



# TR-5007: 通过Google Cloud NetApp Volumes上的服务器内增量合并优化 Oracle VLDB 备份和恢复

NetApp database solutions

NetApp  
August 18, 2025

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# TR-5007：通过Google Cloud NetApp Volumes上的服务器内增量合并优化 Oracle VLDB 备份和恢复

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该解决方案提供了部署到 Google Compute Engine VM 的 Oracle VLDB 的概述和详细信息，该 VM 通过在 Google Cloud NetApp Volumes 存储池上挂载 NFS 来快速恢复，以暂存通过 RMAN 不断增量合并的备用数据库副本。

## 目的

使用 Oracle 恢复管理器 (RMAN) 备份工具恢复 Oracle 中的超大型数据库 (VLDB) 可能是一项极具挑战性的任务。发生故障时从备份媒体恢复数据库的过程可能非常耗时，从而延迟数据库恢复并可能严重影响您的服务水平协议 (SLA)。由于成本考虑，RMAN 备份通常流式传输到对象存储，因此对于部署在云中的 Oracle VLDB 来说，情况变得更加糟糕。因此，如果 SLA 必不可少，则恢复和恢复 VLDB 是不可行的。从 10g 版本开始，Oracle 引入了 RMAN 功能，允许用户在数据库服务器主机上的附加磁盘存储上创建 Oracle 数据库数据文件的分阶段映像副本。这些图像副本可以使用 RMAN 按照用户定义的间隔进行增量更新。如果发生故障，数据库管理员 (DBA) 可以迅速将 Oracle 数据库从故障媒体切换到映像副本，从而无需进行完整的数据库媒体还原。尽管所需的数据存储量增加了一倍，但其结果是 SLA 得到了极大改善。

如果您热衷于 VLDB 的 SLA 并考虑将 Oracle 数据库迁移到 Google Cloud Platform (GCP) 等公共云，则可以使用 Google Cloud NetApp Volumes (GCNV) 等资源设置类似的数据库保护结构来暂存备用数据库映像副本。GCNV 是 Google 提供的完全托管的高性能文件存储服务，它使在 Google Cloud 中迁移和运行要求苛刻的企业应用程序（例如 Oracle 数据库）变得更容易、更安全、更经济高效。其多样化的服务级别允许灵活地控制存储成本，同时实现接近零的 RPO 和可管理的 RTO。在本文档中，我们演示了如何从 GCNV 存储池配置和导出 NFS 文件系统，并将其挂载到 Oracle 数据库服务器上，以便在主存储发生故障时暂存备用数据库副本以便快速恢复。

此解决方案适用于以下用例：

- Oracle 数据库数据文件映像通过 RMAN 复制备份到 Google Cloud NetApp Volumes 存储池上的服务器内 NFS 文件系统。
- 当同一台或备用 Google Compute Engine VM 发生故障时，可以快速恢复 Oracle VLDB。
- 在几分钟内从暂存数据库映像副本克隆主机上的 Oracle 数据库副本以供其他用例使用。

## 受众

此解决方案适用于以下人群：

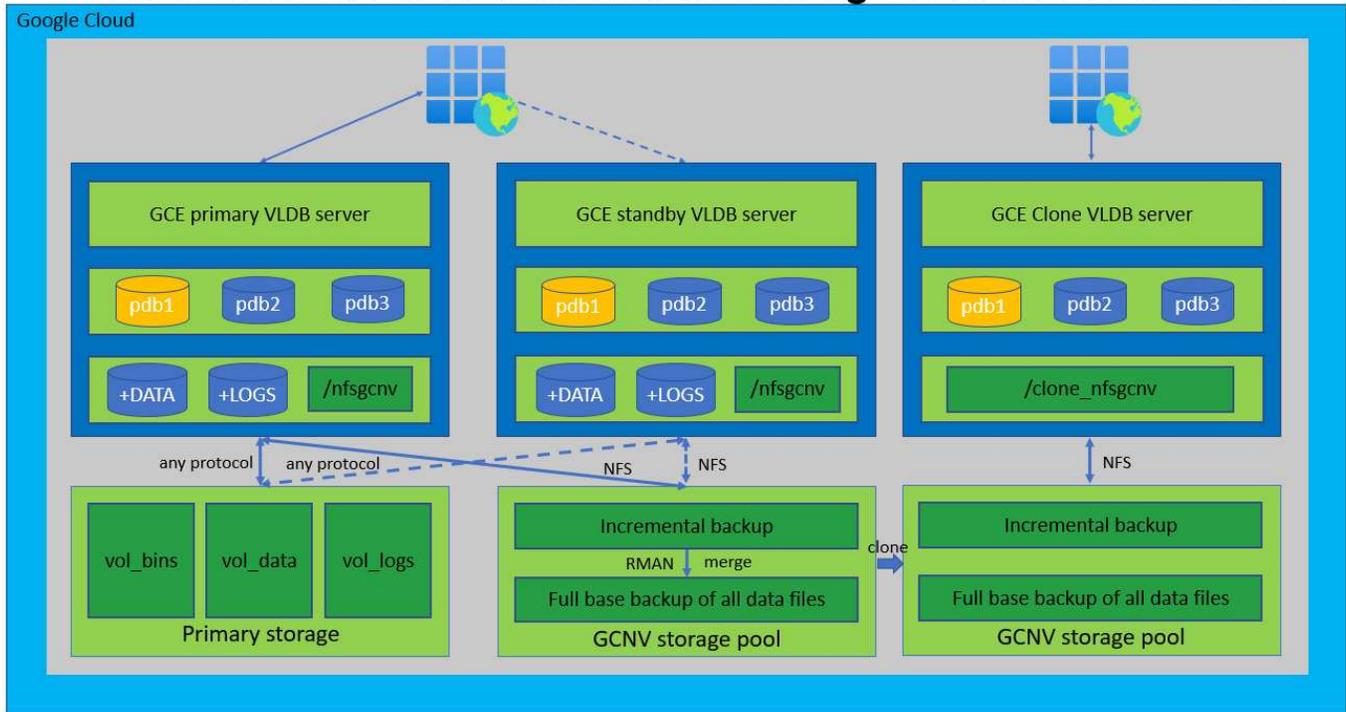
- 在 Google Cloud Platform 中设置和管理 Oracle VLDB 的 DBA。
- 在 Google Cloud Platform 中测试 Oracle 工作负载的数据库解决方案架构师。
- 管理部署到 GCNV 存储池的 Oracle 数据库的存储管理员。
- 希望在 Google Cloud Platform 中建立 Oracle 数据库的应用程序所有者。

# 解决方案测试和验证环境

该解决方案的测试和验证是在Google Cloud NetApp Volumes存储池和 Google Compute Engine VM 中执行的，这些存储池和虚拟机可能与最终部署环境不匹配。有关更多信息，请参阅[部署考虑的关键因素](#)。

## 架构

### Oracle VLDB In-Server Incremental Merge via RMAN on GCNV



## 硬件和软件组件

硬件		
Google Cloud NetApp Volumes存储池	Google 当前提供的服务	高级服务 2 TiB 存储池，标准服务 2 TiB 存储池
用于数据库服务器的 Google Compute Engine VM	N1 (4 个 vCPU, 15 GiB 内存)	2 个虚拟机，一个作为主数据库服务器，另一个作为备用或克隆数据库服务器
软件		
红帽Linux	Red Hat Enterprise Linux 8.10 (Ootpa) - x86/64	RHEL 市场图像，PAYG
Oracle 网络基础设施	19.18 版	已应用RU补 丁p34762026_190000_Linux-x86-64.zip
Oracle 数据库	19.18 版	已应用RU补 丁p34765931_190000_Linux-x86-64.zip

dNFS一次性补丁	p32931941_190000_Linux-x86-64.zip	适用于网格和数据库
Oracle OPatch	版本 12.2.0.1.36	最新补丁 p6880880_190000_Linux-x86-64.zip
NFS	3.0 版	已启用 Oracle dNFS
Ansible	版本核心 2.16.2	python版本-3.10.13

## 部署考虑的关键因素

- **GCNV 存储池服务级别。** GCNV存储池提供四种服务级别：Standard、Premium、Extreme和Flex。默认情况下，自动 QoS 适用于存储池内创建的卷，它会根据卷的大小和服务级别限制卷的吞吐量。唯一的例外是，从 Flex 存储池分配的卷共享存储池可用的吞吐量。
- **\*RMAN 增量合并的 Oracle VLDB 服务器内备份存储限制。\***在我们的测试和验证中，用于 Oracle 增量备份和合并的 NFS 卷是从具有标准服务级别的单个 GCNV 存储池中分配的，该存储池的容量限制为 200 TiB。对于超过该阈值的部署，可以并行实现多个 GCNV 存储池和多个 NFS 挂载点，以提供更高的容量。
- **使用 RMAN 增量合并实现 Oracle 可恢复性。** RMAN 服务器内增量备份和合并通常根据您的 RTO 和 RPO 目标以用户定义的频率执行。如果主数据库文件存储和/或归档日志完全丢失，则可能会发生数据丢失。Oracle 数据库可以从服务器内的数据库备份映像副本恢复到最新的可用增量备份。为了最大限度地减少数据丢失，需要在 GCNV NFS 备份挂载点上设置 Oracle 闪回恢复区，并将存档日志与数据库映像副本一起备份到同一个 NFS 挂载点，以便在发生故障时将数据库前滚到最后的存档日志。因此，可以实现接近零的 RPO。
- **\*在 GCNV 存储池上从 NFS 映像备份运行 Oracle VLDB。\***目前，不支持将数据库卷服务级别从标准重新分配为高级或极端。但是，支持将服务级别从高级重新分配到极致。为了在发生故障后长时间在映像副本上运行数据库，建议从高级存储池中分配卷以用于数据库映像副本备份。
- **\*Google Compute Engine 虚拟机。\***在测试验证中，我们使用N1类型的GCE VM实例作为Oracle数据库服务器。其他类型的 GCE VM 可能更加优化，更适合数据库工作负载。根据实际工作负载要求，适当调整虚拟机的 vCPU 数量和 RAM 容量。
- **dNFS 配置。** dNFS 内置于 Oracle 内核中，并且已知当 Oracle 部署到 NFS 存储时可显著提高 Oracle 数据库性能。dNFS 打包到 Oracle 二进制文件中，但默认情况下未打开。对于 NFS 上的任何 Oracle 数据库部署，都应该启用它。对于 VLDB 的多个 GCNV 存储池部署，应正确配置到不同 GCNV 存储池的 dNFS 多路径。

## 解决方案部署

该解决方案假定 Oracle VLDB 已部署在 VPC 内的 Google Cloud 环境中。Oracle VLDB 可以在 GCNV 存储或 Google Cloud 生态系统内的任何其他存储选项上运行。以下部分提供了设置 Oracle VLDB 映像备份并通过 RMAN 增量合并到从 GCNV 存储池挂载的 NFS 文件系统的分步部署过程。Oracle VLDB 的主存储也托管在不同的 GCNV 存储池中。

### 部署先决条件

部署需要以下先决条件。

1. 已设置 GCP 帐户，并在 Google Cloud 帐户中的项目内创建了必要的 VPC 和网络配置。
2. 在 Google Cloud 门户控制台中，按照文档操作"创建存储池"创建一个具有标准服务的GCNV存储池，如下所示。

Storage pools

A storage pool specifies the following for all volumes within the pool: Capacity, service level, Virtual Private Cloud (VPC), Active Directory policy, LDAP, and encryption. [Learn more](#)

Filter Name: ora Search for storage pools by name, location, etc.

Status	Name	Location	Service level	Capacity	Allocated to Volumes	Volume count	Created	Labels
Ready	<a href="#">ora-bkup</a>	us-east4	Standard	2048 GiB	2047 GiB	1	May 23, 2025, 11:26:36 AM	resource_id: 10853679974953495969 database: oracle creator: acao
Ready	<a href="#">ora-prod</a>	us-east4	Premium	3072 GiB	2000 GiB	8	May 20, 2025, 3:25:05 PM	database: oracle creator: acao resource_id: 5475979997962797836

3. 在 Google Cloud 门户控制台中，按照文档操作"创建卷"为服务器内 Oracle VLDB 映像备份创建卷。在此解决方案演示中，Oracle VLDB 主存储也托管在 GCNV 上，如下所示。

Volumes

A volume provides NFS or SMB file services for your application, with integrated data protection services. A volume is allocated from a pool and will get an individual throughput limit based on its allocated size and the pool service level. [Learn more](#)

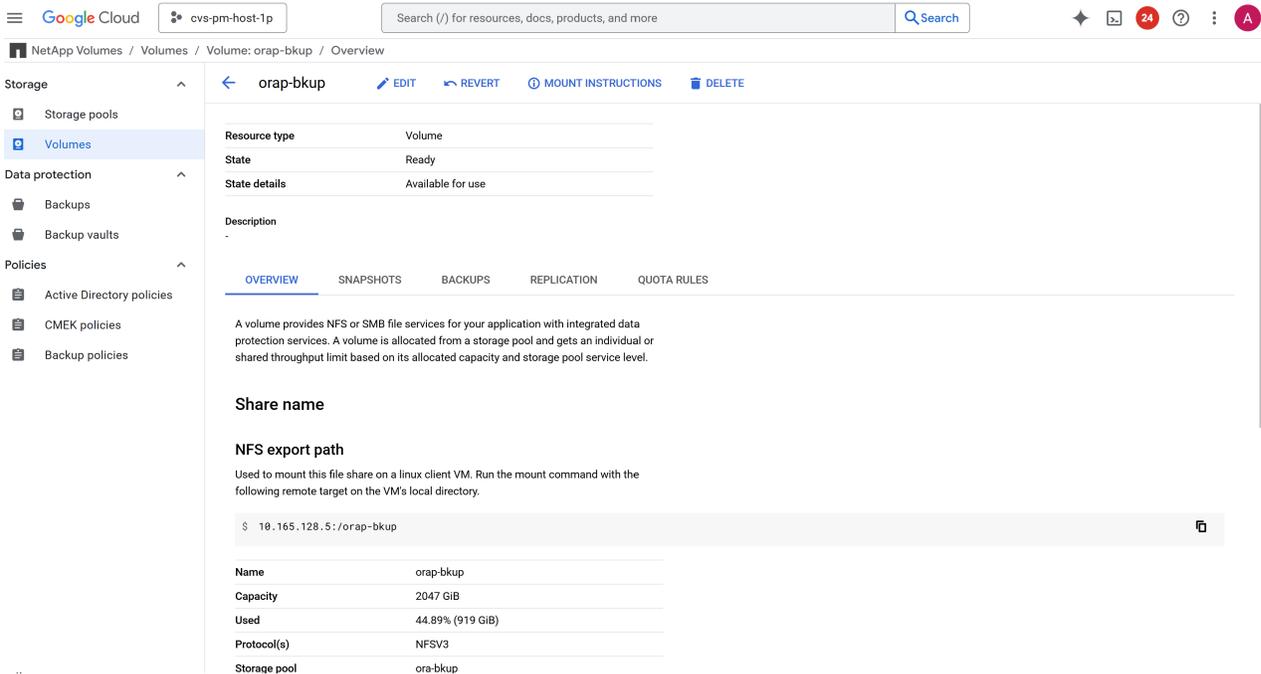
Filter Name: ora Search for volumes by name, location, etc.

Status	Name	Location	Service level	Share name	Capacity	Used	Protocol(s)	Storage pool	Labels
Ready	<a href="#">ora-bkup</a>	us-east4	Standard	orap-bkup	2047	44.89% (919 GiB)	NFSV3	ora-bkup	database: oracle creator: acao resource_id: 12664458934480123852
Ready	<a href="#">orap-u08</a>	us-east4	Premium	orap-u08	300	66.67% (200 GiB)	NFSV3	ora-prod	database: oracle creator: acao resource_id: 5013208791319493120
Ready	<a href="#">orap-u07</a>	us-east4	Premium	orap-u07	250	80.4% (201 GiB)	NFSV3	ora-prod	resource_id: 14994205951955147360 database: oracle creator: acao
Ready	<a href="#">orap-u06</a>	us-east4	Premium	orap-u06	250	80.4% (201 GiB)	NFSV3	ora-prod	resource_id: 2276456791356111503 database: oracle creator: acao
Ready	<a href="#">orap-u05</a>	us-east4	Premium	orap-u05	250	80.4% (201 GiB)	NFSV3	ora-prod	creator: acao resource_id: 4493200584357705755 database: oracle
Ready	<a href="#">orap-u04</a>	us-east4	Premium	orap-u04	250	80.4% (201 GiB)	NFSV3	ora-prod	resource_id: 1213548711092035313 database: oracle creator: acao
Ready	<a href="#">orap-u03</a>	us-east4	Premium	orap-u03	250	80.4% (201 GiB)	NFSV3	ora-prod	creator: acao resource_id: 14567023349176120762 database: oracle
Ready	<a href="#">orap-u02</a>	us-east4	Premium	orap-u02	250	80.4% (201 GiB)	NFSV3	ora-prod	creator: acao resource_id: 16039063595587464348 database: oracle
Ready	<a href="#">orap-u01</a>	us-east4	Premium	orap-u01	200	10% (20)	NFSV3	ora-prod	database: oracle creator: acao

将 NFS 卷从 GCNV 挂载到主 Oracle VLDB 服务器

为了获得更好的性能，为 Oracle VLDB 服务器内备份配置的 GCNV 卷理想情况下应位于与主数据库服务器和主存储相同的 Google Cloud 区域。

### 1. 从 Google Cloud 控制台检索 GCNV 卷 NFS 导出路径。



The screenshot shows the Google Cloud console interface for a NetApp Volume named 'orap-bkup'. The left sidebar shows the navigation menu with 'Volumes' selected. The main content area displays the volume's details, including its state (Ready) and description. The 'NFS export path' section is highlighted, showing the path `10.165.128.5:/orap-bkup`. Below this, a table lists the volume's properties:

Name	orap-bkup
Capacity	2047 GiB
Used	44.89% (919 GiB)
Protocol(s)	NFSv3
Storage pool	ora-bkup

### 2. 登录到主 Oracle VLDB 服务器。以 root 身份挂载从 GCNV 存储导出的 NFS 卷。根据需要更改为您的 NFS 服务器 IP 地址和文件路径。

```
sudo mkdir /nfsgcnv
```

```
mount 10.165.128.5:/orap-bkup /nfsgcnv -o  
rw,bg,hard,vers=3,proto=tcp,timeo=600,rsz=262144,wsz=262144
```

### 3. 将挂载点所有权更改为 oracle:oinstall，或根据需要更改为您的 oracle 用户名和主要组。

```
sudo chown oracle:oinstall /nfsgcnv
```

### 4. 将 NFS 挂载添加到 /etc/fstab。

```
sudo vi /etc/fstab
```

设置 **Oracle RMAN** 增量合并到 **GCNV** 上的映像副本，以进行服务器内 **VLDB** 备份

RMAN 增量合并在每个增量备份/合并间隔持续更新暂存数据库数据文件映像副本。数据库备份的映像副本将与您执行增量备份/合并的频率一样最新。因此，在决定 RMAN 增量备份和合并的频率时，请考虑数据库性能、RTO 和 RPO 目标。

1. 以 oracle 用户身份登录到主 Oracle VLDB 服务器。
2. 为了验证此解决方案，主数据库设置为具有网格基础架构重新启动配置的独立服务器，如下所示。主存储托管在提供优质服务的 GCNV 存储池上。再次强调，这不是必需的，主存储可以是 Google 云中的任何其他存储选项。

```
[oracle@orap ~]$ df -h
Filesystem                Size      Used Avail Use% Mounted on
devtmpfs                  7.2G         0  7.2G   0% /dev
tmpfs                     7.3G    1.1G   6.2G  16% /dev/shm
tmpfs                     7.3G     8.5M   7.2G   1% /run
tmpfs                     7.3G         0   7.3G   0% /sys/fs/cgroup
/dev/sda2                  50G     22G   29G  43% /
/dev/sda1                  200M    5.9M  194M   3% /boot/efi
10.165.128.5:/orap-u02     250G    203G   48G  81% /u02
10.165.128.5:/orap-u07     250G    203G   48G  82% /u07
10.165.128.5:/orap-u06     250G    203G   48G  81% /u06
10.165.128.5:/orap-u04     250G    203G   48G  81% /u04
10.165.128.5:/orap-u05     250G    203G   48G  82% /u05
10.165.128.5:/orap-bkup    2.0T    918G  1.2T  45% /nfs/gcnv
10.165.128.5:/orap-u03     250G    202G   49G  81% /u03
10.165.128.4:/orap-u01     200G     21G  180G  11% /u01
10.165.128.5:/orap-u08     300G    201G  100G  67% /u08
tmpfs                     1.5G         0   1.5G   0% /run/user/54321
```

```
[oracle@orap ~]$ crsctl stat res -t
```

```
-----
-----
Name                Target  State          Server          State
details
-----
-----
Local Resources
-----
-----
ora.DATA.dg
                ONLINE  ONLINE         orap            STABLE
ora.LISTENER.lsnr
                ONLINE  ONLINE         orap            STABLE
ora.LOGS.dg
                ONLINE  ONLINE         orap            STABLE
ora.asm
```

```

                ONLINE  ONLINE          orap
Started, STABLE
ora.ons
                OFFLINE OFFLINE          orap                      STABLE
-----
Cluster Resources
-----
ora.cssd
  1          ONLINE  ONLINE          orap                      STABLE
ora.diskmon
  1          OFFLINE OFFLINE          STABLE
ora.evmd
  1          ONLINE  ONLINE          orap                      STABLE
ora.ntap.db
  1          ONLINE  ONLINE          orap
Open, HOME=/u01/app/o

racle/product/19.0.0

/NTAP, STABLE
-----

```

```

[oracle@orap ~]$ asmcmd
ASMCMDB> lsdg
State      Type      Rebal  Sector  Logical_Sector  Block      AU
Total_MB  Free_MB  Req_mir_free_MB  Usable_file_MB  Offline_disks
Voting_files  Name
MOUNTED   EXTERN  N       512     512    4096    4194304
1228800  1150288          0       1150288          0
N  DATA/
MOUNTED   EXTERN  N       512     512    4096    4194304
204800   204636          0       204636          0
N  LOGS/
ASMCMDB> lsdsk
Path
/u02/oradata/asm/orap_data_disk_01
/u02/oradata/asm/orap_data_disk_02
/u02/oradata/asm/orap_data_disk_03
/u02/oradata/asm/orap_data_disk_04
/u03/oradata/asm/orap_data_disk_05
/u03/oradata/asm/orap_data_disk_06
/u03/oradata/asm/orap_data_disk_07

```

```
/u03/oradata/asm/orap_data_disk_08  
/u04/oradata/asm/orap_data_disk_09  
/u04/oradata/asm/orap_data_disk_10  
/u04/oradata/asm/orap_data_disk_11  
/u04/oradata/asm/orap_data_disk_12  
/u05/oradata/asm/orap_data_disk_13  
/u05/oradata/asm/orap_data_disk_14  
/u05/oradata/asm/orap_data_disk_15  
/u05/oradata/asm/orap_data_disk_16  
/u06/oradata/asm/orap_data_disk_17  
/u06/oradata/asm/orap_data_disk_18  
/u06/oradata/asm/orap_data_disk_19  
/u06/oradata/asm/orap_data_disk_20  
/u07/oradata/asm/orap_data_disk_21  
/u07/oradata/asm/orap_data_disk_22  
/u07/oradata/asm/orap_data_disk_23  
/u07/oradata/asm/orap_data_disk_24  
/u08/oralogs/asm/orap_logs_disk_01  
/u08/oralogs/asm/orap_logs_disk_02  
/u08/oralogs/asm/orap_logs_disk_03  
/u08/oralogs/asm/orap_logs_disk_04
```

3. 在挂载点 /nfsgcnv 下创建一个 oracopy 目录来存储 oracle 数据文件映像副本，以及一个 archlog 目录用于 Oracle 闪回恢复区。

```
mkdir /nfsgcnv/oracopy
```

```
mkdir /nfsgcnv/archlog
```

4. 通过 sqlplus 登录到 Oracle 数据库，启用块更改跟踪以加快增量备份速度，并且如果 Oracle 闪存恢复区当前位于主存储上，则将其更改为 GCNV NFS 挂载。这允许将 RMAN 默认控制文件/spfile 自动备份和存档日志备份到 GCNV NFS 挂载，以便将数据库恢复到最后一个可用的存档日志。

```
sqlplus / as sysdba
```

在 sqlplus 提示符下，执行以下命令。

```
alter database enable block change tracking using file  
'/nfsgcnv/oracopy/bct_ntap.ctf'
```

```
alter system set db_recovery_file_dest='/nfsgcnv/archlog/'
scope=both;
```

