# Research Paper Name: Intel Xeon Microprocessor

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*Abstract*—**In this research, we present an performance evaluation of a 256-core cluster based on the Intel Xeon Processor E5-2680. This is the new version of Sandy Bridge processor for server and workstation market. It employs an integrated memory controller, dual Intel Quick Path Interconnect (QPI) port and integrated PCIe 3.0 controller. We assessed these architectural enhancements using the High Performance Computing Challenge (HPCC) benchmarks and NAS Parallel Benchmarks (NPB). For Interconnect analysis we have used the NetPIPE performance evaluator. We compare and contrast the results of a cluster based on the Intel Xeon E5-2680 with a cluster based on Intel Xeon 5680 Processor and another cluster based on Intel Xeon 5570 Processor.**

*Index Terms*—**Intel Xeon E5-2680; benchmarking; multicore; clusters;**

## I. MAIN SUMMARY

An Intel Xeon processor is one of Intel's state-of-the-art central processing units (CPU). The Intel Xeon processors are definitely power processors. They have a large number of cores, and they also have special features that make them great for running intensive programs and mission-critical tasks. Many Supercomputer applications are unable to achieve good sustained performance due to memory bandwidth issue. The Sandy Bridge development team responded with a new architecture implemented in the Intel Xeon E5-2600 family. This new processor has been used to build a 256-core cluster with Fourteen Data Rate (FDR) Infini Band (IB) 14Gb/s data rate per lane. The architecture is a revolutionary product from several perspectives.

## II. PROPOSED METHODOLOGY

The Xeon used is the microprocessor 3120A, as known as Knights Corner. The 3120A microprocessor has 57 physical in-order cores, and each one has 32 512-wide vector registers and supports four hardware threads. The device has a total of 6 GB GDDR5 main memory, and each core has 64 KB of L1 cache and 512 KB of L2 cache. The 3120A is built in a 22nm technology with Intel's 3-D Trigate transistors. The operating system is the CentOS 7.0 with Intel MPSS version 3.7 and GDB 7.8 with Intel extensions. The tested device is protected with Machine Check Architecture (MCA) reliability solution, which includes SECDED ECC in memory structures .The Intel

Xeon processors are definitely power processors. They have a large number of cores, and they also have special features that make them great for running intensive programs and mission-critical tasks. Arguably the most important of these features is error-correcting code memory.

## III. ADVANTAGES AND DISADVANTAGES

Advantages are:
1. Intel Xeon is practically built for workstation computers.
2. The large number of cores and advanced RAM functions give it enough processing power and speed to handle the most intensive creative applications, from computer-aided design (CAD) to 4K video editing to 3D rendering.

Disadvantages are:
Some shortcomings that make Xeon processors unsuitable for most consumer-grade desktop PCs include lower clock rates at the same price point (since servers run more tasks in parallel than desktops, core counts are more important than clock rates), usually an absence of an integrated graphics processing unit (GPU).

## IV. WHY IS PAPER IS UNIQUE?

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## V. TERMINOLOGY USED IN THIS PAPER

Xeon is a 400 MHz Pentium microprocessor from Intel for use in "mid-range" enterprise servers and workstations. On a server motherboard from Intel, up to eight (and later even more) Xeon processors will be able to do multiprocessing sharing the same 100 Mhz bus. Xeon is replacing the Pentium Pro as Intel's main enterprise microchip. Xeon is designed for Internet and large transactional database servers as well as for engineering, graphics, and multimedia applications that require moving a lot of data around quickly. Xeon is the high end of the Pentium line ( Celeron is the low end).Xeon processors support error checking and correcting memory so are more stable and less prone to data corruption due to memory errors,

whereas i7 processors do not, so in this scenario a Xeon based workstation will be far more preferable.

## VI. Future Work

Intel has revealed its most powerful generation of data centre processors yet as it looks to step up to the challenge of a smarter and more connected world. Advertisement The new Xeon Scalable processors provide the company's greatest leap forward in performance in a decade, Intel says, greatly aiding the development of compute-heavy technologies such as AI and 5G networks. This is our largest gen on gen performance improvement in the past decade...this is a revolutionary change.

## VII. Conclusion

Though Intel has been the giant in the microprocessor industry, AMD however, has been in the frontline of most innovative technologies. AMD manufacturer has succeeded in setting Intel on their toe. We are also of the opinion that if AMD was not in the processor world, probably Intel would have monopolized the industry. The slogan would have been "Intel and others". Further research can be carried out on a streamlined and thorough comparison on one subsystem in the Intel and AMD microarchitecture such as Memory Access technology or power management subsystem in a distributed environment.

## Acknowledgment

## References

[1] G. Eason, B. Noble, and I. N. Sneddon, "On certain integrals of Lipschitz-Hankel type involving products of Bessel functions," Phil. Trans. Roy. Soc. London, vol. A247, pp. 529–551, April 1955.

[2] J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68–73.

[3] I. S. Jacobs and C. P. Bean, "Fine particles, thin films and exchange anisotropy," in Magnetism, vol. III, G. T. Rado and H. Suhl, Eds. New York: Academic, 1963, pp. 271–350.

[4] K. Elissa, "Title of paper if known," unpublished.

[5] R. Nicole, "Title of paper with only first word capitalized," J. Name Stand. Abbrev., in press.

[6] Y. Yorozu, M. Hirano, K. Oka, and Y. Tagawa, "Electron spectroscopy studies on magneto-optical media and plastic substrate interface," IEEE Transl. J. Magn. Japan, vol. 2, pp. 740–741, August 1987 [Digests 9th Annual Conf. Magnetics Japan, p. 301, 1982].

[7] M. Young, The Technical Writer's Handbook. Mill Valley, CA: University Science, 1989.