



Data

EMI Data, the unified **European
Data Management Middleware**

Patrick Fuhrmann (DESY)

EMI Data Area lead

Credits

- Alejandro Alvarez
- Alex Sim
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- Elisabetta Ronchieri
- Fabrizio Furano
- Giuseppe Fiameni
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- Giuseppe Lo Presti
- Jon Kerr Nilsen
- Jan Schaefer
- Jean-Philippe Baud
- Karsten Schwank
- Michele Carpane
- Michele Dibenedetto
- Michail Salichos
- Mischa Salle
- Oscar Koeroo
- Oliver Keeble
- Paul Millar
- Ralph Mueller-Pfefferkorn
- Ricardo Rocha
- Riccardo Zappi
- Tigran Mkrtchyan
- Zsolt Molnar
- Zsombor Nagy

Our wiki : <https://twiki.cern.ch/twiki/bin/view/EMI/EmiJra1T3Data>

Outline

- The EMI Factsheet
- From 22 Partners to EMI-Data (quick and boring)
- The EMI-Data shopping cart.
- The EMI(-Data) release plan.
- The EMI-Data Mission
- Conclusions



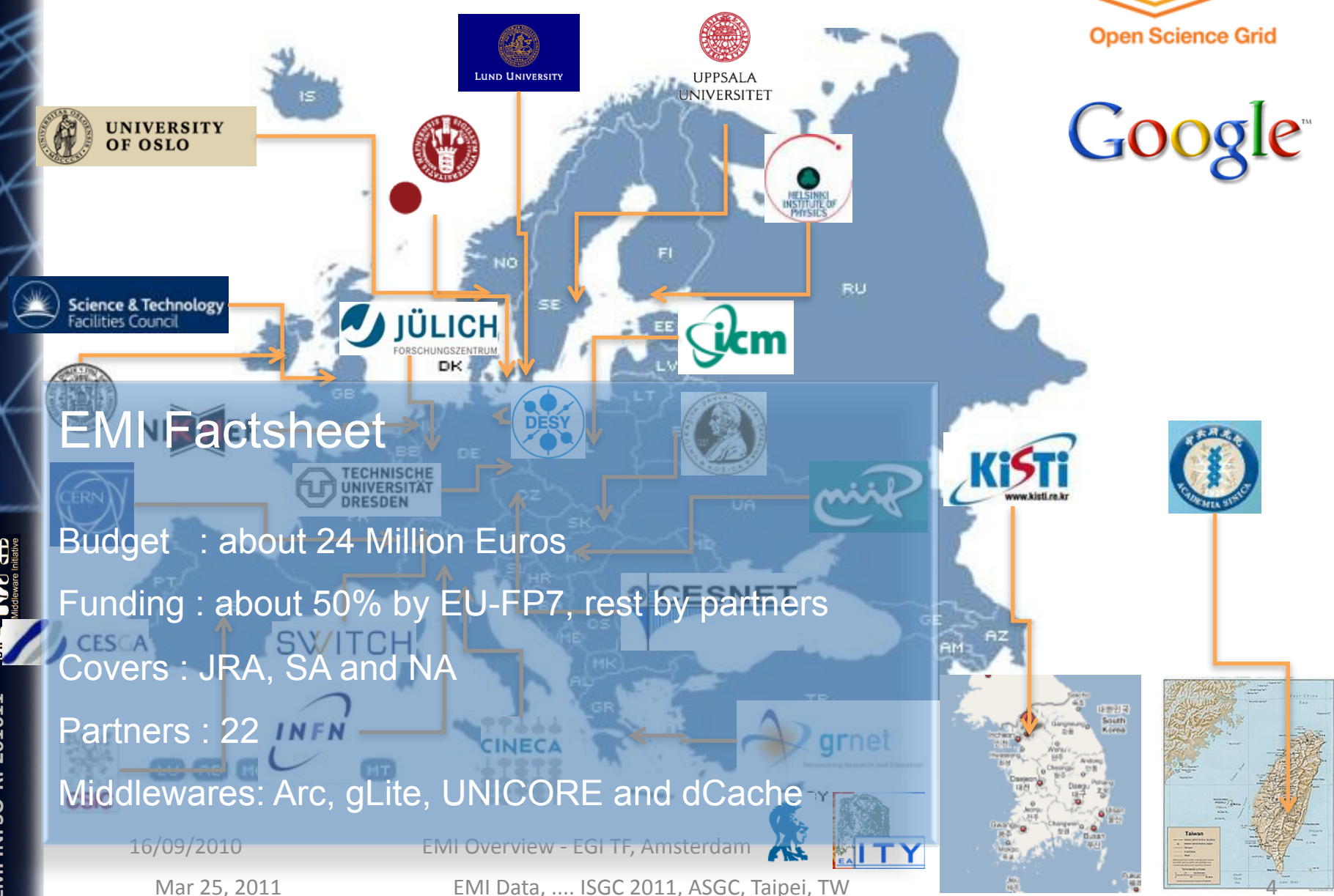
