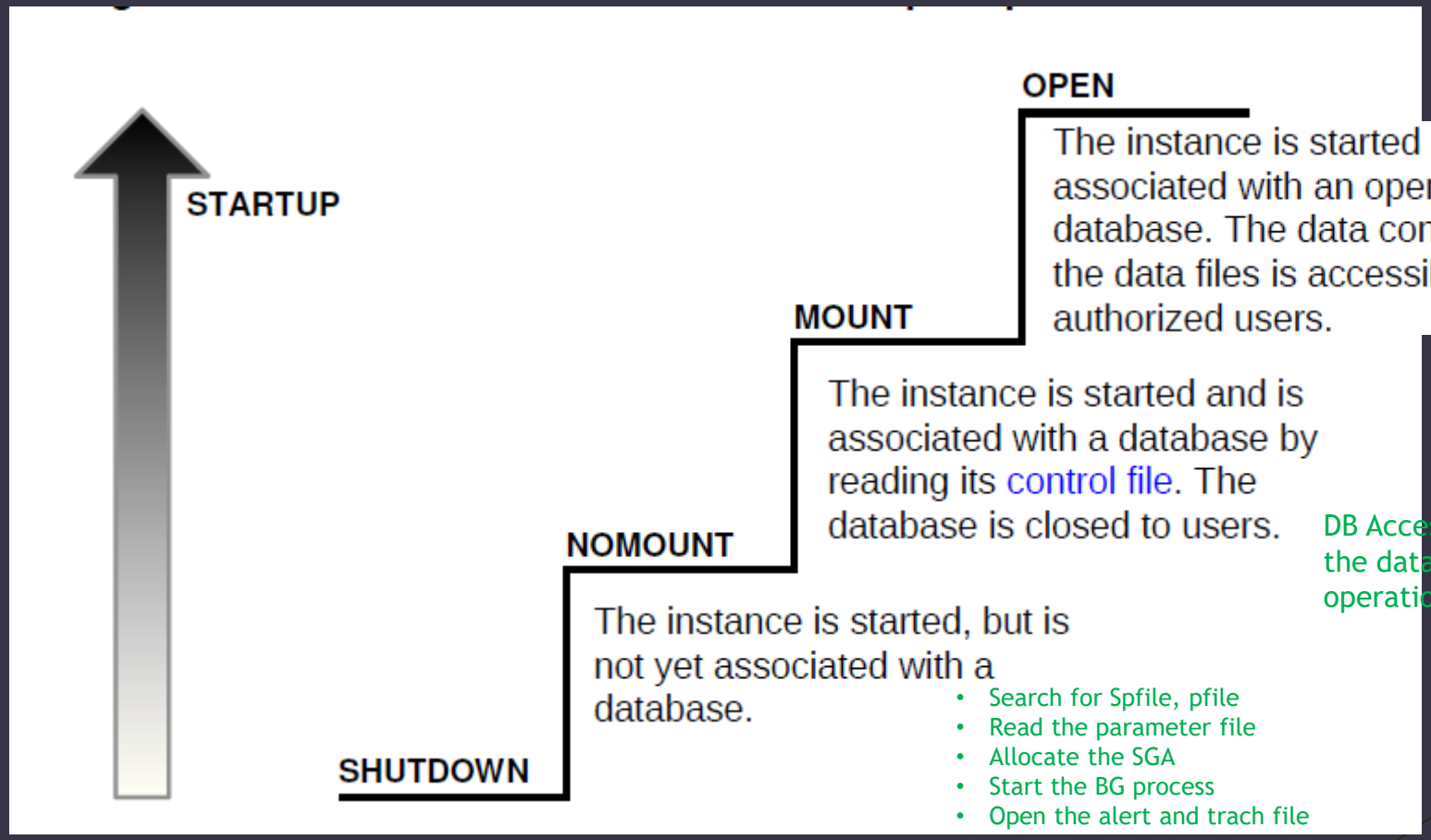
Database Startup , shutdown and connections

We manually start an instance, and then mount and open the database, making it available for users. You can use the SQL*Plus STARTUP command,



- Opens the online data files in tablespaces
- Acquires an undo tablespace
- Opens the online redo log files

DB Accessible only to database administrators. the database is not available for normal operations.

