TR-4973: Recuperação rápida e clonagem do Oracle VLDB com mesclagem incremental no AWS FSx ONTAP

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Índice

TR-4973: Recuperação rápida e clonagem do Oracle VLDB com mesclagem incremental no AWS FSx ONTAP

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Esta solução fornece uma visão geral e detalhes para recuperação rápida e clonagem do Oracle VLDB implantado na instância de computação AWS EC2 com montagem NFS no FSx ONTAP para preparar uma cópia de arquivo de dados em espera para ser mesclada incrementalmente de forma constante via RMAN.

Propósito

Recuperar um banco de dados muito grande (VLDB) no Oracle usando a ferramenta de backup Oracle Recovery Manager (RMAN) pode ser uma tarefa altamente desafiadora. O processo de restauração do banco de dados a partir da mídia de backup em caso de falha pode ser demorado, atrasando a recuperação do banco de dados e potencialmente impactando significativamente seu Contrato de Nível de Serviço (SLA). No entanto, a partir da versão 10g, a Oracle introduziu um recurso RMAN que permite aos usuários criar cópias de imagem preparadas dos arquivos de dados do banco de dados Oracle em armazenamento em disco adicional localizado no host do servidor de banco de dados. Essas cópias de imagem podem ser atualizadas incrementalmente usando o RMAN diariamente. Em caso de falha, o administrador do banco de dados (DBA) pode alternar rapidamente o banco de dados Oracle da mídia com falha para a cópia de imagem, eliminando a necessidade de uma restauração completa da mídia do banco de dados. O resultado é um SLA muito melhorado, embora ao custo de dobrar o armazenamento de banco de dados necessário.

Se você estiver interessado no SLA para seu VLDB e pensando em mover o banco de dados Oracle para uma nuvem pública, como a AWS, você pode configurar uma estrutura de proteção de banco de dados semelhante usando recursos como o AWS FSx ONTAP para preparar sua cópia de imagem do banco de dados standby. Nesta documentação, demonstramos como provisionar e exportar um sistema de arquivos NFS do AWS FSx ONTAP para ser montado em um servidor de banco de dados Oracle para preparar uma cópia de banco de dados em espera para recuperação rápida em caso de falha de armazenamento primário.

Melhor ainda, também mostramos como você pode aproveitar o NetApp FlexClone para criar uma cópia do mesmo sistema de arquivos NFS de preparação para outros casos de uso, como configurar um ambiente Oracle de desenvolvimento/teste com essa mesma cópia de imagem de banco de dados de espera sem investimento adicional em armazenamento.

Esta solução aborda os seguintes casos de uso:

- Uma fusão incremental de cópia de imagem Oracle VLDB via RMAN no ponto de montagem NFS do armazenamento AWS FSx ONTAP .
- Recuperação rápida de um Oracle VLDB alternando para cópia de imagem de banco de dados no armazenamento FSx ONTAP em caso de falha.
- Clone o volume do sistema de arquivos FSx ONTAP NFS armazenando uma cópia de imagem Oracle VLDB a ser usada para configurar outra instância de banco de dados para outros casos de uso.

