

# Exportar e importar datos de Oracle

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16 de diciembre de 2019

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## 1. Exportar datos

- Se utiliza el comando `expdp`
  - Ayuda con `expdp help=yes`
  - Es necesario crear antes el **directory** de **Oracle**

```
Export: Release 12.1.0.2.0 - Production on Fri Dec 16 13:32:15 2016

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The Data Pump export utility provides a mechanism for transferring data objects
between Oracle databases. The utility is invoked with the following command:

    Example: expdp scott/tiger DIRECTORY=dmpdir DUMPFILE=scott.dmp

You can control how Export runs by entering the 'expdp' command followed
by various parameters. To specify parameters, you use keywords:

    Format:  expdp KEYWORD=value or KEYWORD=(value1,value2,...,valueN)
    Example: expdp scott/tiger DUMPFILE=scott.dmp DIRECTORY=dmpdir SCHEMAS=scott
              or TABLES=(T1:P1,T1:P2), if T1 is partitioned table

USERID must be the first parameter on the command line.

-----

The available keywords and their descriptions follow. Default values are listed within square brackets.

ABORT_STEP
Stop the job after it is initialized or at the indicated object.
```

---

Valid values are -1 or N where N is zero or greater.  
N corresponds to the object's process order number in the master table.

**ACCESS\_METHOD**  
Instructs Export to use a particular method to unload data.  
Valid keyword values are: [AUTOMATIC], DIRECT\_PATH and EXTERNAL\_TABLE.

**ATTACH**  
Attach to an existing job.  
For example, ATTACH=job\_name.

**CLUSTER**  
Utilize cluster resources and distribute workers across the Oracle RAC [YES].

**COMPRESSION**  
Reduce the size of a dump file.  
Valid keyword values are: ALL, DATA\_ONLY, [METADATA\_ONLY] and NONE.

**COMPRESSION\_ALGORITHM**  
Specify the compression algorithm that should be used.  
Valid keyword values are: [BASIC], LOW, MEDIUM and HIGH.

**CONTENT**  
Specifies data to unload.  
Valid keyword values are: [ALL], DATA\_ONLY and METADATA\_ONLY.

**DATA\_OPTIONS**  
Data layer option flags.  
Valid keyword values are: XML\_CLOBS.

**DIRECTORY**  
Directory object to be used for dump and log files.

**DUMPFIL**  
Specify list of destination dump file names [expdat.dmp].  
For example, DUMPFIL=scott1.dmp, scott2.dmp, dmpdir:scott3.dmp.

**ENCRYPTION**  
Encrypt part or all of a dump file.  
Valid keyword values are: ALL, DATA\_ONLY, ENCRYPTED\_COLUMNS\_ONLY, METADATA\_ONLY and NONE.

**ENCRYPTION\_ALGORITHM**  
Specify how encryption should be done.  
Valid keyword values are: [AES128], AES192 and AES256.

**ENCRYPTION\_MODE**  
Method of generating encryption key.  
Valid keyword values are: DUAL, PASSWORD and [TRANSPARENT].

**ENCRYPTION\_PASSWORD**  
Password key for creating encrypted data within a dump file.

**ENCRYPTION\_PWD\_PROMPT**  
Specifies whether to prompt for the encryption password [NO].  
Terminal echo will be suppressed while standard input is read.

**ESTIMATE**  
Calculate job estimates.  
Valid keyword values are: [BLOCKS] and STATISTICS.

**ESTIMATE\_ONLY**  
Calculate job estimates without performing the export [NO].

**EXCLUDE**  
Exclude specific object types.  
For example, EXCLUDE=SCHEMA:"='HR'".

**FILESIZE**  
Specify the size of each dump file in units of bytes.

**FLASHBACK\_SCN**  
SCN used to reset session snapshot.

---

FLASHBACK\_TIME  
Time used to find the closest corresponding SCN value.

FULL  
Export entire database [NO].

HELP  
Display Help messages [NO].

