Exportar e importar datos de Oracle

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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.

DUMPFILE
Specify list of destination dump file names [expdat.dmp].
For example, DUMPFILE=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_DUMPFILES
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;
```

- Seguridad: es importante dar permisos a los procesos de **Oracle** para acceder y escribir al directorio

  - Pero no al resto de usuarios

  - Mejor setfacl que chmod

1.3 Caracteres de escape

- A veces hay que pasar parámetros con espacios u otros caracteres especiales

- En bash se haría con comillas "dobles" o 'simples'

- expdp maneja por sí mismo las comillas, así que hay que escaparlas en bash

```
expdp \'sys/alumno@localhost:1521/orclpdb1 as sysdba\' DIRECTORY=datos DUMPFILE=\'con espacios.dmp\'
```

1.4 Conectar sin contraseña como `SYS` a PDB en local

- Se usa la variable ORACLE_PDB_SID, junto con ORACLE_SID_

- Por lo que sea, no funciona con sqlplus

```
export ORACLE_SID=ORCL
export ORACLE_PDB_SID=pdasir
expdp \'/ as sysdba\' DIRECTORY=datos DUMPFILE=\'con espacios.dmp\'
```

1.5 Conectar sin contraseña en *connection string*

- Si se usa un *connection string* con servidor, SID y/o puerto es **obligatorio** poner la contraseña

- Para evitarlo, se puede usar un nombre de servicio de Oracle
    - Hay que crear una entrada en `$ORACLE_HOME/network/admin/tnsnames.ora`
    - Este fichero es equivalente a `/etc/hosts` para comandos de Oracle

```
PDB_PDASIR =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = localhost)(PORT = 1521))
    (CONNECT_DATA =
      (SERVICE_NAME = pdasir)
    )
  )
```

```
expdp \'sys@pdasir as sysdba\' DIRECTORY=datos DUMPFILE=\'con espacios.dmp\'
```

1.6 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

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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/PROCACT_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

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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 **INCLUDE/EXCLUDE** una tabla

- INCLUDE y EXCLUDE son filtros, como condiciones de where
  - Se puede usar PARFILE para no tener que escapar caracteres en la *shell*
- Mejor utilizar TABLES

```
impdp USERNAME/PASSWORD schemas=USERNAME directory=backup dumpfile=full.dmp EXCLUDE=TABLE:\"like 'IMG_%%'\" EXCLUDE=TABLE
    ↪ :\"IN \(\'EMP\',\'DEPT\'\)\"
```

2.2 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.dm
p
Processing object type SCHEMA_EXPORT/PRE_SCHEMA/PROCACT_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
```
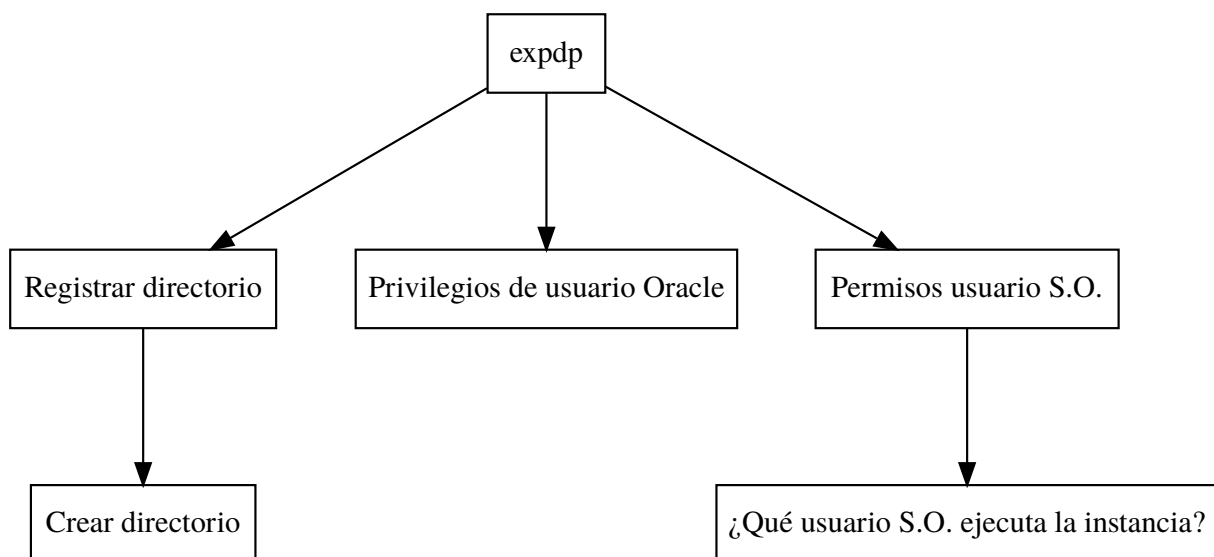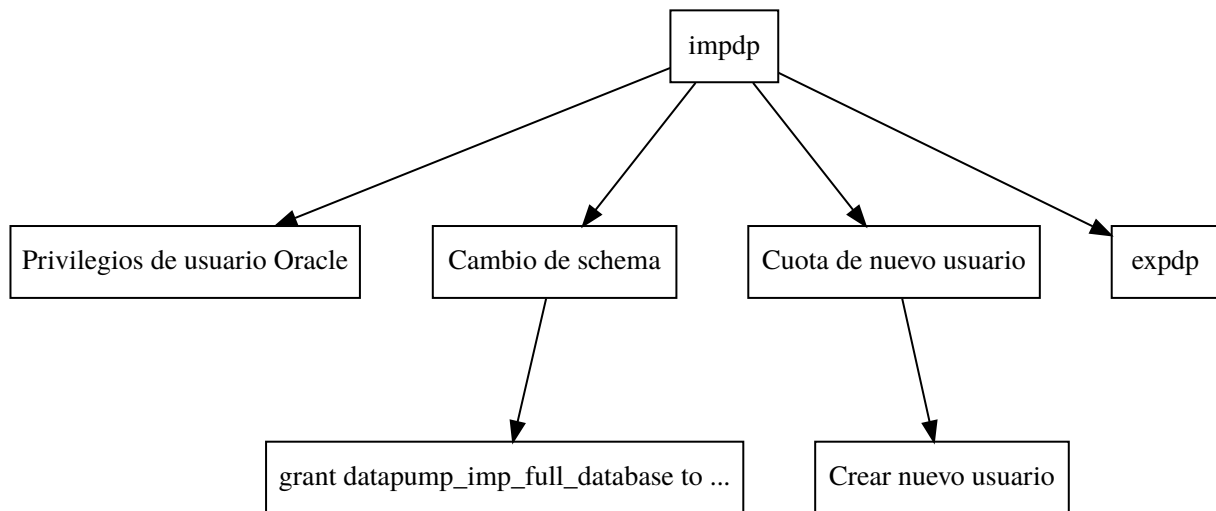
Permiso para cambiar schema