EMI INFO-RI-261611

Mar 25, 2011

EMI Data, ISGC 2011, ASGC, Taipei, TW



EMI Factsheet



EMI Factsheet

Budget : about 24 Million Euros

Funding : about 50% by EU-FP7, rest by partners

Covers : JRA, SA and NA

Partners : 22

Middlewares: Arc, gLite, UNICORE and dCache

16/09/2010

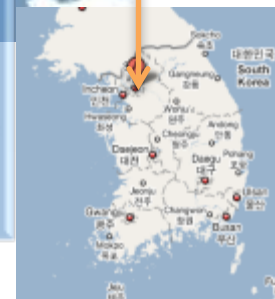
EMI Overview - EGI TF, Amsterdam

Mar 25, 2011

EMI Data, ISGC 2011, ASGC, Taipei, TW



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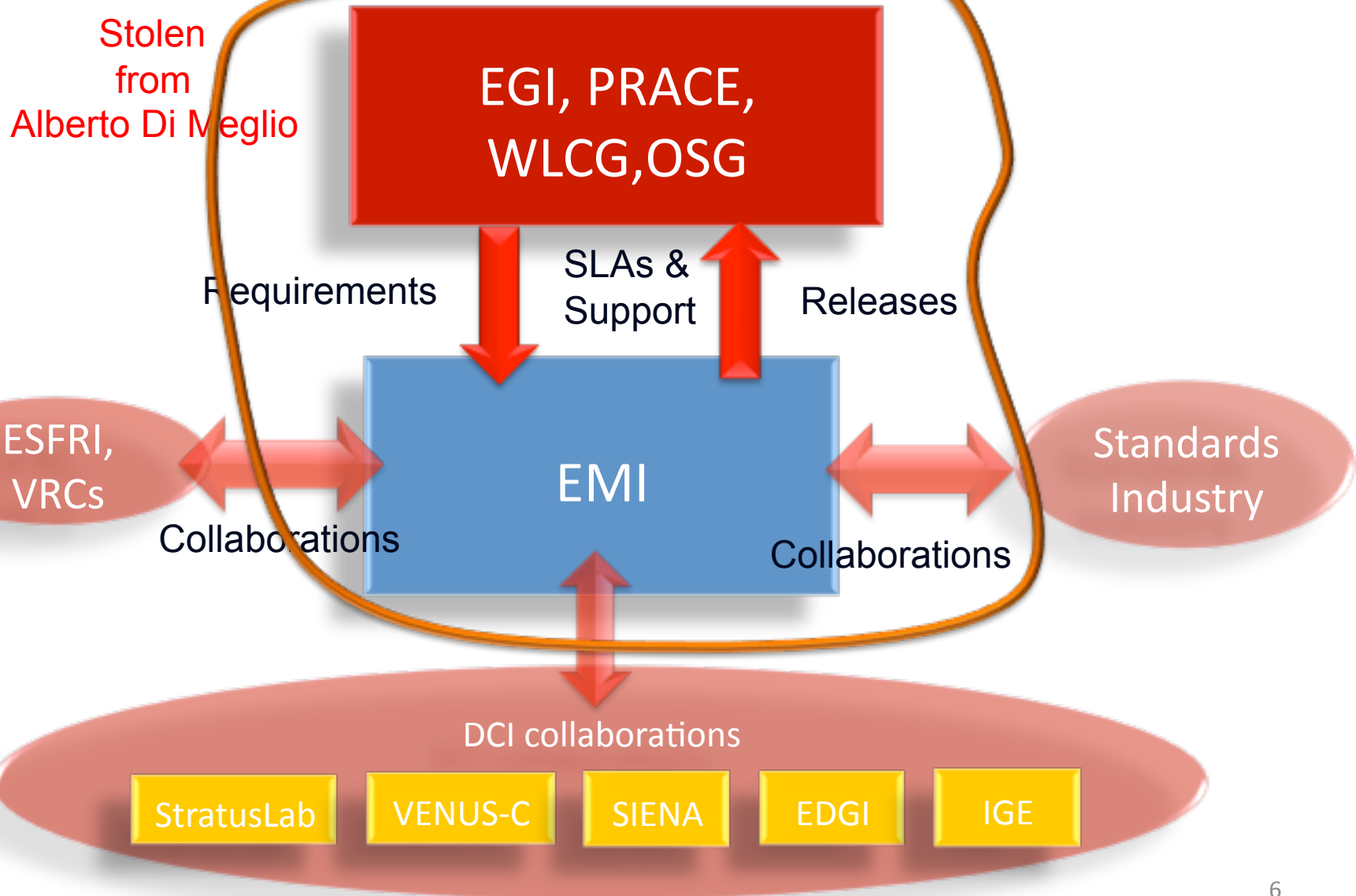
Why

According to our Project Director, Alberto Di Meglio :

The European Middleware Initiative (EMI) project represents a close collaboration of the major European middleware providers - ARC, gLite, UNICORE and dCache - to establish a sustainable model to **support, harmonise and evolve distributed computing middleware** for deployment in EGI, PRACE and other distributed e-Infrastructures



