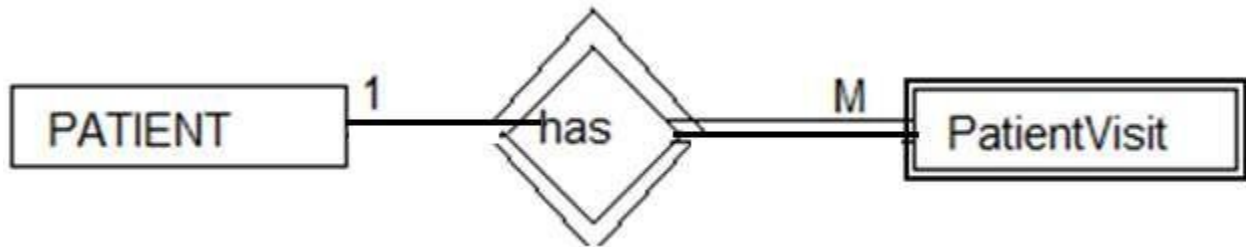


Dependent(ENO, SNO, Name, Gender, DOB, RelType)

ER Diagram with Identifying & Weakness Relationship

Exercise

Scenario: Identifying & Weak relationship



Scenario: Identifying & Strong relationship

Introduction to Database Administration

TOPIC 39

ER Diagram with Mapping

ER Diagram with Mapping

ER Diagram with Mapping

Relational Schema - Implementation Datasets

Example-1: Mapping 1-1

Example-2: Mapping 1-N

Example-3: Mapping M-N

Example-4: Mapping of Ternary Relationship

Mapping of Schema

ER Diagram with Mapping

Relational Schema – Implementation PKs, FKs are required

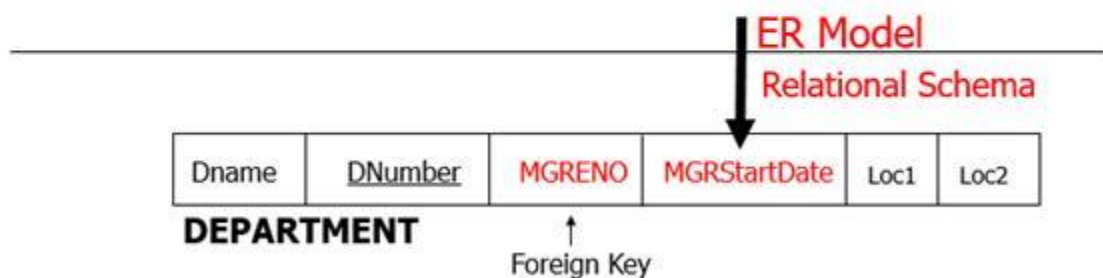
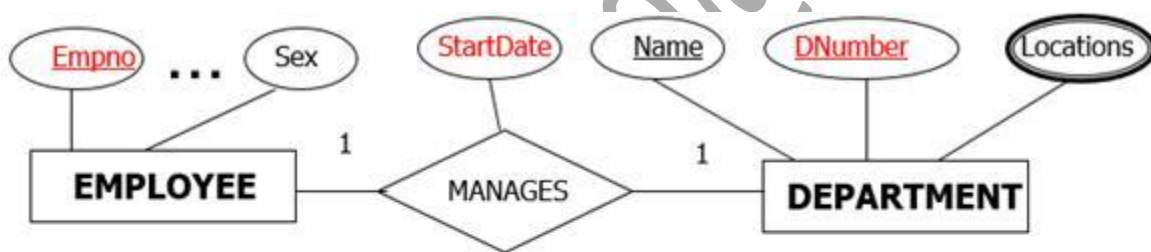
Course	CourseID	Title	CrHrs	Pre-Req
	CS203	Database System	3-3-3	CS201
	CS201	Data Structure	3-0-3	CS101
	CS303	Software Engineering	3-0-0	

CrsOffer	SemID	CourseID	Sec	Instr	B#	Room#	MasStu
	F2018	CS201	A	Ali Hassan	2	203	40
	F2018	CS201	B	Jamil	3	301	40
	S2019	CS203	A	Ejaz	2	203	55
	S2019	CS303	A	Jamil	1	101	50
	S2019	CS407	A		3		40

Our ER gives relational schema tables similar to above ... Applying Knowledge – Do able artifacts (Implementation) Each mapped table will have fewer records
Records should be referenced with the possible variations in tables

ER Diagram with Mapping

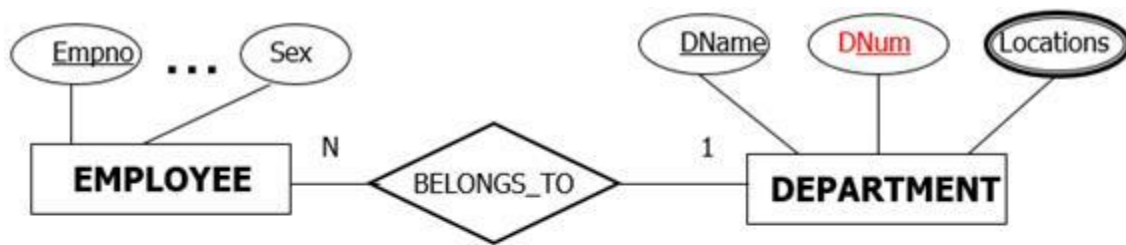
Example-1: Mapping 1-1



MGRSSN must be UNIQUE KEY to validate 1:1, Dname must has NOT NULL constraint

ER Diagram with Mapping

Example-2: Mapping 1-N



↓ **ER Model**
Relational Schema or ER Diagram

EMPLOYEE

Fname	Minit	Lname	<u>Emp#</u>	Bdate	Sex	Address	Salary	DNum
-------	-------	-------	-------------	-------	-----	---------	--------	------

DEPARTMENT

<u>DNum</u>	DName	Loc1	Loc2
-------------	-------	------	------

↑ Foreign Key

ER Diagram with Mapping
Example-3: Mapping M-N



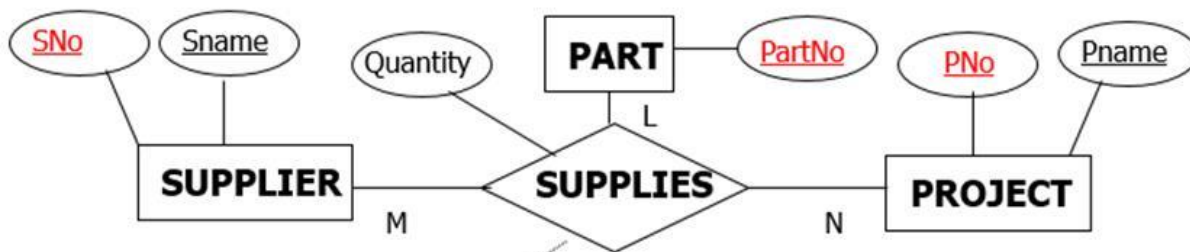
↓ **ER Model**
Relational Schema or ER Diagram

WORKS_ON	<u>ESSN</u>	<u>PNO</u>	Hours
-----------------	-------------	------------	-------

WORK_ON table requires in addition to tables EMPLOYEE and PROJECT

ESSN and PNO are the composite keys, Hours must has NOT NULL constraint

ER Diagram with Mapping
Example-4: Mapping of Ternary Relationship

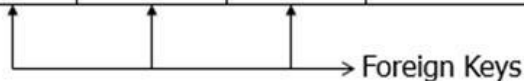


ER Model

Relational Schema or ER Diagram

SUPPLY

<u>SNo</u>	<u>PartNo</u>	<u>PNo</u>	Quantity
------------	---------------	------------	----------



Quantity must has NOT NULL constraint. Similar example can be Lecturer teaches course to students. Other example: Vehicle, Policeman, Ticket (Ticket# is a serial unique number)

Mapping of Schema

EMPLOYEE

ENAM, FNAME, WDATE, LNAME, SSN, BDATE, ADDRESS, SEX, SALARY, PERSSN, DNO

DEPARTMENT

DNAME, DNUMBER, MGR, ASN

MGRSTARTDATE

DEPT_LOCATIONS

<u>DNUMBER</u>	<u>DLOCATION</u>
----------------	------------------

PROJECT
PNAME PLUMBER

PLOCATIO I

DNUM

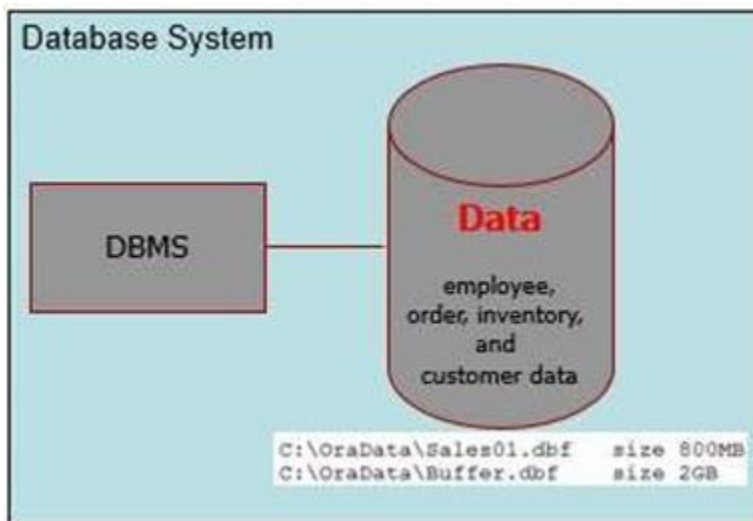
WORKS ON
ESSN PNO HOI S

DEPENOE
ESSN DEPENDENT NAME

SEX BDATE RELATIONSHIP ",'
Introduction to Database Administration

TOPIC 40

Oracle DBMS



Oracle DBMS

Oracle DBMS

Definition

Relational Model

Relational DB Elements

How data is organized?

RDBMS Operations

Oracle DBMS Quick History

Oracle DBMS

Definition

Database Management System (DBMS) is a software package that controls the storage, organization, and retrieval of data, a DBMS has the following elements:

Kernal code (manages memory and storage)

Repository of metadata (data dictionary)

Query Language (accessing data)

Oracle DBMS

Relational Model

Scientist E. F. Codd defined relational model based on mathematical theory, called relational model. The relational model has the following major aspects:

Structures (Well-defined objects store or access the data)

Operations (data manipulation)

Integrity rules (constraints or restrictions)

Oracle DBMS

Relational Database Elements

Table



Row



Column



Field or cell



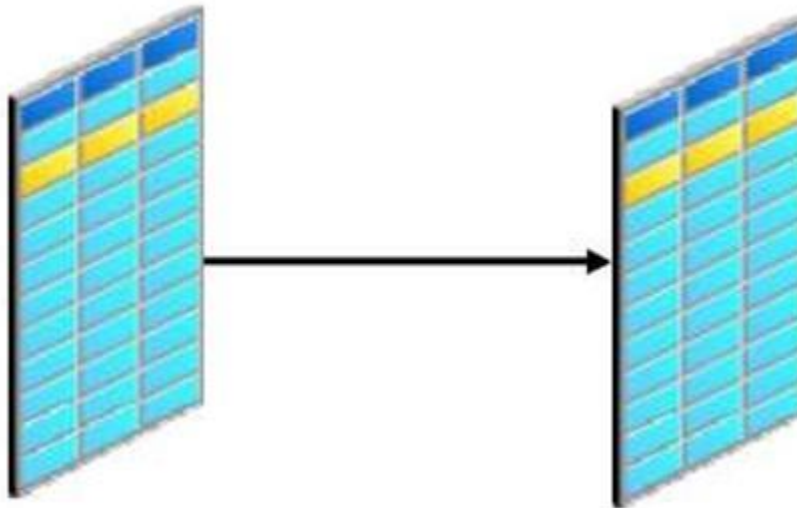
Tuple Attribute Cell

Oracle DBMS

How data is organized?

EMPLOYEES

DEPARTMENTS



Oracle DBMS

RDBMS Operations

Logical operations

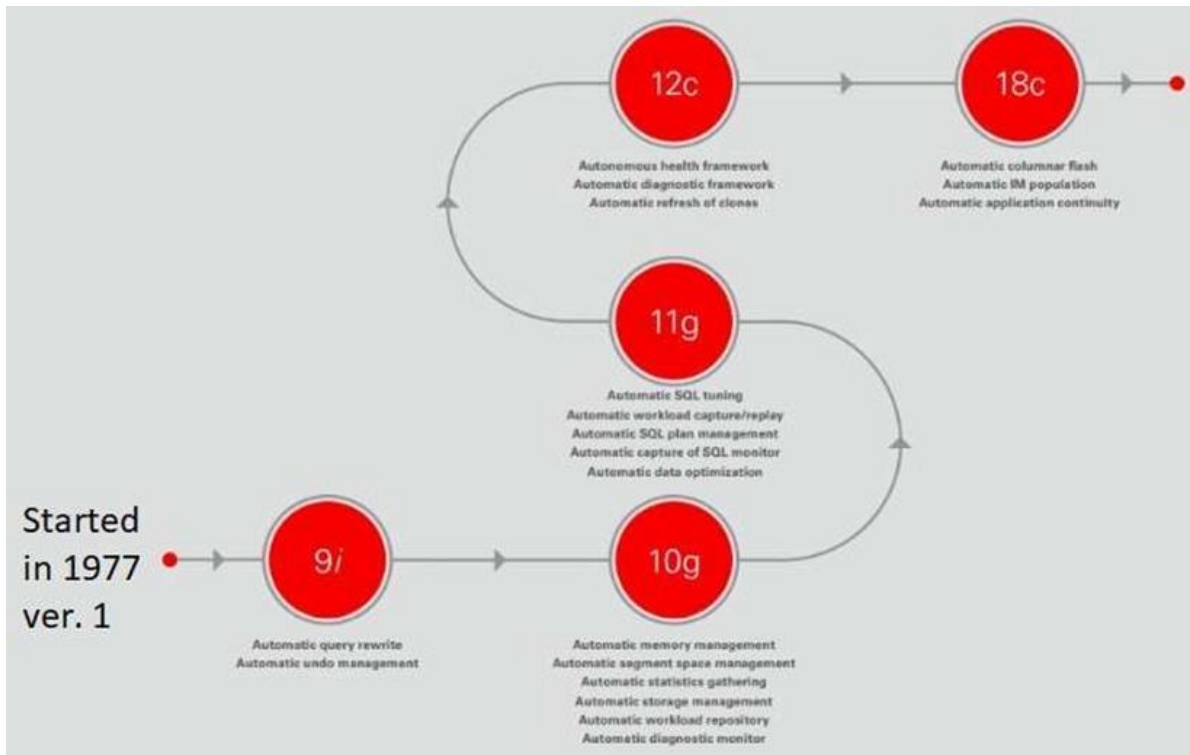
An application specifies what content is required. For example, an application requests an employee name or adds an employee record to a table. Execution of DDL in an application or schema of DBMS.

Physical operations

RDBMS determines how things should be done and carries out the operation. For example, after an application queries a table, the database may use an index to find the requested rows and read the data into memory etc. before returning result.

Both operations are independent to each other

Oracle DBMS



Oracle DBMS Quick History

www.oracle.com

Introduction to Database Administration

CS409 Handouts Made by Mahjabeen

mahjabeen97869@gmail.com

contact # 0321 2711298

TOPIC 41

Oracle Schema Objects & Data Access

Oracle Schema Objects & Data Access

Oracle Schema Objects & Data Access

Schema Objects

Types of Schema Objects

Tables

Indexes

Tables & Indexes in a Schema

Views, Sequences & Synonym

Data Access

Oracle Schema Objects & Data Access

Schema Objects

Physical data storage is independent from logical data structures

Schema is a collection of data structures, or schema objects

Schema is owned by the database user name.

Schema objects such as tables, views, indexes and sequences etc. are user- created structures that directly refer to the data (files) in the database.

BMS created objects are data dictionary views, user's roles etc.

Oracle Schema Objects & Data Access

Types of Schema Objects

Tables

Indexes

Constraints

Sequences

Views

Triggers

Sequences

Synonym

PL/SQL subprograms and packages, Java Classes etc.

Oracle Schema Objects & Data Access

Tables

Basic storage unit or schema object for storing data in structured form

Table consists rows and columns with specific data types of columns

Maximum number of columns are 255 and unlimited number of rows or tuples in a table

Every table is uniquely identified in a schema

Integrity constraints such as NOT NULL, CHECK and PKs etc. are applied on table's columns

Oracle Schema Objects & Data Access

Indexes

An index is an optional data structure that can be created on one or more columns of a table.

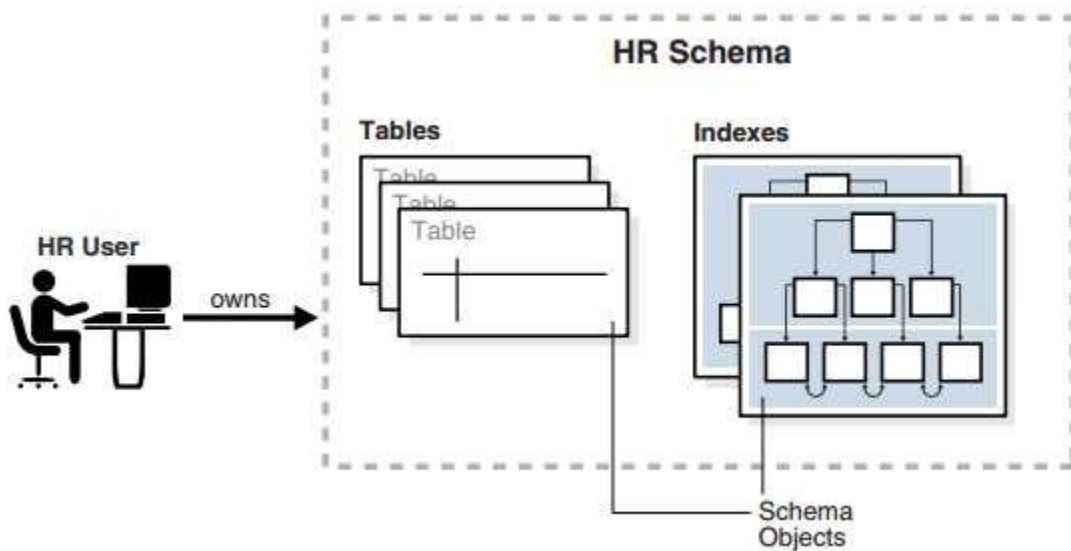
Index can increase performance of data retrieval

Index can be created on searching columns

Indexes are physically and logically independent

Oracle Schema Objects & Data Access

Tables & Indexes in a Schema



Oracle Schema Objects & Data Access

Views, Sequences & Synonym

Stored queries are called Views. Views do not keep separate data rather they extract data from tables

A Sequence is a user-created object that can be shared by multiple users. It can be used for PK column.

A Synonym is an alias for another schema object and does not require separate storage

Oracle Schema Objects & Data Access

Data Access

Data is accessed by SQL from DBMS.

PL/SQL, Java are also used to access the data from DBMS

Data is accessed by sub languages

DML and DCL.

Data is accessed in logical schema from physical data files through internal schema. Access paths for data access may varied.

Introduction to Database Administration

TOPIC 42

Oracle Transaction Management

Oracle Transaction Management

Oracle Transaction Management

Transaction management

Multi-user Environment

Transactions

Example of Funds Transfer

All or Nothing Transaction

PL/SQL Transaction Example

Oracle Transaction Management

Transaction Management

Oracle Database is designed as a multiuser database. The database must ensure that multiple users can work concurrently without corrupting one another's data.

