TR-4973: Ripristino rapido e clonazione di Oracle VLDB con unione incrementale su AWS FSx ONTAP

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Sommario

TR-4973: Ripristino rapido e clonazione di Oracle VLDB con unione incrementale su AWS FSx ONTAP

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Questa soluzione fornisce una panoramica e dettagli per un rapido ripristino e clonazione di Oracle VLDB distribuito su un'istanza di elaborazione AWS EC2 con montaggio NFS su FSx ONTAP per la creazione di una copia di file di dati in standby da unire in modo incrementale e costante tramite RMAN.

Scopo

Il ripristino di un database molto grande (VLDB) in Oracle utilizzando lo strumento di backup Oracle Recovery Manager (RMAN) può rivelarsi un'operazione molto complessa. In caso di guasto, il processo di ripristino del database dai supporti di backup può richiedere molto tempo, ritardando il ripristino del database e potenzialmente incidendo in modo significativo sul Contratto di servizio (SLA). Tuttavia, a partire dalla versione 10g, Oracle ha introdotto una funzionalità RMAN che consente agli utenti di creare copie di immagini organizzate dei file di dati del database Oracle su un ulteriore spazio di archiviazione su disco situato sull'host del server DB. Queste copie delle immagini possono essere aggiornate in modo incrementale quotidianamente tramite RMAN. In caso di errore, l'amministratore del database (DBA) può rapidamente spostare il database Oracle dal supporto danneggiato alla copia immagine, eliminando la necessità di un ripristino completo del supporto del database. Il risultato è un SLA notevolmente migliorato, anche se al costo di raddoppiare lo spazio di archiviazione del database richiesto.

Se sei interessato a un SLA per il tuo VLDB e stai pensando di spostare il database Oracle su un cloud pubblico come AWS, puoi impostare una struttura di protezione del database simile utilizzando risorse come AWS FSx ONTAP per la gestione temporanea della copia dell'immagine del database in standby. In questa documentazione, illustriamo come effettuare il provisioning ed esportare un file system NFS da AWS FSx ONTAP da montare su un server di database Oracle per predisporre una copia del database in standby per un rapido ripristino in caso di guasto dell'archiviazione primaria.

Meglio ancora, mostriamo anche come sfruttare NetApp FlexClone per creare una copia dello stesso file system NFS di staging per altri casi d'uso, ad esempio per creare un ambiente Oracle di sviluppo/test con la stessa copia dell'immagine del database di standby, senza ulteriori investimenti in termini di storage.

Questa soluzione affronta i seguenti casi d'uso:

- Un'unione incrementale di copie di immagini Oracle VLDB tramite RMAN su un punto di montaggio NFS fuori dall'archiviazione AWS FSx ONTAP .
- Ripristino rapido di un Oracle VLDB passando alla copia dell'immagine del database sullo storage FSx ONTAP in caso di errore.
- Clona il volume del file system NFS FSx ONTAP che memorizza una copia dell'immagine Oracle VLDB da utilizzare per creare un'altra istanza del database per altri casi d'uso.

Pubblico

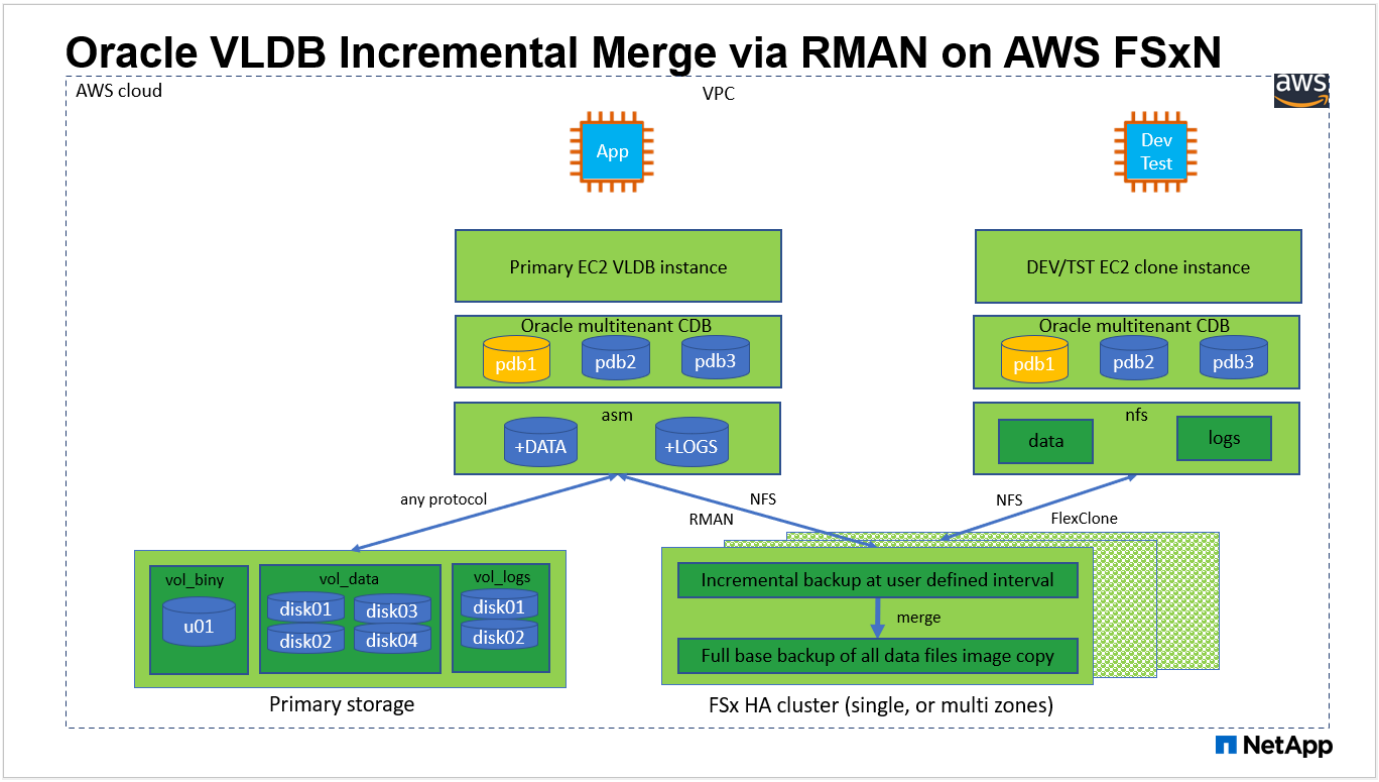
Questa soluzione è destinata alle seguenti persone:

- Un DBA che ha configurato l'unione incrementale delle copie delle immagini Oracle VLDB tramite RMAN in AWS per un ripristino più rapido del database.
- Architetto di soluzioni di database che testa i carichi di lavoro Oracle nel cloud pubblico AWS.
- Un amministratore di storage che gestisce i database Oracle distribuiti nello storage AWS FSx ONTAP .
- Un proprietario di un'applicazione che vorrebbe installare database Oracle nell'ambiente AWS FSx/EC2.

Ambiente di test e convalida della soluzione

Il test e la convalida di questa soluzione sono stati eseguiti in un ambiente AWS FSx ONTAP ed EC2 che potrebbe non corrispondere all'ambiente di distribuzione finale. Per ulteriori informazioni, consultare la sezione Fattori chiave per la considerazione dell'implementazione .

Architettura



Componenti hardware e software

Hardware		
Archiviazione FSx ONTAP	Versione attuale offerta da AWS	Un cluster FSx HA nella stessa VPC e zona di disponibilità
Istanza EC2 per il calcolo	t2.xlarge/4vCPU/16G	Due istanze EC2 T2 xlarge EC2, una come server DB primario e l'altra come server DB clone
Software		
RedHat Linux	RHEL-8.6.0_HVM-20220503-x86_64-2-Hourly2-GP2	Abbonamento RedHat distribuito per i test

Infrastruttura Oracle Grid	Versione 19.18	Patch RU applicata p34762026_190000_Linux-x86-64.zip
Database Oracle	Versione 19.18	Patch RU applicata p34765931_190000_Linux-x86-64.zip
Oracle OPatch	Versione 12.2.0.1.36	Ultima patch p6880880_190000_Linux-x86-64.zip

Fattori chiave per la considerazione dell'implementazione

- **Layout di archiviazione Oracle VLDB per unione incrementale RMAN.** Nei nostri test e nelle nostre convalide, il volume NFS per il backup incrementale e l'unione di Oracle viene allocato da un singolo file system FSx, con una velocità di elaborazione di 4 GBps, 160.000 IOPS SSD raw e un limite di capacità di 192 TiB. Per la distribuzione oltre le soglie, è possibile concatenare più file system FSx in parallelo con più punti di montaggio NFS per fornire una capacità maggiore.
- **Recuperabilità di Oracle tramite unione incrementale RMAN.** Il backup incrementale e l'unione RMAN vengono generalmente eseguiti con una frequenza definita dall'utente in base agli obiettivi RTO e RPO. In caso di perdita totale dell'archiviazione dei dati primari e/o dei registri archiviati, può verificarsi una perdita di dati. Il database Oracle può essere ripristinato fino all'ultimo backup incrementale disponibile dalla copia dell'immagine di backup del database FSx. Per ridurre al minimo la perdita di dati, l'area di ripristino flash di Oracle può essere configurata sul punto di montaggio NFS di FSx e i log archiviati vengono sottoposti a backup sul punto di montaggio NFS di FSx insieme alla copia dell'immagine del database.
- **Esecuzione di Oracle VLDB dal file system NFS di FSx.** A differenza di altri sistemi di archiviazione di massa per il backup di database, AWS FSx ONTAP è uno storage di livello produttivo abilitato al cloud che offre elevati livelli di prestazioni ed efficienza di archiviazione. Una volta che Oracle VLDB passa dall'archiviazione primaria alla copia dell'immagine sul file system NFS FSx ONTAP , le prestazioni del database possono essere mantenute a un livello elevato mentre viene risolto il problema dell'archiviazione primaria. Puoi stare tranquillo sapendo che l'esperienza utente delle applicazioni non viene compromessa da un guasto dell'archiviazione primaria.
- * Copia dell'immagine FlexClone Oracle VLDB del volume NFS per altri casi d'uso.* AWS FSx ONTAP FlexClone fornisce copie condivise dello stesso volume di dati NFS che sono scrivibili. Pertanto, possono essere utilizzati per molti altri casi d'uso, mantenendo comunque l'integrità della copia dell'immagine Oracle VLDB di staging anche quando il database Oracle viene commutato. Ciò consente un enorme risparmio sui costi di archiviazione riducendo sostanzialmente l'ingombro dello storage VLDB. NetApp consiglia di ridurre al minimo le attività FlexClone in caso di passaggio del database dallo storage primario alla copia dell'immagine del database, per mantenere elevate le prestazioni di Oracle.
- **Istanze di calcolo EC2.** In questi test e convalide, abbiamo utilizzato un'istanza AWS EC2 t2.xlarge come istanza di calcolo del database Oracle. NetApp consiglia di utilizzare un'istanza EC2 di tipo M5 come istanza di elaborazione per Oracle nella distribuzione di produzione perché è ottimizzata per il carico di lavoro del database. È necessario dimensionare l'istanza EC2 in modo appropriato per il numero di vCPU e la quantità di RAM in base ai requisiti effettivi del carico di lavoro.
- **Distribuzione di cluster HA di storage FSx a zona singola o multizona.** In questi test e convalide, abbiamo distribuito un cluster FSx HA in una singola zona di disponibilità AWS. Per la distribuzione in produzione, NetApp consiglia di distribuire una coppia FSx HA in due diverse zone di disponibilità. Un cluster FSx HA viene sempre fornito in una coppia HA sincronizzata in una coppia di file system attivi-passivi per fornire ridondanza a livello di storage. L'implementazione multizona migliora ulteriormente l'elevata disponibilità in caso di guasto in una singola zona AWS.

- **Dimensionamento del cluster di archiviazione FSx.** Un file system di storage Amazon FSx ONTAP fornisce fino a 160.000 IOPS SSD raw, fino a 4 GBps di throughput e una capacità massima di 192 TiB. Tuttavia, è possibile dimensionare il cluster in termini di IOPS forniti, throughput e limite di archiviazione (minimo 1.024 GiB) in base alle esigenze effettive al momento della distribuzione. La capacità può essere regolata dinamicamente al volo senza compromettere la disponibilità dell'applicazione.
- **Configurazione dNFS.** dNFS è integrato nel kernel Oracle ed è noto per aumentare notevolmente le prestazioni del database Oracle quando Oracle viene distribuito su storage NFS. dNFS è incluso nel pacchetto binario Oracle ma non è attivato per impostazione predefinita. Dovrebbe essere attivato per qualsiasi distribuzione di database Oracle su NFS. Per la distribuzione di più file system FSx per un VLDB, è necessario configurare correttamente il multi-path dNFS verso diversi file system NFS FSx.

Distribuzione della soluzione

Si presume che il tuo Oracle VLDB sia già distribuito nell'ambiente AWS EC2 all'interno di una VPC. Se hai bisogno di aiuto con la distribuzione di Oracle in AWS, consulta i seguenti report tecnici.

- "Procedure consigliate per la distribuzione di Oracle Database su EC2 e FSx"
- "Distribuzione e protezione del database Oracle in AWS FSx/EC2 con iSCSI/ASM"
- "Oracle 19c in riavvio autonomo su AWS FSx/EC2 con NFS/ASM"

Il tuo Oracle VLDB può essere eseguito su un FSx ONTAP o su qualsiasi altro storage tra quelli disponibili nell'ecosistema AWS EC2. La sezione seguente fornisce procedure di distribuzione dettagliate per la configurazione dell'unione incrementale RMAN in una copia immagine di un Oracle VLDB in fase di staging in un montaggio NFS da uno storage AWS FSx ONTAP .

Prerequisiti per la distribuzione

Per la distribuzione sono richiesti i seguenti prerequisiti.

1. È stato configurato un account AWS e sono stati creati i segmenti di rete e VPC necessari all'interno del tuo account AWS.
2. Dalla console AWS EC2, è necessario distribuire due istanze EC2 Linux, una come server Oracle DB primario e un server DB di destinazione clone alternativo facoltativo. Per maggiori dettagli sulla configurazione dell'ambiente, consultare il diagramma dell'architettura nella sezione precedente. Rivedere anche il"Guida utente per istanze Linux" per maggiori informazioni.
3. Dalla console AWS EC2, distribuisci i cluster HA di storage Amazon FSx ONTAP per ospitare i volumi NFS che archiviano la copia dell'immagine di standby del database Oracle. Se non hai familiarità con la distribuzione dell'archiviazione FSx, consulta la documentazione"Creazione di file system FSx ONTAP" per istruzioni dettagliate.
4. I passaggi 2 e 3 possono essere eseguiti utilizzando il seguente toolkit di automazione Terraform, che crea un'istanza EC2 denominata `ora_01` e un file system FSx denominato `fsx_01` . Rivedere attentamente le istruzioni e modificare le variabili in base all'ambiente prima dell'esecuzione. Il modello può essere facilmente modificato in base alle proprie esigenze di distribuzione.

```
git clone https://github.com/NetApp-
Automation/na_aws_fsx_ec2_deploy.git
```

Assicurati di aver allocato almeno 50 G nel volume radice dell'istanza EC2 per avere spazio sufficiente per organizzare i file di installazione di Oracle.

Fornire ed esportare il volume NFS da montare sull'host dell'istanza del database EC2

In questa dimostrazione, mostreremo come effettuare il provisioning di un volume NFS dalla riga di comando effettuando l'accesso a un cluster FSx tramite ssh come utente fsxadmin tramite l'IP di gestione del cluster FSx. In alternativa, il volume può essere allocato anche tramite la console AWS FSx. Ripetere le procedure su altri file system FSx se sono configurati più file system FSx per adattarsi alle dimensioni del database.

