CCIN2P3

CNRS

CNRS Nucléaire & particules

CC-IN2P3 status report
FJPPN Workshop

CC-IN2P3, Villeurbanne, February 2026

Outline

- **Some (general) news from CC-IN2P3**

- **Computing**
  - new GPUs installed (2025)

- **Storage**
  - new tape library

- **Facilities**
  - new computing room

- **User services**

- **Conclusion & perspectives**

IN2P3 Computing Center overview

- **Resources**
  - 79 people (75 engineers - 63 IT -, 3 people in the research team and 1 trainee)
  - Budget 2025: 7.1 M€ (HR excluded)
    - 2.5 M€ buildings (incl. 1.7 M€ for electricity)
    - 4 M€ computing (incl. 2 for WLCG) & 0.4 M€ running costs
  - Budget 2026: should be ~7.1 M€ (got lucky, no cut)
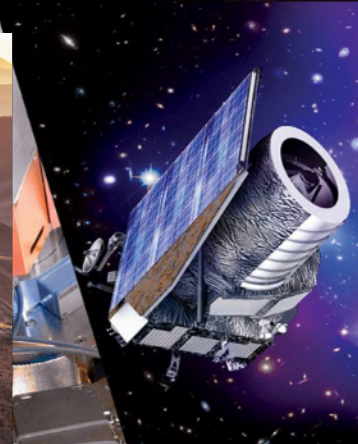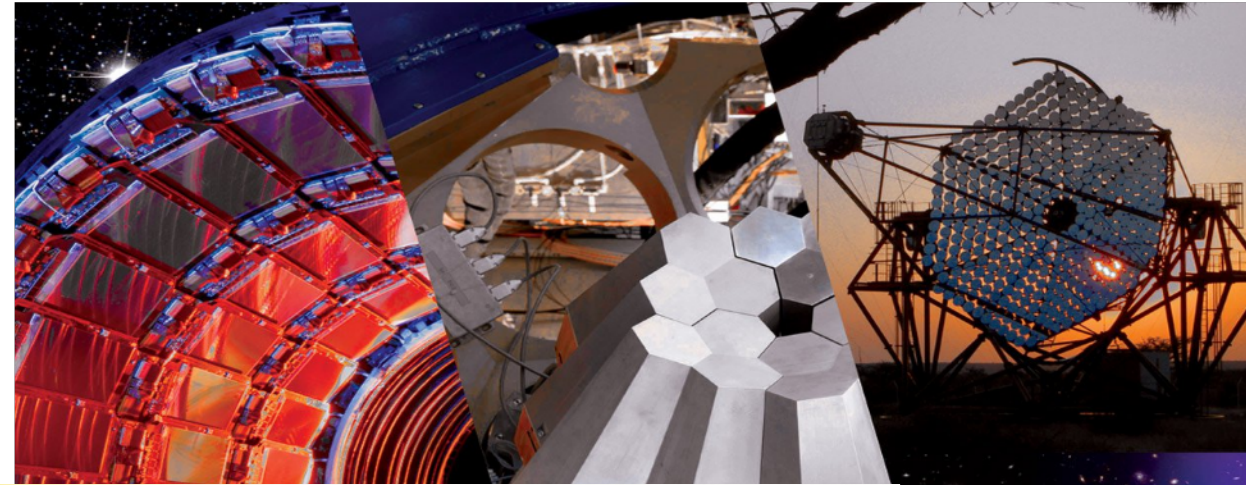
- **Facilities**
  - 1700 m^2 over two computing rooms
  - New room Vil3 just built (delivered in December 2025)

- **Computing**
  - ~800 servers, 1060 kHS23
  - 4 ARM workers available (test)

