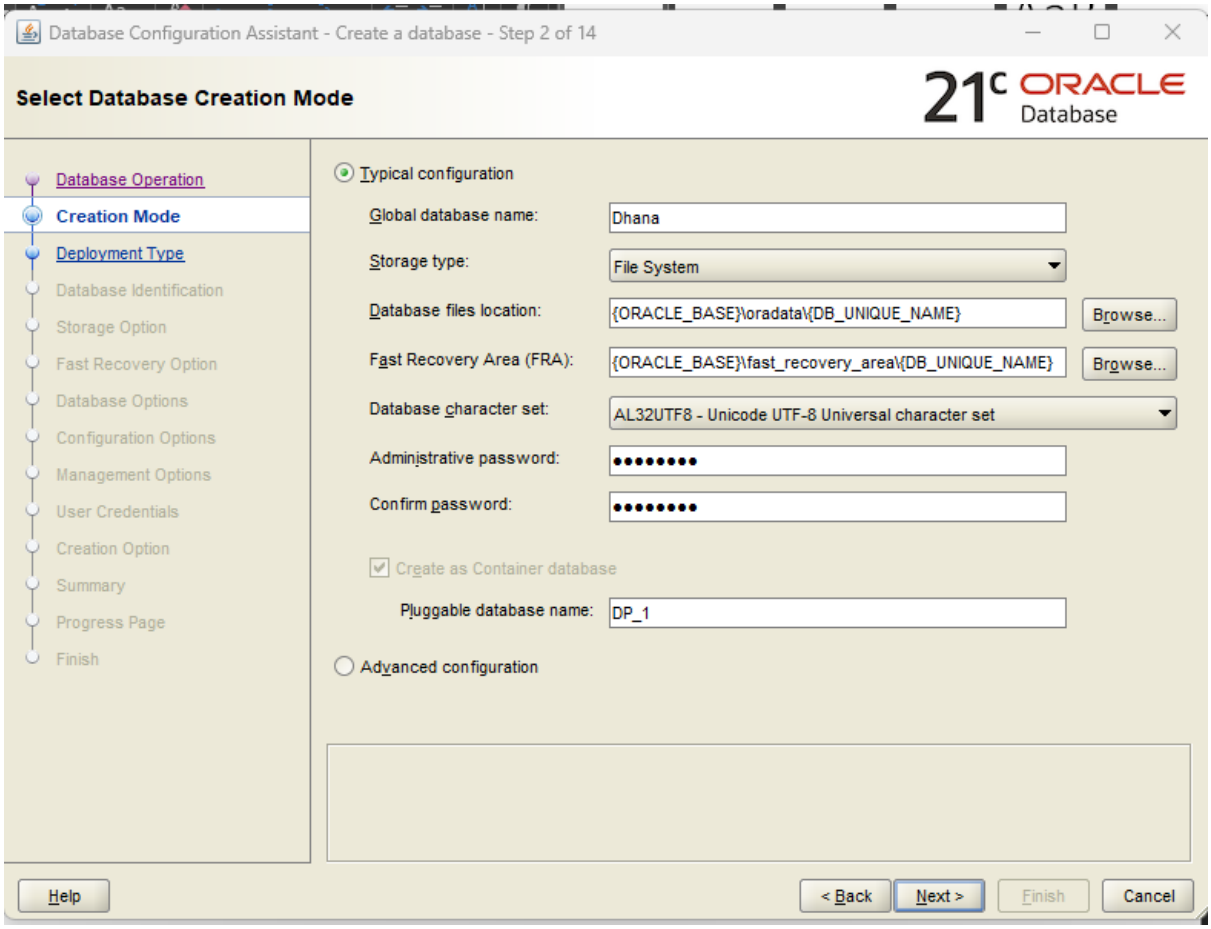
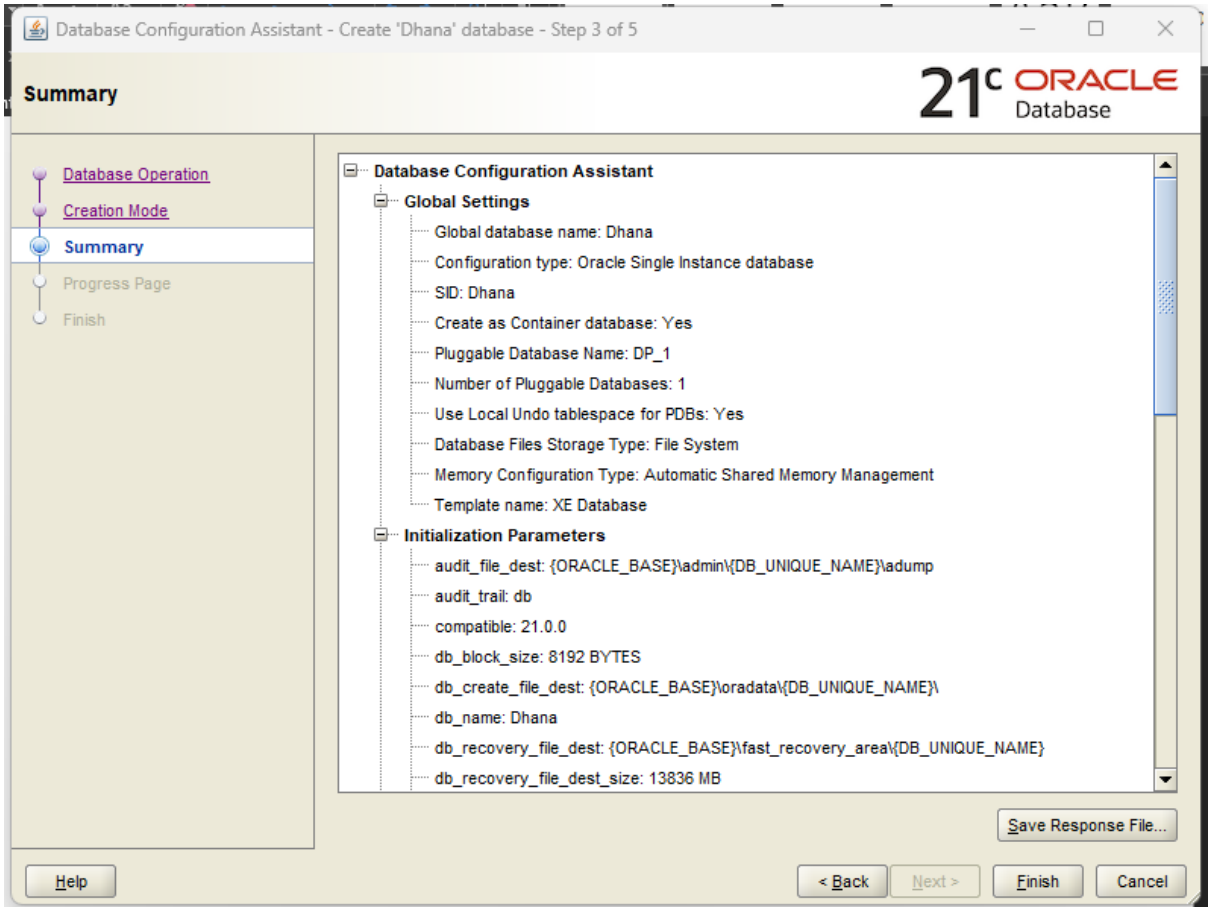
Database creation in Oracle 21c

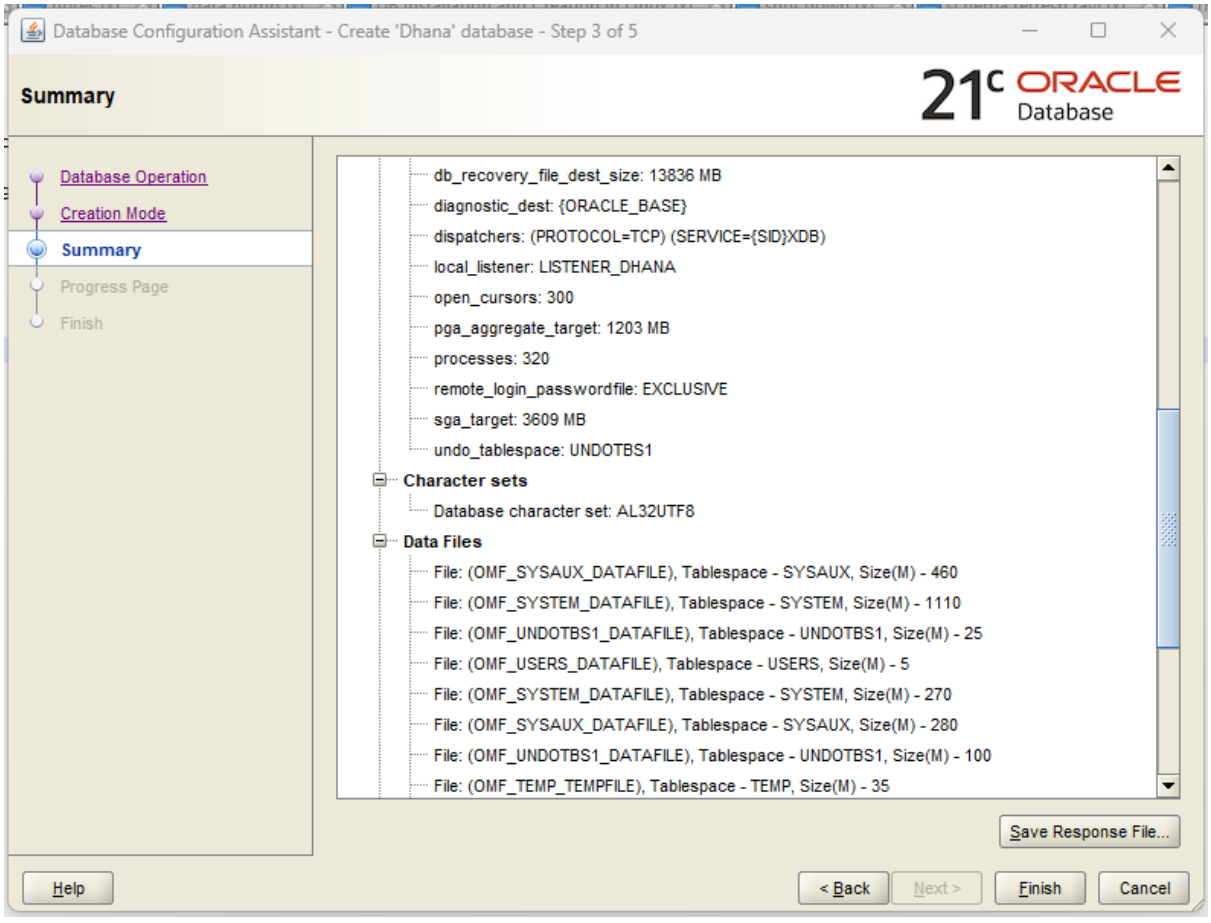
Key features of 21c

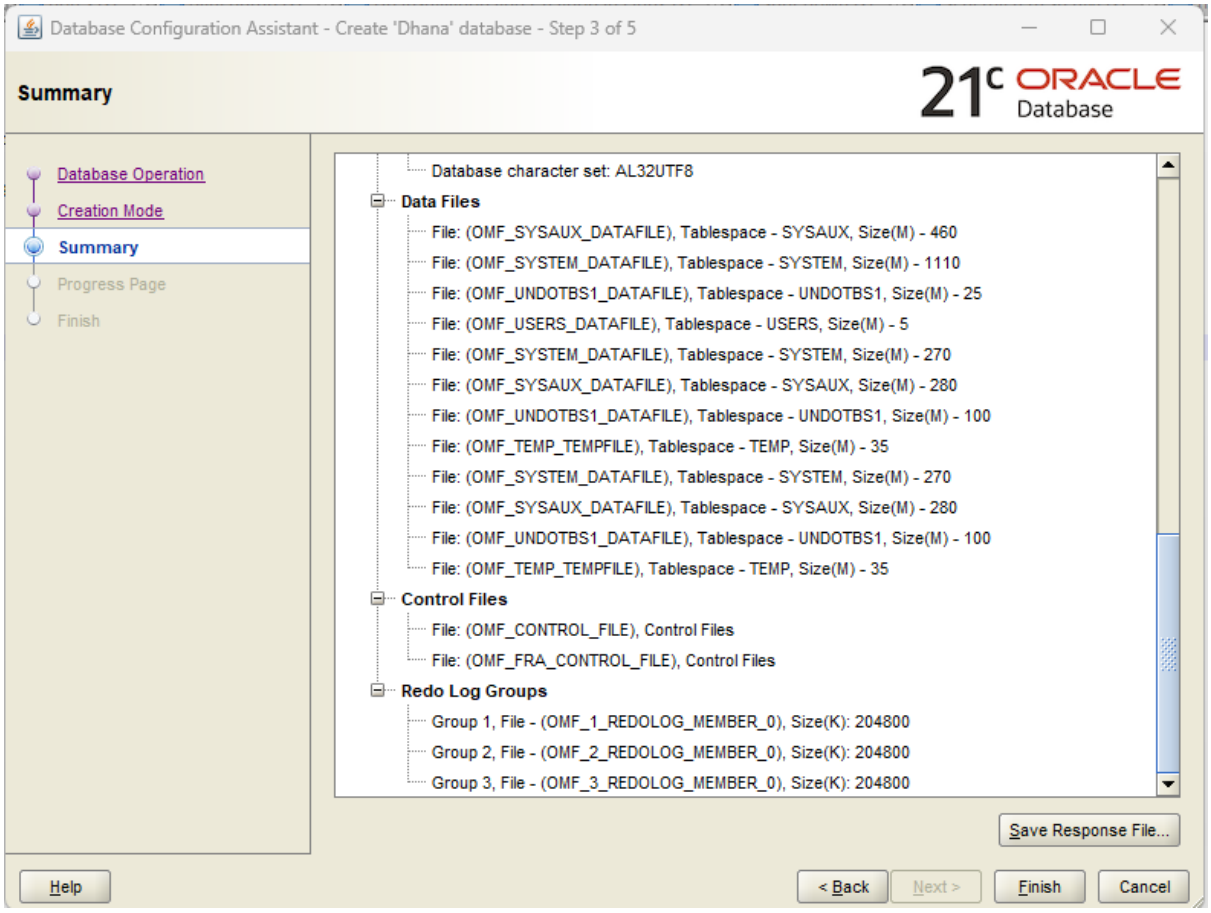
Immutable tables in Oracle Database 21c - An immutable table is a tamper-proof, insert-only table with an associated table-level and row-level retention period. FOR LOOP Iteration Enhancements in Oracle Database 21c - The FOR LOOP iteration control has been enhanced in Oracle database 21c, making it much more flexible.

