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OGSA Enabled Grid Economic Services



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Since submission...



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- BoFs at GGF5
 - Grid Economic Services Architecture (GESA)
 - Steven Newhouse
 - Jon MacLaren
 - Kate Keahey
 - Resource Usage Service (RUS)
 - Steven Newhouse
 - James Magowan
- Initial WG meetings at GGF 6
- Activity planned for GGF 7 (later)
- Discussion at NeSC Security Workshop (Dec02)
- GT3 Alpha release in January 2003

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Proposed Scope



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- Core Logging & Accounting Services
 - For contribution to GT3
- Secure Charging and Payment Mechanisms
 - Define interfaces that leverage existing infrastructures
- Performance Engineering
 - Prediction and optimisation of execution time
- Computational Economics
 - Development and reference implementation of protocols
 - Exploration of advanced mechanisms (e.g. futures)
- Deployment within UK e-Science Grid
 - Utilise UK's Grid Infrastructure
 - Exposure to real environment, users & applications

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Open Grid Services Architecture



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- From Web services:
 - Standard interface definition mechanisms: multiple protocol bindings, multiple implementations, local/remote transparency
- Building on Globus Toolkit:
 - Preserve GT2 features (i.e. retain client side API)
 - **Grid service**: semantics for service interactions
 - Management of transient instances (& state)
 - **Factory, Registry, Discovery**, other services
 - Reliable and secure transport
- Multiple hosting targets: J2EE, .NET, "C", ...
- Service orientated architecture enables resource virtualisation

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OGSA Service Model



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- System comprises (a typically few) persistent services & (potentially many) transient services
 - All services adhere to specified Grid service interfaces and behaviors
 - Reliable invocation, lifetime management, discovery, authorization, notification, upgradeability, concurrency, manageability
 - Interfaces for managing Grid service instances
 - Factory, registry, discovery, lifetime, etc.
- => *Reliable, secure management of distributed state*

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OGSA Service Data



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- A Grid service instance maintains a set of service data elements
 - XML fragments encapsulated in standard <name, type, TTL-info> containers
 - Includes basic introspection information, interface-specific data, and application data
- **FindServiceData** operation (GridService interface) queries this information
 - Extensible query language support
- See also notification interfaces
 - Allows notification of service existence and changes in service data

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For Computational Markets



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- Expose Resources through a Factory Service
 - Factory has the ability to spawn more services
 - This is a highly extensible entry point
 - Equivalent to invoking a Java constructor
- Service Data Elements (XML)
 - Contains & expose meta-data relating to the service
 - Static elements provided from GSS
 - Dynamic elements from the service or elsewhere

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Grid Economic Service Architecture



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- GESA enabled client ‘obtains’ a GSH
 - Grid Service Handle (GSH) provides unique service ID
- GSH passed to an existing client
 - Retain existing client interface with an economic service
- Key Issues:
 - Information needed to make the selection (SDE)
 - Two (Multi?) stage commit to support pricing
 - Enable wide ranging exploration of grid economic models

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New Service Data Elements



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- Trust, Reputation & Reliability (0+)
 - Can I rely on this service? Will it do what it says on the tin?
 - Who has ‘audited’ this service for performance & integrity?
 - Do we (the UK) need an OfGrid?
 - Allow SDE to updated by signed statements?
- Compensation & Liability (0+)
 - Who can I complain to and can I prosecute?
 - How could the contract be broken?
- Grid Banking Services (1+)
 - Declare which GBS are acceptable
- Resource Usage Service (1)
 - Declare which RUS is used by the service

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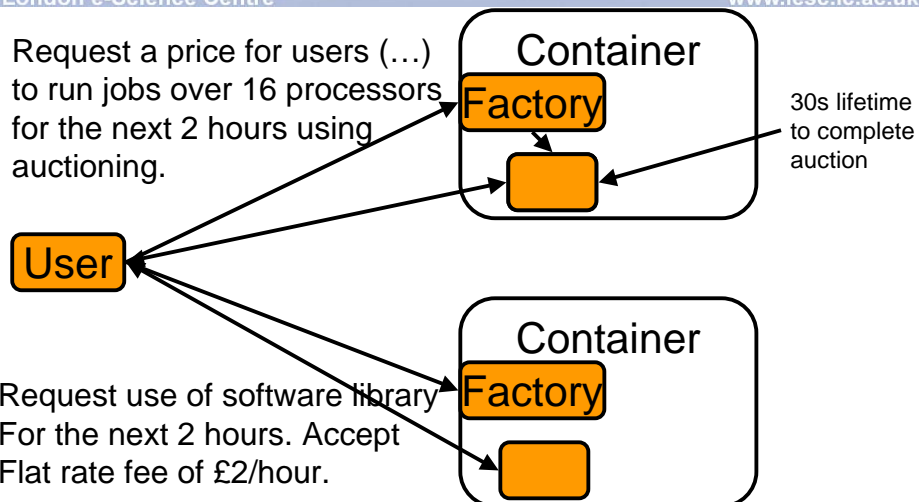


How it might work...

