4

Managing the Database Instance

Objectives

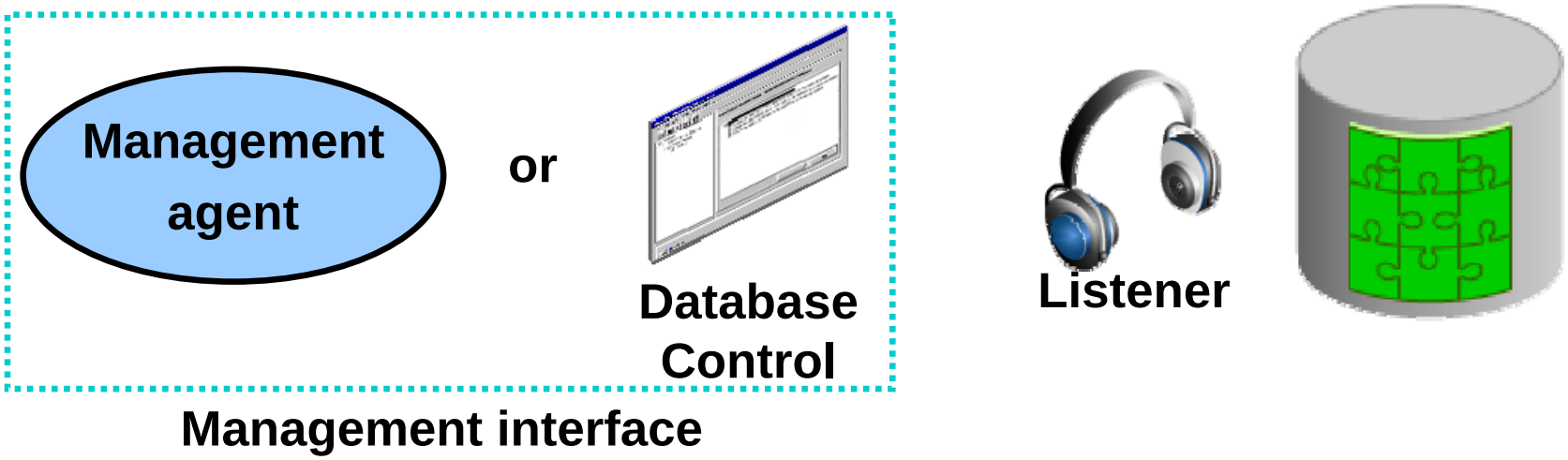
After completing this lesson, you should be able to:

- Start and stop the Oracle database and components
- Use Oracle Enterprise Manager
- Access a database with SQL*Plus
- Modify database initialization parameters
- Describe the stages of database startup
- Describe database shutdown options
- View the alert log
- Access dynamic performance views

Management Framework

Oracle Database 11*g* Release 2 management framework components:

- Database instance
- Listener
- Management interface:
  - Database Control
  - Management agent (when using Grid Control)

