OpenShift Container Platform 4.11

CLI tools

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

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

**CHAPTER 1. OPENSIGN CONTAINER PLATFORM CLI TOOLS OVERVIEW** .................................................. 11
  1.1. LIST OF CLI TOOLS ............................................................................................................... 11

**CHAPTER 2. OPENSIGN CLI (OC)** ................................................................. 12
  2.1. GETTING STARTED WITH THE OPENSIGN CLI ................................................................. 12
    2.1.1. About the OpenShift CLI ............................................................................................ 12
    2.1.2. Installing the OpenShift CLI ....................................................................................... 12
      2.1.2.1. Installing the OpenShift CLI by downloading the binary ..................................... 12
        Installing the OpenShift CLI on Linux ........................................................................... 12
        Installing the OpenShift CLI on Windows ..................................................................... 13
        Installing the OpenShift CLI on macOS ....................................................................... 13
      2.1.2.2. Installing the OpenShift CLI by using the web console ........................................ 13
        2.1.2.2.1. Installing the OpenShift CLI on Linux using the web console ......................... 14
        2.1.2.2.2. Installing the OpenShift CLI on Windows using the web console .................. 15
        2.1.2.2.3. Installing the OpenShift CLI on macOS using the web console ....................... 15
      2.1.2.3. Installing the OpenShift CLI by using an RPM ..................................................... 16
      2.1.2.4. Installing the OpenShift CLI by using Homebrew ................................................ 17
    2.1.3. Logging in to the OpenShift CLI ..................................................................................... 17
    2.1.4. Using the OpenShift CLI ............................................................................................... 19
      2.1.4.1. Creating a project .................................................................................................... 19
      2.1.4.2. Creating a new app ................................................................................................. 19
      2.1.4.3. Viewing pods .......................................................................................................... 19
      2.1.4.4. Viewing pod logs ................................................................................................. 20
      2.1.4.5. Viewing the current project ................................................................................... 20
      2.1.4.6. Viewing the status for the current project .............................................................. 20
      2.1.4.7. Listing supported API resources ............................................................................ 20
    2.1.5. Getting help .................................................................................................................... 21
    2.1.6. Logging out of the OpenShift CLI ................................................................................ 22
  2.2. CONFIGURING THE OPENSIGN CLI .............................................................. 22
    2.2.1. Enabling tab completion .............................................................................................. 22
      2.2.1.1. Enabling tab completion for Bash ........................................................................... 22
      2.2.1.2. Enabling tab completion for Zsh ............................................................................ 23
    2.3. MANAGING CLI PROFILES ............................................................................................. 23
      2.3.1. About switches between CLI profiles ......................................................................... 23
      2.3.2. Manual configuration of CLI profiles ....................................................................... 26
      2.3.3. Load and merge rules ............................................................................................... 28
  2.4. EXTENDING THE OPENSIGN CLI WITH PLUG-INS ............................................. 29
    2.4.1. Writing CLI plug-ins ................................................................................................... 29
    2.4.2. Installing and using CLI plug-ins ............................................................................... 30
  2.5. OPENSIGN CLI DEVELOPER COMMAND REFERENCE ................................. 31
    2.5.1. OpenShift CLI (oc) developer commands ................................................................. 31
      2.5.1.1. oc annotate ............................................................................................................ 31
      2.5.1.2. oc api-resources .................................................................................................. 31
      2.5.1.3. oc api-versions ..................................................................................................... 32
      2.5.1.4. oc apply ................................................................................................................ 32
      2.5.1.5. oc apply edit-last-applied .................................................................................... 32
      2.5.1.6. oc apply set-last-applied ..................................................................................... 33
      2.5.1.7. oc apply view-last-applied .................................................................................... 33
      2.5.1.8. oc attach ............................................................................................................... 33
      2.5.1.9. oc auth can-i ......................................................................................................... 34
      2.5.1.10. oc auth reconcile ............................................................................................... 34
2.5.1.11. oc autoscale
2.5.1.12. oc cancel-build
2.5.1.13. oc cluster-info
2.5.1.14. oc cluster-info dump
2.5.1.15. oc completion
2.5.1.16. oc config current-context
2.5.1.17. oc config delete-cluster
2.5.1.18. oc config delete-context
2.5.1.19. oc config delete-user
2.5.1.20. oc config get-clusters
2.5.1.21. oc config get-contexts
2.5.1.22. oc config get-users
2.5.1.23. oc config rename-context
2.5.1.24. oc config set
2.5.1.25. oc config set-cluster
2.5.1.26. oc config set-context
2.5.1.27. oc config set-credentials
2.5.1.28. oc config unset
2.5.1.29. oc config use-context
2.5.1.30. oc config view
2.5.1.31. oc cp
2.5.1.32. oc create
2.5.1.33. oc create build
2.5.1.34. oc create clusterresourcequota
2.5.1.35. oc create clusterrole
2.5.1.36. oc create clusterrolebinding
2.5.1.37. oc create configmap
2.5.1.38. oc create cronjob
2.5.1.39. oc create deployment
2.5.1.40. oc create deploymentconfig
2.5.1.41. oc create identity
2.5.1.42. oc create imagestream
2.5.1.43. oc create imagestreamtag
2.5.1.44. oc create ingress
2.5.1.45. oc create job
2.5.1.46. oc create namespace
2.5.1.47. oc create poddisruptionbudget
2.5.1.48. oc create priorityclass
2.5.1.49. oc create quota
2.5.1.50. oc create role
2.5.1.51. oc create rolebinding
2.5.1.52. oc create route edge
2.5.1.53. oc create route passthrough
2.5.1.54. oc create route reencrypt
2.5.1.55. oc create secret docker-registry
2.5.1.56. oc create secret generic
2.5.1.57. oc create secret tls
2.5.1.58. oc create service clusterip
2.5.1.59. oc create service externalname
2.5.1.60. oc create service loadbalancer
2.5.1.61. oc create service nodeport
2.5.1.62. oc create serviceaccount
2.5.1.63. oc create token
<table>
<thead>
<tr>
<th>Command</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5.1.64. oc create user</td>
<td>50</td>
</tr>
<tr>
<td>2.5.1.65. oc create useridentitymapping</td>
<td>50</td>
</tr>
<tr>
<td>2.5.1.66. oc debug</td>
<td>50</td>
</tr>
<tr>
<td>2.5.1.67. oc delete</td>
<td>51</td>
</tr>
<tr>
<td>2.5.1.68. oc describe</td>
<td>51</td>
</tr>
<tr>
<td>2.5.1.69. oc diff</td>
<td>52</td>
</tr>
<tr>
<td>2.5.1.70. oc edit</td>
<td>52</td>
</tr>
<tr>
<td>2.5.1.71. oc exec</td>
<td>52</td>
</tr>
<tr>
<td>2.5.1.72. oc explain</td>
<td>53</td>
</tr>
<tr>
<td>2.5.1.73. oc expose</td>
<td>53</td>
</tr>
<tr>
<td>2.5.1.74. oc extract</td>
<td>54</td>
</tr>
<tr>
<td>2.5.1.75. oc get</td>
<td>54</td>
</tr>
<tr>
<td>2.5.1.76. oc idle</td>
<td>55</td>
</tr>
<tr>
<td>2.5.1.77. oc image append</td>
<td>55</td>
</tr>
<tr>
<td>2.5.1.78. oc image extract</td>
<td>56</td>
</tr>
<tr>
<td>2.5.1.79. oc image info</td>
<td>56</td>
</tr>
<tr>
<td>2.5.1.80. oc image mirror</td>
<td>57</td>
</tr>
<tr>
<td>2.5.1.81. oc import-image</td>
<td>58</td>
</tr>
<tr>
<td>2.5.1.82. oc kustomize</td>
<td>58</td>
</tr>
<tr>
<td>2.5.1.83. oc label</td>
<td>58</td>
</tr>
<tr>
<td>2.5.1.84. oc login</td>
<td>59</td>
</tr>
<tr>
<td>2.5.1.85. oc logout</td>
<td>59</td>
</tr>
<tr>
<td>2.5.1.86. oc logs</td>
<td>59</td>
</tr>
<tr>
<td>2.5.1.87. oc new-app</td>
<td>60</td>
</tr>
<tr>
<td>2.5.1.88. oc new-build</td>
<td>61</td>
</tr>
<tr>
<td>2.5.1.89. oc new-project</td>
<td>61</td>
</tr>
<tr>
<td>2.5.1.90. oc observe</td>
<td>62</td>
</tr>
<tr>
<td>2.5.1.91. oc patch</td>
<td>62</td>
</tr>
<tr>
<td>2.5.1.92. oc plugin list</td>
<td>62</td>
</tr>
<tr>
<td>2.5.1.93. oc policy add-role-to-user</td>
<td>63</td>
</tr>
<tr>
<td>2.5.1.94. oc policy scc-review</td>
<td>63</td>
</tr>
<tr>
<td>2.5.1.95. oc policy scc-subject-review</td>
<td>63</td>
</tr>
<tr>
<td>2.5.1.96. oc port-forward</td>
<td>64</td>
</tr>
<tr>
<td>2.5.1.97. oc process</td>
<td>64</td>
</tr>
<tr>
<td>2.5.1.98. oc project</td>
<td>65</td>
</tr>
<tr>
<td>2.5.1.99. oc projects</td>
<td>65</td>
</tr>
<tr>
<td>2.5.1.100. oc proxy</td>
<td>65</td>
</tr>
<tr>
<td>2.5.1.101. oc registry info</td>
<td>66</td>
</tr>
<tr>
<td>2.5.1.102. oc registry login</td>
<td>66</td>
</tr>
<tr>
<td>2.5.1.103. oc replace</td>
<td>66</td>
</tr>
<tr>
<td>2.5.1.104. oc rollback</td>
<td>66</td>
</tr>
<tr>
<td>2.5.1.105. oc rollout cancel</td>
<td>67</td>
</tr>
<tr>
<td>2.5.1.106. oc rollout history</td>
<td>67</td>
</tr>
<tr>
<td>2.5.1.107. oc rollout latest</td>
<td>67</td>
</tr>
<tr>
<td>2.5.1.108. oc rollout pause</td>
<td>67</td>
</tr>
<tr>
<td>2.5.1.109. oc rollout restart</td>
<td>68</td>
</tr>
<tr>
<td>2.5.1.110. oc rollout resume</td>
<td>68</td>
</tr>
<tr>
<td>2.5.1.111. oc rollout retry</td>
<td>68</td>
</tr>
<tr>
<td>2.5.1.112. oc rollout status</td>
<td>68</td>
</tr>
<tr>
<td>2.5.1.113. oc rollout undo</td>
<td>68</td>
</tr>
<tr>
<td>2.5.1.114. oc rsh</td>
<td>69</td>
</tr>
<tr>
<td>2.5.1.115. oc rsync</td>
<td>69</td>
</tr>
<tr>
<td>2.5.1.116. oc run</td>
<td>69</td>
</tr>
</tbody>
</table>
2.5.1.117. oc scale
2.5.1.118. oc secrets link
2.5.1.119. oc secrets unlink
2.5.1.120. oc set build-hook
2.5.1.121. oc set build-secret
2.5.1.122. oc set data
2.5.1.123. oc set deployment-hook
2.5.1.124. oc set env
2.5.1.125. oc set image
2.5.1.126. oc set image-lookup
2.5.1.127. oc set probe
2.5.1.128. oc set resources
2.5.1.129. oc set route-backends
2.5.1.130. oc set selector
2.5.1.131. oc set serviceaccount
2.5.1.132. oc set subject
2.5.1.133. oc set triggers
2.5.1.134. oc set volumes
2.5.1.135. oc start-build
2.5.1.136. oc status
2.5.1.137. oc tag
2.5.1.138. oc version
2.5.1.139. oc wait
2.5.1.140. oc whoami

