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Standards and interoperation: The KnowARC approach

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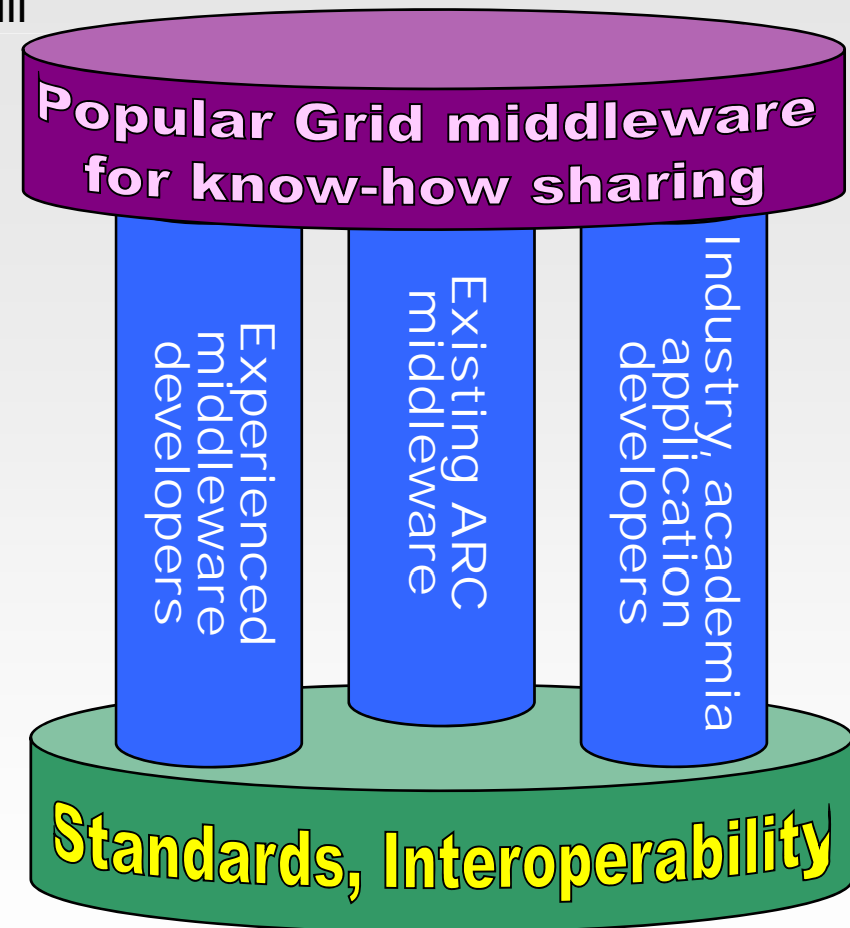
EGEE07, Budapest, 4 October 2007

Interoperation via standards



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- ✦ NorduGrid expects that core standards will be embraced by our target systems:
 - ❖ Glite, Unicore, Globus, Gria,..
 - ❖ Gateways are temporary solutions
- ✦ NorduGrid is replacing the *ARC Classic* custom interfaces with community embraced ones
 - ❖ Job management
 - ❖ Information model
 - ❖ Job description
- ✦ NorduGrid is proactive in standardization
 - ❖ Most of the community embraced standards are immature
 - ❖ “*Super Computing Demo standards*” are not sufficient for production



On interoperability of “pre-standard” middlewares



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- ✚ For simplicity, let’s “forget” most of the major middlewares (UNICORE, Avaki, SRB, GT4, Condor, etc) and take a look at only on the Glite(LCG) vs ARC interoperability:
 - ❖ both are production level middlewares
 - ❖ both are mostly pre-standard implementations (non WS-based systems)

Component	Glite (LCG)	ARC Classic
Basic software stack	GT2 solutions from VDT, WMS	pre-WS GT libraries, ARC Grid Manager, ARC Gridftp server
Data transfer	GridFTP , SRM v?	GridFTP , SRM v1.1 client
Data management	EDG RLS, Fireman & Co, LFC	RC, RLS, Fireman
Information	LDAP , GLUE1.1, BDII-GIIS, R-GMA, <i>interested in “Glue2”</i>	LDAP , ARC schema, ARC-GIIS, <i>interested in “Glue2”</i>
Job description	JDL (based on classAds)	XRSL, <i>also JSDL support</i>
Job management (CE interface)	mixture of Condor & GRAM, CREAM	ARC protocol via GridFTP
Security	GSI, VOMS , MyProxy, CAS (?)	GSI, VOMS , GACL