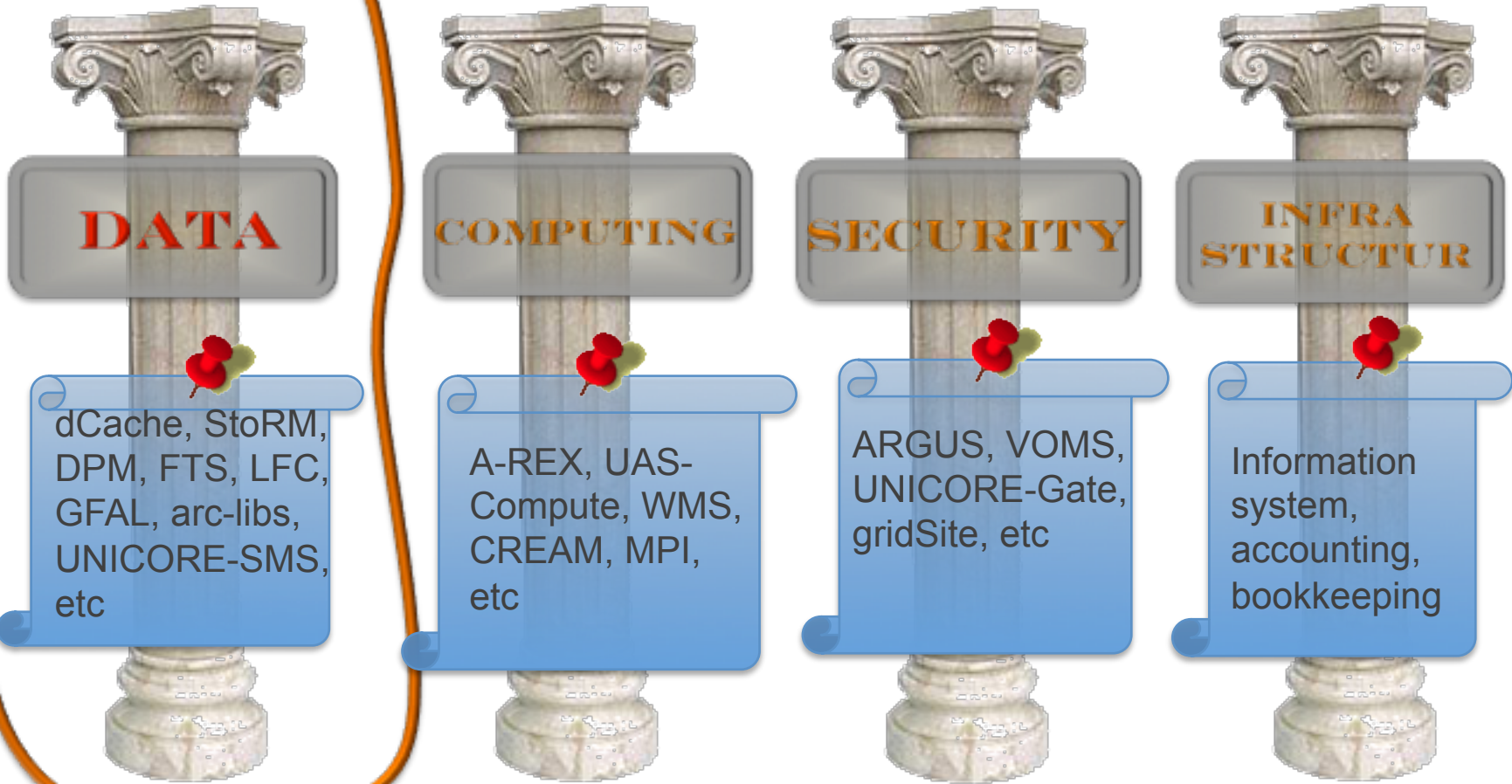
EMI in context



EMI Data in context



EUROPEAN MIDDLEWARE INITIATIVE



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7

What does EMI-Data provide ?

The EMI-Data shopping ~~basket~~ ^{CART}



The EMI shopping cart

Reliable **F**ile
Transport **S**ervice



File Location
and meta
data Service
(LFC)



Data
Access and
control
library(s)

Professional Storage Solutions
Fits all sizes (IKEA approach)



DPM



Generic Meta Data
Service (AMGA)



