Getting Started with OpenStack

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Agenda

• What is OpenStack?
• Use cases and work loads
• Demo: Install and operate OpenStack on your laptop
• Getting help and additional resources
What is OpenStack?
Overview

- Cloud computing platform for public/private clouds
- Abstracts data centers into pools of resources
- Provides management layer for efficient, automated allocation of resources
- Empowers operators, admins, users via self service portals
- Provides APIs to develop cloud-aware applications
The OpenStack Community

- Founded in Sept 2012
- Rackspace and NASA
- Apache 2.0 license
- Designed and developed in an open collaborative fashion
- 24,000 developers
- 500 companies
- 20 million lines of code

- Releases every six months
- Current stable release - “Kilo”
  - Version 2015.1.1
  - Released June 30, 2015
  - 1500 developers contributed
  - 150 companies involved
  - 20,000 patch sets
http://stackalytics.com/?release=kilo&metric=marks
Extensible Software Architecture

Applications / Services

OpenStack Service APIs, SDK, CLI

Compute Service (Nova)
Storage Services (Cinder and Swift)
Network Service (Neutron)
Dashboard (Horizon)
Identity (Keystone)
Many more Services

Infrastructure Plugins

Physical and Virtualized Infrastructure
## OpenStack Projects

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Use Cases and Work Loads
OpenStack Use Cases

• Public cloud
  • AWS style offerings
• Private cloud
  • General purpose compute
  • Purpose-build for specific application
  • API-managed data center

• Embedded
  • Application which needs data center orchestration
• Workload-specific
  • Object storage
OpenStack Adoption Drivers

• Speed
• Flexibility
• Cost
• Programmatic workflows
Learning Lab Demo: OpenStack On Your Laptop
Install VirtualBox

1. Install package for your platform
2. Install extension pack
Create Network Adaptors

Host-only adapter
- Allows the networking to be contained within the laptop and communicate with the host machine itself

NAT adapter
- Allows instances to connect to outside world
Import OVA File

• Import “CentOS 7 Packstack VirtualBox.ova” file into VirtualBox

• “File -> Import Appliance” menu
Associates Networks with OVA File

- Click on “Settings” -> “Network”
- Select tab for “Adapter 1”, the Host-only network adapter
  - Make sure “Enable Network Adapter” box is checked
  - Expand the “Advanced” tab.
  - Make sure “Promiscuous Mode” is set to “Allow All”.
- Select the tab for “Adapter 2”, the NAT network adapter
  - Make sure the “Enable Network Adapter” box is checked
Power On

- Select “Start” from the VirtualBox menu to power on the CentOS 7 appliance.

- Once it boots you can login to the console window with the credentials:
  - Username: admin
  - Password: !cisco123
Access Horizon Dashboard

• From the CentOS 7 Desktop, open “Firefox Web Browser” from the “Applications “dropdown menu

• Within Firefox, access the OpenStack dashboard (a.k.a. Horizon UI) at:
  • http://192.168.56.10/
  • Username: admin
  • Password: !cisco123
Your own OpenStack Cloud

- There are two users: admin and demo
- “admin” should be used principally for administrative purposes, such as resetting network interfaces or loading “common” systems images
- “demo” user (with same password), is configured as a typical “user” of the system, with access to a shared public network
View Your Networks as a User

- Logout as Admin
- Login as Demo User
- Select “Network” -> “Network Topology”
- You should see a public network and a private network with a router providing access between the two
Explore and Modify Your Networks

- A router connects the private network created for the demo user to the shared public network
- Hover over the router icon to see additional info
- Note the router has been assigned IP address 10.0.0.1
- Click on the private network to see additional info
- Note it has been assigned the address space 10.0.0.0/24 and its Gateway IP is set to that of the router we just explored (i.e. 10.0.0.1)
Access from Laptop

- The same access illustrated previously from within VirtualBox is also available via your laptop using a browser or terminal application.
- Open a browser on your laptop, and point it to the Horizon UI at:
  - **http://192.168.56.10**
  - Username: demo
  - Password: !cisco123
- Running a VPN on your laptop may interfere with the routing necessary to access your local OpenStack environment. If you find this to be the case, power off the VM, restart your laptop, launch VirtualBox, and start the Cent OS 7 VM again.
Deploy a VM within OpenStack

