OpenStack Overview

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Agenda

9:00–9:30 a.m. - Registration and Tech Expo
9:30–10:30 a.m. - Introduction to SDN
10:30–11:30 a.m. - SDN Protocols and Controllers Part One
11:30 a.m.–12:00 p.m. - Lunch and Tech Expo
12:00–1:00 p.m. - SDN Protocols and Controllers Part Two
1:00–1:45 p.m. - SDN and Splunk
1:45–2:45 p.m. - What's New with OpenStack
2:45–3:00 p.m. - Wrap Up
Agenda

- What is OpenStack?
- Common Use Cases
- OpenStack Participation
- Deployment Summary
- OpenStack + SDN
What is OpenStack?
“OpenStack is a collection of open source technologies delivering a massively scalable cloud operating system” - openstack.org
OpenStack is “Project” Based
Core Projects Shown

Compute
“Nova”
- Houses VMs
- API driven
- Support for multi-hypervisors

Storage
“Glance, Swift, Cinder”
- Instance/VM image storage
- Cloud object storage
- Persistent block level storage

Dashboard
“Horizon”
- Web app for controlling OpenStack resources
- Self-service portal

Identity
“Keystone”
- Centralized policies
- Tenant mgmt.
- RBAC
- Ext. integration (LDAP)

Networking
“Neutron”
- Networking as a service
- Multiple models
- IP address mgmt.
- Plugins to external HW

Telemetry
“Ceilometer”
- Central collection point
- Metering and monitoring

Orchestration
“Heat”
- Template-based orchestration engine
- More rapid deployment of applications

Database
“Trove”
- DBaaS
- Single-tenant DB within instance

Data Processing
“Sahara”
- Fast provisioning of Hadoop clusters

New!
What’s New in Juno

- PTL Juno Summary:  
  https://www.youtube.com/playlist?list=PLKqaoAnDyfgqppX5f3PCuOgsDm-_UJu2aU

- Nova
  - NFV
    - Improvements in live upgrades (introduced in Icehouse)
    - http://blog.russellbryant.net/2014/07/07/juno-preview-for-openstack-compute-nova/

- Heat
  - Rollback
  - non-Admin resource creation

- Neutron
  - Distributed Virtual Router
  - L3 HA
  - New LBaaS API

Reference
Common Use Cases
Common OpenStack Use Cases

- OpenStack, at least today, is targeted at hosting modern day distributed applications written for the cloud – This isn’t your grandpa’s server virtualization platform built for individual VM HA/Mobility

- Proof-of-Concept environment to work out CI/CD
  - A place to research, learn and test CI/CD processes
  - PoC web applications along with ‘practicing’ the new DevOps methodology
  - A place to learn the whole cloud deployment framework, document, train, move to production

- Host traditional development environments
  - Using the lessons learned in the sandbox phase:
    - Build Dev, QA and production environments
    - Apply CI/CD processes
    - Slow-role Web application deployment either on ‘standard’ OpenStack or in conjunction with a PaaS deployment

- Data Processing environments – Big Data clusters, etc..

- Training systems – Cheap and fast to build and tear down for each class

- Revenue generating applications – Vertical applications (only if the app doesn’t care much about VM-level HA)
Shock-and-Awe: Dashboard is not where tenants do their work

Overview

Limit Summary

Instances
Used 3 of 10

VCPUs
Used 10 of 20

RAM
Used 20.0 GB of 50.0 GB

Floating IPs
Used 0 of 50

Security Groups
Used 1 of 10

Select a period of time to query its usage:

From: 2014-09-01 To: 2014-09-06

The date should be in YYYY-mm-dd format.

Active Instances: 3
Active RAM: 20GB
This Period's VCPU-Hours: 49.85
This Period's GB-Hours: 1994.02

Usage Summary
Cloud Apps Deployment – Automate it

Boot the Instance

Rinse & Repeat

Config Management

App is Deployed

- Cloud-init for Puppet/Chef/etc..
- Image already has agent/script

```
# Nodes for web server instances
node 'sales-web-01' {
  include lamp
}
```

```
root@build-server:~# tree /etc/puppet/modules/lamp/
/etc/puppet/modules/lamp/
  └── files
      ├── apache2.conf
      │   └── index.php
      └── php5.conf
      └── manifests
          └── init.pp
```

```
nova boot --user-data ./cloud-config-puppet.txt --image precise-x86_64 --flavor m1.tiny --key_name ctrl-key --nic net-id=42823c88-bb86-4e9a-9f7b-ef1c0631ee5e sales-web-01
```

http://docs.openstack.org/user-guide/content/user-data.html
Cloud App Deployment - Heat

- Heat provides you a way to deploy resources (network, router, load-balancer, VM and applications) all from a ‘template’
- Today, Heat orchestrates resources inside a tenant space

- https://wiki.openstack.org/wiki/Heat
- http://blog.scottlowe.org/2014/05/01/an-introduction-to-openstack-heat/
- https://github.com/shmcfarl/my-heat-templates
OpenStack Participation
Why Does OpenStack Matter?

