From Infra to Services: LBAAS and K8S

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www.computingstack.com

About ComputingStack.com

ComputingStack is a development and engineering focused business. We contribute to upstream Open Source, create our own package and deliver the services of those to enterprise user for those data and cloud solution. In meanwhile we partner up with solution providers to accelerate their solution portfolios.

IntOS is a self-maintained package by ComputingStack, composed of IntOS OpenStack, Ceph Storage, Kubernetes as well IntOS Cloud Management. The ground up packaging with “0” dependencies on third parties compoment makes it possible to depoy anywhere anytime any device.

95% generic upstream codes of openstack, ceph, K8s, monitoring, high availability components

5% in-house developed codes: automation, packaging , bug fix, HA , security engineering, customizations, tools

IntOS targets at Enterprise Ready for high complex cloud, while incrementally incorporating Cloud 2.0 services for NFV, Edge, IoT etc.

Pre-Conclusions

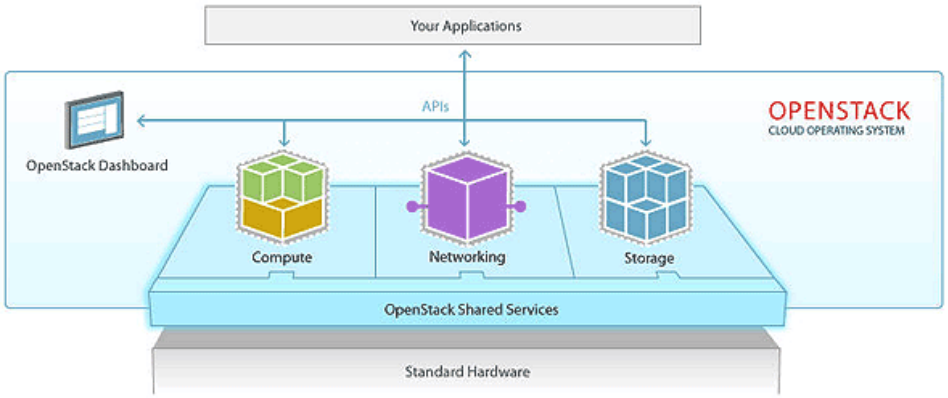
Benefits:

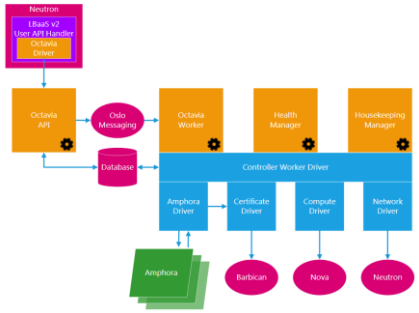
- No EXPENSIVE **$€£¥$** public cloud
- Magnum+Octavia+Barbican provide super experience of Kubernetes clustering: High Secure, Scalable, and High Available
- A comparable to AWS EKS
- Just a natural step forward, when OpenStack in place,
- Truly community driven “OPEN”: issues resolvable

Drawbacks:

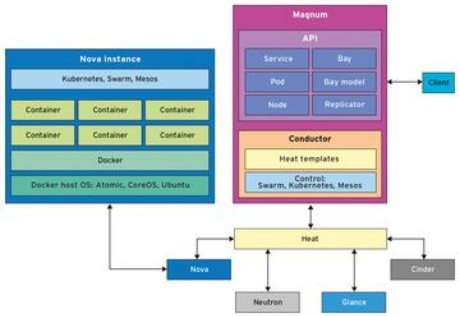
- Integration is not a small work, expert openstack + solid Kubernetes knowledge, but with community, it can be simple ☺
- Both OpenStack and Kubernetes are dynamic, so keeping changing is a challenge for reaching a best balance (functionality vs stability) of this marriage.
- Octavia is over HAProxy, a rather stable, approachable, usable backend

