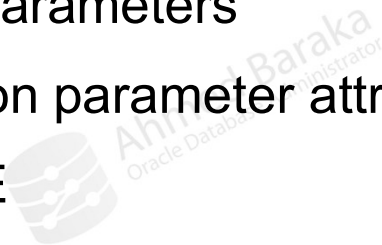# Database Initialization Parameters
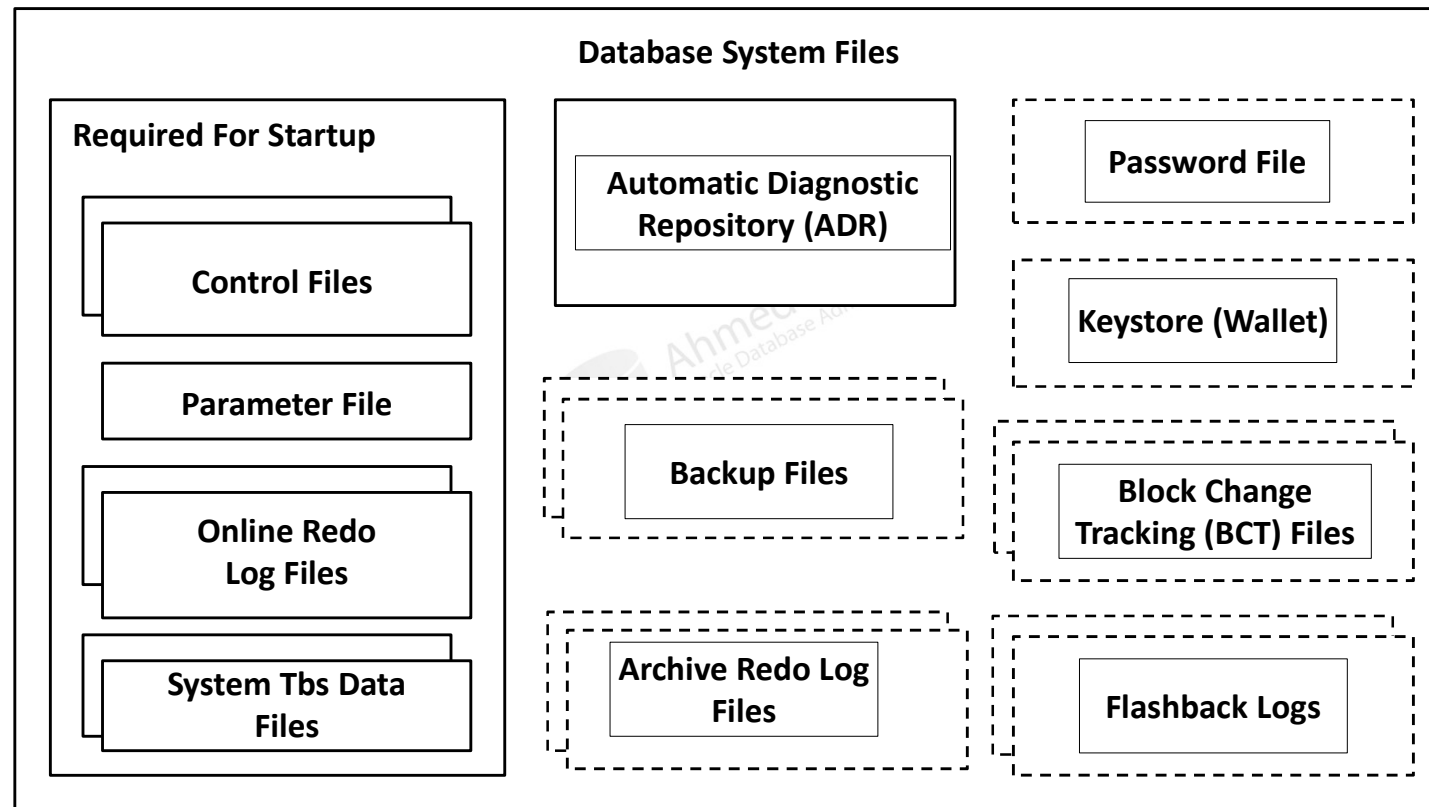
**By Ahmed Baraka**

