

GoldenGate for Bigdata 实践

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20-22

数据库和云讲座群



甲骨文云技术公众号



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GoldenGate for BigData 实践

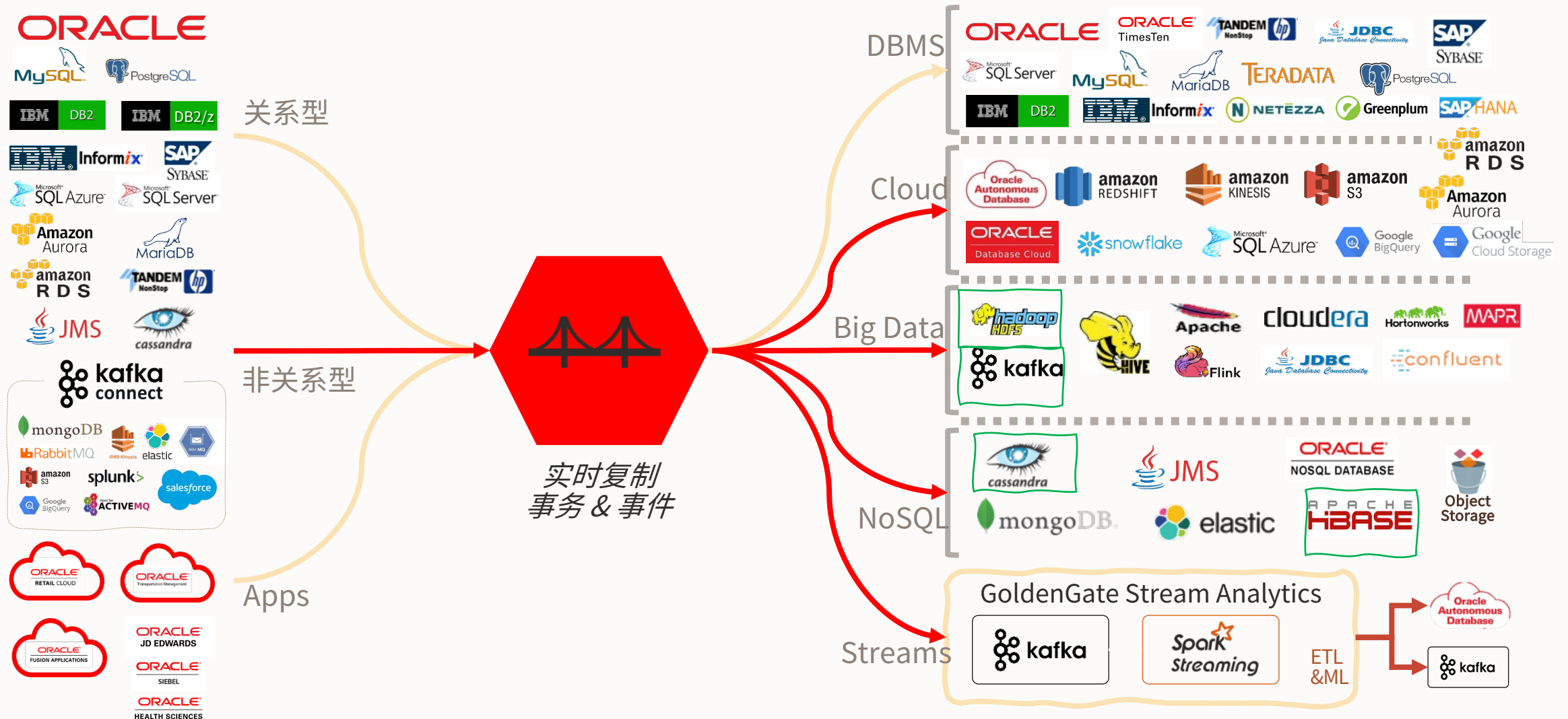
甲骨文技术公益课 - 数据库专场

2023年11月24日 11:00

线上直播

邹奇

GoldenGate for Big Data





GoldenGate for Big Data 支持哪些数据目标

Cloud Data Warehouses (stage-merge)

- GoldenGate for Oracle Autonomous DWH
- GoldenGate for Snowflake
- GoldenGate for Microsoft Azure Synapse Analytics
- GoldenGate for Hive
- GoldenGate for AWS Redshift
- GoldenGate for Google Cloud Platform Big Query

NoSQL Data Stores

- GoldenGate for Oracle NoSQL
- GoldenGate for MongoDB
- GoldenGate for Cassandra / DataStax
- GoldenGate for Hbase

General Database

- GoldenGate for JDBC

Events & Messaging

- GoldenGate for Oracle Cloud Infrastructure Streaming
- GoldenGate for Kafka
- GoldenGate for Confluent Kafka Connect
- GoldenGate for AWS Kinesis
- GoldenGate for Microsoft Azure Event Hubs
- GoldenGate for JMS

Storage & Search

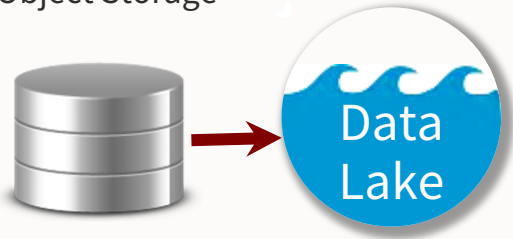
- GoldenGate for Oracle Cloud Infrastructure Object Storage
- GoldenGate for AWS S3
- GoldenGate for Microsoft Azure Blob Storage
- GoldenGate for Microsoft Azure Data Lake
- GoldenGate for Microsoft Azure Data Lake Gen2
- GoldenGate for Google Cloud Storage
- GoldenGate for Elasticsearch
- GoldenGate for Flat File
- GoldenGate for HDFS
- GoldenGate for Java



GG for Big Data -- 典型场景

Data Lake Ingestion

HDFS
Elasticsearch
Object Storage



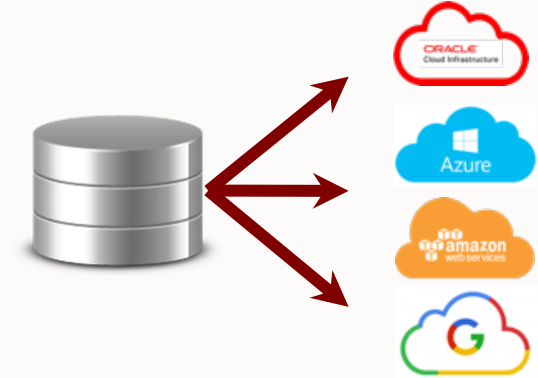
Streaming Ingestion

Kafka, Confluent, Kinesis/MSK
Oracle Streaming Service



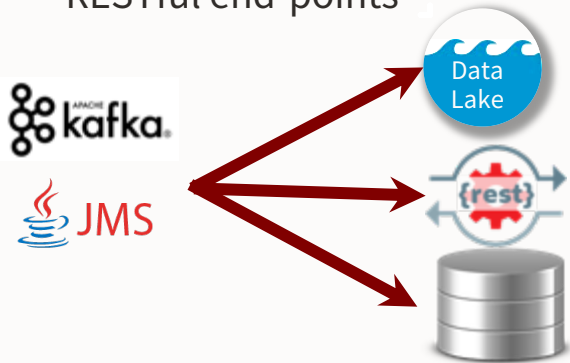
Multi-Cloud Ingestion

Object Storage & Data Warehouse



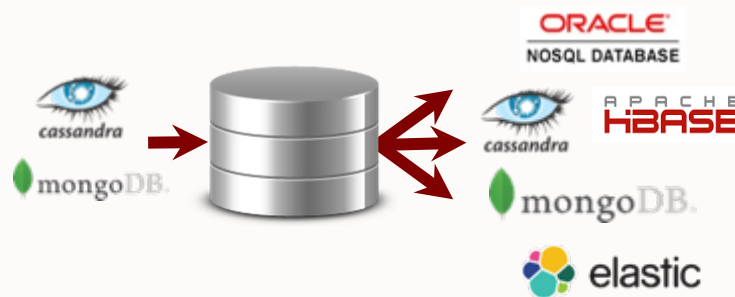
Messaging Replication

Formats: JSON, XML,
Delimited, Avro, Parquet, etc
RESTful end-points



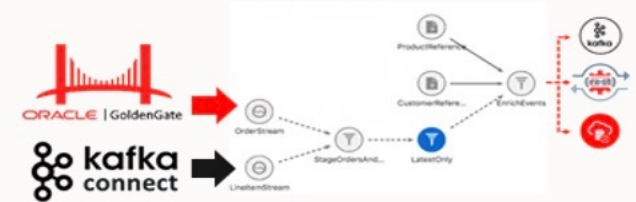
NoSQL Replication

Cassandra, Mongo, HBase and Oracle
Elasticsearch (ELK Stack)

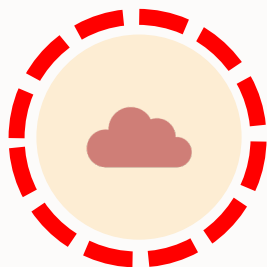


Stream Data Processing

Distributed Computing Architecture
for Streaming ETL on Spark



GoldenGate for Big Data – 关键优势



多云 &
异构系统集成



更低的TCO成本



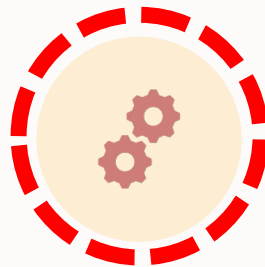
微服务架构



超强的扩展性 &
性能



安全性



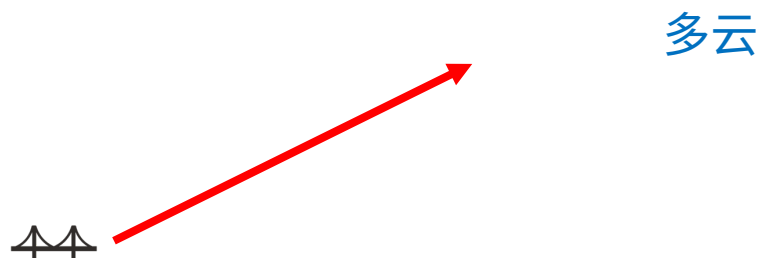
集成流式数据处理



现有的 OGG 部署



…增加 OGG for Big Data 部署



多云

One of the largest
DI install bases in
the world

GoldenGate 微服务架构

微服务架构可实现自动化、解耦、监控和高安全性

Recap - Oracle GoldenGate Classic Architecture

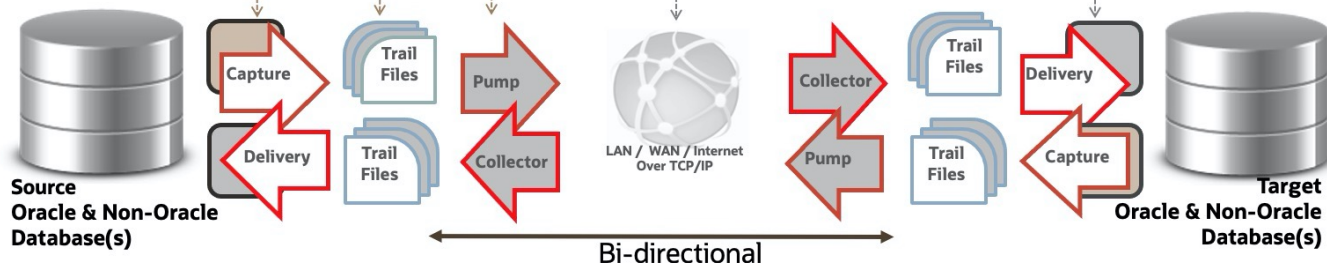
Capture: committed transactions are captured (and can be filtered) as they occur by reading the transaction logs. GoldenGate offers two options for capture for Oracle; Classic & Integrated Capture

Trail: stages and queues data for routing.

