iRODS at CC-IN2P3: overview

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Talk overview

- CC-IN2P3 activity.
- iRODS in production:
  - Hardware setup.
  - Usage.
  - Prospects.
- iRODS developments in Lyon:
  - Scripts.
  - Micro-services.
  - Drivers.
  - Resource Monitoring System.
  - iCommand.
- SRB to iRODS migration.
CC-IN2P3 activities

- Federate computing needs of the French scientific community in:
  - Nuclear and particle physics.
  - Astrophysics and astroparticles.
- Computing services to international collaborations:
  - CERN (LHC), Fermilab, SLAC, ….
- Opened now to biology, Arts & Humanities.
9 servers:
- 3 iCAT servers (metacatalog): Linux SL4, Linux SL5
- 6 data servers (200 TB): Sun Thor x4540, Solaris 10.

Metacatalog on a dedicated Oracle 11g cluster.

HPSS interface: rfio server (using universal MSS driver).

Use of fuse-iRODS:
- For Fedora-Commons.
- For legacy web applications.

TSM: backup of some stored data.

Monitoring and restart of the services fully automated (crontab + Nagios + SMURF).

Automatic weekly reindexing of the iCAT databases.

Accounting: daily report on our web site.
DNS alias:
• load balanced.
• redundancy improved.
• scalability improved.
TIDRA: Rhône-Alpes area data grid.

Used by:
- Biology.
- Biomedical applications:
  - Animal imagery, Human data.
  - Automatic bulk metadata registration in iRODS based on DICOM files content (Yonny).
  - Coming soon: synchrotron data (ESRF – Grenoble).

Already 3 millions of files registered.

Up to 60000 connections per day on iRODS.

Authentication: using password or grid certificate.

Expecting growth: + 20 TBs or more.
Adonis: French academic platform for Arts and Humanities.

Various projects:
- Data archives.
- Data online access through:
  - Fedora-commons.
  - Web site.
- Data access and processing by batch jobs.

iRODS at the heart of Adonis.

Already 20 TB of data (2 M files), more than 100 TB at the end of this year.
Ex: archival and data publication of audio files (CRDO).

1. Data transfer: CRDO → CINES (Montpellier).
2. Archived at CINES.
3. iRODS transfer to CC-IN2P3: `iput file.tar`
4. Automatic untar at Lyon.
5. Automatic registration in Fedora commons.
iRODS usage: prospects

- **Starting:**
  - Neuroscience: ~60 TB.
  - IMXGAM: ~ 15 TB (X and gamma ray imagery).
  - dChooz (neutrino experiment): ~ 15 TB / year.

- **Coming soon:** LSST (astro):
  - For the IN2P3 electronic test-bed: ~ 10 TB.
  - For the DC3b data challenge: 100 TB ?

- **Thinking about a replacement of light weight transfer tool (bbftp).**

  ➔ **communities:** High Energy physics, astrophysics, biology, biomedical, Arts and Humanities.
iRODS contributions

- Scripts:
  - Test of icommands functionalities.

- icommand:
  - iscan (release 2.3): admin command.

- Micro-services:
  - Access control: flexible firewall.
  - Msi to tar/untar files and register them in iRODS.
  - Msi to set ACLs on objects/collections.

- Universal Mass Storage driver.

- Miscellaneous (related to the Resource Monitoring System):
  - Choose best resource based on the load.
  - Automatic setup of status for a server (up or down).
1. Ask each server for its metrics: rule engine cron task (msi).

2. Performance script launched on each server.

3. Results sent back to the iCAT.

4. Store metrics into iCAT.

5. Compute a «quality factor» for each server stored in an other table: r.e. cron task (msi).
Provide a single GUI for accessing the data on the GRID.

JUX tries to be intuitive and easy to use for non-expert users:
  – use context menus, drag-and-drop…
  – close to widely used explorer (i.e. Windows explorer)

Written in Java by Pascal Calvat.

Based on the JSAGA API developed at ccin2p3 by Sylvain Reynaud.

JSAGA provides the data management layer:
  – Protocols: srb, irods, gsiftp, srm, http, file, sftp, zip…
  – SRB and iRODS plugins are using Jargon.
  – Can add a plugin easily for a new protocol.

JSAGA provides security mechanisms:
  – Globus proxy, VOMS proxy, Login/Password, X509
Download: https://forge.in2p3.fr/wiki/jux
SRB migration to iRODS

- SRB as of today:
  - More than 10 experiments using it.
  - Key component for all of them.
  - More than 2 PBs handled by the SRB.
  - Max network traffic 15 TB / day.
  - 500,000 connections per day, even more.
  - OS: Windows, MAC, Linux (SL, Debian, Suse), Solaris, AIX.
  - Clients: from laptop to supercomputers.
  - Connections as far as Australia and Hawaii.
- Still growing.
SRB migration to iRODS

- Tricky to do it in production:
  - Java part ok: almost transparent.
  - Shell commands: need to adapt client side scripts.
  - Will provide a simple tool to help converting scripts from Scommands to icommands.

- Will start this year (2 years process) with BioEmergence (extra 60 TBs in iRODS).

- Won’t do migration for ended projects (BaBar, SNFactory etc…).
iRODS overall assessment

- iRODS is becoming more and more popular in IN2P3 community and beyond.
- Very flexible, large amount of functionalities.
- As SRB, it allows to go way above simple data transfer.
- Can be interfaced with many different technologies (no limit):
  - Cloud, Mass Storage, web services, databases, ....
  - Able to answer a vast amount of needs.
- Lot of projects = lot of work for us!
- Goal for this year: ~ x00 TB (guess: > 300 TBs).
- Should reach PB scale very quickly.
- Filenames and metadata with accentuated letters.
- Need better control on servers’ activity:
  - Connections can come from anywhere (laptops, batch farms …).
  - Limit the number of processed requests at the same time.
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