# Objectives

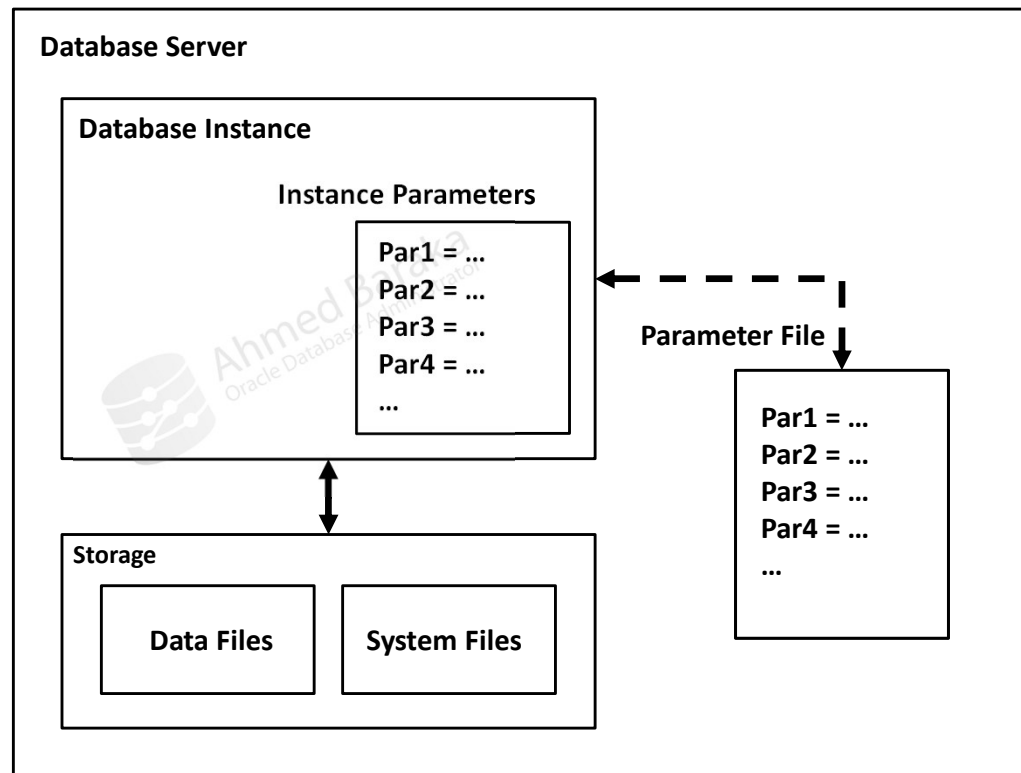In this lecture, you will learn how to perform the following:

- Describe database parameter file

- Manage the initialization parameters

- Understand the initialization parameter attributes

- Create PFILE and SPFILE

# Database System Files

## Database System Files

### Required For Startup

- Control Files
- Parameter File
- Online Redo Log Files
- System Tbs Data Files

Automatic Diagnostic Repository (ADR)

Password File

Keystore (Wallet)

Backup Files

Block Change Tracking (BCT) Files

Archive Redo Log Files

Flashback Logs

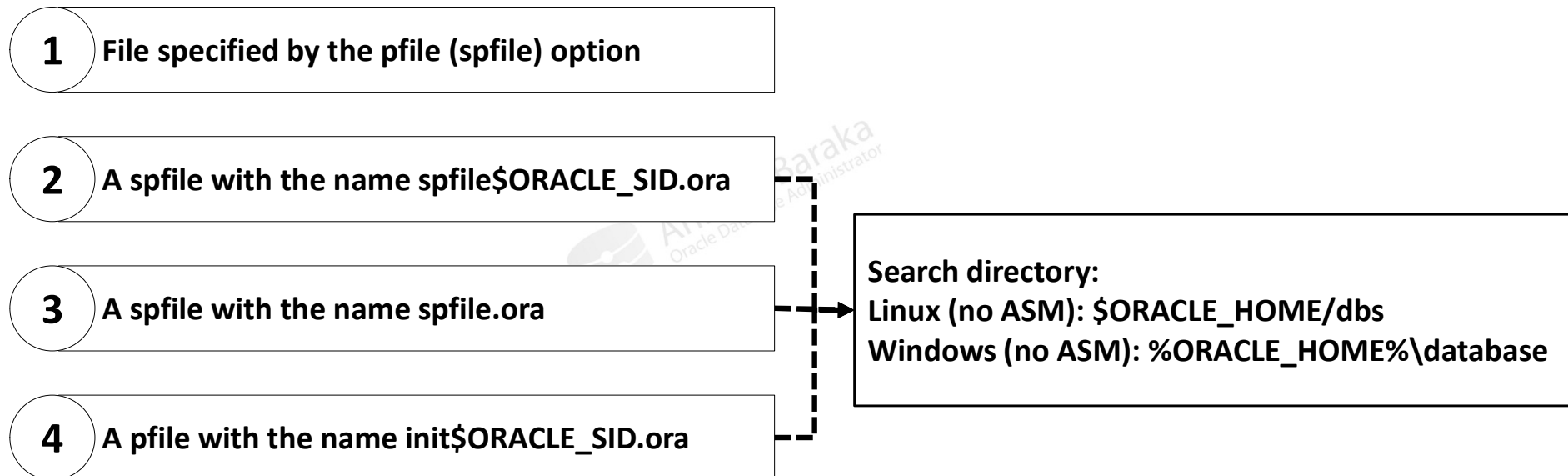# Oracle Database Initialization Parameters

