European Middleware Initiative (EMI) and Standards

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(Jülich Supercomputing Centre)

EGI Technical Forum & OGF33 Conference

Lyon, 19-24 September 2011

Thanks: Strategic Impacts over time

Roots to Success - OGF-Europe

OpenGridForum Europe

Cloudscape

OpenGridForum Europe

Occi
Open Cloud Computing Interface

ETSI
World Class Standards

Reservoir

Microsoft Research

OpenNebula

Cloud Computing

Cloudscape I & II

Cloud Adoption Reports

Cloud & Virtualisation Training

SDO Collaboration

Strengthening OGF in Europe

Supporting GIN WG
Establishment of PGI WG
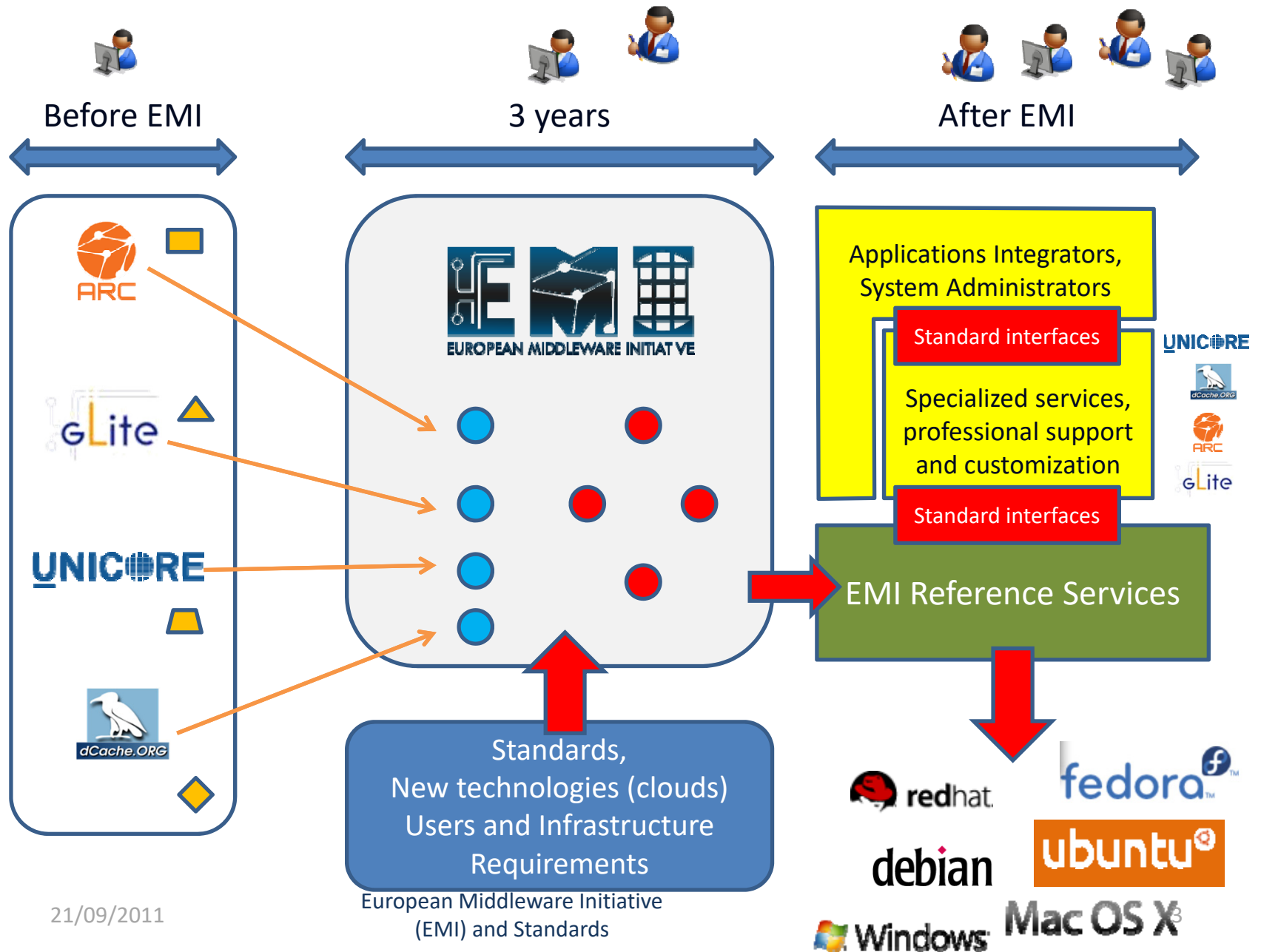
ETSI - Addressing Telcos & Cloud

Expert Contributions

Key Industry & Cloud provider Contributions

OGF-Europe successfully promoted and communicated the development of open standards and best practices with European leadership, in a truly global context, and by doing this, established an important pillar of the foundation for a distributed, computing infrastructure that will enable capabilities beyond current imaginations.

