Technical white paper

Data Replication in HP DMA

HP Database and Middleware Automation version 10.00

Data Replication and HP DMA

To help HP Database and Middleware Automation (HP DMA) extend across broader geographical regions, you can build multiple HP DMA servers and use Oracle® Streams replication between those servers. This ensures that your HP DMA solution packs, policies, and deployments – all HP DMA automation items except your scheduler – are identical between the servers.

There are many ways to achieve Oracle replication. This paper shows you two examples of setting up Oracle Streams using the Data Pump method of moving data. The first example uses two active HP DMA databases, where replication must function in both directions. The second example assumes that the replicated database will only be used for read operations and to serve as a standby database for disaster recovery purposes.

Example 1 – Both databases are active

In this example, both the source and destination databases are active, and replication must function in both directions.

Prerequisites

- Both databases have archive logging enabled.
- The Oracle Streams initiation parameters are set as follows:
  - STREAMS_POOL_SIZE is set to 100M (if you are not using Automatic Memory Management or Automatic Shared Memory Management)
  - SESSIONS and PROCESSES are increased by 50
  - GLOBAL_NAMES is set to true
  - UNDO_RETENTION is set to 3600
- The database links in the strmadmin schema for both databases are set up such that the source and destination databases connect to each other using the strmadmin login.
- The source database is already set up and is running as the HP DMA server.
- The schema for the HP DMA tables in the destination database has been built and is ready for tables to be imported.

Step 1: Set up the streams administrator account to manage streams

Run these commands on both the source and destination databases – note that these are examples and should be changed to match your environment:

```
CREATE TABLESPACE streams_tbs DATAFILE /u01/app/oradata/orcl/streams_tbs.dbf' SIZE 25M REUSE
AUTOEXTEND ON MAXSIZE UNLIMITED;
CREATE USER strmadmin IDENTIFIED BY password DEFAULT TABLESPACE streams_tbs QUOTA UNLIMITED
ON streams_tbs;
GRANT DBA TO strmadmin;
BEGIN
  DBMS_STREAMS_AUTH.GRANT_ADMIN_PRIVILEGE(
    grantee          => 'strmadmin',
    grant_privileges => TRUE);
END;
/
CREATE DIRECTORY strmadmin.streams_dir AS '/u01/app/oracle/admin/streams';
```

Step 2: Run this PL/SQL code

Run the following anonymous block of code from a SQLPLUS session connected as strmadmin on the source database. Replace the names of the source and destination servers, and modify the directory names, if necessary, for your environment.

```
DECLARE
    tables DBMS_UTILITY.UNCL_ARRAY;
    tab_count number := 1;
    src_dir varchar(30) := ' strmadmin.streams_dir ';
    dest_dir varchar(30) := ' strmadmin.streams_dir ';
    src_db varchar(30) := 'dma.src';
    dest_db varchar(30) := 'dma.dest';
    cursor tables_cur is
        select owner || '.' || table_name as table_name from dba_tables where table_name
like  'DMA%'
        and table_name not like '%QRTZ%';
BEGIN
    for i in tables_cur
    loop
        tables(tab_count) := i.table_name;
        execute immediate('alter table ' || i.table_name || ' add supplemental log data
(all) columns')
        tab_count := tab_count + 1;
    end loop;

    dbms_streams_adm.maintain_tables(
        table_names      => tables,
        source_directory_object     => src_dir,
        destination_directory_object  => dest_dir,
        source_database   => src_db,
        destination_database   => dest_db,
        capture_name                => 'capture_dma',
        capture_queue_table         => 'streams_queue_qt_dma',
        capture_queue_name          => 'streams_queue_dma',
        apply_name                  => 'apply_dma',
        apply_queue_table           => 'streams_queue_qt_dma',
        apply_queue_name            => 'streams_queue_dma',
        bi_directional => TRUE,
        instantiation => DBMS_STREAMS_ADM.INSTANTIATION_TABLE);
end;
/
```

Step 3: Track progress

The block of code in Step 2 will take some time to complete, and the time will vary depending on the systems you are using. To track progress, run this query on the Destination database to see how many rules have been set up in Oracle Streams:

```
select count(*) from DBA_STREAMS_TABLE_RULES where table_name like 'DMA%';
```

When the code is complete, the count should be 264 rules.

