



TR-5020: Distribuzione di istanze Oracle standalone su Google Cloud NetApp Volumes con NFS

NetApp database solutions

NetApp
March 13, 2026

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TR-5020: Distribuzione di istanze Oracle standalone su Google Cloud NetApp Volumes con NFS

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Questa soluzione fornisce una panoramica e i dettagli per la distribuzione di Oracle su Google Cloud NetApp Volumes come storage di database primario tramite protocollo NFS e il database Oracle viene distribuito come container database standalone con dNFS abilitato.

Scopo

Eseguire carichi di lavoro Oracle esigenti in termini di performance e sensibili alla latenza nel cloud può essere una sfida. Google Cloud NetApp Volumes (GCNV) semplifica la migrazione e l'esecuzione di carichi di lavoro Oracle impegnativi per i professionisti delle line-of-business (LOB) aziendali e dello storage senza modifiche al codice. Google Cloud NetApp Volumes è ampiamente utilizzato come servizio sottostante di file-storage condiviso in vari scenari, come nuove implementazioni o migrazioni (lift and shift) di database Oracle da ambienti on-premises a Google Cloud.

Questa documentazione illustra la configurazione dei volumi GCNV DB nella console di Google Cloud e la distribuzione semplificata dei database Oracle in Google Cloud NetApp Volumes tramite mount NFS utilizzando l'automazione Ansible. Il database Oracle viene distribuito in una configurazione di container database (CDB) e pluggable databases (PDB) con il protocollo dNFS di Oracle abilitato per aumentare le performance. Inoltre, viene illustrata una strategia dettagliata di backup, ripristino e clonazione del database e viene fornito un toolkit di automazione per la gestione del backup del database Oracle in Google Cloud.

Questa soluzione affronta i seguenti casi d'uso:

- Distribuzione automatizzata del database Oracle su Google Cloud NetApp Volumes in Google Cloud con protocollo NFS.
- Backup, ripristino e clonazione del database Oracle su Google Cloud NetApp Volumes in Google Cloud.

Pubblico

Questa soluzione è destinata alle seguenti persone:

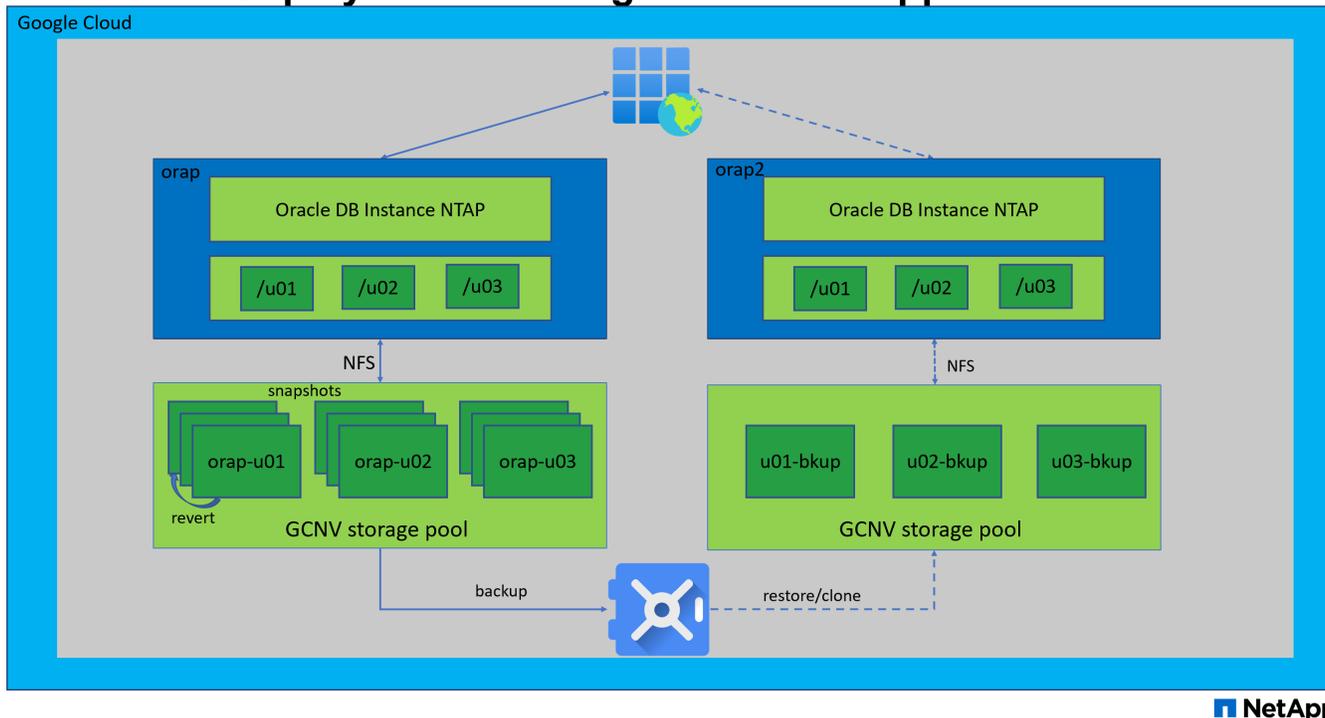
- Un amministratore di database che desidera implementare Oracle su Google Cloud NetApp Volumes.
- Un solution architect di database che desidera testare carichi di lavoro Oracle su Google Cloud NetApp Volumes.
- Un amministratore di storage che desidera implementare e gestire un database Oracle su Google Cloud NetApp Volumes.
- Il proprietario di un'applicazione che desidera implementare un database Oracle su Google Cloud NetApp Volumes.

Ambiente di test e convalida della soluzione

I test e la convalida di questa soluzione sono stati eseguiti in un ambiente di laboratorio che potrebbe non corrispondere all'ambiente di distribuzione finale. Vedi la sezione [Fattori chiave per la considerazione dell'implementazione](#) per maggiori informazioni.

Architettura

Oracle SI Deployment on Google Cloud NetApp Volumes with NFS



Componenti hardware e software

Hardware		
Google Cloud NetApp Volumes	Offerta attuale in Google Cloud da parte di Google	Un pool di storage con livello di servizio Flex, capacità di 2 TiB, throughput di 64 MiB/s e 1024 IOPS predisposti per lo storage del database Oracle
Google Compute Engine VMs per database server	n1-standard-4 (4 vCPUs, 15 GB di memoria)	Due istanze di macchine virtuali Linux per la dimostrazione di implementazione e ripristino
Software		
RedHat Linux	RHEL Linux 8.10 (LVM) - x64 Gen2	Abbonamento RedHat distribuito per i test
Database Oracle	Versione 21.19	Applicata la patch RU p38068980_210000_Linux-x86-64.zip

Oracle OPatch	Versione 12.2.0.1.48	Ultima patch p6880880_210000_Linux-x86-64.zip
NFS	Versione 3.0	Oracle dNFS abilitato
Ansible	nucleo 2.16.2	Python 3.10.13

Configurazione del database Oracle nell'ambiente di laboratorio

Server	Banca dati	Archiviazione DB
orap - database server primario	NTAP(NTAP_PDB1,NTAP_PDB2, NTAP_PDB3)	/u01, /u02, /u03 mount NFS su pool di storage Google Cloud NetApp Volumes
orap2 - ripristinato da backup	NTAP(NTAP_PDB1,NTAP_PDB2, NTAP_PDB3)	/u01, /u02, /u03 mount NFS su pool di storage Google Cloud NetApp Volumes

Fattori chiave per la considerazione dell'implementazione

- **Livello di servizio e throughput del pool di storage GCNV.** GCNV offre quattro diversi livelli di servizio: Standard, Premium, Extreme e Flex. Per i livelli di servizio Standard, Premium ed Extreme, il throughput IO è determinato e fissato in base alla dimensione di un volume DB. Il throughput IO totale è limitato in base al dimensionamento del pool di storage. Per il livello di servizio Flex, il throughput IO non è fissato in base alla dimensione di un volume DB, ma è condiviso tra tutti i volumi DB ed è limitato al livello di dimensionamento del pool di storage. Questo consente di gestire database con volumi più piccoli e occasionali picchi di IOPS. A titolo di riferimento, i livelli di servizio Standard, Premium ed Extreme forniscono rispettivamente 16 KiB/s per GiB, 64 KiB/s per GiB e 128 KiB/s per GiB di throughput. Il livello di servizio Flex, invece, offre fino a 5 GiB/s per pool di storage con impostazione delle performance personalizzata. È importante dimensionare correttamente il livello di servizio e il pool di storage in base al throughput IO previsto e ai requisiti di IOPS del carico di lavoro del database Oracle.
- **Struttura di archiviazione del database.** In questa implementazione automatizzata di Oracle, vengono forniti tre volumi di database per ogni database per ospitare, di default, i file binari, i dati e i log di Oracle. I volumi vengono montati sul database server Oracle come /u01 - binary, /u02 - data, /u03 - logs tramite NFS. I file di controllo doppi sono configurati sui punti di mount /u02 e /u03 per la ridondanza.
- **Configurazione dNFS.** Utilizzando Oracle dNFS (disponibile da Oracle 11g), un database Oracle in esecuzione su Google Compute Engine con storage Google Cloud NetApp Volumes può gestire un volume di I/O significativamente maggiore rispetto al client NFS. La distribuzione automatizzata di Oracle configura dNFS su NFSv3 per impostazione predefinita.
- **Backup Snapshot e Vault.** Invece del backup tradizionale del database RMAN, NetApp raccomanda di implementare backup snapshot e vault efficienti in termini di storage e coerenti con le applicazioni per ottenere backup snapshot veloci (secondi), ripristino rapido del database (minuti), recovery e clonazione da snapshot o backup nel vault di storage. Uno snapshot è una copia point-in-time dei volumi del database che può essere creata in secondi e non consuma spazio di storage aggiuntivo al momento della creazione. Coesiste con i volumi del database primario e può essere perso se i volumi primari vengono compromessi. Un backup vault è una copia dello snapshot che viene archiviata nello storage a oggetti e in una posizione diversa per scopi di disaster recovery.
- **Considerazioni su RTO/RPO.** Quando si configurano le strategie di backup del database, è importante considerare i requisiti di Recovery Time Objective (RTO) e Recovery Point Objective (RPO). Sebbene l'impatto sulle prestazioni del database sia minimo con il backup basato su snapshot, esiste un

compromesso tra la frequenza dei backup, che influisce su RTO/RPO, e la spesa per lo storage. Backup più frequenti possono aiutare a ottenere valori di RTO/RPO inferiori, ma potrebbero aumentare i costi di storage. È importante trovare il giusto equilibrio in base alle esigenze aziendali e al budget. La soluzione di automazione fornisce un toolkit di automazione basato su Ansible playbook per gestire il backup del database Oracle con conservazione e pianificazione del backup configurabili dall'utente.

Distribuzione della soluzione

Le sezioni seguenti forniscono procedure dettagliate per la distribuzione automatizzata di Oracle 21c e per il backup, il ripristino e la clonazione del database su Google Cloud NetApp Volumes, con volumi di database montati direttamente tramite NFS su VM di Google Cloud Compute Engine come database server.

Prerequisiti per la distribuzione

Per la distribuzione sono richiesti i seguenti prerequisiti.

1. È stato configurato un account Google Cloud e le necessarie impostazioni VPC e di rete sono state create all'interno del progetto specifico del tuo account Google Cloud.
2. Dalla console di Google Cloud, distribuisce le VM di Google Compute Engine come Oracle DB server. Assicurati di disattivare il firewall e di abilitare l'autenticazione SSH tramite chiave privata/pubblica delle VM con un utente admin ai DB server per l'automazione. Consulta il diagramma dell'architettura nella sezione precedente per dettagli sulla configurazione dell'ambiente.



Assicurati di aver allocato almeno 50G nel disco root della VM per avere spazio sufficiente per predisporre i file di installazione di Oracle e aggiungere il file di swap del sistema operativo.

3. Configura una macchina virtuale Linux come nodo controller Ansible con la versione di Ansible e Git installata come indicato nel file README del toolkit di automazione. Per assistenza con l'automazione Ansible, consulta il seguente xref: [./oracle/"Introduzione all'automazione delle soluzioni NetApp"](#) nella sezione -

```
Setup the Ansible Control Node for CLI deployments on RHEL / CentOS o  
Setup the Ansible Control Node for CLI deployments on Ubuntu / Debian.
```



Il nodo controller di Ansible può trovarsi sia on-premises che su Google Cloud, purché possa raggiungere le VM del database server di Google Cloud tramite la porta ssh.

4. Clonare una copia del toolkit di automazione della distribuzione NetApp Oracle per NFS.

```
git clone https://bitbucket.ngage.netapp.com/scm/ns-  
bb/na_oracle_deploy_nfs.git
```



Al momento, l'accesso al toolkit è consentito solo agli utenti interni NetApp con accesso Bitbucket. Gli utenti esterni interessati possono richiedere l'accesso al proprio account team o contattare il team NetApp Solutions Engineering.