预期输出:

```
[oracle@orap ~]$ sqlplus / as sysdba

SQL*Plus: Release 19.0.0.0.0 - Production on Wed Mar 20 16:44:21
2024
Version 19.18.0.0.0

Copyright (c) 1982, 2022, Oracle. All rights reserved.

Connected to:
Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 -
Production
Version 19.18.0.0.0

SQL> alter database enable block change tracking using file
'/nfsgcnv/oracopy/bct_ntap.ctf';

Database altered.

SQL> alter system set db_recovery_file_dest='/nfsgcnv/archlog/'
scope=both;

System altered.

SQL> alter system set db_recovery_file_dest_size = 400G scope=both;

System altered.

SQL> show parameter recover

NAME                                TYPE                                VALUE
-----                                -
db_recovery_file_dest                string                              /nfsgcnv/archlog/
db_recovery_file_dest_size           big integer                         400G
db_unrecoverable_scn_tracking        boolean                              TRUE
recovery_parallelism                 integer                              0
remote_recovery_file_dest            string
SQL>
```

5. 创建 RMAN 备份和增量合并脚本。该脚本为并行 RMAN 备份和合并分配多个通道。第一次执行将生成初始的完整基线图像副本。在完整运行过程中，它首先清除保留窗口之外的过时备份，以保持暂存区清洁。然后它在合并和备份之前切换当前日志文件。增量备份在合并之后进行，因此数据库映像副本落后于当前数据库状态一个备份/合并周期。可以根据用户的喜好逆转合并和备份的顺序，以便更快地恢复。RMAN 脚本可以集成到一个简单的 shell 脚本中，从主 DB 服务器上的 crontab 执行。确保 RMAN 设置中的控制文件自动备份处于打开状态。

```
vi /home/oracle/rman_bkup_merge.cmd

Add following lines:

RUN
{
  allocate channel c1 device type disk format '/nfsgcnv/oracopy/%U';
  allocate channel c2 device type disk format '/nfsgcnv/oracopy/%U';
  allocate channel c3 device type disk format '/nfsgcnv/oracopy/%U';
  allocate channel c4 device type disk format '/nfsgcnv/oracopy/%U';
  delete obsolete;
  sql 'alter system archive log current';
  recover copy of database with tag 'OraCopyBKUPonGCNV_level_0';
  backup incremental level 1 copies=1 for recover of copy with tag
'OraCopyBKUPonGCNV_level_0' database;
}
```

6. 在主 Oracle VLDB 服务器上，以 oracle 用户身份本地登录到 RMAN，可以使用或不使用 RMAN 目录。在此演示中，我们没有连接到 RMAN 目录。

```
rman target / nocatalog;

output:

[oracle@orap ~]$ rman target / nocatalog

Recovery Manager: Release 19.0.0.0.0 - Production on Wed Mar 20
16:54:24 2024
Version 19.18.0.0.0

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reserved.

connected to target database: NTAP (DBID=1379265854)
using target database control file instead of recovery catalog
```

7. 从 RMAN 提示符执行脚本。第一次执行会创建基线数据库映像副本，后续执行则会逐步合并和更新基线映像副本。以下是如何执行脚本以及典型的输出。设置通道数以匹配主机上的 CPU 核心。

```

RMAN> @/home/oracle/rman_bkup_merge.cmd

RMAN> RUN
2> {
3>  allocate channel c1 device type disk format
'/nfsgcnv/oracopy/%U';
4>  allocate channel c2 device type disk format
'/nfsgcnv/oracopy/%U';
5>  allocate channel c3 device type disk format
'/nfsgcnv/oracopy/%U';
6>  allocate channel c4 device type disk format
'/nfsgcnv/oracopy/%U';
7>  delete obsolete;
8>  sql 'alter system archive log current';
9>  recover copy of database with tag 'OraCopyBKUPonGCNV_level_0';
10> backup incremental level 1 copies=1 for recover of copy with
tag 'OraCopyBKUPonGCNV_level_0' database;
11> }
allocated channel: c1
channel c1: SID=23 device type=DISK

allocated channel: c2
channel c2: SID=151 device type=DISK

allocated channel: c3
channel c3: SID=20 device type=DISK

allocated channel: c4
channel c4: SID=150 device type=DISK

RMAN retention policy will be applied to the command
RMAN retention policy is set to redundancy 1
Deleting the following obsolete backups and copies:
Type                Key      Completion Time      Filename/Handle
-----
Backup Set          1        22-MAY-25
  Backup Piece      1        22-MAY-25
+LOGS/NTAP/AUTOBACKUP/2025_05_22/s_1201793914.260.1201793917
Backup Set          2        22-MAY-25
  Backup Piece      2        22-MAY-25
+LOGS/NTAP/AUTOBACKUP/2025_05_22/s_1201795422.261.1201795425
Backup Set          3        22-MAY-25
  Backup Piece      3        22-MAY-25
+LOGS/NTAP/AUTOBACKUP/2025_05_22/s_1201797230.262.1201797231
Backup Set          4        22-MAY-25
  Backup Piece      4        22-MAY-25

```

+LOGS/NTAP/AUTOBACKUP/2025\_05\_22/s\_1201799039.264.1201799041  
Backup Set 5 22-MAY-25  
Backup Piece 5 22-MAY-25  
+LOGS/NTAP/AUTOBACKUP/2025\_05\_22/s\_1201802655.265.1201802659  
Backup Set 6 22-MAY-25  
Backup Piece 6 22-MAY-25  
+LOGS/NTAP/AUTOBACKUP/2025\_05\_22/s\_1201803558.266.1201803561  
Backup Set 7 22-MAY-25  
Backup Piece 7 22-MAY-25  
+LOGS/NTAP/AUTOBACKUP/2025\_05\_22/s\_1201805066.267.1201805069  
Backup Set 8 22-MAY-25  
Backup Piece 8 22-MAY-25  
+LOGS/NTAP/AUTOBACKUP/2025\_05\_22/s\_1201806272.268.1201806275  
Backup Set 9 22-MAY-25  
Backup Piece 9 22-MAY-25  
+LOGS/NTAP/AUTOBACKUP/2025\_05\_22/s\_1201807778.269.1201807781  
Backup Set 10 23-MAY-25  
Backup Piece 10 23-MAY-25  
+LOGS/NTAP/AUTOBACKUP/2025\_05\_23/s\_1201874668.271.1201874669  
deleted backup piece  
backup piece  
handle=+LOGS/NTAP/AUTOBACKUP/2025\_05\_22/s\_1201793914.260.1201793917  
RECID=1 STAMP=1201793917  
deleted backup piece  
backup piece  
handle=+LOGS/NTAP/AUTOBACKUP/2025\_05\_22/s\_1201799039.264.1201799041  
RECID=4 STAMP=1201799040  
deleted backup piece  
backup piece  
handle=+LOGS/NTAP/AUTOBACKUP/2025\_05\_22/s\_1201795422.261.1201795425  
RECID=2 STAMP=1201795424  
deleted backup piece  
backup piece  
handle=+LOGS/NTAP/AUTOBACKUP/2025\_05\_22/s\_1201803558.266.1201803561  
RECID=6 STAMP=1201803561  
deleted backup piece  
backup piece  
handle=+LOGS/NTAP/AUTOBACKUP/2025\_05\_22/s\_1201797230.262.1201797231  
RECID=3 STAMP=1201797231  
deleted backup piece  
backup piece  
handle=+LOGS/NTAP/AUTOBACKUP/2025\_05\_22/s\_1201802655.265.1201802659  
RECID=5 STAMP=1201802658  
deleted backup piece  
backup piece  
handle=+LOGS/NTAP/AUTOBACKUP/2025\_05\_22/s\_1201805066.267.1201805069

RECID=7 STAMP=1201805069

Deleted 2 objects

deleted backup piece

backup piece

handle=+LOGS/NTAP/AUTOBACKUP/2025\_05\_22/s\_1201806272.268.1201806275

RECID=8 STAMP=1201806275

Deleted 3 objects

deleted backup piece

backup piece

handle=+LOGS/NTAP/AUTOBACKUP/2025\_05\_22/s\_1201807778.269.1201807781

RECID=9 STAMP=1201807780

Deleted 2 objects

deleted backup piece

backup piece

handle=+LOGS/NTAP/AUTOBACKUP/2025\_05\_23/s\_1201874668.271.1201874669

RECID=10 STAMP=1201874669

Deleted 3 objects

sql statement: alter system archive log current

Starting recover at 23-MAY-25

no copy of datafile 1 found to recover  
no copy of datafile 3 found to recover  
no copy of datafile 4 found to recover  
no copy of datafile 5 found to recover  
no copy of datafile 6 found to recover  
no copy of datafile 7 found to recover  
no copy of datafile 8 found to recover  
no copy of datafile 9 found to recover  
no copy of datafile 10 found to recover  
no copy of datafile 11 found to recover  
no copy of datafile 12 found to recover  
no copy of datafile 13 found to recover  
no copy of datafile 14 found to recover  
no copy of datafile 15 found to recover  
no copy of datafile 16 found to recover  
no copy of datafile 17 found to recover  
no copy of datafile 18 found to recover  
no copy of datafile 19 found to recover  
no copy of datafile 20 found to recover  
no copy of datafile 21 found to recover  
no copy of datafile 22 found to recover

no copy of datafile 23 found to recover  
no copy of datafile 24 found to recover  
no copy of datafile 25 found to recover  
no copy of datafile 26 found to recover  
no copy of datafile 27 found to recover  
no copy of datafile 28 found to recover  
no copy of datafile 29 found to recover  
no copy of datafile 30 found to recover  
no copy of datafile 31 found to recover  
no copy of datafile 32 found to recover  
no copy of datafile 33 found to recover  
no copy of datafile 34 found to recover  
no copy of datafile 35 found to recover  
no copy of datafile 36 found to recover  
no copy of datafile 37 found to recover  
no copy of datafile 38 found to recover  
no copy of datafile 39 found to recover  
no copy of datafile 40 found to recover  
no copy of datafile 41 found to recover  
no copy of datafile 42 found to recover  
no copy of datafile 43 found to recover  
no copy of datafile 44 found to recover  
no copy of datafile 45 found to recover  
no copy of datafile 46 found to recover  
no copy of datafile 47 found to recover  
no copy of datafile 48 found to recover  
no copy of datafile 49 found to recover  
no copy of datafile 50 found to recover  
Finished recover at 23-MAY-25

Starting backup at 23-MAY-25

no parent backup or copy of datafile 1 found  
no parent backup or copy of datafile 3 found  
no parent backup or copy of datafile 4 found  
no parent backup or copy of datafile 7 found  
no parent backup or copy of datafile 6 found  
no parent backup or copy of datafile 5 found  
no parent backup or copy of datafile 8 found  
no parent backup or copy of datafile 21 found  
no parent backup or copy of datafile 22 found  
no parent backup or copy of datafile 25 found  
no parent backup or copy of datafile 28 found  
no parent backup or copy of datafile 32 found  
no parent backup or copy of datafile 33 found  
no parent backup or copy of datafile 36 found  
no parent backup or copy of datafile 41 found

```
no parent backup or copy of datafile 44 found
no parent backup or copy of datafile 46 found
no parent backup or copy of datafile 10 found
no parent backup or copy of datafile 9 found
no parent backup or copy of datafile 11 found
no parent backup or copy of datafile 12 found
no parent backup or copy of datafile 23 found
no parent backup or copy of datafile 26 found
no parent backup or copy of datafile 29 found
no parent backup or copy of datafile 30 found
no parent backup or copy of datafile 34 found
no parent backup or copy of datafile 37 found
no parent backup or copy of datafile 39 found
no parent backup or copy of datafile 42 found
no parent backup or copy of datafile 47 found
no parent backup or copy of datafile 48 found
no parent backup or copy of datafile 14 found
no parent backup or copy of datafile 13 found
no parent backup or copy of datafile 15 found
no parent backup or copy of datafile 16 found
no parent backup or copy of datafile 24 found
no parent backup or copy of datafile 27 found
no parent backup or copy of datafile 31 found
no parent backup or copy of datafile 35 found
no parent backup or copy of datafile 38 found
no parent backup or copy of datafile 40 found
no parent backup or copy of datafile 43 found
no parent backup or copy of datafile 45 found
no parent backup or copy of datafile 49 found
no parent backup or copy of datafile 50 found
no parent backup or copy of datafile 18 found
no parent backup or copy of datafile 17 found
no parent backup or copy of datafile 19 found
no parent backup or copy of datafile 20 found
channel c1: starting datafile copy
input datafile file number=00021
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.286.1
201793019
channel c2: starting datafile copy
input datafile file number=00022
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.287.1
201793419
channel c3: starting datafile copy
input datafile file number=00025
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.290.1
201794401
```

```
channel c4: starting datafile copy
input datafile file number=00028
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.293.1
201795271
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE1_FNO-28_0f3q6gvn tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=4
STAMP=1201886858
channel c4: datafile copy complete, elapsed time: 01:19:26
channel c4: starting datafile copy
input datafile file number=00032
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.297.1
201797351
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE1_FNO-25_0e3q6gvn tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=5
STAMP=1201886918
channel c3: datafile copy complete, elapsed time: 01:20:21
channel c3: starting datafile copy
input datafile file number=00033
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.298.1
201800805
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE1_FNO-21_0c3q6gvm tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=6
STAMP=1201886943
channel c1: datafile copy complete, elapsed time: 01:20:50
channel c1: starting datafile copy
input datafile file number=00036
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.301.1
201801969
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE1_FNO-22_0d3q6gvm tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=7
STAMP=1201887138
channel c2: datafile copy complete, elapsed time: 01:24:05
channel c2: starting datafile copy
input datafile file number=00041
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.306.1
201803399
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE1_FNO-32_0g3q6lkl tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=8
STAMP=1201891753
channel c4: datafile copy complete, elapsed time: 01:21:26
channel c4: starting datafile copy
input datafile file number=00044
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.309.1
201804651
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE1_FNO-36_0i3q6ln9 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=9
```

```
STAMP=1201891755
channel c1: datafile copy complete, elapsed time: 01:20:03
channel c1: starting datafile copy
input datafile file number=00046
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.312.1
201806095
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE1_FNO-33_0h3q6lmf tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=10
STAMP=1201891766
channel c3: datafile copy complete, elapsed time: 01:20:44
channel c3: starting datafile copy
input datafile file number=00023
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.288.1
201793535
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE1_FNO-41_0j3q6ltd tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=11
STAMP=1201892161
channel c2: datafile copy complete, elapsed time: 01:23:37
channel c2: starting datafile copy
input datafile file number=00026
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.291.1
201795153
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE2_FNO-23_0m3q6qdr tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=12
STAMP=1201896617
channel c3: datafile copy complete, elapsed time: 01:20:53
channel c3: starting datafile copy
input datafile file number=00029
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.294.1
201796261
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE1_FNO-46_0l3q6qdc tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=13
STAMP=1201896650
channel c1: datafile copy complete, elapsed time: 01:21:35
channel c1: starting datafile copy
input datafile file number=00030
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.295.1
201797317
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE1_FNO-44_0k3q6qdc tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=14
STAMP=1201896694
channel c4: datafile copy complete, elapsed time: 01:22:20
channel c4: starting datafile copy
input datafile file number=00034
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.300.1
201800829
```

```
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE2_FNO-26_0n3q6qq7 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=15
STAMP=1201897015
channel c2: datafile copy complete, elapsed time: 01:20:53
channel c2: starting datafile copy
input datafile file number=00037
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.302.1
201802025
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE2_FNO-30_0p3q6v6b tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=16
STAMP=1201901480
channel c1: datafile copy complete, elapsed time: 01:20:37
channel c1: starting datafile copy
input datafile file number=00039
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.304.1
201803375
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE2_FNO-29_0o3q6v5h tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=17
STAMP=1201901527
channel c3: datafile copy complete, elapsed time: 01:21:48
channel c3: starting datafile copy
input datafile file number=00042
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.307.1
201804601
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE2_FNO-34_0q3q6v7o tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=18
STAMP=1201901805
channel c4: datafile copy complete, elapsed time: 01:25:14
channel c4: starting datafile copy
input datafile file number=00047
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.311.1
201806051
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE2_FNO-37_0r3q6vhu tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=19
STAMP=1201901963
channel c2: datafile copy complete, elapsed time: 01:22:23
channel c2: starting datafile copy
input datafile file number=00048
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.313.1
201873549
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE2_FNO-39_0s3q73th tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=20
STAMP=1201906343
channel c1: datafile copy complete, elapsed time: 01:20:55
channel c1: starting datafile copy
input datafile file number=00024
```

name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.289.1  
201793665  
output file name=/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-  
SOE2\_FNO-42\_0t3q73uv tag=ORACOPYBKUPONGCNV\_LEVEL\_0 RECID=21  
STAMP=1201906415  
channel c3: datafile copy complete, elapsed time: 01:21:24  
channel c3: starting datafile copy  
input datafile file number=00027  
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.292.1  
201795207  
output file name=/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-  
SOE2\_FNO-47\_0u3q747i tag=ORACOPYBKUPONGCNV\_LEVEL\_0 RECID=22  
STAMP=1201906737  
channel c4: datafile copy complete, elapsed time: 01:22:15  
channel c4: starting datafile copy  
input datafile file number=00031  
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.296.1  
201797343  
output file name=/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-  
SOE2\_FNO-48\_0v3q74cd tag=ORACOPYBKUPONGCNV\_LEVEL\_0 RECID=23  
STAMP=1201906865  
channel c2: datafile copy complete, elapsed time: 01:21:45  
channel c2: starting datafile copy  
input datafile file number=00035  
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.299.1  
201800821  
output file name=/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-  
SOE3\_FNO-24\_103q7818 tag=ORACOPYBKUPONGCNV\_LEVEL\_0 RECID=24  
STAMP=1201911205  
channel c1: datafile copy complete, elapsed time: 01:21:03  
channel c1: starting datafile copy  
input datafile file number=00038  
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.303.1  
201802375  
output file name=/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-  
SOE3\_FNO-27\_113q78nk tag=ORACOPYBKUPONGCNV\_LEVEL\_0 RECID=25  
STAMP=1201911367  
channel c3: datafile copy complete, elapsed time: 01:22:33  
channel c3: starting datafile copy  
input datafile file number=00040  
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.305.1  
201803381  
output file name=/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-  
SOE3\_FNO-31\_123q791p tag=ORACOPYBKUPONGCNV\_LEVEL\_0 RECID=26  
STAMP=1201911632  
channel c4: datafile copy complete, elapsed time: 01:21:33

```
channel c4: starting datafile copy
input datafile file number=00043
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.308.1
201804629
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE3_FNO-35_133q795m tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=27
STAMP=1201911835
channel c2: datafile copy complete, elapsed time: 01:22:57
channel c2: starting datafile copy
input datafile file number=00045
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.310.1
201806031
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE3_FNO-38_143q7dd7 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=28
STAMP=1201916184
channel c1: datafile copy complete, elapsed time: 01:23:06
channel c1: starting datafile copy
input datafile file number=00049
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.314.1
201873563
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE3_FNO-40_153q7did tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=29
STAMP=1201916197
channel c3: datafile copy complete, elapsed time: 01:20:24
channel c3: starting datafile copy
input datafile file number=00050
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.315.1
201875477
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE3_FNO-43_163q7dqp tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=30
STAMP=1201916471
channel c4: datafile copy complete, elapsed time: 01:20:40
channel c4: starting datafile copy
input datafile file number=00001
name=+DATA/NTAP/DATAFILE/system.257.1201727295
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSTEM_FNO-1_1a3q7ii2 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=31
STAMP=1201916673
channel c4: datafile copy complete, elapsed time: 00:03:15
channel c4: starting datafile copy
input datafile file number=00003
name=+DATA/NTAP/DATAFILE/sysaux.258.1201727339
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE3_FNO-45_173q7e17 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=32
STAMP=1201916703
channel c2: datafile copy complete, elapsed time: 01:21:05
```

```
channel c2: starting datafile copy
input datafile file number=00004
name=+DATA/NTAP/DATAFILE/undotbs1.259.1201727365
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
UNDOTBS1_FNO-4_1c3q7ipa tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=33
STAMP=1201916821
channel c2: datafile copy complete, elapsed time: 00:01:55
channel c2: starting datafile copy
input datafile file number=00010
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/sysaux.273
.1201729255
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSAUX_FNO-3_1b3q7io5 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=34
STAMP=1201916851
channel c4: datafile copy complete, elapsed time: 00:02:58
channel c4: starting datafile copy
input datafile file number=00014
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/sysaux.278
.1201729279
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSAUX_FNO-10_1d3q7isu tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=35
STAMP=1201916936
channel c2: datafile copy complete, elapsed time: 00:01:52
channel c2: starting datafile copy
input datafile file number=00018
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/sysaux.283
.1201729301
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSAUX_FNO-14_1e3q7itp tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=36
STAMP=1201916940
channel c4: datafile copy complete, elapsed time: 00:01:25
channel c4: starting datafile copy
input datafile file number=00006
name=+DATA/NTAP/86B637B62FE07A65E053F706E80A27CA/DATAFILE/sysaux.267
.1201728307
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSAUX_FNO-6_1g3q7j0e tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=37
STAMP=1201917017
channel c4: datafile copy complete, elapsed time: 00:01:25
channel c4: starting datafile copy
input datafile file number=00009
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/system.272
.1201729255
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSAUX_FNO-18_1f3q7j0e tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=38
STAMP=1201917035
```

```
channel c2: datafile copy complete, elapsed time: 00:01:34
channel c2: starting datafile copy
input datafile file number=00013
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/system.277
.1201729279
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSTEM_FNO-9_1h3q7j35 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=39
STAMP=1201917090
channel c4: datafile copy complete, elapsed time: 00:01:03
channel c4: starting datafile copy
input datafile file number=00017
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/system.282
.1201729301
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSTEM_FNO-13_1i3q7j3d tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=40
STAMP=1201917097
channel c2: datafile copy complete, elapsed time: 00:01:00
channel c2: starting datafile copy
input datafile file number=00005
name=+DATA/NTAP/86B637B62FE07A65E053F706E80A27CA/DATAFILE/system.266
.1201728307
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSTEM_FNO-5_1k3q7j5a tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=42
STAMP=1201917174
channel c2: datafile copy complete, elapsed time: 00:01:25
channel c2: starting datafile copy
input datafile file number=00011
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/undotbs1.2
71.1201729255
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSTEM_FNO-17_1j3q7j56 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=41
STAMP=1201917174
channel c4: datafile copy complete, elapsed time: 00:01:31
channel c4: starting datafile copy
input datafile file number=00008
name=+DATA/NTAP/86B637B62FE07A65E053F706E80A27CA/DATAFILE/undotbs1.2
68.1201728307
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
UNDOTBS1_FNO-11_1l3q7j80 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=44
STAMP=1201917237
channel c2: datafile copy complete, elapsed time: 00:00:56
channel c2: starting datafile copy
input datafile file number=00015
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/undotbs1.2
76.1201729279
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
```

```
UNDOTBS1_FNO-8_1m3q7j82 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=43
STAMP=1201917232
channel c4: datafile copy complete, elapsed time: 00:00:55
channel c4: starting datafile copy
input datafile file number=00019
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/undotbs1.2
81.1201729301
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
UNDOTBS1_FNO-15_1n3q7j9p tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=45
STAMP=1201917288
channel c2: datafile copy complete, elapsed time: 00:00:55
channel c2: starting datafile copy
input datafile file number=00007
name=+DATA/NTAP/DATAFILE/users.260.1201727365
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
UNDOTBS1_FNO-19_1o3q7j9p tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=46
STAMP=1201917295
channel c4: datafile copy complete, elapsed time: 00:00:55
channel c4: starting datafile copy
input datafile file number=00012
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/users.275.
1201729277
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
USERS_FNO-7_1p3q7jbg tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=47
STAMP=1201917297
channel c2: datafile copy complete, elapsed time: 00:00:02
channel c2: starting datafile copy
input datafile file number=00016
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/users.280.
1201729301
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
USERS_FNO-12_1q3q7jbh tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=48
STAMP=1201917297
channel c4: datafile copy complete, elapsed time: 00:00:01
channel c4: starting datafile copy
input datafile file number=00020
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/users.285.
1201729323
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
USERS_FNO-16_1r3q7jbi tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=49
STAMP=1201917298
channel c2: datafile copy complete, elapsed time: 00:00:01
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
USERS_FNO-20_1s3q7jbi tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=50
STAMP=1201917298
channel c4: datafile copy complete, elapsed time: 00:00:01
```

```

output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE3_FNO-50_193q7i95 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=51
STAMP=1201919158
channel c3: datafile copy complete, elapsed time: 00:49:26
output file name=/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SOE3_FNO-49_183q7i95 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=52
STAMP=1201919167
channel c1: datafile copy complete, elapsed time: 00:49:36
Finished backup at 24-MAY-25

Starting Control File and SPFILE Autobackup at 24-MAY-25
piece
handle=/nfsgcnv/archlog/NTAP/autobackup/2025_05_24/o1_mf_s_120191917
3_n32c1775_.bkp comment=NONE
Finished Control File and SPFILE Autobackup at 24-MAY-25
released channel: c1
released channel: c2
released channel: c3
released channel: c4

RMAN> **end-of-file**

RMAN>

