

Fact sheet



Grid Computing

The grid is a software architecture to enable the secure sharing of IT resources among the members of a virtual organisation. The resources that are to be shared are rendered as “grid services” and can include computer cycles, storage space, a database, an application, a file, a scientific instrument, or almost anything else in the IT arena. Geographic proximity is not a requirement, nor is it necessary that the resources be in the same ownership or management domain(s). Unlike “the Web” there is not just one grid. Many disjointed grids can exist even within a single enterprise.

Grid computing solutions let enterprises use their IT resources more efficiently as it allows collaboration within a company of computer tasks of any size or duration. It will make it possible to set up ad hoc, secure IT projects between geographically disparate units, and even between teams across organisational boundaries and so accelerate innovation and creation, all at lower cost-per-use ratios. In addition, grid computing enables companies to quickly deploy resources for new projects, thereby improving time-to-market for new products. Grid computing also employs emerging Web services standards -- such as XML, SOAP, WSDL and others -- to enable streamlined machine interaction among partner organisations. Also, it's an equalizer among small and large players in any given field as power and capabilities associated with much bigger, more sophisticated data centres are made available in almost real-time at a much lower cost.

According to recent research from IDC¹, the grid computing market will generate revenue exceeding \$12 billion by 2007, up from a little more than \$ one billion in 2003. The growth will be across high-performance computing (HPC) applications and commercial data applications. “We believe that grids hold significant potential as the next step in the evolution of the (information technology) environment,” said John Humphreys, research manager for workstations and high-performance computing systems at IDC².

HP's commitment to grid computing

HP has been a pioneer in grid computing since the late 1980s when Joel Birnbaum, then the director of HP Laboratories, envisioned the notion of “utility computing”. Since then HP has been putting its energies toward grid computing inside and outside the lab. Company Chairman and Chief Executive Officer Carly Fiorina recently committed to use industry standards to grid-enable all of HP's products. Products ranging from the smallest handhelds, printers and PCs to the most powerful storage arrays and supercomputers will be able to connect with and serve as

Hewlett-Packard Company
150 Route Du Nant D'Avril
1217 Meyrin
Switzerland
www.hp.com

¹ published April 23, 2004

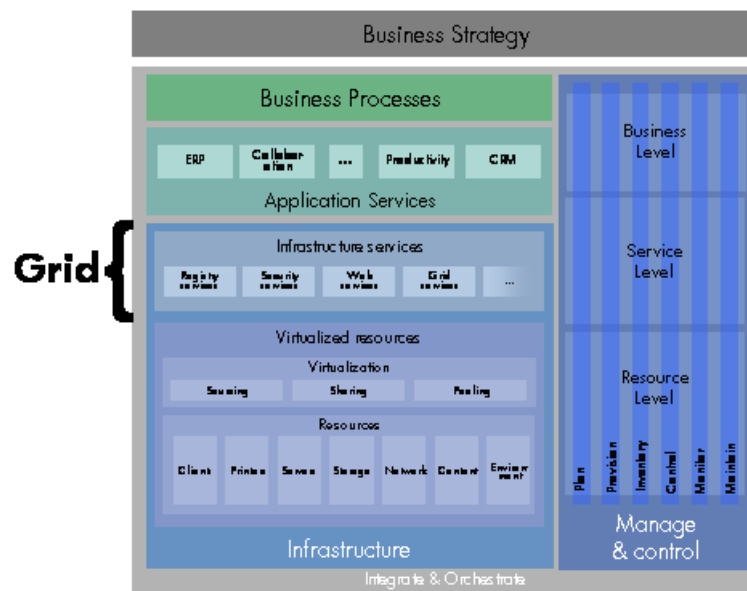
² CNET NEWS 4/23

resources on a grid. Already today HP provides customers with grid-enabled systems running HP-UX, Linux, and Tru64 UNIX.

HP's grid strategy has three primary thrusts. Most importantly, grid computing enables HP's vision of the Adaptive Enterprise - where information technology is a highly efficient, flexible service that is agile enough to change in line with a corporation's business and its business environment. Another benefit to grid-enabling HP's systems is working with customers and partners already using grid, primarily those in scientific and technical computing. Last but not least, HP foresees the fgrid making a huge contribution in a third area, the space where home networking meets entertainment media. In these cases, there's typically a content provider that allows access only to subscribers. The provider may also require that materials are viewed on a device with certain characteristics, such as high-grade security.