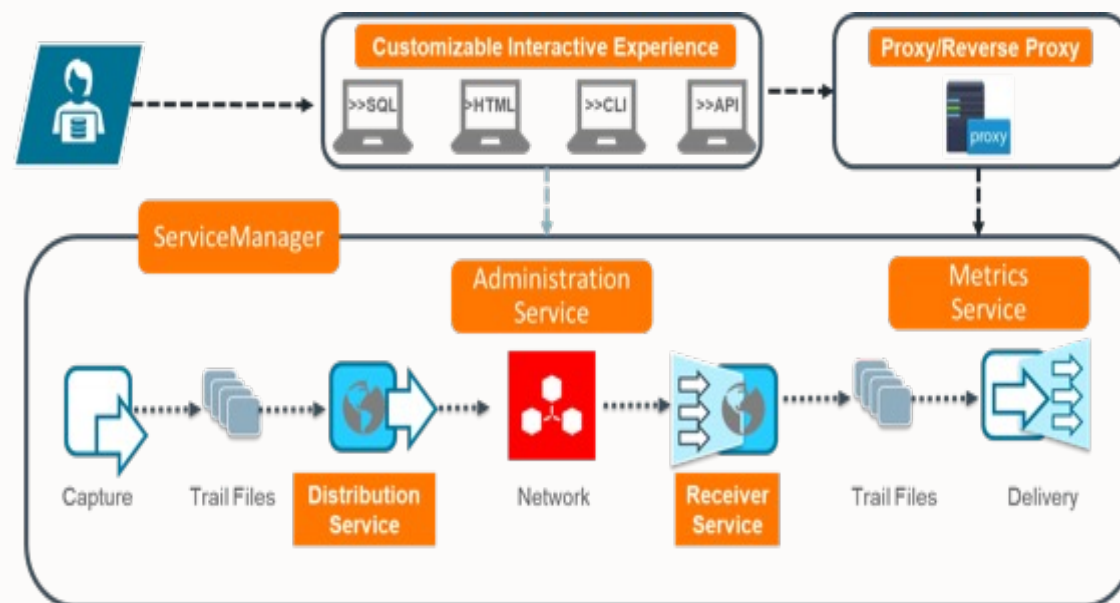
Pump: distributes data for routing to target(s).

Route: data is compressed, encrypted for routing to target(s).

Delivery: applies data with transaction integrity.

