Status of Data Management Services

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DESY

WLCG Service Coordination Meeting - CERN

Disclaimer

- **I**nformation provided in this status report is obtained from developers responsible for the respective projects

- Primary topic is SRM

- SE Types covered in this status report
  - CASTOR (O. Barring, Shaun De Witt, Sebastien Ponce)
  - SRM/dCache (R. Kennedy, T. Perelmutov, J. Bakken, A. Rana)
  - DPM (J.-P. Baud)

Enhancements required by Experiments

- Timescales – Experiment's view
  - "Necessary to expose service well before start of SC4"
  - Five Priority items
    - (Explicit) Pin/Unpin
    - Relative Paths in SURLs
    - Permission functions – SRM Integration w/ VOMS
    - Directory functions
    - Global Space Reservation

Explicit Pin/Unpin

- ❑ Issues associated with Explicit Pin/Unpin
  - ❑ Pins have a lifetime
    - ■ Operational issue when used by average user who could interfere w/ the rest of community, especially in an HSM environment w/ Migration capabilities
  - ❑ Not part of the SRMv2.1 Specification
    - ■ Method to support pin/unpin functionality though
      - ❑ srmPrepareToGet/Put has a lifetime field
      - ❑ Lifetime can be extended
      - ❑ Method to release pin (per job)
      - ❑ max. lifetime part of server configuration

Explicit Pin/Unpin Implementation Status

- **Castor**
  - Integrated w/ Stager API
    - Currently being tested
    - Availability expected before Christmas
- **dCache**
  - Initial v2 release ready on 15 January
    - Includes data transfer functions
      - srmPrepareToGet/Put (used for pin/unpin)
      - srmCopy
- **DPM**
  - Implemented and tested since early 2005
  - Time interval can be specified (prepareToGet, separate command) or admin specified defaults (pool specific) can be used

Relative Path

- **②** Relative Path in SURLs
  - ❑ Requirement as we understand it
    - ■ (Re-)use the same file path beyond the SE access point
      srm://server:port/castor|pnfs|dpm/domain/VO/<u>file-path</u>
    - ■ Only "file-path" provides valuable information to applications, the rest is concerned w/ site and implementation specifics the experiments are not interested in

  - ❑ Developers have mixed feelings (raised by SRM/dCache team)
    - ■ SRM URLs are supposed to be freely transferable between users and different roles assumed by the same user, which is not possible w / relative paths.
    - ■ How can file locations have any meanings with relative paths?
    - ■ Relative paths can only be interpreted knowing the detailed configuration of an SE as a function of the user and associated role

Relative Path – Implementation Status

- **Castor**
  - Partial Implementation (w/o VOMS support) available before Christmas
  - Implementation incl. VOMS support by end January
- **SRM/dCache**
  - Since Relative Paths don't fit the concept - there are no plans to implement them:
  - SRM URLs are supposed to be freely transferable between users (cannot be done w/ relative paths)
- **DPM**
  - No concrete plans at the moment – will not be available before end January

"VOMS Integration"

- ❸ Permission functions: All experiments would like the permissions to be based on roles & DN's. SRM should be integrated with VOMS
  - ❏ Issues
    - ◼ Implementation of permission functions depends on the support from the underlying storage system (i.e. support for ACLs vs. UNIX permissions only)
  - ❏ Implementation Status
    - ◼ CASTOR
      - ❏ Availability announced for end of January