DOG

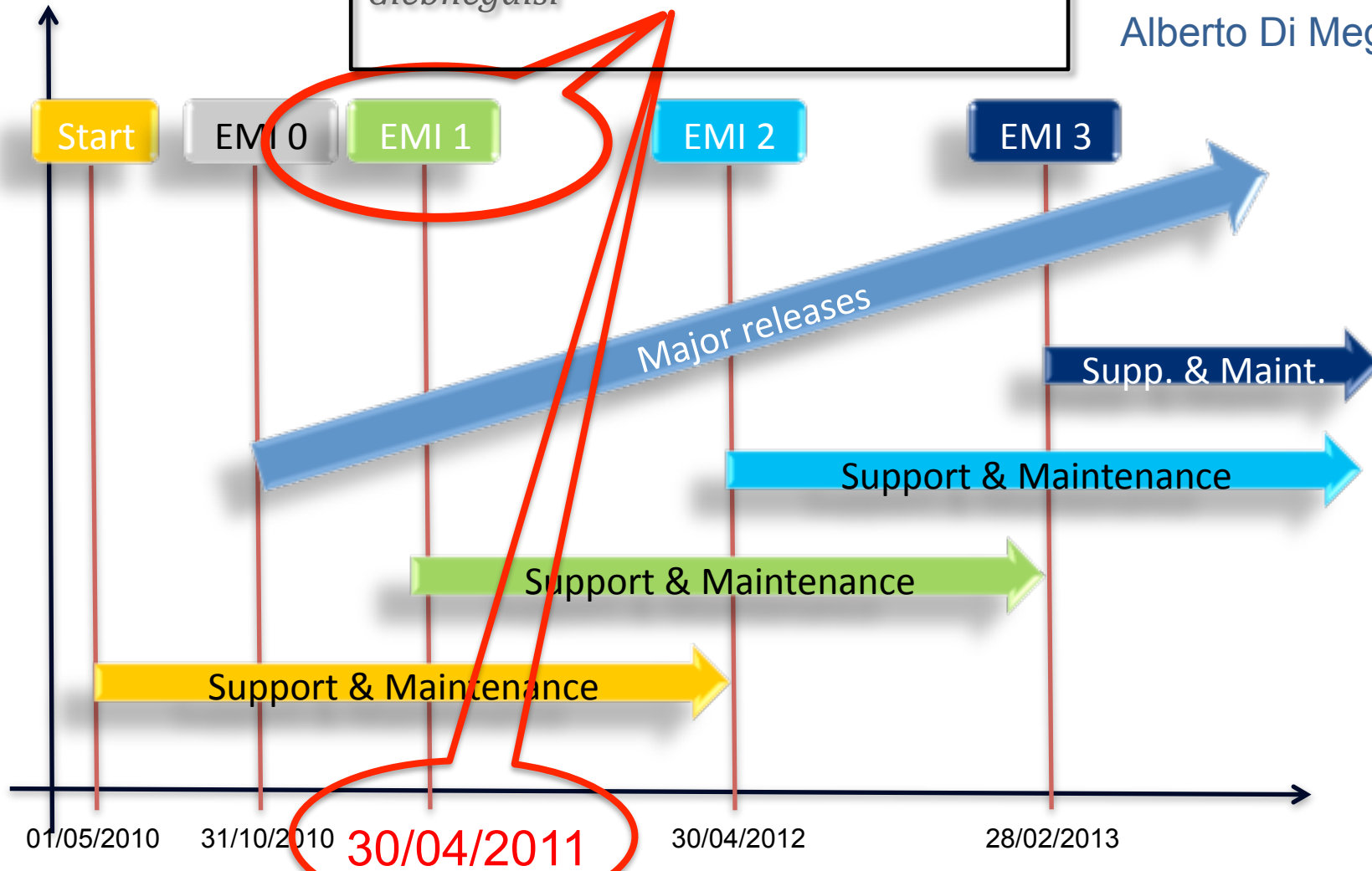
Happy

Dancing

Release Plan

Kebnekaise, Lappland, Sw, 2100m
Giebnegáisi

Stolen
from
Alberto Di Meglio



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The Mission



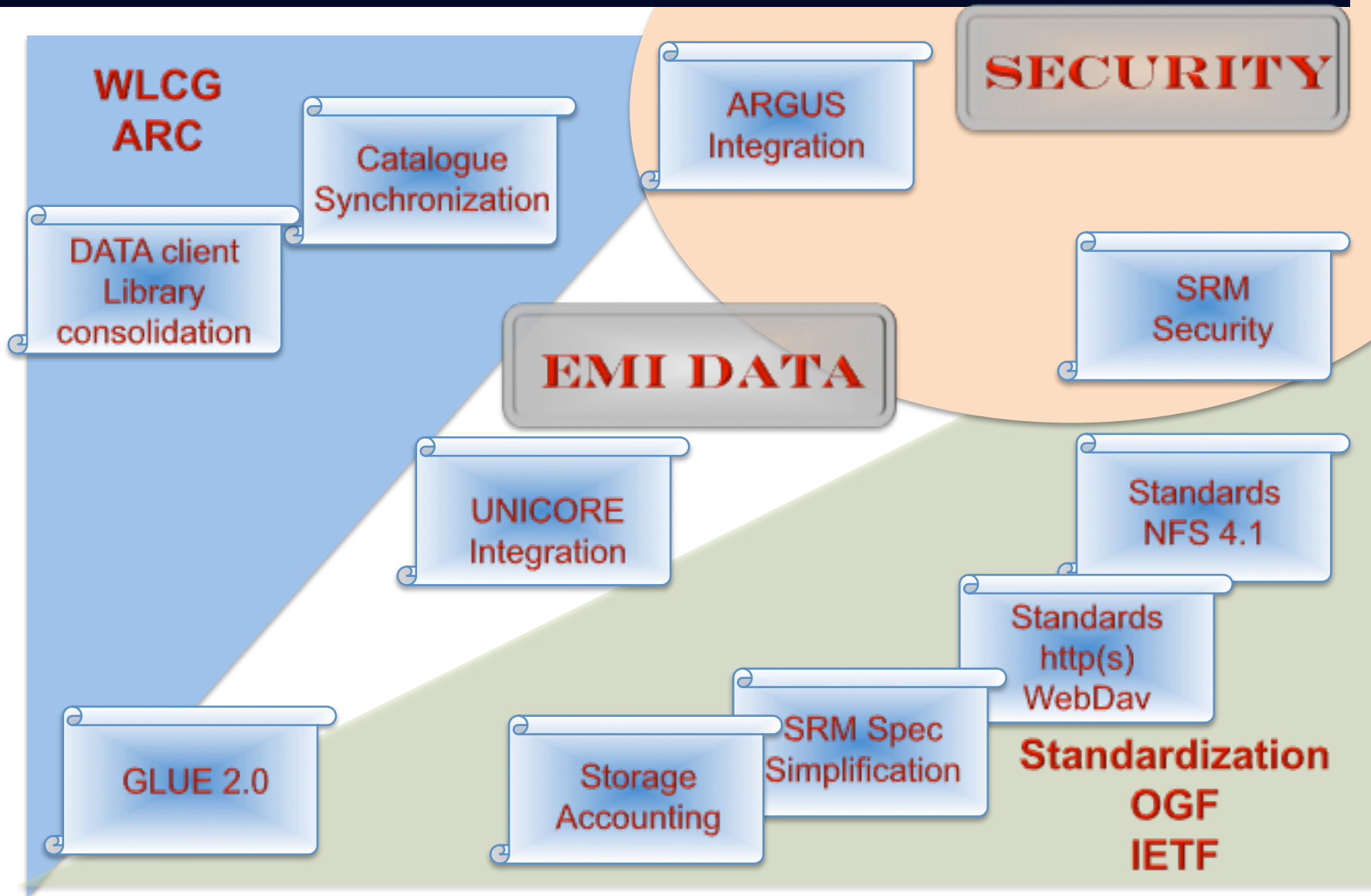
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The Mission

