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# VIRTUALISATION WITHIN THE CONTROL SYSTEM ENVIRONMENT AT THE AUSTRALIAN SYNCHROTRON

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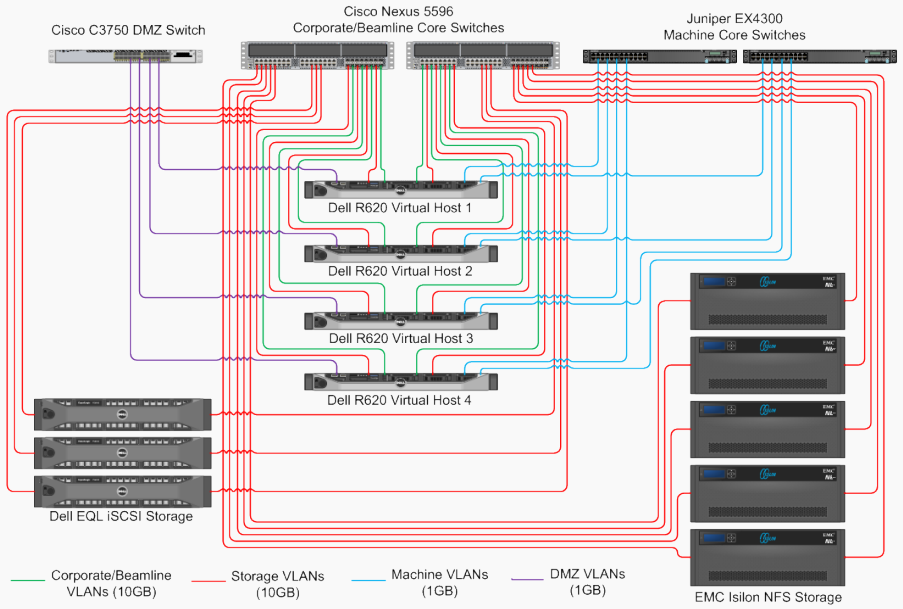
# AUSTRALIAN SYNCHROTRON

- 3rd generation light-source: 100 MeV linac, 100 MeV to 3 GeV booster, 3 GeV storage ring (216 m circumference)
- 9 experimental stations (VLANs) with 10 instruments in total
- More than 500 Input Output Controllers (IOCs) running EPICS.
  - Mostly CentOS w/o any special hardware (apart from serial)
  - One service per host philosophy
  - Also, a hundred Libera systems, some Windows hosts, VME-bus computers and PLC-based controllers with EPICS embedded.

# SOLUTIONS

VMware ESXi 6 with resource pooling

- 200 active VMs
- ~ 50 vIOCS
- 3 EPICS CA Archivers
- ~ 15 build boxes
- VCS, CI and bug tracking
- DHCP, DNS, NTP, PXE
- Observium, Zabbix
- 19 EPICS Gateways (LXC)
- 10 Cosylab (MCS8) μIOCs




vIOC median run-time parameters:

- 1 vCPU (9.5 MHz)
  672 MB RAM allocated,
  13 GB disk space used (20 GB thin-provisioned)

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# CONCLUSION

- Virtualisation has significantly improved the resilience of the control systems at the Australian Synchrotron
- Removed effectively high risk Soft IOCs and reduced the overall hardware footprint as well as the management tremendously
- New services can be deployed and tested very easily and in a very cost-effective matter
- Resource pooling enables a self-service for scientists
- VMware's live migration of control systems between different hypervisors works well but the snapshotting seems to interfere with EPICS processes
- iSCSI storage can be very cost-effective but the NFS protocol is more forgiving
- vCenter Server Appliance 5.5 has greatly improved the stability of the Virtualisation Environment



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