

Computing
Particle Physics Annual Meeting
May 2025

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Who We Are

- Rob Fay
- Mark Wong
- David Hutchcroft (on the academic side of things)

What We Do

- HEP and Grid Computing, in no particular order:

Helpdesk: Online, Drop-in.

Accounts/Authentication: Account management, LDAP, IPA, 2FA.

Storage: RAID, ZFS, Gluster, Backups.

Batch and Interactive: SLURM cluster, interactive nodes, GPGPUs: CUDA, Tensorflow.

Networking: Hardware, Management, Monitoring, Firewalls, IPv6.

Web Services: TWiki, Indico, Certs.

Collaboration Services: Gitlab, Mattermost, WISP, Vision.

Email: Webmail, Mailing Lists.

System Monitoring: Zabbix, Cacti, Ganglia, Security.

OS Support: Linux (CentOS, AlmaLinux), Windows, Mac.

Hardware: Procurement, Installs, Repairs, Machine Hosting, Data Centre Management, Stores.

Software: Installs, Licensing, Debugging, Virtual Machine Hosting, Containers, Puppet.

Grid Computing: CPU (72 nodes, >4000 threads), Storage (~1PB), Clouds, Documentation.

Security: Scanning, updating, fixing vulnerabilities.

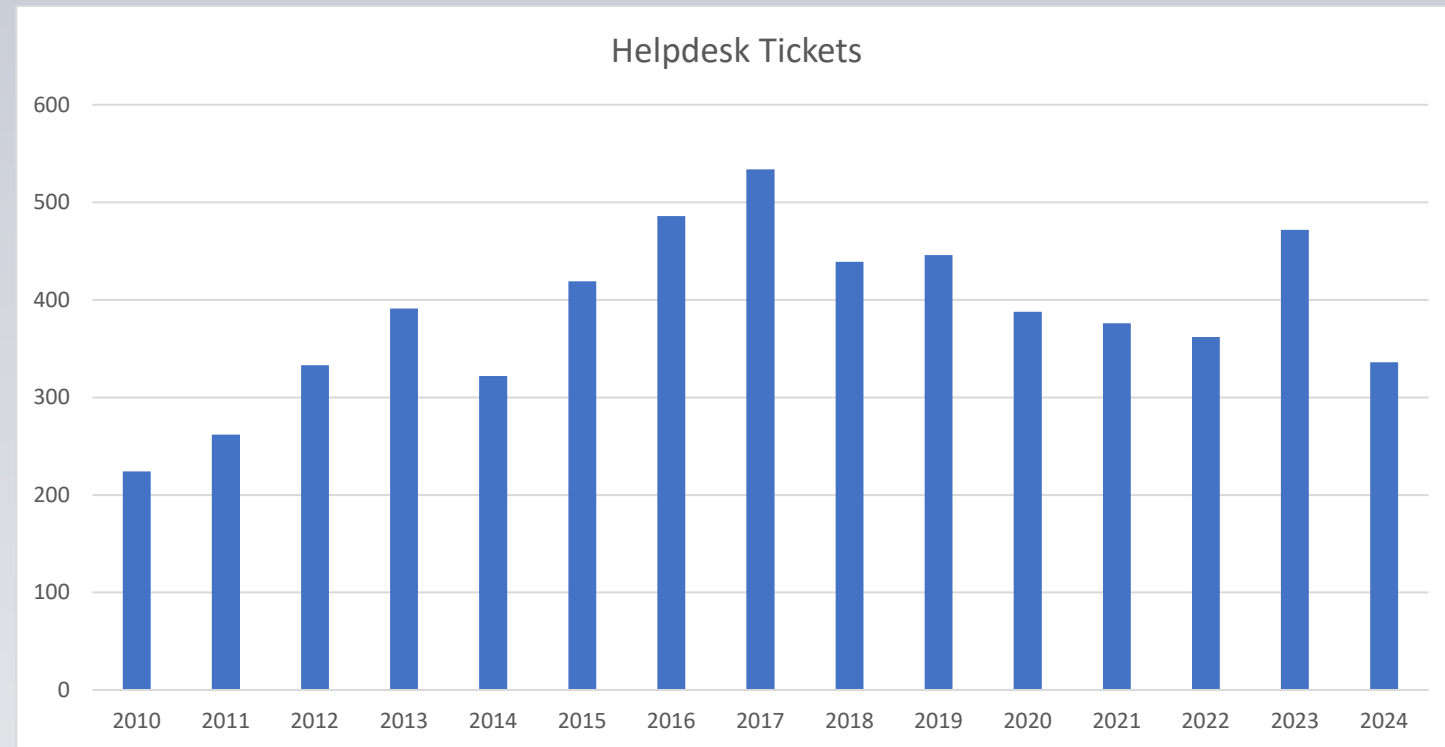
And more!

