IBM Cloud Kubernetes Service overview

Unit objectives

- Create a Kubernetes cluster by using the IBM Cloud Kubernetes Service.
- Create containers and build on the IBM Cloud Container Registry.
- Work with helm charts.
- Deploy an application to IBM Kubernetes Service.

IBM Cloud Kubernetes Service

Topics

- IBM Cloud Kubernetes Service
- Deploying an application
- Summary and further reading

IBM Cloud Kubernetes Service

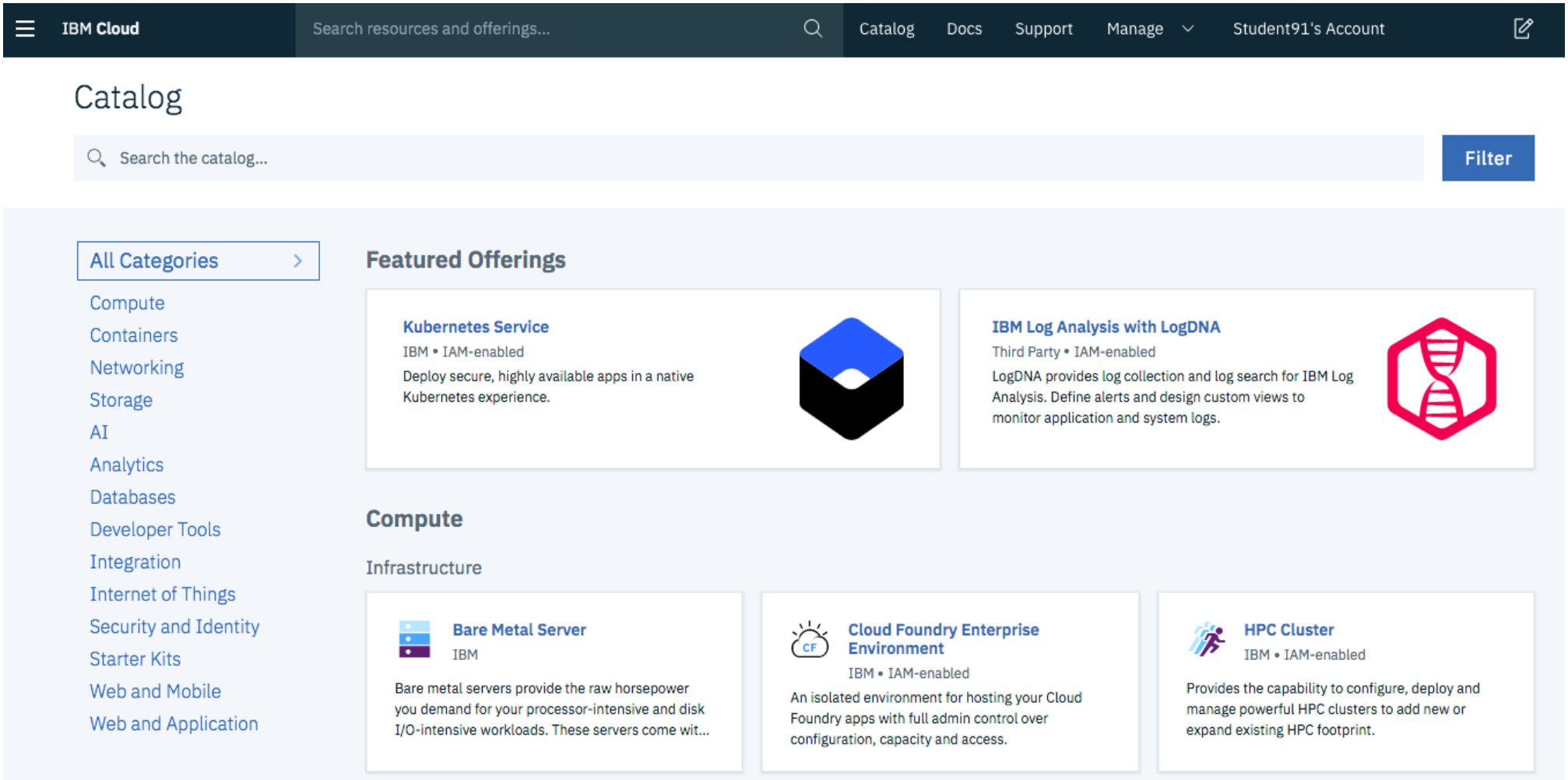
A certified, managed Kubernetes service that provides an intuitive user experience with on-going cluster management. It has built-in security and isolation to enable rapid delivery of apps while using IBM Cloud Services.

Features:

