# Red Hat OpenShift Service on AWS 4

## Backing up and restoring applications

Backing up and restoring of applications data

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## Legal Notice



## Abstract

This document provides information about backing up applications.

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# CHAPTER 1. BACKING UP APPLICATIONS

You can employ OpenShift API for Data Protection (OADP) with Red Hat OpenShift Service on AWS (ROSA) clusters to backup and restore application data. Before installing OADP, you must set up role and policy credentials for OADP so that it can use the AWS API.

This is a two stage process:

1. Prepare AWS credentials.
2. Install the OADP Operator and provide it with the IAM role.

## 1.1. PREPARING AWS CREDENTIALS

An AWS account must be ready to accept an OADP installation.

### Procedure

1. Create the following environment variables by running the following commands:

**NOTE**

Change the cluster name to match your ROSA cluster, and ensure you are logged into the cluster as an administrator. Ensure that all fields are outputted correctly before continuing.

```
$ export CLUSTER_NAME=my-cluster 1
export ROSA_CLUSTER_ID=$(rosa describe cluster -c ${CLUSTER_NAME} --output json |
jq -r .id)
export REGION=$(rosa describe cluster -c ${CLUSTER_NAME} --output json | jq -r
.region.id)
export OIDC_ENDPOINT=$(oc get authentication.config.openshift.io cluster -o
jsonpath='{.spec.serviceAccountIssuer}' | sed 's|^https://||')
export AWS_ACCOUNT_ID=$(aws sts get-caller-identity --query Account --output text)
export CLUSTER_VERSION=$(rosa describe cluster -c ${CLUSTER_NAME} -o json | jq -r
.version.raw_id | cut -f -2 -d '.')
export ROLE_NAME="${CLUSTER_NAME}-openshift-oadp-aws-cloud-credentials"
export SCRATCH="/tmp/${CLUSTER_NAME}/oadp"
mkdir -p ${SCRATCH}
echo "Cluster ID: ${ROSA_CLUSTER_ID}, Region: ${REGION}, OIDC Endpoint:
${OIDC_ENDPOINT}, AWS Account ID: ${AWS_ACCOUNT_ID}"
```

1 Replace **my-cluster** with your ROSA cluster name.

2. On the AWS account, create an IAM policy to allow access to S3.
   a. Check to see if the policy exists by running the following command:

```
$ POLICY_ARN=$(aws iam list-policies --query "Policies[?
PolicyName=='RosaOadpVer1'].{ARN:Arn}" --output text) 1
```

1 Replace **RosaOadp** with your policy name.

b. Use the following command to create the policy JSON file and then create the policy in ROSA.

**NOTE**

If the policy ARN is not found, the command will create the policy. If the policy ARN already exists, the **if** statement will intentionally skip the policy creation.

```
$ if [[ -z "${POLICY_ARN}" ]]; then
cat << EOF > ${SCRATCH}/policy.json (1)
{
"Version": "2012-10-17",
"Statement": [
 {
   "Effect": "Allow",
   "Action": [
     "s3:CreateBucket",
     "s3:DeleteBucket",
     "s3:PutBucketTagging",
     "s3:GetBucketTagging",
     "s3:PutEncryptionConfiguration",
     "s3:GetEncryptionConfiguration",
     "s3:PutLifecycleConfiguration",
     "s3:GetLifecycleConfiguration",
     "s3:GetBucketLocation",
     "s3:ListBucket",
     "s3:GetObject",
     "s3:PutObject",
     "s3:DeleteObject",
     "s3:ListBucketMultipartUploads",
     "s3:AbortMultipartUpload",
     "s3:ListMultipartUploadParts",
     "ec2:DescribeSnapshots",
     "ec2:DescribeVolumes",
     "ec2:DescribeVolumeAttribute",
     "ec2:DescribeVolumesModifications",
     "ec2:DescribeVolumeStatus",
     "ec2:CreateTags",
     "ec2:CreateVolume",
     "ec2:CreateSnapshot",
     "ec2:DeleteSnapshot"
   ],
   "Resource": "*"
 }
]}
EOF

POLICY_ARN=$(aws iam create-policy --policy-name "RosaOadpVer1" \
--policy-document file:///${SCRATCH}/policy.json --query Policy.Arn \
--tags Key=rosa_openshift_version,Value=${CLUSTER_VERSION}
Key=rosa_role_prefix,Value=ManagedOpenShift
Key=operator_namespace,Value=openshift-oadp Key=operator_name,Value=openshift-
```

```
oadp \
--output text)
fi
```

