Enterprise Grid Computing

Overview

Introduction

Enterprise Grid Computing is a managed architecture that aggregates the IT resources of a business data center into dynamically assignable pools

Enterprise grid computing does not include:
- **Academic and scientific research grids**
- **Desktop grids**
- **Vector supercomputers**

Grid computing market will reach $12b by 2007*

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Enterprise Grids in Context

Grid computing evolved from many trends in IT computing:

- The internet made physical location less important
- Virtual processing environments became more common
- Virtual storage was put into use by many organizations
- Failover and high performance clusters were deployed
- Management frameworks became more sophisticated
- Network bandwidth grew substantially
- Servers were networked to function as a fabric of resources and interact with other application components

Enterprise Grids In Context

From the IT trends, grid computing inherits important attributes including:

- **Fault resilience through redundant systems and interconnects**
- **Ability to scale up (vertically) and out (horizontally)**
- **Load-balancing capabilities for heavy workloads**
- **Support for a variety of systems, including legacy and low-cost servers**
- **On-the-fly addition of new systems to support incremental growth**

Technology Benefits of Enterprise Grid Computing

Enterprise Grid Computing enables companies to:

- **Dynamically provision** resources to meet business priorities and application requirements
- **Simplify** provisioning tasks
- **Consolidate** computing components
- **Standardize** configurations, processes, applications and components across an enterprise
- **Scale** as resources and workloads grow

Business Benefits of Enterprise Grid Computing

Enterprise Grid Computing enables companies to:

- **Better utilize IT infrastructure**
- **Reduce and contain hardware, software and staffing costs**
- **Increase agility to meet changing business demands**
- **Grow revenue by adding new services**
- **Improve quality of service through quicker response times**
- **Gain competitive advantages**

State of Enterprise Grid Computing Today

To be successful with grid today, enterprise customers must be resourceful. Success requires careful integration of:

- **Computers, networks, and storage**
- **Operating systems and resource management software**
- **Applications from a small (but growing) set of vendors**
- **Custom applications developed in-house**

The Six Areas of Concern

Enterprise users concerns about grid operation and management include:

1. Confusion about what grid is and how it works
2. Cross-vendor interoperability
3. CPU and applications usage billing and accounting
4. Security and user authentication
5. Standards
6. Global enterprise grids across international boundaries

1. Confusion about Enterprise Grid Computing

Issues:

- **No standard model for component interactions**
- **Solutions to individual problems lack an overall context**
- **Not clear how components and interactions create solutions**
- **Taxonomy and vocabulary not widely agreed to**

EGA Solution:

- **The EGA Reference Model establishes common terms and model so everyone can communicate clearly and consistently**
- **Available on EGA web site**

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2. Cross-vendor interoperability

Issues:

- **No standard provisioning interfaces exist which:**
  – Restricts development of cross-vendor solutions
  – Limits provisioning capabilities within and between data centers
  – Limits moving and copying files across and within storage subsystems

EGA Solutions Underway:

- **Drive standards to:**
  – Enable consistent access to data and storage regardless of the component type or resource provider
  – Enable creation of integrated, cross-vendor grid solutions
- **Standardize interfaces**
  – Minimize investment in tools and skills required to manage a grid infrastructure

3. Usage Billing and Accounting

Issues:

- Enterprise grids need standards for resource accounting, however:
    - There is no standard way to collect and report usage information
    - There is no agreement on usage metrics

EGA Solutions Underway:

- Enable pay-per-use metering and chargeback capabilities
- Standardize usage accounting for software and hardware
- Leverage existing utility framework

4. Security and User Authentication

Issues:

- Enterprise grid security is not well understood
- Market Perception - security issues make it difficult to safely deploy grid technology today

EGA Solution:

- Identify security requirements and recommend safe and reliable set of security best practices
- Now available on EGA web site

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5. Standards

Issues:
- **There is little momentum around a single vendor, technology or standards organization**
- **Efforts are often duplicated between groups, vendors and users which creates confusion**

EGA Solutions Underway:

- **Drive standards adoption**
- **Collaborate with standards-making bodies**
- **Promote the advancement of grid solutions**
- **Leverage work from a wide variety of organizations**
- **Develop and market open, secure, scalable grid solutions**

6. Global Enterprise Grids

Issues:
- **No one group addressing needs of enterprises operating globally and in specific regions**
- **Users need standardized implementations in data centers regardless of location**
- **Need to understand requirements of local governments**

EGA Solution:
- **EGA Regional Groups formed to:**
  - Create global parity in standards
  - Promote adoption and development on an international basis
  - Create reproducible configurations across multiple data centers lowering cost of operation and management

The Way Forward

Ready-to-deploy robust grid solutions based on open, industry-standard technology deliver immediate benefits:

- **Provides choice and flexibility**
- **Encourages solutions that interoperate across vendors products**
- **Enables solutions to be forward and backward compatible**
- **Ensures scalability**
- **Preserves investment in a grid infrastructure**
- **Helps bring innovative products to the market**

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Next Five Years of Enterprise Grid

Paradigm shift to cross-entity resources sharing

– Extending data stores, applications, and compute resources over a dedicated network or the open Internet

Seamless interoperation between enterprise grids

– Cooperative processing between data centers

– Interoperation between enterprise grids owned by separate entities

– Dynamic capacity addition to grow grids quickly

– Support for all enterprise applications

Service provider business models

– Allows users to purchase IT resources like any other utility

– Enabled by capacity-on-demand, dynamic capacity addition, and complete support for a wide range of enterprise applications