DataGuard DOs and DONTs
About me

Oracle DBA since 2000 and Version 7.3.4
Certified Professional 10g, 11g
RAC / Cluster Certified Expert 10g, 11g, 12c
Oracle ACE
@DBAMarco
dbamarco.wordpress.com
The Range of Services of Robotron with branch-specific Expertise

- Methodical and technological responsibility
- Comprehensive expertise of industry-specific business processes
Why Data Guard

- Oracle Database Appliance X[6|7]-2/SML has redundancy for
  - Storage
  - Power Supply
  - Networking
- X[3-7]-2HA add redundancy for
  - Server
- But it is in one Rack
  - Outage of compute center is not covered
- Business critical applications needs to be replicated to 2nd datacenter
  - Data Guard to 2nd ODA
Why Data Guard

DataGuard

Datacenter A

Datacenter B
Why Data Guard

Datacenter A ➔ DataGuard ➔ Datacenter B

Experts for database solutions.
Why Data Guard

Datacenter A

Datacenter B
Agenda

1. Why Data Guard
2. Naming
3. Setup
4. Creating Standby
5. Configuration
6. Networking
Naming

- What do we have to name?

- database name - forms the database as a set of datafiles
- instance name - identifies the processes
- database unique name - distinguishes different roles of same database
- service name - abstraction layer for applications
- ORACLE_SID - gets us the startup parameters (SPfile / init.ora)
- global name - used for database links
Naming

<table>
<thead>
<tr>
<th>Service Name</th>
<th>Instance Name</th>
<th>DB Unique Name</th>
<th>DB Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACMESVC</td>
<td>ACMEA1</td>
<td>ACMEA</td>
<td>ACME</td>
</tr>
<tr>
<td></td>
<td>ACMEA2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ACMEB1</td>
<td>ACMEB</td>
<td>ACME</td>
</tr>
<tr>
<td></td>
<td>ACMEB2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Datacenter A

Datacenter B
Agenda

- Why Data Guard
- Naming
- Setup
- Creating Standby
- Configuration
- Networking
Setup

- PSU vs Bundle Patches
  - Don’t mix, go with one → preferred: BPs

- Mixed Oracle Version support with Data Guard Redo Transport Services (Doc ID 785347.1)
  - Note: Starting with 11.2.0.1 it is possible to have a Physical Standby at a higher Patchlevel (Patch, CPU, PSU, BP) when the README of the Patch states that it is valid for Standby First Patching

- Oracle Patch Assurance - Data Guard Standby-First Patch Apply (Doc ID 1265700.1)
  - Data Guard is completely independent from anything under the database, so you can run different versions of the operating system, Oracle Clusterware, hardware, or storage Software across different sites with no restrictions on versions or time.
  - The maximum supported duration to have different database home software between primary and standby is 31 days.
Setup

- Prepare source database as much as possible
  - Prepare database naming
    - DB_NAME
    - DB_UNIQUE_NAME
    - DB_DOMAIN
    - GI resource: srvctl add database -db <DB_UNIQUE_NAME> -dbname <DB_NAME>
  - Enable Archivelog
  - Activate Force Logging
  - Create appropriate Redo Logs and Standby Redo Logs
  - Use OMF if possible
    - Oracle will create unique directories like .../oradata/<db_name>/<db_unique_name>
Prepare source database as much as possible

- Set all necessary init parameters, especially
  - **DB_BLOCK_CHECKING** MEDIUM (FULL if performance allows it)
    performs logical checks on data blocks (and index blocks in FULL mode)
  - **DB_BLOCK_CHECKSUM** TYPICAL (FULL for inmemory checksum, performance impact)
    computes checksums for data and log blocks before writing
  - **DB_LOST_WRITE_PROTECT** TYPICAL
    record cache reads for r/w tablespaces in Redolog, SCNs can be compared
  - **STANDBY_FILE_MANAGEMENT** AUTO
    automatically create files on standby DBs
Setup – ODA HA specific

