Oracle GoldenGate 19.1

New Features & Enhancements
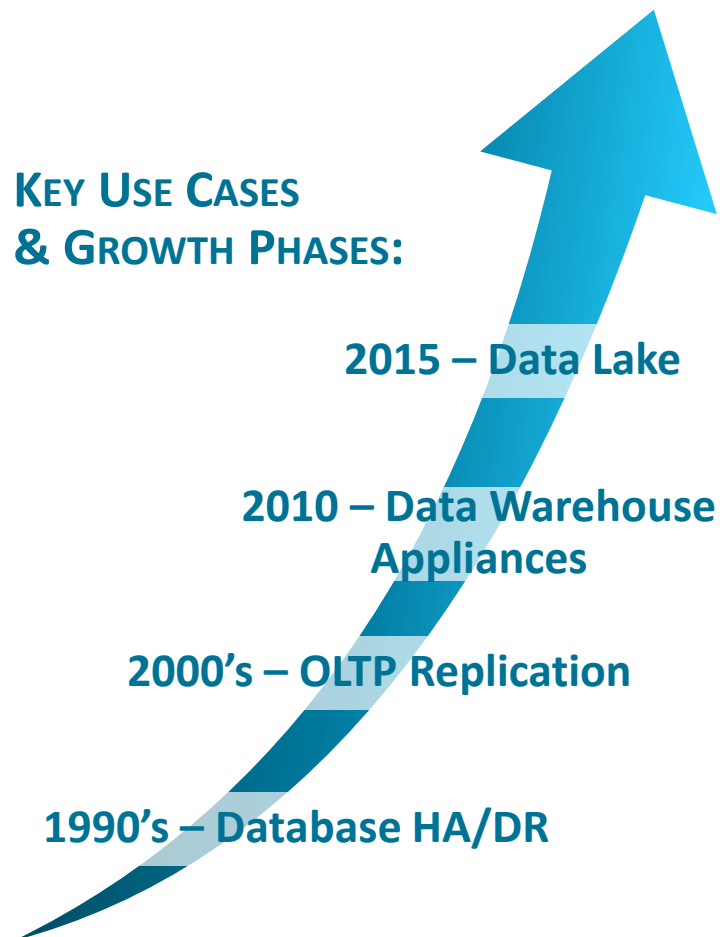
Oracle Product Development

Safe Harbor Statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, timing, and pricing of any features or functionality described for Oracle's products may change and remains at the sole discretion of Oracle Corporation.
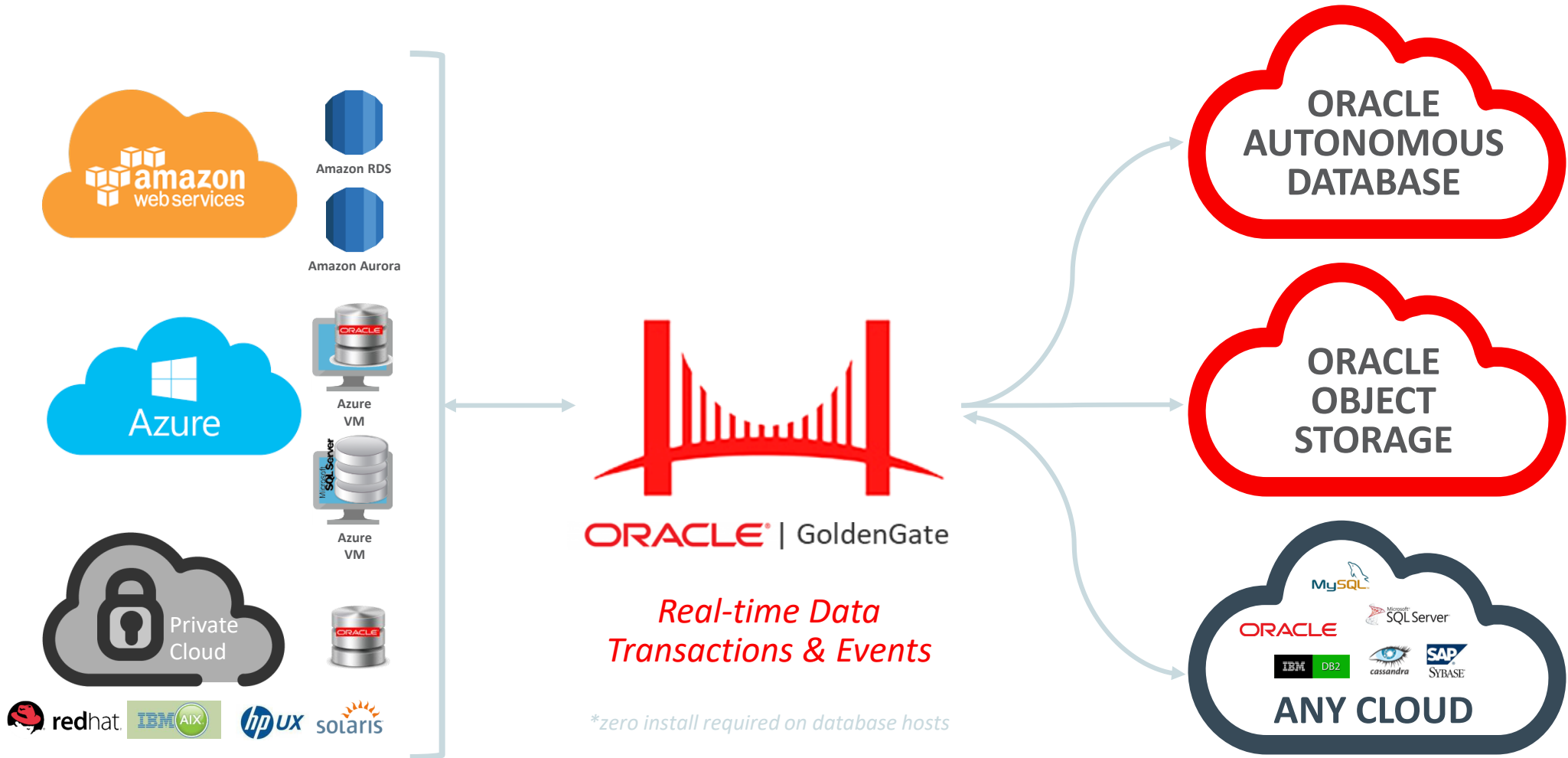
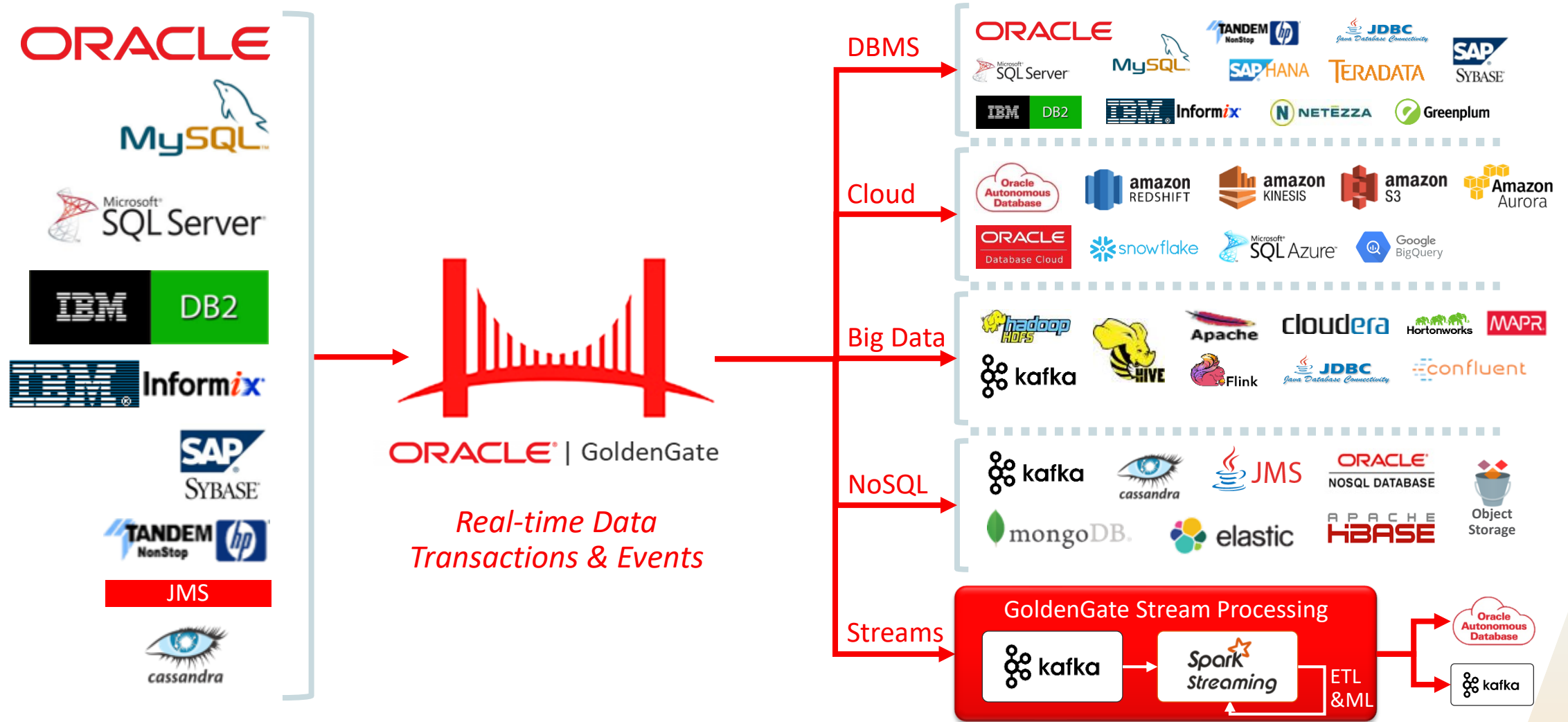# Oracle GoldenGate | 20+ Years of Innovation