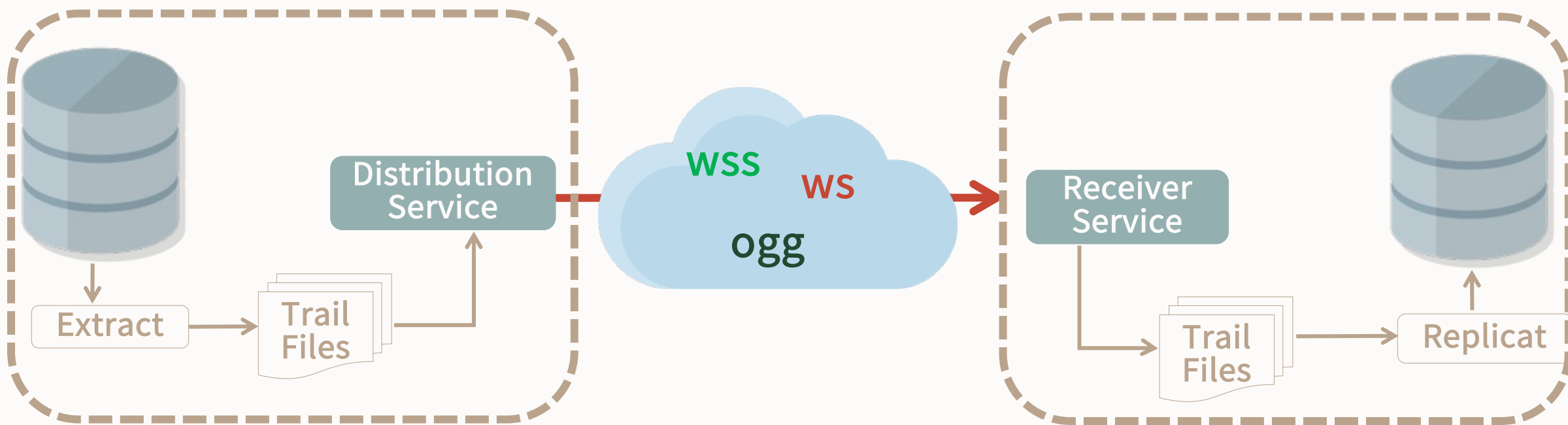


New - 微服务架构



支持的通讯协议

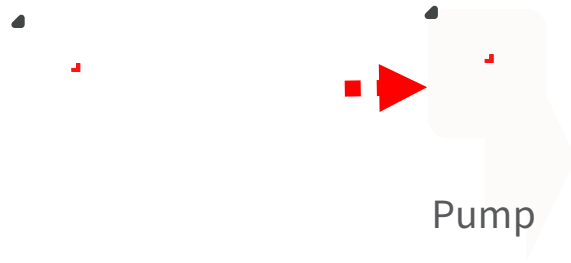
行业标准 HTTP (S) 发起的全双工流协议



- 基于SSL的安全性
- 可以无缝支持 HTTP 正向/反向代理服务器



Classic to Classic



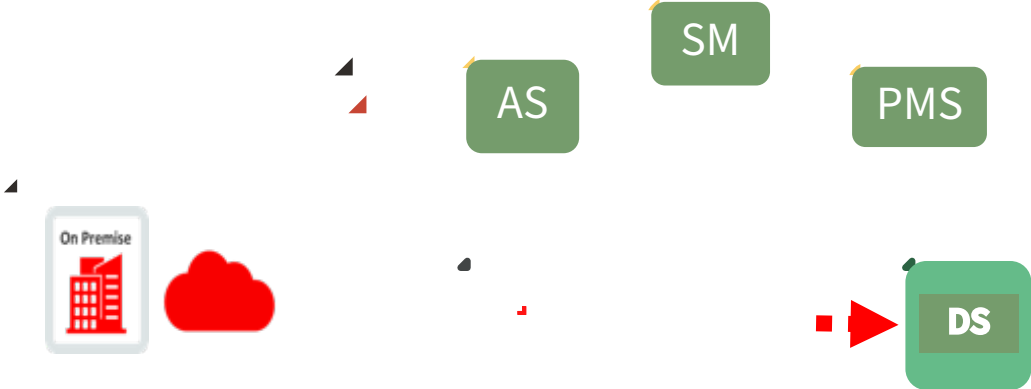
AVRO
JSON
XML
ORC
PARQUE
T



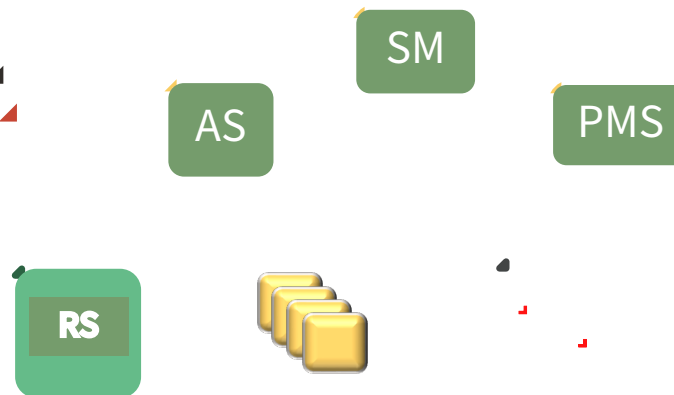
ORACLE
NOSQL
DATABASE



Microservices to Classic

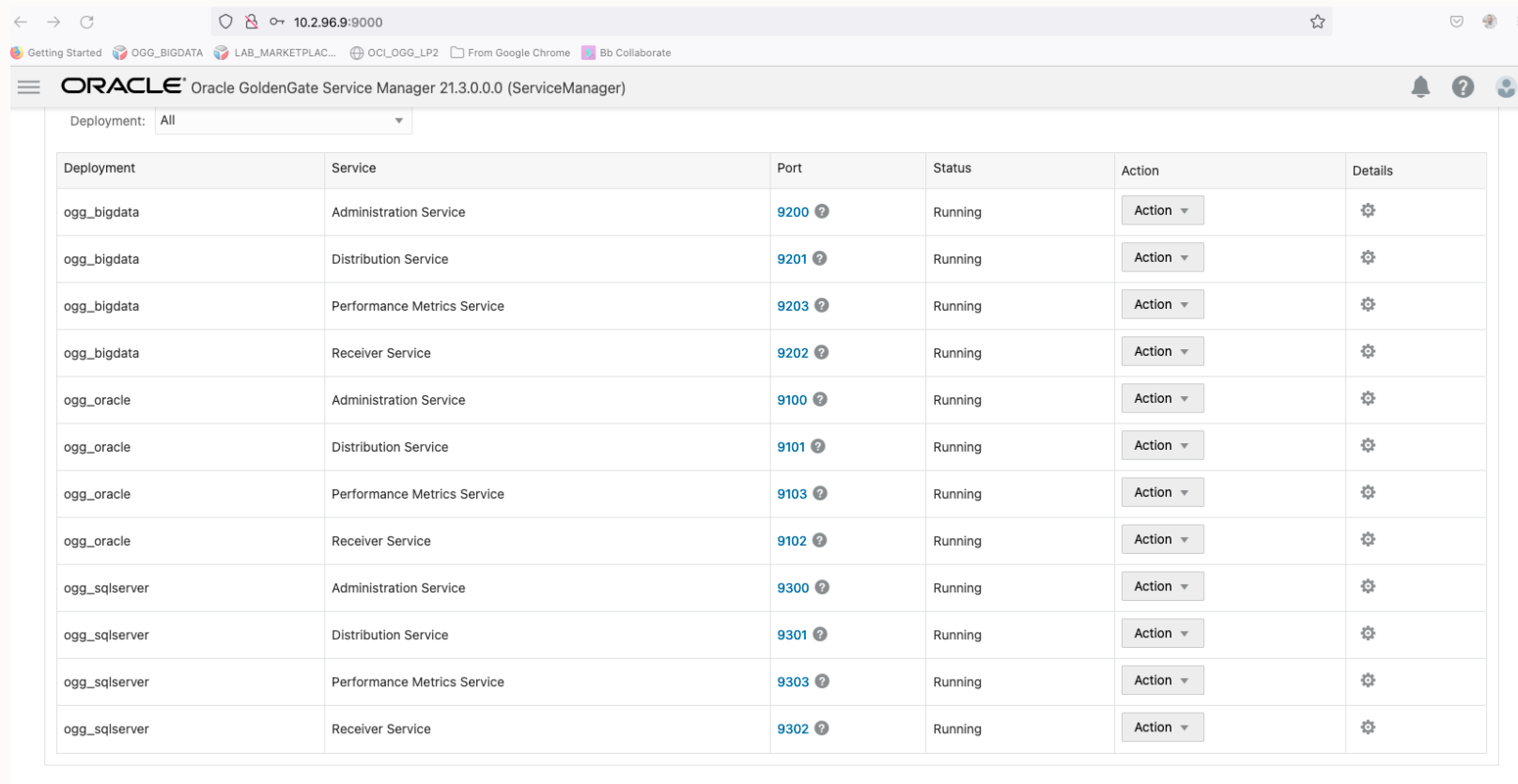


Classic to Microservices



GGBD Microservices 安装配置

- 使用 OUI 安装
- 过程与 OGG Core 相似
- 支持在源系统/边缘节点上或作为中间层（远程）服务器安装
- 需要独立安装 Java
- 第三方库需要单独安装
 - Dependency Downloader



The screenshot shows the Oracle GoldenGate Service Manager web interface. The browser address bar displays the URL 10.2.96.9:9000. The page title is "ORACLE Oracle GoldenGate Service Manager 21.3.0.0.0 (ServiceManager)". Below the title, there is a "Deployment:" dropdown menu set to "All". The main content is a table with the following columns: Deployment, Service, Port, Status, Action, and Details. The table lists 12 services, all of which are in a "Running" status. Each row includes an "Action" dropdown menu and a "Details" gear icon.

Deployment	Service	Port	Status	Action	Details
ogg_bigdata	Administration Service	9200	Running	Action	⚙️
ogg_bigdata	Distribution Service	9201	Running	Action	⚙️
ogg_bigdata	Performance Metrics Service	9203	Running	Action	⚙️
ogg_bigdata	Receiver Service	9202	Running	Action	⚙️
ogg_oracle	Administration Service	9100	Running	Action	⚙️
ogg_oracle	Distribution Service	9101	Running	Action	⚙️
ogg_oracle	Performance Metrics Service	9103	Running	Action	⚙️
ogg_oracle	Receiver Service	9102	Running	Action	⚙️
ogg_sqlserver	Administration Service	9300	Running	Action	⚙️
ogg_sqlserver	Distribution Service	9301	Running	Action	⚙️
ogg_sqlserver	Performance Metrics Service	9303	Running	Action	⚙️
ogg_sqlserver	Receiver Service	9302	Running	Action	⚙️



GGBD Microservices – 升级

从 Classic 升级到 Microservices

- 不支持自动升级
- 可手动升级
 - 创建一个新的 GGBD Extract/Replicat
 - 将配置文件中的内容复制到微服务 UI





第三方库自动下载器

OGGBD 21.1 新特性

- 实用程序脚本位于安装目录中
 - {OGGBD install}/DependencyDownloader
- 下载第三方库的步骤
 1. 确保 Java 在 PATH 中可用。要验证，请从上述目录运行以下命令
`>java -version`
 2. 对于 Windows，请确保 Cygwin 已安装
(这是一个免费软件，用于模拟Unix命令)
 3. 设置代理设置，以防本机上没有直接互联网。编辑文件
{OGGBD install}/DependencyDownloader/config_proxy.sh
并取消注释并编辑以下行：
`export PROXY_SERVER_HOST=proxy.mycompany.com`
`export PROXY_SERVER_PORT=8080`

运行依赖项下载脚本

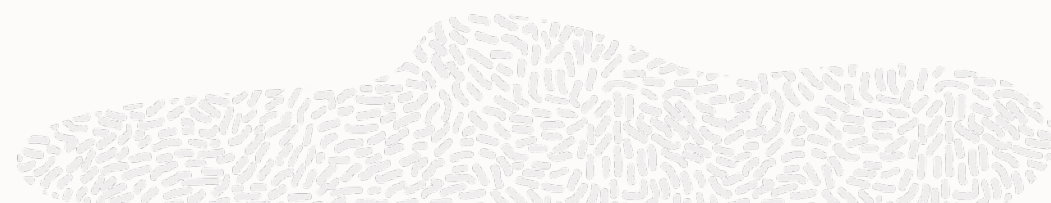
```
> {OGGBD install}/DependencyDownloader/{dependency_script} {version}
```

例如： `./aws.sh 1.11.893 ./hbase_cloudera.sh 2.4.6 ./kafka.sh 1.4.2`

库文件将自动下载到以下目录

```
{OGGBD install}/DependencyDownloader/dependencies/aws_sdk_1.11.893
```


第三方库自动下载器



Handler Name /Type	Script Name
Apache HDFS, HDFS Event, ORC, Parquet	hadoop.sh
Azure HDFS, HDFS Event, ORC, Parquet	hadoop_azure_cloudera.sh
Cloudera HDFS, HDFS Event, ORC, Parquet-	hadoop_cloudera.sh
Hortonworks HDFS, HDFS Event, ORC, Parquet	hadoop_hortonworks.sh
Apache HBase	hbase.sh
Cloudera HBase	hbase_cloudera.sh
Hortonworks HBase	hbase_hortonworks.sh
Apache Kafka, Kafka Connect, Kafka Capture	kafka.sh
Cloudera Kafka, Kafka Connect, Kafka Capture	kafka_cloudera.sh
HortonWorks Kafka, Kafka Connect, Kafka Capture	kafka_hortonworks.sh
Confluent Kafka, Kafkaconnect, KafkaCapture	kafka_confluent.sh

Handler Name /Type	Script Name
AWS Kinesis and S3 Event Handler	aws.sh
Apache ORC	orc.sh
Apache Parquet	parquet.sh
Apache Cassandra	cassandra.sh
Datastax Enterprise	cassandra_dse.sh
Elasticsearch REST	elasticsearch_rest.sh
Elasticsearch Transport	elasticsearch_transport.sh
GCP BigQuery	bigquery.sh
MongoDB	mongodb.sh
Oracle NoSQL	oracle_nosql.sh
Oracle OCI	oracle_oci.sh

Best practices

- 尽可能使用与OGG连接的目标端完全相同版本的客户端依赖库
- 在运行 Dependency Downloader 脚本之前, 通过 webUI 独立验证版本号是否存在于存储库中。



OGG-BD Pluggable Formatters

OGG-BD 可插拔格式器是一个非常强大和灵活的工具，用于增强各种消息格式。可插拔格式化程序可以与各种OGG-BD Event Handler一起使用，并根据消息的类型增强消息。可用于 Avro_Row、Avro_Operation、Avro_Object_Container、JSON 和 XML

- Operation-Based Formatting
 - JSON
 - Avro Operation
 - XML
- Row-Based Formatting
 - Delimited Text
 - Avro Row
 - Avro OCF

```
{  
  "table": "GG.TCUSTORD",  
  "op_type": "U",  
  "op_ts": "2013-06-02 22:14:41.000000",  
  "current_ts": "2015-09-18T10:13:11.492000",  
  "pos": "000000000000000002891",  
  "primary_keys": ["CUST_CODE", "ORDER_DATE",  
  "PRODUCT_CODE", "ORDER_ID"],  
  "tokens": { "R": "AADPkvAAEAAEqLzAAA" },  
  "CUST_CODE": "BILL",  
  "ORDER_DATE": "1995-12-31:15:00:00",  
  "PRODUCT_CODE": "CAR",  
  "ORDER_ID": "765",  
  "PRODUCT_PRICE": 14000.0,  
  "PRODUCT_AMOUNT": 3.0,  
  "TRANSACTION_ID": "100"  
}
```