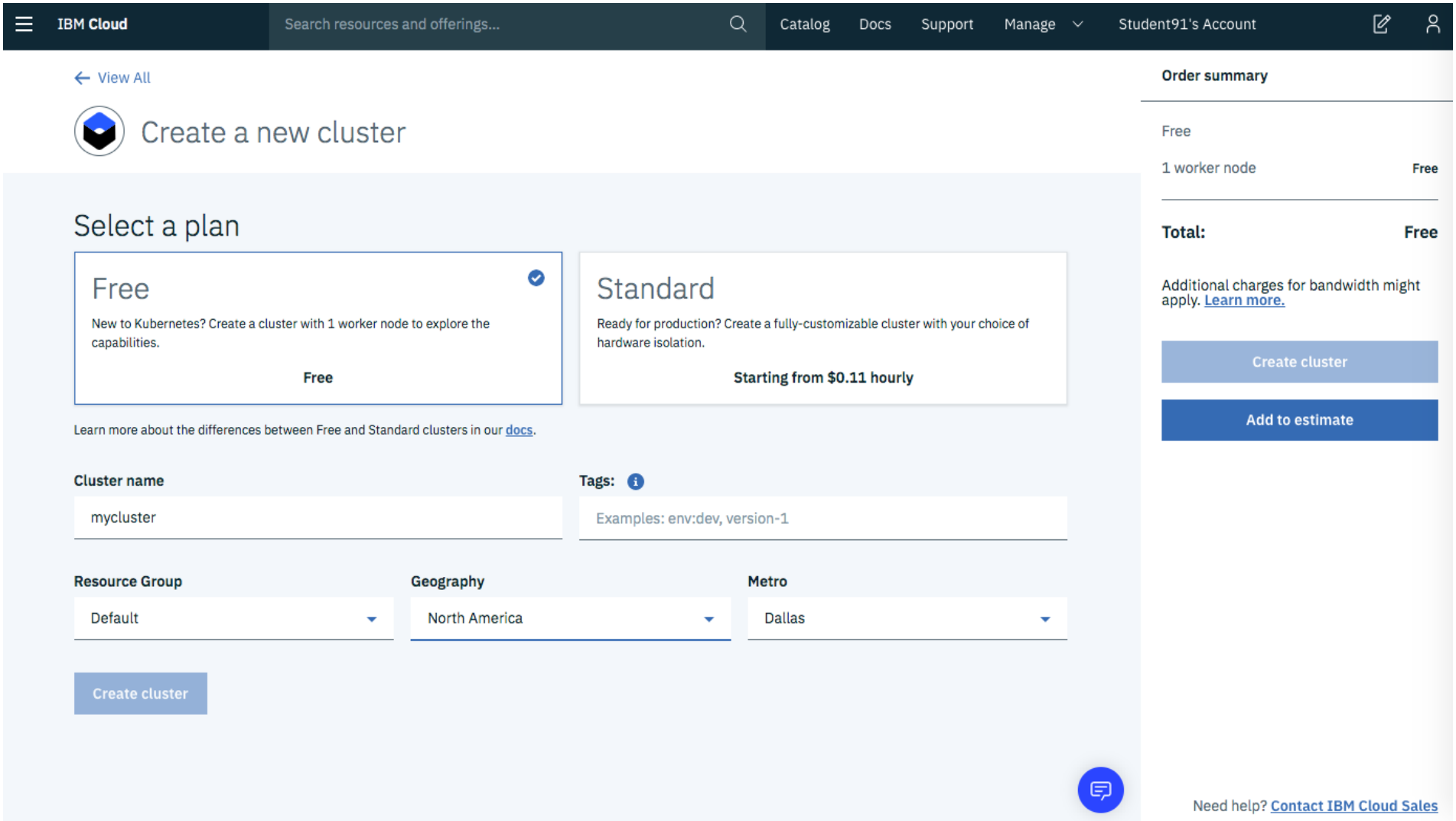
- Secure.
- Automated lifecycle management.
- Fully integrated with IBM Cloud and third-party services.
- Fully integrated with cognitive solutions with various Watson APIs.
- Different worker node types.
- Supports community-certified Kubernetes and Red Hat OpenShift (RHOS) Kubernetes.

IBM Cloud Kubernetes Service demonstration

Access the IBM Service catalog and select **Kubernetes Service**.