```

8. 列出备份后的数据库映像副本，观察到在 GCNV NFS 挂载点中已创建数据库映像副本。

```

RMAN> list copy of database tag 'OraCopyBKUPonGCNV_level_0';

List of Datafile Copies
=====

Key       File S Completion Time Ckp SCN       Ckp Time       Sparse
-----
31        1    A 24-MAY-25      2812886       24-MAY-25      NO
          Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
          SYSTEM_FNO-1_1a3q7ii2
          Tag: ORACOPYBKUPONGCNV_LEVEL_0

34        3    A 24-MAY-25      2813001       24-MAY-25      NO
          Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
          SYSAUX_FNO-3_1b3q7io5
          Tag: ORACOPYBKUPONGCNV_LEVEL_0

33        4    A 24-MAY-25      2813043       24-MAY-25      NO
          Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-

```

```

UNDOTBS1_FNO-4_1c3q7ipa
    Tag: ORACOPYBKUPONGCNV_LEVEL_0

42      5      A 24-MAY-25      2377077      21-MAY-25      NO
    Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSTEM_FNO-5_1k3q7j5a
    Tag: ORACOPYBKUPONGCNV_LEVEL_0
    Container ID: 2, PDB Name: PDB$SEED

37      6      A 24-MAY-25      2377077      21-MAY-25      NO
    Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSAUX_FNO-6_1g3q7j0e
    Tag: ORACOPYBKUPONGCNV_LEVEL_0
    Container ID: 2, PDB Name: PDB$SEED

47      7      A 24-MAY-25      2813504      24-MAY-25      NO
    Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
USERS_FNO-7_1p3q7jbg
    Tag: ORACOPYBKUPONGCNV_LEVEL_0

43      8      A 24-MAY-25      2377077      21-MAY-25      NO
    Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
UNDOTBS1_FNO-8_1m3q7j82
    Tag: ORACOPYBKUPONGCNV_LEVEL_0
    Container ID: 2, PDB Name: PDB$SEED

39      9      A 24-MAY-25      2813238      24-MAY-25      NO
    Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSTEM_FNO-9_1h3q7j35
    Tag: ORACOPYBKUPONGCNV_LEVEL_0
    Container ID: 3, PDB Name: NTAP_PDB1

35      10     A 24-MAY-25      2813112      24-MAY-25      NO
    Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSAUX_FNO-10_1d3q7isu
    Tag: ORACOPYBKUPONGCNV_LEVEL_0
    Container ID: 3, PDB Name: NTAP_PDB1

44      11     A 24-MAY-25      2813425      24-MAY-25      NO
    Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
UNDOTBS1_FNO-11_1l3q7j80
    Tag: ORACOPYBKUPONGCNV_LEVEL_0
    Container ID: 3, PDB Name: NTAP_PDB1

48      12     A 24-MAY-25      2813508      24-MAY-25      NO
    Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-

```

```

USERS_FNO-12_1q3q7jbb
  Tag: ORACOPYBKUPONGCNV_LEVEL_0
  Container ID: 3, PDB Name: NTAP_PDB1

40      13      A 24-MAY-25      2813243      24-MAY-25      NO
  Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSTEM_FNO-13_1i3q7j3d
  Tag: ORACOPYBKUPONGCNV_LEVEL_0
  Container ID: 4, PDB Name: NTAP_PDB2

36      14      A 24-MAY-25      2813124      24-MAY-25      NO
  Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSAUX_FNO-14_1e3q7itp
  Tag: ORACOPYBKUPONGCNV_LEVEL_0
  Container ID: 4, PDB Name: NTAP_PDB2

45      15      A 24-MAY-25      2813463      24-MAY-25      NO
  Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
UNDOTBS1_FNO-15_1n3q7j9p
  Tag: ORACOPYBKUPONGCNV_LEVEL_0
  Container ID: 4, PDB Name: NTAP_PDB2

49      16      A 24-MAY-25      2813512      24-MAY-25      NO
  Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
USERS_FNO-16_1r3q7jbi
  Tag: ORACOPYBKUPONGCNV_LEVEL_0
  Container ID: 4, PDB Name: NTAP_PDB2

41      17      A 24-MAY-25      2813364      24-MAY-25      NO
  Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSTEM_FNO-17_1j3q7j56
  Tag: ORACOPYBKUPONGCNV_LEVEL_0
  Container ID: 5, PDB Name: NTAP_PDB3

38      18      A 24-MAY-25      2813185      24-MAY-25      NO
  Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSAUX_FNO-18_1f3q7j0e
  Tag: ORACOPYBKUPONGCNV_LEVEL_0
  Container ID: 5, PDB Name: NTAP_PDB3

46      19      A 24-MAY-25      2813467      24-MAY-25      NO
  Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
UNDOTBS1_FNO-19_1o3q7j9p
  Tag: ORACOPYBKUPONGCNV_LEVEL_0
  Container ID: 5, PDB Name: NTAP_PDB3

```

50	20	A	24-MAY-25	2813516	24-MAY-25	NO
	Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS- USERS_FNO-20_1s3q7jbi					
	Tag: ORACOPYBKUPONGCNV_LEVEL_0					
	Container ID: 5, PDB Name: NTAP_PDB3					
6	21	A	23-MAY-25	2768847	23-MAY-25	NO
	Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO- 21_0c3q6gvm					
	Tag: ORACOPYBKUPONGCNV_LEVEL_0					
	Container ID: 3, PDB Name: NTAP_PDB1					
7	22	A	23-MAY-25	2768851	23-MAY-25	NO
	Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO- 22_0d3q6gvm					
	Tag: ORACOPYBKUPONGCNV_LEVEL_0					
	Container ID: 3, PDB Name: NTAP_PDB1					
12	23	A	23-MAY-25	2777335	23-MAY-25	NO
	Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO- 23_0m3q6qdr					
	Tag: ORACOPYBKUPONGCNV_LEVEL_0					
	Container ID: 4, PDB Name: NTAP_PDB2					
24	24	A	24-MAY-25	2803186	23-MAY-25	NO
	Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO- 24_103q7818					
	Tag: ORACOPYBKUPONGCNV_LEVEL_0					
	Container ID: 5, PDB Name: NTAP_PDB3					
5	25	A	23-MAY-25	2768856	23-MAY-25	NO
	Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO- 25_0e3q6gvn					
	Tag: ORACOPYBKUPONGCNV_LEVEL_0					
	Container ID: 3, PDB Name: NTAP_PDB1					
15	26	A	23-MAY-25	2777644	23-MAY-25	NO
	Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO- 26_0n3q6qq7					
	Tag: ORACOPYBKUPONGCNV_LEVEL_0					
	Container ID: 4, PDB Name: NTAP_PDB2					
25	27	A	24-MAY-25	2803231	23-MAY-25	NO
	Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO- 27_113q78nk					
	Tag: ORACOPYBKUPONGCNV_LEVEL_0					

Container ID: 5, PDB Name: NTAP\_PDB3

```
4      28      A 23-MAY-25      2768859      23-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-
28_0f3q6gvn
      Tag: ORACOPYBKUPONGCNV_LEVEL_0
      Container ID: 3, PDB Name: NTAP_PDB1

17     29      A 23-MAY-25      2781833      23-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-
29_0o3q6v5h
      Tag: ORACOPYBKUPONGCNV_LEVEL_0
      Container ID: 4, PDB Name: NTAP_PDB2

16     30      A 23-MAY-25      2781842      23-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-
30_0p3q6v6b
      Tag: ORACOPYBKUPONGCNV_LEVEL_0
      Container ID: 4, PDB Name: NTAP_PDB2

26     31      A 24-MAY-25      2803450      23-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-
31_123q791p
      Tag: ORACOPYBKUPONGCNV_LEVEL_0
      Container ID: 5, PDB Name: NTAP_PDB3

8      32      A 23-MAY-25      2773143      23-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-
32_0g3q6lkl
      Tag: ORACOPYBKUPONGCNV_LEVEL_0
      Container ID: 3, PDB Name: NTAP_PDB1

10     33      A 23-MAY-25      2773183      23-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-
33_0h3q6lmf
      Tag: ORACOPYBKUPONGCNV_LEVEL_0
      Container ID: 3, PDB Name: NTAP_PDB1

18     34      A 23-MAY-25      2781890      23-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-
34_0q3q6v7o
      Tag: ORACOPYBKUPONGCNV_LEVEL_0
      Container ID: 4, PDB Name: NTAP_PDB2

27     35      A 24-MAY-25      2803827      23-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-
```

35\_133q795m  
 Tag: ORACOPYBKUPONGCNV\_LEVEL\_0  
 Container ID: 5, PDB Name: NTAP\_PDB3

9 36 A 23-MAY-25 2773193 23-MAY-25 NO  
 Name: /nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-  
 36\_0i3q6ln9  
 Tag: ORACOPYBKUPONGCNV\_LEVEL\_0  
 Container ID: 3, PDB Name: NTAP\_PDB1

19 37 A 23-MAY-25 2782104 23-MAY-25 NO  
 Name: /nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-  
 37\_0r3q6vhu  
 Tag: ORACOPYBKUPONGCNV\_LEVEL\_0  
 Container ID: 4, PDB Name: NTAP\_PDB2

28 38 A 24-MAY-25 2808047 24-MAY-25 NO  
 Name: /nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-  
 38\_143q7dd7  
 Tag: ORACOPYBKUPONGCNV\_LEVEL\_0  
 Container ID: 5, PDB Name: NTAP\_PDB3

20 39 A 23-MAY-25 2786009 23-MAY-25 NO  
 Name: /nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-  
 39\_0s3q73th  
 Tag: ORACOPYBKUPONGCNV\_LEVEL\_0  
 Container ID: 4, PDB Name: NTAP\_PDB2

29 40 A 24-MAY-25 2808169 24-MAY-25 NO  
 Name: /nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-  
 40\_153q7did  
 Tag: ORACOPYBKUPONGCNV\_LEVEL\_0  
 Container ID: 5, PDB Name: NTAP\_PDB3

11 41 A 23-MAY-25 2773323 23-MAY-25 NO  
 Name: /nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-  
 41\_0j3q6ltd  
 Tag: ORACOPYBKUPONGCNV\_LEVEL\_0  
 Container ID: 3, PDB Name: NTAP\_PDB1

21 42 A 23-MAY-25 2786042 23-MAY-25 NO  
 Name: /nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-  
 42\_0t3q73uv  
 Tag: ORACOPYBKUPONGCNV\_LEVEL\_0  
 Container ID: 4, PDB Name: NTAP\_PDB2

30	43	A	24-MAY-25	2808367	24-MAY-25	NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-						
43_163q7dqp						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 5, PDB Name: NTAP_PDB3						
14	44	A	23-MAY-25	2777322	23-MAY-25	NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-						
44_0k3q6qdc						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 3, PDB Name: NTAP_PDB1						
32	45	A	24-MAY-25	2808624	24-MAY-25	NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-						
45_173q7e17						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 5, PDB Name: NTAP_PDB3						
13	46	A	23-MAY-25	2777326	23-MAY-25	NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-						
46_0l3q6qdc						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 3, PDB Name: NTAP_PDB1						
22	47	A	23-MAY-25	2786345	23-MAY-25	NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-						
47_0u3q747i						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 4, PDB Name: NTAP_PDB2						
23	48	A	23-MAY-25	2786456	23-MAY-25	NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-						
48_0v3q74cd						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 4, PDB Name: NTAP_PDB2						
52	49	A	24-MAY-25	2812634	24-MAY-25	NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-						
49_183q7i95						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 5, PDB Name: NTAP_PDB3						
51	50	A	24-MAY-25	2812638	24-MAY-25	NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-						
50_193q7i95						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						

RMAN>

9. 从 Oracle RMAN 命令提示符报告模式以观察当前 VLDB 数据文件是否位于主存储上。

RMAN> report schema;

Report of database schema for database with db\_unique\_name NTAP

List of Permanent Datafiles

=====

File	Size (MB)	Tablespace	RB segs	Datafile Name
1	1070	SYSTEM	YES	+DATA/NTAP/DATAFILE/system.257.1201727295
3	970	SYSAUX	NO	+DATA/NTAP/DATAFILE/sysaux.258.1201727339
4	680	UNDOTBS1	YES	+DATA/NTAP/DATAFILE/undotbs1.259.1201727365
5	400	PDB\$SEED:SYSTEM	NO	+DATA/NTAP/86B637B62FE07A65E053F706E80A27CA/DATAFILE/system.266.1201728307
6	460	PDB\$SEED:SYSAUX	NO	+DATA/NTAP/86B637B62FE07A65E053F706E80A27CA/DATAFILE/sysaux.267.1201728307
7	5	USERS	NO	+DATA/NTAP/DATAFILE/users.260.1201727365
8	235	PDB\$SEED:UNDOTBS1	NO	+DATA/NTAP/86B637B62FE07A65E053F706E80A27CA/DATAFILE/undotbs1.268.1201728307
9	410	NTAP_PDB1:SYSTEM	YES	+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/system.272.1201729255
10	510	NTAP_PDB1:SYSAUX	NO	+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/sysaux.273.1201729255
11	240	NTAP_PDB1:UNDOTBS1	YES	+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/undotbs1.271.1201729255
12	5	NTAP_PDB1:USERS	NO	+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/users.275.1201729277
13	410	NTAP_PDB2:SYSTEM	YES	

```

+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/system.277.1201
729279
14 510 NTAP_PDB2:SYS AUX NO
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/sysaux.278.1201
729279
15 235 NTAP_PDB2:UNDOTBS1 YES
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/undotbs1.276.12
01729279
16 5 NTAP_PDB2:USERS NO
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/users.280.12017
29301
17 410 NTAP_PDB3:SYSTEM YES
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/system.282.1201
729301
18 510 NTAP_PDB3:SYS AUX NO
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/sysaux.283.1201
729301
19 235 NTAP_PDB3:UNDOTBS1 YES
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/undotbs1.281.12
01729301
20 5 NTAP_PDB3:USERS NO
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/users.285.12017
29323
21 30720 NTAP_PDB1:SOE1 NO
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.286.120179
3019
22 30720 NTAP_PDB1:SOE1 NO
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.287.120179
3419
23 30720 NTAP_PDB2:SOE2 NO
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.288.120179
3535
24 30720 NTAP_PDB3:SOE3 NO
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.289.120179
3665
25 30720 NTAP_PDB1:SOE1 NO
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.290.120179
4401
26 30720 NTAP_PDB2:SOE2 NO
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.291.120179
5153
27 30720 NTAP_PDB3:SOE3 NO
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.292.120179
5207
28 30720 NTAP_PDB1:SOE1 NO
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.293.120179

```

5271  
29 30720 NTAP\_PDB2:SOE2 NO  
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.294.120179  
6261  
30 30720 NTAP\_PDB2:SOE2 NO  
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.295.120179  
7317  
31 30720 NTAP\_PDB3:SOE3 NO  
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.296.120179  
7343  
32 30720 NTAP\_PDB1:SOE1 NO  
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.297.120179  
7351  
33 30720 NTAP\_PDB1:SOE1 NO  
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.298.120180  
0805  
34 30720 NTAP\_PDB2:SOE2 NO  
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.300.120180  
0829  
35 30720 NTAP\_PDB3:SOE3 NO  
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.299.120180  
0821  
36 30720 NTAP\_PDB1:SOE1 NO  
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.301.120180  
1969  
37 30720 NTAP\_PDB2:SOE2 NO  
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.302.120180  
2025  
38 30720 NTAP\_PDB3:SOE3 NO  
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.303.120180  
2375  
39 30720 NTAP\_PDB2:SOE2 NO  
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.304.120180  
3375  
40 30720 NTAP\_PDB3:SOE3 NO  
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.305.120180  
3381  
41 30720 NTAP\_PDB1:SOE1 NO  
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.306.120180  
3399  
42 30720 NTAP\_PDB2:SOE2 NO  
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.307.120180  
4601  
43 30720 NTAP\_PDB3:SOE3 NO  
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.308.120180  
4629

```

44  30720  NTAP_PDB1:SOE1  NO
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.309.120180
4651
45  30720  NTAP_PDB3:SOE3  NO
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.310.120180
6031
46  30720  NTAP_PDB1:SOE1  NO
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.312.120180
6095
47  30720  NTAP_PDB2:SOE2  NO
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.311.120180
6051
48  30720  NTAP_PDB2:SOE2  NO
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.313.120187
3549
49  30720  NTAP_PDB3:SOE3  NO
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.314.120187
3563
50  30720  NTAP_PDB3:SOE3  NO
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.315.120187
5477

```

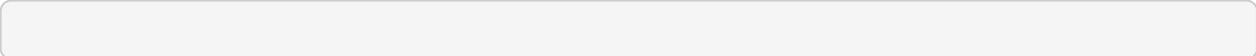
List of Temporary Files

=====

File	Size (MB)	Tablespace	Maxsize (MB)	Tempfile Name
1	123	TEMP	32767	+DATA/NTAP/TEMPFILE/temp.265.1201727469
2	123	PDB\$SEED:TEMP	32767	+DATA/NTAP/35AD01790801A78FE063060B460ABC41/TEMPFILE/temp.269.1201728335
3	16384	NTAP_PDB1:TEMP	32767	+DATA/NTAP/35AD38314E81AF11E063060B460AE362/TEMPFILE/temp.274.1201729271
4	30720	NTAP_PDB2:TEMP	32767	+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/TEMPFILE/temp.279.1201729295
5	30720	NTAP_PDB3:TEMP	32767	+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/TEMPFILE/temp.284.1201729319

RMAN>

10. 验证来自 OS NFS 挂载点的数据库映像副本。



```

[oracle@orap ~]$ ls -l /nfsgcnv/oracopy/
total 954924748
-rw-r----- 1 oracle asm      11600384 May 27 16:25 bct_ntap.ctf
-rw-r----- 1 oracle asm 32212262912 May 23 17:29 data_D-NTAP_I-
1379265854_TS-SOE1_FNO-21_0c3q6gvm
-rw-r----- 1 oracle asm 32212262912 May 23 17:32 data_D-NTAP_I-
1379265854_TS-SOE1_FNO-22_0d3q6gvm
-rw-r----- 1 oracle asm 32212262912 May 23 17:28 data_D-NTAP_I-
1379265854_TS-SOE1_FNO-25_0e3q6gvm
-rw-r----- 1 oracle asm 32212262912 May 23 17:27 data_D-NTAP_I-
1379265854_TS-SOE1_FNO-28_0f3q6gvm
-rw-r----- 1 oracle asm 32212262912 May 23 18:49 data_D-NTAP_I-
1379265854_TS-SOE1_FNO-32_0g3q6lkl
-rw-r----- 1 oracle asm 32212262912 May 23 18:49 data_D-NTAP_I-
1379265854_TS-SOE1_FNO-33_0h3q6lmf
-rw-r----- 1 oracle asm 32212262912 May 23 18:49 data_D-NTAP_I-
1379265854_TS-SOE1_FNO-36_0i3q6ln9
-rw-r----- 1 oracle asm 32212262912 May 23 18:56 data_D-NTAP_I-
1379265854_TS-SOE1_FNO-41_0j3q6ltd
-rw-r----- 1 oracle asm 32212262912 May 23 20:11 data_D-NTAP_I-
1379265854_TS-SOE1_FNO-44_0k3q6qdc
-rw-r----- 1 oracle asm 32212262912 May 23 20:10 data_D-NTAP_I-
1379265854_TS-SOE1_FNO-46_0l3q6qdc
-rw-r----- 1 oracle asm 32212262912 May 23 20:10 data_D-NTAP_I-
1379265854_TS-SOE2_FNO-23_0m3q6qdr
-rw-r----- 1 oracle asm 32212262912 May 23 20:16 data_D-NTAP_I-
1379265854_TS-SOE2_FNO-26_0n3q6qq7
-rw-r----- 1 oracle asm 32212262912 May 23 21:32 data_D-NTAP_I-
1379265854_TS-SOE2_FNO-29_0o3q6v5h
-rw-r----- 1 oracle asm 32212262912 May 23 21:31 data_D-NTAP_I-
1379265854_TS-SOE2_FNO-30_0p3q6v6b
-rw-r----- 1 oracle asm 32212262912 May 23 21:36 data_D-NTAP_I-
1379265854_TS-SOE2_FNO-34_0q3q6v7o
-rw-r----- 1 oracle asm 32212262912 May 23 21:39 data_D-NTAP_I-
1379265854_TS-SOE2_FNO-37_0r3q6vhu
-rw-r----- 1 oracle asm 32212262912 May 23 22:52 data_D-NTAP_I-
1379265854_TS-SOE2_FNO-39_0s3q73th
-rw-r----- 1 oracle asm 32212262912 May 23 22:53 data_D-NTAP_I-
1379265854_TS-SOE2_FNO-42_0t3q73uv
-rw-r----- 1 oracle asm 32212262912 May 23 22:58 data_D-NTAP_I-
1379265854_TS-SOE2_FNO-47_0u3q747i
-rw-r----- 1 oracle asm 32212262912 May 23 23:01 data_D-NTAP_I-
1379265854_TS-SOE2_FNO-48_0v3q74cd
-rw-r----- 1 oracle asm 32212262912 May 24 00:13 data_D-NTAP_I-
1379265854_TS-SOE3_FNO-24_103q7818
-rw-r----- 1 oracle asm 32212262912 May 24 00:16 data_D-NTAP_I-

```

```

1379265854_TS-SOE3_FNO-27_113q78nk
-rw-r----- 1 oracle asm 32212262912 May 24 00:20 data_D-NTAP_I-
1379265854_TS-SOE3_FNO-31_123q791p
-rw-r----- 1 oracle asm 32212262912 May 24 00:23 data_D-NTAP_I-
1379265854_TS-SOE3_FNO-35_133q795m
-rw-r----- 1 oracle asm 32212262912 May 24 01:36 data_D-NTAP_I-
1379265854_TS-SOE3_FNO-38_143q7dd7
-rw-r----- 1 oracle asm 32212262912 May 24 01:36 data_D-NTAP_I-
1379265854_TS-SOE3_FNO-40_153q7did
-rw-r----- 1 oracle asm 32212262912 May 24 01:41 data_D-NTAP_I-
1379265854_TS-SOE3_FNO-43_163q7dqp
-rw-r----- 1 oracle asm 32212262912 May 24 01:45 data_D-NTAP_I-
1379265854_TS-SOE3_FNO-45_173q7e17
-rw-r----- 1 oracle asm 32212262912 May 24 02:26 data_D-NTAP_I-
1379265854_TS-SOE3_FNO-49_183q7i95
-rw-r----- 1 oracle asm 32212262912 May 24 02:25 data_D-NTAP_I-
1379265854_TS-SOE3_FNO-50_193q7i95
-rw-r----- 1 oracle asm 534781952 May 24 01:48 data_D-NTAP_I-
1379265854_TS-SYSAUX_FNO-10_1d3q7isu
-rw-r----- 1 oracle asm 534781952 May 24 01:49 data_D-NTAP_I-
1379265854_TS-SYSAUX_FNO-14_1e3q7itp
-rw-r----- 1 oracle asm 534781952 May 24 01:50 data_D-NTAP_I-
1379265854_TS-SYSAUX_FNO-18_1f3q7j0e
-rw-r----- 1 oracle asm 985669632 May 24 01:47 data_D-NTAP_I-
1379265854_TS-SYSAUX_FNO-3_1b3q7io5
-rw-r----- 1 oracle asm 482353152 May 24 01:50 data_D-NTAP_I-
1379265854_TS-SYSAUX_FNO-6_1g3q7j0e
-rw-r----- 1 oracle asm 1121984512 May 24 01:44 data_D-NTAP_I-
1379265854_TS-SYSTEM_FNO-1_1a3q7ii2
-rw-r----- 1 oracle asm 429924352 May 24 01:51 data_D-NTAP_I-
1379265854_TS-SYSTEM_FNO-13_1i3q7j3d
-rw-r----- 1 oracle asm 429924352 May 24 01:52 data_D-NTAP_I-
1379265854_TS-SYSTEM_FNO-17_1j3q7j56
-rw-r----- 1 oracle asm 419438592 May 24 01:52 data_D-NTAP_I-
1379265854_TS-SYSTEM_FNO-5_1k3q7j5a
-rw-r----- 1 oracle asm 429924352 May 24 01:51 data_D-NTAP_I-
1379265854_TS-SYSTEM_FNO-9_1h3q7j35
-rw-r----- 1 oracle asm 251666432 May 24 01:53 data_D-NTAP_I-
1379265854_TS-UNDOTBS1_FNO-11_1l3q7j80
-rw-r----- 1 oracle asm 246423552 May 24 01:54 data_D-NTAP_I-
1379265854_TS-UNDOTBS1_FNO-15_1n3q7j9p
-rw-r----- 1 oracle asm 246423552 May 24 01:54 data_D-NTAP_I-
1379265854_TS-UNDOTBS1_FNO-19_1o3q7j9p
-rw-r----- 1 oracle asm 713039872 May 24 01:47 data_D-NTAP_I-
1379265854_TS-UNDOTBS1_FNO-4_1c3q7ipa
-rw-r----- 1 oracle asm 246423552 May 24 01:53 data_D-NTAP_I-

