5   Networks

A network links two or more computers to share data or resources (Laudon and Laudon, 2007). This allows people to collaborate and also allows hardware such as printers and faxes to be shared more cost-effectively.

Networks are important to an organisation because they help a business connect with its customers, suppliers and collaborators. Through doing this a company can order new raw materials more rapidly and cheaply from its suppliers and can keep in touch with the needs of its customers. Further benefits of networks include reduction of costs through the use of facilities such as email, reduced time for information flow, for example comparing email with post delivery, ability to share information by accessing a database over a network system, ability to share hardware devices such as printers over a network, use of group working tools to share documents and other information. The main disadvantages of networks are the cost of installing the network and ensuring a secure and reliable network service.

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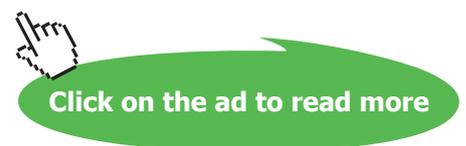
5.1   Network components

Some of the major components that make up a network are now described.

5.1.1   Servers

Servers control the flow of information around the network and use specialised software called the network operating system (NOS) to manage the network. The server and NOS together enables sharing of information, application software and hardware devices such as printers. It also controls access to information in files. For a network of perhaps 20 people or more, the functions described above may be split between several servers to share the load. There may be a separate file server, print server, password server and database server. In very large companies there will be many servers used for data storage. These will all be linked by the network to ensure that the data are accessible by everyone. They will also be responsible for ensuring through a process known as replication that the same version of data exists on different servers. With the use of many servers, an opportunity exists to spread the computing workload across these servers rather than overloading a single central machine, which happened in the days of the mainframe. The sharing of functions across several computers is known as 'distributed computing'.

5.1.2   End-user computers or terminals

The access points for users of a network are known variously as clients, nodes, work- stations or, most commonly, PCs. To work on the network each client must have networking software such as Novell Netware installed. A connection to the network is also required through either a network cable connected to a network interface card in one of the PC's slots or through a wireless network system.

5.1.3   Telecommunications processors

Telecommunications processors are the pieces of hardware that are used to link the servers and clients and different networks together. These are usually referred to by their specific names, such as hubs, multiplexers, bridges and routers. In a company that needs to use gateway devices, a specialist is required to maintain them. Hubs are used to connect up to 20 PCs to a network in a convenient way using patch cables (which look similar to phone cables and sockets) running between the back of each PC and the hub. The hub may then be attached to a server or a backbone connection leading to the server. Routers can select the best route for packets to be transmitted and are also used on the Internet backbones and wide area network to achieve this. Although these devices used to be distinct, they are now produced as hybrids which share functions. Companies attached to the Internet usually use a router as a gateway to attach their internal network to the Internet. This is often combined with a 'firewall', which is intended to reduce the risk of someone from outside the company gaining unauthorised access to company data.

5.1.4   Middleware

Middleware is a specialised type of software which allows different software applications to communicate. It acts as a layer between other software to assist in data transfer between incompatible systems. It is often described as the 'glue' that binds the software applications to the systems software. It is important in a networked world, since it provides translation services between software running on different types of computer systems in different companies. An example of middleware is gateway software which enables an internal e-mail system such as Lotus cc:Mail to send messages to other e-mail systems via the Internet. Middleware is also necessary to enable a single software application such as sales order processing to access different types of database, such as Oracle, Informix or Microsoft SQL Server, which a large company may use. Middleware to assist in communications can be categorised according to a seven-layer model known as the OSI model.