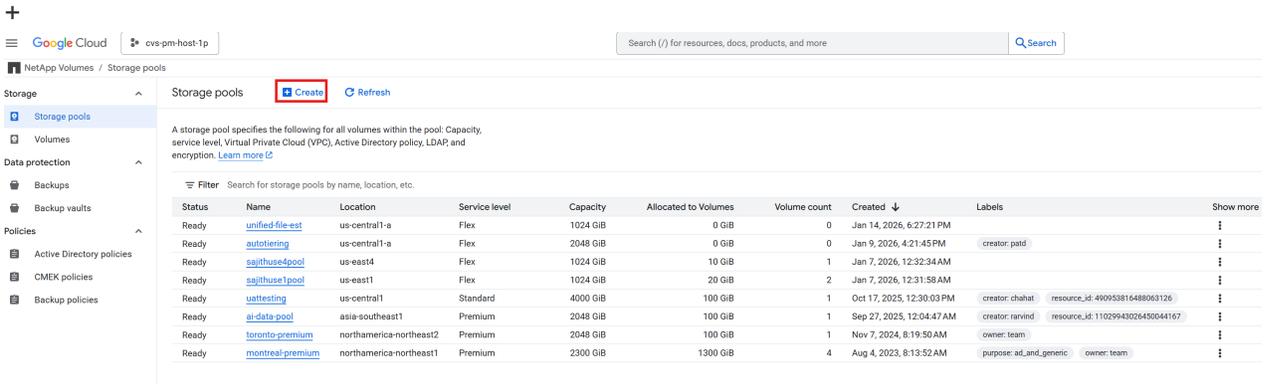
5. Stage following i file di installazione di Oracle 21c nella directory /tmp/archive della VM Google Cloud DB con permessi 777.

```
installer_archives:  
- "LINUX.X64_213000_db_home.zip"  
- "p34765931_210000_Linux-x86-64.zip"  
- "p6880880_210000_Linux-x86-64.zip"
```

Configurazione di Google Cloud NetApp Volumes per lo storage del database Oracle

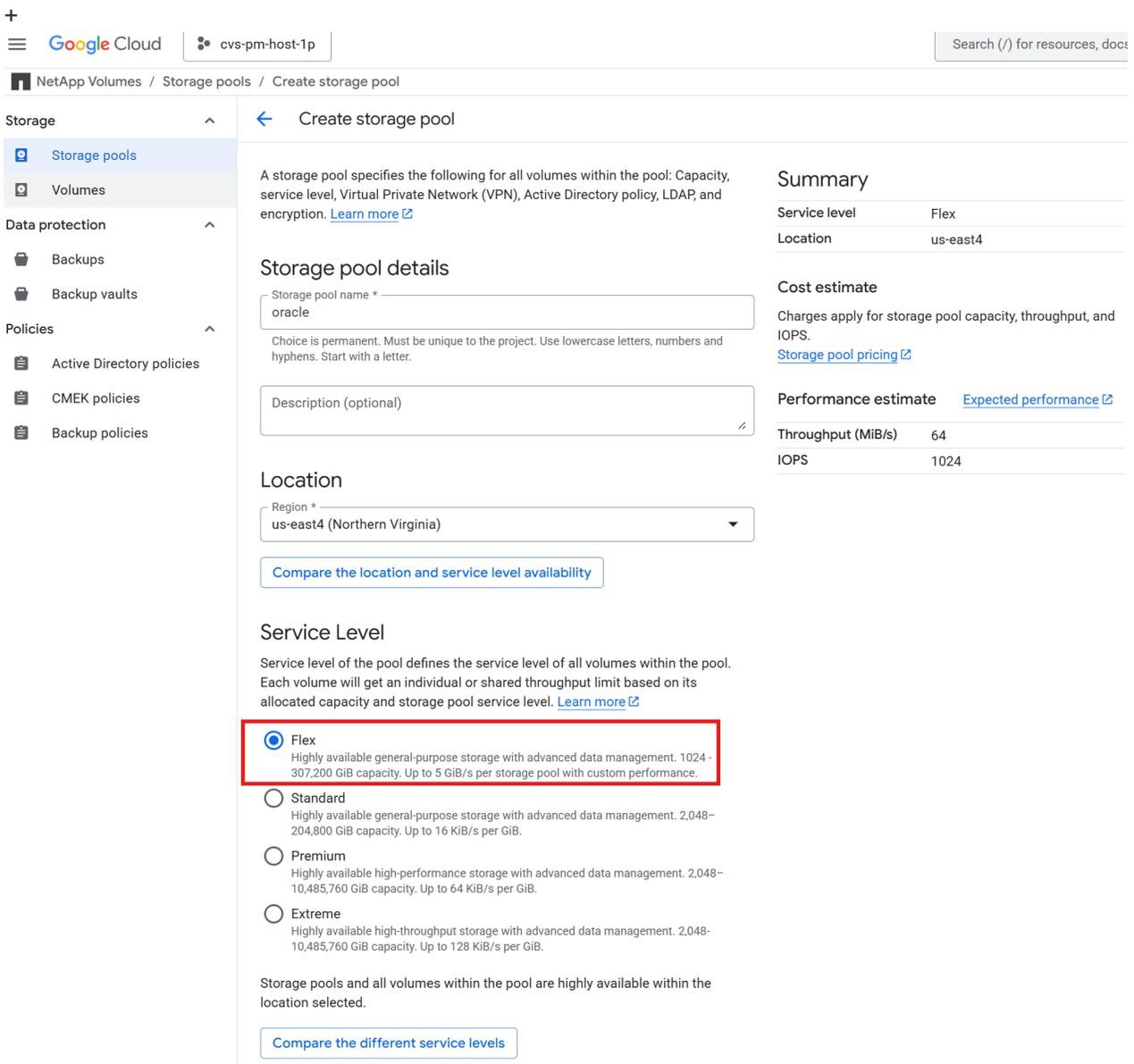
Di seguito sono riportati i passaggi per configurare Google Cloud NetApp Volumes per lo storage del database Oracle, con schermate dimostrative.

1. Crea un pool di storage con il livello di servizio e la capacità desiderati per lo storage del database Oracle.



The screenshot shows the Google Cloud console interface for NetApp Volumes Storage pools. The left sidebar contains navigation options: Storage pools, Volumes, Data protection (Backups, Backup vaults), and Policies (Active Directory policies, CMEK policies, Backup policies). The main area displays a table of storage pools with columns for Status, Name, Location, Service level, Capacity, Allocated to Volumes, Volume count, Created, and Labels. A red box highlights the 'Create' button at the top of the Storage pools section.

Status	Name	Location	Service level	Capacity	Allocated to Volumes	Volume count	Created	Labels	Show more
Ready	unified-file-est	us-central1-a	Flex	1024 GiB	0 GiB	0	Jan 14, 2026, 6:27:21 PM		⋮
Ready	autotiering	us-central1-a	Flex	2048 GiB	0 GiB	0	Jan 9, 2026, 4:21:45 PM	creator: patd	⋮
Ready	sajihuse4pool	us-east4	Flex	1024 GiB	10 GiB	1	Jan 7, 2026, 12:32:34 AM		⋮
Ready	sajihuse1pool	us-east1	Flex	1024 GiB	20 GiB	2	Jan 7, 2026, 12:31:58 AM		⋮
Ready	uattesting	us-central1	Standard	4000 GiB	100 GiB	1	Oct 17, 2025, 12:30:03 PM	creator: chahat resource_id: 490553816488063126	⋮
Ready	ai-data-pool	asia-southeast1	Premium	2048 GiB	100 GiB	1	Sep 27, 2025, 12:04:47 AM	creator: ranvind owner: team resource_id: 11029943026450044167	⋮
Ready	toronto-premium	northamerica-northeast2	Premium	2048 GiB	100 GiB	1	Nov 7, 2024, 8:19:50 AM	owner: team	⋮
Ready	montreal-premium	northamerica-northeast1	Premium	2300 GiB	1300 GiB	4	Aug 4, 2023, 8:13:52 AM	purpose: ad_and_genetic owner: team	⋮



The screenshot shows the 'Create storage pool' configuration page in Google Cloud. The left sidebar is the same as in the previous screenshot. The main area is titled 'Create storage pool' and contains several sections: 'Storage pool details' with a text input for 'Storage pool name *' (containing 'oracle') and a description input; 'Location' with a dropdown menu set to 'us-east4 (Northern Virginia)'; 'Service Level' with radio buttons for 'Flex', 'Standard', 'Premium', and 'Extreme'. The 'Flex' option is selected and highlighted with a red box. A 'Summary' section on the right shows 'Service level' as 'Flex' and 'Location' as 'us-east4'. Below the 'Service Level' section, there is a 'Performance estimate' section showing 'Throughput (MiB/s)' as 64 and 'IOPS' as 1024. A red box also highlights the 'Flex' option in the 'Service Level' section.

Storage pool details

Storage pool name * oracle

Description (optional)

Location

Region * us-east4 (Northern Virginia)

Service Level

Service level of the pool defines the service level of all volumes within the pool. Each volume will get an individual or shared throughput limit based on its allocated capacity and storage pool service level. [Learn more](#)

- Flex**
Highly available general-purpose storage with advanced data management. 1024 - 307,200 GiB capacity. Up to 5 GiB/s per storage pool with custom performance.
- Standard**
Highly available general-purpose storage with advanced data management. 2,048 - 204,800 GiB capacity. Up to 16 KiB/s per GiB.
- Premium**
Highly available high-performance storage with advanced data management. 2,048 - 10,485,760 GiB capacity. Up to 64 KiB/s per GiB.
- Extreme**
Highly available high-throughput storage with advanced data management. 2,048 - 10,485,760 GiB capacity. Up to 128 KiB/s per GiB.

Storage pools and all volumes within the pool are highly available within the location selected.

Summary

Service level Flex

Location us-east4

Cost estimate

Charges apply for storage pool capacity, throughput, and IOPS. [Storage pool pricing](#)

Performance estimate [Expected performance](#)

Throughput (MiB/s) 64

IOPS 1024

- Storage
 - Storage pools
 - Volumes
- Data protection
 - Backups
 - Backup vaults
- Policies
 - Active Directory policies
 - CMEK policies
 - Backup policies

Create storage pool

Availability

Determines data availability in the event of zone failures. Choice is permanent. [Learn more](#)

Zonal
Volume will be available in a single zone.

Regional
Volume will be available in the selected zones. In the event of an active zone outage, volumes automatically failover to a replica zone.

Zone *
us-east4-b

Capacity and performance

Capacity *
1024 GiB

Capacity must be between 1,024 GiB and 307,200 GiB in increments of 1 GiB. Capacity cannot be decreased later.

Performance

Custom performance is enabled in the current location. Capacity, throughput, and IOPS can be independently modified and will be charged independently.

Throughput *
64 MiB/s

Throughput must be between 64 and 5,120 MiB/s in increments of 1 MiB/s.

IOPS
1024 IOPS

IOPS must be between 1,024 and 160,000 in increments of 1 IOPS.

Set up connections

Select the network and address range that applications will use to access your volume. [Learn more](#)

Network
shared-vpc-prod

Private services access connection for network shared-vpc-prod has been successfully created. You will now be able to use the same network across all your project's managed services. If you would like to change this connection, please visit the [Networking page](#).

Summary

Service level	Flex
Location	us-east4

Cost estimate

Charges apply for storage pool capacity, throughput, and IOPS. [Storage pool pricing](#)

Performance estimate [Expected performance](#)

Throughput (MiB/s)	64
IOPS	1024

+

- Storage
 - Storage pools**
 - Volumes
- Data protection
 - Backups
 - Backup vaults
- Policies
 - Active Directory policies
 - CMEK policies
 - Backup policies

← Create storage pool

Network shared-vpc-prod

✔ Private services access connection for network shared-vpc-prod has been successfully created. You will now be able to use the same network across all your project's managed services. If you would like to change this connection, please visit the [Networking page](#).

Summary

Service level	Flex
Location	us-east4

Cost estimate

Charges apply for storage pool capacity, throughput, and IOPS. [Storage pool pricing](#)

Performance estimate [Expected performance](#)

Throughput (MiB/s)	64
IOPS	1024

Active Directory policy

Assign an Active Directory policy to provision a storage pool for volumes using LDAP, Kerberos, or any SMB protocol variations. [Learn more](#)

Assign an Active Directory policy to the storage pool. Choice is permanent once assigned.

LDAP configuration for NFS protocol(s)

Enable LDAP (Available only at storage pool creation)
Enables user look up from Active Directory LDAP server for your NFS volumes. Choice is permanent.

Encryption

The following encryption policy applies for all volumes in your region. [Learn more](#)

Encryption

- Google-managed encryption key
No configuration required
- Customer-managed encryption key (CMEK)
Manage via [CMEK policies for NetApp Volumes](#).

Auto-tiering

Optimize storage costs by automatically moving cold data on volumes with enabled auto-tiering to the most cost-effective access tier depending on access pattern changes. [Learn more](#)

Allow auto-tiering for volumes. Choice is permanent.

Labels

Label your storage pools for reports, queries.

Key 1 * database Value 1 oracle

[+ Add label](#)

[Create](#) [Cancel](#)

- Storage
 - Storage pools**
 - Volumes
- Data protection
 - Backups
 - Backup vaults
- Policies
 - Active Directory policies
 - CMEK policies
 - Backup policies

Storage pools [Create](#) [Refresh](#)

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

Filter Search for storage pools by name, location, etc.

Status	Name	Location	Service level	Capacity	Allocated to Volumes	Volume count	Created ↓	Labels	Show more
Ready	oracle	us-east4-b	Flex	1024 GiB	0 GiB	0	Jan 15, 2026, 12:29:53 PM	database: oracle	⋮
Ready	unified-file-est	us-central1-a	Flex	1024 GiB	0 GiB	0	Jan 14, 2026, 6:27:21 PM		⋮
Ready	autotiering	us-central1-a	Flex	2048 GiB	0 GiB	0	Jan 9, 2026, 4:21:45 PM	creator: patd	⋮
Ready	sap/thuse4pool	us-east4	Flex	1024 GiB	10 GiB	1	Jan 7, 2026, 12:32:34 AM		⋮
Ready	sap/thuse1pool	us-east1	Flex	1024 GiB	20 GiB	2	Jan 7, 2026, 12:31:58 AM		⋮
Ready	uattesting	us-central1	Standard	4000 GiB	100 GiB	1	Oct 17, 2025, 12:30:03 PM	creator: chahat resource_id: 490953816488063126	⋮
Ready	ai-data-pool	asia-southeast1	Premium	2048 GiB	100 GiB	1	Sep 27, 2025, 12:04:47 AM	creator: ravind resource_id: 11029943026450044167	⋮
Ready	toronto-premium	northamerica-northeast2	Premium	2048 GiB	100 GiB	1	Nov 7, 2024, 8:19:50 AM	owner: team	⋮
Ready	montreal-premium	northamerica-northeast1	Premium	2300 GiB	1300 GiB	4	Aug 4, 2023, 8:13:52 AM	purpose: ad_and_generic owner: team	⋮

2. Crea tre volumi DB per database Oracle con la dimensione desiderata nel pool di storage per lo storage del database. Ad esempio, /u01 per i file binari, /u02 per i file di dati e /u03 per i file di redo log e i file di controllo con protocollo NFSv3 e opzione di mount come mostrato nelle seguenti schermate.

+

The screenshot shows the Google Cloud NetApp Volumes console. The left sidebar contains navigation options: Storage pools, Volumes, Data protection, Backups, Backup vaults, Policies, Active Directory policies, CMEK policies, and Backup policies. The main area displays a table of volumes with columns for Status, Name, Location, Service level, Share name, Capacity, Used, Protocol(s), Storage pool, Labels, and Show more. A 'Create' button is highlighted in the top right of the Volumes section.

Status	Name	Location	Service level	Share name	Capacity	Used	Protocol(s)	Storage pool	Labels	Show more
Ready	bkprvol	us-east1	Flex		10	0% (0 GiB)	iSCSI	sajihuse1pool		⋮
● Read only	crdemo_dst	us-east4	Flex		10	60% (6 GiB)	iSCSI	sajihuse4pool		⋮
Ready	crdemo_arc	us-east1	Flex		10	60% (6 GiB)	iSCSI	sajihuse1pool		⋮
Ready	karfica	northamerica-northeast1	Premium	karfica	100	0% (0 GiB)	SMB	montreal-premium	creator: konnerth	⋮
Ready	cashare	northamerica-northeast1	Premium	cashare	100	0% (0 GiB)	SMB	montreal-premium	resource_id: 9793440331267625540 creator: konnerth	⋮
● Preparing	lindsey-test	asia-southeast1	Premium	lindsey-test	100	0% (0 GiB)	NFSv3	at-data-pool	creator: lindsey resource_id: 1410645181332178370	⋮
Ready	voluattesting	us-central1	Standard	voluattesting	100	0% (0 GiB)	NFSv3	uattesting	resource_id: 15314611774523162194 creator: chahat	⋮
Ready	crb-demo	northamerica-northeast2	Premium	crb-demo	100	0% (0 GiB)	NFSv3	toronto-premium	creator: briahi resource_id: 1630636522832868345	⋮
Ready	karlquota	northamerica-northeast1	Premium	karlquota	100	0% (0 GiB)	NFSv3	montreal-premium	creator: konnerth owner: karl	⋮
Ready	okldata	northamerica-northeast1	Premium	okldata	1000	89.5% (895 GiB)	SMB	montreal-premium	creator: okrause owner: okrause	⋮

+

Storage

Storage pools

Volumes

Data protection

Backups

Backup vaults

Policies

Active Directory policies

CMEK policies

Backup policies

Create a volume

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

Volume name *

orap-u01

Choice is permanent. Must be unique to the region. Use lowercase letters, numbers and hyphens. Start with a letter.