Público

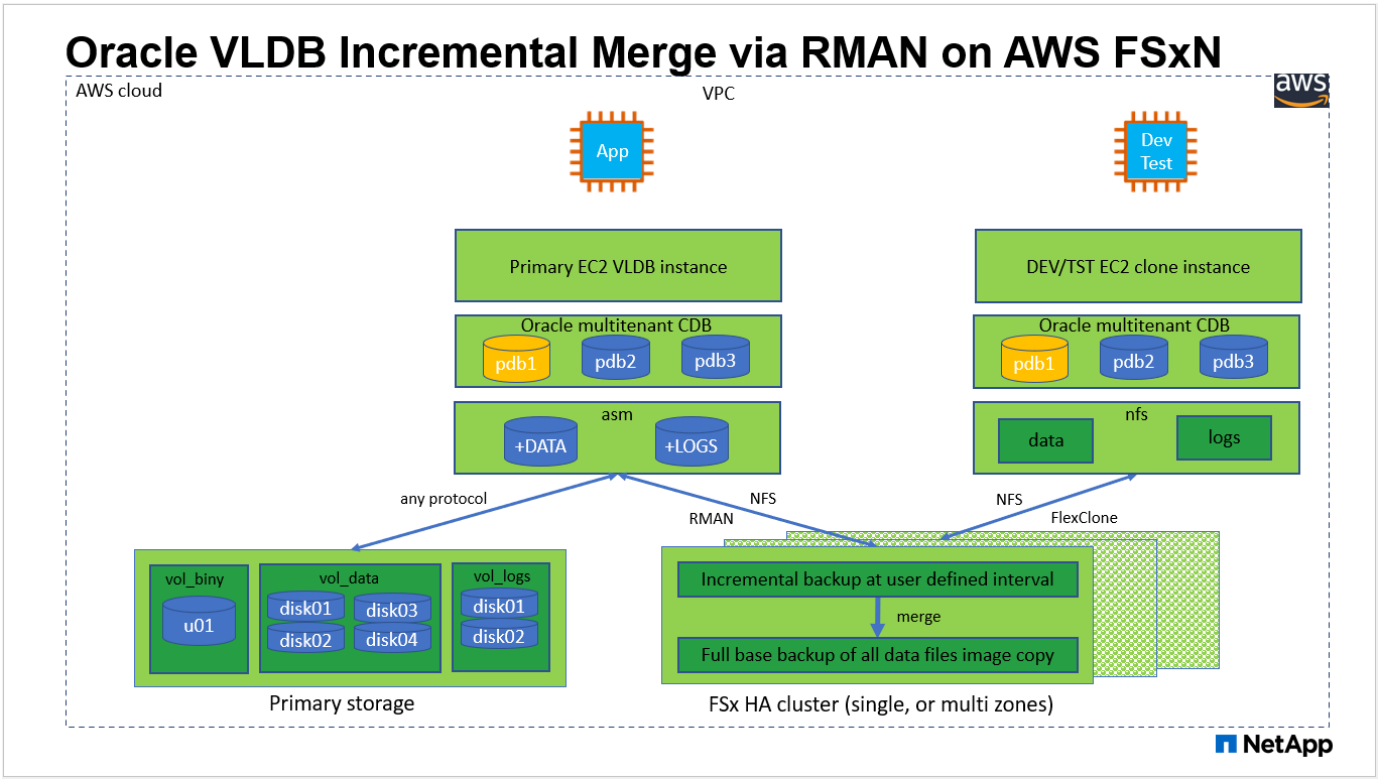
Esta solução é destinada às seguintes pessoas:

- Um DBA que configurou a mesclagem incremental de cópias de imagem do Oracle VLDB via RMAN na AWS para recuperação mais rápida do banco de dados.
- Um arquiteto de soluções de banco de dados que testa cargas de trabalho Oracle na nuvem pública da AWS.
- Um administrador de armazenamento que gerencia bancos de dados Oracle implantados no armazenamento AWS FSx ONTAP .
- Um proprietário de aplicativo que gostaria de configurar bancos de dados Oracle no ambiente AWS FSx/EC2.

Ambiente de teste e validação de soluções

O teste e a validação desta solução foram realizados em um ambiente AWS FSx ONTAP e EC2 que pode não corresponder ao ambiente de implantação final. Para mais informações, consulte a seção Fatores-chave para consideração de implantação .

Arquitetura



Componentes de hardware e software

Hardware		
Armazenamento FSx ONTAP	Versão atual oferecida pela AWS	Um cluster FSx HA na mesma VPC e zona de disponibilidade
Instância EC2 para computação	t2.xlarge/4vCPU/16G	Duas instâncias EC2 T2 xlarge EC2, uma como servidor de banco de dados primário e a outra como servidor de banco de dados clone

Software		
RedHat Linux	RHEL-8.6.0_HVM-20220503-x86_64-2-Hora2-GP2	Assinatura RedHat implantada para teste
Infraestrutura de grade Oracle	Versão 19.18	Patch RU aplicado p34762026_190000_Linux-x86-64.zip
Banco de Dados Oracle	Versão 19.18	Patch RU aplicado p34765931_190000_Linux-x86-64.zip
Oracle OPatch	Versão 12.2.0.1.36	Último patch p6880880_190000_Linux-x86-64.zip