```

```

1379265854_TS-UNDOTBS1_FNO-8_1m3q7j82
-rw-r----- 1 oracle asm      5251072 May 24 01:54 data_D-NTAP_I-
1379265854_TS-USERS_FNO-12_1q3q7jbh
-rw-r----- 1 oracle asm      5251072 May 24 01:54 data_D-NTAP_I-
1379265854_TS-USERS_FNO-16_1r3q7jbi
-rw-r----- 1 oracle asm      5251072 May 24 01:54 data_D-NTAP_I-
1379265854_TS-USERS_FNO-20_1s3q7jbi
-rw-r----- 1 oracle asm      5251072 May 24 01:54 data_D-NTAP_I-
1379265854_TS-USERS_FNO-7_1p3q7jbg

```

11. 按照所需的时间间隔，从 crontab 中的简单 UNIX shell 脚本运行 RMAN 备份脚本。

```

[oracle@orap ~]$ cat rman_bkup_merge.sh
#!/usr/bin/sh

log=/home/oracle/logs/ora_bkup_merge_`date +%Y-%m%d-%H%M%S`.log

echo "Begin Oracle DB incremental backup/merge to copy at `date
+%Y-%m%d-%H%M%S`" >> $log

export ORACLE_HOME=/u01/app/oracle/product/19.0.0/NTAP
export ORACLE_SID=NTAP
export PATH=$ORACLE_HOME/bin:$PATH

rman target / nocatalog <<EOF>> $log
@/home/oracle/rman_bkup_merge.cmd
EOF

echo "End Oracle DB incremental backup/merge to copy at `date +%Y-
%m%d-%H%M%S`" >> $log

```

这完成了从 GCNV 存储在服务器内 NFS 挂载上对 Oracle VLDB 备用映像副本备份和合并的设置。

## 使用备份映像副本快速恢复 Oracle VLDB

完全恢复丢失或损坏的 Oracle 数据文件

如果由于主存储问题（例如数据丢失或损坏）而发生故障，数据库可以快速切换到 GCNV NFS 挂载上的映像副本，并恢复到当前状态，而无需数据库还原。消除媒体恢复可大大加快 VLDB 的数据库恢复速度。此用例假设 Oracle VLDB DB 服务器完好无损，并且数据库控制文件、存档日志和当前日志均可供恢复。

1. 以 oracle 用户身份登录主 VLDB 服务器主机并在切换之前创建测试表。

```
[oracle@orap ~]$ sqlplus / as sysdba

SQL*Plus: Release 19.0.0.0.0 - Production on Tue May 27 17:31:23
2025
Version 19.18.0.0.0

Copyright (c) 1982, 2022, Oracle. All rights reserved.

Connected to:
Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 -
Production
Version 19.18.0.0.0

SQL> alter session set container=ntap_pdb1;

Session altered.

SQL> create table test(id integer, dt timestamp, event
varchar(100));

Table created.
```

2. 在测试表中插入一行。该行是在最近的增量备份和合并之后插入的，并且其数据不在备份集中。后续演示将显示数据库完全恢复后，测试行也被恢复。

```
SQL> insert into test values (1, sysdate, 'validate a full recovery
after a switch to DB backup copy on GCNV');

1 row created.

SQL> commit;

Commit complete.
```

3. 通过关闭数据库来模拟故障。

```
SQL> alter session set container=cdb$root;
```

```
Session altered.
```

```
SQL> shutdown immediate;
```

```
Database closed.
```

```
Database dismounted.
```

```
ORACLE instance shut down.
```

4. 以 oracle 用户身份, 通过 RMAN 连接到 Oracle 数据库以切换要复制的数据库。

```
[oracle@orap ~]$ rman target / nocatalog;
```

```
Recovery Manager: Release 19.0.0.0.0 - Production on Tue May 27
```

```
17:40:59 2025
```

```
Version 19.18.0.0.0
```

```
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```

```
connected to target database (not started)
```

```
RMAN> startup mount;
```

```
Oracle instance started
```

```
database mounted
```

```
Total System Global Area      5620363744 bytes
```

```
Fixed Size                      9175520 bytes
```

```
Variable Size                   1023410176 bytes
```

```
Database Buffers                4580179968 bytes
```

```
Redo Buffers                    7598080 bytes
```

```
RMAN> switch database to copy;
```

```
datafile 1 switched to datafile copy "/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SYSTEM_FNO-1_1a3q7ii2"
```

```
datafile 3 switched to datafile copy "/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SYSAUX_FNO-3_1b3q7io5"
```

```
datafile 4 switched to datafile copy "/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-UNDOTBS1_FNO-4_1c3q7ipa"
```

```
datafile 5 switched to datafile copy "/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SYSTEM_FNO-5_1k3q7j5a"
```

```
datafile 6 switched to datafile copy "/nfsgcnv/oracopy/data_D-
```

NTAP\_I-1379265854\_TS-SYSAUX\_FNO-6\_1g3q7j0e"  
datafile 7 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-USERS\_FNO-7\_1p3q7jbg"  
datafile 8 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-UNDOTBS1\_FNO-8\_1m3q7j82"  
datafile 9 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSTEM\_FNO-9\_1h3q7j35"  
datafile 10 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSAUX\_FNO-10\_1d3q7isu"  
datafile 11 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-UNDOTBS1\_FNO-11\_1l3q7j80"  
datafile 12 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-USERS\_FNO-12\_1q3q7jbbh"  
datafile 13 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSTEM\_FNO-13\_1i3q7j3d"  
datafile 14 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSAUX\_FNO-14\_1e3q7itp"  
datafile 15 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-UNDOTBS1\_FNO-15\_1n3q7j9p"  
datafile 16 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-USERS\_FNO-16\_1r3q7jbi"  
datafile 17 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSTEM\_FNO-17\_1j3q7j56"  
datafile 18 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSAUX\_FNO-18\_1f3q7j0e"  
datafile 19 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-UNDOTBS1\_FNO-19\_1o3q7j9p"  
datafile 20 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-USERS\_FNO-20\_1s3q7jbi"  
datafile 21 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SOE1\_FNO-21\_0c3q6gvm"  
datafile 22 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SOE1\_FNO-22\_0d3q6gvm"  
datafile 23 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SOE2\_FNO-23\_0m3q6qdr"  
datafile 24 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SOE3\_FNO-24\_103q7818"  
datafile 25 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SOE1\_FNO-25\_0e3q6gvn"  
datafile 26 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SOE2\_FNO-26\_0n3q6qq7"  
datafile 27 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SOE3\_FNO-27\_1l3q78nk"  
datafile 28 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SOE1\_FNO-28\_0f3q6gvn"  
datafile 29 switched to datafile copy "/nfsgcnv/oracopy/data\_D-

```
NTAP_I-1379265854_TS-SOE2_FNO-29_0o3q6v5h"
datafile 30 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-30_0p3q6v6b"
datafile 31 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-31_123q791p"
datafile 32 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-32_0g3q6lkl"
datafile 33 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-33_0h3q6lmf"
datafile 34 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-34_0q3q6v7o"
datafile 35 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-35_133q795m"
datafile 36 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-36_0i3q6ln9"
datafile 37 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-37_0r3q6vhu"
datafile 38 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-38_143q7dd7"
datafile 39 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-39_0s3q73th"
datafile 40 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-40_153q7did"
datafile 41 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-41_0j3q6ltd"
datafile 42 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-42_0t3q73uv"
datafile 43 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-43_163q7dqp"
datafile 44 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-44_0k3q6qdc"
datafile 45 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-45_173q7e17"
datafile 46 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-46_0l3q6qdc"
datafile 47 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-47_0u3q747i"
datafile 48 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-48_0v3q74cd"
datafile 49 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-49_183q7i95"
datafile 50 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-50_193q7i95"
```

5. 恢复并打开数据库，使其从上次增量备份更新到当前状态。

```
RMAN> recover database;
```

```
Starting recover at 27-MAY-25
```

```
allocated channel: ORA_DISK_1
```

```
channel ORA_DISK_1: SID=139 device type=DISK
```

```
channel ORA_DISK_1: starting incremental datafile backup set restore
```

```
channel ORA_DISK_1: specifying datafile(s) to restore from backup  
set
```

```
destination for restore of datafile 00012: /nfsgcnv/oracopy/data_D-  
NTAP_I-1379265854_TS-USERS_FNO-12_1q3q7jbh
```

```
destination for restore of datafile 00028: /nfsgcnv/oracopy/data_D-  
NTAP_I-1379265854_TS-SOE1_FNO-28_0f3q6gvn
```

```
destination for restore of datafile 00041: /nfsgcnv/oracopy/data_D-  
NTAP_I-1379265854_TS-SOE1_FNO-41_0j3q6ltd
```

```
destination for restore of datafile 00044: /nfsgcnv/oracopy/data_D-  
NTAP_I-1379265854_TS-SOE1_FNO-44_0k3q6qdc
```

```
channel ORA_DISK_1: reading from backup piece
```

```
/nfsgcnv/oracopy/213qh3m5_65_1_1
```

```
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/213qh3m5_65_1_1
```

```
tag=ORACOPYBKUPONGCNV_LEVEL_0
```

```
channel ORA_DISK_1: restored backup piece 1
```

```
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
```

```
channel ORA_DISK_1: starting incremental datafile backup set restore
```

```
channel ORA_DISK_1: specifying datafile(s) to restore from backup  
set
```

```
destination for restore of datafile 00011: /nfsgcnv/oracopy/data_D-  
NTAP_I-1379265854_TS-UNDOTBS1_FNO-11_1l3q7j80
```

```
destination for restore of datafile 00025: /nfsgcnv/oracopy/data_D-  
NTAP_I-1379265854_TS-SOE1_FNO-25_0e3q6gvn
```

```
destination for restore of datafile 00036: /nfsgcnv/oracopy/data_D-  
NTAP_I-1379265854_TS-SOE1_FNO-36_0i3q6ln9
```

```
destination for restore of datafile 00046: /nfsgcnv/oracopy/data_D-  
NTAP_I-1379265854_TS-SOE1_FNO-46_0l3q6qdc
```

```
channel ORA_DISK_1: reading from backup piece
```

```
/nfsgcnv/oracopy/1u3qh3m5_62_1_1
```

```
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/1u3qh3m5_62_1_1
```

```
tag=ORACOPYBKUPONGCNV_LEVEL_0
```

```
channel ORA_DISK_1: restored backup piece 1
```

```
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
```

```
channel ORA_DISK_1: starting incremental datafile backup set restore
```

```
channel ORA_DISK_1: specifying datafile(s) to restore from backup  
set
```

```
destination for restore of datafile 00015: /nfsgcnv/oracopy/data_D-  
NTAP_I-1379265854_TS-UNDOTBS1_FNO-15_1n3q7j9p
```

```
destination for restore of datafile 00029: /nfsgcnv/oracopy/data_D-  
NTAP_I-1379265854_TS-SOE2_FNO-29_0o3q6v5h
```

```
destination for restore of datafile 00039: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-39_0s3q73th
destination for restore of datafile 00048: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-48_0v3q74cd
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/1v3qh3m5_63_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/1v3qh3m5_63_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00019: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-UNDOTBS1_FNO-19_1o3q7j9p
destination for restore of datafile 00031: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-31_123q791p
destination for restore of datafile 00043: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-43_163q7dqp
destination for restore of datafile 00050: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-50_193q7i95
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/203qh3m5_64_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/203qh3m5_64_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00010: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSAUX_FNO-10_1d3q7isu
destination for restore of datafile 00021: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-21_0c3q6gvm
destination for restore of datafile 00032: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-32_0g3q61kl
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/243qh3m7_68_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/243qh3m7_68_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00016: /nfsgcnv/oracopy/data_D-
```

```
NTAP_I-1379265854_TS-USERS_FNO-16_1r3q7jbi
destination for restore of datafile 00030: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-30_0p3q6v6b
destination for restore of datafile 00042: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-42_0t3q73uv
destination for restore of datafile 00047: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-47_0u3q747i
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/223qh3m6_66_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/223qh3m6_66_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00020: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-USERS_FNO-20_1s3q7jbi
destination for restore of datafile 00035: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-35_133q795m
destination for restore of datafile 00045: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-45_173q7e17
destination for restore of datafile 00049: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-49_183q7i95
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/233qh3m7_67_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/233qh3m7_67_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00009: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSTEM_FNO-9_1h3q7j35
destination for restore of datafile 00022: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-22_0d3q6gvm
destination for restore of datafile 00033: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-33_0h3q6lmf
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/273qh3m7_71_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/273qh3m7_71_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
```

```
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00013: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSTEM_FNO-13_1i3q7j3d
destination for restore of datafile 00026: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-26_0n3q6qq7
destination for restore of datafile 00037: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-37_0r3q6vhu
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/283qh3m7_72_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/283qh3m7_72_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00014: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSAUX_FNO-14_1e3q7itp
destination for restore of datafile 00023: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-23_0m3q6qdr
destination for restore of datafile 00034: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-34_0q3q6v7o
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/253qh3m7_69_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/253qh3m7_69_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00018: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSAUX_FNO-18_1f3q7j0e
destination for restore of datafile 00024: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-24_103q78l8
destination for restore of datafile 00038: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-38_143q7dd7
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/263qh3m7_70_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/263qh3m7_70_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:02
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
```

```
set
destination for restore of datafile 00001: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSTEM_FNO-1_1a3q7ii2
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/2a3qh3m9_74_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/2a3qh3m9_74_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00017: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSTEM_FNO-17_1j3q7j56
destination for restore of datafile 00027: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-27_113q78nk
destination for restore of datafile 00040: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-40_153q7did
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/293qh3m9_73_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/293qh3m9_73_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00007: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-USERS_FNO-7_1p3q7jbg
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/2g3qh3ma_80_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/2g3qh3ma_80_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00004: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-UNDOTBS1_FNO-4_1c3q7ipa
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/2c3qh3m9_76_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/2c3qh3m9_76_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:03
```

```
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00003: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSAUX_FNO-3_1b3q7io5
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/2b3qh3m9_75_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/2b3qh3m9_75_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:07
```

```
starting media recovery
media recovery complete, elapsed time: 00:00:04
```

Finished recover at 27-MAY-25

```
RMAN> alter database open;
```

Statement processed

```
RMAN>
```

6. 恢复后从 sqlplus 检查数据库结构，观察到除控制、临时和当前日志文件之外的所有 VLDB 数据文件现在都已切换到 GCNV NFS 文件系统上的副本。

```
[oracle@orap ~]$ sqlplus / as sysdba;

SQL*Plus: Release 19.0.0.0.0 - Production on Tue May 27 17:45:04
2025
Version 19.18.0.0.0

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Connected to:
Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 -
Production
Version 19.18.0.0.0

SQL> show pdbs;

   CON_ID CON_NAME                                OPEN MODE  RESTRICTED
-----
   2 PDB$SEED                                     READ ONLY  NO
   3 NTAP_PDB1                                  READ WRITE NO
```

```

          4 NTAP_PDB2                                READ WRITE NO
          5 NTAP_PDB3                                READ WRITE NO
SQL> select name from v$datafile
       2 union
       3 select name from v$tempfile
       4 union
       5 select name from v$controlfile
       6 union
       7 select member from v$logfile;

NAME
-----
+DATA/NTAP/35AD01790801A78FE063060B460ABC41/TEMPFILE/temp.269.120172
8335
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/TEMPFILE/temp.274.120172
9271
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/TEMPFILE/temp.279.120172
9295
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/TEMPFILE/temp.284.120172
9319
+DATA/NTAP/CONTROLFILE/current.261.1201727423
+DATA/NTAP/ONLINELOG/group_1.262.1201727425
+DATA/NTAP/ONLINELOG/group_2.263.1201727425
+DATA/NTAP/ONLINELOG/group_3.264.1201727425
+DATA/NTAP/TEMPFILE/temp.265.1201727469
+LOGS/NTAP/CONTROLFILE/current.256.1201727423
+LOGS/NTAP/ONLINELOG/group_1.258.1201727433

NAME
-----
+LOGS/NTAP/ONLINELOG/group_2.257.1201727431
+LOGS/NTAP/ONLINELOG/group_3.259.1201727433
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-21_0c3q6gvm
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-22_0d3q6gvm
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-25_0e3q6gvm
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-28_0f3q6gvm
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-32_0g3q6lkl
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-33_0h3q6lmf
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-36_0i3q6ln9
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-41_0j3q6ltd
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-44_0k3q6qdc

NAME
-----

```

-----  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-46\_013q6qdc  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-23\_0m3q6qdr  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-26\_0n3q6qq7  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-29\_0o3q6v5h  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-30\_0p3q6v6b  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-34\_0q3q6v7o  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-37\_0r3q6vhu  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-39\_0s3q73th  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-42\_0t3q73uv  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-47\_0u3q747i  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-48\_0v3q74cd

NAME

-----  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-24\_103q7818  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-27\_113q78nk  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-31\_123q791p  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-35\_133q795m  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-38\_143q7dd7  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-40\_153q7did  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-43\_163q7dqp  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-45\_173q7e17  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-49\_183q7i95  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-50\_193q7i95  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSAUX\_FNO-10\_1d3q7isu

NAME

-----  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSAUX\_FNO-14\_1e3q7itp  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSAUX\_FNO-18\_1f3q7j0e  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSAUX\_FNO-3\_1b3q7io5  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSAUX\_FNO-6\_1g3q7j0e  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSTEM\_FNO-13\_1i3q7j3d  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSTEM\_FNO-17\_1j3q7j56  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSTEM\_FNO-1\_1a3q7ii2  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSTEM\_FNO-5\_1k3q7j5a  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSTEM\_FNO-9\_1h3q7j35  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-UNDOTBS1\_FNO-  
11\_1l3q7j80  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-UNDOTBS1\_FNO-  
15\_1n3q7j9p

NAME

```

-----
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-UNDOTBS1_FNO-
19_1o3q7j9p
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-UNDOTBS1_FNO-4_1c3q7ipa
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-UNDOTBS1_FNO-8_1m3q7j82
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-USERS_FNO-12_1q3q7jbh
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-USERS_FNO-16_1r3q7jbi
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-USERS_FNO-20_1s3q7jbi
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-USERS_FNO-7_1p3q7jbg

```

62 rows selected.

7. 从 SQL plus 中，验证上次增量备份之后和切换到映像备份副本之前我们已惰性的测试行是否已恢复。

```

SQL> alter session set container=ntap_pdb1;

Session altered.

SQL> select * from test;

          ID
-----
DT
-----
EVENT
-----
          1
27-MAY-25 05.35.44.000000 PM
validate a full recovery after a switch to DB backup copy on GCNV

SQL>

```

将 **Oracle VLDB** 从备份副本恢复到主存储

主存储的存储故障修复后，数据库可以轻松地恢复到主存储，并且停机时间最短。以下是分步操作步骤。

1. 从 RMAN 检查 DB 模式当前位于 GCNV 备份存储上。

```
RMAN> report schema;
```

```
Report of database schema for database with db_unique_name NTAP
```

```
List of Permanent Datafiles
```

```
=====
```

File	Size (MB)	Tablespace	RB segs	Datafile Name
1	1070	SYSTEM	YES	/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SYSTEM_FNO-1_1a3q7ii2
3	970	SYSAUX	NO	/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SYSAUX_FNO-3_1b3q7io5
4	680	UNDOTBS1	YES	/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-UNDOTBS1_FNO-4_1c3q7ipa
5	400	PDB\$SEED:SYSTEM	NO	/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SYSTEM_FNO-5_1k3q7j5a
6	460	PDB\$SEED:SYSAUX	NO	/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SYSAUX_FNO-6_1g3q7j0e
7	5	USERS	NO	/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-USERS_FNO-7_1p3q7jbg
8	235	PDB\$SEED:UNDOTBS1	NO	/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-UNDOTBS1_FNO-8_1m3q7j82
9	410	NTAP_PDB1:SYSTEM	YES	/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SYSTEM_FNO-9_1h3q7j35
10	510	NTAP_PDB1:SYSAUX	NO	/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SYSAUX_FNO-10_1d3q7isu
11	240	NTAP_PDB1:UNDOTBS1	YES	/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-UNDOTBS1_FNO-11_1l3q7j80
12	5	NTAP_PDB1:USERS	NO	/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-USERS_FNO-12_1q3q7jbh
13	410	NTAP_PDB2:SYSTEM	YES	/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SYSTEM_FNO-13_1i3q7j3d
14	510	NTAP_PDB2:SYSAUX	NO	/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SYSAUX_FNO-14_1e3q7itp
15	235	NTAP_PDB2:UNDOTBS1	YES	/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-UNDOTBS1_FNO-15_1n3q7j9p
16	5	NTAP_PDB2:USERS	NO	/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-USERS_FNO-16_1r3q7jbi
17	410	NTAP_PDB3:SYSTEM	YES	/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SYSTEM_FNO-17_1j3q7j56
18	510	NTAP_PDB3:SYSAUX	NO	/nfsgcnv/oracopy/data_D-

NTAP_I-1379265854_TS-SYSAUX_FNO-18_1f3q7j0e	19	235	NTAP_PDB3:UNDOTBS1	YES	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-UNDOTBS1_FNO-19_1o3q7j9p	20	5	NTAP_PDB3:USERS	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-USERS_FNO-20_1s3q7jbi	21	30720	NTAP_PDB1:SOE1	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-21_0c3q6gvm	22	30720	NTAP_PDB1:SOE1	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-22_0d3q6gvm	23	30720	NTAP_PDB2:SOE2	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-23_0m3q6qdr	24	30720	NTAP_PDB3:SOE3	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-24_103q7818	25	30720	NTAP_PDB1:SOE1	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-25_0e3q6gvm	26	30720	NTAP_PDB2:SOE2	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-26_0n3q6qq7	27	30720	NTAP_PDB3:SOE3	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-27_113q78nk	28	30720	NTAP_PDB1:SOE1	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-28_0f3q6gvm	29	30720	NTAP_PDB2:SOE2	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-29_0o3q6v5h	30	30720	NTAP_PDB2:SOE2	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-30_0p3q6v6b	31	30720	NTAP_PDB3:SOE3	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-31_123q791p	32	30720	NTAP_PDB1:SOE1	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-32_0g3q61kl	33	30720	NTAP_PDB1:SOE1	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-33_0h3q61mf	34	30720	NTAP_PDB2:SOE2	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-34_0q3q6v7o	35	30720	NTAP_PDB3:SOE3	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-35_133q795m	36	30720	NTAP_PDB1:SOE1	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-36_0i3q61n9	37	30720	NTAP_PDB2:SOE2	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-37_0r3q6vhu	38	30720	NTAP_PDB3:SOE3	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-38_143q7dd7	39	30720	NTAP_PDB2:SOE2	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-39_0s3q73th	40	30720	NTAP_PDB3:SOE3	NO	/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-40_153q7did	41	30720	NTAP_PDB1:SOE1	NO	/nfsgcnv/oracopy/data_D-

```

NTAP_I-1379265854_TS-SOE1_FNO-41_0j3q6ltd
42 30720 NTAP_PDB2:SOE2 NO /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-42_0t3q73uv
43 30720 NTAP_PDB3:SOE3 NO /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-43_163q7dqp
44 30720 NTAP_PDB1:SOE1 NO /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-44_0k3q6qdc
45 30720 NTAP_PDB3:SOE3 NO /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-45_173q7e17
46 30720 NTAP_PDB1:SOE1 NO /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-46_0l3q6qdc
47 30720 NTAP_PDB2:SOE2 NO /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-47_0u3q747i
48 30720 NTAP_PDB2:SOE2 NO /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-48_0v3q74cd
49 30720 NTAP_PDB3:SOE3 NO /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-49_183q7i95
50 30720 NTAP_PDB3:SOE3 NO /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-50_193q7i95

```

List of Temporary Files

=====

File	Size (MB)	Tablespace	Maxsize (MB)	Tempfile Name
1	123	TEMP	32767	+DATA/NTAP/TEMPFILE/temp.265.1201727469
2	123	PDB\$SEED:TEMP	32767	+DATA/NTAP/35AD01790801A78FE063060B460ABC41/TEMPFILE/temp.269.1201728335
3	16384	NTAP_PDB1:TEMP	32767	+DATA/NTAP/35AD38314E81AF11E063060B460AE362/TEMPFILE/temp.274.1201729271
4	30720	NTAP_PDB2:TEMP	32767	+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/TEMPFILE/temp.279.1201729295
5	30720	NTAP_PDB3:TEMP	32767	+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/TEMPFILE/temp.284.1201729319

2. 一旦主数据库切换到映像副本，主数据库现在就是 RMAN 记录中的副本。

