Interoperability in Grid Computing

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Special Interest Session III

Outline: Interoperability in Grid Computing

- Grid Computing for Medicine and Life Science
- Interoperability
- Architecture and Middleware
- Data Access
- Portal
- Application Classes and Applications
- Service oriented Grids

Evolution of Grid Computing

long term

Inter Grids: Wide Area Service Grids
- Globale Grid Service Infrastructure
- international, global Grids
- Semantic Grids
- Service Oriented Knowledge
- Utilities (SOKU)

Evolutiuon

medium term

Extra Grids: Distributed Partner Grids
- Distributed Enterprise and Campus Environments
- Integration of Partners, inter organisational Collaboration,
- Virtual Organisation
- Security, inter organisational load balancing

short term

Intra Grids: Enterprise Grids
- process management across departments
- Authentification, Authorisation, Security, Accouting
- additional options e.g. load balancing

Time

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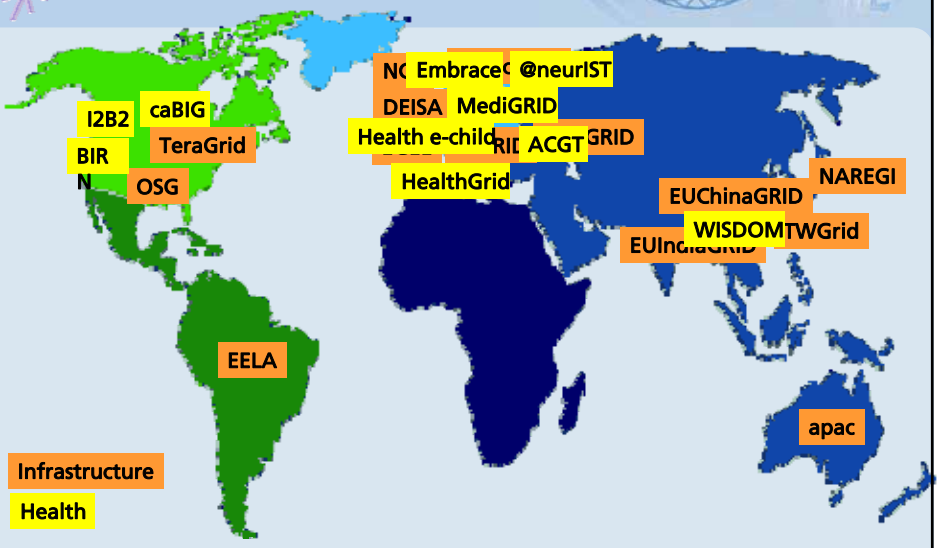
Grid Projects (selection)



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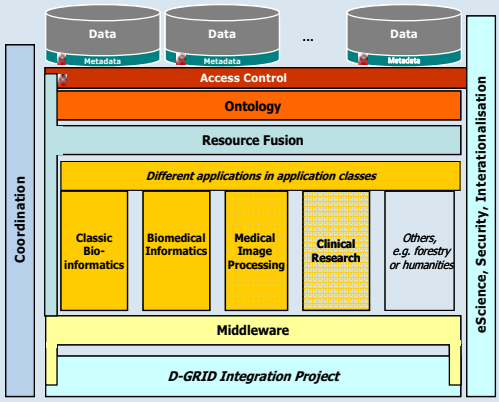
MediGRID - Grid Computing for Medicine and Life Sciences

Enhance **interdisciplinary and widely location-independent collaboration** within medical and biomedical research by use of GRID technologies

GRID-services in a controlled e-Science platform which is continually available, economically calculable and secured by policies as well as their implementation offer a promising opportunity for the support of future collaborative research with efficient, modern IT tools.

Transparent access to distributed resources through **virtualisation** enabled by a GRID.