Via grid computing to an Adaptive Enterprise

As mentioned above, HP sees the grid evolving to become a very general and powerful way to virtualise and fully utilise resources, leading to an Adaptive Enterprise where business and IT are are synchronised to capitalise on change. HP's solutions, technologies, and services for an adaptive enterprise are not an out-of-the-box solution. For many customers, it will be an evolution. HP's goal is to help customers harness the power of their existing infrastructure, as HP helps them evolve toward an adaptive enterprise by adding capacity to their existing infrastructure incrementally over time. As part of the Adaptive Enterprise, the grid plays a key role in the "middle layer", connecting business practices software to infrastructure.



Open standards as key to success

HP believes that open, vendor-neutral standards are critical to the wide adoption of grid technology and that the flexibility of an open standards-based approach is the only way to bring together heterogeneous resources into an effective grid computing environment. As such, HP is a strong supporter of organisations aiding in the

development of an open grid environment, including the Globus Project and the Enterprise Grid Alliance (EGA – announced 4/20/04). In addition, HP is a Platinum sponsor of and active participant in the Global Grid Forum (GGF). HP's grid-enabled hardware also supports the latest versions of the Globus Toolkit, the de facto standard for grid software.

Grid Solutions from HP

HP Services Technology & Infrastructure group provides a full range of grid computing consulting services. Services include a grid assessment service that analyses the current and proposed state of the customer's environment, compares it to the designed future state, and identifies applicable grid technologies. HP's expertise stems from the technical computing world, where the company has deep experience and a broad-range of capabilities for integrating grid into commercial environments.

Also, HP has partnered with Avaki, Platform Computing and others to provide grid software solutions to HP's customers, adding value to these solutions by coupling them with HP's physical resource offerings.

HP customers in the manufacturing, health care, and financial services industries already benefit from these services, which help deploy and manage computer-intensive applications; stemming from this experience, enterprise customers will similarly benefit from grid services for commercial applications.

Customers using HP's grid solutions today include BAE Systems, Canadian Westgrid, CERN OpenLab for Datagrid Applications, Pacific Northwest National Laboratory, Pittsburgh Supercomputing Center, Samsung's Advanced Institute of Technology, US Biomedical Informatics Research Network, and Wellcome Trust Sanger Institute. EMEA-specific customers include the Italian Southern Partnership for Advanced Computational Infrastructure (SPACI) and the Scientific Supercomputing Center Karlsruhe (SSCK), Germany.

Grid management

The management and monitoring of grid services is an area that remains under development. HP has expanded its Web Services Management Framework (WSMF) to incorporate and be compatible with grid services, and is working with the grid community to instill WSMF into the emerging standards for grid services management.

WSMF is also being integrated into HP's OpenView software suite so that the management of grids and grid services will be within the same powerful framework that HP OpenView provides for other management and monitoring tasks.

The forthcoming version of the Globus Toolkit will allow grid users to bring standardised Web services into a grid environment, further simplifying the automated allocation of resources available on a grid.

The HP Utility Data Center is an example of how HP has integrated grid technology into its existing solutions. However, because a UDC is able to dynamically reconfigure itself to match incoming grid service requests, it adds an additional level of adaptability to the grid to which it is connected.

Grid: Latest developments

HP SmartFrog, released under an open source license on March 10, 2004, is a



software framework for building distributed, component-based software systems that are easy to configure and easy to automatically install, start, and shut down. Designed as a set of building blocks to build configurable software systems, SmartFrog provides key elements and a language framework to enable the construction of web services solutions for grid computing and other distributed environments. SmartFrog technology is expected to be especially useful in the development of grid computing applications for commercial enterprise customers, where an Open Source environment is essential to effective deployments.

SmartFrog was initially developed at HP Labs as a way of rapidly creating and deploying distributed services. It was the enabling technology behind the large-scale, utility-based rendering service used by 422, a Bristol-based production company.

Researchers in HP Labs continue to actively pursue innovations and technologies that will address the main challenges of deployment of grid computing environments, including reduced complexity and increased security.