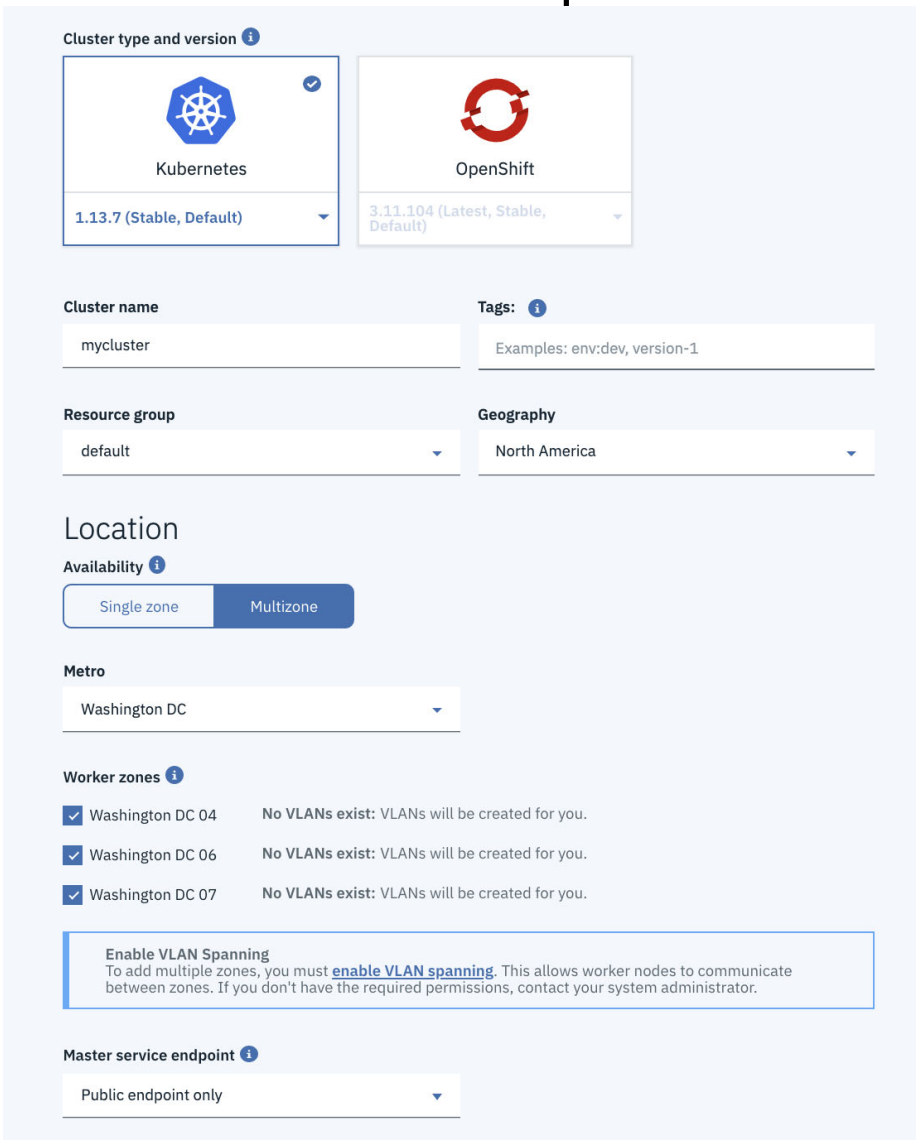


Creating a free cluster



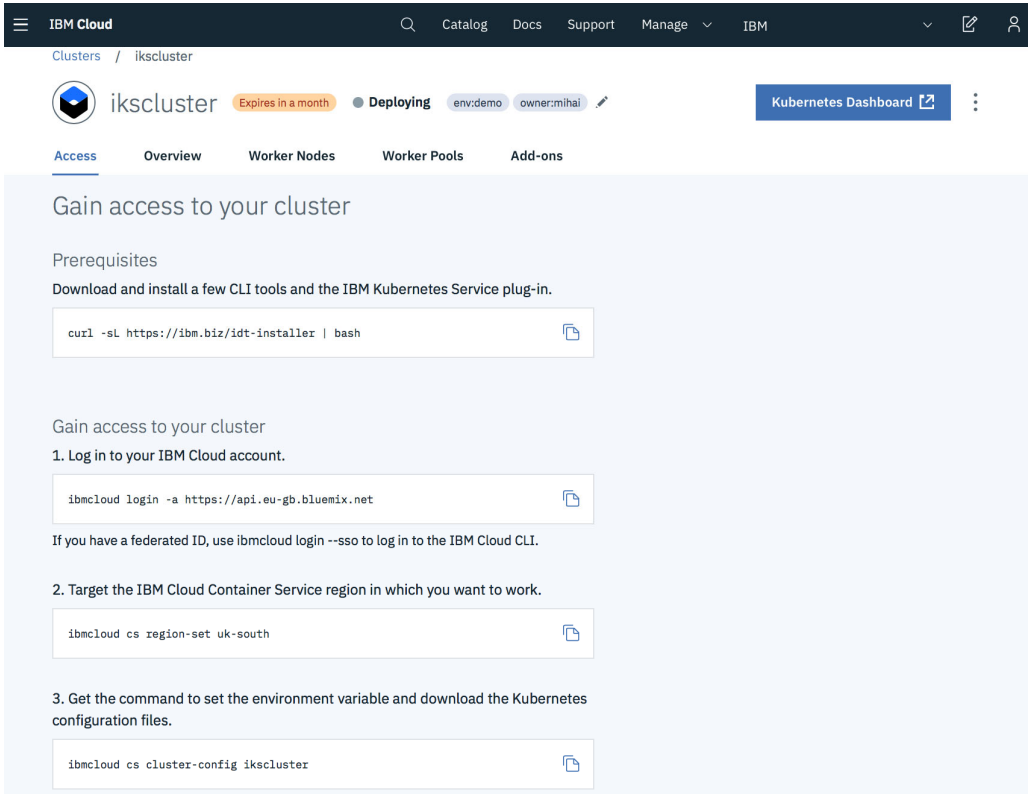
Instructor demonstration

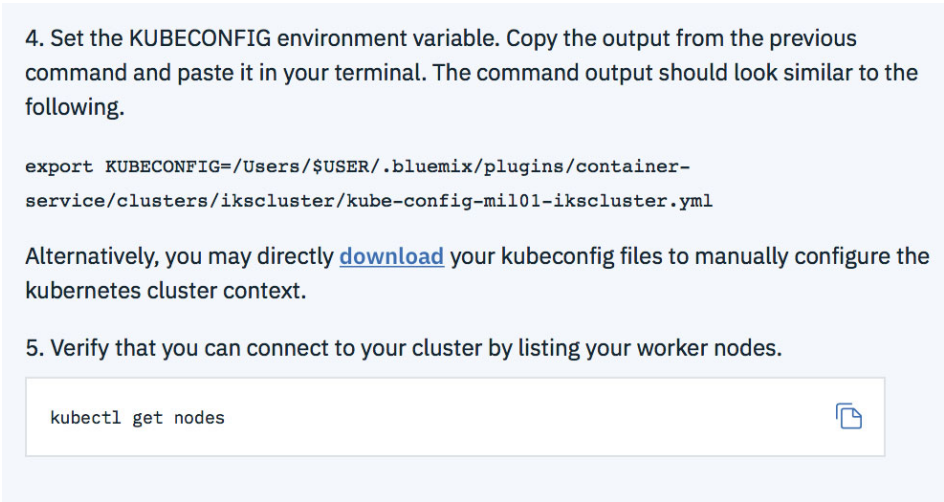
If you choose to use a standard cluster, you can select the Kubernetes version and *flavors* of compute resources.



Accessing your cluster

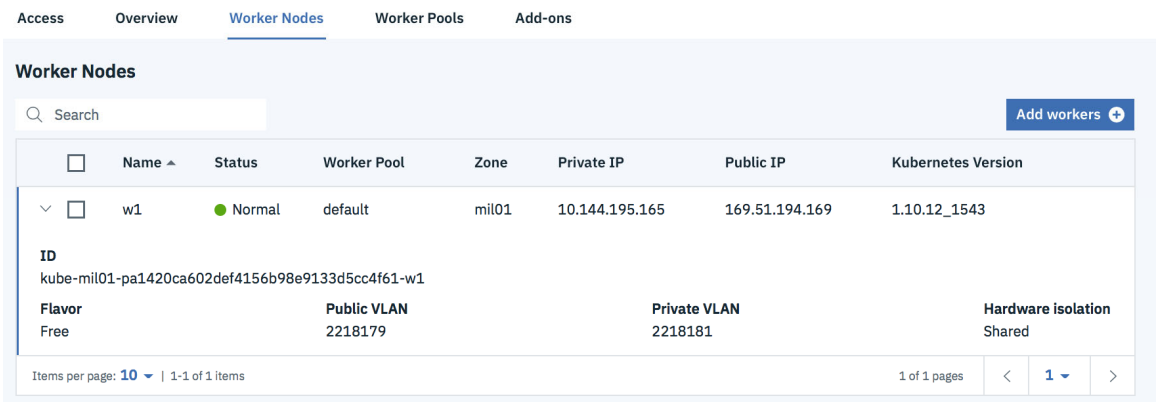
Wait for your cluster to provision, and then access it by using the `kubectl` command.

