X.25 & FRAME RELAY

Computer System & Networking

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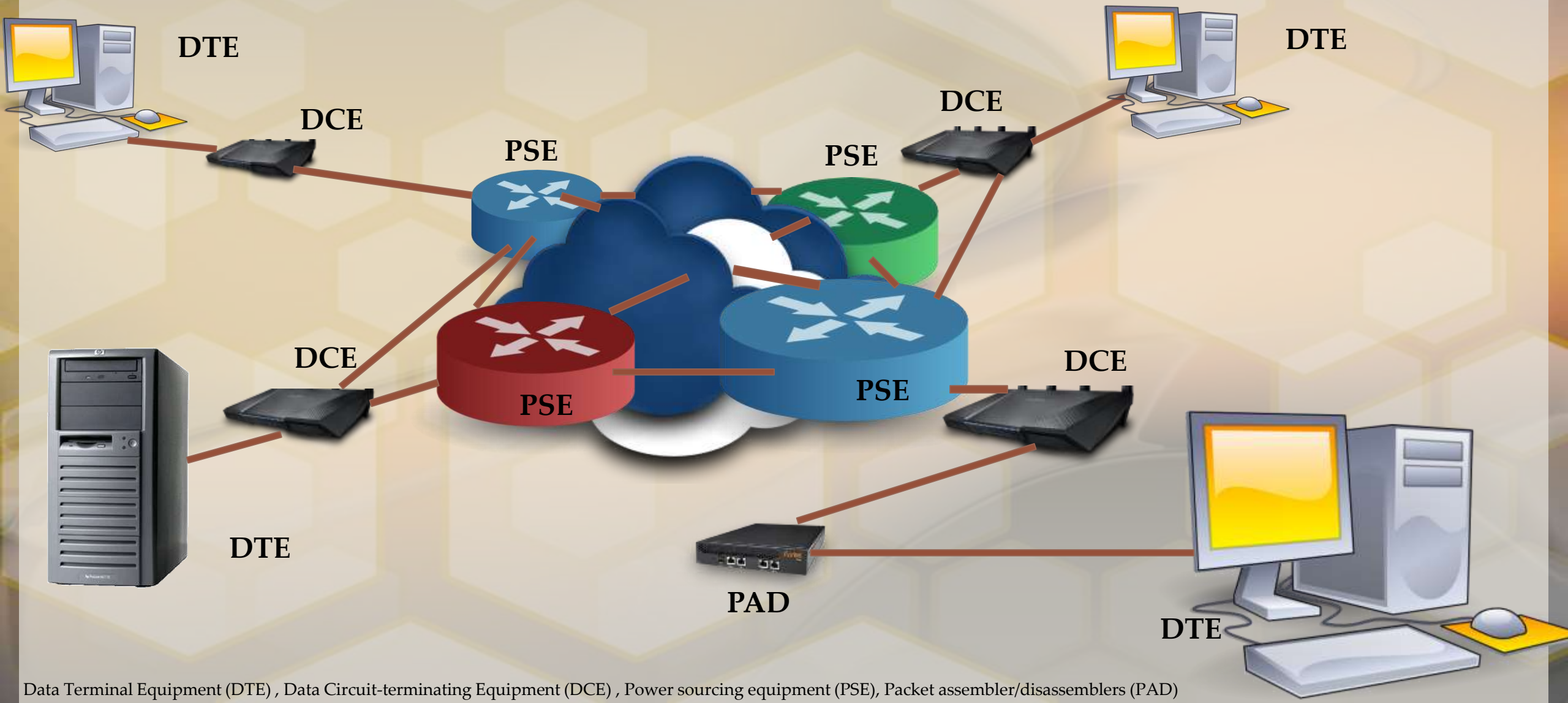
What is X.25

