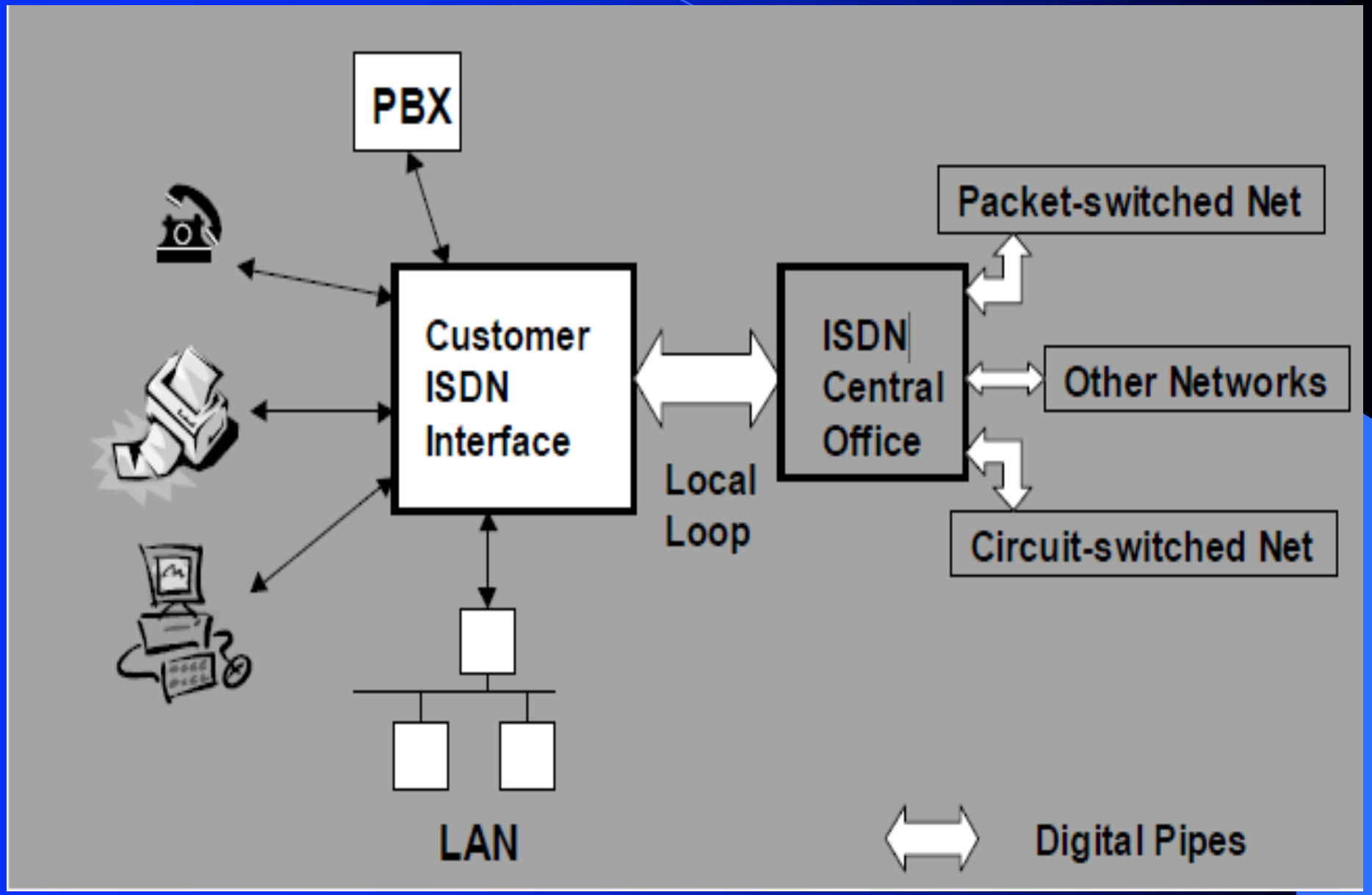
Introduction to ISDN

What is ISDN?

