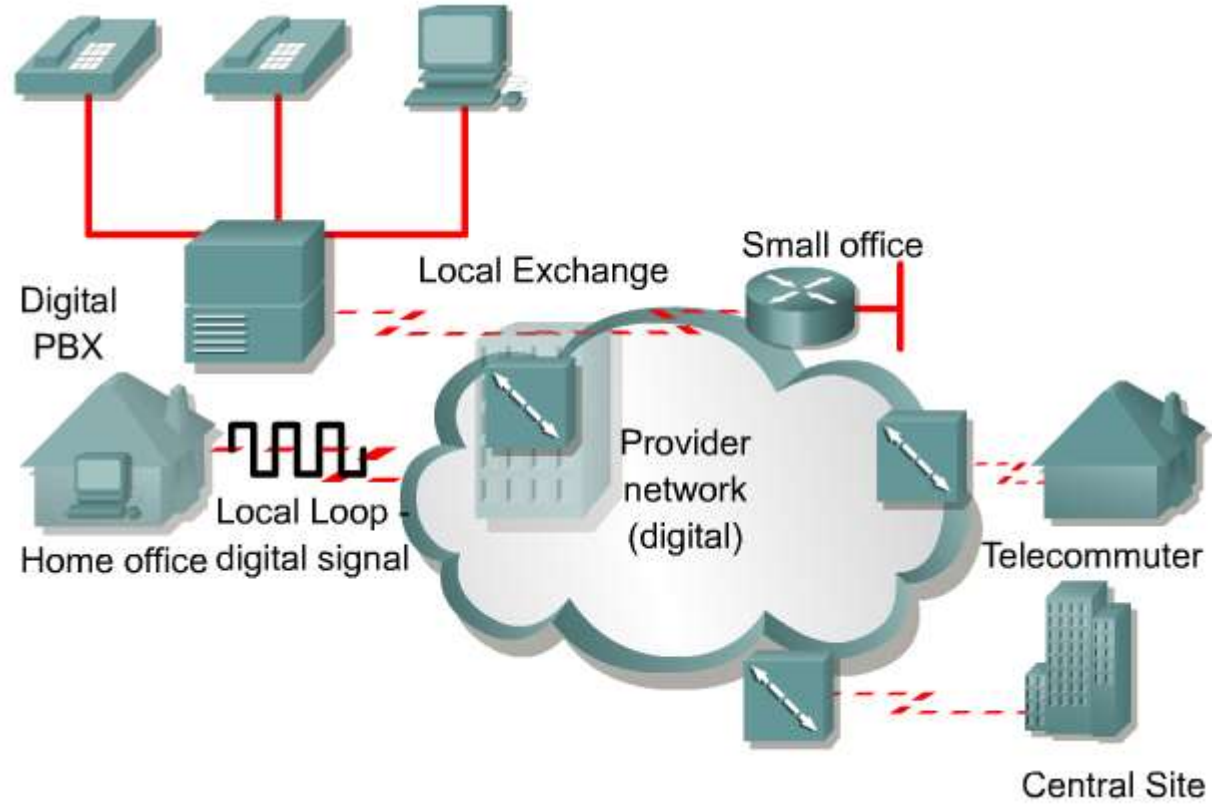


Introducing ISDN:-

- Telephone companies developed **ISDN (Integrated Services Digital Network)** as part of an effort to standardize subscriber services.
- This included the **User-Network Interface (UNI)**, better known as the local loop.
- The ISDN standards define the hardware and call setup schemes for end-to-end digital connectivity.
- These standards help achieve the goal of worldwide connectivity by ensuring that ISDN networks easily communicate with one another.
- In an ISDN network, the digitizing function is done at the user site rather than the telephone company.

private branch exchange (PBX)



ISDN is a set of standards that defines an end-to-end digital network.

