

Enterprise Grid Alliance

*Accelerating the Deployment of
Grids in Enterprise Data Centers*

GGF15 - Capturing Enterprise Grid Requirements Through Use Cases

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Chair, EGA TSC & Ref Model WG

Enterprise Grid Computing

- Different priorities to traditional Grid community
 - All about guarantees and not just best efforts
 - Mission critical applications
- Commercial and technical workload, inc. **ALL** of
 - Traditional mixed workload, transactional (OLTP) and batch
 - Data warehousing
 - Web services and service oriented architectures
 - Compute and I/O intensive
- Key benefits - economies of scale
 - Better performance, scaling, throughput and resilience
 - Greater efficiency and agility
- Inhibitors To Adoption
 - Grid is poorly understood
 - MUST NOT break today's processes

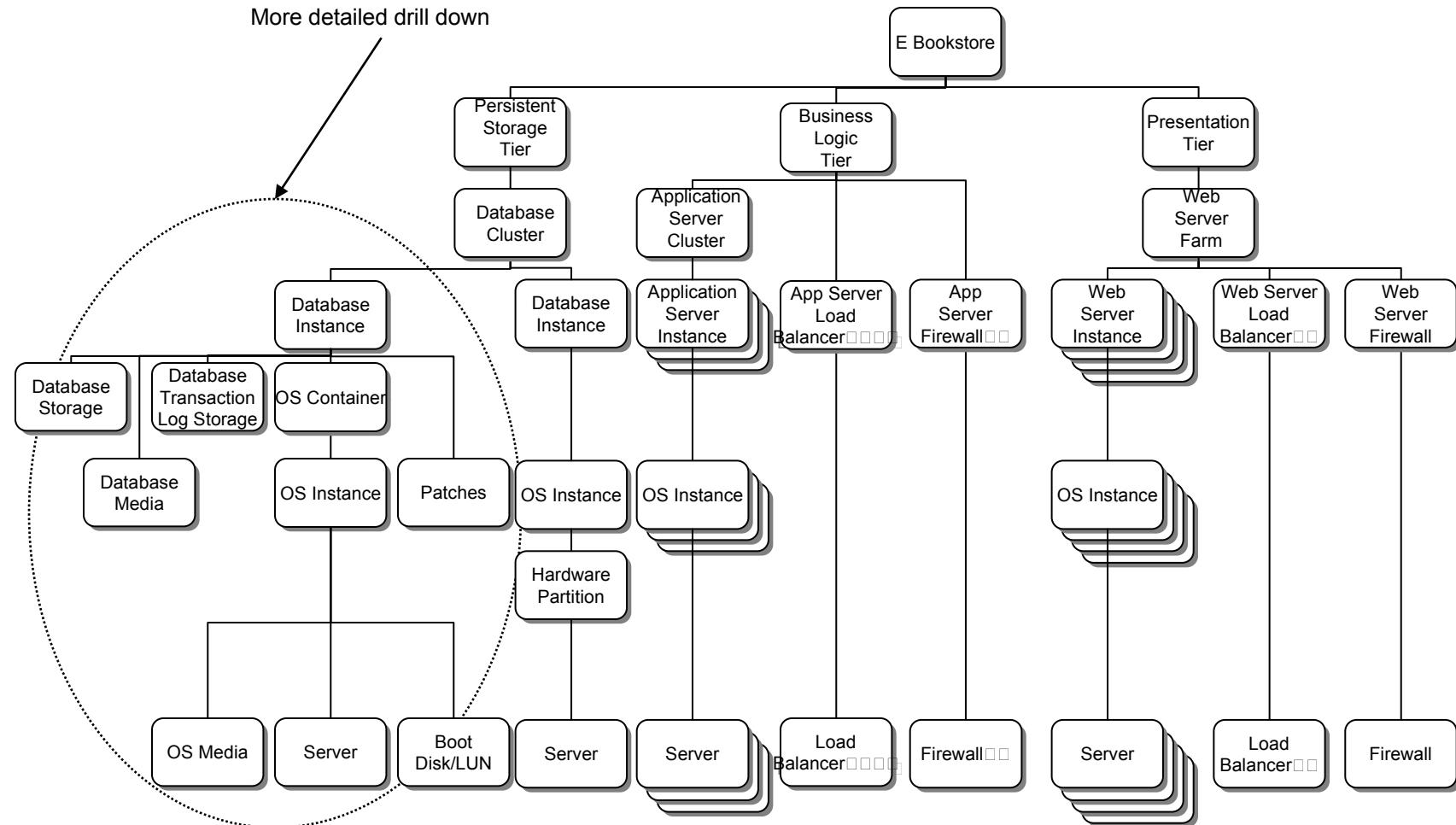
Enterprise Grid Alliance Working Groups

- Reference Model
 - Common lexicon/taxonomy/model
 - Use cases
- Component Provisioning
 - Requirements for provisioning (including use cases)
 - Initially focused on servers
- Data Provisioning
 - Provisioning and management of data
- Security
 - Requirements exclusive to grids
- Utility Accounting
 - Requirements for enabling utility billing and pricing

EGA Reference Model: Glossary

- An *enterprise Grid* is a collection of interconnected (networked) *Grid components* under the control of a *Grid Management Entity* (GME)
- Grid component - A super class of object including everything that is managed in an enterprise Grid
 - Physical: servers, disks, switches, etc.
 - Logical: services, applications, operating systems, load balancing software, tiers of services, etc.
- Grid management entity - the logical aggregation that managed the enterprise Grid
 - People
 - Process
 - Technology

EGA Reference Model: *Representing Services As Graphs*

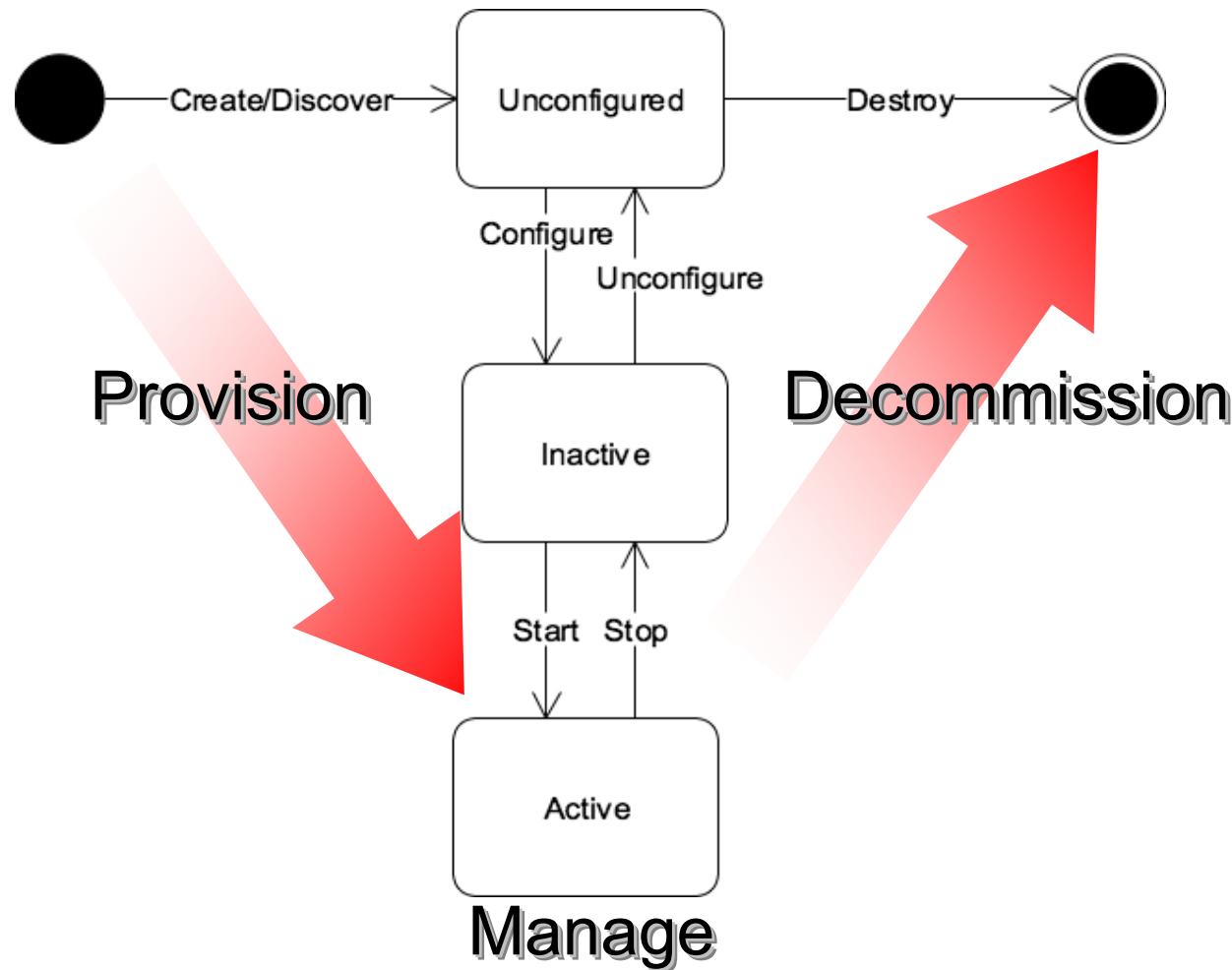


EGA Reference Model:

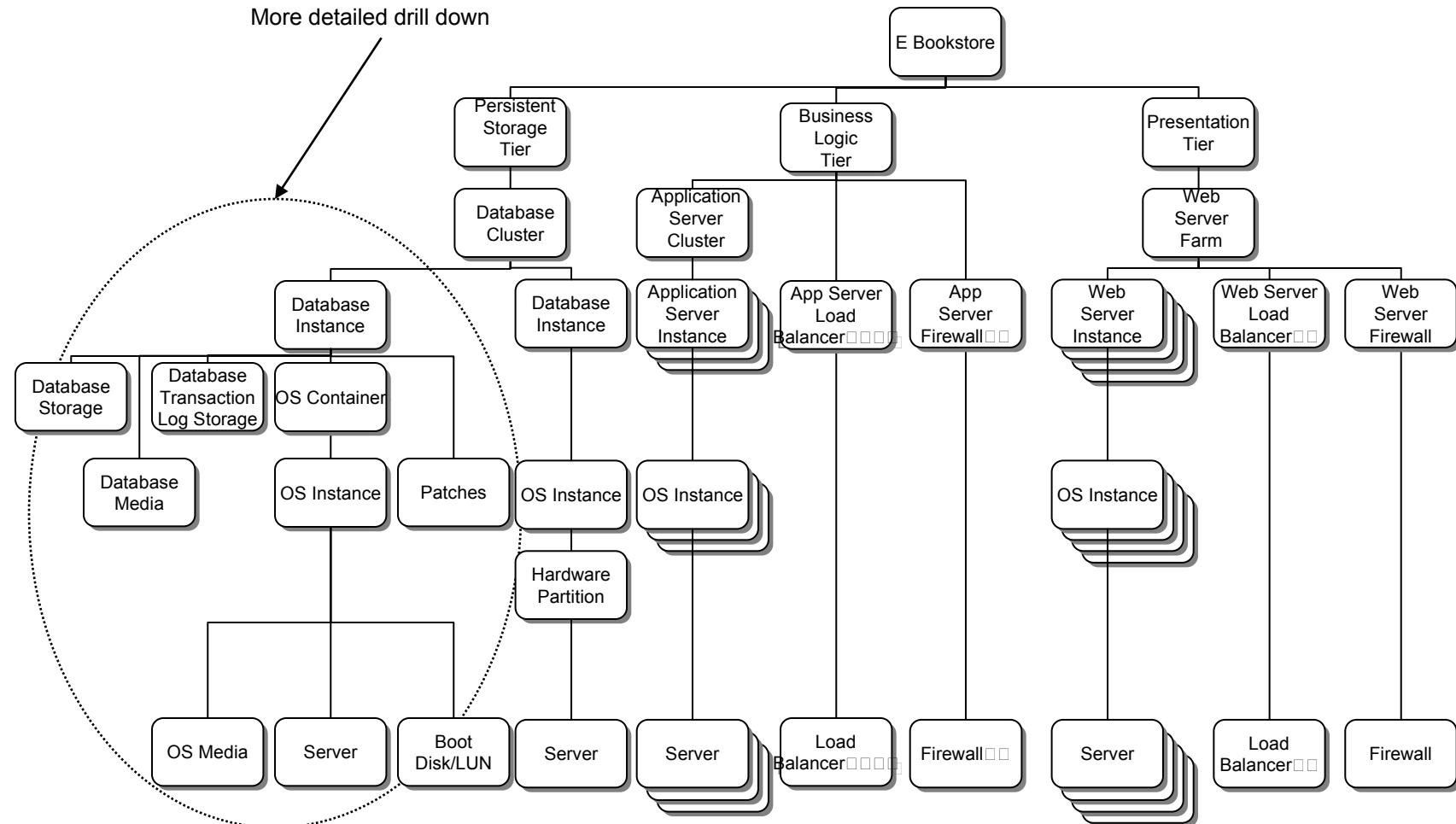
Classifying Grid Components

Biz Process/-Service	E-Bookstore	ERP Service	Online Bank	
Virtualized Platform	Aggregations	Web Server Farm	Federation	Clusters Load Balanced Farms
Platform Instance	Database	LDAP	Web Server	Application Server
Virtualized OE	Network File systems - NFS, CIFS	Virtualized OS eg N1 Grid Containers, BSD Jails etc.		Load Balancers, Global IP in clusters
OE	File Systems	OS - eg AIX, HP/UX, Linux, Solaris, Windows etc.		IP, TCP, UDP etc
Virtualized Physical	LUNs, Volumes	VMMs & Hypervisors Hardware Partitions		VLANs
Physical	Disks, Array Controllers, SAN Switches	Servers, Blades etc.		Switches, Routers etc..
	Storage	Compute		Network