KEY USE CASES & GROWTH PHASES:

2015 – Data Lake

2010 – Data Warehouse Appliances

2000's – OLTP Replication

1990's – Database HA/DR

Oracle GoldenGate: Innovations for Another 20 Years

SUMMER, 2018

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1000'S OF CUSTOMERS GLOBALLY

ebay

Linked in

NETFLIX

iTunes

PayPal

Google

JPMorgan Chase & Co.

STARBUCKS

MGM

Bank of America

T··Mobile·

WELLS FARGO

MAERSK

intuit QuickBooks

https://www.oracle.com/us/products/middleware/data-integration/oracle-goldengate-innovations-wp-5093027.pdf

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Oracle GoldenGate | **Multi-Cloud Capable**

Amazon RDS

Amazon Aurora

Azure VM

Azure VM

Private Cloud

ORACLE AUTONOMOUS DATABASE

ORACLE OBJECT STORAGE

ANY CLOUD

ORACLE | GoldenGate

Real-time Data Transactions & Events

zero install required on database hosts

Oracle GoldenGate | **Platform for the Whole Enterprise**

Real-time Data Transactions & Events
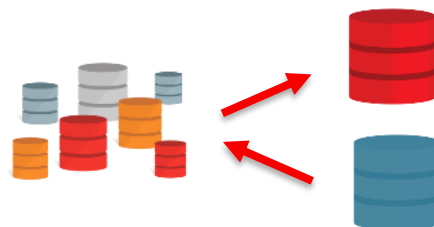
Oracle GoldenGate | Key Use Cases

Database HA/DR
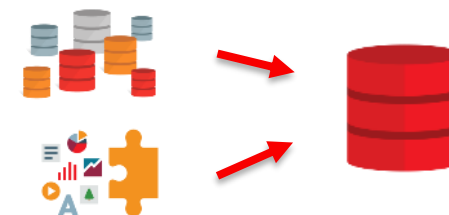Active-Active, Multi-Master, Zero-Downtime, DB Migrations

sync

OLTP Replication
Replicate transactions, data & events across OLTP databases
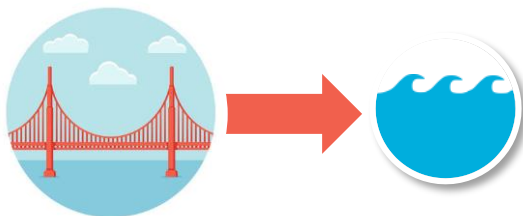
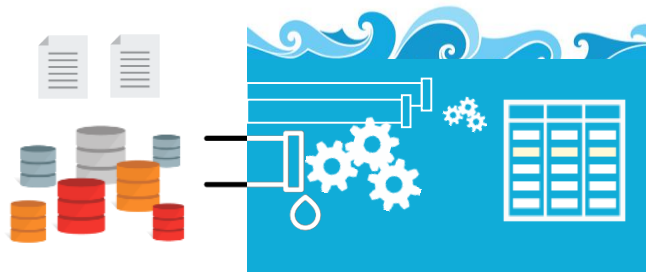## Data Warehouse Ingest
Load and stage data into Data Warehouse tables

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

Oracle GoldenGate | **Investments in Leadership**

ORACLE® | GoldenGate

GoldenGate 19.1
- Oracle Database 19c
- Microservices Security and Manageability
- Performance and Scalability Improvements
- Simplifying the GoldenGate Experience

