OpenShift Container Platform 4.9

CLI tools

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

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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.

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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.
- Knative CLI (kn): The **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 4.9. Download and install the new version of **oc**.

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 v4.9 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>
```

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 v4.9 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>
```

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 v4.9 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

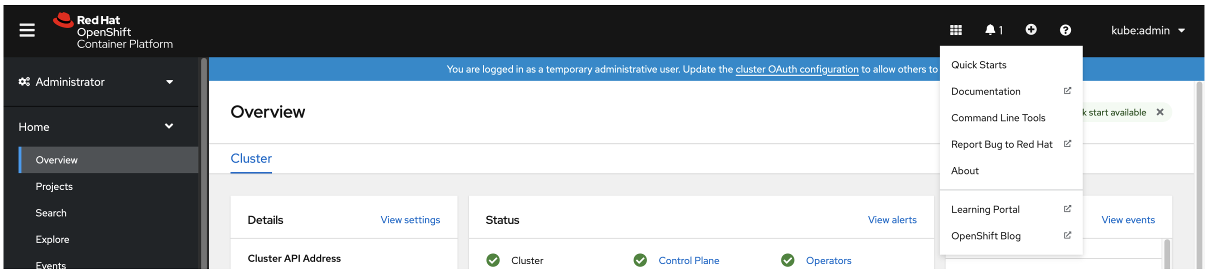
If you installed an earlier version of **oc**, you cannot use it to complete all of the commands in OpenShift Container Platform 4.9. Download and install the new version of **oc**.

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.

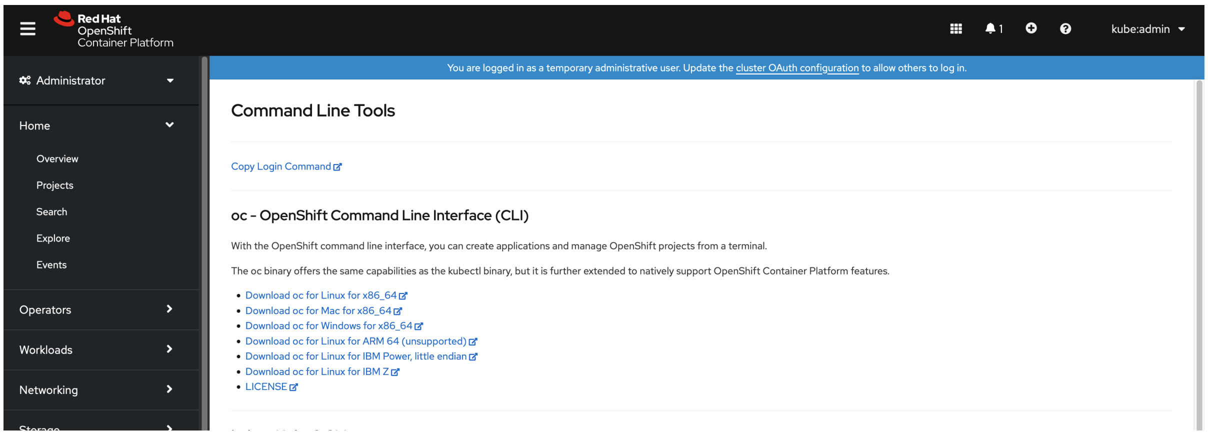
Procedure

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



You are logged in as a temporary administrative user. Update the cluster OAuth configuration to allow others to

2. Click **Command Line Tools**.



You are logged in as a temporary administrative user. Update the cluster OAuth configuration to allow others to log in.

oc - OpenShift Command Line Interface (CLI)

With the OpenShift command line interface, you can create applications and manage OpenShift projects from a terminal.

The oc binary offers the same capabilities as the kubectl binary, but it is further extended to natively support OpenShift Container Platform features.

- Download oc for Linux for x86_64
- Download oc for Mac for x86_64
- Download oc for Windows for x86_64
- Download oc for Linux for ARM 64 (unsupported)
- Download oc for Linux for IBM Power, little endian
- Download oc for Linux for IBM Z
- LICENSE

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:

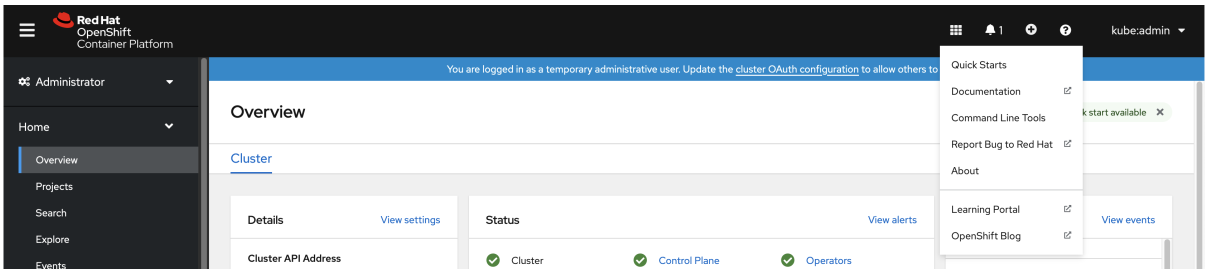
```
$ oc <command>
```

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.

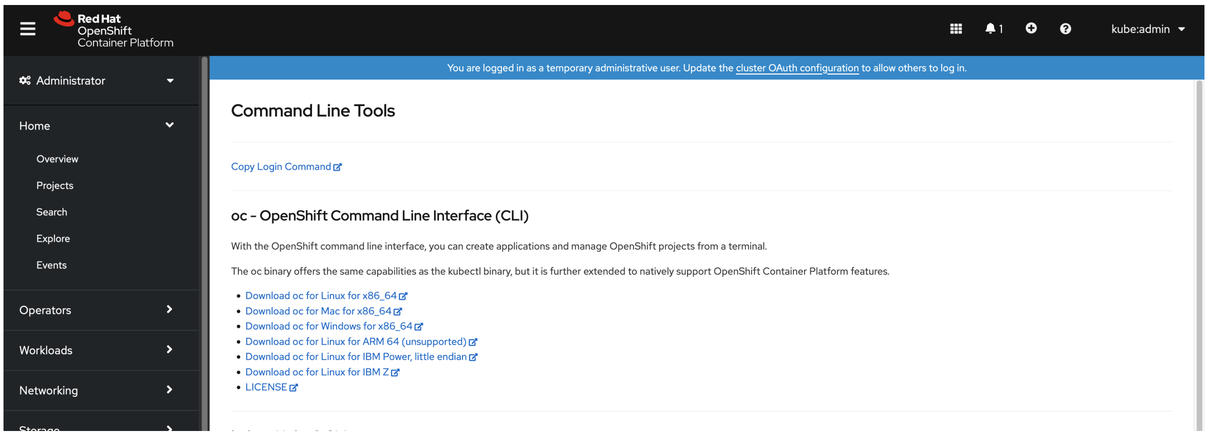
Procedure

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



You are logged in as a temporary administrative user. Update the cluster OAuth configuration to allow others to

2. Click **Command Line Tools**.



You are logged in as a temporary administrative user. Update the cluster OAuth configuration to allow others to log in.

Command Line Tools

Copy Login Command

oc - OpenShift Command Line Interface (CLI)

With the OpenShift command line interface, you can create applications and manage OpenShift projects from a terminal.

The oc binary offers the same capabilities as the kubectl binary, but it is further extended to natively support OpenShift Container Platform features.

- Download oc for Linux for x86_64
- Download oc for Mac for x86_64
- Download oc for Windows for x86_64
- Download oc for Linux for ARM 64 (unsupported)
- Download oc for Linux for IBM Power, little endian
- Download oc for Linux for IBM Z
- LICENSE

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:

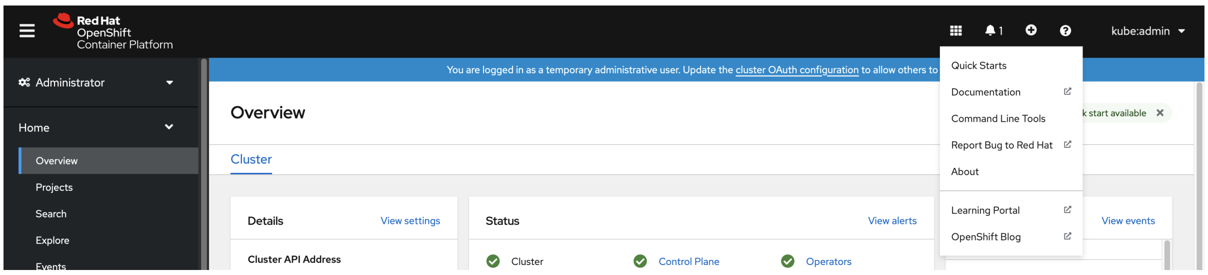
```
C:\> oc <command>
```

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.

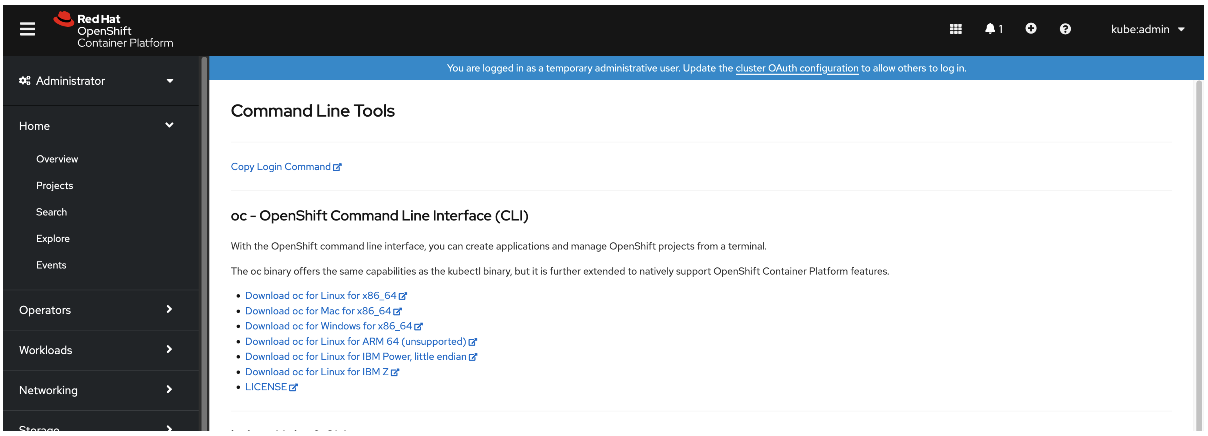
Procedure

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



You are logged in as a temporary administrative user. Update the cluster OAuth configuration to allow others to

2. Click **Command Line Tools**.



You are logged in as a temporary administrative user. Update the cluster OAuth configuration to allow others to log in.

Command Line Tools

Copy Login Command

oc - OpenShift Command Line Interface (CLI)

With the OpenShift command line interface, you can create applications and manage OpenShift projects from a terminal.

The oc binary offers the same capabilities as the kubectl binary, but it is further extended to natively support OpenShift Container Platform features.

- Download oc for Linux for x86_64
- Download oc for Mac for x86_64
- Download oc for Windows for x86_64
- Download oc for Linux for ARM 64 (unsupported)
- Download oc for Linux for IBM Power, little endian
- Download oc for Linux for IBM Z
- LICENSE

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 4.9.

   - For Red Hat Enterprise Linux 8:

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

   - For Red Hat Enterprise Linux 7:

   ```
   # subscription-manager repos --enable="rhel-7-server-ose-4.9-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>
```

2.1.3. 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.

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.

```
$ 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

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

Prerequisites

- You must have the **oc** CLI tool installed.
- You must have the package **bash-completion** installed.

Procedure

The following procedure enables tab completion for Bash.

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.

2.3. 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.

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.

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 COMMAND REFERENCE

This reference provides descriptions and example commands for OpenShift CLI (**oc**) developer commands. For administrator commands, see the OpenShift CLI administrator command reference .

Run **oc help** to list all commands or run **oc <command> --help** to get additional details for a specific command.

2.5.1. OpenShift CLI (oc) developer commands

2.5.1.1. oc annotate

Update the annotations on a resource

Example usage

```
  # Update pod 'foo' with the annotation 'description' and the value 'my frontend'
  # If the same annotation is set multiple times, only the last value will be applied
  oc annotate pods foo description='my frontend'

  # Update a pod identified by type and name in "pod.json"
  oc annotate -f pod.json description='my frontend'

  # Update pod 'foo' with the annotation 'description' and the value 'my frontend running nginx',
overwriting any existing value
  oc annotate --overwrite pods foo description='my frontend running nginx'

  # Update all pods in the namespace
  oc annotate pods --all description='my frontend running nginx'

  # Update pod 'foo' only if the resource is unchanged from version 1
  oc annotate pods foo description='my frontend running nginx' --resource-version=1

  # Update pod 'foo' by removing an annotation named 'description' if it exists
  # Does not require the --overwrite flag
  oc annotate pods foo description-
```

2.5.1.2. oc api-resources

Print the supported API resources on the server

Example usage

```
# Print the supported API resources
oc api-resources

# Print the supported API resources with more information
oc api-resources -o wide

# Print the supported API resources sorted by a column
oc api-resources --sort-by=name

# Print the supported namespaced resources
oc api-resources --namespaced=true

# Print the supported non-namespaced resources
oc api-resources --namespaced=false

# Print the supported API resources with a specific APIGroup
oc api-resources --api-group=extensions
```

2.5.1.3. oc api-versions

Print the supported API versions on the server, in the form of "group/version"

Example usage

```
# Print the supported API versions
oc api-versions
```

2.5.1.4. oc apply

Apply a configuration to a resource by file name or stdin

Example usage

```
# Apply the configuration in pod.json to a pod
oc apply -f ./pod.json

# Apply resources from a directory containing kustomization.yaml - e.g. dir/kustomization.yaml
oc apply -k dir/

# Apply the JSON passed into stdin to a pod
cat pod.json | oc apply -f -

# Note: --prune is still in Alpha
# Apply the configuration in manifest.yaml that matches label app=nginx and delete all other
resources that are not in the file and match label app=nginx
oc apply --prune -f manifest.yaml -l app=nginx

# Apply the configuration in manifest.yaml and delete all the other config maps that are not in the file
oc apply --prune -f manifest.yaml --all --prune-whitelist=core/v1/ConfigMap
```

2.5.1.5. oc apply edit-last-applied

Edit latest last-applied-configuration annotations of a resource/object

Example usage

```
# Edit the last-applied-configuration annotations by type/name in YAML
oc apply edit-last-applied deployment/nginx

# Edit the last-applied-configuration annotations by file in JSON
oc apply edit-last-applied -f deploy.yaml -o json
```

2.5.1.6. oc apply set-last-applied

Set the last-applied-configuration annotation on a live object to match the contents of a file

Example usage

```
# Set the last-applied-configuration of a resource to match the contents of a file
oc apply set-last-applied -f deploy.yaml

# Execute set-last-applied against each configuration file in a directory
oc apply set-last-applied -f path/

# Set the last-applied-configuration of a resource to match the contents of a file; will create the annotation if it does not already exist
oc apply set-last-applied -f deploy.yaml --create-annotation=true
```

2.5.1.7. oc apply view-last-applied

View the latest last-applied-configuration annotations of a resource/object

Example usage

```
# View the last-applied-configuration annotations by type/name in YAML
oc apply view-last-applied deployment/nginx

# View the last-applied-configuration annotations by file in JSON
oc apply view-last-applied -f deploy.yaml -o json
```

2.5.1.8. oc attach

Attach to a running container

Example usage

```
# Get output from running pod mypod; use the 'oc.kubernetes.io/default-container' annotation
# for selecting the container to be attached or the first container in the pod will be chosen
oc attach mypod

# Get output from ruby-container from pod mypod
oc attach mypod -c ruby-container

# Switch to raw terminal mode; sends stdin to 'bash' in ruby-container from pod mypod
# and sends stdout/stderr from 'bash' back to the client
```

```
oc attach mypod -c ruby-container -i -t

# Get output from the first pod of a replica set named nginx
oc attach rs/nginx
```

2.5.1.9. oc auth can-i

Check whether an action is allowed

Example usage

```
# Check to see if I can create pods in any namespace
oc auth can-i create pods --all-namespaces

# Check to see if I can list deployments in my current namespace
oc auth can-i list deployments.apps

# Check to see if I can do everything in my current namespace ("*" means all)
oc auth can-i '*' '*'

# Check to see if I can get the job named "bar" in namespace "foo"
oc auth can-i list jobs.batch/bar -n foo

# Check to see if I can read pod logs
oc auth can-i get pods --subresource=log

# Check to see if I can access the URL /logs/
oc auth can-i get /logs/

# List all allowed actions in namespace "foo"
oc auth can-i --list --namespace=foo
```

2.5.1.10. oc auth reconcile

Reconciles rules for RBAC role, role binding, cluster role, and cluster role binding objects

Example usage

```
# Reconcile RBAC resources from a file
oc auth reconcile -f my-rbac-rules.yaml
```

2.5.1.11. oc autoscale

Autoscale a deployment config, deployment, replica set, stateful set, or replication controller

Example usage

```
  # Auto scale a deployment "foo", with the number of pods between 2 and 10, no target CPU
utilization specified so a default autoscaling policy will be used
  oc autoscale deployment foo --min=2 --max=10
```

```
# Auto scale a replication controller "foo", with the number of pods between 1 and 5, target CPU utilization at 80%
oc autoscale rc foo --max=5 --cpu-percent=80
```

2.5.1.12. oc cancel-build

Cancel running, pending, or new builds

Example usage

```
# Cancel the build with the given name
oc cancel-build ruby-build-2

# Cancel the named build and print the build logs
oc cancel-build ruby-build-2 --dump-logs

# Cancel the named build and create a new one with the same parameters
oc cancel-build ruby-build-2 --restart

# Cancel multiple builds
oc cancel-build ruby-build-1 ruby-build-2 ruby-build-3

# Cancel all builds created from the 'ruby-build' build config that are in the 'new' state
oc cancel-build bc/ruby-build --state=new
```

2.5.1.13. oc cluster-info

Display cluster information

Example usage

```
# Print the address of the control plane and cluster services
oc cluster-info
```

2.5.1.14. oc cluster-info dump

Dump relevant information for debugging and diagnosis

Example usage

```
# Dump current cluster state to stdout
oc cluster-info dump

# Dump current cluster state to /path/to/cluster-state
oc cluster-info dump --output-directory=/path/to/cluster-state

# Dump all namespaces to stdout
oc cluster-info dump --all-namespaces

# Dump a set of namespaces to /path/to/cluster-state
oc cluster-info dump --namespaces default,kube-system --output-directory=/path/to/cluster-state
```

2.5.1.15. oc completion

Output shell completion code for the specified shell (bash or zsh)

Example usage

```
# Installing bash completion on macOS using homebrew
## If running Bash 3.2 included with macOS
brew install bash-completion
## or, if running Bash 4.1+
brew install bash-completion@2
## If oc is installed via homebrew, this should start working immediately
## If you've installed via other means, you may need add the completion to your completion directory
oc completion bash > $(brew --prefix)/etc/bash_completion.d/oc


# Installing bash completion on Linux
## If bash-completion is not installed on Linux, install the 'bash-completion' package
## via your distribution's package manager.
## Load the oc completion code for bash into the current shell
source <(oc completion bash)
## Write bash completion code to a file and source it from .bash_profile
oc completion bash > ~/.kube/completion.bash.inc
printf "
# Kubectl shell completion
source '$HOME/.kube/completion.bash.inc'
" >> $HOME/.bash_profile
source $HOME/.bash_profile

# Load the oc completion code for zsh[1] into the current shell
source <(oc completion zsh)
# Set the oc completion code for zsh[1] to autoload on startup
oc completion zsh > "${fpath[1]}/_oc"
```

2.5.1.16. oc config current-context

Display the current-context

Example usage

```
# Display the current-context
oc config current-context
```

2.5.1.17. oc config delete-cluster

Delete the specified cluster from the kubeconfig

Example usage

```
# Delete the minikube cluster
oc config delete-cluster minikube
```

2.5.1.18. oc config delete-context

Delete the specified context from the kubeconfig

Example usage

```
# Delete the context for the minikube cluster
oc config delete-context minikube
```

2.5.1.19. oc config delete-user

Delete the specified user from the kubeconfig

Example usage

```
# Delete the minikube user
oc config delete-user minikube
```

2.5.1.20. oc config get-clusters

Display clusters defined in the kubeconfig

Example usage

```
# List the clusters that oc knows about
oc config get-clusters
```

2.5.1.21. oc config get-contexts

Describe one or many contexts

Example usage

```
# List all the contexts in your kubeconfig file
oc config get-contexts

# Describe one context in your kubeconfig file
oc config get-contexts my-context
```

2.5.1.22. oc config get-users

Display users defined in the kubeconfig

Example usage

```
# List the users that oc knows about
oc config get-users
```

2.5.1.23. oc config rename-context

Rename a context from the kubeconfig file

Example usage

```
# Rename the context 'old-name' to 'new-name' in your kubeconfig file
oc config rename-context old-name new-name
```

2.5.1.24. oc config set

Set an individual value in a kubeconfig file

Example usage

```
# Set the server field on the my-cluster cluster to https://1.2.3.4
oc config set clusters.my-cluster.server https://1.2.3.4

# Set the certificate-authority-data field on the my-cluster cluster
oc config set clusters.my-cluster.certificate-authority-data $(echo "cert_data_here" | base64 -i -)

# Set the cluster field in the my-context context to my-cluster
oc config set contexts.my-context.cluster my-cluster

# Set the client-key-data field in the cluster-admin user using --set-raw-bytes option
oc config set users.cluster-admin.client-key-data cert_data_here --set-raw-bytes=true
```

2.5.1.25. oc config set-cluster

Set a cluster entry in kubeconfig

Example usage

```
# Set only the server field on the e2e cluster entry without touching other values
oc config set-cluster e2e --server=https://1.2.3.4

# Embed certificate authority data for the e2e cluster entry
oc config set-cluster e2e --embed-certs --certificate-authority=~/.kube/e2e/kubernetes.ca.crt

# Disable cert checking for the dev cluster entry
oc config set-cluster e2e --insecure-skip-tls-verify=true

# Set custom TLS server name to use for validation for the e2e cluster entry
oc config set-cluster e2e --tls-server-name=my-cluster-name
```

2.5.1.26. oc config set-context

Set a context entry in kubeconfig

Example usage

```
# Set the user field on the gce context entry without touching other values
oc config set-context gce --user=cluster-admin
```

2.5.1.27. oc config set-credentials

Set a user entry in kubeconfig

Example usage

```
# Set only the "client-key" field on the "cluster-admin"
# entry, without touching other values
oc config set-credentials cluster-admin --client-key=~/.kube/admin.key

# Set basic auth for the "cluster-admin" entry
oc config set-credentials cluster-admin --username=admin --password=uXFGweU9l35qcif

# Embed client certificate data in the "cluster-admin" entry
oc config set-credentials cluster-admin --client-certificate=~/.kube/admin.crt --embed-certs=true

# Enable the Google Compute Platform auth provider for the "cluster-admin" entry
oc config set-credentials cluster-admin --auth-provider=gcp

# Enable the OpenID Connect auth provider for the "cluster-admin" entry with additional args
oc config set-credentials cluster-admin --auth-provider=oidc --auth-provider-arg=client-id=foo --auth-provider-arg=client-secret=bar

# Remove the "client-secret" config value for the OpenID Connect auth provider for the "cluster-admin" entry
oc config set-credentials cluster-admin --auth-provider=oidc --auth-provider-arg=client-secret-

# Enable new exec auth plugin for the "cluster-admin" entry
oc config set-credentials cluster-admin --exec-command=/path/to/the/executable --exec-api-version=client.authentication.k8s.io/v1beta1

# Define new exec auth plugin args for the "cluster-admin" entry
oc config set-credentials cluster-admin --exec-arg=arg1 --exec-arg=arg2

# Create or update exec auth plugin environment variables for the "cluster-admin" entry
oc config set-credentials cluster-admin --exec-env=key1=val1 --exec-env=key2=val2

# Remove exec auth plugin environment variables for the "cluster-admin" entry
oc config set-credentials cluster-admin --exec-env=var-to-remove-
```

2.5.1.28. oc config unset

Unset an individual value in a kubeconfig file

Example usage

```
# Unset the current-context
oc config unset current-context

# Unset namespace in foo context
oc config unset contexts.foo.namespace
```

2.5.1.29. oc config use-context

Set the current-context in a kubeconfig file

Example usage

```
# Use the context for the minikube cluster
oc config use-context minikube
```

2.5.1.30. oc config view

Display merged kubeconfig settings or a specified kubeconfig file

Example usage

```
# Show merged kubeconfig settings
oc config view

# Show merged kubeconfig settings and raw certificate data
oc config view --raw

# Get the password for the e2e user
oc config view -o jsonpath='{.users[?(@.name == "e2e")].user.password}'
```

2.5.1.31. oc cp

Copy files and directories to and from containers

Example usage

```
# !!!Important Note!!!
# Requires that the 'tar' binary is present in your container
# image.  If 'tar' is not present, 'oc cp' will fail.
#
# For advanced use cases, such as symlinks, wildcard expansion or
# file mode preservation, consider using 'oc exec'.

