OpenStack Charm Deployment without Canonical MAAS for Testing & Small Deployment

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aws

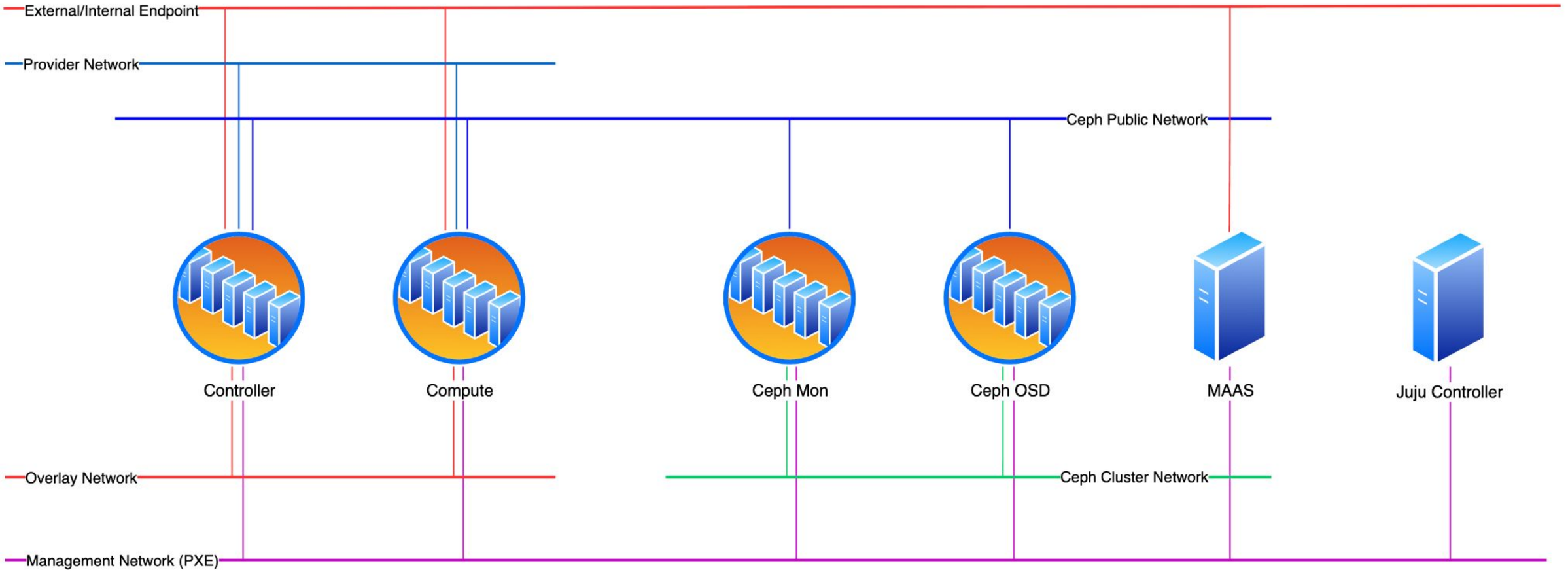
Introduction

- OpenStack Deployment Tools
- OpenStack Charm
- Juju
- Charm
- MAAS

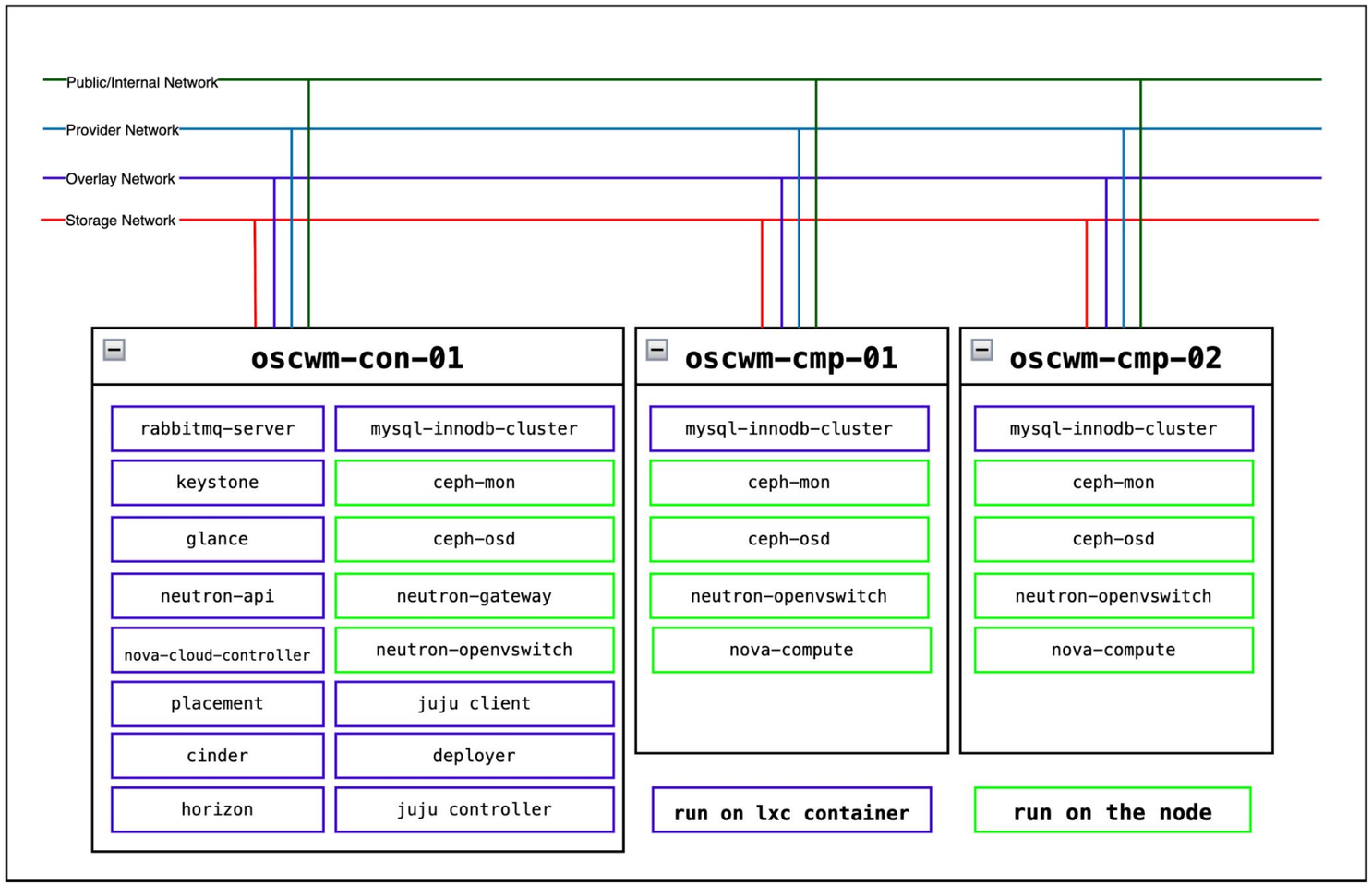
Introduction

Juju, the orchestrator engine	Juju is an open source orchestration engine for software operators that enables the deployment, integration and lifecycle management of applications at any scale, on any infrastructure.
Charms, the software operators	A charm is an operator: business logic encapsulated in reusable software packages that automate every aspect of an application's life. Charms are developed with the Charm SDK which comprises the: • **Ops library:** a Python framework for developing and testing charms • **Charmcraft:** a tool for building, packaging and publishing charms.

Typical Topology Deployment



Deployment Topology



Install & Configure LXD

- Install LXD on `oscwm-con-01`

```
ubuntu@oscwm-con-01:~$ sudo snap install lxd
2025-05-28T05:30:05Z INFO Waiting for automatic snapd restart...
lxd (5.21/stable) 5.21.3-c5ae129 from Canonical✓ installed
```

- Install LXD on `oscwm-cmp-01`

```
ubuntu@oscwm-cmp-01:~$ sudo snap install lxd
2025-05-28T06:30:05Z INFO Waiting for automatic snapd restart...
lxd (5.21/stable) 5.21.3-c5ae129 from Canonical✓ installed
```

- Install LXD on `oscwm-cmp-02`

```
ubuntu@oscwm-cmp-02:~$ sudo snap install lxd
2025-05-28T16:11:27Z INFO Waiting for automatic snapd restart...
lxd (5.21/stable) 5.21.3-c5ae129 from Canonical✓ installed
```

Install & Configure LXD

