OVERVIEW

BISDN is an extension of ISDN in terms of
capabilities, i.e. it not only has the narrowband
capability of ISDN but also the broadband
capability.

B-ISDN

Definition

"A service requiring transmission channels capable of supporting rates greater than the primary rate." ITU-T.

Any service inquiry with a speed greater than 1.544 Mbps is defined as broadband, and any communications based on this speed are called broadband communications.
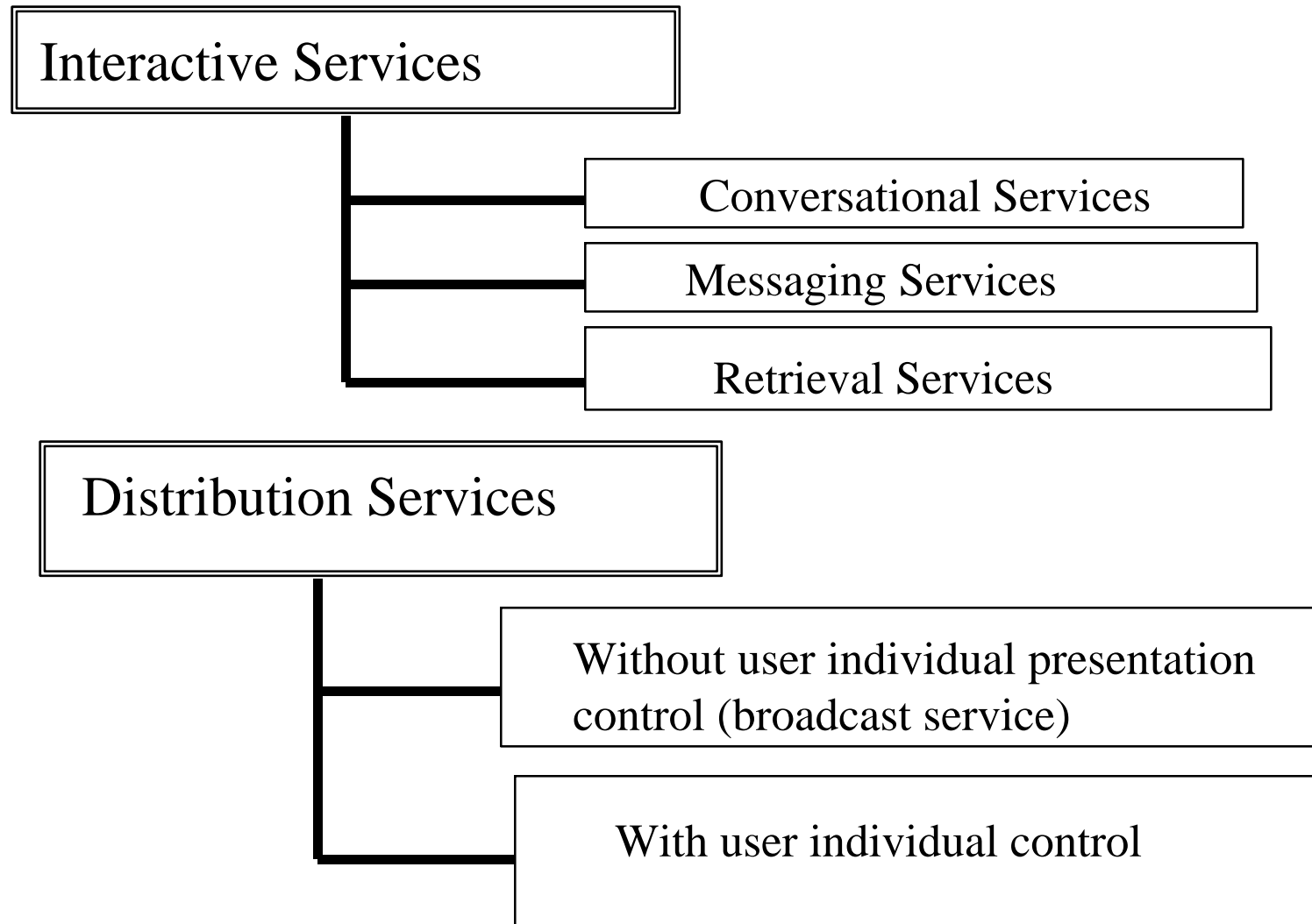
B-ISDN

BISDN is an extension of ISDN only in term of the name. Everything is different including protocol, architecture, transmission, and switching technology.