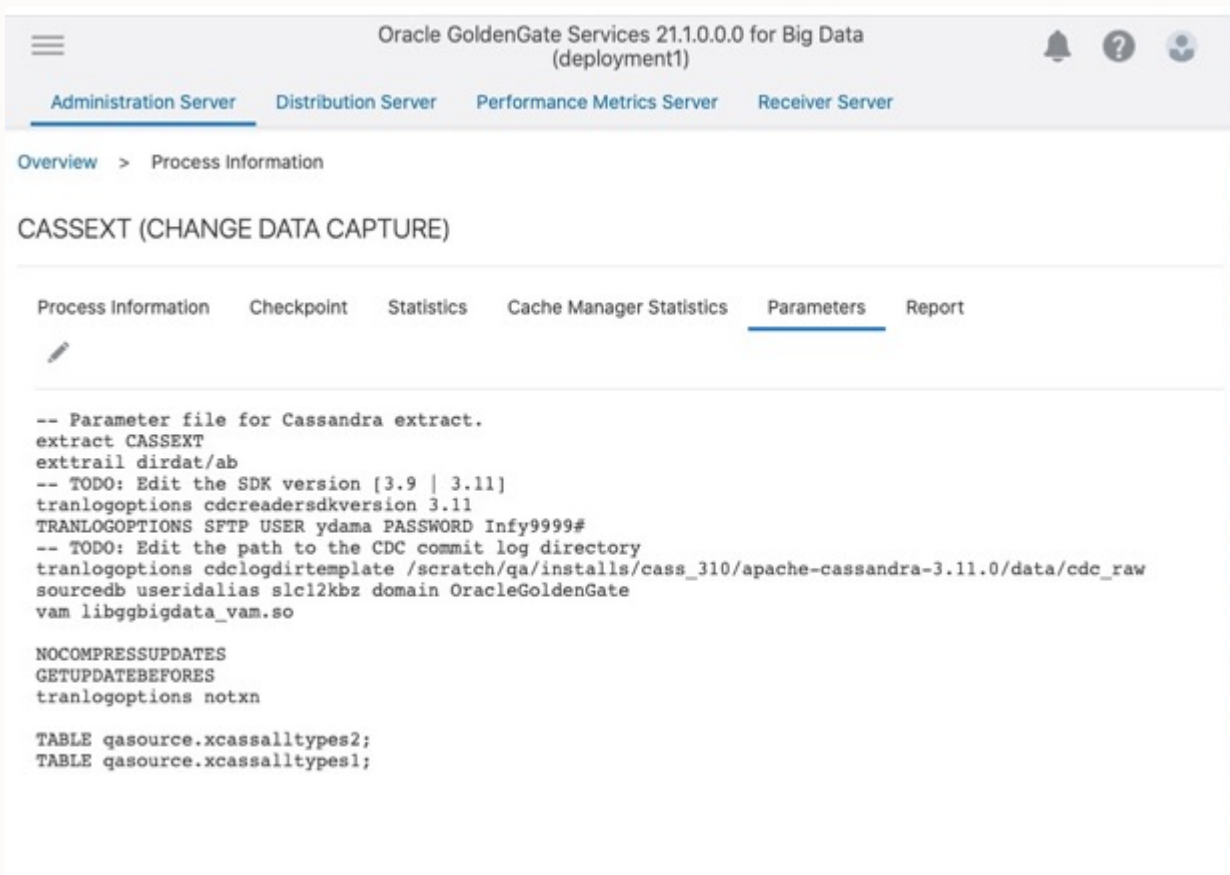


Keyword	Explanation	Transaction Message Support
<code>\${fullyQualifiedTableName}</code>	Resolves to the fully qualified table name including the period (.) delimiter between the catalog, schema, and table names. For example, test.dbo.table1.	No
<code>\${catalogName}</code>	Resolves to the catalog name.	No
<code>\${schemaName}</code>	Resolves to the schema name.	No
<code>\${tableName}</code>	Resolves to the short table name.	No
<code>\${opType}</code>	Resolves to the type of the operation: (INSERT, UPDATE, DELETE, or TRUNCATE)	No
<code>\${primaryKeys}</code>	Resolves to the concatenated primary key values delimited by an underscore (_) character.	No
<code>\${position}</code>	The sequence number of the source trail file followed by the offset (RBA).	Yes
<code>\${opTimestamp}</code>	The operation timestamp from the source trail file.	Yes
<code>\${emptyString}</code>	Resolves to "" .	Yes
<code>\${groupName}</code>	Resolves to the name of the Replicat process. If using coordinated delivery, it resolves to the name of the Replicat process with the Replicate thread number appended.	Yes
<code>\${staticMap[]}</code>	Resolves to a static value where the key is the fully-qualified table name. The keys and values are designated inside of the square brace in the following format: <code>\${staticMap[dbo.table1=value1,dbo.table2=value2]}</code>	No
<code>\${columnValue[]}</code>	Resolves to a column value where the key is the fully-qualified table name and the value is the column name to be resolved. For example: <code>\${staticMap[dbo.table1=col1,dbo.table2=col2]}</code>	No
<code>\${currentTimestamp}</code> Or <code>\${currentTimestamp[]}</code>	Resolves to the current timestamp. You can control the format of the current timestamp using the Java based formatting as described in the SimpleDateFormat class, see https://docs.oracle.com/javase/8/docs/api/java/text/SimpleDateFormat.html Examples: <code>\${currentDate}</code> <code>\${currentDate[yyyy-mm-dd hh:MM:ss.SSS]}</code>	Yes
<code>\${null}</code>	Resolves to a NULL string.	Yes
<code>\${custom[]}</code>	It is possible to write a custom value resolver. If required, contact Oracle Support.	Implementation dependent
<code>\${token[]}</code>	Resolves a token value.	No



OGG-BD 配置

配置 Big Data **Extract – Properties** 文件 (eg: Cassandra Extract)



```
-- Parameter file for Cassandra extract.
extract CASSEXT
exttrail dirdat/ab
-- TODO: Edit the SDK version [3.9 | 3.11]
tranlogoptions cdcreadersdkversion 3.11
TRANLOGOPTIONS SFTP USER ydama PASSWORD Infy9999#
-- TODO: Edit the path to the CDC commit log directory
tranlogoptions cdclgdirtemplate /scratch/qa/installs/cass_310/apache-cassandra-3.11.0/data/cdc_raw
sourcecdb userdialias slcl2kbz domain OracleGoldenGate
vam libggbigdata_vam.so

NOCOMPRESSUPDATES
GETUPDATEBEFORES
tranlogoptions notxn

TABLE qasource.xcassalltypes2;
TABLE qasource.xcassalltypes1;
```

- 配置 GLOBALS 参数
- 标准 OGG 参数文件
 - Need VAM details for extract



OGG-BD 配置

配置 Big Data Replicat – Parameters 和 Properties 文件 (eg. Cassandra)

Oracle GoldenGate Services 21.1.0.0.0 for Big Data (deployment1)

Administration Server Distribution Server Performance Metrics Server Receiver Server

Overview > Process Information

CAE02DEL (CLASSIC APPLY)

Process Information Checkpoint Statistics Parameters Properties Report

```
replicat cae02del

SETENV (TZ=PST8PDT)
GETTRUNCATES
GETUPDATEBEFORES
ReportCount Every 1000 Records, Rate
MAP gasource.*, target qatarget.*;
```

```
# Properties file for Replicat cae02del

gg.log=log4j
gg.log.level=info
gg.report.time=30sec
# Relative CLASSPATH to the maven target build area and Hasoop path to point to
# the core-site.xml file for Hadoop connection configuration.
#Ex:
#gg.classpath=./ggjava/ggjava.jar:/scratch/qa/ogkdir/v211x_210108/DependencyDownloader/dependencies/cassandra_4.0.0/*:/scratch/qa/ogkdir/v211x_210108/
DependencyDownloader/dependencies/cassandra_4.0.0/*
#gg.classpath=./ggjava/ggjava.jar:/scratch/qa/ogkdir/v211x_210108/DependencyDownloader/dependencies/cassandra_4.0.0/*
javawriter.bootoptions=-Xmx512m -Xms32m -Djava.class.path=ggjava/ggjava.jar

gg.classpath=/scratch/ogg_v211/core-
1/software/ggjava/ggjava.jar:/net/slc12kbz/scratch/qa/ogkdir/v211x_210108/DependencyDownloader/dependencies/cassandra_4.0.0/*

gg.handlerlist=cassandra
#The handler properties
gg.handler.cassandra.type=cassandra
```



OGG for Big Data: HDFS 支持

What is HDFS?

- HDFS是Hadoop的分布式文件系统，可以存储不同结构的数据文件

OGG HDFS 功能

- 写入 HDFS 分隔文件

```
Path Prefix Timestamp Suffix
File: /ogg/gg_2015-03-11_13-33-01.000.txt

Schema Table OpType Timestamp C1 Name C2 Name C3 Name
Sales, Customer, I, 2015-03-11_13-33-01.000, ID, 1234, FIRST, John,
LAST, Doe
Field Delimiter Line Delimiter
```

- 不同的源表写入同一个文件
- 可以包括时间戳和操作类型：插入/更新/删除
- 可以根据大小滚动文件
- 可以选择将列名包含在数据中



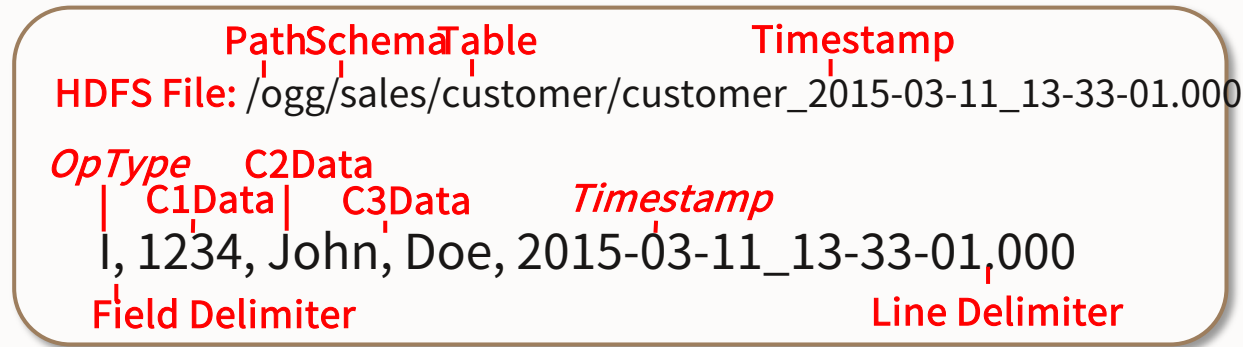
OGG for Big Data: Hive 支持

What is Hive?

- Hive 是 Hadoop 的 SQL 接口，用于在 HDFS 中查询数据。

OGG Hive功能

- 写入 HDFS 分隔文件



Hive Table: customer

OP	ID	FIRST	LAST	TS
I	1234	John	Doe	2015-03...

