

1

Creating an Oracle Database

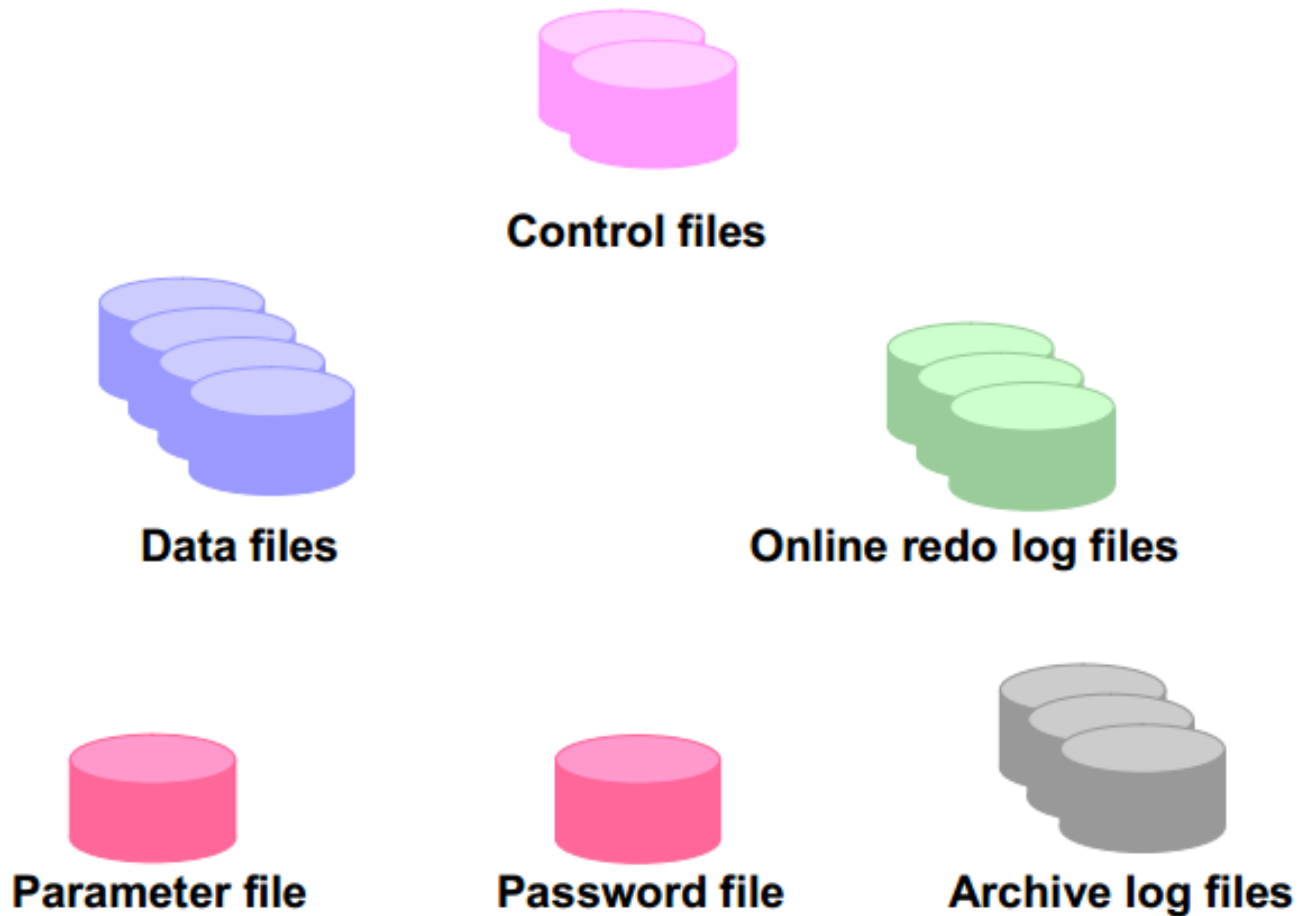
Oracle for Base

Objectives

After completing this lesson, you should be able to do the following:

- Describe the Oracle database architecture
- Understand the instance architecture
- Use the management framework
- Use DBCA to
 - Create a database
 - Configure a database
 - Drop a database
 - Manage templates

Database Architecture



Database Architecture

The files that constitute an Oracle database are organized into the following:

- **Control files:** Contain data about the database itself, called the metadata. These files are critical to the database. Without them you cannot open the data files to access the data within the database.
- **Data files:** Contain the data of the database
- **Online redo log files:** Allow for instance recovery of the database. If the database crashes and does not lose any data files, the instance can recover the database with the information in these files.

Database Architecture

There are other files which are not officially part of the database but are important to the successful running of the database. These are:

- **Parameter file:** Used to define how the instance will be configured when it starts up.
- **Password file:** Allows users to connect remotely to the database and perform administrative tasks.
- **Archive log files:** Contain an ongoing history of the redo generated by the instance. These files allow for database recovery; using these files and a backup of the database, you can recover a lost data file.

Control Files

- Contain physical database structure information
- Multiplexed to protect against loss
- Required to start the instance



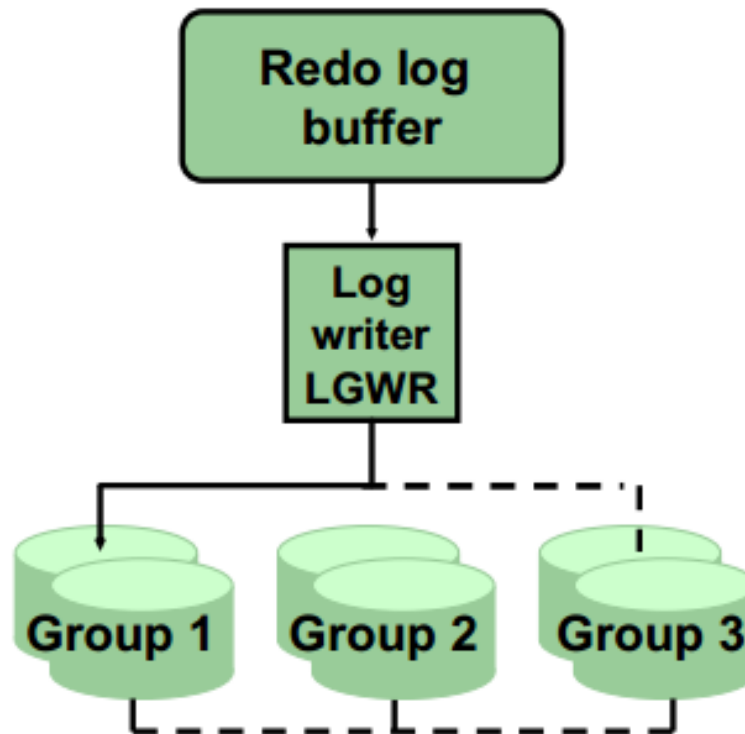
Control files

Control Files

- When you start the instance and mount the database, the control file is read. The entries in the control file specify the physical files that the database comprises.
- When you add additional files to your database, the control file is automatically updated.
- The location of the control files is specified in an initialization parameter.

