EGEE Technology Market Evaluation

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Innovation Advisory Service

- Supports developing collaborations between industrial companies and scientific groups
- Strategic objectives:
  - Spread technologies to broader market areas:
    - Through industry & interdisciplinary collaborative research
    - By supporting entrepreneurial activity in our community
  - Support UK academic and industrial leadership in the PPARC programme through Programme Technology Development

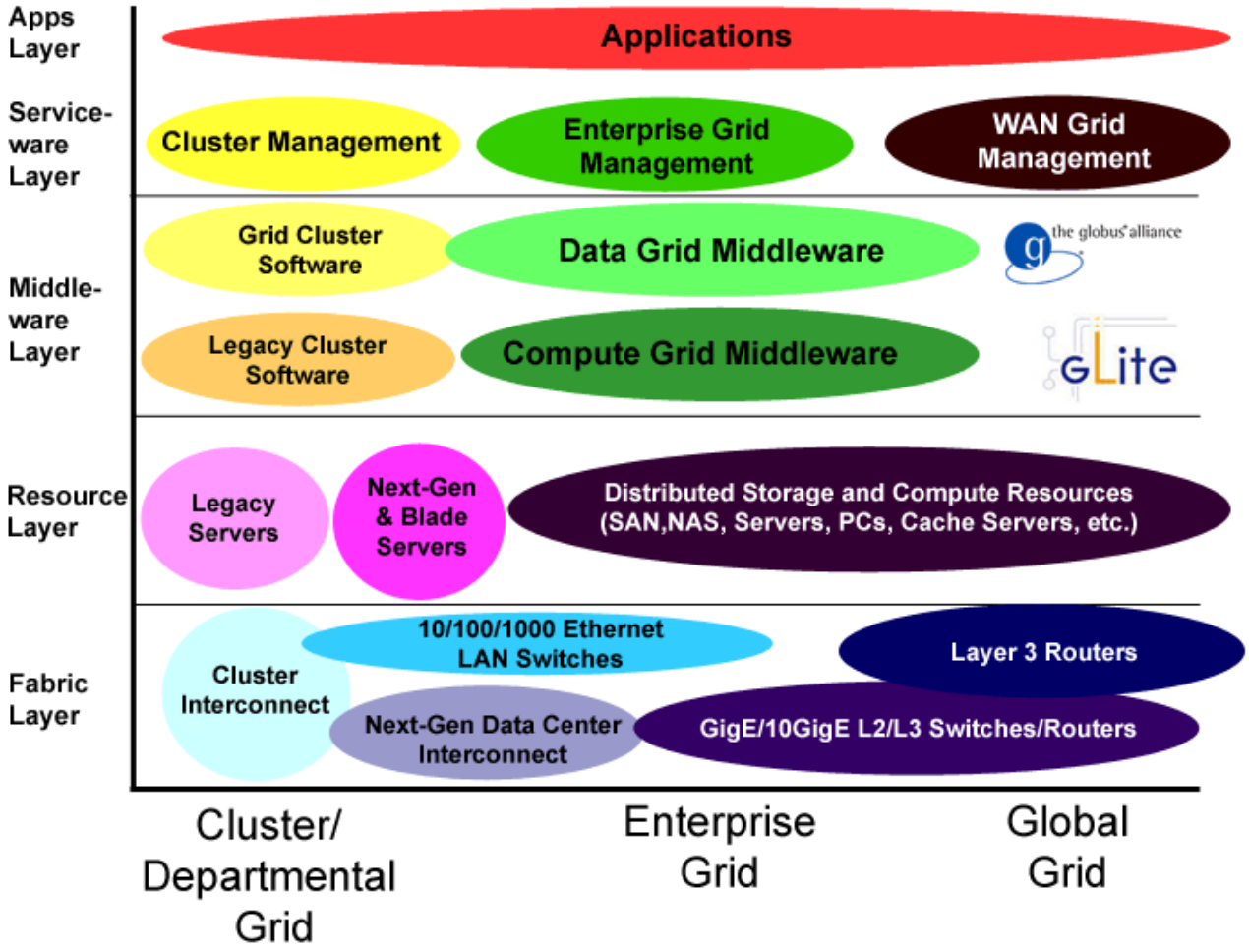
Technology Market Evaluation (TME)

- **TME** is a part of the formal process for ‘technology push’ in corporate venturing organisations called TechMax™ developed by Qi3 Ltd.
- **TME** is the methodology to assess and evaluate the potential applications and markets for a given technology or patent

EGEE TME Questions

- What is the Technology Readiness Level?
- What other elements are required to make a product?
- What are the market structure and Value Drivers?
- What are the business model options?