- Configure LXD on `oscwm-con-01` , `oscwm-cmp-01` , `oscwm-cmp-02`

auto

```
root@oscwm-con-01:/home/ubuntu# sudo lxd init --preseed <<EOF
config:
  core.https_address: '[::]:8443'
networks: []
storage_pools:
- name: lvm
  driver: lvm
  config:
    source: /dev/vdd
profiles:
- name: default
  description: "Default LXD Network"
  config: {}
  devices:
    eth0:
      name: eth0
      nictype: bridged
      parent: os-external
      type: nic
    root:
      path: /
      pool: lvm
      type: disk
projects: []
cluster: null
EOF
root@oscwm-cmp-02:/home/ubuntu#
```

Install Juju & Bootstrap Controller

- Create LXC Container on `oscwm-con-01` for `juju-controller`

```
root@oscwm-con-01:/home/ubuntu# lxc launch ubuntu:22.04 juju-controller
Creating juju-controller
Starting juju-controller
root@oscwm-con-01:/home/ubuntu# lxc list
+-----------------+---------+----------------------+------+-----------+-----------+
|      NAME       |  STATE  |         IPV4         | IPV6 |   TYPE    | SNAPSHOTS |
+-----------------+---------+----------------------+------+-----------+-----------+
| juju-controller | RUNNING | 10.210.121.254 (eth0) |      | CONTAINER | 0         |
+-----------------+---------+----------------------+------+-----------+-----------+
```

- Install Juju Client on LXC Container `juju-controller` in `oscwm-con-01`

```
ubuntu@oscwm-con-01:~$ sudo lxc exec juju-controller bash
root@juju-controller:~# su - ubuntu
ubuntu@juju-controller:~$ wget https://launchpad.net/juju/3.6/3.6.8/+download/juju-3.6.8-linux-amd64.tar.xz
ubuntu@juju-controller:~$ tar xf juju-3.6.8-linux-amd64.tar.xz
ubuntu@juju-controller:~$ sudo install -o root -g root -m 0755 juju /usr/local/bin/juju
```

