



Configuring OGG with OGI Bundled Agents (XAG) for HA

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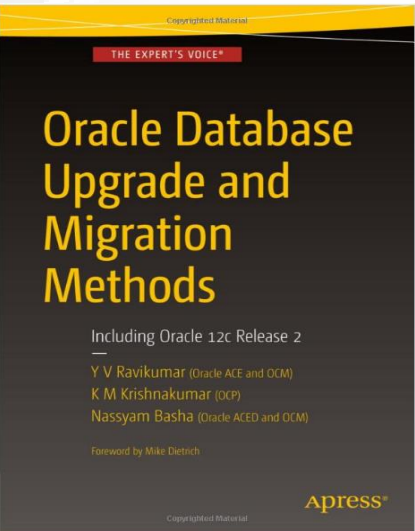


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ORACLE GOLDENGATE

Configuring OGG with OGI Bundled Agents (XAG)



High Availability with GI with XAG





Oracle GoldenGate Architecture with HA and XAG

Source OGG VIP Resource
Xag.gg_1-vip.vip

Shared Filesystem Resource
/acfs OR /dbfs OR /ocfs2

Source OGG Agent Resource
gg_1

Source OGG VIP Resource
Xag.gg_2-vip.vip

Shared Filesystem Resource
/acfs OR /dbfs OR /ocfs2

Source OGG Agent Resource
gg_2

Source Database:
primdb

Oracle ClusterWare 12c
(12.1.0.2.0)

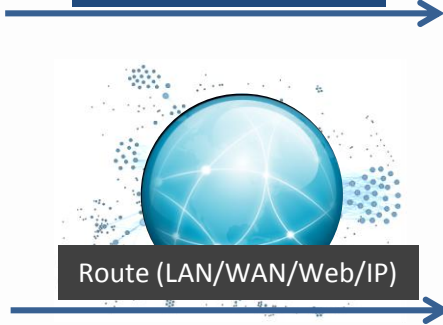
Oracle GoldenGate 12.2.0.1.1



Source Database – Cluster Nodes



REAL-TIME UPDATES



Target Database:
orcldb

Oracle ClusterWare 12c
(12.1.0.2.0)

Oracle GoldenGate 12.2.0.1.1



Target Database – Cluster Nodes



- Oracle Grid Infrastructure (OGI) provides the necessary components to manage High Availability (HA) for any business critical applications. Oracle Clusterware Bundled Agents for OGG are now part of the Oracle GI.
- Oracle GI Bundled Agents (XAG) are Oracle GI components that provide the HA framework to application resources and resource types managed through the bundled agent management interface, AGCTL.
- **AGCTL**, Agent Control, is the agent **command** line utility to manage XAG for application HA using OGI.
- Manages **Apache Tomcat, Apache Webserver, Goldengate, JDE Enterprise Server, MySQL Server, Peoplesoft App Server, Peoplesoft Batch Server, Peoplesoft PIA Server, Siebel Gateway, Siebel Server, WebLogic Administration Server** as Oracle Clusterware Resources.
- They automate the failover and recovery of OGG processes in an Oracle RAC/Oracle Exadata environments.
- The environments must be identical on both nodes in the cluster so that Oracle GoldenGate and Oracle Clusterware execution, log and configuration files are available on all nodes.
- XAG_HOME is created locally when the xagpack.zip file is unzipped in a local directory.
- XAG allows you to register Oracle GoldeGate instance with CRS to provide HA in Clustered Environment.
- GGSCI command “START/STOP MANAGER” is passed to XAG and the manager is started/stopped by XAG.



File Systems support for OGG in XAG environment

A shared files system is required for OGG recovery information such as checkpoint files, trail files, and BR files. The file system needs a shared file system because OGG will need to startup on different nodes in the event of planned or unplanned outages .



Oracle ASM Cluster File System (ACFS)

- Oracle 11g R2 introduces the Oracle Automatic Storage Management Cluster File System (ASM Cluster File System, ACFS).
- ACFS is a general purpose single-node (standalone) or multi-node cluster file system on top of ASM volume management (ADVM)).
- ACFS can be used for Oracle GoldenGate trail files with no restrictions.
- Oracle Grid Infrastructure ships with the ACFS.
- ACFS file system will be mounted on all user defined nodes and file system availability is managed entirely by the Oracle GI.
- Oracle GoldenGate installation can be done on ACFS and you can also store the recovery-related files in a cluster configuration in ACFS to make them accessible to all nodes.