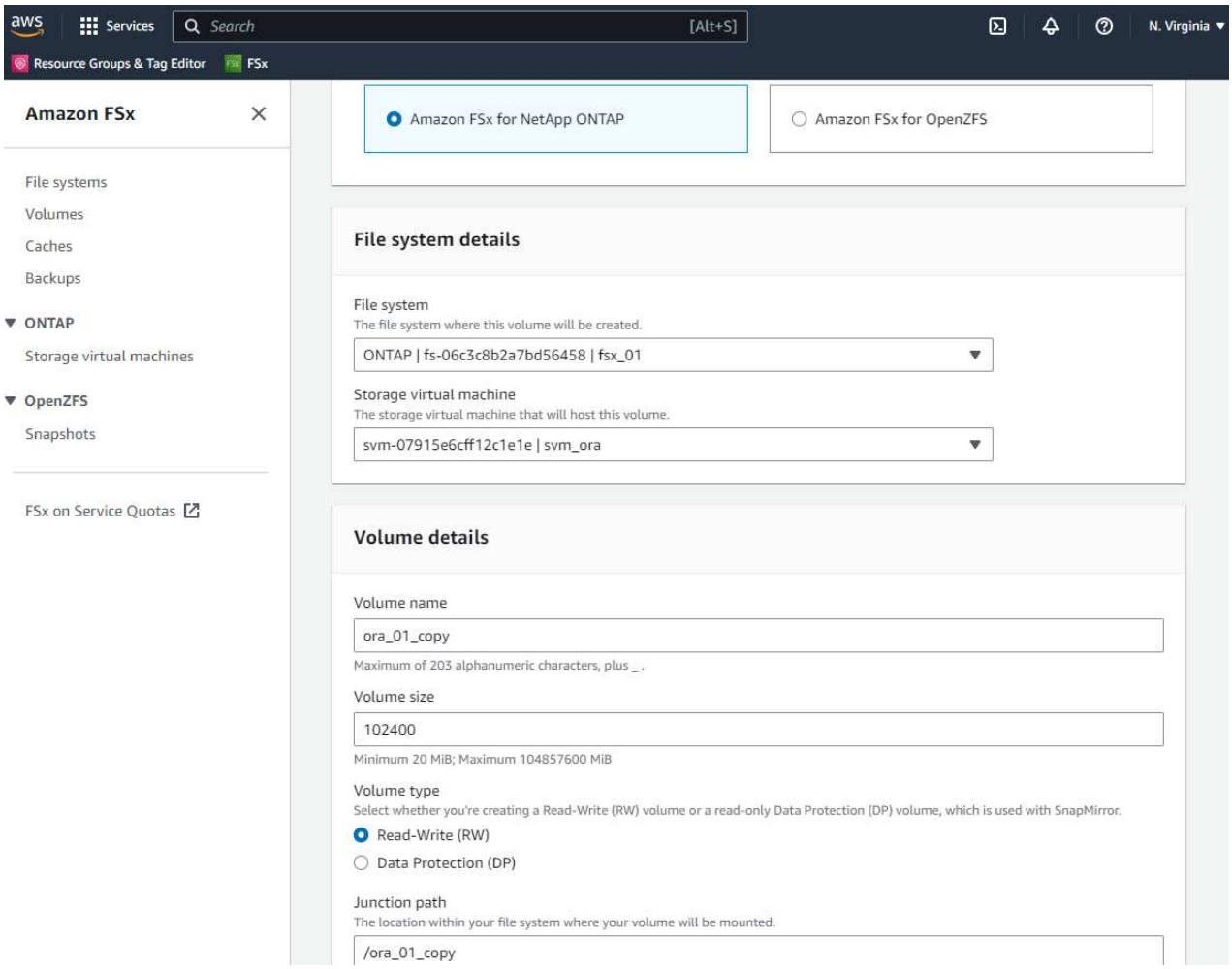
1. Per prima cosa, predisporre il volume NFS tramite CLI accedendo al cluster FSx tramite SSH come utente fsxadmin. Modifica l'indirizzo IP di gestione del cluster FSx, che può essere recuperato dalla console dell'interfaccia utente di AWS FSx ONTAP .

```
ssh fsxadmin@172.30.15.53
```

2. Crea un volume NFS delle stesse dimensioni del tuo storage primario per archiviare la copia dell'immagine dei file di dati del database Oracle VLDB primario.

```
vol create -volume ora_01_copy -aggregate aggr1 -size 100G -state
online -type RW -junction-path /ora_01_copy -snapshot-policy none
-tiering-policy snapshot-only
```

3. In alternativa, il volume può essere fornito dall'interfaccia utente della console AWS FSx con le opzioni: efficienza di archiviazione `Enabled` , stile di sicurezza `Unix` , Politica di snapshot `None` e livelli di archiviazione `Snapshot Only` come mostrato di seguito.



4. Crea una policy di snapshot personalizzata per il database Oracle con una pianificazione giornaliera e una conservazione di 30 giorni. Dovresti adattare la policy alle tue esigenze specifiche in termini di frequenza degli snapshot e finestra di conservazione.

```
snapshot policy create -policy oracle -enabled true -schedule1 daily
-count1 30
```

Applica la policy al volume NFS fornito per il backup incrementale e l'unione RMAN.

```
vol modify -volume ora_01_copy -snapshot-policy oracle
```

5. Accedi all'istanza EC2 come ec2-user e crea una directory /nfsfsxn. Creare directory di punti di montaggio aggiuntivi per file system FSx aggiuntivi.

```
sudo mkdir /nfsfsxn
```

6. Montare il volume NFS FSx ONTAP sull'host dell'istanza del database EC2. Modifica l'indirizzo NFS lif del tuo server virtuale FSx. L'indirizzo NFS lif può essere recuperato dalla console dell'interfaccia utente di FSx ONTAP .

```
sudo mount 172.30.15.19:/ora_01_copy /nfsfsxn -o
rw,bg,hard,vers=3,proto=tcp,timeo=600,rsize=262144,wsize=262144,noin
tr
```

7. Modificare la proprietà del punto di montaggio in oracle:oisntall, modificare il nome utente Oracle e il gruppo primario, se necessario.

```
sudo chown oracle:oinstall /nfsfsxn
```

Imposta l’unione incrementale di Oracle RMAN per la copia dell’immagine su FSx

L'unione incrementale RMAN aggiorna continuamente la copia dell'immagine dei file di dati del database di staging a ogni intervallo di backup/unione incrementale. La copia dell'immagine del backup del database sarà aggiornata con la stessa frequenza con cui si esegue il backup/unione incrementale. Pertanto, quando si decide la frequenza del backup incrementale e dell'unione RMAN, è necessario tenere in considerazione le prestazioni del database e gli obiettivi RTO e RPO.

1. Accedi all'istanza EC2 del server DB primario come utente Oracle
2. Creare una directory oracopy nel punto di montaggio /nfsfsxn per memorizzare le copie delle immagini dei file di dati Oracle e la directory archlog per l'area di ripristino flash di Oracle.

```
mkdir /nfsfsxn/oracopy
```

```
mkdir /nfsfsxn/archlog
```

3. Accedi al database Oracle tramite sqlplus, abilita il monitoraggio delle modifiche dei blocchi per un backup incrementale più rapido e modifica l'area di ripristino flash di Oracle sul montaggio FSx ONTAP se attualmente si trova sullo storage primario. Ciò consente il backup automatico del file di controllo/spfile predefinito di RMAN e dei log archiviati sul mount NFS di FSx ONTAP per il ripristino.

```
sqlplus / as sysdba
```

Dal prompt di sqlplus, eseguire il seguente comando.

```
alter database enable block change tracking using file
'/nfsfsxn/oracopy/bct_db1.ctf'
```

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

4. Creare uno script di backup RMAN e di unione incrementale. Lo script alloca più canali per il backup e l'unione RMAN paralleli. La prima esecuzione genererebbe la copia iniziale completa dell'immagine di base. In un'esecuzione completa, elimina innanzitutto i backup obsoleti che si trovano al di fuori della finestra di conservazione per mantenere pulita l'area di staging. Quindi cambia il file di registro corrente prima di unirlo e di eseguire il backup. Il backup incrementale segue l'unione, in modo che la copia dell'immagine del database sia in ritardo rispetto allo stato corrente del database di un ciclo di backup/unione. L'ordine di unione e backup può essere invertito per un ripristino più rapido, a seconda delle preferenze dell'utente. Lo script RMAN può essere integrato in un semplice script shell da eseguire da crontab sul server DB primario. Assicurarsi che il backup automatico del file di controllo sia attivato nelle impostazioni RMAN.

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

Add following lines:

RUN
{
  allocate channel c1 device type disk format '/nfsfsxn/oracopy/%U';
  allocate channel c2 device type disk format '/nfsfsxn/oracopy/%U';
  allocate channel c3 device type disk format '/nfsfsxn/oracopy/%U';
  allocate channel c4 device type disk format '/nfsfsxn/oracopy/%U';
  delete obsolete;
  sql 'alter system archive log current';
  recover copy of database with tag 'OraCopyBKUPonFSxN_level_0';
  backup incremental level 1 copies=1 for recover of copy with tag
'OraCopyBKUPonFSxN_level_0' database;
}
```

5. Sul server EC2 DB, accedi a RMAN localmente come utente Oracle con o senza catalogo RMAN. In questa dimostrazione non ci stiamo connettendo a un catalogo RMAN.

```
rman target / nocatalog;

output:

[oracle@ip-172-30-15-99 ~]$ rman target / nocatalog;

Recovery Manager: Release 19.0.0.0.0 - Production on Wed May 24
17:44:49 2023
Version 19.18.0.0.0

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reserved.

connected to target database: DB1 (DBID=1730530050)
using target database control file instead of recovery catalog

RMAN>
```

6. Dal prompt RMAN, eseguire lo script. La prima esecuzione crea una copia dell'immagine del database di base, mentre le esecuzioni successive uniscono e aggiornano la copia dell'immagine di base in modo incrementale. Di seguito viene descritto come eseguire lo script e il risultato tipico. Imposta il numero di canali in modo che corrisponda ai core della CPU sull'host.

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

```
RMAN> RUN
2> {
3>   allocate channel c1 device type disk format
'/nfsfsxn/oracopy/%U';
4>   allocate channel c2 device type disk format
'/nfsfsxn/oracopy/%U';
5>   allocate channel c3 device type disk format
'/nfsfsxn/oracopy/%U';
6>   allocate channel c4 device type disk format
'/nfsfsxn/oracopy/%U';
7>   delete obsolete;
8>   sql 'alter system archive log current';
9>   recover copy of database with tag 'OraCopyBKUPonFSxN_level_0';
10>  backup incremental level 1 copies=1 for recover of copy with
tag 'OraCopyBKUPonFSxN_level_0' database;
11> }

allocated channel: c1
channel c1: SID=411 device type=DISK

allocated channel: c2
channel c2: SID=146 device type=DISK

allocated channel: c3
channel c3: SID=402 device type=DISK

allocated channel: c4
channel c4: SID=37 device type=DISK

Starting recover at 17-MAY-23
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
.
.
Finished recover at 17-MAY-23

Starting backup at 17-MAY-23
channel c1: starting incremental level 1 datafile backup set
channel c1: specifying datafile(s) in backup set
input datafile file number=00022
name=+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.287.113
7018311
```

```
input datafile file number=00026
name=+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.291.113
7018481
input datafile file number=00030
name=+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.295.113
7018787
input datafile file number=00011
name=+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/undotbs1.27
1.1136668041
input datafile file number=00035
name=+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.300.113
7019181
channel c1: starting piece 1 at 17-MAY-23
channel c2: starting incremental level 1 datafile backup set
channel c2: specifying datafile(s) in backup set
input datafile file number=00023
name=+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.288.113
7018359
input datafile file number=00027
name=+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.292.113
7018523
input datafile file number=00031
name=+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.296.113
7018837
input datafile file number=00009
name=+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/system.272.
1136668041
input datafile file number=00034
name=+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.299.113
7019117
.
.
Finished backup at 17-MAY-23

Starting Control File and SPFILE Autobackup at 17-MAY-23
piece
handle=+LOGS/DB1/AUTOBACKUP/2023_05_17/s_1137095435.367.1137095435
comment=NONE
Finished Control File and SPFILE Autobackup at 17-MAY-23
released channel: c1
released channel: c2
released channel: c3
released channel: c4

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

7. Elenca la copia dell'immagine del database dopo il backup per verificare che sia stata creata una copia dell'immagine del database nel punto di montaggio NFS di FSx ONTAP .

```
RMAN> list copy of database tag 'OraCopyBKUPonFSxN_level_0';

List of Datafile Copies
========================

Key     File S Completion Time Ckp SCN    Ckp Time        Sparse
------- ---- - --------------- ---------- --------------- ------
19      1    A 17-MAY-23       3009819    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSTEM_FNO-1_0h1sd7ae
        Tag: ORACOPYBKUPONFSXN_LEVEL_0

20      3    A 17-MAY-23       3009826    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSAUX_FNO-3_0i1sd7at
        Tag: ORACOPYBKUPONFSXN_LEVEL_0

21      4    A 17-MAY-23       3009830    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-4_0j1sd7b4
        Tag: ORACOPYBKUPONFSXN_LEVEL_0

27      5    A 17-MAY-23       2383520    12-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSTEM_FNO-5_0p1sd7cf
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 2, PDB Name: PDB$SEED

26      6    A 17-MAY-23       2383520    12-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSAUX_FNO-6_0o1sd7c8
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 2, PDB Name: PDB$SEED

34      7    A 17-MAY-23       3009907    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-
7_101sd7dl
        Tag: ORACOPYBKUPONFSXN_LEVEL_0

33      8    A 17-MAY-23       2383520    12-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-8_0v1sd7di
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
```

```
        Container ID: 2, PDB Name: PDB$SEED

28      9    A 17-MAY-23       3009871    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSTEM_FNO-9_0q1sd7cm
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

22      10   A 17-MAY-23       3009849    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSAUX_FNO-10_0k1sd7bb
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

25      11   A 17-MAY-23       3009862    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-11_0n1sd7c1
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

35      12   A 17-MAY-23       3009909    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-
12_111sd7dm
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

29      13   A 17-MAY-23       3009876    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSTEM_FNO-13_0r1sd7ct
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 4, PDB Name: DB1_PDB2

23      14   A 17-MAY-23       3009854    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSAUX_FNO-14_0l1sd7bi
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 4, PDB Name: DB1_PDB2

31      15   A 17-MAY-23       3009900    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-15_0t1sd7db
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 4, PDB Name: DB1_PDB2

36      16   A 17-MAY-23       3009911    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-
```

```
16_121sd7dn
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 4, PDB Name: DB1_PDB2

30      17   A 17-MAY-23       3009895    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSTEM_FNO-17_0s1sd7d4
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 5, PDB Name: DB1_PDB3

24      18   A 17-MAY-23       3009858    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSAUX_FNO-18_0m1sd7bq
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 5, PDB Name: DB1_PDB3

32      19   A 17-MAY-23       3009903    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-19_0u1sd7de
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 5, PDB Name: DB1_PDB3

37      20   A 17-MAY-23       3009914    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-
20_131sd7do
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 5, PDB Name: DB1_PDB3

4       21   A 17-MAY-23       3009019    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
21_021sd6pv
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

5       22   A 17-MAY-23       3009419    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
22_031sd6r2
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

6       23   A 17-MAY-23       3009460    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
23_041sd6s5
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1
```

```
7       24   A 17-MAY-23       3009473    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
24_051sd6t9
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

8       25   A 17-MAY-23       3009502    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
25_061sd6uc
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

9       26   A 17-MAY-23       3009548    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
26_071sd6vf
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

10      27   A 17-MAY-23       3009576    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
27_081sd70i
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

11      28   A 17-MAY-23       3009590    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
28_091sd71l
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

12      29   A 17-MAY-23       3009619    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
29_0a1sd72o
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

13      30   A 17-MAY-23       3009648    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
30_0b1sd73r
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

14      31   A 17-MAY-23       3009671    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
31_0c1sd74u
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
```

```
        Container ID: 3, PDB Name: DB1_PDB1

15      32   A 17-MAY-23       3009729    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
32_0d1sd762
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

16      33   A 17-MAY-23       3009743    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
33_0e1sd775
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

17      34   A 17-MAY-23       3009771    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
34_0f1sd788
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

18      35   A 17-MAY-23       3009805    17-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
35_0g1sd79b
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1


RMAN>
```