```
RMAN> list copy of database;
```

List of Datafile Copies

=====

Key	File S	Completion Time	Ckp SCN	Ckp Time	Sparse
53	1 A	27-MAY-25	2901679	27-MAY-25	NO
Name: +DATA/NTAP/DATAFILE/system.257.1201727295					
54	3 A	27-MAY-25	2901679	27-MAY-25	NO
Name: +DATA/NTAP/DATAFILE/sysaux.258.1201727339					
55	4 A	27-MAY-25	2901679	27-MAY-25	NO
Name: +DATA/NTAP/DATAFILE/undotbs1.259.1201727365					
56	5 A	27-MAY-25	2377077	21-MAY-25	NO
Name:					
+DATA/NTAP/86B637B62FE07A65E053F706E80A27CA/DATAFILE/system.266.1201728307					
Container ID: 2, PDB Name: PDB\$SEED					
57	6 A	27-MAY-25	2377077	21-MAY-25	NO
Name:					
+DATA/NTAP/86B637B62FE07A65E053F706E80A27CA/DATAFILE/sysaux.267.1201728307					
Container ID: 2, PDB Name: PDB\$SEED					
58	7 A	27-MAY-25	2901679	27-MAY-25	NO
Name: +DATA/NTAP/DATAFILE/users.260.1201727365					
59	8 A	27-MAY-25	2377077	21-MAY-25	NO
Name:					
+DATA/NTAP/86B637B62FE07A65E053F706E80A27CA/DATAFILE/undotbs1.268.1201728307					
Container ID: 2, PDB Name: PDB\$SEED					
60	9 A	27-MAY-25	2901354	27-MAY-25	NO
Name:					
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/system.272.1201729255					
Container ID: 3, PDB Name: NTAP_PDB1					
61	10 A	27-MAY-25	2901354	27-MAY-25	NO
Name:					
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/sysaux.273.1201729255					
Container ID: 3, PDB Name: NTAP_PDB1					
62	11 A	27-MAY-25	2901354	27-MAY-25	NO

```

Name:
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/undotbs1.271.12
01729255
Container ID: 3, PDB Name: NTAP_PDB1

63      12      A 27-MAY-25      2901354      27-MAY-25      NO
Name:
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/users.275.12017
29277
Container ID: 3, PDB Name: NTAP_PDB1

64      13      A 27-MAY-25      2901510      27-MAY-25      NO
Name:
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/system.277.1201
729279
Container ID: 4, PDB Name: NTAP_PDB2

65      14      A 27-MAY-25      2901510      27-MAY-25      NO
Name:
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/sysaux.278.1201
729279
Container ID: 4, PDB Name: NTAP_PDB2

66      15      A 27-MAY-25      2901510      27-MAY-25      NO
Name:
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/undotbs1.276.12
01729279
Container ID: 4, PDB Name: NTAP_PDB2

67      16      A 27-MAY-25      2901510      27-MAY-25      NO
Name:
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/users.280.12017
29301
Container ID: 4, PDB Name: NTAP_PDB2

68      17      A 27-MAY-25      2901509      27-MAY-25      NO
Name:
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/system.282.1201
729301
Container ID: 5, PDB Name: NTAP_PDB3

69      18      A 27-MAY-25      2901509      27-MAY-25      NO
Name:
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/sysaux.283.1201
729301
Container ID: 5, PDB Name: NTAP_PDB3

```

70	19	A	27-MAY-25	2901509	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/undotbs1.281.1201729301					
	Container ID: 5, PDB Name: NTAP_PDB3					
71	20	A	27-MAY-25	2901509	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/users.285.1201729323					
	Container ID: 5, PDB Name: NTAP_PDB3					
72	21	A	27-MAY-25	2901354	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.286.1201793019					
	Container ID: 3, PDB Name: NTAP_PDB1					
73	22	A	27-MAY-25	2901354	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.287.1201793419					
	Container ID: 3, PDB Name: NTAP_PDB1					
74	23	A	27-MAY-25	2901510	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.288.1201793535					
	Container ID: 4, PDB Name: NTAP_PDB2					
75	24	A	27-MAY-25	2901509	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.289.1201793665					
	Container ID: 5, PDB Name: NTAP_PDB3					
76	25	A	27-MAY-25	2901354	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.290.1201794401					
	Container ID: 3, PDB Name: NTAP_PDB1					
77	26	A	27-MAY-25	2901510	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.291.1201795153					

Container ID: 4, PDB Name: NTAP\_PDB2

78 27 A 27-MAY-25 2901509 27-MAY-25 NO

Name:

+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.292.120179  
5207

Container ID: 5, PDB Name: NTAP\_PDB3

79 28 A 27-MAY-25 2901354 27-MAY-25 NO

Name:

+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.293.120179  
5271

Container ID: 3, PDB Name: NTAP\_PDB1

80 29 A 27-MAY-25 2901510 27-MAY-25 NO

Name:

+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.294.120179  
6261

Container ID: 4, PDB Name: NTAP\_PDB2

81 30 A 27-MAY-25 2901510 27-MAY-25 NO

Name:

+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.295.120179  
7317

Container ID: 4, PDB Name: NTAP\_PDB2

82 31 A 27-MAY-25 2901509 27-MAY-25 NO

Name:

+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.296.120179  
7343

Container ID: 5, PDB Name: NTAP\_PDB3

83 32 A 27-MAY-25 2901354 27-MAY-25 NO

Name:

+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.297.120179  
7351

Container ID: 3, PDB Name: NTAP\_PDB1

84 33 A 27-MAY-25 2901354 27-MAY-25 NO

Name:

+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.298.120180  
0805

Container ID: 3, PDB Name: NTAP\_PDB1

85 34 A 27-MAY-25 2901510 27-MAY-25 NO

Name:

+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.300.120180  
0829

Container ID: 4, PDB Name: NTAP\_PDB2

86 35 A 27-MAY-25 2901509 27-MAY-25 NO

Name:

+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.299.120180  
0821

Container ID: 5, PDB Name: NTAP\_PDB3

87 36 A 27-MAY-25 2901354 27-MAY-25 NO

Name:

+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.301.120180  
1969

Container ID: 3, PDB Name: NTAP\_PDB1

88 37 A 27-MAY-25 2901510 27-MAY-25 NO

Name:

+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.302.120180  
2025

Container ID: 4, PDB Name: NTAP\_PDB2

89 38 A 27-MAY-25 2901509 27-MAY-25 NO

Name:

+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.303.120180  
2375

Container ID: 5, PDB Name: NTAP\_PDB3

90 39 A 27-MAY-25 2901510 27-MAY-25 NO

Name:

+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.304.120180  
3375

Container ID: 4, PDB Name: NTAP\_PDB2

91 40 A 27-MAY-25 2901509 27-MAY-25 NO

Name:

+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.305.120180  
3381

Container ID: 5, PDB Name: NTAP\_PDB3

92 41 A 27-MAY-25 2901354 27-MAY-25 NO

Name:

+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.306.120180  
3399

Container ID: 3, PDB Name: NTAP\_PDB1

93	42	A	27-MAY-25	2901510	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.307.120180					
	4601					
	Container ID: 4, PDB Name: NTAP_PDB2					
94	43	A	27-MAY-25	2901509	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.308.120180					
	4629					
	Container ID: 5, PDB Name: NTAP_PDB3					
95	44	A	27-MAY-25	2901354	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.309.120180					
	4651					
	Container ID: 3, PDB Name: NTAP_PDB1					
96	45	A	27-MAY-25	2901509	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.310.120180					
	6031					
	Container ID: 5, PDB Name: NTAP_PDB3					
97	46	A	27-MAY-25	2901354	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.312.120180					
	6095					
	Container ID: 3, PDB Name: NTAP_PDB1					
98	47	A	27-MAY-25	2901510	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.311.120180					
	6051					
	Container ID: 4, PDB Name: NTAP_PDB2					
99	48	A	27-MAY-25	2901510	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.313.120187					
	3549					
	Container ID: 4, PDB Name: NTAP_PDB2					
100	49	A	27-MAY-25	2901509	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.314.120187					
	3563					

Container ID: 5, PDB Name: NTAP\_PDB3

```
101      50      A 27-MAY-25      2901509      27-MAY-25      NO
Name:
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.315.120187
5477
```

Container ID: 5, PDB Name: NTAP\_PDB3

3. 如果存在, 请清除主存储上现已过时的数据文件, 以释放空间和/或清除记录。

```
RMAN> delete copy of database;
```

```
allocated channel: ORA_DISK_1
```

```
channel ORA_DISK_1: SID=137 device type=DISK
```

```
List of Datafile Copies
```

```
=====
```

Key	File S	Completion Time	Ckp SCN	Ckp Time	Sparse
53	1 A	27-MAY-25	2901679	27-MAY-25	NO
	Name: +DATA/NTAP/DATAFILE/system.257.1201727295				
54	3 A	27-MAY-25	2901679	27-MAY-25	NO
	Name: +DATA/NTAP/DATAFILE/sysaux.258.1201727339				
55	4 A	27-MAY-25	2901679	27-MAY-25	NO
	Name: +DATA/NTAP/DATAFILE/undotbs1.259.1201727365				
56	5 A	27-MAY-25	2377077	21-MAY-25	NO
	Name:				
	+DATA/NTAP/86B637B62FE07A65E053F706E80A27CA/DATAFILE/system.266.1201728307				
	Container ID: 2, PDB Name: PDB\$SEED				
57	6 A	27-MAY-25	2377077	21-MAY-25	NO
	Name:				
	+DATA/NTAP/86B637B62FE07A65E053F706E80A27CA/DATAFILE/sysaux.267.1201728307				
	Container ID: 2, PDB Name: PDB\$SEED				
58	7 A	27-MAY-25	2901679	27-MAY-25	NO
	Name: +DATA/NTAP/DATAFILE/users.260.1201727365				
59	8 A	27-MAY-25	2377077	21-MAY-25	NO
	Name:				

```

+DATA/NTAP/86B637B62FE07A65E053F706E80A27CA/DATAFILE/undotbs1.268.12
01728307
    Container ID: 2, PDB Name: PDB$SEED

60      9      A 27-MAY-25      2901354      27-MAY-25      NO
    Name:
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/system.272.1201
729255
    Container ID: 3, PDB Name: NTAP_PDB1

61      10     A 27-MAY-25      2901354      27-MAY-25      NO
    Name:
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/sysaux.273.1201
729255
    Container ID: 3, PDB Name: NTAP_PDB1

62      11     A 27-MAY-25      2901354      27-MAY-25      NO
    Name:
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/undotbs1.271.12
01729255
    Container ID: 3, PDB Name: NTAP_PDB1

63      12     A 27-MAY-25      2901354      27-MAY-25      NO
    Name:
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/users.275.12017
29277
    Container ID: 3, PDB Name: NTAP_PDB1

64      13     A 27-MAY-25      2901510      27-MAY-25      NO
    Name:
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/system.277.1201
729279
    Container ID: 4, PDB Name: NTAP_PDB2

65      14     A 27-MAY-25      2901510      27-MAY-25      NO
    Name:
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/sysaux.278.1201
729279
    Container ID: 4, PDB Name: NTAP_PDB2

66      15     A 27-MAY-25      2901510      27-MAY-25      NO
    Name:
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/undotbs1.276.12
01729279
    Container ID: 4, PDB Name: NTAP_PDB2

```

67	16	A	27-MAY-25	2901510	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/users.280.1201729301					
	Container ID: 4, PDB Name: NTAP_PDB2					
68	17	A	27-MAY-25	2901509	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/system.282.1201729301					
	Container ID: 5, PDB Name: NTAP_PDB3					
69	18	A	27-MAY-25	2901509	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/sysaux.283.1201729301					
	Container ID: 5, PDB Name: NTAP_PDB3					
70	19	A	27-MAY-25	2901509	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/undotbs1.281.1201729301					
	Container ID: 5, PDB Name: NTAP_PDB3					
71	20	A	27-MAY-25	2901509	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/users.285.1201729323					
	Container ID: 5, PDB Name: NTAP_PDB3					
72	21	A	27-MAY-25	2901354	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.286.1201793019					
	Container ID: 3, PDB Name: NTAP_PDB1					
73	22	A	27-MAY-25	2901354	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.287.1201793419					
	Container ID: 3, PDB Name: NTAP_PDB1					
74	23	A	27-MAY-25	2901510	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.288.1201793535					

Container ID: 4, PDB Name: NTAP\_PDB2

75 24 A 27-MAY-25 2901509 27-MAY-25 NO

Name:

+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.289.120179  
3665

Container ID: 5, PDB Name: NTAP\_PDB3

76 25 A 27-MAY-25 2901354 27-MAY-25 NO

Name:

+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.290.120179  
4401

Container ID: 3, PDB Name: NTAP\_PDB1

77 26 A 27-MAY-25 2901510 27-MAY-25 NO

Name:

+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.291.120179  
5153

Container ID: 4, PDB Name: NTAP\_PDB2

78 27 A 27-MAY-25 2901509 27-MAY-25 NO

Name:

+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.292.120179  
5207

Container ID: 5, PDB Name: NTAP\_PDB3

79 28 A 27-MAY-25 2901354 27-MAY-25 NO

Name:

+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.293.120179  
5271

Container ID: 3, PDB Name: NTAP\_PDB1

80 29 A 27-MAY-25 2901510 27-MAY-25 NO

Name:

+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.294.120179  
6261

Container ID: 4, PDB Name: NTAP\_PDB2

81 30 A 27-MAY-25 2901510 27-MAY-25 NO

Name:

+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.295.120179  
7317

Container ID: 4, PDB Name: NTAP\_PDB2

82 31 A 27-MAY-25 2901509 27-MAY-25 NO

Name:

+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.296.120179  
7343

Container ID: 5, PDB Name: NTAP\_PDB3

83      32    A 27-MAY-25            2901354      27-MAY-25            NO

Name:

+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.297.120179  
7351

Container ID: 3, PDB Name: NTAP\_PDB1

84      33    A 27-MAY-25            2901354      27-MAY-25            NO

Name:

+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.298.120180  
0805

Container ID: 3, PDB Name: NTAP\_PDB1

85      34    A 27-MAY-25            2901510      27-MAY-25            NO

Name:

+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.300.120180  
0829

Container ID: 4, PDB Name: NTAP\_PDB2

86      35    A 27-MAY-25            2901509      27-MAY-25            NO

Name:

+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.299.120180  
0821

Container ID: 5, PDB Name: NTAP\_PDB3

87      36    A 27-MAY-25            2901354      27-MAY-25            NO

Name:

+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.301.120180  
1969

Container ID: 3, PDB Name: NTAP\_PDB1

88      37    A 27-MAY-25            2901510      27-MAY-25            NO

Name:

+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.302.120180  
2025

Container ID: 4, PDB Name: NTAP\_PDB2

89      38    A 27-MAY-25            2901509      27-MAY-25            NO

Name:

+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.303.120180  
2375

Container ID: 5, PDB Name: NTAP\_PDB3

90	39	A	27-MAY-25	2901510	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.304.120180					
	3375					
	Container ID: 4, PDB Name: NTAP_PDB2					
91	40	A	27-MAY-25	2901509	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.305.120180					
	3381					
	Container ID: 5, PDB Name: NTAP_PDB3					
92	41	A	27-MAY-25	2901354	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.306.120180					
	3399					
	Container ID: 3, PDB Name: NTAP_PDB1					
93	42	A	27-MAY-25	2901510	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.307.120180					
	4601					
	Container ID: 4, PDB Name: NTAP_PDB2					
94	43	A	27-MAY-25	2901509	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.308.120180					
	4629					
	Container ID: 5, PDB Name: NTAP_PDB3					
95	44	A	27-MAY-25	2901354	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.309.120180					
	4651					
	Container ID: 3, PDB Name: NTAP_PDB1					
96	45	A	27-MAY-25	2901509	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.310.120180					
	6031					
	Container ID: 5, PDB Name: NTAP_PDB3					
97	46	A	27-MAY-25	2901354	27-MAY-25	NO
	Name:					
	+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.312.120180					
	6095					

Container ID: 3, PDB Name: NTAP\_PDB1

98 47 A 27-MAY-25 2901510 27-MAY-25 NO

Name:

+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.311.1201806051

Container ID: 4, PDB Name: NTAP\_PDB2

99 48 A 27-MAY-25 2901510 27-MAY-25 NO

Name:

+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.313.1201873549

Container ID: 4, PDB Name: NTAP\_PDB2

100 49 A 27-MAY-25 2901509 27-MAY-25 NO

Name:

+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.314.1201873563

Container ID: 5, PDB Name: NTAP\_PDB3

101 50 A 27-MAY-25 2901509 27-MAY-25 NO

Name:

+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.315.1201875477

Container ID: 5, PDB Name: NTAP\_PDB3

Do you really want to delete the above objects (enter YES or NO)?

YES

deleted datafile copy

datafile copy file name=+DATA/NTAP/DATAFILE/system.257.1201727295

RECID=53 STAMP=1202233336

deleted datafile copy

datafile copy file name=+DATA/NTAP/DATAFILE/sysaux.258.1201727339

RECID=54 STAMP=1202233336

deleted datafile copy

datafile copy file name=+DATA/NTAP/DATAFILE/undotbs1.259.1201727365

RECID=55 STAMP=1202233336

deleted datafile copy

datafile copy file

name=+DATA/NTAP/86B637B62FE07A65E053F706E80A27CA/DATAFILE/system.266

.1201728307 RECID=56 STAMP=1202233336

deleted datafile copy

datafile copy file

name=+DATA/NTAP/86B637B62FE07A65E053F706E80A27CA/DATAFILE/sysaux.267

.1201728307 RECID=57 STAMP=1202233336

deleted datafile copy  
datafile copy file name=+DATA/NTAP/DATAFILE/users.260.1201727365  
RECID=58 STAMP=1202233336  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/86B637B62FE07A65E053F706E80A27CA/DATAFILE/undotbs1.2  
68.1201728307 RECID=59 STAMP=1202233336  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/system.272  
.1201729255 RECID=60 STAMP=1202233336  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/sysaux.273  
.1201729255 RECID=61 STAMP=1202233336  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/undotbs1.2  
71.1201729255 RECID=62 STAMP=1202233336  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/users.275.  
1201729277 RECID=63 STAMP=1202233336  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/system.277  
.1201729279 RECID=64 STAMP=1202233336  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/sysaux.278  
.1201729279 RECID=65 STAMP=1202233337  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/undotbs1.2  
76.1201729279 RECID=66 STAMP=1202233337  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/users.280.  
1201729301 RECID=67 STAMP=1202233337  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/system.282  
.1201729301 RECID=68 STAMP=1202233337  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/sysaux.283

.1201729301 RECID=69 STAMP=1202233337  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/undotbs1.2  
81.1201729301 RECID=70 STAMP=1202233337  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/users.285.  
1201729323 RECID=71 STAMP=1202233337  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.286.1  
201793019 RECID=72 STAMP=1202233337  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.287.1  
201793419 RECID=73 STAMP=1202233337  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.288.1  
201793535 RECID=74 STAMP=1202233337  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.289.1  
201793665 RECID=75 STAMP=1202233337  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.290.1  
201794401 RECID=76 STAMP=1202233337  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.291.1  
201795153 RECID=77 STAMP=1202233337  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.292.1  
201795207 RECID=78 STAMP=1202233337  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.293.1  
201795271 RECID=79 STAMP=1202233337  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.294.1  
201796261 RECID=80 STAMP=1202233337  
deleted datafile copy

datafile copy file  
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.295.1  
201797317 RECID=81 STAMP=1202233338  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.296.1  
201797343 RECID=82 STAMP=1202233338  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.297.1  
201797351 RECID=83 STAMP=1202233338  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.298.1  
201800805 RECID=84 STAMP=1202233338  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.300.1  
201800829 RECID=85 STAMP=1202233338  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.299.1  
201800821 RECID=86 STAMP=1202233338  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.301.1  
201801969 RECID=87 STAMP=1202233338  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.302.1  
201802025 RECID=88 STAMP=1202233338  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.303.1  
201802375 RECID=89 STAMP=1202233338  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.304.1  
201803375 RECID=90 STAMP=1202233338  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.305.1  
201803381 RECID=91 STAMP=1202233338  
deleted datafile copy  
datafile copy file  
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.306.1

```
201803399 RECID=92 STAMP=1202233338
deleted datafile copy
datafile copy file
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.307.1
201804601 RECID=93 STAMP=1202233338
deleted datafile copy
datafile copy file
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.308.1
201804629 RECID=94 STAMP=1202233338
deleted datafile copy
datafile copy file
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.309.1
201804651 RECID=95 STAMP=1202233338
deleted datafile copy
datafile copy file
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.310.1
201806031 RECID=96 STAMP=1202233338
deleted datafile copy
datafile copy file
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.312.1
201806095 RECID=97 STAMP=1202233339
deleted datafile copy
datafile copy file
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.311.1
201806051 RECID=98 STAMP=1202233339
deleted datafile copy
datafile copy file
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.313.1
201873549 RECID=99 STAMP=1202233339
deleted datafile copy
datafile copy file
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.314.1
201873563 RECID=100 STAMP=1202233339
deleted datafile copy
datafile copy file
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.315.1
201875477 RECID=101 STAMP=1202233339
Deleted 49 objects
```

```
RMAN> list copy of database;
```

```
specification does not match any datafile copy in the repository
```

4. 修改 rman 备份和合并脚本以指向主存储，在我们的测试用例中 - RMAN 通道定义中的 ASM 磁盘组 +DATA。执行修改后的备份脚本以在主存储上创建新的映像副本。

```

RMAN> @/home/oracle/rman_bkup_merge.cmd.1

RMAN> RUN
2> {
3>   allocate channel c1 device type disk format '+DATA';
4>   allocate channel c2 device type disk format '+DATA';
5>   allocate channel c3 device type disk format '+DATA';
6>   allocate channel c4 device type disk format '+DATA';
7>   delete obsolete;
8>   sql 'alter system archive log current';
9>   recover copy of database with tag 'OraCopyBKUPonGCNV_level_0';
10>  backup incremental level 1 copies=1 for recover of copy with
tag 'OraCopyBKUPonGCNV_level_0' database;
11> }
released channel: ORA_DISK_1
allocated channel: c1
channel c1: SID=137 device type=DISK

allocated channel: c2
channel c2: SID=397 device type=DISK

allocated channel: c3
channel c3: SID=390 device type=DISK

allocated channel: c4
channel c4: SID=274 device type=DISK

RMAN retention policy will be applied to the command
RMAN retention policy is set to redundancy 1
Deleting the following obsolete backups and copies:
Type                Key      Completion Time      Filename/Handle
-----
Backup Set          12      24-MAY-25
  Backup Piece      12      24-MAY-25
/nfsgcnv/archlog/NTAP/autobackup/2025_05_24/o1_mf_s_1201919173_n32c1
775_.bkp
deleted backup piece
backup piece
handle=/nfsgcnv/archlog/NTAP/autobackup/2025_05_24/o1_mf_s_120191917
3_n32c1775_.bkp RECID=12 STAMP=1201919175
Deleted 1 objects

sql statement: alter system archive log current

Starting recover at 27-MAY-25

```

no copy of datafile 1 found to recover  
no copy of datafile 3 found to recover  
no copy of datafile 4 found to recover  
no copy of datafile 5 found to recover  
no copy of datafile 6 found to recover  
no copy of datafile 7 found to recover  
no copy of datafile 8 found to recover  
no copy of datafile 9 found to recover  
no copy of datafile 10 found to recover  
no copy of datafile 11 found to recover  
no copy of datafile 12 found to recover  
no copy of datafile 13 found to recover  
no copy of datafile 14 found to recover  
no copy of datafile 15 found to recover  
no copy of datafile 16 found to recover  
no copy of datafile 17 found to recover  
no copy of datafile 18 found to recover  
no copy of datafile 19 found to recover  
no copy of datafile 20 found to recover  
no copy of datafile 21 found to recover  
no copy of datafile 22 found to recover  
no copy of datafile 23 found to recover  
no copy of datafile 24 found to recover  
no copy of datafile 25 found to recover  
no copy of datafile 26 found to recover  
no copy of datafile 27 found to recover  
no copy of datafile 28 found to recover  
no copy of datafile 29 found to recover  
no copy of datafile 30 found to recover  
no copy of datafile 31 found to recover  
no copy of datafile 32 found to recover  
no copy of datafile 33 found to recover  
no copy of datafile 34 found to recover  
no copy of datafile 35 found to recover  
no copy of datafile 36 found to recover  
no copy of datafile 37 found to recover  
no copy of datafile 38 found to recover  
no copy of datafile 39 found to recover  
no copy of datafile 40 found to recover  
no copy of datafile 41 found to recover  
no copy of datafile 42 found to recover  
no copy of datafile 43 found to recover  
no copy of datafile 44 found to recover  
no copy of datafile 45 found to recover  
no copy of datafile 46 found to recover  
no copy of datafile 47 found to recover

no copy of datafile 48 found to recover  
no copy of datafile 49 found to recover  
no copy of datafile 50 found to recover  
Finished recover at 27-MAY-25

Starting backup at 27-MAY-25

no parent backup or copy of datafile 1 found  
no parent backup or copy of datafile 3 found  
no parent backup or copy of datafile 4 found  
no parent backup or copy of datafile 7 found  
no parent backup or copy of datafile 6 found  
no parent backup or copy of datafile 5 found  
no parent backup or copy of datafile 8 found  
no parent backup or copy of datafile 21 found  
no parent backup or copy of datafile 22 found  
no parent backup or copy of datafile 25 found  
no parent backup or copy of datafile 28 found  
no parent backup or copy of datafile 32 found  
no parent backup or copy of datafile 33 found  
no parent backup or copy of datafile 36 found  
no parent backup or copy of datafile 41 found  
no parent backup or copy of datafile 44 found  
no parent backup or copy of datafile 46 found  
no parent backup or copy of datafile 10 found  
no parent backup or copy of datafile 9 found  
no parent backup or copy of datafile 11 found  
no parent backup or copy of datafile 12 found  
no parent backup or copy of datafile 23 found  
no parent backup or copy of datafile 26 found  
no parent backup or copy of datafile 29 found  
no parent backup or copy of datafile 30 found  
no parent backup or copy of datafile 34 found  
no parent backup or copy of datafile 37 found  
no parent backup or copy of datafile 39 found  
no parent backup or copy of datafile 42 found  
no parent backup or copy of datafile 47 found  
no parent backup or copy of datafile 48 found  
no parent backup or copy of datafile 14 found  
no parent backup or copy of datafile 13 found  
no parent backup or copy of datafile 15 found  
no parent backup or copy of datafile 16 found  
no parent backup or copy of datafile 24 found  
no parent backup or copy of datafile 27 found  
no parent backup or copy of datafile 31 found  
no parent backup or copy of datafile 35 found  
no parent backup or copy of datafile 38 found

