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Oracle GoldenGate: Best Practices for Highly Available Off-Box and Hub Configurations

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Oracle Maximum Availability Architecture

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Safe Harbor

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More than 20 Years of Innovation

KEY USE CASES & GROWTH PHASES:

2015 – Data Lake

2010 – Data Warehouse

2000's – OLTP Replication

1990's – Database HA/DR

Oracle
GoldenGate:
Innovations for
Another 20
Years

SUMMER, 2018

ORACLE

1000'S OF CUSTOMERS GLOBALLY

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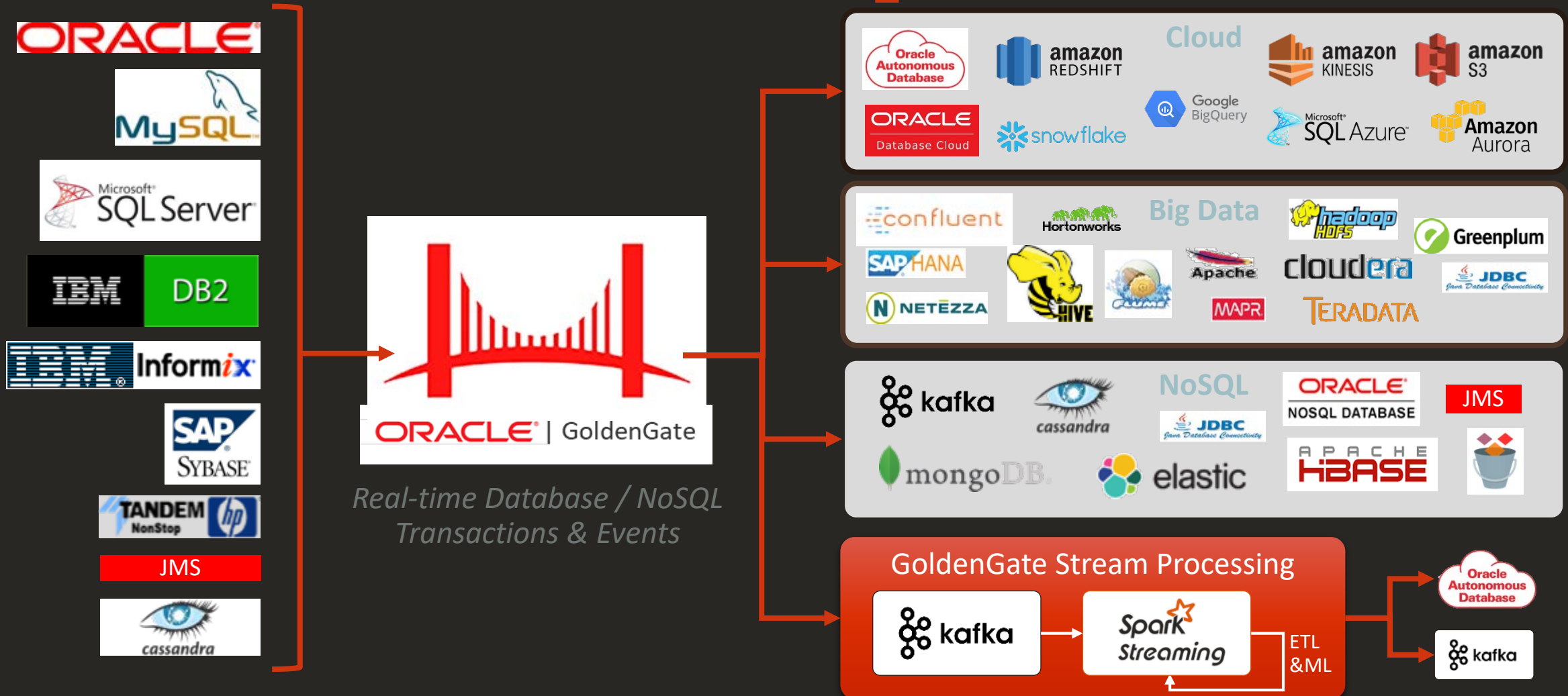
T-Mobile

