

Network Layer Design Issues

Data link layer This layer is the protocol layer that transfers data between nodes on a network segment across the physical layer. The data link layer provides the functional and procedural means to transfer data between network entities and may also provide the means to detect and possibly correct errors that can occur in the physical layer. The data link layer, or layer 2, is the second layer of the seven-layer OSI model of computer networking. This layer is the protocol layer that transfers data between nodes on a network segment across the physical layer. The data link layer, or layer 2, is the second layer of the seven-layer OSI model of computer networking.

Structure Within a computer network, hosts are identified by network addresses, which allow networking hardware to locate and identify hosts. Hosts may also have hostnames, memorable labels for the host nodes, which can be mapped to a network address using a hosts file or a name server such as Domain Name Service. The physical medium that supports information exchange includes wired media like copper cables, optical fibers, and wireless radio-frequency media. The arrangement of hosts and hardware within a network architecture is known as the network topology.

Power network design (IC) Issues in the design include voltage drop, current density in conductors, the physical size of conductors in a metal layer of a chip, and In the design of integrated circuits, power network design is the analysis and design of on-chip conductor networks that distribute electrical power on a chip. power on a chip. High-speed switching constrains design choices in the power network. On-chip networks may serve millions of device. Various methods are used to model current demands on the chip to reduce the complexity of simulation calculations. Design methods and software tools for layout of power networks may require iteration to produce a desirable design. Simulations are used to verify proper performance under worst-case conditions. Issues in the design include voltage drop, current density in conductors, the physical size of conductors in a metal layer of a chip, and reduction of undesired noise conducted through the distribution network.

Multiple protocols often describe different aspects of a single communication. A group of protocols... The process can be tailored according to each new network or service.

Multilayer switch a computer networking device that switches on OSI layer 2 like an ordinary network switch and provides extra functions on higher OSI layers. The MLS was invented by engineers at Digital Equipment Corporation. The MLS was A multilayer switch (MLS) is a computer networking device that switches on OSI layer 2 like an ordinary network switch and provides extra functions on higher OSI layers 798f36da3c

The Internet protocol suite provides end-to-end data communication specifying how data should be packetized, addressed, transmitted, routed, and received. This functionality is organized into four abstraction layers, which classify all related protocols according to each protocol's scope of networking. An implementation of the layers for a particular application forms a protocol stack. From lowest to highest, the layers are the link layer, containing communication methods for data that remains within a single network segment (link); the internet layer, providing internetworking between... 798f36da3c == A network planning methodology == 798f36da3c == Multilayer switch == 798f36da3c

Communication protocol The protocol defines the rules, syntax, semantics, and synchronization of communication and possible error recovery methods. Protocols may be implemented by hardware, software, or a combination of both. The CYCLADES network, designed by Louis Pouzin in the early 1970s, was the first to A communication protocol is a system of rules that allows two or more entities of a communications system to transmit information. communication protocols, an early example of the protocol layering concept 798f36da3c

The OSI model is a 7-layer abstract model that describes an architecture of data communications for networked computers. The layers build upon each other, allowing for the abstraction of specific functions in each one. The top (7th) layer is the Application Layer describing methods and protocols of software applications. It is then held that the user is the 8th layer. 798f36da3c Some examples of overlay networking technologies are, VXLAN, BGP VPNs, and IP-over-IP technologies, such as GRE, IPSEC tunnels, or SD-WAN. 798f36da3c

Transport Layer Security The Transport Layer Security (TLS) is a cryptographic protocol designed to provide communications security over a computer network, such as the Internet. The protocol is widely used in applications such as email, instant messaging, and voice over IP, but its use in securing HTTPS remains the most publicly visible. Transport Layer Security (TLS) is a cryptographic protocol designed to provide communications security over a computer network, such as the Internet 798f36da3c

The data link layer is concerned with local delivery of frames between nodes on the same level of the network. Data-link

frames, as these protocol data units are called, do not cross the boundaries of a local area network. Inter-network routing and global addressing are higher-layer functions, allowing data-link protocols to focus on local delivery, addressing, and media arbitration. In this way, the data link layer is analogous to a neighborhood traffic cop; it endeavors to arbitrate between parties contending for access to a medium, without concern for their ultimate destination. When devices attempt to use a medium simultaneously, frame collisions occur. Data-link protocols specify how devices detect and recover from such collisions, and may provide... 798f36da3c == Function == 798f36da3c

Network planning and design Network planning and design is an iterative process, encompassing topological design, network-synthesis, and network-realization, and is aimed at ensuring Network planning and design is an iterative process, encompassing 798f36da3c