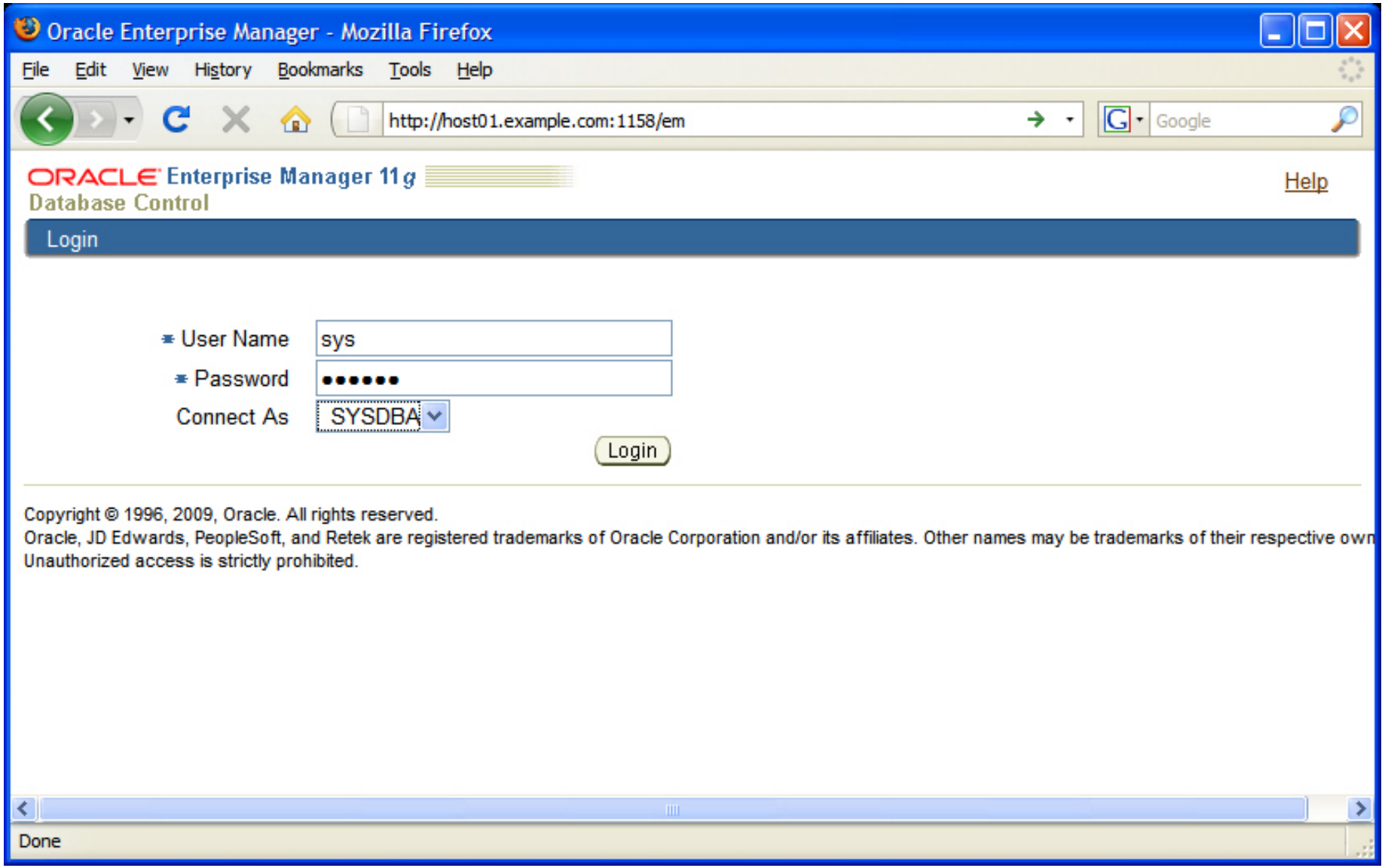


Starting and Stopping Database Control

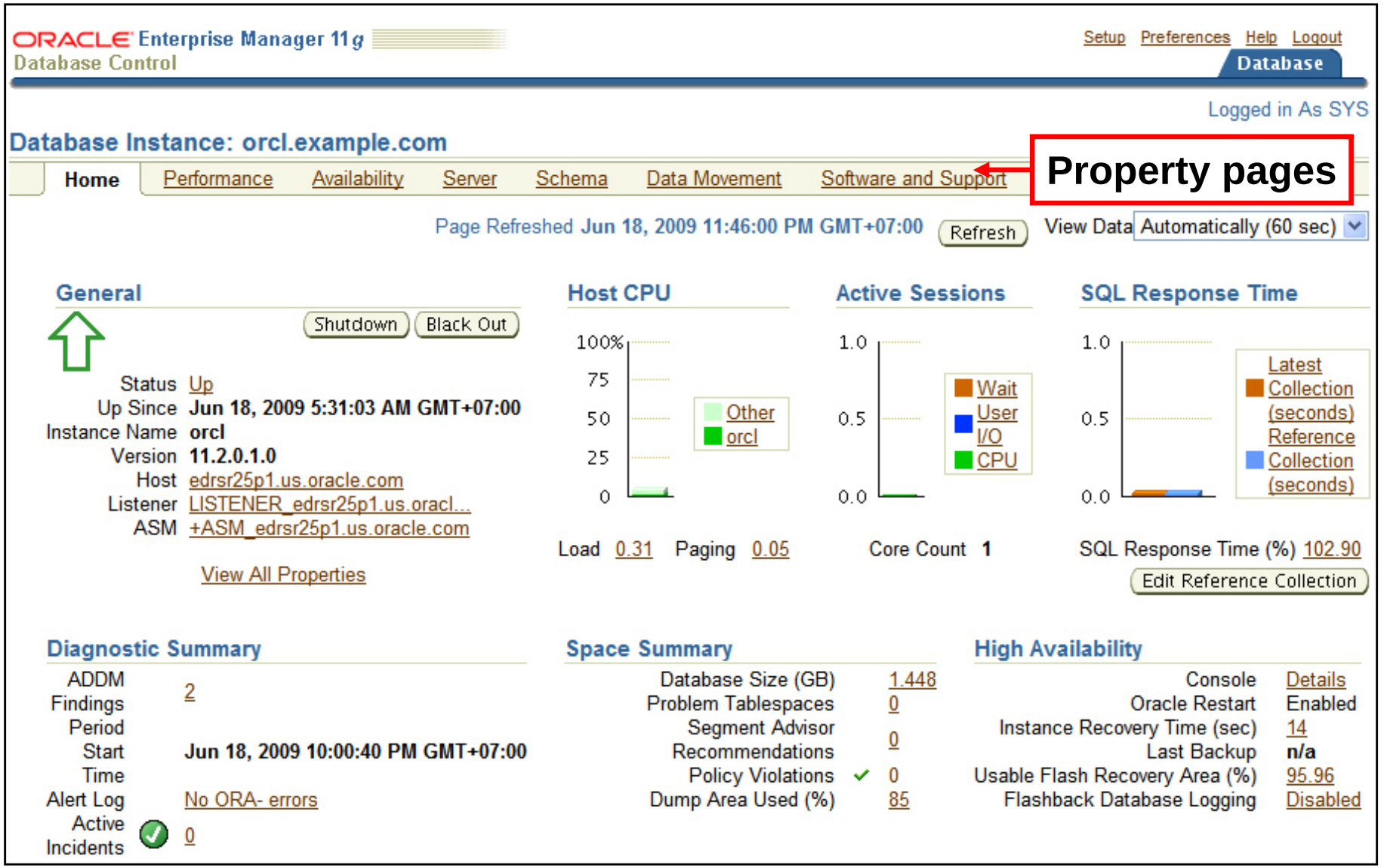
```
$ . oraenv
ORACLE_SID = [orcl] ? orcl
The Oracle base for ORACLE_HOME=/u01/app/oracle/product/11.2.0/db_home1
is /u01/app/oracle
$ emctl start dbconsole
Oracle Enterprise Manager 11g Database Control Release 11.2.0.1.0
Copyright (c) 1996, 2009 Oracle Corporation.  All rights reserved.
http://host01.example.com:1158/em/console/aboutApplication
Starting Oracle Enterprise Manager 11g Database Control ........started.
---------------------------------------------------------------
Logs are generated in directory
/u01/app/oracle/product/11.2.0/db_home1/host01.example.com_orcl/sysman/
log
```

```
$ emctl stop dbconsole
Oracle Enterprise Manager 11g Database Control Release 11.2.0.1.0
Copyright (c) 1996, 2009 Oracle Corporation.  All rights reserved.
https://host01.example.com:1158/em/console/aboutApplication
Stopping Oracle Enterprise Manager 11g Database Control ...
 ...  Stopped.
```

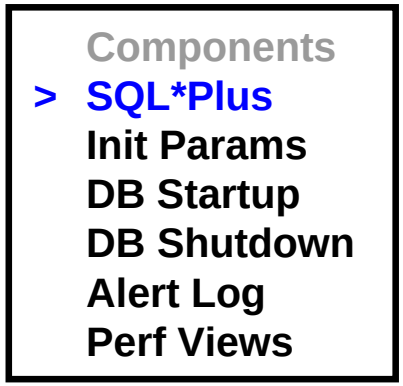
Oracle Enterprise Manager



Database Home Page



Other Oracle Tools



- SQL*Plus provides an additional interface to your database so that you can:
  - Perform database management operations
  - Execute SQL commands to query, insert, update, and delete data in your database
- SQL Developer:
  - Is a graphical user interface for accessing your instance of Oracle Database
  - Supports development in both SQL and PL/SQL
  - Is available in the default installation of Oracle Database

Using SQL*Plus

SQL*Plus is:

- A command-line tool
- Used interactively or in batch mode

```
$ sqlplus hr

SQL*Plus: Release 11.2.0.1.0 - Production on Thu Jun 18 05:04:49 2009
Copyright (c) 1982, 2009, Oracle.  All rights reserved.
Enter Password: *******

Connected to:
Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - Production
With the Partitioning, Automatic Storage Management, OLAP, Data Mining
and Real Application Testing options

SQL> select last_name from employees;
LAST_NAME
-------------------------
Abel
Ande
…
```

Calling SQL*Plus from a Shell Script

```
$ ./batch_sqlplus.sh

SQL*Plus: Release 11.2.0.1.0 - Production on Thu Jun 18 05:10:19 2009
Copyright (c) 1982, 2009, Oracle.  All rights reserved.

Connected to:
Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - Production
With the Partitioning, Automatic Storage Management, OLAP, Data Mining
and Real Application Testing options

SQL>
  COUNT(*)
----------
       107
SQL>
107 rows updated.
SQL>
Commit complete.
SQL> Disconnected from Oracle Database 11g Enterprise Edition Release
11.2.0.1.0 - Production
With the Partitioning, Automatic Storage Management, OLAP, Data Mining
and Real Application Testing options
$
```

```
# Name of this file: batch_sqlplus.sh
# Count employees and give raise.
sqlplus hr/hr <<EOF
select count(*) from employees;
update employees set salary = salary*1.10;
commit;
quit
EOF
```

Output

Calling a SQL Script from SQL*Plus

script.sql

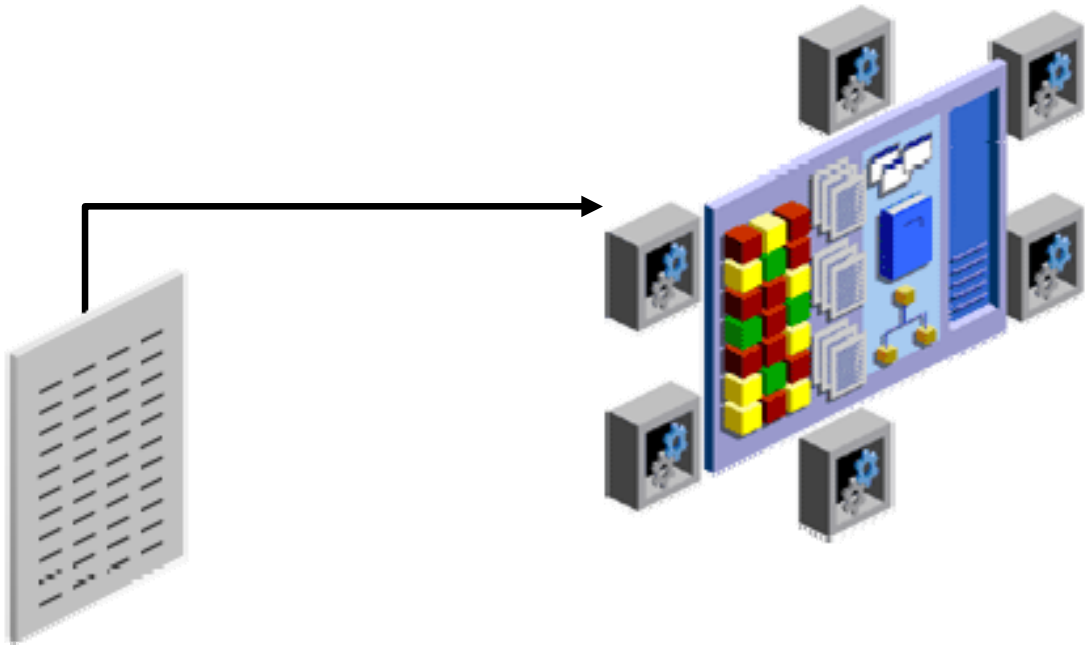
```
select * from departments where location_id = 1400;
quit
```

