

**Computing**  
**Particle Physics Annual Meeting**  
**May 2026**

Rob Fay, Mark Wong, David Hutchcroft

# 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 (104 nodes, >7,500 slots) , Storage (>1PB), Clouds, Documentation.

**Security:** Scanning, updating, fixing vulnerabilities.

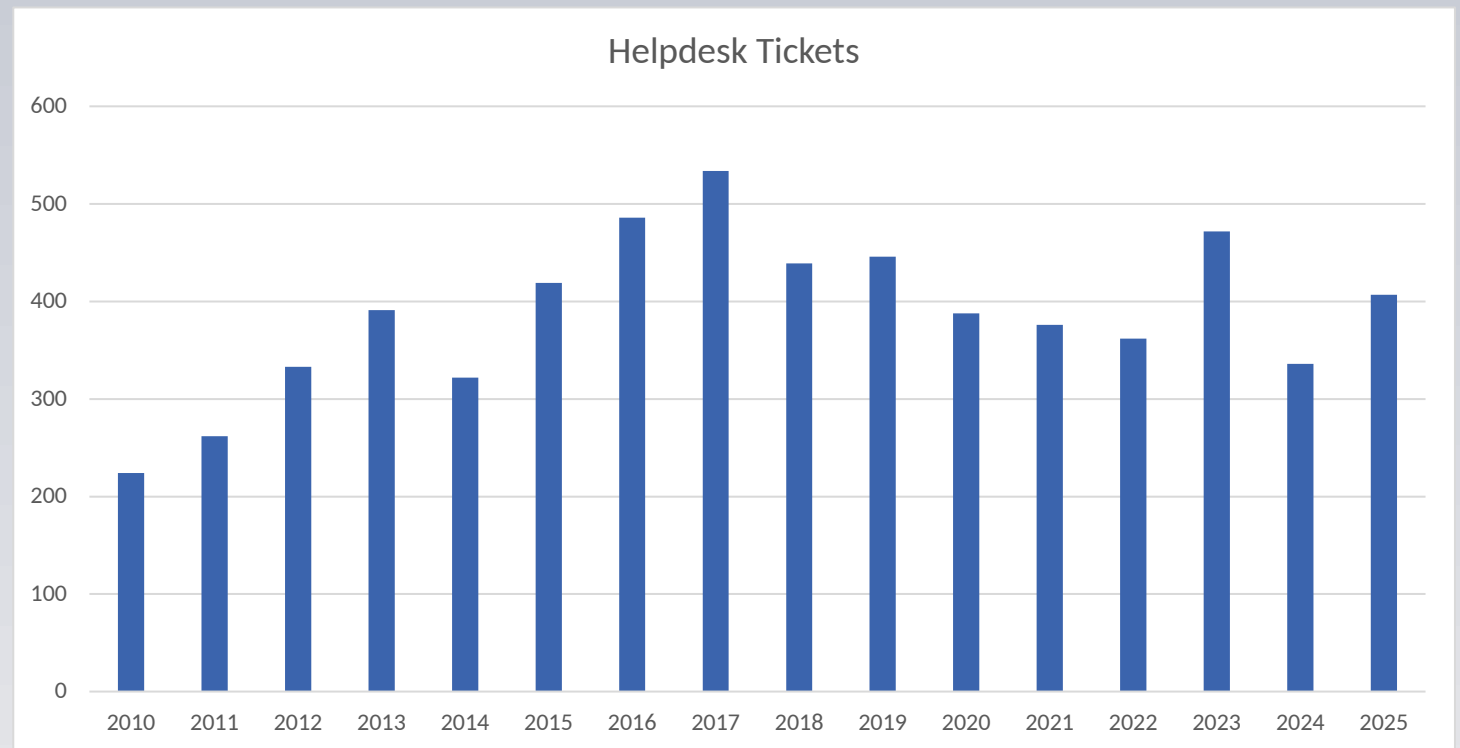
**And more!**

# 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

- 407 helpdesk tickets in 2025
- Bit more than average
- But only ~114 so far this year...
- Please bear with us if your ticket is not answered immediately