1. **SCRATCH** is a name for a temporary directory created for the environment variables.

c. View the policy ARN by running the following command:

```
$ echo ${POLICY_ARN}
```

3. Create an IAM role trust policy for the cluster:

a. Create the trust policy file by running the following command:

```
$ cat <<EOF > ${SCRATCH}/trust-policy.json
{
    "Version": "2012-10-17",
    "Statement": [{
      "Effect": "Allow",
      "Principal": {
        "Federated": "arn:aws:iam::${AWS_ACCOUNT_ID}:oidc-
provider/${OIDC_ENDPOINT}"
      },
      "Action": "sts:AssumeRoleWithWebIdentity",
      "Condition": {
        "StringEquals": {
          "${OIDC_ENDPOINT}:sub": [
            "system:serviceaccount:openshift-adp:openshift-adp-controller-manager",
            "system:serviceaccount:openshift-adp:velero"]
        }
      }
    }]
}
EOF
```

b. Create the role by running the following command:

```
$ ROLE_ARN=$(aws iam create-role --role-name \
  "${ROLE_NAME}" \
  --assume-role-policy-document file://${SCRATCH}/trust-policy.json \
  --tags Key=rosa_cluster_id,Value=${ROSA_CLUSTER_ID}
Key=rosa_openshift_version,Value=${CLUSTER_VERSION}
Key=rosa_role_prefix,Value=ManagedOpenShift
Key=operator_namespace,Value=openshift-adp
Key=operator_name,Value=openshift-oadp \
    --query Role.Arn --output text)
```

c. View the role ARN by running the following command:

```
$ echo ${ROLE_ARN}
```

4. Attach the IAM policy to the IAM role by running the following command:

```
$ aws iam attach-role-policy --role-name "${ROLE_NAME}" \
  --policy-arn ${POLICY_ARN}
```

**Next steps**

- Continue to *Installing the OADP Operator and providing the IAM role* .

## 1.2. INSTALLING THE OADP OPERATOR AND PROVIDING THE IAM ROLE

AWS Security Token Service (AWS STS) is a global web service that provides short-term credentials for IAM or federated users. Red Hat OpenShift Service on AWS (ROSA) with STS is the recommended credential mode for ROSA clusters. This document describes how to install OpenShift API for Data Protection (OADP) on (ROSA) with AWS STS.

**IMPORTANT**

Restic and Kopia are not supported in the OADP on ROSA with AWS STS environment. Make sure that the Restic/Kopia node agent is disabled. For backing up volumes, OADP on ROSA with AWS STS supports only native snapshots and CSI snapshots. See *Known Issues* for more information.

**IMPORTANT**

In an Amazon ROSA cluster using STS authentication, restoring backed-up data in a different AWS region is not supported.

The Data Mover feature is not currently supported in ROSA clusters. You can use native AWS S3 tools for moving data.

**Prerequisites**

- A cluster with the required access and tokens. For instructions, see the procedure in "Preparing AWS credentials". If you plan to use two different clusters for backing up and restoring, you need to prepare AWS credentials, including **ROLE_ARN**, for each cluster.

