

# Paychex Active Data Guard Implementation

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# About Paychex, Inc.

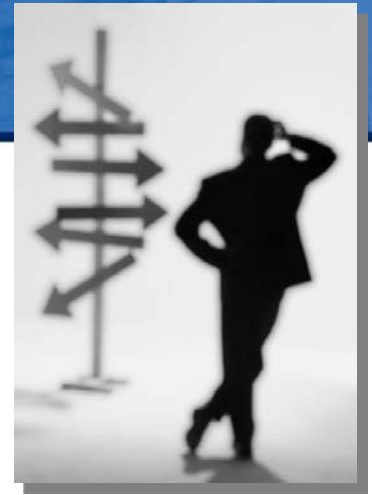


- Paychex Inc, is a leading provider of payroll, human resources, and benefits outsourcing solutions to approximately 564,000 small and medium sized businesses.
- Fiscal 2011 highlights (ended May 31, 2011):
  - \$2 billion revenue;
  - \$0.8 billion pre-tax income;
  - \$0.5 billion net income
- *Computerworld* list of “Top 100 Best Places to Work in IT”.

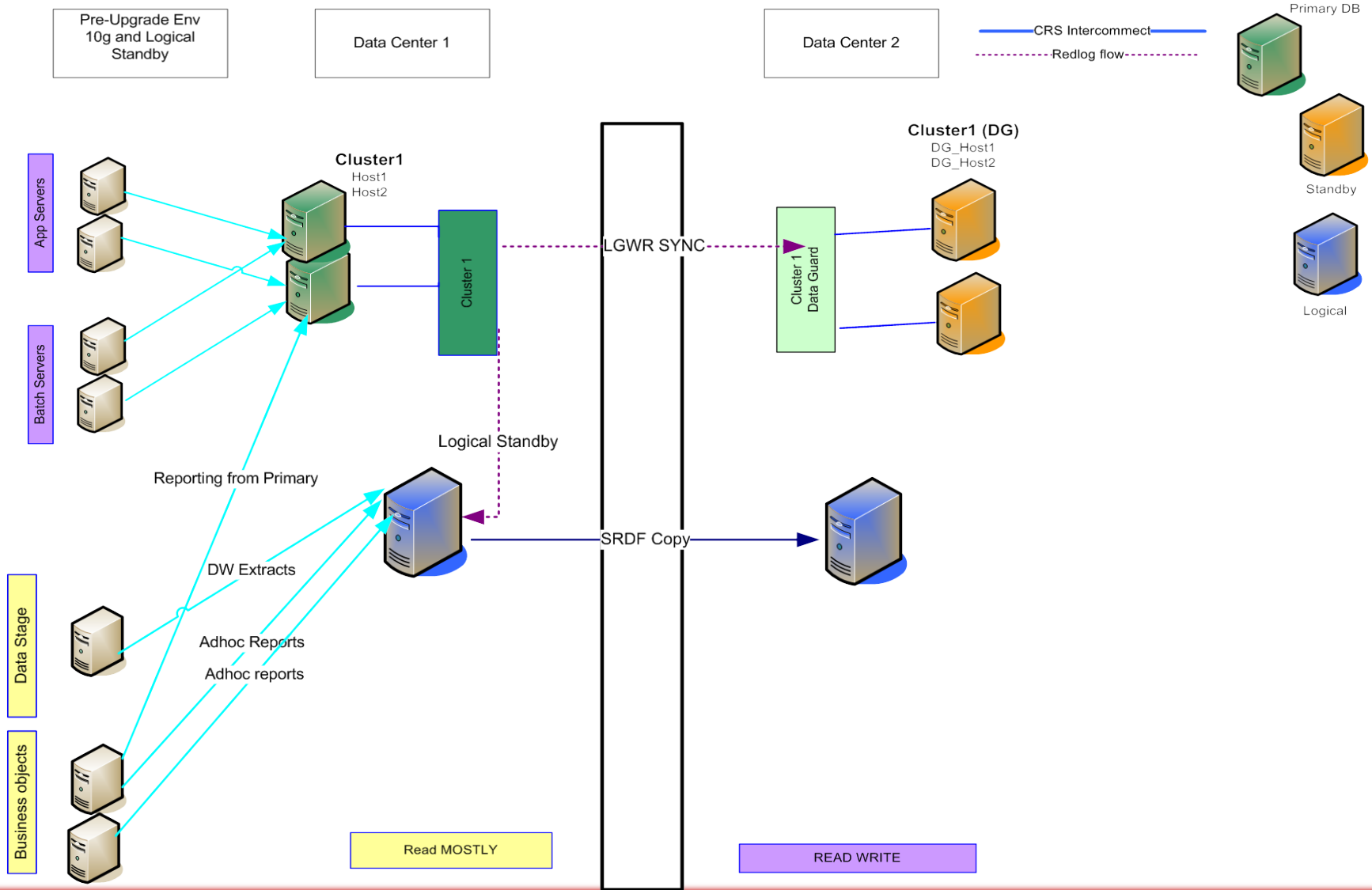
# Why Upgrade to 11g Release 2?