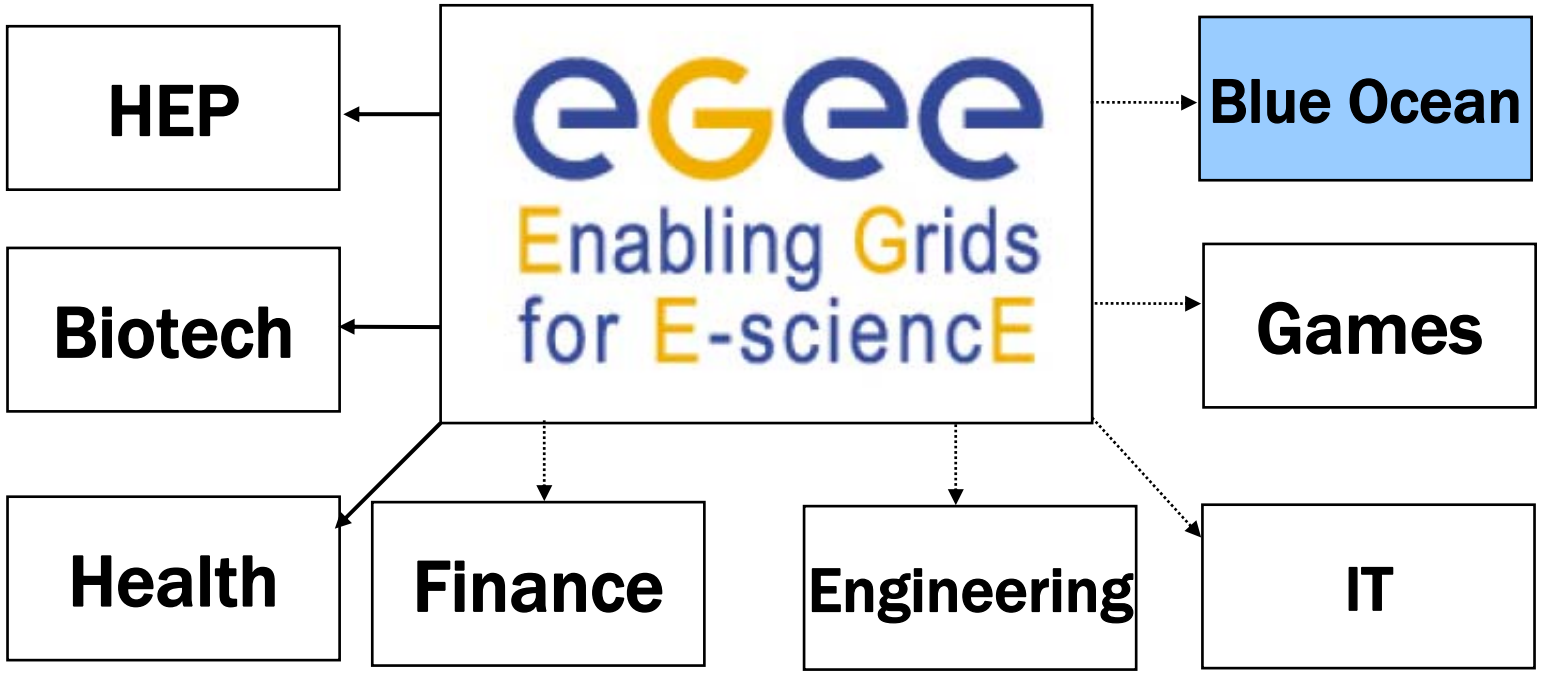
Grid Classification and the Five Layer Model



