iRODS experience at PDC

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Desired functionality

Looking for a system for long term storage and capable of delivering scientific data to single users and communities that we serve.

- User-friendly while maintaining flexibility
- Scalable
- Secure access
- Multi-resident data
- …

Community-driven, open-source, data grid software that provides means for managing large distributed collections of digital objects, and maintain metadata and apply data management policies, iRODS was an interesting candidate.

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Testbed setup

- CentOS 6.3 with Postgresql 9.0.3
- iRODS 3.1 (Integrated Rule-Oriented Data System)
- Single Zone – an iCAT-enabled host – possibly with other non-iCAT servers
- And a simple Resource – Vault easy to deploy and maintain, scales …
- Easy and quick installation
- iRODS running as not-privileged user
- First aim was to test available clients

(icommands, iRODS Web Browser, iDrop, Fuse)

Easy installation, icommands the most powerful client, iDrop works on every OS (Windows!)

Fuse used easily on Linux ….

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Authentication Test

- Password (default): Challenge/response - MD5 hash
- Kerberos V5: (using PDCs default realm NADA.KTH.SE)
  - recompile server and clients, enable user and change configuration
- GSI (Grid Security Infrastructure using Terena Certificates)
  - Obtain server certificate, recompile, use Globus Toolkit

iCommands uses all three methods while all other clients use default password based method.

Investigate iRODS Web Browser with Shibboleth and SWAMID

SWAMID is an identity federation that includes most higher education institutions and government agencies that is involved in higher education and research in Sweden.

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Testbed setup …

Resource is a HW/SW system that stores data

Resource Type: e.g Unix or Windows FS, HPSS, S3 Cloud Storage, RDBMS, MSSUD/TSM, etc…

Resource Class: e.g Cache, Archive, Compound bundle, DB class, etc…

A – Type:Unix FS, Class:archive "PDCDisk"

B – Type: S3, Class: cache "PDCCloud"

C – Type: MSSUD, Class: cache "PDCTape"

Vault, Archive resource is default, scales, ... while Compound Resource S3, MSSUD uses drivers to keep files in sync with cache resource (iput iget) ...
S3 delete function had a small bug in the code that was reported.

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High availability features

- Challenge is the meta-data servers, specifically in the backing RDBMS.
- Consequently – if HA is available for the RDBMS iRODS can have HA
- PgSQL case - use pgpool
  - maintains consistency between two independent PgSQL instances
- Change iRODS Server manually in .irodsEnv file
- Ultra Monkey or such ... HA, Load Balancing ?
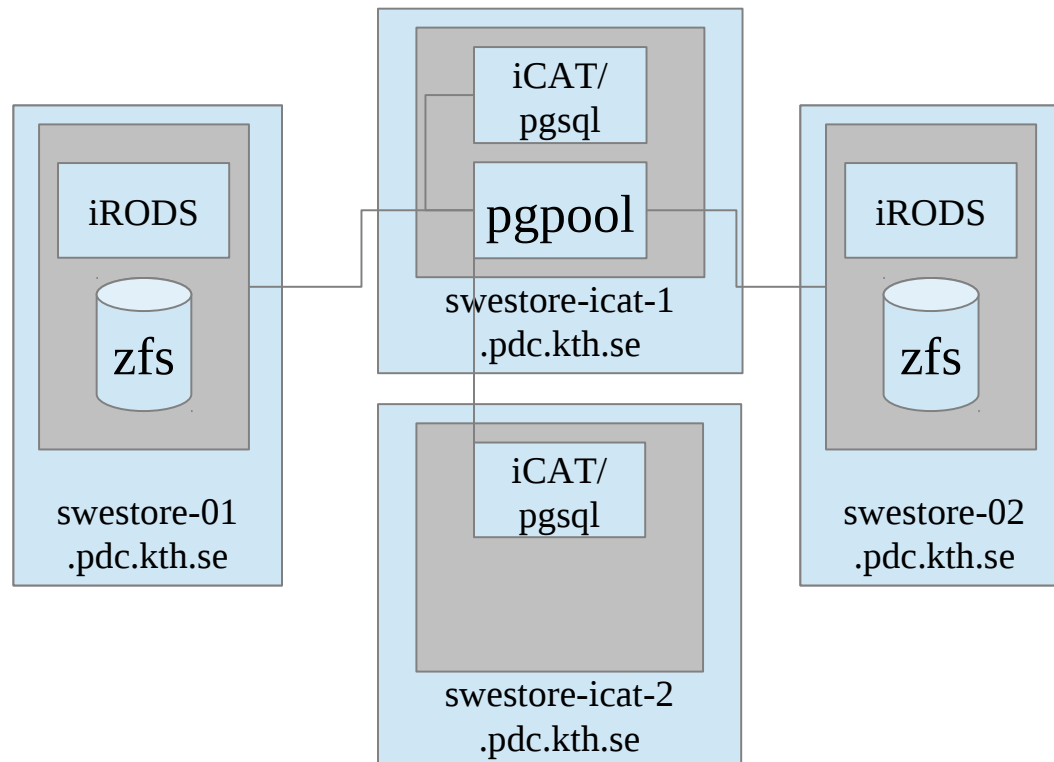
INCF Collaboration

International Neuroinformatics Coordinating Facility

They need to :

Share data, Publish data, Preserve data, Federate data ...

While providing secure access, authorization for tens/hundreds of thousands of members of the federation, versioning, archive, replicate, easy metadata annotation, ...

First step is to build on iRODS a "Dropbox for Scientific Data" (Global namespace, local file access, authorisation and authentication, decentralized architecture with data publication)

First test done between Sweden (PDC), Finland(CSC), Germany(BCCn) and San Diego (UCSD)

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CineGrid Collaboration

KTH Swedish Royal Institute of Technology is CineGrid Institutional Member

CineGrid organization uses iRODS technology in collaborating and archiving 4k movie data (super high definition movies) among the members all over the world.

iRODS storage nodes are spread out internationally over Japan, Netherlands, Czech Republic, Sweden, Brazil and Hongkong.

RBUDP: Reliable Blast UDP is used for CineGrid Exchange

iRODS is enabling a media curation platform for long-term data preservation and creates a workflow for curators to handle large amount of media data in a cross-organisational environment

Swedish node is situated at PDC (~40TB) and it is going in production soon (in couple of days).

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EUDAT Collaboration

PDC is one of EUDAT data centers (CINECA, BSC, SARA, CSC, CERN, JULICH, RZG, EPCC, ...)

Multiple research communities are going to use Collaborative Data Infrastructure (CLARIN, EPOS, ENES, LIFEWATCH, VPH)

Early candidate services has been defined and in particular

Safe Replication which service enables EUDAT communities to easily create replicas of their scientific datasets in multiple data centers. The iRODS technology plays a central role in the Safe Replication service.

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