



# **TR-4986: Simplified, Automated Oracle Deployment on Amazon FSx ONTAP with iSCSI**

NetApp database solutions

NetApp  
July 31, 2025

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# TR-4986: Simplified, Automated Oracle Deployment on Amazon FSx ONTAP with iSCSI

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This solution provides overview and details for automated Oracle deployment and protection in Amazon FSx ONTAP as primary database storage with iSCSI protocol and Oracle database configured in standalone ReStart using Oracle asm as volume manager.

## Purpose

Amazon FSx ONTAP is a storage service that allows you to launch and run fully managed NetApp ONTAP file systems in the AWS Cloud. It provides the familiar features, performance, capabilities, and APIs of NetApp file systems with the agility, scalability, and simplicity of a fully managed AWS service. It empowers you to run the most demanding database workload, such as Oracle, in the AWS cloud with peace of mind.

This documentation demonstrates the simplified deployment of Oracle databases in an Amazon FSx ONTAP file system using Ansible automation. The Oracle database is deployed in a standalone ReStart configuration with iSCSI protocol for data access and Oracle ASM for database storage disks management. It also provides information on Oracle database backup, restore, and clone using the NetApp SnapCenter UI tool for storage-efficient database operation in AWS Cloud.

This solution addresses the following use cases:

- Automated Oracle database deployment on Amazon FSx ONTAP file system
- Oracle database backup and restore on Amazon FSx ONTAP file system using NetApp SnapCenter tool
- Oracle database clone for dev/test or other use cases on Amazon FSx ONTAP file system using NetApp SnapCenter tool

## Audience

This solution is intended for the following people:

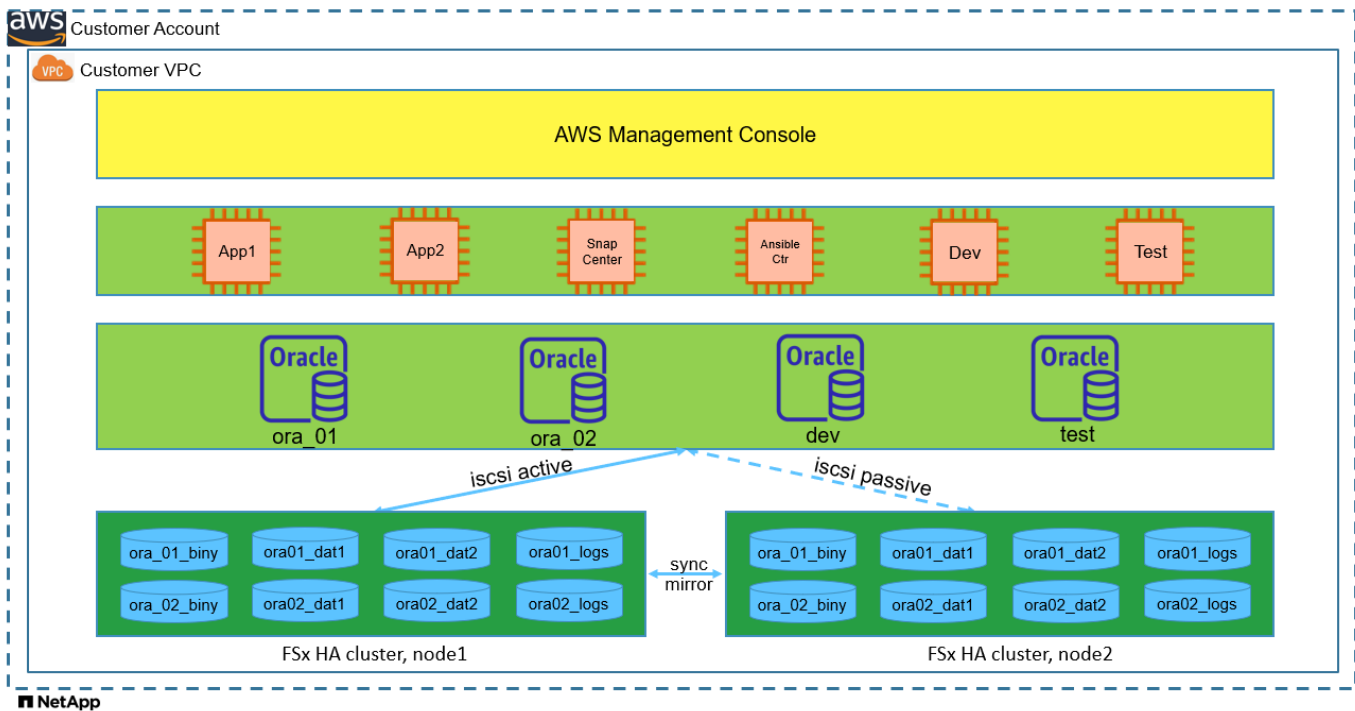
- A DBA who would like to deploy Oracle on Amazon FSx ONTAP file system.
- A database solution architect who would like to test Oracle workloads on Amazon FSx ONTAP file system.
- A storage administrator who would like to deploy and manage an Oracle database on Amazon FSx ONTAP file system.
- An application owner who would like to stand up an Oracle database on Amazon FSx ONTAP file system.