Oracle Cluster File System (OCFS2)

- Cluster File System (OCFS2) is included in recent Linux distributions (included in the Linux kernel in some distributions).
- OCFS2 is an open source general purpose cluster file system (Only on Linux)



Database File System (DBFS)

- Oracle 11g R2 introduced Database File System (DBFS).
- In DBFS files are stored as secure files which are internally stored as LOB data values in the Oracle Database. In-database storage provides high availability, security and encryption capabilities that may not be otherwise available on general purpose file systems. In a cluster configuration the DBFS can be accessed from multiple nodes, and hence it can act as a cluster file system.
- In order to mount a DBFS as an OS file system another component, a DBFS client (dbfs_client) is required.
- Oracle Database 11.2.0.1 you can only mount a DBFS file system on Linux.
- DBFS can be used for Oracle GoldenGate trail files with no restrictions
- Oracle GoldenGate installation can be done on DBFS and you can also store the recovery-related files in a cluster configuration in DBFS to make them accessible to all nodes.
- We can use DBFS file system on Oracle Exadata for Oracle GoldenGate.



ORACLE GOLDENGATE

Configuring OGG with OGI Bundled Agents (XAG) with ACFS





Source and Target Cluster Versions

Source Cluster

Oracle Version:	Oracle Database 12cR1 (12.1.0.2.0)
GoldenGate version:	Oracle GoldenGate (12.2.0.1.1)
XAG Version:	xagpack_72.zip
Hostnames:	rac1-12c, rac2-12c
Database:	primdb (primdb1 and primdb2)
GRID Home:	/u01/app/12.1.0.2/grid
Oracle Home:	/u01/app/oracle/product/12.1.0.2/db_1
GoldenGate Home	/vol1/app/ggate
XAG Home	/u01/app/xag
Public IPs	192.168.2.101, 192.168.2.102
Private IPs	10.1.4.146, 10.1.4.147
SCAN	192.168.2.105, 192.168.2.106 and 192.168.2.107
XAG VIP	192.168.1.150

Target Cluster

Oracle Version:	Oracle Database 12cR1 (12.1.0.2.0)
GoldenGate version:	Oracle GoldenGate (12.2.0.1.1)
XAG Version:	xagpack_72.zip
Hostnames:	rac3-12c, rac4-12c
Database:	orclpdb (orclpdb1 and orclpdb2)
GRID Home:	/u01/app/12.1.0.2/grid
Oracle Home:	/u01/app/oracle/product/12.1.0.2/db_1
GoldenGate Home	/vol1/app/ggate
XAG Home	/u01/app/xag
Public IPs	192.168.2.201, 192.168.2.202
Private IPs	10.1.4.246, 10.1.4.247
SCAN	192.168.2.205, 192.168.2.206 and 192.168.2.207
XAG VIP	192.168.1.160



Configured Setup at Source and Target Cluster

@Source Database - Cluster

- ✓ Installed and configured Oracle Grid Infrastructure 12cR1 (12.1.0.2.0) in /u01/app/12.1.0.2/grid
- ✓ Installed and configured Oracle Database 12cR1 (12.1.0.2.0) in /u01/app/oracle/product/12.1.0.2/db_1
- ✓ Assigned PUBLIC IPs, PRIVATE IPs and SCAN IPs for cluster nodes (rac1-12c and rac2-12c)
- ✓ Created ACFS_DG disk group for placing ACFS file system for shared Oracle GoldenGate software installation.
- ✓ Installed and configured Oracle GoldenGate on shared directory - /vol1/app/gggate
- ✓ Created separate tablespace and OGG user and assigned required privileges
- ✓ Enabled parameters - **enable_goldengate_replication & streams_pool_size**
- ✓ Created and configured Manager (MGR), Integrated Extract (eprimdb) and Pump (pprimdb) Processes

@Target Database - Cluster

- ✓ Installed and configured Oracle Grid Infrastructure 12cR1 (12.1.0.2.0) in /u01/app/12.1.0.2/grid
- ✓ Installed and configured Oracle Database 12cR1 (12.1.0.2.0) in /u01/app/oracle/product/12.1.0.2/db_1
- ✓ Assigned PUBLIC IPs, PRIVATE IPs and SCAN IPs for cluster nodes (rac3-12c and rac4-12c)
- ✓ Created ACFS_DG disk group for placing ACFS file system for shared Oracle GoldenGate software installation
- ✓ Installed and configured Oracle GoldenGate on shared directory - /vol1/app/ggate
- ✓ Created separate tablespace and OGG user and assigned required privileges
- ✓ Enabled parameters - **enable_goldengate_replication & streams_pool_size**
- ✓ Created and configured Manager (MGR) and Replicat (rprimdb) Processes.



