

Introducing Commercial Use Cases to an Academic e-Science Infrastructure

Philipp Wieder, TU Dortmund

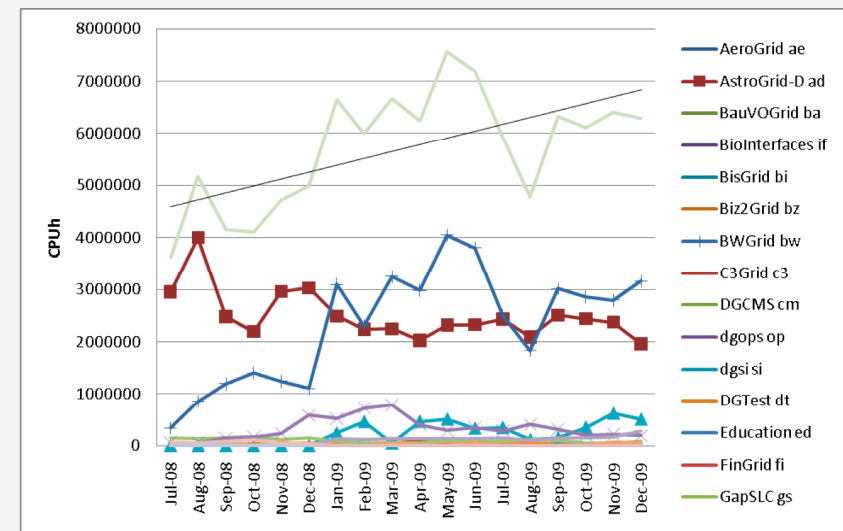
Managing Quality of Service in
Distributed Computing Infrastructures Workshop
March 17, 2010, Open Grid Forum 28, Munich, DE

Outline

- For those who do not know D-Grid
- Driven by use cases
- Nice architecture sketches
- Technology insights
- Challenges? Yes!
- Status quo

Status Quo D-Grid

- Heterogeneous Grid environment
 - Three middleware
 - OGSA-DAI, dCache, ...
 - Numerous “Core Services”
- > 30k cores in 2009 distributed all over Germany
- > 30 projects under the D-Grid umbrella
- D-Grid Integration Project steers operation, VO Mgmt, ...