Description

volume for Oracle binary.

Storage pool details

Select a storage pool in which to create the volume

Selected Storage Pool

oracle

Location	us-east4-b
Storage pool available capacity	1024 GiB
Number of volumes in the pool	0
Service level	Flex
VPC	shared-vpc-prod
Active Directory policy	No value
LDAP enabled	No
Encryption	Google-managed

[Select storage pool](#)

[Create new storage pool](#)

Volume details

Share name *

orap-u01



Must be unique to a location

Capacity *

50

GiB

Capacity must be between 1 GiB and 307,200 GiB in increments of 1 GiB.

+

Storage ^

Storage pools

Volumes

Data protection ^

Backups

Backup vaults

Policies ^

Active Directory policies

CMEK policies

Backup policies

← Create a volume

Auto-tiering

Optimize storage costs by automatically moving cold data on volumes with enabled auto-tiering to the most cost-effective access tier depending on access pattern changes. [Learn more](#)

i Allow auto-tiering on the storage pool to enable it on this volume.

Edit Storage Pool

Protocol(s) configuration

Protocol(s) *
NFSv3

Configuration for selected protocol(s)

Block volume from deletion when clients are connected **?**
Required for volumes used as GCVE datastores. Choice is permanent.

Export rules ^

Rules are evaluated in order. First matching rule applies.

Rules

^ Edit Rule 🗑️ ⬆️ ⬇️

Allowed Clients *
0.0.0.0/0

Comma-separated list of IPv4 addresses or CIDRs (up to 4096 characters).

Access *

Read & Write

Read Only

Root Access (no_root_squash)

On

Off

Done

Add Rule

- Storage
 - Storage pools
 - Volumes
- Data protection
 - Backups
 - Backup vaults
- Policies
 - Active Directory policies
 - CMEK policies
 - Backup policies

Create a volume

Add Rule

Snapshot configuration

- Make snapshot directory visible**
Makes .snapshot (NFS) or ~snapshot (SMB) directory visible to clients. For SMB volumes, it also enables "Previous versions" support. For NFSv4.1 volumes, the directory itself will not be listed but can be accessed to list contents, etc.
- Allow scheduled snapshots**
When enabled, snapshots are created according to the schedule configured below.

HOURLY DAILY WEEKLY MONTHLY

Snapshots To Keep:

Hour (UTC): Minute (UTC):

i The snapshot schedule will not be applied to the volume. To apply the snapshot schedule, adjust the retention controls.

Backup configuration

Use backup policy to automate volume backups.

- Allow scheduled backups**
When enabled, backups are automatically created according to the following specified policy.

Backup location

Choose a backup vault to store your backups.

Backup vault:

Type	In-region
Region	us-east4

Labels

Label your volumes for reports, queries.

Key 1 *: Value 1:

+ Add label

Create Cancel

Non attivare il backup pianificato in Google Cloud NetApp Volumes in questo momento, poiché lo schema di backup integrato non è app-consistent. Il toolkit di automazione del backup fornito per questa soluzione gestirà il backup del database app-consistent con pianificazione e conservazione definite dall'utente.

Distribuzione automatizzata di Oracle con Ansible playbook

File dei parametri di automazione

Il playbook Ansible esegue le attività di installazione e configurazione del database con parametri predefiniti. Il toolkit attualmente supporta la distribuzione del database Oracle versione 19c e 21c. Per questa soluzione di automazione Oracle, ci sono tre file di parametri definiti dall'utente che richiedono l'inserimento di dati prima dell'esecuzione del playbook.

- `host`: definiscono i target su cui viene eseguito il playbook di automazione.
- `vars/vars.yml`: il file delle variabili globali che definisce le variabili che si applicano a tutti i target.
- `host_vars/host_name.yml`: il file delle variabili locali che definisce le variabili che si applicano solo a una destinazione denominata. Nel nostro caso d'uso, si tratta dei server Oracle DB.

Oltre a questi file di variabili definiti dall'utente, esistono diversi file di variabili predefiniti che contengono parametri predefiniti che non richiedono modifiche, a meno che non siano strettamente necessari. Le sezioni seguenti mostrano come configurare i file delle variabili definite dall'utente.

Configurazione dei file dei parametri

1. Obiettivo Ansible `hosts` configurazione dei file:

```
#Oracle hosts
[oracle]
orap ansible_host=10.61.180.6
ansible_ssh_private_key_file=ora_01.pem
orap2 ansible_host=10.61.180.8
ansible_ssh_private_key_file=ora_02.pem
```

2. Globale `vars/vars.yml` configurazione dei file

```

#####
### ONTAP env specific config variables ###
#####

# Prerequisite to create three volumes in NetApp ONTAP storage from
System Manager or cloud dashboard with following naming convention:
# {{ inventory_hostname }}_u01 or {{ inventory_hostname }}-u01 --
Oracle binary
# {{ inventory_hostname }}_u02 or {{ inventory_hostname }}-u02 --
Oracle data
# {{ inventory_hostname }}_u03 or {{ inventory_hostname }}-u03 --
Oracle redo
# It is important to strictly follow the name convention or the
automation will fail.

host_datastores_nfs:
  - {vol_name: "{{ inventory_hostname }}-u01", lif: "{{ nfs_lif }}" }
  - {vol_name: "{{ inventory_hostname }}-u02", lif: "{{ nfs_lif }}" }
  - {vol_name: "{{ inventory_hostname }}-u03", lif: "{{ nfs_lif }}" }

#####
### Linux env specific config variables ###
#####

redhat_sub_username: "xxxxxxxxxx"
redhat_sub_password: "xxxxxxxxxx"

#####
### DB env specific install and config variables ###
#####

# Database version: support 19c and 21c, 19c|19.0.0 or 21c|21.0.0
ora_version: 21c
ora_version_num: 21.0.0

# Set initial password for all required Oracle passwords. Change
them after installation.
initial_pwd_all: "xxxxxxxxxx"

# Database domain name
db_domain: cvs-pm-host-1p.internal

```

3. Configurazione del server DB locale host_vars/host_name.yml come orap.yml, orap2.yml ...

```
# User configurable Oracle host specific parameters

# Database SID. By default, a container DB is created with 3 PDBs
within the CDB
oracle_sid: NTAP

# CDB is created with SGA at 75% of memory_limit, MB. Consider how
many databases to be hosted on the node and how much ram to be
allocated to each DB. The grand total of SGA should not exceed 75%
available RAM on node.
memory_limit: 8192

# NFS server ip address to access database volumes - retrieved from
Google Cloud console within the volume details.
nfs_lif: 10.165.128.242
```

Esecuzione del playbook

Il toolkit di automazione contiene in totale cinque playbook. Ognuno di essi esegue blocchi di attività diversi e ha scopi diversi.

```
0-all_playbook.yml - execute playbooks from 1-4 in one playbook run.
1-ansible_requirements.yml - set up Ansible controller with required
libs and collections.
2-linux_config.yml - execute Linux kernel configuration on Oracle DB
servers.
4-oracle_config.yml - install and configure Oracle on DB servers and
create a container database.
5-destroy.yml - optional to undo the environment to dismantle all.
```

Esistono tre opzioni per eseguire i playbook con i seguenti comandi.

1. Eseguire tutti i playbook di distribuzione in un'unica esecuzione combinata.

```
ansible-playbook -i hosts 0-all_playbook.yml -u admin -e
@vars/vars.yml
```

2. Eseguire i playbook uno alla volta con la sequenza numerica da 1 a 4.

```
ansible-playbook -i hosts 1-ansible_requirements.yml -u admin -e
@vars/vars.yml
```

```
ansible-playbook -i hosts 2-linux_config.yml -u admin -e
@vars/vars.yml
```

```
ansible-playbook -i hosts 4-oracle_config.yml -u admin -e
@vars/vars.yml
```

3. Eseguire 0-all_playbook.yml con un tag.

```
ansible-playbook -i hosts 0-all_playbook.yml -u admin -e
@vars/vars.yml -t ansible_requirements
```

```
ansible-playbook -i hosts 0-all_playbook.yml -u admin -e
@vars/vars.yml -t linux_config
```

```
ansible-playbook -i hosts 0-all_playbook.yml -u admin -e  
@vars/vars.yml -t oracle_config
```

4. Annulla l'ambiente

```
ansible-playbook -i hosts 5-destroy.yml -u admin -e @vars/vars.yml
```

Convalida post-esecuzione

Dopo l'esecuzione del playbook, accedi alla macchina virtuale del database server Oracle per verificare che Oracle sia installato e configurato e che un container database sia stato creato con successo. Di seguito è riportato un esempio di convalida del database Oracle sull'host orap.

1. Convalida i mount NFS

```
[oracle@orap ~]$ df -h
Filesystem                Size      Used Avail Use% Mounted on
devtmpfs                  7.2G         0  7.2G   0% /dev
tmpfs                     7.3G         0  7.3G   0% /dev/shm
tmpfs                     7.3G     8.5M  7.2G   1% /run
tmpfs                     7.3G         0  7.3G   0% /sys/fs/cgroup
/dev/sda2                  50G       31G   20G  62% /
/dev/sda1                  200M     5.9M  194M   3% /boot/efi
10.165.128.242:/orap-u02  500G     410G   91G  82% /u02
10.165.128.242:/orap-u03  300G     2.5G  298G   1% /u03
10.165.128.242:/orap-u01   50G     11G   40G  21% /u01
tmpfs                     1.5G         0  1.5G   0% /run/user/1010

[admin@orap ~]$ cat /etc/fstab

#
# /etc/fstab
# Created by anaconda on Wed Jul  9 15:09:30 2025
#
# Accessible filesystems, by reference, are maintained under
# '/dev/disk/'.
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for
# more info.
#
# After editing this file, run 'systemctl daemon-reload' to update
# systemd
# units generated from this file.
#
UUID=c829892e-02dc-40d8-b1b0-42a3b90b6315 /
xfs      defaults          0 0
UUID=6275-3342          /boot/efi              vfat
defaults,uid=0,gid=0,umask=077,shortname=winnt 0 2
/root/swapfile swap swap defaults 0 0
10.165.128.242:/orap-u01 /u01 nfs
rw,bg,hard,vers=3,proto=tcp,timeo=600,rsize=262144,wsiz=262144 0 0
10.165.128.242:/orap-u02 /u02 nfs
rw,bg,hard,vers=3,proto=tcp,timeo=600,rsize=262144,wsiz=262144 0 0
10.165.128.242:/orap-u03 /u03 nfs
rw,bg,hard,vers=3,proto=tcp,timeo=600,rsize=262144,wsiz=262144 0 0
```

2. Come utente oracle, convalida Oracle listener

```
[oracle@orap ~]$ lsnrctl status listener

LSNRCTL for Linux: Version 21.0.0.0.0 - Production on 17-FEB-2026
20:34:06

Copyright (c) 1991, 2021, Oracle. All rights reserved.

Connecting to (DESCRIPTION=(ADDRESS=(PROTOCOL=TCP) (HOST=orap.us-
east4-b.c.cvs-pm-host-1p.internal) (PORT=1521)))
STATUS of the LISTENER
-----
Alias                     LISTENER
Version                   TNSLSNR for Linux: Version 21.0.0.0.0 -
Production
Start Date                17-FEB-2026 16:03:25
Uptime                    0 days 4 hr. 30 min. 41 sec
Trace Level               off
Security                  ON: Local OS Authentication
SNMP                      OFF
Listener Parameter File
/u01/app/oracle/homes/OraDB21Home1/network/admin/listener.ora
Listener Log File
/u01/app/oracle/diag/tnslsnr/orap/listener/alert/log.xml
Listening Endpoints Summary...
  (DESCRIPTION=(ADDRESS=(PROTOCOL=tcp) (HOST=orap.us-east4-b.c.cvs-
pm-host-1p.internal) (PORT=1521)))
  (DESCRIPTION=(ADDRESS=(PROTOCOL=ipc) (KEY=EXTPROC1521)))
  (DESCRIPTION=(ADDRESS=(PROTOCOL=tcps) (HOST=orap.us-east4-b.c.cvs-
pm-host-
1p.internal) (PORT=5500)) (Security=(my_wallet_directory=/u01/app/orac
le/homes/OraDB21Home1/admin/NTAP/xdb_wallet)) (Presentation=HTTP) (Ses
sion=RAW))
Services Summary...
Service "48ea7bc6e662ab02e063130b460ac1b5.cvs-pm-host-1p.internal"
has 1 instance(s).
  Instance "NTAP", status READY, has 1 handler(s) for this
service...
Service "48ea7e8e7de8ab6de063130b460a341d.cvs-pm-host-1p.internal"
has 1 instance(s).
  Instance "NTAP", status READY, has 1 handler(s) for this
service...
Service "48ea7ff1feb4ab7ce063130b460ac700.cvs-pm-host-1p.internal"
has 1 instance(s).
  Instance "NTAP", status READY, has 1 handler(s) for this
```

```
service...
Service "NTAP.cvs-pm-host-1p.internal" has 1 instance(s).
  Instance "NTAP", status READY, has 1 handler(s) for this
service...
Service "NTAPXDB.cvs-pm-host-1p.internal" has 1 instance(s).
  Instance "NTAP", status READY, has 1 handler(s) for this
service...
Service "ntap_pdb1.cvs-pm-host-1p.internal" has 1 instance(s).
  Instance "NTAP", status READY, has 1 handler(s) for this
service...
Service "ntap_pdb2.cvs-pm-host-1p.internal" has 1 instance(s).
  Instance "NTAP", status READY, has 1 handler(s) for this
service...
Service "ntap_pdb3.cvs-pm-host-1p.internal" has 1 instance(s).
  Instance "NTAP", status READY, has 1 handler(s) for this
service...
The command completed successfully
```

3. Convalida del database Oracle e dNFS

```
[oracle@orap ~]$ cat /etc/oratab
#

# This file is used by ORACLE utilities.  It is created by root.sh
# and updated by either Database Configuration Assistant while
creating
# a database or ASM Configuration Assistant while creating ASM
instance.

# A colon, ':', is used as the field terminator.  A new line
terminates
# the entry.  Lines beginning with a pound sign, '#', are comments.
#
# Entries are of the form:
#   $ORACLE_SID:$ORACLE_HOME:<N|Y>:
#
# The first and second fields are the system identifier and home
# directory of the database respectively.  The third field indicates
# to the dbstart utility that the database should , "Y", or should
not,
# "N", be brought up at system boot time.
#
# Multiple entries with the same $ORACLE_SID are not allowed.
```

```

#
#
NTAP:/u01/app/oracle/product/21.0.0/NTAP:Y

[oracle@orap ~]$ sqlplus / as sysdba

SQL*Plus: Release 21.0.0.0.0 - Production on Wed Jan 28 18:18:02
2026
Version 21.19.0.0.0

Copyright (c) 1982, 2021, Oracle. All rights reserved.

Connected to:
Oracle Database 21c Enterprise Edition Release 21.0.0.0.0 -
Production
Version 21.19.0.0.0

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

NAME          OPEN_MODE          LOG_MODE
-----
NTAP          READ WRITE        ARCHIVELOG

SQL> show pdbs

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

SQL> select name from v$datafile;

NAME
-----
/u02/oradata/NTAP/system01.dbf
/u02/oradata/NTAP/sysaux01.dbf
/u02/oradata/NTAP/undotbs01.dbf
/u02/oradata/NTAP/pdbseed/system01.dbf
/u02/oradata/NTAP/pdbseed/sysaux01.dbf
/u02/oradata/NTAP/users01.dbf
/u02/oradata/NTAP/pdbseed/undotbs01.dbf
/u02/oradata/NTAP/NTAP_pdb1/system01.dbf
/u02/oradata/NTAP/NTAP_pdb1/sysaux01.dbf