8. Schema del report dal prompt dei comandi Oracle RMAN per verificare che i file di dati del database attivi correnti si trovino nel gruppo di dischi ASM +DATA dell'archiviazione primaria.

```
RMAN> report schema;

Report of database schema for database with db_unique_name DB1

List of Permanent Datafiles
===========================
File Size(MB) Tablespace           RB segs Datafile Name
---- -------- -------------------- ------- ------------------------
1    1060     SYSTEM               YES
+DATA/DB1/DATAFILE/system.257.1136666315
3    810      SYSAUX               NO
+DATA/DB1/DATAFILE/sysaux.258.1136666361
4    675      UNDOTBS1             YES
+DATA/DB1/DATAFILE/undotbs1.259.1136666385
```

```
5    400      PDB$SEED:SYSTEM      NO
+DATA/DB1/86B637B62FE07A65E053F706E80A27CA/DATAFILE/system.266.11366
67165
6    460      PDB$SEED:SYSAUX      NO
+DATA/DB1/86B637B62FE07A65E053F706E80A27CA/DATAFILE/sysaux.267.11366
67165
7    5        USERS                NO
+DATA/DB1/DATAFILE/users.260.1136666387
8    230      PDB$SEED:UNDOTBS1    NO
+DATA/DB1/86B637B62FE07A65E053F706E80A27CA/DATAFILE/undotbs1.268.113
6667165
9    400      DB1_PDB1:SYSTEM      YES
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/system.272.11366
68041
10   490      DB1_PDB1:SYSAUX      NO
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/sysaux.273.11366
68041
11   465      DB1_PDB1:UNDOTBS1    YES
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/undotbs1.271.113
6668041
12   5        DB1_PDB1:USERS       NO
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/users.275.113666
8057
13   400      DB1_PDB2:SYSTEM      YES
+DATA/DB1/FB867EA89ECF81C0E053630F1EACB901/DATAFILE/system.277.11366
68057
14   470      DB1_PDB2:SYSAUX      NO
+DATA/DB1/FB867EA89ECF81C0E053630F1EACB901/DATAFILE/sysaux.278.11366
68057
15   235      DB1_PDB2:UNDOTBS1    YES
+DATA/DB1/FB867EA89ECF81C0E053630F1EACB901/DATAFILE/undotbs1.276.113
6668057
16   5        DB1_PDB2:USERS       NO
+DATA/DB1/FB867EA89ECF81C0E053630F1EACB901/DATAFILE/users.280.113666
8071
17   400      DB1_PDB3:SYSTEM      YES
+DATA/DB1/FB867F8A4D4F821CE053630F1EAC69CC/DATAFILE/system.282.11366
68073
18   470      DB1_PDB3:SYSAUX      NO
+DATA/DB1/FB867F8A4D4F821CE053630F1EAC69CC/DATAFILE/sysaux.283.11366
68073
19   235      DB1_PDB3:UNDOTBS1    YES
+DATA/DB1/FB867F8A4D4F821CE053630F1EAC69CC/DATAFILE/undotbs1.281.113
6668073
20   5        DB1_PDB3:USERS       NO
+DATA/DB1/FB867F8A4D4F821CE053630F1EAC69CC/DATAFILE/users.285.113666
```

```
8087
21   4096     DB1_PDB1:SOE         NO
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.286.11370182
39
22   4096     DB1_PDB1:SOE         NO
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.287.11370183
11
23   4096     DB1_PDB1:SOE         NO
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.288.11370183
59
24   4096     DB1_PDB1:SOE         NO
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.289.11370184
05
25   4096     DB1_PDB1:SOE         NO
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.290.11370184
43
26   4096     DB1_PDB1:SOE         NO
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.291.11370184
81
27   4096     DB1_PDB1:SOE         NO
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.292.11370185
23
28   4096     DB1_PDB1:SOE         NO
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.293.11370187
07
29   4096     DB1_PDB1:SOE         NO
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.294.11370187
45
30   4096     DB1_PDB1:SOE         NO
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.295.11370187
87
31   4096     DB1_PDB1:SOE         NO
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.296.11370188
37
32   4096     DB1_PDB1:SOE         NO
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.297.11370189
35
33   4096     DB1_PDB1:SOE         NO
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.298.11370190
77
34   4096     DB1_PDB1:SOE         NO
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.299.11370191
17
35   4096     DB1_PDB1:SOE         NO
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/DATAFILE/soe.300.11370191
81
```

```
List of Temporary Files
=======================
File Size(MB) Tablespace           Maxsize(MB) Tempfile Name
---- -------- -------------------- ----------- --------------------
1    123      TEMP                 32767
+DATA/DB1/TEMPFILE/temp.265.1136666447
2    123      PDB$SEED:TEMP        32767
+DATA/DB1/FB864A929AEB79B9E053630F1EAC7046/TEMPFILE/temp.269.1136667
185
3    10240    DB1_PDB1:TEMP        32767
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/TEMPFILE/temp.274.1136668
051
4    123      DB1_PDB2:TEMP        32767
+DATA/DB1/FB867EA89ECF81C0E053630F1EACB901/TEMPFILE/temp.279.1136668
067
5    123      DB1_PDB3:TEMP        32767
+DATA/DB1/FB867F8A4D4F821CE053630F1EAC69CC/TEMPFILE/temp.284.1136668
081

RMAN>
```

9. Convalida la copia dell'immagine del database dal punto di montaggio NFS del sistema operativo.

```
[oracle@ip-172-30-15-99 ~]$ ls -l /nfsfsxn/oracopy/
total 70585148
-rw-r----- 1 oracle asm 4294975488 May 17 18:09 data_D-DB1_I-
1730530050_TS-SOE_FNO-21_021sd6pv
-rw-r----- 1 oracle asm 4294975488 May 17 18:10 data_D-DB1_I-
1730530050_TS-SOE_FNO-22_031sd6r2
-rw-r----- 1 oracle asm 4294975488 May 17 18:10 data_D-DB1_I-
1730530050_TS-SOE_FNO-23_041sd6s5
-rw-r----- 1 oracle asm 4294975488 May 17 18:11 data_D-DB1_I-
1730530050_TS-SOE_FNO-24_051sd6t9
-rw-r----- 1 oracle asm 4294975488 May 17 18:11 data_D-DB1_I-
1730530050_TS-SOE_FNO-25_061sd6uc
-rw-r----- 1 oracle asm 4294975488 May 17 18:12 data_D-DB1_I-
1730530050_TS-SOE_FNO-26_071sd6vf
-rw-r----- 1 oracle asm 4294975488 May 17 18:13 data_D-DB1_I-
1730530050_TS-SOE_FNO-27_081sd70i
-rw-r----- 1 oracle asm 4294975488 May 17 18:13 data_D-DB1_I-
1730530050_TS-SOE_FNO-28_091sd71l
-rw-r----- 1 oracle asm 4294975488 May 17 18:14 data_D-DB1_I-
1730530050_TS-SOE_FNO-29_0a1sd72o
-rw-r----- 1 oracle asm 4294975488 May 17 18:14 data_D-DB1_I-
```

```
1730530050_TS-SOE_FNO-30_0b1sd73r
-rw-r----- 1 oracle asm 4294975488 May 17 18:15 data_D-DB1_I-
1730530050_TS-SOE_FNO-31_0c1sd74u
-rw-r----- 1 oracle asm 4294975488 May 17 18:16 data_D-DB1_I-
1730530050_TS-SOE_FNO-32_0d1sd762
-rw-r----- 1 oracle asm 4294975488 May 17 18:16 data_D-DB1_I-
1730530050_TS-SOE_FNO-33_0e1sd775
-rw-r----- 1 oracle asm 4294975488 May 17 18:17 data_D-DB1_I-
1730530050_TS-SOE_FNO-34_0f1sd788
-rw-r----- 1 oracle asm 4294975488 May 17 18:17 data_D-DB1_I-
1730530050_TS-SOE_FNO-35_0g1sd79b
-rw-r----- 1 oracle asm  513810432 May 17 18:18 data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-10_0k1sd7bb
-rw-r----- 1 oracle asm  492838912 May 17 18:18 data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-14_0l1sd7bi
-rw-r----- 1 oracle asm  492838912 May 17 18:18 data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-18_0m1sd7bq
-rw-r----- 1 oracle asm  849354752 May 17 18:18 data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-3_0i1sd7at
-rw-r----- 1 oracle asm  482353152 May 17 18:18 data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-6_0o1sd7c8
-rw-r----- 1 oracle asm 1111498752 May 17 18:18 data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-1_0h1sd7ae
-rw-r----- 1 oracle asm  419438592 May 17 18:19 data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-13_0r1sd7ct
-rw-r----- 1 oracle asm  419438592 May 17 18:19 data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-17_0s1sd7d4
-rw-r----- 1 oracle asm  419438592 May 17 18:19 data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-5_0p1sd7cf
-rw-r----- 1 oracle asm  419438592 May 17 18:19 data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-9_0q1sd7cm
-rw-r----- 1 oracle asm  487596032 May 17 18:18 data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-11_0n1sd7c1
-rw-r----- 1 oracle asm  246423552 May 17 18:19 data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-15_0t1sd7db
-rw-r----- 1 oracle asm  246423552 May 17 18:19 data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-19_0u1sd7de
-rw-r----- 1 oracle asm  707796992 May 17 18:18 data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-4_0j1sd7b4
-rw-r----- 1 oracle asm  241180672 May 17 18:19 data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-8_0v1sd7di
-rw-r----- 1 oracle asm    5251072 May 17 18:19 data_D-DB1_I-
1730530050_TS-USERS_FNO-12_111sd7dm
-rw-r----- 1 oracle asm    5251072 May 17 18:19 data_D-DB1_I-
1730530050_TS-USERS_FNO-16_121sd7dn
-rw-r----- 1 oracle asm    5251072 May 17 18:19 data_D-DB1_I-
```

```
1730530050_TS-USERS_FNO-20_131sd7do
-rw-r----- 1 oracle asm    5251072 May 17 18:19 data_D-DB1_I-
1730530050_TS-USERS_FNO-7_101sd7dl
```

Questo completa la configurazione del backup e dell'unione della copia dell'immagine di standby del database Oracle.

Passa Oracle DB alla copia dell'immagine per un rapido ripristino

In caso di guasto dovuto a un problema di archiviazione primaria, come perdita o danneggiamento dei dati, il database può essere rapidamente convertito in una copia dell'immagine sul mount NFS FSx ONTAP e ripristinato allo stato corrente senza dover ripristinare il database. L'eliminazione del ripristino dei supporti velocizza enormemente il ripristino del database per un VLDB. Questo caso d'uso presuppone che l'istanza host del database sia intatta e che il file di controllo del database, i log archiviati e quelli correnti siano tutti disponibili per il ripristino.

1. Accedi all'host del server EC2 DB come utente Oracle e crea una tabella di prova prima di passare.

```
[ec2-user@ip-172-30-15-99 ~]$ sudo su
[root@ip-172-30-15-99 ec2-user]# su - oracle
Last login: Thu May 18 14:22:34 UTC 2023
[oracle@ip-172-30-15-99 ~]$ sqlplus / as sysdba

SQL*Plus: Release 19.0.0.0.0 - Production on Thu May 18 14:30:36
2023
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 DB1_PDB1                       READ WRITE NO
         4 DB1_PDB2                       READ WRITE NO
         5 DB1_PDB3                       READ WRITE NO
SQL> alter session set container=db1_pdb1;

Session altered.

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

Table created.

SQL> insert into test values(1, sysdate, 'test oracle incremental
merge switch to copy');
```

```
1 row created.

SQL> commit;

Commit complete.

SQL> select * from test;

        ID
----------
DT
---------------------------------------------------------------------------
-------
EVENT
---------------------------------------------------------------------------
------------
         1
18-MAY-23 02.35.37.000000 PM
test oracle incremental merge switch to copy


SQL>
```

2. Simula un errore arrestando e interrompendo il database, quindi avvia Oracle nella fase di montaggio.

```
SQL> shutdown abort;
ORACLE instance shut down.
SQL> startup mount;
ORACLE instance started.

Total System Global Area 1.2885E+10 bytes
Fixed Size                  9177880 bytes
Variable Size            1778384896 bytes
Database Buffers         1.1073E+10 bytes
Redo Buffers               24375296 bytes
Database mounted.
SQL>
```

3. Come utente Oracle, connettiti al database Oracle tramite RMAN per cambiare il database da copiare.

```
RMAN> switch database to copy;

datafile 1 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-1_0h1sd7ae"
```

```
datafile 3 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-3_0i1sd7at"
datafile 4 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-4_0j1sd7b4"
datafile 5 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-5_0p1sd7cf"
datafile 6 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-6_0o1sd7c8"
datafile 7 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-USERS_FNO-7_101sd7dl"
datafile 8 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-8_0v1sd7di"
datafile 9 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-9_0q1sd7cm"
datafile 10 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SYSAUX_FNO-10_0k1sd7bb"
datafile 11 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-UNDOTBS1_FNO-11_0n1sd7c1"
datafile 12 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-USERS_FNO-12_111sd7dm"
datafile 13 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SYSTEM_FNO-13_0r1sd7ct"
datafile 14 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SYSAUX_FNO-14_0l1sd7bi"
datafile 15 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-UNDOTBS1_FNO-15_0t1sd7db"
datafile 16 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-USERS_FNO-16_121sd7dn"
datafile 17 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SYSTEM_FNO-17_0s1sd7d4"
datafile 18 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SYSAUX_FNO-18_0m1sd7bq"
datafile 19 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-UNDOTBS1_FNO-19_0u1sd7de"
datafile 20 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-USERS_FNO-20_131sd7do"
datafile 21 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-21_021sd6pv"
datafile 22 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-22_031sd6r2"
datafile 23 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-23_041sd6s5"
datafile 24 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-24_051sd6t9"
datafile 25 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-25_061sd6uc"
```

```
datafile 26 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-26_071sd6vf"
datafile 27 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-27_081sd70i"
datafile 28 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-28_091sd71l"
datafile 29 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-29_0a1sd72o"
datafile 30 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-30_0b1sd73r"
datafile 31 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-31_0c1sd74u"
datafile 32 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-32_0d1sd762"
datafile 33 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-33_0e1sd775"
datafile 34 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-34_0f1sd788"
datafile 35 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-35_0g1sd79b"
```

4. Ripristina e apri il database per aggiornarlo allo stato corrente dell'ultimo backup incrementale.

```
RMAN> recover database;

Starting recover at 18-MAY-23
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=392 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 00009: /nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SYSTEM_FNO-9_0q1sd7cm
destination for restore of datafile 00023: /nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-23_041sd6s5
destination for restore of datafile 00027: /nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-27_081sd70i
destination for restore of datafile 00031: /nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-31_0c1sd74u
destination for restore of datafile 00034: /nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-34_0f1sd788
channel ORA_DISK_1: reading from backup piece
/nfsfsxn/oracopy/321sfous_98_1_1
channel ORA_DISK_1: piece handle=/nfsfsxn/oracopy/321sfous_98_1_1
tag=ORACOPYBKUPONFSXN_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: /nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SYSAUX_FNO-10_0k1sd7bb
destination for restore of datafile 00021: /nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-21_021sd6pv
destination for restore of datafile 00025: /nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-25_061sd6uc
.
.
.
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: /nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-USERS_FNO-16_121sd7dn
channel ORA_DISK_1: reading from backup piece
/nfsfsxn/oracopy/3i1sfov0_114_1_1
channel ORA_DISK_1: piece handle=/nfsfsxn/oracopy/3i1sfov0_114_1_1
tag=ORACOPYBKUPONFSXN_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: /nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-USERS_FNO-20_131sd7do
channel ORA_DISK_1: reading from backup piece
/nfsfsxn/oracopy/3j1sfov0_115_1_1
channel ORA_DISK_1: piece handle=/nfsfsxn/oracopy/3j1sfov0_115_1_1
tag=ORACOPYBKUPONFSXN_LEVEL_0
channel ORA_DISK_1: restored backup piece 1
channel ORA_DISK_1: restore complete, elapsed time: 00:00:01

starting media recovery
media recovery complete, elapsed time: 00:00:01

Finished recover at 18-MAY-23

RMAN> alter database open;

Statement processed
```

```
RMAN>
```

