Database migration from Tru64 UNIX to HP-UX with Oracle 10g

Jeff Smith & Wiekus Beukes

Hewlett-Packard

Agenda

- Oracle 10gR1 Data pump

- Oracle 10gR1 Transportable tablespaces

Oracle 10gR1 Data Pump

Jeff Smith

Overview of Data Pump New Features

- – Execution Threads
- – Ability to Restart
- – Ability to detach and reattach
- – Support for Export/Import over a Network
- – Remap Data File, Tablespace, Schemas
- – Filtering with Include and Exclude
- – Interactive command mode Monitoring and Interaction
- – Specify Version of Database Objects

How does Data Pump Access Data?

– Direct Path Loads and Unloads
– External Tables

Accessing Data Over a Network

– Export and Import
– Source is a read only database

Monitoring Job Status

– The log file
– The STATUS command

File Allocation

- – Dump files
- – Log Files
- – SQL File
- – Add Additional Dump Files

Data Pump Export

- Invoking Data Pump Export

- Filtering During Data Pump Export

- Parameters Available in Exports Command-Line Mode

Data Pump Import

- Invoking Data Pump Import

- Filtering During Data Pump Import

- Parameters Available in Imports Command-Line Mode

Data Pump Performance

Oracle 10gR1 Heterogeneous Transportable Tablespaces

Wiekus Beukes

Oracle 10gR1 Heterogeneous transportable tablespaces (HTTS)

- Transportable tablespaces are not new
  - Introduced in 8i.

- 10gR1 adds heterogeneity to transportable tablespaces.
  - RMAN is enhanced to convert the data files between the on disk structures.
    - Not in place conversion. Need disk space for source and target data files on the server where the files are being converted (source or target server).

Oracle 10gR1 HTTS

- Not applicable for all migrations
  - Limitations for HTTS:
    - The source and target database must use the same character set and national character set.
    - The transported tablespace name must not exist on the target.
    - Objects with underlying objects (materialized views etc.) or contained objects (partitioned tables etc.) are not transportable unless all of the underlying or contained objects are in the tablespaces being transported.
    - Transportable tablespaces do not support 8.0-compatible advanced queues with multiple recipients.
    - You cannot transport the SYSTEM tablespace or objects owned by the user SYS. (Examples of such objects are PL/SQL, Java classes, callouts, views, synonyms, users, privileges, dimensions, directories, and sequences).
    - Types whose interpretation is application-specific and opaque to the database (such as RAW, BFILE, and the AnyTypes) can be transported, but they are not converted as part of the cross-platform transport operation.
    - BINARY_FLOAT and BINARY_DOUBLE types are transportable if using Data Pump for the metadata exports only.

- Migrating from Tru64 you will need to always do a RMAN convert.

How-to migrate the Database using HTTS

- Migrating the database with HTTS involves moving only the user tablespaces.

  All system tablespaces must be created as usual on the target system using the standard Oracle tools like DBCA etc.

- Make sure the tablespaces you are migrating is self-contained

  ```
  sqlplus "/ as sysdba"
     SQL> EXECUTE DBMS_TTS.TRANSPORT_SET_CHECK('TS_NAME1,TS_NAME2,..', TRUE);
     SQL> SELECT * FROM TRANSPORT_SET_VIOLATIONS;
  ```

  Resolve all violations before continuing!

How-to migrate the Database using HTTS

- Switch the targeted tablespaces to read only.

```
sqlplus "/ as sysdba"
    SQL> ALTER TABLESPACE <TS_NAME> READ ONLY;
    SQL> QUIT;
```

- Export the metadata for the tablespaces to be transported.

```
expdp TRANSPORT_TABLESPACES=(TS_NAME1,TS_NAME2,..) \
    TRANSPORT_FULL_CHECK=Y DIRECTORY=TRANSPORT_DUMP_DIR DUMPFILE=OraHTTS.dmp
```

  – Traditional exp/imp can also be used. This step has no performance implications as the export / import is very small, only the metadata for the tablespaces are exported and imported.

  – Streams can be used at the same time to allow the tablespaces to be kept in sync after the transportation of the tablespaces.

How-to migrate the Database using HTTS

- Depending on your situation you could convert the data files on either the source or the target server.
  - The conversion step is the most time consuming, do it on the new Itanium server.

- Transfer the metadata dump file and the data files to the Itanium server.
  - If at all possible use a private GigE (or better) network connection to transfer the files to the new Itanium server.
  - There might be a faster way of moving the data files – one possibility is doing a snapshot on the storage array if you use RAW devices (without LSM and Tru64 disk partitions).

How-to migrate the Database using HTTS

- The data files is converted using the RMAN CONVERT command.

```
rman TARGET /
    RMAN> CONVERT DATAFILE '/oracle/tmp/oradbvol1', '/oracle/tmp/oradbvol2'
    RMAN> FROM PLATFORM = 'HP Tru64 UNIX'
    RMAN> DB_FILE_NAME_CONVERT = ('/oracle/tmp', '/dev/vgora/') PARALLELISM 2;
    RMAN> EXIT;
```

- Useful options
  - DB_FILE_NAME_CONVERT
    - Very useful if the system layout is different than on the Tru64 UNIX - In the sample the target database is on RAW, RMAN will convert the file and dump it directly on the RAW device.
  - PARALLELISM
    - May improve performance if converting multiple data files at the same time.

How-to migrate the Database using HTTS

- Plug the transported tablespaces into the target database

```
impdp DUMPFILE=OraHTTS.dmp DIRECTORY=TRANSPORT_DUMP_DIR \
    DATAFILES=/dev/vgora/oradbvol1, /dev/vgora/oradbvol2
```

- The tablespace can now be switched to read-write mode.

```
sqlplus "/ as sysdba"
    SQL> ALTER TABLESPACE <TS_NAME> READ WRITE;
    SQL> QUIT;
```

  - If streams instantiation rules was setup before transporting the tablespaces, you will need to switch the source tablespace also to read-write mode so streams can start to propagate the changes to the target.

RMAN data file conversion performance

RMAN conversion running on a HP rx5670

Source: In house testing