An Overview of Intel Core i7 Processor

Hamira Shaikh

Dept. of Computer Science, Rizvi College of Engineering, Mumbai, India

Abstract— With the advancement in technology, Intel has launched Intel core i7 processor which is seen to be fastest, intelligent and multi core technology that comes with high performance, overclocking, multithreading and faster computations features. With the advantage of increased bandwidth and reduction in latency, Intel Core i7 includes the technology of Quick Path Interconnect (QPI). Core i7 have completely new architecture which seems to be more efficient than the previous one.

Keywords— *multi core, overclocking, multithreading, bandwidth, latency, Quick Path Interconnect*

I. INTRODUCTION

The Intel core i7 processor is one of the latest cutting edge processes with the fastest and remarkably high end multi core technology Desktop PC. It has the ability to deliver complete execution cores within a single processor. Speaking about the architecture, it is the first processor which uses Nehalem Micro Architecture. This architecture was released in November 2008 which is the successor to the older Core Micro Architecture. It is dynamically scalable and design scalable. The first Intel core i7 processor was released in November 2008. Several variations are made during the manufacturing of i7 processors. The property of overclocking is unlocked to serve high performance for desktop, computers. Intel core i7 processor provides high efficiency which is able to conserve energy for desktops, computers, laptops, and mobile devices. The features of Intel core i7 processor are it is quad core processor. Intel named its quad core as i7. Most of the i7 Extreme computers have four cores. Core i7 have 8MB Intel smart cache memory and it supports up to 64GB in DDR4 RAM memory. It has Hyper-Threading Technology which allows more than one thread to run on each core. The Turbo Boost Technology of Intel increases its operating frequency which helps to boost the performance.


II. RELATED WORK

In [1] this paper we got acquainted by the features of Intel Core i7 processor. The core i7 processor has new platform architecture. It includes three components, CPU, a Graphics and Memory Controller Hub (GMCH).A distributed shared memory architecture using Intel Quick Path Interconnect (QPI) has been adopted by Intel Core i7. In this, each CPU has access to local memory but they also have access to other memory that is local to other CPU with the help of QPI Transactions. For gaining maximum performance rate, the application software is multithreaded in accordance with the new architecture. The maximum frequency of the specific processing core on the Core i7 processor is dependent on the number of active cores and the amount of time the processor spends in the Turbo Boost state depends on the workload and operating environment. This processor is ideal for multitasking and multithreading.

[2] The paper shows the basics of Intel Architecture System which is based on high end 64 bit implementation. Intel Core i7 processor has four independent cores which provides simultaneously multithreading feature. The CPU has integrated L1, L2, and a shared L3 cache. The cache coherence is carried out by processors on chip DRAM Controller. If the requested address data is not present in the processor's cache, or if the data in the external memory is newer than the data present in cache copy, the memory controller retrieves the data at the requested address. Data transfers between the processor and memory are always 64 bits wide, the full width of the L2 cache on the processor. The architecture configuration represents maximum performance with capability and expandability.

III. ARCHITECTURE OF INTEL CORE i7 PROCESSOR

The architecture of Intel is of 64 bit. The first generation core I series processors are based on Nehalem Micro Architecture featuring "graphics media accelerator".

The two main modules of the architecture are core and uncore. The core is responsible for controlling all the cores whereas the uncore looks after the L3 caches, memory controller and the QPI Links. Both the modules run independently. There is a socket named new LGA 1366 which provides higher pin density allowing stable power supply to chip. There is a chipset which is a group of integrated circuits or chips designed to work together and are usually considered as single product. The new features added makes Core i7 processors well to the creation of higher performance processing system. The execution threads are explicitly attempted to allocate memory for their operation within the memory space local to the CPU on which they are executing. When the application creates only two execution threads, then the two idle cores are put in a low-power state and their power is diverted to the two active cores to allow them to run at an even higher clock frequency. Similar behavior would apply in the case where the applications generate only a single execution thread.
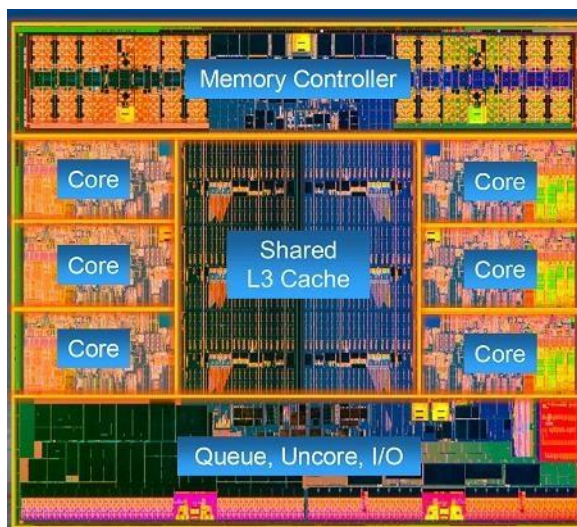
IV. ADVANTAGES AND DISADVANTAGES

The core i7's robust hardware specification is considered as the prominent advantage of the processor. The technical details range from 4 to 8 processing cores,

8MB to 12MB of cache and 4 to 16 threads configurations which prove to be an asset for desktop applications. The faster Turbo Boost Technology provides better onboard graphics than the previous versions of Intel. It provides faster and high processing power and has stable and responsive performance than Intel Core i3 and Intel Core i5. It has the capability of overclocking feature which operates beyond their base clock speed. The Multithreading feature allows parallel computations. It enables each core to do two things simultaneously to improve the multitasking capabilities of a particular computer.

Some of the disadvantages of Core i7 are the cost factor, which is 5 to 8 times more expensive than Core i3 and i5. There is a slight difference between the designing of the variants such as high end graphics for animation, video editing, graphics design and video gaming. Due this the performance factor is hampered as the low end variants would not perform as good as high end variants. As the processor seems to be powerful, the energy demand is higher. When compared to core i3 and i5, its intensive power requirement leads to shorter battery life which says that it is unsuitable for portable computers. An effective cooling system is required to overcome the problem excessive heat generation. This leads to additional cost.

V. CONCLUSION AND FUTURESCOPE

It has been observed that Intel Core i7 is power efficient and cutting edge processor that proves to be better one than the previous version. This processor seems to be helpful in machine learning and artificial intelligence computations with enhanced speed step and virtualization technology. The feature of overclocking which allows the pc to run at a higher clock rate extends the performance. The processor is powerful and capable of performing heavy tasks with ease and is good for gaming purpose due to its efficiency and consistency. Intel has also further included adaptive sync standard supplementary support of VESA, which should help to keep frames running seamlessly on compatible displays without screen blurring, aliasing, etc. This processor is ideal for computer 3D games, multitasking and multi-threading applications.

VI. REFERENCES

[1] International Journal of Engineering Research and General Science Volume 3, Issue 2, March-April, 2015 ISSN 2091-2730 480 www.ijergs.org FEATURES OF INTEL CORE i7 PROCESSORS P.Sangeetha1 , Mrs. M. Mythili2 1M.phil Full Time Research Scholar Department of Computer Science 2Assistant Professor Department of

Computer Science & Applications Vivekananda College of Arts and Science for Women (Autonomous), Namakkal, Tamilnadu, India

[2] White Paper Introduction to Intel® Architecture, Jim Turley Principal Analyst, Silicon Insider

Authors Profile

Hamira Shaikh is pursuing Bachelor of Engineering in Computer Engineering from Rizvi College of Engineering which is affiliated with Mumbai University.