



CERN Site Report

Jérôme Belleman

CERN

European Organisation for Nuclear Research
(**C**onseil **E**uropéen pour la **R**echerche **N**ucléaire)

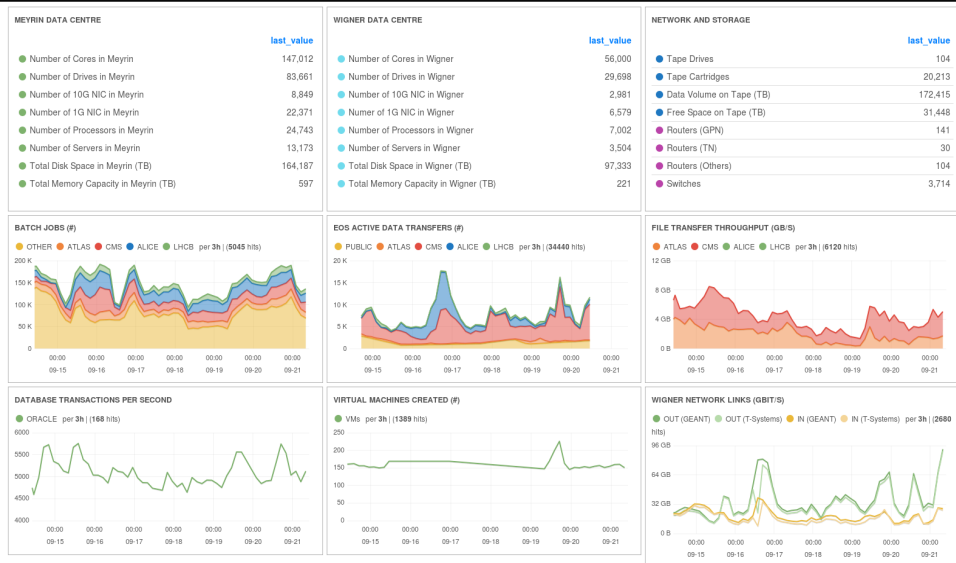
- Founded in 1954, 22 member states today
- World's largest particle physics laboratory
- Located at Franco-Swiss border near Geneva
- $\approx 2\,300$ staff members, $> 12\,000$ users

IT Department at CERN

Enabling the laboratory to fulfil its mission

- Main data centre in Meyrin site
- Wigner data centre in Budapest, 23 ms away
- Connected via 2 dedicated 100 Gb/s links
- Service resources in both sites where possible (+ disaster recovery)





<https://meter.cern.ch>

Storage (I)

AFS Phaseout:

- Long-term [viability of OpenAFS?](#)
- No hard deadline, final clean-up during LS2
- Usage review ongoing with user communities
- Alternatives: CVMFS, CASTOR, EOS, Ceph, CERNBox

Storage (II)

CERNBox:

- For all CERN users, 1 TB each
- Update: bug fixes, future desktop clients, notebook viewers, Service for Web-based Analysis (SWAN) pilot
- Growing fast, 5000 users

See Jan's talk

Operating Systems

- Windows:
 - Win 10 pilot > 300 PCs, on new ones by July 2017
 - Win 7 support planned to end before 2020
- macOS 10.11, 10.12 supported, 10.12 encouraged (security)
- Linux:
 - Production: SLC 6.8, CC 7.2
 - Docker Registry pilot → GitLab Registry
- Software:
 - Office 365 ProPlus, Windows and Mac
 - Visual Studio Community 2015, Windows

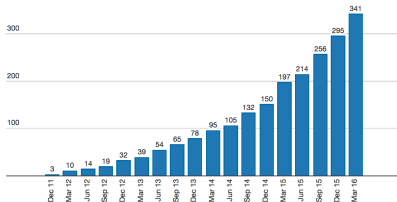
Databases (I)

DB on Demand (DBoD)

- Almost full DBA privileges
- MySQL, PostgreSQL, InfluxDB
- Clusters, backups to EOS, replication

Database on Demand instances

Evolution of the amount of MySQL, Oracle, and PostgreSQL instances in the DBoD service



Databases (II)

Hadoop:

- Service: infrastructure, consultancy, community
- Impala, Spark, Sqoop, Pig, Hive, ...
- Experiments, general purpose, SQL: > 6 PB

See Kate's talk

Version Control Services

GitLab:

- SVN until end of LS2, Gitolite now read-only
- GitLab: 5k users, 70k clone-pull/d, 4k push/d
- Now scaling up and replicating to Wigner

Other features:

- GitLab-CI, > 300 projects running builds
- GitLab Pages, generate static web sites
- GitLab Registry

Batch Services

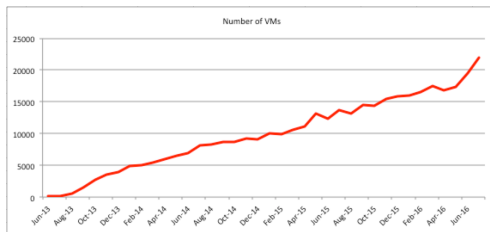
- 82k slots in LSF, 26k in Condor
- Mostly Grid work in Condor, opening now for local users
 - Kerberos token renewal implemented – thanks UW!
 - Migration of all work to Condor starting now
- External batch running all 4 LHC experiments seamlessly through the main Condor instance
- Monitoring of Condor moved to Fifemon from FNAL (Graphite/Grafana + Condor probes)

