opinion

iMedPub Journals
www.imedpub.com

International Journal of Innovative Research in Computer and Communication Engineering

2022
Vol.8 No.01:104

Multi-Core Processors are Microprocessor Chips that have Multiple CPUs

Thompson Chen*

Department of Information Science and Technology, Hokkaido University, Sapporo, Hokkaido, Japan

***Corresponding author:** Thompson Chen, Department of Information Science and Technology, Hokkaido University, Sapporo, Hokkaido, Japan, E-mail: Chen_T@gmail.com

Received date: December 31, 2022, Manuscript No. IJIRCCE-23- 15784; **Editor assigned date:** January 02, 2023, PreQC No.IJIRCCE-23- 15784(PQ); **Reviewed date:** January 11, 2023, QC No. IJIRCCE-23- 15784; **Revised date:** January 22, 2023, Manuscript No. IJIRCCE-23- 15784(R); **Published date:** January 28, 2023, DOI: 10.36648/ijircce.8.01.104.

Citation: Chen T (2023) Multi-Core Processors are Microprocessor Chips that have Multiple CPUs. Int J Inn Res Compu Commun Eng Vol.8 No. 01:104.

Description

The electronic circuitry that carries out the instructions that make up a computer program is referred to as a central processing unit (CPU), which is also referred to as a main processor, central processor, or simply processor. Basic arithmetic, logic, controlling, and input/output (I/O) operations are carried out by the CPU in accordance with the program's instructions. This is in contrast to external components like main memory and I/O circuitry and specialized processors like graphics processing units (GPUs). Although the form, design, and implementation of CPUs have changed over time, their fundamental operation has largely remained the same. The Arithmetic-Logic Unit (ALU), which carries out arithmetic and logic operations, processor registers, which provide operands to the ALU and store the results of ALU operations, and a control unit, which coordinates the coordinated operations of the ALU, registers, and other components, are the primary components of a CPU. One or more CPUs are housed on a single Integrated Circuit (IC) chip, which is where the majority of contemporary CPUs are implemented.

Arithmetic-Logic Unit

Multi-core processors are microprocessor chips that have multiple CPUs. Multithreading can also be used to create additional virtual or logical CPUs from the individual physical CPUs, or processor cores. In addition to a CPU, an integrated circuit may contain memory, peripheral interfaces, and other computer components; Microcontrollers, systems on a chip, array processors, and vector processors are all names for such integrated devices. Array processors and vector processors have multiple processors that work together in parallel, with no central unit. A form of abstraction of dynamically aggregated computational resources is virtual CPUs. The fact that early computers, like the ENIAC, needed to be physically rewired to do different things gave these machines the name "fixed-program computers." The term "central processing unit" has been used since 1955. Since "CPU" generally refers to a device for running software (computer programs), the stored-program computer was one of the first devices that could be called a CPU.

High-Speed Memory

The concept of a stored-program computer had already been included in the design of J. Presper Eckert and John William Mauchly's ENIAC, but it was initially omitted in order to finish the project sooner. The paper First Draft of a Report on the EDVAC was distributed by mathematician John von Neumann on June 30, 1945, prior to the creation of ENIAC. It was the blueprint for a computer with stored programs that would eventually be finished in August 1949. EDVAC was made to carry out a certain number of different kinds of instructions (or operations). Importantly, the EDVAC programs were not to be specified by the computer's physical wiring but rather stored in high-speed memory. This got around an important limitation of ENIAC, which was that it took a lot of time and effort to set the computer up to do a new job. According to von Neumann's design, EDVAC's program could be altered by simply altering the memory's contents. The Manchester Baby, a small-scale experimental stored-program computer, ran its first program on June 21, 1948, and the Manchester Mark 1 ran its first program in the night of June 1949. Early CPUs were custom designs that were used as part of a larger and sometimes distinctive computer. EDVAC was not the first stored-program computer. However, the development of mass-produced multi-purpose processors has largely replaced this approach to designing custom CPUs for a specific application. The rise in popularity of the Integrated Circuit (IC) has accelerated this standardization, which began with discrete transistor mainframes and minicomputers. The integrated circuit has made it possible to design and produce increasingly complex CPUs within nanometer-scale tolerances. The miniaturization and standardization of central processing units (CPUs) have greatly expanded the use of digital devices in modern life beyond the confined scope of dedicated computing machines. Modern microprocessors can be found in everything from mobile phones to automobiles and even toys. While Konrad Zuse and others before him had proposed and implemented similar concepts, von Neumann is most commonly credited with the design of the stored-program computer due to his design of EDVAC, which became known as the von Neumann architecture.

In addition, the so-called Harvard architecture of the Harvard Mark I, which was completed prior to EDVAC, utilized a stored-program design rather than electronic memory and made use of punched paper tape. The Harvard architecture uses the same memory space for both CPU instructions and data, whereas the von Neumann architecture separates the storage and treatment of the two. While the majority of contemporary CPUs are primarily von Neumann-designed, Harvard-architecture CPUs are also prevalent, particularly in embedded applications; For instance, processors based on the Harvard architecture are the Atmel AVR microcontrollers. As switching elements, relays and vacuum tubes thermionic tubes were frequently employed; Thousands or tens of thousands of switching devices are required for a productive computer. A system's overall speed is influenced by the speed of the switches. Relay computers like the slower, but earlier Harvard Mark I failed very rarely, whereas vacuum-tube computers like EDVAC typically lasted eight hours between failures. The significant speed advantages provided by tube-based CPUs generally outweighed the reliability issues, and as a result, these CPUs eventually dominated the market. Compared to contemporary microelectronic designs, the majority of these early synchronous CPUs operated at slow clock rates. At this time, clock signal frequencies of 100 kHz to 4 MHz were very common. These frequencies were mostly limited by the speed of the switching devices they were built with. The design complexity of CPUs increased as different technologies made it easier to make electronic devices that were smaller and more reliable. The invention of the transistor marked the beginning of this kind of advancement. In the 1950s and 1960s, transistorized central processing units (CPUs) were no longer required to be constructed from bulky, unreliable, and fragile switching elements like vacuum tubes and relays. As a result of this advancement, CPUs that were more complex and dependable could be assembled on one or more printed circuit boards that contained discrete individual components. The IBM System360 computer architecture was introduced in 1964 and was used in a series of computers that could run the same programs at different speeds and with different performance.

This article is available from: https://www.imedpub.com/international-innovative-research-computer-communication-engineering/