Exercise 5. Managing IBM Kubernetes Service clusters

Estimated time

00:30

Important

It takes about 30 minutes to provision a cluster. Part 1 should be started during the lecture or before a break.

Overview

This exercise demonstrates how to create an IBM Kubernetes Service cluster and manage it by using the `kubectl` CLI.

Objectives

After completing this exercise, you should be able to:

- Create an IBM Kubernetes Service cluster.
- Connect to a cluster on IBM Cloud Kubernetes Service.
- List the worker nodes in a cluster.

Introduction

IBM Cloud Kubernetes Service creates a cluster of compute hosts and deploys highly available containers. It provides intelligent scheduling, self-healing, horizontal scaling, service discovery and load balancing, automated rollouts and rollbacks, and secret and configuration management.

Developers can easily roll out and roll back application versions, whether they are collaborating in development and test environments or deploying to production. Therefore, developers can spend more time coding and less time working with the infrastructure.

Requirements

- You must have a Pay-As-You-Go or Subscription IBM Cloud account so that you can create a cluster. If you are a university student, you can apply for a no-charge feature code.
- The IBM Cloud CLI must be installed.
- The Kubernetes CLI, the IBM Cloud Kubernetes Service plug-in, and the IBM Cloud Container Registry plug-in must be installed.

Exercise instructions

In this exercise, you complete the following tasks:

__ 1. Create an IBM Cloud Kubernetes Service cluster.

__ 2. Connect to your cluster on IBM Cloud Kubernetes Service.

__ 3. List the worker nodes in your cluster.

Part 1: Creating an IBM Cloud Kubernetes Service cluster

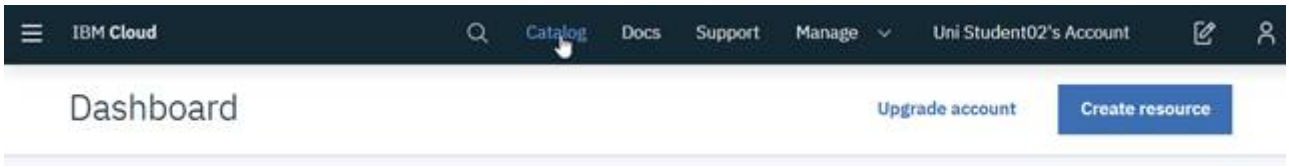
Before you dive into Kubernetes, you must provision a cluster for your containerized app. A cluster is a set of resources, worker nodes, networks, and storage devices that keep apps highly available. After you have your cluster, you can deploy your apps into the containers.

Important

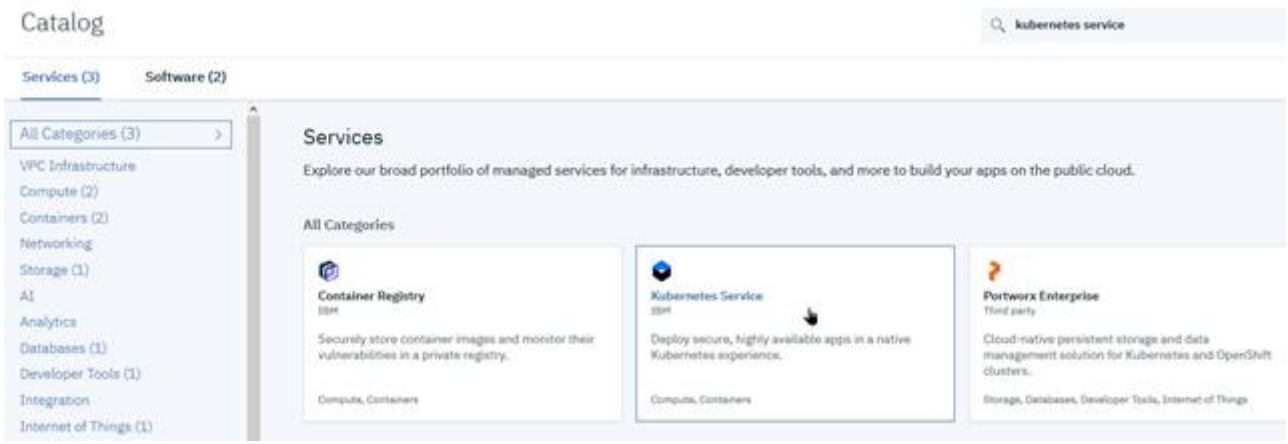
It takes about 30 minutes to provision a cluster. This part should be started during the lecture or before a break.

