



Version 1.1

July 2024

# Oracle Data Protection Deployment Using Cohesity Oracle Adapter

*Options and Instructions to Deploy Cohesity Data  
Protection for Oracle Servers*

## **ABSTRACT**

*The document provides a workflow to help deploy Oracle Data Protection using Cohesity Oracle Adapter for a customer's environment.*

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## Introduction

This document provides a step-by-step guide for customers to deploy the Oracle Data Protection using Cohesity Oracle Adapter for their environment.

## Oracle Data Protection Methods

The Cohesity Oracle solution extends the scalability of Oracle Recovery Manager (RMAN) and provides the features and tools needed for automating backups, recoveries, and managing your data within a single pane of glass.

Cohesity offers three backup methods:

- Cohesity Oracle Adapter
- Cohesity Oracle SBT Plug-in
- RMAN NFS Target

This guide is focused on the beneficial use of Cohesity Oracle Adapter.

**Cohesity Oracle Adapter:** Cohesity Oracle Adapter integrates with RMAN to provide application-consistent backup and recovery for Oracle databases. The adapter provides a unified user interface allowing users to manage and provision all the Oracle database protection services, supporting Oracle single instance, RAC, or Oracle Multitenant databases. Additionally, Cohesity Oracle Adapter provides an incremental forever backup approach eliminating the need for regular expensive full backups.

**Cohesity Oracle RMAN SBT Plug-in:** The Cohesity Oracle SBT Plug-in allows you to use Cohesity on-premises or multi-cloud data platform as target storage for backing up Oracle databases. For more details, see [Oracle Data Protection Deployment Using Cohesity Oracle SBT Plug-in](#).

**Cohesity Oracle RMAN NFS Target:** Cohesity can be presented as an NFS volume to be used as inline-deduplication Oracle databases backup target. Oracle RMAN can use the Cohesity on-premises or multi-cloud data platform as a deduplication target and automatically leverage Cohesity's QoS policy for optimal data tiering as well as global deduplication and compression to reduce secondary storage consumption. For more details, see [Oracle Data Protection Deployment Using RMAN NFS Target](#).

## Deciding an Oracle Data Protection Method

The decision on which method to use for data protection of Oracle on Cohesity depends on the operating system, Oracle configuration, and type of database. For self-managed Cohesity deployments either on-prem or in the cloud, use the following decision process to choose an Oracle Data Protection Method.

You might choose the **Oracle Adapter** if you:

1. Want a fully automated data protection method for Oracle databases.

2. Don't want to write, manage, or update RMAN scripts.
3. Want incremental-forever backups (no need for Periodic fulls).
4. Want instant recovery of your Oracle databases.
5. Want to create near-instant, zero-cost clones of your Oracle databases for non-prod use cases.
6. Want advanced, centralized management, and reporting of your Oracle backups.

## Select a Deployment Option

Use the table below to choose a Deployment Option for Oracle Data Protection based on your environment.

Table 1: Oracle Data Protection Selection

OPERATING SYSTEM	SINGLE INSTANCE	RAC	STANDBY / DATAGUARD	MULTI-TENANCY (CDB/PDB)	ORACLE TDE
<b>Linux</b> (RHEL, Centos, OEL 6/7/8), (SuSE/SLES 11, 12, 15)	<a href="#">Oracle Adapter*</a> , <a href="#">RMAN SBT</a> , or <a href="#">RMAN NFS Target</a>				
<b>Windows</b> (2012, 2012 R2, 2016, 2019)	<a href="#">Oracle Adapter</a> <a href="#">RMAN SBT</a> , or <a href="#">RMAN SMB Target</a>	<a href="#">RMAN SBT</a> , or <a href="#">RMAN SMB Target</a>			
<b>AIX</b> 7.1, 7.2	<a href="#">Oracle Adapter</a> , <a href="#">RMAN SBT</a> , or <a href="#">RMAN NFS Target</a>		<a href="#">RMAN SBT</a> , or <a href="#">RMAN NFS Target</a>		
<b>HPUX</b> (All)	<a href="#">RMAN NFS Target</a>				
<b>Solaris</b> (All)					
<b>Other DB and OS</b> (Ex - Oracle 10, RHEL 5)					

\* CDB/PDB supports only 6.6.0x and later.

\* Oracle supported by version (Oracle Adapter (11gR2 and above), SBT (11gR2 and above), RMAN-NFS (all versions))

\* See [Cohesity Software Support Matrix](#) to validate your specific configuration details.

## Oracle Adapter Considerations

Cohesity Oracle Adapter uses RMAN incremental merge backup method, which is an incremental forever technology. It supports all sizes of databases. However, incremental forever does not mean it is always faster than full backup. It depends on the database size, change rate, and your Cohesity platform. If a customer is expecting Oracle Adapter backup to be faster than full backup, then use the following size recommendations as general guidance. If the database size is not in this range, more tuning on agent or platform will be required.

The following databases are ideal candidates to use Oracle Adapter:

- You can use Cohesity Oracle Adapter for all the supported configurations irrespective of the database size.
- Databases with a change rate greater than 3 - 5 TB between successive backups may need additional configurations in the adapter. Cohesity recommends customers to contact Cohesity to get the additional tuning parameters reviewed.
- Automatic scheduling of database backups with out-of-box parallelism to meet backup SLA.
- Both databases and the Cohesity cluster are in the same facility, either both on-prem or in cloud. Cohesity recommends the source and Cohesity cluster should be in the DC for best performance.
- A cold database backup is not supported by the Oracle Adapter.
- Cohesity adapter before 6.6.0c doesn't support concurrent database and archive logs backup tasks. Not too frequent archive log backups. Consider running the archive log once every two hours or four hours.

## Using Cohesity Oracle Adapter

This section focuses on the Cohesity Oracle Adapter option. The Cohesity Oracle Adapter integrates with Oracle Recovery Manager to provide application-consistent backup and recovery for Oracle databases. The adapter provides a unified user interface allowing users to manage and provision all the Oracle database protection services, supporting Oracle single instance, RAC, or Oracle Multitenant databases.

**NOTE:** The instructions in this document are for version 6.6, however, some screenshots have been taken using version 6.5.1.

### Install Oracle Adapter

1. Review and validate all prerequisites are met:
  - a) [Supported Versions](#)
  - b) [Additional Prerequisites](#)
  - c) See [Ports used for Oracle Adapter](#) and confirm that required ports are open for communication with the Cohesity cluster.

There are several commands to test whether the ports are open. Depending on what packages are installed on the server, the following commands can be used to test whether the ports are open or not.

Here are the examples to run the commands assuming one of the Cohesity node VIPs is 10.99.1.65.

```
nc -zv 10.99.1.65 11113
curl -XGET 10.99.1.65:11113/flagz
telnet 10.99.1.65 11111
nmap -Pn -p 11111 10.99.1.65
```

2. Determine which Operating System account will run the Cohesity agent on the Linux Oracle server:
  - a) **Run as root (recommended):** Having root run the Cohesity service requires the minimum amount of changes to the sudoers file. For more information, see [Running Agent with ROOT](#).
  - b) **Run as a non-root user:** Running as a non-root user requires modifications to the sudoers file. See [Sudoers Permissions for Service Account User](#) for commands required for the non-root user to be allowed to run as root.
    - i. If the account chosen is a service account that does not own the Oracle binaries, this account must belong to an OS group that enables the account to hold SYSDBA or

SYSBACKUP privileges as defined here: [Running Agent with OS Service Account User](#).

**NOTE:** AIX can only be installed as a ROOT user.

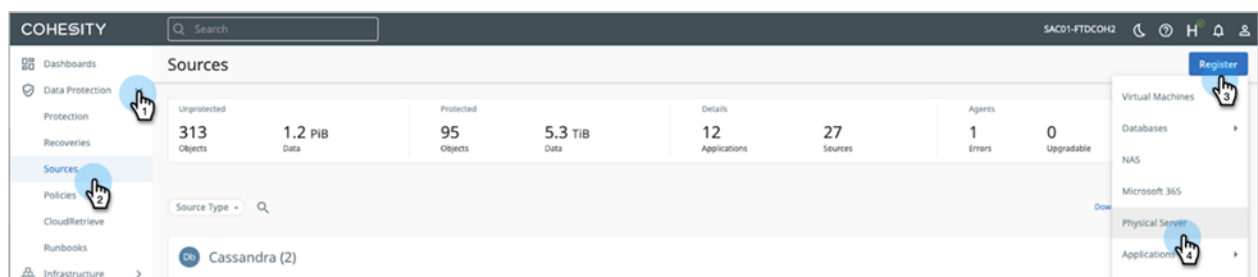
- ii. For more information about configuring sudoers for use with the Cohesity Oracle Adapter, see [Sudoers List for Cohesity's Oracle Adapter](#).
3. Download and install the Agent.
    - a) In the Cohesity home page, select **Data Protection > Sources**.
    - b) Click **Download Cohesity Agent** near the top-right of the page.
      - i. **Linux:** Offers both script installer and RPM options. The script installer option is the recommended approach. For more information, see [Install the Linux Agent](#).
      - ii. **AIX:** Offers the Java Agent. For more information, see [Install the AIX Java Agent](#).
      - iii. **Windows:** see [Install the Windows Agent](#).
    - c) Copy the Agent to the Oracle server and complete the installation.

## Register Oracle Source

Registering Oracle is a two-step process. You first must register it as a physical server, then as an Oracle server.

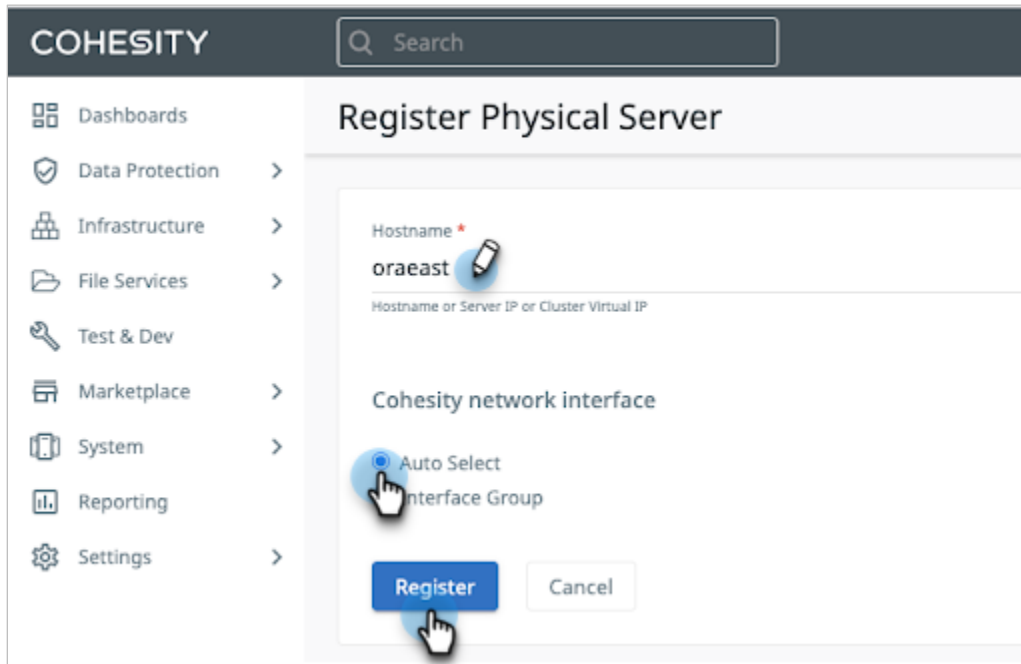
**To register Oracle source as a Physical Server:**

1. In the Cohesity Dashboard, select **Data Protection > Sources**, then click **Register > Physical Server** from the drop-down menu.



