

# Data in the Stream

## Integrating Oracle Streams and DataGuard

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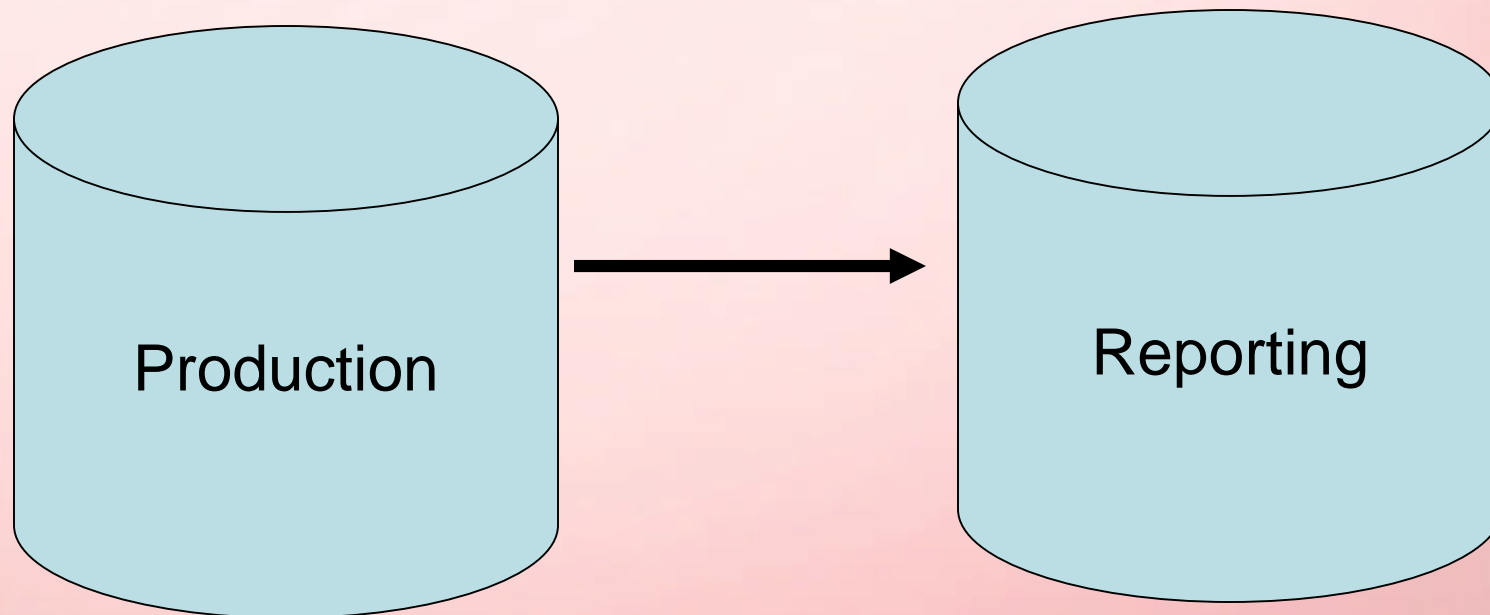
BURLESON  
CONSULTING

# Oracle Replication - Why

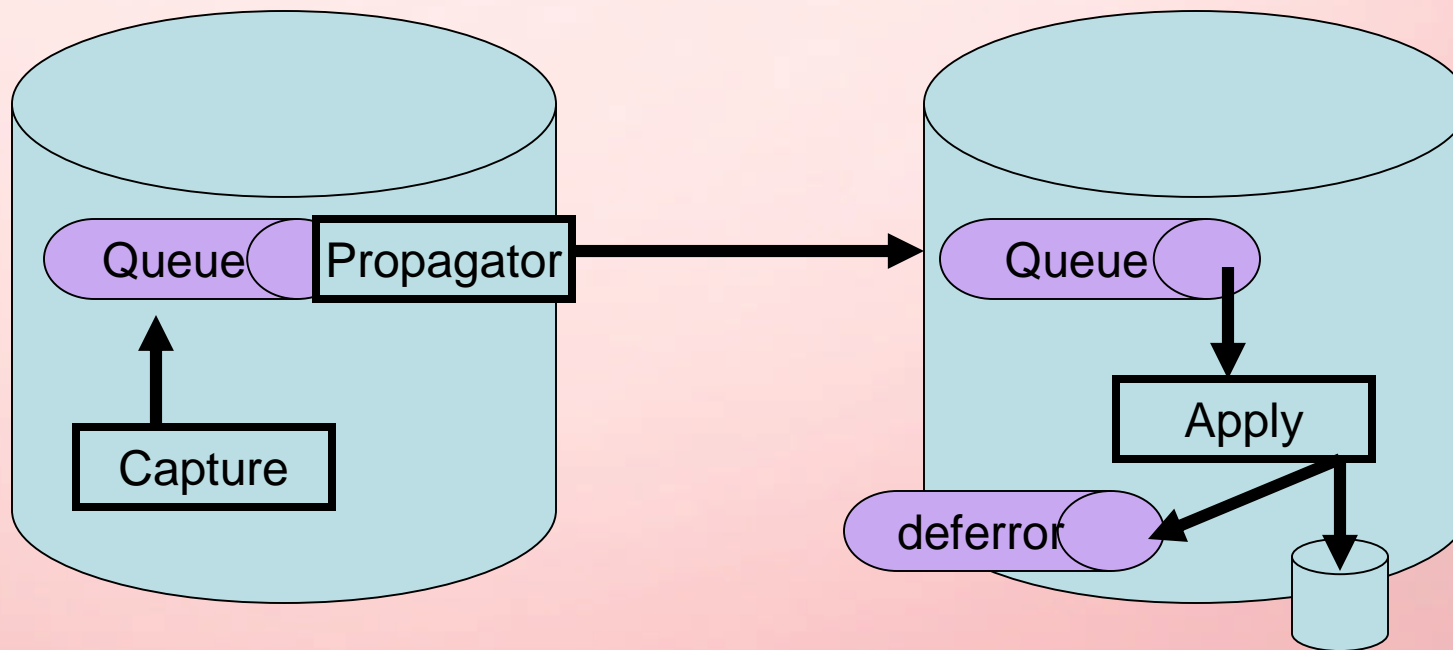
- Share data to remote locations.
- Offload heavy SQL from the primary database.
- Data Availability
- Data Protection