- Fixing of issues based on the experience of operating the infrastructures for some years.
- Improving or creating interoperability between components and middle-wares.
- Reducing components by merging functionality or removing duplication.
- Applying standards where available
- Standardizing EMI-Data mechanisms with “standardization bodies” e.g. OGF
- Attracting new communities.
- **Becoming competitive and attractive**
 - Standards
 - Professional Support
 - Strict quality monitoring



Mission overview



Standardization

Applying industry standards

- Posix file system : NFS 4.1 / pNFS
- WebDAV
- SSL security for SRM

Standardization : WebDAV

WebDAV

- Very useful for new (non-LHC) communities.
- IETF Standard
- Allows “File system like” access with
 - Mac OS
 - Linux
 - Windows



webdav.dcache.org
Connected as: WebDAV

Disconnect

	<i>EMI-1</i>	<i>EMI-2</i>	<i>EMI-3</i>
<i>dCache</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<i>StoRM</i>		<input checked="" type="checkbox"/>	
<i>DPM</i>			<input checked="" type="checkbox"/>

Standardization : NFS 4.1 / pNFS

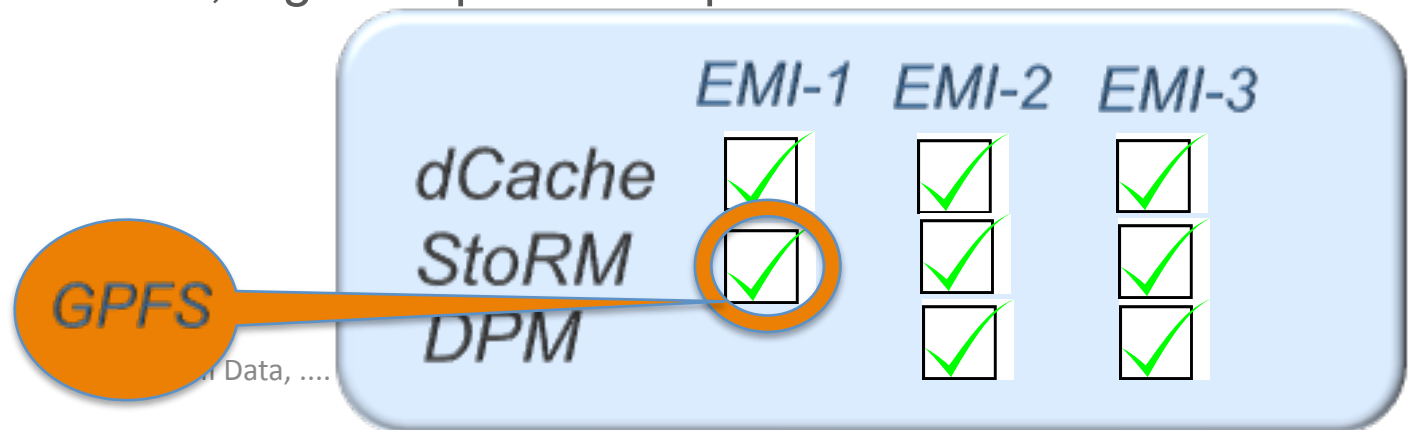
Simplicity

- ✓ Regular mount-point and real POSIX I/O
- ✓ Can be used by unmodified applications (e.g. Mathematica..)
- ✓ Data client provided by the OS vendor
- ✓ Smart caching (block caching) development done by OS vendors

