Faculty of Natural, Mathematical & Engineering Sciences

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NMES

Rosalind + Gravity HPC Clusters. Migrated to Create. IaaS platform based on OpenStack

King's CREATE

King's Computational Research, Engineering and Technology Environment (CREATE) is a tightly integrated ecosystem of research computing infrastructure hosted by King's College London.

System	Status	Description
CREATE Cloud	Closed pilot, full launch Q1 2023	a private cloud platform to provide flexible and scalable hosting environments, allowing researchers greater control over their own research computing resources using virtual machines
CREATE HPC (High Performance Computing)	Live	A compute cluster with CPU and GPU nodes, fast network interconnects and shared storage, for large scale simulations and data analytics
CREATE RDS (Research Data Storage)	Live	A very large, highly resilient storage area for longer term curation of research data
CREATE TRE (Trusted Research Environment)	Pilot Q1 2023, full launch Q2 2023	Tightly controlled project areas making use of Cloud and HPC resources to process sensitive datasets (e.g. clinical PIID) complying with NHS Digital audit standards (DSPT)
CREATE Web	Closed pilot, full launch Q1 2023	A self-service web hosting platform for static content (HTML/CSS/JS) and WordPress sites

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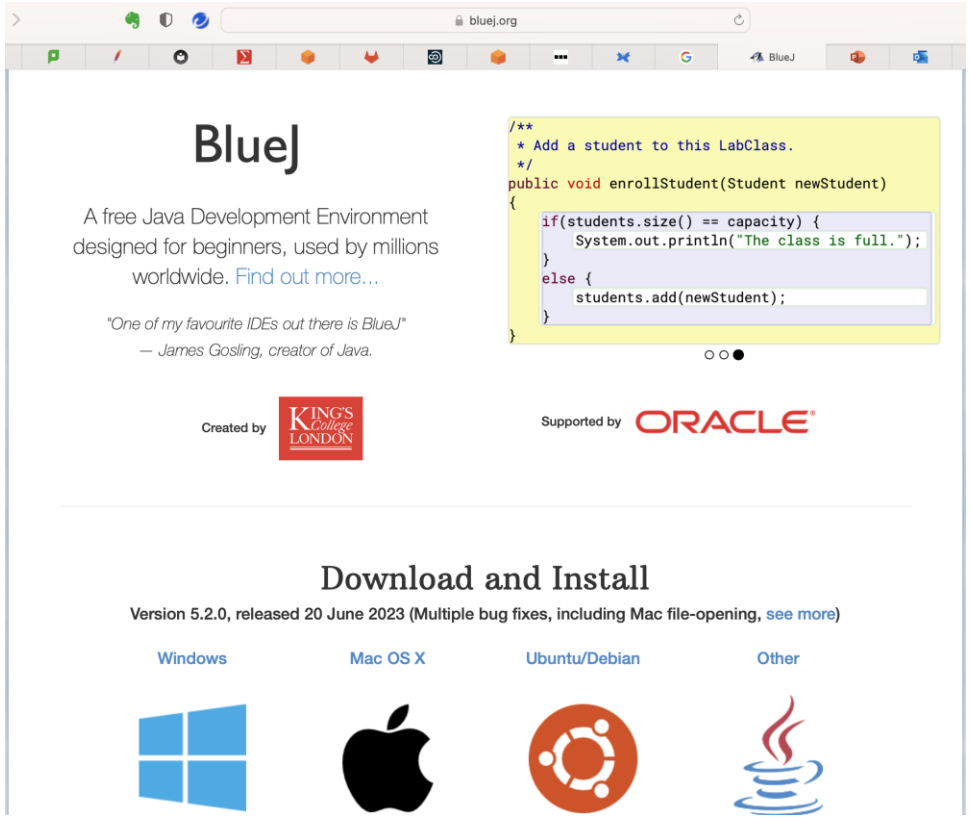
- 13k+users
- Two “DC” on Strand Site with 4 racks, 3 racks in Virtus DC4 , AWS + others (4 racks for G5 antenna projects).
- 25Gb and 10Gb fiber. 10Gb to Slough.
- Puppet (3,6), Ansible, Foreman, Katelo, python scripts for proxmox(cloudinit, foreman and infoblox modules)
- Monitoring: Zabbix, influxdb, Grafana, collectd, Slack messaging
- Laptops hundreds Windows SOE,
- Desktops Ubuntu 20.04 transition to 22.04 this summer (802.1x initial problems) + Centos7+ Windows SOE
- Servers Ubuntu, Centos, Debian (True Nas, Proxmox)
- 137.x.x.x/16 migration

Services



- 1 server hosted https://www.ovh.com/auth
- Backup in aws
- 2x mirrored database servers in our DC
- https://apps.nms.kcl.ac.uk/wiki/doku.php?id=computingsupport:services:s2lab_infra:start&s[]=switches
- S2Lab infrastructure (pentest, security)
- G5 software and antenna cluster
- Malware gathering
- Robots labs
- Software development and benchmarking
- Lab equipment
- ….

