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Faculty of Science And Technology

Department of Information And Communication Technology

Assignment

Course Title: Microprocessor and Computer Architecture

Topics Title: Intel Xeon Processor

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Abstract:

This Paper provides the basic concepts of the Intel Xeon processor, which was first launched in 1998, and till now, people have used different types and versions for multiple purposes. The reader is first introduced to the introduction of processor intel processor and then the intel Xeon processor. And then The features and functionalities of the Intel Xeon. Then different types of Xeon processors and a comparison between Xeon and core are discussed in this section. After that Advantages and limitations of Xeon are explained broadly. Later on, Discussed the users of the Intel Xeon. Finally, the IEEE References are given[1].

Introduction:

An integrated electronic circuit called a processor is what does the calculations for a computer. A processor executes basic instructions an operating system gives, including mathematical, logical, input/output (I/O), and other operations (OS). Most other processes rely on the actions of a processor. It's usual to use the phrases processor, central processing unit (CPU), and microprocessor interchangeably. Nowadays, the terms processor" and CPU are frequently used interchangeably, although this is incorrect because a computer's CPU is merely one of its processors (PC). Another processor is the graphics processing unit (GPU), and specific hard drives are technically capable of processing data.

The most widely used CPUs for desktops and laptops worldwide are Intel processors. A variety of model families are available, with names like Core, Xeon, Pentium, and Celeron. They are divided into several generations: the ninth, tenth, and eleventh, known as Coffee Lake, Comet/Ice Lake, and Rocket/Tiger Lake.

Most PCs on the market are powered by these standard word processors, with variants designed for improved speed, mobility, creative workflows, gaming performance, business news, big data, and other applications.

Intel's modern central processing unit is the Xeon processor (CPU). They resemble Intel Core processors in many aspects. Additionally, they are more evolved in several ways.

In case you're unfamiliar with what a CPU does, here's a brief explanation. The CPU works on your computer to run software applications and do calculations.

The core is each processor's most crucial part. The core both produces instructions for the other computer components and reads instructions that are provided to it by those components. A CPU can read and write more instructions and execute programs more quickly the more cores it has.

Power processors are unquestionably the Intel Xeon CPUs. They are excellent for running intense programs and mission-critical jobs because of their high core count and unique features. Error-correcting code memory is arguably the most crucial of these features [2].

Features and Functionalities of the Intel Xeon:

Regarding x86 microprocessors, Intel's Xeon (/zin/ ZEE-on) brand is aimed at the non-consumer workstation, servers, and embedded system industries. It first appeared in June 1998. In addition to supporting ECC memory, having more cores, more PCI Express lanes, supporting more significant amounts of RAM, larger cache memory, and additional provision for enterprise-grade reliability, availability, and serviceability (RAS) features that handle hardware exceptions through the Machine Check Architecture, Xeon processors are based on the same architecture as regular desktop-grade CPUs. Depending on the nature and impact of the machine-check exception, they are frequently able to safely continue processing where a conventional processor cannot. Up to 28 cores are offered by the Intel Xeon processor Scalable series on the Purely platform, adding more computational power than the 22 cores of its predecessor. There are also new memory protection features, Intel® Speed Shift Technology, on-die PMAX detection, integrated Fabric via Cornelis Networks, Internet Wide Area RDMA Protocol (warp), Intel Virtual RAID on CPU, a non-inclusive last-level cache, a larger 1MB L2 cache, faster 2666 MHz DDR4 memory, an increase to six memory channels per CPU, and more [3].

Different Intel Xeon CPU Types:

- Xeon E: Designed for entry-level desktops and servers.
- Xeon D: A micro server-specific processor
- Xeon W: Committed to producing strong and durable servers and workstations
- Xeon Scalable Processors: Bronze, silver, gold, and platinum are the four categories of Xeon Scalable Processors, from lowest to greatest. Xeon Scalable CPUs power high-end robust servers and workstations with different specifications and price points [4].

Comparison Between the Intel Xeon Vs Intel Core:

Intel Xeon CPU

Balance clock speed

Do not support overclocking

Premium price ranging

Up to 40 cores and 80

cores with hyperthreading

Support ECC RAM

Entry-level models support six memories
RAM

channels and 768 GB of RAM

Last longer

Intel Core CPU

Faster clock speed

Support overclocking

Cheaper price ranging

Up to 10 cores

Don't Support ECC RAM

two memory channels and 128 GB of

Do not last if Xeon CPUs

Advantages of Intel Xeon:

- **Compatibility:** Intel CPUs are readily available because they are one of the most important processor brand names on the market. This gives customers more options for PCs and a wider range of functions, and it can be found in devices selling for less money.
- **Power Consumption:** Compared to other CPUs on the market, Intel Xeon processors for notebook PCs do not consume a lot of electricity.
- **Heat Production:** The Intel processing chips produce less heat because they use less power.
- **Production Potential:** With 15 CPU development facilities worldwide, Intel can produce a bigger volume of manufactured CPUs, increasing their availability and potential market share[5].

Limitations:

High production capacity has a negative side, however, for another reason. Due to the greater demand, many manufacturers are vying for the limited supply of Intel processors. Additionally, fewer older processors are produced when a new one is introduced. A Xeon processor, on the other hand, is an Intel CPU that was created and produced particularly for use in high-end industrial, military, and commercial servers and workstations. Therefore, those are significant restrictions.

Power Wastage While desktop computers do not have the same low power drain as compact PCs, they do. These use a lot of electricity, produce more heat, and require the PC's cooling system to work harder, which increases power consumption.

Heat. There is heat production from some of the more potent Intel processors. The CPU becomes hotter due to the multicore processors' increased energy consumption, necessitating the installation of many fans to keep it cool[6].

Users of Intel Xeon:

A Xeon processor is a high-end Intel CPU made particularly for use in industrial, military, and commercial workstations and servers. The Xeon brand was launched by the business in June 1998, and there are presently four processor families—Xeon E, Xeon W, Xeon D, and Xeon Scalable—available under it. Each of these families is built to handle a variety of tasks. The workload-intensive computation for cloud computing data centers, military weapons and radar systems, industrial manufacturing and data analytics applications, intelligence-gathering programs, and many other applications is frequently performed by servers and workstations powered by Xeon processors. Although many consumer-level PCs also use Xeon processors, these systems are expensive. They typically overkill for most users' needs, such as web browsing, online shopping, and streaming videos. However, given the rigorous computational demands of the military and several sectors, a server or workstation with a Xeon motherboard is often the rule, not the exception, in the rugged computing market [7].

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