2.6. OPENSHIFT CLI ADMINISTRATOR COMMAND REFERENCE

2.6.1. OpenShift CLI (oc) administrator commands
2.6.1.1. oc adm build-chain
2.6.1.2. oc adm catalog mirror
2.6.1.3. oc adm certificate approve
2.6.1.4. oc adm certificate deny
2.6.1.5. oc adm cordon
2.6.1.6. oc adm create-bootstrap-project-template
2.6.1.7. oc adm create-error-template
2.6.1.8. oc adm create-login-template
2.6.1.9. oc adm create-provider-selection-template
2.6.1.10. oc adm drain
2.6.1.11. oc adm groups add-users
2.6.1.12. oc adm groups new
2.6.1.13. oc adm groups prune
2.6.1.14. oc adm groups remove-users
2.6.1.15. oc adm groups sync
2.6.1.16. oc adm inspect
2.6.1.17. oc adm migrate template-instances
2.6.1.18. oc adm must-gather
2.6.1.19. oc adm new-project
2.6.1.20. oc adm node-logs
2.6.1.21. oc adm pod-network isolate-projects
2.6.1.22. oc adm pod-network join-projects
2.6.1.23. oc adm pod-network make-projects-global
2.6.1.24. oc adm policy add-role-to-user
2.6.1.25. oc adm policy add-scc-to-group
2.6.1.26. oc adm policy add-scc-to-user
3.5.2.2.2. Searching services
3.5.2.2.3. Getting information about a service

3.5.3. odo create
3.5.3.1. Creating a component
3.5.3.2. Starter projects
3.5.3.3. Using an existing devfile
3.5.3.4. Interactive creation

3.5.4. odo delete
3.5.4.1. Deleting a component
3.5.4.2. Undeploying devfile Kubernetes components
3.5.4.3. Delete all
3.5.4.4. Available flags

3.5.5. odo deploy

3.5.6. odo link
3.5.6.1. Various linking options
3.5.6.1.1. Default behavior
3.5.6.1.2. The --inlined flag
3.5.6.1.3. The --map flag
3.5.6.1.4. The --bind-as-files flag
3.5.6.2. Examples
3.5.6.2.1. Default odo link
3.5.6.2.2. Using odo link with the --inlined flag
3.5.6.2.3. Custom bindings
3.5.6.2.3.1. To inline or not?
3.5.6.3. Binding as files
3.5.6.4. --bind-as-files examples
3.5.6.4.1. Using the default odo link
3.5.6.4.2. Using --inlined
3.5.6.4.3. Custom bindings

3.5.7. odo registry
3.5.7.1. Listing the registries
3.5.7.2. Adding a registry
3.5.7.3. Deleting a registry
3.5.7.4. Updating a registry

3.5.8. odo service
3.5.8.1. Creating a new service
3.5.8.1.1. Inlining the manifest
3.5.8.1.2. Configuring the service
3.5.8.1.2.1. Using command-line arguments
3.5.8.1.2.2. Using a file
3.5.8.2. Deleting a service
3.5.8.3. Listing services
3.5.8.4. Getting information about a service

3.5.9. odo storage
3.5.9.1. Adding a storage volume
3.5.9.2. Listing the storage volumes
3.5.9.3. Deleting a storage volume
3.5.9.4. Adding storage to specific container

3.5.10. Common flags

3.5.11. JSON output
4.2. INSTALLING THE KNATIVE CLI

CHAPTER 5. PIPELINES CLI (TKN) ................................................................. 132

5.1. INSTALLING TKN ................................................................................. 132
  5.1.1. Installing Red Hat OpenShift Pipelines CLI (tkn) on Linux ........ 132
  5.1.2. Installing Red Hat OpenShift Pipelines CLI (tkn) on Linux using an RPM 132
  5.1.3. Installing Red Hat OpenShift Pipelines CLI (tkn) on Windows .... 134
  5.1.4. Installing Red Hat OpenShift Pipelines CLI (tkn) on macOS ...... 134

5.2. CONFIGURING THE OPENSHIFT PIPELINES TKN CLI ...................... 134
  5.2.1. Enabling tab completion ................................................................. 134

5.3. OPENS SHIFT PIPELINES TKN REFERENCE .................................... 135
  5.3.1. Basic syntax .................................................................................. 135
  5.3.2. Global options .............................................................................. 135
  5.3.3. Utility commands ........................................................................ 135
    5.3.3.1. tkn ......................................................................................... 135
    5.3.3.2. completion [shell] .................................................................. 135
    5.3.3.3. version ................................................................................... 135
  5.3.4. Pipelines management commands .................................................... 136
    5.3.4.1. pipeline .................................................................................. 136
    5.3.4.2. pipeline delete ...................................................................... 136
    5.3.4.3. pipeline describe ................................................................... 136
    5.3.4.4. pipeline list ............................................................................ 136
    5.3.4.5. pipeline logs .......................................................................... 136
    5.3.4.6. pipeline start ......................................................................... 136
  5.3.5. Pipeline run commands ................................................................. 137
    5.3.5.1. pipelinerun ............................................................................ 137
    5.3.5.2. pipelinerun cancel ................................................................. 137
    5.3.5.3. pipelinerun delete ................................................................. 137
    5.3.5.4. pipelinerun describe .............................................................. 137
    5.3.5.5. pipelinerun list ...................................................................... 138
    5.3.5.6. pipelinerun logs ................................................................. 138
  5.3.6. Task management commands .......................................................... 138
    5.3.6.1. task ...................................................................................... 138
    5.3.6.2. task delete ............................................................................. 138
    5.3.6.3. task describe ........................................................................ 138
    5.3.6.4. task list .................................................................................. 138
    5.3.6.5. task logs ................................................................................. 139
    5.3.6.6. task start ............................................................................... 139
  5.3.7. Task run commands ...................................................................... 139
    5.3.7.1. taskrun .................................................................................. 139
    5.3.7.2. taskrun cancel ................................................................. 139
    5.3.7.3. taskrun delete ...................................................................... 139
    5.3.7.4. taskrun describe ................................................................. 139
    5.3.7.5. taskrun list ............................................................................ 140
    5.3.7.6. taskrun logs ................................................................. 140
  5.3.8. Condition management commands ................................................... 140
    5.3.8.1. condition .............................................................................. 140
    5.3.8.2. condition delete ................................................................... 140
    5.3.8.3. condition describe .............................................................. 140
    5.3.8.4. condition list ...................................................................... 140
  5.3.9. Pipeline Resource management commands ...................................... 141
    5.3.9.1. resource ................................................................................. 141
    5.3.9.2. resource create ................................................................. 141
5.3.9.3. resource delete 141
5.3.9.4. resource describe 141
5.3.9.5. resource list 141

5.3.10. ClusterTask management commands 142
  5.3.10.1. clustertask 142
  5.3.10.2. clustertask delete 142
  5.3.10.3. clustertask describe 142
  5.3.10.4. clustertask list 142
  5.3.10.5. clustertask start 142

5.3.11. Trigger management commands 142
  5.3.11.1. eventlistener 142
  5.3.11.2. eventlistener delete 143
  5.3.11.3. eventlistener describe 143
  5.3.11.4. eventlistener list 143
  5.3.11.5. eventlistener logs 143
  5.3.11.6. triggerbinding 143
  5.3.11.7. triggerbinding delete 143
  5.3.11.8. triggerbinding describe 144
  5.3.11.9. triggerbinding list 144
  5.3.11.10. triggertemplate 144
  5.3.11.11. triggertemplate delete 144
  5.3.11.12. triggertemplate describe 144
  5.3.11.13. trigggertemplate list 144
  5.3.11.14. clustertriggerbinding 144
  5.3.11.15. clustertriggerbinding delete 145
  5.3.11.16. clustertriggerbinding describe 145
  5.3.11.17. clustertriggerbinding list 145

5.3.12. Hub interaction commands 145
  5.3.12.1. hub 145
  5.3.12.2. hub downgrade 146
  5.3.12.3. hub get 146
  5.3.12.4. hub info 146
  5.3.12.5. hub install 146
  5.3.12.6. hub reinstall 146
  5.3.12.7. hub search 146
  5.3.12.8. hub upgrade 147

CHAPTER 6. OPM CLI  ........................................................................................................ 148

6.1. INSTALLING THE OPM CLI  .................................................................................... 148
  6.1.1. About the opm CLI  ......................................................................................... 148
  6.1.2. Installing the opm CLI  .................................................................................... 148
  6.1.3. Additional resources  ....................................................................................... 149

6.2. OPM CLI REFERENCE  .............................................................................................. 149
  6.2.1. init  .................................................................................................................. 150
  6.2.2. render  .............................................................................................................. 150
  6.2.3. validate  ........................................................................................................... 150
  6.2.4. serve  ............................................................................................................... 151
  6.2.5. index  ............................................................................................................... 151
    6.2.5.1. add  .......................................................................................................... 152
    6.2.5.2. prune  ....................................................................................................... 153
    6.2.5.3. prune-stranded  ....................................................................................... 153
    6.2.5.4. rm  ............................................................................................................ 154
CHAPTER 7. OPERATOR SDK

7.1. INSTALLING THE OPERATOR SDK CLI

7.1.1. Installing the Operator SDK CLI

7.2. OPERATOR SDK CLI REFERENCE

7.2.1. bundle

7.2.1.1. validate

7.2.2. cleanup

7.2.3. completion

7.2.4. create

7.2.4.1. api

7.2.5. generate

7.2.5.1. bundle

7.2.5.2. kustomize

7.2.5.2.1. manifests

7.2.6. init

7.2.7. run

7.2.7.1. bundle

7.2.7.2. bundle-upgrade

7.2.8. scorecard
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 Knative (kn) CLI tool provides simple and intuitive terminal commands that can be used to interact with OpenShift Serverless components, such as Knative Serving and Eventing.

- **Pipelines CLI (tkn)**: OpenShift Pipelines is a continuous integration and continuous delivery (CI/CD) solution in OpenShift Container Platform, which internally uses Tekton. The tkn CLI tool provides simple and intuitive commands to interact with OpenShift Pipelines using the terminal.

- **opm CLI**: The opm CLI tool helps the Operator developers and cluster administrators to create and maintain the catalogs of Operators from the terminal.

- **Operator SDK**: The Operator SDK, a component of the Operator Framework, provides a CLI tool that Operator developers can use to build, test, and deploy an Operator from the terminal. It simplifies the process of building Kubernetes-native applications, which can require deep, application-specific operational knowledge.
CHAPTER 2. OPENShift CLI (OC)

2.1. GETTING STARTED WITH THE OPENSShift 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 4.11. 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**

2. Select the architecture in the **Product Variant** drop-down menu.
3. Select the appropriate version in the **Version** drop-down menu.
4. Click **Download Now** next to the **OpenShift v4.11 Linux Client** entry and save the file.
5. Unpack the archive:

   ```
   $ tar xzvf <file>
   ```

6. 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**


2. Select the appropriate version in the **Version** drop-down menu.

3. Click **Download Now** next to the **OpenShift v4.11 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**


2. Select the appropriate version in the **Version** drop-down menu.

3. Click **Download Now** next to the **OpenShift v4.11 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 4.11. Download and install the new version of oc.