```
no parent backup or copy of datafile 40 found
no parent backup or copy of datafile 43 found
no parent backup or copy of datafile 45 found
no parent backup or copy of datafile 49 found
no parent backup or copy of datafile 50 found
no parent backup or copy of datafile 18 found
no parent backup or copy of datafile 17 found
no parent backup or copy of datafile 19 found
no parent backup or copy of datafile 20 found
channel c1: starting datafile copy
input datafile file number=00021 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-21_0c3q6gvm
channel c2: starting datafile copy
input datafile file number=00022 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-22_0d3q6gvm
channel c3: starting datafile copy
input datafile file number=00025 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-25_0e3q6gvm
channel c4: starting datafile copy
input datafile file number=00028 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-28_0f3q6gvm
output file
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.313.1
202239779 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=148 STAMP=1202243608
channel c2: datafile copy complete, elapsed time: 01:03:56
channel c2: starting datafile copy
input datafile file number=00032 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-32_0g3q6lkl
output file
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.311.1
202239779 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=149 STAMP=1202243617
channel c3: datafile copy complete, elapsed time: 01:03:60
channel c3: starting datafile copy
input datafile file number=00033 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-33_0h3q6lmf
output file
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.315.1
202239779 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=150 STAMP=1202243621
channel c1: datafile copy complete, elapsed time: 01:04:03
channel c1: starting datafile copy
input datafile file number=00036 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-36_0i3q6ln9
output file
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.314.1
202239779 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=151 STAMP=1202243625
channel c4: datafile copy complete, elapsed time: 01:04:11
```

```
channel c4: starting datafile copy
input datafile file number=00041 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-41_0j3q6ltd
output file
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.312.1
202243617 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=153 STAMP=1202247449
channel c2: datafile copy complete, elapsed time: 01:03:60
channel c2: starting datafile copy
input datafile file number=00044 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-44_0k3q6qdc
output file
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.310.1
202243619 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=152 STAMP=1202247446
channel c3: datafile copy complete, elapsed time: 01:03:57
channel c3: starting datafile copy
input datafile file number=00046 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-46_0l3q6qdc
output file
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.308.1
202243631 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=154 STAMP=1202247463
channel c4: datafile copy complete, elapsed time: 01:04:02
channel c4: starting datafile copy
input datafile file number=00023 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-23_0m3q6qdr
output file
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.309.1
202243625 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=155 STAMP=1202247473
channel c1: datafile copy complete, elapsed time: 01:04:12
channel c1: starting datafile copy
input datafile file number=00026 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-26_0n3q6qq7
output file
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.307.1
202247457 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=156 STAMP=1202251305
channel c2: datafile copy complete, elapsed time: 01:04:15
channel c2: starting datafile copy
input datafile file number=00029 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-29_0o3q6v5h
output file
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.306.1
202247457 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=157 STAMP=1202251305
channel c3: datafile copy complete, elapsed time: 01:04:15
channel c3: starting datafile copy
input datafile file number=00030 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-30_0p3q6v6b
output file
```

```
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.305.1
202247473 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=158 STAMP=1202251311
channel c4: datafile copy complete, elapsed time: 01:04:01
channel c4: starting datafile copy
input datafile file number=00034 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-34_0q3q6v7o
output file
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.304.1
202247477 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=159 STAMP=1202251313
channel c1: datafile copy complete, elapsed time: 01:03:59
channel c1: starting datafile copy
input datafile file number=00037 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-37_0r3q6vhu
output file
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.302.1
202251311 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=160 STAMP=1202255139
channel c3: datafile copy complete, elapsed time: 01:03:48
channel c3: starting datafile copy
input datafile file number=00039 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-39_0s3q73th
output file
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.303.1
202251311 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=161 STAMP=1202255150
channel c2: datafile copy complete, elapsed time: 01:04:04
channel c2: starting datafile copy
input datafile file number=00042 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-42_0t3q73uv
output file
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.301.1
202251313 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=162 STAMP=1202255155
channel c4: datafile copy complete, elapsed time: 01:04:03
channel c4: starting datafile copy
input datafile file number=00047 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-47_0u3q747i
output file
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.299.1
202251315 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=163 STAMP=1202255166
channel c1: datafile copy complete, elapsed time: 01:04:17
channel c1: starting datafile copy
input datafile file number=00048 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-48_0v3q74cd
output file
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.298.1
202255157 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=164 STAMP=1202258984
channel c2: datafile copy complete, elapsed time: 01:03:51
channel c2: starting datafile copy
```

```
input datafile file number=00024 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-24_103q78l8
output file
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.297.1
202255157 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=165 STAMP=1202258992
channel c4: datafile copy complete, elapsed time: 01:03:59
channel c4: starting datafile copy
input datafile file number=00027 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-27_113q78nk
output file
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.296.1
202255171 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=166 STAMP=1202259002
channel c1: datafile copy complete, elapsed time: 01:03:59
channel c1: starting datafile copy
input datafile file number=00031 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-31_123q791p
output file
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.300.1
202255141 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=167 STAMP=1202259003
channel c3: datafile copy complete, elapsed time: 01:04:30
channel c3: starting datafile copy
input datafile file number=00035 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-35_133q795m
output file
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.295.1
202258989 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=168 STAMP=1202262811
channel c2: datafile copy complete, elapsed time: 01:03:49
channel c2: starting datafile copy
input datafile file number=00038 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-38_143q7dd7
output file
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.294.1
202258997 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=169 STAMP=1202262817
channel c4: datafile copy complete, elapsed time: 01:03:43
channel c4: starting datafile copy
input datafile file number=00040 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-40_153q7did
output file
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.292.1
202259011 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=170 STAMP=1202262857
channel c3: datafile copy complete, elapsed time: 01:04:13
channel c3: starting datafile copy
input datafile file number=00043 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-43_163q7dqp
output file
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.293.1
```

202259011 tag=ORACOPYBKUPONGCNV\_LEVEL\_0 RECID=171 STAMP=1202262866  
channel c1: datafile copy complete, elapsed time: 01:04:16  
channel c1: starting datafile copy  
input datafile file number=00045 name=/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SOE3\_FNO-45\_173q7e17  
output file  
name+=DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.291.1  
202262817 tag=ORACOPYBKUPONGCNV\_LEVEL\_0 RECID=172 STAMP=1202266648  
channel c2: datafile copy complete, elapsed time: 01:03:56  
channel c2: starting datafile copy  
input datafile file number=00049 name=/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SOE3\_FNO-49\_183q7i95  
output file  
name+=DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.290.1  
202262819 tag=ORACOPYBKUPONGCNV\_LEVEL\_0 RECID=173 STAMP=1202266665  
channel c4: datafile copy complete, elapsed time: 01:04:10  
channel c4: starting datafile copy  
input datafile file number=00050 name=/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SOE3\_FNO-50\_193q7i95  
output file  
name+=DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.288.1  
202262869 tag=ORACOPYBKUPONGCNV\_LEVEL\_0 RECID=174 STAMP=1202266695  
channel c1: datafile copy complete, elapsed time: 01:03:56  
channel c1: starting datafile copy  
input datafile file number=00001 name=/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSTEM\_FNO-1\_1a3q7ii2  
output file  
name+=DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.289.1  
202262865 tag=ORACOPYBKUPONGCNV\_LEVEL\_0 RECID=175 STAMP=1202266710  
channel c3: datafile copy complete, elapsed time: 01:04:08  
channel c3: starting datafile copy  
input datafile file number=00003 name=/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSAUX\_FNO-3\_1b3q7io5  
output file name+=DATA/NTAP/DATAFILE/sysaux.281.1202266713  
tag=ORACOPYBKUPONGCNV\_LEVEL\_0 RECID=176 STAMP=1202266836  
channel c3: datafile copy complete, elapsed time: 00:02:06  
channel c3: starting datafile copy  
input datafile file number=00004 name=/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-UNDOTBS1\_FNO-4\_1c3q7ipa  
output file name+=DATA/NTAP/DATAFILE/system.285.1202266707  
tag=ORACOPYBKUPONGCNV\_LEVEL\_0 RECID=177 STAMP=1202266837  
channel c1: datafile copy complete, elapsed time: 00:02:14  
channel c1: starting datafile copy  
input datafile file number=00010 name=/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSAUX\_FNO-10\_1d3q7isu  
output file

```
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/sysaux.282
.1202266839 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=178 STAMP=1202266904
channel c1: datafile copy complete, elapsed time: 00:01:15
channel c1: starting datafile copy
input datafile file number=00014 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSAUX_FNO-14_1e3q7itp
output file name=+DATA/NTAP/DATAFILE/undotbs1.283.1202266839
tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=179 STAMP=1202266919
channel c3: datafile copy complete, elapsed time: 00:01:24
channel c3: starting datafile copy
input datafile file number=00018 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSAUX_FNO-18_1f3q7j0e
output file
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/sysaux.280
.1202266915 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=180 STAMP=1202266976
channel c1: datafile copy complete, elapsed time: 00:01:03
channel c1: starting datafile copy
input datafile file number=00006 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSAUX_FNO-6_1g3q7j0e
output file
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/sysaux.276
.1202266923 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=181 STAMP=1202266987
channel c3: datafile copy complete, elapsed time: 00:01:10
channel c3: starting datafile copy
input datafile file number=00009 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSTEM_FNO-9_1h3q7j35
output file
name=+DATA/NTAP/35AD01790801A78FE063060B460ABC41/DATAFILE/sysaux.278
.1202266977 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=182 STAMP=1202267033
channel c1: datafile copy complete, elapsed time: 00:01:00
channel c1: starting datafile copy
input datafile file number=00013 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSTEM_FNO-13_1i3q7j3d
output file
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/system.277
.1202266995 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=183 STAMP=1202267043
channel c3: datafile copy complete, elapsed time: 00:00:53
channel c3: starting datafile copy
input datafile file number=00017 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSTEM_FNO-17_1j3q7j56
output file
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/system.275
.1202267039 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=184 STAMP=1202267089
channel c1: datafile copy complete, elapsed time: 00:00:53
channel c1: starting datafile copy
input datafile file number=00005 name=/nfsgcnv/oracopy/data_D-
```

```
NTAP_I-1379265854_TS-SYSTEM_FNO-5_1k3q7j5a
output file
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/system.271
.1202267047 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=185 STAMP=1202267099
channel c3: datafile copy complete, elapsed time: 00:01:00
channel c3: starting datafile copy
input datafile file number=00011 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-UNDOTBS1_FNO-11_1l3q7j80
output file
name=+DATA/NTAP/35AD01790801A78FE063060B460ABC41/DATAFILE/system.273
.1202267093 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=186 STAMP=1202267137
channel c1: datafile copy complete, elapsed time: 00:00:51
channel c1: starting datafile copy
input datafile file number=00008 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-UNDOTBS1_FNO-8_1m3q7j82
output file
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/undotbs1.2
72.1202267109 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=187
STAMP=1202267138
channel c3: datafile copy complete, elapsed time: 00:00:35
channel c3: starting datafile copy
input datafile file number=00015 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-UNDOTBS1_FNO-15_1n3q7j9p
output file
name=+DATA/NTAP/35AD01790801A78FE063060B460ABC41/DATAFILE/undotbs1.2
68.1202267143 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=188
STAMP=1202267172
channel c1: datafile copy complete, elapsed time: 00:00:36
channel c1: starting datafile copy
input datafile file number=00019 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-UNDOTBS1_FNO-19_1o3q7j9p
output file
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/undotbs1.2
60.1202267143 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=189
STAMP=1202267172
channel c3: datafile copy complete, elapsed time: 00:00:35
channel c3: starting datafile copy
input datafile file number=00007 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-USERS_FNO-7_1p3q7jbg
output file name=+DATA/NTAP/DATAFILE/users.266.1202267179
tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=190 STAMP=1202267179
channel c3: datafile copy complete, elapsed time: 00:00:01
channel c3: starting datafile copy
input datafile file number=00012 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-USERS_FNO-12_1q3q7jbh
output file
```

```
name=+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/users.259.
1202267181 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=191 STAMP=1202267182
channel c3: datafile copy complete, elapsed time: 00:00:03
channel c3: starting datafile copy
input datafile file number=00016 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-USERS_FNO-16_1r3q7jbi
output file
name=+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/users.258.
1202267185 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=192 STAMP=1202267185
channel c3: datafile copy complete, elapsed time: 00:00:03
channel c3: starting datafile copy
input datafile file number=00020 name=/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-USERS_FNO-20_1s3q7jbi
output file
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/users.257.
1202267189 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=193 STAMP=1202267190
channel c3: datafile copy complete, elapsed time: 00:00:03
output file
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/undotbs1.2
67.1202267179 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=194
STAMP=1202267199
channel c1: datafile copy complete, elapsed time: 00:00:24
output file
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.287.1
202266655 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=195 STAMP=1202268827
channel c2: datafile copy complete, elapsed time: 00:36:19
output file
name=+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.286.1
202266669 tag=ORACOPYBKUPONGCNV_LEVEL_0 RECID=196 STAMP=1202268833
channel c4: datafile copy complete, elapsed time: 00:36:14
Finished backup at 28-MAY-25

Starting Control File and SPFILE Autobackup at 28-MAY-25
piece
handle=/nfsgcnv/archlog/NTAP/autobackup/2025_05_28/o1_mf_s_120226884
2_n3f11d04_.bkp comment=NONE
Finished Control File and SPFILE Autobackup at 28-MAY-25
released channel: c1
released channel: c2
released channel: c3
released channel: c4
```

```
RMAN> **end-of-file**
```

```
RMAN>
```

5. 验证现在在主存储上是否创建了新的 VLDB 映像副本。

```
RMAN> list copy of database;
```

```
List of Datafile Copies
```

```
=====
```

Key	File S	Completion Time	Ckp SCN	Ckp Time	Sparse
177	1 A	28-MAY-25	2951405	28-MAY-25	NO
	Name: +DATA/NTAP/DATAFILE/system.285.1202266707				
	Tag: ORACOPYBKUPONGCNV_LEVEL_0				
176	3 A	28-MAY-25	2951427	28-MAY-25	NO
	Name: +DATA/NTAP/DATAFILE/sysaux.281.1202266713				
	Tag: ORACOPYBKUPONGCNV_LEVEL_0				
179	4 A	28-MAY-25	2951801	28-MAY-25	NO
	Name: +DATA/NTAP/DATAFILE/undotbs1.283.1202266839				
	Tag: ORACOPYBKUPONGCNV_LEVEL_0				
186	5 A	28-MAY-25	2377077	21-MAY-25	NO
	Name:				
	+DATA/NTAP/35AD01790801A78FE063060B460ABC41/DATAFILE/system.273.1202267093				
	Tag: ORACOPYBKUPONGCNV_LEVEL_0				
	Container ID: 2, PDB Name: PDB\$SEED				
182	6 A	28-MAY-25	2377077	21-MAY-25	NO
	Name:				
	+DATA/NTAP/35AD01790801A78FE063060B460ABC41/DATAFILE/sysaux.278.1202266977				
	Tag: ORACOPYBKUPONGCNV_LEVEL_0				
	Container ID: 2, PDB Name: PDB\$SEED				
190	7 A	28-MAY-25	2952103	28-MAY-25	NO
	Name: +DATA/NTAP/DATAFILE/users.266.1202267179				
	Tag: ORACOPYBKUPONGCNV_LEVEL_0				
188	8 A	28-MAY-25	2377077	21-MAY-25	NO
	Name:				
	+DATA/NTAP/35AD01790801A78FE063060B460ABC41/DATAFILE/undotbs1.268.1202267143				
	Tag: ORACOPYBKUPONGCNV_LEVEL_0				
	Container ID: 2, PDB Name: PDB\$SEED				

183	9	A	28-MAY-25	2951919	28-MAY-25	NO
Name:						
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/system.277.1202 266995						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 3, PDB Name: NTAP_PDB1						
178	10	A	28-MAY-25	2951806	28-MAY-25	NO
Name:						
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/sysaux.282.1202 266839						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 3, PDB Name: NTAP_PDB1						
187	11	A	28-MAY-25	2952000	28-MAY-25	NO
Name:						
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/undotbs1.272.12 02267109						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 3, PDB Name: NTAP_PDB1						
191	12	A	28-MAY-25	2952108	28-MAY-25	NO
Name:						
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/users.259.1202 67181						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 3, PDB Name: NTAP_PDB1						
184	13	A	28-MAY-25	2951954	28-MAY-25	NO
Name:						
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/system.275.1202 267039						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 4, PDB Name: NTAP_PDB2						
180	14	A	28-MAY-25	2951863	28-MAY-25	NO
Name:						
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/sysaux.280.1202 266915						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 4, PDB Name: NTAP_PDB2						
189	15	A	28-MAY-25	2952084	28-MAY-25	NO
Name:						
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/undotbs1.260.12 02267143						

```

Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 4, PDB Name: NTAP_PDB2

192      16      A 28-MAY-25      2952113      28-MAY-25      NO
Name:
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/users.258.12022
67185

Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 4, PDB Name: NTAP_PDB2

185      17      A 28-MAY-25      2951961      28-MAY-25      NO
Name:
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/system.271.1202
267047

Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 5, PDB Name: NTAP_PDB3

181      18      A 28-MAY-25      2951870      28-MAY-25      NO
Name:
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/sysaux.276.1202
266923

Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 5, PDB Name: NTAP_PDB3

194      19      A 28-MAY-25      2952099      28-MAY-25      NO
Name:
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/undotbs1.267.12
02267179

Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 5, PDB Name: NTAP_PDB3

193      20      A 28-MAY-25      2952119      28-MAY-25      NO
Name:
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/users.257.12022
67189

Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 5, PDB Name: NTAP_PDB3

150      21      A 27-MAY-25      2912326      27-MAY-25      NO
Name:
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.315.120223
9779

Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 3, PDB Name: NTAP_PDB1

148      22      A 27-MAY-25      2912334      27-MAY-25      NO

```

```

Name:
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.313.120223
9779
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 3, PDB Name: NTAP_PDB1

158      23      A 27-MAY-25      2919519      27-MAY-25      NO
Name:
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.305.120224
7473
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 4, PDB Name: NTAP_PDB2

168      24      A 28-MAY-25      2943784      28-MAY-25      NO
Name:
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.295.120225
8989
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 5, PDB Name: NTAP_PDB3

149      25      A 27-MAY-25      2912330      27-MAY-25      NO
Name:
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.311.120223
9779
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 3, PDB Name: NTAP_PDB1

159      26      A 27-MAY-25      2919524      27-MAY-25      NO
Name:
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.304.120224
7477
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 4, PDB Name: NTAP_PDB2

169      27      A 28-MAY-25      2943790      28-MAY-25      NO
Name:
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.294.120225
8997
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 5, PDB Name: NTAP_PDB3

151      28      A 27-MAY-25      2912331      27-MAY-25      NO
Name:
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.314.120223
9779
Tag: ORACOPYBKUPONGCNV_LEVEL_0

```

Container ID: 3, PDB Name: NTAP\_PDB1

161 29 A 27-MAY-25 2936579 27-MAY-25 NO

Name:

+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.303.120225  
1311

Tag: ORACOPYBKUPONGCNV\_LEVEL\_0

Container ID: 4, PDB Name: NTAP\_PDB2

160 30 A 27-MAY-25 2936583 27-MAY-25 NO

Name:

+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.302.120225  
1311

Tag: ORACOPYBKUPONGCNV\_LEVEL\_0

Container ID: 4, PDB Name: NTAP\_PDB2

171 31 A 28-MAY-25 2943799 28-MAY-25 NO

Name:

+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.293.120225  
9011

Tag: ORACOPYBKUPONGCNV\_LEVEL\_0

Container ID: 5, PDB Name: NTAP\_PDB3

153 32 A 27-MAY-25 2915938 27-MAY-25 NO

Name:

+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.312.120224  
3617

Tag: ORACOPYBKUPONGCNV\_LEVEL\_0

Container ID: 3, PDB Name: NTAP\_PDB1

152 33 A 27-MAY-25 2915943 27-MAY-25 NO

Name:

+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.310.120224  
3619

Tag: ORACOPYBKUPONGCNV\_LEVEL\_0

Container ID: 3, PDB Name: NTAP\_PDB1

162 34 A 27-MAY-25 2936588 27-MAY-25 NO

Name:

+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.301.120225  
1313

Tag: ORACOPYBKUPONGCNV\_LEVEL\_0

Container ID: 4, PDB Name: NTAP\_PDB2

170 35 A 28-MAY-25 2943803 28-MAY-25 NO

Name:

```

+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.292.120225
9011
    Tag: ORACOPYBKUPONGCNV_LEVEL_0
    Container ID: 5, PDB Name: NTAP_PDB3

155    36    A 27-MAY-25          2915949    27-MAY-25    NO
    Name:
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.309.120224
3625
    Tag: ORACOPYBKUPONGCNV_LEVEL_0
    Container ID: 3, PDB Name: NTAP_PDB1

163    37    A 27-MAY-25          2936592    27-MAY-25    NO
    Name:
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.299.120225
1315
    Tag: ORACOPYBKUPONGCNV_LEVEL_0
    Container ID: 4, PDB Name: NTAP_PDB2

172    38    A 28-MAY-25          2947486    28-MAY-25    NO
    Name:
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.291.120226
2817
    Tag: ORACOPYBKUPONGCNV_LEVEL_0
    Container ID: 5, PDB Name: NTAP_PDB3

167    39    A 28-MAY-25          2940255    27-MAY-25    NO
    Name:
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.300.120225
5141
    Tag: ORACOPYBKUPONGCNV_LEVEL_0
    Container ID: 4, PDB Name: NTAP_PDB2

173    40    A 28-MAY-25          2947490    28-MAY-25    NO
    Name:
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.290.120226
2819
    Tag: ORACOPYBKUPONGCNV_LEVEL_0
    Container ID: 5, PDB Name: NTAP_PDB3

154    41    A 27-MAY-25          2915970    27-MAY-25    NO
    Name:
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.308.120224
3631
    Tag: ORACOPYBKUPONGCNV_LEVEL_0
    Container ID: 3, PDB Name: NTAP_PDB1

```

164	42	A	28-MAY-25	2940264	27-MAY-25	NO
Name:						
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.298.1202255157						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 4, PDB Name: NTAP_PDB2						
175	43	A	28-MAY-25	2947509	28-MAY-25	NO
Name:						
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.289.1202262865						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 5, PDB Name: NTAP_PDB3						
156	44	A	27-MAY-25	2919491	27-MAY-25	NO
Name:						
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.307.1202247457						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 3, PDB Name: NTAP_PDB1						
174	45	A	28-MAY-25	2947515	28-MAY-25	NO
Name:						
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.288.1202262869						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 5, PDB Name: NTAP_PDB3						
157	46	A	27-MAY-25	2919495	27-MAY-25	NO
Name:						
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.306.1202247457						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 3, PDB Name: NTAP_PDB1						
165	47	A	28-MAY-25	2940268	27-MAY-25	NO
Name:						
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.297.1202255157						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 4, PDB Name: NTAP_PDB2						
166	48	A	28-MAY-25	2940277	27-MAY-25	NO
Name:						
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.296.1202255171						

```
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 4, PDB Name: NTAP_PDB2
```

```
195      49      A 28-MAY-25      2951380      28-MAY-25      NO
Name:
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.287.120226
6655
```

```
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 5, PDB Name: NTAP_PDB3
```

```
196      50      A 28-MAY-25      2951389      28-MAY-25      NO
Name:
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.286.120226
6669
```

```
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 5, PDB Name: NTAP_PDB3
```

6. 在测试表中插入一个新的测试行，并验证恢复到主存储上的图像副本是否可以恢复所有事务。

```
[oracle@orap ~]$ sqlplus / as sysdba

SQL*Plus: Release 19.0.0.0.0 - Production on Wed May 28 20:04:53
2025
Version 19.18.0.0.0

Copyright (c) 1982, 2022, Oracle. All rights reserved.