INCLUDE  
Include specific object types.  
For example, INCLUDE=TABLE\_DATA.

JOB\_NAME  
Name of export job to create.

KEEP\_MASTER  
Retain the master table after an export job that completes successfully [NO].

LOGFILE  
Specify log file name [export.log].

LOGTIME  
Specifies that messages displayed during export operations be timestamped.  
Valid keyword values are: ALL, [NONE], LOGFILE and STATUS.

METRICS  
Report additional job information to the export log file [NO].

NETWORK\_LINK  
Name of remote database link to the source system.

NOLOGFILE  
Do not write log file [NO].

PARALLEL  
Change the number of active workers for current job.

PARFILE  
Specify parameter file name.

QUERY  
Predicate clause used to export a subset of a table.  
For example, QUERY=employees:"WHERE department\_id > 10".

REMAP\_DATA  
Specify a data conversion function.  
For example, REMAP\_DATA=EMP.EMPNO:REMAPPKG.EMPNO.

REUSE\_DUMPFILES  
Overwrite destination dump file if it exists [NO].

SAMPLE  
Percentage of data to be exported.

SCHEMAS  
List of schemas to export [login schema].

SERVICE\_NAME  
Name of an active Service and associated resource group to constrain Oracle RAC resources.

SOURCE\_EDITION  
Edition to be used for extracting metadata.

STATUS  
Frequency (secs) job status is to be monitored where  
the default [0] will show new status when available.

TABLES  
Identifies a list of tables to export.  
For example, TABLES=HR.EMPLOYEES,SH.SALES:SALES\_1995.

---

```

TABLESPACES
Identifies a list of tablespaces to export.

TRANSPORTABLE
Specify whether transportable method can be used.
Valid keyword values are: ALWAYS and [NEVER].

TRANSPORT_FULL_CHECK
Verify storage segments of all tables [NO].

TRANSPORT_TABLESPACES
List of tablespaces from which metadata will be unloaded.

VERSION
Version of objects to export.
Valid keyword values are: [COMPATIBLE], LATEST or any valid database version.

VIEWS_AS_TABLES
Identifies one or more views to be exported as tables.
For example, VIEWS_AS_TABLES=HR.EMP_DETAILS_VIEW.

-----

The following commands are valid while in interactive mode.
Note: abbreviations are allowed.

ADD_FILE
Add dumpfile to dumpfile set.

CONTINUE_CLIENT
Return to logging mode. Job will be restarted if idle.

EXIT_CLIENT
Quit client session and leave job running.

FILESIZE
Default filesize (bytes) for subsequent ADD_FILE commands.

HELP
Summarize interactive commands.

KILL_JOB
Detach and delete job.

PARALLEL
Change the number of active workers for current job.

REUSE_DUMPFILLES
Overwrite destination dump file if it exists [NO].

START_JOB
Start or resume current job.
Valid keyword values are: SKIP_CURRENT.

STATUS
Frequency (secs) job status is to be monitored where
the default [0] will show new status when available.

STOP_JOB
Orderly shutdown of job execution and exits the client.
Valid keyword values are: IMMEDIATE.

```

## 1.1. directory de Oracle

- Algunos comandos de **Oracle** necesitan trabajar sobre directorios del disco
- A veces no interesa que los usuarios conozcan/decidan los directorios

- para no llenar una partición
- para no divulgar información de la base de datos
- para no acceder a directorios donde **Oracle** puede, pero el usuario no

## 1.2. Definir un directorio

```
grant create any directory to unusuario;
create directory mi_directorio_de_backup as '/home/alumno/backups';
```

```
GRANT READ, WRITE ON DIRECTORY mi_directorio_de_backup TO usuario;
```