EGEE Five Layer Model

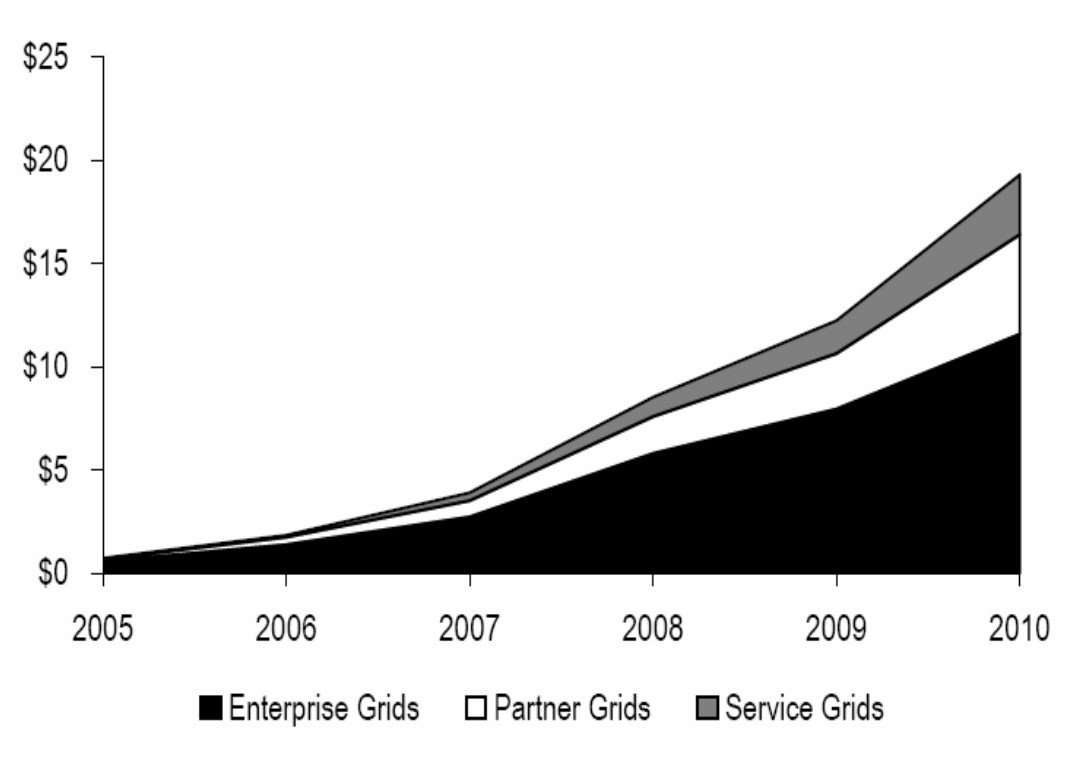
Application Layer	LCG, OPENPLAST, EGEODE VO, WISDOM, Diligent (A DIgital Library Infrastructure on Grid ENabled Technology)
Serviceware Layer	Real Time Monitoring, GILDA, genius
Middleware Layer	gLite
Resource Layer	An infrastructure of over 20,000 CPU About 5 Petabytes (5 million Gigabytes) of storage
Network Layer	GEANT2, Massive data transfers > 1.5 GB/s

Grid Applications by Industry



Grid Market

- According to The INSIGHT Research Corporation, worldwide grid spending is expected to grow from $714.9 million in 2005 to approximately $19.2 billion in 2010, as shown in Figure below.



GRID COMPUTING, A VERTICAL MARKET PERSPECTIVE 2005-2010, The INSIGHT Research Corporation February 2005

Grid Computing Taxonomy

Layer	Description	Vendors/Industry Segment
Application Layer	Distributed and/or performance-intensive application software	Life Sciences, Energy, Manufacturing, Financial Services, Government, Education
Serviceware Layer	Service interface and tool for usage metrics, billing, accounting	Sun, IBM, HP, Oracle, Platform Computing, Avaki, Entropia, United Devices, DataSynapse, GridFrastructure, Globus
Middleware Layer	Grid-wide "glue" software for resource mapping, scheduling, priority-based queuing, security	Sun, IBM, HP, Oracle, Platform Computing, Avaki, Entropia, United Devices, DataSynapse, GridFrastructure, Univa (Globus)
Resource Layer	Collection of distributed, heterogeneous storage and compute resources	Sun, IBM, HP, Dell, Egenera, EMC, SGI, other numerous storage and server startups
Fabric Layer	Performance-driven, high-speed networking (highly Ethernet-centric)	Cisco, Foundry, Force10 Networks, Juniper Networks