- Search for Spfile, pfile
- Read the parameter file
- Allocate the SGA
- Start the BG process
- Open the alert and trach file

select status from v$instance;

Connection with Administrator Privileges

Database startup and shutdown are powerful administrative options that are restricted to users who connect to Oracle Database with administrator privileges.

The following special system privileges enable access to a database instance even when the database is not open:

Note: the authentication happened using the password file

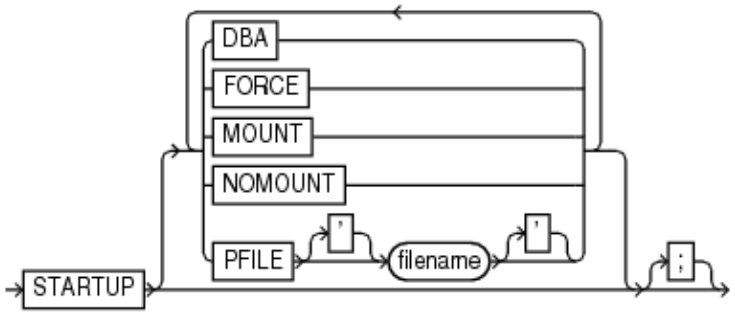
- SYSDBA
- SYSOPER
- SYSBACKUP
- SYSDG
- SYSKM

The **SYS** administrative account is automatically created when a database is created. This account can perform all database administrative functions. The SYS schema stores the base tables and views for the data dictionary.

SYSDBA and SYSOPER are administrative privileges required to perform high-level administrative operations such as creating, starting up, shutting down, backing up, or recovering the database. The SYSDBA system privilege is for fully empowered database administrators and the SYSOPER system privilege allows a user to perform basic operational tasks, but without the ability to look at user data.

Syntax

startup::=



Description of the illustration startup.eps

Semantics

Syntax Element	Description
`STARTUP`	If you specify only `STARTUP` with no other options, then the instance starts the instance with the default server parameter file, mounts the control file, and opens the database.
`DBA`	Restricts access to users with the `RESTRICTED SESSION` privilege.
`FORCE`	If the database is open, then `FORCE` shuts down the database with a `SHUTDOWN ABORT` statement before re-opening it. If the database is closed, then `FORCE` opens the database.
`MOUNT`	Starts the instance, then mounts the database without opening it
`NOMOUNT`	Starts the instance without mounting the database. If no parameter file exists, then RMAN starts the instance with a temporary parameter file. You can then run `RESTORE SPFILE` to restore a backup server parameter file.
`PFILE` *filename*	Specifies the file name of the text-based initialization parameter file for the target database. If `PFILE` is not specified, then the default initialization parameter file name is used.

https://docs.oracle.com/en/database/oracle/oracle-database/18/rcmrf/STARTUP.html#GUID-96DFEF80-A2D1-493C-8CFF-BF0CB4BE281D

Shutdown the database

- To shut down a database and instance, you must first connect as SYSOPER or SYSDBA
- We need to shutdown sometimes for specific reasons:

❑ change a static parameter
❑ Patch the database server
❑ perform maintenance or other administrative tasks

Shutdown Modes

	ABORT	IMMEDIATE	TRANSACTIONAL	NORMAL
Allows new connections	No	No	No	No
Waits until current sessions end	No	No	No	Yes
Waits until current transactions end	No	No	Yes	Yes
Forces a checkpoint and closes files	No	Yes	Yes	Yes

Note: if you only did shutdown without any option, this mean shutdown normal

On the way down:

- Uncommitted changes rolled back, for `IMMEDIATE`
- Database buffer cache written to data files
- Resources released

During:

`SHUTDOWN NORMAL`
or
`SHUTDOWN TRANSACTIONAL`
or
`SHUTDOWN IMMEDIATE`

Consistent database

On the way up:

- No instance recovery

On the way down:

- Modified buffers not written to data files
- Uncommitted changes not rolled back

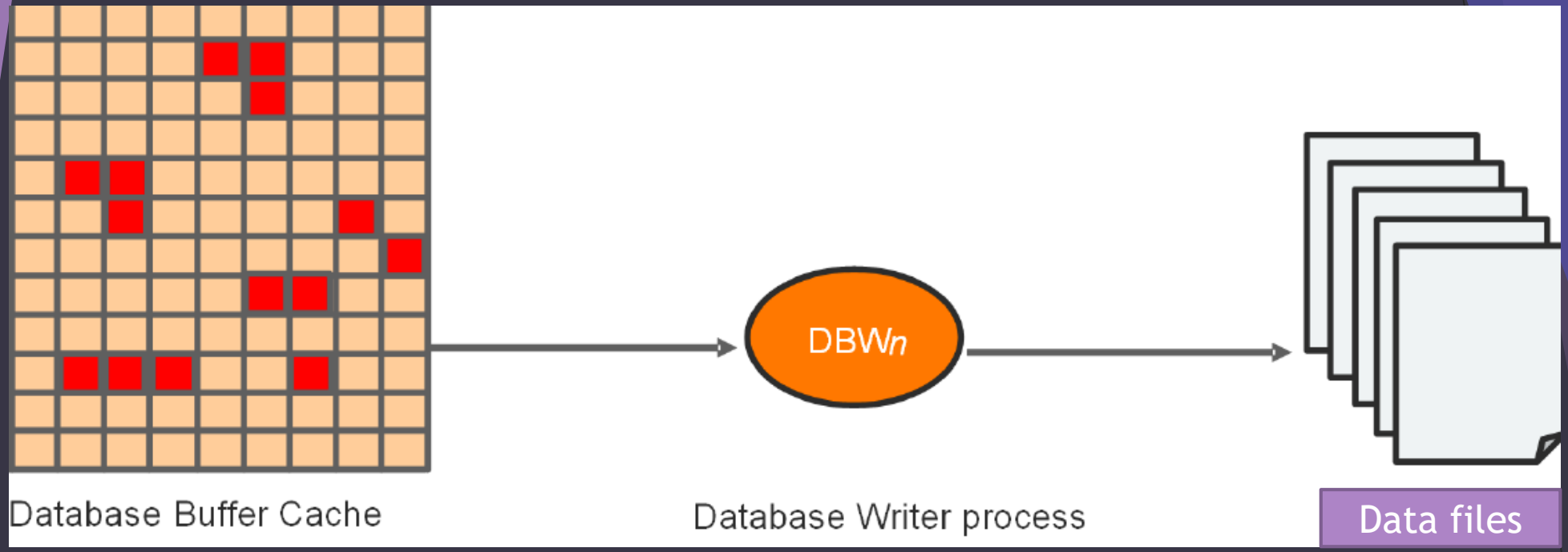
During:

`SHUTDOWN ABORT`
or
Instance failure
or
`STARTUP FORCE`

Inconsistent database

On the way up:

- Online redo log files used to reapply changes
- Undo segments used to roll back uncommitted changes
- Resources released

