

Meeting computing demands with Superdome performance



The First Marine Research Centre of the National Marine Bureau is engaged in marine scientific research. It is internationally renowned for its research capabilities and has garnered many accolades. To maintain this high level of research excellence, the National Marine Bureau decided to improve the performance of its IT infrastructure.



HP customer case study: HP equips the National Marine Bureau with a high performance Superdome server, enhancing performance and boosting scalability.

Industry: Research and development

Objectives

- Equip the National Marine Bureau with high performance linearity.
- Implement expansion features.
- Ensure high availability.
- Fulfil economic benefits and high investment returns.

Approach

- Deployment of 128 1.6GHz 18MB Cache Montecito CPU Cores in an HP Integrity Superdome server based on the Montecito processor.

IT improvements

- High level of performance while realising a high return on investment through HP's solutions.

Business outcomes

Accelerate business growth

- Good linearity during the operation of the customer's Laboratory of Geophysical Fluid Dynamical and Numerical Modeling (LAGFD) software, and guarantee of the customer's quality of work, with enhanced efficiency.

Lower costs

- The HP Systems Insight Manager (SIM) management platform combined with HP Integrity Essentials increases the usage rate of resources, thereby lowering management complexity, and decreasing operating outlay.



The need for high performance and expandable hardware frameworks

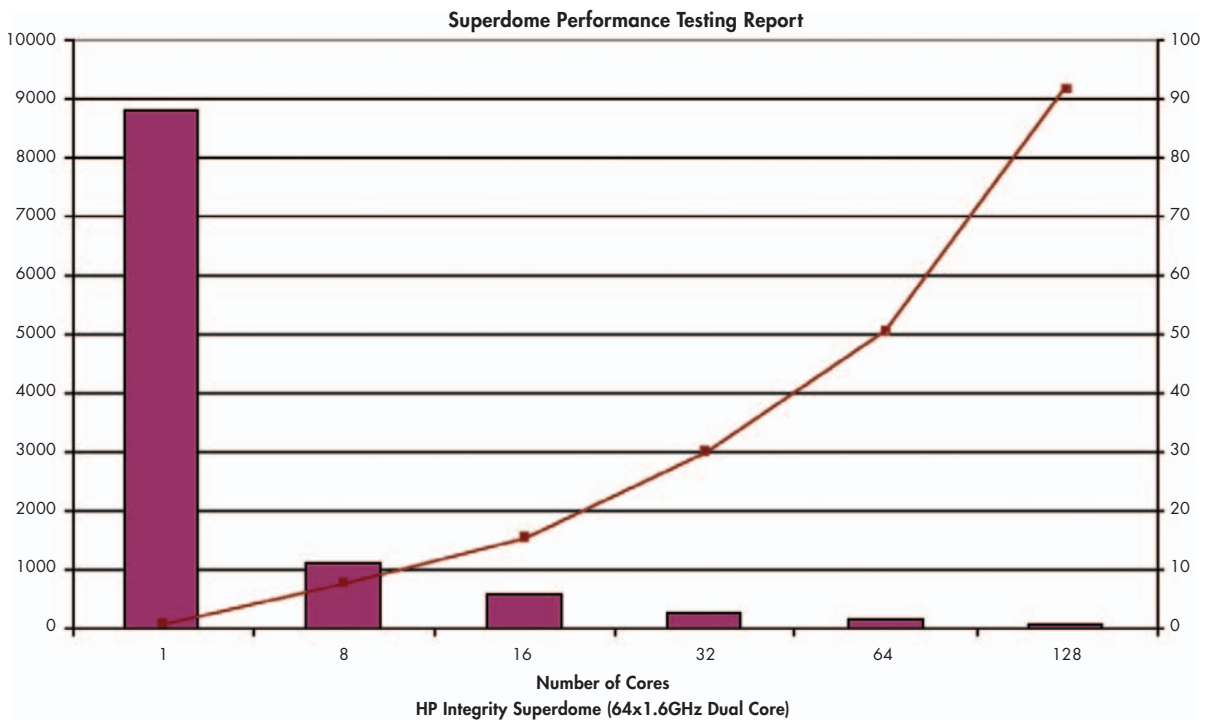
The application software that is involved in the field of high performance computing is infinitely varied and diverse – the computing characteristics of the application software of each field are different from one another, and also place different demands on the computing platform. A server, when running application software from different fields, will present vastly different sets of performance characteristics. Therefore, there is a need to select and design reasonable hardware frameworks based on the specific characteristics of the application. Customers frequently request that the server be equipped with a high degree of linearity in the process of running their LAGFD application procedure. In addition, in accordance with the customer's business operation needs, the server also has to be equipped with flexible, expandable capacity, high availability features, simplified management characteristics, and an outstanding return on investment.

