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Data Communication CS601 Lecture No 33

Lecture Prepared By

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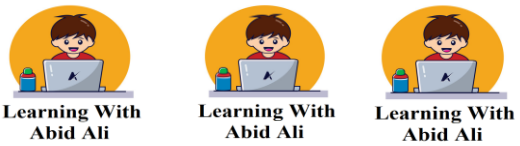
CS601 Lecture No 33 Topic 191 to 196

Other Wired Networks

- **Access Networks**
  - ✓ **Networks that connect a small LAN to an ISP** (ISP is Internet Service Provider. LAN is Local Area Network)

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- **Wide Area Networks**
  - ✓ **Wired networks used to transfer data over long distances**

Telephone Network

- **The telephone network had its beginnings in the late 1800s**
- **Plain Old Telephone System (POTS) was originally an analog system using analog signals to transmit voice**
- **With the advent of the computer era, the network, in the 1980s, began to carry data in addition to voice**
- **During the last decade, the telephone network has undergone many technical changes and the network is now Digital as well as Analog**

Major Components

The telephone network is made of three major components:

- ✓ **Local Loops**
- ✓ **Trunks**
- ✓ **Switching offices**

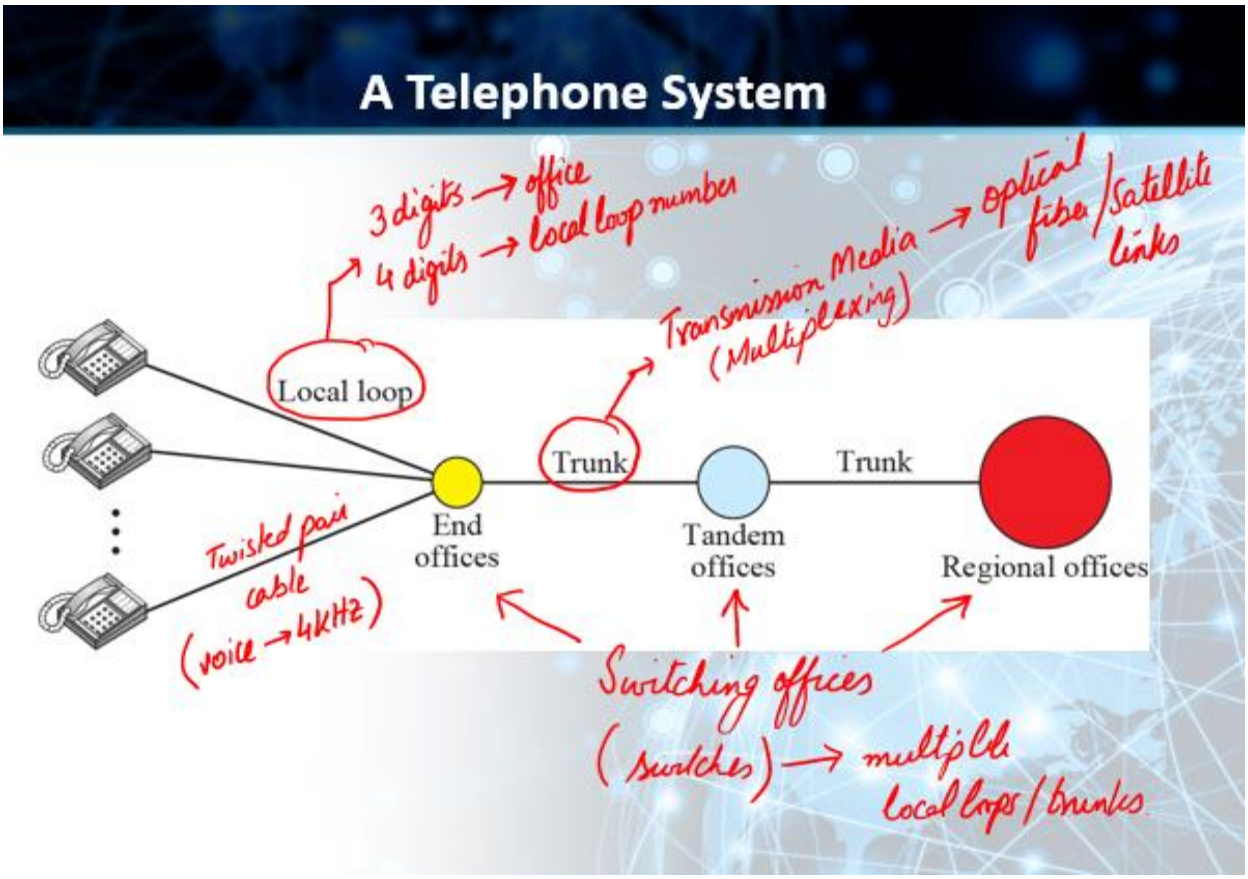
The telephone network has several levels of switching offices:

