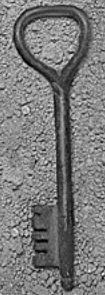
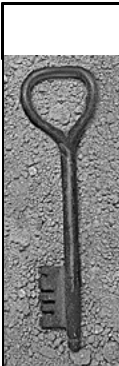
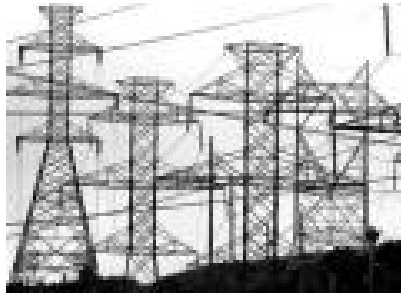
	<h2>Grid Computing in E-Commerce</h2>
	<p>Ali Naseer – May 3rd, 2004</p>

	<h2>Grid Computing in E-Commerce</h2> <ul style="list-style-type: none">◆ What is Grid Computing?◆ How does it work?◆ What are the applications of GC, where it stands now, and how far it will go?



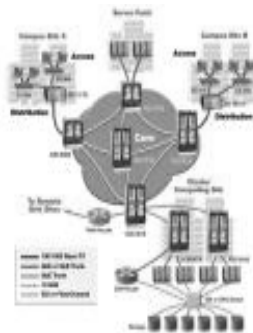
Grid Computing in E-Commerce



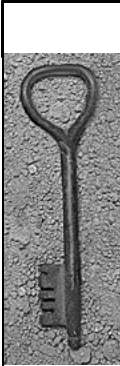
- ◆ Analogy
- ◆ Marshalling Resources
- ◆ City A – City B
- ◆ GC will revolutionize back end programming
- ◆ Inexpensive yet capable model



Definition



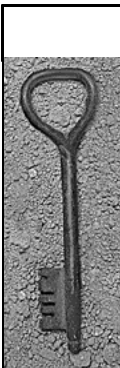
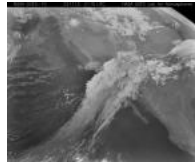
- ◆ Grids are an approach for building dynamically constructed problem solving environments using distributed and federated, high performance computing and data handling infrastructure that manages geographically and organizationally dispersed resources.



Examples



- ◆ NASA
- ◆ IPG-Information Power Grid.
- ◆ Next Generation Space Shuttle.
- ◆ Provide scientists/Engineers capabilities via facilitating routine construction of info based problem solving environments.

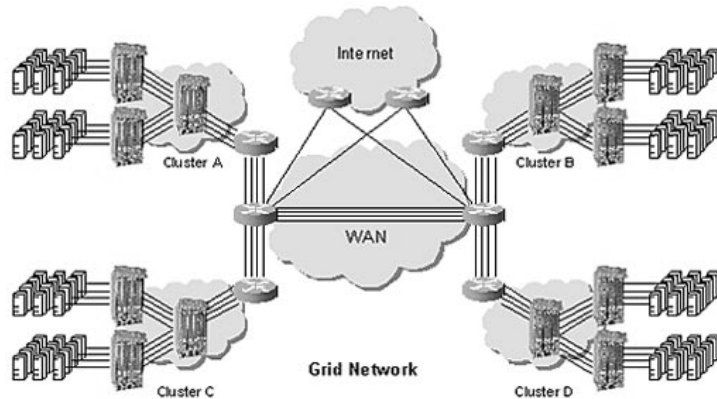


IPG

- ◆ The idea is that the IPG will help with a multitude of tasks, by facilitating in coupled, multidisciplinary simulations which are too much for a single computer to handle.

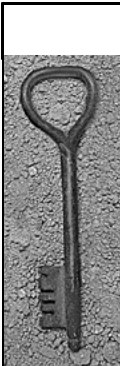


Grid Layout



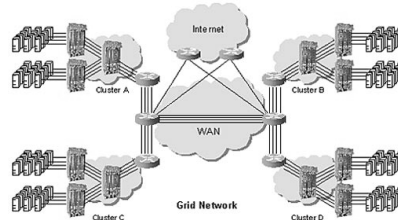
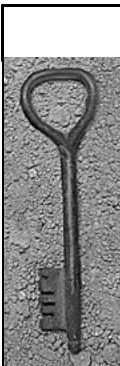
For E-commerce GC will:

- ◆ Allow aggregating all IT resources into an enterprise wide Virtual Resource Pool.
- ◆ Resources provisioned dynamically.
- ◆ Maximize utility.
- ◆ Quality of Service.

