



TDS: Empowering the Broadband Generation



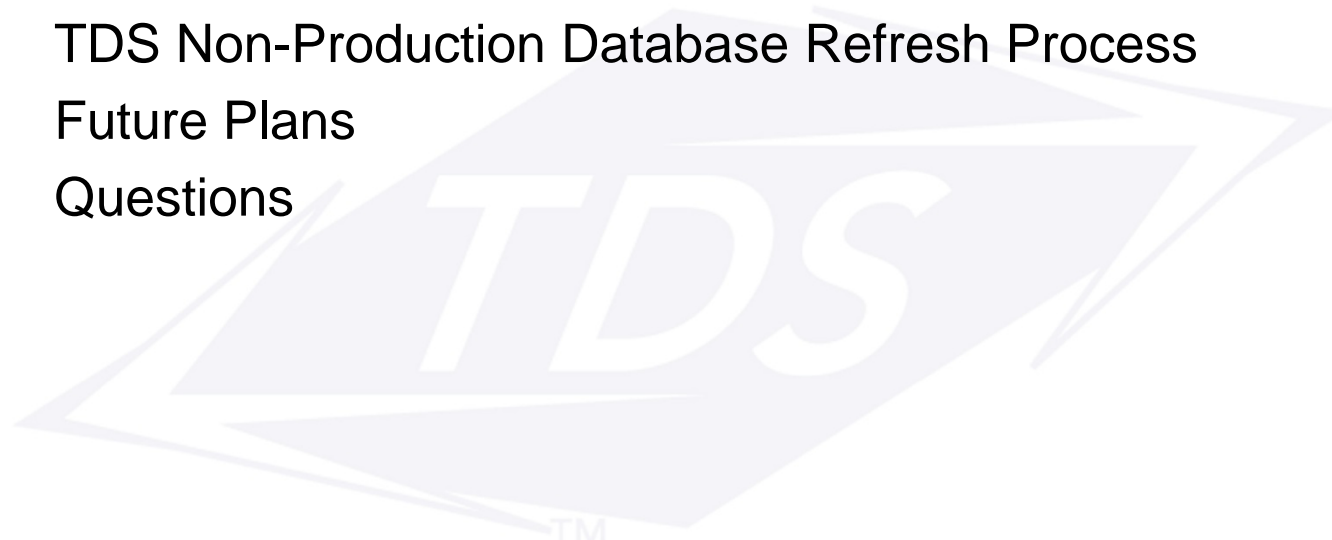
Building and Maintaining Non-Production Databases using Oracle Recovery Manager

