DataPump를 활용한 Data Migration

EXPORT

.dmp

full = y
IMPORT

DG SYSTEM

DG DATA

DG FRA

EXAMPLE

SYSTEM

HRTBS

HRIDX TBS

remap_tablespace=example:hrtbs
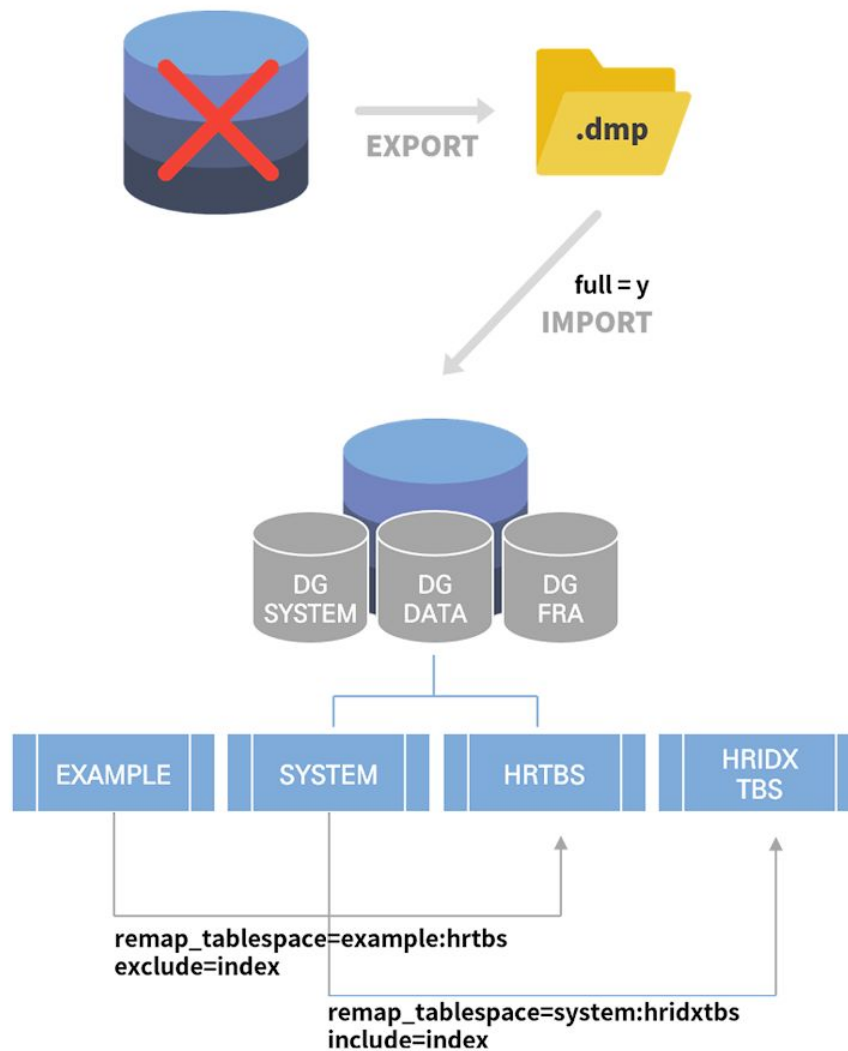exclude=index