Redo Log Files

- Record changes to the database
- Multiplex to protect against loss

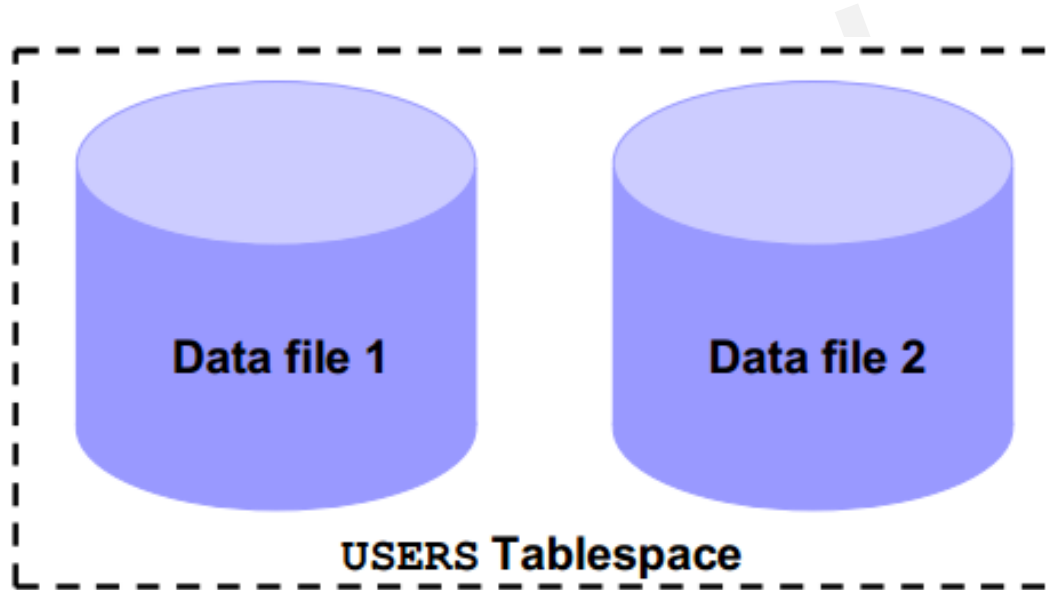


Redo Log Files

- You use redo log files to record changes to the database as a result of transactions and internal Oracle database server actions.
- They protect the database from loss of integrity due to system failures caused by power outages, disk failures, and so on.
- Redo log files should be multiplexed to ensure that the information stored in them is not lost in the event of a disk failure.
- There do log consists of groups of redo log files. A group consists of a redo log file and its multiplexed copies. Each identical copy is said to be a member of that group and each group is identified by a number.
- The log writer (LGWR) process writes redo records from the redo log buffer to a redo log group until the file is filled or a log switch operation is requested.

Tablespaces and Datafiles

- Tablespaces consist of one or more data files
- Data files belong to only one tablespace

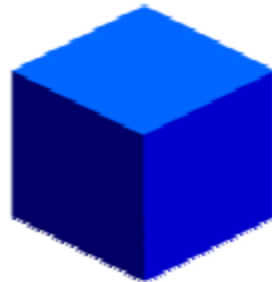


Tablespaces and Datafiles

- A database is divided into logical storage units called tablespaces, which can be used to group related logical structures together. Each database is logically divided into one or more tablespaces.
- One or more data files are explicitly created for each tablespace to physically store the data of all logical structures in a tablespace.
- **Note:** You can also create bigfile tablespaces, which are tablespaces with a single, but very large (up to 4G blocks) data file.

Segments, Extents, and Blocks

- Segments exist within a tablespace.
- Segments are made of a collection of extents.
- Extents are a collection of data blocks.
- Data blocks are mapped to OS blocks.