- ✓ **End offices**
- ✓ **Tandem offices**
- ✓ **Regional offices**

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Local-Access Transport Areas (LATAs)

- **A LATA can be a small or large metropolitan area**
- **A small state may have a single LATA; a large state may have several LATAs**
- **A LATA boundary may overlap with state boundary; part of a LATA can be in one state, part in another state**
- **Services offered by Telephone companies inside a LATA are called Intra-LATA services and between LATAs are called Inter-LATA services**
- **Carrier that handles Intra-LATA are called a Local Exchange Carrier (LEC) and the ones that handle Inter-LATA are called Interexchange Carriers (IXCs)**

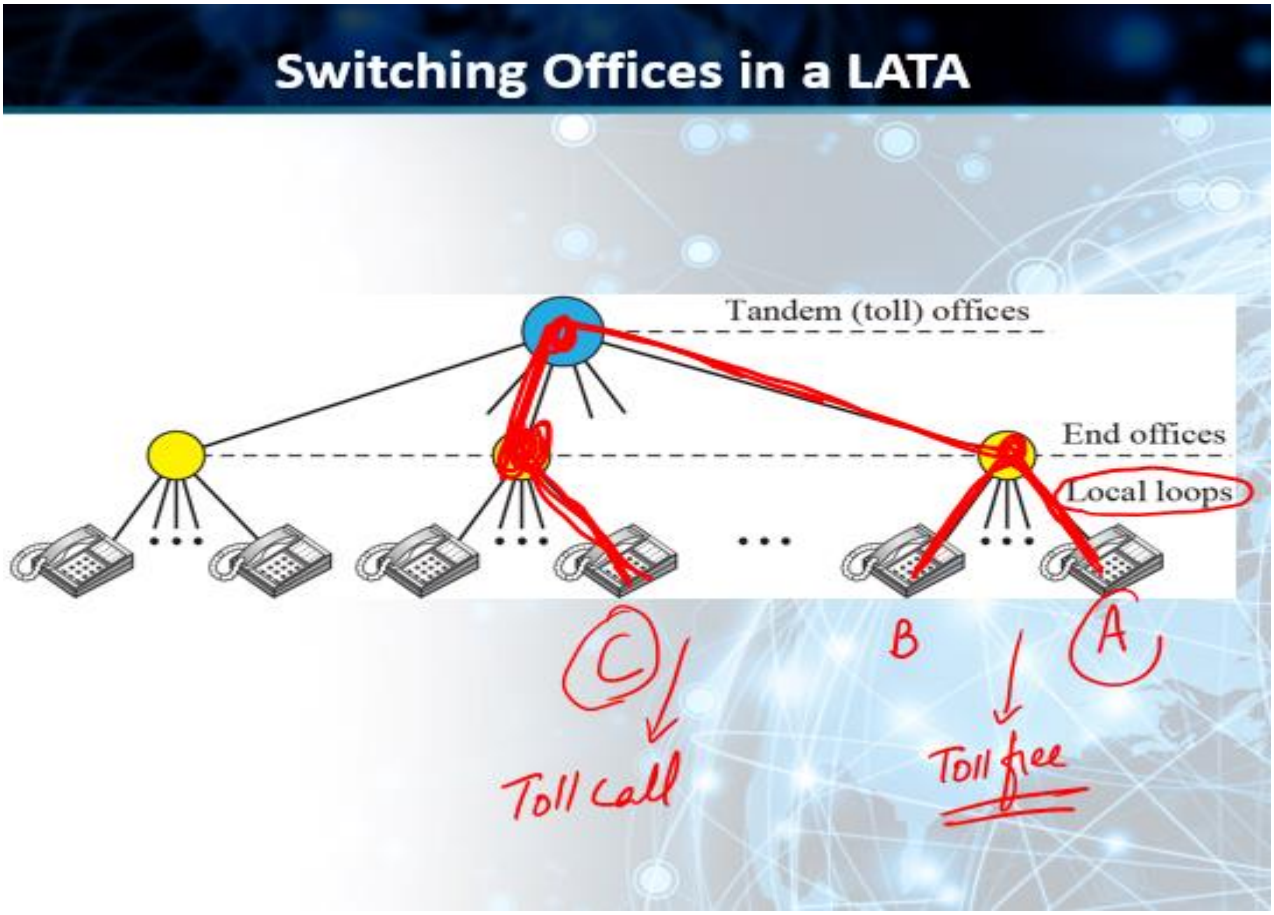
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What is the difference between intra Lata and inter LATA services?

