OpenShift Container Platform 4.7

CLI tools

Learning how to use the command-line tools for OpenShift Container Platform

Last Updated: 2022-09-29

OpenShift Container Platform 4.7 CLI tools

Learning how to use the command-line tools for OpenShift Container Platform

Legal Notice

Abstract

This document provides information about installing, configuring, and using the command-line tools for OpenShift Container Platform. It also contains a reference of CLI commands and examples of how to use them.

Table of Contents

CHAPTER 1. OPENSHIFT CONTAINER PLATFORM CLI TOOLS OVERVIEW

A user performs a range of operations while working on OpenShift Container Platform such as the following:

- Managing clusters
- Building, deploying, and managing applications
- Managing deployment processes
- Developing Operators
- Creating and maintaining Operator catalogs

OpenShift Container Platform offers a set of command-line interface (CLI) tools that simplify these tasks by enabling users to perform various administration and development operations from the terminal. These tools expose simple commands to manage the applications, as well as interact with each component of the system.

1.1. LIST OF CLI TOOLS

The following set of CLI tools are available in OpenShift Container Platform:

- OpenShift CLI (oc): This is the most commonly used CLI tool by OpenShift Container Platform users. It helps both cluster administrators and developers to perform end-to-end operations across OpenShift Container Platform using the terminal. Unlike the web console, it allows the user to work directly with the project source code using command scripts.
- Developer CLI (odo): The **odo** CLI tool helps developers focus on their main goal of creating and maintaining applications on OpenShift Container Platform by abstracting away complex Kubernetes and OpenShift Container Platform concepts. It helps the developers to write, build, and debug applications on a cluster from the terminal without the need to administer the cluster.
- Helm CLI: Helm is a package manager for Kubernetes applications which enables defining, installing, and upgrading applications packaged as Helm charts. Helm CLI helps the user deploy applications and services to OpenShift Container Platform clusters using simple commands from the terminal.
- Knative CLI (kn): The Knative (**kn**) CLI tool provides simple and intuitive terminal commands that can be used to interact with OpenShift Serverless components, such as Knative Serving and Eventing.
- Pipelines CLI (tkn): OpenShift Pipelines is a continuous integration and continuous delivery (CI/CD) solution in OpenShift Container Platform, which internally uses Tekton. The **tkn** CLI tool provides simple and intuitive commands to interact with OpenShift Pipelines using the terminal.
- opm CLI: The **opm** CLI tool helps the Operator developers and cluster administrators to create and maintain the catalogs of Operators from the terminal.
- Operator SDK: The Operator SDK, a component of the Operator Framework, provides a CLI tool that Operator developers can use to build, test, and deploy an Operator from the terminal. It simplifies the process of building Kubernetes-native applications, which can require deep,

application-specific operational knowledge.

CHAPTER 2. OPENSHIFT CLI (OC)

2.1. GETTING STARTED WITH THE OPENSHIFT CLI

2.1.1. About the OpenShift CLI

With the OpenShift command-line interface (CLI), the **oc** command, you can create applications and manage OpenShift Container Platform projects from a terminal. The OpenShift CLI is ideal in the following situations:

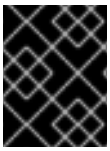
- Working directly with project source code
- Scripting OpenShift Container Platform operations
- Managing projects while restricted by bandwidth resources and the web console is unavailable

2.1.2. Installing the OpenShift CLI

You can install the OpenShift CLI (**oc**) either by downloading the binary or by using an RPM.

2.1.2.1. Installing the OpenShift CLI by downloading the binary

You can install the OpenShift CLI (**oc**) to interact with OpenShift Container Platform from a command-line interface. You can install **oc** on Linux, Windows, or macOS.



IMPORTANT

If you installed an earlier version of **oc**, you cannot use it to complete all of the commands in OpenShift Container Platform 4.7. Download and install the new version of **oc**.

2.1.2.1.1. Installing the OpenShift CLI on Linux

You can install the OpenShift CLI (**oc**) binary on Linux by using the following procedure.

Procedure

1. Navigate to the OpenShift Container Platform downloads page on the Red Hat Customer Portal.
2. Select the appropriate version in the **Version** drop-down menu.
3. Click **Download Now** next to the **OpenShift v4.7 Linux Client** entry and save the file.
4. Unpack the archive:

```
$ tar xvzf <file>
```

5. Place the **oc** binary in a directory that is on your **PATH**.
   To check your **PATH**, execute the following command:

```
$ echo $PATH
```

After you install the OpenShift CLI, it is available using the **oc** command:

```
$ oc <command>
```

2.1.2.1.2. Installing the OpenShift CLI on Windows

You can install the OpenShift CLI (**oc**) binary on Windows by using the following procedure.

Procedure

1. Navigate to the OpenShift Container Platform downloads page on the Red Hat Customer Portal.
2. Select the appropriate version in the **Version** drop-down menu.
3. Click **Download Now** next to the **OpenShift v4.7 Windows Client** entry and save the file.
4. Unzip the archive with a ZIP program.
5. Move the **oc** binary to a directory that is on your **PATH**.
   To check your **PATH**, open the command prompt and execute the following command:

   ```
   C:\> path
   ```

After you install the OpenShift CLI, it is available using the **oc** command:

```
C:\> oc <command>
```

2.1.2.1.3. Installing the OpenShift CLI on macOS

You can install the OpenShift CLI (**oc**) binary on macOS by using the following procedure.

Procedure

1. Navigate to the OpenShift Container Platform downloads page on the Red Hat Customer Portal.
2. Select the appropriate version in the **Version** drop-down menu.
3. Click **Download Now** next to the **OpenShift v4.7 MacOSX Client** entry and save the file.
4. Unpack and unzip the archive.
5. Move the **oc** binary to a directory on your PATH.
   To check your **PATH**, open a terminal and execute the following command:

   ```
   $ echo $PATH
   ```

After you install the OpenShift CLI, it is available using the **oc** command:

```
$ oc <command>
```

2.1.2.2. Installing the OpenShift CLI by using the web console

You can install the OpenShift CLI (**oc**) to interact with OpenShift Container Platform from a web console. You can install **oc** on Linux, Windows, or macOS.

IMPORTANT

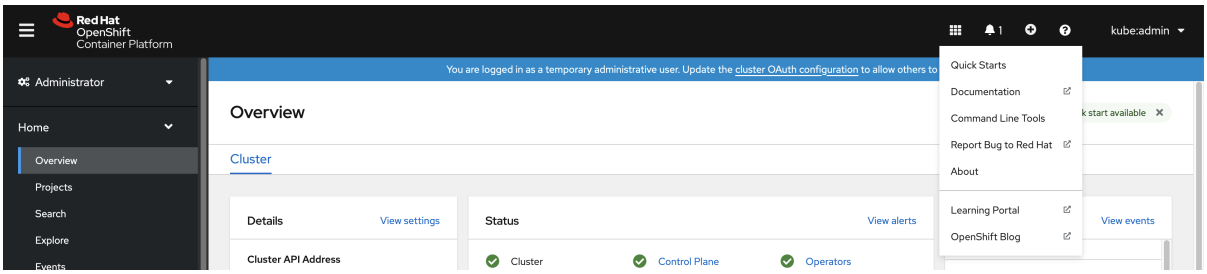
If you installed an earlier version of **oc**, you cannot use it to complete all of the commands in OpenShift Container Platform 4.7. Download and install the new version of **oc**.

2.1.2.2.1. Installing the OpenShift CLI on Linux using the web console

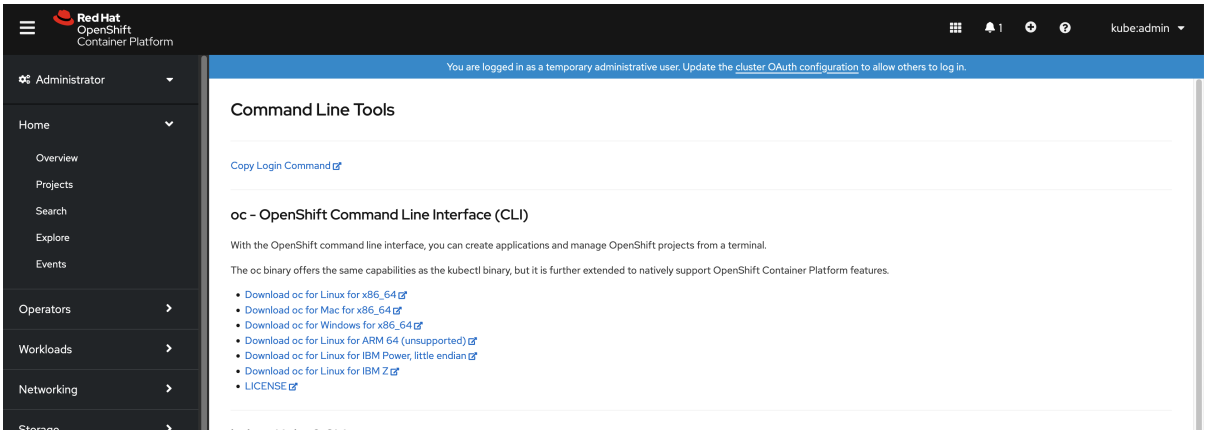
You can install the OpenShift CLI (**oc**) binary on Linux by using the following procedure.

Procedure

1. From the web console, click **?**.



2. Click **Command Line Tools**.



3. Select appropriate **oc** binary for your Linux platform, and then click **Download oc for Linux**
4. Save the file.
5. Unpack the archive.

```
$ tar xvzf <file>
```

6. Move the **oc** binary to a directory that is on your **PATH**.
   To check your **PATH**, execute the following command:

```
$ echo $PATH
```

After you install the OpenShift CLI, it is available using the **oc** command:

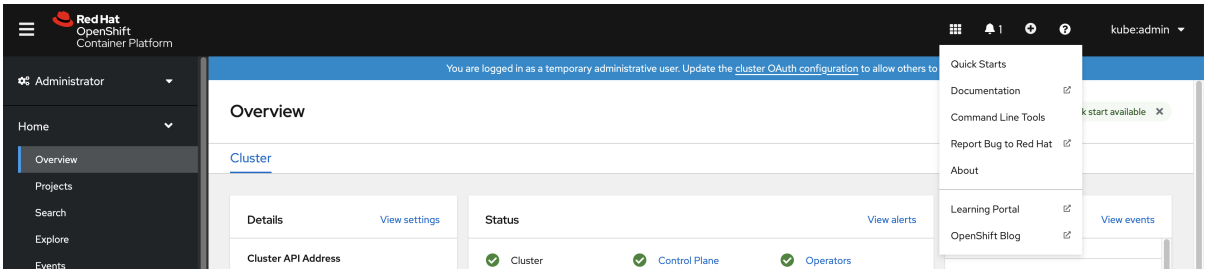
```
$ oc <command>
```

2.1.2.2.2. Installing the OpenShift CLI on Windows using the web console

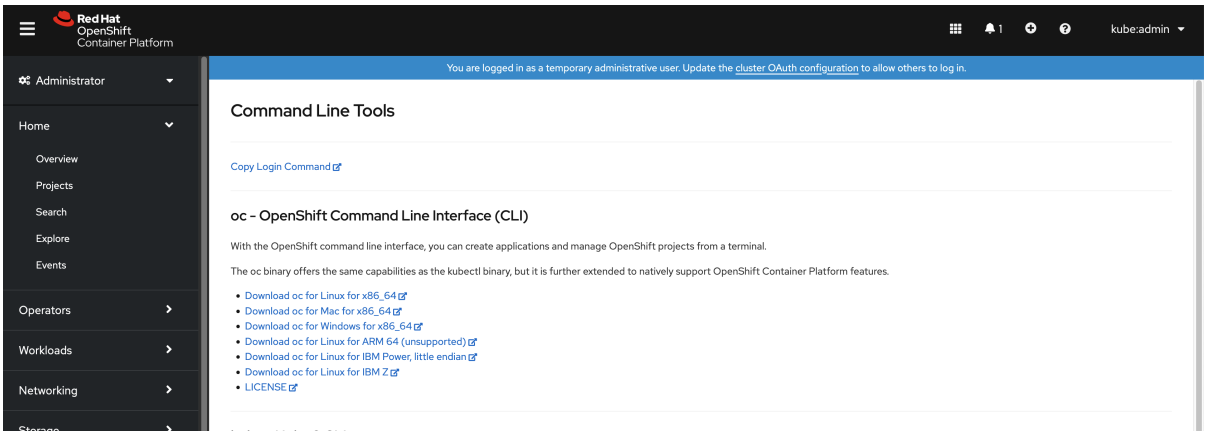
You can install the OpenShift CLI (**oc**) binary on Winndows by using the following procedure.

Procedure

1. From the web console, click **?**.



2. Click **Command Line Tools**.



3. Select the **oc** binary for Windows platform, and then click **Download oc for Windows for x86_64**.

4. Save the file.

5. Unzip the archive with a ZIP program.

6. Move the **oc** binary to a directory that is on your **PATH**.
   To check your **PATH**, open the command prompt and execute the following command:

```
C:\> path
```

After you install the OpenShift CLI, it is available using the **oc** command:

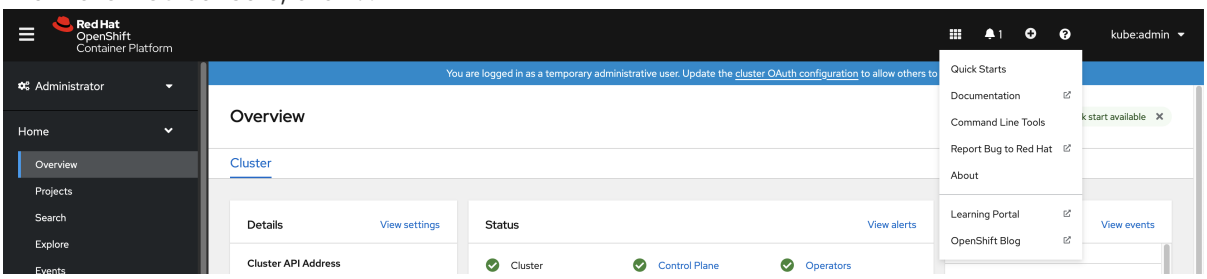
```
C:\> oc <command>
```

2.1.2.2.3. Installing the OpenShift CLI on macOS using the web console

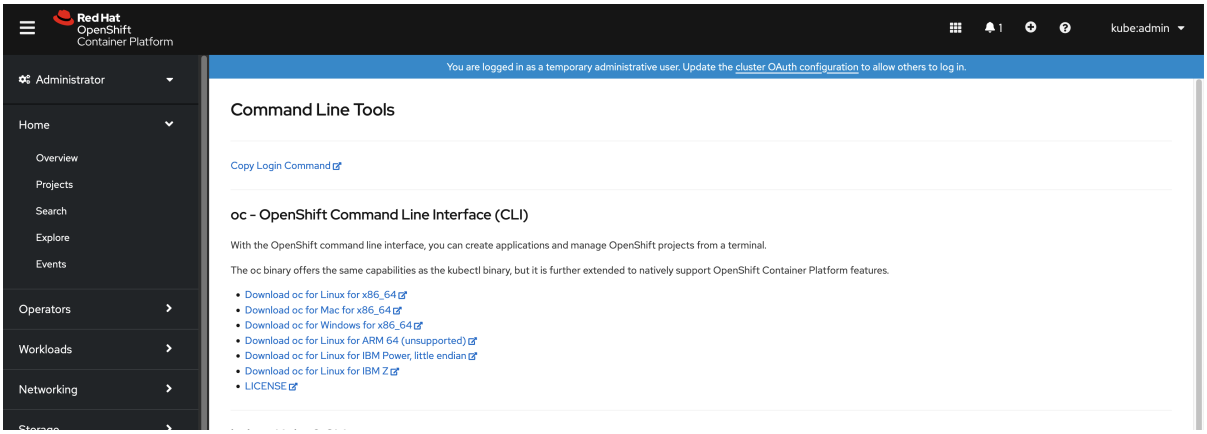
You can install the OpenShift CLI (**oc**) binary on macOS by using the following procedure.

Procedure

1. From the web console, click **?**.



2. Click **Command Line Tools**.



3. Select the **oc** binary for macOS platform, and then click **Download oc for Mac for x86_64**

4. Save the file.

5. Unpack and unzip the archive.

6. Move the **oc** binary to a directory on your PATH.
   To check your **PATH**, open a terminal and execute the following command:

```
$ echo $PATH
```

After you install the OpenShift CLI, it is available using the **oc** command:

```
$ oc <command>
```

2.1.2.3. Installing the OpenShift CLI by using an RPM

For Red Hat Enterprise Linux (RHEL), you can install the OpenShift CLI (**oc**) as an RPM if you have an active OpenShift Container Platform subscription on your Red Hat account.

Prerequisites

- Must have root or sudo privileges.

Procedure

1. Register with Red Hat Subscription Manager:

```
# subscription-manager register
```

2. Pull the latest subscription data:

```
# subscription-manager refresh
```

3. List the available subscriptions:

```
# subscription-manager list --available --matches '*OpenShift*'
```

4. In the output for the previous command, find the pool ID for an OpenShift Container Platform subscription and attach the subscription to the registered system:

```
# subscription-manager attach --pool=<pool_id>
```

5. Enable the repositories required by OpenShift Container Platform 4.7.
   - For Red Hat Enterprise Linux 8:

```
# subscription-manager repos --enable="rhocp-4.7-for-rhel-8-x86_64-rpms"
```

   - For Red Hat Enterprise Linux 7:

```
# subscription-manager repos --enable="rhel-7-server-ose-4.7-rpms"
```

6. Install the **openshift-clients** package:

```
# yum install openshift-clients
```

After you install the CLI, it is available using the **oc** command:

```
$ oc <command>
```

2.1.2.4. Installing the OpenShift CLI by using Homebrew

For macOS, you can install the OpenShift CLI (**oc**) by using the Homebrew package manager.

Prerequisites

- You must have Homebrew (**brew**) installed.

Procedure

- Run the following command to install the openshift-cli package:

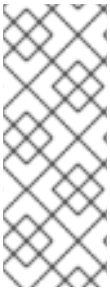
```
$ brew install openshift-cli
```

2.1.3. Logging in to the OpenShift CLI

You can log in to the OpenShift CLI (**oc**) to access and manage your cluster.

Prerequisites

- You must have access to an OpenShift Container Platform cluster.
- You must have installed the OpenShift CLI (**oc**).



NOTE

To access a cluster that is accessible only over an HTTP proxy server, you can set the **HTTP_PROXY**, **HTTPS_PROXY** and **NO_PROXY** variables. These environment variables are respected by the **oc** CLI so that all communication with the cluster goes through the HTTP proxy.

Authentication headers are sent only when using HTTPS transport.

Procedure

1. Enter the **oc login** command and pass in a user name:

```
$ oc login -u user1
```

2. When prompted, enter the required information:

Example output

```
Server [https://localhost:8443]: https://openshift.example.com:6443 (1)
The server uses a certificate signed by an unknown authority.
You can bypass the certificate check, but any data you send to the server could be
intercepted by others.
Use insecure connections? (y/n): y (2)

Authentication required for https://openshift.example.com:6443 (openshift)
Username: user1
Password: (3)
Login successful.

You don't have any projects. You can try to create a new project, by running

    oc new-project <projectname>

Welcome! See 'oc help' to get started.
```

(1) Enter the OpenShift Container Platform server URL.

(2) Enter whether to use insecure connections.

(3) Enter the user's password.

NOTE

If you are logged in to the web console, you can generate an **oc login** command that includes your token and server information. You can use the command to log in to the OpenShift Container Platform CLI without the interactive prompts. To generate the command, select **Copy login command** from the username drop-down menu at the top right of the web console.

You can now create a project or issue other commands for managing your cluster.

2.1.4. Using the OpenShift CLI

Review the following sections to learn how to complete common tasks using the CLI.