Batch Services



Cloud Services (I)

- OpenStack, partly Liberty/Mitaka
- 7k KVM, 200 Hyper-V, mostly for Batch
- 45 cells, 5 availability zones, 2 data centres
- 3k images, 3k volumes
- 3k users, 3k projects



Cloud Services (II)

- H/W retirement, live/cold migration of 5k VMs
- Neutron in production – how to move VMs?
- Migrating Windows VMs from Hyper-V to KVM
- Container orchestration for Swarm, Kubernetes, Mesos in production
- Looking at Ironi (Bare Metal as a Service)

Interactive Services – LXPLUS

- 80 VMs, 2k users/day
- 25 users/VM, 60 sessions/VM
- Cgroups: CPU and I/O fairshare, memory limits
- User accounting

Configuration Management

Numbers:

- 80 quadcore Puppet masters
- 312 modules (CERN and upstream)
- Resources in [commercial clouds](#)

Recent activities:

- Foreman 1.6.1→1.11.2, Ruby 1.9→2.2, SLC6→CC7
- Root passwords management with Puppet
- BagPlus Puppet module, install lxplus-like nodes
- MCollective broker migration

Networking

IPv6 and saving IPv4 addresses:

- More dynamic addressing
- Merge fixed and dynamic GPN services
- Fixed addresses only for services

Wi-Fi:

- More and more mobile devices used
- Moving between buildings
- 1 access point/3 offices

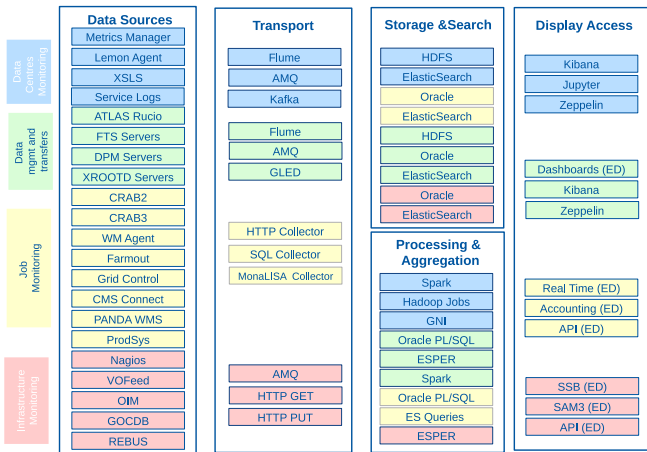
See Vincent's talk

Collaboration

Mattermost:

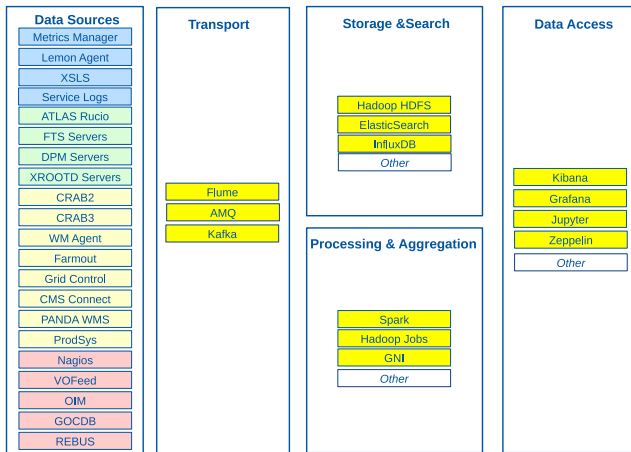
- Common place where everyone can be reached
- Alternative to Slack
- Hooks: RSS feeds, Indico, restaurant menu
- Fast evolution, we can contribute
- Service in the making

Unified Monitoring



<http://monit.cern.ch>

Unified Monitoring



<http://monit.cern.ch>

Elasticsearch

Need for a central service:

- Survey: > 20 independent ES instances
- Consolidation: central service
- Production foreseen Q1 2017

Current status:

- Test instances for 20 different use cases
- Most prerequisites for production in place
- Clusters ranging from a few GB to 250 TB
- Kibana 4.x, Elasticsearch 2.x
- Now: finalising use cases, improving workflows

More Talks from CERN This Week (I)

- *CERN Computing Facilities Evolution*, Wayne Salter
- *Pre-Studies for Wi-Fi Service Enhancement at CERN*, Adam Sosnowski
- *Wi-Fi Service Enhancement at CERN*, Vincent Ducret
- *Deploying Open Compute Hardware at CERN*, Marco Guerri
- *A Race for the Data Center: POWER8 and AArch64*, Marco Guerri
- *Security Update*, Hannah Short
- *Can We Trust eduGAIN?*, Hannah Short

More Talks from CERN This Week (II)

- *EOS, DPM and FTS Developments and Plans*, Andrea Manzi
- *Update on HNSciCloud Project*, Helge Meinhard
- *Update from Database Services*, Kate Dzedziniewicz-Wojcik
- *AFS Phaseout at CERN*, Jan Iven
- *Cloud Services – Network Realities*, Tony Cass
- *SDN-enabled Intrusion Detection System*, Adam Krajewski



www.cern.ch