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

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

**Procedure**

1. From the web console, click ?.

2. Click Command Line Tools.

3. Select appropriate oc binary for your Linux platform, and then click Download oc for Linux.

4. Save the file.

5. Unpack the archive.

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

6. Move the oc binary to a directory that is on your PATH.

   To check your PATH, execute the following command:

   ```
   $ echo $PATH
   ```

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

   ```
   $ oc <command>
   ```
2.1.2.2.2. Installing the OpenShift CLI on Windows using the web console

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

Procedure

1. From the web console, click ?.

2. Click Command Line Tools.

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

4. Save the file.

5. Unzip the archive with a ZIP program.

6. Move the oc binary to a directory that is on your PATH.

   To check your PATH, open the command prompt and execute the following command:

   C:\> path

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

C:\> oc <command>

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

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

Procedure

1. From the web console, click ?.
2. **Click Command Line Tools**

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

4. Save the file.

5. Unpack and unzip the archive.

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

   ```
   $ echo $PATH
   ```

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

   ```
   $ oc <command>
   ```

### 2.1.2.3. Installing the OpenShift CLI by using an RPM

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

**Prerequisites**

- Must have root or `sudo` privileges.

**Procedure**

1. Register with Red Hat Subscription Manager:

   ```
   # subscription-manager register
   ```

2. Pull the latest subscription data:

   ```
   ```
# subscription-manager refresh

3. List the available subscriptions:

   # subscription-manager list --available --matches "OpenShift"

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

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

5. Enable the repositories required by OpenShift Container Platform 4.11.

   # subscription-manager repos --enable="rhocp-4.11-for-rhel-8-x86_64-rpms"

   **NOTE**
   It is not supported to install the OpenShift CLI (oc) as an RPM for Red Hat Enterprise Linux (RHEL) 9. You must install the OpenShift CLI for RHEL 9 by downloading the binary.

6. Install the `openshift-clients` package:

   # yum install openshift-clients

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

$ oc <command>

---

**2.1.2.4. Installing the OpenShift CLI by using Homebrew**

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

**Prerequisites**

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

**Procedure**

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

  $ brew install openshift-cli

---

**2.1.3. Logging in to the OpenShift CLI**

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

**Prerequisites**

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

NOTE

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

Authentication headers are sent only when using HTTPS transport.

Procedure

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

   $ oc login -u user1

2. When prompted, enter the required information:

   Example output

   Server [https://localhost:8443]: https://openshift.example.com:6443
   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

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

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

   oc new-project <projectname>

   Welcome! See ‘oc help’ to get started.

   1. Enter the OpenShift Container Platform server URL.
   2. Enter whether to use insecure connections.
   3. Enter the user’s password.

NOTE

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

You can now create a project or issue other commands for managing your cluster.
2.1.4. Using the OpenShift CLI

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

2.1.4.1. Creating a project

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

$$ oc new-project my-project$$

Example output

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

2.1.4.2. Creating a new app

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

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

Example output

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

Run 'oc status' to view your app.

2.1.4.3. Viewing pods

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

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

$$ oc get pods -o wide$$

Example output

<table>
<thead>
<tr>
<th>NAME</th>
<th>READY</th>
<th>STATUS</th>
<th>STARTS</th>
<th>AGE</th>
<th>IP</th>
<th>NODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOMINATED NODE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cakephp-ex-1-build</td>
<td>0/1</td>
<td>Completed</td>
<td>0</td>
<td>5m45s</td>
<td>10.131.0.10</td>
<td>ip-10-0-141-74.ec2.internal</td>
</tr>
<tr>
<td>cakephp-ex-1-deploy</td>
<td>0/1</td>
<td>Completed</td>
<td>0</td>
<td>3m44s</td>
<td>10.129.2.9</td>
<td>ip-10-0-147-65.ec2.internal</td>
</tr>
<tr>
<td>cakephp-ex-1-ktz97</td>
<td>1/1</td>
<td>Running</td>
<td>0</td>
<td>3m33s</td>
<td>10.128.2.11</td>
<td>ip-10-0-168-105.ec2.internal</td>
</tr>
</tbody>
</table>
2.1.4.4. Viewing pod logs

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

```bash
$ 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.

```bash
$ 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.

```bash
$ 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.

```bash
$ oc api-resources
```

Example output

```
<table>
<thead>
<tr>
<th>NAME</th>
<th>SHORTNAMES</th>
<th>APIGROUP</th>
<th>NAMESPACED</th>
<th>KIND</th>
</tr>
</thead>
<tbody>
<tr>
<td>bindings</td>
<td></td>
<td>true</td>
<td>Binding</td>
<td>ComponentStatus</td>
</tr>
<tr>
<td>componentstatuses</td>
<td>cs</td>
<td>false</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```
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**
2.1.6. Logging out of the OpenShift CLI

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

- **Use the `oc logout` command.**

```
$ oc logout
```

**Example output**

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

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

2.2. CONFIGURING THE OPENSHIFT CLI

2.2.1. Enabling tab completion

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

2.2.1.1. Enabling tab completion for Bash

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

**Prerequisites**

- You must have the OpenShift CLI (oc) installed.
- You must have the package `bash-completion` installed.
**Procedure**

1. Save the Bash completion code to a file:

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

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

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

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

Tab completion is enabled when you open a new terminal.

### 2.2.1.2. Enabling tab completion for Zsh

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

**Prerequisites**

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

**Procedure**

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

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

Tab completion is enabled when you open a new terminal.

### 2.3. MANAGING CLI PROFILES

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

#### 2.3.1. About switches between CLI profiles

Contexts allow you to easily switch between multiple users across multiple OpenShift Container Platform servers, or clusters, when using CLI operations. Nicknames make managing CLI configurations easier by providing short-hand references to contexts, user credentials, and cluster details. After logging in with the CLI for the first time, OpenShift Container Platform creates a `~/.kube/config` file if one does not already exist. As more authentication and connection details are provided to the CLI, either automatically during an `oc login` operation or by manually configuring CLI profiles, the updated information is stored in the configuration file:

**CLI config file**
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`.

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.

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.

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**

```bash
$ 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**

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

<table>
<thead>
<tr>
<th>Subcommand</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>view</strong></td>
<td>Displays the merged CLI configuration currently in use.</td>
</tr>
<tr>
<td></td>
<td>$ oc config view</td>
</tr>
<tr>
<td></td>
<td>Displays the result of the specified CLI config file.</td>
</tr>
<tr>
<td></td>
<td>$ oc config view --config=&lt;specific_filename&gt;</td>
</tr>
</tbody>
</table>

### Example usage

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

  ```bash
  $ oc login https://openshift1.example.com --
  token=ns7yVhuRNpDM9cgzf1hxQ7bM5s7N2ZVrkZepSRf4LC0
  ```

- View the cluster entry automatically created:

  ```bash
  $ oc config view
  ```

**Example output**

```yaml
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: ns7yVhuRNpDM9cgzf1hxQ7bM5s7N2ZVrkZepSRf4LC0
```

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

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

- Examine the current context, to confirm that the changes are implemented:
All subsequent CLI operations use 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.

$ oc whoami -c
- 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.

```bash
#!/bin/bash

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

# optional argument handling
```
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.
   
   ```bash
   $ chmod +x <plugin_file>
   ```

2. Place the file anywhere in your `PATH`, such as `/usr/local/bin/`.
   
   ```bash
   $ sudo mv <plugin_file> /usr/local/bin/.
   ```

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

#### Example output

The following compatible plug-ins 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 -

# Apply the configuration from all files that end with '.json' - i.e. expand wildcard characters in file names
oc apply -f '*.json'

# 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
```
2.5.1.9. `oc auth can-i`

Check whether an action is allowed

**Example usage**

```bash
# 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**

```bash
# 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**

```bash
# 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
```
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, zsh or fish)

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"

# Load the oc completion code for fish[2] into the current shell
oc completion fish | source
# To load completions for each session, execute once:
oc completion fish > ~/.config/fish/completions/oc.fish

# Load the oc completion code for powershell into the current shell
oc completion powershell | Out-String | Invoke-Expression
# Set oc completion code for powershell to run on startup
## Save completion code to a script and execute in the profile
oc completion powershell > $HOME\.kube\completion.ps1
Add-Content $PROFILE "$HOME\.kube\completion.ps1"
## Execute completion code in the profile
Add-Content $PROFILE "if (Get-Command oc -ErrorAction SilentlyContinue) {
oc completion powershell | Out-String | Invoke-Expression
}"
## Add completion code directly to the $PROFILE script
oc completion powershell >> $PROFILE
```

2.5.16. oc config current-context

Display the current-context
### Example usage

```bash
# 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

```bash
# 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

```bash
# 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

```bash
# 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

```bash
# 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

```bash
# List all the contexts in your kubeconfig file
oc config get-contexts
```
2.5.1.22. oc config get-users

Display users defined in the kubeconfig

Example usage

```bash
# 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

```bash
# 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

```bash
# 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

# 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 e2e cluster entry
```

2.5.1.25. oc config set-cluster

Set a cluster entry in kubeconfig

Example usage

```bash
# 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 e2e 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

# Set proxy url for the e2e cluster entry
oc config set-cluster e2e --proxy-url=https://1.2.3.4

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
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'.
```
2.5.1.32. oc create

Create a resource from a file or from stdin

Example usage

```
# 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
```

2.5.1.33. 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
```
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
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:8080" \ 
--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 \ 
```
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 -- command 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

```bash
# 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

```bash
# 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,persistentvolumeclaims=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

```bash
# 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
2.5.1.52. oc create route edge
Create a route that uses edge TLS termination

Example usage

```bash
# 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

```bash
# 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

```bash
# 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

```bash
# 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 env files
oc create secret generic my-secret --from-env-file=path/to/foo.env --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 token
Request a service account token

Example usage

```
# Request a token to authenticate to the kube-apiserver as the service account "myapp" in the current namespace
oc create token myapp

# Request a token for a service account in a custom namespace
oc create token myapp --namespace myns

# Request a token with a custom expiration
oc create token myapp --duration 10m

# Request a token with a custom audience
oc create token myapp --audience https://example.com

# Request a token bound to an instance of a Secret object
```
2.5.1.64. 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"
```

2.5.1.65. 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
```

2.5.1.66. 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
2.5.1.67. oc delete

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

Example usage

```bash
# 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 resources from all files that end with '.json' - i.e. expand wildcard characters in file names
oc apply -f '*.json'

# 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
```

2.5.1.68. oc describe

Show details of a specific resource or group of resources

Example usage

```bash
# 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
```
2.5.1.69. oc diff

Diff the live version against a would-be applied version

Example usage

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

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

2.5.1.70. oc edit

Edit a resource on the server

Example usage

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

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

# Edit the deployment/mydeployment's status subresource
oc edit deployment mydeployment --subresource='status'
```

2.5.1.71. oc exec

Execute a command in a container

Example usage

```bash
# 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
```
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
2.5.1.74. oc extract

Extract secrets or config maps to disk

**Example usage**

```bash
# 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**

```bash
# 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
```
Idle scalable resources

**Example usage**

```bash
# 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**

```bash
# 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)
oct 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/*:.

# 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
2.5.1.80. oc image mirror

Mirror images from one repository to another

Example usage

```bash
# 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:latest 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)

# 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

# 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**

```bash
# 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**

```bash
# 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
2.5.1.87. `oc new-app`

Create a new application

**Example usage**

```bash
# 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

# 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
```
2.5.1.88. oc new-build

Create a new build configuration

Example usage

```bash
# 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
```

2.5.1.89. oc new-project

Request a new project

Example usage

```bash
# 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
RUN yum install -y httpd'"

# Create a build config from a remote repository and add custom environment variables
oc new-build https://github.com/youruser/yourgitrepo --source-secret=yoursecret

# 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

# Create a build config that gets its input from a remote repository and another container image
```
# 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:
 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"}"