Install Juju & Bootstrap Controller

- Configure SSH Config

```
ubuntu@juju-controller:~$ cat .ssh/config
Host oscwm-con-01
        Hostname 10.210.121.100
        User ubuntu
Host oscwm-cmp-01
        Hostname 10.210.121.101
        User ubuntu
Host oscwm-cmp-02
        Hostname 10.210.121.102
        User ubuntu
Host juju-controller
        Hostname 10.210.121.254
        User ubuntu
```

- Enable Passwordless SSH

```
ubuntu@juju-controller:~/.ssh$ ssh-keygen
ubuntu@juju-controller:~$ ssh-copy-id ubuntu@10.210.121.254  #juju-controller
ubuntu@juju-controller:~$ ssh-copy-id ubuntu@10.210.121.100  #oscwm-cmp-01
ubuntu@juju-controller:~$ ssh-copy-id ubuntu@10.210.121.101  #oscwm-cmp-01
ubuntu@juju-controller:~$ ssh-copy-id ubuntu@10.210.121.102  #oscwm-cmp-02
```

- Create Static Host

```
ubuntu@juju-controller:~$ cat /etc/hosts
10.210.121.254  juju-controller
10.210.121.100  oscwm-con-01
10.210.121.101  oscwm-cmp-01
10.210.121.102  oscwm-cmp-02
```

Install Juju & Bootstrap Controller

- Botstrap Juju controller on `juju-controller` LXD Container

```
ubuntu@juju-controller:~$ juju bootstrap manual/juju-controller --bootstrap-series=jammy juju-controller
Creating Juju controller "juju-controller" on manual
Looking for packaged Juju agent version 3.6.8 for amd64
Located Juju agent version 3.6.8-ubuntu-amd64 at https://streams.canonical.com/juju/tools/agent/3.6.8/juju-3.6.8-linux-amd64.tgz
Installing Juju agent on bootstrap instance
Running machine configuration script...
Bootstrap agent now started
Contacting Juju controller at juju-controller to verify accessibility...

Bootstrap complete, controller "juju-controller" is now available
Controller machines are in the "controller" model

Now you can run
    juju add-model <model-name>
to create a new model to deploy workloads.
```

- Add Juju Model

```
ubuntu@juju-controller:~$ juju add-model --config default-series=jammy openstack-lab
Added 'openstack-lab' model with credential 'default' for user 'admin'
```

Add Machine to Juju & Network Space

Add Machine to Juju & Space

- Add machine `oscwm-con-01` , `oscwm-cmp-01` , `oscwm-cmp-02`

```
ubuntu@juju-controller:~$ juju add-machine ssh:ubuntu@oscwm-con-01 --private-key /home/ubuntu/.ssh/id_rsa
created machine 0
ubuntu@juju-controller:~$ juju add-machine ssh:ubuntu@oscwm-cmp-01 --private-key /home/ubuntu/.ssh/id_rsa
created machine 1
ubuntu@juju-controller:~$ juju add-machine ssh:ubuntu@oscwm-cmp-02 --private-key /home/ubuntu/.ssh/id_rsa
created machine 3
```

- List Machine

```
ubuntu@juju-controller:~$ juju machines
Machine  State    Address         Inst id              Base          AZ  Message
0        started  10.210.121.100  manual:oscwm-con-01  ubuntu@22.04      Manually provisioned machine
1        started  10.210.121.101  manual:oscwm-cmp-01  ubuntu@22.04      Manually provisioned machine
3        started  10.210.121.102  manual:oscwm-cmp-02  ubuntu@22.04      Manually provisioned machine
```

Add Machine to Juju & Space

- Default Space

```
ubuntu@juju-controller:~$ juju spaces
Name   Space ID  Subnets
alpha  0         10.210.121.0/24
                 10.210.122.0/24
                 10.210.140.0/24
                 10.210.150.0/24
```

- Add spaces

```
ubuntu@juju-controller:~$ juju add-space external 10.210.121.0/24
added space "external" with subnets 10.210.121.0/24
ubuntu@juju-controller:~$ juju add-space internal 10.210.122.0/24
added space "internal" with subnets 10.210.122.0/24
ubuntu@juju-controller:~$ juju add-space storage 10.210.140.0/24
added space "storage" with subnets 10.210.140.0/24
ubuntu@juju-controller:~$ juju add-space overlay 10.210.150.0/24
added space "overlay" with subnets 10.210.150.0/24
```

```
ubuntu@juju-controller:~$ juju spaces
Name      Space ID  Subnets
alpha     0
external  1         10.210.121.0/24
internal  2         10.210.122.0/24
storage   3         10.210.140.0/24
overlay   4         10.210.150.0/24
```