Output

```
$ sqlplus hr/hr @script.sql

SQL*Plus: Release 11.2.0.1.0 - Production on Thu Jun 18 05:13:42 2009
Copyright (c) 1982, 2009, Oracle.  All rights reserved.

Connected to:
Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - Production
With the Partitioning, Automatic Storage Management, OLAP, Data Mining
and Real Application Testing options

DEPARTMENT_ID DEPARTMENT_NAME                MANAGER_ID LOCATION_ID
------------- ------------------------------ ---------- -----------
           60 IT                                    103        1400

Disconnected from Oracle Database 11g Enterprise Edition Release
11.2.0.1.0 - Production
With the Partitioning, Automatic Storage Management, OLAP, Data Mining
and Real Application Testing options
```

Initialization Parameter Files

- Components
- SQL*Plus
- > Init Params
- DB Startup
- DB Shutdown
- Alert Log
- Perf Views



spfileorcl.ora

or

initorcl.ora

Simplified Initialization Parameters

Basic

```
CONTROL_FILES
DB_BLOCK_SIZE
PROCESSES
UNDO_TABLESPACE
…
```

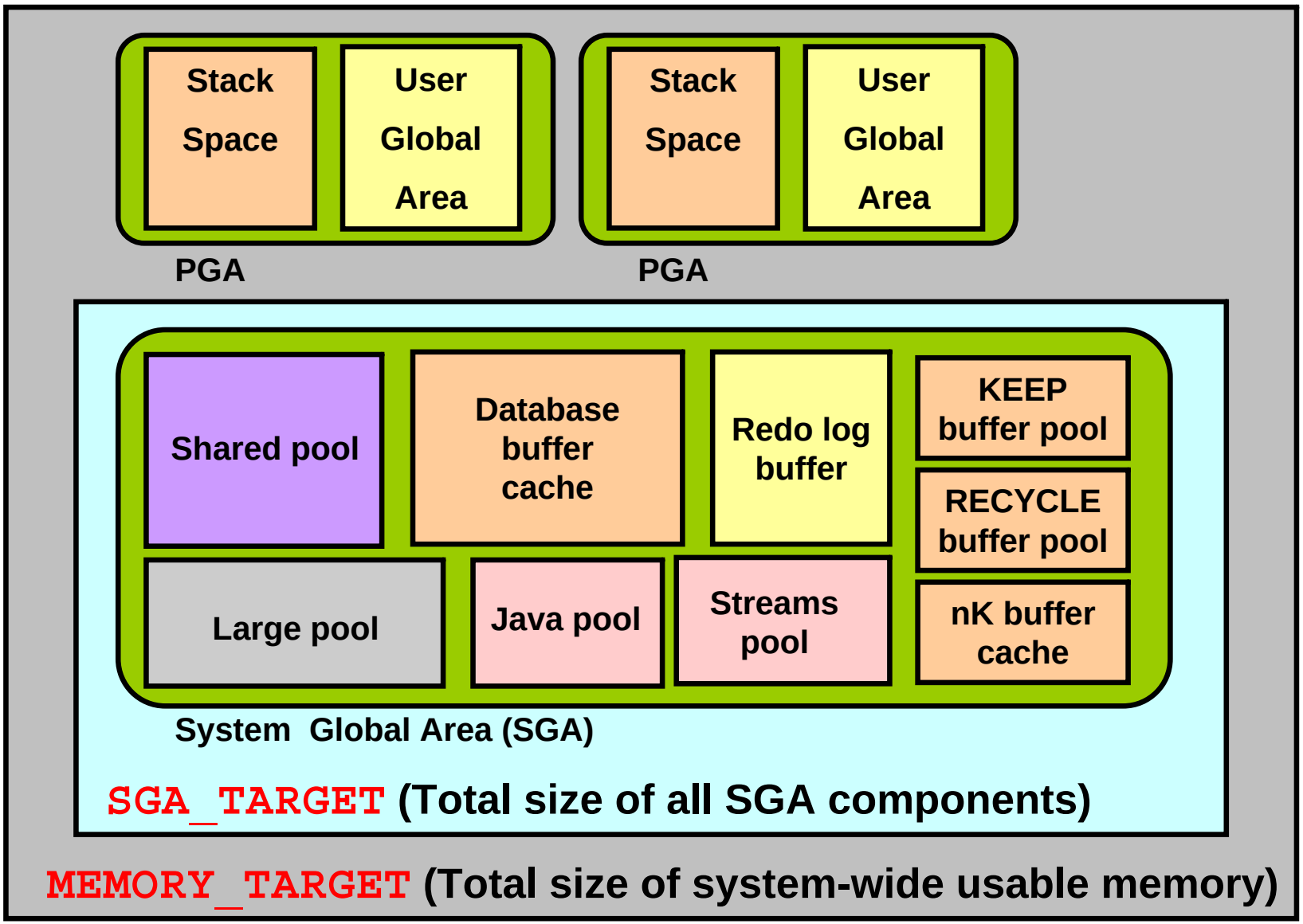
Advanced

```
DB_CACHE_SIZE
DB_FILE_MULTIBLOCK
_READ_COUNT
SHARED_POOL_SIZE
…
```

Initialization Parameters: Examples

Parameter	Specifies
CONTROL_FILES	One or more control file names
DB_FILES	Maximum number of database files
PROCESSES	Maximum number of OS user processes that can simultaneously connect
DB_BLOCK_SIZE	Standard database block size used by all tablespaces
DB_CACHE_SIZE	Size of the standard block buffer cache

Initialization Parameters: Examples



Initialization Parameters: Examples

Parameter	Specifies
PGA_AGGREGATE_TARGET	Amount of PGA memory allocated to all server processes
SHARED_POOL_SIZE	Size of shared pool (in bytes)
UNDO_MANAGEMENT	Undo space management mode to be used

Using SQL*Plus to View Parameters

```
 SQL> SELECT name , value FROM V$PARAMETER;
NAME                          VALUE
------------                 ----------
lock_name_space               2
processes                     150
sessions                      247
timed_statistics              TRUE
timed_os_statistics           0
…

SQL>SHOW PARAMETER SHARED_POOL_SIZE
NAME                                 TYPE        VALUE
------------------------------------ ----------- ---------------------
shared_pool_size                     big integer 0

SQL> show parameter para
NAME                                 TYPE        VALUE
------------------------------------ ----------- ---------------------
fast_start_parallel_rollback         string      LOW
parallel_adaptive_multi_user         boolean     TRUE
parallel_automatic_tuning            boolean     FALSE
parallel_execution_message_size      integer     16384
parallel_instance_group              string
…
```

Changing Initialization Parameter Values

- Static parameters:
  - Can be changed only in the parameter file
  - Require restarting the instance before taking effect
  - Account for about 110 parameters
- Dynamic parameters:
  - Can be changed while database is online
  - Can be altered at:
    - Session level
    - System level
  - Are valid for duration of session or based on `SCOPE` setting
  - Are changed by using `ALTER SESSION` and `ALTER SYSTEM` commands
  - Account for about 234 parameters

Changing Parameter Values: Examples

```
SQL> ALTER SESSION
     SET NLS_DATE_FORMAT ='mon dd yyyy';

Session altered.

SQL> SELECT SYSDATE FROM dual;

SYSDATE
-----------
jun 18 2009
```

```
SQL> ALTER SYSTEM  SET
SEC_MAX_FAILED_LOGIN_ATTEMPTS=2 COMMENT='Reduce
from 10 for tighter security.' SCOPE=SPFILE;

System altered.
```

Quiz

Enterprise Manager Database Control can be used to manage many databases concurrently.