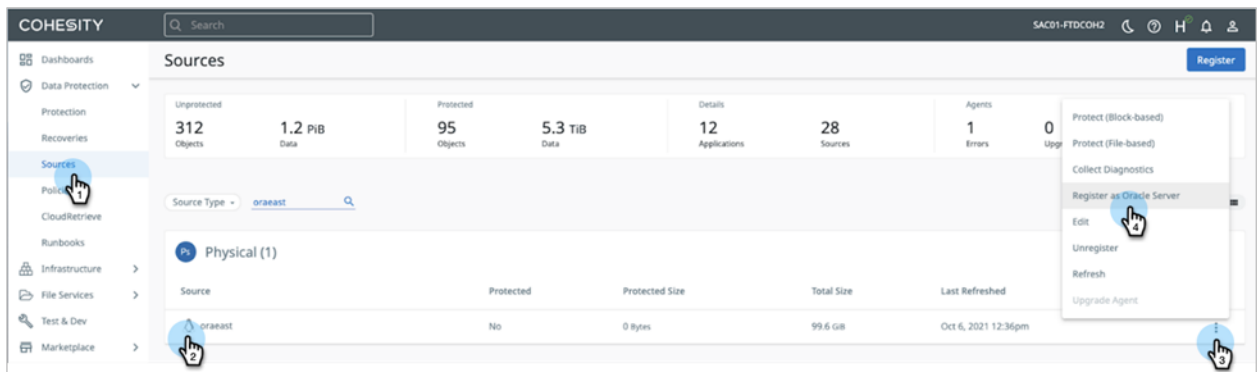
- In the **Hostname** field, add the Server Name or IP Address.

If you prefer a configured interface group, you can select it here, else, Cohesity uses **Auto Select** by default. Click **Register**.



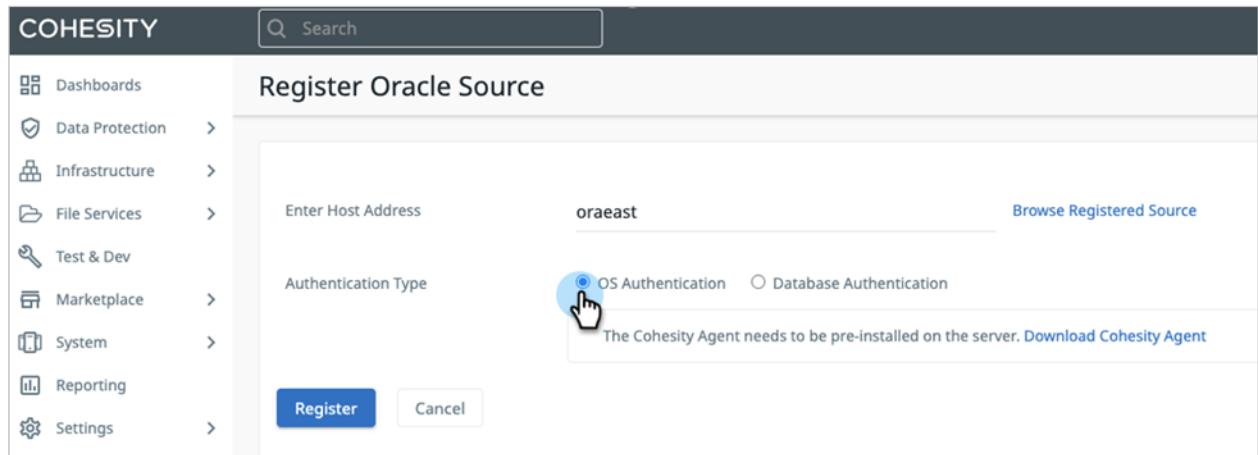
**NOTE:** To register an Oracle RAC, use the scan-name or scan-ip for the source registration. Similarly, for registering an Oracle Veritas Cluster Server (VCS), use the virtual resource name or virtual IP for source registration.

- In the **Sources** page, select the Physical Server (e.g., oraeast) from the list, click the ellipsis icon (⋮) at the right, and then select **Register as Oracle Server** from the menu.



4. Select the **Authentication Type** for the database server as either **OS Authentication** or **Database Authentication**.

For most implementations, OS Authentication will be leveraged. See [Oracle Authentication Method Requirement](#) table for authentication requirements by specific operations.

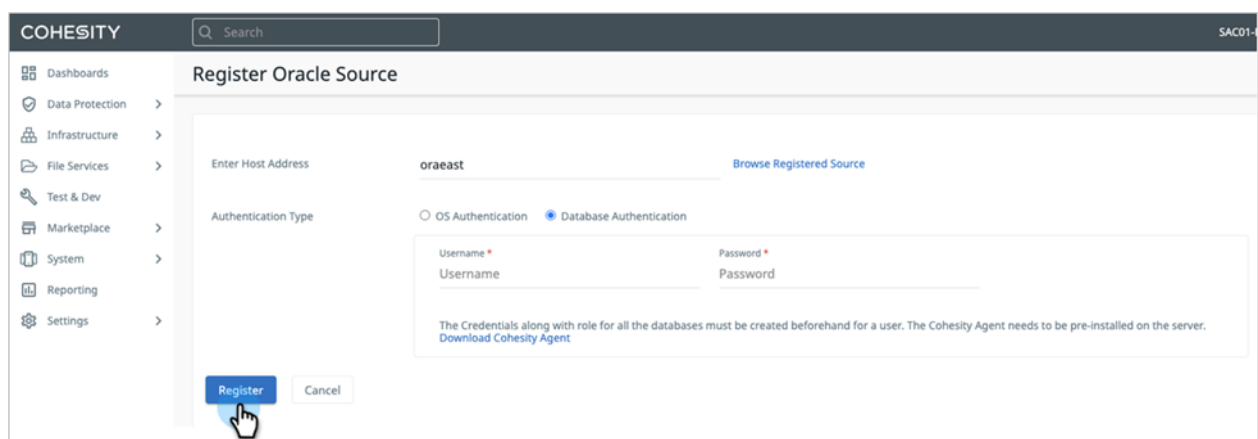


The screenshot shows the 'Register Oracle Source' form in the COHESITY interface. The 'Enter Host Address' field contains 'oraeast'. The 'Authentication Type' section has two radio buttons: 'OS Authentication' (selected) and 'Database Authentication'. Below this, a note states: 'The Cohesity Agent needs to be pre-installed on the server. Download Cohesity Agent'. At the bottom, there are 'Register' and 'Cancel' buttons.

If **Database Authentication** is selected, enter the **Username** and **Password** of the database account.

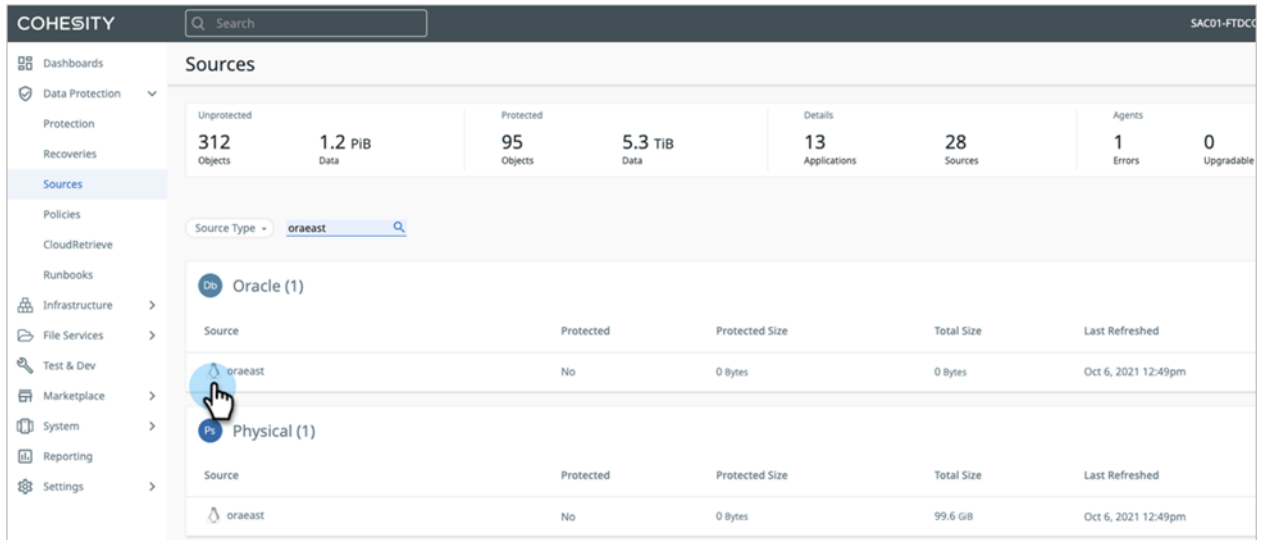
**NOTE:** For Database Authentication, a database account with either SYSDBA or SYSBACKUP privileges must exist in all databases on the server being registered. Individual database accounts for separate databases residing on a single database server are not supported.

5. Click **Register** to complete the Oracle Source registration.

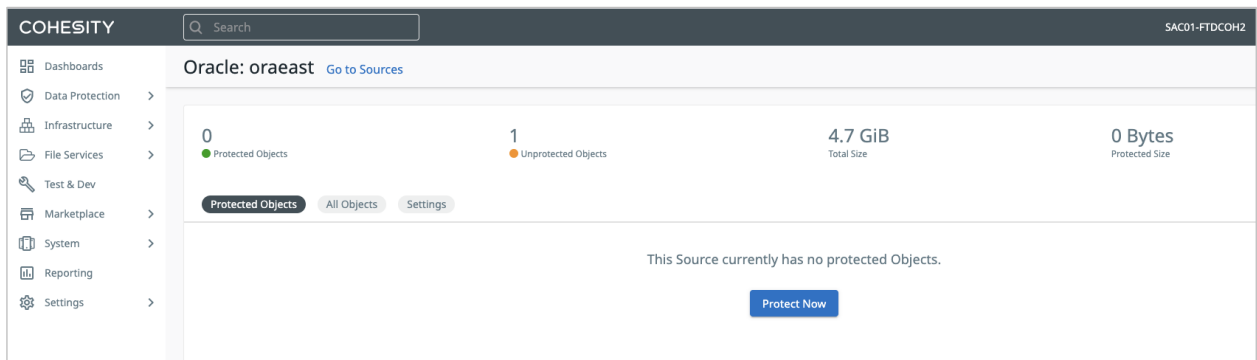


The screenshot shows the 'Register Oracle Source' form with 'Database Authentication' selected. The 'Enter Host Address' field contains 'oraeast'. The 'Authentication Type' section has 'OS Authentication' unselected and 'Database Authentication' selected. Below this, there are two input fields: 'Username' and 'Password', both containing the text 'Username' and 'Password' respectively. A note at the bottom states: 'The Credentials along with role for all the databases must be created beforehand for a user. The Cohesity Agent needs to be pre-installed on the server. Download Cohesity Agent'. At the bottom, there are 'Register' and 'Cancel' buttons, with a hand cursor pointing to the 'Register' button.