Deploy Ceph, MySQL, RabbitMQ

Deploy Ceph Cluster

We will deploy `ceph-mon`, `ceph-osd` to machine `0`, `1`, `2`

- Deploy Ceph Cluster

```
ubuntu@juju-controller:~$ juju deploy -n 3 --to 0,1,2 --channel latest/edge --config openstack-lab.yaml ceph-osd os-ceph-osd
Deployed "os-ceph-osd" from charm-hub charm "ceph-osd", revision 632 in channel latest/edge on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju deploy -n 3 --to 0,1,2 --channel latest/edge --config openstack-lab.yaml ceph-mon os-ceph-mon
Deployed "os-ceph-mon" from charm-hub charm "ceph-mon", revision 268 in channel latest/edge on ubuntu@22.04/stable
ubuntu@juju-controller:~$ juju integrate os-ceph-mon:osd os-ceph-osd:mon

ubuntu@juju-controller:~$ juju bind os-ceph-mon external admin=internal cluster=storage dashboard=external mds=storage metrics-endpoint=external mon=storage
osd=storage prometheus=external public=external client=storage
ubuntu@juju-controller:~$ juju bind os-ceph-osd external cluster=storage  mon=storage nrpe-external-master=external public=external secrets-storage=external
```

Deploy Ceph Cluster

```
ubuntu@juju-controller:~$ juju status os-ceph-*
Model          Controller       Cloud/Region  Version  SLA          Timestamp
openstack-lab  juju-controller  manual        3.6.8    unsupported  13:28:00+07:00

App                     Version  Status  Scale  Charm                Channel         Rev  Exposed  Message
os-ceph-mon             19.2.0   active      3  ceph-mon             latest/edge     268  no       Unit is ready and clustered
os-ceph-osd             19.2.0   active      3  ceph-osd             latest/edge     632  no       Unit is ready (1 OSD)
os-neutron-gateway      23.1.0   active      1  neutron-gateway      2024.1/stable   539  no       Unit is ready
os-neutron-openvswitch  23.1.0   active      0  neutron-openvswitch  2024.1/stable   578  no       Unit is ready
os-nova-compute         28.2.0   active      2  nova-compute         2024.1/stable   771  no       Unit is ready

Unit                      Workload  Agent  Machine  Public address  Ports  Message
os-ceph-mon/0*            active    idle   0        10.210.121.100         Unit is ready and clustered
os-ceph-mon/1             active    idle   1        10.210.121.101         Unit is ready and clustered
os-ceph-mon/2             active    idle   2        10.210.121.102         Unit is ready and clustered
os-ceph-osd/0*            active    idle   0        10.210.121.100         Unit is ready (1 OSD)
os-ceph-osd/1             active    idle   1        10.210.121.101         Unit is ready (1 OSD)
os-ceph-osd/2             active    idle   2        10.210.121.102         Unit is ready (1 OSD)
os-neutron-gateway/0*     active    idle   0        10.210.121.100         Unit is ready
os-nova-compute/0*        active    idle   1        10.210.121.101         Unit is ready
  os-neutron-openvswitch/1  active  idle            10.210.121.101         Unit is ready
os-nova-compute/1         active    idle   2        10.210.121.102         Unit is ready
  os-neutron-openvswitch/0* active  idle            10.210.121.102         Unit is ready

Machine  State    Address         Inst id              Base          AZ  Message
0        started  10.210.121.100  manual:oscwm-con-01  ubuntu@22.04      Manually provisioned machine
1        started  10.210.121.101  manual:oscwm-cmp-01  ubuntu@22.04      Manually provisioned machine
2        started  10.210.121.102  manual:oscwm-cmp-02  ubuntu@22.04      Manually provisioned machine
```

Deploy Ceph Cluster

```
ubuntu@juju-controller:~$ juju ssh 0 sudo ceph -s
  cluster:
    id:     f18e812e-6087-11f0-8c23-fd9831d73258
    health: HEALTH_OK

  services:
    mon: 3 daemons, quorum oscwm-con-01,oscwm-cmp-01,oscwm-cmp-02 (age 46h)
    mgr: oscwm-cmp-02(active, since 46h), standbys: oscwm-cmp-01, oscwm-con-01
    osd: 3 osds: 3 up (since 46h), 3 in (since 46h)

  data:
    pools:   4 pools, 49 pgs
    objects: 133 objects, 183 MiB
    usage:   447 MiB used, 300 GiB / 300 GiB avail
    pgs:     49 active+clean

Connection to 10.210.140.100 closed.
ubuntu@juju-controller:~$
```

Deploy MySQL InnoDB Cluster

We will deploy `mysql-innodb-clusters` to LXD on machine `0`, `1`, `2`

- Deploy mysql-innodb-clusters

```
ubuntu@juju-controller:~$ juju deploy -n 3 --to lxd:0,lxd:1,lxd:2 --channel 8.0/stable --config openstack-lab.yaml mysql-innodb-cluster os-mysql-innodb-clusters
--constraints spaces=external,internal --bind "external cluster=internal coordinator=internal db-monitor=internal db-router=internal shared-db=internal"
Deployed "os-mysql-innodb-clusters" from charm-hub charm "mysql-innodb-cluster", revision 159 in channel 8.0/stable on ubuntu@22.04/stable
```

