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Data Replication

Reporting Database

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Agenda

- The Ask
- Oracle Database Replication Solutions
- Relative Comparison
- Summary
- Q&A

The Ask

- Reduce the workload on the KEC/Alliance database instance minimizing performance issues.
- Off-load daily production data to a remote reporting database server.
- Utilize Oracle data replication technologies to help facilitate data replication for the KEC/Alliance applications.



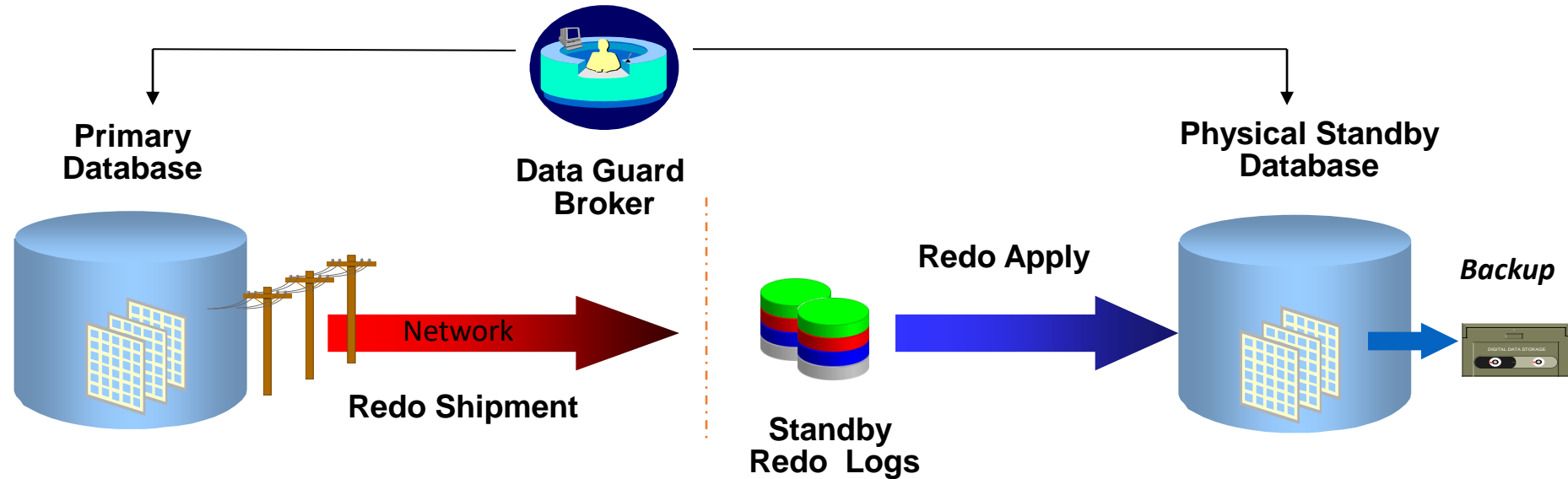
Database Replication Solutions

- Oracle Data Guard
 - Physical Standby
 - Logical Standby
- Oracle Active Data Guard
- Oracle Streams (Down Stream Capture)
- Oracle Golden Gate

