopedia.com/quick_ref/servers.asp)

[Real-time communication servers, formerly known as chat servers or IRC Servers, and still sometimes referred to as instant messaging (IM) servers, enable large numbers users to exchange information near instantaneously.](https://www.webopedia.com/quick_ref/servers.asp)

[FTP Server](https://www.webopedia.com/quick_ref/servers.asp)

[One of the oldest of the Internet services, File Transfer Protocol makes it possible to move one or more files securely between computers while providing file security and organization as well as transfer control.](https://www.webopedia.com/quick_ref/servers.asp)

[Collaboration Server](https://www.webopedia.com/quick_ref/servers.asp)

[In many ways, collaboration software, once called 'groupware,' demonstrates the original power of the Web. Collaboration software designed to enable users to collaborate, regardless of location, via the Internet or a corporate intranet and to work together in a virtual atmosphere.](https://www.webopedia.com/quick_ref/servers.asp)

[List Server](https://www.webopedia.com/quick_ref/servers.asp)

[List servers offer a way to better manage mailing lists, whether they be interactive discussions open to the public or one-way lists that deliver announcements, newsletters or advertising.](https://www.webopedia.com/quick_ref/servers.asp)

[Telnet Server](https://www.webopedia.com/quick_ref/servers.asp)

[A Telnet server enables users to log on to a host computer and perform tasks as if they're working on the remote computer itself.](https://www.webopedia.com/quick_ref/servers.asp)

[Open Source Server](https://www.webopedia.com/quick_ref/servers.asp)

[From your underlying open source server operating system to the server software that help you get your job done, open source software is a critical part of many IT infrastructures.](https://www.webopedia.com/quick_ref/servers.asp)

[Virtual Server](https://www.webopedia.com/quick_ref/servers.asp)

[In 2009, the number of virtual servers deployed exceeded the number of physical servers. Today, server virtualization has become near ubiquitous in the data center.](https://www.webopedia.com/quick_ref/servers.asp)

6) Vinne

Internet Server Providers (ISP’S)

What is an ISP?

An ISP stands for Internet Service Provider. An ISP is basically the gateway to the internet. In order to use applications online you must have a secure internet connection. Most things on your computer like the Web browser, mail , or whether display will require the access to an internet connection.

<http://www.crydee.com/raymond-feist/faq/10605/what-is-an-isp-and-ip-address>

What are some common ISPs people use in the Toronto Area?

The two main internet service providers are Rogers and Bell. But there are also manys others ISP’s in the area such as Fido. Teksavvy, Acanac, Velcom, Coextro, Beanfeild Internet, Fibrestream, and Dialog. There are also many other various smaller internet providers. Ultimately when you select an ISP it depends on the type of quality internet you want.

<https://www.comparemyrates.ca/blog/top-10-internet-service-providers-toronto/>

How is an ISP different from a Internet application / service?

An ISP is different from an internet application service because an ISP is the source or the gateway that provides the internet for applications and services to use. An ISP is different from the applications on your computer because the applications will use the ISP as an source of internet connection. Although some applications may be useable offline such as Microsoft word, you will require an reliable internet connection to work on documents on Google docs. An application is a separate program on your computer that may or may not require an internet connection to function.

<https://whatismyipaddress.com/isp>

Internet Connection Technologies

Describe some internet connection technologies using telephone line.

Digital Subscriber Line (DSL) service provides a connection to the Internet through the telephone network. Unlike dial-up, DSL can operate using a single phone line without preventing normal use of the telephone line for voice phone calls. DSL uses the high frequencies, while the low (audible) frequencies of the line are left free for regular telephone communication. These frequency bands are subsequently separated by filters installed at the customer's premises.

DSL is a good internet connection technology because it has many benefits:

* Reliable and secure, dedicated connection
* More affordable
* Can compete in some areas with speeds offered by cable
* Best for email, browsing and light internet usage
* DSL is available much more widely because it uses the telephone network, which covers just about the entire country due to government mandate. While the presence of telephone lines doesn’t guarantee that DSL will be available, it’s certainly more widespread than cable, so may be your only option.

<https://www.highspeedinternet.com/resources/dsl-vs-cable>

<https://primus.ca/business/en/content-hub/cat/blog/post/what-to-choose-between-cable-or-dsl-internet>

Describe some internet connection technologies using Wi-Fi.