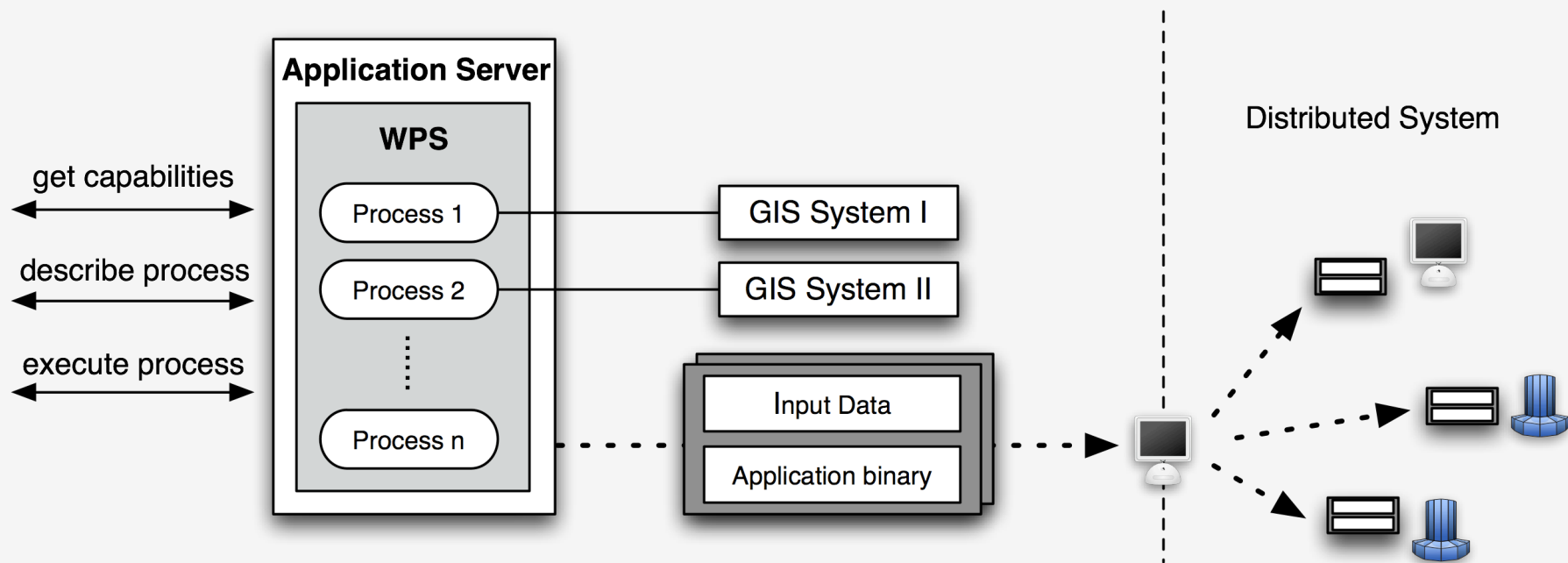
Objectives of SLA4D-Grid

- Main: Design and realisation of a Service Level Agreement layer for the D-Grid
- Secondary:
 - Quality of Service guarantees for D-Grid communities
 - New business models
 - Foundation for commercial resource providers
 - Close integration with existing D-Grid infrastructure

Use Cases

- From within the project
 - Geodata Infrastructures, con terra
 - Cloud offering, Sun Microsystems
- Academic
 - Resource delegation, DGSI
- Commercial
 - ERP SaaS, SAP