Complete the following steps:

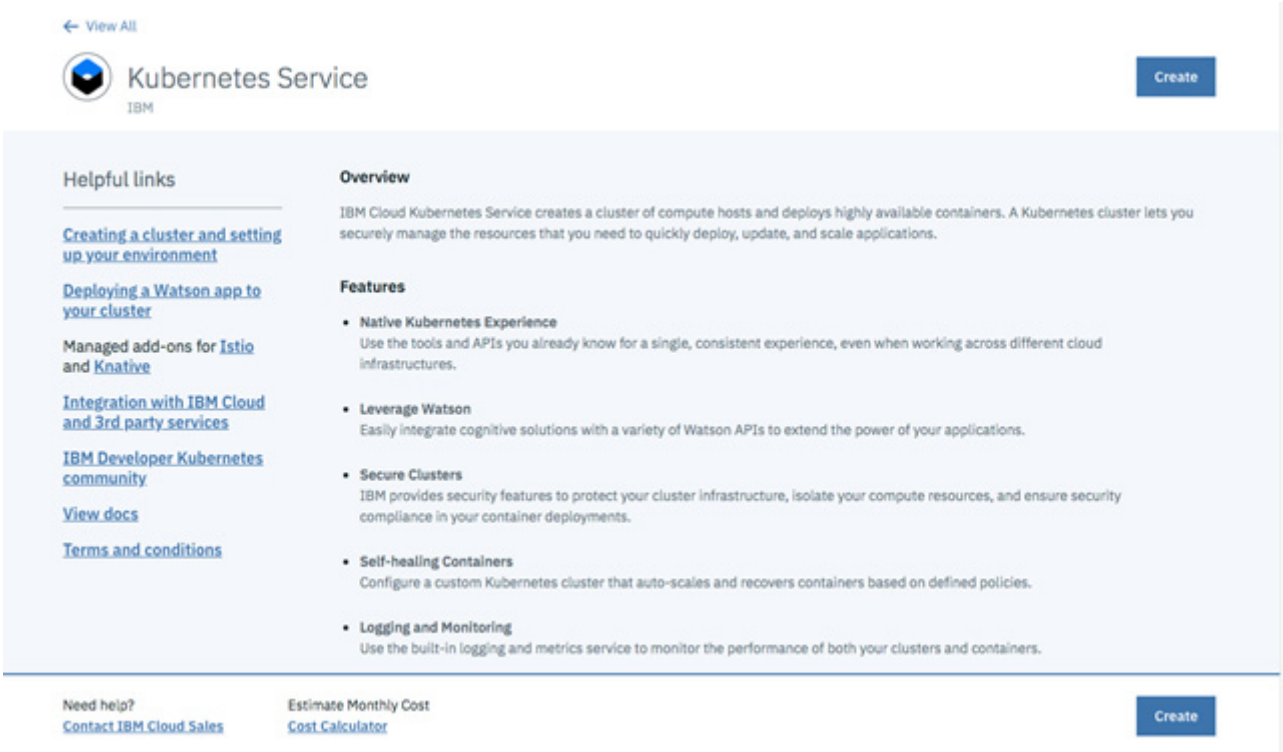
__ 1. Log in to https://cloud.ibm.com and click **Catalog**, as shown in the following figure.



