

Grids in the IT Data Center

OGF 21 - Seattle

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Setting the Context

- GFSG Discussions @ OGF 20
 - Tasked with pulling together a small group to draft an OGF 'position statement' on grids in the IT Data Center
- Team Included
 - Paul Strong, Bernd Kosch, Hans-Christian Hoppe, Chris Kantarjiev, Robert Fogel, Cheryl Doninger, Mark Linesch,
- This presentation reflects the output of that group

Presentation Contents

- Grids in the Data Center - Definition
 - Trends and Motivations
 - Characteristics
- Grids in the Data Center - Challenges
 - What are the problems organizations face in building this infrastructure
- OGF Activities
 - What activities are underway within the OGF to assist the community.

Trends and Motivations

Business Agility/Flexibility

- Current data centers, based on siloed infrastructure and monolithic applications are no longer sustainable

Infrastructure Cost Challenges

- Drive to increase utilization of data center resources, making the most efficient use of these resources to maximize ROI.
- Address the power, cooling and floor space issues

Trends and Motivations

Increased Workload Demands

- More Applications, More Data, Faster Results
- Many applications have outgrown a single (large) server environment, and a scale-out model is the only cost-effective option

Management Complexity

- While providing superior price/performance, scale-out architectures (100s to 1000s of servers) introduce severe complexity and manageability challenges

Shared Services Model

- Trend toward re-architecting an enterprise IT infrastructure away from a vertical, line-of-business orientation toward a horizontal, shared, service-oriented architecture.

Data Center Grid - Characteristics

- **Dynamic Infrastructure**
 - Multiple competing demands from different applications, lines of business and users require a flexible and ever changing data center infrastructure.
- **Multiple Application Types and Workloads**
 - Support multiple business unit applications, mixed application types, and user communities
- **IT Control**
 - Infrastructure is centrally managed and controlled by the CIO group
 - Corporate policy and Management Domains guide the processes and procedures around the management, utilization and security of the Grid.

Data Center Grid - Characteristics

- Managed by Business policies and Priorities
 - Combination of budgets and business value used to define how resources are applied to meet corporate business objectives.
- Ability to Scale
 - 10's, 100's and 1000's of resources,
 - Supporting multiple applications on shared infrastructure resources.
- Integrate and federate diverse, often very large scale data storage and database resources,
 - Provide swift access to static and streaming data, and employ techniques like data affinity scheduling or caching to minimize data access overheads.

Data Center Grid - Challenges

- Configuration Management
 - Enable application virtualization where an application service can be flexibly deployed onto resources as required by business demand.
 - Deployment and configuration of all types of resources, and the dependencies between resources in support of the applications.
 - Manage the infrastructure that is in a state of continual change
- Automated Resource and Application Management, Monitoring and Reporting
 - Enable the ability to respond to problems and provide real time and historical views of both resource usage and application performance against service levels.

Data Center Grid - Challenges

- Storage and Data Integration
 - Flexible compute and data environment to support application scalability on the distributed infrastructure.
- Scalability of Processes and Tools
 - Tools to manage a few statically configured/siloed application environments will not scale to meet the needs of 1000's of servers deployed in a shared infrastructure.
- Resource Allocation, Sharing, Service Level Management and Chargeback
 - Balance Competing Business priorities across multiple application types vs. Efficiency

Data Center Grid - Challenges



- Software Licensing models
 - Enable the dynamic scaling of business applications to meet unpredictable business demand or performance service levels.
- Psychological/Political issues
 - Overcoming the perceived need to own resources, increase willingness to share, define workable internal budget models for asset acquisition/chargeback.

OGF Activities

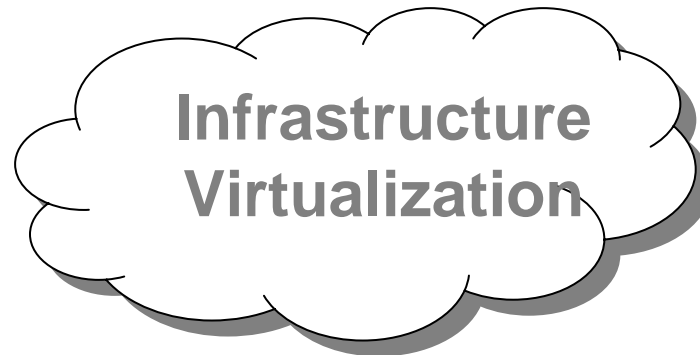
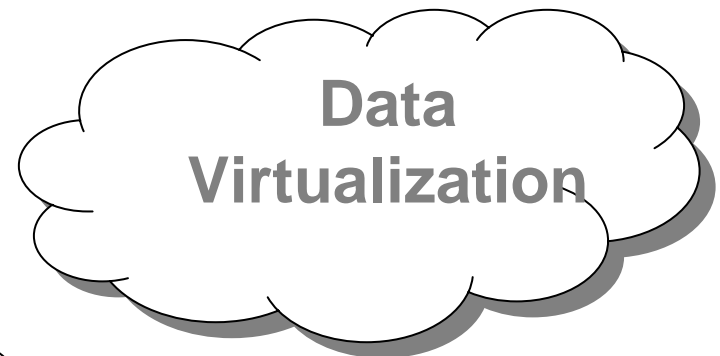
- Reference Model Working Group
- Grid and Virtualization Working Group
- Enterprise Area Activities

Conclusions - Break the static links

Match applications to available resources



Access data at any location, in any format



Pool, share and aggregated resources

Conclusions - Data Center Grid

- Enable sharing of infrastructure across application types (batch, services, transactional) based on policy, demand and load
- Enable an optimal use of a minimum set of infrastructure resources
- Provide a holistic view of the environment (infrastructure and applications) enabling economies of scale in management and integration of management tool stack
- Build on similar experiences from Grid in Technical computing.