Barr Pharmaceuticals:

Integrated strategies and capabilities to deliver successful global growth.
Use of DataGuard and Cold Failover Clusters

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Senior Manager, Database Administration, Barr Laboratories, Inc.
Agenda

- Who am I? and “Thank you’s.”
- What is Data Guard (DG), Oracle Standby Database (S/B) and Cold Failover Clusters (CFCs)?
- How we use DG and S/B.
- Tools.
- International Implementation.
- Large(ish) database.
- DG & CFC, not so perfect together.
Thank yous

• Thorsten from Oracle Support Germany
• My team:
  – Simay
  – Deepak
  – Tom
• The Croats:
  – Drago
  – Andrea
Quick Intro

• Data Guard (DG) is, essentially, a wrapper around Standby Database (SB) that makes SB easier to manage.
  – A standby database is: “A copy of a production (primary) database that you can use for disaster protection.¹”
  – “A Data Guard configuration consists of one production (primary) database and one or more standby databases²”

• A Cold Failover Cluster (CFC) is an Active-Passive Cluster, that is, a particular package can only run on one node in the cluster at a time.
  – It can best be explained by differentiating it from something like RAC: CFC solutions like Oracle FailSafe (OFS) and HP’s MC/ServiceGuard (MC/SG) allow quick failover without the huge license cost of RAC.
Quick Intro (2)

Standby

Primary — Archived redo logs are transferred over the network — Standby
Quick Intro (2)

Data Guard Configuration

Primary

Archived redo logs are transferred over the network

Standby
Tools

- **9iOEM:**
  - Data Guard Manager.

- **10gEMGC**
  - “Setup and Manage” option on the “Maintenance” tab for a database.

- **dgmgrl**
  - Command-line utility.
dgmgrl

```bash
spr3sbx2:oratru> dgmgrl
DGMGRL for HPUX: Version 10.2.0.2.0 - 64bit Production

Copyright (c) 2000, 2005, Oracle. All rights reserved.

Welcome to DGMGRL, type "help" for information.
DGMGRL> connect /
Connected.
DGMGRL> 
```
spr3sbx2:oratru> dgmgrl
DGMGR for HPUX: Version 10.2.0.2.0 - 64bit Production

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Welcome to DGMGR, type "help" for information.
DGMGR> connect /
Connected.
DGMGR> create configuration 'TRUSolution' as
> primary database is 'TRU_PR'
> connect identifier is TRU;
Configuration "TRUSolution" created with primary database "TRU_PR"
DGMGR>
dgmgrl

spr3sbx2:oratrut> dgmgrl
DGMGRl for HPUX: Version 10.2.0.2.0 - 64bit Production

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Welcome to DGMRL, type "help" for information.
DGMRL> connect /
Connected.
DGMRL> create configuration 'TRUSolution' as
> primary database is 'TRU_PR'
> connect identifier is TRU;
Configuration "TRUSolution" created with primary database "TRU_PR"
DGMRL> add database 'TRU_DR' as
> connect identifier is TRU_DR_SSH
> maintained as physical;
Database "TRU_DR" added
DGMRL>
dgmgrl

**ORACLE_SPR3SBX2.R2W - WRQ Reflection for UNIX and Digital**

**DGMGR> Show database verbose 'TRU_DR'**

**Database**
- **Name:** TRU_DR
- **Role:** PHYSICAL STANDBY
- **Enabled:** NO
- **Intended State:** OFFLINE
- **Instance(s):** TRU

**Properties:**
- `InitialConnectIdentifier` = 'tru_dr_ssh'
- `LogOptMode` = 'ARCH'
- `Dependency` = '
- `DelayMins` = '0'
- `Binding` = 'OPTIONAL'
- `MaxFailure` = '0'
- `MaxConnections` = '1'
- `ReopenSECS` = '10'
- `NetTimeout` = '180'
- `LogShipping` = 'ON'
- `PreferredApplyInstance` = '
- `ApplyInstanceTimeout` = '0'
- `ApplyParallel` = 'AUTO'

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9iOEM Data Guard Manager
9iOEM Data Guard Manager

Use Data Guard Manager to automate the tasks involved in setting up and managing a standby database environment. With Data Guard Manager, you can:

- Create multiple physical or logical standby databases.
- Switchover or failover to a standby database.
- Receive event notifications through email or pager.
- Scan configuration and database alert logs for errors.
- Monitor the performance of a configuration.

To get started, first review the setup requirements help topic, then click on the Create button in the toolbar.