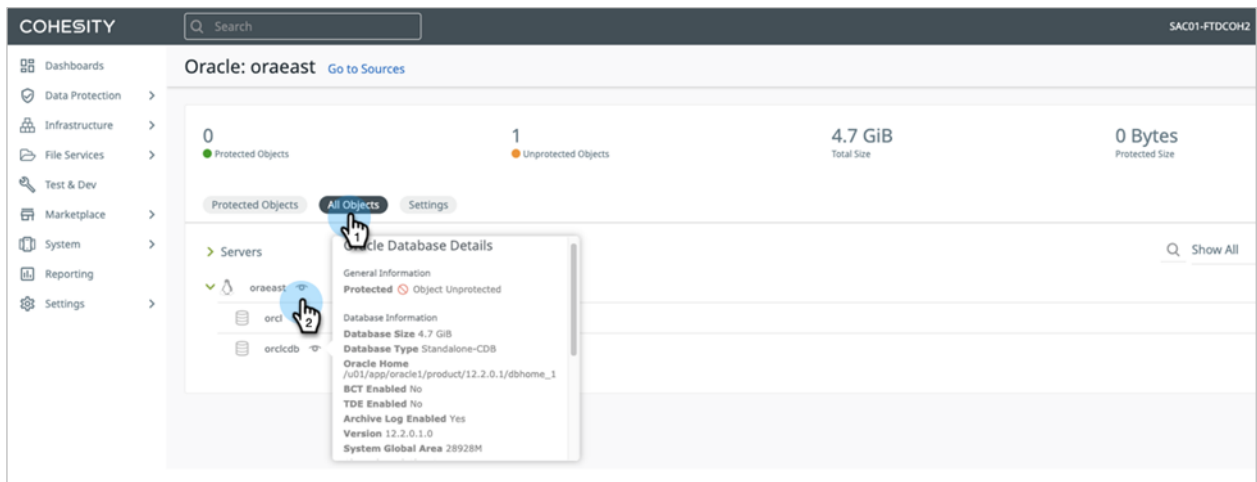
- Once the Source has been registered, select the source to verify that all databases are successfully discovered.



When first selecting the source the default view is the **Protected Objects** screen, which will not show any objects since a Protection Group has not been created yet.



- Click the **All Objects** button to see the databases that have been discovered.



**TIP:** Click on the eyeball icon next to the database to view the details of the database such as **Archive Log Enabled (Required)**, **BCT Enabled (Recommended)**, **Database Type**, **Oracle Home**, etc.

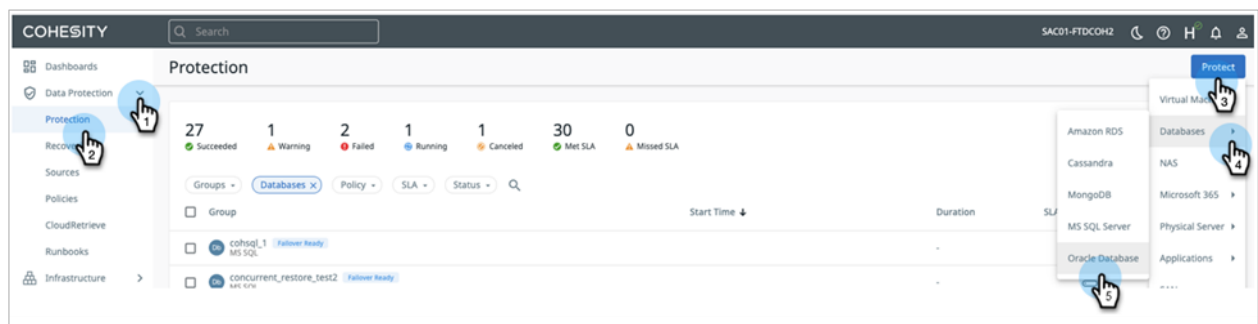
**NOTE:** If no databases are discovered or if databases are missing from the Oracle source, see [Troubleshooting Tips](#) for more information.

## Creating an Oracle Protection Group

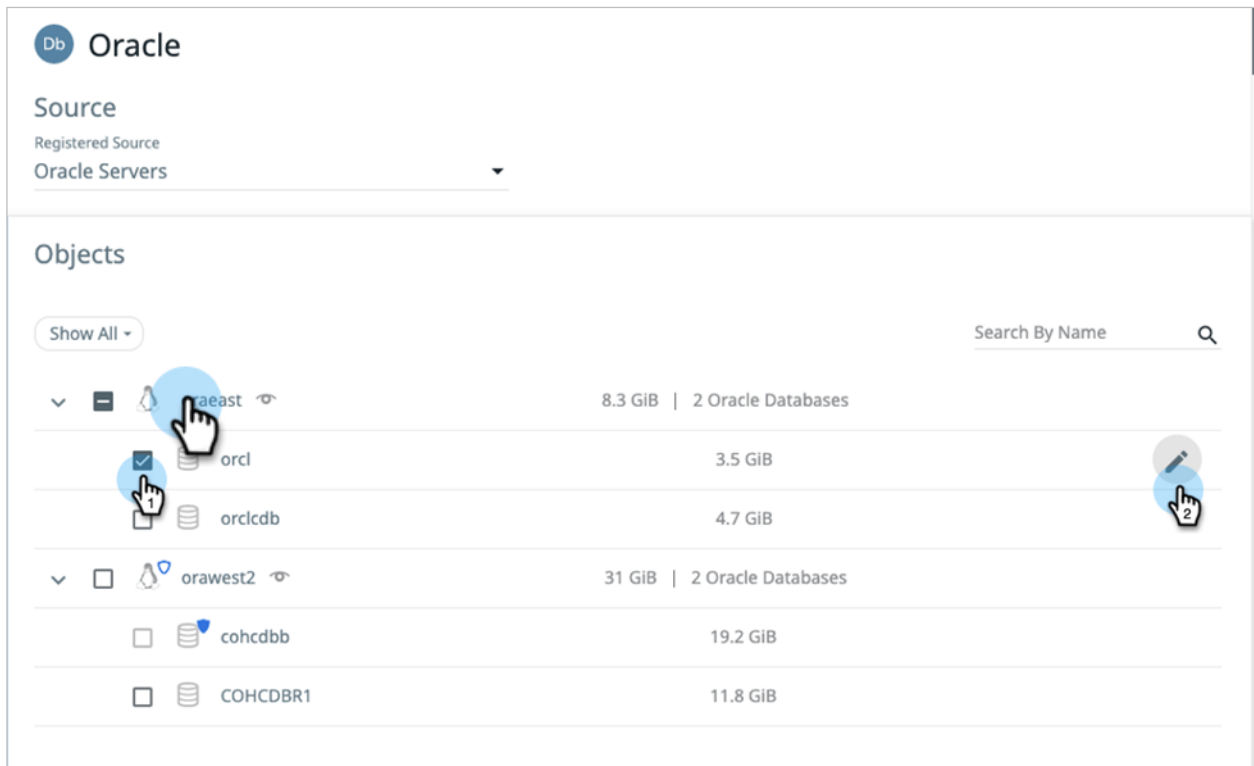
A Protection Group uses the schedules and settings defined in the policy to determine when and how backups are captured, archived, or replicated.

### To Create an Oracle Protection Group

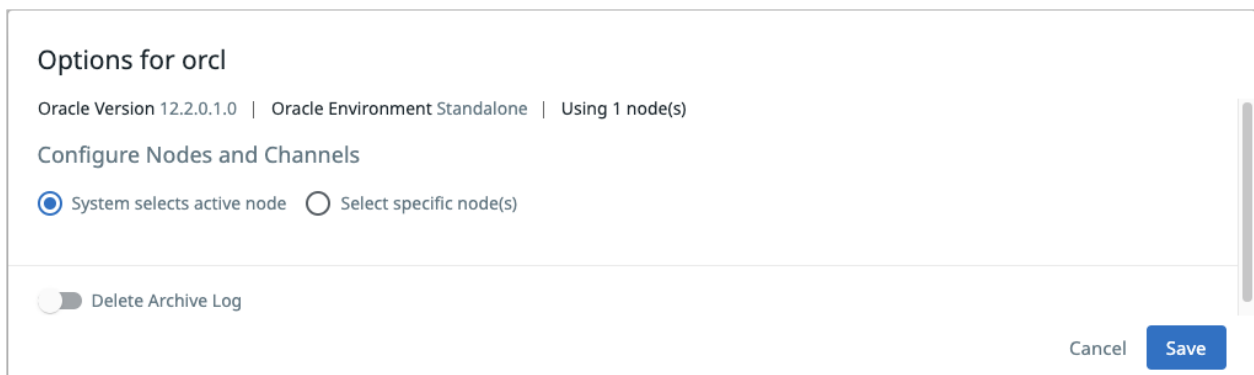
1. From the main dashboard, select **Data Protection > Protection**, click **Protect** in the upper right-hand corner and select **Databases > Oracle Database** to start the Protection Group creation.



2. Select the Oracle databases that you want to protect. All Oracle Servers that are registered with the Cohesity cluster are displayed and individual databases can be selected. Click the **pencil/edit** icon to the right of a database being selected to configure specific options for the selected database.



3. Upon clicking the pencil/edit icon, the **Options** screen appears allowing you to configure Oracle channels and to manage the archive log deletion.



4. By default, Cohesity selects the number of default RMAN channels for protection using the following logic:

$$\text{RMAN channels} = \text{MIN}(2 * \# \text{ of Cohesity nodes}, 2 * \# \text{ of target server CPU})$$


To modify the default, click **Select specific node(s)** and modify the number of **Channels** to allocate (e.g., 5 in this example).

