



S J P N Trust's

Hirasugar Institute of Technology, Nidasoshi.

Inculcating Values, Promoting Prosperity

Approved by AICTE, Recognized by Govt. of Karnataka and Affiliated to VTU Belagavi

ECE Dept.

DSS

VI Sem

2017-18

Department of Electronics & Communication Engg.

Course : Digital Switching System -15EC654. Sem.: 6th (2017-18)

Module-1

DEVELOPMENT OF TELECOMMUNICATIONS

Course Coordinator:

Prof. S. B. AKKOLE

S J P N Trust's



Hirasugar Institute of Technology, Nidasoshi.

Inculcating Values, Promoting Prosperity

Approved by AICTE, Recognized by Govt. of Karnataka and Affiliated to VTU Belagavi

ECE Dept.

DSS

VI Sem

2017-18

DEVELOPMENT OF TELECOMMUNICATIONS: Network structure, Network services, terminology, Regulation, Standards. Introduction to telecommunications transmission, Power levels, Four wire circuits, Digital transmission, FDM, TDM, PDH and SDH [Text-1]



CHAPTER 1: 1.1 DEVELOPMENT OF TELECOMMUNICATIONS SERVICES

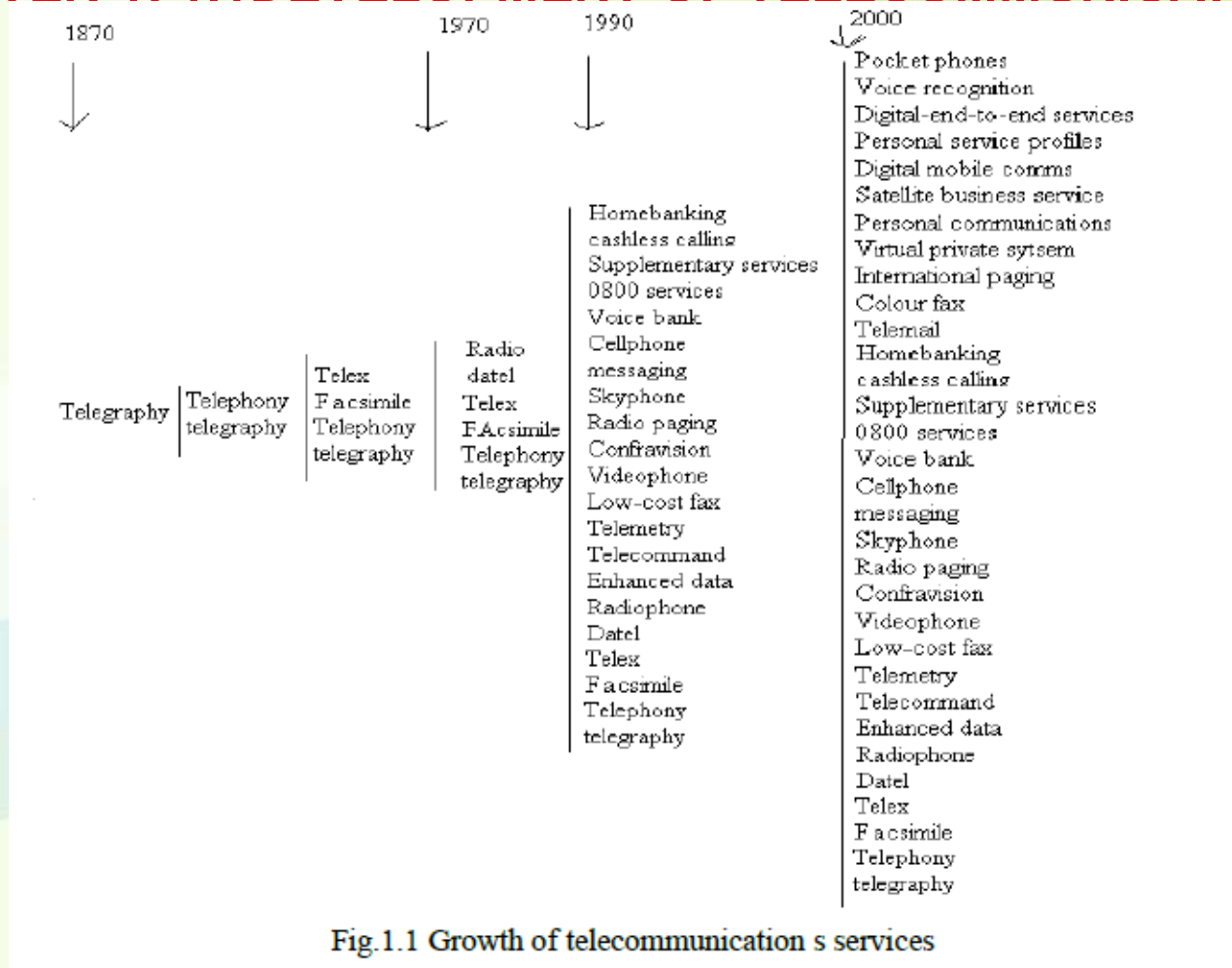


Fig.1.1 Growth of telecommunication s services



There are mainly five types of network structures or topologies or configurations. They are mesh, bus, ring, star and tree.

