Bright Computing

Computerome – A Life Sciences Supercomputer of National Significance, Underpinned by Bright

CENTERFO RBIOLOGI CALSEQU ENCEANA LYSIS CBS

The Center for Biological Sequence Analysis (CBS) at the Technical University of Denmark was formed in 1993 to conduct research in the field of bioinformatics and systems biology. Today, a team of more than 90 scientists, working in ten specialist research categories, represents one of the largest bioinformatics groups in academia in Europe.

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— Peter Løngreen, Head of High-Performance Computing & IT at CBS

The Creation of Computerome

In 2014, the systems management team at CBS set about upgrading its supercomputer to cater for increasingly sophisticated requirements in high performance computing. The new HPC environment would be designed to eliminate bottlenecks during complex computations, which can be a common problem in Life Science research due to the high volume of heterogeneous data involved in the projects. CBS recognised that a special HPC design was required, to overcome these bottlenecks. The systems management team enlisted the expertise of more than 50 top researchers, who spent a year designing and testing an HPC environment that was robust enough to support the rigorous demands of Life Science research.

Computerome was born; a state-of-the-art storage system and a heterogeneous supercomputer which ranks 121 in the list of the world's largest publicly known supercomputers, making it by far the most powerful computer in Denmark, and the world's most powerful computer dedicated to Life Sciences. Computerome had been specifically and meticulously designed to accommodate the diverse nature of Life Science applications and the multiple types of data that characterise the field.

With more than 16,000 cores, 92 TeraBytes of memory, and 7 PetaBytes of storage, great emphasis was placed on using innovative technologies to optimise the power of Computerome, to increase research capabilities in Life Science and reduce time to solution.

The Need for Infrastructure Management

When building the supercomputer, the systems management team at CBS knew that they would benefit greatly from a sophisticated infrastructure management platform, to automate the day-to-day administration of the powerful supercomputer.

The team evaluated a number of competing cluster management software solutions, and after a detailed analysis, chose Bright technology as it was the most effective at managing the cluster with as little human intervention as possible.

Peter Løngreen, Head of High-Performance Computing & IT at CBS explains; "We chose Bright for a number of reasons. Firstly it efficiently removes a huge amount of

time-consuming manual administration. Secondly, during the POC, Bright's level of service and support was exceptional; when we asked for help, a resolution was very quick. And, being responsive to our SLAs is important for a mission critical system like ours."

The Solution

Today, Bright Cluster Manager® provides the overall system software and management solution that powers Computerome. Chosen for its flexibility and remote management capabilities, Bright Cluster Manager gives the Computerome team a robust, responsive and comprehensive single-pane-of-glass management interface for Computerome's hardware, operating system, HPC software, and users.

"Integration is nearly always an issue when aligning two organisations" explains Løngreen, "but Bright integrated into Computerome seamlessly. The Bright team was responsive and flexible, and very focused."

According to Løngreen, Bright was selected as a result of the product's impressive flexibility and adaptability to the Computerome environment, and for its superior set of features and functionality.

The Benefits

University research units, hospitals and pharmaceuticals have already used Computerome for some significant genome projects. In fact, the HPC environment has been instrumental in a number of high profile projects for the major Danish universities and the Danish Human Reference Genome project.

Computerome, enables researchers to store and analyse the rapidly growing volumes of biological data, to compute how diseases are linked to particular genes, or how to alter bacteria so it acts like a biotechnological cell factory.

In terms of benefits that Bright brings to CBS, the complexity surrounding the management of Computerome has largely disappeared, and staff intervention has notably reduced. Thanks to Bright, CBS is able to treat Computerome like a laboratory, where the team can try new things and carry out demanding computations on the fly.

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Bright's solution for high performance computing has made it incredibly easy for CBS to build and operate their supercomputer, using their choice of best of breed server and networking equipment, and tying them together into a comprehensive, easy to manage solution.

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