By relying on the strong advantage the company possesses in terms of skills in the field of high performance computing as well as its rich experience in item implementation, HP has provided The First Centre with solutions that not only conform to the development trends pertaining to high performance computing, but solutions that are also suited to customer needs.

HP's solution: The HP Superdome server, based on the Montecito processor, achieves superior linearity, and expansion potential

HP installed the HP-UX TCOE operating system that is designed for high performance computing, as the Superdome server had been matched with one high-end Montecito processor, and deployed with 128 1.6GHz 18MB Cache Montecito CPU cores with 256GB of memory.

The Superdome server makes use of the memory-sharing system framework of the cc-NUMA framework, incorporating 16 Cell boards, with each Cell board providing eight CPU cores, numbering 128 cores in total. Unlike the Blade architecture that compromises bandwidth between modules, the Superdome server is, in essence, a memory-sharing system, and this has enabled the Superdome server to maintain good linearity while running the application procedures of The First Centre. HP has undertaken response testing on a 128-core Superdome server from the HP test centre, specifically using the LAGFD application procedures from The First Centre. The test results indicated that the linearity was very good, proving that the Superdome solution has all the features necessary for a memory-sharing system framework.



In this particular case, if four HP Integrity rx8640 servers were to be deployed, and if a cluster system was formed using the Infiniband high speed interconnected facility, the same performance as that of a single HP Integrity Superdome 128-core server can also be achieved and operating costs can be maximally reduced. However, when considering the possibility of The First Centre purchasing more servers to create an even larger supercomputer in the future, HP still continued with the implementation of the costlier Superdome solution, providing The First Centre with increased room for system expansion in the future.

Why HP?

HP is widely recognised as the global pioneer in the field of open systems. HP is the world's first supplier of UNIX systems, and the company has also achieved top scores in terms of customer satisfaction in supporting UNIX systems. In the field of high performance computing, HP currently occupies the largest market share, and its successes can be found in organisations around the world that deal with high performance computing, including the three largest national laboratories in the US, the world's largest military and civilian supercomputers based on commercial standards



(belonging to the US Department of Energy and The National Science Foundation, respectively), and Europe's largest computer (The French Atomic Energy Commission), etc. HP China has insisted on the direction of specialisation by constantly introducing various types of advanced products and skills from other dynamic countries. While creating tailor-made solutions for domestic customers, HP China also provides comprehensive packages that include all aspects of skills consultancy, service, and training.

With the arrival of the era of business operations technology, HP China has established a niche in reducing the risks faced by customers. This is achieved by lowering operating costs and by abiding by the principles of the open system, providing customers with a nimble, flexible, and manageable product, and entrusting customers with sufficient capabilities to deal with business expansion. The HP Integrity Superdome server is thus one of the adaptive infrastructures that HP uses to assist customers US, the world's largest military, and civilian supercomputers based on commercial standards in realising business operations technology. The HP Integrity Superdome server is able to rely on its flexible capacity, its higher availability, and simplified management to provide customers with better IT investment returns.

The HP Integrity Superdome server has positioned itself in the field of enterprise-level application and high performance computing, and is suitable for enterprises that need to handle large volumes of data, for service providers, and for global online business cities.

It represents a quantitative leap for large scale servers. The Superdome uses high end server technology and an I/O with large capacities for memory and expansion, with the potential for expansion, flexibility, and lasting value – criteria that are required for new business operations.

The HP Integrity Superdome, equipped with cutting edge virtualisation capabilities, is able to adequately support consolidation and expansion. As a top enterprise computing solution, it is able to provide customers with well balanced high performance features, as well as high capacity, flexibility, availability, safety, and manageability. The HP Integrity Superdome supports numerous types of operating environments. Through deployment, it is able to provide enhanced performance for all types of workloads, regardless of whether these workloads are based on business, inquiries, or even batch processing. The virtualisation technology of consolidation has provided customers with extremely attractive investment protection and higher IT returns.

