Industrial Views on

Existing and Future Grid Middlewares

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D-Grid

Industry is on a Journey

Old World

Static

Silo

Physical

Manual

Application

New World

Dynamic

Shared

Virtual

Automated

Service

Courtesy
Mark Linesch, GGF

Transitioning from **S**ilo **O**riented **A**rchitecture
to
Service **O**riented **A**rchitecture

D-GRID

Industry View of Grids

- Cluster Grids (better: grid-enabled clusters)

- Departmental Grids

- Enterprise Grids (BofA, J&J), Campus Grids (Houston, White Rose)

- Partner Grids (Automotive companies)

- Service Provider Grid (T-Systems, BT)

- Vertical Grids (Theme Grids: e.g. BioGrid, BIRN, NEESgrid)

- Regional Grids (NCgrid, CoGrid)

- National Grids (D-Grid, Naregi, Teragrid)

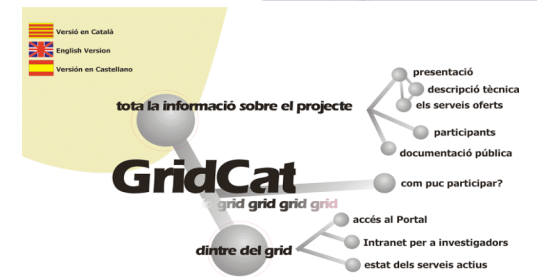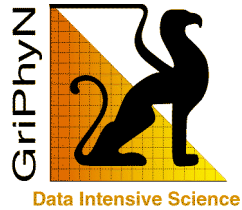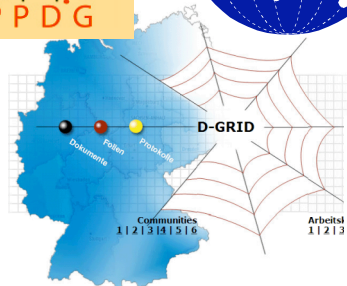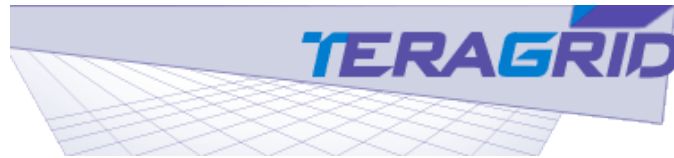- International Grids (EGEE, DAISA)

- The GRID

The Industry View is not

The Industry
View is not, this:

EGA – Reference Model, May 2005

Definition:

"An Enterprise Grid is a collection of interconnected

grid components under the control of a

Grid Management Entity."

1000s of those Grids in Industry

Life Sciences

- Startup and cost efficient
- Custom research or limited use applications
- Multi-day application runs (BLAST)
- Exponential Combinations
- Limited administrative staff
- Complementary techniques

Electronic Design

- Time to Market
- Fastest platforms, largest Grids
- License Management
- Well established application suite
- Large legacy investment
- Platform Ownership issues