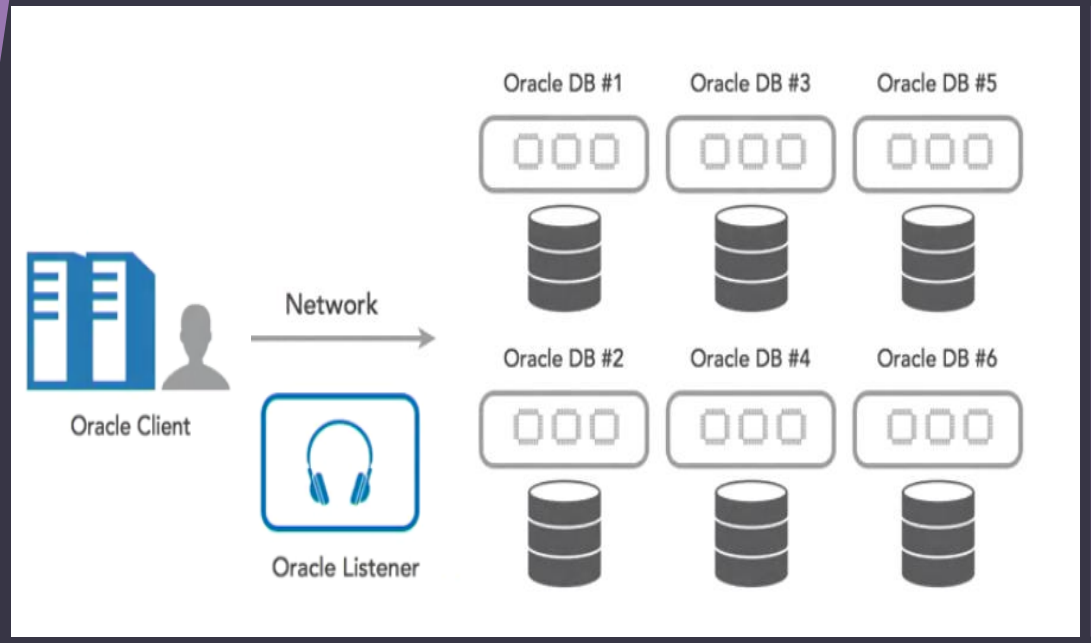


When the DWBn write to data files?

1- Dirty buffers threshold
2- when we need free buffers for some operations
3- shutdown (normal, transactional, immediate)
4- changing the status for tablespace (for example read only)
5- during a checkpoint

Connecting to oracle database

- Back in the day, the only way to connect to a database was usually to be on a host .
- Now oracle support TCP/IP and Secure TCP/IP connections from clients.
- To make connection with oracle we need Oracle net services
- Oracle net services installed with the database.
- Oracle Net Listener is a separate process that runs on the database server computer. It receives incoming client connection requests and manages the traffic of these requests to the database server
- Oracle uses 2 main files (listener.ora, tnsnames.ora) for network configuration.



- Oracle listener as a gateway to the actual Oracle database
- It is a separate component
- Multiple Oracle instances running locally on the same server can use the same Oracle Listener as a gateway for all connecting clients.
- When a client wants to establish a connection to a specific Oracle instance or database, the Oracle Client will use a combination of the host name where the instance and listener are running as well as the uniquely identifying service name for the desired instance

Connecting to oracle database

Listener.ora is a SQL*Net configuration file used to configure Oracle Database Listeners (required to accept remote connection requests).

This file normally resides in the ORACLE HOME/network/admin directory

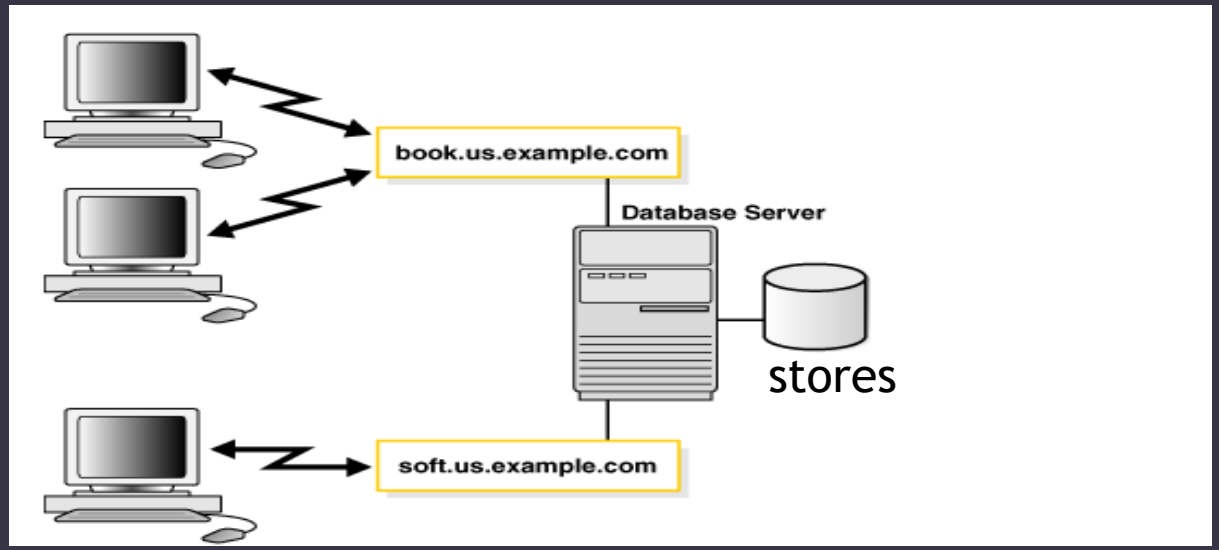
```
LISTENER =
  (DESCRIPTION_LIST =
    (DESCRIPTION =
      (ADDRESS = (PROTOCOL = TCP)(HOST = test.com)(PORT = 1521))
      (ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC1521))
    )
  )
```