# Copy /tmp/foo local file to /tmp/bar in a remote pod in namespace <some-namespace>
tar cf - /tmp/foo | oc exec -i -n <some-namespace> <some-pod> -- tar xf - -C /tmp/bar

# Copy /tmp/foo from a remote pod to /tmp/bar locally
oc exec -n <some-namespace> <some-pod> -- tar cf - /tmp/foo | tar xf - -C /tmp/bar

# Copy /tmp/foo_dir local directory to /tmp/bar_dir in a remote pod in the default namespace
oc cp /tmp/foo_dir <some-pod>:/tmp/bar_dir

# Copy /tmp/foo local file to /tmp/bar in a remote pod in a specific container
oc cp /tmp/foo <some-pod>:/tmp/bar -c <specific-container>

# Copy /tmp/foo local file to /tmp/bar in a remote pod in namespace <some-namespace>
oc cp /tmp/foo <some-namespace>/<some-pod>:/tmp/bar

# Copy /tmp/foo from a remote pod to /tmp/bar locally
oc cp <some-namespace>/<some-pod>:/tmp/foo /tmp/bar
```

2.5.1.32. oc create

Create a resource from a file or from stdin

Example usage

```
# Create a pod using the data in pod.json
oc create -f ./pod.json

# Create a pod based on the JSON passed into stdin
cat pod.json | oc create -f -

# Edit the data in docker-registry.yaml in JSON then create the resource using the edited data
oc create -f docker-registry.yaml --edit -o json
```

2.5.1.33. oc create build

Create a new build

Example usage

```
# Create a new build
oc create build myapp
```

2.5.1.34. oc create clusterresourcequota

Create a cluster resource quota

Example usage

```
  # Create a cluster resource quota limited to 10 pods
  oc create clusterresourcequota limit-bob --project-annotation-selector=openshift.io/requester=user-
bob --hard=pods=10
```

2.5.1.35. oc create clusterrole

Create a cluster role

Example usage

```
  # Create a cluster role named "pod-reader" that allows user to perform "get", "watch" and "list" on
pods
  oc create clusterrole pod-reader --verb=get,list,watch --resource=pods

  # Create a cluster role named "pod-reader" with ResourceName specified
  oc create clusterrole pod-reader --verb=get --resource=pods --resource-name=readablepod --
resource-name=anotherpod

  # Create a cluster role named "foo" with API Group specified
  oc create clusterrole foo --verb=get,list,watch --resource=rs.extensions

  # Create a cluster role named "foo" with SubResource specified
  oc create clusterrole foo --verb=get,list,watch --resource=pods,pods/status

  # Create a cluster role name "foo" with NonResourceURL specified
  oc create clusterrole "foo" --verb=get --non-resource-url=/logs/*
  # Create a cluster role name "monitoring" with AggregationRule specified
  oc create clusterrole monitoring --aggregation-rule="rbac.example.com/aggregate-to-monitoring=true"
```

2.5.1.36. oc create clusterrolebinding

Create a cluster role binding for a particular cluster role

Example usage

```
  # Create a cluster role binding for user1, user2, and group1 using the cluster-admin cluster role
  oc create clusterrolebinding cluster-admin --clusterrole=cluster-admin --user=user1 --user=user2 --group=group1
```

2.5.1.37. oc create configmap

Create a config map from a local file, directory or literal value

Example usage

```
  # Create a new config map named my-config based on folder bar
  oc create configmap my-config --from-file=path/to/bar

  # Create a new config map named my-config with specified keys instead of file basenames on disk
  oc create configmap my-config --from-file=key1=/path/to/bar/file1.txt --from-file=key2=/path/to/bar/file2.txt

  # Create a new config map named my-config with key1=config1 and key2=config2
  oc create configmap my-config --from-literal=key1=config1 --from-literal=key2=config2

  # Create a new config map named my-config from the key=value pairs in the file
  oc create configmap my-config --from-file=path/to/bar

  # Create a new config map named my-config from an env file
  oc create configmap my-config --from-env-file=path/to/bar.env
```

2.5.1.38. oc create cronjob

Create a cron job with the specified name

Example usage

```
  # Create a cron job
  oc create cronjob my-job --image=busybox --schedule="*/1 * * * *"

  # Create a cron job with a command
  oc create cronjob my-job --image=busybox --schedule="*/1 * * * *" -- date
```

2.5.1.39. oc create deployment

Create a deployment with the specified name

Example usage

```
# Create a deployment named my-dep that runs the busybox image
oc create deployment my-dep --image=busybox

# Create a deployment with a command
oc create deployment my-dep --image=busybox -- date

# Create a deployment named my-dep that runs the nginx image with 3 replicas
oc create deployment my-dep --image=nginx --replicas=3

# Create a deployment named my-dep that runs the busybox image and expose port 5701
oc create deployment my-dep --image=busybox --port=5701
```

2.5.1.40. oc create deploymentconfig

Create a deployment config with default options that uses a given image

Example usage

```
# Create an nginx deployment config named my-nginx
oc create deploymentconfig my-nginx --image=nginx
```

2.5.1.41. oc create identity

Manually create an identity (only needed if automatic creation is disabled)

Example usage

```
# Create an identity with identity provider "acme_ldap" and the identity provider username
"adamjones"
oc create identity acme_ldap:adamjones
```

2.5.1.42. oc create imagestream

Create a new empty image stream

Example usage

```
# Create a new image stream
oc create imagestream mysql
```

2.5.1.43. oc create imagestreamtag

Create a new image stream tag

Example usage

```
# Create a new image stream tag based on an image in a remote registry
oc create imagestreamtag mysql:latest --from-image=myregistry.local/mysql/mysql:5.0
```

2.5.1.44. oc create ingress

Create an ingress with the specified name

Example usage

```
# Create a single ingress called 'simple' that directs requests to foo.com/bar to svc
# svc1:8080 with a tls secret "my-cert"
oc create ingress simple --rule="foo.com/bar=svc1:8080,tls=my-cert"

# Create a catch all ingress of "/path" pointing to service svc:port and Ingress Class as
"otheringress"
oc create ingress catch-all --class=otheringress --rule="/path=svc:port"

# Create an ingress with two annotations: ingress.annotation1 and ingress.annotations2
oc create ingress annotated --class=default --rule="foo.com/bar=svc:port" \
--annotation ingress.annotation1=foo \
--annotation ingress.annotation2=bla

# Create an ingress with the same host and multiple paths
oc create ingress multipath --class=default \
--rule="foo.com/=svc:port" \
--rule="foo.com/admin/=svcadmin:portadmin"

# Create an ingress with multiple hosts and the pathType as Prefix
oc create ingress ingress1 --class=default \
--rule="foo.com/path*=svc:8080" \
--rule="bar.com/admin*=svc2:http"

# Create an ingress with TLS enabled using the default ingress certificate and different path types
oc create ingress ingtls --class=default \
--rule="foo.com/=svc:https,tls" \
--rule="foo.com/path/subpath*=othersvc:8080"

# Create an ingress with TLS enabled using a specific secret and pathType as Prefix
oc create ingress ingsecret --class=default \
--rule="foo.com/*=svc:8080,tls=secret1"

# Create an ingress with a default backend
oc create ingress ingdefault --class=default \
--default-backend=defaultsvc:http \
--rule="foo.com/*=svc:8080,tls=secret1"
```

2.5.1.45. oc create job

Create a job with the specified name

Example usage

```
# Create a job
oc create job my-job --image=busybox

# Create a job with a command
oc create job my-job --image=busybox -- date

# Create a job from a cron job named "a-cronjob"
oc create job test-job --from=cronjob/a-cronjob
```

2.5.1.46. oc create namespace

Create a namespace with the specified name

Example usage

```
# Create a new namespace named my-namespace
oc create namespace my-namespace
```

2.5.1.47. oc create poddisruptionbudget

Create a pod disruption budget with the specified name

Example usage

```
# Create a pod disruption budget named my-pdb that will select all pods with the app=rails label
# and require at least one of them being available at any point in time
oc create poddisruptionbudget my-pdb --selector=app=rails --min-available=1

# Create a pod disruption budget named my-pdb that will select all pods with the app=nginx label
# and require at least half of the pods selected to be available at any point in time
oc create pdb my-pdb --selector=app=nginx --min-available=50%
```

2.5.1.48. oc create priorityclass

Create a priority class with the specified name

Example usage

```
  # Create a priority class named high-priority
  oc create priorityclass high-priority --value=1000 --description="high priority"

  # Create a priority class named default-priority that is considered as the global default priority
  oc create priorityclass default-priority --value=1000 --global-default=true --description="default
priority"

  # Create a priority class named high-priority that cannot preempt pods with lower priority
  oc create priorityclass high-priority --value=1000 --description="high priority" --preemption-
policy="Never"
```

2.5.1.49. oc create quota

Create a quota with the specified name

Example usage

```
  # Create a new resource quota named my-quota
  oc create quota my-quota --
hard=cpu=1,memory=1G,pods=2,services=3,replicationcontrollers=2,resourcequotas=1,secrets=5,persi
tentvolumeclaims=10

  # Create a new resource quota named best-effort
  oc create quota best-effort --hard=pods=100 --scopes=BestEffort
```

2.5.1.50. oc create role

Create a role with single rule

Example usage

```
  # Create a role named "pod-reader" that allows user to perform "get", "watch" and "list" on pods
  oc create role pod-reader --verb=get --verb=list --verb=watch --resource=pods

  # Create a role named "pod-reader" with ResourceName specified
  oc create role pod-reader --verb=get --resource=pods --resource-name=readablepod --resource-name=anotherpod

  # Create a role named "foo" with API Group specified
  oc create role foo --verb=get,list,watch --resource=rs.extensions

  # Create a role named "foo" with SubResource specified
  oc create role foo --verb=get,list,watch --resource=pods,pods/status
```

2.5.1.51. oc create rolebinding

Create a role binding for a particular role or cluster role

Example usage

```
  # Create a role binding for user1, user2, and group1 using the admin cluster role
  oc create rolebinding admin --clusterrole=admin --user=user1 --user=user2 --group=group1
```

2.5.1.52. oc create route edge

Create a route that uses edge TLS termination

Example usage

```
  # Create an edge route named "my-route" that exposes the frontend service
  oc create route edge my-route --service=frontend

  # Create an edge route that exposes the frontend service and specify a path
  # If the route name is omitted, the service name will be used
  oc create route edge --service=frontend --path /assets
```

2.5.1.53. oc create route passthrough

Create a route that uses passthrough TLS termination

Example usage

```
  # Create a passthrough route named "my-route" that exposes the frontend service
  oc create route passthrough my-route --service=frontend

  # Create a passthrough route that exposes the frontend service and specify
  # a host name. If the route name is omitted, the service name will be used
  oc create route passthrough --service=frontend --hostname=www.example.com
```

2.5.1.54. oc create route reencrypt

Create a route that uses reencrypt TLS termination

Example usage

```
# Create a route named "my-route" that exposes the frontend service
oc create route reencrypt my-route --service=frontend --dest-ca-cert cert.cert

# Create a reencrypt route that exposes the frontend service, letting the
# route name default to the service name and the destination CA certificate
# default to the service CA
oc create route reencrypt --service=frontend
```

2.5.1.55. oc create secret docker-registry

Create a secret for use with a Docker registry

Example usage

```
# If you don't already have a .dockercfg file, you can create a dockercfg secret directly by using:
oc create secret docker-registry my-secret --docker-server=DOCKER_REGISTRY_SERVER --
docker-username=DOCKER_USER --docker-password=DOCKER_PASSWORD --docker-
email=DOCKER_EMAIL

# Create a new secret named my-secret from ~/.docker/config.json
oc create secret docker-registry my-secret --from-file=.dockerconfigjson=path/to/.docker/config.json
```

2.5.1.56. oc create secret generic

Create a secret from a local file, directory, or literal value

Example usage

```
# Create a new secret named my-secret with keys for each file in folder bar
oc create secret generic my-secret --from-file=path/to/bar

# Create a new secret named my-secret with specified keys instead of names on disk
oc create secret generic my-secret --from-file=ssh-privatekey=path/to/id_rsa --from-file=ssh-
publickey=path/to/id_rsa.pub

# Create a new secret named my-secret with key1=supersecret and key2=topsecret
oc create secret generic my-secret --from-literal=key1=supersecret --from-literal=key2=topsecret

# Create a new secret named my-secret using a combination of a file and a literal
oc create secret generic my-secret --from-file=ssh-privatekey=path/to/id_rsa --from-
literal=passphrase=topsecret

# Create a new secret named my-secret from an env file
oc create secret generic my-secret --from-env-file=path/to/bar.env
```

2.5.1.57. oc create secret tls

Create a TLS secret

Example usage

```
# Create a new TLS secret named tls-secret with the given key pair
oc create secret tls tls-secret --cert=path/to/tls.cert --key=path/to/tls.key
```

2.5.1.58. oc create service clusterip

Create a ClusterIP service

Example usage

```
# Create a new ClusterIP service named my-cs
oc create service clusterip my-cs --tcp=5678:8080

# Create a new ClusterIP service named my-cs (in headless mode)
oc create service clusterip my-cs --clusterip="None"
```

2.5.1.59. oc create service externalname

Create an ExternalName service

Example usage

```
# Create a new ExternalName service named my-ns
oc create service externalname my-ns --external-name bar.com
```

2.5.1.60. oc create service loadbalancer

Create a LoadBalancer service

Example usage

```
# Create a new LoadBalancer service named my-lbs
oc create service loadbalancer my-lbs --tcp=5678:8080
```

2.5.1.61. oc create service nodeport

Create a NodePort service

Example usage

```
# Create a new NodePort service named my-ns
oc create service nodeport my-ns --tcp=5678:8080
```

2.5.1.62. oc create serviceaccount

Create a service account with the specified name

Example usage

–

```
# Create a new service account named my-service-account
oc create serviceaccount my-service-account
```

2.5.1.63. oc create user

Manually create a user (only needed if automatic creation is disabled)

Example usage

```
# Create a user with the username "ajones" and the display name "Adam Jones"
oc create user ajones --full-name="Adam Jones"
```

2.5.1.64. oc create useridentitymapping

Manually map an identity to a user

Example usage

```
# Map the identity "acme_ldap:adamjones" to the user "ajones"
oc create useridentitymapping acme_ldap:adamjones ajones
```

2.5.1.65. oc debug

Launch a new instance of a pod for debugging

Example usage

```
# Start a shell session into a pod using the OpenShift tools image
oc debug

# Debug a currently running deployment by creating a new pod
oc debug deploy/test

# Debug a node as an administrator
oc debug node/master-1

# Launch a shell in a pod using the provided image stream tag
oc debug istag/mysql:latest -n openshift

# Test running a job as a non-root user
oc debug job/test --as-user=1000000

# Debug a specific failing container by running the env command in the 'second' container
oc debug daemonset/test -c second -- /bin/env

# See the pod that would be created to debug
oc debug mypod-9xbc -o yaml

# Debug a resource but launch the debug pod in another namespace
# Note: Not all resources can be debugged using --to-namespace without modification. For
example,
# volumes and service accounts are namespace-dependent. Add '-o yaml' to output the debug pod
```

```
definition
  # to disk.  If necessary, edit the definition then run 'oc debug -f -' or run without --to-namespace
  oc debug mypod-9xbc --to-namespace testns
```

2.5.1.66. oc delete

Delete resources by file names, stdin, resources and names, or by resources and label selector

Example usage

```
  # Delete a pod using the type and name specified in pod.json
  oc delete -f ./pod.json

  # Delete resources from a directory containing kustomization.yaml - e.g. dir/kustomization.yaml
  oc delete -k dir

  # Delete a pod based on the type and name in the JSON passed into stdin
  cat pod.json | oc delete -f -

  # Delete pods and services with same names "baz" and "foo"
  oc delete pod,service baz foo

  # Delete pods and services with label name=myLabel
  oc delete pods,services -l name=myLabel

  # Delete a pod with minimal delay
  oc delete pod foo --now

  # Force delete a pod on a dead node
  oc delete pod foo --force

  # Delete all pods
  oc delete pods --all
```

2.5.1.67. oc describe

Show details of a specific resource or group of resources

Example usage

```
  # Describe a node
  oc describe nodes kubernetes-node-emt8.c.myproject.internal

  # Describe a pod
  oc describe pods/nginx

  # Describe a pod identified by type and name in "pod.json"
  oc describe -f pod.json

  # Describe all pods
  oc describe pods

  # Describe pods by label name=myLabel
  oc describe po -l name=myLabel
```

```
# Describe all pods managed by the 'frontend' replication controller (rc-created pods
# get the name of the rc as a prefix in the pod the name)
oc describe pods frontend
```

2.5.1.68. oc diff

Diff the live version against a would-be applied version

Example usage

```
# Diff resources included in pod.json
oc diff -f pod.json

# Diff file read from stdin
cat service.yaml | oc diff -f -
```

2.5.1.69. oc edit

Edit a resource on the server

Example usage

```
# Edit the service named 'docker-registry'
oc edit svc/docker-registry

# Use an alternative editor
KUBE_EDITOR="nano" oc edit svc/docker-registry

# Edit the job 'myjob' in JSON using the v1 API format
oc edit job.v1.batch/myjob -o json

# Edit the deployment 'mydeployment' in YAML and save the modified config in its annotation
oc edit deployment/mydeployment -o yaml --save-config
```

2.5.1.70. oc ex dockergc

Perform garbage collection to free space in docker storage

Example usage

```
# Perform garbage collection with the default settings
oc ex dockergc
```

2.5.1.71. oc exec

Execute a command in a container

Example usage

```
# Get output from running the 'date' command from pod mypod, using the first container by default
oc exec mypod -- date
```

```
 # Get output from running the 'date' command in ruby-container from pod mypod
 oc exec mypod -c ruby-container -- date

 # Switch to raw terminal mode; sends stdin to 'bash' in ruby-container from pod mypod
 # and sends stdout/stderr from 'bash' back to the client
 oc exec mypod -c ruby-container -i -t -- bash -il

 # List contents of /usr from the first container of pod mypod and sort by modification time
 # If the command you want to execute in the pod has any flags in common (e.g. -i),
 # you must use two dashes (--) to separate your command's flags/arguments
 # Also note, do not surround your command and its flags/arguments with quotes
 # unless that is how you would execute it normally (i.e., do ls -t /usr, not "ls -t /usr")
 oc exec mypod -i -t -- ls -t /usr

 # Get output from running 'date' command from the first pod of the deployment mydeployment,
using the first container by default
 oc exec deploy/mydeployment -- date

 # Get output from running 'date' command from the first pod of the service myservice, using the first
container by default
 oc exec svc/myservice -- date
```

2.5.1.72. oc explain

Get documentation for a resource

Example usage

```
 # Get the documentation of the resource and its fields
 oc explain pods

 # Get the documentation of a specific field of a resource
 oc explain pods.spec.containers
```

2.5.1.73. oc expose

Expose a replicated application as a service or route

Example usage

```
 # Create a route based on service nginx. The new route will reuse nginx's labels
 oc expose service nginx

 # Create a route and specify your own label and route name
 oc expose service nginx -l name=myroute --name=fromdowntown

 # Create a route and specify a host name
 oc expose service nginx --hostname=www.example.com

 # Create a route with a wildcard
 oc expose service nginx --hostname=x.example.com --wildcard-policy=Subdomain
 # This would be equivalent to *.example.com. NOTE: only hosts are matched by the wildcard;
subdomains would not be included
```

```
  # Expose a deployment configuration as a service and use the specified port
  oc expose dc ruby-hello-world --port=8080

  # Expose a service as a route in the specified path
  oc expose service nginx --path=/nginx

  # Expose a service using different generators
  oc expose service nginx --name=exposed-svc --port=12201 --protocol="TCP" --
generator="service/v2"
  oc expose service nginx --name=my-route --port=12201 --generator="route/v1"

  # Exposing a service using the "route/v1" generator (default) will create a new exposed route with
the "--name" provided
  # (or the name of the service otherwise). You may not specify a "--protocol" or "--target-port" option
when using this generator
```

2.5.1.74. oc extract

Extract secrets or config maps to disk

Example usage

```
  # Extract the secret "test" to the current directory
  oc extract secret/test

  # Extract the config map "nginx" to the /tmp directory
  oc extract configmap/nginx --to=/tmp

  # Extract the config map "nginx" to STDOUT
  oc extract configmap/nginx --to=-

  # Extract only the key "nginx.conf" from config map "nginx" to the /tmp directory
  oc extract configmap/nginx --to=/tmp --keys=nginx.conf
```

2.5.1.75. oc get

Display one or many resources

Example usage

```
  # List all pods in ps output format
  oc get pods

  # List all pods in ps output format with more information (such as node name)
  oc get pods -o wide

  # List a single replication controller with specified NAME in ps output format
  oc get replicationcontroller web

  # List deployments in JSON output format, in the "v1" version of the "apps" API group
  oc get deployments.v1.apps -o json

  # List a single pod in JSON output format
  oc get -o json pod web-pod-13je7

  # List a pod identified by type and name specified in "pod.yaml" in JSON output format
  oc get -f pod.yaml -o json

  # List resources from a directory with kustomization.yaml - e.g. dir/kustomization.yaml
  oc get -k dir/

  # Return only the phase value of the specified pod
  oc get -o template pod/web-pod-13je7 --template={{.status.phase}}

  # List resource information in custom columns
  oc get pod test-pod -o custom-
columns=CONTAINER:.spec.containers[0].name,IMAGE:.spec.containers[0].image

  # List all replication controllers and services together in ps output format
  oc get rc,services

  # List one or more resources by their type and names
  oc get rc/web service/frontend pods/web-pod-13je7
```

2.5.1.76. oc idle

Idle scalable resources

Example usage

```
  # Idle the scalable controllers associated with the services listed in to-idle.txt
  $ oc idle --resource-names-file to-idle.txt
```

2.5.1.77. oc image append

Add layers to images and push them to a registry

Example usage

```
  # Remove the entrypoint on the mysql:latest image
  oc image append --from mysql:latest --to myregistry.com/myimage:latest --image '{"Entrypoint":null}'

  # Add a new layer to the image
  oc image append --from mysql:latest --to myregistry.com/myimage:latest layer.tar.gz

  # Add a new layer to the image and store the result on disk
  # This results in $(pwd)/v2/mysql/blobs,manifests
  oc image append --from mysql:latest --to file://mysql:local layer.tar.gz

  # Add a new layer to the image and store the result on disk in a designated directory
  # This will result in $(pwd)/mysql-local/v2/mysql/blobs,manifests
  oc image append --from mysql:latest --to file://mysql:local --dir mysql-local layer.tar.gz

  # Add a new layer to an image that is stored on disk (~/mysql-local/v2/image exists)
  oc image append --from-dir ~/mysql-local --to myregistry.com/myimage:latest layer.tar.gz

  # Add a new layer to an image that was mirrored to the current directory on disk ($(pwd)/v2/image
exists)
  oc image append --from-dir v2 --to myregistry.com/myimage:latest layer.tar.gz

  # Add a new layer to a multi-architecture image for an os/arch that is different from the system's
os/arch
  # Note: Wildcard filter is not supported with append. Pass a single os/arch to append
  oc image append --from docker.io/library/busybox:latest --filter-by-os=linux/s390x --to
myregistry.com/myimage:latest layer.tar.gz
```

2.5.1.78. oc image extract

Copy files from an image to the file system

Example usage

```
  # Extract the busybox image into the current directory
  oc image extract docker.io/library/busybox:latest

  # Extract the busybox image into a designated directory (must exist)
  oc image extract docker.io/library/busybox:latest --path /:/tmp/busybox

  # Extract the busybox image into the current directory for linux/s390x platform
  # Note: Wildcard filter is not supported with extract. Pass a single os/arch to extract
  oc image extract docker.io/library/busybox:latest --filter-by-os=linux/s390x

  # Extract a single file from the image into the current directory
  oc image extract docker.io/library/centos:7 --path /bin/bash:.

  # Extract all .repo files from the image's /etc/yum.repos.d/ folder into the current directory
  oc image extract docker.io/library/centos:7 --path /etc/yum.repos.d/*.repo:.

  # Extract all .repo files from the image's /etc/yum.repos.d/ folder into a designated directory (must
exist)
  # This results in /tmp/yum.repos.d/*.repo on local system
  oc image extract docker.io/library/centos:7 --path /etc/yum.repos.d/*.repo:/tmp/yum.repos.d

  # Extract an image stored on disk into the current directory ($(pwd)/v2/busybox/blobs,manifests
exists)
  # --confirm is required because the current directory is not empty
  oc image extract file://busybox:local --confirm

  # Extract an image stored on disk in a directory other than $(pwd)/v2 into the current directory
  # --confirm is required because the current directory is not empty ($(pwd)/busybox-mirror-
dir/v2/busybox exists)
  oc image extract file://busybox:local --dir busybox-mirror-dir --confirm

  # Extract an image stored on disk in a directory other than $(pwd)/v2 into a designated directory
(must exist)
  oc image extract file://busybox:local --dir busybox-mirror-dir --path /:/tmp/busybox

  # Extract the last layer in the image
  oc image extract docker.io/library/centos:7[-1]

  # Extract the first three layers of the image
  oc image extract docker.io/library/centos:7[:3]
```

```
# Extract the last three layers of the image
oc image extract docker.io/library/centos:7[-3:]
```

2.5.1.79. oc image info

Display information about an image

Example usage

```
# Show information about an image
oc image info quay.io/openshift/cli:latest

# Show information about images matching a wildcard
oc image info quay.io/openshift/cli:4.*

# Show information about a file mirrored to disk under DIR
oc image info --dir=DIR file://library/busybox:latest

# Select which image from a multi-OS image to show
oc image info library/busybox:latest --filter-by-os=linux/arm64
```

2.5.1.80. oc image mirror

Mirror images from one repository to another

Example usage

```
# Copy image to another tag
oc image mirror myregistry.com/myimage:latest myregistry.com/myimage:stable

# Copy image to another registry
oc image mirror myregistry.com/myimage:latest docker.io/myrepository/myimage:stable

# Copy all tags starting with mysql to the destination repository
oc image mirror myregistry.com/myimage:mysql* docker.io/myrepository/myimage

# Copy image to disk, creating a directory structure that can be served as a registry
oc image mirror myregistry.com/myimage:latest file://myrepository/myimage:latest

# Copy image to S3 (pull from <bucket>.s3.amazonaws.com/image:latest)
oc image mirror myregistry.com/myimage:latest
s3://s3.amazonaws.com/<region>/<bucket>/image:latest

# Copy image to S3 without setting a tag (pull via @<digest>)
oc image mirror myregistry.com/myimage:latest s3://s3.amazonaws.com/<region>/<bucket>/image

# Copy image to multiple locations
oc image mirror myregistry.com/myimage:latest docker.io/myrepository/myimage:stable \
docker.io/myrepository/myimage:dev

# Copy multiple images
oc image mirror myregistry.com/myimage:latest=myregistry.com/other:test \
myregistry.com/myimage:new=myregistry.com/other:target
```

```
  # Copy manifest list of a multi-architecture image, even if only a single image is found
  oc image mirror myregistry.com/myimage:latest=myregistry.com/other:test \
  --keep-manifest-list=true

  # Copy specific os/arch manifest of a multi-architecture image
  # Run 'oc image info myregistry.com/myimage:latest' to see available os/arch for multi-arch images
  # Note that with multi-arch images, this results in a new manifest list digest that includes only
  # the filtered manifests
  oc image mirror myregistry.com/myimage:latest=myregistry.com/other:test \
  --filter-by-os=os/arch

  # Copy all os/arch manifests of a multi-architecture image
  # Run 'oc image info myregistry.com/myimage:latest' to see list of os/arch manifests that will be
mirrored
  oc image mirror myregistry.com/myimage:latest=myregistry.com/other:test \
  --keep-manifest-list=true

  # Note the above command is equivalent to
  oc image mirror myregistry.com/myimage:latest=myregistry.com/other:test \
  --filter-by-os=.*
```

2.5.1.81. oc import-image

Import images from a container image registry

Example usage

```
  # Import tag latest into a new image stream
  oc import-image mystream --from=registry.io/repo/image:latest --confirm

  # Update imported data for tag latest in an already existing image stream
  oc import-image mystream

  # Update imported data for tag stable in an already existing image stream
  oc import-image mystream:stable

  # Update imported data for all tags in an existing image stream
  oc import-image mystream --all

  # Import all tags into a new image stream
  oc import-image mystream --from=registry.io/repo/image --all --confirm

  # Import all tags into a new image stream using a custom timeout
  oc --request-timeout=5m import-image mystream --from=registry.io/repo/image --all --confirm
```

2.5.1.82. oc kustomize

Build a kustomization target from a directory or URL.

Example usage

```
  # Build the current working directory
  oc kustomize
```

```
# Build some shared configuration directory
oc kustomize /home/config/production

# Build from github
oc kustomize https://github.com/kubernetes-sigs/kustomize.git/examples/helloWorld?ref=v1.0.6
```

2.5.1.83. oc label

Update the labels on a resource

Example usage

```
# Update pod 'foo' with the label 'unhealthy' and the value 'true'
oc label pods foo unhealthy=true

# Update pod 'foo' with the label 'status' and the value 'unhealthy', overwriting any existing value
oc label --overwrite pods foo status=unhealthy

# Update all pods in the namespace
oc label pods --all status=unhealthy

# Update a pod identified by the type and name in "pod.json"
oc label -f pod.json status=unhealthy

# Update pod 'foo' only if the resource is unchanged from version 1
oc label pods foo status=unhealthy --resource-version=1

# Update pod 'foo' by removing a label named 'bar' if it exists
# Does not require the --overwrite flag
oc label pods foo bar-
```

2.5.1.84. oc login

Log in to a server

Example usage

```
# Log in interactively
oc login --username=myuser

# Log in to the given server with the given certificate authority file
oc login localhost:8443 --certificate-authority=/path/to/cert.crt

# Log in to the given server with the given credentials (will not prompt interactively)
oc login localhost:8443 --username=myuser --password=mypass
```

2.5.1.85. oc logout

End the current server session

Example usage

```
# Log out
oc logout
```

2.5.1.86. oc logs

Print the logs for a container in a pod

Example usage

```
# Start streaming the logs of the most recent build of the openldap build config
oc logs -f bc/openldap

# Start streaming the logs of the latest deployment of the mysql deployment config
oc logs -f dc/mysql

# Get the logs of the first deployment for the mysql deployment config. Note that logs
# from older deployments may not exist either because the deployment was successful
# or due to deployment pruning or manual deletion of the deployment
oc logs --version=1 dc/mysql

# Return a snapshot of ruby-container logs from pod backend
oc logs backend -c ruby-container

# Start streaming of ruby-container logs from pod backend
oc logs -f pod/backend -c ruby-container
```

2.5.1.87. oc new-app

Create a new application

Example usage

```
# List all local templates and image streams that can be used to create an app
oc new-app --list

# Create an application based on the source code in the current git repository (with a public remote)
and a container image
oc new-app . --image=registry/repo/langimage

# Create an application myapp with Docker based build strategy expecting binary input
oc new-app  --strategy=docker --binary --name myapp

# Create a Ruby application based on the provided [image]~[source code] combination
oc new-app centos/ruby-25-centos7~https://github.com/sclorg/ruby-ex.git

# Use the public container registry MySQL image to create an app. Generated artifacts will be
labeled with db=mysql
oc new-app mysql MYSQL_USER=user MYSQL_PASSWORD=pass MYSQL_DATABASE=testdb -
l db=mysql

# Use a MySQL image in a private registry to create an app and override application artifacts'
names
oc new-app --image=myregistry.com/mycompany/mysql --name=private
```

```
# Create an application from a remote repository using its beta4 branch
oc new-app https://github.com/openshift/ruby-hello-world#beta4

# Create an application based on a stored template, explicitly setting a parameter value
oc new-app --template=ruby-helloworld-sample --param=MYSQL_USER=admin

# Create an application from a remote repository and specify a context directory
oc new-app https://github.com/youruser/yourgitrepo --context-dir=src/build

# Create an application from a remote private repository and specify which existing secret to use
oc new-app https://github.com/youruser/yourgitrepo --source-secret=yoursecret

# Create an application based on a template file, explicitly setting a parameter value
oc new-app --file=./example/myapp/template.json --param=MYSQL_USER=admin

# Search all templates, image streams, and container images for the ones that match "ruby"
oc new-app --search ruby

# Search for "ruby", but only in stored templates (--template, --image-stream and --image
# can be used to filter search results)
oc new-app --search --template=ruby

# Search for "ruby" in stored templates and print the output as YAML
oc new-app --search --template=ruby --output=yaml
```

2.5.1.88. oc new-build

Create a new build configuration

Example usage

```
# Create a build config based on the source code in the current git repository (with a public
# remote) and a container image
oc new-build . --image=repo/langimage

# Create a NodeJS build config based on the provided [image]~[source code] combination
oc new-build centos/nodejs-8-centos7~https://github.com/sclorg/nodejs-ex.git