Communicating systems use well-defined formats for exchanging various messages. Each message has an exact meaning intended to elicit a response from a range of possible responses predetermined for that particular situation. The specified behavior is typically independent of how it is to be implemented. Communication protocols have to be agreed upon by the parties involved. To reach an agreement, a protocol may be developed into a technical standard. A programming language describes the same for computations, so there is a close analogy between protocols and programming languages: protocols are to communication what programming languages are to computations. An alternate formulation states that protocols are to communication what algorithms are to computation. 798f36da3c In 2003, Network World readers humorously proposed... 798f36da3c The closely-related Datagram Transport Layer Security (DTLS) is a communications protocol that provides security to datagram-based applications. In technical writing, references to "(D)TLS" are often seen when it applies to both versions. 798f36da3c Since the OSI layer numbers are commonly used to discuss networking topics, a troubleshooter may describe an issue caused by a user to be a layer 8 issue, similar to the PEBKAC acronym, the ID-Ten-T Error and also PICNIC. 798f36da3c Switching technologies are crucial to network design, as they allow traffic to be sent only where it is needed in most cases, using fast, hardware-based methods. Switching uses different kinds of network switches. A standard switch is known as a layer-2 switch and is commonly found in nearly any LAN. Layer-3 or layer-4 switches require advanced technology (see managed switch) and are more expensive and thus are usually only found in larger LANs or in special network environments. 798f36da3c

Overlay network The concept of overlay networking is distinct from the traditional model of OSI layered networks, and almost always assumes that the underlay network is an IP network of some kind. The concept of overlay networking is

distinct from the An overlay network is a logical computer network that is layered on top of a physical network. An overlay network is a logical computer network that is layered on top of a physical network 798f36da3c

TLS is a proposed Internet Engineering Task Force (IETF) standard, first defined in 1999, and the current version is TLS 1.3, defined in August 2018. TLS builds on the now-deprecated SSL (Secure Sockets Layer) specifications (1994, 1995, 1996) developed by Netscape Communications for adding... 798f36da3c

Layer 8 Layer 8 is a term used to refer to user or political layer on top of the 7-layer OSI model of computer networking. The OSI model is a 7-layer abstract Layer 8 is a term used to refer to user or political layer on top of the 7-layer OSI model of computer networking 798f36da3c

Computer network lower three layers of the OSI model: the physical layer, the data link layer, and the network layer. A global area network (GAN) is a network used for supporting In computer science, computer engineering, and telecommunications, a network is a group of communicating computers and peripherals known as hosts, which communicate data to other hosts via communication protocols, as facilitated by networking hardware 798f36da3c

== Layers, defined == 798f36da3c The power distribution network distributes power and ground voltages from pad locations to all devices in a design. Shrinking device dimensions, faster switching frequencies and increasing power consumption in deep sub-micrometer technologies cause large switching currents to flow in the power and ground networks which degrade performance and reliability. A robust power distribution network... 798f36da3c Political economic theory holds that the 8th layer is important to understanding the OSI Model. Political policies such as network neutrality, spectrum management, and digital inclusion all shape the technologies comprising layers 1–7 of the OSI Model. 798f36da3c topological design, network-synthesis, and network-realization, and is aimed at ensuring that a new telecommunications network or service meets the needs of the subscriber and operator. 798f36da3c In the 1980s, a network guru T-shirt from the 1980s shows Layer 8 as the "financial" layer, and Layer 9 as the "political" layer. The design was credited to Evi Nemeth. 798f36da3c A traditional network planning methodology in the context of business decisions involves five layers of planning, namely: 798f36da3c The first computer network was created in 1940 when George Stibitz connected a terminal at Dartmouth to his Complex Number Calculator at Bell Labs in New York. Today, almost all computers are connected to a computer network, such as the global Internet or embedded networks such as those found in many modern electronic devices. Many applications have only limited functionality unless they are... 798f36da3c

Internet protocol suite Early versions of this networking model were known as the Department of Defense (DoD) Internet Architecture Model because the research and development were funded by the Defense Advanced Research Projects Agency (DARPA) of the United States Department of Defense. connectionless layer and the Transmission Control Protocol (TCP) as a reliable connection-oriented service. The foundational protocols in the suite are the Transmission Control Protocol (TCP), the User Datagram Protocol (UDP), and the Internet Protocol (IP). The design of the network included the recognition The Internet protocol suite, commonly known as TCP/IP, is a framework for organizing the communication protocols used in the Internet and similar computer networks according to functional criteria 798f36da3c

Multi-layer switching combines layer-2, -3 and -4 switching technologies and provides high-speed scalability with low latency. Multi-layer switching can move traffic at wire speed and also provide layer-3 routing. There is no performance difference between forwarding at different layers because the routing and switching are all hardware-based – routing decisions are made by specialized application-specific integrated circuits (ASICs) with the help of... 798f36da3c The TLS protocol aims primarily to provide security, including privacy (confidentiality), integrity, and authenticity through the use of cryptography, such as the use of certificates, between two or more communicating computer applications. It runs in the presentation layer and is itself composed of two layers: the TLS record and the TLS handshake protocols. 798f36da3c

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