

OpenStack Magnum Hands-on

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Prerequisites & Expectations

- 8GB RAM minimum
- Expectations
 - This will be very slow due to 2 layers of virtualization
 - Things might fail (timeouts)

Agenda

- Setup development environment
 - Install Vagrant, VirtualBox
 - Get vagrant box
 - Spin VM with Devstack
 - Setup Devstack
 - Create magnum bay
- Intro to Magnum, Kubernetes
- Magnum CLI hands-on
 - Bay models, bays, pods, services, deploy kubernetes,docker based app

Hands-on part 1 - openstack up !

- Install Vagrant 1.8.X and VirtualBox 5.0.X
- Inside magnum (the one you got from us) folder:
 - If you have more than 6GB of free memory:
 - Edit Vagrantfile v.cpus and vb.memory
 - `vagrant up`
 - `vagrant ssh`
- `cd devstack && ./stack.sh`
- `./magnum_setup.sh`
 - (if more than 6GB RAM, edit line 41, replace 500 with 1000)
 - What it does
 - Updates flavor
 - Creates CoreOS image
 - Creates keypair and security groups
 - Creates an example baymodel (but we'll create another one)

<https://etherpad.openstack.org/p/magnumhandson-lab>

Hands-on part 2 - bay up !

- `sudo iptables -t nat -A POSTROUTING -o eth0 -j MASQUERADE`
- `source openrc admin admin`
- `cat /etc/resolv.conf` (take note of DNS IP)

- **Create bay**

```
magnum baymodel-create --name demo \  
  --image-id coreos \  
  --keypair-id testkey \  
  --external-network-id public \  
  --dns-nameserver <DNS IP from above> \  
  --flavor-id m1.small \  
  --network-driver flannel \  
  --coe kubernetes \  
  --tls-disabled
```