Benefits are:

- Carries many types of network traffic (for example data, voice, video)
- Sets up calls faster than basic telephone service
- Faster data transfer rate than modems

Benefits of ISDN include:

Carries a variety of user traffic signals, including data, voice, and video

Offers much faster call setup than modem connections

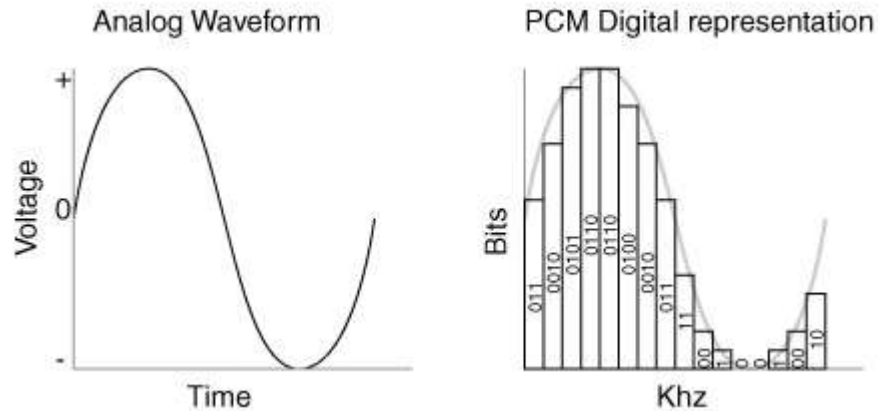
B channels provide a faster data transfer rate than modems .

B channels are suitable for negotiated (complete) Point-to-Point Protocol (PPP) links

ISDN :-

- ISDN also provides more bandwidth than a traditional 56 kbps dialup connection. (Bandwidth:- is the capacity of a wired or wireless n/w communications link to transmit the maximum amount of data from one point to another over a computer n/w or internet connection).
- ISDN uses **bearer (carrier) channels**, also called **B channels**, as clear data paths.
- Each B channel provides 64 kbps of bandwidth.
- An ISDN connection with two B channels would provide a total usable bandwidth of 128 kbps.
- Each ISDN B channel can make a separate serial connection to any other site in the ISDN network.

Why 64Kbps channels and what is PCM?



For now, 64,000 bps is what's required to carry a single phone call over a link (an analog call which has been digitized).

PCM (Pulse Code Modulation) is how the analog signal is translated to digital and visa versa.

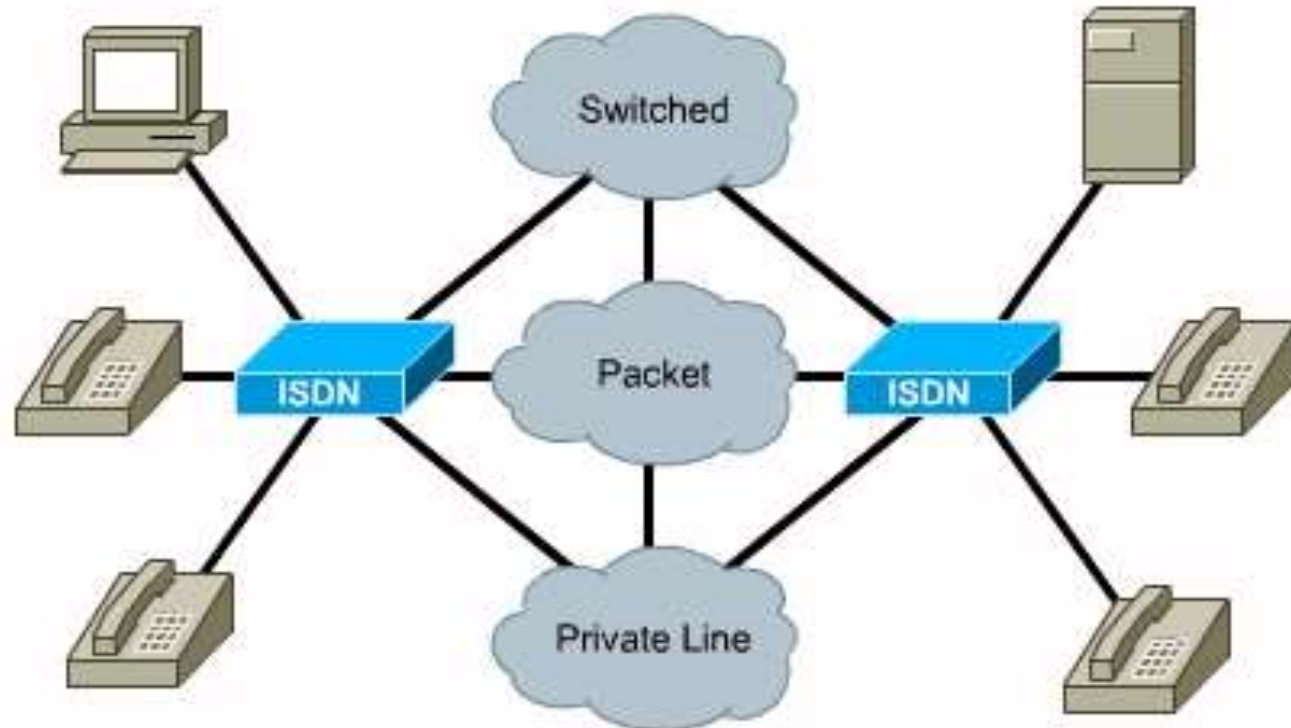
ISDN standards define **two main channel types**