## Solution test and validation environment

The testing and validation of this solution were performed in a lab setting that might not match the final deployment environment. See the section [Key factors for deployment consideration](#) for more information.

## Architecture

## Simplified, automated Oracle deployment on Amazon FSx ONTAP with iSCSI



### Hardware and software components

#### Hardware

Amazon FSx ONTAP storage	Current version offered by AWS	One FSx HA cluster in the same VPC and availability zone
EC2 instance for compute	t2.xlarge/4vCPU/16G	Two EC2 T2 xlarge EC2 instances for concurrent deployment

#### Software

RedHat Linux	RHEL-8.6, 4.18.0-372.9.1.el8.x86_64 kernel	Deployed RedHat subscription for testing
Windows Server	2022 Standard, 10.0.20348 Build 20348	Hosting SnapCenter server
Oracle Grid Infrastructure	Version 19.18	Applied RU patch p34762026_190000_Linux-x86-64.zip
Oracle Database	Version 19.18	Applied RU patch p34765931_190000_Linux-x86-64.zip
Oracle OPatch	Version 12.2.0.1.36	Latest patch p6880880_190000_Linux-x86-64.zip
SnapCenter Server	Version 4.9P1	Workgroup deployment
Open JDK	Version java-1.8.0-openjdk.x86_64	SnapCenter plugin requirement on DB VMs

## Oracle database configuration in the lab environment

Server	Database	DB Storage
ora_01	NTAP1(NTAP1_PDB1,NTAP1_PDB2,NTAP1_PDB3)	iSCSI luns on Amazon FSx ONTAP file system
ora_02	NTAP2(NTAP2_PDB1,NTAP2_PDB2,NTAP2_PDB3)	iSCSI luns on Amazon FSx ONTAP file system

## Key factors for deployment consideration

- **Oracle database storage layout.** In this automated Oracle deployment, we provision four database volumes to host Oracle binary, data, and logs by default. A single lun in a volume allocates to Oracle binary. We then create two ASM disk groups from data and logs luns. Within the +DATA asm disk group, we provision two data volumes with two luns in a volume. Within the +LOGS asm disk group, we create two luns in a log volume. Multiple luns laid out within an ONTAP volume provides better performance in general.
- **Multiple DB servers deployment.** The automation solution can deploy an Oracle container database to multiple DB servers in a single Ansible playbook run. Regardless of the number of DB servers, the playbook execution remains the same. You can deploy multiple container databases to a single EC2 instance with different database instance IDs (Oracle SID). But ensure there is sufficient memory on the host to support deployed databases.
- **iSCSI configuration.** The EC2 instance database server connects to FSx storage with the iSCSI protocol. EC2 instances generally deploy with a single network interface or ENI. The single NIC interface carries both iSCSI and application traffic. It is important to gauge the Oracle database peak I/O throughput requirement by carefully analyzing the Oracle AWR report in order to choose the right EC2 compute instance that meets both application and iSCSI traffic-throughput requirements. Also, AWS EC2 generally limits each TCP flow to 5 Gbps. Each iSCSI path provides 5 Gbps (625 MBps) of bandwidth, and multiple iSCSI connections may be required to support higher throughput requirements.
- **Oracle ASM redundancy level to use for each Oracle ASM disk group that you create.** Because the Amazon FSx ONTAP is HA enabled for data protection at the cluster disk level, you should use `External Redundancy`, which means that the option does not allow Oracle ASM to mirror the contents of the disk group.
- **Database backup.** NetApp provides a SnapCenter software suite for database backup, restore, and cloning with a user-friendly UI interface. NetApp recommends implementing such a management tool to achieve fast (under a minute) SnapShot backup, quick (minutes) database restore, and database clone.

## Solution deployment

The following sections provide step-by-step procedures for automated Oracle 19c deployment and protection on Amazon FSx ONTAP file system with directly mounted database luns via iSCSI to EC2 instance VM in a single node Restart configuration with Oracle ASM as database volume manager.

## Prerequisites for deployment

Deployment requires the following prerequisites.

