Best Practices for Deploying the Microservices Architecture

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Introduction to Enterprise Database Management (EDM) – Database Virtualization and Engineering (DVE)

- Long history of managing Oracle RAC-hosted consolidation environments
- Establishes standards for multiple database products
- Sets infrastructure standards for Oracle hosting
- Responsible for database product certifications
- Manages multiple Oracle Exadata Engineered Systems
- Manages multiple Dedicated GoldenGate Replication Hubs
GoldenGate Replication Hub Environment

- Shared Consolidated and Geographically Dispersed
- Consists of multiple 4-Way Oracle RAC Clusters
- XAG Cluster Integration for HA Management and ACFS
- Monitoring – GG Monitor Agent thru Oracle GoldenGate Plug-In
- GoldenGate 12.2 for Oracle 12c and 11g RDBMS (MT and Non-Container)
- GoldenGate 12.2/12.3 Java Adapters to downstream JMS
- GoldenGate 12.2 for Sybase 16
- GoldenGate 12.2 Replicats for Oracle 12c From SQL Server
- GoldenGate 12.3 Classic for 12c RDBMS version only
- Currently In Development for early 2019 production deployment
  - GoldenGate 12.3 For BigData
  - GoldenGate 12.3 For DB2 (Waiting on Oracle’s DB2 12 Certification)
  - **GoldenGate 12.3 Microservices Architecture**
GoldenGate Replication Hub Environment

DMZ

Replication Hub

Database A

Database B

Database C

Database N
GoldenGate Phased Deployment Process

Plan → Intake → Configure → Production Deployment
Enterprise replication inventory is vital!

- Required for all patching and maintenance activities
- Ability to define replication to an ecosystem for communications
- Required for metrics reporting
- Chargeback and labor
- Drives the decommission list

<table>
<thead>
<tr>
<th>Identify Replication Candidates</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Application ID</th>
<th>Application mnemonic (2 char)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replication Type</td>
<td>Business Unit</td>
</tr>
<tr>
<td>Trail file space amount</td>
<td>Current Configuration (OS, CPU, storage)</td>
</tr>
<tr>
<td>Replication Category</td>
<td>Maintenance Window</td>
</tr>
<tr>
<td>Isolation Requirements</td>
<td>Physical Location</td>
</tr>
<tr>
<td>Monitor/Support Groups</td>
<td>DDL/STREAMS_POOL_SIZE/MINKEEPDAYS</td>
</tr>
</tbody>
</table>
Highly Standardized

- Select a uniform hardware platform
  - GG installs are standardized (same filesystem location, same patch level, no-drift environments)
  - Consistent Naming Standards: Evars, service managers, homes, ACFS filesystems all managed by engineering
  - Provides a consistent user experience on each cluster
  - Clearly define support roles and responsibilities between groups
  - Checks and balances – Engineering defines standards, Container DBAs enforces standards, Application DBA supports replication according to standards
  - Mandatory two character mnemonic guarantees unique checkpoint file naming
  - All replication MUST employ credential stores and trail file encryption

- Be firm; limit exceptions, enforce standards to the defined stack.
Highly Consolidated Replication Hubs

- Segment By Business Unit and Monitoring Group
  - 4-way RAC allows for two, 2-node Allocation Units For each manager
  - Requested trail space limits the dedicated ACFS resource to the ask
  - Service manager is assigned to only two nodes of 4-way replication hub cluster
  - GG VIP is assigned to manager
  - Support Groups alerting assigned to service manager in OEM
  - Service manager home ➔ Dedicated ACFS ➔ Service manager Business Unit

Example:

OGG_HOME: /app/ora/software/ogg/12c

ACFS Name: /ggacfs_bizunit01

XAG 9.1 Cluster Resource: xag.ggbizunit01.oracle
Install 12.3 MA

- MA Software install is different than classic
- Software homes are separate from deployments
- Utilize response file method to automate your install
- Patched homes now can be preinstalled without disrupting operations
- Install simplification allow us easily meet our compliance requirements
Patching

- Peak Enterprise GoldenGate reached ~1400 GoldenGate Homes
- Highly Standardized Hub consolidation ~500 GoldenGate Homes
- 12.3 MA, expected home count levels ~250 GoldenGate Homes
- Current pathing is rolling (failover, patch, failback, patch)
- Patched MA software home will be auto-deployed in advance using the response file install
- ServiceManager will be stopped, repoint, and restarted
- Extremely efficient model operating on far less homes.
Planning and Intake

- Establish enterprise replication use cases
- Hold periodic intake meetings to review new replication
- Create a standardized questionnaire to gather necessary info for configuration and deployment
- Identify two character application mnemonic for each application
- Have published replication standards document for configuration and deployment
- Obtain signoff before deployment
User Management

- Expect LDAP Integration in future GA release
- Standardize C# container replication database user
- Standardize non-container replication database user
- Develop role separation document
- Establish clear ownership of tasks based on role
- Have a plan to manage users manually anticipating future LDAP support
SSL Setup

- EM 13c, 12c: How to Configure the Enterprise Manager Cloud Control Management Agent for Secure Socket Layer (SSL) Certificates (Doc ID 2213661.1)
- Subject Alternative Name (SAN) necessary for Cluster HA
- GoldenGate Virtual IP will be Service Manager URL for HA
  - https://lab01ga.wellsfargo.com:18000/
- SAN setup with orapki
  - $OGG_HOME/bin/orapki wallet add -wallet $GG_WALLET_LOC/lab01 -dn "CN=lab01.acme.com, OU=EDM, O=Acme, L=San Francisco, ST=California, C=US" -keysize 2048 -addext_san DNS:lab01,DNS:lab02.acme.com,DNS:lab02,DNS:lab01ga.acme.com,DNS:lab01ga,DNS:lab01gb.acme.com,DNS:lab01gb -pwd abc123
- Auto login wallet will need to be staged
- XAG relocation testing is working well using Virtual IP
Software Install

