Red Hat OpenShift Pipelines 1.19

Creating CI/CD pipelines

Getting started with creating and running tasks and pipelines in OpenShift Pipelines

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Legal Notice

Abstract

This document provides information about creating and running tasks and pipelines in OpenShift Pipelines.

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CHAPTER 1. CREATING CI/CD SOLUTIONS FOR APPLICATIONS USING OPENSHIFT PIPELINES

With Red Hat OpenShift Pipelines, you can create a customized CI/CD solution to build, test, and deploy your application.

To create a full-fledged, self-serving CI/CD pipeline for an application, perform the following tasks:

- Create custom tasks, or install existing reusable tasks.
- Create and define the delivery pipeline for your application.
- Provide a storage volume or filesystem that is attached to a workspace for the pipeline execution, using one of the following approaches:
  - Specify a volume claim template that creates a persistent volume claim
  - Specify a persistent volume claim
- Create a **PipelineRun** object to instantiate and invoke the pipeline.
- Add triggers to capture events in the source repository.

This section uses the **pipelines-tutorial** example to demonstrate the preceding tasks. The example uses a simple application which consists of:

- A front-end interface, **pipelines-vote-ui**, with the source code in the **pipelines-vote-ui** Git repository.
- A back-end interface, **pipelines-vote-api**, with the source code in the **pipelines-vote-api** Git repository.
- The **apply-manifests** and **update-deployment** tasks in the **pipelines-tutorial** Git repository.

1.1. PREREQUISITES

- You have access to an OpenShift Container Platform cluster.
- You have installed OpenShift Pipelines using the Red Hat OpenShift Pipelines Operator listed in the OpenShift OperatorHub. After it is installed, it is applicable to the entire cluster.
- You have installed OpenShift Pipelines CLI.
- You have forked the front-end **pipelines-vote-ui** and back-end **pipelines-vote-api** Git repositories using your GitHub ID, and have administrator access to these repositories.
- Optional: You have cloned the **pipelines-tutorial** Git repository.

1.2. CREATING A PROJECT AND CHECKING YOUR PIPELINE SERVICE ACCOUNT

Procedure

1. Log in to your OpenShift Container Platform cluster:
   -

```
$ oc login -u <login> -p <password> https://openshift.example.com:6443
```

2. Create a project for the sample application. For this example workflow, create the **pipelines-tutorial** project:

```
$ oc new-project pipelines-tutorial
```

NOTE

If you create a project with a different name, be sure to update the resource URLs used in the example with your project name.

3. View the **pipeline** service account:
Red Hat OpenShift Pipelines Operator adds and configures a service account named **pipeline** that has sufficient permissions to build and push an image. This service account is used by the **PipelineRun** object.

```
$ oc get serviceaccount pipeline
```

1.3. CREATING PIPELINE TASKS

Procedure

1. Install the **apply-manifests** and **update-deployment** task resources from the **pipelines-tutorial** repository, which contains a list of reusable tasks for pipelines:

```
$ oc create -f https://raw.githubusercontent.com/openshift/pipelines-tutorial/pipelines-1.19/01_pipeline/01_apply_manifest_task.yaml
$ oc create -f https://raw.githubusercontent.com/openshift/pipelines-tutorial/pipelines-1.19/01_pipeline/02_update_deployment_task.yaml
```

2. Use the **tkn task list** command to list the tasks you created:

```
$ tkn task list
```

The output verifies that the **apply-manifests** and **update-deployment** task resources were created:

```
NAME                DESCRIPTION   AGE
apply-manifests                   1 minute ago
update-deployment                 48 seconds ago
```

1.4. ASSEMBLING A PIPELINE

A pipeline represents a CI/CD flow and is defined by the tasks to be executed. It is designed to be generic and reusable in multiple applications and environments.

A pipeline specifies how the tasks interact with each other and their order of execution using the **from** and **runAfter** parameters. It uses the **workspaces** field to specify one or more volumes that each task in the pipeline requires during execution.

In this section, you will create a pipeline that takes the source code of the application from GitHub, and then builds and deploys it on OpenShift Container Platform.

The pipeline performs the following tasks for the back-end application **pipelines-vote-api** and front-end application **pipelines-vote-ui**:

- Clones the source code of the application from the Git repository by referring to the **git-url** and **git-revision** parameters.
- Builds the container image using the **buildah** task provided in the **openshift-pipelines** namespace.
- Pushes the image to the OpenShift image registry by referring to the **image** parameter.
- Deploys the new image on OpenShift Container Platform by using the **apply-manifests** and **update-deployment** tasks.

Procedure

1. Copy the contents of the following sample pipeline YAML file and save it:

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: build-and-deploy
spec:
  workspaces:
  - name: shared-workspace
  params:
  - name: deployment-name
    type: string
    description: name of the deployment to be patched
  - name: git-url
    type: string
    description: url of the git repo for the code of deployment
  - name: git-revision
    type: string
    description: revision to be used from repo of the code for deployment
    default: "pipelines-1.19"
  - name: IMAGE
    type: string
    description: image to be built from the code
  tasks:
  - name: fetch-repository
    taskRef:
      resolver: cluster
      params:
      - name: kind
        value: task
      - name: name
        value: git-clone
      - name: namespace
        value: openshift-pipelines
    workspaces:
    - name: output
      workspace: shared-workspace
```

```
    params:
    - name: URL
      value: $(params.git-url)
    - name: SUBDIRECTORY
      value: ""
    - name: DELETE_EXISTING
      value: "true"
    - name: REVISION
      value: $(params.git-revision)
  - name: build-image
    taskRef:
      resolver: cluster
      params:
      - name: kind
        value: task
      - name: name
        value: buildah
      - name: namespace
        value: openshift-pipelines
    workspaces:
    - name: source
      workspace: shared-workspace
    params:
    - name: IMAGE
      value: $(params.IMAGE)
    runAfter:
    - fetch-repository
  - name: apply-manifests
    taskRef:
      name: apply-manifests
    workspaces:
    - name: source
      workspace: shared-workspace
    runAfter:
    - build-image
  - name: update-deployment
    taskRef:
      name: update-deployment
    params:
    - name: deployment
      value: $(params.deployment-name)
    - name: IMAGE
      value: $(params.IMAGE)
    runAfter:
    - apply-manifests
```

The pipeline definition abstracts away the specifics of the Git source repository and image registries. These details are added as **params** when a pipeline is triggered and executed.

2. Create the pipeline:

```
$ oc create -f <pipeline-yaml-file-name.yaml>
```

Alternatively, you can also execute the YAML file directly from the Git repository:

```
$ oc create -f https://raw.githubusercontent.com/openshift/pipelines-tutorial/pipelines-1.19/01_pipeline/04_pipeline.yaml
```

3. Use the **tkn pipeline list** command to verify that the pipeline is added to the application:

```
$ tkn pipeline list
```

The output verifies that the **build-and-deploy** pipeline was created:

```
NAME              AGE           LAST RUN   STARTED   DURATION   STATUS
build-and-deploy  1 minute ago  ---        ---       ---        ---
```

1.5. MIRRORING IMAGES TO RUN PIPELINES IN A RESTRICTED ENVIRONMENT

To run OpenShift Pipelines in a disconnected cluster or a cluster provisioned in a restricted environment, ensure that either the Samples Operator is configured for a restricted network, or a cluster administrator has created a cluster with a mirrored registry.

The following procedure uses the **pipelines-tutorial** example to create a pipeline for an application in a restricted environment using a cluster with a mirrored registry. To ensure that the **pipelines-tutorial** example works in a restricted environment, you must mirror the respective builder images from the mirror registry for the front-end interface, **pipelines-vote-ui**; back-end interface, **pipelines-vote-api**; and the **cli**.

Procedure

1. Mirror the builder image from the mirror registry for the front-end interface, **pipelines-vote-ui**.
   a. Verify that the required images tag is not imported:

```
$ oc describe imagestream python -n openshift
```

Example output

```
Name:   python
Namespace:  openshift
[...]

3.8-ubi9 (latest)
  tagged from registry.redhat.io/ubi9/python-38:latest
    prefer registry pullthrough when referencing this tag

  Build and run Python 3.8 applications on UBI 8. For more information about using this builder image, including OpenShift considerations, see https://github.com/sclorg/s2i-python-container/blob/master/3.8/README.md.
  Tags: builder, python
  Supports: python:3.8, python
  Example Repo: https://github.com/sclorg/django-ex.git

[...]
```

   b. Mirror the supported image tag to the private registry:

```
$ oc image mirror registry.redhat.io/ubi9/python-39:latest <mirror-registry>:
<port>/ubi9/python-39
```

c. Import the image:

```
$ oc tag <mirror-registry>:<port>/ubi9/python-39 python:latest --scheduled -n openshift
```

You must periodically re-import the image. The **--scheduled** flag enables automatic re-import of the image.

d. Verify that the images with the given tag have been imported:

```
$ oc describe imagestream python -n openshift
```

Example output

```
Name:   python
Namespace:  openshift
[...]

latest
  updates automatically from registry  <mirror-registry>:<port>/ubi9/python-39

  *  <mirror-registry>:<port>/ubi9/python-39@sha256:3ee...

[...]
```

2. Mirror the builder image from the mirror registry for the back-end interface, **pipelines-vote-api**.

a. Verify that the required images tag is not imported:

```
$ oc describe imagestream golang -n openshift
```

Example output

```
Name:   golang
Namespace:  openshift
[...]

1.14.7-ubi8 (latest)
  tagged from registry.redhat.io/ubi8/go-toolset:1.14.7
    prefer registry pullthrough when referencing this tag

  Build and run Go applications on UBI 8. For more information about using this builder
image, including OpenShift considerations, see https://github.com/sclorg/golang-
container/blob/master/README.md.
  Tags: builder, golang, go
  Supports: golang
  Example Repo: https://github.com/sclorg/golang-ex.git

[...]
```

b. Mirror the supported image tag to the private registry:

```
$ oc image mirror registry.redhat.io/ubi9/go-toolset:latest <mirror-registry>:
<port>/ubi9/go-toolset
```

c. Import the image:

```
$ oc tag <mirror-registry>:<port>/ubi9/go-toolset golang:latest --scheduled -n openshift
```

You must periodically re-import the image. The **--scheduled** flag enables automatic re-import of the image.

d. Verify that the images with the given tag have been imported:

```
$ oc describe imagestream golang -n openshift
```

Example output

```
Name:   golang
Namespace:  openshift
[...]

latest
  updates automatically from registry <mirror-registry>:<port>/ubi9/go-toolset

  * <mirror-registry>:<port>/ubi9/go-
toolset@sha256:59a74d581df3a2bd63ab55f7ac106677694bf612a1fe9e7e3e1487f55c421
b37

[...]
```

3. Mirror the builder image from the mirror registry for the **cli**.

a. Verify that the required images tag is not imported:

```
$ oc describe imagestream cli -n openshift
```

Example output

```
Name:                cli
Namespace:           openshift
[...]

latest
  updates automatically from registry quay.io/openshift-release-dev/ocp-v4.0-art-
dev@sha256:65c68e8c22487375c4c6ce6f18ed5485915f2bf612e41fef6d41cbfcdb143551


  * quay.io/openshift-release-dev/ocp-v4.0-art-
dev@sha256:65c68e8c22487375c4c6ce6f18ed5485915f2bf612e41fef6d41cbfcdb143551


[...]
```

b. Mirror the supported image tag to the private registry:

```
$ oc image mirror quay.io/openshift-release-dev/ocp-v4.0-art-
dev@sha256:65c68e8c22487375c4c6ce6f18ed5485915f2bf612e41fef6d41cbfcdb143551
<mirror-registry>:<port>/openshift-release-dev/ocp-v4.0-art-dev:latest
```

c. Import the image:

```
$ oc tag <mirror-registry>:<port>/openshift-release-dev/ocp-v4.0-art-dev cli:latest --
scheduled -n openshift
```

You must periodically re-import the image. The **--scheduled** flag enables automatic re-import of the image.

d. Verify that the images with the given tag have been imported:

```
$ oc describe imagestream cli -n openshift
```

Example output

```
Name:                   cli
Namespace:              openshift
[...]

latest
  updates automatically from registry <mirror-registry>:<port>/openshift-release-dev/ocp-
v4.0-art-dev

  * <mirror-registry>:<port>/openshift-release-dev/ocp-v4.0-art-
dev@sha256:65c68e8c22487375c4c6ce6f18ed5485915f2bf612e41fef6d41cbfcdb143551


[...]
```

Additional resources

- Configuring Samples Operator for a restricted cluster
- About disconnected installation mirroring

1.6. RUNNING A PIPELINE

A **PipelineRun** resource starts a pipeline and ties it to the Git and image resources that should be used for the specific invocation. It automatically creates and starts the **TaskRun** resources for each task in the pipeline.

Procedure

1. Start the pipeline for the back-end application:

```
$ tkn pipeline start build-and-deploy \
    -w name=shared-
workspace,volumeClaimTemplateFile=https://raw.githubusercontent.com/openshift/pipelines-
tutorial/pipelines-1.19/01_pipeline/03_persistent_volume_claim.yaml \
    -p deployment-name=pipelines-vote-api \
```

```
    -p git-url=https://github.com/openshift/pipelines-vote-api.git \
    -p IMAGE='image-registry.openshift-image-registry.svc:5000/pipelines-tutorial/pipelines-vote-api' \
    --use-param-defaults
```

The previous command uses a volume claim template, which creates a persistent volume claim for the pipeline execution.

2. To track the progress of the pipeline run, enter the following command::

```
$ tkn pipelinerun logs <pipelinerun_id> -f
```

The <pipelinerun_id> in the above command is the ID for the **PipelineRun** that was returned in the output of the previous command.

3. Start the pipeline for the front-end application:

```
$ tkn pipeline start build-and-deploy \
    -w name=shared-workspace,volumeClaimTemplateFile=https://raw.githubusercontent.com/openshift/pipelines-tutorial/pipelines-1.19/01_pipeline/03_persistent_volume_claim.yaml \
    -p deployment-name=pipelines-vote-ui \
    -p git-url=https://github.com/openshift/pipelines-vote-ui.git \
    -p IMAGE='image-registry.openshift-image-registry.svc:5000/pipelines-tutorial/pipelines-vote-ui' \
    --use-param-defaults
```

4. To track the progress of the pipeline run, enter the following command:

```
$ tkn pipelinerun logs <pipelinerun_id> -f
```

The <pipelinerun_id> in the above command is the ID for the **PipelineRun** that was returned in the output of the previous command.

5. After a few minutes, use **tkn pipelinerun list** command to verify that the pipeline ran successfully by listing all the pipeline runs:

```
$ tkn pipelinerun list
```

The output lists the pipeline runs:

```
NAME                        STARTED      DURATION     STATUS
build-and-deploy-run-xy7rw   1 hour ago   2 minutes    Succeeded
build-and-deploy-run-z2rz8   1 hour ago   19 minutes   Succeeded
```

6. Get the application route:

```
$ oc get route pipelines-vote-ui --template='http://{{.spec.host}}'
```

Note the output of the previous command. You can access the application using this route.

7. To rerun the last pipeline run, using the pipeline resources and service account of the previous pipeline, run:

```
$ tkn pipeline start build-and-deploy --last
```

Additional resources

- Authenticating pipelines with repositories using secrets

1.7. ADDING TRIGGERS TO A PIPELINE

Triggers enable pipelines to respond to external GitHub events, such as push events and pull requests. After you assemble and start a pipeline for the application, add the **TriggerBinding**, **TriggerTemplate**, **Trigger**, and **EventListener** resources to capture the GitHub events.

Procedure

1. Copy the content of the following sample **TriggerBinding** YAML file and save it:

```
apiVersion: triggers.tekton.dev/v1beta1
kind: TriggerBinding
metadata:
  name: vote-app
spec:
  params:
  - name: git-repo-url
    value: $(body.repository.url)
  - name: git-repo-name
    value: $(body.repository.name)
  - name: git-revision
    value: $(body.head_commit.id)
```

2. Create the **TriggerBinding** resource:

```
$ oc create -f <triggerbinding-yaml-file-name.yaml>
```

   Alternatively, you can create the **TriggerBinding** resource directly from the **pipelines-tutorial** Git repository:

```
$ oc create -f https://raw.githubusercontent.com/openshift/pipelines-tutorial/pipelines-1.19/03_triggers/01_binding.yaml
```

3. Copy the content of the following sample **TriggerTemplate** YAML file and save it:

```
apiVersion: triggers.tekton.dev/v1beta1
kind: TriggerTemplate
metadata:
  name: vote-app
spec:
  params:
  - name: git-repo-url
    description: The git repository url
  - name: git-revision
    description: The git revision
    default: pipelines-1.19
  - name: git-repo-name
```

```
    description: The name of the deployment to be created / patched

  resourcetemplates:
  - apiVersion: tekton.dev/v1
    kind: PipelineRun
    metadata:
      generateName: build-deploy-$(tt.params.git-repo-name)-
    spec:
      taskRunTemplate:
        serviceAccountName: pipeline
      pipelineRef:
        name: build-and-deploy
      params:
      - name: deployment-name
        value: $(tt.params.git-repo-name)
      - name: git-url
        value: $(tt.params.git-repo-url)
      - name: git-revision
        value: $(tt.params.git-revision)
      - name: IMAGE
        value: image-registry.openshift-image-registry.svc:5000/pipelines-
tutorial/$(tt.params.git-repo-name)
      workspaces:
      - name: shared-workspace
        volumeClaimTemplate:
          spec:
            accessModes:
              - ReadWriteOnce
            resources:
              requests:
                storage: 500Mi
```

The template specifies a volume claim template to create a persistent volume claim for defining the storage volume for the workspace. Therefore, you do not need to create a persistent volume claim to provide data storage.

4. Create the **TriggerTemplate** resource:

```
$ oc create -f <triggertemplate-yaml-file-name.yaml>
```

Alternatively, you can create the **TriggerTemplate** resource directly from the **pipelines-tutorial** Git repository:

```
$ oc create -f https://raw.githubusercontent.com/openshift/pipelines-tutorial/pipelines-
1.19/03_triggers/02_template.yaml
```

5. Copy the contents of the following sample **Trigger** YAML file and save it:

```
apiVersion: triggers.tekton.dev/v1beta1
kind: Trigger
metadata:
  name: vote-trigger
spec:
  serviceAccountName: pipeline
  bindings:
```

```
    - ref: vote-app
  template:
    ref: vote-app
```

6. Create the **Trigger** resource:

```
$ oc create -f <trigger-yaml-file-name.yaml>
```

Alternatively, you can create the **Trigger** resource directly from the **pipelines-tutorial** Git repository:

```
$ oc create -f https://raw.githubusercontent.com/openshift/pipelines-tutorial/pipelines-1.19/03_triggers/03_trigger.yaml
```

7. Copy the contents of the following sample **EventListener** YAML file and save it:

```
apiVersion: triggers.tekton.dev/v1beta1
kind: EventListener
metadata:
  name: vote-app
spec:
  serviceAccountName: pipeline
  triggers:
    - triggerRef: vote-trigger
```

Alternatively, if you have not defined a trigger custom resource, add the binding and template spec to the **EventListener** YAML file, instead of referring to the name of the trigger:

```
apiVersion: triggers.tekton.dev/v1beta1
kind: EventListener
metadata:
  name: vote-app
spec:
  serviceAccountName: pipeline
  triggers:
  - bindings:
    - ref: vote-app
    template:
      ref: vote-app
```

8. Create the **EventListener** resource by performing the following steps:

- To create an **EventListener** resource using a secure HTTPS connection:

  a. Add a label to enable the secure HTTPS connection to the **Eventlistener** resource:

  ```
  $ oc label namespace <ns-name> operator.tekton.dev/enable-annotation=enabled
  ```

  b. Create the **EventListener** resource:

  ```
  $ oc create -f <eventlistener-yaml-file-name.yaml>
  ```

  Alternatively, you can create the **EvenListener** resource directly from the **pipelines-tutorial** Git repository:

```
$ oc create -f https://raw.githubusercontent.com/openshift/pipelines-tutorial/pipelines-1.19/03_triggers/04_event_listener.yaml
```

c. Create a route with the re-encrypt TLS termination:

```
$ oc create route reencrypt --service=<svc-name> --cert=tls.crt --key=tls.key --ca-cert=ca.crt --hostname=<hostname>
```

Alternatively, you can create a re-encrypt TLS termination YAML file to create a secured route.

Example Re-encrypt TLS Termination YAML of the Secured Route

```
apiVersion: route.openshift.io/v1
kind: Route
metadata:
  name: route-passthrough-secured 1
spec:
  host: <hostname>
  to:
    kind: Service
    name: frontend 2
  tls:
    termination: reencrypt 3
    key: [as in edge termination]
    certificate: [as in edge termination]
    caCertificate: [as in edge termination]
    destinationCACertificate: |- 4
      -----BEGIN CERTIFICATE-----
      [...]
      -----END CERTIFICATE-----
```

1 2 The name of the object, which is limited to 63 characters.

3 The **termination** field is set to **reencrypt**. This is the only required **tls** field.

4 Required for re-encryption. **destinationCACertificate** specifies a CA certificate to validate the endpoint certificate, securing the connection from the router to the destination pods. If the service is using a service signing certificate, or the administrator has specified a default CA certificate for the router and the service has a certificate signed by that CA, this field can be omitted.

See **oc create route reencrypt --help** for more options.

- To create an **EventListener** resource using an insecure HTTP connection:

a. Create the **EventListener** resource.

b. Expose the **EventListener** service as an OpenShift Container Platform route to make it publicly accessible:

```
$ oc expose svc el-vote-app
```

1.8. CONFIGURING EVENT LISTENERS TO SERVE MULTIPLE NAMESPACES

NOTE

You can skip this section if you want to create a basic CI/CD pipeline. However, if your deployment strategy involves multiple namespaces, you can configure event listeners to serve multiple namespaces.

To increase reusability of **EvenListener** objects, cluster administrators can configure and deploy them as multi-tenant event listeners that serve multiple namespaces.

Procedure

1. Configure cluster-wide fetch permission for the event listener.

   a. Set a service account name to be used in the **ClusterRoleBinding** and **EventListener** objects. For example, **el-sa**.

   Example ServiceAccount.yaml

   ```
   apiVersion: v1
   kind: ServiceAccount
   metadata:
     name: el-sa
   ---
   ```

   b. In the **rules** section of the **ClusterRole.yaml** file, set appropriate permissions for every event listener deployment to function cluster-wide.

   Example ClusterRole.yaml

   ```
   kind: ClusterRole
   apiVersion: rbac.authorization.k8s.io/v1
   metadata:
     name: el-sel-clusterrole
   rules:
   - apiGroups: ["triggers.tekton.dev"]
     resources: ["eventlisteners", "clustertriggerbindings", "clusterinterceptors",
   "triggerbindings", "triggertemplates", "triggers"]
     verbs: ["get", "list", "watch"]
   - apiGroups: [""]
     resources: ["configmaps", "secrets"]
     verbs: ["get", "list", "watch"]
   - apiGroups: [""]
     resources: ["serviceaccounts"]
     verbs: ["impersonate"]
   ...
   ```

   c. Configure cluster role binding with the appropriate service account name and cluster role name.

   Example ClusterRoleBinding.yaml

```
apiVersion: rbac.authorization.k8s.io/v1
kind: ClusterRoleBinding
metadata:
  name: el-mul-clusterrolebinding
subjects:
- kind: ServiceAccount
  name: el-sa
  namespace: default
roleRef:
  apiGroup: rbac.authorization.k8s.io
  kind: ClusterRole
  name: el-sel-clusterrole
...
```

2. In the **spec** parameter of the event listener, add the service account name, for example **el-sa**. Fill the **namespaceSelector** parameter with names of namespaces where event listener is intended to serve.

Example EventListener.yaml

```
apiVersion: triggers.tekton.dev/v1beta1
kind: EventListener
metadata:
  name: namespace-selector-listener
spec:
  taskRunTemplate:
    serviceAccountName: el-sa
  namespaceSelector:
    matchNames:
    - default
    - foo
...
```

3. Create a service account with the necessary permissions, for example **foo-trigger-sa**. Use it for role binding the triggers.

Example ServiceAccount.yaml