Oracle Transaction Management

Multi-user Environment

Oracle Database is designed as a multiuser database. The database must ensure that multiple users can work concurrently without corrupting one another's data.

Oracle Transaction Management

Transactions

SQL is initiated at user level (client) and it executes on Server (central Database) at a distant, may be from one city to another.

A transaction is a logical, atomic unit of work (block) that contains one or more SQL statements.

Either transaction is done (**committed**) or not done (**rolled back**). No partial execution of transaction is allowed.

Oracle Transaction Management

Example of Funds Transfer

A transaction is a funds transfer from a saving account to a checking account. The transfer consists of the following separate operations:

- Decrease the saving account
- Increase the checking account
- Record the transaction in the transaction journal

Oracle Transaction Management

Example of Funds Transfer

Oracle Database guarantees that all three operations **succeed or fail** as a unit. In case of failure, all three operations will be rolled back.

Oracle Transaction Management

All or Nothing Transactions

If you perform an atomic operation that updates several files, and if the system fails halfway through, then the files will not be consistent. In contrast, a transaction moves an Oracle Database from one consistent state to another

All or nothing, basic principle of atomic execution of a transaction

Oracle Transaction Management

PL/SQL Transactions Example

```
BEGIN
    update emp
    set sal = 500
    where empno = 7988;

    delete from emp
    where empno = 7414;

    COMMIT;
EXCEPTION
    WHEN OTHERS THEN
        ROLLBACK;
END;
/
```

Introduction to Database Administration

TOPIC 43

Oracle Database Architecture
Oracle Database Architecture

Oracle Database Architecture

Database Architecture
Database & Instance
Oracle DB Server Architecture
Instance DB Configuration
Database Physical Storage Structure
Database Logical Storage Structure
Oracle Database Architecture

Database Architecture

A database server is the key to information management

In general, a server reliably manages a large amount of data in a multiuser environment so that users can concurrently access the same data

A database server also prevents unauthorized access and provides efficient solutions for failure recovery.

Oracle Database Architecture

Database & Instance

A database is a set of files, located on disk, that store data. These files can exist independently of a database instance.

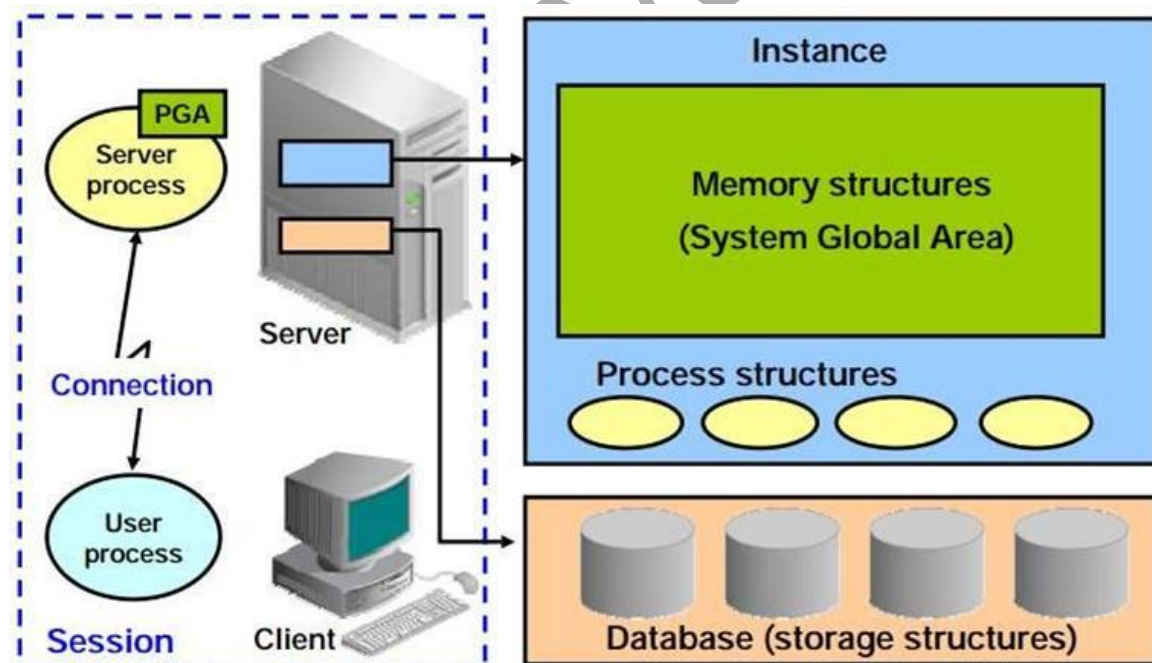
An instance is a set of memory structures that manage database files. The instance consists of a shared memory area, called the system global area (**SGA**), and a set of background processes. An instance can exist independently of database files.

Oracle Database Architecture

Database & Instance

Each client process is associated with its own server process. The server process has its own private session memory, known as the program global area (**PGA**).

Oracle Database Architecture

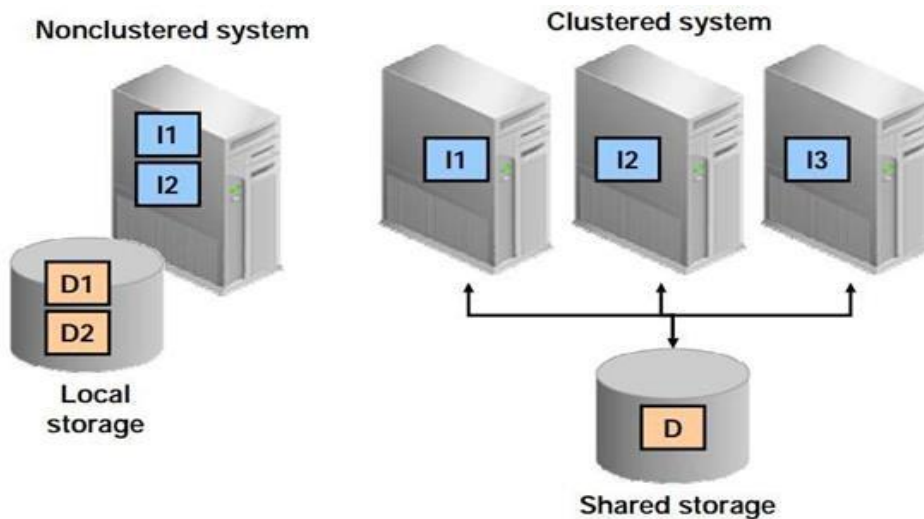


Oracle DB Server Architecture

Each client process is associated with its own server process. The server process has its own private session memory, known as the program global area (PGA).

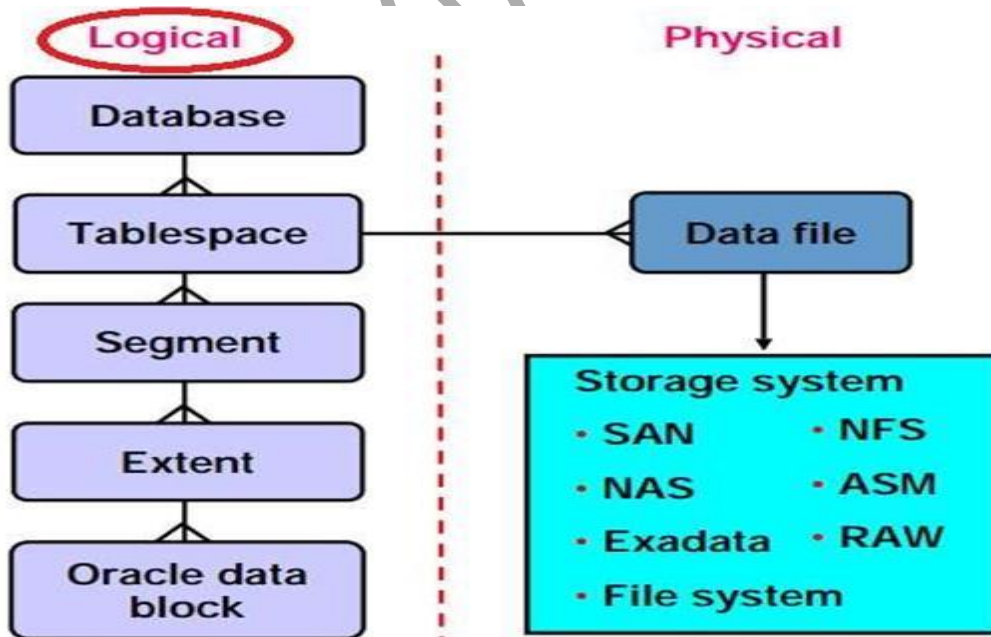
Oracle Database Architecture

Instance DB Configuration



Oracle Database Architecture

Database Logical Storage Structure



Oracle Database Architecture

Database Physical Storage Structure



Control files



Data files



Online redo log files



Parameter file



Backup files



Archived redo log files



Password file



Alert log and trace files

TOPIC 44

Oracle11g Installation

Oracle11g Installation

Installation Steps

Installation Startup

Installation ...

Login with Oracle Database Manager

OS Services

How to un-install Oracle?

Oracle11g Installation

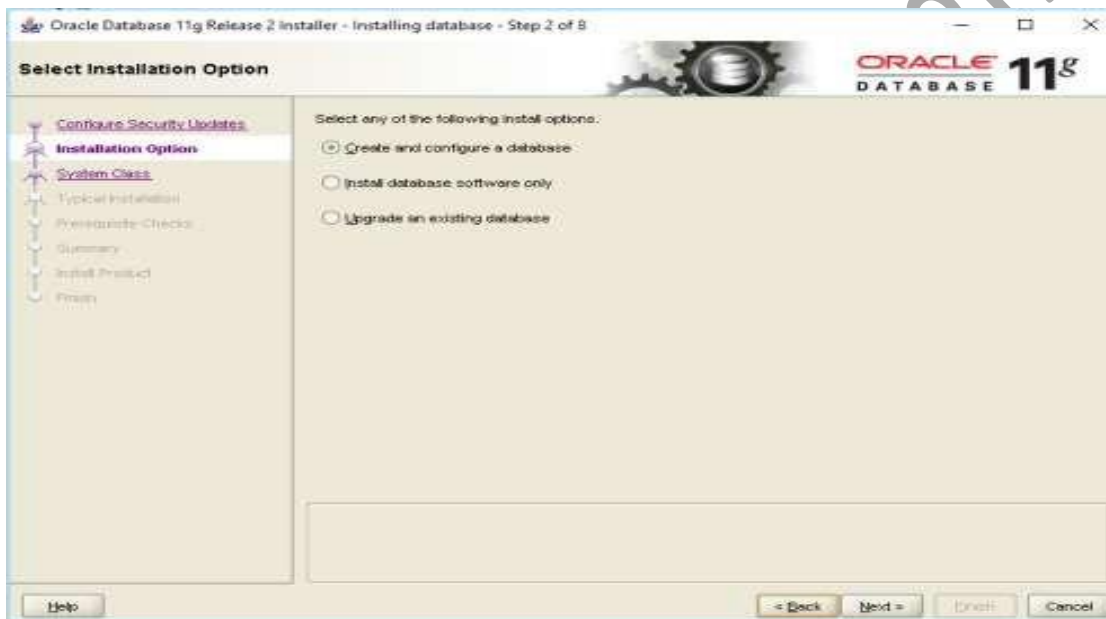
Installation Startup

Before Installing Oracle, you must installed complete OS windows with all patches and Activations (Install Java JDK 1.5 (e.g.,

jre-1_5_0-windows-i586.exe)

Name	Date modified	Type	Size
doc	02-Sep-19 11:54 AM	File folder	
install	02-Sep-19 11:54 AM	File folder	
response	02-Sep-19 11:54 AM	File folder	
stage	02-Sep-19 11:55 AM	File folder	
setup.exe	12-Mar-10 5:49 AM	Application	530 KB
welcome.html	02-Mar-10 8:52 PM	Chrome HTML Do...	5 KB

Run SETUP.EXE to start Oracle Universal Installer
Oracle11g Installation
Installation Startup

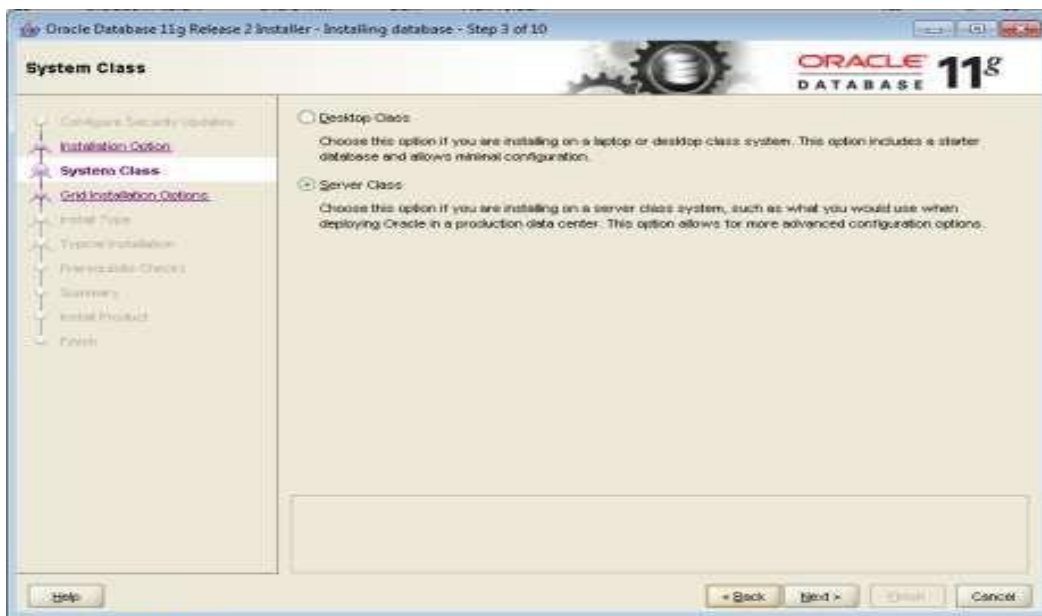


Before Installing Oracle, you must install complete OS windows with all patches and activations. You may get this pop up in case if you have oracle previous Installation, other proceed with next choice.