# Update a deployment's replicas through the scale subresource using a merge patch.
oc patch deployment nginx-deployment --subresource=scale --type=merge -p "{"spec": {"replicas":2}}"
```

## 2.5.1.92. oc plugin list

List all visible plugin executables on a user’s PATH
Example usage

```
# List all available plugins
oc plugin list
```

2.5.1.93. 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
```

2.5.1.94. 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
```

2.5.1.95. 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
```
2.5.1.96. **oc port-forward**

Forward one or more local ports to a pod

**Example usage**

```bash
# 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
```

2.5.1.97. **oc process**

Process a template into list of resources

**Example usage**

```bash
# 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
```
2.5.1.98. *oc project*

Switch to another project

**Example usage**

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

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

2.5.1.99. *oc projects*

Display existing projects

**Example usage**

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

2.5.1.100. *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
```
2.5.1.101. oc registry info

Print information about the integrated registry

Example usage

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

2.5.1.102. oc registry login

Log in to the integrated registry

Example usage

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

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

2.5.1.103. oc replace

Replace a resource by file name or stdin

Example usage

```bash
# 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/\1' | oc replace -f -

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

2.5.1.104. oc rollback

Revert part of an application back to a previous deployment

Example usage

```bash
# Perform a rollback to the last successfully completed deployment for a deployment config
oc rollback frontend
```
2.5.1.105. oc rollout cancel

Cancel the in-progress deployment

Example usage

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

2.5.1.106. 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
```

2.5.1.107. 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
```

2.5.1.108. oc rollout pause

Mark the provided resource as paused

Example usage

```
# Mark the nginx deployment as paused. Any current state of
```
2.5.1.109. oc rollout restart

Restart a resource

Example usage

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

# Restart a daemon set
oc rollout restart daemonset/abc

# Restart deployments with the app=nginx label
oc rollout restart deployment --selector=app=nginx
```

2.5.1.110. oc rollout resume

Resume a paused resource

Example usage

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

2.5.1.111. oc rollout retry

Retry the latest failed rollout

Example usage

```bash
# 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
```

2.5.1.112. oc rollout status

Show the status of the rollout

Example usage

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

2.5.1.113. oc rollout undo

Undo a previous rollout

Example usage
2.5.1.114. `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
```

2.5.1.115. `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
```

2.5.1.116. `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
```
2.5.1.117. 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
```

2.5.1.118. 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
```
2.5.119. oc secrets unlink

Detach secrets from a service account

Example usage

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

2.5.120. oc set build-hook

Update a build hook on a build config

Example usage

```bash
# 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"
```

2.5.121. oc set build-secret

Update a build secret on a build config

Example usage

```bash
# 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
```

2.5.122. 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

2.5.1.123. 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

2.5.1.124. 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
2.5.1.125. *oc set image*

Update the image of a pod template

**Example usage**

```bash
oc set image dc/nginx busybox=busybox nginx=nginx:1.9.1
```

Set a deployment config's nginx container image to 'nginx:1.9.1', and its busybox container image to 'busybox'.

```bash
oc set image dc/myapp app=openshift/ruby:2.3 --source=imagestreamtag
```

Set a deployment config's app container image to the image referenced by the imagestream tag 'openshift/ruby:2.3'.

```bash
oc set image deployments,rc nginx=nginx:1.9.1 --all
```

Update all deployments' and rc's nginx container's image to 'nginx:1.9.1'

```bash
oc set image daemonset abc *=nginx:1.9.1
```

Update image of all containers of daemonset abc to 'nginx:1.9.1'

```bash
oc set image -f path/to/file.yaml nginx=nginx:1.9.1 --local -o yaml
```

Print result (in yaml format) of updating nginx container image from local file, without hitting the server

2.5.1.126. *oc set image-lookup*

Change how images are resolved when deploying applications

**Example usage**

```bash
oc set image-lookup
```

Print all of the image streams and whether they resolve local names

```bash
oc set image-lookup mysql
```

Use local name lookup on image stream mysql

```bash
oc set image-lookup deploy/mysql
```

Force a deployment to use local name lookup

```bash
oc set image-lookup deploy/mysql --list
```

Show the current status of the deployment lookup
# 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

2.5.1.127. 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

2.5.1.128. 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

2.5.1.129. oc set route-backends
Update the backends for a route

Example usage

```bash
# 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
```

2.5.1.130. 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 -
```

2.5.1.131. 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
```

2.5.1.132. oc set subject

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

Example usage
2.5.1.133. 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
```

2.5.1.134. 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
```
2.5.1.135. 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
```

2.5.1.136. oc status

Show an overview of the current project

**Example usage**

```
# See an overview of the current project
oc status
```
2.5.1.137. 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
```

2.5.1.138. 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
```

2.5.1.139. oc wait
Experimental: Wait for a specific condition on one or many resources

Example usage
2.5.1.140. 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 -h` 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
```
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 cordon

Mark node as unschedulable

Example usage
2.6.1.6. oc adm create-bootstrap-project-template

Create a bootstrap project template

Example usage

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

2.6.1.7. oc adm create-error-template

Create an error page template

Example usage

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

2.6.1.8. oc adm create-login-template

Create a login template

Example usage

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

2.6.1.9. oc adm create-provider-selection-template

Create a provider selection template

Example usage

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

2.6.1.10. oc adm drain

Drain node in preparation for maintenance

Example usage

```bash
# 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
```
2.6.1.11. `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
```

2.6.1.12. `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
```

2.6.1.13. `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
```

2.6.1.14. `oc adm groups remove-users`

Remove users from a group

```
# 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
```
2.6.15. `oc adm groups sync`
Sync OpenShift groups with records from an external provider

Example usage

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

- # 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

2.6.16. `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

2.6.17. `oc adm migrate template-instances`
Update template instances to point to the latest group-version-kinds

Example usage
2.6.1.18. oc adm must-gather

Launch a new instance of a pod for gathering debug information

**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
```

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

2.6.19. 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'
```

2.6.20. 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=/
```
2.6.1.21. 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'
```

2.6.1.22. 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'
```

2.6.1.23. 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'
```

2.6.1.24. 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 adm policy add-role-to-user view user1

# Add the 'edit' role to serviceaccount1 for the current project
oc adm policy add-role-to-user edit -z serviceaccount1
```
2.6.1.25. 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

2.6.1.26. 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

2.6.1.27. 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 adm 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 adm 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 adm 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 adm policy scc-review -f myresource_with_no_sa.yaml

2.6.1.28. 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 adm policy scc-subject-review -u bob -f myresource.yaml

# Check whether user bob who belongs to projectAdmin group can create a pod specified in
### 2.6.1.29. oc adm prune builds

Remove old completed and failed builds

**Example usage**

```bash
# 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
```

### 2.6.1.30. oc adm prune deployments

Remove old completed and failed deployment configs

**Example usage**

```bash
# 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
```

### 2.6.1.31. oc adm prune groups

Remove old OpenShift groups referencing missing records from an external provider

**Example usage**

```bash
# 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
```
2.6.1.32. oc adm prune images

Remove unreferenced images

Example usage

```bash
# 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
```

2.6.1.33. oc adm release extract

Extract the contents of an update payload to disk

Example usage

```bash
# 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

# Use git to check out the source code for the current cluster release to DIR from linux/s390x image
# Note: Wildcard filter is not supported. Pass a single os/arch to extract
oc adm release extract --git=DIR quay.io/openshift-release-dev/ocp-release:4.2.2 --filter-by-os=linux/s390x
```

2.6.1.34. oc adm release info

Display information about a release

Example usage

```bash
# Show information about the cluster's current release
oc adm release info
```
2.6.1.35. 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

2.6.1.36. 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
2.6.1.37. oc adm taint

Update the taints on one or more nodes

Example usage

```bash
# 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
```

2.6.1.38. oc adm top images

Show usage statistics for images

Example usage

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

2.6.1.39. oc adm top imagestreams

Show usage statistics for image streams

Example usage

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

2.6.1.40. oc adm top node

Display resource (CPU/memory) usage of nodes

Example usage

```bash
# 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 \
cli=docker.io/mycompany/cli:latest --to-image docker.io/mycompany/myrepo:latest

# 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
```
2.6.1.41. oc adm top pod

Display resource (CPU/memory) usage of pods

Example usage

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

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

2.6.1.42. oc adm uncordon

Mark node as schedulable

Example usage

```bash
# Mark node “foo” as schedulable
oc adm uncordon foo
```

2.6.1.43. oc adm upgrade

Upgrade a cluster or adjust the upgrade channel

Example usage

```bash
# Review the available cluster updates
oc adm upgrade

# Update to the latest version
oc adm upgrade --to-latest=true
```

2.6.1.44. oc adm verify-image-signature

Verify the image identity contained in the image signature

Example usage

```bash
# Verify the image signature and identity using the local GPG keychain
```
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 4.11. If you want the latest features, you must download and install the latest version of the `oc` binary corresponding to your OpenShift Container Platform server version.

Non-security API changes will involve, at minimum, two minor releases (4.1 to 4.2 to 4.3, for example) to allow older `oc` binaries to update. Using new capabilities might require newer `oc` binaries. A 4.3 server might have additional capabilities that a 4.2 `oc` binary cannot use and a 4.3 `oc` binary might have additional capabilities that are unsupported by a 4.2 server.

Table 2.2. Compatibility Matrix

<table>
<thead>
<tr>
<th>X.Y (Server)</th>
<th>X.Y+1 (Server)</th>
<th>X.Y (oc Client)</th>
<th>X.Y+1 (oc Client)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X.Y (Client)</td>
<td>1</td>
<td>X.Y+1 (Server)</td>
<td>3</td>
</tr>
<tr>
<td>X.Y+1 footnote:versionpolicy [Where N is a number greater than or equal to 1] (Server)</td>
<td>2</td>
<td>(Server)</td>
<td>1</td>
</tr>
</tbody>
</table>

1. Fully compatible.
2. `oc` client might not be able to access server features.
3. `oc` client might provide options and features that might not be compatible with the accessed server.

2.7.2. The `kubectl` binary

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

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

For more information, see the `kubectl documentation`. 
CHAPTER 3. DEVELOPER CLI (ODO)

3.1. odo RELEASE NOTES

3.1.1. Notable changes and improvements in odo version 2.5.0

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

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

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

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

3.2.1. odo key features

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

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

3.2.2. odo core concepts

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

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

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

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

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

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

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

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

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

devfile
An open standard for defining containerized development environments that enables developer tools to simplify and accelerate workflows. For more information, see the documentation at https://devfile.io.

You can connect to publicly available devfile registries, or you can install a Secure Registry.