5. Controllare la struttura del database da sqlplus dopo il ripristino per osservare che tutti i file di dati del database, ad eccezione dei file di controllo, temporanei e di registro correnti, sono ora trasferiti per la copia sul file system NFS FSx ONTAP .

```
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/DB1/CONTROLFILE/current.261.1136666435
+DATA/DB1/FB864A929AEB79B9E053630F1EAC7046/TEMPFILE/temp.269.1136667
185
+DATA/DB1/FB867DA8C68C816EE053630F1EAC2BCF/TEMPFILE/temp.274.1136668
051
+DATA/DB1/FB867EA89ECF81C0E053630F1EACB901/TEMPFILE/temp.279.1136668
067
+DATA/DB1/FB867F8A4D4F821CE053630F1EAC69CC/TEMPFILE/temp.284.1136668
081
+DATA/DB1/ONLINELOG/group_1.262.1136666437
+DATA/DB1/ONLINELOG/group_2.263.1136666437
+DATA/DB1/ONLINELOG/group_3.264.1136666437
+DATA/DB1/TEMPFILE/temp.265.1136666447
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-21_021sd6pv
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-22_031sd6r2

NAME
------------------------------------------------------------------------
------------
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-23_041sd6s5
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-24_051sd6t9
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-25_061sd6uc
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-26_071sd6vf
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-27_081sd70i
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-28_091sd71l
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-29_0a1sd72o
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-30_0b1sd73r
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-31_0c1sd74u
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-32_0d1sd762
```

```
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-33_0e1sd775

NAME
--------------------------------------------------------------------------------
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-34_0f1sd788
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-35_0g1sd79b
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSAUX_FNO-10_0k1sd7bb
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSAUX_FNO-14_0l1sd7bi
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSAUX_FNO-18_0m1sd7bq
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSAUX_FNO-3_0i1sd7at
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSAUX_FNO-6_0o1sd7c8
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSTEM_FNO-13_0r1sd7ct
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSTEM_FNO-17_0s1sd7d4
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSTEM_FNO-1_0h1sd7ae
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSTEM_FNO-5_0p1sd7cf

NAME
--------------------------------------------------------------------------------
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSTEM_FNO-9_0q1sd7cm
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-UNDOTBS1_FNO-11_0n1sd7c1
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-UNDOTBS1_FNO-15_0t1sd7db
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-UNDOTBS1_FNO-19_0u1sd7de
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-UNDOTBS1_FNO-4_0j1sd7b4
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-UNDOTBS1_FNO-8_0v1sd7di
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-12_111sd7dm
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-16_121sd7dn
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-20_131sd7do
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-7_101sd7dl

43 rows selected.

SQL>
```

6. Da SQL plus, controlla il contenuto della tabella di test che abbiamo inserito prima di passare alla copia

```
SQL> show pdbs

    CON_ID CON_NAME                       OPEN MODE  RESTRICTED
---------- ------------------------------ ---------- ----------
         2 PDB$SEED                       READ ONLY  NO
         3 DB1_PDB1                       READ WRITE NO
         4 DB1_PDB2                       READ WRITE NO
         5 DB1_PDB3                       READ WRITE NO
SQL> alter session set container=db1_pdb1;

Session altered.

SQL> select * from test;

        ID
----------
DT
---------------------------------------------------------------------
-------
EVENT
---------------------------------------------------------------------
------------
         1
18-MAY-23 02.35.37.000000 PM
test oracle incremental merge switch to copy


SQL>
```

7. È possibile eseguire il database Oracle nel montaggio NFS FSx per un periodo prolungato senza alcuna penalizzazione delle prestazioni, poiché FSx ONTAP è uno storage ridondante di livello produttivo che garantisce prestazioni elevate. Una volta risolto il problema di archiviazione primaria, è possibile ripristinarlo invertendo i processi di unione dei backup incrementali con tempi di inattività minimi.

Ripristino del database Oracle dalla copia dell'immagine su un host di istanza del database EC2 diverso

In caso di errore, quando vengono persi sia l'archiviazione primaria sia l'host dell'istanza del database EC2, il ripristino non può essere eseguito dal server originale. Fortunatamente, hai ancora una copia dell'immagine di backup del database Oracle sul file system NFS FSx ONTAP ridondante. È possibile predisporre rapidamente un'altra istanza identica di EC2 DB e montare facilmente la copia immagine del VLDB sul nuovo host EC2 DB tramite NFS per eseguire il ripristino. In questa sezione illustreremo passo dopo passo le procedure per farlo.

1. Inserire una riga per testare la tabella creata in precedenza per il ripristino del database Oracle sulla convalida host alternativa.

```
[oracle@ip-172-30-15-99 ~]$ sqlplus / as sysdba

SQL*Plus: Release 19.0.0.0.0 - Production on Tue May 30 17:21:05
2023
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 DB1_PDB1                       READ WRITE NO
         4 DB1_PDB2                       READ WRITE NO
         5 DB1_PDB3                       READ WRITE NO
SQL> alter session set container=db1_pdb1;

Session altered.


SQL> insert into test values(2, sysdate, 'test recovery on a new EC2
instance host with image copy on FSx ONTAP');

1 row created.

SQL> commit;

Commit complete.

SQL> select * from test;
```

```
        ID
----------
DT
---------------------------------------------------------------------
-------
EVENT
---------------------------------------------------------------------
------------
         1
18-MAY-23 02.35.37.000000 PM
test oracle incremental merge switch to copy

         2
30-MAY-23 05.23.11.000000 PM
test recovery on a new EC2 instance host with image copy on FSx
ONTAP


SQL>
```

2. Come utente Oracle, esegui il backup incrementale RMAN e unisci per svuotare la transazione nel set di backup sul mount NFS FSx ONTAP .

```
[oracle@ip-172-30-15-99 ~]$ rman target / nocatalog

Recovery Manager: Release 19.0.0.0.0 - Production on Tue May 30
17:26:03 2023
Version 19.18.0.0.0

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

connected to target database: DB1 (DBID=1730530050)
using target database control file instead of recovery catalog

RMAN> @rman_bkup_merge.cmd
```

3. Arrestare l'host dell'istanza primaria del database EC2 per simulare un guasto totale dell'host del server di archiviazione e del database.
4. Privilegiare un nuovo host di istanza EC2 DB ora_02 con lo stesso sistema operativo e versione tramite la console AWS EC2. Configurare il kernel del sistema operativo con le stesse patch dell'host del server DB EC2 primario, Oracle preinstallare RPM e aggiungere anche spazio di swap all'host. Installare la stessa versione e le stesse patch di Oracle presenti nell'host del server DB EC2 primario con l'opzione solo software. Queste attività possono essere automatizzate con il toolkit di automazione NetApp disponibile ai link sottostanti.

Kit di strumenti:"na_oracle19c_deploy" Documentazione:"Distribuzione automatizzata di Oracle19c per ONTAP su NFS"

5. Configurare l'ambiente Oracle in modo simile all'host dell'istanza primaria del database EC2 ora_01, ad esempio oratab, oraInst.loc e l'utente Oracle .bash_profile. È buona norma eseguire il backup di tali file sul punto di montaggio NFS di FSx ONTAP .
6. La copia dell'immagine di backup del database Oracle sul mount NFS FSx ONTAP viene archiviata su un cluster FSx che si estende su più zone di disponibilità AWS per garantire ridondanza, elevata disponibilità e prestazioni elevate. Il file system NFS può essere facilmente montato su un nuovo server, purché la rete sia raggiungibile. Le seguenti procedure montano la copia dell'immagine di un backup Oracle VLDB sull'host dell'istanza EC2 DB appena fornita per il ripristino.

   Come utente ec2, crea il punto di montaggio.

   ```
   sudo mkdir /nfsfsxn
   ```

   Come utente ec2, monta il volume NFS in cui è archiviata la copia dell'immagine di backup di Oracle VLDB.

   ```
   sudo mount 172.30.15.19:/ora_01_copy /nfsfsxn -o
   rw,bg,hard,vers=3,proto=tcp,timeo=600,rsize=262144,wsize=262144,noin
   tr
   ```

7. Convalida la copia dell'immagine di backup del database Oracle sul punto di montaggio NFS FSx ONTAP .

   ```
   [ec2-user@ip-172-30-15-124 ~]$ ls -ltr /nfsfsxn/oracopy
   total 78940700
   -rw-r-----. 1 oracle 54331  482353152 May 26 18:45 data_D-DB1_I-
   1730530050_TS-SYSAUX_FNO-6_4m1t508t
   -rw-r-----. 1 oracle 54331  419438592 May 26 18:45 data_D-DB1_I-
   1730530050_TS-SYSTEM_FNO-5_4q1t509n
   -rw-r-----. 1 oracle 54331  241180672 May 26 18:45 data_D-DB1_I-
   1730530050_TS-UNDOTBS1_FNO-8_4t1t50a6
   -rw-r-----. 1 oracle 54331     450560 May 30 15:29 6b1tf6b8_203_1_1
   -rw-r-----. 1 oracle 54331     663552 May 30 15:29 6c1tf6b8_204_1_1
   -rw-r-----. 1 oracle 54331     122880 May 30 15:29 6d1tf6b8_205_1_1
   -rw-r-----. 1 oracle 54331     507904 May 30 15:29 6e1tf6b8_206_1_1
   -rw-r-----. 1 oracle 54331    4259840 May 30 15:29 6f1tf6b9_207_1_1
   -rw-r-----. 1 oracle 54331    9060352 May 30 15:29 6h1tf6b9_209_1_1
   -rw-r-----. 1 oracle 54331     442368 May 30 15:29 6i1tf6b9_210_1_1
   -rw-r-----. 1 oracle 54331     475136 May 30 15:29 6j1tf6bb_211_1_1
   -rw-r-----. 1 oracle 54331   48660480 May 30 15:29 6g1tf6b9_208_1_1
   -rw-r-----. 1 oracle 54331     589824 May 30 15:29 6l1tf6bb_213_1_1
   -rw-r-----. 1 oracle 54331     606208 May 30 15:29 6m1tf6bb_214_1_1
   -rw-r-----. 1 oracle 54331     368640 May 30 15:29 6o1tf6bb_216_1_1
   ```

```
-rw-r-----. 1 oracle 54331     368640 May 30 15:29 6p1tf6bc_217_1_1
-rw-r-----. 1 oracle 54331      57344 May 30 15:29 6r1tf6bc_219_1_1
-rw-r-----. 1 oracle 54331      57344 May 30 15:29 6s1tf6bc_220_1_1
-rw-r-----. 1 oracle 54331      57344 May 30 15:29 6t1tf6bc_221_1_1
-rw-r-----. 1 oracle 54331 4294975488 May 30 17:26 data_D-DB1_I-
1730530050_TS-SOE_FNO-23_3q1t4ut3
-rw-r-----. 1 oracle 54331 4294975488 May 30 17:26 data_D-DB1_I-
1730530050_TS-SOE_FNO-21_3o1t4ut2
-rw-r-----. 1 oracle 54331 4294975488 May 30 17:26 data_D-DB1_I-
1730530050_TS-SOE_FNO-27_461t4vt7
-rw-r-----. 1 oracle 54331 4294975488 May 30 17:26 data_D-DB1_I-
1730530050_TS-SOE_FNO-25_3s1t4v1a
-rw-r-----. 1 oracle 54331 4294975488 May 30 17:26 data_D-DB1_I-
1730530050_TS-SOE_FNO-22_3p1t4ut3
-rw-r-----. 1 oracle 54331 4294975488 May 30 17:26 data_D-DB1_I-
1730530050_TS-SOE_FNO-31_4a1t5015
-rw-r-----. 1 oracle 54331 4294975488 May 30 17:26 data_D-DB1_I-
1730530050_TS-SOE_FNO-29_481t4vt7
-rw-r-----. 1 oracle 54331 4294975488 May 30 17:26 data_D-DB1_I-
1730530050_TS-SOE_FNO-34_4d1t5058
-rw-r-----. 1 oracle 54331 4294975488 May 30 17:26 data_D-DB1_I-
1730530050_TS-SOE_FNO-26_451t4vt7
-rw-r-----. 1 oracle 54331 4294975488 May 30 17:26 data_D-DB1_I-
1730530050_TS-SOE_FNO-24_3r1t4ut3
-rw-r-----. 1 oracle 54331  555753472 May 30 17:26 data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-10_4i1t5083
-rw-r-----. 1 oracle 54331  429924352 May 30 17:26 data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-9_4n1t509m
-rw-r-----. 1 oracle 54331 4294975488 May 30 17:26 data_D-DB1_I-
1730530050_TS-SOE_FNO-30_491t5014
-rw-r-----. 1 oracle 54331 4294975488 May 30 17:26 data_D-DB1_I-
1730530050_TS-SOE_FNO-28_471t4vt7
-rw-r-----. 1 oracle 54331 4294975488 May 30 17:26 data_D-DB1_I-
1730530050_TS-SOE_FNO-35_4e1t5059
-rw-r-----. 1 oracle 54331 4294975488 May 30 17:26 data_D-DB1_I-
1730530050_TS-SOE_FNO-32_4b1t501u
-rw-r-----. 1 oracle 54331  487596032 May 30 17:26 data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-11_4l1t508t
-rw-r-----. 1 oracle 54331 4294975488 May 30 17:26 data_D-DB1_I-
1730530050_TS-SOE_FNO-33_4c1t501v
-rw-r-----. 1 oracle 54331    5251072 May 30 17:26 data_D-DB1_I-
1730530050_TS-USERS_FNO-12_4v1t50aa
-rw-r-----. 1 oracle 54331 1121984512 May 30 17:26 data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-1_4f1t506m
-rw-r-----. 1 oracle 54331  707796992 May 30 17:26 data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-4_4h1t5083
```

```
-rw-r-----. 1 oracle 54331  534781952 May 30 17:26 data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-14_4j1t508s
-rw-r-----. 1 oracle 54331  429924352 May 30 17:26 data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-13_4o1t509m
-rw-r-----. 1 oracle 54331  429924352 May 30 17:26 data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-17_4p1t509m
-rw-r-----. 1 oracle 54331  534781952 May 30 17:26 data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-18_4k1t508t
-rw-r-----. 1 oracle 54331 1027612672 May 30 17:26 data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-3_4g1t506m
-rw-r-----. 1 oracle 54331    5251072 May 30 17:26 data_D-DB1_I-
1730530050_TS-USERS_FNO-7_4u1t50a6
-rw-r-----. 1 oracle 54331  246423552 May 30 17:26 data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-15_4r1t50a6
-rw-r-----. 1 oracle 54331    5251072 May 30 17:26 data_D-DB1_I-
1730530050_TS-USERS_FNO-16_501t50ad
-rw-r-----. 1 oracle 54331  246423552 May 30 17:26 data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-19_4s1t50a6
-rw-r-----. 1 oracle 54331    5251072 May 30 17:26 data_D-DB1_I-
1730530050_TS-USERS_FNO-20_511t50ad
-rw-r-----. 1 oracle 54331 2318712832 May 30 17:32 721tfd6b_226_1_1
-rw-r-----. 1 oracle 54331 1813143552 May 30 17:33 701tfd6a_224_1_1
-rw-r-----. 1 oracle 54331     966656 May 30 17:33 731tfdic_227_1_1
-rw-r-----. 1 oracle 54331    5980160 May 30 17:33 751tfdij_229_1_1
-rw-r-----. 1 oracle 54331     458752 May 30 17:33 761tfdin_230_1_1
-rw-r-----. 1 oracle 54331     458752 May 30 17:33 771tfdiq_231_1_1
-rw-r-----. 1 oracle 54331   11091968 May 30 17:33 741tfdij_228_1_1
-rw-r-----. 1 oracle 54331     401408 May 30 17:33 791tfdit_233_1_1
-rw-r-----. 1 oracle 54331 2070708224 May 30 17:33 6v1tfd6a_223_1_1
-rw-r-----. 1 oracle 54331     376832 May 30 17:33 7a1tfdit_234_1_1
-rw-r-----. 1 oracle 54331 1874903040 May 30 17:33 711tfd6b_225_1_1
-rw-r-----. 1 oracle 54331     303104 May 30 17:33 7c1tfdiu_236_1_1
-rw-r-----. 1 oracle 54331     319488 May 30 17:33 7d1tfdiv_237_1_1
-rw-r-----. 1 oracle 54331      57344 May 30 17:33 7f1tfdiv_239_1_1
-rw-r-----. 1 oracle 54331      57344 May 30 17:33 7g1tfdiv_240_1_1
-rw-r-----. 1 oracle 54331      57344 May 30 17:33 7h1tfdiv_241_1_1
-rw-r--r--. 1 oracle 54331      12720 May 30 17:33 db1_ctl.sql
-rw-r-----. 1 oracle 54331   11600384 May 30 17:54 bct_db1.ctf
```