- ISDN - Integrated Services Digital Network
- Telephone services →Telecommunication services integrate digital voice, 64-kbps data, telex, fax, slow-scan video
- local interface to a “digital pipe”enables higher data rates

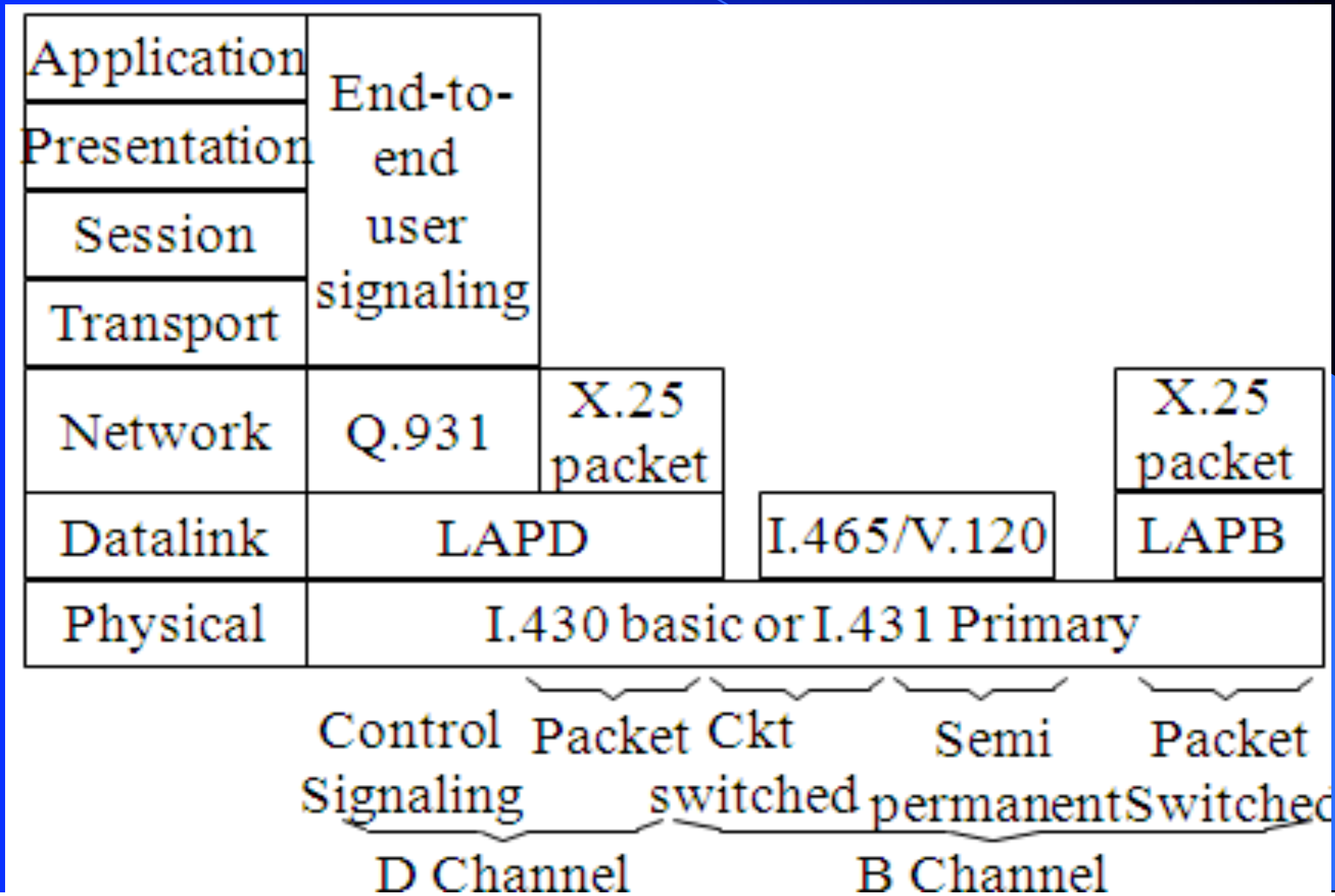
ISDN view


PBX
Packet-switched Net
Customer ISDN Interface
ISDN Central Office
Other Networks
Local Loop
Circuit-switched Net
LAN
Digital Pipes