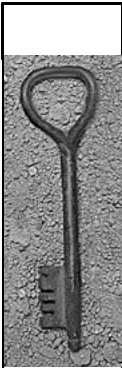


How GC works?

- ◆ Daisy Chaining-PC's, Servers, Workstations.
- ◆ Distance/Location not a factor.
- ◆ Power of Networks/Storage/Computing Resources doubles every 9, 12, 18 months.
- ◆ Storage capacity increases, supercedes microprocessor speeds.
- ◆ Petabytes of data.

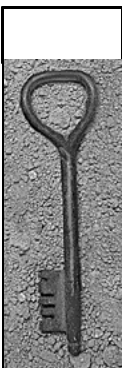


- ◆ The combined power of all the clusters provide for incredible amounts of computing power. E-commerce businesses that need faster input to help facilitate a sale will be easily able to exploit the Grid and PC's that are just sitting idle. If for example demographic or sales data is instantly needed for a sale Grid computing can put many PC's in charge of gathering information and providing it to the business or customer.



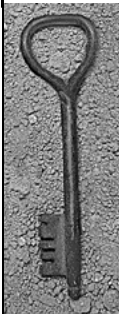
Investment Bankers

- ◆ A great benefit of Grid Computing would be investment bankers who require running huge computations on currency and commodity.



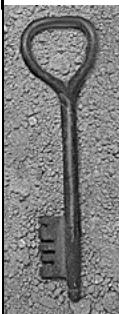
Benefits

- ◆ Grid computing will allow for sharing of software licenses, as well as allow any business to prioritize crucial tasks ahead of other ones.
- ◆ This obviously has some drawbacks. It is not known how software companies will look at sharing licenses. Also, prioritizing tasks might generate friction among different departments or organizations.



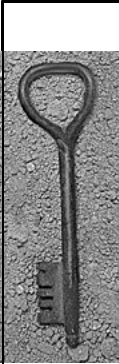
Virtual Organization

- ◆ Grid Computing allows the formation of a Virtual Organization and the members are the ones utilizing the services of the Grid.
- ◆ The full and complete realization of the Grid's potential requires that we tweak the architecture that supports the Grid. A simple client-server model is not flexible enough for creating the Virtual Organization.
- ◆ A spectrum of Architectures, ranging from client-server to general peer to peer are necessary as participants are alternately resource providers or consumers.

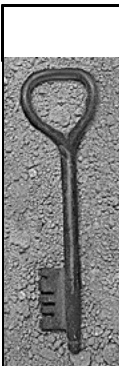
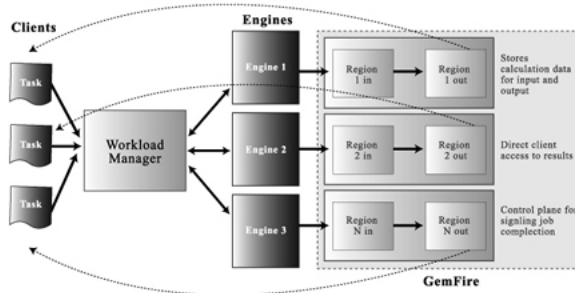


Handling the VO for E-commerce

- ◆ Another issue is that current 'distributed system technologies' are not capable of handling a Virtual Organization. This is because the technologies are too rigid or inflexible or they do not support the wide variety of resources and services that are necessary for sharing. To overcome this problem a new technology needs to be defined or a "Grid Software Infrastructure"



How GemFire Complements Compute Grid



Technical benefits of GemFire include:

Data locality - removes latency; replicates data to idle CPUs; minimizes network utilization

On-demand data provisioning - dynamic provisioning of caching services on any Grid node to accommodate load-balancing requests and to enable intelligent scheduling of work jobs to specific data sets