- Deploy in Progress

```
ubuntu@juju-controller:~$ juju status
Model          Controller       Cloud/Region  Version  SLA          Timestamp
openstack-lab  juju-controller  manual        3.6.8    unsupported  22:05:38+07:00

App                       Version  Status   Scale  Charm                Channel      Rev  Exposed  Message
os-mysql-innodb-clusters           waiting    0/3  mysql-innodb-cluster  8.0/stable   159  no       waiting for machine

Unit                         Workload  Agent       Machine  Public address  Ports  Message
os-mysql-innodb-clusters/6   waiting   allocating  0/lxd/2                         waiting for machine
os-mysql-innodb-clusters/7   waiting   allocating  1/lxd/2                         waiting for machine
os-mysql-innodb-clusters/8   waiting   allocating  2/lxd/2                         waiting for machine
```

Deploy MySQL InnoDB Cluster

```
ubuntu@juju-controller:~$ juju status os-mysql-innodb-clusters
Model          Controller       Cloud/Region  Version  SLA          Timestamp
openstack-lab  juju-controller  manual        3.6.8    unsupported  13:55:52+07:00

App                       Version  Status  Scale  Charm                  Channel     Rev  Exposed  Message
os-mysql-innodb-clusters  8.0.42   active      3  mysql-innodb-cluster   8.0/stable  159  no       Unit is ready: Mode: R/O, Cluster is ONLINE and can tolerate up to ONE failure.

Unit                         Workload  Agent  Machine  Public address  Ports  Message
os-mysql-innodb-clusters/6   active    idle   0/lxd/2  10.210.121.242         Unit is ready: Mode: R/O, Cluster is ONLINE and can tolerate up to ONE failure.
os-mysql-innodb-clusters/7   active    idle   1/lxd/2  10.210.121.240         Unit is ready: Mode: R/O, Cluster is ONLINE and can tolerate up to ONE failure.
os-mysql-innodb-clusters/8*  active    idle   2/lxd/2  10.210.121.241         Unit is ready: Mode: R/W, Cluster is ONLINE and can tolerate up to ONE failure.

Machine  State    Address         Inst id              Base          AZ  Message
0        started  10.210.121.100  manual:oscwm-con-01  ubuntu@22.04      Manually provisioned machine
0/lxd/2  started  10.210.121.242  juju-42d5f2-0-lxd-2  ubuntu@22.04      Container started
1        started  10.210.121.101  manual:oscwm-cmp-01  ubuntu@22.04      Manually provisioned machine
1/lxd/2  started  10.210.121.240  juju-42d5f2-1-lxd-2  ubuntu@22.04      Container started
2        started  10.210.121.102  manual:oscwm-cmp-02  ubuntu@22.04      Manually provisioned machine
2/lxd/2  started  10.210.121.241  juju-42d5f2-2-lxd-2  ubuntu@22.04      Container started
ubuntu@juju-controller:~$
```

Deploy RabbitMQ

We will deploy `rabbitmq-server` to LXD on machine `0`

```
ubuntu@juju-controller:~$ juju deploy -n 1 --to lxd:0 --channel 3.9/stable --config openstack-lab.yaml ch:rabbitmq-server os-rabbitmq-server --constraints
spaces=external,internal --bind "external amqp=internal"

Deployed "os-rabbitmq-server" from charm-hub charm "rabbitmq-server", revision 246 in channel 3.9/stable on ubuntu@22.04/stable
```

```
ubuntu@juju-controller:~$ juju status os-rabbitmq-server
Model          Controller       Cloud/Region  Version  SLA          Timestamp
openstack-lab  juju-controller  manual        3.6.8    unsupported  13:58:49+07:00

App                 Version  Status  Scale  Charm             Channel     Rev  Exposed  Message
os-rabbitmq-server  3.9.27   active      1  rabbitmq-server   3.9/stable  246  no       Unit is ready

Unit                   Workload  Agent  Machine  Public address  Ports           Message
os-rabbitmq-server/0*  active    idle   0/lxd/3  10.210.121.239  5672,15672/tcp  Unit is ready

Machine  State    Address          Inst id                Base          AZ  Message
0        started  10.210.121.100   manual:oscwm-con-01    ubuntu@22.04      Manually provisioned machine
0/lxd/3  started  10.210.121.239   juju-42d5f2-0-lxd-3    ubuntu@22.04      Container started
ubuntu@juju-controller:~$
```