Segment



Extents



**Data
blocks**

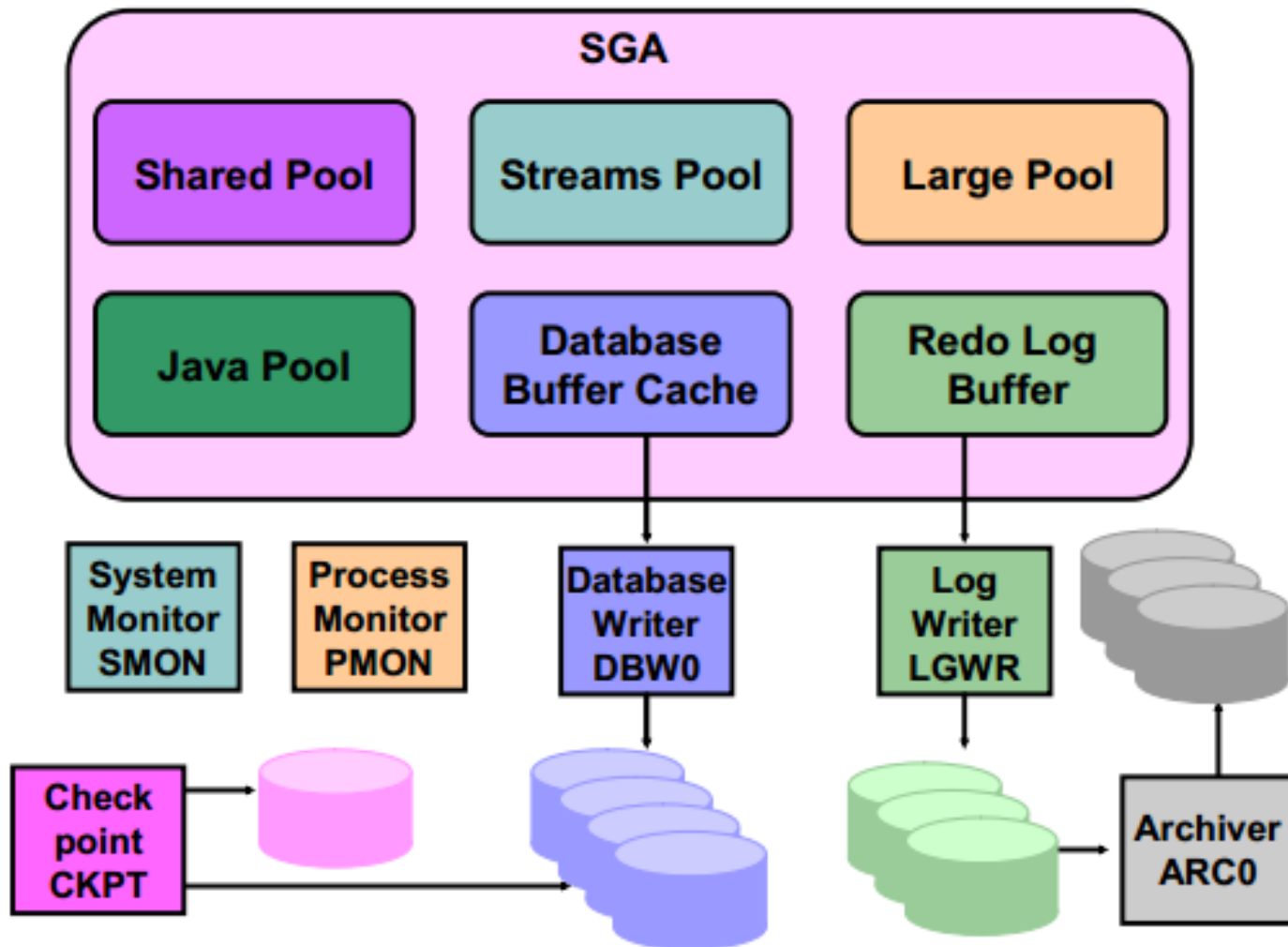


OS blocks

Segments, Extents, and Blocks

- Database objects such as tables and indexes are stored in tablespaces as segments. Each segment contains one or more extents.
- An extent consists of contiguous data blocks, which means that each extent can exist only in one data file.
- Data blocks are the smallest unit of I/O in the database.
- The size of the data block can be set at database creation time. The default size of 8 K is adequate for most databases.
- The maximum block size depends on your OS. The minimum block size is 2K and should rarely (if ever) be used.
- You can have tablespaces with different block sizes.

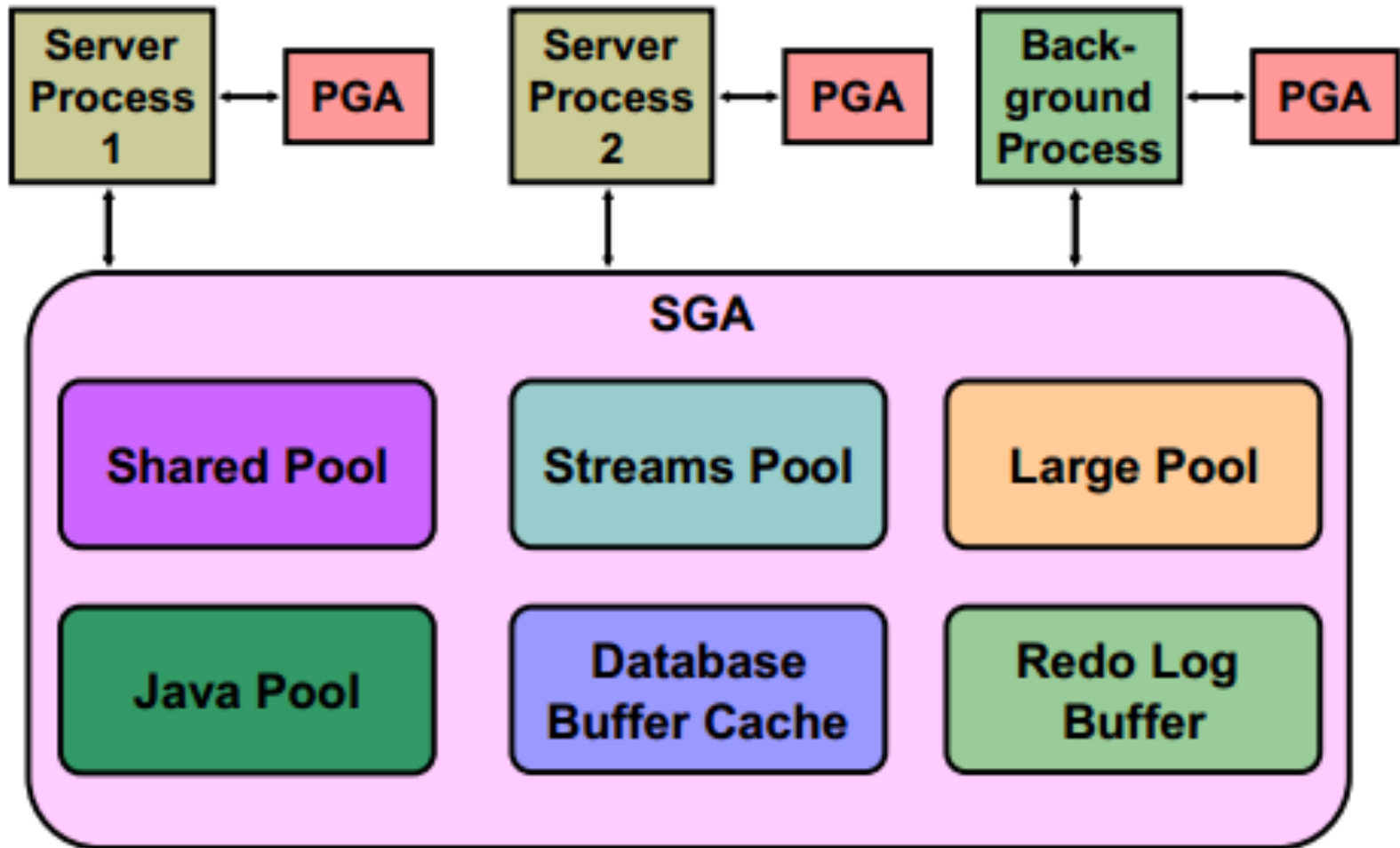
Oracle Instance Management



Oracle Instance Management

- An Oracle database server consists of an Oracle database and an Oracle instance. An Oracle instance is made up of memory buffers known as the **S**ystem **G**lobal **A**rea (**SGA**) and background processes that handle much of the behind-the-scenes work involved in running an instance.