EGA Reference Model: *Grid Component Life Cycle*



EGA Reference Model: *Representing Services As Graphs*



Scenarios & Use Cases

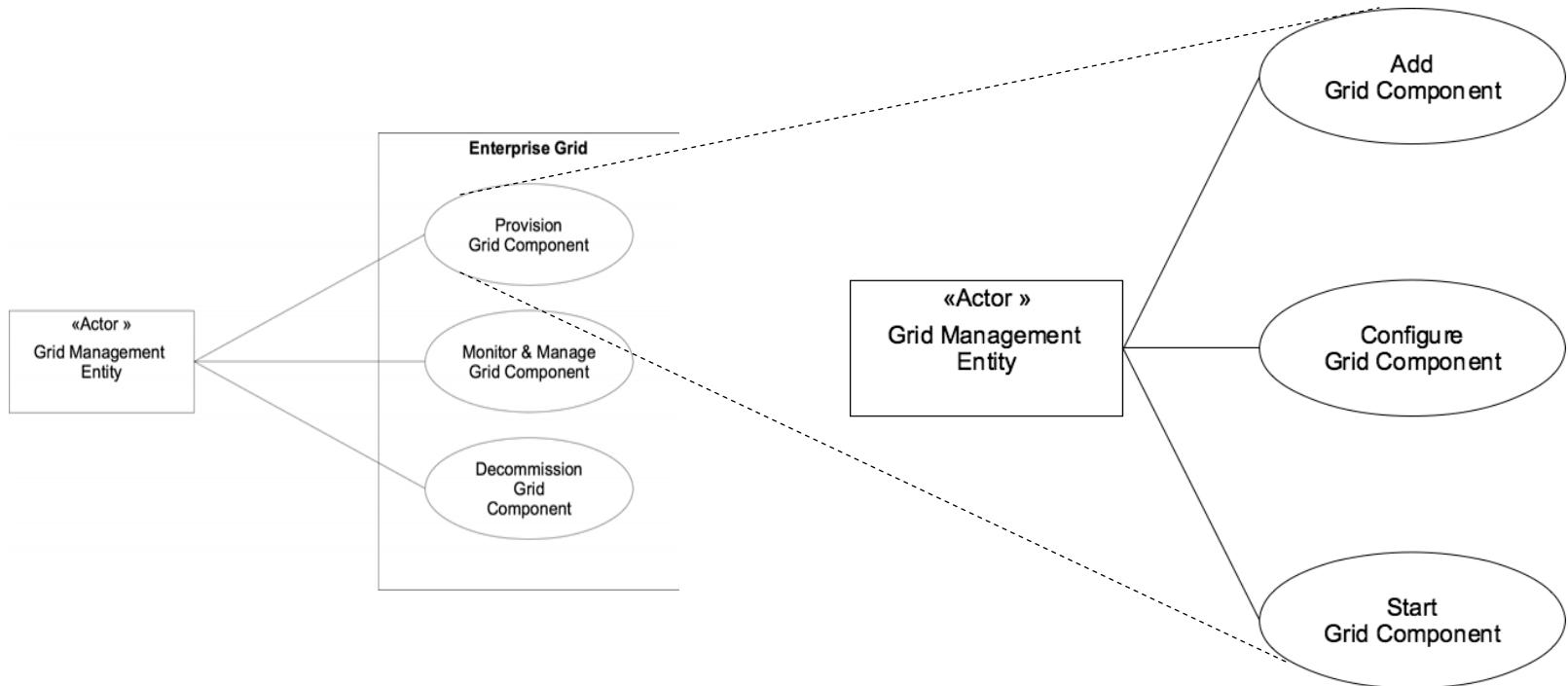
- Scenario
 - The storyboard, e.g. line of biz VP walks into IT VP's office and says "I need this new service deployed"
- Use Case
 - Enumerated set of steps required to realize the scenario
 - Sequence diagrams (UML)
 - Detailed
 - Leverage EGA reference model
 - Describes today's process (NOT the desired state) so as to identify major pain points and their context
 - Goal
 - *Automate process by replacing actors with software/services*
 - *Identifies appropriate services and their functionality*



Use Cases

- Key Enterprise Grid Technology Areas
 - Virtualization
 - Abstraction
 - Automation
- Automation
 - Moving Process From Human To Machine Domain
- Enterprises Are Built On Process
 - ITIL, eTOM, COBIT, Ad Hoc
- Use Cases
 - Proven mechanism to aid problem decomposition
 - Allow us to enumerate and capture problem and context, including process
 - Leverage Reference Model - map processes to model

EGA Reference Model: Use Case - *Managing Grid Component Life Cycle*



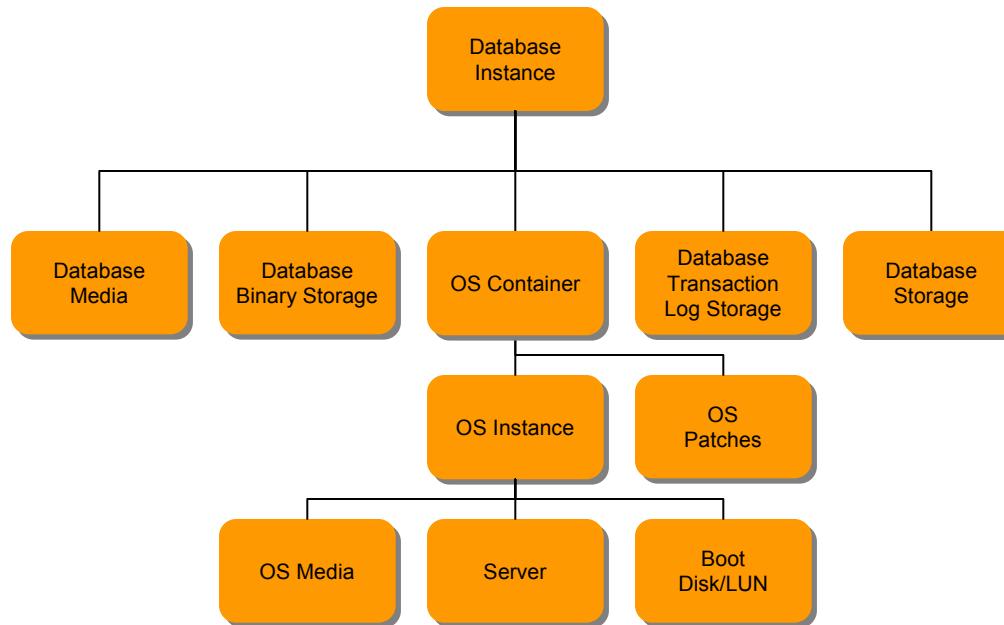
Use Case Format

- Title
- Summary
- Dependencies
- Actors
- Stakeholders
- Pre-Conditions
- Initiation Of Use Case
- Flows
 - Basic, Alternate, Exceptional
- Success Criteria
- Post Conditions