Connected to:
Oracle Database 19c Enterprise Edition Release 19.0.0.0.0 -
Production
Version 19.18.0.0.0

SQL> show pdbs

          CON_ID CON_NAME                                OPEN MODE  RESTRICTED
-----
          2 PDB$SEED                                READ ONLY  NO
          3 NTAP_PDB1                                READ WRITE NO
          4 NTAP_PDB2                                READ WRITE NO
          5 NTAP_PDB3                                READ WRITE NO

SQL> alter session set container=ntap_pdb1;

Session altered.

SQL> select * from test;
```

```

          ID
-----
DT
-----
EVENT
-----
          1
27-MAY-25 05.35.44.000000 PM
validate a full recovery after a switch to DB backup copy

```

```
SQL> insert into test values(2, sysdate, 'Swing database back to
primary storage from nfs backup mount on GCNV');
```

```
1 row created.
```

```
SQL> commit;
```

```
Commit complete.
```

```
SQL> select * from test;
```

```

          ID
-----
DT
-----
EVENT
-----
          1
27-MAY-25 05.35.44.000000 PM
validate a full recovery after a switch to DB backup copy on GCNV

```

```

          2
28-MAY-25 08.09.34.000000 PM
Swing database back to primary storage from nfs backup mount on GCNV

```

```

          ID
-----
DT
-----

```

```
EVENT
```

```
-----  
-----
```

```
SQL>
```

## 7. 从 RMAN 关闭数据库以切换回主存储上的备份映像副本。

```
[oracle@orap ~]$ rman target / nocatalog
```

```
Recovery Manager: Release 19.0.0.0.0 - Production on Wed May 28  
20:01:55 2025
```

```
Version 19.18.0.0.0
```

```
Copyright (c) 1982, 2019, Oracle and/or its affiliates. All rights  
reserved.
```

```
connected to target database: NTAP (DBID=1379265854)  
using target database control file instead of recovery catalog
```

```
RMAN> shutdown abort;
```

```
Oracle instance shut down
```

```
RMAN> startup mount;
```

```
connected to target database (not started)  
Oracle instance started  
database mounted
```

```
Total System Global Area      5620363744 bytes
```

```
Fixed Size                      9175520 bytes
```

```
Variable Size                   1023410176 bytes
```

```
Database Buffers                4580179968 bytes
```

```
Redo Buffers                     7598080 bytes
```

```
RMAN> switch database to copy;
```

```
datafile 1 switched to datafile copy
```

```
"+DATA/NTAP/DATAFILE/system.285.1202266707"
```

```
datafile 3 switched to datafile copy
```

```
"+DATA/NTAP/DATAFILE/sysaux.281.1202266713"
```

```
datafile 4 switched to datafile copy
```

```
"+DATA/NTAP/DATAFILE/undotbs1.283.1202266839"
```

datafile 5 switched to datafile copy  
"+DATA/NTAP/35AD01790801A78FE063060B460ABC41/DATAFILE/system.273.120  
2267093"  
datafile 6 switched to datafile copy  
"+DATA/NTAP/35AD01790801A78FE063060B460ABC41/DATAFILE/sysaux.278.120  
2266977"  
datafile 7 switched to datafile copy  
"+DATA/NTAP/DATAFILE/users.266.1202267179"  
datafile 8 switched to datafile copy  
"+DATA/NTAP/35AD01790801A78FE063060B460ABC41/DATAFILE/undotbs1.268.1  
202267143"  
datafile 9 switched to datafile copy  
"+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/system.277.120  
2266995"  
datafile 10 switched to datafile copy  
"+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/sysaux.282.120  
2266839"  
datafile 11 switched to datafile copy  
"+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/undotbs1.272.1  
202267109"  
datafile 12 switched to datafile copy  
"+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/users.259.1202  
267181"  
datafile 13 switched to datafile copy  
"+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/system.275.120  
2267039"  
datafile 14 switched to datafile copy  
"+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/sysaux.280.120  
2266915"  
datafile 15 switched to datafile copy  
"+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/undotbs1.260.1  
202267143"  
datafile 16 switched to datafile copy  
"+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/users.258.1202  
267185"  
datafile 17 switched to datafile copy  
"+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/system.271.120  
2267047"  
datafile 18 switched to datafile copy  
"+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/sysaux.276.120  
2266923"  
datafile 19 switched to datafile copy  
"+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/undotbs1.267.1  
202267179"  
datafile 20 switched to datafile copy  
"+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/users.257.1202

267189"  
datafile 21 switched to datafile copy  
"+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.315.12022  
39779"  
datafile 22 switched to datafile copy  
"+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.313.12022  
39779"  
datafile 23 switched to datafile copy  
"+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.305.12022  
47473"  
datafile 24 switched to datafile copy  
"+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.295.12022  
58989"  
datafile 25 switched to datafile copy  
"+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.311.12022  
39779"  
datafile 26 switched to datafile copy  
"+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.304.12022  
47477"  
datafile 27 switched to datafile copy  
"+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.294.12022  
58997"  
datafile 28 switched to datafile copy  
"+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.314.12022  
39779"  
datafile 29 switched to datafile copy  
"+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.303.12022  
51311"  
datafile 30 switched to datafile copy  
"+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.302.12022  
51311"  
datafile 31 switched to datafile copy  
"+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.293.12022  
59011"  
datafile 32 switched to datafile copy  
"+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.312.12022  
43617"  
datafile 33 switched to datafile copy  
"+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.310.12022  
43619"  
datafile 34 switched to datafile copy  
"+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.301.12022  
51313"  
datafile 35 switched to datafile copy  
"+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.292.12022  
59011"

datafile 36 switched to datafile copy  
"+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.309.12022  
43625"  
datafile 37 switched to datafile copy  
"+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.299.12022  
51315"  
datafile 38 switched to datafile copy  
"+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.291.12022  
62817"  
datafile 39 switched to datafile copy  
"+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.300.12022  
55141"  
datafile 40 switched to datafile copy  
"+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.290.12022  
62819"  
datafile 41 switched to datafile copy  
"+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.308.12022  
43631"  
datafile 42 switched to datafile copy  
"+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.298.12022  
55157"  
datafile 43 switched to datafile copy  
"+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.289.12022  
62865"  
datafile 44 switched to datafile copy  
"+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.307.12022  
47457"  
datafile 45 switched to datafile copy  
"+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.288.12022  
62869"  
datafile 46 switched to datafile copy  
"+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.306.12022  
47457"  
datafile 47 switched to datafile copy  
"+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.297.12022  
55157"  
datafile 48 switched to datafile copy  
"+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.296.12022  
55171"  
datafile 49 switched to datafile copy  
"+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.287.12022  
66655"  
datafile 50 switched to datafile copy  
"+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.286.12022  
66669"

```

RMAN> recover database;

Starting recover at 28-MAY-25
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=139 device type=DISK

starting media recovery
media recovery complete, elapsed time: 00:00:07

Finished recover at 28-MAY-25

RMAN> alter database open;

Statement processed

RMAN>

```

8. 验证数据库现在是否已返回主存储。

```

RMAN> report schema;

Report of database schema for database with db_unique_name NTAP

List of Permanent Datafiles
=====
File Size(MB) Tablespace          RB segs Datafile Name
-----
1      1070      SYSTEM                YES
+DATA/NTAP/DATAFILE/system.285.1202266707
3      1020      SYSAUX                NO
+DATA/NTAP/DATAFILE/sysaux.281.1202266713
4      680       UNDOTBS1              YES
+DATA/NTAP/DATAFILE/undotbs1.283.1202266839
5      400       PDB$SEED:SYSTEM      NO
+DATA/NTAP/35AD01790801A78FE063060B460ABC41/DATAFILE/system.273.1202
267093
6      460       PDB$SEED:SYSAUX      NO
+DATA/NTAP/35AD01790801A78FE063060B460ABC41/DATAFILE/sysaux.278.1202
266977
7      5         USERS                NO
+DATA/NTAP/DATAFILE/users.266.1202267179
8      235      PDB$SEED:UNDOTBS1    NO
+DATA/NTAP/35AD01790801A78FE063060B460ABC41/DATAFILE/undotbs1.268.12
02267143
9      410      NTAP_PDB1:SYSTEM     YES

```

```

+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/system.277.1202
266995
10 510 NTAP_PDB1:SYS AUX NO
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/sysaux.282.1202
266839
11 240 NTAP_PDB1:UNDOTBS1 YES
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/undotbs1.272.12
02267109
12 5 NTAP_PDB1:USERS NO
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/users.259.12022
67181
13 410 NTAP_PDB2:SYSTEM YES
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/system.275.1202
267039
14 510 NTAP_PDB2:SYS AUX NO
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/sysaux.280.1202
266915
15 235 NTAP_PDB2:UNDOTBS1 YES
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/undotbs1.260.12
02267143
16 5 NTAP_PDB2:USERS NO
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/users.258.12022
67185
17 410 NTAP_PDB3:SYSTEM YES
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/system.271.1202
267047
18 510 NTAP_PDB3:SYS AUX NO
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/sysaux.276.1202
266923
19 235 NTAP_PDB3:UNDOTBS1 YES
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/undotbs1.267.12
02267179
20 5 NTAP_PDB3:USERS NO
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/users.257.12022
67189
21 30720 NTAP_PDB1:SOE1 NO
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.315.120223
9779
22 30720 NTAP_PDB1:SOE1 NO
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.313.120223
9779
23 30720 NTAP_PDB2:SOE2 NO
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.305.120224
7473
24 30720 NTAP_PDB3:SOE3 NO
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.295.120225

```

8989  
25 30720 NTAP\_PDB1:SOE1 NO  
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.311.120223  
9779  
26 30720 NTAP\_PDB2:SOE2 NO  
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.304.120224  
7477  
27 30720 NTAP\_PDB3:SOE3 NO  
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.294.120225  
8997  
28 30720 NTAP\_PDB1:SOE1 NO  
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.314.120223  
9779  
29 30720 NTAP\_PDB2:SOE2 NO  
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.303.120225  
1311  
30 30720 NTAP\_PDB2:SOE2 NO  
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.302.120225  
1311  
31 30720 NTAP\_PDB3:SOE3 NO  
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.293.120225  
9011  
32 30720 NTAP\_PDB1:SOE1 NO  
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.312.120224  
3617  
33 30720 NTAP\_PDB1:SOE1 NO  
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.310.120224  
3619  
34 30720 NTAP\_PDB2:SOE2 NO  
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.301.120225  
1313  
35 30720 NTAP\_PDB3:SOE3 NO  
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.292.120225  
9011  
36 30720 NTAP\_PDB1:SOE1 NO  
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.309.120224  
3625  
37 30720 NTAP\_PDB2:SOE2 NO  
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.299.120225  
1315  
38 30720 NTAP\_PDB3:SOE3 NO  
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.291.120226  
2817  
39 30720 NTAP\_PDB2:SOE2 NO  
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.300.120225  
5141

```

40  30720  NTAP_PDB3:SOE3  NO
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.290.120226
2819
41  30720  NTAP_PDB1:SOE1  NO
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.308.120224
3631
42  30720  NTAP_PDB2:SOE2  NO
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.298.120225
5157
43  30720  NTAP_PDB3:SOE3  NO
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.289.120226
2865
44  30720  NTAP_PDB1:SOE1  NO
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.307.120224
7457
45  30720  NTAP_PDB3:SOE3  NO
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.288.120226
2869
46  30720  NTAP_PDB1:SOE1  NO
+DATA/NTAP/35AD38314E81AF11E063060B460AE362/DATAFILE/soe1.306.120224
7457
47  30720  NTAP_PDB2:SOE2  NO
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.297.120225
5157
48  30720  NTAP_PDB2:SOE2  NO
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/DATAFILE/soe2.296.120225
5171
49  30720  NTAP_PDB3:SOE3  NO
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.287.120226
6655
50  30720  NTAP_PDB3:SOE3  NO
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/DATAFILE/soe3.286.120226
6669

```

List of Temporary Files

=====

File	Size (MB)	Tablespace	Maxsize (MB)	Tempfile Name
1	123	TEMP	32767	+DATA/NTAP/TEMPFILE/temp.265.1201727469
2	123	PDB\$SEED:TEMP	32767	+DATA/NTAP/35AD01790801A78FE063060B460ABC41/TEMPFILE/temp.269.1201728335
3	16384	NTAP_PDB1:TEMP	32767	+DATA/NTAP/35AD38314E81AF11E063060B460AE362/TEMPFILE/temp.274.1201729271

```
4      30720      NTAP_PDB2:TEMP      32767
+DATA/NTAP/35AD39A949B7AF76E063060B460A61D2/TEMPFILE/temp.279.120172
9295
5      30720      NTAP_PDB3:TEMP      32767
+DATA/NTAP/35AD3B0BAD41AFCEE063060B460AD1CC/TEMPFILE/temp.284.120172
9319
```

9. 从 sqlplus 验证测试表中所有事务均已恢复。

```

SQL> alter session set container=ntap_pdb1;

Session altered.

SQL> select * from test;

          ID
-----
DT
-----
EVENT
-----
          1
27-MAY-25 05.35.44.000000 PM
validate a full recovery after a switch to DB backup copy on GCNV

          2
28-MAY-25 08.09.34.000000 PM
Swing database back to primary storage from nfs backup mount on GCNV

          ID
-----
DT
-----
EVENT
-----

SQL> select systimestamp from dual;

SYSTIMESTAMP
-----
28-MAY-25 08.17.55.895654 PM +00:00

SQL>

```

- 最后，删除 GCNV 备份存储上过时的 DB 映像副本，并在 GCNV 备份存储上创建新的备份映像以完成循环。



如果发生故障，导致主存储和/或主数据库服务器主机丢失，则存档日志文件中没有的所有事务都将丢失。但是，GCNV NFS 文件系统中提供的 Oracle 数据库备份映像副本非常方便。您可以使用备份映像副本将主数据库快速恢复到同一个主数据库服务器或备用数据库服务器（如果有）。在本节中，我们将演示恢复到主数据库服务器的逐步过程。恢复到新的备用数据库服务器的方法几乎相同；但是，必须在安装和配置相同的 Oracle 软件堆栈的备用数据库服务器上安装数据库备份映像副本。

1. 向我们之前创建的测试表中插入一行，以进行 Oracle VLDB 时间点恢复验证。

```
SQL> insert into test values(3, sysdate, 'validate a point-in-time
recovery by switching to DB backup copy on GCNV');
```

```
1 row created.
```

```
SQL> commit;
```

```
Commit complete.
```

```
SQL> select * from test;
```

```
          ID
-----
DT
-----
EVENT
-----
          1
27-MAY-25 05.35.44.000000 PM
validate a full recovery after a switch to DB backup copy on GCNV

          2
28-MAY-25 08.09.34.000000 PM
Swing database back to primary storage from nfs backup mount on GCNV

          ID
-----
DT
-----
EVENT
-----

          3
29-MAY-25 03.22.22.000000 PM
validate a point-in-time recovery by switching to DB backup copy on
GCNV
```

2. 归档当前日志文件，以便将事务推送到归档日志文件。

```
SQL> alter session set container=cdb$root;

Session altered.

SQL> alter system archive log current;

System altered.
```

3. 关闭主 VLDB 服务器主机以模拟存储和 DB 服务器主机的完全故障。
4. 如果在备用数据库服务器上执行恢复，请确保它与主数据库服务器主机具有相同的操作系统、相同的版本，并且操作系统内核已修补。此外，已在仅使用软件选项的备用数据库服务器上安装和配置了相同版本和补丁的 Oracle。
5. 另外，在备用数据库服务器上配置与主数据库服务器类似的 oracle 环境，例如 oratab 和 oracle 用户 .bash\_profile 等。将这些文件备份到 GCNV NFS 挂载点是一个好的做法。
6. 然后将 GCNV NFS 文件系统上的 Oracle 数据库备份映像副本安装在备用 DB 服务器上以进行恢复。以下步骤演示了该过程的细节。

以管理员用户身份创建挂载点。

```
sudo mkdir /nfsgcnv
```

以管理员用户身份挂载存储 Oracle VLDB 备份映像副本的 NFS 卷。

```
sudo mount 10.165.128.5:/orap-bkup /nfsgcnv -o
rw,bg,hard,vers=3,proto=tcp,timeo=600,rsize=262144,wsiz=262144
```

7. 验证 GCNV NFS 挂载上可用的 Oracle 存档日志以进行恢复，并记下最后一个日志文件日志序列号。在我们的测试案例中，这个数字是 27。我们的恢复点最多到日志序列号 28。
8. 如果从备用数据库主机恢复，以 oracle 用户身份，将 ORACLE\_HOME 变量设置为备用数据库服务器上的当前 Oracle 安装，将 ORACLE\_SID 设置为主 Oracle 实例 SID。本次测试中为 NTAP。

```
[oracle@ora-02 ~]$ export
ORACLE_HOME=/u01/app/oracle/product/19.0.0/NTAP
[oracle@ora-02 ~]$ export ORACLE_SID=NTAP
[oracle@ora-02 ~]$ export PATH=$PATH:$ORACLE_HOME/bin
```

9. 以 oracle 用户身份，在 \$ORACLE\_HOME/dbs 目录中创建一个通用 Oracle 初始化文件，并配置适当的管理目录。最重要的是，拥有 Oracle flash recovery area 指向主 Oracle VLDB 服务器中定义的 GCNV NFS 挂载路径。`flash recovery area` 配置在章节中进行了演示 `Setup Oracle RMAN incremental merge to image copy on GCNV for in-server VLDB backup`。将 Oracle 控制文件设置为 GCNV NFS 备份文件系统。

```
vi /home/oracle/initNTAP.ora
```

使用以下示例条目：

```
*.audit_file_dest='/u01/app/oracle/admin/NTAP/adump'  
*.audit_trail='db'  
*.compatible='19.0.0'  
*.control_files=('/nfsgcnv/oracopy/NTAP.ctl')  
*.db_block_size=8192  
*.db_create_file_dest='/nfsgcnv/oracopy/'  
*.db_name='NTAP'  
*.db_recovery_file_dest_size=85899345920  
*.db_recovery_file_dest='/nfsgcnv/archlog/'  
*.diagnostic_dest='/u01/app/oracle'  
*.enable_pluggable_database=true  
*.local_listener='LISTENER'  
*.nls_language='AMERICAN'  
*.nls_territory='AMERICA'  
*.pga_aggregate_target=1024m  
*.processes=320  
*.remote_login_passwordfile='EXCLUSIVE'  
*.sga_target=10240m
```

如果出现差异，则应使用从主 Oracle VLDB 服务器恢复的备份初始化文件替换上述初始化文件。

10. 以 oracle 用户身份启动 RMAN 在主或备用 DB 服务器主机上运行 Oracle 恢复。首先，启动 Oracle 实例 `nomount` 状态。

```
[oracle@orap ~]$ rman target / nocatalog

Recovery Manager: Release 19.0.0.0.0 - Production on Thu May 29
15:46:15 2025
Version 19.18.0.0.0

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reserved.

connected to target database (not started)

RMAN> startup nomount pfile='/home/oracle/initNTAP.ora';

Oracle instance started

Total System Global Area      10737418000 bytes

Fixed Size                      9174800 bytes
Variable Size                   1577058304 bytes
Database Buffers                 9126805504 bytes
Redo Buffers                      24379392 bytes
```

11. 设置数据库ID。可以从 GCNV NFS 挂载点上的映像副本的 Oracle 文件名中检索数据库 ID。

```
RMAN> set dbid = 1379265854;

executing command: SET DBID
```

12. 从自动备份恢复控制文件。如果启用了 Oracle 控制文件和 spfile 自动备份，则它们会在每个增量备份和合并周期中备份。如果有多个副本可用，将恢复最新的备份。

```

RMAN> restore controlfile from autobackup;

Starting restore at 29-MAY-25
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=2 device type=DISK

recovery area destination: /nfsgcnv/archlog/
database name (or database unique name) used for search: NTAP
channel ORA_DISK_1: AUTOBACKUP
/nfsgcnv/archlog/NTAP/autobackup/2025_05_29/o1_mf_s_1202395822_n3jx1
hnf_.bkp found in the recovery area
channel ORA_DISK_1: looking for AUTOBACKUP on day: 20250529
channel ORA_DISK_1: restoring control file from AUTOBACKUP
/nfsgcnv/archlog/NTAP/autobackup/2025_05_29/o1_mf_s_1202395822_n3jx1
hnf_.bkp
channel ORA_DISK_1: control file restore from AUTOBACKUP complete
output file name=/nfsgcnv/oracopy/NTAP.ctl
Finished restore at 29-MAY-25

```

13. 将初始化文件从 spfile 恢复到 \$ORACLE\_HOME/dbs 文件夹，以便稍后更新参数文件以与主 VLDB 匹配。

```

RMAN> restore spfile to pfile
'/u01/app/oracle/product/19.0.0/NTAP/dbs/initNTAP.ora' from
autobackup;

Starting restore at 29-MAY-25
using channel ORA_DISK_1

recovery area destination: /nfsgcnv/archlog/
database name (or database unique name) used for search: NTAP
channel ORA_DISK_1: AUTOBACKUP
/nfsgcnv/archlog/NTAP/autobackup/2025_05_29/o1_mf_s_1202395822_n3jx1
hnf_.bkp found in the recovery area
channel ORA_DISK_1: looking for AUTOBACKUP on day: 20250529
channel ORA_DISK_1: restoring spfile from AUTOBACKUP
/nfsgcnv/archlog/NTAP/autobackup/2025_05_29/o1_mf_s_1202395822_n3jx1
hnf_.bkp
channel ORA_DISK_1: SPFILE restore from AUTOBACKUP complete
Finished restore at 29-MAY-25

```

14. 挂载控制文件并验证数据库备份映像副本。

```

RMAN> alter database mount;

```

released channel: ORA\_DISK\_1

Statement processed

RMAN> list copy of database tag 'ORACOPYBKUPONGCNV\_LEVEL\_0';

List of Datafile Copies

=====

Key	File S	Completion Time	Ckp SCN	Ckp Time	Sparse
273	1 A	29-MAY-25	3310055	29-MAY-25	NO
	Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SYSTEM_FNO-1_6j3ql96a				
	Tag: ORACOPYBKUPONGCNV_LEVEL_0				
274	3 A	29-MAY-25	3310333	29-MAY-25	NO
	Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SYSAUX_FNO-3_6k3ql9c3				
	Tag: ORACOPYBKUPONGCNV_LEVEL_0				
275	4 A	29-MAY-25	3310521	29-MAY-25	NO
	Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-UNDOTBS1_FNO-4_6l3ql9hu				
	Tag: ORACOPYBKUPONGCNV_LEVEL_0				
283	5 A	29-MAY-25	2377077	21-MAY-25	NO
	Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SYSTEM_FNO-5_6t3qlaa4				
	Tag: ORACOPYBKUPONGCNV_LEVEL_0				
	Container ID: 2, PDB Name: PDB\$SEED				
279	6 A	29-MAY-25	2377077	21-MAY-25	NO
	Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SYSAUX_FNO-6_6p3ql9vu				
	Tag: ORACOPYBKUPONGCNV_LEVEL_0				
	Container ID: 2, PDB Name: PDB\$SEED				
288	7 A	29-MAY-25	3311276	29-MAY-25	NO
	Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-USERS_FNO-7_723qlaif				
	Tag: ORACOPYBKUPONGCNV_LEVEL_0				
285	8 A	29-MAY-25	2377077	21-MAY-25	NO
	Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-UNDOTBS1_FNO-8_6v3qlae9				

```

Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 2, PDB Name: PDB$SEED

280      9      A 29-MAY-25      3310854      29-MAY-25      NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSTEM_FNO-9_6q3qla21
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 3, PDB Name: NTAP_PDB1

276     10     A 29-MAY-25      3310587      29-MAY-25      NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSAUX_FNO-10_6m3ql9lh
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 3, PDB Name: NTAP_PDB1

284     11     A 29-MAY-25      3311150      29-MAY-25      NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
UNDOTBS1_FNO-11_6u3qlacg
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 3, PDB Name: NTAP_PDB1

289     12     A 29-MAY-25      3311281      29-MAY-25      NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
USERS_FNO-12_733qlaij
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 3, PDB Name: NTAP_PDB1

281     13     A 29-MAY-25      3310906      29-MAY-25      NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSTEM_FNO-13_6r3qla52
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 4, PDB Name: NTAP_PDB2

277     14     A 29-MAY-25      3310662      29-MAY-25      NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSAUX_FNO-14_6n3ql9ou
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 4, PDB Name: NTAP_PDB2