Financial Services

- Market simulations
- Time IS Money
- Proprietary applications
- Multiple Platforms
- Multiple scenario execution
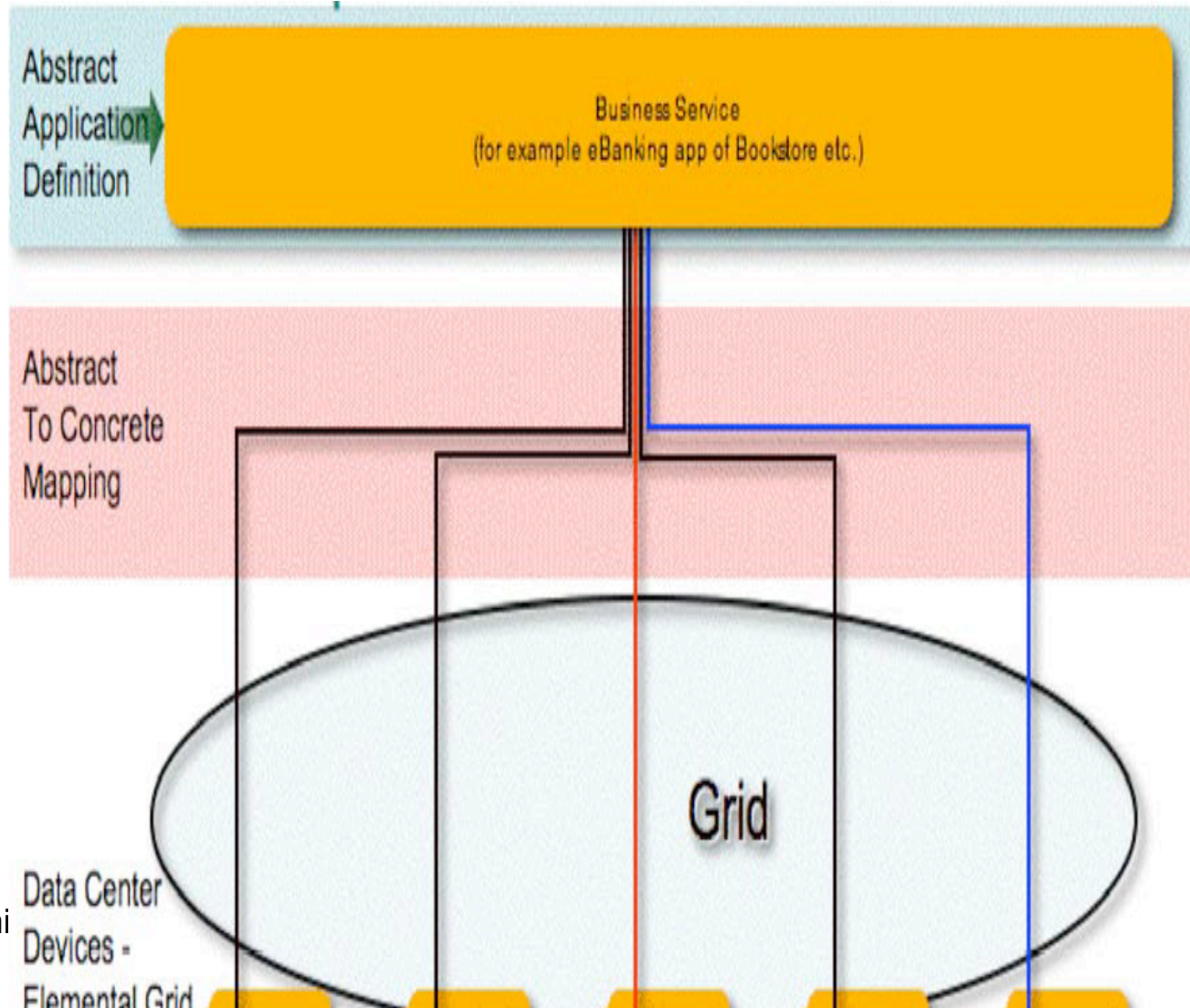- Need instant results & analysis tools

High Performance Computing

- Parallel Reservoir Simulations
- Geophysical Ray Tracing
- Custom in-house codes
- Large scale, multi-platform execution

EGA – Basic Views of a Data Center
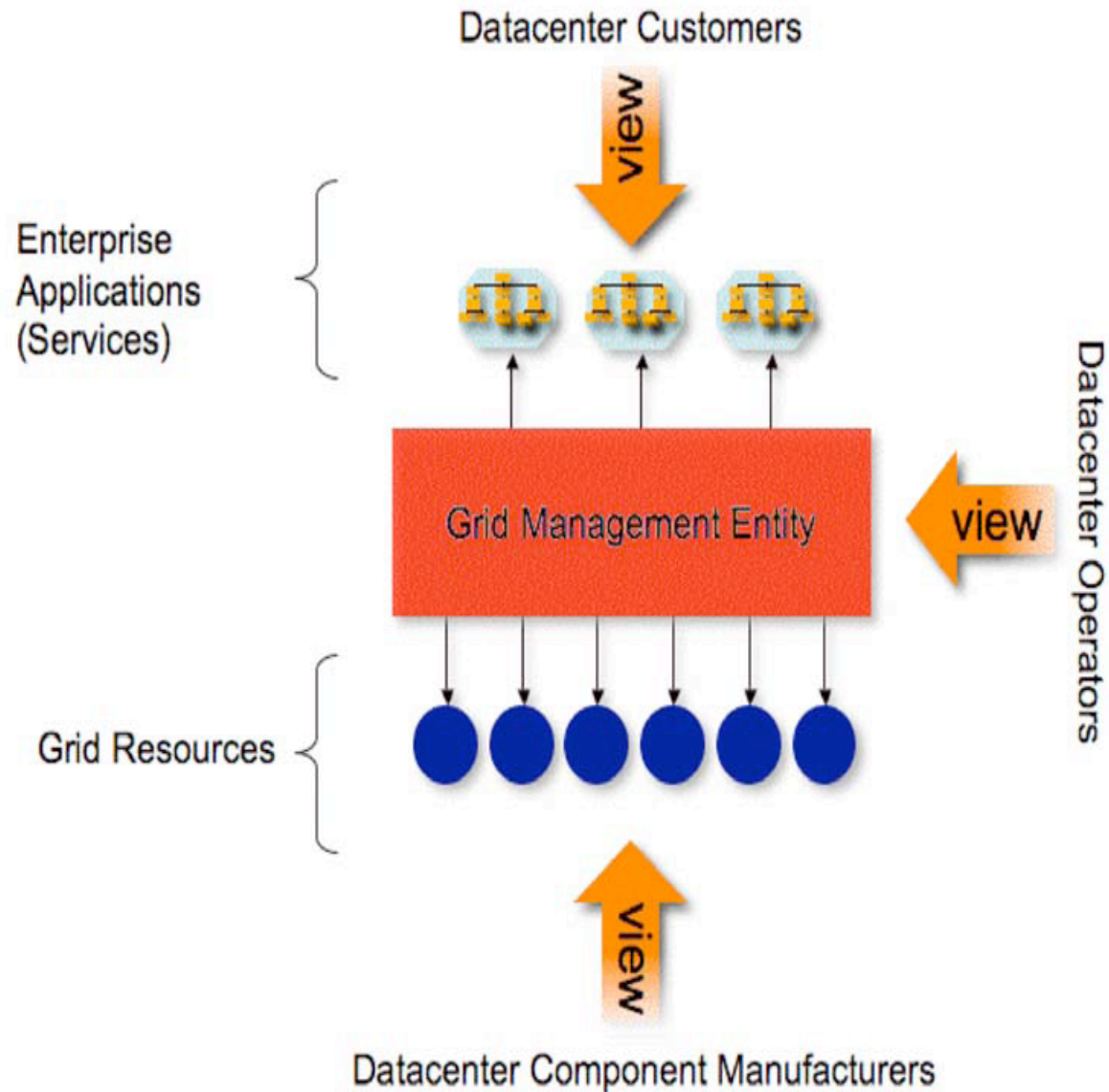
EGA Grid Middleware