# Oracle Streams



# Streams Components

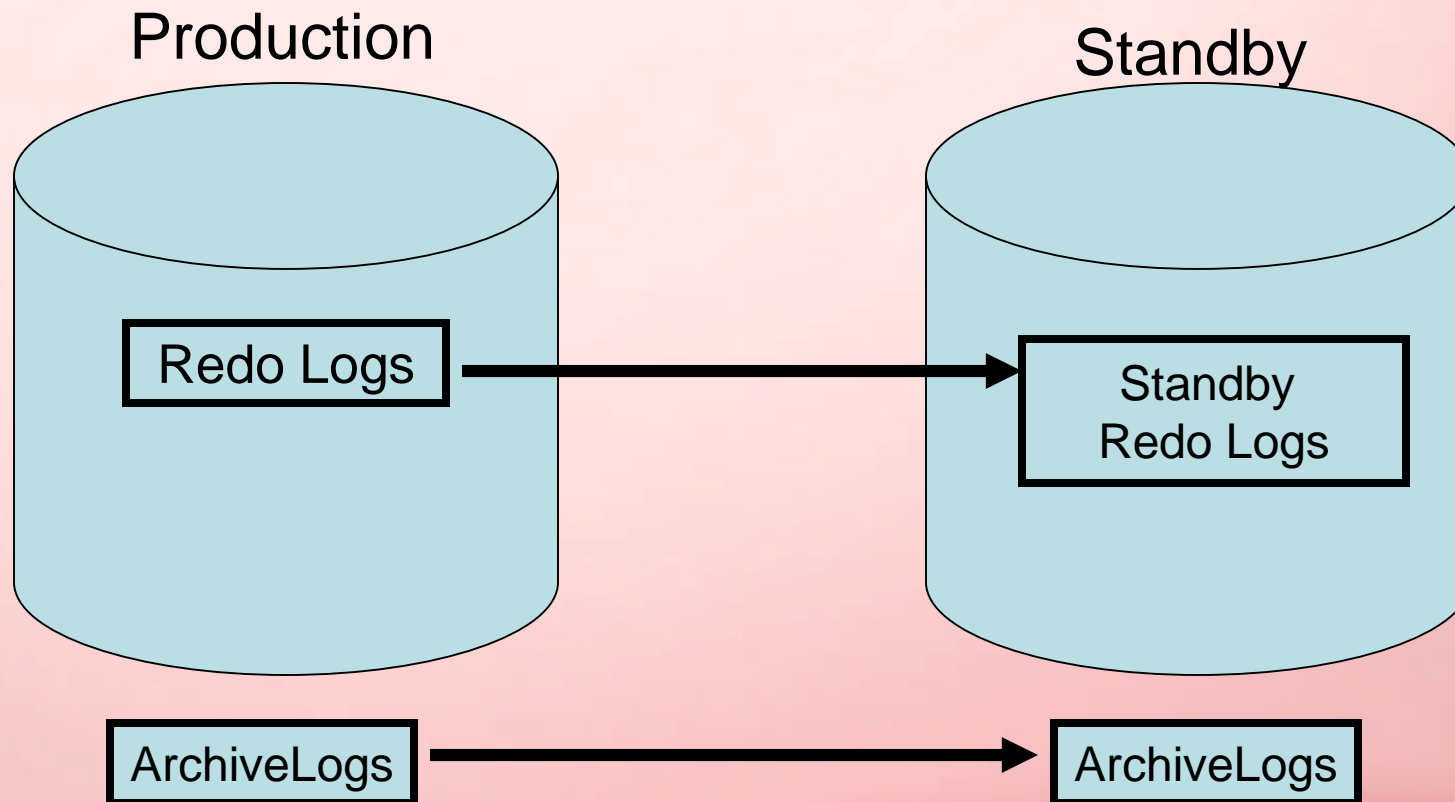


# Oracle DataGuard

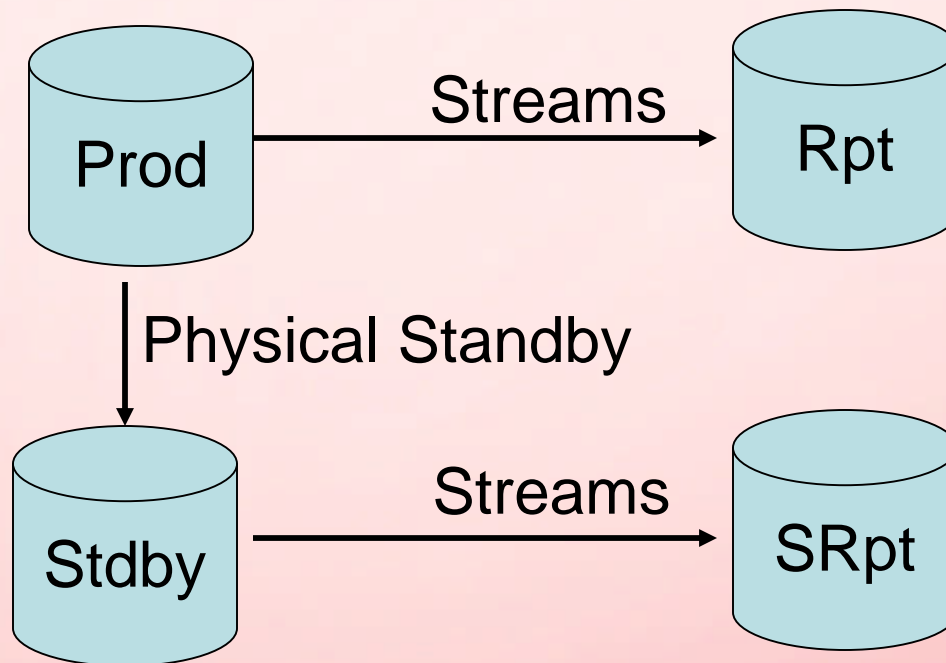
- Physical Standby
- Logical Standby (like Streams)
- Manual Standby (not DataGuard)
- Active Standby (11g)