- TCP/IP is the standard communication protocol used for client/server communication over a network.
- The IPC protocol support can be used only when the client program and Oracle Database are installed on the same system

Understanding Database Services

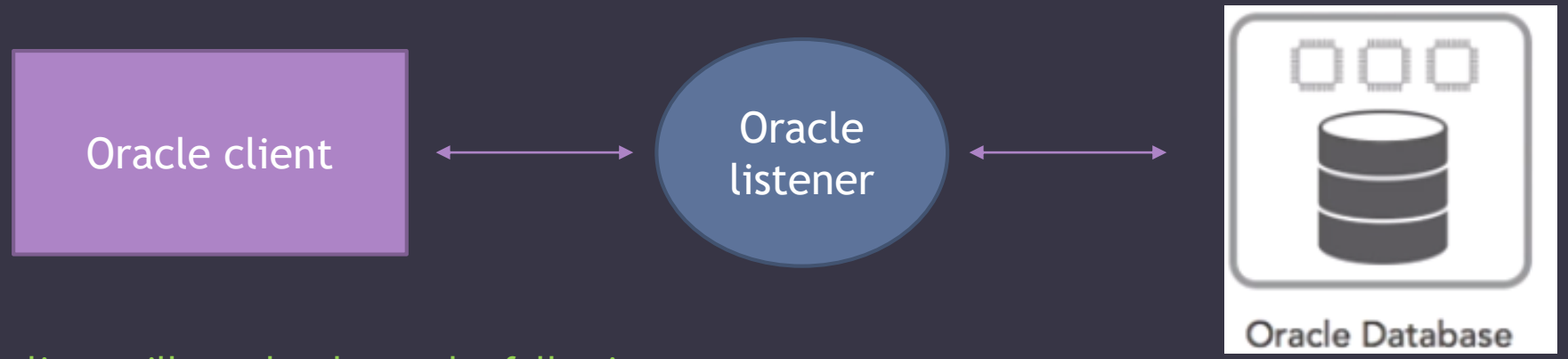
An Oracle database is represented to clients as a service (it is just an alias for the db)
A database can have one or more services associated with it.
SERVICE_NAME is the new feature from oracle 8i onwards in which database can register itself with listener
Note1: The **listener registration process (LREG)** registers information about the database instance and dispatcher processes with the Oracle Net Listener.
Note2: In releases before Oracle Database 12*c*, PMON performed the listener registration

One Service for the Database



Multiple Services Associated with One Database

Understanding tnsnames.ora



Oracle client will need to know the following:

- The hostname where is the listener is running
- Port number
- Listener protocol
- Name of the service that the listener is handling

Instead of having to specify all of these parameters every single time a client needs to connect to an Oracle database, we use client-side configuration file called the tnsnames.ora.

Connect username/password@orcldb

```
ORCLDB =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = localhost)(PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = orcl)
    )
  )
```

How client connections work