



Development and Operation of the D-Grid Infrastructure

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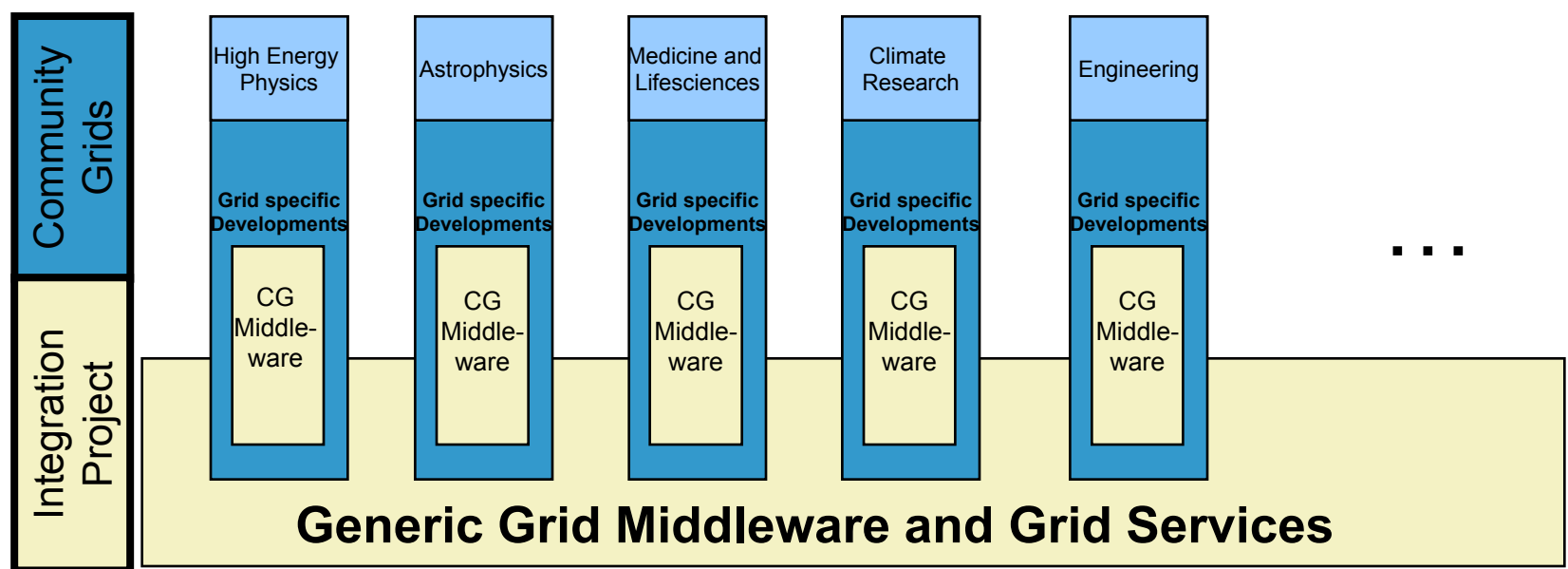
- D-Grid – projects for a german national grid initiative funded by BMBF since 2005
- General grid environment for e-Science and business
- Community grid projects + integration project
- Integration of developments from other projects (EGEE, UNICORE, Globus)
- Integration of developments from communities
- Provision of software needed by communities
- Scalable, extensible, generic grid platform
- Installation of a reliable and sustainable infrastructure

