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Many computers make light work!

The processor of a computer works for just a fraction of the time, says S.Ananthanarayanan.

This because the processor is the fastest thing in the computer, and after most computations, it needs to wait for fresh input or to for a place write its results out.

Using the idle resource

Modern computer systems make use of this idle time by doing many things at once. A user could be running more than one program at a time or even two or more users may be connected to the computer. There is a bit of intelligence in the computer's operating system that keeps allotting the processor's time to different processes in such a way that the time spent waiting for inputs or in writing results of one process is used for doing the computation of another process.

It is a complex bit of intelligence, because each shift from one process to another also involves copying out the status of the first process and accessing, and updating the context of the process now being taken up.

In sequence or in parallel

Sometimes, the same job may have two parts that could be done simultaneously, to speed things up. For example, if a job is to sort a list of candidates according to age, and to sort a list of customers according to bank balance, it is not necessary that one part be done before the other. In such cases, the job could be split into two, and with each job running during the 'input/output' cycles of the other, the work could be done in half the time!

Sometimes the same task could be split in two. For Example, to sort a large list, of millions of entries, maybe, the list itself could be divided into two and the two halves sorted. This would take only half the time, orless, as the lists are half the size and the two processes run in parallel. Next, the two-sorted half-lists are merged. Merging sorted lists is a very fast process and takes negligible time.

More than one processor

Another attack at faster computing is to fit another processor on the computer. These, 'multiprocessor' computers, again, need a complex controlling system to divide and distribute parts of the work to the two processors and then to put the separate computations together.

But the real 'big dad' of parallel processing is to use separate computers to do parts of a job at the same time. Here, the processors of several, even hundreds or thousands of computers that are connected over a network all chip in to do parts of a job. Gigantic computations involving crunching of huge data for weather prediction, or calculations for genetic research, are being done this way, using computers connected over the Internet.

The controlling system senses when any of the collaborating computers is switched on and a bit of work is assigned to that computer, for as long as the computer is on. As many personal computers are busy for only a fraction of the time that they are on, this makes great computing power available.