1) Database creation with typical configuration




Database Configuration Assistant - Create 'Dhana' database - Step 3 of 5
Summary
21c ORACLE Database
Database Operation
Creation Mode
Summary
Progress Page
Finish
Database Configuration Assistant
Global Settings
Global database name: Dhana
Configuration type: Oracle Single Instance database
SID: Dhana
Create as Container database: Yes
Pluggable Database Name: DP_1
Number of Pluggable Databases: 1
Use Local Undo tablespace for PDBs: Yes
Database Files Storage Type: File System
Memory Configuration Type: Automatic Shared Memory Management
Template name: XE Database
Initialization Parameters
audit_file_dest: {ORACLE_BASE}\admin\{DB_UNIQUE_NAME}\adump
audit_trail: db
compatible: 21.0.0
db_block_size: 8192 BYTES
db_create_file_dest: {ORACLE_BASE}\oradata\{DB_UNIQUE_NAME}\
db_name: Dhana
db_recovery_file_dest: {ORACLE_BASE}\fast_recovery_area\{DB_UNIQUE_NAME}
db_recovery_file_dest_size: 13836 MB
Save Response File...
Help
< Back
Next >
Finish
Cancel


Database Configuration Assistant - Create 'Dhana' database - Step 3 of 5
Summary
21c ORACLE Database
Database Operation
Creation Mode
Summary
Progress Page
Finish
db_recovery_file_dest_size: 13836 MB
diagnostic_dest: {ORACLE_BASE}
dispatchers: (PROTOCOL=TCP) (SERVICE={SID}XDB)
local_listener: LISTENER_DHANA
open_cursors: 300
pga_aggregate_target: 1203 MB
processes: 320
remote_login_passwordfile: EXCLUSIVE
sga_target: 3609 MB
undo_tablespace: UNDOTBS1
Character sets
Database character set: AL32UTF8
Data Files
File: (OMF_SYSAUX_DATAFILE), Tablespace - SYSAUX, Size(M) - 460
File: (OMF_SYSTEM_DATAFILE), Tablespace - SYSTEM, Size(M) - 1110
File: (OMF_UNDOTBS1_DATAFILE), Tablespace - UNDOTBS1, Size(M) - 25
File: (OMF_USERS_DATAFILE), Tablespace - USERS, Size(M) - 5
File: (OMF_SYSTEM_DATAFILE), Tablespace - SYSTEM, Size(M) - 270
File: (OMF_SYSAUX_DATAFILE), Tablespace - SYSAUX, Size(M) - 280
File: (OMF_UNDOTBS1_DATAFILE), Tablespace - UNDOTBS1, Size(M) - 100
File: (OMF_TEMP_TEMPFILE), Tablespace - TEMP, Size(M) - 35
Save Response File...
Help
< Back
Next >
Finish
Cancel


Database Configuration Assistant - Create 'Dhana' database - Step 3 of 5
Summary
21c ORACLE Database
Database Operation
Creation Mode
Summary
Progress Page
Finish
Database character set: AL32UTF8
Data Files
File: (OMF_SYSAUX_DATAFILE), Tablespace - SYSAUX, Size(M) - 460
File: (OMF_SYSTEM_DATAFILE), Tablespace - SYSTEM, Size(M) - 1110
File: (OMF_UNDOTBS1_DATAFILE), Tablespace - UNDOTBS1, Size(M) - 25
File: (OMF_USERS_DATAFILE), Tablespace - USERS, Size(M) - 5
File: (OMF_SYSTEM_DATAFILE), Tablespace - SYSTEM, Size(M) - 270
File: (OMF_SYSAUX_DATAFILE), Tablespace - SYSAUX, Size(M) - 280
File: (OMF_UNDOTBS1_DATAFILE), Tablespace - UNDOTBS1, Size(M) - 100
File: (OMF_TEMP_TEMPFILE), Tablespace - TEMP, Size(M) - 35
File: (OMF_SYSTEM_DATAFILE), Tablespace - SYSTEM, Size(M) - 270
File: (OMF_SYSAUX_DATAFILE), Tablespace - SYSAUX, Size(M) - 280
File: (OMF_UNDOTBS1_DATAFILE), Tablespace - UNDOTBS1, Size(M) - 100
File: (OMF_TEMP_TEMPFILE), Tablespace - TEMP, Size(M) - 35
Control Files
File: (OMF_CONTROL_FILE), Control Files
File: (OMF_FRA_CONTROL_FILE), Control Files
Redo Log Groups
Group 1, File - (OMF_1_REDOLOG_MEMBER_0), Size(K): 204800
Group 2, File - (OMF_2_REDOLOG_MEMBER_0), Size(K): 204800
Group 3, File - (OMF_3_REDOLOG_MEMBER_0), Size(K): 204800
Save Response File...
Help
< Back
Next >
Finish
Cancel

2) Database creation with advanced configurations –

RAC (Real time application cluster)

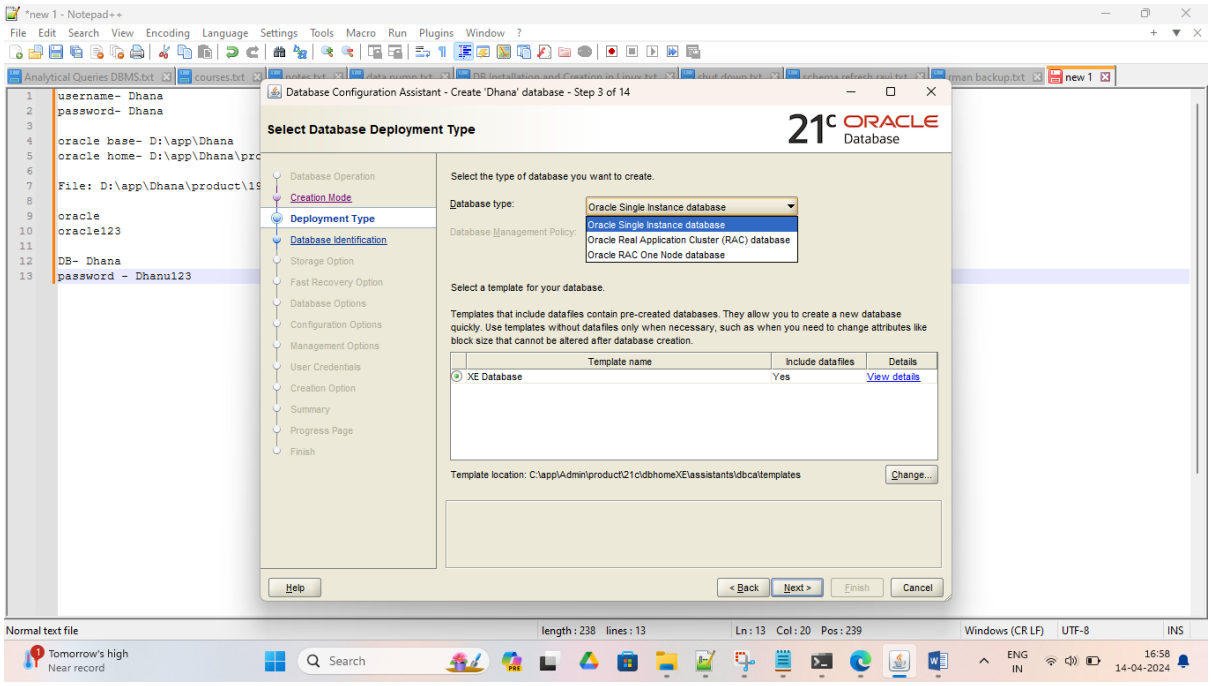
The idea is to utilize the additional resources of multiple machines to satisfy higher load demands (scalability) as well as provide a higher level of availability since connections can be directed to any available instance.
– servers connecting to the same database (shared storage) simultaneous
– servers are usually same location “in a room”
– RAC is mainly for load balancing

RAC One node

Same infrastructure as a classical RAC, just here it is a single instance of RAC running on one node of cluster while the 2nd node is in a cold standby mode. It provides a cold fail-over solution for Oracle database.
– built-in cluster fail-over for HA but not to load balance unlike regular RAC
– useful for some maintenance purpose like rolling upgrade or proactive upgrade
– it is capable for online upgrade to real RAC

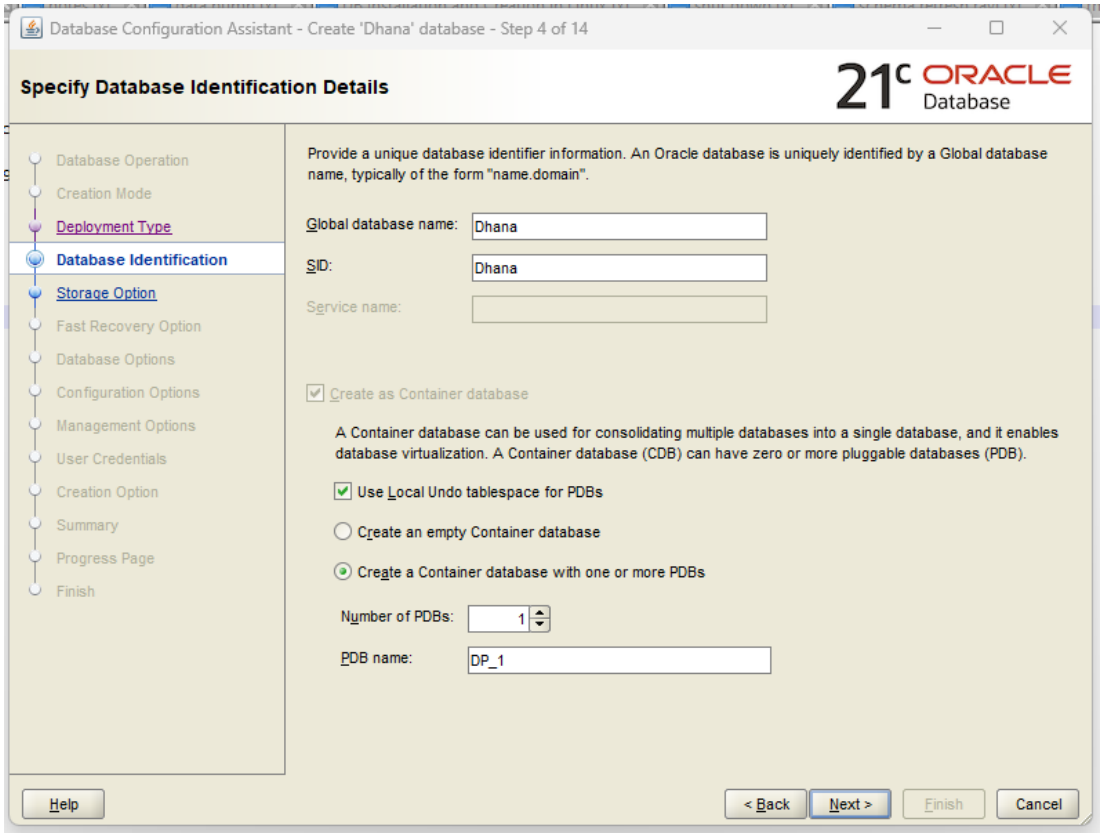
Data Guard-

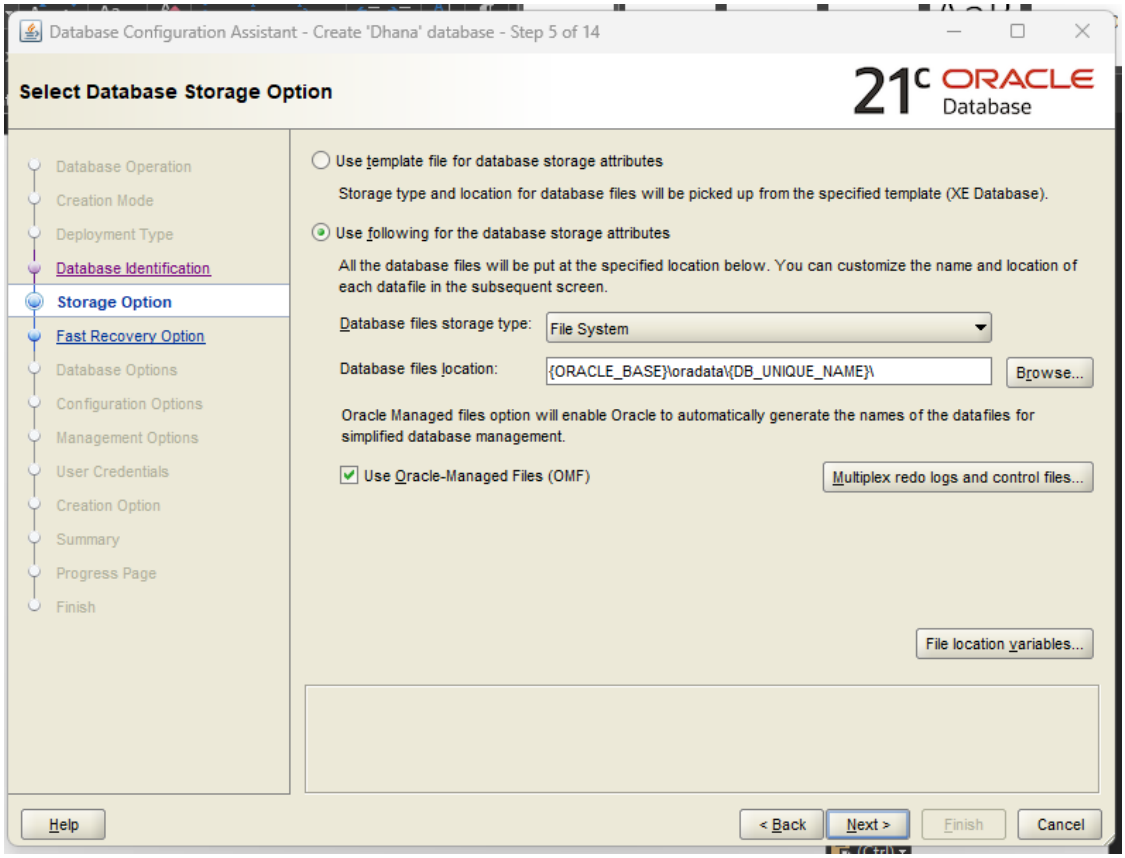
Data Guard provides for continuity of operations – if the room in which your RAC cluster resides “goes away” (fire, flood, main hw failure, whatever) data guard is ” somewhere else, ready to take over” (fail over site).
– designed for disaster recovery and business continuity solution (cost-effective way)
– the DG provide many extra features to use the secondary site database (reporting, testing, UAT env., etc.)
– possible to build total replication (physical) or just some part (logical)