- **X.25 is an ITU-T standard protocol suite for packet switched wide area network (WAN) communication.**
- **Packet Switching is a technique whereby the network routes individual packets of HDLC data between different destinations based on addressing within each packet.**
- **An X.25 network consists of a network of interconnected nodes to which user equipment can connect.**
- **The user end of the network is known as Data Terminal Equipment (DTE) and the carrier's equipment is Data Circuit-terminating Equipment (DCE) .**
- **X.25 routes packets across the network from DTE to DTE.**

X.25 NETWORK



Data Terminal Equipment (DTE) , Data Circuit-terminating Equipment (DCE) , Power sourcing equipment (PSE), Packet assembler/disassemblers (PAD)

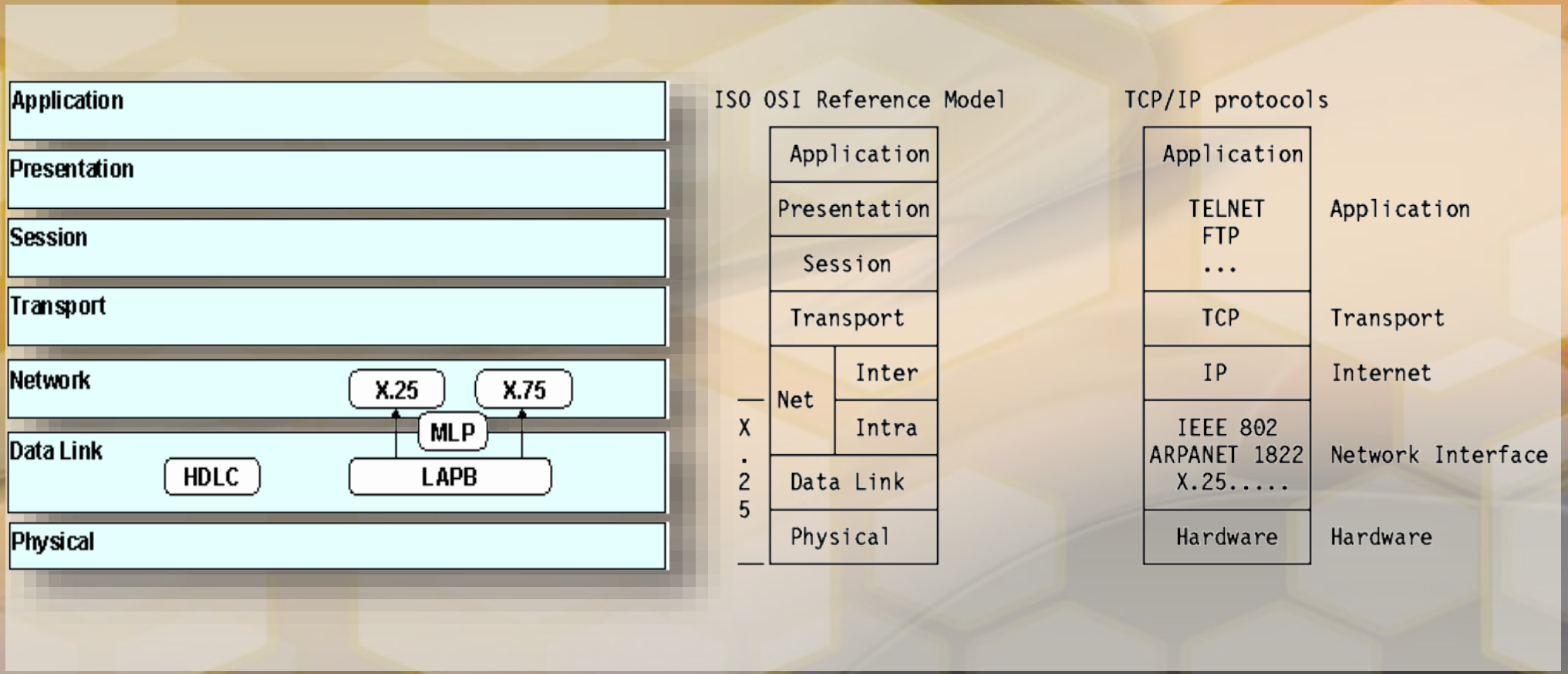
What is X.25

- **The protocol known as X.25 was developed by the organization now known as the International Telecommunications Union (ITU) and encompasses the first three layers of the OSI 7-layered architecture as defined by the International Organization for Standardization (ISO)**