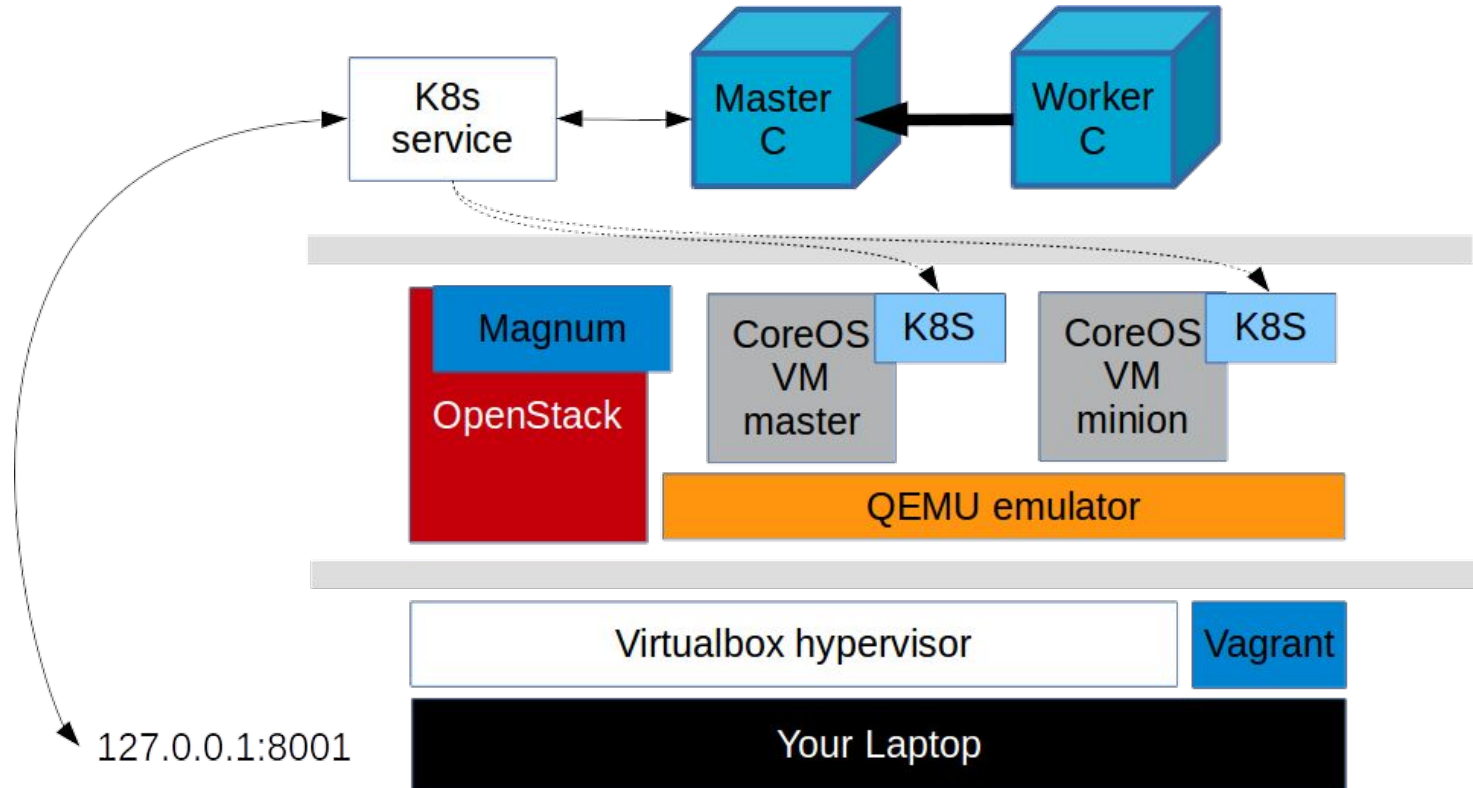
- **Create the bay**

- `magnum bay-create --name demo --baymodel demo --node-count 1`

- **Keep an eye on the progress**

- `watch -n 5 "magnum bay-list && nova list"`

Stack that we are going to build...



Kubernetes

Open-source platform for container application:

- Deployment
- Scaling
- Operations (rolling upgrades...)

Concepts:

- Pod
- Service
- Replication controller

Magnum

Containers-as-a service for OpenStack

Components:

- **Conductor**
 - Uses OpenStack Heat to deploy VM's with kubernetes, swarm, mesos
 - Uses Docker API
 - Uses Kubernetes API (or other container orchestrator)
- **API**
 - Talks to conductor via AMQP

OpenStack + Magnum

Components used by Magnum:

- Keystone - provides multi-tenancy
- Nova compute - computing service
- Heat - virtual application deployment service
- Neutron - networking service
- Glance - virtual machine image service
- Cinder - volume service

Magnum objects

- Bay - collection of virtual machines for hosting containers
- Bay Model - bay “flavor” (os image, dns, orchestration engine)
- Pod - a collection of containers running on 1 host
- Service - a logical set of pods and an access policy
- Replication Controller - “watchdog” for pods (also scaling and upgrade)
- Container - docker container

Magnum CLI

- `magnum baymodel-create`
- `magnum bay-create`
- `magnum coe-service-create`
- `magnum rc-create`

Hands-on part 3 - explore bay

- List bays
 - `magnum bay-list`
- Show bay details
 - `magnum bay-show demo`
- SSH to node
 - `ssh core@MASTER_IP`
- List running docker container on the node
 - `docker ps`

Hands-on part 4 - kubectl

To directly interface kubernetes running inside bay:

- `cd ~/app`
- `magnum bay-show demo # Note master_addresses`
- `./kubectl-setup.sh MASTER_ADDRESS`
- `./kubectl get pods`
- `./kubectl get service`

Hands-on part 5 - kube app up !

- `magnum pod-create --manifest master.yaml --bay demo`
 - `magnum pod-show demo-master --bay demo`
 - `./kubectl get pod` (repeat until READY 1/1 ~5 min)
- `magnum coe-service-create --manifest master-service.yaml --bay demo # (save node_port)`
 - `magnum coe-service list --bay demo`
 - `magnum coe-service-show demo-master-service --bay demo`
 - `./kubectl describe service demo-master-service`
- **Expose master service to the host (laptop)**
 - `./portforward.sh MINION_IP NODE_PORT`
- `magnum pod-create --manifest worker.yaml --bay demo`
 - `./kubectl get pod` (repeat until READY 1/1 ~5 min)
- Open browser from laptop <http://127.0.0.1:8001>

Tools

- OpenStack - manages virtual/bare metal machines in datacenter
- Kubernetes - docker containers orchestration.
- Magnum - OpenStack component for deploying docker and kubernetes (not only) enabled vm's/bare metal machines. Containers as a service
- Devstack - developer oriented OpenStack deployment tool
- VirtualBox - tool for managing local virtual machines
- Vagrant - automation of development environment deployment using VirtualBox (not only)