

# WHAT IS A NETWORK

In the simplest terms, a *network* consists of two or more computers that are connected together to share information. All networking, no matter how complex, builds off this simple system.

Though this may seem like a basic idea, the concept was a major achievement in communications.

## What Makes Up a Network?

To have a network you typically have four things (besides the computers themselves):

### Protocol

A set of communication rules to make sure that everyone speaks the same language

### Network Interface Cards (NIC)

Card that plug into your computers and lets them send and receive messages from other computers

### Cable

The medium to connect all of the computers together

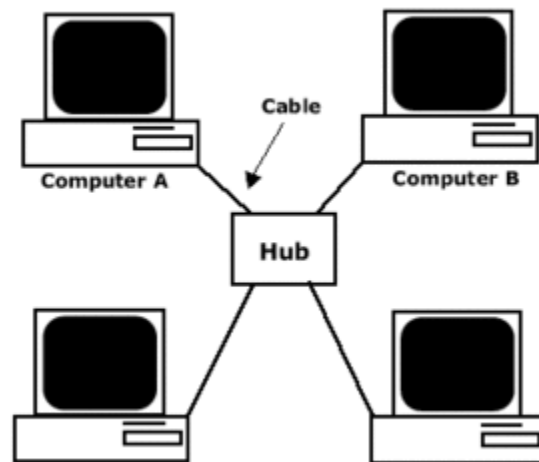
### Switch

*Hardware* to perform traffic control - i.e. to direct messages around the network correctly

Note: The keyword is typically. *Wireless* networks obviously don't use cables for example - but, the rest still apply.

## How Does a Network Work?

How does one computer send information to another? It is actually rather simple. The diagram below shows a simple network:



If Computer A wants to send a file to Computer B, the following would take place:

1. Based on a protocol that both computers use, the NIC in Computer A translates the file (which consists of binary data — 1's and 0's) into pulses of electricity.
2. The pulses of electricity pass through the cable with a minimum (hopefully) of resistance.
3. The hub takes in the electric pulses and shoots them out to all of the other cables.
4. Computer B's NIC interprets the pulses and decides if the message is for it or not. In this case it is, so, Computer B's NIC translates the pulses back into the 1's and 0's that make up the file.

Sounds easy. However, if anything untoward happens along the way, you have a problem, not a network. So, if Computer A sends the message to the network using NetBEUI (a proprietary

Microsoft protocol that lets computers in a local area network talk to each other), but Computer B only understands the TCP/IP (Transmission Control Protocol/*Internet Protocol* - a different, non-Microsoft protocol), it will not understand the message, no matter how many times Computer A sends it. Computer B also won't get the message if the cable is getting interference from the fluorescent lights - or if the network card has decided not to turn on today... etc. etc. etc.

## **Network Classification**

Like snowflakes, no two networks are ever alike. So, it helps to classify them by some general characteristics for discussion. A given network can be characterized by its:

### **Size**

The geographic size of the network

### **Security and Access**

Who can access the network? How is access controlled?

### **Protocol**

The rules of communication in use on it for example *TCP/IP*, NetBEUI, AppleTalk (a communications protocol for networks of Apple computers), etc.

### **Hardware**

The types of physical links and hardware that connect the network

## **Size: LANs and WANs**

Regarding size, networks are generally lumped into two categories, local area networks (LANs) and wide area networks (WANs). A LAN is primarily defined by geography, and is typically housed in one building or campus. A WAN, on the other hand, is a network that joins many LANs together using super special, highly secret, WAN technologies. Hopefully you're still reading now... As they are so common, LANs are usually further divided into two major types:

### ***Peer-to-peer***

A peer-to-peer network doesn't have any dedicated servers (central computers controlling the network) or hierarchy among the computers. All of the computers on the network handle security and administration for themselves. The users must make the decisions about who gets access to what. For more information, see article [Peer-to-Peer Networks](#).

### ***Client-server***

A client-server network works the same way as a peer-to-peer network except that there is at least one computer that is dedicated as a server. The server is a central computer that stores files for sharing, controls access to the printer, and generally acts as the dictator of the network. For more information, see the article [Client-Server Networks](#).

## **Protocol**

As stated above, the protocol of a network is the set of guidelines for inter-computer communication. Two computers with different protocols won't be able to communicate with one another. While many computers have the ability to interpret multiple protocols, it is important to understand the different protocols available before deciding on one that is appropriate for your network.

## **Hardware**

While some theoretically-minded people would claim that the hardware involved in a network isn't extremely important, they probably haven't ever actually dealt with setting up one.

Hardware is important. While in theory, every hub should send and receive signals perfectly, that isn't always the case. The problem is that if you ask two network administrators what hub they recommend, you will probably get two entirely different, yet passionate answers.

From picking the cable e.g. optical fibre (expensive and generally used for connecting hubs or computers that are a long distance apart), or copper (CAT5E - used for distances of up to 90 Metres), or opting for a wireless solution (for short distances generally within a building), to choosing a server, you should find the most suitable hardware for your needs.

Source: <http://www.ictknowledgebase.org.uk/whatisanetwork>