Presented By:
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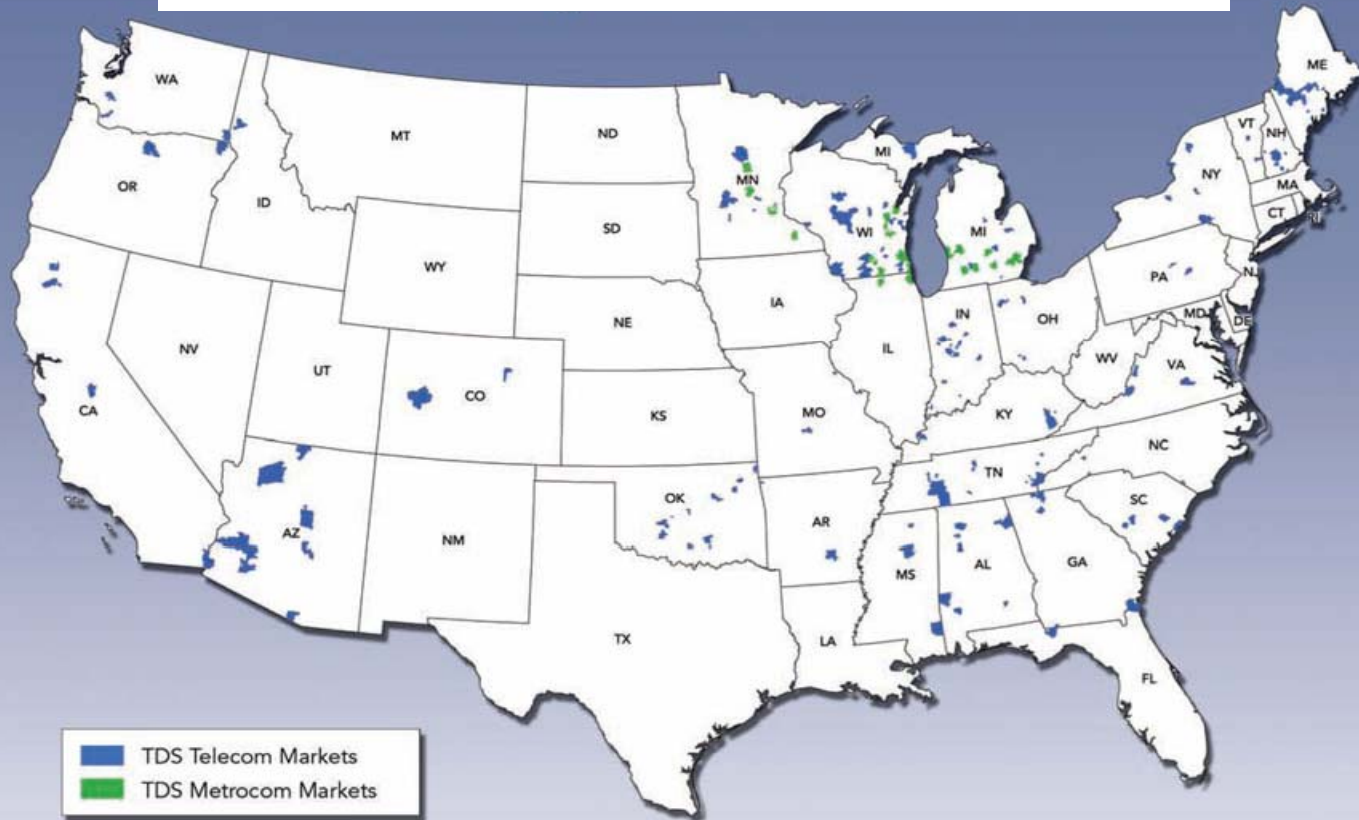
Agenda

- Who is TDS?
- Why we use Recovery Manager (RMAN)
- TDS Non-Production Database Refresh Process
- Future Plans
- Questions





More than 1.1 million lines in service nationwide



**TDS is the 7th largest telecom provider in U.S.
Connects business and residential customers with phone, Internet
and TV services in 30 states.**



Production Oracle Database Infrastructure

- 2 High performance Database Machine quarter racks
 - Went live January 2011
- 1 TDS designed 11g RAC until 2014
 - Supports “primary” 10g databases
 - Will be replaced by high performance quarter rack
- 1 Standalone Linux server
 - Used for databases that don’t support RAC
- 3-node Solaris non-RAC cluster
 - Used for application that required non-RAC clustering
- Databases are Data Guarded between RACs
 - 10g Standby’s run on Database Machine
- 8 TB of data
- 66 Databases



Non-Production Oracle Database Infrastructure

- Non-Production
 - 1 High capacity Database Machine quarter rack
 - 1 TDS designed 11g RAC in until 2014
 - Will be replaced by high capacity quarter rack
 - 1 Standalone Linux server
 - Used for databases that don't support RAC
 - 3-node Solaris(VERITAS) non-RAC cluster
 - Used for application that required VERITAS clustering
- 21 TB of data
 - We average, 3 TB of data refreshed from production each week
- 130 Databases



Why we use Recovery Manger

- Minimizes Production Risk for Refresh Process
 - Using our process, DBAs are unable to reverse the direction of the refresh
 - If process is not properly followed, Oracle RMAN returns an error when you try to connect to the production database as “auxiliary”
- No Additional Load on Production for Refresh Process
 - Executed on non-production hardware
 - Uses nightly production backups to disk
- Integrated with Automatic Storage Management (ASM)
- Provides Verification of our Backups



