Vertical service-oriented solutions supporting industrial inter-enterprise collaboration

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IT Innovation
Understanding the distributed computing landscape
OGF21, Seattle, US, 16 Oct 2007
Contents

• Where are we today?
• The importance of vertical integration
• The designers and managers perspectives
• Conclusions
Where are we today?

- Enterprise Grids and SOAs are a fundamental part of IT strategy in most businesses
- Proof-of-concepts and pilot applications exist in many sectors that extend enterprise boundaries
- Businesses are beginning to focus on core functions rather than the IT
  - i.e. Grids and SOI are becoming part of the application enabling middleware
- Loosing the IT and achieving vertically integrated domain solutions is a CSF for middleware
Why vertical integration is so important

Management Tools

Problem Solving Tools

Trust/Security/SLA Services

Application Services

Provisioning and Monitoring

Applications/Information

Virtualisation

Nodes, Cores, Storage, Network

Resource Mgmt

Policy

Workflows, scripts, portals

Teams/Resources/Planning/Risks

Project Manager

Design Engineer

Tracking Gantt

Resource Graph
The Designers Perspective
Product design tools...we all make our choices!
An approach for interoperation

- Legacy Applications are wrapped as services
- Initial workflows are built from applications and published as services
- Further hierarchical workflows assembled from wrapped applications and workflows
- Benefits are that each site selects own technology and remains independent of workflow language
Four sectors of international economic importance:
Automotive
Pharmaceutical
Aerospace
Meteorology

Seven Grid-technology development areas:
Grid infrastructure
Distributed Data Access
VO Administration
Workflows
Ontologies
Analysis Services
Knowledge Services
Who are the SIMDAT Partners?

Application Users
- gsk
- Renault
- Audi
- EUMETSAT
- EADS
- Met Office
- DWD
- IDESTYLE

Capability Providers
- MSC Software
- ESI Group
- LMS
- inpharmatica
- University of Southampton

Grid Technologists
- IT Innovation
- NEC
- IBM
- FhG
- Universität Karlsruhe (TH)
- Intel
- Oracle

SIMDAT

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Aerospace: Multi-disciplinary Design

**Bae Systems**
- Aerodynamics Service
  - (Model Center, SunGridEngine, GRIA)

**Eads**
- Acoustics Service
  - (iSightFD, Torque/LSF, GRIA)

**University of Southampton**
- Design Optimisation Service
  - (Matlab, OGSA-DAI, Condor, GRIA)

**Msc Software**
- Structures Service
  - (Patran, GRIA)

SIMDAT
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Automotive Crash Compatibility Testing

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ESTEC Concurrent Design Facility
Current Limitations

- Lack of unified views and data representation of adopted engineering life-cycle support tools
- Need to involve too many highly specialized skills to build up project specific distributed environments
- Difficulty in sharing knowledge and expertise
- Long loops for technical decision-making in complex project organizations
- Inability to maximize benefits from use of available IT
Virtual Collaborative Facility
Critical Infrastructure Requirements

- Rights, access and resource management monitoring
- User friendliness in synchronous/asynchronous collaboration
- Easiness of reconfiguration (tools, collaboration scale)
- Integration with legacy network/hardware infrastructures
- Standard data access
Service-Oriented Architecture

- **Transport**: (HTTP, HTTPS)
- **Messagin**
- **AXIS 1.x, .NET/WSE
- **Persistence**: (File store, DB)
- **Security and Trust**: (Token services)
- **GRIA Client**
- **GRIA Account**
- **Security and Trust**: (Token services)
- **GRIA Project**
- **Registry**
- **Orchestration (Job / Workflow Services)**
- **Application (Derived from Scenarios)**
- **Workflow Client**
- **GDCD CDF Excel Client**
- **EPM EDM Server**
- **GRIA Job Service**
- **GDCD Data Service**
- **GRIA Data Service**
- **Collaboration Tools**
- **Video/Audio Conferencing**
- **Application (Derived from Scenarios)**
- **EPM EDM Server**
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Web Service interoperability works!

**.NET Framework**
- .NET 3.0
  - WCF
  - WPF/Silverlight
  - WF
- .NET 2.0
  - WSE 3.0

**WS-1**
- WS-Security
- WS-Addressing
- WS-I Basic Security Profile

**GRIA/Java**
- WSS4J
- Axis 1.4
- Windows XP/Linux/Mac OS X

Platform Independent

Hardware
Pan-European Deployment
The Managers Perspective
Procurement is well understood!

- Procurement of IT assets needs to be integrated with existing tools and processes
- Businesses already have mature procurement systems with approval and accountability routes
IT Procurement through Project and SharePoint

- Project managers procure SLAs from approved external suppliers based on RFQ’s
- One or two phase negotiation depending upon value of service
- MS Project and SharePoint provides management view of project resources
- GRIA provides B2B agreements and provisioning
Conclusions

- Vertically integrated inter-enterprise infrastructures are a reality today
- Next generation PSEs will support these capabilities based on Web Service standards
- Most research challenges have been technically solved
  - infrastructures support dynamic B2B procurement of IT assets
  - federated trust, security and relationship management is understood
  - telcos understand how to dynamically provision services
- Some operational and cultural challenges remain
  - business models for service provision and application licensing
  - changes to enterprise cost models resulting from fine-grained procurement
- Production deployment of basic inter-enterprise capabilities will be seen within the next 12 months in some industries
Thanks to all our partner contributions and specifically: