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
- ≈ 2 500 staff members, ≈ 17 000 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 3 dedicated 100-Gb/s links
- Service resources in both sites where possible (+ disaster recovery)

CERN

Wigner RCP

COMPUTING

Servers (Meyrin)	Cores (Meyrin)
11.1 K	**165 K**

Servers (Wigner)	Cores (Wigner)
3.5 K	**56.0 K**

STORAGE

Disks (Meyrin)	Tape Drives
61.0 K	**91**

Disks (Wigner)	Tape Cartridges
29.7 K	**26.7 K**

NETWORK

Routers	Star Points
236	**675**

Switches	Wifi Points
3.9 K	**1.8 K**

Batch Jobs — ATLAS CMS LHCB ALICE OTHER
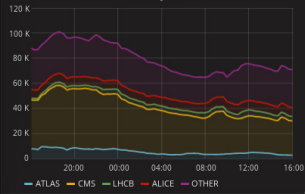
EOS Active Data Transfers — ATLAS CMS LHCB ALICE OTHER
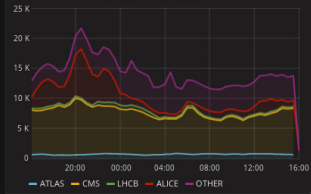
File Transfer Throughput — ATLAS CMS LHCB ALICE
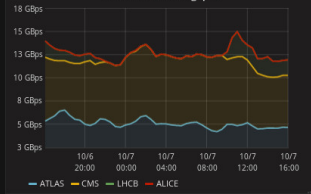
Virtual Machines Created — VMs

Oracle Databases Average Transactions
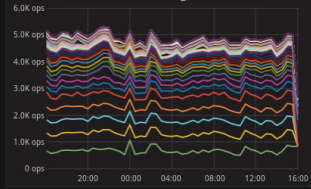
Wigner Network Links — To CERN To Wigner
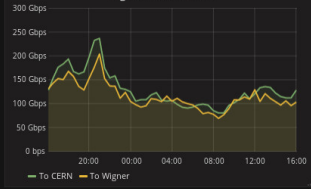
Storage: AFS Phaseout

Commits per Month

Contributors per Month

- Jan Iven's talk (HEPiX Fall 2016) and
  https://www.openhub.net/p/openafs
- Clean-up, software removal, migration
- Choosing the right tool
  - EOSFUSEx to become good at small writes (Q42017)
  - Copy-in/Copy-out for batch (HTCondor)
  - CERNBox for disconnected operations
- No planned 2nd external disconnection test yet

Storage: Disks, Tapes and More

This Thursday:

Storage for Science at CERN,
Giuseppe Lo Presti

The Outlook for Archival Storage at CERN,
Michael Davis

Linux and CentOS

- CERN CentOS 7.4, Sep 2017
  - SSSD: Kerberos authentication with smart card
  - Flatpak support
  - Btrfs now dropped
- CentOS Dojo Day at CERN on 20 Oct 2017
- Scientific Linux CERN 6.9 remains available
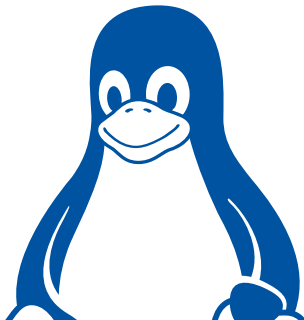
Windows and Microsoft

- Windows 10
- Window 7 support ends Jan 2020
- Forefront Endpoint Protection ended Sep 2017
- WannaCrypt threat: disabling SMB v1 on file servers
- Update to Office 2016
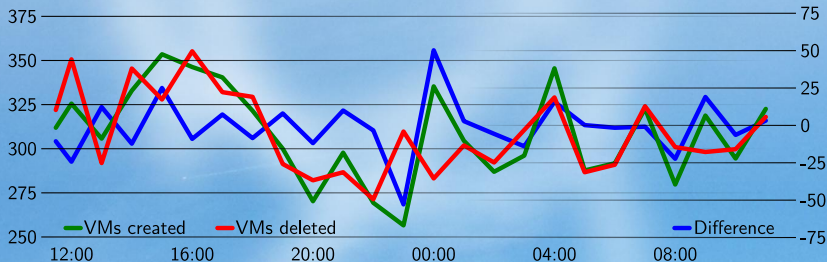
Batch Services

This Wednesday:

Running Jobs Everywhere: an Overview of Batch Services at CERN, Jérôme Belleman

Cloud Services (I)

Status:

- 281k cores, 33k VMs, 8k HVs, 3.6k projects
- $> 90\%$ compute in the cloud
- 120 Magnum container clusters (66% K8s)

Cloud Services (II)

Recent activities:

- Upgrades to OpenStack Pike and CentOS 7.4
- Migration to Neutron
- Bare-metal provisioning
- File Share as a Service

Future plans:

- Containers on bare metal
- GPUs in the cloud

Configuration Management

- Various PuppetDB service improvements
- Migrating to PuppetDB 4
- Investigating new tools for secrets
- Last HEPiX: *A Hard Puppexit from 3 to 4*
- Various minor updates
  - Puppet 4.9.4
  - Facter 3.6.2
  - MCollective 2.10.2
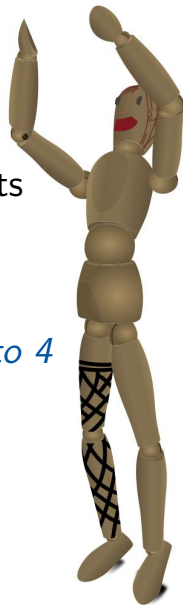
Load-Balancing

- DNS load-balancing been there for long
- Serial approach: time limit for loop (Perl)
- Concurrent approach improves scalability (Go):
  - Aliases evaluated concurrently
  - SNMP requests in parallel for each alias
- Added value:
  - SNMP retries against short network hiccups
  - Ready for IPv6-only nodes: supports AAAA records and uses UDP6 for SNMP when the machine announces IPv6 addresses
- Changed plan from big-bang to progressive deployment after problems affecting IPv6

Interactive Services

- lxplus, aiadm at CERN
- cgroups:
  - Per-user fairshare (CPU, block I/O)
  - Memory limits
  - User slice setup in CC7 with systemd

- Counters → InfluxDB
  - `cpuacct`, `memory`, `blkio`
  - Get lxplus-wide usage per user, per group
  - Debug crises/misuse
  - Produce accounting

LXPLUS CPU delivered per group

	avg ▾
▬ cpu.sum {groupname: zh}	45
▬ cpu.sum {groupname: zp}	39
▬ cpu.sum {groupname: z5}	13
▬ cpu.sum {groupname: def-cg}	2
▬ cpu.sum {groupname: flume}	1
▬ cpu.sum {groupname: z2}	1
▬ cpu.sum {groupname: za}	1
▬ cpu.sum {groupname: pz}	1
▬ cpu.sum {groupname: wi}	0
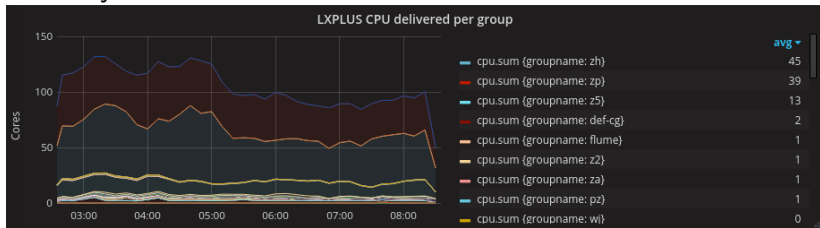
Authenticated Cron