Fundamentals

- Types of channels
  - Bearer channel (B-channel=64 kb/s) clear pipe for data
  - Delta channel (D-channel, 16 kb/s or 64 kb/s) call signaling information:
    - who is calling
    - type of call
    - calling what number

ISDN protocol architecture



Fundamentals

- Service types
  - Basic Rate Interface (2 B channels + 1 D channel (16 kb/s))
  - Primary Rate Interface (30 B channels + 1 D channel (64 kb/s))

Advantages of ISDN

- Digital
  - reliable connection
- Speed
  - 128 kb/s (160 kb/s) for BRI
  - 1920 kb/s (2048 kb/s) for PRI
- Fast call setup
  - 2 seconds

Advantages of ISDN

- Bandwidth on Demand
  - adding new channels to the bundle of channels
- Multiple devices
  - phone, fax, PC, videoconferencing system, router, terminal adapter,.. each with its own sub-address

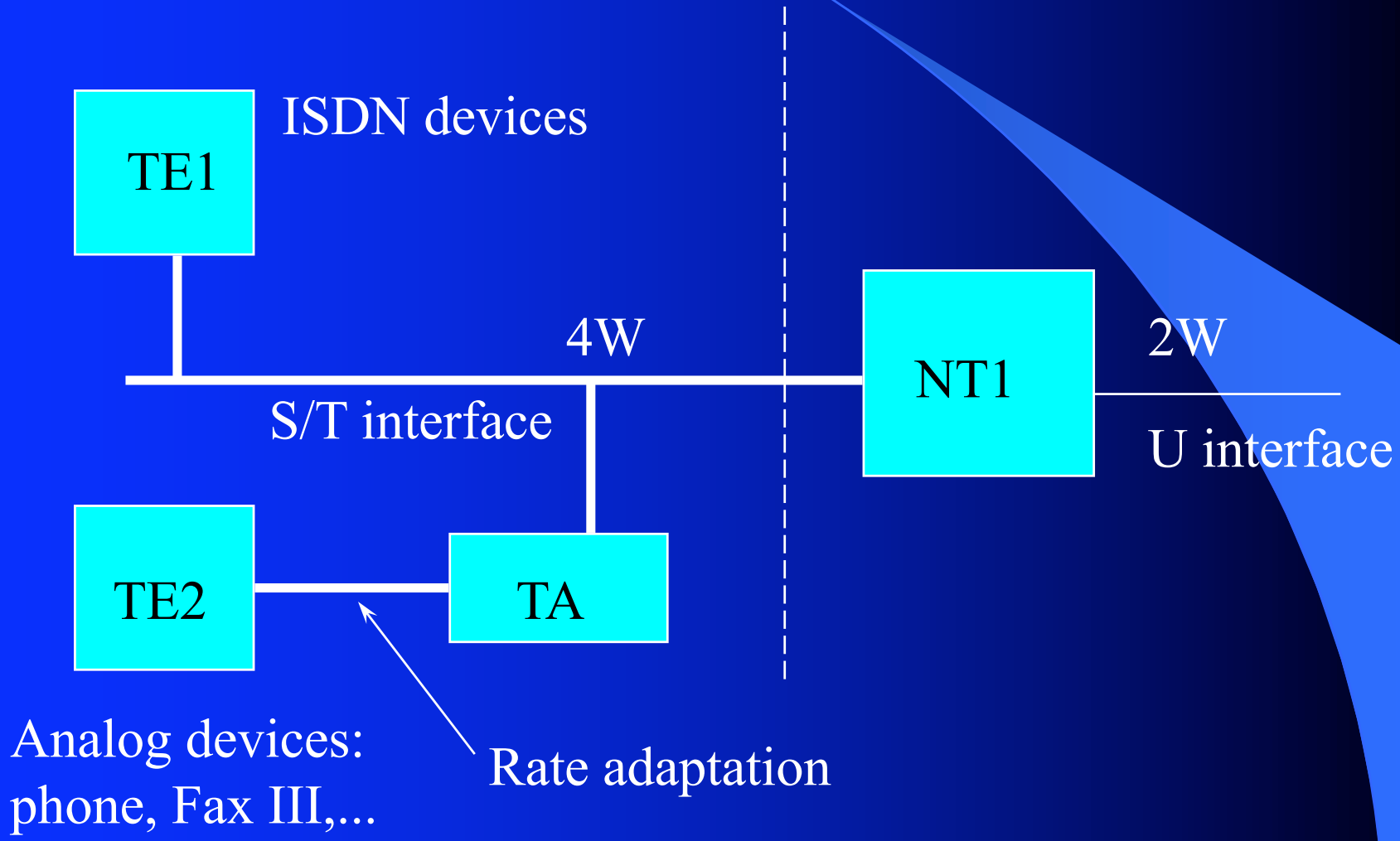
ISDN and OSI model

- Layer1 - Physical
- Layer2 - Data Link
- Layer3 – Network

Interfaces and Devices

- Interfaces
  - S/T (4w)
  - U (2w)
- Devices
  - NT1
  - TE1 - ISDN devices
  - TE2 - analog devices (need TA)
  - TA - Terminal Adapter (rate adaptation (V.110, V.120)

