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Best Practices for Oracle RMAN Backups on Cohesity Views

Use Cohesity View as RMAN Backup Target

ABSTRACT

Take Oracle RMAN to a new level. Use Cohesity with Oracle RMAN to protect your Oracle databases. Learn how to use Cohesity shares in your native Oracle RMAN scripts. Effectively orchestrate and manage many more Oracle database backups using Cohesity as a resource across environments. Automate Oracle RMAN backups and scale with a growing environment.

Table of Contents

Complexity Forces Us to Sink or Swim	4
Control and Manage the Environment Efficiently	5
Key into Cohesity's Capabilities	6
Extend RMAN's Capabilities	7
Get Started	8
Follow the Steps	9
Create a View	10
Understand View and Storage Domain Settings	11
Understand QoS Policies	12
Add the Oracle Host to the Cohesity Allow List	14
Open the Possibilities with a View	15
Connect Using SBT Plug-in for Source-Side Deduplication	16
Advantages of Source-Side Deduplication	17
Install Cohesity's Oracle SBT Plug-in	19
Engage Source-Side Deduplication on Linux	20
<i>Example RMAN Backup Script Using Cohesity Oracle SBT Plug-in</i>	<i>21</i>
<i>Example RMAN Restore Script Using Cohesity Oracle SBT Plug-in</i>	<i>22</i>
Connect Using NFS Mounts	23
Create Mount Points & Multiply Channels	24
Optimize Mount Performance	25
Allocate Channels Using NFS Mounts on Linux	26
<i>Example RMAN Backup Script Using NFS mounts</i>	<i>27</i>
<i>Example RMAN Restore Script Using NFS Mounts</i>	<i>29</i>
Schedule with the Remote Adapter	30
Built-In Support	31
Upgrade the DR Plan	32
Take Local Snapshots	33
Replicate Backups Off-site	34

Archive Backups to the Cloud	35
Appendix: Understand RMAN Backup & Restore Command Components	36
Your Feedback	37
About the Authors	37
Document Version History	37

Figures

Figure 1: Cohesity Makes Native RMAN Backups Scalable	5
Figure 2: Protect Oracle Backups with Cohesity	9
Figure 3: Suite of Features when Using a View as Backup Target	15
Figure 4: Advantage of Source-Side Deduplication with Cohesity Oracle SBT Plug-in .	18
Figure 5: Multiply Throughput by Using VIPs	24
Figure 6: Remote Adapter Process for RMAN Script Execution	30
Figure 7: Oracle Backups in Cohesity View are Available to Replicate and Archive	32
Figure 8: Cohesity CloudArchive, Cloud Recover, and CloudRetrieve Provide Disaster Recovery	35

Tables

Table 1: Mount Options for Each Supported OS	10
Table 2: Inherited Features Between the Storage Domain and View	11
Table 3: QoS Policy Settings for Optimized Workloads	12
Table 4: QoS Policies	12
Table 5: Optimal NFS Mount Options for Each Supported OS	25
Table 6: RMAN Backup Command Components	36
Table 7: RMAN Restore Command Components	36

Complexity Forces Us to Sink or Swim

Oracle's Recovery Manager (RMAN) has a proven track record and is considered dependable and highly reliable. But in today's complex data center environments, there is no easy way to manage all those backups and restores. Without an enterprise-level data management solution, one is left to either sink or swim.

Three essential factors push the demand for efficient data management:

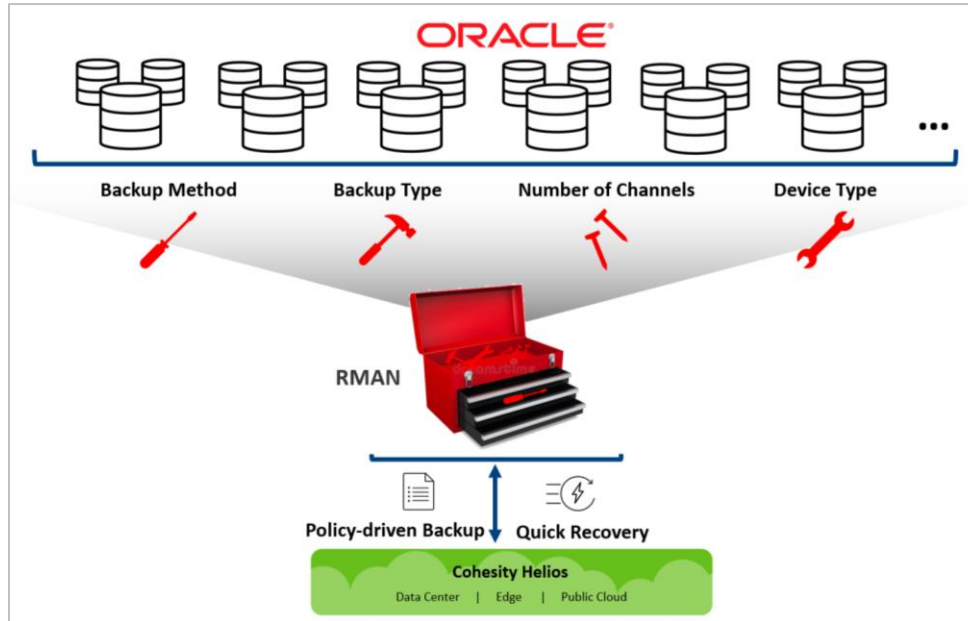
- **The growing number of databases.** The number and kind of backups increases as the demand for protection increases.
- **The increasing size of databases.** Larger databases result in longer backup windows that make it harder to meet your SLAs.
- **The ever-increasing duration and cost of retention.** Managing the storage for backups becomes more difficult as company standards and government regulations increase retention requirements.

Cohesity, when used in conjunction with Oracle RMAN, delivers unparalleled performance and scale-out capabilities that simplify data management.

Control and Manage the Environment Efficiently

To stay ahead of these factors, Cohesity extends the scalability of RMAN by providing the capabilities needed for automating and managing your database backups and recoveries from a single pane of glass.

Figure 1: Cohesity Makes Native RMAN Backups Scalable



Key into Cohesity's Capabilities

There are many reasons to use Cohesity to manage your enterprise data, and specifically to help you get your arms around a growing avalanche of database backups, so that you can back them up efficiently and recover from them quickly when necessary.