```

```
/u02/oradata/NTAP/NTAP_pdb1/undotbs01.dbf
```

```
/u02/oradata/NTAP/NTAP_pdb1/users01.dbf
```

```
NAME
```

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

```
/u02/oradata/NTAP/NTAP_pdb2/system01.dbf
```

```
/u02/oradata/NTAP/NTAP_pdb2/sysaux01.dbf
```

```
/u02/oradata/NTAP/NTAP_pdb2/undotbs01.dbf
```

```
/u02/oradata/NTAP/NTAP_pdb2/users01.dbf
```

```
/u02/oradata/NTAP/NTAP_pdb3/system01.dbf
```

```
/u02/oradata/NTAP/NTAP_pdb3/sysaux01.dbf
```

```
/u02/oradata/NTAP/NTAP_pdb3/undotbs01.dbf
```

```
/u02/oradata/NTAP/NTAP_pdb3/users01.dbf
```

```
/u02/oradata/NTAP/NTAP_pdb1/soe_01.pdf
```

```
/u02/oradata/NTAP/NTAP_pdb1/soe_02.pdf
```

```
/u02/oradata/NTAP/NTAP_pdb1/soe_03.pdf
```

```
NAME
```

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

```
/u02/oradata/NTAP/NTAP_pdb1/soe_04.pdf
```

```
/u02/oradata/NTAP/NTAP_pdb1/soe_05.pdf
```

```
/u02/oradata/NTAP/NTAP_pdb1/soe_06.pdf
```

```
/u02/oradata/NTAP/NTAP_pdb1/soe_07.pdf
```

```
/u02/oradata/NTAP/NTAP_pdb1/soe_08.pdf
```

```
/u02/oradata/NTAP/NTAP_pdb1/soe_09.pdf
```

```
/u02/oradata/NTAP/NTAP_pdb1/soe_10.pdf
```

```
/u02/oradata/NTAP/NTAP_pdb1/soe_11.pdf
```

```
/u02/oradata/NTAP/NTAP_pdb1/soe_12.pdf
```

```
31 rows selected.
```

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

```
NAME
```

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

```
/u02/oradata/NTAP/control01.ctl
```

```
/u03/orareco/NTAP/control02.ctl
```

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

```
NAME
```

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

```
/u02/oradata/NTAP/temp01.dbf
/u02/oradata/NTAP/pdbseed/temp012026-01-21_17-35-36-638-PM.dbf
/u02/oradata/NTAP/NTAP_pdb1/temp01.dbf
/u02/oradata/NTAP/NTAP_pdb2/temp01.dbf
/u02/oradata/NTAP/NTAP_pdb3/temp01.dbf
/u02/oradata/NTAP/NTAP_pdb1/temp02.dbf
```

6 rows selected.

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

MEMBER

```
-----
-----
/u03/orareco/NTAP/onlinelog/redo03.log
/u03/orareco/NTAP/onlinelog/redo02.log
/u03/orareco/NTAP/onlinelog/redo01.log
```

```
SQL> select svrname, dirname from v$dnfs_servers;
```

SVRNAME

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

DIRNAME

```
-----
-----
10.165.128.242
/orap-u02

10.165.128.242
/orap-u03

10.165.128.242
/orap-u01
```

4. Convalidare il servizio Oracle per l'avvio e l'arresto automatici.

```
[admin@orap ~]$ sudo systemctl status oracle_NTAP
● oracle_NTAP.service - Oracle Database Start/Stop Service
   Loaded: loaded (/etc/systemd/system/oracle_NTAP.service; enabled;
   vendor preset: disabled)
   Active: active (running) since Wed 2026-01-28 16:59:10 UTC; 1h
   22min ago
     Tasks: 79 (limit: 94156)
    Memory: 7.1G
    CGroup: /system.slice/oracle_NTAP.service
```

```
└─1368 /u01/app/oracle/product/21.0.0/NTAP/bin/tnslsnr
LISTENER -inherit
└─1903 ora_pmon_NTAP
└─1907 ora_clmn_NTAP
└─1911 ora_psp0_NTAP
└─1915 ora_vktm_NTAP
└─1921 ora_gen0_NTAP
└─1925 ora_mman_NTAP
└─1931 ora_gen1_NTAP
└─1933 ora_gen2_NTAP
└─1935 ora_vosd_NTAP
└─1937 ora_diag_NTAP
└─1939 ora_ofsd_NTAP
└─1941 ora_dbrm_NTAP
└─1943 ora_vkrm_NTAP
└─1945 ora_svcb_NTAP
└─1947 ora_pman_NTAP
└─1949 ora_dia0_NTAP
└─1955 ora_dbw0_NTAP
└─1957 ora_lgwr_NTAP
└─1961 ora_ckpt_NTAP
└─1965 ora_smon_NTAP
└─1969 ora_smco_NTAP
└─1971 ora_reco_NTAP
└─1973 ora_bg00_NTAP
└─1975 ora_lreg_NTAP
└─1981 ora_pxmN_NTAP
└─1991 ora_mmon_NTAP
└─1993 ora_mml1_NTAP
└─2000 ora_lg00_NTAP
└─2003 ora_bg01_NTAP
└─2006 ora_d000_NTAP
└─2008 ora_w000_NTAP
└─2010 ora_s000_NTAP
└─2015 ora_lg01_NTAP
└─2017 ora_tmon_NTAP
└─2019 ora_w001_NTAP
└─2026 ora_m000_NTAP
└─2036 ora_tt00_NTAP
└─2038 ora_arc0_NTAP
└─2040 ora_tt01_NTAP
└─2042 ora_arc1_NTAP
└─2044 ora_arc2_NTAP
└─2048 ora_arc3_NTAP
└─2050 ora_tt02_NTAP
└─2063 ora_w002_NTAP
```

```
└─2065 ora_rcbg_NTAP
└─2069 ora_aqpc_NTAP
└─2073 ora_p000_NTAP
└─2075 ora_p001_NTAP
└─2077 ora_p002_NTAP
└─2079 ora_p003_NTAP
└─2081 ora_p004_NTAP
└─2083 ora_p005_NTAP
└─2085 ora_p006_NTAP
└─2087 ora_p007_NTAP
└─2092 ora_w003_NTAP
└─2164 ora_w004_NTAP
└─2279 ora_qm02_NTAP
└─2289 ora_q005_NTAP
└─2296 ora_cjq0_NTAP
└─2450 ora_m001_NTAP
└─2454 ora_m002_NTAP
└─2458 ora_m003_NTAP
└─2508 ora_w005_NTAP
└─2510 ora_m004_NTAP
└─2512 ora_m005_NTAP
└─2514 ora_m006_NTAP
└─2516 ora_w006_NTAP
└─2540 ora_q00i_NTAP
└─2550 ora_w007_NTAP
└─2559 ora_cl00_NTAP
```

```
Jan 28 16:58:29 orap systemd[1]: Starting Oracle Database Start/Stop Service...
```

```
Jan 28 16:58:31 orap dbstart[1519]: Processing Database instance "NTAP": log file /u01/app/oracle/homes/OraDB21Home1/rdbms/log/startup.log
```

```
Jan 28 16:59:10 orap systemd[1]: Started Oracle Database Start/Stop Service.
```

```
[admin@orap ~]$
```

Backup del database Oracle con Google Cloud NetApp Volumes

Snapshot del database Oracle e backup del vault

Per facilitare la configurazione semplice del backup del database Oracle, il team di NetApp Solutions Engineering ha sviluppato un playbook Ansible per automatizzare il backup del database Oracle con conservazione e pianificazione del backup configurabili dall'utente. Il playbook sfrutta le funzionalità di snapshot e backup vault di Google Cloud NetApp Volumes per ottenere backup snapshot rapidi (in pochi secondi), ripristino rapido (in pochi minuti) del database, recupero e clonazione da snapshot o backup nel vault di storage.

1. Clona una copia del toolkit di automazione del backup del database Oracle NetApp per GCNV.

```
git clone https://bitbucket.ngage.netapp.com/scm/ns-  
bb/na_oracle_bkup_gcnv.git
```



Al momento, l'accesso al toolkit è consentito solo agli utenti interni NetApp con accesso Bitbucket. Gli utenti esterni interessati possono richiedere l'accesso al proprio account team o contattare il team NetApp Solutions Engineering.

2. Leggete il file README nel toolkit e seguite le istruzioni riportate di seguito su come configurare e pianificare il processo di backup tramite crontab o qualsiasi altro strumento di pianificazione. Il playbook è progettato per essere eseguito su un nodo controller Ansible con accesso alle VM del database server Oracle e a Google NetApp Volumes. Creerà snapshot coerenti con l'applicazione dei volumi del database in base alla pianificazione e alla policy di conservazione definite e copierà gli snapshot nel vault per scopi di ripristino di emergenza.
3. Per impostazione predefinita, il playbook crea un backup snapshot giornaliero e snapshot orari ogni ora. La conservazione predefinita degli snapshot è di 7 snapshot giornalieri e 24 snapshot orari. Eventuali snapshot aggiuntivi che superano la conservazione vengono eliminati, mantenendo copie a rotazione di 7 snapshot giornalieri e 24 snapshot orari. Puoi regolare la frequenza di backup e la conservazione in base ai requisiti RTO/RPO e alle considerazioni sui costi di storage. Mentre il backup snapshot giornaliero esegue il backup di tutti i volumi del database, il backup snapshot orario esegue il backup solo dei volumi di log e risparmia spazio di storage. Durante il backup snapshot giornaliero, il playbook elimina anche i file di log di archivio Oracle in base alla conservazione definita per risparmiare spazio di storage sui volumi di log del database.
4. Di seguito è riportato un esempio di voce crontab per creare un backup Snapshot e copiarlo nel vault.

```
[admin@ansiblectl na_oracle_bkup_gcnv]$ crontab -l  
0 0 * * *  
/home/admin/na_oracle_bkup_gcnv/oracle_standalone_snapshot_daily.sh  
0 1-23 * * *  
/home/admin/na_oracle_bkup_gcnv/oracle_standalone_snapshot_hourly.sh  
5 0 * * 7  
/home/admin/na_oracle_bkup_gcnv/oracle_standalone_vaultbkup_weekly.s  
h  
5 0 * * 1-6  
/home/admin/na_oracle_bkup_gcnv/oracle_standalone_vaultbkup_daily.sh  
5 1-23 * * *  
/home/admin/na_oracle_bkup_gcnv/oracle_standalone_vaultbkup_hourly.s  
h
```

5. Il backup del vault può essere eseguito a intervalli settimanali, giornalieri o orari a seconda dei requisiti RTO/RPO. Mentre i backup settimanali e giornalieri includono tutti i volumi del database, il backup orario del vault include solo i volumi di log per risparmiare spazio di storage. Il primo backup del vault richiede più tempo poiché crea la baseline. Una volta stabilito il backup baseline, tutti i backup aggiuntivi del vault sono incrementali utilizzando la metodologia incremental forever. Tutti i backup del vault vengono creati dagli snapshot più recenti coerenti con l'applicazione al momento dell'esecuzione per garantire la recuperabilità. A differenza dei tipici backup baseline e incrementali, i dati del backup baseline del vault vengono aggregati in ogni backup incrementale. In altre parole, ogni backup incrementale del vault contiene l'intero set di dati e può essere utilizzato per il ripristino senza la necessità di ripristinare il backup baseline. Questo approccio semplifica la gestione dei backup e il processo di ripristino, garantendo al contempo un utilizzo efficiente dello spazio di storage nel vault. Non è necessario preoccuparsi della catena di backup e delle dipendenze quando si deve eliminare un backup, poiché in questo approccio tutti i backup sono indipendenti. Lo script di automazione del backup elimina automaticamente i backup per soddisfare l'obiettivo di conservazione definito.
6. La seguente registrazione del file di log è un esempio di backup snapshot e gestione della conservazione.

```

Begin Oracle DB snapshot backup at 2026-0217-160001

PLAY [Enable Oracle bkup mode for consistent snapshot]
*****

TASK [Gathering Facts]
*****

ok: [orap]

TASK [Call presnap tasks block before snapshot]
*****

TASK [oracle : Copy presnap script to prod host]
*****

ok: [orap]

TASK [oracle : Stage prod DB for snapshot]
*****

changed: [orap]

PLAY [Take a volume snapshot or vault backup]
*****

TASK [Gathering Facts]
*****

ok: [localhost]

TASK [ontap : Open a GCP connection via cli]
*****

included:

```

```
/home/admin/na_oracle_bkup_gcnv/roles/ontap/tasks/gcp_open_conn.yml
for localhost
```

```
TASK [ontap : Login to GCP with service key from cli]
```

```
*****
```

```
changed: [localhost]
```

```
TASK [ontap : Take app consistent snapshots for DB volumes]
```

```
*****
```

```
included:
```

```
/home/admin/na_oracle_bkup_gcnv/roles/ontap/tasks/gcp_vol_snapshot.y
ml for localhost
```

```
TASK [ontap : Obtain current date, time]
```

```
*****
```

```
ok: [localhost] => {
```

```
  "ansible_date_time": {
    "date": "2026-02-17",
    "day": "17",
    "epoch": "1771362008",
    "epoch_int": "1771362008",
    "hour": "16",
    "iso8601": "2026-02-17T21:00:08Z",
    "iso8601_basic": "20260217T160008243394",
    "iso8601_basic_short": "20260217T160008",
    "iso8601_micro": "2026-02-17T21:00:08.243394Z",
    "minute": "00",
    "month": "02",
    "second": "08",
    "time": "16:00:08",
    "tz": "EST",
    "tz_dst": "EDT",
    "tz_offset": "-0500",
    "weekday": "Tuesday",
    "weekday_number": "2",
    "weeknumber": "07",
    "year": "2026"
  }
```

```
}
```

```
}
```

```
TASK [ontap : Take a snapshot of all DB data volumes in sequence]
```

```
*****
```

```
skipping: [localhost] => (item=orap-u01)
```

```
skipping: [localhost] => (item=orap-u02)
```

```
skipping: [localhost] => (item=orap-u03)
```

```
skipping: [localhost]
```

```

TASK [ontap : Take a snapshot of all DB logs volumes in sequence]
*****
changed: [localhost] => (item=orap-u03)

TASK [ontap : Pause to allow snapshots to complete]
*****
Pausing for 15 seconds
ok: [localhost]

TASK [ontap : Take app consistent vault backups from DB volume
snapshots] *****
skipping: [localhost]

TASK [ontap : Take app consistent vault backups from DB volumes]
*****
skipping: [localhost]

PLAY [End Oracle backup mode after snapshot]
*****

TASK [Gathering Facts]
*****
ok: [orap]

TASK [Call postsnap tasks block after snapshot]
*****

TASK [oracle : Copy postsnap script to prod host]
*****
ok: [orap]

TASK [oracle : Execute postsnapshot script]
*****
changed: [orap]

PLAY [Prune volume snapshot based on defined retention goals]
*****

TASK [Gathering Facts]
*****
ok: [localhost]

TASK [Call snapshot management tasks block]
*****

TASK [ontap : Login to GCP with service key from cli]
*****