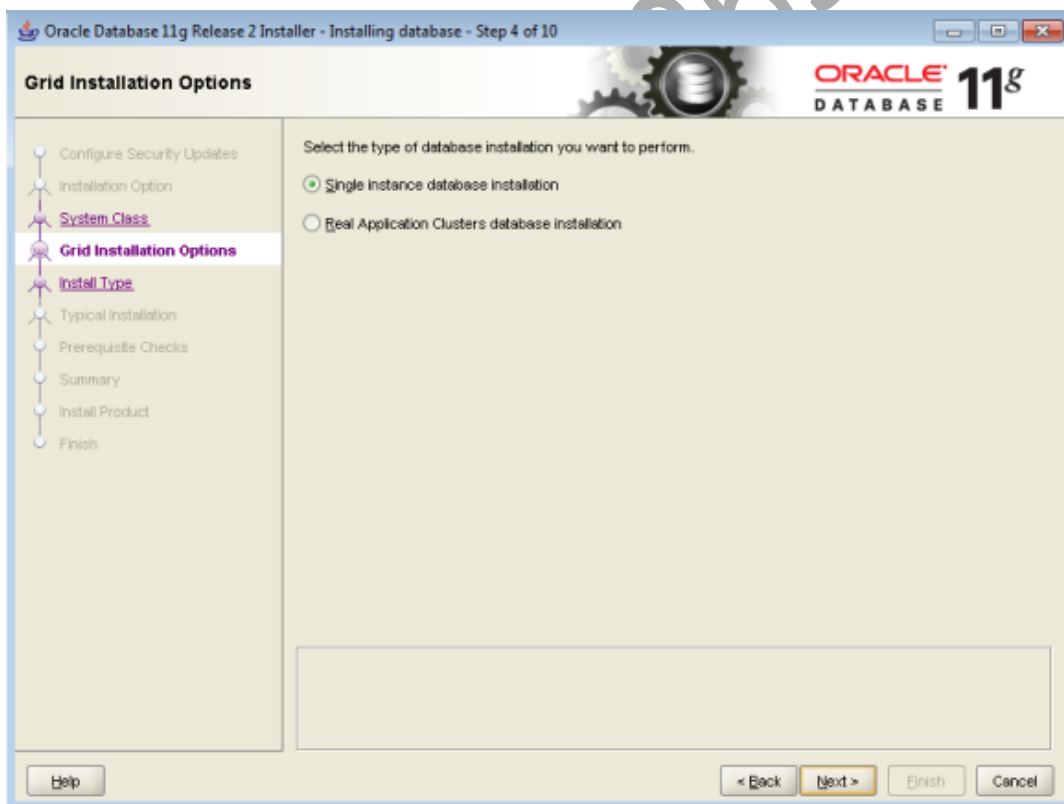
Oracle11g Installation

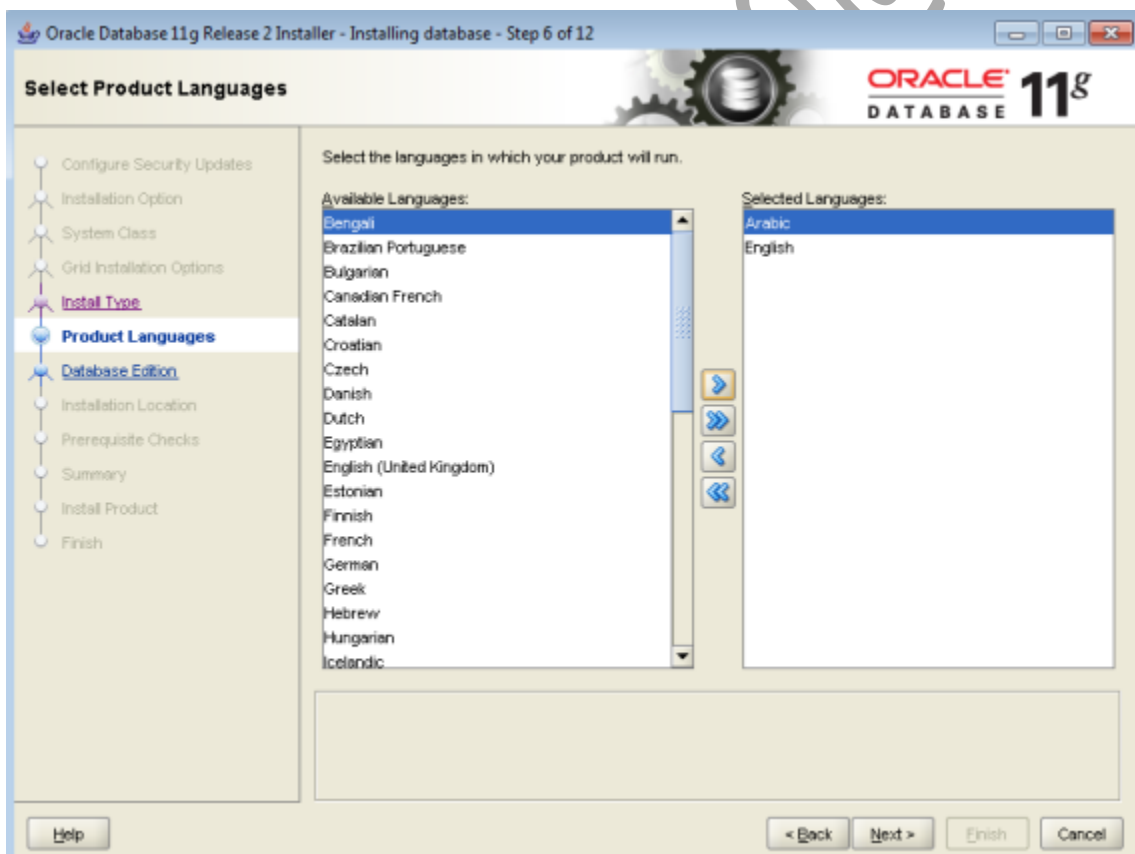
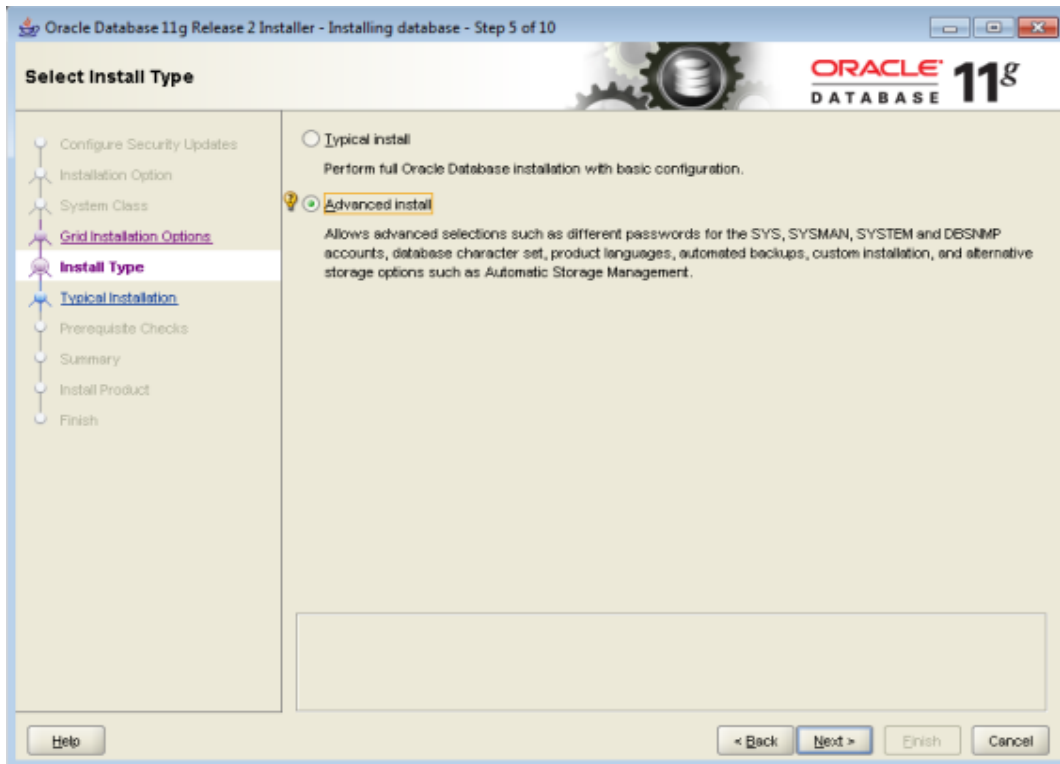
Installation Startup

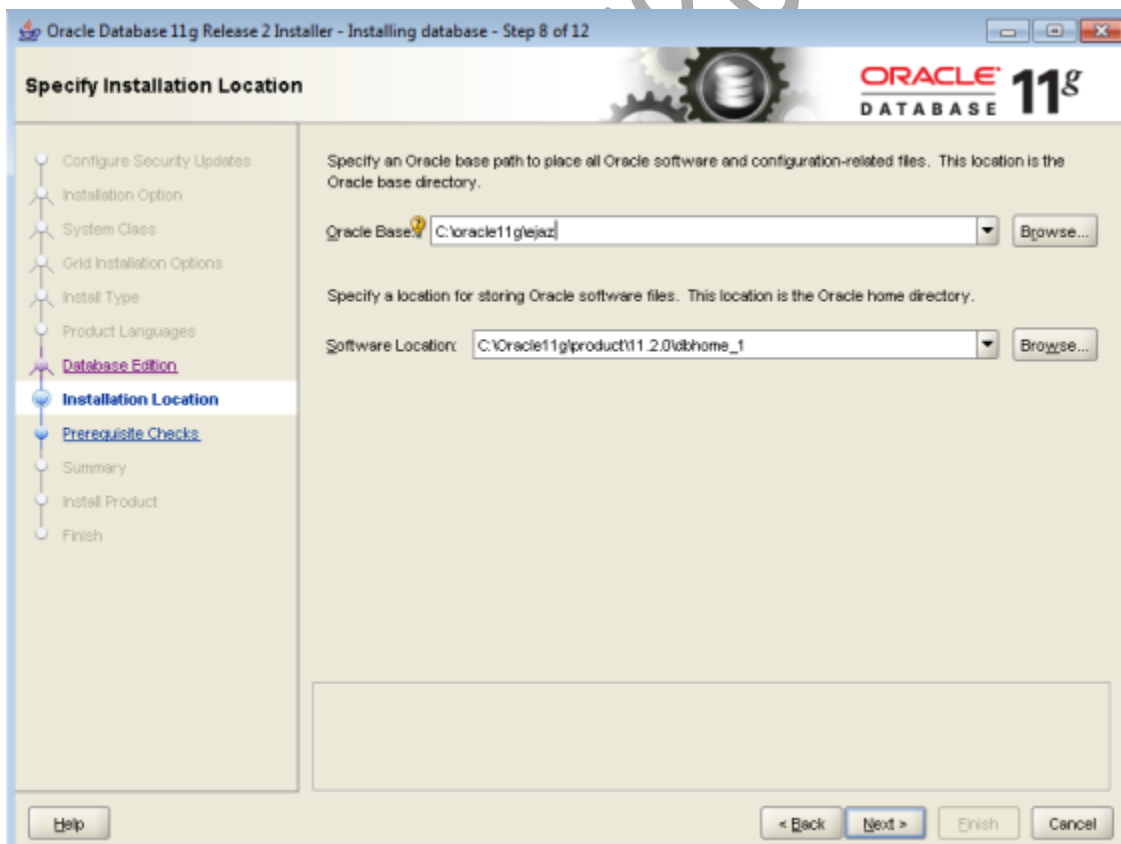
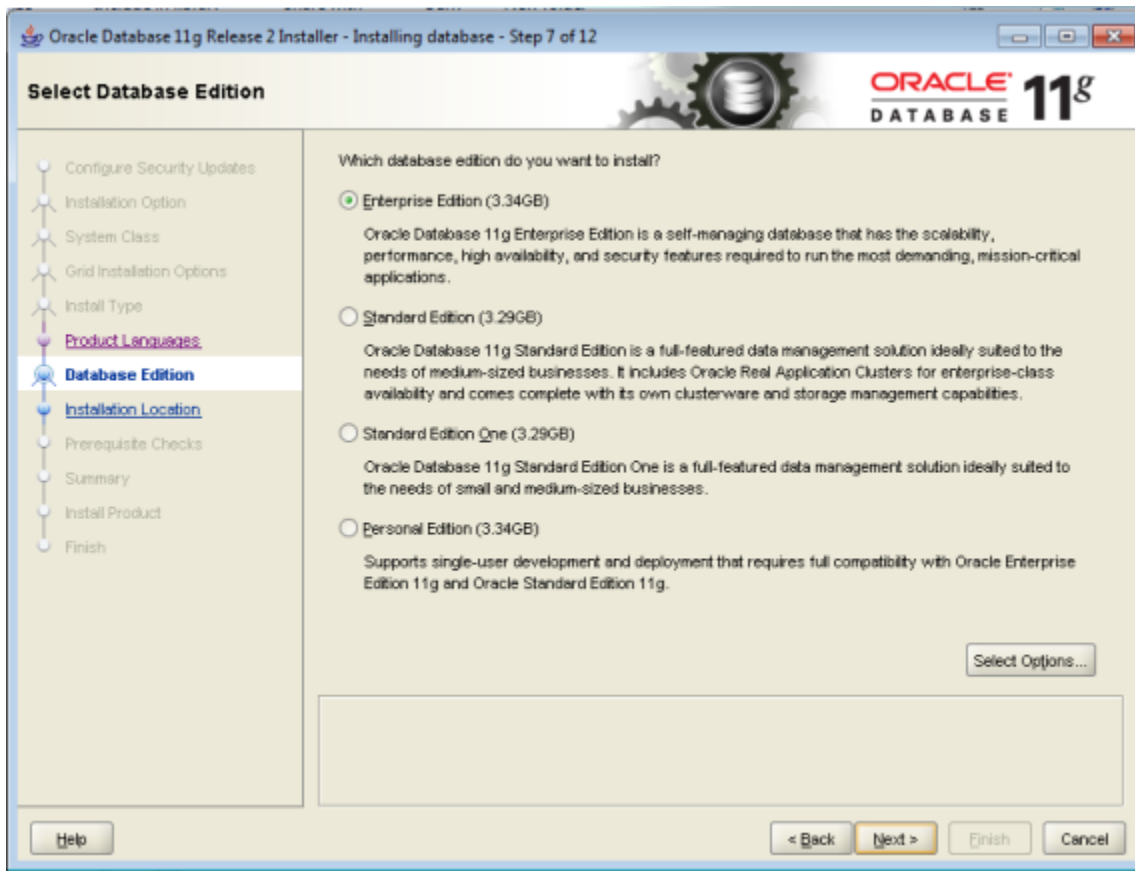
Before Installing Oracle, you must installed complete OS windows with all patches and activations
Run SETUP.EXE to start Oracle Universal Installer

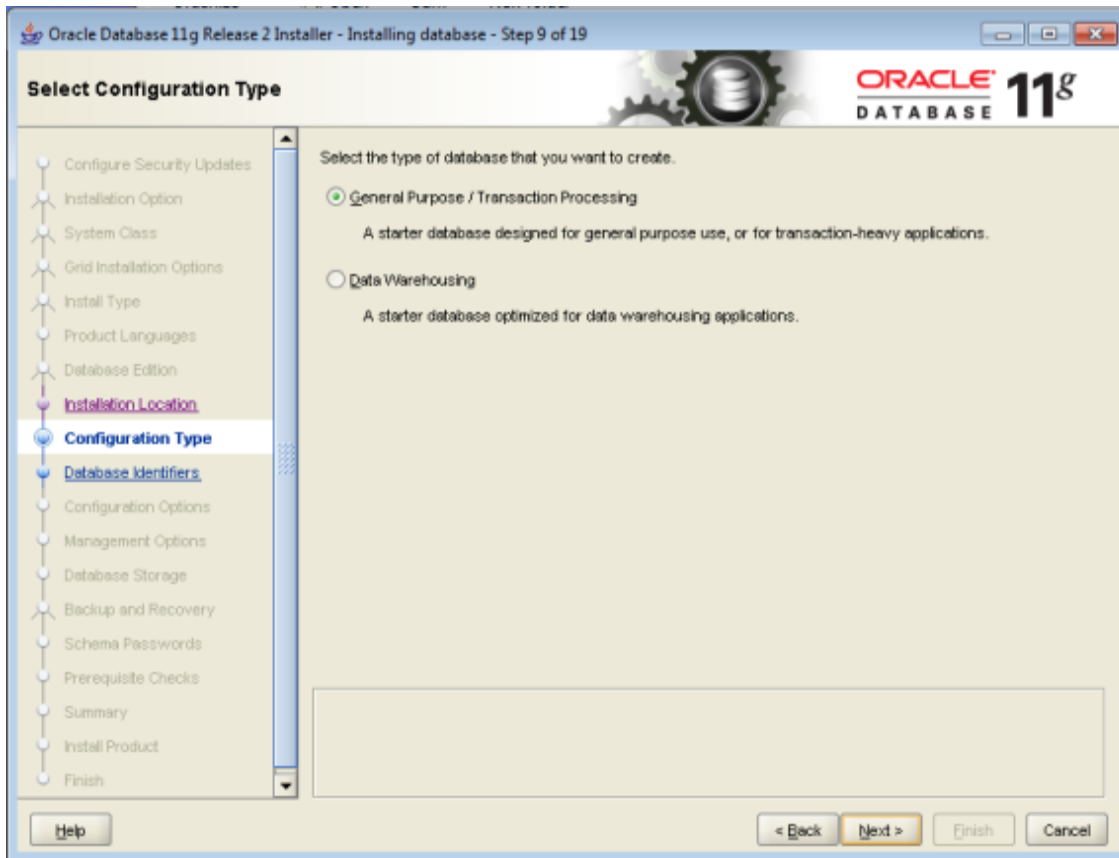


Installation

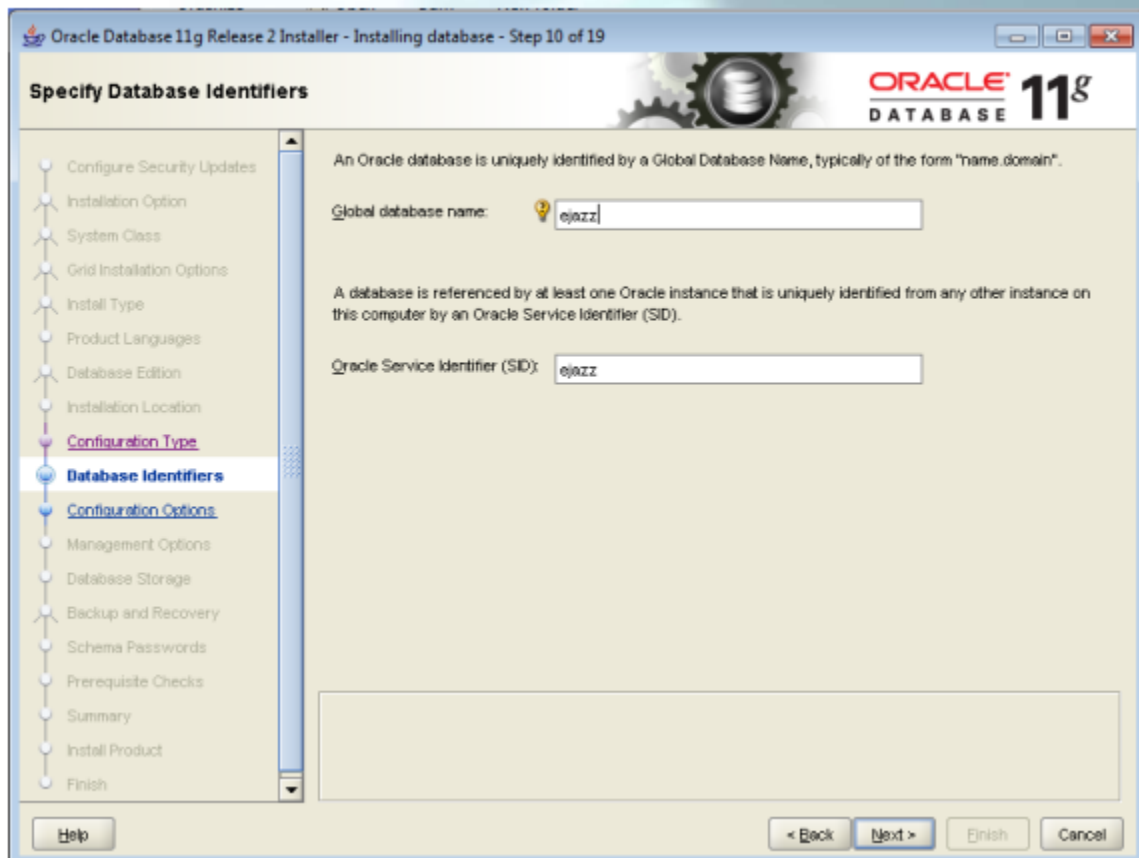


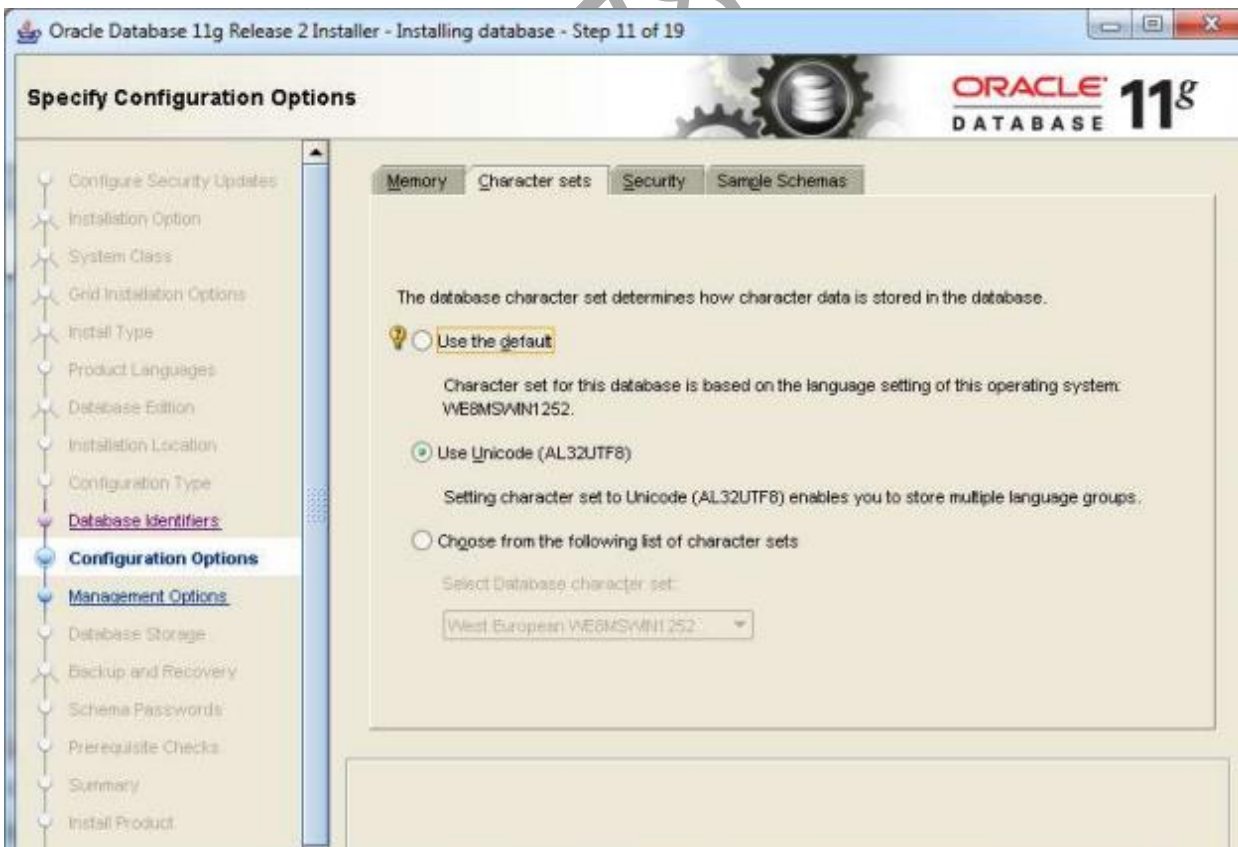
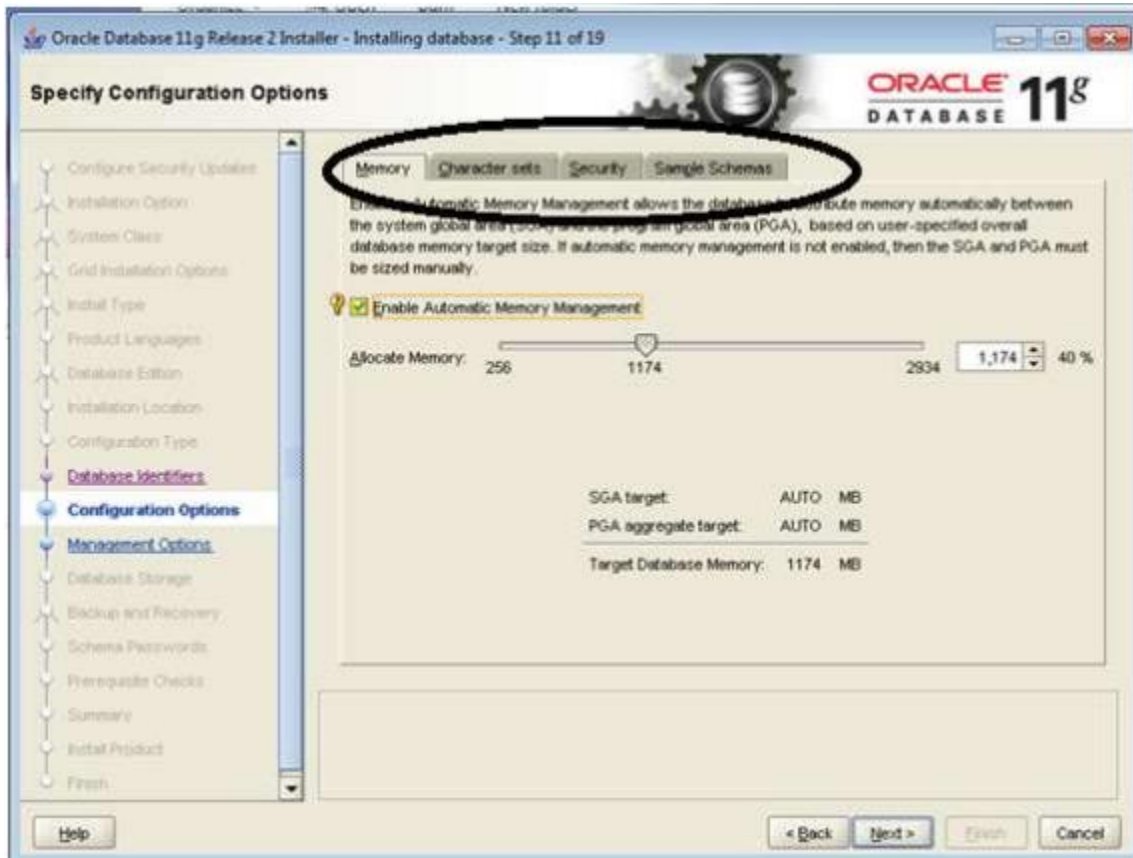