2.1.4.1. Creating a project

Use the **oc new-project** command to create a new project.

```
$ oc new-project my-project
```

Example output

```
Now using project "my-project" on server "https://openshift.example.com:6443".
```

2.1.4.2. Creating a new app

Use the **oc new-app** command to create a new application.

```
$ oc new-app https://github.com/sclorg/cakephp-ex
```

Example output

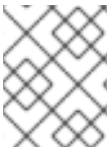
```
--> Found image 40de956 (9 days old) in imagestream "openshift/php" under tag "7.2" for "php"

...

    Run 'oc status' to view your app.
```

2.1.4.3. Viewing pods

Use the **oc get pods** command to view the pods for the current project.



NOTE

When you run **oc** inside a pod and do not specify a namespace, the namespace of the pod is used by default.

```
$ oc get pods -o wide
```

Example output

```
NAME                READY   STATUS      RESTARTS   AGE     IP            NODE
NOMINATED NODE
cakephp-ex-1-build  0/1     Completed   0          5m45s   10.131.0.10   ip-10-0-141-74.ec2.internal
<none>
cakephp-ex-1-deploy 0/1     Completed   0          3m44s   10.129.2.9    ip-10-0-147-65.ec2.internal
<none>
cakephp-ex-1-ktz97  1/1     Running     0          3m33s   10.128.2.11   ip-10-0-168-105.ec2.internal
<none>
```

-

2.1.4.4. Viewing pod logs

Use the **oc logs** command to view logs for a particular pod.

```
$ oc logs cakephp-ex-1-deploy
```

Example output

```
--> Scaling cakephp-ex-1 to 1
--> Success
```

2.1.4.5. Viewing the current project

Use the **oc project** command to view the current project.

```
$ oc project
```

Example output

```
Using project "my-project" on server "https://openshift.example.com:6443".
```

2.1.4.6. Viewing the status for the current project

Use the **oc status** command to view information about the current project, such as services, deployments, and build configs.

```
$ oc status
```

Example output

```
In project my-project on server https://openshift.example.com:6443

svc/cakephp-ex - 172.30.236.80 ports 8080, 8443
  dc/cakephp-ex deploys istag/cakephp-ex:latest <-
    bc/cakephp-ex source builds https://github.com/sclorg/cakephp-ex on openshift/php:7.2
    deployment #1 deployed 2 minutes ago - 1 pod

3 infos identified, use 'oc status --suggest' to see details.
```

2.1.4.7. Listing supported API resources

Use the **oc api-resources** command to view the list of supported API resources on the server.

```
$ oc api-resources
```

Example output

```
NAME                              SHORTNAMES   APIGROUP                       NAMESPACED   KIND
bindings                                                                      true         Binding
```

```
componentstatuses                 cs                                     false        ComponentStatus
configmaps                        cm                                     true         ConfigMap
...
```

2.1.5. Getting help

You can get help with CLI commands and OpenShift Container Platform resources in the following ways.

- Use **oc help** to get a list and description of all available CLI commands:

  Example: Get general help for the CLI

  ```
  $ oc help
  ```

  Example output

  ```
  OpenShift Client

  This client helps you develop, build, deploy, and run your applications on any OpenShift or
  Kubernetes compatible
  platform. It also includes the administrative commands for managing a cluster under the 'adm'
  subcommand.

  Usage:
    oc [flags]

  Basic Commands:
    login           Log in to a server
    new-project     Request a new project
    new-app         Create a new application

  ...
  ```

- Use the **--help** flag to get help about a specific CLI command:

  Example: Get help for the oc create command

  ```
  $ oc create --help
  ```

  Example output

  ```
  Create a resource by filename or stdin

  JSON and YAML formats are accepted.

  Usage:
    oc create -f FILENAME [flags]

  ...
  ```

- Use the **oc explain** command to view the description and fields for a particular resource:

Example: View documentation for the Pod resource

```
$ oc explain pods
```

Example output

```
KIND:     Pod
VERSION:  v1

DESCRIPTION:
     Pod is a collection of containers that can run on a host. This resource is
     created by clients and scheduled onto hosts.

FIELDS:
   apiVersion <string>
     APIVersion defines the versioned schema of this representation of an
     object. Servers should convert recognized schemas to the latest internal
     value, and may reject unrecognized values. More info:
     https://git.k8s.io/community/contributors/devel/api-conventions.md#resources

...
```

2.1.6. Logging out of the OpenShift CLI

You can log out the OpenShift CLI to end your current session.

- Use the **oc logout** command.

```
$ oc logout
```

Example output

```
Logged "user1" out on "https://openshift.example.com"
```

This deletes the saved authentication token from the server and removes it from your configuration file.

2.2. CONFIGURING THE OPENSHIFT CLI

2.2.1. Enabling tab completion

You can enable tab completion for the Bash or Zsh shells.

2.2.1.1. Enabling tab completion for Bash

After you install the OpenShift CLI (**oc**), you can enable tab completion to automatically complete **oc** commands or suggest options when you press Tab. The following procedure enables tab completion for the Bash shell.

Prerequisites

- You must have the OpenShift CLI (**oc**) installed.

- You must have the package **bash-completion** installed.

Procedure

1. Save the Bash completion code to a file:

```
$ oc completion bash > oc_bash_completion
```

2. Copy the file to **/etc/bash_completion.d/**:

```
$ sudo cp oc_bash_completion /etc/bash_completion.d/
```

   You can also save the file to a local directory and source it from your **.bashrc** file instead.

Tab completion is enabled when you open a new terminal.

2.2.1.2. Enabling tab completion for Zsh

After you install the OpenShift CLI (**oc**), you can enable tab completion to automatically complete **oc** commands or suggest options when you press Tab. The following procedure enables tab completion for the Zsh shell.

Prerequisites

- You must have the OpenShift CLI (**oc**) installed.

Procedure

- To add tab completion for **oc** to your **.zshrc** file, run the following command:

```
$ cat >>~/.zshrc<<EOF
if [ $commands[oc] ]; then
  source <(oc completion zsh)
  compdef _oc oc
fi
EOF
```

Tab completion is enabled when you open a new terminal.

2.3. MANAGING CLI PROFILES

A CLI configuration file allows you to configure different profiles, or contexts, for use with the CLI tools overview. A context consists of user authentication and OpenShift Container Platform server information associated with a *nickname*.

2.3.1. About switches between CLI profiles

Contexts allow you to easily switch between multiple users across multiple OpenShift Container Platform servers, or clusters, when using CLI operations. Nicknames make managing CLI configurations easier by providing short-hand references to contexts, user credentials, and cluster details. After logging in with the CLI for the first time, OpenShift Container Platform creates a ~/**.kube/config** file if one does

not already exist. As more authentication and connection details are provided to the CLI, either automatically during an **oc login** operation or by manually configuring CLI profiles, the updated information is stored in the configuration file:

CLI config file

```
apiVersion: v1
clusters: (1)
- cluster:
    insecure-skip-tls-verify: true
    server: https://openshift1.example.com:8443
  name: openshift1.example.com:8443
- cluster:
    insecure-skip-tls-verify: true
    server: https://openshift2.example.com:8443
  name: openshift2.example.com:8443
contexts: (2)
- context:
    cluster: openshift1.example.com:8443
    namespace: alice-project
    user: alice/openshift1.example.com:8443
  name: alice-project/openshift1.example.com:8443/alice
- context:
    cluster: openshift1.example.com:8443
    namespace: joe-project
    user: alice/openshift1.example.com:8443
  name: joe-project/openshift1/alice
current-context: joe-project/openshift1.example.com:8443/alice (3)
kind: Config
preferences: {}
users: (4)
- name: alice/openshift1.example.com:8443
  user:
    token: xZHd2piv5_9vQrg-SKXRJ2Dsl9SceNJdhNTljEKTb8k
```

(1) The **clusters** section defines connection details for OpenShift Container Platform clusters, including the address for their master server. In this example, one cluster is nicknamed **openshift1.example.com:8443** and another is nicknamed **openshift2.example.com:8443**.

(2) This **contexts** section defines two contexts: one nicknamed **alice-project/openshift1.example.com:8443/alice**, using the **alice-project** project, **openshift1.example.com:8443** cluster, and **alice** user, and another nicknamed **joe-project/openshift1.example.com:8443/alice**, using the **joe-project** project, **openshift1.example.com:8443** cluster and **alice** user.

(3) The **current-context** parameter shows that the **joe-project/openshift1.example.com:8443/alice** context is currently in use, allowing the **alice** user to work in the **joe-project** project on the **openshift1.example.com:8443** cluster.

(4) The **users** section defines user credentials. In this example, the user nickname **alice/openshift1.example.com:8443** uses an access token.

The CLI can support multiple configuration files which are loaded at runtime and merged together along with any override options specified from the command line. After you are logged in, you can use the **oc status** or **oc project** command to verify your current working environment:

Verify the current working environment

```
$ oc status
```

Example output

```
oc status
In project Joe's Project (joe-project)

service database (172.30.43.12:5434 -> 3306)
  database deploys docker.io/openshift/mysql-55-centos7:latest
    #1 deployed 25 minutes ago - 1 pod

service frontend (172.30.159.137:5432 -> 8080)
  frontend deploys origin-ruby-sample:latest <-
    builds https://github.com/openshift/ruby-hello-world with joe-project/ruby-20-centos7:latest
    #1 deployed 22 minutes ago - 2 pods

To see more information about a service or deployment, use 'oc describe service <name>' or 'oc
describe dc <name>'.
You can use 'oc get all' to see lists of each of the types described in this example.
```

List the current project

```
$ oc project
```

Example output

```
Using project "joe-project" from context named "joe-project/openshift1.example.com:8443/alice" on
server "https://openshift1.example.com:8443".
```

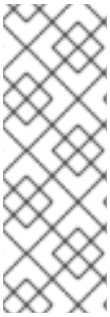
You can run the **oc login** command again and supply the required information during the interactive process, to log in using any other combination of user credentials and cluster details. A context is constructed based on the supplied information if one does not already exist. If you are already logged in and want to switch to another project the current user already has access to, use the **oc project** command and enter the name of the project:

```
$ oc project alice-project
```

Example output

```
Now using project "alice-project" on server "https://openshift1.example.com:8443".
```

At any time, you can use the **oc config view** command to view your current CLI configuration, as seen in the output. Additional CLI configuration commands are also available for more advanced usage.



NOTE

If you have access to administrator credentials but are no longer logged in as the default system user **system:admin**, you can log back in as this user at any time as long as the credentials are still present in your CLI config file. The following command logs in and switches to the default project:

```
$ oc login -u system:admin -n default
```

2.3.2. Manual configuration of CLI profiles

NOTE

This section covers more advanced usage of CLI configurations. In most situations, you can use the **oc login** and **oc project** commands to log in and switch between contexts and projects.

If you want to manually configure your CLI config files, you can use the **oc config** command instead of directly modifying the files. The **oc config** command includes a number of helpful sub-commands for this purpose:

Table 2.1. CLI configuration subcommands

Subcommand	Usage
set-cluster	Sets a cluster entry in the CLI config file. If the referenced cluster nickname already exists, the specified information is merged in. `$ oc config set-cluster <cluster_nickname> [--server=<master_ip_or_fqdn>] [--certificate-authority=<path/to/certificate/authority>] [--api-version=<apiversion>] [--insecure-skip-tls-verify=true]`
set-context	Sets a context entry in the CLI config file. If the referenced context nickname already exists, the specified information is merged in. `$ oc config set-context <context_nickname> [--cluster=<cluster_nickname>] [--user=<user_nickname>] [--namespace=<namespace>]`
use-context	Sets the current context using the specified context nickname. `$ oc config use-context <context_nickname>`
set	Sets an individual value in the CLI config file. `$ oc config set <property_name> <property_value>` The **<property_name>** is a dot-delimited name where each token represents either an attribute name or a map key. The **<property_value>** is the new value being set.

Subcommand	Usage
unset	Unsets individual values in the CLI config file. `$ oc config unset <property_name>` The **<property_name>** is a dot-delimited name where each token represents either an attribute name or a map key.

view	Displays the merged CLI configuration currently in use.
	
	`$ oc config view`
	
	Displays the result of the specified CLI config file.
	
	`$ oc config view --config=<specific_filename>`

Example usage

- Log in as a user that uses an access token. This token is used by the **alice** user:

```
$ oc login https://openshift1.example.com --
token=ns7yVhuRNpDM9cgzfhhxQ7bM5s7N2ZVrkZepSRf4LC0
```

- View the cluster entry automatically created:

```
$ oc config view
```

Example output

```
apiVersion: v1
clusters:
- cluster:
    insecure-skip-tls-verify: true
    server: https://openshift1.example.com
  name: openshift1-example-com
contexts:
- context:
    cluster: openshift1-example-com
    namespace: default
    user: alice/openshift1-example-com
  name: default/openshift1-example-com/alice
current-context: default/openshift1-example-com/alice
kind: Config
preferences: {}
users:
- name: alice/openshift1.example.com
  user:
    token: ns7yVhuRNpDM9cgzfhhxQ7bM5s7N2ZVrkZepSRf4LC0
```

- Update the current context to have users log in to the desired namespace:

```
$ oc config set-context `oc config current-context` --namespace=<project_name>
```

- Examine the current context, to confirm that the changes are implemented:

```
$ oc whoami -c
```

All subsequent CLI operations uses the new context, unless otherwise specified by overriding CLI options or until the context is switched.

2.3.3. Load and merge rules

You can follow these rules, when issuing CLI operations for the loading and merging order for the CLI configuration:

- CLI config files are retrieved from your workstation, using the following hierarchy and merge rules:
  - If the **--config** option is set, then only that file is loaded. The flag is set once and no merging takes place.
  - If the **$KUBECONFIG** environment variable is set, then it is used. The variable can be a list of paths, and if so the paths are merged together. When a value is modified, it is modified in the file that defines the stanza. When a value is created, it is created in the first file that exists. If no files in the chain exist, then it creates the last file in the list.
  - Otherwise, the ***~/.kube/config*** file is used and no merging takes place.
- The context to use is determined based on the first match in the following flow:
  - The value of the **--context** option.
  - The **current-context** value from the CLI config file.
  - An empty value is allowed at this stage.
- The user and cluster to use is determined. At this point, you may or may not have a context; they are built based on the first match in the following flow, which is run once for the user and once for the cluster:
  - The value of the **--user** for user name and **--cluster** option for cluster name.
  - If the **--context** option is present, then use the context's value.
  - An empty value is allowed at this stage.
- The actual cluster information to use is determined. At this point, you may or may not have cluster information. Each piece of the cluster information is built based on the first match in the following flow:
  - The values of any of the following command line options:
    - **--server**,
    - **--api-version**

- **--certificate-authority**
- **--insecure-skip-tls-verify**

  - If cluster information and a value for the attribute is present, then use it.
  - If you do not have a server location, then there is an error.

- The actual user information to use is determined. Users are built using the same rules as clusters, except that you can only have one authentication technique per user; conflicting techniques cause the operation to fail. Command line options take precedence over config file values. Valid command line options are:

  - **--auth-path**
  - **--client-certificate**
  - **--client-key**
  - **--token**

- For any information that is still missing, default values are used and prompts are given for additional information.

2.4. EXTENDING THE OPENSHIFT CLI WITH PLUG-INS

You can write and install plug-ins to build on the default **oc** commands, allowing you to perform new and more complex tasks with the OpenShift Container Platform CLI.

2.4.1. Writing CLI plug-ins

You can write a plug-in for the OpenShift Container Platform CLI in any programming language or script that allows you to write command-line commands. Note that you can not use a plug-in to overwrite an existing **oc** command.

IMPORTANT

OpenShift CLI plug-ins are currently a Technology Preview feature. Technology Preview features are not supported with Red Hat production service level agreements (SLAs), might not be functionally complete, and Red Hat does not recommend to use them for production. These features provide early access to upcoming product features, enabling customers to test functionality and provide feedback during the development process.

See the Red Hat Technology Preview features support scope for more information.

Procedure

This procedure creates a simple Bash plug-in that prints a message to the terminal when the **oc foo** command is issued.

1. Create a file called **oc-foo**.
   When naming your plug-in file, keep the following in mind:

   - The file must begin with **oc-** or **kubectl-** to be recognized as a plug-in.
   - The file name determines the command that invokes the plug-in. For example, a plug-in

with the file name **oc-foo-bar** can be invoked by a command of **oc foo bar**. You can also use underscores if you want the command to contain dashes. For example, a plug-in with the file name **oc-foo_bar** can be invoked by a command of **oc foo-bar**.

2. Add the following contents to the file.

```
#!/bin/bash

# optional argument handling
if [[ "$1" == "version" ]]
then
    echo "1.0.0"
    exit 0
fi

# optional argument handling
if [[ "$1" == "config" ]]
then
    echo $KUBECONFIG
    exit 0
fi

echo "I am a plugin named kubectl-foo"
```

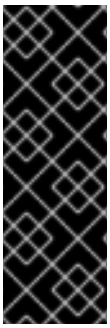
After you install this plug-in for the OpenShift Container Platform CLI, it can be invoked using the **oc foo** command.

Additional resources

- Review the Sample plug-in repository for an example of a plug-in written in Go.
- Review the CLI runtime repository for a set of utilities to assist in writing plug-ins in Go.

2.4.2. Installing and using CLI plug-ins

After you write a custom plug-in for the OpenShift Container Platform CLI, you must install it to use the functionality that it provides.



IMPORTANT

OpenShift CLI plug-ins are currently a Technology Preview feature. Technology Preview features are not supported with Red Hat production service level agreements (SLAs), might not be functionally complete, and Red Hat does not recommend to use them for production. These features provide early access to upcoming product features, enabling customers to test functionality and provide feedback during the development process.

See the Red Hat Technology Preview features support scope for more information.

Prerequisites

- You must have the **oc** CLI tool installed.
- You must have a CLI plug-in file that begins with **oc-** or **kubectl-**.

Procedure

1. If necessary, update the plug-in file to be executable.

```
$ chmod +x <plugin_file>
```

2. Place the file anywhere in your **PATH**, such as **/usr/local/bin/**.

```
$ sudo mv <plugin_file> /usr/local/bin/.
```

3. Run **oc plugin list** to make sure that the plug-in is listed.

```
$ oc plugin list
```

Example output

```
The following compatible plugins are available:

/usr/local/bin/<plugin_file>
```

If your plug-in is not listed here, verify that the file begins with **oc-** or **kubectl-**, is executable, and is on your **PATH**.

4. Invoke the new command or option introduced by the plug-in.
For example, if you built and installed the **kubectl-ns** plug-in from the Sample plug-in repository, you can use the following command to view the current namespace.

```
$ oc ns
```

Note that the command to invoke the plug-in depends on the plug-in file name. For example, a plug-in with the file name of **oc-foo-bar** is invoked by the **oc foo bar** command.

2.5. OPENSHIFT CLI DEVELOPER COMMANDS

2.5.1. Basic CLI commands

2.5.1.1. explain

Display documentation for a certain resource.

Example: Display documentation for pods

```
$ oc explain pods
```

2.5.1.2. login

Log in to the OpenShift Container Platform server and save login information for subsequent use.

Example: Interactive login

```
$ oc login -u user1
```

2.5.1.3. new-app

Create a new application by specifying source code, a template, or an image.

Example: Create a new application from a local Git repository

```
$ oc new-app .
```

Example: Create a new application from a remote Git repository

```
$ oc new-app https://github.com/sclorg/cakephp-ex
```

Example: Create a new application from a private remote repository

```
$ oc new-app https://github.com/youruser/yourprivaterepo --source-secret=yoursecret
```

2.5.1.4. new-project

Create a new project and switch to it as the default project in your configuration.

Example: Create a new project

```
$ oc new-project myproject
```

2.5.1.5. project

Switch to another project and make it the default in your configuration.

Example: Switch to a different project

```
$ oc project test-project
```

2.5.1.6. projects

Display information about the current active project and existing projects on the server.

Example: List all projects

```
$ oc projects
```

2.5.1.7. status

Show a high-level overview of the current project.

Example: Show the status of the current project

```
$ oc status
```

2.5.2. Build and Deploy CLI commands

2.5.2.1. cancel-build

Cancel a running, pending, or new build.

Example: Cancel a build

```
$ oc cancel-build python-1
```

Example: Cancel all pending builds from the python build config

```
$ oc cancel-build buildconfig/python --state=pending
```

2.5.2.2. import-image

Import the latest tag and image information from an image repository.

