

## Processor Performance

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**Abstract:** Since the computer is invented the main heart of the computer is the CPU (performance). We have researched from the earlier paper that processor was not enough to compute with the performance. This paper, explains the characteristics of processor performance and its implementation for several configurations, including Intel quad core processor, Quad-core multi-processor, Quad Core CPU Chip having 4 cores on one single chip, Thread-Level Parallelism. Using the clock rate, the CPU's execution time, which is the total time the processor takes to process some program in seconds per program (total number of bytes), can be calculated. We propose a performance evaluation methodology affected by a benchmark test. Measuring of such systems performance becomes an important task for any system embedded design process.

**Keywords**—CPU performance, throughput, speed.

### I. INTRODUCTION

Processor basic unit in the computer performance speed. Anyone who is purchasing a computer is primarily concerned with the "bottom line" - how fast it will do whatever the customer wants to do with it. The assessment needs of customers are best met by benchmark. When processor performance is quantified, it is taken to be inversely proportional to execution time.

There are two different ways of dealing with processor speed.

- Elapsed Time
- Throughput

In the related work we have seen many attempts made by us for checking the processor performance by single number.

We have seen that benchmark plays an important role in calculating the CPU benchmarks. In the methodology we seen that performance boost by single core to multi core and thread-level parallelism. Also, we seen RISC and CISC method carried out for calculating the varying speed of the processor in the system. From the final result we have seen that the by adopting to the multi core processing system from the single core or the dual core there is great performance boost revolution of the multi core processors in the system.

### II. RELATED WORK

Many attempts were made in the past to measure the performance of a processor and make in a single number. For example, MOPS, MFLOPS, Dhrystone, DMIPS, BogoMIPS, and so on. Nowadays, CoreMark is one of the most commonly used benchmark programs used to measure the

processor performance. CoreMark is developed by Embedded Microprocessor Benchmark Consortium (EEMBC, [www.eembc.org/coremark](http://www.eembc.org/coremark)) and is one of the most reliable performance measurement tools available. Finally, benchmarks, such as EEMBC (Embedded Microprocessor Benchmark Consortium), Benchmarks typically report MIPS (Millions of Instructions per Second) =  $\text{Instruction Count}/(\text{CPU execution time} \times 10^6) = \text{Clock Rate}/(\text{CPI} \times 10^6)$ .

### III. METHODOLOGY

Now-a-days multi core processing system has become the trend. This is mainly because of its performance boost and its efficiency. Not only it provides high performance the power consumption has become also less. This high performance is achieved by pipelining and as well as super scaling. Due to these attributes we have succeeded in achieved multi core processor which is overall better than the single core processor and the dual core processor. With each year we can see the number of cores in a processor increasing and thereby introducing some new techniques to use each core thoroughly and efficiently. We have used the techniques to evaluate the multicore CPU performance, metrics, factors, benchmark tools. [1]

In [2], this paper basically compares CPU performance between RISC and CISC multiprocessors of varying speeds and it shows that ISA style no longer matters. This test is conducted using benchmarks namely BRL-CAD over multiple configurations. By this test the had found out that the CPU performance depends on the clock speed and the

number of functional units. Nowadays the performance distance between desktop PCs and Gaming PCs is blurred out .New techniques is emerging to increase CPU performance such as pipelined super-scalar execution, branch prediction and speculative execution.