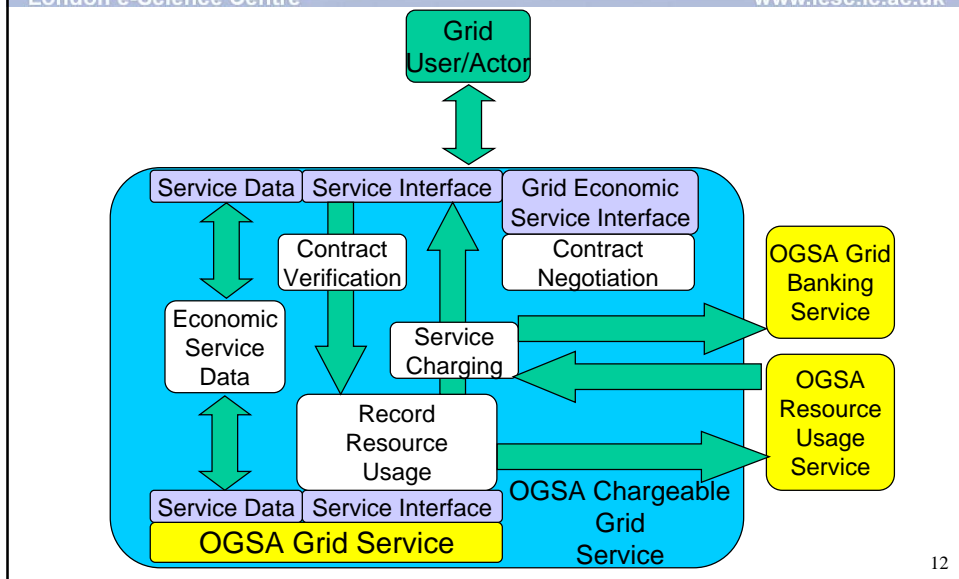
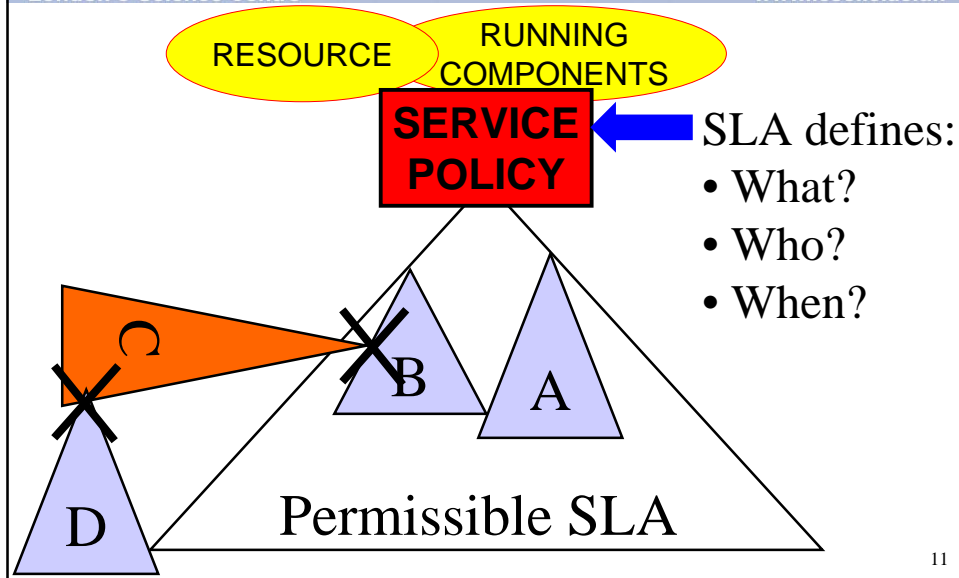


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Proposed Work Packages



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1. Identification of models through use cases
2. Protocol & Service specification
3. Grid Accounting Service
4. Grid Banking Service
5. Grid Brokering Service
6. Exemplar e-Science Applications
7. Deployments
8. Negotiating Mechanisms

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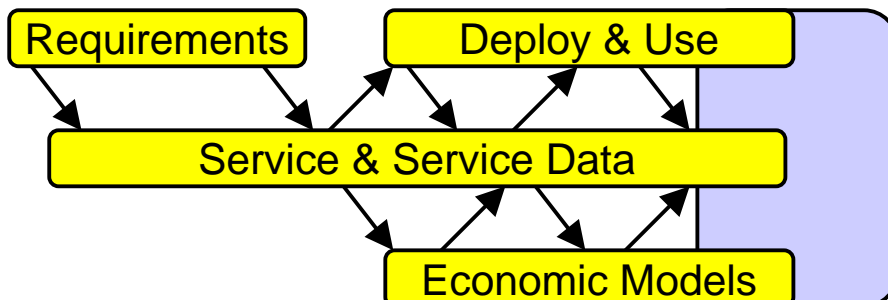
Project areas



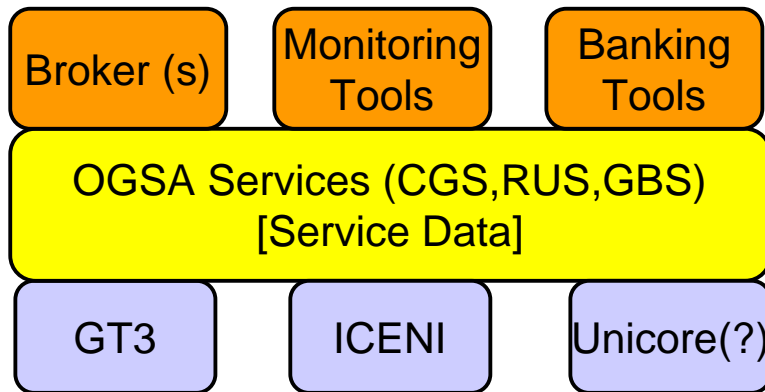
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- Requirements (1)
- Grid Economic Services Architecture (2,3 & 4)
- Grid Economic Models (5 & 8)
- Usage & Deployment (6 & 7)



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- Application Service Provider
- Computational Resource Provider
- Computational Reseller Provider
- Software Licensing Provider
- Computational Broker Provider
- Scientific User
- Instrument Service Provider
- Utility Computing
- Data Provider