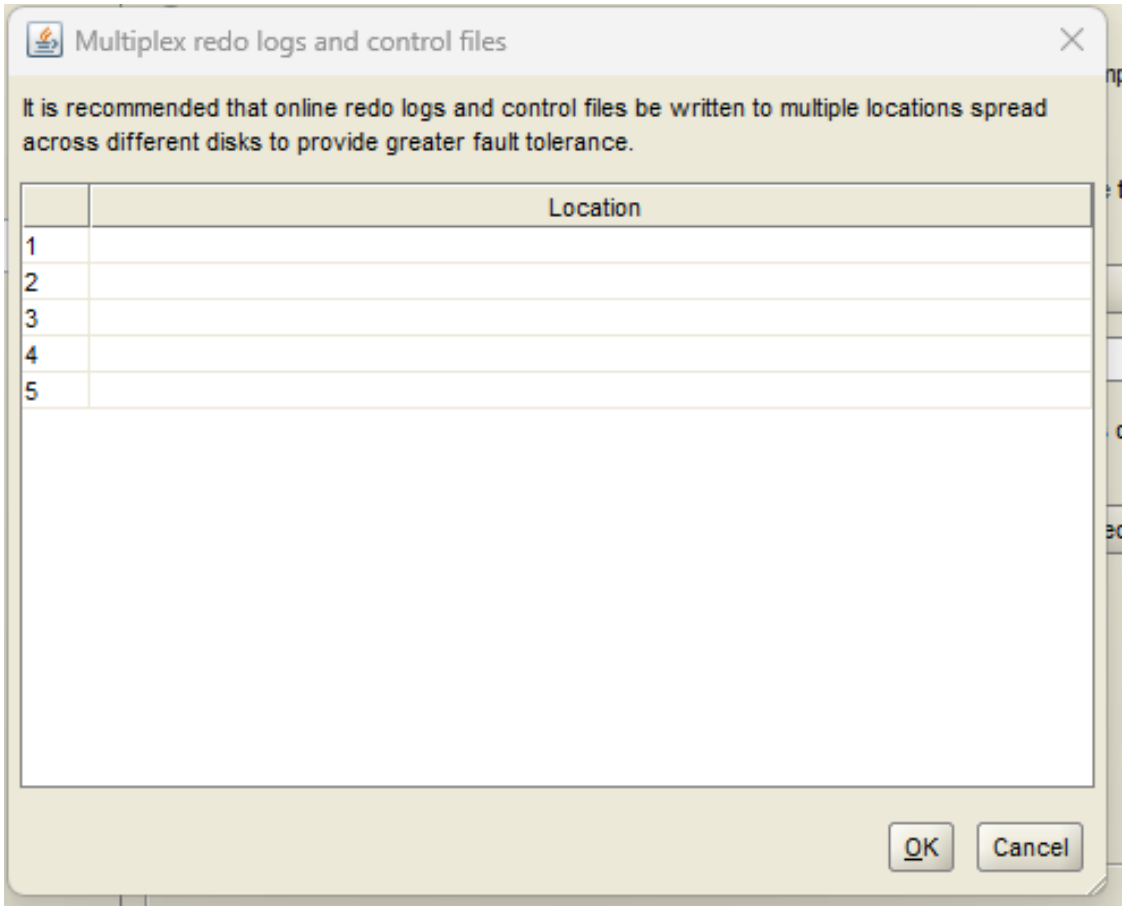


Pluggable database-

A pluggable database (PDB) is a portable collection of schemas, schema objects, and non-schema objects that appears to an Oracle Net client as a non-CDB. PDBs can be plugged into to CDBs. A CDB can contain multiple PDBs. Each PDB appears on the network as a separate database.

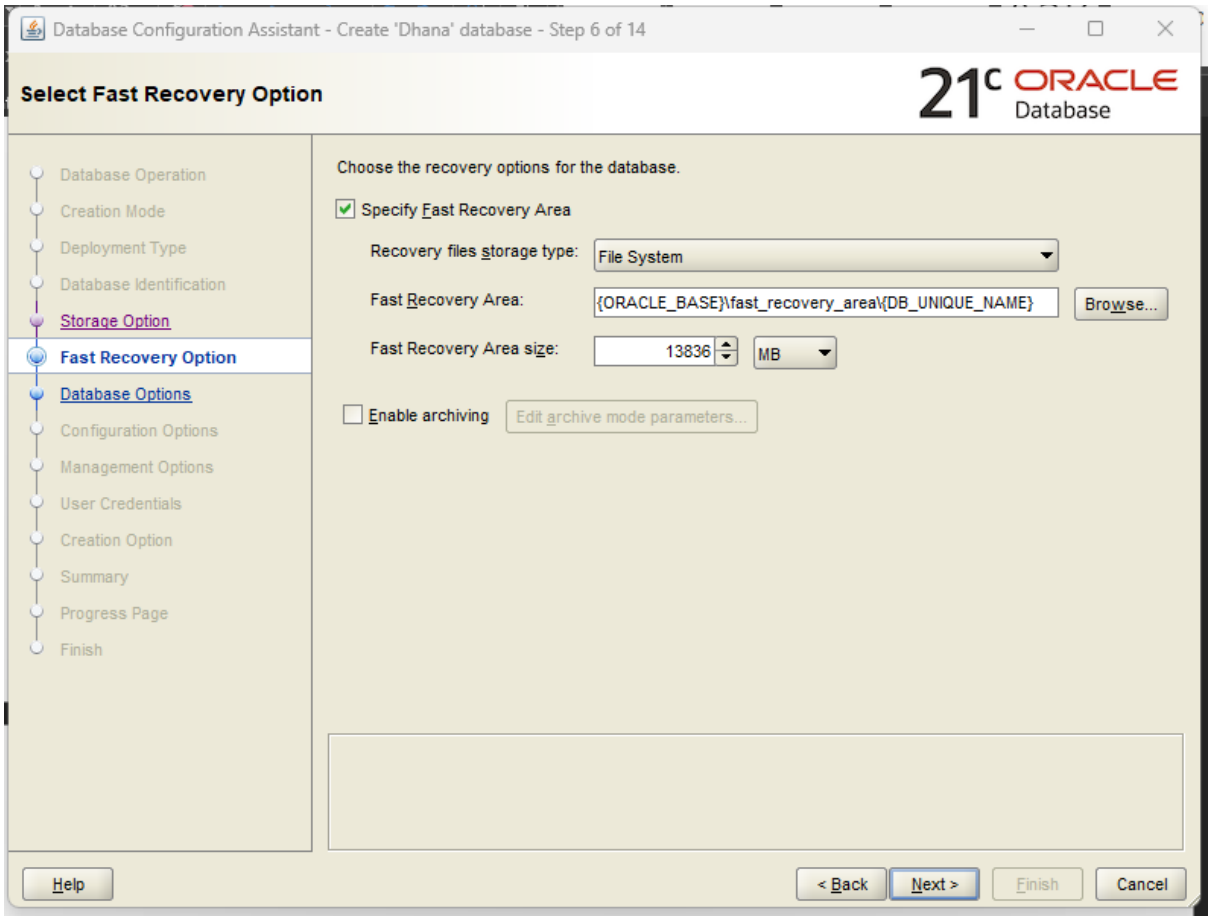



Database Configuration Assistant - Create 'Dhana' database - Step 5 of 14
Select Database Storage Option
21c ORACLE Database
Database Operation
Creation Mode
Deployment Type
Database Identification
Storage Option
Fast Recovery Option
Database Options
Configuration Options
Management Options
User Credentials
Creation Option
Summary
Progress Page
Finish
Use template file for database storage attributes
Storage type and location for database files will be picked up from the specified template (XE Database).
Use following for the database storage attributes
All the database files will be put at the specified location below. You can customize the name and location of each datafile in the subsequent screen.
Database files storage type:
File System
Database files location:
{ORACLE_BASE}\oradata\{DB_UNIQUE_NAME}\
Browse...
Oracle Managed files option will enable Oracle to automatically generate the names of the datafiles for simplified database management.
Use Oracle-Managed Files (OMF)
Multiplex redo logs and control files...
File location variables...
Help
< Back
Next >
Finish
Cancel


Multiplex redo logs and control files
It is recommended that online redo logs and control files be written to multiple locations spread across different disks to provide greater fault tolerance.
Location
1
2
3
4
5
OK
Cancel

Fast Recovery area-

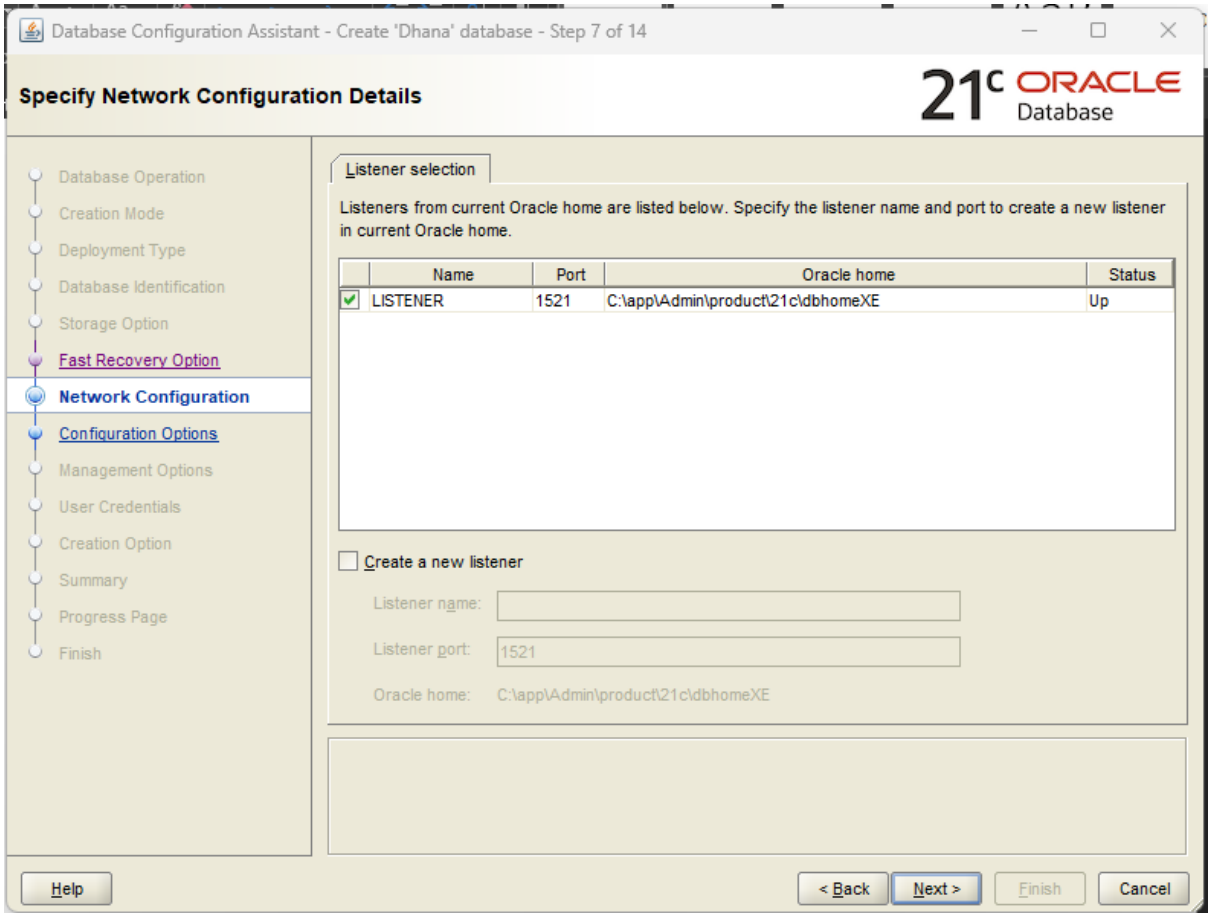
The fast recovery area is an Oracle-managed directory, file system, or Oracle Automatic Storage Management disk group that provides a centralized storage location for backup and recovery files. Oracle creates archived logs and flashback logs in the fast recovery area.