Oracle Memory Structures



Oracle Memory Structures

- **System Global Area (SGA):** Shared by all server and background processes
- **Program Global Area (PGA):** Private to each server and background process; there is one PGA for each process.
- The **System Global Area (SGA)** is a shared memory area that contains data and control information for the instance.

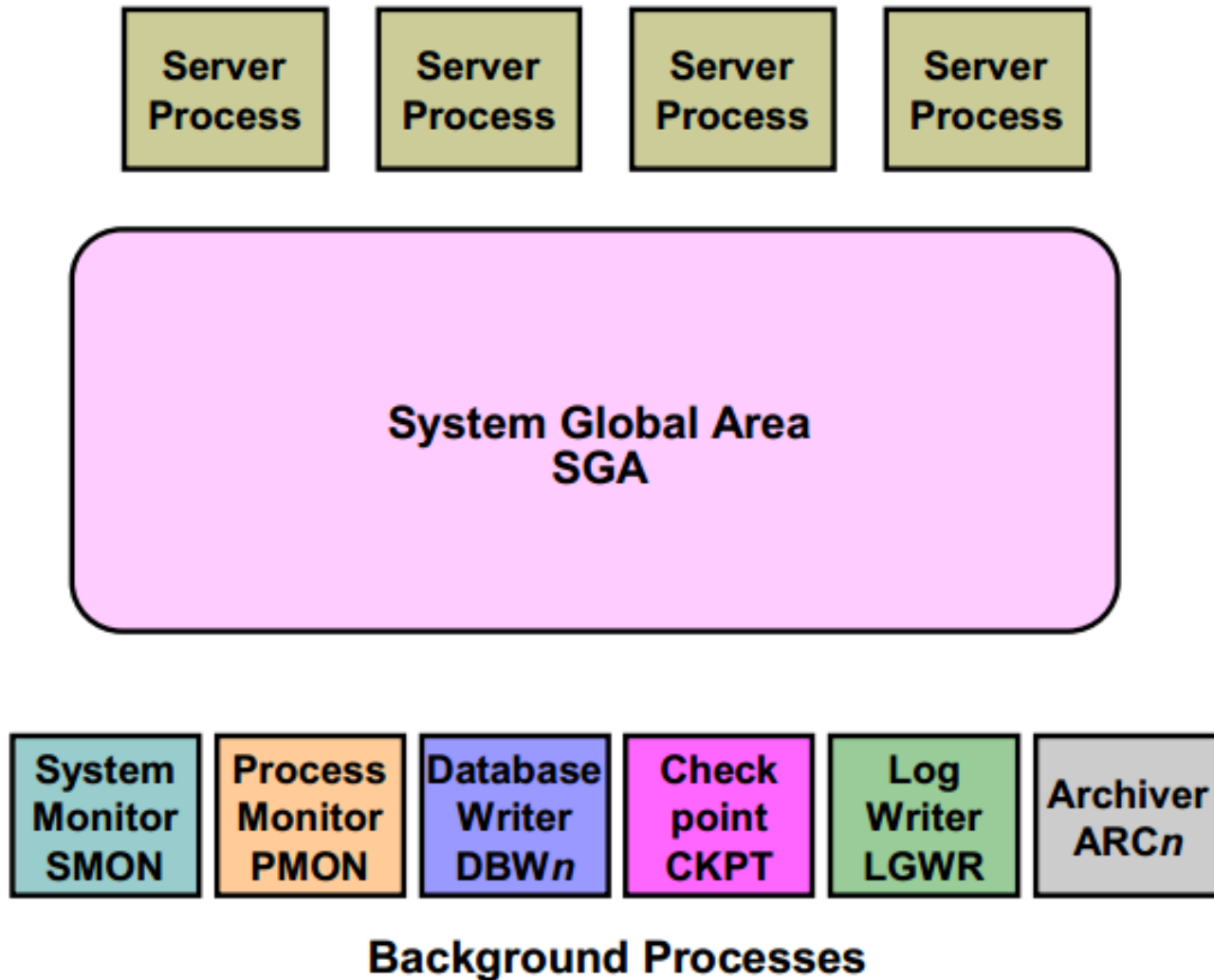
Oracle Memory Structures

- The **SGA** includes the following data structures:
 - **Database buffer cache:** Caches blocks of data retrieved from the database
 - **Redo log buffer:** Caches redo information (used for instance recovery) until it can be written to the physical redo log files stored on disk
 - **Shared pool:** Caches various constructs that can be shared among users
 - **Large pool:** Optional area used for buffering large I/O requests
 - **Java pool:** Used for all session-specific Java code and data within the Java Virtual Machine (JVM)
 - **Streams pool:** Used by Oracle Streams

Oracle Memory Structures

- With the dynamic SGA in frastructure, the size of the database buffer cache, the shared pool, the large pool, the Java pool, and the Streams pool changes without shutting down the instance.
- A Program Global Area (PGA) is a memory region which contains data and control information for each server process.
- A server process is a process that services a client's requests. Each server process has its own private PGA area that is created when the server process is started.

Oracle Processes



Oracle Processes

- When you invoke an application program or an Oracle tool such as Enterprise Manager, the Oracle server creates a server process to execute commands issued by the application.
- Which background processes are present depends upon the features that are being used in the database. The most common background processes are the following:
 - **System monitor (SMON):** Performs crash recovery when the instance is started following a failure
 - **Process monitor (PMON):** Performs process cleanup when a user process fails.
 - **Database writer (DBWn):** Writes modified blocks from the database buffer cache to the files on disk

Oracle Processes

- Which background processes are present depends upon the features that are being used in the database. The most common background processes are the following:
 - **Checkpoint (CKPT):** Signals DBWn at checkpoints and updates all of the data files and control files of the database to indicate the most recent checkpoint
 - **Log writer (LGWR):** Writes redo log entries to disk
 - **Archiver (ARCn):** Copies the redo log files to archival storage when the log files are full or a log switch occurs

Data Dictionary

- The data dictionary is the central set of tables and views that are used as a read-only reference about a particular database. A data dictionary stores information such as:
 - The logical and physical structure of the database
 - Valid users of the database
 - Information about integrity constraints
 - How much space is allocated for a schema object and how much of it is in use
- A data dictionary is created when a database is created and is automatically updated when the structure of the database is updated.