Interfaces and Devices



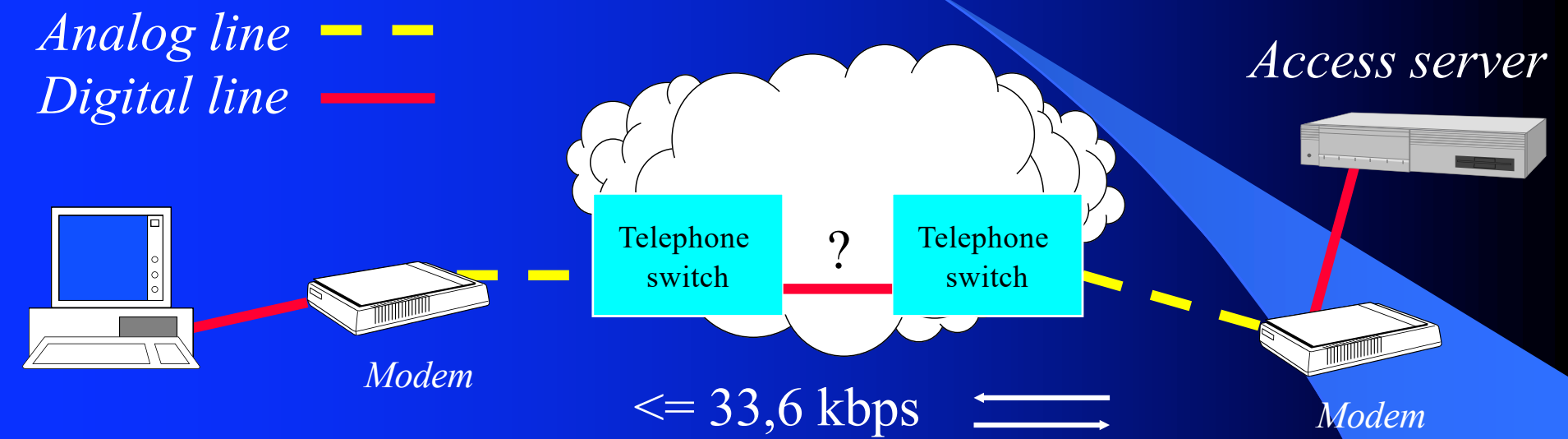
ISDN Access Servers

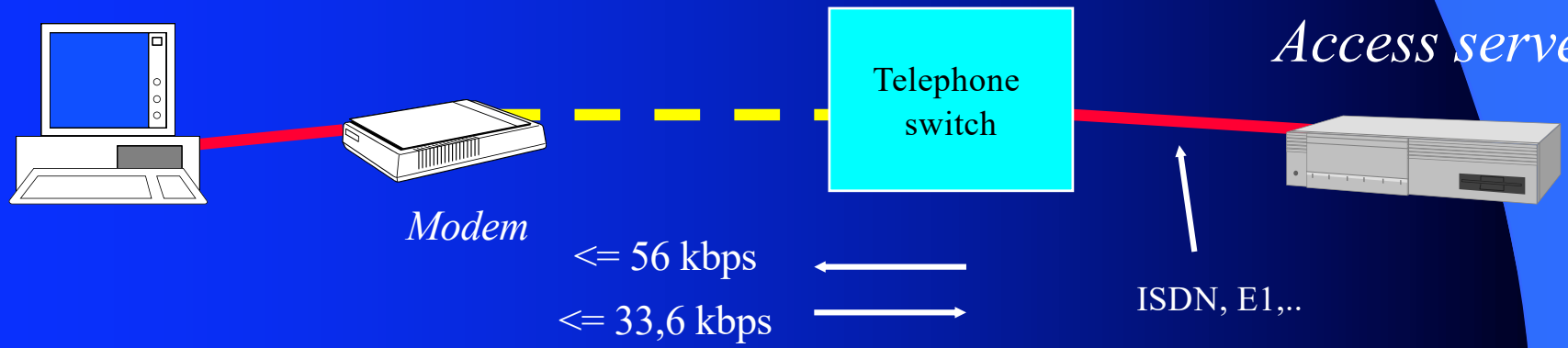
- Digital modems (accepting analog and ISDN calls)
  - software busy-out feature
- 56 kbit/s technologies
- Rate adaptation (V.110, V.120,..)
- Compression (Stack,..)
- Synchronous PPP (with CHAP/PAP authentication)

ISDN Access Servers

- PPP Multilink
- BACP (Bandwidth Allocation Control Protocol)
- Controlling the number of B-channels per user
- D-channel based callback
- CLIP - Caller Line Identification Presentation