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Specific Requirements in MedGRID

- Highest requirements on data protection and privacy (patient data, data from biosamples, genome data)
- The data basis is relatively inhomogenious as the standardization of data formats (e.g. in medical imaging or clinical studies) is so far not very advanced.
- Lack of semantic interoperability.
- Heterogenouse User Community.
  MediGRID users and their main tasks:
  - Doctor (looking for data, providing data, processing data)
  - Assistant Medical Technician (providing data)
  - Researcher doing bioinformatics (processing data)
  - Researcher doing clinical studies (processing data)
  - Radiologist (providing and processing data – e.g. mammograms -> medical image processing)
  - etc.

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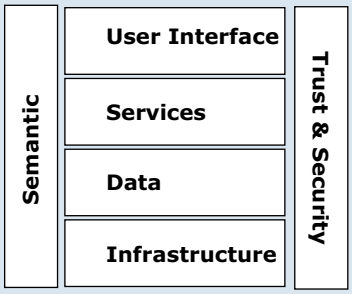
Interoperability

Interoperability is the collaboration of different systems, techniques and organisations.

IEEE Definition:

Interoperability is the ability of two or more systems or components to exchange information and to use the information that has been exchanged.

Necessary Requirements:
- Standards
- Semantical interoperability: speaking the same »language«



Source: Institute of Electrical and Electronics Engineers. IEEE Standard Computer Dictionary: A Compilation of IEEE Standard Computer Glossaries. New York, NY: 1990.

Grid Technologies Overview

Open Source Products:
- Globus Toolkit
- Unicore
- gLite
- Condor
- Phast Grid
- GRIA
- BOINC
- Storage Resource Broker (SRB)
- OGSA-DAI (Data Access and Integration)
- XEN
- VMWare
- eXeGrid

Commercial Products:
- Univa: Globus Toolkit
- Sun N1 Grid Engine
- Nirvana SRB
- Oracle 10g Suite
- Data Synapse GridServer
- United Devices GX Synergy
- Grid Systems Nitya Extended Suite
- Platform Computing
  - Platform Globus Toolkit
  - Enterprise Grid Orchestrator
  - LSF
- Sybase: AVAKI Enterprise Information Integration (EII)

Standardisation Organisations (selection)

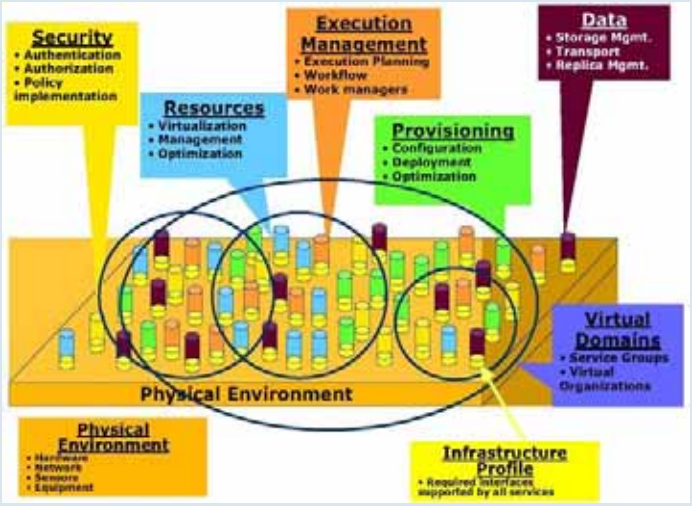
Internet Engineering Task Force (IETF)
- Internet Protocol (Version 1: RFC 791, Version 6: RFC 2460
- Transmission Control Protocol (RFC 793)

W3C – World Wide Web Consortium
- HTML, XML, XSLT, etc.

Organization for the Advancement of Structured Information Standards (OASIS)
- Web Services Resource Framework (WSRF) / WSRF.net, SAML, XACML,…

Open Grid Forum (OGF)
- Open Grid Services Architecture (OGSA)
- »GIN - Grid-Interoperability-Now« group within the Open Grid Forum works on interoperability between e-Infrastructures in order to provide services to global user communities

Open Grid Services Architecture Framework 1.5



Quelle: The Open Grid Services Architecture, Version 1.5, https://forge.gridforum.org/sf/docman/do/downloadDocument/projects.ogsa-wg/docman.root.published_documents.ogsa_1_5/doc13553