- **Storage**
  - Tapes: 570 PB (full capacity, including the new library installed in November 2025)
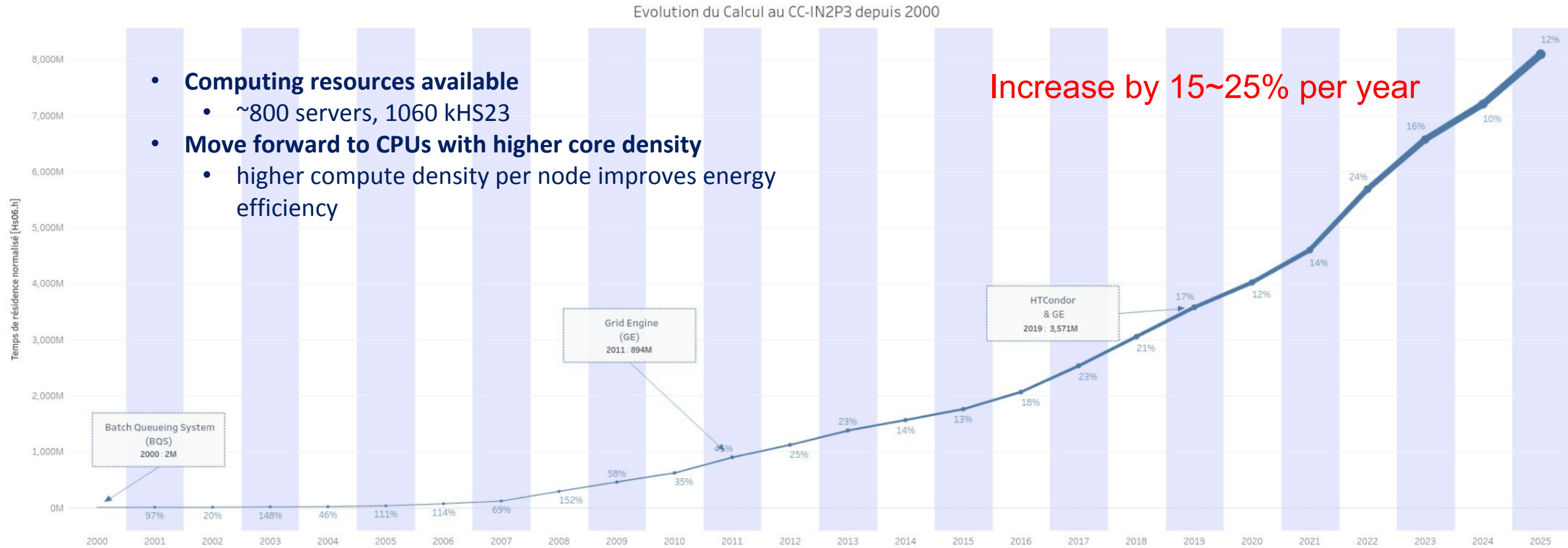 - HDDs: ~100 PB

Computing & Batch Systems

Computing

Walltime increase over the years

Evolution du Calcul au CC-IN2P3 depuis 2000

- **Computing resources available**
  - ~800 servers, 1060 kHS23
- **Move forward to CPUs with higher core density**
  - higher compute density per node improves energy efficiency

Increase by 15~25% per year

New GPUs installed in 2025

- **New GPUs intalled in the JupyterLab (platform) and in Slurm in 2025**

  - provided (and bought) by Huma-Num (Humanities and Social sciences)

- **In Slurm**

  - V100 (already installed)
    - PowerEdge C4140
    - 18 workers, **72 GPUs (32GB per GPU) with 192GB memory per worker**

  - **H100 NVL (installed in Spring 2025)**
    - ProLiant DL385 Gen11
    - 4 workers, **16 GPUs (94GB per GPU) with 1,5TB of memory per worker**

  NEW!!

- **In JupyterLab**

  - **L40S (installed in Spring 2025)**
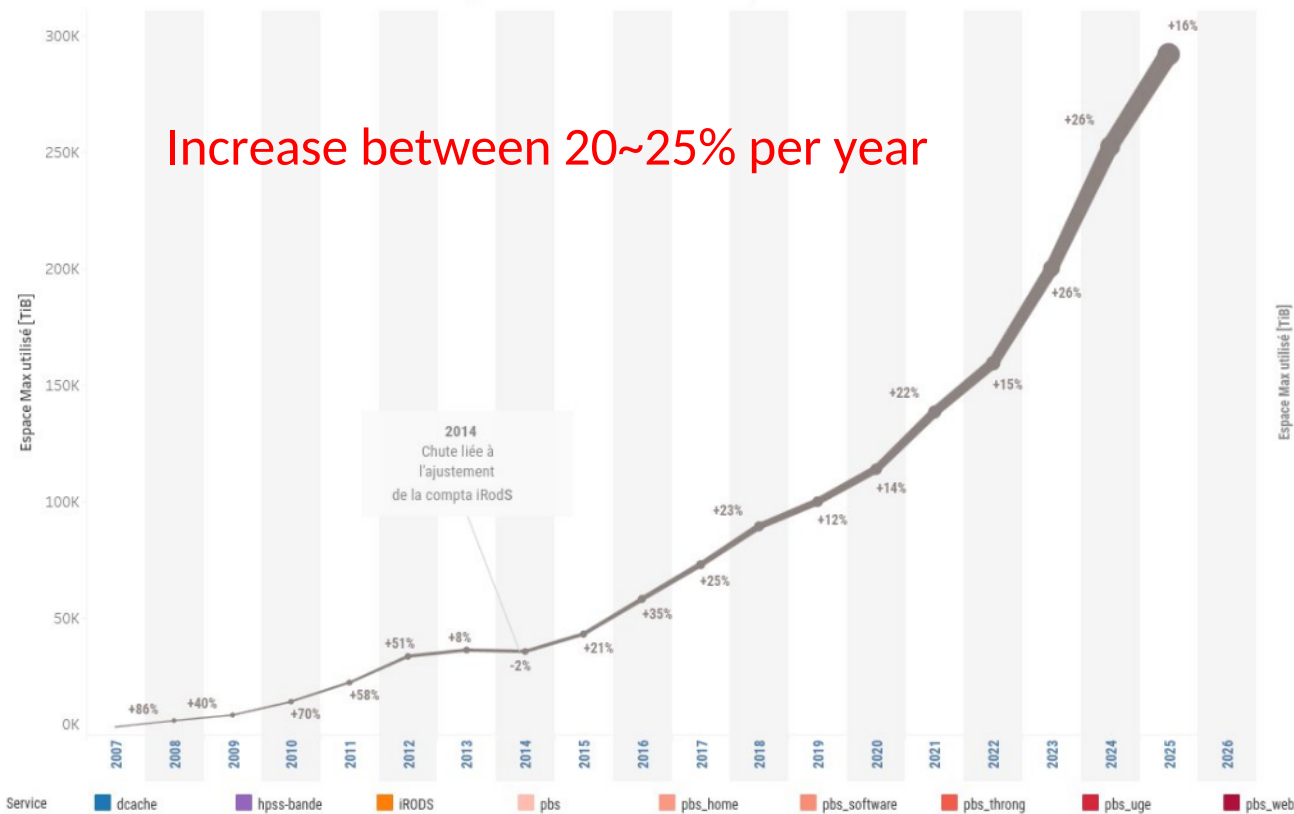   - ProLiant DL385 Gen11
    - 8 workers, **30 GPUs (48GB per GPU) with 768GB of memory per worker**