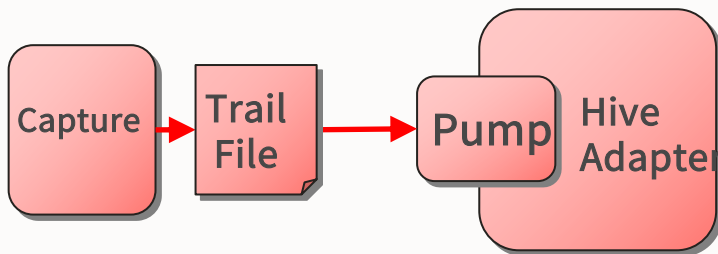
- 不同的源表更改会写入单独的文件夹
- 可以包括时间戳和操作类型：插入/更新/删除
- 可用于非 Hive 用例
- 可以根据大小滚动文件

Hive 数据同步

- 表从源数据库复制到 Hive
- 任何源操作（插入、更新、删除）都会在 Hive 中创建新行
- 使用 Hive 视图合并操作，使其具有与源相同的数据
- Oracle Data Integrator 还可用于定期合并表中的数据

Credit (RDBMS Table)

ID	Balanc e	Level



Credit (Hive Table)

ID	Bal	Level	Timesta mp	O p

Credit_latest (Hive View)

ID	Balanc e	Level

Hive View

Credit_merged(Hive Table)

ID	Balanc e	Level

ODI data
movement



使用 GoldenGate 实现Hive数据增量加载

Credit (RDBMS Table)

ID	Balance	Level
123	400	GOLD
345	450	SILVER
678	210	GOLD
981	0	BLACK

GoldenGate



Credit (Hive Table)

ID	Bal	Level	Timestamp	Op
123	400	GOLD	2014-10-07 19:17:32	I
345	50	SILVER	2014-10-07 19:21:00	I
678	210	GOLD	2014-06-08 19:17:32	I
981	0	BLACK	2014-10-08 1:30:19	I
345	450	SILVER	2014-10-08 1:33:05	U
123			2014-10-08 1:36:57	D

Credit_Latest (Hive View)

ID	Bal	Level
123	400	GOLD
345	450	SILVER
678	210	GOLD
981	0	BLACK

- 持续的实时复制数据
- 对源端入侵小
- 无需时间戳字段
- 支持删除操作

免费咨询热线: 400-699-8888



Credit_Latest Hive 视图

```
CREATE VIEW credit_latest
AS
  SELECT t1.*
  FROM credit t1
       JOIN (SELECT cust_id,
                    Max(last_change) max_modified
              FROM credit
              GROUP BY cust_id) s
  ON t1.cust_id = s.cust_id
   AND t1.last_change = s.max_modified
 WHERE t1.op_type != 'D';
```

仅检索每个客户 ID 的最新一条记录。

忽略最后一个具有删除标志的记录

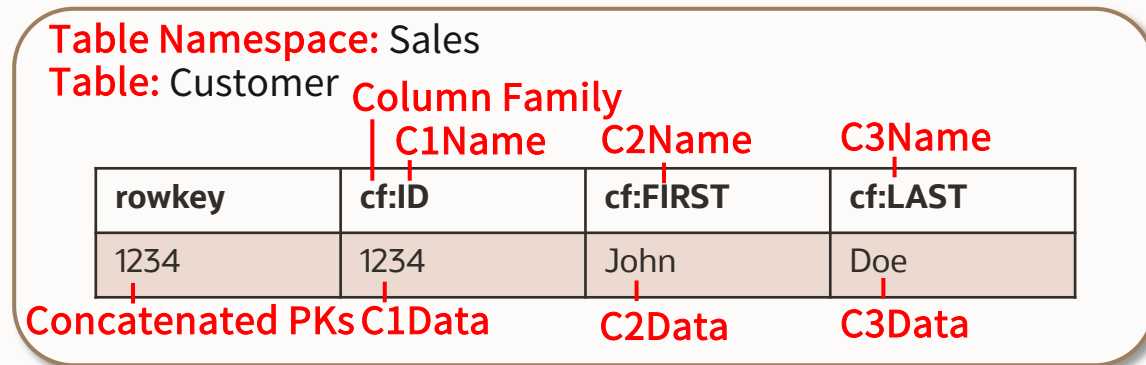
OGG for Big Data: Hbase 支持

What is HBase?

- HBase 是 Hadoop 的键值存储

OGG Hbase 功能

- 写入 HBase 表



- 原生支持插入、更新、删除
- 支持 truncate
- 可以配置column family名称

OGG for Big Data – Kafka 支持

- 可以将 LCR 数据写入 Kafka 主题
- 支持的操作：插入、更新、删除和主键更新
- 可以集成可插拔的格式化程序
 - 带分隔符的文本、JSON、XML、Avro
- 表到表和字段到字段的映射使用 Avro Schema (MDP)
- 支持压缩: GZIP and Snappy



Kafka Target

1. GG Big Data Adapters Handler Properties:

`gg.handlerlist=ggkafka`

`gg.handler.ggkafka.type=kafka`

`gg.handler.ggkafka.topicName=gg_kafka`

`gg.handler.ggkafka.mode=tx`

2. Kafka Producer Configuration Properties :

`bootstrap.servers=10.20.30.40:9092`

`acks=1`

`compression.type=snappy`

`reconnect.backoff.ms=1000`

`batch.size=102400`

`linger.ms=20000`



OGG for Kafka 消息模式

Transaction Mode:

`gg.handler.name.Mode=tx`

在TX模式下，序列化数据从源 Oracle GoldenGate 跟踪文件将事务中的每个操作连接起来。操作数据的内容构成了 Kafka Producer 记录对象的值。Kafka ProducerRecord 对象的键为 NULL。一个 Kafka 消息包含 1 到 N 个操作的数据，其中 N 是事务中的操作数。对于分组事务，所有操作的所有数据都连接成单个 Kafka 消息。因此，分组事务可能会导致非常大的 Kafka 消息，每个消息包含大量操作的数据。

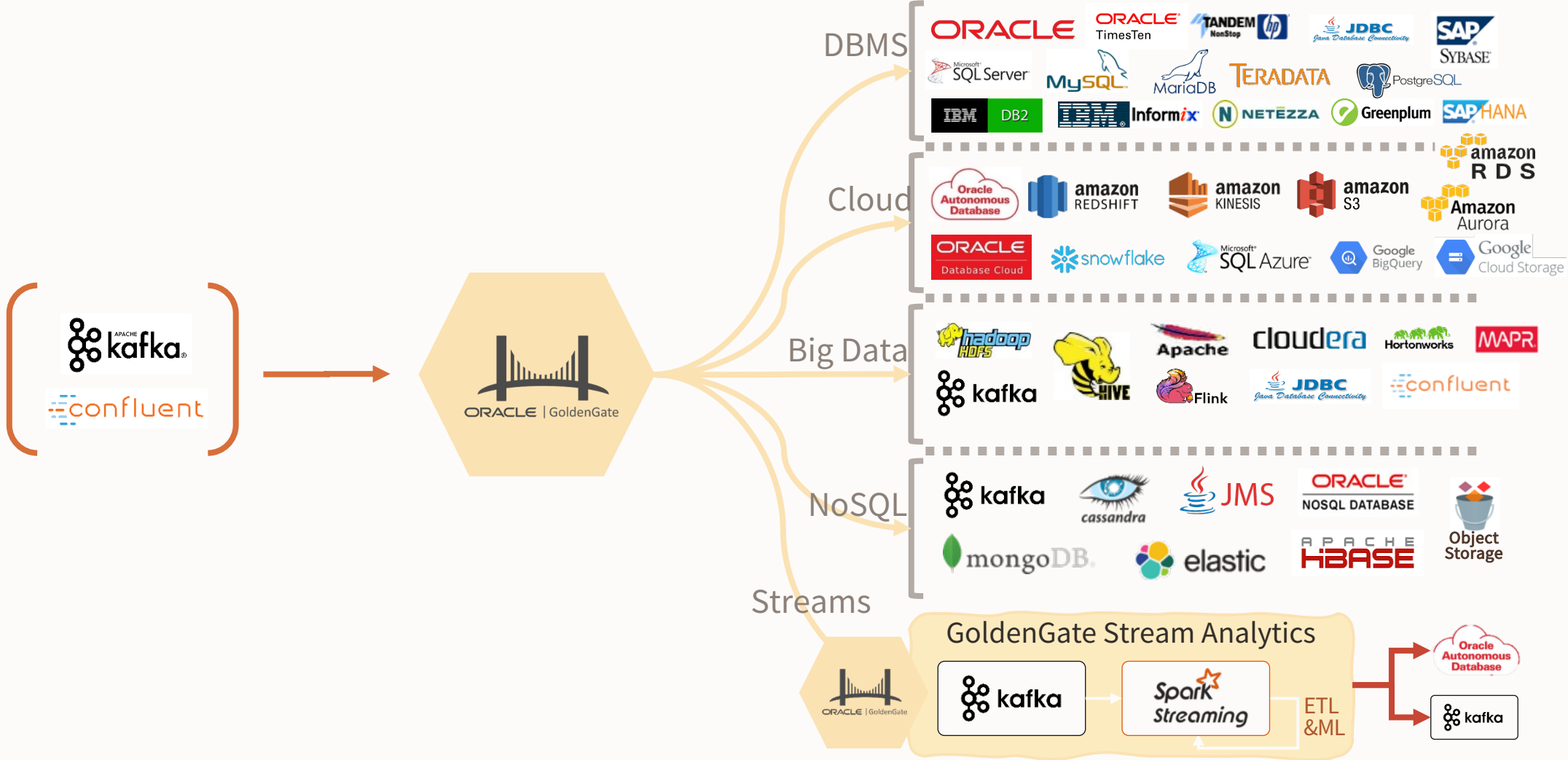
Operation Mode:

`gg.handler.name.Mode=op`

在OP模式下，每个操作的序列化数据作为值放入单个 ProducerRecord 对象中。生产者记录键是源操作的完全限定表名。ProducerRecord 会立即使用 Kafka Producer API 发送。这意味着传入操作与生成的 Kafka 消息数之间存在 1 对 1 的关系。



OGGBD for Kafka Capture



OGGBD Kafka Capture 支持范围

1. Supported technologies

- Apache Kafka 2.4+
- Confluent Platform 5.x, 6.x (Kafka Connect)
- AWS MSK
- Azure Event Hub

2. Supported security protocols

- SASL (Kerberos)
- SSL (Server auth or mutual auth)
- SASL_SSL (Kerberos and SSL)

3. Supported modes

- Generic
- Kafka Connect



OGGBD Kafka Capture 支持范围

1. 支持的消息类型

- Generic: All (JSON, Avro, Delimited Text, XML)
- Kafka Connect: JSON, Avro

2. Supported Primitive Types

- Generic: All
- Kafka Connect: String, Boolean, Bytes (binary), 8/16/32/64-bit Integer, 32/64-bit Float

3. Supported Logical Types

- Generic: All
- Kafka Connect: Decimal, Timestamp, Date, Time

4. Supported Container Types

- Generic: All
- Kafka Connect
 - Array – Only arrays of primitive or logical types are supported.
 - Map – Only lists of primitive or logical types are supported.



OGGBD Kafka Capture 限制

1. Unsupported message types

- Kafka Connect: Protobuf messages are not currently supported.