Step 4: Initialize the quartz tables on the destination database

After you have configured Oracle Streams, you must connect to the destination database as the HP DMA user that you have configured and run the following script to initialize the quartz tables that handle scheduling for HP DMA.

```
@/opt/hp/dma/server/db_sql/dma-oracle/hpdma_schema-qrtz.sql
```

Example 2 – Second database is only for reading

In this example, the destination database is used only for read operations and as a standby for disaster recovery purposes.

Prerequisites

- The source database has archive logging enabled.
- The Oracle Streams initiation parameters are set as follows:
  - STREAMS_POOL_SIZE is set to 100M (if you are not using Automatic Memory Management or Automatic Shared Memory Management)
  - SESSIONS and PROCESSES are increased by 50
  - GLOBAL_NAMES is set to true
  - UNDO_RETENTION is set to 3600
- The database links in the strmadmin schema for the source database are set up such that the source database connects to the destination database using strmadmin.
- The source database is already set up and is running as the HP DMA server.
- The schema for the HP DMA tables in the destination database has been built and is ready for tables to be imported.

Step 1: Set up the streams administrator account to manage streams

NOTE: Run these commands on both the source and destination databases.

```
CREATE TABLESPACE streams_tbs DATAFILE /u01/app/oradata/orcl /streams_tbs.dbf' SIZE 25M
REUSE AUTOEXTEND ON MAXSIZE UNLIMITED;
CREATE USER strmadmin IDENTIFIED BY password DEFAULT TABLESPACE streams_tbs QUOTA UNLIMITED
ON streams_tbs;
GRANT DBA TO strmadmin;
BEGIN
  DBMS_STREAMS_AUTH.GRANT_ADMIN_PRIVILEGE(
    grantee          => 'strmadmin',
    grant_privileges => TRUE);
END;
/

CREATE DIRECTORY strmadmin.streams_dir AS '/u01/app/oracle/admin/streams';
```

Step 2: Run this PL/SQL code

Run the following anonymous block of code from a SQLPLUS session connected as strmadmin on the source database. Replace the names of the source and destination servers, and modify the directory names, if necessary, for your environment.

```
DECLARE
    tables DBMS_UTILITY.UNCL_ARRAY;
    tab_count number := 1;
    src_dir varchar(30) := ' strmadmin.streams_dir ';
    dest_dir varchar(30) := ' strmadmin.streams_dir ';
    src_db varchar(30) := 'dma.src';
    dest_db varchar(30) := 'dma.dest';
    cursor tables_cur is
        select owner || '.' || table_name as table_name from dba_tables where table_name
like  'DMA%';
BEGIN
    for i in tables_cur
    loop
        tables(tab_count) := i.table_name;
        execute immediate('alter table ' || i.table_name || ' add supplemental log data
(all) columns')
        tab_count := tab_count + 1;
    end loop;
```

```
    dbms_streams_adm.maintain_tables(
        table_names      => tables,
        source_directory_object     => src_dir,
        destination_directory_object  => dest_dir,
        source_database   => src_db,
        destination_database   => dest_db,
        capture_name                 => 'capture_dma',
        capture_queue_table          => 'streams_queue_qt_dma',
        capture_queue_name           => 'streams_queue_dma',
        apply_name                   => 'apply_dma',
        apply_queue_table            => 'streams_queue_qt_dma',
        apply_queue_name             => 'streams_queue_dma',
        bi_directional => FALSE,
        instantiation => DBMS_STREAMS_ADM.INSTANTIATION_TABLE);
end;
/
```

Resources

For service overview, data sheets, ordering guide and technical overview

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