

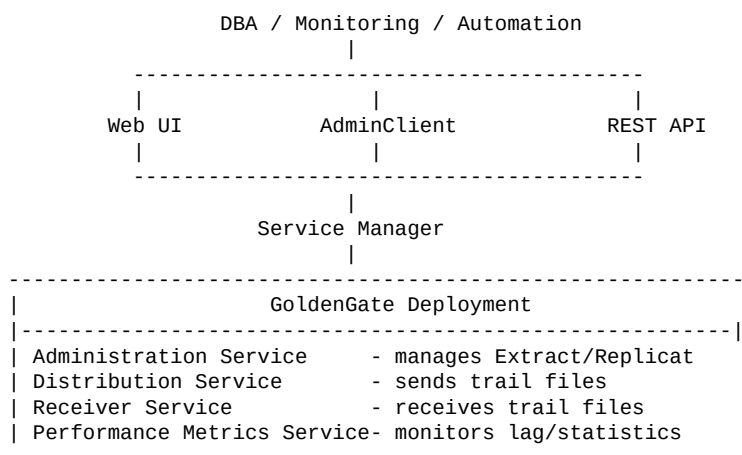
Oracle GoldenGate Microservices Architecture

Interview-Friendly Notes with Diagrams and Scenario-Based Explanation - GoldenGate 19c and Later

Oracle GoldenGate Microservices Architecture, commonly called **OGG MA**, is the modern service-based GoldenGate architecture. It manages replication through a web interface, AdminClient, and REST APIs instead of depending only on GGSCI and the classic Manager process.

The core replication concepts remain the same: Extract captures source changes, trail files store those changes, and Replicat applies them on the target. What changes in Microservices Architecture is how the environment is deployed, managed, monitored, and how trails are transported between systems.

1. High-Level Architecture



2. Main Components

2.1 Service Manager

Service Manager is the top-level service. It controls one or more GoldenGate deployments and starts, stops, or monitors the deployment services.

- Acts as the main entry point for the Microservices environment.
- Manages deployments and service lifecycle.
- Provides links to Administration, Distribution, Receiver, and Metrics services.
- Similar in importance to Manager in Classic Architecture, but service-oriented.

```
Service Manager
|
|--- Deployment 1
|   |--- Administration Service
|   |--- Distribution Service
|   |--- Receiver Service
|   |--- Performance Metrics Service
|
|--- Deployment 2
|   |--- Administration Service
|   |--- Distribution Service
|   |--- Receiver Service
|   |--- Performance Metrics Service
```

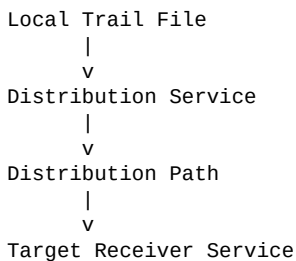
2.2 Administration Service

Administration Service is used to manage GoldenGate processes inside a deployment. It is the service DBAs use most often for Extract and Replicat administration.

- Create, start, stop, and monitor Extract processes.
- Create, start, stop, and monitor Replicat processes.
- View and edit parameter files.
- View reports, process status, checkpoints, and lag details.
- Accessible through the web UI, AdminClient, and REST API.

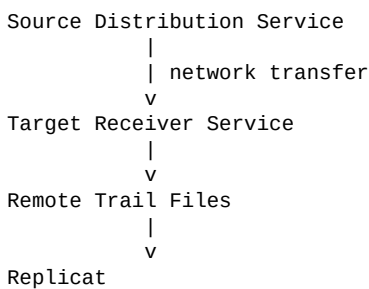
2.3 Distribution Service

Distribution Service sends trail files from the source deployment to a target deployment. In Classic Architecture, this job is normally handled by a Data Pump Extract. In Microservices Architecture, this work is managed using a **Distribution Path**.



2.4 Receiver Service

Receiver Service runs on the target side. It receives trail files from the source Distribution Service and writes them into the target trail location.