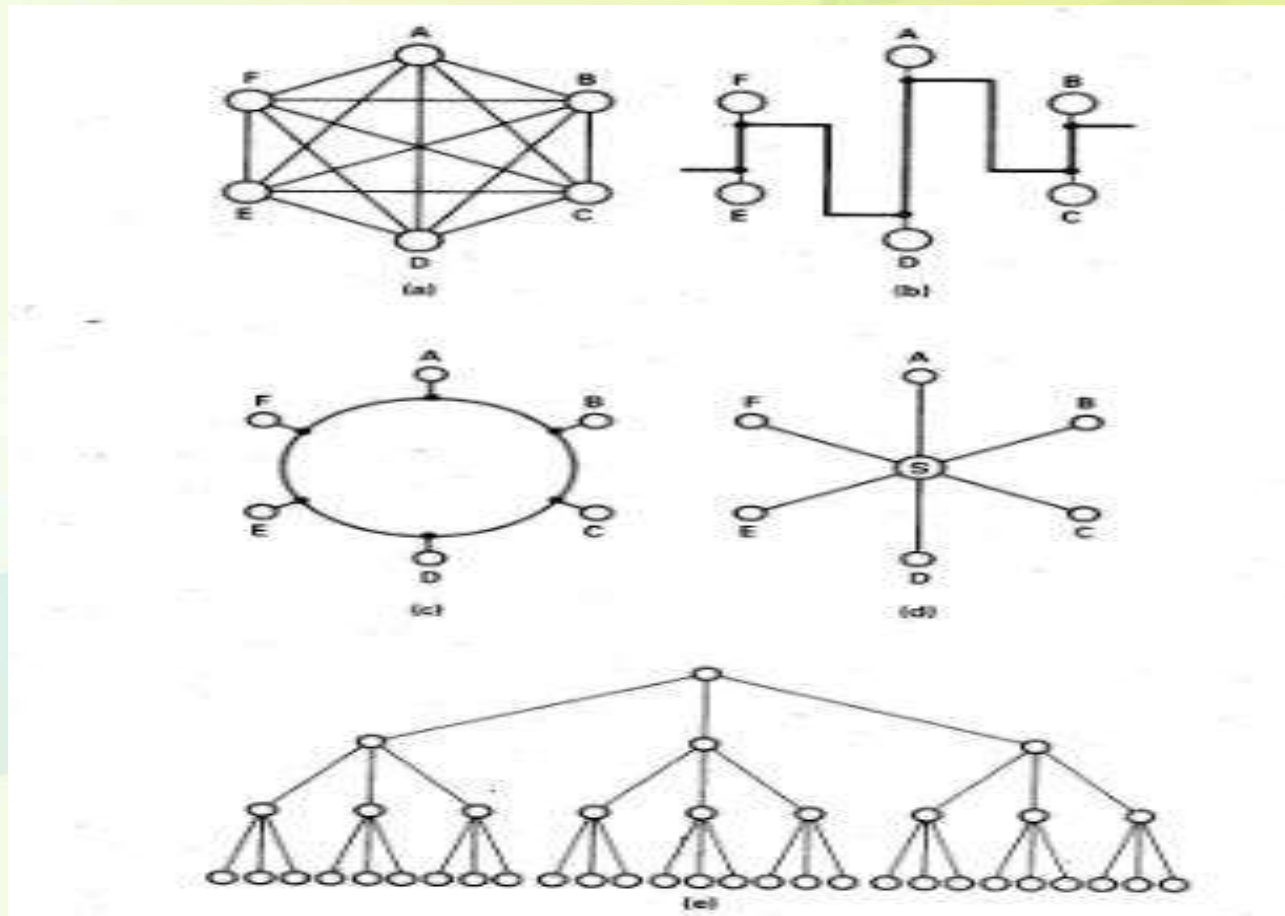


Fig. 1.2 Network configurations (a) mesh (b) Bus (c) ring (d) star and (e) tree



S J P N Trust's

Hirasugar Institute of Technology, Nidasoshi.

Inculcating Values, Promoting Prosperity

Approved by AICTE, Recognized by Govt. of Karnataka and Affiliated to VTU Belagavi

ECE Dept.

DSS

VI Sem

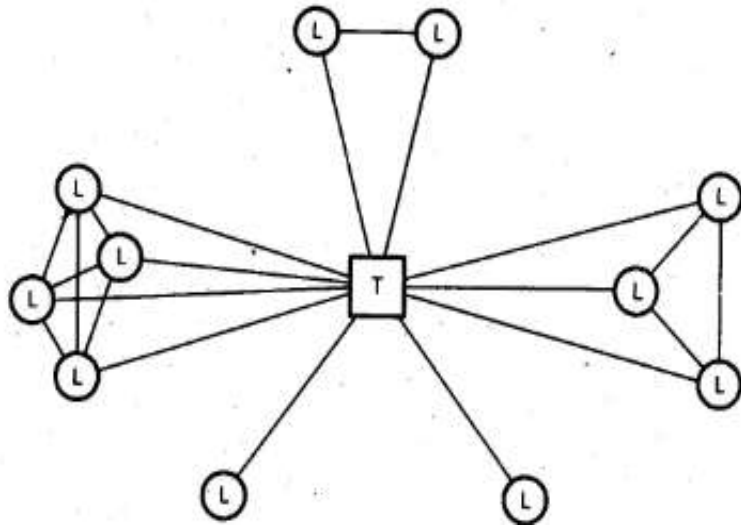
2017-18

1.3 Trunk or Tandem Exchange

A central switching centre, these make connection between the customer's local exchanges.

Multi Exchange Area

It usually has a direct exchange between some exchanges, but traffic between the other is routed via a tandem exchange (T). It is shown in figure below is a mixture of star network, joining local exchanges (L) to the tandem exchange, and mesh networks connecting some of the local exchanges together.