286     15     A 29-MAY-25      3311229      29-MAY-25      NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
UNDOTBS1_FNO-15_703qlaft
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 4, PDB Name: NTAP_PDB2

290     16     A 29-MAY-25      3311286      29-MAY-25      NO

```

```

Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
USERS_FNO-16_743qlaik
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 4, PDB Name: NTAP_PDB2

282      17      A 29-MAY-25      3311063      29-MAY-25      NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSTEM_FNO-17_6s3qla7n
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 5, PDB Name: NTAP_PDB3

278      18      A 29-MAY-25      3310747      29-MAY-25      NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
SYSAUX_FNO-18_6o3ql9s9
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 5, PDB Name: NTAP_PDB3

287      19      A 29-MAY-25      3311242      29-MAY-25      NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
UNDOTBS1_FNO-19_713qlago
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 5, PDB Name: NTAP_PDB3

291      20      A 29-MAY-25      3311290      29-MAY-25      NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-
USERS_FNO-20_753qlail
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 5, PDB Name: NTAP_PDB3

251      21      A 28-MAY-25      3261788      28-MAY-25      NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-
21_5o3qkcd8
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 3, PDB Name: NTAP_PDB1

295      22      A 29-MAY-25      3261776      28-MAY-25      NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-
22_5i3qk79h
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 3, PDB Name: NTAP_PDB1

255      23      A 29-MAY-25      3266361      28-MAY-25      NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-
23_5v3qkh6o
Tag: ORACOPYBKUPONGCNV_LEVEL_0
Container ID: 4, PDB Name: NTAP_PDB2

```

266	24	A	29-MAY-25	3280010	29-MAY-25	NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-						
24_693qkvfv						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 5, PDB Name: NTAP_PDB3						
296	25	A	29-MAY-25	3261780	28-MAY-25	NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-						
25_5j3qk79h						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 3, PDB Name: NTAP_PDB1						
257	26	A	29-MAY-25	3270370	29-MAY-25	NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-						
26_603qklqo						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 4, PDB Name: NTAP_PDB2						
268	27	A	29-MAY-25	3280164	29-MAY-25	NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-						
27_6a3qkvj9						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 5, PDB Name: NTAP_PDB3						
297	28	A	29-MAY-25	3261784	28-MAY-25	NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-						
28_5k3qk79h						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 3, PDB Name: NTAP_PDB1						
258	29	A	29-MAY-25	3270566	29-MAY-25	NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-						
29_613qkm09						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 4, PDB Name: NTAP_PDB2						
259	30	A	29-MAY-25	3270571	29-MAY-25	NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-						
30_623qkm0g						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						
Container ID: 4, PDB Name: NTAP_PDB2						
267	31	A	29-MAY-25	3280168	29-MAY-25	NO
Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-						
31_6b3qkvj9						
Tag: ORACOPYBKUPONGCNV_LEVEL_0						

Container ID: 5, PDB Name: NTAP\_PDB3

```
249      32      A 28-MAY-25          3261793      28-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-
32_5p3qkcd9
      Tag: ORACOPYBKUPONGCNV_LEVEL_0
      Container ID: 3, PDB Name: NTAP_PDB1

250      33      A 28-MAY-25          3261797      28-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-
33_5q3qkcd9
      Tag: ORACOPYBKUPONGCNV_LEVEL_0
      Container ID: 3, PDB Name: NTAP_PDB1

260      34      A 29-MAY-25          3270587      29-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-
34_633qkmlb
      Tag: ORACOPYBKUPONGCNV_LEVEL_0
      Container ID: 4, PDB Name: NTAP_PDB2

269      35      A 29-MAY-25          3284192      29-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-
35_6c3ql412
      Tag: ORACOPYBKUPONGCNV_LEVEL_0
      Container ID: 5, PDB Name: NTAP_PDB3

252      36      A 28-MAY-25          3261801      28-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-
36_5r3qkcda
      Tag: ORACOPYBKUPONGCNV_LEVEL_0
      Container ID: 3, PDB Name: NTAP_PDB1

261      37      A 29-MAY-25          3275627      29-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-
37_643qkqjf
      Tag: ORACOPYBKUPONGCNV_LEVEL_0
      Container ID: 4, PDB Name: NTAP_PDB2

270      38      A 29-MAY-25          3297172      29-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-
38_6d3ql47q
      Tag: ORACOPYBKUPONGCNV_LEVEL_0
      Container ID: 5, PDB Name: NTAP_PDB3

262      39      A 29-MAY-25          3275722      29-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-
```

39\_653qkqnn  
 Tag: ORACOPYBKUPONGCNV\_LEVEL\_0  
 Container ID: 4, PDB Name: NTAP\_PDB2

271 40 A 29-MAY-25 3297259 29-MAY-25 NO  
 Name: /nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-  
 40\_6e3ql4b5  
 Tag: ORACOPYBKUPONGCNV\_LEVEL\_0  
 Container ID: 5, PDB Name: NTAP\_PDB3

253 41 A 29-MAY-25 3266273 28-MAY-25 NO  
 Name: /nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-  
 41\_5s3qkh37  
 Tag: ORACOPYBKUPONGCNV\_LEVEL\_0  
 Container ID: 3, PDB Name: NTAP\_PDB1

264 42 A 29-MAY-25 3275738 29-MAY-25 NO  
 Name: /nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-  
 42\_663qkqoq  
 Tag: ORACOPYBKUPONGCNV\_LEVEL\_0  
 Container ID: 4, PDB Name: NTAP\_PDB2

272 43 A 29-MAY-25 3297314 29-MAY-25 NO  
 Name: /nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-  
 43\_6f3ql4bo  
 Tag: ORACOPYBKUPONGCNV\_LEVEL\_0  
 Container ID: 5, PDB Name: NTAP\_PDB3

254 44 A 29-MAY-25 3266318 28-MAY-25 NO  
 Name: /nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-  
 44\_5t3qkh4m  
 Tag: ORACOPYBKUPONGCNV\_LEVEL\_0  
 Container ID: 3, PDB Name: NTAP\_PDB1

292 45 A 29-MAY-25 3309950 29-MAY-25 NO  
 Name: /nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-  
 45\_6g3ql91c  
 Tag: ORACOPYBKUPONGCNV\_LEVEL\_0  
 Container ID: 5, PDB Name: NTAP\_PDB3

256 46 A 29-MAY-25 3266357 28-MAY-25 NO  
 Name: /nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-  
 46\_5u3qkh6o  
 Tag: ORACOPYBKUPONGCNV\_LEVEL\_0  
 Container ID: 3, PDB Name: NTAP\_PDB1

```

263      47      A 29-MAY-25      3275799      29-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-
47_673qkqr5
      Tag: ORACOPYBKUPONGCNV_LEVEL_0
      Container ID: 4, PDB Name: NTAP_PDB2

265      48      A 29-MAY-25      3279927      29-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-
48_683qkvb4
      Tag: ORACOPYBKUPONGCNV_LEVEL_0
      Container ID: 4, PDB Name: NTAP_PDB2

293      49      A 29-MAY-25      3309965      29-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-
49_6h3ql91s
      Tag: ORACOPYBKUPONGCNV_LEVEL_0
      Container ID: 5, PDB Name: NTAP_PDB3

294      50      A 29-MAY-25      3310038      29-MAY-25      NO
      Name: /nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-
50_6i3ql955
      Tag: ORACOPYBKUPONGCNV_LEVEL_0
      Container ID: 5, PDB Name: NTAP_PDB3

```

15. 将数据库切换到复制以运行恢复，而无需数据库还原。

```

RMAN> switch database to copy;

Starting implicit crosscheck backup at 29-MAY-25
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=12 device type=DISK
Crosschecked 20 objects
Finished implicit crosscheck backup at 29-MAY-25

Starting implicit crosscheck copy at 29-MAY-25
using channel ORA_DISK_1
Crosschecked 49 objects
Finished implicit crosscheck copy at 29-MAY-25

searching for all files in the recovery area
cataloging files...
cataloging done

List of Cataloged Files
=====

```

File Name:

/nfsgcnv/archlog/NTAP/archivelog/2025\_05\_29/o1\_mf\_1\_27\_n3jzbg2\_.arc

File Name:

/nfsgcnv/archlog/NTAP/autobackup/2025\_05\_29/o1\_mf\_s\_1202395822\_n3jx1  
hnf\_.bkp

datafile 1 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSTEM\_FNO-1\_6j3ql96a"

datafile 3 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSAUX\_FNO-3\_6k3ql9c3"

datafile 4 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-UNDOTBS1\_FNO-4\_6l3ql9hu"

datafile 5 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSTEM\_FNO-5\_6t3qlaa4"

datafile 6 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSAUX\_FNO-6\_6p3ql9vu"

datafile 7 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-USERS\_FNO-7\_723qlaif"

datafile 8 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-UNDOTBS1\_FNO-8\_6v3qlae9"

datafile 9 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSTEM\_FNO-9\_6q3qla21"

datafile 10 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSAUX\_FNO-10\_6m3ql9lh"

datafile 11 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-UNDOTBS1\_FNO-11\_6u3qlacg"

datafile 12 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-USERS\_FNO-12\_733qlaij"

datafile 13 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSTEM\_FNO-13\_6r3qla52"

datafile 14 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSAUX\_FNO-14\_6n3ql9ou"

datafile 15 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-UNDOTBS1\_FNO-15\_703qlaft"

datafile 16 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-USERS\_FNO-16\_743qlaik"

datafile 17 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSTEM\_FNO-17\_6s3qla7n"

datafile 18 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SYSAUX\_FNO-18\_6o3ql9s9"

datafile 19 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-UNDOTBS1\_FNO-19\_713qlago"

datafile 20 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-USERS\_FNO-20\_753qlail"

datafile 21 switched to datafile copy "/nfsgcnv/oracopy/data\_D-  
NTAP\_I-1379265854\_TS-SOE1\_FNO-21\_5o3qkcd8"

datafile 22 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-22\_5i3qk79h"  
datafile 23 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-23\_5v3qkh6o"  
datafile 24 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-24\_693qkvfv"  
datafile 25 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-25\_5j3qk79h"  
datafile 26 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-26\_603qklqo"  
datafile 27 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-27\_6a3qkvj9"  
datafile 28 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-28\_5k3qk79h"  
datafile 29 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-29\_613qkm09"  
datafile 30 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-30\_623qkm0g"  
datafile 31 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-31\_6b3qkvj9"  
datafile 32 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-32\_5p3qkcd9"  
datafile 33 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-33\_5q3qkcd9"  
datafile 34 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-34\_633qkmlb"  
datafile 35 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-35\_6c3ql412"  
datafile 36 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-36\_5r3qkcda"  
datafile 37 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-37\_643qkqjf"  
datafile 38 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-38\_6d3ql47q"  
datafile 39 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-39\_653qkqnn"  
datafile 40 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-40\_6e3ql4b5"  
datafile 41 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-41\_5s3qkh37"  
datafile 42 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-42\_663qkqoq"  
datafile 43 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-43\_6f3ql4bo"  
datafile 44 switched to datafile copy "/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-44\_5t3qkh4m"

```
datafile 45 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-45_6g3ql91c"
datafile 46 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-46_5u3qkh6o"
datafile 47 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-47_673qkqr5"
datafile 48 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-48_683qkvb4"
datafile 49 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-49_6h3ql91s"
datafile 50 switched to datafile copy "/nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-50_6i3ql955"
```

16. 运行 Oracle 恢复直至闪回恢复区中最后一个可用的存档日志。

```
RMAN> run {
2> set until sequence=28;
3> recover database;
4> }

executing command: SET until clause

Starting recover at 29-MAY-25
using channel ORA_DISK_1
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00011: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-UNDOTBS1_FNO-11_6u3qlacg
destination for restore of datafile 00025: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-25_5j3qk79h
destination for restore of datafile 00036: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-36_5r3qkcd
destination for restore of datafile 00046: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-46_5u3qkh6o
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/773qm617_231_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/773qm617_231_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00012: /nfsgcnv/oracopy/data_D-
```

```
NTAP_I-1379265854_TS-USERS_FNO-12_733qlaij
destination for restore of datafile 00028: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-28_5k3qk79h
destination for restore of datafile 00041: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-41_5s3qkh37
destination for restore of datafile 00044: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-44_5t3qkh4m
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/7a3qm617_234_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/7a3qm617_234_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:02
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00015: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-UNDOTBS1_FNO-15_703qlaft
destination for restore of datafile 00029: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-29_613qkm09
destination for restore of datafile 00039: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-39_653qkqnn
destination for restore of datafile 00048: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-48_683qkvb4
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/783qm617_232_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/783qm617_232_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00019: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-UNDOTBS1_FNO-19_713qlago
destination for restore of datafile 00031: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-31_6b3qkvj9
destination for restore of datafile 00043: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-43_6f3ql4bo
destination for restore of datafile 00050: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-50_6i3ql955
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/793qm617_233_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/793qm617_233_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
```

```
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00010: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSAUX_FNO-10_6m3ql9lh
destination for restore of datafile 00021: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-21_5o3qkcd8
destination for restore of datafile 00032: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-32_5p3qkcd9
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/7d3qm619_237_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/7d3qm619_237_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00014: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSAUX_FNO-14_6n3ql9ou
destination for restore of datafile 00023: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-23_5v3qkh6o
destination for restore of datafile 00034: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-34_633qkmlb
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/7e3qm619_238_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/7e3qm619_238_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00016: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-USERS_FNO-16_743qlaik
destination for restore of datafile 00030: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-30_623qkm0g
destination for restore of datafile 00042: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-42_663qkqoq
destination for restore of datafile 00047: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-47_673qkqr5
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/7b3qm619_235_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/7b3qm619_235_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
```

```
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00020: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-USERS_FNO-20_753qlail
destination for restore of datafile 00035: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-35_6c3ql412
destination for restore of datafile 00045: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-45_6g3ql91c
destination for restore of datafile 00049: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-49_6h3ql91s
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/7c3qm619_236_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/7c3qm619_236_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00001: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSTEM_FNO-1_6j3ql96a
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/7j3qm61a_243_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/7j3qm61a_243_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00009: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSTEM_FNO-9_6q3qla21
destination for restore of datafile 00022: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-22_5i3qk79h
destination for restore of datafile 00033: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE1_FNO-33_5q3qkcd9
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/7g3qm619_240_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/7g3qm619_240_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
```

```
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00013: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSTEM_FNO-13_6r3qla52
destination for restore of datafile 00026: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-26_603qklqo
destination for restore of datafile 00037: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE2_FNO-37_643qkqjf
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/7h3qm6la_241_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/7h3qm6la_241_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00017: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSTEM_FNO-17_6s3qla7n
destination for restore of datafile 00027: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-27_6a3qkvj9
destination for restore of datafile 00040: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-40_6e3ql4b5
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/7i3qm6la_242_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/7i3qm6la_242_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00018: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSAUX_FNO-18_6o3ql9s9
destination for restore of datafile 00024: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-24_693qkvfv
destination for restore of datafile 00038: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SOE3_FNO-38_6d3ql47q
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/7f3qm6l9_239_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/7f3qm6l9_239_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
```

```

set
destination for restore of datafile 00004: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-UNDOTBS1_FNO-4_6l3ql9hu
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/7l3qm6la_245_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/7l3qm6la_245_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:02
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00007: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-USERS_FNO-7_723qlaif
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/7p3qm6lb_249_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/7p3qm6lb_249_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01
channel ORA_DISK_1: starting incremental datafile backup set restore
channel ORA_DISK_1: specifying datafile(s) to restore from backup
set
destination for restore of datafile 00003: /nfsgcnv/oracopy/data_D-
NTAP_I-1379265854_TS-SYSAUX_FNO-3_6k3ql9c3
channel ORA_DISK_1: reading from backup piece
/nfsgcnv/oracopy/7k3qm6la_244_1_1
channel ORA_DISK_1: piece handle=/nfsgcnv/oracopy/7k3qm6la_244_1_1
tag=ORACOPYBKUPONGCNV_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:03

starting media recovery

archived log for thread 1 with sequence 27 is already on disk as
file
/nfsgcnv/archlog/NTAP/archivelog/2025_05_29/o1_mf_1_27_n3jzbgh2_.arc
archived log file
name=/nfsgcnv/archlog/NTAP/archivelog/2025_05_29/o1_mf_1_27_n3jzbgh2
_.arc thread=1 sequence=27
media recovery complete, elapsed time: 00:00:01
Finished recover at 29-MAY-25

RMAN>
RMAN> exit

```

Recovery Manager complete.



为了更快地恢复，请使用 `recovery_parallelism` 参数启用并行会话或在数据库恢复的恢复命令中指定并行度：`RECOVER DATABASE PARALLEL (DEGREE d INSTANCES DEFAULT);`。一般来说，并行度应该等于主机上的 CPU 核心数。

17. 退出 RMAN，通过 sqlplus 以 oracle 用户身份登录 Oracle，以在不完全恢复后打开数据库并重置日志。

```
SQL> select name, open_mode from v$database;
```

```
NAME          OPEN_MODE
-----
NTAP          MOUNTED
```

```
SQL> select instance_name, host_name from v$instance;
```

```
INSTANCE_NAME
-----
HOST_NAME
-----
NTAP
orap
```

```
SQL> select member from v$logfile;
```

```
MEMBER
-----
-----
+DATA/NTAP/ONLINELOG/group_3.264.1201727425
+LOGS/NTAP/ONLINELOG/group_3.259.1201727433
+DATA/NTAP/ONLINELOG/group_2.263.1201727425
+LOGS/NTAP/ONLINELOG/group_2.257.1201727431
+DATA/NTAP/ONLINELOG/group_1.262.1201727425
+LOGS/NTAP/ONLINELOG/group_1.258.1201727433
```

6 rows selected.

```
SQL> alter database rename file
'+LOGS/NTAP/ONLINELOG/group_1.258.1201727433' to
'/nfsgcnv/oracopy/group_1.258.1201727433';
```

Database altered.

```
SQL> alter database rename file
'+DATA/NTAP/ONLINELOG/group_1.262.1201727425' to
'/nfsgcnv/oracopy/group_1.262.1201727425';
```

Database altered.

```
SQL> alter database rename file
'+LOGS/NTAP/ONLINELOG/group_2.257.1201727431' to
'/nfsgcnv/oracopy/group_2.257.1201727431';
```

Database altered.

```
SQL> alter database rename file
'+DATA/NTAP/ONLINELOG/group_2.263.1201727425' to
'/nfsgcnv/oracopy/group_2.263.1201727425';
```

Database altered.

```
SQL> alter database rename file
'+LOGS/NTAP/ONLINELOG/group_3.259.1201727433' to
'/nfsgcnv/oracopy/group_3.259.1201727433';
```

Database altered.

```
SQL> alter database rename file
'+DATA/NTAP/ONLINELOG/group_3.264.1201727425' to
'/nfsgcnv/oracopy/group_3.264.1201727425';
```

Database altered.

```
SQL> alter database open resetlogs;
```

Database altered.

```
SQL> show pdbs
```

CON_ID	CON_NAME	OPEN MODE	RESTRICTED
2	PDB\$SEED	READ ONLY	NO
3	NTAP_PDB1	READ WRITE	NO
4	NTAP_PDB2	READ WRITE	NO
5	NTAP_PDB3	READ WRITE	NO

18. 验证数据库文件现在位于 GCNV 上的备份文件系统中。

```
SQL> select name from v$datafile;
```

NAME

-----  
-----  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSTEM\_FNO-1\_6j3ql96a  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSAUX\_FNO-3\_6k3ql9c3  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-UNDOTBS1\_FNO-4\_6l3ql9hu  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSTEM\_FNO-5\_6t3qlaa4  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSAUX\_FNO-6\_6p3ql9vu  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-USERS\_FNO-7\_723qlaif  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-UNDOTBS1\_FNO-8\_6v3qlae9  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSTEM\_FNO-9\_6q3qla21  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSAUX\_FNO-10\_6m3ql9lh  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-UNDOTBS1\_FNO-  
11\_6u3qlacg  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-USERS\_FNO-12\_733qlaij

NAME

-----  
-----  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSTEM\_FNO-13\_6r3qla52  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSAUX\_FNO-14\_6n3ql9ou  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-UNDOTBS1\_FNO-  
15\_703qlaft  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-USERS\_FNO-16\_743qlaik  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSTEM\_FNO-17\_6s3qla7n  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SYSAUX\_FNO-18\_6o3ql9s9  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-UNDOTBS1\_FNO-  
19\_713qlago  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-USERS\_FNO-20\_753qlail  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-21\_5o3qkcd8  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-22\_5i3qk79h  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-23\_5v3qkh6o

NAME

-----  
-----  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-24\_693qkvfv  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-25\_5j3qk79h  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-26\_603qklqo  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-27\_6a3qkvj9  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-28\_5k3qk79h  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-29\_613qkm09  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE2\_FNO-30\_623qkm0g  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE3\_FNO-31\_6b3qkvj9  
/nfsgcnv/oracopy/data\_D-NTAP\_I-1379265854\_TS-SOE1\_FNO-32\_5p3qkcd9

```
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-33_5q3qkcd9  
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-34_633qkm1b
```

NAME

```
-----  
-----  
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-35_6c3ql412  
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-36_5r3qkcda  
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-37_643qkqjf  
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-38_6d3ql47q  
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-39_653qkqnn  
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-40_6e3ql4b5  
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-41_5s3qkh37  
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-42_663qkqoq  
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-43_6f3ql4bo  
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-44_5t3qkh4m  
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-45_6g3ql91c
```

NAME

```
-----  
-----  
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE1_FNO-46_5u3qkh6o  
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-47_673qkqr5  
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE2_FNO-48_683qkvb4  
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-49_6h3ql91s  
/nfsgcnv/oracopy/data_D-NTAP_I-1379265854_TS-SOE3_FNO-50_6i3ql955
```

49 rows selected.

```
SQL> select member from v$logfile;
```

MEMBER

```
-----  
-----  
/nfsgcnv/oracopy/group_3.264.1201727425  
/nfsgcnv/oracopy/group_3.259.1201727433  
/nfsgcnv/oracopy/group_2.263.1201727425  
/nfsgcnv/oracopy/group_2.257.1201727431  
/nfsgcnv/oracopy/group_1.262.1201727425  
/nfsgcnv/oracopy/group_1.258.1201727433
```

6 rows selected.

```
SQL> select name from v$controlfile;
```

```
NAME
```

```
-----  
-----  
  
/nfsgcnv/oracopy/NTAP.ctl
```

## 19. 其他恢复后任务

- Add GCNV NFS mount to fstab of the standby DB server if recovering from a standby DB server so that the NFS file system will be mounted when DB server host rebooted.
- Update pfile restored to \$ORACLE\_HOME/dbs directory and create spfile from pfile.

20. 要恢复到主存储，请按照第节中详述的完全相同的步骤操作 Reverse VLDB back to primary storage from backup copy。如果在备用数据库服务器上恢复，则需要将主存储导入备用数据库服务器。还需要将 Oracle 控制文件和当前在线日志文件从 GCNV nfs 挂载重新定位回主存储，这可以在几分钟的停机时间内完成。

这样就完成了从 GCNV NFS 文件系统上的备份映像副本到同一主 DB 服务器或备用 DB 服务器的 Oracle VLDB 数据库时间点恢复。

## 从备份映像副本克隆 Oracle VLDB 以供其他用例使用

从 GCNV 上的备份映像副本克隆新的 Oracle VLDB 类似于将主数据库按时间点恢复到新的 DB 服务器。NetApp 解决方案工程团队提供了自动化工具包，以促进整个流程的快速（几分钟）和轻松实施。

以下自动化工具包包含一个脚本，可用于通过 NFS 挂载从存储在 GCNV 存储上的主数据库备份映像副本创建或刷新 Oracle VLDB 的克隆，以实现完整的克隆生命周期管理。详细内容请参考文档：["通过服务器内映像备份实现 Oracle VLDB 克隆生命周期自动化"](#)。

```
https://bitbucket.ngage.netapp.com/mvc/projects/NS-  
BB/repos/na_oracle_bkup_clone/browse
```



目前，只有具有 bitbucket 访问权限的 NetApp 内部用户才能访问该工具包。对于感兴趣的外部用户，请向您的客户团队请求访问权限或联系 NetApp 解决方案工程团队。

## 在哪里可以找到更多信息

要了解有关本文档中描述的信息的更多信息，请查看以下文档和/或网站：

- NetApp 在 Google Cloud 上提供一流的文件存储服务

<https://cloud.google.com/netapp-volumes?hl=en>

- RMAN: 合并增量备份策略 (文档 ID 745798.1)

["https://support.oracle.com/knowledge/Oracle%20Database%20Products/745798\\_1.html"](https://support.oracle.com/knowledge/Oracle%20Database%20Products/745798_1.html)

- RMAN 备份和恢复用户指南

["https://docs.oracle.com/en/database/oracle/oracle-database/19/bradv/getting-started-rman.html"](https://docs.oracle.com/en/database/oracle/oracle-database/19/bradv/getting-started-rman.html)

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