# How It's Going – Network

- Building network now fully managed by IT Services
  - Clean room ports also now on their own VLAN and IP range
  - Registration requests for new devices need to go to IT Services
- Network Access Control (NAC) also 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
  - Still 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 CentOS 7 systems running!
  - Continues to be 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

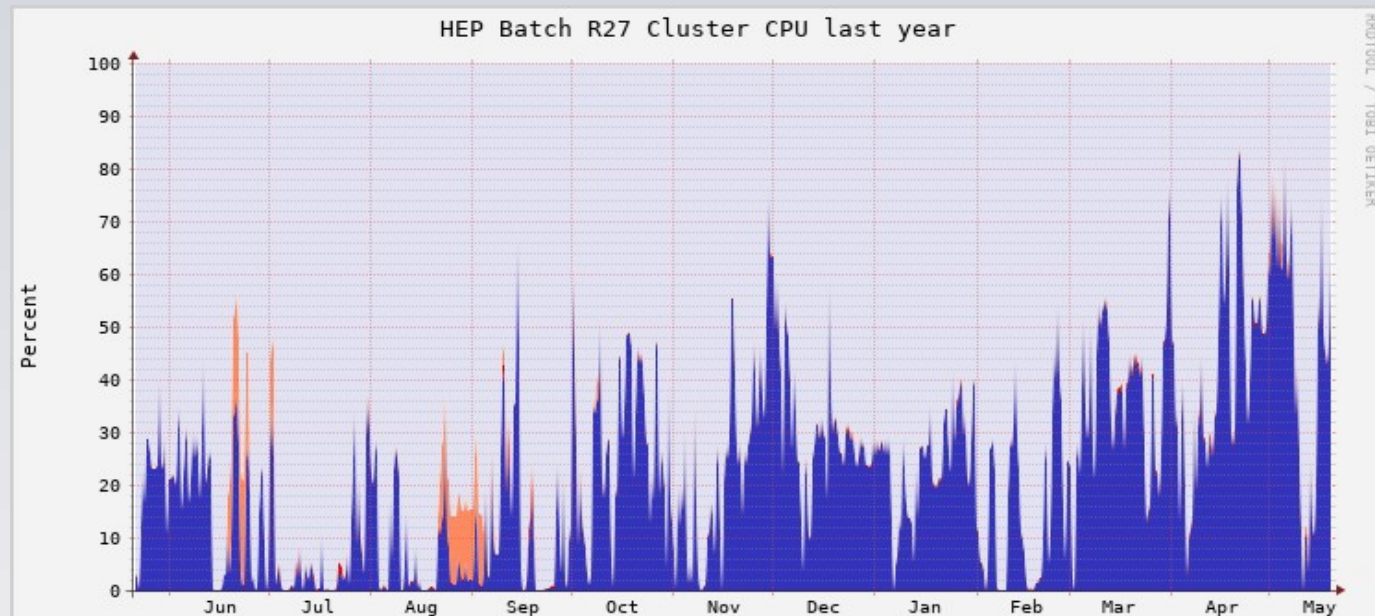
- AlmaLinux
  - RHEL9-based OS.
  - Regular updates, up to AlmaLinux 9.7 now
  - Desktop build of AL9 available, request via helpdesk
  - Updating partly driven by demand; continue to let us know:
    - When you need more AL9 resources
    - If you're still going to need CentOS 7 for longer

# How It's Going – Computing

- Interactive Nodes
  - Gamma, Theta – AlmaLinux 9
  - New node Eta came online in June last year – AlmaLinux 9
  - Alpha – AlmaLinux 9, GPU system with six Nvidia A100 80GB GPUs
  - Phi, Kappa, hepcuda1 – CentOS 7, getting on a bit
    - These will likely remain on CentOS 7 and be retired when no longer useful