At the same time, HP is also renowned thanks to the comprehensive support services that it provides. HP always occupies the top rankings of numerous domestic evaluations. In 1994, HP China obtained the ISO9002 quality certification in the computing products aftersales service and support categories. HP is the country's only computing company to have received such certification. This has provided the assurance that the service which is provided by HP China to customers in China has attained international standards. So, HP's service organisation that is stationed permanently in Qingdao would be able to provide high-level quality service for The First Centre.

Customer solution at a glance

Primary applications

- HP Virtual Server Environment

Primary hardware

- HP Integrity Superdome server with 128 1.6GHz 18MB cache Montecito CPU cores

Primary software

- HP-UX TCOE operating system
- HP Systems Insight Manager
- HP Integrity Essentials

Customer benefits: Achieving high performance and high investment returns, and enhancing business results

Through the implementation of this particular solution, the National Marine Bureau now reaps the following benefits:

1. Strengthened expansion capabilities

The HP Integrity Superdome makes use of the 1.6GHz new dual core Intel® Itanium® processor, which is specially designed to handle the most demanding enterprise workloads. It is able to expand to deal with enterprise developments. The HP Super-scalable Processor Chip Set sx2000 provides outstanding availability, reliability, and manageability, further upgrading the performance and the capacity of the Integrity Superdome.

2. High availability

The HP Integrity Superdome utilises the construction methodology of having redundant unit board modules, and is equipped with the following features: Error Checking and Correcting (ECC) at the CPU and the memory paths, flexible and nimble cluster solutions, online addition and replacement of PCI-X I/O cards, and dynamic processor (only limited to HP-UX 11i and Windows®) and memory (HP-UX 11i) re-allocation. The advanced technology that is utilised includes: double chip-spare (chip-spare protection is immediately restored after a DRAM failure, and protects against the vast majority of memory buffer failures) and linked self-healing technology (recovery is possible from any connector failure without loss of performance).

The HP Integrity Superdome is able to be divided into a certain number of hard partitions, and also provides electrical de-allocation between the environments such that failures in one environment will not affect another environment. Such features allow maintenance and protective operations to be conducted within a single partition, without the need to interrupt the operations of the entire server.

3. Flexibility

The HP Integrity Superdome is able to support operating systems such as HP-UX 11i, Microsoft® Windows® Server 2003, Linux, and OpenVMS. Customers are thus free to choose between these operating systems, and deploy the various applications that are most suited to their business operations.

In addition, through the simultaneous operation of numerous operating systems, customers can also achieve unrivalled consolidation.

4. Simplified management

The combination of the HP Systems Insight Manager and the HP Integrity Essentials simplifies the deployment, maintenance, and management of the HP Integrity Superdome, and thus lightens the workload of the system managers, enabling customers to redeploy their resources to other items that would enhance their competitive advantage.

5. Increased rate of usage and optimisation

The HP Virtual Server Environment (VSE) provides a flexible capacity management system, assisting customers in the optimisation rate pertaining to real time improvement of their servers. VSE has undertaken an industry-leading initiative, integrating the aspects of intelligent control together with the aspects of partition, high availability features (such as the HP Serviceguard), and the publicly used fixed pricing, enabling customers to create a virtual server pool that can either expand or contract, and grow or shrink based on business operation priority levels.

6. Investment returns

The Intel® Itanium® 9M processor and dual core Intel® Itanium® processor can be separately installed on different hard partitions within the HP Integrity Superdome, thus enabling mixed use within the same server. The HP Integrity Superdome also supports next generation Intel® processors to further lengthen product lifespan and simplify the process of adopting new technology. Through the addition of new processors, customers can not only flexibly expand their IT capacities, but also upgrade the HP Integrity Superdome without requiring the need for expensive replacement of the entire machine.

HP's support for the HP Integrity Superdome server has not only enabled The First Centre to make its research more effective and stable, it has also provided The First Centre with excellent flexibility and expansion potential, equipping the company with the ability to adapt to future changes.

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