## 1.3. Ejemplo de exportación

```
[alumno@centos-asgbd ~]$ expdp alumno/alumno directory=mi_directorio_de_backup schemas=alumno dumpfile=alumno.
↪ dmp logfile=alumno.log
Export: Release 12.1.0.2.0 - Production on Fri Dec 16 13:07:26 2016

Copyright (c) 1982, 2015, Oracle and/or its affiliates. All rights reserved.

Connected to: Oracle Database 12c Standard Edition Release 12.1.0.2.0 - 64bit Production
Starting "ALUMNO"."SYS_EXPORT_SCHEMA_01": alumno/***** directory=mi_directorio_de_backup schemas=alumno
↪ dumpfile=alumno.dmp logfile=alumno.log
Estimate in progress using BLOCKS method...
Processing object type SCHEMA_EXPORT/TABLE/TABLE_DATA
Total estimation using BLOCKS method: 192 KB
Processing object type SCHEMA_EXPORT/PRE_SCHEMA/PROACT_SCHEMA
Processing object type SCHEMA_EXPORT/TABLE/TABLE
Processing object type SCHEMA_EXPORT/TABLE/GRANT/OWNER_GRANT/OBJECT_GRANT
Processing object type SCHEMA_EXPORT/TABLE/COMMENT
Processing object type SCHEMA_EXPORT/TABLE/INDEX/INDEX
Processing object type SCHEMA_EXPORT/TABLE/CONSTRAINT/CONSTRAINT
Processing object type SCHEMA_EXPORT/TABLE/INDEX/STATISTICS/INDEX_STATISTICS
Processing object type SCHEMA_EXPORT/TABLE/CONSTRAINT/REF_CONSTRAINT
Processing object type SCHEMA_EXPORT/TABLE/STATISTICS/TABLE_STATISTICS
Processing object type SCHEMA_EXPORT/STATISTICS/MARKER
. . exported "ALUMNO"."MATRICULAS" 6.523 KB 44 rows
. . exported "ALUMNO"."MULTAS" 8.195 KB 35 rows
. . exported "ALUMNO"."PERSONAS" 6.875 KB 47 rows
Master table "ALUMNO"."SYS_EXPORT_SCHEMA_01" successfully loaded/unloaded
*****
Dump file set for ALUMNO.SYS_EXPORT_SCHEMA_01 is:
/home/alumno/backups/alumno.dmp
Job "ALUMNO"."SYS_EXPORT_SCHEMA_01" successfully completed at Fri Dec 16 13:08:00 2016 elapsed 0 00:00:33
```

## 2. Importar datos

- Se utiliza el comando impdp
  - Ayuda con impdp help=yes

```
Import: Release 12.1.0.2.0 - Production on Fri Dec 16 13:31:18 2016
```

```
Copyright (c) 1982, 2015, Oracle and/or its affiliates. All rights reserved.
```

```
The Data Pump Import utility provides a mechanism for transferring data objects
```

---

between Oracle databases. The utility is invoked with the following command:

Example: `impdp scott/tiger DIRECTORY=dmpdir DUMPFILE=scott.dmp`

You can control how Import runs by entering the '`impdp`' command followed by various parameters. To specify parameters, you use keywords:

Format: `impdp KEYWORD=value or KEYWORD=(value1,value2,...,valueN)`

Example: `impdp scott/tiger DIRECTORY=dmpdir DUMPFILE=scott.dmp`

USERID must be the first parameter on the command line.

-----

The available keywords and their descriptions follow. Default values are listed within square brackets.

#### ABORT\_STEP

Stop the job after it is initialized or at the indicated object.

Valid values are -1 or N where N is zero or greater.

N corresponds to the object's process order number in the master table.

#### ACCESS\_METHOD

Instructs Import to use a particular method to load data.

Valid keyword values are: [AUTOMATIC], CONVENTIONAL, DIRECT\_PATH and EXTERNAL\_TABLE.

#### ATTACH

Attach to an existing job.

For example, ATTACH=job\_name.

#### CLUSTER

Utilize cluster resources and distribute workers across the Oracle RAC [YES].

#### CONTENT

Specifies data to load.