__ 2. In the search field, enter **Kubernetes Service** and click the service, as shown in the following figure.

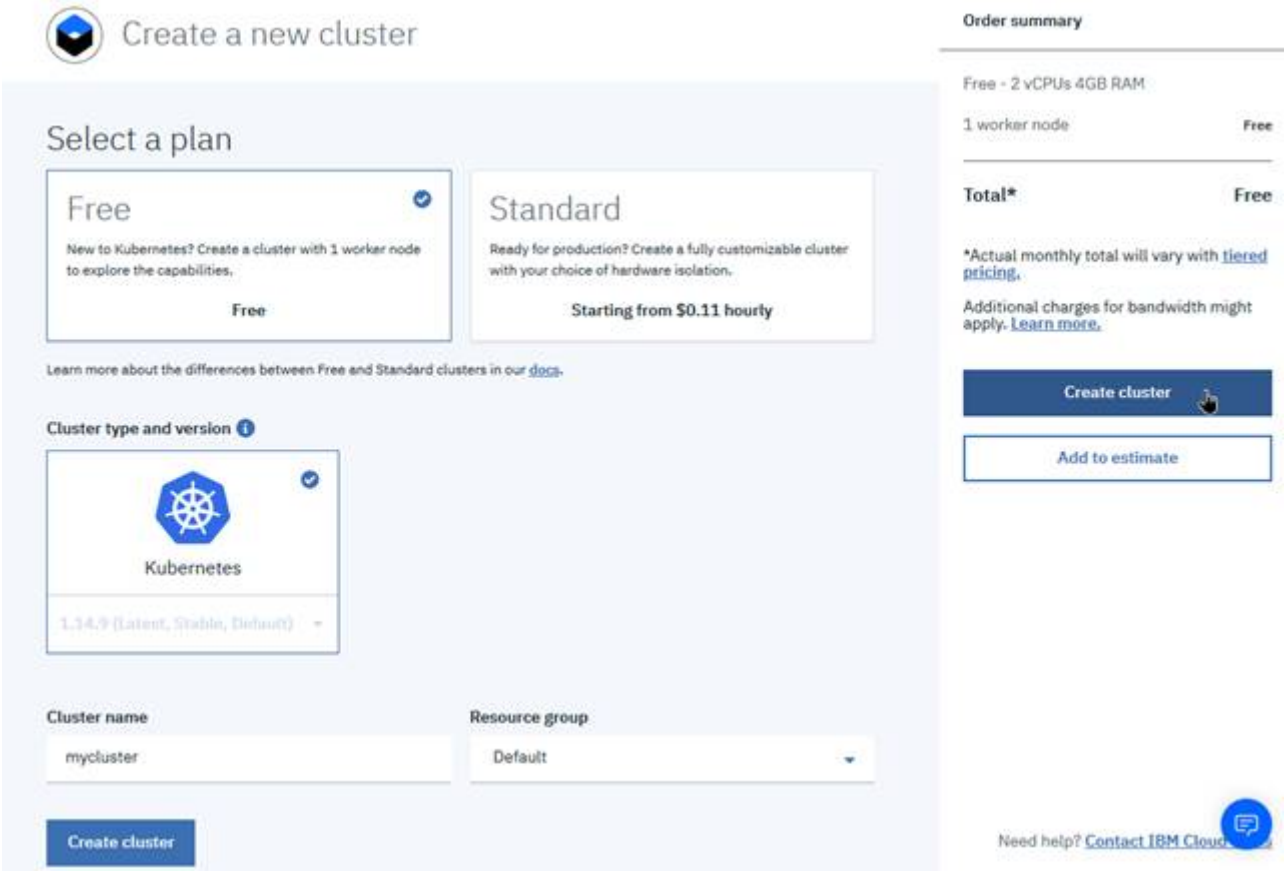


__ 3. In the upper right, click **Create**, as shown in the following figure.

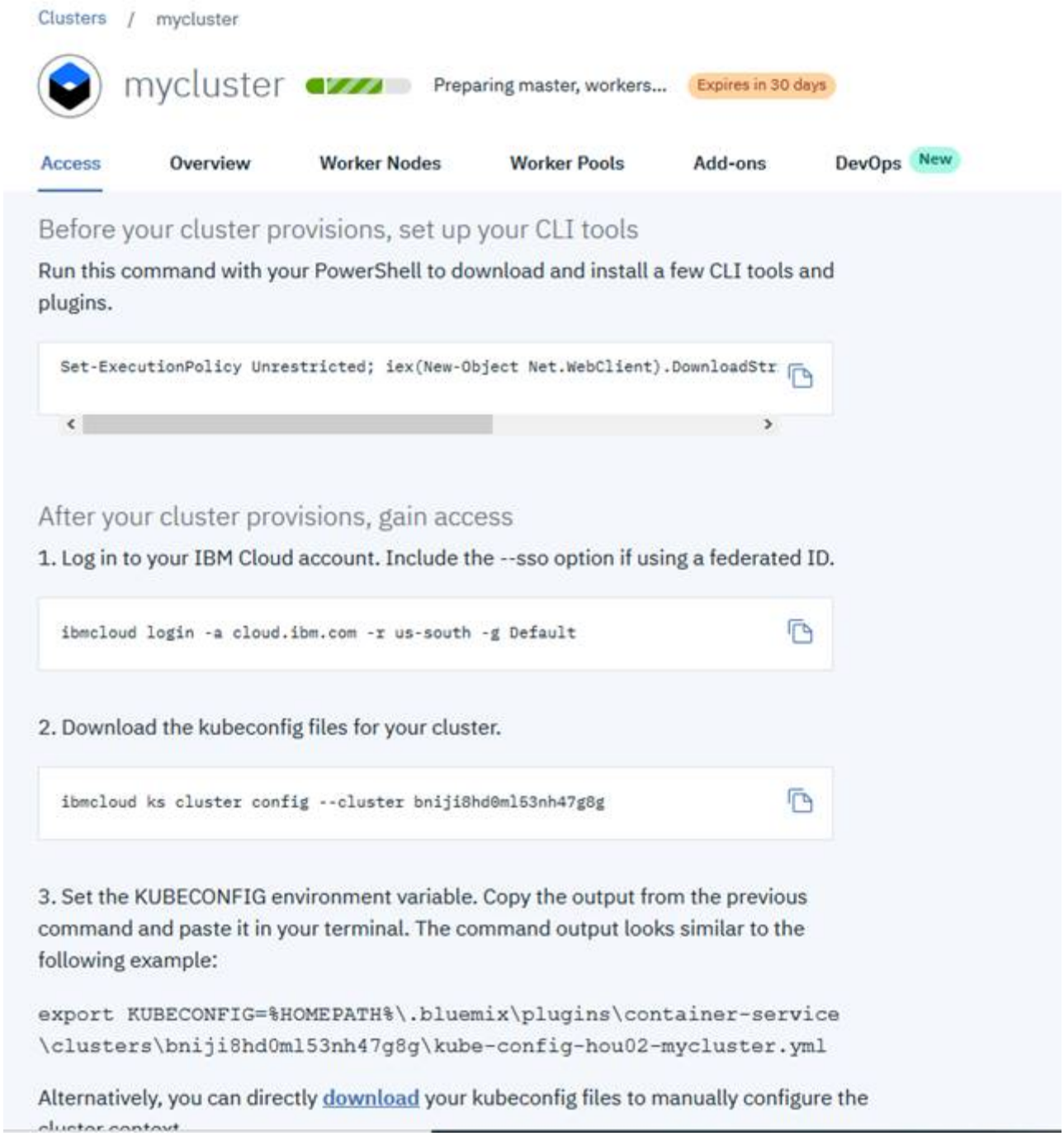


__ 4. For the plan, select **Free** and keep the defaults. Click **Create cluster**, as shown in the following figure.

A free cluster creates only one worker node, which is fine for this exercise, but you should consider a standard cluster for a production environment.