### Options for orcl

Oracle Version 12.2.0.1.0 | Oracle Environment Standalone | Using 1 node(s)

#### Configure Nodes and Channels

System selects active node  Select specific node(s)

<input checked="" type="checkbox"/> Hostname	Node IP	Channels
<input checked="" type="checkbox"/> oraeast	oraeast	5 

Delete Archive Log

Cancel

**NOTES:**

- The above example illustrates channel allocation for a standalone Oracle server. In a RAC environment, all nodes of the RAC are displayed, and channels can be allocated over individual RAC nodes.
- If Oracle Standard Edition is installed, Oracle will not allow multiple RMAN channels, so setting this to a number higher than 1 will not increase the number of RMAN channels.
- DB Authentication must be configured to use multi-channel (see step 5), multi-node RMAN channels in a RAC protection group as shown below (10.19.2.100):

Options for cohcrab

Oracle Version 19.0.0.0.0 | Oracle Environment RAC | Using 2 node(s)

Configure Nodes and Channels

System selects active node  Select specific node(s)

<input checked="" type="checkbox"/> Hostname	Node IP	Channels	Port
<input checked="" type="checkbox"/> orarac2.saj.corp.cohesity.com	10.19.1.212	1	1521
<input checked="" type="checkbox"/> orarac3.sa.corp.cohesity.com	10.19.1.213	1	1521

Update Database credentials for user with sysdba or sysbackup privilege.

Username \* Password \*

SYS \*\*\*\*\*

Delete Archive Log

Delete Archive Log aft...

0

Cancel Save

- To configure archive log deletion for the database, enable the **Delete Archive Log** toggle and click **Save**. Cohesity will not delete the archive logs by default.

Options for orcl

Oracle Version 12.2.0.1.0 | Oracle Environment Standalone | Using 1 node(s)

Configure Nodes and Channels

System selects active node  Select specific node(s)

<input checked="" type="checkbox"/> Hostname	Node IP	Channels
<input checked="" type="checkbox"/> oraeast	oraeast	5

Delete Archive Log

Delete Archive Log aft...  
  
 Days

Choosing the delete option may permanently remove archived logs that are not previously backed up by Cohesity. In addition, if you are using Oracle RMAN archived log delete policy to manage archived logs deletion on this database, depending on the policy, it may prevent Cohesity from deleting the archived logs.

Cancel **Save**

**NOTE:** Once archive log deletions are enabled, they are configured to be kept on disk for one day and then deleted. To change this setting and have the archive logs deleted immediately after being protected, change this value to 0 as shown above.

You must set the archive log deletion setting for each database.

- Enter a **Name** for the Protection Group.

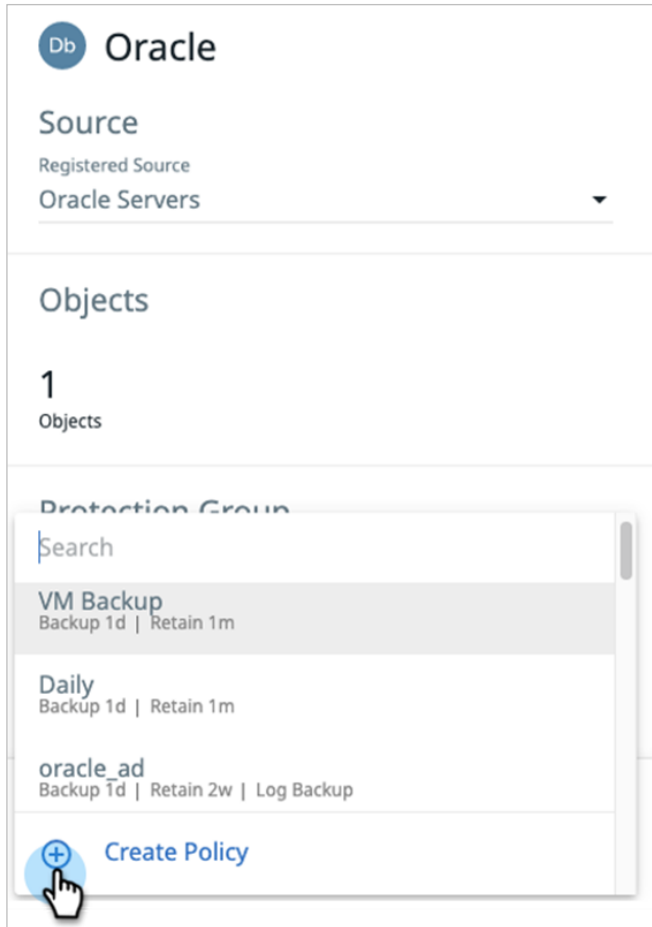
Objects

1  
Objects

Protection Group

Name   
 Oracle

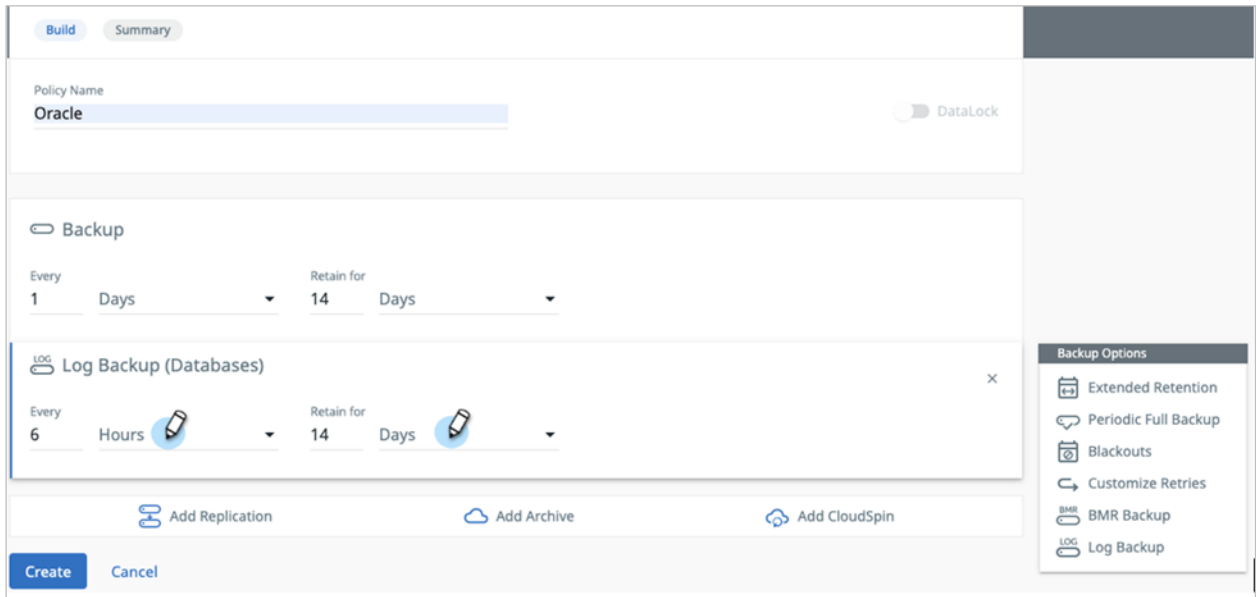
7. Select an existing policy for the Protection Group or click **Create Policy** to define a new one.



**NOTE:** There are several options available when creating a Policy. For more information, see [Create or Edit a Standard Policy](#).

8. Specify the **Log Backup** schedule and retention for the database logs.

**NOTE:** If a daily incremental backup is configured, there will be an option in the Protection Group creation screen to select the **Start Time** (not shown). If the interval is less than 24 hours, the start time will not be configurable, and the backups will run based on the number of hours set between backups in the policy.



- Next, configure any **Additional Settings** that you want for the Protection Group.

**NOTE:** The Oracle Adapter leverages NFS mounts on Linux/AIX. The additional settings have an option as to whether or not these NFS mounts should persist on the database server once the jobs have completed. By default, the NFS mounts are set to persist. If you want to remove these mounts, set the **Persist Mountpoints** option to **No**.

The screenshot shows the configuration page for an Oracle Protection Group. At the top, it displays 'Db Oracle' and the start time '6:53pm | America/New\_York'. Below this is a section titled 'Additional Settings' with a dropdown arrow. The settings are listed in a table-like format:

End Date	Never
QoS Policy	Backup Auto
Pre & Post Scripts	None
Persist Mountpoints	Yes
Cluster Interface	Auto Select
Abort in Blackouts	No
Alerts	Alert On: Failure
Priority	Medium
SLA	Full: 120 minutes Incremental: 60 minutes
Pause Future Runs	No
Description	None

At the bottom of the configuration area, there are two buttons: 'Save' and 'Cancel'. A hand cursor is pointing to the 'Persist Mountpoints' toggle, which is currently set to 'Yes'.

For more information see, [Protect Oracle Database](#).

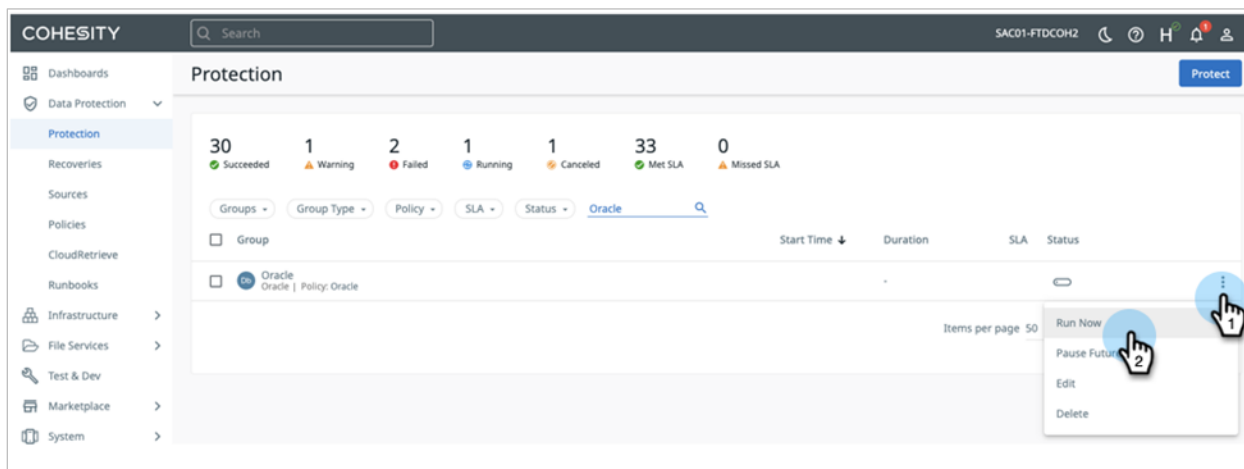
- Click **Save**.