Some GIN/PGI Impacts:
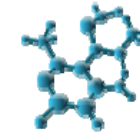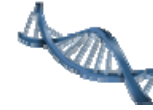**(with thanks to SIENA and Johannes Watzl)**

• **Collaboration in GIN/PGI with CREAM-BES, ARC-BES, and UNICORE-BES and several others broad EMI consortium together (after OMII-Europe) and thus as UMD in EGI are interoperable with DEISA/PRACE**

• **Collaboration in GIN/PGI with GENESISII-BES and UNICORE-BES led to joint efforts in XSEDE and interoperability across Europe and the US**

•**Thanks to OGF-Europe & SIENA**

•**SIENA will have a similar impact (perhaps after its life-time)**

EMI Middleware Evolution

EMI: e-Science Perspective

- **Focus for EMI: Support Science!**

- Scientific results through innovative usage of (interoperable) e-Infrastructures
  - Beyond pure SSH, also prepare for future usage

- Maturity of specific(!) interfaces and protocols necessary to establish users trust
  - EMI – Execution services as PGI concept implementations and long-term standardization
  - BES/JSDL, HPC-BP, small updates of them (PGI)

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EMI implements digital agenda parts

- Chairs OGF groups and implements standards from various SDOs together

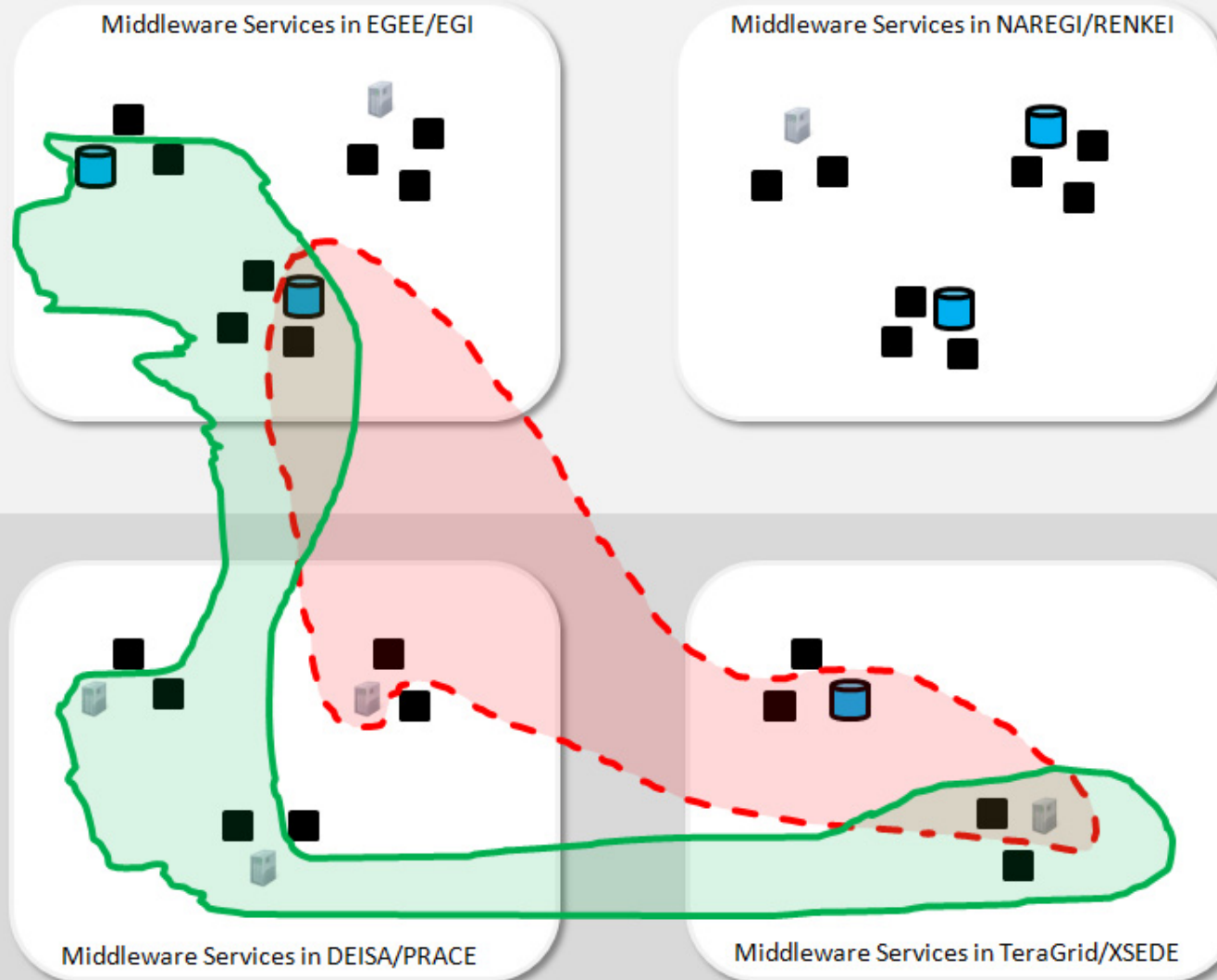Digital Agenda for Europe 2010-2020

Openness and interoperability

✓ Recognize and create **more and better standards** in Europe

✓ **Make better use** of these standards

✓ **Ensure interoperability** even in absence of standards

Digital Agenda Part on Interoperability

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Enabling Individual Infrastructures