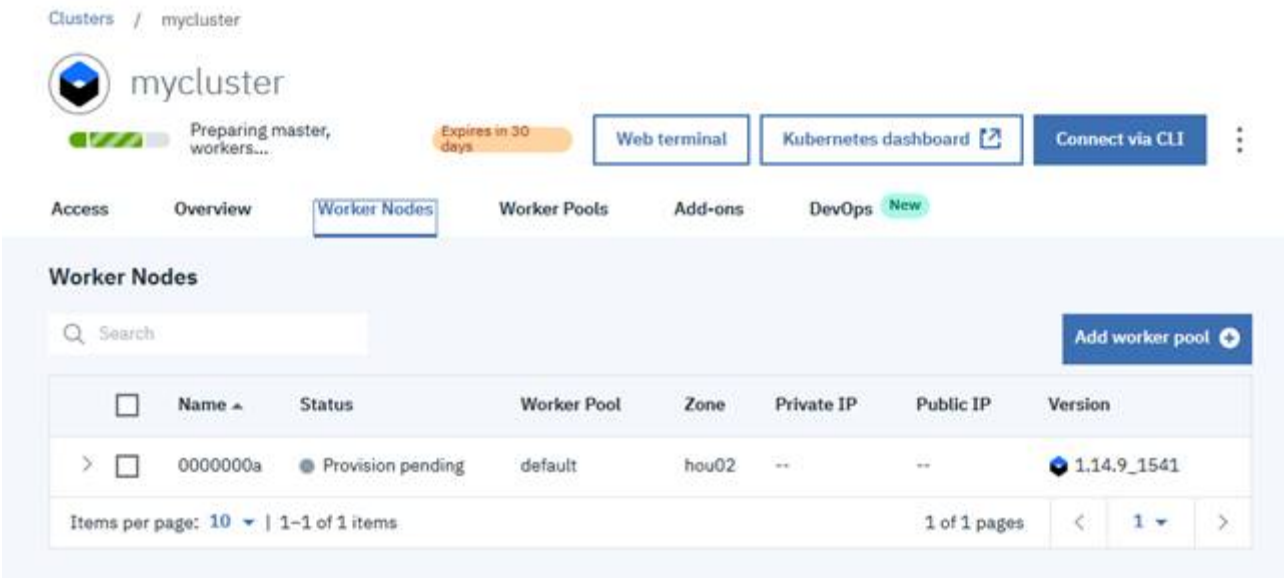


__ 5. Explore the page that opens. You will perform these steps in this exercise.



__ 6. Open the **Worker Nodes** tab, as shown in the following figure.

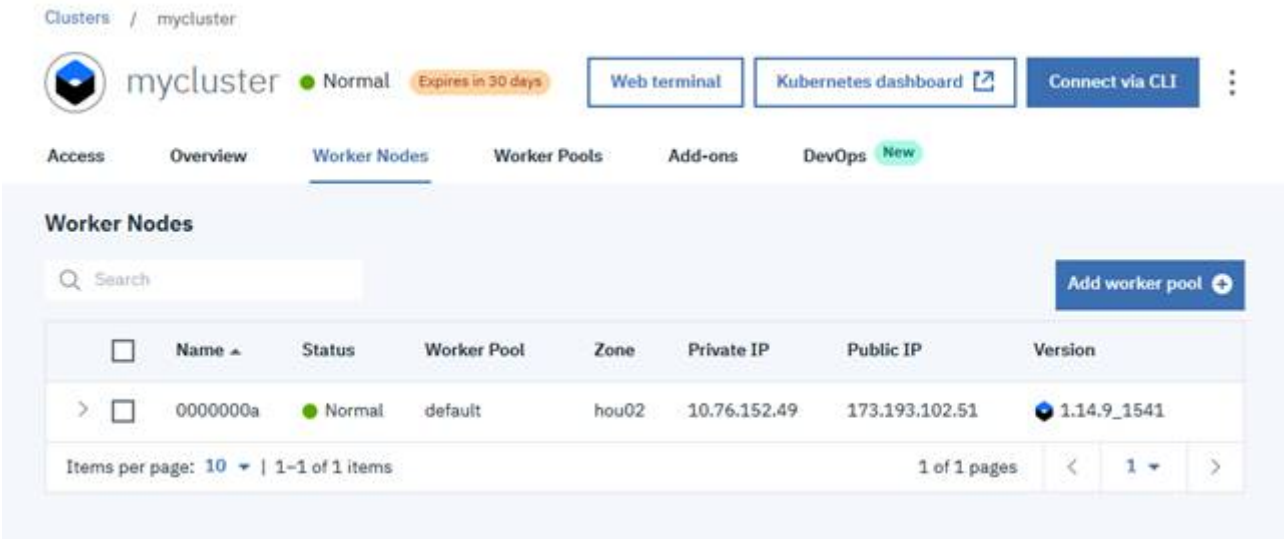
You can see the progress in the Worker Nodes tab.