remap_tablespace=system:hridxtbs
include=index

Portfolio 03. DataPump를 활용한 Data Migration

1. 프로젝트 목적

    1) 기존 데이터를 새로운 RAC 환경의 데이터베이스로 이관
    2) DataPump의 활용

2. 프로젝트 요구사항

    1) DataPump를 사용하여 데이터를 추출한다.
    2) 고 가용성을 위한 RAC DB 생성한다.
    3) OCR, Vote Disk를 위한 DISK GROUP:DGSYSTEM 생성 (Normal) – 사용 가능한 공간 3GB 이상
    4) Data를 위한 DISK GROUP:DGDATA 생성(Normal) – 사용 가능한 공간 10GB 이상
    5) Backup을 위한 DISK GROUP:DGFRA 생성(External) – 사용 가능한 공간 10GB 이상
    6) DGSYSTEM, DGFRA 디스크 그룹에는 redo log, control file이 저장되지 않도록 구성한다.
    7) HR 업무를 위해 HRTBS 생성(DGDATA, bigfile tablespace, autoextend on)
    8) HR 인덱스를 위해 HRIDXTBS 생성(DGDATA, bigfile tablespace, autoextend on)
    9) HR 유저의 스키마를 HRTBS, HRIDXTBS로 이동한 후 계정을 사용할 수 있도록 설정한다.

3. 프로젝트 작업 환경

    1) OS : Linux (OEL 5.4)
    2) DB : Oracle 11g

4. 프로젝트 수행

export 작업할 디렉토리를 생성한 후 권한을 준다.

※ datapump는 디렉토리를 통해서 간접적으로 OS파일에 접근한다. 그래서 미리 디렉토리가 만들어져 있어야 하고 접근할 수 있는 권한이 필요하다. 사용하고자 하는 DIRECTORY 이름 지정하고, as 뒤에는 DIRECTORY가 사용할 물리적인 경로를 써준다.

```
SYS@orcl1> CREATE DIRECTORY DUMP AS '/mnt/hgfs/share';
Directory created.

SYS@orcl1> GRANT READ, WRITE ON DIRECTORY DUMP TO SYSTEM;
Grant succeeded.

SYS@orcl1> GRANT CREATE ANY DIRECTORY TO SYSTEM;
Grant succeeded.

SYS@orcl1> SELECT * FROM DBA_DIRECTORIES;

OWNER       DIRECTORY_NAME            DIRECTORY_PATH
----------  ------------------------  ----------------------------------------
SYS         DUMP                      /mnt/hgfs/share
SYS         SUBDIR                    /u01/app/oracle/product/11.2.0.3/dbhome_
                                      1/demo/schema/order_entry//2002/Sep

SYS         SS_OE_XMLDIR              /u01/app/oracle/product/11.2.0.3/dbhome_
                                      1/demo/schema/order_entry/

SYS         ORACLE_OCM_CONFIG_DIR2    /u01/app/oracle/product/11.2.0.4/dbhome_
                                      1/ccr/state

SYS         LOG_FILE_DIR              /u01/app/oracle/product/11.2.0.3/dbhome_
                                      1/demo/schema/log/

SYS         MEDIA_DIR                 /u01/app/oracle/product/11.2.0.3/dbhome_
                                      1/demo/schema/product_media/

SYS         XMLDIR                    /u01/app/oracle/product/11.2.0.3/dbhome_
                                      1/rdbms/xml

SYS         DATA_FILE_DIR             /u01/app/oracle/product/11.2.0.3/dbhome_
                                      1/demo/schema/sales_history/

SYS         DATA_PUMP_DIR             /u01/app/oracle/product/11.2.0.4/dbhome_
                                      1/rdbms/log/

SYS         ORACLE_OCM_CONFIG_DIR     /u01/app/oracle/product/11.2.0.4/dbhome_
                                      1/ccr/hosts/host01/state
```