**Procedure**

1. Create an OpenShift secret from your AWS token file by entering the following commands.
   a. Create the credentials file:

```
$ cat <<EOF > ${SCRATCH}/credentials
[default]
role_arn = ${ROLE_ARN}
web_identity_token_file = /var/run/secrets/openshift/serviceaccount/token
EOF
```

   b. Create a namespace for OADP:

```
$ oc create namespace openshift-adp
```

   c. Create the OpenShift secret:

```
$ oc -n openshift-adp create secret generic cloud-credentials \
  --from-file=${SCRATCH}/credentials
```

**NOTE**

In Red Hat OpenShift Service on AWS versions 4.15 and later, the OADP Operator supports a new standardized STS workflow through the Operator Lifecycle Manager (OLM) and Cloud Credentials Operator (CCO). In this workflow, you do not need to create the above secret, you only need to supply the role ARN during the installation of OLM-managed operators via the Red Hat OpenShift Service on AWS web console. The above secret is created automatically via CCO.

2. Install the OADP Operator.

   a. In the Red Hat OpenShift Service on AWS web console, navigate to Operators → OperatorHub.

   b. Search for the OADP Operator, then click **Install**.

3. Create AWS cloud storage using your AWS credentials:

```
$ cat << EOF | oc create -f -
apiVersion: oadp.openshift.io/v1alpha1
kind: CloudStorage
metadata:
  name: ${CLUSTER_NAME}-oadp
  namespace: openshift-adp
spec:
  creationSecret:
    key: credentials
    name: cloud-credentials
  enableSharedConfig: true
  name: ${CLUSTER_NAME}-oadp
  provider: aws
  region: $REGION
EOF
```

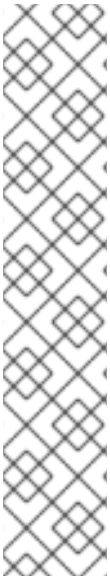
4. Create the **DataProtectionApplication** resource, which is used to configure the connection to the storage where the backups and volume snapshots are stored:

```
$ cat << EOF | oc create -f -
apiVersion: oadp.openshift.io/v1alpha1
kind: DataProtectionApplication
metadata:
  name: ${CLUSTER_NAME}-dpa
  namespace: openshift-adp
spec:
  backupLocations:
  - bucket:
      cloudStorageRef:
        name: ${CLUSTER_NAME}-oadp
      credential:
        key: credentials
```

```
      name: cloud-credentials
    prefix: velero
    default: true
    config:
      region: ${REGION}
  configuration:
    velero:
      defaultPlugins:
      - openshift
      - aws
    nodeAgent: 1
      enable: false
      uploaderType: restic
  snapshotLocations:
    - velero:
        config:
          credentialsFile: /tmp/credentials/openshift-adp/cloud-credentials-credentials 2
          enableSharedConfig: "true" 3
          profile: default 4
          region: ${REGION} 5
        provider: aws
EOF
```

1. See the first note below.
2. The **credentialsFile** field is the mounted location of the bucket credential on the pod.
3. The **enableSharedConfig** field allows the **snapshotLocations** to share or reuse the credential defined for the bucket.
4. Use the profile name set in the AWS credentials file.
5. Specify **region** as your AWS region. This must be the same as the cluster region.

You are now ready to backup and restore OpenShift applications, as described in the OADP documentation.



NOTE

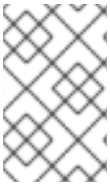
The **enable** parameter of **restic** is set to **false** in this configuration because OADP does not support Restic in ROSA environments.

If you are using OADP 1.2, replace this configuration:

```
nodeAgent:
  enable: false
  uploaderType: restic
```

with the following:

```
restic:
  enable: false
```



NOTE

If you want to use two different clusters for backing up and restoring, the two clusters must have identical AWS S3 storage names in both the cloudstorage CR and the OADP **DataProtectionApplication** configuration.

**Additional resources**

- Preparing AWS credentials

## 1.3. KNOWN ISSUES

**Restic, Kopia, and DataMover are not supported or recommended**

- CloudStorage: openshift-adp-controller-manager crashloop seg fault with Restic enabled
- (Affects OADP 1.1.x_ only): CloudStorage: bucket is removed on CS CR delete, although it doesn't have "oadp.openshift.io/cloudstorage-delete": "true"

## 1.4. ADDITIONAL RESOURCES

- Understanding ROSA with STS
- Getting started with ROSA STS
- Creating a ROSA cluster with STS
- About installing OADP
- Configuring CSI volumes
- ROSA storage options