```
apiVersion: v1
kind: ServiceAccount
metadata:
  name: foo-trigger-sa
  namespace: foo
...
```

Example RoleBinding.yaml

```
apiVersion: rbac.authorization.k8s.io/v1
kind: RoleBinding
metadata:
  name: triggercr-rolebinding
  namespace: foo
subjects:
- kind: ServiceAccount
```

```
  name: foo-trigger-sa
  namespace: foo
roleRef:
  apiGroup: rbac.authorization.k8s.io
  kind: ClusterRole
  name: tekton-triggers-eventlistener-roles
...
```

4. Create a trigger with the appropriate trigger template, trigger binding, and service account name.

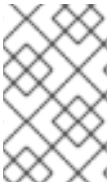
Example Trigger.yaml

```
apiVersion: triggers.tekton.dev/v1beta1
kind: Trigger
metadata:
  name: trigger
  namespace: foo
spec:
  taskRunTemplate:
    serviceAccountName: foo-trigger-sa
  interceptors:
    - ref:
        name: "github"
      params:
        - name: "secretRef"
          value:
            secretName: github-secret
            secretKey: secretToken
        - name: "eventTypes"
          value: ["push"]
  bindings:
    - ref: vote-app
  template:
    ref: vote-app
...
```

1.9. CREATING WEBHOOKS

Webhooks are HTTP POST messages that are received by the event listeners whenever a configured event occurs in your repository. The event payload is then mapped to trigger bindings, and processed by trigger templates. The trigger templates eventually start one or more pipeline runs, leading to the creation and deployment of Kubernetes resources.

In this section, you will configure a webhook URL on your forked Git repositories **pipelines-vote-ui** and **pipelines-vote-api**. This URL points to the publicly accessible **EventListener** service route.



NOTE

Adding webhooks requires administrative privileges to the repository. If you do not have administrative access to your repository, contact your system administrator for adding webhooks.

Procedure

1. Get the webhook URL:
   - For a secure HTTPS connection:

     ```
     $ echo "URL: $(oc  get route el-vote-app --template='https://{{.spec.host}}')"
     ```

   - For an HTTP (insecure) connection:

     ```
     $ echo "URL: $(oc  get route el-vote-app --template='http://{{.spec.host}}')"
     ```

     Note the URL obtained in the output.
2. Configure webhooks manually on the front-end repository:
   a. Open the front-end Git repository **pipelines-vote-ui** in your browser.
   b. Click **Settings → Webhooks → Add Webhook**
   c. On the **Webhooks/Add Webhook** page:
      i. Enter the webhook URL from step 1 in **Payload URL** field
      ii. Select **application/json** for the **Content type**
      iii. Specify the secret in the **Secret** field
      iv. Ensure that the **Just the push event**is selected
      v. Select **Active**
      vi. Click **Add Webhook**
3. Repeat step 2 for the back-end repository **pipelines-vote-api**.

1.10. TRIGGERING A PIPELINE RUN

Whenever a **push** event occurs in the Git repository, the configured webhook sends an event payload to the publicly exposed **EventListener** service route. The **EventListener** service of the application processes the payload, and passes it to the relevant **TriggerBinding** and **TriggerTemplate** resource pairs. The **TriggerBinding** resource extracts the parameters, and the **TriggerTemplate** resource uses these parameters and specifies the way the resources must be created. This may rebuild and redeploy the application.

In this section, you push an empty commit to the front-end **pipelines-vote-ui** repository, which then triggers the pipeline run.

Procedure

1. From the terminal, clone your forked Git repository **pipelines-vote-ui**:

   ```
   $ git clone git@github.com:<your GitHub ID>/pipelines-vote-ui.git -b pipelines-1.19
   ```

2. Push an empty commit:

   ```
   $ git commit -m "empty-commit" --allow-empty && git push origin pipelines-1.19
   ```

3. Check if the pipeline run was triggered:

```
$ tkn pipelinerun list
```

Notice that a new pipeline run was initiated.

1.11. ENABLING MONITORING OF EVENT LISTENERS FOR TRIGGERS FOR USER-DEFINED PROJECTS

As a cluster administrator, to gather event listener metrics for the **Triggers** service in a user-defined project and display them in the OpenShift Container Platform web console, you can create a service monitor for each event listener. On receiving an HTTP request, event listeners for the **Triggers** service return three metrics – **eventlistener_http_duration_seconds**, **eventlistener_event_count**, and **eventlistener_triggered_resources**.

Prerequisites

- You have logged in to the OpenShift Container Platform web console.
- You have installed the Red Hat OpenShift Pipelines Operator.
- You have enabled monitoring for user-defined projects.

Procedure

1. For each event listener, create a service monitor. For example, to view the metrics for the **github-listener** event listener in the **test** namespace, create the following service monitor:

```
apiVersion: monitoring.coreos.com/v1
kind: ServiceMonitor
metadata:
  labels:
    app.kubernetes.io/managed-by: EventListener
    app.kubernetes.io/part-of: Triggers
    eventlistener: github-listener
  annotations:
    networkoperator.openshift.io/ignore-errors: ""
  name: el-monitor
  namespace: test
spec:
  endpoints:
    - interval: 10s
      port: http-metrics
  jobLabel: name
  namespaceSelector:
    matchNames:
      - test
  selector:
    matchLabels:
      app.kubernetes.io/managed-by: EventListener
      app.kubernetes.io/part-of: Triggers
      eventlistener: github-listener
...
```

2. Test the service monitor by sending a request to the event listener. For example, push an empty commit:

```
$ git commit -m "empty-commit" --allow-empty && git push origin main
```

3. On the OpenShift Container Platform web console, navigate to **Administrator → Observe → Metrics**.

4. To view a metric, search by its name. For example, to view the details of the **eventlistener_http_resources** metric for the **github-listener** event listener, search using the **eventlistener_http_resources** keyword.

Additional resources

- Enabling monitoring for user-defined projects

1.12. CONFIGURING PULL REQUEST CAPABILITIES IN GITHUB INTERCEPTOR

With GitHub Interceptor, you can create logic that validates and filters GitHub webhooks. For example, you can validate the webhook's origin and filter incoming events based on specified criteria. When you use GitHub Interceptor to filter event data, you can specify the event types that Interceptor can accept in a field. In Red Hat OpenShift Pipelines, you can use the following capabilities of GitHub Interceptor:

- Filter pull request events based on the files that have been changed
- Validate pull requests based on configured GitHub owners

1.12.1. Filtering pull requests using GitHub Interceptor

You can filter GitHub events based on the files that have been changed for push and pull events. This helps you to execute a pipeline for only relevant changes in your Git repository. GitHub Interceptor adds a comma delimited list of all files that have been changed and uses the CEL Interceptor to filter incoming events based on the changed files. The list of changed files is added to the **changed_files** property of the event payload in the top-level **extensions** field.

Prerequisites

- You have installed the Red Hat OpenShift Pipelines Operator.

Procedure

1. Perform one of the following steps:

   - For a public GitHub repository, set the value of the **addChangedFiles** parameter to **true** in the YAML configuration file shown below:

```
apiVersion: triggers.tekton.dev/v1beta1
kind: EventListener
metadata:
  name: github-add-changed-files-pr-listener
spec:
  triggers:
    - name: github-listener
```

```
    interceptors:
      - ref:
          name: "github"
          kind: ClusterInterceptor
          apiVersion: triggers.tekton.dev
        params:
        - name: "secretRef"
          value:
            secretName: github-secret
            secretKey: secretToken
        - name: "eventTypes"
          value: ["pull_request", "push"]
        - name: "addChangedFiles"
          value:
            enabled: true
      - ref:
          name: cel
        params:
        - name: filter
          value: extensions.changed_files.matches('controllers/')
...
```

- For a private GitHub repository, set the value of the **addChangedFiles** parameter to **true** and provide the access token details, **secretName** and **secretKey** in the YAML configuration file shown below:

```
apiVersion: triggers.tekton.dev/v1beta1
kind: EventListener
metadata:
  name: github-add-changed-files-pr-listener
spec:
  triggers:
    - name: github-listener
      interceptors:
        - ref:
            name: "github"
            kind: ClusterInterceptor
            apiVersion: triggers.tekton.dev
          params:
          - name: "secretRef"
            value:
              secretName: github-secret
              secretKey: secretToken
          - name: "eventTypes"
            value: ["pull_request", "push"]
          - name: "addChangedFiles"
            value:
              enabled: true
              personalAccessToken:
                secretName: github-pat
                secretKey: token
        - ref:
            name: cel
          params:
```

```
        - name: filter
          value: extensions.changed_files.matches('controllers/')
...
```

2. Save the configuration file.

1.12.2. Validating pull requests using GitHub Interceptors

You can use GitHub Interceptor to validate the processing of pull requests based on the GitHub owners configured for a repository. This validation helps you to prevent unnecessary execution of a **PipelineRun** or **TaskRun** object. GitHub Interceptor processes a pull request only if the user name is listed as an owner or if a configurable comment is issued by an owner of the repository. For example, when you comment **/ok-to-test** on a pull request as an owner, a **PipelineRun** or **TaskRun** is triggered.

NOTE

Owners are configured in an **OWNERS** file at the root of the repository.

Prerequisites

- You have installed the Red Hat OpenShift Pipelines Operator.

Procedure

1. Create a secret string value.
2. Configure the GitHub webhook with that value.
3. Create a Kubernetes secret named **secretRef** that contains your secret value.
4. Pass the Kubernetes secret as a reference to your GitHub Interceptor.
5. Create an **owners** file and add the list of approvers into the **approvers** section.
6. Perform one of the following steps:
   - For a public GitHub repository, set the value of the **githubOwners** parameter to **true** in the YAML configuration file shown below:

```
apiVersion: triggers.tekton.dev/v1beta1
kind: EventListener
metadata:
  name: github-owners-listener
spec:
  triggers:
    - name: github-listener
      interceptors:
        - ref:
            name: "github"
            kind: ClusterInterceptor
            apiVersion: triggers.tekton.dev
          params:
            - name: "secretRef"
              value:
                secretName: github-secret
```

```
            secretKey: secretToken
        - name: "eventTypes"
          value: ["pull_request", "issue_comment"]
        - name: "githubOwners"
          value:
            enabled: true
            checkType: none
...
```

- For a private GitHub repository, set the value of the **githubOwners** parameter to **true** and provide the access token details, **secretName** and **secretKey** in the YAML configuration file shown below:

```
apiVersion: triggers.tekton.dev/v1beta1
kind: EventListener
metadata:
  name: github-owners-listener
spec:
  triggers:
    - name: github-listener
      interceptors:
        - ref:
            name: "github"
            kind: ClusterInterceptor
            apiVersion: triggers.tekton.dev
          params:
            - name: "secretRef"
              value:
                secretName: github-secret
                secretKey: secretToken
            - name: "eventTypes"
              value: ["pull_request", "issue_comment"]
            - name: "githubOwners"
              value:
                enabled: true
                personalAccessToken:
                  secretName: github-token
                  secretKey: secretToken
                checkType: all
...
```

NOTE

The **checkType** parameter is used to specify the GitHub owners who need authentication. You can set its value to **orgMembers**, **repoMembers**, or **all**.

7. Save the configuration file.

1.13. ADDITIONAL RESOURCES

- To include Pipelines as Code along with the application source code in the same repository, see About Pipelines as Code.

- For more details on pipelines in the **Developer** perspective, see the Working with OpenShift Pipelines in the web console section.
- To learn more about Security Context Constraints (SCCs), see the Managing Security Context Constraints section.
- For more examples of reusable tasks, see the OpenShift Catalog repository. Additionally, you can also see the Tekton Catalog in the Tekton project.
- To install and deploy a custom instance of Tekton Hub for reusable tasks and pipelines, see Using Tekton Hub with Red Hat OpenShift Pipelines .
- For more details on re-encrypt TLS termination, see Re-encryption Termination.
- For more details on secured routes, see the Secured routes section.

CHAPTER 2. WORKING WITH RED HAT OPENSHIFT PIPELINES IN THE WEB CONSOLE

You can use the **Administrator** or **Developer** perspective to create and modify **Pipeline**, **PipelineRun**, and **Repository** objects from the **Pipelines** page in the OpenShift Container Platform web console. You can also use the **+Add** page in the **Developer** perspective of the web console to create CI/CD pipelines for your software delivery process.

2.1. WORKING WITH RED HAT OPENSHIFT PIPELINES IN THE DEVELOPER PERSPECTIVE

In the **Developer** perspective, you can access the following options for creating pipelines from the **+Add** page:

- Use the **+Add → Pipelines → Pipeline builder** option to create customized pipelines for your application.
- Use the **+Add → From Git** option to create pipelines using pipeline templates and resources while creating an application.

After you create the pipelines for your application, you can view and visually interact with the deployed pipelines in the **Pipelines** view. You can also use the **Topology** view to interact with the pipelines created using the **From Git** option. You must apply custom labels to pipelines created using the **Pipeline builder** to see them in the **Topology** view.

Prerequisites

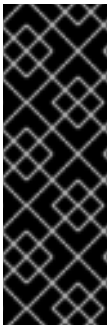
- You have access to an OpenShift Container Platform cluster and have switched to the **Developer** perspective.
- You have the OpenShift Pipelines Operator installed in your cluster.
- You are a cluster administrator or a user with create and edit permissions.
- You have created a project.

2.1.1. Constructing pipelines using the Pipeline builder

In the **Developer** perspective of the console, you can use the **+Add → Pipeline → Pipeline builder** option to:

- Configure pipelines using either the **Pipeline builder** or the **YAML view**.
- Construct a pipeline flow using existing tasks. When you install the OpenShift Pipelines Operator, it adds reusable pipeline tasks to your cluster that can be used with the cluster resolver.
- Specify the type of resources required for the pipeline run, and if required, add additional parameters to the pipeline.
- Reference these pipeline resources in each of the tasks in the pipeline as input and output resources.
- If required, reference any additional parameters added to the pipeline in the task. The parameters for a task are prepopulated based on the specifications of the task.

- Use the Operator-installed, reusable snippets and samples to create detailed pipelines.
- Search and add tasks from your configured local Tekton Hub instance.



IMPORTANT

In the developer perspective, you can create a customized pipeline using your own set of curated tasks. To search, install, and upgrade your tasks directly from the developer console, your cluster administrator needs to install and deploy a local Tekton Hub instance and link that hub to the OpenShift Container Platform cluster. For more details, see *Using Tekton Hub with OpenShift Pipelines* in the *Additional resources* section. If you do not deploy any local Tekton Hub instance, by default, you can only access namespace tasks and public Tekton Hub tasks.

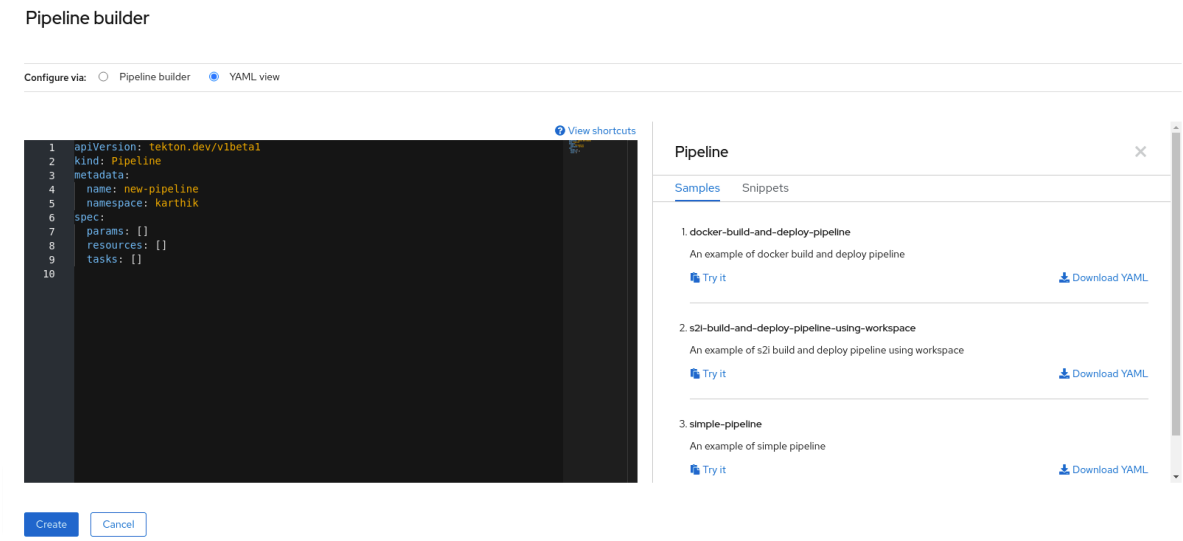
Procedure

1. In the **+Add** view of the **Developer** perspective, click the **Pipeline** tile to see the **Pipeline builder** page.
2. Configure the pipeline using either the **Pipeline builder** view or the **YAML view**.

NOTE

The **Pipeline builder** view supports a limited number of fields whereas the **YAML view** supports all available fields. Optionally, you can also use the Operator-installed, reusable snippets and samples to create detailed pipelines.

Figure 2.1. YAML view



3. Configure your pipeline by using **Pipeline builder**:
   a. In the **Name** field, enter a unique name for the pipeline.
   b. In the **Tasks** section:
      i. Click **Add task**.
      ii. Search for a task using the quick search field and select the required task from the displayed list.

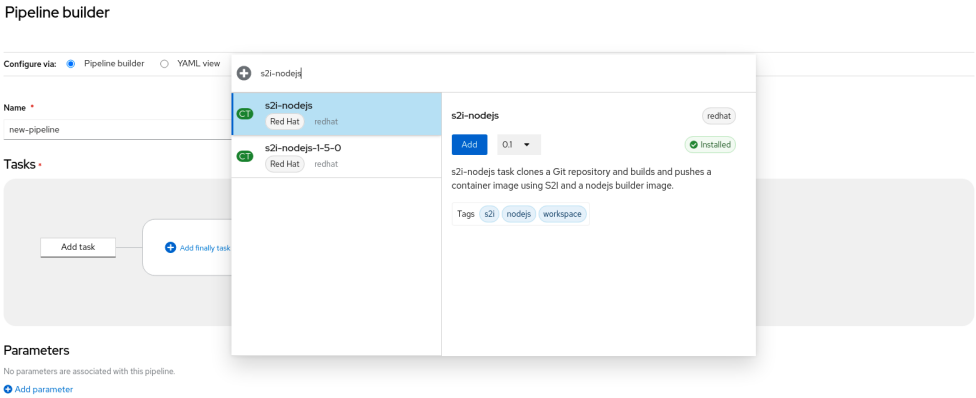
iii. Click **Add** or **Install and add**. In this example, use the **s2i-nodejs** task.

NOTE

The search list contains all the Tekton Hub tasks and tasks available in the cluster. Also, if a task is already installed it will show **Add** to add the task whereas it will show **Install and add** to install and add the task. It will show **Update and add** when you add the same task with an updated version.

- To add sequential tasks to the pipeline:
  - Click the plus icon to the right or left of the task → click **Add task**.
  - Search for a task using the quick search field and select the required task from the displayed list.
  - Click **Add** or **Install and add**.

Figure 2.2. Pipeline builder

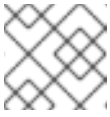


- To add a final task:
  - Click the **Add finally task** → Click **Add task**.
  - Search for a task using the quick search field and select the required task from the displayed list.
  - Click **Add** or **Install and add**.

c. In the **Resources** section, click **Add Resources** to specify the name and type of resources for the pipeline run. These resources are then used by the tasks in the pipeline as inputs and outputs. For this example:

i. Add an input resource. In the **Name** field, enter **Source**, and then from the **Resource Type** drop-down list, select **Git**.

ii. Add an output resource. In the **Name** field, enter **Img**, and then from the **Resource Type** drop-down list, select **Image**.



NOTE

A red icon appears next to the task if a resource is missing.

d. Optional: The **Parameters** for a task are pre-populated based on the specifications of the task. If required, use the **Add Parameters** link in the **Parameters** section to add additional parameters.

e. In the **Workspaces** section, click **Add workspace** and enter a unique workspace name in the **Name** field. You can add multiple workspaces to the pipeline.

f. In the **Tasks** section, click the **s2i-nodejs** task to see the side panel with details for the task. In the task side panel, specify the resources and parameters for the **s2i-nodejs** task:

i. If required, in the **Parameters** section, add more parameters to the default ones, by using the $(params.<param-name>) syntax.

ii. In the **Image** section, enter **Img** as specified in the **Resources** section.

iii. Select a workspace from the **source** drop-down under **Workspaces** section.

g. Add resources, parameters, and workspaces to the **openshift-client** task.

4. Click **Create** to create and view the pipeline in the **Pipeline Details** page.

5. Click the **Actions** drop-down menu then click **Start**, to see the **Start Pipeline** page.

6. The **Workspaces** section lists the workspaces you created earlier. Use the respective drop-down to specify the volume source for your workspace. You have the following options: **Empty Directory**, **Config Map**, **Secret**, **PersistentVolumeClaim**, or **VolumeClaimTemplate**.

2.1.2. Creating OpenShift Pipelines along with applications

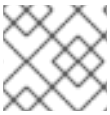
To create pipelines along with applications, use the **From Git** option in the **Add+** view of the **Developer** perspective. You can view all of your available pipelines and select the pipelines you want to use to create applications while importing your code or deploying an image.

The Tekton Hub Integration is enabled by default and you can see tasks from the Tekton Hub that are supported by your cluster. Administrators can opt out of the Tekton Hub Integration and the Tekton Hub tasks will no longer be displayed. You can also check whether a webhook URL exists for a generated pipeline. Default webhooks are added for the pipelines that are created using the **+Add** flow and the URL is visible in the side panel of the selected resources in the Topology view.

For more information, see Creating applications using the Developer perspective .

2.1.3. Adding a GitHub repository containing pipelines

In the **Developer** perspective, you can add your GitHub repository containing pipelines to the OpenShift Container Platform cluster. This allows you to run pipelines and tasks from your GitHub repository on the cluster when relevant Git events, such as push or pull requests, are triggered.



NOTE

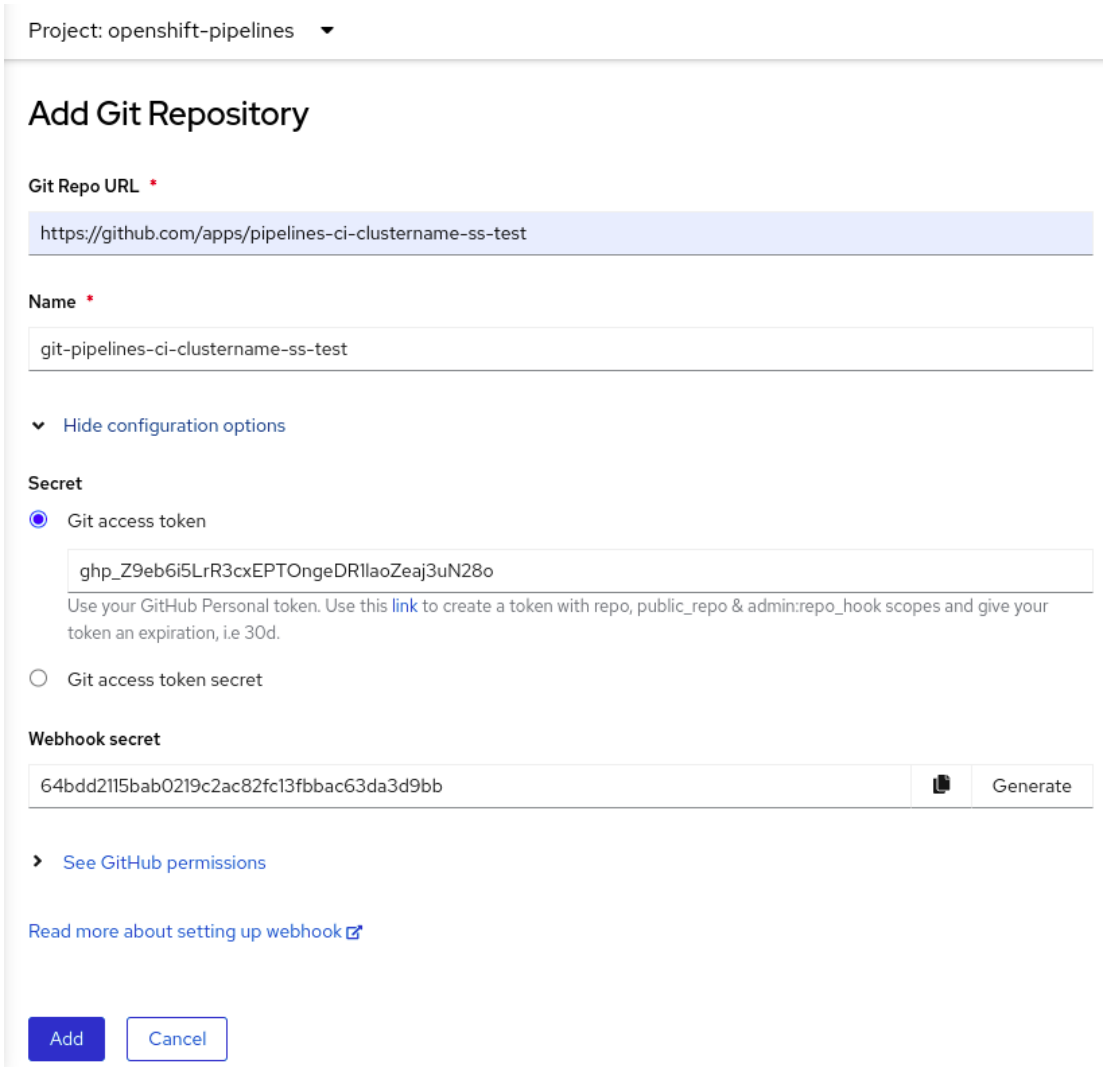
You can add both public and private GitHub repositories.

Prerequisites

- Ensure that your cluster administrator has configured the required GitHub applications in the administrator perspective.

Procedure

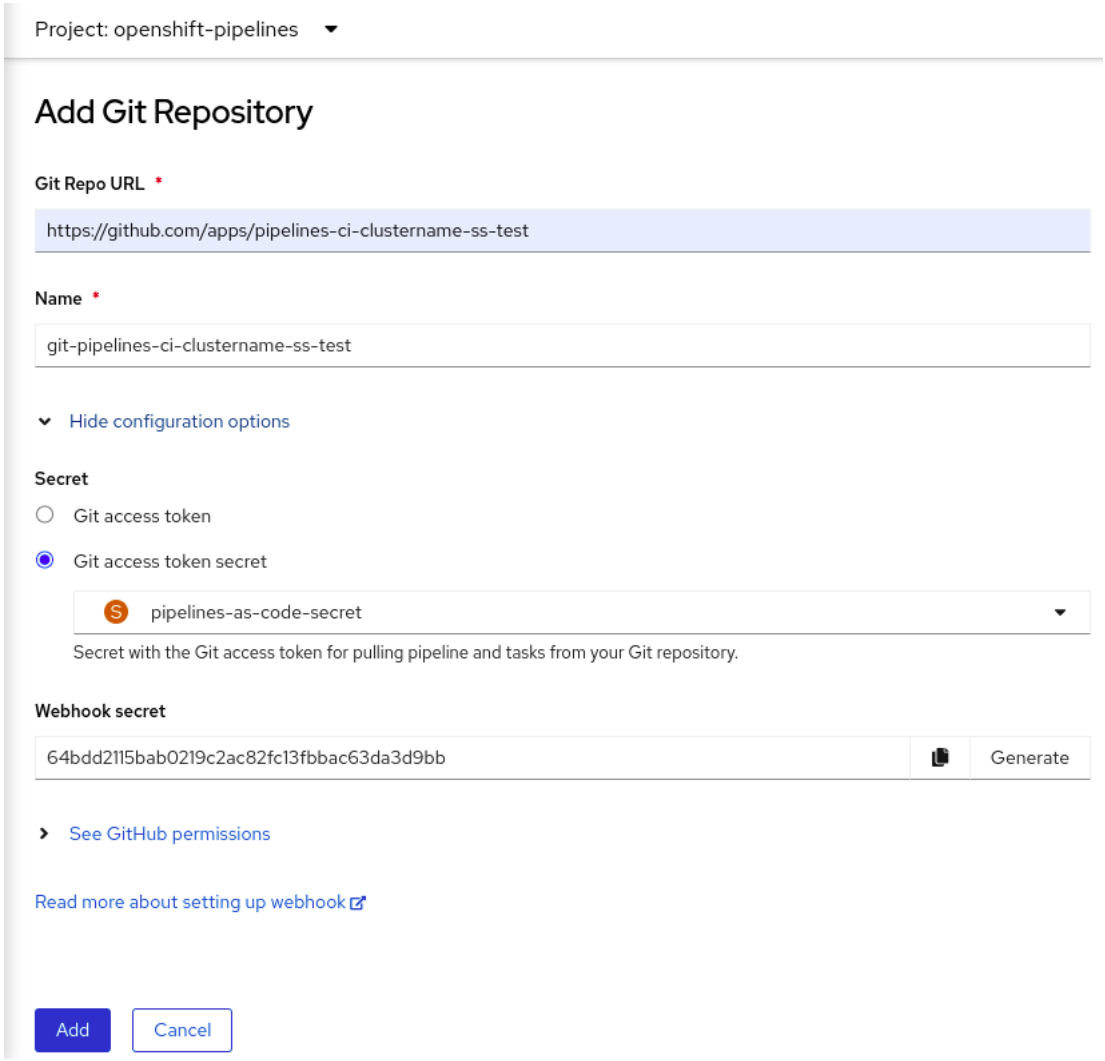
1. In the **Developer** perspective, choose the namespace or project in which you want to add your GitHub repository.
2. Navigate to **Pipelines** using the left navigation pane.
3. Click **Create → Repository** on the right side of the **Pipelines** page.
4. Enter your **Git Repo URL** and the console automatically fetches the repository name.
5. Click **Show configuration options**. By default, you see only one option **Setup a webhook**. If you have a GitHub application configured, you see two options:
   - **Use GitHub App**: Select this option to install your GitHub application in your repository.
   - **Setup a webhook**: Select this option to add a webhook to your GitHub application.
6. Set up a webhook using one of the following options in the **Secret** section:
   - Setup a webhook using **Git access token**:
     a. Enter your personal access token.
     b. Click **Generate** corresponding to the **Webhook secret** field to generate a new webhook secret.



NOTE

You can click the link below the **Git access token** field if you do not have a personal access token and want to create a new one.

- Setup a webhook using **Git access token secret**
  - Select a secret in your namespace from the dropdown list. Depending on the secret you selected, a webhook secret is automatically generated.



7. Add the webhook secret details to your GitHub repository:
   a. Copy the **webhook URL** and navigate to your GitHub repository settings.
   b. Click **Webhooks → Add webhook**.
   c. Copy the **Webhook URL** from the developer console and paste it in the **Payload URL** field of the GitHub repository settings.
   d. Select the **Content type**.
   e. Copy the **Webhook secret** from the developer console and paste it in the **Secret** field of the GitHub repository settings.
   f. Select one of the **SSL verification** options.
   g. Select the events to trigger this webhook.

h. Click **Add webhook**.

8. Navigate back to the developer console and click **Add**.
9. Read the details of the steps that you have to perform and click **Close**.
10. View the details of the repository you just created.

NOTE

When importing an application using **Import from Git** and the Git repository has a **.tekton** directory, you can configure **pipelines-as-code** for your application.

2.1.4. Interacting with pipelines using the Developer perspective

The **Pipelines** view in the **Developer** perspective lists all the pipelines in a project, along with the following details:

- The namespace in which the pipeline was created
- The last pipeline run
- The status of the tasks in the pipeline run
- The status of the pipeline run
- The creation time of the last pipeline run

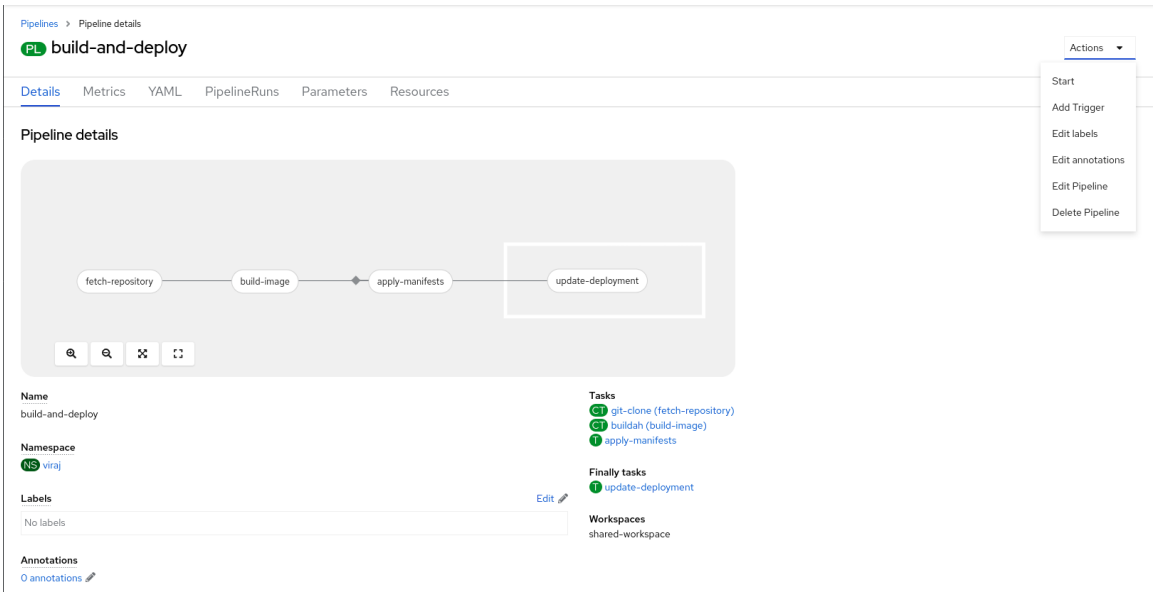
Procedure

1. In the **Pipelines** view of the **Developer** perspective, select a project from the **Project** drop-down list to see the pipelines in that project.
2. Click the required pipeline to see the **Pipeline details** page.
   By default, the **Details** tab displays a visual representation of all the **serial** tasks, **parallel** tasks, **finally** tasks, and **when** expressions in the pipeline. The tasks and the **finally** tasks are listed in the lower right portion of the page.

   To view the task details, click the listed **Tasks** and **Finally** tasks. In addition, you can do the following:

   - Use the zoom in, zoom out, fit to screen, and reset view features using the standard icons displayed in the lower left corner of the **Pipeline details** visualization.
   - Change the zoom factor of the pipeline visualization using the mouse wheel.
   - Hover over the tasks and see the task details.

Figure 2.3. Pipeline details



3. Optional: On the **Pipeline details** page, click the **Metrics** tab to see the following information about pipelines:

   - **Pipeline Success Ratio**
   - **Number of Pipeline Runs**
   - **Pipeline Run Duration**
   - **Task Run Duration**
     You can use this information to improve the pipeline workflow and eliminate issues early in the pipeline lifecycle.

4. Optional: Click the **YAML** tab to edit the YAML file for the pipeline.

5. Optional: Click the **Pipeline Runs** tab to see the completed, running, or failed runs for the pipeline.
   The **Pipeline Runs** tab provides details about the pipeline run, the status of the task, and a link to debug failed pipeline runs. Use the Options menu ⋮ to stop a running pipeline, to rerun a pipeline using the same parameters and resources as that of the previous pipeline execution, or to delete a pipeline run.

   - Click the required pipeline run to see the **Pipeline Run details** page. By default, the **Details** tab displays a visual representation of all the serial tasks, parallel tasks, **finally** tasks, and when expressions in the pipeline run. The results for successful runs are displayed under the **Pipeline Run results** pane at the bottom of the page. Additionally, you would only be able to see tasks from Tekton Hub which are supported by the cluster. While looking at a task, you can click the link beside it to jump to the task documentation.

NOTE

The **Details** section of the **Pipeline Run Details** page displays a **Log Snippet** of the failed pipeline run. **Log Snippet** provides a general error message and a snippet of the log. A link to the **Logs** section provides quick access to the details about the failed run.

- On the **Pipeline Run details** page, click the **Task Runs** tab to see the completed, running, and failed runs for the task.
  The **Task Runs** tab provides information about the task run along with the links to its task and pod, and also the status and duration of the task run. Use the Options menu to delete a task run.

NOTE

The **TaskRuns** list page features a **Manage columns** button, which you can also use to add a **Duration** column.

- Click the required task run to see the **Task Run details** page. The results for successful runs are displayed under the **Task Run results** pane at the bottom of the page.

NOTE

The **Details** section of the **Task Run details** page displays a **Log Snippet** of the failed task run. **Log Snippet** provides a general error message and a snippet of the log. A link to the **Logs** section provides quick access to the details about the failed task run.

6. Click the **Parameters** tab to see the parameters defined in the pipeline. You can also add or edit additional parameters, as required.
7. Click the **Resources** tab to see the resources defined in the pipeline. You can also add or edit additional resources, as required.

2.1.5. Starting pipelines from Pipelines view

After you create a pipeline, you need to start it to execute the included tasks in the defined sequence. You can start a pipeline from the **Pipelines** view, the **Pipeline Details** page, or the **Topology** view.

Procedure

To start a pipeline using the **Pipelines** view:

1. In the **Pipelines** view of the **Developer** perspective, click the **Options** menu adjoining a pipeline, and select **Start**.
2. The **Start Pipeline** dialog box displays the **Git Resources** and the **Image Resources** based on the pipeline definition.

NOTE

For pipelines created using the **From Git** option, the **Start Pipeline** dialog box also displays an **APP_NAME** field in the **Parameters** section, and all the fields in the dialog box are prepopulated by the pipeline template.

   a. If you have resources in your namespace, the **Git Resources** and the **Image Resources** fields are prepopulated with those resources. If required, use the drop-downs to select or create the required resources and customize the pipeline run instance.

3. Optional: Modify the **Advanced Options** to add the credentials that authenticate the specified private Git server or the image registry.

   a. Under **Advanced Options**, click **Show Credentials Options** and select **Add Secret**.

   b. In the **Create Source Secret** section, specify the following:

      i. A unique **Secret Name** for the secret.

      ii. In the **Designated provider to be authenticated** section, specify the provider to be authenticated in the **Access to** field, and the base **Server URL**.

      iii. Select the **Authentication Type** and provide the credentials:

      - For the **Authentication Type Image Registry Credentials**, specify the **Registry Server Address** that you want to authenticate, and provide your credentials in the **Username**, **Password**, and **Email** fields.
        Select **Add Credentials** if you want to specify an additional **Registry Server Address**.
      - For the **Authentication Type Basic Authentication**, specify the values for the **UserName** and **Password or Token** fields.
      - For the **Authentication Type SSH Keys**, specify the value of the **SSH Private Key** field.

      NOTE

      For basic authentication and SSH authentication, you can use annotations such as:

      - **tekton.dev/git-0:** https://github.com
      - **tekton.dev/git-1:** https://gitlab.com.

      iv. Select the check mark to add the secret.

   You can add multiple secrets based upon the number of resources in your pipeline.

4. Click **Start** to start the pipeline.

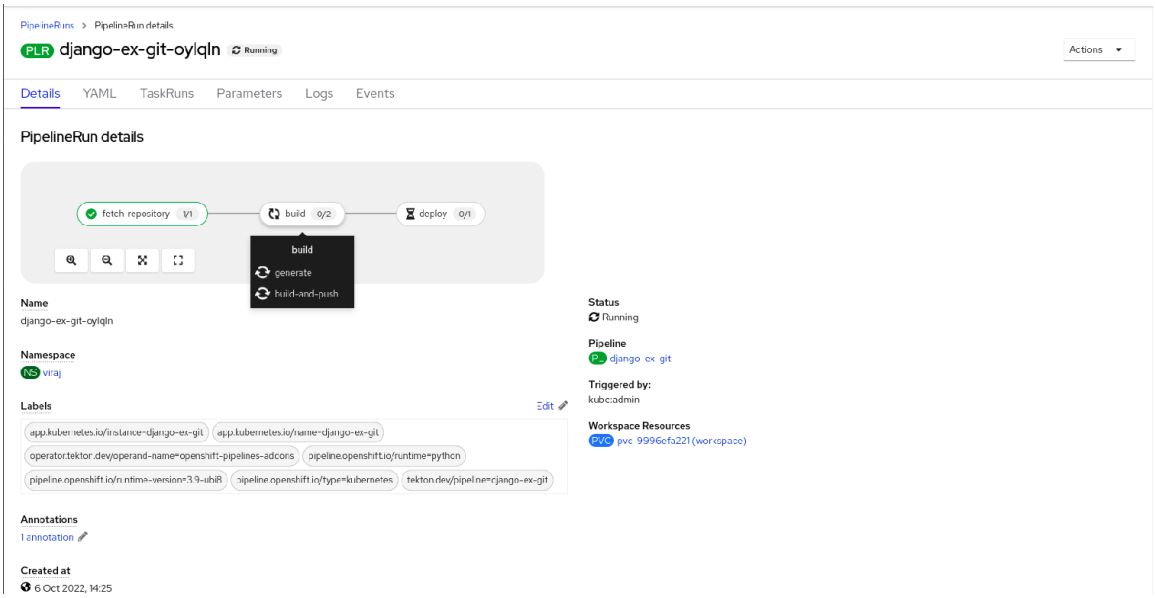
5. The **PipelineRun details** page displays the pipeline being executed. After the pipeline starts, the tasks and steps within each task are executed. You can:

   - Use the zoom in, zoom out, fit to screen, and reset view features using the standard icons, which are in the lower left corner of the **PipelineRun details** page visualization.
   - Change the zoom factor of the pipelinerun visualization using the mouse wheel. At specific zoom factors, the background color of the tasks changes to indicate the error or warning status.
   - Hover over the tasks to see the details, such as the time taken to execute each step, task name, and task status.
   - Hover over the tasks badge to see the total number of tasks and tasks completed.
   - Click on a task to see the logs for each step in the task.

- Click the **Logs** tab to see the logs relating to the execution sequence of the tasks. You can also expand the pane and download the logs individually or in bulk, by using the relevant button.

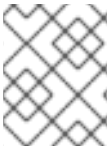
- Click the **Events** tab to see the stream of events generated by a pipeline run.
  You can use the **Task Runs**, **Logs**, and **Events** tabs to assist in debugging a failed pipeline run or a failed task run.

Figure 2.4. Pipeline run details



2.1.6. Starting pipelines from Topology view

For pipelines created using the **From Git** option, you can use the **Topology** view to interact with pipelines after you start them:



NOTE

To see the pipelines created using **Pipeline builder** in the **Topology** view, customize the pipeline labels to link the pipeline with the application workload.

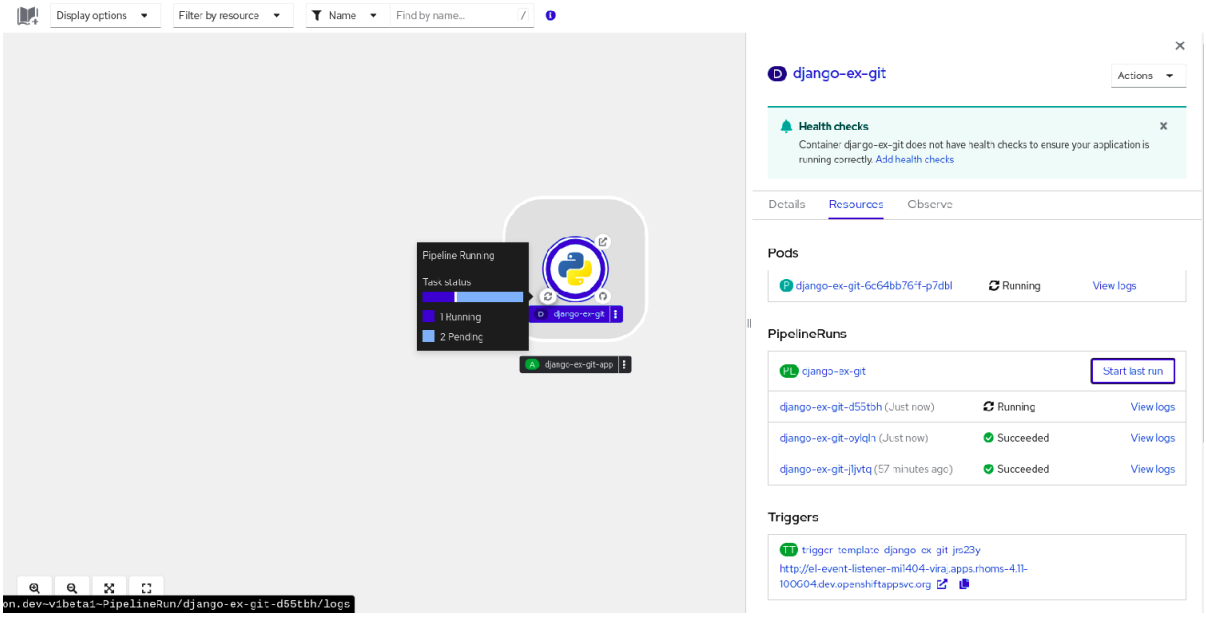
Procedure

1. Click **Topology** in the left navigation panel.

2. Click the application to display **Pipeline Runs** in the side panel.

3. In **Pipeline Runs**, click **Start Last Run** to start a new pipeline run with the same parameters and resources as the previous one. This option is disabled if a pipeline run has not been initiated. You can also start a pipeline run when you create it.

Figure 2.5. Pipelines in Topology view



In the **Topology** page, hover to the left of the application to see the status of its pipeline run. After a pipeline is added, a bottom left icon indicates that there is an associated pipeline.

2.1.7. Interacting with pipelines from Topology view

The side panel of the application node in the **Topology** page displays the status of a pipeline run and you can interact with it.

- If a pipeline run does not start automatically, the side panel displays a message that the pipeline cannot be automatically started, hence it would need to be started manually.
- If a pipeline is created but the user has not started the pipeline, its status is not started. When the user clicks the **Not started** status icon, the start dialog box opens in the **Topology** view.
- If the pipeline has no build or build config, the **Builds** section is not visible. If there is a pipeline and build config, the **Builds section** is visible.
- The side panel displays a **Log Snippet** when a pipeline run fails on a specific task run. You can view the **Log Snippet** in the **Pipeline Runs** section, under the **Resources** tab. It provides a general error message and a snippet of the log. A link to the **Logs** section provides quick access to the details about the failed run.

2.1.8. Editing pipelines

You can edit the pipelines in your cluster using the **Developer** perspective of the web console:

Procedure

1. In the **Pipelines** view of the **Developer** perspective, select the pipeline you want to edit to see the details of the pipeline. In the **Pipeline Details** page, click **Actions** and select **Edit Pipeline**.
2. On the **Pipeline builder** page, you can perform the following tasks:
   - Add additional tasks, parameters, or resources to the pipeline.

- Click the task you want to modify to see the task details in the side panel and modify the required task details, such as the display name, parameters, and resources.
- Alternatively, to delete the task, click the task, and in the side panel, click **Actions** and select **Remove Task**.

3. Click **Save** to save the modified pipeline.

2.1.9. Deleting pipelines

You can delete the pipelines in your cluster using the **Developer** perspective of the web console.

Procedure

1. In the **Pipelines** view of the **Developer** perspective, click the **Options** menu adjoining a Pipeline, and select **Delete Pipeline**.
2. In the **Delete Pipeline** confirmation prompt, click **Delete** to confirm the deletion.

2.2. ADDITIONAL RESOURCES

- Using Tekton Hub with OpenShift Pipelines

2.3. CREATING PIPELINE TEMPLATES IN THE ADMINISTRATOR PERSPECTIVE

As a cluster administrator, you can create pipeline templates that developers can reuse when they create a pipeline on the cluster.

Prerequisites

- You have access to an OpenShift Container Platform cluster with cluster administrator permissions, and have switched to the **Administrator** perspective.
- You have installed the OpenShift Pipelines Operator in your cluster.

Procedure

1. Navigate to the **Pipelines** page to view existing pipeline templates.
2. Click the icon to go to the **Import YAML** page.
3. Add the YAML for your pipeline template. The template must include the following information:

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
# ...
  namespace: openshift (1)
  labels:
```

```
    pipeline.openshift.io/runtime: <runtime> 2
    pipeline.openshift.io/type: <pipeline-type> 3
# ...
```

1. The template must be created in the **openshift** namespace.
2. The template must contain the **pipeline.openshift.io/runtime** label. The accepted runtime values for this label are **nodejs**, **golang**, **dotnet**, **java**, **php**, **ruby**, **perl**, **python**, **nginx**, and **httpd**.
3. The template must contain the **pipeline.openshift.io/type:** label. The accepted type values for this label are **openshift**, **knative**, and **kubernetes**.