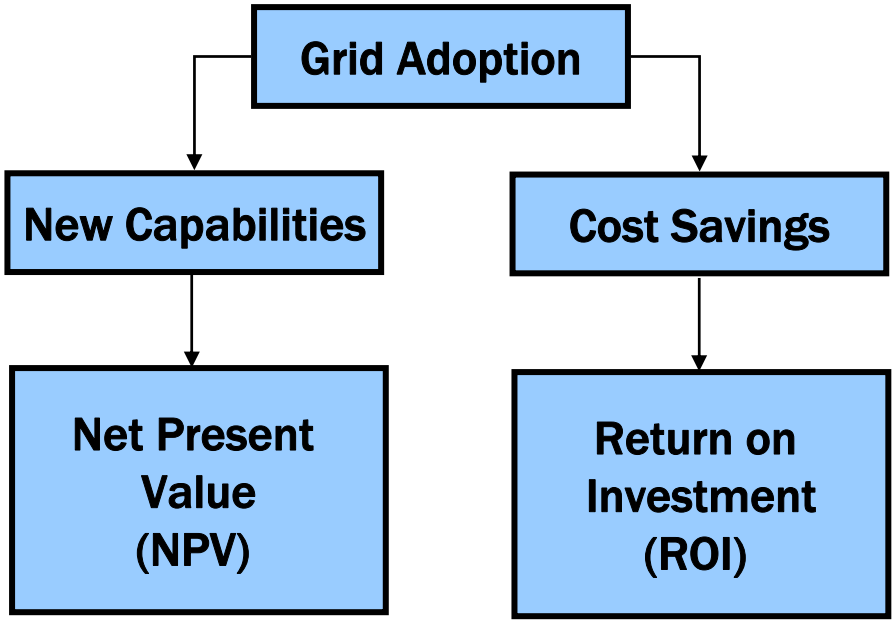
Slide 8

Z4

http://www.byteandswitch.com/document.asp?doc_id=33176&page_number=1
Byte and Switch
Grid Networking
3 May 2003
Zorro, 12/30/2005

Grid Value Proposition

- **Grid implementation effect could be twofold:**
  - To enable new capabilities (generate new revenues)
  - To realize cost savings (reduce overheads)



New Capabilities

- **Ct – Represents cash flow in a year t;**
- **r – The discount rate which reflects project risks;**
- **Co – the initial investment, which includes investment in grid adoption.**
- **If NPV is a positive value that means that the project benefits justify initial investment including grid.**