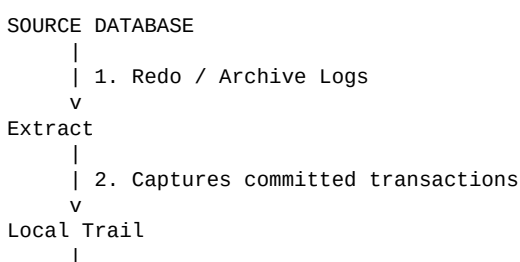


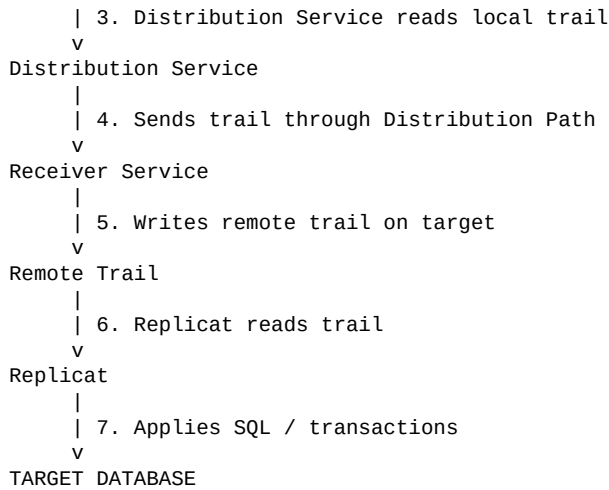
2.5 Performance Metrics Service

Performance Metrics Service provides monitoring and performance information. It is used to observe lag, throughput, process status, and replication statistics.

- Displays Extract and Replicat status.
- Shows lag and throughput.
- Provides charts and performance statistics.
- Useful for proactive monitoring and troubleshooting.

3. End-to-End Replication Flow





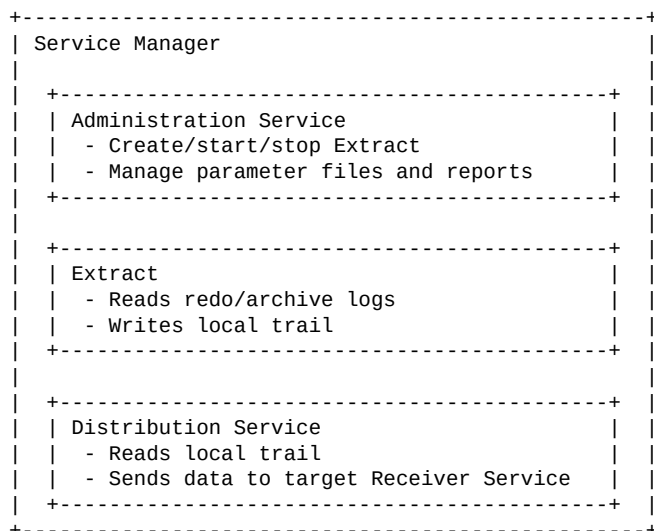
Clear Step-by-Step Explanation

Step	Component	Explanation
1	Source Database	Application DML generates redo and archive logs.
2	Extract	Captures committed transactions from redo/archive logs. Integrated Extract is commonly used for Oracle source databases.
3	Local Trail	Extract writes captured changes into local trail files.
4	Distribution Service	Reads local trail files and sends them to the target through a Distribution Path.
5	Receiver Service	Receives trail data and writes remote trail files on the target server.
6	Replicat	Reads remote trail files and applies transactions to the target database.