Fatores-chave para consideração de implantação

- **Layout de armazenamento Oracle VLDB para mesclagem incremental RMAN.** Em nossos testes e validações, o volume NFS para backup incremental e mesclagem do Oracle é alocado a partir de um único sistema de arquivos FSx, que tem taxa de transferência de 4 GBps, 160.000 IOPS SSD brutos e limite de capacidade de 192 TiB. Para implantação acima dos limites, vários sistemas de arquivos FSx podem ser concatenados em paralelo com vários pontos de montagem NFS para fornecer maior capacidade.
- **Recuperação do Oracle usando mesclagem incremental do RMAN.** O backup incremental e a mesclagem do RMAN geralmente são executados na frequência definida pelo usuário com base nos seus objetivos de RTO e RPO. Se houver perda total do armazenamento de dados primários e/ou logs arquivados, poderá ocorrer perda de dados. O banco de dados Oracle pode ser recuperado até o último backup incremental disponível na cópia de imagem de backup do banco de dados FSx. Para minimizar a perda de dados, a área de recuperação flash do Oracle pode ser configurada no ponto de montagem do FSx NFS e os logs arquivados podem ser copiados para a montagem do FSx NFS junto com a cópia da imagem do banco de dados.
- **Executando Oracle VLDB no sistema de arquivos FSx NFS.** Diferentemente de outros armazenamentos em massa para backup de banco de dados, o AWS FSx ONTAP é um armazenamento de nível de produção habilitado para nuvem que oferece alto nível de desempenho e eficiência de armazenamento. Depois que o Oracle VLDB alterna do armazenamento primário para a cópia de imagem no sistema de arquivos FSx ONTAP NFS, o desempenho do banco de dados pode ser mantido em alto nível enquanto a falha do armazenamento primário é resolvida. Você pode ficar tranquilo sabendo que a experiência do aplicativo do usuário não é afetada por falhas no armazenamento primário.
- * Cópia de imagem FlexClone Oracle VLDB do volume NFS para outros casos de uso.* O AWS FSx ONTAP FlexClone fornece cópias compartilhadas do mesmo volume de dados NFS que são graváveis. Dessa forma, eles podem ser usados para muitos outros casos de uso, mantendo a integridade da cópia de imagem do Oracle VLDB de preparação, mesmo quando o banco de dados Oracle é alternado. Isso proporciona uma tremenda economia de custos de armazenamento ao reduzir substancialmente o espaço de armazenamento do VLDB. A NetApp recomenda minimizar as atividades do FlexClone no caso de troca do banco de dados do armazenamento primário para a cópia de imagem do banco de dados, a fim de manter o desempenho do Oracle em alto nível.
- **Instâncias de computação do EC2.** Nesses testes e validações, usamos uma instância t2.xlarge do AWS EC2 como instância de computação do banco de dados Oracle. A NetApp recomenda usar uma instância EC2 do tipo M5 como instância de computação para Oracle na implantação de produção porque ela é otimizada para carga de trabalho de banco de dados. Você precisa dimensionar a instância do EC2 adequadamente para o número de vCPUs e a quantidade de RAM com base nos requisitos reais da carga

de trabalho.

- **Implantação de clusters de HA de armazenamento FSx em uma ou várias zonas.** Nesses testes e validações, implantamos um cluster FSx HA em uma única zona de disponibilidade da AWS. Para implantação de produção, a NetApp recomenda implantar um par FSx HA em duas zonas de disponibilidade diferentes. Um cluster FSx HA é sempre provisionado em um par HA que é espelhado de forma sincronizada em um par de sistemas de arquivos ativos-passivos para fornecer redundância em nível de armazenamento. A implantação em várias zonas aumenta ainda mais a alta disponibilidade em caso de falha em uma única zona da AWS.
- **Dimensionamento do cluster de armazenamento FSx.** Um sistema de arquivos de armazenamento Amazon FSx ONTAP fornece até 160.000 IOPS SSD brutos, taxa de transferência de até 4 GBps e capacidade máxima de 192 TiB. No entanto, você pode dimensionar o cluster em termos de IOPS provisionados, taxa de transferência e limite de armazenamento (mínimo de 1.024 GiB) com base nos seus requisitos reais no momento da implantação. A capacidade pode ser ajustada dinamicamente sem afetar a disponibilidade do aplicativo.
- **Configuração do dNFS.** O dNFS é integrado ao kernel do Oracle e é conhecido por aumentar drasticamente o desempenho do banco de dados Oracle quando o Oracle é implantado no armazenamento NFS. O dNFS é empacotado no binário do Oracle, mas não é ativado por padrão. Ele deve ser ativado para qualquer implantação de banco de dados Oracle no NFS. Para implantação de vários sistemas de arquivos FSx para um VLDB, o multicaminho dNFS para diferentes sistemas de arquivos FSx NFS deve ser configurado corretamente.

Implantação da solução

Supõe-se que você já tenha seu Oracle VLDB implantado no ambiente AWS EC2 dentro de uma VPC. Se precisar de ajuda na implantação do Oracle na AWS, consulte os seguintes relatórios técnicos para obter ajuda.

- "Melhores práticas de implantação do Oracle Database no EC2 e FSx"
- "Implantação e proteção de banco de dados Oracle no AWS FSx/EC2 com iSCSI/ASM"
- "Oracle 19c em reinicialização autônoma no AWS FSx/EC2 com NFS/ASM"

Seu Oracle VLDB pode ser executado em um FSx ONTAP ou em qualquer outro armazenamento de escolha dentro do ecossistema AWS EC2. A seção a seguir fornece procedimentos de implantação passo a passo para configurar a mesclagem incremental do RMAN em uma cópia de imagem de um Oracle VLDB que está sendo preparado em uma montagem NFS do armazenamento AWS FSx ONTAP .