  NEW!!

Storage Resources
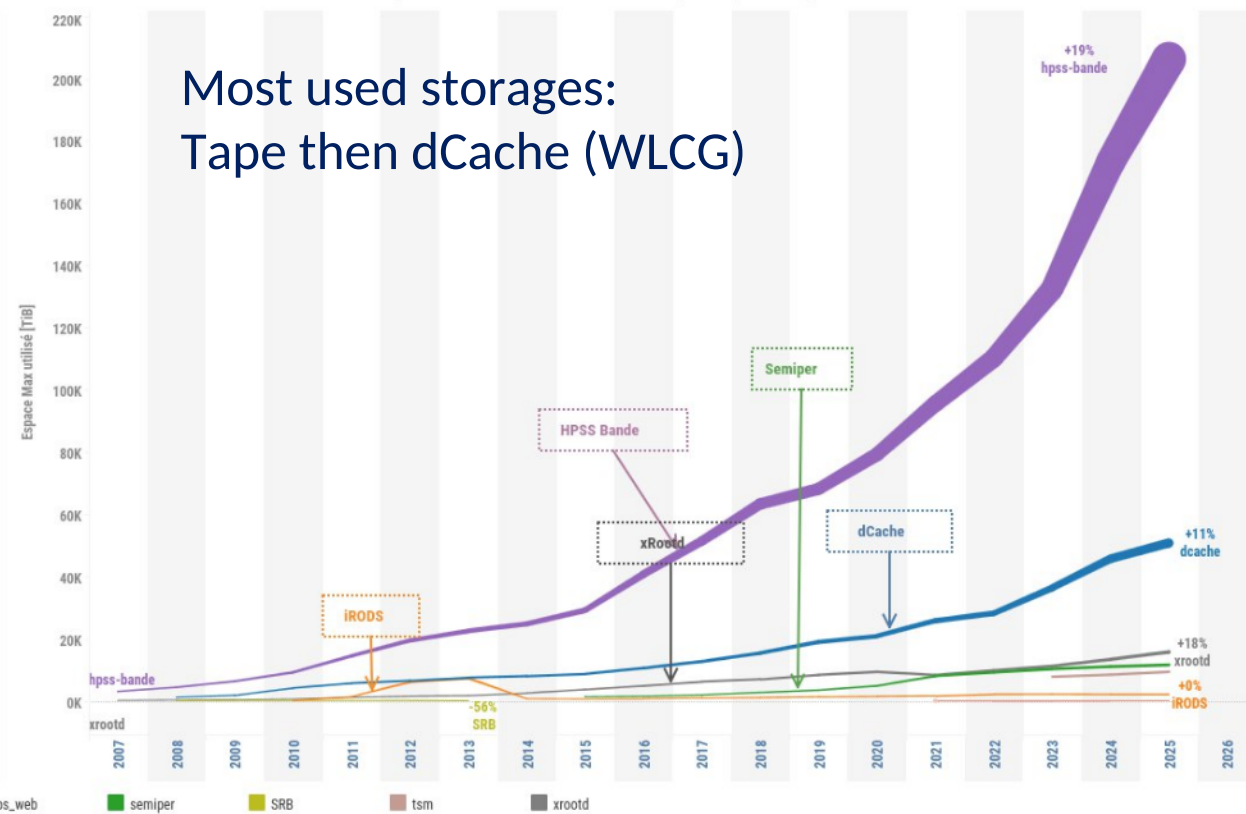
Storage

CCIN2P3

Increase of the storage usage and split between main backends provided

Evolution du stockage Total utilisé
-Espace mensuel maximum utilisé sur la période-