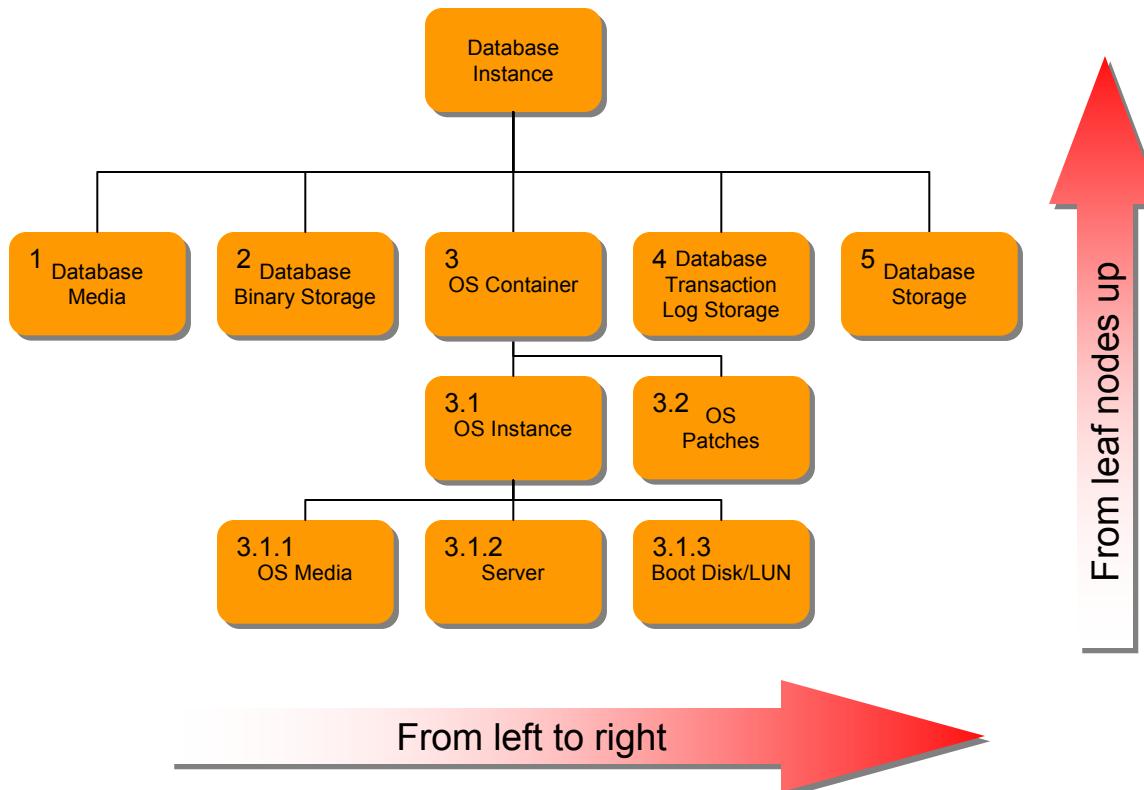
Provisioning By Walking The DAG

ApplyVerb {ProvisionGridComponent}



Provisioning By Walking The DAG

ApplyVerb {ProvisionGridComponent}

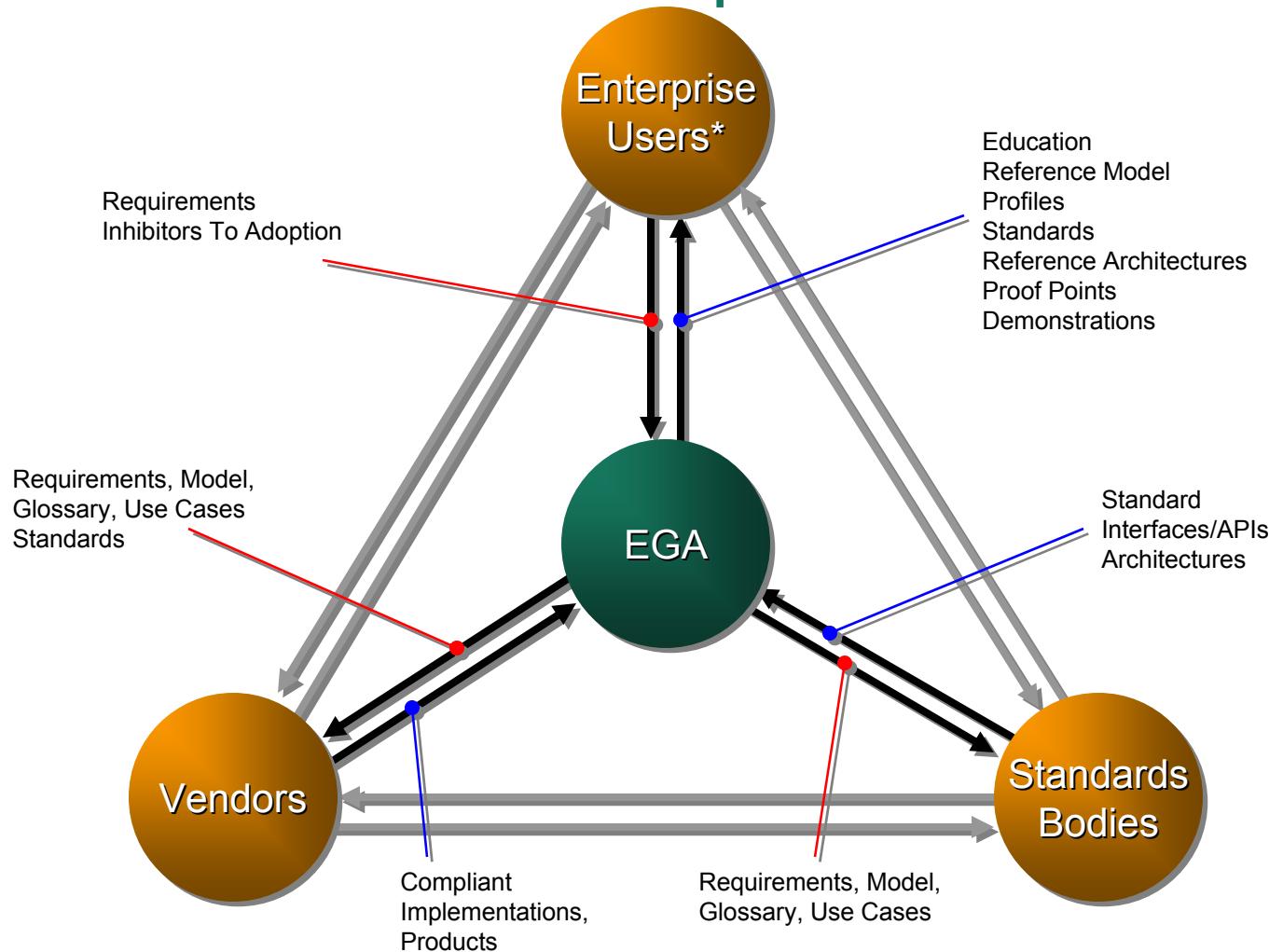


EGA Use Case Delivery

- Pragmatic
 - Driven by high priority data center problems
 - Context for other EGA working groups
 - Basis for collaboration with other bodies, e.g. GGF, DMTF, SNIA
- v1.0 - Released May 2005
 - EGA Reference Model
 - Template use case
- v Next - Release Oct/Nov 2005
 - Focus on provisioning
 - Bottom up
 - 70+ detailed use cases
 - Validation via User Forums/Group
- v Next++
 - Service Level Management use cases
 - Top down



EGA Role as Requirements Definer



***Enterprise users**
• Commercial end users
• Public sector end users
• Systems integrators
• Solutions providers



For More Information

General Information:

www.gridalliance.org

help@gridalliance.org

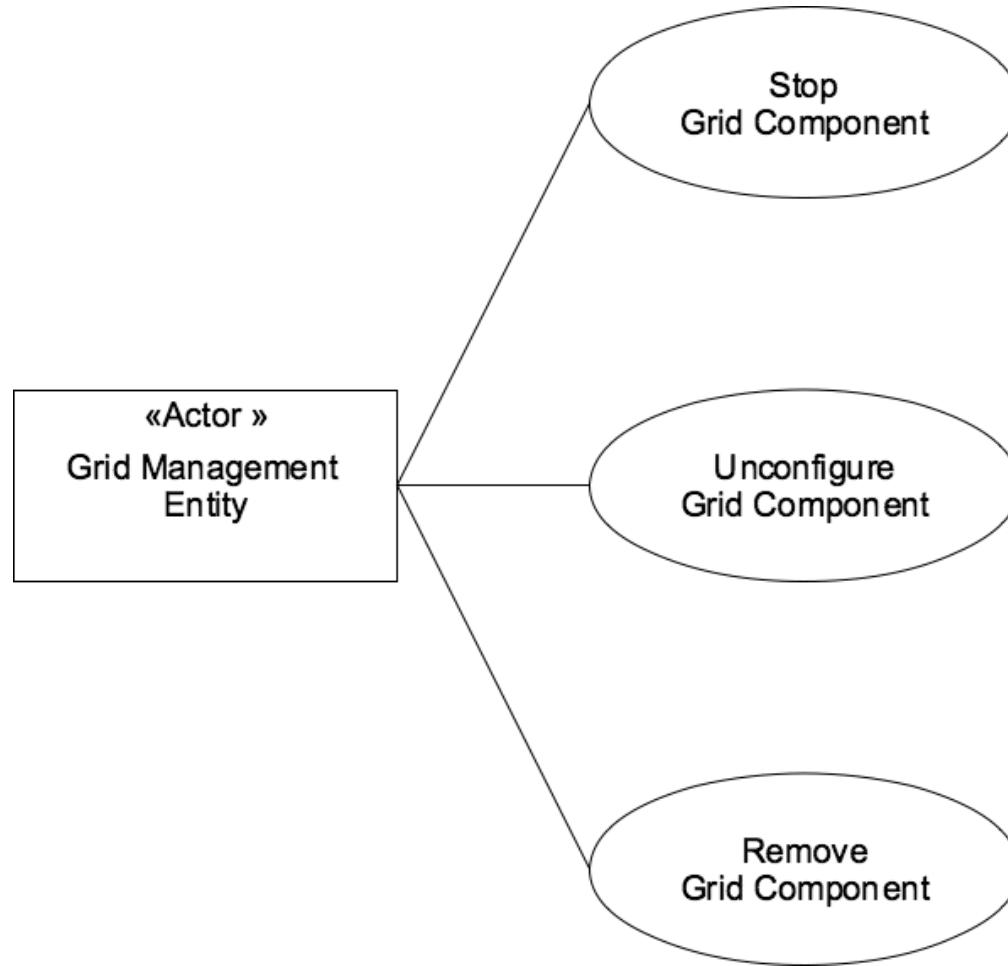
Sign Up to Stay Informed. Join the EGA Interest List:

www.gridalliance.org/interest/

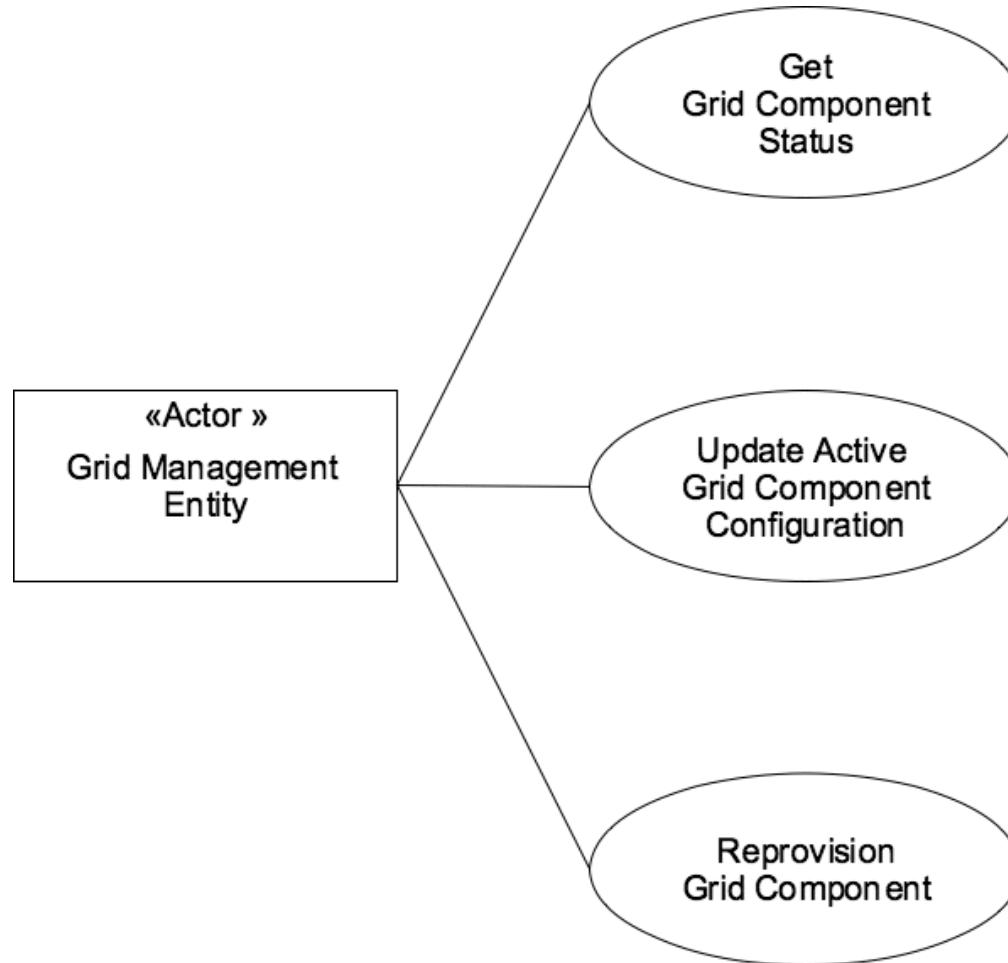




Decommission Grid Component Use Case



Monitor & Manage Grid Component Use Case



Grid Computing Landscape

- Network scale computing leverages
 - Trend toward network distributed services
 - Network bandwidth
- Potentially unbounded
 - Performance + scaling + throughput
 - Inherent resilience
- Widespread adoption, but still largely perceived as...
 - Academic and scientific workload
 - Compute intensive
- Growing ecosystem
 - Product and service providers
 - Standards setting organizations



Barriers to Enterprise Grid Adoption

- Reluctance to risk mission critical applications
- Confusion
 - What is Grid?
 - How to apply grid in commercial data centers?
- Immaturity
 - Incomplete models
 - Lack of stable standards
 - Shortage of case studies and proven roadmaps
 - Unproven interoperability between vendor products
- Additional inhibitors
 - Cultural attitudes toward exclusive ownership of IT assets
 - Trust and accounting model issues
 - Licensing and resource sharing concerns



Enterprise Grid Alliance

- Vendor neutral consortium
 - 30+ leading vendors and end-users
- Global participation
 - HQ in US, regional steering committees in Japan and EMEA
- Clear mission
 - Accelerating the deployment of Grids in enterprise data centers
 - Single focus: enterprise data centers
- Not a traditional standards body
 - Achieve results through collaboration
 - Create standards as a last resort
- Pay-to-play level playing field
 - Open to ALL stakeholders
 - One organization one vote



EGA Membership Growth – 32

(60 percent growth since April 2004 launch)

Board Members	EMC ² where information lives	FUJITSU COMPUTERS SIEMENS	hp invent	intel.
Sponsor Members	Ascential™			
Contributor Members	AMD	APC [®] Legendary Reliability™	Cassatt	ENIGMATEC CORPORATION
Associate Members	the 451 group	AVARSYS INCORPORATED	Cisco SYSTEMS	CITRIX [®]
	DELL™	INFORMATICA [®]	MCNC Grid Computing & Networking Services	Data Synapse
	Qlusters	TOPSPIN [®]	UBS	Micron [®]
			Univa	Paremus
			UNISYS	Voltaire



Enterprise Grid Alliance Reference Model

- Fills an obvious gap
 - complementary to the existing body of work
- Technology agnostic
 - Makes no assumptions about implementation
 - Avoids need to re-write/re-factor as technologies evolve
- Vendor neutral
 - 20 participants from 14 EGA member organizations
- Catalyst
 - Reflection of the current understanding of Grid stakeholders
 - Basis for collaboration with other industry bodies to ensure emerging standards meet enterprise requirements
- Evolution
 - Validate the model
 - Solicit feedback From GGF, DMTF, SNIA, vendors, SI's and end users



EGA Technical Program

- Simple strategy
 - Educate
 - Capture requirements
 - Drive interoperability
 - Drive adoption
- Pragmatic approach
 - Non-traditional; delivery through collaboration
 - Consensus driven application of domain expertise
 - Focus on short to medium term deliverables
 - Phased approach to solutions
 - Start simple - single data center with enterprise applications
 - Extend - include multiple data centers and technical applications
 - Unify and complete - bring together to reflect Grid as a utility
 - Individually chartered working groups to address specific areas
 - Reference Model, Component Provisioning, Data Provisioning, Security And Utility Accounting

