

**Storage Development at Fermilab at
WLCG Collaboration meeting Data
Management II BOF**

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Fermilab Mission in Storage

- Provide high performance, state-of-the-art storage, data movement and caching systems for all Fermilab users and collaborations.
- Provide systems with common interfaces across HEP implementations.
- Contribute to US CMS, CMS and OSG storage and data management solutions.
- Participate in community wide projects and initiatives - at present these include GridFTP, dCache, and SRM.
- Integrate storage and data movement with managed high throughput network technologies.

Constraints

- Limited development resources at Fermilab implies effort must fit in the lab mission
- Expect that successful developments will emerge from the community and attract developer contributions and funding.
- The complexity and diversity of storage and data management systems in HEP means that expertise and support is provided by the deployment community for storage installations, configurations and software.

Fermilab Development Efforts for the WLCG

Contributions related to dCache.org and dCache software.

I coordinate all Fermilab contributions to the dCache collaborations and support of dCache users.

- We develop and support the following dCache software components:
 - SRM
 - Resilient (replica) Manager
 - GPlazma
- GridFTP contributions (in Globus and dCache codes):
 - Checksumming (Andrew Baranovski- SciDAC CEDS)
 - Extensions to the standard and code enhancements.
- Activities funded by Open Science Grid for storage and data movement support for OSG sites and stakeholders.
 - Packaging, deployment and support through the Virtual Data Toolkit
 - Support for WLCG US Tier-2s and Tier-3s (and collaboration with the US Tier-1s)
 - Extensions to the dCache and SRM codes needed by OSG stakeholders.
 - To come: Contributions to the GSSD.

Funding for storage and data movement support for WLCG

- dCache contributions at Fermilab funded by Fermilab Computing Division, US-CMS and OSG.
- SciDAC CEDPS project includes extensions to data movement (GridFTP), enhancements to integration of GridFTP and dCache.
- DOE funded LambdaStation provides enhanced features for integration of dCache with managed wide area networks.

Organization

- Gene Oleynik - Storage Section Head, Overall leader of Fermilab dCache Contributions.
- Timur Perelmutov - dCache/SRM at Fermilab technical project lead.
 - Timur Perelmutov - SRM
 - Dmitry Litvintsev (50%) - SRM
 - Alex Kulyavtsev - Resilient Manager
 - Vladimir Podstavkov - Resilient Manager
- Expect to hire another developer this coming year.
- Ted Hesselroth - OSG Storage Middleware

Support: WLCG Support expected to follow this model

- We operate within a 3 tiered support model:
 - Level 1 - Local site expertise. Install hardware, configure and maintain systems, first level of troubleshooting
 - Level 2 - More expertise; advise, assist and troubleshoot installations, configuration issues and transfer problems
 - Level 3 support - Developer expertise, identify and fix bugs
- Fermilab developers provide all three levels of support (with help from operational groups) for the Fermilab dCache systems at CDF, CMS, and our public dCache system (MINOS MiniBooNe, etc.)
- Our expectations are
 - L1 expertise is available at and provided by the deployment sites
 - L2 support is funded the by external stakeholder organizations (e.g. OSG storage activities staff, WLCG/EGEE funded support staff)
 - Developers provide L3 support in a steady state situation (ie effort limited).

FTEs in Support

- Fermilab core developers (total 3.5 FTEs) spend 1.5 FTE in local and global support.
- US CMS Tier-1 Facility provides Level 1 and Level 2 support of 2 FTEs.
- US CMS Tier-2 Sites provide local and community support at 1 FTE per site.
- OSG Level 2 and Extensions staff is currently 2.75 FTE (reevaluated annually).

Current Issues and Action items in Fermilab dCache Contributions & Delivery for the WLCG

- We recognize the software schedule has slipped. For Fermilab the reasons are various and mainly related to the current large install dCache base for our running experiments.
- A major cause recently is continuing instability in the CDF dCache 1.7 system. This was installed in March '07 and is a critical need for CDF data analysis.
- We are adding to our dCache contributions for WLCG delivery and schedule:
 - Dmitry will be 100% on SRM starting next week (When he is back from vacation)
 - Vladimir has joined the resilient dCache effort
 - US CMS are increasing their contributions through the hire another developer in the next few months.
- We are working with OSG to re-align the priorities and increase contributions through the GSSD.

Next Steps..

- Fermilab is committed to our contributions to and support of dCache for the WLCG, US CMS and LHC experiments.

We continue to believe a key to successful ramp-up is to have stakeholders and development managers need to work together to set expectations and prioritize work.