→ Core D-Grid

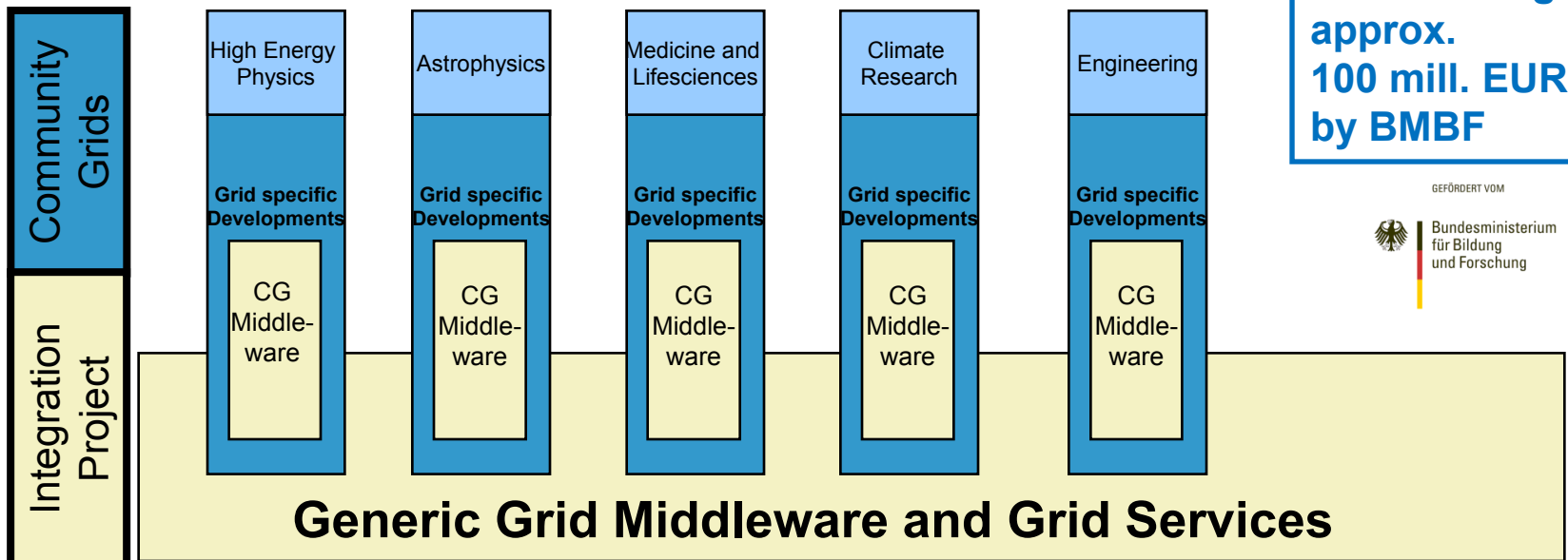


Community grids / integration project

- Initially 7 community projects (D-Grid 1, 2005-2008)
- 15 new community projects (D-Grid 2, 2007-2010)
- Possibly more new community projects (D-Grid 3)
- Integration project DGI-1 (2005-2007) / DGI-2 (2008-2010)
 - Installation, operation, and development of the grid infrastructure



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total funding of approx. 100 mill. EUR by BMBF