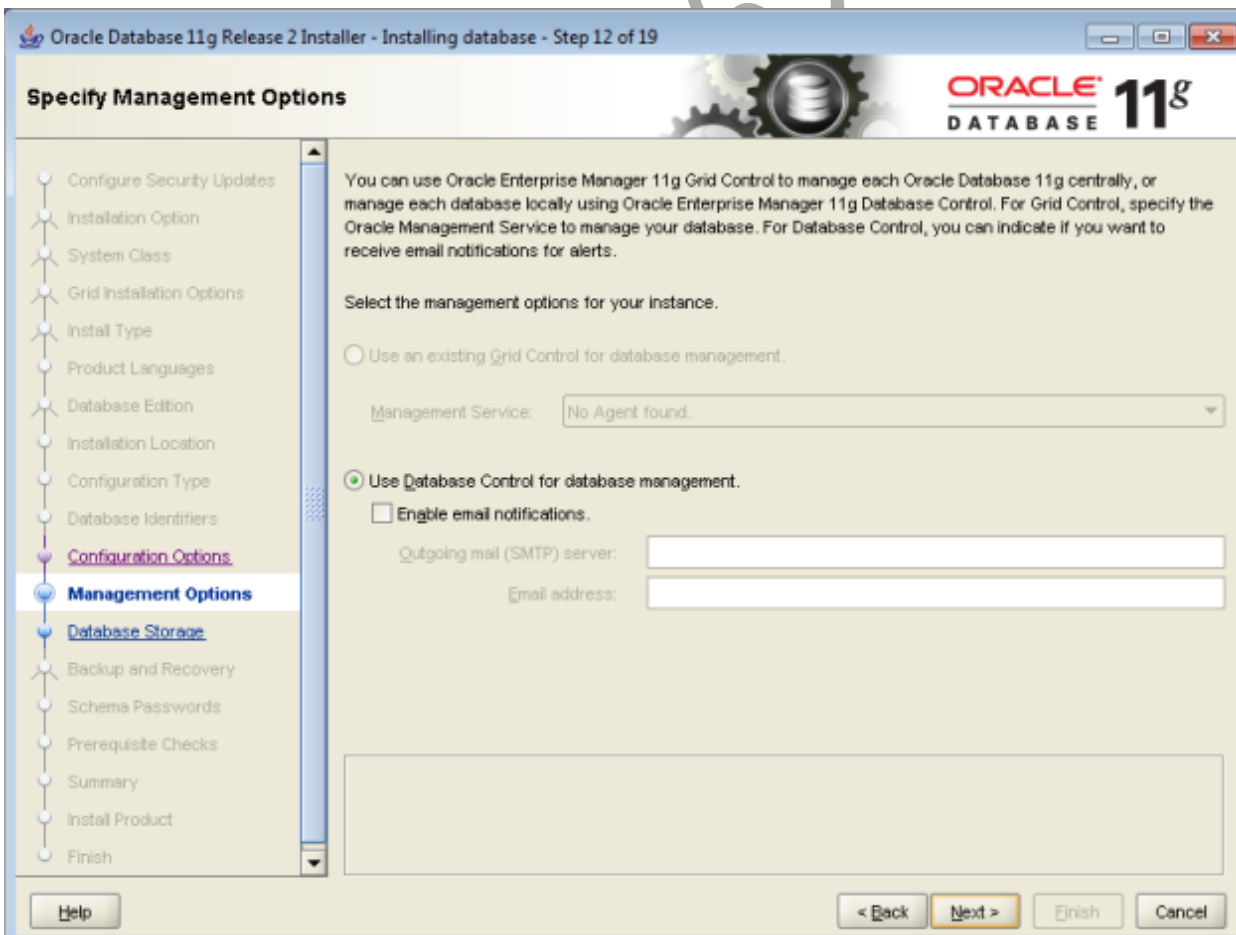
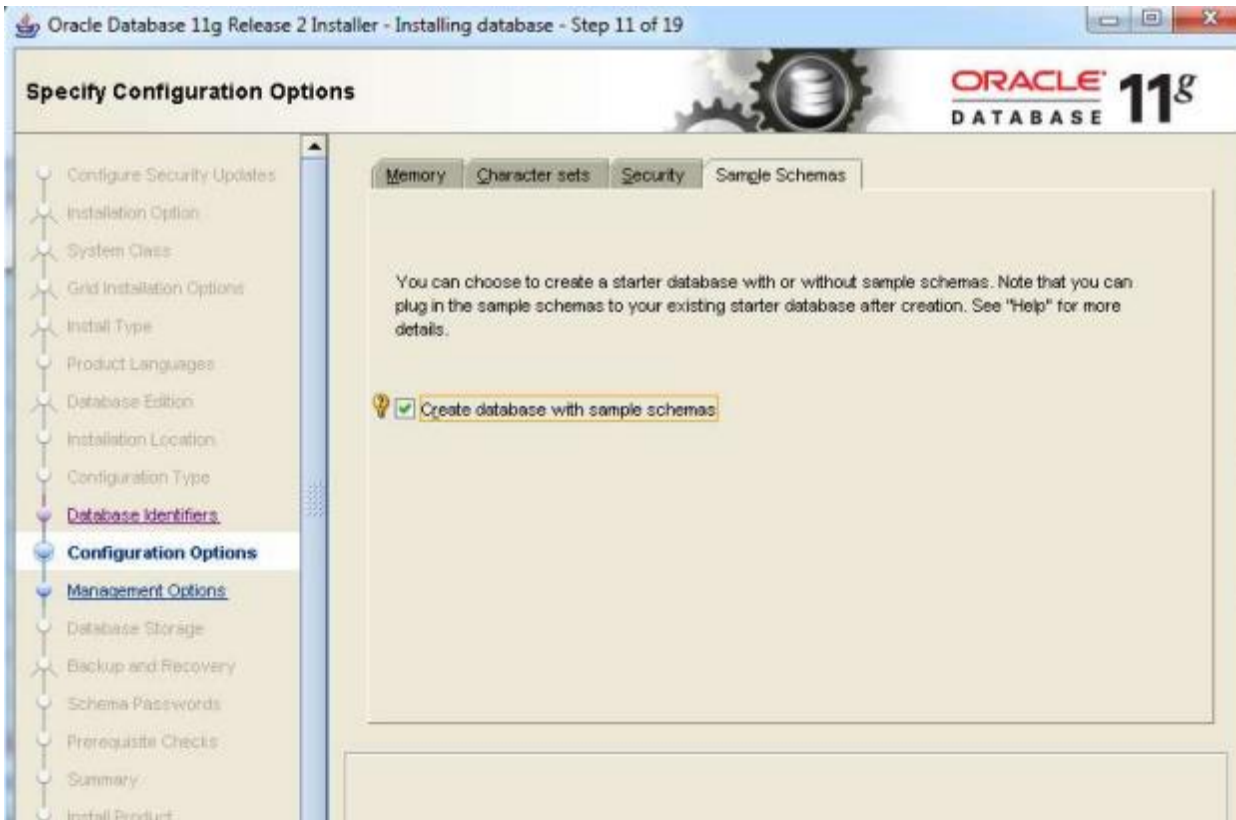


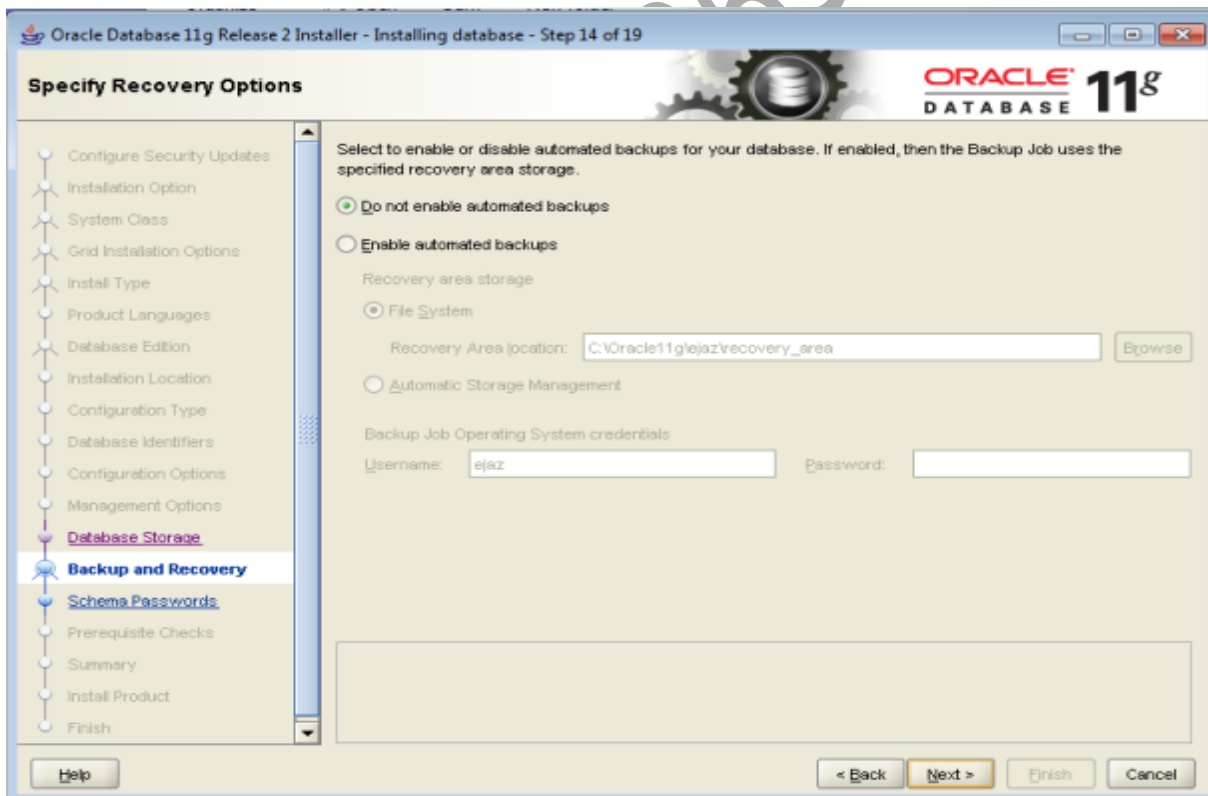
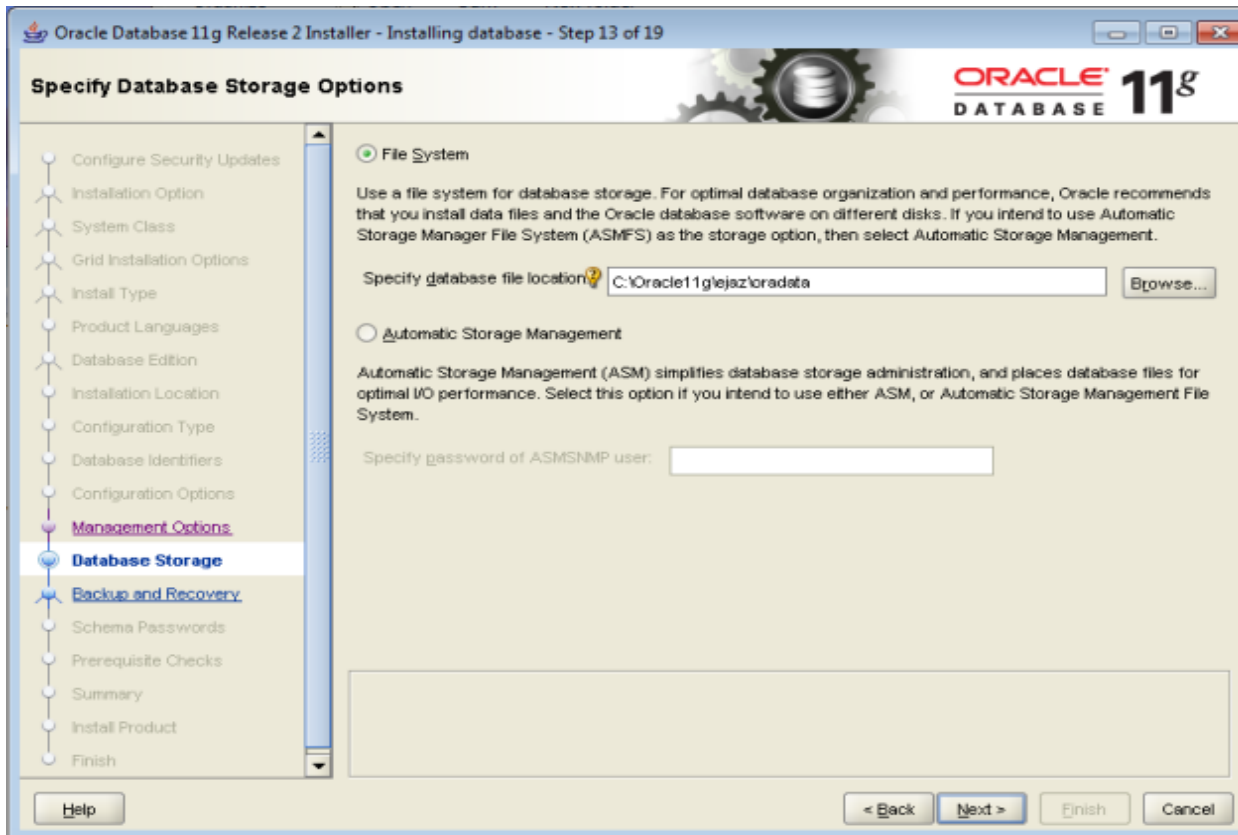


Installation









Oracle Database 11g Release 2 Installer - Installing database - [Step 15 of 19](#)

Oracle Database 11g Release 2 Installer - Installing database - Step 15 of 19

Specify Schema Passwords

The starter database contains pre-loaded schemas, most of which have passwords that are expired and locked at the end of installation. After installation is complete, you must unlock and set new passwords for those accounts you want to use. Schemas used for database management and postinstallation functions are left unlocked, and passwords for these accounts will not expire. Specify the passwords for these accounts.