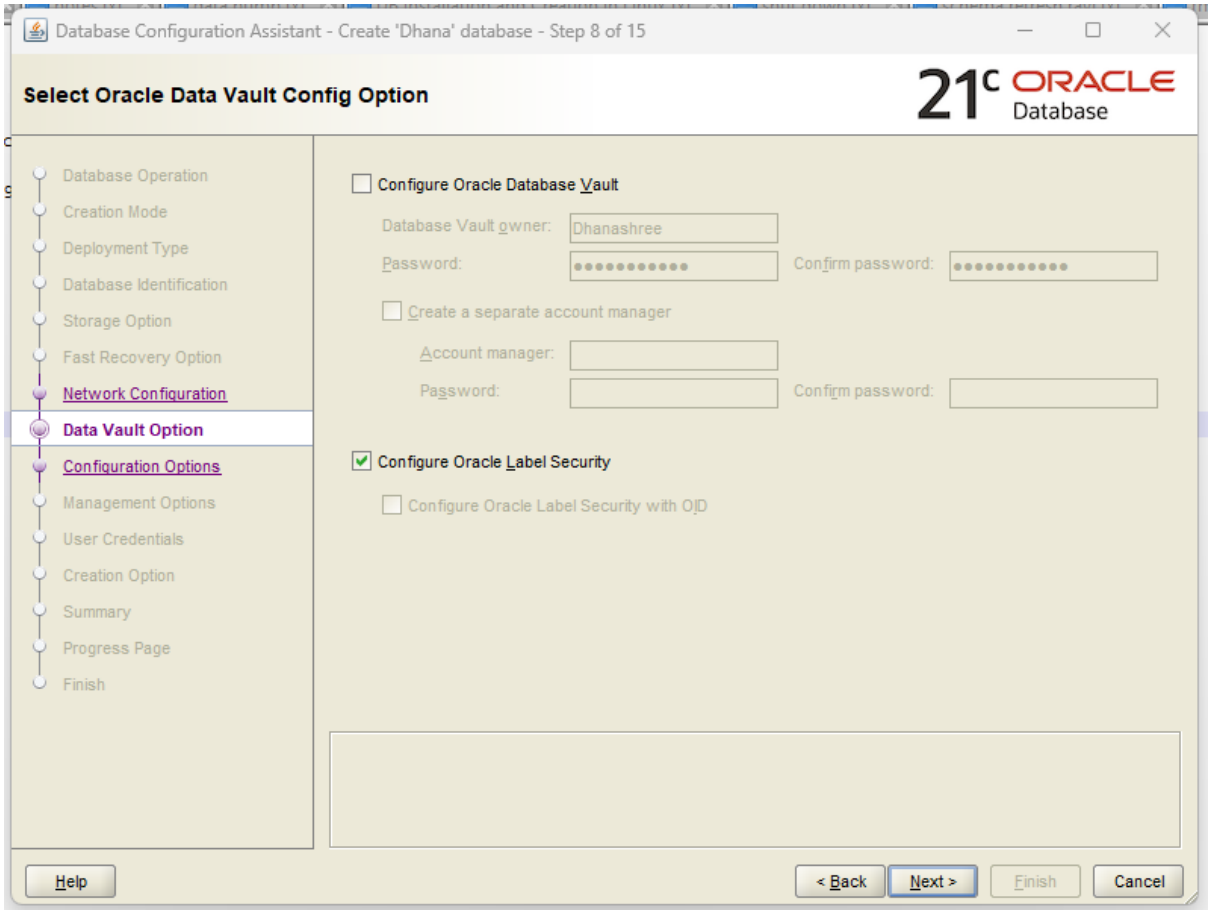


Listener-

Oracle Net Listener is a separate process that runs on the database server. It receives incoming client connection requests and manages the traffic of these requests to the database server.

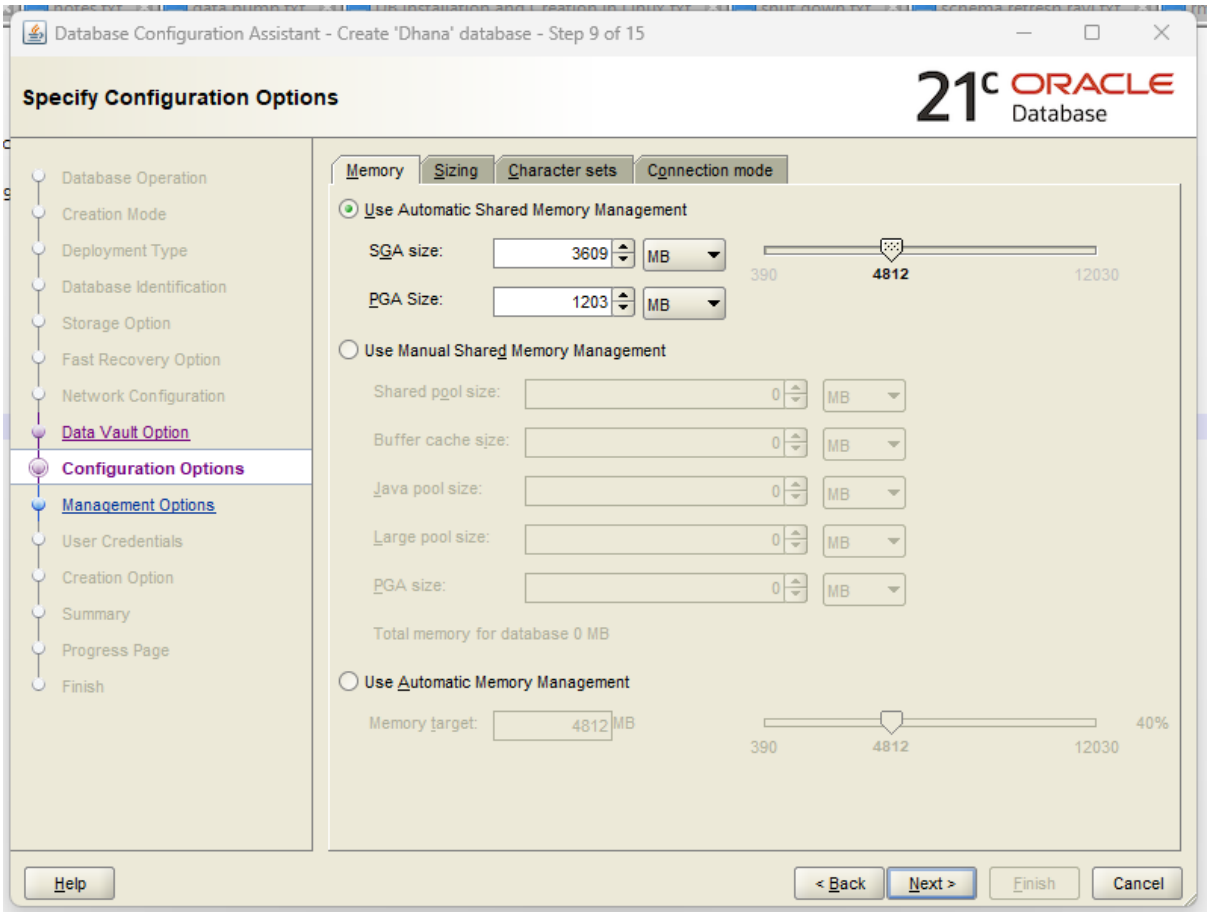
The difference between SCAN Listener and Local Listener is SCAN listener runs corresponding to SCAN VIP's while Local Listener runs with Node VIP or Node IP address. SCAN Listener can move to another database node in case of node failure but local Listener doesn't have this kind of behaviour.


Database Configuration Assistant - Create 'Dhana' database - Step 7 of 14
Specify Network Configuration Details
21c ORACLE Database
Database Operation
Creation Mode
Deployment Type
Database Identification
Storage Option
Fast Recovery Option
Network Configuration
Configuration Options
Management Options
User Credentials
Creation Option
Summary
Progress Page
Finish
Listener selection
Listeners from current Oracle home are listed below. Specify the listener name and port to create a new listener in current Oracle home.
Name
Port
Oracle home
Status
LISTENER
1521
C:\app\Admin\product\21c\dbhomeXE
Up
Create a new listener
Listener name:
Listener port:
1521
Oracle home:
C:\app\Admin\product\21c\dbhomeXE
Help
< Back
Next >
Finish
Cancel

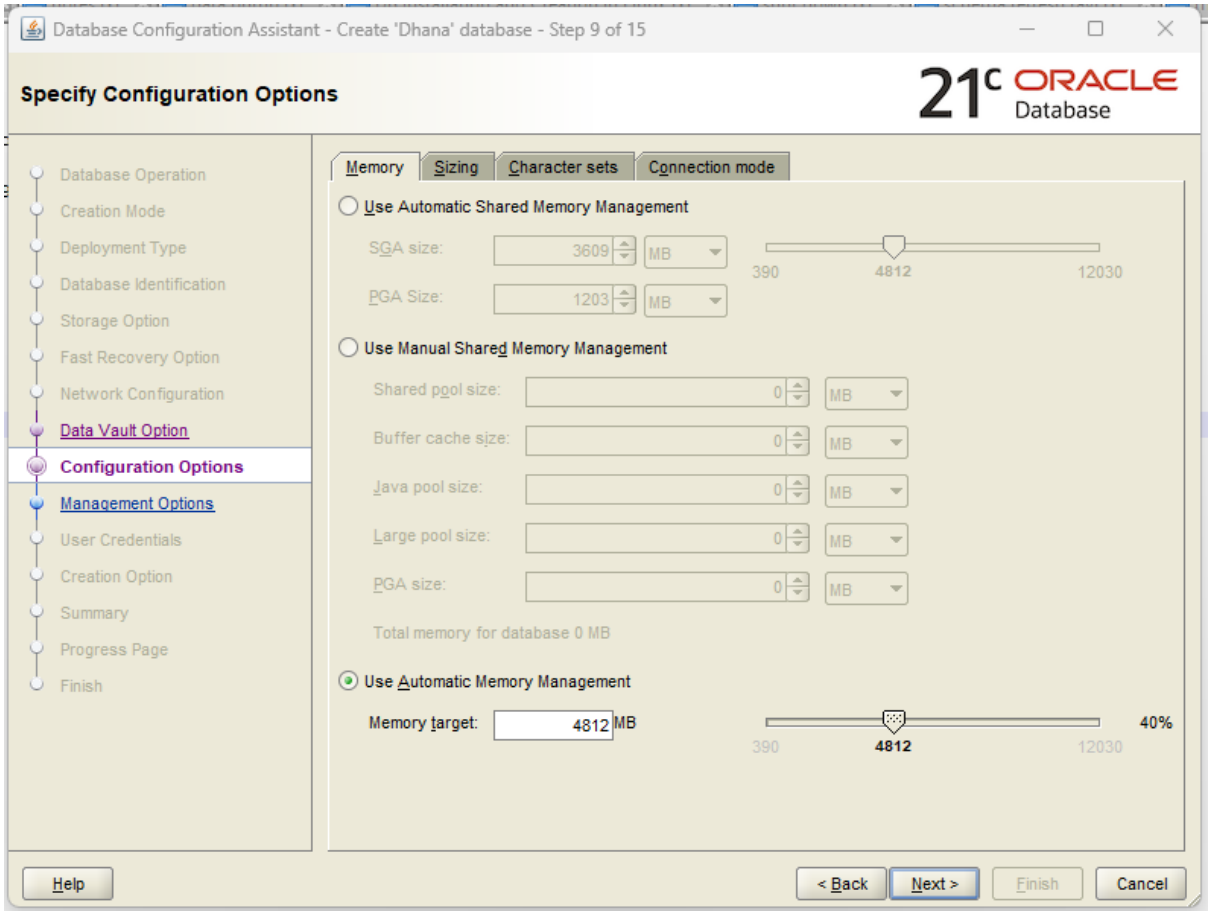

Database Configuration Assistant - Create 'Dhana' database - Step 8 of 15
Select Oracle Data Vault Config Option
21c ORACLE Database
Database Operation
Creation Mode
Deployment Type
Database Identification
Storage Option
Fast Recovery Option
Network Configuration
Data Vault Option
Configuration Options
Management Options
User Credentials
Creation Option
Summary
Progress Page
Finish
Configure Oracle Database Vault
Database Vault owner:
Dhanashree
Password:
Confirm password:
Create a separate account manager
Account manager:
Password:
Confirm password:
Configure Oracle Label Security
Configure Oracle Label Security with OID
Help
< Back
Next >
Finish
Cancel

SGA is system global area. It is a shared memory allocation. All servers and background processes can access this global area. Buffer cache is biggest area of SGA.

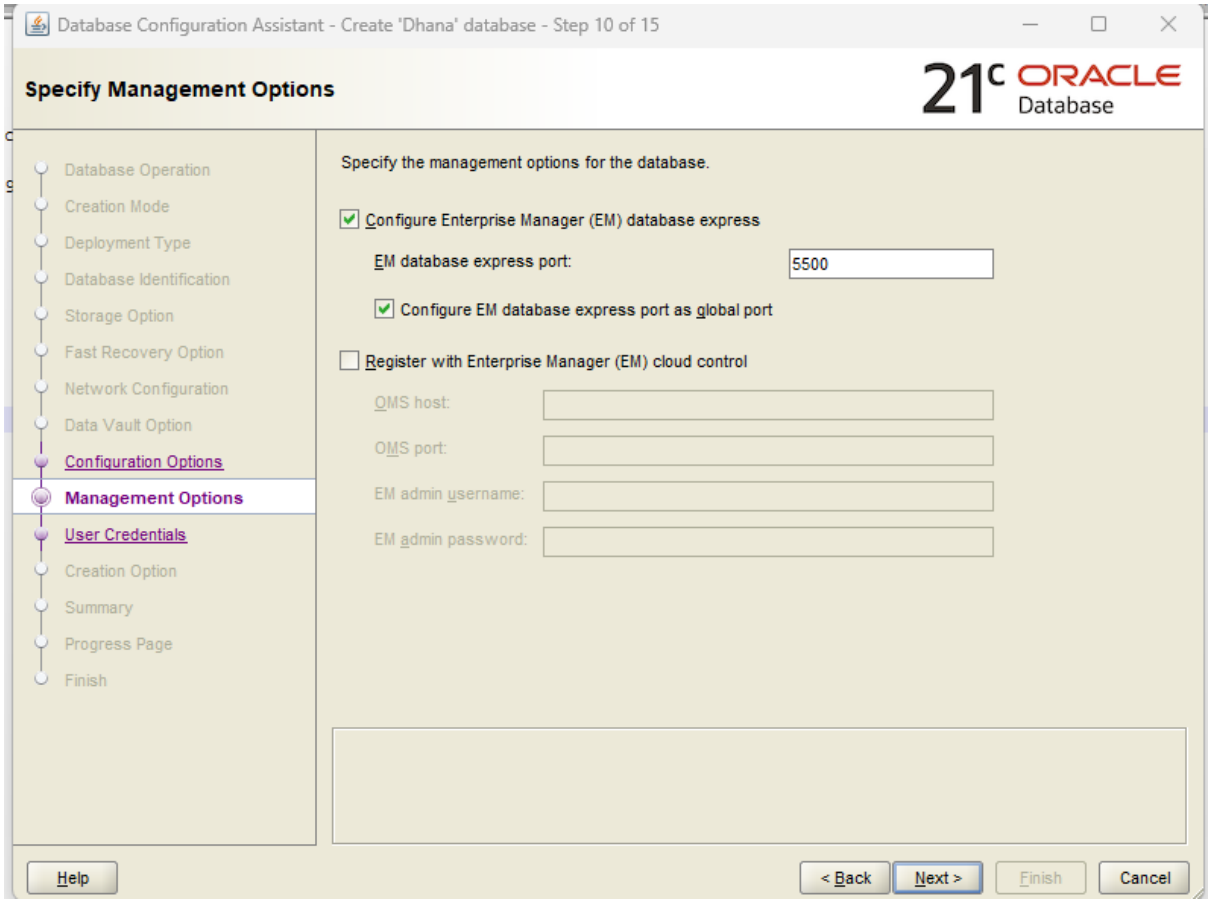
PGA is private global area. It is non-shared memory allocation. Oracle database creates PGA when oracle process starts.