## Upgrade Drivers

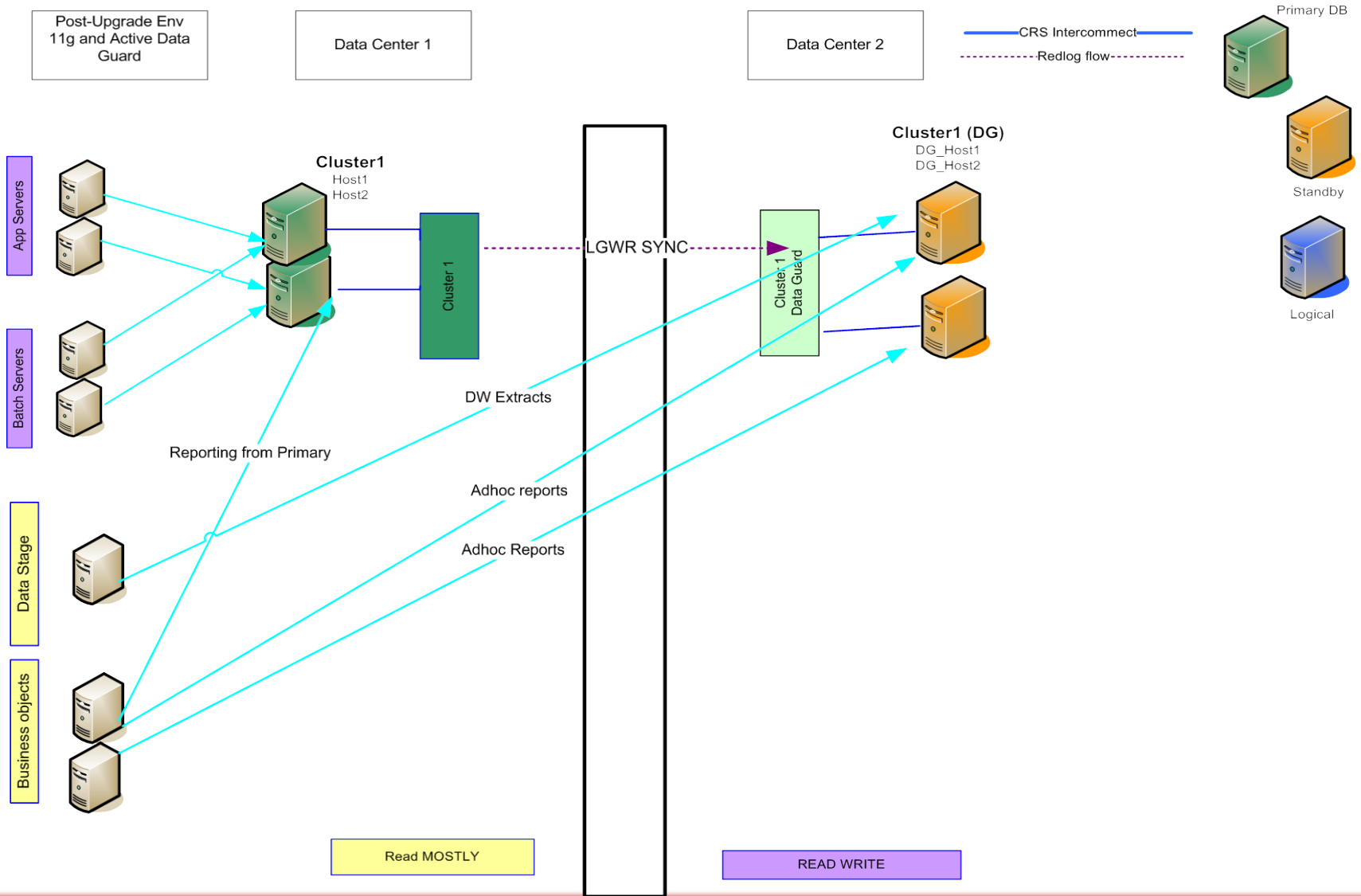
- Bring us up-to-date with Oracle Release
- Leverage disaster recovery hardware
- Cost reduction
- Database replay



# Pre-11g Upgrade Architecture



# Post Upgrade Architecture



# 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?

**YES!!**

# 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)?

## 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';`

# How Did We Do It (cont)?

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)

# SQL Performance, cont.

- 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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