Database Configuration Assistant (DBCA)

Database Configuration Assistant (**DBCA**) enables you to create, change the configuration of, or delete a database. You can also create a database from a list of predefined templates or use an existing database as a sample to create a new database or template. A template is a predefined database that you use as a starting point for a new database.

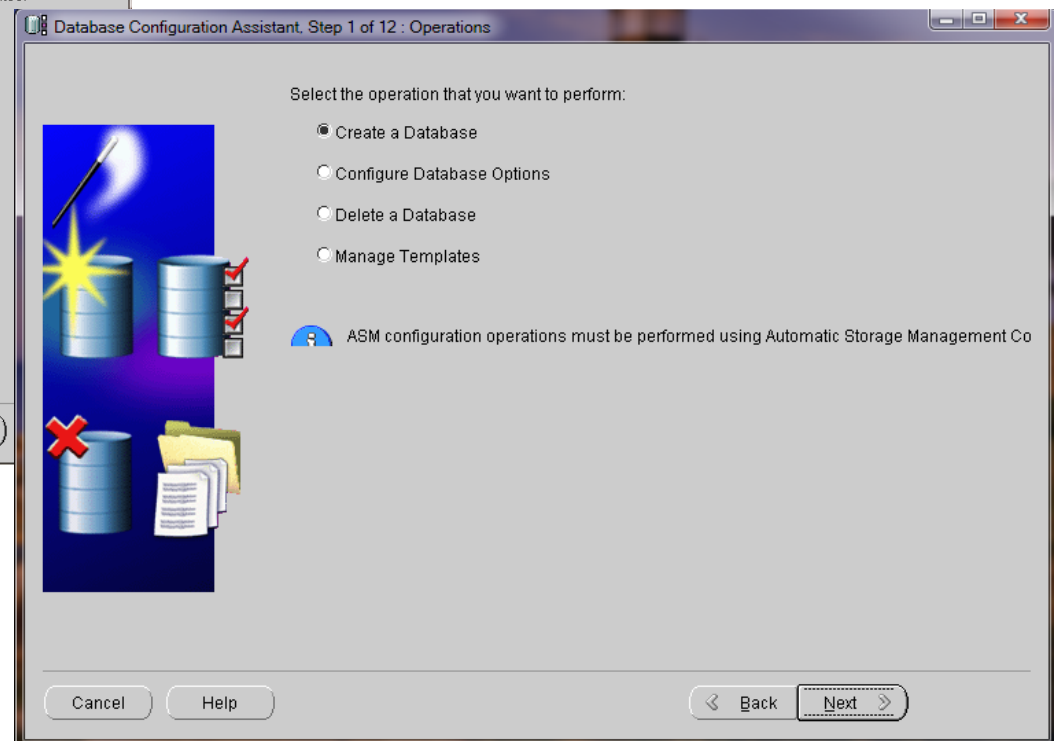
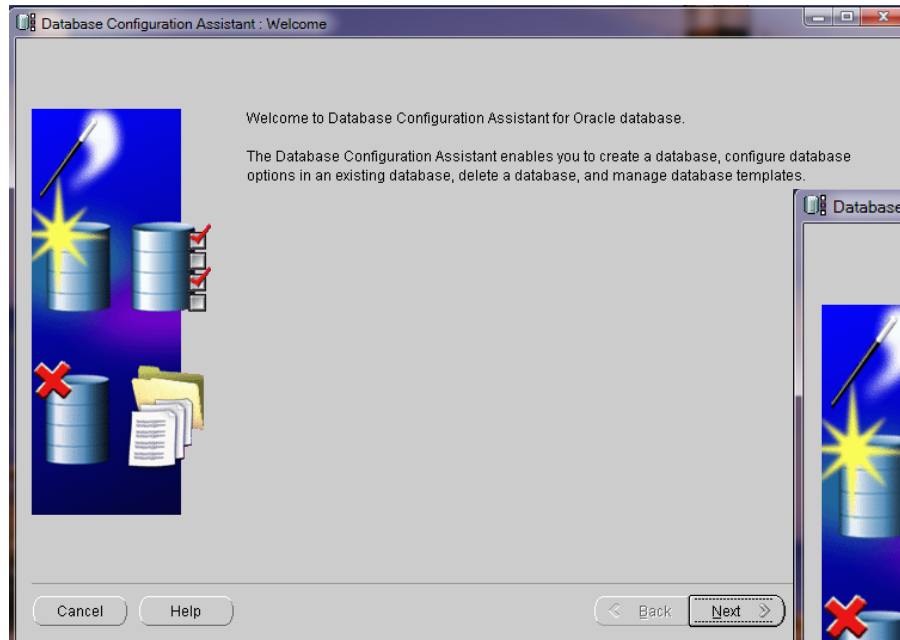
- **Create a database:** If you select this option, you can create a new database or template.
- **Configure options in a database:** If you select the “*Change database configuration*” option, you can configure installed options that have not previously been configured for use with your database. You can also enable or disable shared server support.

Database Configuration Assistant (DBCA)

Database Configuration Assistant (**DBCA**) enables you to create, change the configuration of, or delete a database. You can also create a database from a list of predefined templates or use an existing database as a sample to create a new database or template. A template is a predefined database that you use as a starting point for a new database.

- **Delete a database:** If you select this option, you can delete all the database files.
- **Manage Templates:** If you select this option, you have three ways to create a template:
 - From an existing template
 - From an existing database(structure only)
 - From an existing database(structure as well as data)