1. An AWS account has been set up, and the necessary VPC and network segments have been created within your AWS account.
2. From the AWS EC2 console, deploy EC2 Linux instances as Oracle DB servers. Enable SSH private/public key authentication for ec2-user. See the architecture diagram in the previous section for details about the environment setup. Also review the [User Guide for Linux instances](#) for more information.
3. From the AWS FSx console, provision an Amazon FSx ONTAP file system that meets the requirements. Review the documentation [Creating FSx ONTAP file systems](#) for step-by-step instructions.
4. Steps 2 and 3 can be performed using the following Terraform automation toolkit, which creates an EC2 instance named `ora_01` and an FSx file system named `fsx_01`. Review the instruction carefully and change the variables to suit your environment before execution. The template can be easily revised for your own deployment requirements.

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

5. Provision an EC2 Linux instance as the Ansible controller node with the latest version of Ansible and Git installed. Refer to the following link for details: [Getting Started with NetApp solution automation^](#) in section -  
Setup the Ansible Control Node for CLI deployments on RHEL / CentOS or  
Setup the Ansible Control Node for CLI deployments on Ubuntu / Debian.
6. Provision a Windows server to run the NetApp SnapCenter UI tool with the latest version. Refer to the following link for details: [Install the SnapCenter Server](#)
7. Clone a copy of the NetApp Oracle deployment automation toolkit for iSCSI.

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

8. Stage following Oracle 19c installation files on EC2 instances `/tmp/archive` directory.

```
installer_archives:
- "LINUX.X64_193000_grid_home.zip"
- "p34762026_190000_Linux-x86-64.zip"
- "LINUX.X64_193000_db_home.zip"
- "p34765931_190000_Linux-x86-64.zip"
- "p6880880_190000_Linux-x86-64.zip"
```



Ensure that you have allocated at least 50G in Oracle VM root volume to have sufficient space to stage Oracle installation files.

9. Watch the following video:

## Automation parameter files

Ansible playbook executes database installation and configuration tasks with predefined parameters. For this Oracle automation solution, there are three user-defined parameter files that need user input before playbook execution.

- `hosts` - define targets that the automation playbook is running against.
- `vars/vars.yml` - the global variable file that defines variables that apply to all targets.
- `host_vars/host_name.yml` - the local variable file that defines variables that apply only to a named target. In our use case, these are the Oracle DB servers.

In addition to these user-defined variable files, there are several default variable files that contain default parameters that do not require change unless necessary. The following sections show how to configure the user-defined variable files.

## Parameter files configuration

## 1. Ansible target hosts file configuration:

```
# Enter Amazon FSx ONTAP management IP address
[ontap]
172.16.9.32

# Enter name for ec2 instance (not default IP address naming) to be
# deployed one by one, follow by ec2 instance IP address, and ssh
# private key of ec2-user for the instance.
[oracle]
ora_01 ansible_host=10.61.180.21 ansible_ssh_private_key_file
=ora_01.pem
ora_02 ansible_host=10.61.180.23 ansible_ssh_private_key_file
=ora_02.pem
```

## 1. Global vars/vars.yml file configuration

```
#####
#####
#####
Oracle 19c deployment global user
configurable variables #####
#####
Consolidate all variables from ONTAP, linux
and oracle #####
#####
#####

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

# Enter the supported ONTAP platform: on-prem, aws-fsx.
ontap_platform: aws-fsx

# Enter ONTAP cluster management user credentials
username: "fsxadmin"
password: "xxxxxxxx"

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



```
#####
#####

# Enter RHEL subscription to enable repo
redhat_sub_username: xxxxxxxx
redhat_sub_password: "xxxxxxx"

#####
#####
###          Oracle DB env specific config variables
###
#####
#####

# Enter Database domain name
db_domain: solutions.netapp.com

# Enter initial password for all required Oracle passwords. Change
them after installation.
initial_pwd_all: xxxxxxxx
```

1. Local DB server host\_vars/host\_name.yml configuration such as ora\_01.yml, ora\_02.yml ...

```
# User configurable Oracle host specific parameters

# Enter container database SID. By default, a container DB is
created with 3 PDBs within the CDB
oracle_sid: NTAP1

# Enter database shared memory size or SGA. CDB is created with SGA
at 75% of memory_limit, MB. The grand total of SGA should not exceed
75% available RAM on node.
memory_limit: 8192
```

## Playbook execution

There are a total of six playbooks in the automation toolkit. Each performs different task blocks and serves different purposes.

```
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.
3-ontap_config.yml - configure ONTAP svm/volumes/luns for Oracle
database and grant DB server access to luns.
4-oracle_config.yml - install and configure Oracle on DB servers for
grid infrastructure and create a container database.
5-destroy.yml - optional to undo the environment to dismantle all.
```

There are three options to run the playbooks with the following commands.

1. Execute all deployment playbooks in one combined run.