## Backup Database

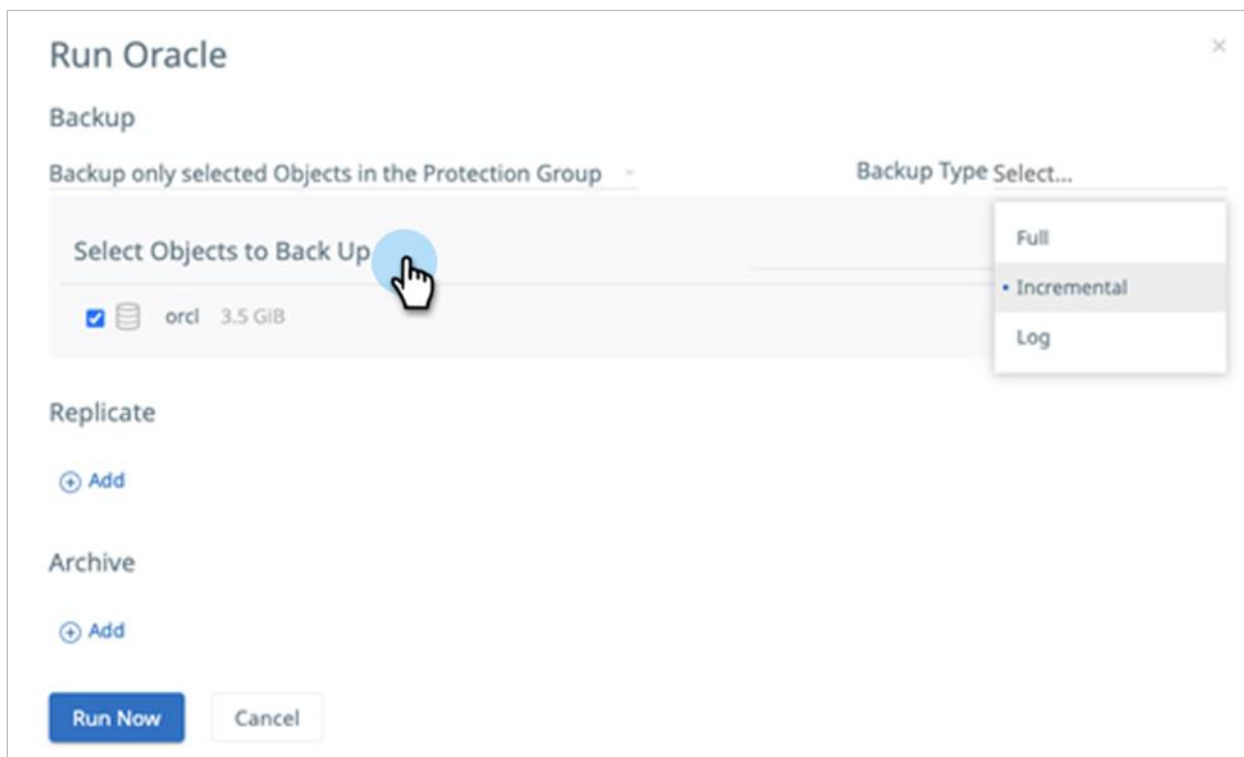
Database backups and log backups run off the schedules determined by the policy assigned to the Protection Group. If you want an ad-hoc backup, use the **Run Now** option.

### To Run an Ad-hoc Backup:

1. Hover the cursor over the desired Protection Group, click the ellipsis icon (  ) and select **Run Now** from the menu.



2. In the Run Now options screen, you can go with the default option **Backup all Objects in the Protection Group** or select **Backup only selected Objects in the Protection Group**.



3. Additionally, the default **Backup Type** is **Incremental**, but you can run either a **Full** or **Log** backup from here as well.

**NOTE:** While the Protection Group is actively backing up the databases, job details can be viewed within the UI by selecting the Protection Group then selecting the desired backup run, and then selecting the desired database.

See [Troubleshooting - Backups](#) for details on where to find logs that will assist in resolving any issues arising during backup.

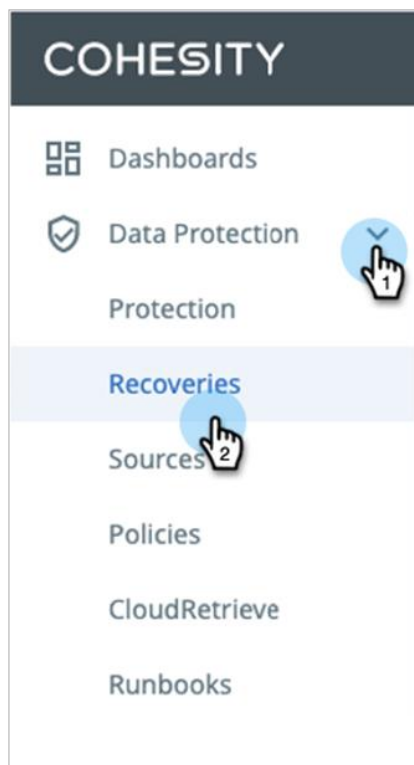
## Recover Database

There are several options offered when recovering Oracle Adapter backups.

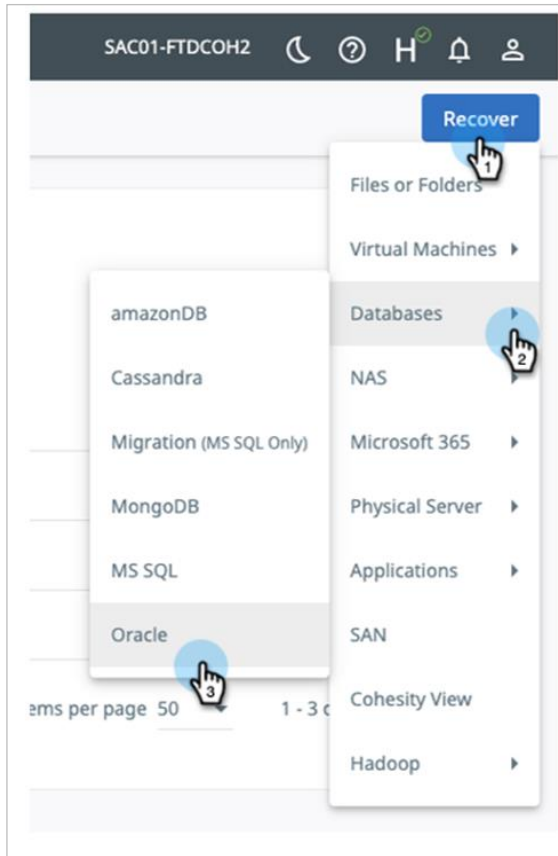
- Recover the database back to its original location.
- Recover the database as a new database on the same server or to an alternate server.
- Recover the native RMAN backup to a mounted view.
- Recover an individual pluggable database.
- Perform an 'instant recovery' which creates a database clone on the Cohesity cluster and migrates the database back to primary storage while the database is online.

### To Recover a Database

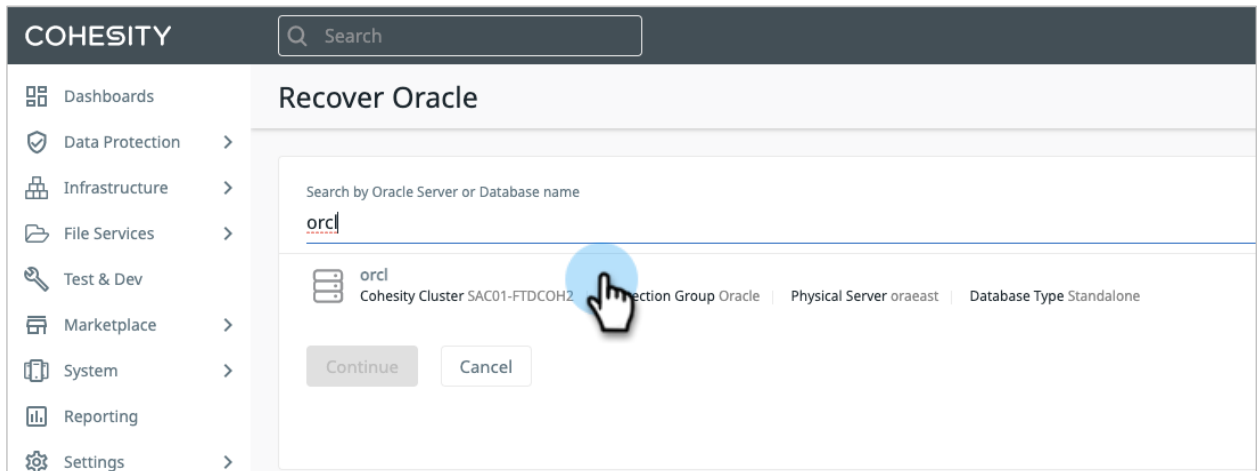
1. From the main dashboard, navigate to **Data Protection > Recoveries**.



2. Click **Recover** and select **Databases > Oracle** from the drop-down menu.



3. Search for the database to be recovered by entering the name (partial or full name), then select the database and click **Continue**.



- Once the recovery point-in-time is set, the number of streams used for the restore can be configured, same as with the backup. If a customer is recovering to a RAC environment, you can define multiple channels over multiple nodes to optimize the time taken to recover the database.

**Task Name \*** Recover-orasc

Cohesity Cluster ve651ep1

**2. Recover Point**

Recover Point  
Nov 9, 2021 7:04am (Latest Recover Point)

**Time Zone** America/Los\_Angeles (GMT -08:00) **Change Zone**

**3. Settings**

Alternate Database    Overwrite Original

Oracle Host\*  
orascan1

Configure Channels

Restore Database Files to \*

Oracle Version 19.0.0.0.0 | Oracle Environment RAC | Nominated Nodes 1

Auto Select Node  
Cohesity will select one active node for you.

**Configure Channels**  
Select Node and set its Channels

Nodes	Node IP	Channels
<input checked="" type="radio"/> orarac2.sa.corp.cohesity.com ▲	10.19.1.212	4
<input type="radio"/> orarac3.sa.corp.cohesity.com	10.19.1.213	1
<input type="radio"/> orarac1.sa.corp.cohesity.com	10.19.1.211	1

5. Select the desired Recovery Option.

- [Alternate Database](#)
- [Overwrite Original Database](#)
- [Create Cohesity View with DB Files](#)

For more information about specific recovery options, see [Recover Oracle Database](#).

### 3. Settings

Alternate Database    Overwrite Original Database    Create Cohesity View with DB Files

Oracle Host\*  
Search

Restore Database Files to \*

---

Oracle Home \*  
/u01/app/oracle/product/11.2.0.3/db\_1

Base Directory \*  
/u01/app/oracle

Database Name

Pfile Parameters  
Specify Pfile Parameters as key=value seperated by a new line.

Leave database in Recovery mode. If selected, recovered database will not be open R/W.

Enable Archive Log mode for the Database If selected, recovered database will have archiving of the redo log enabled.

**NOTE:**

- When restoring Oracle databases, recovering to an alternate platform (i.e. AIX > Linux) is not supported because an RMAN Convert is needed for this type of operation.
- Oracle recovery to later versions is not supported because an Oracle upgrade would be required prior to opening the databases.

