

TO QUALITY, AND BEYOND

Brad Marshall, AARNET

Brad.marshall@aarnet.edu.au

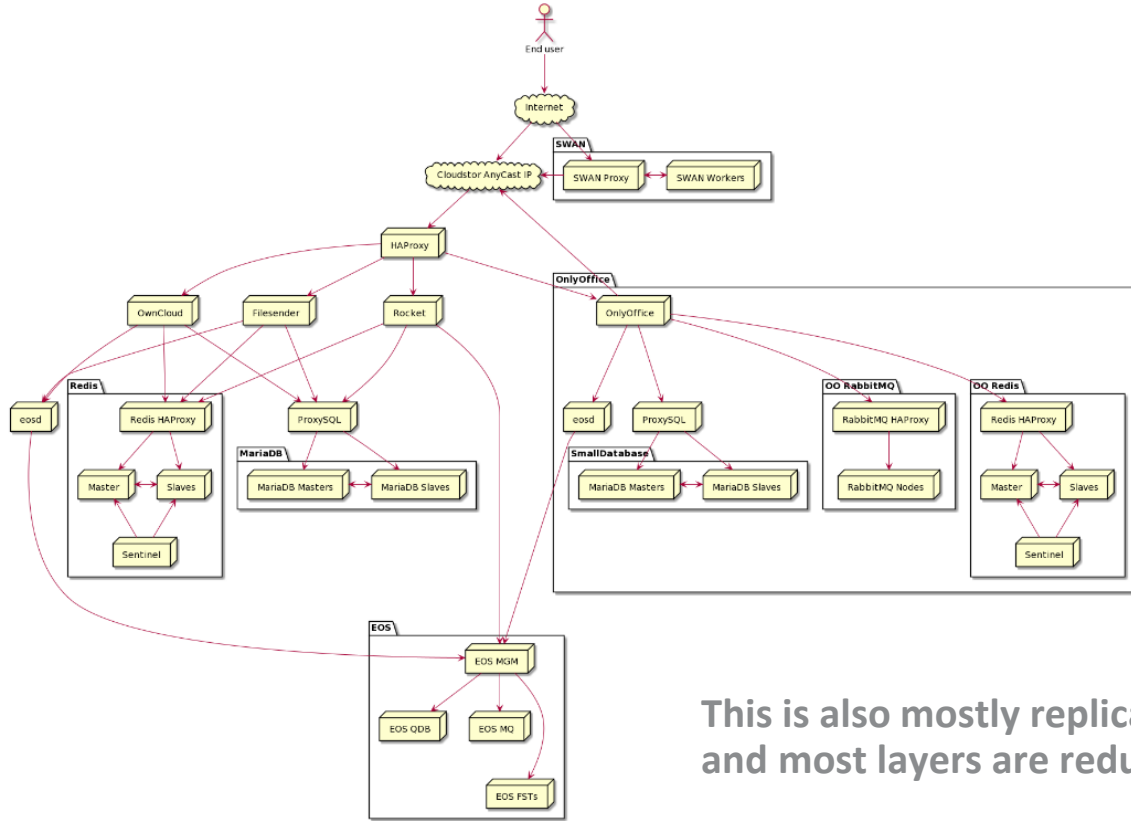
27 Jan 2021

WHAT IS CLOUDSTOR

- Australia's largest cloud storage and sync website for research
 - Owncloud with EOS backend
 - S3 shards using Minio and EOS
- Four major sites – Brisbane, Melbourne, Canberra, Perth
- Number of users - ~ 100k users
- Number of files – 361M in Cloudstor Prime
- Growth rate – 215k files a day, 100T a month



WHAT IS CLOUDSTOR REALLY



This is also mostly replicated per site, and most layers are redundant internally

QUALITY APPROACHES

- The system is scaling rapidly, and seeing issues here and there
- Have had issues with users reporting performance issues at specific regions
- Found 3 main areas to start improving quality:
 - Scalable test environments
 - Improved monitoring
 - CI/CD