WELLS FARGO

MAERSK

intuit
QuickBooks

For the Whole Enterprise



Key Use Cases

Database HA/DR

Active-Active, Multi-Master,
Zero-Downtime, DB Migrations



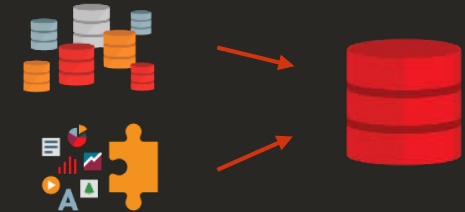
OLTP Replication

Replicate transactions, data &
events across OLTP databases



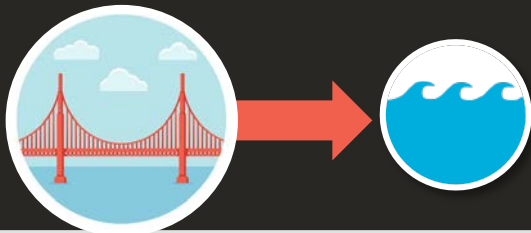
Data Warehouse Ingest

Load and stage data into Data
Warehouse tables



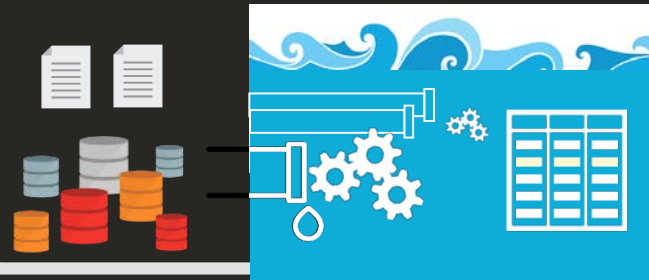
Data Lake Ingest

Best-in-class streaming data
ingestion for all data lakes



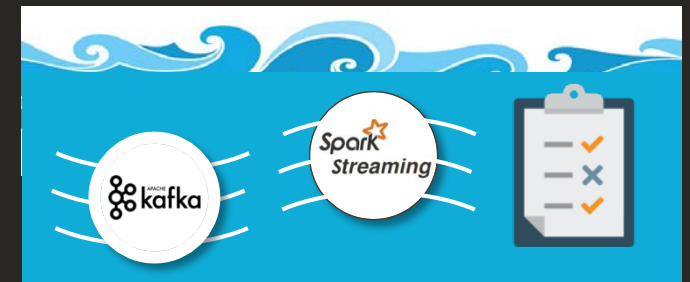
Data Pipelines

Transform and process any data
as it in arrives in the Stream

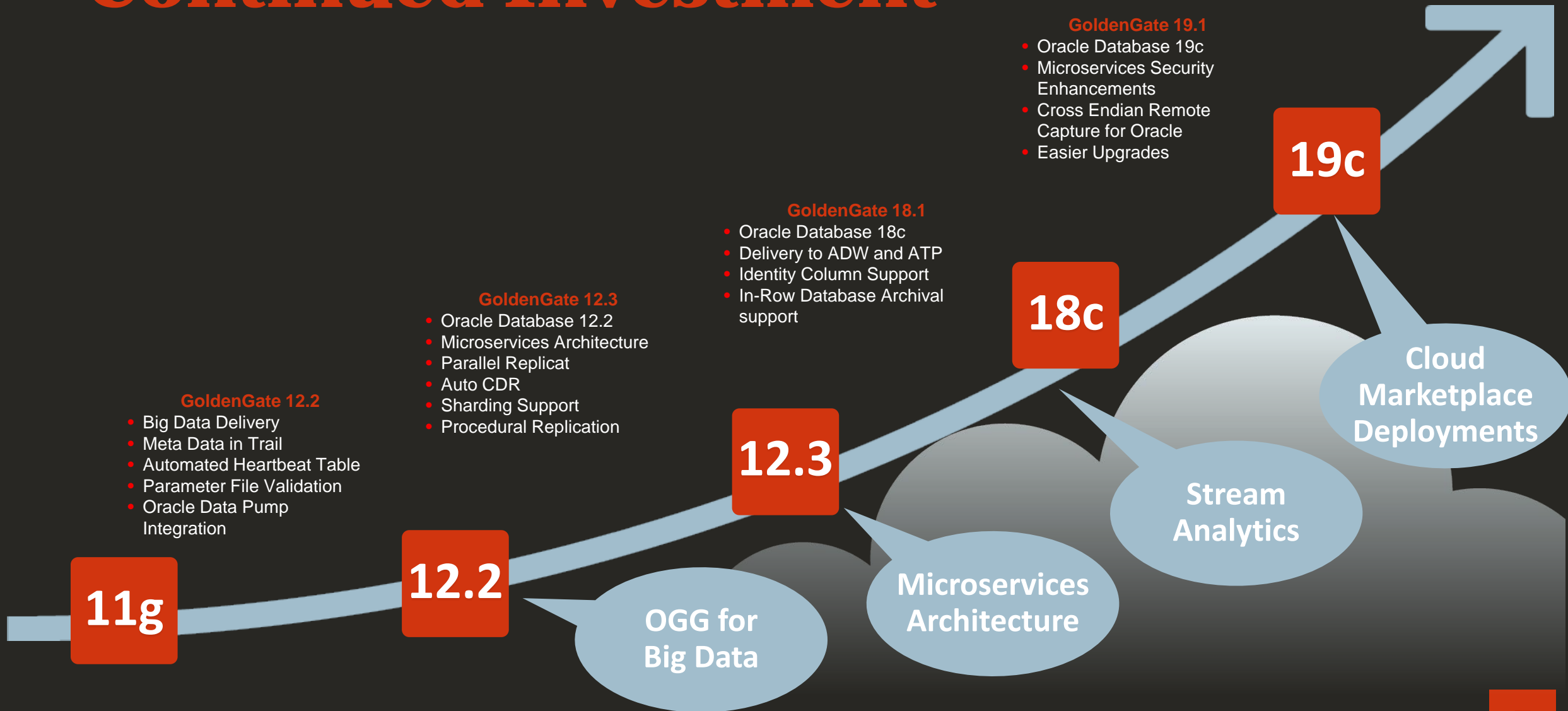


Stream Analytics

Apply machine learning, geo-
spatial and advanced rules



Continued Investment



GoldenGate 19.1 New Feature Summary

Support for Oracle Database 19.1

Long term support release. Final patchset update for Oracle GoldenGate 12.3 release.

Security and Manageability Enhancements for Microservices

Integration with Key Management Systems, Support for DMZ environments.
Defaults changed to TLS1.2, Digest Auth, Strong Password Verifier
Managed profiles for AutoStart, AutoRestart, and Key Management.

Performance and Scalability Improvements

Improved performance and scalability for Parallel Replicat.
Remote integrated capture performance tolerates high latency networks.

Ease of use

Simplified software upgrade procedures. Enhanced heartbeats to simplify system recovery. Simplify mid-tier & cloud deployments with remote cross-endian Integrated Extract. Better smart defaults that eliminate need to set parameters for common use cases.

Agent Free Migration to Cloud – OCI Marketplace Solution

Cross endian remote Integrated Extract allow remote capture of on-premise databases for easier migration to the cloud

