**Network switch**

In a local area network (LAN) using Ethernet, a network switch determines where to send each incoming message frame by looking at the physical device address (also known as the Media Access Control address or MAC address). Switches maintain tables that match each MAC address to the port from which the MAC address has been received. If a frame is to be forwarded to a MAC address that is unknown to the switch infrastructure, it is flooded to all ports in the switching domain. Broadcast and multicast frames are also flooded. This is known as BUM [flooding](https://searchnetworking.techtarget.com/definition/flooding) -- broadcast, unknown unicast, and multicast flooding.   This capability makes a switch a Layer 2 or data-link layer device in the Open Systems Interconnection ([OSI](https://searchnetworking.techtarget.com/definition/OSI)) communications model.

Types of networking switches

There are several types of switches in networking in addition to physical devices:

**Virtual switches** are software-only switches instantiated inside virtual machine (VM) hosting environments.

**A routing switch** connects LANs; in addition to doing MAC-based Layer 2 switching it can also perform [routing](https://searchnetworking.techtarget.com/definition/router) functions at OSI Layer 3 (the [network layer](https://searchnetworking.techtarget.com/definition/Network-layer)) directing traffic based on the [Internet Protocol (IP) address](https://searchwindevelopment.techtarget.com/definition/IP-address) in each [packet](https://searchnetworking.techtarget.com/definition/packet).

How a network switch works

Fundamental concepts of a networking switch.

Switches, physical and virtual, comprise the vast majority of network devices in modern data networks. They provide the wired connections to desktop computers, wireless access points, industrial machinery and some internet of things (IoT) devices such as card entry systems. They interconnect the computers that host virtual machines in data centers, as well as the dedicated physical servers, and much of the storage infrastructure. They carry vast amounts of traffic in telecommunications provider networks.

**A network switch can be deployed in the following ways:**

Edge, or access, switches: These switches manage traffic either coming into or exiting the network. Devices like computers and access points connect to edge switches.

Aggregation, or distribution, switches: These switches are placed within an optional middle layer. Edge switches connect into these and they can send traffic from switch to switch or send it up to core switches.

Core switches: These network switches comprise the backbone of the network, connecting either aggregation or edge switches to each other, connecting user or device edge networks to data center networks and, typically, connecting enterprise LANs to the routers that connect them to the internet.

Many data centers adopt a leaf/spine architecture, which eliminates the aggregation layer. In this design, servers and storage connect to leaf switches (edge switches) and every leaf switch connects into two or more spine (core) switches. This minimizes the number of [hop](https://whatis.techtarget.com/definition/hop)sdata has to take getting from source to destination, and, thereby, minimizes the time spent in transit, or [latency](https://whatis.techtarget.com/definition/latency).

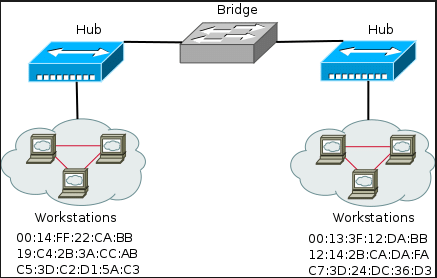
Some data centers establish a fabric or mesh network design that makes every device appear to be on a single, large switch. This approach reduces latency to its minimum and is used for highly demanding applications such as high-performance computing (HPC) in financial services or engineering.

Not all networks use switches. For example, a network may be (and often was, in the 1980s and 1990s) organized in a [token ring](https://searchnetworking.techtarget.com/definition/Token-Ring) or connected via a [bus](https://searchstorage.techtarget.com/definition/bus) or a hub or repeater. In these networks, every connected device sees all traffic and reads the traffic addressed to it. A network can also be established by directly connecting computers to one another, without a separate layer of network devices; this approach is mostly of interest in HPC contexts where sub-5-microsecond latencies are desired and can become quite complex to design, wire and manage.

# MAC address (Media Access Control address)

In a local area network (LAN) or other network, the MAC (Media Access Control) address is your computer's unique hardware number. (On an [Ethernet](https://searchnetworking.techtarget.com/definition/Ethernet) LAN, it's the same as your Ethernet address.) When you're connected to the Internet from your computer (or [host](https://searchnetworking.techtarget.com/definition/host) as the Internet protocol thinks of it), a correspondence table relates your [IP address](https://searchwindevelopment.techtarget.com/definition/IP-address) to your computer's physical (MAC) address on the LAN.

**Bridge in a network**

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A bridge is a device that connects and passes packets between two networksegments that use the same communications protocol. Bridges operate at the data link layer (layer 2) of the OSI reference model. A bridge will filter, forward or flood an incoming frame based on the MAC address of that frame.

Gateway – A gateway, as the name suggests, is a passage to connect two networks together that may work upon different networking models. They basically works as the messenger agents that take data from one system, interpret it, and transfer it to another system. Gateways are also called protocol converters and can operate at any network layer. Gateways are generally more complex than switch or router.

A gateway is a hardware device that acts as a "gate" between two networks. It may be a router, firewall, server, or other device that enables traffic to flow in and out of the network. While a gateway protects the nodes within network, it also a node itself.

What is difference between Gateway and Router?

Gateways regulate traffic between two dissimilar networks, while routers regulate traffic between similar networks. The easiest way to illustrate this point is through an example. ... Because TCP/IP is also the primary protocol of the Internet, you could use a router to connect your network to the Internet.