1. True
2. False

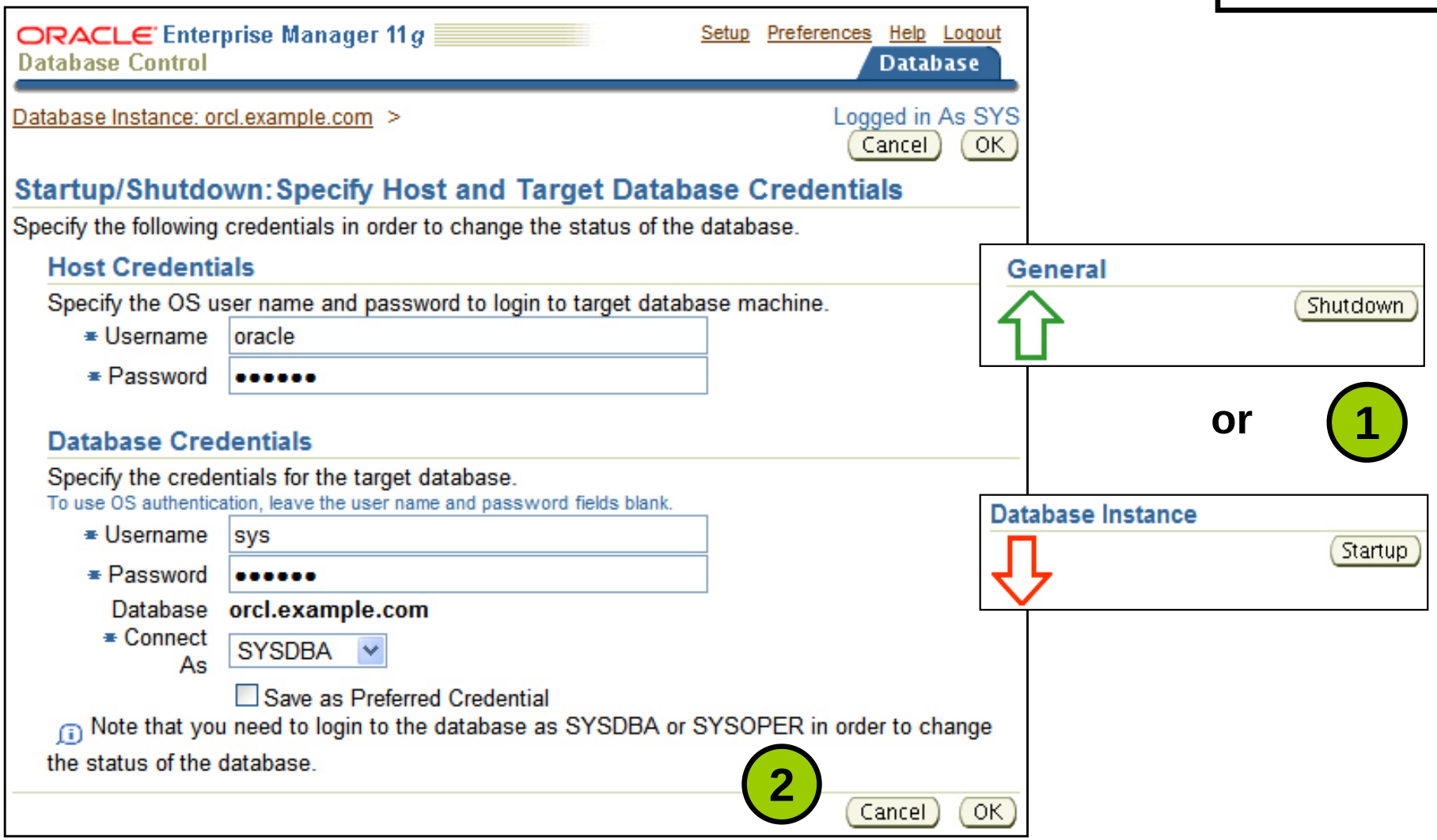
Quiz

The majority of the database parameters are dynamic and can be changed without having to shut down the database instance.