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

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

Procedure
1. Log in to the cluster with odo:
   
   $ odo login -u developer -p developer

2. List the available odo components:
   
   $ odo catalog list components

Example output

Odo Devfile Components:
### 3.2.4. Telemetry in odo

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

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

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

3.3. INSTALLING ODO

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

**NOTE**

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

3.3.1. Installing odo on Linux

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

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Binary</th>
<th>Tarball</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux</td>
<td>odo-linux-amd64</td>
<td>odo-linux-amd64.tar.gz</td>
</tr>
<tr>
<td>Linux on IBM Power</td>
<td>odo-linux-ppc64le</td>
<td>odo-linux-ppc64le.tar.gz</td>
</tr>
<tr>
<td>Linux on IBM Z and LinuxONE</td>
<td>odo-linux-s390x</td>
<td>odo-linux-s390x.tar.gz</td>
</tr>
</tbody>
</table>

**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`:

     ```bash
     ```

   - If you download the tarball, extract the binary:

     ```bash
     $ 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 xzvf odo.tar.gz
     ```

2. Change the permissions on the binary:

   ```bash
   $ 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.

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Binary</th>
<th>Tarball</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows</td>
<td><code>odo-windows-amd64.exe</code></td>
<td><code>odo-windows-amd64.exe.zip</code></td>
</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Binary</th>
<th>Tarball</th>
</tr>
</thead>
<tbody>
<tr>
<td>macOS</td>
<td><code>odo-darwin-amd64</code></td>
<td><code>odo-darwin-amd64.tar.gz</code></td>
</tr>
</tbody>
</table>

**Procedure**

1. Navigate to the content gateway and download the appropriate file:
• If you download the binary, rename it to 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:

   ```
   $ 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
   ```

   ```
   # chmod +x odo
   ```

   ```
   $ echo $PATH
   ```

   ```
   $ odo version
   ```

   OpenShift Container Platform 4.11 CLI tools
# 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-4.11-for-rhel-8-x86_64-rpms"

6. Install the odo package:

# yum install odo

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

$ odo version

### 3.4. CONFIGURING THE ODO CLI

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

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

#### 3.4.1. Viewing the current configuration

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

$ odo preference view

**Example output**

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CURRENT_VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>UpdateNotification</td>
<td></td>
</tr>
<tr>
<td>NamePrefix</td>
<td></td>
</tr>
<tr>
<td>Timeout</td>
<td></td>
</tr>
<tr>
<td>BuildTimeout</td>
<td></td>
</tr>
<tr>
<td>PushTimeout</td>
<td></td>
</tr>
<tr>
<td>Ephemeral</td>
<td></td>
</tr>
<tr>
<td>ConsentTelemetry</td>
<td>true</td>
</tr>
</tbody>
</table>
3.4.2. Setting a value

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

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

**NOTE**

Preference keys are case-insensitive.

Example command

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

Example output

```
Global preference was successfully updated
```

3.4.3. Unsetting a value

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

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

**NOTE**

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

Example command

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

Example output

```
Global preference was successfully updated
```

3.4.4. Preference key table

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

<table>
<thead>
<tr>
<th>Preference key</th>
<th>Description</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UpdateNotification</td>
<td>Control whether a notification to update <code>odo</code> is shown.</td>
<td>True</td>
</tr>
<tr>
<td>NamePrefix</td>
<td>Set a default name prefix for an <code>odo</code> resource. For example,</td>
<td>Current directory name</td>
</tr>
<tr>
<td></td>
<td><code>component</code> or <code>storage</code>.</td>
<td></td>
</tr>
</tbody>
</table>
3.4.5. Ignoring files or patterns

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

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

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

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

The `.odoignore` file allows any glob expressions.

3.5. ODO CLI REFERENCE

3.5.1. odo build-images

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

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

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

<> The `uri` field indicates the relative path of the Dockerfile to use, relative to the directory containing the `devfile.yaml`. The devfile specification indicates that `uri` could also be an HTTP URL, but this case is
not supported by odo yet. The `BuildContext` indicates the directory used as build context. The default value is `${PROJECTS_ROOT}`.

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

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

### 3.5.2. odo catalog

odo uses different catalogs to deploy components and services.

#### 3.5.2.1. Components

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

#### 3.5.2.1.1. Listing components

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

```bash
$ odo catalog list components
```

**Example output**

<table>
<thead>
<tr>
<th>NAME</th>
<th>DESCRIPTION</th>
<th>REGISTRY</th>
</tr>
</thead>
<tbody>
<tr>
<td>go</td>
<td>Stack with the latest Go version</td>
<td>DefaultDevfileRegistry</td>
</tr>
<tr>
<td>java-maven</td>
<td>Upstream Maven and OpenJDK 11</td>
<td>DefaultDevfileRegistry</td>
</tr>
<tr>
<td>nodejs</td>
<td>Stack with Node.js 14</td>
<td>DefaultDevfileRegistry</td>
</tr>
<tr>
<td>php-laravel</td>
<td>Stack with Laravel 8</td>
<td>DefaultDevfileRegistry</td>
</tr>
<tr>
<td>python</td>
<td>Python Stack with Python 3.7</td>
<td>DefaultDevfileRegistry</td>
</tr>
</tbody>
</table>

[...]

#### 3.5.2.1.2. Getting information about a component

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

```bash
$ odo catalog describe component
```

For example, run the command:

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

**Example output**

```
* Registry: DefaultDevfileRegistry

Starter Projects: 
---
name: nodejs-starter
attributes: {}
```
Registry is the registry from which the devfile is retrieved. Starter projects are sample projects in the same language and framework of the devfile, that can help you start a new project.

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

3.5.2.2. Services

odo can deploy services with the help of Operators.

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

3.5.2.2.1. Listing services

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

```
$ odo catalog list services
```

**Example output**

<table>
<thead>
<tr>
<th>NAME</th>
<th>CRDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>postgresql-operator.v0.1.1</td>
<td>Backup, Database</td>
</tr>
<tr>
<td>redis-operator.v0.8.0</td>
<td>RedisCluster, Redis</td>
</tr>
</tbody>
</table>

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

**NOTE**

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

3.5.2.2.2. Searching services

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

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

$ odo catalog search service postgres

**Example output**

<table>
<thead>
<tr>
<th>Services available through Operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
</tr>
<tr>
<td>postgresql-operator.v0.1.1</td>
</tr>
</tbody>
</table>

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

### 3.5.2.2.3. Getting information about a service

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

$ odo catalog describe service

For example:

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

**Example output**

```
KIND: Database
VERSION: v1alpha1

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

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

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

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

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

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

$ odo catalog describe service redis-operator.v0.8.0
Example output

NAME: redis-operator.v0.8.0
DESCRIPTION:

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

... (cut short for brevity)

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

CRDs:

<table>
<thead>
<tr>
<th>NAME</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RedisCluster</td>
<td>Redis Cluster</td>
</tr>
<tr>
<td>Redis</td>
<td>Redis</td>
</tr>
</tbody>
</table>

3.5.3. odo create

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

3.5.3.1. Creating a component

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

```
odo create nodejs mynodejs
```

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

NOTE

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

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

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

The --context flag supports relative and absolute paths.

To specify the project or app where your component will be deployed, use the --project and --app flags. For example, to create a component that is part of the myapp app inside the backend project, run the command:
If these flags are not specified, they will default to the active app and project.

3.5.3.2. Starter projects

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

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

```
odo catalog describe component nodejs
```

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

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

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

3.5.3.3. Using an existing devfile

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

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

3.5.3.4. Interactive creation

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

```
$ odo create

? Which devfile component type do you wish to create go
? What do you wish to name the new devfile component go-api
? What project do you want the devfile component to be created in default

Devfile Object Validation
  ✓ Checking devfile existence [164258ns]
  ✓ Creating a devfile component from registry: DefaultDevfileRegistry [246051ns]

Validation
  ✓ Validating if devfile name is correct [92255ns]

? Do you want to download a starter project Yes

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

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

3.5.4. odo delete

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

3.5.4.1. Deleting a component

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

$ odo delete

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

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

3.5.4.2. Undeploying devfile Kubernetes components

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

$ odo delete --deploy

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

3.5.4.3. Delete all

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

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

$ odo delete --all

3.5.4.4. Available flags

-f, --force
Use this flag to avoid the confirmation questions.

-w, --wait

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

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

3.5.5. odo deploy

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

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

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

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

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

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

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

3.5.6.1. Various linking options

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

3.5.6.1.1. Default behavior

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

3.5.6.1.2. The `--inlined` flag

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

3.5.6.1.3. The `--map` flag

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

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

3.5.6.2. Examples

3.5.6.2.1. Default `odo link`

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

```sh
$ odo list
```

**Sample output**

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

```sh
$ odo service list
```

**Sample output**

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

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

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

**Example output**

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

To apply the link, please use `odo push`

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

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

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

```sh
$ odo url list
```

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

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

```
$ odo describe
```

**Example output:**

Component Name: backend  
Type: spring  
Environment Variables:  
- PROJECTS_ROOT=/projects  
- PROJECT_SOURCE=/projects  
- DEBUG_PORT=5858  
Storage:  
- m2 of size 3Gi mounted to /home/user/.m2  
URLs:  
Linked Services:  
- PostgresCluster/hippo  
Environment Variables:  
- POSTGRESCLUSTER_PGBOUNCER-EMPTY  
- POSTGRESCLUSTER_PGBOUNCER.INI  
- POSTGRESCLUSTER_ROOT.CRT  
- POSTGRESCLUSTER_VERIFIER  
- POSTGRESCLUSTER_ID_ECDSA  
- POSTGRESCLUSTER_PGBOUNCER-VERIFIER  
- POSTGRESCLUSTER_TLS.CRT  
- POSTGRESCLUSTER_PGBOUNCER-URI  
- POSTGRESCLUSTER_PATRONI.CRT-COMBINED  
- POSTGRESCLUSTER_USER  
- pgImage  
- pgVersion  
- POSTGRESCLUSTER_CLUSTERIP  
- POSTGRESCLUSTER_HOST  
- POSTGRESCLUSTER_PGBACKREST_REPO.CONF  
- POSTGRESCLUSTER_PGBOUNCER-USERS.TXT  
- POSTGRESCLUSTER_TLS.KEY  
- POSTGRESCLUSTER_PGBACKREST_INSTANCE.CONF  
- POSTGRESCLUSTER_PGBOUNCER-PASSWORD  
- POSTGRESCLUSTER_PATRONI.CA-ROOTS  
- POSTGRESCLUSTER_DBNAME  
- POSTGRESCLUSTER_PGBOUNCER-PASSWORD  
- POSTGRESCLUSTER_SSHD_CONFIG  
- POSTGRESCLUSTER_PGBOUNCER-FRONTEND.KEY  
- POSTGRESCLUSTER_PGBACKREST_INSTANCE_CONFIG
Some of these variables are used in the backend component’s `src/main/resources/application.properties` file so that the Java Spring Boot application can connect to the PostgreSQL database service.

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

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

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

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

b. `odo-service-backend-postgresql-hippo.yaml` - the link created using `odo link` command.

### 3.5.6.2.2. Using `odo link` with the --inlined flag

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

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

```
$ odo unlink PostgresCluster/hippo

✓ Successfully unlinked component “backend” from service “PostgresCluster/hippo”
```

To apply the changes, please use `odo push`

To unlink them on the cluster, run `odo push`. Now if you inspect the `kubernetes/` directory, you see only one file:
Next, use the `--inlined` flag to create a link:

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

**Example output:**

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

To apply the link, please use `odo push`

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

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

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

### 3.5.6.2.3. Custom bindings

`odo link` accepts the flag `--map` which can inject custom binding information into the component. Such binding information will be fetched from the manifest of the resource that you are linking to your component. For example, in the context of the backend component and PostgreSQL service, you can inject information from the PostgreSQL service's manifest `postgresqlcluster.yaml` file into the backend component.
If the name of your `PostgresCluster` service is `hippo` (or the output of `odo service list`, if your PostgresCluster service is named differently), when you want to inject the value of `postgresVersion` from that YAML definition into your backend component, run the command:

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

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

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

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

Example output:

```
pgVersion=13
```

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

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

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

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

Example output:

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

3.5.6.2.3.1. To inline or not?

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

3.5.6.3. Binding as files

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

Ensure that there are no existing links between the backend component and the PostgreSQL service. You could do this by running `odo describe` in the backend component’s directory and check if you see output similar to the following:
Linked Services:
· PostgresCluster/hippo

Unlink the service from the component using:

$ odo unlink PostgresCluster/hippo
$ odo push

3.5.6.4. --bind-as-files examples

3.5.6.4.1. Using the default odo link

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

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

Example odo describe output:

$ odo describe

Component Name: backend
Type: spring
Environment Variables:
· PROJECTS_ROOT=/projects
· PROJECT_SOURCE=/projects
· DEBUG_PORT=5858
· SERVICE_BINDING_ROOT=/bindings
· SERVICE_BINDING_ROOT=/bindings
Storage:
· m2 of size 3Gi mounted to /home/user/.m2
URLs:
· http://8080-tcp.192.168.39.112.nip.io exposed via 8080
Linked Services:
· PostgresCluster/hippo
Files:
· /bindings/backend-postgrescluster-hippo/pgbackrest_instance.conf
· /bindings/backend-postgrescluster-hippo/user
· /bindings/backend-postgrescluster-hippo/ssh_known_hosts
· /bindings/backend-postgrescluster-hippo/clusterIP
· /bindings/backend-postgrescluster-hippo/password
· /bindings/backend-postgrescluster-hippo/patroni.yaml
· /bindings/backend-postgrescluster-hippo/pgbouncer-frontend.crt
· /bindings/backend-postgrescluster-hippo/pgbouncer-host
· /bindings/backend-postgrescluster-hippo/root.key
· /bindings/backend-postgrescluster-hippo/pgbouncer-frontend.key
· /bindings/backend-postgrescluster-hippo/pgbouncer-empty
· /bindings/backend-postgrescluster-hippo/uri
· /bindings/backend-postgrescluster-hippo/config-hash
· /bindings/backend-postgrescluster-hippo/pgbouncer-frontend
· /bindings/backend-postgrescluster-hippo/pgbouncer-empty
· /bindings/backend-postgrescluster-hippo/port
· /bindings/backend-postgrescluster-hippo/dns.crt
Everything that was an environment variable in the **key=value** format in the earlier `odo describe` output is now mounted as a file. Use the `cat` command to view the contents of some of these files:

**Example command:**
```
$ odo exec -- cat /bindings/backend-postgrescluster-hippo/password
```

**Example output:**
```
qu(JC:jn^mm/Bw)eu+j.GX{k
```

**Example command:**
```
$ odo exec -- cat /bindings/backend-postgrescluster-hippo/user
```

**Example output:**
```
hippo
```

**Example command:**
```
$ odo exec -- cat /bindings/backend-postgrescluster-hippo/clusterIP
```

**Example output:**
```
10.101.78.56
```

### 3.5.6.4.2. Using `--inlined`

The result of using `--bind-as-files` and `--inlined` together is similar to using `odo link --inlined`. The files include:

- `/bindings/backend-postgrescluster-hippo/pgbouncer-uri`
- `/bindings/backend-postgrescluster-hippo/root.crt`
- `/bindings/backend-postgrescluster-hippo/ssh_config`
- `/bindings/backend-postgrescluster-hippo/dns.key`
- `/bindings/backend-postgrescluster-hippo/host`
- `/bindings/backend-postgrescluster-hippo/patroni.crt-combined`
- `/bindings/backend-postgrescluster-hippo/pgbouncer-frontend.ca-roots`
- `/bindings/backend-postgrescluster-hippo/tls.key`
- `/bindings/backend-postgrescluster-hippo/verifier`
- `/bindings/backend-postgrescluster-hippo/ca.crt`
- `/bindings/backend-postgrescluster-hippo/dbname`
- `/bindings/backend-postgrescluster-hippo/patroni.ca-roots`
- `/bindings/backend-postgrescluster-hippo/pgbackrest_repo.conf`
- `/bindings/backend-postgrescluster-hippo/pgbouncer-port`
- `/bindings/backend-postgrescluster-hippo/pgbouncer-verifier`
- `/bindings/backend-postgrescluster-hippo/id_ecdsa`
- `/bindings/backend-postgrescluster-hippo/id_ecdsa.pub`
- `/bindings/backend-postgrescluster-hippo/pgbouncer-password`
- `/bindings/backend-postgrescluster-hippo/pgbouncer-users.txt`
- `/bindings/backend-postgrescluster-hippo/sshd_config`
- `/bindings/backend-postgrescluster-hippo/tls.crt`
- `/bindings/backend-postgrescluster-hippo/pgbouncer-password`
- `/bindings/backend-postgrescluster-hippo/pgbouncer-users.txt`
- `/bindings/backend-postgrescluster-hippo/sshd_config`
- `/bindings/backend-postgrescluster-hippo/tls.crt`
The result of using `--bind-as-files` and `--inlined` together is similar to using `odo link --inlined`. The manifest of the link gets stored in the `devfile.yaml`, instead of being stored in a separate file under `kubernetes/` directory. Other than that, the `odo describe` output would be the same as earlier.

### 3.5.6.4.3. Custom bindings

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

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

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

**Example command:**

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

**Example output:**

```
13
```

**Example command:**

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

**Example output:**

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

### 3.5.7. odo registry

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

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

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

#### 3.5.7.1. Listing the registries

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

```bash
$ odo registry list
```

**Example output:**

```
NAME                       URL                             SECURE
DefaultDevfileRegistry     https://registry.devfile.io     No
```
DefaultDevfileRegistry is the default registry used by odo; it is provided by the devfile.io project.

3.5.7.2. Adding a registry

To add a registry, run the command:

```
$ odo registry add
```

Example output:

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

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

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

3.5.7.3. Deleting a registry

To delete a registry, run the command:

```
$ odo registry delete
```

Example output:

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

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

3.5.7.4. Updating a registry

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

```
$ odo registry update
```

Example output:

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

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

3.5.8. odo service

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

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

A service is deployed using two steps:

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

3.5.8.1. Creating a new service

To create a new service, run the command:

```
$ odo service create
```

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

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

Example output

```
Successfully added service to the configuration; do 'odo push' to create service on the cluster
```

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

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

Example output

```
apiVersion: redis.redis.opstreelabs.in/v1beta1
kind: Redis
metadata:
  name: my-redis-service
spec:
  kubernetesConfig:
    image: quay.io/opstree/redis:v6.2.5
    imagePullPolicy: IfNotPresent
    resources:
      limits:
        cpu: 101m
        memory: 128Mi
      requests:
        cpu: 101m
        memory: 128Mi
    serviceType: ClusterIP
```
Note that the name of the created instance is optional. If you do not provide a name, it will be the lowercase name of the service. For example, the following command creates an instance of a Redis service named `redis`:

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

### 3.5.8.1.1. Inlining the manifest

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

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

Successfully added service to the configuration; do 'odo push' to create service on the cluster
3.5.8.1.2 Configuring the service

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

3.5.8.1.2.1 Using command-line arguments

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

The following example configures the Redis service with three parameters:

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

Example command

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

Example output

```
apiVersion: redis.redis.opstreelabs.in/v1beta1
kind: Redis
metadata:
  name: my-redis-service
```
You can obtain the possible parameters for a specific service using the `odo catalog describe service` command.

### 3.5.8.1.2.2. Using a file

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

1. Create a manifest:

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

2. Create the service from the manifest:

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

### 3.5.8.2. Deleting a service

To delete a service, run the command:

```
$ odo service delete
```

**Example output**

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

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

Use the `--force` (or `-f`) flag to force the deletion of the service without confirmation.
3.5.8.3. Listing services

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

```
$ odo service list
```

Example output:

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

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

3.5.8.4. Getting information about a service

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

```
$ odo service describe
```

Example output:

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

3.5.9. odo storage

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

3.5.9.1. Adding a storage volume

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

```
$ odo storage create
```

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

3.5.9.2. Listing the storage volumes

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

$ odo storage list

Example output:

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

3.5.9.3. Deleting a storage volume

To delete a storage volume, run the command:

$ odo storage delete

Example output:

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

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

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

3.5.9.4. Adding storage to specific container

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

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

components:
  - name: nodejs1
    container:
      image: registry.access.redhat.com/ubi8/nodejs-12:1-36
      memoryLimit: 1024Mi
In the example, there are two containers, `nodejs1` and `nodejs2`. To attach storage to the `nodejs2` container, use the following command:

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

**Example output:**

```bash
✓ Added storage store to nodejs-testing-xnfg
```

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

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