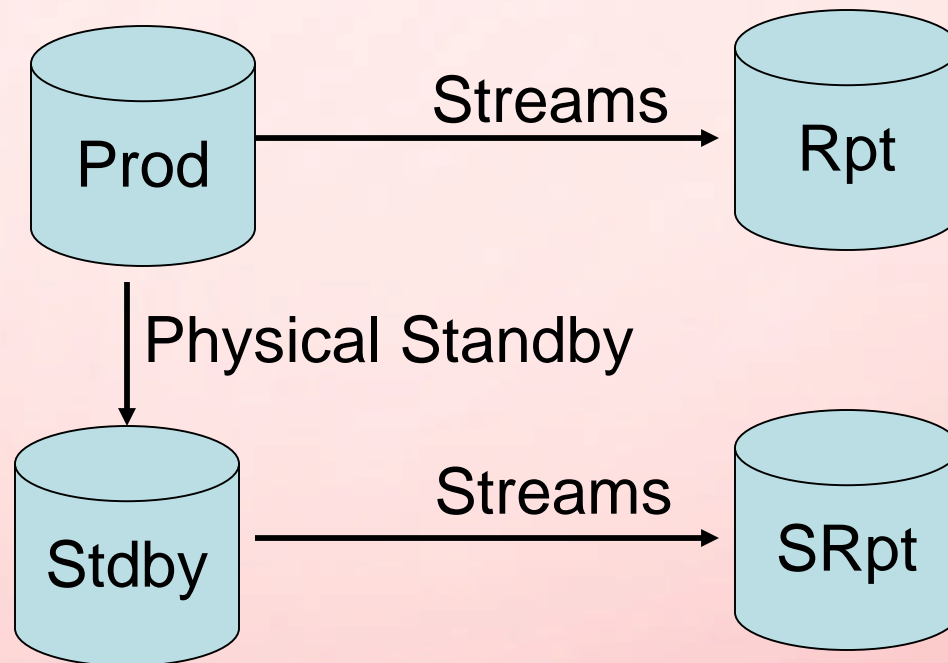
# DataGuard Components



# Integrating the Two is Easy...



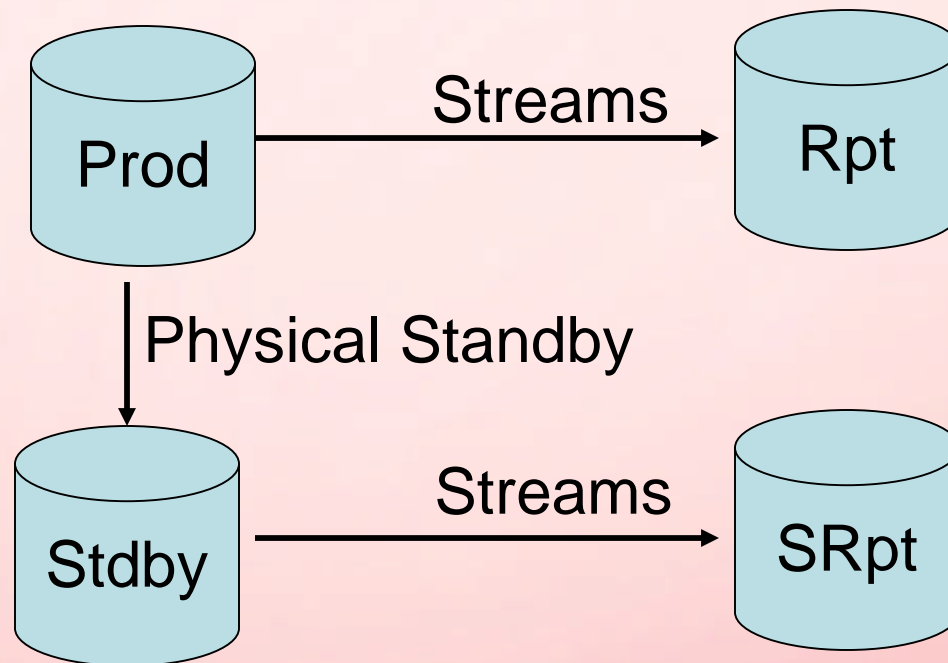
# Integrating the Two is Easy...