Example: Import the latest image information

```
$ oc import-image my-ruby
```

2.5.2.3. new-build

Create a new build config from source code.

Example: Create a build config from a local Git repository

```
$ oc new-build .
```

Example: Create a build config from a remote Git repository

```
$ oc new-build https://github.com/sclorg/cakephp-ex
```

2.5.2.4. rollback

Revert an application back to a previous deployment.

Example: Roll back to the last successful deployment

```
$ oc rollback php
```

Example: Roll back to a specific version

```
$ oc rollback php --to-version=3
```

2.5.2.5. rollout

Start a new rollout, view its status or history, or roll back to a previous revision of your application.

Example: Roll back to the last successful deployment

```
$ oc rollout undo deploymentconfig/php
```

Example: Start a new rollout for a deployment with its latest state

```
$ oc rollout latest deploymentconfig/php
```

2.5.2.6. start-build

Start a build from a build config or copy an existing build.

Example: Start a build from the specified build config

```
$ oc start-build python
```

Example: Start a build from a previous build

```
$ oc start-build --from-build=python-1
```

Example: Set an environment variable to use for the current build

```
$ oc start-build python --env=mykey=myvalue
```

2.5.2.7. tag

Tag existing images into image streams.

Example: Configure the ruby image's latest tag to refer to the image for the 2.0 tag

```
$ oc tag ruby:latest ruby:2.0
```

2.5.3. Application management CLI commands

2.5.3.1. annotate

Update the annotations on one or more resources.

Example: Add an annotation to a route

```
$ oc annotate route/test-route haproxy.router.openshift.io/ip_whitelist="192.168.1.10"
```

Example: Remove the annotation from the route

```
$ oc annotate route/test-route haproxy.router.openshift.io/ip_whitelist-
```

2.5.3.2. apply

Apply a configuration to a resource by file name or standard in (stdin) in JSON or YAML format.

Example: Apply the configuration in pod.json to a pod

```
$ oc apply -f pod.json
```

2.5.3.3. autoscale

Autoscale a deployment or replication controller.

Example: Autoscale to a minimum of two and maximum of five pods

```
$ oc autoscale deploymentconfig/parksmap-katacoda --min=2 --max=5
```

2.5.3.4. create

Create a resource by file name or standard in (stdin) in JSON or YAML format.

Example: Create a pod using the content in `pod.json`

```
$ oc create -f pod.json
```

2.5.3.5. delete

Delete a resource.

Example: Delete a pod named `parksmap-katacoda-1-qfqz4`

```
$ oc delete pod/parksmap-katacoda-1-qfqz4
```

Example: Delete all pods with the `app=parksmap-katacoda` label

```
$ oc delete pods -l app=parksmap-katacoda
```

2.5.3.6. describe

Return detailed information about a specific object.

Example: Describe a deployment named `example`

```
$ oc describe deployment/example
```

Example: Describe all pods

```
$ oc describe pods
```

2.5.3.7. edit

Edit a resource.

Example: Edit a deployment using the default editor

```
$ oc edit deploymentconfig/parksmap-katacoda
```

Example: Edit a deployment using a different editor

```
$ OC_EDITOR="nano" oc edit deploymentconfig/parksmap-katacoda
```

Example: Edit a deployment in JSON format

```
$ oc edit deploymentconfig/parksmap-katacoda -o json
```

2.5.3.8. expose

Expose a service externally as a route.

Example: Expose a service

```
$ oc expose service/parksmap-katacoda
```

Example: Expose a service and specify the host name

```
$ oc expose service/parksmap-katacoda --hostname=www.my-host.com
```

2.5.3.9. get

Display one or more resources.

Example: List pods in the `default` namespace

```
$ oc get pods -n default
```

Example: Get details about the `python` deployment in JSON format

```
$ oc get deploymentconfig/python -o json
```

2.5.3.10. label

Update the labels on one or more resources.

Example: Update the `python-1-mz2rf` pod with the label `status` set to `unhealthy`

```
$ oc label pod/python-1-mz2rf status=unhealthy
```

2.5.3.11. scale

Set the desired number of replicas for a replication controller or a deployment.

Example: Scale the `ruby-app` deployment to three pods

```
$ oc scale deploymentconfig/ruby-app --replicas=3
```

2.5.3.12. secrets

Manage secrets in your project.

Example: Allow my-pull-secret to be used as an image pull secret by the default service account

```
$ oc secrets link default my-pull-secret --for=pull
```

2.5.3.13. serviceaccounts

Get a token assigned to a service account or create a new token or **kubeconfig** file for a service account.

Example: Get the token assigned to the default service account

```
$ oc serviceaccounts get-token default
```

2.5.3.14. set

Configure existing application resources.

Example: Set the name of a secret on a build config

```
$ oc set build-secret --source buildconfig/mybc mysecret
```

2.5.4. Troubleshooting and debugging CLI commands

2.5.4.1. attach

Attach the shell to a running container.

Example: Get output from the python container from pod python-1-mz2rf

```
$ oc attach python-1-mz2rf -c python
```

2.5.4.2. cp

Copy files and directories to and from containers.

Example: Copy a file from the python-1-mz2rf pod to the local file system

```
$ oc cp default/python-1-mz2rf:/opt/app-root/src/README.md ~/mydirectory/.
```

2.5.4.3. debug

Launch a command shell to debug a running application.

Example: Debug the python deployment

```
$ oc debug deploymentconfig/python
```

2.5.4.4. exec

Execute a command in a container.

Example: Execute the ls command in the python container from pod python-1-mz2rf

```
$ oc exec python-1-mz2rf -c python ls
```

2.5.4.5. logs

Retrieve the log output for a specific build, build config, deployment, or pod.

Example: Stream the latest logs from the python deployment

```
$ oc logs -f deploymentconfig/python
```

2.5.4.6. port-forward

Forward one or more local ports to a pod.

Example: Listen on port 8888 locally and forward to port 5000 in the pod

```
$ oc port-forward python-1-mz2rf 8888:5000
```

2.5.4.7. proxy

Run a proxy to the Kubernetes API server.

Example: Run a proxy to the API server on port 8011 serving static content from ./local/www/

```
$ oc proxy --port=8011 --www=./local/www/
```

2.5.4.8. rsh

Open a remote shell session to a container.

Example: Open a shell session on the first container in the python-1-mz2rf pod

```
$ oc rsh python-1-mz2rf
```

2.5.4.9. rsync

Copy contents of a directory to or from a running pod container. Only changed files are copied using the **rsync** command from your operating system.

Example: Synchronize files from a local directory with a pod directory

```
$ oc rsync ~/mydirectory/ python-1-mz2rf:/opt/app-root/src/
```

2.5.4.10. run

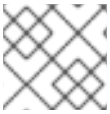
Create a pod running a particular image.

Example: Start a pod running the perl image

```
$ oc run my-test --image=perl
```

2.5.4.11. wait

Wait for a specific condition on one or more resources.



NOTE

This command is experimental and might change without notice.

Example: Wait for the python-1-mz2rf pod to be deleted

```
$ oc wait --for=delete pod/python-1-mz2rf
```

2.5.5. Advanced developer CLI commands

2.5.5.1. api-resources

Display the full list of API resources that the server supports.

Example: List the supported API resources

```
$ oc api-resources
```

2.5.5.2. api-versions

Display the full list of API versions that the server supports.

Example: List the supported API versions

```
$ oc api-versions
```

2.5.5.3. auth

Inspect permissions and reconcile RBAC roles.

Example: Check whether the current user can read pod logs

```
$ oc auth can-i get pods --subresource=log
```

Example: Reconcile RBAC roles and permissions from a file

```
$ oc auth reconcile -f policy.json
```

2.5.5.4. cluster-info

Display the address of the master and cluster services.

Example: Display cluster information

```
$ oc cluster-info
```

2.5.5.5. extract

Extract the contents of a config map or secret. Each key in the config map or secret is created as a separate file with the name of the key.

Example: Download the contents of the `ruby-1-ca` config map to the current directory

```
$ oc extract configmap/ruby-1-ca
```

Example: Print the contents of the `ruby-1-ca` config map to stdout

```
$ oc extract configmap/ruby-1-ca --to=-
```

2.5.5.6. idle

Idle scalable resources. An idled service will automatically become unidled when it receives traffic or it can be manually unidled using the **oc scale** command.

Example: Idle the `ruby-app` service

```
$ oc idle ruby-app
```

2.5.5.7. image

Manage images in your OpenShift Container Platform cluster.

Example: Copy an image to another tag

```
$ oc image mirror myregistry.com/myimage:latest myregistry.com/myimage:stable
```

2.5.5.8. observe

Observe changes to resources and take action on them.

Example: Observe changes to services

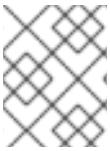
```
$ oc observe services
```

2.5.5.9. patch

Updates one or more fields of an object using strategic merge patch in JSON or YAML format.

Example: Update the `spec.unschedulable` field for node `node1` to `true`

```
$ oc patch node/node1 -p '{"spec":{"unschedulable":true}}'
```



NOTE

If you must patch a custom resource definition, you must include the **--type merge** or **--type json** option in the command.

2.5.5.10. policy

Manage authorization policies.

Example: Add the edit role to user1 for the current project

```
$ oc policy add-role-to-user edit user1
```

2.5.5.11. process

Process a template into a list of resources.

Example: Convert template.json to a resource list and pass to oc create

```
$ oc process -f template.json | oc create -f -
```

2.5.5.12. registry

Manage the integrated registry on OpenShift Container Platform.

Example: Display information about the integrated registry

```
$ oc registry info
```

2.5.5.13. replace

Modify an existing object based on the contents of the specified configuration file.

Example: Update a pod using the content in pod.json

```
$ oc replace -f pod.json
```

2.5.6. Settings CLI commands

2.5.6.1. completion

Output shell completion code for the specified shell.

Example: Display completion code for Bash

```
$ oc completion bash
```

2.5.6.2. config

Manage the client configuration files.

Example: Display the current configuration

```
$ oc config view
```

Example: Switch to a different context

```
$ oc config use-context test-context
```

2.5.6.3. logout

Log out of the current session.

Example: End the current session

```
$ oc logout
```

2.5.6.4. whoami

Display information about the current session.

Example: Display the currently authenticated user

```
$ oc whoami
```

2.5.7. Other developer CLI commands

2.5.7.1. help

Display general help information for the CLI and a list of available commands.

Example: Display available commands

```
$ oc help
```

Example: Display the help for the new-project command

```
$ oc help new-project
```

2.5.7.2. plugin

List the available plug-ins on the user's **PATH**.

Example: List available plug-ins

```
$ oc plugin list
```

2.5.7.3. version

Display the **oc** client and server versions.

Example: Display version information

```
$ oc version
```

For cluster administrators, the OpenShift Container Platform server version is also displayed.

2.6. OPENSHIFT CLI ADMINISTRATOR COMMANDS

NOTE

You must have **cluster-admin** or equivalent permissions to use these administrator commands.

2.6.1. Cluster management CLI commands

2.6.1.1. inspect

Gather debugging information for a particular resource.

NOTE

This command is experimental and might change without notice.

Example: Collect debugging data for the OpenShift API server cluster Operator

```
$ oc adm inspect clusteroperator/openshift-apiserver
```

2.6.1.2. must-gather

Bulk collect data about the current state of your cluster to debug issues.

NOTE

This command is experimental and might change without notice.

Example: Gather debugging information

```
$ oc adm must-gather
```

2.6.1.3. top

Show usage statistics of resources on the server.

Example: Show CPU and memory usage for pods

```
$ oc adm top pods
```

Example: Show usage statistics for images

```
$ oc adm top images
```

2.6.2. Node management CLI commands

2.6.2.1. cordon

Mark a node as unschedulable. Manually marking a node as unschedulable blocks any new pods from being scheduled on the node, but does not affect existing pods on the node.

Example: Mark `node1` as unschedulable

```
$ oc adm cordon node1
```

2.6.2.2. drain

Drain a node in preparation for maintenance.

Example: Drain `node1`

```
$ oc adm drain node1
```

2.6.2.3. node-logs

Display and filter node logs.

Example: Get logs for `NetworkManager`

```
$ oc adm node-logs --role master -u NetworkManager.service
```

2.6.2.4. taint

Update the taints on one or more nodes.

Example: Add a taint to dedicate a node for a set of users

```
$ oc adm taint nodes node1 dedicated=groupName:NoSchedule
```

Example: Remove the taints with key `dedicated` from node `node1`

```
$ oc adm taint nodes node1 dedicated-
```

2.6.2.5. uncordon

Mark a node as schedulable.

Example: Mark `node1` as schedulable

```
$ oc adm uncordon node1
```

2.6.3. Security and policy CLI commands

2.6.3.1. certificate

Approve or reject certificate signing requests (CSRs).

Example: Approve a CSR

```
$ oc adm certificate approve csr-sqgzp
```

2.6.3.2. groups

Manage groups in your cluster.

Example: Create a new group

```
$ oc adm groups new my-group
```

2.6.3.3. new-project

Create a new project and specify administrative options.

Example: Create a new project using a node selector

```
$ oc adm new-project myproject --node-selector='type=user-node,region=east'
```

2.6.3.4. pod-network

Manage pod networks in the cluster.

Example: Isolate `project1` and `project2` from other non-global projects

```
$ oc adm pod-network isolate-projects project1 project2
```

2.6.3.5. policy

Manage roles and policies on the cluster.

Example: Add the `edit` role to `user1` for all projects

```
$ oc adm policy add-cluster-role-to-user edit user1
```

Example: Add the `privileged` security context constraint to a service account

```
$ oc adm policy add-scc-to-user privileged -z myserviceaccount
```

2.6.4. Maintenance CLI commands

2.6.4.1. migrate

Migrate resources on the cluster to a new version or format depending on the subcommand used.

Example: Perform an update of all stored objects

```
$ oc adm migrate storage
```

Example: Perform an update of only pods

```
$ oc adm migrate storage --include=pods
```

2.6.4.2. prune

Remove older versions of resources from the server.

Example: Prune older builds including those whose build configs no longer exist

```
$ oc adm prune builds --orphans
```

2.6.5. Configuration CLI commands

2.6.5.1. create-bootstrap-project-template

Create a bootstrap project template.

Example: Output a bootstrap project template in YAML format to stdout

```
$ oc adm create-bootstrap-project-template -o yaml
```

2.6.5.2. create-error-template

Create a template for customizing the error page.

Example: Output a template for the error page to stdout

```
$ oc adm create-error-template
```

2.6.5.3. create-kubeconfig

Creates a basic **.kubeconfig** file from client certificates.

Example: Create a .kubeconfig file with the provided client certificates

```
$ oc adm create-kubeconfig \
  --client-certificate=/path/to/client.crt \
  --client-key=/path/to/client.key \
  --certificate-authority=/path/to/ca.crt
```

2.6.5.4. create-login-template

Create a template for customizing the login page.

Example: Output a template for the login page to stdout

```
$ oc adm create-login-template
```

2.6.5.5. create-provider-selection-template

Create a template for customizing the provider selection page.

Example: Output a template for the provider selection page to stdout

```
$ oc adm create-provider-selection-template
```

2.6.6. Other Administrator CLI commands

2.6.6.1. build-chain

Output the inputs and dependencies of any builds.

Example: Output dependencies for the perl imagestream

```
$ oc adm build-chain perl
```

2.6.6.2. completion

Output shell completion code for the **oc adm** commands for the specified shell.

Example: Display oc adm completion code for Bash

```
$ oc adm completion bash
```

2.6.6.3. config

Manage the client configuration files. This command has the same behavior as the **oc config** command.

Example: Display the current configuration

```
$ oc adm config view
```

Example: Switch to a different context

```
$ oc adm config use-context test-context
```

2.6.6.4. release

Manage various aspects of the OpenShift Container Platform release process, such as viewing information about a release or inspecting the contents of a release.

Example: Generate a changelog between two releases and save to changelog.md

```
$ oc adm release info --changelog=/tmp/git \
    quay.io/openshift-release-dev/ocp-release:4.7.0-x86_64 \
    quay.io/openshift-release-dev/ocp-release:4.7.1-x86_64 \
    > changelog.md
```

2.6.6.5. verify-image-signature

Verify the image signature of an image imported to the internal registry using the local public GPG key.

Example: Verify the nodejs image signature

```
$ oc adm verify-image-signature \
    sha256:2bba968aedb7dd2aafe5fa8c7453f5ac36a0b9639f1bf5b03f95de325238b288 \
    --expected-identity 172.30.1.1:5000/openshift/nodejs:latest \
    --public-key /etc/pki/rpm-gpg/RPM-GPG-KEY-redhat-release \
    --save
```

2.7. USAGE OF OC AND KUBECTL COMMANDS

The Kubernetes command-line interface (CLI), **kubectl**, can be used to run commands against a Kubernetes cluster. Because OpenShift Container Platform is a certified Kubernetes distribution, you can use the supported **kubectl** binaries that ship with OpenShift Container Platform, or you can gain extended functionality by using the **oc** binary.

2.7.1. The oc binary

The **oc** binary offers the same capabilities as the **kubectl** binary, but it extends to natively support additional OpenShift Container Platform features, including:

- **Full support for OpenShift Container Platform resources**
  Resources such as **DeploymentConfig**, **BuildConfig**, **Route**, **ImageStream**, and **ImageStreamTag** objects are specific to OpenShift Container Platform distributions, and build upon standard Kubernetes primitives.

- **Authentication**
  The **oc** binary offers a built-in **login** command that allows authentication and enables you to work with OpenShift Container Platform projects, which map Kubernetes namespaces to authenticated users. See Understanding authentication for more information.

- **Additional commands**
  The additional command **oc new-app**, for example, makes it easier to get new applications started using existing source code or pre-built images. Similarly, the additional command **oc new-project** makes it easier to start a project that you can switch to as your default.

IMPORTANT

If you installed an earlier version of the **oc** binary, you cannot use it to complete all of the commands in OpenShift Container Platform 4.7. If you want the latest features, you must download and install the latest version of the **oc** binary corresponding to your OpenShift Container Platform server version.

Non-security API changes will involve, at minimum, two minor releases (4.1 to 4.2 to 4.3, for example) to allow older **oc** binaries to update. Using new capabilities might require newer **oc** binaries. A 4.3 server

might have additional capabilities that a 4.2 **oc** binary cannot use and a 4.3 **oc** binary might have additional capabilities that are unsupported by a 4.2 server.

Table 2.2. Compatibility Matrix

	X.Y (**oc** Client)	**X.Y+N** footnote:versionpolicyn[Where **N** is a number greater than or equal to 1.] (**oc** Client)
X.Y (Server)	1	3
X.Y+N footnote:versionpolicyn[] (Server)	2	1

1 Fully compatible.

2 **oc** client might be unable to access server features.

3 **oc** client might provide options and features that might not be compatible with the accessed server.

2.7.2. The kubectl binary

The **kubectl** binary is provided as a means to support existing workflows and scripts for new OpenShift Container Platform users coming from a standard Kubernetes environment, or for those who prefer to use the **kubectl** CLI. Existing users of **kubectl** can continue to use the binary to interact with Kubernetes primitives, with no changes required to the OpenShift Container Platform cluster.

You can install the supported **kubectl** binary by following the steps to Install the OpenShift CLI. The **kubectl** binary is included in the archive if you download the binary, or is installed when you install the CLI by using an RPM.

For more information, see the kubectl documentation.

CHAPTER 3. DEVELOPER CLI (ODO)

3.1. ODO RELEASE NOTES

3.1.1. Notable changes and improvements in odo version 2.5.0

- Creates unique routes for each component, using **adler32** hashing
- Supports additional fields in the devfile for assigning resources:
  - cpuRequest
  - cpuLimit
  - memoryRequest
  - memoryLimit
- Adds the **--deploy** flag to the **odo delete** command, to remove components deployed using the **odo deploy** command:

```
$ odo delete --deploy
```

- Adds mapping support to the **odo link** command
- Supports ephemeral volumes using the **ephemeral** field in **volume** components
- Sets the default answer to **yes** when asking for telemetry opt-in
- Improves metrics by sending additional telemetry data to the devfile registry
- Updates the bootstrap image to **registry.access.redhat.com/ocp-tools-4/odo-init-container-rhel8:1.1.11**
- The upstream repository is available at https://github.com/redhat-developer/odo

3.1.2. Bug fixes

- Previously, **odo deploy** would fail if the **.odo/env** file did not exist. The command now creates the **.odo/env** file if required.
- Previously, interactive component creation using the **odo create** command would fail if disconnect from the cluster. This issue is fixed in the latest release.