☐ Use different passwords for these accounts

	Password	Confirm password
SYS	*****	*****
SYSTEM	*****	*****
SYSMAN	*****	*****
DBSNMP	*****	

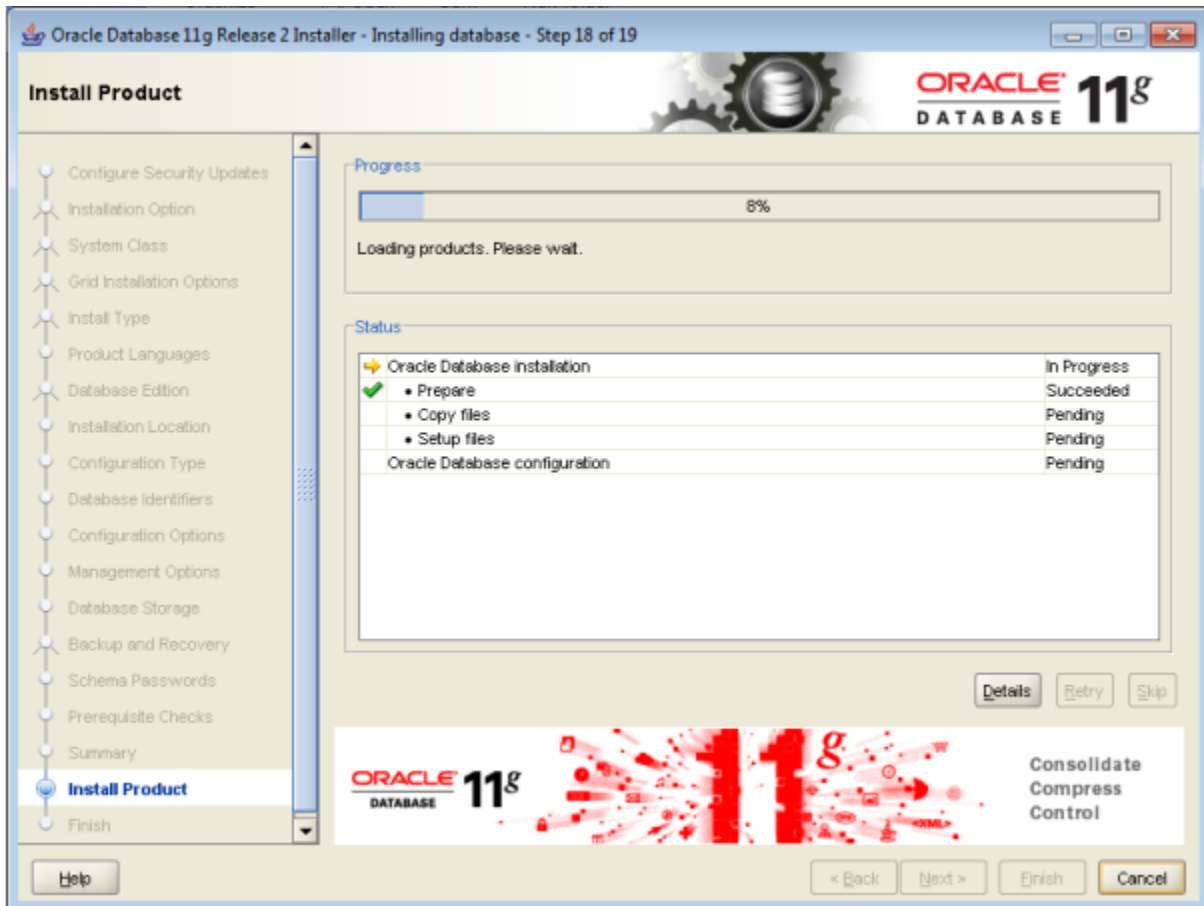
☒ Use the same password for all accounts

Password: ***** Confirm password: *****

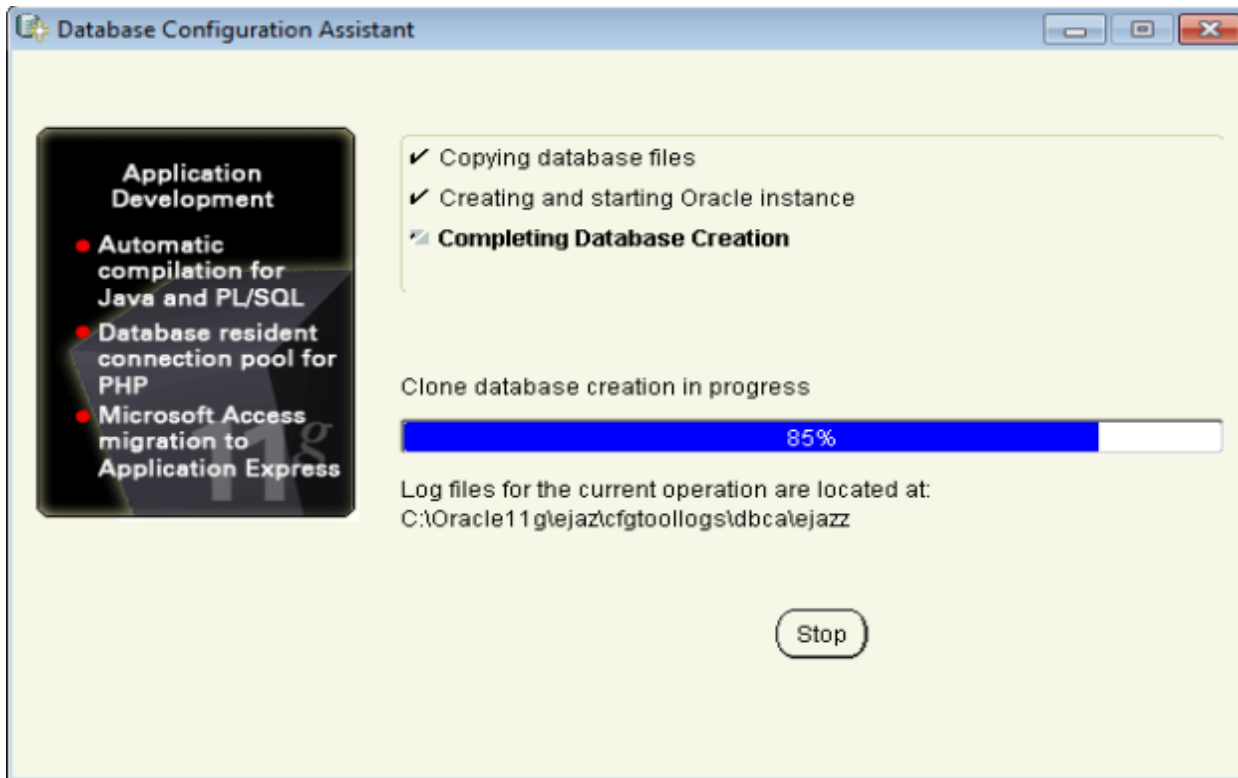
Messages:

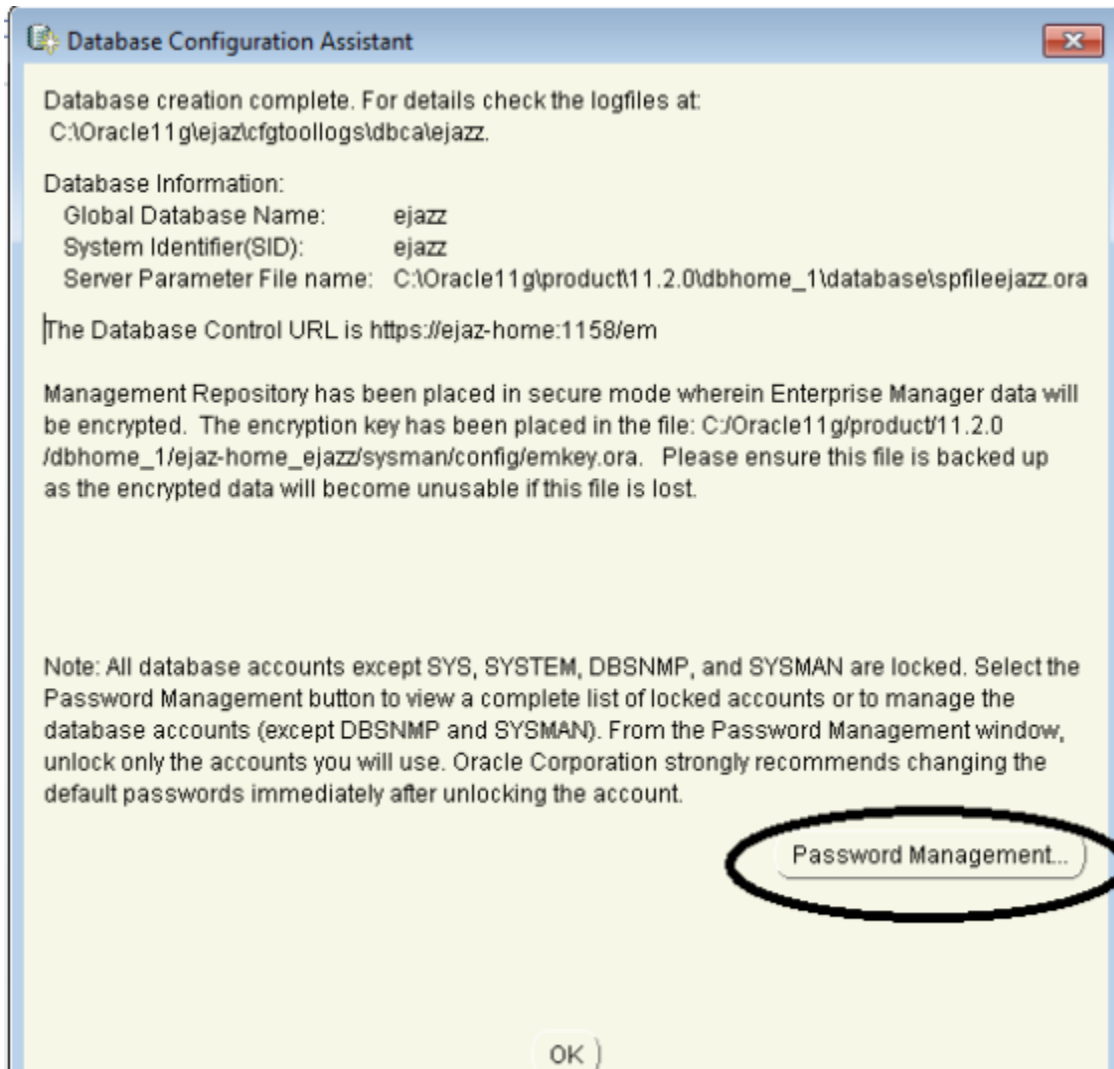
⚠ Password [INS-30011] The ADMIN password entered does not conform to the Oracle recommended standards.

Help < Back Next > Finish Cancel

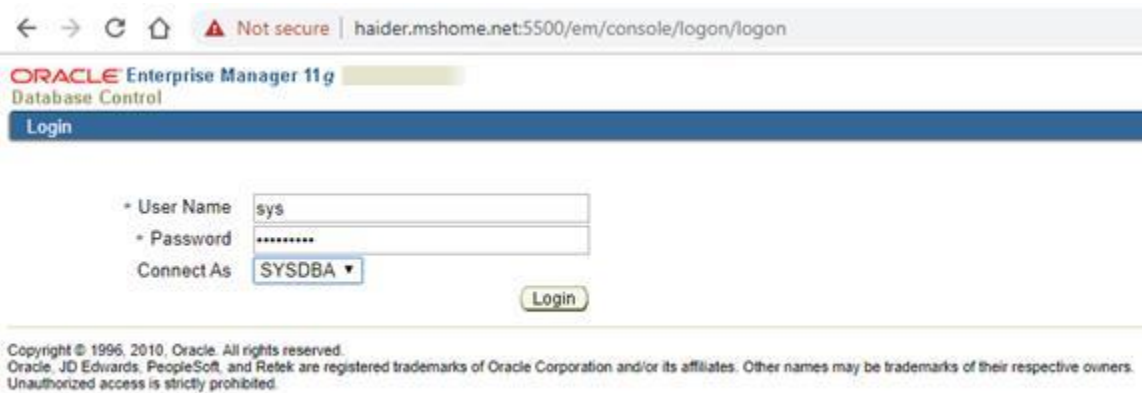


In case if any process failed, press Retry button. If NetConfig error displays then press continue
Grid Installation Options





Oracle11g Installation
Login with Oracle Database Manager



Oracle11g Installation



Installation

HOW TO LOGIN USING sys?

In User Name input box or prompt, type the following

sys / as sysdba then press enter key and type password as

password@ejazz (you will see like *****)

you can try without typing SID @ejazz

if you connection failed

Oracle11g Installation

Installation

How to unlock any user (like scott, **your test user**)

user: sys / as sysdba (press enter key) give password that has been set during the installation

SQL>alter user scott account unlock;
Oracle11g Installation

Installation

How to change password:

SQL>Alter user st110145 identified by newpassword;

Alternatively Login:

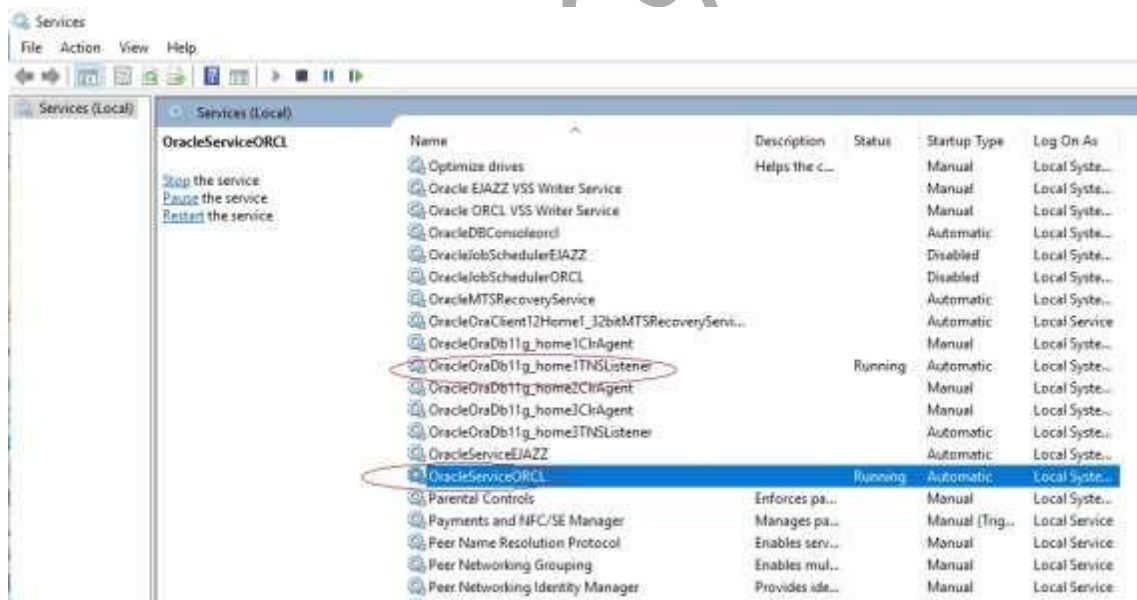
Start SQL*Plus and log in as the SYS user, connecting as SYSDBA:

\$ORACLE_HOME/bin/sqlplus SQL> CONNECT SYS as SYSDBA

Enter password: sys_password

Oracle11g Installation

OS Services



Control Panel □ Admin Tools □ Services
Oracle11g Installation

Installation



To un-install oracle, follow press Oracle Installation Products □ Oracle Installer, choose oracle home and press Remove button

Once De-installation process is completed. Restart your Computer or Server, remove all oracle folders. Then install Oracle again.

Introduction to Database Administration

TOPIC 45

MS SQL Server Installation

MS SQL Server Installation

Installation Steps

Editions of MS SQL Server 2017

Installation ...

Installation by Giving Password

Installation in Progress

Installation Complete

MS SQL Server Installation

Editions of MS SQL Server 2017

Enterprise: Comprehensive, high-end capacities for commanding database and business intelligence essentials.

Standard: Core data management and business intelligence abilities for non-critical workloads with minimal IT support.

Express: This is a free version with limited SQL Server features.

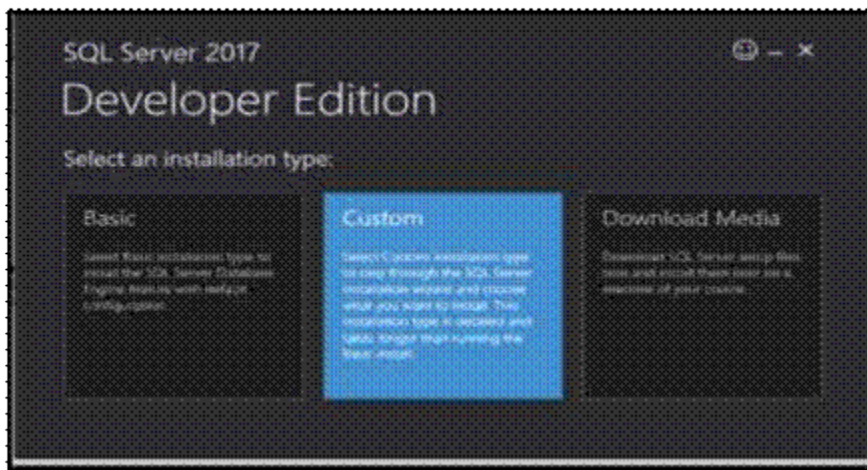
Developer: This is a free version to build, test, and demo apps in non-production environments. All Enterprise Edition features are included.

Web: SQL Server Web edition is a low-cost version for Web features

MS SQL Server Installation

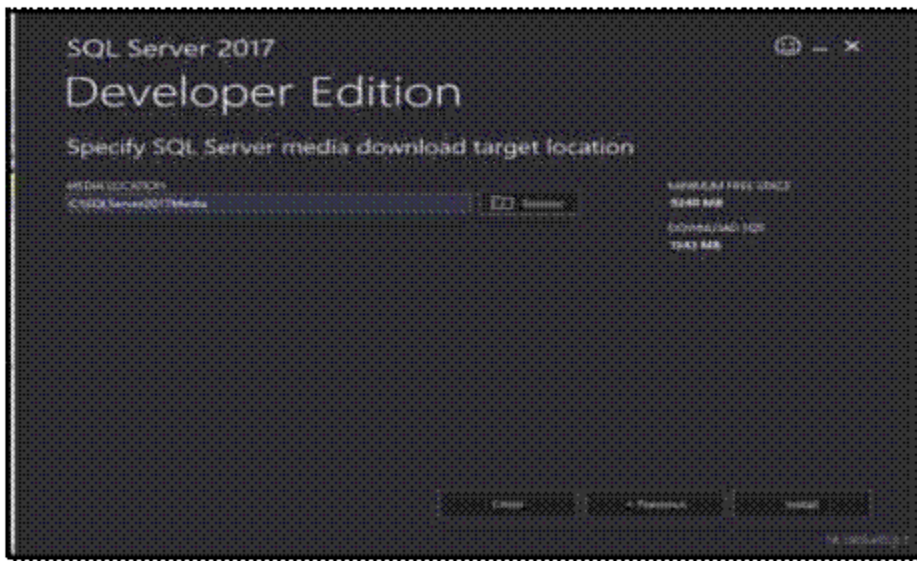
Installation ...

Once SQL Server 2017 Developer edition is downloaded, double click on it to launch.



MS SQL Server Installation

Installation ...

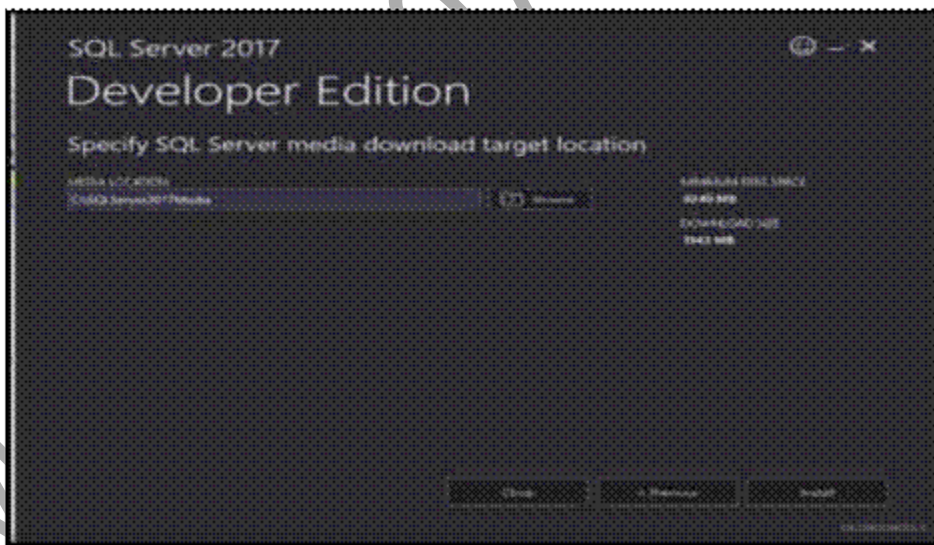


Specify the Media Location where we want to save the SQL Server media. The drive should have at minimum free space of 9240 MB in order to extract the media.

MS SQL Server Installation

Installation ...

Specify the Media Location where we want to save the SQL Server media. The drive should have at minimum free space of 9240 MB in order to extract the media.