4. Source-Side and Target-Side Diagrams

4.1 Source-Side Deployment

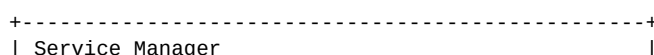
SOURCE SERVER / SOURCE DEPLOYMENT

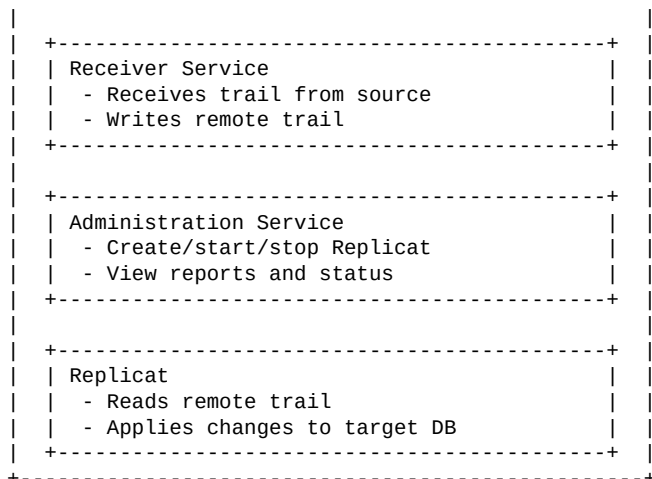


Source DB Redo Logs ---> Extract ---> Local Trail ---> Distribution Service

4.2 Target-Side Deployment

TARGET SERVER / TARGET DEPLOYMENT





Receiver Service ---> Remote Trail ---> Replicat ---> Target Database

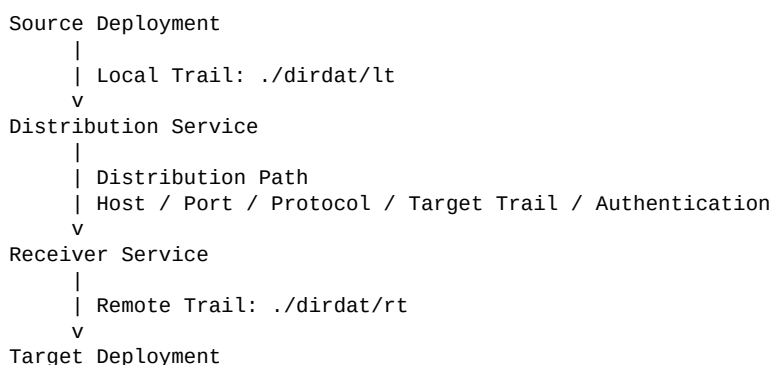
5. Deployment Concept

A deployment is an isolated GoldenGate environment. One Service Manager can manage multiple deployments. Each deployment contains its own configuration, trail files, checkpoints, reports, credentials, and services.



6. Distribution Path

A Distribution Path is the Microservices object that ships data from a source deployment to a target deployment. It replaces the common Classic Architecture pattern where a Pump Extract sends trail files to the target Collector.



Path Field	Meaning
Path name	Logical name of the distribution path.
Source trail	Local trail that Distribution Service reads.
Target host	Target GoldenGate server or target deployment host.

Path Field	Meaning
Target port	Receiver Service port.
Target trail	Remote trail name on target.
Authentication	User credentials or certificate-based security.
Encryption	Optional secured transfer configuration.

7. Target-Initiated Path

Normally, the source Distribution Service pushes trail data to the target Receiver Service. In stricter firewall environments, the target may initiate the connection to pull data from the source. This is called a target-initiated path.

Normal Push Path:

Source Distribution Service -----> Target Receiver Service

Target-Initiated Path:

Source Distribution Service <----- Target Receiver Service
target initiates connection

8. Classic Architecture vs Microservices Architecture

Area	Classic Architecture	Microservices Architecture
Main control	Manager	Service Manager
Command interface	GGSCI	AdminClient
Web UI	Limited / not primary	Primary administration option
REST API	Not the main model	Built-in REST-based management
Trail shipping	Data Pump Extract	Distribution Service / Path
Trail receiving	Collector	Receiver Service
Monitoring	GGSCI, reports, logs	Performance Metrics Service, UI, REST API
Deployment style	File and process based	Service and deployment based
Automation	Shell/GGSCI scripts	REST API and AdminClient friendly

9. Common Access Methods

Access Method	Used For
Web UI	Visual administration, process management, report viewing, lag checks, path management.
AdminClient	Command-line administration similar to GGSCI style but for Microservices.
REST API	Automation, DevOps integration, scripted deployment, monitoring integration.

Sample AdminClient Commands

```
adminclient
CONNECT http://hostname:port AS oggadmin PASSWORD password
```

```
INFO ALL
INFO EXTRACT EXT1
INFO REPLICAT REP1
START EXTRACT EXT1
STOP EXTRACT EXT1
START REPLICAT REP1
STOP REPLICAT REP1
SEND EXTRACT EXT1 STATUS
```

```
SEND REPLICAT REP1 STATUS
VIEW REPORT EXT1
VIEW REPORT REP1
```

10. Typical Ports

Each service usually runs on a separate port. The exact ports depend on how the deployment was created.