2. Unsupported features

- DDL Replication (Both Generic & Kafka Connect modes)

3. Unsupported container types

- Kafka Connect:
 - Nested Arrays and Maps. Arrays of arrays for example.
 - Struct

OGG for Kafka Capture 配置

1. GLOBALS

- 添加 “OGGSOURCE KAFKA” 以启用从 Kafka 捕获
 - Deployment now restricted to Kafka Capture
- 将 Kafka 库添加到 JVMCLASSPATH (使用 DependencyDownloader)

2. Extract 参数

- 编辑 Kafka 使用者属性文件的路径 (TRANLOGOPTIONS, KAFKACONSUMERPROPERTIES <path>/<consumer>.properties)
 - Consumer properties must match Kafka producer properties (JSON in both if JSON is used, etc.)
- Add ‘VAM libggbigdata_vam.so’ to load VAM (Vendor Access Module) shared libraries
- 添加 TABLE ‘<schema>.<topic>’ (可以是任意 shcema)



Java Database Connectivity Handler

- Netezza Database
- GreenPlum
- etc.

```
gg.handlerlist=jdbcwriter
gg.handler.jdbcwriter.type=jdbc

#Handler properties for MySQL database target
gg.handler.jdbcwriter.DriverClass=com.mysql.jdbc.Driver
gg.handler.jdbcwriter.connectionURL=jdbc:<a target="_blank" href="mysql://">mysql://</a><DBServer address>:3306/<database name>
gg.handler.jdbcwriter.userName=<dbuser>
gg.handler.jdbcwriter.password=<dbpassword>
gg.classpath=/path/to/mysql/jdbc/driver//mysql-connector-java-5.1.39-bin.jar

goldengate.userexit.timestamp=utc
goldengate.userexit.writers=javawriter
javawriter.stats.display=TRUE
javawriter.stats.full=TRUE
gg.log=log4j
gg.log.level=INFO
gg.report.time=30sec
javawriter.bootoptions=-Xmx512m -Xms32m -Djava.class.path=.:ggjava/ggjava.jar:./dirprm
```



Command Event Handler

- 命令事件处理程序的目的是通过执行提供的外部程序或脚本，将文件编写器处理程序生成的数据文件加载到相应的目标中。

```
gg.eventhandler.command.type=command
```

```
gg.eventhandler.command.command=<path of the script to be executed>
```

```
#gg.eventhandler.command.cmdWaitMilli=10000
```

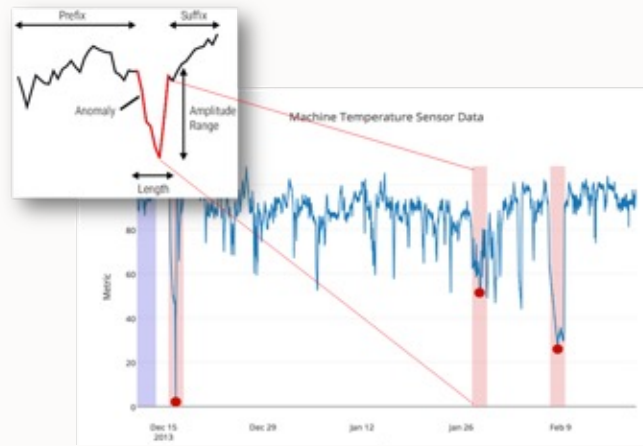
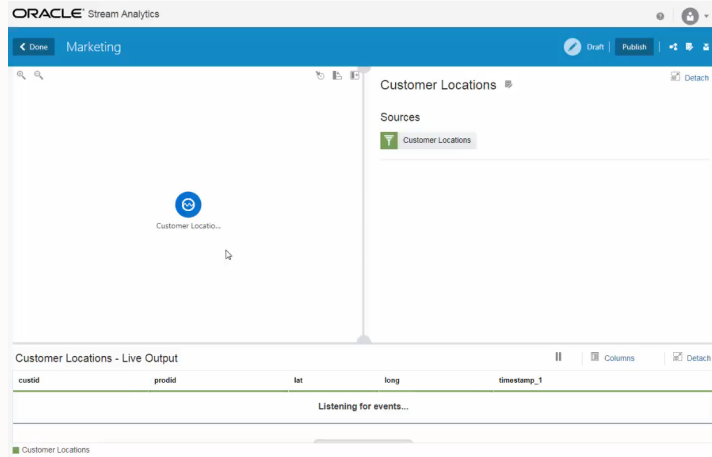
```
gg.eventhandler.command.multithreaded=true
```

```
gg.eventhandler.command.commandArgumentTemplate=${tablename},${datafilename},${countoperations}
```

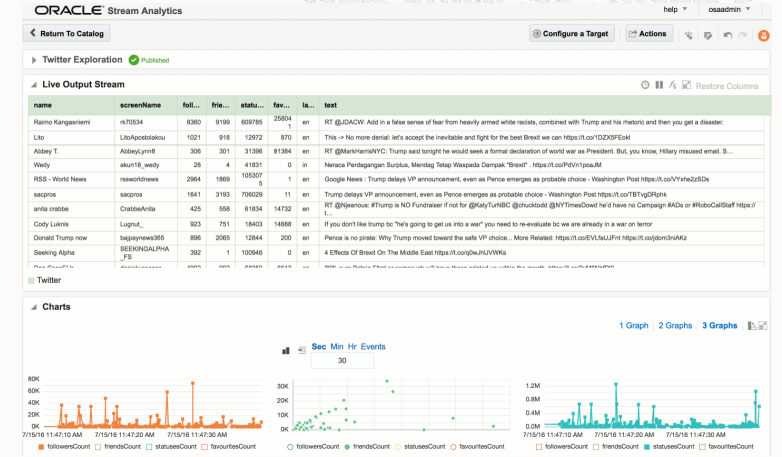


Goldengate Stream Analytics

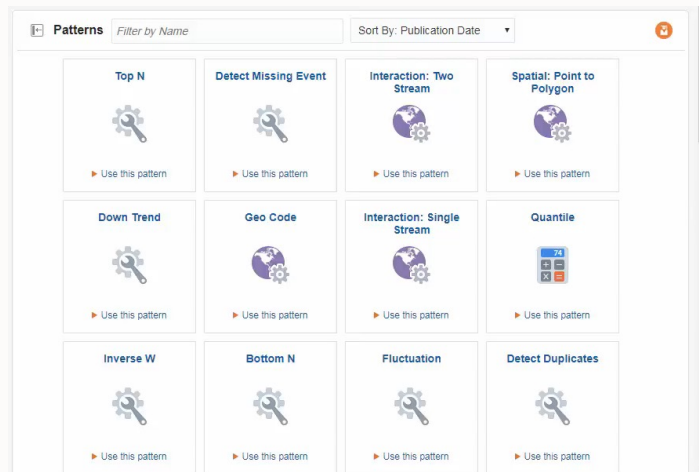
Self-Service, Low-Code ETL Pipelines Time Series Analytics