Pré-requisitos para implantação

A implantação requer os seguintes pré-requisitos.

1. Uma conta da AWS foi configurada e os segmentos de VPC e rede necessários foram criados dentro da sua conta da AWS.
2. No console do AWS EC2, você deve implantar duas instâncias do EC2 Linux, uma como o servidor Oracle DB principal e um servidor de DB de destino clone alternativo opcional. Veja o diagrama de arquitetura na seção anterior para obter mais detalhes sobre a configuração do ambiente. Revise também o"Guia do usuário para instâncias Linux" para maiores informações.
3. No console do AWS EC2, implante clusters de HA de armazenamento do Amazon FSx ONTAP para hospedar os volumes NFS que armazenam a cópia da imagem de espera do banco de dados Oracle. Se você não estiver familiarizado com a implantação do armazenamento FSx, consulte a documentação"Criação de sistemas de arquivos FSx ONTAP" para obter instruções passo a passo.
4. As etapas 2 e 3 podem ser executadas usando o seguinte kit de ferramentas de automação do Terraform, que cria uma instância EC2 denominada `ora_01` e um sistema de arquivos FSx chamado `fsx_01` . Revise as instruções cuidadosamente e altere as variáveis para adequá-las ao seu ambiente antes da execução. O modelo pode ser facilmente revisado para atender às suas próprias necessidades de implantação.

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

Certifique-se de ter alocado pelo menos 50 GB no volume raiz da instância do EC2 para ter espaço suficiente para preparar os arquivos de instalação do Oracle.

Provisionar e exportar volume NFS para ser montado no host da instância do EC2 DB

Nesta demonstração, mostraremos como provisionar um volume NFS a partir da linha de comando, efetuando login em um cluster FSx via ssh como usuário fsxadmin por meio do IP de gerenciamento do cluster FSx. Como alternativa, o volume também pode ser alocado usando o console do AWS FSx. Repita os procedimentos em outros sistemas de arquivos FSx se mais de um sistema de arquivos FSx estiver configurado para acomodar o tamanho do banco de dados.

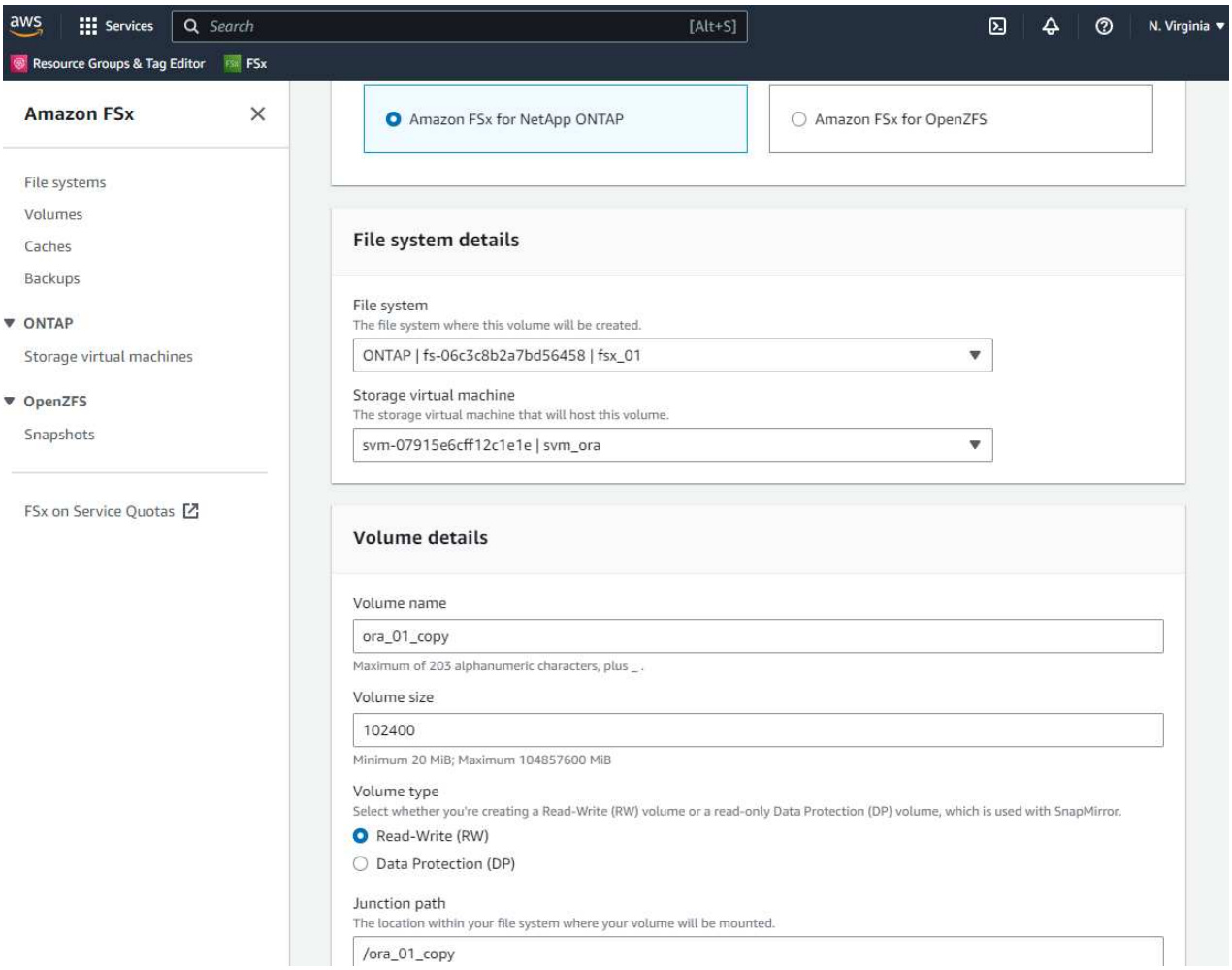
1. Primeiro, provisione o volume NFS via CLI efetuando login no cluster FSx via SSH como o usuário fsxadmin. Altere o endereço IP de gerenciamento do cluster FSx, que pode ser recuperado no console da interface do usuário do AWS FSx ONTAP .

```
ssh fsxadmin@172.30.15.53
```