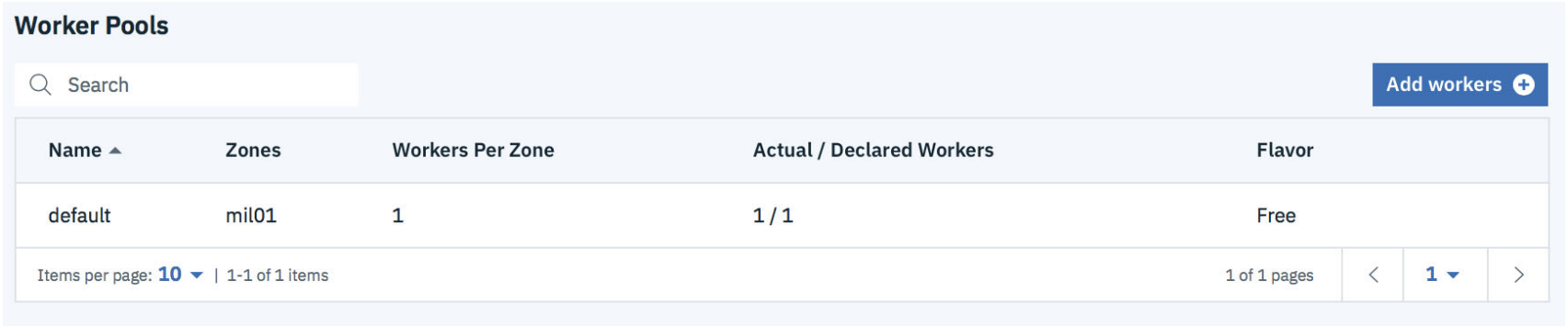




Scaling out

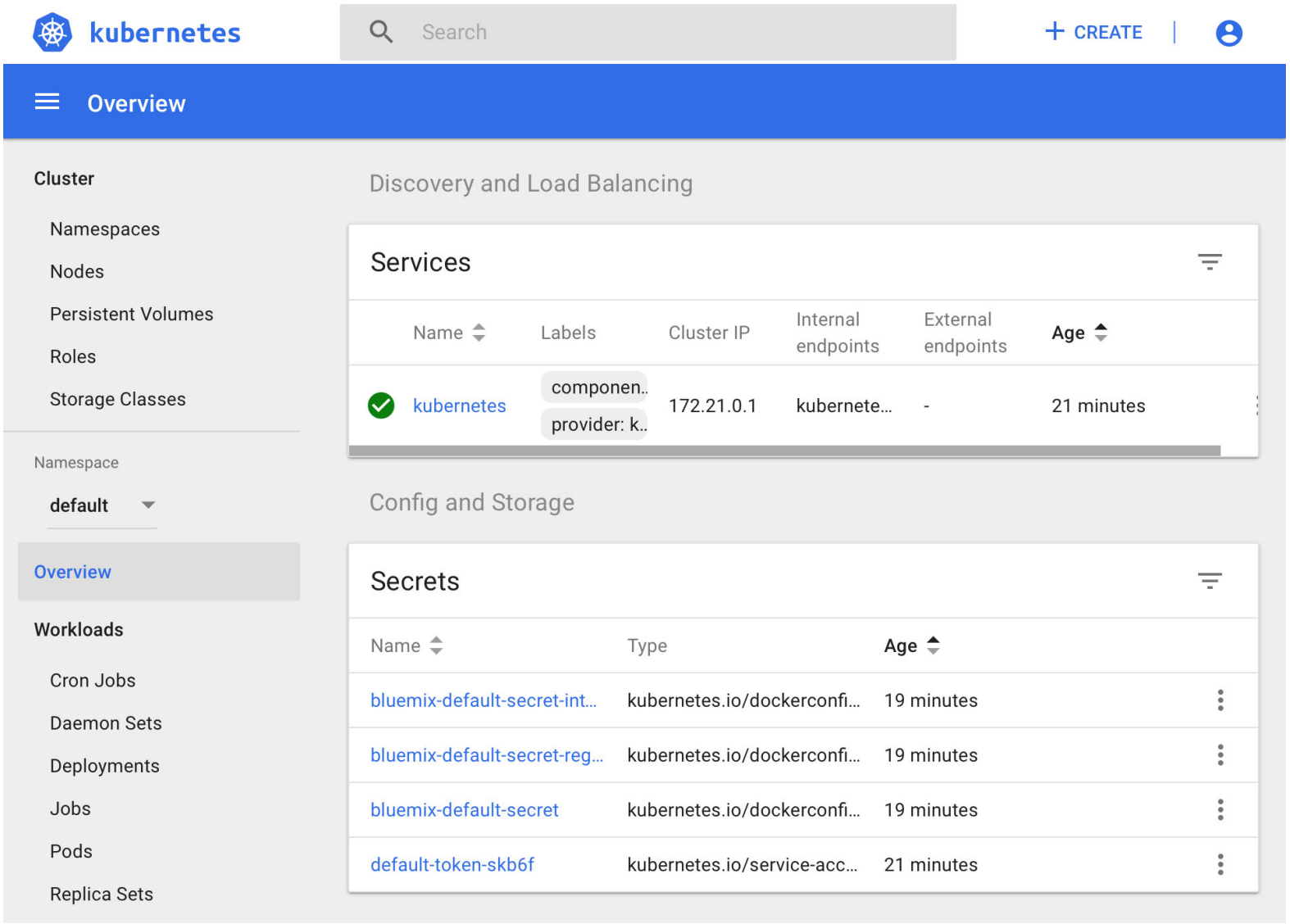
The cluster can scale out by adding more worker nodes.