- Replacing acron at CERN
- Thanks for the suggestions so far!
- Investigating:
  - Dkron
  - Apache Airflow
  - Chronos
  - Azkaban
  - Nomad
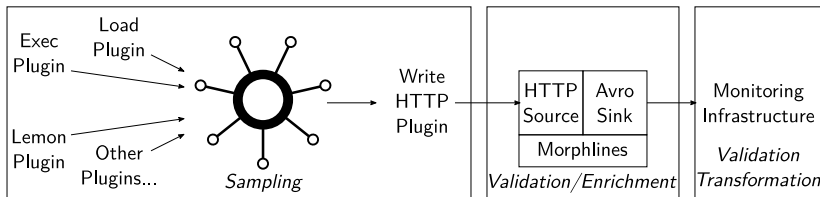 - . . .

Interested in your experience

Databases

This Thursday:

Updates from Database Services at CERN,
Andrei Dumitru

Monitoring: collectd

- More collectd
- Lemon still in prod
- In parallel for a while
- June 2017: collectd in all nodes

- OS monitoring enabled by default
- IT services can select existing plugins or write their own

Elasticsearch Service Consolidation

- 49(+10) use cases on 19(-2) clusters
- Up to 20 use cases in single cluster, with ACLs
- Access control: ReadonlyREST and Ulrich Schwickerath's talk (HEPiX Spring 2017)
- Support for 5.2.1, 5.4.0, 5.5.2, phased out 2.x
- Resources unchanged since last HEPiX:
  - 100 virtual, 8 physical SSD data nodes
  - 100 virtual service nodes (search/master)
  - 7 disk servers

Telephony

- Analogue $\rightarrow$ Soft before end 2018 (9k numbers)
- Lync $\rightarrow$ Skype for Business in Sep 2017
- For Windows, Macs, Linux, Android, iOS
- Contacts, directory, video, instant messaging
- Headsets, earsets, speakerphones

Security

This Thursday:

Vincent Brillault and Romain Wartel:

- *EGI CSIRT: Keeping EGI Secure*

- *Security: Case Study*
- *Security Update*

Privacy at CERN and WLCG

- Office of Data Privacy Protection
- Align to best practices
- Service owners to write privacy notices
- WLCG adopted new *Policy on the Processing of Personal Data*

Talks from CERN This Week (I)

- *LHCOPN and LHCONE*, Edoardo Martelli
- *Techlab Update*, Romain Wartel
- *Optimising the resource needs for the LHC computing: ideas for a common approach*, Andrea Sciabà
- *Running Jobs Everywhere: an Overview of Batch Services at CERN*, Jérôme Belleman

- *Storage for Science at CERN*, Giuseppe Lo Presti
- *The Outlook for Archival Storage at CERN*, Michael Davis
- *On Server Management Interface (BMC)*, Alexandru Grigore
- *Updates from Database Services at CERN*, Andrei Dumitru

Talks from CERN This Week (II)

- *Modernising CERN document conversion service*, Ruben Gaspar
- *Continuous Integration for Linux Images*, Jérôme Belleman
- *Configuration Automation for CERN's New Wi-Fi Infrastructure*, Quentin Barrand

- *EGI CSIRT: Keeping EGI Secure*, Vincent Brillault
- *Firewall Load-Balancing Solution at CERN*, Vincent Ducret
- *Follow-up about Wi-Fi Service Enhancement at CERN*, Vincent Ducret
- *Low-Power Wide-Area Network (LPWAN) at CERN*, Rodrigo Sierra

Talks from CERN This Week (III)

- *Netbench – Testing Network Devices with Real-Life Traffic Patterns*, Stefan Stancu

- *Network Automation for Intrusion Detection System*, Adam Krajewski

- *Network Functions Virtualisation Working Group Proposal*, Marian Babik

- *Security Update*, Romain Wartel

- *Security: Case Study*, Romain Wartel, Vincent Brillault

- *The Birth of HEPiX – At KEK in 1991*, Helge Meinhard

- *Using Configuration Management to Deploy and Manage Network Services*, Quentin Barrand

- *WLCG/OSG Networking Update*, Marian Babik