```bash
$ odo storage list
```

**Example output:**

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

### 3.5.10. Common flags

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

#### Table 3.1. odo flags

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--context</code></td>
<td>Set the context directory where the component is defined.</td>
</tr>
<tr>
<td><code>--project</code></td>
<td>Set the project for the component. Defaults to the project defined in the local configuration. If none is available, then current project on the cluster.</td>
</tr>
<tr>
<td><code>--app</code></td>
<td>Set the application of the component. Defaults to the application defined in the local configuration. If none is available, then <code>app</code>.</td>
</tr>
<tr>
<td><code>--kubeconfig</code></td>
<td>Set the path to the <code>kubeconfig</code> value if not using the default configuration.</td>
</tr>
<tr>
<td><code>--show-log</code></td>
<td>Use this flag to see the logs.</td>
</tr>
</tbody>
</table>
### Command Description

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-f, --force</code></td>
<td>Use this flag to tell the command not to prompt the user for confirmation.</td>
</tr>
<tr>
<td><code>-v, --v</code></td>
<td>Set the verbosity level. See <a href="#">Logging in odo</a> for more information.</td>
</tr>
<tr>
<td><code>-h, --help</code></td>
<td>Output the help for a command.</td>
</tr>
</tbody>
</table>

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

### 3.5.11. JSON output

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

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

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

*Delete* commands return a `Status` resource; see the [Status Kubernetes resource](#).

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

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

<table>
<thead>
<tr>
<th>Commands</th>
<th>Kind (version)</th>
<th>Kind (version) of list items</th>
<th>Complete content?</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>odo application describe</code></td>
<td>Application (odo.dev/v1alpha1)</td>
<td><code>n/a</code></td>
<td>no</td>
</tr>
<tr>
<td><code>odo application list</code></td>
<td>List (odo.dev/v1alpha1)</td>
<td>Application (odo.dev/v1alpha1)</td>
<td>?</td>
</tr>
<tr>
<td><code>odo catalog list components</code></td>
<td>List (odo.dev/v1alpha1)</td>
<td><code>missing</code></td>
<td>yes</td>
</tr>
<tr>
<td><code>odo catalog list services</code></td>
<td>List (odo.dev/v1alpha1)</td>
<td>ClusterServiceVersion (operators.coreos.com/v1alpha1)</td>
<td>?</td>
</tr>
<tr>
<td><code>odo catalog describe component</code></td>
<td><code>missing</code></td>
<td><code>n/a</code></td>
<td>yes</td>
</tr>
<tr>
<td>Commands</td>
<td>Kind (version)</td>
<td>Kind (version) of list items</td>
<td>Complete content?</td>
</tr>
<tr>
<td>-----------------------</td>
<td>------------------------------------</td>
<td>------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>odo catalog describe</td>
<td>CRDDescription (odo.dev/v1alpha1)</td>
<td>n/a</td>
<td>yes</td>
</tr>
<tr>
<td>service</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>odo component create</td>
<td>Component (odo.dev/v1alpha1)</td>
<td>n/a</td>
<td>yes</td>
</tr>
<tr>
<td>odo component</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>describe</td>
<td>Component (odo.dev/v1alpha1)</td>
<td>n/a</td>
<td>yes</td>
</tr>
<tr>
<td>odo component list</td>
<td>List (odo.dev/v1alpha1)</td>
<td>Component (odo.dev/v1alpha1)</td>
<td>yes</td>
</tr>
<tr>
<td>odo config view</td>
<td>DevfileConfiguration (odo.dev/v1alpha1)</td>
<td>n/a</td>
<td>yes</td>
</tr>
<tr>
<td>odo debug info</td>
<td>OdoDebugInfo (odo.dev/v1alpha1)</td>
<td>n/a</td>
<td>yes</td>
</tr>
<tr>
<td>odo env view</td>
<td>EnvInfo (odo.dev/v1alpha1)</td>
<td>n/a</td>
<td>yes</td>
</tr>
<tr>
<td>odo preference view</td>
<td>PreferenceList (odo.dev/v1alpha1)</td>
<td>n/a</td>
<td>yes</td>
</tr>
<tr>
<td>odo project create</td>
<td>Project (odo.dev/v1alpha1)</td>
<td>n/a</td>
<td>yes</td>
</tr>
<tr>
<td>odo project delete</td>
<td>Status (v1)</td>
<td>n/a</td>
<td>yes</td>
</tr>
<tr>
<td>odo project get</td>
<td>Project (odo.dev/v1alpha1)</td>
<td>n/a</td>
<td>yes</td>
</tr>
<tr>
<td>odo project list</td>
<td>List (odo.dev/v1alpha1)</td>
<td>Project (odo.dev/v1alpha1)</td>
<td>yes</td>
</tr>
<tr>
<td>odo registry list</td>
<td>List (odo.dev/v1alpha1)</td>
<td>missing</td>
<td>yes</td>
</tr>
<tr>
<td>odo service create</td>
<td>Service</td>
<td>n/a</td>
<td>yes</td>
</tr>
<tr>
<td>odo service describe</td>
<td>Service</td>
<td>n/a</td>
<td>yes</td>
</tr>
<tr>
<td>odo service list</td>
<td>List (odo.dev/v1alpha1)</td>
<td>Service</td>
<td>yes</td>
</tr>
<tr>
<td>odo storage create</td>
<td>Storage (odo.dev/v1alpha1)</td>
<td>n/a</td>
<td>yes</td>
</tr>
<tr>
<td>Commands</td>
<td>Kind (version)</td>
<td>Kind (version) of list items</td>
<td>Complete content?</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------------------------------</td>
<td>-----------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>odo storage delete</td>
<td>Status (v1)</td>
<td>n/a</td>
<td>yes</td>
</tr>
<tr>
<td>odo storage list</td>
<td>List (odo.dev/v1alpha1)</td>
<td>Storage (odo.dev/v1alpha1)</td>
<td>yes</td>
</tr>
<tr>
<td>odo url list</td>
<td>List (odo.dev/v1alpha1)</td>
<td>URL (odo.dev/v1alpha1)</td>
<td>yes</td>
</tr>
</tbody>
</table>
CHAPTER 4. KNATIVE CLI FOR USE WITH OPENSIGHT SERVERLESS

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

4.1. KEY FEATURES

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

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

4.2. INSTALLING THE KNATIVE CLI

See Installing the Knative CLI.
CHAPTER 5. PIPELINES CLI (TKN)

5.1. INSTALLING TKN

Use the **tkn** CLI tool 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**.

**IMPORTANT**

Running Red Hat OpenShift Pipelines on ARM hardware is a Technology Preview feature only. Technology Preview features are not supported with Red Hat production service level agreements (SLAs) and might not be functionally complete. Red Hat does not recommend using them in production. These features provide early access to upcoming product features, enabling customers to test functionality and provide feedback during the development process.

For more information about the support scope of Red Hat Technology Preview features, see [https://access.redhat.com/support/offerings/techpreview/](https://access.redhat.com/support/offerings/techpreview/).

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 tool.
   - Linux (x86_64, amd64)
   - Linux on IBM Z and LinuxONE (s390x)
   - Linux on IBM Power (ppc64le)
   - Linux on ARM (arm64)

2. Unpack the archive:
   ```
   $ tar xvzf <file>
   ```

3. Place the **tkn** and **tkn-pac** binaries 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-1.8-for-rhel-8-x86_64-rpms"
     ```
   - Linux on IBM Z and LinuxONE (s390x)
     ```
     # subscription-manager repos --enable="pipelines-1.8-for-rhel-8-s390x-rpms"
     ```
   - Linux on IBM Power (ppc64le)
     ```
     # subscription-manager repos --enable="pipelines-1.8-for-rhel-8-ppc64le-rpms"
     ```
   - Linux on ARM (arm64)
     ```
     # subscription-manager repos --enable="pipelines-1.8-for-rhel-8-arm64-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 tool.
2. Unzip the archive with a ZIP program.
3. Add the location of your tkn.exe and tkn-pac.exe files 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 relevant CLI tool.
   - macOS
   - macOS on ARM
2. Unpack and unzip the archive.
3. Move the tkn and tkn-pac binaries to a directory on your PATH.
4. To check your PATH, open a terminal window and run:
   ```
   $ echo $PATH
   ```

5.2. CONFIGURING THE OPENSIFT 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

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

Replace 5 with the number of most recently executed task runs you want to retain.

5.3.7.4. taskrun describe

5.3.7.5. taskrun log
Display log of a TaskRun.

Example: Display the log of the mytaskrun task run of the mytask task

$ tkn taskrun log mytask mytaskrun -n myspace
Describe a task run.

**Example: Describe the *mytaskrun* task run in a namespace**

```bash
$ tkn taskrun describe mytaskrun -n myspace
```

5.3.7.5. **taskrun list**

List task runs.

**Example: List all the task runs in a namespace**

```bash
$ 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**

```bash
$ tkn taskrun logs -f mytaskrun -n myspace
```

5.3.8. **Condition management commands**

5.3.8.1. **condition**

Manage Conditions.

**Example: Display help**

```bash
$ tkn condition --help
```

5.3.8.2. **condition delete**

Delete a Condition.

**Example: Delete the *mycondition1* Condition from a namespace**

```bash
$ tkn condition delete mycondition1 -n myspace
```

5.3.8.3. **condition describe**

Describe a Condition.

**Example: Describe the *mycondition1* Condition in a namespace**

```bash
$ 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 clustertask --help
```
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
5.3.12.8. hub upgrade

Upgrade an installed resource.

Example: Upgrade the installed mytask task in the mynamespace namespace to a new version

```bash
$ tkn hub search --tags cli

$ 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:
     ```bash
     $ 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

### 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> [command-options] [arguments] [flags]

### Table 6.1. Global flags

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--skip-tls</td>
<td>Skip TLS certificate verification for container image registries while pulling bundles or indexes.</td>
</tr>
</tbody>
</table>
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. init

Generate an olm.package declarative config blob.

Command syntax

```bash
$ opm init <package_name> [<flags>]
```

Table 6.2. init flags

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-c, --default-channel (string)</td>
<td>The channel that subscriptions will default to if unspecified.</td>
</tr>
<tr>
<td>-d, --description (string)</td>
<td>Path to the Operator’s README.md or other documentation.</td>
</tr>
<tr>
<td>-i, --icon (string)</td>
<td>Path to package’s icon.</td>
</tr>
<tr>
<td>-o, --output (string)</td>
<td>Output format: json (the default value) or yaml.</td>
</tr>
</tbody>
</table>

6.2.2. render

Generate a declarative config blob from the provided index images, bundle images, and SQLite database files.

Command syntax

```bash
$ opm render <index_image | bundle_image | sqlite_file> [<flags>]
```

Table 6.3. render flags

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-o, --output (string)</td>
<td>Output format: json (the default value) or yaml.</td>
</tr>
</tbody>
</table>

6.2.3. validate
Validate the declarative config JSON file(s) in a given directory.

Command syntax

```
$ opm validate <directory> [flags]
```

6.2.4. 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 6.4. serve flags

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--debug</code></td>
<td>Enable debug logging.</td>
</tr>
<tr>
<td><code>-p, --port (string)</code></td>
<td>Port number to serve on. Default: 50051.</td>
</tr>
<tr>
<td><code>-t, --termination-log (string)</code></td>
<td>Path to a container termination log file. Default: /dev/termination-log.</td>
</tr>
</tbody>
</table>

6.2.5. index

Generate Operator index for SQLite database format container images from pre-existing Operator bundles.

IMPORTANT

As of OpenShift Container Platform 4.11, the default Red Hat-provided Operator catalog releases in the file-based catalog format. The default Red Hat-provided Operator catalogs for OpenShift Container Platform 4.6 through 4.10 released in the deprecated SQLite database format.

The `opm` subcommands, flags, and functionality related to the SQLite database format are also deprecated and will be removed in a future release. The features are still supported and must be used for catalogs that use the deprecated SQLite database format.

Many of the `opm` subcommands and flags for working with the SQLite database format, such as `opm index prune`, do not work with the file-based catalog format. For more information about working with file-based catalogs, see "Additional resources".
Command syntax

\$ opm index <subcommand> [<flags>]

Table 6.5. `index` subcommands

<table>
<thead>
<tr>
<th>Subcommand</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>add</td>
<td>Add Operator bundles to an index.</td>
</tr>
<tr>
<td>prune</td>
<td>Prune an index of all but specified packages.</td>
</tr>
<tr>
<td>prune-stranded</td>
<td>Prune an index of stranded bundles, which are bundles that are not associated with a particular image.</td>
</tr>
<tr>
<td>rm</td>
<td>Delete an entire Operator from an index.</td>
</tr>
</tbody>
</table>

6.2.5.1. add

Add Operator bundles to an index.

Command syntax

\$ opm index add [<flags>]

Table 6.6. `index add` flags

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-i, --binary-image</td>
<td>Container image for on-image <code>opm</code> command</td>
</tr>
<tr>
<td>-u, --build-tool (string)</td>
<td>Tool to build container images: <code>podman</code> (the default value) or <code>docker</code>. Overrides part of the <code>--container-tool</code> flag.</td>
</tr>
<tr>
<td>-b, --bundles (strings)</td>
<td>Comma-separated list of bundles to add.</td>
</tr>
<tr>
<td>-c, --container-tool (string)</td>
<td>Tool to interact with container images, such as for saving and building: <code>docker</code> or <code>podman</code>.</td>
</tr>
<tr>
<td>-f, --from-index (string)</td>
<td>Previous index to add to.</td>
</tr>
<tr>
<td>--generate</td>
<td>If enabled, only creates the Dockerfile and saves it to local disk.</td>
</tr>
<tr>
<td>--mode (string)</td>
<td>Graph update mode that defines how channel graphs are updated: <code>replaces</code> (the default value), <code>semver</code>, or <code>semver-skippatch</code>.</td>
</tr>
<tr>
<td>-d, --out-dockerfile (string)</td>
<td>Optional: If generating the Dockerfile, specify a file name.</td>
</tr>
<tr>
<td>Flag</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>--permissive</td>
<td>Allow registry load errors.</td>
</tr>
<tr>
<td>-p, --pull-tool (string)</td>
<td>Tool to pull container images: none (the default value), docker, or podman. Overrides part of the --container-tool flag.</td>
</tr>
<tr>
<td>-t, --tag (string)</td>
<td>Custom tag for container image being built.</td>
</tr>
</tbody>
</table>

### 6.2.5.2. prune

Prune an index of all but specified packages.

**Command syntax**