```

```

changed: [localhost]

TASK [ontap : Process snapshots for each volume]
*****
included:
/home/admin/na_oracle_bkup_gcnv/roles/ontap/tasks/gcp_process_vol_sn
apshot.yml for localhost => (item=orap-u01)
included:
/home/admin/na_oracle_bkup_gcnv/roles/ontap/tasks/gcp_process_vol_sn
apshot.yml for localhost => (item=orap-u02)
included:
/home/admin/na_oracle_bkup_gcnv/roles/ontap/tasks/gcp_process_vol_sn
apshot.yml for localhost => (item=orap-u03)

TASK [ontap : List an existing snapshot of a DB volume in sequence
if exist] ***
changed: [localhost]

TASK [ontap : Debug orap-u01 snapshot list]
*****
ok: [localhost] => {
  "snapshots.stdout_lines": [
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u01/snapshots/snap-daily-orap-u01-20260209t153007",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u01/snapshots/snap-daily-orap-u01-20260213t103635",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u01/snapshots/snap-daily-orap-u01-20260213t000008",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u01/snapshots/snap-daily-orap-u01-20260205t153007",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u01/snapshots/snap-daily-orap-u01-20260206t153007",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u01/snapshots/snap-daily-orap-u01-20260212t125953",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u01/snapshots/snap-daily-orap-u01-20260210t153007"
  ]
}

TASK [ontap : Parse orap-u01 snapshots count]
*****
ok: [localhost]

TASK [ontap : Parse orap-u01 snapshots by backup frequency]
*****
ok: [localhost] => (item=['projects/cvs-pm-host-1p/locations/us-

```

```
east4-b/volumes/orap-u01/snapshots/snap-daily-orap-u01-20260209t153007', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u01/snapshots/snap-daily-orap-u01-20260213t103635', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u01/snapshots/snap-daily-orap-u01-20260213t000008', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u01/snapshots/snap-daily-orap-u01-20260205t153007', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u01/snapshots/snap-daily-orap-u01-20260206t153007', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u01/snapshots/snap-daily-orap-u01-20260212t125953', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u01/snapshots/snap-daily-orap-u01-20260210t153007']])
```

```
TASK [ontap : list orap-u01 daily snapshot]
```

```
*****
```

```
ok: [localhost] => {
  "daily_snapshot_raw_0": [
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u01/snapshots/snap-daily-orap-u01-20260205t153007",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u01/snapshots/snap-daily-orap-u01-20260206t153007",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u01/snapshots/snap-daily-orap-u01-20260209t153007",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u01/snapshots/snap-daily-orap-u01-20260210t153007",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u01/snapshots/snap-daily-orap-u01-20260212t125953",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u01/snapshots/snap-daily-orap-u01-20260213t000008",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u01/snapshots/snap-daily-orap-u01-20260213t103635"
  ]
}
```

```
TASK [ontap : list orap-u01 hourly snapshot]
```

```
*****
```

```
ok: [localhost] => {
  "hourly_snapshot_raw_0": []
}
```

```
TASK [ontap : Report snapshots count per volume]
```

```
*****
```

```
ok: [localhost] => {
  "msg": [
    "Volume orap-u01 has 7 daily snapshots",
    "Volume orap-u01 has 0 hourly snapshots"
  ]
}
```

```

    ]
}

TASK [ontap : Check if cleanup is needed]
*****
ok: [localhost]

TASK [ontap : Report cleanup status for orap-u01 daily snapshot
after check against retention policy] ***
skipping: [localhost]

TASK [ontap : Report cleanup status for orap-u01 hourly snapshot
after check against retention policy] ***
skipping: [localhost]

TASK [ontap : Deletion plan for orap-u01 daily snapshots, if cleanup
needed] ***
skipping: [localhost]

TASK [ontap : Deletion plan for orap-u01 hourly snapshots, if
cleanup needed] ***
skipping: [localhost]

TASK [ontap : Get the orap-u01 excess daily snapshots]
*****
skipping: [localhost] => (item=[])
skipping: [localhost]

TASK [ontap : Get the orap-u01 excess hourly snapshots]
*****
skipping: [localhost] => (item=[])
skipping: [localhost]

TASK [ontap : Delete orap-u01 excess daily snapshots]
*****
skipping: [localhost]

TASK [ontap : Delete orap-u01 excess hourly snapshots]
*****
skipping: [localhost]

TASK [ontap : List an existing snapshot of a DB volume in sequence
if exist] ***
changed: [localhost]

TASK [ontap : Debug orap-u02 snapshot list]
*****

```

```
ok: [localhost] => {
  "snapshots.stdout_lines": [
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u02/snapshots/snap-daily-orap-u02-20260210t153007",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u02/snapshots/snap-daily-orap-u02-20260213t000008",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u02/snapshots/snap-daily-orap-u02-20260206t153007",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u02/snapshots/snap-daily-orap-u02-20260205t153007",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u02/snapshots/snap-daily-orap-u02-20260212t125953",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u02/snapshots/snap-daily-orap-u02-20260209t153007",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u02/snapshots/snap-daily-orap-u02-20260213t103635"
  ]
}
```

TASK [ontap : Parse orap-u02 snapshots count]

ok: [localhost]

TASK [ontap : Parse orap-u02 snapshots by backup frequency]

```
ok: [localhost] => (item=['projects/cvs-pm-host-1p/locations/us-
east4-b/volumes/orap-u02/snapshots/snap-daily-orap-u02-
20260210t153007', 'projects/cvs-pm-host-1p/locations/us-east4-
b/volumes/orap-u02/snapshots/snap-daily-orap-u02-20260213t000008',
'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u02/snapshots/snap-daily-orap-u02-20260206t153007', 'projects/cvs-
pm-host-1p/locations/us-east4-b/volumes/orap-u02/snapshots/snap-
daily-orap-u02-20260205t153007', 'projects/cvs-pm-host-
1p/locations/us-east4-b/volumes/orap-u02/snapshots/snap-daily-orap-
u02-20260212t125953', 'projects/cvs-pm-host-1p/locations/us-east4-
b/volumes/orap-u02/snapshots/snap-daily-orap-u02-20260209t153007',
'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u02/snapshots/snap-daily-orap-u02-20260213t103635'])
```

TASK [ontap : list orap-u02 daily snapshot]

```
ok: [localhost] => {
  "daily_snapshot_raw_1": [
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u02/snapshots/snap-daily-orap-u02-20260205t153007",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
```

```

u02/snapshots/snap-daily-orap-u02-20260206t153007",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u02/snapshots/snap-daily-orap-u02-20260209t153007",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u02/snapshots/snap-daily-orap-u02-20260210t153007",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u02/snapshots/snap-daily-orap-u02-20260212t125953",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u02/snapshots/snap-daily-orap-u02-20260213t000008",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u02/snapshots/snap-daily-orap-u02-20260213t103635"
    ]
}

```

```

TASK [ontap : list orap-u02 hourly snapshot]

```

```

*****

```

```

ok: [localhost] => {
    "hourly_snapshot_raw_1": []
}

```

```

TASK [ontap : Report snapshots count per volume]

```

```

*****

```

```

ok: [localhost] => {
    "msg": [
        "Volume orap-u02 has 7 daily snapshots",
        "Volume orap-u02 has 0 hourly snapshots"
    ]
}

```

```

TASK [ontap : Check if cleanup is needed]

```

```

*****

```

```

ok: [localhost]

```

```

TASK [ontap : Report cleanup status for orap-u02 daily snapshot
after check against retention policy] ***

```

```

skipping: [localhost]

```

```

TASK [ontap : Report cleanup status for orap-u02 hourly snapshot
after check against retention policy] ***

```

```

skipping: [localhost]

```

```

TASK [ontap : Deletion plan for orap-u02 daily snapshots, if cleanup
needed] ***

```

```

skipping: [localhost]

```

```

TASK [ontap : Deletion plan for orap-u02 hourly snapshots, if

```

```

cleanup needed] ***
skipping: [localhost]

TASK [ontap : Get the orap-u02 excess daily snapshots]
*****
skipping: [localhost] => (item=[])
skipping: [localhost]

TASK [ontap : Get the orap-u02 excess hourly snapshots]
*****
skipping: [localhost] => (item=[])
skipping: [localhost]

TASK [ontap : Delete orap-u02 excess daily snapshots]
*****
skipping: [localhost]

TASK [ontap : Delete orap-u02 excess hourly snapshots]
*****
skipping: [localhost]

TASK [ontap : List an existing snapshot of a DB volume in sequence
if exist] ***
changed: [localhost]

TASK [ontap : Debug orap-u03 snapshot list]
*****
ok: [localhost] => {
  "snapshots.stdout_lines": [
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260213t090008",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260217t120011",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260213t060008",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-daily-orap-u03-20260213t000008",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-daily-orap-u03-20260213t103635",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260212t210008",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260212t220008",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260213t100010",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-

```

u03/snapshots/snap-hourly-orap-u03-20260213t120009",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260217t150007",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260213t030007",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-daily-orap-u03-20260210t153007",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260213t080007",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-daily-orap-u03-20260209t153007",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-daily-orap-u03-20260205t153007",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260213t150007",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260213t050008",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-daily-orap-u03-20260206t153007",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260213t130008",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260212t230009",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-daily-orap-u03-20260212t125953",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260217t160008",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260213t110008",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260213t160007",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260213t020007",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260213t040008",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260217t130008",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260213t140007",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260213t070007",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260212t200008",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260213t010008",
"projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-

```
u03/snapshots/snap-hourly-orap-u03-20260217t140008"
```

```
]
```

```
}
```

```
TASK [ontap : Parse orap-u03 snapshots count]
```

```
*****
```

```
ok: [localhost]
```

```
TASK [ontap : Parse orap-u03 snapshots by backup frequency]
```

```
*****
```

```
ok: [localhost] => (item=['projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-20260213t090008', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-20260217t120011', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-20260213t060008', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-daily-orap-u03-20260213t000008', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-daily-orap-u03-20260213t103635', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-20260212t210008', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-20260212t220008', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-20260213t100010', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-20260213t120009', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-20260217t150007', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-20260213t030007', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-daily-orap-u03-20260210t153007', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-20260213t080007', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-daily-orap-u03-20260209t153007', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-daily-orap-u03-20260205t153007', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-20260213t150007', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-20260213t050008', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-daily-orap-u03-20260206t153007', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-20260213t130008', 'projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-20260212t230009', 'projects/cvs-pm-host-
```

```
lp/locations/us-east4-b/volumes/orap-u03/snapshots/snap-daily-orap-
u03-20260212t125953', 'projects/cvs-pm-host-lp/locations/us-east4-
b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-20260217t160008',
'projects/cvs-pm-host-lp/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260213t110008', 'projects/cvs-
pm-host-lp/locations/us-east4-b/volumes/orap-u03/snapshots/snap-
hourly-orap-u03-20260213t160007', 'projects/cvs-pm-host-
lp/locations/us-east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-
u03-20260213t020007', 'projects/cvs-pm-host-lp/locations/us-east4-
b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-20260213t040008',
'projects/cvs-pm-host-lp/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260217t130008', 'projects/cvs-
pm-host-lp/locations/us-east4-b/volumes/orap-u03/snapshots/snap-
hourly-orap-u03-20260213t140007', 'projects/cvs-pm-host-
lp/locations/us-east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-
u03-20260213t070007', 'projects/cvs-pm-host-lp/locations/us-east4-
b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-20260212t200008',
'projects/cvs-pm-host-lp/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260213t010008', 'projects/cvs-
pm-host-lp/locations/us-east4-b/volumes/orap-u03/snapshots/snap-
hourly-orap-u03-20260217t140008']])
```

```
TASK [ontap : list orap-u03 daily snapshot]
```

```
*****
```

```
ok: [localhost] => {
```

```
  "daily_snapshot_raw_2": [
```

```
    "projects/cvs-pm-host-lp/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-daily-orap-u03-20260205t153007",
```

```
    "projects/cvs-pm-host-lp/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-daily-orap-u03-20260206t153007",
```

```
    "projects/cvs-pm-host-lp/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-daily-orap-u03-20260209t153007",
```

```
    "projects/cvs-pm-host-lp/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-daily-orap-u03-20260210t153007",
```

```
    "projects/cvs-pm-host-lp/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-daily-orap-u03-20260212t125953",
```

```
    "projects/cvs-pm-host-lp/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-daily-orap-u03-20260213t000008",
```

```
    "projects/cvs-pm-host-lp/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-daily-orap-u03-20260213t103635"
```

```
  ]
```

```
}
```

```
TASK [ontap : list orap-u03 hourly snapshot]
```

```
*****
```

```
ok: [localhost] => {
```

```
"hourly_snapshot_raw_2": [  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260212t200008",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260212t210008",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260212t220008",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260212t230009",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260213t010008",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260213t020007",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260213t030007",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260213t040008",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260213t050008",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260213t060008",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260213t070007",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260213t080007",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260213t090008",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260213t100010",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260213t110008",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260213t120009",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260213t130008",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260213t140007",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260213t150007",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260213t160007",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260217t120011",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-  
u03/snapshots/snap-hourly-orap-u03-20260217t130008",  
  "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
```

```

u03/snapshots/snap-hourly-orap-u03-20260217t140008",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260217t150007",
    "projects/cvs-pm-host-1p/locations/us-east4-b/volumes/orap-
u03/snapshots/snap-hourly-orap-u03-20260217t160008"
    ]
}

TASK [ontap : Report snapshots count per volume]
*****
ok: [localhost] => {
    "msg": [
        "Volume orap-u03 has 7 daily snapshots",
        "Volume orap-u03 has 25 hourly snapshots"
    ]
}

TASK [ontap : Check if cleanup is needed]
*****
ok: [localhost]

TASK [ontap : Report cleanup status for orap-u03 daily snapshot
after check against retention policy] ***
skipping: [localhost]

TASK [ontap : Report cleanup status for orap-u03 hourly snapshot
after check against retention policy] ***
ok: [localhost] => {
    "msg": [
        "Volume orap-u03 hourly snapshots exceeded retention limit
and needs cleanup"
    ]
}

TASK [ontap : Deletion plan for orap-u03 daily snapshots, if cleanup
needed] ***
skipping: [localhost]

TASK [ontap : Deletion plan for orap-u03 hourly snapshots, if
cleanup needed] ***
ok: [localhost] => {
    "msg": "Volume: orap-u03\nTotal hourly snapshots: 25\nWill
delete excess: 1\n"
}

TASK [ontap : Get the orap-u03 excess daily snapshots]

