



# **Automated Oracle Data Protection**

## **NetApp Solutions**

NetApp  
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# Solution Overview

## Automated Data Protection for Oracle Databases

Organizations are automating their environments to gain efficiencies, accelerate deployments, and reduce manual effort. Configuration management tools like Ansible are being used to streamline enterprise database operations. In this solution, we demonstrate how you can use Ansible to automate the data protection of Oracle with NetApp ONTAP. By enabling storage administrators, systems administrators, and DBAs to consistently and rapidly setup data replication to an offsite data center or to public cloud, you achieve the following benefits:

- Eliminate design complexities and human errors, and implement a repeatable consistent deployment and best practices
- Decrease time for configuration of Intercluster replication, CVO instantiation, and recovery of Oracle databases
- Increase database administrators, systems and storage administrators productivity
- Provides database recovery workflow for ease of testing a DR scenario.

NetApp provides customers with validated Ansible modules and roles to accelerate deployment, configuration, and lifecycle management of your Oracle database environment. This solution provides instruction and Ansible playbook code, to help you:

### On Prem to on prem replication

- Create intercluster lifs on source and destination
- Establish cluster and vserver peering
- Create and initialize SnapMirror of Oracle volumes
- Create a replication schedule through AWX/Tower for Oracle binaries, databases, and logs
- Restore Oracle DB on the destination, and bring database online

### On Prem to CVO in AWS

- Create AWS connector
- Create CVO instance in AWS
- Add On-Prem cluster to Cloud Manager
- Create intercluster lifs on source
- Establish cluster and vserver peering
- Create and initialize SnapMirror of Oracle volumes
- Create a replication schedule through AWX/Tower for Oracle binaries, databases, and logs
- Restore Oracle DB on the destination, and bring database online

For more details or to begin, please see the overview videos below.

### AWX/Tower Deployments

- Part 1: TBD

### video

- Part 2: TBD

### video

After you are ready, click [here for getting started with the solution](#).

## Getting started

This solution has been designed to be run in an AWX/Tower environment.

### AWX/Tower

For AWX/Tower environments, you are guided through creating an inventory of your ONTAP cluster management and Oracle server (IPs and hostnames), creating credentials, configuring a project that pulls the Ansible code from NetApp Automation Github, and the Job Template that launches the automation.

1. The solution has been designed to run in a private cloud scenario (on-premise to on-premise), and hybrid cloud (on-premise to public cloud Cloud Volumes ONTAP [CVO])
2. Fill out the variables specific to your environment, and copy and paste them into the Extra Vars fields in your job template.
3. After the extra vars have been added to your job template, you can launch the automation.
4. The automation is set to be ran three phases (Setup, Replication Schedule for Oracle Binaries, Database, Logs, and Replication Schedule just for Logs), and a forth phase to recovering the database at a DR site.
5. For detailed instructions for obtaining the keys and tokens necessary for the CVO Data Protection visit [Gather Pre-requisites For CVO and Connector Deployments](#)

### Requirements

## On-Prem |

| Environment         | Requirements                                                                                                                  |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Ansible environment | AWX/Tower                                                                                                                     |
|                     | Ansible v.2.10 and higher                                                                                                     |
|                     | Python 3                                                                                                                      |
|                     | Python libraries<br>- netapp-lib<br>- xmlltodict<br>- jmespath                                                                |
| ONTAP               | ONTAP version 9.8 +                                                                                                           |
|                     | Two data aggregates                                                                                                           |
|                     | NFS vlan and ifgrp created                                                                                                    |
| Oracle server(s)    | RHEL 7/8                                                                                                                      |
|                     | Oracle Linux 7/8                                                                                                              |
|                     | Network interfaces for NFS, public, and optional mgmt                                                                         |
|                     | Existing Oracle environment on source, and the equivalent Linux operating system at the destination (DR Site or Public Cloud) |