Oracle Data Guard

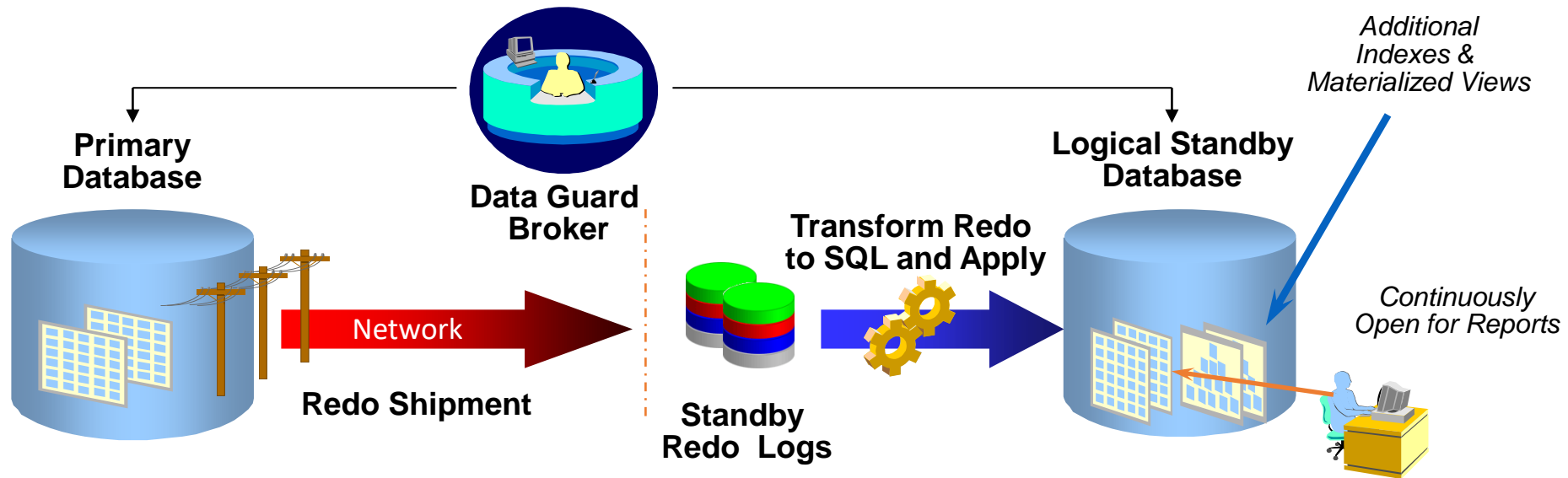
- Best Protection at the lowest cost.
- Automatic database Fail-over.
- Reduced network traffic compared to remote mirroring.
- Multi-layer validations that protects the standby databases from corruptions.
 - Automatic checksum and internal meta-data validation for all reads and writes
 - Validates data block during reads and after updates
- Comes shipped with Oracle Enterprise Edition, no special licensing is needed.

Oracle Data Guard – Physical Standby



- Provides a physically identical copy (block-for-block) of the primary production database where schemas, indexes, and all other structures are the same
- Provides disaster recovery and high availability with Switchover/Failover capabilities
- Synchronized through Redo-Apply using standard Oracle media recovery techniques

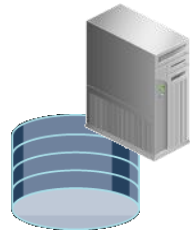
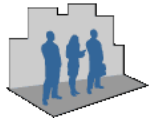
Oracle Data Guard – Logical Standby



- Logical Standby database is an open, independent, active database.
 - Contains the same logical information (rows) as production
 - Physical organization and structure can be very different
- Can be queried for reports while logs are being applied via SQL APPLY.
- Can have additional indexes and views for better query performance.
- Some limitations and prerequisite conditions:
 - Some data types are not supported (BFILE, ROWID, user-defined types)
 - Table Rows in the Primary Database Can Be Uniquely Identified