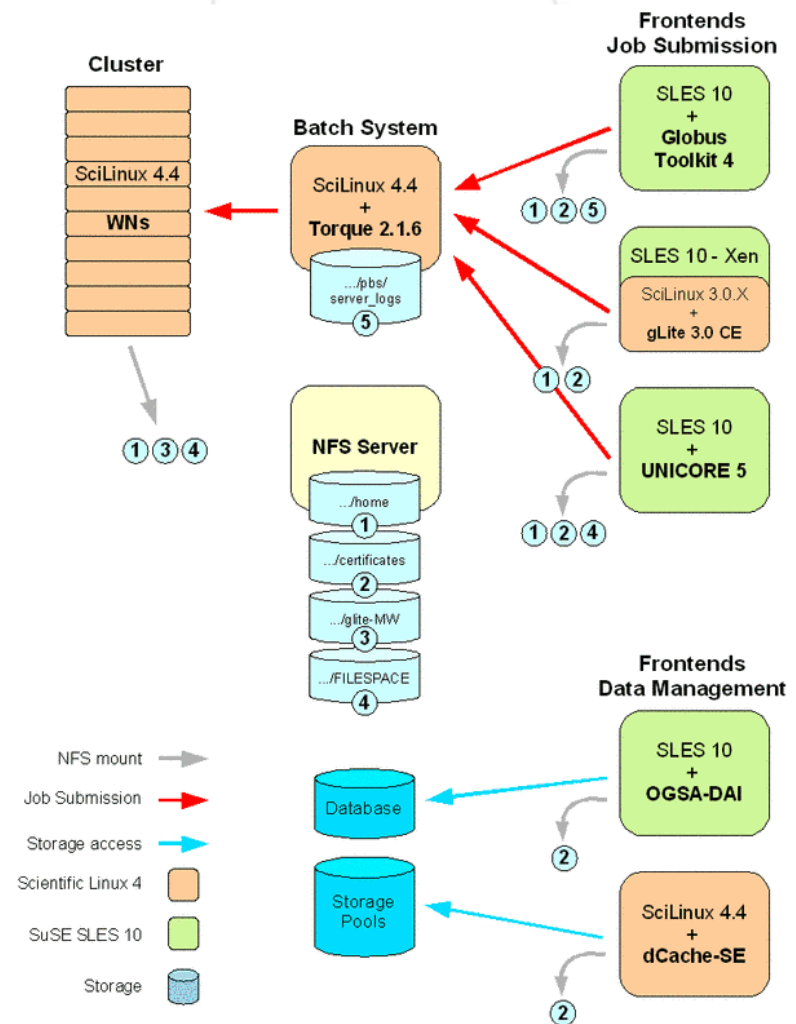


- Initially 10 partners, own compute and storage resources
 - extremely heterogeneous (from cluster to supercomputer)
 - installation of middleware stack and integration complicated
 - experience with different middleware on different platforms
- Additional funding of investments by BMBF
 - 2006: compute and storage resources at 25 partner sites, 2200 CPU-Cores, 800 TB Disk, 1.4 PB Tape
 - 2007: further investments of about 20 mill. EUR
 - hardware less heterogeneous
 - new concept to operate several middleware systems on one resource
 - new development of a Grid Resource Registry Service (GRRS)



Grid middleware

- Reference installation