The Goal of BISDN is to achieve complete integration of services, ranging from low-bit--rate bursty signals to high-bit-rate continuous real-time signals.

B-ISDN

- **Designed to exploit the advances in technology.**
- **Provides for integration of wide range of communications facilities and the support of universal communications with the following characteristics.**

✓ *Worldwide exchange between any two subscribers in any medium.*

✓ *Retrieval and sharing of information from multiple sources, in multiple media.*

✓ *Distribution of a wide variety of materials to home or office, on demand.*

Broadband Services

Interactive Services

Conversational Services

Messaging Services

Retrieval Services

Distribution Services

Without user individual presentation control (broadcast service)

With user individual control

B-ISDN Services

- **Interactive Services**

  ✓ **Two-way exchange of information (other than control-signaling information) between two subscribers or between a subscriber and a service provider.**

- **Distribution Services**

  ✓ **Primarily one way transfer of information, from service provider to B-ISDN subscriber.**

B-ISDN Services

Distribution Services Without User Presentation Control

✓ **Referred also as broadcast services**

✓ **Provide a continuos flow of information, which is distributed from a central source to an unlimited number of authorized receivers connected to the network.**

✓ **User can access this flow of information but has no control over it.**

✓ **Example: High definition television (HDTV)**

B-ISDN Services
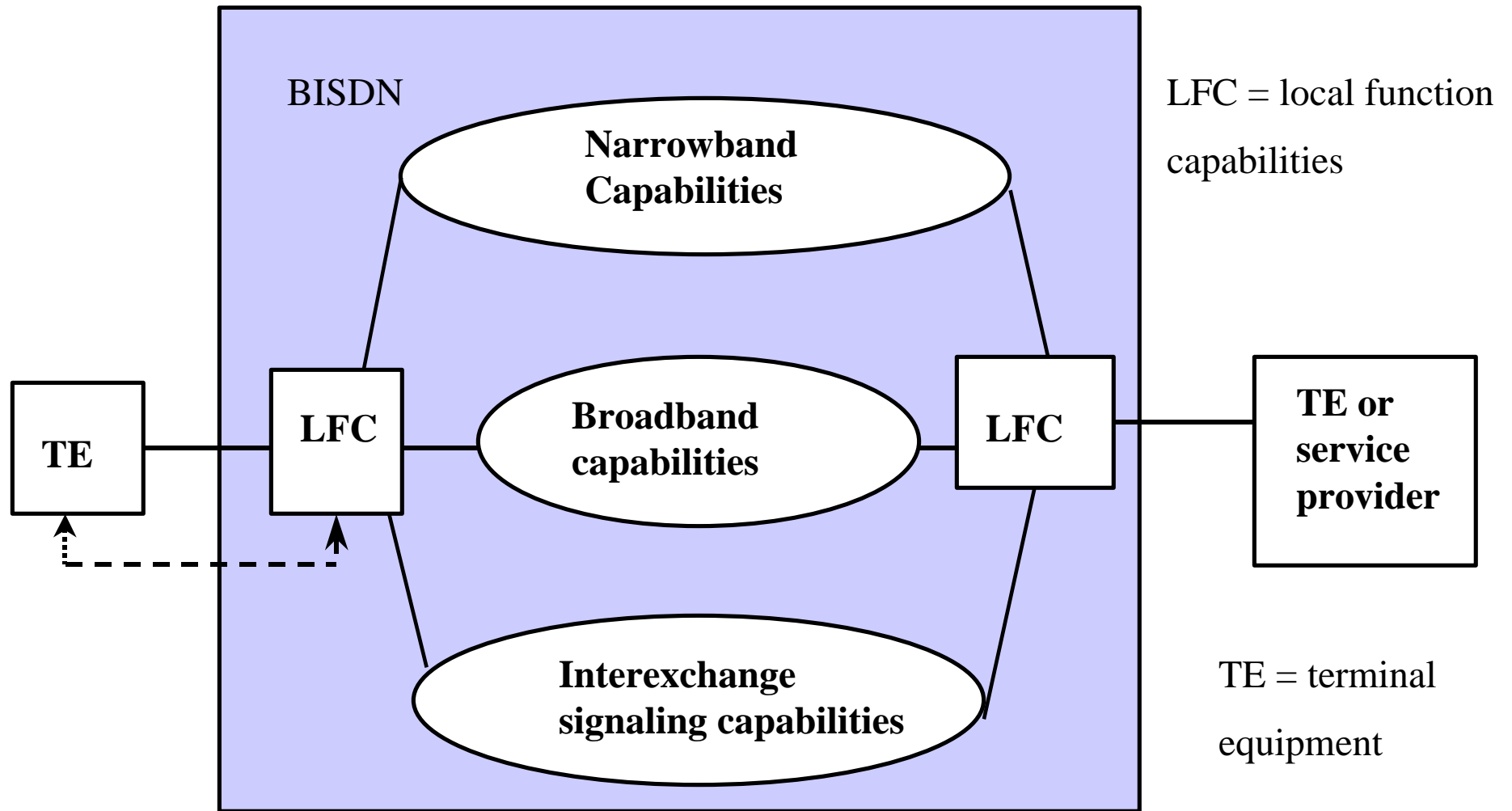
Distribution Services With User Presentation Control