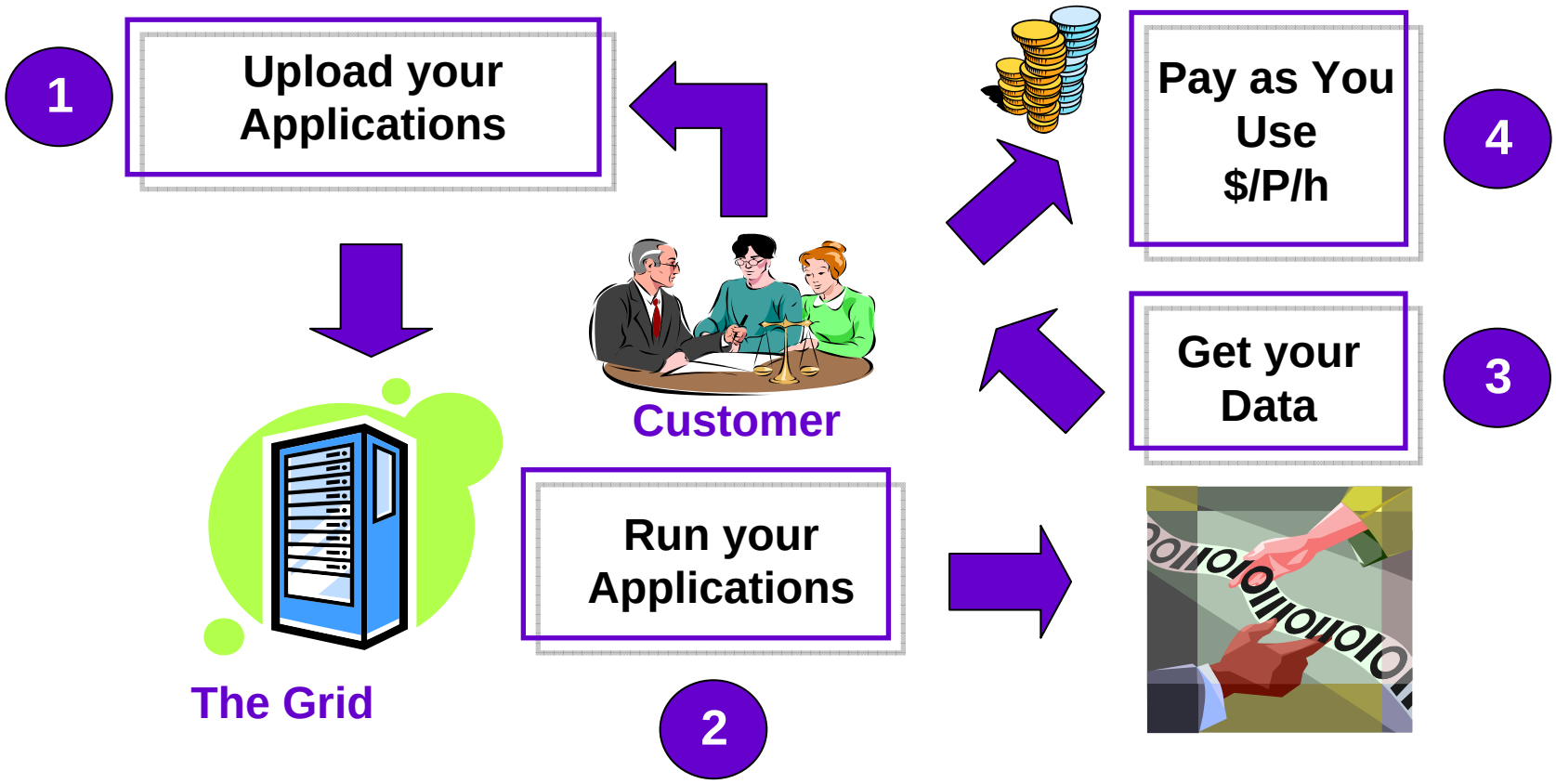
$$NPV = \sum_{t=1}^{T} \frac{C_t}{(1+r)^t} - C_o$$

Cost Savings

- **Resource Utilization**
- **Storage Management and Utilization**
  - overall reduction in storage needs as data replication/duplication was eliminated
- **Hardware Costs**
- **Scaling Costs**

$$ROI = \frac{(\text{Gain from Investment} - \text{Cost of Investment})}{\text{Cost of Investment}}$$

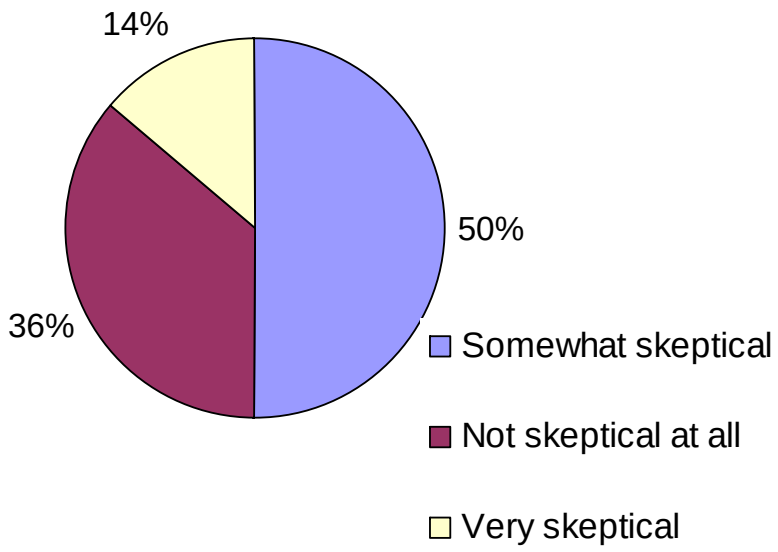
Utility Computing



Utility/Grid Computing Adoption Problems

- **Cost**
- **Compatibility/Vendor Lock-in**
- **Lack of applications**
- **Security**
- **Lack of skills**