Oracle Active Data Guard

**Read-write
Workload**



**Production
Database**



**Continuous redo
shipping, validation & apply**



**Active Standby
Database**



**Real-time
Reporting**

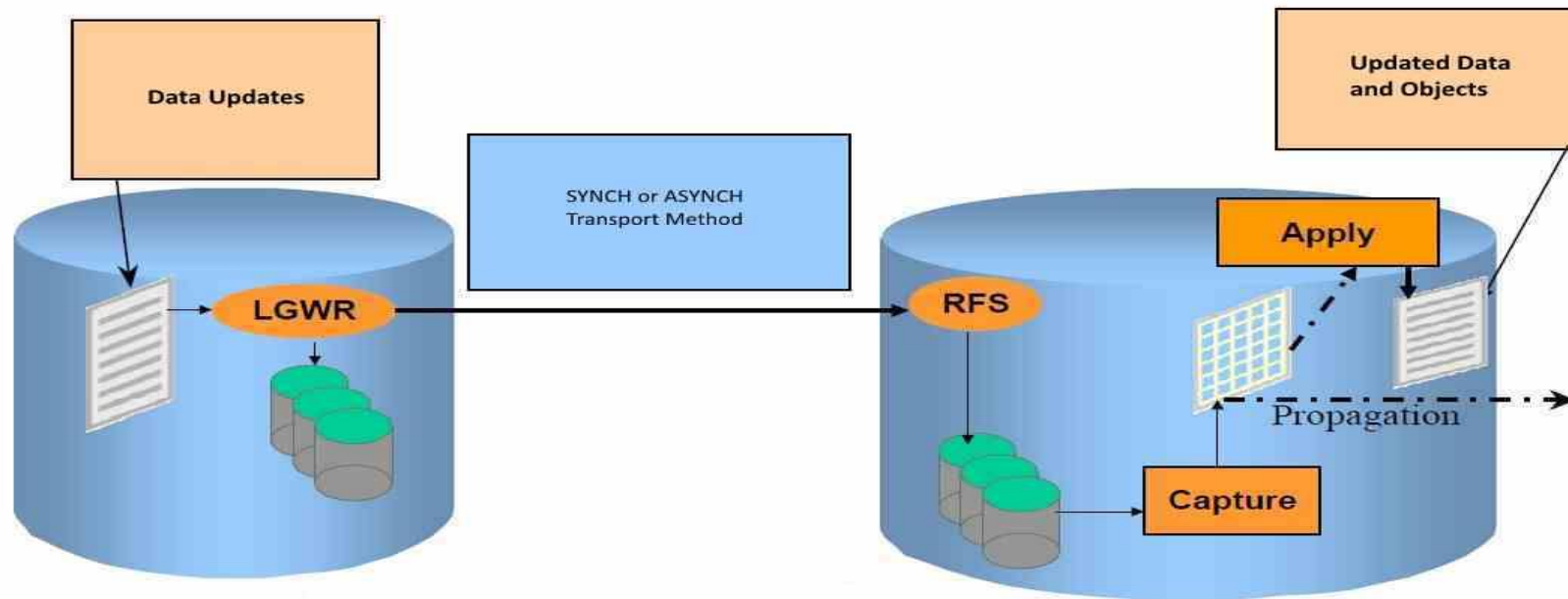


**Fast
Incremental
Backups**

- Enables read-only access to a physical standby database for queries, reporting, web-based access, .. etc. while continuously applying changes received from the production database.
- Supports RMAN fast incremental backups on the Active Data Guard physical standby (RMAN block change tracking).
- Automatic Block Media Repair - data block corruptions on the Primary database can be repaired by obtaining those blocks from the standby site.
- Oracle Active Data Guard is a database option license for Oracle Enterprise Edition. An Active Data Guard license is required for the primary database and each Active Data Guard physical standby database