✓ **Distribute information from a central source to a large number of users.**

✓ **Information is provided as a sequence of information entities (e.g. , frames) with cyclical repetition.**

✓ **User has the ability of individual access to the cyclical distributed information and can control start and order of presentation.**

✓ **Example: cable text**

Services include voice-band services such as telemetry, low-speed data, telephone, and facsimile and broadband services, such as high-quality video conferencing, high-definition television (HDTV) video transmission and high speed data transmission.

Thus BISDN must adapt the characteristics of each of the different services and integrate them into a common transmission and switching platform.

For instance, the packet switching concept is used for data-transmission and the circuit switching concept is used for voice transmission. In BISDN both these concepts are used so that both type of traffic can be handled.

B-ISDN Architecture (Functional)

BISDN

Narrowband
Capabilities

Broadband
capabilities

Interexchange
signaling capabilities

TE

LFC

LFC

TE or
service
provider

LFC = local function
capabilities

TE = terminal
equipment

B-ISDN

Functional Architecture

✔ **Control of B-ISDN based on common-channel signaling**

✔ **B-ISDN must support all the 64-kbps transmission services, both circuit switching and packet switching.**

✔ **In addition it should support higher-data-rate transmission services. Example: <u>high resolution video</u> (150 Mbps), <u>video-on-demand</u> (600 Mbps)**

✔ **At the user-network interface, higher-data-rate transmission are provided using ATM.**

✔ **Needs fiber subscriber loops.**

B-ISDN

Transmission Structure

Three new transmission services

✔ Full-duplex 155 Mbps

✔ Asymmetrical 155 Mbps (subscriber to the network), and 622 Mbps (network to subscriber)

✔ Full duplex 622 Mbps - for multiple video

B-ISDN

Protocols

✔ **ATM used for transfer of information across the user-network interface**

✔ **This implies that B-ISDN is a packet-based network (at the interface and internal switching)**