Virtualisation

- Proxmox 1 Cluster in Strand

SAN iScsi storage, Dell Storage Array SCv3000+ Dell SCV320 Ebod SSD.

- 1x Virtus London 4

Ceph

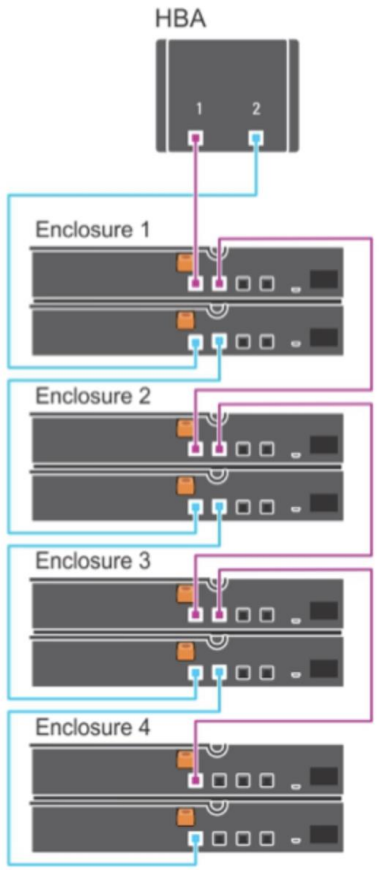
Both backup on a Proxmox PBS server with ZFS on disks on Supermicro Jbod and LTO8 Library 40slots

-Deduplication at Datastore level.

-Tape Backup

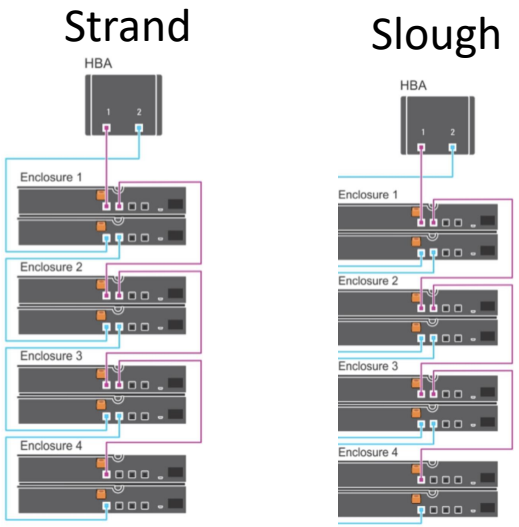
PBS-Enterprise-class client-server backup software that backups virtual machines, containers, and physical hosts. Proxmox Backup Server supports incremental backups, data deduplication, compression, and authenticated encryption

Storage

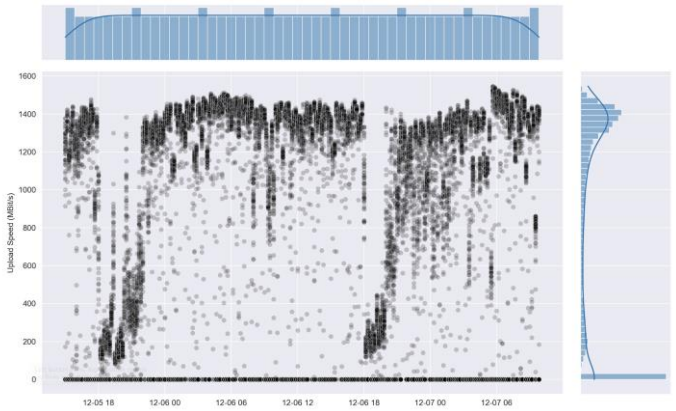


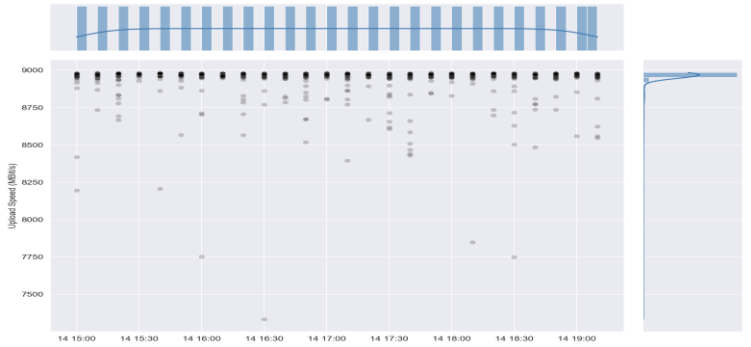
900TB, ZFS, Ceph, MD1100, Supermicro Jbods
Home directories, projects, Nextcloud,
Luks encryption in puppet, issues with DiF/Dix Type2 protection formatting.
Snapshots and cross site nightly backup
Complicated and no space for upgrading