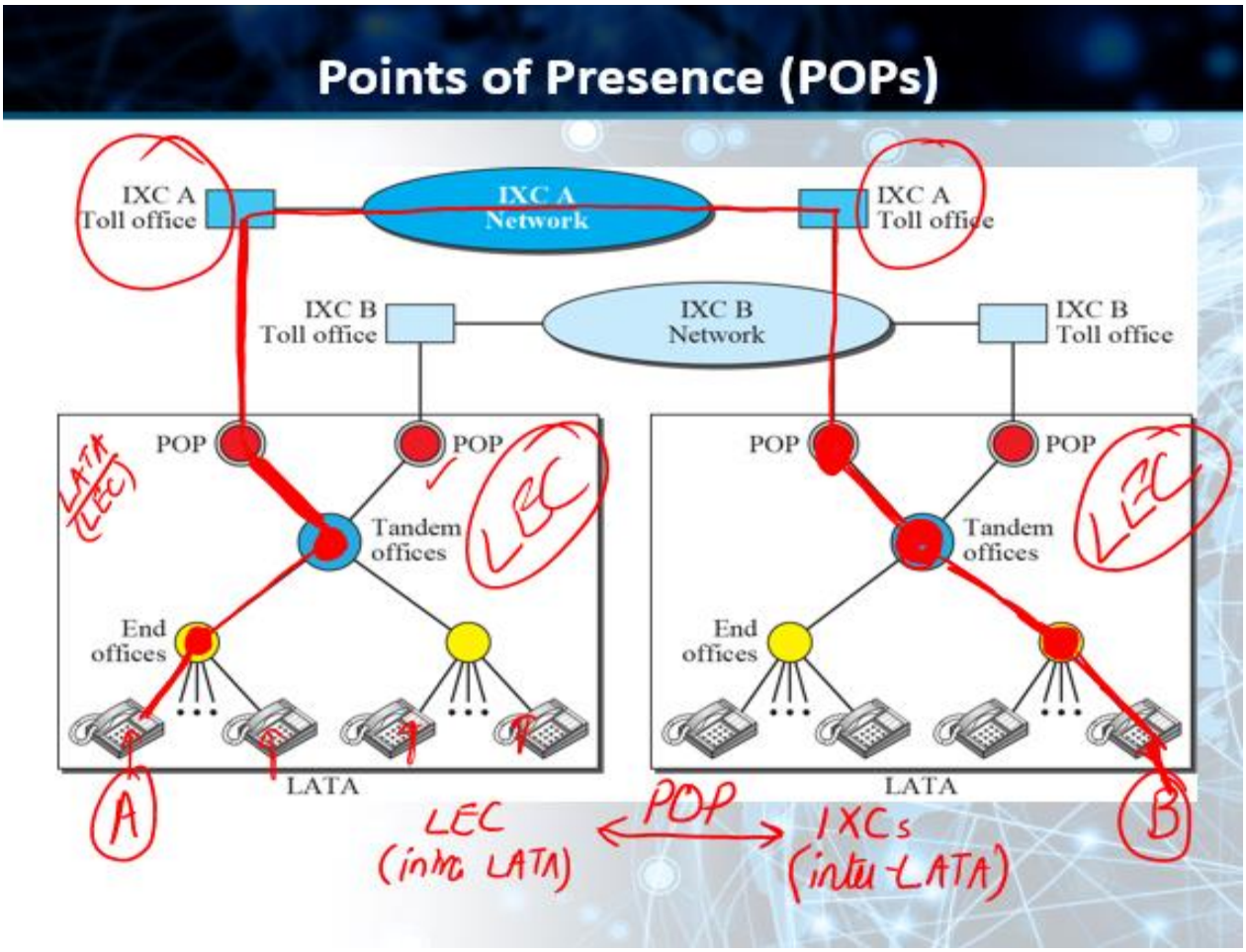
A telephone call within the same LATA (same region). IntraLATA is local telephone service. InterLATA refers to a call from one LATA to another, which can be within a state or from state to state (interstate).