Consists of layers of increasingly abstract objects

Unicore Summi

EGA – Grid Component Classes

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 Filesystems - 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,	Servers,	Switches,

Unicore Sum

EGA – Grid Management Entity

GME is logical entity that manages
- the grid components
- the relationship between various grid components
- their life cycles

GME manipulates life cycle:
- Create, Configure, Start, Update, Notify, Monitor
  Control, Stop, Unconfigure, Destroy

GME and Policies:
- applies policies (e.g. Service Level Objectives and constraints)
  defined by the enterprise, to the enterprise grid

Industry Challenges/Requirements for Enterprise Grids

- $ "We don't care about VO Grids, we care about the enterprise grids"

- $ Lack of trust in new technologies, fear of being the first

- $ Need to support existing applications

- $ Interoperability between disparate vendors' components

- $ Securing investment in grid => components and standard interfaces

- $ Scalability (scale out: department => enterprise => partners)

- $ Easy use, reduced complexity, automation,…

- $ Agility: provision and decommission grid components as biz needs change

- $ Security: what can be done today ??   (and what not) (in enterprises!)

- $ Need for policy engines in A-A-A-A-A

- $ Need to standardize and automate provisioning of servers and data

- $ Provide cross-platform, service based, billing

- $ Easily map biz goals onto resource and services utilization

- $ Create demos and reference implementations/architecture

But, there will be more in the future:

Distributed Aircraft Maintenance Environment — DAME

DAME is an e-Science pilot project, demonstrating
the use of the GRID to implement a distributed decision
support system for deployment in maintenance applications

Partners: Universities of York, Leads, Sheffield, Oxford and **Rolls Royce**

Business Challenges, Potential Grid Inhibitors

- Difficult to differentiate reality from hype
- Sensitive data, sensitive applications (medical patient records)
- Different organizations have different ROI
- Accounting, who pays for what (sharing!)
- Security policies: consistent and enforced across the grid !
- Lack of standards prevent interoperability of components
- Current IT culture is not predisposed to sharing resources
- Not all applications are grid-ready or grid-enabled
- Open source is not equal open source (read the little print)
- SLAs based on open source (liability?)
- "Static" licensing model don't embrace grid
- Protection of intellectual property
- Legal issues (FDA, HIPAA, multi-country grids)

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Grid Adoption in Business

- ☐ Think big, start small (be a visionary and a realist)
- ☐ Grid is a good opportunity to revisit existing IT infrastructure
- ☐ Look for comparable success stories and use case analyses
- ☐ Identify gaps, problems, concerns, … Can grids help ?
- ☐ Find out in talking/listening to your users / customers !
- ☐ Build YOUR list of grid business benefits and inhibitors
- ☐ Create awareness -> training -> testbed (6 wks – 6 months)
- ☐ Get help from Grid Service Providers
- ☐ Get buy-in from upper management
- ☐ Eventually, evolve from testbed into production