



**The Era of Grid Computing:
Enabling New Possibilities
For Your Business**

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Imagine the possibilities...

What would it mean to your business today if you could..... analyze the value of an investment portfolio in minutes, rather than hours?... significantly accelerate the drug discovery process?... scale your business to meet cyclical demands—while cutting IT expenditures in half?... double the productivity of your employees?...cut the design time of your products in half, while reducing the instances of defects?... unite your research team with others around the world?

Imagine what your business could do if it were no longer constrained by the limitations of existing compute and data resources, budgetary restrictions and more. Sound like a thing of the future? Perhaps in the technology world of yesteryear, it would have been. Fortunately, we have moved into the 21st century, the era of On Demand Computing.

Success in today's business world requires that companies be dynamic, nimble and flexible. It requires organizations to deftly react to rapidly changing economic environments, immediately respond to shifts in customer demand and change tack at a moment's notice to outmaneuver the competition. Success today requires business On Demand.

However, creating such an organization is a tall order. At the business strategy level, increasing operational flexibility involves improving collaboration between employees, partners and suppliers. Boosting responsiveness and reaching markets faster means enhancing productivity for employees, granting them instantaneous and ubiquitous access to the resources they need to accelerate business processes and deploy new workloads. And of course, all these feats must be accomplished while expanding revenue streams and slashing capital expenditures.

To meet these challenges, companies today are turning to an emerging, enabling technology: Grid Computing.

Highlights

Grid Computing provides an answer

Simply put, Grid Computing can be defined as applying resources from many computers in a network—at the same time—to a single problem; usually a problem that requires a large number of processing cycles or an access to large amounts of data.

Utilizing Grid technologies from IBM and IBM partners (such as Platform Computing, Avaki, DataSynapse and United Devices), organizations can unite disparate technology capabilities to create a single, unified system. Thus, enabling the virtual sharing of, management of and access to devices across an enterprise, industry or workgroup. IBM Grid offerings help place all of the necessary IT resources at the fingertips of those who need it, when they need it. In this manner, Grid solutions can help companies to rapidly solve complex business problems like those mentioned above—and break through the limitations of today's technology infrastructure. Employees can leverage all of a company's assets to spark creativity and uncover new business designs.

Grid Computing and business today

IBM Grid Computing techniques can be applied to a number of business problems, producing benefits that directly affect the bottom line. These applications include:

IBM Grid technology is designed to harness vast capabilities in the form of compute power and database resources, and place them at the disposal of R&D professionals.

Research and development

Research and development (R&D) activities tend to be information- and compute-intensive, involving methods such as analytics, deep computing, data mining and data extraction. For this reason, IBM has developed Grid Computing offerings for R&D markets such as the pharmaceutical, manufacturing and electronics industries, the medical research community, academic institutions and others. IBM and its partners' Grid technologies are designed to harness vast capabilities in the form of compute power and database resources, and place them at the disposal of R&D professionals. In this manner, Grid Computing can help to boost the productivity of these researchers, significantly reducing cycle time, and time-to-market.

Highlights

Companies can utilize IBM Grid solutions to greatly increase their ability to make sound, informed business decisions in a timely fashion.

By creating unified product development Grids, manufacturers can not only engender collaboration across their supply chains, but they can also take advantage of augmented computing capabilities to decrease cycle time, reduce development costs and improve time to market—ultimately delivering a higher value product to end customers.

In addition, IBM Research and Development Grid offerings enable the exploitation of data and database management systems that can be amassed quickly and securely for “point-in-time” data warehousing capabilities, then disassembled immediately. This capability is particularly important in competitive market environments that demand privacy and discretion around development.

Business intelligence and analysis

Business intelligence and analytical Grids are generally designed to carry out heavy data mining, data intelligence and data exploitation projects that would traditionally consume a comparatively long period of time (days or weeks). Examples of such projects include seismic and reservoir analyses in the petroleum industry and derivative analysis work in the financial services industry. Using IBM and its partners' Grid Computing technologies, such businesses can take advantage of untapped compute and processing resources to impressively accelerate analytical processes, reaching end results far more rapidly and accurately than within conventional computing environments. In this manner, companies can utilize IBM Grid solutions to greatly increase their ability to make sound, informed business decisions in a timely fashion.

Engineering and product design

Because they have adopted an extremely collaborative approach—incorporating vast numbers of partners, original equipment manufacturers (OEMs), suppliers and assembly plants—large manufacturing businesses face a unique computing challenge when it comes to engineering and product design cycles. For example, an automotive manufacturer developing a particular model might need to collaborate with thousands of parts suppliers in order to create its desired end product. In addition, each of those partners could potentially run different operating systems, applications and databases—an integration nightmare.