    - ◼ DPM
      - ❏ VOMS integration is done and tested
      - ❏ Code cleanup and compatibility testing (grid-proxy-init/voms-proxy-init)
      - ❏ ACLs based on virtual IDs associated w/ DNs and VOMS roles
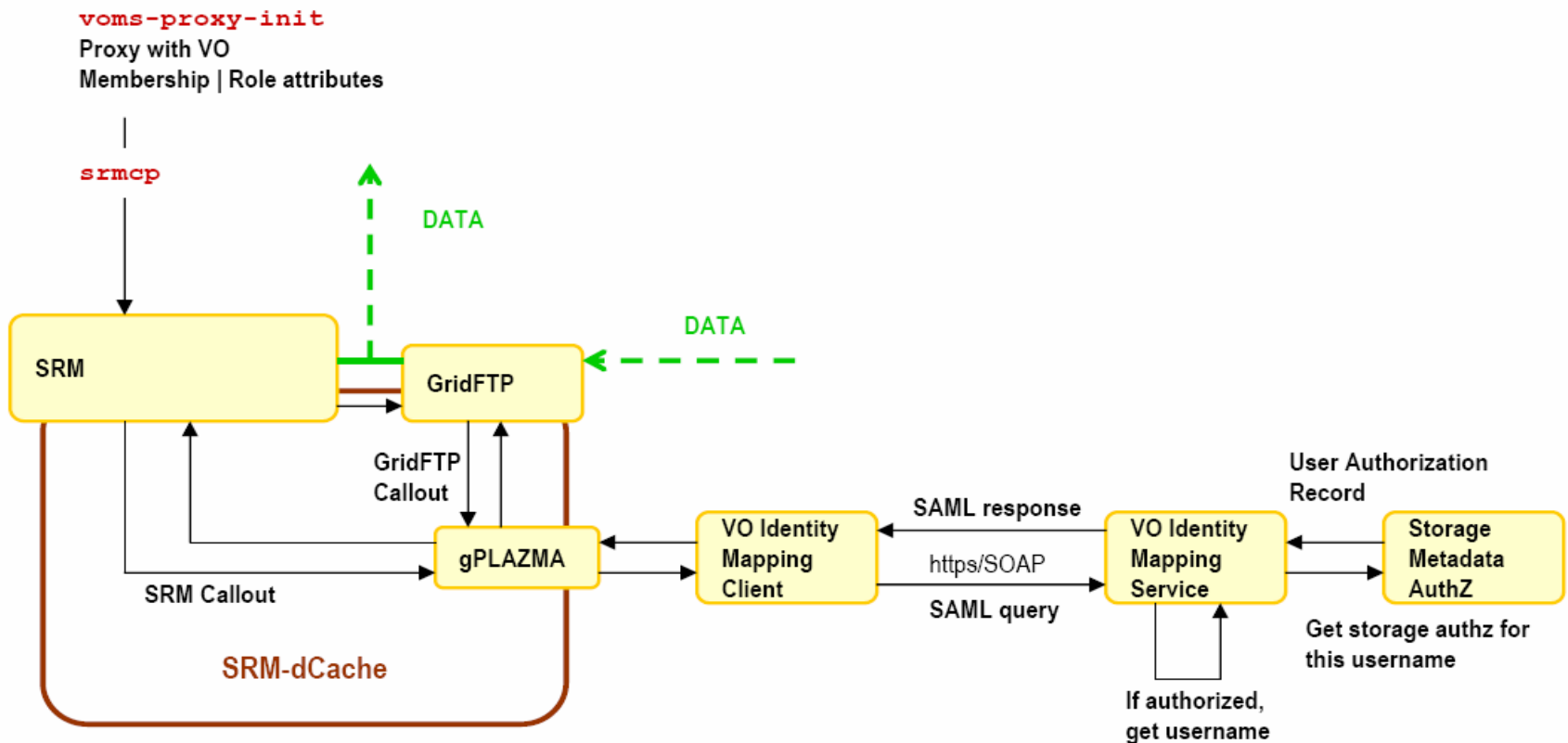   - ❏ Needs more work on Admin Interface

Implementation Status SRM/dCache

Source: Abhishek Rana (UCSD), Timur Perelmutov (FNAL)
Development as part of the OSG development program

