**How Network Equipment Works**

Networking equipment interconnects devices so that data can be shared between them. The layout or topology of these connected devices describes the network's design or structure. Common topologies for computer networks include bus, ring, star, tree, and mesh. Hybrid topologies are also used.

In wireless networks, devices communicate via radio waves and do not require physical connections. In wired networks, cables are used. These cables are equipped with connectors for a specific port or interface type. For example, attachment unit interface (AUI) cables are equipped with 15-pin connectors that mate with a 15-pin receptacle on network transceivers.

Computer networks handle data according to protocols that are fundamental mechanisms for network communications. Network protocols specify the software attributes of data communications, including the structure of packets and the information contained therein. Depending upon the type of network, packets may be called blocks, cells, frames or segments. Network protocols may also prescribe some or all of the operational characteristics of the network hardware on which they run.

**Types of Network Equipment**

The Engineering 360 SpecSearch database allows industrial buyers to search for and select the following types of network equipment.

* **Hubs** provide a central location for attaching wires to workstations. There are two types: passive and active.
* **Switches** connect devices to host computers and allow large numbers of these devices to share a limited number of ports.
* **Routers** are protocol-dependent devices that connect sub-networks or divide a very large network into smaller sub-networks.
* **Repeaters** use regeneration and retiming to ensure that signals are transmitted clearly through all network segments.
* **Bridges** are used to interconnect local or remote networks. They centralize network administration.
* **Gateways** can interconnect networks with different, incompatible communications protocols.
* **Multiplexers** combine multiple signal inputs into one output.
* **Transceivers** connect nodes and send and receive signals. They are sometimes called medium access units (MAU).
* **Firewalls** safeguard a network against unauthorized access.

Other network devices such as wireless access points (WAP) and modular platforms are also available.

**Product and Performance Specifications**

Network equipment may be designed for local area networks (LAN), metropolitan area networks (MAN), or wide area networks (WAN).

Processor type, speed, and computer memory are other important product parameters. Form factors include chips, boards or cards, and stand-alone or enclosed modules. Performance specifications include data rate and operating temperature, the number of users and concurrent connections that devices can support, and the total number of media access control (MAC) addressed that can be stored.

**Features and Applications**

When selecting network equipment, buyers may need to consider whether a device is power over Ethernet (PoE) ready, or if it supports voice-over-Internet protocol (VoIP). Devices with full duplex capabilities can transmit data simultaneously in both directions, and may be stackable or rack-mountable. Product features such as alarms and LED indicators provide audible and visual notifications to network administrators.

Network equipment may be designed or suitable for particular applications. For example, hardened products are often used in telecommunications applications. Their casings provide protection from weather-related conditions and can act as a heat sink, directing high temperatures away from sensitive components.

* [Network Firewalls](https://www.globalspec.com/learnmore/communications_networking/networking_equipment/network_firewalls)

Network firewalls protect computer networks against unauthorized use or attack. They permit or deny access to private network devices and applications, and represent an important part of an organization's overall security policy. Firewalls may be software applications, hardware devices (such as routers), or a combination of both. They include turnkey products that are relatively easy to install as well as complex, multi-layer installations that require the expertise of a certified network administrator.

* [Network Gateways](https://www.globalspec.com/learnmore/communications_networking/networking_equipment/network_gateways)

Network gateways interconnect networks with different, incompatible communication protocols. They perform a Layer-7 protocol-conversion to translate one set of protocols into another (for example, from TCP/IP to SNA or from TCP/IP to X.25).

* [Network Hubs](https://www.globalspec.com/learnmore/communications_networking/networking_equipment/network_hubs)

Network hubs provide a central location for attaching wires to workstations. Often, these hardware devices include a network switch that controls how and where data is forwarded.

* [Network Repeaters and Extenders](https://www.globalspec.com/learnmore/communications_networking/networking_equipment/network_repeaters)

Networking repeaters regenerate incoming electrical, wireless, or optical signals to preserve signal integrity and extend the distance over which data can travel. They are often used to connect cable segments in IEEE 802.3 networks.

* [Network Routers](https://www.globalspec.com/learnmore/communications_networking/networking_equipment/network_routers)

Network routers are protocol-dependent devices that connect subnetworks, or that break down a large network into smaller subnetworks.

* [Network Switches](https://www.globalspec.com/learnmore/communications_networking/networking_equipment/network_switches)

Network switches connect network devices to host computers and allow a large number of devices to share a limited number of ports. They increase network capacity and speed by examining and filtering data packets. Switches also regenerate forwarded packets, reducing collision rates and permitting the use of additional nodes.

* [VoIP and IP Telephony](https://www.globalspec.com/learnmore/communications_networking/networking_equipment/ip_telephony)

VoIP and IP telephony allows PC users to make phone calls over the Internet or other packet networks via gateways and standard telephones.