2. Crie um volume NFS do mesmo tamanho do seu armazenamento primário para armazenar uma cópia da imagem dos arquivos de dados do banco de dados Oracle VLDB primário.

```
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. Como alternativa, o volume pode ser provisionado a partir da interface do usuário do console AWS FSx com opções: eficiência de armazenamento `Enabled` , estilo de segurança `Unix` , Política de instantâneo `None` , e níveis de armazenamento `Snapshot Only` como mostrado abaixo.



4. Crie uma política de snapshot personalizada para o banco de dados Oracle com uma programação diária e retenção de 30 dias. Você deve ajustar a política para atender às suas necessidades específicas em termos de frequência de snapshots e janela de retenção.

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

Aplique a política ao volume NFS provisionado para backup incremental e mesclagem do RMAN.

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

5. Efetue login na instância do EC2 como ec2-user e crie um diretório /nfsfsxn. Crie diretórios de ponto de montagem adicionais para sistemas de arquivos FSx adicionais.

```
sudo mkdir /nfsfsxn
```

6. Monte o volume FSx ONTAP NFS no host da instância do EC2 DB. Altere o endereço NFS lif do seu servidor virtual FSx. O endereço NFS lif pode ser recuperado do console FSx ONTAP UI.

```
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. Altere a propriedade do ponto de montagem para oracle:oisntall, altere seu nome de usuário Oracle e grupo primário conforme necessário.

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

Configurar mesclagem incremental do Oracle RMAN para cópia de imagem no FSx

A mesclagem incremental do RMAN atualiza a cópia da imagem dos arquivos de dados do banco de dados de preparação continuamente em cada intervalo de backup/mesclagem incremental. A cópia da imagem do backup do banco de dados será tão atualizada quanto a frequência com que você executa o backup/mesclagem incremental. Portanto, leve em consideração o desempenho do banco de dados, seus objetivos de RTO e RPO ao decidir a frequência de backup incremental e mesclagem do RMAN.

1. Efetue login na instância EC2 do servidor de banco de dados primário como usuário Oracle
2. Crie um diretório oracopy no ponto de montagem /nfsfsxn para armazenar cópias de imagem de arquivos de dados Oracle e um diretório archlog para a área de recuperação do Oracle Flash.

```
mkdir /nfsfsxn/oracopy
```

```
mkdir /nfsfsxn/archlog
```

3. Efetue login no banco de dados Oracle via sqlplus, habilite o rastreamento de alterações de bloco para backup incremental mais rápido e altere a área de recuperação do Oracle Flash para montagem FSx ONTAP se ela estiver atualmente no armazenamento primário. Isso permite que o backup automático do arquivo de controle padrão/spfile do RMAN e os logs arquivados sejam copiados para a montagem FSx ONTAP NFS para recuperação.

```
sqlplus / as sysdba
```