PLAN FOR TEST ENVIRONMENT

- **Reproducibility is the main problem here**
- **Current test environment is a single UAT cluster, makes testing multiple concurrent issues difficult**
- **Also conflating testing with development**
- **Some development done locally, but doesn't reflect prod**
- **So how can we fix it?**



QA ENVIRONMENT

- New QA environment built based on Openstack using Canonical toolset including Ubuntu, MAAS (OS deployment, Juju (configuration management) and containers
- Terraform to spin up VMs
- Use same technology as prod to deploy (usually ansible or helm)
- Now we can have as many isolated environments as we need (within resource limits)
- Can build up complicated network to emulate production



QA MONITORING

The QA environment has its own set of infra for monitoring and logging:

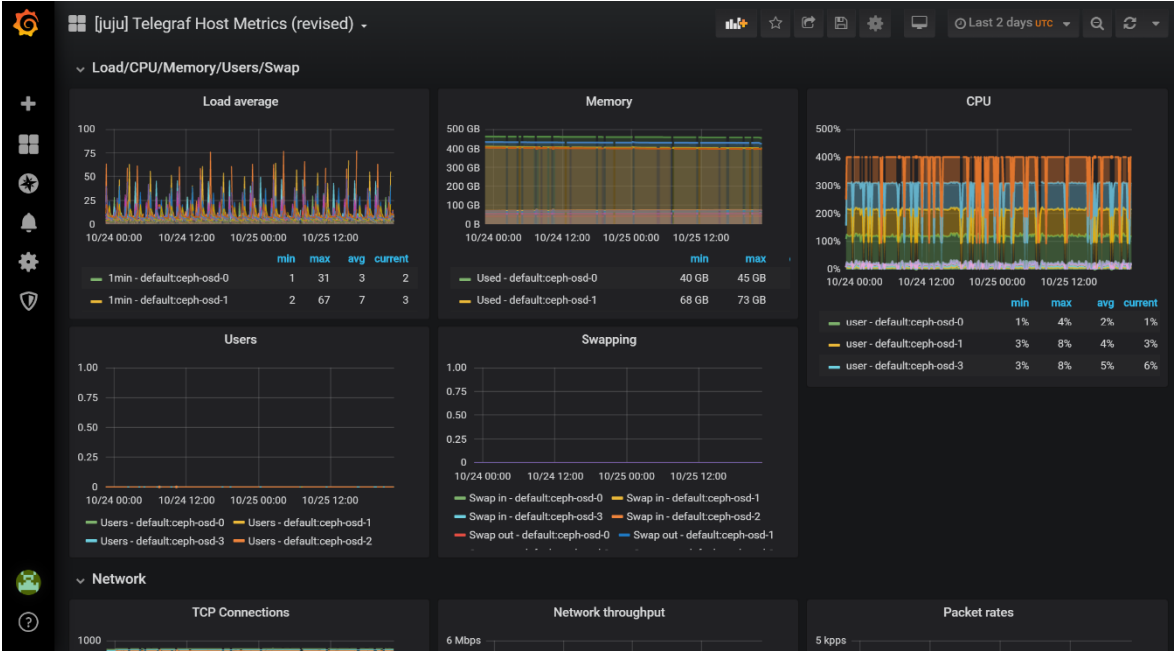
- Nagios for monitoring
- Prometheus for metrics
- Elasticsearch for logging
- Grafana and graylog for visualisation
- Openstack Horizon for VM manipulation
- MAAS for OS installs

QA ENV DASHBOARD

The screenshot shows the Ubuntu Cloud Services dashboard for the 'aarnet-ldap' project. The left sidebar contains navigation links for Project, API Access, Compute, Overview, Instances, Images, Key Pairs, Server Groups, Volumes, Network, Orchestration, Object Store, and Identity. The main content area displays the 'Overview' page with a breadcrumb 'Project / Compute / Overview'. Under the 'Limit Summary' section, there are two categories: 'Compute' and 'Volume'. Each category contains three circular gauges showing usage against limits.