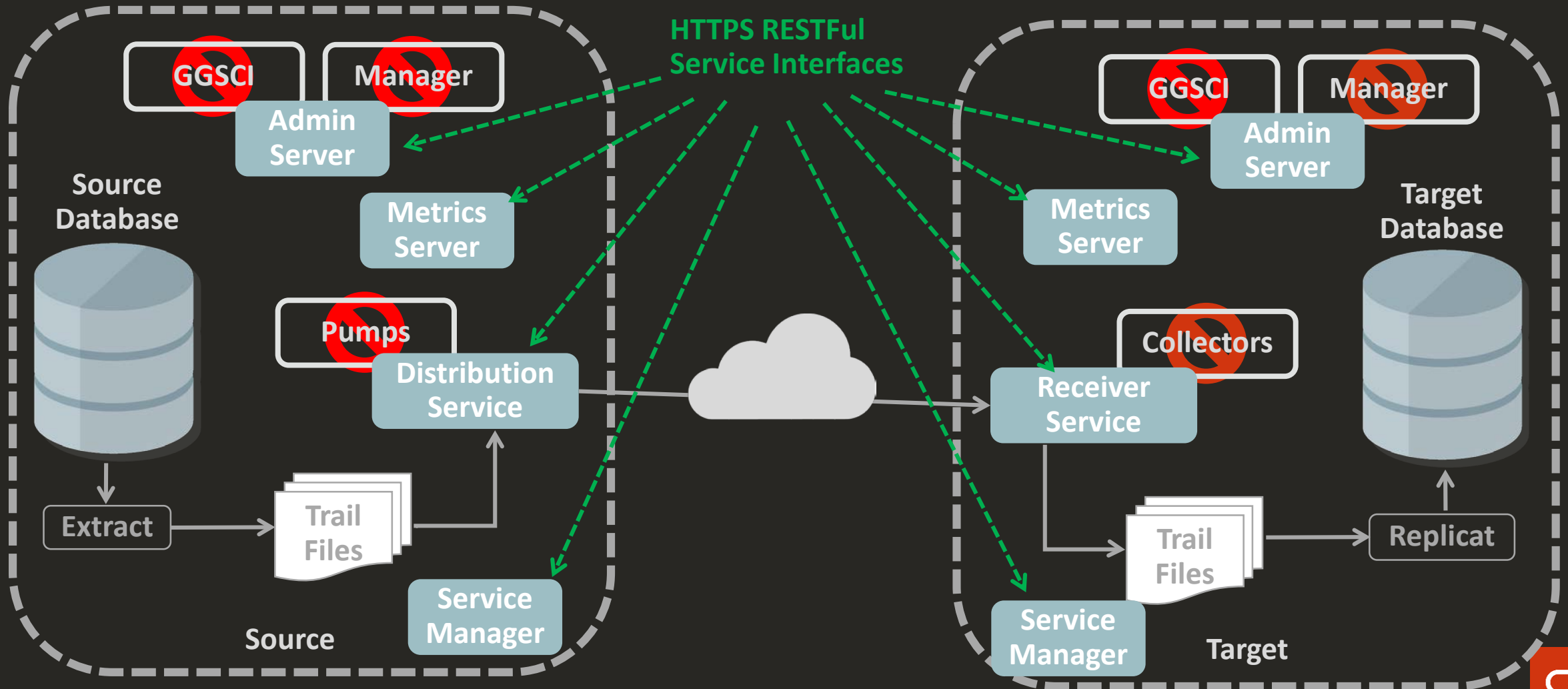
Agenda

- Microservices Architecture
- GoldenGate Traditional vs Hub Configuration
- GoldenGate Hub in the Oracle Cloud
- GoldenGate Hub with Maximum Availability Architecture
- Summary

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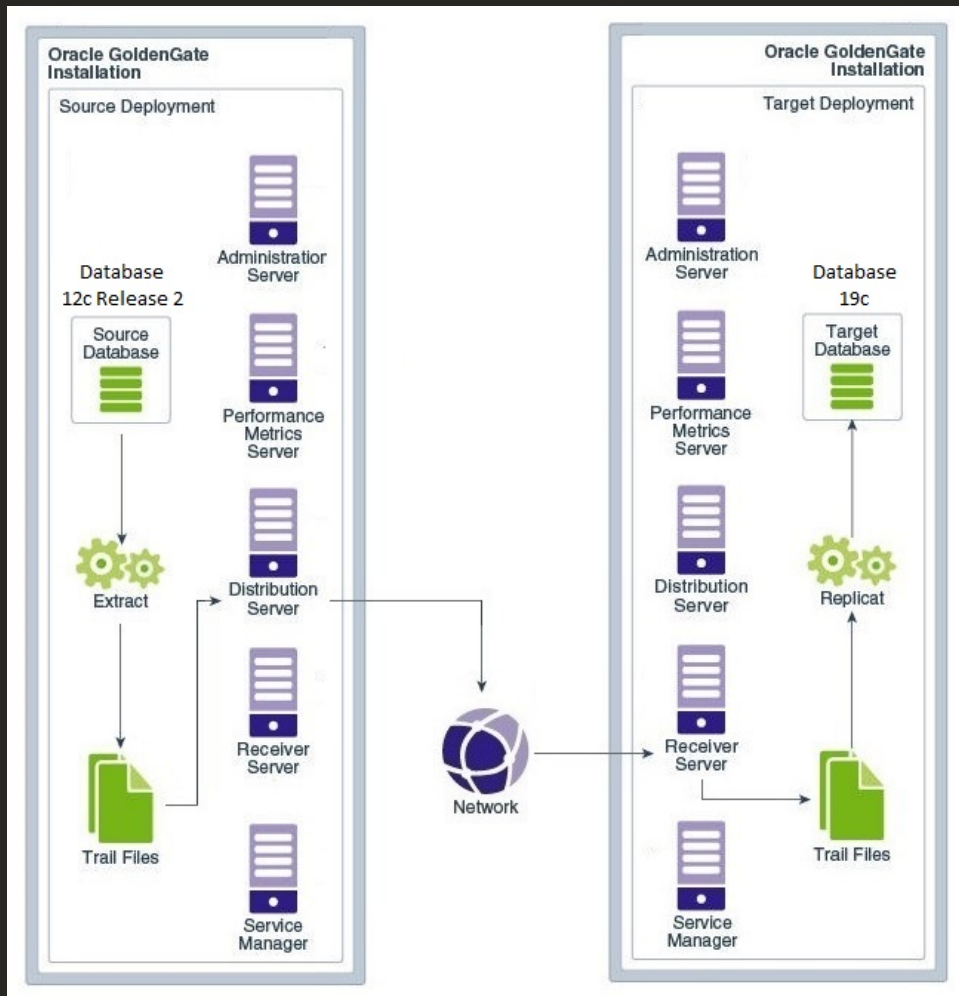
MicroServices Architecture



