

Understanding WAN Technologies

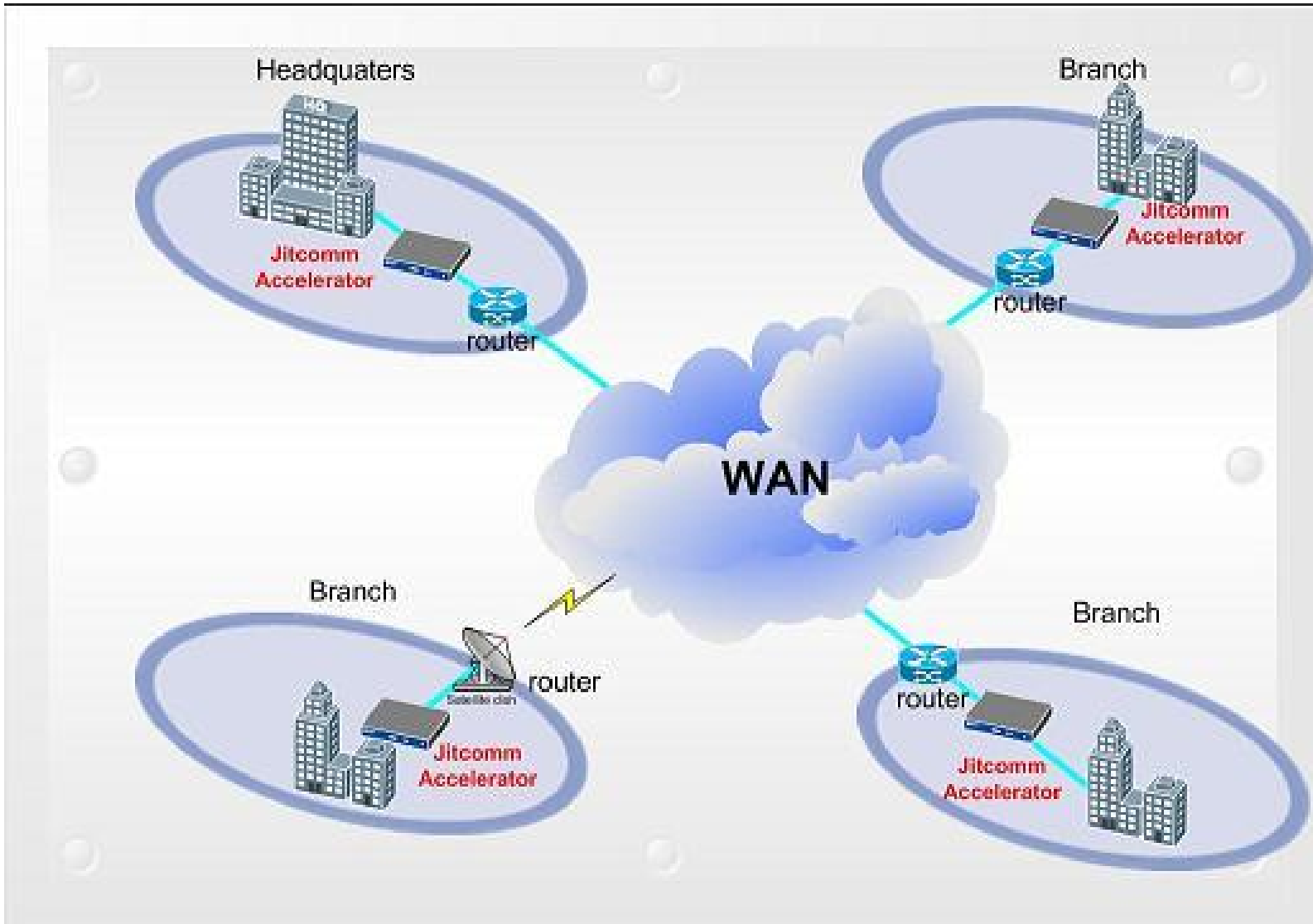
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Outline

- What is Wide Area Network?
- Why are WANs Necessary?
- How is a WAN Different from a LAN?
- WAN Access and the OSI Reference Model
- WAN Devices
- The Role of Routers in WANs
- WAN Data-Link Protocols
- WAN Communication Link Options

Wide Area Network



WANs vs. LANs

	WANs	LANs
Area	Wide geographic area	Single building or small geographic area
Ownership	Subscription to outside service provider	Owned by Organization