- **Simple Data Protection.** Simplifies backup environments by eliminating the need for media servers and master servers.
- **Distributed Platform.** You can easily scale out capacity and linear performance simply by adding nodes to the cluster.
- **High Availability (HA).** Our web-scale platform—with scale-out capacity, linear performance, and non-disruptive upgrade—is designed to tolerate hardware failures.
- **Native Cloud Integration.** Integrate with AWS, Google Cloud, and Microsoft Azure for long-term archival and data tiering.
- **Data Management and Storage.** Cohesity acts as an NFS target for Oracle data files, control files, and redo logs.
- **Lower TCO.** Dramatically reduce physical storage usage and network traffic costs using our advanced global deduplication and compression technologies.

Extend RMAN's Capabilities

Cohesity extends RMAN's capabilities by integrating several technologies that allow for flexibility in how RMAN backups are performed. Cohesity integrates the [Oracle Secure Backup SBT interface](#), [remote procedure call \(RPC\)](#) communications, and Cohesity's source-side deduplication library in the [Cohesity Oracle SBT Plug-in](#). The plug-in enables you to use Cohesity as extended storage for backing up Oracle databases with the Oracle SBT interface, bringing with it all the Cohesity advantages listed above, as well as Cohesity's source-side deduplication technology, which takes advantage of local compute power in your data center to:

- Reduce the impact on your storage infrastructure.
- Reduce network traffic.
- Make backups much faster.

For more, see [Explaining Cohesity's Space-Efficient Target and Source-Side Dedupe Integration For Oracle RMAN](#).

The Oracle SBT Plug-in is very easy to use with RMAN. Once your Oracle backups are on Cohesity, think of the possibilities. [Get started!](#)

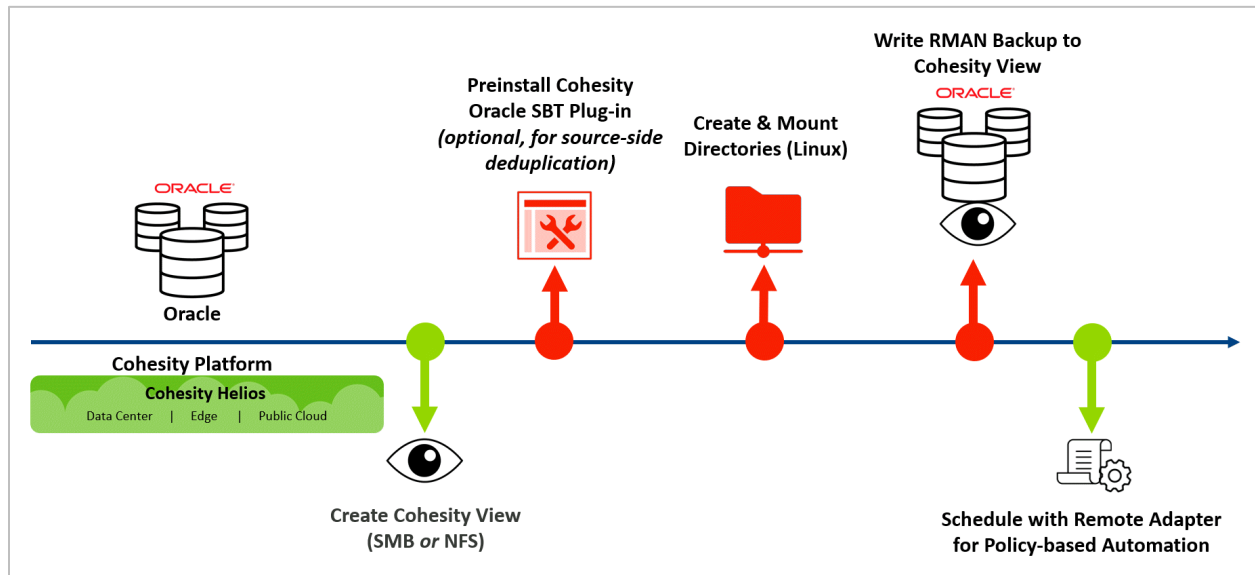
Get Started

At the highest level, using Cohesity for your RMAN backups involves a few sequential tasks. Once you complete the steps, you can use Cohesity *for other RMAN backups* and even *create new backup strategies* designed to better meet your company's needs.

Follow the Steps

Review each step and become familiar with the tasks needed to complete the setup.

Figure 2: Protect Oracle Backups with Cohesity



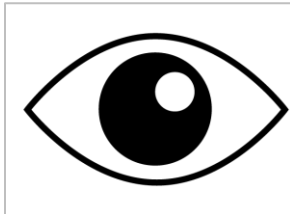
To create native RMAN backups using Cohesity:

1. **[Create a Cohesity View](#)**. Configure a named storage location for the Oracle backups.
2. **Choose Your Connection Method.**
 - [Connect Using source-side deduplication](#) (recommended). Explore the best options for using source-side deduplication to connect.
 - [Connect using NFS Mounts](#). Explore the best options for using optimized NFS mounts to connect.
3. **[Schedule with Remote Adapter](#)** (recommended). Use Cohesity's Remote Adapter to automate your RMAN scripts.

Once your Oracle backups are on a Cohesity View, think of the possibilities!

Create a View

To store your RMAN backups on Cohesity, you need to create a Cohesity View. The View allows files and folders to be fully browsed and searched. In addition, [a Cohesity View is created in a Storage Domain](#), where you can set the appropriate options for deduplication, compression, and Quality of Service (QoS) policy.



A View is a storage location that has been allocated on the Cohesity cluster that can be mounted and accessed via NFS, SMB, or RPC protocols. When creating a View in Cohesity, you specify which protocol Cohesity will use to present the View, so that it can act as a storage location for your RMAN backup.

Table 1 below provides the protocols that are supported for each operating system.

Table 1: Mount Options for Each Supported OS

OS	RECOMMENDED PROTOCOL	SOURCE-SIDE DEDUPLICATION
Linux	NFS RPC via SBT	Supported* <i>*Cohesity Oracle SBT Plug-in must be installed.</i>
AIX	NFS	n/a
HP-Unix		
Solaris		
Windows	SMB*	<i>*This document does not cover Cohesity's Oracle on Windows Adapter.</i>

NOTE: You can configure a Cohesity View to use all three protocols for access.