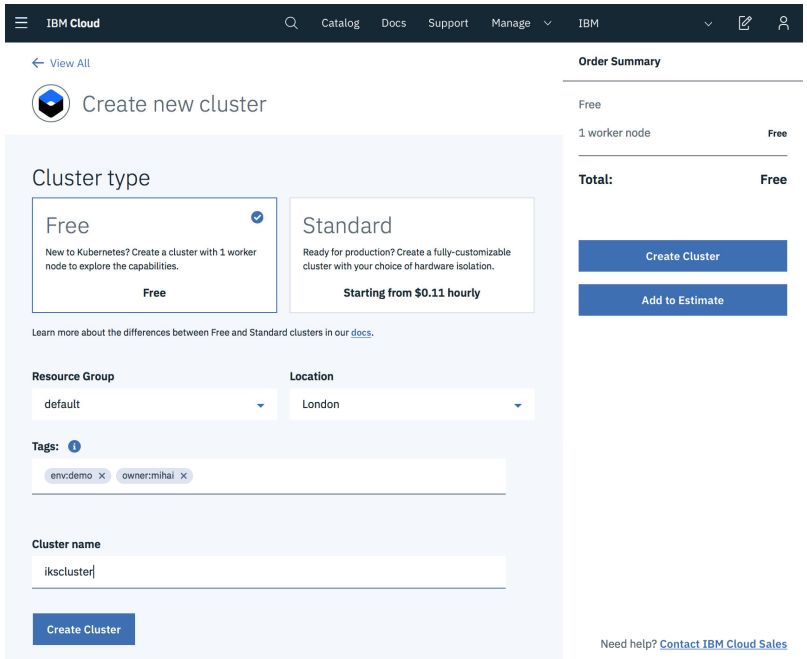
Kubernetes Dashboard

You can also access the Web UI (Dashboard).



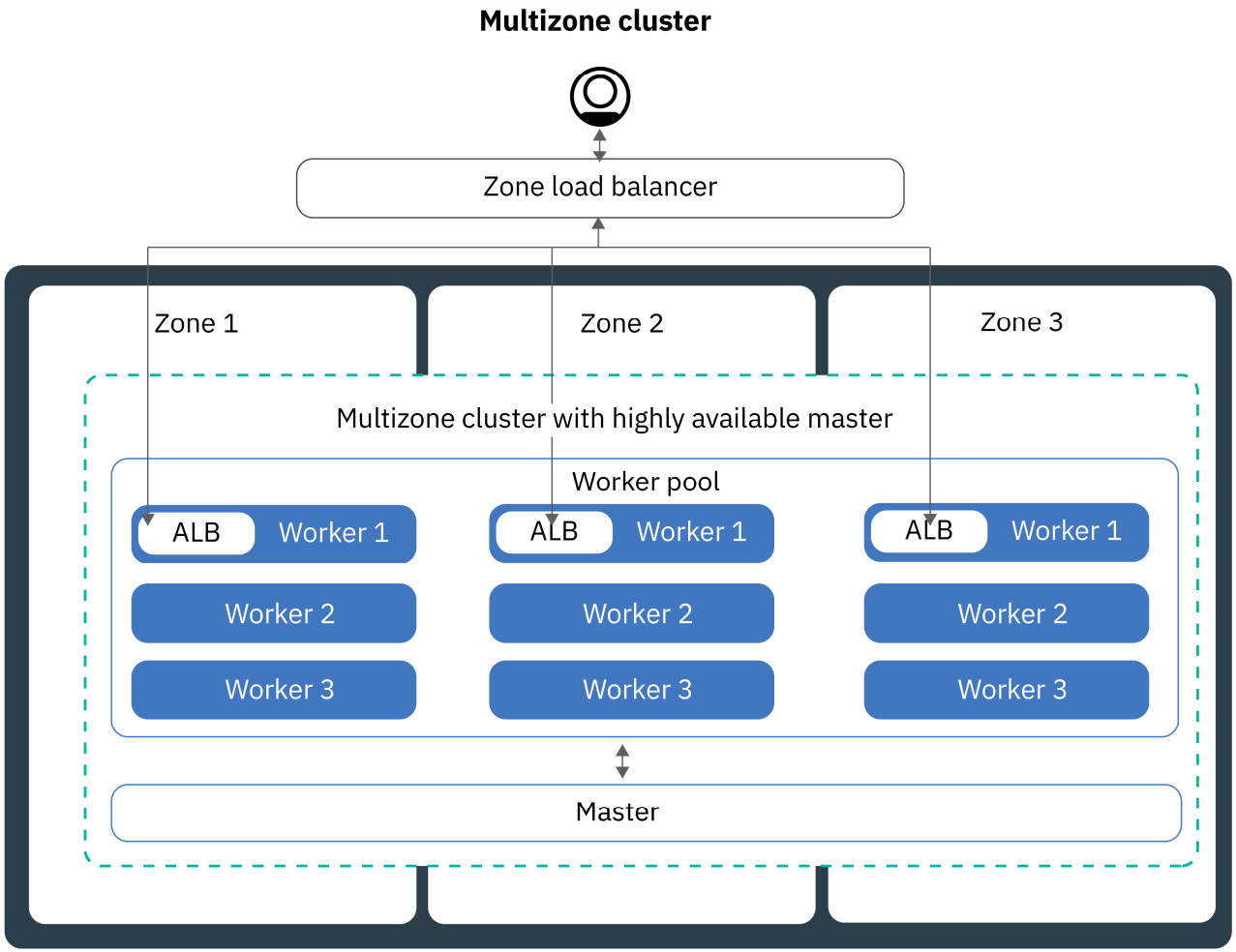
Exercise 5: Part 1

- For exercise 5, you must create a new Kubernetes cluster by clicking **Free Cluster** and then clicking **Create Cluster** on the IBM Cloud console.
  - It takes 30 minutes to provision the cluster.
- Perform Exercise 5, *Part 1. Creating an IBM Cloud Kubernetes Service cluster* **now**.
- Notify the instructor after you click **Create Cluster** to proceed.



