**OpenStack + Ceph Cluster Deployment with Kolla-Ansible & Terraform**

**Infrastructure Summary**

| **Attribute** | **Configuration** |
| --- | --- |
| Nodes | 3 VM nodes (Controller1, Controller2, Controller3) |
| RAM | 16 GB per node |
| CPU | 4 vCPUs per node |
| Storage per node | 1x NVMe + 3x SATA drives |
| Network Interfaces | 2 bridge networks + 4 host-only networks |
| Virtualization Platform | VMware-based (inferred from MACs) |
| Operating System | (Assumed) Ubuntu or CentOS (please clarify if needed) |

**Storage Layer — Ceph Deployment**

**Ansible-Driven Ceph Deployment Flow**

Project directory: ceph-cluster-deploy/

**Ceph roles executed in order**:

1. common – installs dependencies
2. addhosts – sets up /etc/hosts
3. docker – deploys container runtime
4. cephadm – installs Ceph CLI & agent
5. bootstrap – initializes the monitor & manager
6. mgrs – configures additional mgr daemons
7. osds – prepares and adds OSDs
8. dashboards – enables the Ceph dashboard
9. monitoring – sets up Prometheus, etc.
10. ceph\_post – health check, pool tuning
11. finalize – wraps config export, clean-up

Ceph Dashboard Access:  
https://<controller-ip>:8443 (password configured in dashboards role)

**Control Plane — OpenStack Deployment with Kolla-Ansible**

**OpenStack Deployment Directory: openstack-deploy/**

**🧰 Project Layout**

openstack-deploy/

├── ansible.cfg

├── group\_vars/

│ └── all.yml

├── inventory/

│ └── multinode

├── playbooks/

│ └── site.yml

├── roles/

│ ├── install\_deps

│ ├── create\_venv

│ ├── install\_kolla

│ ├── prepare\_configs

│ ├── bootstrap\_kolla

│ ├── run\_prechecks

│ ├── deploy\_openstack

│ └── post\_deploy

└── requirements.yml

**Deployment Steps**

1. **Install Dependencies**  
   ansible-playbook playbooks/site.yml --tags install\_deps
2. **Create Virtual Environment (optional)**  
   ansible-playbook playbooks/site.yml --tags create\_venv
3. **Install Kolla-Ansible**  
   ansible-playbook playbooks/site.yml --tags install\_kolla
4. **Prepare Configurations (globals.yml)**  
   ansible-playbook playbooks/site.yml --tags prepare\_configs
5. **Bootstrap Environment**  
   ansible-playbook playbooks/site.yml --tags bootstrap\_kolla
6. **Run Prechecks**  
   ansible-playbook playbooks/site.yml --tags run\_prechecks
7. **Deploy OpenStack Services**  
   ansible-playbook playbooks/site.yml --tags deploy\_openstack
8. **Post-Deployment Setup**  
   ansible-playbook playbooks/site.yml --tags post\_deploy

Admin CLI:

source /etc/kolla/admin-openrc.sh

openstack service list

Horizon UI:  
http://<controller-vip>  
Login as admin, password from /etc/kolla/passwords.yml

**Automation — VM Deployment with Terraform**

**Terraform Structure**

terraform-openstack/

├── main.tf # Defines VM, keypair, network, floating IP

├── variables.tf # Parameter definitions

├── terraform.tfvars # Actual input values

└── README.md # Usage instructions

**Flow**

* Creates VM using openstack\_compute\_instance\_v2
* Binds to private network via UUID
* Allocates and associates floating IP from public pool
* Attaches SSH keypair from local public key
* Outputs floating IP for direct access

To run:

terraform init

terraform apply