GoldenGate 18.1
- Oracle Database 18c
- Support for ADW and ATP
- Support for identity columns
- Support for in-row archival
- Microservices Enhancements
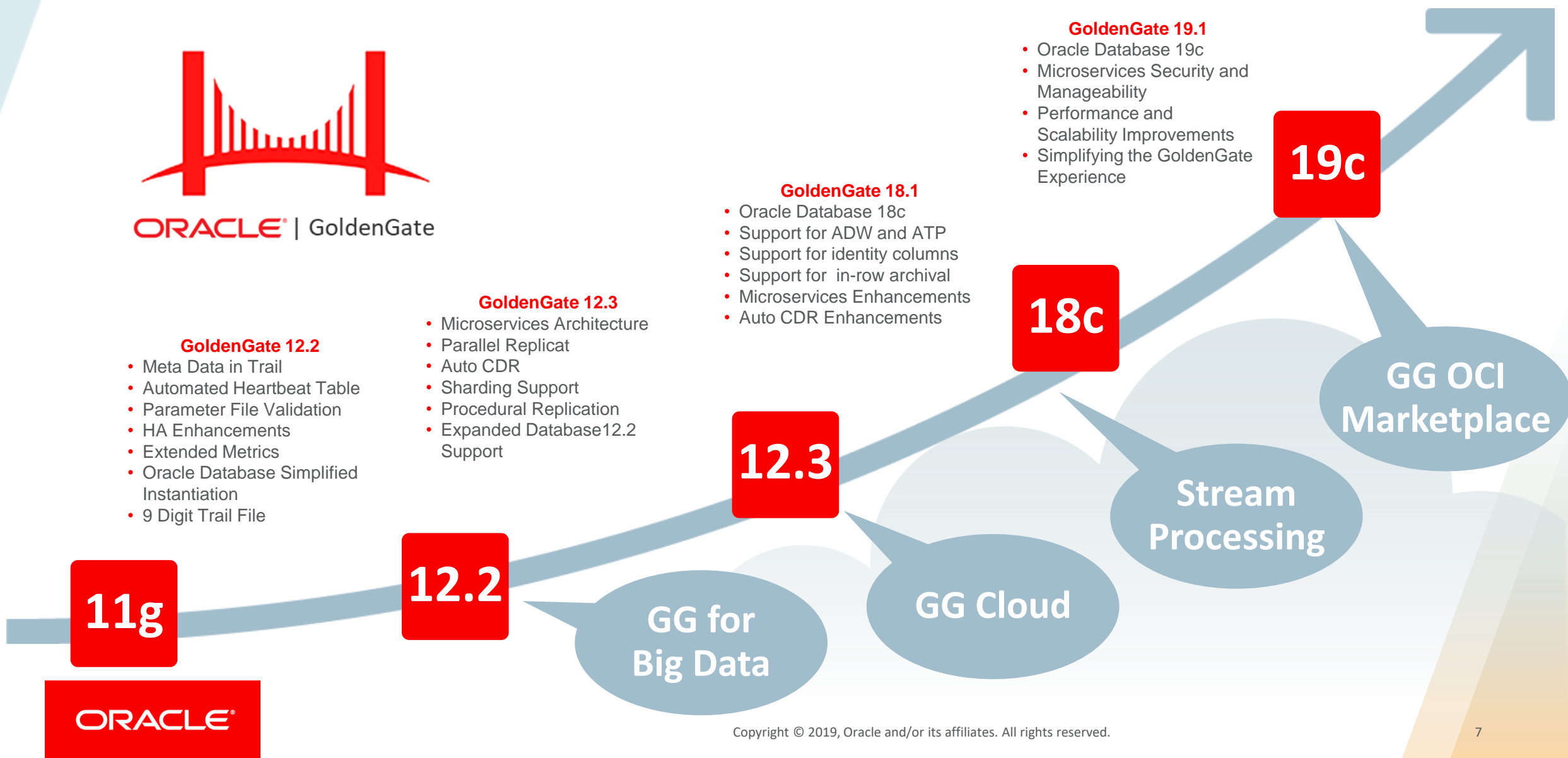- Auto CDR Enhancements

GoldenGate 12.3
- Microservices Architecture
- Parallel Replicat
- Auto CDR
- Sharding Support
- Procedural Replication
- Expanded Database12.2 Support

GoldenGate 12.2
- Meta Data in Trail
- Automated Heartbeat Table
- Parameter File Validation
- HA Enhancements
- Extended Metrics
- Oracle Database Simplified Instantiation
- 9 Digit Trail File

19c

18c

12.3

12.2

11g

GG OCI Marketplace

Stream Processing

GG Cloud

GG for Big Data

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Oracle GoldenGate | 19.1 New Features (for Oracle DB)

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.

OCI Marketplace Solution
GoldenGate 19.1 available from OCI Marketplace in both Classic and Microservices editions. Cross endian remote Integrated Extract allows remote capture of all on-premises Oracle databases for easier migration to the cloud.

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Program Agenda

1 ▶ Important Highlights:

     • ***Version Compatibility, Lifetime Support, Security, Endian Conversion, Performance and Reference Architecture Guidance***

2 ▶ Microservices – Security and Manageability Enhancements

3 ▶ Performance and Scalability Improvements

4 ▶ Simplifying the GoldenGate Experience

5 ▶ Future Roadmap Themes

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Oracle Database 19c Support & Backward Compatibility

Supports on-premises and cloud databases

- GoldenGate 19c has support for following Database versions
  - Oracle Database 19c
  - Oracle Database 18c
  - Oracle Database 12.2 and 12.1.0.2
  - Oracle Database 11.2.0.4

- Autonomous Data Warehouse (ADW) & Autonomous Transaction Processing (ATP) are Fully Certified (as Targets/Delivery)

Oracle GoldenGate Lifetime Support Policy

- GoldenGate 19.1 release will be the terminal patchset release of GoldenGate 12.3
  - GoldenGate 18.1 was the first patchset release of GoldenGate 12.3.
  - This is similar to how Oracle Database 19c is the terminal release of the Oracle Database 12.2 product line.