```
$ opm index prune [<flags>]
```

**Table 6.7. index prune flags**

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-i, --binary-image</td>
<td>Container image for on-image opm command</td>
</tr>
<tr>
<td>-c, --container-tool (string)</td>
<td>Tool to interact with container images, such as for saving and building: docker or podman.</td>
</tr>
<tr>
<td>-f, --from-index (string)</td>
<td>Index to prune.</td>
</tr>
<tr>
<td>--generate</td>
<td>If enabled, only creates the Dockerfile and saves it to local disk.</td>
</tr>
<tr>
<td>-d, --out-dockerfile (string)</td>
<td>Optional: If generating the Dockerfile, specify a file name.</td>
</tr>
<tr>
<td>-p, --packages (strings)</td>
<td>Comma-separated list of packages to keep.</td>
</tr>
<tr>
<td>--permissive</td>
<td>Allow registry load errors.</td>
</tr>
<tr>
<td>-t, --tag (string)</td>
<td>Custom tag for container image being built.</td>
</tr>
</tbody>
</table>

### 6.2.5.3. 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 6.8. index prune-stranded flags**

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-i, --binary-image</td>
<td>Container image for on-image <code>opm</code> command</td>
</tr>
<tr>
<td>-c, --container-tool</td>
<td>Tool to interact with container images, such as for saving and building: <code>docker</code> or <code>podman</code>.</td>
</tr>
<tr>
<td>-f, --from-index</td>
<td>Index to prune.</td>
</tr>
<tr>
<td>--generate</td>
<td>If enabled, only creates the Dockerfile and saves it to local disk.</td>
</tr>
<tr>
<td>-d, --out-dockerfile</td>
<td>Optional: If generating the Dockerfile, specify a file name.</td>
</tr>
<tr>
<td>-p, --packages</td>
<td>Comma-separated list of packages to keep.</td>
</tr>
<tr>
<td>--permissive</td>
<td>Allow registry load errors.</td>
</tr>
<tr>
<td>-t, --tag</td>
<td>Custom tag for container image being built.</td>
</tr>
</tbody>
</table>

**6.2.5.4. rm**

Delete an entire Operator from an index.

**Command syntax**

```
$ opm index rm [<flags>]
```

**Table 6.9. index rm flags**

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-i, --binary-image</td>
<td>Container image for on-image <code>opm</code> command</td>
</tr>
<tr>
<td>-u, --build-tool</td>
<td>Tool to build container images: <code>podman</code> (the default value) or <code>docker</code>. Overrides part of the <code>--container-tool</code> flag.</td>
</tr>
<tr>
<td>-c, --container-tool</td>
<td>Tool to interact with container images, such as for saving and building: <code>docker</code> or <code>podman</code>.</td>
</tr>
<tr>
<td>-f, --from-index</td>
<td>Previous index to delete from.</td>
</tr>
<tr>
<td>--generate</td>
<td>If enabled, only creates the Dockerfile and saves it to local disk.</td>
</tr>
<tr>
<td>Flag</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>-o, --operators</td>
<td>Comma-separated list of Operators to delete.</td>
</tr>
<tr>
<td>(strings)</td>
<td></td>
</tr>
<tr>
<td>-d, --out-dockerfile</td>
<td>Optional: If generating the Dockerfile, specify a file name.</td>
</tr>
<tr>
<td>(string)</td>
<td></td>
</tr>
<tr>
<td>-p, --packages</td>
<td>Comma-separated list of packages to keep.</td>
</tr>
<tr>
<td>(strings)</td>
<td></td>
</tr>
<tr>
<td>--permissive</td>
<td>Allow registry load errors.</td>
</tr>
<tr>
<td>-p, --pull-tool</td>
<td>Tool to pull container images: <strong>none</strong> (the default value), <strong>docker</strong>, or <strong>podman</strong>.</td>
</tr>
<tr>
<td>(string)</td>
<td>Overrides part of the <strong>--container-tool</strong> flag.</td>
</tr>
<tr>
<td>-t, --tag</td>
<td>Custom tag for container image being built.</td>
</tr>
<tr>
<td>(string)</td>
<td></td>
</tr>
</tbody>
</table>

**Additional resources**

- Operator Framework packaging format
- Managing custom catalogs
- Mirroring images for a disconnected installation using the oc-mirror plug-in
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 v1.16.0.

7.1.1. Installing the Operator SDK CLI

You can install the OpenShift SDK CLI tool on Linux.

Prerequisites

- Go v1.18+
- docker v17.03+, podman v1.9.3+, or buildah v1.7+

Procedure

1. Navigate to the OpenShift mirror site.
2. From the latest 4.11 directory, download the latest version of the tarball for Linux.
3. Unpack the archive:

   ```bash
   $ tar xvf operator-sdk-v1.22.0-ocp-linux-x86_64.tar.gz
   ```
4. Make the file executable:

   ```bash
   $ chmod +x operator-sdk
   ```
5. Move the extracted operator-sdk binary to a directory that is on your PATH.

   TIP

   To check your PATH:

   ```bash
   $ 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: "v1.22.0-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

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-h, --help</td>
<td>Help output for the bundle validate subcommand.</td>
</tr>
<tr>
<td>--index-builder</td>
<td>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.</td>
</tr>
<tr>
<td>(string)</td>
<td></td>
</tr>
<tr>
<td>--list-optional</td>
<td>List all optional validators available. When set, no validators are run.</td>
</tr>
<tr>
<td>--select-optional</td>
<td>Label selector to select optional validators to run. When run with the --list-optional flag, lists available optional validators.</td>
</tr>
<tr>
<td>(string)</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-h, --help</td>
<td>Help output for the run bundle subcommand.</td>
</tr>
<tr>
<td>--kubeconfig (string)</td>
<td>Path to the kubeconfig file to use for CLI requests.</td>
</tr>
<tr>
<td>n, --namespace (string)</td>
<td>If present, namespace in which to run the CLI request.</td>
</tr>
<tr>
<td>--timeout &lt;duration&gt;</td>
<td>Time to wait for the command to complete before failing. The default value is 2m0s.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Subcommand</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bash</td>
<td>Generate bash completions.</td>
</tr>
<tr>
<td>zsh</td>
<td>Generate zsh completions.</td>
</tr>
</tbody>
</table>

Table 7.4. completion flags

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-h, --help</td>
<td>Usage help output.</td>
</tr>
</tbody>
</table>

For example:

$ operator-sdk completion bash

Example output

```
# bash completion for operator-sdk
...  
# 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

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-h, --help</code></td>
<td>Help output for the <code>run bundle</code> subcommand.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--channels</code> (string)</td>
<td>Comma-separated list of channels to which the bundle belongs. The default value is <code>alpha</code>.</td>
</tr>
<tr>
<td><code>--crds-dir</code> (string)</td>
<td>Root directory for <code>CustomResoureDefinition</code> manifests.</td>
</tr>
<tr>
<td><code>--default-channel</code> (string)</td>
<td>The default channel for the bundle.</td>
</tr>
<tr>
<td><code>--deploy-dir</code> (string)</td>
<td>Root directory for Operator manifests, such as deployments and RBAC. This directory is different from the directory passed to the <code>--input-dir</code> flag.</td>
</tr>
<tr>
<td><code>-h, --help</code></td>
<td>Help for <code>generate bundle</code></td>
</tr>
<tr>
<td><code>--input-dir</code> (string)</td>
<td>Directory from which to read an existing bundle. This directory is the parent of your bundle <code>manifests</code> directory and is different from the <code>--deploy-dir</code> directory.</td>
</tr>
<tr>
<td><code>--kustomize-dir</code> (string)</td>
<td>Directory containing Kustomize bases and a <code>kustomization.yaml</code> file for bundle manifests. The default path is <code>config/manifests</code>.</td>
</tr>
<tr>
<td><code>--manifests</code></td>
<td>Generate bundle manifests.</td>
</tr>
</tbody>
</table>
### 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

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--apis-dir</code> (string)</td>
<td>Root directory for API type definitions.</td>
</tr>
<tr>
<td><code>-h, --help</code></td>
<td>Help for <code>generate kustomize manifests</code>.</td>
</tr>
<tr>
<td><code>--input-dir</code> (string)</td>
<td>Directory containing existing Kustomize files.</td>
</tr>
<tr>
<td><code>--interactive</code></td>
<td>When set to <code>false</code>, if no Kustomize base exists, an interactive command prompt is presented to accept custom metadata.</td>
</tr>
</tbody>
</table>
7.2.6. init

The `operator-sdk init` command initializes an Operator project and generates, or scaffolds, a default project directory layout for the given plug-in.

This command writes the following files:

- Boilerplate license file
- `PROJECT` file with the domain and repository
- `Makefile` to build the project
- `go.mod` file with project dependencies
- `kustomization.yaml` file for customizing manifests
- Patch file for customizing images for manager manifests
- Patch file for enabling Prometheus metrics
- `main.go` file to run

Table 7.8. init flags

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--output-dir</code> (string)</td>
<td>Directory where to write Kustomize files.</td>
</tr>
<tr>
<td><code>--package</code> (string)</td>
<td>Package name.</td>
</tr>
<tr>
<td><code>-q</code>, <code>--quiet</code></td>
<td>Run in quiet mode.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--index-image (string)</code></td>
<td>Index image in which to inject a bundle. The default image is <code>quay.io/operator-framework/upstream-opm-builder:latest</code>.</td>
</tr>
<tr>
<td><code>--install-mode &lt;install_mode_value&gt;</code></td>
<td>Install mode supported by the cluster service version (CSV) of the Operator, for example <strong>AllNamespaces</strong> or <strong>SingleNamespace</strong>.</td>
</tr>
<tr>
<td><code>--timeout &lt;duration&gt;</code></td>
<td>Install timeout. The default value is <strong>2m0s</strong>.</td>
</tr>
<tr>
<td><code>--kubeconfig (string)</code></td>
<td>Path to the <code>kubeconfig</code> file to use for CLI requests.</td>
</tr>
<tr>
<td><code>--namespace (string)</code></td>
<td>If present, namespace in which to run the CLI request.</td>
</tr>
<tr>
<td><code>-h, --help</code></td>
<td>Help output for the <strong>run bundle</strong> subcommand.</td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>--timeout &lt;duration&gt;</code></td>
<td>Upgrade timeout. The default value is <strong>2m0s</strong>.</td>
</tr>
<tr>
<td><code>--kubeconfig (string)</code></td>
<td>Path to the <code>kubeconfig</code> file to use for CLI requests.</td>
</tr>
<tr>
<td><code>--namespace (string)</code></td>
<td>If present, namespace in which to run the CLI request.</td>
</tr>
<tr>
<td><code>-h, --help</code></td>
<td>Help output for the <strong>run bundle</strong> subcommand.</td>
</tr>
</tbody>
</table>

#### 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

<table>
<thead>
<tr>
<th>Flag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-c, --config (string)</code></td>
<td>Path to scorecard configuration file. The default path is <code>bundle/tests/scorecard/config.yaml</code>.</td>
</tr>
<tr>
<td><code>-h, --help</code></td>
<td>Help output for the <code>scorecard</code> command.</td>
</tr>
<tr>
<td><code>--kubeconfig (string)</code></td>
<td>Path to <code>kubeconfig</code> file.</td>
</tr>
<tr>
<td><code>-L, --list</code></td>
<td>List which tests are available to run.</td>
</tr>
<tr>
<td><code>-n, --namespace (string)</code></td>
<td>Namespace in which to run the test images.</td>
</tr>
<tr>
<td><code>-o, --output (string)</code></td>
<td>Output format for results. Available values are <code>text</code>, which is the default, and <code>json</code>.</td>
</tr>
<tr>
<td><code>-l, --selector (string)</code></td>
<td>Label selector to determine which tests are run.</td>
</tr>
<tr>
<td><code>-s, --service-account (string)</code></td>
<td>Service account to use for tests. The default value is <code>default</code>.</td>
</tr>
<tr>
<td><code>-x, --skip-cleanup</code></td>
<td>Disable resource cleanup after tests are run.</td>
</tr>
<tr>
<td><code>-w, --wait-time &lt;duration&gt;</code></td>
<td>Seconds to wait for tests to complete, for example 35s. The default value is 30s.</td>
</tr>
</tbody>
</table>

Additional resources

- See Validating Operators using the scorecard tool for details about running the scorecard tool.