```
ansible-playbook -i hosts 0-all_playbook.yml -u ec2-user -e
@vars/vars.yml
```

2. Execute playbooks one at a time with the number sequence from 1-4.

```
ansible-playbook -i hosts 1-ansible_requirements.yml -u ec2-user -e
@vars/vars.yml
```

```
ansible-playbook -i hosts 2-linux_config.yml -u ec2-user -e
@vars/vars.yml
```

```
ansible-playbook -i hosts 3-ontap_config.yml -u ec2-user -e
@vars/vars.yml
```

```
ansible-playbook -i hosts 4-oracle_config.yml -u ec2-user -e
@vars/vars.yml
```

3. Execute 0-all\_playbook.yml with a tag.

```
ansible-playbook -i hosts 0-all_playbook.yml -u ec2-user -e  
@vars/vars.yml -t ansible_requirements
```

```
ansible-playbook -i hosts 0-all_playbook.yml -u ec2-user -e  
@vars/vars.yml -t linux_config
```

```
ansible-playbook -i hosts 0-all_playbook.yml -u ec2-user -e  
@vars/vars.yml -t ontap_config
```

```
ansible-playbook -i hosts 0-all_playbook.yml -u ec2-user -e  
@vars/vars.yml -t oracle_config
```

#### 4. Undo the environment

```
ansible-playbook -i hosts 5-destroy.yml -u ec2-user -e  
@vars/vars.yml
```

## Post execution validation

After the playbook run, login to the Oracle DB server as oracle user to validate that Oracle grid infrastructure and database are created successfully. Following is an example of Oracle database validation on host ora\_01.

#### 1. Validate Oracle container database on EC2 instance

```
[admin@ansiblectl na_oracle_deploy_iscsi]$ ssh -i ora_01.pem ec2-
user@172.30.15.40
Last login: Fri Dec  8 17:14:21 2023 from 10.61.180.18
[ec2-user@ip-172-30-15-40 ~]$ uname -a
Linux ip-172-30-15-40.ec2.internal 4.18.0-372.9.1.el8.x86_64 #1 SMP
Fri Apr 15 22:12:19 EDT 2022 x86_64 x86_64 x86_64 GNU/Linux

[ec2-user@ip-172-30-15-40 ~]$ sudo su
[root@ip-172-30-15-40 ec2-user]# su - oracle
Last login: Fri Dec  8 16:25:52 UTC 2023 on pts/0
[oracle@ip-172-30-15-40 ~]$ sqlplus / as sysdba

SQL*Plus: Release 19.0.0.0.0 - Production on Fri Dec 8 18:18:20 2023
Version 19.18.0.0.0

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

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

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

NAME          OPEN_MODE          LOG_MODE
-----
NTAP1         READ WRITE         ARCHIVELOG

SQL> show pdbs

      CON_ID CON_NAME                                OPEN MODE  RESTRICTED
-----
          2 PDB$SEED                                READ ONLY  NO
          3 NTAP1_PDB1                             READ WRITE NO
          4 NTAP1_PDB2                             READ WRITE NO
          5 NTAP1_PDB3                             READ WRITE NO

SQL> select name from v$datafile;

NAME
```

```

-----
+DATA/NTAP1/DATAFILE/system.257.1155055419
+DATA/NTAP1/DATAFILE/sysaux.258.1155055463
+DATA/NTAP1/DATAFILE/undotbs1.259.1155055489
+DATA/NTAP1/86B637B62FE07A65E053F706E80A27CA/DATAFILE/system.266.115
5056241
+DATA/NTAP1/86B637B62FE07A65E053F706E80A27CA/DATAFILE/sysaux.267.115
5056241
+DATA/NTAP1/DATAFILE/users.260.1155055489
+DATA/NTAP1/86B637B62FE07A65E053F706E80A27CA/DATAFILE/undotbs1.268.1
155056241
+DATA/NTAP1/0C03AAFA7C6FD2E5E063280F1EACFBE0/DATAFILE/system.272.115
5057059
+DATA/NTAP1/0C03AAFA7C6FD2E5E063280F1EACFBE0/DATAFILE/sysaux.273.115
5057059
+DATA/NTAP1/0C03AAFA7C6FD2E5E063280F1EACFBE0/DATAFILE/undotbs1.271.1
155057059
+DATA/NTAP1/0C03AAFA7C6FD2E5E063280F1EACFBE0/DATAFILE/users.275.1155
057075

```

NAME