When PROD Fails,  
Failover to Stdby  
Report off the StdbyRPT

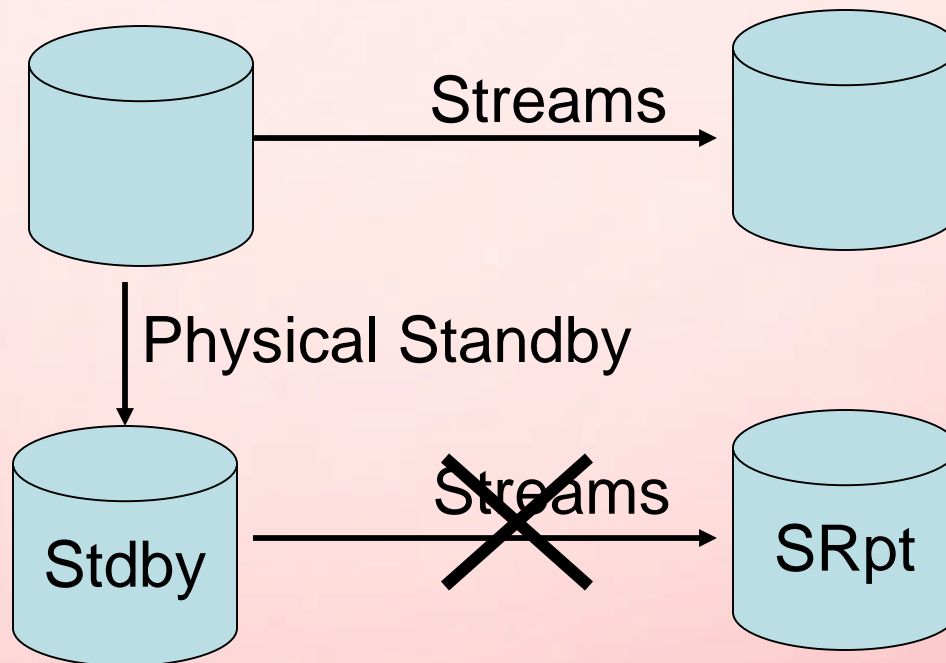


# Integrating the Two is Easy...



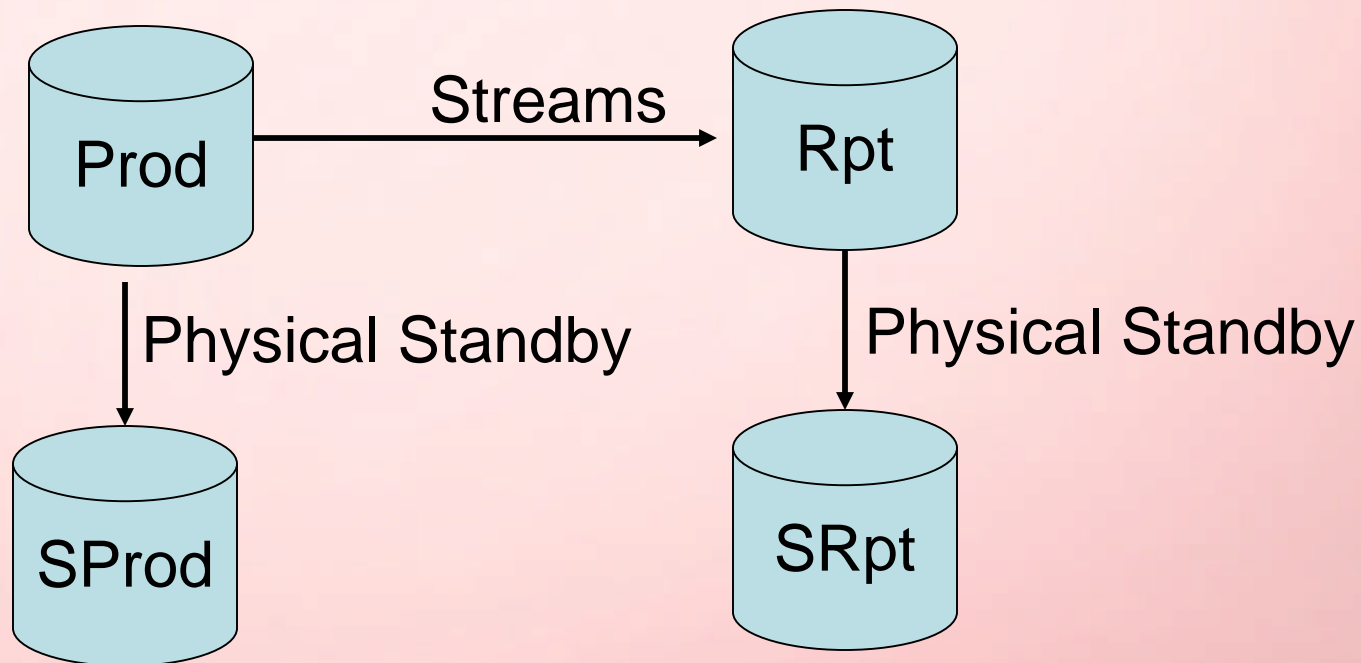
...Except it will not work!!!

