dCache – protocol developments and plans

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(on behalf of the dCache team)

2015-01-13 pre-GDB: on Data Management & Data Preservation
Why am I here?

• We, WLCG, are re-evaluating the “protocol zoo”

• From a dCache point-of-view:
  • dCache provides significant storage for WLCG.
  • dCache provides significant storage capacity for many other communities.

• The dCache team needs to be efficient – not waste resources.
as a consequence, the dCache mantra

Use standards.
What should we do with SRM?

• There has been *considerable* investment in SRM,
• SRM has some *unique features*:
  • Transfer protocol negotiation,
  • Asynchronous operations,
  • Bulk operations,
  • Transactions / 2-stage-commit upload.
  • (Space reservations, Access-Latency, ...)
• Battle tested, with over 10 years of production use
  → it works.
SRM unique features

If WLCG continues to makes use of SRM unique features then it must either:

- Continue using SRM for those unique features
- Invent a new protocol to support unique features
  
  (NB. a protocol extension == a new protocol)

Inventing a new protocol is bad: takes effort away from all software teams

WLCG has a finite effort → implementing a new protocol means all WLCG storage will suffer.

Recommendation: if WLCG uses SRM-unique features then stay with SRM for those features

We (dCache) are continuing to improve SRM, both server and client.
Non-unique SRM features

- **Storage accounting** *(WebDAV+RFC-4331)*
  
  Not equivalent, but if space-reservations tied to namespace, it may be used instead. Along with DPM, we plan to implement support for this.

- **Direct data transfers** *(not actually an SRM feature)*
  
  - Suggest using WebDAV for WAN and NFS for LAN (like GPFS+StoRM).
  - We plan to drop dcap support once NFS is proven to work in production.

- **3rd party transfers** *(FTP, WebDAV+extension, xrootd+extension, NFSv4.2)*
  
  Solution space is quite complex. Suggest using FTP for now and watch how WebDAV develops. N.B. SRM two-stage commit can prevent dark data.

- **Namespace operations** *(FTP, WebDAV, xrootd, NFS)*
  
  Recommend bulk operations use SRM; for a “small” number of operations, any protocol is fine – suggest WebDAV or NFS if available.
WebDAV

- We have added 3rd-party transfer support
  - Supports current specification.
  - Working with FTS/DPM developers to verify this.
  - Some limitations of the current approach, some development may be needed.

- Will be adding support for RFC 4331.
  - Provides information like `du -ks <directory>`.
  - For many VOs, may be a substitute for SRM space accounting.
NFS

- Deployed at DESY for **CMS** (WNs and NAF) and **other users**:
  - “Interactive” NAF has CMS permanently mounted.
  - Grid WN was for a limited period, with some fraction of WNs using NFS.
- Operations are basically OK, but performance is under investigation.
  - When network is working well, performance is comparable with dcap
    Statistics show a slight decrease in performance, but a good starting point.
  - NFS protocol also allows the clients (WNs) reading data through the door, which is used as a fall-back if there's a problem. This works, but there is a large impact on performance. We're working on this by:
    - tuning the client to be more resilient to minor, transitory problems,
    - reducing this impact when the client falls back and reads through the door.
Plugins allow communities to extend basic functionality:

- CMS, ATLAS and ALICE make use of this
- Used for monitoring, name-to-name translation (federation), access-control, redirection, ...
- Plugin framework will change in the near future:
  - dCache v2.12 (~1\textsuperscript{st} March) or v2.13 (~1\textsuperscript{st} July)
  - (don't panic)

- \textbf{3\textsuperscript{rd}-party copy}: currently no road-map.
Authentication

• Many people looking at **SAML** (or OpenID-Contact) to replace X.509
  
  dCache team are investigating this in collaboration with LSDMA, EGI FedCloud and OGF.

• Medium term solutions will likely involve **gateway services**:
  
  • Infrastructure continues to use X.509; online CAs generate X.509 certificates.
  
  • Does not exclude any of the listed protocols.
dCache server releases
... along with the series support durations.

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2.13: Next Golden Release
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**RUN 2**
One more thing...
Prometheus

• The goal:
  try to discover bugs before software hits production services

• The problem:
  We can't test all (ATLAS, CMS, LHCb, Alice, …) use-cases.

• The offer: prometheus.desy.de
  A test instance, rebuilt daily (data is lost overnight),
  Always the tip of development branch (currently 2.12.0-SNAPSHOT),
  Anyone from atlas, cms, lhcb, alice and dteam VOs can use this service right now.
  Verify their software-stack works with the next major-version dCache.
  Bug-fixes (which will be rolled out on production services) are available first in prometheus.

• If you're interested, start testing – contact me if there's any problems.
Thanks for listening, any questions?
Backup slides
DCAP vs NFS performance