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Signaling

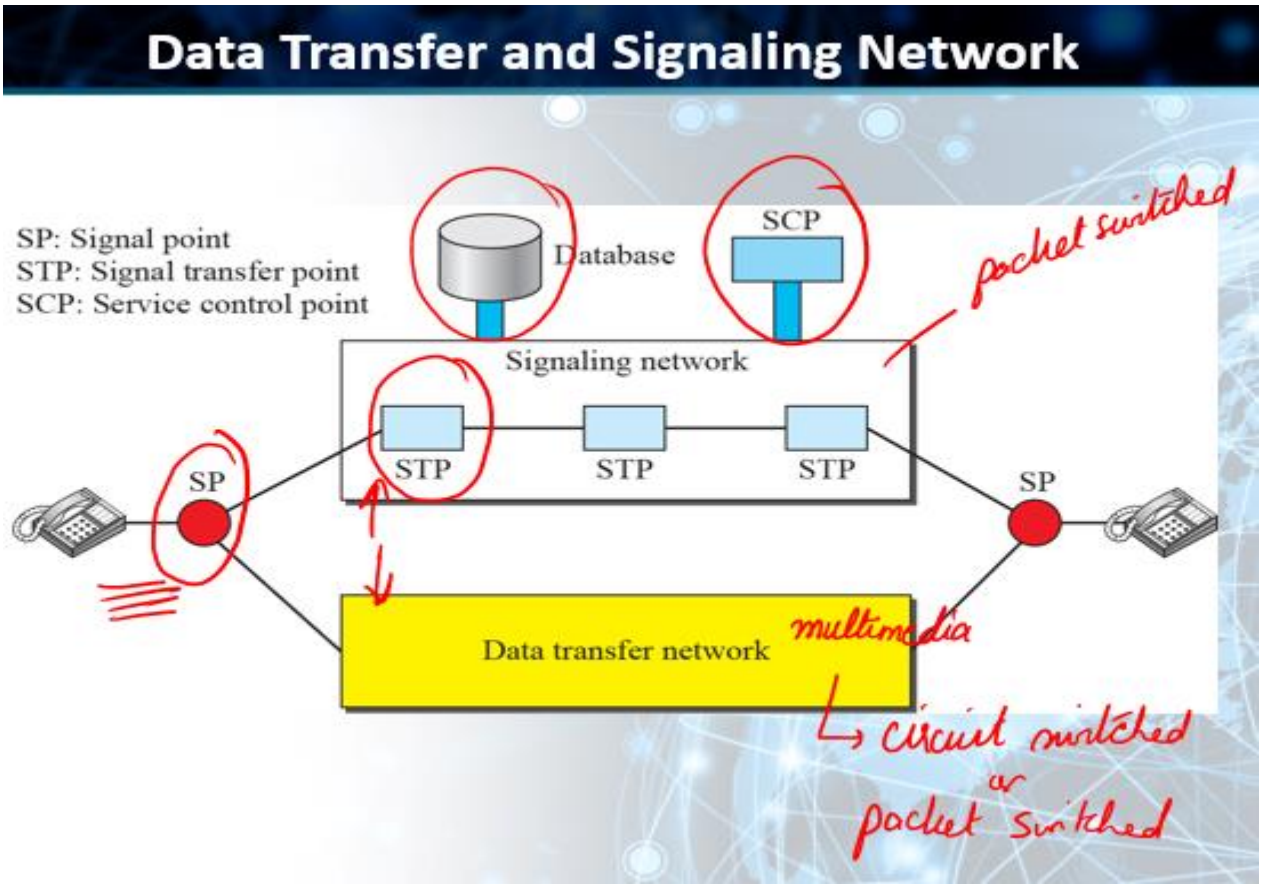
- **The telephone network in the beginning, used a circuit-switched network with dedicated links to transfer voice communication**
- **The operator connected the two parties by using a wire with two plugs inserted into the corresponding two jacks**
- **Later, the signaling system became automatic**
- **Rotary telephones were invented that sent a digital signal defining each digit in a multi-digit telephone number**

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- **As telephone networks evolved into a complex network, the functionality of the signaling system increased**