# Create a build config from a remote repository using its beta2 branch
oc new-build https://github.com/openshift/ruby-hello-world#beta2

# Create a build config using a Dockerfile specified as an argument
oc new-build -D $'FROM centos:7\nRUN yum install -y httpd'

# Create a build config from a remote repository and add custom environment variables
oc new-build https://github.com/openshift/ruby-hello-world -e RACK_ENV=development

# Create a build config from a remote private repository and specify which existing secret to use
oc new-build https://github.com/youruser/yourgitrepo --source-secret=yoursecret

# Create a build config from a remote repository and inject the npmrc into a build
oc new-build https://github.com/openshift/ruby-hello-world --build-secret npmrc:.npmrc

# Create a build config from a remote repository and inject environment data into a build
oc new-build https://github.com/openshift/ruby-hello-world --build-config-map env:config
```

```
  # Create a build config that gets its input from a remote repository and another container image
  oc new-build https://github.com/openshift/ruby-hello-world --source-image=openshift/jenkins-1-
centos7 --source-image-path=/var/lib/jenkins:tmp
```

2.5.1.89. oc new-project

Request a new project

Example usage

```
  # Create a new project with minimal information
  oc new-project web-team-dev

  # Create a new project with a display name and description
  oc new-project web-team-dev --display-name="Web Team Development" --
description="Development project for the web team."
```

2.5.1.90. oc observe

Observe changes to resources and react to them (experimental)

Example usage

```
  # Observe changes to services
  oc observe services

  # Observe changes to services, including the clusterIP and invoke a script for each
  oc observe services --template '{ .spec.clusterIP }' -- register_dns.sh

  # Observe changes to services filtered by a label selector
  oc observe namespaces -l regist-dns=true --template '{ .spec.clusterIP }' -- register_dns.sh
```

2.5.1.91. oc patch

Update fields of a resource

Example usage

```
  # Partially update a node using a strategic merge patch, specifying the patch as JSON
  oc patch node k8s-node-1 -p '{"spec":{"unschedulable":true}}'

  # Partially update a node using a strategic merge patch, specifying the patch as YAML
  oc patch node k8s-node-1 -p $'spec:\n unschedulable: true'

  # Partially update a node identified by the type and name specified in "node.json" using strategic
merge patch
  oc patch -f node.json -p '{"spec":{"unschedulable":true}}'

  # Update a container's image; spec.containers[*].name is required because it's a merge key
  oc patch pod valid-pod -p '{"spec":{"containers":[{"name":"kubernetes-serve-
hostname","image":"new image"}]}}'
```

```
  # Update a container's image using a JSON patch with positional arrays
  oc patch pod valid-pod --type='json' -p='[{"op": "replace", "path": "/spec/containers/0/image",
"value":"new image"}]'
```

2.5.1.92. oc policy add-role-to-user

Add a role to users or service accounts for the current project

Example usage

```
  # Add the 'view' role to user1 for the current project
  oc policy add-role-to-user view user1

  # Add the 'edit' role to serviceaccount1 for the current project
  oc policy add-role-to-user edit -z serviceaccount1
```

2.5.1.93. oc policy scc-review

Check which service account can create a pod

Example usage

```
  # Check whether service accounts sa1 and sa2 can admit a pod with a template pod spec specified
in my_resource.yaml
  # Service Account specified in myresource.yaml file is ignored
  oc policy scc-review -z sa1,sa2 -f my_resource.yaml

  # Check whether service accounts system:serviceaccount:bob:default can admit a pod with a
template pod spec specified in my_resource.yaml
  oc policy scc-review -z system:serviceaccount:bob:default -f my_resource.yaml

  # Check whether the service account specified in my_resource_with_sa.yaml can admit the pod
  oc policy scc-review -f my_resource_with_sa.yaml

  # Check whether the default service account can admit the pod; default is taken since no service
account is defined in myresource_with_no_sa.yaml
  oc policy scc-review -f myresource_with_no_sa.yaml
```

2.5.1.94. oc policy scc-subject-review

Check whether a user or a service account can create a pod

Example usage

```
  # Check whether user bob can create a pod specified in myresource.yaml
  oc policy scc-subject-review -u bob -f myresource.yaml

  # Check whether user bob who belongs to projectAdmin group can create a pod specified in
myresource.yaml
  oc policy scc-subject-review -u bob -g projectAdmin -f myresource.yaml
  # Check whether a service account specified in the pod template spec in myresourcewithsa.yaml
can create the pod
  oc policy scc-subject-review -f myresourcewithsa.yaml
```

2.5.1.95. oc port-forward

Forward one or more local ports to a pod

Example usage

```
  # Listen on ports 5000 and 6000 locally, forwarding data to/from ports 5000 and 6000 in the pod
  oc port-forward pod/mypod 5000 6000

  # Listen on ports 5000 and 6000 locally, forwarding data to/from ports 5000 and 6000 in a pod
selected by the deployment
  oc port-forward deployment/mydeployment 5000 6000

  # Listen on port 8443 locally, forwarding to the targetPort of the service's port named "https" in a pod
selected by the service
  oc port-forward service/myservice 8443:https

  # Listen on port 8888 locally, forwarding to 5000 in the pod
  oc port-forward pod/mypod 8888:5000

  # Listen on port 8888 on all addresses, forwarding to 5000 in the pod
  oc port-forward --address 0.0.0.0 pod/mypod 8888:5000

  # Listen on port 8888 on localhost and selected IP, forwarding to 5000 in the pod
  oc port-forward --address localhost,10.19.21.23 pod/mypod 8888:5000

  # Listen on a random port locally, forwarding to 5000 in the pod
  oc port-forward pod/mypod :5000
```

2.5.1.96. oc process

Process a template into list of resources

Example usage

```
  # Convert the template.json file into a resource list and pass to create
  oc process -f template.json | oc create -f -

  # Process a file locally instead of contacting the server
  oc process -f template.json --local -o yaml

  # Process template while passing a user-defined label
  oc process -f template.json -l name=mytemplate

  # Convert a stored template into a resource list
  oc process foo

  # Convert a stored template into a resource list by setting/overriding parameter values
  oc process foo PARM1=VALUE1 PARM2=VALUE2
```

```
# Convert a template stored in different namespace into a resource list
oc process openshift//foo

# Convert template.json into a resource list
cat template.json | oc process -f -
```

2.5.1.97. oc project

Switch to another project

Example usage

```
# Switch to the 'myapp' project
oc project myapp

# Display the project currently in use
oc project
```

2.5.1.98. oc projects

Display existing projects

Example usage

```
# List all projects
oc projects
```

2.5.1.99. oc proxy

Run a proxy to the Kubernetes API server

Example usage

```
# To proxy all of the Kubernetes API and nothing else
oc proxy --api-prefix=/

# To proxy only part of the Kubernetes API and also some static files
# You can get pods info with 'curl localhost:8001/api/v1/pods'
oc proxy --www=/my/files --www-prefix=/static/ --api-prefix=/api/

# To proxy the entire Kubernetes API at a different root
# You can get pods info with 'curl localhost:8001/custom/api/v1/pods'
oc proxy --api-prefix=/custom/

# Run a proxy to the Kubernetes API server on port 8011, serving static content from ./local/www/
oc proxy --port=8011 --www=./local/www/

# Run a proxy to the Kubernetes API server on an arbitrary local port
# The chosen port for the server will be output to stdout
oc proxy --port=0
```

```
# Run a proxy to the Kubernetes API server, changing the API prefix to k8s-api
# This makes e.g. the pods API available at localhost:8001/k8s-api/v1/pods/
oc proxy --api-prefix=/k8s-api
```

2.5.1.100. oc registry info

Print information about the integrated registry

Example usage

```
# Display information about the integrated registry
oc registry info
```

2.5.1.101. oc registry login

Log in to the integrated registry

Example usage

```
# Log in to the integrated registry
oc registry login

# Log in as the default service account in the current namespace
oc registry login -z default

# Log in to different registry using BASIC auth credentials
oc registry login --registry quay.io/myregistry --auth-basic=USER:PASS
```

2.5.1.102. oc replace

Replace a resource by file name or stdin

Example usage

```
# Replace a pod using the data in pod.json
oc replace -f ./pod.json

# Replace a pod based on the JSON passed into stdin
cat pod.json | oc replace -f -

# Update a single-container pod's image version (tag) to v4
oc get pod mypod -o yaml | sed 's/\(image: myimage\):.*$/\1:v4/' | oc replace -f -

# Force replace, delete and then re-create the resource
oc replace --force -f ./pod.json
```

2.5.1.103. oc rollback

Revert part of an application back to a previous deployment

Example usage

```
# Perform a rollback to the last successfully completed deployment for a deployment config
oc rollback frontend

# See what a rollback to version 3 will look like, but do not perform the rollback
oc rollback frontend --to-version=3 --dry-run

# Perform a rollback to a specific deployment
oc rollback frontend-2

# Perform the rollback manually by piping the JSON of the new config back to oc
oc rollback frontend -o json | oc replace dc/frontend -f -

# Print the updated deployment configuration in JSON format instead of performing the rollback
oc rollback frontend -o json
```

2.5.1.104. oc rollout cancel

Cancel the in-progress deployment

Example usage

```
# Cancel the in-progress deployment based on 'nginx'
oc rollout cancel dc/nginx
```

2.5.1.105. oc rollout history

View rollout history

Example usage

```
# View the rollout history of a deployment
oc rollout history dc/nginx

# View the details of deployment revision 3
oc rollout history dc/nginx --revision=3
```

2.5.1.106. oc rollout latest

Start a new rollout for a deployment config with the latest state from its triggers

Example usage

```
# Start a new rollout based on the latest images defined in the image change triggers
oc rollout latest dc/nginx

# Print the rolled out deployment config
oc rollout latest dc/nginx -o json
```

2.5.1.107. oc rollout pause

Mark the provided resource as paused

Example usage

```
# Mark the nginx deployment as paused. Any current state of
# the deployment will continue its function, new updates to the deployment will not
# have an effect as long as the deployment is paused
oc rollout pause dc/nginx
```

2.5.1.108. oc rollout restart

Restart a resource

Example usage

```
# Restart a deployment
oc rollout restart deployment/nginx

# Restart a daemon set
oc rollout restart daemonset/abc
```

2.5.1.109. oc rollout resume

Resume a paused resource

Example usage

```
# Resume an already paused deployment
oc rollout resume dc/nginx
```

2.5.1.110. oc rollout retry

Retry the latest failed rollout

Example usage

```
# Retry the latest failed deployment based on 'frontend'
# The deployer pod and any hook pods are deleted for the latest failed deployment
oc rollout retry dc/frontend
```

2.5.1.111. oc rollout status

Show the status of the rollout

Example usage

```
# Watch the status of the latest rollout
oc rollout status dc/nginx
```

2.5.1.112. oc rollout undo

Undo a previous rollout

Example usage

```
# Roll back to the previous deployment
oc rollout undo dc/nginx

# Roll back to deployment revision 3. The replication controller for that version must exist
oc rollout undo dc/nginx --to-revision=3
```

2.5.1.113. oc rsh

Start a shell session in a container

Example usage

```
# Open a shell session on the first container in pod 'foo'
oc rsh foo

# Open a shell session on the first container in pod 'foo' and namespace 'bar'
# (Note that oc client specific arguments must come before the resource name and its arguments)
oc rsh -n bar foo

# Run the command 'cat /etc/resolv.conf' inside pod 'foo'
oc rsh foo cat /etc/resolv.conf

# See the configuration of your internal registry
oc rsh dc/docker-registry cat config.yml

# Open a shell session on the container named 'index' inside a pod of your job
oc rsh -c index job/sheduled
```

2.5.1.114. oc rsync

Copy files between a local file system and a pod

Example usage

```
# Synchronize a local directory with a pod directory
oc rsync ./local/dir/ POD:/remote/dir

# Synchronize a pod directory with a local directory
oc rsync POD:/remote/dir/ ./local/dir
```

2.5.1.115. oc run

Run a particular image on the cluster

Example usage

```
# Start a nginx pod
oc run nginx --image=nginx

# Start a hazelcast pod and let the container expose port 5701
oc run hazelcast --image=hazelcast/hazelcast --port=5701
```

```
# Start a hazelcast pod and set environment variables "DNS_DOMAIN=cluster" and
"POD_NAMESPACE=default" in the container
oc run hazelcast --image=hazelcast/hazelcast --env="DNS_DOMAIN=cluster" --
env="POD_NAMESPACE=default"

# Start a hazelcast pod and set labels "app=hazelcast" and "env=prod" in the container
oc run hazelcast --image=hazelcast/hazelcast --labels="app=hazelcast,env=prod"

# Dry run; print the corresponding API objects without creating them
oc run nginx --image=nginx --dry-run=client

# Start a nginx pod, but overload the spec with a partial set of values parsed from JSON
oc run nginx --image=nginx --overrides='{ "apiVersion": "v1", "spec": { ... } }'

# Start a busybox pod and keep it in the foreground, don't restart it if it exits
oc run -i -t busybox --image=busybox --restart=Never

# Start the nginx pod using the default command, but use custom arguments (arg1 .. argN) for that
command
oc run nginx --image=nginx -- <arg1> <arg2> ... <argN>

# Start the nginx pod using a different command and custom arguments
oc run nginx --image=nginx --command -- <cmd> <arg1> ... <argN>
```

2.5.1.116. oc scale

Set a new size for a deployment, replica set, or replication controller

Example usage

```
# Scale a replica set named 'foo' to 3
oc scale --replicas=3 rs/foo

# Scale a resource identified by type and name specified in "foo.yaml" to 3
oc scale --replicas=3 -f foo.yaml

# If the deployment named mysql's current size is 2, scale mysql to 3
oc scale --current-replicas=2 --replicas=3 deployment/mysql

# Scale multiple replication controllers
oc scale --replicas=5 rc/foo rc/bar rc/baz

# Scale stateful set named 'web' to 3
oc scale --replicas=3 statefulset/web
```

2.5.1.117. oc secrets link

Link secrets to a service account

Example usage

```
# Add an image pull secret to a service account to automatically use it for pulling pod images
oc secrets link serviceaccount-name pull-secret --for=pull
```

```
  # Add an image pull secret to a service account to automatically use it for both pulling and pushing build images
  oc secrets link builder builder-image-secret --for=pull,mount

  # If the cluster's serviceAccountConfig is operating with limitSecretReferences: True, secrets must be added to the pod's service account whitelist in order to be available to the pod
  oc secrets link pod-sa pod-secret
```

2.5.1.118. oc secrets unlink

Detach secrets from a service account

Example usage

```
  # Unlink a secret currently associated with a service account
  oc secrets unlink serviceaccount-name secret-name another-secret-name ...
```

2.5.1.119. oc serviceaccounts create-kubeconfig

Generate a kubeconfig file for a service account

Example usage

```
  # Create a kubeconfig file for service account 'default'
  oc serviceaccounts create-kubeconfig 'default' > default.kubeconfig
```

2.5.1.120. oc serviceaccounts get-token

Get a token assigned to a service account

Example usage

```
  # Get the service account token from service account 'default'
  oc serviceaccounts get-token 'default'
```

2.5.1.121. oc serviceaccounts new-token

Generate a new token for a service account

Example usage

```
  # Generate a new token for service account 'default'
  oc serviceaccounts new-token 'default'

  # Generate a new token for service account 'default' and apply
  # labels 'foo' and 'bar' to the new token for identification
  oc serviceaccounts new-token 'default' --labels foo=foo-value,bar=bar-value
```

2.5.1.122. oc set build-hook

Update a build hook on a build config

Example usage

```
# Clear post-commit hook on a build config
oc set build-hook bc/mybuild --post-commit --remove

# Set the post-commit hook to execute a test suite using a new entrypoint
oc set build-hook bc/mybuild --post-commit --command -- /bin/bash -c /var/lib/test-image.sh

# Set the post-commit hook to execute a shell script
oc set build-hook bc/mybuild --post-commit --script="/var/lib/test-image.sh param1 param2 &&
/var/lib/done.sh"
```

2.5.1.123. oc set build-secret

Update a build secret on a build config

Example usage

```
# Clear the push secret on a build config
oc set build-secret --push --remove bc/mybuild

# Set the pull secret on a build config
oc set build-secret --pull bc/mybuild mysecret

# Set the push and pull secret on a build config
oc set build-secret --push --pull bc/mybuild mysecret

# Set the source secret on a set of build configs matching a selector
oc set build-secret --source -l app=myapp gitsecret
```

2.5.1.124. oc set data

Update the data within a config map or secret

Example usage

```
# Set the 'password' key of a secret
oc set data secret/foo password=this_is_secret

# Remove the 'password' key from a secret
oc set data secret/foo password-

# Update the 'haproxy.conf' key of a config map from a file on disk
oc set data configmap/bar --from-file=../haproxy.conf

# Update a secret with the contents of a directory, one key per file
oc set data secret/foo --from-file=secret-dir
```

2.5.1.125. oc set deployment-hook

Update a deployment hook on a deployment config

Example usage

```
  # Clear pre and post hooks on a deployment config
  oc set deployment-hook dc/myapp --remove --pre --post

  # Set the pre deployment hook to execute a db migration command for an application
  # using the data volume from the application
  oc set deployment-hook dc/myapp --pre --volumes=data -- /var/lib/migrate-db.sh

  # Set a mid deployment hook along with additional environment variables
  oc set deployment-hook dc/myapp --mid --volumes=data -e VAR1=value1 -e VAR2=value2 --
/var/lib/prepare-deploy.sh
```

2.5.1.126. oc set env

Update environment variables on a pod template

Example usage

```
  # Update deployment config 'myapp' with a new environment variable
  oc set env dc/myapp STORAGE_DIR=/local

  # List the environment variables defined on a build config 'sample-build'
  oc set env bc/sample-build --list

  # List the environment variables defined on all pods
  oc set env pods --all --list

  # Output modified build config in YAML
  oc set env bc/sample-build STORAGE_DIR=/data -o yaml

  # Update all containers in all replication controllers in the project to have ENV=prod
  oc set env rc --all ENV=prod

  # Import environment from a secret
  oc set env --from=secret/mysecret dc/myapp

  # Import environment from a config map with a prefix
  oc set env --from=configmap/myconfigmap --prefix=MYSQL_ dc/myapp

  # Remove the environment variable ENV from container 'c1' in all deployment configs
  oc set env dc --all --containers="c1" ENV-

  # Remove the environment variable ENV from a deployment config definition on disk and
  # update the deployment config on the server
  oc set env -f dc.json ENV-

  # Set some of the local shell environment into a deployment config on the server
  oc set env | grep RAILS_ | oc env -e - dc/myapp
```

2.5.1.127. oc set image

Update the image of a pod template

Example usage

```
  # Set a deployment configs's nginx container image to 'nginx:1.9.1', and its busybox container image to 'busybox'.
  oc set image dc/nginx busybox=busybox nginx=nginx:1.9.1

  # Set a deployment configs's app container image to the image referenced by the imagestream tag 'openshift/ruby:2.3'.
  oc set image dc/myapp app=openshift/ruby:2.3 --source=imagestreamtag

  # Update all deployments' and rc's nginx container's image to 'nginx:1.9.1'
  oc set image deployments,rc nginx=nginx:1.9.1 --all

  # Update image of all containers of daemonset abc to 'nginx:1.9.1'
  oc set image daemonset abc *=nginx:1.9.1

  # Print result (in yaml format) of updating nginx container image from local file, without hitting the server
  oc set image -f path/to/file.yaml nginx=nginx:1.9.1 --local -o yaml
```

2.5.1.128. oc set image-lookup

Change how images are resolved when deploying applications

Example usage

```
  # Print all of the image streams and whether they resolve local names
  oc set image-lookup

  # Use local name lookup on image stream mysql
  oc set image-lookup mysql

  # Force a deployment to use local name lookup
  oc set image-lookup deploy/mysql

  # Show the current status of the deployment lookup
  oc set image-lookup deploy/mysql --list

  # Disable local name lookup on image stream mysql
  oc set image-lookup mysql --enabled=false

  # Set local name lookup on all image streams
  oc set image-lookup --all
```

2.5.1.129. oc set probe

Update a probe on a pod template

Example usage

```
  # Clear both readiness and liveness probes off all containers
  oc set probe dc/myapp --remove --readiness --liveness

  # Set an exec action as a liveness probe to run 'echo ok'
  oc set probe dc/myapp --liveness -- echo ok
```

```
# Set a readiness probe to try to open a TCP socket on 3306
oc set probe rc/mysql --readiness --open-tcp=3306

# Set an HTTP startup probe for port 8080 and path /healthz over HTTP on the pod IP
oc set probe dc/webapp --startup --get-url=http://:8080/healthz

# Set an HTTP readiness probe for port 8080 and path /healthz over HTTP on the pod IP
oc set probe dc/webapp --readiness --get-url=http://:8080/healthz

# Set an HTTP readiness probe over HTTPS on 127.0.0.1 for a hostNetwork pod
oc set probe dc/router --readiness --get-url=https://127.0.0.1:1936/stats

# Set only the initial-delay-seconds field on all deployments
oc set probe dc --all --readiness --initial-delay-seconds=30
```

2.5.1.130. oc set resources

Update resource requests/limits on objects with pod templates

Example usage

```
# Set a deployments nginx container CPU limits to "200m and memory to 512Mi"
oc set resources deployment nginx -c=nginx --limits=cpu=200m,memory=512Mi

# Set the resource request and limits for all containers in nginx
oc set resources deployment nginx --limits=cpu=200m,memory=512Mi --
requests=cpu=100m,memory=256Mi

# Remove the resource requests for resources on containers in nginx
oc set resources deployment nginx --limits=cpu=0,memory=0 --requests=cpu=0,memory=0

# Print the result (in YAML format) of updating nginx container limits locally, without hitting the server
oc set resources -f path/to/file.yaml --limits=cpu=200m,memory=512Mi --local -o yaml
```

2.5.1.131. oc set route-backends

Update the backends for a route

Example usage

```
# Print the backends on the route 'web'
oc set route-backends web

# Set two backend services on route 'web' with 2/3rds of traffic going to 'a'
oc set route-backends web a=2 b=1

# Increase the traffic percentage going to b by 10%% relative to a
oc set route-backends web --adjust b=+10%%

# Set traffic percentage going to b to 10%% of the traffic going to a
oc set route-backends web --adjust b=10%%

# Set weight of b to 10
oc set route-backends web --adjust b=10
```

```
  # Set the weight to all backends to zero
  oc set route-backends web --zero
```

2.5.1.132. oc set selector

Set the selector on a resource

Example usage

```
  # Set the labels and selector before creating a deployment/service pair.
  oc create service clusterip my-svc --clusterip="None" -o yaml --dry-run | oc set selector --local -f -
'environment=qa' -o yaml | oc create -f -
  oc create deployment my-dep -o yaml --dry-run | oc label --local -f - environment=qa -o yaml | oc
create -f -
```

2.5.1.133. oc set serviceaccount

Update the service account of a resource

Example usage

```
  # Set deployment nginx-deployment's service account to serviceaccount1
  oc set serviceaccount deployment nginx-deployment serviceaccount1

  # Print the result (in YAML format) of updated nginx deployment with service account from a local
file, without hitting the API server
  oc set sa -f nginx-deployment.yaml serviceaccount1 --local --dry-run -o yaml
```

2.5.1.134. oc set subject

Update the user, group, or service account in a role binding or cluster role binding

Example usage

```
  # Update a cluster role binding for serviceaccount1
  oc set subject clusterrolebinding admin --serviceaccount=namespace:serviceaccount1

  # Update a role binding for user1, user2, and group1
  oc set subject rolebinding admin --user=user1 --user=user2 --group=group1

  # Print the result (in YAML format) of updating role binding subjects locally, without hitting the server
  oc create rolebinding admin --role=admin --user=admin -o yaml --dry-run | oc set subject --local -f -
--user=foo -o yaml
```

2.5.1.135. oc set triggers

Update the triggers on one or more objects

Example usage

```
  # Print the triggers on the deployment config 'myapp'
```

```
oc set triggers dc/myapp

# Set all triggers to manual
oc set triggers dc/myapp --manual

# Enable all automatic triggers
oc set triggers dc/myapp --auto

# Reset the GitHub webhook on a build to a new, generated secret
oc set triggers bc/webapp --from-github
oc set triggers bc/webapp --from-webhook

# Remove all triggers
oc set triggers bc/webapp --remove-all

# Stop triggering on config change
oc set triggers dc/myapp --from-config --remove

# Add an image trigger to a build config
oc set triggers bc/webapp --from-image=namespace1/image:latest

# Add an image trigger to a stateful set on the main container
oc set triggers statefulset/db --from-image=namespace1/image:latest -c main
```

2.5.1.136. oc set volumes

Update volumes on a pod template

Example usage

```
# List volumes defined on all deployment configs in the current project
oc set volume dc --all

# Add a new empty dir volume to deployment config (dc) 'myapp' mounted under
# /var/lib/myapp
oc set volume dc/myapp --add --mount-path=/var/lib/myapp

# Use an existing persistent volume claim (pvc) to overwrite an existing volume 'v1'
oc set volume dc/myapp --add --name=v1 -t pvc --claim-name=pvc1 --overwrite

# Remove volume 'v1' from deployment config 'myapp'
oc set volume dc/myapp --remove --name=v1

# Create a new persistent volume claim that overwrites an existing volume 'v1'
oc set volume dc/myapp --add --name=v1 -t pvc --claim-size=1G --overwrite

# Change the mount point for volume 'v1' to /data
oc set volume dc/myapp --add --name=v1 -m /data --overwrite

# Modify the deployment config by removing volume mount "v1" from container "c1"
# (and by removing the volume "v1" if no other containers have volume mounts that reference it)
oc set volume dc/myapp --remove --name=v1 --containers=c1
```

```
# Add new volume based on a more complex volume source (AWS EBS, GCE PD,
# Ceph, Gluster, NFS, ISCSI, ...)
oc set volume dc/myapp --add -m /data --source=<json-string>
```

2.5.1.137. oc start-build

Start a new build

Example usage

```
# Starts build from build config "hello-world"
oc start-build hello-world

# Starts build from a previous build "hello-world-1"
oc start-build --from-build=hello-world-1

# Use the contents of a directory as build input
oc start-build hello-world --from-dir=src/

# Send the contents of a Git repository to the server from tag 'v2'
oc start-build hello-world --from-repo=../hello-world --commit=v2

# Start a new build for build config "hello-world" and watch the logs until the build
# completes or fails
oc start-build hello-world --follow

# Start a new build for build config "hello-world" and wait until the build completes. It
# exits with a non-zero return code if the build fails
oc start-build hello-world --wait
```

2.5.1.138. oc status

Show an overview of the current project

Example usage

```
# See an overview of the current project
oc status

# Export the overview of the current project in an svg file
oc status -o dot | dot -T svg -o project.svg

# See an overview of the current project including details for any identified issues
oc status --suggest
```

2.5.1.139. oc tag

Tag existing images into image streams

Example usage

```
 # Tag the current image for the image stream 'openshift/ruby' and tag '2.0' into the image stream
'yourproject/ruby with tag 'tip'
```

```
  oc tag openshift/ruby:2.0 yourproject/ruby:tip

  # Tag a specific image
  oc tag
openshift/ruby@sha256:6b646fa6bf5e5e4c7fa41056c27910e679c03ebe7f93e361e6515a9da7e258cc
yourproject/ruby:tip

  # Tag an external container image
  oc tag --source=docker openshift/origin-control-plane:latest yourproject/ruby:tip

  # Tag an external container image and request pullthrough for it
  oc tag --source=docker openshift/origin-control-plane:latest yourproject/ruby:tip --reference-
policy=local

  # Remove the specified spec tag from an image stream
  oc tag openshift/origin-control-plane:latest -d
```

2.5.1.140. oc version

Print the client and server version information

Example usage

```
  # Print the OpenShift client, kube-apiserver, and openshift-apiserver version information for the
current context
  oc version

  # Print the OpenShift client, kube-apiserver, and openshift-apiserver version numbers for the current
context
  oc version --short

  # Print the OpenShift client version information for the current context
  oc version --client
```

2.5.1.141. oc wait

Experimental: Wait for a specific condition on one or many resources

Example usage

```
  # Wait for the pod "busybox1" to contain the status condition of type "Ready"
  oc wait --for=condition=Ready pod/busybox1

  # The default value of status condition is true; you can set it to false
  oc wait --for=condition=Ready=false pod/busybox1

  # Wait for the pod "busybox1" to be deleted, with a timeout of 60s, after having issued the "delete"
command
  oc delete pod/busybox1
  oc wait --for=delete pod/busybox1 --timeout=60s
```

2.5.1.142. oc whoami

Return information about the current session

Example usage

```
# Display the currently authenticated user
oc whoami
```

2.5.2. Additional resources

- OpenShift CLI administrator command reference

2.6. OPENSHIFT CLI ADMINISTRATOR COMMAND REFERENCE

This reference provides descriptions and example commands for OpenShift CLI (**oc**) administrator commands. You must have **cluster-admin** or equivalent permissions to use these commands.

For developer commands, see the OpenShift CLI developer command reference.

Run **oc adm help** to list all administrator commands or run **oc <command> --help** to get additional details for a specific command.

2.6.1. OpenShift CLI (oc) administrator commands

2.6.1.1. oc adm build-chain

Output the inputs and dependencies of your builds

Example usage