How It's Going

- The usual:
 - The ever-increasing number of complex systems and services
 - Still doing the same work with relatively less, please continue to bear with us
 - **Julie Clark** helping with purchase and store of spare consumables
- Overall we have been able to keep things going well

How It's Going

- 336 helpdesk tickets in 2024
- Slightly fewer than average
- But 180+ already so far this year...
- Please bear with us if your ticket is not answered immediately



How It's Going – Network

- IT services split the existing networks into separate VLANs
 - Clean room ports also now on their own new VLAN and IP range
 - A lot of work behind the scenes to minimise disruption
 - Registration requests for new devices now need to go to IT Services
- Network Access Control (NAC) also now enabled by IT Services
 - Single-user systems require authentication to enable network access
 - Exemptions are possible (e.g. for multi-user systems, 24/7 network access)
 - Request exemptions from IT Services

How It's Going – Data Storage

- Bundle (/bundle/data & /bundle/scratch)
 - Scaled, clustered, expandable file system
 - Good for large experiment data files , not so good for storing lots of small files
 - Continuing to keep it going while reviewing other options
- Hepstore:
 - Provides bulk, individually quota'd, resilient but not backed up storage
 - Default 500GB individual quota up from 300GB, increases available on request

How It's Going – Operating Systems

- CentOS 7 reached end-of-life at the end of June 2024
 - Still a lot of CentOS 7 systems running
 - So far OK, but may need to be restricted if critical security vulnerabilities emerge
- AlmaLinux 9 is the standard supported OS now