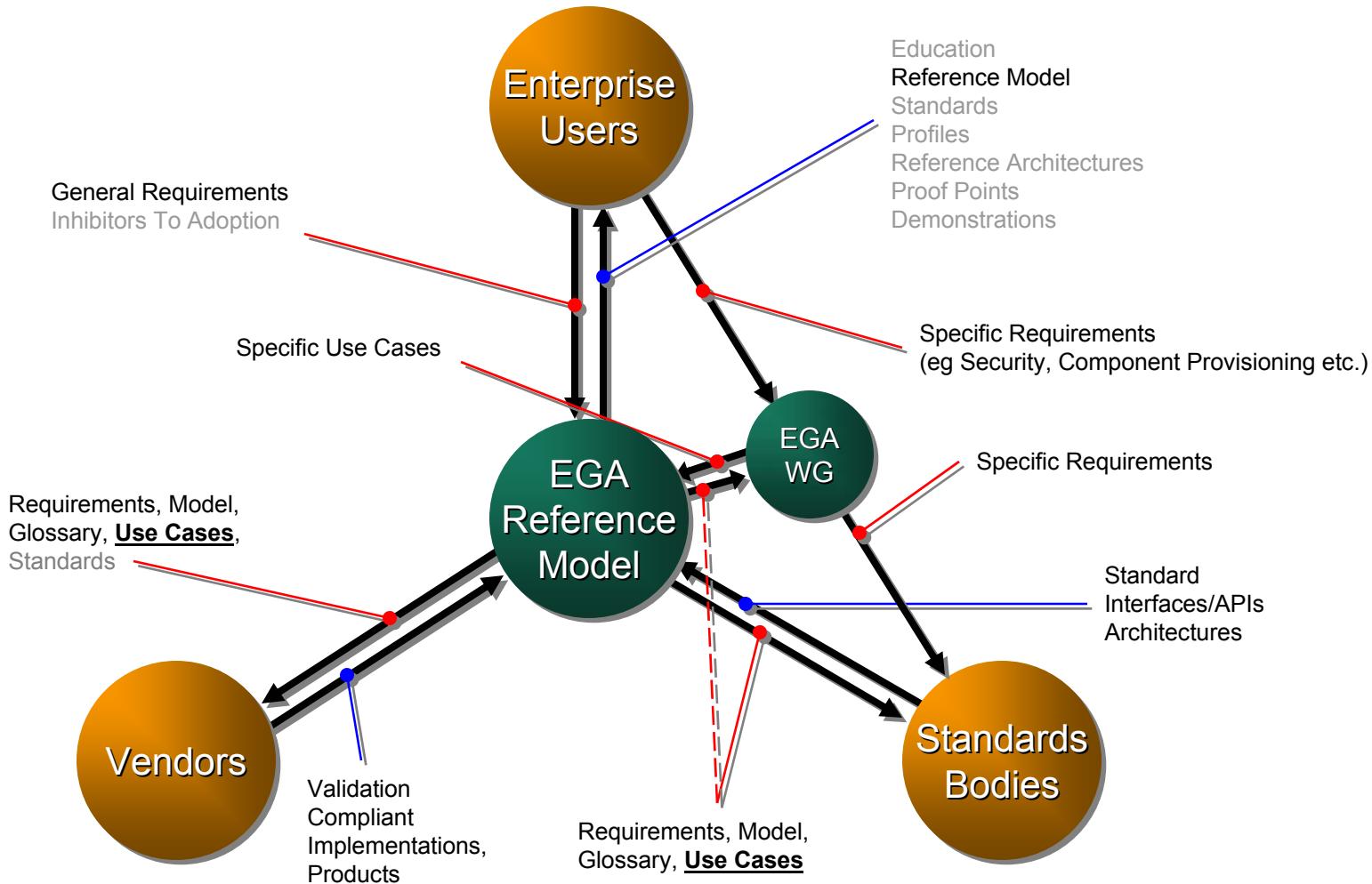
EGA Reference Model

- Glossary
 - Defines a framework for classifying Grid resources/services together with their relationships and dependencies in a conceptual component architectural setting
- Model
 - Context for requirements, solutions and comparisons
 - Vendor neutral
 - Technology/implementation agnostic
 - Describes existing data centers
 - Does not assume a particular technology roadmap
- Use cases
 - Set of commercial enterprise community-centric use cases
 - Consistent and relevant requirements for partner SDOs and all other enterprise Grid stakeholders

EGA Reference Model

- Specific
 - Enterprise data center grids
- Sharp focus
 - Provide shared context or framework for describing enterprise Grid customer requirements, technical problems and technical solutions inside and outside EGA
- Simple
 - Small set of simple objects, relationships and verbs describe highly complex data centers, their constituent parts and their life cycles
- Complementary
 - Addressing a gap

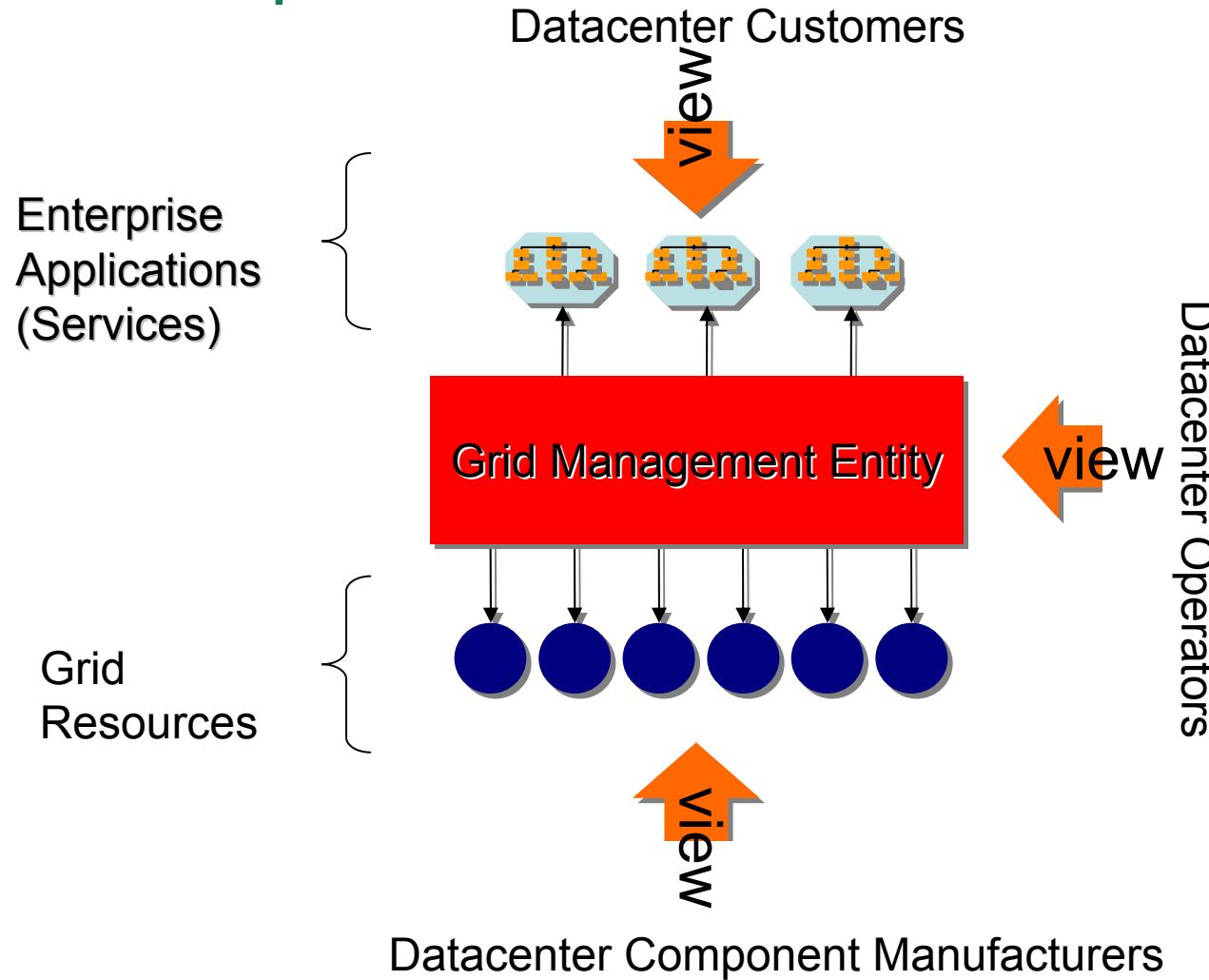
Role of EGA Reference Model



Enterprise Grid - Definition

- An Enterprise Grid is a collection of interconnected (networked) Grid Components under the control of a Grid Management Entity.
- An Enterprise Grid is typically differentiated from traditional data centers by management practices and technology which
 - Make management service or application centric rather than component centric
 - Enable the pooling and sharing of networked resources
- Initial scope for EGA working groups
 - Within a single data center
 - Under the control of a single entity
 - Commercial workloads

An Enterprise Grid



The Grid Component

- Grid Component
 - Is a super class of object covering every managed thing in the data center
 - *Resources - e.g. servers, switches, disks, arrays, routers*
 - *Applications and Services - databases, ERP services, CRM etc.*
 - *Everything in between, e.g Meta-Resources such as*
 - Virtual Machines
 - Hardware Partitions
 - OS Partitions, such as BSD Jails etc.
 - Clusters
 - Is recursive
 - *A component such as an ERP service is clearly comprised of other components such as databases, application servers etc.*
 - *These are in turn realized through binding to other components, i.e. more traditional resources such as servers and operating systems etc.*
 - Has a life cycle
 - *It is Created, Discovered, Provisioned, Managed, De-Commissioned, Destroyed*

Service vs Resource

- Whether a grid component is a service or a resource is really a matter of perspective
- The EGA ref model chooses not to make a distinction - they are all managed objects

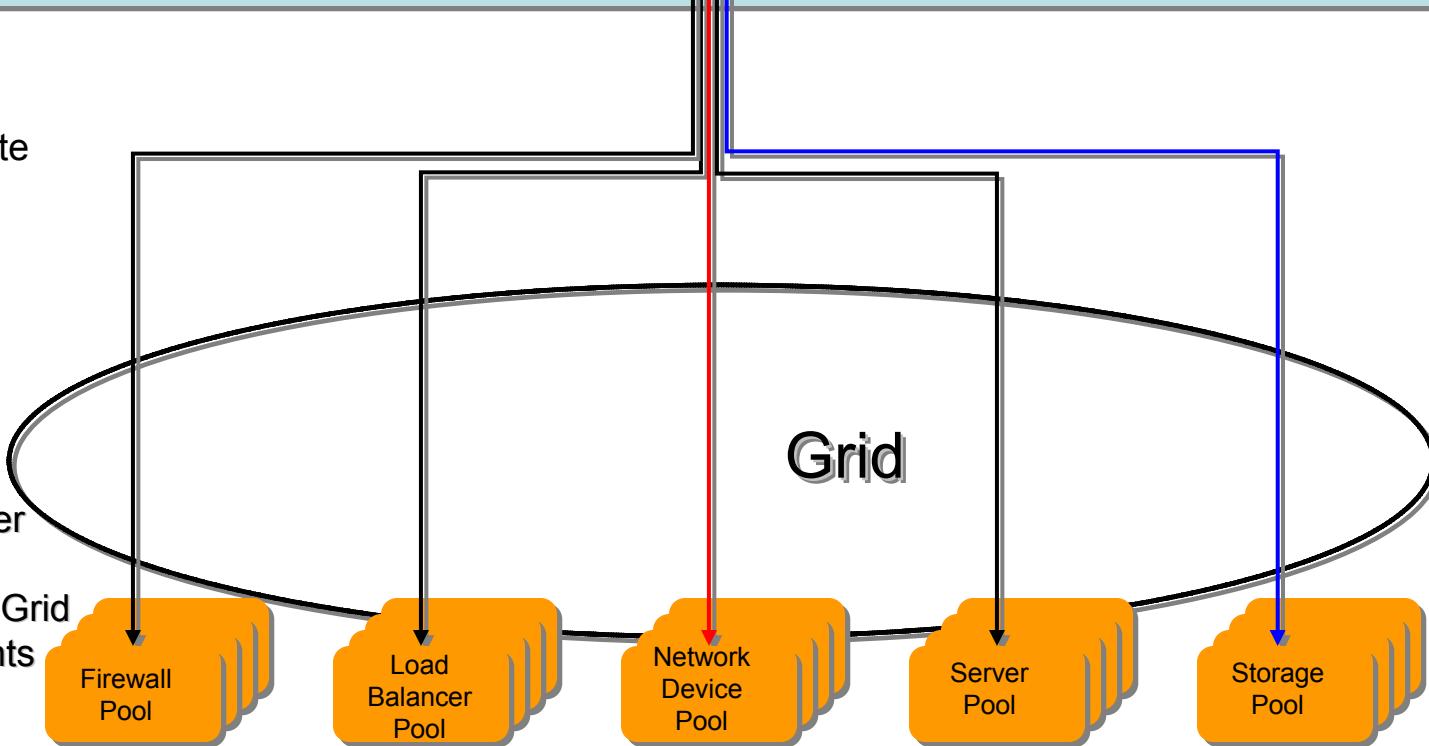
Mapping Business Services To Grid Components