Survey Results



On-Demand Computing Survey Results
Computerworld Jun 2004

Utility/Grid Computing Adoption Problems

Survey Results

- **16%** Cost of services
- **16%** Proprietary technologies and lack of interoperability will lead to vendor lock-in
- **12%** Lack of security
- **11%** Implementation will be too complex
- **11%** Inability to adequately monitor service-level agreements and meter actual usage from service providers
- **10%** Applications will have to be rewritten to see benefits
- **23%** Other

On-Demand Computing Survey Results
Computerworld Jun 2004

EGEE Five Layer Model

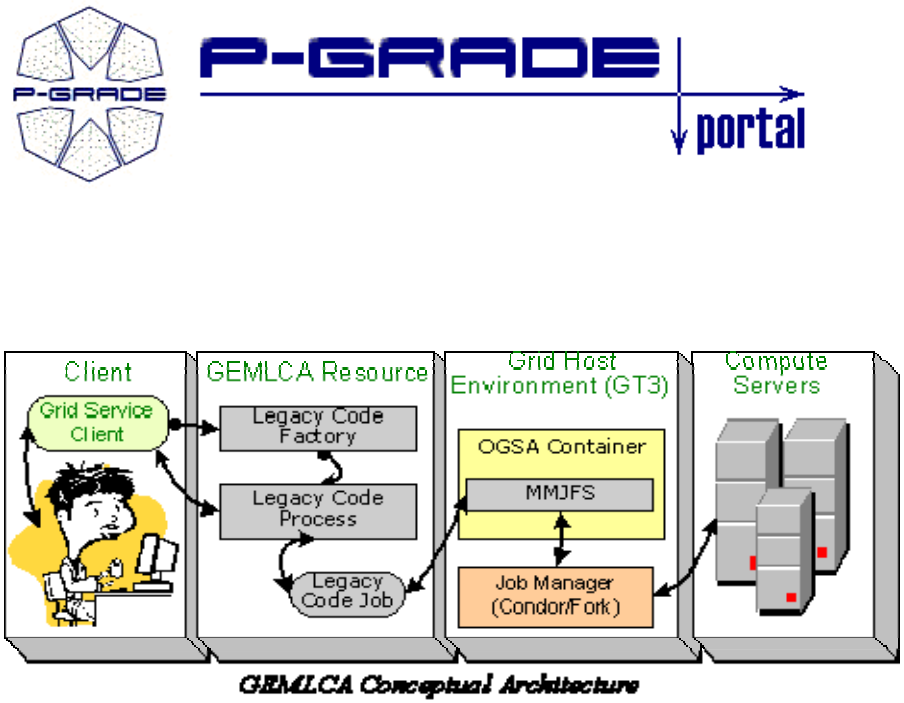
	Problem	Opportunity for EGEE
Application Layer	Lack of Applications, Licensing	Collaborative Projects with ISV. Case Study: **Cambridge Ontology**
Serviceware Layer	Complexity, Usage Metering	Industry specific portals, RGMA and APEL, economic models. Case Study: **GEMLCA**
Middleware Layer	Compatibility, Security, Lack of Skills, Cost	gLite Case Study: **Univa**
Resource Layer	Cost	
Network Layer	Cost	

Case Study: Univa

- Founded in 2004 by Grid computing pioneers Steve Tuecke, Dr. Ian Foster, Dr. Carl Kesselman and Rich Miller
- Provides commercial support for Globus Toolkit 4
- Received funding from VC funds
- Has a partnership agreement with IBM

