Network Operations Centre (NOC)
Infrastructure Services
Monitoring and Alerting
About SCU

- Regional University
- Located on the North East Coast of NSW,
- 4 major campus sites stretching from Sydney to Gold Coast (Airport), primary campus is located in Lismore NSW.
- Currently a new campus called Beachside, is being constructed adjacent to the Coolangatta Airport, SE QLD,
- Beachside campus consists of a 4 and 10 story building with a further 7 story building set to commence by end of 2013,
- Recently added an engineering school to the profile of courses offered,
- Students 16,000, Staff 911,
- Approximately 50% of students are studying via distance education.
Monitoring and Alerting

Infrastructure Overview

- Campuses interlinked by 1GB AARNET Circuits,
- Data Centre’s located at Lismore and Gold Coast Campuses interlink via 10GB AARNET circuit,
- Primary Lismore and Beachside campuses provisioned with physically diverse tails with AARNET circuit redundancy for Internet and WAN connectivity,
- Networking platform, CISCO,
- Storage and Server platform, HP,
- Virtualisation platform, VMWARE ESX 5.1,
- Deploying next generation HP P7400 (3PAR) storage arrays coupled C7000 flex fabric blades with CISCO NEXUS 5K ToR,
- Storage replication between DC sites,
- Active Directory for File/Print/DHCP/Authentication/Internal DNS,
- Database MSSQL and ORACLE RAC farms,
- Websites REDHAT/APACHE, WINDOWS/IIS
- Load sharing F5,
- Messaging platform, Microsoft O365 for students and staff,
- Number of wireless Access Points, 540
- Number of physical hosts approx. 100,
- Number of virtual guests approx. 515,
- Virtualisation fraction 83.7%,
Monitoring and Alerting

Before NOC

- Multiple monitoring platforms (Nagios, Cacti, MRTG, Statscount, CISCO Works, HP Insight, VCops, HP Capacity Advisor),
- No aggregate view of performance across infrastructure platforms,
- Lack of transparency on infrastructure performance incidents outside of technical teams, leading to inefficient resolution practices,
- Competing work priorities prevents teams from sustaining an ongoing focus on developing and maintaining a cohesive monitoring service,
- No consistent approach to developing monitors across teams (templating),
- Differing levels of expertise and insights on how to best develop a cohesive monitoring capability.
Monitoring and Alerting

Objectives

• Provide a 24X7 performance monitoring, alerting and escalation capability,
• Aggregate infrastructure monitoring, alerting and reporting under a common interface/platform,
• Achieve greater transparency over infrastructure performances,
• Provide a template driven service to ensure consistency of monitors and alerts across the infrastructure,
• Activate alert triggers based on sustained performance levels to smooth out performance spikes and reduce false positives,
• Gain access to an expertise to readily develop new monitoring and alerting capabilities,
• Provide an interface/process that allows new monitors to be requested readily and obsolete monitors disabled.
• Do it cost effectively.
Monitoring and Alerting

After NOC

- Common platform for monitoring all infrastructures,
- Access to expertise for developing new monitors/tests and reports,
- Independent and transparent provider of monitoring services,
- Leverage of a 24X7 helpdesk and call escalation service,
- Comprehensive set of SMS alerts,
- Interface for requesting and disabling alerts,
- All key production services and network interfaces monitored,
- Monitoring data backed up for future analysis.
Monitoring and Alerting

**NOC Processes**

- [AARNet NOC Services - SCU Handover.pdf](AARNet%20NOC%20Services%20-%20SCU%20Handover.pdf)
- [SCUMonitoringChangeRequest-v1.0.pdf](SCUMonitoringChangeRequest-v1.0.pdf)
Monitoring and Alerting

SMS Alerts

- **CRITICAL (PROBLEM)**
  - 'Internal DNS (ADS) - Staff Domain controllers'
  - 'CRITICAL: physical memory: Total: 4G - Used: 3.94G (98%) - Free: 59.7M (2%) critical'
  - 23 July

- **CRITICAL (RECOVERY)**
  - 'Internal DNS (ADS) - Staff Domain controllers'
  - 'OK: physical memory: Total: 4G - Used: 781M (19%) - Free: 3.24G (81%)'
  - 23 Jun 2013 19:44:24