WAN Access and the OSI Model

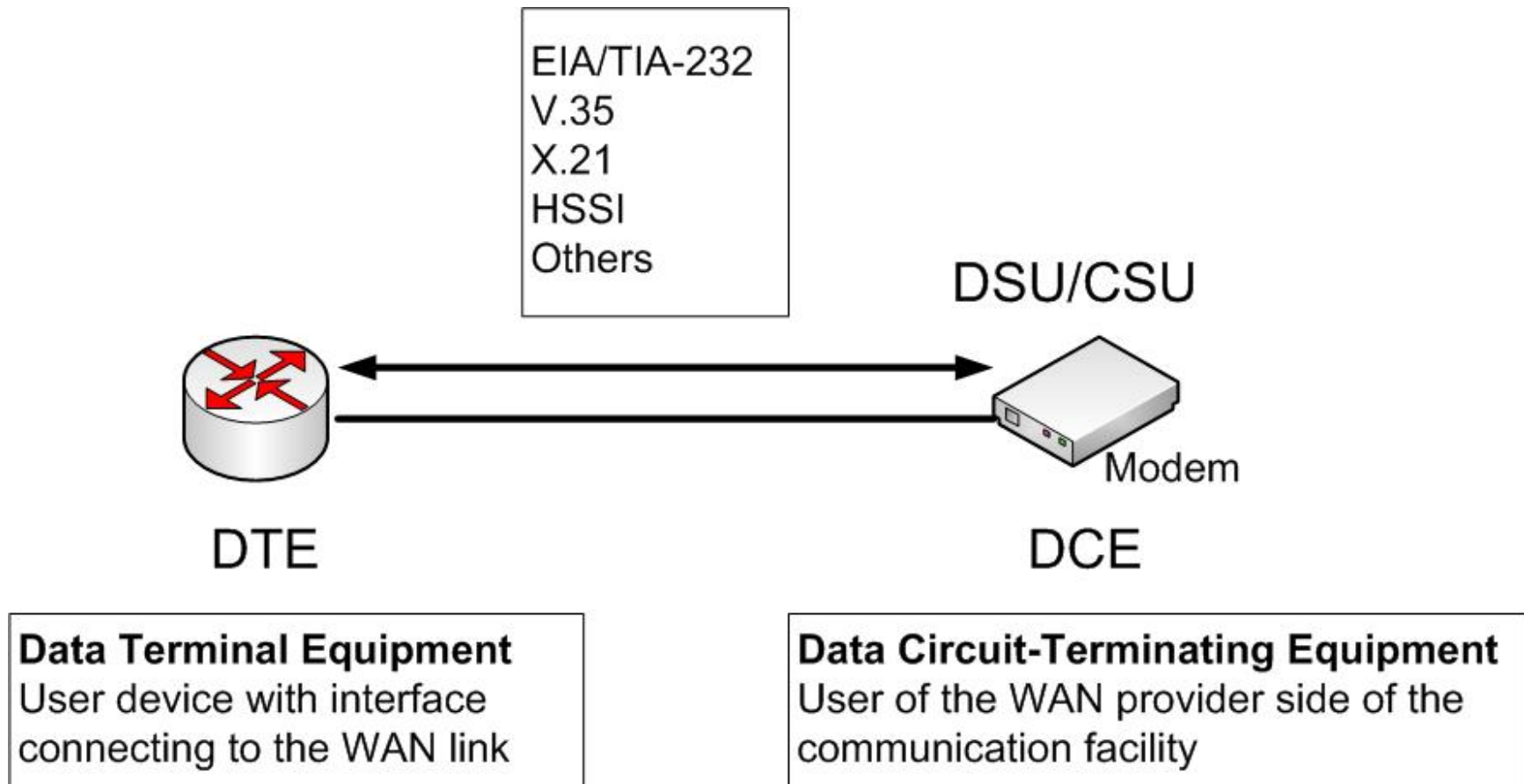
Application	
Presentation	
Session	
Transport	
Network	
Data Link	ISDN, Frame Relay, ATM, HDLC
Physical	Electrical, mechanical, operational connections