DB 전체를 export 한다.

```
[oracle@host01 ~]$ expdp system/oracle_4U directory=dump dumpfile=full.dmp
job_name=fullexp full=y
```
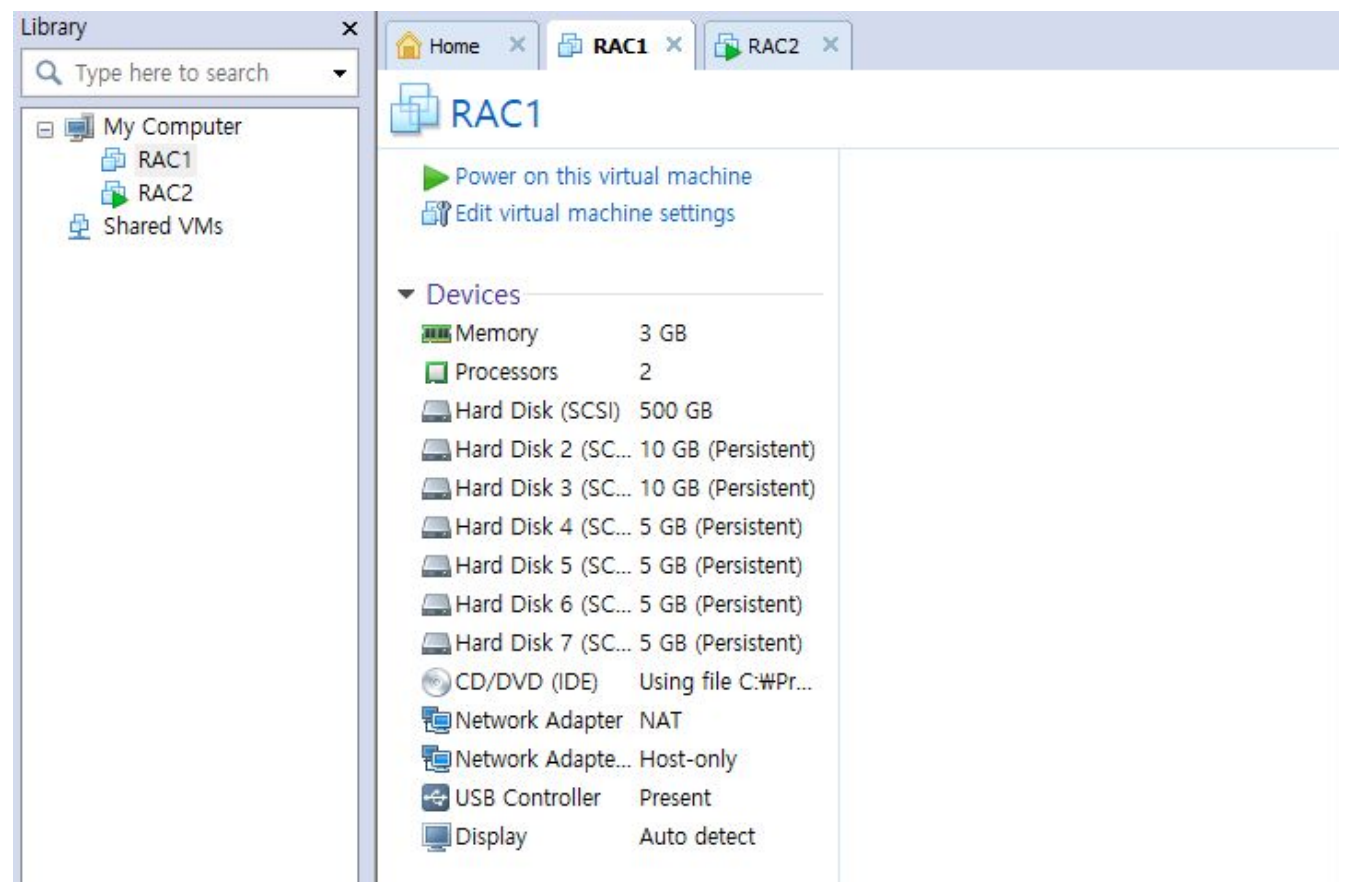
```
Master table "SYSTEM"."FULLEXP" successfully loaded/unloaded
****************************************************************************
Dump file set for SYSTEM.FULLEXP is:
  /mnt/hgfs/share/full.dump
Job "SYSTEM"."FULLEXP" completed with 1 error(s) at Mon Aug 24 11:16:20 2020 elapsed
0 00:07:21
```

RAC DB를 지운 후 재생성한다. 이 때, 프로젝트 요구사항을 염두하고 하드디스크를 구성한다.