GGSCI (rac1-12c.localdomain as ogguser@primdb1) 8> view param eprimdb

```
extract eprimdb
exttrail ./dirdat/lt
userid ogguser@primdb, password oracle
table scott.*;
```

GGSCI (rac1-12c.localdomain as ogguser@primdb1) 9> view param mgr

```
PORT 7878
AUTORESTART ER *, retries 5, waitminutes 1, resetminutes 60
AUTOSTART ER *
```

GGSCI (rac1-12c.localdomain) 8> view param pprimdb

```
extract pprimdb
rmthost gg_2-vip, mgrport 7879
rmttrail ./dirdat/rt
passthru
table scott.*;
```

Important Note: The RMOHOST parameter must reference the resource VIP IP of the target for automatic failover in an Oracle GoldenGate XAG configuration.



```
GGSCI (rac3-12c.localdomain) 2> view param mgr
```

```
PORT 7879  
AUTOSTART ER *
```

```
GGSCI (rac3-12c.localdomain) 5> view param ./GLOBALS
```

```
GGSCHEMA OGGUSER  
ENABLEMONITORING  
CHECKPOINTTABLE OGGUSER.GGS_CHECKPOINT
```

```
GGSCI (rac3-12c.localdomain) 7> view param rprimdb
```

```
replicat rprimdb  
userid ogguser@orcldb, password oracle  
assumetargetdefs  
ddloptions report  
discardfile ./dirout/rprimdb.dsc, purge  
map scott.*, target scott.*;
```

```
GGSCI (rac3-12c.localdomain as ogguser@orcldb1) 6> add checkpointtable
```

```
GGSCI (rac4-12c.localdomain as ogguser@orcldb2) 8> info CHECKPOINTTABLE  
No checkpoint table specified. Using GLOBALS specification (OGGUSER.GGS_CHECKPOINT)...  
Checkpoint table OGGUSER.GGS_CHECKPOINT created 2017-12-04 03:43:37.
```



XAG Setup – Source Cluster

Download and unzip XAG components in rac1-12c node and Install outside of Grid Infrastructure ORACLE_HOME and make sure OS user PATH finds this XAG before the GI installed version

Download XAG components from the below URL

<http://www.oracle.com/technetwork/database/database-technologies/clusterware/downloads/xag-agents-downloads-3636484.html>

```
[oracle@rac1-12c xag]$ unzip xagpack_72.zip
```

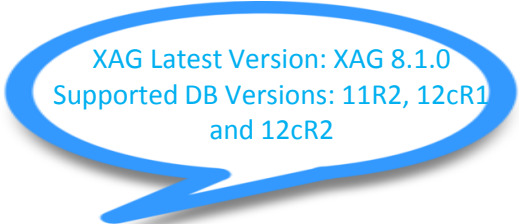
Login as 'root' user and create directory in rac1-12c and rac2-12c nodes for XAG

```
[root@rac1-12c app]# mkdir -p /u01/app/xag
[root@rac1-12c app]# chown -R oracle:oinstall /u01/app/xag/
[root@rac1-12c app]# chmod -R 777 /u01/app/xag/
```

```
[root@rac2-12c app]# mkdir -p /u01/app/xag
[root@rac2-12c app]# chown -R oracle:oinstall /u01/app/xag/
[root@rac2-12c app]# chmod -R 777 /u01/app/xag/
```

```
[oracle@rac1-12c xag]$ ./xagsetup.sh --install --directory /u01/app/xag --all_nodes
```

Installing Oracle Grid Infrastructure Agents on: rac1-12c
Installing Oracle Grid Infrastructure Agents on: rac2-12c
Done.



XAG Latest Version: XAG 8.1.0
Supported DB Versions: 11R2, 12cR1
and 12cR2

```
[oracle@rac1-12c bin]$ ./agctl query releaseversion
The Oracle Grid Infrastructure Agents release version is 7.2.0
[oracle@rac1-12c bin]$ █
```



XAG Setup – Source Cluster

```
[root@rac1-12c ~]# cat /etc/hosts
```

```
192.168.2.101      rac1-12c.localdomain      rac1-12c
192.168.2.102      rac2-12c.localdomain      rac2-12c
10.1.4.246         rac1-12c-priv.localdomain rac1-12c-priv
10.1.4.247         rac2-12c-priv.localdomain rac2-12c-priv
192.168.2.103      rac1-12c-vip.localdomain  rac1-12c-vip
192.168.2.104      rac2-12c-vip.localdomain  rac2-12c-vip
192.168.2.105      rac-scan.localdomain      rac-scan
192.168.2.106      rac-scan.localdomain      rac-scan
192.168.2.107      rac-scan.localdomain      rac-scan
192.168.2.150     gg_1-vip.localdomain     gg_1-vip
```

```
[root@rac2-12c ~]# cat /etc/hosts
```

```
192.168.2.101      rac1-12c.localdomain      rac1-12c
192.168.2.102      rac2-12c.localdomain      rac2-12c
10.1.4.246         rac1-12c-priv.localdomain rac1-12c-priv
10.1.4.247         rac2-12c-priv.localdomain rac2-12c-priv
192.168.2.103      rac1-12c-vip.localdomain  rac1-12c-vip
192.168.2.104      rac2-12c-vip.localdomain  rac2-12c-vip
192.168.2.105      rac-scan.localdomain      rac-scan
192.168.2.106      rac-scan.localdomain      rac-scan
192.168.2.107      rac-scan.localdomain      rac-scan
192.168.2.150     gg_1-vip.localdomain     gg_1-vip
```