- Software is now separate from the deployment
- Software version is variable
- One software install per server for all SMs on the cluster
- Standardized response file
  - INSTALL_OPTION=ORA12c
  - SOFTWARE_LOCATION=/app/ora/software/ogg/12c
  - START_MANAGER=false
  - INVENTORY_LOCATION=/app/orainv/inv
  - UNIX_GROUP_NAME=orainst
- Limit the database version to 12c
- Keep master response file in known location or software repository
- Only do silent installs
- Automate install and response file generation
Software Install - Evars

- **Standard environment variables**
  - **OGG Software Install Location**
    - `export OGG_HOME="/app/ora/software/ogg/12c"`
  - **Service Manager deployment home**
    - `export SM_DEPLOYMENT_HOME="/ggapp_<BU name><BU Number>/sm"`
  - **Service Manager registry location**
    - `export SM_REGISTRY_LOCATION="${SM_DEPLOYMENT_HOME}/etc/conf"`
  - **Service Manager registry filename**
    - `export SM_REGISTRY_FILE="${SM_REGISTRY_LOCATION}/deploymentRegistry.dat"`
  - **OGG registry location**
    - `export OGG_CONF_HOME="${SM_REGISTRY_LOCATION}"`
  - **ORACLE_HOME**
    - `export ORACLE_HOME="/app/ora/software/db/18c"`
  - **LD_LIBRARY_PATH**
    - `export LD_LIBRARY_PATH=$ORACLE_HOME/lib:$LD_LIBRARY_PATH"`
Deployment – Best Practice Guidelines

- Separate Service Managers by business unit or funding source
- Divide RAC cluster into allocation units
- Use ACFS to enforce budgeted resource limits
- Multiple deployments within the same SM should be part of the same replication ecosystem
There should be a well documented standard to manage a deployment

Keep master SM response file in known location or software repository

Automate install and response file generation

Initial deployment will require a minimum of ~24 parameter values

Subsequent deployments in the same Service Manager will require ~10 parameter values

Naming standards, Ports, Service Managers, Deployment configuration should be managed and enforced by a central authority

Actual replication should be managed by users according to the published standards
## Deployment – Shared

![Deployment Interface](https://example.com/deployment-interface.png)

### Oracle GoldenGate Service Manager 12.3.0.1.2

<table>
<thead>
<tr>
<th>Deployment</th>
<th>Service</th>
<th>Port</th>
<th>Status</th>
<th>Action</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>BU01</td>
<td>Administration Server</td>
<td>18006</td>
<td>Running</td>
<td>Stop</td>
<td><img src="https://example.com/stop.png" alt="Stop" /></td>
</tr>
<tr>
<td>BU02</td>
<td>Administration Server</td>
<td>18011</td>
<td>Running</td>
<td>Stop</td>
<td><img src="https://example.com/stop.png" alt="Stop" /></td>
</tr>
<tr>
<td>BU03</td>
<td>Distribution Server</td>
<td>18007</td>
<td>Running</td>
<td>Stop</td>
<td><img src="https://example.com/stop.png" alt="Stop" /></td>
</tr>
<tr>
<td>BU04</td>
<td>Distribution Server</td>
<td>18012</td>
<td>Running</td>
<td>Stop</td>
<td><img src="https://example.com/stop.png" alt="Stop" /></td>
</tr>
<tr>
<td>BU05</td>
<td>Performance Metrics Server</td>
<td>18009</td>
<td>Running</td>
<td>Stop</td>
<td><img src="https://example.com/stop.png" alt="Stop" /></td>
</tr>
<tr>
<td>BU06</td>
<td>Performance Metrics Server</td>
<td>18014</td>
<td>Running</td>
<td>Stop</td>
<td><img src="https://example.com/stop.png" alt="Stop" /></td>
</tr>
<tr>
<td>BU07</td>
<td>Receiver Server</td>
<td>18006</td>
<td>Running</td>
<td>Stop</td>
<td><img src="https://example.com/stop.png" alt="Stop" /></td>
</tr>
<tr>
<td>BU08</td>
<td>Receiver Server</td>
<td>18011</td>
<td>Running</td>
<td>Stop</td>
<td><img src="https://example.com/stop.png" alt="Stop" /></td>
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</tbody>
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<table>
<thead>
<tr>
<th>Deployment</th>
<th>GoldenGate Home</th>
<th>Status</th>
<th>Running Services</th>
<th>Not Running Services</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service/manager</td>
<td>/app/ora/software/egg/32c</td>
<td>Running</td>
<td>0</td>
<td>0</td>
<td>Action</td>
</tr>
<tr>
<td>BU01</td>
<td>/app/ora/software/egg/32c</td>
<td>Running</td>
<td>0</td>
<td>0</td>
<td>Action</td>
</tr>
<tr>
<td>BU02</td>
<td>/app/ora/software/egg/32c</td>
<td>Running</td>
<td>0</td>
<td>0</td>
<td>Action</td>
</tr>
</tbody>
</table>
Thank you for attending

GoldenGate Microservices
Questions and Answers