Increase between 20~25% per year

Most used storages:
Tape then dCache (WLCG)

Détail du stockage utilisé par Service
-Espace mensuel maximum utilisé sur la période pour chaque Service-

Distributed filesystems

- Isilon NAS (GROUP directories, data) being phased out as distributed FS over compute nodes, replaced by CephFS
  - Currently 2 clusters of CephFS in production : 2 x 5 PB
- Isilon NAS still used for HOME directories
  - snapshots feature
  - higher level of data security (erasure coding or replication)

Tape management

- Two Spectra TFinity libraries currently in production
  - 2 x 48 IBM TS1160 tape drives
  - full capacity: 2 x 135 = 270 PB
  - current usage ~234 PB
- New IBM TS4500 (installed in December 2025)
  - 48 LTO10 tape drives
  - full capacity: 300 PB
  - 1200 tapes (12% of full capacity)
- HPE Storever MSL 3040
  - 14 LTO9 tape drives
  - full capacity: 10 PB
  - backup for IN2P3 labs (and various CNRS groups)

Old Oracle library

2 new Spectra libraries

Old Oracle library replaced by IBM TS4500 on December (increased the full capacity to 570 PB)
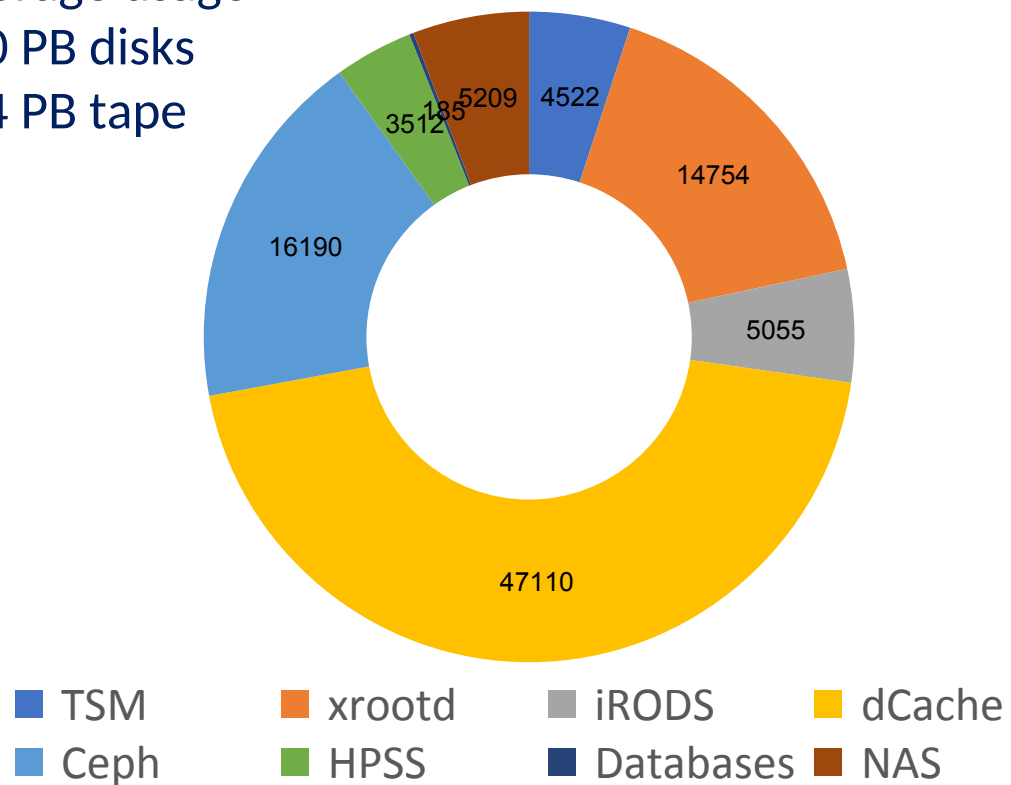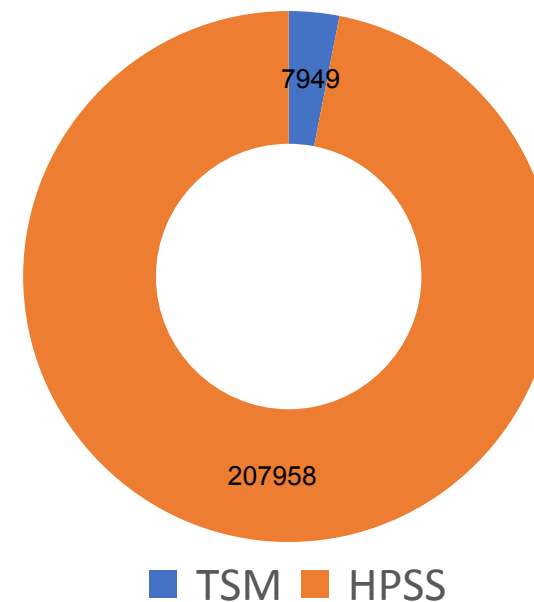
Full capacity 300 PB