__ 7. Wait until the status becomes Normal, as shown in the following figure. When the status reaches Normal, you can start working with your cluster.

Note

It might take several minutes (approximately 30 minutes) to deploy the cluster.



Part 2: Connecting to your cluster on IBM Cloud Kubernetes Service

You can access your cluster with the IBM Cloud CLI by completing the following steps:

__ 1. Log in to IBM Cloud by using the IBM Cloud CLI. Open a command prompt and run the following command:

```
ibmcloud login -a https://cloud.ibm.com -r <your region> -u <your IBM ID email> -p <your password> -g <your resource group>
```

Example:

```
ibmcloud login -a https://cloud.ibm.com -r us-south -u myuser@example.com -p mypassword -g Default
```

Note

A resource group is a way for you to organize your account resources in customizable groupings. You have a default resource group in your account that is called **Default** which you can use in this exercise.

Optional

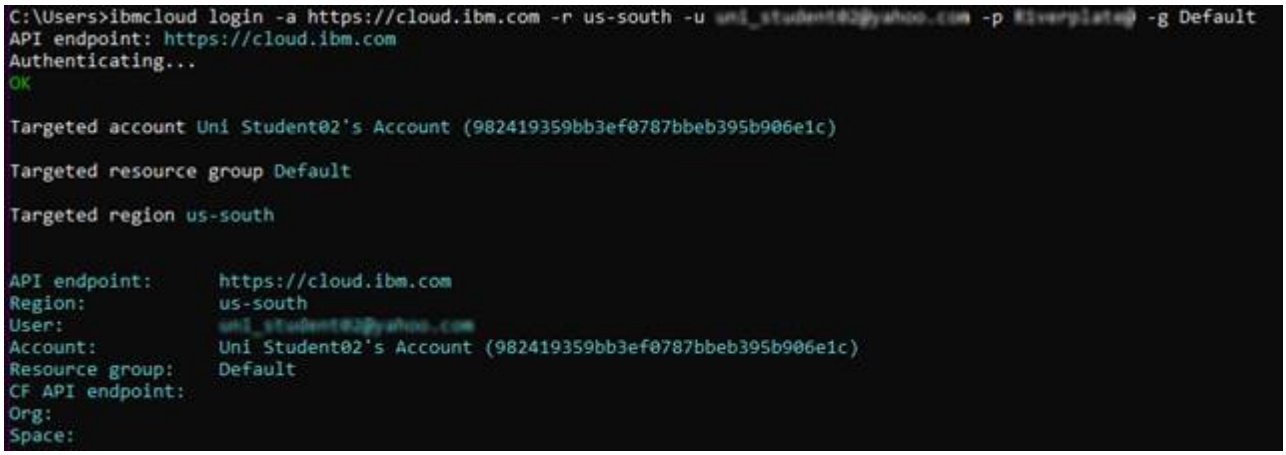
If you have a federated ID, use **`ibmcloud login --sso`** to log in to get started.

After you press `Y`, log in to IBM Cloud by using your federated ID (IBM ID account in this example). Copy the passcode, and paste it into the command prompt, as shown in the following figure.