An example use case: Fermilab VO-role mapping AuthZ

SRM/dCache

- ■ Role based Authentication/Authorization Services with gPLAZMA

gPLAZMA authenticates.
Storage Authz Service contacts GUMS and gPLAZMA Storage Metadata Service.
GUMS translates {DN, Membership, Role} to Username.
System optionally translates Username to site-wide {UID, GID}.
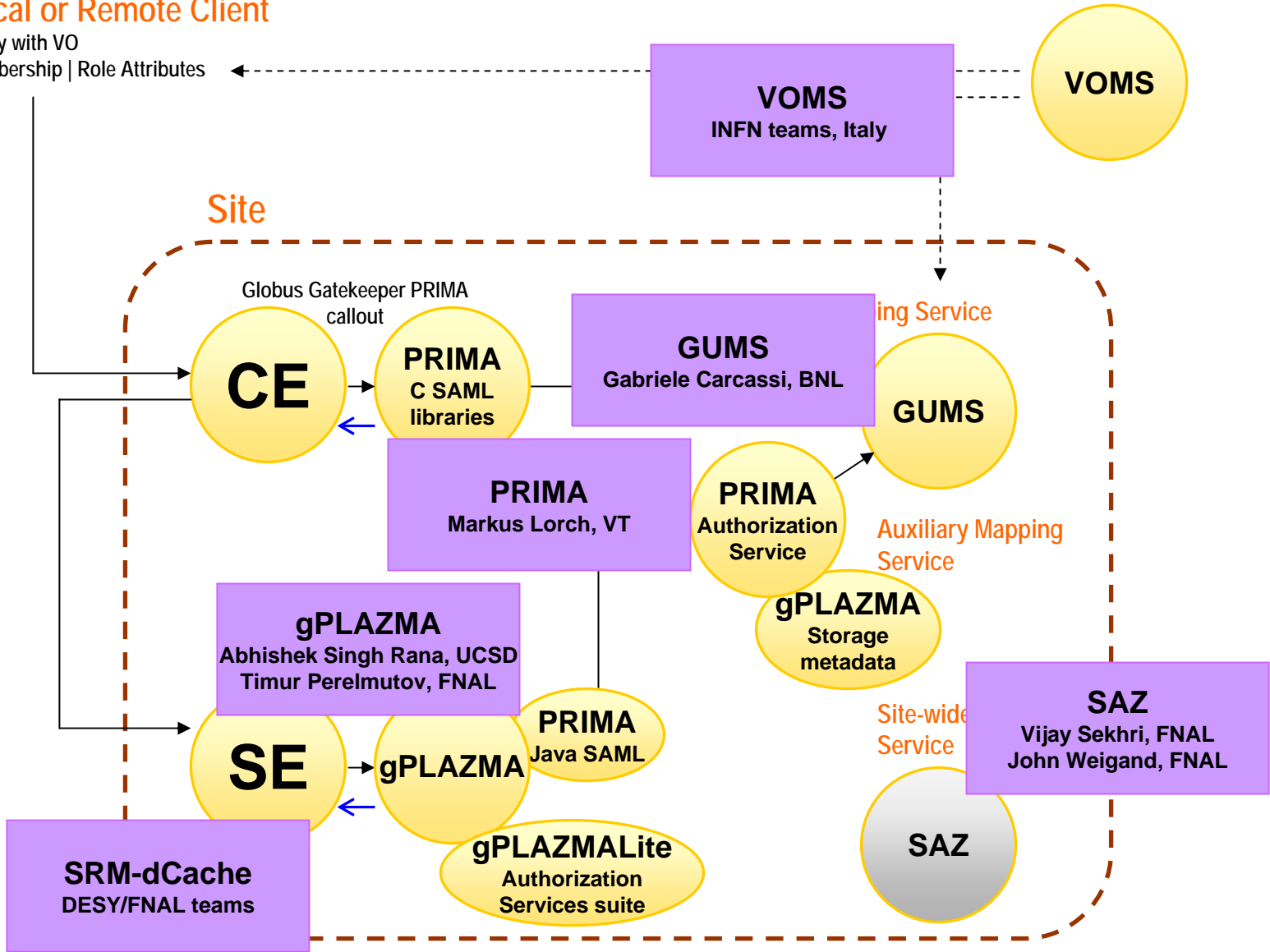gPLAZMA Storage Metadata Service translates Username to Storage-privilege Set.
Storage-privilege Set is {UID, GID, permitted storage area, R/W permissions}.
Storage-privilege Set is User-level ACL governed by {DN, Membership, Role} .