3.1.3. Getting support

For Product

If you find an error, encounter a bug, or have suggestions for improving the functionality of **odo**, file an issue in Bugzilla. Choose **OpenShift Developer Tools and Services** as a product type and **odo** as a component.

Provide as many details in the issue description as possible.

For Documentation

If you find an error or have suggestions for improving the documentation, file a Jira issue for the most relevant documentation component.

3.2. UNDERSTANDING ODO

Red Hat OpenShift Developer CLI (**odo**) is a tool for creating applications on OpenShift Container Platform and Kubernetes. With **odo**, you can develop, test, debug, and deploy microservices-based applications on a Kubernetes cluster without having a deep understanding of the platform.

odo follows a *create and push* workflow. As a user, when you *create*, the information (or manifest) is stored in a configuration file. When you *push*, the corresponding resources are created on the Kubernetes cluster. All of this configuration is stored in the Kubernetes API for seamless accessibility and functionality.

odo uses *service* and *link* commands to link components and services together. **odo** achieves this by creating and deploying services based on Kubernetes Operators in the cluster. Services can be created using any of the Operators available on the Operator Hub. After linking a service, **odo** injects the service configuration into the component. Your application can then use this configuration to communicate with the Operator-backed service.

3.2.1. odo key features

odo is designed to be a developer-friendly interface to Kubernetes, with the ability to:

- Quickly deploy applications on a Kubernetes cluster by creating a new manifest or using an existing one
- Use commands to easily create and update the manifest, without the need to understand and maintain Kubernetes configuration files
- Provide secure access to applications running on a Kubernetes cluster
- Add and remove additional storage for applications on a Kubernetes cluster
- Create Operator-backed services and link your application to them
- Create a link between multiple microservices that are deployed as **odo** components
- Remotely debug applications you deployed using **odo** in your IDE
- Easily test applications deployed on Kubernetes using **odo**

3.2.2. odo core concepts

odo abstracts Kubernetes concepts into terminology that is familiar to developers:

Application

A typical application, developed with a cloud-native approach, that is used to perform a particular task.
Examples of *applications* include online video streaming, online shopping, and hotel reservation systems.

Component

A set of Kubernetes resources that can run and be deployed separately. A cloud-native application is a collection of small, independent, loosely coupled *components*.
Examples of *components* include an API back-end, a web interface, and a payment back-end.

Project

A single unit containing your source code, tests, and libraries.

Context

A directory that contains the source code, tests, libraries, and **odo** config files for a single component.

URL

A mechanism to expose a component for access from outside the cluster.

Storage

Persistent storage in the cluster. It persists the data across restarts and component rebuilds.

Service

An external application that provides additional functionality to a component.
Examples of *services* include PostgreSQL, MySQL, Redis, and RabbitMQ.

In **odo**, services are provisioned from the OpenShift Service Catalog and must be enabled within your cluster.

devfile

An open standard for defining containerized development environments that enables developer tools to simplify and accelerate workflows. For more information, see the documentation at https://devfile.io.
You can connect to publicly available *devfile* registries, or you can install a Secure Registry.

3.2.3. Listing components in odo

odo uses the portable *devfile* format to describe components and their related URLs, storage, and services. **odo** can connect to various devfile registries to download devfiles for different languages and frameworks. See the documentation for the **odo registry** command for more information on how to manage the registries used by **odo** to retrieve devfile information.

You can list all the *devfiles* available of the different registries with the **odo catalog list components** command.

Procedure

1. Log in to the cluster with **odo**:

```
$ odo login -u developer -p developer
```

2. List the available **odo** components:

```
$ odo catalog list components
```

Example output

```
Odo Devfile Components:
```

```
NAME                        DESCRIPTION                                     REGISTRY
dotnet50                    Stack with .NET 5.0
DefaultDevfileRegistry
dotnet60                    Stack with .NET 6.0
DefaultDevfileRegistry
dotnetcore31                Stack with .NET Core 3.1
DefaultDevfileRegistry
go                          Stack with the latest Go version
DefaultDevfileRegistry
java-maven                  Upstream Maven and OpenJDK 11
DefaultDevfileRegistry
java-openliberty            Java application Maven-built stack using the Open Liberty ru...
DefaultDevfileRegistry
java-openliberty-gradle     Java application Gradle-built stack using the Open Liberty r...
DefaultDevfileRegistry
java-quarkus                Quarkus with Java
DefaultDevfileRegistry
java-springboot             Spring Boot® using Java
DefaultDevfileRegistry
java-vertx                  Upstream Vert.x using Java
DefaultDevfileRegistry
java-websphereliberty       Java application Maven-built stack using the WebSphere
Liber...    DefaultDevfileRegistry
java-websphereliberty-gradle    Java application Gradle-built stack using the WebSphere
Libe...    DefaultDevfileRegistry
java-wildfly                Upstream WildFly
DefaultDevfileRegistry
java-wildfly-bootable-jar   Java stack with WildFly in bootable Jar mode, OpenJDK 11
and...    DefaultDevfileRegistry
nodejs                      Stack with Node.js 14
DefaultDevfileRegistry
nodejs-angular              Stack with Angular 12
DefaultDevfileRegistry
nodejs-nextjs               Stack with Next.js 11
DefaultDevfileRegistry
nodejs-nuxtjs               Stack with Nuxt.js 2
DefaultDevfileRegistry
nodejs-react                Stack with React 17
DefaultDevfileRegistry
nodejs-svelte               Stack with Svelte 3
DefaultDevfileRegistry
nodejs-vue                  Stack with Vue 3
DefaultDevfileRegistry
php-laravel                 Stack with Laravel 8
DefaultDevfileRegistry
python                      Python Stack with Python 3.7
DefaultDevfileRegistry
python-django               Python3.7 with Django
DefaultDevfileRegistry
```

3.2.4. Telemetry in odo

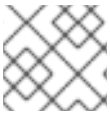
odo collects information about how it is being used, including metrics on the operating system, RAM, CPU, number of cores, **odo** version, errors, success/failures, and how long **odo** commands take to complete.

You can modify your telemetry consent by using the **odo preference** command:

- **odo preference set ConsentTelemetry true** consents to telemetry.
- **odo preference unset ConsentTelemetry** disables telemetry.
- **odo preference view** shows the current preferences.

3.3. INSTALLING ODO

You can install the **odo** CLI on Linux, Windows, or macOS by downloading a binary. You can also install the OpenShift VS Code extension, which uses both the **odo** and the **oc** binaries to interact with your OpenShift Container Platform cluster. For Red Hat Enterprise Linux (RHEL), you can install the **odo** CLI as an RPM.



NOTE

Currently, **odo** does not support installation in a restricted network environment.

3.3.1. Installing odo on Linux

The **odo** CLI is available to download as a binary and as a tarball for multiple operating systems and architectures including:

Operating System	Binary	Tarball
Linux	odo-linux-amd64	odo-linux-amd64.tar.gz
Linux on IBM Power	odo-linux-ppc64le	odo-linux-ppc64le.tar.gz
Linux on IBM Z and LinuxONE	odo-linux-s390x	odo-linux-s390x.tar.gz

Procedure

1. Navigate to the content gateway and download the appropriate file for your operating system and architecture.
   - If you download the binary, rename it to **odo**:

     ```
     $ curl -L https://developers.redhat.com/content-gateway/rest/mirror/pub/openshift-v4/clients/odo/latest/odo-linux-amd64 -o odo
     ```

   - If you download the tarball, extract the binary:

     ```
     $ curl -L https://developers.redhat.com/content-gateway/rest/mirror/pub/openshift-v4/clients/odo/latest/odo-linux-amd64.tar.gz -o odo.tar.gz
     $ tar xvzf odo.tar.gz
     ```

2. Change the permissions on the binary:

   ```
   $ chmod +x <filename>
   ```

3. Place the **odo** binary in a directory that is on your **PATH**.
To check your **PATH**, execute the following command:

```
$ echo $PATH
```

4. Verify that **odo** is now available on your system:

```
$ odo version
```

3.3.2. Installing odo on Windows

The **odo** CLI for Windows is available to download as a binary and as an archive.

Operating System	Binary	Tarball
Windows	odo-windows-amd64.exe	odo-windows-amd64.exe.zip

Procedure

1. Navigate to the content gateway and download the appropriate file:
   - If you download the binary, rename it to **odo.exe**.
   - If you download the archive, unzip the binary with a ZIP program and then rename it to **odo.exe**.
2. Move the **odo.exe** binary to a directory that is on your **PATH**.
To check your **PATH**, open the command prompt and execute the following command:

```
C:\> path
```

3. Verify that **odo** is now available on your system:

```
C:\> odo version
```

3.3.3. Installing odo on macOS

The **odo** CLI for macOS is available to download as a binary and as a tarball.

Operating System	Binary	Tarball
macOS	odo-darwin-amd64	odo-darwin-amd64.tar.gz

Procedure

1. Navigate to the content gateway and download the appropriate file:

- If you download the binary, rename it to **odo**:

```
$ curl -L https://developers.redhat.com/content-gateway/rest/mirror/pub/openshift-v4/clients/odo/latest/odo-darwin-amd64 -o odo
```

- If you download the tarball, extract the binary:

```
$ curl -L https://developers.redhat.com/content-gateway/rest/mirror/pub/openshift-v4/clients/odo/latest/odo-darwin-amd64.tar.gz -o odo.tar.gz
$ tar xvzf odo.tar.gz
```

2. Change the permissions on the binary:

```
# chmod +x odo
```

3. Place the **odo** binary in a directory that is on your **PATH**.
   To check your **PATH**, execute the following command:

```
$ echo $PATH
```

4. Verify that **odo** is now available on your system:

```
$ odo version
```

3.3.4. Installing odo on VS Code

The OpenShift VS Code extension uses both **odo** and the **oc** binary to interact with your OpenShift Container Platform cluster. To work with these features, install the OpenShift VS Code extension on VS Code.

Prerequisites

- You have installed VS Code.

Procedure

1. Open VS Code.
2. Launch VS Code Quick Open with **Ctrl**+**P**.
3. Enter the following command:

```
$ ext install redhat.vscode-openshift-connector
```

3.3.5. Installing odo on Red Hat Enterprise Linux (RHEL) using an RPM

For Red Hat Enterprise Linux (RHEL), you can install the **odo** CLI as an RPM.

Procedure

1. Register with Red Hat Subscription Manager:

```
# subscription-manager register
```

2. Pull the latest subscription data:

```
# subscription-manager refresh
```

3. List the available subscriptions:

```
# subscription-manager list --available --matches '*OpenShift Developer Tools and Services*'
```

4. In the output of the previous command, find the **Pool ID** field for your OpenShift Container Platform subscription and attach the subscription to the registered system:

```
# subscription-manager attach --pool=<pool_id>
```

5. Enable the repositories required by **odo**:

```
# subscription-manager repos --enable="ocp-tools-4.9-for-rhel-8-x86_64-rpms"
```

6. Install the **odo** package:

```
# yum install odo
```

7. Verify that **odo** is now available on your system:

```
$ odo version
```

3.4. CONFIGURING THE ODO CLI

You can find the global settings for **odo** in the **preference.yaml** file which is located by default in your **$HOME/.odo** directory.

You can set a different location for the **preference.yaml** file by exporting the **GLOBALODOCONFIG** variable.

3.4.1. Viewing the current configuration

You can view the current **odo** CLI configuration by using the following command:

```
$ odo preference view
```

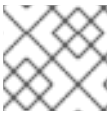
Example output

```
PARAMETER           CURRENT_VALUE
UpdateNotification
NamePrefix
Timeout
BuildTimeout
PushTimeout
Ephemeral
ConsentTelemetry    true
```

3.4.2. Setting a value

You can set a value for a preference key by using the following command:

```
$ odo preference set <key> <value>
```



NOTE

Preference keys are case-insensitive.

Example command

```
$ odo preference set updatenotification false
```

Example output

```
Global preference was successfully updated
```

3.4.3. Unsetting a value

You can unset a value for a preference key by using the following command:

```
$ odo preference unset <key>
```

NOTE

You can use the **-f** flag to skip the confirmation.

Example command

```
$ odo preference unset updatenotification
? Do you want to unset updatenotification in the preference (y/N) y
```

Example output

```
Global preference was successfully updated
```

3.4.4. Preference key table

The following table shows the available options for setting preference keys for the **odo** CLI:

Preference key	Description	Default value
UpdateNotification	Control whether a notification to update **odo** is shown.	True
NamePrefix	Set a default name prefix for an **odo** resource. For example, **component** or **storage**.	Current directory name

Preference key	Description	Default value
Timeout	Timeout for the Kubernetes server connection check.	1 second
BuildTimeout	Timeout for waiting for a build of the git component to complete.	300 seconds
PushTimeout	Timeout for waiting for a component to start.	240 seconds
Ephemeral	Controls whether **odo** should create an **emptyDir** volume to store source code.	True
ConsentTelemetry	Controls whether **odo** can collect telemetry for the user's **odo** usage.	False

3.4.5. Ignoring files or patterns

You can configure a list of files or patterns to ignore by modifying the **.odoignore** file in the root directory of your application. This applies to both **odo push** and **odo watch**.

If the **.odoignore** file does *not* exist, the **.gitignore** file is used instead for ignoring specific files and folders.

To ignore **.git** files, any files with the **.js** extension, and the folder **tests**, add the following to either the **.odoignore** or the **.gitignore** file:

```
.git
*.js
tests/
```

The **.odoignore** file allows any glob expressions.

3.5. ODO CLI REFERENCE

3.5.1. odo build-images

odo can build container images based on Dockerfiles, and push these images to their registries.

When running the **odo build-images** command, **odo** searches for all components in the **devfile.yaml** with the **image** type, for example:

```
components:
- image:
    imageName: quay.io/myusername/myimage
    dockerfile:
      uri: ./Dockerfile <.>
      buildContext: ${PROJECTS_ROOT} <.>
  name: component-built-from-dockerfile
```

<.> The **uri** field indicates the relative path of the Dockerfile to use, relative to the directory containing the **devfile.yaml**. The devfile specification indicates that **uri** could also be an HTTP URL, but this case is

not supported by odo yet. <.> The **buildContext** indicates the directory used as build context. The default value is **${PROJECTS_ROOT}**.

For each image component, odo executes either **podman** or **docker** (the first one found, in this order), to build the image with the specified Dockerfile, build context, and arguments.

If the **--push** flag is passed to the command, the images are pushed to their registries after they are built.

3.5.2. odo catalog

odo uses different *catalogs* to deploy *components* and *services*.

3.5.2.1. Components

odo uses the portable *devfile* format to describe the components. It can connect to various devfile registries to download devfiles for different languages and frameworks. See **odo registry** for more information.

3.5.2.1.1. Listing components

To list all the *devfiles* available on the different registries, run the command:

```
$ odo catalog list components
```

Example output

```
NAME            DESCRIPTION                         REGISTRY
go              Stack with the latest Go version    DefaultDevfileRegistry
java-maven      Upstream Maven and OpenJDK 11       DefaultDevfileRegistry
nodejs          Stack with Node.js 14               DefaultDevfileRegistry
php-laravel     Stack with Laravel 8                DefaultDevfileRegistry
python          Python Stack with Python 3.7        DefaultDevfileRegistry
[...]
```

3.5.2.1.2. Getting information about a component

To get more information about a specific component, run the command:

```
$ odo catalog describe component
```

For example, run the command:

```
$ odo catalog describe component nodejs
```

Example output

```
* Registry: DefaultDevfileRegistry <.>

Starter Projects: <.>
---
name: nodejs-starter
attributes: {}
```

```
description: ""
subdir: ""
projectsource:
  sourcetype: ""
  git:
    gitlikeprojectsource:
      commonprojectsource: {}
      checkoutfrom: null
      remotes:
        origin: https://github.com/odo-devfiles/nodejs-ex.git
  zip: null
  custom: null
```

<.> *Registry* is the registry from which the devfile is retrieved. <.> *Starter projects* are sample projects in the same language and framework of the devfile, that can help you start a new project.

See **odo create** for more information on creating a project from a starter project.

3.5.2.2. Services

odo can deploy *services* with the help of *Operators*.

Only Operators deployed with the help of the *Operator Lifecycle Manager* are supported by odo.

3.5.2.2.1. Listing services

To list the available Operators and their associated services, run the command:

```
$ odo catalog list services
```

Example output

```
Services available through Operators
NAME                            CRDs
postgresql-operator.v0.1.1          Backup, Database
redis-operator.v0.8.0               RedisCluster, Redis
```

In this example, two Operators are installed in the cluster. The **postgresql-operator.v0.1.1** Operator deploys services related to PostgreSQL: **Backup** and **Database**. The **redis-operator.v0.8.0** Operator deploys services related to Redis: **RedisCluster** and **Redis**.

NOTE

To get a list of all the available Operators, **odo** fetches the ClusterServiceVersion (CSV) resources of the current namespace that are in a *Succeeded* phase. For Operators that support cluster-wide access, when a new namespace is created, these resources are automatically added to it. However, it may take some time before they are in the *Succeeded* phase, and **odo** may return an empty list until the resources are ready.

3.5.2.2.2. Searching services

To search for a specific service by a keyword, run the command:

```
$ odo catalog search service
```

For example, to retrieve the PostgreSQL services, run the command:

```
$ odo catalog search service postgres
```

Example output

```
Services available through Operators
NAME                          CRDs
postgresql-operator.v0.1.1    Backup, Database
```

You will see a list of Operators that contain the searched keyword in their name.

3.5.2.2.3. Getting information about a service

To get more information about a specific service, run the command:

```
$ odo catalog describe service
```

For example:

```
$ odo catalog describe service postgresql-operator.v0.1.1/Database
```

Example output

```
KIND:    Database
VERSION: v1alpha1

DESCRIPTION:
    Database is the Schema for the the Database Database API

FIELDS:
  awsAccessKeyId (string)
    AWS S3 accessKey/token ID

    Key ID of AWS S3 storage. Default Value: nil Required to create the Secret
    with the data to allow send the backup files to AWS S3 storage.
[...]
```

A service is represented in the cluster by a CustomResourceDefinition (CRD) resource. The previous command displays the details about the CRD such as **kind**, **version**, and the list of fields available to define an instance of this custom resource.

The list of fields is extracted from the *OpenAPI schema* included in the CRD. This information is optional in a CRD, and if it is not present, it is extracted from the ClusterServiceVersion (CSV) resource representing the service instead.

It is also possible to request the description of an Operator-backed service, without providing CRD type information. To describe the Redis Operator on a cluster, without CRD, run the following command:

```
$ odo catalog describe service redis-operator.v0.8.0
```

Example output

```
NAME: redis-operator.v0.8.0
DESCRIPTION:

 A Golang based redis operator that will make/oversee Redis
 standalone/cluster mode setup on top of the Kubernetes. It can create a
 redis cluster setup with best practices on Cloud as well as the Bare metal
 environment. Also, it provides an in-built monitoring capability using

... (cut short for beverity)

 Logging Operator is licensed under [Apache License, Version
 2.0](https://github.com/OT-CONTAINER-KIT/redis-operator/blob/master/LICENSE)


CRDs:
 NAME           DESCRIPTION
 RedisCluster   Redis Cluster
 Redis          Redis
```

3.5.3. odo create

odo uses a *devfile* to store the configuration of a component and to describe the component's resources such as storage and services. The *odo create* command generates this file.

3.5.3.1. Creating a component

To create a *devfile* for an existing project, run the **odo create** command with the name and type of your component (for example, **nodejs** or **go**):

```
odo create nodejs mynodejs
```

In the example, **nodejs** is the type of the component and **mynodejs** is the name of the component that **odo** creates for you.

NOTE

For a list of all the supported component types, run the command **odo catalog list components**.

If your source code exists outside the current directory, the **--context** flag can be used to specify the path. For example, if the source for the nodejs component is in a folder called **node-backend** relative to the current working directory, run the command:

```
odo create nodejs mynodejs --context ./node-backend
```

The **--context** flag supports relative and absolute paths.