8. Verificare i log archiviati Oracle disponibili sul mount NFS FSx ONTAP per il ripristino e annotare il numero di sequenza dell'ultimo file di log. In questo caso è 175. Il nostro punto di ripristino è fino al numero di sequenza del registro 176.

```
 [ec2-user@ip-172-30-15-124 ~]$ ls -ltr
/nfsfsxn/archlog/DB1/archivelog/2023_05_30
total 5714400
```

```
-r--r-----. 1 oracle 54331    321024 May 30 14:59
o1_mf_1_140__003t9mvn_.arc
-r--r-----. 1 oracle 54331  48996352 May 30 15:29
o1_mf_1_141__01t9qf6r_.arc
-r--r-----. 1 oracle 54331 167477248 May 30 15:44
o1_mf_1_142__02n3x2qb_.arc
-r--r-----. 1 oracle 54331 165684736 May 30 15:46
o1_mf_1_143__02rotwyb_.arc
-r--r-----. 1 oracle 54331 165636608 May 30 15:49
o1_mf_1_144__02x563wh_.arc
-r--r-----. 1 oracle 54331 168408064 May 30 15:51
o1_mf_1_145__031kg2co_.arc
-r--r-----. 1 oracle 54331 169446400 May 30 15:54
o1_mf_1_146__035xpcdt_.arc
-r--r-----. 1 oracle 54331 167595520 May 30 15:56
o1_mf_1_147__03bds8qf_.arc
-r--r-----. 1 oracle 54331 169270272 May 30 15:59
o1_mf_1_148__03gyt7rx_.arc
-r--r-----. 1 oracle 54331 170712576 May 30 16:01
o1_mf_1_149__03mfxl7v_.arc
-r--r-----. 1 oracle 54331 170744832 May 30 16:04
o1_mf_1_150__03qzz0ty_.arc
-r--r-----. 1 oracle 54331 169380864 May 30 16:06
o1_mf_1_151__03wgxdry_.arc
-r--r-----. 1 oracle 54331 169833984 May 30 16:09
o1_mf_1_152__040y85v3_.arc
-r--r-----. 1 oracle 54331 165134336 May 30 16:20
o1_mf_1_153__04ox946w_.arc
-r--r-----. 1 oracle 54331 169929216 May 30 16:22
o1_mf_1_154__04rbv7n8_.arc
-r--r-----. 1 oracle 54331 171903488 May 30 16:23
o1_mf_1_155__04tv1yvn_.arc
-r--r-----. 1 oracle 54331 179061248 May 30 16:25
o1_mf_1_156__04xgfjtl_.arc
-r--r-----. 1 oracle 54331 173593088 May 30 16:26
o1_mf_1_157__04zyg8hw_.arc
-r--r-----. 1 oracle 54331 175999488 May 30 16:27
o1_mf_1_158__052gp9mt_.arc
-r--r-----. 1 oracle 54331 179092992 May 30 16:29
o1_mf_1_159__0551wk7s_.arc
-r--r-----. 1 oracle 54331 175524352 May 30 16:30
o1_mf_1_160__057l46my_.arc
-r--r-----. 1 oracle 54331 173949440 May 30 16:32
o1_mf_1_161__05b2dmwp_.arc
-r--r-----. 1 oracle 54331 184166912 May 30 16:33
o1_mf_1_162__05drbj8n_.arc
```

```
-r--r-----. 1 oracle 54331 173026816 May 30 16:35
o1_mf_1_163__05h8lm1h_.arc
-r--r-----. 1 oracle 54331 174286336 May 30 16:36
o1_mf_1_164__05krsqmh_.arc
-r--r-----. 1 oracle 54331 166092288 May 30 16:37
o1_mf_1_165__05n378pw_.arc
-r--r-----. 1 oracle 54331 177640960 May 30 16:39
o1_mf_1_166__05pmg74l_.arc
-r--r-----. 1 oracle 54331 173972992 May 30 16:40
o1_mf_1_167__05s3o01r_.arc
-r--r-----. 1 oracle 54331 178474496 May 30 16:41
o1_mf_1_168__05vmwt34_.arc
-r--r-----. 1 oracle 54331 177694208 May 30 16:43
o1_mf_1_169__05y45qdd_.arc
-r--r-----. 1 oracle 54331 170814976 May 30 16:44
o1_mf_1_170__060kgh33_.arc
-r--r-----. 1 oracle 54331 177325056 May 30 16:46
o1_mf_1_171__0631tvgv_.arc
-r--r-----. 1 oracle 54331 164455424 May 30 16:47
o1_mf_1_172__065d94fq_.arc
-r--r-----. 1 oracle 54331 178252288 May 30 16:48
o1_mf_1_173__067wnwy8_.arc
-r--r-----. 1 oracle 54331 170579456 May 30 16:50
o1_mf_1_174__06b9zdh8_.arc
-r--r-----. 1 oracle 54331  93928960 May 30 17:26
o1_mf_1_175__08c7jc2b_.arc
[ec2-user@ip-172-30-15-124 ~]$
```

9. Come utente Oracle, imposta la variabile ORACLE_HOME sull'installazione Oracle corrente sul nuovo host DB dell'istanza EC2 ora_02, ORACLE_SID sul SID dell'istanza Oracle primaria. In questo caso è db1.
10. Come utente Oracle, crea un file init Oracle generico nella directory $ORACLE_HOME/dbs con le directory di amministrazione appropriate configurate. La cosa più importante è avere Oracle `flash recovery area` puntare al percorso di montaggio NFS FSx ONTAP come definito nell'istanza Oracle VLDB primaria. `flash recovery area` la configurazione è dimostrata nella sezione `Setup Oracle RMAN incremental merge to image copy on FSx`. Impostare il file di controllo Oracle sul file system NFS FSx ONTAP .

    ```
    vi $ORACLE_HOME/dbs/initdb1.ora
    ```

    Con le seguenti voci di esempio:

```
*.audit_file_dest='/u01/app/oracle/admin/db1/adump'
*.audit_trail='db'
*.compatible='19.0.0'
*.control_files=('/nfsfsxn/oracopy/db1.ctl')
*.db_block_size=8192
*.db_create_file_dest='/nfsfsxn/oracopy/'
*.db_domain='demo.netapp.com'
*.db_name='db1'
*.db_recovery_file_dest_size=85899345920
*.db_recovery_file_dest='/nfsfsxn/archlog/'
*.diagnostic_dest='/u01/app/oracle'
*.dispatchers='(PROTOCOL=TCP) (SERVICE=db1XDB)'
*.enable_pluggable_database=true
*.local_listener='LISTENER'
*.nls_language='AMERICAN'
*.nls_territory='AMERICA'
*.open_cursors=300
*.pga_aggregate_target=1024m
*.processes=320
*.remote_login_passwordfile='EXCLUSIVE'
*.sga_target=10240m
*.undo_tablespace='UNDOTBS1'
```

In caso di discrepanza, il file init sopra indicato dovrebbe essere sostituito dal file init di backup ripristinato dal server Oracle DB primario.

11. Come utente Oracle, avvia RMAN per eseguire il ripristino Oracle su un nuovo host di istanza DB EC2.

```
[oracle@ip-172-30-15-124 dbs]$ rman target / nocatalog;

Recovery Manager: Release 19.0.0.0.0 - Production on Wed May 31
00:56:07 2023
Version 19.18.0.0.0

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reserved.

connected to target database (not started)

RMAN> startup nomount;

Oracle instance started

Total System Global Area   12884900632 bytes

Fixed Size                     9177880 bytes
Variable Size               1778384896 bytes
Database Buffers           11072962560 bytes
Redo Buffers                  24375296 bytes
```

12. Imposta l'ID del database. L'ID del database può essere recuperato dal nome del file Oracle della copia dell'immagine sul punto di montaggio NFS di FSx.

```
RMAN> set dbid = 1730530050;

executing command: SET DBID
```

13. Ripristina il file di controllo dal backup automatico. Se è abilitato il backup automatico di Oracle controlfile e spfile, il backup viene eseguito a ogni ciclo di backup incrementale e di unione. Se sono disponibili più copie, verrà ripristinato l'ultimo backup.

```
RMAN> restore controlfile from autobackup;

Starting restore at 31-MAY-23
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=2 device type=DISK

recovery area destination: /nfsfsxn/archlog
database name (or database unique name) used for search: DB1
channel ORA_DISK_1: AUTOBACKUP
/nfsfsxn/archlog/DB1/autobackup/2023_05_30/o1_mf_s_1138210401__08qlx
rrr_.bkp found in the recovery area
channel ORA_DISK_1: looking for AUTOBACKUP on day: 20230531
channel ORA_DISK_1: looking for AUTOBACKUP on day: 20230530
channel ORA_DISK_1: restoring control file from AUTOBACKUP
/nfsfsxn/archlog/DB1/autobackup/2023_05_30/o1_mf_s_1138210401__08qlx
rrr_.bkp
channel ORA_DISK_1: control file restore from AUTOBACKUP complete
output file name=/nfsfsxn/oracopy/db1.ctl
Finished restore at 31-MAY-23
```

14. Ripristinare il file init da spfile in una cartella /tmp per aggiornare in seguito il file dei parametri in modo che corrisponda all'istanza del database primario.

```
RMAN> restore spfile to pfile '/tmp/archive/initdb1.ora' from
autobackup;

Starting restore at 31-MAY-23
using channel ORA_DISK_1

recovery area destination: /nfsfsxn/archlog
database name (or database unique name) used for search: DB1
channel ORA_DISK_1: AUTOBACKUP
/nfsfsxn/archlog/DB1/autobackup/2023_05_30/o1_mf_s_1138210401__08qlx
rrr_.bkp found in the recovery area
channel ORA_DISK_1: looking for AUTOBACKUP on day: 20230531
channel ORA_DISK_1: looking for AUTOBACKUP on day: 20230530
channel ORA_DISK_1: restoring spfile from AUTOBACKUP
/nfsfsxn/archlog/DB1/autobackup/2023_05_30/o1_mf_s_1138210401__08qlx
rrr_.bkp
channel ORA_DISK_1: SPFILE restore from AUTOBACKUP complete
Finished restore at 31-MAY-23
```

15. Montare il file di controllo e convalidare la copia dell'immagine di backup del database.

```
RMAN> alter database mount;

released channel: ORA_DISK_1
Statement processed

RMAN> list copy of database tag 'OraCopyBKUPonFSxN_level_0';

List of Datafile Copies
=======================

Key     File S Completion Time Ckp SCN    Ckp Time        Sparse
------- ---- - --------------- ---------- --------------- ------
316     1    A 30-MAY-23       4120170    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSTEM_FNO-1_4f1t506m
        Tag: ORACOPYBKUPONFSXN_LEVEL_0

322     3    A 30-MAY-23       4120175    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSAUX_FNO-3_4g1t506m
        Tag: ORACOPYBKUPONFSXN_LEVEL_0

317     4    A 30-MAY-23       4120179    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-4_4h1t5083
        Tag: ORACOPYBKUPONFSXN_LEVEL_0

221     5    A 26-MAY-23       2383520    12-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSTEM_FNO-5_4q1t509n
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 2, PDB Name: PDB$SEED

216     6    A 26-MAY-23       2383520    12-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSAUX_FNO-6_4m1t508t
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 2, PDB Name: PDB$SEED

323     7    A 30-MAY-23       4120207    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-
7_4u1t50a6
        Tag: ORACOPYBKUPONFSXN_LEVEL_0

227     8    A 26-MAY-23       2383520    12-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-8_4t1t50a6
```

```
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 2, PDB Name: PDB$SEED

308     9    A 30-MAY-23       4120158    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSTEM_FNO-9_4n1t509m
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

307     10   A 30-MAY-23       4120166    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSAUX_FNO-10_4i1t5083
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

313     11   A 30-MAY-23       4120154    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-11_4l1t508t
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

315     12   A 30-MAY-23       4120162    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-
12_4v1t50aa
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

319     13   A 30-MAY-23       4120191    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSTEM_FNO-13_4o1t509m
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 4, PDB Name: DB1_PDB2

318     14   A 30-MAY-23       4120183    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSAUX_FNO-14_4j1t508s
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 4, PDB Name: DB1_PDB2

324     15   A 30-MAY-23       4120199    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-15_4r1t50a6
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 4, PDB Name: DB1_PDB2

325     16   A 30-MAY-23       4120211    30-MAY-23       NO
```

```
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-
16_501t50ad
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 4, PDB Name: DB1_PDB2

320     17   A 30-MAY-23       4120195    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSTEM_FNO-17_4p1t509m
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 5, PDB Name: DB1_PDB3

321     18   A 30-MAY-23       4120187    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSAUX_FNO-18_4k1t508t
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 5, PDB Name: DB1_PDB3

326     19   A 30-MAY-23       4120203    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-19_4s1t50a6
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 5, PDB Name: DB1_PDB3

327     20   A 30-MAY-23       4120216    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-
20_511t50ad
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 5, PDB Name: DB1_PDB3

298     21   A 30-MAY-23       4120166    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
21_3o1t4ut2
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

302     22   A 30-MAY-23       4120154    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
22_3p1t4ut3
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

297     23   A 30-MAY-23       4120158    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
23_3q1t4ut3
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1
```

```
306     24   A 30-MAY-23       4120162    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
24_3r1t4ut3
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

300     25   A 30-MAY-23       4120166    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
25_3s1t4v1a
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

305     26   A 30-MAY-23       4120154    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
26_451t4vt7
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

299     27   A 30-MAY-23       4120158    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
27_461t4vt7
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

310     28   A 30-MAY-23       4120162    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
28_471t4vt7
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

303     29   A 30-MAY-23       4120166    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
29_481t4vt7
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

309     30   A 30-MAY-23       4120154    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
30_491t5014
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

301     31   A 30-MAY-23       4120158    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
31_4a1t5015
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
```

```
        Container ID: 3, PDB Name: DB1_PDB1

312     32   A 30-MAY-23       4120162    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
32_4b1t501u
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

314     33   A 30-MAY-23       4120162    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
33_4c1t501v
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

304     34   A 30-MAY-23       4120158    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
34_4d1t5058
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

311     35   A 30-MAY-23       4120154    30-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
35_4e1t5059
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1
```

16. Cambia il database da copiare per eseguire il ripristino senza ripristinare il database.

```
RMAN> switch database to copy;

Starting implicit crosscheck backup at 31-MAY-23
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=11 device type=DISK
Crosschecked 33 objects
Finished implicit crosscheck backup at 31-MAY-23

Starting implicit crosscheck copy at 31-MAY-23
using channel ORA_DISK_1
Crosschecked 68 objects
Finished implicit crosscheck copy at 31-MAY-23

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

List of Cataloged Files
```

```
======================
File Name:
/nfsfsxn/archlog/DB1/autobackup/2023_05_30/o1_mf_s_1138210401__08qlx
rrr_.bkp

datafile 1 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-1_4f1t506m"
datafile 3 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-3_4g1t506m"
datafile 4 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-4_4h1t5083"
datafile 5 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-5_4q1t509n"
datafile 6 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-6_4m1t508t"
datafile 7 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-USERS_FNO-7_4u1t50a6"
datafile 8 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-8_4t1t50a6"
datafile 9 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-9_4n1t509m"
datafile 10 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SYSAUX_FNO-10_4i1t5083"
datafile 11 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-UNDOTBS1_FNO-11_4l1t508t"
datafile 12 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-USERS_FNO-12_4v1t50aa"
datafile 13 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SYSTEM_FNO-13_4o1t509m"
datafile 14 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SYSAUX_FNO-14_4j1t508s"
datafile 15 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-UNDOTBS1_FNO-15_4r1t50a6"
datafile 16 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-USERS_FNO-16_501t50ad"
datafile 17 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SYSTEM_FNO-17_4p1t509m"
datafile 18 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SYSAUX_FNO-18_4k1t508t"
datafile 19 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-UNDOTBS1_FNO-19_4s1t50a6"
datafile 20 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-USERS_FNO-20_511t50ad"
datafile 21 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-21_3o1t4ut2"
datafile 22 switched to datafile copy "/nfsfsxn/oracopy/data_D-
```

```
DB1_I-1730530050_TS-SOE_FNO-22_3p1t4ut3"
datafile 23 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-23_3q1t4ut3"
datafile 24 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-24_3r1t4ut3"
datafile 25 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-25_3s1t4v1a"
datafile 26 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-26_451t4vt7"
datafile 27 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-27_461t4vt7"
datafile 28 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-28_471t4vt7"
datafile 29 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-29_481t4vt7"
datafile 30 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-30_491t5014"
datafile 31 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-31_4a1t5015"
datafile 32 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-32_4b1t501u"
datafile 33 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-33_4c1t501v"
datafile 34 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-34_4d1t5058"
datafile 35 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-35_4e1t5059"
```