If you are unsure of which protocol to use, we recommend that you set the View protocol to "All". You can change this setting later if necessary.

For more, see [Create a View](#) in the online Help.

Understand View and Storage Domain Settings

A Cohesity View is created inside a Storage Domain. At the Storage Domain level, settings like fault tolerance, encryption, and storage efficiencies are applied. To ensure that your Oracle backups are stored with encryption, create your View in a Storage Domain that has encryption enabled.

Table 2: Inherited Features Between the Storage Domain and View

FEATURES	STORAGE DOMAIN SETTING	VIEW SETTING
Fault Tolerance	Erasure Coding (EC) Replication Factor (RF)	Inherits Storage Domain fault tolerance settings and cannot be changed for the View.
Storage Efficiency	Deduplication (inline, post-process, or disabled) Compression (inline, post-process, or disabled)	Inherits Storage Domain efficiencies. OR If deduplication and compression are enabled and set to <i>inline</i> in the Storage Domain, you can override those settings in the View, but you can't disable them deduplication or compression altogether.
Encryption	Enabled or disabled	Inherits Storage Domain's settings and cannot be changed in the View.
CloudTier	Inherits cluster settings, unless overwritten at the Storage Domain level.	Inherits Storage Domain's settings and cannot be changed for the View.
QoS Policy	n/a	Set for each View.

Understand QoS Policies

Each Cohesity View is assigned a QoS policy. A QoS policy determines the priority of I/O (when contention occurs) and to which storage media it is written. There are two basic QoS principles, TestAndDev and Backup Target, each of which has variants by priority and storage media.

Table 3: QoS Policy Settings for Optimized Workloads

QoS POLICY	OPTIMIZED FOR I/O WORKLOAD TYPE	PRIORITY ↓	STORAGE MEDIA
TestAndDev	Random reads & writes (for NFS & SMB Cohesity Views)	High	SSD
		Low	
Backup Target	Sequential reads & writes (for backups using Cohesity DataProtect)	SSD	HDD
		High	
		Low	

As part of your Oracle backup strategy, select the appropriate QoS policy for the View. By specifying a priority and the type of workload you expect, Cohesity can optimize how it processes data for latency, and priority.

Table 4 below lists the QoS Policies based on increasing order of QoS priority. Within each of the QoS Policies, automatic tuning takes place—that is, by default, Cohesity detects random and sequential patterns automatically and generally puts random I/Os on SSD and sequential I/Os directly on HDD. Cohesity assigns weights to each of these QoS Policies and then serves requests based on these weights.

Table 4: QoS Policies

QoS POLICY	DESCRIPTION
Backup Target Low	Use this policy for non-latency sensitive workloads such as backups, which keep many I/Os outstanding. Data is written to HDD and has higher latency compared to other QoS policies that write to an SSD.
Backup Target High	The same as <i>Backup Target Low</i> , except that, when there is contention, the priority for processing workloads with this policy is higher than workloads with Backup Target Low.
Backup Target SSD	Use this policy for workloads such as backups, which keep many I/Os outstanding, but in this case, Cohesity sends both sequential and random I/Os to SSD, to deliver lower latency than other <i>Backup Target</i> QoS policies.
TestAndDev Low	Use this policy for workloads that require lower I/O latency or do not keep many I/Os outstanding, as the I/Os are given higher priority compared to other QoS policies. Data is written to SSD and has lower latency than <i>Backup Target SSD</i> .

QoS POLICY	DESCRIPTION
TestAndDev High	The same as <i>TestAndDev Low</i> , except that, when there is contention, the I/Os with this QoS policy are given higher priority compared to I/Os with <i>TestAndDev Low</i> .

Cohesity leverages both SSD and HDD storage. The percentage of SSD capacity is smaller than that of HDD capacity. SSD capacity ranges from 4-13%, depending upon the hardware model. Of the available SSD, a percentage is reserved for the *TestAndDev* and *Backup Target SSD* QoS policies. As a result:

- With the *Backup Target High* and *Backup Target Low* QoS policies, capacity is very high, as it is directly proportional to HDD capacity.
- With the *TestAndDev* QoS policy, data is first written to SSD, and later down-tiered to HDDs through a background process. This results in the cluster doing double the amount of work (write-amplification) and also reduces the lifetime of SSDs. We recommend using the *TestAndDev* QoS policy *only* for very important workloads that are latency-sensitive. For your specific environment, Cohesity recommends trying the *Backup Target (Low or High)* QoS policy first. Switch to the *TestAndDev* policy *only* if the *Backup Target* policies are not meeting your SLAs.

In other words, very few of your Cohesity Views should be set to use the *TestAndDev* QoS policy. All other Views should use a *Backup Target (Low, High, or SSD)* QoS policy.

NOTE: Always remember that no matter which QoS policy you use, files that are stored in the Cohesity View will eventually be downtiered to hard drives.

Add the Oracle Host to the Cohesity Allow List

Next, to allow access to the View shares, you need grant access to the Oracle database host by adding the host's IP address to the 'Allow List' (fka. 'whitelist') on Cohesity. Without this step, RMAN will not be able to write your database backups to Cohesity.

IMPORTANT: A common mistake [while creating an Allow List for a View](#) is forgetting to add the database server IP address to the Cohesity Allow Lists, or entering an incorrect IP address. Another is forgetting to click **Save** when creating the Allow List.

Open the Possibilities with a View

A View can be snapshotted, replicated, archived, and cloned. In this way, you are positioned to increase the resiliency of your backup strategy and manage your data with much greater efficiency. You can even use Cohesity to [upgrade your disaster recovery \(DR\) plan](#).

Figure 3: Suite of Features when Using a View as Backup Target



By keeping a series of snapshots of the View containing your RMAN backups, Cohesity safeguards the backups from corruption and from catastrophic disaster. Once you have enough snapshots to ensure your backups are protected, you can archive older snapshots off-site or in the cloud using CloudArchive.