Thanks to the open standards-based architecture that is the foundation of Grid Computing (Open Grid Services Architecture, or OGSA), these large manufacturers will be able to virtualize disparate, heterogeneous systems into a single, powerful computing instance. By creating unified product development Grids, manufacturers can not only engender collaboration across their supply chains, but they can also take advantage of augmented computing capabilities to decrease cycle time, reduce development costs and improve time to market—ultimately delivering a higher value product to end customers.

Highlights

Through Grid, IT departments can gain access to expanded, virtualized networks of resources that can operate as backup and recovery systems—for improved operational resilience and reduced infrastructure investment requirements.

Using IBM Grid Computing technologies, enterprises can realize true business benefits that can help them meet the challenges of the On Demand era.

Enterprise optimization

With IBM Grid solutions, organizations can quickly link together disparate resources to optimize workloads across them, thereby provisioning compute and data resources “on the fly” across enterprise boundaries. For example, while an enterprise's Tokyo office is closed for the day, the New York office can utilize its infrastructure resources to augment processing power during market trading hours. This flexibility and scalability of capacity also makes it possible for organizations to provision computing capacity to meet average—not peak—demand, thus taking advantage of virtualized resources to meet unexpected surges in resource requirements and improve their utilization of IT assets.

Utilizing IBM Grid technologies, companies can take full advantage of underutilized compute resources to serve as a platform for backup and recovery. Through Grid, IT departments can gain access to expanded, virtualized networks of resources that can operate as backup and recovery systems for improved operational resilience and reduced infrastructure investment requirements.

Enabling a successful business strategy

Through the use of IBM and its Partners' Grid Computing technologies, enterprises can realize true business benefits that can help them meet the challenges of the On Demand era. Grid Computing can help empower companies to:

- **Improve time to results for new products and services**
By improving productivity and collaboration, organizations ultimately reduce time to results. Whether these results include bringing a new product to market faster, solving a complex business problem sooner, mapping a gene or completing in-depth data analysis to launch a new service, IBM Grid offerings give companies the gift of speed and time to market advantage, which ultimately leads to a competitive advantage.
- **Enable collaboration and promote operational flexibility**
IBM Grid offerings can bring together not only disparate technology resources, but also people. By making it easy for personnel to share, access and manage information, Grid technology can enable organizations to improve collaboration across business units and geographies in support of key business initiatives such as globalization and acquisition and with increased time to results.

Highlights

By gaining the ability to solve complex business problems faster, organizations are able to move quickly and gain a competitive advantage.

By helping to ensure optimal utilization of computing capabilities, IBM Grid offerings can help companies avoid the common pitfalls of over-provisioning and incurring excess infrastructure costs.

- **Scale to meet variable business demands**

With IBM Grid offerings, businesses can create flexible, resilient operational infrastructures that address rapid fluctuations in customer demand by instantaneously accessing compute and data resources to “sense and respond” to business needs. Gaining the ability to solve complex business problems faster means that organizations can move quickly and gain a competitive advantage in the On Demand era.

- **Increase productivity**

By giving end users uninhibited access to the computing, data and storage resources they need—when they need them—IBM and its Partners' Grid technologies can help companies better equip employees to do their jobs, solve complex business problems with ease and move through product design phases, research projects and more—faster than ever. And when individuals gain personal productivity on an Internet scale, organizations as a whole win.

- **Leverage existing capital investments**

Maximizing productive, efficient use of existing resources is one of the keys to minimizing operating costs. By helping to ensure optimal utilization of computing capabilities, IBM Grid offerings can help companies avoid the common pitfalls of over-provisioning and incurring excess infrastructure costs. Because Grid Computing leverages open industry standards to create a single, unified technology infrastructure, the technology frees IT organizations from the burden of administering disparate, non-integrated systems for reduced management overhead. In addition, companies can take advantage of Grid resources to deliver effective, low-cost backup and recovery scenarios without investing in duplicate systems.

Highlights

IBM is a strong supporter of Grid-based architectures.

IBM is currently designing its products and services to participate in Grid Computing.

IBM and the Globus Project: Leading the way to Grid

In its commitment to Grid Computing and open standards, IBM is a strong supporter of Grid-based architectures and the Globus Project™, a multi-institutional research and development effort. The goal of the Globus Project is to address the technical and business challenges required to make Grid Computing a global success.

Founded by a team of technicians and researchers, the Globus Project has published a set of specifications and standards that leverage the combined expertise of Web Services and Grid Computing: the Open Grid Services Architecture (OGSA). OGSA brings together industry and Grid Computing standards to form a common technical base for Grids the world over. As the result of collaboration by some of the best architects and technical minds in the industry, OGSA specifies an open standard for Grid computing protocols and interfaces, leverages Web services and is designed to enable large-scale cooperation and access to applications through the Internet. IBM is a leader in the development of the OGSA standard.