## Alternate Database Recovery

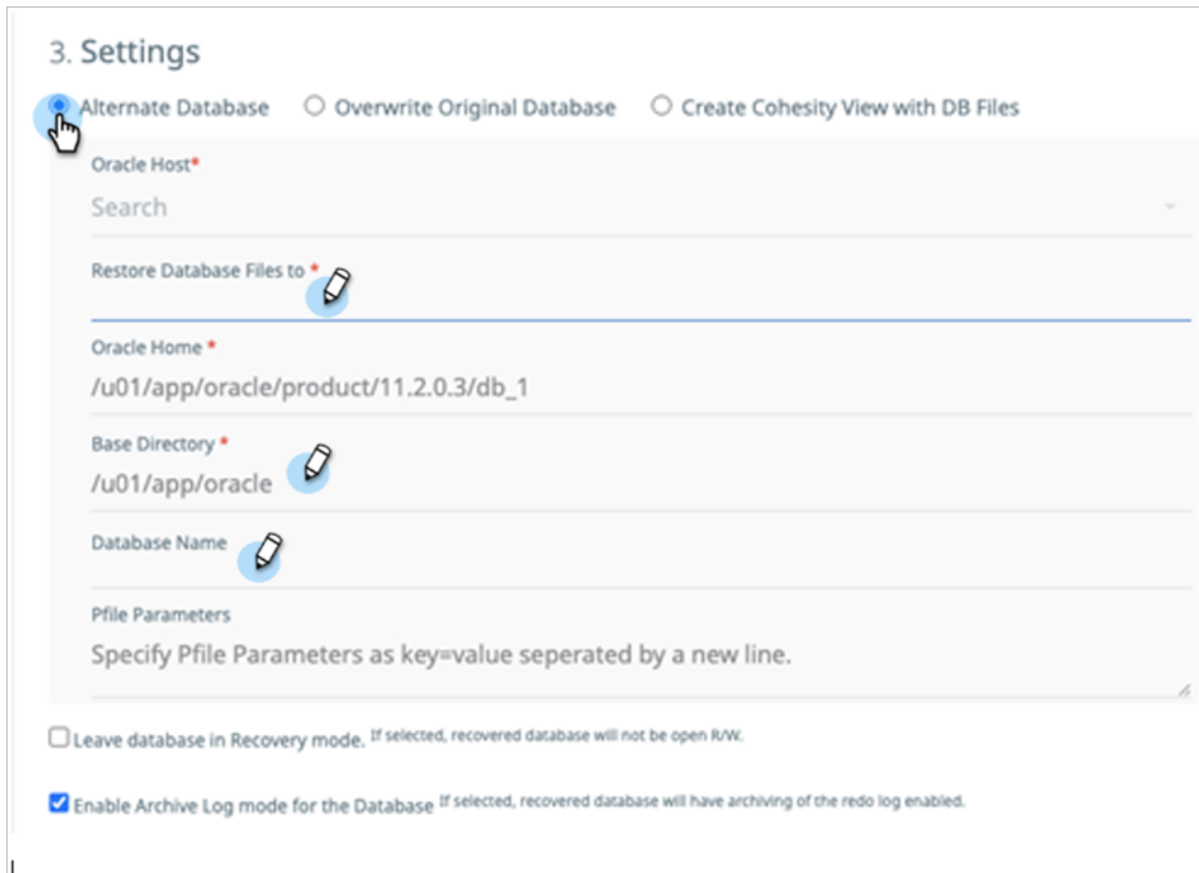
When recovering a database as an 'Alternate Database', the RMAN Duplicate process is invoked, restoring the protected database as a completely new database with a new Database ID (DBID).

You can recover the database to the same or an alternate server and the entire process will be managed by RMAN, removing any administrative actions from the end user.

1. Enter the values for both the **Oracle Home** and **Base Directory** fields for the destination Oracle installation.

**NOTE:** These values can be determined by echoing the \$ORACLE\_HOME and \$ORACLE\_BASE environment variables in the destination Oracle environment.

2. Enter the **Database Name**.




3. Settings

Alternate Database    Overwrite Original Database    Create Cohesity View with DB Files


Oracle Host\*

Search


Restore Database Files to\* 

Oracle Home\*

/u01/app/oracle/product/11.2.0.3/db\_1

Base Directory\* 

/u01/app/oracle

Database Name 

Pfile Parameters

Specify Pfile Parameters as key=value separated by a new line.

Leave database in Recovery mode. If selected, recovered database will not be open R/W.

Enable Archive Log mode for the Database If selected, recovered database will have archiving of the redo log enabled.

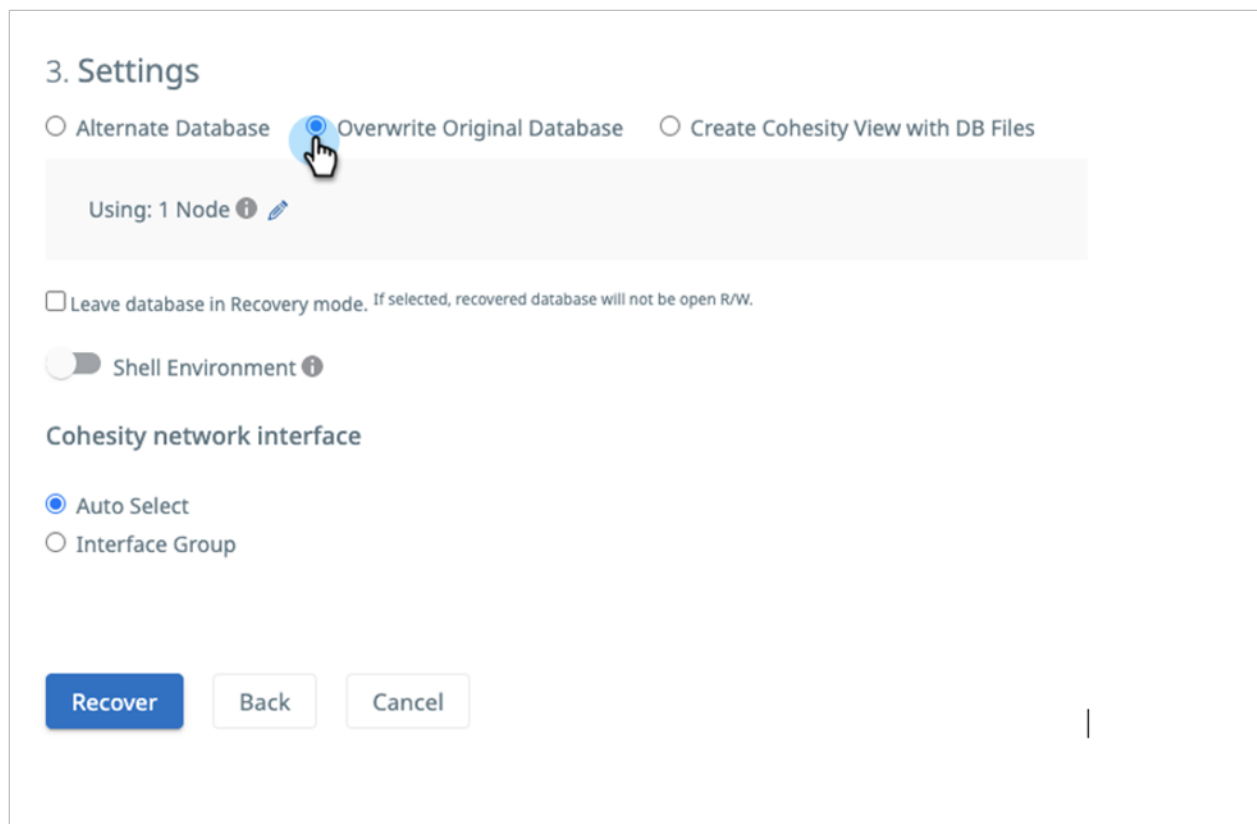
**NOTE:**

- The database name must conform to Oracle rules for naming instances (max of 8 alphanumeric characters).
- RAC restores to Alternate Databases will be restored as standalone instances. RAC can be restored through a single node via configured channels option.

## Overwrite Original Database

The **Overwrite Original Database** option recovers the database back to its original location. There are no additional details required to be provided by the user.

RAC restores the database using the **Overwrite Original Database** option and will be recovered as RAC. Overwriting the original database destroys the original database.



3. Settings

Alternate Database  Overwrite Original Database  Create Cohesity View with DB Files

Using: 1 Node ⓘ ✎

Leave database in Recovery mode. If selected, recovered database will not be open R/W.

Shell Environment ⓘ

Cohesity network interface

Auto Select  
 Interface Group

Recover Back Cancel

## Create Cohesity View with DB Files

While both the **Alternate Database** and **Overwrite Original Database** options recover the database as a whole, there are situations where a user may want to recover a tablespace, one or more datafiles, some archive logs, a controlfile, or an spfile. For this granularity requirement, the native RMAN backup can be made available to the user via an NFS mount using the **Create Cohesity View with DB Files** option.


**NOTE:** This process is extremely fast as it does not physically move any data.


To Create a Cohesity View with DB Files option:

1. Select **Create Cohesity View with DB Files**.
2. Search for and specify the **Oracle Host** destination server (which must be registered with the Cohesity cluster).
3. Enter the name of the View to be created.
4. Click **Recover**.

### 3. Settings

Alternate Database    Overwrite Original Database    Create Cohesity View with DB Files

Oracle Host\*  
Search 

View Name Identifier \* 

This will create a new View, and you can identify view with above name

Cohesity network interface

Auto Select  
 Interface Group

**Recover**   Back   Cancel

- Once completed, start your own RMAN session and run an RMAN 'catalog' command so that RMAN is aware of the backup.
- You can then run any RMAN script against this backup.

```
oracle@oracle-01 oracle_02_5_path01$ ls
BKP_0_78_data_D-ORCL2_I-1062461118_TS-SYSAUX_FNO-3_070b0jsh      BKP-PIECE_0_78_090b0jtb_1_1
BKP_0_78_data_D-ORCL2_I-1062461118_TS-SYSTEM_FNO-1_060b0jsh   BKP-PIECE_0_78_0b0b0jtf_1_1
BKP_0_78_data_D-ORCL2_I-1062461118_TS-UNDOTBS1_FNO-4_000b0jtb BKP-PIECE_0_78_0c0b0jtg_1_1
BKP_0_78_data_D-ORCL2_I-1062461118_TS-USERS_FNO-6_0a0b0jtf    controlfile_78_030b0jsc_1_1
BKP-PIECE_0_78_040b0jse_1_1                                     spfile_78_0d0b0jth_1_1
BKP-PIECE_0_78_050b0jse_1_1
```