56 k Technology

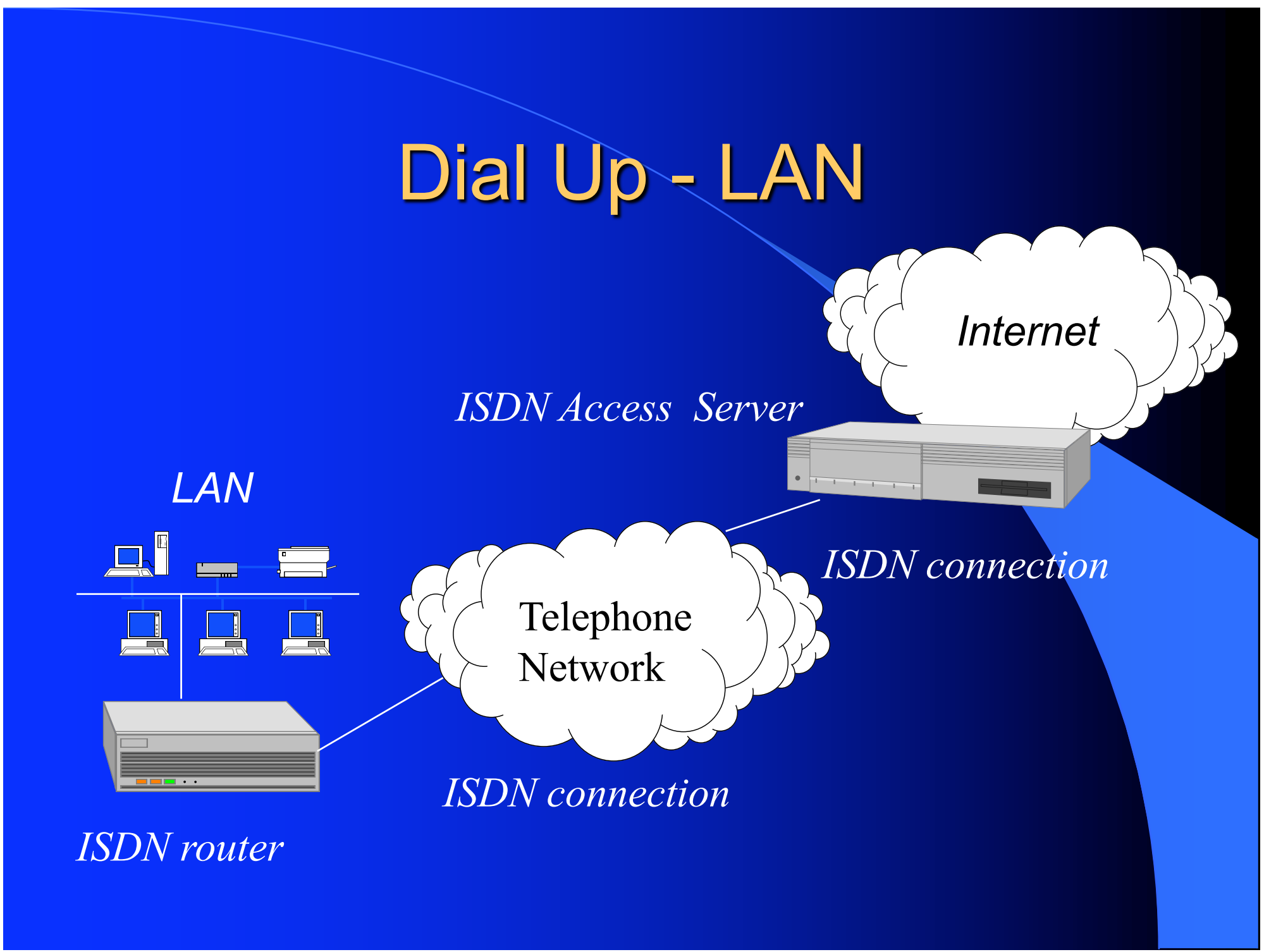




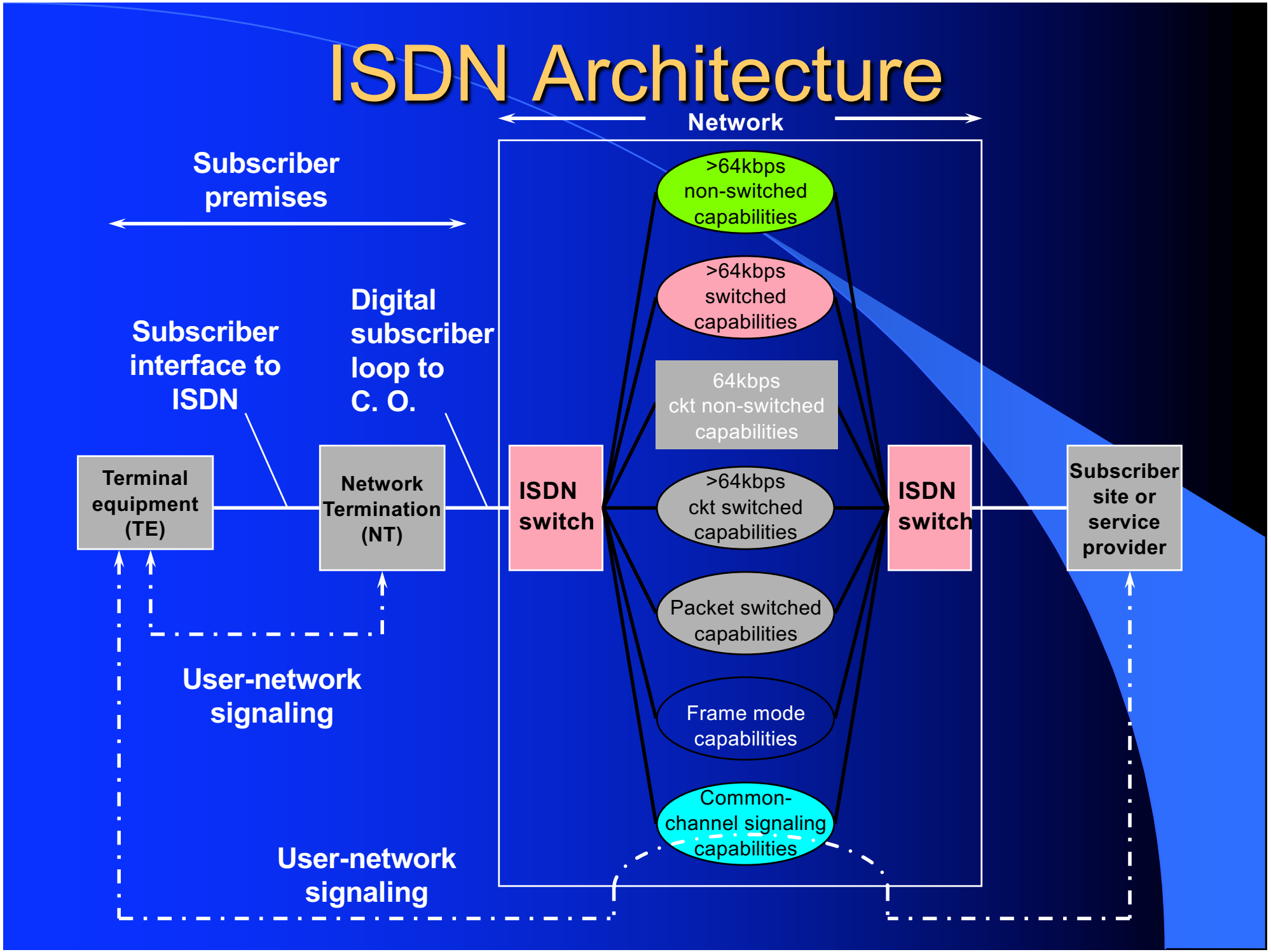
Using ISDN for IP Data Networks

- Characteristics
  - Speed
  - Fast call setup
  - Bandwidth on Demand

Dial Up - LAN


Internet
ISDN Access Server
LAN
ISDN connection
Telephone Network
ISDN connection
ISDN router