Spatial Data Infrastructures



B. Baranski, Grid Computing Enabled Web Processing Service, 2008

Resource Delegation

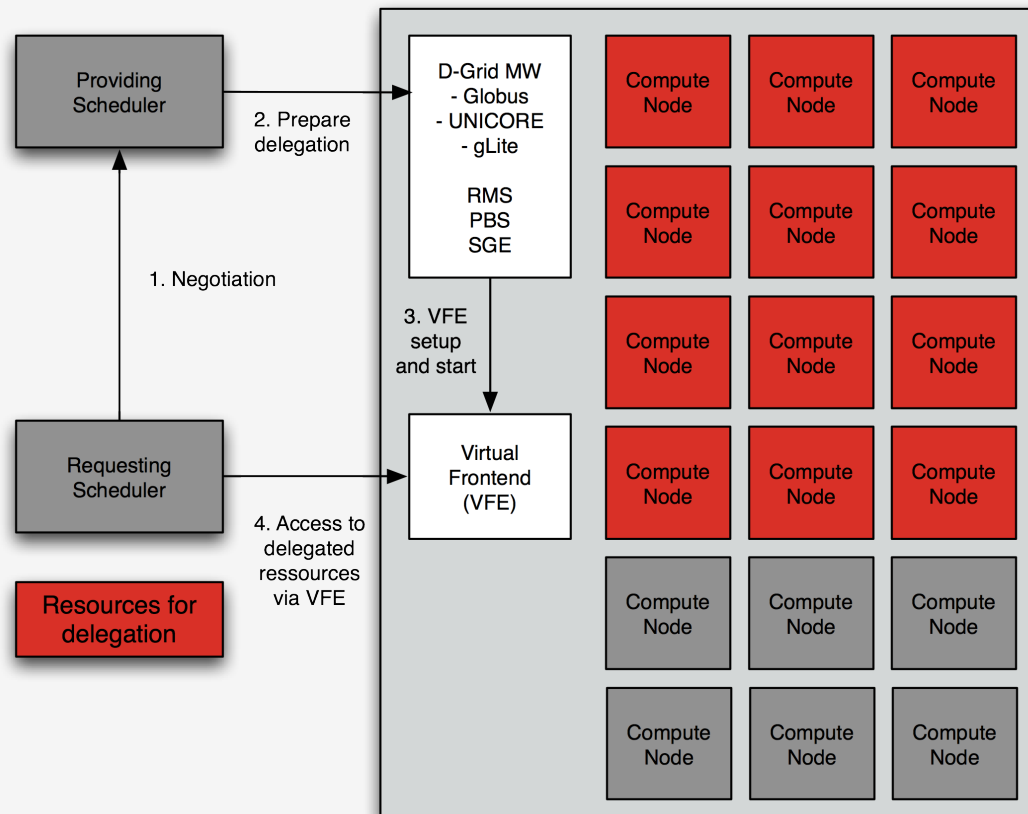
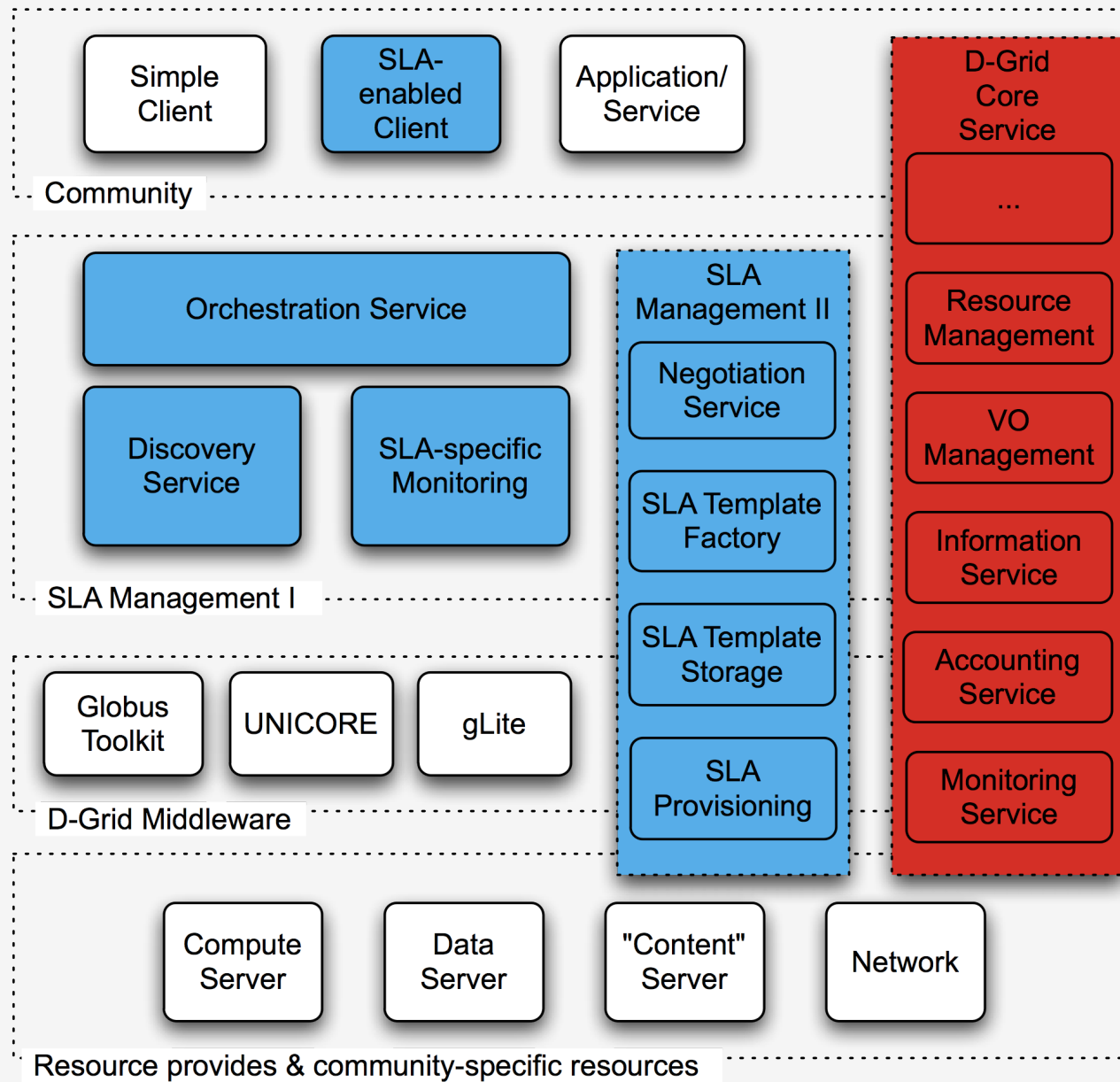