```

-----
+DATA/NTAP1/0C03AC0089ACD352E063280F1EAC12BD/DATAFILE/system.277.115
5057075
+DATA/NTAP1/0C03AC0089ACD352E063280F1EAC12BD/DATAFILE/sysaux.278.115
5057075
+DATA/NTAP1/0C03AC0089ACD352E063280F1EAC12BD/DATAFILE/undotbs1.276.1
155057075
+DATA/NTAP1/0C03AC0089ACD352E063280F1EAC12BD/DATAFILE/users.280.1155
057091
+DATA/NTAP1/0C03ACEABA54D386E063280F1EACE573/DATAFILE/system.282.115
5057091
+DATA/NTAP1/0C03ACEABA54D386E063280F1EACE573/DATAFILE/sysaux.283.115
5057091
+DATA/NTAP1/0C03ACEABA54D386E063280F1EACE573/DATAFILE/undotbs1.281.1
155057091
+DATA/NTAP1/0C03ACEABA54D386E063280F1EACE573/DATAFILE/users.285.1155
057105

```

19 rows selected.

SQL> select name from v\$controlfile;

NAME

```
-----  
+DATA/NTAP1/CONTROLFILE/current.261.1155055529  
+LOGS/NTAP1/CONTROLFILE/current.256.1155055529
```

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

```
MEMBER  
-----
```

```
-----  
+DATA/NTAP1/ONLINELOG/group_3.264.1155055531  
+LOGS/NTAP1/ONLINELOG/group_3.259.1155055539  
+DATA/NTAP1/ONLINELOG/group_2.263.1155055531  
+LOGS/NTAP1/ONLINELOG/group_2.257.1155055539  
+DATA/NTAP1/ONLINELOG/group_1.262.1155055531  
+LOGS/NTAP1/ONLINELOG/group_1.258.1155055539
```

```
6 rows selected.
```

```
SQL> exit
```

```
Disconnected from Oracle Database 19c Enterprise Edition Release  
19.0.0.0.0 - Production  
Version 19.18.0.0.0
```

## 2. Validate Oracle listener.

```
[oracle@ip-172-30-15-40 ~]$ lsnrctl status listener
```

```
LSNRCTL for Linux: Version 19.0.0.0.0 - Production on 08-DEC-2023  
18:20:24
```

```
Copyright (c) 1991, 2022, Oracle. All rights reserved.
```

```
Connecting to (DESCRIPTION=(ADDRESS=(PROTOCOL=TCP) (HOST=ip-172-30-  
15-40.ec2.internal) (PORT=1521)))
```

```
STATUS of the LISTENER
```

```
-----  
Alias                     LISTENER  
Version                   TNSLSNR for Linux: Version 19.0.0.0.0 -  
Production  
Start Date                08-DEC-2023 16:26:09  
Uptime                    0 days 1 hr. 54 min. 14 sec  
Trace Level               off  
Security                  ON: Local OS Authentication  
SNMP                      OFF  
Listener Parameter File
```

```

/u01/app/oracle/product/19.0.0/grid/network/admin/listener.ora
Listener Log File          /u01/app/oracle/diag/tnslsnr/ip-172-30-15-
40/listener/alert/log.xml
Listening Endpoints Summary...
  (DESCRIPTION=(ADDRESS=(PROTOCOL=tcp) (HOST=ip-172-30-15-
40.ec2.internal) (PORT=1521)))
  (DESCRIPTION=(ADDRESS=(PROTOCOL=ipc) (KEY=EXTPROC1521)))
  (DESCRIPTION=(ADDRESS=(PROTOCOL=tcps) (HOST=ip-172-30-15-
40.ec2.internal) (PORT=5500)) (Security=(my_wallet_directory=/u01/app/
oracle/product/19.0.0/NTAP1/admin/NTAP1/xdb_wallet)) (Presentation=HT
TP) (Session=RAW))
Services Summary...
Service "+ASM" has 1 instance(s).
  Instance "+ASM", status READY, has 1 handler(s) for this
service...
Service "+ASM_DATA" has 1 instance(s).
  Instance "+ASM", status READY, has 1 handler(s) for this
service...
Service "+ASM_LOGS" has 1 instance(s).
  Instance "+ASM", status READY, has 1 handler(s) for this
service...
Service "0c03aafa7c6fd2e5e063280f1eacfb0.solutions.netapp.com" has
1 instance(s).
  Instance "NTAP1", status READY, has 1 handler(s) for this
service...
Service "0c03ac0089acd352e063280f1eac12bd.solutions.netapp.com" has
1 instance(s).
  Instance "NTAP1", status READY, has 1 handler(s) for this
service...
Service "0c03aceaba54d386e063280f1eace573.solutions.netapp.com" has
1 instance(s).
  Instance "NTAP1", status READY, has 1 handler(s) for this
service...
Service "NTAP1.solutions.netapp.com" has 1 instance(s).
  Instance "NTAP1", status READY, has 1 handler(s) for this
service...
Service "NTAP1XDB.solutions.netapp.com" has 1 instance(s).
  Instance "NTAP1", status READY, has 1 handler(s) for this
service...
Service "ntap1_pdb1.solutions.netapp.com" has 1 instance(s).
  Instance "NTAP1", status READY, has 1 handler(s) for this
service...
Service "ntap1_pdb2.solutions.netapp.com" has 1 instance(s).
  Instance "NTAP1", status READY, has 1 handler(s) for this
service...
Service "ntap1_pdb3.solutions.netapp.com" has 1 instance(s).

```

Instance "NTAP1", status READY, has 1 handler(s) for this service...

The command completed successfully

### 3. Validate the grid infrastructure and resources created.