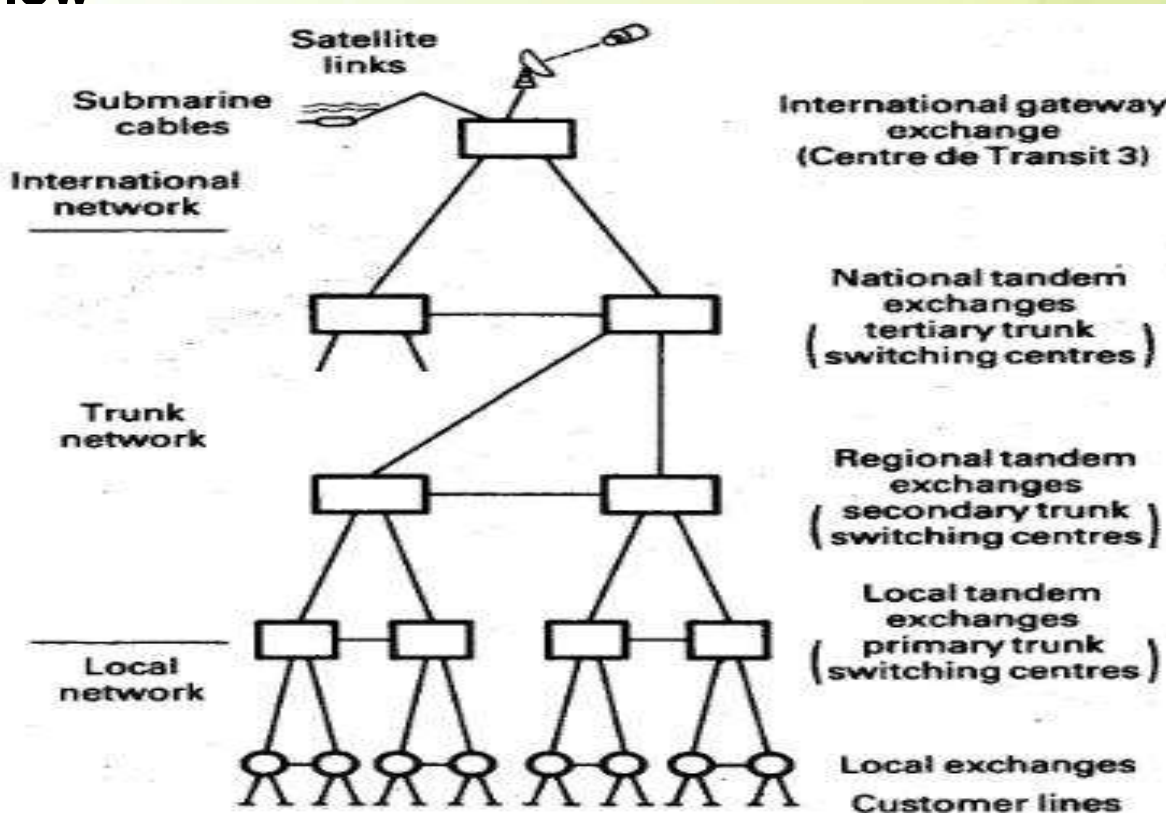


L=Local exchange, T=tandem exchange



1.4 Tree Network

Tree network is a concatenation of star networks as shown in figure V. This type of network used in the large national networks to interconnect one or more levels of switching centers. Example of tree network is National public telecommunication network (PSTN) shown in figure below





A national Public Telecommunication Network (PSTN) as shown in figure consists of the following hierarchy