Planning your cluster for high availability

IBM Cloud Kubernetes Service can also deploy across multiple availability zones.



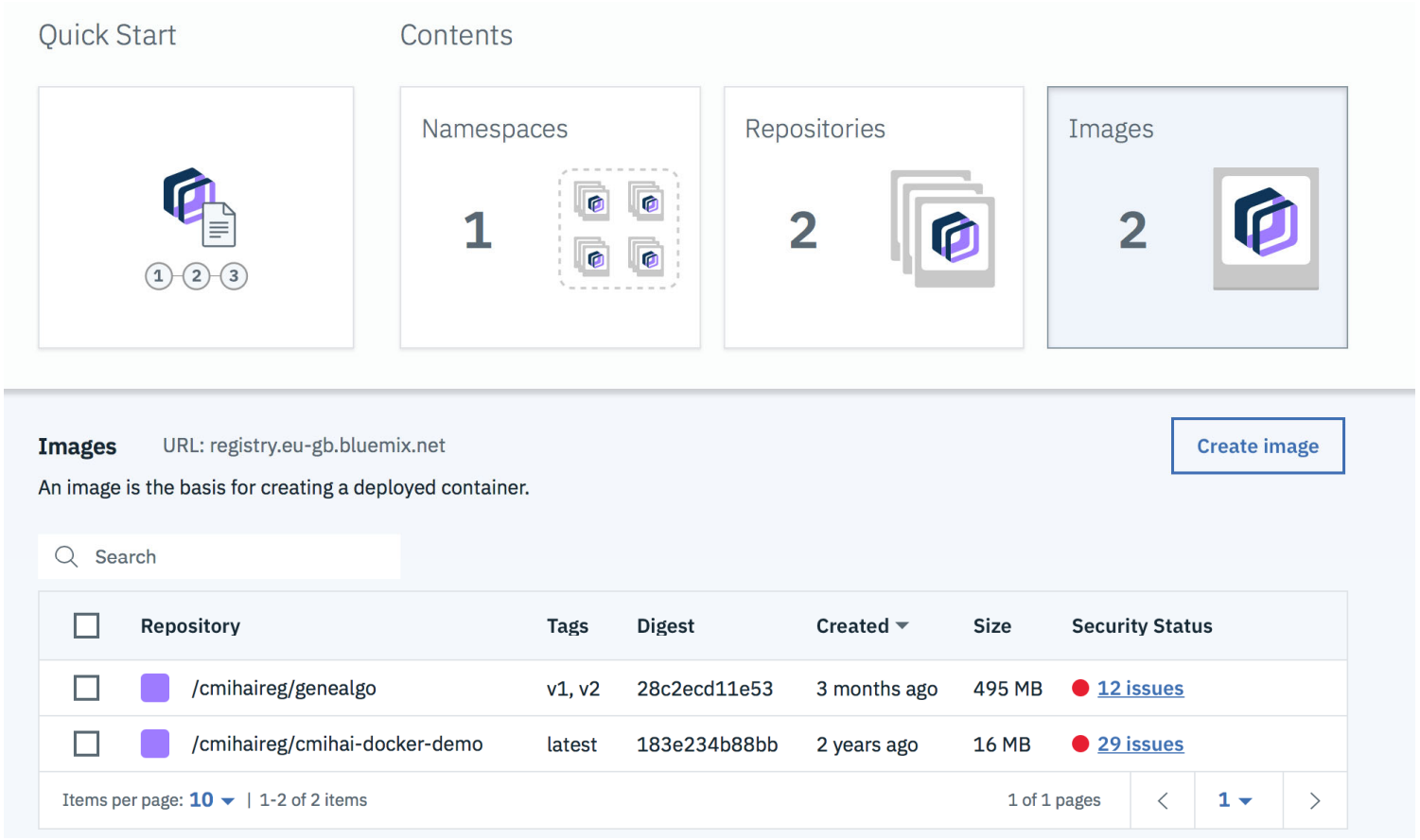
Accessing IBM Cloud Kubernetes Service by using kubectl

Access the Kubernetes cluster by using the **kubectl** command.

```
# 1. Log in to your IBM Cloud account:
ibmcloud login -a https://cloud.ibm.com

# 2. Target the IBM Cloud Kubernetes Service region:
ibmcloud ks region-set uk-south

# 3. Get the command to set the environment variables and download
the Kubernetes configuration files:
ibmcloud ks cluster-config ikscluster


# 4.  Set the KUBECONFIG environment variable:
export KUBECONFIG=/Users/cmihai/.bluemix/plugins/container-
service/clusters/ikscluster/kube-config-mil01-ikscluster.yml

# 5. Verify that you can connect to your cluster:
kubectl get nodes
kubectl get all
kubectl get pods --all-namespaces
```