Valid keywords are: [ALL], DATA\_ONLY and METADATA\_ONLY.

#### DATA\_OPTIONS

Data layer option flags.

Valid keywords are: DISABLE\_APPEND\_HINT and SKIP\_CONSTRAINT\_ERRORS.

#### DIRECTORY

Directory object to be used for dump, log and SQL files.

#### DUMPFILE

List of dump files to import from [expdat.dmp].

For example, DUMPFILE=scott1.dmp, scott2.dmp, dmpdir:scott3.dmp.

#### ENCRYPTION\_PASSWORD

Password key for accessing encrypted data within a dump file.

Not valid for network import jobs.

#### ENCRYPTION\_PWD\_PROMPT

Specifies whether to prompt for the encryption password [NO].

Terminal echo will be suppressed while standard input is read.

#### ESTIMATE

Calculate network job estimates.

Valid keywords are: [BLOCKS] and STATISTICS.

#### EXCLUDE

Exclude specific object types.

For example, EXCLUDE=SCHEMA:"='HR'".

#### FLASHBACK\_SCN

SCN used to reset session snapshot.

#### FLASHBACK\_TIME

Time used to find the closest corresponding SCN value.

#### FULL

Import everything from source [YES].

---

HELP  
Display help messages [NO].

INCLUDE  
Include specific object types.  
For example, INCLUDE=TABLE\_DATA.

JOB\_NAME  
Name of import job to create.

KEEP\_MASTER  
Retain the master table after an import job that completes successfully [NO].

LOGFILE  
Log file name [import.log].

LOGTIME  
Specifies that messages displayed during import operations be timestamped.  
Valid keyword values are: ALL, [NONE], LOGFILE and STATUS.

MASTER\_ONLY  
Import just the master table and then stop the job [NO].

METRICS  
Report additional job information to the import log file [NO].

NETWORK\_LINK  
Name of remote database link to the source system.

NOLOGFILE  
Do not write log file [NO].

PARALLEL  
Change the number of active workers for current job.

PARFILE  
Specify parameter file.

PARTITION\_OPTIONS  
Specify how partitions should be transformed.  
Valid keywords are: DEPARTITION, MERGE and [NONE].

QUERY  
Predicate clause used to import a subset of a table.  
For example, QUERY=employees:"WHERE department\_id > 10".

REMAP\_DATA  
Specify a data conversion function.  
For example, REMAP\_DATA=EMP.EMPNO:REMAPPKG.EMPNO.

REMAP\_DATAFILE  
Redefine data file references in all DDL statements.

REMAP\_SCHEMA  
Objects from one schema are loaded into another schema.

REMAP\_TABLE  
Table names are remapped to another table.  
For example, REMAP\_TABLE=HR.EMPLOYEES:EMPS.

REMAP\_TABLESPACE  
Tablespace objects are remapped to another tablespace.

REUSE\_DATAFILES  
Tablespace will be initialized if it already exists [NO].

SCHEMAS  
List of schemas to import.

SERVICE\_NAME  
Name of an active Service and associated resource group to constrain Oracle RAC resources.