# About Database Initialization Parameters

- They are used to control the behavior of the database operation

- They are saved in the initialization parameter file

- The database reads the parameter file when it starts up

- If a parameter value not found in the parameter file, its default value takes effect

- **Dynamic (modifiable) parameters**: can be changed in the memory and parameter file

- **Static parameters**: can be changed only in the parameter file

# About Database Initialization Parameters

- Reference: **Oracle Database Reference** documentation

- Initialization parameter file types:

  - **Server parameter file (SPFILE)**: is a binary file. Its contents is altered by SQL statements: ALTER SYSTEM. Typically used when the database operates normally.

  - **Text initialization parameter file (PFILE)**: is a regular text file. Modified manually with an editor. It cannot be modified by the database. Typically used in special scenarios.

- When the database starts up, it reads either the SPFILE or PFILE.

# Initialization Parameter File Search Flow

**1** ) File specified by the pfile (spfile) option

**2** ) A spfile with the name spfile$ORACLE_SID.ora

**3** ) A spfile with the name spfile.ora

**4** ) A pfile with the name init$ORACLE_SID.ora

Search directory:
Linux (no ASM): $ORACLE_HOME/dbs
Windows (no ASM): %ORACLE_HOME%\database

# Initialization Parameter Examples

| Parameter | Description |
|---|---|
| CONTROL_FILES | Full path of database instance control file(s) |
| PROCESSES | Maximum number of OS user processes that can simultaneously connect |
| DB_BLOCK_SIZE | Standard database block size used by all tablespaces |
| SGA_TARGET | Specifies the total size of all SGA components |
| MEMORY_TARGET | Specifies the Oracle systemwide usable memory |

# Displaying Parameter Values Effective in Current Session

```
SQL> show parameter sga_target
NAME                                     TYPE        VALUE
------------------------------------ ----------- --------------

sga_target                               big integer 2400M

SQL> show parameter sga
NAME                                     TYPE        VALUE
------------------------------------ ----------- -----------------------
sga_max_size                             big integer 2400M
sga_min_size                             big integer 0
sga_target                               big integer 2400M
unified_audit_sga_queue_size             integer     1048576

SQL> SELECT NAME , VALUE  FROM V$PARAMETER WHERE NAME='sga_target';
NAME               VALUE
----------------- --------------------
sga_target         2506096640
```

# Displaying Parameter Values in the SPFILE

```
SQL> SELECT NAME , VALUE FROM V$SPPARAMETER WHERE NAME='sga_target';

NAME                VALUE
---------------     --------------------
sga_target          2506096640
```

# V$PARAMETER Structure

```
SQL> desc V$PARAMETER
 Name                                     Null?    Type
 ---------------------------------------- -------- --------------------
 NUM                                               NUMBER
 NAME                                              VARCHAR2(80)
 TYPE                                              NUMBER
 VALUE                                             VARCHAR2(4000)
 DISPLAY_VALUE                                     VARCHAR2(4000)
 DEFAULT_VALUE                                     VARCHAR2(255)
 ISDEFAULT                                         VARCHAR2(9)
 ISSES_MODIFIABLE                                  VARCHAR2(5)
 ISSYS_MODIFIABLE                                  VARCHAR2(9)
 ISPDB_MODIFIABLE                                  VARCHAR2(5)
 ISINSTANCE_MODIFIABLE                             VARCHAR2(5)
 ISMODIFIED                                        VARCHAR2(10)
 ISADJUSTED                                        VARCHAR2(5)
 ISDEPRECATED                                      VARCHAR2(5)
 ISBASIC                                           VARCHAR2(5)
 ...
```

