





Advanced Features of the CERN Cloud



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CERN Cloud Infrastructure

Outline

- **CERN Cloud**
 - **Overview**
 - **Service offering**
- **Advanced Services**
 - **Use cases**
 - **Status**
 - **Upcoming plans**
- **Q & A**



CERN Cloud Service

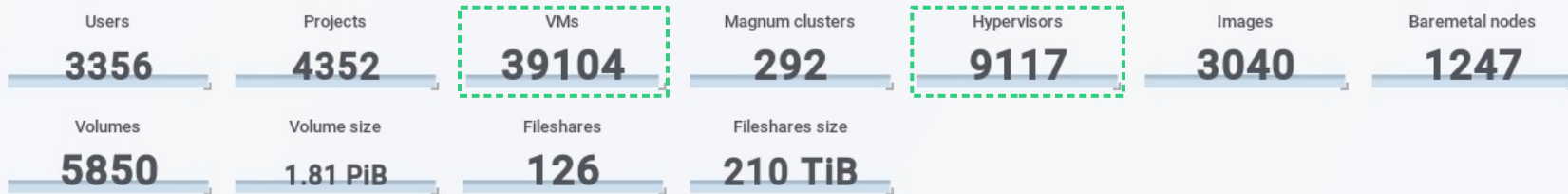
- **Infrastructure as a Service**
- **Production on July 2013**
- **Based on OpenStack cloud software**
 - **Current release: Queens**
- **CentOS 7 based**
- **Geneva and Wigner Computer centres**
- **Highly scalable architecture**