**Choice**

- There is no one-size fits all option for cloud computing – Amazon or VMware are cool but not the be all/end all solution
- There is no single vendor who can fill all needs of a cloud stack – You will likely engage with multiple partners

**Community**

- Open Source
- Community driven – Individual, organizational
- Better time-to-market and faster feature velocity

**Commercialization**

- Start with the ‘baseline’ OpenStack components
- Vendor opportunities for value-add integration on top of OpenStack baseline
  - Design, deployment, automation, operation, high-availability, applications, etc…
Cisco’s Focus on OpenStack - Today

Community
- Neutron – Network Service
- Horizon – Dashboard
- Keystone – Identity
- Swift – Object Storage
- Ceph/Cinder – Block Storage
- Automation – PuppetLabs
- HA Design

Engineering
- Cisco Product Integration
- Nexus Plugins – Neutron
- UCS
- CSR/ASR
- Co-developed solutions (Red Hat, Canonical, SUSE)

Customers
- Cisco Designs on specific releases in ‘beachhead’ accounts
- Start simple, build from there – Focus on automation and HA
- Evangelization of what Cisco is doing - Thought Leadership – Help customers know What, When, Where & How
Cisco + Other Distributions/Vendors

- Red Hat:
  - UCSO:
  - UCSO:
- Ubuntu:
Distro/Vendor Supported Installers

- Red Hat OpenStack (RHOS/RDO) – PackStack and Foreman/Staypuft:
  http://www.redhat.com/openstack/
  http://openstack.redhat.com/Main_Page

- Canonical/Ubuntu – MAAS and JuJu: http://www.ubuntu.com/cloud

- SUSE: https://www.suse.com/products/suse-cloud/features/


- Piston Cloud: http://www.pistoncloud.com/

- Others …
Product Integration Overview


Deployment Summary
What Really Changes in my Data Center/Internet Edge?

- OpenStack components live South of the Top-of-Rack switch
- Your existing DC, Internet Edge and BN architecture stays the same
- It’s about the compute, storage and orchestration/management tiers
- Your apps go largely unchanged
All-in-One (AIO)

AIO Controller/Compute/Storage

AIO Controller:
- MySQL, MariaDB, etc
- RabbitMQ, Qpid, etc..
- API Endpoints:
  - Keystone
  - Glance
  - Nova
  - Neutron
  - Cinder
  - Heat
  - Swift

AIO Controller

Compute/Storage

Compute

Storage

Compute

Storage

Compute

Storage
All-in-One (AIO) – Compressed HA

Data Center Infrastructure

Infrastructure Services
- SLB
- Build/PXE
- Automation
- DNS
- DHCP
- NTP
- Logging

AIO Controllers:
- Galera/MySQL
- RabbitMQ

API Endpoints:
- Keystone
- Glance
- Nova
- Neutron
- Cinder
- Heat
- Swift
What’s a Service Cloud?

- It’s the ‘underlay’ Cloud
- Used as a hosting platform for tenant cloud services – usually in a large cloud (1000s of instances with 100-1000s of tenants)
- It is an OpenStack deployment that will host (virtually) the OpenStack control functions used by each tenant
OpenStack + SDN
Relationship between SDN and OpenStack

1. Physical Resource Layer
   • Networking, Storage and Compute resources
   • Hardware-based networking services

2. Network Resource and SDN Layer
   • Resource Virtualization Provisioning, and Management

3. OpenStack Cloud Platform Layer
   • Presents compute and networking virtualization interfaces to application developers in a multi-tenant environment

4. User Application Layer
   • Self-provision resources through APIs
   • Only see virtualized resources
Conclusion

- Trends include the movement to or back to private clouds with the design option to link workloads between various clouds (Public<>Private)
- Don’t go down the path of OpenStack if your goal is a ‘free’ alternative to another server virtualization system – Use OpenStack for what OpenStack was built for
- OpenStack is for real, but immature in some aspects, especially networking and upgrades – Gaps are closing quickly
- Real value-add is not in installation and the basic OpenStack components but rather on overall system design, DevOps, optimization and scale-out above what a baseline OpenStack system provides
Thank you.