---

```

SKIP_UNUSABLE_INDEXES
Skip indexes that were set to the Index Unusable state.

SOURCE_EDITION
Edition to be used for extracting metadata.

SQLFILE
Write all the SQL DDL to a specified file.

STATUS
Frequency (secs) job status is to be monitored where
the default [0] will show new status when available.

STREAMS_CONFIGURATION
Enable the loading of Streams metadata [YES].

TABLE_EXISTS_ACTION
Action to take if imported object already exists.
Valid keywords are: APPEND, REPLACE, [SKIP] and TRUNCATE.

TABLES
Identifies a list of tables to import.
For example, TABLES=HR.EMPLOYEES,SH.SALES:SALES_1995.

TABLESPACES
Identifies a list of tablespaces to import.

TARGET_EDITION
Edition to be used for loading metadata.

TRANSFORM
Metadata transform to apply to applicable objects.
Valid keywords are: DISABLE_ARCHIVE_LOGGING, INMEMORY, INMEMORY_CLAUSE,
LOB_STORAGE, OID, PCTSPACE, SEGMENT_ATTRIBUTES, STORAGE, and
TABLE_COMPRESSION_CLAUSE.

TRANSPORTABLE
Options for choosing transportable data movement.
Valid keywords are: ALWAYS and [NEVER].
Only valid in NETWORK_LINK mode import operations.

TRANSPORT_DATAFILES
List of data files to be imported by transportable mode.

TRANSPORT_FULL_CHECK
Verify storage segments of all tables [NO].
Only valid in NETWORK_LINK mode import operations.

TRANSPORT_TABLESPACES
List of tablespaces from which metadata will be loaded.
Only valid in NETWORK_LINK mode import operations.

VERSION
Version of objects to import.
Valid keywords are: [COMPATIBLE], LATEST, or any valid database version.
Only valid for NETWORK_LINK and SQLFILE.

VIEWS_AS_TABLES
Identifies one or more views to be imported as tables.
For example, VIEWS_AS_TABLES=HR.EMP_DETAILS_VIEW.
Note that in network import mode, a table name may be appended
to the view name.

-----

The following commands are valid while in interactive mode.
Note: abbreviations are allowed.

CONTINUE_CLIENT
Return to logging mode. Job will be restarted if idle.

```



```

EXIT_CLIENT
Quit client session and leave job running.

HELP
Summarize interactive commands.

KILL_JOB
Detach and delete job.

PARALLEL
Change the number of active workers for current job.

START_JOB
Start or resume current job.
Valid keywords are: SKIP_CURRENT.

STATUS
Frequency (secs) job status is to be monitored where
the default [0] will show new status when available.

STOP_JOB
Orderly shutdown of job execution and exits the client.
Valid keywords are: IMMEDIATE.

```

## 2.1. Importar un schema en otro schema

- Importar un fichero del usuario profesor en el usuario alumno

```

impdp system/alumno SCHEMAS=alumno remap_schema=alumno:profesor \
        directory=EXPORTDIR \
        dumpfile=profesor.dmp

```

```

[alumno@centos-asgbd backups]$ impdp system/alumno schemas=profesor remap_schema=profesor:alumno directory=
↪ mi_directorio_de_backup dumpfile=profesor.dmp

Import: Release 12.1.0.2.0 - Production on Fri Dec 16 13:23:38 2016

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Connected to: Oracle Database 12c Standard Edition Release 12.1.0.2.0 - 64bit Production
Master table "SYSTEM"."SYS_IMPORT_SCHEMA_01" successfully loaded/unloaded
Starting "SYSTEM"."SYS_IMPORT_SCHEMA_01": system/***** schemas=profesor remap_schema=profesor:alumno
↪ directory=mi_directorio_de_backup dumpfile=profesor.dmp
p
Processing object type SCHEMA_EXPORT/PRE_SCHEMA/PROACT_SCHEMA
Processing object type SCHEMA_EXPORT/TABLE/TABLE
Processing object type SCHEMA_EXPORT/TABLE/TABLE_DATA
. . imported "ALUMNO"."MATRICULAS"          6.523 KB      44 rows
. . imported "ALUMNO"."MULTAS"              8.195 KB      35 rows
. . imported "ALUMNO"."PERSONAS"            6.875 KB      47 rows
Processing object type SCHEMA_EXPORT/TABLE/GRANT/OWNER_GRANT/OBJECT_GRANT
Processing object type SCHEMA_EXPORT/TABLE/INDEX/INDEX
Processing object type SCHEMA_EXPORT/TABLE/CONSTRAINT/CONSTRAINT
Processing object type SCHEMA_EXPORT/TABLE/INDEX/STATISTICS/INDEX_STATISTICS
Processing object type SCHEMA_EXPORT/TABLE/CONSTRAINT/REF_CONSTRAINT
Processing object type SCHEMA_EXPORT/TABLE/STATISTICS/TABLE_STATISTICS
Processing object type SCHEMA_EXPORT/STATISTICS/MARKER
Job "SYSTEM"."SYS_IMPORT_SCHEMA_01" successfully completed at Fri Dec 16 13:23:58 2016 elapsed 0 00:00:19

