LCI workshop
on high performance clustered computing

Linux Clusters Institute: OpenStack Nova

Yale, August 13th – 17th 2018

John Michael Lowe | Senior Cloud Engineer
Indiana University
jomlowe@iu.edu

Jetstream

Nova

- Components
- Cloud-init and metadata
- Devstack
- Troubleshooting

Components

- Nova API
- Nova Conductor
- Nova Placement
- Nova Scheduler
- Nova Compute
- Nova Novnc Proxy
- Nova Console auth

Components – Nova API

- Services api and some database requests
- Uses Nova-API database plus other database(s) by proxy
- Configuration files
  - /etc/nova/nova.conf
- Deployed on controller

Components – Nova Conductor

- Marshals database requests from other components
- Configuration files
  - /etc/nova/nova.conf
- Deployed min one per cell on controller

Cells

- Breaks up Nova control plane allowing scaling
- One Nova database per cell
- One message bus per cell
- One or more conductors per cell
- Shared Nova api
- Shared Placement/Scheduler

Components – Nova Placement

- Manages claims on resources; disk, memory, and cpu
- Uses Nova-API database (for now)
- Configuration files
  - /etc/nova/nova.conf
  - /etc/nova/nova.conf (nova compute contacts directly)
- Deployed on controller as WSGI application

Components – Nova Scheduler

- Filters and ranks hypervisors based on current states
- Configuration files
  - /etc/nova/nova/conf
- Deployed on controller

Components – Nova Compute

- Uses libvirt to control instances of qemu
- Configuration files
  - /etc/nova/nova.conf
- Deployed on compute nodes

Components – Nova Novnc Proxy

- Proxies web socket connections to vnc server in qemu
- Serves web vnc client
- Configuration files
  - /etc/nova/nova.conf
- Deployed on controller

Components – Nova Console Auth

- Token authentication for console proxies
- Configuration files
  - /etc/nova/nova.conf
- Deployed on controller

Metadata and Cloud-init

- Cloud-init runs in all cloud enabled images and consumes metadata to configure instances during initial boot
- Works on all major clouds
- Passed to instances as userdata argument
- Vendor data is supplied by operator, user data takes precedence
- SSH keys, users, packages, upgrades, write arbitrary data into files, and other modules

Devstack

- Scripted installation of a all-in-one OpenStack for development and testing
- Pulls latest bits from github
- Devstack installed via cloud-init https://docs.openstack.org/devstack/latest/guides/single-vm.html

Deployment Considerations

- Enabling live migration will make maintenance possible but not all optimizations are compatible
- Websockets for console proxies don't proxy well through haproxy, needs master/backup configuration for HA
- All compute nodes keep in contact with placement
- During deployment is the time to look at and follow the Ceph Openstack documentation http://docs.ceph.com/docs/mimic/rbd/rbd-openstack/

Troubleshooting

- All requests have an id propagated through all participating components logs
- Check /var/lib/libvirt/qemu/instance-<id>.log for qemu errors
- Requests and their events can be found by running ‘nova instance-action-list <instance-id>’ and ‘nova instance-action <instance-id> <request-id>’
- The XML for the instance is examined by running ‘virsh dumpxml <instance-name>’ on the compute node

Resources

- Admin guide
  https://docs.openstack.org/nova/latest/admin/
- Deployment guide
  https://docs.openstack.org/nova/latest/install/

Questions