Deployment Service (TripleO)

The `Deployment` service installs, upgrades, and operates OpenStack clouds by using the Director node, which is an OpenStack cloud.

Orchestration Service (Heat)

The `Orchestration` service can provision both infrastructure and application workloads, by using resources that are defined in Heat orchestration Template (HOT) files. HOT template and environment files are the primary configuration method for deploying overclouds. In later Red Hat OpenStack Platform versions, the `Orchestration` template and environment files define the services, resources, and architecture to deploy, while Ansible Playbooks implement the software provisioning.

Container Deployment Service (Kolla)

In later RHOSP versions, the OpenStack services are containerized. The `Container Deployment` service provides production-ready containers and configuration management for operation of OpenStack services.

Bare Metal Service (Ironic)

The `Bare Metal` provisioning service prepares and provisions both physical hardware and KVM virtual machines. The service works with standard and vendor-specific drivers, such as PXE and IPMI, to communicate with a wide range of hardware.

Selecting a Ceph Integration Architecture

A storage operator, who works closely with infrastructure architects and network engineers, chooses the Ceph integration architecture and server node roles that are needed to support the organization's application use cases and sizing forecasts. Ceph can be integrated into an OpenStack infrastructure by using either of two implementation designs. Both Ceph designs are implemented by `TripleO`, which uses Ansible Playbooks for the bulk of the software deployment and configuration.

> **Note**
>
> RHOSP 16.1 and 16.2 support RHCS 5 only as an external cluster. RHOSP 17 supports dedicated RHCS 5 deployment with `cephadm` to replace `ceph-ansible`.

Dedicated

An organization without an existing, stand-alone Ceph cluster installs a dedicated Ceph cluster that is composed of Ceph services and storage nodes during an RHOSP overcloud installation. Only services and workloads that are deployed for, or on, an OpenStack overcloud can use an OpenStack-dedicated Ceph implementation. External applications cannot access or use OpenStack-dedicated Ceph cluster storage.

External

An organization can use an existing, stand-alone Ceph cluster for storage when creating a new OpenStack overcloud. The `TripleO` deployment is configured to access that external cluster to create the necessary pools, accounts, and other resources during overcloud installation. Instead of creating internal Ceph services, the deployment configures the OpenStack overcloud to access the existing Ceph cluster as a Ceph client.

A dedicated Ceph cluster supports a maximum of 750 OSDs when running the Ceph control plane services on the RHOSP controllers. An external Ceph cluster can scale significantly larger, depending on the hardware configuration. Updates and general maintenance are easier on an external cluster because they can occur independently of RHOSP operations.