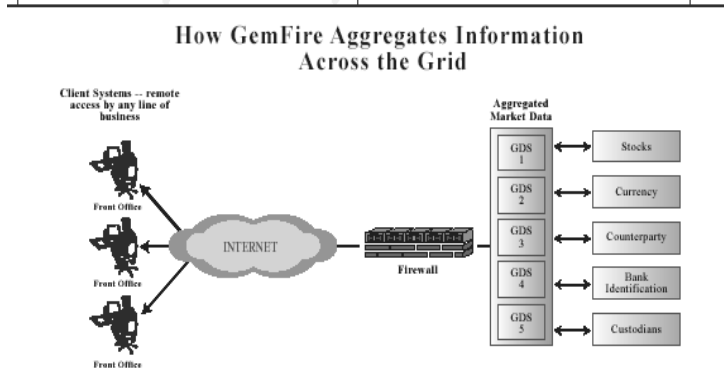
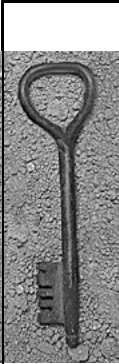
Data virtualization - single system image access to data via logical namespace; aggregate view of data

Consistency management - automatic synchronization according to user-defined policies

Scale-out - increased operational access to large volumes of data offloads long running, expensive analysis tasks

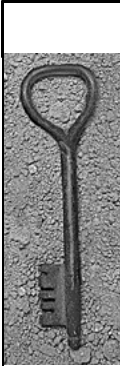
Notification - complex event processing framework enables signaling between workflow activities

High Availability - RAID-like mirroring at the object level avoiding the need for costly data reconfiguration during hardware servicing



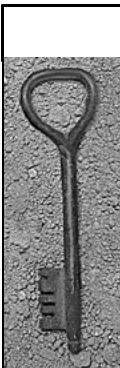
Areas in E-commerce

- ◆ Although Grid Computing was initially a baby of the research field, mostly used for powerful simulations and solving complex problems; now it can lend the same power to e-commerce.
- ◆ It is speeding up the slow parallel applications.
- ◆ Grid Computing is helping out in diverse areas such as Risk Management, options pricing, and trading, etc.
- ◆ Brokerages and investment banks, as well as trading floors are utilizing the unused and idle CPU cycles from the nodes that are in the Grid they utilize, to aggregate/pool computing capacity to speed up business operations.



GC as a business

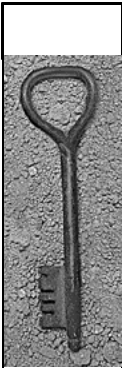
- ◆ The use of Grids has itself become a business.
- ◆ Sharing and managing resources is a complex task and requires an economic model.
- ◆ New and competitive economic models provide the steps and rules/tools for the sharing and allocation of resources.
- ◆ One of the models for example is barter-based-model, where resources are shared and traded by exchanging. The medium of exchange could be storage space vs. CPU time.



Price based model

- ◆ Another model is the price-based model in which the resources are priced.
- ◆ This is done by various factors which involve the “demand, supply, value, and the wealth of economic systems”



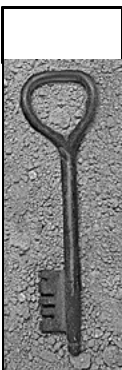


The providers of the service need “price generation schemes” which will help in utilizing the system better, but also to make the service more competitive.

Coordination mechanisms are needed so that the market price equilibrium is obtained and no illegal price manipulation is done.


Currently, Grid related work where scheduling of problems and resource management are done, is decided by a scheduling component. This scheduling component decides based on certain cost functions which jobs can be executed and at which site.

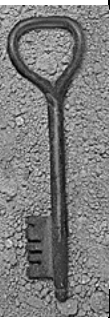
Most systems right now treat cost the same even though different resources might have cost a different amount.



Examples of Economic Models

- ◆ Commodity Market Model
- ◆ Posted Price Models
- ◆ Bargaining Model
- ◆ Tendering/Contract-Net Model
- ◆ Auction Model
- ◆ Bid-Based Proportional Resource Sharing Model
- ◆ Community/Coalition/Bartering Model
- ◆ Monopoly/Oligopoly

	<p>In the Grid Marketplace the two types of players (resource provider and consumer) can use any one of the models, or a combination thereof to obtain the best possible ROI.</p>

	<h2 style="text-align: center;">Conclusion</h2>
	<ul style="list-style-type: none">◆ Grid Computing has moved forward from just being a territory of the science and research community to being a tool for everyone.◆ E-commerce has been strengthened by the possibilities of Grid Computing. This potential will only grow over time.◆ Companies can now relate to customers online. They can facilitate excellent e-commerce sales by providing data and information at higher speeds and greater potential. This is not possible with static systems or with one computer utilizing its own resource to do the whole job.