Full capacity 2 x 135 PB

Storage

Disk Size Distribution (TiB)
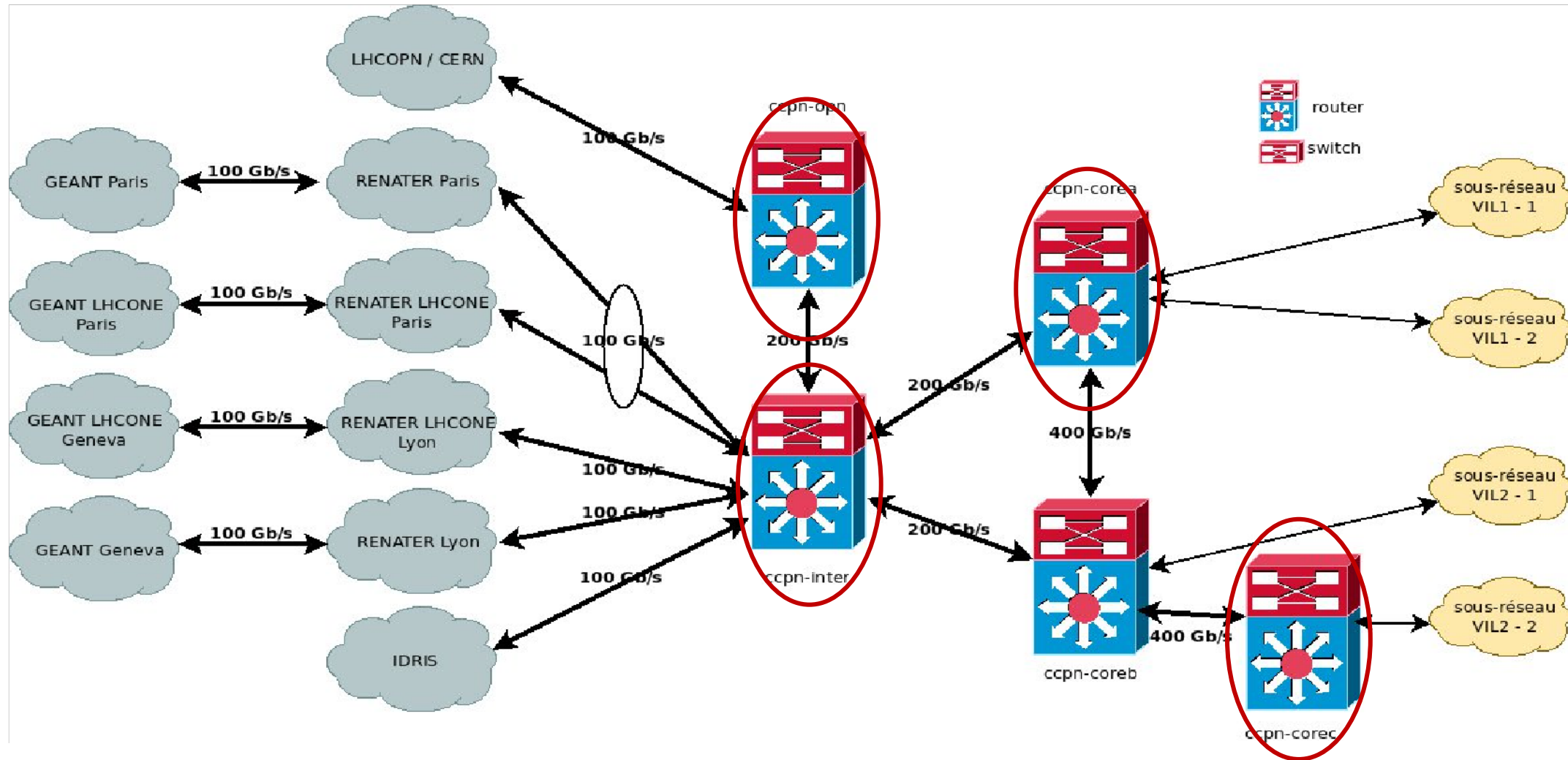
Current storage usage
- ~100 PB disks
- ~234 PB tape

Legend:
- ■ TSM
- ■ xrootd
- ■ iRODS
- ■ dCache
- ■ Ceph
- ■ HPSS
- ■ Databases
- ■ NAS

Disk values: 4522, 14754, 5055, 47110, 16190, 3512, 185, 5209

Tape Size Distribution (TiB)

Legend:
- ■ TSM
- ■ HPSS

Tape values: 7949, 207958

Networking

Current network infrastructure... but the <u>network backbone</u> is planned to be upgraded / replaced.

Current network infrastructure... but the network backbone is planned to be upgraded / replaced.