Abstract Application Definition

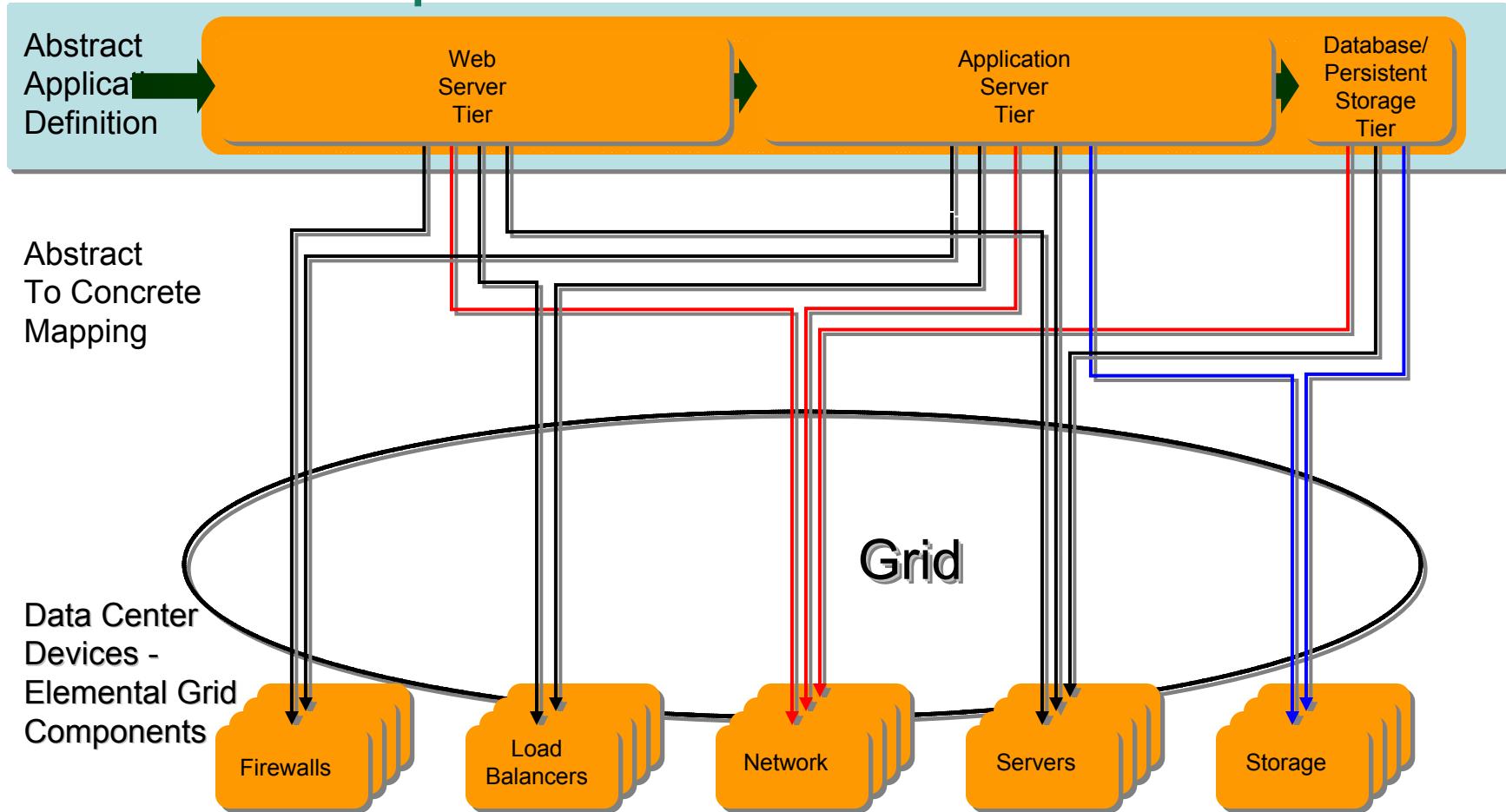
Business Service
(for example eBanking app or Bookstore etc.)

Abstract To Concrete Mapping

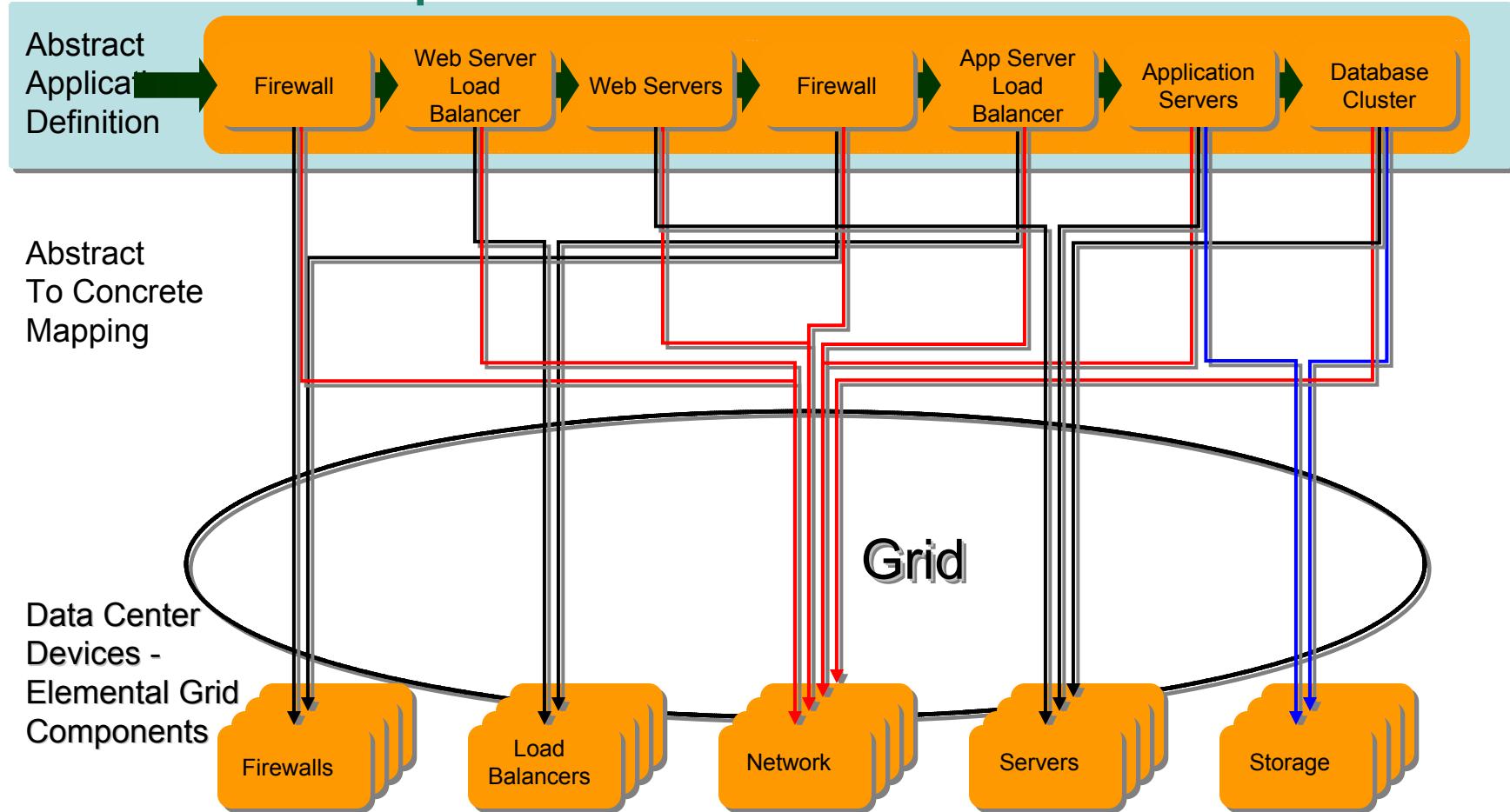
Data Center Devices - Elemental Grid Components



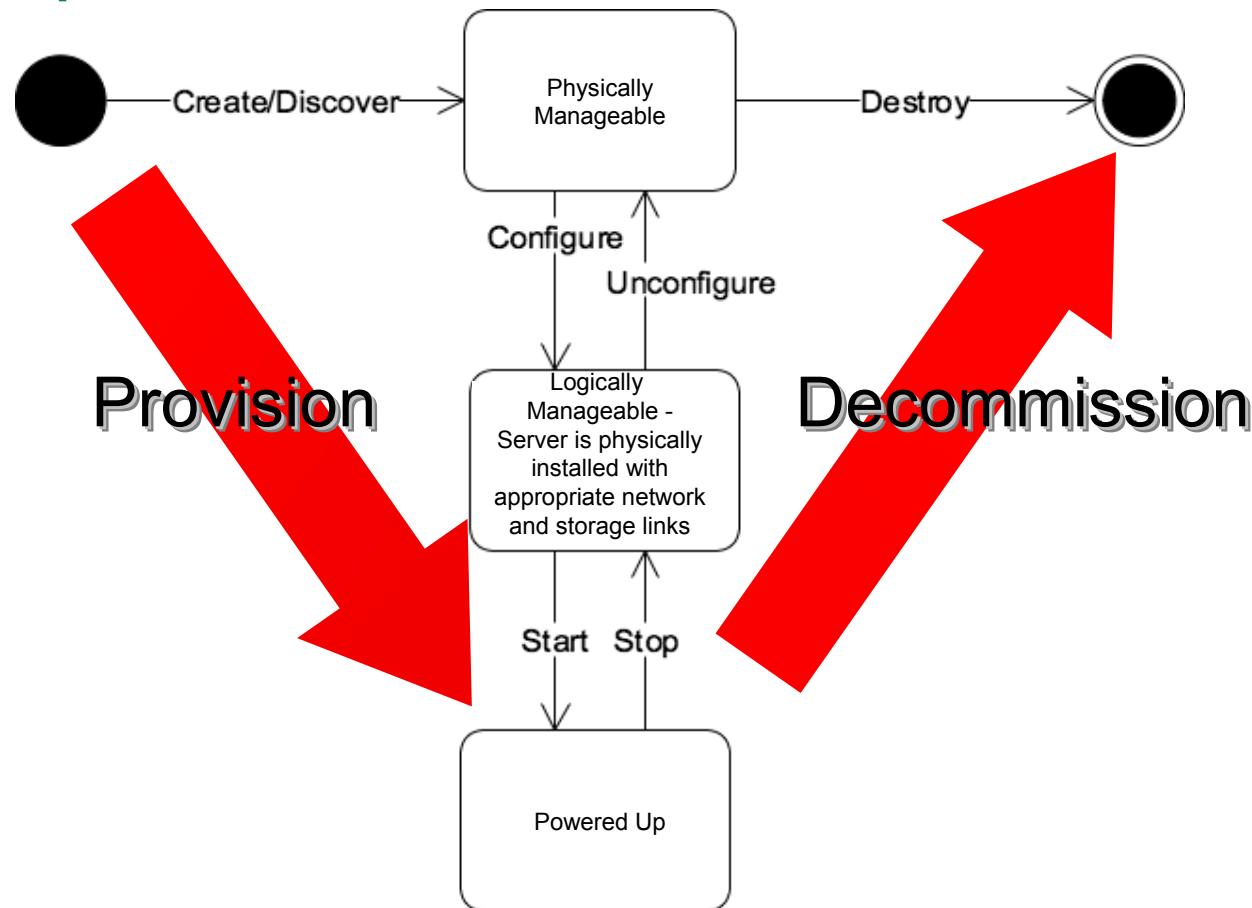
Mapping Business Services To Grid Components