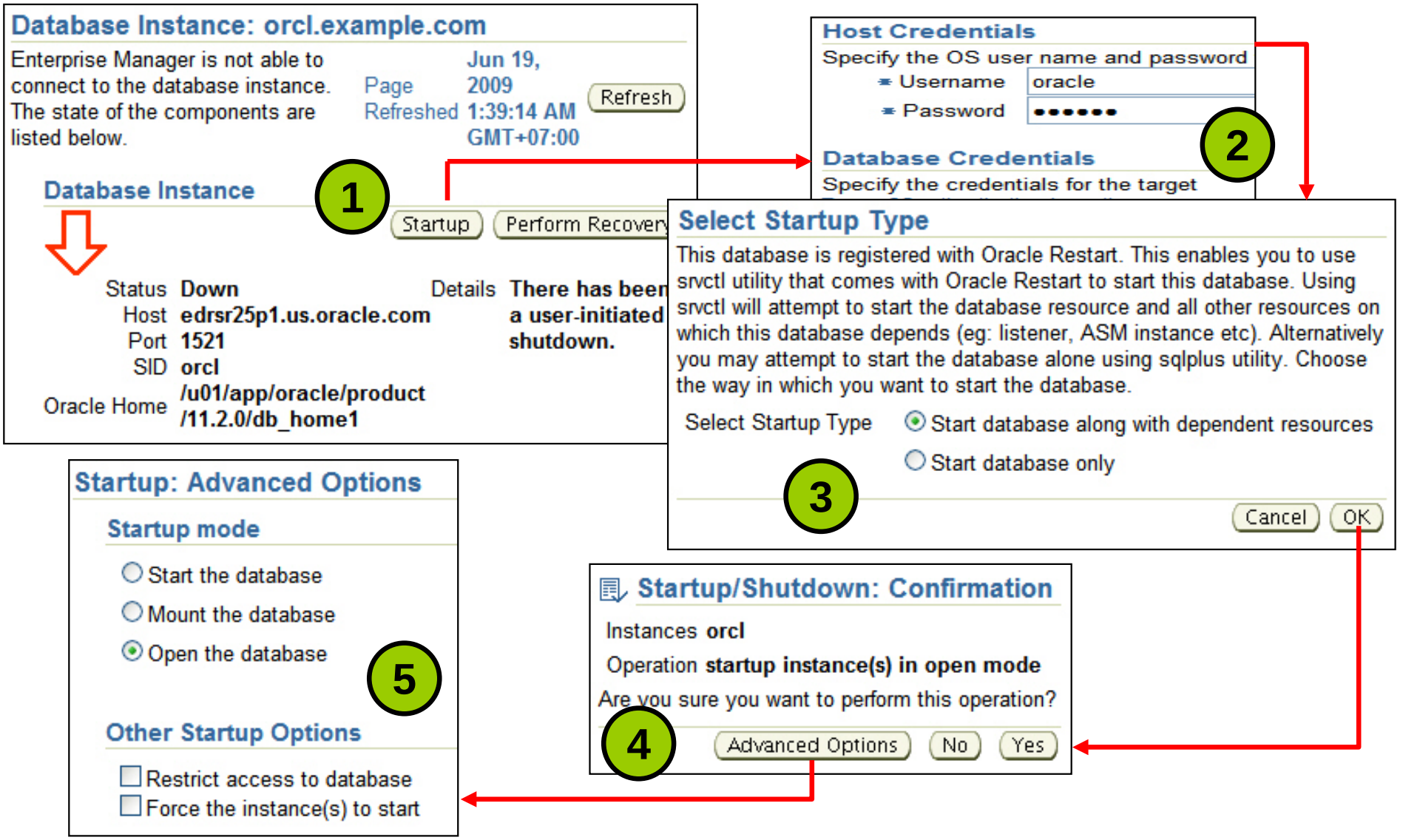
1. True
2. False

Database Startup and Shutdown: Credentials

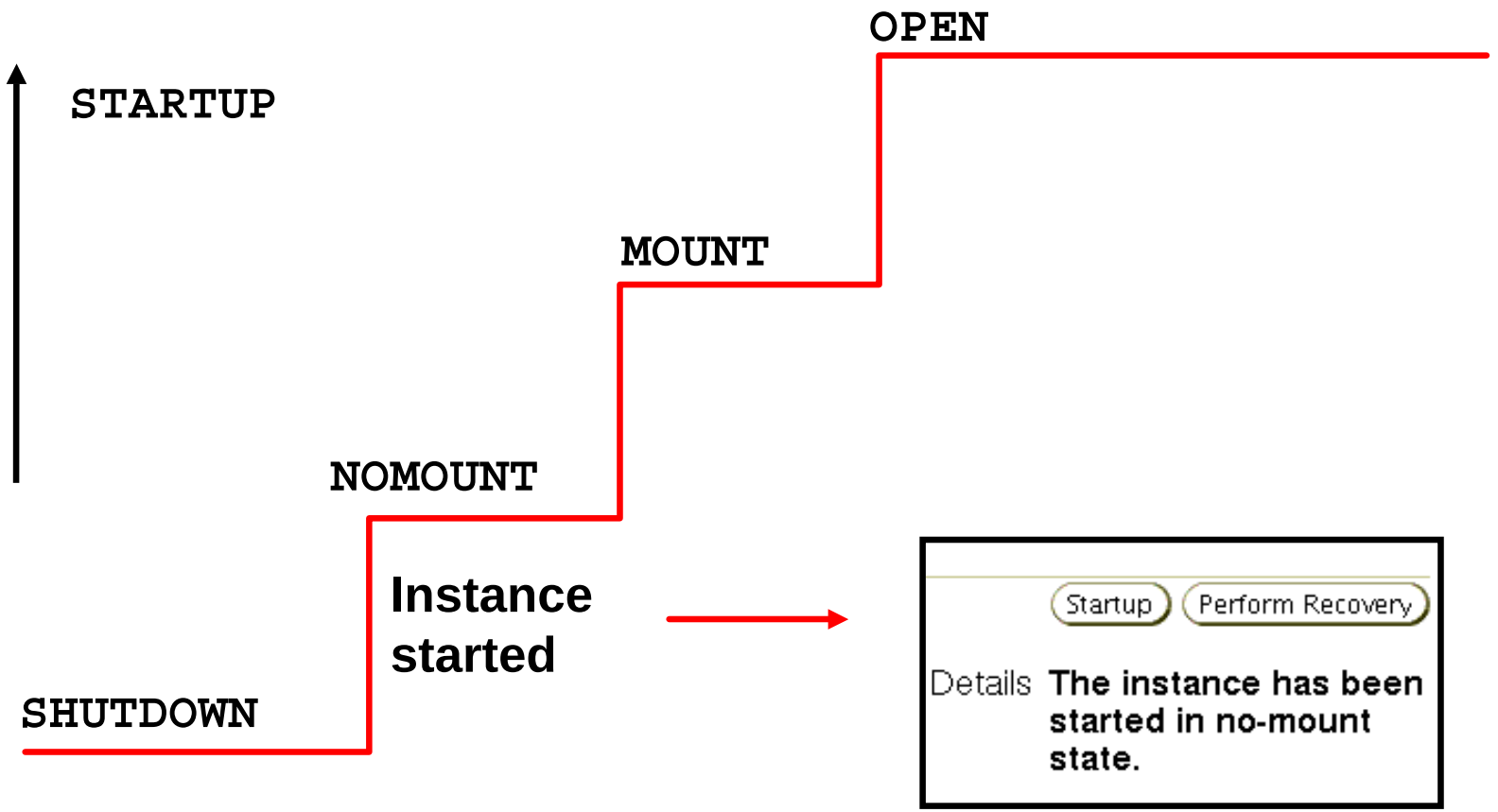
Components
SQL*Plus
Init Params
> DB Startup
DB Shutdown
Alert Log
Perf Views