Approach to standardization (1/2)



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- ❖ **Interoperability efforts:**
 - ❖ KnowARC conducted an “*Interoperability minimum service survey*”
 - ❖ good starting point in understanding different existing systems and documenting their interfaces
 - ❖ KnowARC/NorduGrid is active in OGF-GIN group
 - ❖ KnowARC is developing gateway-like solutions
- ❖ **ARC Standard conformance roadmap** was made public
 - ❖ fragmentation of the standardization landscape and process
 - ❖ by far too many (non-implemented) proposals of numerous Standard Development Organizations
 - ❖ integration concerns: can all these proposals be implemented and used together?
- ❖ **Concentrate standardization efforts** on areas where major middleware and infrastructure providers are represented
 - ❖ major players: Globus, Condor (OSG), Unicore, Glite (EGEE), OMII, Chinese middleware(s), ObjectWeb (Proactive), ARC (NorduGrid)
- ❖ **Avoid** emerging “**de facto standards**” defined **by implementations**
- ❖ **Avoid standardization of software stack**
- ❖ **Focus on Interfaces, Interfaces, Interfaces**

Approach to standardization (2/2)



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Areas where **standardization is urgently needed**:

- ✦ Job description language
 - ❖ JSDL 1.0 is deliberately narrowly focused
- ✦ Information models
 - ❖ representation of main Grid-related objects:
 - Computing & Storage services and resources
 - Grid jobs, Virtual Organizations
- ✦ Standard interface to core OGSA services
 - ❖ Computing resources (execution service)
 - ❖ Standard interface to Storages
 - ❖ Application environment management on Grid
- ✦ Description of job execution environment
 - ❖ Application environments
- ✦ Virtual Organizations
 - ❖ E.g.: Naming
- ✦ Standards related to Grid economy
 - ❖ Usage Records, etc...



- ✦ Project partners are active in posting **public comments**
 - ❖ BES specification
 - ❖ HPC Profile
 - ❖ JSDL errata
 - ❖ OGF Strategic Roadmap
 - ❖ Information modeling guidelines
- ✦ Joined the work of many OGF working group
 - ❖ JSDL, OGSA, OGSA-BES, JSDL, GIN, GLUE
- ✦ Plays **leading role** in the Glue Working Group
 - ❖ Main contributor to standard draft
 - ❖ Co-chair
- ✦ KnowARC is committed to **provide early implementations** of relevant specifications:
 - ❖ Already supports JSDL and BES, will support GLUE2
- ✦ Communicate back NorduGrid extensions

BES implementation from KnowARC: A-REX



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- ✦ BES-compliant job execution service: A-REX
 - ❖ BES-Factory port type is implemented
 - ❖ New WS Interface over the *classic ARC* execution service
- ✦ NorduGrid BES-Extensions:
 - ❖ A-REX port-type with **ChangeActivityStatus** operation
 - ❖ Job Status extensions with **ARC substates**:
 - Accepting, Accepted, Preparing, Prepared, Submitting, Executing, Killing, Executed, Finishing, Failed, Pending, Held
- ✦ Further extensions to be considered:
 - ❖ **stagin** directory specification
- ✦ Interface definition:
 - ❖ http://www.knowarc.eu/documents/Knowarc_D1.2-1_07.pdf
- ✦ Prototype code is available

Support for JSDL version 1.0



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- ✦ XRSL is the primary job description language of ARC
 - ❖ XRSL is more expressive than JSDL 1.0
 - ❖ "Nordugrid's Extended Globus RSL (xRSL) vs JSDL 1.0":
 - <http://www.nordugrid.org/documents/jsdl-vs-xrsl.pdf>
- ✦ ARC provides support for JSDL v1.0
 - ❖ by job submission clients
 - ❖ by job management/execution services
 - ❖ with the necessary **Nordugrid extensions**:
 - http://svn.nordugrid.org/trac/nordugrid/browser/arc0/trunk/arclib/jsdl_arc.xsd