To specify the project or app where your component will be deployed, use the **--project** and **--app** flags. For example, to create a component that is part of the **myapp** app inside the **backend** project, run the command:

```
odo create nodejs --app myapp --project backend
```

NOTE

If these flags are not specified, they will default to the active app and project.

3.5.3.2. Starter projects

Use the starter projects if you do not have existing source code but want to get up and running quickly to experiment with devfiles and components. To use a starter project, add the **--starter** flag to the **odo create** command.

To get a list of available starter projects for a component type, run the **odo catalog describe component** command. For example, to get all available starter projects for the nodejs component type, run the command:

```
odo catalog describe component nodejs
```

Then specify the desired project using the **--starter** flag on the **odo create** command:

```
odo create nodejs --starter nodejs-starter
```

This will download the example template corresponding to the chosen component type, in this instance, **nodejs**. The template is downloaded to your current directory, or to the location specified by the **--context** flag. If a starter project has its own devfile, then this devfile will be preserved.

3.5.3.3. Using an existing devfile

If you want to create a new component from an existing devfile, you can do so by specifying the path to the devfile using the **--devfile** flag. For example, to create a component called **mynodejs**, based on a devfile from GitHub, use the following command:

```
odo create mynodejs --devfile https://raw.githubusercontent.com/odo-
devfiles/registry/master/devfiles/nodejs/devfile.yaml
```

3.5.3.4. Interactive creation

You can also run the **odo create** command interactively, to guide you through the steps needed to create a component:

```
$ odo create

? Which devfile component type do you wish to create go
? What do you wish to name the new devfile component go-api
? What project do you want the devfile component to be created in default
Devfile Object Validation
 ✓  Checking devfile existence [164258ns]
 ✓  Creating a devfile component from registry: DefaultDevfileRegistry [246051ns]
Validation
 ✓  Validating if devfile name is correct [92255ns]
? Do you want to download a starter project Yes

Starter Project
```

```
 ✓  Downloading starter project go-starter from https://github.com/devfile-samples/devfile-stack-go.git
[429ms]

Please use odo push command to create the component with source deployed
```

You are prompted to choose the component type, name, and the project for the component. You can also choose whether or not to download a starter project. Once finished, a new **devfile.yaml** file is created in the working directory.

To deploy these resources to your cluster, run the command **odo push**.

3.5.4. odo delete

The **odo delete** command is useful for deleting resources that are managed by **odo**.

3.5.4.1. Deleting a component

To delete a *devfile* component, run the **odo delete** command:

```
$ odo delete
```

If the component has been pushed to the cluster, the component is deleted from the cluster, along with its dependent storage, URL, secrets, and other resources. If the component has not been pushed, the command exits with an error stating that it could not find the resources on the cluster.

Use the **-f** or **--force** flag to avoid the confirmation questions.

3.5.4.2. Undeploying devfile Kubernetes components

To undeploy the devfile Kubernetes components, that have been deployed with **odo deploy**, execute the **odo delete** command with the **--deploy** flag:

```
$ odo delete --deploy
```

Use the **-f** or **--force** flag to avoid the confirmation questions.

3.5.4.3. Delete all

To delete all artifacts including the following items, run the **odo delete** command with the **--all** flag :

- *devfile* component
- Devfile Kubernetes component that was deployed using the **odo deploy** command
- Devfile
- Local configuration

```
$ odo delete --all
```

3.5.4.4. Available flags

-f, --force

Use this flag to avoid the confirmation questions.

-w, --wait

Use this flag to wait for component deletion and any dependencies. This flag does not work when undeploying.

The documentation on *Common Flags* provides more information on the flags available for commands.

3.5.5. odo deploy

odo can be used to deploy components in a manner similar to how they would be deployed using a CI/CD system. First, **odo** builds the container images, and then it deploys the Kubernetes resources required to deploy the components.

When running the command **odo deploy**, **odo** searches for the default command of kind **deploy** in the devfile, and executes this command. The kind **deploy** is supported by the devfile format starting from version 2.2.0.

The **deploy** command is typically a *composite* command, composed of several *apply* commands:

- A command referencing an **image** component that, when applied, will build the image of the container to deploy, and then push it to its registry.
- A command referencing a Kubernetes component that, when applied, will create a Kubernetes resource in the cluster.

With the following example **devfile.yaml** file, a container image is built using the **Dockerfile** present in the directory. The image is pushed to its registry and then a Kubernetes Deployment resource is created in the cluster, using this freshly built image.

```
schemaVersion: 2.2.0
[...]
variables:
  CONTAINER_IMAGE: quay.io/phmartin/myimage
commands:
  - id: build-image
    apply:
      component: outerloop-build
  - id: deployk8s
    apply:
      component: outerloop-deploy
  - id: deploy
    composite:
      commands:
        - build-image
        - deployk8s
      group:
        kind: deploy
        isDefault: true
components:
  - name: outerloop-build
    image:
      imageName: "{{CONTAINER_IMAGE}}"
      dockerfile:
        uri: ./Dockerfile
        buildContext: ${PROJECTS_ROOT}
```

```
- name: outerloop-deploy
  kubernetes:
    inlined: |
      kind: Deployment
      apiVersion: apps/v1
      metadata:
        name: my-component
      spec:
        replicas: 1
        selector:
          matchLabels:
            app: node-app
        template:
          metadata:
            labels:
              app: node-app
          spec:
            containers:
              - name: main
                image: {{CONTAINER_IMAGE}}
```

3.5.6. odo link

The **odo link** command helps link an **odo** component to an Operator-backed service or another **odo** component. It does this by using the Service Binding Operator. Currently, **odo** makes use of the Service Binding library and not the Operator itself to achieve the desired functionality.

3.5.6.1. Various linking options

odo provides various options for linking a component with an Operator-backed service or another **odo** component. All these options (or flags) can be used whether you are linking a component to a service or to another component.

3.5.6.1.1. Default behavior

By default, the **odo link** command creates a directory named **kubernetes/** in your component directory and stores the information (YAML manifests) about services and links there. When you use **odo push**, **odo** compares these manifests with the state of the resources on the Kubernetes cluster and decides whether it needs to create, modify or destroy resources to match what is specified by the user.

3.5.6.1.2. The **--inlined** flag

If you specify the **--inlined** flag to the **odo link** command, **odo** stores the link information inline in the **devfile.yaml** in the component directory, instead of creating a file under the **kubernetes/** directory. The behavior of the **--inlined** flag is similar in both the **odo link** and **odo service create** commands. This flag is helpful if you want everything stored in a single **devfile.yaml**. You have to remember to use **--inlined** flag with each **odo link** and **odo service create** command that you execute for the component.

3.5.6.1.3. The **--map** flag

Sometimes, you might want to add more binding information to the component, in addition to what is available by default. For example, if you are linking the component with a service and would like to bind some information from the service's spec (short for specification), you could use the **--map** flag. Note that **odo** does not do any validation against the spec of the service or component being linked. Using this flag is only recommended if you are comfortable using the Kubernetes YAML manifests.

3.5.6.1.4. The **--bind-as-files** flag

For all the linking options discussed so far, **odo** injects the binding information into the component as environment variables. If you would like to mount this information as files instead, you can use the **--bind-as-files** flag. This will make **odo** inject the binding information as files into the **/bindings** location within your component's Pod. Compared to the environment variables scenario, when you use **--bind-as-files**, the files are named after the keys and the value of these keys is stored as the contents of these files.

3.5.6.2. Examples

3.5.6.2.1. Default **odo link**

In the following example, the backend component is linked with the PostgreSQL service using the default **odo link** command. For the backend component, make sure that your component and service are pushed to the cluster:

```
$ odo list
```

Sample output

```
APP     NAME        PROJECT       TYPE       STATE      MANAGED BY ODO
app     backend     myproject     spring     Pushed     Yes
```

```
$ odo service list
```

Sample output

```
NAME                    MANAGED BY ODO     STATE      AGE
PostgresCluster/hippo     Yes (backend)      Pushed     59m41s
```

Now, run **odo link** to link the backend component with the PostgreSQL service:

```
$ odo link PostgresCluster/hippo
```

Example output

```
 ✓  Successfully created link between component "backend" and service "PostgresCluster/hippo"

To apply the link, please use `odo push`
```

And then run **odo push** to actually create the link on the Kubernetes cluster.

After a successful **odo push**, you will see a few outcomes:

1. When you open the URL for the application deployed by backend component, it shows a list of **todo** items in the database. For example, in the output for the **odo url list** command, the path where **todos** are listed is included:

   ```
   $ odo url list
   ```

   Sample output

```
Found the following URLs for component backend
NAME        STATE     URL                                  PORT     SECURE     KIND
8080-tcp    Pushed    http://8080-tcp.192.168.39.112.nip.io    8080    false    ingress
```

The correct path for the URL would be http://8080-tcp.192.168.39.112.nip.io/api/v1/todos. The exact URL depends on your setup. Also note that there are no **todos** in the database unless you add some, so the URL might just show an empty JSON object.

2. You can see binding information related to the Postgres service injected into the backend component. This binding information is injected, by default, as environment variables. You can check it using the **odo describe** command from the backend component's directory:

```
$ odo describe
```

Example output:

```
Component Name: backend
Type: spring
Environment Variables:
 · PROJECTS_ROOT=/projects
 · PROJECT_SOURCE=/projects
 · DEBUG_PORT=5858
Storage:
 · m2 of size 3Gi mounted to /home/user/.m2
URLs:
 · http://8080-tcp.192.168.39.112.nip.io exposed via 8080
Linked Services:
 · PostgresCluster/hippo
   Environment Variables:
   · POSTGRESCLUSTER_PGBOUNCER-EMPTY
   · POSTGRESCLUSTER_PGBOUNCER.INI
   · POSTGRESCLUSTER_ROOT.CRT
   · POSTGRESCLUSTER_VERIFIER
   · POSTGRESCLUSTER_ID_ECDSA
   · POSTGRESCLUSTER_PGBOUNCER-VERIFIER
   · POSTGRESCLUSTER_TLS.CRT
   · POSTGRESCLUSTER_PGBOUNCER-URI
   · POSTGRESCLUSTER_PATRONI.CRT-COMBINED
   · POSTGRESCLUSTER_USER
   · pgImage
   · pgVersion
   · POSTGRESCLUSTER_CLUSTERIP
   · POSTGRESCLUSTER_HOST
   · POSTGRESCLUSTER_PGBACKREST_REPO.CONF
   · POSTGRESCLUSTER_PGBOUNCER-USERS.TXT
   · POSTGRESCLUSTER_SSH_CONFIG
   · POSTGRESCLUSTER_TLS.KEY
   · POSTGRESCLUSTER_CONFIG-HASH
   · POSTGRESCLUSTER_PASSWORD
   · POSTGRESCLUSTER_PATRONI.CA-ROOTS
   · POSTGRESCLUSTER_DBNAME
   · POSTGRESCLUSTER_PGBOUNCER-PASSWORD
   · POSTGRESCLUSTER_SSHD_CONFIG
   · POSTGRESCLUSTER_PGBOUNCER-FRONTEND.KEY
   · POSTGRESCLUSTER_PGBACKREST_INSTANCE.CONF
```

```
· POSTGRESCLUSTER_PGBOUNCER-FRONTEND.CA-ROOTS
· POSTGRESCLUSTER_PGBOUNCER-HOST
· POSTGRESCLUSTER_PORT
· POSTGRESCLUSTER_ROOT.KEY
· POSTGRESCLUSTER_SSH_KNOWN_HOSTS
· POSTGRESCLUSTER_URI
· POSTGRESCLUSTER_PATRONI.YAML
· POSTGRESCLUSTER_DNS.CRT
· POSTGRESCLUSTER_DNS.KEY
· POSTGRESCLUSTER_ID_ECDSA.PUB
· POSTGRESCLUSTER_PGBOUNCER-FRONTEND.CRT
· POSTGRESCLUSTER_PGBOUNCER-PORT
· POSTGRESCLUSTER_CA.CRT
```

Some of these variables are used in the backend component's **src/main/resources/application.properties** file so that the Java Spring Boot application can connect to the PostgreSQL database service.

3. Lastly, **odo** has created a directory called **kubernetes/** in your backend component's directory that contains the following files:

```
$ ls kubernetes
odo-service-backend-postgrescluster-hippo.yaml  odo-service-hippo.yaml
```

These files contain the information (YAML manifests) for two resources:

a. **odo-service-hippo.yaml** - the Postgres *service* created using **odo service create --from-file ../postgrescluster.yaml** command.

b. **odo-service-backend-postgrescluster-hippo.yaml** - the *link* created using **odo link** command.

3.5.6.2.2. Using odo link with the --inlined flag

Using the **--inlined** flag with the **odo link** command has the same effect as an **odo link** command without the flag, in that it injects binding information. However, the subtle difference is that in the above case, there are two manifest files under **kubernetes/** directory, one for the Postgres service and another for the link between the backend component and this service. However, when you pass the **--inlined** flag, **odo** does not create a file under the **kubernetes/** directory to store the YAML manifest, but rather stores it inline in the **devfile.yaml** file.

To see this, unlink the component from the PostgreSQL service first:

```
$ odo unlink PostgresCluster/hippo
```

Example output:

```
 ✓  Successfully unlinked component "backend" from service "PostgresCluster/hippo"

To apply the changes, please use `odo push`
```

To unlink them on the cluster, run **odo push**. Now if you inspect the **kubernetes/** directory, you see only one file:

```
$ ls kubernetes
odo-service-hippo.yaml
```

Next, use the **--inlined** flag to create a link:

```
$ odo link PostgresCluster/hippo --inlined
```

Example output:

```
 ✓  Successfully created link between component "backend" and service "PostgresCluster/hippo"

To apply the link, please use `odo push`
```

You need to run **odo push** for the link to get created on the cluster, like the procedure that omits the **--inlined** flag. **odo** stores the configuration in **devfile.yaml**. In this file, you can see an entry like the following:

```
kubernetes:
  inlined: |
    apiVersion: binding.operators.coreos.com/v1alpha1
    kind: ServiceBinding
    metadata:
      creationTimestamp: null
      name: backend-postgrescluster-hippo
    spec:
      application:
        group: apps
        name: backend-app
        resource: deployments
        version: v1
      bindAsFiles: false
      detectBindingResources: true
      services:
      - group: postgres-operator.crunchydata.com
        id: hippo
        kind: PostgresCluster
        name: hippo
        version: v1beta1
    status:
      secret: ""
  name: backend-postgrescluster-hippo
```

Now if you were to run **odo unlink PostgresCluster/hippo**, **odo** would first remove the link information from the **devfile.yaml**, and then a subsequent **odo push** would delete the link from the cluster.

3.5.6.2.3. Custom bindings

odo link accepts the flag **--map** which can inject custom binding information into the component. Such binding information will be fetched from the manifest of the resource that you are linking to your component. For example, in the context of the backend component and PostgreSQL service, you can inject information from the PostgreSQL service's manifest **postgrescluster.yaml** file into the backend component.

If the name of your **PostgresCluster** service is **hippo** (or the output of **odo service list**, if your PostgresCluster service is named differently), when you want to inject the value of **postgresVersion** from that YAML definition into your backend component, run the command:

```
$ odo link PostgresCluster/hippo --map pgVersion='{{ .hippo.spec.postgresVersion }}'
```

Note that, if the name of your Postgres service is different from **hippo**, you will have to specify that in the above command in the place of **.hippo** in the value for **pgVersion**.

After a link operation, run **odo push** as usual. Upon successful completion of the push operation, you can run the following command from your backend component directory, to validate if the custom mapping got injected properly:

```
$ odo exec -- env | grep pgVersion
```

Example output:

```
pgVersion=13
```

Since you might want to inject more than just one piece of custom binding information, **odo link** accepts multiple key-value pairs of mappings. The only constraint is that these should be specified as **--map <key>=<value>**. For example, if you want to also inject PostgreSQL image information along with the version, you could run:

```
$ odo link PostgresCluster/hippo --map pgVersion='{{ .hippo.spec.postgresVersion }}' --map
pgImage='{{ .hippo.spec.image }}'
```

and then run **odo push**. To validate if both the mappings got injected correctly, run the following command:

```
$ odo exec -- env | grep -e "pgVersion\|pgImage"
```

Example output:

```
pgVersion=13
pgImage=registry.developers.crunchydata.com/crunchydata/crunchy-postgres-ha:centos8-13.4-0
```

3.5.6.2.3.1. To inline or not?

You can accept the default behavior where **odo link** generate a manifests file for the link under **kubernetes**/ directory. Alternatively, you can use the **--inlined** flag if you prefer to store everything in a single **devfile.yaml** file.

3.5.6.3. Binding as files

Another helpful flag that **odo link** provides is **--bind-as-files**. When this flag is passed, the binding information is not injected into the component's Pod as environment variables but is mounted as a filesystem.

Ensure that there are no existing links between the backend component and the PostgreSQL service. You could do this by running **odo describe** in the backend component's directory and check if you see output similar to the following:

```
Linked Services:
 · PostgresCluster/hippo
```

Unlink the service from the component using:

```
$ odo unlink PostgresCluster/hippo
$ odo push
```

3.5.6.4. --bind-as-files examples

3.5.6.4.1. Using the default odo link

By default, **odo** creates the manifest file under the **kubernetes**/ directory, for storing the link information. Link the backend component and PostgreSQL service using:

```
$ odo link PostgresCluster/hippo --bind-as-files
$ odo push
```

Example odo describe output:

```
$ odo describe

Component Name: backend
Type: spring
Environment Variables:
 · PROJECTS_ROOT=/projects
 · PROJECT_SOURCE=/projects
 · DEBUG_PORT=5858
 · SERVICE_BINDING_ROOT=/bindings
 · SERVICE_BINDING_ROOT=/bindings
Storage:
 · m2 of size 3Gi mounted to /home/user/.m2
URLs:
 · http://8080-tcp.192.168.39.112.nip.io exposed via 8080
Linked Services:
 · PostgresCluster/hippo
   Files:
    · /bindings/backend-postgrescluster-hippo/pgbackrest_instance.conf
    · /bindings/backend-postgrescluster-hippo/user
    · /bindings/backend-postgrescluster-hippo/ssh_known_hosts
    · /bindings/backend-postgrescluster-hippo/clusterIP
    · /bindings/backend-postgrescluster-hippo/password
    · /bindings/backend-postgrescluster-hippo/patroni.yaml
    · /bindings/backend-postgrescluster-hippo/pgbouncer-frontend.crt
    · /bindings/backend-postgrescluster-hippo/pgbouncer-host
    · /bindings/backend-postgrescluster-hippo/root.key
    · /bindings/backend-postgrescluster-hippo/pgbouncer-frontend.key
    · /bindings/backend-postgrescluster-hippo/pgbouncer.ini
    · /bindings/backend-postgrescluster-hippo/uri
    · /bindings/backend-postgrescluster-hippo/config-hash
    · /bindings/backend-postgrescluster-hippo/pgbouncer-empty
    · /bindings/backend-postgrescluster-hippo/port
    · /bindings/backend-postgrescluster-hippo/dns.crt
```

```
· /bindings/backend-postgrescluster-hippo/pgbouncer-uri
· /bindings/backend-postgrescluster-hippo/root.crt
· /bindings/backend-postgrescluster-hippo/ssh_config
· /bindings/backend-postgrescluster-hippo/dns.key
· /bindings/backend-postgrescluster-hippo/host
· /bindings/backend-postgrescluster-hippo/patroni.crt-combined
· /bindings/backend-postgrescluster-hippo/pgbouncer-frontend.ca-roots
· /bindings/backend-postgrescluster-hippo/tls.key
· /bindings/backend-postgrescluster-hippo/verifier
· /bindings/backend-postgrescluster-hippo/ca.crt
· /bindings/backend-postgrescluster-hippo/dbname
· /bindings/backend-postgrescluster-hippo/patroni.ca-roots
· /bindings/backend-postgrescluster-hippo/pgbackrest_repo.conf
· /bindings/backend-postgrescluster-hippo/pgbouncer-port
· /bindings/backend-postgrescluster-hippo/pgbouncer-verifier
· /bindings/backend-postgrescluster-hippo/id_ecdsa
· /bindings/backend-postgrescluster-hippo/id_ecdsa.pub
· /bindings/backend-postgrescluster-hippo/pgbouncer-password
· /bindings/backend-postgrescluster-hippo/pgbouncer-users.txt
· /bindings/backend-postgrescluster-hippo/sshd_config
· /bindings/backend-postgrescluster-hippo/tls.crt
```

Everything that was an environment variable in the **key=value** format in the earlier **odo describe** output is now mounted as a file. Use the **cat** command to view the contents of some of these files:

Example command:

```
$ odo exec -- cat /bindings/backend-postgrescluster-hippo/password
```

Example output:

```
q({JC:jn^mm/Bw}eu+j.GX{k
```

Example command:

```
$ odo exec -- cat /bindings/backend-postgrescluster-hippo/user
```

Example output:

```
hippo
```

Example command:

```
$ odo exec -- cat /bindings/backend-postgrescluster-hippo/clusterIP
```

Example output:

```
10.101.78.56
```

3.5.6.4.2. Using **--inlined**

The result of using **--bind-as-files** or **--inlined** is the similar to using **odo link --inlined**. The

The result of using **--bind-as-files** and **--inlined** together is similar to using **odo link --inlined**. The manifest of the link gets stored in the **devfile.yaml**, instead of being stored in a separate file under **kubernetes**/ directory. Other than that, the **odo describe** output would be the same as earlier.