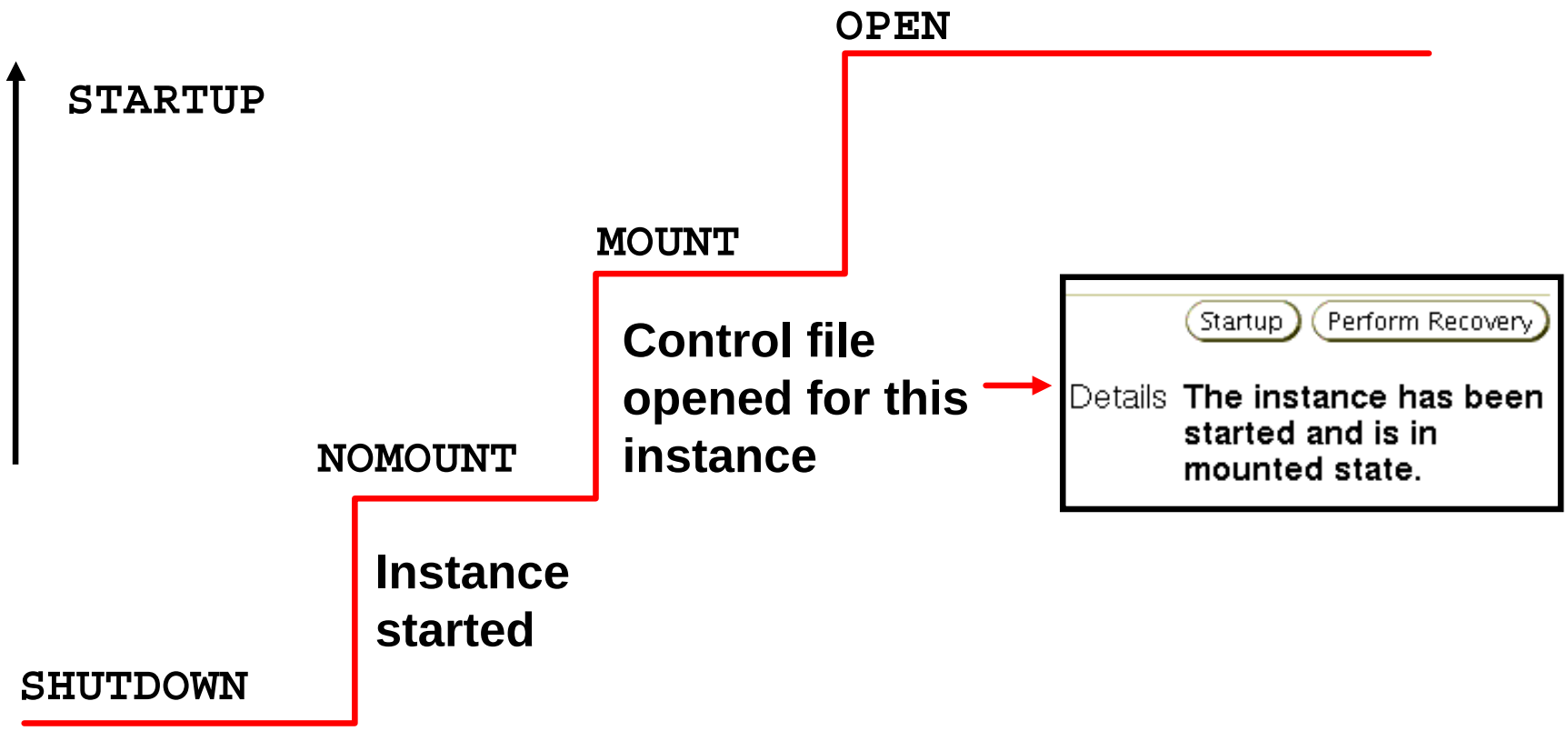
Starting Up an Oracle Database Instance



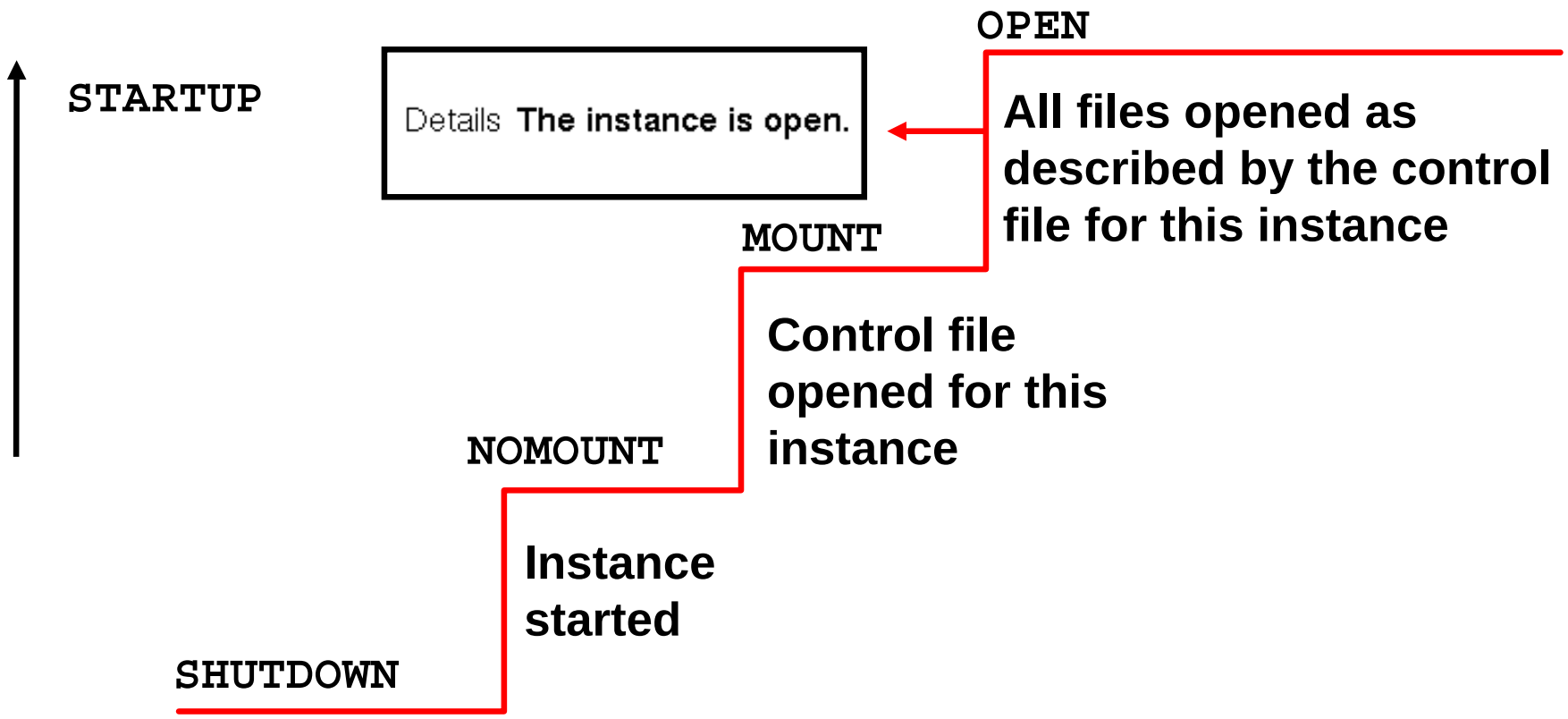
Starting Up an Oracle Database Instance: NOMOUNT



Starting Up an Oracle Database Instance: MOUNT



Starting Up an Oracle Database Instance: OPEN



Startup Options: Examples

- Using the `sqlplus` utility:

```
SQL> startup                                    1
```

```
SQL> startup nomount                            2
```

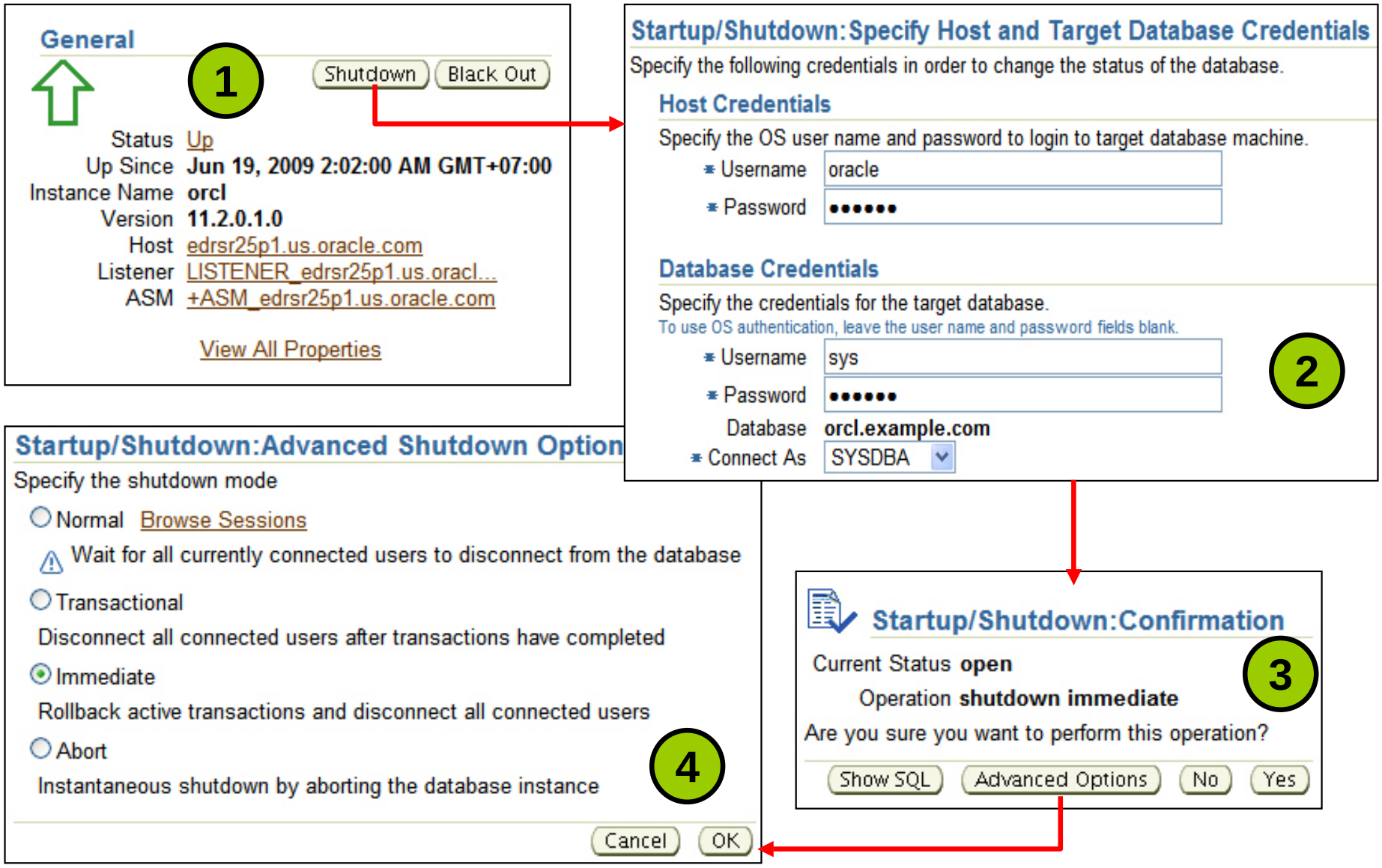
```
SQL> alter database mount;                      3
```

```
SQL> alter database open;                       4
```

