

Overview

This short paper is a quick introduction to HPC (high performance computing) sometimes referred to as HPTC (high performance technical computing).

Ever since the early days of computing, technology champions have been on a never ending quest of deriving more juice from existing computing infrastructures. As computing became more affordable breaking out of the realms of supercomputers of the likes of CRAYs, organizations such as Progression have assisted several compute infrastructures achieve computing performance improvements ranging from 100% to over 700% leveraging core understanding of complex myriad of servers and clusters.

Innovations in technologies like Grid computing, Cloud computing, Virtualization and Consolidation are the results of several such implementations aiding in transforming learning into business advantage.

THE TECHNOLOGY

A usual solution to increasing computing capacity is to add more physical servers or create server clusters so that we can run bigger applications or derive faster results. But the general outcome is not a linear increase in computing power while exponentially increasing hardware costs.

HPC practice at Progression focuses on core architecture designing & deployment and tuning methodologies which enable your existing or proposed computing environment to provide more capability without increasing hardware.

A CASE

Consider the case of **Robert BOSCH** India which provides engineering and business services to the Bosch World such as Electronic Control Unit Development for automotive, industrial, consumer goods, Process Consulting, Mechanical Engineering & VLSI Services. Their existing infrastructure suffered deficiencies in Performance, Workload Management and Resource Utilization.

Progression's HPC Team designed a cluster deployment based on existing HP 9300 Opteron workstations along with a dynamic resource

management solution. Target performance was obtained with 12 processors as against 20 processors for similar work load. Additionally, idle workstations at night were converted to a grid running simulations lab thereby dramatically increasing utilization factors.

PREPARING FOR HPC

Preparing your computing environment requires an audit of the current hardware and application needs. Broadly categorized based on data volume, data transfer volume and computing requirement a suitable design considers data transfer requirements, associated data storage requirements and data computing requirements.

A proof of concept lab at Progression often runs simulations of the target system in more complex cases.

“Today, with the infrastructure utilization in excess of 80% in the post deployment scenario, we have been able to execute much larger jobs in faster turn-around times hence delighting our customers globally.”

- **Robert Bosch, India**

RESULTANT ARCHITECTURE

The resulting gain in performance is an outcome of two direct architectural modifications.

First, through optimizations (including kernel level modifications) of the computing stack based on Unix derivatives, the throughput or computing capability is enhanced. Second, a Work-Load Manager handles job-ques so that the computing environment is always running tasks.

The result is that utilization of the underlying computing infrastructure is dramatically improved and job cycle times go up by a factor of **2x to 7x**.

FINANCIAL ADVANTAGE

There are measurable financial benefits of HPC with Progression. Firstly, we profess reduction of capital investments since the same infrastructure can deliver higher performance post HPC. Second, a sound deployment increases productivity of capital achieving more processing per unit of time. A job requiring, say, 5 days can now be done in 3 days. Third, our experience with several implementations means that our design & deployment times are minimalistic translating into cost effective total project costs. Fourth, we encourage you to periodically assess increase in productivity of labor to determine your ROI.

HERE AT PROGRESSION

Started as a formal practice in 2002 with our first implementation at Indian Institute of Technology (IIT) Chemistry department, we have several deployments like Jawaharlal Nehru University (JNU), Robert Bosch India, Indian Railways, Honeywell, Infotech

Enterprises totaling over 40 implementations in India and overseas and including domains such as CAE, FEA, Fluid Dynamics, Molecular Dynamics, Bio-Informatics, Weather Modeling and more. Ranging from a 4 node deployment to 256 node clusters, we have skills in Sun Solaris, HP-UX and Linux, delivering solutions for HPC, HPS (high performance storage), Grid Computing (including Grid-By-Night), Cloud Computing and Virtualization & Optimization.

Progression's dedicated team of HPC engineers is available for discussions, analysis, design and implementation at all times and can be reached at our email address [HPCINFO \[at\] progression.com](mailto:HPCINFO@progression.com). We will be happy to assist you with an in depth assessment of how HPC can deliver value and business advantage in your computing environment.

Progression is an active member of the Global Grid Consortium.

FURTHER READING

A more technical discussion on HPC along with Case Studies on implementations by Progression can be found on our website under the Downloads section. Further literature is also available on topics like Grid Computing, Cloud computing, Virtualization & Consolidation.

The Web has several resources on HPC. A good place to start: www.linuxhpc.org

A great resource for understanding complimentary technologies like Virtualization is VMware, a Progression Partner company www.VMware.com.

About Progression

Progression Infonet Pvt. Ltd. was incorporated in 1995 with a vision to provide and optimize IT computing infrastructure. We are a full systems integration company (voted Best SI Company 2008 by Dataquest) with key expertise in HP, SUN, Microsoft, Linux, Solaris, VMware & Citrix. All our engineers, including our sales force, are certified for designing & architecting, selling, servicing and optimizing computing infrastructures based on these market leading solutions. We are an ISO 9001:2000 certified company with complete orientation to ITIL 3. We are head quartered in our own building in Gurgaon and are present at New Delhi, Noida, Mumbai and Bangaluru.



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