Zero to Cloud-Native with IBM Cloud

Part 4: OpenShift Provisioning and Configuration

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Introduction

In this tutorial, we will use IBM Cloud's Managed OpenShift service to run our cloud-native application. We will be creating a multizone cluster in this tutorial. If you prefer a single zone cluster then the same tutorial will work.

Why do we need a multizone cluster? In a multizone cluster, the worker nodes in your worker pools are replicated across multiple zones within one region. Multizone clusters are designed to evenly schedule pods across worker nodes and zones to assure availability and failure recovery. If worker nodes are not spread evenly across the zones or capacity is insufficient in one of the zones, the Kubernetes scheduler or OpenShift controller might fail to schedule all requested pods.

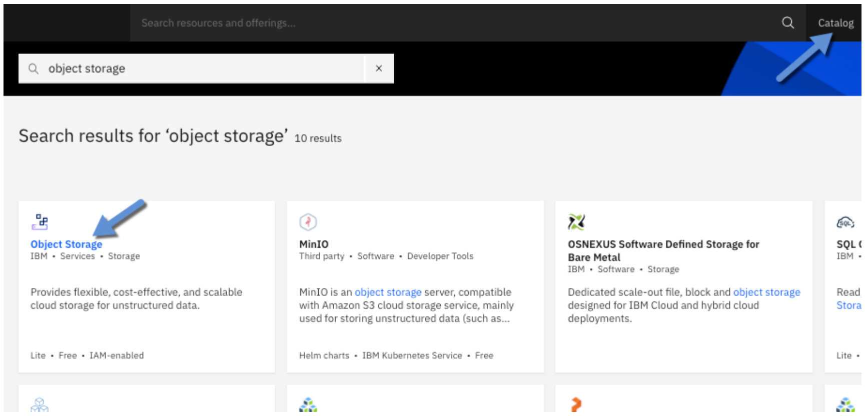
For a tutorial, from an availability perspective, a multizone cluster is not really needed. I've decided to use a multizone cluster of this tutorial to show the value and ease of using a multizone cluster that you would typically see in a production environment.

Preparing for Your Cluster

Before provisioning your cluster, you need to consider which network infrastructure you want to use from a Virtual Private Cloud to Classic Infrastructure. As we went through in Part 2 – we will be deploying our cluster in the Virtual Private Cloud we already created to give our application an additional layer of security from a networking perspective.

Cloud Object Storage

For a cluster provisioned on a virtual private cloud, the internal image registry is backed by IBM Cloud Object Storage. If you don't already have a Cloud Object Storage instance that would like to use, you will need to create one. To do so, click on the IBM Cloud Catalog, search for Object Storage and click the IBM Cloud Object Storage tile.



object storage

Search results for 'object storage' 10 results

Object Storage
IBM • Services • Storage
Provides flexible, cost-effective, and scalable cloud storage for unstructured data.
Lite • Free • IAM-enabled

MinIO
Third party • Software • Developer Tools
MinIO is an object storage server, compatible with Amazon S3 cloud storage service, mainly used for storing unstructured data (such as...
Helm charts • IBM Kubernetes Service • Free

OSNEXUS Software Defined Storage for Bare Metal
IBM • Software • Storage
Dedicated scale-out file, block and object storage designed for IBM Cloud and hybrid cloud deployments.

SQL (
IBM •
Read
Stora
Lite •

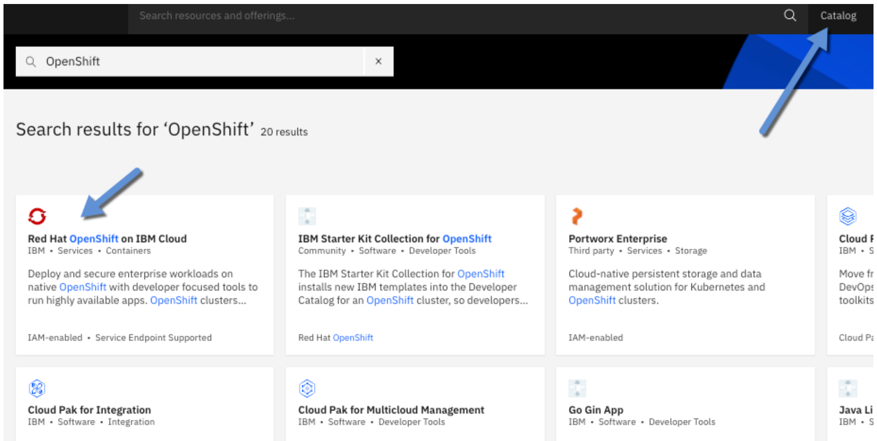
As we have done with all the other IBM Cloud services we have created, you will need to give the Cloud Object Storage instance a name and specify the resource group it will be in.