Why pNFS

Performance

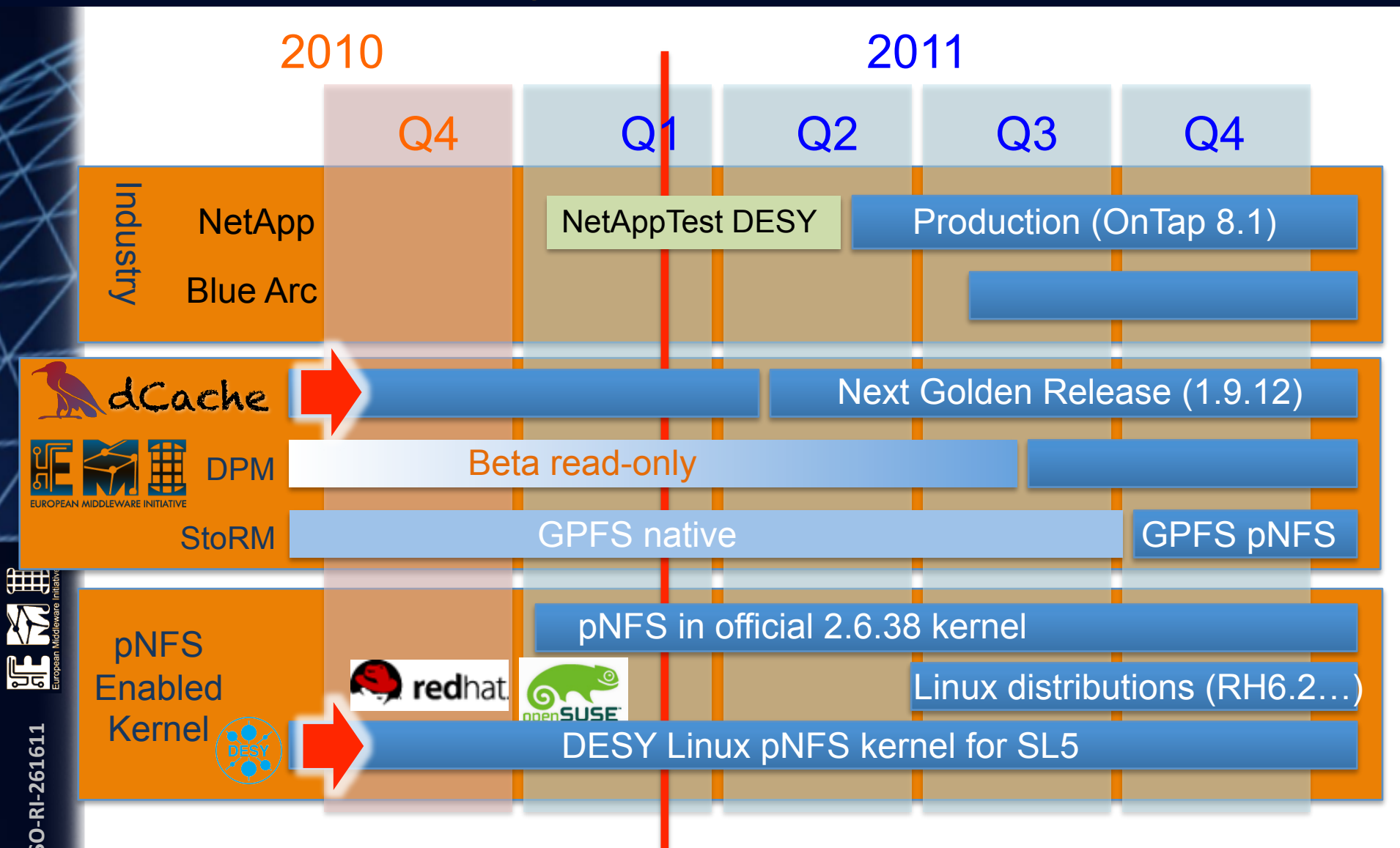
- ✓ **p**NFS : parallel NFS (first version of NFS which support multiple data servers)
- ✓ Clever protocols , e.g. Compound Requests



Mar 25, 2011

Data, ...

Availability for production use

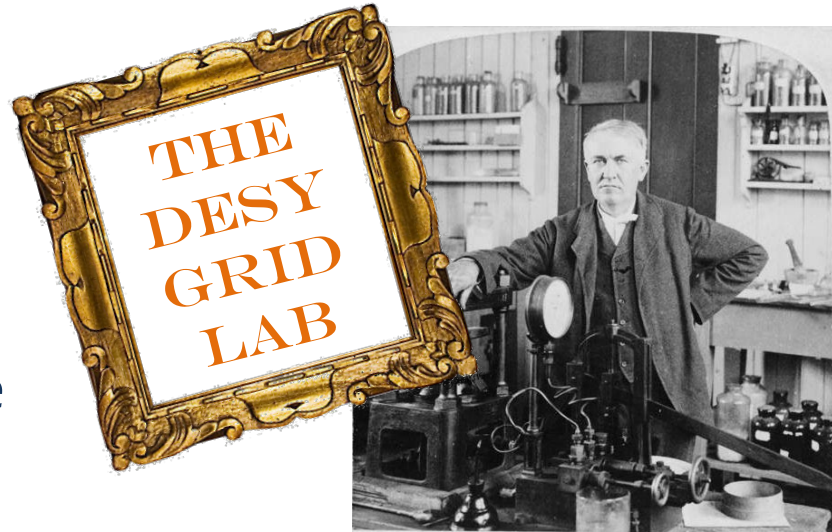


Performance and Stability

THE DESY GRID LAB

OPERATED BY
YVES KEMP
DMITRI OZEROV

DESY Grid Lab available for more than 9 months to evaluate protocols and systems.



CERN NFS 4.1 EVALUATION SETUP

CONTACT
ANDREA SCIABA

Has been enlarged and will start testing end of March'11

Interoperability

Interoperability between EMI components and

- Integration of ARGUS (Blacklisting)
- GLUE 2.0 migration
- UNICORE client integration

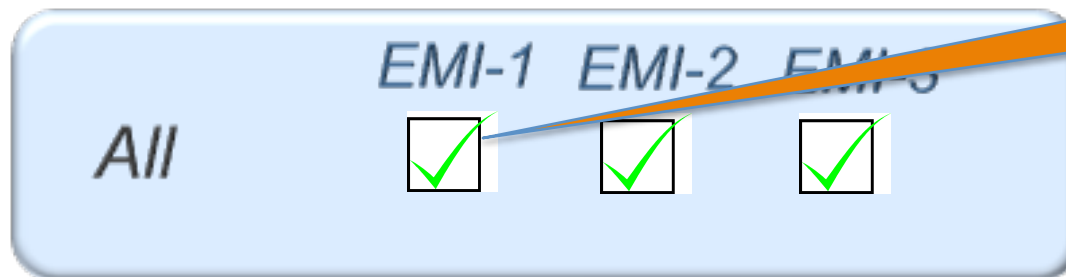
Interoperability

ARGUS integration

- ✓ ARGUS : Authorization system
- ✓ Allows local and centralized configuration (and both)
- ✓ SE's, LFC and FTS starting with ARGUS blacklisting

