

## Chapter 1 : What is LAN? Local-Area Network - Webopedia Definition

*A crazy love song. Some chords I find on the uke (whatever they are here?) create a certain mood, so I sing along & try to write words to match it.*

Production Network Simulation Question Chapter Description This chapter describes and explains the basic components of a LAN as well as common Ethernet technologies and media options. It also provides review questions and additional resources to assist in preparation for the Cisco ICND1 exam. Understanding how a LAN functions, including network components, frames, Ethernet addresses, and operational characteristics, is important for an overall knowledge of networking technologies. It also describes the basic operations of an Ethernet LAN and how frames are transmitted over it. LANs can vary widely in their size. A LAN might consist of only two computers in a home office or small business, or it might include hundreds of computers in a large corporate office or multiple buildings. Figure shows some examples of LANs. Examples of LANs A small home business or a small office environment could use a small LAN to connect two or more computers and to connect the computers to one or more shared peripheral devices such as printers. A large corporate office could use multiple LANs to accommodate hundreds of computers and shared peripheral devices, for departments such as finance or operations, spanning many floors in an office complex. Figure highlights some typical hardware components of a LAN. Computers serve as the endpoints in the network, sending and receiving data. Interconnections enable data to travel from one point to another in the network. Interconnections include these components: Network interface cards NIC translate the data produced by the computer into a format that can be transmitted over the LAN. Network media, such as cables or wireless media, transmit signals from one device on the LAN to another. A LAN requires the following network devices: Hubs provide aggregation devices operating at Layer 1 of the OSI reference model. However, hubs have been replaced in this function by switches, and it is very rare to see hubs in any LAN these days. Ethernet switches form the aggregation point for LANs. Routers, sometimes called gateways, provide a means to connect LAN segments. Routers operate at Layer 3 of the OSI reference model. Protocols govern the way data is transmitted over a LAN and include the following: When users are connected through a network, they can share files and even software application programs. This makes data more easily available and promotes more efficient collaboration on work projects. The resources that can be shared include both input devices, such as cameras, and output devices, such as printers. Communication path to other networks: If a resource is not available locally, the LAN, through a gateway, can provide connectivity to remote resources—for example, access to the web. A LAN can be configured in a variety of sizes, depending on the requirements of the environment in which it operates. LANs can be of various sizes to fit different work requirements, including the following: The SOHO environment typically has only a few computers and some peripherals such as printers. The enterprise environment might include many separate LANs in a large office building or in different buildings on a corporate campus. In the enterprise environment, each LAN might contain hundreds of computers and peripherals.. Figure demonstrates the dramatic differences that can exist with the size of LANs. It later came to be called thick Ethernet because of the thickness of the cable used in this type of network , and it transmitted data at 10 megabits per second Mbps. The standard for Ethernet was updated in the s to add more capability, and the new version of Ethernet was referred to as Ethernet Version 2 also called Ethernet II. The set of standards they created was called Ethernet This topic describes Ethernet LAN standards at the data link layer. Logical link control LLC: Transitions up to the network layer MAC: This layer provides versatility in services to the network layer protocols that are above it, while communicating effectively with the variety of MAC and Layer 1 technologies below it. The LLC, as a sublayer, participates in the encapsulation process. An LLC header tells the data link layer what to do with a packet when it receives a frame. For example, a host receives a frame and then looks in the LLC header to understand that the packet is destined for the IP protocol at the network layer. Instead, it used a type field in the Ethernet header to identify the Layer 3 protocol being carried in the Ethernet frame. To participate on the network, each device must have a unique MAC address. This topic describes that set of rules. If the media is idle, the computer sends its data. After a transmission has

been sent, the computers on the network compete for the next available idle time to send another frame. This competition for idle time means that no one station has an advantage over another on the network. If the network is not in use, the stations transmit. A collision occurs when two stations listen for network traffic, hear none, and transmit simultaneously see Figure In this case, both transmissions are damaged, and the stations must retransmit at some later time. When a station transmits, the signal is referred to as a carrier. The NIC senses the carrier and consequently refrains from broadcasting a signal. If no carrier exists, a waiting station knows that it is free to transmit. The extent of the network segment over which collisions occur is referred to as the collision domain. The size of the collision domain has an impact on efficiency and therefore on data throughput. The reason this occurs is that switches create tiny collision domains containing just one device. This eliminates the potential for collisions. If two or more stations attempt a transmission simultaneously, a collision occurs. The stations are alerted of the collision, and they execute a backoff algorithm that randomly schedules retransmission of the frame. This scenario prevents the machines from repeatedly attempting to transmit at the same time. Collisions are normally resolved in microseconds. While collisions are resolved quickly, it is still advantageous to eliminate them entirely from the network. This allows much more efficient communications. This is accomplished through the use of switches as described earlier. The frame contains header information, trailer information, and the actual data that is being transmitted. Figure illustrates all the fields that are in a MAC layer of the Ethernet frame, which include the following: This field consists of 7 bytes of alternating 1s and 0s, which synchronize the signals of the communicating computers. This field contains bits that signal the receiving computer that the transmission of the actual frame is about to start and that any data following is part of the packet. This field contains the address of the NIC on the local network to which the packet is being sent. This field contains the address of the NIC of the sending computer. In Ethernet II, this field contains a code that identifies the network layer protocol. The protocol information is contained in This field contains the data that is received from the network layer on the transmitting computer. This data is then sent to the same protocol on the destination computer. Frame check sequence FCS: This field includes a checking mechanism to ensure that the packet of data has been transmitted without corruption. Ethernet frames are addressed accordingly. Figure shows forms of Ethernet communications. Ethernet Communications The three major types of network communications are as follows: Communication in which a frame is sent from one host and addressed to one specific destination. In a unicast transmission, you have just one sender and one receiver. Unicast transmission is the predominant form of transmission on LANs and within the Internet. Communication in which a frame is sent from one address to all other addresses. In this case, you have just one sender, but the information is sent to all connected receivers. Broadcast transmission is essential when sending the same message to all devices on the LAN. Communication in which information is sent to a specific group of devices or clients. Unlike broadcast transmission, in multicast transmission, clients must be members of a multicast group to receive the information. Ethernet Addresses The address used in an Ethernet LAN, which is associated with the network adapter, is the means by which data is directed to the proper receiving location. Figure shows the format of an Ethernet MAC address. A bit Ethernet MAC address has two components: The letter O identifies the manufacturer of the NIC. Within the OUI, the two following bits have meaning only when used in the destination address: Broadcast or multicast bit: This indicates to the receiving interface that the frame is destined for all or a group of end stations on the LAN segment. Locally administered address bit: Normally the combination of OUI and a bit station address is universally unique; however, if the address is modified locally, this bit should be set. This uniquely identifies the Ethernet hardware.

## Chapter 2 : lans - Wiktionary

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## Chapter 3 : Understanding LANs > Cisco ICND1 Foundation Learning Guide: LANs and Ethernet

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*LANs are often as much a place for tinkering and repairs as they are gaming. There wasn't a good representation of the wider gender skew in gaming, but that's always been the case with LANs.*

### Chapter 6 : Iñ - Wiktionary

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### Chapter 9 : LANS “ Louisiana Neurosurgical Society

*Virtual LANs (VLANs) By design, Network Hosts connected to the same Local Network topology, whether by means of an Access Point or Switch, can pass traffic back-and-forth transparently.*