```

```

*****
skipping: [localhost] => (item=[])
skipping: [localhost]

TASK [ontap : Get the orap-u03 excess hourly snapshots]
*****
ok: [localhost] => (item=['projects/cvs-pm-host-1p/locations/us-
east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-
20260212t200008']) => {
    "msg": "The excess 1 hourly snapshots are: ['projects/cvs-pm-
host-1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-hourly-
orap-u03-20260212t200008']"
}

TASK [ontap : Delete orap-u03 excess daily snapshots]
*****
skipping: [localhost]

TASK [ontap : Delete orap-u03 excess hourly snapshots]
*****
changed: [localhost] => (item=projects/cvs-pm-host-1p/locations/us-
east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-u03-
20260212t200008)

PLAY RECAP
*****
*
localhost                : ok=40    changed=7    unreachable=0
failed=0    skipped=23    rescued=0    ignored=0
orap                : ok=6     changed=2    unreachable=0
failed=0    skipped=0    rescued=0    ignored=0

End Oracle DB snapshot backup at 2026-0217-160040

```

7. La seguente registrazione del file di log cattura i dettagli di un backup del vault da snapshot coerenti con l'applicazione.

```

Begin Oracle DB daily vault backup at 2026-0225-000501

PLAY [Enable Oracle bkup mode for consistent snapshot]
*****

TASK [Gathering Facts]
*****
ok: [orap]

```

```

TASK [Call presnap tasks block before snapshot]
*****
skipping: [orap]

PLAY [Take a volume snapshot or vault backup]
*****

TASK [Gathering Facts]
*****
ok: [localhost]

TASK [ontap : Open a GCP connection via cli]
*****
included:
/home/admin/na_oracle_bkup_gcnv/roles/ontap/tasks/gcp_open_conn.yml
for localhost

TASK [ontap : Login to GCP with service key from cli]
*****
changed: [localhost]

TASK [ontap : Take app consistent snapshots for DB volumes]
*****
skipping: [localhost]

TASK [ontap : Take app consistent vault backups from DB volume
snapshots] *****
included:
/home/admin/na_oracle_bkup_gcnv/roles/ontap/tasks/gcp_snap_bk2vault.
yml for localhost

TASK [ontap : Check if an existing backup vault db-vault exist]
*****
ok: [localhost]

TASK [ontap : debug]
*****
ok: [localhost] => {
  "vault_list_raw.stdout_lines": [
    "db-vault",
    "us-east4-vault",
    "dg-backup-vault-destination-b9ec"
  ]
}

TASK [ontap : Check if db-vault is in the list]
*****

```

```

ok: [localhost]

TASK [ontap : Create backup vault, if not exist]
*****
skipping: [localhost]

TASK [ontap : Assign DB volumes to backup vault]
*****
skipping: [localhost] => (item=orap-u01)
skipping: [localhost] => (item=orap-u02)
skipping: [localhost] => (item=orap-u03)
skipping: [localhost]

TASK [ontap : Purge the existing vault backups to maintain the
retention] *****
included:
/home/admin/na_oracle_bkup_gcnv/roles/ontap/tasks/gcp_del_vault_bkup
.yml for localhost => (item=orap-u01)
included:
/home/admin/na_oracle_bkup_gcnv/roles/ontap/tasks/gcp_del_vault_bkup
.yml for localhost => (item=orap-u02)
included:
/home/admin/na_oracle_bkup_gcnv/roles/ontap/tasks/gcp_del_vault_bkup
.yml for localhost => (item=orap-u03)

TASK [ontap : List existing vault bkup of the DB volume orap-u01 if
exist] *****
changed: [localhost]

TASK [ontap : Display all backups for volume orap-u01]
*****
ok: [localhost] => {
  "vol_vault_bkup.stdout_lines": [
    "projects/cvs-pm-host-1p/locations/us-east4/backupVaults/db-
vault/backups/bkup-daily-orap-u01-20260220t131037",
    "projects/cvs-pm-host-1p/locations/us-east4/backupVaults/db-
vault/backups/bkup-orap-u01-20260224t134624",
    "projects/cvs-pm-host-1p/locations/us-east4/backupVaults/db-
vault/backups/bkup-daily-orap-u01-20260224t000504",
    "projects/cvs-pm-host-1p/locations/us-east4/backupVaults/db-
vault/backups/bkup-daily-orap-u01-20260223t155123"
  ]
}

TASK [ontap : Retrieve the vault backups to purge for volume orap-
u01 with retention goal] ***

```

```
ok: [localhost] => {
  "msg": [
    "projects/cvs-pm-host-1p/locations/us-east4/backupVaults/db-
    vault/backups/bkup-daily-orap-u01-20260220t131037"
  ]
}
```

TASK [ontap : Purge the extra vault backups for volume orap-u01 to maintain the retention] ***

```
changed: [localhost] => (item=projects/cvs-pm-host-1p/locations/us-
east4/backupVaults/db-vault/backups/bkup-daily-orap-u01-
20260220t131037)
```

TASK [ontap : List existing vault bkup of the DB volume orap-u02 if exist] *****

```
changed: [localhost]
```

TASK [ontap : Display all backups for volume orap-u02]

```
ok: [localhost] => {
  "vol_vault_bkup.stdout_lines": [
    "projects/cvs-pm-host-1p/locations/us-east4/backupVaults/db-
    vault/backups/bkup-daily-orap-u02-20260224t000504",
    "projects/cvs-pm-host-1p/locations/us-east4/backupVaults/db-
    vault/backups/bkup-daily-orap-u02-20260223t155123",
    "projects/cvs-pm-host-1p/locations/us-east4/backupVaults/db-
    vault/backups/bkup-daily-orap-u02-20260220t131037",
    "projects/cvs-pm-host-1p/locations/us-east4/backupVaults/db-
    vault/backups/bkup-orap-u02-20260224t134624"
  ]
}
```

TASK [ontap : Retrieve the vault backups to purge for volume orap-u02 with retention goal] ***

```
ok: [localhost] => {
  "msg": [
    "projects/cvs-pm-host-1p/locations/us-east4/backupVaults/db-
    vault/backups/bkup-daily-orap-u02-20260220t131037"
  ]
}
```

TASK [ontap : Purge the extra vault backups for volume orap-u02 to maintain the retention] ***

```
changed: [localhost] => (item=projects/cvs-pm-host-1p/locations/us-
east4/backupVaults/db-vault/backups/bkup-daily-orap-u02-
20260220t131037)
```

```

TASK [ontap : List existing vault bkup of the DB volume orap-u03 if
exist] *****
changed: [localhost]

TASK [ontap : Display all backups for volume orap-u03]
*****
ok: [localhost] => {
    "vol_vault_bkup.stdout_lines": [
        "projects/cvs-pm-host-1p/locations/us-east4/backupVaults/db-
vault/backups/bkup-daily-orap-u03-20260224t120840",
        "projects/cvs-pm-host-1p/locations/us-east4/backupVaults/db-
vault/backups/bkup-daily-orap-u03-20260224t000504",
        "projects/cvs-pm-host-1p/locations/us-east4/backupVaults/db-
vault/backups/bkup-hourly-orap-u03-20260220t140451",
        "projects/cvs-pm-host-1p/locations/us-east4/backupVaults/db-
vault/backups/bkup-orap-u03-20260224t134624"
    ]
}

TASK [ontap : Retrieve the vault backups to purge for volume orap-
u03 with retention goal] ***
ok: [localhost] => {
    "msg": [
        "projects/cvs-pm-host-1p/locations/us-east4/backupVaults/db-
vault/backups/bkup-daily-orap-u03-20260224t000504"
    ]
}

TASK [ontap : Purge the extra vault backups for volume orap-u03 to
maintain the retention] ***
changed: [localhost] => (item=projects/cvs-pm-host-1p/locations/us-
east4/backupVaults/db-vault/backups/bkup-daily-orap-u03-
20260224t000504)

TASK [ontap : Obtain current date, time]
*****
ok: [localhost] => {
    "ansible_date_time": {
        "date": "2026-02-25",
        "day": "25",
        "epoch": "1771995904",
        "epoch_int": "1771995904",
        "hour": "00",
        "iso8601": "2026-02-25T05:05:04Z",
        "iso8601_basic": "20260225T000504817299",
        "iso8601_basic_short": "20260225T000504",
    }
}

```

```

        "iso8601_micro": "2026-02-25T05:05:04.817299Z",
        "minute": "05",
        "month": "02",
        "second": "04",
        "time": "00:05:04",
        "tz": "EST",
        "tz_dst": "EDT",
        "tz_offset": "-0500",
        "weekday": "Wednesday",
        "weekday_number": "3",
        "weeknumber": "08",
        "year": "2026"
    }
}

TASK [ontap : Create a weekly vault backup for each volume from most
recent volume snapshot] ***
skipping: [localhost] => (item=orap-u01)
skipping: [localhost] => (item=orap-u02)
skipping: [localhost] => (item=orap-u03)
skipping: [localhost]

TASK [ontap : Create a daily vault backup for each volume from most
recent volume snapshot] ***
included:
/home/admin/na_oracle_bkup_gcnv/roles/ontap/tasks/gcp_process_vol_va
ult.yml for localhost => (item=orap-u01)
included:
/home/admin/na_oracle_bkup_gcnv/roles/ontap/tasks/gcp_process_vol_va
ult.yml for localhost => (item=orap-u02)
included:
/home/admin/na_oracle_bkup_gcnv/roles/ontap/tasks/gcp_process_vol_va
ult.yml for localhost => (item=orap-u03)

TASK [ontap : List existing snapshots of DB volume orap-u01 if
exist] *****
changed: [localhost]

TASK [ontap : Retrieve the last or most recent snapshot]
*****
ok: [localhost] => {
    "snapshots.stdout_lines | sort | last": "projects/cvs-pm-host-
1p/locations/us-east4-b/volumes/orap-u01/snapshots/snap-daily-orap-
u01-20260225t000007"
}

```

```

TASK [ontap : Take a vault bkup of DB volume orap-u01 from most
recent snapshot] ***
changed: [localhost]

TASK [ontap : List existing snapshots of DB volume orap-u02 if
exist] *****
changed: [localhost]

TASK [ontap : Retrieve the last or most recent snapshot]
*****
ok: [localhost] => {
    "snapshots.stdout_lines | sort | last": "projects/cvs-pm-host-
1p/locations/us-east4-b/volumes/orap-u02/snapshots/snap-daily-orap-
u02-20260225t000007"
}

TASK [ontap : Take a vault bkup of DB volume orap-u02 from most
recent snapshot] ***
changed: [localhost]

TASK [ontap : List existing snapshots of DB volume orap-u03 if
exist] *****
changed: [localhost]

TASK [ontap : Retrieve the last or most recent snapshot]
*****
ok: [localhost] => {
    "snapshots.stdout_lines | sort | last": "projects/cvs-pm-host-
1p/locations/us-east4-b/volumes/orap-u03/snapshots/snap-hourly-orap-
u03-20260224t230008"
}

TASK [ontap : Take a vault bkup of DB volume orap-u03 from most
recent snapshot] ***
changed: [localhost]

TASK [ontap : Create a hourly vault backup for each volume from most
recent volume snapshot] ***
skipping: [localhost] => (item=orap-u03)
skipping: [localhost]

TASK [ontap : Take app consistent vault backups from DB volumes]
*****
skipping: [localhost]

PLAY [End Oracle backup mode after snapshot]
*****

```

```

TASK [Gathering Facts]
*****
ok: [orap]

TASK [Call postsnap tasks block after snapshot]
*****
skipping: [orap]

PLAY [Prune volume snapshot based on defined retention goals]
*****

TASK [Gathering Facts]
*****
ok: [localhost]

TASK [Call snapshot management tasks block]
*****
skipping: [localhost]

PLAY RECAP
*****
*
localhost          : ok=36   changed=13   unreachable=0
failed=0   skipped=7   rescued=0   ignored=0
orap        : ok=2    changed=0   unreachable=0
failed=0   skipped=2   rescued=0   ignored=0

```

End Oracle DB daily vault backup at 2026-0225-001406



Se esiste già un backup del vault da uno Snapshot, un secondo tentativo di backup sullo stesso Snapshot verrà saltato senza errore.

Ripristino e clonazione del database Oracle con Google Cloud NetApp Volumes

Ripristino in-place e point-in-time del database Oracle utilizzando gli snapshot di Google Cloud NetApp Volumes

Il ripristino point-in-time di un database Oracle viene comunemente utilizzato per recuperare dati cancellati o danneggiati accidentalmente, oppure per ripristinare da un errore logico. Con gli snapshot di Google NetApp Volumes, puoi facilmente eseguire il ripristino point-in-time di un database Oracle ripristinando il database a uno snapshot specifico. Ciò consente di recuperare rapidamente da una perdita o corruzione di dati senza dover ripristinare da un backup completo. Di seguito sono illustrati i passaggi per recuperare una tabella eliminata utilizzando gli snapshot di Google NetApp Volumes.

1. Ai fini di questa dimostrazione, creiamo innanzitutto una tabella di prova denominata "test" nel database "NTAP" e vi inseriamo alcuni dati. Successivamente, eliminiamo la tabella per simulare una cancellazione accidentale dei dati. Dopodiché, utilizzeremo gli snapshot di Google NetApp Volumes per ripristinare il database a un point-in-time precedente all'eliminazione della tabella e verificheremo che la tabella e i relativi dati siano stati recuperati correttamente.

```
SQL> select current_timestamp from dual;
```

```
CURRENT_TIMESTAMP
```

```
-----  
-----  
06-FEB-26 08.41.29.708302 PM +00:00
```

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

```
          ID
```

```
-----  
DT
```

```
-----  
EVENT
```

```
-----  
          1
```

```
05-FEB-26 08.14.17.000000 PM
```

```
testing Oracle in-place restore and point-in-time recovery for GCNV
```

```
SQL> drop table test;
```

```
Table dropped.
```

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

```
select * from test
```

```
          *
```

```
ERROR at line 1:
```

```
ORA-00942: table or view does not exist
```

2. Interrompere i servizi Oracle per arrestare il database Oracle e smontare i file system sull'host prima di ripristinare da uno Snapshot.

```

[root@orap admin]# systemctl stop oracle_NTAP
[root@orap admin]# umount /u01
[root@orap admin]# umount /u02
[root@orap admin]# umount /u03
[root@orap admin]# df -h
Filesystem      Size  Used Avail Use% Mounted on
devtmpfs        7.2G   0  7.2G   0% /dev
tmpfs           7.3G   0  7.3G   0% /dev/shm
tmpfs           7.3G  17M  7.2G   1% /run
tmpfs           7.3G   0  7.3G   0% /sys/fs/cgroup
/dev/sda2       50G   23G   28G  46% /
/dev/sda1       200M  5.9M  194M   3% /boot/efi
tmpfs           1.5G   0  1.5G   0% /run/user/1010

```

3. Identifica lo snapshot che contiene i dati che desideri recuperare. Puoi utilizzare la Google Cloud Console o lo strumento a riga di comando `gcloud` per elencare gli snapshot disponibili per il volume del tuo database Oracle. Fai clic sui tre puntini alla fine dell'elenco degli snapshot e sotto `Show More` per visualizzare le opzioni. Seleziona `Revert` per ripristinare lo snapshot selezionato. Ripeti per tutti i volumi del database.