Deploy OpenStack Service

Deploy Keystone

We will deploy `keystone` to LXD on machine `0`

```
ubuntu@juju-controller:~$ juju deploy -n 1 --to lxd:0 --channel 2024.1/stable --config openstack-lab.yaml ch:keystone os-keystone --constraints
spaces=external,internal --bind "external cluster=internal ha=internal shared-db=internal"
Deployed "os-keystone" from charm-hub charm "keystone", revision 726 in channel 2024.1/stable on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju deploy --channel 8.0/stable mysql-router os-keystone-mysql-router --bind "external shared-db=internal db-router=internal"
Deployed "os-keystone-mysql-router" from charm-hub charm "mysql-router", revision 201 in channel latest/edge on ubuntu@22.04/stable
ubuntu@juju-controller:~$ juju relate os-keystone-mysql-router:db-router os-mysql-innodb-clusters:db-router
ubuntu@juju-controller:~$ juju relate os-keystone-mysql-router:shared-db os-keystone:shared-db
```

```
ubuntu@juju-controller:~$ juju status os-keystone
Model          Controller       Cloud/Region  Version  SLA          Timestamp
openstack-lab  juju-controller  manual        3.6.8    unsupported  14:08:29+07:00

App                       Version  Status  Scale  Charm         Channel        Rev  Exposed  Message
os-keystone               24.0.0   active      1  keystone      2024.1/stable  726  no       Application Ready
os-keystone-mysql-router  8.0.42   active      1  mysql-router  8.0/stable     257  no       Unit is ready

Unit                         Workload  Agent  Machine  Public address  Ports     Message
os-keystone/1*               active    idle   0/lxd/5  10.210.121.237  5000/tcp  Unit is ready
  os-keystone-mysql-router/1*  active    idle            10.210.121.237            Unit is ready

Machine  State    Address         Inst id              Base          AZ  Message
0        started  10.210.121.100  manual:oscwm-con-01  ubuntu@22.04      Manually provisioned machine
0/lxd/5  started  10.210.121.237  juju-42d5f2-0-lxd-5  ubuntu@22.04      Container started
```

Deploy Glance

We will deploy `glance` to machine `0`

```
ubuntu@juju-controller:~$ juju deploy -n 1 --to lxd:0 --channel 2024.1/stable --config openstack-lab.yaml ch:glance os-glance --constraints
spaces=external,internal,storage --bind "external admin=internal amqp=internal ceph=storage cluster=internal ha=internal image-service=internal internal=internal
shared-db=internal"
Deployed "os-glance" from charm-hub charm "glance", revision 621 in channel 2024.1/stable on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju deploy --channel 8.0/stable mysql-router os-glance-mysql-router --bind "external shared-db=internal db-router=internal"
Deployed "os-glance-mysql-router" from charm-hub charm "mysql-router", revision 257 in channel 8.0/stable on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju relate os-glance-mysql-router:db-router os-mysql-innodb-clusters:db-router
ubuntu@juju-controller:~$ juju relate os-glance-mysql-router:shared-db os-glance:shared-db
ubuntu@juju-controller:~$ juju relate os-glance:identity-service os-keystone:identity-service
ubuntu@juju-controller:~$ juju relate os-ceph-mon:client os-glance:ceph
```

```
ubuntu@juju-controller:~$ juju status os-glance
Model          Controller       Cloud/Region  Version  SLA          Timestamp
openstack-lab  juju-controller  manual        3.6.8    unsupported  14:07:13+07:00

App                    Version  Status  Scale  Charm         Channel        Rev  Exposed  Message
os-glance              27.0.0   active      1  glance        2024.1/stable  621  no       Unit is ready
os-glance-mysql-router  8.0.42   active      1  mysql-router  8.0/stable     257  no       Unit is ready

Unit                      Workload  Agent  Machine  Public address  Ports     Message
os-glance/0*              active    idle   0/lxd/6  10.210.121.236  9292/tcp  Unit is ready
  os-glance-mysql-router/0*  active    idle            10.210.121.236            Unit is ready

Machine  State    Address         Inst id              Base          AZ  Message
0        started  10.210.121.100  manual:oscwm-con-01  ubuntu@22.04      Manually provisioned machine
0/lxd/6  started  10.210.121.236  juju-42d5f2-0-lxd-6  ubuntu@22.04      Container started
```

Deploy Neutron

We will deploy `neutron-api` to LXD `0` , `neutron-gateway` to machine `0` , `neutron-openvswitch` to machine `1` , `2`

auto

```
ubuntu@juju-controller:~$ juju deploy -n 1 --to lxd:0 --channel 2024.1/stable --config openstack-lab.yaml neutron-api os-neutron-api --constraints
spaces=external,internal --bind "external admin=internal amqp=internal cluster=internal ha=internal internal=internal neutron-api=internal neutron-load-
balancer=internal neutron-plugin-api=internal neutron-plugin-api-subordinate=internal public=external shared-db=internal"
Deployed "os-neutron-api" from charm-hub charm "neutron-api", revision 603 in channel 2024.1/stable on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju deploy -n 1 --to 0 --channel 2024.1/stable --config openstack-lab.yaml neutron-gateway os-neutron-gateway --bind "external
amqp=internal amqp-nova=internal cluster=internal data=overlay ha=internal neutron-plugin-api=internal"
Deployed "os-neutron-gateway" from charm-hub charm "neutron-gateway", revision 539 in channel 2024.1/stable on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju deploy --channel 2024.1/stable --config openstack-lab.yaml neutron-openvswitch os-neutron-openvswitch --bind "external
amqp=internal data=overlay neutron-control=internal neutron-plugin=internal neutron-plugin-api=internal"
Deployed "os-neutron-openvswitch" from charm-hub charm "neutron-openvswitch", revision 578 in channel 2024.1/stable on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju deploy --channel 8.0/stable mysql-router os-neutron-api-mysql-router --bind "external shared-db=internal db-router=internal"
Deployed "os-neutron-api-mysql-router" from charm-hub charm "mysql-router", revision 257 in channel 8.0/stable on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju relate os-neutron-gateway:amqp os-rabbitmq-server:amqp
ubuntu@juju-controller:~$ juju relate os-neutron-api os-neutron-openvswitch
ubuntu@juju-controller:~$ juju relate os-neutron-openvswitch os-rabbitmq-server
ubuntu@juju-controller:~$ juju relate os-keystone:identity-service os-neutron-api:identity-service
ubuntu@juju-controller:~$ juju relate os-neutron-api-mysql-router:db-router os-mysql-innodb-clusters:db-router
ubuntu@juju-controller:~$ juju relate os-neutron-api-mysql-router:shared-db os-neutron-api:shared-db
ubuntu@juju-controller:~$ juju relate os-rabbitmq-server:amqp os-neutron-api:amqp
```