```
# Build the dependency tree for the 'latest' tag in <image-stream>
oc adm build-chain <image-stream>

# Build the dependency tree for the 'v2' tag in dot format and visualize it via the dot utility
oc adm build-chain <image-stream>:v2 -o dot | dot -T svg -o deps.svg

# Build the dependency tree across all namespaces for the specified image stream tag found in the
'test' namespace
oc adm build-chain <image-stream> -n test --all
```

2.6.1.2. oc adm catalog mirror

Mirror an operator-registry catalog

Example usage

```
# Mirror an operator-registry image and its contents to a registry
oc adm catalog mirror quay.io/my/image:latest myregistry.com

# Mirror an operator-registry image and its contents to a particular namespace in a registry
oc adm catalog mirror quay.io/my/image:latest myregistry.com/my-namespace

# Mirror to an airgapped registry by first mirroring to files
oc adm catalog mirror quay.io/my/image:latest file:///local/index
oc adm catalog mirror file:///local/index/my/image:latest my-airgapped-registry.com
```

```
# Configure a cluster to use a mirrored registry
oc apply -f manifests/imageContentSourcePolicy.yaml

# Edit the mirroring mappings and mirror with "oc image mirror" manually
oc adm catalog mirror --manifests-only quay.io/my/image:latest myregistry.com
oc image mirror -f manifests/mapping.txt

# Delete all ImageContentSourcePolicies generated by oc adm catalog mirror
oc delete imagecontentsourcepolicy -l operators.openshift.org/catalog=true
```

2.6.1.3. oc adm certificate approve

Approve a certificate signing request

Example usage

```
# Approve CSR 'csr-sqgzp'
oc adm certificate approve csr-sqgzp
```

2.6.1.4. oc adm certificate deny

Deny a certificate signing request

Example usage

```
# Deny CSR 'csr-sqgzp'
oc adm certificate deny csr-sqgzp
```

2.6.1.5. oc adm completion

Output shell completion code for the specified shell (bash or zsh)

Example usage

```
# Installing bash completion on macOS using homebrew
## If running Bash 3.2 included with macOS
brew install bash-completion
## or, if running Bash 4.1+
brew install bash-completion@2
## If oc is installed via homebrew, this should start working immediately
## If you've installed via other means, you may need add the completion to your completion directory
oc completion bash > $(brew --prefix)/etc/bash_completion.d/oc


# Installing bash completion on Linux
## If bash-completion is not installed on Linux, install the 'bash-completion' package
## via your distribution's package manager.
## Load the oc completion code for bash into the current shell
source <(oc completion bash)
## Write bash completion code to a file and source it from .bash_profile
oc completion bash > ~/.kube/completion.bash.inc
printf "
# Kubectl shell completion
```

```
source '$HOME/.kube/completion.bash.inc'
" >> $HOME/.bash_profile
source $HOME/.bash_profile

# Load the oc completion code for zsh[1] into the current shell
source <(oc completion zsh)
# Set the oc completion code for zsh[1] to autoload on startup
oc completion zsh > "${fpath[1]}/_oc"
```

2.6.1.6. oc adm config current-context

Display the current-context

Example usage

```
# Display the current-context
oc config current-context
```

2.6.1.7. oc adm config delete-cluster

Delete the specified cluster from the kubeconfig

Example usage

```
# Delete the minikube cluster
oc config delete-cluster minikube
```

2.6.1.8. oc adm config delete-context

Delete the specified context from the kubeconfig

Example usage

```
# Delete the context for the minikube cluster
oc config delete-context minikube
```

2.6.1.9. oc adm config delete-user

Delete the specified user from the kubeconfig

Example usage

```
# Delete the minikube user
oc config delete-user minikube
```

2.6.1.10. oc adm config get-clusters

Display clusters defined in the kubeconfig

Example usage

```
# List the clusters that oc knows about
oc config get-clusters
```

2.6.1.11. oc adm config get-contexts

Describe one or many contexts

Example usage

```
# List all the contexts in your kubeconfig file
oc config get-contexts

# Describe one context in your kubeconfig file
oc config get-contexts my-context
```

2.6.1.12. oc adm config get-users

Display users defined in the kubeconfig

Example usage

```
# List the users that oc knows about
oc config get-users
```

2.6.1.13. oc adm config rename-context

Rename a context from the kubeconfig file

Example usage

```
# Rename the context 'old-name' to 'new-name' in your kubeconfig file
oc config rename-context old-name new-name
```

2.6.1.14. oc adm config set

Set an individual value in a kubeconfig file

Example usage

```
# Set the server field on the my-cluster cluster to https://1.2.3.4
oc config set clusters.my-cluster.server https://1.2.3.4

# Set the certificate-authority-data field on the my-cluster cluster
oc config set clusters.my-cluster.certificate-authority-data $(echo "cert_data_here" | base64 -i -)

# Set the cluster field in the my-context context to my-cluster
oc config set contexts.my-context.cluster my-cluster

# Set the client-key-data field in the cluster-admin user using --set-raw-bytes option
oc config set users.cluster-admin.client-key-data cert_data_here --set-raw-bytes=true
```

2.6.1.15. oc adm config set-cluster

Set a cluster entry in kubeconfig

Example usage

```
# Set only the server field on the e2e cluster entry without touching other values
oc config set-cluster e2e --server=https://1.2.3.4

# Embed certificate authority data for the e2e cluster entry
oc config set-cluster e2e --embed-certs --certificate-authority=~/.kube/e2e/kubernetes.ca.crt

# Disable cert checking for the dev cluster entry
oc config set-cluster e2e --insecure-skip-tls-verify=true

# Set custom TLS server name to use for validation for the e2e cluster entry
oc config set-cluster e2e --tls-server-name=my-cluster-name
```

2.6.1.16. oc adm config set-context

Set a context entry in kubeconfig

Example usage

```
# Set the user field on the gce context entry without touching other values
oc config set-context gce --user=cluster-admin
```

2.6.1.17. oc adm config set-credentials

Set a user entry in kubeconfig

Example usage

```
# Set only the "client-key" field on the "cluster-admin"
# entry, without touching other values
oc config set-credentials cluster-admin --client-key=~/.kube/admin.key

# Set basic auth for the "cluster-admin" entry
oc config set-credentials cluster-admin --username=admin --password=uXFGweU9l35qcif

# Embed client certificate data in the "cluster-admin" entry
oc config set-credentials cluster-admin --client-certificate=~/.kube/admin.crt --embed-certs=true

# Enable the Google Compute Platform auth provider for the "cluster-admin" entry
oc config set-credentials cluster-admin --auth-provider=gcp

# Enable the OpenID Connect auth provider for the "cluster-admin" entry with additional args
 oc config set-credentials cluster-admin --auth-provider=oidc --auth-provider-arg=client-id=foo --auth-
provider-arg=client-secret=bar

# Remove the "client-secret" config value for the OpenID Connect auth provider for the "cluster-
admin" entry
 oc config set-credentials cluster-admin --auth-provider=oidc --auth-provider-arg=client-secret-
```

```
# Enable new exec auth plugin for the "cluster-admin" entry
oc config set-credentials cluster-admin --exec-command=/path/to/the/executable --exec-api-version=client.authentication.k8s.io/v1beta1

# Define new exec auth plugin args for the "cluster-admin" entry
oc config set-credentials cluster-admin --exec-arg=arg1 --exec-arg=arg2

# Create or update exec auth plugin environment variables for the "cluster-admin" entry
oc config set-credentials cluster-admin --exec-env=key1=val1 --exec-env=key2=val2

# Remove exec auth plugin environment variables for the "cluster-admin" entry
oc config set-credentials cluster-admin --exec-env=var-to-remove-
```

2.6.1.18. oc adm config unset

Unset an individual value in a kubeconfig file

Example usage

```
# Unset the current-context
oc config unset current-context

# Unset namespace in foo context
oc config unset contexts.foo.namespace
```

2.6.1.19. oc adm config use-context

Set the current-context in a kubeconfig file

Example usage

```
# Use the context for the minikube cluster
oc config use-context minikube
```

2.6.1.20. oc adm config view

Display merged kubeconfig settings or a specified kubeconfig file

Example usage

```
# Show merged kubeconfig settings
oc config view

# Show merged kubeconfig settings and raw certificate data
oc config view --raw

# Get the password for the e2e user
oc config view -o jsonpath='{.users[?(@.name == "e2e")].user.password}'
```

2.6.1.21. oc adm cordon

Mark node as unschedulable

Example usage

```
# Mark node "foo" as unschedulable
oc adm cordon foo
```

2.6.1.22. oc adm create-bootstrap-project-template

Create a bootstrap project template

Example usage

```
# Output a bootstrap project template in YAML format to stdout
oc adm create-bootstrap-project-template -o yaml
```

2.6.1.23. oc adm create-error-template

Create an error page template

Example usage

```
# Output a template for the error page to stdout
oc adm create-error-template
```

2.6.1.24. oc adm create-login-template

Create a login template

Example usage

```
# Output a template for the login page to stdout
oc adm create-login-template
```

2.6.1.25. oc adm create-provider-selection-template

Create a provider selection template

Example usage

```
# Output a template for the provider selection page to stdout
oc adm create-provider-selection-template
```

2.6.1.26. oc adm drain

Drain node in preparation for maintenance

Example usage

```
# Drain node "foo", even if there are pods not managed by a replication controller, replica set, job,
daemon set or stateful set on it
oc adm drain foo --force
```

```
  # As above, but abort if there are pods not managed by a replication controller, replica set, job,
daemon set or stateful set, and use a grace period of 15 minutes
  oc adm drain foo --grace-period=900
```

2.6.1.27. oc adm groups add-users

Add users to a group

Example usage

```
  # Add user1 and user2 to my-group
  oc adm groups add-users my-group user1 user2
```

2.6.1.28. oc adm groups new

Create a new group

Example usage

```
  # Add a group with no users
  oc adm groups new my-group

  # Add a group with two users
  oc adm groups new my-group user1 user2

  # Add a group with one user and shorter output
  oc adm groups new my-group user1 -o name
```

2.6.1.29. oc adm groups prune

Remove old OpenShift groups referencing missing records from an external provider

Example usage

```
  # Prune all orphaned groups
  oc adm groups prune --sync-config=/path/to/ldap-sync-config.yaml --confirm

  # Prune all orphaned groups except the ones from the blacklist file
  oc adm groups prune --blacklist=/path/to/blacklist.txt --sync-config=/path/to/ldap-sync-config.yaml --
confirm

  # Prune all orphaned groups from a list of specific groups specified in a whitelist file
  oc adm groups prune --whitelist=/path/to/whitelist.txt --sync-config=/path/to/ldap-sync-config.yaml --
confirm

  # Prune all orphaned groups from a list of specific groups specified in a whitelist
  oc adm groups prune groups/group_name groups/other_name --sync-config=/path/to/ldap-sync-
config.yaml --confirm
```

2.6.1.30. oc adm groups remove-users

Remove users from a group

Example usage

```
# Remove user1 and user2 from my-group
oc adm groups remove-users my-group user1 user2
```

2.6.1.31. oc adm groups sync

Sync OpenShift groups with records from an external provider

Example usage

```
# Sync all groups with an LDAP server
oc adm groups sync --sync-config=/path/to/ldap-sync-config.yaml --confirm

# Sync all groups except the ones from the blacklist file with an LDAP server
oc adm groups sync --blacklist=/path/to/blacklist.txt --sync-config=/path/to/ldap-sync-config.yaml --confirm

# Sync specific groups specified in a whitelist file with an LDAP server
oc adm groups sync --whitelist=/path/to/whitelist.txt --sync-config=/path/to/sync-config.yaml --confirm

# Sync all OpenShift groups that have been synced previously with an LDAP server
oc adm groups sync --type=openshift --sync-config=/path/to/ldap-sync-config.yaml --confirm

# Sync specific OpenShift groups if they have been synced previously with an LDAP server
oc adm groups sync groups/group1 groups/group2 groups/group3 --sync-config=/path/to/sync-config.yaml --confirm
```

2.6.1.32. oc adm inspect

Collect debugging data for a given resource

Example usage

```
# Collect debugging data for the "openshift-apiserver" clusteroperator
oc adm inspect clusteroperator/openshift-apiserver

# Collect debugging data for the "openshift-apiserver" and "kube-apiserver" clusteroperators
oc adm inspect clusteroperator/openshift-apiserver clusteroperator/kube-apiserver

# Collect debugging data for all clusteroperators
oc adm inspect clusteroperator

# Collect debugging data for all clusteroperators and clusterversions
oc adm inspect clusteroperators,clusterversions
```

2.6.1.33. oc adm migrate template-instances

Update template instances to point to the latest group-version-kinds

Example usage

```
  # Perform a dry-run of updating all objects
  oc adm migrate template-instances

  # To actually perform the update, the confirm flag must be appended
  oc adm migrate template-instances --confirm
```

2.6.1.34. oc adm must-gather

Launch a new instance of a pod for gathering debug information

Example usage

```
  # Gather information using the default plug-in image and command, writing into ./must-gather.local.<rand>
  oc adm must-gather

  # Gather information with a specific local folder to copy to
  oc adm must-gather --dest-dir=/local/directory

  # Gather audit information
  oc adm must-gather -- /usr/bin/gather_audit_logs

  # Gather information using multiple plug-in images
  oc adm must-gather --image=quay.io/kubevirt/must-gather --image=quay.io/openshift/origin-must-gather

  # Gather information using a specific image stream plug-in
  oc adm must-gather --image-stream=openshift/must-gather:latest

  # Gather information using a specific image, command, and pod-dir
  oc adm must-gather --image=my/image:tag --source-dir=/pod/directory -- myspecial-command.sh
```

2.6.1.35. oc adm new-project

Create a new project

Example usage

```
  # Create a new project using a node selector
  oc adm new-project myproject --node-selector='type=user-node,region=east'
```

2.6.1.36. oc adm node-logs

Display and filter node logs

Example usage

```
  # Show kubelet logs from all masters
  oc adm node-logs --role master -u kubelet

  # See what logs are available in masters in /var/logs
  oc adm node-logs --role master --path=/
```

```
# Display cron log file from all masters
oc adm node-logs --role master --path=cron
```

2.6.1.37. oc adm pod-network isolate-projects

Isolate project network

Example usage

```
# Provide isolation for project p1
oc adm pod-network isolate-projects <p1>

# Allow all projects with label name=top-secret to have their own isolated project network
oc adm pod-network isolate-projects --selector='name=top-secret'
```

2.6.1.38. oc adm pod-network join-projects

Join project network

Example usage

```
# Allow project p2 to use project p1 network
oc adm pod-network join-projects --to=<p1> <p2>

# Allow all projects with label name=top-secret to use project p1 network
oc adm pod-network join-projects --to=<p1> --selector='name=top-secret'
```

2.6.1.39. oc adm pod-network make-projects-global

Make project network global

Example usage

```
# Allow project p1 to access all pods in the cluster and vice versa
oc adm pod-network make-projects-global <p1>

# Allow all projects with label name=share to access all pods in the cluster and vice versa
oc adm pod-network make-projects-global --selector='name=share'
```

2.6.1.40. oc adm policy add-role-to-user

Add a role to users or service accounts for the current project

Example usage

```
# Add the 'view' role to user1 for the current project
oc policy add-role-to-user view user1

# Add the 'edit' role to serviceaccount1 for the current project
oc policy add-role-to-user edit -z serviceaccount1
```

2.6.1.41. oc adm policy add-scc-to-group

Add a security context constraint to groups

Example usage

```
# Add the 'restricted' security context constraint to group1 and group2
oc adm policy add-scc-to-group restricted group1 group2
```

2.6.1.42. oc adm policy add-scc-to-user

Add a security context constraint to users or a service account

Example usage

```
# Add the 'restricted' security context constraint to user1 and user2
oc adm policy add-scc-to-user restricted user1 user2

# Add the 'privileged' security context constraint to serviceaccount1 in the current namespace
oc adm policy add-scc-to-user privileged -z serviceaccount1
```

2.6.1.43. oc adm policy scc-review

Check which service account can create a pod

Example usage

```
  # Check whether service accounts sa1 and sa2 can admit a pod with a template pod spec specified
in my_resource.yaml
  # Service Account specified in myresource.yaml file is ignored
  oc policy scc-review -z sa1,sa2 -f my_resource.yaml

  # Check whether service accounts system:serviceaccount:bob:default can admit a pod with a
template pod spec specified in my_resource.yaml
  oc policy scc-review -z system:serviceaccount:bob:default -f my_resource.yaml

  # Check whether the service account specified in my_resource_with_sa.yaml can admit the pod
  oc policy scc-review -f my_resource_with_sa.yaml

  # Check whether the default service account can admit the pod; default is taken since no service
account is defined in myresource_with_no_sa.yaml
  oc policy scc-review -f myresource_with_no_sa.yaml
```

2.6.1.44. oc adm policy scc-subject-review

Check whether a user or a service account can create a pod

Example usage

```
# Check whether user bob can create a pod specified in myresource.yaml
oc policy scc-subject-review -u bob -f myresource.yaml

# Check whether user bob who belongs to projectAdmin group can create a pod specified in
```

```
myresource.yaml
  oc policy scc-subject-review -u bob -g projectAdmin -f myresource.yaml

  # Check whether a service account specified in the pod template spec in myresourcewithsa.yaml
can create the pod
  oc policy scc-subject-review -f myresourcewithsa.yaml
```

2.6.1.45. oc adm prune builds

Remove old completed and failed builds

Example usage

```
  # Dry run deleting older completed and failed builds and also including
  # all builds whose associated build config no longer exists
  oc adm prune builds --orphans

  # To actually perform the prune operation, the confirm flag must be appended
  oc adm prune builds --orphans --confirm
```

2.6.1.46. oc adm prune deployments

Remove old completed and failed deployment configs

Example usage

```
  # Dry run deleting all but the last complete deployment for every deployment config
  oc adm prune deployments --keep-complete=1

  # To actually perform the prune operation, the confirm flag must be appended
  oc adm prune deployments --keep-complete=1 --confirm
```

2.6.1.47. oc adm prune groups

Remove old OpenShift groups referencing missing records from an external provider

Example usage

```
  # Prune all orphaned groups
  oc adm prune groups --sync-config=/path/to/ldap-sync-config.yaml --confirm

  # Prune all orphaned groups except the ones from the blacklist file
  oc adm prune groups --blacklist=/path/to/blacklist.txt --sync-config=/path/to/ldap-sync-config.yaml --
confirm

  # Prune all orphaned groups from a list of specific groups specified in a whitelist file
  oc adm prune groups --whitelist=/path/to/whitelist.txt --sync-config=/path/to/ldap-sync-config.yaml --
confirm

  # Prune all orphaned groups from a list of specific groups specified in a whitelist
  oc adm prune groups groups/group_name groups/other_name --sync-config=/path/to/ldap-sync-
config.yaml --confirm
```

2.6.1.48. oc adm prune images

Remove unreferenced images

Example usage

```
  # See what the prune command would delete if only images and their referrers were more than an hour old
  # and obsoleted by 3 newer revisions under the same tag were considered
  oc adm prune images --keep-tag-revisions=3 --keep-younger-than=60m

  # To actually perform the prune operation, the confirm flag must be appended
  oc adm prune images --keep-tag-revisions=3 --keep-younger-than=60m --confirm

  # See what the prune command would delete if we are interested in removing images
  # exceeding currently set limit ranges ('openshift.io/Image')
  oc adm prune images --prune-over-size-limit

  # To actually perform the prune operation, the confirm flag must be appended
  oc adm prune images --prune-over-size-limit --confirm

  # Force the insecure http protocol with the particular registry host name
  oc adm prune images --registry-url=http://registry.example.org --confirm

  # Force a secure connection with a custom certificate authority to the particular registry host name
  oc adm prune images --registry-url=registry.example.org --certificate-authority=/path/to/custom/ca.crt --confirm
```

2.6.1.49. oc adm release extract

Extract the contents of an update payload to disk

Example usage

```
  # Use git to check out the source code for the current cluster release to DIR
  oc adm release extract --git=DIR

  # Extract cloud credential requests for AWS
  oc adm release extract --credentials-requests --cloud=aws
```

2.6.1.50. oc adm release info

Display information about a release

Example usage

```
  # Show information about the cluster's current release
  oc adm release info

  # Show the source code that comprises a release
  oc adm release info 4.2.2 --commit-urls

  # Show the source code difference between two releases
  oc adm release info 4.2.0 4.2.2 --commits
```

```
# Show where the images referenced by the release are located
oc adm release info quay.io/openshift-release-dev/ocp-release:4.2.2 --pullspecs
```

2.6.1.51. oc adm release mirror

Mirror a release to a different image registry location

Example usage

```
# Perform a dry run showing what would be mirrored, including the mirror objects
oc adm release mirror 4.3.0 --to myregistry.local/openshift/release \
--release-image-signature-to-dir /tmp/releases --dry-run

# Mirror a release into the current directory
oc adm release mirror 4.3.0 --to file://openshift/release \
--release-image-signature-to-dir /tmp/releases

# Mirror a release to another directory in the default location
oc adm release mirror 4.3.0 --to-dir /tmp/releases

# Upload a release from the current directory to another server
oc adm release mirror --from file://openshift/release --to myregistry.com/openshift/release \
--release-image-signature-to-dir /tmp/releases

# Mirror the 4.3.0 release to repository registry.example.com and apply signatures to connected
cluster
oc adm release mirror --from=quay.io/openshift-release-dev/ocp-release:4.3.0-x86_64 \
--to=registry.example.com/your/repository --apply-release-image-signature
```

2.6.1.52. oc adm release new

Create a new OpenShift release

Example usage

```
# Create a release from the latest origin images and push to a DockerHub repo
oc adm release new --from-image-stream=4.1 -n origin --to-image
docker.io/mycompany/myrepo:latest

# Create a new release with updated metadata from a previous release
oc adm release new --from-release registry.svc.ci.openshift.org/origin/release:v4.1 --name 4.1.1 \
--previous 4.1.0 --metadata ... --to-image docker.io/mycompany/myrepo:latest

# Create a new release and override a single image
oc adm release new --from-release registry.svc.ci.openshift.org/origin/release:v4.1 \
cli=docker.io/mycompany/cli:latest --to-image docker.io/mycompany/myrepo:latest

# Run a verification pass to ensure the release can be reproduced
oc adm release new --from-release registry.svc.ci.openshift.org/origin/release:v4.1
```

2.6.1.53. oc adm taint

Update the taints on one or more nodes

Example usage

```
# Update node 'foo' with a taint with key 'dedicated' and value 'special-user' and effect 'NoSchedule'
# If a taint with that key and effect already exists, its value is replaced as specified
oc adm taint nodes foo dedicated=special-user:NoSchedule

# Remove from node 'foo' the taint with key 'dedicated' and effect 'NoSchedule' if one exists
oc adm taint nodes foo dedicated:NoSchedule-

# Remove from node 'foo' all the taints with key 'dedicated'
oc adm taint nodes foo dedicated-

# Add a taint with key 'dedicated' on nodes having label mylabel=X
oc adm taint node -l myLabel=X  dedicated=foo:PreferNoSchedule

# Add to node 'foo' a taint with key 'bar' and no value
oc adm taint nodes foo bar:NoSchedule
```

2.6.1.54. oc adm top images

Show usage statistics for images

Example usage

```
# Show usage statistics for images
oc adm top images
```

2.6.1.55. oc adm top imagestreams

Show usage statistics for image streams

Example usage

```
# Show usage statistics for image streams
oc adm top imagestreams
```

2.6.1.56. oc adm top node

Display resource (CPU/memory) usage of nodes

Example usage

```
# Show metrics for all nodes
oc adm top node

# Show metrics for a given node
oc adm top node NODE_NAME
```

2.6.1.57. oc adm top pod

Display resource (CPU/memory) usage of pods

Example usage

```
# Show metrics for all pods in the default namespace
oc adm top pod

# Show metrics for all pods in the given namespace
oc adm top pod --namespace=NAMESPACE

# Show metrics for a given pod and its containers
oc adm top pod POD_NAME --containers

# Show metrics for the pods defined by label name=myLabel
oc adm top pod -l name=myLabel
```

2.6.1.58. oc adm uncordon

Mark node as schedulable

Example usage

```
# Mark node "foo" as schedulable
oc adm uncordon foo
```

2.6.1.59. oc adm verify-image-signature

Verify the image identity contained in the image signature

Example usage

```
  # Verify the image signature and identity using the local GPG keychain
  oc adm verify-image-signature
sha256:c841e9b64e4579bd56c794bdd7c36e1c257110fd2404bebbb8b613e4935228c4 \
  --expected-identity=registry.local:5000/foo/bar:v1

  # Verify the image signature and identity using the local GPG keychain and save the status
  oc adm verify-image-signature
sha256:c841e9b64e4579bd56c794bdd7c36e1c257110fd2404bebbb8b613e4935228c4 \
  --expected-identity=registry.local:5000/foo/bar:v1 --save

  # Verify the image signature and identity via exposed registry route
  oc adm verify-image-signature
sha256:c841e9b64e4579bd56c794bdd7c36e1c257110fd2404bebbb8b613e4935228c4 \
  --expected-identity=registry.local:5000/foo/bar:v1 \
  --registry-url=docker-registry.foo.com

  # Remove all signature verifications from the image
  oc adm verify-image-signature
sha256:c841e9b64e4579bd56c794bdd7c36e1c257110fd2404bebbb8b613e4935228c4 --remove-all
```

2.6.2. Additional resources

- OpenShift CLI developer command reference

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 4.9. 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 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** binary)	X.Y+N footnote:versionpolicyn[Where **N** is a number greater than or equal to 1.] (**oc** binary)
X.Y (Server)	❶	❸
X.Y+N footnote:versionpolicyn[] (Server)	❷	❶

1 Fully compatible.

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

3 **oc** binary 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-TITLE} 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 an issue in Bugzilla. Choose the **OpenShift Container Platform** product type and the **Documentation** component type.

3.2. UNDERSTANDING ODO

odo is a CLI tool for creating applications on OpenShift Container Platform and Kubernetes. With **odo**, you can write, build, and debug applications on a cluster without the need to administer the cluster itself. Creating deployment configurations, build configurations, service routes and other OpenShift Container Platform or Kubernetes elements are all automated by **odo**.

Existing tools such as **oc** are operations-focused and require a deep understanding of Kubernetes and OpenShift Container Platform concepts. **odo** abstracts away complex Kubernetes and OpenShift Container Platform concepts allowing developers to focus on what is most important to them: code.

3.2.1. Key features

odo is designed to be simple and concise with the following key features:

- Simple syntax and design centered around concepts familiar to developers, such as projects, applications, and components.
- Completely client based. No additional server other than OpenShift Container Platform is required for deployment.
- Official support for Node.js and Java components.
- Partial compatibility with languages and frameworks such as Ruby, Perl, PHP, and Python.
- Detects changes to local code and deploys it to the cluster automatically, giving instant feedback to validate changes in real time.
- Lists all the available components and services from the cluster.

3.2.2. Core concepts

Project

A project is your source code, tests, and libraries organized in a separate single unit.

Application

An application is a program designed for end users. An application consists of multiple microservices or components that work individually to build the entire application. Examples of applications: a video game, a media player, a web browser.

Component

A component is a set of Kubernetes resources which host code or data. Each component can be run and deployed separately. Examples of components: Node.js, Perl, PHP, Python, Ruby.

Service

A service is software that your component links to or depends on. Examples of services: MariaDB, Jenkins, MySQL. In **odo**, services are provisioned from the OpenShift Service Catalog and must be enabled within your cluster.

3.2.2.1. Officially supported languages and corresponding container images

Table 3.1. Supported languages, container images, package managers, and platforms

Language	Container image	Package manager	Platform
Node.js	rhscl/nodejs-10-rhel7	NPM	amd64, s390x, ppc64le
	rhscl/nodejs-12-rhel7	NPM	amd64, s390x, ppc64le
Java	redhat-openjdk-18/openjdk18-openshift	Maven, Gradle	amd64, s390x, ppc64le
	openjdk/openjdk-11-rhel8	Maven, Gradle	amd64, s390x, ppc64le
	openjdk/openjdk-11-rhel7	Maven, Gradle	amd64, s390x, ppc64le

3.2.2.1.1. Listing available container images

NOTE

The list of available container images is sourced from the cluster's internal container registry and external registries associated with the cluster.

To list the available components and associated container images for your cluster:

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

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

2. List the available **odo** supported and unsupported components and corresponding container images:

```
$ odo catalog list components
```

Example output

```
Odo Devfile Components:
NAME                DESCRIPTION                           REGISTRY
java-maven          Upstream Maven and OpenJDK 11         DefaultDevfileRegistry
java-openliberty    Open Liberty microservice in Java     DefaultDevfileRegistry
java-quarkus        Upstream Quarkus with Java+GraalVM    DefaultDevfileRegistry
java-springboot     Spring Boot® using Java               DefaultDevfileRegistry
nodejs              Stack with NodeJS 12                  DefaultDevfileRegistry