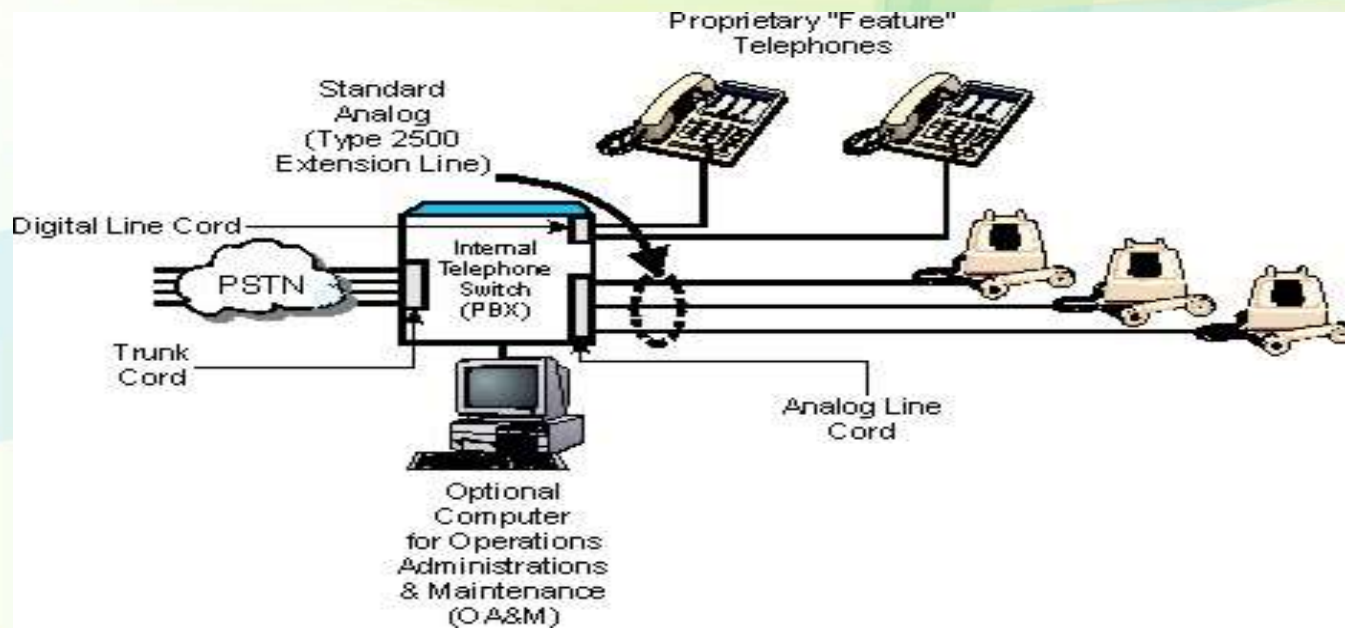
- 1. Local network:** These connect customer's stations to their local exchanges. It is also called as customer loop, customer access network, or the subscriber distribution network.
- 2. Junction network:** This interconnects a group of local exchanges with a tandem or trunk exchange.
- 3. Trunk network or toll network:** This provide long distance circuits between local areas throughout the country

The junction network and toll network together called as core network, the inner core consisting of trunk and the outer core consisting of the junction networks.



1.5 Private branch exchanges (PBX):

Below the hierarchy of the national public network, some customers have internal lines serving extension telephone. These connected to one another and to lines from the public exchange by a PBX. This may be owned by any company after purchasing from the public telecommunication operators.





A telecommunication network consisting of a large number of transmission links joining different locations, which are known as nodes of the network .

There are four different nodes

- 1)Customer nodes: A customer terminal forms the node.**
- 2) Switching nodes: A switching centre forms the other node.**
- 3) Transmission nodes: Here certain circuits are not switched but their transmission paths are joined semi-permanently**
- 4)Services nodes: Customers require connection to nodes where there are telephone operators to assist them in making calls and to public emergency services e.g. police, fire, and ambulance services. And also to the value added network services (VANS) such as voice mail boxes, stock market prices and sport results**



1.6 Signaling:

To make connection to the required destination, and clear it down when no longer required, the customer must send information to the exchange. Such information must be sent between all exchanges on the route. This interchange of information is called is signaling.

A telecommunication network is a system consisting of the following interacting sub systems:

- Transmission system
- Switching systems
- Signaling system



1.7 Network services

The different services required by the customer of the public telecommunication networks are

- The public switched telephone network (PSTN)
- The public switched telegraph network (Telex)

- Private networks for voice and data
- Cellular radio networks providing mobile communication
- Public data networks (PDN), usually employing packet switching
- Special service networks, introduced to meet specialized demands from customers.



S J P N Trust's

Hirasugar Institute of Technology, Nidasoshi.