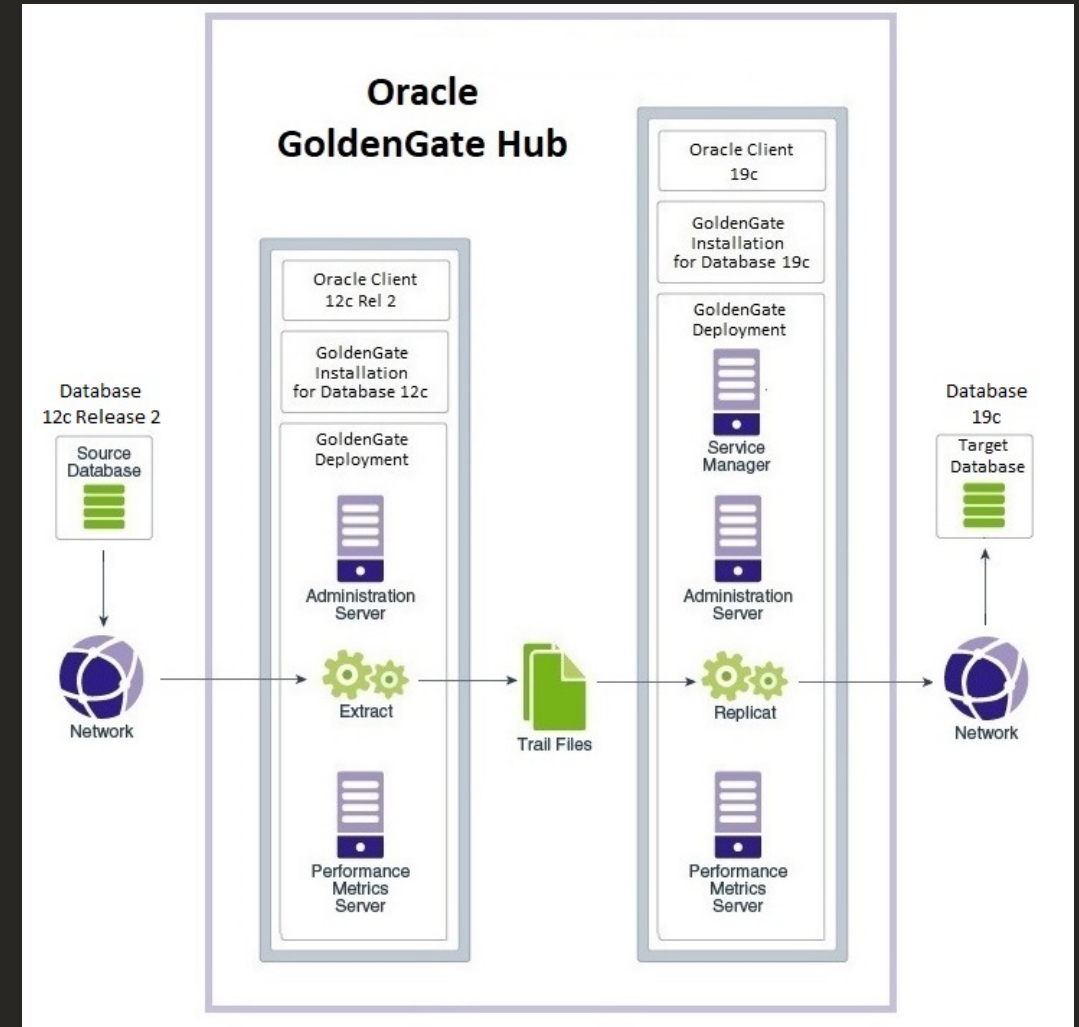
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GoldenGate Local vs. Hub Configuration



VS.



GoldenGate Local vs. Hub Configuration

Local Configuration	Hub Configuration
<ul style="list-style-type: none">- GoldenGate software installed on database servers- Uses RDBMS software home for required libraries- GoldenGate processes run on the database servers- Logminer Server runs in the database- Distribution Path required to transfer trails from source to target database hosts- Higher resource consumption on database server- Nginx provides HTTPS to multiple database servers- Manage & monitor on multiple database servers	<ul style="list-style-type: none">- GoldenGate software installed on the Hub only- Uses Oracle Client software for required libraries- GoldenGate processes only run on the Hub- Logminer Server runs in the database- Distribution Path not needed, trail files local to both Extract (source) and Replicat (target)- Lower resource consumption on database server- Nginx connection to single hub server- Manage & monitor on a single server

GoldenGate Hub Configuration

- Hub should be close network proximity to the target database (low ms latency)
- Apply latest database quarterly patchset/release update for optimized remote Extract performance*
- Use latest version of GoldenGate (19c)
 - GoldenGate 19c cross endian remote capture
- Source and target databases must both be enabled for GoldenGate replication
 - `ENABLE_GOLDENGATE_REPLICATION=TRUE`

GoldenGate Hub Configuration

- GoldenGate processes all run on the GoldenGate Hub
- For Integrated Extract, Logminer Server runs inside the source database
 - Requires STREAMS_POOL_SIZE allocation
- For integrated parallel Replicat or integrated Replicat
 - Requires STREAMS_POOL_SIZE allocation
- Connectivity from GoldenGate Hub to database controlled by TNS alias defined in tnsnames.ora or Oracle Easy Connect Plus* naming method

*Available when connection to 19c and onwards database

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GoldenGate Hub in the Oracle Cloud