```
[oracle@ip-172-30-15-40 ~]$ asm
[oracle@ip-172-30-15-40 ~]$ crsctl check has
CRS-4638: Oracle High Availability Services is online
[oracle@ip-172-30-15-40 ~]$ crsctl stat res -t
-----
-----
Name                Target  State          Server          State
details
-----
-----
Local Resources
-----
-----
ora.DATA.dg
          ONLINE  ONLINE        ip-172-30-15-40  STABLE
ora.LISTENER.lsnr
          ONLINE  ONLINE        ip-172-30-15-40  STABLE
ora.LOGS.dg
          ONLINE  ONLINE        ip-172-30-15-40  STABLE
ora.asm
          ONLINE  ONLINE        ip-172-30-15-40
Started,STABLE
ora.ons
          OFFLINE OFFLINE        ip-172-30-15-40  STABLE
-----
-----
Cluster Resources
-----
-----
ora.cssd
    1      ONLINE  ONLINE        ip-172-30-15-40  STABLE
ora.diskmon
    1      OFFLINE OFFLINE                STABLE
ora.driver.afd
    1      ONLINE  ONLINE        ip-172-30-15-40  STABLE
ora.evmd
    1      ONLINE  ONLINE        ip-172-30-15-40  STABLE
ora.ontap1.db
    1      ONLINE  ONLINE        ip-172-30-15-40
```



```
Open,HOME=/u01/app/o
```

```
racle/product/19.0.0
```

```
/NTAP1,STABLE
```

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

#### 4. Validate Oracle ASM.

```
[oracle@ip-172-30-15-40 ~]$ asmcmd
```

```
ASMCMD> lsdg
```

State	Type	Rebal	Sector	Logical_Sector	Block	AU
Total_MB	Free_MB	Req_mir_free_MB	Usable_file_MB	Offline_disks		
Voting_files	Name					

MOUNTED	EXTERN	N	512	512	4096	4194304
163840	155376		0	155376		0

