



Centre de Calcul de l'Institut National de Physique Nucléaire et de Physique des Particules

Storage Services @CC-IN2P3

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- ▶ Storage questions: What? Why? When?
 - Computing landscape (shared filesystem)
 - Mass storage
 - Distributed storage



Storage questions

▶ WHAT do I have to store?

- Is it script and/or software?
- Inputs, outputs, log files?
- Scientific data
- Documents?

▶ WHEN will I need the stored data again?

- Today, tomorrow, during this week
- Two, three months tops
- A couple of years and no more
- ...
- For my grandchildren 😊

▶ WHY?

- Computing or other treatments
- Sharing
- Archive



- ▶ **PBS: Permanent Backed up Storage**
 - Snapshot every 12 hours, backup on tape every 24 hours
 - \$HOME (20G personal space)
 - \$THRONG (100G shared space within the group)

- ▶ **\$TMPDIR (/scratch)**
 - Shared file system ONLY on interactive (cca) machines
 - Local file system on worker nodes
 - Limited to job lifetime

- ▶ **SPS: Semi-Permanent Storage**
 - High throughput file system for working data
 - NO backup, NO snapshot
 - Space quota varies depending on the group resources request
 - Limited time?

- ▶ **HPSS: High Performance Storage System**
 - Tape storage
 - NOT an archive (single copy only, no life cycle management)
 - Scientific data only
 - Raw data
 - Long term usage
 - Suitable for files >1 GiB



Mass storage

- ▶ TSM: Tivoli Storage Manager
 - Tape backup system
 - Spectrum protect
 - Server backup for IN2P3 labs and DSI
 - No archive



- ▶ XRootD
 - Efficient read-only storage for HPSS retrieval
(internal scheduling mechanism)
 - Large disk cache (5 PiB)
 - Local copy or remote access
 - High scalability



- ▶ iRods: Integrated Rule-Oriented Data System
 - Storage middleware
 - Need of a specific account
 - Management of metadata
 - Migration to tape

The logo for iRODS, featuring the lowercase letter 'i' in a teal color and the uppercase letters 'RODS' in a dark grey color, all in a bold, sans-serif font.

Namespaces

/hps	HPSS + XRootD namespace	Not mounted on machines, only remote access
/scratch	Temporary workspace (\$TMPDIR)	Local disk on workernode. Shared filesystem on interactive machine
/sps	SPS namespace	
/pbs/home	\$HOME	
/pbs/throng	\$THRONG_DIR	
/pbs/software	Installed software namespace	
/in2p3	iRods namespace	

Summary table

- ▶ <https://doc.cc.in2p3.fr/en:stockage-et-transfert>

Where is the Data <i>before</i> the job?	File type / format	Access	Files / dataset types shared concurrently by jobs	Working dataset size
dCache	Any / ROOT (data)	read AND write non posix (dCap, ROOT, local copy)	read	> 10MiB
HPSS	Any (data)	read OR write non posix (local copy)	read	> 1GiB
iRODS	Any (data)	read OR write non posix (local copy)	read	Any
SPS	Any + binaries + logs	read AND write posix OR local copy	read AND write	≤ 8GiB : direct access > 8GiB : local copy
XRootD	ROOT (any)	read (non posix) write (ALICE) (ROOT, local copy)	read	Any

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