IBM Cloud Container Registry

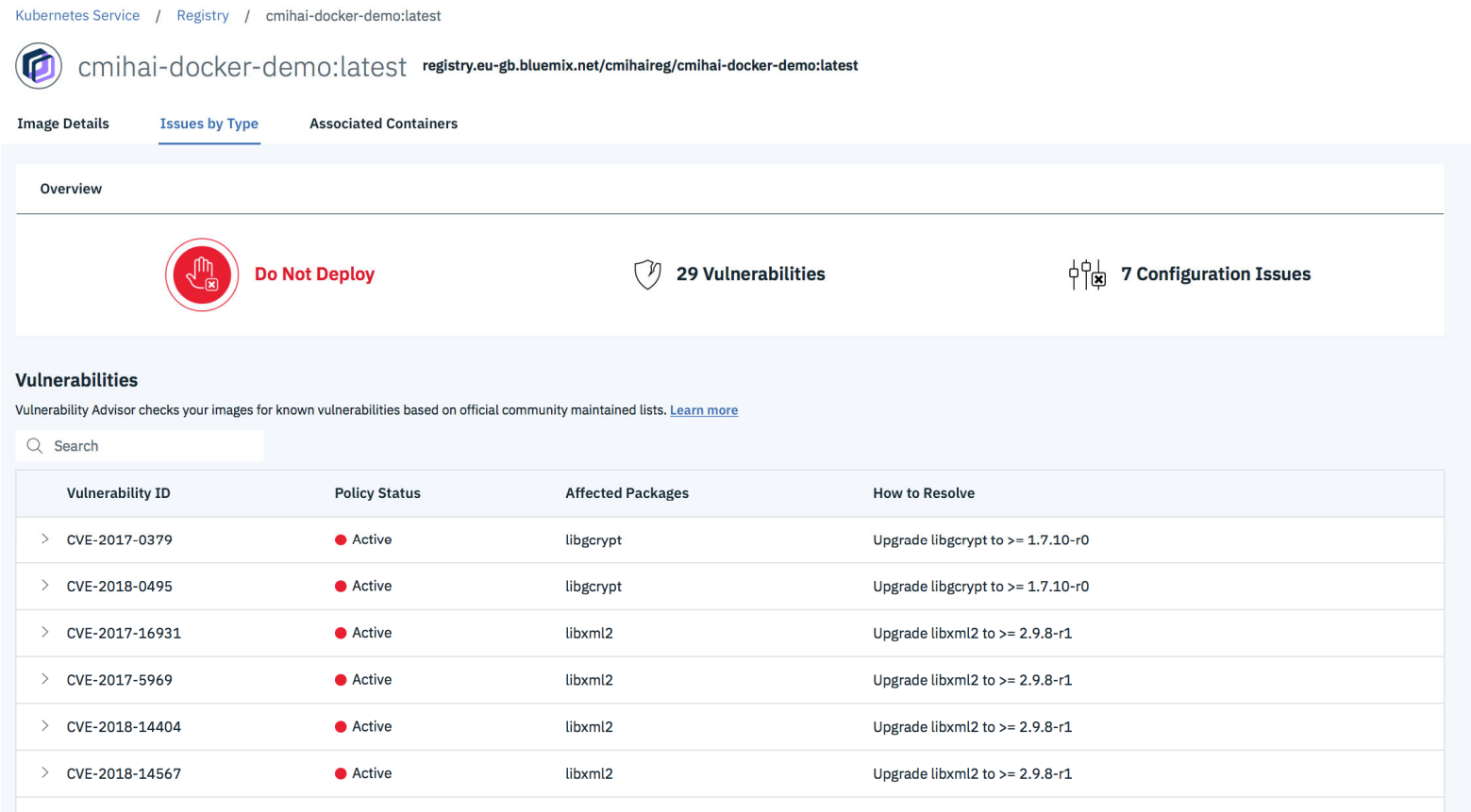
- Multi-tenant private image registry with an integrated Vulnerability Advisor.
- Check images for known vulnerabilities and create deployment rules to prevent using vulnerable images.



IBM Cloud Container Registry

Vulnerability Advisor

- Detailed view of detected vulnerabilities.
- Vulnerability Advisor provides security management for IBM Cloud Container Registry and provides functions to help you secure your images.



Using the Private Image Registry

Command-line usage

```
# List images
ibmcloud cr login
ibmcloud cr image-list

# Creating a namespace
ibmcloud cr namespace-list
ibmcloud cr namespace-add <my_namespace>

# Tag and push an image
ibmcloud cr build -t
us.icr.io/<my_namespace>/<my_repository>:<my_tag> .
```

