

Computer Networks

Computer networking refers to interconnected computing devices that can exchange data and share resources with each other. These networked devices use a system of rules, called communications protocols, to transmit information over physical or wireless technologies.

Let's answer some common computer networking FAQs.

How does a computer network work?

Nodes and links are the basic building blocks in computer networking. A network node may be data communication equipment (DCE) such as a modem, hub or, switch, or data terminal equipment (DTE) such as two or more computers and printers. A link refers to the transmission media connecting two nodes. Links may be physical, like cable wires or optical fibers, or free space used by wireless networks.

In a working computer network, nodes follow a set of rules or protocols that define how to send and receive electronic data via the links. The computer network architecture defines the design of these physical and logical components. It provides the specifications for the network's physical components, functional organization, protocols, and procedures.

What do computer networks do?

Computer networks were first created in the late 1950s for use in the military and defense. They were initially used to transmit data over telephone lines and had limited commercial and scientific applications. With the advent of internet technologies, a computer network has become indispensable for enterprises.

Modern-day network solutions deliver more than connectivity. They are critical for the digital transformation and success of businesses today. Underlying network capabilities have become more programmable, automated, and secure.

Modern computer networks can:

Operate virtually

The underlying physical network infrastructure can be logically partitioned to create multiple "overlay" networks. In an overlay computer network, the nodes are virtually linked, and data can be transmitted between them through multiple physical paths. For example, many enterprise networks are overlaid on the internet.

Integrate on a large scale

Modern networking services connect physically distributed computer networks. These services can optimize network functions through automation and monitoring to create one large-scale, high-performance network. Network services can be scaled up or down based on demand.

Respond quickly to changing conditions

Many computer networks are software-defined. Traffic can be routed and controlled centrally using a digital interface. These computer networks support virtual traffic management.

Provide data security

All networking solutions come with in-built security features like encryption and access control. Third-party solutions like antivirus software, firewalls, and antimalware can be integrated to make the network more secure.

What are the types of computer network architecture?

Computer network design falls under two broad categories:

1. Client-server architecture

In this type of computer network, nodes may be servers or clients. Server nodes provide resources like memory, processing power, or data to client nodes. Server nodes may also manage client node behavior. Clients may communicate with each other, but they do not share resources. For example, some computer devices in enterprise networks store data and configuration settings. These devices are the servers in the network. Clients may access this data by making a request to the server machine.

2. Peer-to-peer architecture

In Peer-to-Peer (P2P) architecture, connected computers have equal powers and privileges. There is no central server for coordination. Each device in the computer network can act as either client or server. Each peer may share some of its resources, like memory and processing power, with the entire computer network. For example, some companies use P2P architecture to host memory-consuming applications, such as 3-D graphic rendering, across multiple digital devices.

What is network topology?

The arrangement of nodes and links is called network topology. They can be configured in different ways to get different outcomes. Some types of network topologies are:

Bus topology

Each node is linked to one other node only. Data transmission over the network connections occurs in one direction.

Ring topology

Each node is linked to two other nodes, forming a ring. Data can flow bi-directionally. However, single node failure can bring down the entire network.

Star topology

A central server node is linked to multiple client network devices. This topology performs better as data doesn't have to go through each node. It is also more reliable.

Mesh topology

Every node is connected to many other nodes. In a full mesh topology, every node is connected to every other node in the network.

What are the types of enterprise computer networks?

Depending on the organization's size and requirements, there are three common types of enterprise private networks:

Local area network (LAN)

A LAN is an interconnected system limited in size and geography. It typically connects computers and devices within a single office or building. It is used by small companies or as a test network for small-scale prototyping.

Wide area networks (WAN)

An enterprise network spanning buildings, cities, and even countries, is called a wide area network (WAN). While local area networks are used to transmit data at higher speeds within close proximity, WANs are set up for long-distance communication that is secure and dependable.

SD-WAN or software-defined WAN is virtual WAN architecture controlled by software technologies. An SD-WAN offers more flexible and dependable connectivity services that can be controlled at the application level without sacrificing security and quality of service.

Service provider networks

Service provider networks allow customers to lease network capacity and functionality from the provider. Network service providers may consist of telecommunications companies, data carriers, wireless communications providers, Internet service providers, and cable television operators offering high-speed Internet access.

Cloud networks

Conceptually, a cloud network can be seen as a WAN with its infrastructure delivered by a cloud-based service. Some or all of an organization's network capabilities and resources are hosted in a public or private cloud platform and made available on demand. These network resources can include virtual routers, firewalls, bandwidth, and network management software, with other tools and functions available as required.

Businesses today use cloud networks to accelerate time-to-market, increase scale, and manage costs effectively. The cloud network model has become the standard approach for building and delivering applications for modern enterprises.

What are AWS computer networking services?

AWS networking services are designed to provide enterprises with:

Network security

AWS infrastructure is monitored 24/7 to help ensure confidentiality and integrity and to meet the highest global network security standards.

Network availability

AWS has the global infrastructure required to deliver high availability anywhere in the world.

Network performance

AWS network services deliver high-speed performance with minimal lag time.