# Integration Problems



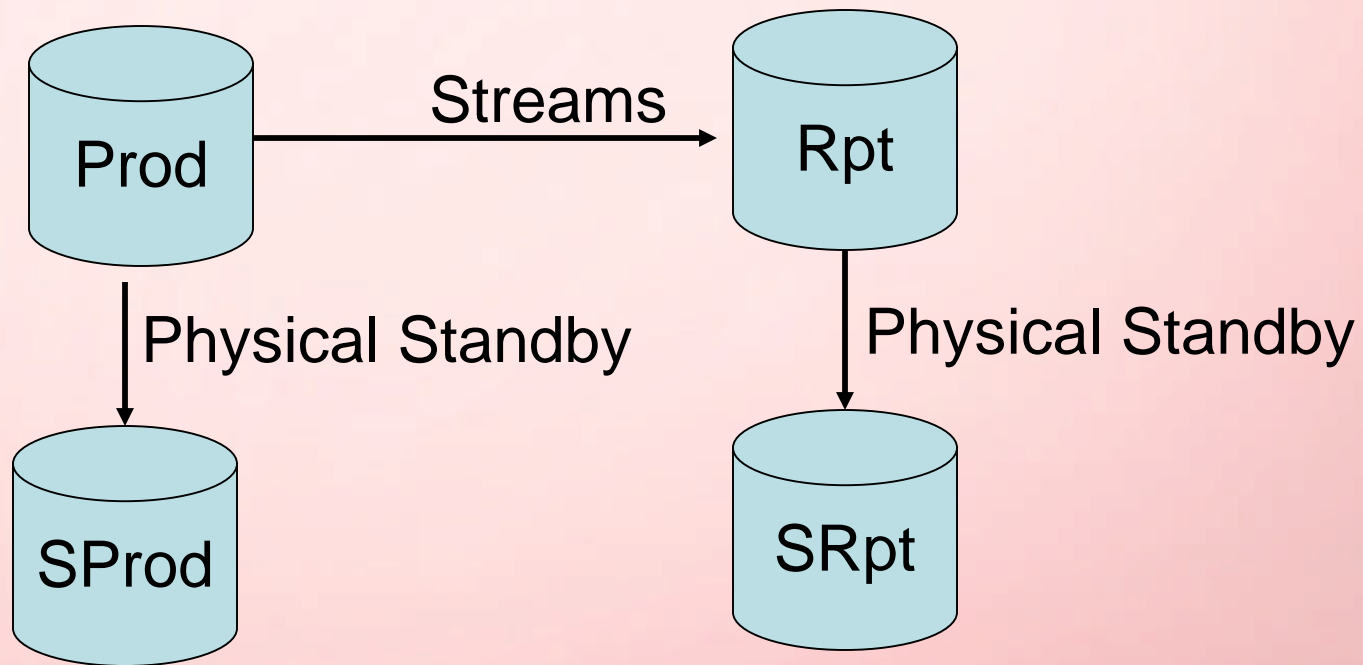
You can not Stream from a database that is not open.

# Integration Problems

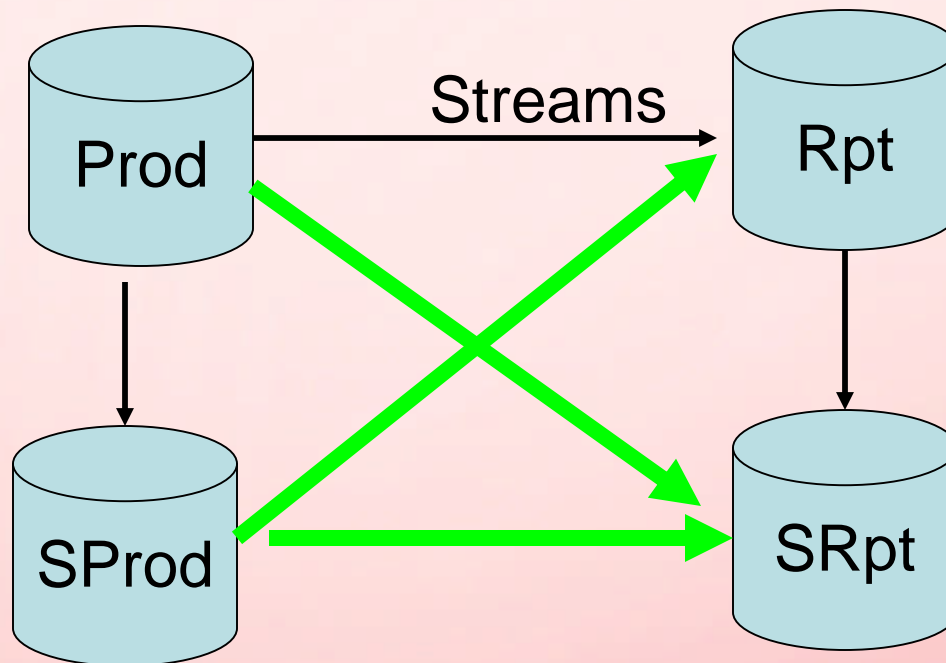


This leaves you with 2 Stdbys

# Still Pretty Easy



# Still Pretty Easy...till you failover



# Failover/Switchover

- PROD to Stdbby
  - Stream to where? RPT or SRPT?
- RPT to SRPT
  - Reconfigure Streams to SRPT
- Failover Both.
  - Reconfigure Stream, possible rebuild.

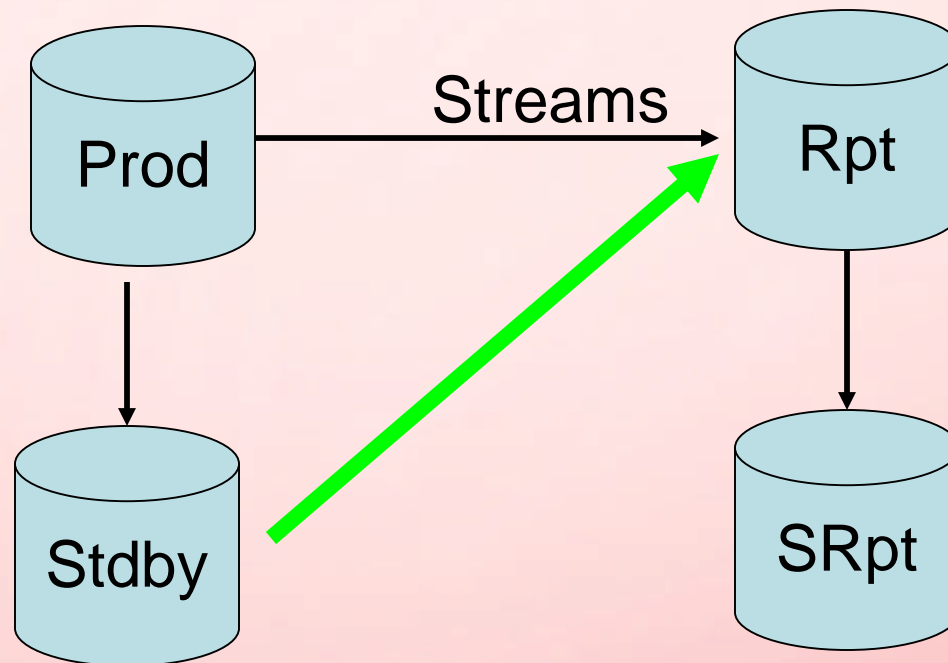


# Good News

- Streams Configuration propagates to Standby
  - Switchover PROD to Standby and back.
    - No Streams Change.
    - Rtn DBLink Change
    - Configuration propagates to standby.
    - Supplemental Logging also propagates.