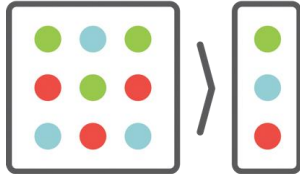
To protect your Oracle backups:

- **Capture and Store.** Protection from loss and corruption. Protects the RMAN backups with regularly scheduled snapshots of the View.
- **Geo-Protect.** Protection from catastrophic loss. Protects the View containing the RMAN backups by replicating it to an off-site location.
- **Cost-effective Archive:** Protects and holds the backups. Protects the View containing the RMAN backups by archiving the snapshot to the cloud under a long-term retention plan. These are stored on a lower-cost storage tier.

RMAN backups and files, when stored on a Cohesity View, always have the benefit of all the Cohesity features.

Connect Using SBT Plug-in for Source-Side Deduplication

Using the source-side deduplication feature in the Cohesity Oracle SBT Plug-in extends the capabilities of RMAN by allowing storage-efficient deduplication to take place on the Oracle host before data is copied to Cohesity.



This reduces the number of transferred blocks, resulting in faster backups and reduced network traffic between Oracle hosts and the Cohesity View during backup.

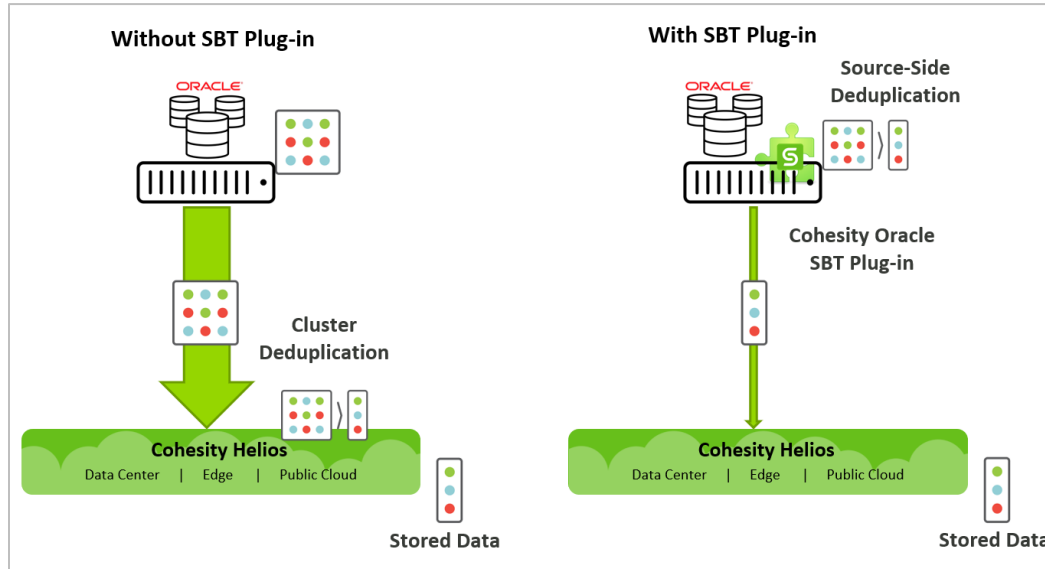
Advantages of Source-Side Deduplication

Deduplicating your data on the source before transmitting it dramatically reduces the amount of data you need to send for each backup, which results in several significant benefits:

- Faster backups.
- Reduces network traffic between Oracle hosts and Cohesity View.
- Enables more frequent backups, resulting in higher RPOs.
- Cohesity can run more backups simultaneously.
- Reduced data ingress/egress costs.

Figure 4 below illustrates how source-side deduplication minimizes network traffic and makes backups faster. For these reasons, we recommend that you take advantage of the Cohesity Oracle SBT Plug-in on your Oracle host.

Figure 4: Advantage of Source-Side Deduplication with Cohesity Oracle SBT Plug-in



IMPORTANT: Installing the Cohesity Oracle SBT Plug-in on the host is optional. You should install it if you plan to use source-side deduplication. You don't need the plug-in to take advantage of all the Cohesity features.

Install Cohesity's Oracle SBT Plug-in

To use Cohesity's source-side deduplication, the first thing to do is download and install the SBT Plug-in on your Oracle host.

To learn:

- How to install the plug-in.
- How to use the plug-in with backup and restore operations (including sample scripts).
- Which Oracle versions are supported.

See [Install Cohesity Oracle SBT Plug-in](#) in the online Help.

Engage Source-Side Deduplication on Linux

Using Cohesity's source-side deduplication technology is a simple change to your RMAN Script.

To do so, you just need to [install the Cohesity Oracle SBT Plug-in](#) and then reference it in your RMAN script.

There are several advantages to using RPC:

- Does not rely on the NFS stack, which is often slower.
- No need to create mount points on your Oracle host.
- With source-side deduplication, backups are considerably faster.

To use source-side deduplication, you will need to:

- Reference the plug-in in the RMAN `ALLOCATE CHANNEL` command.
- Use the 'SBT' channel type which uses a RPC protocol.

Generally, the RPC protocol is faster than the NFS protocol. Together with Cohesity's source-side deduplication, it dramatically improves performance.

NOTE: When using RPC, the port numbers required to push data across are:

- **SunRPC:** 11111
- **GRPC:**11113

TIP: For a growing library of example scripts, see [Example-RMAN-Scripts](#) in Cohesity's Oracle-Scripts GitHub repository, a collection of sample scripts that you can use to write and customize the scripts you need for your environment.

To use source-side deduplication, you will have to make a change in the `ALLOCATE` command, but the technique is the same: maximize performance by multiplying channels with nodes.

Review the RMAN command structure below and become familiar with its syntax to understand how to properly form the RMAN statement.

```
<Allocate_Command> <Channel_Name> device type SBT_TAPE PARMS <Plug-
in_Reference> <Plug-in_Parameters>
```

To reference the SBT library in the Cohesity Oracle SBT Plug-in, use an `ALLOCATE CHANNEL` command like this example, using your Oracle host's location and parameters.

```
Run {
ALLOCATE CHANNEL Kp3 TYPE 'SBT_TAPE' PARMS
'SBT_LIBRARY=/mnt/oracle/ora_bin/sbt_lib/libsbt_7_linux-x86_64.so,
SBT_PARMS=(mount_path=<Cohesity_View_IP>:/oracle_dataset01,
vips=<Cohesity_Node_VIP>,gflag-name=sbt_use_grpc,gflag-value=true)'
```

Example RMAN Backup Script Using Cohesity Oracle SBT Plug-in

When you reference the Cohesity Oracle SBT Plug-in in your RMAN command to back up databases, you can use a “multiple channel + multiple node” technique by assigning two or more channels and map them to a VIP for each node in your Cohesity cluster.

