Preparing to deploy in a disconnected environment

Prerequisite configuration for disconnected deployments
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Abstract
Read this document for instructions on preparing a disconnected environment to install Red Hat OpenShift Container Storage 4.5.
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When your Red Hat OpenShift Container Storage environment is not directly connected to the internet, some additional configuration is required to provide the Operator Lifecycle Manager (OLM) with alternatives to the default Operator Hub and image registries.

See the OpenShift Container Platform documentation for more general information: Using Operator Lifecycle Manager on restricted networks.

To configure your cluster for disconnected operation:

1. Configure authentication for an alternative registry.
2. Build and mirror the Red Hat operator catalog.
3. Creating Operator imageContentSourcePolicy
4. Creating a CatalogSource from a mirrored catalog

When these steps are complete, continue with deployment as usual.
CHAPTER 1. ADDING MIRROR REGISTRY AUTHENTICATION DETAILS

Prerequisites

- Verify that your existing disconnected cluster uses OpenShift Container Platform 4.3 or higher.
- Verify that you have an `oc client` version of 4.4 or higher.
- Prepare a mirror host with a mirror registry. See Preparing your mirror host for details.

Procedure

1. Log in to the OpenShift Container Platform cluster using the `cluster-admin` role.
2. Locate your `auth.json` file.
   This file is generated when you use podman or docker to log in to a registry. It is located in one of the following locations:
   - `~/.docker/auth.json`
   - `/run/user/<UID>/containers/auth.json`
   - `/var/run/containers/<UID>/auth.json`
3. Obtain your unique Red Hat registry pull secret and paste it into your `auth.json` file. It will look something like this.

   ```json
   {
     "auths": {
       "cloud.openshift.com": {
         "auth": "*****************",
         "email": "user@example.com"
       },
       "quay.io": {
         "auth": "*****************",
         "email": "user@example.com"
       },
       "registry.connect.redhat.com": {
         "auth": "*****************",
         "email": "user@example.com"
       },
       "registry.redhat.io": {
         "auth": "*****************",
         "email": "user@example.com"
       }
     }
   }
   ```
4. Export environment variables with the appropriate details for your setup.

   ```bash
   $ export AUTH_FILE="<location_of_auth.json>"
   $ export MIRROR_REGISTRY_DNS="<your_registry_url>:<port>"
   ```
5. Use `podman` to log in to the mirror registry and store the credentials in the `${AUTH_FILE}`.

```bash
$ podman login ${MIRROR_REGISTRY_DNS} --tls-verify=false --authfile ${AUTH_FILE}
```

This adds the mirror registry to the `auth.json` file.

```json
{
    "auths": {
        "cloud.openshift.com": {
            "auth": "*****************",
            "email": "user@example.com"
        },
        "quay.io": {
            "auth": "*****************",
            "email": "user@example.com"
        },
        "registry.connect.redhat.com": {
            "auth": "*****************",
            "email": "user@example.com"
        },
        "registry.redhat.io": {
            "auth": "*****************",
            "email": "user@example.com"
        },
        "<mirror_registry>": {
            "auth": "*****************",
            "email": "user@example.com"
        }
    }
}
```
CHAPTER 2. BUILDING AND MIRRORING THE RED HAT OPERATOR CATALOG

Follow this process on a host that has access to Red Hat registries to create a mirror of those registries.

Prerequisites

- Run these commands as a cluster administrator.
- Be aware that mirroring the redhat-operator catalog can take hours to complete, and requires substantial available disk space on the mirror host.

Procedure

1. Build the catalog for redhat-operators.
   Match the tag of the ose-operator-registry in the --from flag to the major and minor versions of the OpenShift Container Platform cluster (for example, 4.5).

   ```bash
   $ oc adm catalog build --appregistry-org redhat-operators \
   --from=registry.redhat.io/openshift4/ose-operator-registry:v4.5 \
   --to=${MIRROR_REGISTRY_DNS}/olm/redhat-operators:v1 \
   --registry-config=${AUTH_FILE} \
   --filter-by-os="linux/amd64" --insecure
   ```

2. Mirror the catalog for redhat-operators.
   This is a long operation and can take 1-5 hours. Make sure there is 100 GB available disk space on the mirror host.