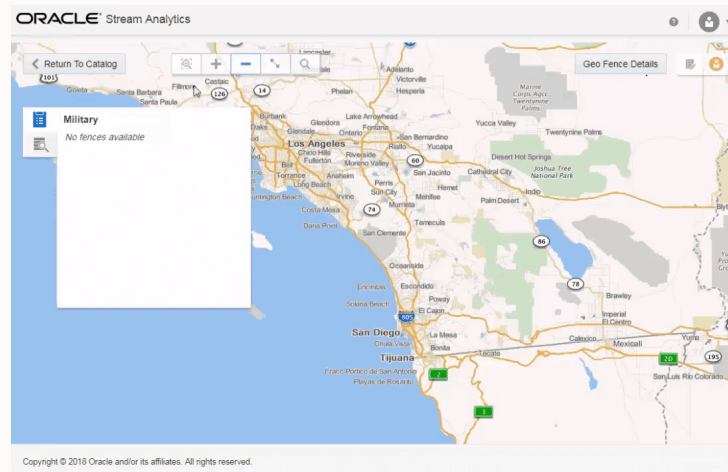
Real-Time Dashboards



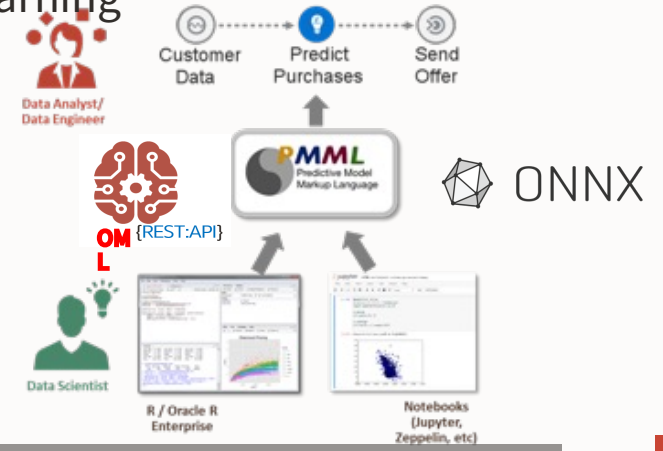
Rule-Driven Business Decisions



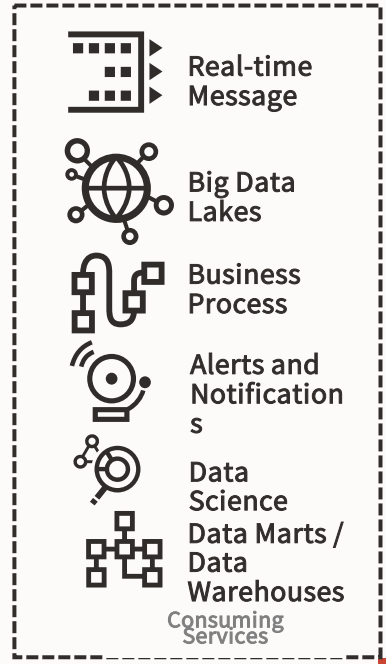
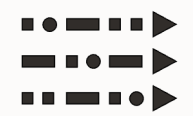
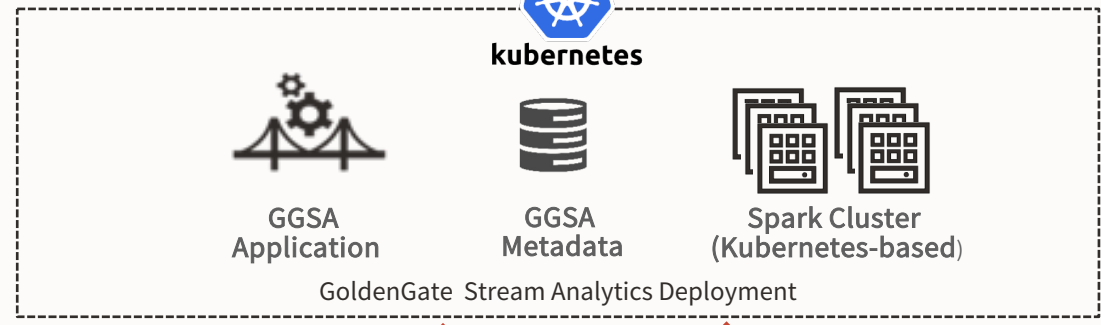
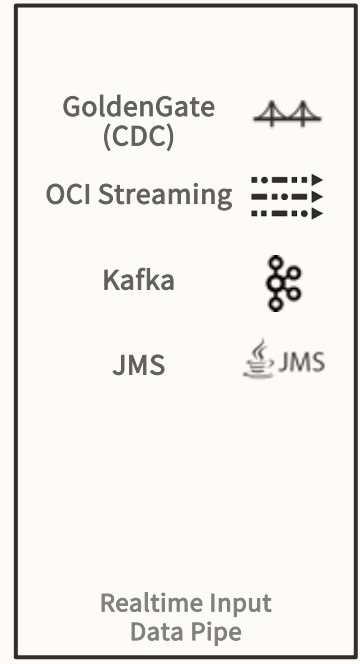
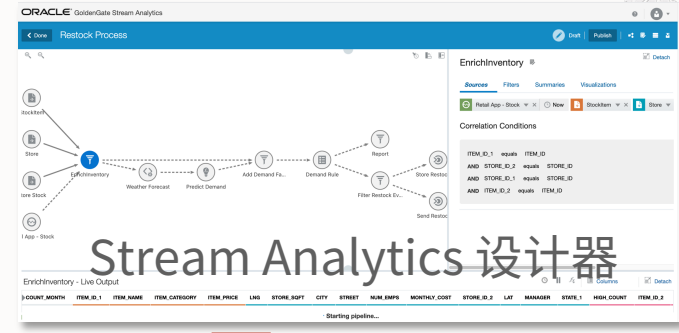
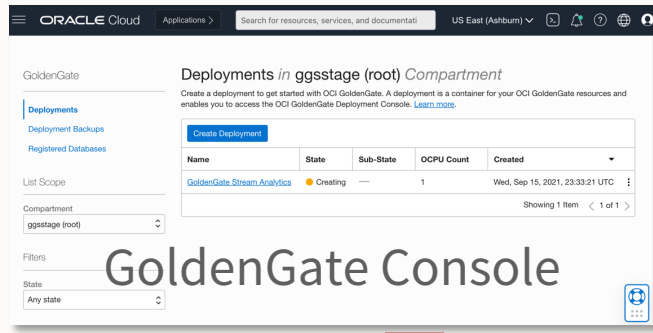
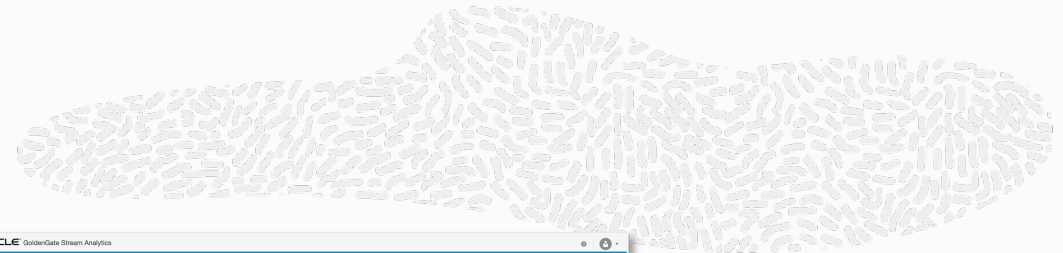
Geo-Spatial Analysis & Geo-Fencing



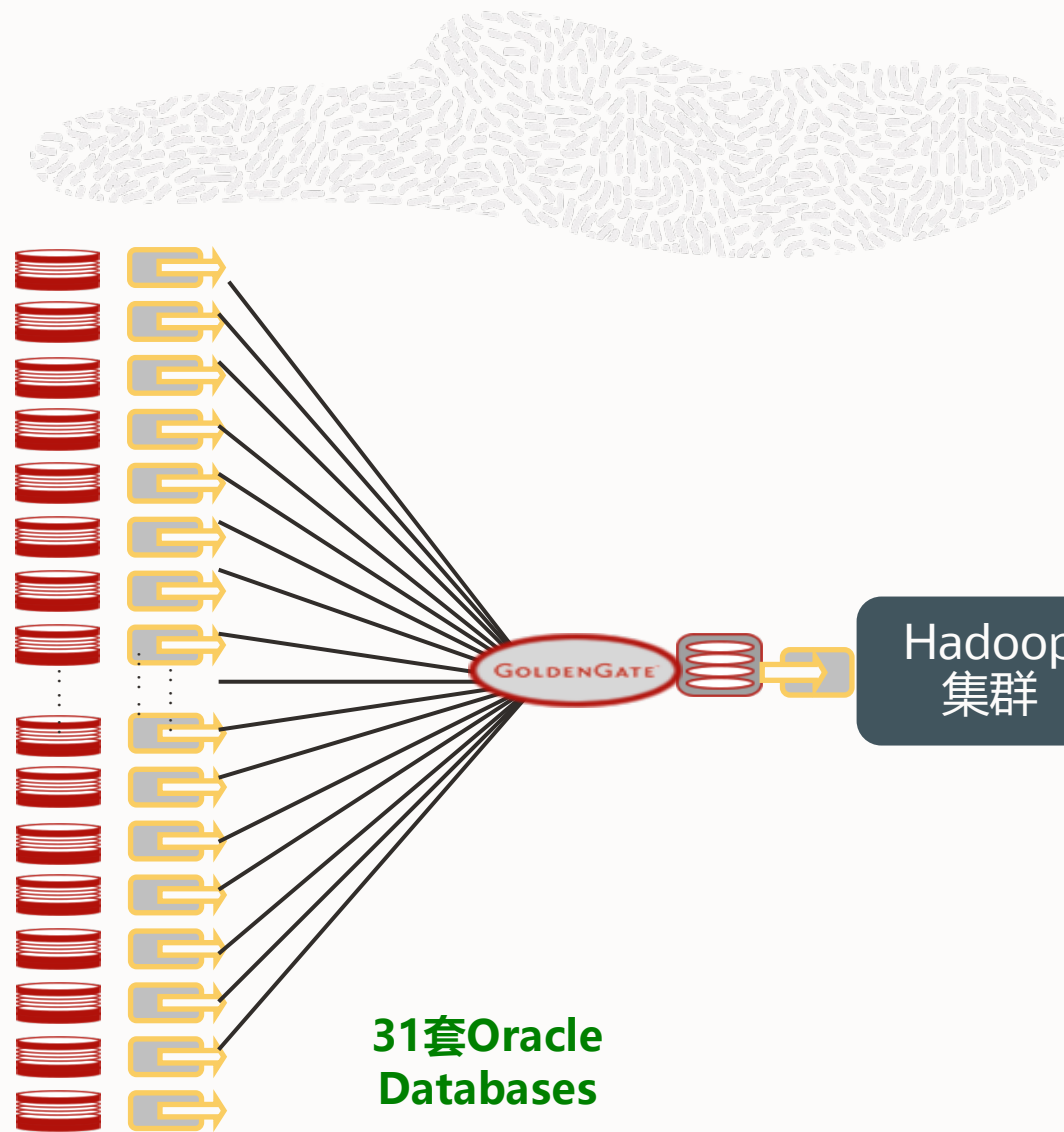
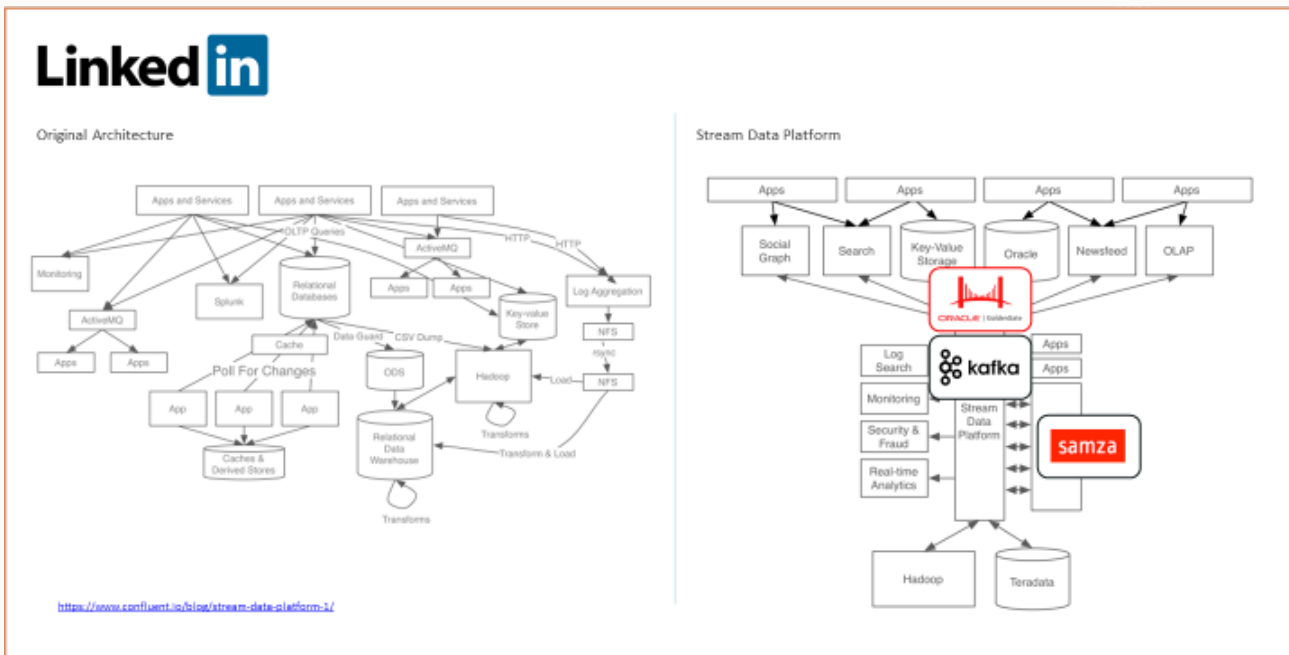
Predictive Analytics / Machine Learning



