OSM-MR#9 Hackfest

OSM in Production

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Session goals

- Clarify the current state of the art
- Understand any new issues from the field
- Discuss further enhancements within the OSM community
Production considerations for OSM

- **Availability**
  - OSM components - NBI, LCM, RO, VCA, MON, POL
  - HA, geo-redundancy, backups and disaster recovery

- **Integrations** - authentication, monitoring, ext. systems

- **Deployment** - K8s substrates, proxy/air-gap

- **Operations**
  - Capacity - sizing, planning, scaling
  - Upgrades and patches

- **Security** - ETSI NFV-SEC, CIS, NCSC, NIST
  - Secret storage
NBI, LCM, RO, POL

- Stateless services on Kubernetes - except for RO
- High availability is supported
- Data stores are Mongo and MySQL with standard HA
- Shared files provided by Mongo
Currently not scalable, so collection is migrating to a new architecture, where VIM metrics are not re-collected by OSM

- High availability supported
- Uses MongoDB to store alarms
- Next step: automatic Grafana integration
MON

- No framework for complex VNF monitoring
  - **New** - SNMP support through Prometheus exporters
  - Add exporters for each VIM/VNF use case, separate type for every VIM
  - Use MongoDB streams reacting to changes instead of busy-waiting strategy
VCA

- Juju controller
  - High availability with 3 clustered Juju instances
  - Handles thousands of charms on modest capacity (32GB RAM, 4 cores)
  - Automatic failover handling
- LXD
  - High availability with 3 clustered LXD nodes
  - Juju already handles failover automatically
- Proxy Charms
  - Control of scaling to 2+ units
  - Initial guidelines for HA Charms [1][2] - Proxy charms should be stateless
  - Future improvement: HA Kubernetes proxy charms
Backup

- Databases - well and widely understood
  - Mongodb
  - MySQL
  - Prometheus internal db
- VCA
  - Juju controller has built-in backup/restore capability
  - Proxy charm containers snapshot via LXD or underlying filesystem
  - Could standardise backup primitives, e.g

  `juju run-action magma-o/leader osm-backup`
Geo-redundancy and disaster recovery

- Active/Standby strategy
- Active stack is running normally
- OSM state data stored in persistent block device
- Storage replication across sites
- Transition from standby to active made by the operations team
Integration

- Authentication
- External systems through NBI
  - RBAC policy definition
  - Compliance with SOL005 for OSS/BSS integration
  - Subscription and notification for NS lifecycle events
- MON & LMA:
  - OSM cluster + substrate monitoring
  - VNF workloads
- Export events to external systems (SNMP, Syslog, Prometheus, Graylog, Elastic, etc)
Deployment

- Openstack cloud
  - Load balancing
  - Block storage backend
  - Pre-created K8s and VNF flavors
- Bare metal machines
  - Machine provisioning (e.g. MAAS)
  - Load balancing (e.g. MetalLB, F5)
- Networking
  - Access to external systems (e.g. LDAP, OSS/BSS, Monitoring)
- Proxied & air-gapped environments
Operations

• Capacity planning
  • Sizing
  • Scaling
• Resource monitoring
  • LXD
  • K8s cluster
  • OSM components including MySQL, MongoDB, Kafka, etc.
• Cluster scale-out
  • Is my capacity planning correct? How to address alerts?
• Upgrades and patching
  • Any issue that needs urgent fixing? How to enable new feature <foo>?
Security

• FIPS / CIS hardening for the substrate
• Monitoring of dependencies for vulnerabilities
• CVE patching of upstream OSM container images
• ETSI NFV-SEC? NCSC? NIST? Which are important?
• Kubernetes security
  • Authorization Mode: AlwaysAllow or stricter, e.g. RBAC?
  • Resource quota per pod
  • Security contexts
Secrets storage

- Different secrets in use:
  - Database/message queue/external systems credentials
  - SSL certificates
  - Encryption keys

- Currently OSM does not have a coherent approach for secret storage:
  - Some stored in mongodb, others shared in docker environments

- New mechanism for certs/private keys
  - Vault
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