Advanced Features of the CERN Cloud
Outline

• CERN Cloud
  - Overview
  - Service offering

• Advanced Services
  - Use cases
  - Status
  - Upcoming plans

• Q & A
CERN Cloud Service

- Infrastructure as a Service
- Production on July 2013
- Based on OpenStack cloud software
  - Current release: Queens
- CentOS 7 based
- Geneva and Wigner Computer centres
- Highly scalable architecture
Initial Service offering

IaaS

Compute: nova
Storage: cinder, glance
Identity: keystone

Web UI: horizon
CERN Cloud Infrastructure

IaaS

- neutron
- nova
- ironic
- cinder
- manila
- glance
- keystone
- barbican

IaaS+

- heat
- magnum
- mistral
- horizon

Orchestration
- heat

Container Orchestration
- magnum

Automation
- mistral

Web UI
- horizon

Network
- neutron

Compute
- nova
- ironic

Storage
- cinder
- manila
- glance

Identity
- keystone

Key manager
- barbican

Web UI
- horizon
Advanced Services

**IaaS**
- **Network**: neutron
- **Compute**: nova, ironic
- **Storage**: cinder, manila, glance

**IaaS+**
- **Orchestration**: heat, magnum
- **Automation**: mistral
- **Web UI**: horizon

**Identity**: keystone
**Key manager**: barbican
File shares as a Service

- #1 user request
  - Block devices <-> File Shares

- Share protocols
  - CephFS

- Use cases
  - High-Performance Computing
  - Replacement of NFS Filers

- Ongoing work
  - Enable NFS access through Ganesha
Container orchestration Engines

- Creates clusters for container deployment
- Template based
  - Kubernetes, docker-swarm, DCOS
- Integration into ecosystem
  - CVMFS, Kerberos, CSI (CephFS)
- Use cases
  - Service for web based analysis, Recast, REANA, ...
  - Spark on Kubernetes
  - Gitlab CI
  - ATLAS TDAQ
CoEaaS Upcoming features

- Automation
  - Upgrades
  - Healing
- Availability
  - Kubernetes multi master
- Central logging
- Multitenancy
Software defined networking

- Work in progress
  - Replace legacy network component by Neutron
- Evaluation and deployment of a SDN
- Based on Tungsten Fabric (opencontrail)
- Rich featureset
  - Project networks
  - Floating IPs
  - Security groups
  - LBaaS
  - FWaaS
Baremetal as a Service

- #2 user request
  - Performance

- Virtual and physical machines are managed in the same way

- Use cases
  - HPC
  - Containers on baremetal
  - Storage nodes, Databases

- Ongoing work
  - Enroll our own infrastructure into Ironic :D
Workflow as a Service

- Automation of tasks
  - All Openstack actions available
- Trigger by API or event
- Use cases
  - Project management
  - Instance expiration
  - Common client tasks
Summary

● Continuous improvement process
  - Easy to use, easy to scale, easy to manage, easy to support

● Follow technological trends
  - Incorporate new use cases
  - Integrate them into ecosystem
  - Improve current infrastructure
Thank you

Use cases

- High Performance Computing
- NFS Filers
- Service for web based analysis, Recast, REANA, ...
- Spark on Kubernetes
- ATLAS TDAQ
- Containers on baremetal
- Storage nodes, Databases, ...
- Hypervisors

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