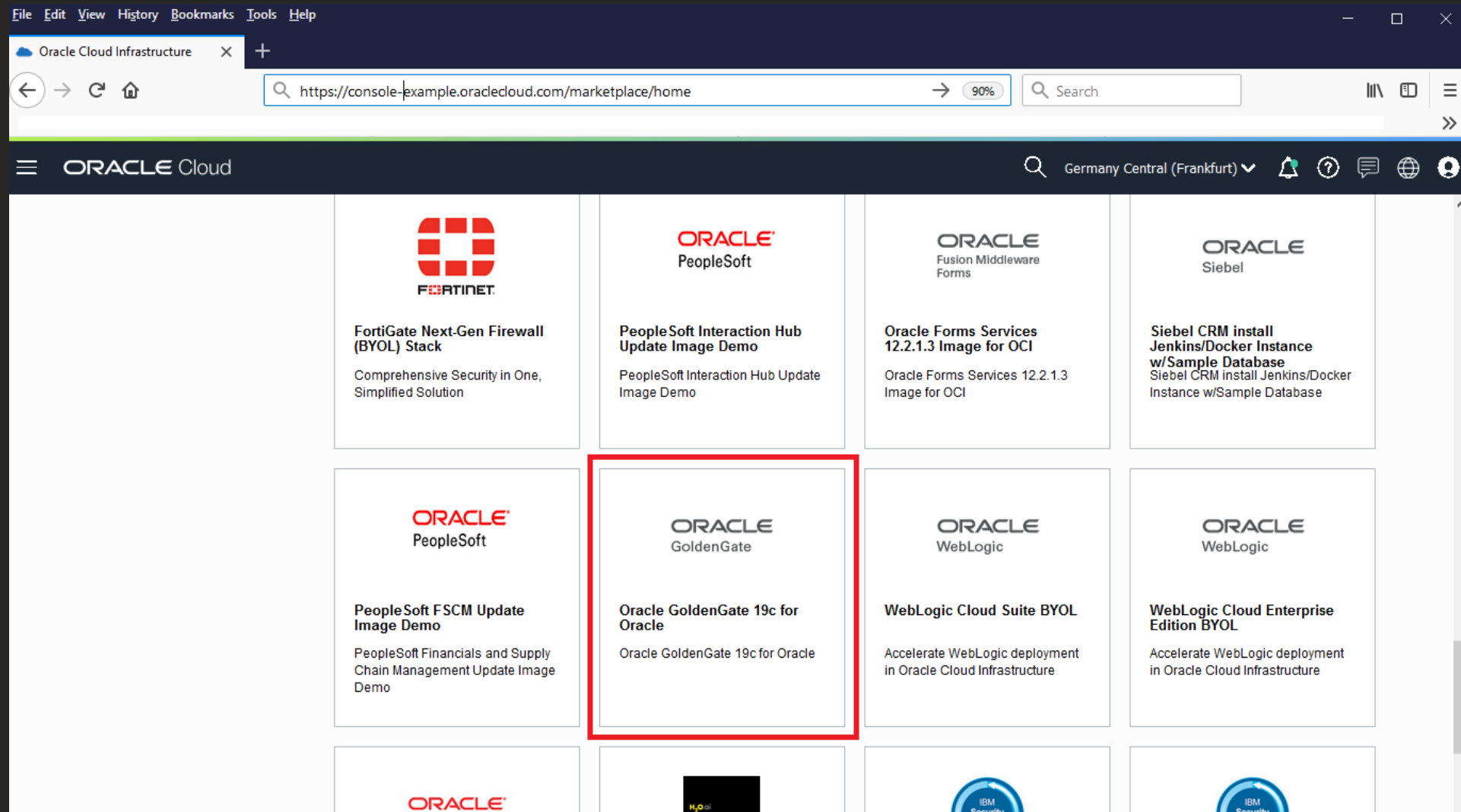
- Simplified GoldenGate Hub creation with OCI Marketplace
 - Installs Oracle Client software 11g Release 2 to 19c
 - Installs Oracle GoldenGate for database 11g Release 2 to 19c
 - Installs and configures Nginx reverse proxy
 - Creates two GoldenGate deployments (one for source and target databases)
- Compute shapes available (guidelines in parenthesis)
 - VM.Standard2.4 (< 1MB/sec peak redo rate)
 - VM.Standard2.8 (< 15MB/sec peak redo rate)
 - VM.Standard2.16 or VM.Standard2.24 (> 15MB/sec peak redo rate)

GoldenGate Hub in the Oracle Cloud

- Default volume sizes
 - Trails volume size is 512GB
 - Deployments volume size is 128GB
 - Can set custom sizes if require more storage
- GoldenGate Hub in the Oracle Cloud suitable for:
 - Database migration
 - Bidirectional replication*
- Documentation available at