The links of the backbone routers will be upgraded from 100Gb/s to 400 Gb/s

- routers 'ccpn-inter', 'ccpn-corea', 'ccpn-corec' and 'ccpn-opn' will be replaced (will still use Cisco hardware)
- 'ccpn-coreb' will disappear

New router for the new computing room Vil3 (400Gb/s)

**Upgrade planned for S1 2026.**

Facilities

New Computing Room vil3

New room partly funded through FITS Equipex (national project with IDRIS, national HPC)

- Target usage: research infrastructure hosting
  - will allow to move remaining IT services from Vil1 to Vil3
- Construction completed on December 25
- 2MW IT at term (130 racks, 15KW), PUE ~1.3 (full occupancy)
- ~9 M€ without IT

Some user services
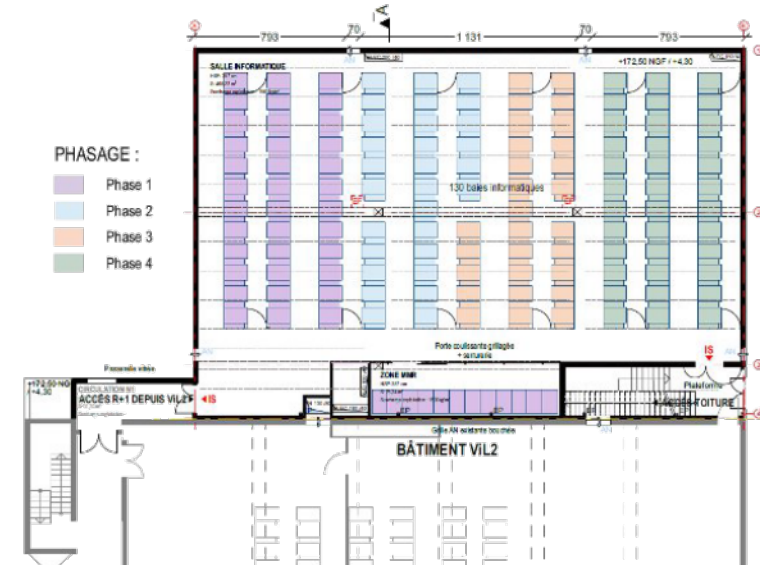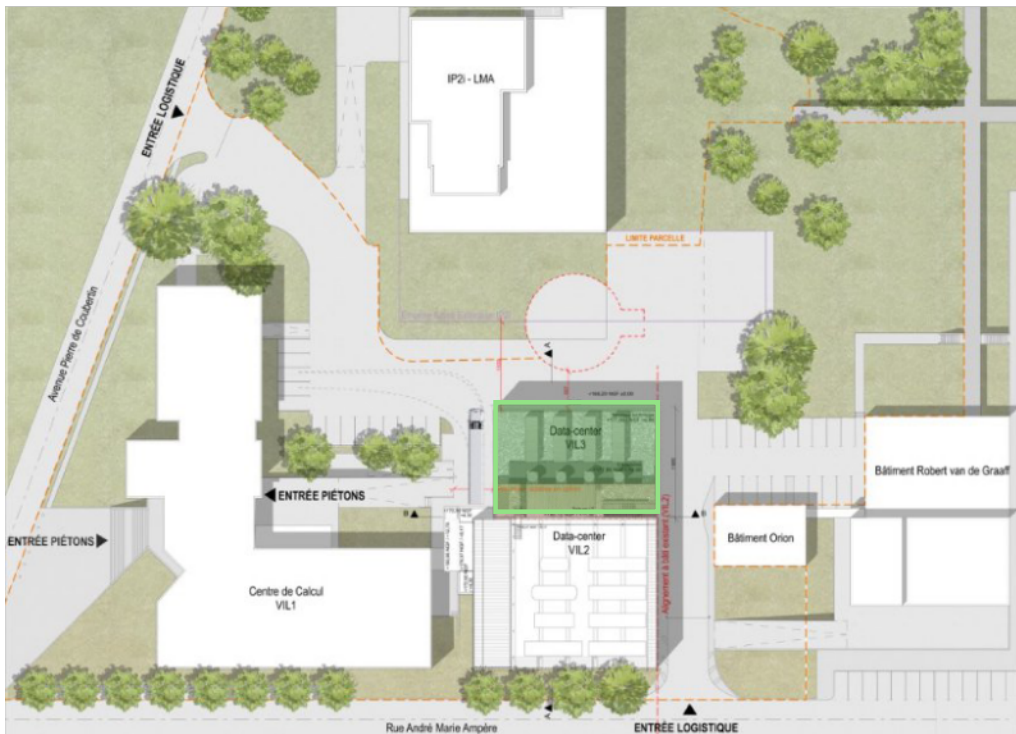
Computing : Jupyter notebooks
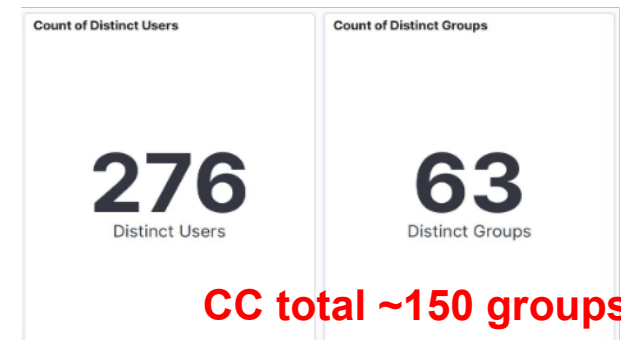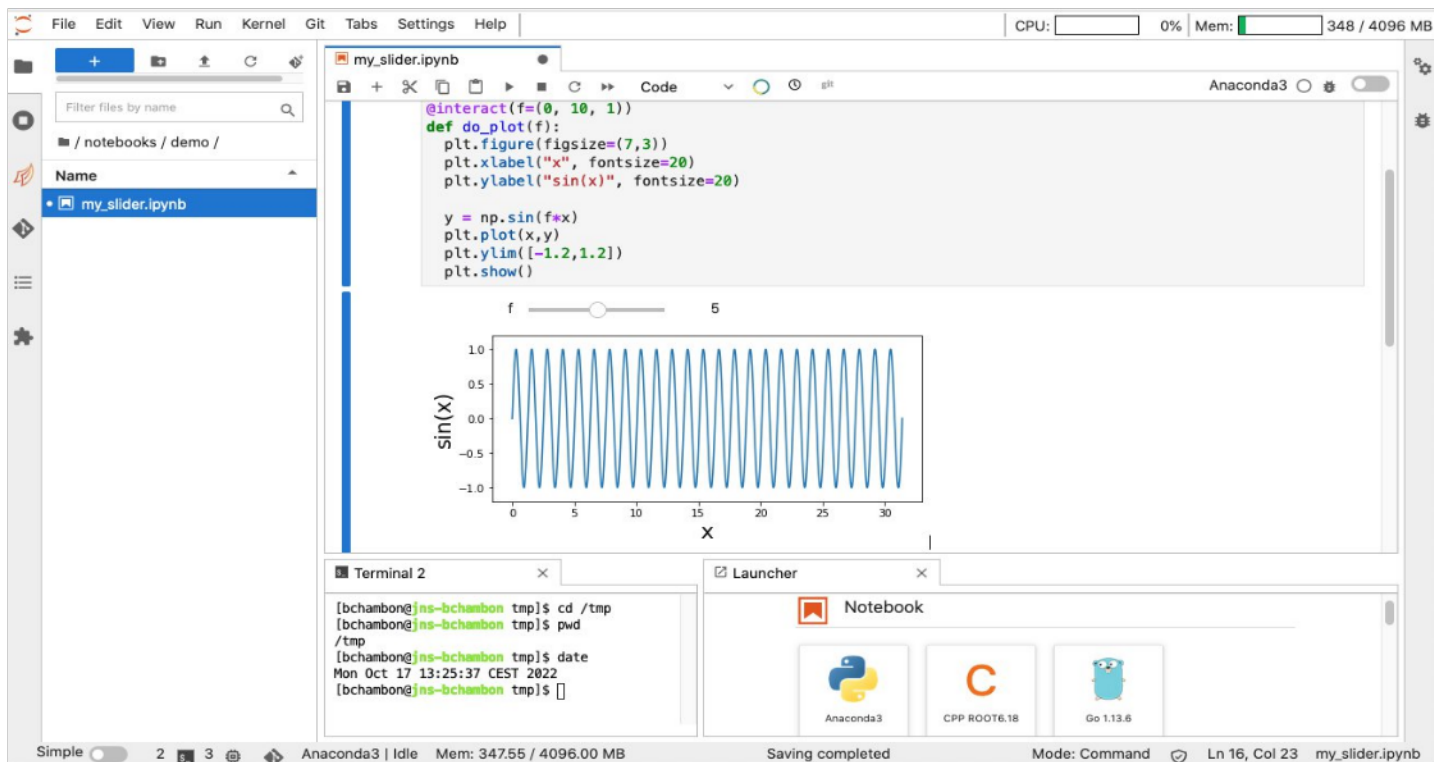
CC total ~150 groups

Platform often used/reserved for trainings
- 5~6 trainings per year (few days to a week long)
- using mostly GPUs

- provides various programming languages and (JupyterLab's) extensions to extend the features of the service
- provides Nvidia L40S GPUs (30 GPUs installed in Spring 2025)

A new Jupyter notebooks platform is being developed, <u>based and run directly on Slurm</u>, will
- allow a better resources management and accounting
- provide exactly the same computing environment as Slurm

- **New Identity portal (authorization & authentication) being developed**
  - allow users to fully manage their account and their groups
  - will improve the automation of most procedures

- **OpenStack (cloud) platform (Platform-As-A-Service)**
  - allow users to setup virtual machines according to their needs
  - users are free to install any software they need