- **X.25 permits a DTE user on an X.25 network to communicate with a number of remote DTE's simultaneously.**

- **Connections occur on logical channels of two types;**
  - **Switched virtual circuits (SVC's)**
  - **Permanent virtual circuits (PVC's)**

What is X.25


Application
Presentation
Session
Transport
Network
X.25
X.75
MLP
Data Link
HDLC
LAPB
Physical
ISO OSI Reference Model
Application
Presentation
Session
Transport
Net
Inter
Intra
X.25
Data Link
Physical
TCP/IP protocols
Application
TELNET
FTP
...
Application
TCP
Transport
IP
Internet
IEEE 802
ARPANET 1822
X.25.....
Network Interface
Hardware
Hardware

Use of X.25

- **Transferring transparent data.**
- **Transfer of asynchronous data streams**
  - **Credit card verification networks.**
  - **Include automatic teller machine networks.**
- **Supports a variety of mainframe terminal/server applications.**

Characteristics of X.25

- **Maximum packet sizes vary from 64 bytes to 4096 bytes,**
  - **128 bytes is default on most networks.**
- **X.25 is optimized for low speed lines:**
  - **100kbps and below.**
  - **At line speeds above 100 kbps the effects of latency.**
- **X.25 has been development of packet switched protocols**
  - **TCP/IP and ATM.**