<https://docs.oracle.com/en/middleware/goldengate/core/19.1/oggmp/>

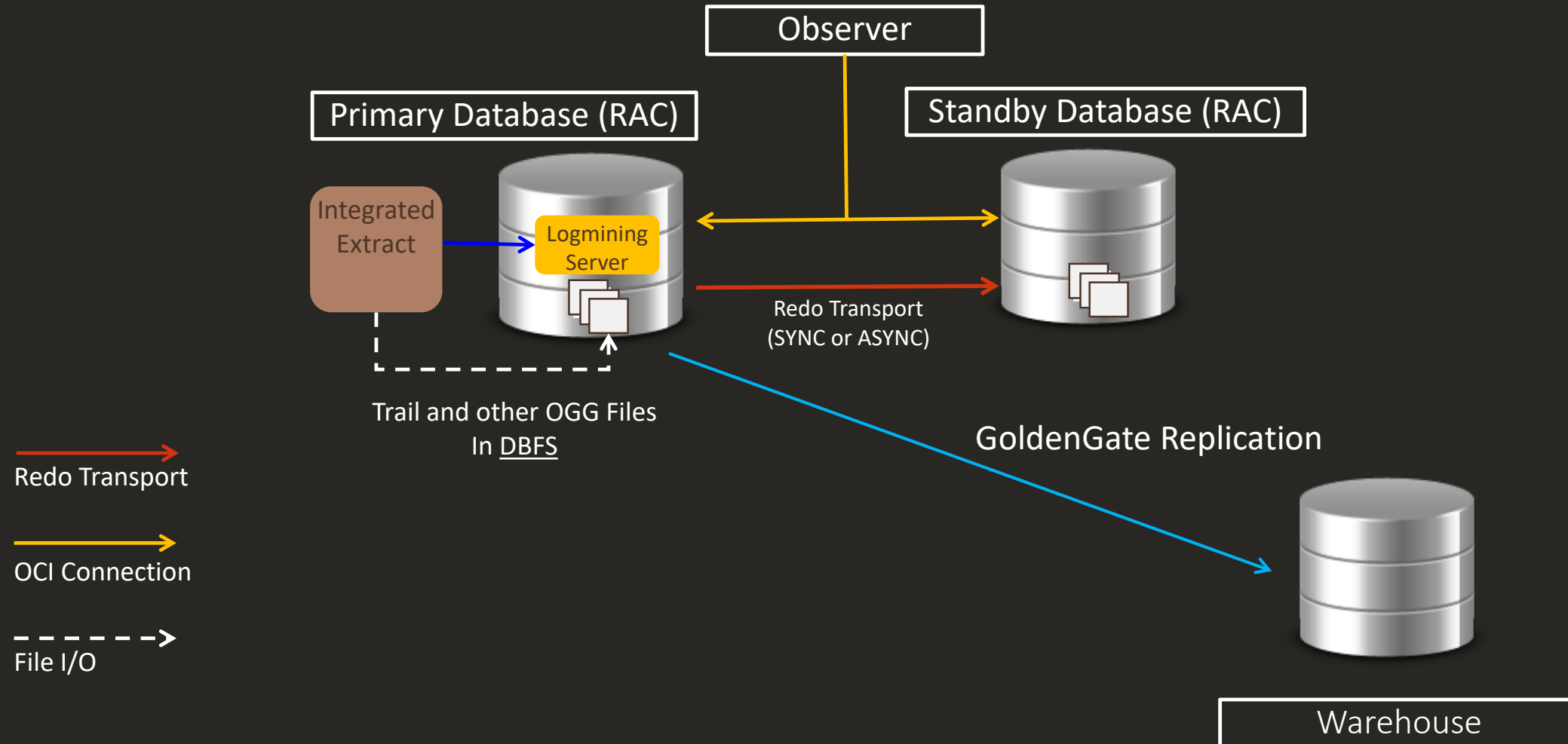
GoldenGate Hub in the Oracle Cloud



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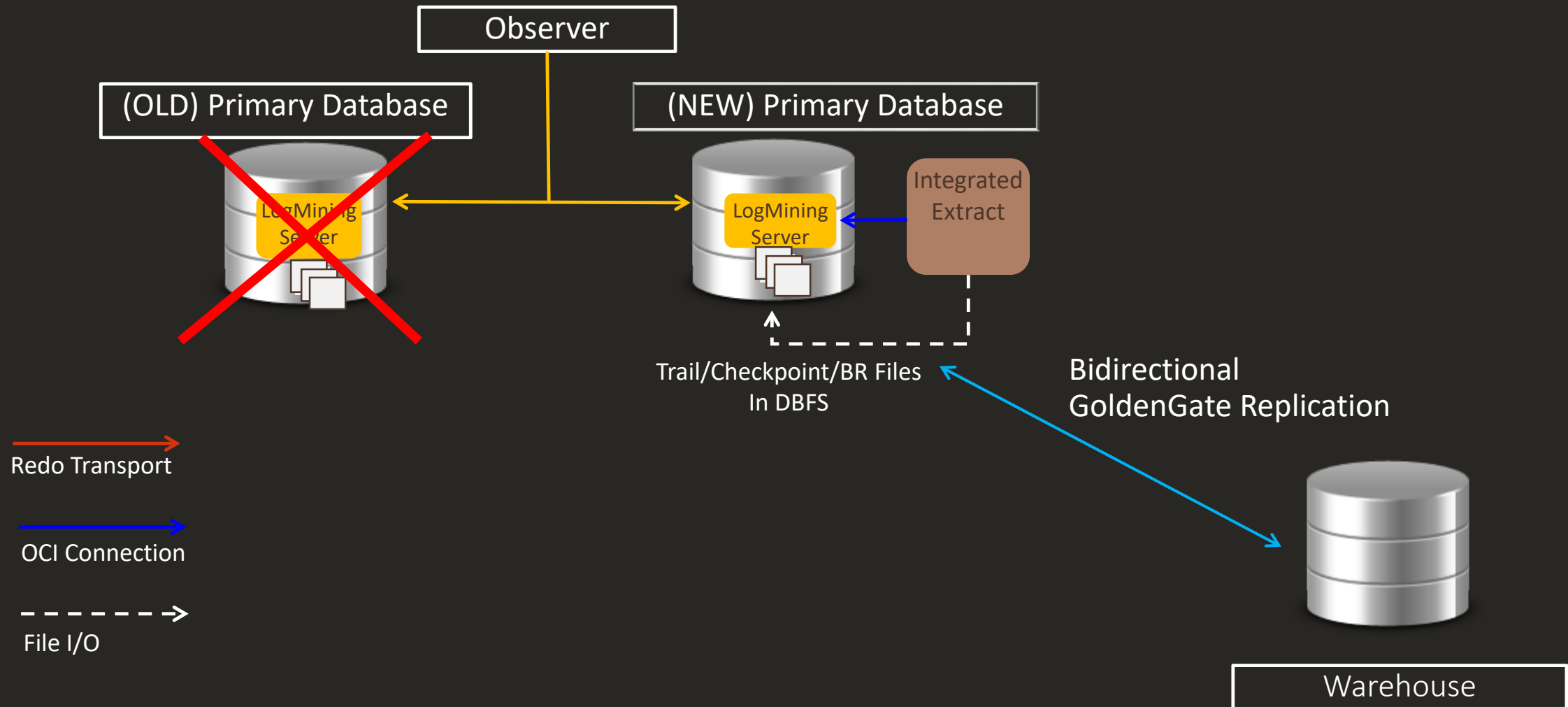
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Local GoldenGate MAA Configuration Using Database File System (DBFS)



Local GoldenGate MAA Configuration

Using Database File System (DBFS)