A wireless network allows devices to stay connected to the network but roam untethered to any wires. Access points amplify Wi-Fi signals, so a device can be far from a router but still be connected to the network. Wireless networks usually use routers to transmit radio wave signals to many of the devices.

Some benefits of the wireless networks include:

Mobility

· You're not tied to your desk, as you are with a wired connection. You and your employees can go online in conference room meetings, for example.

Productivity

· Wireless access to the Internet and to your company's key applications and resources helps your staff get the job done and encourages collaboration.

Easy setup

· You don't have to string cables, so installation can be quick and cost effective.

Expandability

· You can easily expand wireless networks with existing equipment, whereas a wired network might require additional wiring.

Security

· Advances in wireless networks provide robust security protections.

Cost

· Because wireless networks eliminate or reduce wiring expenses, they can cost less to operate than wired networks.

<https://www.cisco.com/c/en/us/solutions/small-business/resource-center/networking/wireless-network.html>

Some different types of Wireless networks include:

WLANS: Wireless Local Area Networks

WLANS allow users in a local area, such as a university campus or library, to form a network or gain access to the internet. A temporary network can be formed by a small number of users without the need of an access point; given that they do not need access to network resources.

##### WPANS: Wireless Personal Area Networks

The two current technologies for wireless personal area networks are Infra Red (IR) and Bluetooth (IEEE 802.15). These will allow the connectivity of personal devices within an area of about 30 feet. However, IR requires a direct line of site and the range is less.

##### WWANS: Wireless Wide Area Networks

These types of networks can be maintained over large areas, such as cities or countries, via multiple satellite systems or antenna sites looked after by an ISP. These types of systems are referred to as 2G (2nd Generation) systems.

Describe some internet connection technologies using fibre optics cables.

· FTTP/FTTH/FTTB/FTTD: Fiber to the premise, home, business or desktop are the most direct fiber lines. With them, you are getting pure fiber straight to your residence, with no copper cables involved. These are also the most expensive fiber connections for the ISPs.

· FTTB: With fiber to the building, the fiber line is distributed throughout the building by copper lines. This is a popular choice for apartment buildings, hotels, schools or buildings that provide Internet to several different businesses.

· FTTC/FTTN/FTTS: Fiber to the cabinet/curb, neighborhood, or street are the most common fiber connections. Fiber is delivered to a street cabinet, around 1000ft from the farthest premise, and is then dispersed by copper cables. It is the most affordable fiber optic Internet connection for ISPs because they do not have to invest in costly infrastructure to the individual premises, and it can be re-distributed if/when new residence or businesses move in.

<https://www.otelco.com/resources/a-guide-to-fiber-optic-internet/#fiber-optic-communications>

Network Routers & Switches

What is a "Routing Table"?

Routers examine the destination IP address of a received packet and make routing decisions accordingly. To determine out which interface the packet will be sent, routers use routing tables. A routing table lists all networks for which routes are known. Each router’s routing table is unique and stored in the RAM of the device.

When a router receives a packet that needs to be forwarded to a host on another network, it examines its destination IP address and looks for the routing information stored in the routing table. Each entry in the routing table consists of the following entries:

· the network and the subnet mask – specifies a range of IP addresses.

· the remote router – the IP address of the router used to reach that network.

· the outgoing interface – the outgoing interface the packet should go out to reach the destination network.

How are data packets sent through the internet between a client and a server?

Data packets are sent between a client and a server through a router that uses routing tables. A routing table contains the information necessary to forward a packet along the best path toward its destination. Each packet contains information about its origin and destination. When a packet is received, a network device examines the packet and matches it to the routing table entry providing the best match for its destination. The table then provides the device with instructions for sending the packet to the next hop on its route across the network.

What special hardware & software is required for a network router / switch?

The hardware that is required

**7 Muktika**

**Local Area Networks (LAN)**

[A local area network (LAN) is a computer network within a small geographical area such as a home, school, computer laboratory, office building or group of buildings.](https://www.techopedia.com/definition/5526/local-area-network-lan)

[A local area network (LAN) is a group of computers and associated devices that share a common communications line or wireless link to a server.](https://searchnetworking.techtarget.com/definition/local-area-network-LAN)

[Ethernet and Wi-Fi are the two primary ways to enable LAN connections. Ethernet is a specification that enables computers to communicate with each other. Wi-Fi uses radio waves to connect computers to the LAN. Other LAN technologies, including Token Ring, Fiber Distributed Data Interface and ARCNET, have lost favor as Ethernet and Wi-Fi speeds have increased.](https://searchnetworking.techtarget.com/definition/local-area-network-LAN)

Local Area Network is a computer network that is used within a small community or the vicinity such as a house, a school, a workplace and other places that use a computer. To add, LAN is a computer network that is very much heard in the society.