- DO NOT enable Flashback Database
  - +DATA diskgroup uses outer (fast) partition
  - +FRA diskgroup uses inner (slow) partition
  - Flashback Logs are bound to use FRA

- competing I/Os on +DATA and +FRA
  - lot of head movement → increasing I/O times
  - Performance impact

- This limitation has been lifted in X6-2HA!
Workaround
- Configure FRA to be elsewhere
- Configure Archivelog destination to be on +FRA
→ policies for automatic deletion of Archivelogs do not work anymore

<table>
<thead>
<tr>
<th>Syntax Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCHIVELOG DELETION POLICY</td>
<td>Determines when archived redo log files are eligible for deletion. The archived log deletion policy applies to all log archiving destinations, including the fast recovery area. The policy does not apply to archived redo log files in backup sets. Only archived redo log files in the fast recovery area are automatically deleted by the database. You can execute the BACKUP ..., DELETE ... OUTFILE, DELETE ARCHIVELOGS, or DELETE OBSOLETE commands to delete logs manually from log archiving destinations, including the recovery area. If FORCE is not specified on the deletion commands, then these deletion commands obey the archived log deletion policy. If FORCE is specified, then the deletion commands ignore the archived log deletion policy. In the recovery area, the database retains logs eligible for deletion if possible. The database deletes the oldest logs first when disk space is required. When the recovery area is under disk pressure, the database may delete archived redo log files needed by Oracle Streams.</td>
</tr>
</tbody>
</table>
Agenda

- Why Data Guard
- Naming
- Setup
- Creating Standby
- Configuration
- Networking
Creating Standby

- Prepare Auxiliary
  - Create Database Home with appropriate version and patches
  - Prepare Storage
    - adump directory
    - Datafiles
    - FRA
    - ...
  - Prepare Listener for remote startup of auxiliary instance
  - Create temporary password file
Creating Standby

- Use RMAN DUPLICATE FOR STANDBY
  - Set and Reset all Parameters
  - Duplicates even Password File

- Register database with clusterware
  - `srvctl add database -db <DB_UNIQUE_NAME> -dbname <DB_NAME>`

- Check Configuration
  - Flashback Database (always OFF after duplicate)
  - Parameters
  - Standby Redologs
  - Logging Mode
Agenda

- Why Data Guard
- Naming
- Setup
- Creating Standby
- Configuration
- Networking
Use Easy Connect

- Prevents TNSNAMES.ORA misconfiguration

DGMGRL> create configuration orcl as
> primary database is <primary_unique_name>
> connect identifier is '<primary scan name>:<port>/<primary_service_name>';

DGMGRL> add database <standby_unique_name>
> as connect identifier is '<standby scan name>:<port>/<standby_service_name>'
> maintained as physical;

- Once the configuration is in place use „dgmgrl“ only
do not use „alter system“ anymore
→ prevents inconsistencies
Use RMAN catalog

Set Archive Log Deletion Policy in RMAN

```sql
configure archivelog deletion policy to shipped to [all] standby for db_unique_name <primary unique name>;

configure archivelog deletion policy to applied on [all] standby for db_unique_name <standby unique name>;
```
Add standby database to srvctl with appropriate start option (MOUNT)
  - Prevents licensing issues

Grid Infrastructure changes start option automatically during switchovers

```
srvctl add database -db <standby unique name>
    -oraclehome <ORACLE_HOME> -dbtype [RAC | SINGLE]
    -domain <domain> -role PHYSICAL_STANDBY
    -startoption MOUNT
```
Agenda

- Why Data Guard
- Naming
- Setup
- Creating Standby
- Configuration
- Networking
Use separate service

- Create service on primary as well as on standby
- Grid Infrastructure takes care of starting the service, depends on database role

```
srvctl add service -db <unique name> -service <service name> -role primary -failoverttype SELECT -failovermethod BASIC -cardinality uniform -failoverdelay 180 -failoverretry 5
```

```
srvctl start service -db <primary unique name> -service <service name>
```
Networking