```
N DATA/
```

MOUNTED	EXTERN	N	512	512	4096	4194304
81920	80972		0	80972		0

```
N LOGS/
```

```
ASMCMD> lsdk
```

```
Path
```

```
AFD:ORA_01_DAT1_01
```

```
AFD:ORA_01_DAT1_03
```

```
AFD:ORA_01_DAT2_02
```

```
AFD:ORA_01_DAT2_04
```

```
AFD:ORA_01_LOGS_01
```

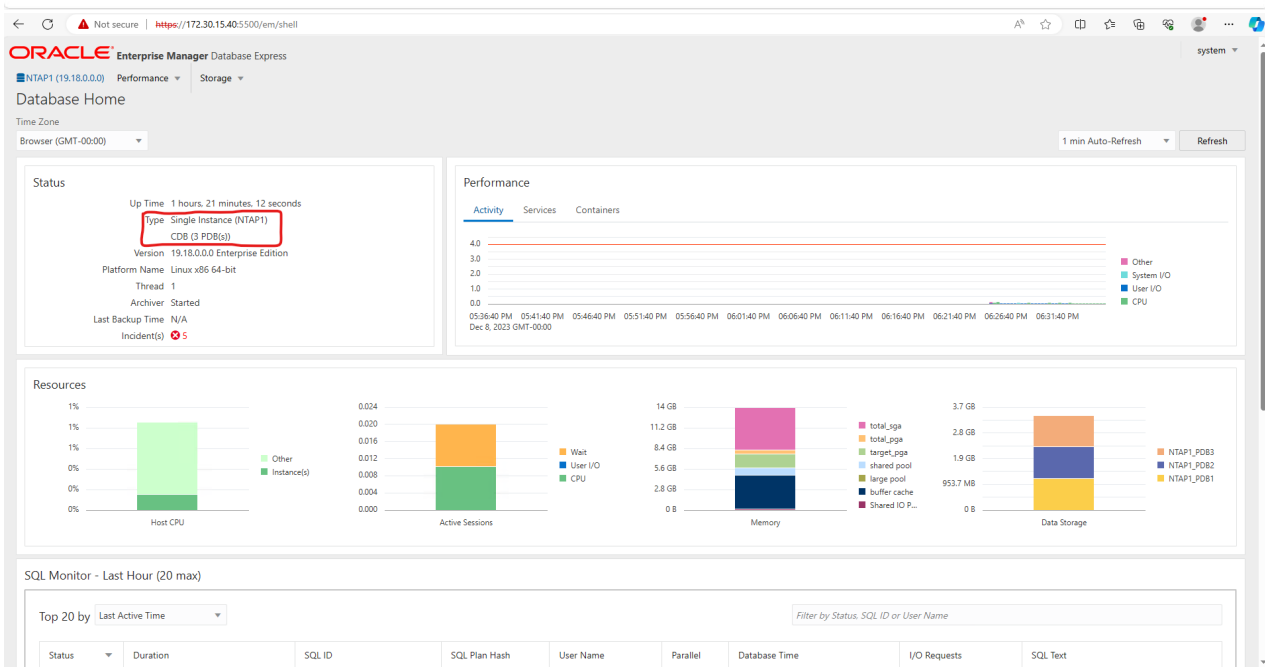
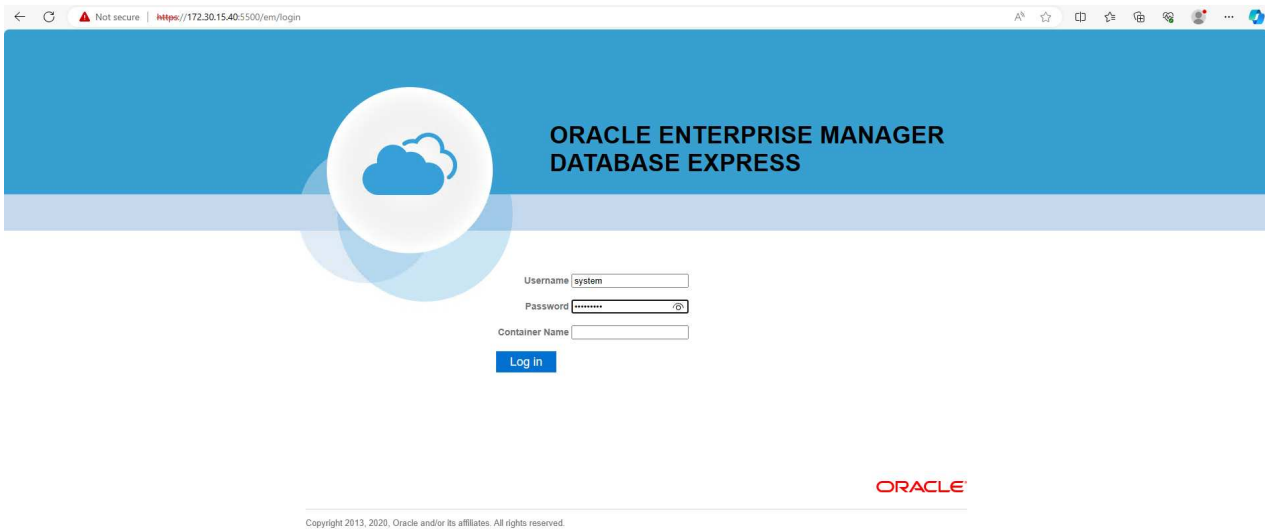
```
AFD:ORA_01_LOGS_02
```

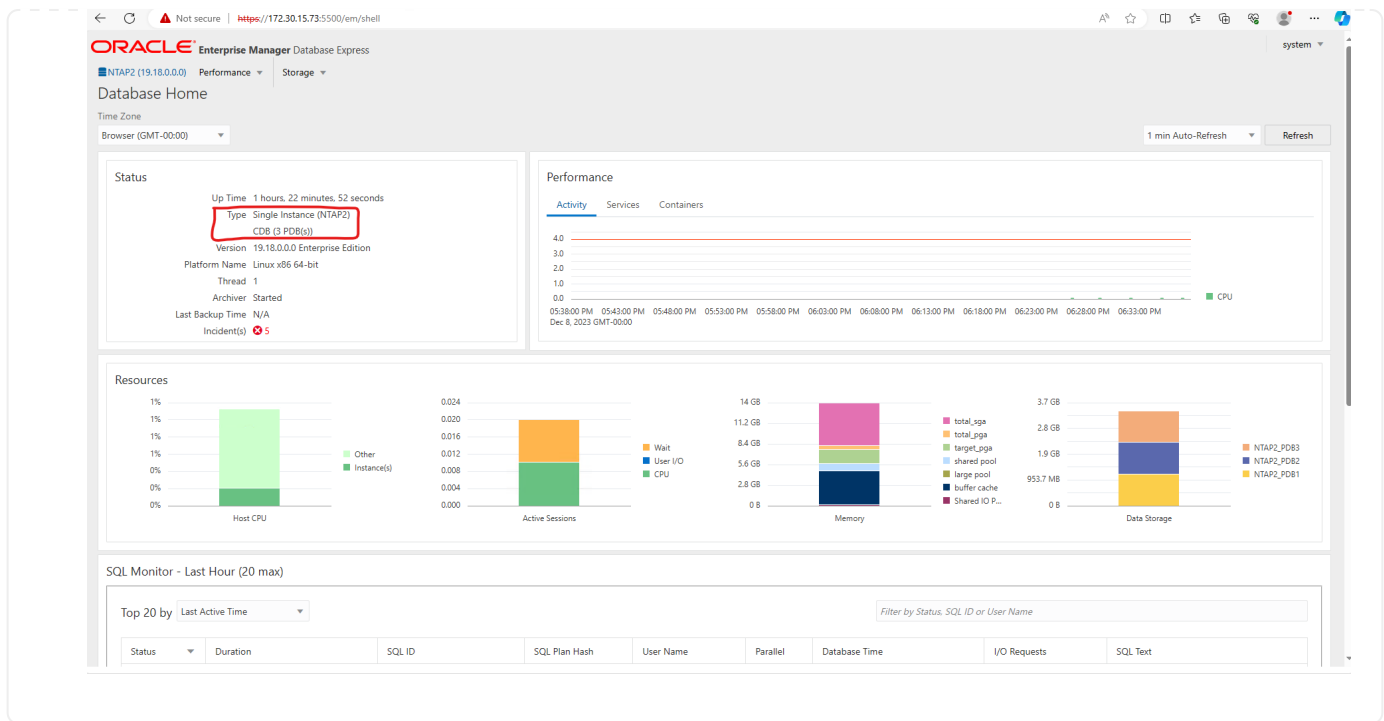
```
ASMCMD> afd_state
```