**IV.DIAGRAM**

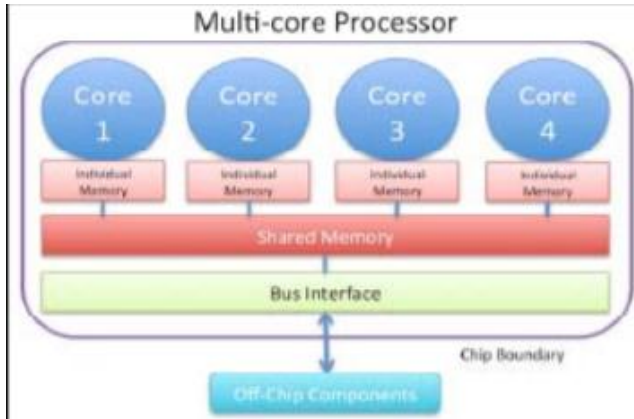


Fig no.1: Intel quad core processor

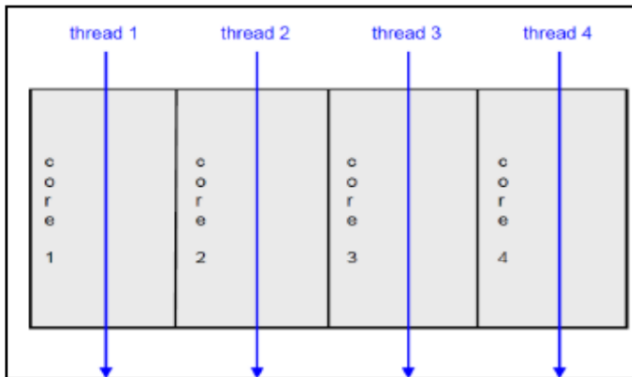


Fig no 2 :Quad-core multi-processor

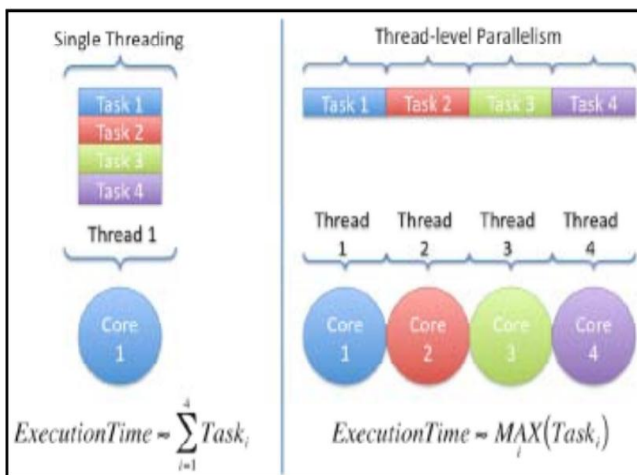


Fig no. 3: Quad Core CPU Chip having 4 cores on one single chip

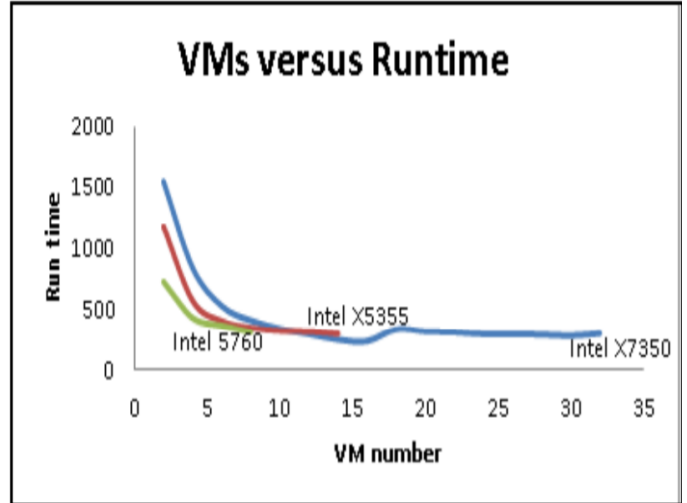


Fig no. 4: Thread-Level Parallelism

**V. RESULT AND ANALYSIS**

By adopting to the multi core processing system from the single core or the dual core there is great performance boost that can be seen which lead to the revolution of the multi core processors. Most of the companies are using the techniques of superscaling and pipelining. They are conducting various benchmarks to test their processor for a real world usage. Companies are trying to invent a new technique by each year. The number of researchers needed for research and create a processor is increasing day by day. As the day pass by the number of cores in a processor is increasing so is the performance. Though the performance is increasing it also creates new issues which we have to deal first. We can look into the future to have a model similar to super computer sitting in our home or in office. With latest trends of Google's quantum computing the processor performance is yet to be challenged to a higher level. This quantum computing chips are highly efficient in doing certain tasks with an uncomparable speed which takes it even far beyond the super computers. This will be the next game changer in processor market taking the level of performance and throughput to it's peak. This can be considered as a beginning as the best is yet to be discovered.

**VI. CONCLUSION**

Most of the people are well aware about the benefits of a multi core processor. Most of the processor making industry is trying to find out a new way to make their chip highly performance oriented. They are inventing new techniques to do so. Technological giants such as Intel, AMD are into to task of producing chips with up to 20 cores to give high performance. Due to this the gaming industry has got a boost. The distance between performance of a office PCs and a Gaming PCs is reduced greatly. Though the performance is upgraded each year there is nothing more than adding cores

each year. The OEMs is not trying to use all the core efficiently. If they really try to use each and every core simultaneously it leads to the problem of overheating. Which can be solved by using latest technology of liquid cooling and conditioned environment. Though as discussed above Google's quantum computing chip may be capable of removing all this drawback leading to a new level of processor performance.

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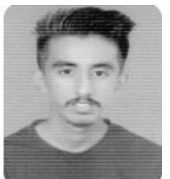
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