Inculcating Values, Promoting Prosperity

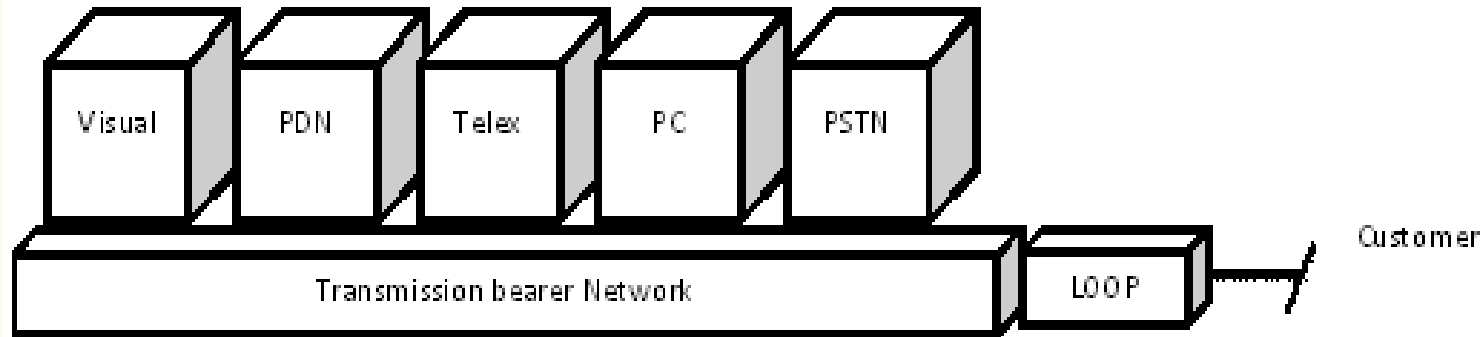
Approved by AICTE, Recognized by Govt. of Karnataka and Affiliated to VTU Belagavi

ECE Dept.

DSS

VI Sem

2017-18



Relationship of services and bearer networks: PC=Private Circuits, PDN=Public Data Network, PSTN=Public Switched Telephone Network.

Relationship of the service and bearer networks is shown in figure above the different services all use a common transmission bearer network consisting of junction and trunk circuits. Customers are connected to this at their local exchanges via the local access network.

The services provided over telecommunication networks can be divided into two categories.

- 1. Teleservices: Here provision of the service depends on particular terminal apparatus (e.g. a telephone or teleprinter)**
- 2. Bearer services: In which present the customer with transmission capacity that can be used for any desired function (e.g. private circuits)**



1.8 Terminology

They are different type's networks and switching centers are present worldwide. For example, a switching centre is called an exchange in the UK; in North America switching centre is called central office. The different nomenclature is tabulated in the table below

North America	British
Customer's loop	Local network Access network
Central office	Exchange
End office Class 5 office	Local exchange
Inter office trunk	Junction
Junctor	Trunk
Toll office	Trunk exchange

An exchange on which customers lines terminate is a **Local exchange** in UK but **end office** in North America. An exchange that switches long distance traffic is called a **trunk exchange** in UK and **toll office** in North America.

Circuits between local exchanges or between a local exchange and a tandem exchange and a tandem or trunk exchange are called junctions in the UK, in North America are called trunks. In UK the term trunk is used for a circuit between switches in an exchange, in North America is called a junctor.



1.9 Regulation

In most countries the telecommunication operating companies are privately owned and efforts have been made to state ownership. In USA, the customer can only obtain local service from the regional Bell operating company, they can choose long distance carrier to use. Tariffs are regulated by Federal Communication Commission with the help of Public Utilities Commissions of individual states.

In Britain, both British Telecom and Mercury Communications provide local and trunk services. Cable television companies have been licensed to provide telephone services to their customers. Also, three competing cellular mobile radio companies have been established. The office of the telecommunications (OFTEL) was setup by government's regulatory body.



1.10 Standards

The work of ITU (International Telecommunication Union) is carried through two main bodies:

1. The ITU telecommunication sectors (ITU-T): formerly called as the Comité Consultatif Telegraphique et Telephonique (CCITT).

Its function includes

- the study of technical questions,
- operating methods and
- tariffs for telephony,
- telegraphy and
- data communications.

2. The ITU radio communication sectors (ITU-R): formerly called as the Comité Consultatif International des Radio communication (CCIR).

Its function are

- Studying all technical and operating questions relating to radio communication,
- including point-to-point communications,
- mobile services and
- broadcasting.

associated with International Frequency Registration Board (IFRB), which regulates the assignment of radio frequency to prevent interference between different transmissions.

Queries?