The example below shows two channels that are mapped to two separate nodes on the Cohesity View. In other words, two Oracle channels are each assigned to a separate node which *write* the Oracle backup in parallel to Cohesity. These backup files land on the same View.

When done this way, each channel uses separate node resources to write to the View.

```
Run {  
  
  ALLOCATE CHANNEL Kp33 TYPE 'SBT_TAPE' PARMS  
    'SBT_LIBRARY=/mnt/oracle/ora_bin/sbt_lib/libsbt_7_linux-x86_64.so,  
    SBT_PARMS=(mount_path=<Cohesity_View_IP>:/oracle_dataset01,  
  
    vips=<Cohesity_Node_VIP>,gflag-name=sbt_use_grpc,gflag-value=true'  
  
  ALLOCATE CHANNEL Kp34 TYPE 'SBT_TAPE' PARMS  
    'SBT_LIBRARY=/mnt/oracle/ora_bin/sbt_lib/libsbt_7_linux-x86_64.so,  
    SBT_PARMS=(mount_path=1<Cohesity_View_IP>:/oracle_dataset01,  
  
    vips=<Cohesity_Node_VIP>,gflag-name=sbt_use_grpc,gflag-value=true) '  
  
  BACKUP DATABASE FORMAT '%d_%T_%U.DBF';  
  
}
```

You can greatly improve your backup performance by increasing the number of channels based on the number of nodes in your cluster.

Example RMAN Restore Script Using Cohesity Oracle SBT Plug-in

To restore the databases that you protected using the Cohesity SBT Plug-in, you need to define the channel in the same way that you used for your RMAN backup. To do so, use the same ALLOCATE CHANNEL command format. In this way, you are using the same “multi-channel + multi-node” technique to improve restore performance.

This example shows two channels that are mapped to two separate nodes on the Cohesity View. In other words, two Oracle channels are each assigned to a separate node which *read* the Oracle backup in parallel back to the host.

When done this way, each channel uses separate node resources to read the backup file.

This can greatly improve your backup performance by increasing the number of channels based on the number of nodes in your cluster.

```
Run {  
  
ALLOCATE CHANNEL Kp33 TYPE 'SBT_TAPE' PARMS  
'SBT_LIBRARY=/mnt/oracle/ora_bin/sbt_lib/libsbt_7_linux-x86_64.so,  
SBT_PARMS=(mount_path=<Cohesity_View_IP>:/oracle_dataset01,  
vips=<Cohesity_Node_VIP>,gflag-name=sbt_use_grpc,gflag-value=true)';  
  
ALLOCATE CHANNEL Kp34 TYPE 'SBT_TAPE' PARMS  
'SBT_LIBRARY=/mnt/oracle/ora_bin/sbt_lib/libsbt_7_linux-x86_64.so,  
SBT_PARMS=(mount_path=<Cohesity_View_IP>:/oracle_dataset01,  
vips=<Cohesity_Node_VIP>,gflag-name=sbt_use_grpc,gflag-value=true)';  
  
RESTORE DATABASE;  
  
RECOVER DATABASE;  
  
}
```

For more example scripts, log in to GitHub and see [Example-RMAN-Scripts](#) in Cohesity's Oracle-Scripts GitHub repository.

Connect Using NFS Mounts

Using NFS mount points is a more traditional method of pushing your backups to storage. Using NFS mounts to a View allows you to take advantage of Cohesity's unique performance strategy: parallelization. A Cohesity View lets you use NFS mounts to assign a channel to each node in a Cohesity cluster.

By assigning each channel to its own node, you are assigning the separate but parallel resources of each node to shoulder the workload, making your backups faster.

Each node in a Cohesity cluster has a Virtual IP (VIP). Use these VIPs in your RMAN scripts when you allocate channels.

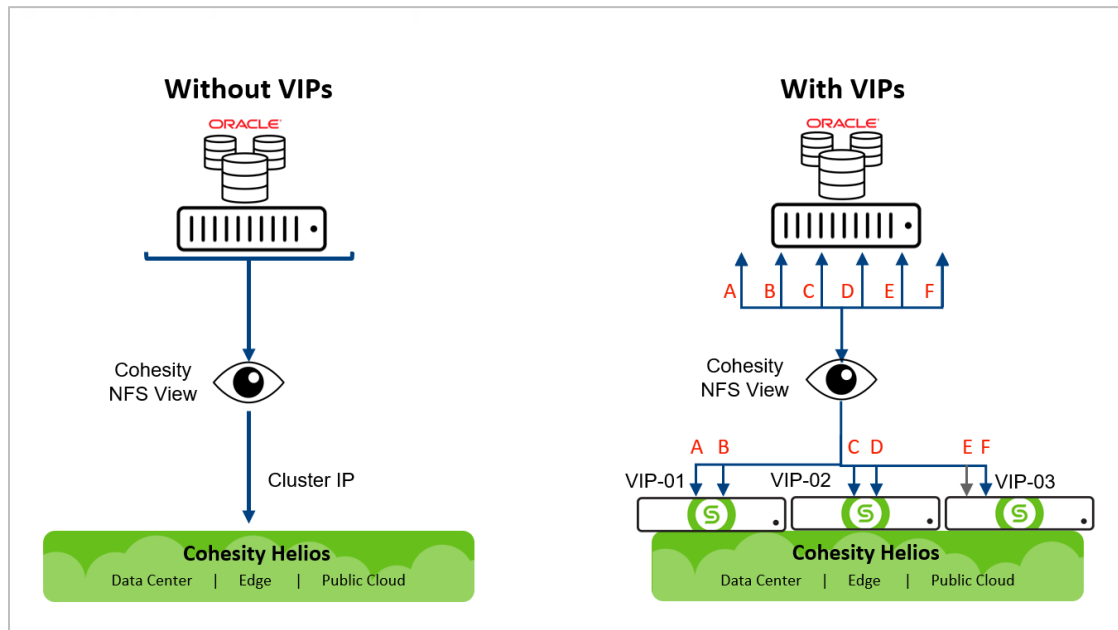
Create Mount Points & Multiply Channels

Cohesity gives you the advantage of improving backup performance by using multiple RMAN channels in the backup operation on the Oracle side, then coupling it with multiple NFS shares that have been created with separate VIPs on the Cohesity cluster.

