# Grid computing

How to share data processing among servers, workstations and storage **Interviewed by Jason Lloyd**

Over the past several years, scientific and information technology publications have either encouraged or debated the use of grid computing. Major hardware and software companies have tried to take advantage of this discussion to promote their own "grid" products.

With the promises of dramatic IT cost reductions, increased system performance and increased productivity, grid computing is an option that should be evaluated in all industries.

*Smart Business* asked Paul Singleton, senior Oracle consultant at Perpetual Technologies Inc., about the benefits and misconceptions of grid computing.

**Paul Singleton**
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### What is grid computing?

The phrase 'grid computing' came about from discussions of how the accumulation and delivery of computing power to applications should function similarly to the delivery of electricity through an electrical grid.

Grid computing allows a company to share its data-processing workload among its servers, workstations and storage, as long as excess capacity exists on each of these resources. As workload increases on one server, any grid-related tasks on that server can be allocated to another, less busy server. A true grid can utilize resources regardless of hardware vendor or operating system. No proprietary tool is required for participating in or managing the grid.

### How are grids helpful?

Grids allow companies to fully utilize their resources rather than having excess capacity. Grids take advantage of different peak-load times of systems, including differences in time zones. This resource sharing and increased utilization reduces the rate at which companies need to upgrade and replace hardware. Large, expensive servers can be replaced with commodity hardware. More work is done with less equipment, reducing administration and maintenance costs.

Improved resource utilization has another benefit. It allows companies to proceed with strategic initiatives, previously delayed due to the cost of acquiring new, dedicated hardware. In a grid environment, these new systems require less powerful hardware because they can use the excess capacity of existing systems. Likewise, the extra capacity on the new system can be used by existing applications.

### What are some common misconceptions about grid computing?

A grid should not be confused with a cluster. A cluster is a set of computers that work together as if they were a single system, but each node belongs exclusively to that cluster. They are not added and removed dynamically. Clusters use vendor-specific cluster management software to coordinate their work, and the cluster administration is performed centrally with the vendor's tools. A number of these clusters may exist within a grid, along with other stand-alone servers and storage devices, but the clusters themselves are not grids.

A product might make use of multiple servers, but if the product is vendor-specific, uses proprietary protocols to work, or is centrally managed by the vendor's tools, then it is not a grid.

### What are some of the challenges to widespread adoption of grid computing?

For commercial, off-the-shelf products, licensing is probably the biggest challenge. Traditional licensing models include licensing an application for every system on which it runs, or licensing based upon the number of CPUs in the customer's server. These are not well suited for grid computing.

Other mechanisms for measuring usage will need to be developed. Creating licensing models that are simple but still acceptable to customers and vendors could prove difficult.

Companies developing their own grid applications face several technical challenges. For example, in a traditional architecture, an application has fast access to the data it requires. Storage and data are shared in a grid environment; this poses a challenge in keeping data close enough to the application so that data access doesn't become a bottleneck.

Grid security can be more complex than traditional computer security, especially in environments where workstations, as well as servers, provide computing resources for applications. Protocols such as 'grid security infrastructure' are being developed to address authentication and secure communication between grid components.

### What industries are using grid computing?

Early grid computing applications were mostly seen in the scientific community where research grants funded development of grid-based systems. From there, collaboration between commercial firms and universities began producing business-related grid applications.

In the commercial world, grids are most commonly found in engineering, pharmaceutical, and financial services companies. However, any company facing challenges in managing the growth of computational and data management requirements is a good candidate for grid technology.

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