4. Click **Create**. After the pipeline has been created, you are taken to the **Pipeline details** page, where you can view information about or edit your pipeline.

2.4. PIPELINE EXECUTION STATISTICS IN THE WEB CONSOLE

You can view statistics related to execution of pipelines in the web console.

To view the statistic information, you must complete the following steps:

- Install Tekton Results. For more information about installing Tekton Results, see *Using Tekton Results for OpenShift Pipelines observability* in the *Additional resources* section.
- Enable the OpenShift Pipelines console plugin.

Statistic information is available for all pipelines together and for each individual pipeline.

IMPORTANT

The OpenShift Pipelines Pipelines console plugin 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 Technology Preview Features Support Scope .

Additonal resources

- Using Tekton Results for OpenShift Pipelines observability

2.4.1. Enabling the OpenShift Pipelines console plugin

To view the statistic information, you must first enable the OpenShift Pipelines console plugin.

Prerequisites

- You installed the Red Hat OpenShift Pipelines Operator in your cluster.
- You are logged on to the web console with cluster administrator permissions.

IMPORTANT

The OpenShift Pipelines console plugin requires OpenShift Container Platform version 4.15 or a later version.

Procedure

1. In the **Administrator** perspective of the web console, select **Operators → Installed Operators**.
2. Click **Red Hat OpenShift Pipelines** in the table of Operators.
3. In the right pane on the screen, check the status label under **Console plugin**. The label is either **Enabled** or **Disabled**.
4. If the label is **Disabled**, click this label. In the window that displays, select **Enable** and then click **Save**.

2.4.2. Viewing the statistics for all pipelines together

You can view consolidated statistic information related to all pipelines on the system.

Prerequisites

- You installed the Red Hat OpenShift Pipelines Operator in your cluster.
- You installed the OpenShift Pipelines web console plugin.

Procedure

1. In the **Administrator** perspective of the web console, select **Pipelines → Overview**.
   A statistics overview displays. This overview includes the following information: **A graph reflecting the number and status of pipeline runs over a time period** The total, average, and maximum durations of pipeline execution over the same period. ** The total number of pipeline runs over the same period.

   A table of pipelines also displays. This table lists all pipelines that were run in the time period, showing their duration and success rate.
2. Optional: Change the settings of the statistics display as necessary:
   - **Project**: The project or namespace to display statistics for.
   - **Time range**: The time period to display statistics for.
   - **Refresh interval**: How often Red Hat OpenShift Pipelines must update the data in the window while you are viewing it.

2.4.3. Viewing the statistics for a specific pipeline

You can view statistic information related to a particular pipeline.

Prerequisites

- You installed the Red Hat OpenShift Pipelines Operator in your cluster.

- You installed the OpenShift Pipelines web console plugin.

Procedure

1. In the **Administrator** perspective of the web console, select **Pipelines → Pipelines**.
2. Click a pipeline in the list of pipelines. The **Pipeline details** view displays.
3. Click the **Metrics** tab.
   A statistics overview displays. This overview includes the following information: **A graph reflecting the number and status of pipeline runs over a time period** The total, average, and maximum durations of pipeline execution over the same period. ** The total number of pipeline runs over the same period.
4. Optional: Change the settings of the statistics display as necessary:
   - **Project**: The project or namespace to display statistics for.
   - **Time range**: The time period to display statistics for.
   - **Refresh interval**: How often Red Hat OpenShift Pipelines must update the data in the window while you are viewing it.

CHAPTER 3. SPECIFYING REMOTE PIPELINES, TASKS, AND STEP ACTIONS USING RESOLVERS

Pipelines and tasks are reusable blocks for your CI/CD processes. You can reuse pipelines or tasks that you previously developed, or that were developed by others, without having to copy and paste their definitions. These pipelines or tasks can be available from several types of sources, from other namespaces on your cluster to public catalogs.

In a pipeline run resource, you can specify a pipeline from an existing source. In a pipeline resource or a task run resource, you can specify a task from an existing source.

Step actions, defined in **StepAction** custom resources (CRs), are reusable actions that a single step within a task completes. When specifying a step, you can reference a **StepAction** definition from an existing source.

In these cases, the *resolvers* in Red Hat OpenShift Pipelines retrieve the pipeline, task, or **StepAction** definition from the specified source at run time.

The following resolvers are available in a default installaton of Red Hat OpenShift Pipelines:

Hub resolver

Retrieves a task, pipeline, or **StepAction** definition from the Pipelines Catalog available on Artifact Hub or Tekton Hub.

Bundles resolver

Retrieves a task, pipeline, or **StepAction** definition from a Tekton bundle, which is an OCI image available from any OCI repository, such as an OpenShift container repository.

Git resolver

Retrieves a task, pipeline, or **StepAction** definition from a Git repository. You must specify the repository, the branch, and the path.

HTTP resolver

Retrieves a task, pipeline, or **StepAction** definition from a remote HTTP or HTTPS URL. You must specify the URL for authentication.

Cluster resolver

Retrieves a task, pipeline, or **StepAction** definition that is already created on the same OpenShift Container Platform cluster in a specific namespace.

An OpenShift Pipelines installation includes a set of standard tasks that you can use in your pipelines. These tasks are located in the OpenShift Pipelines installation namespace, which is normally the **openshift-pipelines** namespace. You can use the cluster resolver to access the tasks.

OpenShift Pipelines also provides a standard **StepAction** definition. You can use the cluster resolver to access this definition.

3.1. SPECIFYING A REMOTE PIPELINE, TASK, OR STEP ACTION FROM A TEKTON CATALOG

You can use the hub resolver to specify a remote pipeline, task, or **StepAction** definition that is defined either in a public Tekton catalog of Artifact Hub or in an instance of Tekton Hub.

IMPORTANT

The Artifact Hub project is not supported with Red Hat OpenShift Pipelines. Only the configuration of Artifact Hub is supported.

3.1.1. Configuring the hub resolver

You can change the default hub for pulling a resource, and the default catalog settings, by configuring the hub resolver.

Procedure

1. To edit the **TektonConfig** custom resource, enter the following command:

```
$ oc edit TektonConfig config
```

2. In the **TektonConfig** custom resource, edit the **pipeline.hub-resolver-config** spec:

```
apiVersion: operator.tekton.dev/v1alpha1
kind: TektonConfig
metadata:
  name: config
spec:
  pipeline:
    hub-resolver-config:
      default-tekton-hub-catalog: Tekton (1)
      default-artifact-hub-task-catalog: tekton-catalog-tasks (2)
      default-artifact-hub-pipeline-catalog: tekton-catalog-pipelines (3)
      defailt-kind: pipeline (4)
      default-type: tekton (5)
      tekton-hub-api: "https://my-custom-tekton-hub.example.com" (6)
      artifact-hub-api: "https://my-custom-artifact-hub.example.com" (7)
```

(1) The default Tekton Hub catalog for pulling a resource.

(2) The default Artifact Hub catalog for pulling a task resource.

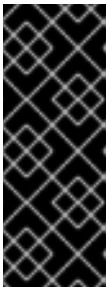
(3) The default Artifact Hub catalog for pulling a pipeline resource.

(4) The default object kind for references.

(5) The default hub for pulling a resource, either **artifact** for Artifact Hub or **tekton** for Tekton Hub.

(6) The Tekton Hub API used, if the **default-type** option is set to **tekton**.

(7) Optional: The Artifact Hub API used, if the **default-type** option is set to **artifact**.



IMPORTANT

If you set the **default-type** option to **tekton**, you must configure your own instance of the Tekton Hub by setting the **tekton-hub-api** value.

If you set the **default-type** option to **artifact** then the resolver uses the public hub API at https://artifacthub.io/ by default. You can configure your own Artifact Hub API by setting the **artifact-hub-api** value.

3.1.2. Specifying a remote pipeline, task, or step action using the hub resolver

When creating a pipeline run, you can specify a remote pipeline from Artifact Hub or Tekton Hub. When creating a pipeline or a task run, you can specify a remote task from Artifact Hub or Tekton Hub. When creating a step within a task, you can reference a remote **StepAction** definition from Artifact Hub or Tekton Hub.

Procedure

- To specify a remote pipeline, task, or **StepAction** definition from Artifact Hub or Tekton Hub, use the following reference format in the **pipelineRef**, **taskRef**, or **step.ref** spec:

```
# ...
  resolver: hub
  params:
  - name: catalog
    value: <catalog>
  - name: type
    value: <catalog_type>
  - name: kind
    value: [pipeline|task]
  - name: name
    value: <resource_name>
  - name: version
    value: <resource_version>
# ...
```

Table 3.1. Supported parameters for the hub resolver

Parameter	Description	Example value
catalog	The catalog for pulling the resource.	Default: **tekton-catalog-tasks** (for the **task** kind); **tekton-catalog-pipelines** (for the **pipeline** kind).
type	The type of the catalog for pulling the resource. Either **artifact** for Artifact Hub or **tekton** for Tekton Hub.	Default: **artifact**
kind	Either **task** or **pipeline**.	Default: **task**

Parameter	Description	Example value
name	The name of the task or pipeline to fetch from the hub.	**golang-build**
version	The version of the task or pipeline to fetch from the hub. You must use quotes (**"**) around the number.	**"0.5.0"**

If the pipeline or task requires additional parameters, specify values for these parameters in the **params** section of the specification of the pipeline, pipeline run, or task run. The **params** section of the **pipelineRef** or **taskRef** specification must contain only the parameters that the resolver supports.

Examples

The following example pipeline run references a remote pipeline from a catalog:

```
apiVersion: tekton.dev/v1
kind: PipelineRun
metadata:
  name: hub-pipeline-reference-demo
spec:
  pipelineRef:
    resolver: hub
    params:
    - name: catalog
      value: tekton-catalog-pipelines
    - name: type
      value: artifact
    - name: kind
      value: pipeline
    - name: name
      value: example-pipeline
    - name: version
      value: "0.1"
  params:
  - name: sample-pipeline-parameter
    value: test
```

The following example pipeline references a remote task from a catalog:

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: pipeline-with-hub-task-reference-demo
spec:
  tasks:
  - name: "cluster-task-reference-demo"
    taskRef:
      resolver: hub
      params:
      - name: catalog
```

```
      value: tekton-catalog-tasks
    - name: type
      value: artifact
    - name: kind
      value: task
    - name: name
      value: example-task
    - name: version
      value: "0.6"
  params:
  - name: sample-task-parameter
    value: test
```

The following example task run references a remote task from a catalog:

```
apiVersion: tekton.dev/v1
kind: TaskRun
metadata:
  name: hub-task-reference-demo
spec:
  taskRef:
    resolver: hub
    params:
    - name: catalog
      value: tekton-catalog-tasks
    - name: type
      value: artifact
    - name: kind
      value: task
    - name: name
      value: example-task
    - name: version
      value: "0.6"
  params:
  - name: sample-task-parameter
    value: test
```

The following example task includes a step that references a **StepAction** definition from a catalog:

```
apiVersion: tekton.dev/v1
kind: Task
metadata:
  name: hub-stepaction-reference-demo
spec:
  steps:
  - name: example-step
    ref:
    - resolver: hub
    - params:
      - name: catalog
        value: tekton-catalog-stepactions
      - name: type
        value: artifact
      - name: kind
        value: StepAction
```

```
    - name: name
      value: example-stepaction
    - name: version
      value: "0.6"
  params:
  - name: sample-stepaction-parameter
    value: test
```

3.2. SPECIFYING A REMOTE PIPELINE, TASK, OR STEP ACTION FROM A TEKTON BUNDLE

You can use the bundles resolver to specify a remote pipeline, task, or **StepAction** definition from a Tekton bundle. A Tekton bundle is an OCI image available from any OCI repository, such as an OpenShift container repository.

3.2.1. Configuring the bundles resolver

You can change the default service account name and the default kind for pulling resources from a Tekton bundle by configuring the bundles resolver.

Procedure

1. To edit the **TektonConfig** custom resource, enter the following command:

```
$ oc edit TektonConfig config
```

2. In the **TektonConfig** custom resource, edit the **pipeline.bundles-resolver-config** spec:

```
apiVersion: operator.tekton.dev/v1alpha1
kind: TektonConfig
metadata:
  name: config
spec:
  pipeline:
    bundles-resolver-config:
      default-service-account: pipelines (1)
      default-kind: task (2)
```

(1) The default service account name to use for bundle requests.

(2) The default layer kind in the bundle image.

3.2.2. Specifying a remote pipeline, task, or step action using the bundles resolver

When creating a pipeline run, you can specify a remote pipeline from a Tekton bundle. When creating a pipeline or a task run, you can specify a remote task from a Tekton bundle. When creating a step within a task, you can reference a remote **StepAction** definition from a Tekton bundle.

Procedure

- To specify a remote pipeline, task, or **StepAction** definition from a Tekton bundle, use the following reference format in the **pipelineRef**, **taskRef**, or **step.ref** spec:

```
# ...
  resolver: bundles
  params:
  - name: bundle
    value: <fully_qualified_image_name>
  - name: name
    value: <resource_name>
  - name: kind
    value: [pipeline|task]
# ...
```

Table 3.2. Supported parameters for the bundles resolver

Parameter	Description	Example value
serviceAccount	The name of the service account to use when constructing registry credentials.	**default**
bundle	The bundle URL pointing at the image to fetch.	**gcr.io/tekton-releases/catalog/upstream/golang-build:0.1**
name	The name of the resource to pull out of the bundle.	**golang-build**
kind	The kind of the resource to pull out of the bundle.	**task**

If the pipeline or task requires additional parameters, specify values for these parameters in the **params** section of the specification of the pipeline, pipeline run, or task run. The **params** section of the **pipelineRef** or **taskRef** specification must contain only the parameters that the resolver supports.

Examples

The following example pipeline run references a remote pipeline from a Tekton bundle:

```
apiVersion: tekton.dev/v1
kind: PipelineRun
metadata:
  name: bundle-pipeline-reference-demo
spec:
  pipelineRef:
    resolver: bundles
    params:
    - name: bundle
      value: registry.example.com:5000/simple/pipeline:latest
    - name: name
      value: hello-pipeline
    - name: kind
      value: pipeline
```

```
  params:
  - name: sample-pipeline-parameter
    value: test
  - name: username
    value: "pipelines"
```

The following example pipeline references a remote task from a Tekton bundle:

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: pipeline-with-bundle-task-reference-demo
spec:
  tasks:
  - name: "bundle-task-demo"
    taskRef:
      resolver: bundles
      params:
      - name: bundle
        value: registry.example.com:5000/advanced/task:latest
      - name: name
        value: hello-world
      - name: kind
        value: task
    params:
    - name: sample-task-parameter
      value: test
```

The following example task run references a remote task from a Tekton bundle:

```
apiVersion: tekton.dev/v1
kind: TaskRun
metadata:
  name: bundle-task-reference-demo
spec:
  taskRef:
    resolver: bundles
    params:
    - name: bundle
      value: registry.example.com:5000/simple/new_task:latest
    - name: name
      value: hello-world
    - name: kind
      value: task
  params:
  - name: sample-task-parameter
    value: test
```

The following example task includes a step that references a **StepAction** definition from a Tekton bundle:

```
apiVersion: tekton.dev/v1
kind: Task
metadata:
  name: bundle-stepaction-reference-demo
```

```
spec:
  steps:
  - name: example-step
    ref:
      resolver: bundles
      params:
      - name: bundle
        value: registry.example.com:5000/simple/new_task:latest
      - name: name
        value: hello-world-action
      - name: kind
        value: StepAction
    params:
    - name: sample-stepaction-parameter
      value: test
```

3.3. SPECIFYING A REMOTE PIPELINE, TASK, OR STEP ACTION WITH ANONYMOUS GIT CLONING

You can use the Git resolver to access a remote pipeline, task, or **StepAction** definition from a Git repository. The repository must include a YAML file that defines the pipeline or task. For anonymous access, you can clone repositories with the resolver without needing authentication credentials.

3.3.1. Configuring the Git resolver for anonymous Git cloning

If you want to use anonymous Git cloning, you can configure the default Git revision, fetch timeout, and default repository URL for pulling remote pipelines and tasks from a Git repository.

Procedure

1. To edit the **TektonConfig** custom resource, enter the following command:

```
$ oc edit TektonConfig config
```

2. In the **TektonConfig** custom resource, edit the **pipeline.git-resolver-config** spec:

```
apiVersion: operator.tekton.dev/v1alpha1
kind: TektonConfig
metadata:
  name: config
spec:
  pipeline:
    git-resolver-config:
      default-revision: main (1)
      fetch-timeout: 1m (2)
      default-url: https://github.com/tektoncd/catalog.git (3)
```

(1) The default Git revision to use if none is specified.

(2) The maximum time any single Git clone resolution may take, for example, **1m**, **2s**, **700ms**. Red Hat OpenShift Pipelines also enforces a global maximum timeout of 1 minute on all resolution requests.

3 The default Git repository URL for anonymous cloning if none is specified.

3.3.2. Specifying a remote pipeline, task, or step action by using the Git resolver for anonymous cloning

When creating a pipeline run, you can specify a remote pipeline from a Git repository by using anonymous cloning. When creating a pipeline or a task run, you can specify a remote task from a Git repository. When creating a step within a task, you can reference a remote **StepAction** definition from a Git repository.

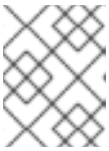
Procedure

- To specify a remote pipeline, task, or **StepAction** definition from a Git repository, use the following reference format in the **pipelineRef**, **taskRef**, or **step.ref** spec:

```
# ...
  resolver: git
  params:
  - name: url
    value: <git_repository_url>
  - name: revision
    value: <branch_name>
  - name: pathInRepo
    value: <path_in_repository>
# ...
```

Table 3.3. Supported parameters for the Git resolver

Parameter	Description	Example value
url	The URL of the repository, when using anonymous cloning.	**https://github.com/tektoncd/catalog.git**
revision	The Git revision in the repository. You can specify a branch name, a tag name, or a commit SHA hash.	**aeb957601cf41c012be462827053a21a420befca** **main** **v0.38.2**
pathInRepo	The path name of the YAML file in the repository.	**task/golang-build/0.3/golang-build.yaml**



NOTE

To clone and fetch the repository anonymously, use the **url** parameter. Do not specify the **url** parameter and the **repo** parameter together.

If the pipeline or task requires additional parameters, provide these parameters in **params**.

Examples

The following example pipeline run references a remote pipeline from a Git repository:

```
apiVersion: tekton.dev/v1beta1
kind: PipelineRun
metadata:
  name: git-pipeline-reference-demo
spec:
  pipelineRef:
    resolver: git
    params:
      - name: url
        value: https://github.com/tektoncd/catalog.git
      - name: revision
        value: main
      - name: pathInRepo
        value: pipeline/simple/0.1/simple.yaml
  params:
    - name: name
      value: "testPipelineRun"
    - name: sample-pipeline-parameter
      value: test
```

The following example pipeline references a remote task from a Git repository:

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: pipeline-with-git-task-reference-demo
spec:
  tasks:
    - name: "git-task-reference-demo"
      taskRef:
        resolver: git
        params:
          - name: url
            value: https://github.com/tektoncd/catalog.git
          - name: revision
            value: main
          - name: pathInRepo
            value: task/git-clone/0.6/git-clone.yaml
      params:
      - name: sample-task-parameter
        value: test
```

The following example task run references a remote task from a Git repository:

```
apiVersion: tekton.dev/v1beta1
kind: TaskRun
metadata:
  name: git-task-reference-demo
spec:
  taskRef:
    resolver: git
    params:
      - name: url
```

```
      value: https://github.com/tektoncd/catalog.git
    - name: revision
      value: main
    - name: pathInRepo
      value: task/git-clone/0.6/git-clone.yaml
  params:
  - name: sample-task-parameter
    value: test
```

The following example task includes a step that references a **StepAction** definition from a Git repository:

```
apiVersion: tekton.dev/v1
kind: Task
metadata:
  name: git-stepaction-reference-demo
spec:
  steps:
  - name: example-step
    ref:
      resolver: git
      - name: url
        value: https://github.com/openshift-pipelines/tektoncd-catalog.git
      - name: revision
        value: p
      - name: pathInRepo
        value: stepactions/stepaction-git-clone/0.4.1/stepaction-git-clone.yaml
    params:
    - name: sample-stepaction-parameter
      value: test
```

3.4. SPECIFYING A REMOTE PIPELINE, TASK, OR STEP ACTION WITH AN AUTHENTICATED GIT API

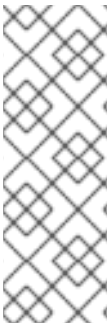
You can specify a remote pipeline, task, or **StepAction** definition from a Git repository by using the Git resolver. The repository must contain a YAML file that defines the pipeline or task. You can securely access repositories by using an authenticated API, which supports user authentication.

3.4.1. Configuring the Git resolver for an authenticated API

For an authenticated Source Control Management (SCM) API, you must set the configuration for the authenticated Git connection.

You can use Git repository providers that are supported by the **go-scm** library. Not all **go-scm** implementations have been tested with the Git resolver, but the following providers are known to work:

- **github.com** and GitHub Enterprise
- **gitlab.com** and self-hosted Gitlab
- Gitea
- Bitbucket Data Center
- Bitbucket Cloud



NOTE

- You can configure Git connections by using the authenticated SCM API. You can provide a security token that enables all users on your cluster to access one repository. Additionally, you can specify different SCM providers and tokens for specific pipelines or tasks.
- If you configure the Git resolver to use the authenticated SCM API, you can also use anonymous Git clone references to retrieve pipelines and tasks.

Procedure

1. To edit the **TektonConfig** custom resource, enter the following command:

```
$ oc edit TektonConfig config
```

2. In the **TektonConfig** custom resource, edit the **pipeline.git-resolver-config** spec:

```
apiVersion: operator.tekton.dev/v1alpha1
kind: TektonConfig
metadata:
  name: config
spec:
  pipeline:
    git-resolver-config:
      default-revision: main (1)
      fetch-timeout: 1m (2)
      scm-type: github (3)
      server-url: api.internal-github.com (4)
      api-token-secret-name: github-auth-secret (5)
      api-token-secret-key: github-auth-key (6)
      api-token-secret-namespace: github-auth-namespace (7)
      default-org: tektoncd (8)
```

(1) The default Git revision to use if none is specified.

(2) The maximum time any single Git clone resolution may take, for example, **1m**, **2s**, **700ms**. Red Hat OpenShift Pipelines also enforces a global maximum timeout of 1 minute on all resolution requests.

(3) The SCM provider type.

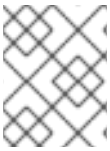
(4) The base URL for use with the authenticated SCM API. This setting is not required if you are using **github.com**, **gitlab.com**, or Bitbucket Cloud.

(5) The name of the secret that contains the SCM provider API token.

(6) The key within the token secret that contains the token.

(7) The namespace containing the token secret, if not **default**.

(8) Optional: The default organization for the repository, when using the authenticated API. This organization is used if you do not specify an organization in the resolver parameters.



NOTE

The **scm-type**, **api-token-secret-name**, and **api-token-secret-key** settings are required to use the authenticated SCM API.

3.4.2. Configuring multiple Git providers

You can configure multiple Git providers, or you can add multiple configurations for the same Git provider, to use in different task runs and pipeline runs.

Add details in the **TektonConfig** custom resource (CR) with your unique identifier key prefix.

Procedure

1. Edit the **TektonConfig** CR by running the following command:

```
$ oc edit TektonConfig config
```

2. In the **TektonConfig** CR, edit the **pipeline.git-resolver-config** spec:

```
apiVersion: operator.tekton.dev/v1alpha1
kind: TektonConfig
metadata:
  name: config
spec:
# ...
  pipeline:
    git-resolver-config:
      # configuration 1 (1)
      fetch-timeout: "1m"
      default-url: "https://github.com/tektoncd/catalog.git"
      default-revision: "main"
      scm-type: "github"
      server-url: ""
      api-token-secret-name: ""
      api-token-secret-key: ""
      api-token-secret-namespace: "default"
      default-org: ""
      # configuration 2 (2)
      test1.fetch-timeout: "5m"
      test1.default-url: ""
      test1.default-revision: "stable"
      test1.scm-type: "github"
      test1.server-url: "api.internal-github.com"
      test1.api-token-secret-name: "test1-secret"
      test1.api-token-secret-key: "token"
      test1.api-token-secret-namespace: "test1"
      test1.default-org: "tektoncd"
      # configuration 3 (3)
      test2.fetch-timeout: "10m"
      test2.default-url: ""
      test2.default-revision: "stable"
      test2.scm-type: "gitlab"
      test2.server-url: "api.internal-gitlab.com"
      test2.api-token-secret-name: "test2-secret"
```

```
    test2.api-token-secret-key: "pat"
    test2.api-token-secret-namespace: "test2"
    test2.default-org: "tektoncd-infra"
# ...
```

1. The default configuration to use if no **configKey** key is provided or the key is provided with the **default** value.
2. The configuration used if the **configKey** key is passed with the **test1** value.
3. The configuration used if the **configKey** key is passed with the **test2** value.

WARNING

configKey values with the **.** symbol are not supported. If you try to pass a **configKey** value that contains the **.** symbol, the **TaskRun** or **PipelineRun** resource where you passed the value fails to run.

3.4.3. Specifying a remote pipeline, task, or step action using the Git resolver with the authenticated SCM API

When creating a pipeline run, you can specify a remote pipeline from a Git repository using the authenticated SCM API. When creating a pipeline or a task run, you can specify a remote task from a Git repository. When creating a step within a task, you can reference a remote **StepAction** definition from a Git repository.

Prerequisites

- If you want to use the authenticated SCM API, you must configure the authenticated Git connection for the Git resolver.

Procedure

- To specify a remote pipeline, task, or **StepAction** definition from a Git repository, use the following reference format in the **pipelineRef**, **taskRef**, or **step.ref** spec:

```
# ...
  resolver: git
  params:
  - name: org
    value: <git_organization_name>
  - name: repo
    value: <git_repository_name>
  - name: revision
    value: <branch_name>
  - name: pathInRepo
    value: <path_in_repository>
# ...
```

Table 3.4. Supported parameters for the Git resolver

Parameter	Description	Example value
org	The organization for the repository, when using the authenticated SCM API.	**tektoncd**
repo	The repository name, when using the authenticated SCM API.	**test-infra**
revision	The Git revision in the repository. You can specify a branch name, a tag name, or a commit SHA hash.	**aeb957601cf41c012be462827053a21a420befca** **main** **v0.38.2**
pathInRepo	The path name of the YAML file in the repository.	**task/golang-build/0.3/golang-build.yaml**

NOTE

To clone and fetch the repository anonymously, use the **url** parameter. To use the authenticated SCM API, use the **repo** parameter. Do not specify the **url** parameter and the **repo** parameter together.

If the pipeline or task requires additional parameters, specify values for these parameters in the **params** section of the specification of the pipeline, pipeline run, or task run. The **params** section of the **pipelineRef** or **taskRef** specification must contain only the parameters that the resolver supports.

Examples

The following example pipeline run references a remote pipeline from a Git repository:

```
apiVersion: tekton.dev/v1
kind: PipelineRun
metadata:
  name: git-pipeline-reference-demo
spec:
  pipelineRef:
    resolver: git
    params:
    - name: org
      value: tektoncd
    - name: repo
      value: catalog
    - name: revision
      value: main
    - name: pathInRepo
      value: pipeline/simple/0.1/simple.yaml
  params:
```

```
  - name: name
    value: "testPipelineRun"
  - name: sample-pipeline-parameter
    value: test
```

The following example pipeline references a remote task from a Git repository:

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: pipeline-with-git-task-reference-demo
spec:
  tasks:
  - name: "git-task-reference-demo"
    taskRef:
      resolver: git
      params:
      - name: org
        value: tektoncd
      - name: repo
        value: catalog
      - name: revision
        value: main
      - name: pathInRepo
        value: task/git-clone/0.6/git-clone.yaml
    params:
    - name: sample-task-parameter
      value: test
```

The following example task run references a remote task from a Git repository:

```
apiVersion: tekton.dev/v1
kind: TaskRun
metadata:
  name: git-task-reference-demo
spec:
  taskRef:
    resolver: git
    params:
    - name: org
      value: tektoncd
    - name: repo
      value: catalog
    - name: revision
      value: main
    - name: pathInRepo
      value: task/git-clone/0.6/git-clone.yaml
  params:
  - name: sample-task-parameter
    value: test
```

The following example task includes a step that references a **StepAction** definition from a Git repository:

```
apiVersion: tekton.dev/v1
```

```
kind: Task
metadata:
  name: git-stepaction-reference-demo
spec:
  steps:
  - name: example-step
    ref:
      resolver: git
      - name: org
        value: openshift-pipelines
      - name: repo
        value: tektoncd-catalog
      - name: revision
        value: p
      - name: pathInRepo
        value: stepactions/stepaction-git-clone/0.4.1/stepaction-git-clone.yaml
    params:
    - name: sample-stepaction-parameter
      value: test
```

3.4.4. Specifying multiple Git providers

You can specify multiple Git providers by passing the unique **configKey** parameter when creating **TaskRun** and **PipelineRun** resources.

If no **configKey** parameter is passed, the default configuration is used. You can also specify default configuration by setting the **configKey** value to **default**.

WARNING

configKey values with the **.** symbol are not supported. If you try to pass a **configKey** value that contains the **.** symbol, the **TaskRun** or **PipelineRun** resource where you passed the value fails to run.

Prerequisites

- Configure multiple Git providers through the **Tektonconfig** custom resource. For more information, see "Configuring multiple Git providers".

Procedure

- To specify a Git provider, use the following reference format in the **pipelineRef** and **taskRef** spec:

```
# ...
  resolver: git
  params:
  # ...
```

```
  - name: configKey
    value: <your_unique_key> 1
# ...
```

1 Your unique key that matches one of the configuration keys, for example, **test1**.

3.4.5. Specifying a remote pipeline or task by using the Git resolver with the authenticated SCM API overriding the Git resolver configuration

You can override the initial configuration settings in specific pipeline runs or tasks to customize the behavior according to different use cases. You can use this method to access an authenticated provider that is not configured in the **TektonConfig** custom resource (CR).

The following example task run references a remote task from a Git repository that overrides the previous resolver configuration:

```
apiVersion: tekton.dev/v1beta1
kind: TaskRun
metadata:
  name: git-task-reference-demo
spec:
  taskRef:
    resolver: git
    params:
    - name: org
      value: tektoncd
    - name: repo
      value: catalog
    - name: revision
      value: main
    - name: pathInRepo
      value: task/git-clone/0.6/git-clone.yaml
    - name: token
      value: my-secret-token
    - name: tokenKey
      value: token
    - name: scmType
      value: github
    - name: serverURL
      value: https://ghe.mycompany.com
```

Table 3.5. Supported parameters to override the Git resolver

Parameter	Description	Example value
org	The organization for the repository.	**tektoncd**
repo	The repository name.	catalog

Parameter	Description	Example value
revision	The Git revision in the repository. You can specify a branch name, a tag name, or a commit SHA hash.	main
pathInRepo	The path name of the YAML file in the repository.	task/git-clone/0.6/git-clone.yaml
token	The secret name used for authentication.	my-secret-token
tokenKey	The key name for the token.	token
scmType	The type of SCM (Source Control Management) system.	github
serverURL	The URL of the server hosting the repository.	**https://ghe.mycompany.com**

3.5. SPECIFYING A REMOTE PIPELINE, TASK, OR STEP ACTION BY USING THE HTTP RESOLVER

You can specify a remote pipeline, task, or **StepAction** definition from an HTTP or HTTPS URL by using the HTTP resolver. The URL must point to a YAML file that defines the pipeline, task, or step action.

3.5.1. Configuring the HTTP resolver

You can use the HTTP resolver to fetch pipelines or tasks from an HTTP or HTTPS URL. You can configure the default values for the HTTP resolver by editing the **TektonConfig** custom resource (CR).

Procedure

1. Edit the **TektonConfig** CR by entering the following command:

```
$ oc edit TektonConfig config
```

2. In the **TektonConfig** CR, edit the **pipeline.http-resolver-config** spec:

```
apiVersion: operator.tekton.dev/v1alpha1
kind: TektonConfig
metadata:
  name: config
spec:
  pipeline:
    http-resolver-config:
      fetch-timeout: "1m" (1)
```

(1) The maximum amount of time the HTTP resolver waits for a response from the server.

3.5.2. Specifying a remote pipeline, task, or step action with the HTTP Resolver

When creating a pipeline run, you can specify a remote pipeline from an HTTP or HTTPS URL. When creating a pipeline or a task run, you can specify a remote task from an HTTP or HTTPS URL. When creating a step within a task, you can reference a remote **StepAction** definition from an HTTP or HTTPS URL.

Procedure

- Specify a remote pipeline, task, or **StepAction** definition from an HTTP or HTTPS URL, using the following format in the **pipelineRef**, **taskRef**, or **step.ref** spec:

```
# ...
  resolver: http
  params:
  - name: url
    value: <fully_qualified_http_url>
# ...
```

Table 3.6. Supported parameters for the HTTP Resolver

Parameter	Description	Example Value
url	The HTTP URL pointing to the Tekton resource to fetch.	**https://raw.githubusercontent.com/openshift-pipelines/tektoncd-catalog/p/tasks/task-git-clone/0.4.1/task-git-clone.yaml**

Examples

The following example pipeline run references a remote pipeline from the same cluster:

```
apiVersion: tekton.dev/v1beta1
kind: PipelineRun
metadata:
  name: http-pipeline-reference-demo
spec:
  pipelineRef:
    resolver: http
    params:
    - name: url
      value: https://raw.githubusercontent.com/tektoncd/catalog/main/pipeline/build-push-gke-deploy/0.1/build-push-gke-deploy.yaml
  params:
  - name: sample-pipeline-parameter
    value: test
  - name: username
    value: "pipelines"
```

The following example pipeline defines a task that references a remote task from an HTTPS URL:

```
apiVersion: tekton.dev/v1beta1
```

```
kind: Pipeline
metadata:
  name: pipeline-with-http-task-reference-demo
spec:
  tasks:
  - name: "http-task-demo"
    taskRef:
      resolver: http
      params:
      - name: url
        value: https://raw.githubusercontent.com/openshift-pipelines/tektoncd-catalog/p/tasks/task-git-clone/0.4.1/task-git-clone.yaml
    params:
    - name: sample-task-parameter
      value: test
```

The following example task run references a remote task from an HTTPS URL:

```
apiVersion: tekton.dev/v1beta1
kind: TaskRun
metadata:
  name: http-task-reference-demo
spec:
  taskRef:
    resolver: http
    params:
    - name: url
      value: https://raw.githubusercontent.com/openshift-pipelines/tektoncd-catalog/p/tasks/task-git-clone/0.4.1/task-git-clone.yaml
  params:
  - name: sample-task-parameter
    value: test
```

The following example task includes a step that references a **StepAction** definition from an HTTPS URL:

```
apiVersion: tekton.dev/v1
kind: Task
metadata:
  name: http-stepaction-reference-demo
spec:
  steps:
  - name: example-step
    ref:
      resolver: http
      params:
      - name: url
        value: https://raw.githubusercontent.com/openshift-pipelines/tektoncd-catalog/p/stepactions/stepaction-git-clone/0.4.1/stepaction-git-clone.yaml
    params:
    - name: sample-stepaction-parameter
      value: test
```

3.6. SPECIFYING A PIPELINE, TASK, OR STEP ACTION FROM THE SAME CLUSTER

You can use the cluster resolver to specify a pipeline, task, or **StepAction** definition that is defined in a namespace on the OpenShift Container Platform cluster where Red Hat OpenShift Pipelines is running.

In particular, you can use the cluster resolver to access tasks that OpenShift Pipelines provides in its installation namespace, which is normally the **openshift-pipelines** namespace.

3.6.1. Configuring the cluster resolver

You can change the default kind and namespace for the cluster resolver, or limit the namespaces that the cluster resolver can use.

Procedure

1. To edit the **TektonConfig** custom resource, enter the following command:

```
$ oc edit TektonConfig config
```

2. In the **TektonConfig** custom resource, edit the **pipeline.cluster-resolver-config** spec:

```
apiVersion: operator.tekton.dev/v1alpha1
kind: TektonConfig
metadata:
  name: config
spec:
  pipeline:
    cluster-resolver-config:
      default-kind: pipeline (1)
      default-namespace: namespace1 (2)
      allowed-namespaces: namespace1, namespace2 (3)
      blocked-namespaces: namespace3, namespace4 (4)
```

(1) The default resource kind to fetch, if not specified in parameters.

(2) The default namespace for fetching resources, if not specified in parameters.

(3) A comma-separated list of namespaces that the resolver is allowed to access. If this key is not defined, all namespaces are allowed.

(4) An optional comma-separated list of namespaces which the resolver is blocked from accessing. If this key is not defined, all namespaces are allowed.

3.6.2. Specifying a pipeline, task, or step action from the same cluster using the cluster resolver

When creating a pipeline run, you can specify a pipeline that exists on the same cluster. When creating a pipeline or a task run, you can specify a task that exists on the the same cluster. When creating a step within a task, you can specify a **StepAction** definition that exists on the the same cluster.

Procedure

- To specify a pipeline, task, or **StepAction** definition from the same cluster, use the following reference format in the **pipelineRef**, **taskRef**, or **step.ref** spec:

```
# ...
  resolver: cluster
  params:
  - name: name
    value: <name>
  - name: namespace
    value: <namespace>
  - name: kind
    value: [pipeline|task|stepaction]
# ...
```

Table 3.7. Supported parameters for the cluster resolver

Parameter	Description	Example value
name	The name of the resource to fetch.	**some-pipeline**
namespace	The namespace in the cluster containing the resource.	**other-namespace**
kind	The kind of the resource to fetch.	**pipeline**

If the pipeline or task requires additional parameters, provide these parameters in **params**.

Examples

The following example pipeline run references a pipeline from the same cluster:

```
apiVersion: tekton.dev/v1
kind: PipelineRun
metadata:
  name: cluster-pipeline-reference-demo
spec:
  pipelineRef:
    resolver: cluster
    params:
    - name: name
      value: some-pipeline
    - name: namespace
      value: test-namespace
    - name: kind
      value: pipeline
  params:
  - name: sample-pipeline-parameter
    value: test
```

The following example pipeline references a task from the same cluster:

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
```

```
  name: pipeline-with-cluster-task-reference-demo
spec:
  tasks:
  - name: "cluster-task-reference-demo"
    taskRef:
      resolver: cluster
      params:
      - name: name
        value: some-task
      - name: namespace
        value: test-namespace
      - name: kind
        value: task
    params:
    - name: sample-task-parameter
      value: test
```

The following example task run references a task from the same cluster:

```
apiVersion: tekton.dev/v1
kind: TaskRun
metadata:
  name: cluster-task-reference-demo
spec:
  taskRef:
    resolver: cluster
    params:
    - name: name
      value: some-task
    - name: namespace
      value: test-namespace
    - name: kind
      value: task
  params:
  - name: sample-task-parameter
    value: test
```

The following example task includes a step that references a **StepAction** definition from the same cluster:

```
apiVersion: tekton.dev/v1
kind: Task
metadata:
  name: cluster-stepaction-reference-demo
spec:
  steps:
  - name: example-step
    ref:
      resolver: cluster
      params:
      - name: name
        value: some-step
      - name: namespace
        value: test-namespace
      - name: kind
```

```
      value: stepaction
  params:
  - name: sample-stepaction-parameter
    value: test
```

3.7. TASKS PROVIDED IN THE OPENSHIFT PIPELINES NAMESPACE

An OpenShift Pipelines installation includes a set of standard tasks that you can use in your pipelines. These tasks are located in the OpenShift Pipelines installation namespace, which is normally the **openshift-pipelines** namespace. You can use the cluster resolver to access the tasks.

Until version 1.16, OpenShift Pipelines included **ClusterTask** functionality. Versions 1.17 and later no longer include this functionality. If your pipelines use **ClusterTask** references, you can re-create them with the tasks that are available from the OpenShift Pipelines installation namespace by using the cluster resolver. However, certain changes are made in these tasks compared to the previously existing **ClusterTask** definitions.

You cannot specify a custom execution image in any of the tasks available in the OpenShift Pipelines installation namespace. These tasks do not support parameters such as **BUILDER_IMAGE**, **gitInitImage**, or **KN_IMAGE**. If you want to use a custom execution image, create a copy of the task and replace the image by editing the copy.

buildah

The **buildah** task builds a source code tree into a container image and then pushes the image to a container registry.

Example usage of the buildah task

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: build-and-deploy
spec:
# ...
  tasks:
# ...
  - name: build-image
    taskRef:
      resolver: cluster
      params:
      - name: kind
        value: task
      - name: name
        value: buildah
      - name: namespace
        value: openshift-pipelines
    params:
    - name: IMAGE
      value: $(params.IMAGE)
    workspaces:
    - name: source
      workspace: shared-workspace
# ...
```

Table 3.8. Supported parameters for the buildah task

Parameter	Description	Type	Default value
IMAGE	Fully qualified container image name to be built by Buildah.	**string**	
DOCKERFILE	Path to the **Dockerfile** (or **Containerfile**) relative to the **source** workspace.	**string**	**./Dockerfile**
CONTEXT	Path to the directory to use as the context.	**string**	**.**
STORAGE_DRIVER	Set the Buildah storage driver to reflect the settings of the current cluster node settings.	**string**	**vfs**
FORMAT	The format of the container to build, either **oci** or **docker**.	**string**	**oci**
BUILD_EXTRA_ARGS	Extra parameters for the **build** command when building the image.	**string**	
PUSH_EXTRA_ARGS	Extra parameters for the **push** command when pushing the image.	**string**	
SKIP_PUSH	Skip pushing the image to the container registry.	**string**	**false**
TLS_VERIFY	The TLS verification flag, normally **true**.	**string**	**true**
VERBOSE	Turn on verbose logging; all commands executed are added to the log.	**string**	**false**

Table 3.9. Supported workspaces for the **buildah** task

Workspace	Description
source	Container build context, usually the application source code that includes a **Dockerfile** or **Containerfile** file.
dockerconfig	An optional workspace for providing a **.docker/config.json** file that Buildah uses to access the container registry. Place the file at the root of the workspace with the name **config.json** or **.dockerconfigjson**.
rhel-entitlement	An optional workspace for providing the entitlement keys that Buildah uses to access a Red Hat Enterprise Linux (RHEL) subscription. The mounted workspace must contains the **entitlement.pem** and **entitlement-key.pem** files.

Table 3.10. Results that the **buildah** task returns

Result	Type	Description
IMAGE_URL	**string**	The fully qualified name of the image that was built.
IMAGE_DIGEST	**string**	Digest of the image that was built.

Changes from the **buildah** ClusterTask

- The **VERBOSE** parameter was added.
- The **BUILDER_IMAGE** parameter was removed.

git-cli

The **git-cli** task runs the **git** command-line utility. You can pass the full Git command or several commands to run using the **GIT_SCRIPT** parameter. If the commands need authentication to a Git repository, for example, in order to complete a push, you must supply the authentication credentials.

Example usage of the git-cli task

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: update-repo
spec:
# ...
  tasks:
# ...
  - name: push-to-repo
    taskRef:
      resolver: cluster
      params:
      - name: kind
        value: task
      - name: name
        value: git-cli
      - name: namespace
        value: openshift-pipelines
    params:
    - name: GIT_SCRIPT
      value: "git push"
    - name: GIT_USER_NAME
      value: "Example Developer"
    - name: GIT_USER_EMAIL
      value: "developer@example.com"
    workspaces:
    - name: ssh-directory
      workspace: ssh-workspace (1)
    - name: source
      workspace: shared-workspace
# ...
```

(1) In this example, **ssh-workspace** must contain the contents of the **.ssh** directory with a valid key for authorization to the Git repository.

Table 3.11. Supported parameters for the **git-cli** task

Parameter	Description	Type	Default value
CRT_FILENAME	Certificate Authority (CA) bundle filename in the **ssl-ca-directory** workspace.	**string**	**ca-bundle.crt**
HTTP_PROXY	HTTP proxy server (non-TLS requests).	**string**	
HTTPS_PROXY	HTTPS proxy server (TLS requests).	**string**	
NO_PROXY	Opt out of proxying HTTP/HTTPS requests.	**string**	
SUBDIRECTORY	Relative path to the **source** workspace where the git repository is present.	**string**	
USER_HOME	Absolute path to the Git user home directory in the pod.	**string**	**/home/git**
DELETE_EXISTING	Erase any existing contents of the **source** workspace before completing the git operations.	**string**	**true**
VERBOSE	Log all the executed commands.	**string**	**false**
SSL_VERIFY	The global **http.sslVerify** value. Do not use **false** unless you trust the remote repository.	**string**	**true**
GIT_USER_NAME	Git user name for performing Git operations.	**string**	
GIT_USER_EMAIL	Git user email for performing Git operations.	**string**	
GIT_SCRIPT	The Git script to run.	**string**	**git help**

Table 3.12. Supported workspaces for the **git-cli** task

Workspace	Description
ssh-directory	A **.ssh** directory with the private key,**known_hosts**, **config**, and other files as necessary. If you provide this workspace, the task uses it for authentication to the Git repository. Bind this workspace to a **Secret** resource for secure storage of authentication information.

Workspace	Description
basic-auth	A workspace containing a **.gitconfig** and **.git-credentials** files. If you provide this workspace, the task uses it for authentication to the Git repository. Use a **ssh-directory** workspace for authentication instead of**basic-auth** whenever possible. Bind this workspace to a **Secret** resource for secure storage of authentication information.
ssl-ca-directory	A workspace containing CA certificates. If you provide this workspace, Git uses these certificates to verify the peer when interacting with remote repositories using HTTPS.
source	A workspace that contains the fetched Git repository.
input	An optional workspace that contains the files that need to be added to the Git repository. You can access the workspace from your script using **$(workspaces.input.path)**, for example: **cp $(workspaces.input.path)/<file_that_i_want> .** **git add <file_that_i_want>**

Table 3.13. Results that the **git-cli** task returns

Result	Type	Description
COMMIT	**string**	The SHA digest of the commit that is at the HEAD of the current branch in the cloned Git repository.

Changes from the **git-cli ClusterTask**

- Several new parameters were added.
- The **BASE_IMAGE** parameter was removed.
- The **ssl-ca-directory** workspace was added.
- The default values for the **USER_HOME** and **VERBOSE** parameters were changed.
- The name of the result was changed from **commit** to **COMMIT**.

git-clone

The **git-clone** task uses Git to initialize and clone a remote repository on a workspace. You can use this task at the start of a pipeline that builds or otherwise processes this source code.

Example usage of the git-clone task

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
```

```
  name: build-source
spec:
# ...
  tasks:
  - name: clone-repo
    taskRef:
      resolver: cluster
      params:
      - name: kind
        value: task
      - name: name
        value: git-clone
      - name: namespace
        value: openshift-pipelines
    params:
    - name: URL
      value: "https://github.com/example/repo.git"
    workspaces:
    - name: output
      workspace: shared-workspace
```

Table 3.14. Supported parameters for the git-clone task

Parameter	Description	Type	Default value
CRT_FILENAME	Certificate Authority (CA) bundle filename in the **ssl-ca-directory** workspace.	**string**	**ca-bundle.crt**
HTTP_PROXY	HTTP proxy server (non-TLS requests).	**string**	
HTTPS_PROXY	HTTPS proxy server (TLS requests).	**string**	
NO_PROXY	Opt out of proxying HTTP/HTTPS requests.	**string**	
SUBDIRECTORY	Relative path in the **output** workspace where the task places the Git repository.	**string**	
USER_HOME	Absolute path to the Git user home directory in the pod.	**string**	**/home/git**
DELETE_EXISTING	Delete the contents of the default workspace, if they exist, before running the Git operations.	**string**	**true**
VERBOSE	Log the executed commands.	**string**	**false**
SSL_VERIFY	The global **http.sslVerify** value. Do not set this parameter to to **false** unless you trust the remote repository.	**string**	**true**

Parameter	Description	Type	Default value
URL	Git repository URL.	**string**	
REVISION	The revision to check out, for example, a branch or tag.	**string**	**main**
REFSPEC	The **refspec** string for the repository that the task fetches before checking out the revision.	**string**	
SUBMODULES	Initialize and fetch Git submodules.	**string**	**true**
DEPTH	Number of commits to fetch, a "shallow clone" is a single commit.	**string**	**1**
SPARSE_CHECKOUT_DIRECTORIES	List of directory patterns, separated by commas, for performing a "sparse checkout".	**string**	

Table 3.15. Supported workspaces for the **git-clone** task

Workspace	Description
ssh-directory	A **.ssh** directory with the private key, **known_hosts**, **config**, and other files as necessary. If you provide this workspace, the task uses it for authentication to the Git repository. Bind this workspace to a **Secret** resource for secure storage of authentication information.
basic-auth	A workspace containing a **.gitconfig** and **.git-credentials** files. If you provide this workspace, the task uses it for authentication to the Git repository. Use a **ssh-directory** workspace for authentication instead of **basic-auth** whenever possible. Bind this workspace to a **Secret** resource for secure storage of authentication information.
ssl-ca-directory	A workspace containing CA certificates. If you provide this workspace, Git uses these certificates to verify the peer when interacting with remote repositories using HTTPS.
output	A workspace that contains the fetched git repository, data will be placed on the root of the workspace or on the relative path defined by the **SUBDIRECTORY** parameter.