- Once a new yearly release is out a period of 2 years is provided for customers to upgrade to the new release.
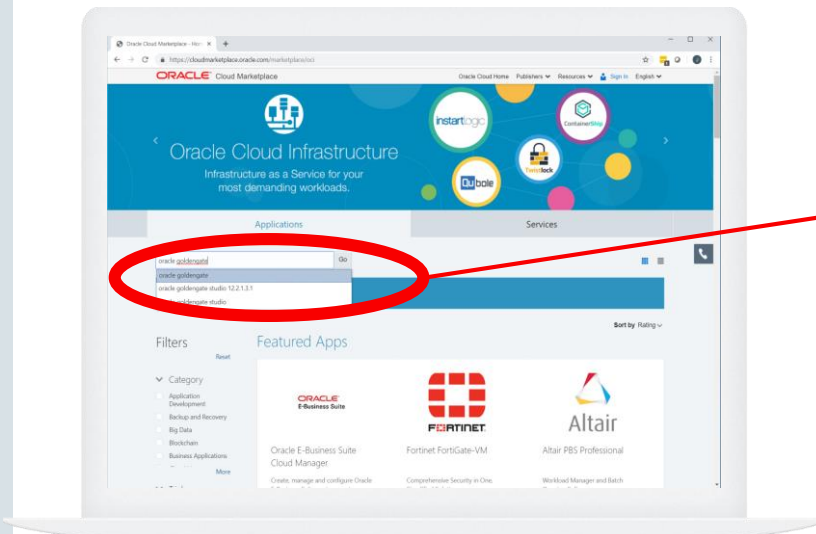
Release OGG for - Oracle, Non-Oracle - Mainframe	Patching End Dates (Error Correction)	Extended Support End Dates
12.3	31-Oct-2020	n/a
18.1	31-May-2021	n/a
19.1	31-Aug-2025	*31-Aug-2025*

GoldenGate on OCI Marketplace – 3 Steps to Productivity

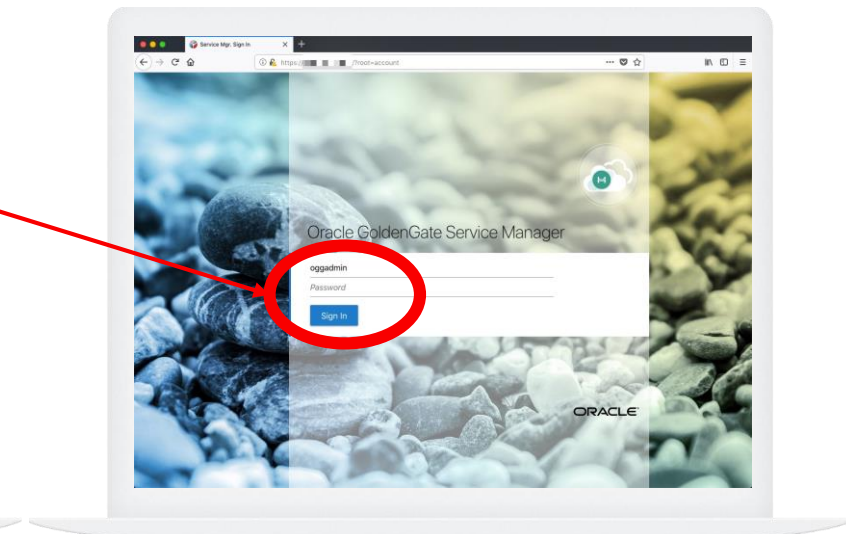**Step 1: Search OCI Marketplace**

Step 2: Provision GoldenGate on OCI

Step 3: Run GG Web Apps

Navigate to https://cloudmarketplace.oracle.com/ and search for "Oracle GoldenGate"
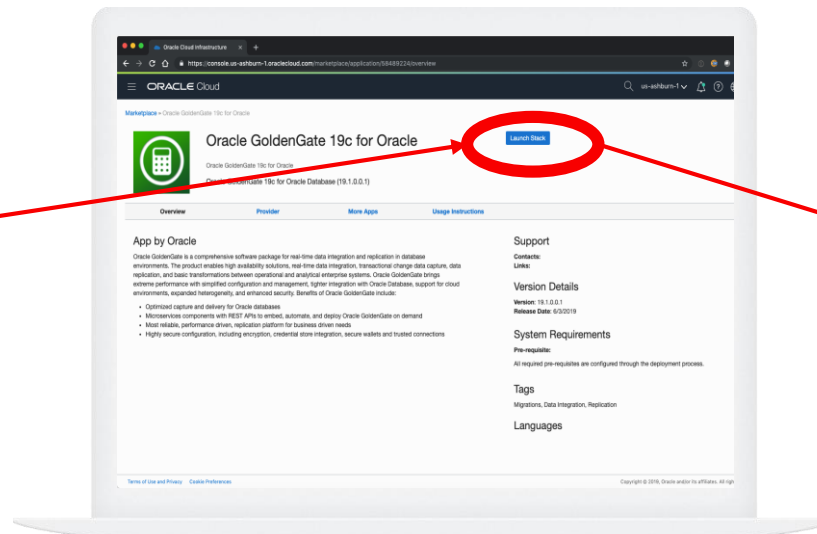
Choose "Launch App" and click through ~4 pages of forms (existing OCI account is required)

Access GoldenGate Microservices (Web Apps) from public IP Address given via OCI confirmation page

Oracle GoldenGate Enterprise Strength Security

- GoldenGate 19.1 adds to world-class security foundation
  - **Target-initiated Paths:** for firewall restricted situations where the Source cannot initiate communication with the Target
  - **Key Management Store:** integrate directly with external key vaults
  - **Fine Grained Control:** for Administrators to turn on/off the services
  - **TLS 1.2 by Default:** for secure communication
  - **HTTP Strict Transport Security:** for browser based clients
  - **Digest Authentication:** now default instead of basic
  - **Secure Wallet:** per OS user, for Admin Client credentials
  - **Encryption Profiles:** for data at rest encryption, can specify which master encryption key to use on a per trail/path basis
- Since GoldenGate 12.3...
  - **Reverse Proxy:** when using GG micro-services edition
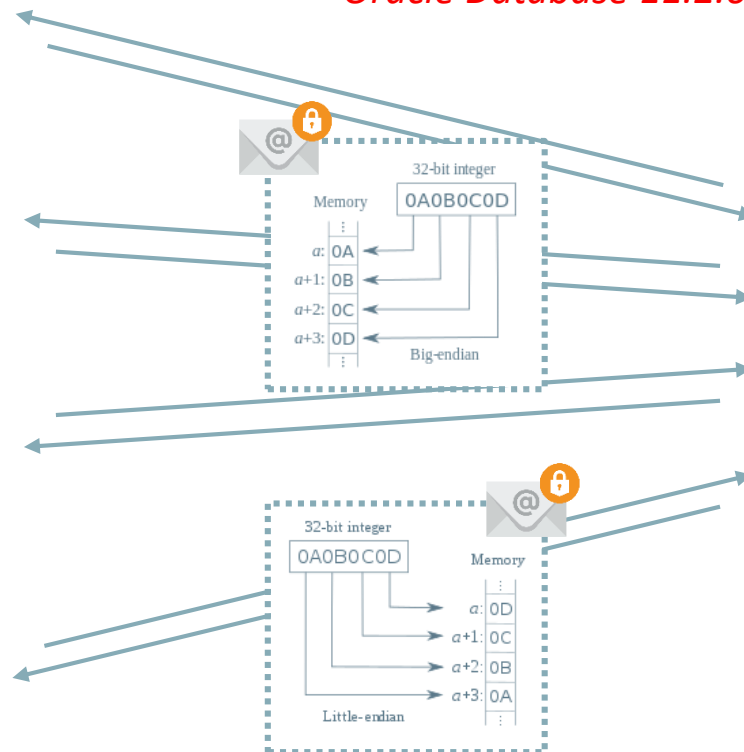 - **Secure Web Sockets/WSS:** secure, flexible integrations across the WAN