17. Esegui il ripristino di Oracle fino all'ultimo registro di archivio disponibile nell'area di ripristino flash.

```
RMAN> run {
2> set until sequence=176;
3> recover database;
4> }

executing command: SET until clause

Starting recover at 31-MAY-23
using channel ORA_DISK_1

starting media recovery

archived log for thread 1 with sequence 142 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_142__02n3x2qb_.ar
```

```
c
archived log for thread 1 with sequence 143 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_143__02rotwyb_.ar
c
archived log for thread 1 with sequence 144 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_144__02x563wh_.ar
c
archived log for thread 1 with sequence 145 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_145__031kg2co_.ar
c
archived log for thread 1 with sequence 146 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_146__035xpcdt_.ar
c
archived log for thread 1 with sequence 147 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_147__03bds8qf_.ar
c
archived log for thread 1 with sequence 148 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_148__03gyt7rx_.ar
c
archived log for thread 1 with sequence 149 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_149__03mfxl7v_.ar
c
archived log for thread 1 with sequence 150 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_150__03qzz0ty_.ar
c
archived log for thread 1 with sequence 151 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_151__03wgxdry_.ar
c
archived log for thread 1 with sequence 152 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_152__040y85v3_.ar
c
archived log for thread 1 with sequence 153 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_153__04ox946w_.ar
c
archived log for thread 1 with sequence 154 is already on disk as
```

```
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_154__04rbv7n8_.ar
c
archived log for thread 1 with sequence 155 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_155__04tv1yvn_.ar
c
archived log for thread 1 with sequence 156 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_156__04xgfjtl_.ar
c
archived log for thread 1 with sequence 157 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_157__04zyg8hw_.ar
c
archived log for thread 1 with sequence 158 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_158__052gp9mt_.ar
c
archived log for thread 1 with sequence 159 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_159__0551wk7s_.ar
c
archived log for thread 1 with sequence 160 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_160__057l46my_.ar
c
archived log for thread 1 with sequence 161 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_161__05b2dmwp_.ar
c
archived log for thread 1 with sequence 162 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_162__05drbj8n_.ar
c
archived log for thread 1 with sequence 163 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_163__05h8lm1h_.ar
c
archived log for thread 1 with sequence 164 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_164__05krsqmh_.ar
c
archived log for thread 1 with sequence 165 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_165__05n378pw_.ar
```

```
c
archived log for thread 1 with sequence 166 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_166__05pmg74l_.ar
c
archived log for thread 1 with sequence 167 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_167__05s3o01r_.ar
c
archived log for thread 1 with sequence 168 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_168__05vmwt34_.ar
c
archived log for thread 1 with sequence 169 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_169__05y45qdd_.ar
c
archived log for thread 1 with sequence 170 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_170__060kgh33_.ar
c
archived log for thread 1 with sequence 171 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_171__0631tvgv_.ar
c
archived log for thread 1 with sequence 172 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_172__065d94fq_.ar
c
archived log for thread 1 with sequence 173 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_173__067wnwy8_.ar
c
archived log for thread 1 with sequence 174 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_174__06b9zdh8_.ar
c
archived log for thread 1 with sequence 175 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_175__08c7jc2b_.ar
c
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_142__02n3x2q
b_.arc thread=1 sequence=142
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_143__02rotwy
```

```
b_.arc thread=1 sequence=143
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_144__02x563w
h_.arc thread=1 sequence=144
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_145__031kg2c
o_.arc thread=1 sequence=145
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_146__035xpcd
t_.arc thread=1 sequence=146
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_147__03bds8q
f_.arc thread=1 sequence=147
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_148__03gyt7r
x_.arc thread=1 sequence=148
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_149__03mfxl7
v_.arc thread=1 sequence=149
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_150__03qzz0t
y_.arc thread=1 sequence=150
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_151__03wgxdr
y_.arc thread=1 sequence=151
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_152__040y85v
3_.arc thread=1 sequence=152
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_153__04ox946
w_.arc thread=1 sequence=153
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_154__04rbv7n
8_.arc thread=1 sequence=154
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_155__04tv1yv
n_.arc thread=1 sequence=155
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_156__04xgfjt
l_.arc thread=1 sequence=156
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_157__04zyg8h
w_.arc thread=1 sequence=157
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_158__052gp9m
t_.arc thread=1 sequence=158
```

```
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_159__0551wk7
s_.arc thread=1 sequence=159
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_160__057l46m
y_.arc thread=1 sequence=160
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_161__05b2dmw
p_.arc thread=1 sequence=161
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_162__05drbj8
n_.arc thread=1 sequence=162
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_163__05h8lm1
h_.arc thread=1 sequence=163
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_164__05krsqm
h_.arc thread=1 sequence=164
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_165__05n378p
w_.arc thread=1 sequence=165
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_166__05pmg74
l_.arc thread=1 sequence=166
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_167__05s3o01
r_.arc thread=1 sequence=167
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_168__05vmwt3
4_.arc thread=1 sequence=168
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_169__05y45qd
d_.arc thread=1 sequence=169
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_170__060kgh3
3_.arc thread=1 sequence=170
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_171__0631tvg
v_.arc thread=1 sequence=171
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_172__065d94f
q_.arc thread=1 sequence=172
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_173__067wnwy
8_.arc thread=1 sequence=173
archived log file
```

```
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_174__06b9zdh
8_.arc thread=1 sequence=174
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_05_30/o1_mf_1_175__08c7jc2
b_.arc thread=1 sequence=175
media recovery complete, elapsed time: 00:48:34
Finished recover at 31-MAY-23
```

> Per un ripristino più rapido, abilitare le sessioni parallele con il parametro recovery_parallelism o specificare il grado di parallelismo nel comando di ripristino per il ripristino del database: `RECOVER DATABASE PARALLEL (DEGREE d INSTANCES DEFAULT);` . In generale, i gradi di parallelismo dovrebbero essere pari al numero di core della CPU sull'host.

18. Uscire da RMAN, accedere a Oracle come utente Oracle tramite sqlplus per aprire il database e reimpostare il registro dopo un ripristino incompleto.

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

NAME      OPEN_MODE
--------- --------------------
DB1       MOUNTED

SQL> select member from v$logfile;

MEMBER
--------------------------------------------------------------------------------
------------
+DATA/DB1/ONLINELOG/group_3.264.1136666437
+DATA/DB1/ONLINELOG/group_2.263.1136666437
+DATA/DB1/ONLINELOG/group_1.262.1136666437

SQL> alter database rename file
'+DATA/DB1/ONLINELOG/group_1.262.1136666437' to
'/nfsfsxn/oracopy/redo01.log';

Database altered.

SQL> alter database rename file
'+DATA/DB1/ONLINELOG/group_2.263.1136666437' to
'/nfsfsxn/oracopy/redo02.log';

Database altered.

SQL> alter database rename file
'+DATA/DB1/ONLINELOG/group_3.264.1136666437' to
'/nfsfsxn/oracopy/redo03.log';

Database altered.

SQL> alter database open resetlogs;

Database altered.
```

19. Convalida il database ripristinato sul nuovo host che contiene la riga inserita prima dell'errore del database primario.

```
SQL> show pdbs

    CON_ID CON_NAME                       OPEN MODE  RESTRICTED
---------- ------------------------------ ---------- ----------
         2 PDB$SEED                       READ ONLY  NO
         3 DB1_PDB1                       READ WRITE NO
         4 DB1_PDB2                       READ WRITE NO
         5 DB1_PDB3                       READ WRITE NO
SQL> alter session set container=db1_pdb1;

Session altered.

SQL> select * from test;

        ID DT
EVENT
----------
--------------------------------------------------------------------
-------
--------------------------------------------------------------------
-------------------------------
         1 18-MAY-23 02.35.37.000000 PM
test oracle incremental merge switch to copy
         2 30-MAY-23 05.23.11.000000 PM
test recovery on a new EC2 instance host with image copy on FSx
ONTAP
```

20. Altri compiti post-recupero

```
Add FSx ONTAP NFS mount to fstab so that the NFS file system will be
mounted when EC2 instance host rebooted.

As EC2 user, vi /etc/fstab and add following entry:

172.30.15.19:/ora_01_copy       /nfsfsxn        nfs
rw,bg,hard,vers=3,proto=tcp,timeo=600,rsize=262144,wsize=262144,noin
tr  0       0

Update the Oracle init file from primary databse init file backup
that is restored to /tmp/archive and create spfile as needed.
```

In questo modo viene completato il ripristino del database Oracle VLDB dalla copia dell'immagine di backup sul file system NFS FSx ONTAP a un nuovo host di istanza DB EC2.

Copia dell’immagine standby di Oracle clonata per altri casi d’uso

Un altro vantaggio dell'utilizzo di AWS FSx ONTAP per la copia temporanea dell'immagine Oracle VLDB è che può essere FlexClonato per soddisfare molti altri scopi con un investimento minimo in termini di storage aggiuntivo. Nel seguente caso d'uso, illustriamo come creare uno snapshot e clonare il volume NFS di staging su FSx ONTAP per altri casi d'uso Oracle quali DEV, UAT, ecc.

1. Iniziamo inserendo una riga nella stessa tabella di test creata in precedenza.

```
 SQL> insert into test values (3, sysdate, 'test clone on a new EC2
instance host with image copy on FSx ONTAP');

1 row created.

SQL> select * from test;

        ID
----------
DT
---------------------------------------------------------------------
-------
EVENT
---------------------------------------------------------------------
------------
         1
18-MAY-23 02.35.37.000000 PM
test oracle incremental merge switch to copy

         2
30-MAY-23 05.23.11.000000 PM
test recovery on a new EC2 instance host with image copy on FSx
ONTAP

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

         3
05-JUN-23 03.19.46.000000 PM
test clone on a new EC2 instance host with image copy on FSx ONTAP


SQL>
```

2. Eseguire un backup RMAN e unirlo alla copia dell'immagine del database FSx ONTAP in modo che la transazione venga catturata nel set di backup sul mount NFS di FSx ma non unita alla copia finché il database clonato non viene ripristinato.

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

3. Accedi al cluster FSx tramite ssh come utente fsxadmin per osservare gli snapshot creati dalla policy di backup pianificata di Oracle e acquisire uno snapshot una tantum in modo che includa la transazione eseguita nel passaggio 1.

```
FsxId06c3c8b2a7bd56458::> vol snapshot create -vserver svm_ora
-volume ora_01_copy -snapshot one-off.2023-06-05-1137 -foreground
true

FsxId06c3c8b2a7bd56458::> snapshot show

---Blocks---
Vserver  Volume   Snapshot                                  Size
Total% Used%
-------- -------- ------------------------------------ --------
------ -----
svm_ora  ora_01_copy
                  daily.2023-06-02_0010                   3.59GB
2%    5%
                  daily.2023-06-03_0010                   1.10GB
1%    1%
                  daily.2023-06-04_0010                    608KB
0%    0%
                  daily.2023-06-05_0010                   3.81GB
2%    5%
                  one-off.2023-06-05-1137                  168KB
0%    0%
         svm_ora_root
                  weekly.2023-05-28_0015                  1.86MB
0%   78%
                  daily.2023-06-04_0010                    152KB
0%   22%
                  weekly.2023-06-04_0015                  1.24MB
0%   70%
                  daily.2023-06-05_0010                    196KB
0%   27%
                  hourly.2023-06-05_1005                   156KB
0%   22%
                  hourly.2023-06-05_1105                   156KB
0%   22%
                  hourly.2023-06-05_1205                   156KB
0%   22%
                  hourly.2023-06-05_1305                   156KB
0%   22%
                  hourly.2023-06-05_1405                  1.87MB
0%   78%
                  hourly.2023-06-05_1505                   148KB
0%   22%
15 entries were displayed.
```

4. Clonare lo snapshot una tantum da utilizzare per creare una nuova istanza clone DB1 su un host EC2 Oracle alternativo. Hai la possibilità di clonare da qualsiasi snapshot giornaliero disponibile per il volume ora_01_copy.

```
FsxId06c3c8b2a7bd56458::> vol clone create -flexclone db1_20230605of
-type RW -parent-vserver svm_ora -parent-volume ora_01_copy
-junction-path /db1_20230605of -junction-active true -parent
-snapshot one-off.2023-06-05-1137
[Job 464] Job succeeded: Successful

FsxId06c3c8b2a7bd56458::>

FsxId06c3c8b2a7bd56458::> vol show db1*
Vserver   Volume       Aggregate    State      Type       Size
Available Used%
--------- ------------ ------------ ---------- ---- ----------
---------- -----
svm_ora   db1_20230605of
                       aggr1        online     RW        200GB
116.6GB   38%

FsxId06c3c8b2a7bd56458::>
```

5. Disattivare la policy snapshot per il volume clonato poiché eredita la policy snapshot del volume padre, a meno che non si desideri proteggere il volume clonato, quindi lasciarla invariata.

```
FsxId06c3c8b2a7bd56458::> vol modify -volume db1_20230605of
-snapshot-policy none

Warning: You are changing the Snapshot policy on volume
"db1_20230605of" to "none". Snapshot copies on this volume that do
not match any of the prefixes of the new Snapshot policy will not be
deleted. However, when the new Snapshot policy
         takes effect, depending on the new retention count, any
existing Snapshot copies that continue to use the same prefixes
might be deleted. See the 'volume modify' man page for more
information.
Do you want to continue? {y|n}: y
Volume modify successful on volume db1_20230605of of Vserver
svm_ora.

FsxId06c3c8b2a7bd56458::>
```

6. Accedi a una nuova istanza EC2 Linux con software Oracle preinstallato con la stessa versione e livello di patch della tua istanza Oracle EC2 primaria e monta il volume clonato.

```
[ec2-user@ip-172-30-15-124 ~]$ sudo mkdir /nfsfsxn
[ec2-user@ip-172-30-15-124 ~]$ sudo mount -t nfs
172.30.15.19:/db1_20230605of /nfsfsxn -o
rw,bg,hard,vers=3,proto=tcp,timeo=600,rsize=262144,wsize=262144,noin
tr
```

7. Convalida i set di backup incrementali del database, la copia delle immagini e i log archiviati disponibili sul mount NFS di FSx.