You can also map several channels to the same VIP to increase parallel processing.

A combination of multiple channels and multiple mount points (defined using VIPs) yields better backup performance.

Figure 5: Multiply Throughput by Using VIPs



TIP: While you *can* use only some nodes, for best performance, create a mount point for *each* node in your Cohesity cluster using that node's unique VIP.

Note that you need to plan this carefully; allocating too many or too few channels can degrade performance. We recommend that you experiment with the number of channels in your backup command to determine the optimal combination of channels and mount points to give you the best performance. The number of channels should be in multiples based on your cluster node count. For example, if your Cohesity cluster has 3 nodes, then use channels in multiples of 3 (3, 6, 9, 12).

Optimize Mount Performance

You can further improve performance by choosing the right options when creating the mount points you will use.

The optimal settings for your NFS mounts differ by operating System. We recommend the following NFS mount options for each supported operating system:

Table 5: Optimal NFS Mount Options for Each Supported OS

OS	RECOMMENDED NFS MOUNT OPTIONS
Linux	<code>mount -t nfs -o noatime,vers=3,proto=tcp,rsize=524288,wsiz=524288,timeo=10000,hard,intr,nolock</code>
AIX	<code>mount -o rw,bg,hard,intr,rsize=524288,wsiz=524288,vers=3,proto=tcp,sec=sys,llock,noac</code>
HP-Unix	<code>rw,bg,vers=3,proto=tcp,noac,forcedirectio,hard,nointr,timeo=600,rsize=1048576,wsiz=1048576,suid</code>
Solaris	<code>mount -F nfs -o intr,hard,rsize=1048576,wsiz=1048576,proto=tcp,vers=3,llock</code>

For example, to create an NFS mount in Linux, use a command like:

```
mount -t nfs -o noatime,vers=3,proto=tcp,rsize=524288,wsiz=524288,timeo=10000,hard,intr,nolock <Cohesity_Node_VIP>:/oracle_dataset01 /mnt/oracle/mntVip32
```

Once you have created several optimized mount points on your Oracle host, the next step is to use them in RMAN when allocating channels.

Allocate Channels Using NFS Mounts on Linux

Now, with your mount points created on your Oracle server, you will use them in your RMAN script to create channels for your backups.

TIP: For example scripts, see [Example-RMAN-Scripts](#) in Cohesity's Oracle-Scripts GitHub repository, a growing collection of sample scripts that you can use to write and customize the scripts you need for your environment.

To connect to Cohesity, add an RMAN command that follows the structure of this example of a simple NFS channel:

```
<Allocate_Command> <Channel_Name> device type disk
format='<Mount_Path>/<File_Name>';
```

To connect to Cohesity, use an `allocate channel` command with additional file format environment variables, like this example:

```
Run {
ALLOCATE CHANNEL Kp4 device type disk
format='/mnt/oracle/mntVip33/%d_%U_FILE01';
```

Below, we provide example RMAN scripts for both [backup](#) and [restore](#). Use these examples as models to create your RMAN scripts using the Cohesity View. We recommend that you experiment with the number of channels in your restore command to determine the optimal combination of channels and mount points to give you the best performance. The number of channels should be in multiples based on your cluster node count. For example, if your Cohesity cluster has 4 nodes, then use channels in multiples of 4 (4, 8, 16, 32).

Once you have the RMAN backup and restore scripts you need, you can use the Cohesity Remote Adapter to [schedule your backups](#). It's optional, but very useful.

Example RMAN Backup Script Using NFS mounts

When you connect to Cohesity in your RMAN command to back up databases, you can use multiple channels and map them to a VIP for each node in your Cohesity cluster. This example shows four channels that are mapped to four separate nodes on the Cohesity View.

```
Run {
allocate channel vip32 device type disk
format='/mnt/oracle/mntVip01/%d_%U_FILE01';
allocate channel vip33 device type disk
format='/mnt/oracle/mntVip02/%d_%U_FILE02';
allocate channel vip34 device type disk
format='/mnt/oracle/mntVip03/%d_%U_FILE03';
allocate channel vip35 device type disk
format='/mnt/oracle/mntVip04/%d_%U_FILE04';
Backup database;
}
```

Use multiple channels with multiple nodes to optimize your backups. This example shows eight channels with four nodes.

```
Run {  
allocate channel vip31 device type disk  
format='/mnt/oracle/mntVip01/%d_%U_FILE01';  
allocate channel vip32 device type disk  
format='/mnt/oracle/mntVip01/%d_%U_FILE02';  
allocate channel vip33 device type disk  
format='/mnt/oracle/mntVip02/%d_%U_FILE03';  
allocate channel vip34 device type disk  
format='/mnt/oracle/mntVip02/%d_%U_FILE04';  
allocate channel vip35 device type disk  
format='/mnt/oracle/mntVip03/%d_%U_FILE05';  
allocate channel vip36 device type disk  
format='/mnt/oracle/mntVip03/%d_%U_FILE06';  
allocate channel vip37 device type disk  
format='/mnt/oracle/mntVip04/%d_%U_FILE07';  
allocate channel vip38 device type disk  
format='/mnt/oracle/mntVip04/%d_%U_FILE08';  
Backup database;  
}
```

Example RMAN Restore Script Using NFS Mounts

When you connect to Cohesity to recover databases, you can use multiple channels and map them to the VIP of each node in your Cohesity cluster. This restore example shows four channels that are mapped to four separate nodes on the Cohesity cluster.

TIP: For the best performance, we recommend that you test your command with different numbers of channels to find the optimal combination of channels and mount points.