3.5.6.4.3. Custom bindings

When you pass custom bindings while linking the backend component with the PostgreSQL service, these custom bindings are injected not as environment variables but are mounted as files. For example:

```
$ odo link PostgresCluster/hippo --map pgVersion='{{ .hippo.spec.postgresVersion }}' --map
pgImage='{{ .hippo.spec.image }}' --bind-as-files
$ odo push
```

These custom bindings get mounted as files instead of being injected as environment variables. To validate that this worked, run the following command:

Example command:

```
$ odo exec -- cat /bindings/backend-postgrescluster-hippo/pgVersion
```

Example output:

```
13
```

Example command:

```
$ odo exec -- cat /bindings/backend-postgrescluster-hippo/pgImage
```

Example output:

```
registry.developers.crunchydata.com/crunchydata/crunchy-postgres-ha:centos8-13.4-0
```

3.5.7. odo registry

odo uses the portable *devfile* format to describe the components. **odo** can connect to various devfile registries, to download devfiles for different languages and frameworks.

You can connect to publicly available devfile registries, or you can install your own *Secure Registry*.

You can use the **odo registry** command to manage the registries that are used by **odo** to retrieve devfile information.

3.5.7.1. Listing the registries

To list the registries currently contacted by **odo**, run the command:

```
$ odo registry list
```

Example output:

```
NAME                    URL                         SECURE
DefaultDevfileRegistry  https://registry.devfile.io  No
```

DefaultDevfileRegistry is the default registry used by odo; it is provided by the devfile.io project.

3.5.7.2. Adding a registry

To add a registry, run the command:

```
$ odo registry add
```

Example output:

```
$ odo registry add StageRegistry https://registry.stage.devfile.io
New registry successfully added
```

If you are deploying your own Secure Registry, you can specify the personal access token to authenticate to the secure registry with the **--token** flag:

```
$ odo registry add MyRegistry https://myregistry.example.com --token <access_token>
New registry successfully added
```

3.5.7.3. Deleting a registry

To delete a registry, run the command:

```
$ odo registry delete
```

Example output:

```
$ odo registry delete StageRegistry
? Are you sure you want to delete registry "StageRegistry" Yes
Successfully deleted registry
```

Use the **--force** (or **-f**) flag to force the deletion of the registry without confirmation.

3.5.7.4. Updating a registry

To update the URL or the personal access token of a registry already registered, run the command:

```
$ odo registry update
```

Example output:

```
$ odo registry update MyRegistry https://otherregistry.example.com --token <other_access_token>
? Are you sure you want to update registry "MyRegistry" Yes
Successfully updated registry
```

Use the **--force** (or **-f**) flag to force the update of the registry without confirmation.

3.5.8. odo service

odo can deploy *services* with the help of *Operators*.

The list of available Operators and services available for installation can be found using the **odo catalog** command.

Services are created in the context of a *component*, so run the **odo create** command before you deploy services.

A service is deployed using two steps:

1. Define the service and store its definition in the devfile.
2. Deploy the defined service to the cluster, using the **odo push** command.

3.5.8.1. Creating a new service

To create a new service, run the command:

```
$ odo service create
```

For example, to create an instance of a Redis service named **my-redis-service**, you can run the following command:

Example output

```
$ odo catalog list services
Services available through Operators
NAME                    CRDs
redis-operator.v0.8.0   RedisCluster, Redis

$ odo service create redis-operator.v0.8.0/Redis my-redis-service
Successfully added service to the configuration; do 'odo push' to create service on the cluster
```

This command creates a Kubernetes manifest in the **kubernetes/** directory, containing the definition of the service, and this file is referenced from the **devfile.yaml** file.

```
$ cat kubernetes/odo-service-my-redis-service.yaml
```

Example output

```
apiVersion: redis.redis.opstreelabs.in/v1beta1
kind: Redis
metadata:
  name: my-redis-service
spec:
  kubernetesConfig:
    image: quay.io/opstree/redis:v6.2.5
    imagePullPolicy: IfNotPresent
    resources:
      limits:
        cpu: 101m
        memory: 128Mi
      requests:
        cpu: 101m
        memory: 128Mi
    serviceType: ClusterIP
```

```
  redisExporter:
    enabled: false
    image: quay.io/opstree/redis-exporter:1.0
  storage:
    volumeClaimTemplate:
      spec:
        accessModes:
        - ReadWriteOnce
        resources:
          requests:
            storage: 1Gi
```

Example command

```
$ cat devfile.yaml
```

Example output

```
[...]
components:
- kubernetes:
    uri: kubernetes/odo-service-my-redis-service.yaml
  name: my-redis-service
[...]
```

Note that the name of the created instance is optional. If you do not provide a name, it will be the lowercase name of the service. For example, the following command creates an instance of a Redis service named **redis**:

```
$ odo service create redis-operator.v0.8.0/Redis
```

3.5.8.1.1. Inlining the manifest

By default, a new manifest is created in the **kubernetes**/ directory, referenced from the **devfile.yaml** file. It is possible to inline the manifest inside the **devfile.yaml** file using the **--inlined** flag:

```
$ odo service create redis-operator.v0.8.0/Redis my-redis-service --inlined
Successfully added service to the configuration; do 'odo push' to create service on the cluster
```

Example command

```
$ cat devfile.yaml
```

Example output

```
[...]
components:
- kubernetes:
    inlined: |
      apiVersion: redis.redis.opstreelabs.in/v1beta1
      kind: Redis
      metadata:
```

```
      name: my-redis-service
    spec:
      kubernetesConfig:
        image: quay.io/opstree/redis:v6.2.5
        imagePullPolicy: IfNotPresent
        resources:
          limits:
            cpu: 101m
            memory: 128Mi
          requests:
            cpu: 101m
            memory: 128Mi
        serviceType: ClusterIP
      redisExporter:
        enabled: false
        image: quay.io/opstree/redis-exporter:1.0
      storage:
        volumeClaimTemplate:
          spec:
            accessModes:
            - ReadWriteOnce
            resources:
              requests:
                storage: 1Gi
  name: my-redis-service
[...]
```

3.5.8.1.2. Configuring the service

Without specific customization, the service will be created with a default configuration. You can use either command-line arguments or a file to specify your own configuration.

3.5.8.1.2.1. Using command-line arguments

Use the **--parameters** (or **-p**) flag to specify your own configuration.

The following example configures the Redis service with three parameters:

```
$ odo service create redis-operator.v0.8.0/Redis my-redis-service \
    -p kubernetesConfig.image=quay.io/opstree/redis:v6.2.5 \
    -p kubernetesConfig.serviceType=ClusterIP \
    -p redisExporter.image=quay.io/opstree/redis-exporter:1.0
Successfully added service to the configuration; do 'odo push' to create service on the cluster
```

Example command

```
$ cat kubernetes/odo-service-my-redis-service.yaml
```

Example output

```
apiVersion: redis.redis.opstreelabs.in/v1beta1
kind: Redis
metadata:
  name: my-redis-service
```

```
spec:
  kubernetesConfig:
    image: quay.io/opstree/redis:v6.2.5
    serviceType: ClusterIP
  redisExporter:
    image: quay.io/opstree/redis-exporter:1.0
```

You can obtain the possible parameters for a specific service using the **odo catalog describe service** command.

3.5.8.1.2.2. Using a file

Use a YAML manifest to configure your own specification. In the following example, the Redis service is configured with three parameters.

1. Create a manifest:

```
$ cat > my-redis.yaml <<EOF
apiVersion: redis.redis.opstreelabs.in/v1beta1
kind: Redis
metadata:
  name: my-redis-service
spec:
  kubernetesConfig:
    image: quay.io/opstree/redis:v6.2.5
    serviceType: ClusterIP
  redisExporter:
    image: quay.io/opstree/redis-exporter:1.0
EOF
```

2. Create the service from the manifest:

```
$ odo service create --from-file my-redis.yaml
Successfully added service to the configuration; do 'odo push' to create service on the cluster
```

3.5.8.2. Deleting a service

To delete a service, run the command:

```
$ odo service delete
```

Example output

```
$ odo service list
NAME                      MANAGED BY ODO     STATE              AGE
Redis/my-redis-service    Yes (api)          Deleted locally    5m39s
```

```
$ odo service delete Redis/my-redis-service
? Are you sure you want to delete Redis/my-redis-service Yes
Service "Redis/my-redis-service" has been successfully deleted; do 'odo push' to delete service from the cluster
```

Use the **--force** (or **-f**) flag to force the deletion of the service without confirmation.

3.5.8.3. Listing services

To list the services created for your component, run the command:

```
$ odo service list
```

Example output

```
$ odo service list
NAME                    MANAGED BY ODO     STATE            AGE
Redis/my-redis-service-1   Yes (api)       Not pushed
Redis/my-redis-service-2   Yes (api)       Pushed           52s
Redis/my-redis-service-3   Yes (api)       Deleted locally  1m22s
```

For each service, **STATE** indicates if the service has been pushed to the cluster using the **odo push** command, or if the service is still running on the cluster but removed from the devfile locally using the **odo service delete** command.

3.5.8.4. Getting information about a service

To get details of a service such as its kind, version, name, and list of configured parameters, run the command:

```
$ odo service describe
```

Example output

```
$ odo service describe Redis/my-redis-service
Version: redis.redis.opstreelabs.in/v1beta1
Kind: Redis
Name: my-redis-service
Parameters:
NAME                        VALUE
kubernetesConfig.image      quay.io/opstree/redis:v6.2.5
kubernetesConfig.serviceType   ClusterIP
redisExporter.image         quay.io/opstree/redis-exporter:1.0
```

3.5.9. odo storage

odo lets users manage storage volumes that are attached to the components. A storage volume can be either an ephemeral volume using an **emptyDir** Kubernetes volume, or a Persistent Volume Claim (PVC). A PVC allows users to claim a persistent volume (such as a GCE PersistentDisk or an iSCSI volume) without understanding the details of the particular cloud environment. The persistent storage volume can be used to persist data across restarts and rebuilds of the component.

3.5.9.1. Adding a storage volume

To add a storage volume to the cluster, run the command:

```
$ odo storage create
```

Example output:

```
$ odo storage create store --path /data --size 1Gi
✓  Added storage store to nodejs-project-ufyy

$ odo storage create tempdir --path /tmp --size 2Gi --ephemeral
✓  Added storage tempdir to nodejs-project-ufyy

Please use `odo push` command to make the storage accessible to the component
```

In the above example, the first storage volume has been mounted to the **/data** path and has a size of **1Gi**, and the second volume has been mounted to **/tmp** and is ephemeral.

3.5.9.2. Listing the storage volumes

To check the storage volumes currently used by the component, run the command:

```
$ odo storage list
```

Example output:

```
$ odo storage list
The component 'nodejs-project-ufyy' has the following storage attached:
NAME      SIZE     PATH      STATE
store     1Gi      /data     Not Pushed
tempdir   2Gi      /tmp      Not Pushed
```

3.5.9.3. Deleting a storage volume

To delete a storage volume, run the command:

```
$ odo storage delete
```

Example output:

```
$ odo storage delete store -f
Deleted storage store from nodejs-project-ufyy

Please use `odo push` command to delete the storage from the cluster
```

In the above example, using the **-f** flag force deletes the storage without asking user permission.

3.5.9.4. Adding storage to specific container

If your devfile has multiple containers, you can specify which container you want the storage to attach to, using the **--container** flag in the **odo storage create** command.

The following example is an excerpt from a devfile with multiple containers :

```
components:
  - name: nodejs1
    container:
      image: registry.access.redhat.com/ubi8/nodejs-12:1-36
      memoryLimit: 1024Mi
```

```
      endpoints:
        - name: "3000-tcp"
          targetPort: 3000
      mountSources: true
  - name: nodejs2
    container:
      image: registry.access.redhat.com/ubi8/nodejs-12:1-36
      memoryLimit: 1024Mi
```

In the example, there are two containers,**nodejs1** and **nodejs2**. To attach storage to the **nodejs2** container, use the following command:

```
$ odo storage create --container
```

Example output:

```
$ odo storage create store --path /data --size 1Gi --container nodejs2
✓  Added storage store to nodejs-testing-xnfg

Please use `odo push` command to make the storage accessible to the component
```

You can list the storage resources, using the **odo storage list** command:

```
$ odo storage list
```

Example output:

```
The component 'nodejs-testing-xnfg' has the following storage attached:
NAME      SIZE      PATH      CONTAINER      STATE
store     1Gi       /data     nodejs2        Not Pushed
```

3.5.10. Common flags

The following flags are available with most **odo** commands:

Table 3.1. odo flags

Command	Description
--context	Set the context directory where the component is defined.
--project	Set the project for the component. Defaults to the project defined in the local configuration. If none is available, then current project on the cluster.
--app	Set the application of the component. Defaults to the application defined in the local configuration. If none is available, then *app*.
--kubeconfig	Set the path to the **kubeconfig** value if not using the default configuration.
--show-log	Use this flag to see the logs.

Command	Description
-f, **--force**	Use this flag to tell the command not to prompt the user for confirmation.
-v, **--v**	Set the verbosity level. See Logging in odo for more information.
-h, **--help**	Output the help for a command.

NOTE

Some flags might not be available for some commands. Run the command with the **--help** flag to get a list of all the available flags.

3.5.11. JSON output

The **odo** commands that output content generally accept a **-o json** flag to output this content in JSON format, suitable for other programs to parse this output more easily.

The output structure is similar to Kubernetes resources, with the **kind**, **apiVersion**, **metadata**, **spec**, and **status** fields.

List commands return a **List** resource, containing an **items** (or similar) field listing the items of the list, with each item also being similar to Kubernetes resources.

Delete commands return a **Status** resource; see the Status Kubernetes resource.

Other commands return a resource associated with the command, for example, **Application**, **Storage**, **URL**, and so on.

The full list of commands currently accepting the **-o json** flag is:

Commands	Kind (version)	Kind (version) of list items	Complete content?
odo application describe	Application (odo.dev/v1alpha1)	*n/a*	no
odo application list	List (odo.dev/v1alpha1)	Application (odo.dev/v1alpha1)	?
odo catalog list components	List (odo.dev/v1alpha1)	*missing*	yes
odo catalog list services	List (odo.dev/v1alpha1)	ClusterServiceVersion (operators.coreos.com/v1alpha1)	?
odo catalog describe component	*missing*	*n/a*	yes

Commands	Kind (version)	Kind (version) of list items	Complete content?
odo catalog describe service	CRDDescription (odo.dev/v1alpha1)	*n/a*	yes
odo component create	Component (odo.dev/v1alpha1)	*n/a*	yes
odo component describe	Component (odo.dev/v1alpha1)	*n/a*	yes
odo component list	List (odo.dev/v1alpha1)	Component (odo.dev/v1alpha1)	yes
odo config view	DevfileConfiguration (odo.dev/v1alpha1)	*n/a*	yes
odo debug info	OdoDebugInfo (odo.dev/v1alpha1)	*n/a*	yes
odo env view	EnvInfo (odo.dev/v1alpha1)	*n/a*	yes
odo preference view	PreferenceList (odo.dev/v1alpha1)	*n/a*	yes
odo project create	Project (odo.dev/v1alpha1)	*n/a*	yes
odo project delete	Status (v1)	*n/a*	yes
odo project get	Project (odo.dev/v1alpha1)	*n/a*	yes
odo project list	List (odo.dev/v1alpha1)	Project (odo.dev/v1alpha1)	yes
odo registry list	List (odo.dev/v1alpha1)	*missing*	yes
odo service create	Service	*n/a*	yes
odo service describe	Service	*n/a*	yes
odo service list	List (odo.dev/v1alpha1)	Service	yes
odo storage create	Storage (odo.dev/v1alpha1)	*n/a*	yes

Commands	Kind (version)	Kind (version) of list items	Complete content?
odo storage delete	Status (v1)	*n/a*	yes
odo storage list	List (odo.dev/v1alpha1)	Storage (odo.dev/v1alpha1)	yes
odo url list	List (odo.dev/v1alpha1)	URL (odo.dev/v1alpha1)	yes

CHAPTER 4. HELM CLI

4.1. GETTING STARTED WITH HELM 3

4.1.1. Understanding Helm

Helm is a software package manager that simplifies deployment of applications and services to OpenShift Container Platform clusters.

Helm uses a packaging format called *charts*. A Helm chart is a collection of files that describes the OpenShift Container Platform resources.

A running instance of the chart in a cluster is called a *release*. A new release is created every time a chart is installed on the cluster.

Each time a chart is installed, or a release is upgraded or rolled back, an incremental revision is created.

4.1.1.1. Key features

Helm provides the ability to:

- Search through a large collection of charts stored in the chart repository.
- Modify existing charts.
- Create your own charts with OpenShift Container Platform or Kubernetes resources.
- Package and share your applications as charts.

4.1.2. Installing Helm

The following section describes how to install Helm on different platforms using the CLI.

You can also find the URL to the latest binaries from the OpenShift Container Platform web console by clicking the **?** icon in the upper-right corner and selecting **Command Line Tools**.

Prerequisites

- You have installed Go, version 1.13 or higher.

4.1.2.1. On Linux

1. Download the Helm binary and add it to your path:

```
# curl -L https://mirror.openshift.com/pub/openshift-v4/clients/helm/latest/helm-linux-amd64 -o /usr/local/bin/helm
```

2. Make the binary file executable:

```
# chmod +x /usr/local/bin/helm
```

3. Check the installed version:

```
$ helm version
```

Example output

```
version.BuildInfo{Version:"v3.0",
GitCommit:"b31719aab7963acf4887a1c1e6d5e53378e34d93", GitTreeState:"clean",
GoVersion:"go1.13.4"}
```

4.1.2.2. On Windows 7/8

1. Download the latest **.exe** file and put in a directory of your preference.
2. Right click **Start** and click **Control Panel**.
3. Select **System and Security** and then click **System**.
4. From the menu on the left, select **Advanced systems settings** and click **Environment Variables** at the bottom.
5. Select **Path** from the **Variable** section and click **Edit**.
6. Click **New** and type the path to the folder with the **.exe** file into the field or click **Browse** and select the directory, and click **OK**.

4.1.2.3. On Windows 10

1. Download the latest **.exe** file and put in a directory of your preference.
2. Click **Search** and type **env** or **environment**.
3. Select **Edit environment variables for your account**
4. Select **Path** from the **Variable** section and click **Edit**.
5. Click **New** and type the path to the directory with the exe file into the field or click **Browse** and select the directory, and click **OK**.