- Within Horizon UI, select “Compute->Instances”, then the “Launch Instance” button
  - Fill in instance name (e.g. first_vm)
  - Select boot from image
  - Select the “cirros” image
  - Select the Launch button on the bottom of the popup
- It may take a minute or two for the VM to start
- Once complete, the “Power State” will switch from “Spawning” to “Running”
Console Into Your VM

• Once “Running”, you click on the Instance Name of your new instance to see all the details about it

• You can select the “Console” tab to login to your VM

• The default credentials are generally noted in the VM when it first starts
  • username: “cirros”
  • password “cubswin:)”
Start another VM from the CLI

- You can SSH into the VM itself to get access to the local set of CLI tools (and the configuration files and application components.)
- CLI access is restricted to the admin; however, once with the CLI you can execute OpenStack CLI command as either admin or demo
- Let’s use the CLI to launch a second VM (e.g. cli_vm).
- To access the CLI (you can do this either from a terminal on your laptop or via the graphical interface of the VM itself):
  - ssh admin@192.168.56.10        # password !cisco123
  - sudo su -                     # password !cisco123
  - source ./keystonerc DEMO     # configures access to CLI as demo
  - nova boot --flavor m1.small --image cirros cli_vm    # launch VM
Explore on Your Own

• Credentials stored in /root/keystonerc_admin

• Configuration for OpenStack components generally found at /etc/<component-name>/.conf" (e.g. /etc/nova/nova.conf)

• Logs specified by logs_dir (e.g. /var/log/nova)

• Happy exploring!

[root@ai01 ~]# cat /root/keystonerc_admin
export OS_USERNAME=admin
export OS_TENANT_NAME=admin
export OS_PASSWORD=icisco123
export OS_AUTH_URL=http://192.168.56.10:5000/v2.0/
export OS_REGION_NAME=RegionOne
export PS1='[\u@\h \W(keystone_admin)]$ '

[root@ai01 nova(keystone_demo)]# cat /etc/nova/nova.conf | more
[DEFAULT]
notification_driver=ceilometer.compute.nova_notifier
notification_driver=nova.openstack.common.notifier.rpc_notifier

# Options defined in oslo.messaging

# Use durable queues in amqp. (boolean value)
# Deprecated group; name = DEFAULT; rabbit_durable_queues
# amqp_durable_queues=false
# amqp_durable_queues=False

# Auto-delete queues in amqp. (boolean value)
# amqp_auto_delete=false

[root@ai01 nova(keystone_demo)]# tail -f /var/log/nova/nova-compute.log
2015-08-11 12:51:33.316 3793 AUDIT nova.compute.resource_tracker [-] Free disk (GB): 20
2015-08-11 12:51:33.317 3793 AUDIT nova.compute.resource_tracker [-] Total usable vcpus: 2, PCI stats: []
2015-08-11 12:51:33.317 3793 AUDIT nova.compute.resource_tracker [-] Total physical ram (MB): 2560
2015-08-11 12:52:34.316 3793 AUDIT nova.compute.resource_tracker [-] Free disk (GB): 20
2015-08-11 12:52:34.316 3793 AUDIT nova.compute.resource_tracker [-] Total usable vcpus: 2, PCI stats: []
2015-08-11 12:52:34.316 3793 AUDIT nova.compute.resource_tracker [-] Total physical ram (MB): 2560
2015-08-11 12:52:34.316 3793 INFO nova.compute.resource_tracker [-] Compute_service record updated
Where to go for help and additional resources?
DevNet

- Cisco’s developer program
  - https://developer.cisco.com

- Make the internet a platform for innovation for developers
Open Source Dev Center
Your Source for Open Source at Cisco

https://developer.cisco.com/opensource

- Contributions to open source
- Use in products/solutions
- Community forums, blogs
- Developer VMs
- Developer Events
  - IETF Hackathon
  - Newcomer Training for OpenStack
  - Building Apps on OpenDaylight
OpenStack

- [https://developer.cisco.com/openstack](https://developer.cisco.com/openstack)
Learning Labs

- [https://learninglabs.cisco.com/](https://learninglabs.cisco.com/)
Sandbox

- https://devnetsandbox.cisco.com
https://communities.cisco.com/community/community/openstack
Questions?
Thank you
TOMORROW starts here.