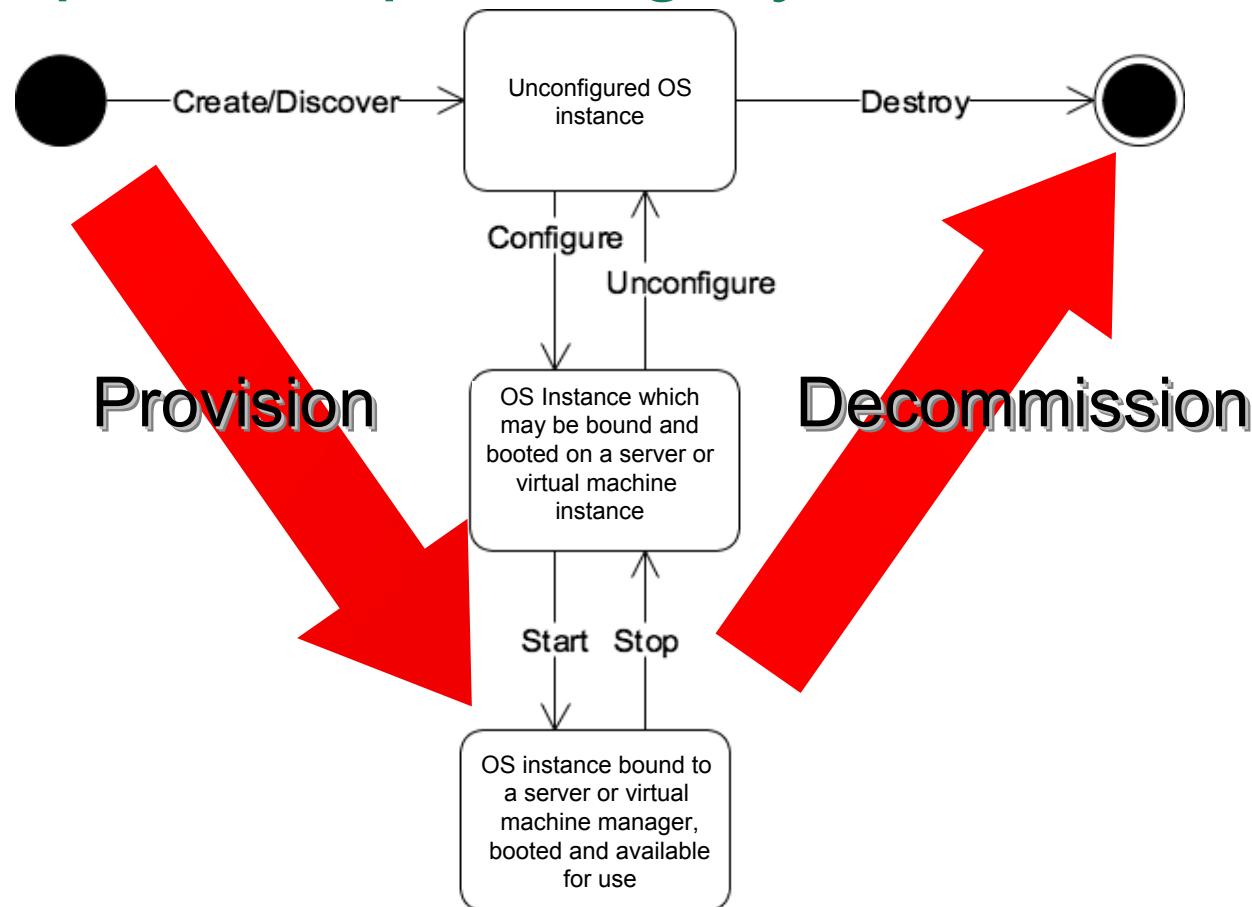
Mapping Business Services To Grid Components



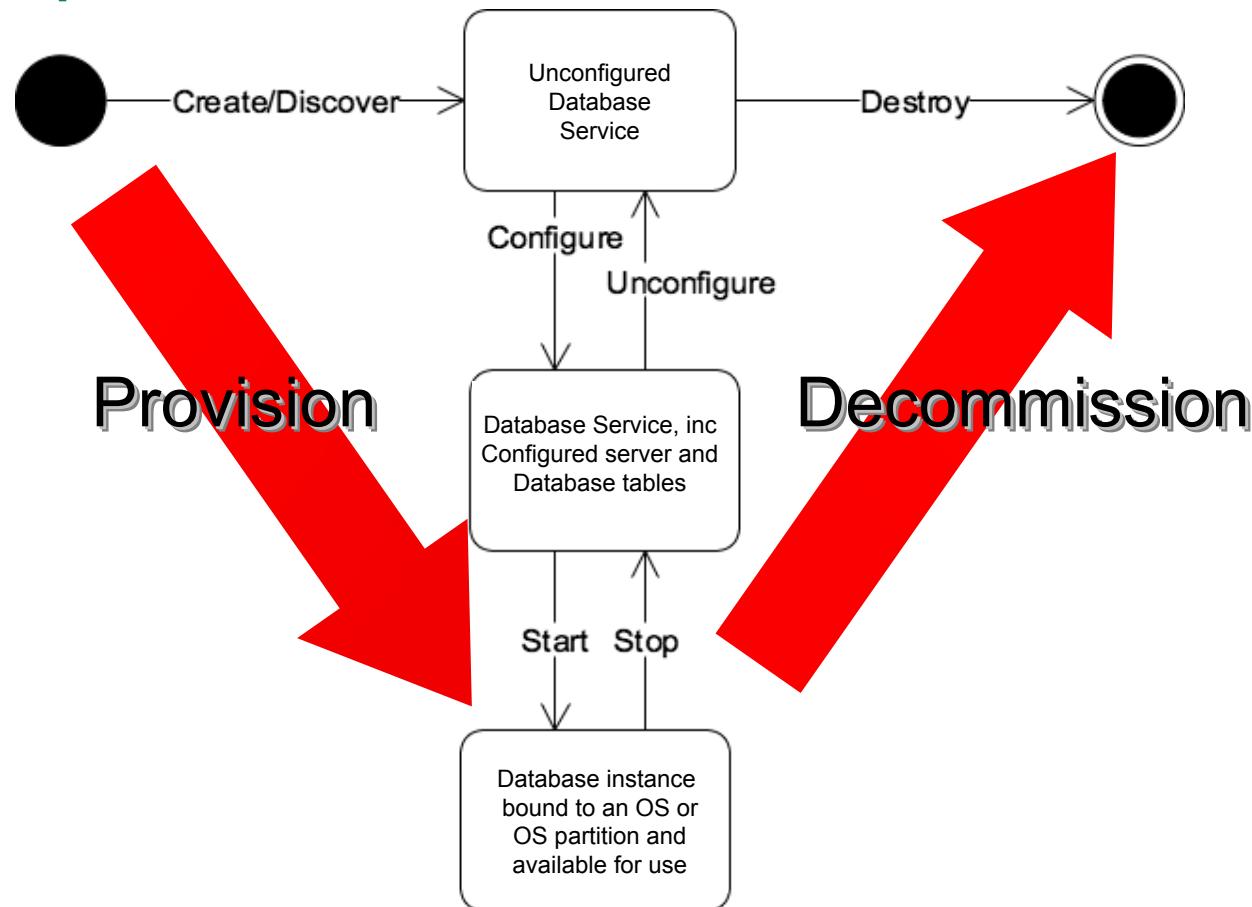
Grid Component Life Cycle - Example 1 - Server



Grid Component Life Cycle - Example 2 - Operating System



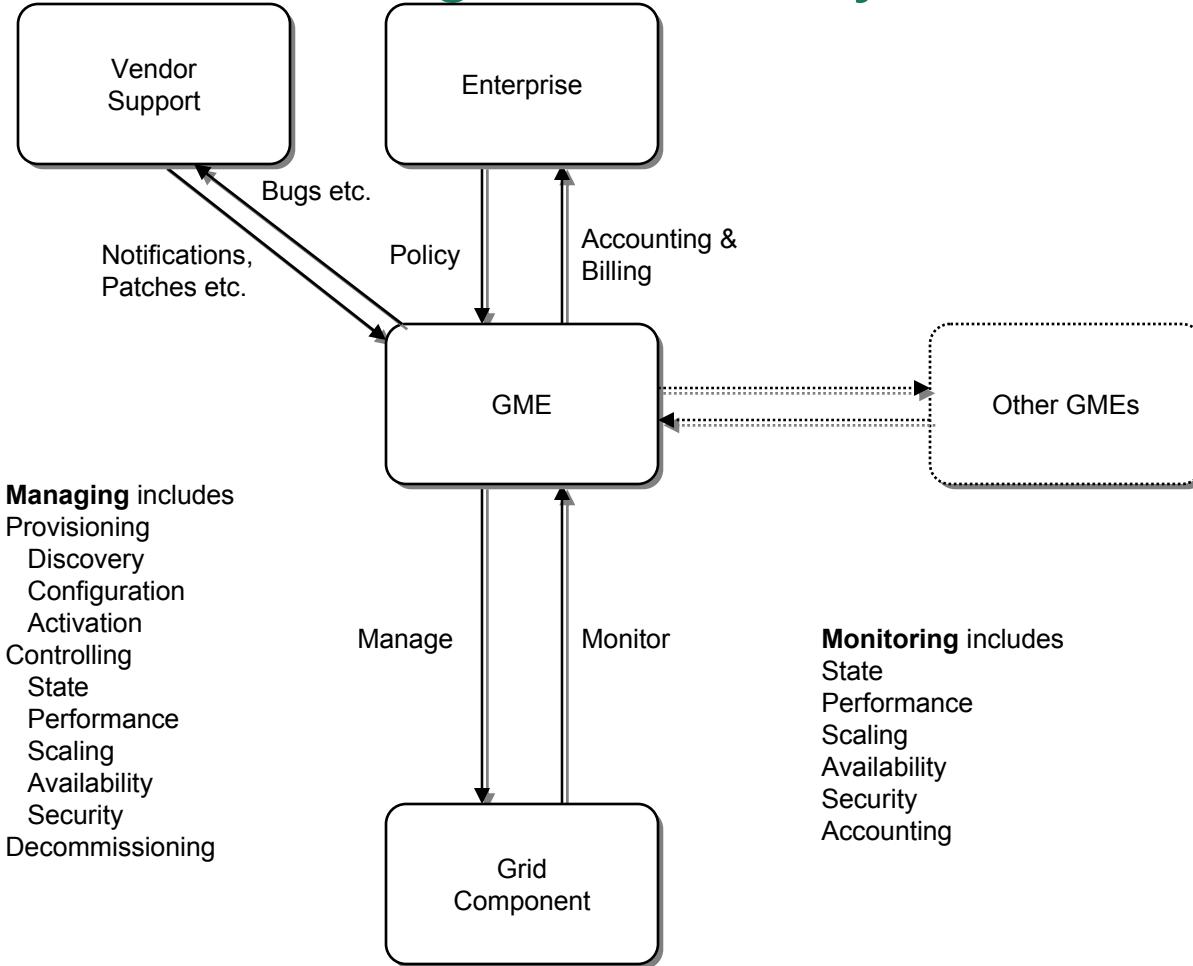
Grid Component Life Cycle - Example 3 - Database Service