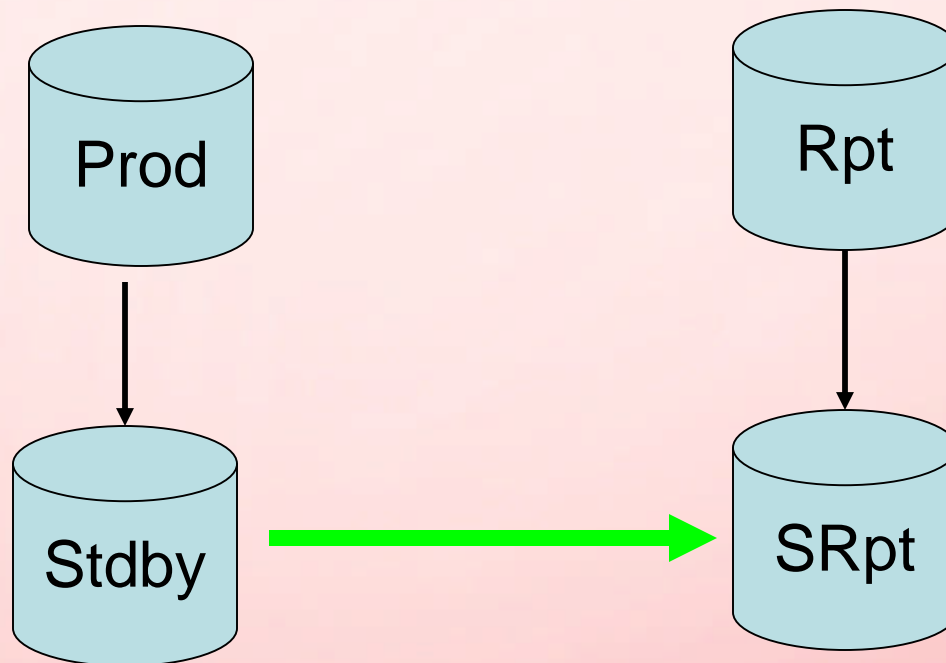
# Switchover PROD and Standby.



Stdby has the Streams Configuration.  
Switchover requires no reconfiguration.



# Switchover Prod and Rpt.



Still pretty easy.

Problem is Stdby is replicating to Rpt.

# Switchover Prod and Rpt.

- You must point the propagator on the Standby to the Report Standby.
  - Luckily this is a simple tnsname change.
  - Again the return dblink must also update.

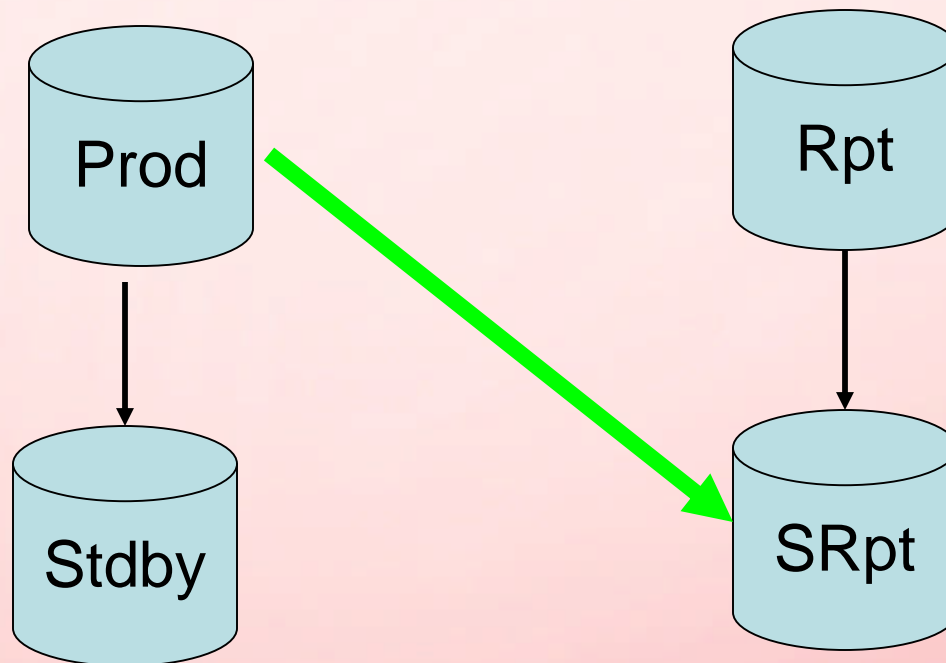


# Switchover Prod and Rpt.

- Steps to switch over both.
  - Prepare for Switchover Prod
  - Prepare for Switchover Rpt
  - Edit tnsname.ora on prod standby to point to report standby.
  - Edit tnsnames.ora on RPT Stdby to point to Stdby.
  - Execute Switchover of PROD.
  - Execute Switchover of Rpt.