We moving closer to our OGF Grid Interoperation Now (GIN) VISION

Middleware Services in EGEE/EGI

Middleware Services in NAREGI/RENKEI

Middleware Services in DEISA/PRACE

Middleware Services in TeraGrid/XSEDE

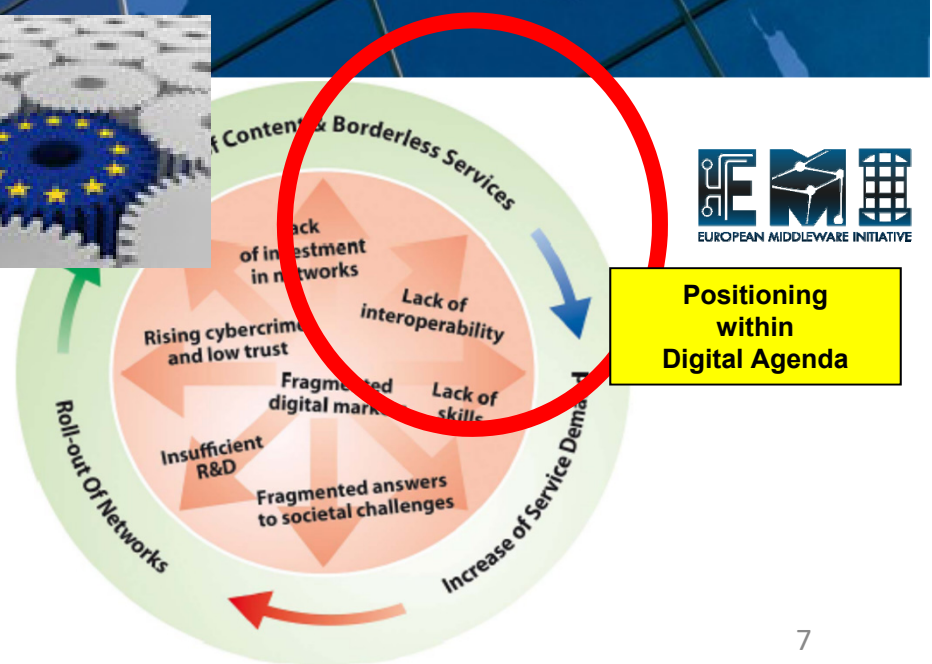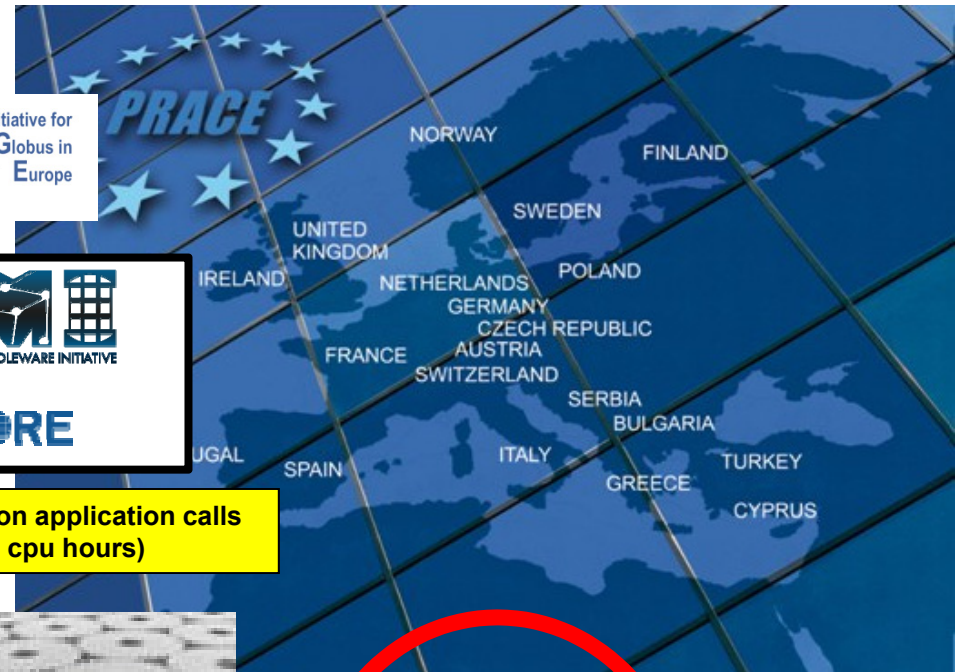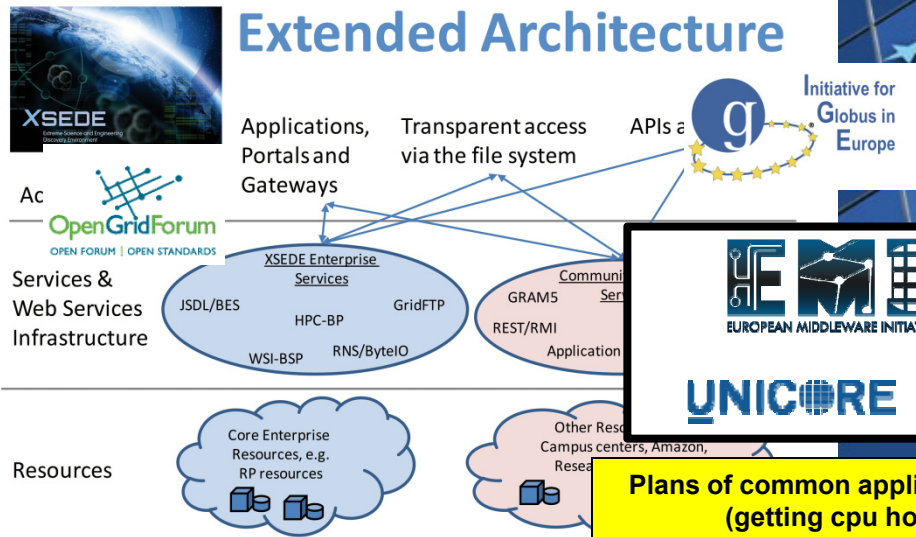(i) Traditionally HTC-driven e-science Infrastructures