- **CRITICAL (ACKNOWLEDGEMENT)**
  - 'Test Linux Platform'
  - 'PING CRITICAL - Packet loss = 100%'
  - 25 Jun 2013 17:31:45 +1000
  - ldora1.scu.int
Monitoring and Alerting

**Future Plans**

- Continued the rollout of monitors across the Infrastructure,
- Work with AARNET on developing the sites displays and reporting capabilities, e.g. geographical view with drill down capabilities,
- Develop more sophisticated end user, service performance and benchmarking tests,
- Refine existing monitors.
- Data Centres
Monitoring and Alerting

NOC Demonstration

- https://cpe-scu-noc1.aarnet.net.au/
Thanks for listening
24x7 NOC – Project Phases

- Phase 1 – Move to 24x7 Operations ✓ 25 June 2010
- Phase 2 – Optical Monitoring ✓ September 2010
- Phase 3 - NOC Services ✓ February 2011
  - Transitioned trial customer ACU
  - Added CDU in 2011
  - Started SCU in late 2011 (mid December!)
SCU Requirements

• Single Monitoring service:
  – Windows Servers
  – Linux Servers
  – Databases
  – Network
  – Data centres
SCU Requirements

- Customised contact & escalation system
- Per group contacts
- Specific Priority Escalations
SCU Deployment - Hardware

- 2 x Servers (Acer – with REHL6)
- 2 x VPN Devices (Mikrotik)
- 4 x Probes (Mikrotik)
- 2 x SMS Modems (Falcomm)

Deployment Locations
  - Lismore (Primary)
  - Riverside (Coolangatta – Secondary)
SCU Deployment Locations

Monitoring Topology

Southern Cross University

Probe 1
Lismore
Monitoring 2
SMS 2

Beachside

Riverside Coolangatta
Monitoring 1
SMS 1
Probe 2

Coffs Harbour
Probe 3

Sydney
Probe 4
SCU Deployment - Software

- Red Hat Enterprise Linux 6 – platform OS
- Nagios 3.4.4
  - PHP4Nagios 0.6.16
SCU Deployment – Nagios Modules

- All standard 3.x modules
  (check_ping, check_http, check_snmp et al)

- Custom built modules
  - F5 load balancer check
  - Interface check (with error counts, discards)
  - MS-SQL
  - Oracle
SCU Deployment – Nagios Modules

- Windows Monitoring

Active NRPE based module
NSCP (0.4.0) http://www.nsclient.org/nscp/

- check_drive
- check_file
- check_process
- check_memory
- check_cpu
- check_registry
- check_uptime
SCU Deployment – DHCP Check

- `check_dhcp` (with DHCP Helper/Relay)  
  -✗

- Mikrotik – VPNs back to master VPN and trunks…  
  -✗

- Mikrotik remote probes as DHCP clients  
  -✓
SCU Performance Monitoring
Phase II
Check our network…

• Iperf
• Weathermap
NOC Process

Improvements...
SCU Tickets & E-Mail

- Change management between SCU and AARNet
  - deployed ticket system for SCU to lodge & view tickets
- Added dedicated NOC correspondence e-mail address for SCU
  - Ensures SCU related information is collated and answered in context.
Future changes/additions

- SeleniumRC
- SNMP Traps
- Nagios 4.x or Icinga or ???
- Database configuration – for rapid change.
The Results...
Thanks

• SCU
  - Luke Walford, Tim Lane, Matthew Smith, Howard Jeffery
  - Unix: Robin Garner
  - Windows: Graham Oliver, Shane Morris, Simon Nimmo
  - Exchange: Tony Hill
  - Networks: Michael Lymbery, Mark Angel
  - Data Centre: Bernard Thomas

• AARNet
  - Doug Farmer
  - Adam Binneweg
  - SysAdmin Team: David Jericho, Rob Kearey, George Coburn
Thank you for listening.

Questions?

1300 APL NOC
noc@aarnet.edu.au

mike.groeneweg@aarnet.edu.au
Monitoring BOF
5pm