Category	Resource	Used	Limit
Compute	Instances	Used 0 of 10	10
	VCPUs	Used 0 of 20	20
	RAM	Used 0Bytes of 50GB	50GB
Volume	Volumes	Used 0 of 10	10
	Volume Snapshots	Used 0 of 10	10
	Volume Storage	Used 0Bytes of 1000GB	1000GB

QA ENV GRAFANA



QA ENV LOGGING

The screenshot displays the Graylog web interface. At the top, the navigation bar includes 'Search', 'Streams', 'Alerts', 'Dashboards', 'Sources', 'System', and user information 'In 64 / Out 64 msg/s'. The search bar contains the query: "not found" AND http OR http_response_code:[400 TO 404].

Search result
Found **24,060 messages** in 12 ms, searched in 1 index.
Results retrieved at 2021-01-22 03:50:57.

Histogram
Year, Quarter, Month, Week, Day, Hour, Minute

Time	Count
03:45	~100
03:46	~5000
03:47	~4000
03:48	~5000
03:49	~4500
03:50	~4500

Messages

Timestamp	source
2021-01-22 03:50:54.521	juju-311c28-0-lxd-10
Jan 22 03:50:54	juju-311c28-0-lxd-10 nrpe[2435117]: Error: (use_ssl == true): Request packet version was invalid!

QA ENV MONITORING

Tactical Monitoring Overview
 Last Updated: Fri Oct 23 03:31:15 UTC 2020
 Updated every 90 seconds
 Nagios® Core™ 3.5.1 - www.nagios.org
 Logged in as nagiosadmin

Network Outages
 0 Outages

Hosts
 0 Down 0 Unreachable 69 Up 0 Pending

Services
 37 Critical 0 Warning 0 Unknown 565 Ok 0 Pending

37 Unhandled Problems

Monitoring Features

Flap Detection	Notifications	Event Handlers	Active Checks	Passive Checks
✓ All Services Enabled No Services Flapping All Hosts Enabled No Hosts Flapping	✓ All Services Enabled All Hosts Enabled	✓ All Services Enabled All Hosts Enabled	✓ All Services Enabled All Hosts Enabled	✓ All Services Enabled All Hosts Enabled

CURRENT DEPLOYMENT METHODOLOGY

- **Cobbler to deploy RHEL**
- PXE boot plus image deployment
- **Ansible to configure hosts**
- Configuration management tool
- **Mix of rancher 1.6 (essentially docker-compose) and rancher 2.2 (kubernetes) for containers**
- Container management
- **Kubernetes deploy via helm**
- Orchestration inside kubernetes



MONITORING PROBLEMS

- No end to end checks for performance metrics
- Limited visibility of whats happening inside the application
- Always more system metrics to be monitored