Table 3.16. Results that the **git-clone** task returns

Result	Type	Description

Result	Type	Description
COMMIT	**string**	The SHA digest of the commit that is at the HEAD of the current branch in the cloned Git repository.
URL	**string**	The URL of the repository that was cloned.
COMMITTER_DATE	**string**	The epoch timestamp of the commit that is at the HEAD of the current branch in the cloned Git repository.

Changes from the **git-clone** ClusterTask

- All parameter names were changed to uppercase.
- All result names were changed to uppercase.
- The **gitInitImage** parameter was removed.

kn

The **kn** task uses the **kn** command-line utility to complete operations on Knative resources, such as services, revisions, or routes.

Example usage of the **kn** task

```
apiVersion: tekton.dev/v1
kind: PipelineRun
metadata:
 name: kn-run
spec:
 pipelineSpec:
   tasks:
   - name: kn-run
     taskRef:
       resolver: cluster
       params:
       - name: kind
         value: task
       - name: name
         value: kn
       - name: namespace
         value: openshift-pipelines
     params:
     - name: ARGS
       value: [version]
```

Table 3.17. Supported parameters for the kn task

Parameter	Description	Type	Default value
ARGS	The arguments for the **kn** utility.	**array**	**- help**

Changes from the kn ClusterTask

- The **KN_IMAGE** parameter was removed.

kn-apply

The **kn-apply** task deploys a specified image to a Knative Service. This task uses the **kn service apply** command to create or update the specified Knative service.

Example usage of the kn-apply task

```
apiVersion: tekton.dev/v1
kind: PipelineRun
metadata:
 name: kn-apply-run
spec:
 pipelineSpec:
   tasks:
   - name: kn-apply-run
     taskRef:
       resolver: cluster
       params:
       - name: kind
         value: task
       - name: name
         value: kn-apply
       - name: namespace
         value: openshift-pipelines
     params:
     - name: SERVICE
       value: "hello"
     - name: IMAGE
       value: "gcr.io/knative-samples/helloworld-go:latest"
```

Table 3.18. Supported parameters for the kn-apply task

Parameter	Description	Type	Default value
SERVICE	The Knative service name.	**string**	
IMAGE	The fully qualified name of the image to deploy.	**string**	

Changes from the kn-apply ClusterTask

- The **KN_IMAGE** parameter was removed.

maven

The **maven** task runs a Maven build.

Example usage of the maven task

```
apiVersion: tekton.dev/v1
kind: Pipeline
```

```
metadata:
  name: build-and-deploy
spec:
# ...
  tasks:
# ...
  - name: build-from-source
    taskRef:
      resolver: cluster
      params:
      - name: kind
        value: task
      - name: name
        value: maven
      - name: namespace
        value: openshift-pipelines
    workspaces:
    - name: source
      workspace: shared-workspace
# ...
```

Table 3.19. Supported parameters for the**maven** task

Parameter	Description	Type	Default value
GOALS	The Maven goals to run.	**array**	**- package**
MAVEN_MIRROR_URL	The Maven repository mirror URL.	**string**	
SUBDIRECTORY	The subdirectory within the **source** workspace that the task runs the Maven build on.	**string**	**.**

Table 3.20. Supported workspaces for the**maven** task

Workspace	Description
source	The workspace that contains the Maven project.
server_secret	The workspace that contains the secrets for connecting to the Maven server, such as the user name and password.
proxy_secret	The workspace that contains the credentials for connecting to the proxy server, such as the user name and password.
proxy_configmap	The workspace that contains proxy configuration values, such as **proxy_port**, **proxy_host**, **proxy_protocol**, **proxy_non_proxy_hosts**.
maven_settings	The workspace that contains custom Maven settings.

Changes from the **maven ClusterTask**

- The parameter name **CONTEXT_DIR** was changed to **SUBDIRECTORY**.
- The workspace name **maven-settings** was changed to **maven_settings**.

openshift-client

The **openshift-client** task runs commands using the **oc** command-line interface. You can use this task to manage an OpenShift Container Platform cluster.

Example usage of the **openshift-client** task

```
apiVersion: tekton.dev/v1
kind: PipelineRun
metadata:
 name: openshift-client-run
spec:
 pipelineSpec:
   tasks:
   - name: openshift-client-run
     taskRef:
       resolver: cluster
       params:
       - name: kind
         value: task
       - name: name
         value: openshift-client
       - name: namespace
         value: openshift-pipelines
     params:
     - name: SCRIPT
       value: "oc version"
```

Table 3.21. Supported parameters for the **openshift-client** task

Parameter	Description	Type	Default value
SCRIPT	The **oc** CLI arguments to run.	**string**	**oc help**
VERSION	The OpenShift Container Platform version to use.	**string**	**latest**

Table 3.22. Supported workspaces for the **openshift-client** task

Workspace	Description
manifest_dir	The workspace containing manifest files that you want to apply using the **oc** utility.
kubeconfig_dir	An optional workspace in which you can provide a **.kube/config** file that contains credentials for accessing the cluster. Place this file at the root of the workspace and name it **kubeconfig**.

Workspace	Description

Changes from the openshift-client ClusterTask

- The workspace name **manifest-dir** was changed to **manifest_dir**.
- The workspace name **kubeconfig-dir** was changed to **kubeconfig_dir**.

s2i-dotnet

The **s2i-dotnet** task builds the source code using the Source to Image (S2I) dotnet builder image, which is available from the OpenShift Container Platform registry as **image-registry.openshift-image-registry.svc:5000/openshift/dotnet**.

Example usage of the s2i-dotnet task

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: build-and-deploy
spec:
# ...
  tasks:
# ...
  - name: build-s2i
    taskRef:
      resolver: cluster
      params:
      - name: kind
        value: task
      - name: name
        value: s2i-dotnet
      - name: namespace
        value: openshift-pipelines
    workspaces:
    - name: source
      workspace: shared-workspace
# ...
```

Table 3.23. Supported parameters for the s2i-dotnet task

Parameter	Description	Type	Default value
IMAGE	The fully qualified name for the container image that the S2I process builds.	**string**	
IMAGE_SCRIPTS_URL	The URL containing the default assemble and run scripts for the builder image.	**string**	**image:///usr/libexec/s2i**

Parameter	Description	Type	Default value
ENV_VARS	An array of values for environment variables to set in the build process, listed in the **KEY=VALUE** format.	**array**	
CONTEXT	Path to the directory within the **source** workspace to use as the context.	**string**	**.**
STORAGE_DRIVER	Set the Buildah storage driver to reflect the settings of the current cluster node settings.	**string**	**vfs**
FORMAT	The format of the container to build, either **oci** or **docker**.	**string**	**oci**
BUILD_EXTRA_ARGS	Extra parameters for the **build** command when building the image.	**string**	
PUSH_EXTRA_ARGS	Extra parameters for the **push** command when pushing the image.	**string**	
SKIP_PUSH	Skip pushing the image to the container registry.	**string**	**false**
TLS_VERIFY	The TLS verification flag, normally **true**.	**string**	**true**
VERBOSE	Turn on verbose logging; all commands executed are added to the log.	**string**	**false**
VERSION	The tag of the image stream, which corresponds to the language version.	**string**	**latest**

Table 3.24. Supported workspaces for the **s2i-dotnet** task

Workspace	Description
source	The application source code, which is the build context for the S2I workflow.
dockerconfig	An optional workspace for providing a **.docker/config.json** file that Buildah uses to access the container registry. Place the file at the root of the workspace with the name **config.json** or **.dockerconfigjson**.

Table 3.25. Results that the **s2i-dotnet** task returns

Result	Type	Description
IMAGE_URL	**string**	The fully qualified name of the image that was built.

Result	Type	Description
IMAGE_DIGEST	**string**	Digest of the image that was built.

s2i-go

The **s2i-go** task builds the source code using the S2I Golang builder image, which is available from the OpenShift Container Platform registry as **image-registry.openshift-image-registry.svc:5000/openshift/golang**.

Example usage of the s2i-go task

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: build-and-deploy
spec:
# ...
  tasks:
# ...
  - name: build-s2i
    taskRef:
      resolver: cluster
      params:
      - name: kind
        value: task
      - name: name
        value: s2i-go
      - name: namespace
        value: openshift-pipelines
    workspaces:
    - name: source
      workspace: shared-workspace
# ...
```

Table 3.26. Supported parameters for the s2i-go task

Parameter	Description	Type	Default value
IMAGE	The fully qualified name for the container image that the S2I process builds.	**string**	
IMAGE_SCRIPTS_URL	The URL containing the default assemble and run scripts for the builder image.	**string**	**image:///usr/libexec/s2i**
ENV_VARS	An array of values for environment variables to set in the build process, listed in the **KEY=VALUE** format.	**array**	
CONTEXT	Path to the directory within the **source** workspace to use as the context.	**string**	**.**

Parameter	Description	Type	Default value
STORAGE_DRIVER	Set the Buildah storage driver to reflect the settings of the current cluster node settings.	**string**	**vfs**
FORMAT	The format of the container to build, either **oci** or **docker**.	**string**	**oci**
BUILD_EXTRA_ARGS	Extra parameters for the **build** command when building the image.	**string**	
PUSH_EXTRA_ARGS	Extra parameters for the **push** command when pushing the image.	**string**	
SKIP_PUSH	Skip pushing the image to the container registry.	**string**	**false**
TLS_VERIFY	The TLS verification flag, normally **true**.	**string**	**true**
VERBOSE	Turn on verbose logging; all commands executed are added to the log.	**string**	**false**
VERSION	The tag of the image stream, which corresponds to the language version.	**string**	**latest**

Table 3.27. Supported workspaces for the **s2i-go** task

Workspace	Description
source	The application source code, which is the build context for the S2I workflow.
dockerconfig	An optional workspace for providing a **.docker/config.json** file that Buildah uses to access the container registry. Place the file at the root of the workspace with the name **config.json** or **.dockerconfigjson**.

Table 3.28. Results that the **s2i-go** task returns

Result	Type	Description
IMAGE_URL	**string**	The fully qualified name of the image that was built.
IMAGE_DIGEST	**string**	Digest of the image that was built.

s2i-java

The **s2i-java** task builds the source code using the S2I Java builder image, which is available from the OpenShift Container Platform registry as **image-registry.openshift-image-registry.svc:5000/openshift/java**.

Table 3.29. Supported parameters for the **s2i-java** task

Parameter	Description	Type	Default value
IMAGE	The fully qualified name for the container image that the S2I process builds.	**string**	
IMAGE_SCRIPTS_URL	The URL containing the default assemble and run scripts for the builder image.	**string**	**image:///usr/libexec/s2i**
ENV_VARS	An array of values for environment variables to set in the build process, listed in the **KEY=VALUE** format.	**array**	
CONTEXT	Path to the directory within the **source** workspace to use as the context.	**string**	**.**
STORAGE_DRIVER	Set the Buildah storage driver to reflect the settings of the current cluster node settings.	**string**	**vfs**
FORMAT	The format of the container to build, either **oci** or **docker**.	**string**	**oci**
BUILD_EXTRA_ARGS	Extra parameters for the **build** command when building the image.	**string**	
PUSH_EXTRA_ARGS	Extra parameters for the **push** command when pushing the image.	**string**	
SKIP_PUSH	Skip pushing the image to the container registry.	**string**	**false**
TLS_VERIFY	The TLS verification flag, normally **true**.	**string**	**true**
VERBOSE	Turn on verbose logging; all commands executed are added to the log.	**string**	**false**
VERSION	The tag of the image stream, which corresponds to the language version.	**string**	**latest**

Table 3.30. Supported workspaces for the **s2i-java** task

Workspace	Description
source	The application source code, which is the build context for the S2I workflow.

Workspace	Description
dockerconfig	An optional workspace for providing a **.docker/config.json** file that Buildah uses to access the container registry. Place the file at the root of the workspace with the name **config.json** or **.dockerconfigjson**.

Table 3.31. Results that the **s2i-java** task returns

Result	Type	Description
IMAGE_URL	**string**	The fully qualified name of the image that was built.
IMAGE_DIGEST	**string**	Digest of the image that was built.

Changes from the **s2i-java ClusterTask**

- Several new parameters were added.
- The **BUILDER_IMAGE**, **MAVEN_ARGS_APPEND**, **MAVEN_CLEAR_REPO**, and **MAVEN_MIRROR_URL** parameters were removed. You can pass the **MAVEN_ARGS_APPEND**, **MAVEN_CLEAR_REPO**, and **MAVEN_MIRROR_URL** values as environment variables.
- The parameter name **PATH_CONTEXT** was changed to **CONTEXT**.
- The parameter name **TLS_VERIFY** was changed to **TLSVERIFY**.
- The **IMAGE_URL** result was added.

s2i-nodejs

The **s2i-nodejs** task builds the source code using the S2I NodeJS builder image, which is available from the OpenShift Container Platform registry as **image-registry.openshift-image-registry.svc:5000/openshift/nodejs**.

Example usage of the **s2i-nodejs** task

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: build-and-deploy
spec:
# ...
  tasks:
# ...
  - name: build-s2i
    taskRef:
      resolver: cluster
      params:
      - name: kind
        value: task
      - name: name
        value: s2i-nodejs
```

```
      - name: namespace
        value: openshift-pipelines
    workspaces:
    - name: source
      workspace: shared-workspace
  # ...
```

Table 3.32. Supported parameters for the **s2i-nodejs** task

Parameter	Description	Type	Default value
IMAGE	The fully qualified name for the container image that the S2I process builds.	**string**	
IMAGE_SCRIPTS_URL	The URL containing the default assemble and run scripts for the builder image.	**string**	**image:///usr/libexec/s2i**
ENV_VARS	An array of values for environment variables to set in the build process, listed in the **KEY=VALUE** format.	**array**	
CONTEXT	Path to the directory within the **source** workspace to use as the context.	**string**	**.**
STORAGE_DRIVER	Set the Buildah storage driver to reflect the settings of the current cluster node settings.	**string**	**vfs**
FORMAT	The format of the container to build, either **oci** or **docker**.	**string**	**oci**
BUILD_EXTRA_ARGS	Extra parameters for the **build** command when building the image.	**string**	
PUSH_EXTRA_ARGS	Extra parameters for the **push** command when pushing the image.	**string**	
SKIP_PUSH	Skip pushing the image to the container registry.	**string**	**false**
TLS_VERIFY	The TLS verification flag, normally **true**.	**string**	**true**
VERBOSE	Turn on verbose logging; all commands executed are added to the log.	**string**	**false**
VERSION	The tag of the image stream, which corresponds to the language version.	**string**	**latest**

Table 3.33. Supported workspaces for the **s2i-nodejs** task

Workspace	Description
source	The application source code, which is the build context for the S2I workflow.
dockerconfig	An optional workspace for providing a **.docker/config.json** file that Buildah uses to access the container registry. Place the file at the root of the workspace with the name **config.json** or **.dockerconfigjson**.

Table 3.34. Results that the **s2i-nodejs** task returns

Result	Type	Description
IMAGE_URL	**string**	The fully qualified name of the image that was built.
IMAGE_DIGEST	**string**	Digest of the image that was built.

s2i-perl

The **s2i-perl** task builds the source code using the S2I Perl builder image, which is available from the OpenShift Container Platform registry as **image-registry.openshift-image-registry.svc:5000/openshift/perl**.

Example usage of the s2i-perl task

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: build-and-deploy
spec:
# ...
  tasks:
# ...
  - name: build-s2i
    taskRef:
      resolver: cluster
      params:
      - name: kind
        value: task
      - name: name
        value: s2i-perl
      - name: namespace
        value: openshift-pipelines
    workspaces:
    - name: source
      workspace: shared-workspace
# ...
```

Table 3.35. Supported parameters for the **s2i-perl** task

Parameter	Description	Type	Default value
IMAGE	The fully qualified name for the container image that the S2I process builds.	**string**	
IMAGE_SCRIPTS_URL	The URL containing the default assemble and run scripts for the builder image.	**string**	**image:///usr/libexec/s2i**
ENV_VARS	An array of values for environment variables to set in the build process, listed in the **KEY=VALUE** format.	**array**	
CONTEXT	Path to the directory within the **source** workspace to use as the context.	**string**	**.**
STORAGE_DRIVER	Set the Buildah storage driver to reflect the settings of the current cluster node settings.	**string**	**vfs**
FORMAT	The format of the container to build, either **oci** or **docker**.	**string**	**oci**
BUILD_EXTRA_ARGS	Extra parameters for the **build** command when building the image.	**string**	
PUSH_EXTRA_ARGS	Extra parameters for the **push** command when pushing the image.	**string**	
SKIP_PUSH	Skip pushing the image to the container registry.	**string**	**false**
TLS_VERIFY	The TLS verification flag, normally **true**.	**string**	**true**
VERBOSE	Turn on verbose logging; all commands executed are added to the log.	**string**	**false**
VERSION	The tag of the image stream, which corresponds to the language version.	**string**	**latest**

Table 3.36. Supported workspaces for the **s2i-perl** task

Workspace	Description
source	The application source code, which is the build context for the S2I workflow.
dockerconfig	An optional workspace for providing a **.docker/config.json** file that Buildah uses to access the container registry. Place the file at the root of the workspace with the name **config.json** or **.dockerconfigjson**.

Workspace	Description

Table 3.37. Results that the **s2i-perl** task returns

Result	Type	Description
IMAGE_URL	**string**	The fully qualified name of the image that was built.
IMAGE_DIGEST	**string**	Digest of the image that was built.

s2i-php

The **s2i-php** task builds the source code using the S2I PHP builder image, which is available from the OpenShift Container Platform registry as **image-registry.openshift-image-registry.svc:5000/openshift/php**.

Example usage of the s2i-php task

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: build-and-deploy
spec:
# ...
  tasks:
# ...
  - name: build-s2i
    taskRef:
      resolver: cluster
      params:
      - name: kind
        value: task
      - name: name
        value: s2i-php
      - name: namespace
        value: openshift-pipelines
    workspaces:
    - name: source
      workspace: shared-workspace
# ...
```

Table 3.38. Supported parameters for the **s2i-php** task

Parameter	Description	Type	Default value
IMAGE	The fully qualified name for the container image that the S2I process builds.	**string**	

Parameter	Description	Type	Default value
IMAGE_SCRIPTS_URL	The URL containing the default assemble and run scripts for the builder image.	**string**	**image:///usr/libexec/s2i**
ENV_VARS	An array of values for environment variables to set in the build process, listed in the **KEY=VALUE** format.	**array**	
CONTEXT	Path to the directory within the **source** workspace to use as the context.	**string**	**.**
STORAGE_DRIVER	Set the Buildah storage driver to reflect the settings of the current cluster node settings.	**string**	**vfs**
FORMAT	The format of the container to build, either **oci** or **docker**.	**string**	**oci**
BUILD_EXTRA_ARGS	Extra parameters for the **build** command when building the image.	**string**	
PUSH_EXTRA_ARGS	Extra parameters for the **push** command when pushing the image.	**string**	
SKIP_PUSH	Skip pushing the image to the container registry.	**string**	**false**
TLS_VERIFY	The TLS verification flag, normally **true**.	**string**	**true**
VERBOSE	Turn on verbose logging; all commands executed are added to the log.	**string**	**false**
VERSION	The tag of the image stream, which corresponds to the language version.	**string**	**latest**

Table 3.39. Supported workspaces for the **s2i-php** task

Workspace	Description
source	The application source code, which is the build context for the S2I workflow.
dockerconfig	An optional workspace for providing a **.docker/config.json** file that Buildah uses to access the container registry. Place the file at the root of the workspace with the name **config.json** or **.dockerconfigjson**.

Table 3.40. Results that the **s2i-php** task returns

Result	Type	Description
IMAGE_URL	**string**	The fully qualified name of the image that was built.
IMAGE_DIGEST	**string**	Digest of the image that was built.

s2i-python

The **s2i-python** task builds the source code using the S2I Python builder image, which is available from the OpenShift Container Platform registry as **image-registry.openshift-image-registry.svc:5000/openshift/python**.

Example usage of the s2i-python task

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: build-and-deploy
spec:
# ...
  tasks:
# ...
  - name: build-s2i
    taskRef:
      resolver: cluster
      params:
      - name: kind
        value: task
      - name: name
        value: s2i-python
      - name: namespace
        value: openshift-pipelines
    workspaces:
    - name: source
      workspace: shared-workspace
# ...
```

Table 3.41. Supported parameters for the s2i-python task

Parameter	Description	Type	Default value
IMAGE	The fully qualified name for the container image that the S2I process builds.	**string**	
IMAGE_SCRIPTS_URL	The URL containing the default assemble and run scripts for the builder image.	**string**	**image:///usr/libexec/s2i**
ENV_VARS	An array of values for environment variables to set in the build process, listed in the **KEY=VALUE** format.	**array**	

Parameter	Description	Type	Default value
CONTEXT	Path to the directory within the **source** workspace to use as the context.	**string**	**.**
STORAGE_DRIVER	Set the Buildah storage driver to reflect the settings of the current cluster node settings.	**string**	**vfs**
FORMAT	The format of the container to build, either **oci** or **docker**.	**string**	**oci**
BUILD_EXTRA_ARGS	Extra parameters for the **build** command when building the image.	**string**	
PUSH_EXTRA_ARGS	Extra parameters for the **push** command when pushing the image.	**string**	
SKIP_PUSH	Skip pushing the image to the container registry.	**string**	**false**
TLS_VERIFY	The TLS verification flag, normally **true**.	**string**	**true**
VERBOSE	Turn on verbose logging; all commands executed are added to the log.	**string**	**false**
VERSION	The tag of the image stream, which corresponds to the language version.	**string**	**latest**

Table 3.42. Supported workspaces for the **s2i-python** task

Workspace	Description
source	The application source code, which is the build context for the S2I workflow.
dockerconfig	An optional workspace for providing a **.docker/config.json** file that Buildah uses to access the container registry. Place the file at the root of the workspace with the name **config.json** or **.dockerconfigjson**.