Implementation Status

- Packaging / Distribution available by end Jan
- Need to integrate gPLAZMA into dCap door
  - No firm date w.r.t. availability given

Directory Functions

- ❑ Implementation Status
  - ■ CASTOR
    - ❑ All implemented except srmLs and srmCp that will be made available by mid January
  - ■ SRM/dCache
    - ❑ Initial v2 release (beta on 15 Jan) will support ls, rm, mv etc.
  - ■ DPM
    - ❑ All implemented since first release except srmLs does not support recursive listings nor offsets

Global Space Reservation - Implementation Status

- **Castor**
  - Fully available

- **SRM/dCache**
  - Tentative date for alpha release is 15 March

- **DPM**
  - Current implementation just returns token, which at the moment is not used in PrepareToGet/Put methods
  - A full implementation will not be available before March 2006

Interoperability Castor-dCache-DPM-?

- Issues include
  - Specifications leave room for interpretation
  - srmCp interoperability problems in v1.1
- SRMv2 test suite by Gilbert Grosdidier
  - LBL suite for DRM part of VDT but not suitable
  - Flavia Donno will create RPMs
- Instances for Interoperability tests available for Castor and DPM (?)

Interoperability issues dCache ⇔ DPM

- ❏ Based on current/recent distributions
- ❏ Problems observed on transfers from dCache => DPM
    - ■ srmCp push goes at good rate
    - ■ Direct gridFTP to gridFTP door goes at good rate
    - ■ 3rd party gridFTP get/put choked at 250 kB/s
    - ➢ FTS currently uses gridFTP get/put (basic version of srmCp client exist)
        - ▪ Invoke srmGet and srmPut, receive 2 TURLs and make 3rd party gridFTP between source and destination host
    - ➢ Problem appears to be independent from FTS code
        - ➢ Manual invocation of commands leading to same result

SRMv2 / FTS

- Main Issue w.r.t. SC-4 is Timeline
  - FTS developers need to integrate after SRMv2 implementations are available to them
- Other worries
  - Differences in Implementations (Castor, dCache, DPM,?)
  - srmCp is important for Performance
  - Cross SRMv2 ⇔ SRMv1 support
  - Need to understand behavior of new features (i.e. Space Reservation etc.)

Data Integrity for Data in Transit

- Timur (FNAL) has made proposal to enable integrity verification in SRM servers when clients are writing into Storage Systems
  - 2 optional fields in PrepareToPut
    - Checksum type and checksum value
  - Parameters could be optionally set by the client
  - Server calculates checksum on data transferred into SRM managed storage via any of the supported protocol
  - Server can reject transfer in case locally calculated checksum does not match the transferred checksum
  - Include checksum type and value in srmPrepareToPut file status structure
  - In FNAL SRM implementation implement integrity verification functionality as part of the gridFTP v2 specification (CKSM, SCKSM) as it is defined in
  - https://forge.gridforum.org/projects/gridftp-wg/document/draft-ggf-gridftp-v2protocol-2.pdf/en/1

Summary

- **Good progress made w/ all three implementations**
  - Castor
    - Transfer and directory functions ready by end January
    - Global Space Reservation fully available today
  - SRM/dCache
    - Transfer and directory functions ready by end January (Beta)
    - Global Space Reservation by mid March (alpha)
  - DPM
    - Transfer and directory functions ready by end January
    - Space Reservation not before March (optimistic date)
  - SRMv2 test suite will help sort out Interop issues
  - See no showstopper but schedule is tight