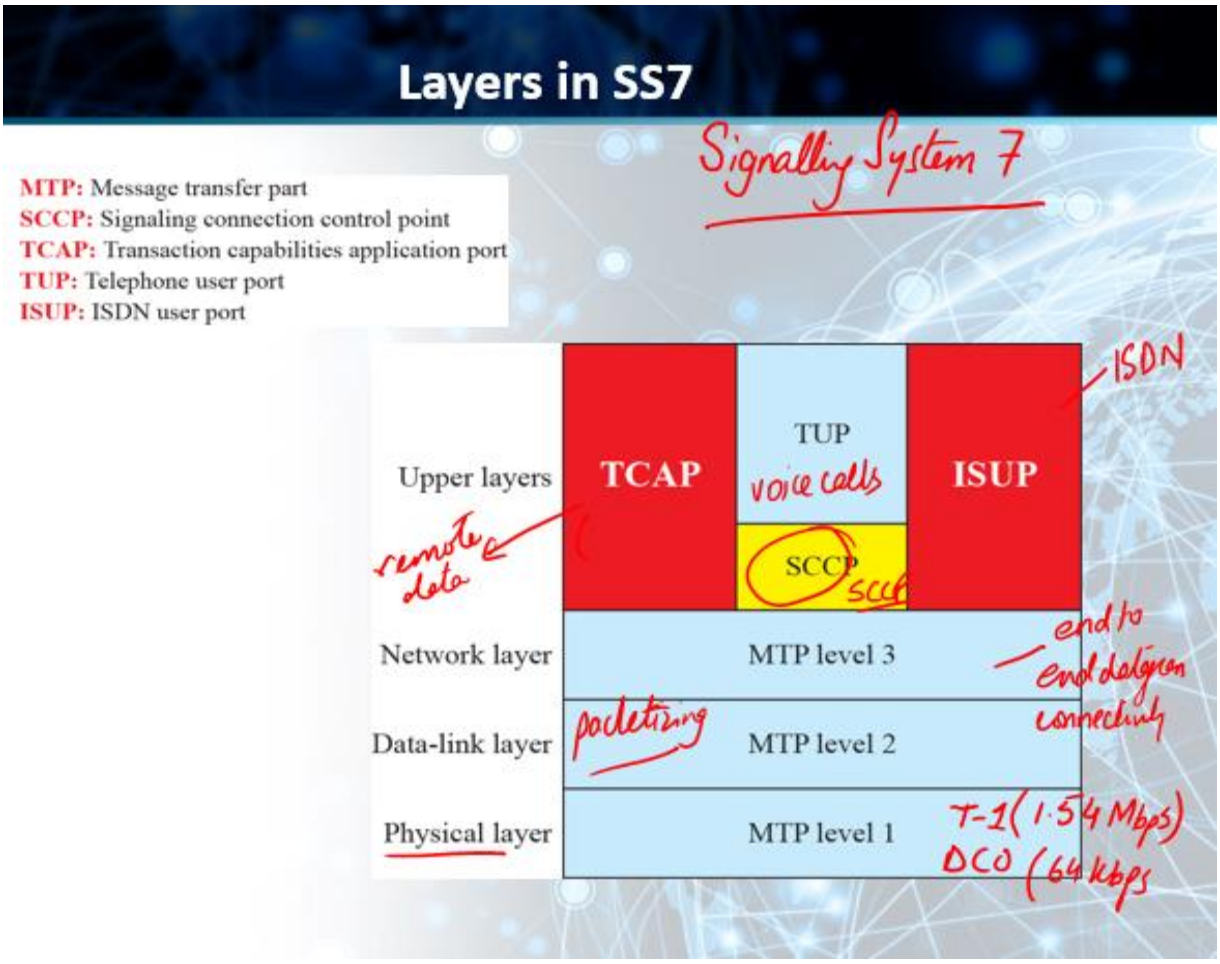


Layers in SS7

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(MTP) Message Transfer Part

Services

- **Telephone companies provide two types of services:**
  - ✓ **Analog Services**
    - ➢ **Analog Switched Services**
    - ➢ **Analog Leased Services**
  - ✓ **Digital Services**

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- **Switched /56 Service**
- **Digital Data Service**

Digital Subscriber Line (DSL)

- **After traditional dial-up modems reached their peak data rate, telephone companies developed another technology, DSL, to provide higher-speed access to the Internet**
- **DSL supports high-speed digital communication over the existing telephone**
- **DSL technology is a set of technologies, each differing in the first letter (ADSL, VDSL, HDSL, and SDSL)**