추출해 놓은 덤프를 작업 스테이지로 이동한다.

```
[oracle@host01 ~]$ mkdir dp
[oracle@host01 ~]$ ls
afiedt.buf  Desktop  dp  tbs1.dbf

[oracle@host01 ~]$ cp /mnt/hgfs/share/full.dump /home/oracle/dp
[oracle@host01 ~]$ cp /mnt/hgfs/share/export.dump /home/oracle/dp

[oracle@host01 dp]$ ls
export.log  full.dump
```

---

import 작업할 디렉토리를 생성한 후 권한을 준다.

```
SYS@orcl1> CREATE DIRECTORY DATAPUMP AS '/home/oracle/dp';
Directory created.

SYS@orcl1> GRANT READ, WRITE ON DIRECTORY DATAPUMP TO SYSTEM;
Grant succeeded.
SYS@orcl1> GRANT CREATE ANY DIRECTORY TO SYSTEM;
```

```
Grant succeeded.

SYS@orcl1> SELECT * FROM DBA_DIRECTORIES;

OWNER       DIRECTORY_NAME           DIRECTORY_PATH
---------- ------------------------ ---------------------------------------
SYS         SUBDIR                   /u01/app/oracle/product/11.2.0.3/dbhome_
                                     1/demo/schema/order_entry//2002/Sep

SYS         SS_OE_XMLDIR             /u01/app/oracle/product/11.2.0.3/dbhome_
                                     1/demo/schema/order_entry/

SYS         LOG_FILE_DIR             /u01/app/oracle/product/11.2.0.3/dbhome_
                                     1/demo/schema/log/

SYS         DATA_FILE_DIR            /u01/app/oracle/product/11.2.0.3/dbhome_
                                     1/demo/schema/sales_history/

SYS         DATAPUMP                 /home/oracle/dp
SYS         MEDIA_DIR                /u01/app/oracle/product/11.2.0.3/dbhome_
                                     1/demo/schema/product_media/

SYS         XMLDIR                   /u01/app/oracle/product/11.2.0.4/dbhome_
                                     1/rdbms/xml

SYS         ORACLE_OCM_CONFIG_DIR    /u01/app/oracle/product/11.2.0.4/dbhome_
                                     1/ccr/hosts/host01/state

SYS         DATA_PUMP_DIR            /u01/app/oracle/product/11.2.0.4/dbhome_
                                     1/rdbms/log/

SYS         ORACLE_OCM_CONFIG_DIR2   /u01/app/oracle/product/11.2.0.4/dbhome_
                                     1/ccr/state

10 rows selected.
```

※ 오라클 11g R2 이상 버전에서는 다음과 같이 확인할 수도 있다.

```
SYS@orcl1>SELECT * FROM DATAPUMP_DIR_OBJS WHERE NAME = 'DATAPUMP';

NAME       PATH                                       READ       WRITE
---------- ------------------------------------------ ---------- ----------
DATAPUMP   /home/oracle/dp                            TRUE       TRUE
```

※ 디렉토리 삭제 방법

```
SYS@orcl1> DROP DIRECTORY [DIRECTORY_NAME];
```

덤프파일을 import 한다.

```
[oracle@host01 ~]$ impdp system/oracle_4U dumpfile=full.dump directory=datapump
full=y logfile=import.log job_name=fullimp
...
Processing object type DATABASE_EXPORT/SCHEMA/POST_SCHEMA/PROCACT_SCHEMA
Processing object type DATABASE_EXPORT/AUDIT
Job "SYSTEM"."FULLIMP" completed with 7433 error(s) at Thu Aug 27 11:07:00 2020
elapsed 0 00:03:55
```