No prompt do sqlplus, execute o seguinte 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. Crie um backup do RMAN e um script de mesclagem incremental. O script aloca vários canais para backup e mesclagem RMAN paralelos. A primeira execução geraria a cópia inicial completa da imagem de base. Em uma execução completa, ele primeiro limpa os backups obsoletos que estão fora da janela de retenção para manter a área de preparação limpa. Em seguida, ele alterna o arquivo de log atual antes da mesclagem e do backup. O backup incremental segue a mesclagem para que a cópia da imagem do banco de dados fique atrás do estado atual do banco de dados em um ciclo de backup/mesclagem. A ordem de mesclagem e backup pode ser revertida para uma recuperação mais rápida, de acordo com a preferência do usuário. O script RMAN pode ser integrado a um script de shell simples para ser executado a partir do crontab no servidor de banco de dados primário. Certifique-se de que o backup automático do arquivo de controle esteja ativado na configuração do 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. No servidor EC2 DB, efetue login no RMAN localmente como usuário Oracle com ou sem catálogo RMAN. Nesta demonstração, não estamos nos conectando a um catálogo 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

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>
```

6. No prompt do RMAN, execute o script. A primeira execução cria uma cópia de imagem de base do banco de dados e as execuções subsequentes mesclam e atualizam a cópia de imagem de base incrementalmente. Veja a seguir como executar o script e a saída típica. Defina o número de canais para corresponder aos núcleos da CPU no 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. Liste a cópia da imagem do banco de dados após o backup para observar se uma cópia da imagem do banco de dados foi criada no ponto de montagem do FSx ONTAP NFS.

```
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. Relatar esquema do prompt de comando do Oracle RMAN para observar se os arquivos de dados do banco de dados ativo atual estão no grupo de discos ASM +DATA do armazenamento primário.

```
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. Validar cópia da imagem do banco de dados do ponto de montagem NFS do sistema operacional.

```
[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
```

Isso conclui a configuração do backup e da mesclagem da cópia de imagem de espera do banco de dados Oracle.

Mude o Oracle DB para cópia de imagem para recuperação rápida

No caso de uma falha devido a um problema de armazenamento primário, como perda ou corrupção de dados, o banco de dados pode ser rapidamente alternado para uma cópia de imagem na montagem FSx ONTAP NFS e recuperado para o estado atual sem restauração do banco de dados. Eliminar a restauração de mídia acelera tremendamente a recuperação do banco de dados para um VLDB. Este caso de uso pressupõe que a instância do host do banco de dados esteja intacta e que o arquivo de controle do banco de dados, os logs arquivados e os atuais estejam disponíveis para recuperação.

1. Efetue login no host do servidor EC2 DB como usuário Oracle e crie uma tabela de teste antes da troca.

```
[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. Simule uma falha abortando o desligamento do banco de dados e, em seguida, inicie o Oracle no estágio de montagem.

```
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. Como usuário Oracle, conecte-se ao banco de dados Oracle via RMAN para alternar o banco de dados para cópia.

```
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. Recupere e abra o banco de dados para atualizá-lo a partir do último backup incremental.

```
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. Verifique a estrutura do banco de dados do sqlplus após a recuperação para observar que todos os arquivos de dados do banco de dados, com exceção dos arquivos de controle, temporários e de log atuais, agora estão alternados para cópia no sistema de arquivos FSx ONTAP NFS.

```
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. No SQL plus, verifique o conteúdo da tabela de teste que inserimos antes de alternar para copiar

```
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. Você pode executar o banco de dados Oracle na montagem FSx NFS por um longo período sem perda de desempenho porque o FSx ONTAP é um armazenamento redundante de nível de produção que oferece alto desempenho. Quando o problema de armazenamento primário for corrigido, você poderá retornar a ele revertendo os processos de mesclagem de backup incremental com tempo de inatividade mínimo.

Recuperação de banco de dados Oracle a partir de cópia de imagem para host de instância de banco de dados EC2 diferente

Em caso de falha quando o armazenamento primário e o host da instância do EC2 DB são perdidos, a recuperação não pode ser realizada a partir do servidor original. Felizmente, você ainda tem uma cópia de imagem de backup do banco de dados Oracle no sistema de arquivos FSx ONTAP NFS redundante. Você pode provisionar rapidamente outra instância idêntica do EC2 DB e montar facilmente a cópia da imagem do seu VLDB no novo host do EC2 DB via NFS para executar a recuperação. Nesta seção, demonstraremos os procedimentos passo a passo para fazer isso.

1. Insira uma linha para testar a tabela que criamos anteriormente para restauração do banco de dados Oracle para validação de host alternativo.