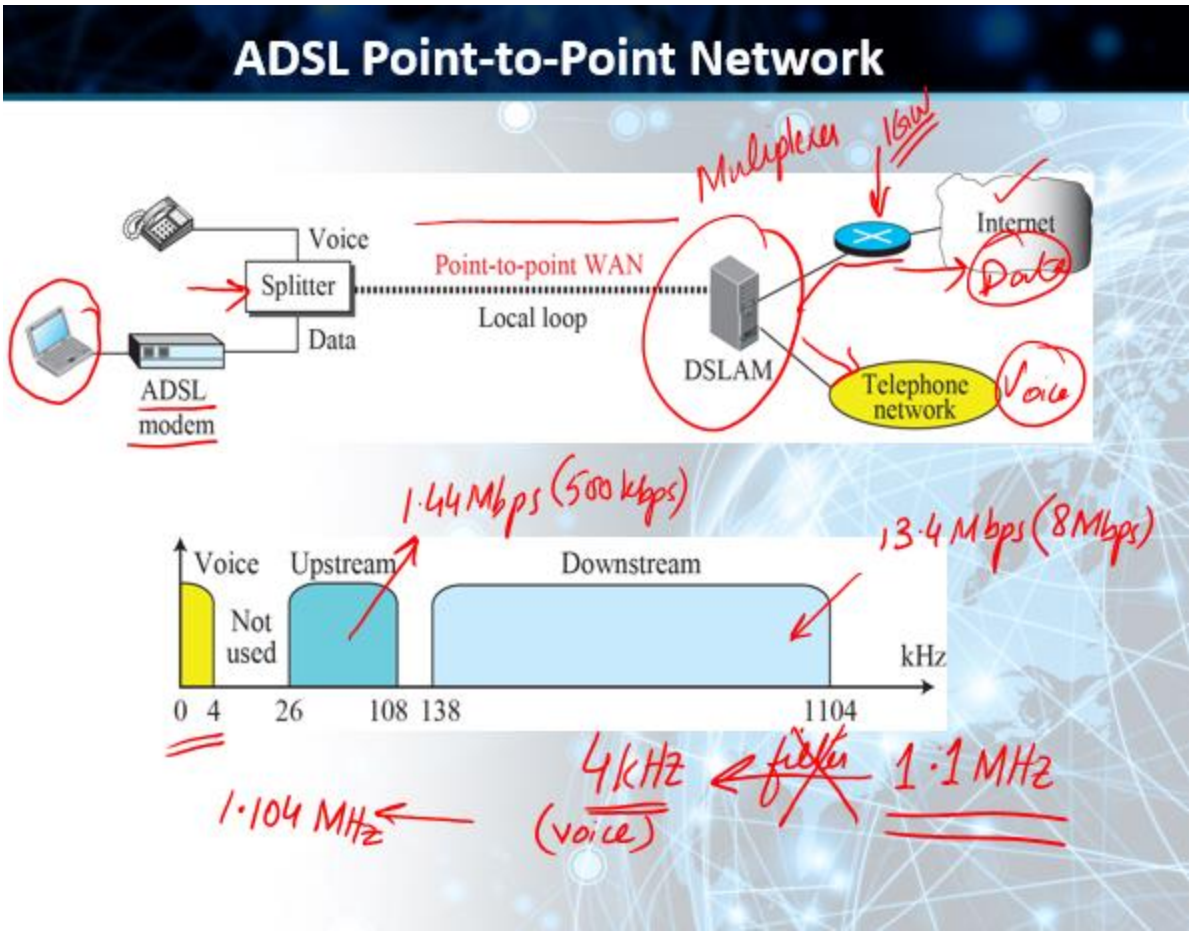
What is DSL ADSL SDSL VDSL?

Common types of DSL are Symmetric Digital Subscriber Line (SDSL, with matching upload and download speeds), Asymmetric Digital Subscriber Line (ADSL, featuring faster download speeds than upload), and Very High-Rate Digital Subscriber Line (VDSL, featuring much faster asymmetric speeds).

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Cable Network

- **The Cable TV networks were initially created to provide remote subscribers access to TV programs**
- **Cable networks enabled access to remote broadcasting stations via microwave connections**
- **Cable TV also found a good ISP market by using some of the channels originally designed for video**