- Whole middleware stack on single resource
 - Globus
 - LCG / gLite
 - UNICORE
 - OGSA-DAI
 - dCache
- Example for resource providers
- Maintained and updated



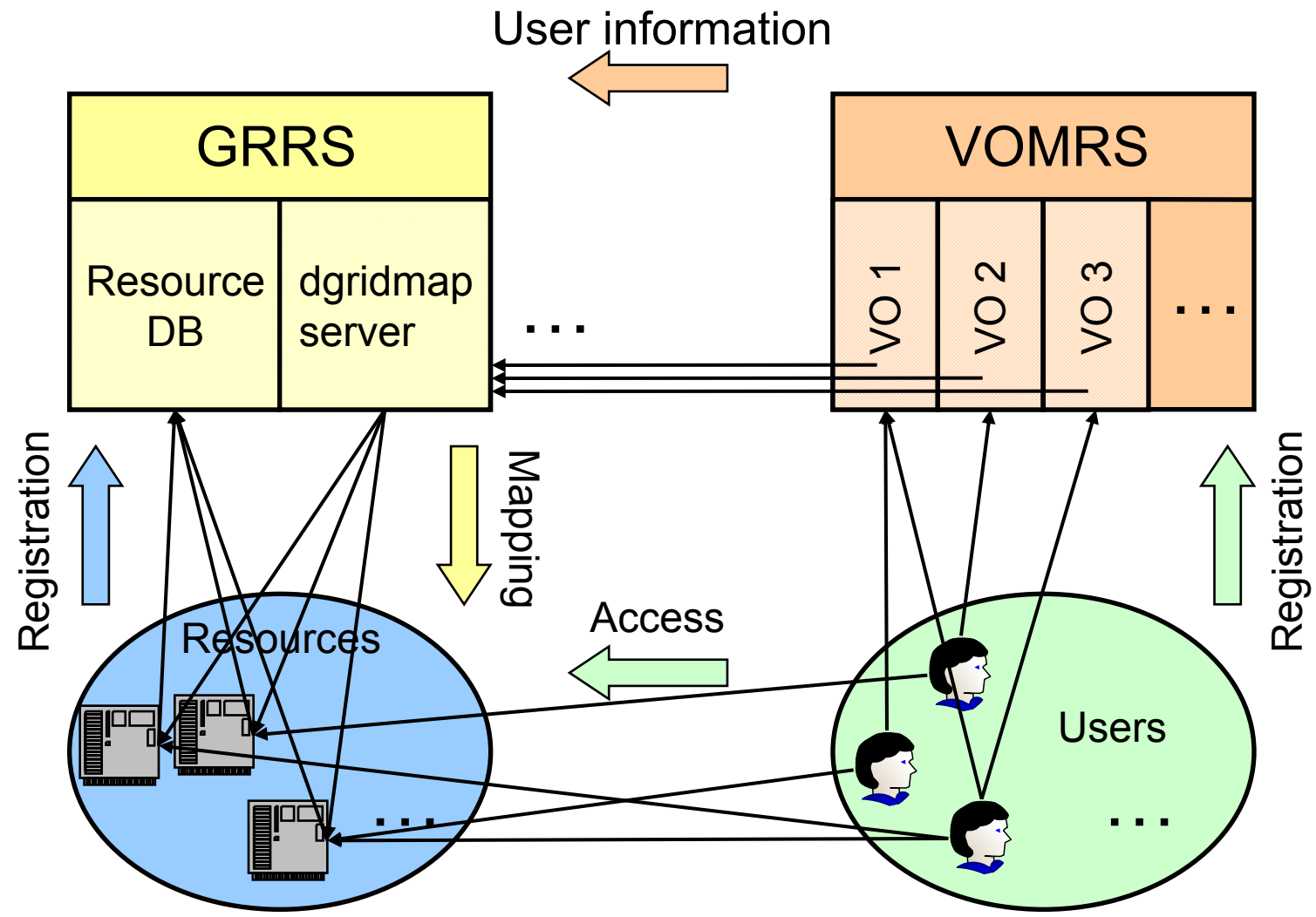
- Point of information <http://www.d-grid.de>
- Public Key Infrastructure (2 CAs, RAs all over the country)
- User and VO management
- Resource management
- Monitoring status of resources and accounting
- User support / trouble ticket system <http://dgus.d-grid.de>
- Provision of grid middleware for resources and clients
- Training courses
- Central D-Grid middleware services
 - *Globus*: MDS4 index, WebMDS, MyProxy
 - *LCG / gLite*: BDII, R-GMA, broker, file catalog, VOMS, central user interface
 - *UNICORE*: gateway