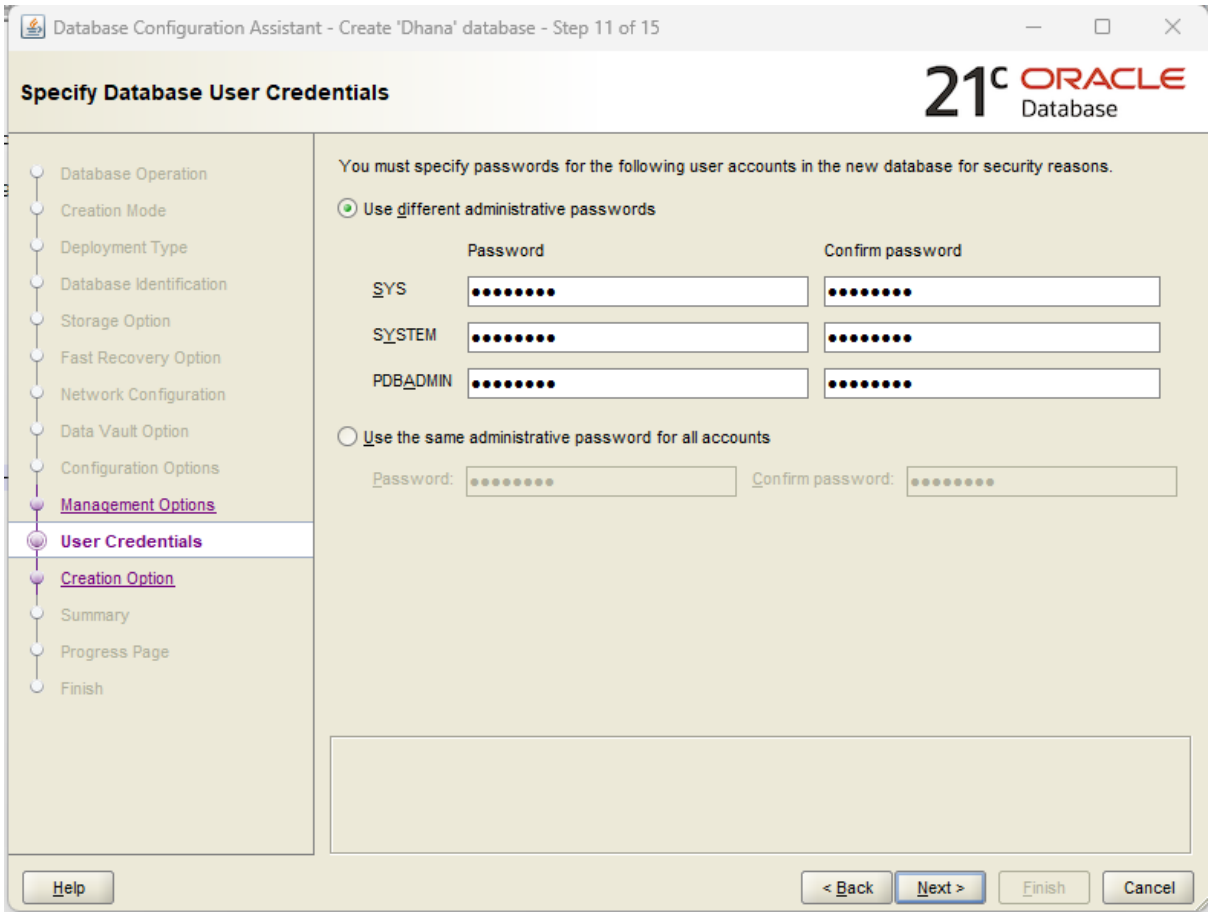


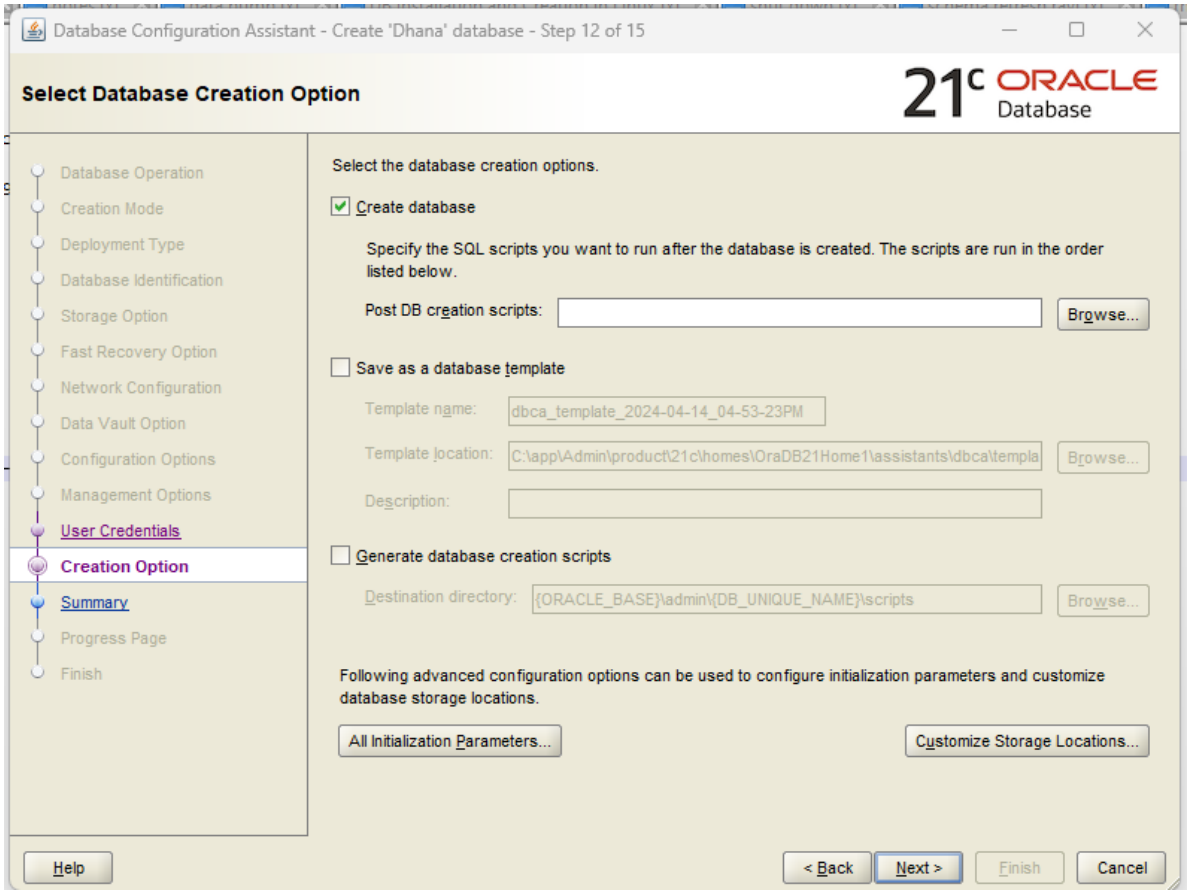
A memory management process will release unused memory back to the OS and claim memory should it be needed. Operations such as join, merge or sort applied to large tables will require large amount of memory. If insufficient memory is available, a memory timeout error will be generated.

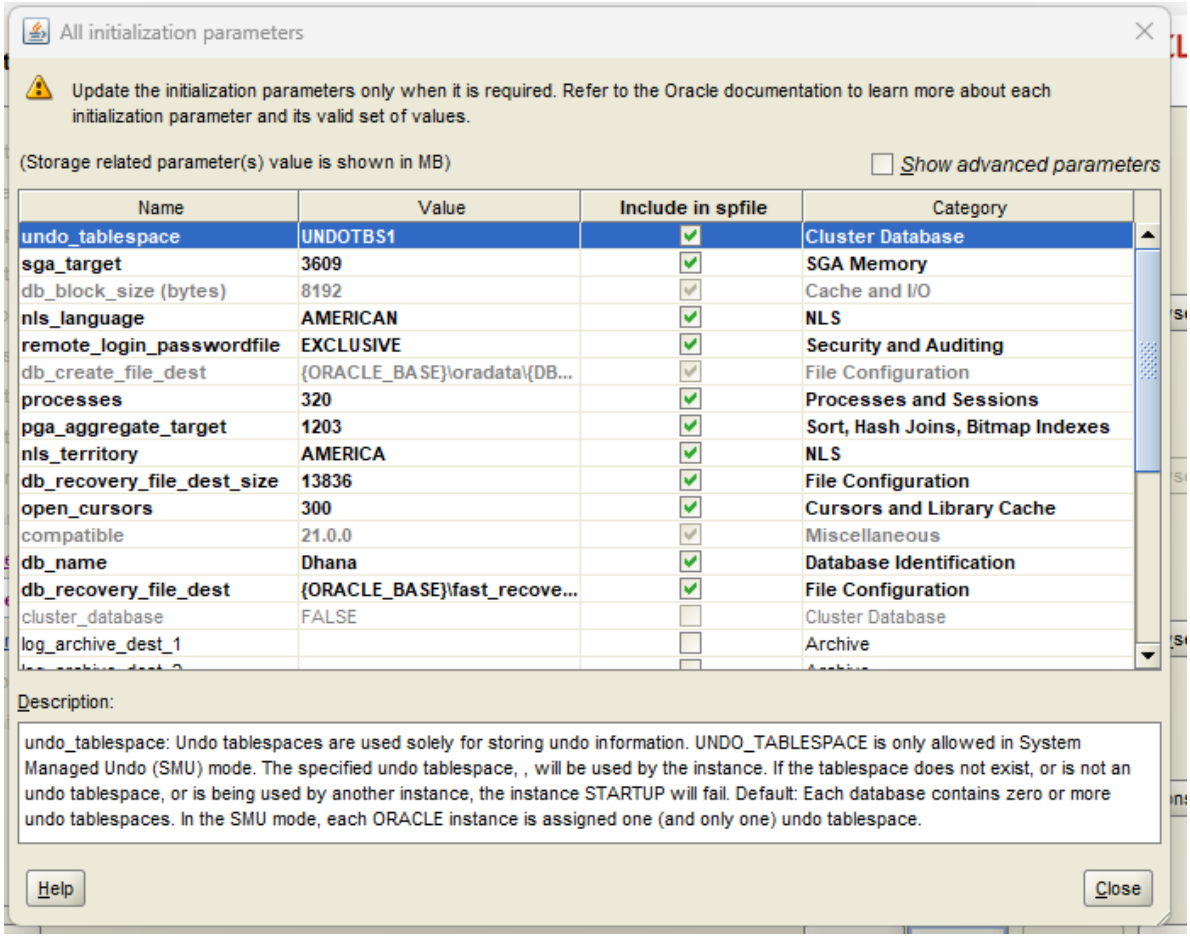


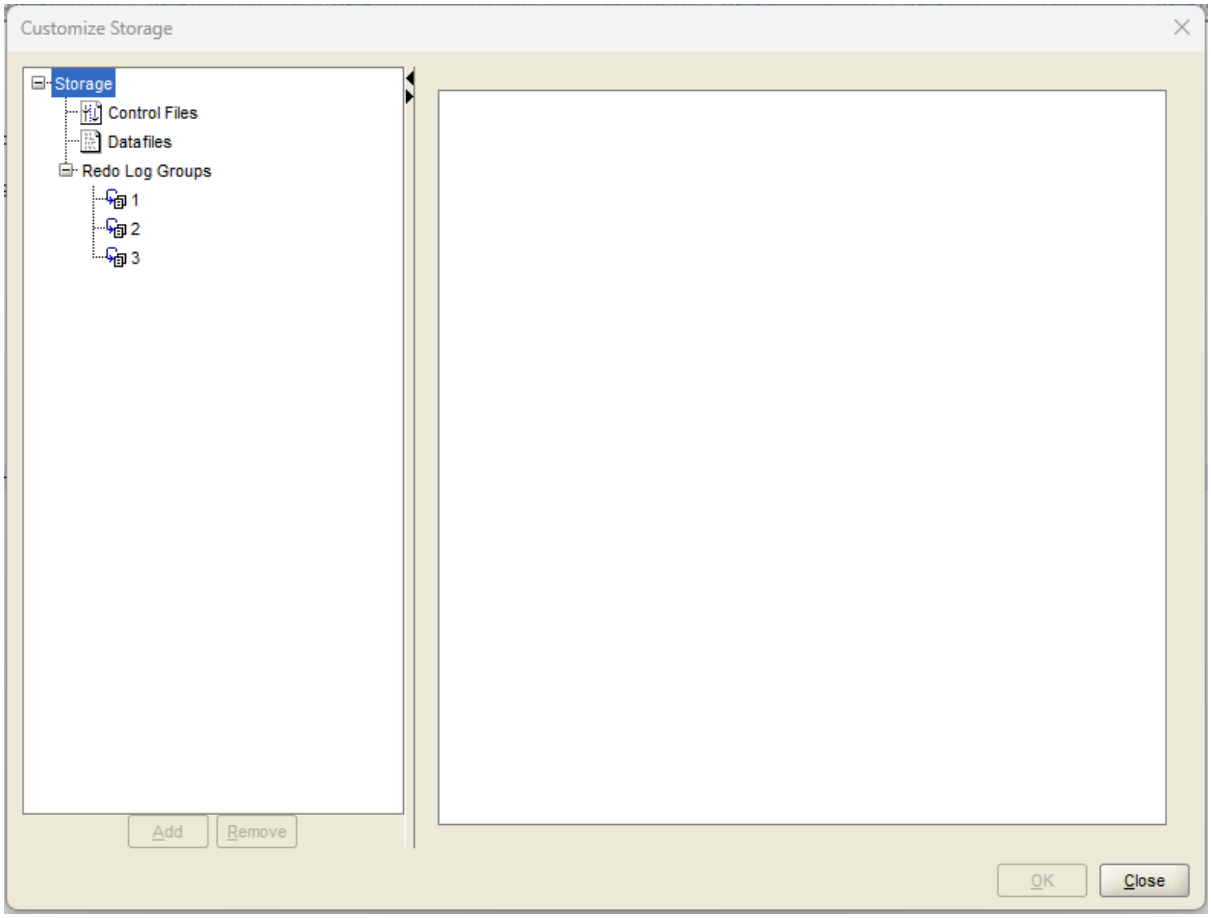
Enterprise manager is used to monitor and manage highly available database, middleware, and application technologies requiring a resilient platform. Features include rapid platform update for patching and updates, proactive health monitoring and diagnostics, and flexible high availability deployment options.

