

RMAN with ZDLRA at Exelon

Who am I?

- Been a DBA since 1992 – Oracle 6.0.7
- Various development and Unix System Administration
- From Denmark. Immigrated to the US in 1996.
Became a US Citizen in 2015
- Worked in a variety of industries like travel, TV,
online gambling and energy
- Currently a DBA Engineer for Exelon Corp. since 2007

Who We Are



Generation

One of the largest U.S. competitive power generators
32,000 MW of owned capacity
Largest U.S. nuclear fleet
Renewables - wind and solar

Competitive Energy Sales

Retail and wholesale sales through Constellation
Approximately 2.5 million residential, public sector and business customers

Transmission and Delivery

Three utilities delivering electricity and natural gas to more than 7.8 million customers:

- BGE in Maryland
- ComEd in Illinois
- PECO in Pennsylvania

Oracle at Exelon

- 2000+ databases total. 320+ production
- DB size ranging from 5GB to 170TB
- Backups to 10 ZDLRA's
 - 4 are project specific
 - 2 are for non-prod
- Replication of all database backups to alternate data center for protection

ZDLRA migration reasons

- Old backup hardware was ready for retirement
- Dollar per protected GB was competitive with other solutions
- Need to minimize Data Loss in protected databases
- Weekly backup sizes are smaller and have much less impact on databases

ZDLRA – Reduction in volume

- ZDLRA only does 1 full backup and then incremental backups for life.
- On average Exelon's incremental backups are 2% of the total database size
 - Huge reduction in IO on local database server
 - Huge reduction in network traffic
 - Huge space savings from only storing 1 full backup
 - No CPU overhead on the local database server from compression. ZDLRA takes care of that.

RMAN Parameter configuration with ZDLRA

```

RMAN> CONFIGURE DEFAULT DEVICE TYPE TO 'SBT_TAPE';

RMAN> CONFIGURE DEVICE TYPE 'SBT_TAPE' PARALLELISM 8 BACKUP TYPE
TO BACKUPSET;

RMAN> CONFIGURE CHANNEL DEVICE TYPE 'SBT_TAPE' FORMAT '%d_%U'
PARMS  "$ORACLE_HOME/dbs/libra/libra.so,
ENV=(RA_WALLET='location=file:$ORACLE_HOME/network/admin
credential_alias=baltimore-ingest-
scan:1521/baltimore:dedicated')";

RMAN> CONFIGURE ARCHIVELOG DELETION POLICY TO SHIPPED TO ALL
STANDBY BACKED UP 1 TIMES TO 'SBT_TAPE';

```

Database Redo Real Time Transport to ZDLRA

- Database sends redo stream to ZDLRA as a log archive destination.
- Database Uses Oracle Wallet to store credentials for connecting to ZDLRA

```
RMAN> log_archive_dest_5='SERVICE="baltimore-ingest-  
scan:1521/baltimore:dedicated", VALID_FOR=(ALL_LOGFILES,  
ALL_ROLES) ASYNC DB_UNIQUE_NAME=baltimore'
```


Oracle Wallet Setup to ZDLRA

```
sqlnet.ora:
```

```
SQLNET.WALLET_OVERRIDE = true  
WALLET_LOCATION = (SOURCE = (METHOD = FILE) (METHOD_DATA =  
(DIRECTORY =$ORACLE_HOME/network/admin ) ) )
```

```
Wallet content:
```

```
$ mkstore -wrl =$ORACLE_HOME/network/admin -listCredential  
Oracle Secret Store Tool : Version 12.1.0.2  
Copyright (c) 2004, 2014, Oracle and/or its affiliates. All  
rights reserved.
```

```
List credential (index: connect_string username)
```

```
1: baltimore-ingest-scan:1521/baltimore:dedicated ravpc1
```

RMAN Sample backup script to ZDLRA

```
RMAN> connect target /  
  
RMAN> connect catalog /@ baltimore-ingest-  
scan:1521/baltimore:dedicated  
  
RMAN> backup incremental level 1 cumulative section size 64g  
filesperset=1 database;
```

Archivelogs should already be backed up via Real Time Transport but otherwise a simple script can handle that:

```
RMAN> backup archivelog all delete all input;
```

RMAN Sample restore script from ZDLRA

```
RMAN> connect target /  
  
RMAN> connect catalog /@ baltimore-ingest-  
scan:1521/baltimore:dedicated  
  
RMAN> restore database;  
  
RMAN> recover database;
```

RMAN Sample database clone build script from ZDLRA

```
RMAN> connect target sys/change_on_install@PROD

RMAN> connect auxiliary /

RMAN> connect catalog /@ baltimore-ingest-
scan:1521/baltimore:dedicated

RMAN> run {
ALLOCATE AUXILIARY CHANNEL c1 DEVICE TYPE sbt_tape
PARMS='SBT_LIBRARY=$ORACLE_HOME/dbs/libra/libra.so,ENV=(RA_WALLET='
location=file:$ORACLE_HOME/network/admin
credential_alias=baltimore-ingest-scan:1521/baltimore:dedicated')'
FORMAT'%U_%d';

set until time "to_date('10/01/2018','MM/DD/YYYY)";
DUPLICATE TARGET DATABASE TO 'TEST';
}
```

RMAN Sample standby database build script from ZDLRA

```
RMAN> connect auxiliary /
RMAN> connect catalog /@ baltimore-ingest-
scan:1521/baltimore:dedicated
RMAN> run {
set DBID 123456789
ALLOCATE AUXILIARY CHANNEL c1 DEVICE TYPE sbt_tape
PARMS='SBT_LIBRARY=$ORACLE_HOME/dbs/libra/libra.so,
ENV=(RA_WALLET='location=file:$ORACLE_HOME/network/admin
credential_alias=baltimore-ingest-scan:1521/baltimore:dedicated')'
FORMAT'%U_%d';
DUPLICATE DATABASE PROD FOR STANDBY DORECOVER NOFILENAMECHECK;
}
```

Summary

- ZDLRA and RMAN makes backups and restores very easy
- In Exelon's case (35 day retention)
 - IO and CPU savings by not reading and compressing **360TB/week** of database files for full backups
 - Network traffic savings of **55TB/week** from not performing full backups (62TB compressed backup vs. 7TB incremental)
 - Backup media savings of **244TB** from only storing 1 full backup