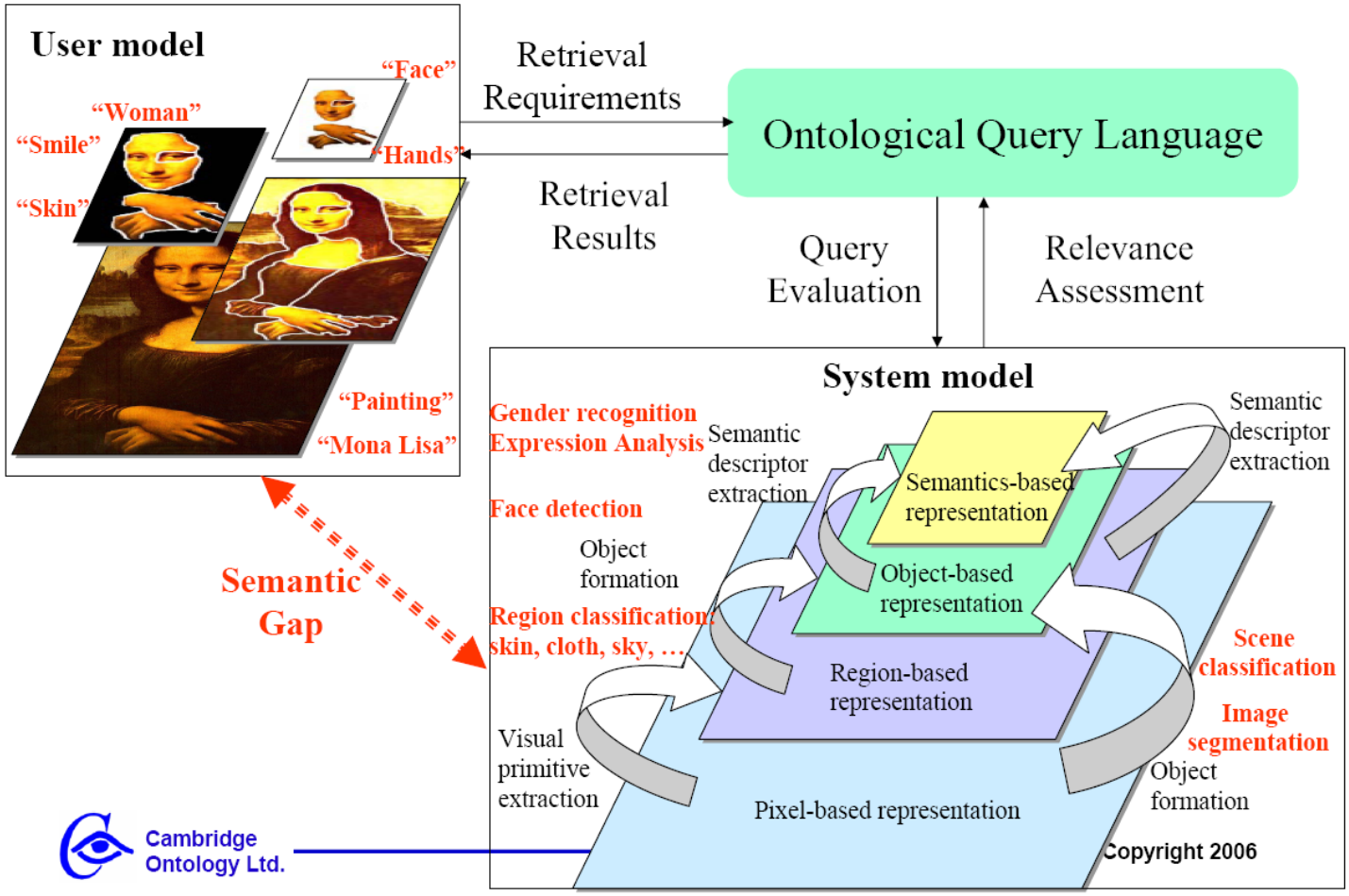
Case Study: P-Grade Portal and GEMLCA

- GEMLCA is a general solution in order to deploy existing legacy code applications written in any programming language as a Grid service
  - without modifying or even requiring access to the legacy code (source or binary)
  - without any real user effort.



GEMLCA Conceptual Architecture

Case Study: Cambridge Ontology



Case Study: Cambridge Ontology

- Cambridge Ontology Ltd. is a small ISV
- Developed a Content Based Image Retrieval (CBIR) application that requires significant computing power
- Grid could be a solution
- Help needed:
  - Grid training
  - Collaborative Development
  - Testbed

New Applications

- Example: behavioural analysis using video and the Bayesian inference method
  - Requires significant computing power
  - Provides new opportunities for businesses in
    - Drug Discovery
    - Biology
    - Security
- New applications could be the basis for new businesses
- Support needed: Collaborative Partnerships and the Cost Recovery Model

Conclusions

- EGEE Industry Forum is an excellent framework for knowledge transfer
- Currently focused on big companies and large projects
- Explosive market growth provides opportunities for entrepreneurship
- More attention to SME and start-ups is needed
- **gLite** could be commercialised
- Grid/SOA is a goldmine for entrepreneurs
- Cost Recovery Model could be a route to market for ISV, service Grids and consultancies
- Governmental support for innovation is important / PPARC Industry Programme Support Scheme (PIPSS)