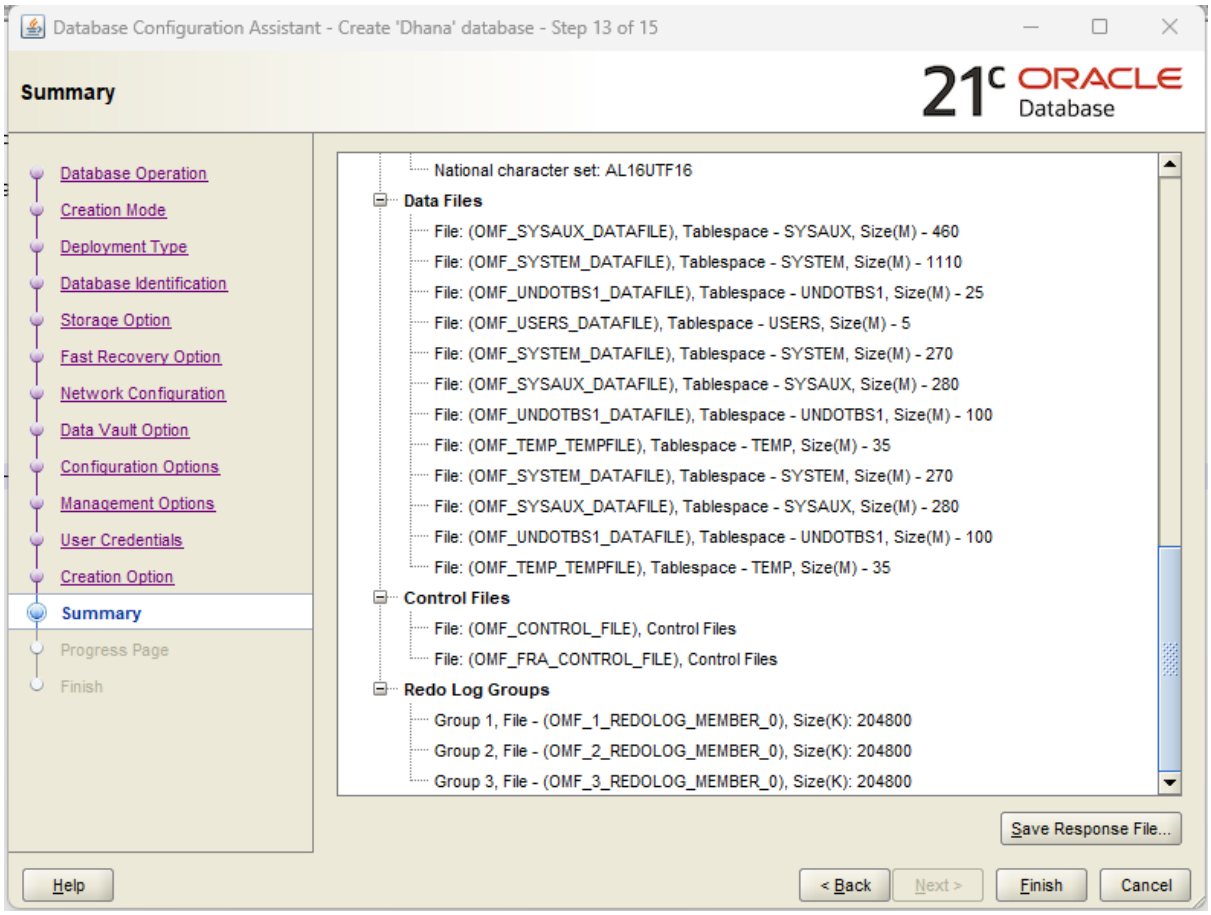

Database Configuration Assistant - Create 'Dhana' database - Step 10 of 15
Specify Management Options
21c ORACLE Database
Database Operation
Creation Mode
Deployment Type
Database Identification
Storage Option
Fast Recovery Option
Network Configuration
Data Vault Option
Configuration Options
Management Options
User Credentials
Creation Option
Summary
Progress Page
Finish
Specify the management options for the database.
Configure Enterprise Manager (EM) database express
EM database express port:
5500
Configure EM database express port as global port
Register with Enterprise Manager (EM) cloud control
OMS host:
OMS port:
EM admin username:
EM admin password:
Help
< Back
Next >
Finish
Cancel


Database Configuration Assistant - Create 'Dhana' database - Step 11 of 15
Specify Database User Credentials
21c ORACLE Database
Database Operation
Creation Mode
Deployment Type
Database Identification
Storage Option
Fast Recovery Option
Network Configuration
Data Vault Option
Configuration Options
Management Options
User Credentials
Creation Option
Summary
Progress Page
Finish
You must specify passwords for the following user accounts in the new database for security reasons.
Use different administrative passwords
Password
Confirm password
SYS
SYSTEM
PDBADMIN
Use the same administrative password for all accounts
Password:
Confirm password:
Help
< Back
Next >
Finish
Cancel

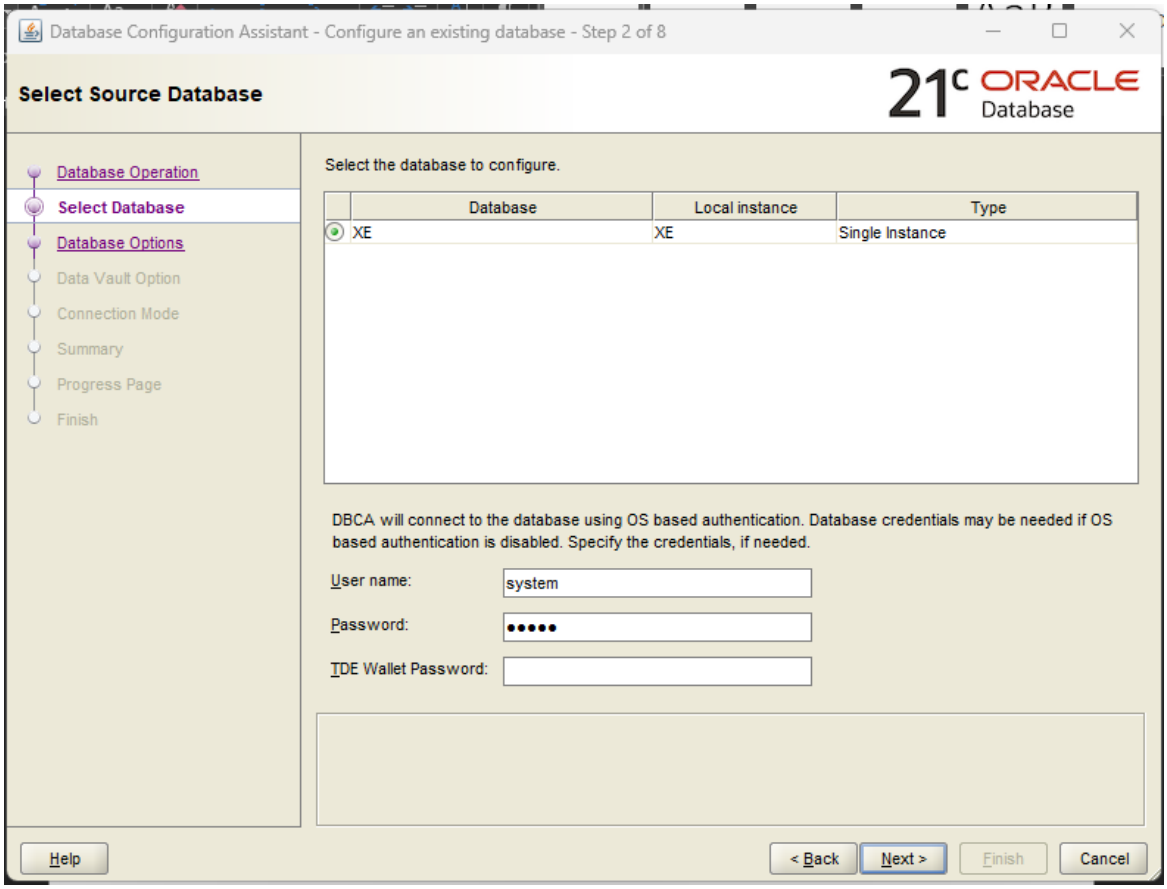

Database Configuration Assistant - Create 'Dhana' database - Step 12 of 15
Select Database Creation Option
21c ORACLE Database
Database Operation
Creation Mode
Deployment Type
Database Identification
Storage Option
Fast Recovery Option
Network Configuration
Data Vault Option
Configuration Options
Management Options
User Credentials
Creation Option
Summary
Progress Page
Finish
Select the database creation options.
Create database
Specify the SQL scripts you want to run after the database is created. The scripts are run in the order listed below.
Post DB creation scripts:
Browse...
Save as a database template
Template name:
dbca_template_2024-04-14_04-53-23PM
Template location:
C:\app\Admin\product\21c\homes\OraDB21Home1\assistants\dbca\templa
Browse...
Description:
Generate database creation scripts
Destination directory:
{ORACLE_BASE}\admin\{DB_UNIQUE_NAME}\scripts
Browse...
Following advanced configuration options can be used to configure initialization parameters and customize database storage locations.
All Initialization Parameters...
Customize Storage Locations...
Help
< Back
Next >
Finish
Cancel

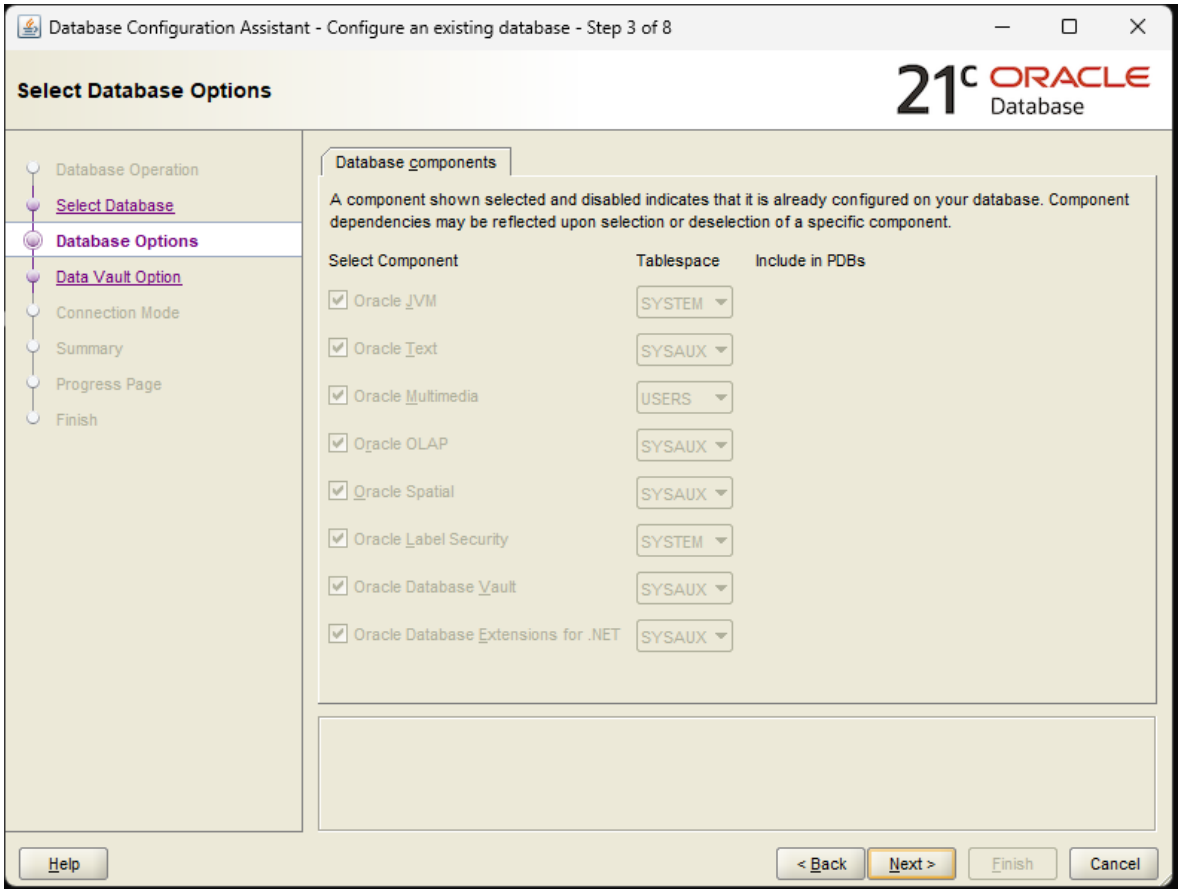

All initialization parameters
Update the initialization parameters only when it is required. Refer to the Oracle documentation to learn more about each initialization parameter and its valid set of values.
(Storage related parameter(s) value is shown in MB)
Show advanced parameters
Name
Value
Include in spfile
Category
undo_tablespace
UNDOTBS1
Cluster Database
sga_target
3609
SGA Memory
db_block_size (bytes)
8192
Cache and I/O
nls_language
AMERICAN
NLS
remote_login_passwordfile
EXCLUSIVE
Security and Auditing
db_create_file_dest
{ORACLE_BASE}\oradata\{DB...
File Configuration
processes
320
Processes and Sessions
pga_aggregate_target
1203
Sort, Hash Joins, Bitmap Indexes
nls_territory
AMERICA
NLS
db_recovery_file_dest_size
13836
File Configuration
open_cursors
300
Cursors and Library Cache
compatible
21.0.0
Miscellaneous
db_name
Dhana
Database Identification
db_recovery_file_dest
{ORACLE_BASE}\fast_recove...
File Configuration
cluster_database
FALSE
Cluster Database
log_archive_dest_1
Archive
Description:
undo_tablespace: Undo tablespaces are used solely for storing undo information. UNDO_TABLESPACE is only allowed in System Managed Undo (SMU) mode. The specified undo tablespace, , will be used by the instance. If the tablespace does not exist, or is not an undo tablespace, or is being used by another instance, the instance STARTUP will fail. Default: Each database contains zero or more undo tablespaces. In the SMU mode, each ORACLE instance is assigned one (and only one) undo tablespace.
Help
Close