Table 3.43. Results that the **s2i-python** task returns

Result	Type	Description
IMAGE_URL	**string**	The fully qualified name of the image that was built.
IMAGE_DIGEST	**string**	Digest of the image that was built.

s2i-ruby

The **s2i-ruby** task builds the source code using the S2I Ruby builder image, which is available from the OpenShift Container Platform registry as **image-registry.openshift-image-registry.svc:5000/openshift/ruby**.

Example usage of the s2i-ruby task

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: build-and-deploy
spec:
# ...
  tasks:
# ...
  - name: build-s2i
    taskRef:
      resolver: cluster
      params:
      - name: kind
        value: task
      - name: name
        value: s2i-ruby
      - name: namespace
        value: openshift-pipelines
    workspaces:
    - name: source
      workspace: shared-workspace
# ...
```

Table 3.44. Supported parameters for the s2i-ruby task

Parameter	Description	Type	Default value
IMAGE	The fully qualified name for the container image that the S2I process builds.	**string**	
IMAGE_SCRIPTS_URL	The URL containing the default assemble and run scripts for the builder image.	**string**	**image:///usr/libexec/s2i**
ENV_VARS	An array of values for environment variables to set in the build process, listed in the **KEY=VALUE** format.	**array**	
CONTEXT	Path to the directory within the **source** workspace to use as the context.	**string**	**.**
STORAGE_DRIVER	Set the Buildah storage driver to reflect the settings of the current cluster node settings.	**string**	**vfs**
FORMAT	The format of the container to build, either **oci** or **docker**.	**string**	**oci**

Parameter	Description	Type	Default value
BUILD_EXTRA_ARGS	Extra parameters for the **build** command when building the image.	**string**	
PUSH_EXTRA_ARGS	Extra parameters for the **push** command when pushing the image.	**string**	
SKIP_PUSH	Skip pushing the image to the container registry.	**string**	**false**
TLS_VERIFY	The TLS verification flag, normally **true**.	**string**	**true**
VERBOSE	Turn on verbose logging; all commands executed are added to the log.	**string**	**false**
VERSION	The tag of the image stream, which corresponds to the language version.	**string**	**latest**

Table 3.45. Supported workspaces for the **s2i-ruby** task

Workspace	Description
source	The application source code, which is the build context for the S2I workflow.
dockerconfig	An optional workspace for providing a **.docker/config.json** file that Buildah uses to access the container registry. Place the file at the root of the workspace with the name **config.json** or **.dockerconfigjson**.

Table 3.46. Results that the **s2i-ruby** task returns

Result	Type	Description
IMAGE_URL	**string**	The fully qualified name of the image that was built.
IMAGE_DIGEST	**string**	Digest of the image that was built.

skopeo-copy

The **skopeo-copy** task executes the **skopeo copy** command.

Skopeo is a command-line tool for working with remote container image registries, which does not require a daemon or other infrastructure to load and run the images. The **skopeo copy** command copies an image from one remote registry to another, for example, from an internal registry to a production registry. Skopeo supports authorization on image registries using credentials that you provide.

Example usage of the skopeo-copy task

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: build-deploy-image
spec:
# ...
  tasks:
  - name: copy-image
    taskRef:
      resolver: cluster
      params:
      - name: kind
        value: task
      - name: name
        value: skopeo-copy
      - name: namespace
        value: openshift-pipelines
    params:
    - name: SOURCE_IMAGE_URL
      value: "docker://internal.registry/myimage:latest"
    - name: DESTINATION_IMAGE_URL
      value: "docker://production.registry/myimage:v1.0"
    workspaces:
    - name: output
      workspace: shared-workspace
```

Table 3.47. Supported parameters for the **skopeo-copy** task

Parameter	Description	Type	Default value
SOURCE_IMAGE_URL	Fully qualified name, including tag, of the source container image.	**string**	
DESTINATION_IMAGE_URL	Fully qualified name, including tag, of the destination image to which Skopeo copies the source image.	**string**	
SRC_TLS_VERIFY	The TLS verification flag for the source registry, normally **true**.	**string**	**true**
DEST_TLS_VERIFY	The TLS verification flag for the destination registry, normally **true**	**string**	**true**
VERBOSE	Output debug information to the log.	**string**	**false**

Table 3.48. Supported workspaces for the **skopeo-copy** task

Workspace	Description
images_url	If you want to copy more than one image, use this workspace to provide the image URLs.

Table 3.49. Results that the **skopeo-copy** task returns

Result	Type	Description
SOURCE_DIGEST	**string**	The SHA256 digest of the source image.
DESTINATION_DIGEST	**string**	The SHA256 digest of the destination image.

Changes from the skopeo-copy ClusterTask

- All parameter names were changed to uppercase.
- The **VERBOSE** parameter was added.
- The workspace name was changed from **images-url** to **images_url**.
- The **SOURCE_DIGEST** and **DESTINATION_DIGEST** results were added.

tkn

The **tkn** task performs operations on Tekton resources using tkn.

Example usage of the tkn task

```
apiVersion: tekton.dev/v1
kind: PipelineRun
metadata:
 name: tkn-run
spec:
 pipelineSpec:
   tasks:
   - name: tkn-run
     taskRef:
       resolver: cluster
       params:
       - name: kind
         value: task
       - name: name
         value: tkn
       - name: namespace
         value: openshift-pipelines
     params:
     - name: ARGS
```

Table 3.50. Supported parameters for the **tkn** task

Parameter	Description	Type	Default value
SCRIPT	The **tkn** CLI script to execute.	**string**	**tkn $@**
ARGS	The **tkn** CLI arguments to run.	**array**	**- --help**

Table 3.51. Supported workspaces for the **tkn** task

Workspace	Description
kubeconfig_dir	An optional workspace in which you can provide a **.kube/config** file that contains credentials for accessing the cluster. Place this file at the root of the workspace and name it **kubeconfig**.

Changes from the **tkn ClusterTask**

- The **TKN_IMAGE** parameter was removed.
- The workspace name was changed from **kubeconfig** to **kubeconfig_dir**.

3.8. COMMUNITY TASKS PROVIDED IN THE OPENSHIFT PIPELINES NAMESPACE

By default, an OpenShift Pipelines installation includes a set of community tasks that you can use in your pipelines. These tasks are located in the OpenShift Pipelines installation namespace, which is normally the **openshift-pipelines** namespace.

argocd-task-sync-and-wait

The **argocd-task-sync-and-wait** community task deploys an Argo CD application and waits for it to be healthy.

To do so, it requires the following configurations: * The address of the Argo CD server configured in the **argocd-env-configmap** config map. * The authentication information configured in the **argocd-env-secret** secret.

Example config map with the address information

```
apiVersion: v1
kind: ConfigMap
metadata:
  name: argocd-env-configmap
data:
  ARGOCD_SERVER: https://argocd.example.com
# ...
```

Example secret with the authentication information

```
apiVersion: v1
kind: Secret
metadata:
  name: argocd-env-secret
data:
  # Option 1
  ARGOCD_USERNAME: example_username (1)
  ARGOCD_PASSWORD: example_password
  # Option 2
  ARGOCD_AUTH_TOKEN: exmaple_token
```

1 Configure either a username and password or an authentication token.

Example usage of the argocd-task-sync-and-wait community task

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: argocd-task-sync-and-wait
spec:
  tasks:
    - name: argocd-task-sync-and-wait
      params:
        - name: application-name
          value: example_app_name
        - name: revision
          value: HEAD
        - name: flags
          value: '--'
        - name: argocd-version
          value: v2.2.2
      taskRef:
        kind: Task
        name: argocd-task-sync-and-wait
```

Table 3.52. Supported parameters for the**argocd-task-sync-and-wait** community task

Parameter	Description	Default value
application-name	Name of the application to deploy.	
revision	Revision to deploy.	**HEAD**
flags		**--**
argocd-version	Version of Argo CD.	**v2.2.2**

helm-upgrade-from-repo

The **helm-upgrade-from-repo** community task installs or upgrades a Helm chart in your OpenShift Container Platform cluster based on the given Helm repository and chart.

Example usage of the helm-upgrade-from-repo community task

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: helm-upgrade-from-repo
spec:
  tasks:
    - name: helm-upgrade-from-repo
      params:
        - name: helm_repo
          value: example_helm_repository
```

```
        - name: chart_name
          value: example_chart_name
        - name: release_version
          value: v1.0.0
        - name: release_name
          value: helm-release
        - name: release_namespace
          value: ''
        - name: overwrite_values
          value: ''
        - name: helm_image
          value: 'docker.io/lachlanevenson/k8s-
helm@sha256:5c792f29950b388de24e7448d378881f68b3df73a7b30769a6aa861061fd08ae'
      taskRef:
        kind: Task
        name: helm-upgrade-from-repo
```

Table 3.53. Supported parameters for the**helm-upgrade-from-repo** community task

Parameter	Description	Default value
helm_repo	Helm repository.	
chart_name	Helm chart name to be deployed.	
release_version	Helm release version in semantic versioning format.	**v1.0.0**
release_name	Helm release name.	**helm-release**
release_namespace	Helm release namespace.	**""**
overwrite_values	Configuration parameters to overwrite, comma separated. For example: **autoscaling.enabled=true,replicas=1**	**""**
helm_image	Helm image to be used.	**docker.io/lachlanevenson/k8s-helm@sha256:5c792f29950b388de24e7448d378881f68b3df73a7b30769a6aa861061fd08ae**

helm-upgrade-from-source

The **helm-upgrade-from-source** community task installs and upgrades a Helm chart in your OpenShift Container Platform cluster based on the given chart and source workspace.

Example usage of the **helm-upgrade-from-source** community task

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
```

```
  name: helm-upgrade-from-source
spec:
  tasks:
    - name: helm-upgrade-from-source
      params:
        - name: charts_dir
          value: example_directory_path
        - name: release_version
          value: v1.0.0
        - name: release_name
          value: helm-release
        - name: release_namespace
          value: ''
        - name: overwrite_values
          value: ''
        - name: values_file
          value: values.yaml
        - name: helm_image
          value: 'docker.io/lachlanevenson/k8s-
helm@sha256:5c792f29950b388de24e7448d378881f68b3df73a7b30769a6aa861061fd08ae'
        - name: upgrade_extra_params
          value: ''
      taskRef:
        kind: Task
        name: helm-upgrade-from-source
      workspaces:
        - name: source
          workspace: shared-workspace
  #...
```

Table 3.54. Supported parameters for the**helm-upgrade-from-source** community task

Parameter	Description	Default value
charts_dir	Directory in the source workspace that contains the Helm chart.	
release_version	Helm release version in semantic versioning format.	**v1.0.0**
release_name	Helm release name.	**helm-release**
release_namespace	Helm release namespace.	**""**
overwrite_values	Configuration parameters to overwrite, comma separated. For example: **autoscaling.enabled=true,replicas=1**	**""**
values_file	File with configuration parameters for Helm.	**values.yaml**

Parameter	Description	Default value
helm_image	Helm image to be used.	**docker.io/lachlanevenson/k8s-helm@sha256:5c792f29950b388de24e7448d378881f68b3df73a7b30769a6aa861061fd08ae**
upgrade_extra_params	Extra parameters passed for the Helm upgrade command.	**""**

Table 3.55. Supported workspaces for the**helm-upgrade-from-source** community task

Workspace	Description
source	The workspace that contains the Helm chart.

jib-maven

The **jib-maven** community task builds Java, Kotlin, Groovy, and Scala sources into a container image by using the Jib tool for Maven projects.

Example usage of the **jib-maven** community task

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: jib-maven
spec:
  tasks:
    - name: jib-maven
      params:
        - name: IMAGE
          value: example_image
        - name: MAVEN_IMAGE
          value: 'registry.redhat.io/ubi9/openjdk-17@sha256:78613bdf887530100efb6ddf92d2a17f6176542740ed83e509cdc19ee7c072d6'
        - name: DIRECTORY
          value: .
        - name: CACHE
          value: empty-dir-volume
        - name: INSECUREREGISTRY
          value: 'false'
        - name: CACERTFILE
          value: service-ca.crt
      taskRef:
        kind: Task
        name: jib-maven
```

```
    workspaces:
      - name: source
        workspace: shared-workspace
#...
```

Table 3.56. Supported parameters for the **jib-maven** community task

Parameter	Description	Default value
IMAGE	Name of the image to build.	
MAVEN_IMAGE	Maven base image.	**registry.redhat.io/ubi9/openjdk-17@sha256:78613bdf887530100efb6ddf92d2a17f6176542740ed83e509cdc19ee7c072d6**
DIRECTORY	Directory containing the app, relative to the source repository root.	**.**
CACHE	Name of the volume for caching Maven artifacts and base image layers.	**empty-dir-volume**
INSECUREREGISTRY	Allow an insecure registry.	**false**
CACERTFILE	Certificate authority (CA) bundle file name for an insecure registry service.	**service-ca.crt**

Table 3.57. Supported workspaces for the **jib-maven** community task

Workspace	Description
source	Workspace that contains the Maven project.
sslcertdir	Optional workspace that contains SSL certificates.

Table 3.58. Results that the **jib-maven** task returns

Result	Type	Description
IMAGE_DIGEST	**string**	Digest of the image that was built.

Changes from the jib-maven community cluster task

- The default values for the **IMAGE** and **MAVEN_IMAGE** parameters were changed.

kubeconfig-creator

The **kubeconfig-creator** community task creates a **kubeconfig** file that other tasks in the pipeline can use for accessing different clusters.

Example usage of the kubeconfig-creator community task

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: kubeconfig-creator
spec:
  tasks:
    - name: kubeconfig-creator
      params:
        - name: name
          value: example_cluster
        - name: url
          value: https://cluster.example.com
        - name: username
          value: example_username
        - name: password
          value: example_password
        - name: cadata
          value: ''
        - name: clientKeyData
          value: ''
        - name: clientCertificateData
          value: ''
        - name: namespace
          value: ''
        - name: token
          value: ''
        - name: insecure
          value: 'false'
      taskRef:
        kind: Task
        name: kubeconfig-creator
      workspaces:
        - name: output
          workspace: shared-workspace
  #...
```

Table 3.59. Supported parameters for thekubeconfig-creator community task

Parameter	Description	Default value
name	Name of the cluster to access.	
url	Address of the cluster to access.	
username	Username for basic authentication to the cluster.	
password	Password for basic authentication to the cluster.	""

Parameter	Description	Default value
cadata	PEM-encoded certificate authority (CA) certificates.	""
clientKeyData	PEM-encoded data from a client key file for TLS.	""
clientCertificateData	PEM-encoded data from a client certification file for TLS.	""
namespace	Default namespace to use on unspecified requests.	""
token	Bearer token for authentication to the cluster.	""
insecure	To indicate whether a server should be accessed without verifying the TLS certificate.	**false**

Table 3.60. Supported workspaces for the **kubeconfig-creator** community task

Workspace	Description
output	The workspace where the **kubeconfig-creator** task stores the **kubeconfig** file.

pull-request

You can use the **pull-request** community task to interact with a source control management (SCM) system through an abstracted interface.

This community task works with both public SCM instances and self-hosted or enterprise GitHub or GitLab instances.

In download mode, this task populates the **pr** workspace with the state of the existing pull request, including the **.MANIFEST** file.

In upload mode, this task compares the contents of the **pr** workspace, including the **.MANIFEST** file, with the content of the pull request and, if the content is different, updates the pull request to match the **pr** workspace.

Example usage of the pull-request community task

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: pull-request
spec:
spec:
  tasks:
    - name: pull-request
      params:
        - name: mode
          value: upload
        - name: url
          value: https://github.com/example/pull/xxxxx
```

```
      - name: provider
        value: github
      - name: secret-key-ref
        value: example_secret
      - name: insecure-skip-tls-verify
        value: 'false'
    taskRef:
      kind: Task
      name: pull-request
    workspaces:
      - name: pr
        workspace: shared-workspace
#...
```

Table 3.61. Supported parameters for the **pull-request** community task

Parameter	Description	Default value
mode	If set to **download**, the state of the pull request at **url** is fetched. If set to **upload** then the pull request at **url** is updated.	
url	URL of the pull request.	
provider	Type of the SCM system. The supported values are **github** or **gitlab**.	
secret-key-ref	Name of a **Secret** object of **Opaque** type that contains a key called **token** with a base64 encoded SCM token.	
insecure-skip-tls-verify	If set to **true**, the certificate validation is disabled.	**false**

Table 3.62. Supported workspaces for the **pull-request** community task

Workspace	Description
pr	The workspace that contains the state of the pull request.

trigger-jenkins-job

You can use the **trigger-jenkins-job** community task to trigger a Jenkins job by using a **curl** request.

Example usage of the trigger-jenkins-job community task

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: trigger-jenkins-job
spec:
  tasks:
```

```
    - name: trigger-jenkins-job
      params:
        - name: JENKINS_HOST_URL
          value: example_host_URL
        - name: JOB_NAME
          value: example_job_name
        - name: JENKINS_SECRETS
          value: jenkins-credentials
        - name: JOB_PARAMS
          value:
            - example_param
      taskRef:
        kind: Task
        name: trigger-jenkins-job
      workspaces:
        - name: source
          workspace: shared-workspace
# ...
```

Table 3.63. Supported parameters for the trigger-jenkins-job community task

Parameter	Description	Default value
JENKINS_HOST_URL	Server URL on which Jenkins is running.	
JOB_NAME	Jenkins Job which needs to be triggered.	
JENKINS_SECRETS	Jenkins secret containing credentials.	**jenkins-credentials**
JOB_PARAMS	Extra arguments to append as a part of the **curl** request.	""

Table 3.64. Supported workspaces for the trigger-jenkins-job community task

Workspace	Description
source	The workspace which can be used to mount files which can be sent through the **curl** request to the Jenkins job.

3.9. STEP ACTION DEFINITIONS PROVIDED WITH OPENSHIFT PIPELINES

OpenShift Pipelines provides standard **StepAction** definitions that you can use in your tasks. Use the cluster resolver to reference these definitions.

git-clone

The **git-clone** step action uses Git to initialize and clone a remote repository on a workspace. You can use this step action to define a task that clones a repository at the start of a pipeline that builds or otherwise processes this source code.

Example usage of the git-clone step action in a task

```
apiVersion: tekton.dev/v1
kind: Task
metadata:
  name: clone-repo-anon
spec:
# ...
  steps:
  - name: clone-repo-step
    ref:
      resolver: cluster
      params:
      - name: name
        value: git-clone
      - name: namespace
        value: openshift-pipelines
      - name: kind
        value: stepaction
    params:
    - name: URL
      value: $(params.url)
    - name: OUTPUT_PATH
      value: $(workspaces.output.path)
```

Table 3.65. Supported parameters for the**git-clone** step action

Parameter	Description	Type	Default value
OUTPUT_PATH	A directory for the fetched Git repository. Cloned repo data is placed in the root of the directory or in the relative path defined by the **SUBDIRECTORY** parameter	**string**	
SSH_DIRECTORY_PATH	A **.ssh** directory with the private key, **known_hosts**, **config**, and other files as necessary. If you provide this directory, the task uses it for authentication to the Git repository. Bind the workspace providing this directory to a **Secret** resource for secure storage of authentication information.	**string**	

Parameter	Description	Type	Default value
BASIC_AUTH_PATH	A directory containing a **.gitconfig** and **.git-credentials** files. If you provide this directgory, the task uses it for authentication to the Git repository. Use a **SSH_DIRECTORY_PATH** directory for authentication instead of **BASIC_AUTH_PATH** whenever possible. Bind the workspace providing this directory to a **Secret** resource for secure storage of authentication information.	**string**	
SSL_CA_DIRECTORY_PATH	A workspace containing CA certificates. If you provide this workspace, Git uses these certificates to verify the peer when interacting with remote repositories using HTTPS.	**string**	
CRT_FILENAME	Certificate authority (CA) bundle filename in the **ssl-ca-directory** workspace.	**string**	**ca-bundle.crt**
HTTP_PROXY	HTTP proxy server (non-TLS requests).	**string**	
HTTPS_PROXY	HTTPS proxy server (TLS requests).	**string**	
NO_PROXY	Opt out of proxying HTTP/HTTPS requests.	**string**	
SUBDIRECTORY	Relative path in the **output** workspace where the task places the Git repository.	**string**	
USER_HOME	Absolute path to the Git user home directory in the pod.	**string**	**/home/git**
DELETE_EXISTING	Delete the contents of the default workspace, if they exist, before running the Git operations.	**string**	**true**
VERBOSE	Log the executed commands.	**string**	**false**
SSL_VERIFY	The global **http.sslVerify** value. Do not set this parameter to to **false** unless you trust the remote repository.	**string**	**true**
URL	Git repository URL.	**string**	

Parameter	Description	Type	Default value
REVISION	The revision to check out, for example, a branch or tag.	**string**	**main**
REFSPEC	The **refspec** string for the repository that the task fetches before checking out the revision.	**string**	
SUBMODULES	Initialize and fetch Git submodules.	**string**	**true**
DEPTH	Number of commits to fetch, a "shallow clone" is a single commit.	**string**	**1**
SPARSE_CHECKOUT_DIRECTORIES	List of directory patterns, separated by commas, for performing a "sparse checkout".	**string**	

Table 3.66. Results that the **git-clone** step action returns

Result	Type	Description
COMMIT	**string**	The SHA digest of the commit that is at the HEAD of the current branch in the cloned Git repository.
URL	**string**	The URL of the repository that was cloned.
COMMITTER_DATE	**string**	The epoch timestamp of the commit that is at the HEAD of the current branch in the cloned Git repository.

cache-upload and cache-fetch

IMPORTANT

Using the **cache-upload** and **cache-fetch** step actions 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 Technology Preview Features Support Scope .

Use the **cache-upload** and **cache-fetch** step actions to preserve the cache directory where a build process keeps its dependencies, storing it in an Amazon Simple Storage Service (S3) bucket, Google Cloud Services (GCS) bucket, or an Open Container Initiative (OCI) repository.

When you use the **cache-upload** step action, the step action calculates a hash based on certain files in your build. You must provide a regular expression to select these files. The **cache-upload** step action stores an image that contains the content of your cache directory, indexed with the hash.

When you use the **cache-fetch** step action, the step action calculates the same hash. Then it checks whether a cached image for this hash is already available. If the image is available, the step action populates your cache directory with the cached content. If the image is not available, the directory remains as it was.

After using the **cache-fetch** step action, you can run the build process. If the cache is successfully fetched, it includes the dependencies that the build process downloaded previously. If the cache was not fetched, the build process downloads dependencies through its normal procedure.

The result of **cache-fetch** indicates whether a cached image was fetched. The subsequent **cache-upload** step action can use the result and skip uploading a new cache image if the cache for the current hash was already available.

The following example task retrieves the source from a repository, fetches the cache (if available), runs a Maven build, and then, if the cache was not fetched, uploads the new cached image of the build directory.

Example usage of the cache-fetch and cache-upload step actions in a task

```
apiVersion: tekton.dev/v1
kind: Task
metadata:
  name: java-demo-task
spec:
  workspaces:
  - name: source
  params:
  - name: repo_url
    type: string
    default: https://github.com/sample-organization/sample-java-project.git
  - name: revision
    type: string
    default: main
  - name: registry
    type: string
    default: image-registry.openshift-image-registry.svc:5000/sample-project/mvn-cache
  - name: image
    type: string
    default: openjdk:latest
  - name: buildCommand
    type: string
    default: "maven -Dmaven.repo.local=${LOCAL_CACHE_REPO} install"
  - name: cachePatterns
    type: array
    default: ["**pom.xml"]
  - name: force-cache-upload
    type: string
    default: "false"
```