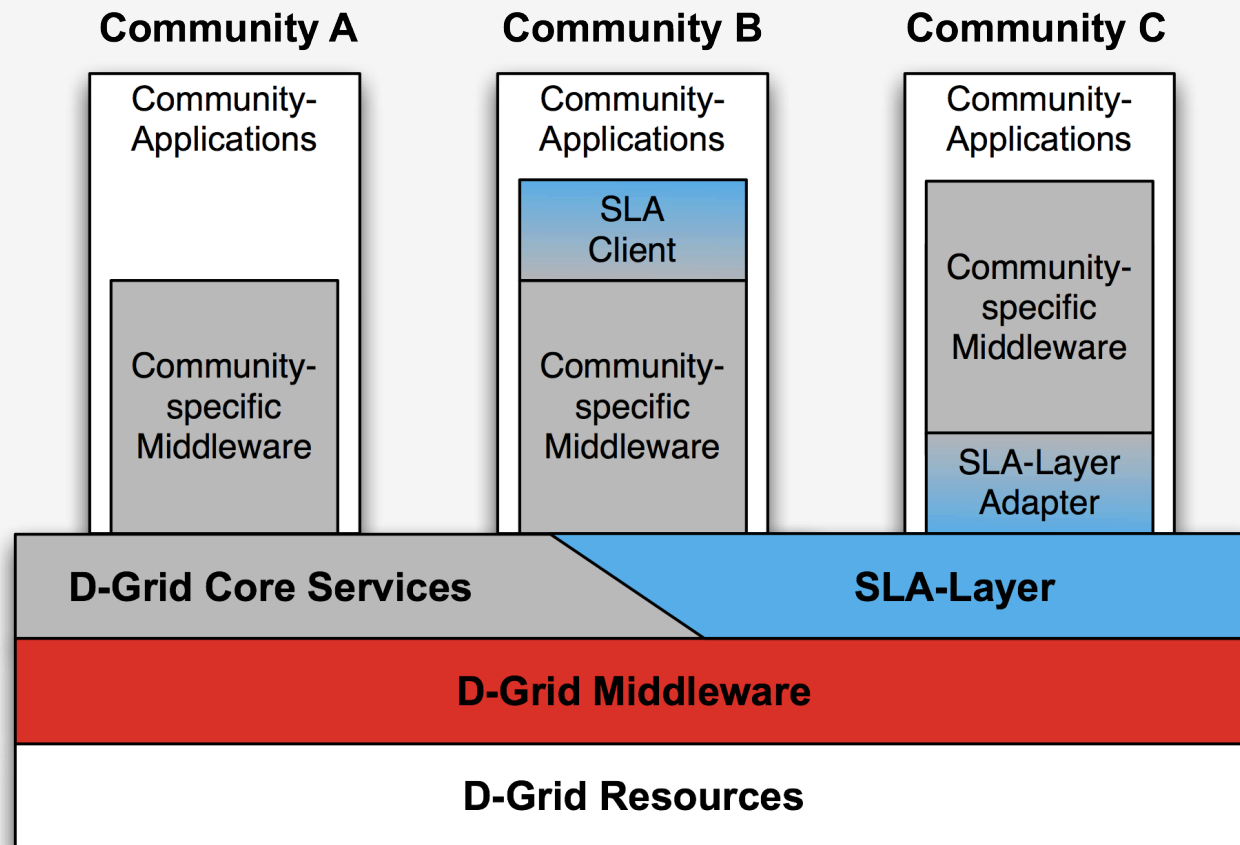
Figure by courtesy of DGSI

Approach

- SLA Layer: Develop a set of services for service-level management
- Generic SLA: Cover the main use of resource reservation
- Domain-specific SLAs: Covering the Use Cases
- User support: Clients, APIs, ...
- Integration: With D-Grid core services like monitoring, accounting, ...