Odo OpenShift Components:
NAME       PROJECT      TAGS                                          SUPPORTED
java       openshift    11,8,latest                                   YES
dotnet     openshift    2.1,3.1,latest                                NO
golang     openshift    1.13.4-ubi7,1.13.4-ubi8,latest                NO
httpd      openshift    2.4-el7,2.4-el8,latest                        NO
```

```
nginx      openshift    1.14-el7,1.14-el8,1.16-el7,1.16-el8,latest                          NO
nodejs     openshift    10-ubi7,10-ubi8,12-ubi7,12-ubi8,latest                               NO
perl       openshift    5.26-el7,5.26-ubi8,5.30-el7,latest                                NO
php        openshift    7.2-ubi7,7.2-ubi8,7.3-ubi7,7.3-ubi8,latest                            NO
python     openshift    2.7-ubi7,2.7-ubi8,3.6-ubi7,3.6-ubi8,3.8-ubi7,3.8-ubi8,latest
NO
ruby       openshift    2.5-ubi7,2.5-ubi8,2.6-ubi7,2.6-ubi8,2.7-ubi7,latest                         NO
wildfly    openshift
10.0,10.1,11.0,12.0,13.0,14.0,15.0,16.0,17.0,18.0,19.0,20.0,8.1,9.0,latest    NO
```

The **TAGS** column represents the available image versions, for example, **10** represents the **rhoar-nodejs/nodejs-10** container image. To learn more about CLI commands, go to odo CLI reference.

3.2.2.2. Telemetry in odo

odo collects information about how **odo** is used: operating system, RAM, CPU size, number of cores, version of **odo**, errors, success/failure, and time it took for a command to complete.

You can modify your Telemetry consent by using **odo preference**:

- **odo preference set ConsentTelemetry true** to consent to Telemetry.
- **odo preference unset ConsentTelemetry** to disable Telemetry.
- **odo preference view** to verify 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.zip
     ```

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. CREATING AND DEPLOYING APPLICATIONS WITH ODO

3.4.1. Working with projects

Project keeps your source code, tests, and libraries organized in a separate single unit.

3.4.1.1. Creating a project

Create a project to keep your source code, tests, and libraries organized in a separate single unit.

Procedure

1. Log in to an OpenShift Container Platform cluster:

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

2. Create a project:

   ```
   $ odo project create myproject
   ```

   Example output

   ```
   ✓ Project 'myproject' is ready for use
   ✓ New project created and now using project : myproject
   ```

3.4.2. Creating a single-component application with odo

With **odo**, you can create and deploy applications on clusters.

Prerequisites

- **odo** is installed.
- You have a running cluster. You can use CodeReady Containers (CRC) to deploy a local cluster quickly.

3.4.2.1. Creating a project

Create a project to keep your source code, tests, and libraries organized in a separate single unit.

Procedure

1. Log in to an OpenShift Container Platform cluster:

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

2. Create a project:

   ```
   $ odo project create myproject
   ```

   Example output

   ```
   ✓ Project 'myproject' is ready for use
   ✓ New project created and now using project : myproject
   ```

3.4.2.2. Creating a Node.js application with odo

To create a Node.js component, download the Node.js application and push the source code to your cluster with **odo**.

Procedure

1. Create a directory for your components:

   ```
   $ mkdir my_components && cd my_components
   ```

2. Download the example Node.js application:

   ```
   $ git clone https://github.com/openshift/nodejs-ex
   ```

3. Change the current directory to the directory with your application:

   ```
   $ cd <directory_name>
   ```

4. Add a component of the type Node.js to your application:

   ```
   $ odo create nodejs
   ```

   NOTE

   By default, the latest image is used. You can also explicitly specify an image version by using **odo create openshift/nodejs:8**.

5. Push the initial source code to the component:

   ```
   $ odo push
   ```

   Your component is now deployed to OpenShift Container Platform.

6. Create a URL and add an entry in the local configuration file as follows:

   ```
   $ odo url create --port 8080
   ```

7. Push the changes. This creates a URL on the cluster.

   ```
   $ odo push
   ```

8. List the URLs to check the desired URL for the component.

   ```
   $ odo url list
   ```

9. View your deployed application using the generated URL.

   ```
   $ curl <url>
   ```

3.4.2.3. Modifying your application code

You can modify your application code and have the changes applied to your application on OpenShift Container Platform.

1. Edit one of the layout files within the Node.js directory with your preferred text editor.
2. Update your component:

   ```
   $ odo push
   ```

3. Refresh your application in the browser to see the changes.

3.4.2.4. Adding storage to the application components

Use the **odo storage** command to add persistent data to your application. Examples of data that must persist include database files, dependencies, and build artifacts, such as a **.m2** Maven directory.

Procedure

1. Add the storage to your component:

   ```
   $ odo storage create <storage_name> --path=<path_to_the_directory> --size=<size>
   ```

2. Push the storage to the cluster:

   ```
   $ odo push
   ```

3. Verify that the storage is now attached to your component by listing all storage in the component:

   ```
   $ odo storage list
   ```

   Example output

   ```
   The component 'nodejs' has the following storage attached:
   NAME          SIZE     PATH      STATE
   mystorage     1Gi      /data     Pushed
   ```

4. Delete the storage from your component:

   ```
   $ odo storage delete <storage_name>
   ```

5. List all storage to verify that the storage state is **Locally Deleted**:

   ```
   $ odo storage list
   ```

   Example output

   ```
   The component 'nodejs' has the following storage attached:
   NAME          SIZE     PATH      STATE
   mystorage     1Gi      /data     Locally Deleted
   ```

6. Push the changes to the cluster:

```
$ odo push
```

3.4.2.5. Adding a custom builder to specify a build image

With OpenShift Container Platform, you can add a custom image to bridge the gap between the creation of custom images.

The following example demonstrates the successful import and use of the **redhat-openjdk-18** image:

Prerequisites

- The OpenShift CLI (oc) is installed.

Procedure

1. Import the image into OpenShift Container Platform:

```
$ oc import-image openjdk18 \
--from=registry.access.redhat.com/redhat-openjdk-18/openjdk18-openshift \
--confirm
```

2. Tag the image to make it accessible to odo:

```
$ oc annotate istag/openjdk18:latest tags=builder
```

3. Deploy the image with odo:

```
$ odo create openjdk18 --git \
https://github.com/openshift-evangelists/Wild-West-Backend
```

3.4.2.6. Connecting your application to multiple services using OpenShift Service Catalog

The OpenShift service catalog is an implementation of the Open Service Broker API (OSB API) for Kubernetes. You can use it to connect applications deployed in OpenShift Container Platform to a variety of services.

Prerequisites

- You have a running OpenShift Container Platform cluster.
- The service catalog is installed and enabled on your cluster.

Procedure

- To list the services:

```
$ odo catalog list services
```

- To use service catalog-related operations:

```
$ odo service <verb> <service_name>
```

3.4.2.7. Deleting an application

Use the **odo app delete** command to delete your application.

Procedure

1. List the applications in the current project:

   ```
   $ odo app list
   ```

   Example output

   ```
     The project '<project_name>' has the following applications:
     NAME
     app
   ```

2. List the components associated with the applications. These components will be deleted with the application:

   ```
   $ odo component list
   ```

   Example output

   ```
     APP     NAME                      TYPE       SOURCE        STATE
     app     nodejs-nodejs-ex-elyf     nodejs     file://./     Pushed
   ```

3. Delete the application:

   ```
   $ odo app delete <application_name>
   ```

   Example output

   ```
     ? Are you sure you want to delete the application: <application_name> from project:
   <project_name>
   ```

4. Confirm the deletion with **Y**. You can suppress the confirmation prompt using the **-f** flag.

3.4.3. Creating a multicomponent application with odo

odo allows you to create a multicomponent application, modify it, and link its components in an easy and automated way.

This example describes how to deploy a multicomponent application - a shooter game. The application consists of a front-end Node.js component and a back-end Java component.

Prerequisites

- **odo** is installed.
- You have a running cluster. Developers can use CodeReady Containers (CRC) to deploy a local cluster quickly.

- Maven is installed.

3.4.3.1. Creating a project

Create a project to keep your source code, tests, and libraries organized in a separate single unit.

Procedure

1. Log in to an OpenShift Container Platform cluster:

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

2. Create a project:

```
$ odo project create myproject
```

Example output

```
✓ Project 'myproject' is ready for use
✓ New project created and now using project : myproject
```

3.4.3.2. Deploying the back-end component

To create a Java component, import the Java builder image, download the Java application and push the source code to your cluster with **odo**.

Procedure

1. Import **openjdk18** into the cluster:

```
$ oc import-image openjdk18 \
--from=registry.access.redhat.com/redhat-openjdk-18/openjdk18-openshift --confirm
```

2. Tag the image as **builder** to make it accessible for odo:

```
$ oc annotate istag/openjdk18:latest tags=builder
```

3. Run **odo catalog list components** to see the created image:

```
$ odo catalog list components
```

Example output

```
Odo Devfile Components:
NAME                 DESCRIPTION                            REGISTRY
java-maven           Upstream Maven and OpenJDK 11          DefaultDevfileRegistry
java-openliberty     Open Liberty microservice in Java      DefaultDevfileRegistry
java-quarkus         Upstream Quarkus with Java+GraalVM     DefaultDevfileRegistry
java-springboot      Spring Boot® using Java                DefaultDevfileRegistry
nodejs               Stack with NodeJS 12                   DefaultDevfileRegistry

Odo OpenShift Components:
```

```
NAME        PROJECT       TAGS                                                                    SUPPORTED
java        openshift     11,8,latest                                                         YES
dotnet      openshift     2.1,3.1,latest                                                      NO
golang      openshift     1.13.4-ubi7,1.13.4-ubi8,latest                                          NO
httpd       openshift     2.4-el7,2.4-el8,latest                                                NO
nginx       openshift     1.14-el7,1.14-el8,1.16-el7,1.16-el8,latest                                NO
nodejs      openshift     10-ubi7,10-ubi8,12-ubi7,12-ubi8,latest                                    NO
perl        openshift     5.26-el7,5.26-ubi8,5.30-el7,latest                                    NO
php         openshift     7.2-ubi7,7.2-ubi8,7.3-ubi7,7.3-ubi8,latest                                NO
python      openshift     2.7-ubi7,2.7-ubi8,3.6-ubi7,3.6-ubi8,3.8-ubi7,3.8-ubi8,latest
NO
ruby        openshift     2.5-ubi7,2.5-ubi8,2.6-ubi7,2.6-ubi8,2.7-ubi7,latest                         NO
wildfly     openshift
10.0,10.1,11.0,12.0,13.0,14.0,15.0,16.0,17.0,18.0,19.0,20.0,8.1,9.0,latest     NO
```

4. Create a directory for your components:

```
$ mkdir my_components && cd my_components
```

5. Download the example back-end application:

```
$ git clone https://github.com/openshift-evangelists/Wild-West-Backend backend
```

6. Change to the back-end source directory:

```
$ cd backend
```

7. Check that you have the correct files in the directory:

```
$ ls
```

Example output

```
debug.sh  pom.xml  src
```

8. Build the back-end source files with Maven to create a JAR file:

```
$ mvn package
```

Example output

```
...
[INFO] -------------------------------------
[INFO] BUILD SUCCESS
[INFO] -------------------------------------
[INFO] Total time: 2.635 s
[INFO] Finished at: 2019-09-30T16:11:11-04:00
[INFO] Final Memory: 30M/91M
[INFO] -------------------------------------
```

9. Create a component configuration of Java component-type named **backend**:

```
$ odo create --s2i openjdk18 backend --binary target/wildwest-1.0.jar
```

Example output

```
 ✓  Validating component [1ms]
 Please use `odo push` command to create the component with source deployed
```

Now the configuration file **config.yaml** is in the local directory of the back-end component that contains information about the component for deployment.

10. Check the configuration settings of the back-end component in the **config.yaml** file using:

```
$ odo config view
```

Example output

```
COMPONENT SETTINGS
------------------------------------------------
PARAMETER         CURRENT_VALUE
Type              openjdk18
Application       app
Project           myproject
SourceType        binary
Ref
SourceLocation    target/wildwest-1.0.jar
Ports             8080/TCP,8443/TCP,8778/TCP
Name              backend
MinMemory
MaxMemory
DebugPort
Ignore
MinCPU
MaxCPU
```

11. Push the component to the OpenShift Container Platform cluster.

```
$ odo push
```

Example output

```
Validation
 ✓  Checking component [6ms]

Configuration changes
 ✓  Initializing component
 ✓  Creating component [124ms]

Pushing to component backend of type binary
 ✓  Checking files for pushing [1ms]
 ✓  Waiting for component to start [48s]
 ✓  Syncing files to the component [811ms]
 ✓  Building component [3s]
```

Using **odo push**, OpenShift Container Platform creates a container to host the back-end component, deploys the container into a pod running on the OpenShift Container Platform cluster, and starts the **backend** component.

12. Validate:

    - The status of the action in odo:

      ```
      $ odo log -f
      ```

      Example output

      ```
      2019-09-30 20:14:19.738  INFO 444 --- [           main] c.o.wildwest.WildWestApplication
      : Starting WildWestApplication v1.0 onbackend-app-1-9tnhc with PID 444
      (/deployments/wildwest-1.0.jar started by jboss in /deployments)
      ```

    - The status of the back-end component:

      ```
      $ odo list
      ```

      Example output

      ```
      APP     NAME        TYPE         SOURCE                           STATE
      app     backend     openjdk18    file://target/wildwest-1.0.jar   Pushed
      ```

3.4.3.3. Deploying the front-end component

To create and deploy a front-end component, download the Node.js application and push the source code to your cluster with **odo**.

Procedure

1. Download the example front-end application:

   ```
   $ git clone https://github.com/openshift/nodejs-ex frontend
   ```

2. Change the current directory to the front-end directory:

   ```
   $ cd frontend
   ```

3. List the contents of the directory to see that the front end is a Node.js application.

   ```
   $ ls
   ```

   Example output

   ```
   README.md       openshift       server.js       views
   helm            package.json    tests
   ```

NOTE

The front-end component is written in an interpreted language (Node.js); it does not need to be built.

4. Create a component configuration of Node.js component-type named **frontend**:

```
$ odo create --s2i nodejs frontend
```

Example output

```
 ✓  Validating component [5ms]
Please use `odo push` command to create the component with source deployed
```

5. Push the component to a running container.

```
$ odo push
```

Example output

```
Validation
 ✓  Checking component [8ms]

Configuration changes
 ✓  Initializing component
 ✓  Creating component [83ms]

Pushing to component frontend of type local
 ✓  Checking files for pushing [2ms]
 ✓  Waiting for component to start [45s]
 ✓  Syncing files to the component [3s]
 ✓  Building component [18s]
 ✓  Changes successfully pushed to component
```

3.4.3.4. Linking both components

Components running on the cluster need to be connected to interact. OpenShift Container Platform provides linking mechanisms to publish communication bindings from a program to its clients.

Procedure

1. List all the components that are running on the cluster:

```
$ odo list
```

Example output

```
OpenShift Components:
APP     NAME         PROJECT     TYPE          SOURCETYPE     STATE
app     backend      testpro     openjdk18     binary         Pushed
app     frontend     testpro     nodejs        local          Pushed
```

2. Link the current front-end component to the back end:

```
$ odo link backend --port 8080
```

Example output

```
 ✓  Component backend has been successfully linked from the component frontend

Following environment variables were added to frontend component:
- COMPONENT_BACKEND_HOST
- COMPONENT_BACKEND_PORT
```

The configuration information of the back-end component is added to the front-end component and the front-end component restarts.

3.4.3.5. Exposing components to the public

Procedure

1. Navigate to the **frontend** directory:

```
$ cd frontend
```

2. Create an external URL for the application:

```
$ odo url create frontend --port 8080
```

Example output

```
 ✓  URL frontend created for component: frontend

To create URL on the OpenShift  cluster, use `odo push`
```

3. Apply the changes:

```
$ odo push
```

Example output

```
Validation
 ✓  Checking component [21ms]

Configuration changes
 ✓  Retrieving component data [35ms]
 ✓  Applying configuration [29ms]

Applying URL changes
 ✓  URL frontend: http://frontend-app-myproject.192.168.42.79.nip.io created

Pushing to component frontend of type local
 ✓  Checking file changes for pushing [1ms]
 ✓  No file changes detected, skipping build. Use the '-f' flag to force the build.
```

4. Open the URL in a browser to view the application.

NOTE

If an application requires permissions to the active service account to access the OpenShift Container Platform namespace and delete active pods, the following error may occur when looking at **odo log** from the back-end component:

Message: Forbidden!Configured service account doesn't have access. Service account may have been revoked

To resolve this error, add permissions for the service account role:

```
$ oc policy add-role-to-group view system:serviceaccounts -n <project>
```

```
$ oc policy add-role-to-group edit system:serviceaccounts -n <project>
```

Do not do this on a production cluster.

3.4.3.6. Modifying the running application

Procedure

1. Change the local directory to the front-end directory:

```
$ cd frontend
```

2. Monitor the changes on the file system using:

```
$ odo watch
```

3. Edit the **index.html** file to change the displayed name for the game.

NOTE

A slight delay is possible before odo recognizes the change.

odo pushes the changes to the front-end component and prints its status to the terminal:

```
File /root/frontend/index.html changed
File  changed
Pushing files...
 ✓  Waiting for component to start
 ✓  Copying files to component
 ✓  Building component
```

4. Refresh the application page in the web browser. The new name is now displayed.

3.4.3.7. Deleting an application

Use the **odo app delete** command to delete your application.

Procedure

1. List the applications in the current project:

```
$ odo app list
```

Example output

```
  The project '<project_name>' has the following applications:
  NAME
  app
```

2. List the components associated with the applications. These components will be deleted with the application:

```
$ odo component list
```

Example output

```
  APP    NAME                     TYPE      SOURCE      STATE
  app    nodejs-nodejs-ex-elyf    nodejs    file://./   Pushed
```

3. Delete the application:

```
$ odo app delete <application_name>
```

Example output

```
  ? Are you sure you want to delete the application: <application_name> from project:
<project_name>
```

4. Confirm the deletion with **Y**. You can suppress the confirmation prompt using the **-f** flag.

3.4.4. Creating an application with a database

This example describes how to deploy and connect a database to a front-end application.

Prerequisites

- **odo** is installed.
- **oc** client is installed.
- You have a running cluster. Developers can use CodeReady Containers (CRC) to deploy a local cluster quickly.
- The Service Catalog is installed and enabled on your cluster.

NOTE

Service Catalog is deprecated on OpenShift Container Platform 4 and later.

3.4.4.1. Creating a project

Create a project to keep your source code, tests, and libraries organized in a separate single unit.

Procedure

1. Log in to an OpenShift Container Platform cluster:

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

2. Create a project:

```
$ odo project create myproject
```

Example output

```
 ✓  Project 'myproject' is ready for use
 ✓  New project created and now using project : myproject
```

3.4.4.2. Deploying the front-end component

To create and deploy a front-end component, download the Node.js application and push the source code to your cluster with **odo**.

Procedure

1. Download the example front-end application:

```
$ git clone https://github.com/openshift/nodejs-ex frontend
```

2. Change the current directory to the front-end directory:

```
$ cd frontend
```

3. List the contents of the directory to see that the front end is a Node.js application.

```
$ ls
```

Example output

```
README.md       openshift       server.js       views
helm            package.json    tests
```

NOTE

The front-end component is written in an interpreted language (Node.js); it does not need to be built.

4. Create a component configuration of Node.js component-type named **frontend**:

```
$ odo create --s2i nodejs frontend
```

Example output

```
 ✓  Validating component [5ms]
Please use `odo push` command to create the component with source deployed
```

5. Create a URL to access the frontend interface.

```
$ odo url create myurl
```

Example output

```
 ✓  URL myurl created for component: nodejs-nodejs-ex-pmdp
```

6. Push the component to the OpenShift Container Platform cluster.

```
$ odo push
```

Example output

```
Validation
 ✓  Checking component [7ms]

 Configuration changes
 ✓  Initializing component
 ✓  Creating component [134ms]

 Applying URL changes
 ✓  URL myurl: http://myurl-app-myproject.192.168.42.79.nip.io created

 Pushing to component nodejs-nodejs-ex-mhbb of type local
 ✓  Checking files for pushing [657850ns]
 ✓  Waiting for component to start [6s]
 ✓  Syncing files to the component [408ms]
 ✓  Building component [7s]
 ✓  Changes successfully pushed to component
```

3.4.4.3. Deploying a database in interactive mode

odo provides a command-line interactive mode which simplifies deployment.

Procedure

- Run the interactive mode and answer the prompts:

```
$ odo service create
```

Example output

```
? Which kind of service do you wish to create database
? Which database service class should we use mongodb-persistent
? Enter a value for string property DATABASE_SERVICE_NAME (Database Service Name):
mongodb
```

```
? Enter a value for string property MEMORY_LIMIT (Memory Limit): 512Mi
? Enter a value for string property MONGODB_DATABASE (MongoDB Database Name):
sampledb
? Enter a value for string property MONGODB_VERSION (Version of MongoDB Image): 3.2
? Enter a value for string property VOLUME_CAPACITY (Volume Capacity): 1Gi
? Provide values for non-required properties No
? How should we name your service  mongodb-persistent
? Output the non-interactive version of the selected options No
? Wait for the service to be ready No
 ✓  Creating service [32ms]
 ✓  Service 'mongodb-persistent' was created
Progress of the provisioning will not be reported and might take a long time.
You can see the current status by executing 'odo service list'
```

NOTE

Your password or username will be passed to the front-end application as environment variables.

3.4.4.4. Deploying a database manually

1. List the available services:

```
$ odo catalog list services
```

Example output

```
NAME                         PLANS
django-psql-persistent       default
jenkins-ephemeral            default
jenkins-pipeline-example     default
mariadb-persistent           default
mongodb-persistent           default
mysql-persistent             default
nodejs-mongo-persistent      default
postgresql-persistent        default
rails-pgsql-persistent       default
```

2. Choose the **mongodb-persistent** type of service and see the required parameters:

```
$ odo catalog describe service mongodb-persistent
```

Example output

```
 ***********************        | *****************************************************
 Name                           | default
 -----------------              | -----------------
 Display Name                   |
 -----------------              | -----------------
 Short Description              | Default plan
 -----------------              | -----------------
 Required Params without a      |
 default value                  |
-----------------              | -----------------
Required Params with a default | DATABASE_SERVICE_NAME
value                          | (default: 'mongodb'),
                               | MEMORY_LIMIT (default:
                               | '512Mi'), MONGODB_VERSION
                               | (default: '3.2'),
                               | MONGODB_DATABASE (default:
                               | 'sampledb'), VOLUME_CAPACITY
                               | (default: '1Gi')
-----------------              | -----------------
Optional Params                | MONGODB_ADMIN_PASSWORD,
                               | NAMESPACE, MONGODB_PASSWORD,
                               | MONGODB_USER
```

3. Pass the required parameters as flags and wait for the deployment of the database:

```
$ odo service create mongodb-persistent --plan default --wait -p
DATABASE_SERVICE_NAME=mongodb -p MEMORY_LIMIT=512Mi -p
MONGODB_DATABASE=sampledb -p VOLUME_CAPACITY=1Gi
```

3.4.4.5. Connecting the database to the front-end application

1. Link the database to the front-end service:

```
$ odo link mongodb-persistent
```

Example output

```
 ✓  Service mongodb-persistent has been successfully linked from the component nodejs-
nodejs-ex-mhbb

Following environment variables were added to nodejs-nodejs-ex-mhbb component:
- database_name
- password
- uri
- username
- admin_password
```

2. See the environment variables of the application and the database in the pod:

   a. Get the pod name:

```
$ oc get pods
```

Example output

```
NAME                                READY     STATUS    RESTARTS   AGE
mongodb-1-gsznc                     1/1       Running   0          28m
nodejs-nodejs-ex-mhbb-app-4-vkn9l   1/1       Running   0          1m
```

   b. Connect to the pod:

```
$ oc rsh nodejs-nodejs-ex-mhbb-app-4-vkn9l
```

c. Check the environment variables:

```
sh-4.2$ env
```

Example output

```
uri=mongodb://172.30.126.3:27017
password=dHIOpYneSkX3rTLn
database_name=sampledb
username=user43U
admin_password=NCn41tqmx7RIqmfv
```

3. Open the URL in the browser and notice the database configuration in the bottom right:

```
$ odo url list
```

Example output

```
Request information
Page view count: 24

DB Connection Info:
Type: MongoDB
URL: mongodb://172.30.126.3:27017/sampledb
```

3.4.5. Creating a Java application with a database

This example describes how to deploy a Java application by using devfile and connect it to a database service.

Prerequisites

- A running cluster.
- **odo** is installed.
- A Service Binding Operator is installed in your cluster. To learn how to install Operators, contact your cluster administrator or see Installing Operators from OperatorHub .
- A Dev4Devs PostgreSQL Operator Operator is installed in your cluster. To learn how to install Operators, contact your cluster administrator or see Installing Operators from OperatorHub .

3.4.5.1. Creating a project

Create a project to keep your source code, tests, and libraries organized in a separate single unit.

Procedure

1. Log in to an OpenShift Container Platform cluster:

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

2. Create a project:

```
$ odo project create myproject
```

Example output

```
✓  Project 'myproject' is ready for use
✓  New project created and now using project : myproject
```

3.4.5.2. Creating a Java MicroServices JPA application

With **odo**, you can create and manage a sample Java MicroServices JPA application.

Procedure

1. Clone the sample application:

   ```
   $ git clone -b jpa-sample https://github.com/redhat-developer/application-stack-samples.git
   ```

2. Navigate to the application directory:

   ```
   $ cd ./application-stack-samples/jpa
   ```

3. Initialize the project:

   ```
   $ odo create java-openliberty java-application
   ```

4. Push the application to the cluster:

   ```
   $ odo push
   ```

   The application is now deployed to the cluster.

5. View the status of the cluster by streaming the OpenShift Container Platform logs to the terminal:

   ```
   $ odo log
   ```

   Notice the test failures and **UnknownDatabaseHostException** error. This is because your application does not have a database yet:

   ```
   [INFO] [err] java.net.UnknownHostException: ${DATABASE_CLUSTERIP}
   [INFO] [err]    at
   java.base/java.net.AbstractPlainSocketImpl.connect(AbstractPlainSocketImpl.java:220)
   [INFO] [err]    at java.base/java.net.SocksSocketImpl.connect(SocksSocketImpl.java:403)
   [INFO] [err]    at java.base/java.net.Socket.connect(Socket.java:609)
   [INFO] [err]    at org.postgresql.core.PGStream.<init>(PGStream.java:68)
   [INFO] [err]    at
   org.postgresql.core.v3.ConnectionFactoryImpl.openConnectionImpl(ConnectionFactoryImpl.jav
   a:144)
   [INFO] [err]    ... 86 more
   [ERROR] Tests run: 2, Failures: 1, Errors: 1, Skipped: 0, Time elapsed: 0.706 s <<<
   FAILURE! - in org.example.app.it.DatabaseIT
   [ERROR] testGetAllPeople  Time elapsed: 0.33 s  <<< FAILURE!
   ```

```
org.opentest4j.AssertionFailedError: Expected at least 2 people to be registered, but there
were only: [] ==> expected: <true> but was: <false>
        at org.example.app.it.DatabaseIT.testGetAllPeople(DatabaseIT.java:57)

[ERROR] testGetPerson  Time elapsed: 0.047 s  <<< ERROR!
java.lang.NullPointerException
        at org.example.app.it.DatabaseIT.testGetPerson(DatabaseIT.java:41)

[INFO]
[INFO] Results:
[INFO]
[ERROR] Failures:
[ERROR]   DatabaseIT.testGetAllPeople:57 Expected at least 2 people to be registered, but
there were only: [] ==> expected: <true> but was: <false>
[ERROR] Errors:
[ERROR]   DatabaseIT.testGetPerson:41 NullPointer
[INFO]
[ERROR] Tests run: 2, Failures: 1, Errors: 1, Skipped: 0
[INFO]
[ERROR] Integration tests failed: There are test failures.
```

6. Create an ingress URL to access the application:

```
$ odo url create --port 8080
```

7. Push the changes to your cluster:

```
$ odo push
```

8. Display the created URL:

```
$ odo url list
```

Example output

```
Found the following URLs for component mysboproj
NAME               STATE      URL                                          PORT     SECURE     KIND
java-application-8080     Pushed     http://java-application-8080.apps-crc.testing     8080
false      ingress
```

The application is now deployed to the cluster and you can access it by using the URL that is created.

9. Use the URL to navigate to the **CreatePerson.xhtml** data entry page and enter a username and age by using the form. Click **Save**.
Note that you cannot see the data by clicking the **View Persons Record List** link since your application does not have a database connected yet.

3.4.5.3. Creating a database with odo

To create a database, you must have an access to the database Operator. For this example, Dev4Devs PostgreSQL Operator is used.

Procedure

1. View the list of the services in your project:

   ```
   $ odo catalog list services
   ```

   Example output

   ```
   Operators available in the cluster
   NAME                                CRDs
   postgresql-operator.v0.1.1                Backup, Database
   ```

2. Store the YAML of the service in a file:

   ```
   $ odo service create postgresql-operator.v0.1.1/Database --dry-run > db.yaml
   ```

3. Add the following values under the **metadata:** section in the **db.yaml** file:

   ```
     name: sampledatabase
     annotations:
       service.binding/db.name: 'path={.spec.databaseName}'
       service.binding/db.password: 'path={.spec.databasePassword}'
       service.binding/db.user: 'path={.spec.databaseUser}'
   ```

   This configuration ensures that when a database service is started, appropriate annotations are added to it. Annotations help the Service Binding Operator in injecting the values for **databaseName**, **databasePassword**, and **databaseUser** into the application.

4. Change the following values under the **spec:** section of the YAML file:

   ```
     databaseName: "sampledb"
     databasePassword: "samplepwd"
     databaseUser: "sampleuser"
   ```

5. Create a database from the YAML file:

   ```
   $ odo service create --from-file db.yaml
   ```

   A database instance is now present in your project.

3.4.5.4. Connecting a Java application to a database

To connect your Java application to the database, use the **odo link** command.

Procedure

1. Display the list of services:

   ```
   $ odo service list
   ```

   Example output

```
NAME                      AGE
Database/sampledatabase   6m31s
```

2. Connect the database to your application:

   ```
   $ odo link Database/sampledatabase
   ```

3. Push the changes to your cluster:

   ```
   $ odo push
   ```

   After the link has been created and pushed, a secret that contains the database connection data is created.

4. Check the component for values injected from the database service:

   ```
   $ odo exec -- bash -c 'env | grep DATABASE'
   declare -x DATABASE_CLUSTERIP="10.106.182.173"
   declare -x DATABASE_DB_NAME="sampledb"
   declare -x DATABASE_DB_PASSWORD="samplepwd"
   declare -x DATABASE_DB_USER="sampleuser"
   ```

5. Open the URL of your Java application and navigate to the **CreatePerson.xhtml** data entry page. Enter a username and age by using the form. Click **Save**.
   Note that now you can see the data in the database by clicking the **View Persons Record List** link.

   You can also use a CLI tool such as **psql** to manipulate the database.

3.4.6. Using devfiles in odo

3.4.6.1. About the devfile in odo

The devfile is a portable file that describes your development environment. With the devfile, you can define a portable developmental environment without the need for reconfiguration.

With the devfile, you can describe your development environment, such as the source code, IDE tools, application runtimes, and predefined commands. To learn more about the devfile, see the devfile documentation.

With **odo**, you can create components from the devfiles. When creating a component by using a devfile, **odo** transforms the devfile into a workspace consisting of multiple containers that run on OpenShift Container Platform, Kubernetes, or Docker. **odo** automatically uses the default devfile registry but users can add their own registries.

3.4.6.2. Creating a Java application by using a devfile

Prerequisites

- You have installed **odo**.

- You must know your ingress domain cluster name. Contact your cluster administrator if you do not know it. For example, **apps-crc.testing** is the cluster domain name for Red Hat CodeReady Containers.

NOTE

Currently odo does not support creating devfile components with **--git** or **--binary** flags. You can only create S2I components when using these flags.

3.4.6.2.1. Creating a project

Create a project to keep your source code, tests, and libraries organized in a separate single unit.

Procedure

1. Log in to an OpenShift Container Platform cluster:

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

2. Create a project:

```
$ odo project create myproject
```

Example output

```
✓  Project 'myproject' is ready for use
✓  New project created and now using project : myproject
```

3.4.6.2.2. Listing available devfile components

With **odo**, you can display all the components that are available for you on the cluster. Components that are available depend on the configuration of your cluster.

Procedure

1. To list available devfile components on your cluster, run:

```
$ odo catalog list components
```

The output lists the available **odo** components:

```
Odo Devfile Components:
NAME                 DESCRIPTION                            REGISTRY
java-maven           Upstream Maven and OpenJDK 11          DefaultDevfileRegistry
java-openliberty     Open Liberty microservice in Java      DefaultDevfileRegistry
java-quarkus         Upstream Quarkus with Java+GraalVM     DefaultDevfileRegistry
java-springboot      Spring Boot® using Java                DefaultDevfileRegistry
nodejs               Stack with NodeJS 12                   DefaultDevfileRegistry

Odo OpenShift Components:
NAME        PROJECT       TAGS                                                  SUPPORTED
java        openshift     11,8,latest                                           YES
dotnet      openshift     2.1,3.1,latest                                        NO
```

```
golang     openshift     1.13.4-ubi7,1.13.4-ubi8,latest                                                        NO
httpd      openshift     2.4-el7,2.4-el8,latest                                                           NO
nginx      openshift     1.14-el7,1.14-el8,1.16-el7,1.16-el8,latest                                          NO
nodejs     openshift     10-ubi7,10-ubi8,12-ubi7,12-ubi8,latest                                              NO
perl       openshift     5.26-el7,5.26-ubi8,5.30-el7,latest                                               NO
php        openshift     7.2-ubi7,7.2-ubi8,7.3-ubi7,7.3-ubi8,latest                                          NO
python     openshift     2.7-ubi7,2.7-ubi8,3.6-ubi7,3.6-ubi8,3.8-ubi7,3.8-ubi8,latest
NO
ruby       openshift     2.5-ubi7,2.5-ubi8,2.6-ubi7,2.6-ubi8,2.7-ubi7,latest                                  NO
wildfly    openshift
10.0,10.1,11.0,12.0,13.0,14.0,15.0,16.0,17.0,18.0,19.0,20.0,8.1,9.0,latest     NO
```

3.4.6.2.3. Deploying a Java application using a devfile

In this section, you will learn how to deploy a sample Java project that uses Maven and Java 8 JDK using a devfile.

Procedure

1. Create a directory to store the source code of your component:

   ```
   $ mkdir <directory-name>
   ```

2. Create a component configuration of Spring Boot component type named **myspring** and download its sample project:

   ```
   $ odo create java-springboot myspring --starter
   ```

   The previous command produces the following output:

   ```
   Validation
   ✓  Checking devfile compatibility [195728ns]
   ✓  Creating a devfile component from registry: DefaultDevfileRegistry [170275ns]
   ✓  Validating devfile component [281940ns]

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

   The **odo create** command downloads the associated **devfile.yaml** file from the recorded devfile registries.

3. List the contents of the directory to confirm that the devfile and the sample Java application were downloaded:

   ```
   $ ls
   ```

   The previous command produces the following output:

   ```
   README.md    devfile.yaml    pom.xml       src
   ```

4. Create a URL to access the deployed component:

   ```
   $ odo url create --host apps-crc.testing
   ```

The previous command produces the following output:

```
✓  URL myspring-8080.apps-crc.testing created for component: myspring

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

NOTE

You must use your cluster host domain name when creating the URL.

5. Push the component to the cluster:

```
$ odo push
```

The previous command produces the following output:

```
Validation
 ✓  Validating the devfile [81808ns]

Creating Kubernetes resources for component myspring
 ✓  Waiting for component to start [5s]

Applying URL changes
 ✓  URL myspring-8080: http://myspring-8080.apps-crc.testing created

Syncing to component myspring
 ✓  Checking files for pushing [2ms]
 ✓  Syncing files to the component [1s]

Executing devfile commands for component myspring
 ✓  Executing devbuild command "/artifacts/bin/build-container-full.sh" [1m]
 ✓  Executing devrun command "/artifacts/bin/start-server.sh" [2s]

Pushing devfile component myspring
 ✓  Changes successfully pushed to component
```

6. List the URLs of the component to verify that the component was pushed successfully:

```
$ odo url list
```

The previous command produces the following output:

```
Found the following URLs for component myspring
NAME              URL                                       PORT     SECURE
myspring-8080     http://myspring-8080.apps-crc.testing     8080     false
```

7. View your deployed application by using the generated URL:

```
$ curl http://myspring-8080.apps-crc.testing
```

3.4.6.3. Converting an S2I component into a devfile component

With **odo**, you can create both Source-to-Image (S2I) and devfile components. If you have an existing S2I component, you can convert it into a devfile component using the **odo utils** command.

Procedure

Run all the commands from the S2I component directory.

1. Run the **odo utils convert-to-devfile** command, which creates **devfile.yaml** and **env.yaml** based on your component:

   ```
   $ odo utils convert-to-devfile
   ```

2. Push the component to your cluster:

   ```
   $ odo push
   ```

   NOTE

   If the devfile component deployment failed, delete it by running: **odo delete -a**

3. Verify that the devfile component deployed successfully:

   ```
   $ odo list
   ```

4. Delete the S2I component:

   ```
   $ odo delete --s2i
   ```

3.4.7. Working with storage

Persistent storage keeps data available between restarts of **odo**.

3.4.7.1. Adding storage to the application components

Use the **odo storage** command to add persistent data to your application. Examples of data that must persist include database files, dependencies, and build artifacts, such as a **.m2** Maven directory.

Procedure

1. Add the storage to your component:

   ```
   $ odo storage create <storage_name> --path=<path_to_the_directory> --size=<size>
   ```

2. Push the storage to the cluster:

   ```
   $ odo push
   ```

3. Verify that the storage is now attached to your component by listing all storage in the component:

   ```
   $ odo storage list
   ```

Example output

```
The component 'nodejs' has the following storage attached:
NAME         SIZE     PATH      STATE
mystorage     1Gi      /data     Pushed
```

4. Delete the storage from your component:

```
$ odo storage delete <storage_name>
```

5. List all storage to verify that the storage state is **Locally Deleted**:

```
$ odo storage list
```

Example output

```
The component 'nodejs' has the following storage attached:
NAME         SIZE     PATH      STATE
mystorage     1Gi      /data     Locally Deleted
```

6. Push the changes to the cluster:

```
$ odo push
```

3.4.7.2. Adding storage to a specific container

If your devfile has multiple containers, you can use the **--container** flag to specify the container you want to attach storage to.

Procedure

1. Create a devfile with multiple containers:

```
components:
  - name: runtime (1)
    container:
      image: registry.access.redhat.com/ubi8/nodejs-12:1-36
      memoryLimit: 1024Mi
      endpoints:
        - name: "3000-tcp"
          targetPort: 3000
      mountSources: true
  - name: funtime (2)
    container:
      image: registry.access.redhat.com/ubi8/nodejs-12:1-36
      memoryLimit: 1024Mi
```

(1) The **runtime** container.

(2) The **funtime** container.

2. To create storage for the **runtime** container:

```
$ odo storage create store --path /data --size 1Gi --container runtime
```

Output of the command:

```
✓  Added storage store to nodejs-testing-xnfg
  Please use `odo push` command to make the storage accessible to the component
```

3. Verify that the storage is now attached to your component by listing all storage in the component:

```
$ odo storage list
```

Example output

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

4. Push the changes to the cluster:

```
$ odo push
```

3.4.7.3. Switching between ephemeral and persistent storage

You can switch between ephemeral and persistent storage in your project by using the **odo preference** command. **odo preference** modifies the global preference in your cluster.

When persistent storage is enabled, the cluster stores the information between the restarts.

When ephemeral storage is enabled, the cluster does not store the information between the restarts.

Ephemeral storage is enabled by default.

Procedure

1. See the preference currently set in your project:

```
$ odo preference view
```

Example output

```
PARAMETER             CURRENT_VALUE
UpdateNotification
NamePrefix
Timeout
BuildTimeout
PushTimeout
Experimental
PushTarget
Ephemeral             true
```

2. To unset the ephemeral storage and set the persistent storage:

```
$ odo preference set Ephemeral false
```

3. To set the ephemeral storage again:

   ```
   $ odo preference set Ephemeral true
   ```

   The **odo preference** command changes the global settings of all your currently deployed components as well as ones you will deploy in future.

4. Run **odo push** to make **odo** create a specified storage for your component:

   ```
   $ odo push
   ```

Additional resources

- Understanding ephemeral storage.
- Understanding persistent storage

3.4.8. Deleting applications

You can delete applications and all components associated with the application in your project.

3.4.8.1. Deleting an application

Use the **odo app delete** command to delete your application.

Procedure

1. List the applications in the current project:

   ```
   $ odo app list
   ```

   Example output

   ```
     The project '<project_name>' has the following applications:
     NAME
     app
   ```

2. List the components associated with the applications. These components will be deleted with the application:

   ```
   $ odo component list
   ```

   Example output

   ```
     APP     NAME                      TYPE       SOURCE       STATE
     app     nodejs-nodejs-ex-elyf     nodejs     file://./    Pushed
   ```

3. Delete the application:

   ```
   $ odo app delete <application_name>
   ```

Example output

```
? Are you sure you want to delete the application: <application_name> from project:
<project_name>
```

4. Confirm the deletion with **Y**. You can suppress the confirmation prompt using the **-f** flag.

3.4.9. Debugging applications in odo

With **odo**, you can attach a debugger to remotely debug your application. This feature is only supported for NodeJS and Java components.

Components created with **odo** run in the debug mode by default. A debugger agent runs on the component, on a specific port. To start debugging your application, you must start port forwarding and attach the local debugger bundled in your Integrated development environment (IDE).

3.4.9.1. Debugging an application

You can debug your application in **odo** with the **odo debug** command.

Procedure

1. Download the sample application that contains the necessary **debugrun** step within its devfile:

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

Example output

```
Validation
 ✓  Checking devfile existence [11498ns]
 ✓  Checking devfile compatibility [15714ns]
 ✓  Creating a devfile component from registry: DefaultDevfileRegistry [17565ns]
 ✓  Validating devfile component [113876ns]

Starter Project
 ✓  Downloading starter project nodejs-starter from https://github.com/odo-devfiles/nodejs-ex.git [428ms]

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

2. Push the application with the **--debug** flag, which is required for all debugging deployments:

```
$ odo push --debug
```

Example output

```
Validation
 ✓  Validating the devfile [29916ns]

Creating Kubernetes resources for component nodejs
 ✓  Waiting for component to start [38ms]
```

```
Applying URL changes
 ✓  URLs are synced with the cluster, no changes are required.

Syncing to component nodejs
 ✓  Checking file changes for pushing [1ms]
 ✓  Syncing files to the component [778ms]

Executing devfile commands for component nodejs
 ✓  Executing install command "npm install" [2s]
 ✓  Executing debug command "npm run debug" [1s]

Pushing devfile component nodejs
 ✓  Changes successfully pushed to component
```

NOTE

You can specify a custom debug command by using the **--debug-command="custom-step"** flag.

3. Port forward to the local port to access the debugging interface:

```
$ odo debug port-forward
```

Example output

```
Started port forwarding at ports - 5858:5858
```

NOTE

You can specify a port by using the **--local-port** flag.

4. Check that the debug session is running in a separate terminal window:

```
$ odo debug info
```

Example output

```
Debug is running for the component on the local port : 5858
```

5. Attach the debugger that is bundled in your IDE of choice. Instructions vary depending on your IDE, for example: VSCode debugging interface.

3.4.9.2. Configuring debugging parameters

You can specify a remote port with **odo config** command and a local port with the **odo debug** command.

Procedure

- To set a remote port on which the debugging agent should run, run:

```
$ odo config set DebugPort 9292
```

NOTE

You must redeploy your component for this value to be reflected on the component.

- To set a local port to port forward, run:

```
$ odo debug port-forward --local-port 9292
```

NOTE

The local port value does not persist. You must provide it every time you need to change the port.

3.4.10. Sample applications

odo offers partial compatibility with any language or runtime listed within the OpenShift Container Platform catalog of component types. For example:

```
NAME      PROJECT     TAGS
dotnet    openshift   3.1,latest
httpd     openshift   2.4,latest
java      openshift   8,latest
nginx     openshift   1.10,1.12,1.8,latest
nodejs    openshift   0.10,4,6,8,latest
perl      openshift   5.16,5.20,5.24,latest
php       openshift   5.5,5.6,7.0,7.1,latest
python    openshift   2.7,3.3,3.4,3.5,3.6,latest
ruby      openshift   2.0,2.2,2.3,2.4,latest
wildfly   openshift   10.0,10.1,8.1,9.0,latest
```

NOTE

For **odo** Java and Node.js are the officially supported component types. Run **odo catalog list components** to verify the officially supported component types.

To access the component over the web, create a URL using **odo url create**.

3.4.10.1. Git repository example applications

Use the following commands to build and run sample applications from a Git repository for a particular runtime.

3.4.10.1.1. httpd

This example helps build and serve static content using httpd on CentOS 7. For more information about using this builder image, including OpenShift Container Platform considerations, see the Apache HTTP Server container image repository.

```
$ odo create httpd --git https://github.com/openshift/httpd-ex.git
```

3.4.10.1.2. java

This example helps build and run fat JAR Java applications on CentOS 7. For more information about using this builder image, including OpenShift Container Platform considerations, see the Java S2I Builder image.

```
$ odo create java --git https://github.com/spring-projects/spring-petclinic.git
```

3.4.10.1.3. nodejs

Build and run Node.js applications on CentOS 7. For more information about using this builder image, including OpenShift Container Platform considerations, see the Node.js 8 container image.

```
$ odo create nodejs --git https://github.com/openshift/nodejs-ex.git
```

3.4.10.1.4. perl

This example helps build and run Perl applications on CentOS 7. For more information about using this builder image, including OpenShift Container Platform considerations, see the Perl 5.26 container image.

```
$ odo create perl --git https://github.com/openshift/dancer-ex.git
```

3.4.10.1.5. php

This example helps build and run PHP applications on CentOS 7. For more information about using this builder image, including OpenShift Container Platform considerations, see the PHP 7.1 Docker image.

```
$ odo create php --git https://github.com/openshift/cakephp-ex.git
```

3.4.10.1.6. python

This example helps build and run Python applications on CentOS 7. For more information about using this builder image, including OpenShift Container Platform considerations, see the Python 3.6 container image.

```
$ odo create python --git https://github.com/openshift/django-ex.git
```

3.4.10.1.7. ruby

This example helps build and run Ruby applications on CentOS 7. For more information about using this builder image, including OpenShift Container Platform considerations, see Ruby 2.5 container image.

```
$ odo create ruby --git https://github.com/openshift/ruby-ex.git
```

3.4.10.2. Binary example applications

Use the following commands to build and run sample applications from a binary file for a particular runtime.

3.4.10.2.1. java

Java can be used to deploy a binary artifact as follows:

```
$ git clone https://github.com/spring-projects/spring-petclinic.git
$ cd spring-petclinic
$ mvn package
$ odo create java test3 --binary target/*.jar
$ odo push
```

3.5. USING ODO IN A RESTRICTED ENVIRONMENT

3.5.1. About odo in a restricted environment

To run **odo** in a disconnected cluster or a cluster provisioned in a restricted environment, you must ensure that a cluster administrator has created a cluster with a mirrored registry.

To start working in a disconnected cluster, you must first push the **odo** init image to the registry of the cluster and then overwrite the **odo** init image path using the **ODO_BOOTSTRAPPER_IMAGE** environment variable.

After you push the **odo** init image, you must mirror a supported builder image from the registry, overwrite a mirror registry and then create your application. A builder image is necessary to configure a runtime environment for your application and also contains the build tool needed to build your application, for example npm for Node.js or Maven for Java. A mirror registry contains all the necessary dependencies for your application.

Additional resources

- Mirroring images for a disconnected installation
- Accessing the registry

3.5.2. Pushing the odo init image to the restricted cluster registry

Depending on the configuration of your cluster and your operating system you can either push the **odo** init image to a mirror registry or directly to an internal registry.

3.5.2.1. Prerequisites

- Install **oc** on the client operating system.
- Install **odo** on the client operating system.
- Access to a restricted cluster with a configured internal registry or a mirror registry.

3.5.2.2. Pushing the odo init image to a mirror registry

Depending on your operating system, you can push the **odo** init image to a cluster with a mirror registry as follows:

3.5.2.2.1. Pushing the init image to a mirror registry on Linux

Procedure

1. Use **base64** to encode the root certification authority (CA) content of your mirror registry:

   ```
   $ echo <content_of_additional_ca> | base64 --decode > disconnect-ca.crt
   ```

2. Copy the encoded root CA certificate to the appropriate location:

   ```
   $ sudo cp ./disconnect-ca.crt /etc/pki/ca-trust/source/anchors/<mirror-registry>.crt
   ```

3. Trust a CA in your client platform and log in to the OpenShift Container Platform mirror registry:

   ```
   $ sudo update-ca-trust enable && sudo systemctl daemon-reload && sudo systemctl restart /
   docker && docker login <mirror-registry>:5000 -u <username> -p <password>
   ```

4. Mirror the **odo** init image:

   ```
   $ oc image mirror registry.access.redhat.com/openshiftdo/odo-init-image-rhel7:<tag>
   <mirror-registry>:5000/openshiftdo/odo-init-image-rhel7:<tag>
   ```

5. Override the default **odo** init image path by setting the **ODO_BOOTSTRAPPER_IMAGE** environment variable:

   ```
   $ export ODO_BOOTSTRAPPER_IMAGE=<mirror-registry>:5000/openshiftdo/odo-init-
   image-rhel7:<tag>
   ```

3.5.2.2.2. Pushing the init image to a mirror registry on MacOS

Procedure

1. Use **base64** to encode the root certification authority (CA) content of your mirror registry:

   ```
   $ echo <content_of_additional_ca> | base64 --decode > disconnect-ca.crt
   ```

2. Copy the encoded root CA certificate to the appropriate location:

   a. Restart Docker using the Docker UI.

   b. Run the following command:

      ```
      $ docker login <mirror-registry>:5000 -u <username> -p <password>
      ```

3. Mirror the **odo** init image:

   ```
   $ oc image mirror registry.access.redhat.com/openshiftdo/odo-init-image-rhel7:<tag>
   <mirror-registry>:5000/openshiftdo/odo-init-image-rhel7:<tag>
   ```

4. Override the default **odo** init image path by setting the **ODO_BOOTSTRAPPER_IMAGE** environment variable:

```
$ export ODO_BOOTSTRAPPER_IMAGE=<mirror-registry>:5000/openshiftdo/odo-init-image-rhel7:<tag>
```

3.5.2.2.3. Pushing the init image to a mirror registry on Windows

Procedure

1. Use **base64** to encode the root certification authority (CA) content of your mirror registry:

   ```
   PS C:\> echo <content_of_additional_ca> | base64 --decode > disconnect-ca.crt
   ```

2. As an administrator, copy the encoded root CA certificate to the appropriate location by executing the following command:

   ```
   PS C:\WINDOWS\system32> certutil -addstore -f "ROOT" disconnect-ca.crt
   ```

3. Trust a CA in your client platform and log in to the OpenShift Container Platform mirror registry:

   a. Restart Docker using the Docker UI.

   b. Run the following command:

      ```
      PS C:\WINDOWS\system32> docker login <mirror-registry>:5000 -u <username> -p <password>
      ```

4. Mirror the **odo** init image:

   ```
   PS C:\> oc image mirror registry.access.redhat.com/openshiftdo/odo-init-image-rhel7:<tag> <mirror-registry>:5000/openshiftdo/odo-init-image-rhel7:<tag>
   ```

5. Override the default **odo** init image path by setting the **ODO_BOOTSTRAPPER_IMAGE** environment variable:

   ```
   PS C:\> $env:ODO_BOOTSTRAPPER_IMAGE="<mirror-registry>:5000/openshiftdo/odo-init-image-rhel7:<tag>"
   ```

3.5.2.3. Pushing the odo init image to an internal registry directly

If your cluster allows images to be pushed to the internal registry directly, push the **odo** init image to the registry as follows:

3.5.2.3.1. Pushing the init image directly on Linux

Procedure

1. Enable the default route:

   ```
   $ oc patch configs.imageregistry.operator.openshift.io cluster -p '{"spec":{"defaultRoute":true}}' --type='merge' -n openshift-image-registry
   ```

2. Get a wildcard route CA:

```
$ oc get secret router-certs-default -n openshift-ingress -o yaml
```

Example output

```
apiVersion: v1
data:
  tls.crt: **************************
  tls.key: ##################
kind: Secret
metadata:
  [...]
type: kubernetes.io/tls
```

3. Use **base64** to encode the root certification authority (CA) content of your mirror registry:

```
$ echo <tls.crt> | base64 --decode > ca.crt
```

4. Trust a CA in your client platform:

```
$ sudo cp ca.crt  /etc/pki/ca-trust/source/anchors/externalroute.crt && sudo update-ca-trust
enable && sudo systemctl daemon-reload && sudo systemctl restart docker
```

5. Log in to the internal registry:

```
$ oc get route -n openshift-image-registry
NAME      HOST/PORT    PATH   SERVICES    PORT  TERMINATION   WILDCARD
default-route   <registry_path>        image-registry   <all>   reencrypt     None

$ docker login <registry_path> -u kubeadmin -p $(oc whoami -t)
```

6. Push the **odo** init image:

```
$ docker pull registry.access.redhat.com/openshiftdo/odo-init-image-rhel7:<tag>

$ docker tag registry.access.redhat.com/openshiftdo/odo-init-image-rhel7:<tag>
<registry_path>/openshiftdo/odo-init-image-rhel7:<tag>

$ docker push <registry_path>/openshiftdo/odo-init-image-rhel7:<tag>
```

7. Override the default **odo** init image path by setting the **ODO_BOOTSTRAPPER_IMAGE** environment variable:

```
$ export ODO_BOOTSTRAPPER_IMAGE=<registry_path>/openshiftdo/odo-init-image-
rhel7:1.0.1
```

3.5.2.3.2. Pushing the init image directly on MacOS

Procedure

1. Enable the default route:

```
$ oc patch configs.imageregistry.operator.openshift.io cluster -p '{"spec":
{"defaultRoute":true}}' --type='merge' -n openshift-image-registry
```

2. Get a wildcard route CA:

```
$ oc get secret router-certs-default -n openshift-ingress -o yaml
```

Example output

```
apiVersion: v1
data:
  tls.crt: **************************
  tls.key: ##################
kind: Secret
metadata:
  [...]
type: kubernetes.io/tls
```

3. Use **base64** to encode the root certification authority (CA) content of your mirror registry:

```
$ echo <tls.crt> | base64 --decode > ca.crt
```

4. Trust a CA in your client platform:

```
$ sudo security add-trusted-cert -d -r trustRoot -k /Library/Keychains/System.keychain ca.crt
```

5. Log in to the internal registry:

```
$ oc get route -n openshift-image-registry
NAME      HOST/PORT    PATH   SERVICES    PORT  TERMINATION   WILDCARD
default-route   <registry_path>         image-registry   <all>   reencrypt     None

$ docker login <registry_path> -u kubeadmin -p $(oc whoami -t)
```

6. Push the **odo** init image:

```
$ docker pull registry.access.redhat.com/openshiftdo/odo-init-image-rhel7:<tag>

$ docker tag registry.access.redhat.com/openshiftdo/odo-init-image-rhel7:<tag>
<registry_path>/openshiftdo/odo-init-image-rhel7:<tag>

$ docker push <registry_path>/openshiftdo/odo-init-image-rhel7:<tag>
```

7. Override the default **odo** init image path by setting the **ODO_BOOTSTRAPPER_IMAGE** environment variable:

```
$ export ODO_BOOTSTRAPPER_IMAGE=<registry_path>/openshiftdo/odo-init-image-
rhel7:1.0.1
```

3.5.2.3.3. Pushing the init image directly on Windows

Procedure

1. Enable the default route:

```
PS C:\> oc patch configs.imageregistry.operator.openshift.io cluster -p '{"spec":
{"defaultRoute":true}}' --type='merge' -n openshift-image-registry
```

2. Get a wildcard route CA:

```
PS C:\> oc get secret router-certs-default -n openshift-ingress -o yaml
```

Example output

```
apiVersion: v1
data:
  tls.crt: **************************
  tls.key: ##################
kind: Secret
metadata:
  [...]
type: kubernetes.io/tls
```

3. Use **base64** to encode the root certification authority (CA) content of your mirror registry:

```
PS C:\> echo <tls.crt> | base64 --decode > ca.crt
```

4. As an administrator, trust a CA in your client platform by executing the following command:

```
PS C:\WINDOWS\system32> certutil -addstore -f "ROOT" ca.crt
```

5. Log in to the internal registry:

```
PS C:\> oc get route -n openshift-image-registry
NAME        HOST/PORT        PATH   SERVICES        PORT   TERMINATION   WILDCARD
default-route   <registry_path>          image-registry   <all>   reencrypt     None

PS C:\> docker login <registry_path> -u kubeadmin -p $(oc whoami -t)
```

6. Push the **odo** init image:

```
PS C:\> docker pull registry.access.redhat.com/openshiftdo/odo-init-image-rhel7:<tag>

PS C:\> docker tag registry.access.redhat.com/openshiftdo/odo-init-image-rhel7:<tag>
<registry_path>/openshiftdo/odo-init-image-rhel7:<tag>

PS C:\> docker push <registry_path>/openshiftdo/odo-init-image-rhel7:<tag>
```

7. Override the default **odo** init image path by setting the **ODO_BOOTSTRAPPER_IMAGE** environment variable:

```
PS C:\> $env:ODO_BOOTSTRAPPER_IMAGE="<registry_path>/openshiftdo/odo-init-
image-rhel7:<tag>"
```

3.5.3. Creating and deploying a component to the disconnected cluster

After you push the **init** image to a cluster with a mirrored registry, you must mirror a supported builder image for your application with the **oc** tool, overwrite the mirror registry using the environment variable, and then create your component.