- Using the `srvctl` utility with Oracle Restart

```
$ srvctl start database -d orcl -o mount
```

Shutting Down an Oracle Database Instance



Shutdown Modes

Shutdown Modes	A	I	T	N
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

Shutdown modes:

- A = ABORT
- I = IMMEDIATE
- T = TRANSACTIONAL
- N = NORMAL

Shutdown Options

On the way down:

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

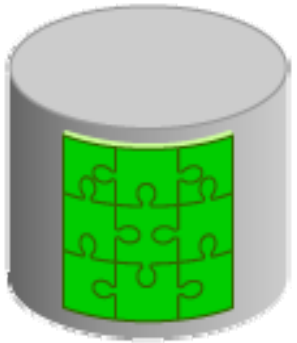
During:

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

On the way up:

- No instance recovery

Consistent database



Shutdown Options

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

Shutdown Options: Examples

- Using SQL*Plus:

```
SQL> shutdown                                    1
```

```
SQL> shutdown transactional                      2
```

```
SQL> shutdown immediate                          3
```

```
SQL> shutdown abort                              4
```

- Using the SRVCTL utility with Oracle Restart

```
$ srvctl stop database -d orcl -o abort
```

Viewing the Alert Log

Components
SQL*Plus
Init Params
DB Startup
DB Shutdown
> Alert Log
Perf Views

Database Home page > Related Links region > Alert Log Content

View Entries Last 50 Go Search

Previous 1-25 of 50 Next 25

Timestamp	Type	Level	Incident ID	Group	Message ID	Message Text
Jun 19, 2009 10:00:16 PM GMT+07:00	NOTIFICATION	16		sqltune	kesaiTuneSqlDrv:5067:3456118459	End automatic SQL Tuning Advisor run for special tuning task "SYS_AUTO_SQL_TUNING_TASK"
Jun 19, 2009 10:00:03 PM GMT+07:00	NOTIFICATION	16		sqltune	kesaiTuneSqlDrv:4555:2579917519	Begin automatic SQL Tuning Advisor run for special tuning task "SYS_AUTO_SQL_TUNING_TASK"
Jun 19, 2009 10:00:00 PM GMT+07:00	NOTIFICATION	16		process start	ksbrdp:3833:3697353022	VKRM started with pid=24, OS id=7929
Jun 19, 2009 10:00:00 PM GMT+07:00	NOTIFICATION	16		process start	ksbs1p_real:2253:2371767696	Starting background process VKRM
Jun 19, 2009 2:07:22 AM GMT+07:00	NOTIFICATION	16		process start	ksbrdp:3833:3697353022	SMCO started with pid=23, OS id=30582
Jun 19, 2009 2:07:22 AM GMT+07:00	NOTIFICATION	16		process start	ksbs1p_real:2253:2371767696	Starting background process SMCO
Jun 19, 2009 2:02:26 AM GMT+07:00	NOTIFICATION	16		process start	ksbrdp:3833:3697353022	CJQ0 started with pid=33, OS id=29846

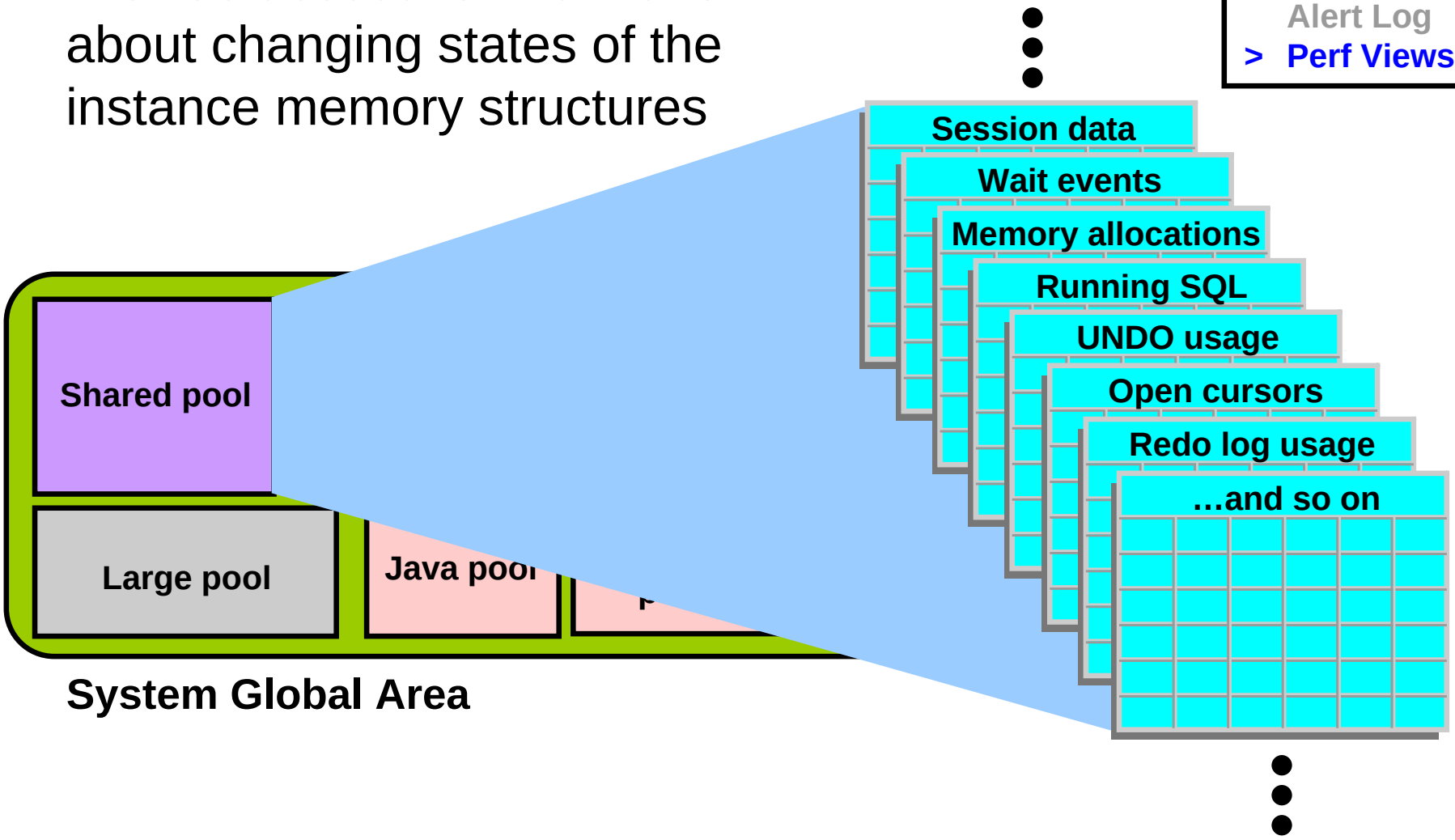
Using Trace Files

- Each server and background process can write to an associated trace file.
- Error information is written to the corresponding trace file.
- Automatic diagnostic repository (ADR)
  - Is a systemwide central tracing and logging repository
  - Stores database diagnostic data such as:
    - Traces
    - Alert log
    - Health monitor reports

