# IBM Storage Fusion
# IBM Block CSI Driver
# Disconnected Installation

| Date | Version | Who | Comment |
|---|---|---|---|
| 2024-02-29 | 1.0 | JCL | Initial version |
| 2024-03-01 | 1.1 | JCL | Update supported environments |
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# 1 Introduction

This document was designed to provide guidance on the different steps needed to perform a disconnected IBM Block CSI Driver installation.

This document is based on the following pre-requisites:

- Red Hat OpenShift 4.12 or later,
- IBM Block CSI Driver 1.11.x.

# 2 IBM Block CSI Driver

## 2.1 Introduction

The IBM Block CSI Driver is designed to allow dynamic provisioning of RWO Persistent Volume Claims by applications in a Red Hat OpenShift environment.

It supports different types of IBM storage arrays and the supported storage arrays as well as their connection types is documented in the official IBM Block CSI Driver documentation 1.11.0 located here.

- iSCSI connected IBM storage array,
- IBM Spectrum Virtualize storage arrays (NVMe and Fiber Channel),
- IBM DS8000 storage arrays (Fiber Channel only).

The IBM Block CSI Driver is public available using the following repository and documents the following installation methods:

- Red Hat OpenShift Web Console,
- Cloning the GitHub repository,
- Using OperatorHub.io.

However, there are no instructions for a disconnected installation procedure that mimics the standard Red Hat OpenShift disconnected operator catalog install. The goal of this document is to provide instructions to align with this method.

# 3 Disconnected IBM Block CSI Operator

## 3.1 Introduction

The steps below can be followed to perform the following and can be applied for any disconnected Red Hat OpenShift environment and on all CPU architectures supported by Red Hat OpenShift and the IBM Block CSI Driver (amd64, s390x, ppc64le):

1. Create a custom operator index and mirror images,
2. Create a custom catalog source and patch operator.

## 3.2 Create Custom Operator Index & Mirror Images

The IBM Block CSI driver is available from the Red Hat OpenShift Community Operator catalog. The catalog index is built by Red Hat and can be used a as a source for detecting and listing packages available in this operator catalog.

The first step is to download the correct version of the `oc-mirror` tool for the correct CPU architecture.

Identify the packages available in the Red Hat Community Operator catalog index using the following command.

```
$ oc-mirror list operators \
   --catalog=registry.redhat.io/redhat/community-operator-index:v4.14 \
   >community-operators.lst
```

Verify the IBM Block CSI Driver is listed in the catalog.

```
$ grep IBM community-operators.lst
…
ibm-block-csi-operator-community
…
```

Initialize the mirroring process.

```
$ oc-mirror init
kind: ImageSetConfiguration
apiVersion: mirror.openshift.io/v1alpha2
storageConfig:
  local:
    path: ./
mirror:
  platform:
    channels:
    - name: stable-4.14
      type: ocp
  operators:
  - catalog: registry.redhat.io/redhat/redhat-operator-
index:v4.16
    packages:
    - name: serverless-operator
      channels:
      - name: stable
  additionalImages:
  - name: registry.redhat.io/ubi8/ubi:latest
  helm: {}
```

Copy the output above and modify it to obtain the following content.

Save the content as `ibm-block.yaml`.

```
$ cat block-csi.yaml
kind: ImageSetConfiguration
apiVersion: mirror.openshift.io/v1alpha2
storageConfig:
  local:
    path: ./archives
mirror:
#  platform:
#    channels:
#    - name: stable-4.14
#      type: ocp
  operators:
  - catalog: registry.redhat.io/redhat/community-operator-
index:v4.14
    packages:
    - name: ibm-block-csi-operator-community
      channels:
      - name: stable
```

Initiate the catalog index creation.

```
$ oc-mirror --config ./ibm-block.yaml \
   docker://{your_private_registry_url} \
   --ignore-history [--dest-skip-tls]
```

The command above should generate the following files in your current working directory:

- `CatalogSource` manifest,
- `ImageContentSourcePolicy` manifest.

These two files can be used as a base for the later steps.

The IBM Block CSI Driver itself is located here and will uses the following container images:

- `quay.io/ibmcsiblock/ibm-block-csi-driver-controller`
- `quay.io/ibmcsiblock/ibm-block-csi-driver-node`
- `k8s.gcr.io/sig-storage/csi-node-driver-registrar`
- `k8s.gcr.io/sig-storage/csi-provisioner`
- `k8s.gcr.io/sig-storage/csi-attacher`
- `k8s.gcr.io/sig-storage/csi-snapshotter`
- `k8s.gcr.io/sig-storage/csi-resizer`
- `quay.io/ibmcsiblock/csi-block-volumereplication-operator`
- `quay.io/ibmcsiblock/csi-volume-group-operator`
- `k8s.gcr.io/sig-storage/livenessprobe`
- `quay.io/ibmcsiblock/ibm-block-csi-host-definer`
- `quay.io/ibmcsiblock/ibm-block-csi-operator:1.11.0`
- `quay.io/ibmcsiblock/ibm-block-csi-operator:1.11.0`

All the images above must be copied to your private registry using `skopeo`.

**Note:** Make sure to run the `skopeo` command from a node that uses the same CPU architecture as the node where you intend to deploy the operator.

### 3.3 Create CatalogSource & Patch Operator (CSV)

Once all images have been copied to your private registry, the IBM Block CSI Driver CSV must be patched to remove all container image reference using a tag.

1. Create your `CatalogSource` using the manifest from above,
2. Deploy the IBM Block CSI Driver Operator via Red Hat OpenShift Console,
3. Patch the IBM Block CSI Driver CSV,

**Note:** To edit the CSV, go to the Red Hat OpenShift console or use the `oc edit` command. Use `skopeo inspect` to identify the digest of each image.

## 4 Configuring Operator

Once you have created a disconnected catalog source in your Red Hat OpenShift cluster, follow the following steps:

1. Update `ImageContentSourcePolicy` need be,
2. If needed restart the IBM Block CSI Driver pods,
    a. Once CSV has been patched,
    b. Once `ImageContentSourcePolicy` is accurate.
3. Configure the IBM Block CSI Driver.

For step 3, follow the IBM Block CSI Driver configuration to configure:

- Host Definer creation (see here),
- Configure credentials and storage classes (see here).