3.5.3.1. Prerequisites

- Install **oc** on the client operating system.
- Install **odo** on the client operating system.
- Access to an restricted cluster with a configured internal registry or a mirror registry.
- Push the **odo** init image to your cluster registry .

3.5.3.2. Mirroring a supported builder image

To use npm packages for Node.js dependencies and Maven packages for Java dependencies and configure a runtime environment for your application, you must mirror a respective builder image from the mirror registry.

Procedure

1. Verify that the required images tag is not imported:

```
$ oc describe is nodejs -n openshift
```

Example output

```
Name:                 nodejs
Namespace:            openshift
[...]

10
  tagged from <mirror-registry>:<port>/rhoar-nodejs/nodejs-10
    prefer registry pullthrough when referencing this tag

  Build and run Node.js 10 applications on RHEL 7. For more information about using this
builder image, including OpenShift considerations, see https://github.com/nodeshift/centos7-
s2i-nodejs.
  Tags: builder, nodejs, hidden
  Example Repo: https://github.com/sclorg/nodejs-ex.git

  ! error: Import failed (NotFound): dockerimage.image.openshift.io "<mirror-registry>:
<port>/rhoar-nodejs/nodejs-10:latest" not found
      About an hour ago

10-SCL (latest)
  tagged from <mirror-registry>:<port>/rhscl/nodejs-10-rhel7
    prefer registry pullthrough when referencing this tag

  Build and run Node.js 10 applications on RHEL 7. For more information about using this
builder image, including OpenShift considerations, see https://github.com/nodeshift/centos7-
s2i-nodejs.
```

```
  Tags: builder, nodejs
  Example Repo: https://github.com/sclorg/nodejs-ex.git

  ! error: Import failed (NotFound): dockerimage.image.openshift.io "<mirror-registry>:
<port>/rhscl/nodejs-10-rhel7:latest" not found
      About an hour ago

[...]
```

2. Mirror the supported image tag to the private registry:

```
$ oc image mirror registry.access.redhat.com/rhscl/nodejs-10-rhel7:<tag>
<private_registry>/rhscl/nodejs-10-rhel7:<tag>
```

3. Import the image:

```
$ oc tag <mirror-registry>:<port>/rhscl/nodejs-10-rhel7:<tag> nodejs-10-rhel7:latest --
scheduled
```

You must periodically re-import the image. The **--scheduled** flag enables automatic re-import of the image.

4. Verify that the images with the given tag have been imported:

```
$ oc describe is nodejs -n openshift
```

Example output

```
Name:                   nodejs
[...]
10-SCL (latest)
  tagged from <mirror-registry>:<port>/rhscl/nodejs-10-rhel7
    prefer registry pullthrough when referencing this tag

  Build and run Node.js 10 applications on RHEL 7. For more information about using this
builder image, including OpenShift considerations, see https://github.com/nodeshift/centos7-
s2i-nodejs.
  Tags: builder, nodejs
  Example Repo: https://github.com/sclorg/nodejs-ex.git

  * <mirror-registry>:<port>/rhscl/nodejs-10-
rhel7@sha256:d669ecbc11ac88293de50219dae8619832c6a0f5b04883b480e073590fab7c54

      3 minutes ago

[...]
```

3.5.3.3. Overwriting the mirror registry

To download npm packages for Node.js dependencies and Maven packages for Java dependencies from a private mirror registry, you must create and configure a mirror npm or Maven registry on the cluster. You can then overwrite the mirror registry on an existing component or when you create a new component.

Procedure

- To overwrite the mirror registry on an existing component:

```
$ odo config set --env NPM_MIRROR=<npm_mirror_registry>
```

- To overwrite the mirror registry when creating a component:

```
$ odo component create nodejs --env NPM_MIRROR=<npm_mirror_registry>
```

3.5.3.4. Creating a Node.js application with odo

To create a Node.js component, download the Node.js application and push the source code to your cluster with **odo**.

Procedure

1. Change the current directory to the directory with your application:

```
$ cd <directory_name>
```

2. Add a component of the type Node.js to your application:

```
$ odo create nodejs
```

NOTE

By default, the latest image is used. You can also explicitly specify an image version by using **odo create openshift/nodejs:8**.

3. Push the initial source code to the component:

```
$ odo push
```

Your component is now deployed to OpenShift Container Platform.

4. Create a URL and add an entry in the local configuration file as follows:

```
$ odo url create --port 8080
```

5. Push the changes. This creates a URL on the cluster.

```
$ odo push
```

6. List the URLs to check the desired URL for the component.

```
$ odo url list
```

7. View your deployed application using the generated URL.

```
$ curl <url>
```

3.5.4. Creating and deploying devfile components to the disconnected cluster

3.5.4.1. Creating a NodeJS application by using a devfile in a disconnected cluster

WARNING

This procedure is using external dependencies such as **nodejs-ex.git** application that are not maintained by Red Hat. These dependencies are not maintained with the documentation and their functionality cannot be guaranteed.

Prerequisites

- You have created and logged into a disconnected cluster.
- You have added **raw.githubusercontent.com**, **registry.access.redhat.com**, and **registry.npmjs.org** URLs in your proxy.

Procedure

1. Define your NodeJS application in a devfile:

   Example of a devfile

```
schemaVersion: 2.0.0
metadata:
name: nodejs
starterProjects:
- name: nodejs-starter
  git:
    remotes:
      origin: "https://github.com/odo-devfiles/nodejs-ex.git"
components:
- name: runtime
  container:
    image: registry.access.redhat.com/ubi8/nodejs-12:1-36
    memoryLimit: 1024Mi
    endpoints:
      - name: "3000/tcp"
        targetPort: 3000
    env:
      - name: HTTP_PROXY
        value: http://<proxy-host>:<proxy-port>
      - name: HTTPS_PROXY
        value: http://<proxy-host>:<proxy-port>
    mountSources: true
commands:
- id: devbuild
  exec:
    component: runtime
    commandLine: npm install
```

```
      workingDir: ${PROJECTS_ROOT}
      group:
        kind: build
        isDefault: true
  - id: build
    exec:
      component: runtime
      commandLine: npm install
      workingDir: ${PROJECTS_ROOT}
      group:
        kind: build
  - id: devrun
    exec:
      component: runtime
      commandLine: npm start
      workingDir: ${PROJECTS_ROOT}
      group:
        kind: run
        isDefault: true
  - id: run
    exec:
      component: runtime
      commandLine: npm start
      workingDir: ${PROJECTS_ROOT}
      group:
        kind: run
```

2. Create the application and push the changes to the cluster:

```
$ odo create nodejs --devfile <path-to-your-devfile> --starter $$ odo push
```

Example output

```
[...]
Pushing devfile component nodejs
 ✓  Changes successfully pushed to component
```

3. Create a URL to access your application and push it to the cluster:

```
$ odo url create url1 --port 3000 --host example.com --ingress && odo push
```

Example output

```
Validation
 ✓  Validating the devfile [145374ns]

Creating Kubernetes resources for component nodejs
 ✓  Waiting for component to start [14s]

Applying URL changes
 ✓  URL url1: http://url1.abcdr.com/ created

Syncing to component nodejs
 ✓  Checking file changes for pushing [2ms]
 ✓  Syncing files to the component [3s]

Executing devfile commands for component nodejs
 ✓  Executing devbuild command "npm install" [4s]
 ✓  Executing devrun command "npm start" [3s]

Pushing devfile component nodejs
 ✓  Changes successfully pushed to component
```

4. Add the storage to your application

   ```
   $ odo storage create <storage-name> --path /data --size 5Gi
   ```

   Example output

   ```
   ✓  Added storage abcde to nodejs

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

5. Push the changes to the cluster:

   ```
   $ odo push
   ```

3.5.4.2. Creating a Java application by using a devfile in a disconnected cluster

> **WARNING**
>
> This procedure is using external dependencies such as **quay.io/eclipse/che-java11-maven:nightly** or an example application **springboot-ex** that are not maintained by Red Hat. These dependencies are not maintained with the documentation and their functionality cannot be guaranteed.

Prerequisites

- You have created and logged into a disconnected cluster.
- You have added **quay.io**, **registry.access.redhat.com**, **apache.org**, **quayio-production-s3.s3.amazonaws.com** URLs in your proxy configuration.

Procedure

1. Define your Java application in a devfile:

   Example of a devfile

   ```
   schemaVersion: 2.0.0
   metadata:
     name: java-maven
   ```

```
  version: 1.1.0
starterProjects:
  - name: springbootproject
    git:
      remotes:
        origin: "https://github.com/odo-devfiles/springboot-ex.git"
components:
  - name: tools
    container:
      image: quay.io/eclipse/che-java11-maven:nightly
      memoryLimit: 512Mi
      mountSources: true
      endpoints:
        - name: 'http-8080'
          targetPort: 8080
      volumeMounts:
        - name: m2
          path: /home/user/.m2
  - name: m2
    volume: {}
commands:
  - id: mvn-package
    exec:
      component: tools
      commandLine: "mvn -Dmaven.repo.local=/home/user/.m2/repository -Dhttp.proxyHost=
<proxy-host> -Dhttp.proxyPort=<proxy-port> -Dhttps.proxyHost=<proxy-host> -
Dhttps.proxyPort=<proxy-port> package"
      group:
        kind: build
        isDefault: true
  - id: run
    exec:
      component: tools
      commandLine: "java -jar target/*.jar"
      group:
        kind: run
        isDefault: true
  - id: debug
    exec:
      component: tools
      commandLine: "java -Xdebug -
Xrunjdwp:server=y,transport=dt_socket,address=${DEBUG_PORT},suspend=n -jar
target/*.jar"
      group:
        kind: debug
        isDefault: true
```

2. Create a Java application:

```
$ odo create java-maven --devfile <path-to-your-devfile> --starter
```

Example output

```
Validation
 ✓  Checking devfile existence [87716ns]
 ✓  Creating a devfile component from registry: DefaultDevfileRegistry [107247ns]
 ✓  Validating devfile component [396971ns]

 Starter Project
 ✓  Downloading starter project springbootproject from https://github.com/odo-devfiles/springboot-ex.git [2s]

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

3. Push the changes to the cluster:

```
$ odo push
```

Example output

```
I0224 14:43:18.802512   34741 util.go:727] HTTPGetRequest: https://raw.githubusercontent.com/openshift/odo/master/build/VERSION
I0224 14:43:18.833631   34741 context.go:115] absolute devfile path: '/Users/pkumari/go/src/github.com/openshift/odo/testim/devfile.yaml'
[...]
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-utils/3.2.1/plexus-utils-3.2.1.jar (262 kB at 813 kB/s)
[INFO] Replacing main artifact with repackaged archive
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  19.638 s
[INFO] Finished at: 2021-02-24T08:59:30Z
[INFO] ------------------------------------------------------------------------
 ✓  Executing mvn-package command "mvn -Dmaven.repo.local=/home/user/.m2/repository -Dhttp.proxyHost=<proxy-host> -Dhttp.proxyPort=<proxy-port> -Dhttps.proxyHost=<proxy-host> -Dhttps.proxyPort=<proxy-port> package" [23s]
 •  Executing run command "java -jar target/*.jar"  ...
I0224 14:29:30.557676   34426 exec.go:27] Executing command [/opt/odo/bin/supervisord ctl start devrun] for pod: java-maven-5b8f99fcdb-9dnk6 in container: tools
devrun: started
 ✓  Executing run command "java -jar target/*.jar" [3s]

Pushing devfile component java-maven
 ✓  Changes successfully pushed to component
```

4. Display the logs to verify that the application has started:

```
$ odo log
```

Example output

```
time="2021-02-24T08:58:58Z" level=info msg="create process:devrun"
time="2021-02-24T08:58:58Z" level=info msg="create process:debugrun"
time="2021-02-24T08:59:32Z" level=debug msg="no auth required"
time="2021-02-24T08:59:32Z" level=debug msg="succeed to find process:devrun"
time="2021-02-24T08:59:32Z" level=info msg="try to start program" program=devrun
time="2021-02-24T08:59:32Z" level=info msg="success to start program" program=devrun
```

```
ODO_COMMAND_RUN is java -jar target/*.jar
Executing command  java -jar target/*.jar
[...]
```

5. Create storage for your application:

```
$ odo storage create storage-name --path /data --size 5Gi
```

Example output

```
✓  Added storage storage-name to java-maven

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

6. Push the changes to the cluster:

```
$ odo push
```

Output

```
✓  Waiting for component to start [310ms]

Validation
 ✓  Validating the devfile [100798ns]

Creating Kubernetes resources for component java-maven
 ✓  Waiting for component to start [30s]
 ✓  Waiting for component to start [303ms]

Applying URL changes
 ✓  URLs are synced with the cluster, no changes are required.

Syncing to component java-maven
 ✓  Checking file changes for pushing [5ms]
 ✓  Syncing files to the component [4s]

Executing devfile commands for component java-maven
 ✓  Waiting for component to start [526ms]
 ✓  Executing mvn-package command "mvn -Dmaven.repo.local=/home/user/.m2/repository
-Dhttp.proxyHost=<proxy-host> -Dhttp.proxyPort=<proxy-port> -Dhttps.proxyHost=<proxy-
host> -Dhttps.proxyPort=<proxy-port> package" [10s]
 ✓  Executing run command "java -jar target/*.jar" [3s]

Pushing devfile component java-maven
 ✓  Changes successfully pushed to component
```

3.6. CREATING INSTANCES OF SERVICES MANAGED BY OPERATORS

Operators are a method of packaging, deploying, and managing Kubernetes services. With **odo**, you can create instances of services from the custom resource definitions (CRDs) provided by the Operators. You can then use these instances in your projects and link them to your components.

To create services from an Operator, you must ensure that the Operator has valid values defined in its

metadata to start the requested service. **odo** uses the **metadata.annotations.alm-examples** YAML file of an Operator to start the service. If this YAML has placeholder values or sample values, a service cannot start. You can modify the YAML file and start the service with the modified values. To learn how to modify YAML files and start services from it, see Creating services from YAML files .

3.6.1. Prerequisites

- Install the **oc** CLI and log in to the cluster.
  - Note that the configuration of the cluster determines the services available to you. To access the Operator services, a cluster administrator must install the respective Operator on the cluster first. To learn more, see Adding Operators to the cluster.
- Install the **odo** CLI.

3.6.2. Creating a project

Create a project to keep your source code, tests, and libraries organized in a separate single unit.

Procedure

1. Log in to an OpenShift Container Platform cluster:

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

2. Create a project:

```
$ odo project create myproject
```

Example output

```
 ✓  Project 'myproject' is ready for use
 ✓  New project created and now using project : myproject
```

3.6.3. Listing available services from the Operators installed on the cluster

With **odo**, you can display the list of the Operators installed on your cluster, and the services they provide.

- To list the Operators installed in current project, run:

```
$ odo catalog list services
```

The command lists Operators and the CRDs. The output of the command shows the Operators installed on your cluster. For example:

```
Operators available in the cluster
NAME                          CRDs
etcdoperator.v0.9.4           EtcdCluster, EtcdBackup, EtcdRestore
mongodb-enterprise.v1.4.5     MongoDB, MongoDBUser, MongoDBOpsManager
```

etcdoperator.v0.9.4 is the Operator, **EtcdCluster**, **EtcdBackup** and **EtcdRestore** are the CRDs provided by the Operator.

3.6.4. Creating a service from an Operator

If an Operator has valid values defined in its **metadata** to start the requested service, you can use the service with **odo service create**.

1. Print the YAML of the service as a file on your local drive:

```
$ oc get csv/etcdoperator.v0.9.4 -o yaml
```

2. Verify that the values of the service are valid:

```
apiVersion: etcd.database.coreos.com/v1beta2
kind: EtcdCluster
metadata:
  name: example
spec:
  size: 3
  version: 3.2.13
```

3. Start an **EtcdCluster** service from the **etcdoperator.v0.9.4** Operator:

```
$ odo service create etcdoperator.v0.9.4 EtcdCluster
```

4. Verify that a service has started:

```
$ oc get EtcdCluster
```

3.6.5. Creating services from YAML files

If the YAML definition of the service or custom resource (CR) has invalid or placeholder data, you can use the **--dry-run** flag to get the YAML definition, specify the correct values, and start the service using the corrected YAML definition. Printing and modifying the YAML used to start a service **odo** provides the feature to print the YAML definition of the service or CR provided by the Operator before starting a service.

1. To display the YAML of the service, run:

```
$ odo service create <operator-name> --dry-run
```

For example, to print YAML definition of **EtcdCluster** provided by the **etcdoperator.v0.9.4** Operator, run:

```
$ odo service create etcdoperator.v0.9.4 --dry-run
```

The YAML is saved as the **etcd.yaml** file.

2. Modify the **etcd.yaml** file:

```
apiVersion: etcd.database.coreos.com/v1beta2
kind: EtcdCluster
metadata:
  name: my-etcd-cluster (1)
```

```
spec:
  size: 1 (2)
  version: 3.2.13
```

(1) Change the name from **example** to **my-etcd-cluster**

(2) Reduce the size from **3** to **1**

3. Start a service from the YAML file:

```
$ odo service create --from-file etcd.yaml
```

4. Verify that the **EtcdCluster** service has started with one pod instead of the pre-configured three pods:

```
$ oc get pods | grep my-etcd-cluster
```

3.7. MANAGING ENVIRONMENT VARIABLES

odo stores component-specific configurations and environment variables in the **config** file. You can use the **odo config** command to set, unset, and list environment variables for components without the need to modify the **config** file.

3.7.1. Setting and unsetting environment variables

Procedure

- To set an environment variable in a component:

```
$ odo config set --env <variable>=<value>
```

- To unset an environment variable in a component:

```
$ odo config unset --env <variable>
```

- To list all environment variables in a component:

```
$ odo config view
```

3.8. CONFIGURING THE ODO CLI

3.8.1. Using command completion

NOTE

Currently command completion is only supported for bash, zsh, and fish shells.

odo provides a smart completion of command parameters based on user input. For this to work, odo needs to integrate with the executing shell.

Procedure

- To install command completion automatically:
  1. Run:

     ```
     $ odo --complete
     ```

  2. Press **y** when prompted to install the completion hook.
- To install the completion hook manually, add **complete -o nospace -C <full_path_to_your_odo_binary> odo** to your shell configuration file. After any modification to your shell configuration file, restart your shell.
- To disable completion:
  1. Run:

     ```
     $ odo --uncomplete
     ```

  2. Press **y** when prompted to uninstall the completion hook.

NOTE

Re-enable command completion if you either rename the odo executable or move it to a different directory.

3.8.2. 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.

3.9. ODO CLI REFERENCE

3.9.1. Basic odo CLI commands

3.9.1.1. app

Perform application operations related to your OpenShift Container Platform project.

Example using app

–

```
# Delete the application
odo app delete myapp

# Describe 'webapp' application,
odo app describe webapp

# List all applications in the current project
odo app list

# List all applications in the specified project
odo app list --project myproject
```

3.9.1.2. catalog

Perform catalog-related operations.

Example using catalog

```
# Get the supported components
odo catalog list components

# Get the supported services from service catalog
odo catalog list services

# Search for a component
odo catalog search component python

# Search for a service
odo catalog search service mysql

# Describe a service
odo catalog describe service mysql-persistent
```

3.9.1.3. component

Manage components of an application.

Example using component

```
# Create a new component
odo component create

# Create a local configuration and create all objects on the cluster
odo component create --now
```

3.9.1.4. config

Modify **odo** specific settings within the **config** file.

Example using config

```
# For viewing the current local configuration
odo config view
```

```
# Set a configuration value in the local configuration
odo config set Type java
odo config set Name test
odo config set MinMemory 50M
odo config set MaxMemory 500M
odo config set Memory 250M
odo config set Ignore false
odo config set MinCPU 0.5
odo config set MaxCPU 2
odo config set CPU 1

# Set an environment variable in the local configuration
odo config set --env KAFKA_HOST=kafka --env KAFKA_PORT=6639

# Create a local configuration and apply the changes to the cluster immediately
odo config set --now

# Unset a configuration value in the local config
odo config unset Type
odo config unset Name
odo config unset MinMemory
odo config unset MaxMemory
odo config unset Memory
odo config unset Ignore
odo config unset MinCPU
odo config unset MaxCPU
odo config unset CPU

# Unset an env variable in the local config
odo config unset --env KAFKA_HOST --env KAFKA_PORT
```

Application	Application is the name of application the component needs to be part of
CPU	The minimum and maximum CPU a component can consume
Ignore	Consider the .odoignore file for push and watch

Table 3.2. Available Local Parameters:

Application	The name of application that the component needs to be part of
CPU	The minimum and maximum CPU a component can consume
Ignore	Whether to consider the **.odoignore** file for push and watch
MaxCPU	The maximum CPU a component can consume

MaxMemory	The maximum memory a component can consume
Memory	The minimum and maximum memory a component can consume
MinCPU	The minimum CPU a component can consume
MinMemory	The minimum memory a component is provided
Name	The name of the component
Ports	Ports to be opened in the component
Project	The name of the project that the component is part of
Ref	Git ref to use for creating component from git source
SourceLocation	The path indicates the location of binary file or git source
SourceType	Type of component source - git/binary/local
Storage	Storage of the component
Type	The type of component
Url	The URL to access the component

3.9.1.5. create

Create a configuration describing a component to be deployed on OpenShift Container Platform. If a component name is not provided, it is autogenerated.

By default, builder images are used from the current namespace. To explicitly supply a namespace, use: **odo create namespace/name:version**. If a version is not specified, the version defaults to **latest**.

Use **odo catalog list** to see a full list of component types that can be deployed.

Example using create

```
# Create new Node.js component with the source in current directory.
odo create nodejs

# Create new Node.js component and push it to the cluster immediately.
odo create nodejs --now

# A specific image version may also be specified
odo create nodejs:latest
```

```
  # Create new Node.js component named 'frontend' with the source in './frontend' directory
  odo create nodejs frontend --context ./frontend

  # Create a new Node.js component of version 6 from the 'openshift' namespace
  odo create openshift/nodejs:6 --context /nodejs-ex

  # Create new Wildfly component with binary named sample.war in './downloads' directory
  odo create wildfly wildfly --binary ./downloads/sample.war

  # Create new Node.js component with source from remote git repository
  odo create nodejs --git https://github.com/openshift/nodejs-ex.git

  # Create new Node.js git component while specifying a branch, tag or commit ref
  odo create nodejs --git https://github.com/openshift/nodejs-ex.git --ref master

  # Create new Node.js git component while specifying a tag
  odo create nodejs --git https://github.com/openshift/nodejs-ex.git --ref v1.0.1

  # Create new Node.js component with the source in current directory and ports 8080-tcp,8100-tcp
and 9100-udp exposed
  odo create nodejs --port 8080,8100/tcp,9100/udp

  # Create new Node.js component with the source in current directory and env variables key=value
and key1=value1 exposed
  odo create nodejs --env key=value,key1=value1

  # Create a new Python component with the source in a Git repository
  odo create python --git https://github.com/openshift/django-ex.git

  # Passing memory limits
  odo create nodejs --memory 150Mi
  odo create nodejs --min-memory 150Mi --max-memory 300 Mi

  # Passing cpu limits
  odo create nodejs --cpu 2
  odo create nodejs --min-cpu 200m --max-cpu 2
```

3.9.1.6. debug

Debug a component.

Example using debug

```
# Displaying information about the state of debugging
odo debug info

# Starting the port forwarding for a component to debug the application
odo debug port-forward

# Setting a local port to port forward
odo debug port-forward --local-port 9292
```

3.9.1.7. delete

Delete an existing component.

Example using delete

```
# Delete component named 'frontend'.
odo delete frontend
odo delete frontend --all-apps
```

3.9.1.8. describe

Describe the given component.

Example using describe

```
# Describe nodejs component
odo describe nodejs
```

3.9.1.9. link

Link a component to a service or component.

Example using link

```
  # Link the current component to the 'my-postgresql' service
  odo link my-postgresql

  # Link component 'nodejs' to the 'my-postgresql' service
  odo link my-postgresql --component nodejs

  # Link current component to the 'backend' component (backend must have a single exposed port)
  odo link backend

  # Link component 'nodejs' to the 'backend' component
  odo link backend --component nodejs

  # Link current component to port 8080 of the 'backend' component (backend must have port 8080
exposed)
  odo link backend --port 8080
```

Link adds the appropriate secret to the environment of the source component. The source component can then consume the entries of the secret as environment variables. If the source component is not provided, the current active component is assumed.

3.9.1.10. list

List all the components in the current application and the states of the components.

The states of the components

Pushed

A component is pushed to the cluster.

Not Pushed

A component is not pushed to the cluster.

Unknown

odo is disconnected from the cluster.

Example using list

```
# List all components in the application
odo list

# List all the components in a given path
odo list --path <path_to_your_component>
```

3.9.1.11. log

Retrieve the log for the given component.

Example using log

```
# Get the logs for the nodejs component
odo log nodejs
```

3.9.1.12. login

Log in to the cluster.

Example using login

```
# Log in interactively
odo login

# Log in to the given server with the given certificate authority file
odo login localhost:8443 --certificate-authority=/path/to/cert.crt

# Log in to the given server with the given credentials (basic auth)
odo login localhost:8443 --username=myuser --password=mypass

# Log in to the given server with the given credentials (token)
odo login localhost:8443 --token=xxxxxxxxxxxxxxxxxxxxxxxxx
```

3.9.1.13. logout

Log out of the current OpenShift Container Platform session.

Example using logout

```
# Log out
odo logout
```

3.9.1.14. preference

Modify **odo** specific configuration settings within the global preference file.

Example using preference

```
# For viewing the current preferences
odo preference view

# Set a preference value in the global preference
odo preference set UpdateNotification false
odo preference set NamePrefix "app"
odo preference set Timeout 20

# Enable experimental mode
odo preference set experimental true

# Unset a preference value in the global preference
odo preference unset  UpdateNotification
odo preference unset  NamePrefix
odo preference unset  Timeout

# Disable experimental mode
odo preference set experimental false

# Use persistent volumes in the cluster
odo preference set ephemeral false
```

NOTE

By default, the path to the global preference file is **~/.odo/preferece.yaml** and it is stored in the environment variable **GLOBALODOCONFIG**. You can set up a custom path by setting the value of the environment variable to a new preference path, for example **GLOBALODOCONFIG="new_path/preference.yaml"**

Table 3.3. Available Parameters:

NamePrefix	The default prefix is the current directory name. Use this value to set a default name prefix.
Timeout	The timeout (in seconds) for OpenShift Container Platform server connection checks.
UpdateNotification	Controls whether an update notification is shown.

3.9.1.15. project

Perform project operations.

Example using project

```
# Set the active project
odo project set

# Create a new project
odo project create myproject

# List all the projects
```

```
odo project list

# Delete a project
odo project delete myproject

# Get the active project
odo project get
```

3.9.1.16. push

Push source code to a component.

Example using push

```
# Push source code to the current component
odo push

# Push data to the current component from the original source.
odo push

# Push source code in ~/mycode to component called my-component
odo push my-component --context ~/mycode

# Push source code and display event notifications in JSON format.
odo push -o json
```

3.9.1.17. registry

Create and modify custom registries.

Example using registry

```
# Add a registry to the registry list
odo registry add <registry name> <registry URL>

# List a registry in the registry list
odo registry list

# Delete a registry from the registry list
odo registry delete <registry name>

# Update a registry in the registry list
odo registry update <registry name> <registry URL>

# List a component with a corresponding registry
odo catalog list components

# Create a component that is hosted by a specific registry
odo create <component type> --registry <registry name>
```

3.9.1.18. service

Perform service catalog operations.

Example using service

```
  # Create new postgresql service from service catalog using dev plan and name my-postgresql-db.
  odo service create dh-postgresql-apb my-postgresql-db --plan dev -p postgresql_user=luke -p
postgresql_password=secret

  # Delete the service named 'mysql-persistent'
  odo service delete mysql-persistent

  # List all services in the application
  odo service list
```

3.9.1.19. storage

Perform storage operations.

Example using storage

```
  # Create storage of size 1Gb to a component
  odo storage create mystorage --path=/opt/app-root/src/storage/ --size=1Gi

  # Delete storage mystorage from the currently active component
  odo storage delete mystorage

  # List all storage attached or mounted to the current component and
  # all unattached or unmounted storage in the current application
  odo storage list

  # Set the `-o json` flag to get a JSON formatted output
  odo storage list -o json
```

3.9.1.20. unlink

Unlink component or a service.

For this command to be successful, the service or component must have been linked prior to the invocation using **odo link**.

Example using unlink

```
  # Unlink the 'my-postgresql' service from the current component
  odo unlink my-postgresql

  # Unlink the 'my-postgresql' service  from the 'nodejs' component
  odo unlink my-postgresql --component nodejs

  # Unlink the 'backend' component from the current component (backend must have a single
exposed port)
  odo unlink backend