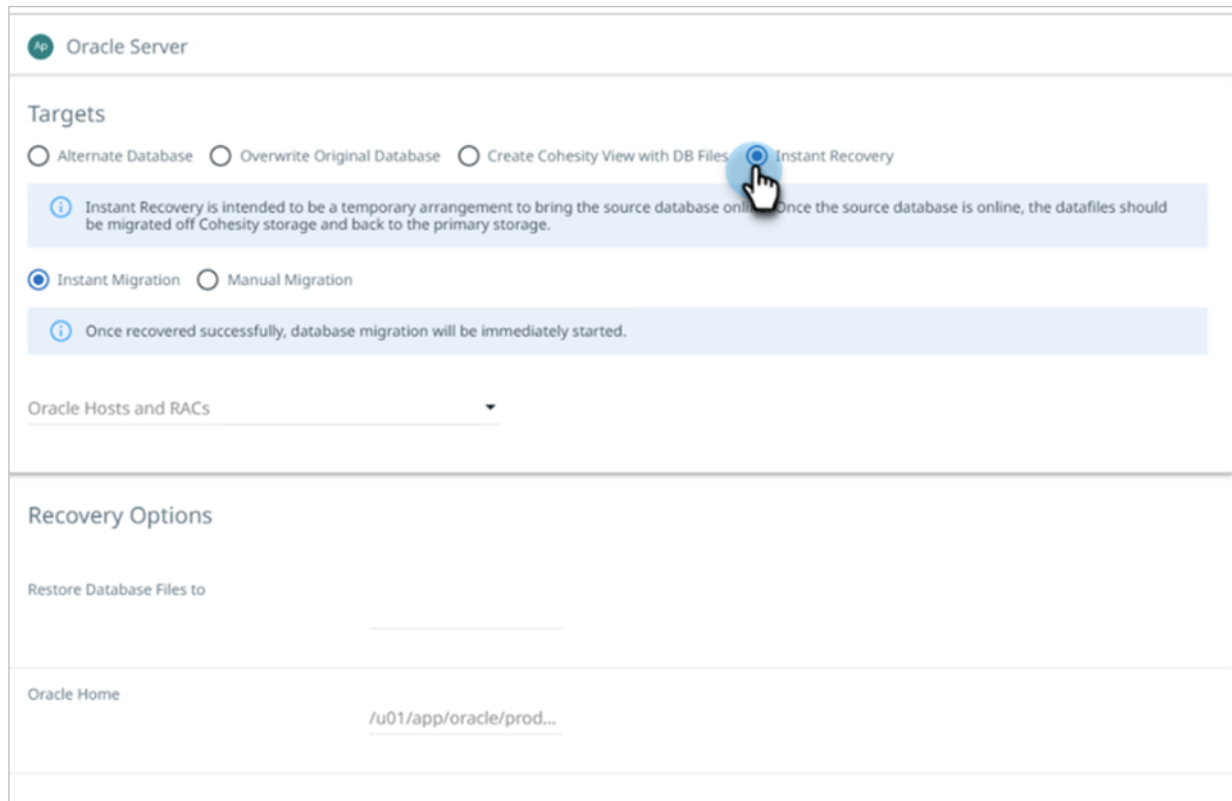
**NOTE:** when using the recovery to a view option, there will be one NFS mount for every node in the Cohesity cluster. All the mounts point to the same View and contain identical contents. The RMAN "catalog start with" command should be used to ensure all mount paths are cataloged.

## Instant Recovery

Instant Recovery is a new feature introduced in Cohesity version 6.6 that builds off of our clone capabilities (discussed in the next section). This recovery option gives users rapid access to the database via a clone operation. The database initially resides on the Cohesity cluster, but then the datafiles are migrated back to primary storage without taking the database instance offline. This outcome is very similar to the VMWare vMotion process.

To initiate Instant Recovery:

1. Select **Instant Recovery** as the Target.



The screenshot displays the Oracle Server configuration interface. At the top, it shows "Oracle Server" with a plus icon. Below this is the "Targets" section, which contains four radio button options: "Alternate Database", "Overwrite Original Database", "Create Cohesity View with DB Files", and "Instant Recovery". The "Instant Recovery" option is selected, and a mouse cursor is pointing at it. Below the radio buttons, there are two informational messages in light blue boxes. The first message states: "Instant Recovery is intended to be a temporary arrangement to bring the source database online. Once the source database is online, the datafiles should be migrated off Cohesity storage and back to the primary storage." The second message states: "Once recovered successfully, database migration will be immediately started." Below the messages is a dropdown menu labeled "Oracle Hosts and RACs". The "Recovery Options" section follows, with a label "Restore Database Files to" and an empty text input field. At the bottom, the "Oracle Home" field is populated with the path "/u01/app/oracle/prod...".

2. Choose either **Instant Migration** or **Manual Migration**.
  - a) **Instant Migration**. Will begin the datafile migration as soon as the database instance is brought online, without any further interaction from the user.
  - b) **Manual Migration**. Will start the migration process at a later time specified by the user. The migration job will show up in the Recoveries area of the UI. When ready to start the manual migration, the user must initiate the migration from the job in the recoveries list.

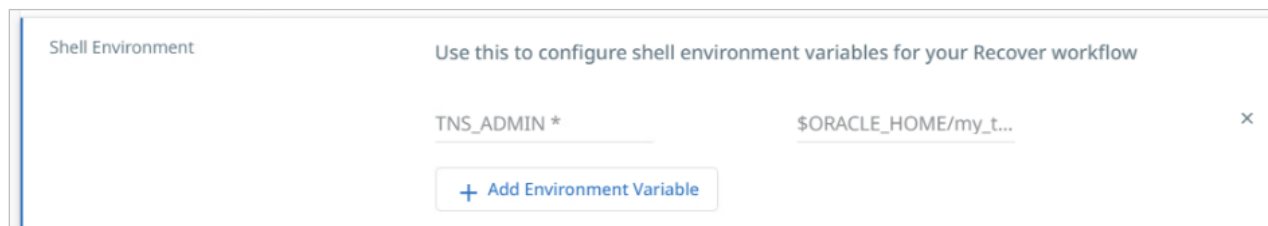
**NOTE:** Instant Recovery relies on Oracle's Online datafile move functionality, which was made available in 12c, so only databases that are on Oracle 12c and later can leverage the Instant Recovery option.

## Container Databases (CDB) and Pluggable Databases (PDB)

Starting version 6.6, users can browse individual pluggable databases (PDBs) for recovery into the original container database or into an alternate container database. You can also recover the container database.

## Oracle Transparent Data Encryption (TDE)

Cohesity supports protection and recovery of Oracle databases that are encrypted via TDE. Cohesity does not manage the TDE keystore, but provides the ability to specify Shell Environment variables to allow the restore to find the TDE keystore information and successfully restore and access the database.



For more information, see [Recover Oracle TDE Database](#).

## Clone Database

Users almost always create non-production or “lower tier” databases from backups of production databases. As databases increase in size, this process consumes significant resources, both times to complete the process, and storage on the destination database servers.

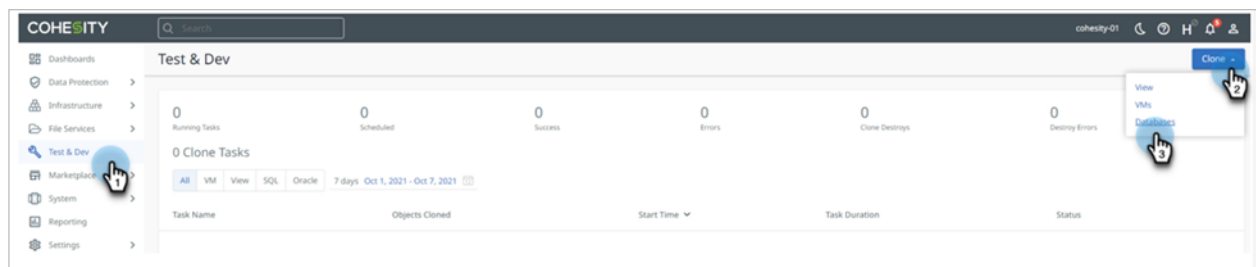
The database clone capability allows users to stand up clones of their production databases in a fraction of the time that it would take to run a traditional restore. Additionally, with the clone process, there are no extra storage requirements on the destination database servers as the database is running as a snapshot on the Cohesity cluster. Clones are meant to be temporary databases that are refreshed often with the latest data from production.

Ideal use cases for database clones are:

- Data validation
- Offloading of batch reporting from production servers
- Providing database copies for functional development
- Testing

To initiate a clone:

1. In the Cohesity home page, select **Test & Dev**.
2. Click the **Clone** button and select **Databases**.



3. Search for the database that you wish to use as a source for the clone.
4. On the Details screen, select a point-in-time from which to clone the source database.
5. Enter the Clone Destination details:
  - a) Destination host
  - b) Destination Oracle Home
  - c) Oracle Base Directory

**NOTE:** There is an option to include clone pre and post scripts. It is often a requirement to remove Personally Identifiable Information (PII) from databases in non-prod environments. A customer can choose their own masking scripts to be run as post-clone scripts or they can choose to leverage the DataMasque application available on the Cohesity Marketplace: <https://marketplace.cohesity.com/app-details/datamasque>.

**NOTE:** Clones are not ideal use cases for environments such as pre-prod where the performance requirements must match the production environment. The clone is a virtualized database running off the Cohesity cluster and will not have the same performance characteristics as a database running on primary storage. For performance-sensitive use cases, Cohesity recommends traditional recovery.

**NOTE:** While it is possible to stand up multiple clones at the same time on the same destination server (no additional storage is required for the database) each running Oracle instance does consume memory and processes. Therefore, it is advisable to monitor the available resources on the destination server to ensure that multiple Oracle instances can run simultaneously.

## Performance and Troubleshooting

This section gives you an overview of the performance factors and troubleshooting tips that you need to consider when you use the Cohesity Oracle Adapter for Oracle data protection.

### Performance Considerations

#### Cluster Size

As a general rule, a single RMAN channel writing to a single Cohesity node will provide somewhere in the area of 125 MB/sec throughput (assuming no bottleneck and no other concurrent workloads). However, the steady state performance that customers should expect is ~75 MB/sec. Every 4 nodes should yield roughly 300MB/sec, provided there are no bottlenecks in the network pipe and assuming that the database server has the resources to push the data as fast as Cohesity can ingest.

Ingest rates for Cohesity nodes vary based on hardware used. All flash arrays have significantly higher throughput than hybrid nodes, but the per node throughput number mentioned above is a good starting point. Throughput lower than 75MB/sec, for a single channel, should be investigated further.

Throughput should be qualified only for full backups

#### RMAN Channels

Optimize the number of RMAN channels to take advantage of the most Cohesity cluster nodes while not overtaxing the CPUs on the database server. See [Create Oracle Protection Group](#).

#### Oracle Block Change Tracking (BCT)

Enabling BCT on the Oracle side will increase the performance of incremental backups. Without BCT enabled, RMAN has to scan the entire database for changed blocks. However, enabling BCT allows Oracle to maintain a file that keeps track of the changed blocks. RMAN will leverage this file instead of scanning the entire database. Additionally, BCT will help the data protection method for Incrementals.

#### RMAN Parameters

- **Filesperset**

For **Cohesity Oracle SBT plug-in** and **RMAN NFS target** using RMAN backup set, setting the RMAN parameter of FILESPERSET=1 will maximize deduplication on the Cohesity cluster. For Cohesity Oracle Adapter, setting FILESPERSET (via an Oracle Adapter Agent gflag) will not affect deduplication on the Cohesity cluster, but it may help to tune the performance of the overall incremental backup time.

- **Section Size**

In databases that have a datafile that is significantly larger than the other datafiles, a backup will encounter a “long pole” effect where all of the RMAN channels will be finished backing up the remainder of the datafiles, which a single RMAN channel will be processing the large datafile, causing the entire backup to run longer. Using the RMAN SECTION SIZE parameter, Oracle can break up the datafiles into smaller sizes to allow multiple RMAN channels to back

up the large datafile in smaller pieces at the same time, and therefore parallelizing the backup of that datafile to shorten the overall backup time. Additionally, smaller section size may help to reduce the incremental merge time for larger databases Oracle supports SECTION SIZE with backupset, as well as image copies (starting from 12c).