유저가 정상적으로 있는지 확인한다.

```
SYS@orcl1>SELECT USERNAME FROM DBA_USERS;

USERNAME
------------------------------
MGMT_VIEW
SYS
SYSTEM
DBSNMP
SYSMAN
SCOTT
SH
HR
OUTLN
FLOWS_FILES
MDSYS
ORDSYS
EXFSYS
WMSYS
APPQOSSYS
...

36 rows selected.
```

HR 업무를 위한 테이블 스페이스 추가

```
SYS@orcl1>CREATE BIGFILE TABLESPACE HRTBS
  2  DATAFILE SIZE 5M
  3  AUTOEXTEND ON;

Tablespace created.

SYS@orcl1>CREATE BIGFILE TABLESPACE HRIDXTBS
  2  DATAFILE SIZE 5M
  3  AUTOEXTEND ON;

Tablespace created.

SYS@orcl1>SELECT TABLESPACE_NAME, BYTES/1024/1024 MB, FILE_NAME
  2  FROM DBA_DATA_FILES;

TABLESPACE_NAME              MB FILE_NAME
------------------- ---------- -------------------------------------------------
USERS                        5 +DGDATA/orcl/datafile/users.259.1049450581
UNDOTBS1                    90 +DGDATA/orcl/datafile/undotbs1.258.1049450579
SYSAUX                     580 +DGDATA/orcl/datafile/sysaux.257.1049450579
SYSTEM                     800 +DGDATA/orcl/datafile/system.256.1049450579
UNDOTBS2                    25 +DGDATA/orcl/datafile/undotbs2.264.1049450839
EXAMPLE                321.875 +DGDATA/orcl/datafile/example.268.1049455529
HRTBS                        5 +DGDATA/orcl/datafile/hrtbs.269.1049543741
HRIDXTBS                     5 +DGDATA/orcl/datafile/hridxtbs.270.1049543805

8 rows selected.
```

HR 계정의 테이블을 조회한다. 현재는 EXAMPLE 테이블 스페이스에 위치해 있다.

```
SYS@orcl1> select owner, table_name, tablespace_name
  2  from dba_tables
  3  where owner = 'HR';

OWNER                    TABLE_NAME                     TABLESPACE_NAME
------------------------ ------------------------------ ------------------
HR                       REGIONS                        EXAMPLE
HR                       LOCATIONS                      EXAMPLE
HR                       DEPARTMENTS                    EXAMPLE
HR                       JOBS                           EXAMPLE
HR                       EMPLOYEES                      EXAMPLE
HR                       JOB_HISTORY                    EXAMPLE
HR                       COUNTRIES

7 rows selected.
```

HR 계정에 테스트 인덱스를 생성한 후 조회한다.

```
SYS@orcl1>CREATE INDEX HR_INDEX ON JOB(JOB_ID, MAX_SALARY);
Index created.

SYS@orcl1> SELECT TABLE_NAME, INDEX_NAME, TABLE_OWNER
  2  FROM USER_INDEXES
  3  WHERE TABLE_OWNER = 'HR';

TABLE_NAME            INDEX_NAME                     TABLE_OWNER
-------------------- ----------------------------- ------------------
JOBS                 HR_INDEX                       HR
```

HR 스키마 전체를 추출한다.

```
[oracle@host01 ~]$ expdp system/oracle_4U schemas=hr directory=datapump
dumpfile=hr_schema.dmp

SYS@orcl1> drop user hr cascade;
User dropped.
```