```
ASMCMD-9526: The AFD state is 'LOADED' and filtering is 'ENABLED' on  
host 'ip-172-30-15-40.ec2.internal'
```

```
ASMCMD> exit
```

#### 5. Login to Oracle Enterprise Manager Express to validate database.





## Oracle backup, restore, and clone with SnapCenter

Refer to TR-4979 [Simplified, self-managed Oracle in VMware Cloud on AWS with guest-mounted FSx ONTAP](#) section Oracle backup, restore, and clone with SnapCenter for details on setting up SnapCenter and executing the database backup, restore, and clone workflows.

## Where to find additional information

To learn more about the information described in this document, review the following documents and/or websites:

- Amazon FSx ONTAP

<https://aws.amazon.com/fsx/netapp-ontap/>

- Amazon EC2

[https://aws.amazon.com/pm/ec2/?trk=36c6da98-7b20-48fa-8225-4784bced9843&sc\\_channel=ps&s\\_kwcid=AL!4422!3!467723097970!e!!g!!aws%20ec2&ef\\_id=Cj0KCQiA54KfBhCKARIsAJzSrdqwQrghn6l71jiWzSeaT9Uh1-vY-VfhJixF-xnv5rWwn2S7RqZOTQ0aAh7eEALw\\_wcB:G:s&s\\_kwcid=AL!4422!3!467723097970!e!!g!!aws%20ec2](https://aws.amazon.com/pm/ec2/?trk=36c6da98-7b20-48fa-8225-4784bced9843&sc_channel=ps&s_kwcid=AL!4422!3!467723097970!e!!g!!aws%20ec2&ef_id=Cj0KCQiA54KfBhCKARIsAJzSrdqwQrghn6l71jiWzSeaT9Uh1-vY-VfhJixF-xnv5rWwn2S7RqZOTQ0aAh7eEALw_wcB:G:s&s_kwcid=AL!4422!3!467723097970!e!!g!!aws%20ec2)

- Installing Oracle Grid Infrastructure for a Standalone Server with a New Database Installation

<https://docs.oracle.com/en/database/oracle/oracle-database/19/ladbi/installing-oracle-grid-infrastructure-for-a-standalone-server-with-a-new-database-installation.html#GUID-0B1CEE8C-C893-46AA-8A6A-7B5FAAEC72B3>

- Installing and Configuring Oracle Database Using Response Files

<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>

- Use Red Hat Enterprise Linux 8.2 with ONTAP

[https://docs.netapp.com/us-en/ontap-sanhost/hu\\_rhel\\_82.html#all-san-array-configurations](https://docs.netapp.com/us-en/ontap-sanhost/hu_rhel_82.html#all-san-array-configurations)

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