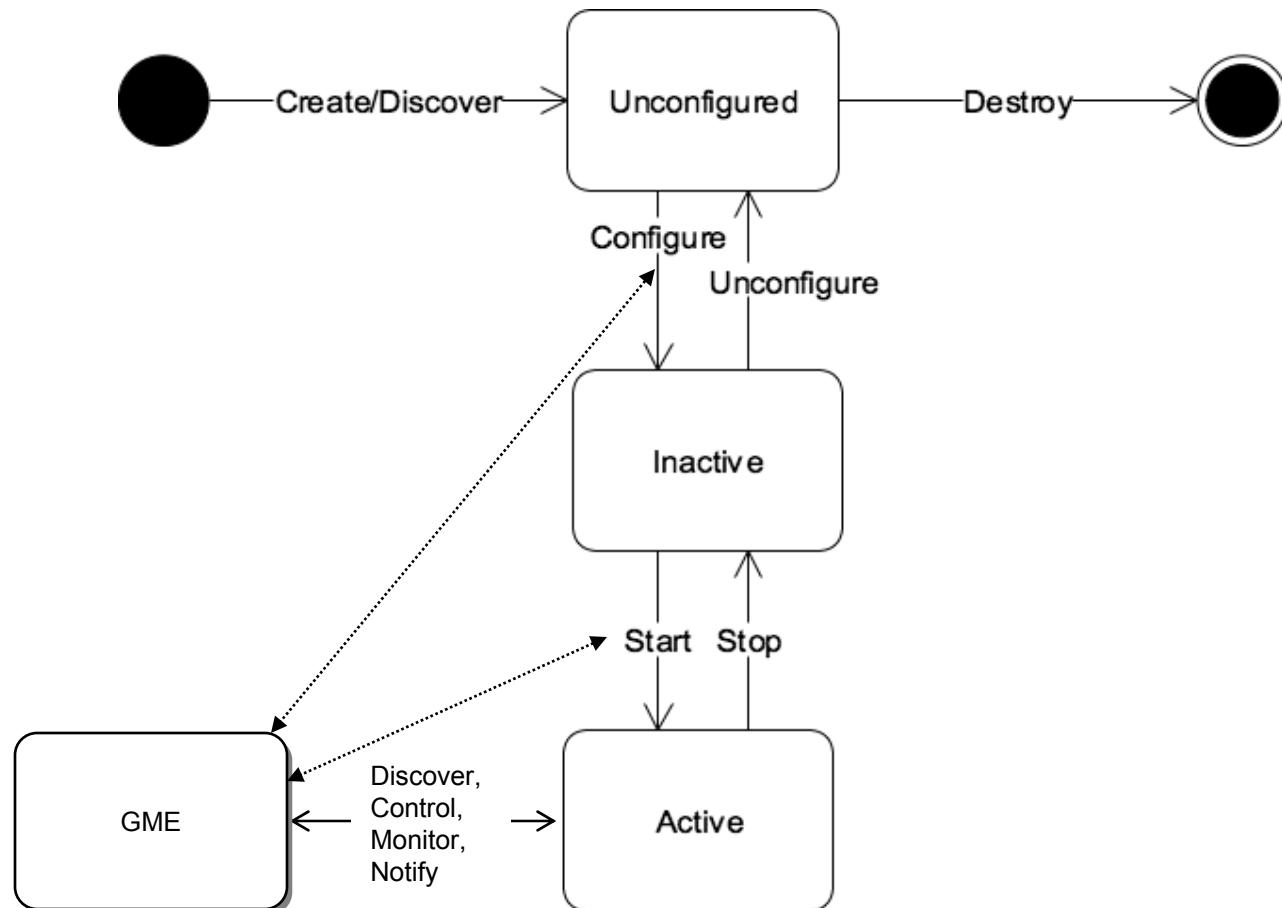
The Grid Management Entity (GME)

- Manages the collection of Grid Components
- Manages the relationships between them
- Manages their life cycle
- May be realized
 - Through people and process
 - Through automated tools
 - A combination of the above
- Provides the context for understanding the key problems associated with managing Grid Components today
- Is the Macro-Actor in all use cases

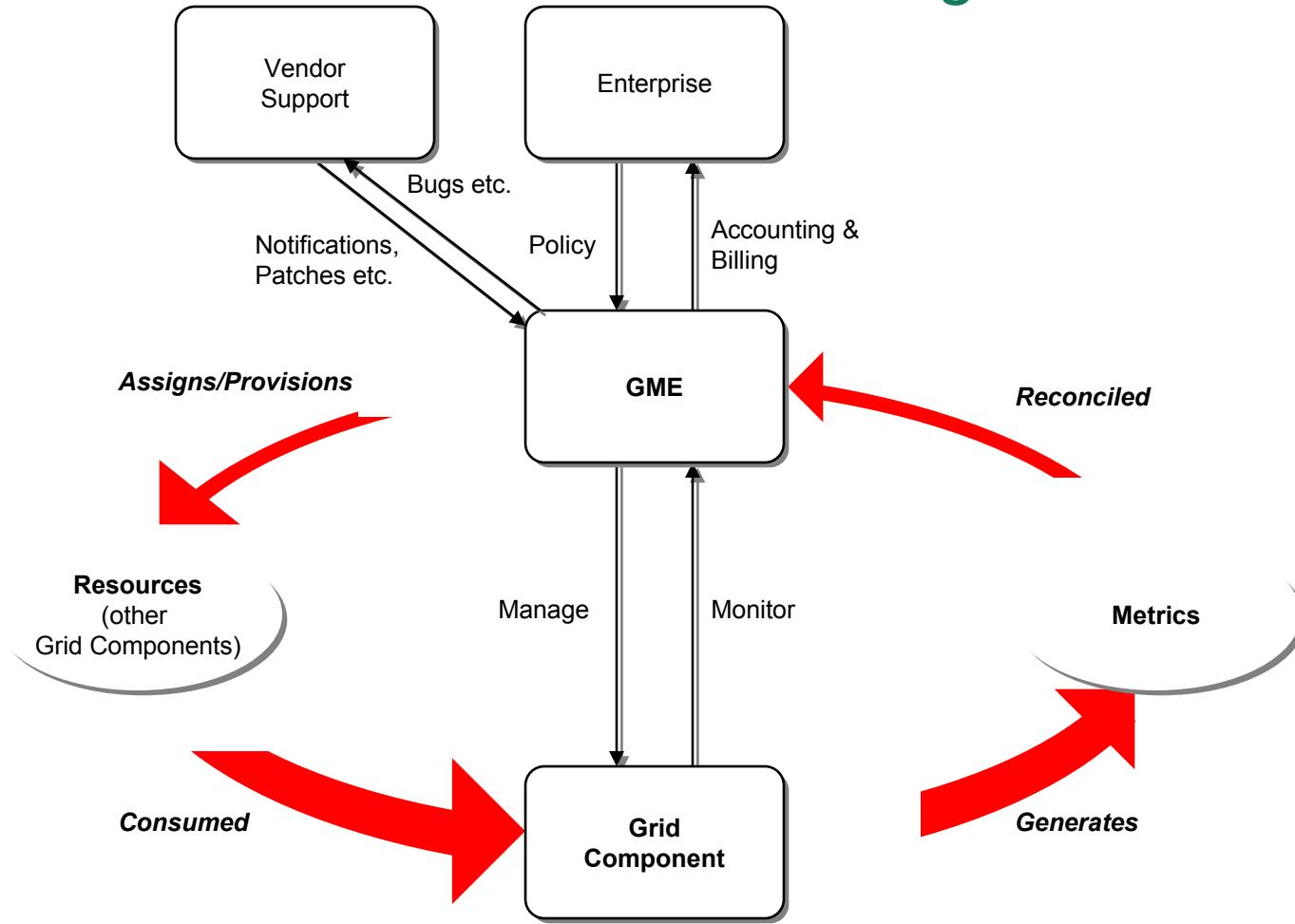
EGA Reference Model: *Role of Grid Management Entity*



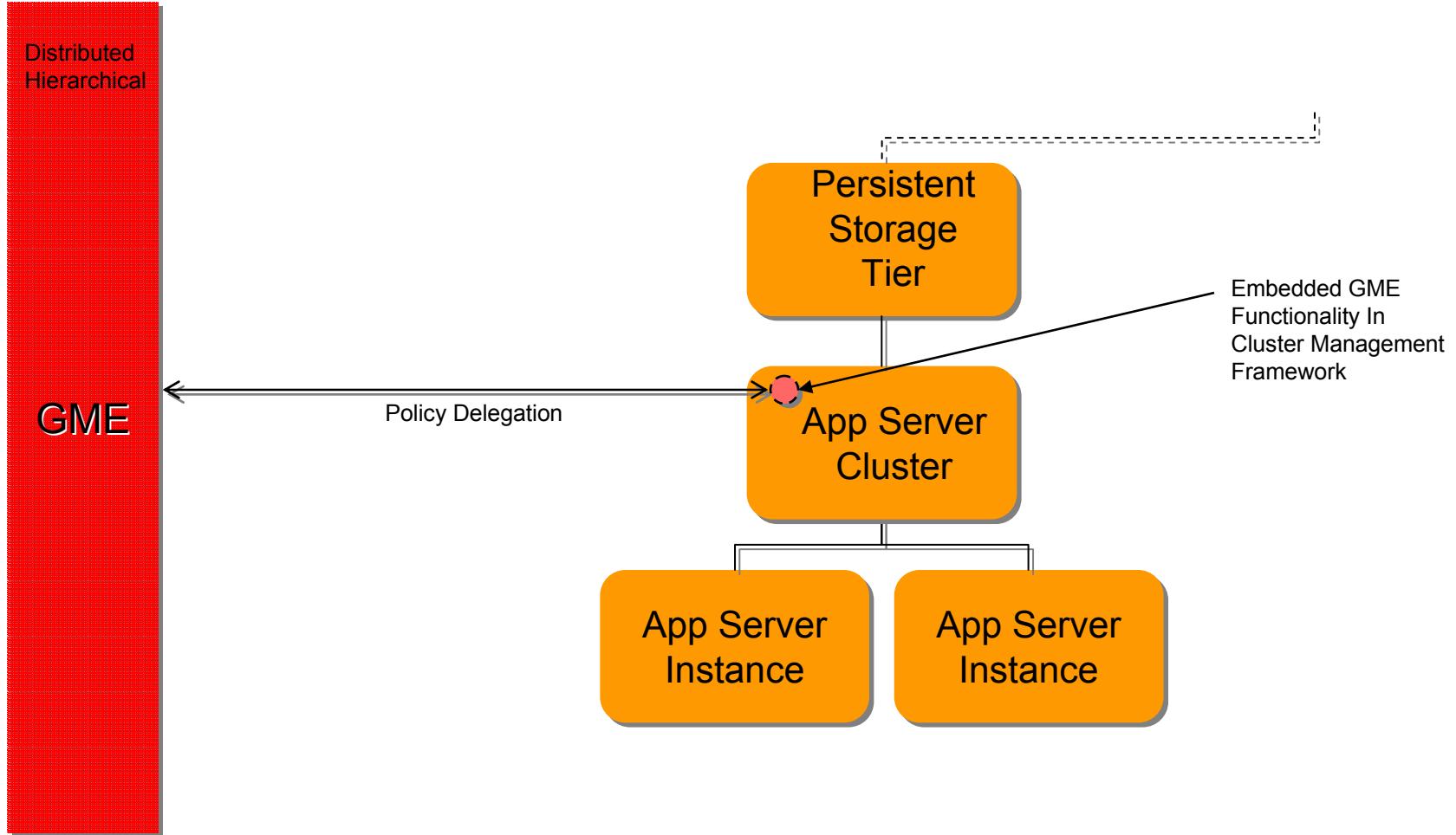
EGA Reference Model: *GME and Grid Component Life Cycle*



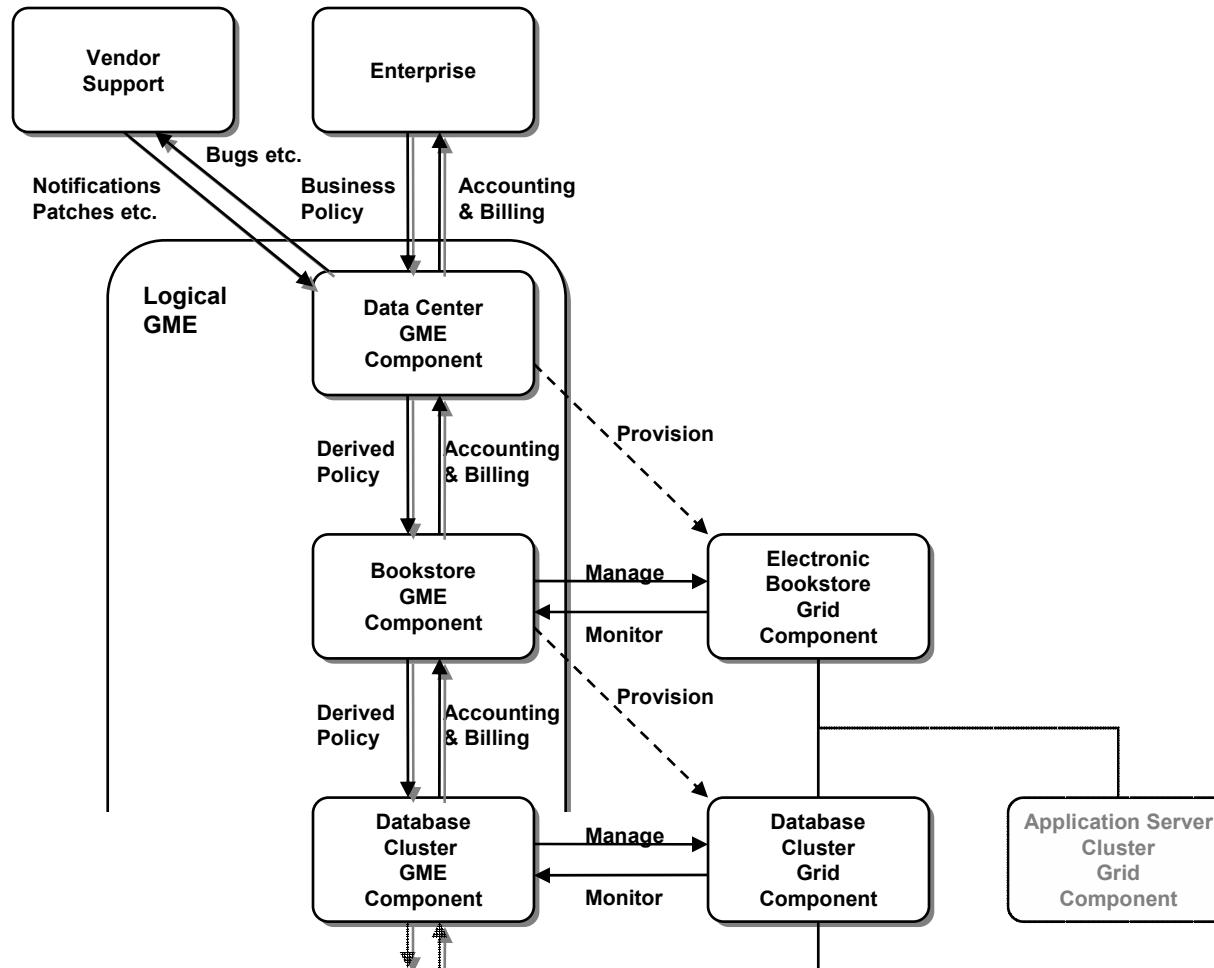
EGA Reference Model: *GME and Service Level Management*