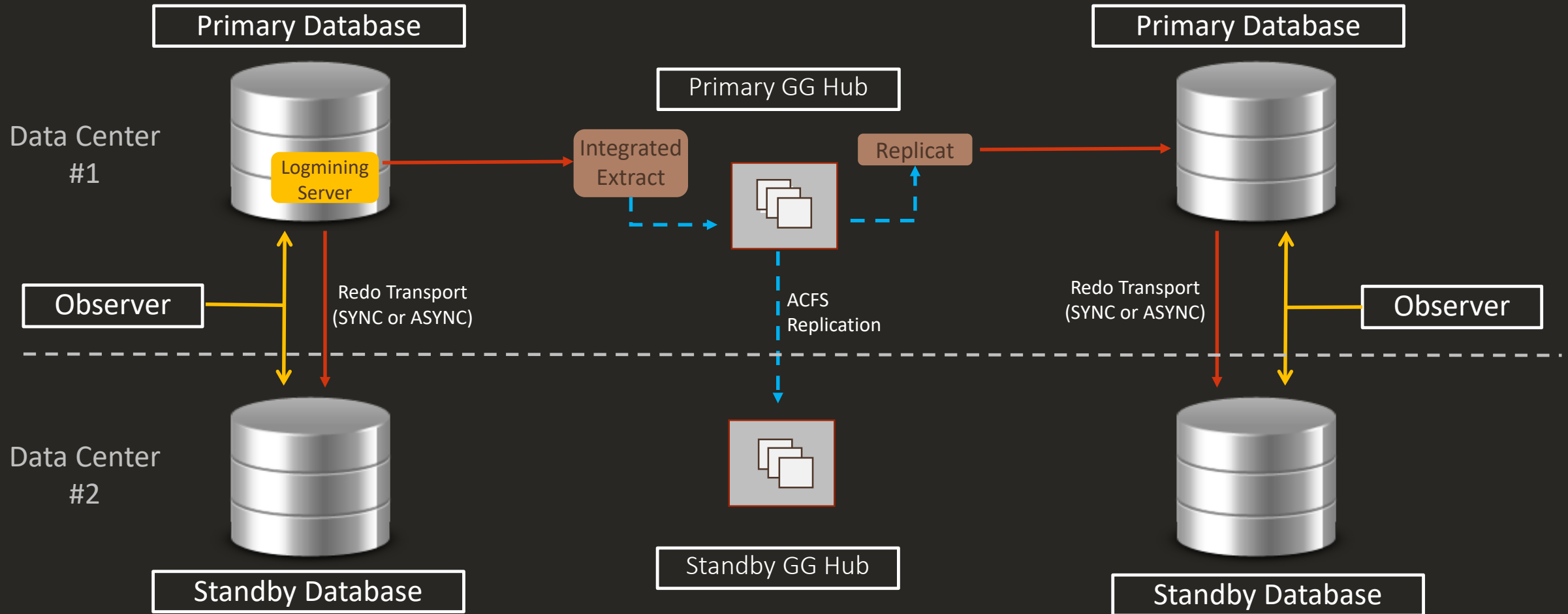


Local GoldenGate MAA Configuration

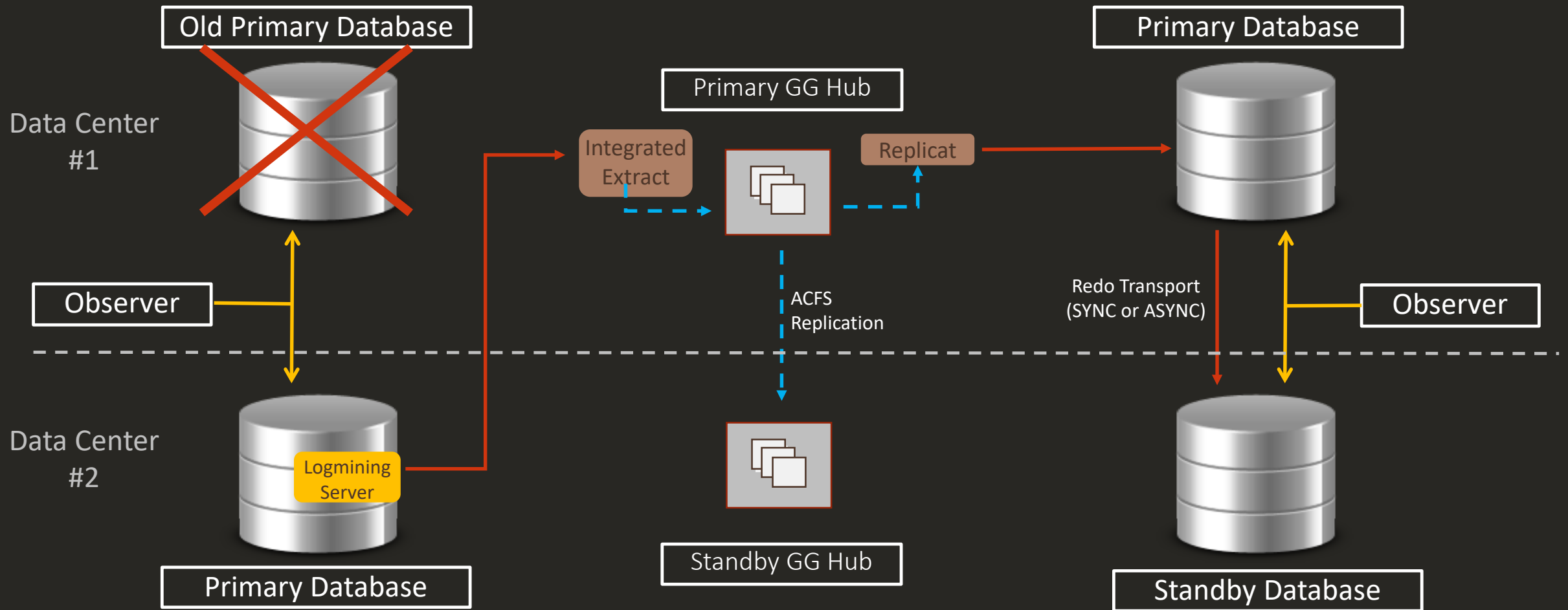
- GoldenGate files stored in Database File System (DBFS) in replicated database
- Oracle RAC and Data Guard protects database from failures
- GoldenGate follows the Data Guard primary after role transition
- Grid Infrastructure stand alone agent (XAG) manages synchronization between database, DBFS, VIPs and GoldenGate
- Each GoldenGate installation separately managed and monitored
- Added complexity when target database moves between data centers for Distribution Path

GoldenGate Hub MAA Configuration

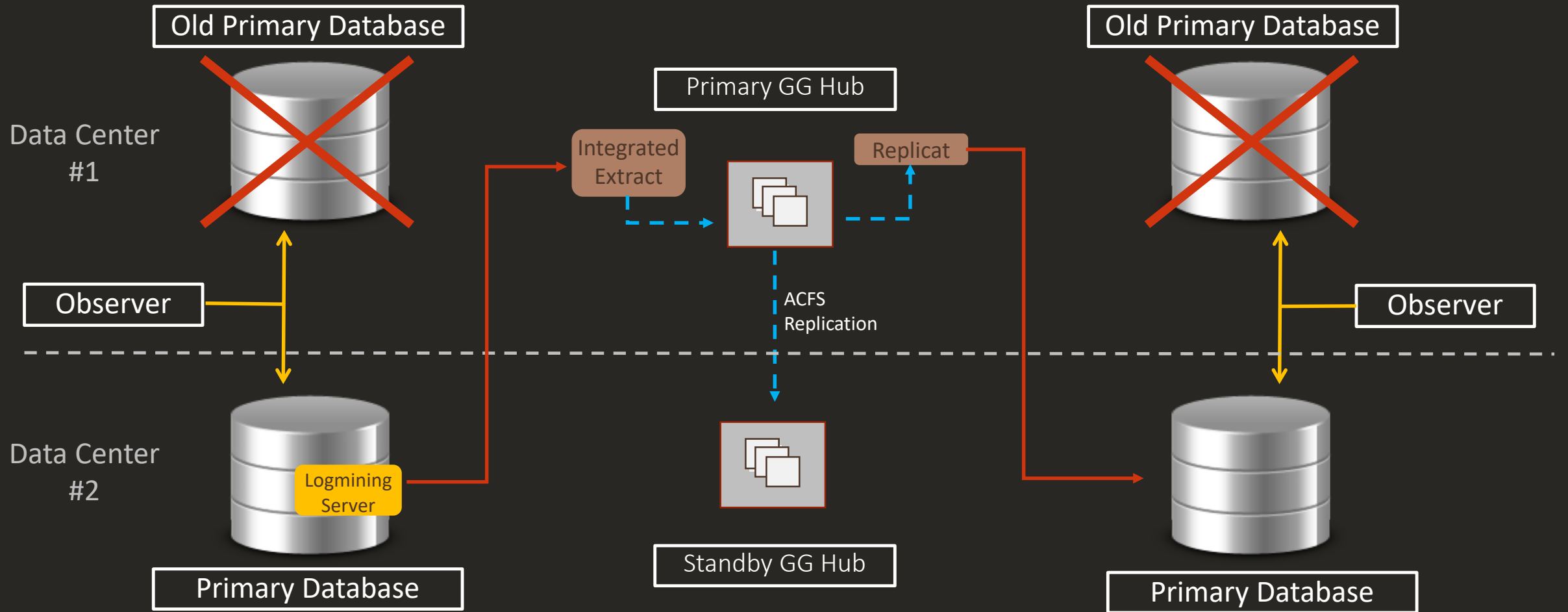
Using ASM Cluster File System (ACFS)