(ii) Traditionally HPC-driven e-science Infrastructures

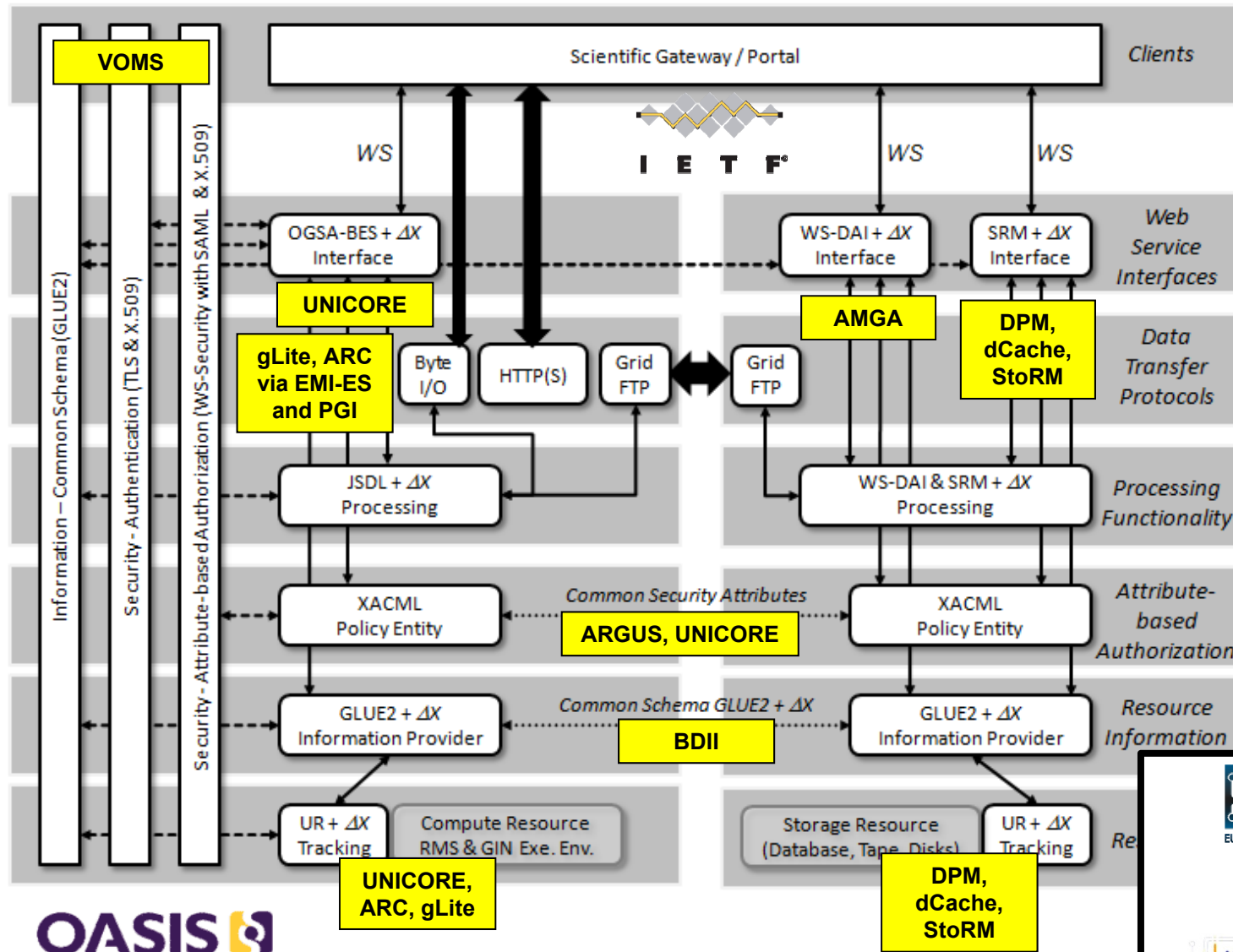Legend: Data Resource Compute Resource Services in middleware Individual Infrastructures

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EMI & e-Infrastructure Landscape

Plans of common application calls
(getting cpu hours)

Positioning
within
Digital Agenda

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EMI Overview & PGI Reference Model

21/09/2011

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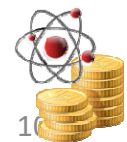
Standards Summary

- Open Grid Forum
  - GLUE2 to describe products in the EMI ecosystem
  - BES/JSDL & evolution with PGI for job submission
    - EMI-ES proposal that implements PGI concepts for validation
  - SRM in three storage products, WS-DAI in metadata catalogue
  - UR with extensions for compute and storage!
    - EMI Storage Accounting Record Proposal
- OASIS
  - SAML and XACML
- On the horizon
  - OGF DRMAA version 2 and evolutions coming out of PGI
  - Cloud standards are observed (OCCI, CDMI), not adopted
  - WS-Trust, towards federated identity, etc.
- Recommendation: Not invent new standards, mature existing ones! Stability of technologies important.

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Next Steps

- Use (interoperable) middleware in science
  - Being 'open minded' and flexible, but still requiring stability of approaches for scientists

- Virtually hosted middleware using cloud methods (e.g. within virtual appliances)
  - Some EMI products might be useful for clouds

- Drive further standardization to encourage uptake of EMI products by industry
  - E.g. SAML, XACML, federated identity

- Explore sustainability models for EMI!

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Engaging with EMI in Open Source Models!

Incubation   **in the right condition!**   **becomes**

Join EMI work on searching models for sustainable software in science!

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Macro R&D Infrastructures model

Community model

Support contracts or Subscription model

Dual-licensing or Commercial model

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