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Oracle GoldenGate Platform Independent Remote Capture
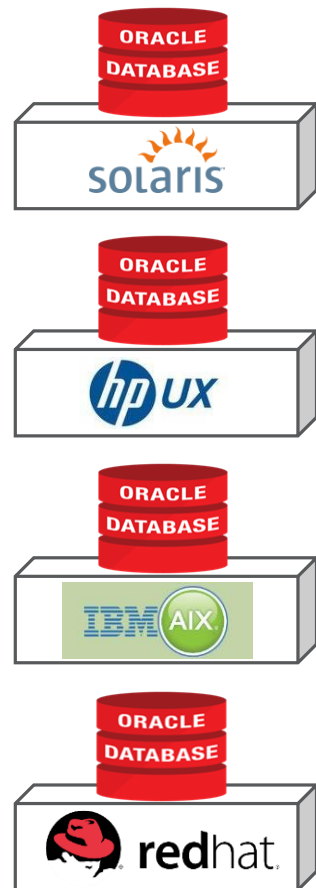
endian normalization inline to GG
remote transaction capture with zero footprint on Source DB hosts
Oracle Database 11.2.0.4 and higher

All Certifications:
https://www.oracle.com/technetwork/middleware/ias/downloads/fusion-certification-100350.html

Oracle GoldenGate 19.1 Unbeatable Performance

Performance Data Points:

Oracle DB:

-- 4TB REDO/hr, raw performance seen in Oracle lab setting

-- 1.5TB REDO/hr, actual perf at large banking customer

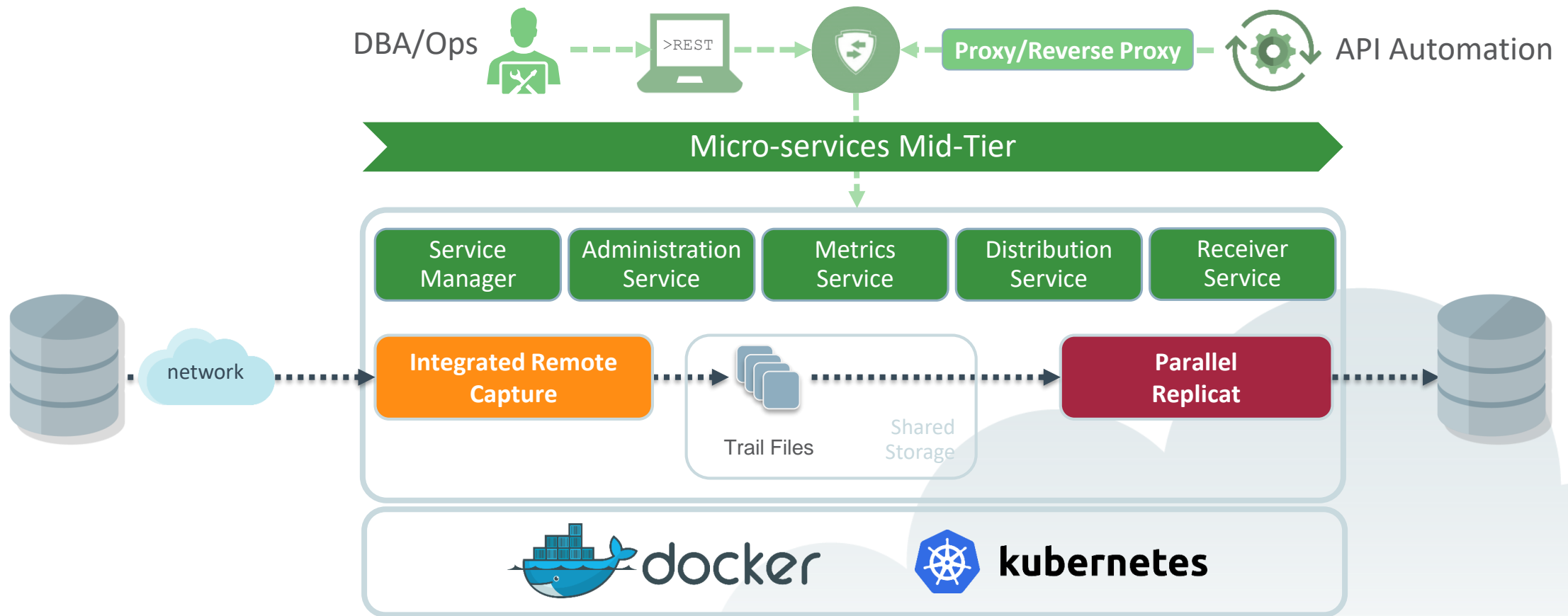-- 1m Tx/second, actual perf at Fortune 200 manufacturing cust

Non-Oracle DB:

-- 4b Tx/day on DB2 active-active at Fortune 200 retailer

-- 55k Tx/second on Mainframe to data lake at APAC mega-bank

Note: your experiences will vary

- Performance investments *every* release cycle

- No other vendor can compare on Oracle Database replication performance
  – Purpose-built APIs for extract and apply
  – Integrated (same DB code base) and highly parallel (external dependency checking)
  – Remote capture is network-optimized so that any network faster than 100ms latency performs similar to local extracts

- Non-Oracle DB performance highly competitive, regularly win bake-offs w/DB2, Mainframe, SQL Server and other non-Oracle databases

- For GoldenGate Big Data, have worked directly with LinkedIn and Confluent to optimize GG→Kafka performance

# Oracle GoldenGate Rock-Solid Reference Architecture

DBA/Ops → >REST → 🛡 ← **Proxy/Reverse Proxy** ⟳ API Automation

Micro-services Mid-Tier

| Service Manager | Administration Service | Metrics Service | Distribution Service | Receiver Service |

network → **Integrated Remote Capture** → Trail Files → **Parallel Replicat**

Shared Storage

docker kubernetes

* Oracle recommends to use Integrated Remote Capture, Micro-Services and Parallel Replicat

Program Agenda

1 ▸ Important Highlights

2 ▸ Microservices – Security and Manageability Enhancements

3 ▸ Performance and Scalability Improvements

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# Target Initiated Paths – Highly Secure Hybrid Cloud

- Receiver Service can pull trail files from Distribution Server

  – Designed for situations where the source Distribution Server cannot initiate communication with the target where the Receiver Server is running.