The screenshot shows the Google Cloud Console interface for a NetApp Volume named 'orap-u02'. The left sidebar contains navigation options like Storage pools, Volumes, Backups, and Policies. The main content area shows the volume's state as 'Ready' and 'Available for use'. Below this, there are tabs for Overview, Snapshots, Backups, Replication, and Observability. The 'Snapshots' tab is active, displaying a table of snapshots and a 'Create Snapshot' button. A table of snapshots is shown with columns for Status, Name, Created, and Show More. A context menu is open over the 'Show More' column, with the 'Revert' option highlighted in a red box.

Storage pools

- Volumes

Data protection

- Backups
- Backup vaults

Policies

- Active Directory policies
- CMEK policies
- Backup policies

orap-u02 Edit Revert Mount instructions Delete

Resource type: Volume

State: Ready

State details: Available for use

Description: Volume for Oracle data.

Overview Snapshots Backups Replication Observability Preview

Snapshots are local space efficient image copies of your volume. Use snapshots to revert a volume to a prior point in time or to restore to a new volume as a copy of your original volume. [Learn more](#)

Create Snapshot

Snapshots: 5/255 Snapshot-only storage: 92.215 GiB

Filter: Search for snapshots by name, created date, state.

Status	Name	Created ↓	Show More
Ready	snap-daily-orap-u02-20260206t153007	Feb 6, 2026, 3:30:11 PM	⋮
Ready	snap-daily-orap-u02-20260205t153007	Feb 5, 2026, 3:30:11 PM	⋮
Ready	bkup-weekly-orap-u02-20260205t000008	Feb 5, 2026, 12:00:33 AM	⋮
Ready	snap-daily-orap-u02-20260204t154019	Feb 4, 2026, 3:40:24 PM	⋮
Ready	snap-daily-orap-u02-20260129t110019	Jan 29, 2026, 11:00:24 AM	⋮

Context menu options: Edit, Revert, Create new volume from snapshot, Delete

Storage

Storage pools

Volumes

Data protection

Backups

Backup vaults

Policies

Active Directory policies

CMEK policies

Backup policies

← Revert volume

Volume that will be reverted

Volume name orap-u02

Region us-east4-b

Snapshot that will be used for the revert

Snapshot
snap-daily-orap-u02-20260206t153007

The snapshot that will be used for the revert.

Snapshot name snap-daily-orap-u02-20260206t153007

Region us-east4-b

Life cycle Ready

Created Feb 6, 2026, 3:30:11 PM

Labels No value

Revert

Cancel

Revert volume?

⚠ This operation cannot be undone.

Reverting the volume to snapshot **snap-daily-orap-u02-20260206t153007** will permanently remove:

- 0 snapshots created after **snap-daily-orap-u02-20260206t153007**
- Any data that was written to the volume after **snap-daily-orap-u02-20260206t153007** was created on **Feb 6, 2026, 3:30:11 PM**

To confirm reverting, type the volume name **orap-u02** below:

orap-u02 *
orap-u02

Cancel

Revert

4. Monta i volumi del database dopo il completamento del ripristino dello snapshot.

```

[root@orap admin]# mount -t nfs 10.165.128.242:/orap-u01 /u01 -o
rw,bg,hard,vers=3,proto=tcp,timeo=600,rsize=65536,wsiz=65536
[root@orap admin]# mount -t nfs 10.165.128.242:/orap-u02 /u02 -o
rw,bg,hard,vers=3,proto=tcp,timeo=600,rsize=65536,wsiz=65536
[root@orap admin]# mount -t nfs 10.165.128.242:/orap-u03 /u03 -o
rw,bg,hard,vers=3,proto=tcp,timeo=600,rsize=65536,wsiz=65536
[root@orap admin]# df -h
Filesystem                Size      Used Avail Use% Mounted on
devtmpfs                  7.2G         0  7.2G   0% /dev
tmpfs                     7.3G         0  7.3G   0% /dev/shm
tmpfs                     7.3G       17M  7.2G   1% /run
tmpfs                     7.3G         0  7.3G   0% /sys/fs/cgroup
/dev/sda2                  50G       23G   28G  46% /
/dev/sda1                  200M     5.9M  194M   3% /boot/efi
tmpfs                     1.5G         0  1.5G   0% /run/user/1010
10.165.128.242:/orap-u01  50G       11G   40G  22% /u01
10.165.128.242:/orap-u02 500G     477G   24G  96% /u02
10.165.128.242:/orap-u03 300G     4.9G  296G   2% /u03

```

5. Accedi al database server Oracle ed esegui i comandi di ripristino point-in-time tramite sqlplus per ripristinare il database al point-in-time desiderato.

```

[oracle@orap ~]$ env | grep ORA
ORACLE_SID=NTAP
ORACLE_HOME=/u01/app/oracle/product/21.0.0/NTAP
[oracle@orap ~]$ sqlplus / as sysdba

SQL*Plus: Release 21.0.0.0.0 - Production on Fri Feb 6 21:08:34 2026
Version 21.19.0.0.0

Copyright (c) 1982, 2021, Oracle. All rights reserved.

Connected to an idle instance.

SQL> startup mount;
ORACLE instance started.

Total System Global Area 6442447808 bytes
Fixed Size                  9700288 bytes
Variable Size              1342177280 bytes
Database Buffers           5083496448 bytes
Redo Buffers                7073792 bytes
Database mounted.

SQL> recover database until cancel using backup controlfile;

```

```
ORA-00279: change 6239773 generated at 02/06/2026 20:30:06 needed
for thread 1
ORA-00289: suggestion :
/u03/orareco/NTAP/archivelog/2026_02_06/o1_mf_1_55_%u_.arc
ORA-00280: change 6239773 for thread 1 is in sequence #55
```

```
[oracle@orap ~]$ ls -l /u03/orareco/NTAP/archivelog/2026_02_06
total 159376
-r--r----- 1 oracle oinstall 118324736 Feb  6 16:05
o1_mf_1_50__4lsr8joo_.arc
-r--r----- 1 oracle oinstall  7432704 Feb  6 17:05
o1_mf_1_51__4p51o6k4_.arc
-r--r----- 1 oracle oinstall  11385856 Feb  6 18:05
o1_mf_1_52__4sjbbr29_.arc
-r--r----- 1 oracle oinstall  16721920 Feb  6 19:05
o1_mf_1_53__4wvn4ohy_.arc
-r--r----- 1 oracle oinstall  8655360 Feb  6 20:30
o1_mf_1_54__51mmc8ph_.arc
```

```
Specify log: {<RET>=suggested | filename | AUTO | CANCEL}
/u03/orareco/NTAP/onlinelog/redo01.log
Log applied.
Media recovery complete.
SQL> alter database open resetlogs;
```

Database altered.

Note: You may need to apply the current online logs if there are any changes when the snapshot was taken.

6. Dopo il completamento del ripristino, verificare che i dati siano stati recuperati con successo.

```

SQL> alter session set container = ntap_pdb1;

Session altered.

SQL> select * from test;

          ID DT
EVENT
-----
-----
-----
-----
-----
          1 05-FEB-26 08.14.17.000000 PM
testing Oracle in-place restore and point-in-time recovery for GCNV

SQL> select current_timestamp from dual;

CURRENT_TIMESTAMP
-----
-----
06-FEB-26 09.39.08.097365 PM +00:00

```

7. Arresta e riavvia il database come servizio systemd per completare il processo di ripristino.

```

SQL> alter session set container=cdb$root;

Session altered.

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

[root@orap admin]# systemctl start oracle_NTAP
[root@orap admin]# systemctl status oracle_NTAP
● oracle_NTAP.service - Oracle Database Start/Stop Service
   Loaded: loaded (/etc/systemd/system/oracle_NTAP.service; enabled;
 vendor preset: disabled)
   Active: active (running) since Fri 2026-02-06 21:42:19 UTC; 9s
 ago
   Process: 61431
 ExecStop=/u01/app/oracle/product/21.0.0/NTAP/bin/dbshut

```

```

/u01/app/oracle/product/21.0.0/NTAP (code=exited, status=0/SUCCESS)
  Process: 62476
  ExecStart=/u01/app/oracle/product/21.0.0/NTAP/bin/dbstart
/u01/app/oracle/product/21.0.0/NTAP (code=exited, status=0/SUCCESS)
  Tasks: 85 (limit: 94156)
  Memory: 6.6G
  CGroup: /system.slice/oracle_NTAP.service
      └─62487 /u01/app/oracle/product/21.0.0/NTAP/bin/tnslsnr
LISTENER -inherit
      └─62587 ora_pmon_NTAP
      └─62591 ora_clmn_NTAP
      └─62595 ora_psp0_NTAP
      └─62599 ora_vktm_NTAP
      └─62605 ora_gen0_NTAP
      └─62609 ora_mman_NTAP
      └─62615 ora_gen1_NTAP
      └─62617 ora_gen2_NTAP
      └─62619 ora_vosd_NTAP
      └─62621 ora_diag_NTAP
      └─62623 ora_ofsd_NTAP
      └─62625 ora_dbrm_NTAP
      └─62627 ora_vkrm_NTAP
      └─62629 ora_svcb_NTAP
      └─62631 ora_pman_NTAP
      └─62633 ora_dia0_NTAP
      └─62635 ora_dbw0_NTAP
      └─62637 ora_lgwr_NTAP
      └─62642 ora_ckpt_NTAP
      └─62648 ora_smon_NTAP
      └─62651 ora_smco_NTAP
      └─62655 ora_reco_NTAP
      └─62657 ora_lreg_NTAP
      └─62659 ora_bg00_NTAP
      └─62661 ora_pxmn_NTAP
      └─62675 ora_mmon_NTAP
      └─62677 ora_mmln_NTAP
      └─62685 ora_lg00_NTAP
      └─62688 ora_bg01_NTAP
      └─62690 ora_d000_NTAP
      └─62692 ora_w000_NTAP
      └─62695 ora_s000_NTAP
      └─62699 ora_lg01_NTAP
      └─62701 ora_tmon_NTAP
      └─62703 ora_w001_NTAP
      └─62710 ora_m000_NTAP
      └─62712 ora_m001_NTAP

```

```
├─62717 ora_tt00_NTAP
├─62719 ora_arc0_NTAP
├─62721 ora_tt01_NTAP
├─62723 ora_arc1_NTAP
├─62725 ora_arc2_NTAP
├─62727 ora_arc3_NTAP
├─62729 ora_tt02_NTAP
├─62733 ora_rcbg_NTAP
├─62737 ora_w002_NTAP
├─62739 ora_aqpc_NTAP
├─62743 ora_p000_NTAP
├─62745 ora_p001_NTAP
├─62747 ora_p002_NTAP
├─62749 ora_p003_NTAP
├─62751 ora_p004_NTAP
├─62753 ora_p005_NTAP
├─62755 ora_p006_NTAP
├─62757 ora_p007_NTAP
├─62759 ora_s001_NTAP
├─62942 ora_w003_NTAP
├─62949 ora_w004_NTAP
├─62958 ora_cjq0_NTAP
├─62960 ora_qm02_NTAP
├─63026 ora_q001_NTAP
├─63028 ora_qm03_NTAP
├─63030 ora_q003_NTAP
├─63032 ora_q004_NTAP
├─63034 ora_q005_NTAP
├─63036 ora_p008_NTAP
├─63038 ora_p009_NTAP
├─63040 ora_p00a_NTAP
├─63042 ora_p00b_NTAP
├─63048 ora_m002_NTAP
├─63050 ora_m003_NTAP
├─63056 ora_mz00_NTAP
├─63060 ora_mz03_NTAP
├─63062 ora_mz02_NTAP
├─63064 ora_mz04_NTAP
└─63072 ora_m004_NTAP
```

```
Feb 06 21:41:55 orap systemd[1]: Starting Oracle Database Start/Stop Service...
```

```
Feb 06 21:41:55 orap dbstart[62524]: Processing Database instance "NTAP": log file
```

```
/u01/app/oracle/homes/OraDB21Home1/rdbms/log/startup.log
```

```
Feb 06 21:42:19 orap systemd[1]: Started Oracle Database Start/Stop
```

Service.

Ripristino del database Oracle su un nuovo host utilizzando i backup di Google Cloud NetApp Volumes vault

In caso di errore che richieda il ripristino su un nuovo host, ad esempio quando l'host originale non è più disponibile e i volumi DB primari sono inaccessibili, puoi utilizzare i backup vault di Google Cloud NetApp Volumes per ripristinare il database Oracle sul nuovo host. Il processo è simile al ripristino in loco tramite snapshot, ma invece di ripristinare uno snapshot, ripristinerai il database da un backup vault. Questo ti consente di recuperare il database su un host diverso, il che può essere utile in scenari in cui l'host originale non è più disponibile o ha subito un guasto hardware. I passaggi per il ripristino da un backup vault sono i seguenti:

1. Identifica il backup del vault che contiene i dati che desideri ripristinare. Puoi utilizzare la Google Cloud Console o lo strumento da riga di comando `gcloud` per visualizzare l'elenco dei backup del vault disponibili per il volume del tuo database Oracle. Fai clic sui tre puntini alla fine dell'elenco dei backup del vault e sotto `Show more` per visualizzare le opzioni. Seleziona `Create new volume from backup` per ripristinare dal backup del vault selezionato. Ripeti per tutti i volumi del database. Hai anche la possibilità di ripristinare nello stesso pool di storage o in un pool di storage diverso, se necessario.

The screenshot shows the Google Cloud Console interface for a NetApp Volume named 'orap-u02'. The left sidebar shows navigation options like Storage pools, Volumes, Data protection, Backups, Backup vaults, and Policies. The main content area shows the 'Backups' tab for the volume. It includes a 'Create Backup' button and an 'Overview' section with a table of backup statistics. Below that is a table of backup entries with columns for Status, Name, Location, Created, Type, Size, Label, and Show more. A dropdown menu is open for the first backup entry, showing options: Edit, Create new volume from backup (highlighted with a red box), and Delete.

Status	Name	Location	Created	Type	Size	Label	Show more
Ready	bkup-daily-orap-u02-20260213t103840	us-east4	Feb 13, 2026, 10:38:57 AM	Manual	384.161 GiB	database: oracle	⋮
Ready	bkup-weekly-orap-u02-20260213t094922	us-east4	Feb 13, 2026, 9:49:41 AM	Manual	384.188 GiB	database: oracle	⋮

Storage

Storage pools

Volumes

Data protection

Backups

Backup vaults

Policies

Active Directory policies

CMEK policies

Backup policies

Create new volume from backup

Source backup

bkup-weekly-orap-u02-20260213t094922

Backup creation time

Feb 13, 2026,
9:49:41 AM

Backup location

us-east4

Source volume

orap-u02

Storage pool details

To create a new volume from backup you need to select a storage pool in the same region as a source backup.