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increase availability of services
by redundant infrastructure
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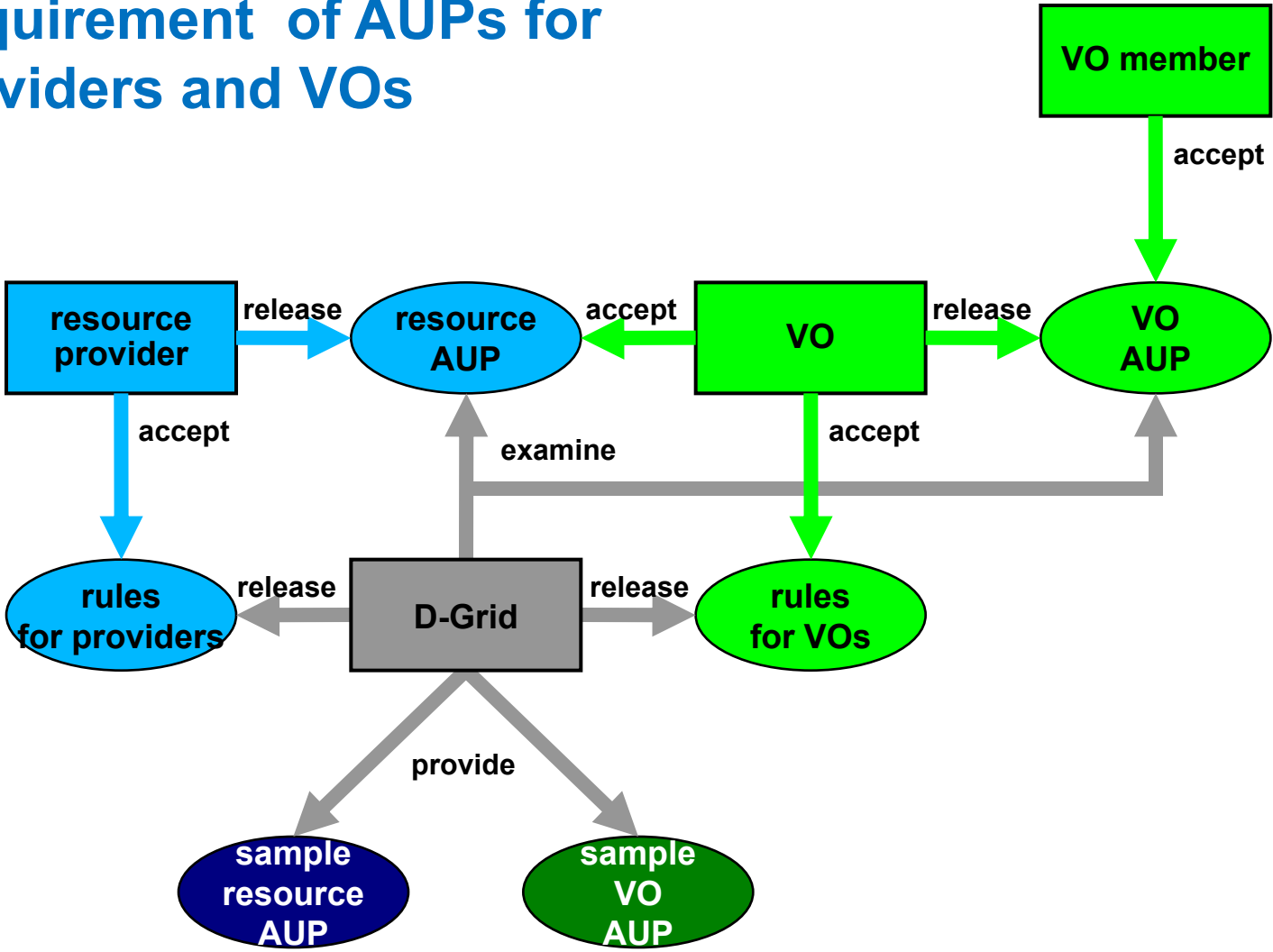


