Bright Computing

South African Centre for High Performance Computing Chooses Bright Infrastructure Management Solution

CASE STUDY

The Council for Scientific and Industrial Research (CSIR) is a leading scientific research and technology development organization in Africa, undertaking multidisciplinary research and technology innovation that contributes to the improvement of the quality of life of South Africans.

CHPC
CENTRE FOR HIGH PERFORMANCE COMPUTING

"Our new supercomputing environment is complex and made up of a 'zoo of architectures,' and requires a sophisticated and easy to use management platform. I am delighted to have chosen Bright Computing's Bright Cluster Manager to fulfill this role."

— Dr. Happy Sithole, PhD, Director of the CHPC

The Customer

The Centre for High Performance Computing (CHPC) is a unit of the CSIR, and provides computational facilities to a wide range of science and engineering domains. The CHPC's mission is to offer world-class high performance computing (HPC) that enables cutting-edge research with high impact on the South African economy.

The Challenge

In 2014, the CHPC embarked on a multi-year project to upgrade its entire HPC environment. Their existing estate, comprising four HPC clusters with a combined compute power of approximately 114 teraflops, were to be enhanced with the edition of a new petascale supercomputer. The system would be known as Lengau, which is a Setswana name for cheetah.

The Solution

After an extensive and thorough procurement process, the CHPC chose a combined solution of Dell hardware and Bright Computing infrastructure management software, delivered by Eclipse Holdings, a South African-based Systems Integrator dedicated to HPC, big data storage solutions, and network and interconnect fabrics.

The Dell HPC system comprises 1,031 Dell PowerEdge servers, based on Intel Xeon processors totalling 19 racks of compute nodes and storage. It has a total Dell storage capacity of five petabytes, and uses Dell networking Ethernet switches and Mellanox EDR InfiniBand with a maximum interconnect speed of 56 GB/s.

The first phase of the project was delivered in late 2015 and early 2016, and equipped the CHPC with a state-of-the-art supercomputer that pushed the petaflop boundary. The second phase was installed in early 2017, adding some 380 nodes. This extended

CHPC's capabilities well beyond the petaflop barrier, equipping the organization with the most powerful supercomputer on the African continent.

Bright automates the deployment of the supercomputer, provisioning the hardware, operating system, application, workload manager, and programming environment from a single interface. Bright Cluster Manager continues to provide single-pane-of-glass management for Lengau, simplifying administration and ensuring CHPC's world class supercomputer is performing optimally at all times.

The Results

Lengau gives users access to compute resources, who previously had limited or no access to the resources due to capacity constraints. The supercomputer carries out large scale (i.e., many cores, many teraflops) simulations that were impossible in the past, opening completely new avenues of research. Added to this, Lengau has the capacity to build the CHPC's private sector user base, for improved national economic benefit.

According to CHPC, there are some key benefits that Bright has delivered:

- Administration and user management is much easier, and assigning roles to specific servers is very straightforward
- It is much simpler and faster to provision thousands of nodes
- Monitoring the cluster is easier and more user friendly
- The DHCP and DNS service is excellent

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