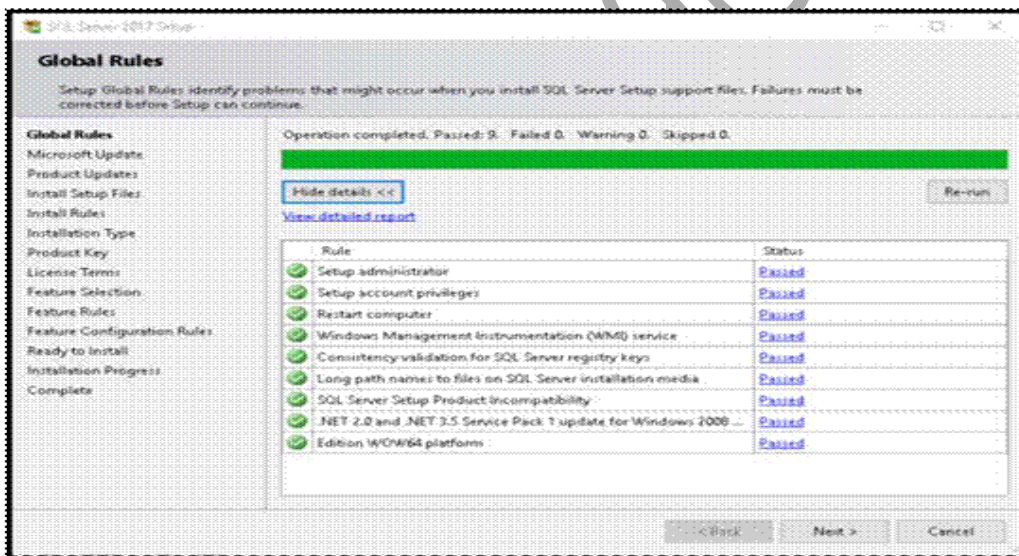
MS SQL Server Installation

Installation ...



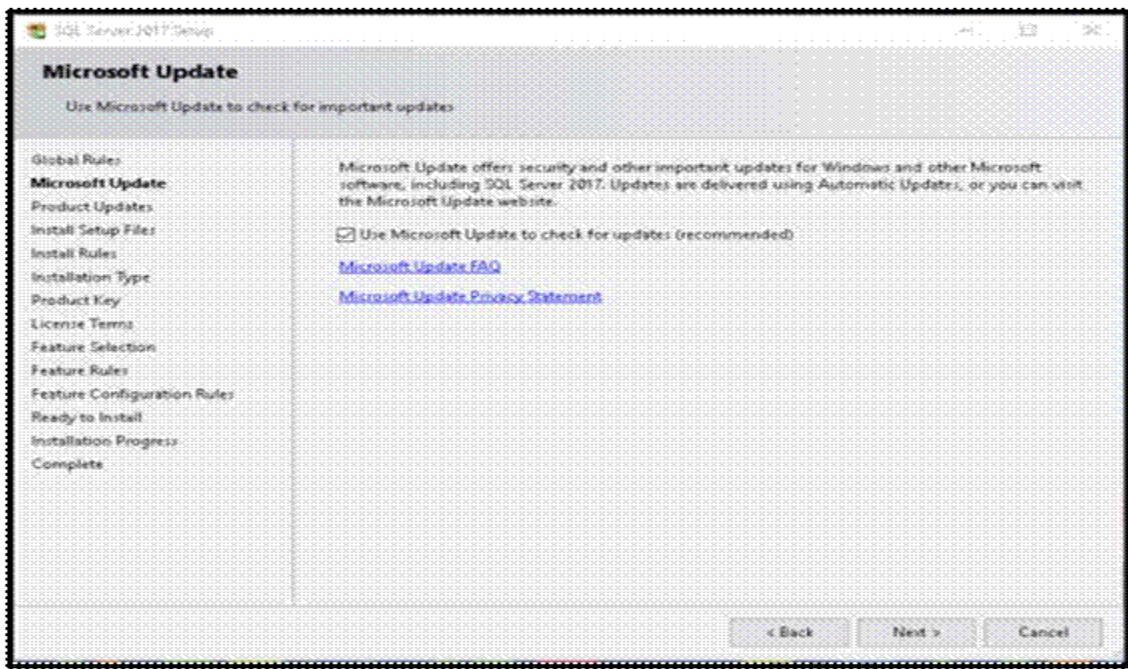
Click on New SQL Server stand-alone installation and you will get this message.
MS SQL Server Installation

Installation ...

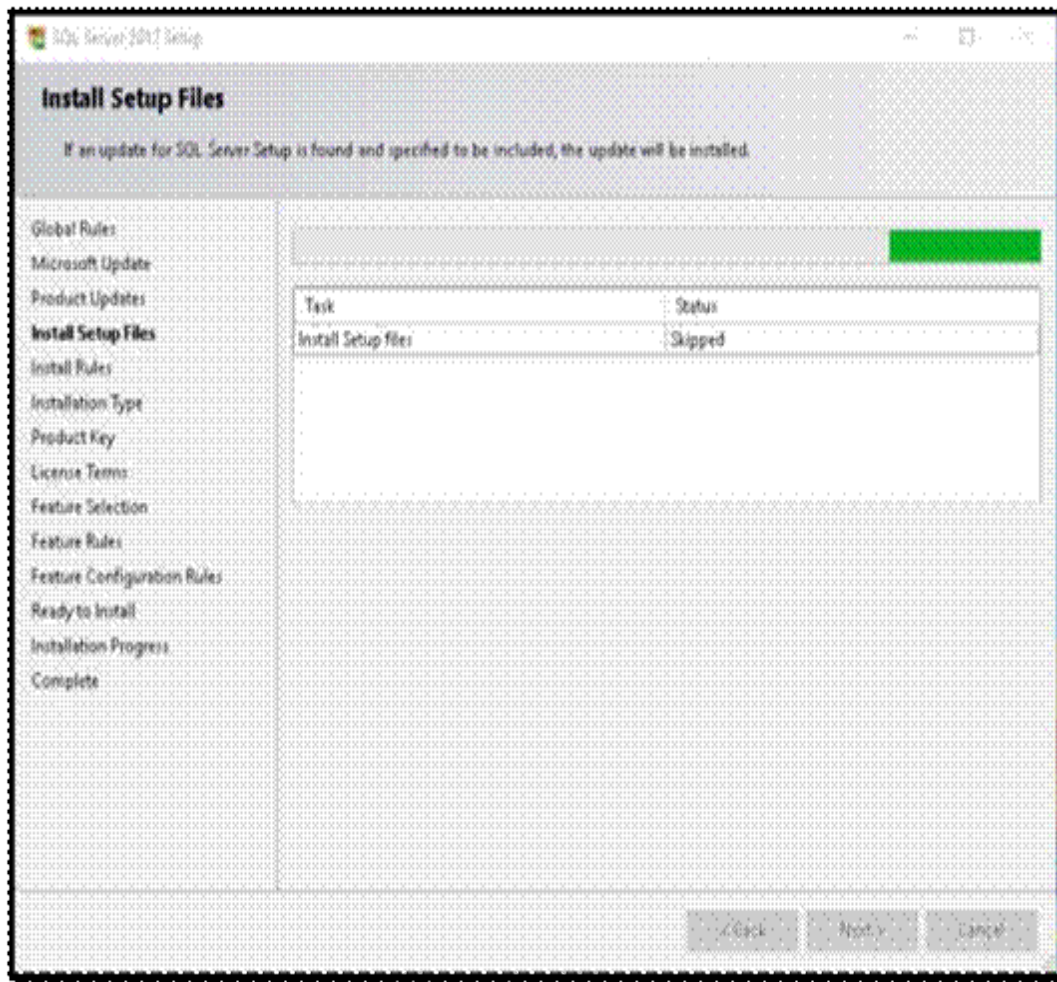


Make sure all Global rules are passed
MS SQL Server Installation

Installation ...



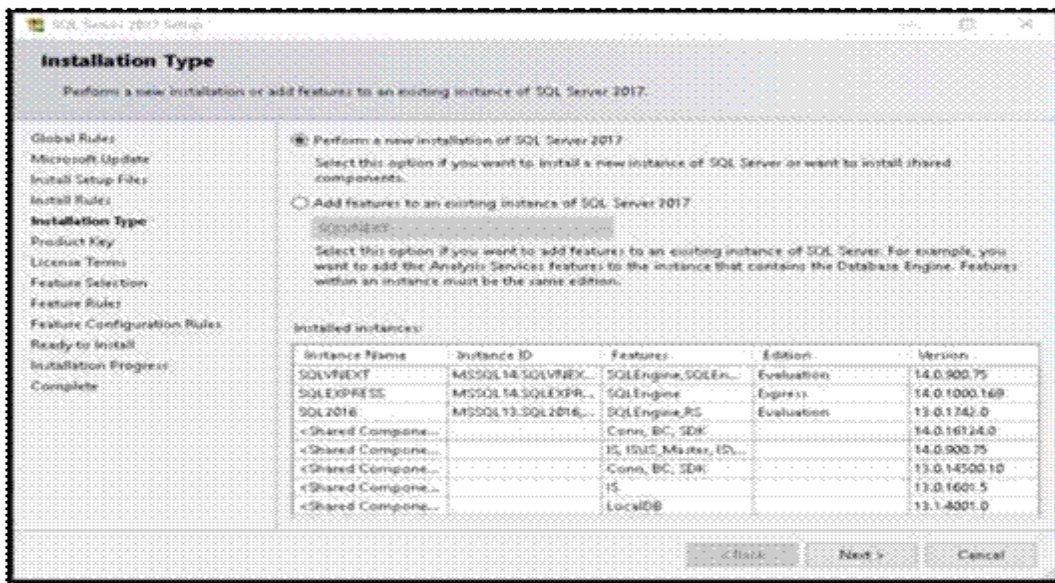
MS SQL Server Installation
Installation ...



MS SQL Server Installation

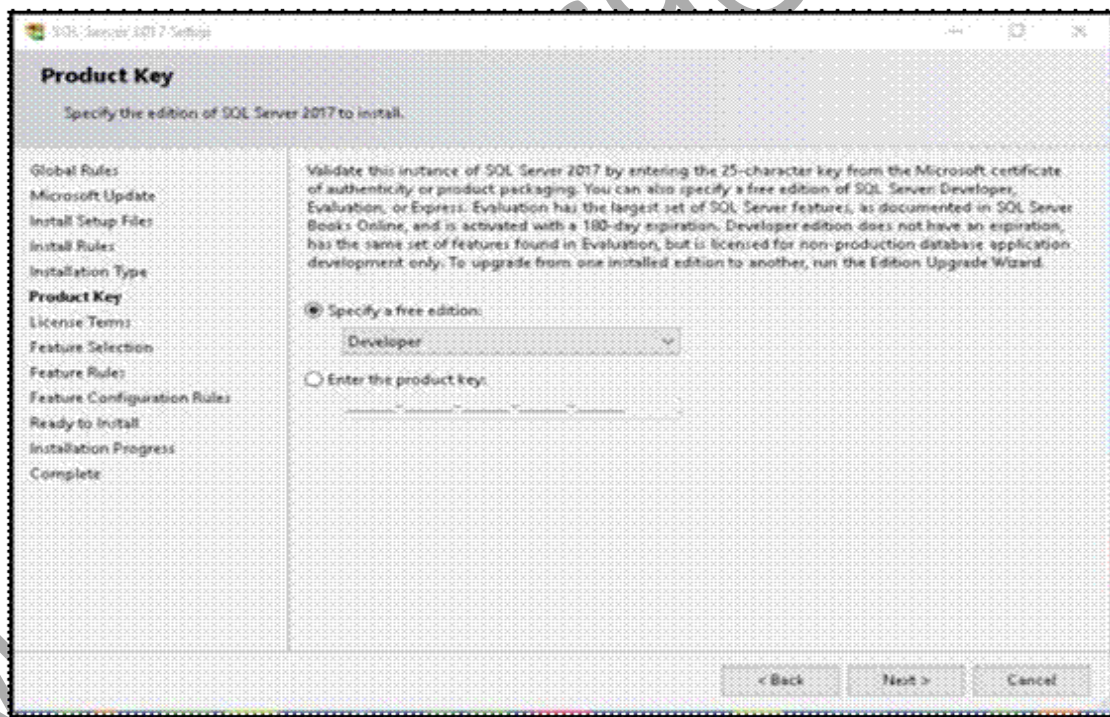
Installation ...

Provide product key of license



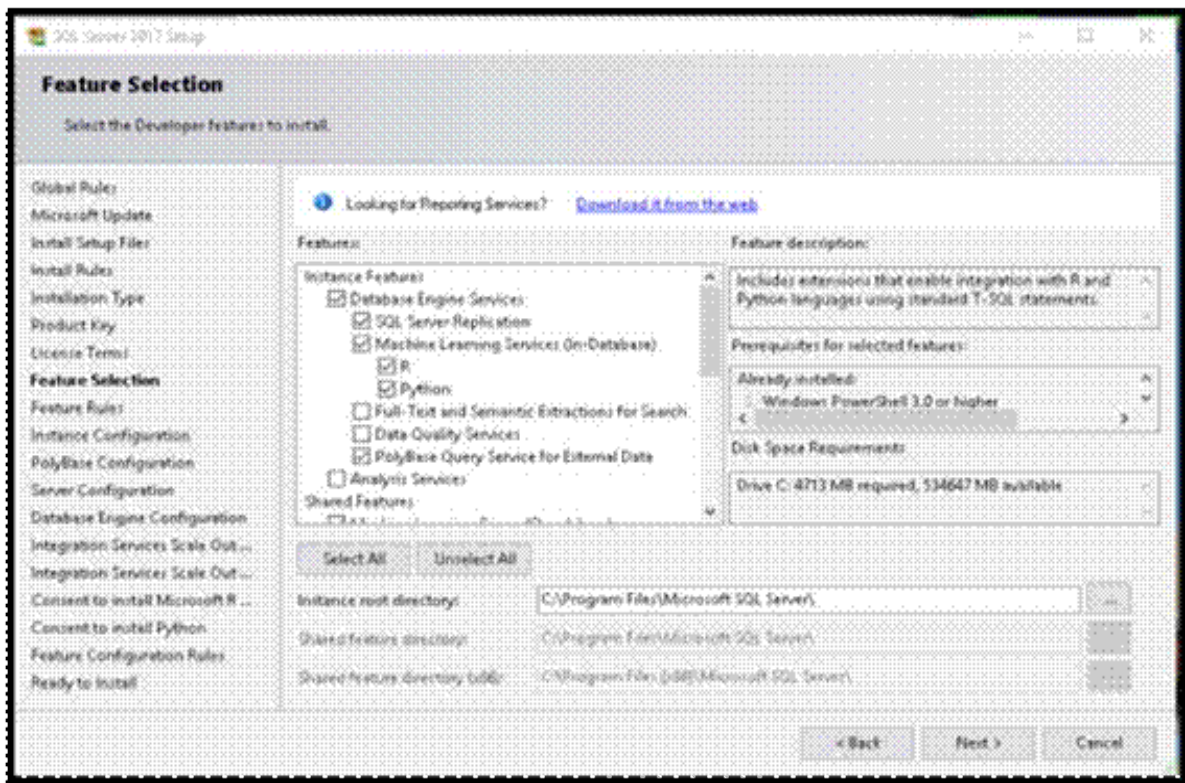
MS SQL Server Installation

Installation ...



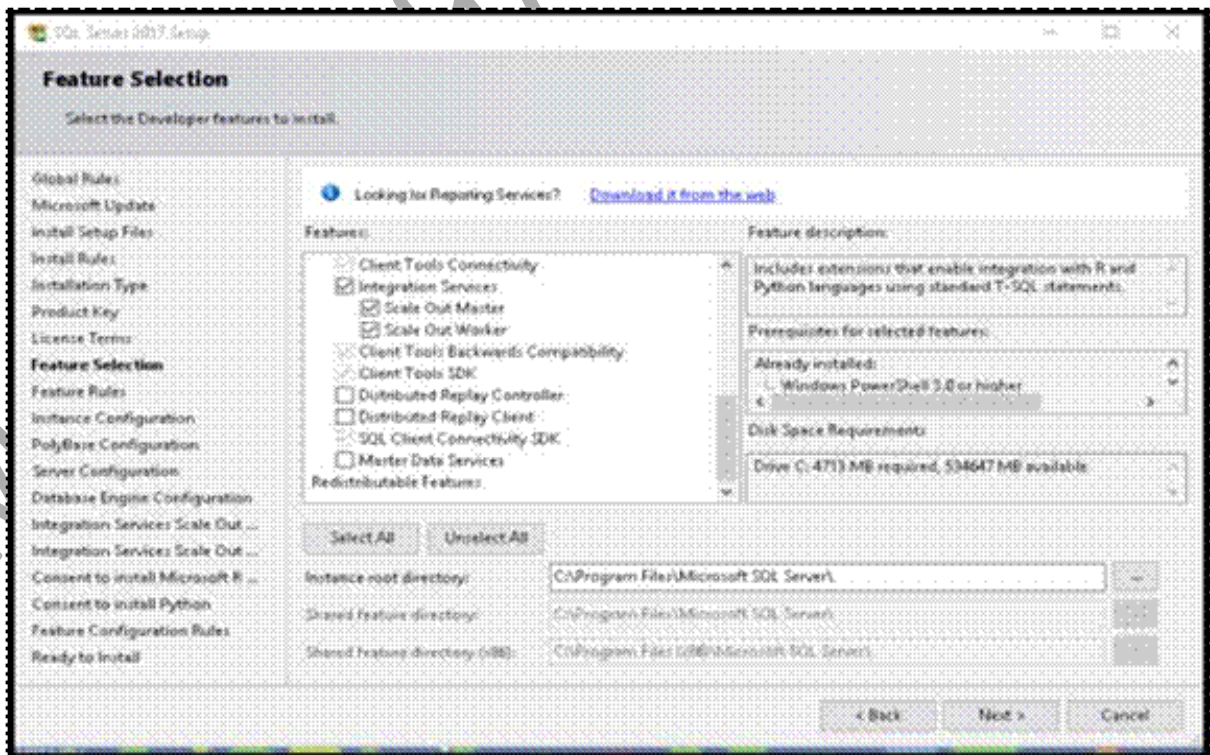
MS SQL Server Installation

Installation ...



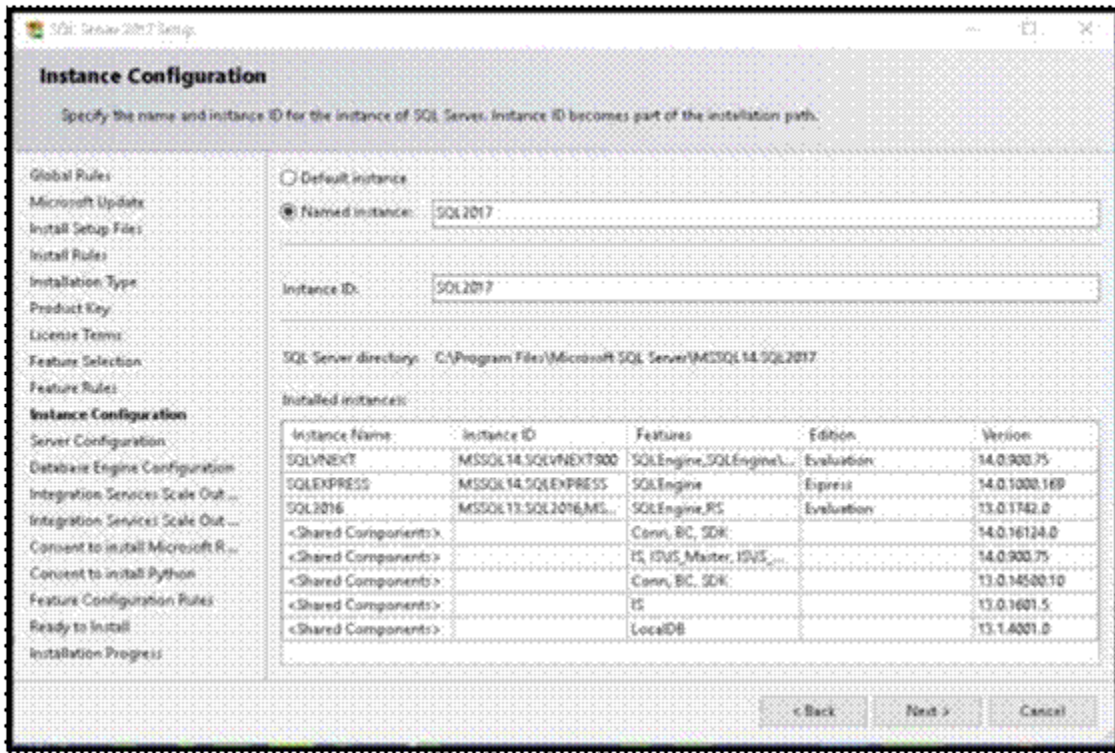
MS SQL Server Installation

Installation ...