```
[ec2-user@ip-172-30-15-124 ~]$ ls -ltr /nfsfsxn/oracopy
total 79450332
-rw-r----- 1 oracle 54331  482353152 Jun  1 19:02 data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-6_891tkrhr
-rw-r----- 1 oracle 54331  419438592 Jun  1 19:03 data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-5_8d1tkril
-rw-r----- 1 oracle 54331  241180672 Jun  1 19:03 data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-8_8g1tkrj7
-rw-r----- 1 oracle 54331  912506880 Jun  1 20:21 8n1tkvv2_279_1_1
-rw-r----- 1 oracle 54331     925696 Jun  1 20:21 8q1tl05i_282_1_1
-rw-r----- 1 oracle 54331 1169014784 Jun  1 20:21 8p1tkvv2_281_1_1
-rw-r----- 1 oracle 54331    6455296 Jun  1 20:21 8r1tl05m_283_1_1
-rw-r----- 1 oracle 54331     139264 Jun  1 20:21 8t1tl05t_285_1_1
-rw-r----- 1 oracle 54331    3514368 Jun  1 20:21 8s1tl05t_284_1_1
-rw-r----- 1 oracle 54331     139264 Jun  1 20:21 8u1tl060_286_1_1
-rw-r----- 1 oracle 54331     425984 Jun  1 20:21 901tl062_288_1_1
-rw-r----- 1 oracle 54331     344064 Jun  1 20:21 911tl062_289_1_1
-rw-r----- 1 oracle 54331     245760 Jun  1 20:21 931tl063_291_1_1
-rw-r----- 1 oracle 54331     237568 Jun  1 20:21 941tl064_292_1_1
-rw-r----- 1 oracle 54331      57344 Jun  1 20:21 961tl065_294_1_1
-rw-r----- 1 oracle 54331      57344 Jun  1 20:21 971tl066_295_1_1
-rw-r----- 1 oracle 54331      57344 Jun  1 20:21 981tl067_296_1_1
-rw-r----- 1 oracle 54331 1040760832 Jun  1 20:23 8m1tkvv2_278_1_1
-rw-r----- 1 oracle 54331  932847616 Jun  1 20:24 8o1tkvv2_280_1_1
-rw-r----- 1 oracle 54331 1121984512 Jun  5 15:21 data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-1_821tkrb8
-rw-r----- 1 oracle 54331 1027612672 Jun  5 15:21 data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-3_831tkrd9
-rw-r----- 1 oracle 54331  429924352 Jun  5 15:21 data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-9_8a1tkrhr
-rw-r----- 1 oracle 54331  707796992 Jun  5 15:21 data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-4_851tkrgf
-rw-r----- 1 oracle 54331  534781952 Jun  5 15:21 data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-14_871tkrhr
-rw-r----- 1 oracle 54331  534781952 Jun  5 15:21 data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-18_881tkrhr
```

```
-rw-r----- 1 oracle 54331  429924352 Jun  5 15:21 data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-13_8b1tkril
-rw-r----- 1 oracle 54331  429924352 Jun  5 15:21 data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-17_8c1tkril
-rw-r----- 1 oracle 54331  246423552 Jun  5 15:21 data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-15_8e1tkril
-rw-r----- 1 oracle 54331  246423552 Jun  5 15:21 data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-19_8f1tkrj4
-rw-r----- 1 oracle 54331    5251072 Jun  5 15:21 data_D-DB1_I-
1730530050_TS-USERS_FNO-7_8h1tkrj9
-rw-r----- 1 oracle 54331    5251072 Jun  5 15:21 data_D-DB1_I-
1730530050_TS-USERS_FNO-16_8j1tkrja
-rw-r----- 1 oracle 54331    5251072 Jun  5 15:21 data_D-DB1_I-
1730530050_TS-USERS_FNO-20_8k1tkrjb
-rw-r----- 1 oracle 54331    5251072 Jun  5 15:21 data_D-DB1_I-
1730530050_TS-USERS_FNO-12_8i1tkrj9
-rw-r----- 1 oracle 54331  555753472 Jun  5 15:21 data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-10_861tkrgo
-rw-r----- 1 oracle 54331  796925952 Jun  5 15:22 data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-11_841tkrf2
-rw-r----- 1 oracle 54331 4294975488 Jun  5 15:22 data_D-DB1_I-
1730530050_TS-SOE_FNO-21_7j1tkqk6
-rw-r----- 1 oracle 54331 4294975488 Jun  5 15:22 data_D-DB1_I-
1730530050_TS-SOE_FNO-34_801tkram
-rw-r----- 1 oracle 54331 4294975488 Jun  5 15:22 data_D-DB1_I-
1730530050_TS-SOE_FNO-29_7r1tkr32
-rw-r----- 1 oracle 54331 4294975488 Jun  5 15:22 data_D-DB1_I-
1730530050_TS-SOE_FNO-25_7n1tkqrh
-rw-r----- 1 oracle 54331 4294975488 Jun  5 15:22 data_D-DB1_I-
1730530050_TS-SOE_FNO-31_7t1tkr3i
-rw-r----- 1 oracle 54331 4294975488 Jun  5 15:22 data_D-DB1_I-
1730530050_TS-SOE_FNO-33_7v1tkra6
-rw-r----- 1 oracle 54331 4294975488 Jun  5 15:22 data_D-DB1_I-
1730530050_TS-SOE_FNO-23_7l1tkqk6
-rw-r----- 1 oracle 54331 4294975488 Jun  5 15:22 data_D-DB1_I-
1730530050_TS-SOE_FNO-27_7p1tkqrq
-rw-r----- 1 oracle 54331 4294975488 Jun  5 15:22 data_D-DB1_I-
1730530050_TS-SOE_FNO-35_811tkrap
-rw-r----- 1 oracle 54331 4294975488 Jun  5 15:22 data_D-DB1_I-
1730530050_TS-SOE_FNO-32_7u1tkr42
-rw-r----- 1 oracle 54331 4294975488 Jun  5 15:22 data_D-DB1_I-
1730530050_TS-SOE_FNO-22_7k1tkqk6
-rw-r----- 1 oracle 54331 4294975488 Jun  5 15:22 data_D-DB1_I-
1730530050_TS-SOE_FNO-24_7m1tkqk6
-rw-r----- 1 oracle 54331 4294975488 Jun  5 15:22 data_D-DB1_I-
1730530050_TS-SOE_FNO-28_7q1tkqs1
```

```
-rw-r----- 1 oracle 54331 4294975488 Jun  5 15:22 data_D-DB1_I-
1730530050_TS-SOE_FNO-30_7s1tkr3a
-rw-r----- 1 oracle 54331 4294975488 Jun  5 15:22 data_D-DB1_I-
1730530050_TS-SOE_FNO-26_7o1tkqrj
-rw-r----- 1 oracle 54331 1241432064 Jun  5 15:30 9d1tv06n_301_1_1
-rw-r----- 1 oracle 54331 1019805696 Jun  5 15:31 9a1tv06m_298_1_1
-rw-r----- 1 oracle 54331    4612096 Jun  5 15:31 9e1tv0ld_302_1_1
-rw-r----- 1 oracle 54331  967163904 Jun  5 15:31 9b1tv06n_299_1_1
-rw-r----- 1 oracle 54331   31563776 Jun  5 15:31 9g1tv0lt_304_1_1
-rw-r----- 1 oracle 54331     319488 Jun  5 15:31 9h1tv0lt_305_1_1
-rw-r----- 1 oracle 54331     335872 Jun  5 15:31 9i1tv0m0_306_1_1
-rw-r----- 1 oracle 54331     565248 Jun  5 15:31 9k1tv0m1_308_1_1
-rw-r----- 1 oracle 54331     581632 Jun  5 15:31 9l1tv0m5_309_1_1
-rw-r----- 1 oracle 54331   54345728 Jun  5 15:31 9f1tv0lt_303_1_1
-rw-r----- 1 oracle 54331     368640 Jun  5 15:31 9n1tv0m5_311_1_1
-rw-r----- 1 oracle 54331     385024 Jun  5 15:31 9o1tv0m6_312_1_1
-rw-r----- 1 oracle 54331  985858048 Jun  5 15:31 9c1tv06n_300_1_1
-rw-r----- 1 oracle 54331      57344 Jun  5 15:31 9q1tv0m7_314_1_1
-rw-r----- 1 oracle 54331      57344 Jun  5 15:31 9r1tv0m8_315_1_1
-rw-r----- 1 oracle 54331      57344 Jun  5 15:31 9s1tv0m9_316_1_1
-rw-r--r-- 1 oracle 54331      12720 Jun  5 15:31 db1_ctl.sql
-rw-r----- 1 oracle 54331   11600384 Jun  5 15:48 bct_db1.ctf
[ec2-user@ip-172-30-15-124 ~]$

[oracle@ip-172-30-15-124 ~]$ ls -l
/nfsfsxn/archlog/DB1/archivelog/2023_06_05
total 2008864
-rw-r----- 1 oracle 54331    729088 Jun  5 14:38
o1_mf_1_190_l7vwvvt9_.arc
-rw-r----- 1 oracle 54331 166651904 Jun  5 14:44
o1_mf_1_191_l7vx6vmg_.arc
-rw-r----- 1 oracle 54331 167406080 Jun  5 14:47
o1_mf_1_192_l7vxctms_.arc
-rw-r----- 1 oracle 54331 166868992 Jun  5 14:49
o1_mf_1_193_l7vxjjps_.arc
-rw-r----- 1 oracle 54331 166087168 Jun  5 14:52
o1_mf_1_194_l7vxnxrh_.arc
-rw-r----- 1 oracle 54331 175210496 Jun  5 14:54
o1_mf_1_195_l7vxswv5_.arc
-rw-r----- 1 oracle 54331 167078400 Jun  5 14:57
o1_mf_1_196_l7vxylwp_.arc
-rw-r----- 1 oracle 54331 169701888 Jun  5 14:59
o1_mf_1_197_l7vy3cyw_.arc
-rw-r----- 1 oracle 54331 167845376 Jun  5 15:02
o1_mf_1_198_l7vy8245_.arc
-rw-r----- 1 oracle 54331 170763776 Jun  5 15:05
```

```
o1_mf_1_199_l7vydv4c_.arc
-rw-r----- 1 oracle 54331 193853440 Jun  5 15:07
o1_mf_1_200_l7vykf23_.arc
-rw-r----- 1 oracle 54331 165523968 Jun  5 15:09
o1_mf_1_201_l7vyp1dh_.arc
-rw-r----- 1 oracle 54331 161117184 Jun  5 15:12
o1_mf_1_202_l7vyvrm5_.arc
-rw-r----- 1 oracle 54331  10098176 Jun  5 15:21
o1_mf_1_203_l7vzdfwm_.arc
```

8. I processi di ripristino sono ora simili al precedente caso d'uso di ripristino su una nuova istanza di EC2 DB dopo un errore: impostare l'ambiente Oracle (oratab, $ORACLE_HOME, $ORACLE_SID) in modo che corrisponda all'istanza di produzione primaria, creare un file init che includa db_recovery_file_dest_size e db_recovery_file_dest che punti alla directory di ripristino flash sul mount NFS di FSx. Quindi, avviare RMAN per eseguire il ripristino. Di seguito sono riportati i passaggi del comando e l'output.

```
[oracle@ip-172-30-15-124 dbs]$ rman target / nocatalog

Recovery Manager: Release 19.0.0.0.0 - Production on Wed Jun 7
14:44:33 2023
Version 19.18.0.0.0

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reserved.

connected to target database (not started)

RMAN> startup nomount;

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

RMAN> set dbid = 1730530050;

executing command: SET DBID

RMAN> restore controlfile from autobackup;

Starting restore at 07-JUN-23
```

```
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=2 device type=DISK

recovery area destination: /nfsfsxn/archlog/
database name (or database unique name) used for search: DB1
channel ORA_DISK_1: AUTOBACKUP
/nfsfsxn/archlog/DB1/autobackup/2023_06_05/o1_mf_s_1138721482_l7vzyb
vq_.bkp found in the recovery area
channel ORA_DISK_1: looking for AUTOBACKUP on day: 20230607
channel ORA_DISK_1: looking for AUTOBACKUP on day: 20230606
channel ORA_DISK_1: looking for AUTOBACKUP on day: 20230605
channel ORA_DISK_1: restoring control file from AUTOBACKUP
/nfsfsxn/archlog/DB1/autobackup/2023_06_05/o1_mf_s_1138721482_l7vzyb
vq_.bkp
channel ORA_DISK_1: control file restore from AUTOBACKUP complete
output file name=/nfsfsxn/oracopy/db1.ctl
Finished restore at 07-JUN-23

RMAN> alter database mount;

released channel: ORA_DISK_1
Statement processed

RMAN> list incarnation;


List of Database Incarnations
DB Key  Inc Key DB Name  DB ID            STATUS  Reset SCN  Reset
Time
------- ------- -------- ---------------- --- ---------- ----------
1       1       DB1      1730530050       PARENT  1          17-APR-
19
2       2       DB1      1730530050       CURRENT 1920977    12-MAY-
23

RMAN> list copy of database tag 'OraCopyBKUPonFSxN_level_0';

List of Datafile Copies
========================

Key     File S Completion Time Ckp SCN    Ckp Time        Sparse
------- ---- - -------------- ---------- --------------- ------
362     1    A 05-JUN-23       8319160    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSTEM_FNO-1_821tkrb8
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
```

```
363     3    A 05-JUN-23       8319165    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSAUX_FNO-3_831tkrd9
        Tag: ORACOPYBKUPONFSXN_LEVEL_0

365     4    A 05-JUN-23       8319171    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-4_851tkrgf
        Tag: ORACOPYBKUPONFSXN_LEVEL_0

355     5    A 01-JUN-23       2383520    12-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSTEM_FNO-5_8d1tkril
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 2, PDB Name: PDB$SEED

349     6    A 01-JUN-23       2383520    12-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSAUX_FNO-6_891tkrhr
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 2, PDB Name: PDB$SEED

372     7    A 05-JUN-23       8319201    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-
7_8h1tkrj9
        Tag: ORACOPYBKUPONFSXN_LEVEL_0

361     8    A 01-JUN-23       2383520    12-MAY-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-8_8g1tkrj7
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 2, PDB Name: PDB$SEED

364     9    A 05-JUN-23       8318717    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSTEM_FNO-9_8a1tkrhr
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

376     10   A 05-JUN-23       8318714    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSAUX_FNO-10_861tkrgo
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

377     11   A 05-JUN-23       8318720    01-JUN-23       NO
```

```
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-11_841tkrf2
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

375     12   A 05-JUN-23       8318719    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-
12_8i1tkrj9
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

368     13   A 05-JUN-23       8319184    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSTEM_FNO-13_8b1tkril
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 4, PDB Name: DB1_PDB2

366     14   A 05-JUN-23       8319175    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSAUX_FNO-14_871tkrhr
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 4, PDB Name: DB1_PDB2

370     15   A 05-JUN-23       8319193    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-15_8e1tkril
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 4, PDB Name: DB1_PDB2

373     16   A 05-JUN-23       8319206    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-
16_8j1tkrja
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 4, PDB Name: DB1_PDB2

369     17   A 05-JUN-23       8319188    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSTEM_FNO-17_8c1tkril
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 5, PDB Name: DB1_PDB3

367     18   A 05-JUN-23       8319180    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
SYSAUX_FNO-18_881tkrhr
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 5, PDB Name: DB1_PDB3
```

```
371     19   A 05-JUN-23       8319197    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-19_8f1tkrj4
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 5, PDB Name: DB1_PDB3

374     20   A 05-JUN-23       8319210    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-
20_8k1tkrjb
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 5, PDB Name: DB1_PDB3

378     21   A 05-JUN-23       8318720    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
21_7j1tkqk6
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

388     22   A 05-JUN-23       8318714    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
22_7k1tkqk6
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

384     23   A 05-JUN-23       8318717    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
23_7l1tkqk6
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

389     24   A 05-JUN-23       8318719    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
24_7m1tkqk6
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

381     25   A 05-JUN-23       8318720    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
25_7n1tkqrh
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

392     26   A 05-JUN-23       8318714    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
26_7o1tkqrj
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
```

```
        Container ID: 3, PDB Name: DB1_PDB1

385     27   A 05-JUN-23       8318717    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
27_7p1tkqrq
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

390     28   A 05-JUN-23       8318719    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
28_7q1tkqs1
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

380     29   A 05-JUN-23       8318720    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
29_7r1tkr32
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

391     30   A 05-JUN-23       8318714    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
30_7s1tkr3a
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

382     31   A 05-JUN-23       8318717    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
31_7t1tkr3i
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

387     32   A 05-JUN-23       8318719    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
32_7u1tkr42
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

383     33   A 05-JUN-23       8318719    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
33_7v1tkra6
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

379     34   A 05-JUN-23       8318717    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
```

```
34_801tkram
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

386     35   A 05-JUN-23       8318714    01-JUN-23       NO
        Name: /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
35_811tkrap
        Tag: ORACOPYBKUPONFSXN_LEVEL_0
        Container ID: 3, PDB Name: DB1_PDB1