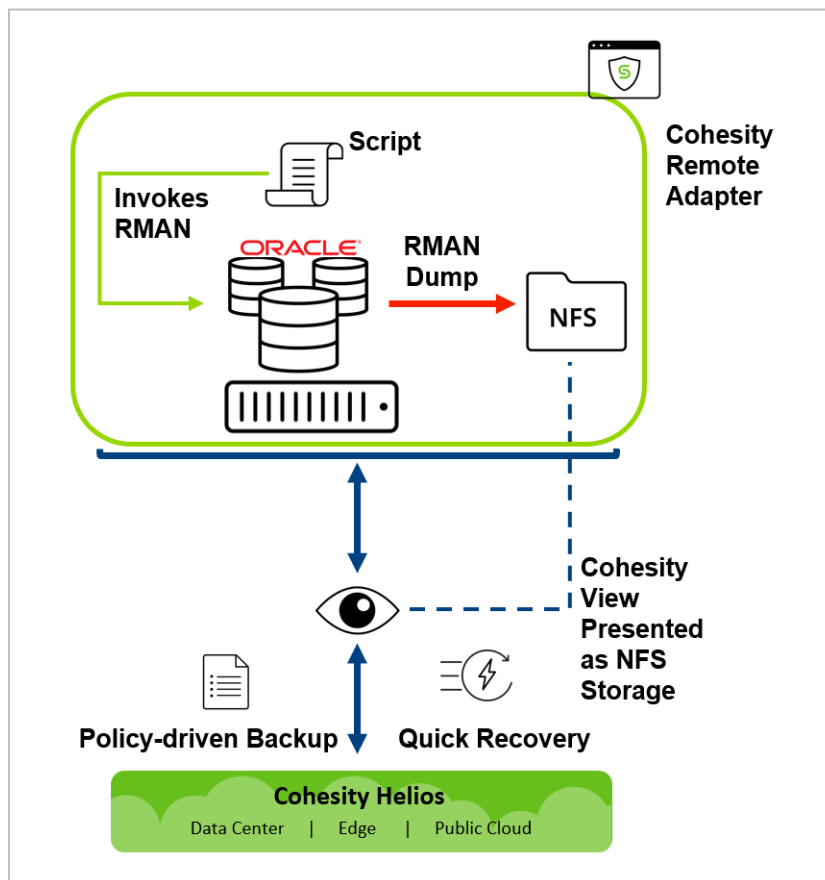
```
Run {  
allocate channel vip32 device type disk  
format='/mnt/oracle/mntVip32/FILE01';  
allocate channel vip33 device type disk  
format='/mnt/oracle/mntVip33/FILE02';  
allocate channel vip34 device type disk  
format='/mnt/oracle/mntVip34/FILE03';  
allocate channel vip35 device type disk  
format='/mnt/oracle/mntVip35/FILE04';  
  
Restore database;  
Recover database;  
}
```

NOTE: The `format` component of the `ALLOCATE CHANNEL` command in this example is not technically required, as RMAN has this information, but is shown here for clarity. In this example, RMAN simply ignores the `'format='/mnt/oracle/mntVip32/FILE01'` portion of the statement.

Schedule with the Remote Adapter

Now that you have connected to Cohesity via the [SBT Plug-in](#) or [NFS](#), you have the option use the Cohesity Remote Adapter to schedule the RMAN script to run. In addition to scheduling everyday RMAN scripts, the Cohesity Remote Adapter supports agentless backup and recovery. The Remote Adapter is a powerful scheduling option for all your RMAN scripts.

Figure 6: Remote Adapter Process for RMAN Script Execution



You can use the [Cohesity Remote Adapter](#) to manage all your RMAN backups and restores.

NOTE: The Cohesity *Remote Adapter* here (used for agentless backups) is different from the [Cohesity Oracle Adapter agent](#), which integrates with RMAN and provides Change Block Tracking.

Built-In Support

Cohesity has built-in support for the Cohesity Remote Adapter. To schedule your RMAN backup jobs, simply log in to your Cohesity cluster, add the databases from your sources to Protection Groups, and apply the Protection policy that meets your business requirements.

The workflow for scheduling your Oracle database protection with the Oracle RMAN remote adapter is:

1. [Create a Remote Adapter Protection Group](#). Add your SSH public key on the Oracle Database host so that the Cohesity cluster can connect to the Remote Adapter and trigger Remote Adapter Protection Runs.
For instructions on adding an SSH public key for an Oracle database, see [Add or Edit a Remote Adapter Protection Group](#).
2. Mount the Cohesity View's NFS mount path on the Oracle database host.
3. Choose a [Protection policy](#) to configure the backup schedule and other settings.
4. Choose a [QoS policy](#) for the Protection Group to optimize performance.
5. Save the Protection Group to set the backups to run as scheduled.

Upgrade the DR Plan

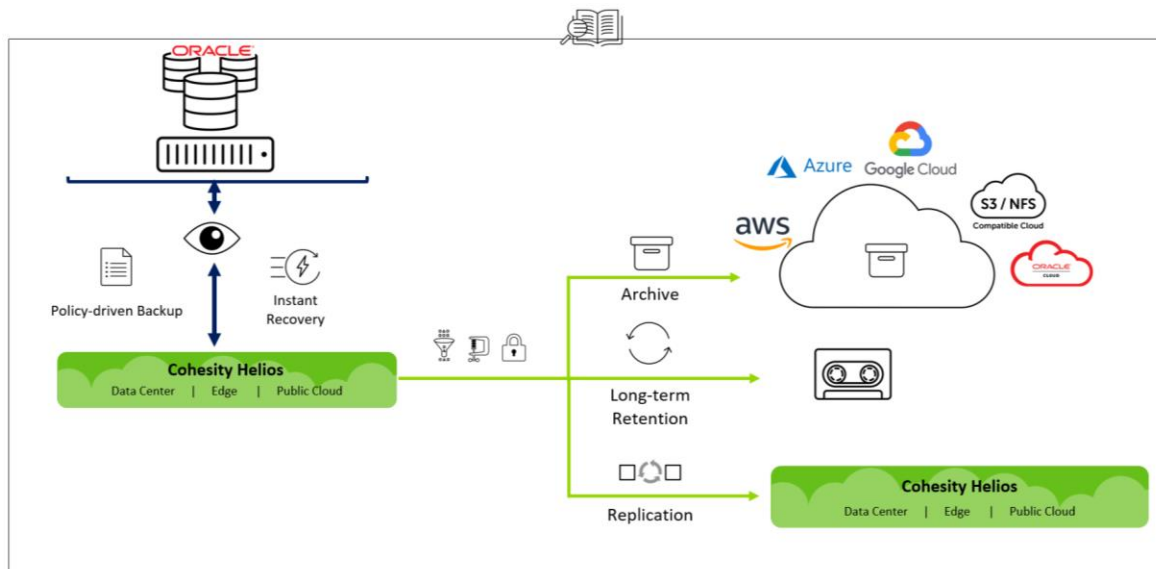
Disaster Recovery (DR) and business continuity are closely related plans designed to proactively protect a business's infrastructure and data. Taking an RMAN backup is only one part of protecting a business. Protecting the business means protecting the data from corruption and from catastrophic disaster. You can achieve this by keeping a series of backups, and then in turn moving those backups off-site and archiving them under a long-term retention plan.