How It's Going – Operating Systems

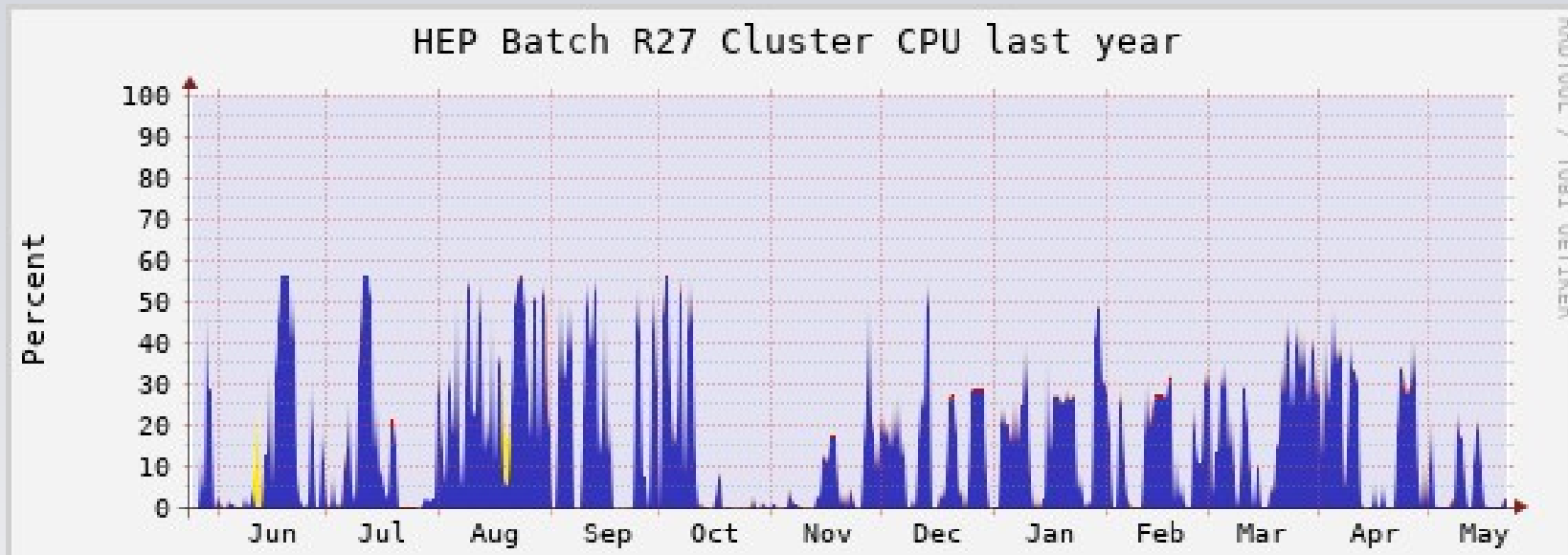
- AlmaLinux
 - RHEL9-based OS.
 - Regular updates, up to AlmaLinux 9.6 now
 - Existing servers still being updated gradually, expect some disruption
 - Desktop build of AL9 available, request via helpdesk
 - Updating partly driven by demand; let us know:
 - When you need more AL9 resources
 - If you're still going to need CentOS 7 for longer

How It's Going – Computing

- Interactive Nodes
 - Gamma, Theta – AlmaLinux 9
 - Alpha – AlmaLinux 9, GPU system with six Nvidia A100 80GB GPUs
 - Phi – CentOS 7, some GPU support with two Nvidia RTX A4000 GPUs
 - Will be replaced with a new AlmaLinux 9 node soon!
 - Kappa, hepcuda1 – CentOS 7, getting on a bit
 - These will likely remain on CentOS 7 and be retired when no longer needed