```

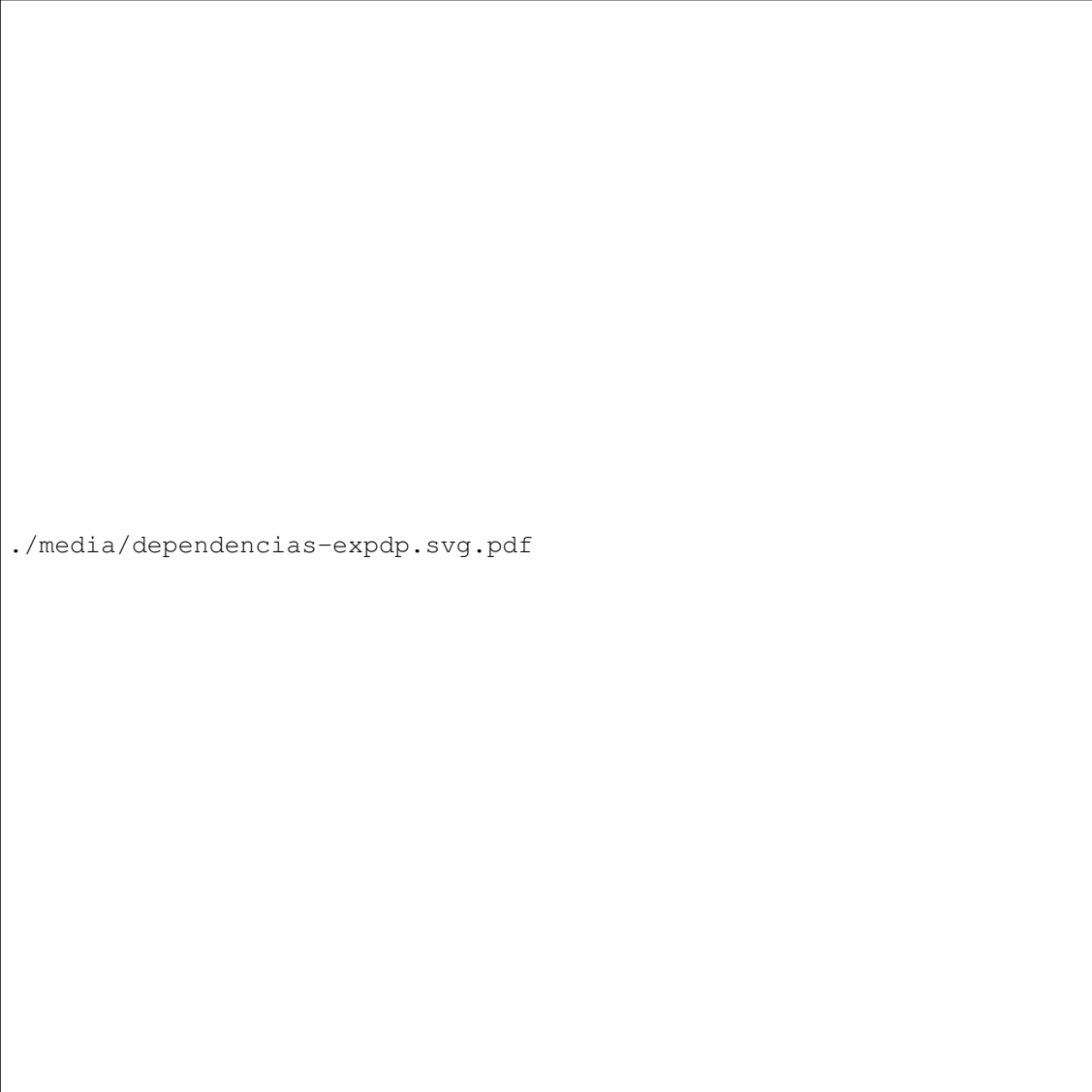
Permiso para cambiar schema

## 3. Ejercicio (1)

- Crea la base de datos de multas en el usuario multas (`../1/sql/multas.sql`)