```
steps:
 - name: create-repo
   image: $(params.image)
   script: |
     mkdir -p $(workspaces.source.path)/repo
     chmod 777 $(workspaces.source.path)/repo
 - name: fetch-repo
   ref:
     resolver: cluster
     params:
     - name: name
       value: git-clone
     - name: namespace
       value: openshift-pipelines
     - name: kind
       value: stepaction
   params:
     - name: OUTPUT_PATH
       value: $(workspaces.source.path)/repo
     - name: URL
       value: $(params.repo_url)
     - name: REVISION
       value: $(params.revision)
 - name: cache-fetch
   ref:
     resolver: cluster
     params:
     - name: name
       value: cache-fetch
     - name: namespace
       value: openshift-pipelines
     - name: kind
       value: stepaction
   params:
   - name: PATTERNS
     value: $(params.cachePatterns)
   - name: SOURCE
     value: oci://$(params.registry):{{hash}}
   - name: CACHE_PATH
     value: $(workspaces.source.path)/cache
   - name: WORKING_DIR
     value: $(workspaces.source.path)/repo
 - name: run-build
   image: $(params.image)
   workingDir: $(workspaces.source.path)/repo
   env:
     - name: LOCAL_CACHE_REPO
       value: $(workspaces.source.path)/cache/repo
   script: |
     set -x
     $(params.buildCommand)
     echo "Cache size is $(du -sh $(workspaces.source.path)/cache)"
 - name: cache-upload
   ref:
     resolver: cluster
     params:
```

```
    - name: name
      value: cache-upload
    - name: namespace
      value: openshift-pipelines
    - name: kind
      value: stepaction
  params:
    - name: PATTERNS
      value: $(params.cachePatterns)
    - name: TARGET
      value: oci://$(params.registry):{{hash}}
    - name: CACHE_PATH
      value: $(workspaces.source.path)/cache
    - name: WORKING_DIR
      value: $(workspaces.source.path)/repo
    - name: FORCE_CACHE_UPLOAD
      value: $(params.force-cache-upload)
```

Table 3.67. Supported parameters for the **cache-fetch** step action

Parameter	Description	Type	Default value
PATTERNS	Regular expression for selecting files to compute the hash. For example, for a Go project, you can use **go.mod** files to compute the cache, and then the value of this parameter is **/**go.sum** (where ** accounts for subdirectories of any depth).	**array**	
SOURCE	Source URI for fetching the cache; use **{{hash}}** to specify the cache hash. The supported types are **oci** (example: **oci://quay.io/example-user/go-cache:{{hash}}**) and **s3** (example: **s3://example-bucket/{{hash}}**)	**string**	
CACHE_PATH	Path for extracting the cache content. Normally this path is in a workspace.	**string**	
WORKING_DIR	Path where the files for calculating the hash are located.	**string**	
INSECURE	If **"true"**, use insecure mode for fetching the cache.	**string**	**"false"**
GOOGLE_APPLICATION_CREDENTIALS	The path where Google credentials are located. Ignored if empty.	**string**	
AWS_CONFIG_FILE	Path to the AWS configuration file. Ignored if empty.	**string**	

Parameter	Description	Type	Default value
AWS_SHARED_CREDENTIALS_FILE	Path to the AWS credentials file. Ignored if empty.	**string**	
BLOB_QUERY_PARAMS	Blob query parameters for configuring S3, GCS, or Azure. Use these optional parameters for additional features such as S3 acceleration, FIPS, or path-style addressing.	**string**	

Table 3.68. Results that the **cache-fetch** step action returns

Result	Type	Description
fetched	**string**	**"true"** if the step has fetched the cache or **"false"** if the step has not fetched the cache.

Table 3.69. Supported parameters for the **cache-upload** step action

Parameter	Description	Type	Default value
PATTERNS	Regular expression for selecting files to compute the hash. For example, for a Go project, you can use **go.mod** files to compute the cache, and then the value of this parameter is **/**go.sum** (where ** accounts for subdirectories of any depth).	**array**	
TARGET	Target URI for uploading the cache; use **{{hash}}** to specify the cache hash. The supported types are **oci** (example: **oci://quay.io/example-user/go-cache:{{hash}}**) and **s3** (example: **s3://example-bucket/{{hash}}**)	**string**	
CACHE_PATH	Path for cache content, which the step packs into the image. Normally this path is in a workspace.	**string**	
WORKING_DIR	Path where the files for calculating the hash are located.	**string**	
INSECURE	If **"true"**, use insecure mode for uploading the cache.	**string**	**"false"**

Parameter	Description	Type	Default value
FETCHED	If **"true"**, the cache for this hash was already fetched.	**string**	**"false"**
FORCE_CACHE_UPLOAD	If **"true"**, the step uploads the cache even if it was fetched previously.	**string**	**"false"**
GOOGLE_APPLICATION_CREDENTIALS	The path where Google credentials are located. Ignored if empty.	**string**	
AWS_CONFIG_FILE	Path to the AWS configuration file. Ignored if empty.	**string**	
AWS_SHARED_CREDENTIALS_FILE	Path to the AWS credentials file. Ignored if empty.	**string**	
BLOB_QUERY_PARAMS	Blob query parameters for configuring S3, GCS, or Azure. Use these optional parameters for additional features such as S3 acceleration, FIPS, or path-style addressing.	**string**	

The **cache-upload** step action returns no results.

3.10. ABOUT NON-VERSIONED AND VERSIONED TASKS AND STEP ACTIONS

The **openshift-pipelines** namespace includes versioned tasks and step actions alongside standard non-versioned tasks and step actions. For example, installing the Red Hat OpenShift Pipelines Operator version 1.18 creates the following items:

- **buildah-1-18-0** versioned task
- **buildah** non-versioned task
- **git-clone-1-18-0** versioned **StepAction** definition
- **git-clone** non-versioned **StepAction** definition

Non-versioned and versioned tasks and step actions have the same metadata, behavior, and specifications, including **params**, **workspaces**, and **steps**. However, they behave differently when you disable them or upgrade the Operator.

Before adopting non-versioned or versioned tasks and step actions as a standard in production environments, cluster administrators might consider their advantages and disadvantages.

Table 3.70. Advantages and disadvantages of non-versioned and versioned tasks and step actions

	Advantages	Disadvantages
Non-versioned tasks and step actions	• If you prefer deploying pipelines with the latest updates and bug fixes, use non-versioned tasks and step actions. • Upgrading the Operator upgrades the non-versioned tasks and step actions, which consumes fewer resources than multiple versioned tasks and step actions.	• If you deploy pipelines that use non-versioned tasks and step actions, they might break after an Operator upgrade if the automatically upgraded tasks and step actions are not backward-compatible.
Versioned tasks and step actions	• If you prefer pipelines in production that do not change after a version update, use versioned tasks and step actions. • When you install a new version of the Operator, the versioned tasks and step actions from the current minor version and the immediate previous minor version are retained.	• If you continue using the earlier versions, you might miss the latest features and critical security updates. • After an upgrade, the Operator cannot manage the earlier versioned tasks and step actions. If you delete the earlier versions manually, you cannot restore them. • After an upgrade, the Operator can delete versioned tasks and step actions from versions earlier than the previous minor release. When you install a new version of and the versioned tasks or step actions from an earlier version are deleted, pipelines that use the versioned tasks from the earlier version stop working.

Non-versioned and versioned tasks and step actions have different naming conventions, and the Red Hat OpenShift Pipelines Operator upgrades them differently.

Table 3.71. Differences between non-versioned and versioned tasks and step actions

	Nomenclature	Upgrade

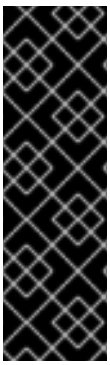
	Nomenclature	Upgrade
Non-versioned tasks and step actions	Non-versioned tasks and step actions only contain the name of the task or step action. For example, the name of the non-versioned task of Buildah installed with Operator v1.18 is **buildah**.	When you upgrade the Operator, it updates the non-versioned tasks and step actions with the latest changes. The name remains unchanged.
Versioned tasks and step actions	Versioned tasks and step actions contain the name, followed by the version as a suffix. For example, the name of the versioned task of Buildah installed with Operator v1.18 is **buildah-1-18-0**.	Upgrading the Operator installs the latest version of versioned tasks and step actions, retains the immediate previous version, and deletes the earlier versions. The latest version corresponds to the upgraded Operator. For example, installing Operator 1.18 installs the **buildah-1-18-0** task, retains the **buildah-1-17-0** task, and deletes earlier versions such as **buildah-1-16-0**.

3.11. ADDITIONAL RESOURCES

- Using Tekton Hub with OpenShift Pipelines

CHAPTER 4. USING MANUAL APPROVAL IN OPENSHIFT PIPELINES

You can specify a manual approval task in a pipeline. When the pipeline reaches this task, it pauses and awaits approval from one or several OpenShift Container Platform users. If any of the users chooses to rejects the task instead of approving it, the pipeline fails. The manual approval gate controller provides this functionality.



IMPORTANT

The manual approval gate 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 Technology Preview Features Support Scope .

4.1. ENABLING THE MANUAL APPROVAL GATE CONTROLLER

To use manual approval tasks, you must first enable the manual approval gate controller.

Prerequisites

- You installed the Red Hat OpenShift Pipelines Operator in your cluster.
- You are logged on to the cluster using the **oc** command-line utility.
- You have administrator permissions for the **openshift-pipelines** namespace.

Procedure

1. Create a file named **manual-approval-gate-cr.yaml** with the following manifest for the **ManualApprovalGate** custom resource (CR):

```
apiVersion: operator.tekton.dev/v1alpha1
kind: ManualApprovalGate
metadata:
  name: manual-approval-gate
spec:
  targetNamespace: openshift-pipelines
```

2. Apply the **ManualApprovalGate** CR by entering the following command:

```
$ oc apply -f manual-approval-gate-cr.yaml
```

3. Verify that the manual approval gate controller is running by entering the following command:

```
$ oc get manualapprovalgates.operator.tekton.dev
```

Example output

```
NAME                    VERSION    READY   REASON
manual-approval-gate    v0.1.0     True
```

Ensure that the **READY** status is **True**. If it is not **True**, wait for a few minutes and enter the command again. The controller might take some time to reach a ready state.

4.2. SPECIFYING A MANUAL APPROVAL TASK

You can specify a manual approval task in your pipeline. When the execution of a pipeline run reaches this task, the pipeline run stops and awaits approval from one or several users.

Prerequisites

- You enabled the manual approver gate controller.
- You created a YAML specification of a pipeline.

Procedure

- Specify an **ApprovalTask** in the pipeline, as shown in the following example:

```
apiVersion: tekton.dev/v1
kind: Pipeline
metadata:
  name: example-manual-approval-pipeline
spec:
  tasks:
# ...
  - name: example-manual-approval-task
    taskRef:
      apiVersion: openshift-pipelines.org/v1alpha1
      kind: ApprovalTask
    params:
    - name: approvers
      value:
      - user1
      - user2
      - user3
    - name: description
      value: Example manual approval task - please approve or reject
    - name: numberOfApprovalsRequired
      value: '2'
    - name: timeout
      value: '60m'
# ...
```

Table 4.1. Parameters for a manual approval task

Parameter	Type	Description
approvers	array	The OpenShift Container Platform users who can approve the task.

Parameter	Type	Description
description	string	Optional: The description of the approval task. OpenShift Pipelines displays the description to the user who can approve or reject the task.
numberOfApprovalsRequired	string	The number of approvals from different users that the task requires.
timeout	string	Optional: The timeout period for approval. If the task does not receive the configured number of approvals during this period, the pipeline run fails. The default timeout is 1 hour.

4.3. APPROVING A MANUAL APPROVAL TASK

When you run a pipeline that includes an approval task and the execution reaches the approval task, the pipeline run pauses and waits for user approval or rejection.

Users can approve or reject the task by using either the web console or the **opc** command line utility.

If any one of the approvers configured in the task rejects the task, the pipeline run fails.

If one user approves the task but the configured number of approvals is still not reached, the same user can change to rejecting the task and the pipeline run fails

4.3.1. Approving a manual approval task by using the web console

You can approve or reject a manual approval task by using the OpenShift Container Platform web console.

If you are listed as an approver in a manual approval task and a pipeline run reaches this task, the web console displays a notification. You can view a list of tasks that require your approval and approve or reject these tasks.

Prerequisites

- You enabled the OpenShift Pipelines console plugin.

Procedure

1. View a list of tasks that you can approve by completing one of the following actions:
   - When a notification about a task requiring your approval displays, click **Go to Approvals tab** in this notification.

- In the **Administrator** perspective menu, select **Pipelines → Pipelines** and then click the **Approvals** tab.
- In the **Developer** perspective menu, select **Pipelines** and then click the **Approvals** tab.
- In the **PipelineRun details** window, in the **Details** tab, click the rectangle that represents the manual approval task. The list displays only the approval for this task.
- In the **PipelineRun details** window, click the **ApprovalTasks** tab. The list displays only the approval for this pipeline run.

2. In the list of approval tasks, in the line that represents the task that you want to approve, click the  icon and then select one of the following options:
   - To approve the task, select **Approve**.
   - To reject the task, select **Reject**.
3. Enter a message in the **Reason** field.
4. Click **Submit**.

Additional resources

- Enabling the OpenShift Pipelines console plugin

4.3.2. Approving a manual approval task by using the command line

You can approve or reject a manual approval task by using the **opc** command-line utility. You can view a list of tasks for which you are an approver and approve or reject the tasks that are pending approval.

Prerequisites

- You downloaded and installed the **opc** command-line utility. This utility is available in the same package as the **tkn** command-line utility.
- You are logged on to the cluster using the **oc** command-line utility.

Procedure

1. View a list of manual approval tasks for which you are listed as an approver by entering the following command:

```
$ opc approvaltask list
```

Example output

```
NAME                                    NumberOfApprovalsRequired   PendingApprovals   Rejected
STATUS
manual-approval-pipeline-01w6e1-task-2   2                           0                  0        Approved
manual-approval-pipeline-6ywv82-task-2   2                           2                  0        Rejected
manual-approval-pipeline-90gyki-task-2   2                           2                  0        Pending
manual-approval-pipeline-jyrkb3-task-2   2                           1                  1        Rejected
```

2. Optional: To view information about a manual approval task, including its name, namespace, pipeline run name, list of approvers, and current status, enter the following command:

```
$ opc approvaltask describe <approval_task_name>
```

3. Approve or reject a manual approval task as necessary:

- To approve a manual approval task, enter the following command:

```
$ opc approvaltask approve <approval_task_name>
```

  Optionally, you can specify a message for the approval by using the **-m** parameter:

```
$ opc approvaltask approve <approval_task_name> -m <message>
```

- To reject a manual approval task, enter the following command:

```
$ opc approvaltask reject <approval_task_name>
```

  Optionally, you can specify a message for the rejection by using the **-m** parameter:

```
$ opc approvaltask reject <approval_task_name> -m <message>
```

Additional resources

- Installing tkn

CHAPTER 5. USING RED HAT ENTITLEMENTS IN PIPELINES

If you have Red Hat Enterprise Linux (RHEL) entitlements, you can use these entitlements to build container images in your pipelines.

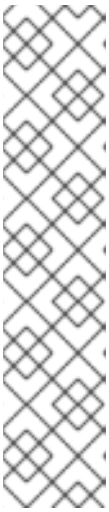
The Insight Operator automatically manages your entitlements after you import them into this operator from Simple Common Access (SCA). This operator provides a secret named **etc-pki-entitlement** in the **openshift-config-managed** namespace.

You can use Red Hat entitlements in your pipelines in one of the following two ways:

- Manually copy the secret into the namespace of the pipeline. This method is least complex if you have a limited number of pipeline namespaces.
- Use the Shared Resources Container Storage Interface (CSI) Driver Operator to share the secret between namespaces automatically.

5.1. PREREQUISITES

- You logged on to your OpenShift Container Platform cluster using the **oc** command line tool.
- You enabled the Insights Operator feature on your OpenShift Container Platform cluster. If you want to use the Shared Resources CSI Driver operator to share the secret between namespaces, you must also enable the Shared Resources CSI driver. For information about enabling features, including the Insights Operator and Shared Resources CSI Driver, see Enabling features using feature gates.



NOTE

After you enable the Insights Operator, you must wait for some time to ensure that the cluster updates all the nodes with this operator. You can monitor the status of all nodes by entering the following command:

```
$ oc get nodes -w
```

To verify that the Insights Operator is active, check that the **insights-operator** pod is running in the **openshift-insights** namespace by entering the following command:

```
$ oc get pods -n openshift-insights
```

- You configured the importing of your Red Hat entitlements into the Insights Operator. For information about importing the entitlements, see Importing simple content access entitlements with Insights Operator.

NOTE

To verify that the Insights Operator made your entitlements available, is active, check that the **etc-pki-entitlement** secret is present in the **openshift-config-managed** namespace by entering the following command:

```
$ oc get secret etc-pki-entitlement -n openshift-config-managed
```

5.2. USING RED HAT ENTITLEMENTS BY MANUALLY COPYING THE ETC-PKI-ENTITLEMENT SECRET

You can copy the **etc-pki-entitlement** secret from the **openshift-config-managed** namespace into the namespace of your pipeline. You can then configure your pipeline to use this secret for the Buildah task.

Prerequisites

- You installed the **jq** package on your system. This package is available in Red Hat Enterprise Linux (RHEL).

Procedure

1. Copy the **etc-pki-entitlement** secret from the **openshift-config-managed** namespace into the namespace of your pipeline by running the following command:

```
$ oc get secret etc-pki-entitlement -n openshift-config-managed -o json | \
  jq 'del(.metadata.resourceVersion)' | jq 'del(.metadata.creationTimestamp)' | \
  jq 'del(.metadata.uid)' | jq 'del(.metadata.namespace)' | \
  oc -n <pipeline_namespace> create -f - 1
```

1 Replace **<pipeline_namespace>** with the namespace of your pipeline.

2. In your Buildah task definition, use the **buildah** task provided in the **openshift-pipelines** namespace or a copy of this task and define the **rhel-entitlement** workspace, as shown in the following example.

3. In your task run or pipeline run that runs the Buildah task, assign the **etc-pki-entitlement** secret to the **rhel-entitlement** workspace, as in the following example.

Example pipeline run definition, including the pipeline and task definitions, that uses Red Hat entitlements

```
apiVersion: tekton.dev/v1
kind: PipelineRun
metadata:
  name: buildah-pr-test
spec:
  workspaces:
    - name: shared-workspace
      volumeClaimTemplate:
        spec:
          accessModes:
            - ReadWriteOnce
          resources:
            requests:
              storage: 1Gi
    - name: dockerconfig
      secret:
        secretName: regred
    - name: rhel-entitlement 1
      secret:
        secretName: etc-pki-entitlement
```

```
  pipelineSpec:
    workspaces:
      - name: shared-workspace
      - name: dockerconfig
      - name: rhel-entitlement 2
    tasks:
# ...
      - name: buildah
        taskRef:
          resolver: cluster
          params:
          - name: kind
            value: task
          - name: name
            value: buildah
          - name: namespace
            value: openshift-pipelines
        workspaces:
        - name: source
          workspace: shared-workspace
        - name: dockerconfig
          workspace: dockerconfig
        - name: rhel-entitlement 3
          workspace: rhel-entitlement
        params:
        - name: IMAGE
          value: <image_where_you_want_to_push>
```

1. The definition of the **rhel-entitlement** workspace in the pipeline run, assigning the **etc-pki-entitlement** secret to the workspace
2. The definition of the **rhel-entitlement** workspace in the pipeline definition
3. The definition of the **rhel-entitlement** workspace in the task definition

5.3. USING RED HAT ENTITLEMENTS BY SHARING THE SECRET USING THE SHARED RESOURCES CSI DRIVER OPERATOR

You can set up sharing of the **etc-pki-entitlement** secret from the **openshift-config-managed** namespace to other namespaces using the Shared Resources Container Storage Interface (CSI) Driver Operator. You can then configure your pipeline to use this secret for the Buildah task.

Prerequisites

- You are logged on to your OpenShift Container Platform cluster using the **oc** command line utility as a user with cluster administrator permissions.
- You enabled the Shared Resources CSI Driver operator on your OpenShift Container Platform cluster.

Procedure

1. Create a **SharedSecret** custom resource (CR) for sharing the **etc-pki-entitlement** secret by running the following command:

```
$ oc apply -f - <<EOF
apiVersion: sharedresource.openshift.io/v1alpha1
kind: SharedSecret
metadata:
  name: shared-rhel-entitlement
spec:
  secretRef:
    name: etc-pki-entitlement
    namespace: openshift-config-managed
EOF
```

2. Create an RBAC role that permits access to the shared secret by running the following command:

```
$ oc apply -f - <<EOF
apiVersion: rbac.authorization.k8s.io/v1
kind: Role
metadata:
  name: shared-resource-rhel-entitlement
  namespace: <pipeline_namespace> 1
rules:
  - apiGroups:
      - sharedresource.openshift.io
    resources:
      - sharedsecrets
    resourceNames:
      - shared-rhel-entitlement
    verbs:
      - use
EOF
```

1 Replace **<pipeline_namespace>** with the namespace of your pipeline.

3. Assign the role to the **pipeline** service account by running the following command:

```
$ oc create rolebinding shared-resource-rhel-entitlement --role=shared-shared-resource-rhel-entitlement \
  --serviceaccount=<pipeline-namespace>:pipeline 1
```

1 Replace **<pipeline-namespace>** with the namespace of your pipeline.

NOTE

If you changed the default service account for OpenShift Pipelines or if you define a custom service account in the pipeline run or task run, assign the role to this account instead of the **pipeline** account.

4. In your Buildah task definition, use the **buildah** task provided in the **openshift-pipelines** namespace or a copy of this task and define the **rhel-entitlement** workspace, as shown in the following example.

5. In your task run or pipeline run that runs the Buildah task, assign the shared secret to the **rhel-entitlement** workspace, as in the following example.

Example pipeline run definition, including the pipeline and task definitions, that uses Red Hat entitlements

```
apiVersion: tekton.dev/v1
kind: PipelineRun
metadata:
  name: buildah-pr-test-csi
spec:
  workspaces:
    - name: shared-workspace
      volumeClaimTemplate:
        spec:
          accessModes:
          - ReadWriteOnce
          resources:
            requests:
              storage: 1Gi
    - name: dockerconfig
      secret:
        secretName: regred
    - name: rhel-entitlement (1)
      csi:
        readOnly: true
        driver: csi.sharedresource.openshift.io
        volumeAttributes:
          sharedSecret: shared-rhel-entitlement
  pipelineSpec:
    workspaces:
    - name: shared-workspace
    - name: dockerconfig
    - name: rhel-entitlement (2)
    tasks:
# ...
    - name: buildah
      taskRef:
        resolver: cluster
        params:
        - name: kind
          value: task
        - name: name
          value: buildah
        - name: namespace
          value: openshift-pipelines
      workspaces:
      - name: source
        workspace: shared-workspace
      - name: dockerconfig
        workspace: dockerconfig
      - name: rhel-entitlement (3)
        workspace: rhel-entitlement
      params:
      - name: IMAGE
        value: <image_where_you_want_to_push>
```

1. The definition of the **rhel-entitlement** workspace in the pipeline run, assigning the **shared-rhel-entitlement** CSI shared secret to the workspace
2. The definition of the **rhel-entitlement** workspace in the pipeline definition
3. The definition of the **rhel-entitlement** workspace in the task definition

5.4. ADDITIONAL RESOURCES

- Simple content access
- Using Insights Operator
- Importing simple content access entitlements with Insights Operator
- Shared Resource CSI Driver Operator
- Changing the default service account for OpenShift Pipelines