   ```bash
   $ oc adm catalog mirror ${MIRROR_REGISTRY_DNS}/olm/redhat-operators:v1 \
   ${MIRROR_REGISTRY_DNS} --registry-config=${AUTH_FILE} --insecure
   ```

3. Disable the default OperatorSources by adding disableAllDefaultSources: true to the spec file for the Operator Hub.

   ```bash
   $ oc patch OperatorHub cluster --type json -p '[["op": "add", "path": "/spec/disableAllDefaultSources", "value": true}]'
   ```
CHAPTER 3. CREATING OPERATOR IMAGECONTENTSOURCEPOLICY

After the `oc adm catalog mirror` command is completed, the `imageContentSourcePolicy.yaml` file gets created. The output directory for this file is usually, `./[catalog image name]-manifests). Use this procedure to add any missing entries to the `.yaml` file and apply them to cluster.

**Procedure**

1. Check the content of this file for the mirrors mapping shown as follows:

   ```yaml
   spec:
   repositoryDigestMirrors:
   - mirrors:
     - <your_registry>/ocs4
       source: registry.redhat.io/ocs4
     - mirrors:
     - <your_registry>/rhceph
       source: registry.redhat.io/rhceph
     - mirrors:
     - <your_registry>/openshift4
       source: registry.redhat.io/openshift4
     - mirrors:
       - <your_registry>/rhscl
         source: registry.redhat.io/rhscl
   ```

2. Add any missing entries to the end of the `imageContentSourcePolicy.yaml` file.

3. Apply the `imageContentSourcePolicy.yaml` file to the cluster.

   ```bash
   $ oc apply -f ./[output dir]/imageContentSourcePolicy.yaml
   ```

Once the Image Content Source Policy is updated, all the nodes (master, infra, and workers) in the cluster need to be updated and rebooted. This process is automatically handled through the Machine Config Pool operator and take up to 30 minutes although the exact elapsed time might vary based on the number of nodes in your OpenShift cluster. You can monitor the update process by using the `oc get mcp` command or the `oc get node` command.
CHAPTER 4. CREATING A CATALOGSOURCE FROM A MIRRORED CATALOG

Procedure

1. Create a **CatalogSource** object that references the catalog image for **redhat-operators**. Save the following in a **redhat-operator-catalogsource.yaml** file, remembering to replace `<your_registry>` with your mirror registry URL:

```yaml
apiVersion: operators.coreos.com/v1alpha1
kind: CatalogSource
metadata:
  name: redhat-operators
  namespace: openshift-marketplace
spec:
  sourceType: grpc
  icon:
    base64data: PHN2ZyBpZD0iTGF5ZXJfMSIgZGF0YS1uYW1iPSJXMSIgc2ZsYGVsZyBZb24gQ29tbWVudCgwMy45LjkuMCw1LjkuNCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwLTEwMy45LjkuMCw1LjkuNCwwL
  mediatype: image/svg+xml
  image: <your_registry>/olm/redhat-operators:v1
  displayName: Redhat Operators Catalog
  publisher: Red Hat
```

2. Create a **catalogsource** using the **redhat-operator-catalogsource.yaml** file:

```
$ oc apply -f redhat-operator-catalogsource.yaml
```

Verification

- Run the following command to verify that **catalogsource** and pod were created correctly.

```
$ oc get catalogsource,pod -n openshift-marketplace | grep redhat-operators
```

- Modify the same command after confirming that the **catalogsource** has been created successfully.
CHAPTER 5. CONTINUE TO DEPLOYMENT

After your alternative catalog source is configured, you can continue to the appropriate deployment process:

- Deploying OpenShift Container Storage using Amazon Web Services
- Deploying OpenShift Container Storage using VMware
- Deploying OpenShift Container Storage using bare metal infrastructure
- Deploying OpenShift Container Storage in external mode