Paychex
Active Data Guard Implementation

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About Paychex, Inc.

- Paychex Inc. is a leading provider of payroll, human resources, and benefits outsourcing solutions to approximately 564,000 small and medium sized businesses.

- Fiscal 2011 highlights (ended May 31, 2011):
  - $2 billion revenue;
  - $0.8 billion pre-tax income;
  - $0.5 billion net income

- Computerworld list of “Top 100 Best Places to Work in IT”.
Why Upgrade to 11g Release 2?

Upgrade Drivers

• Bring us up-to-date with Oracle Release

• Leverage disaster recovery hardware

• Cost reduction

• Database replay
Post Upgrade Architecture

Cluster1
Host1
Host2

Cluster1 (DG)
DG_Host1
DG_Host2

CRS Interconnect
Redlog flow

Post-Upgrade Env
11g and Active Data Guard

Data Center 1

Data Center 2

App Servers

Batch Servers

Data Stage

Business objects

Reporting from Primary

DW Extracts

Adhoc reports

Adhoc Reports

LGWR SYNC

Read MOSTLY

READ WRITE
Analysis of Read-Only Activities

Business Objects

• Adhoc reporting uses logical standby.

• Some reports connected to primary database – due to lag issues on the logical standby.

• Reports that write to tables?

• Analyzed the workload.
Analysis of Read-Only Activities

• We used Data Stage for extracts to our data warehouse. The extracts need to write to tables.

• Remember, Active Data Guard is a true read-only database; you can’t write to tables.

• So, the question is...will Active Data Guard work?
How Did We Do It?

Define Database Service Names

- Created database service names for each workload type, for example:
  - cluster1_reports, cluster1_adhoc, cluster1_app, cluster1_batch

- Modify init.ora parameter on primary and standby
  - On the Primary –
    - ALTER SYSTEM SET SERVICE_NAMES='cluster1_report, cluster1_app, cluster1_batch, db_unique_name' SCOPE=both sid='*';
  - On the Active Data Guard Standby -
    - ALTER SYSTEM SET SERVICE_NAMES='cluster1_adhoc, db_unique_name' SCOPE=both sid='*';
How Did We Do It (cont)متقود

Re-direct dml to primary to enable read-mostly activity

1. Created table on the primary.
   - CREATE my_schema.my_table (id number);

2. Created a separate user, privileges for adhoc reporting.
   - CREATE USER adhoc_usr IDENTIFIED BY password;
   - GRANT select, insert, update, delete ON my_schema.my_table TO myrole;
   - GRANT connect, myrole TO adhoc_usr;

3. Created a private database link from the standby to the primary.
   - CREATE DATABASE LINK mylink CONNECT TO link_user IDENTIFIED BY link_password USING ‘primarydb’;
4. Modified the private synonyms of adhoc_user to point to the tables we needed to modify.
   - CREATE OR REPLACE SYNONYM my_table FOR my_schema.my_table@mylink;

5. Create $ORACLE_HOME/network/admin/tnsnames.ora entry on standby to point to primary.
Putting it all together ....

The report or extract runs ...

- INSERT INTO my_table VALUES('12345');
- commit;  --> This commits on primary.
- SELECT a.id, a.col2, a.col3
  FROM    mytab a
  WHERE a.id in (SELECT b.id FROM my_table b);

** TEST THE PERFORMANCE OF YOUR QUERIES! **

The execution plan will change by selecting data over a database link.
SQL Performance

• Explain plans that need to write to a table won’t work
  ▪ Unless PLAN_TABLE referenced is a synonym which points to the primary database.

• dbms_xplan.display_cursor WILL work.

• ASH reporting is correct in 11.2.0.2.

• AWR reports are actually the workload from the primary (reading from SYSAUX tables)
Oracle Enterprise Manager Performance page can be misleading on ADG.

Standby Statspack Note: 454848.1

Profiles for SQL in Active Data Guard can be used, BUT they must be created in the primary and propagated to standby.
Results

• Gain…. 90 TB of storage… RECLAIMED!

• Bigger gain… reclaimed Fibre Adapter ports which could be used to balance SAN workload

• Biggest gain… reduction in SRDF hardware replication traffic.

• Logical standby requiring a lot of maintenance… GONE!
More Results

**REPORTING**

- Improved performance of reports

- More accurate reports due to zero lag (LGWR SYNC)

- Potential for moving additional reports off primary due to benefits and reliability of Data Guard reporting.

- Potential exists for tuning reporting with different init.ora settings – SGA/PGA/Parallel Query options.
Lessons Learned

• Auto-compile doesn’t work.

• Plan additional resources for post-implementation support.

• Check logon trigger rules and auditing. If they write to tables on login, they will need to be modified.
Lessons Learned

• Test reports early

• Compatible parameter

• Use Active Data Guard!
  ◆ Will detect hidden corruptions on the standby
  ◆ Data Guard and read-only queries for hot data
  ◆ RMAN validation best for cold data
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