Oracle Streams

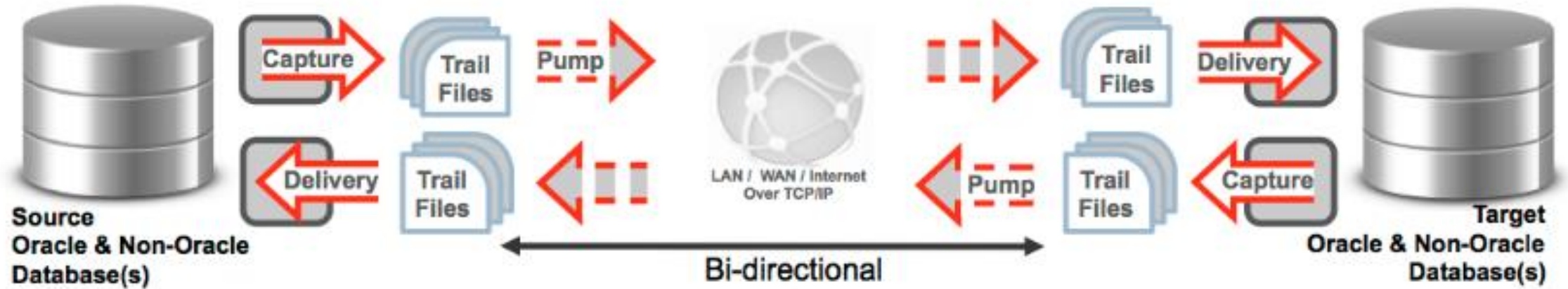
- Support data transformations, sub-setting, custom apply functions.
- Support heterogeneous platforms and different character sets.
- Different replication architectures and Implementations are available (bi-directional replication), hub & spoke, many to one replication.
- Oracle Streams has no licensing costs as it comes shipped with Oracle Enterprise Edition.



Oracle Streams – Real Time Downstream Capture

- Typically used to replicate a full database.
- Offload processing from the source database to a target database.
- Capturing changes uses fewer resources at the source database because the downstream database performs most of the required work.
- Captures changes from the standby redo log whenever possible and from the archived standby redo log files whenever necessary.
- The target database must be running the same release of Oracle Database as the source database or later.
- The operating system on the source and downstream capture sites must be the same.
- The hardware architecture on the source and downstream capture sites must be the same

Oracle GoldenGate



Oracle GoldenGate

- Easy to setup, install and configure; just as robust as Streams and is extremely lightweight.
- Better performance than streams with very low latency.
- Supports more data types than streams (yet still with some limitations, e.g. BFILE, UROWID, ANYDATA, ANYTYPE).
- Replicate all or a portion of the data, with the ability to manipulate the data for heterogeneous environments/different database schemas.
- Geared more towards a heterogeneous environment, hence compatibility between platforms and various RDBMS support.
- Require licensing. GoldenGate licenses also includes Active Data Guard licenses 😊

Database Replication Solutions – Relative Comparison

TECHNOLOGY	STANDBY UTILIZATION	COMPLEXITY	UTILIZATION	LICENSING
Active Data Guard	<ul style="list-style-type: none">• Read-only queries and reporting• Offloading fast backups that supports (BCT)	Moderate	High	Yes
DG - Physical Standby	<ul style="list-style-type: none">• Read-only queries and reporting• QA testing, backups	Low	Low	No
DG - Logical Standby	<ul style="list-style-type: none">• Add local tables, additional schemas, indexes and materialized views• Read-write access for reporting application(s)	Moderate	High	No
Streams	<ul style="list-style-type: none">• Advanced replication capabilities• Completely independent replicas	High	High	No
Golden Gate	<ul style="list-style-type: none">• Advanced cross platform and RDBMS replication capabilities• Independent replicas with read/write access.	High	High	Yes

Summary

IF	THEN
<ul style="list-style-type: none">• Very high primary database throughput.• Simplicity of a physical replica.• Maximum protection from physical corruptions.• Read-only access to synchronized data	Data Guard – Physical Standby/Active Data Guard
<ul style="list-style-type: none">• Simple, one-way logical replication.• Standby requires local tables, additional schemas, and indexes• Offload apps that need read/write access, but don't modify primary data.	Data Guard – Logical Standby
<ul style="list-style-type: none">• Fine grained, N-way Multimaster, Hub & Spoke, or Many-to-One replication• Load balance workload across sites• Accommodations in app design and management are acceptable in return for access to advanced replication features.	Oracle Streams
<ul style="list-style-type: none">• Real-Time data movement is required.• Reporting data should be moved across different databases and platforms.	Oracle GoldenGate

Q&A