- **Kubernetes (Red Hat OpenShift) platform for websites hosting**
  - CC-IN2P3 can provide WordPress based sites and hosts them
    - ~120 sites for and managed by CC-IN2P3
    - ~180 sites for collaborations (and hosted by CC-IN2P3)
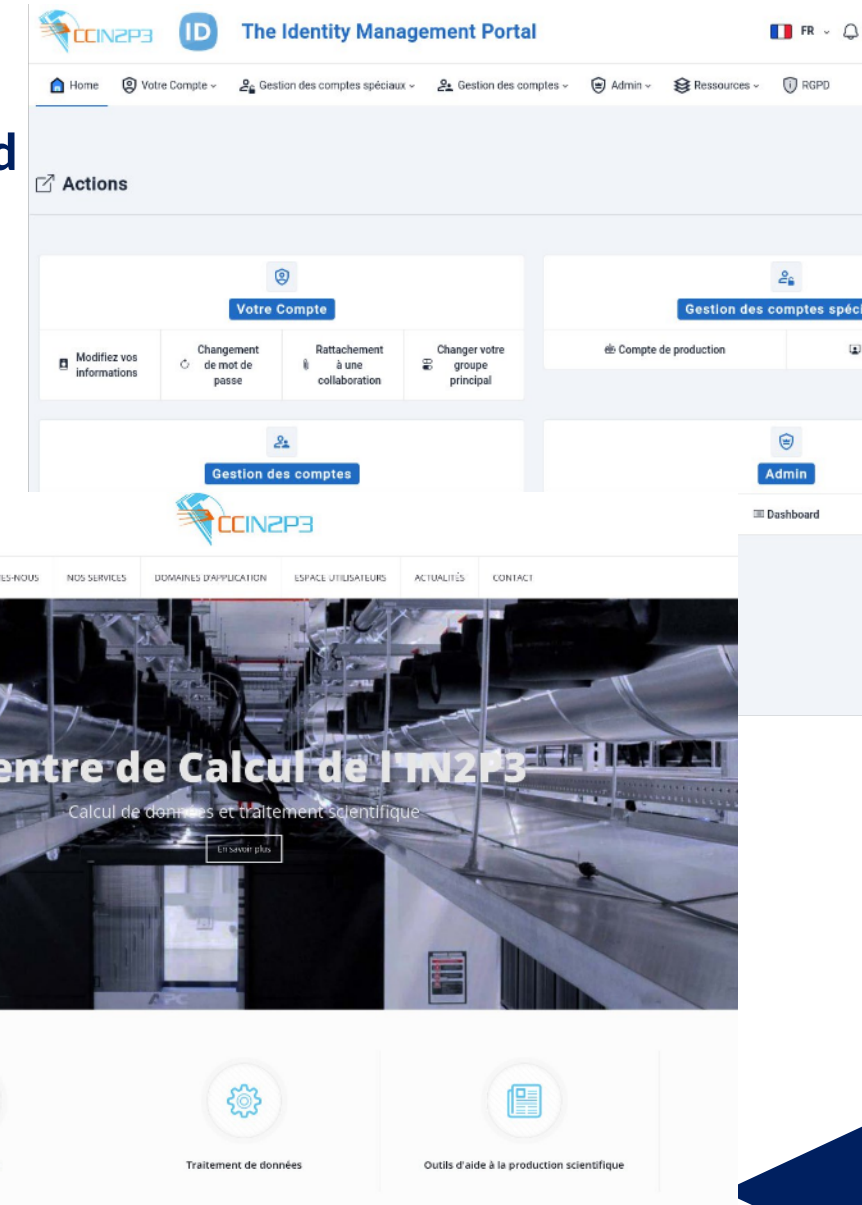
CAD Computer Aided Design
- provide 3D Experience (Dassault Systems)

Elias
- ElasticSearch On Demand service with a Grafana frontend for data visualisation

Various collaborative services provided to the IN2P3 labs
- Indico
- Zimbra
- IN2P3 Box (NextCloud with OnlyOffice)
- IN2P3 Forge (Redmine) for projects management
- Atrium (Nuxeo based, with laptop clients) for documents management

Conclusion & Perspectives

- **2026 budget**
  - should be the same as the past year, 25% only given so far.

- **Hardware price tends to increase**
  - memory by ~50%
  - Nvidia GPU by a factor of ~3 !

- **Hopefully WLCG hardware renewal completed**
  - purchases completed by the end of 2025 (before the price increases)

- **Other 2026 experiment requests (CPU, GPU, storage) still need to be discussed before purchase.**

- **Tape storage usage increasing, currently ~234 PB (full capacity 270 PB)**
  - New tape system (IBM TS4500) purchased, increasing the total capacity by 300 PB

- **Main perspectives for 2026**
  - re-order all IT services between Vil1, Vil2 and Vil3.

Thank You ! Questions ?