Value add on: From stack to services

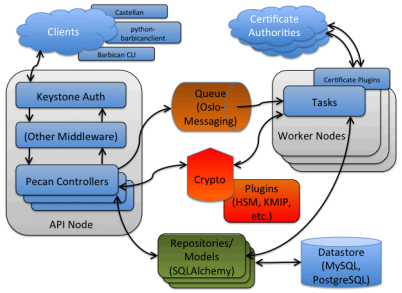




Octavia



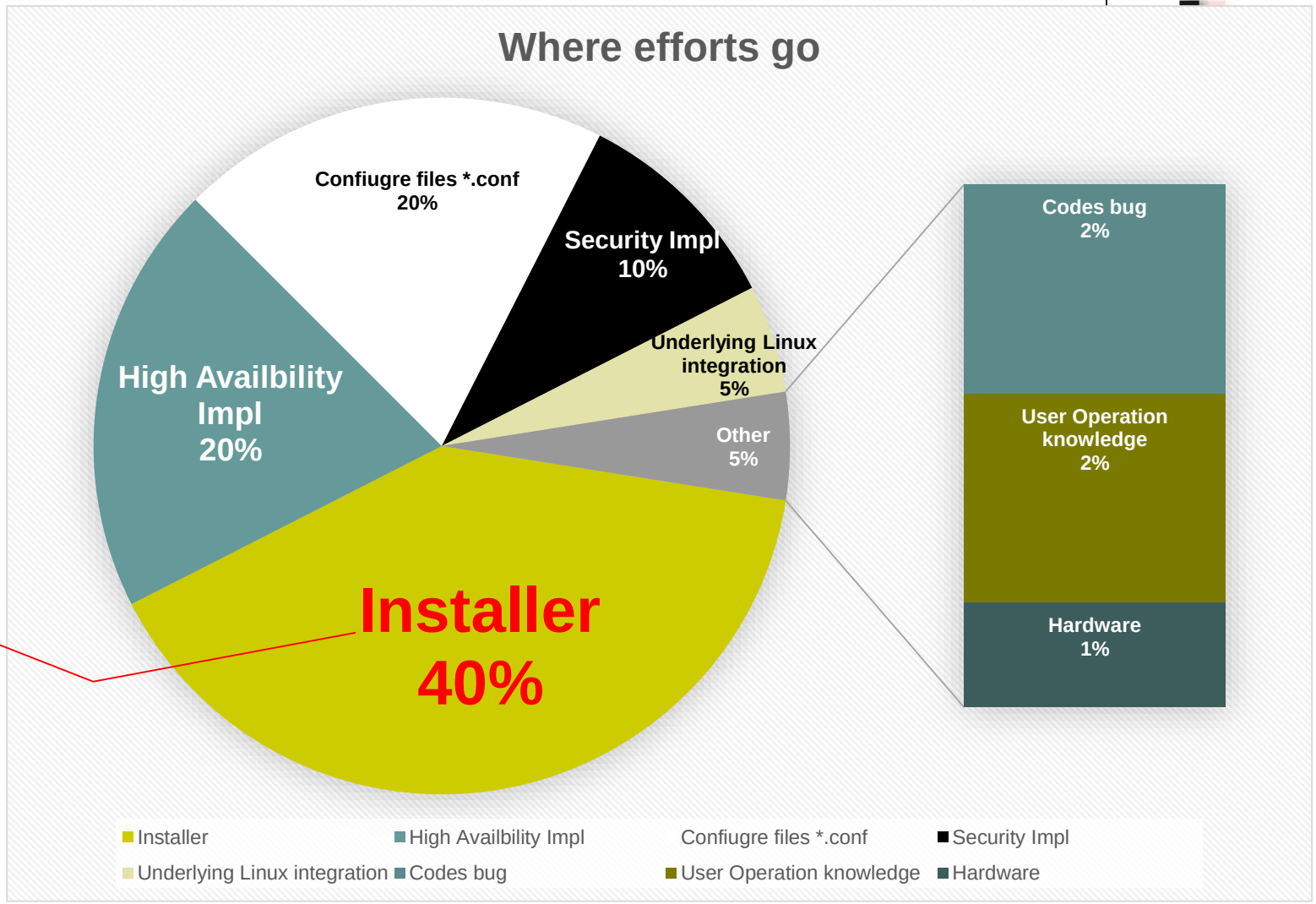
Magnum
Kubernetes



Barbican

DEMO

Understand the complexity of building such



- Kolla
- Helms
- Ansible
- IntOS
- Redhat OSP
- Mirantis MOS
- Ubuntu conjure up
- Yum package
- Apt package
- Vendor specific: Rackspace,
- Wind River
- Huawei etc

Which Installer

Community

Vendor specific

- Kolla
- Helms
- Ansible
- IntOS
- Redhat OSP
- Mirantis MOS
- Wind River Titanium
- Ubuntu conjure up
- Yum package
- Apt package
- Vendor specific: Rackspace, Huawei etc

KOLLA
an OpenStack Community Project

DEVSTACK

HELM

RDO

Apt package

Yum package

....

HUAWEI

MIRANTIS
Pure Play OpenStack

RED HAT OPENSTACK PLATFORM

WIND
AN INTEL COMPANY

ComputingStack

intos

....