- Add Description List to TNSNAMES.ORA entry and use service name

```xml
<TNS alias>=
  (DESCRIPTION_LIST=
    (LOAD_BALANCE=off)
    (FAILOVER=on)
    (DESCRIPTION=
      (CONNECT_TIMEOUT=5)(TRANSPORT_CONNECT_TIMEOUT=3)(RETRY_COUNT=3)
      (ADDRESS_LIST=
        (LOAD_BALANCE=on)
        (ADDRESS=(PROTOCOL=TCP)(HOST=<primary scan>)(PORT=1521))
      )
      (CONNECT_DATA=(SERVICE_NAME=<service name>))
    )
  )
  (DESCRIPTION=
    (CONNECT_TIMEOUT=5)(TRANSPORT_CONNECT_TIMEOUT=3)(RETRY_COUNT=3)
    (ADDRESS_LIST=
      (LOAD_BALANCE=on)
      (ADDRESS=(PROTOCOL=TCP)(HOST=<standby scan>)(PORT=1521))
    )
    (CONNECT_DATA=(SERVICE_NAME=<service name>))
  )
)
Networking

- Use separate network for Data Guard
  - Separate REDO traffic from public LAN
  - Bandwidth Test with OraTcpTest (MOS 2064368.1)
Networking

- How to add a network
  - Add network: `srvctl add network`
  - Add additional VIPs: `srvctl add vip`
  - Add and start local listeners: `srvctl add listener` `srvctl start listener`
  - Add additional scan name: `srvctl add scan`
  - Add and start scan listener: `srvctl add scan_listener` `srvctl start scan_listener`

- Don’t touch any *listener parameters
  - Grid Infrastructure sets all these

- Use scan name of Data Guard network for creating the configuration
<table>
<thead>
<tr>
<th>DOs</th>
<th>DONTs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use Compute Center Identifier in DB_UNIQUE_NAME</td>
<td>Use PRIM and STBY in any of the names (the systems might change roles, then naming will be complete nonsense)</td>
</tr>
<tr>
<td>Use UPPERCASE naming (especially when using OMF)</td>
<td></td>
</tr>
<tr>
<td>Use extra Service for application connects (make them start only when DB has PRIMARY role)</td>
<td>Use default services for application connects (this results in nasty errors when roles change)</td>
</tr>
<tr>
<td>Define sites as multiple DESCRIPTIONs in TNSNAMES.ORA</td>
<td>Specify multiple ADDRESSes for sites in TNSNAMES.ORA</td>
</tr>
<tr>
<td>Make use of extra network interfaces to separate traffic</td>
<td>Set any *listener parameter manually</td>
</tr>
</tbody>
</table>
## Summary – DOs & DON’Ts

<table>
<thead>
<tr>
<th>DOs</th>
<th>DON’Ts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use Grid Infrastructure resource management and register DB with Appliance</td>
<td>Manage standby database manually</td>
</tr>
<tr>
<td>Set all necessary parameters BEFORE creating DG configuration</td>
<td>Modify parameters in databases once DG configuration is in place</td>
</tr>
<tr>
<td>Create Redo Logs and Standby Redologs for every Thread, all equally sized – BEFORE creating the Standby</td>
<td></td>
</tr>
<tr>
<td>Configure proper start option for participating databases according to licensing</td>
<td>Let all participating databases open automatically</td>
</tr>
<tr>
<td>Stick to commands of appliance kits</td>
<td>Manually install database software</td>
</tr>
<tr>
<td>Use default (FRA) for Archived Logs</td>
<td>set any LOG_ARCHIVE_DEST* parameter</td>
</tr>
<tr>
<td>Set all init parameters to appropriate values</td>
<td>enable Flashback Database (unless you have a really good reason)</td>
</tr>
</tbody>
</table>
Marco Mischke
Lead Consultant Oracle Support

@DBAMarco
dbamarco.wordpress.com

+49 351 25859-2884
marco.mischke@robotron.de

www.robotron.de

Questions?