  – Restricted to WS and WSS Protocols for Increased Security

- Configure and administer path via the Receiver Server
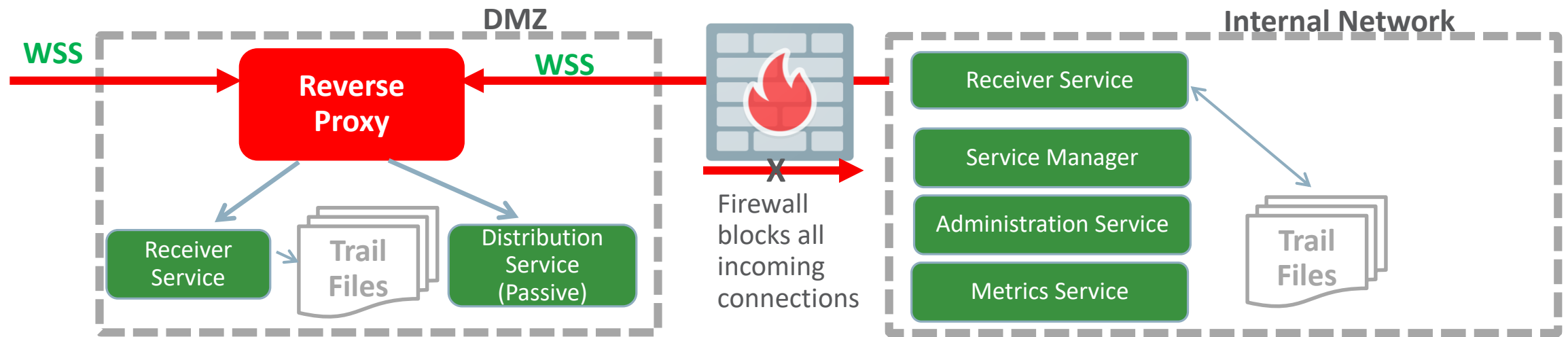
On DMZ open only a single port for WSS streaming

Integration with External Key Management Services

- Lifecycle of master encryption keys managed in KMS
  - GoldenGate does not store trail file encryption master keys on disk
  - Initial KMS support for Oracle Key Vault (OKV) 18.1
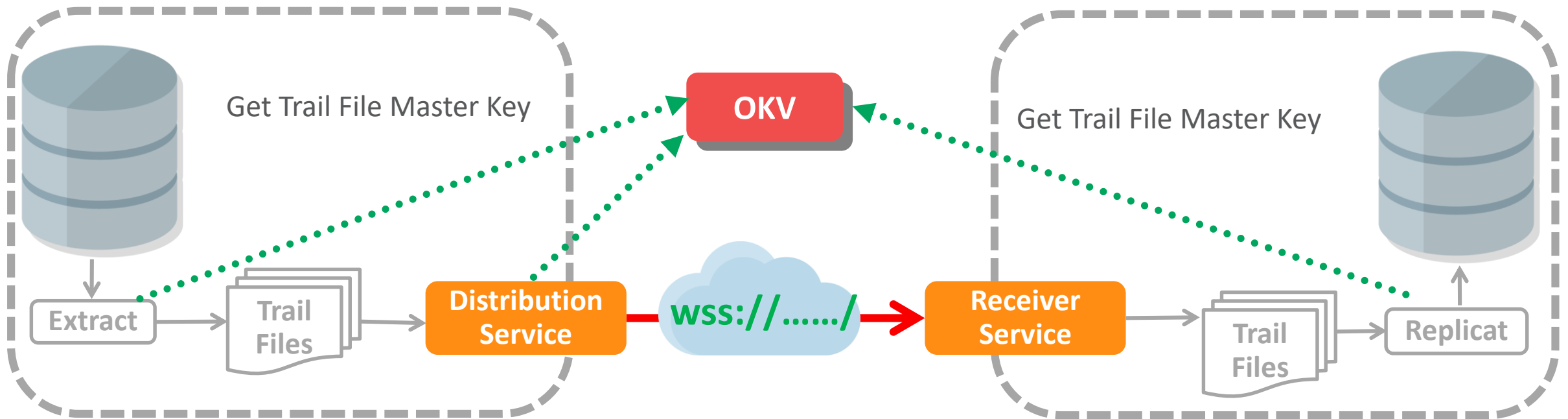
Microservices – Security Enhancements

- Improved service management for users with SECURITY role
  - Easily Enable or Disable services (Admin Service, Distribution & Receiver Service, etc) for fine grained control over each deployment

- TLS 1.2 is now the default for Secured Deployments

- Configurable Password Strength Policy
  - The default password verifier for Microservices now requires a stronger password

- Enhanced REST security
  - HTTP Strict Transport Security header for browser based clients
  - Enhanced CSRF protection using CSRF tokens for browser based clients
  - Digest Authentication now default instead of basic

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Secure scripting enhancements for Microservices

- Store credentials in local Wallet for AdminClient
  - Eliminate need to specify credentials in Obey scripts
  - Wallet isolated per OS user
- Aliases can be created for deployment credentials and Proxy servers
- Credential Store Usage
  - Create an "Alias" for the OGG Microservices user
  - Use the "Alias" in the CONNECT line in the Obey script

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Microservices – Manageability Improvements

- Profiles for AutoStart/AutoRestart
  - Associate a profile with Extract(s) and/or Replicat(s) to control which processes restart upon a failure and how often.
  - Each process can have a different profile based on your SLA

- Encryption Profiles for data at rest encryption
  - Can specify which master encryption key to use on a per trail/path basis.
  - Requires use of Key Management Services (OKV)

- Component Lag Monitoring
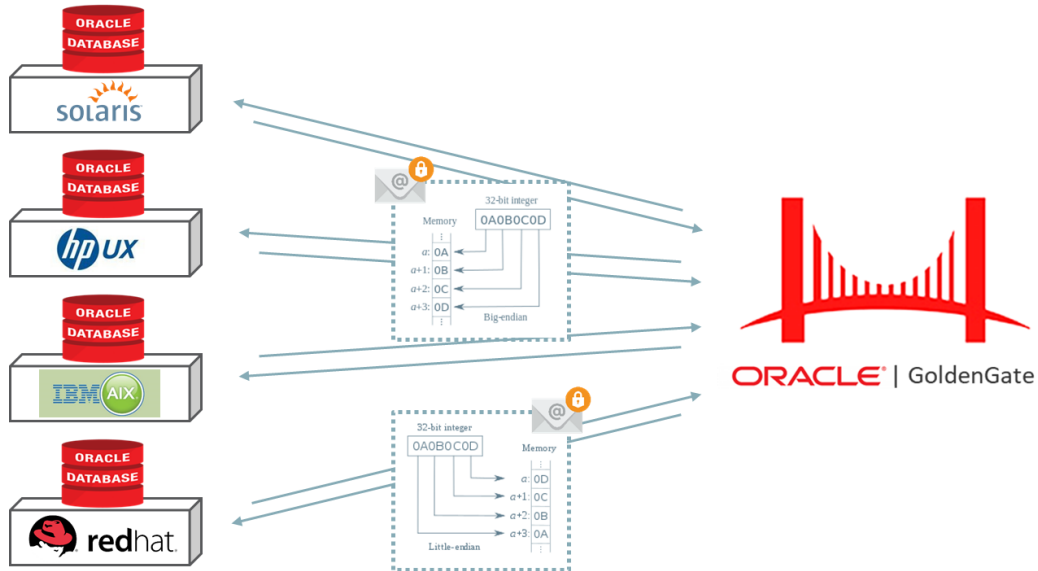 - Create a Task to track GoldenGate Extract/Replicat Lag based on your SLA