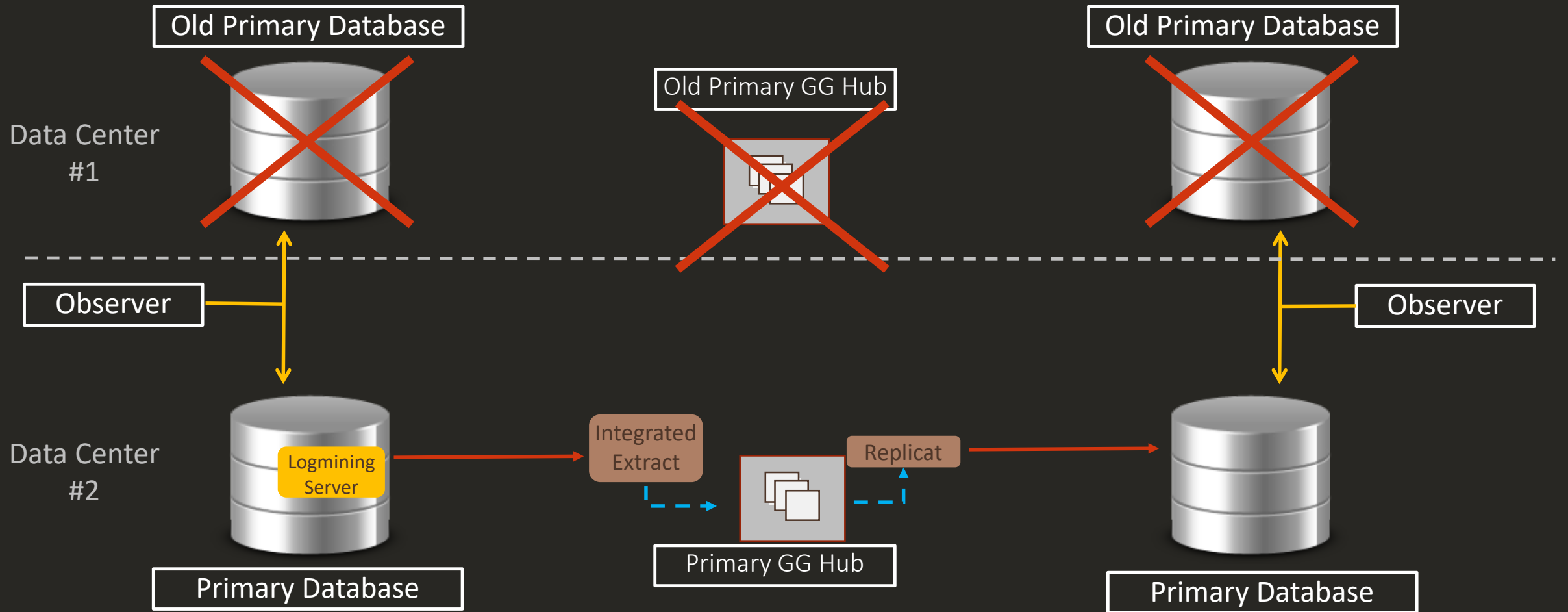
GoldenGate Hub MAA Configuration



GoldenGate Hub MAA Configuration



GoldenGate Hub MAA Configuration



GoldenGate Hub MAA Configuration

ACFS Replication

- GoldenGate deployments stored on ACFS with continuous snapshot replication
- ACFS Replication Enhancements
 - ACFS zero data loss role reversal for planned outages (18c)
 - `acfsutil repl` commands can be run as non-root user (19c)
 - ACFS unplanned failover support (early next year release)
- Enhancements enable automatic GoldenGate ACFS role transitions

GoldenGate Hub MAA Configuration

- Grid Infrastructure agent (XAG) manages hub dependencies between primary file system, VIP and GoldenGate deployments
- Source and Target databases configured for MAA
 - RAC with application VIPs
 - Data Guard
 - Role Based Service
- Extract and Replicat follow role based service with Oracle Net connect string

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Summary

- GoldenGate Hub offers advantages over local configuration
 - Reduced database server resource consumption
 - Ease of administration & monitoring
 - Cross endian remote capture
- GoldenGate in OCI Marketplace simplifies hub configuration
- GoldenGate Hub MAA makes use of:
 - Oracle Grid Infrastructure (CRS)
 - Standalone agent (XAG)
 - ACFS and ACFS Replication
- OCI GoldenGate Hub for database migration & Hub MAA white papers in progress

Further Reading

- Oracle Database Migration with an Oracle GoldenGate Hub Configuration MAA white paper
 - <https://www.oracle.com/a/tech/docs/maa-database-migration-with-a-goldengate-hub.pdf>
- Oracle GoldenGate 19c documentation
 - <https://docs.oracle.com/en/middleware/goldengate/core/19.1/index.html>
- Oracle GoldenGate in OCI Marketplace
 - <https://docs.oracle.com/en/middleware/goldengate/core/19.1/oggmp/>
- ACFS Replication
 - <https://docs.oracle.com/en/database/oracle/oracle-database/19/ostmg/configure-acfs-replication.html#GUID-1BB7CD34-399B-496C-B458-DA3E68F48D31>