Service	Example Port
Service Manager	9001
Administration Service	9002
Distribution Service	9003
Receiver Service	9004
Performance Metrics Service	9005

11. Important Directories

Directory / Location	Purpose
\$OGG_HOME	GoldenGate software installation home.
\$OGG_ETC_HOME	Configuration files.
\$OGG_VAR_HOME	Runtime files.
dirprm	Parameter files.
dirdat	Trail files.
dirrpt	Report files.
dirchk	Checkpoint files.
dirpcs	Process status files.

12. Example Parameter Flow

Extract Parameter Example

```
EXTRACT EXT1
USERIDALIAS ogg_src
EXTTRAIL ./dirdat/lt
TABLE HR.*;
```

Distribution Path Example

```
Source Trail : ./dirdat/lt
Target Host  : target_host
Target Port  : receiver_port
Target Trail : ./dirdat/rt
```

Replicat Parameter Example

```
REPLICAT REP1
USERIDALIAS ogg_tgt
MAP HR.*, TARGET HR.*;
```

13. Interview Explanation

Interview-ready answer: Oracle GoldenGate Microservices Architecture is a REST-based architecture used to configure, monitor, and manage GoldenGate replication through Web UI, AdminClient, and REST APIs. It replaces the

traditional Manager/GGSCI-focused Classic Architecture with independent services such as Service Manager, Administration Service, Distribution Service, Receiver Service, and Performance Metrics Service. Extract captures changes from source redo logs and writes local trail files. Distribution Service sends those trail files to the target Receiver Service. Receiver Service writes remote trail files, and Replicat applies the changes to the target database.

14. Scenario-Based Questions

Scenario 1: Distribution Path is stopped

Question: Distribution Path is stopped. What will happen?

Answer: Extract may continue capturing changes and writing to the local trail, but trail files will not be shipped to the target until the path is restarted. Replicat on the target will eventually lag because it will not receive new remote trail data.

- Check Distribution Service UI and path status.
- Check network connectivity, target host, and Receiver Service port.
- Check authentication, SSL/certificates if used, and disk space.
- Restart the path after fixing the root cause.

Scenario 2: Receiver Service is down

Question: Receiver Service is down on the target. What happens?

Answer: The source Distribution Service cannot deliver trail files to the target. Local trails remain on the source side, and target lag increases. Once Receiver Service is restored, the path can resume shipping data.

Scenario 3: Administration Service is down

Question: Administration Service is down. Are Extract and Replicat stopped?

Answer: Not necessarily. Existing Extract and Replicat processes may continue running. However, you may not be able to manage them through the Admin Service UI until the service is restored.

- Check Service Manager deployment status.
- Check Admin Service logs.
- Check port conflicts and disk space.
- Check operating system process status.

Scenario 4: Performance Metrics Service is down

Question: Replication is working, but Performance Metrics Service is down. What is the impact?

Answer: Replication can continue, but dashboards, performance charts, and some metric views may not be available. You can still use AdminClient, process reports, and logs for operational checks.

Scenario 5: Extract is running but no data reaches target

Possible causes: Distribution Path stopped, Distribution Service down, Receiver Service down, network issue, wrong target host/port, target trail filesystem full, or authentication failure.

Troubleshooting Flow

```
Check Extract status
  |
  v
Check local trail generation
  |
  v
Check Distribution Path status
  |
  v
```

Check Receiver Service
|
v
Check remote trail generation
|
v
Check Replicat status and lag

Scenario 6: Trail files are not getting purged

Answer: Verify PURGEOLDEXTRACTS configuration, checkpoint positions, trail usage by Extract/Replicat, and whether any process is far behind. Never delete trail files manually unless you have confirmed they are no longer needed.

15. Key Points to Remember

- **Service Manager** controls deployments and services.
- **Administration Service** manages Extract and Replicat.
- **Distribution Service** sends trail files.
- **Receiver Service** receives trail files.
- **Performance Metrics Service** monitors lag, throughput, and status.
- **AdminClient** is the command-line interface for Microservices.
- **REST API** supports automation and DevOps workflows.
- **Distribution Path** replaces the common Classic Pump-to-Collector shipping model.
- Extract still captures source changes and Replicat still applies target changes.