Deploy Nova

- Deploy Nova Cloud Controller

```
ubuntu@juju-controller:~$ juju deploy -n 1 --to lxd:0 --channel 2024.1/stable --config openstack-lab.yaml nova-cloud-controller os-nova-cloud-controller --
constraints spaces=external,internal --bind "external admin=internal amqp=internal amqp-cell=internal cinder-volume-service=internal cloud-compute=internal
cloud-controller=internal cluster=internal dashboard=internal ha=internal identity-service=internal image-service=internal internal=internal memcache=internal
neutron-api=internal nova-cell-api=internal placement=internal shared-db-cell=internal shared-db=internal"
Deployed "os-nova-cloud-controller" from charm-hub charm "nova-cloud-controller", revision 782 in channel 2024.1/stable on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju deploy --channel 8.0/stable mysql-router os-ncc-mysql-router --bind "external shared-db=internal db-router=internal"
Deployed "os-ncc-mysql-router" from charm-hub charm "mysql-router", revision 257 in channel 8.0/stable on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju relate os-ncc-mysql-router:db-router os-mysql-innodb-clusters:db-router
ubuntu@juju-controller:~$ juju relate os-ncc-mysql-router:shared-db os-nova-cloud-controller:shared-db
ubuntu@juju-controller:~$ juju relate os-nova-cloud-controller:identity-service os-keystone:identity-service
ubuntu@juju-controller:~$ juju relate os-nova-cloud-controller:amqp os-rabbitmq-server:amqp
ubuntu@juju-controller:~$ juju relate os-nova-cloud-controller:neutron-api os-neutron-api:neutron-api
ubuntu@juju-controller:~$ juju relate os-glance:image-service os-nova-cloud-controller:image-service
```

Deploy Nova

- Deploy Nova Compute

```
ubuntu@juju-controller:~$ juju deploy -n 2 --to 1,2 --channel 2024.1/stable --config openstack-lab.yaml nova-compute os-nova-compute --bind "external
amqp=internal ceph=storage ceph-access=storage cloud-compute=internal cloud-credentials=internal compute-peer=internal internal=internal ephemeral-
backend=internal image-service=internal neutron-plugin=internal secrets-storage=internal"
Deployed "os-nova-compute" from charm-hub charm "nova-compute", revision 771 in channel 2024.1/stable on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju relate os-nova-compute:image-service os-glance:image-service
ubuntu@juju-controller:~$ juju relate os-nova-compute:amqp os-rabbitmq-server:amqp
ubuntu@juju-controller:~$ juju relate os-ceph-mon:client os-nova-compute:ceph
ubuntu@juju-controller:~$ juju relate os-neutron-openvswitch os-nova-compute
ubuntu@juju-controller:~$ juju relate os-nova-cloud-controller:cloud-compute os-nova-compute:cloud-compute
```

Deploy Placement

We will deploy `placement` to LXD `0`

```
ubuntu@juju-controller:~$ juju deploy -n 1 --to lxd:0 --channel 2024.1/stable --config openstack-lab.yaml ch:placement os-placement --constraints
spaces=external,internal --bind "external admin=internal amqp=internal cluster=internal ha=internal identity-service=internal internal=internal
placement=internal shared-db=internal"
Deployed "os-placement" from charm-hub charm "placement", revision 102 in channel 2024.1/stable on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju deploy --channel 8.0/stable mysql-router os-placement-mysql-router --bind "external shared-db=internal db-router=internal"
Deployed "os-placement-mysql-router" from charm-hub charm "mysql-router", revision 257 in channel 8.0/stable on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju relate os-placement-mysql-router:db-router os-mysql-innodb-clusters:db-router
ubuntu@juju-controller:~$ juju relate os-placement-mysql-router:shared-db os-placement:shared-db
ubuntu@juju-controller:~$ juju relate os-placement:identity-service os-keystone:identity-service
ubuntu@juju-controller:~$ juju relate os-placement os-rabbitmq-server
ubuntu@juju-controller:~$ juju relate os-placement:placement os-nova-cloud-controller:placement
```