Storage



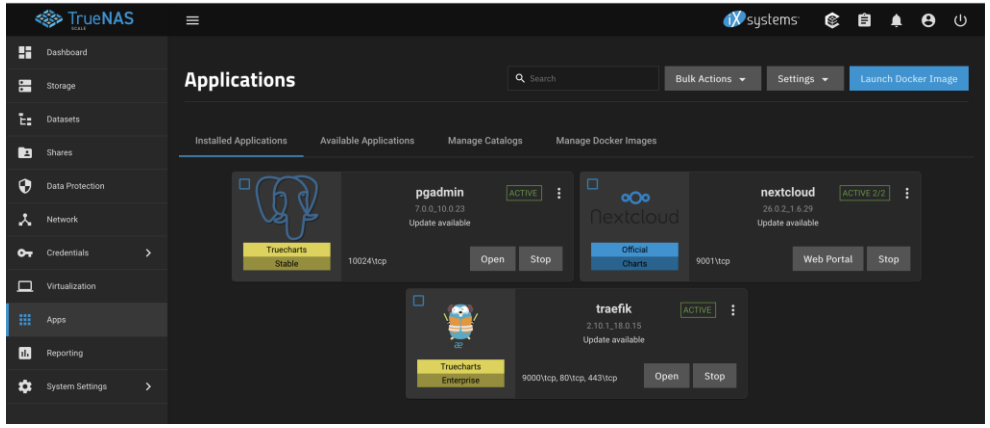
ZFS
Home directories
Across sites. Kerberised nfs4
Puppet znapzend issues (50Million snapshots)
Zfs snapshot deletion 10-12 min/user

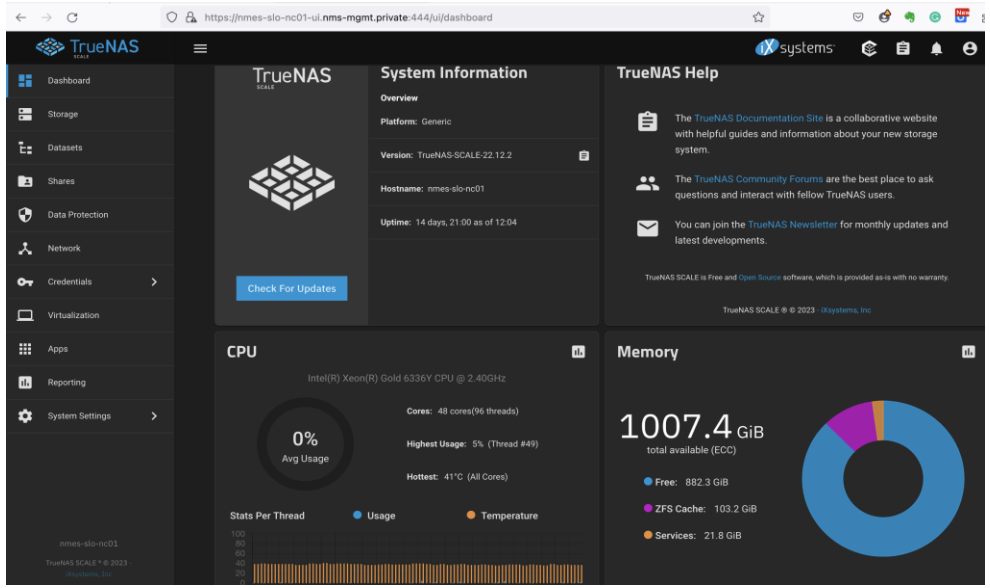




Storage

- TrueNAS ZFS (BSD or Debian)
- Cli, API management (python)
- Hyperconverged Storage. Up & Out scaling. Scale out Zfs + glusterfs
- Kubernetes k3s and docker
- Supermicro Jbods
- 360TB Nextcloud
- Migrate from 20.0 and MySQL 8.0 to 26.0 and Postgreql 13.





Aws

- Teaching: jupyterhub, cocalc, ubuntu and windows desktops in labs,
- S3 backup, wiki, bitwarden (hashicorp vault)
- Majority of teaching modules in aws
- Infrastructure with wireguard, puppet , ssh gateways, guacamole, and local portals for users to register keys.
- AI modules with slurm HPC GPU awc cluster for September

AWS appstream for engineering labs