## CVO

| Environment         | Requirements                                                                                                                  |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Ansible environment | AWX/Tower                                                                                                                     |
|                     | Ansible v.2.10 and higher                                                                                                     |
|                     | Python 3                                                                                                                      |
|                     | Python libraries<br>- netapp-lib<br>- xmlltodict<br>- jmespath                                                                |
| ONTAP               | ONTAP version 9.8 +                                                                                                           |
|                     | Two data aggregates                                                                                                           |
|                     | NFS vlan and ifgrp created                                                                                                    |
| Oracle server(s)    | RHEL 7/8                                                                                                                      |
|                     | Oracle Linux 7/8                                                                                                              |
|                     | Network interfaces for NFS, public, and optional mgmt                                                                         |
|                     | Existing Oracle environment on source, and the equivalent Linux operating system at the destination (DR Site or Public Cloud) |
|                     | Set appropriate swap space on the Oracle EC2 instance, by default some EC2 instances are deployed with 0 swap                 |

| Environment       | Requirements                       |
|-------------------|------------------------------------|
| Cloud Manager/AWS | AWS Access/Secret Key              |
|                   | NetApp Cloud Manager Account       |
|                   | NetApp Cloud Manager Refresh Token |

**Automation Details**

## On-Prem |

This automated deployment is designed with a single Ansible playbook that consists of three separate roles. The roles are for ONTAP, Linux, and Oracle configurations.

The following table describes which tasks are being automated.

| Playbook                   | Tasks                                                                              |
|----------------------------|------------------------------------------------------------------------------------|
| <b>ontap_setup</b>         | Pre-check of the ONTAP environment                                                 |
|                            | Creation of Intercluster LIFs on source cluster (OPTIONAL)                         |
|                            | Creation of Intercluster LIFs on destination cluster (OPTIONAL)                    |
|                            | Creation of Cluster and SVM Peering                                                |
|                            | Creation of destination SnapMirror and Initialization of designated Oracle volumes |
| <b>ora_replication_cg</b>  | Enable backup mode for each database in /etc/oratab                                |
|                            | Snapshot taken of Oracle Binary and Database volumes                               |
|                            | Snapmirror Updated                                                                 |
|                            | Turn off backup mode for each database in /etc/oratab                              |
| <b>ora_replication_log</b> | Switch current log for each database in /etc/oratab                                |
|                            | Snapshot taken of Oracle Log volume                                                |
|                            | Snapmirror Updated                                                                 |
| <b>ora_recovery</b>        | Break SnapMirror                                                                   |
|                            | Enable NFS and create junction path for Oracle volumes on the destination          |
|                            | Configure DR Oracle Host                                                           |
|                            | Mount and verify Oracle volumes                                                    |
|                            | Recover and start Oracle database                                                  |

## CVO

This automated deployment is designed with a single Ansible playbook that consists of three separate roles. The roles are for ONTAP, Linux, and Oracle configurations.

The following table describes which tasks are being automated.

| Playbook            | Tasks                                                                              |
|---------------------|------------------------------------------------------------------------------------|
| cvo_setup           | Pre-check of the environment                                                       |
|                     | AWS Configure/AWS Access Key ID/Secret Key/Default Region                          |
|                     | Creation of AWS Role                                                               |
|                     | Creation of NetApp Cloud Manager Connector instance in AWS                         |
|                     | Creation of Cloud Volumes ONTAP (CVO) instance in AWS                              |
|                     | Add On-Prem Source ONTAP Cluster to NetApp Cloud Manager                           |
|                     | Creation of destination SnapMirror and Initialization of designated Oracle volumes |
| ora_replication_cg  | Enable backup mode for each database in /etc/oratab                                |
|                     | Snapshot taken of Oracle Binary and Database volumes                               |
|                     | Snapmirror Updated                                                                 |
|                     | Turn off backup mode for each database in /etc/oratab                              |
| ora_replication_log | Switch current log for each database in /etc/oratab                                |
|                     | Snapshot taken of Oracle Log volume                                                |
|                     | Snapmirror Updated                                                                 |
| ora_recovery        | Break SnapMirror                                                                   |
|                     | Enable NFS and create junction path for Oracle volumes on the destination CVO      |
|                     | Configure DR Oracle Host                                                           |
|                     | Mount and verify Oracle volumes                                                    |
|                     | Recover and start Oracle database                                                  |

## Default parameters

To simplify automation, we have preset many required Oracle parameters with default values. It is generally not necessary to change the default parameters for most deployments. A more advanced user can make changes to the default parameters with caution. The default parameters are located in each role folder under defaults directory.

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After you are ready, click [here for detailed AWX/Tower procedures](#).



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