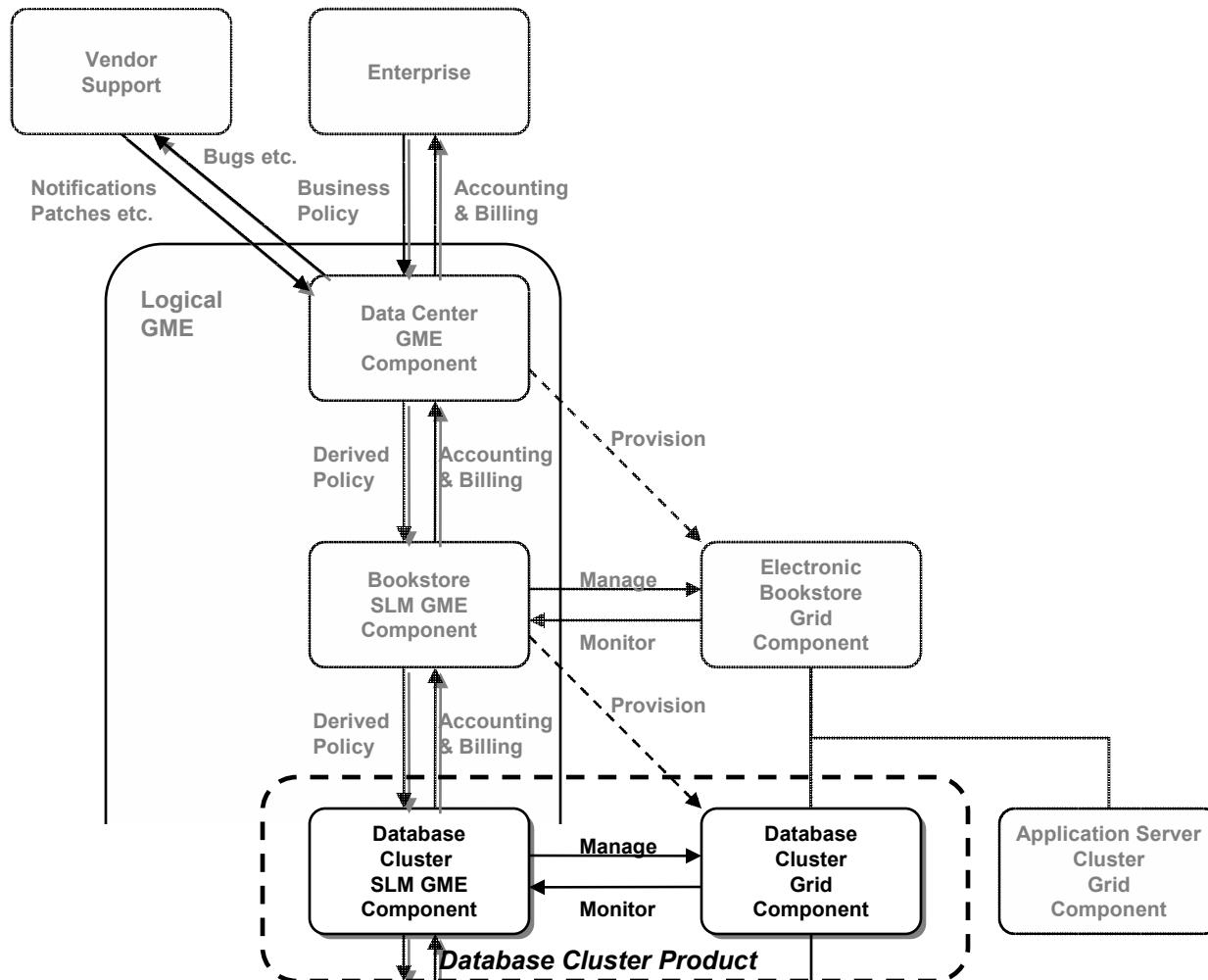
Grid Management Entity



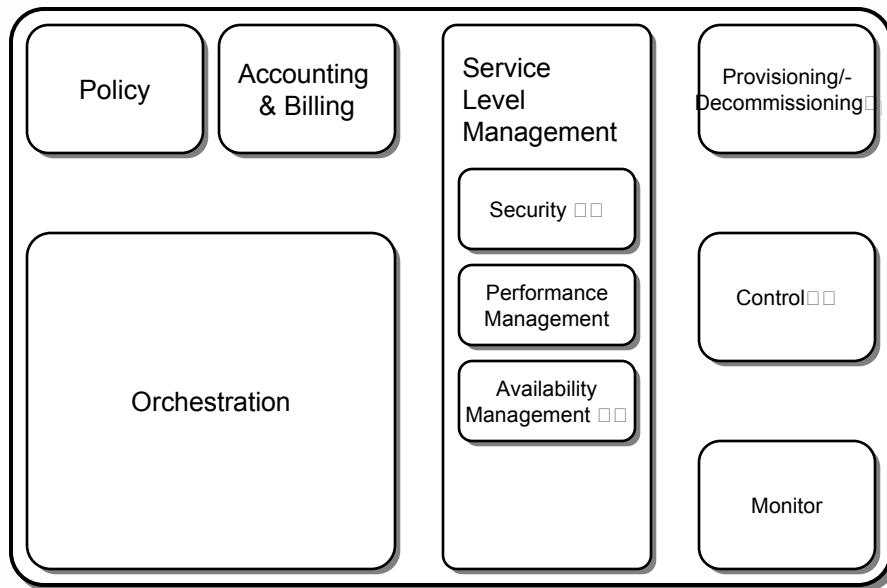
EGA Reference Model: *GME Delegated Policy and SLM*



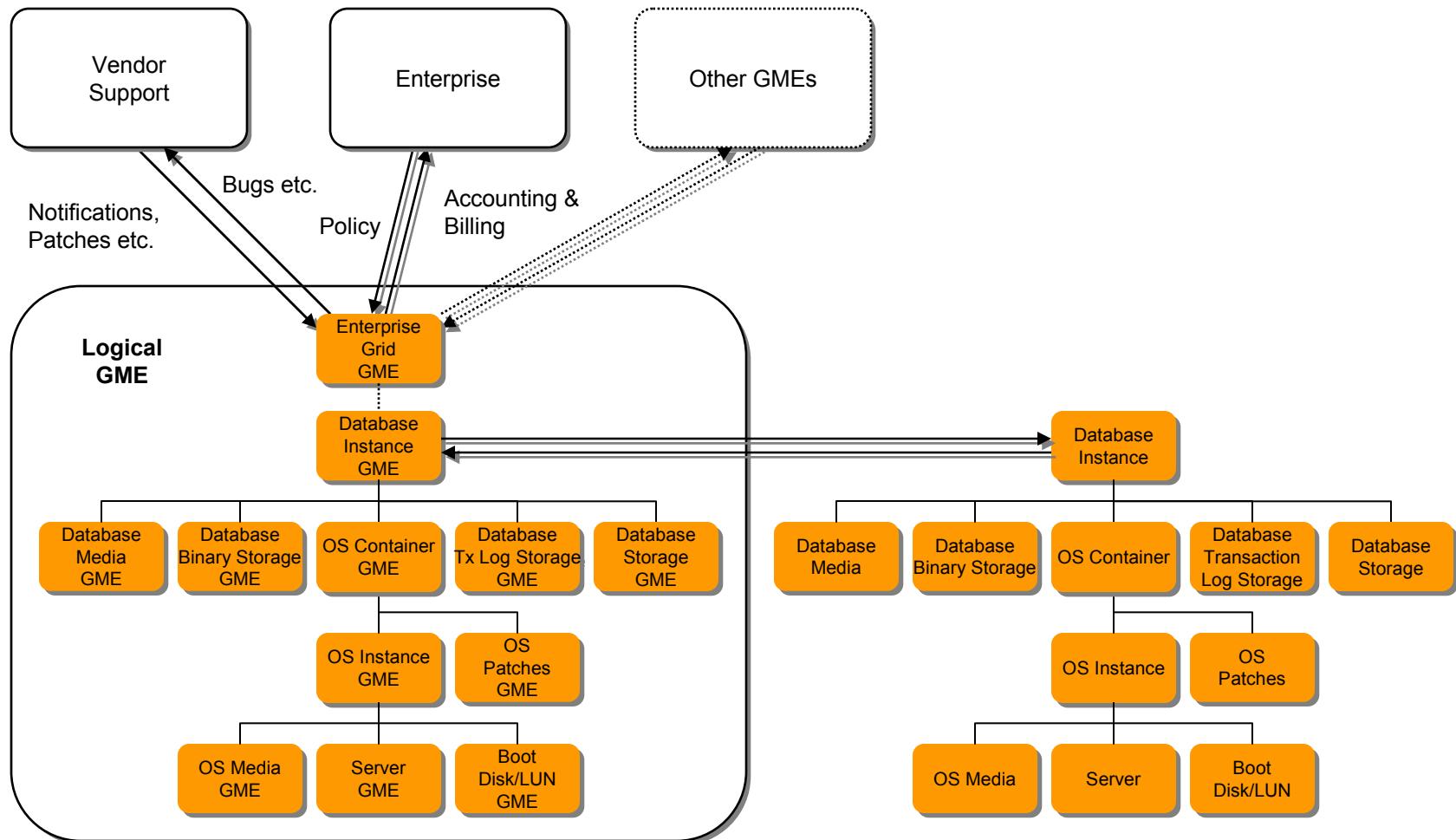
GME Delegated Policy & SLM



EGA Reference Model: *GME Functional Breakdown*



The Functional Breakdown Of The GME



EGA Reference Model: Use Cases

- Key to articulating requirements
- Provide basis for collaboration
- Overall approach
 - Focused - prioritization driven by EGA working groups and their needs
 - Scenarios drive the larger context
 - Use cases built in detail from the bottom up
 - Leverage ref model - DAGs, life cycle, GME functionality etc.
 - Provide operational environment context
- Opportunity to ensure alignment with existing best practices such as ITIL & eTOM

EGA Roadmap: Technical Focus

- Reference Model – v2.0
 - More detailed use cases (~60-100), due later this year
 - Mapping onto other standard architectures and information models
 - OGSA, CIM, ITIL
- Component Provisioning
 - Provisioning (server) use cases and requirements
- Data Provisioning
 - Usage scenarios and mapping of existing specs
- Grid Security
 - Enterprise grid security requirements
 - Issues and resolutions and use cases
- Utility Accounting
 - Currently exploring requirements

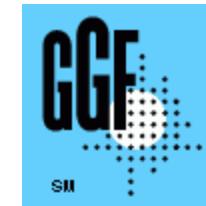
EGA Roadmap: It's About Iteration

- We need feedback
- We encourage membership
- We want to make it more useful



EGA Roadmap: Strategic Relationships

- Developing strategic relationships
 - Identify synergies
 - Build a long-term, cooperative foundation
- DMTF - active engagement/cooperation
 - Joint work register has been created and approved by EGA and DMTF Boards
 - Publicly announced
- SNIA - developing relationship
- GGF - defining relationship



That's why I'm here!