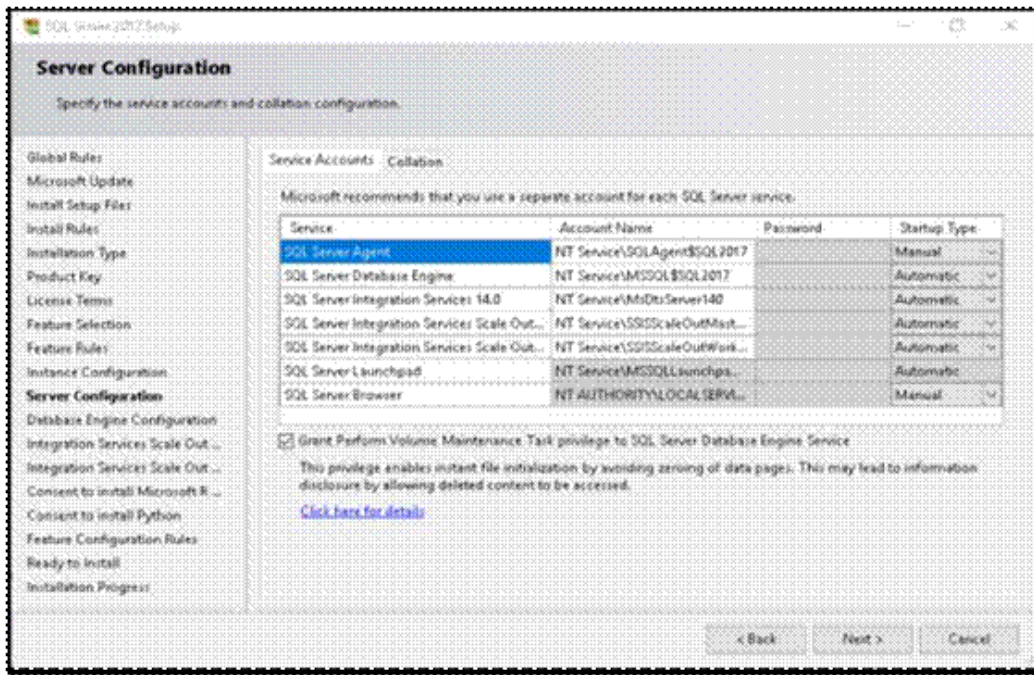
MS SQL Server Installation

Installation ...



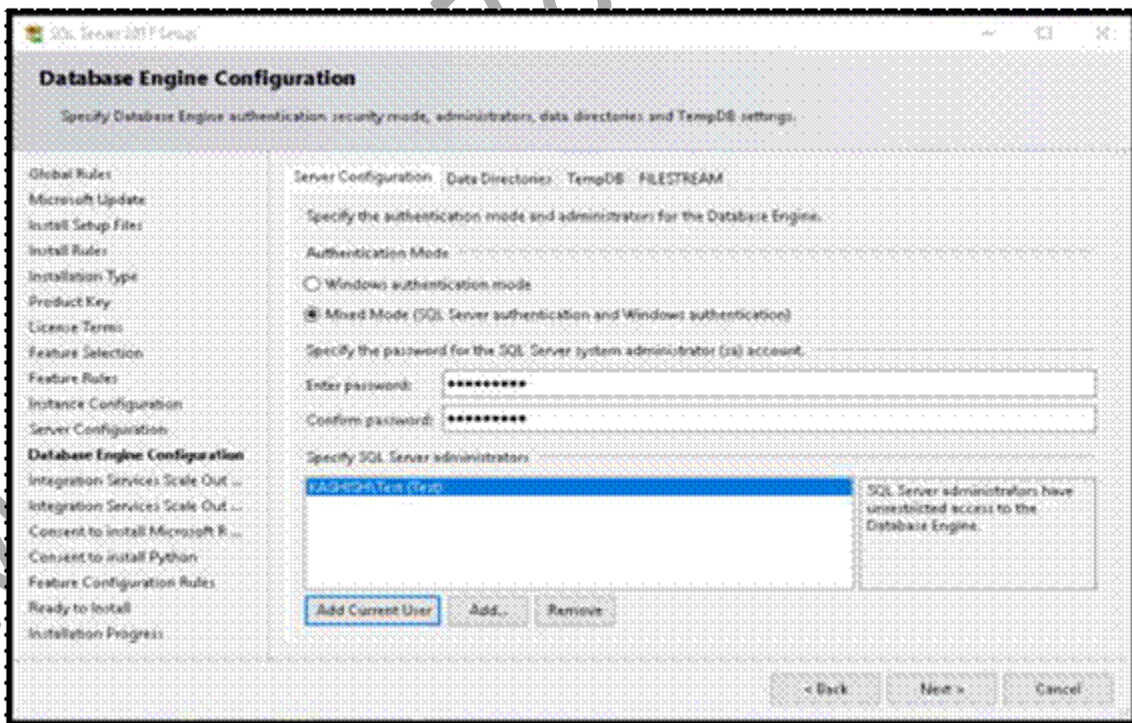
MS SQL Server Installation

Installation ...



MS SQL Server Installation

Installation by Giving Password



MS SQL Server Installation

Installation ...

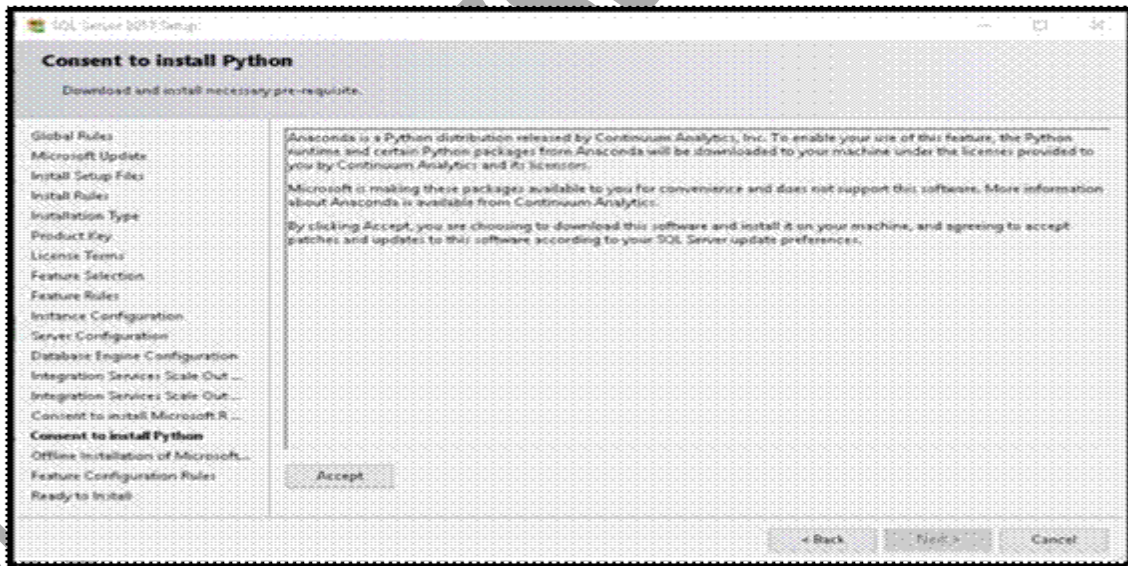
MS SQL Server Installation

Installation ...



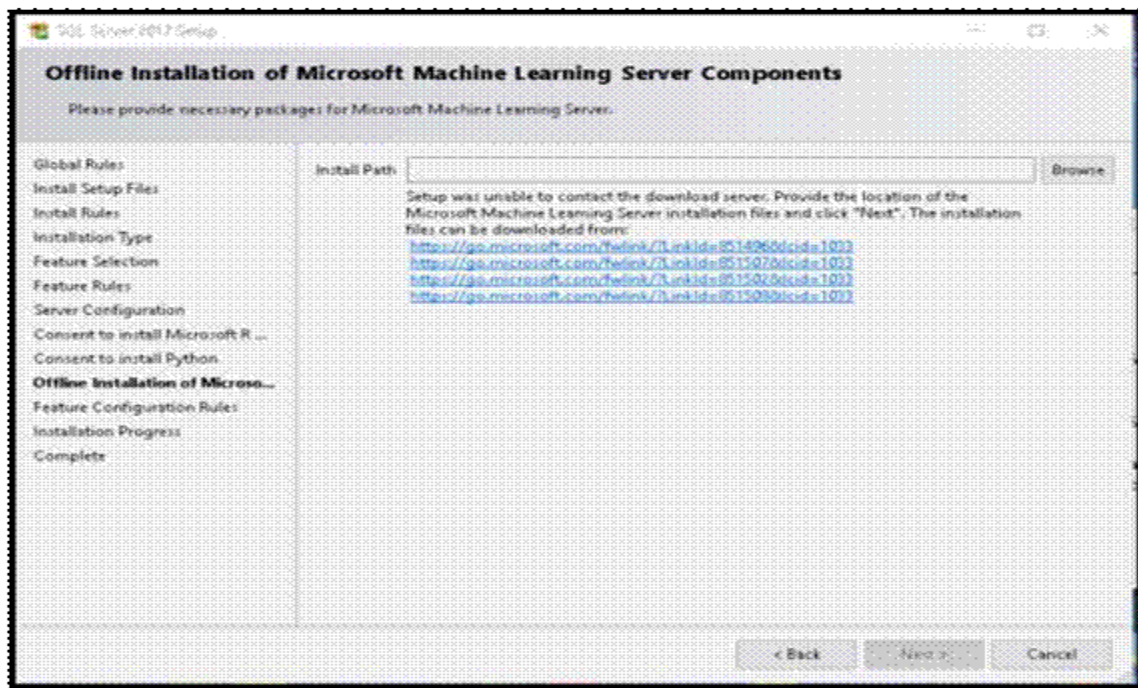
MS SQL Server Installation

Installation ...



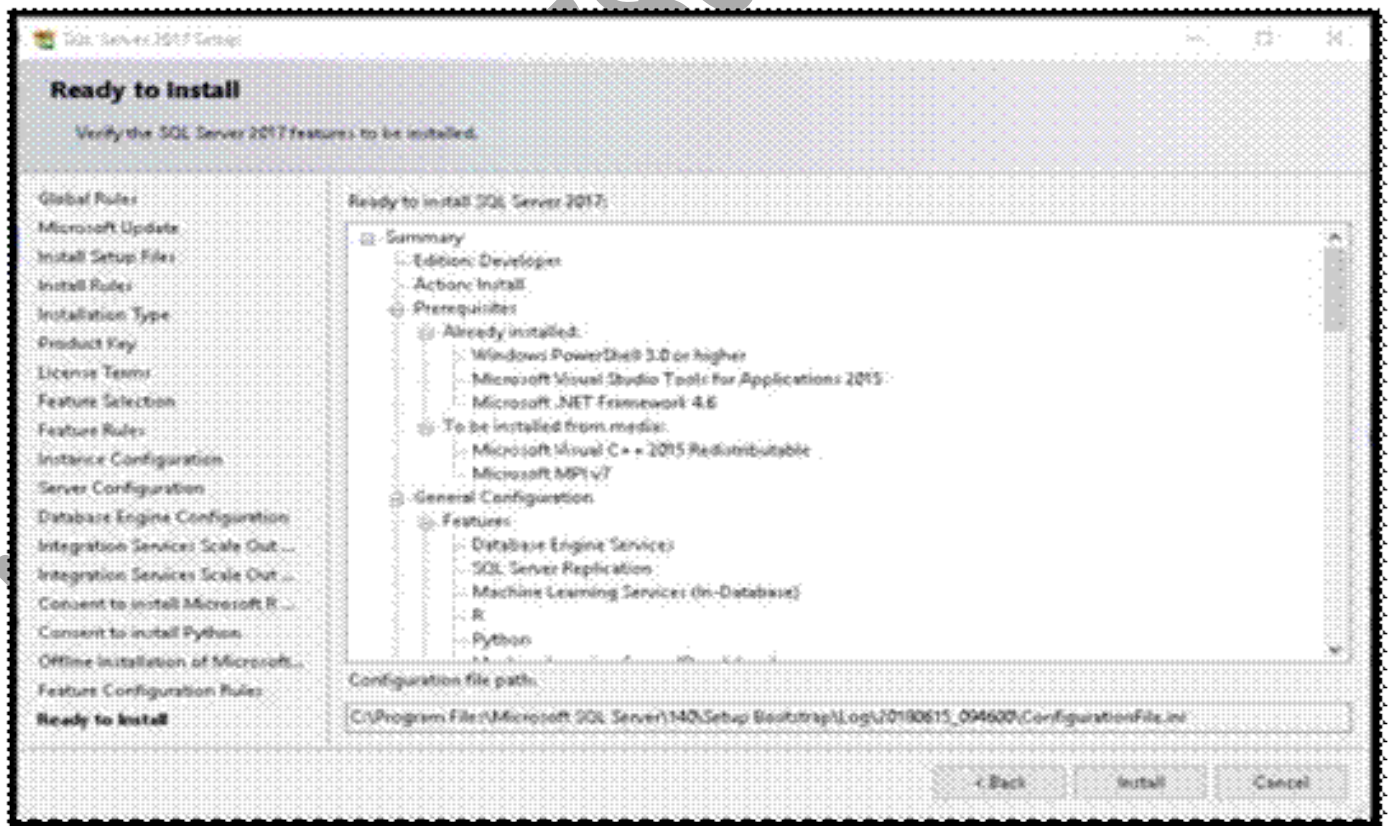
MS SQL Server Installation

Installation



MS SQL Server Installation

Installation



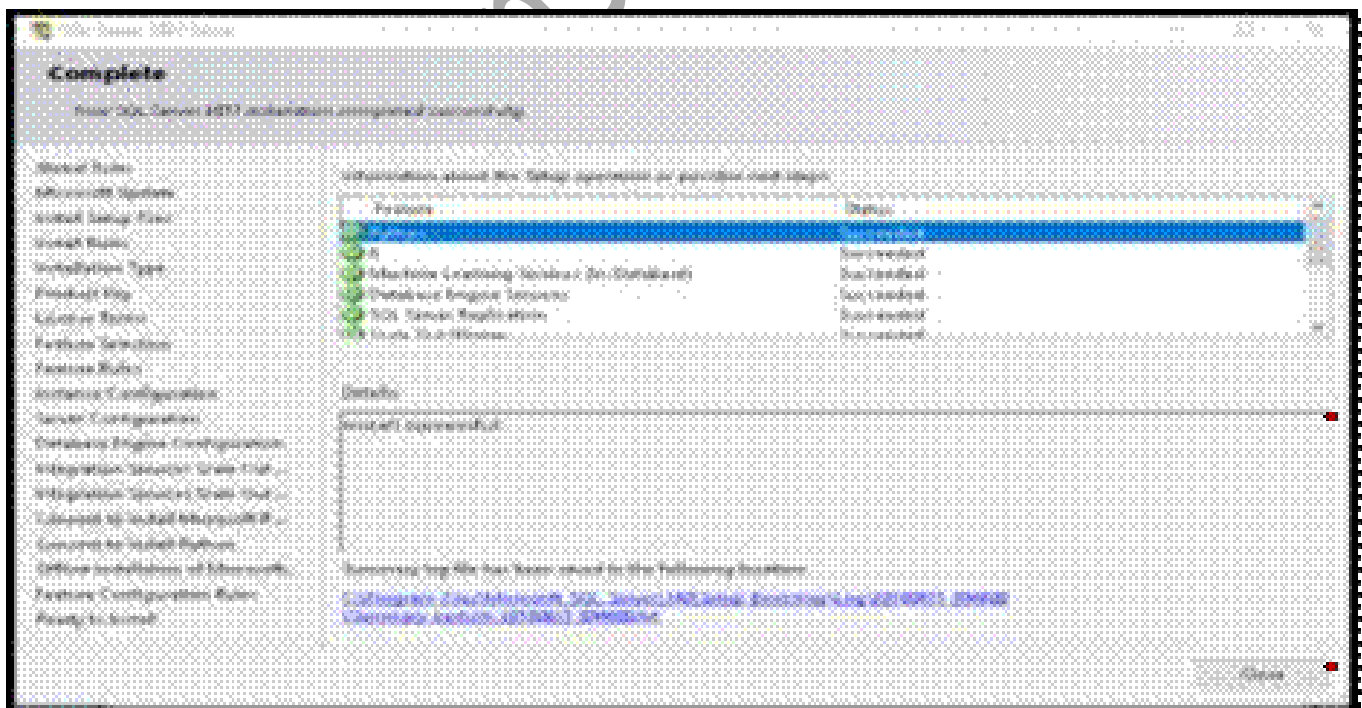
MS SQL Server Installation

Installation in Progress



MS SQL Server Installation

Installation Complete



Install [SQL Server Management Studio 17.x](#) to connect to the database server.

Download and install [SQL Server Data Tools](#) to build SQL Server relational databases, Azure SQL databases, Analysis Services (AS) data models, Integration Services (IS) packages, and Reporting Services (RS) reports.

Go through these other [SQL Server 2017 tips](#).

Introduction to Database Administration

TOPIC 46

Oracle Configuration for Connection

Oracle Configuration for Connection

Configuration for connection

Connect using SQL*Plus

Connect using SQL Developer

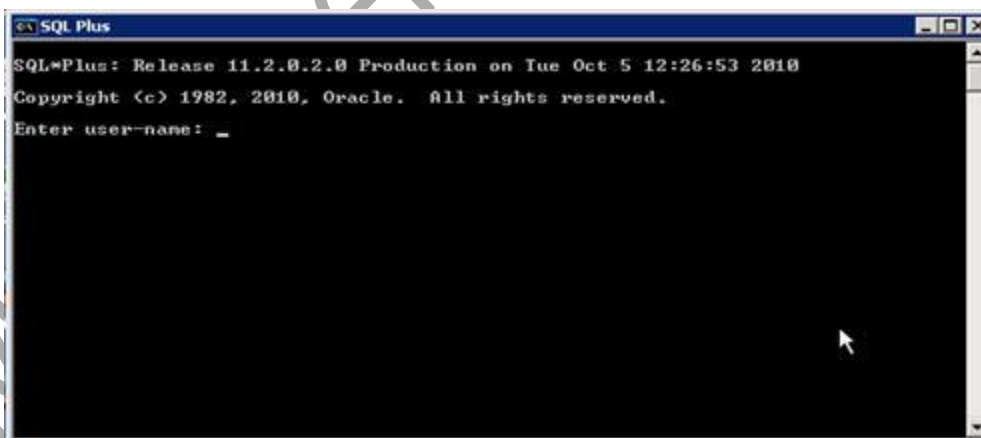
Manual Connect using tnsnames.ora

Oracle Client & Oracle Net

Oracle Configuration for Connection

Connect using SQL*Plus

Click on SQL*Plus icon and login with your user id and password with database name (SID) that you



have given during installation.