Migration

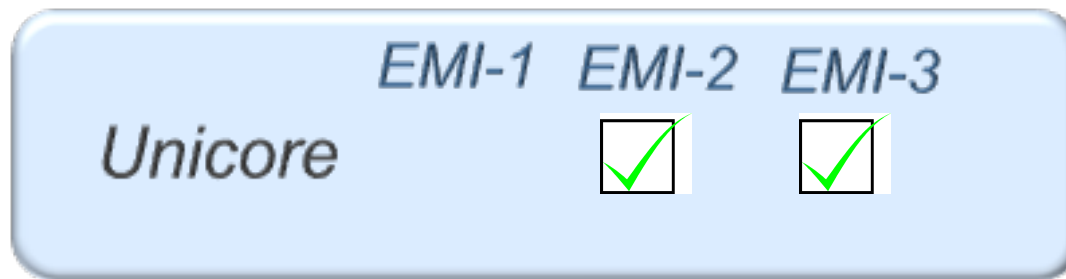
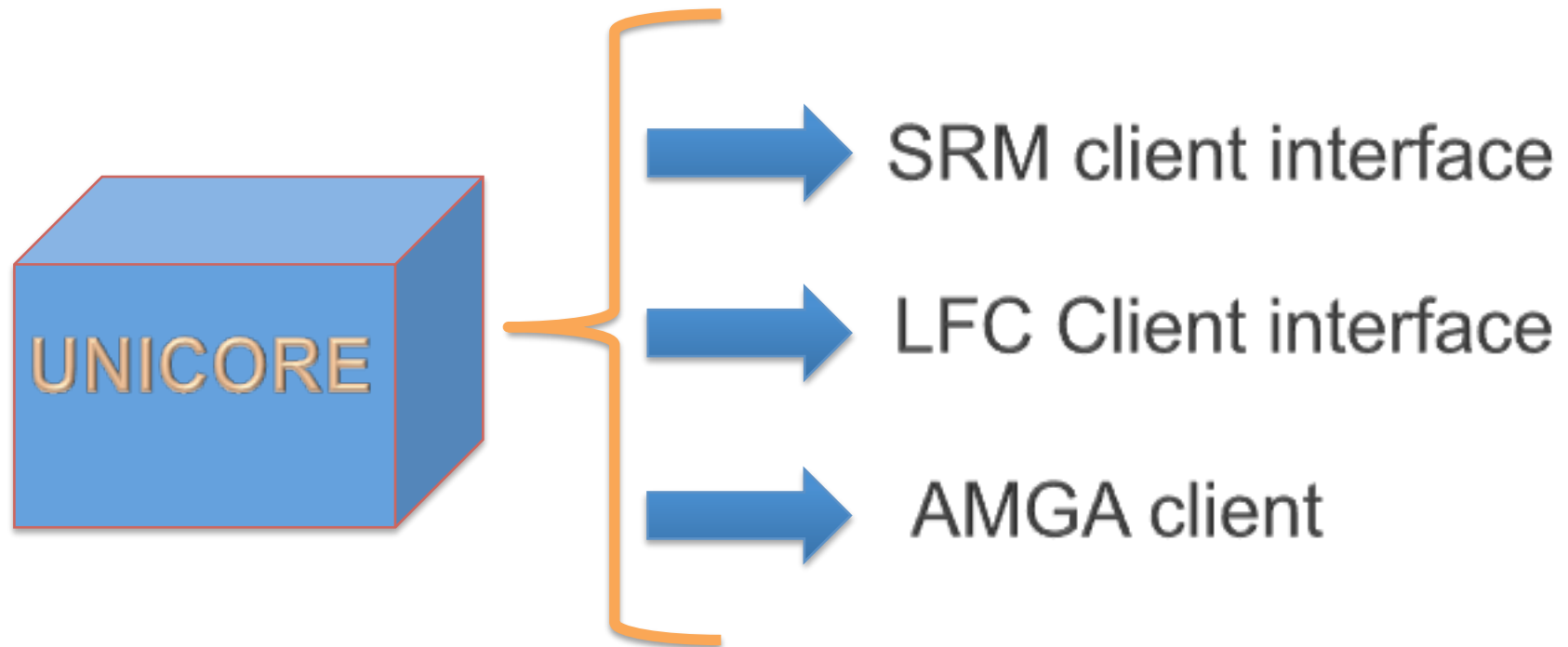
- ✓ Already agreed before EMI
- ✓ Starting with GLUE 1.3 information published with GLUE 2.0
- ✓ Followed by clients (between EMI-1 and EMI-2)
- ✓ Running both systems in parallel for awhile.



GLUE 2 but
GLUE 1.3 content

UNICORE integration

UNICORE access to EMI-Data components



Standards : SRM over SSL

Replacing SRM over httpg (GSI) by https

Stolen from activity leader : Paul Millar

(httpg) is not a standard (SSLv3 is)

coupling delegation with transport negotiation is inflexible.

not widely used outside of Grid.

libraries all coming from a single vendor : GLOBUS

. no hardware acceleration.

delegation has to be solved. (see "spin off" standards)

prototype (server and client) w/o delegation available in



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Spin off standards

EMI involvement in OSG (wg)

- Storage accounting record WG
- Delegation

Storage Accounting Record (StAR)

Stolen from activity leader : Jon Kerr Nielsen

- If there is no standard for storage accounting yet, do anyone actually need it?
- Developing a storage infrastructure
 - We need to know how much storage space is used, by which group/user, on which storage media
 - To know where to put the money when increasing the storage space
 - To know who to ask for the money to increase the storage space
- Basis for billing
 - Storage is expensive
 - Some non-academic resource owners may not like to give it away for free
- Jon prepared a draft definition of a StAR
- -> OGF existing working group (Jon becoming Co-Chair)