Integration Plans

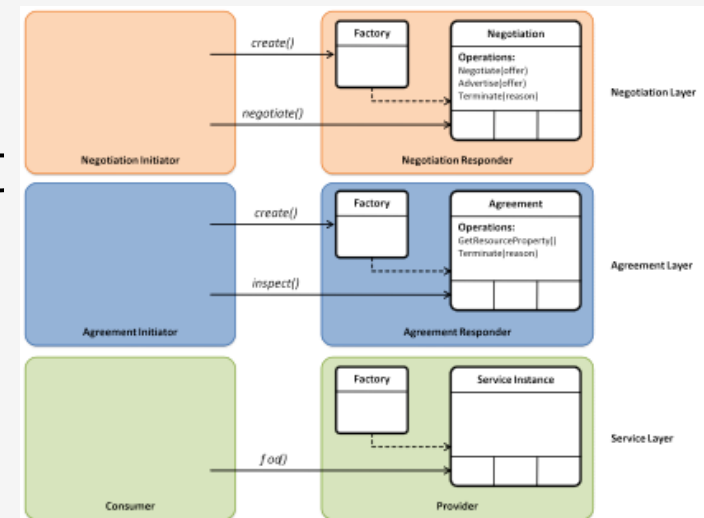


OGF-based Technology

- WS-Agreement as a basis
 - Generic SLA
 - Micro-specs for Advance Reservation, ...
- WS-Agreement for Java (WSAG4J) serves as core
 - Templates, Offers, Agreements
 - Monitoring
 - Negotiation
- JSDL (use case dependent) as requirements description

Spotlight on Negotiation

- Collaborative work: GRAAP, SmartLM, SLA@SOI, SLA4D-Grid
- Based on WS-Agreement
- Bilateral negotiation of agreement offers
- Support re-negotiation
- Symmetric protocol (re. Negotiation initialisation)



WS-Agreement Negotiation 1.0 draft, 2010

Spotlight on Advance Reservation

- Collaborative work: GRAAP, SLA4D-Grid
- Simple reservations
- OGF Micro-spec through GRAAP WG
- Service-level addition to DRMAA extensions proposed by PSNC?

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/
           xmlns:ar="http://www.ogf.org/gra
           targetNamespace="http://www.ogf.c
2009/04/"
           attributeFormDefault="qualified"
           elementFormDefault="qualified">
<xs:complexType name="TimeWindowType">
<xs:sequence>
  <xs:element ref="ar:StartTime" minOccurs="1" maxOccurs="1"/>
  <xs:element ref="ar:EndTime" minOccurs="1" maxOccurs="1"/>
</xs:sequence>
</xs:complexType>
<xs:element name="StartTime" type="xs:dateTime"/>
<xs:element name="EndTime" type="xs:dateTime"/>
<xs:element name="AllocationTimeConstraint"
  type="ar:TimeWindowType" />
<xs:element name="AllocationTime"
  type="ar:TimeWindowType" />
</xs:schema>
```

W. Ziegler, Initial Version of D-Grid SLA, 2009

Challenges I

- Heterogeneous Grid environment
 - “Democratic” process re. technology, operation, etc.
→ broad support vs leisurely process
 - Service offers like SLA4D-Grid’s have to support Globus, gLite, UNICORE
→ broad support vs implementation effort
 - Core services (monitoring, accounting) not offered across all middleware and miss SLA-related requirements
→ established technology vs business demand

Challenges II

- Grids and Clouds
 - All funding sources push strongly towards Clouds
 - well-established environment vs market pressure
 - Grid as a Service, Clouds as Grid resources
 - terminology vs reality
 - Service-level Management
 - resource-centric Grid vs service-centric Cloud

Challenges III

- Business model and modus operandi
 - Technical solutions can be provided by SLA4D-Grid, but integration into operational concept is done by D-Grid
→ service offer vs service operation
 - Legal issues are far from being solved
→ developer's dream vs legal reality
 - Business cases exist, but nobody ever ran business in D-Grid
→ Academic vs commercial

Status Quo

- Project is 10 months young
- Current focus on 1st prototype
 - Support for two use cases
 - SLA development, negotiation, implementation
 - Support for Globus, UNICORE
- Plans
 - Integration with D-Grid monitoring & accounting
 - Added value service-level management
 - Tackle the legal issues

Questions & Recommended Reading

QUESTIONS?

- Overview: <http://www.d-grid.de>
- On SLA4D-Grid: <http://www.sla4d-grid.de>
- Technical reports: soon to appear above
- WSAG4J: <http://packcs-e0.scai.fraunhofer.de/wsag4j/>
- Negotiation: <https://forge.gridforum.org/sf/go/doc15831?nav=1>