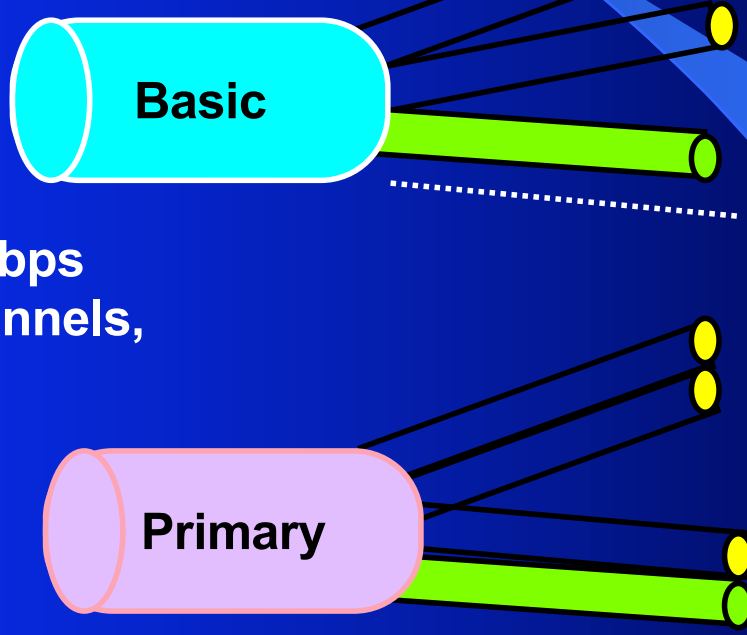
ISDN Architecture



Transmission Structure

- B Channel: 64 kbps
- D Channel: 16 or 64 kbps
- H Channel: 384 (H0), 1536 (H1), or 1920 (H12) kbps
- Basic Rate Interface
- Primary Rate Interface

ISDN Channel Structures



Basic Service:
Management rate: 192 kbps
Standard throughput: 144 kbps
Composition: B + B + D channels,
+ Synch & framing

Primary Service:
Rate: 1.544/2.048 Mbps
Composition: 2.048 Mbps: 30 B at 64 kbps each
2 D at 64 kbps
1.544 Mbps: 23 B at 64 kbps each
1 D at 64 kbps

B
B
Information: Voice, Data

D
Signaling: Overhead or telemetry, etc.

B
B
PCM voice channels

B

D
Signaling