Goldengate Stream Analytics

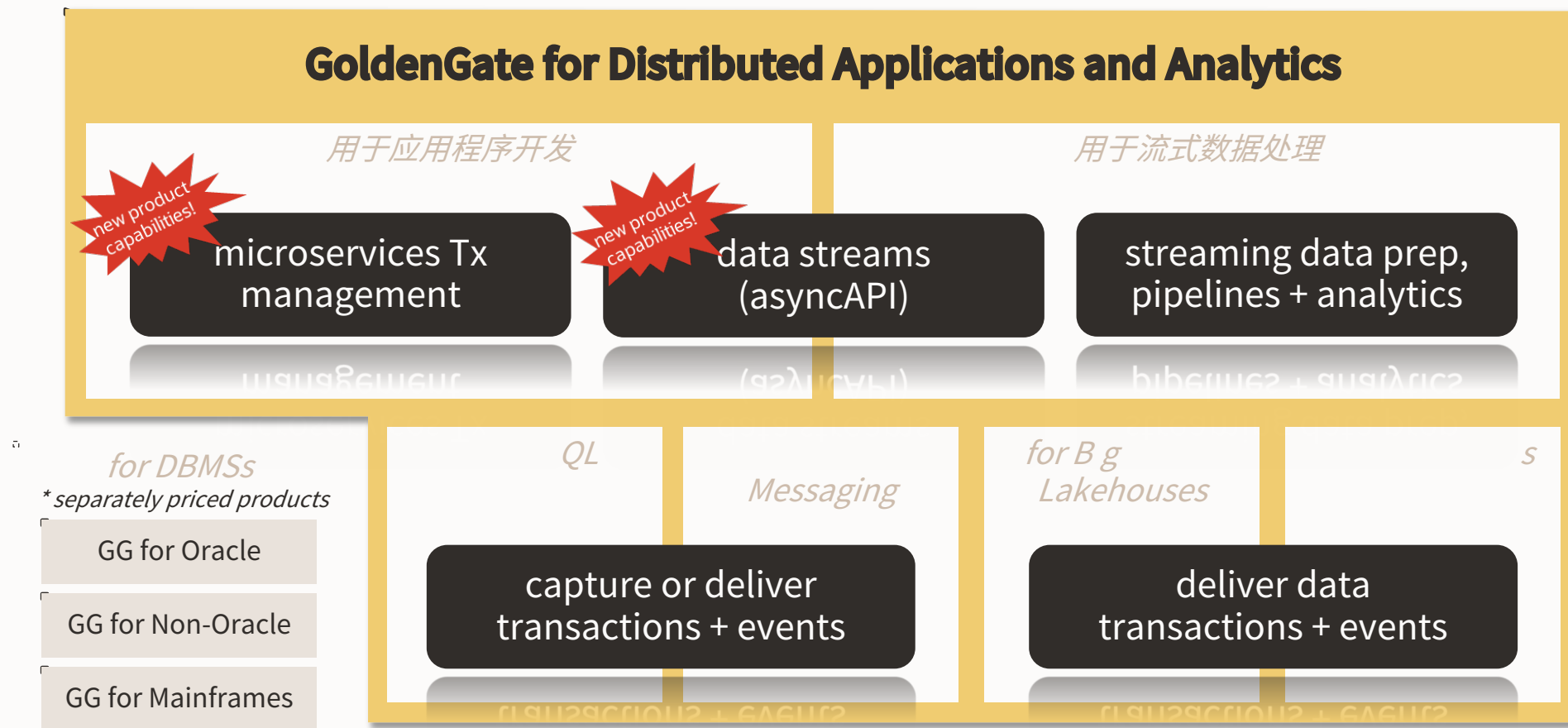


OGG for Bigdata 案例



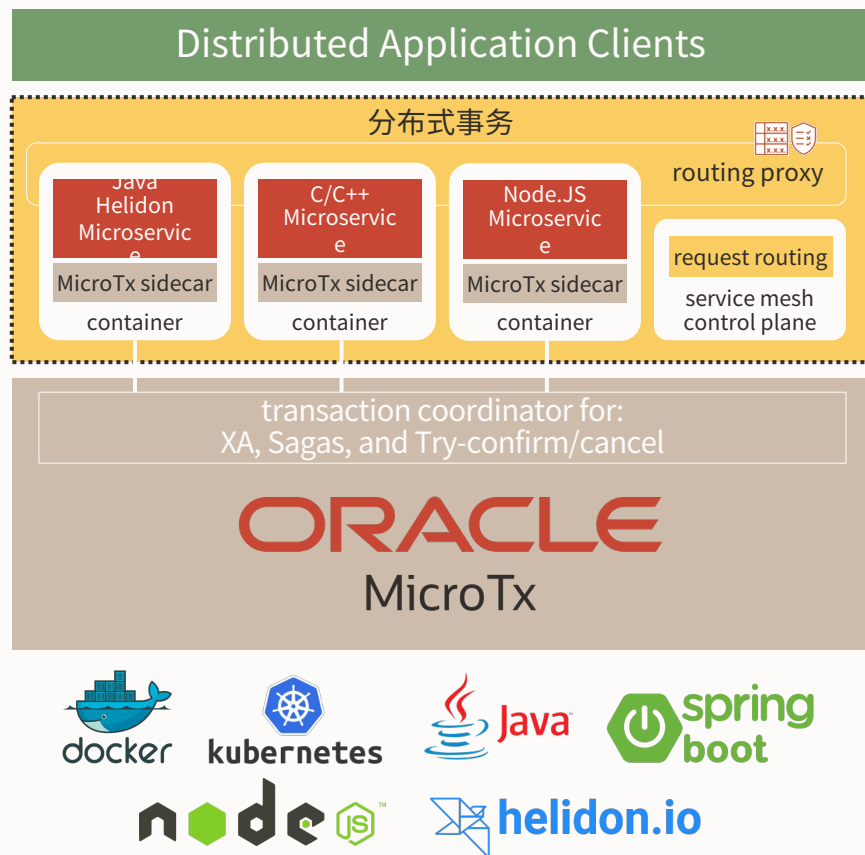
面向分布式应用程序和分析的 GoldenGate

面向应用程序开发人员、数据工程师和数据使用者而简化的单一软件包



Transaction Manager for Microservices 企业版

现在包含在 GoldenGate for Distributed Applications and Analytics 产品包中



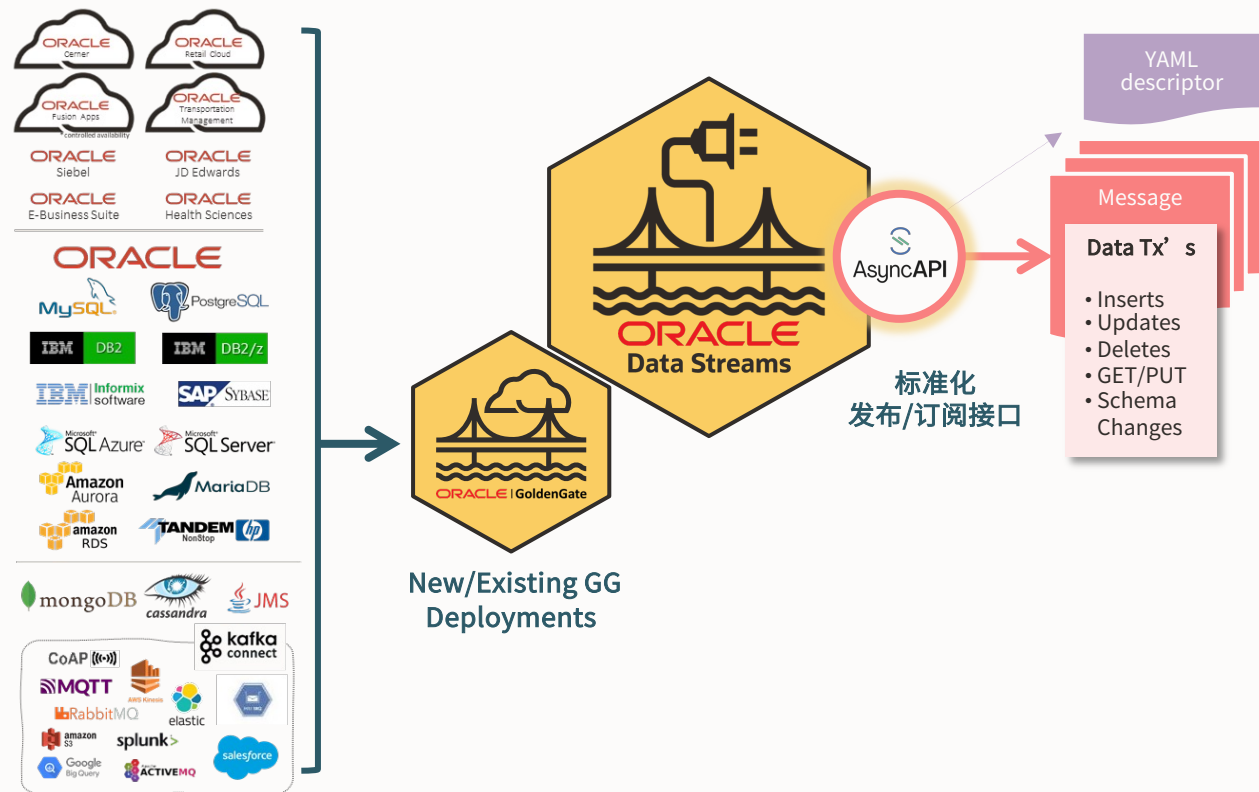
- ✓ 面向处理高数据一致性应用的应用程序开发人员的加速器
- ✓ 预构建的事务模式: 两/多阶段 (XA) 提交, TCC 事务, Event sourcing/Saga long-running 事务, 同步或异步通信等。
- ✓ 多语言微服务支持:
 - Java using Jax-RS in Helidon, WebLogic Server, Spring Boot, and Typescript using Express.js
 - PL/SQL using OAE and Oracle REST Data Services
 - C/C++/COBOL running in Tuxedo (REST-SALT)
- ✓ 利用区块链进行智能合约, 并部署到K8S和 Docker Swarm 上



GoldenGate Data Streams

自动、机器生成的客户端应用程序投递到 exactly-once 的事务事件流 - JSON格式，通过 REST pub/sub

Real-time data events



收益

- ✓ 实时数据事件
提供给任何数据使用者
- ✓ 自动代码生成器：
python™ node.js Golang Java Microsoft .NET Framework
- ✓ 简单的事件溯源和事务
开箱即用的pattern
- ✓ 数据消费者
可以绕过 Kafka 直接处理
- ✓ AsyncAPI 是
事件驱动架构的未来方向





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Oracle 23c的现在和未来

数据库与云系列公益讲座



董志平

- 20年+的数据库优化经验
- 15年+RWP团队成员和负责人
- Real World Performance团队高级经理

内容简介

23c是Oracle下一个长期支持版本，创新性地推出了大量新特性，从JSON关系二元性到属性图、从True Cache到AI，无不在引领数据库的发展方向

本讲座通过多个Demo来演示23c中不同功能的实际使用实践，深入浅出地介绍23c如何实现App Simple的理念



Zoom直播

直播时间: 12月1日 11:00 - 12:00

扫描二维码进入直播

Zoom ID: 957 9669 6723

密码: 20212023



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