RMAN> switch database to copy;

datafile 1 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-1_821tkrb8"
datafile 3 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-3_831tkrd9"
datafile 4 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-4_851tkrgf"
datafile 5 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-5_8d1tkril"
datafile 6 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-SYSAUX_FNO-6_891tkrhr"
datafile 7 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-USERS_FNO-7_8h1tkrj9"
datafile 8 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-UNDOTBS1_FNO-8_8g1tkrj7"
datafile 9 switched to datafile copy "/nfsfsxn/oracopy/data_D-DB1_I-
1730530050_TS-SYSTEM_FNO-9_8a1tkrhr"
datafile 10 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SYSAUX_FNO-10_861tkrgo"
datafile 11 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-UNDOTBS1_FNO-11_841tkrf2"
datafile 12 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-USERS_FNO-12_8i1tkrj9"
datafile 13 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SYSTEM_FNO-13_8b1tkril"
datafile 14 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SYSAUX_FNO-14_871tkrhr"
datafile 15 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-UNDOTBS1_FNO-15_8e1tkril"
datafile 16 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-USERS_FNO-16_8j1tkrja"
datafile 17 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SYSTEM_FNO-17_8c1tkril"
datafile 18 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SYSAUX_FNO-18_881tkrhr"
```

```
datafile 19 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-UNDOTBS1_FNO-19_8f1tkrj4"
datafile 20 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-USERS_FNO-20_8k1tkrjb"
datafile 21 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-21_7j1tkqk6"
datafile 22 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-22_7k1tkqk6"
datafile 23 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-23_7l1tkqk6"
datafile 24 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-24_7m1tkqk6"
datafile 25 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-25_7n1tkqrh"
datafile 26 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-26_7o1tkqrj"
datafile 27 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-27_7p1tkqrq"
datafile 28 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-28_7q1tkqs1"
datafile 29 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-29_7r1tkr32"
datafile 30 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-30_7s1tkr3a"
datafile 31 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-31_7t1tkr3i"
datafile 32 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-32_7u1tkr42"
datafile 33 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-33_7v1tkra6"
datafile 34 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-34_801tkram"
datafile 35 switched to datafile copy "/nfsfsxn/oracopy/data_D-
DB1_I-1730530050_TS-SOE_FNO-35_811tkrap"

RMAN> run {
2> set until sequence 204;
3> recover database;
4> }

executing command: SET until clause

Starting recover at 07-JUN-23
using channel ORA_DISK_1

starting media recovery
```

```
archived log for thread 1 with sequence 190 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_190_l7vwvvt9_.arc
archived log for thread 1 with sequence 191 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_191_l7vx6vmg_.arc
archived log for thread 1 with sequence 192 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_192_l7vxctms_.arc
archived log for thread 1 with sequence 193 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_193_l7vxjjps_.arc
archived log for thread 1 with sequence 194 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_194_l7vxnxrh_.arc
archived log for thread 1 with sequence 195 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_195_l7vxswv5_.arc
archived log for thread 1 with sequence 196 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_196_l7vxylwp_.arc
archived log for thread 1 with sequence 197 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_197_l7vy3cyw_.arc
archived log for thread 1 with sequence 198 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_198_l7vy8245_.arc
archived log for thread 1 with sequence 199 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_199_l7vydv4c_.arc
archived log for thread 1 with sequence 200 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_200_l7vykf23_.arc
archived log for thread 1 with sequence 201 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_201_l7vyp1dh_.arc
archived log for thread 1 with sequence 202 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_202_l7vyvrm5_.arc
archived log for thread 1 with sequence 203 is already on disk as
file
/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_203_l7vzdfwm_.arc
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_190_l7vwvvt9
_.arc thread=1 sequence=190
archived log file
```

```
name=/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_191_l7vx6vmg
_.arc thread=1 sequence=191
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_192_l7vxctms
_.arc thread=1 sequence=192
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_193_l7vxjjps
_.arc thread=1 sequence=193
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_194_l7vxnxrh
_.arc thread=1 sequence=194
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_195_l7vxswv5
_.arc thread=1 sequence=195
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_196_l7vxylwp
_.arc thread=1 sequence=196
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_197_l7vy3cyw
_.arc thread=1 sequence=197
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_198_l7vy8245
_.arc thread=1 sequence=198
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_199_l7vydv4c
_.arc thread=1 sequence=199
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_200_l7vykf23
_.arc thread=1 sequence=200
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_201_l7vyp1dh
_.arc thread=1 sequence=201
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_202_l7vyvrm5
_.arc thread=1 sequence=202
archived log file
name=/nfsfsxn/archlog/DB1/archivelog/2023_06_05/o1_mf_1_203_l7vzdfwm
_.arc thread=1 sequence=203
media recovery complete, elapsed time: 00:19:30
Finished recover at 07-JUN-23

RMAN> exit

Recovery Manager complete.
[oracle@ip-172-30-15-124 dbs]$ sqlplus / as sysdba
```

```
SQL*Plus: Release 19.0.0.0.0 - Production on Wed Jun 7 15:58:12 2023
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> select member from v$logfile;

MEMBER
--------------------------------------------------------------------------
------------
+DATA/DB1/ONLINELOG/group_3.264.1136666437
+DATA/DB1/ONLINELOG/group_2.263.1136666437
+DATA/DB1/ONLINELOG/group_1.262.1136666437

SQL> alter database rename file
'+DATA/DB1/ONLINELOG/group_1.262.1136666437' to
'/nfsfsxn/oracopy/redo01.log';

Database altered.

SQL> alter database rename file
'+DATA/DB1/ONLINELOG/group_2.263.1136666437' to
'/nfsfsxn/oracopy/redo02.log';

Database altered.

SQL> alter database rename file
'+DATA/DB1/ONLINELOG/group_3.264.1136666437' to
'/nfsfsxn/oracopy/redo03.log';

Database altered.

SQL> alter database noarchivelog;

Database altered.

SQL> alter database open resetlogs;

Database altered.

SQL> set lin 200;
```

```
SQL> select name from v$datafile
  2  union
  3  select name from v$controlfile
  4  union
  5  select name from v$tempfile
  6  union
  7  select member from v$logfile;

NAME
--------------------------------------------------------------------------------
--------------------
/nfsfsxn/oracopy/DB1/FB864A929AEB79B9E053630F1EAC7046/datafile/o1_mf
_temp_l81bhz6g_.tmp
/nfsfsxn/oracopy/DB1/FB867DA8C68C816EE053630F1EAC2BCF/datafile/o1_mf
_temp_l81bj16t_.tmp
/nfsfsxn/oracopy/DB1/FB867EA89ECF81C0E053630F1EACB901/datafile/o1_mf
_temp_l81bj135_.tmp
/nfsfsxn/oracopy/DB1/FB867F8A4D4F821CE053630F1EAC69CC/datafile/o1_mf
_temp_l81bj13g_.tmp
/nfsfsxn/oracopy/DB1/datafile/o1_mf_temp_l81bhwjg_.tmp
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-21_7j1tkqk6
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-22_7k1tkqk6
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-23_7l1tkqk6
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-24_7m1tkqk6
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-25_7n1tkqrh
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-26_7o1tkqrj

NAME
--------------------------------------------------------------------------------
--------------------
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-27_7p1tkqrq
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-28_7q1tkqs1
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-29_7r1tkr32
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-30_7s1tkr3a
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-31_7t1tkr3i
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-32_7u1tkr42
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-33_7v1tkra6
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-34_801tkram
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-35_811tkrap
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSAUX_FNO-10_861tkrgo
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSAUX_FNO-14_871tkrhr

NAME
--------------------------------------------------------------------------------
--------------------
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSAUX_FNO-18_881tkrhr
```

```
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSAUX_FNO-3_831tkrd9
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSAUX_FNO-6_891tkrhr
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSTEM_FNO-13_8b1tkril
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSTEM_FNO-17_8c1tkril
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSTEM_FNO-1_821tkrb8
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSTEM_FNO-5_8d1tkril
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSTEM_FNO-9_8a1tkrhr
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-UNDOTBS1_FNO-11_841tkrf2
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-UNDOTBS1_FNO-15_8e1tkril
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-UNDOTBS1_FNO-19_8f1tkrj4

NAME
--------------------------------------------------------------------------------
----------------------
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-UNDOTBS1_FNO-4_851tkrgf
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-UNDOTBS1_FNO-8_8g1tkrj7
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-12_8i1tkrj9
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-16_8j1tkrja
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-20_8k1tkrjb
/nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-7_8h1tkrj9
/nfsfsxn/oracopy/db1.ctl
/nfsfsxn/oracopy/redo01.log
/nfsfsxn/oracopy/redo02.log
/nfsfsxn/oracopy/redo03.log

43 rows selected.

SQL> show pdbs;

    CON_ID CON_NAME                       OPEN MODE  RESTRICTED
---------- ------------------------------ ---------- ----------
         2 PDB$SEED                       READ ONLY  NO
         3 DB1_PDB1                       READ WRITE NO
         4 DB1_PDB2                       READ WRITE NO
         5 DB1_PDB3                       READ WRITE NO
SQL> alter session set container=db1_pdb1;

Session altered.

SQL> select * from test;

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

```
-------------------------------------------------------------
         1 18-MAY-23 02.35.37.000000 PM
test oracle incremental merge switch to copy
         2 30-MAY-23 05.23.11.000000 PM
test recovery on a new EC2 instance host with image copy on FSx
ONTAP
         3 05-JUN-23 03.19.46.000000 PM
test clone on a new EC2 instance host with image copy on FSx ONTAP

SQL>
```

9. Rinominare l'istanza del database clonata e modificare l'ID del database con l'utilità Oracle nid. Lo stato dell'istanza del database deve essere in `mount` per eseguire il comando.

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

NAME      OPEN_MODE            LOG_MODE
--------- -------------------- ------------
DB1       READ WRITE           NOARCHIVELOG

SQL> shutdown immediate;
Database closed.
Database dismounted.
ORACLE instance shut down.

SQL> startup mount;
ORACLE instance started.

Total System Global Area 1.0737E+10 bytes
Fixed Size                  9174800 bytes
Variable Size            1577058304 bytes
Database Buffers         9126805504 bytes
Redo Buffers               24379392 bytes
Database mounted.
SQL> exit
Disconnected from Oracle Database 19c Enterprise Edition Release
19.0.0.0.0 - Production
Version 19.18.0.0.0
[oracle@ip-172-30-15-124 dbs]$ nid target=/ dbname=db1tst

DBNEWID: Release 19.0.0.0.0 - Production on Wed Jun 7 16:15:14 2023

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reserved.

Connected to database DB1 (DBID=1730530050)
```

```
Connected to server version 19.18.0

Control Files in database:
    /nfsfsxn/oracopy/db1.ctl

Change database ID and database name DB1 to DB1TST? (Y/[N]) => Y

Proceeding with operation
Changing database ID from 1730530050 to 3054879890
Changing database name from DB1 to DB1TST
    Control File /nfsfsxn/oracopy/db1.ctl - modified
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSTEM_FNO-
1_821tkrb - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSAUX_FNO-
3_831tkrd - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-4_851tkrg - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSTEM_FNO-
5_8d1tkri - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSAUX_FNO-
6_891tkrh - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-
7_8h1tkrj - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-8_8g1tkrj - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSTEM_FNO-
9_8a1tkrh - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSAUX_FNO-
10_861tkrg - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-11_841tkrf - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-
12_8i1tkrj - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSTEM_FNO-
13_8b1tkri - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSAUX_FNO-
14_871tkrh - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-15_8e1tkri - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-
16_8j1tkrj - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSTEM_FNO-
17_8c1tkri - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SYSAUX_FNO-
18_881tkrh - dbid changed, wrote new name
```

```
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-
UNDOTBS1_FNO-19_8f1tkrj - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-USERS_FNO-
20_8k1tkrj - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
21_7j1tkqk - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
22_7k1tkqk - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
23_7l1tkqk - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
24_7m1tkqk - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
25_7n1tkqr - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
26_7o1tkqr - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
27_7p1tkqr - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
28_7q1tkqs - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
29_7r1tkr3 - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
30_7s1tkr3 - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
31_7t1tkr3 - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
32_7u1tkr4 - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
33_7v1tkra - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
34_801tkra - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/data_D-DB1_I-1730530050_TS-SOE_FNO-
35_811tkra - dbid changed, wrote new name
    Datafile /nfsfsxn/oracopy/DB1/datafile/o1_mf_temp_l81bhwjg_.tm -
dbid changed, wrote new name
    Datafile
/nfsfsxn/oracopy/DB1/FB864A929AEB79B9E053630F1EAC7046/datafile/o1_mf
_temp_l81bhz6g_.tm - dbid changed, wrote new name
    Datafile
/nfsfsxn/oracopy/DB1/FB867DA8C68C816EE053630F1EAC2BCF/datafile/o1_mf
_temp_l81bj16t_.tm - dbid changed, wrote new name
    Datafile
/nfsfsxn/oracopy/DB1/FB867EA89ECF81C0E053630F1EACB901/datafile/o1_mf
_temp_l81bj135_.tm - dbid changed, wrote new name
    Datafile
```

```
/nfsfsxn/oracopy/DB1/FB867F8A4D4F821CE053630F1EAC69CC/datafile/o1_mf
_temp_l81bj13g_.tm - dbid changed, wrote new name
    Control File /nfsfsxn/oracopy/db1.ctl - dbid changed, wrote new
name
    Instance shut down

Database name changed to DB1TST.
Modify parameter file and generate a new password file before
restarting.
Database ID for database DB1TST changed to 3054879890.
All previous backups and archived redo logs for this database are
unusable.
Database is not aware of previous backups and archived logs in
Recovery Area.
Database has been shutdown, open database with RESETLOGS option.
Succesfully changed database name and ID.
DBNEWID - Completed succesfully.
```

10. Modificare la configurazione dell'ambiente del database Oracle con un nuovo nome di database o ID istanza in oratab, file init e creare le directory di amministrazione necessarie che corrispondano al nuovo ID istanza. Quindi, avviare l'istanza con l'opzione resetlogs.

```
SQL> startup mount;
ORACLE instance started.

Total System Global Area 1.0737E+10 bytes
Fixed Size                  9174800 bytes
Variable Size            1577058304 bytes
Database Buffers         9126805504 bytes
Redo Buffers               24379392 bytes
Database mounted.
SQL> alter database open resetlogs;

Database altered.

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

NAME      OPEN_MODE            LOG_MODE
--------- -------------------- ------------
DB1TST    READ WRITE           NOARCHIVELOG

SQL> show pdbs

    CON_ID CON_NAME                       OPEN MODE  RESTRICTED
---------- ------------------------------ ---------- ----------
         2 PDB$SEED                       READ ONLY  NO
         3 DB1_PDB1                       MOUNTED
         4 DB1_PDB2                       MOUNTED
         5 DB1_PDB3                       MOUNTED
SQL> alter pluggable database all open;

Pluggable database altered.

SQL> show pdbs

    CON_ID CON_NAME                       OPEN MODE  RESTRICTED
---------- ------------------------------ ---------- ----------
         2 PDB$SEED                       READ ONLY  NO
         3 DB1_PDB1                       READ WRITE NO
         4 DB1_PDB2                       READ WRITE NO
         5 DB1_PDB3                       READ WRITE NO
SQL>
```

In questo modo si completa la clonazione di una nuova istanza Oracle dalla copia del database di staging sul mount NFS FSx per DEV, UAT o qualsiasi altro caso d'uso. È possibile clonare più istanze di Oracle dalla stessa copia dell'immagine di staging.

Se riscontri un errore `RMAN-06571: datafile 1 does not have recoverable copy` quando si cambia il database da copiare, controllare l'incarnazione del database che corrisponde al DB di produzione primario. Se necessario, reimpostare l'incarnazione in modo che corrisponda al primario con il comando RMAN `reset database to incarnation n;` .

Dove trovare ulteriori informazioni

Per saperne di più sulle informazioni descritte nel presente documento, consultare i seguenti documenti e/o siti web:

- RMAN: Strategie di backup incrementale unite (ID documento 745798.1)

  "https://support.oracle.com/knowledge/Oracle%20Database%20Products/745798_1.html"

- Guida utente per il backup e il ripristino di RMAN

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

- Amazon FSx ONTAP

  "https://aws.amazon.com/fsx/netapp-ontap/"

- Amazon EC2

  https://aws.amazon.com/pm/ec2/?trk=36c6da98-7b20-48fa-8225-4784bced9843&sc_channel=ps&s_kwcid=AL!4422!3!467723097970!e!!g!!aws%20ec2&ef_id=Cj0KCQiA54KfBhCKARIsAJzSrdqwQrghn6I71jiWzSeaT9Uh1-vY-VfhJixF-xnv5rWwn2S7RqZOTQ0aAh7eEALw_wcB:G:s&s_kwcid=AL!4422!3!467723097970!e!!g!!aws%20ec2

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