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

  – Con el usuario sys

- Importa las tablas en el usuario copiamultas

  – Con un usuario que no sea sys
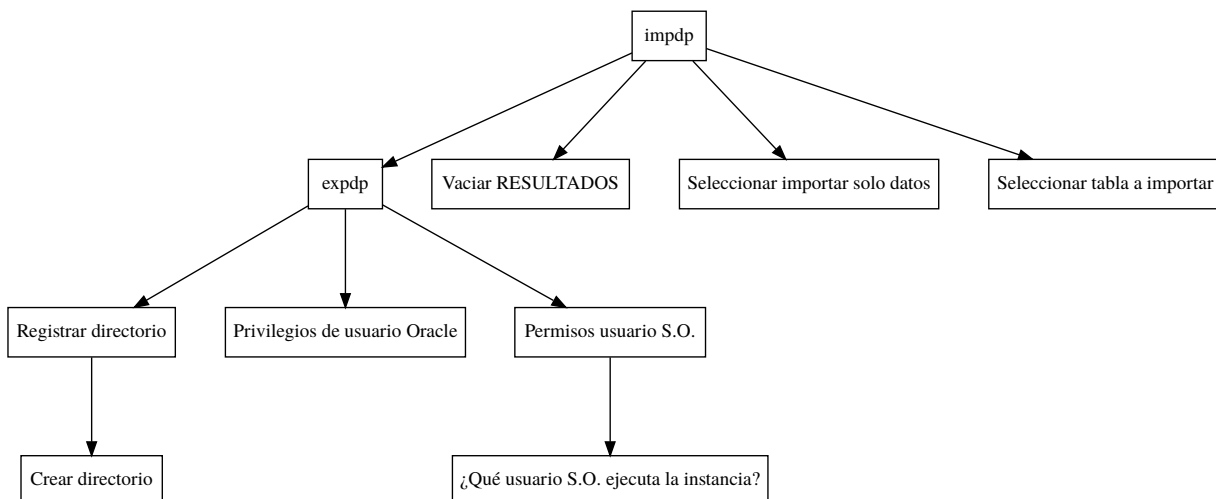
3.1   Tareas para la exportación

3.2 Tareas para la importación

```
                           ┌────────┐
                           │ impdp  │
                           └────────┘
        ┌──────────────┬───────┼───────────────┬──────────┐
┌──────────────────┐ ┌─────────────┐ ┌──────────────────┐ ┌───────┐
│Privilegios de    │ │Cambio de    │ │Cuota de nuevo    │ │ expdp │
│usuario Oracle    │ │schema       │ │usuario           │ └───────┘
└──────────────────┘ └─────────────┘ └──────────────────┘
                          │                  │
        ┌─────────────────────────────────┐ ┌──────────────────┐
        │grant datapump_imp_full_database │ │Crear nuevo usuario│
        │to ...                           │ └──────────────────┘
        └─────────────────────────────────┘
```

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

```
                              ┌───────┐
                              │ impdp │
                              └───────┘
        ┌───────────┬─────────────┼──────────────────────┬──────────────────────┐
   ┌───────┐ ┌──────────────┐ ┌────────────────────┐ ┌────────────────────┐
   │ expdp │ │Vaciar         │ │Seleccionar importar│ │Seleccionar tabla a │
   └───────┘ │RESULTADOS     │ │solo datos          │ │importar            │
     │       └──────────────┘ └────────────────────┘ └────────────────────┘
   ┌──────────┬──────────────┬──────────────────┐
┌──────────────┐ ┌──────────────────┐ ┌──────────────────┐
│Registrar     │ │Privilegios de    │ │Permisos usuario  │
│directorio    │ │usuario Oracle    │ │S.O.              │
└──────────────┘ └──────────────────┘ └──────────────────┘
     │                                       │
┌──────────────┐              ┌──────────────────────────────────┐
│Crear         │              │¿Qué usuario S.O. ejecuta la      │
│directorio    │              │instancia?                        │
└──────────────┘              └──────────────────────────────────┘
```

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

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
  - Página web
  - EPUB
- Creado con:
  - Emacs
  - org-re-reveal
  - Latex
- Alojado en Github