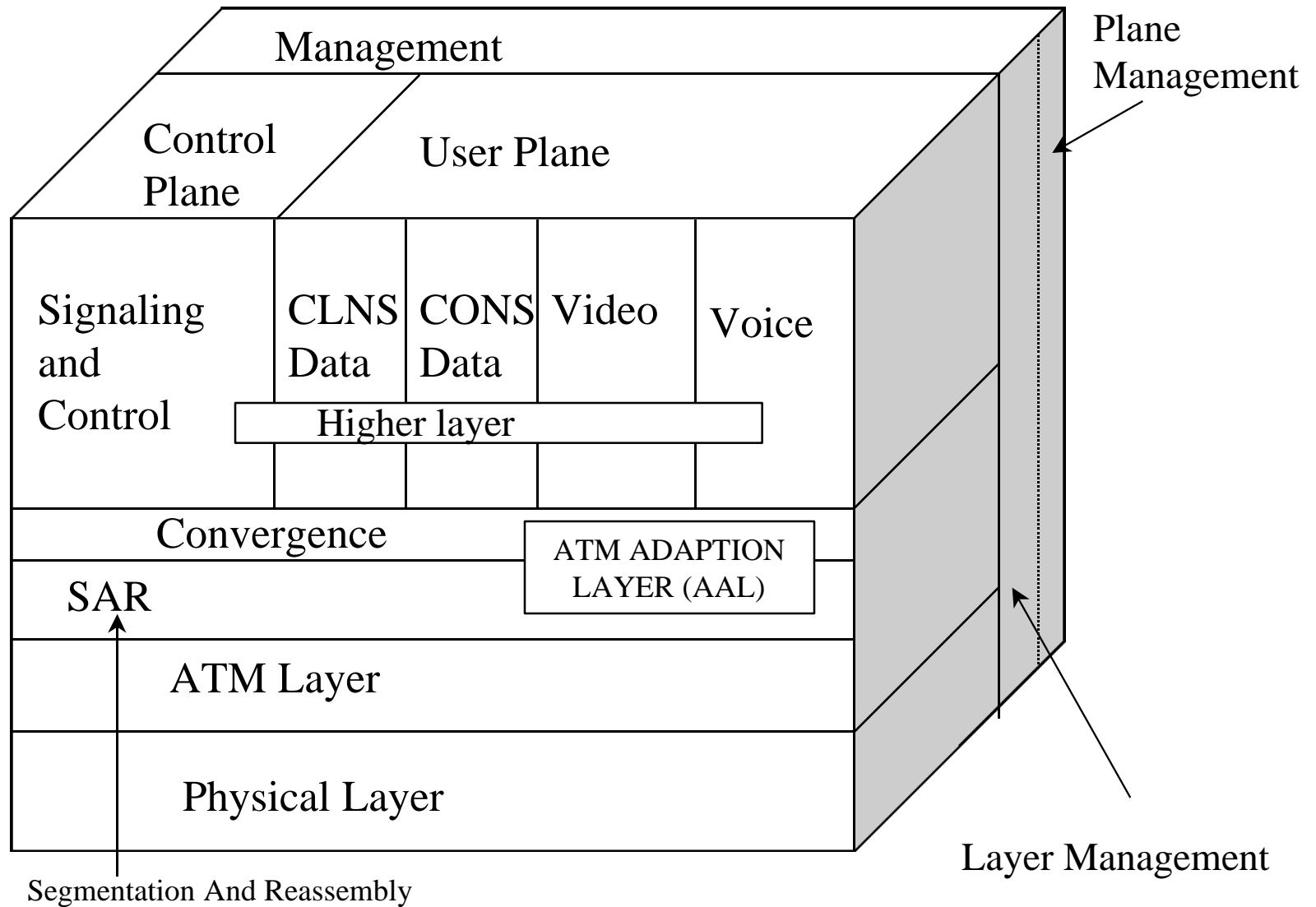✔ **B-ISDN also supports circuit mode applications over a packet based transport mechanism.**

B-ISDN

The B-ISDN reference protocol model consists of three planes:

✔ Management Plane

✔ User Plane

✔ Control Plane

B-ISDN Protocol Reference Model

Management

Control Plane

User Plane

Plane Management

Signaling and Control

CLNS Data

CONS Data

Video

Voice

Higher layer

Convergence

ATM ADAPTION LAYER (AAL)

SAR

ATM Layer

Physical Layer

Segmentation And Reassembly

Layer Management

B-ISDN

Management Plane

Two types of functions exist in this plane

✔ Layer management: All the management functions related to the resources and parameters residing in its protocol entities such as signaling are performed by layer management.

✔ Plane management: All the management functions that relate to the whole system are located in the plane management.

B-ISDN

USER PLANE

✔ The function of the user plane is to transfer the user information from point A to point B in the network.

✔ All associated mechanisms, such as flow control congestion control, or recovery from errors are included.

B-ISDN

CONTROL OR SIGNALING PLANE

✔ This plane is responsible for call control and connection control functions related to setting up and tearing down a connection.

B-ISDN

Physical Layer Functions

Divided into two sublayers

✓ Physical medium: It is the lowest layer of the B-ISDN protocol, and it includes the functions that are only physical-medium-dependent. It itself provides line coding and if necessary, electrical to optical conversion.

✓ Transmission convergence: The main functions of this sub layer are cell rate decoupling, HEC (Header Error Control) header sequence generation, cell delineation, transmission frame adaptation, transmission frame generation.

B-ISDN

ATM Layer functions

✔ generic flow control

✔ cell header generation

✔ virtual channel identifier

✔ cell multiplexing and demultiplexing

B-ISDN

ATM adaptation layer function:

The basic function of the AAL is the enhanced adaptation of the services provided by the ATM layer until the requirement of the higher layer's services are met.

In this layer, the higher layer protocol data units are mapped onto the information field of the ATM cell, which is 48 bytes long.