The following table shows the Kubernetes Service region and the corresponding IBM Cloud location.

IBM Cloud Kubernetes Service region	Corresponding IBM Cloud location
ap-north (standard clusters only)	Tokyo
ap-south	Sydney
eu-central	Frankfurt
uk-south	London
us-east (standard clusters only)	Washington DC
us-south	Dallas

The following figure shows the output of the `ibmcloud` login command.



__ 2. Get the command to set the environment variable and download the Kubernetes configuration files and certificates to connect to your cluster by using kubectl commands.

```
ibmcloud ks cluster-config --cluster <cluster_name_or_ID>
```

Specify the cluster name that you created in Part 1. For example:

```
ibmcloud ks cluster-config mycluster
```

This command downloads the configuration files that are needed to access your Kubernetes cluster locally from your machine. It outputs an environment variable that is called `KUBECONFIG`, as shown in the following figure, which you copy and paste into your terminal or command prompt so that the **`kubectl`** tool can point to your cluster.

__ 3. Set the `KUBECONFIG` environment variable. Copy the output from the previous command and paste it into your terminal or command prompt. The command output looks similar to the following examples.

Example

MacOS (Enter the command in a single line)

```
export
KUBECONFIG=/Users/<user_name>/.bluemix/plugins/container-service/clusters/pr_firm_
cluster/kube-config-prod-par02-pr_firm_cluster.yml
```

Example

Windows (enter the command in a single line).

Example

```
SET
KUBECONFIG=C:\Users\<user_name>\.bluemix\plugins\container-service\clusters\mycluster\kube-config-mel01-mycluster.yml
```

```
C:\Users\ITSOUSER>ibmcloud ks cluster-config --cluster mycluster
OK
The configuration for mycluster was downloaded successfully.

Export environment variables to start using Kubernetes.

SET KUBECONFIG=C:\Users\ITSOUSER\.bluemix\plugins\container-service\clusters\mycluster\kube-config-hou02-mycluster.yml
```

Note

For Windows PowerShell users, instead of copying and pasting the **SET** command from the output of **ibmcloud ks cluster-config**, you must set the KUBECONFIG environment variable by running, for example, the following command:

```
$env:KUBECONFIG =
"C:\Users\<user_name>\.bluemix\plugins\container-service\clusters\mycluster\kube-config-prod-dal10-mycluster.yml"
```

```
PS C:\Users> ibmcloud ks cluster-config mycluster
OK
The configuration for mycluster was downloaded successfully. Export environment variables to start using Kubernetes.

SET KUBECONFIG=C:\Users\lab21\.bluemix\plugins\container-service\clusters\mycluster\kube-config-mel01-mycluster.yml
PS C:\Users> $env:KUBECONFIG="C:\Users\lab21\.bluemix\plugins\container-service\clusters\mycluster\kube-config-mel01-mycluster.yml"
```

__ 4. Verify that the **kubectl** commands run properly with your cluster by checking the Kubernetes CLI server version:

```
kubectl version  --short
```

The **kubectl version --short** command output is shown in the following figure.

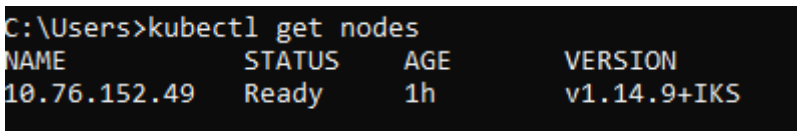
```
C:\Users>kubectl version --short
Client Version: v1.7.0
Server Version: v1.14.9+IKS
```

Part 3: Listing the worker nodes in your cluster

By using **`kubectl`** commands, you can manage your apps, cluster, and cluster resources. Verify that you can connect to your cluster by listing your worker nodes. Run the following command:

```
kubectl get nodes
```

The **`kubectl get nodes`** command output is shown in the following figure.



End of exercise

Exercise review and wrap-up

Now that you completed this exercise, you understand what Kubernetes is, how it works, and how you can access the cluster.

You also know how to retrieve cluster information.