SQL>CONNECT username @ "hostname[:port][/DBname]"

Oracle Configuration for Connection

Connect using SQL Developer

Right click Connection and choose New

The New/Select Database Connection dialog appears
Oracle Configuration for Connection

This PC > Stuff (E:) > app > Haider > product > 11.2.0 > dbhome_1 > NETWORK > ADMIN

tnsnames.ora - Notepad

File Edit Format View Help

ORCL =

(DESCRIPTION =

(ADDRESS = (PROTOCOL = TCP)(HOST = Haider)(PORT = 1521))

(CONNECT_DATA =

(SERVER = DEDICATED)

(SERVICE_NAME = orcl)

)

)

DEVDB =

(DESCRIPTION =

(ADDRESS = (PROTOCOL = TCP)(HOST = Neonplus)(PORT = 1522))

(CONNECT_DATA =

(SERVER = DEDICATED)

(SERVICE_NAME = devdb)

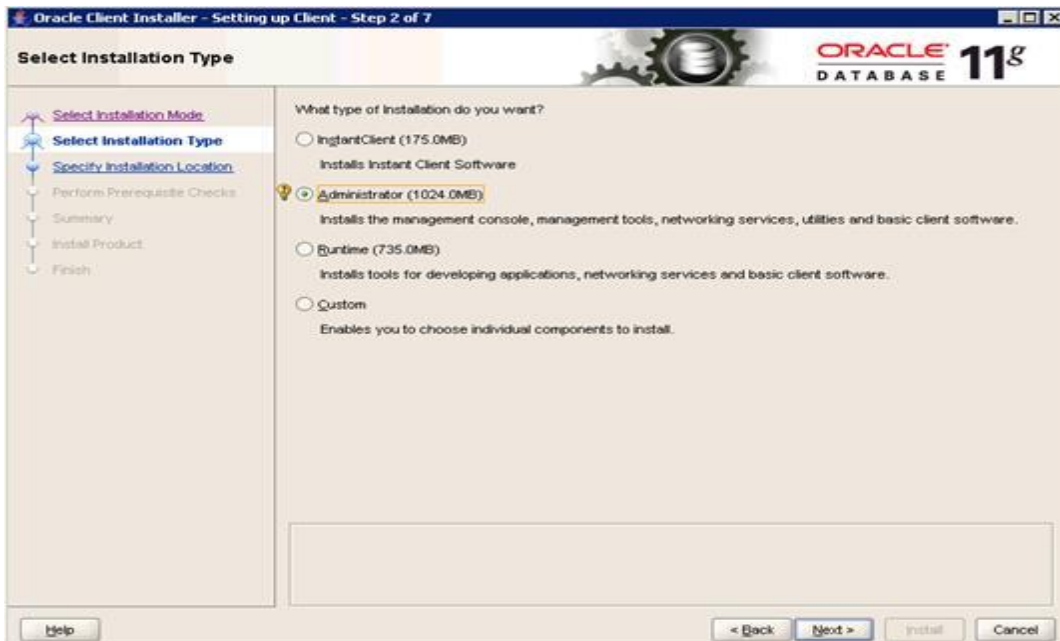
)

)

Manual Connect using tnsname.ora file

Oracle Configuration for Connection

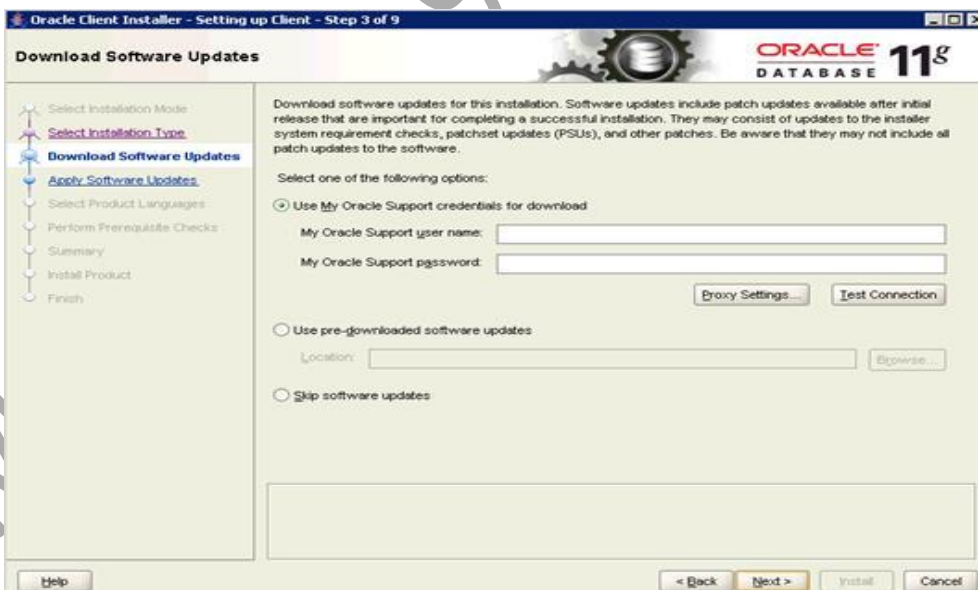
Oracle Client & Oracle Net



Run SETUP.EXE to start Oracle Universal Installer

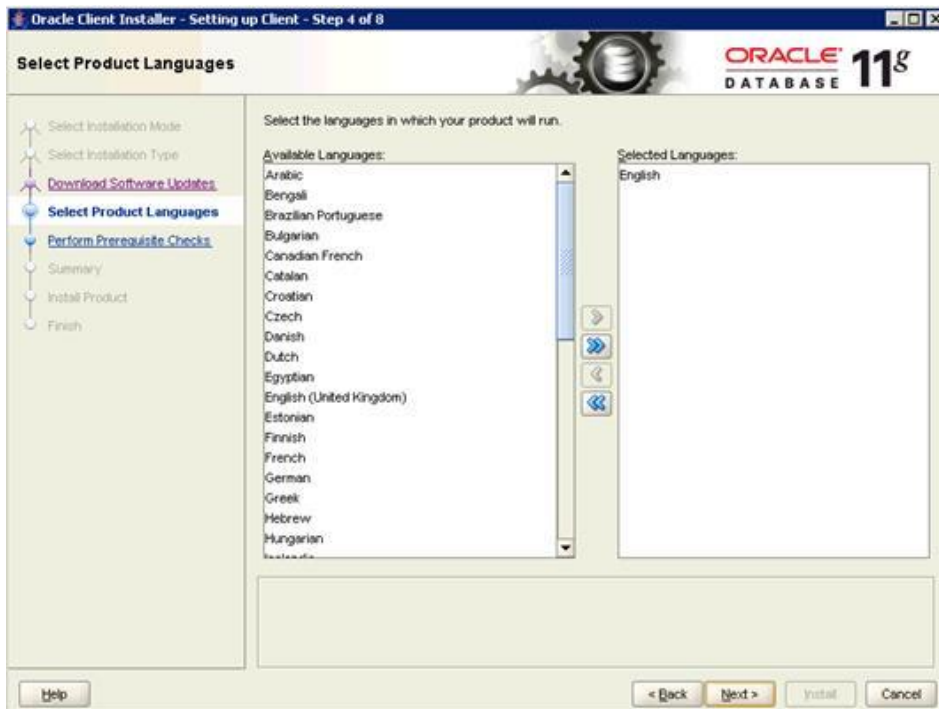
Oracle Configuration for Connection

Oracle Client & Oracle Net



Oracle Configuration for Connection

Oracle Client & Oracle Net

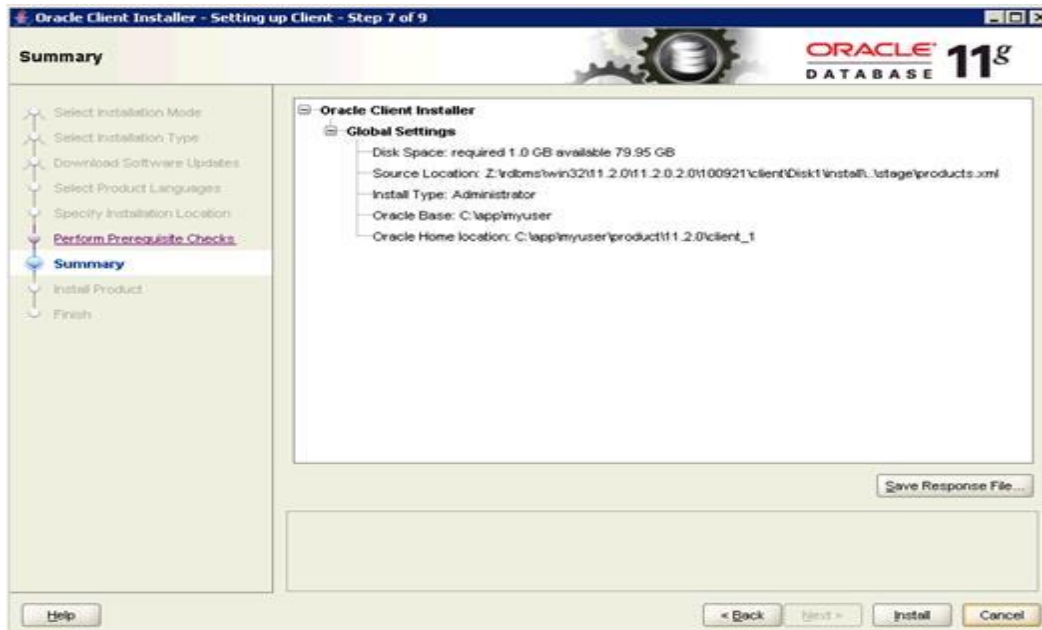


Oracle Configuration for Connection Oracle Client & Oracle Net



Oracle Configuration for Connection

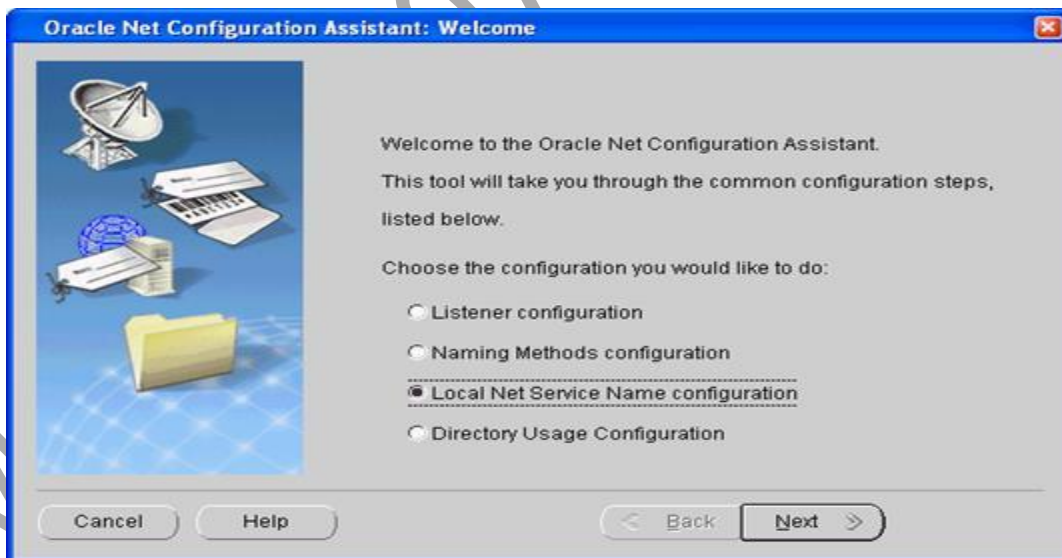
Oracle Client & Oracle Net



Oracle Configuration for Connection Oracle Client & Oracle Net



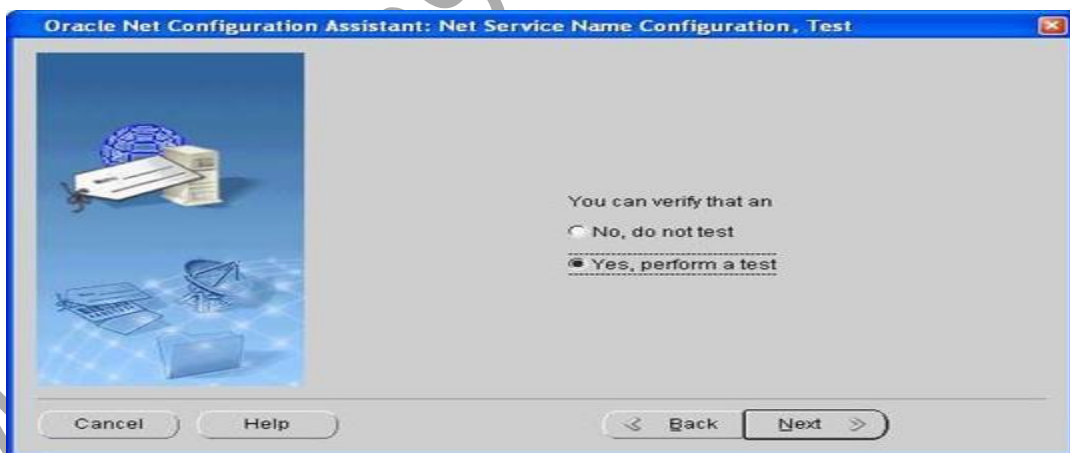
Oracle Configuration for Connection
Oracle Client & Oracle Net



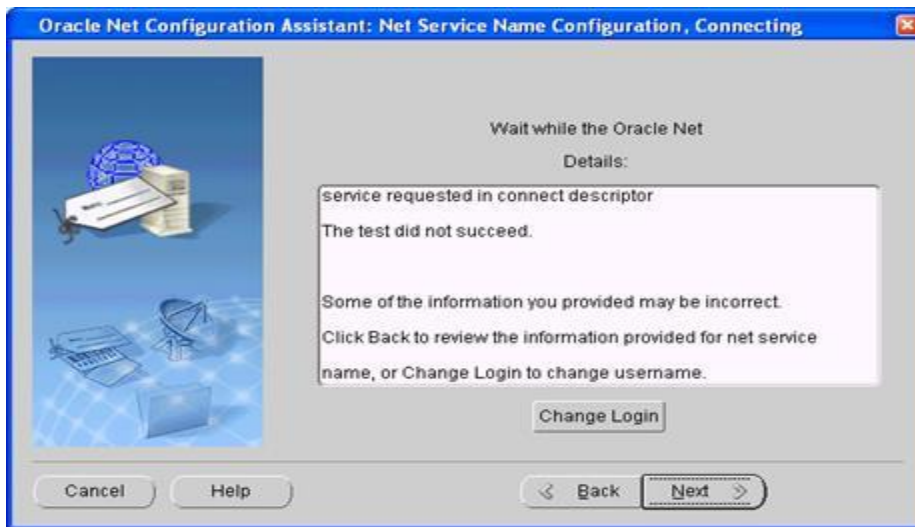
Oracle Configuration for Connection
Oracle Client & Oracle Net



Oracle Configuration for Connection
Oracle Client & Oracle Net



Oracle Configuration for Connection
Oracle Client & Oracle Net



End



Introduction to Database Administration

TOPIC 47

Oracle Data Dictionary Views

Oracle Data Dictionary Views

Data Dictionary Views (Metadata)

Metadata

Data Dictionary

Data Dictionary Contents

Data Dictionary View Sets

How to use Data Dictionary?

Oracle Data Dictionary Views

Metadata

Repository of information (metadata) describing the data in the database.
Data about data is called Metadata Oracle metadata is managed by Data Dictionary (Read only access)

Data Dictionary is managed by using SQL

Catalogue, Repository are alternate names SQL>desc dict
Oracle Data Dictionary Views

Data Dictionary

Schema objects in the database including default values for columns and integrity constraints

Show up of amount of space or storage allocated by objects

Show up of database users, privileges and roles of users.
Oracle Data Dictionary Views

Data Dictionary Contents

Base Tables

These underlying tables store information about the database. Only Oracle database should write to and read these tables.

Views

These views decode the base table data into useful information, such as user or table names, using joins and WHERE clauses to simplify the information. These views contain the names and description of all objects in the data dictionary.

Oracle Data Dictionary Views

Prefix	User Access	Contents	Notes
DBA_	Database administrators	All objects	Some DBA_ views have additional columns containing information useful to the administrator.
ALL_	All users	Objects to which user has privileges	Includes objects owned by user. These views obey the current set of enabled roles.
USER_	All users	Objects owned by user	Views with the prefix USER_ usually exclude the column OWNER. This column is implied in the USER_ views to be the user issuing the query.

Data Dictionary View Sets

```

SELECT OWNER, OBJECT_NAME, OBJECT_TYPE
FROM ALL_OBJECTS
ORDER BY OWNER, OBJECT_NAME;

SELECT OBJECT_NAME, OBJECT_TYPE
FROM USER_OBJECTS
ORDER BY OBJECT_NAME;

SQL> SELECT ((3*4)+5)/3 FROM DUAL;

((3*4)+5)/3
-----
5.66666667

```

Oracle Data Dictionary Views

See columns of table emp and their data types



SQL> desc emp

Name
EMPNO
ENAME
JOB
MGR
HIREDATE
SAL
COMM
DEPTNO

Null?	Type
NOT NULL	NUMBER(4)
	VARCHAR2(10)
	VARCHAR2(9)
	NUMBER(4)
	DATE
	NUMBER(7,2)
	NUMBER(7,2)
	NUMBER(2)

SQL> select empno, hiredate, deptno, sal
2 from emp;

EMPNO	HIREDATE	DEPTNO	SAL
7369	17-DEC-80	20	800
7499	20-FEB-81	30	1600
7521	22-FEB-81	30	1250
7566	02-APR-81	20	2975
7654	28-SEP-81	30	1250
7698	01-MAY-81	30	2850
7782	09-JUN-81	10	2450
7788	19-APR-87	20	3000
7839	17-NOV-81	10	5000
7844	08-SEP-81	30	1500
7876	23-MAY-87	20	1100
7900	03-DEC-81	30	950
7902	03-DEC-81	20	3000
7934	23-JAN-82	10	1300

14 rows selected.

SQL>



Start writing SQL by looking
at above columns

How to use Data Dictionary?

Login with Sys / as sysdba SQL> desc Dict
Introduction to Database Administration

TOPIC 48

Oracle Data Dictionary Views
Oracle Data Dictionary Views

Data Dictionary Views (Metadata)

Example-1: Data Dictionary

Example-2: Data Dictionary

Dynamic Performance Views

Oracle Data Dictionary Views

Example-1: Data Dictionary

Desc dict

```
select table_name from dict
where table_name like '%CONSTRAINT%';
```

desc user_constraints

Oracle Data Dictionary Views

Example-1: Data Dictionary

To see constraints of table EMP:

```
select constraint_name, table_name,
R_constraint_name from user_constraints
where table_name='EMP';
```

Oracle Data Dictionary Views

Example-1: Data Dictionary

To see constraints of table EMP:

```
select constraint_name, table_name,
R_constraint_name from user_constraints
where table_name='EMP';
```

Oracle Data Dictionary Views

Example-2: Data Dictionary

To see the size of table EMP in KB

--login with user scott

```
select sum(bytes)/1024/1024
from dba_segments
where segment_name ='EMP';
```