- 
- Exporta la base de datos al fichero `/datos/exports/multas.dump`
  - Importa las tablas en el usuario `copiamultas`

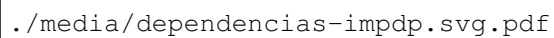
### 3.1. Tareas para la exportación



`./media/dependencias-expdp.svg.pdf`

---

### 3.2. Tareas para la importación



```
./media/dependencias-impdp.svg.pdf
```

## 4. Ejercicio (2)

### 1. Crear la base de datos

- Con la base de datos de carreras ([../1/sql/carreras-coches.sql](#))
- Crear el usuario CARRERAS y ejecutar el *script* SQL

### 2. Exportar

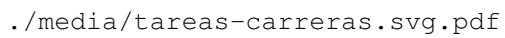
- Exportar las tablas del usuario CARRERAS al fichero `carreras.dmp`

---

### 3. Importar

- Borrar las filas de la tabla `CARRERAS.RESULTADOS`
- Importar los datos desde `carreras.dmp`

### 4.1. Tareas



`./media/tareas-carreras.svg.pdf`

## 5. Otras soluciones

- RMAN
- Copias de *tablespaces*

---

## 5.1. RMAN

- Solución de [Oracle para backups](#)
- Ventajas
  - Granularidad del backup: incrementales o totales
  - En línea
- Desventajas
  - Mayor complejidad

## 5.2. Copias de *tablespaces*

- Los datos están en ficheros dbf
- Basta con hacer copias de esos ficheros
- Ventajas
  - Fácil, no se necesitan herramientas especiales
- Desventajas
  - Muchas veces es necesario parar Oracle para hacer la copia y la restauración

Fuente: [docs.oracle.com](https://docs.oracle.com)

### 5.2.1. Lista de ficheros a copiar

- El fichero pfile o spfile indica dónde está el fichero de control
  - Generalmente en `$ORACLE_HOME/dbs/spfile.ora`
  - `SHOW PARAMETER spfile;`
- El fichero de control indica dónde están los ficheros de datos
- Los tablespaces `system` tienen los metadatos necesarios para entender los tablespaces de datos

```
select 'datos', name from v$datafile
union
select 'temporal', name from v$tempfile
union
select 'redo', member from v$logfile
union
select 'control', name from v$controlfile
union
select 'spfile', value from v$parameter where name='spfile';
```

---

### 5.2.2. Arrancar la base de datos

Si solo se restauran los ficheros de datos (y se tienen suficientes ficheros de log)

```
SQL> startup mount
ORACLE instance started.

Total System Global Area  264241152 bytes
Fixed Size                1286916 bytes
Variable Size            205524220 bytes
Database Buffers          54525952 bytes
Redo Buffers               2904064 bytes
Database mounted.
SQL> recover database until cancel;
Media recovery complete.
SQL> alter database open resetlogs;

Database altered.

SQL>
```

### 5.3. Ejercicio

1. Localiza los ficheros de datos de tu instancia
2. Apaga la instancia y haz una copia de los ficheros
3. Arranca la instancia, y realiza cambios en la base de datos
4. Apaga la instancia e intenta recuperar los ficheros de datos
5. Arranca la instancia, y comprueba que todo sigue como antes del paso 1

## 6. Referencias

- Formatos:
  - [Transparencias](#)
  - [PDF](#)
- Creado con:
  - [Emacs](#)
  - [org-reveal](#)
  - [Latex](#)