4.1.2.4. On MacOS

1. Download the Helm binary and add it to your path:

```
# curl -L https://mirror.openshift.com/pub/openshift-v4/clients/helm/latest/helm-darwin-amd64
-o /usr/local/bin/helm
```

2. Make the binary file executable:

```
# chmod +x /usr/local/bin/helm
```

3. Check the installed version:

```
$ helm version
```

Example output

```
version.BuildInfo{Version:"v3.0",
GitCommit:"b31719aab7963acf4887a1c1e6d5e53378e34d93", GitTreeState:"clean",
GoVersion:"go1.13.4"}
```

4.1.3. Installing a Helm chart on an OpenShift Container Platform cluster

Prerequisites

- You have a running OpenShift Container Platform cluster and you have logged into it.
- You have installed Helm.

Procedure

1. Create a new project:

```
$ oc new-project mysql
```

2. Add a repository of Helm charts to your local Helm client:

```
$ helm repo add stable https://kubernetes-charts.storage.googleapis.com/
```

Example output

```
"stable" has been added to your repositories
```

3. Update the repository:

```
$ helm repo update
```

4. Install an example MySQL chart:

```
$ helm install example-mysql stable/mysql
```

5. Verify that the chart has installed successfully:

```
$ helm list
```

Example output

```
NAME NAMESPACE REVISION UPDATED STATUS CHART APP VERSION
example-mysql mysql 1 2019-12-05 15:06:51.379134163 -0500 EST deployed mysql-1.5.0
5.7.27
```

4.1.4. Creating a custom Helm chart on OpenShift Container Platform

Procedure

1. Create a new project:

```
$ oc new-project nodejs-ex-k
```

2. Download an example Node.js chart that contains OpenShift Container Platform objects:

```
$ git clone https://github.com/redhat-developer/redhat-helm-charts
```

3. Go to the directory with the sample chart:

```
$ cd redhat-helm-charts/alpha/nodejs-ex-k/
```

4. Edit the **Chart.yaml** file and add a description of your chart:

```
apiVersion: v2 (1)
name: nodejs-ex-k (2)
description: A Helm chart for OpenShift (3)
icon: https://static.redhat.com/libs/redhat/brand-assets/latest/corp/logo.svg (4)
```

(1) The chart API version. It should be **v2** for Helm charts that require at least Helm 3.

(2) The name of your chart.

(3) The description of your chart.

(4) The URL to an image to be used as an icon.

5. Verify that the chart is formatted properly:

```
$ helm lint
```

Example output

```
[INFO] Chart.yaml: icon is recommended

1 chart(s) linted, 0 chart(s) failed
```

6. Navigate to the previous directory level:

```
$ cd ..
```

7. Install the chart:

```
$ helm install nodejs-chart nodejs-ex-k
```

8. Verify that the chart has installed successfully:

```
$ helm list
```

Example output

```
NAME NAMESPACE REVISION UPDATED STATUS CHART APP VERSION
nodejs-chart nodejs-ex-k 1 2019-12-05 15:06:51.379134163 -0500 EST deployed nodejs-
0.1.0  1.16.0
```

4.2. CONFIGURING CUSTOM HELM CHART REPOSITORIES

The **Developer Catalog**, in the **Developer** perspective of the web console, displays the Helm charts available in the cluster. By default, it lists the Helm charts from the Red Hat Helm chart repository. For a list of the charts see the Red Hat **Helm index** file.

As a cluster administrator, you can add multiple Helm chart repositories, apart from the default one, and display the Helm charts from these repositories in the **Developer Catalog**.

4.2.1. Adding custom Helm chart repositories

As a cluster administrator, you can add custom Helm chart repositories to your cluster and enable access to the Helm charts from these repositories in the **Developer Catalog**.

Procedure

1. To add a new Helm Chart Repository, you must add the Helm Chart Repository custom resource (CR) to your cluster.

   Sample Helm Chart Repository CR

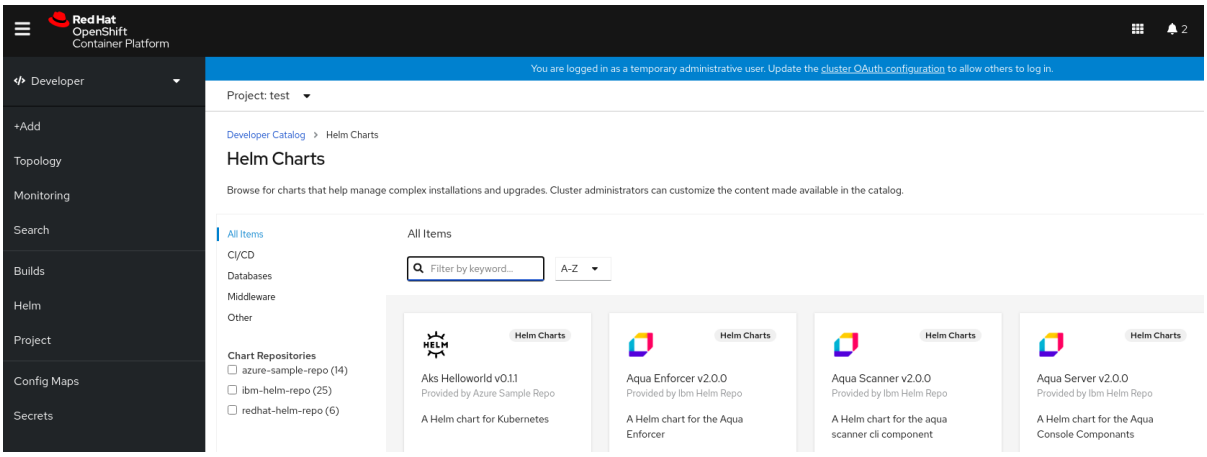
   ```
   apiVersion: helm.openshift.io/v1beta1
   kind: HelmChartRepository
   metadata:
     name: <name>
   spec:
    # optional name that might be used by console
    # name: <chart-display-name>
     connectionConfig:
       url: <helm-chart-repository-url>
   ```

   For example, to add an Azure sample chart repository, run:

   ```
   $ cat <<EOF | oc apply -f -
   apiVersion: helm.openshift.io/v1beta1
   kind: HelmChartRepository
   metadata:
     name: azure-sample-repo
   spec:
     name: azure-sample-repo
     connectionConfig:
       url: https://raw.githubusercontent.com/Azure-Samples/helm-charts/master/docs
   EOF
   ```

2. Navigate to the **Developer Catalog** in the web console to verify that the Helm charts from the chart repository are displayed.
   For example, use the **Chart repositories** filter to search for a Helm chart from the repository.

Figure 4.1. Chart repositories filter



NOTE

If a cluster administrator removes all of the chart repositories, then you cannot view the Helm option in the **+Add** view, **Developer Catalog**, and left navigation panel.

4.2.2. Creating credentials and CA certificates to add Helm chart repositories

Some Helm chart repositories need credentials and custom certificate authority (CA) certificates to connect to it. You can use the web console as well as the CLI to add credentials and certificates.

Procedure

To configure the credentials and certificates, and then add a Helm chart repository using the CLI:

1. In the **openshift-config** namespace, create a **ConfigMap** object with a custom CA certificate in PEM encoded format, and store it under the **ca-bundle.crt** key within the config map:

```
$ oc create configmap helm-ca-cert \
--from-file=ca-bundle.crt=/path/to/certs/ca.crt \
-n openshift-config
```

2. In the **openshift-config** namespace, create a **Secret** object to add the client TLS configurations:

```
$ oc create secret generic helm-tls-configs \
--from-file=tls.crt=/path/to/certs/client.crt \
--from-file=tls.key=/path/to/certs//client.key \
-n openshift-config
```

   Note that the client certificate and key must be in PEM encoded format and stored under the keys **tls.crt** and **tls.key**, respectively.

3. Add the Helm repository as follows:

```
$ cat <<EOF | oc apply -f -
apiVersion: helm.openshift.io/v1beta1
kind: HelmChartRepository
metadata:
  name: <helm-repository>
```

```
spec:
  name: <helm-repository>
  connectionConfig:
    url: <URL for the Helm repository>
    tlsConfig:
        name: helm-tls-configs
    ca:
 name: helm-ca-cert
EOF
```

The **ConfigMap** and **Secret** are consumed in the HelmChartRepository CR using the **tlsConfig** and **ca** fields. These certificates are used to connect to the Helm repository URL.

4. By default, all authenticated users have access to all configured charts. However, for chart repositories where certificates are needed, you must provide users with read access to the **helm-ca-cert** config map and **helm-tls-configs** secret in the **openshift-config** namespace, as follows:

```
$ cat <<EOF | kubectl apply -f -
apiVersion: rbac.authorization.k8s.io/v1
kind: Role
metadata:
  namespace: openshift-config
  name: helm-chartrepos-tls-conf-viewer
rules:
- apiGroups: [""]
  resources: ["configmaps"]
  resourceNames: ["helm-ca-cert"]
  verbs: ["get"]
- apiGroups: [""]
  resources: ["secrets"]
  resourceNames: ["helm-tls-configs"]
  verbs: ["get"]
---
kind: RoleBinding
apiVersion: rbac.authorization.k8s.io/v1
metadata:
  namespace: openshift-config
  name: helm-chartrepos-tls-conf-viewer
subjects:
  - kind: Group
    apiGroup: rbac.authorization.k8s.io
    name: 'system:authenticated'
roleRef:
  apiGroup: rbac.authorization.k8s.io
  kind: Role
  name: helm-chartrepos-tls-conf-viewer
EOF
```

4.3. DISABLING HELM HART REPOSITORIES

As a cluster administrator, you can remove Helm chart repositories in your cluster so they are no longer visible in the **Developer Catalog**.

4.3.1. Disabling Helm Chart repository in the cluster

You can disable Helm Charts in the catalog by adding the **disabled** property in the **HelmChartRepository** custom resource.

Procedure

- To disable a Helm Chart repository by using CLI, add the **disabled: true** flag to the custom resource. For example, to remove an Azure sample chart repository, run:

```
$ cat <<EOF | oc apply -f -
apiVersion: helm.openshift.io/v1beta1
kind: HelmChartRepository
metadata:
  name: azure-sample-repo
spec:
  connectionConfig:
   url:https://raw.githubusercontent.com/Azure-Samples/helm-charts/master/docs
  disabled: true
EOF
```

- To disable a recently added Helm Chart repository by using Web Console:

  1. Go to **Custom Resource Definitions** and search for the **HelmChartRepository** custom resource.
  2. Go to **Instances**, find the repository you want to disable, and click its name.
  3. Go to the **YAML** tab, add the **disabled: true** flag in the **spec** section, and click **Save**.

     Example

```
spec:
  connectionConfig:
    url: <url-of-the-repositoru-to-be-disabled>
  disabled: true
```

     The repository is now disabled and will not appear in the catalog.

CHAPTER 5. KNATIVE CLI FOR USE WITH OPENSHIFT SERVERLESS

The Knative (**kn**) CLI enables simple interaction with Knative components on OpenShift Container Platform.

5.1. KEY FEATURES

The Knative (**kn**) CLI is designed to make serverless computing tasks simple and concise. Key features of the Knative CLI include:

- Deploy serverless applications from the command line.
- Manage features of Knative Serving, such as services, revisions, and traffic-splitting.
- Create and manage Knative Eventing components, such as event sources and triggers.
- Create sink bindings to connect existing Kubernetes applications and Knative services.
- Extend the Knative CLI with flexible plug-in architecture, similar to the **kubectl** CLI.
- Configure autoscaling parameters for Knative services.
- Scripted usage, such as waiting for the results of an operation, or deploying custom rollout and rollback strategies.

5.2. INSTALLING THE KNATIVE CLI

See Installing the Knative CLI.

CHAPTER 6. PIPELINES CLI (TKN)

6.1. INSTALLING TKN

Use the **tkn** CLI to manage Red Hat OpenShift Pipelines from a terminal. The following section describes how to install **tkn** on different platforms.

You can also find the URL to the latest binaries from the OpenShift Container Platform web console by clicking the **?** icon in the upper-right corner and selecting **Command Line Tools**.

6.1.1. Installing Red Hat OpenShift Pipelines CLI (tkn) on Linux

For Linux distributions, you can download the CLI directly as a **tar.gz** archive.

Procedure

1. Download the relevant CLI.
   - Linux (x86_64, amd64)
   - Linux on IBM Z and LinuxONE (s390x)
   - Linux on IBM Power Systems (ppc64le)
2. Unpack the archive:

```
$ tar xvzf <file>
```

3. Place the **tkn** binary in a directory that is on your **PATH**.
4. To check your **PATH**, run:

```
$ echo $PATH
```

6.1.2. Installing Red Hat OpenShift Pipelines CLI (tkn) on Linux using an RPM

For Red Hat Enterprise Linux (RHEL) version 8, you can install the Red Hat OpenShift Pipelines CLI (**tkn**) as an RPM.

Prerequisites

- You have an active OpenShift Container Platform subscription on your Red Hat account.
- You have root or sudo privileges on your local system.

Procedure

1. Register with Red Hat Subscription Manager:

```
# subscription-manager register
```

2. Pull the latest subscription data:

```
# subscription-manager refresh
```

3. List the available subscriptions:

```
# subscription-manager list --available --matches '*pipelines*'
```

4. In the output for the previous command, find the pool ID for your OpenShift Container Platform subscription and attach the subscription to the registered system:

```
# subscription-manager attach --pool=<pool_id>
```

5. Enable the repositories required by Red Hat OpenShift Pipelines:

- Linux (x86_64, amd64)

```
# subscription-manager repos --enable="pipelines-1.4-for-rhel-8-x86_64-rpms"
```

- Linux on IBM Z and LinuxONE (s390x)

```
# subscription-manager repos --enable="pipelines-1.4-for-rhel-8-s390x-rpms"
```

- Linux on IBM Power Systems (ppc64le)

```
# subscription-manager repos --enable="pipelines-1.4-for-rhel-8-ppc64le-rpms"
```

6. Install the **openshift-pipelines-client** package:

```
# yum install openshift-pipelines-client
```

After you install the CLI, it is available using the **tkn** command:

```
$ tkn version
```

6.1.3. Installing Red Hat OpenShift Pipelines CLI (tkn) on Windows

For Windows, the **tkn** CLI is provided as a **zip** archive.

Procedure

1. Download the CLI.
2. Unzip the archive with a ZIP program.
3. Add the location of your **tkn.exe** file to your **PATH** environment variable.
4. To check your **PATH**, open the command prompt and run the command:

```
C:\> path
```

6.1.4. Installing Red Hat OpenShift Pipelines CLI (tkn) on macOS

For macOS, the **tkn** CLI is provided as a **tar.gz** archive.

Procedure

1. Download the CLI.
2. Unpack and unzip the archive.
3. Move the **tkn** binary to a directory on your PATH.
4. To check your **PATH**, open a terminal window and run:

```
$ echo $PATH
```

6.2. CONFIGURING THE OPENSHIFT PIPELINES TKN CLI

Configure the Red Hat OpenShift Pipelines **tkn** CLI to enable tab completion.

6.2.1. Enabling tab completion

After you install the **tkn** CLI, you can enable tab completion to automatically complete **tkn** commands or suggest options when you press Tab.

Prerequisites

- You must have the **tkn** CLI tool installed.
- You must have **bash-completion** installed on your local system.

Procedure

The following procedure enables tab completion for Bash.

1. Save the Bash completion code to a file:

```
$ tkn completion bash > tkn_bash_completion
```

2. Copy the file to **/etc/bash_completion.d/**:

```
$ sudo cp tkn_bash_completion /etc/bash_completion.d/
```

   Alternatively, you can save the file to a local directory and source it from your **.bashrc** file instead.

Tab completion is enabled when you open a new terminal.

6.3. OPENSHIFT PIPELINES TKN REFERENCE

This section lists the basic **tkn** CLI commands.

6.3.1. Basic syntax

tkn [command or options] [arguments…]

6.3.2. Global options

--help, -h

6.3.3. Utility commands

6.3.3.1. tkn

Parent command for **tkn** CLI.

Example: Display all options

```
$ tkn
```

6.3.3.2. completion [shell]

Print shell completion code which must be evaluated to provide interactive completion. Supported shells are **bash** and **zsh**.

Example: Completion code for bash shell

```
$ tkn completion bash
```

6.3.3.3. version

Print version information of the **tkn** CLI.

Example: Check the tkn version

```
$ tkn version
```

6.3.4. Pipelines management commands

6.3.4.1. pipeline

Manage Pipelines.

Example: Display help

```
$ tkn pipeline --help
```

6.3.4.2. pipeline delete

Delete a Pipeline.

Example: Delete the mypipeline Pipeline from a namespace

```
$ tkn pipeline delete mypipeline -n myspace
```

6.3.4.3. pipeline describe

Describe a Pipeline.

Example: Describe mypipeline Pipeline

```
$ tkn pipeline describe mypipeline
```

6.3.4.4. pipeline list

List Pipelines.

Example: Display a list of Pipelines

```
$ tkn pipeline list
```

6.3.4.5. pipeline logs

Display Pipeline logs for a specific Pipeline.

Example: Stream live logs for the mypipeline Pipeline

```
$ tkn pipeline logs -f mypipeline
```

6.3.4.6. pipeline start

Start a Pipeline.

Example: Start mypipeline Pipeline

```
$ tkn pipeline start mypipeline
```

6.3.5. PipelineRun commands

6.3.5.1. pipelinerun

Manage PipelineRuns.

Example: Display help

```
$ tkn pipelinerun -h
```

6.3.5.2. pipelinerun cancel

Cancel a PipelineRun.

Example: Cancel the mypipelinerun PipelineRun from a namespace

```
$ tkn pipelinerun cancel mypipelinerun -n myspace
```

6.3.5.3. pipelinerun delete

Delete a PipelineRun.

Example: Delete PipelineRuns from a namespace

```
$ tkn pipelinerun delete mypipelinerun1 mypipelinerun2 -n myspace
```

6.3.5.4. pipelinerun describe

Describe a PipelineRun.

Example: Describe the mypipelinerun PipelineRun in a namespace

```
$ tkn pipelinerun describe mypipelinerun -n myspace
```

6.3.5.5. pipelinerun list

List PipelineRuns.

Example: Display a list of PipelineRuns in a namespace

```
$ tkn pipelinerun list -n myspace
```

6.3.5.6. pipelinerun logs

Display the logs of a PipelineRun.

Example: Display the logs of the mypipelinerun PipelineRun with all tasks and steps in a namespace

```
$ tkn pipelinerun logs mypipelinerun -a -n myspace
```

6.3.6. Task management commands

6.3.6.1. task

Manage Tasks.

Example: Display help

```
$ tkn task -h
```

6.3.6.2. task delete

Delete a Task.

Example: Delete mytask1 and mytask2 Tasks from a namespace

```
$ tkn task delete mytask1 mytask2 -n myspace
```

6.3.6.3. task describe

Describe a Task.

Example: Describe the mytask Task in a namespace

```
$ tkn task describe mytask -n myspace
```

6.3.6.4. task list

List Tasks.

Example: List all the Tasks in a namespace

```
$ tkn task list -n myspace
```

6.3.6.5. task logs

Display Task logs.

Example: Display logs for the mytaskrun TaskRun of the mytask Task

```
$ tkn task logs mytask mytaskrun -n myspace
```

6.3.6.6. task start

Start a Task.

Example: Start the mytask Task in a namespace

```
$ tkn task start mytask -s <ServiceAccountName> -n myspace
```

6.3.7. TaskRun commands

6.3.7.1. taskrun

Manage TaskRuns.

Example: Display help

```
$ tkn taskrun -h
```

6.3.7.2. taskrun cancel

Cancel a TaskRun.

Example: Cancel the mytaskrun TaskRun from a namespace

```
$ tkn taskrun cancel mytaskrun -n myspace
```

6.3.7.3. taskrun delete

Delete a TaskRun.

Example: Delete mytaskrun1 and mytaskrun2 TaskRuns from a namespace

```
$ tkn taskrun delete mytaskrun1 mytaskrun2 -n myspace
```

6.3.7.4. taskrun describe

Describe a TaskRun.

Example: Describe the mytaskrun TaskRun in a namespace

```
$ tkn taskrun describe mytaskrun -n myspace
```

6.3.7.5. taskrun list

List TaskRuns.

Example: List all TaskRuns in a namespace

```
$ tkn taskrun list -n myspace
```

6.3.7.6. taskrun logs

Display TaskRun logs.