GLUE 2: A Super GLUE



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- ✦ GLUE 1.X is an important experience in the context of information modeling of Grid resources
 - ❖ De-facto standard
- ✦ Other approaches exist
 - ❖ e.g.: NorduGrid Schema, NAREGI Schema
- ✦ Can we create a Super GLUE
 - ❖ that unifies all the modeling efforts?
 - ❖ that is accepted as an open standard?



Slides borrowed from Sergio Andreozzi

GLUE 2: OGF Working Group



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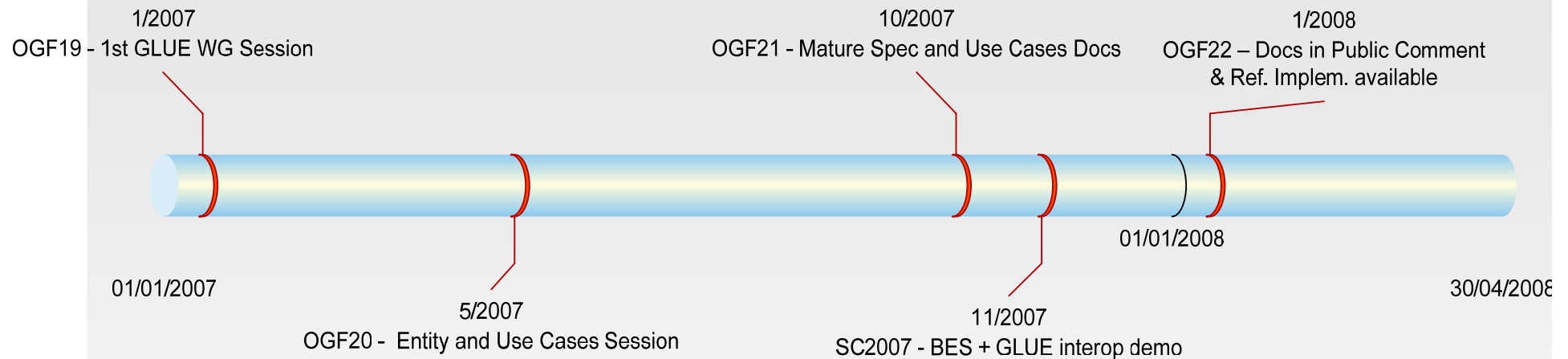
- ✦ New OGF Working Group approved at OGF 19 (Jan 2007)
 - ❖ <http://forge.ogf.org/sf/projects/glue-wg>
- ✦ Focus:
 - ❖ facilitate interoperability between Grid infrastructures via common information models and reference implementation for describing Grid resources in response to use cases
- ✦ Goal:
 - ❖ define a use case document collecting use cases from different Grid projects/infrastructures
 - ❖ define a conceptual model defining the abstract schema GLUE 2.0 satisfying the collected use cases.
 - ❖ develop reference implementations

KnowARC co-chair

GLUE 2: Tentative timeline



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Latest Draft Versions available:

<http://forge.ogf.org/sf/docman/do/listDocuments/projects.glue-wg/docman.root.drafts>

Slides borrowed from Sergio Andreozzi



- ❖ Interoperability minimal service survey
 - ❖ http://www.knowarc.eu/documents/Knowarc_D3.1-1_07.pdf
- ❖ KnowARC standards conformance roadmap
 - ❖ http://www.knowarc.eu/documents/Knowarc_D3.3-1_06.pdf
- ❖ GLUE Working Group of OGF
 - ❖ <https://forge.gridforum.org/sf/projects/glue-wg>
- ❖ Technical documents (in "EU deliverable" format):
 - ❖ www.knowarc.eu/documents
- ❖ ARC1 Code:
 - ❖ svn.nordugrid.org -> arc1 directory
 - ❖ technology-preview packages as public deliverables from www.knowarc.eu/documents
- ❖ Technical threads on nordugrid-discuss mailing list