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The future is Bright, the future is clusters

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Bright Computing's Cluster Manager addresses the growing need for sophisticated management products to support ever-more-complex compute clusters. The company's strategy is one of partnership to build its sales channel, and collaboration to cover all of the HPC bases in an integrated product.

The 451 Take

The market for HPC clusters is expanding in two dimensions. First, users who could not previously afford an HPC system have found they can buy a reasonably priced commodity cluster. At the same time, high-end systems are growing in size at an alarming rate. There are now 10 systems worldwide with more than 100,000 cores, and systems with a few thousand cores are becoming commonplace. Bearing in mind that what happens at the sharp end of HPC today goes mainstream in just a few years' time – these trends add up to a serious problem in the growing complexity of HPC clusters, and a shortage of skills to adequately manage them.

Context

Bright Computing was spun off of HPC systems integrator **ClusterVision** in 2009 to sell the Bright Cluster Manager product beyond the ClusterVision customer base. Funding was provided by the venture arm of **ING Bank**, and the ClusterVision founders are also investors. It now employs 12 development staff in Amsterdam and six sales, marketing and business development staff in the US. Bright Computing has 80 customers, six of which run systems in the TOP500 list.

Business model

Bright Computing's sales strategy is to maintain a very small direct sales force, winning most of its business through the channel. In Europe, its resellers are **Eurotech** (which also resells FPGA-based **Convey Computer** supercomputers) and ClusterVision itself. Current resellers in the US are **Ace Computers**, **Advanced HPC**, **AMAX Information Technologies**, **GraphStream**, **Iron Systems**, **James River Technical**, **Koi Computers**, **Padova Technologies**, **PCPC Direct**, **R-Associates**, **Scalable Informatics**, **Seneca Data**, SICORP, **Silicon Mechanics** and **Unique Digital**.

The company is working hard to expand its channels in both the US and Asia; partnerships are often the key to success for small companies. It has signed up two resellers in Japan since the Supercomputing show last November, and they have already brought in three customers. Its products are also certified by the **Intel** Cluster Ready program, although Bright Computing points out that its own cluster-testing tools are actually more rigorous than Intel's.

Products

Bright Cluster Manager manages the installation, use, monitoring and management of HPC clusters, offering resilience through redundant head nodes. It is based on a trusted Linux distribution (a variety of Linux flavors are supported), and can be driven from a flexible GUI or by command line – the latter method can also be used to generate scripts for common tasks. The management console is independent of the cluster itself (and can run on Windows or Mac OS), meaning that multiple clusters can be managed from a single console. It handles provisioning, cluster-health monitoring and automated management tasks. The parallel shell enables administrators and users to easily run the same command across all or part of a cluster. It is integrated with the TORQUE/OpenPBS, Maui and Grid Engine workload management tools, and can also be configured to work with Moab, LSF, **PBS** Pro, SLURM and **IBM** LoadLeveler.

A wide range of development tools can also be pre-integrated, including compilers from GNU, Intel, **PathScale** and PGI; the open source TAU debugger and commercial offerings from **TotalView Technologies** (acquired by **Rogue Wave Software**) and **Allinea Software**; and a range of open source MPI implementations and mathematical libraries. Bright Computing has integrated its Cluster Manager with the virtual shared memory product from **ScaleMP**, enabling it to support large shared memory systems as well as clusters, and it works closely with **NVIDIA** in support of GPU-based clusters. InfiniBand networks are also supported – in addition to Ethernet.

Customers

A recent win for Bright Computers was at the **Goethe University Frankfurt**, where the Bright Cluster Manager is responsible for the 20,880-core, 772 GPU LOEWE-CSC system, one of the most powerful GPU accelerated systems in the world. The **Texas Advanced Computing Center** (TACC) selected the Bright Cluster Manager to manage its HPC Cluster in the FutureGrid project, an experimental distributed grid and cloud test bed.

The TACC system is used by many different groups with varying requirements. One of the features that led to their selection of the Bright Cluster Manager was the ease with which systems can be reprovisioned on demand. The **University of Groningen** in the Netherlands runs Bright Cluster Manager on its Millipede system, which is the fastest supercomputer in the Netherlands, and also uses ScaleMP software to support applications with a large memory footprint.

Competition

Bright Computing says its most common competitor is an in-house-developed system comprising a stack of scripts that link a variety of open source toolkits. It claims, with just cause, that its product is more robust and reliable, as well as being more scalable to large installations, than the do-it-yourself approach.

Cluster management tools don't all do exactly the same job, so some products that may appear to be competitors may be able to inter-operate in some areas. IBM has its xCAT (eXtreme Cluster Administration Toolkit) cluster management toolkit, but works with Bright Computing to deliver GPU based clusters (which xCAT does not support). **Adaptive Computing's** HPC tools are more focused on workload management than monitoring, while Concurrent Command from **Concurrent Thinking** is an appliance that monitors and manages clusters.

Platform HPC is the cluster management product from **Platform Computing**, a long-established HPC middleware vendor. It handles installation, configuration and management of a cluster – including monitoring, provisioning, multiple operating systems (Linux and Windows), workload managers, networking, storage, development tools and applications. Platform Computing products are sold as OEM or co-branded products by a number of its partners.

SWOT analysis

Strengths	Weaknesses
The Bright Cluster Manager is an integrated product, not a toolkit with potentially incompatible components – which is the case for a number of open source alternatives. Its level of support for HPC ticks many important boxes, particularly NVIDIA GPUs and InfiniBand networks, and its relationship with ScaleMP adds an interesting SMP angle for clusters.	Its sales force is tiny. Relying on technology and sales partners is a good strategy for a small company, but Bright Computing's partner portfolio needs further development.
Opportunities	**Threats**
The cluster market is growing, HPC tools and technologies are crossing over into the mainstream, and there is a shortage of skilled system management staff. Cluster management products are more important today than ever before.	Among Bright Computing's competitors, Platform Computing has over 2,000 customers, 530 staff and a 17-year track record in HPC. With its limited resources, there is a danger that Bright Computing will be a niche player in the growing cluster market.

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