The IBM product foundation

In an ongoing effort to embrace and support the establishment of open industry standards, IBM is currently designing its products and services to participate in Grid Computing. By utilizing the breadth and depth of the company's wide array of products and services, IBM is taking an integrated and comprehensive approach to this new computing era. For example, the IBM @server™ product line forms a solid platform for designing and developing Grid solutions, and even managing entire Grids. In addition, IBM DB2™ products and tools support Grid Computing solutions to enable the rapid, easy construction of complex data infrastructures. In time, IBM will Grid-enable many of its products and offerings.

Highlights

IBM has established strong working relationships with the providers of Grid-enabling middleware solutions.

Currently, IBM is an industry-leading supplier of Grid solutions, services and expertise to the scientific and technical communities, as well as to commercial customers.

Recently, Butterfly.net—a software developer and infrastructure developer for the online video game market—took advantage of open-source IBM and Globus technologies to build one of the first ever commercial computing Grids.

Working with Globus, IBM has created an enhanced version of the Globus Toolkit™ called the IBM Grid Toolbox. It is currently available for both IBM @server xSeries and pSeries servers. This toolkit provides a comprehensive set of software for security, information infrastructure, resource management, data management, communication, fault detection and portability across a wide array of systems. IBM in concert with Globus is also developing a reference implementation of OGSA running on the WebSphere® platform.

In addition, IBM has established strong working relationships with the providers of Grid-enabling middleware solutions, including Avaki, DataSynapse, Platform and United Devices. Because of these relationships, IBM is able to deliver a comprehensive set of tools and capabilities to enable commercial Grid solutions.

Solid technology experience

IBM is an industry-leading supplier of Grid solutions, services and expertise to the scientific and technical communities, as well as to commercial customers. In fact, worldwide Grid projects including the United Kingdom National Grid, Dutch National Grid, University of Pennsylvania Mammography Grid and North Carolina Bioinformatics Grid all leverage IBM Grid technology and expertise for their day-to-day operations.

Recently, Butterfly.net—a software developer and infrastructure developer for the online video game market—built one of the first ever commercial computing Grids, the Butterfly Grid. Using Grid technologies from IBM and Globus, the Butterfly Grid provides online gaming developers and providers with reliable, high-performance and cost-effective capacity on demand. In this manner, the Grid enables gaming providers to economically run multiple games and serve millions of gamers simultaneously for a greater competitive advantage in the gaming world.

Highlights

IBM Grid solutions have helped several major financial services companies to accelerate complex business processes.

Through the development and management of the intraGrid, IBM has gained valuable, first-hand experience in building and operating true commercial computing Grids.

IBM Global Services—along with other key IBM Business Partners—provides a full range of Grid-related services.

In addition, IBM Grid solutions have helped several major financial services companies to accelerate complex business processes. As a result, these companies have reduced the time required to complete in-depth business analyses from days and hours to mere minutes. In this manner, financial services organizations can boost productivity and take advantage of greatly increased time to results while dramatically reducing the resources and assets required to reach them.

Finally, IBM Research has used Globus technologies to build its own Research and Development Grid—the IBM intraGrid—which unifies IBM research and development resources around the world and serves as a test bed for Grid services and solutions. Through the development and management of the intraGrid, IBM has gained valuable, first-hand experience in building and operating true commercial computing Grids.

Backed by IBM

Leveraging years of experience and solid expertise, IBM Global Services is dedicated to helping customers meet their Grid Computing needs. Because Grid is an emerging technology and must be adapted for specific business environments, IBM Global Services—along with other key IBM Business Partners—provide a full range of Grid-related services.

Highlights

IBM provides a wide variety of educational offerings—ranging from Web lectures to classroom courses and customer briefings—all designed to meet customers' Grid readiness needs.

In addition, IBM provides a wide variety of educational offerings—ranging from Web lectures to classroom courses and customer briefings—all designed to meet customers' Grid readiness needs. These resources include a Grid Innovation Workshop, intended to help businesses implement Grid into their businesses, and specialized, industry-specific courses targeted toward the automotive, aerospace, chemical, financial, life sciences and petroleum industries.

Grid Computing brings businesses into the future

As we enter the On Demand computing era, the onus on businesses to move faster, improve flexibility and resilience, bolster productivity and enhance collaboration on a global level will undoubtedly grow. At the same time, however, economic realities indicate that technology budgets may not increase in tandem. For this reason, the adoption of enabling technologies such as Grid Computing will become more and more critical to business success.

As the e-business environment continues to expand, Grid Computing will serve as a key technology tool that can help organizations deftly, efficiently and cost-effectively develop into On Demand businesses. And backed by innovators like IBM, tomorrow's technological vision of Grid Computing is rapidly becoming a reality today. So go ahead. Imagine the possibilities...

What if your company could...identify new oil reserves for drilling in a tenth the time it takes now?...double the accuracy of your market analysis and conduct twice as many trades in the same amount of time?...calculate your total risk or exposure on a loan portfolio in 80 percent less time than it takes today?

To find out how, visit ibm.com/grid.



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Integrated Marketing Communications,
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01-03

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