```
[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

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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> 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. Como usuário Oracle, execute o backup incremental do RMAN e mescle para liberar a transação no conjunto de backup na montagem FSx ONTAP NFS.

```
[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. Desligue o host da instância primária do EC2 DB para simular uma falha total do armazenamento e do host do servidor do BD.
4. Privilegiar um novo host de instância de banco de dados EC2 ora_02 com o mesmo sistema operacional e versão por meio do console AWS EC2. Configure o kernel do sistema operacional com os mesmos patches do host do servidor de banco de dados EC2 primário, o RPM de pré-instalação da Oracle e adicione espaço de swap ao host também. Instale a mesma versão e os mesmos patches do Oracle que no host do servidor de banco de dados EC2 primário com a opção somente software. Essas tarefas podem ser automatizadas com o kit de ferramentas de automação da NetApp

, disponível nos links abaixo.

Kit de ferramentas:"na_oracle19c_deploy" Documentação:"Implantação automatizada do Oracle19c para ONTAP no NFS"

5. Configure o ambiente Oracle de forma semelhante ao host da instância primária do EC2 DB ora_01, como oratab, oraInst.loc e usuário Oracle .bash_profile. É uma boa prática fazer backup desses arquivos no ponto de montagem FSx ONTAP NFS.
6. A cópia da imagem de backup do banco de dados Oracle na montagem FSx ONTAP NFS é armazenada em um cluster FSx que abrange zonas de disponibilidade da AWS para redundância, alta disponibilidade e alto desempenho. O sistema de arquivos NFS pode ser facilmente montado em um novo servidor, desde que a rede seja acessível. Os procedimentos a seguir montam a cópia de imagem de um backup do Oracle VLDB no host da instância do EC2 DB recém-provisionado para recuperação.

   Como usuário ec2, crie o ponto de montagem.

   ```
   sudo mkdir /nfsfsxn
   ```

   Como usuário ec2, monte o volume NFS que armazenou a cópia da imagem de backup do 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. Valide a cópia da imagem de backup do banco de dados Oracle no ponto de montagem FSx ONTAP NFS.

   ```
   [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. Verifique os logs arquivados do Oracle disponíveis na montagem FSx ONTAP NFS para recuperação e anote o último número de sequência de log do arquivo de log. Neste caso, é 175. Nosso ponto de recuperação é até o número de sequência de log 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. Como usuário Oracle, defina a variável ORACLE_HOME como a instalação atual do Oracle no novo host de banco de dados da instância EC2 ora_02, e ORACLE_SID como o SID da instância primária do Oracle. Neste caso, é db1.
10. Como usuário Oracle, crie um arquivo init genérico do Oracle no diretório $ORACLE_HOME/dbs com os diretórios de administração apropriados configurados. O mais importante é ter o Oracle `flash recovery area` aponte para o caminho de montagem FSx ONTAP NFS conforme definido na instância primária do Oracle VLDB. `flash recovery area` a configuração é demonstrada na seção `Setup Oracle RMAN incremental merge to image copy on FSx`. Defina o arquivo de controle do Oracle para o sistema de arquivos FSx ONTAP NFS.

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

Com as seguintes entradas de exemplo:

```
*.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'
```

O arquivo init acima deve ser substituído pelo arquivo init de backup restaurado do servidor Oracle DB principal em caso de discrepância.

11. Como usuário Oracle, inicie o RMAN para executar a recuperação do Oracle em um novo host de instância de banco de dados 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. Definir ID do banco de dados. O ID do banco de dados pode ser recuperado do nome do arquivo Oracle da cópia da imagem no ponto de montagem do FSx NFS.

```
RMAN> set dbid = 1730530050;

executing command: SET DBID
```

13. Restaurar arquivo de controle do backup automático. Se o backup automático do arquivo de controle e do arquivo sp do Oracle estiver habilitado, eles serão copiados em cada ciclo de backup e mesclagem incremental. O backup mais recente será restaurado se várias cópias estiverem disponíveis.

```
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. Restaure o arquivo init do spfile para uma pasta /tmp para atualizar o arquivo de parâmetros posteriormente para corresponder à instância primária do banco de dados.

```
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. Monte o arquivo de controle e valide a cópia da imagem de backup do banco de dados.

```
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. Alterne o banco de dados para copiar e executar a recuperação sem restauração do banco de dados.

