**Introduction to Multicore processor**

A multi-core processor is an integrated circuit with two or more processors connected to it for faster simultaneous processing of several tasks, reduced power consumption, and for greater performance. Generally, it is made up of two or more processors that read and execute program instructions.

In other words, on a single chip, a multi-core processor comprises numerous processing units, or "Cores," each of which has the potential to do distinct tasks. For instance, if you are performing many tasks at once, such as watching a movie and using WhatsApp, one core will handle activities like watching a movie while the other handles other responsibilities like WhatsApp.

A dual-core configuration is comparable to having several different processors installed on the same computer, but the connection between them is faster because the two CPUs are plugged into the same socket. Several instructions in parallel may be executed by individual cores, boosting the speed of software built to make use of the architecture's unique features.

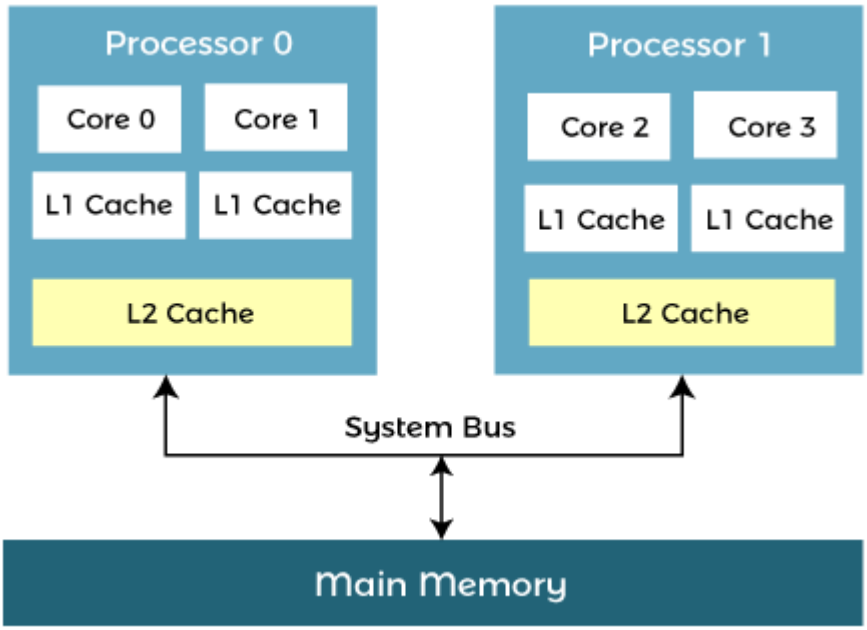
As compared to a single-core processor, a dual-core processor usually is twice as powerful in ideal circumstances. In actuality, performance gains of around 50% are expected: a dual-core CPU is roughly 1.5 times as powerful as a single-core processor.

As single-core processors hit their physical limits of complexity and speed, multi-core computing is becoming more popular. In modern times, the majority of systems are multi-core. Many-core or massively multi-core systems refer to systems with a huge number of CPU cores, such as tens or hundreds.

In the early 2000s, Intel and AMD released the first multicore processors. In modern times, CPUs come with two ("dual-core"), four ("quad-core"), six ("hexa-core"), and eight ("octa-core") cores ("octo-core"). FPGA-based processors contain up to 100 physical cores and 1000 effective independent cores (Field Programmable Gate Arrays).

## Architecture of Multicore Processor

A multi-core processor's design enables the communication between all available cores, and they divide and assign all processing duties appropriately. The processed data from each core is transmitted back to the computer's main board (Motherboard) via a single common gateway once all of the processing operations have been finished. This method beats a single-core CPU in terms of total performance.




# Advantages of Multi-Core Processor

Multicore processors have a number of advantages (pros), including:

## Performance

A multi-core CPU, by nature, can do more work as compared to a single-core processor. The spacing between the cores of an integrated circuit allows for faster clock rates. As a result, the signals do not need to travel a large distance to reach their target and are also persistent. When compared to using a separate processor, the speeds are far quicker.

## Reliability

In multi-core CPUs, the software is always assigned to different cores. When one piece of software fails, the others remain unaffected. Whenever a defect arises, it affects only one core. As a result, multi-core CPUs are better able to resist faults.

## Software Interactions

Even if the software is running on multiple cores, it will communicate with one another. Spatial and temporal isolation is a process that a multi-core processor goes through. Core threads are never delayed as a result of these processes.

## Multitasking

An operating system can use a multi-core CPU to run two or more processes at the same time, even if many programmes may be executed at the same time. A photoshop application, for example, can be used to perform two jobs at once.