TDS Refresh Process

- **New Non-Production Database**
 1. Use documented process to create database using dbca
 2. Follow process for refreshing existing non-production database

- **Refresh Existing Non-Production Database**
 1. Prepare database for refresh
 2. Refresh the database
 3. Post refresh tasks



TDS Refresh Process

Prepare Non-Production Database for Refresh

1. Save the SQL to recreate all database links
2. Save any other objects that are required
3. Verify that Fast Recovery Area is large enough
4. Verify init.ora settings for your environment
 - For example
 - db_file_name_convert should not be set
 - log_file_name_convert should not be set
5. Set cluster_database to false
6. Stop database
7. Use asmcmd to remove old data files
8. Start database in “no mount” mode



TDS Refresh Process

Refresh Non-Production Database

1. Setup environment for database being refreshed
2. Run RMAN on non-production database server
3. Connect to production database
 - connect target sys/sys@ProdDB
4. Connect to the non-production database (DevDB)
 - connect auxiliary /
5. Connect to the RMAN catalog
 - connect catalog rman/rman@CatDB
6. Refresh the database
 - duplicate target database to DevDB until time <Current Time - 4 hours>



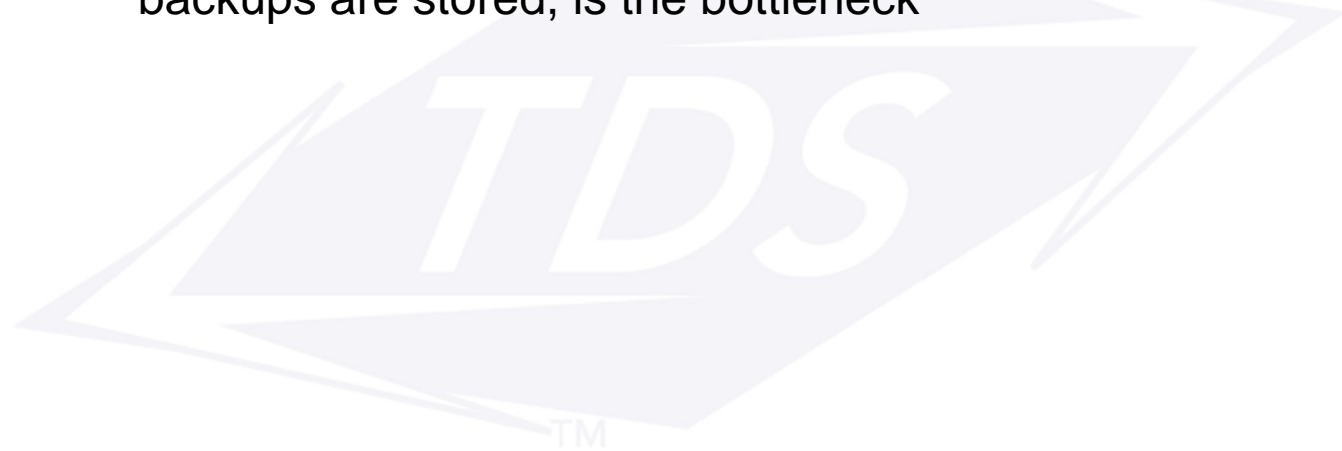
TDS Refresh Process Post Refresh Tasks

1. Set cluster_database to true
2. Reset all passwords to non-production values
3. Use saved SQL to recreate all database links
4. Use saved objects to recreate all required objects
5. Execute data masking scripts



TDS Refresh Process How long does it take

- 1 hour of DBA time per refresh
- 4 hours elapsed for 750 GB database
 - Currently network bandwidth to the NAS, where the backups are stored, is the bottleneck





Future Plans

- Automate Refresh Process using Grid Control Job
 - Reduce DBA time required for a refresh
- Implement the Oracle Grid Control Data Masking Pack
 - Improve the manageability of the data masking process
- Move backup location to InfiniBand connected NAS
 - Reduce the elapsed time for a refresh



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Questions