For this tutorial I will use the following settings:
Plan: Standard
Service Name: Cloud Object Storage-zero-to-cloud-native
Resource Group: zero-to-cloud-native

After entering your settings for Cloud Object Storage, click Create.

RedHat OpenShift on IBM Cloud

To provision an OpenShift cluster, click on the IBM Cloud Catalog, search for OpenShift and then click on the Red Hat OpenShift on IBM Cloud tile.



OpenShift

Search results for 'OpenShift' 20 results

Red Hat OpenShift on IBM Cloud
IBM • Services • Containers
Deploy and secure enterprise workloads on native OpenShift with developer focused tools to run highly available apps. OpenShift clusters...
IAM-enabled • Service Endpoint Supported

IBM Starter Kit Collection for OpenShift
Community • Software • Developer Tools
The IBM Starter Kit Collection for OpenShift installs new IBM templates into the Developer Catalog for an OpenShift cluster, so developers...
Red Hat OpenShift

Portworx Enterprise
Third party • Services • Storage
Cloud-native persistent storage and data management solution for Kubernetes and OpenShift clusters.
IAM-enabled

Cloud F
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Move fr
DevOps
toolkits
Cloud Pa

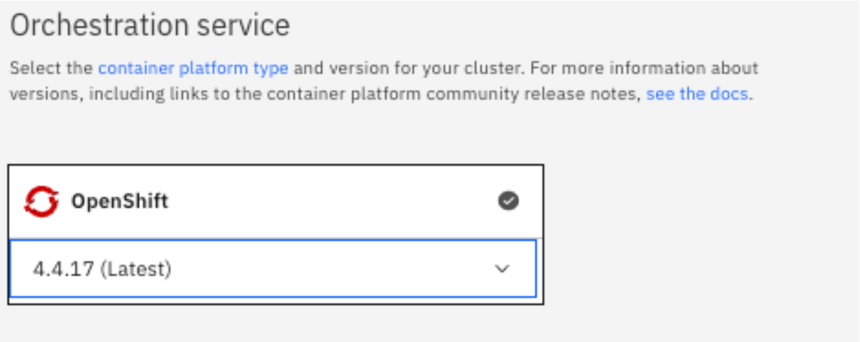
Cloud Pak for Integration
IBM • Software • Integration

Cloud Pak for Multicloud Management
IBM • Software • Developer Tools

Go Gin App
IBM • Software • Developer Tools

Java Li
IBM • S

The first thing we need to do is to specify a version for our OpenShift Cluster. I'm going to select the latest support version in IBM Cloud which is version 4.4.

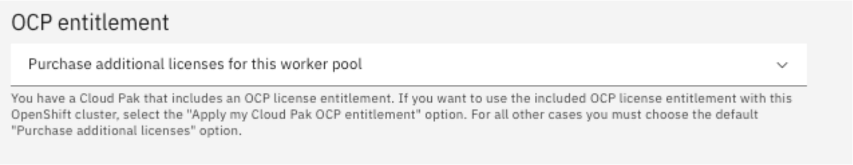

Orchestration service

Select the container platform type and version for your cluster. For more information about versions, including links to the container platform community release notes, see the docs.

OpenShift

4.4.17 (Latest)

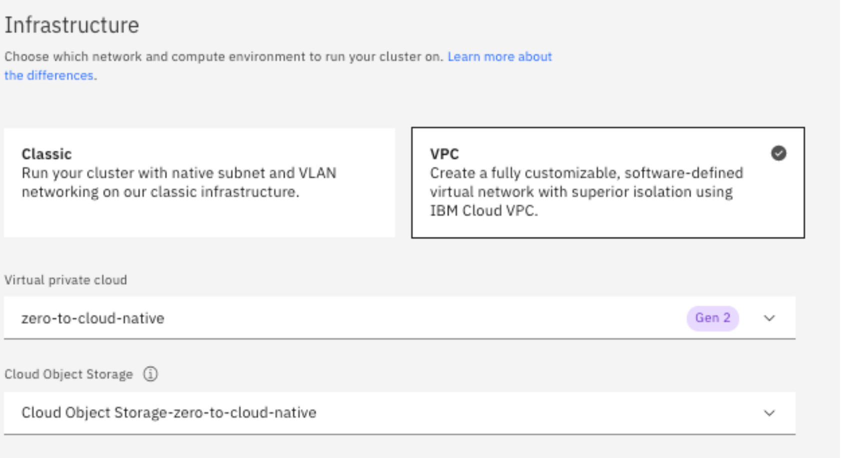
Next, I need to provide an OCP entitlement for the OCP license. If I had bought a CloudPak from IBM, I could apply that OCP license to this cluster. As CloudPaks are out of scope for this tutorial, I will leave the default value Purchase additional licenses for this worker pool.