Cohesity gives you the foundation to build a DR plan to protect your business:

- **Capture and store.** Schedule and store your Oracle backups to a Cohesity View to protect from loss and corruption.
- **Geo-redundancy.** Replicate the Cohesity View to an off-site location to protect from catastrophic loss.
- **Cost-effective archival.** Archive the Cohesity View to the cloud and store it on lower-cost storage tiers to hold your Oracle backups for long-term retention.

Schedule a Protection Group on the Cohesity View to automatically archive and replicate your Oracle backups for long-term retention and disaster recovery.

Figure 7: Oracle Backups in Cohesity View are Available to Replicate and Archive



Take Local Snapshots

Protect your Oracle backups over time by maintaining a series of local Cohesity snapshots of your View. Use the Remote Adapter to automate snapshot management.

Replicate Backups Off-site

Protect your entire set of RMAN backups from catastrophic loss by replicating the whole Cohesity View to an off-site location. A scheduled Protection Group automatically copies the RMAN backups stored in the Cohesity View to a second, off-site Cohesity cluster. By default, source-side deduplication and compression are enabled for replication, so that the system sends only the changed data over the network for cost-effective disaster recovery.

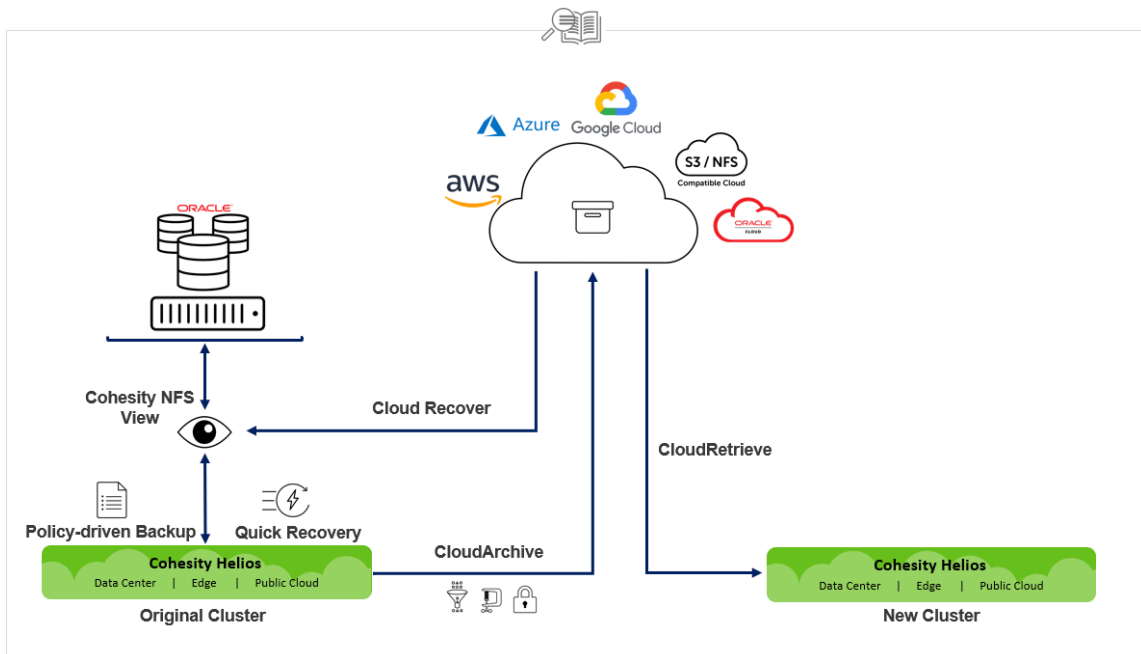
Use the Remote Adapter to automate the Cohesity View replication to another Cohesity cluster.

Archive Backups to the Cloud

Archive your entire set of RMAN backups to the cloud as a way to address long-term data retention requirements and simultaneously lower the cost of storage. Cohesity provides a policy-based method to archive to public clouds (AWS, Azure, and GCP), to any S3-compatible storage, tape, and/or to any NFS mount point.

With Cohesity CloudArchive, Cloud Recover, and CloudRetrieve, your Oracle backups (Cohesity Views) are available for recovery to their original Cohesity cluster or onto a different Cohesity cluster, for geo-redundancy and disaster recovery.

Figure 8: Cohesity CloudArchive, Cloud Recover, and CloudRetrieve Provide Disaster Recovery



Appendix: Understand RMAN Backup & Restore Command Components

To help you identify the parts of the RMAN *backup* command, Table 6 describes each separately.

Table 6: RMAN Backup Command Components

COMPONENT	DESCRIPTION
Allocate Channel	RMAN command to allocate a channel resource.
Kp3	User named channel.
TYPE 'SBT_TAPE'	RMAN command specifying the type of channel.
SBT_LIBRARY	The path and name of the Cohesity Oracle SBT Plug-in.
SBT_PARAMS	A list of parameters passed to the Cohesity Oracle SBT Plug-in.
mount_path	Reference to the IP and View name on your Cohesity cluster.
vips	The virtual IP address of a node on your Cohesity cluster.
gflag-name	Cohesity flag to specify SunRPC or GRPC.
gflag-value	Cohesity flag to enable

To help you identify the parts of the RMAN restore command, Table 7 describes each separately.

Table 7: RMAN Restore Command Components

COMPONENT	DESCRIPTION
Allocate Channel	RMAN command to allocate a channel resource.
Kp4	Name of the channel.
format	Full mount path and file name.

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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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