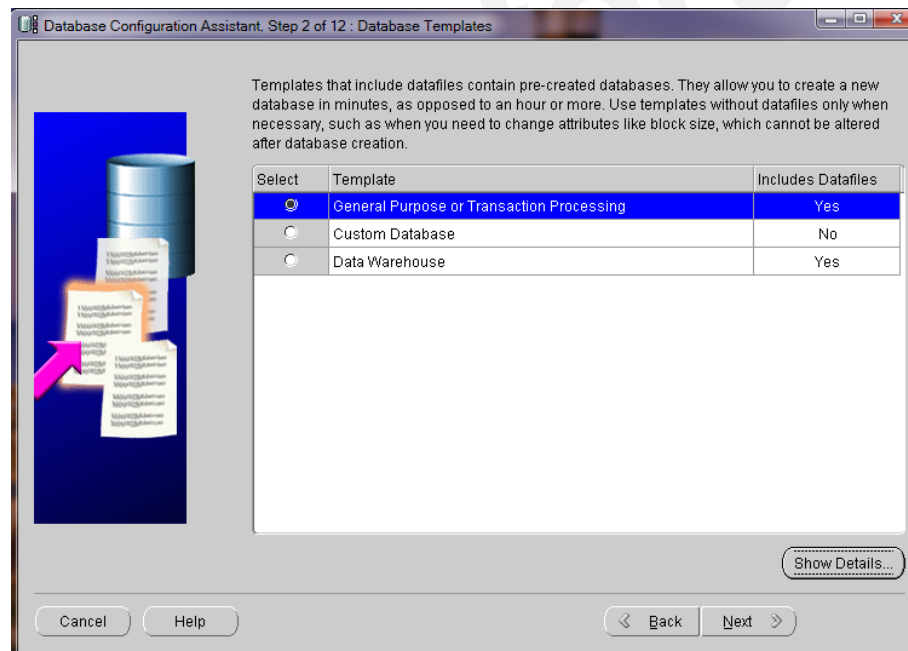
Database Configuration Assistant (DBCA)



Creating a Database

There are templates for data warehouse, general purpose, and transaction processing databases. The templates contain settings optimized for workload. Click Show Details to see the configuration for each type of database.

If you are not sure, select the default General Purpose template.



Database Identification

Enter the Global Database Name, in the form `database_name.domain_name` and SID (Oracle system identifier). The SID defaults to the database name and uniquely identifies the instance that runs the database.

It is important to understand that the SID is the name of the instance that will connect to a database and not necessarily the name of the database

Database Identification


Database Configuration Assistant, Step 3 of 12 : Database Identification

An Oracle database is uniquely identified by a Global Database Name, typically of the form "name.domain".

Global Database Name:

A database is referenced by at least one Oracle instance which is uniquely identified from any other instance on this computer by an Oracle System Identifier (SID).

SID:



Cancel Help < Back Next >


Management Options

Use this page to set up your database so it can be managed with Oracle Enterprise Manager, which provides web-based management tools for individual databases, as well as central management tools for managing your entire Oracle environment.

Use Enterprise Manager, select Configure the Database with Enterprise Manager.

Management Options

Database Configuration Assistant, Step 4 of 12 : Management Options



Enterprise Manager Automatic Maintenance Tasks

☒ **Configure Enterprise Manager**

☐ Register with Grid Control for centralized management

Management Service: No Agents Found

☒ **Configure Database Control for local management**

☐ **Enable Alert Notifications**

Outgoing Mail (SMTP) Server:

Recipient Email Address:

☐ **Enable Daily Disk Backup to Recovery Area**

Backup Start Time: ☒ AM ☐ PM

OS Username:

OS Password:

Cancel Help < Back Next > Finish

Passwords and Storage

Database Configuration Assistant. Step 5 of 12: Database Credentials

For security reasons, you must specify passwords for the following user accounts in the new database.

☐ Use Different Administrative Passwords

User Name	Password	Confirm Password
SYS		
SYSTEM		
DBSNMP		
SYSMAN		

☒ Use the Same Administrative Password for All Accounts

Password:

Confirm Password:

Cancel Help Back Next

Database Configuration Assistant. Step 6 of 12: Database File Locations

Specify storage type and locations for database files.

Storage Type:

Storage Locations:

☒ Use Database File Locations from Template


☐ Use Common Location for All Database Files

Database Files Location: Browse...

☐ Use Oracle-Managed Files

Database Area: Browse...

Multiplex Redo Logs and Control Files...

 If you want to specify different locations for any database files, pick any of the above options except Oracle-Managed Files and use the Storage page later to customize each file location. If you use Oracle-Managed Files, Oracle automatically generates the names for database files, which can not be changed on the Storage page.

File Location Variables...

Cancel Help Back Next Finish

File Locations and Backup Recovery

Database Configuration Assistant. Step 7 of 11 : Recovery Configuration

Choose the recovery options for the database:


☒ Specify Flash Recovery Area

This is used as the default for all disk based backup and recovery operations, and is also required for automatic disk based backup using Enterprise Manager. Oracle recommends that the database files and recovery files be located on physically different disks for data protection and performance.

Flash Recovery Area:

Flash Recovery Area Size:

☐ Enable Archiving



File Locations and Backup Recovery

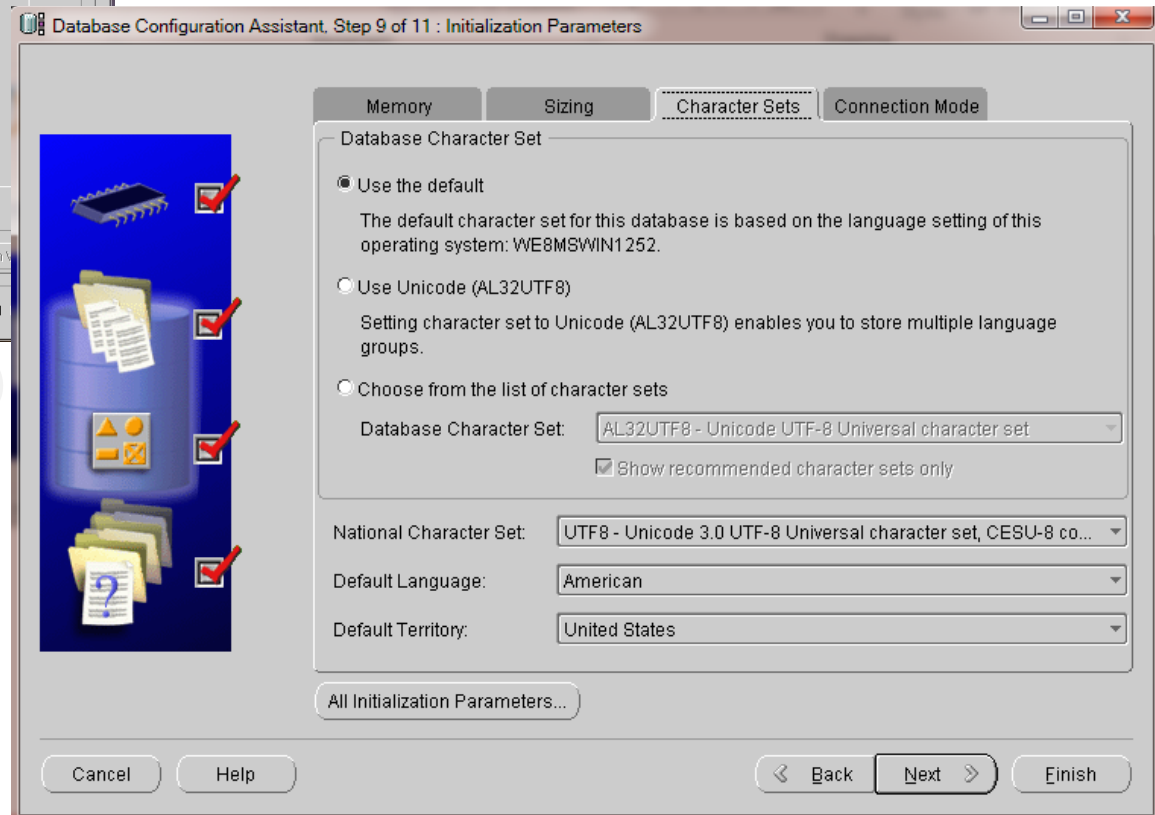
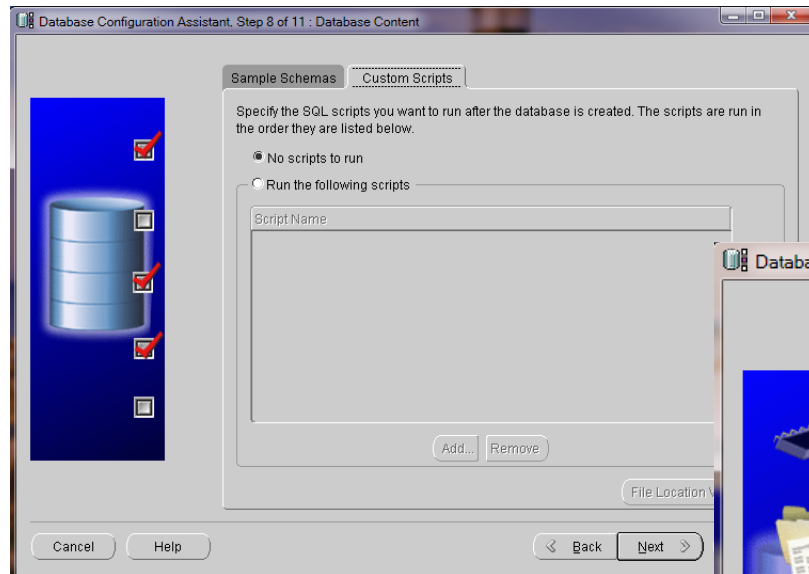
File Locations

- Use Database File Locations from Template
- Use Common Location for All DatabaseFiles
- Use Oracle-ManagedFiles

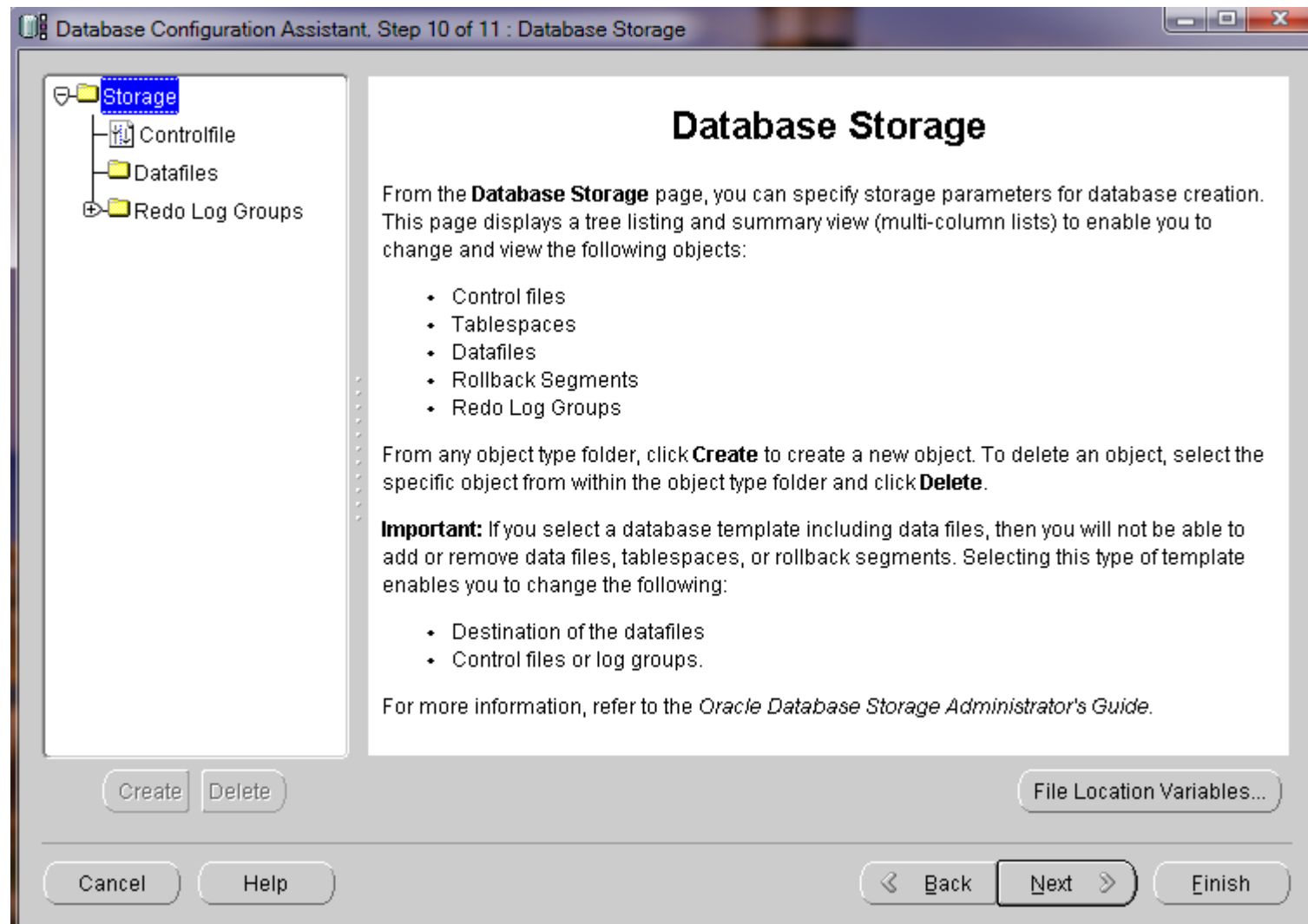
Backup and Recovery Options

- A flash recovery area is a location in which Oracle can store and manage files related to backup and recovery.
- Enabling archiving puts the database in archive log mode at creation time.