Selected Storage Pool

oracle

Location	us-east4-b
Storage pool available capacity	1198 GiB
Number of volumes in the pool	3
Service level	Flex
VPC	shared-vpc-prod
Active Directory policy	No value
LDAP enabled	No
Encryption	Google-managed

Select storage pool

Create new storage pool

Storage

Storage pools

Volumes

Data protection

Backups

Backup vaults

Policies

Active Directory policies

CMEK policies

Backup policies

Create new volume from backup

Volume name *
orap-u02-bkup

Choice is permanent. Must be unique to the region. Use lowercase letters, numbers and hyphens. Start with a letter.

Description
This volume was created from a backup bkup-weekly-orap-u02-20260213t094922 of a volume orap-u02

Share name *
orap-u02-bkup

Must be unique to a region

Capacity *
500 GiB

Capacity must be between 1 GiB and 307,200 GiB in increments of 1 GiB.

Protocol(s) configuration

Protocol(s)
NFSv3

Configuration for selected protocol(s)

Block volume from deletion when clients are connected
Required for volumes used as GCVE datastores. Choice is permanent.

Auto-tiering

Optimize storage costs by automatically moving cold data on volumes with enabled auto-tiering to the most cost-effective access tier depending on access pattern changes. [Learn more](#)

i Allow auto-tiering on the storage pool to enable it on this volume.
[Edit Storage Pool](#)

- Storage ^
 - Storage pools
 - Volumes
- Data protection ^
 - Backups
 - Backup vaults
- Policies ^
 - Active Directory policies
 - CMEK policies
 - Backup policies

← Create new volume from backup

Export rules

Rules are evaluated in order. First matching rule applies.

Rules

^ New Rule

Allowed Clients *

Comma-separated list of IPv4 addresses or CIDRs (up to 4096 characters).

Access *

Read & Write

Read Only

Root Access (no_root_squash)

On

Off

Done

Add Rule

Snapshot configuration ^

- Make snapshot directory visible
Makes .snapshot (NFS) or ~snapshot (SMB) directory visible to clients. For SMB volumes, it also enables "Previous versions" support. For NFSv4.1 volumes, the directory itself will not be listed but can be accessed to list contents, etc.
- Allow scheduled snapshots

Storage

Storage pools

Volumes

Data protection

Backups

Backup vaults

Policies

Active Directory policies

CMEK policies

Backup policies

Create new volume from backup

HOURLY DAILY WEEKLY MONTHLY

Snapshots To Keep: 0

Hour (UTC): Every hour Minute (UTC): 0

Currently disabled. The snapshot schedule will not be applied to the volume. To apply the snapshot schedule, adjust the retention controls.

Backup configuration

Use backup policy to automate volume backups.

Allow scheduled backups
When enabled, backups are automatically created according to the following specified policy.

Backup location

Choose a backup vault to store your backups.

Backup vault

Labels

Label your volumes for reports, queries.

Key 1 *: database Value 1: oracle

+ Add label

Create Cancel

<|

Storage

Storage pools

Volumes

Data protection

Backups

Policies

Active Directory policies

CMEK policies

Backup policies

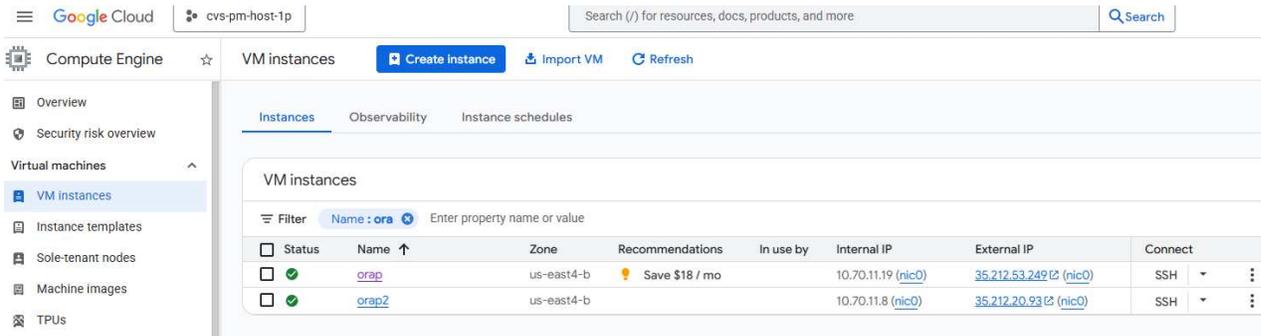
Volumes Create Refresh

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

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

Status	Name	Location	Service level	Share name	Capacity	Used	Protocol(s)	Storage pool	Labels	Show more
Ready	orap-u01-bkup	us-east4-b	Flex	orap-u01-bkup	50	20% (10 GiB)	NFSV3	oracle	database: oracle	⋮
Ready	orap-u03-bkup	us-east4-b	Flex	orap-u03-bkup	300	1.67% (5 GiB)	NFSV3	oracle	database: oracle	⋮
Ready	orap-u02-bkup	us-east4-b	Flex	orap-u02-bkup	500	76.2% (381 GiB)	NFSV3	oracle	database: oracle	⋮
Ready	orap-u03	us-east4-b	Flex	orap-u03	300	2.67% (8 GiB)	NFSV3	oracle	database: oracle	⋮
Ready	orap-u02	us-east4-b	Flex	orap-u02	500	78.2% (391 GiB)	NFSV3	oracle	database: oracle	⋮
Ready	orap-u01	us-east4-b	Flex	orap-u01	50	20% (10 GiB)	NFSV3	oracle	database: oracle	⋮

2. Creare un nuovo database server che corrisponda all'host originale in termini di hardware, sistema operativo e configurazioni delle patch del kernel del sistema operativo. Questo garantirà che il database ripristinato possa essere montato e aperto correttamente dopo il completamento del processo di ripristino.



The screenshot shows the Google Cloud console interface for VM instances. The left sidebar contains navigation options like Overview, Security risk overview, Virtual machines, and Instance templates. The main content area displays a table of VM instances. The table has columns for Status, Name, Zone, Recommendations, In use by, Internal IP, External IP, and Connect. Two instances are listed: 'orap' and 'orap2'.

Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Connect
<input type="checkbox"/>	orap	us-east4-b	Save \$18 / mo		10.70.11.19 (nic0)	35.212.53.249 (nic0)	SSH
<input checked="" type="checkbox"/>	orap2	us-east4-b			10.70.11.8 (nic0)	35.212.20.93 (nic0)	SSH

You may also use the same Ansible playbook from automated database deployment section to automate the new database server configuration for the linux only.

```
[admin@ansiblectl na_oracle_deploy_nfs]$ ansible-playbook -i hosts  
2-linux_config.yml -u admin -e @vars/vars.yml
```

3. Accedi al nuovo server DB come utente admin. Monta i volumi DB ripristinati sugli stessi punti di montaggio dell'host originale. Modifica la proprietà del punto di montaggio, se necessario.

```

[admin@orap2 ~]$ sudo mount -t nfs 10.165.128.242:/orap-u01-bkup
/u01 -o
rw,bg,hard,vers=3,proto=tcp,timeo=600,rsize=262144,wsiz=262144
mount: (hint) your fstab has been modified, but systemd still uses
the old version; use 'systemctl daemon-reload' to reload.
[admin@orap2 ~]$ sudo mount -t nfs 10.165.128.242:/orap-u02-bkup
/u02 -o
rw,bg,hard,vers=3,proto=tcp,timeo=600,rsize=262144,wsiz=262144
mount: (hint) your fstab has been modified, but systemd still uses
the old version; use 'systemctl daemon-reload' to reload.
[admin@orap2 ~]$ sudo mount -t nfs 10.165.128.242:/orap-u03-bkup
/u03 -o
rw,bg,hard,vers=3,proto=tcp,timeo=600,rsize=262144,wsiz=262144
mount: (hint) your fstab has been modified, but systemd still uses
the old version; use 'systemctl daemon-reload' to reload.
[admin@orap2 ~]$ sudo systemctl daemon-reload
[admin@orap2 ~]$ df -h
Filesystem                Size      Used Avail Use% Mounted on
devtmpfs                  7.2G         0  7.2G   0% /dev
tmpfs                     7.3G         0  7.3G   0% /dev/shm
tmpfs                     7.3G    8.5M  7.2G   1% /run
tmpfs                     7.3G         0  7.3G   0% /sys/fs/cgroup
/dev/sda2                  50G       23G   28G  45% /
/dev/sda1                  200M    5.9M  194M   3% /boot/efi
tmpfs                     1.5G         0  1.5G   0% /run/user/1010
tmpfs                     1.5G         0  1.5G   0% /run/user/1011
10.165.128.242:/orap-u01-bkup  50G       11G   40G  22% /u01
10.165.128.242:/orap-u02-bkup 500G    382G  119G  77% /u02
10.165.128.242:/orap-u03-bkup 300G     5.6G  295G   2% /u03

[admin@orap2 ~]$ sudo chown oracle:oinstall /u01
[admin@orap2 ~]$ sudo chown oracle:oinstall /u02
[admin@orap2 ~]$ sudo chown oracle:oinstall /u03

```

4. Configura le variabili d'ambiente del database Oracle e i file della directory principale, come oratab, i file oraInstall.loc.

```

[admin@orap2 ~]$ sudo vi /etc/oraInst.loc
[admin@orap2 ~]$ vi /etc/oratab
[admin@orap2 ~]$ sudo vi /etc/oratab
[admin@orap2 ~]$ sudo chown oracle:oinstall /etc/oratab
[admin@orap2 ~]$ ls -l /etc/ora*
-rw-r--r--. 1 root root 56 Feb 13 19:37 /etc/oraInst.loc
-rw-rw-r--. 1 oracle oinstall 784 Feb 13 19:38 /etc/oratab

[oracle@orap2 ~]$ env | grep ORA
ORACLE_SID=NTAP
ORACLE_HOME=/u01/app/oracle/product/21.0.0/NTAP

```

5. Come utente oracle, ricollega i file binari di Oracle.

```

[oracle@orap2 ~]$ cd $ORACLE_HOME/bin
[oracle@orap2 bin]$ ./relink
writing relink log to:
/u01/app/oracle/homes/OraDB21Home1/install/relinkActions2026-02-
13_07-45-29PM.log

```

6. Ripristina il database fino all'ultimo log disponibile e apri il database con l'opzione resetlogs.

```

[oracle@orap2 bin]$ sqlplus / as sysdba

SQL*Plus: Release 21.0.0.0.0 - Production on Fri Feb 13 19:49:50
2026
Version 21.19.0.0.0

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Connected to an idle instance.

SQL> startup mount;
ORACLE instance started.

Total System Global Area 6442447808 bytes
Fixed Size 9700288 bytes
Variable Size 1593835520 bytes
Database Buffers 4831838208 bytes
Redo Buffers 7073792 bytes
Database mounted.

SQL> recover database until cancel using backup controlfile;
ORA-00279: change 7017907 generated at 02/13/2026 05:00:07 needed

```

```

for thread 1
ORA-00289: suggestion :
/u03/orareco/NTAP/archivelog/2026_02_13/o1_mf_1_96__938r46wf_.arc
ORA-00280: change 7017907 for thread 1 is in sequence #96

Specify log: {<RET>=suggested | filename | AUTO | CANCEL}
auto
ORA-00279: change 7022777 generated at 02/13/2026 06:00:06 needed
for thread 1
ORA-00289: suggestion :
/u03/orareco/NTAP/archivelog/2026_02_13/o1_mf_1_97__96n12q2b_.arc
ORA-00280: change 7022777 for thread 1 is in sequence #97
ORA-00278: log file
'/u03/orareco/NTAP/archivelog/2026_02_13/o1_mf_1_96__938r46wf_.arc'
no longer
needed for this recovery
.
.
Specify log: {<RET>=suggested | filename | AUTO | CANCEL}
cancel
Media recovery cancelled.
SQL> alter database open resetlogs;

Database altered.

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

NAME          OPEN_MODE          LOG_MODE
-----
NTAP          READ WRITE        ARCHIVELOG

SQL> show pdbs;

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

SQL> select instance_name, host_name from v$instance;

INSTANCE_NAME
-----
HOST_NAME
-----

```

```

NTAP
orap2

SQL> alter session set container=ntap_pdb1;

Session altered.

SQL> select * from test;

          ID
-----
DT
-----
EVENT
-----
          1
05-FEB-26 08.14.17.000000 PM
testing Oracle in-place restore and point-in-time recovery for GCNV

```

- Una volta completato il ripristino, è necessario eseguire ulteriori passaggi, come la modifica dei file listener.ora e tnsnames.ora per adattarli al nuovo nome host o indirizzo IP. Se necessario, configurare il servizio systemd per arrestare e riavviare il database per completare il processo di ripristino e recovery.



Nel caso in cui siano implementate copie duplicate dei file di controllo Oracle nella configurazione del database. Il database ripristinato potrebbe avere file di controllo incoerenti dopo il ripristino del database. In questo caso, è possibile utilizzare il file di controllo situato nel volume dei log per sovrascrivere il file di controllo nel volume dei dati e risolvere il problema.

Clonazione del database Oracle su un nuovo host utilizzando snapshot di Google Cloud NetApp Volumes o backup di vault

La clonazione del database Oracle su un nuovo host utilizzando snapshot o backup di vault di Google Cloud NetApp Volumes è identica alla sezione precedente che descrive come utilizzare snapshot o backup di vault di Google Cloud NetApp Volumes per il ripristino e il recovery di un database Oracle su un nuovo host in caso di errore. Tuttavia, la ridenominazione del database clonato può essere un passaggio aggiuntivo desiderato, che può essere facilmente eseguito utilizzando l'utility Oracle dbnewid. La clonazione del database può essere utile per i test UAT, lo sviluppo o altri scopi.

Per alcuni clienti che necessitano di clonazione e aggiornamento automatizzati, si prega di inviare una richiesta al team di NetApp Solutions Engineering per un playbook Ansible di esempio che può essere utilizzato come riferimento per automatizzare il processo di clonazione e aggiornamento con snapshot di Google Cloud NetApp Volumes o backup di vault. Di seguito è riportato il link per inviare una richiesta al team di NetApp Solutions Engineering: "[Richiesta di automazione](#)"

Dove trovare ulteriori informazioni

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

- Panoramica di Google Cloud NetApp Volumes

["https://docs.cloud.google.com/netapp/volumes/docs/discover/overview"](https://docs.cloud.google.com/netapp/volumes/docs/discover/overview)

- Distribuzione di Oracle Direct NFS

["https://docs.oracle.com/en/database/oracle/oracle-database/19/ladbi/deploying-dnfs.html#GUID-D06079DB-8C71-4F68-A1E3-A75D7D96DCE2"](https://docs.oracle.com/en/database/oracle/oracle-database/19/ladbi/deploying-dnfs.html#GUID-D06079DB-8C71-4F68-A1E3-A75D7D96DCE2)

- Installazione e configurazione del database Oracle tramite file di risposta

["https://docs.oracle.com/en/database/oracle/oracle-database/19/ladbi/installing-and-configuring-oracle-database-using-response-files.html#GUID-D53355E9-E901-4224-9A2A-B882070EDDF7"](https://docs.oracle.com/en/database/oracle/oracle-database/19/ladbi/installing-and-configuring-oracle-database-using-response-files.html#GUID-D53355E9-E901-4224-9A2A-B882070EDDF7)

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