**NOTE:** For Oracle Adapter, please request Cohesity Support if you want to change the value of SECTION SIZE or FILESPERSET when trying to improve backup performance.

## Troubleshooting Tips

1. Verify Prerequisites and Review Installation Log.
  - Verify all prerequisites in the [adapter installation](#) section.
  - The installation log will be created in the /tmp directory of the database server.
2. Verify No Other Backups are Running
  - Verify that there are no other backups running against the database being protected. Competing backups will cause RMAN to error if archive logs have been protected and deleted by another backup.
  - If the RMAN backup performance is below the expected number for Cohesity node type and number of nodes, look at the following factors:
    - Network bandwidth between Oracle server and Cohesity. The best tool to measure it is *iperf3*.
    - Number of CPUs on Oracle server. Four (4) CPUs is considered to be low.
    - The primary storage Oracle database is using. Flash storage can provide very high throughput.
3. Review Debug Logs

As of 6.6, Debug Logs are system generated and can be used to troubleshoot Oracle database backup, recovery, and performance issues. These logs can be downloaded (backup logs and restore logs) as a compressed file for both successful and failed recovery job runs.

## To Download a Debug Log

From the Cohesity Administration GUI, click the options icon  and select **Download Debug Logs**. Debug Logs will be downloaded to the local host where the Cohesity Administration GUI browser is run from.

1. Review RMAN Logs

In 6.5.1, More detailed RMAN logs for backup are available on the database server. By default, these logs are located on the NFS mount with the RMAN backup. The file is named **rman\_shell.INFO**. By default, the detailed RMAN logs for recoveries and clones will be found in the /tmp directory. If the NFS mounts are configured to persist, this log will still be available

when the backup completes. However, if the NFS mounts are not set to persist, this log will not be accessible. The following agent gflags can be used to have this RMAN log write to a local directory. One flag sets the directory and the other sets the retention for these files.

**To specify the directory path:**

```
magneto_agent_debug_tool update-gflag-settings --
agent_gflag_settings=linux_oracle_rman_log_copy_path:<path of desired log
directory> --agent_endpoints=<oracle_source_name> --
agent_gflag_settings_effective_now=true
```

**To specify the number of days retention for RMAN log files:**

```
magneto_agent_debug_tool update-gflag-settings --
agent_gflag_settings=linux_oracle_rman_log_copy_keep_days:<number of days
retention> --agent_endpoints=<oracle_source_name> --
agent_gflag_settings_effective_now=true
```

**2. Review Agent log files**

- `<agent install dir>/log/*INFO*`
- `<agent install dir>/log/*ERROR*`

If there is an issue with the agent itself, the agent logs can reveal errors and messages from agent perspective during registration of Oracle source, database recovery, and backup/restore/clone job runs.

## Troubleshooting Tools

This section describes the available troubleshooting tools used on Oracle Linux and AIX servers to test performance with Cohesity.

### The `sbt_perf_test` usage Tool

This tool writes output to `/tmp/trace.txt` file:

```
# Test 10 GB data write/read performance with 4 concurrent processes
./sbt_perf_test --sbt_test_mount_path sac01-ftdcoh2:/ora_sbt_lock --
sbt_test_vips 10.19.2.90 --sbt_test_block_count 40000 --sbt_test_num_channels 4

# Test 2 GB data write/read performance
./sbt_perf_test --sbt_test_mount_path sac01-ftdcoh2:/ora_sbt_lock --
sbt_test_vips 10.19.2.90 --sbt_test_block_count 8000

# Test 2 GB and with source side dedup off
./sbt_perf_test --sbt_test_mount_path sac01-ftdcoh2:/ora_sbt_lock --
sbt_test_vips 10.19.2.90 --sbt_disable_source_side_dedup true --
sbt_test_block_count 8000

# Read throughput
```

The tool does write first, then read. If the tool is run with just 1 channel, you can view the throughput result using the following command. The first line is write throughput. The second line is read throughput. If there are four channels, you need to change “tail -2” to “tail -8”.

```
grep Throughput /tmp/trace.txt |tail -2
```

EXAMPLE: Following is the output example of 4 channels and with source-side depute on. The first four lines are write throughput per channel. The last four lines are read throughput per channel:

```
Throughput (Logical/Physical): 187.87 / 23.84 MB/s Elapsed: 53.00 seconds.
Throughput (Logical/Physical): 181.20 / 20.98 MB/s Elapsed: 55.11 seconds.
Throughput (Logical/Physical): 175.48 / 18.12 MB/s Elapsed: 56.78 seconds.
Throughput (Logical/Physical): 166.89 / 6.68 MB/s Elapsed: 59.69 seconds.
Throughput (Logical/Physical): 224.11 / 224.11 MB/s Elapsed: 44.57 seconds.
Throughput (Logical/Physical): 221.25 / 221.25 MB/s Elapsed: 45.11 seconds.
Throughput (Logical/Physical): 225.07 / 225.07 MB/s Elapsed: 44.30 seconds.
Throughput (Logical/Physical): 227.93 / 227.93 MB/s Elapsed: 43.87 seconds.
```

## Sample init file for database w2cdbbr1 (initw2cdbbr1.ora)

```
w2cdbbr1.__data_transfer_cache_size=0
w2cdbbr1.__db_cache_size=7918845952
w2cdbbr1.__inmemory_ext_roarea=0
w2cdbbr1.__inmemory_ext_rwarea=0
w2cdbbr1.__java_pool_size=33554432
w2cdbbr1.__large_pool_size=67108864
w2cdbbr1.__oracle_base='/u01/app/oracle'#ORACLE_BASE set from environment
w2cdbbr1.__pga_aggregate_target=3355443200
w2cdbbr1.__sga_target=10066329600
w2cdbbr1.__shared_io_pool_size=536870912
w2cdbbr1.__shared_pool_size=1476395008
w2cdbbr1.__streams_pool_size=0
*.audit_file_dest='/u01/app/oracle/admin/w2cdbbr1/adump'
*.audit_trail='db'
*.compatible='12.2.0'
*.control_files='/oradata/w2cdbbr1/controlfile/control1.ctl','/oralog/fra/
w2cdbbr1/controlfile/control2.ctl'#Restore Controlfile
*.db_block_size=8192
*.db_create_file_dest='/oradata/w2cdbbr1'
*.DB_CREATE_ONLINE_LOG_DEST_1='/oralog/fra/w2cdbbr1'
*.db_name='w2cdbbr1'
*.db_recovery_file_dest='/oralog/fra/w2cdbbr1'
*.db_recovery_file_dest_size=15162m
```

```
*.diagnostic_dest='/u01/app/oracle'
*.dispatchers='(PROTOCOL=TCP) (SERVICE=w2cdbbr1XDB) '
*.enable_pluggable_database=true
*.log_archive_format='%t_%s_%r.dbf'
*.nls_language='AMERICAN'
*.nls_territory='AMERICA'
*.open_cursors=300
*.pga_aggregate_target=3192m
*.processes=320
*.remote_login_passwordfile='EXCLUSIVE'
*.sga_target=9574m
*.undo_tablespace='UNDOTBS1'
```

## Duplicate set example if source database is built using OMF

```
# Setting
set newname for database to "'/oradata/w2cdbbr1/%b';"
```

## Duplicate set example if source database is NOT built using OMF

```
# Setting
set newname for database to "'/oradata/w2cdbbr1/%b';"
SET NEWNAME FOR DATAFILE 1 TO "'/oradata/w2cdbbr1/system01.dbf'";
SET NEWNAME FOR DATAFILE 3 TO "'/oradata/w2cdbbr1/sysaux01.dbf'";
SET NEWNAME FOR DATAFILE 4 TO "'/oradata/w2cdbbr1/undotbs01.dbf'";
SET NEWNAME FOR DATAFILE 5 TO "'/oradata/w2cdbbr1/pdbseed/system01.dbf'";
SET NEWNAME FOR DATAFILE 6 TO "'/oradata/w2cdbbr1/pdbseed/sysaux01.dbf'";
SET NEWNAME FOR DATAFILE 7 TO "'/oradata/w2cdbbr1/users01.dbf'";
SET NEWNAME FOR DATAFILE 8 TO "'/oradata/w2cdbbr1/pdbseed/undotbs01.dbf'";
SET NEWNAME FOR DATAFILE 9 TO "'/oradata/w2cdbbr1/w2pdbb/system01.dbf'";
SET NEWNAME FOR DATAFILE 10 TO "'/oradata/w2cdbbr1/w2pdbb/sysaux01.dbf'";
SET NEWNAME FOR DATAFILE 11 TO "'/oradata/w2cdbbr1/w2pdbb/undotbs01.dbf'";
SET NEWNAME FOR DATAFILE 12 TO "'/oradata/w2cdbbr1/w2pdbb/users01.dbf'";
SET NEWNAME FOR TEMPFILE 1 TO "'/oradata/w2cdbbr1/temp01.dbf'";
SET NEWNAME FOR TEMPFILE 2 TO "'/oradata/w2cdbbr1/pdbseed/temp01.dbf'";
SET NEWNAME FOR TEMPFILE 3 TO "'/oradata/w2cdbbr1/w2pdbb/temp01.dbf'";
#set until time \to_date('2020-08-23 11:30:00','YYYY/MM/DD HH24:MI:SS')\";
#set until sequence 15 thread 1;
```

## Appendix: Product Documentation

For in-depth details see the below in the online Help:

- [Oracle Adapter Requirements](#)
- [Cohesity Oracle Adapter Documentation](#)
- [Cohesity Oracle Best Practices](#)
- [Oracle Adapter Troubleshooting](#)

## Your Feedback

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## About the Authors

This document was authored by the Database Solution Architecture team of: Diana Yang, Dave Porco, Sanjay Dhruv, and Matthew Ellis.

Other significant contributors include:

- Scott Lorenz, Solutions Engineer
- Aditya Tandon, Director, Product Management
- Janell Filkin, Implementation Specialist
- Kevin Hill, Mgr, Solutions Architects
- Saad Jafri, Product Solutions Architect
- Sunil Moolchandani, VP, Product Solutions
- Steve Lee, Technical Staff
- Karthick Radhakrishnan, Sr. Manager, Technical Marketing
- Subash Babu, Staff Technology Editor

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1.1	July 2024	Republishing
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## ABOUT COHESITY

[Cohesity](#) is a leader in AI-powered data security and management. Aided by an extensive ecosystem of partners, Cohesity makes it easier to protect, manage, and get value from data – across the data center, edge, and cloud. Cohesity helps organizations defend against cybersecurity threats with comprehensive data security and management capabilities, including immutable backup snapshots, AI-based threat detection, monitoring for malicious behavior, and rapid recovery at scale. Cohesity solutions are delivered as a service, self-managed, or provided by a Cohesity-powered partner. Cohesity is headquartered in San Jose, CA, and is trusted by the world's largest enterprises, including six of the Fortune 10 and 44 of the Fortune 100.

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