OCP entitlement

Purchase additional licenses for this worker pool

You have a Cloud Pak that includes an OCP license entitlement. If you want to use the included OCP license entitlement with this OpenShift cluster, select the "Apply my Cloud Pak OCP entitlement" option. For all other cases you must choose the default "Purchase additional licenses" option.

I then need to specify the infrastructure to use with our cluster. As we have been through, we will be deploying our cluster on a virtual private cloud that we already created. I will select the zero-to-cloud-native VPC I created in part 3 of this tutorial and will also select the instance of Cloud Object Storage for the internal registry of my cluster. The service will automatically create a bucket for your cluster's internal registry using the Cloud Object Storage instance you select.


Infrastructure

Choose which network and compute environment to run your cluster on. Learn more about the differences.

Classic
Run your cluster with native subnet and VLAN networking on our classic infrastructure.

VPC
Create a fully customizable, software-defined virtual network with superior isolation using IBM Cloud VPC.

Virtual private cloud

zero-to-cloud-native Gen 2

Cloud Object Storage

Cloud Object Storage-zero-to-cloud-native

Next, we specify the location where we want to deploy our cluster to. For the resource group name, I will select the resource group we have been using zero-to-cloud-native. For the datacenters, I will keep all three data centers that I created in my VPC selected. Distributing your work load across three zones ensures high availability for your app in case one or two zones are not available. By having your worker nodes spread evenly across all three availability zones gives you an industry leading 99.99% SLA for your OpenShift Cluster.

Next, I setup my default worker pool. A worker pool is a grouping of worker nodes that are all the same flavor or t-shirt size for workers in that pool. Worker nodes pools allow us to do things like autoscaling. When the deployed worker nodes reach capacity and we can't schedule any more workload to the nodes additional worker nodes of the same flavor can be added automatically with autoscaling. This is fully customizable with minimum and maximums.

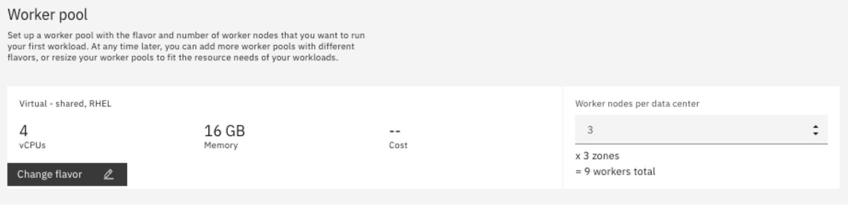
By default we deploy with 4 x 16 worker nodes which is 4 virtual cpus and 16 gigs of memory. For this tutorial that will be more than enough. I'm going to keep the worker node count as 3 per zone. This tutorial only requires 1 worker node, but in future tutorials I will show resiliency features of IBM Cloud Managed OpenShift by having multiple workers in multiple zones.

There are three choices of compute within our managed OpenShift service. The first is called shared compute. Shared compute has a single tenant virtual machine and a multi-tenant hypervisor and hardware underneath it. This is your typical 'cloud' virtual machine.

Then, we have dedicated compute. This means you have a single tenant virtual machine, hypervisor and hardware. In this case, you are the only tenant running on a physical server running in IBM Cloud. You may have multiple virtual machines running on that server but you don't have to worry about your competitor or noisy neighbors because you own that full box.

The last option is bare metal. So if you need to guarantee a certain amount of resources perhaps you need GPUs, compute isolation, or eliminating the hypervisor you can get a bare metal server as part of IBM's managed service for OpenShift.

For this tutorial, I'm going to go with Shared Virtual.



Worker pool

Set up a worker pool with the flavor and number of worker nodes that you want to run your first workload. At any time later, you can add more worker pools with different flavors, or resize your worker pools to fit the resource needs of your workloads.

Virtual - shared, RHEL

4 vCPUs

16 GB Memory

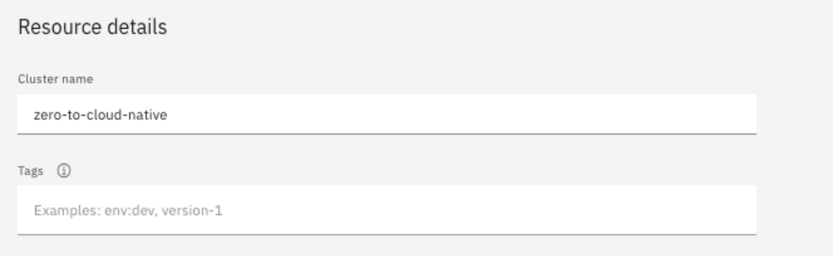
-- Cost

Worker nodes per data center: 3

x 3 zones

= 9 workers total

Finally, I need to give my cluster a name. I'm going to name my cluster zero-to-cloud-native and then click Create.



Resource details

Cluster name: zero-to-cloud-native

Tags: Examples: env:dev, version-1

This will start provisioning your cluster and you can start using it in about 15 minutes. Next up, we will setup the development environment in part 5.