



**Data**

## Standardization in EMI-Data

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# EMI Data Standardization Efforts

According to the **EMI Data Description of Work**

EMI Storage Elements (dCache, StoRM, DPM)

- ✓ Implementing **NFS 4.1 / pNFS**
- ✓ Implementing **WebDAV**

EMI Components and beyond : CASTOR (cern), OSG Storage

- ✓ Defining and standardizing a **Storage Accounting Record**
- ✓ Replacing the **SRM** GSI security layer by plain **SSL/X509** plus delegation.
- ✓ Migrating from **GLUE 1.3** to **GLUE 2.0**
- ✓ Cleaning up **SRM 2.2 spec**

Agreement on common Authorization (Blackmailing) : ARGUS

**BTW** : we are of course doing many more cool things in EMI-Data

# GLUE 1.3 to GLUE 2.0 Migration

GLUE 2.0



See Paul's presentation ....

# SRM over SSL/X509



SRM over SSL/X509

Or

Providing Standard and  
Secure transport.

See Paul's presentation ....

# Storage Accounting

## The Storage Accounting Record



See Jon's presentation

....

If there would be a Nobel  
Price, Jon would deserve it.

“Geez, I had no idea there was  
a Nobel Prize for accounting “

# NFS 4.1 / pNFS

## NFS 4.1 / pNFS



# NFS 4.1 / pNFS

The NFS 4.1 effort is going beyond EMI :

- ✓ EMI
- ✓ gLite
- ✓ Labs
  - ✓ DESY,
  - ✓ FNAL
  - ✓ NDGF
- ✓ German Government :
  - ✓ German d-grid
  - ✓ HGF “Physics at the Terascale”



# Why should you be interested in pNFS

Stolen from : <http://www.pnfs.com/>

## Benefits of Parallel I/O

- ✓ Delivers Very High Application Performance
- ✓ Allows for Massive Scalability without diminished performance

## Benefits of NFS (or most any standard)

- Ensures Interoperability among vendor solutions
- Allows Choice of best-of-breed products
- Eliminates Risks of deploying proprietary technology