Deploy Cinder

```
ubuntu@oscwm-con-01:~$ ubuntu@juju-controller:~$ juju deploy -n 1 --to lxd:0 --channel 2024.1/stable --config openstack-lab.yaml ch:cinder os-cinder --
constraints spaces=external,internal --bind "external admin=internal amqp=internal backup-backend=internal ceph=storage cinder-volume-service=internal
cluster=internal ha=internal identity-service=internal internal=internal shared-db=internal storage-backend=storage"
Deployed "os-cinder" from charm-hub charm "cinder", revision 690 in channel 2024.1/stable on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju deploy --channel 8.0/stable mysql-router os-cinder-mysql-router --bind "external shared-db=internal db-router=internal"
Deployed "os-cinder-mysql-router" from charm-hub charm "mysql-router", revision 257 in channel 8.0/stable on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju relate os-cinder-mysql-router:db-router os-mysql-innodb-clusters:db-router
ubuntu@juju-controller:~$ juju relate os-cinder-mysql-router:shared-db os-cinder:shared-db
ubuntu@juju-controller:~$ juju relate os-cinder:cinder-volume-service os-nova-cloud-controller:cinder-volume-service
ubuntu@juju-controller:~$ juju relate os-cinder:identity-service os-keystone:identity-service
ubuntu@juju-controller:~$ juju relate os-cinder:amqp os-rabbitmq-server:amqp
ubuntu@juju-controller:~$ juju relate os-cinder:image-service os-glance:image-service
```

Deploy Cinder

```
ubuntu@juju-controller:~$ juju deploy --channel 2024.1/stable --config openstack-lab.yaml ch:cinder-ceph os-cinder-ceph
Deployed "os-cinder-ceph" from charm-hub charm "cinder-ceph", revision 533 in channel 2024.1/stable on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju relate os-cinder-ceph:storage-backend os-cinder:storage-backend
ubuntu@juju-controller:~$ juju relate os-cinder-ceph:ceph os-ceph-mon:client
ubuntu@juju-controller:~$ juju relate os-cinder-ceph:ceph-access os-nova-compute:ceph-access

ubuntu@juju-controller:~$ juju deploy cinder-backup --channel 2024.1/stable os-cinder-backup
Deployed "os-cinder-backup" from charm-hub charm "cinder-backup", revision 81 in channel 2024.1/stable on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju relate os-cinder-backup:backup-backend os-cinder:backup-backend
ubuntu@juju-controller:~$ juju relate os-cinder-backup:ceph os-ceph-mon:client
```

Deploy Horizon

```
ubuntu@juju-controller:~$ juju deploy -n 1 --to lxd:0 --channel 2024.1/stable --config openstack-lab.yaml openstack-dashboard os-openstack-dashboard --
constraints spaces=external,internal --bind "external application-dashboard=external cluster=internal dashboard=internal dashboard-plugin=internal identity-
service=internal shared-db=internal website=external"
Deployed "os-openstack-dashboard" from charm-hub charm "openstack-dashboard", revision 691 in channel 2024.1/stable on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju deploy --channel 8.0/stable mysql-router os-dashboard-mysql-router --bind "external shared-db=internal db-router=internal"
Deployed "os-dashboard-mysql-router" from charm-hub charm "mysql-router", revision 257 in channel 8.0/stable on ubuntu@22.04/stable

ubuntu@juju-controller:~$ juju relate os-dashboard-mysql-router:db-router os-mysql-innodb-clusters:db-router
ubuntu@juju-controller:~$ juju relate os-dashboard-mysql-router:shared-db os-openstack-dashboard:shared-db
ubuntu@juju-controller:~$ juju relate os-openstack-dashboard:identity-service os-keystone:identity-service
```

Post Deployment

```
openstack image create --public --disk-format qcow2 --container-format bare --file ~/images/cirros-0.6.2-x86_64-disk.img "Cirros 0.6.2"

openstack aggregate create --zone AZ_Private01_DC1 Private01_DC1
openstack compute service list --service nova-compute -c Host --noindent -f value | xargs -I{} openstack aggregate add host Private01_DC1 {}

openstack flavor create --ram 128 --disk 1 --vcpus 1 --public GP.1C128M
openstack flavor create --ram 1024 --disk 20 --vcpus 1 --public GP.1C1G

openstack network create --availability-zone-hint AZ_Private01_DC1 --share --enable --mtu 1500 --external --default --provider-network-type vlan --provider-physical-network
physnet1 --provider-segment 31 Subnet_Private01_DC1

openstack subnet create --dhcp --gateway 10.210.131.1 --network 10.210.131.0/24 --ip-version 4 --network Subnet_Private01_DC1 --allocation-pool
start=10.210.131.20,end=10.210.131.200 --dns-nameserver 8.8.8.8 --dns-nameserver 8.8.4.4 --dns-nameserver 1.1.1.1 --subnet-range 10.210.131.0/24 Subnet_Private01_DC1

openstack security group create admin-allow-all
openstack security group rule create --remote-ip 0.0.0.0/0 --protocol any admin-allow-all

openstack keypair create --public-key resource/publikkey.pub mine

openstack volume type create ceph-ssd --property volume_backend_name=ceph-ssd

openstack server create --security-group admin-allow-all --key-name mine --flavor GP.1C1G --image "Cirros 0.6.2" --network Subnet_Private01_DC1 --availability-zone
AZ_Private01_DC1 "cirros-test111"
```

THANK YOU

EasyStack open cloud computing

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NASHTAGROUP

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Yogyakarta, 19 July 2025