Ethernet and Wi-Fi are two important items that allow the LAN connections to occur and that is how computers are able to link to each other or other resources such as printers and file servers. To add, a Local Area Network can be a wired, wireless, or both connection.

What is the purpose of a Local Area Network?

[They function to link computers together and provide shared access to printers, file servers, and other services.](https://kb.iu.edu/d/aesx)

The purpose of a Local Area Network is to connect computers together and allowing shared access to printers, file servers, and other services.

What types of applications, servers, and computers are connected to a LAN?

[A common LAN configuration is one that supports personal computers. With the relatively low cost of such systems, individual managers within organizations often independently procure personal computers for departmental applications, such as spreadsheet and project management tools, and for Internet access.](http://www.informit.com/articles/article.aspx?p=21179&seqNum=3)

[In a server-based LAN, devices may connect directly to the server or indirectly via a router or switch.](https://techterms.com/definition/lan)

**Wide Area Networks**

What is a Wide Area Network?

[A wide area network (WAN) is a network that exists over a large-scale geographical area. A WAN connects different smaller networks, including local area networks (LANs) and metro area networks (MANs). This ensures that computers and users in one location can communicate with computers and users in other locations. WAN implementation can be done either with the help of the public transmission system or a private network.](https://www.techopedia.com/definition/5409/wide-area-network-wan)

What is the purpose of a Wide Area Network?

[A WAN (wide area network) is a communications network that spans a large geographic area such as across cities, states, or countries. They can be private to connect parts of a business or they can be more public to connect smaller networks together.](https://www.lifewire.com/wide-area-network-816383)

What types of applications, servers, and computers are connected to a WAN?

[However, in terms of the application of computer networking protocols and concepts, it may be best to view WANs as computer networking technologies used to transmit data over long distances, and between different LANs, MANs and other localised computer networking architectures.](https://en.wikipedia.org/wiki/Wide_area_network)

[WANs are used to connect LANs and other types of networks together so that users and computers in one location can communicate with users and computers in other locations.](https://en.wikipedia.org/wiki/Wide_area_network)

**Virtual Private Networks (VPN)**

What is a Virtual Private Network?

[A VPN, or virtual private network, is a secure tunnel between your device and the internet. VPNs are used to protect your online traffic from snooping, interference, and censorship.](https://www.expressvpn.com/what-is-vpn)

## [6 ways a VPN can help you:](https://www.expressvpn.com/what-is-vpn)

### [Hide your IP and location](https://www.expressvpn.com/what-is-vpn)

### [Encrypt your communications](https://www.expressvpn.com/what-is-vpn)

### [Watch your favorite content](https://www.expressvpn.com/what-is-vpn)

### [Unblock censored websites](https://www.expressvpn.com/what-is-vpn)

### [Avoid spying and throttling](https://www.expressvpn.com/what-is-vpn)

### [Find deals and fight ads](https://www.expressvpn.com/what-is-vpn)

How is a VPN different from a LAN / WAN?

[A VPN is a secure tunnel between two networks that allows private traffic pass over another network, which may be untrusted. It can be over a WAN but it can also be over a LAN. WAN is simply a wide area network. A typical WAN is your Cable or DSL connection to the Internet.](https://www.quora.com/What-is-the-main-differences-between-WAN-and-VPN)

How could you use a VPN to increase the security of services you use in the Internet?

[A VPN lets you increase the security of your web session, transmitted data, financial transactions and personal information online, no matter where you are.](https://www.tomsguide.com/us/-vpn-for-beginners,news-17514.html)

[Security experts warn against using public Wi-Fi hotspots, such as in a coffee shop, airport or hotel lobby, due to the risk of your connection being hijacked or snooped upon. Internet service providers may invade your privacy by selling data about your online habits to advertisers. A VPN greatly reduces those risks.](https://www.tomsguide.com/us/-vpn-for-beginners,news-17514.html)

[A VPN might also help to protect you from identity theft; hides your IP address, making it harder for third parties to track you; accesses all content privately without censorship; and bypasses many firewalls.](https://www.tomsguide.com/us/-vpn-for-beginners,news-17514.html)