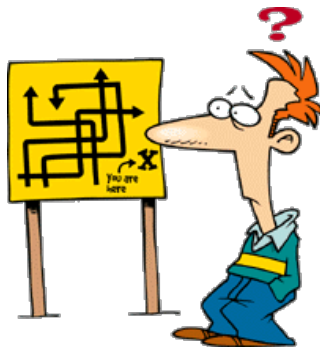
Delegation using SSLv3



Delegation

- SRM needs delegation to perform operations on behalf of the initiator. (e.g. 3rd party copy, bring online, ..)
- GSI (httpg) allows delegation w/o additional services.
- For SSLv3 delegation is not defined.
- There are several options
- -> OSG working group (Forming a research group : Paul)

Fixing an intended design flaw

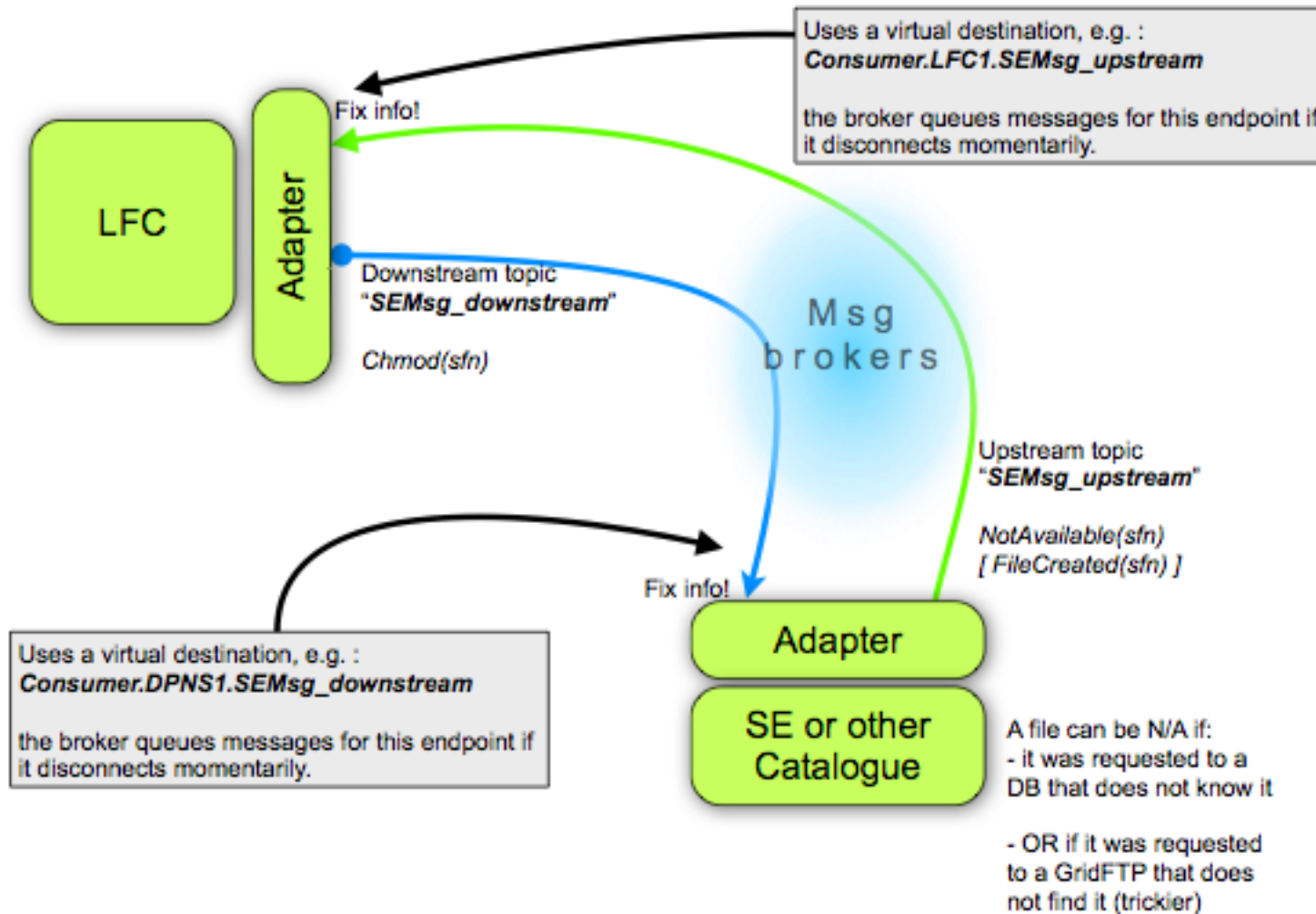


The (in)famous catalogue synchronization

- Catalogues and SE name-spaces get out of sync over the time. (They interact by non atomic operations)
- Mechanisms to get them synchronized exists but involve SE resp. catalogue dump and are painful and certainly don't scale.
- The plan is to use message passing to synchronizes them in 'real time'
- First step (EMI-1) allow to 'register' lost files manually.
- DPM and LFC interaction already done. Now working on experiment catalogues (ATLAS DDN).
- StoRM and dCache a bit behind.

Fixing an intended design flaw

Stolen from activity leader : Fabrizio Furano



Conclusions

- *EMI Data* is a good opportunity to get our storage management middleware into a maintainable shape.
- Standardization is the way to get broader acceptance by other communities.
- EMI-Data will become THE competitor in Storage Management in Europe.
- Everybody can join or may provide suggestions through WLCG or EGI.eu.



Further reading

<https://twiki.cern.ch/twiki/bin/view/EMI/EmiJra1T3Data>

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