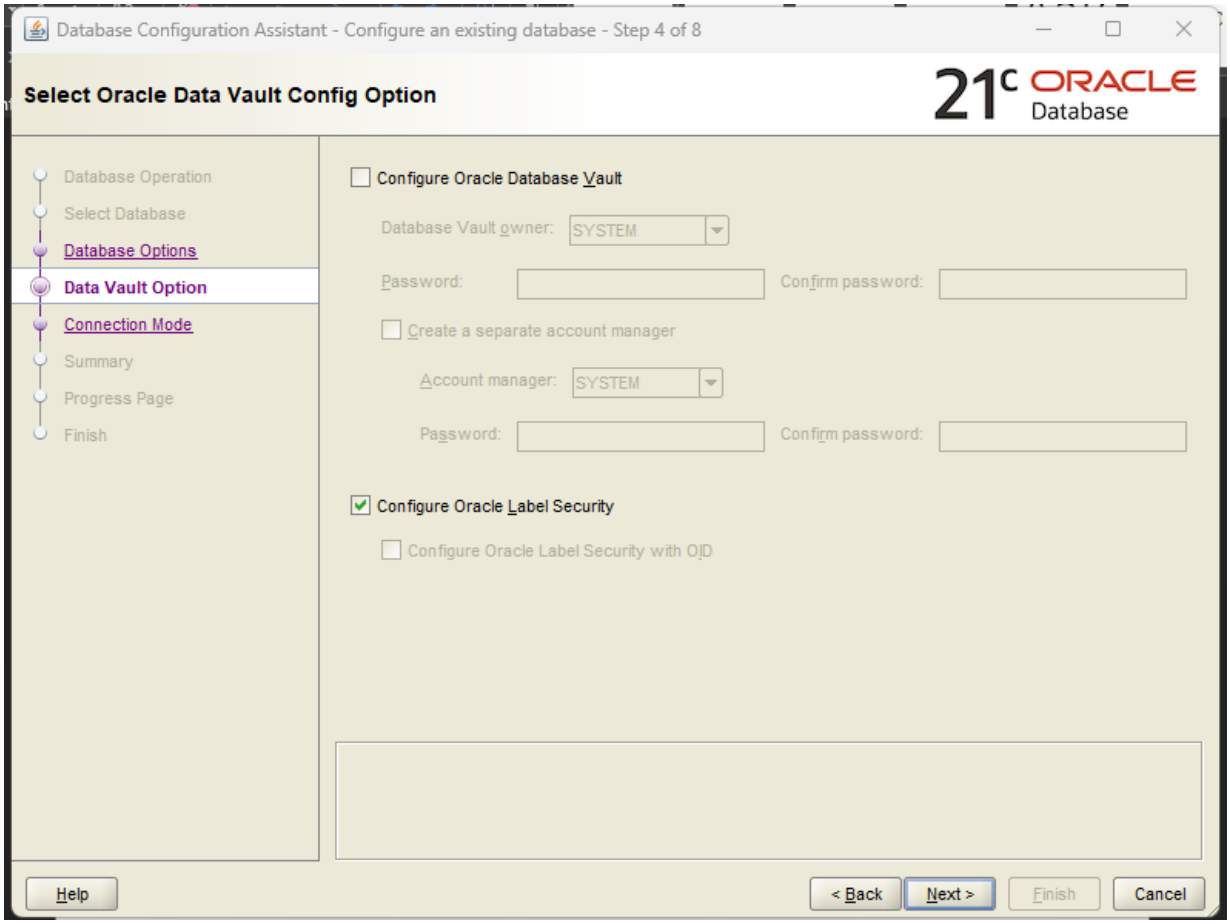

Customize Storage
Storage
Control Files
Datafiles
Redo Log Groups
1
2
3
Add
Remove
OK
Close

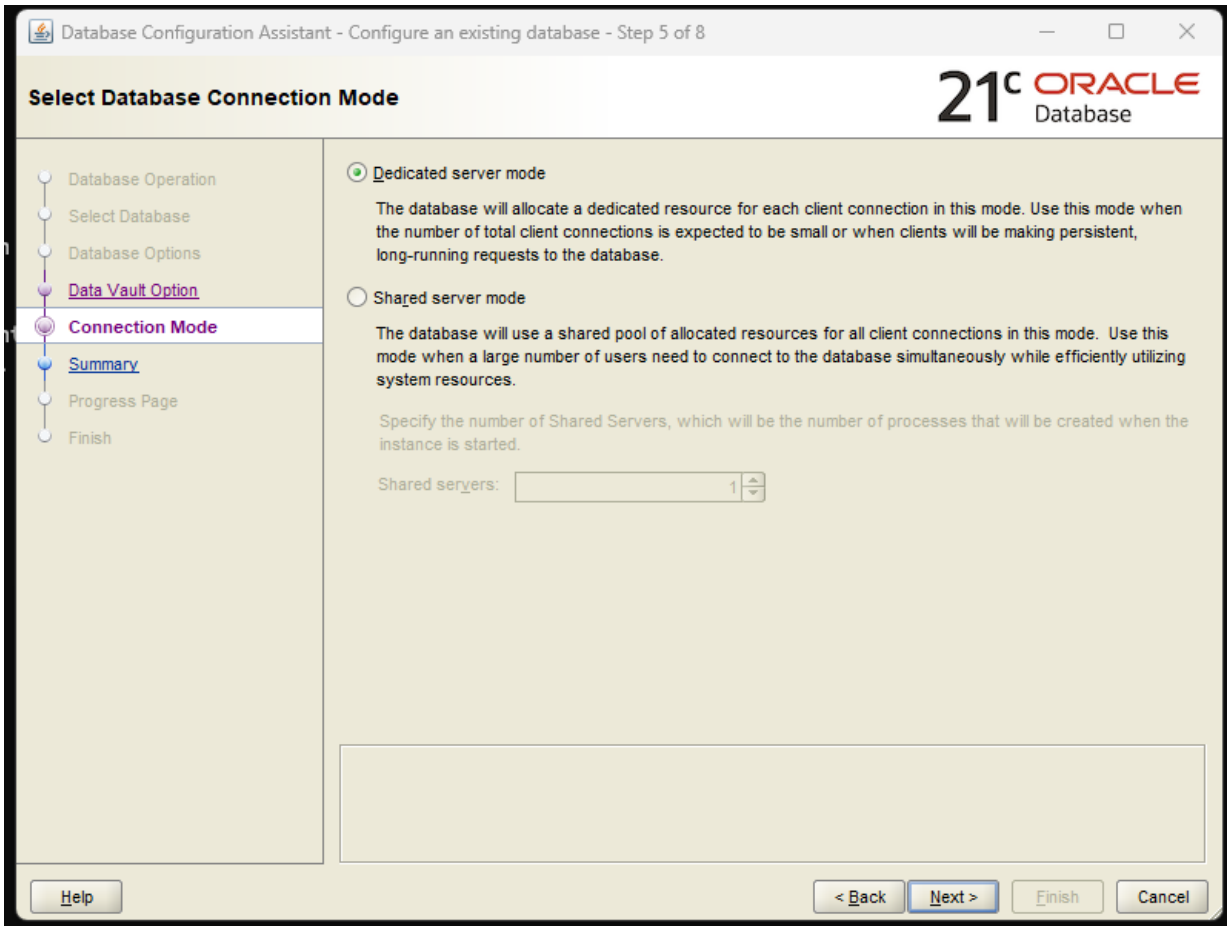

Database Configuration Assistant - Create 'Dhana' database - Step 13 of 15
Summary
21c ORACLE Database
Database Operation
Creation Mode
Deployment Type
Database Identification
Storage Option
Fast Recovery Option
Network Configuration
Data Vault Option
Configuration Options
Management Options
User Credentials
Creation Option
Summary
Progress Page
Finish
National character set: AL16UTF16
Data Files
File: (OMF_SYSAUX_DATAFILE), Tablespace - SYSAUX, Size(M) - 460
File: (OMF_SYSTEM_DATAFILE), Tablespace - SYSTEM, Size(M) - 1110
File: (OMF_UNDOTBS1_DATAFILE), Tablespace - UNDOTBS1, Size(M) - 25
File: (OMF_USERS_DATAFILE), Tablespace - USERS, Size(M) - 5
File: (OMF_SYSTEM_DATAFILE), Tablespace - SYSTEM, Size(M) - 270
File: (OMF_SYSAUX_DATAFILE), Tablespace - SYSAUX, Size(M) - 280
File: (OMF_UNDOTBS1_DATAFILE), Tablespace - UNDOTBS1, Size(M) - 100
File: (OMF_TEMP_TEMPFILE), Tablespace - TEMP, Size(M) - 35
File: (OMF_SYSTEM_DATAFILE), Tablespace - SYSTEM, Size(M) - 270
File: (OMF_SYSAUX_DATAFILE), Tablespace - SYSAUX, Size(M) - 280
File: (OMF_UNDOTBS1_DATAFILE), Tablespace - UNDOTBS1, Size(M) - 100
File: (OMF_TEMP_TEMPFILE), Tablespace - TEMP, Size(M) - 35
Control Files
File: (OMF_CONTROL_FILE), Control Files
File: (OMF_FRA_CONTROL_FILE), Control Files
Redo Log Groups
Group 1, File - (OMF_1_REDOLOG_MEMBER_0), Size(K): 204800
Group 2, File - (OMF_2_REDOLOG_MEMBER_0), Size(K): 204800
Group 3, File - (OMF_3_REDOLOG_MEMBER_0), Size(K): 204800
Save Response File...
Help
< Back
Next >
Finish
Cancel