# How to Know which SPFILE/PFILE is used?

```
SQL> show parameter SPFILE

NAME      TYPE      VALUE
-------   --------  -----------------------
spfile    string    /u01/app/oracle/product/19.0.0/db_1/dbs/spfileoradb.ora
```

# Initialization Parameter Types

**Basic**

```
CONTROL_FILES
DB_BLOCK_SIZE
PROCESSES
UNDO_TABLESPACE
DB_DOMAIN
...
```

**Advanced**

```
DB_CACHE_SIZE
DB_BLOCK_CHECKINGS
DB_BLOCK_CHECKSUM
HARED_POOL_SIZE
AUDIT_TRAIL
...
```

# Setting Initialization Parameters at DB Creation

# Setting Initialization Parameters at DB Creation



To display the Advanced Parameters

Click on the Value column to change the parameter value

A brief description on the selected parameter

# Changing Initialization Parameter Values when SPFILE in Use

- **Static parameters:**
  - Can be changed only in the parameter file
  - Require restarting the instance before taking effect

  ```
  ALTER SYSTEM SET <par name>=<value> SCOPE=SPFILE;
  ```

- **Dynamic (modifiable) parameters:**
  - Can be changed while database is online
  - Can be altered at system level and (some) session level

  ```
  ALTER SYSTEM SET <par name>=<value> SCOPE=BOTH;
  ALTER SYSTEM SET <par name>=<value> SCOPE=MEMORY;
  ```

  ```
  ALTER SESSION SET <par name>=<value>;
  ```

# Changing Initialization Parameter Values Example

| Property | Description |
|---|---|
| Parameter type | Big integer |
| Syntax | SGA_TARGET = integer [K \| M \| G] |
| Default value | 0 (SGA autotuning is disabled for DEFERRED mode autotuning requests, but allowed for IMMEDIATE mode autotuning requests) |
| Modifiable | ALTER SYSTEM |
| Modifiable in a PDB | Yes |
| Range of values | 64 MB to operating system-dependent |
| Basic | Yes |

```
ALTER SYSTEM SET SGA_TARGET=2048M SCOPE=BOTH;
ALTER SYSTEM SET SGA_TARGET=2147483648 SCOPE=BOTH;
```

# Changing Initialization Parameter Values Example

| Property | Description |
|---|---|
| Parameter type | Big integer |
| Syntax | SGA_MAX_SIZE = integer [K | M | G] |
| Default value | Initial size of SGA at startup, dependent on the sizes of different pools in the SGA, such as buffer cache, shared pool, large pool, and so on. |
| Modifiable | No |
| Modifiable in a PDB | No |
| Range of values | 0 to operating system-dependent |

```
ALTER SYSTEM SET SGA_TARGET=4096M SCOPE=SPFILE;
```

# Changing Initialization Parameter Values Example

| Property | Description |
|---|---|
| Parameter type | String |
| Syntax | `NLS_DATE_FORMAT = "format"` |
| Default value | Derived from `NLS_TERRITORY` |
| Modifiable | `ALTER SESSION` |
| Modifiable in a PDB | Yes |
| Range of values | Any valid date format mask but not exceeding a fixed length |
| Basic | No |

```
ALTER SESSION SET NLS_DATE_FORMAT ='Mon-dd-yyyy';
```

# Creating PFILE from SPFILE and Vice Versa

- To create a pfile from spfile:

```
CREATE PFILE='/home/oracle/mypfile.ora' FROM SPFILE;
```

- To create spfile from a pfile:

```
CREATE SPFILE FROM PFILE='/home/oracle/mypfile.ora';
```

# Parameter File Best Practice

- Let the database operate using the default SPFILE

- If you cannot startup a database instance because of an invalid parameter value in the SPFILE, create a temporarily PFILE from the SPFILE, startup the database with the PFILE, if you are happy about the changed parameter values, create SPFILE from the PFILE and restart the database instance.

- Include copy of the SPFILE in the backup routine

# Summary

In this lecture, you should have learnt how to perform the following:

- Describe database parameter file

- Manage the initialization parameters

- Understand the initialization parameter attributes

- Create PFILE and SPFILE