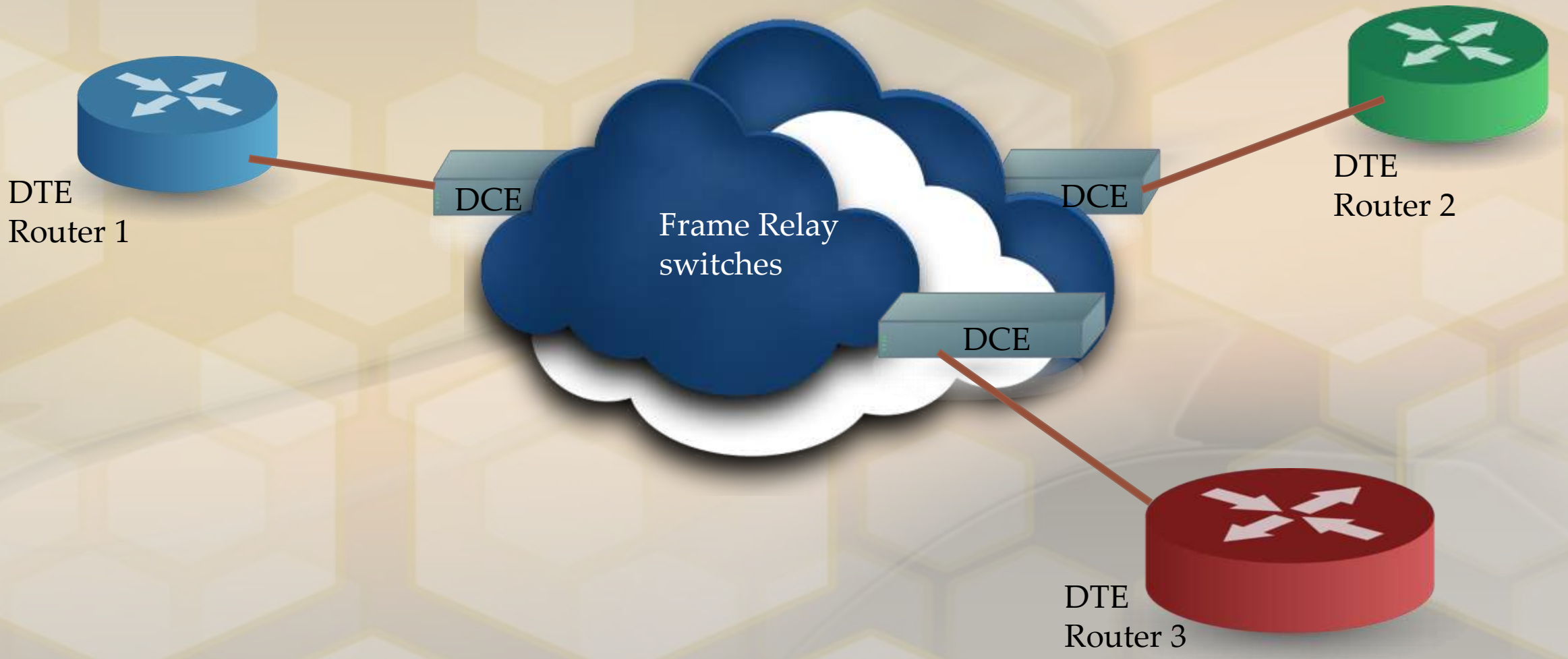
What is Frame Relay

- **Frame relay is a packet-switching telecommunication service**
  - **designed for cost-efficient data transmission for intermittent traffic between local area networks (LANs) and between endpoints in wide area networks (WANs).**
- **Frame relay puts data in a variable-size unit called a frame and leaves any necessary error correction (retransmission of data) up to the endpoints,**
  - **which speeds up overall data transmission.**
- **For most services, the network provides a permanent virtual circuit (PVC),**
  - **which means that the customer sees a continuous, dedicated connection without having to pay for a full-time leased line,**
  - **while the service provider figures out the route each frame travels to its destination and can charge based on usage.**

Frame Relay

- **it's available on fractional T-1 or full T-carrier system carriers.**
- **Frame relay complements and provides a mid-range service between ISDN,**
- **Which offers bandwidth at 128 Kbps, and Asynchronous Transfer Mode (ATM),**
- **Which operates in somewhat similar fashion to frame relay but at speeds of 155.520 Mbps or 622.080 Mbps.**

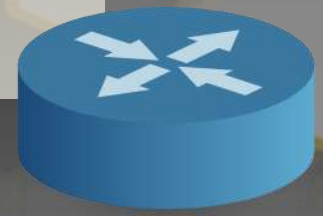
FREAM RELAY



Data Terminal Equipment (DTE) , Data Circuit-terminating Equipment (DCE)

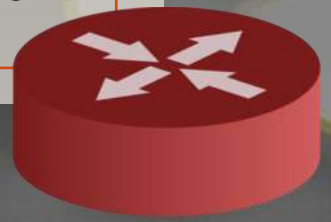
Frame Relay Operation

- In order for a frame relay WAN to transmit data, data terminal equipment (DTE) and data circuit-terminating equipment (DCE) are required.
- DTEs are typically located on the customer's premises and can encompass terminals, routers, bridges and personal computers.
- DCEs are managed by the carriers and provide switching and associated services.
- Frame relay is based on the older X.25 packet-switching technology that was designed for transmitting analog data such as voice conversations.
- Unlike X.25, which was designed for analog signals, frame relay is a fast packet technology, which means that the protocol does not attempt to correct errors.
- When an error is detected in a frame, it is simply dropped (that is, thrown away).



Frame Relay VS X.25

Frame Relay	X.25
Offers higher performance and grater transmission efficiency	Lower than frame relay
Frame relay is a Layer 2 protocol suite	X.25 provides services at Layer 3
No error detection hence it provides greater speeds.	Error detection hence it provides error free delivery. It contains fields which are used for error and flow control.
It has Physical layer and data link layer. Hence higher performance and greater transmission rate is achieved.	It has physical, data link and network layers
It prepares and sends frames.	It prepares and sends packets.
It can dynamically allocate bandwidth.	Fixed bandwidth is available in X.25 network



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