  # Unlink the 'backend' service  from the 'nodejs' component
  odo unlink backend --component nodejs
  # Unlink the backend's 8080 port from the current component
  odo unlink backend --port 8080
```

3.9.1.21. update

Update the source code path of a component

Example using update

```
  # Change the source code path of a currently active component to local (use the current directory as
a source)
  odo update --local

  # Change the source code path of the frontend component to local with source in ./frontend directory
  odo update frontend --local ./frontend

  # Change the source code path of a currently active component to git
  odo update --git https://github.com/openshift/nodejs-ex.git

  # Change the source code path of the component named node-ex to git
  odo update node-ex --git https://github.com/openshift/nodejs-ex.git

  # Change the source code path of the component named wildfly to a binary named sample.war in
./downloads directory
  odo update wildfly --binary ./downloads/sample.war
```

3.9.1.22. url

Expose a component to the outside world.

Example using url

```
  # Create a URL for the current component with a specific port
  odo url create --port 8080

  # Create a URL with a specific name and port
  odo url create example --port 8080

  # Create a URL with a specific name by automatic detection of port (only for components which
expose only one service port)
  odo url create example

  # Create a URL with a specific name and port for component frontend
  odo url create example --port 8080 --component frontend

  # Delete a URL to a component
  odo url delete myurl

  # List the available URLs
  odo url list

  # Create a URL in the configuration and apply the changes to the cluster
  odo url create --now
```

```
# Create an HTTPS URL
odo url create --secure
```

The URLs that are generated using this command can be used to access the deployed components from outside the cluster.

3.9.1.23. utils

Utilities for terminal commands and modifying odo configurations.

Example using utils

```
# Bash terminal PS1 support
source <(odo utils terminal bash)

# Zsh terminal PS1 support
source <(odo utils terminal zsh)
```

3.9.1.24. version

Print the client version information.

Example using version

```
# Print the client version of odo
odo version
```

3.9.1.25. watch

odo starts watching for changes and updates the component upon a change automatically.

Example using watch

```
# Watch for changes in directory for current component
odo watch

# Watch for changes in directory for component called frontend
odo watch frontend
```

3.10. ODO ARCHITECTURE

This section describes **odo** architecture and how **odo** manages resources on a cluster.

3.10.1. Developer setup

With odo you can create and deploy application on OpenShift Container Platform clusters from a terminal. Code editor plug-ins use odo which allows users to interact with OpenShift Container Platform clusters from their IDE terminals. Examples of plug-ins that use odo: VS Code OpenShift Connector, OpenShift Connector for Intellij, Codewind for Eclipse Che.

odo works on Windows, macOS, and Linux operating systems and from any terminal. odo provides autocompletion for bash and zsh command line shells.

odo supports Node.js and Java components.

3.10.2. OpenShift source-to-image

OpenShift Source-to-Image (S2I) is an open-source project which helps in building artifacts from source code and injecting these into container images. S2I produces ready-to-run images by building source code without the need of a Dockerfile. odo uses S2I builder image for executing developer source code inside a container.

3.10.3. OpenShift cluster objects

3.10.3.1. Init Containers

Init containers are specialized containers that run before the application container starts and configure the necessary environment for the application containers to run. Init containers can have files that application images do not have, for example setup scripts. Init containers always run to completion and the application container does not start if any of the init containers fails.

The pod created by odo executes two Init Containers:

- The **copy-supervisord** Init container.
- The **copy-files-to-volume** Init container.

3.10.3.1.1. copy-supervisord

The **copy-supervisord** Init container copies necessary files onto an **emptyDir** volume. The main application container utilizes these files from the **emptyDir** volume.

Files that are copied onto theemptyDir volume:

- Binaries:
  - **go-init** is a minimal init system. It runs as the first process (PID 1) inside the application container. go-init starts the **SupervisorD** daemon which runs the developer code. go-init is required to handle orphaned processes.
  - **SupervisorD** is a process control system. It watches over configured processes and ensures that they are running. It also restarts services when necessary. For odo, **SupervisorD** executes and monitors the developer code.
- Configuration files:
  - **supervisor.conf** is the configuration file necessary for the SupervisorD daemon to start.
- Scripts:
  - **assemble-and-restart** is an OpenShift S2I concept to build and deploy user-source code. The assemble-and-restart script first assembles the user source code inside the application container and then restarts SupervisorD for user changes to take effect.
  - **Run** is an OpenShift S2I concept of executing the assembled source code. The **run** script executes the assembled code created by the **assemble-and-restart** script.

  - **s2i-setup** is a script that creates files and directories which are necessary for the **assemble-and-restart** and run scripts to execute successfully. The script is executed whenever the application container starts.

- Directories:

  - **language-scripts**: OpenShift S2I allows custom **assemble** and **run** scripts. A few language specific custom scripts are present in the **language-scripts** directory. The custom scripts provide additional configuration to make odo debug work.

The **emptyDir** volume is mounted at the **/opt/odo** mount point for both the Init container and the application container.

3.10.3.1.2. **copy-files-to-volume**

The **copy-files-to-volume** Init container copies files that are in **/opt/app-root** in the S2I builder image onto the persistent volume. The volume is then mounted at the same location (**/opt/app-root**) in an application container.

Without the persistent volume on **/opt/app-root** the data in this directory is lost when the persistent volume claim is mounted at the same location.

The PVC is mounted at the **/mnt** mount point inside the Init container.

3.10.3.2. Application container

Application container is the main container inside of which the user-source code executes.

Application container is mounted with two volumes:

- **emptyDir** volume mounted at **/opt/odo**

- The persistent volume mounted at **/opt/app-root**

go-init is executed as the first process inside the application container. The **go-init** process then starts the **SupervisorD** daemon.

SupervisorD executes and monitors the user assembled source code. If the user process crashes, **SupervisorD** restarts it.

3.10.3.3. Persistent volumes and persistent volume claims

A persistent volume claim (PVC) is a volume type in Kubernetes which provisions a persistent volume. The life of a persistent volume is independent of a pod lifecycle. The data on the persistent volume persists across pod restarts.

The **copy-files-to-volume** Init container copies necessary files onto the persistent volume. The main application container utilizes these files at runtime for execution.

The naming convention of the persistent volume is <component_name>-s2idata.

Container	PVC mounted at
copy-files-to-volume	**/mnt**

Container	PVC mounted at
Application container	**/opt/app-root**

3.10.3.4. emptyDir volume

An **emptyDir** volume is created when a pod is assigned to a node, and exists as long as that pod is running on the node. If the container is restarted or moved, the content of the **emptyDir** is removed, Init container restores the data back to the **emptyDir**. **emptyDir** is initially empty.

The **copy-supervisord** Init container copies necessary files onto the **emptyDir** volume. These files are then utilized by the main application container at runtime for execution.

Container	**emptyDir volume** mounted at
copy-supervisord	**/opt/odo**
Application container	**/opt/odo**

3.10.3.5. Service

A service is a Kubernetes concept of abstracting the way of communicating with a set of pods.

odo creates a service for every application pod to make it accessible for communication.

3.10.4. odo push workflow

This section describes **odo push** workflow. odo push deploys user code on an OpenShift Container Platform cluster with all the necessary OpenShift Container Platform resources.

1. Creating resources
   If not already created, **odo** push creates the following OpenShift Container Platform resources:

   - **DeploymentConfig** object:
     - Two init containers are executed: **copy-supervisord** and **copy-files-to-volume**. The init containers copy files onto the **emptyDir** and the **PersistentVolume** type of volumes respectively.
     - The application container starts. The first process in the application container is the **go-init** process with PID=1.
     - **go-init** process starts the SupervisorD daemon.

     NOTE

     The user application code has not been copied into the application container yet, so the **SupervisorD** daemon does not execute the **run** script.

   - **Service** object

- **Secret** objects
- **PersistentVolumeClaim** object

2. Indexing files
   - A file indexer indexes the files in the source code directory. The indexer traverses through the source code directories recursively and finds files which have been created, deleted, or renamed.
   - A file indexer maintains the indexed information in an odo index file inside the **.odo** directory.
   - If the odo index file is not present, it means that the file indexer is being executed for the first time, and creates a new odo index JSON file. The odo index JSON file contains a file map - the relative file paths of the traversed files and the absolute paths of the changed and deleted files.
3. Pushing code
   Local code is copied into the application container, usually under /**tmp**/**src**.
4. Executing **assemble-and-restart**
   On a successful copy of the source code, the **assemble-and-restart** script is executed inside the running application container.

CHAPTER 4. KNATIVE CLI (KN) FOR USE WITH OPENSHIFT SERVERLESS

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

4.1. KEY FEATURES

The **kn** CLI is designed to make serverless computing tasks simple and concise. Key features of the **kn** 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 **kn** 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.

4.2. INSTALLING THE KNATIVE CLI

See Installing the Knative CLI.

CHAPTER 5. PIPELINES CLI (TKN)

5.1. 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**.

5.1.1. 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
```

5.1.2. 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-1.6-for-rhel-8-x86_64-rpms"
     ```

   - Linux on IBM Z and LinuxONE (s390x)

     ```
     # subscription-manager repos --enable="pipelines-1.6-for-rhel-8-s390x-rpms"
     ```

   - Linux on IBM Power Systems (ppc64le)

     ```
     # subscription-manager repos --enable="pipelines-1.6-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
```

5.1.3. 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
   ```

5.1.4. 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
   ```

5.2. CONFIGURING THE OPENSHIFT PIPELINES TKN CLI

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

5.2.1. 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.

5.3. OPENSHIFT PIPELINES TKN REFERENCE

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

5.3.1. Basic syntax

tkn [command or options] [arguments...]

5.3.2. Global options

--help, -h

5.3.3. Utility commands

5.3.3.1. tkn

Parent command for **tkn** CLI.

Example: Display all options

```
$ tkn
```

5.3.3.2. 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
```

5.3.3.3. version

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

Example: Check the tkn version

```
$ tkn version
```

5.3.4. Pipelines management commands

5.3.4.1. pipeline

Manage pipelines.

Example: Display help

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

5.3.4.2. pipeline delete

Delete a pipeline.

Example: Delete the mypipeline pipeline from a namespace

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

5.3.4.3. pipeline describe

Describe a pipeline.

Example: Describe the mypipeline pipeline

```
$ tkn pipeline describe mypipeline
```

5.3.4.4. pipeline list

Display a list of pipelines.

Example: Display a list of pipelines

```
$ tkn pipeline list
```

5.3.4.5. pipeline logs

Display the logs for a specific pipeline.

Example: Stream the live logs for the mypipeline pipeline

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

5.3.4.6. pipeline start

Start a pipeline.

Example: Start the mypipeline pipeline

```
$ tkn pipeline start mypipeline
```

5.3.5. Pipeline run commands

5.3.5.1. pipelinerun

Manage pipeline runs.

Example: Display help

```
$ tkn pipelinerun -h
```

5.3.5.2. pipelinerun cancel

Cancel a pipeline run.

Example: Cancel the mypipelinerun pipeline run from a namespace

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

5.3.5.3. pipelinerun delete

Delete a pipeline run.

Example: Delete pipeline runs from a namespace

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

Example: Delete all pipeline runs from a namespace, except the five most recently executed pipeline runs

```
$ tkn pipelinerun delete -n myspace --keep 5 (1)
```

(1) Replace **5** with the number of most recently executed pipeline runs you want to retain.

Example: Delete all pipelines

```
$ tkn pipelinerun delete --all
```

NOTE

Starting with Red Hat OpenShift Pipelines 1.6, the **tkn pipelinerun delete --all** command does not delete any resources that are in the running state.

5.3.5.4. pipelinerun describe

Describe a pipeline run.

Example: Describe the mypipelinerun pipeline run in a namespace

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

5.3.5.5. pipelinerun list

List pipeline runs.

Example: Display a list of pipeline runs in a namespace

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

5.3.5.6. pipelinerun logs

Display the logs of a pipeline run.

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

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

5.3.6. Task management commands

5.3.6.1. task

Manage tasks.

Example: Display help

```
$ tkn task -h
```

5.3.6.2. task delete

Delete a task.

Example: Delete mytask1 and mytask2 tasks from a namespace

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

5.3.6.3. task describe

Describe a task.

Example: Describe the mytask task in a namespace

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

5.3.6.4. task list

List tasks.

Example: List all the tasks in a namespace

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

5.3.6.5. task logs

Display task logs.

Example: Display logs for the mytaskrun task run of the mytask task

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

5.3.6.6. task start

Start a task.

Example: Start the mytask task in a namespace

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

5.3.7. Task run commands

5.3.7.1. taskrun

Manage task runs.

Example: Display help

```
$ tkn taskrun -h
```

5.3.7.2. taskrun cancel

Cancel a task run.

Example: Cancel the mytaskrun task run from a namespace

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

5.3.7.3. taskrun delete

Delete a TaskRun.

Example: Delete the mytaskrun1 and mytaskrun2 task runs from a namespace

```
$ tkn taskrun delete mytaskrun1 mytaskrun2 -n myspace
```

Example: Delete all but the five most recently executed task runs from a namespace

```
$ tkn taskrun delete -n myspace --keep 5 1
```

1 Replace **5** with the number of most recently executed task runs you want to retain.

5.3.7.4. taskrun describe

Describe a task run.

Example: Describe the mytaskrun task run in a namespace

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

5.3.7.5. taskrun list

List task runs.

Example: List all the task runs in a namespace

```
$ tkn taskrun list -n myspace
```

5.3.7.6. taskrun logs

Display task run logs.

Example: Display live logs for the mytaskrun task run in a namespace

```
$ tkn taskrun logs -f mytaskrun -n myspace
```

5.3.8. Condition management commands

5.3.8.1. condition

Manage Conditions.

Example: Display help

```
$ tkn condition --help
```

5.3.8.2. condition delete

Delete a Condition.

Example: Delete the mycondition1 Condition from a namespace

```
$ tkn condition delete mycondition1 -n myspace
```

5.3.8.3. condition describe

Describe a Condition.

Example: Describe the mycondition1 Condition in a namespace

```
$ tkn condition describe mycondition1 -n myspace
```

5.3.8.4. condition list

List Conditions.

Example: List Conditions in a namespace

```
$ tkn condition list -n myspace
```

5.3.9. Pipeline Resource management commands

5.3.9.1. resource

Manage Pipeline Resources.

Example: Display help

```
$ tkn resource -h
```

5.3.9.2. 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.

5.3.9.3. resource delete

Delete a Pipeline Resource.

Example: Delete the `myresource` Pipeline Resource from a namespace

```
$ tkn resource delete myresource -n myspace
```

5.3.9.4. resource describe

Describe a Pipeline Resource.

Example: Describe the `myresource` Pipeline Resource

```
$ tkn resource describe myresource -n myspace
```

5.3.9.5. resource list

List Pipeline Resources.

Example: List all Pipeline Resources in a namespace

```
$ tkn resource list -n myspace
```

5.3.10. ClusterTask management commands

5.3.10.1. clustertask

Manage ClusterTasks.

Example: Display help

```
$ tkn clustertask --help
```

5.3.10.2. clustertask delete

Delete a ClusterTask resource in a cluster.

Example: Delete `mytask1` and `mytask2` ClusterTasks

```
$ tkn clustertask delete mytask1 mytask2
```

5.3.10.3. clustertask describe

Describe a ClusterTask.

Example: Describe the mytask ClusterTask

```
$ tkn clustertask describe mytask1
```

5.3.10.4. clustertask list

List ClusterTasks.

Example: List ClusterTasks

```
$ tkn clustertask list
```

5.3.10.5. clustertask start

Start ClusterTasks.

Example: Start the mytask ClusterTask

```
$ tkn clustertask start mytask
```

5.3.11. Trigger management commands

5.3.11.1. eventlistener

Manage EventListeners.

Example: Display help

```
$ tkn eventlistener -h
```

5.3.11.2. eventlistener delete

Delete an EventListener.

Example: Delete mylistener1 and mylistener2 EventListeners in a namespace

```
$ tkn eventlistener delete mylistener1 mylistener2 -n myspace
```

5.3.11.3. eventlistener describe

Describe an EventListener.

Example: Describe the mylistener EventListener in a namespace

```
$ tkn eventlistener describe mylistener -n myspace
```

5.3.11.4. eventlistener list

List EventListeners.

Example: List all the EventListeners in a namespace

```
$ tkn eventlistener list -n myspace
```

5.3.11.5. eventlistener logs

Display logs of an EventListener.

Example: Display the logs of the mylistener EventListener in a namespace

```
$ tkn eventlistener logs mylistener -n myspace
```

5.3.11.6. triggerbinding

Manage TriggerBindings.

Example: Display TriggerBindings help

```
$ tkn triggerbinding -h
```

5.3.11.7. triggerbinding delete

Delete a TriggerBinding.

Example: Delete mybinding1 and mybinding2 TriggerBindings in a namespace

```
$ tkn triggerbinding delete mybinding1 mybinding2 -n myspace
```

5.3.11.8. triggerbinding describe

Describe a TriggerBinding.

Example: Describe the mybinding TriggerBinding in a namespace

```
$ tkn triggerbinding describe mybinding -n myspace
```

5.3.11.9. triggerbinding list

List TriggerBindings.

Example: List all the TriggerBindings in a namespace

```
$ tkn triggerbinding list -n myspace
```

5.3.11.10. triggertemplate

Manage TriggerTemplates.

Example: Display TriggerTemplate help

```
$ tkn triggertemplate -h
```

5.3.11.11. triggertemplate delete

Delete a TriggerTemplate.

Example: Delete mytemplate1 and mytemplate2 TriggerTemplates in a namespace

```
$ tkn triggertemplate delete mytemplate1 mytemplate2 -n `myspace`
```

5.3.11.12. triggertemplate describe

Describe a TriggerTemplate.

Example: Describe the mytemplate TriggerTemplate in a namespace

```
$ tkn triggertemplate describe mytemplate -n `myspace`
```

5.3.11.13. triggertemplate list

List TriggerTemplates.

Example: List all the TriggerTemplates in a namespace

```
$ tkn triggertemplate list -n myspace
```

5.3.11.14. clustertriggerbinding

Manage ClusterTriggerBindings.

Example: Display ClusterTriggerBindings help

```
$ tkn clustertriggerbinding -h
```

5.3.11.15. clustertriggerbinding delete

Delete a ClusterTriggerBinding.

Example: Delete myclusterbinding1 and myclusterbinding2 ClusterTriggerBindings

```
$ tkn clustertriggerbinding delete myclusterbinding1 myclusterbinding2
```

5.3.11.16. clustertriggerbinding describe

Describe a ClusterTriggerBinding.

Example: Describe the **myclusterbinding** ClusterTriggerBinding

```
$ tkn clustertriggerbinding describe myclusterbinding
```

5.3.11.17. clustertriggerbinding list

List ClusterTriggerBindings.

Example: List all ClusterTriggerBindings

```
$ tkn clustertriggerbinding list
```

5.3.12. Hub interaction commands

Interact with Tekton Hub for resources such as tasks and pipelines.

5.3.12.1. 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**.

5.3.12.2. 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
```

5.3.12.3. 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
```

5.3.12.4. 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
```

5.3.12.5. 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
```

5.3.12.6. 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
```

5.3.12.7. 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
```

5.3.12.8. 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 6. OPM CLI

6.1. INSTALLING THE OPM CLI

6.1.1. About the opm CLI

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 Operator bundles that are similar to software repositories. The result is a container image which can be stored in a container registry and then installed on a cluster.

A catalog 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 reference the image in a catalog source, defined by 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 format for more information about the bundle format.
- To create a bundle image using the Operator SDK, see Working with bundle images.

6.1.2. Installing the opm CLI

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:"v1.18.0",
GitCommit:"32eb2591437e394bdc58a58371c5cd1e6fe5e63f", BuildDate:"2021-09-
21T10:41:00Z", GoOs:"linux", GoArch:"amd64"}
```

6.1.3. Additional resources

- See Managing custom catalogs for **opm** procedures including creating, updating, and pruning catalogs.

6.2. OPM CLI REFERENCE

The **opm** command-line interface (CLI) is a tool for creating and maintaining Operator catalogs.

opm CLI syntax

```
$ opm <command> [<subcommand>] [<argument>] [<flags>]
```

Table 6.1. Global flags

Flag	Description
--skip-tls	Skip TLS certificate verification for container image registries while pulling bundles or indexes.

IMPORTANT

The SQLite-based catalog format, including the related CLI commands, is a deprecated feature. Deprecated functionality is still included in OpenShift Container Platform and continues to be supported; however, it will be removed in a future release of this product and is not recommended for new deployments.

For the most recent list of major functionality that has been deprecated or removed within OpenShift Container Platform, refer to the *Deprecated and removed features* section of the OpenShift Container Platform release notes.

6.2.1. index

Generate Operator index container images from pre-existing Operator bundles.

Command syntax

```
$ opm index <subcommand> [<flags>]
```

Table 6.2. **index** subcommands

Subcommand	Description
add	Add Operator bundles to an index.
export	Export an Operator from an index in the **appregistry** format.
prune	Prune an index of all but specified packages.
prune-stranded	Prune an index of stranded bundles, which are bundles that are not associated with a particular image.
rm	Delete an entire Operator from an index.

6.2.1.1. add

Add Operator bundles to an index.

Command syntax

```
$ opm index add [<flags>]
```

Table 6.3. **index add** flags

Flag	Description
-i, **--binary-image**	Container image for on-image **opm** command
-u, **--build-tool** (string)	Tool to build container images: **podman** (the default value) or **docker**. Overrides part of the **--container-tool** flag.

Flag	Description
-b, **--bundles** (strings)	Comma-separated list of bundles to add.
-c, **--container-tool** (string)	Tool to interact with container images, such as for saving and building: **docker** or **podman**.
-f, **--from-index** (string)	Previous index to add to.
--generate	If enabled, only creates the Dockerfile and saves it to local disk.
--mode (string)	Graph update mode that defines how channel graphs are updated: **replaces** (the default value), **semver**, or **semver-skippatch**.
-d, **--out-dockerfile** (string)	Optional: If generating the Dockerfile, specify a file name.
--permissive	Allow registry load errors.
-p, **--pull-tool** (string)	Tool to pull container images: **none** (the default value), **docker**, or **podman**. Overrides part of the **--container-tool** flag.
-t, **--tag** (string)	Custom tag for container image being built.

6.2.1.2. export

Export an Operator from an index in the **appregistry** format.

Command syntax

```
$ opm index export [<flags>]
```

Table 6.4. **index export** flags

Flag	Description
-i, **--index** (string)	Index to get the packages from.
-f, **--download-folder** (string)	Directory where the downloaded Operator bundles are stored. The default directory is **downloaded**.
-c, **--container-tool** (string)	Tool to interact with container images, such as for saving and building: **docker** or **podman**.
-h, **--help**	Help for the **export** command.
-p, **--package** (string)	Comma-separated list of packages to export.

6.2.1.3. prune

Prune an index of all but specified packages.

Command syntax

```
$ opm index prune [<flags>]
```

Table 6.5. **index prune** flags

Flag	Description
-i, **--binary-image**	Container image for on-image **opm** command
-c, **--container-tool** (string)	Tool to interact with container images, such as for saving and building: **docker** or **podman**.
-f, **--from-index** (string)	Index to prune.
--generate	If enabled, only creates the Dockerfile and saves it to local disk.
-d, **--out-dockerfile** (string)	Optional: If generating the Dockerfile, specify a file name.
-p, **--packages** (strings)	Comma-separated list of packages to keep.
--permissive	Allow registry load errors.
-t, **--tag** (string)	Custom tag for container image being built.

6.2.1.4. prune-stranded

Prune an index of stranded bundles, which are bundles that are not associated with a particular image.

Command syntax

```
$ opm index prune-stranded [<flags>]
```

Table 6.6. **index prune-stranded** flags

Flag	Description
-i, **--binary-image**	Container image for on-image **opm** command
-c, **--container-tool** (string)	Tool to interact with container images, such as for saving and building: **docker** or **podman**.

Flag	Description
-f, **--from-index** (string)	Index to prune.
--generate	If enabled, only creates the Dockerfile and saves it to local disk.
-d, **--out-dockerfile** (string)	Optional: If generating the Dockerfile, specify a file name.
--permissive	Allow registry load errors.
-t, **--tag** (string)	Custom tag for container image being built.

6.2.1.5. rm

Delete an entire Operator from an index.

Command syntax

```
$ opm index rm [<flags>]
```

Table 6.7. **index rm flags**

Flag	Description
-i, **--binary-image**	Container image for on-image **opm** command
-u, **--build-tool** (string)	Tool to build container images: **podman** (the default value) or **docker**. Overrides part of the **--container-tool** flag.
-c, **--container-tool** (string)	Tool to interact with container images, such as for saving and building: **docker** or **podman**.
-f, **--from-index** (string)	Previous index to delete from.
--generate	If enabled, only creates the Dockerfile and saves it to local disk.
-o, **--operators** (strings)	Comma-separated list of Operators to delete.
-d, **--out-dockerfile** (string)	Optional: If generating the Dockerfile, specify a file name.
--permissive	Allow registry load errors.

Flag	Description
-p, **--pull-tool** (string)	Tool to pull container images: **none** (the default value), **docker**, or **podman**. Overrides part of the **--container-tool** flag.
-t, **--tag** (string)	Custom tag for container image being built.

6.2.2. init

Generate an **olm.package** declarative config blob.

Command syntax

```
$ opm init <package_name> [<flags>]
```

Table 6.8. **init** flags

Flag	Description
-c, **--default-channel** (string)	The channel that subscriptions will default to if unspecified.
-d, **--description** (string)	Path to the Operator's **README.md** or other documentation.
-i, **--icon** (string)	Path to package's icon.
-o, **--output** (string)	Output format: **json** (the default value) or **yaml**.

6.2.3. render

Generate a declarative config blob from the provided index images, bundle images, and SQLite database files.

Command syntax

```
$ opm render <index_image | bundle_image | sqlite_file> [<flags>]
```

Table 6.9. **render** flags

Flag	Description
-o, **--output** (string)	Output format: **json** (the default value) or **yaml**.

6.2.4. validate

Validate the declarative config JSON file(s) in a given directory.

Command syntax

```
$ opm validate <directory> [<flags>]
```

6.2.5. serve

Serve declarative configs via a GRPC server.

> **NOTE**
>
> The declarative config directory is loaded by the **serve** command at startup. Changes made to the declarative config after this command starts are not reflected in the served content.

Command syntax

```
$ opm serve <source_path> [<flags>]
```

Table 6.10. **serve** flags

Flag	Description
--debug	Enable debug logging.
-p, **--port** (string)	Port number to serve on. Default: **50051**.
-t, **--termination-log** (string)	Path to a container termination log file. Default: **/dev/termination-log**.

CHAPTER 7. OPERATOR SDK

7.1. 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.

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.

NOTE

OpenShift Container Platform 4.9 and later supports Operator SDK v1.10.1.

7.1.1. Installing the Operator SDK CLI

You can install the OpenShift SDK CLI tool on Linux.

Prerequisites

- Go v1.16+
- **docker** v17.03+, **podman** v1.9.3+, or **buildah** v1.7+

Procedure

1. Navigate to the OpenShift mirror site .
2. From the latest 4.9.0 directory, download the latest version of the tarball for Linux.
3. Unpack the archive:

```
$ tar xvf operator-sdk-v1.10.1-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: "v1.10.1-ocp", ...
  ```

7.2. 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>]
```

See Developing Operators for full documentation on the Operator SDK.

7.2.1. bundle

The **operator-sdk bundle** command manages Operator bundle metadata.

7.2.1.1. validate

The **bundle validate** subcommand validates an Operator bundle.

Table 7.1. **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.

7.2.2. cleanup

The **operator-sdk cleanup** command destroys and removes resources that were created for an Operator that was deployed with the **run** command.

Table 7.2. **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**.

7.2.3. completion

The **operator-sdk completion** command generates shell completions to make issuing CLI commands quicker and easier.

Table 7.3. **completion** subcommands

Subcommand	Description
bash	Generate bash completions.
zsh	Generate zsh completions.

Table 7.4. **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
```

7.2.4. create

The **operator-sdk create** command is used to create, or *scaffold*, a Kubernetes API.

7.2.4.1. 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 7.5. **create api** flags

Flag	Description
-h, **--help**	Help output for the **run bundle** subcommand.

7.2.5. generate

The **operator-sdk generate** command invokes a specific generator to generate code or manifests.

7.2.5.1. 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 7.6. **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.

7.2.5.2. kustomize

The **generate kustomize** subcommand contains subcommands that generate Kustomize data for the Operator.

7.2.5.2.1. 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 7.7. **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.

7.2.6. init

The **operator-sdk init** command initializes a 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 7.8. **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.

7.2.7. run

The **operator-sdk run** command provides options that can launch the Operator in various environments.

7.2.7.1. bundle

The **run bundle** subcommand deploys an Operator in the bundle format with Operator Lifecycle Manager (OLM).

Table 7.9. **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.

7.2.7.2. bundle-upgrade

The **run bundle-upgrade** subcommand upgrades an Operator that was previously installed in the bundle format with Operator Lifecycle Manager (OLM).

Table 7.10. **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.

7.2.8. 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 7.11. **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.