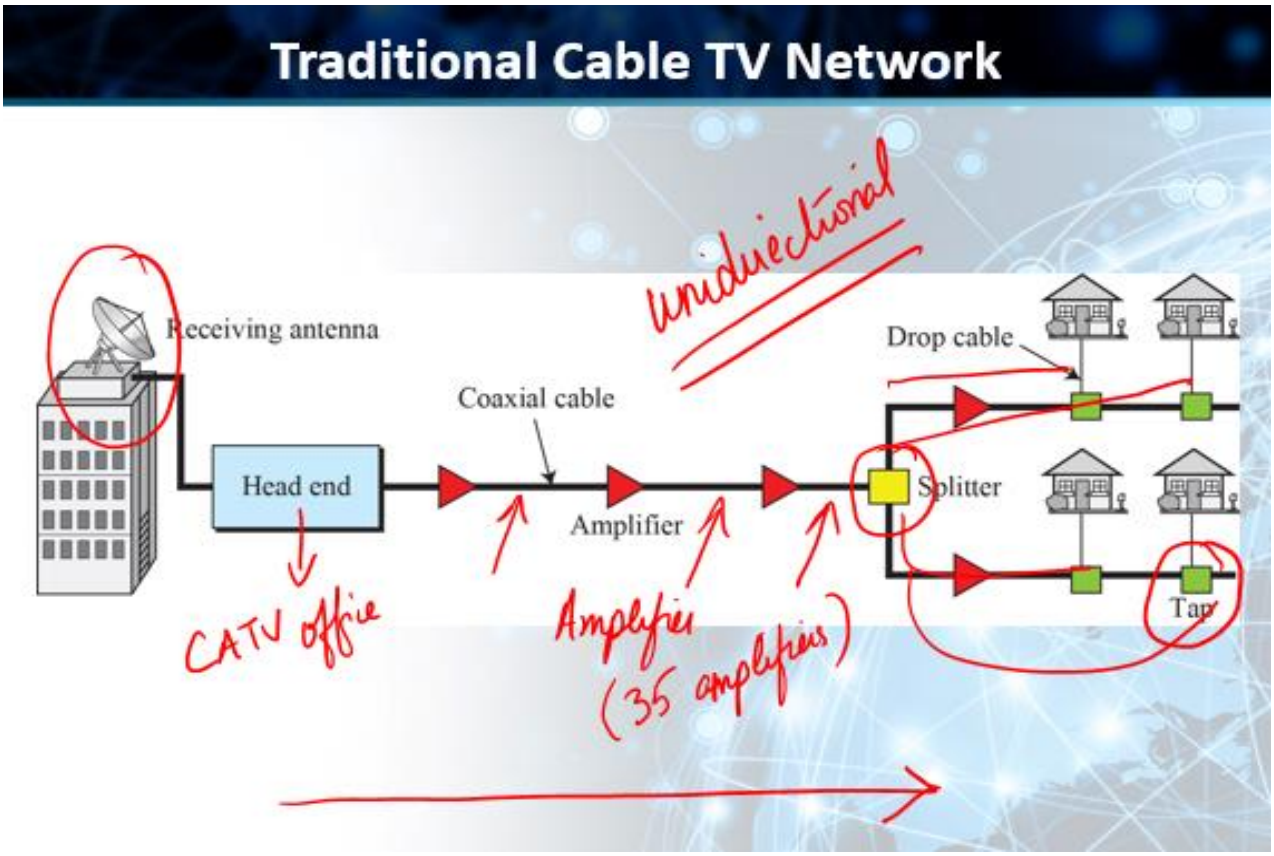
Traditional Cable Networks

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- **Cable TV started to distribute broadcast video signals to locations with poor or no reception in the late 1940s**
- **It was called community antenna television (CATV) because an antenna at the top of a tall hill or building received the signals from the TV stations**