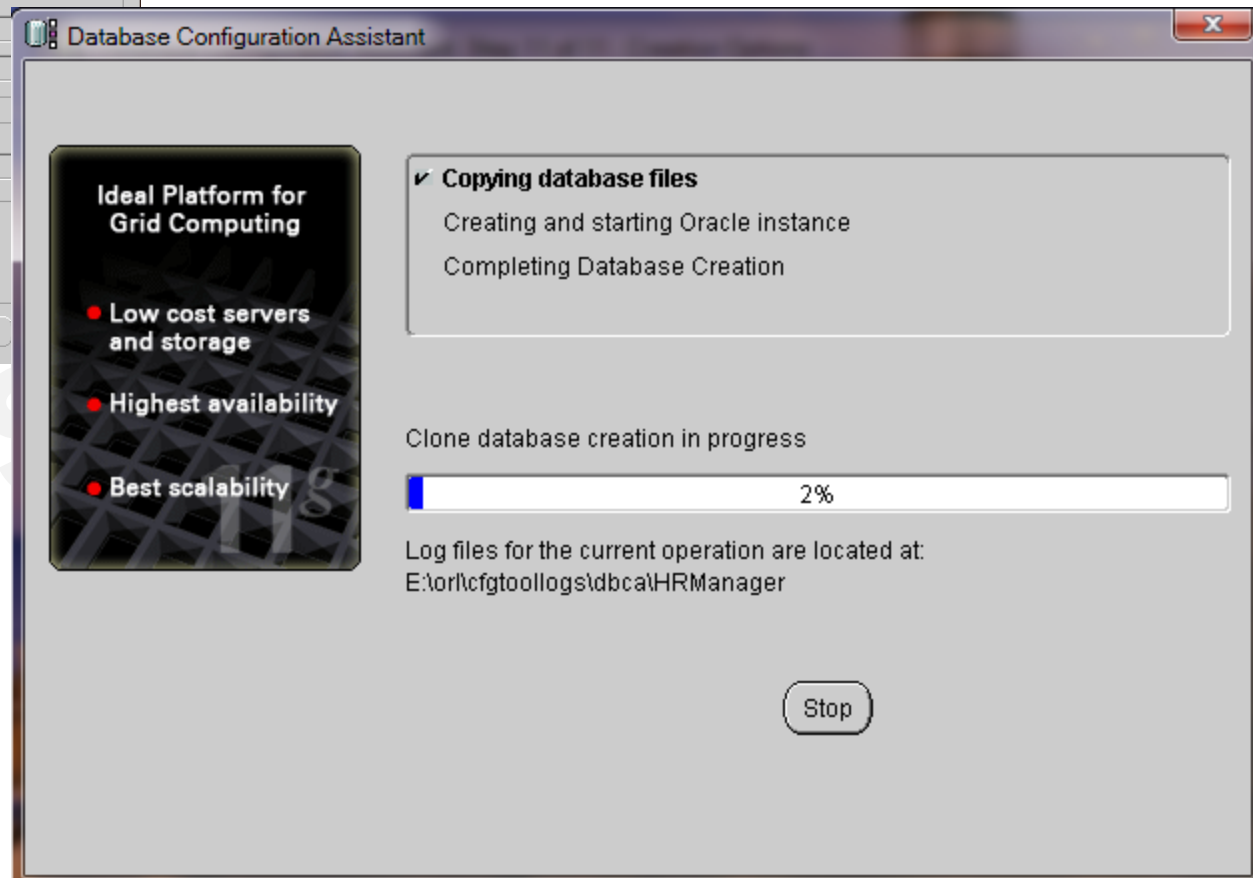
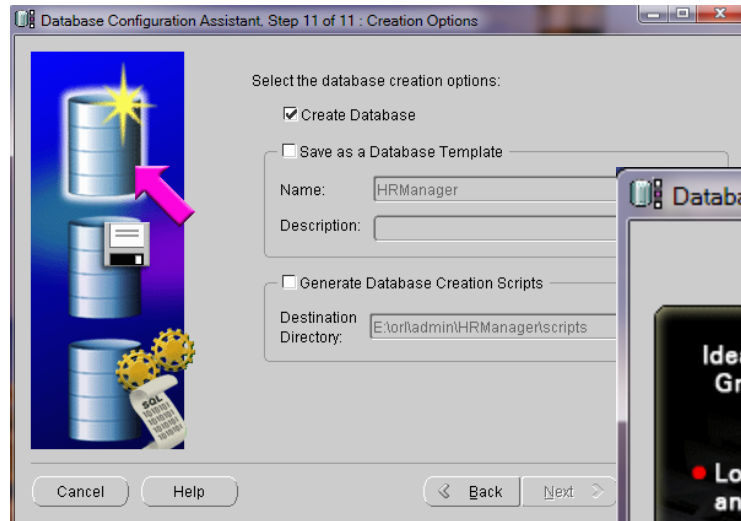
Content and Initialization Parameters



Database Storage



Creation Options and Create



Summary

In this lesson, you should have learned how to:

- Describe the Oracle database architecture
- Understand the instance architecture
- Use the management framework
- Use DBCA to
 - Create a database
 - Configure a database
 - Drop a database
 - Manage templates

Practice

Creating an Oracle Database

This practice covers creating an Oracle database by using DBCA.

Stanford

Practice

Your IT manager returns from a meeting with a few of the users that will be using the new system you are going to support. They want a second database for storage of historical data.

Using DBCA you will create a database using the General Purpose template with the following information:

- Set the global database name hist.oracle.com and the **SID** to hist.
- Set the passwords to oracle.
- For the storage options use FileSystem.
- Use Flash Recovery area, accept the default size and location, disable the backups.

After you create the database the users decided that they don't need to track the historical data. Drop the hist database

THANK YOU !

Stanford – Dạy kinh nghiệm lập trình