

# How Client/Server Networks Work

**T**here's a good chance the office computer you use to access data and files, send e-mail, access the Internet, and print out reports is a small piece of a larger puzzle known as a network.

Whether it involves two computers connected by a cable or hundreds of computers linked by telephone lines, networks are becoming increasingly popular in offices and homes. This is essentially due to the many enhancements networks provide such as a more efficient work flow, better lines of communication, and the increased ease of sharing information and resources among users.

To illustrate the makeup of a network designed for a small office, we've created a diagram consisting of the key components, including the hardware and software

necessities. Put simply, networks let users work closer together to easily share and transfer files and data.

Networks also save money by letting users share expensive peripherals, such as printers and scanners, as well as software applications. Most networks form as LANs (local-area networks) or WANs (wide-area networks). LANs connect computers that reside in a smaller and confined area, such as within a home, office building, or large corporate room setting. Also, LANs primarily connect computers by using cables. Conversely, WANs connect computers across a much larger area, usually by utilizing telephone lines or satellites.

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## Workstation

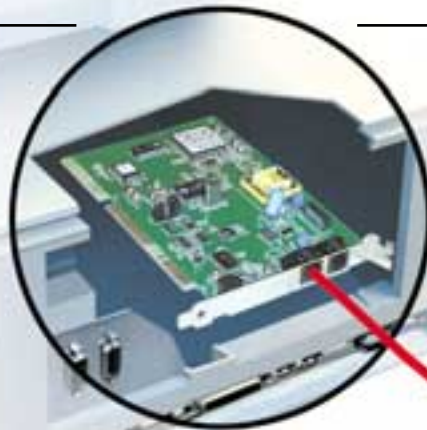
A personal computer that's connected to a network is a workstation (or a node). However, workstations can also qualify as standalone systems. Each workstation has its own unique address that identifies it from the other nodes on the network.

## NIC (Network Interface Card)

A NIC is a printed circuit board you insert (like an expansion card) into a computer so the computer can be connected to a network.

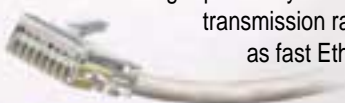
## IP (Internet Protocol) Address

When a network is connected to the Internet, it needs a registered IP address for each node or device. The address is four sets of numbers separated by periods, such as 114.271.53.1. The IP works with Transmission Control Protocol to form TCP/IP, a standard for transmitting data over networks. IP is the routing method for a packet of data, while TCP ensures that the packet arrives correctly at its final destination.



## Ethernet Cable

Experts refer to this type of network cable as twisted-pair cable because it has four pairs of small wires twisted together inside a single, highly flexible cable. The cable transmits data between the network hub and each networked computer, including the server(s) and workstations. Most Ethernets support a data transfer rate of 10Base-T, meaning the speed across the network is 10Mbps (megabits per second) on twisted-pair cables. For newer network upgrades, however, 10Base-T is being replaced by 100Base-T, which has a transmission rate of 100Mbps and is known as fast Ethernet.





On most networks connected to the internet, the servers will have a firewall. See the box at right for Internet information.

### Server

A server is a powerful computer that handles a network's shared resources, such as software, printers, data storage, shared directories, e-mail, and other services. One server may handle all these tasks, or several servers might share the duties (often by dedicating each server to one particular task).



### Hub

The hub is the central component where all the nodes, devices, and computers on the network interconnect so they can communicate with each other. Some hubs simply forward a packet of data from one node to another until it reaches the correct destination, others (sometimes referred to as switching hubs) can receive a packet and forward it directly to the correct destination. (A **node** is any device that can communicate with other computers in a group of interconnected computers. Usually, a node refers specifically to a computer system or terminal that is part of a network.)

## With An Internet Connection

### Firewall

A firewall, which can be either software or hardware, denies unauthorized users from accessing a network (usually via the Internet). For security reasons, all packets of data that are entering or leaving a network must first pass through the firewall. If a particular packet doesn't meet the set security standards, the firewall blocks that packet.



### Router

A router is a device that connects two networks. It can also connect a network directly to an ISP for Internet access. Routers receive packets of data, filter them, and forward them to a final destination using the best possible route, sometimes traveling through multiple routers in the process.



### ISP (Internet service provider)

An ISP provides a connection to the Internet.



### Router

See above.



### Internet