Dynamic Performance Views

Components
SQL*Plus
Init Params
DB Startup
DB Shutdown
Alert Log
> Perf Views

Provide access to information about changing states of the instance memory structures



Dynamic Performance Views: Usage Examples

1
```
SQL> SELECT sql_text, executions FROM v$sql
WHERE cpu_time > 200000;
```

2
```
SQL> SELECT * FROM v$session WHERE machine =
'EDRSR9P1' and logon_time > SYSDATE - 1;
```

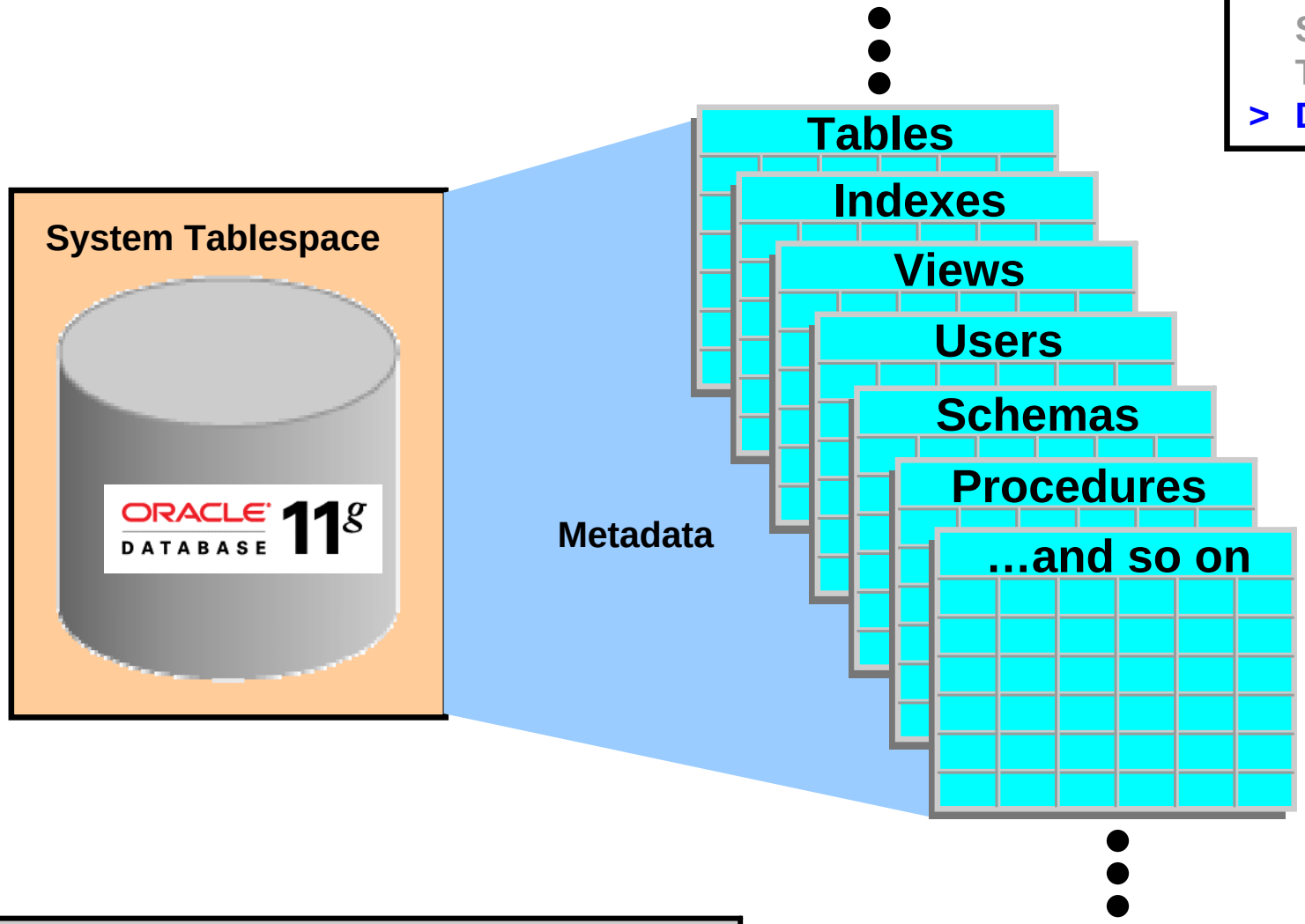
3
```
SQL> SELECT sid, ctime FROM v$lock
WHERE block > 0;
```

Dynamic Performance Views: Considerations

- These views are owned by the `SYS` user.
- Different views are available at different times:
  - The instance has been started.
  - The database is mounted.
  - The database is open.
- You can query `V$FIXED_TABLE` to see all the view names.
- These views are often referred to as “v-dollar views.”
- Read consistency is not guaranteed on these views because the data is dynamic.

Data Dictionary: Overview

- Schema
- Constraints
- Indexes
- Views
- Sequences
- Temp Tables
- > Data Dict




```
SELECT * FROM dictionary;
```

Data Dictionary Views

	Who Can Query	Contents	Subset of	Notes
DBA_	DBA	Everything	N/A	May have additional columns meant for DBA use only
ALL_	Everyone	Everything that the user has privileges to see	DBA_ views	Includes user's own objects and other objects the user has been granted privileges to see
USER_	Everyone	Everything that the user owns	ALL_ views	Is usually the same as ALL_ except for the missing OWNER column (Some views have abbreviated names as PUBLIC synonyms.)

Data Dictionary: Usage Examples

1
```
SELECT table_name, tablespace_name
FROM user_tables;
```

2
```
SELECT sequence_name, min_value, max_value,
increment_by
FROM all_sequences
WHERE sequence_owner IN ('MDSYS','XDB');
```

3
```
SELECT USERNAME, ACCOUNT_STATUS
FROM dba_users
WHERE ACCOUNT_STATUS = 'OPEN';
```

4
```
DESCRIBE dba_indexes
```

Quiz

When using Oracle Restart, the server control utility (`srvctl`) must be used instead of SQL*Plus to start and stop a database instance.

1. True
2. False

Quiz

Which data dictionary view can be used to find the names of all tables in the database?

1. USER_TABLES
2. ALL_TABLES
3. DBA_TABLES
4. ANY_TABLES

Summary

In this lesson, you should have learned how to:

- Start and stop the Oracle database and components
- Use Oracle Enterprise Manager
- Access a database with SQL*Plus
- Modify database initialization parameters
- Describe the stages of database startup
- Describe database shutdown options
- View the alert log
- Access dynamic performance views

Practice 4 Overview: Managing the Oracle Instance

This practice covers the following topics:

- Navigating in Enterprise Manager
- Viewing and modifying initialization parameters
- Stopping and starting the database instance
- Viewing the alert log
- Connecting to the database by using SQL*Plus