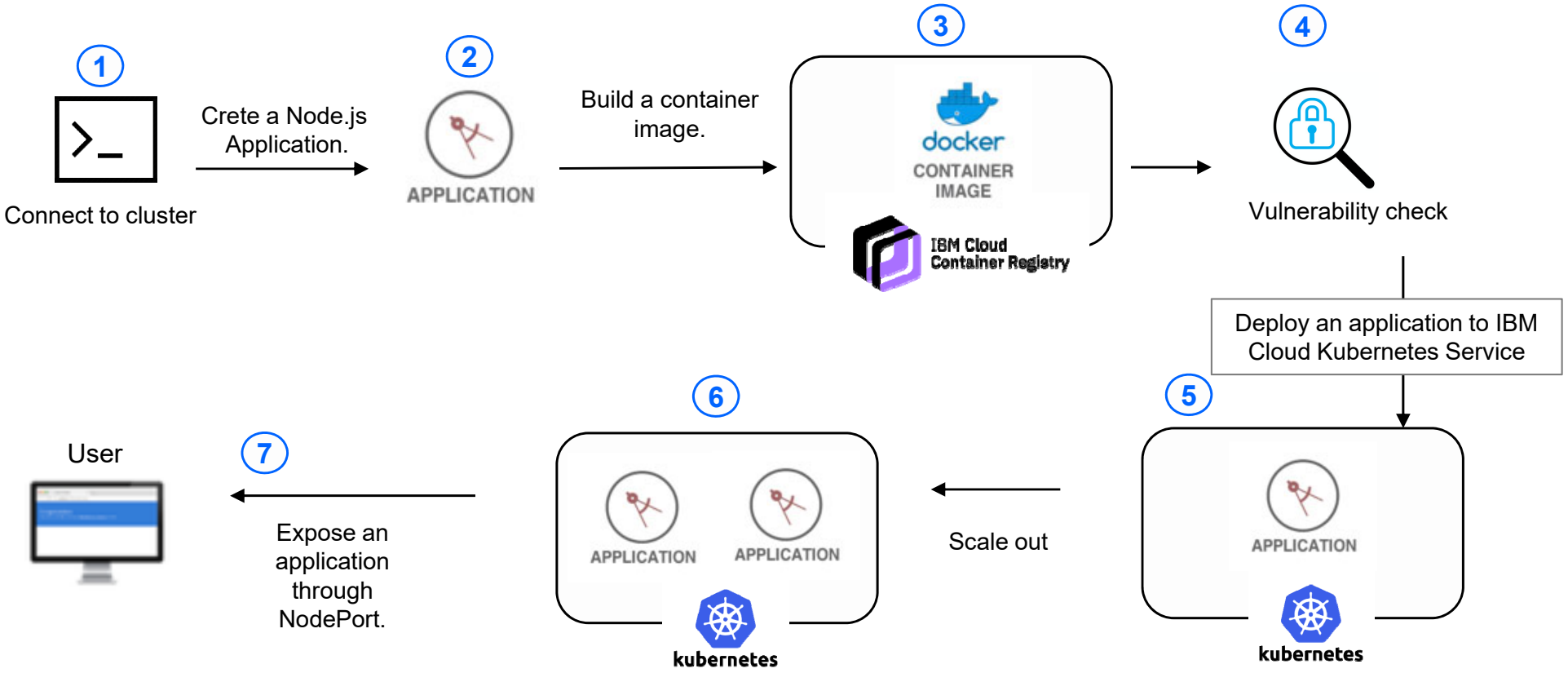
Deploying an application

Topics

- IBM Cloud Kubernetes Service
- Deploying an application
- Summary and further reading

Deploying an application on IBM Cloud Kubernetes Service

You can deploy an application according to the steps that are shown in this slide. The circled numbers are matched with each step of the next slide.



Deploy an application on IBM Cloud Kubernetes Service

You deploy an application in exercise 6 by completing the following steps:

1. Connect to your cluster by using the CLI.
2. Create a Node.js sample application.
   - IBM Cloud App Service starter kits provide a pre-configured sample application.
3. Build a container image.
   - You build your images directly on the IBM Cloud Container Registry service.
4. Check the security status of container images.
   - IBM Cloud Container Registry provides the Vulnerability Advisor service.
5. Deploy an application to IBM Cloud Kubernetes Service.
   - You can directly manipulate deployment through YAML.
6. Scale out an application.
   - You can scale an application manually or set up the autoscale function.
7. Expose the app over the internet.
   - You expose the service by using NodePort.

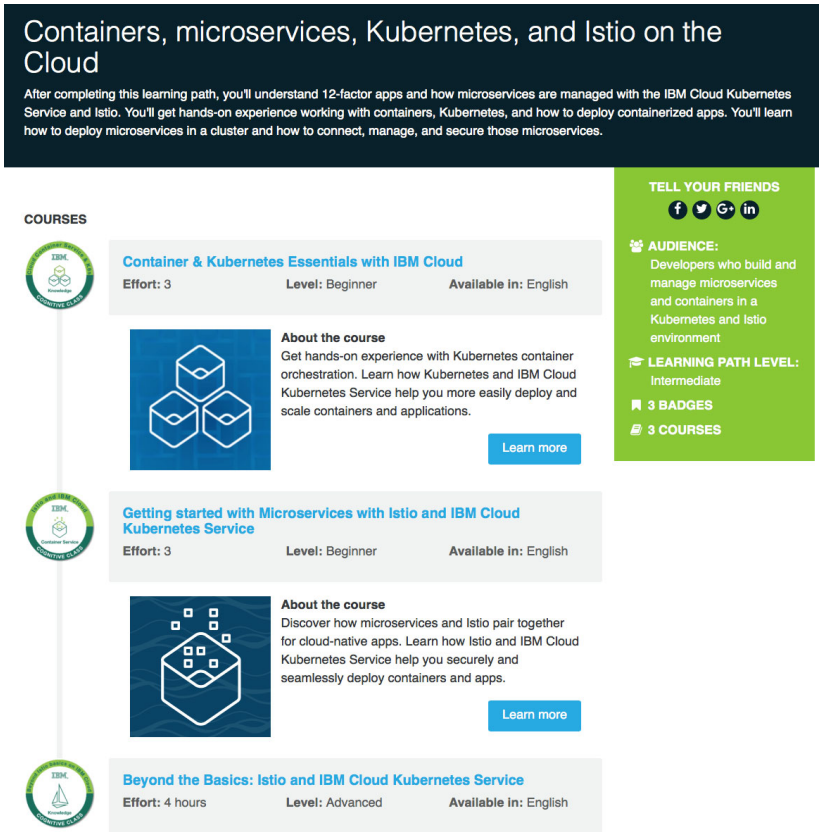
Summary and further reading

Topics

- IBM Cloud Kubernetes Service
- Deploying an application
- Summary and further reading

Further reading

- https://kubernetes.io/docs/concepts/overview/what-is-kubernetes/
- https://www.ibm.com/cloud/garage/content/course/kubernetes-101
- https://cognitiveclass.ai



Unit summary

- Create a Kubernetes cluster by using the IBM Cloud Kubernetes Service.
- Create containers and build on the IBM Cloud Container Registry.
- Work with helm charts.
- Deploy an application to IBM Kubernetes Service.

Exercise 5: Managing IBM Cloud Kubernetes Service clusters

Exercise objectives

- This exercise demonstrates how to create an IBM Kubernetes Service cluster and manage it by using the **kubectl** CLI.
- After completing this exercise, you should be able to:
  - Create an IBM Cloud Kubernetes Service cluster.
  - Connect to a cluster on IBM Cloud Kubernetes Service.
  - List the worker nodes in a cluster.

Exercise 6: Deploying an application on Kubernetes

Exercise objectives

- In this exercise, you build a containerized application and deploy it to IBM Cloud Kubernetes Service.
- After completing this exercise, you should be able to:
  - Create a containerized Node.js application and build it on IBM Cloud Container Registry.
  - Explain how the container security analysis capability of Vulnerability Advisor can identify the security vulnerabilities by scanning an image.
  - Create a deployment and scale it.
  - Expose your application on the internet.