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Remote Cross-Endian Integrated Extract Support

All Certifications:
https://www.oracle.com/technetwork/middleware/ias/downloads/fusion-certification-100350.html

- Increased Performance when run Locally and Remotely
  - High latency networks are no longer a performance issue
  - Hybrid / Mid-Tier topologies, deploy OGG in the cloud to capture from anywhere

- Flexibility for Remote Integrated Extract
  - Automatically enabled.
  - Source database can have compatibility set to 11.2.0.4 through 19.x.
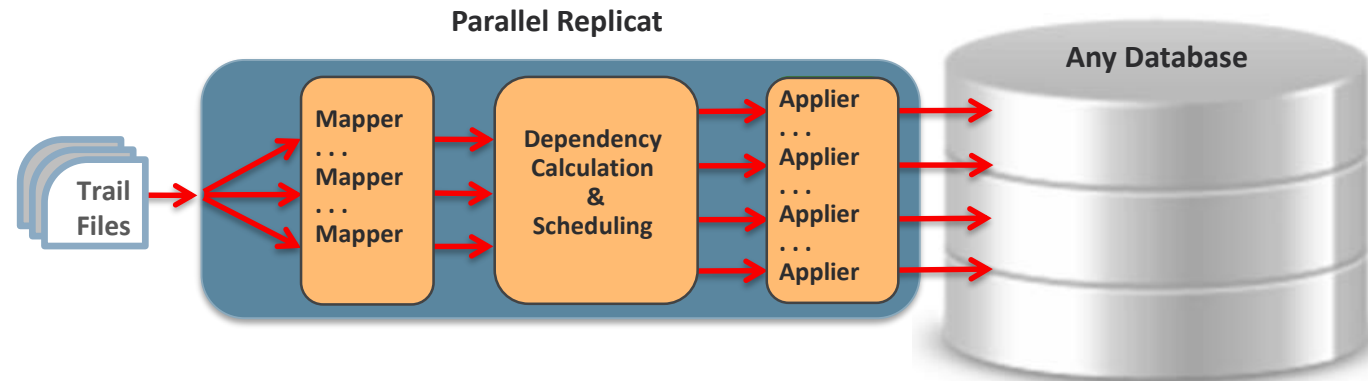 - Source database can be different operating system and different Endian

Parallel Replicat Performance Improvements

- Improved performance and scalability for Parallel Replicat

- Better Autoscaling Algorithm and Autotuning

- Remote Parallel Replicat supports Cloud Databases
  - Autonomous Transaction Processing (ATP) – Use non-integrated mode
  - Autonomous Data Warehouse (ADW) – Use non-integrated mode
  - Exadata Cloud at Customer (ExaCC) – Use non-Integrated or Integrated mode*
  - Exadata Cloud Service (ExaCS) – Use non-Integrated or Integrated mode

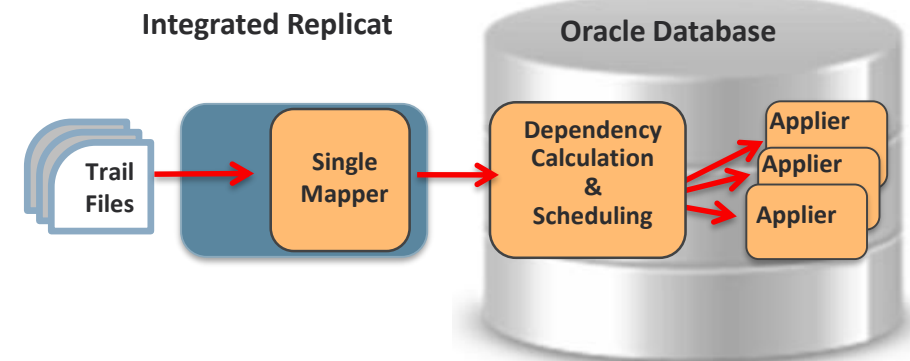- Oracle Recommends all customers switch to Parallel Replicat

* - Requires Database version 12.2 or higher

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Parallel Replicat Architecture: Recommended Approach

- **Best Performance**
- **More Automated**
- **High Stability**
- **Oracle DB or Non-Oracle DBs (future)**
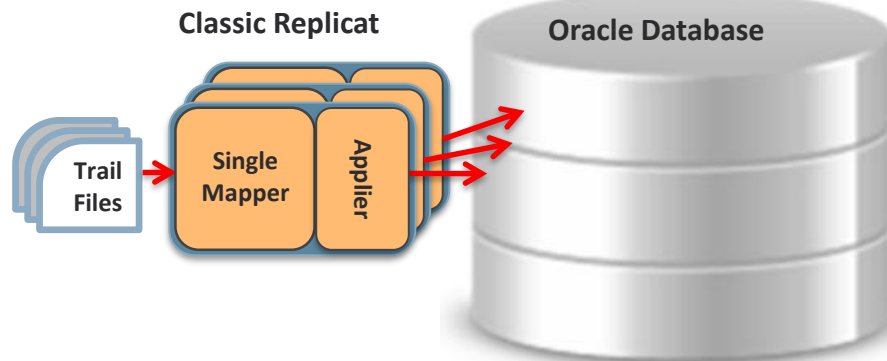
Parallel Replicat

Trail Files → Mapper . . . Mapper . . . Mapper → Dependency Calculation & Scheduling → Applier . . . Applier . . . Applier . . . Applier → **Any Database**

Older Options:

Classic Replicat

Trail Files → Single Mapper / Applier → **Oracle Database**

Integrated Replicat

Trail Files → Single Mapper → Dependency Calculation & Scheduling → Applier / Applier / Applier → **Oracle Database**

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Simplified Software Upgrade

- Simply upgrade software and restart GoldenGate processes
  - Extract will always maintains trail compatibility of previous version
  - Eliminates operational procedures on the targets when source is upgraded
  - No additional command necessary at source.
  - Simplifies software upgrades in Active-Active environments
- Update FORMAT RELEASE parameter explicitly to force trail file format to higher version
  - At target, Replicats will require quiesce and re-position in this case
- Complete steps for the upgrade can be found in the Oracle GoldenGate 19c Documentation

Making GoldenGate Easier to Use

Smarter default settings for parameters to simplify deployments

- TRANLOGOPTIONS INCLUDEREGIONID is no longer need, region ID is automatically stored if necessary

- CONVERTBADNUM and _INFINITYTOZERO is no longer needed when dealing with +INF and –INF, these values are automatically handled if encountered

- NOALLOWNULLABLEKEYS is now the default to skip choosing potentially problematic indexes.