EXAMPLE 테이블 스페이스에 위치했던 오브젝트를 HRTBS 테이블 스페이스에 import한다. (인덱스 제외)

```
[oracle@host01 ~]$  impdp system/oracle_4U directory=datapump
dumpfile=hr_schema.dmp schemas=hr remap_tablespace=example:hrtbs exclude=index

Import: Release 11.2.0.4.0 - Production on Thu Aug 27 14:04:27 2020
Copyright (c) 1982, 2011, Oracle and/or its affiliates.  All rights reserved.
...
Data Mining and Real Application Testing options
Master table "SYSTEM"."SYS_IMPORT_SCHEMA_01" successfully loaded/unloaded
Starting "SYSTEM"."SYS_IMPORT_SCHEMA_01":  system/******** directory=datapump
dumpfile=hr_schema.dmp schemas=hr remap_tablespace=example:hrtbs exclude=index
Processing object type SCHEMA_EXPORT/USER
Processing object type SCHEMA_EXPORT/SYSTEM_GRANT
Processing object type SCHEMA_EXPORT/ROLE_GRANT
Processing object type SCHEMA_EXPORT/DEFAULT_ROLE
Processing object type SCHEMA_EXPORT/PRE_SCHEMA/PROCACT_SCHEMA
Processing object type SCHEMA_EXPORT/SEQUENCE/SEQUENCE
Processing object type SCHEMA_EXPORT/TABLE/TABLE
Processing object type SCHEMA_EXPORT/TABLE/TABLE_DATA
. . imported "HR"."COUNTRIES"                       6.367 KB     25 rows
```

```
. . imported "HR"."DEPARTMENTS"                            7.007 KB       27 rows
. . imported "HR"."EMPLOYEES"                              16.80 KB      107 rows
. . imported "HR"."JOBS"                                   6.992 KB       19 rows
. . imported "HR"."JOB_HISTORY"                            7.054 KB       10 rows
. . imported "HR"."LOCATIONS"                              8.273 KB       23 rows
. . imported "HR"."REGIONS"                                5.476 KB        4 rows
Processing object type SCHEMA_EXPORT/TABLE/GRANT/OWNER_GRANT/OBJECT_GRANT
Processing object type SCHEMA_EXPORT/TABLE/COMMENT
Processing object type SCHEMA_EXPORT/PROCEDURE/PROCEDURE
Processing object type SCHEMA_EXPORT/PROCEDURE/ALTER_PROCEDURE
Processing object type SCHEMA_EXPORT/TABLE/CONSTRAINT/CONSTRAINT
Processing object type SCHEMA_EXPORT/VIEW/VIEW
Processing object type SCHEMA_EXPORT/TABLE/CONSTRAINT/REF_CONSTRAINT
Processing object type SCHEMA_EXPORT/TABLE/TRIGGER
Processing object type SCHEMA_EXPORT/TABLE/STATISTICS/TABLE_STATISTICS
Job "SYSTEM"."SYS_IMPORT_SCHEMA_01" successfully completed at Thu Aug 27 14:04:36
2020 elapsed 0 00:00:07

SYS@orcl1>select owner, table_name, tablespace_name
    2 from dba_tables
    3 where owner = 'HR';

OWNER                          TABLE_NAME                     TABLESPACE_NAME
------------------------------ ------------------------------ --------------------
HR                             REGIONS                        HRTBS
HR                             LOCATIONS                      HRTBS
HR                             DEPARTMENTS                    HRTBS
HR                             JOBS                           HRTBS
HR                             EMPLOYEES                      HRTBS
HR                             JOB_HISTORY                    HRTBS
HR                             COUNTRIES

7 rows selected.
```

인덱스 파일을 HRIDXTBS 테이블 스페이스에 import한다.

```
[oracle@host01 ~]$ impdp system/oracle_4U directory=datapump
dumpfile=hr_schema.dmp schemas=hr remap_tablespace=system:hridxtbs include=index

SYS@orcl1>select table_name, index_name, table_owner, tablespace_name
  2  from user_indexes
  3  where table_owner = 'HR';

TABLE_NAME       INDEX_NAME       TABLE_OWNER        TABLESPACE_NAME
---------------- ---------------- ------------------ --------------------
JOBS             HR_INDEX         HR                 HRIDXTBS
```

---

hr 계정에 접속해서 employees 테이블이 정상적으로 들어갔는지 확인한다.

```
SYS@orcl1>conn hr/hr
Connected.

HR@orcl1>select * from employees;
...
107 rows selected.
```