



WAN-Connection

WAN (Wide Area Network):

1. WAN technologies are used to transmit data over long distances between different hosts. They define protocols at the physical layer and data-link layer to facilitate communication.
2. WANs can be categorized into two types: leased-line WAN and Ethernet WAN.

Leased-Line WAN:

1. When upgrading a network from a LAN to a WAN, a router is added to connect the LAN to the WAN. Leased-line WAN specifically refers to the use of leased lines.
2. Conceptually, a leased line acts like a direct, full-duplex Ethernet link between two points. It uses two pairs of wires, one for sending data and one for receiving data.
3. Leased lines utilize HDLC (High-Level Data Link Control) protocol at the data-link layer.
4. The term "leased" implies that the cable company owns the line, and the user pays a monthly fee for the leased line service. These lines are often installed by telephone companies in large networks with switching capabilities.
5. Leased lines deliver data in both directions at a predetermined speed using full-duplex and crossover technologies.



6. Leased lines differ from Ethernet crossover cables. They do not physically exist as a single long cable between hosts. While leased lines define Layer 1 transmission (bits), they do not define Layer 2 transmission. Layer 2 transmission is defined by the company providing the leased-line service.
7. The most commonly used data-link protocols in leased-line WANs are HDLC and point-to-point protocols.
8. HDLC has some differences compared to Ethernet, including different field structures. HDLC is an international standard known for its use in point-to-point topologies. It does not require the inclusion of a source address like Ethernet does.
9. Cisco proprietary HDLC adds a type field to the HDLC header, allowing networks to detect the type of IP protocol being used and also VLAN IDs.

Ethernet WAN:

1. Ethernet WAN is a newer technology that allows Ethernet to be used in WAN environments. It has overcome the limitations of traditional Ethernet, which was primarily designed for LANs.
2. With Ethernet WAN, routers connect to each other using Ethernet links. Customers connect their routers to the WAN through wired, wireless, or fiber Ethernet WAN links.
3. WAN service providers offer a variety of Ethernet WAN services under different names. However, they all follow the same model.



4. Inside the service provider's network, Ethernet switches are used, along with other technologies, to create WAN services for customers.
5. Ethernet WAN services provide Layer 2 connectivity, meaning they offer a transparent, Ethernet-like connection between customer routers.
6. Some names associated with Ethernet WAN include Ethernet WAN, Ethernet Line Service (E-Line), Ethernet Emulation (e.g., ATM network), and Ethernet over MPLS (Multiprotocol Label Switching).