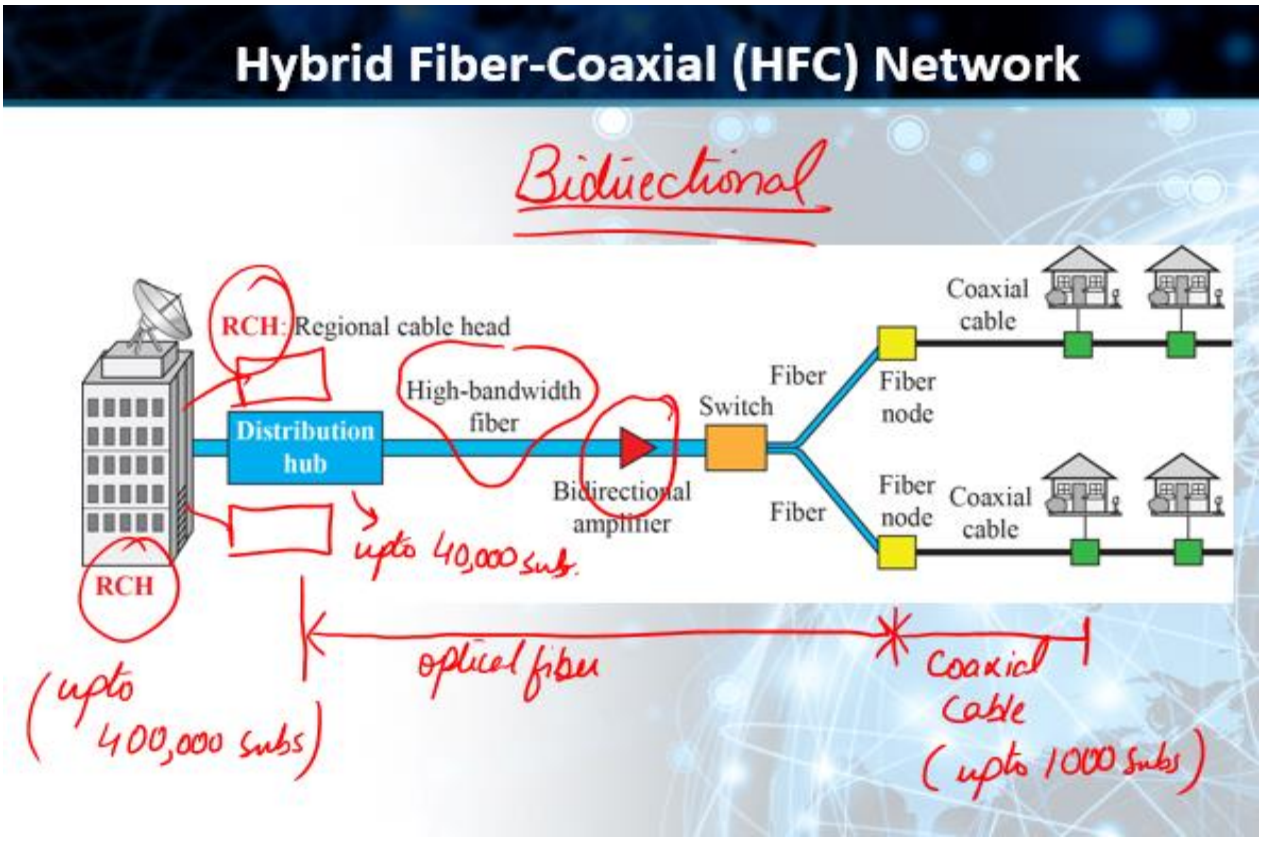
Hybrid Fiber Coaxial (HFC) Network

- **Second generation of cable network is called a Hybrid Fiber-Coaxial (HFC) network**
- **The network uses a combination of fiber-optic and coaxial cable**

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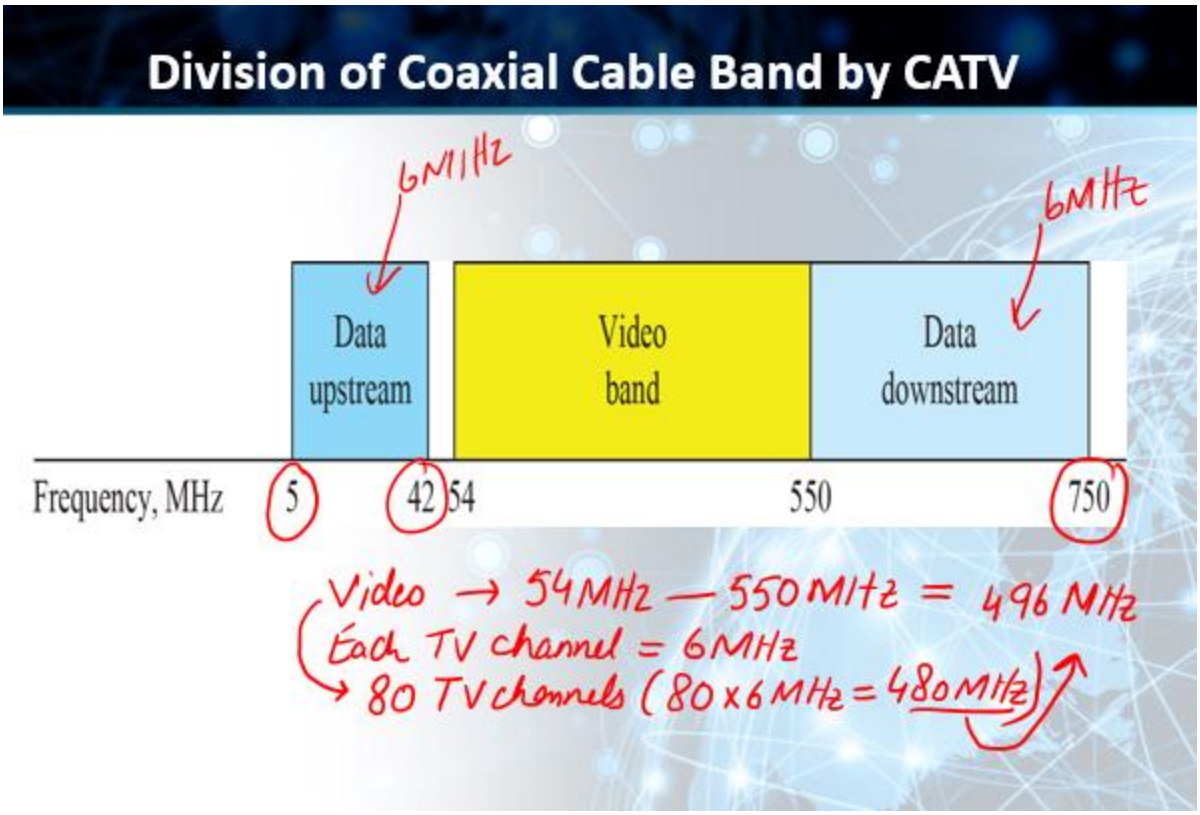
Cable TV for Data Transfer

- **Cable companies are now competing with telephone companies for the residential customer who wants high-speed data transfer**
- **DSL technology provides high-data-rate connections for residential subscribers over the local loop BUT UTP is susceptible to Interfence**
- **This imposes an upper limit on the data rate. A solution is the use of the cable TV network**

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