- The bearer channel, or B channel, is defined as a clear digital path of 64 kbps
- The second channel type is called a delta channel, or D channel.
 - There can either be 16 kbps for the Basic Rate Interface (BRI) or 64 kbps for the Primary Rate Interface (PRI).
- When a TCP connection is established, there is an exchange of information called the connection setup.
 - This information is exchanged over the path on which the data will eventually (readily) be transmitted.
 - Both the control information and the data share the same pathway.
- **ISDN** however, uses a separate channel for control information

What is ISDN?

INTEGRATED SERVICES DIGITAL
NETWORK

- ISDN is a set of standards which define an end to end Digital Network
- WAN Technology



Features of ISDN:-

- **Uses Digital Signal**
- **Uses Existing telephone wiring**
- **Charges are generally based on the duration of call (How long the WAN link was used)**
- **Alternate to using leased lines**
- **Can transport many types of Network traffic (Voice, Data, Video, Text, Graphics etc)**
- **Faster Data transfer rate than modems**
- **Faster Call setup than Modems**

ISDN Components

- **Terminal Equipment type 1 (TE1)** * ISDN
compatible device (Router with ISDN Interface)
 - * TE1s connect to the ISDN network through a four-wire, twisted-pair digital link
- **Terminal Equipment type 2 (TE2)**
 - * ISDN Non-compatible devices.
 - * Will require a terminal adapter.
- **Terminal Adapter (TA)**
 - * Converts standard electrical signals into the form used by ISDN
 - * Needed for connection with TE2 devices
 - * The ISDN TA can be either a standalone device or a board inside the TE2

- **Network termination type 1 (NT1)**

- * Network-termination devices that connect the four-wire Subscriber wiring to the conventional two-wire local loop

- * Is a *customer premises equipment* (CPE) device (North America)

- **Network termination type 2 (NT2)**

- * Intelligent device that performs switching & concentrating.

- * Provides multiple ISDN interfaces on an ISDN line. The NT2 may be as simple as a bridging device connected to an NT1 unit or it may be as complicated as a PBX (Private Branch exchanges)

ISDN NOTES:-

- Integrated Services Digital Network is a telephone system network.
- It is a wide area network becoming widely available.
- Prior to the ISDN, the phone system was viewed as a way to transport voice, with some special services available for data.
- ISDN is a circuit -switched telephone network system, that also provides access to packet switched networks, designed to allow digital transmission of voice and data over ordinary telephone copper wires, resulting in better voice quality than an analog phone.

- It offers circuit-switched connections (for either voice or data), and packet-switched connections (for data), in increments of 64 Kbit/s.
- Another major market application is Internet access, where ISDN typically provides a maximum of 128 Kbit/s in both upstream and downstream directions (which can be considered to be broadband speed, since it exceeds/proceeds).
- ISDN is designed to provide access to voice and data services simultaneously.

Types of ISDN Services:-

- **Basic rate interface (BRI)**

- Basic access service or 2B+D
 - Two 64 Kbps bearer 'B' channels (for voice or data)
 - One 16 Kbps control signaling 'D' channel
- Can be installed over existing telephones lines (if less than 3.5 miles)
- Requires BRI specific end connections

- **Primary rate interface (PRI)**

- Primary access service or 23B+D
 - Twenty three 64 Kbps 'B' channels
 - One 64 Kbps 'D' channel (basically T-1 service)
- Requires T1 like special circuit

