

Supercomputers

Supercomputers are the most powerful computers made and are physically the largest. The systems are built to process huge amounts of data and the fastest ones process more than one trillion calculations per second. Some supercomputers can house thousands of processors.

Scientists and engineers frequently build models of complex processes and then simulate the processes on a machine. These computers help analyse and forecast global weather patterns for example, while shedding light on related issues such as pollution, global warming and depletion of the ozone layer.

Supercomputers are being used to map the human genome – DNA structure. The human genome project uses supercomputing resources around the world in the hope of discovering all human genes – scientists estimate that there are 80 – 100,000 human genes made up of more than 3 billion chemical bases. If printed the human DNA sequence would fill about 200,000 pages.

Supercomputers cost tens of millions of dollars and consume enough electricity to power dozens of homes. They are often housed in protective rooms with special cooling systems, power protection and other security features. Due to their size and cost, supercomputers are rare and only used by large corporations, universities and government agencies that can afford them. Supercomputing resources are often shared to give researchers access to these machines.

Mainframe Computers

The largest type of computer in common use is the mainframe. Mainframe computers are used in large organisations like insurance companies and banks where many people need frequent access to the same data, which is organised into huge databases.

Mainframes are being used more as specialised servers on the www, enabling companies to offer secure transactions with customers over the Internet. If you purchase an airline ticket over the web there is a good chance your transaction is being handled by a mainframe system. In this

type of application the mainframe system may be referred to as an enterprise server or an e-commerce server.

In a traditional mainframe environment each user works at a computer terminal. A terminal is a monitor and a keyboard wired to the mainframe. There are two types of terminals used with mainframes

1. Dumb terminal – no CPU or storage devices. This is simply an I/O device that functions as a window into a computer located elsewhere.
2. Intelligent terminal – has its own processor and can perform processing operations but do not provide ant storage.

A mainframe system can house an enormous volume of data containing billions of records. Large mainframe systems can handle the input and output requirements of several thousand terminals. The largest IBM S/390 mainframe can support 50,000 users simultaneously while executing 1,600,000,000 instructions per second.

Mainframes start at \$30,000 while extensive mainframes can cost several million dollars. It used to be common for mainframe computers to occupy entire offices or entire floors. Typically they were placed in glass offices with special air conditioning to keep them cool and on raised floors to accommodate all the wiring needed to connect the system. Today a typical mainframe looks like an unimposing cabinet – or row of cabinets – though it may still need a somewhat controlled environment.

Minicomputers

First released in the 1960s minicomputers got their name because of their small size relative to other computers of the day. The capabilities of the minicomputer are somewhere between mainframes and PCs. They can handle much more input and output than PCs and most are designed for multiple terminals.

Minicomputers are commonly used as servers in network environments that handle data sharing needs of other computers on the network. Like mainframes these computers are being used more as web servers handling thousands of transactions per day.

Minicomputers typically cost between \$18,000 and \$500,000 and are ideal for many organisations and computers that cannot afford or do not need mainframes.

Workstations

Somewhere between multi-user midrange computers and PCs are workstations. These are specialised single user computers with many of the features of PCs but with the processing power of a minicomputer. These powerful machines are popular amongst scientists, engineers, graphic artists, animators and programmers – users who need a great deal of processing power. Workstations typically use advanced processors, more RAM and storage capacities than PCs.

Today the difference between minicomputers, workstations and PCs are becoming blurred. Low-end minicomputers and high-end workstations are now similar in features and capabilities. The same is true of low-end workstations and high end PCs.

Microcomputers or PCs

In 1981 IBM called its first microcomputer the IBM-PC. Within a few years many companies were copying the IBM design creating clones or compatibles designed to function like the original.

Microprocessors, memory chips and storage devices are continually making gains in speed and capacity while size and price are stable. The range of options makes the microcomputer the computer for the masses and explains why so many systems have appeared in homes and offices over the past few years. Microcomputers include the following types,

1. Desktop models – including tower models.
2. Notebook computers
3. Network computers
4. Handheld PCs

Desktops

In common usage the term desktop means a full size computer that is small enough to be used at a desk but too large to be carried around. Traditionally the computers main case is horizontally orientated but variations include the tower model. PCs can cost anywhere from \$600 to \$7500. The most popular models are in the range \$1000 - \$2000 and the tremendous growth in this region has brought many manufacturers into the arena.

Notebooks

Notebook computers – also called laptops – are of a size to fit easily inside a briefcase. They can operate on alternating current or by battery. They are fully functional microcomputers for people who need the power of a PC wherever they go.

Some notebooks can be plugged into docking stations which include a full size monitor, keyboard mouse, additional storage devices as well as additional ports. Due tot their size notebooks tend to be more expensive than comparably equipped desktops.

Network Computers (NCs)

In some situations a user does not need the full power and features of a PC, example Internet use or data entry does not require full processing power, memory or storage capabilities of a PC. In this instance a NC becomes useful.

A network computer is a less powerful version of a PC with minimal processing power, memory and storage. They are designed to be connected to a network, a corporate intranet or to the Internet. It relies on the network for software and data storage and may even use the networks server to perform some processing tasks.

A popular example of a home based NC is WebTV, enabling the user to connect a television to the Internet. It uses a special set top box to connect to the TV and provides a set of controls to enable navigation.

Many large companies have adopted NCs as they are cheaper to purchase, operate and maintain than normal PCs. As most users systems are connected to the company network anyway users can take advantage of the servers speed and storage capacity.

Other advantages include

1. Enhanced data security
2. Reduced threat of viruses
3. Centralised software
4. Limited upgrades

Handheld PCs

Also called palmtop computers, it can be any sort of computer that fits in the users hand,

1. PDA
2. Mobile phone with Internet, email and fax capabilities
3. H/PC Pro device.