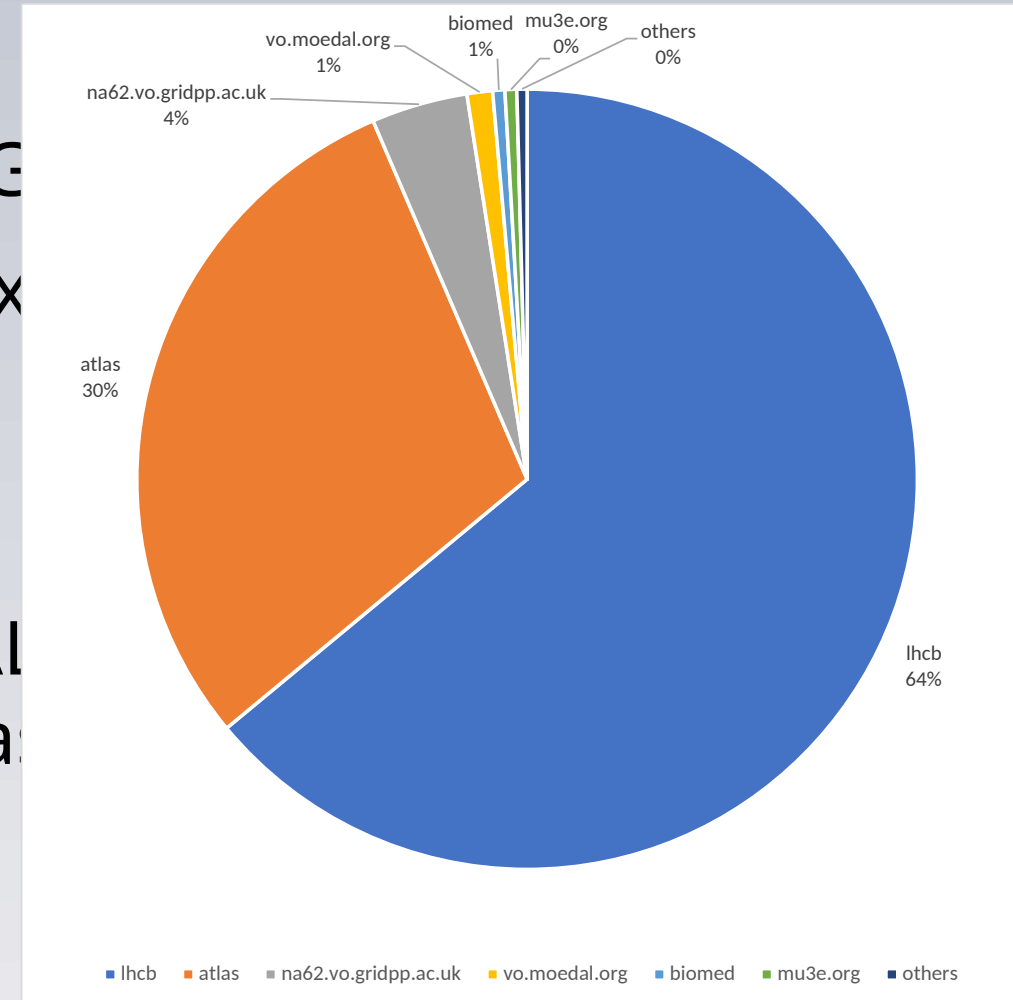
# How It's Going – Computing

- Batch Queue
  - Newest nodes - compute-a19 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
  - Over 7,500 job slots
  - ~1.5PB storage
  - Integrated recycled nodes from RAL last year giving a substantial increase in capacity



# How It's Going – Security

- AI-assisted vulnerability discovery and attacks increasing
  - May help in the long term, but more security alerts, patching, and rebooting required now
  - Remember to save your work regularly – some vulnerabilities may require reboots with little or no notice
- 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 supply chain disruption
  - Some down to other demands ('AI'!) sucking up all the oxygen
    - Now with vastly more expensive memory!
- 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](mailto: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](mailto:servicedesk@liverpool.ac.uk)

# Thank you!

- We used to say 'Merry Christmas' when this meeting was in December
- But it's May the 22nd
- So... Happy International Day for Biological Diversity!
- Any questions? (not about biodiversity)



**INTERNATIONAL DAY  
FOR BIODIVERSITY 2026**  
Acting locally for global impact