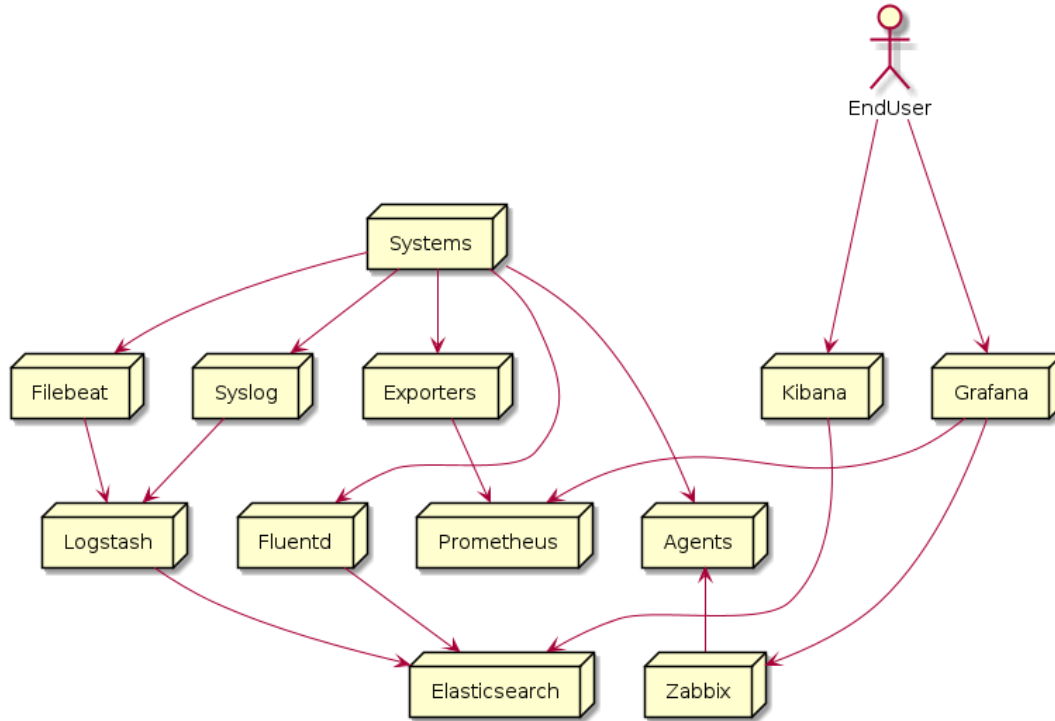


MONITORING

- Zabbix does most of the monitoring
- Grafana and Kibana for dashboarding and log searching
- Mostly doing system based metrics – ie, disk usage, cpu load, memory etc
- Starting to add Prometheus monitoring
 - Initially starting with node exporter (for system metrics) and cAdvisor (for container metrics)
 - Will evaluate AlertManager for sending alerts on these metrics
- Adding end to end performance metrics
 - Means no more surprises from customers

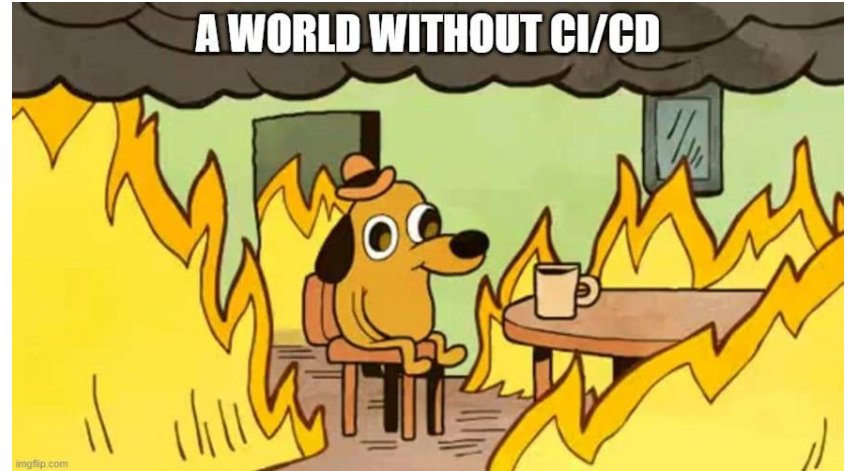


MONITORING ARCHITECTURE



CI/CD

- Using Jenkins for CI/CD
- Currently autobuilding and testing containers on git commit
- Doing some automated deployments to testing systems from git
- Allows us to ensure system is working after every change
- Removes manual steps from the process



CONCLUSION

- More visibility of what's going on means faster reaction times to problems
- Less user reporting issues that we don't know about, more proactive
- Hopefully develop feedback loops to improve systems
- Faster QA means faster deployments means less downtime
- Better tested services means better user experience





THANK YOU – ANY QUESTIONS?

BRAD.MARSHALL@AARNET.EDU.AU