Three Versions of load balancers by OpenStack

LBAAS V1	LBAASV2	OCTAVIA
Deprecated in Liberty	Deprecated in Pike	Only option of Load Balancer in Queens
Agent support: neutron_lbaas.services.loadbalancer.plugin.LoadBalancerPluginv2 neutron_lbaas.drivers.haproxy.plugin_driver.HaproxyOnHostPluginDriver:default	Agent support: neutron_lbaas.services.loadbalancer.plugin.LoadBalancerPluginv2 neutron_lbaas.drivers.haproxy.plugin_driver.HaproxyOnHostPluginDriver:default Octavia Support: neutron_lbaas.services.loadbalancer.plugin.LoadBalancerPluginv2 LOADBALANCERV2:Octavia:neutron_lbaas.drivers.octavia.driver.OctaviaDriver:default	ZERO neutron dependencies

Queens Version Major Change

Queens has no significant change, but is a cut off alike change, as it is separated completely from Neutron

- stopped github/neutron-lbaas repo
- stopped github/neutron-lbaas-dashbaord
- Continue: github/octavia
- New: github/octavia-dashboard
- Stopped as plugin/service provider to neutron, but level 1 service
- Stopped cli: neutron-lbaas-xxxx
- Octavia doesnot read neutron.conf
- Api CALL change
- CLI: only ocatavia neutron-lbaas

- How is it causing compatibility problem?
  - Configuration
  - Database
  - Upgrading
  - Magnum

Network and Image Prep

LB COMSUMES a lot of IP and Compute resources!!!

Lb-mgmt-net has to be a public network, through which Octavia conductor talks with LB instances

In dev, external_network (which floating-ip uses) can be used as lb-mgmt-net

Image: amphora with: tags: amphora

Flavor: amphora is Ubuntu, so can’t be too small, but our env shows 1 core 2G ram performs well

Certificates in Octavia

Notes: Certificates dealing can be daunting

The bi-directional TLS authentication is only security measure for network between HAproxy and OpenStack controller, hence a must, either CA signed or self-signed.

https://github.com/openstack/octavia/blob/master/bin/create_certificates.sh works

```
openssl genrsa -passout pass:foobar -des3 -out private/cakey.pem  (A)2048
openssl req -x509 -passin pass:foobar(B) -new -nodes -key private/cakey.pem
\
        -config $OPEN_SSL_CONF \
        -subj "/C=US/ST=Denial/L=Springfield/O=Dis/CN=www.example.com" \
        -days $VALIDITY_DAYS \
        -out ca_01.pem (C)
openssl x509 -in ca_01.pem -text -noout
openssl req \
       -newkey rsa:2048 -nodes -keyout client.key (D) \
       -subj "/C=US/ST=Denial/L=Springfield/O=Dis/CN=www.example.com" \
       -out client.csr (E)
openssl ca -passin pass:foobar -config $OPEN_SSL_CONF -in client.csr \
           -days $VALIDITY_DAYS -out client-.pem -batch
cat client-.pem client.key > client.pem (F)
```

```
Vi /etc/Octavia/Octavia.conf
[certificates]
ca_private_key = /home/intos/certificates/private/cakey.pem (A)
ca_private_key_passphrase = foobar(B)
```

```
[haproxy_amphora]
client_cert = /etc/octavia/certs/server_ca.pem (F)
server_ca = /etc/octavia/certs/client.pem (C)
```

```
[amphora_agent]
agent_server_ca = /etc/octavia/certs/client_ca.pem(D)
agent_server_cert = /etc/octavia/certs/server.pem(F)
```

Migration to Octavia from neutron-lbaas: work around

https://wiki.openstack.org/wiki/Neutron/LBaaS/Deprecation

- Octavia DB replaces previous neutron DB addon
- Manual deletion might be needed on neutron db, but it won't hurt
- neutron.conf: no service_provider, no plugin

Integration with Magnum

- Octavia is a MUST for kubernetes over OpenStack
- Integration might be straightforward as only API call in between
- However:
  - Magnum k8s master: kube-controller-manager.service may not be well compatible with new API change of Octavia to create external LB service to expose pods
  - Manual LB works well
  - Workaround: service_plugins = router,lbaasv2-proxy

Some lessons

- OpenStack is far beyond network/computing/storage, but SERVICES
- OpenStack Doc provides an idea, but far from being correct, sometimes misleading ☹
- Codes, codes, dive more, more insights!
- DevStack is fairly easy to learn many codes details, highly recommended as a tool handy
- OpenStack is high complex, and be prepared for long install journey, but eventually worth it
- Fortunately we have community and support ☺

Q&A

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