# Switchover Rpt to Rpt Standby.



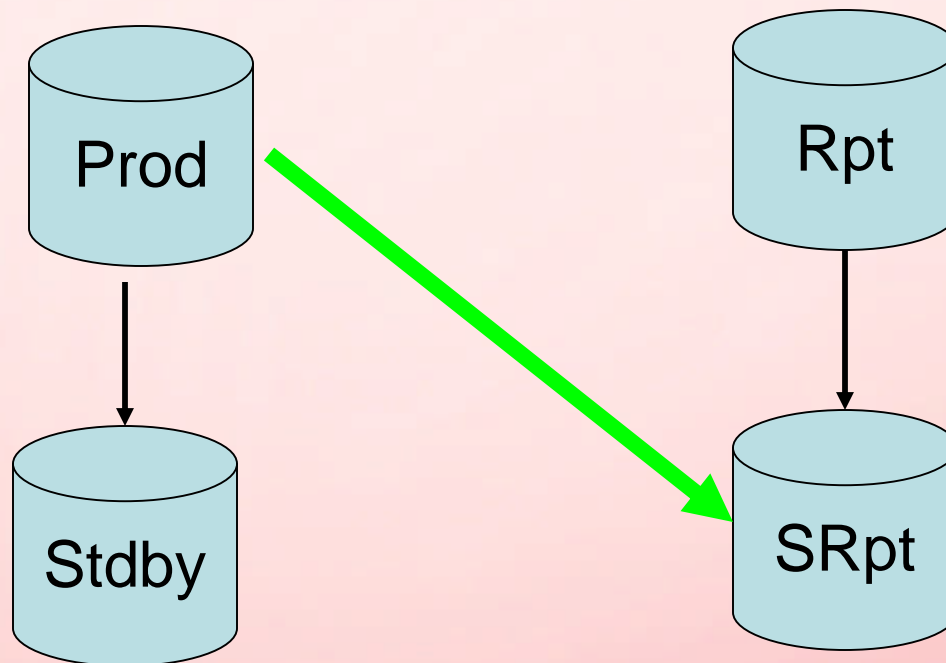
RptStdby has the Streams Configuration.  
Switchover requires no reconfiguration.  
Need to point Prod to Rpt Standby

# Switchover Rpt to Rpt Standby.

- Steps
  - Shutdown Prod
  - Switchover Rpt to Rpt Standby
  - Edit tnsnames.ora to point to Rpt Standby.
  - Edit tnsnames.ora to point back to Prod
  - Restart Prod