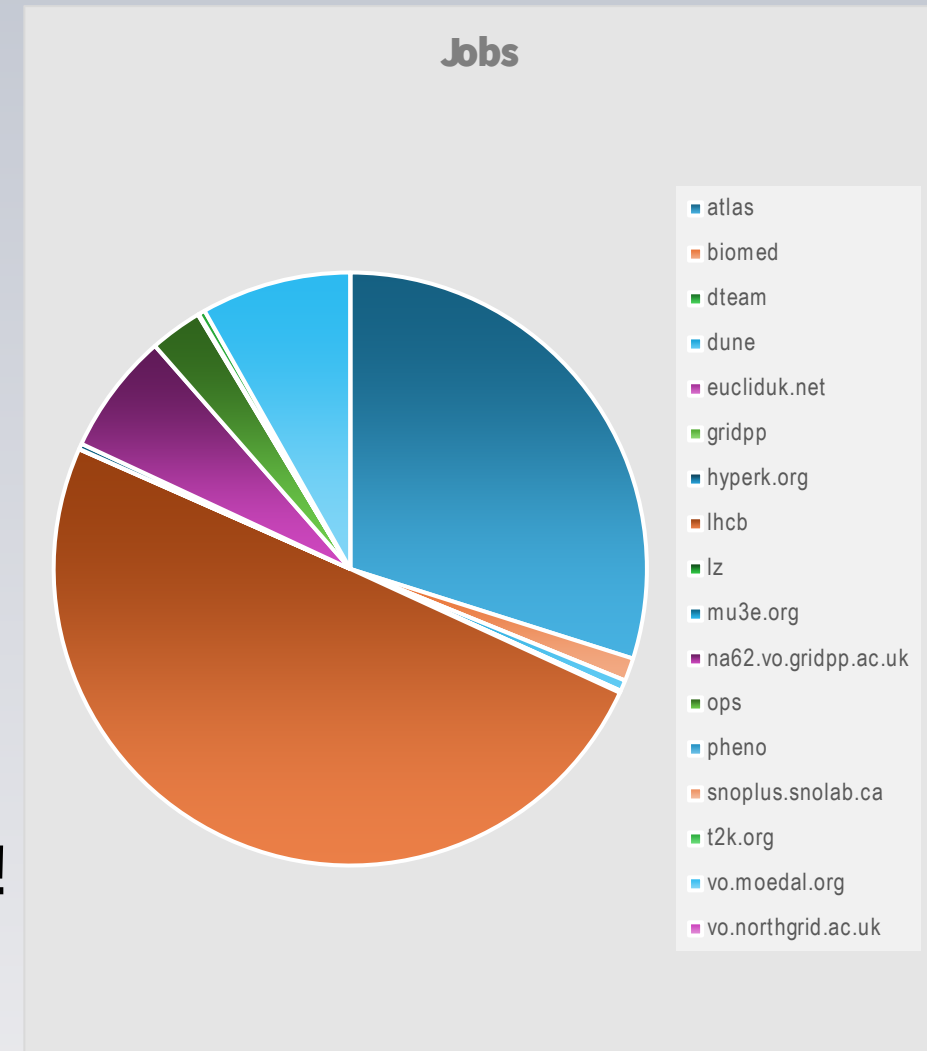
How It's Going – Computing

- Batch Queue
 - Newest nodes - compute-alg queue - AlmaLinux 9
 - Older nodes - compute queue - CentOS 7
 - Antediluvian nodes – short queue – CentOS 7



How It's Going – Grid

- UKI-NORTHGRID-LIV-HEP Tier2 WLCG
 - Compute and Servers all AlmaLinux 9
 - Over 4,000 job slots
 - 1.2PB storage
 - Replaced 64 old 8-core nodes with 2 new 192-core nodes last year;
3x compute power, >10x energy efficiency!



How It's Going – Security

- Several other universities hacked
 - Typically 'ransomware' attacks; files are encrypted and held to ransom
 - Beware of phishing emails
- IT services regularly scan our network for security vulnerabilities
 - If you're managing a system, keep it up to date, keep us informed about who's looking after it
 - Let us know if you need any help with it
- Duo two-factor authentication (2FA) running on HEP SSH
 - If Duo isn't working, tell University IT services
 - If anything else is causing you problems, tell us
 - Remember your **HEP account** is independent from your University IT account

How It's Going – Procurement

- Unpredictable Delays
 - Some down to staff turnover at our suppliers
 - Some down to supply chain disruption
 - Some down to other demands ('AI'!) sucking up all the oxygen
- Let us know about IT procurement needs with as much time as possible to avoid running into the ends of grants

Key Reminders

- Passwords
 - Still need to be sufficiently strong
 - That means not just common words
 - And not common words with numbers and/or an exclamation mark at the end
- Pooling resources
 - Julie Clark is taking care of purchasing consumables
 - We can try to help procure larger systems with limited funds and short notice
 - But the more notice the better
 - And where those limited funds can be combined, we can get better systems!

Key Reminders

- HEP accounts, systems, IT procurement, IT advice for HEP work :
- Helpdesk – helpdesk@hep.ph.liv.ac.uk
 - Talk to us!
 - The earlier projects and problems are raised, the better
 - If you are not sure → ask us and we'll advise
- Twiki - <https://hep.ph.liv.ac.uk/twiki>
 - Most computing things are documented here
- Building network, eduroam and DUO problems
 - IT Services servicedesk@liverpool.ac.uk

Thank you!

- We used to say 'Merry Christmas' here back when this was in December
- But it's May the 23rd
- So... Happy World Turtle Day!
- Any questions? (not about turtles)

