Journal of Current Research in Engineering and Science
Bi-Annual Online Journal (ISSN : 2581 - 611X)

Volume 5- Issue 1, Paper 4 January 2022

Recent Trends in shaping future generation Computation with Data Intensive Super Computing

Ms. S.Varalakshmi,
Assistant Professor, Department of Computer Science,
Bharathidasan Govt.College for Women, Pondicherry University, Pondicherry, vlaksomu@gmail.com.

Abstract— This research paper presents an introduction to Super Computing technology and the trends in shaping the future generation computation requirements with data intensive super computing. This paradigm represents a valuable effort to tackle the large scale datasets produced by almost every application in future. Supercomputing is a form of high performance computing that calculates or determines the computation using a computer which is more powerful system called Super Computer. Data-Intensive Super Computing serves as a data-centric application driven and unified data sources with high performance data analytics. So, Supercomputing is a key technology which can uplift and transform the computation society towards "data-value era " otherwise called as technological evolution.

Keywords: Super Computing, containerization, intensive data, scalability.

I. INTRODUCTION

Super computing technology comprises of super computers which are the fastest computers in the world. It consists of interconnects, I/O systems, memory and processor cores. These CPUs grouped into computer nodes which comprising a processor or a group of processors called Symmetric multiprocessor (SMP) and a memory block.[1]

II. SUPER COMPUTING &AI

To run AI programs, super computers are often used and it has become synonymous with AI. Because AI programs almost in need of high performance computing which super computers does. Artificial Intelligence (AI) relies on faster supercomputers will get benefitted in the global race. Ultra-fast data processing brings with it far-reaching and solves fundamental ethical questions.

III. SUPER COMPUTING SPEED

Supercomputing speed is measured in floating point operations per second (FLOPS) Peta flops are measure of computers processing speed which is equal to a thousand trillion flops. One peta flops system can perform one quad trillion flops. Thus one super computer can perform by one million times more processing power than the fastest laptop.

IV. TRENDS TOWARDS DATA-INTENSIVE SUPER COMPUTING CENTERS

Supercomputing centres does computing services and now turned into data value providers by prioritizing the five supercomputing trends.

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A. Making diversified computing as mainstream.

The emerging supercomputing systems use CPUs, GPUs and HPGAs for powerful parallel computing rather than traditional high performance computing systems (HPC). It uses CPUs for double precision floating point computing. As we are travelling in an intelligent world, where all things are interconnected and the computing requirements were exploding.[2] To meet the mass and high computing requirements, we need to improve the efficiency of the chip to process higher diversified heterogeneous computing power.

B. *Maturing the optical Switching Technology*

By integrating the storage and network management in a supercomputing centre, it will create a lossless data technology with remote direct memory access over converged Ethernet infrastructure. Thus interconnection between all optical Supercomputing centres offers resource sharing which in turn facilitates high computing capability for future computation.

C. *Data is becoming intensified*

Traditional supercomputing applications, such as, energy exploration, weather forecasting and satellite remote sensing, with high precision will generate increasing amounts of data[3]. Moreover, more than 80% of emerging supercomputing applications will generate data at the petabyte scale. Larger the data volumes with more data types and high reliable concurrent tasks demand more from supercomputing storage. And it expects to deliver highly reliable and high bandwidth data with massive concurrent access and support.

D. *Containerized applications*

These applications run in isolated runtime environments called containers. It encapsulates its application with underlying hardware including libraries, binaries and configuration files. thus makes an application portable and behave consistently across different hosts[4]. It allows developers by writing the code once and run almost anywhere. Now this technology is available in open-source and making the ecosystem development more feasible.

E. *Super Computing Architecture is Converging*

By following the first four trends, Super Computing will adopt a heterogeneous and composite multi state architecture. It is used to converge the resources and application together. Thus a unified heterogeneous converged system with CPUs, GPUs and other computing power systems are scheduled under unified applications. In this platform, various Super Computing applications will be operated with highly scalable datasets. All migrated data unified and optimized. It also ensures ROI boosting.

V. VALUES OF DATA-INTENSIVE SUPERCOMPUTING

- **Research:** The architecture that converges AI, HPC and big data technologies is an interdisciplinary innovation which is fuelled by data-intensive research. It facilitates the evolution of research from the computational science to the data science.
- **Business:** The unified data foundation is converged, secure, efficient, and low-carbon, reducing the lifecycle management costs of massive unstructured and structured data. It improves the data utilization efficiency of applications that converge scientific computing, big data, and AI.
- **Industry**: High performance data analytics (HPDA) software, parallel file systems, and data storage and data management systems have boosted the development of supercomputing storage industry worldwide and application technology ecosystem.

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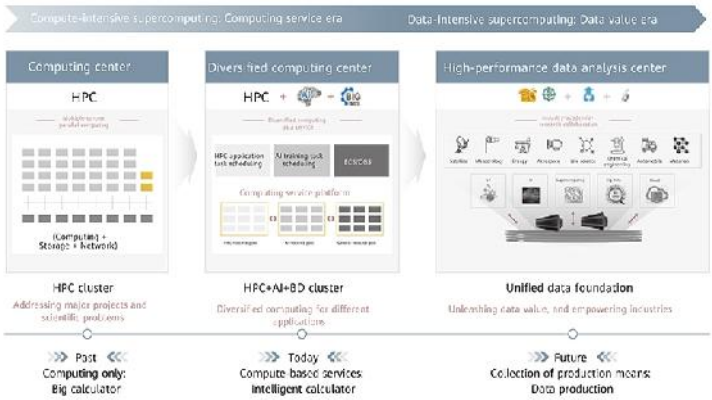

Fig-1 : SuperComputing entering the data-value era [1]

VI. CONCLUSION

In this was, it was briefly presented that data intensification is most significant. The amount of data involved in computing and its power has increased dramatically with high reliability. While mobilizing stored data in Super Computing centres seems to be biggest challenge, industries started transforming from Computing-Intensive to Data-Intensive approach.

Data-Intensive Super Computing serves as a data-centric application driven and unified data sources with high performance data analytics. The industry consensus is that data-intensive computing can unlock a thriving supercomputing industry covering storage, data collection, transmission, computing and utilization capabilities. Thus it drives Super Computing to the data-value era from the computing-service era.

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