To learn more about Data Guard, click the Quick Tour button.
9iOEM Data Guard Manager

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9iOEM Data Guard Manager
9iOEM Data Guard Manager
9iOEM Data Guard Manager
ORACLE Enterprise Manager 10g

Grid Control

Database Instance: ...

Home | Performance | Administration | Maintenance

The Administration tab displays links that allow you to administer database objects and initiate database operations inside an Oracle database. The Maintenance tab displays links that provide functions that control the flow of data between or outside Oracle databases.

High Availability

Backup and Recovery
- Schedule Recovery
- Perform Recovery
- Manage Current Backups
- Manage Restore Points
- Backup Agents

Backup Recovery Settings
- Backup Settings
- Recovery Settings
- Recovery Catalog Settings

Oracle Secure Backup
- Oracle Secure Backup Device and Media
- File System Backup and Restore

Data Guard
- Setup and Manage

Data Movement

Move Data
- Export Data
- Import Data
- Move Data from One Database
- Move Data from Datafiles
- Monitor Export and Import Jobs

Move Database Files
- Clone Database
- Transport Tablespaces

Software Deployments

Configuration
- Search
- Compare Configuration

Database Software Patching
- Apply Patch
- View Patch Cache
10gEMGC

Oracle Enterprise Manager 10g

Data Guard

Overview

Data Guard Status: Normal
Fast-Start Saver: Disabled

Primary Database

Name: 10gEMGC
Host: 10gEMGC

Standby Databases

Select Name | Host | Data Guard Status | Role | Last Received Log | Last Applied Log | Estimated Failover Time
---|---|---|---|---|---|---
10gEMGC | 10gEMGC | Normal | Physical Standby | 1696 | 1696 | 0 seconds

Standby Progress Summary

The transport lag is the time difference between the primary last update and the standby last received redo. The apply lag is the time difference between the primary last update and the standby last applied redo.
International Implementation

Archived redo logs are transferred over the network.
Large(ish) Database

Data Guard Configuration

Primary\textsuperscript{1} - Forest, Virginia
Primary\textsuperscript{2}

Archived redo logs are transferred over the network

Standby - Pomona, New York
DG and CFC, not so perfect together

Archived redo logs are transferred over the network.
DG and CFC, not so perfect together

Data Guard Configuration

Archived redo logs are transferred over the network

Primary¹

Primary²

Cold Failover Cluster

Standby
DG and CFC, not so perfect together

Archived redo logs are transferred over the network
RPO/RTO

- **RPO = Recovery Point Objective:**
  - The amount of data loss that is acceptable to the business.
  - While, in theory, this can be 0 and we’ve all heard of banks with painful RPOs, I’ve rarely seen it any more stringent than 4 hours

- **RTO = Recovery Time Objective:**
  - How long the application can be unavailable to the business.
  - Again, this can also be 0, but I’ve rarely seen RTOs less than 24 hours.
Rebuilding DG after OFS fails over

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Rebuilding DG after OFS fails over
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Rebuilding DG after OFS fails over
Switchover in an OFS/DG Configuration
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Switchover in an OFS/DG Configuration

Oracle Enterprise Manager (TNS3P8UTT) - Processing: Failover - Microsoft Internet Explorer

Grid Control

ORACLE Enterprise Manager 18g

@ Processing: Failover

Failing over to TWOF5_PSB1.BARRLABS.COM

This process takes some time. The page automatically returns to the Data Guard overview page upon completion.

Click on the alert log link to view progress details in a new browser window.

View alert log: TWOF5_PSB1.BARRLABS.COM TWOF5_PSB1.BARRLABS.COM

Performing failover

Restarting primary database

Waiting for failover to complete

TIP: This process cannot be cancelled. It will continue even if the browser window is closed.
Switchover in an OFS/DG Configuration
References

1. [http://download.oracle.com/docs/cd/B19306_01/server.102/b14220/glossary.htm#sthref4216](http://download.oracle.com/docs/cd/B19306_01/server.102/b14220/glossary.htm#sthref4216)
2. [http://download.oracle.com/docs/cd/B19306_01/server.102/b14239/concepts.htm#i1033723](http://download.oracle.com/docs/cd/B19306_01/server.102/b14239/concepts.htm#i1033723)
3. MetaLink Notes:
   - Note# 259902.1, Oracle 9i Data Guard and Oracle Fail Safe
   - Note# 413696.1, Data Guard Broker does not support Cold Failover Clusters

   A number of the slides came from instructions developed by me and my team so that we could repeatably perform tasks with DG &, most especially, with CFCs!
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