```
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. Execute a recuperação do Oracle até o último log de arquivo disponível na área de recuperação 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
```

> Para uma recuperação mais rápida, habilite sessões paralelas com o parâmetro recovery_parallelism ou especifique o grau de paralelismo no comando de recuperação para recuperação de banco de dados: `RECOVER DATABASE PARALLEL (DEGREE d INSTANCES DEFAULT);` . Em geral, os graus de paralelismo devem ser iguais ao número de núcleos de CPU no host.

18. Saia do RMAN, efetue login no Oracle como usuário oracle via sqlplus para abrir o banco de dados e redefinir o log após uma recuperação incompleta.

```
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. Valide o banco de dados restaurado para o novo host que tem a linha que inserimos antes da falha do banco de dados primário.

```
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. Outras tarefas de recuperação pós-processamento

```
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.
```

Isso conclui a recuperação do banco de dados Oracle VLDB da cópia de imagem de backup no sistema de arquivos FSx ONTAP NFS para um novo host de instância de banco de dados EC2.

Clonar cópia de imagem de espera do Oracle para outros casos de uso

Outro benefício de usar o AWS FSx ONTAP para preparar uma cópia de imagem Oracle VLDB é que ele pode ser FlexClonado para atender a muitos outros propósitos com investimento mínimo em armazenamento adicional. No caso de uso a seguir, demonstramos como fazer um snapshot e clonar o volume NFS de preparação no FSx ONTAP para outros casos de uso do Oracle, como DEV, UAT, etc.

1. Começamos inserindo uma linha na mesma tabela de teste que criamos antes.

```
 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. Faça um backup do RMAN e mescle-o à cópia da imagem do banco de dados FSx ONTAP para que a transação seja capturada no conjunto de backup na montagem FSx NFS, mas não seja mesclada à cópia até que o banco de dados clonado seja recuperado.

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

3. Efetue login no cluster FSx via ssh como usuário fsxadmin para observar os snapshots criados pela política de backup agendado - Oracle e tirar um snapshot único para que ele inclua a transação que confirmamos na etapa 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. Clone do snapshot único a ser usado para configurar uma nova instância clone do DB1 em um host Oracle EC2 alternativo. Você tem a opção de clonar qualquer instantâneo diário disponível para o 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. Desative a política de instantâneo para o volume clonado, pois ela herda a política de instantâneo do volume pai, a menos que você queira proteger o volume clonado. Nesse caso, deixe-a como está.

```
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. Efetue login em uma nova instância do EC2 Linux com o software Oracle pré-instalado com a mesma versão e nível de patch da sua instância primária do Oracle EC2 e monte o volume clonado.

```
[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. Valide os conjuntos de backup incrementais do banco de dados, a cópia da imagem e os logs arquivados disponíveis na montagem do FSx NFS.

```
[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. Os processos de recuperação agora são semelhantes ao caso de uso anterior de recuperação para uma nova instância de banco de dados EC2 após uma falha - defina o ambiente Oracle (oratab, $ORACLE_HOME, $ORACLE_SID) para corresponder à instância de produção primária, crie um arquivo init incluindo db_recovery_file_dest_size e db_recovery_file_dest que apontam para o diretório de recuperação flash na montagem FSx NFS. Em seguida, inicie o RMAN para executar a recuperação. A seguir estão as etapas do comando e a saída.

```
[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

Copyright (c) 1982, 2019, Oracle and/or its affiliates.  All rights
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. Renomeie a instância do banco de dados clonada e altere o ID do banco de dados com o utilitário nid do Oracle. O estado da instância do banco de dados precisa estar em `mount` para executar o 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. Altere a configuração do ambiente do banco de dados Oracle para o novo nome do banco de dados ou ID da instância no oratab, arquivo init e crie os diretórios de administração necessários que correspondam ao novo ID da instância. Em seguida, inicie a instância com a opção 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>
```

Isso conclui a clonagem de uma nova instância Oracle a partir da cópia do banco de dados de preparação na montagem FSx NFS para DEV, UAT ou qualquer outro caso de uso. Várias instâncias do Oracle podem ser clonadas a partir da mesma cópia de imagem de preparação.

Se você encontrar um erro `RMAN-06571: datafile 1 does not have recoverable copy` ao alternar o banco de dados para cópia, verifique se a encarnação do banco de dados corresponde ao banco de dados de produção principal. Se necessário, redefina a encarnação para corresponder ao primário com o comando RMAN `reset database to incarnation n;` .

Onde encontrar informações adicionais

Para saber mais sobre as informações descritas neste documento, revise os seguintes documentos e/ou sites:

- RMAN: Estratégias de backup incremental mescladas (ID do documento 745798.1)

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

- Guia do usuário de backup e recuperação do 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

Informações sobre direitos autorais

Informações sobre marcas comerciais