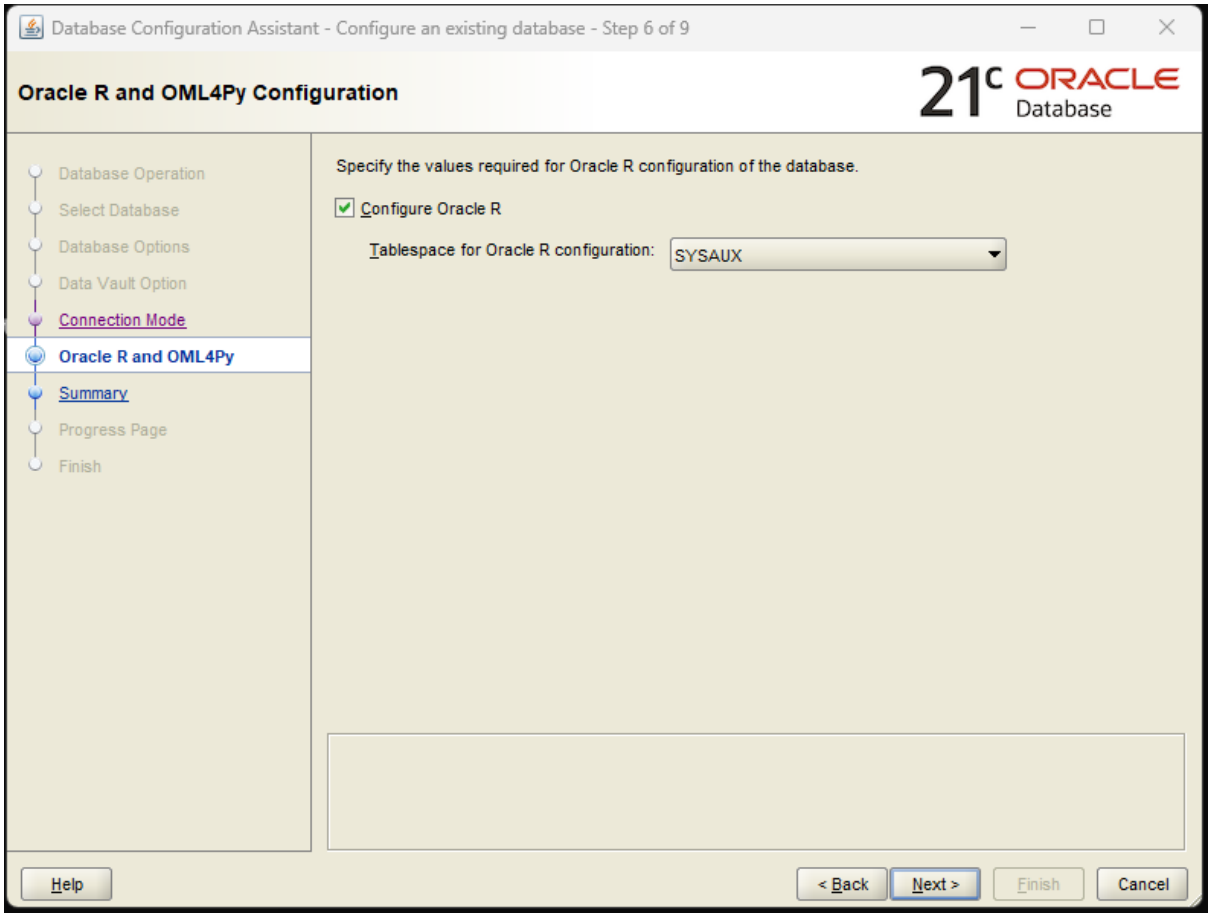
3) Configuring existing database

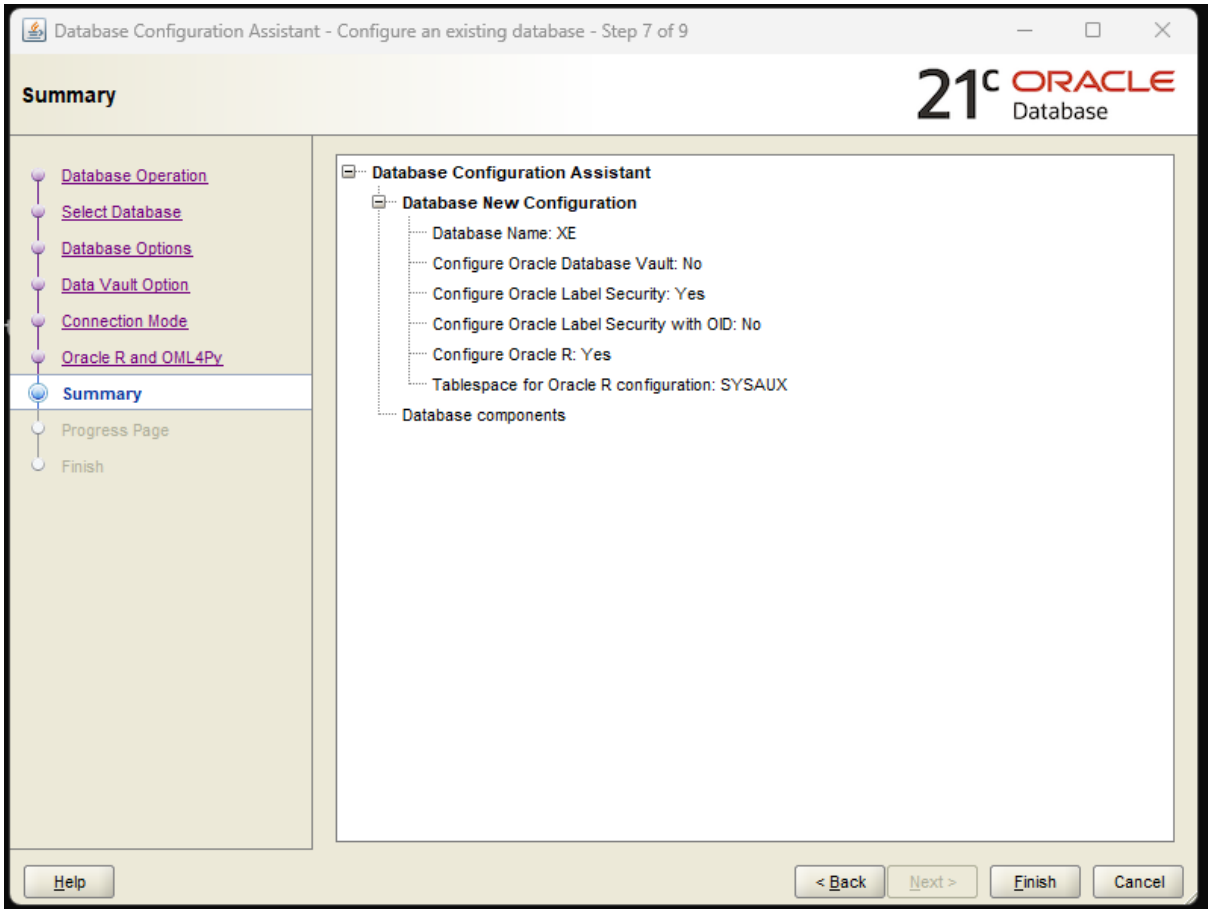


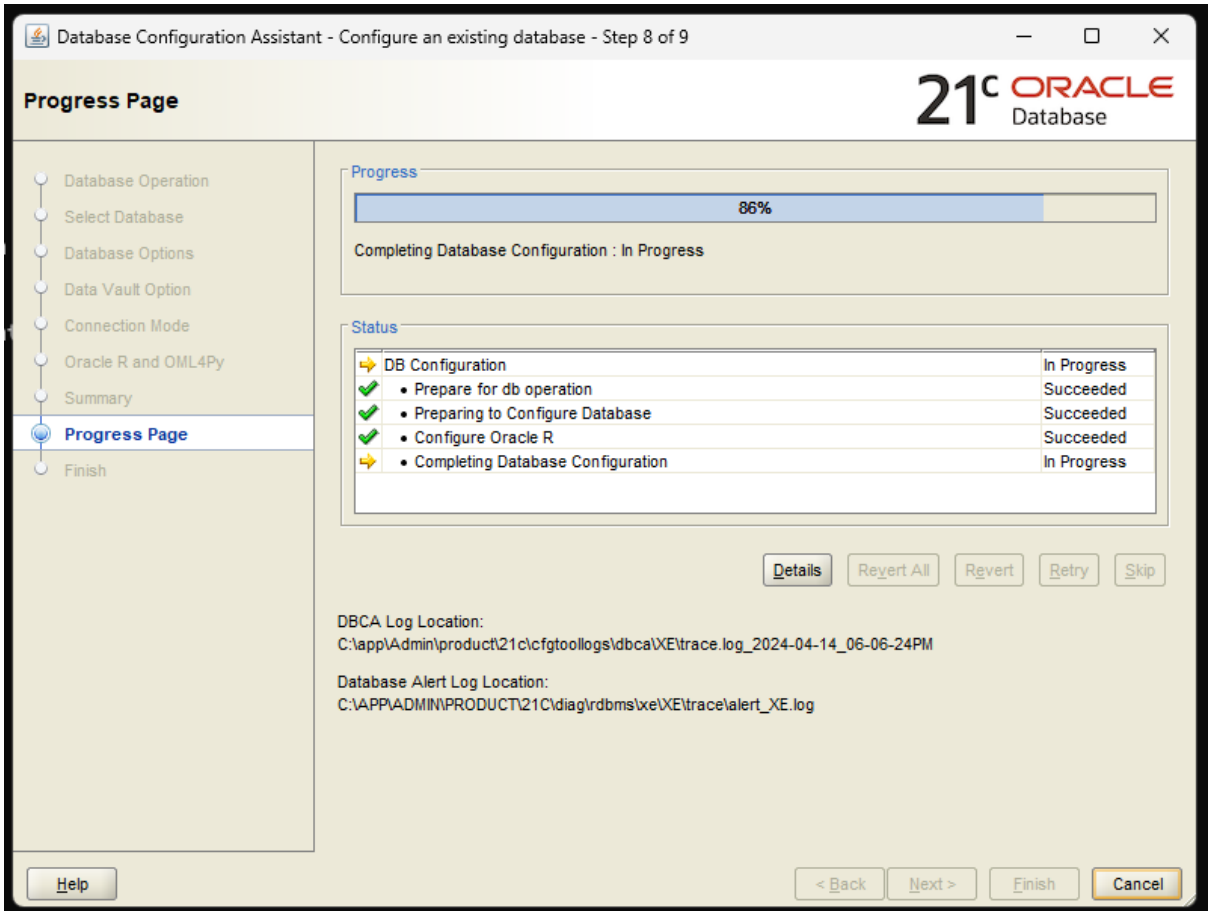


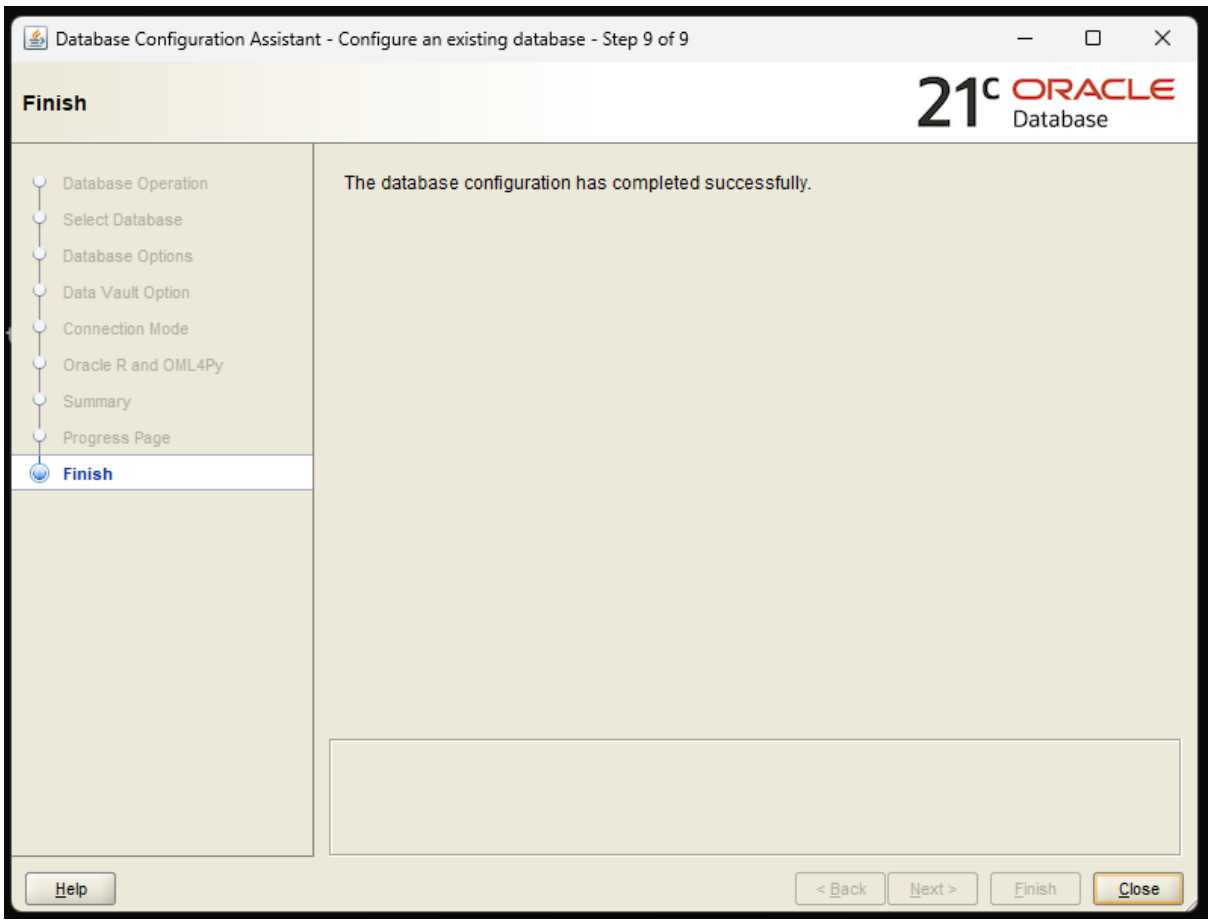

Database Configuration Assistant - Configure an existing database - Step 4 of 8
Select Oracle Data Vault Config Option
21c ORACLE Database
Database Operation
Select Database
Database Options
Data Vault Option
Connection Mode
Summary
Progress Page
Finish
Configure Oracle Database Vault
Database Vault owner:
SYSTEM
Password:
Confirm password:
Create a separate account manager
Account manager:
SYSTEM
Password:
Confirm password:
Configure Oracle Label Security
Configure Oracle Label Security with OID
Help
< Back
Next >
Finish
Cancel


Database Configuration Assistant - Configure an existing database - Step 5 of 8
Select Database Connection Mode
21c ORACLE Database
Database Operation
Select Database
Database Options
Data Vault Option
Connection Mode
Summary
Progress Page
Finish
Dedicated server mode
The database will allocate a dedicated resource for each client connection in this mode. Use this mode when the number of total client connections is expected to be small or when clients will be making persistent, long-running requests to the database.
Shared server mode
The database will use a shared pool of allocated resources for all client connections in this mode. Use this mode when a large number of users need to connect to the database simultaneously while efficiently utilizing system resources.
Specify the number of Shared Servers, which will be the number of processes that will be created when the instance is started.
Shared servers:
1
Help
< Back
Next >
Finish
Cancel


Database Configuration Assistant - Configure an existing database - Step 6 of 9
Oracle R and OML4Py Configuration
21c ORACLE Database
Database Operation
Select Database
Database Options
Data Vault Option
Connection Mode
Oracle R and OML4Py
Summary
Progress Page
Finish
Specify the values required for Oracle R configuration of the database.
Configure Oracle R
Tablespace for Oracle R configuration:
SYSAUX
Help
< Back
Next >
Finish
Cancel


Database Configuration Assistant - Configure an existing database - Step 7 of 9
Summary
21c ORACLE Database
Database Operation
Select Database
Database Options
Data Vault Option
Connection Mode
Oracle R and OML4Py
Summary
Progress Page
Finish
Database Configuration Assistant
Database New Configuration
Database Name: XE
Configure Oracle Database Vault: No
Configure Oracle Label Security: Yes
Configure Oracle Label Security with OID: No
Configure Oracle R: Yes
Tablespace for Oracle R configuration: SYSAUX
Database components
Help
< Back
Next >
Finish
Cancel


Database Configuration Assistant - Configure an existing database - Step 8 of 9
Progress Page
21c ORACLE Database
Database Operation
Select Database
Database Options
Data Vault Option
Connection Mode
Oracle R and OML4Py
Summary
Progress Page
Finish
Progress
86%
Completing Database Configuration : In Progress
Status
DB Configuration
In Progress
• Prepare for db operation
Succeeded
• Preparing to Configure Database
Succeeded
• Configure Oracle R
Succeeded
• Completing Database Configuration
In Progress
Details
Revert All
Revert
Retry
Skip
DBCA Log Location:
C:\app\Admin\product\21c\cfgtoollogs\dbca\XE\trace.log_2024-04-14_06-06-24PM
Database Alert Log Location:
C:\APP\ADMIN\PRODUCT\21C\diag\rdbms\xe\XE\trace\alert_XE.log
Help
< Back
Next >
Finish
Cancel


Database Configuration Assistant - Configure an existing database - Step 9 of 9
Finish
21c ORACLE Database
Database Operation
Select Database
Database Options
Data Vault Option
Connection Mode
Oracle R and OML4Py
Summary
Progress Page
Finish
The database configuration has completed successfully.
Help
< Back
Next >
Finish
Close