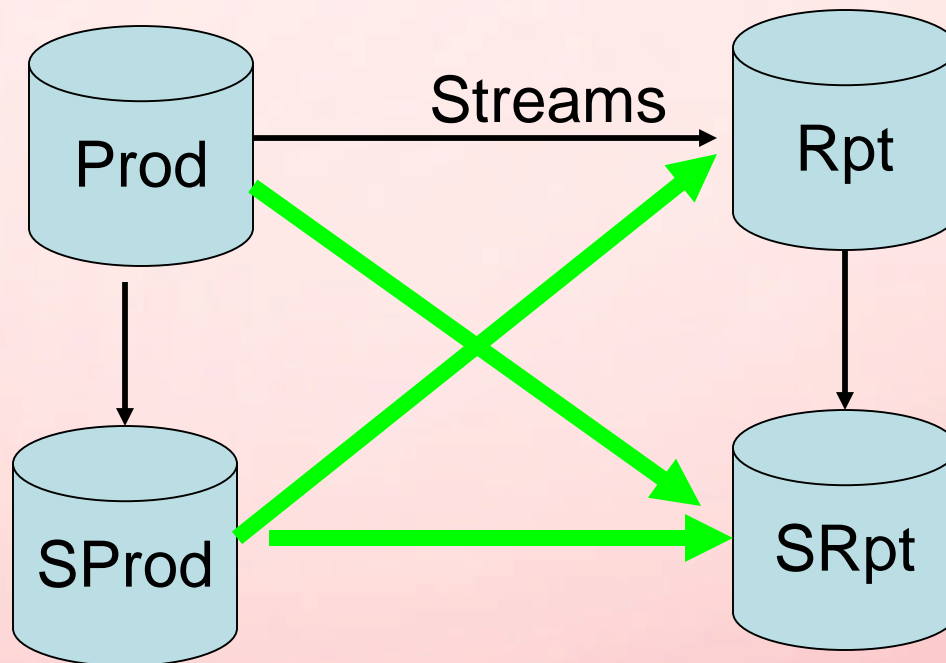


# Switchover Rpt to Rpt Standby.



# What we covered so far.

## Switchover only



All Pretty Easy

# Failover!!!

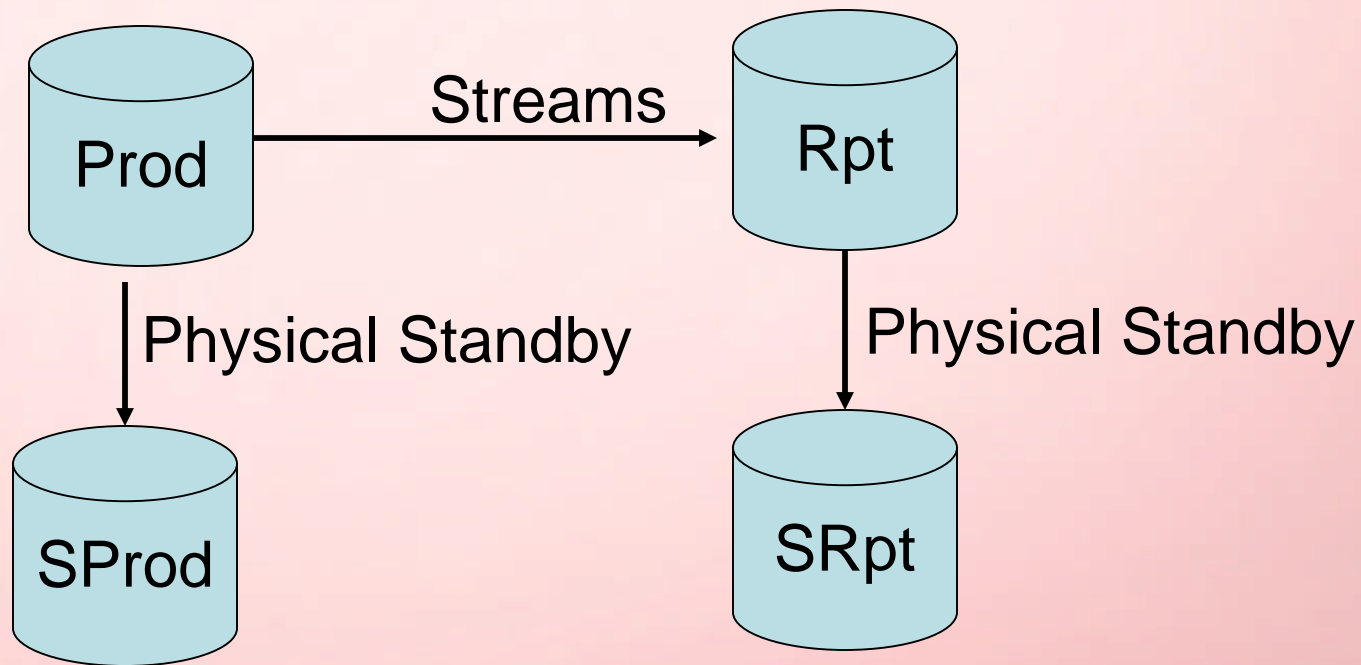
- Evil
  - Possible (likely) Data Loss!!!
  - Problematic with Replication
    - Prod has data that is missing from Rpt (bad)
    - Rpt has data that is missing from Prod (VERY BAD!!!)





# Failover Issues

## How Do We Get There



Prod has transactions that Stdbby does not.  
Stdbby has transactions that Prod does not.  
Remember Source SCN has no relation to destination SCN.

# Where in the world is Carmen Database?

- The Primary database will record the scn that is became active in STANDBY\_BECAME\_PRIMARY\_SCN

```
SQL> select STANDBY_BECAME_PRIMARY_SCN from v$database;
```

- The Report (Destination) database has a message number.

```
SQL> select oldest_message_number from  
      dba_apply_progress;
```



# Prod > Rpt

- Steps
  - Failover both databases.
  - Determine Apply Message Number.
  - Stop Capture Process
  - Drop the Propagator
  - Reset Capture SCN
  - Recreate the Propagator
  - Restart Capture and Apply
  - Fix Apply Errors.



# Prod > Rpt

```
SQL> select STANDBY_BECAME_PRIMARY_SCN from v$database;  
SQL> select oldest_message_number from  
       dba_apply_progress;
```

Begin

```
    Dbms_capture_adm.alter_capture(  
        Capture_name=>'CAPTURE_XXX',  
        Start_scn => <number for apply above>);
```

End;

/



# Prod > Rpt

## Drop the Propagator

```
Exec Dbms_propagation_adm.drop_propagation ('PROP_XX');
```



# Prod > Rpt

Recreate the Propagator

begin

```
dbms_streams_adm.add_schema_propagation_rules(  
  schema_name => , "SCHEMA1" ,  
  streams_name => ' "PROP_XX" ' ,  
  source_queue_name => ' "STRMSADMIN"."REP_CAPTURE_QUEUE" ' ,  
  destination_queue_name =>  
  ' "STRMSADMIN"."REP_DEST_QUEUE"@RPTPROD.DBLINK.LOCAL ' ,  
  include_dml => TRUE ,  
  include_ddl => TRUE ,  
  include_tagged_lcr => TRUE ,  
  source_database => ' PROD.DBLINK.LOCAL ' ,  
  inclusion_rule => TRUE ,  
  and_condition => NULL ,  
  queue_to_queue => true );
```

END;

/

# PROD < RPT

- Must either add missing transactions to PROD or PIT Recover RPT.
  - Adding missing transactions = handle apply errors. May be easy if you can do it.
  - PIT Recovr RPT to the SCN where PROD Standby became Primary.
    - Could Take a Long Time.
    - FLASHBACK!!!!!! Fast Recovery To SCN.
- Possibly Recreate the Streams.





# PROD < RPT

- Steps
  - Determine Prod's switchover SCN.
  - Flashback Rpt to XXX or PIT Recover
    - Remember that then destination SCN has not related to source SCN.
  - Find the Apply SCN.
  - Drop the Propagator
  - Reset the Capture First\_SCN.
  - Recreate the Propagator
  - Startup Streams.
  - Handle Apply Errors





# PROD < RPT

- Determine Prod's switchover SCN.

```
SELECT OLDEST_MESSAGE_NUMBER FROM DBA_APPLY_PROGRESS;  
SELECT FIRST_SCN FROM DBA_CAPTURE;  
select STANDBY_BECAME_PRIMARY_SCN from v$database;
```

Do not flashback past the first\_scn.

Try to hit just before the STANDBY\_BECAME\_PRIMARY\_SCN.



# PROD < RPT

- Find the Apply SCN after the Flashback.
- Drop the Propagator
- Reset the Capture Start\_SCN.
  - This tells the CAPTURE to start at this SCN and continue from there.

```
BEGIN
DBMS_CAPTURE_ADM.ALTER_CAPTURE(
capture_name => 'capture_XX',
start_scn => 829381993);
END;
```

/

# PROD < RPT

- Recreate the Propagator
- Startup Streams.
- Handle Apply Errors



# Conclusion

- Integrating Streams and DataGuard
  - Easy to Integrate
- Switchover Without Data Loss.
  - Easy – Need to Practice, Practice, Practice
- Failover with Data Loss.
  - Depends who has the extra transactions
  - Practice PIT/Flashback of Destination.
  - Become comfortable with Streams Components
- Practice, Practice, Practice