# Two aspect from our perspective

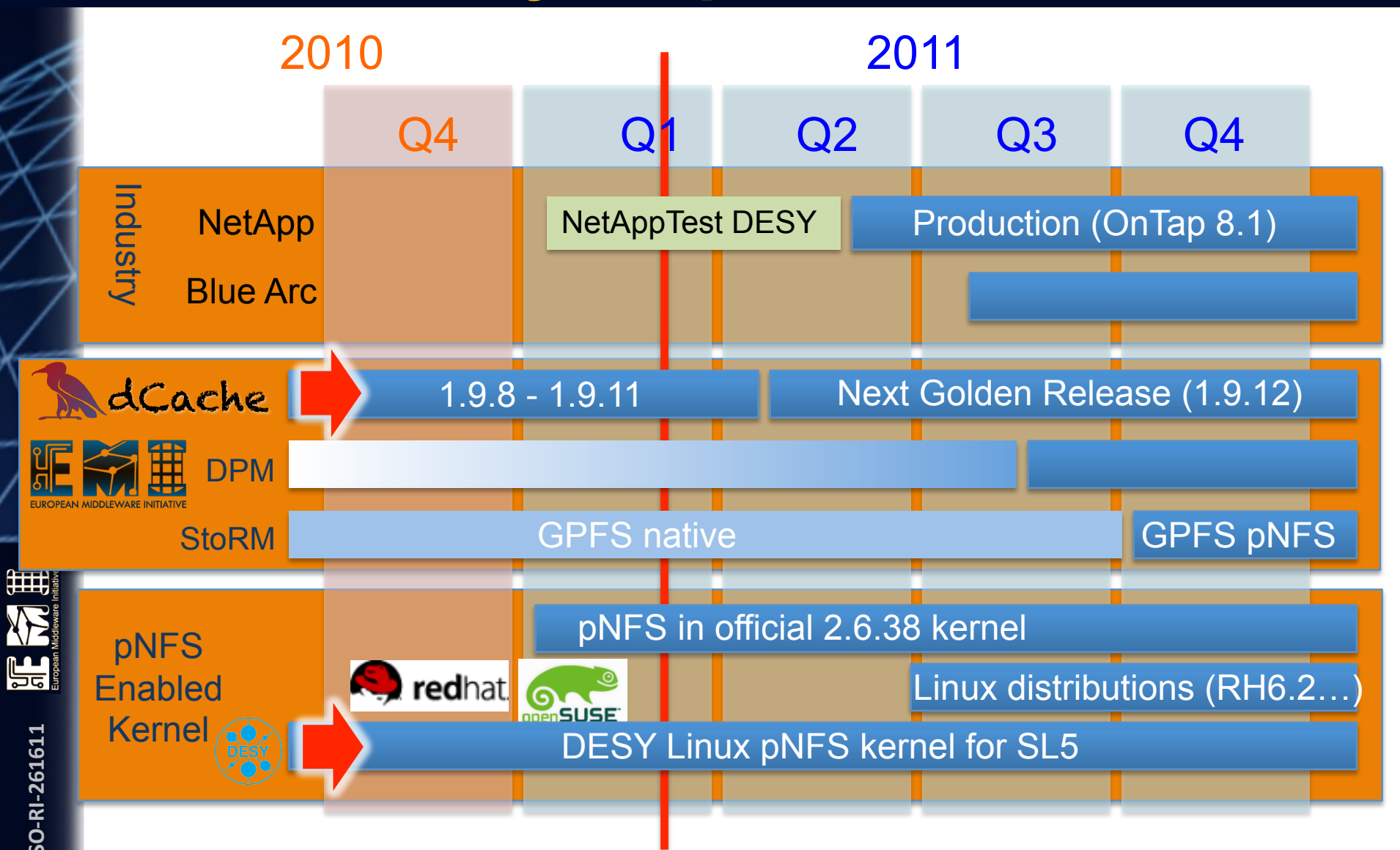
## Simplicity

- ✓ 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

## Performance

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

# Availability for production use



EMI INFO-RI-261611  
 European Middleware Initiative

# pNFS support in SL5/6

- Full NFS 4.1/pNFS client available in 2.6.38
- Back port into RH6 expected with RH6.2, shortly after it will be in SL6.2.

# WebDAV



webdav.dcache.org

Connected as: WebDAV

Disconnect

## WebDAV

**Web**-based **D**istributed **A**uthoring and **V**ersioning

- ✓ A major extension to HTTP(s)
- ✓ Provides some kind of web-based network file system
- ✓ Allows browsing, uploading, downloading, renaming... of files
- ✓ Standard : defined by IETF
- ✓ Supported by all major Operating Systems
- ✓ From browser plug-in to file system simulation (fuse).

EMI DoW requires that all EMI Storage Elements support http (s) and WebDAV before end of the project.

## Availability

- Done for dCache in the EMI - 1 release.
- DPM and StoRM following with EMI-2 (one year from now)

# Standards provide ...

Standards but especially NFS4.1/pNFS and WebDAV

- opens new communities to EMI-Data.
  - E.g. Photon science (XFEL, CFEL @ DESY)
  - SNIC, Swedish National Infrastructure for Computing
- Makes EMI-Data systems a realistic competitor to expensive industry solutions. (IBM, NetApp ..)



# References

Some references



# References

Center for Technology Integration

<http://www.citi.umich.edu/>

NFS

<http://www.nfsv4.org/nfsv4techinfo.html>

PNFS

<http://www.pnfs.com/>

RFC 5661

<http://tools.ietf.org/html/rfc5661>

NFS 4.1 in first dCache Golden Release (1.9.5)

<http://www.dcache.org/downloads/1.9/release-notes-1.9.5-1.html>

EMI, The European Middleware Initiative

<http://www.eu-emi.eu/en/>

EMI, The European Grid Infrastructure

<http://www.egi.eu>

WLCG Collaboration Workshop, July 20, 2010, Patrick Fuhrmann

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11 Reasons you should care, June 16, 2010, Gerd Behrmann

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<http://www.dcache.org/manuals/2010/20101102-hepix-patrick-nfs41.pdf>

Linux Kernel : [www.kernel.org](http://www.kernel.org)

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NetApp : [www.netapp.com](http://www.netapp.com)

<http://media.netapp.com/documents/wp-7057.pdf>

BlueArch : [www.bluearc.com](http://www.bluearc.com)

<http://www.bluearc.com/storage-news/press-releases/101112-bluearc-demos-pnfs-at-supercomputing-2010.shtml>

Scientific Linux

<http://www.scientificlinux.org>

FERMIlab

<http://www.fnal.gov>

pNFS enabled SL5 Kernel

[http://www.dcache.org/chimera/x86\\_64; dcache-www01.desy.de/yum/nfs4.1/el5/nfsv41.repo](http://www.dcache.org/chimera/x86_64; dcache-www01.desy.de/yum/nfs4.1/el5/nfsv41.repo)







# Thank you

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