- Registration of resources at **Grid Resource Registry Service** (GRRS)
 - resource database
 - <https://dispatch.fz-juelich.de:8814/D-Grid-Resource-List>
- Registration of users at **Virtual Organization Management Registration Service** (VOMRS) for their community / VO
 - member database
 - currently 14 VOs
 - <https://dispatch.fz-juelich.de:8814/D-Grid-VO-Member>
- **Support of groups (sub-VOs)**
- **dgridmap** service: server in GRRS, client on resource
 - user mapping for each middleware system
 - Globus, LCG/gLite, UNICORE, OGSA-DAI, dCache

- *Globus*: MDS4 / Web-MDS for Globus resources
 - geo-data / resource status
 - hierarchical structure site / resource
- *LCG / gLite*: site functional tests
- *UNICORE*: client monitoring window
 - new developments with UNICORE 6
- Separate D-Grid project for monitoring D-MON
 - development of a unified monitoring framework
 - collect data from Globus, gLite, UNICORE
 - integration of D-MON results into the D-Grid infrastructure
- Accounting system under development
 - based on the Distributed Grid Accounting System (DGAS)
 - collect data from Globus, gLite, UNICORE

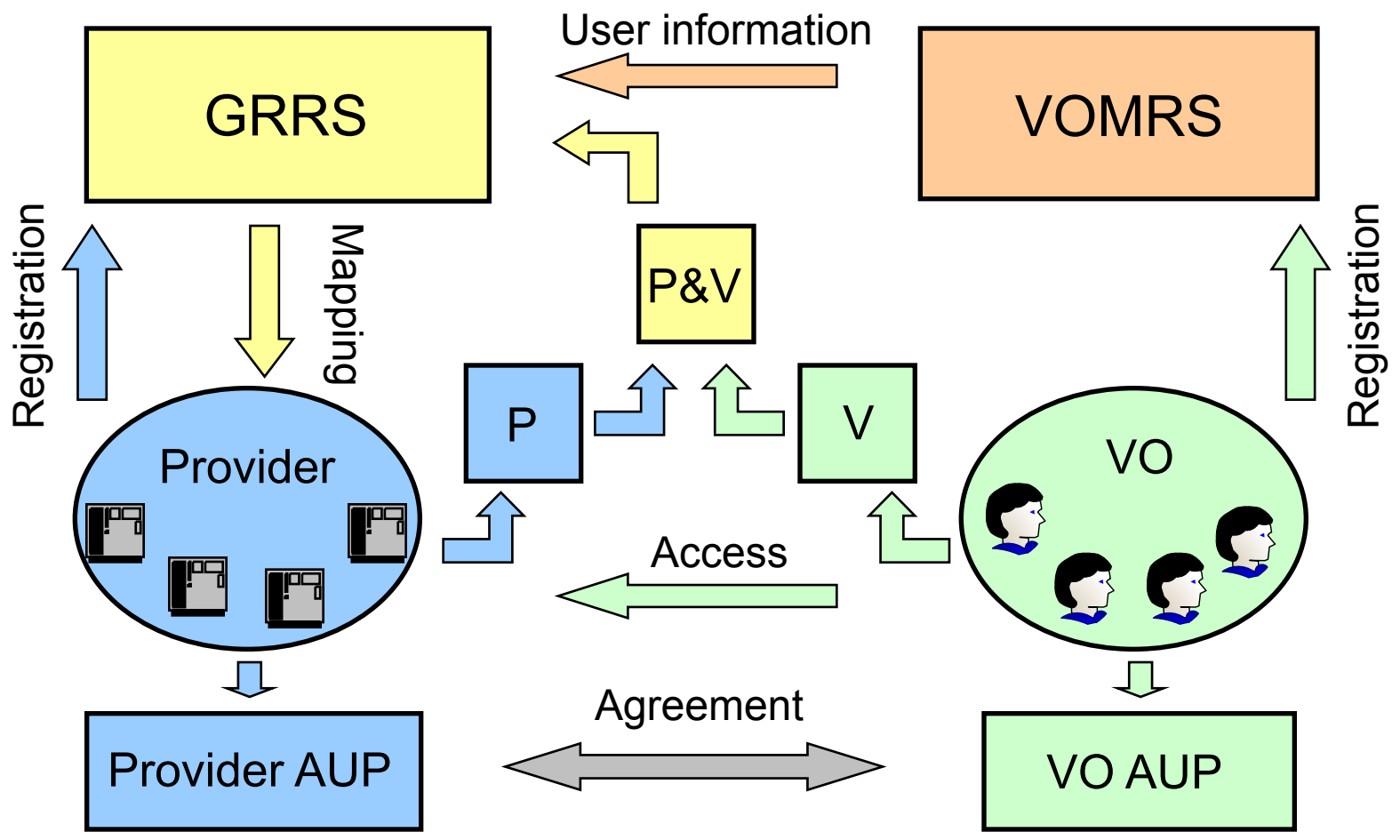
Policy relations between users and resource providers (1)

Requirement of AUPs for providers and VOs



Policy relations between users and resource providers (2)

Requirement of a more flexible mapping resource - VO



- Providing new services required by business partners
- Creation of a legal entity: **D-Grid Entwicklungs- und Betriebsgesellschaft mbH** (~ limited liability corporation)
- Automated creation of virtual organizations
 - support of VOs with shorter life time
- Short Lived Certificates (SLC) issued by a Short Lived Credential Service (SLCS)
- Quality of Service (QoS) / Service Level Agreements (SLA)
- Integration of scheduling / brokering services
- Common production environment
 - compilers, MPI etc., application software from communities by means of modules and images
- Further development of operational concept

- Infrastructure for a rapidly growing grid
- Support for communities with different background and requirements
 - scientific communities
 - business partners
- Concept for easy integration of resources
- Support of 3 middleware systems for compute resources and 2 middleware systems for storage resources
- Common production environment
- Common monitoring and accounting infrastructure
- D-Grid is involved in the European Grid Initiative (EGI)



Partners of DGI-2

Universität Dortmund



R | R | Z | N |

Leibniz
Universität Hannover



Max-Planck-Institut
für Gravitationsphysik
(Albert-Einstein-Institut)



Forschungszentrum Karlsruhe
in der Helmholtz-Gemeinschaft

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