Example: Display live logs for the mytaskrun TaskRun in a namespace

```
$ tkn taskrun logs -f mytaskrun -n myspace
```

6.3.8. Condition management commands

6.3.8.1. condition

Manage Conditions.

Example: Display help

```
$ tkn condition --help
```

6.3.8.2. condition delete

Delete a Condition.

Example: Delete the mycondition1 Condition from a namespace

```
$ tkn condition delete mycondition1 -n myspace
```

6.3.8.3. condition describe

Describe a Condition.

Example: Describe the mycondition1 Condition in a namespace

```
$ tkn condition describe mycondition1 -n myspace
```

6.3.8.4. condition list

List Conditions.

Example: List Conditions in a namespace

```
$ tkn condition list -n myspace
```

6.3.9. Pipeline Resource management commands

6.3.9.1. resource

Manage Pipeline Resources.

Example: Display help

```
$ tkn resource -h
```

6.3.9.2. resource create

Create a Pipeline Resource.

Example: Create a Pipeline Resource in a namespace

```
$ tkn resource create -n myspace
```

This is an interactive command that asks for input on the name of the Resource, type of the Resource, and the values based on the type of the Resource.

6.3.9.3. resource delete

Delete a Pipeline Resource.

Example: Delete the myresource Pipeline Resource from a namespace

```
$ tkn resource delete myresource -n myspace
```

6.3.9.4. resource describe

Describe a Pipeline Resource.

Example: Describe the myresource Pipeline Resource

```
$ tkn resource describe myresource -n myspace
```

6.3.9.5. resource list

List Pipeline Resources.

Example: List all Pipeline Resources in a namespace

```
$ tkn resource list -n myspace
```

6.3.10. ClusterTask management commands

6.3.10.1. clustertask

Manage ClusterTasks.

Example: Display help

```
$ tkn clustertask --help
```

6.3.10.2. clustertask delete

Delete a ClusterTask resource in a cluster.

Example: Delete mytask1 and mytask2 ClusterTasks

```
$ tkn clustertask delete mytask1 mytask2
```

6.3.10.3. clustertask describe

Describe a ClusterTask.

Example: Describe the mytask ClusterTask

```
$ tkn clustertask describe mytask1
```

6.3.10.4. clustertask list

List ClusterTasks.

Example: List ClusterTasks

```
$ tkn clustertask list
```

6.3.10.5. clustertask start

Start ClusterTasks.

Example: Start the mytask ClusterTask

```
$ tkn clustertask start mytask
```

6.3.11. Trigger management commands

6.3.11.1. eventlistener

Manage EventListeners.

Example: Display help

```
$ tkn eventlistener -h
```

6.3.11.2. eventlistener delete

Delete an EventListener.

Example: Delete mylistener1 and mylistener2 EventListeners in a namespace

```
$ tkn eventlistener delete mylistener1 mylistener2 -n myspace
```

6.3.11.3. eventlistener describe

Describe an EventListener.

Example: Describe the mylistener EventListener in a namespace

```
$ tkn eventlistener describe mylistener -n myspace
```

6.3.11.4. eventlistener list

List EventListeners.

Example: List all the EventListeners in a namespace

```
$ tkn eventlistener list -n myspace
```

6.3.11.5. eventlistener logs

Display logs of an EventListener.

Example: Display the logs of the mylistener EventListener in a namespace

```
$ tkn eventlistener logs mylistener -n myspace
```

6.3.11.6. triggerbinding

Manage TriggerBindings.

Example: Display TriggerBindings help

```
$ tkn triggerbinding -h
```

6.3.11.7. triggerbinding delete

Delete a TriggerBinding.

Example: Delete mybinding1 and mybinding2 TriggerBindings in a namespace

```
$ tkn triggerbinding delete mybinding1 mybinding2 -n myspace
```

6.3.11.8. triggerbinding describe

Describe a TriggerBinding.

Example: Describe the mybinding TriggerBinding in a namespace

```
$ tkn triggerbinding describe mybinding -n myspace
```

6.3.11.9. triggerbinding list

List TriggerBindings.

Example: List all the TriggerBindings in a namespace

```
$ tkn triggerbinding list -n myspace
```

6.3.11.10. triggertemplate

Manage TriggerTemplates.

Example: Display TriggerTemplate help

```
$ tkn triggertemplate -h
```

6.3.11.11. triggertemplate delete

Delete a TriggerTemplate.

Example: Delete mytemplate1 and mytemplate2 TriggerTemplates in a namespace

```
$ tkn triggertemplate delete mytemplate1 mytemplate2 -n `myspace`
```

6.3.11.12. triggertemplate describe

Describe a TriggerTemplate.

Example: Describe the mytemplate TriggerTemplate in a namespace

```
$ tkn triggertemplate describe mytemplate -n `myspace`
```

6.3.11.13. triggertemplate list

List TriggerTemplates.

Example: List all the TriggerTemplates in a namespace

```
$ tkn triggertemplate list -n myspace
```

6.3.11.14. clustertriggerbinding

Manage ClusterTriggerBindings.

Example: Display ClusterTriggerBindings help

```
$ tkn clustertriggerbinding -h
```

6.3.11.15. clustertriggerbinding delete

Delete a ClusterTriggerBinding.

Example: Delete myclusterbinding1 and myclusterbinding2 ClusterTriggerBindings

```
$ tkn clustertriggerbinding delete myclusterbinding1 myclusterbinding2
```

6.3.11.16. clustertriggerbinding describe

Describe a ClusterTriggerBinding.

Example: Describe the myclusterbinding ClusterTriggerBinding

```
$ tkn clustertriggerbinding describe myclusterbinding
```

6.3.11.17. clustertriggerbinding list

List ClusterTriggerBindings.

Example: List all ClusterTriggerBindings

```
$ tkn clustertriggerbinding list
```

6.3.12. Hub interaction commands

Interact with Tekton Hub for resources such as tasks and pipelines.

6.3.12.1. hub

Interact with hub.

Example: Display help

```
$ tkn hub -h
```

Example: Interact with a hub API server

```
$ tkn hub --api-server https://api.hub.tekton.dev
```

NOTE

For each example, to get the corresponding sub-commands and flags, run **tkn hub <command> --help**.

6.3.12.2. hub downgrade

Downgrade an installed resource.

Example: Downgrade the mytask task in the mynamespace namespace to it's older version

```
$ tkn hub downgrade task mytask --to version -n mynamespace
```

6.3.12.3. hub get

Get a resource manifest by its name, kind, catalog, and version.

Example: Get the manifest for a specific version of the myresource pipeline or task from the tekton catalog

```
$ tkn hub get [pipeline | task] myresource --from tekton --version version
```

6.3.12.4. hub info

Display information about a resource by its name, kind, catalog, and version.

Example: Display information about a specific version of the mytask task from the tekton catalog

```
$ tkn hub info task mytask --from tekton --version version
```

6.3.12.5. hub install

Install a resource from a catalog by its kind, name, and version.

Example: Install a specific version of the mytask task from the tekton catalog in the mynamespace namespace

```
$ tkn hub install task mytask --from tekton --version version -n mynamespace
```

6.3.12.6. hub reinstall

Reinstall a resource by its kind and name.

Example: Reinstall a specific version of the mytask task from the tekton catalog in the mynamespace namespace

```
$ tkn hub reinstall task mytask --from tekton --version version -n mynamespace
```

6.3.12.7. hub search

Search a resource by a combination of name, kind, and tags.

Example: Search a resource with a tag cli

```
$ tkn hub search --tags cli
```

6.3.12.8. hub upgrade

Upgrade an installed resource.

Example: Upgrade the installed mytask task in the mynamespace namespace to a new version

```
$ tkn hub upgrade task mytask --to version -n mynamespace
```

CHAPTER 7. OPM CLI

7.1. ABOUT OPM

The **opm** CLI tool is provided by the Operator Framework for use with the Operator Bundle Format. This tool allows you to create and maintain catalogs of Operators from a list of bundles, called an *index*, that are similar to software repositories. The result is a container image, called an *index image*, which can be stored in a container registry and then installed on a cluster.

An index contains a database of pointers to Operator manifest content that can be queried through an included API that is served when the container image is run. On OpenShift Container Platform, Operator Lifecycle Manager (OLM) can use the index image as a catalog by referencing it in a **CatalogSource** object, which polls the image at regular intervals to enable frequent updates to installed Operators on the cluster.

Additional resources

- See Operator Framework packaging formats for more information about the Bundle Format.
- To create a bundle image using the Operator SDK, see Working with bundle images.

7.2. INSTALLING OPM

You can install the **opm** CLI tool on your Linux, macOS, or Windows workstation.

Prerequisites

- For Linux, you must provide the following packages. RHEL 8 meets these requirements:
  - **podman** version 1.9.3+ (version 2.0+ recommended)
  - **glibc** version 2.28+

Procedure

1. Navigate to the OpenShift mirror site and download the latest version of the tarball that matches your operating system.
2. Unpack the archive.
   - For Linux or macOS:

     ```
     $ tar xvf <file>
     ```

   - For Windows, unzip the archive with a ZIP program.
3. Place the file anywhere in your **PATH**.
   - For Linux or macOS:
     a. Check your **PATH**:

        ```
        $ echo $PATH
        ```

b. Move the file. For example:

```
$ sudo mv ./opm /usr/local/bin/
```

- For Windows:

a. Check your **PATH**:

```
C:\> path
```

b. Move the file:

```
C:\> move opm.exe <directory>
```

Verification

- After you install the **opm** CLI, verify that it is available:

```
$ opm version
```

Example output

```
Version: version.Version{OpmVersion:"v1.15.4-2-g6183dbb3",
GitCommit:"6183dbb3567397e759f25752011834f86f47a3ea", BuildDate:"2021-02-
13T04:16:08Z", GoOs:"linux", GoArch:"amd64"}
```

7.3. ADDITIONAL RESOURCES

- See Managing custom catalogs for **opm** procedures including creating, updating, and pruning index images.

CHAPTER 8. OPERATOR SDK

8.1. INSTALLING THE OPERATOR SDK CLI

The Operator SDK provides a command-line interface (CLI) tool that Operator developers can use to build, test, and deploy an Operator. You can install the Operator SDK CLI on your workstation so that you are prepared to start authoring your own Operators.

See Developing Operators for full documentation on the Operator SDK.

NOTE

OpenShift Container Platform 4.7 supports Operator SDK v1.3.0.

8.1.1. Installing the Operator SDK CLI

You can install the OpenShift SDK CLI tool on Linux.

Prerequisites

- Go v1.13+
- **docker** v17.03+, **podman** v1.9.3+, or **buildah** v1.7+

Procedure

1. Navigate to the OpenShift mirror site.
2. From the **4.7.23** directory, download the latest version of the tarball for Linux.
3. Unpack the archive:

```
$ tar xvf operator-sdk-v1.3.0-ocp-linux-x86_64.tar.gz
```

4. Make the file executable:

```
$ chmod +x operator-sdk
```

5. Move the extracted **operator-sdk** binary to a directory that is on your **PATH**.

TIP

To check your **PATH**:

```
$ echo $PATH
```

```
$ sudo mv ./operator-sdk /usr/local/bin/operator-sdk
```

Verification

- After you install the Operator SDK CLI, verify that it is available:

```
$ operator-sdk version
```

Example output

```
operator-sdk version: "v1.3.0-ocp", ...
```

8.2. OPERATOR SDK CLI REFERENCE

The Operator SDK command-line interface (CLI) is a development kit designed to make writing Operators easier.

Operator SDK CLI syntax

```
$ operator-sdk <command> [<subcommand>] [<argument>] [<flags>]
```

Operator authors with cluster administrator access to a Kubernetes-based cluster (such as OpenShift Container Platform) can use the Operator SDK CLI to develop their own Operators based on Go, Ansible, or Helm. Kubebuilder is embedded into the Operator SDK as the scaffolding solution for Go-based Operators, which means existing Kubebuilder projects can be used as is with the Operator SDK and continue to work.

See Developing Operators for full documentation on the Operator SDK.

8.2.1. bundle

The **operator-sdk bundle** command manages Operator bundle metadata.

8.2.1.1. validate

The **bundle validate** subcommand validates an Operator bundle.

Table 8.1. bundle validate flags

Flag	Description
-h, **--help**	Help output for the **bundle validate** subcommand.
--index-builder (string)	Tool to pull and unpack bundle images. Only used when validating a bundle image. Available options are **docker**, which is the default, **podman**, or **none**.
--list-optional	List all optional validators available. When set, no validators are run.
--select-optional (string)	Label selector to select optional validators to run. When run with the **--list-optional** flag, lists available optional validators.

8.2.2. cleanup

The **operator-sdk cleanup** command destroys and removes resources that were created for an Operator that was deployed with the **run** command.

Table 8.2. cleanup flags

Flag	Description
-h, **--help**	Help output for the **run bundle** subcommand.
--kubeconfig (string)	Path to the **kubeconfig** file to use for CLI requests.
n, **--namespace** (string)	If present, namespace in which to run the CLI request.
--timeout <duration>	Time to wait for the command to complete before failing. The default value is **2m0s**.

8.2.3. completion

The **operator-sdk completion** command generates shell completions to make issuing CLI commands quicker and easier.

Table 8.3. completion subcommands

Subcommand	Description
bash	Generate bash completions.
zsh	Generate zsh completions.

Table 8.4. completion flags

Flag	Description
-h, --help	Usage help output.

For example:

```
$ operator-sdk completion bash
```

Example output

```
# bash completion for operator-sdk                  -*- shell-script -*-
...
# ex: ts=4 sw=4 et filetype=sh
```

8.2.4. create

The **operator-sdk create** command is used to create, or *scaffold*, a Kubernetes API.

8.2.4.1. api

The **create api** subcommand scaffolds a Kubernetes API. The subcommand must be run in a project that was initialized with the **init** command.

Table 8.5. **create api** flags

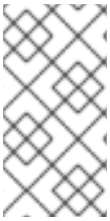
Flag	Description
-h, **--help**	Help output for the **run bundle** subcommand.

8.2.5. generate

The **operator-sdk generate** command invokes a specific generator to generate code or manifests.

8.2.5.1. bundle

The **generate bundle** subcommand generates a set of bundle manifests, metadata, and a **bundle.Dockerfile** file for your Operator project.



NOTE

Typically, you run the **generate kustomize manifests** subcommand first to generate the input Kustomize bases that are used by the **generate bundle** subcommand. However, you can use the **make bundle** command in an initialized project to automate running these commands in sequence.

Table 8.6. **generate bundle** flags

Flag	Description
--channels (string)	Comma-separated list of channels to which the bundle belongs. The default value is **alpha**.
--crds-dir (string)	Root directory for **CustomResoureDefinition** manifests.
--default-channel (string)	The default channel for the bundle.
--deploy-dir (string)	Root directory for Operator manifests, such as deployments and RBAC. This directory is different from the directory passed to the **--input-dir** flag.
-h, **--help**	Help for **generate bundle**
--input-dir (string)	Directory from which to read an existing bundle. This directory is the parent of your bundle **manifests** directory and is different from the**--deploy-dir** directory.
--kustomize-dir (string)	Directory containing Kustomize bases and a **kustomization.yaml** file for bundle manifests. The default path is **config/manifests**.
--manifests	Generate bundle manifests.

Flag	Description
--metadata	Generate bundle metadata and Dockerfile.
--output-dir (string)	Directory to write the bundle to.
--overwrite	Overwrite the bundle metadata and Dockerfile if they exist. The default value is **true**.
--package (string)	Package name for the bundle.
-q, **--quiet**	Run in quiet mode.
--stdout	Write bundle manifest to standard out.
--version (string)	Semantic version of the Operator in the generated bundle. Set only when creating a new bundle or upgrading the Operator.

Additional resources

- See Bundling an Operator and deploying with Operator Lifecycle Manager for a full procedure that includes using the **make bundle** command to call the **generate bundle** subcommand.

8.2.5.2. kustomize

The **generate kustomize** subcommand contains subcommands that generate Kustomize data for the Operator.

8.2.5.2.1. manifests

The **generate kustomize manifests** subcommand generates or regenerates Kustomize bases and a **kustomization.yaml** file in the **config/manifests** directory, which are used to build bundle manifests by other Operator SDK commands. This command interactively asks for UI metadata, an important component of manifest bases, by default unless a base already exists or you set the **--interactive=false** flag.

Table 8.7. **generate kustomize manifests** flags

Flag	Description
--apis-dir (string)	Root directory for API type definitions.
-h, **--help**	Help for **generate kustomize manifests**.
--input-dir (string)	Directory containing existing Kustomize files.
--interactive	When set to **false**, if no Kustomize base exists, an interactive command prompt is presented to accept custom metadata.

Flag	Description
--output-dir (string)	Directory where to write Kustomize files.
--package (string)	Package name.
-q, **--quiet**	Run in quiet mode.

8.2.6. init

The **operator-sdk init** command initializes an Operator project and generates, or *scaffolds*, a default project directory layout for the given plug-in.

This command writes the following files:

- Boilerplate license file
- **PROJECT** file with the domain and repository
- **Makefile** to build the project
- **go.mod** file with project dependencies
- **kustomization.yaml** file for customizing manifests
- Patch file for customizing images for manager manifests
- Patch file for enabling Prometheus metrics
- **main.go** file to run

Table 8.8. init flags

Flag	Description
--help, -h	Help output for the **init** command.
--plugins (string)	Name and optionally version of the plug-in to initialize the project with. Available plug-ins are **ansible.sdk.operatorframework.io/v1**, **go.kubebuilder.io/v2**, **go.kubebuilder.io/v3**, and **helm.sdk.operatorframework.io/v1**.
--project-version	Project version. Available values are **2** and **3-alpha**, which is the default.

8.2.7. run

The **operator-sdk run** command provides options that can launch the Operator in various environments.

8.2.7.1. bundle

The **run bundle** subcommand deploys an Operator in the bundle format with Operator Lifecycle Manager (OLM).

Table 8.9. **run bundle** flags

Flag	Description
--index-image (string)	Index image in which to inject a bundle. The default image is **quay.io/operator-framework/upstream-opm-builder:latest**.
--install-mode <install_mode_value>	Install mode supported by the cluster service version (CSV) of the Operator, for example **AllNamespaces** or **SingleNamespace**.
--timeout <duration>	Install timeout. The default value is **2m0s**.
--kubeconfig (string)	Path to the **kubeconfig** file to use for CLI requests.
n, **--namespace** (string)	If present, namespace in which to run the CLI request.
-h, **--help**	Help output for the **run bundle** subcommand.

Additional resources

- See Operator group membership for details on possible install modes.

8.2.7.2. bundle-upgrade

The **run bundle-upgrade** subcommand upgrades an Operator that was previously installed in the bundle format with Operator Lifecycle Manager (OLM).

Table 8.10. **run bundle-upgrade** flags

Flag	Description
--timeout <duration>	Upgrade timeout. The default value is **2m0s**.
--kubeconfig (string)	Path to the **kubeconfig** file to use for CLI requests.
n, **--namespace** (string)	If present, namespace in which to run the CLI request.
-h, **--help**	Help output for the **run bundle** subcommand.

8.2.8. scorecard

The **operator-sdk scorecard** command runs the scorecard tool to validate an Operator bundle and provide suggestions for improvements. The command takes one argument, either a bundle image or directory containing manifests and metadata. If the argument holds an image tag, the image must be

present remotely.

Table 8.11. **scorecard** flags

Flag	Description
-c, **--config** (string)	Path to scorecard configuration file. The default path is **bundle/tests/scorecard/config.yaml**.
-h, **--help**	Help output for the **scorecard** command.
--kubeconfig (string)	Path to **kubeconfig** file.
-L, **--list**	List which tests are available to run.
-n, --namespace (string)	Namespace in which to run the test images.
-o, **--output** (string)	Output format for results. Available values are **text**, which is the default, and **json**.
-l, **--selector** (string)	Label selector to determine which tests are run.
-s, **--service-account** (string)	Service account to use for tests. The default value is **default**.
-x, **--skip-cleanup**	Disable resource cleanup after tests are run.
-w, **--wait-time <duration>**	Seconds to wait for tests to complete, for example **35s**. The default value is **30s**.

Additional resources

- See Validating Operators using the scorecard tool for details about running the scorecard tool.