- TRANLOGOPTIONS GETCTASDML is now enabled by default to support a wider array of topologies
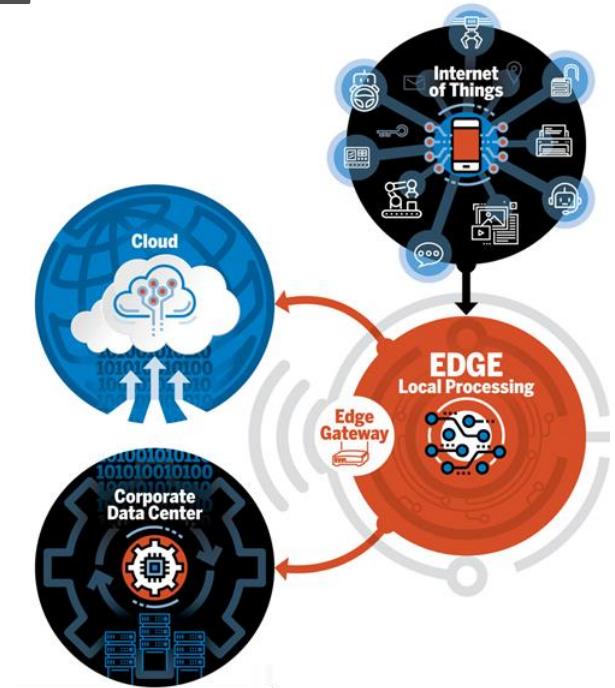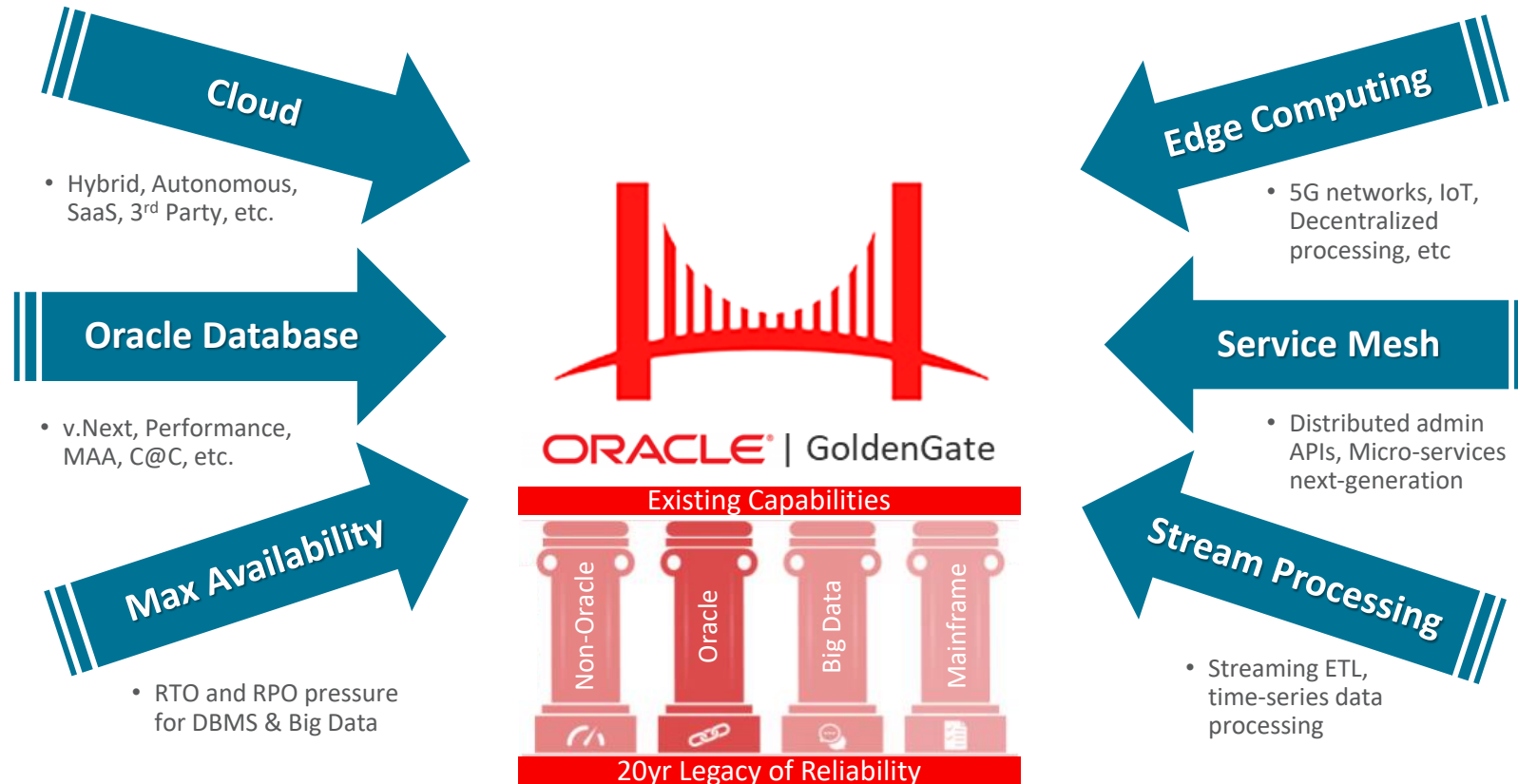
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Ease of Use Enhancements

- Improved Initial Load Process
  - The consistent SCN used for the Initial load is provided, so it can be used to precisely position the Replicat process to avoid duplicate records.

- Enhanced Heartbeat Table
  - The Heartbeat Table has been extended to include information about the source Extract process for recovery purposes. The last heartbeat record can be used to reposition Extract in the event of a disaster or loss of the source system.

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Oracle GoldenGate | Industry Forces to 2022

Cloud
- Hybrid, Autonomous, SaaS, 3rd Party, etc.

Oracle Database
- v.Next, Performance, MAA, C@C, etc.

Max Availability
- RTO and RPO pressure for DBMS & Big Data

Edge Computing
- 5G networks, IoT, Decentralized processing, etc

Service Mesh
- Distributed admin APIs, Micro-services next-generation

Stream Processing
- Streaming ETL, time-series data processing

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Existing Capabilities

Non-Oracle Oracle Big Data Mainframe

20yr Legacy of Reliability