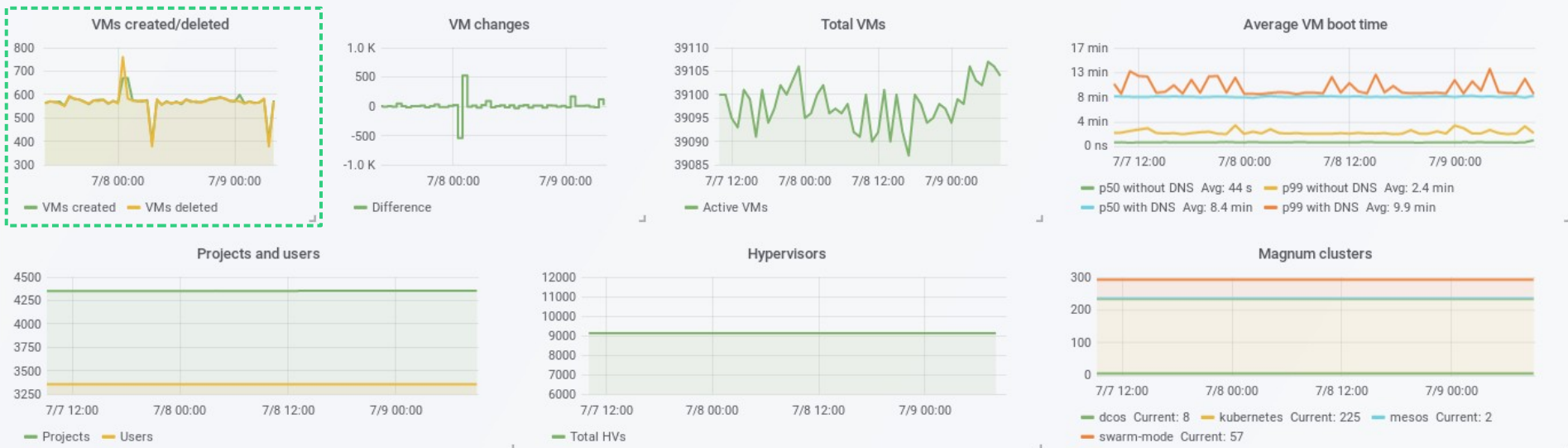
Cloud resources



Openstack services stats

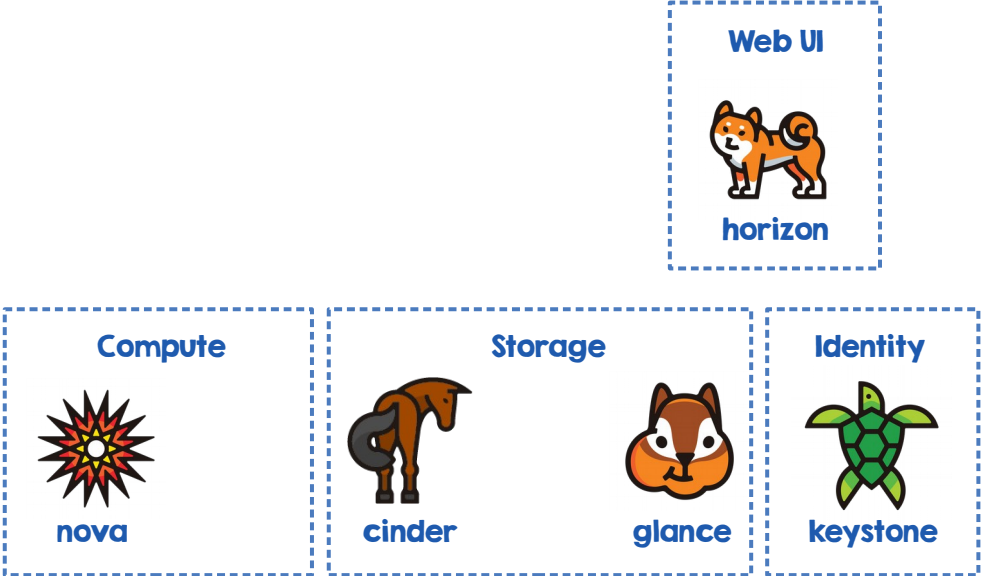


Resource overview by time



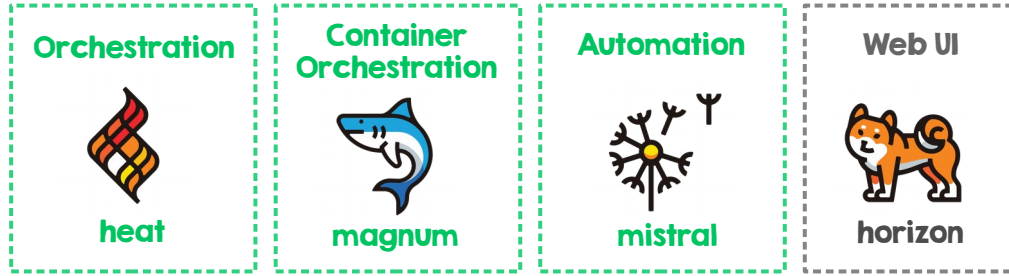
Initial Service offering

IaaS

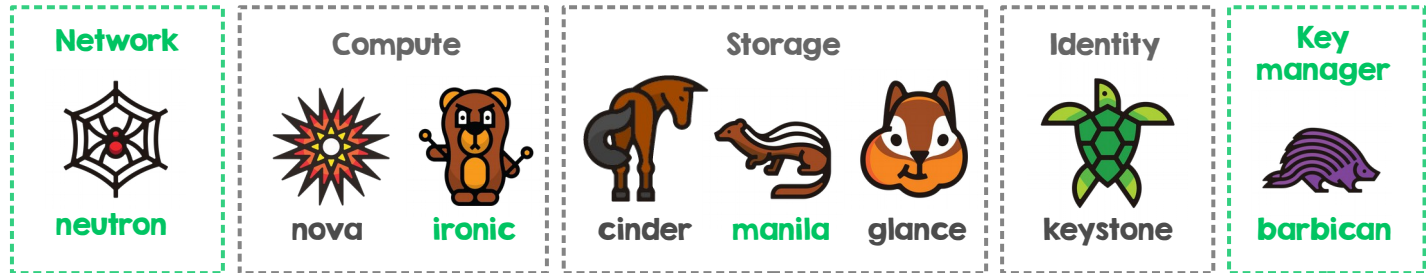


CERN Cloud Infrastructure

IaaS+







IaaS



Advanced Services

IaaS+

<p>Orchestration</p>  <p>heat</p>	<p>Container Orchestration</p>  <p>magnum</p>	<p>Automation</p>  <p>mistral</p>	<p>Web UI</p>  <p>horizon</p>
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IaaS

<p>Network</p>  <p>neutron</p>	<p>Compute</p>   <p>nova</p> <p>ironic</p>	<p>Storage</p>    <p>cinder</p> <p>manila</p> <p>glance</p>	<p>Identity</p>  <p>keystone</p>	<p>Key manager</p>  <p>barbican</p>
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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**



manila

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**



magnum



CoEaaS Upcoming features

- **Automation**
 - **Upgrades**
 - **Healing**
- **Availability**
 - **Kubernetes multi master**
- **Central logging**
- **Multitenancy**



magnum

Software defined networking



neutron

- **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

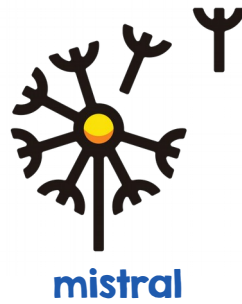
- **#2 user request**
 - **Performance**
- **Virtual and physical machines are managed in the same way**
- **Use cases**
 - **HPC**
 - **Containers on baremetal**
 - **Storage nodes, Databases**
- **Ongoing work**
 - **Enroll our own infrastructure into Ironic :D**



ironic

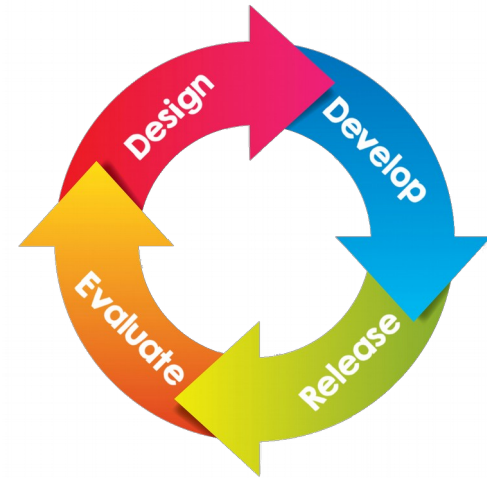
Workflow as a Service

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