WAN Services

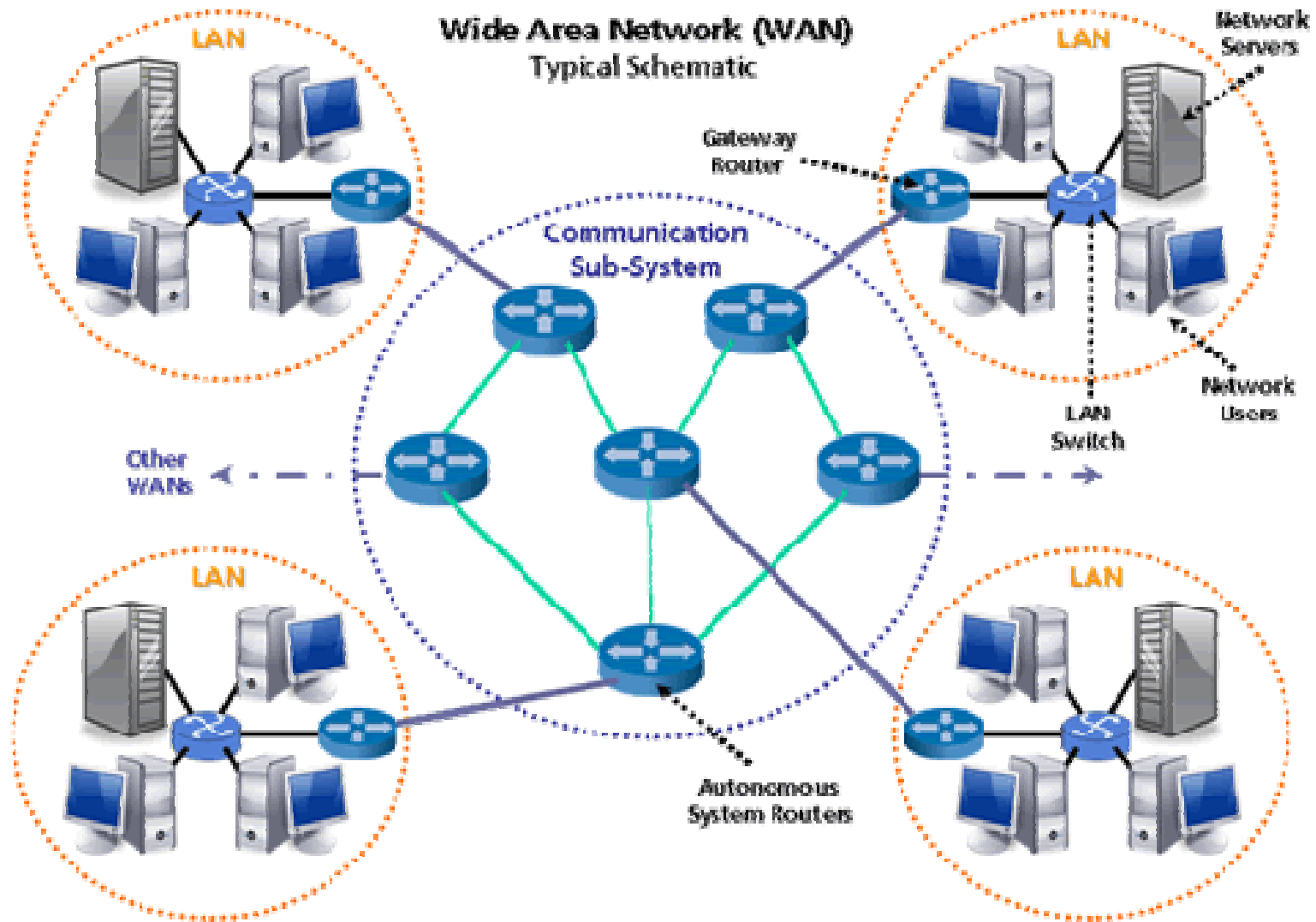
WAN Devices

- Routers
- Terminal Servers
- Modems
- DSU / CSU
- WAN networking devices
 - ATM switches
 - Frame Relay switches
 - PSTN / ISDN switches

Physical Layer: WANs



WANs – Multiple LANs



WAN Data-Link Protocols

Data-Link Protocol (Layer 2)	Associated Upper-Layer Protocol or Protocols
ATM (2)	ATM (3) or any network layer (IP, Novell IPX, Appletalk, and so on)
PPP	Any network layer (IP, Novell IPX, Appletalk, and so on)
HDLC	Any network layer (IP, Novell IPX, Appletalk, and so on)
LAPF (Frame Relay)	Any network layer (IP, Novell IPX, Appletalk, and so on)
LAPD (ISDN 2)	ISDN (3)
LAPB (X.25 2)	X.25 (3)

WAN Link Options