Creating an Oracle ACFS File System – Source cluster



Creation of ACFS

```
ASMCMD> volinfo --all
```

```
no volumes found
```

Create an Oracle ASM volume in a mounted disk group (ACFS_DG) with the ASMCMD 'volcreate' command

```
ASMCMD> volcreate -G acfs_dg -s 19G vol1
```

```
ASMCMD> volinfo --all
```

```
Diskgroup Name: ACFS_DG
```

```
Volume Name: VOL1
```

```
Volume Device: /dev/asm/vol1-11
```

```
State: ENABLED
```

```
Size (MB): 19456
```

```
Resize Unit (MB): 64
```

```
Redundancy: UNPROT
```

```
Stripe Columns: 8
```

```
Stripe Width (K): 1024
```

```
Usage:
```

```
Mountpath:
```

```
ASMCMD> exit
```



Creating an Oracle ACFS File System – Source cluster

```
ASMCMD> volinfo --all
Diskgroup Name: ACFS_DG

Volume Name: VOL1
Volume Device: /dev/asm/vol1-11
State: ENABLED
Size (MB): 19456
Resize Unit (MB): 64
Redundancy: UNPROT
Stripe Columns: 8
Stripe Width (K): 1024
Usage: ACFS
Mountpath: /vol1
```

```
[oracle@rac1-12c ~]$ . oraenv
ORACLE_SID = [+ASM1] ? +ASM1
The Oracle base remains unchanged with value /u01/app/oracle
[oracle@rac1-12c ~]$ sqlplus / as sysasm

SQL*Plus: Release 12.1.0.2.0 Production on Wed Jun 28 09:26:58 2017
Copyright (c) 1982, 2014, Oracle. All rights reserved.

Connected to:
Oracle Database 12c Enterprise Edition Release 12.1.0.2.0 - 64bit Production
With the Real Application Clusters and Automatic Storage Management options

SQL> col volume_name format a10
SQL> col volume_device format a40
SQL> select volume_name,volume_device from v$asm_volume;

VOLUME_NAM VOLUME_DEVICE
-----
VOL1        /dev/asm/vol1-11

SQL> █
```




Creating an Oracle ACFS File System – Source Cluster

```
[root@rac1-12c ~]# modprobe oracleacfs
[root@rac1-12c ~]# modprobe oracleadvn
[root@rac1-12c ~]# modprobe oracleoks
[root@rac1-12c ~]# lsmod | grep oracle
```

Login as 'oracle' user. Create a file system with the Oracle ACFS 'mkfs' command.

```
[oracle@rac1-12c ~]$ mkfs -t acfs /dev/asm/vol1-11
mkfs.acfs: version                = 12.1.0.2.0
mkfs.acfs: on-disk version        = 39.0
mkfs.acfs: volume                 = /dev/asm/vol1-11
mkfs.acfs: volume size            = 20401094656 ( 19.00 GB )
mkfs.acfs: Format complete.
[oracle@rac1-12c ~]$
```

Login as 'root' user and create volume 'vol1' and grant required privileges

```
[root@rac1-12c ~]# cd /
[root@rac1-12c /]# mkdir vol1
[root@rac1-12c /]# chown -R oracle:oinstall /vol1
[root@rac1-12c /]# chmod -R 777 /vol1
```

ACFS file system needs the following drivers:

oracleacfs - ASM file system module
oracleadvn - ASM dynamic volume manager module
oracleoks - kernel services module



Registering ACFS File System with Clusterware – Source Cluster

```
[root@rac1-12c /]# acfsutil registry -a /dev/asm/vol1-11 /vol1
```

```
acfsutil registry: mount point /vol1 successfully added to Oracle Registry
```

```
[root@rac1-12c /]# acfsutil registry -c /dev/asm/vol1-11 /vol1 -u oracle
```

```
acfsutil registry: successfully modified ACFS registration for '/dev/asm/vol1-11'
```

```
[root@rac1-12c /]#[root@rac1-12c /]# mount -t acfs /dev/asm/vol1-11 /vol1
```

```
[root@rac1-12c /]# df -h
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/vg_rac1-lv_root	35G	23G	11G	67%	/
tmpfs	3.9G	630M	3.3G	16%	/dev/shm
/dev/sda1	477M	55M	397M	13%	/boot
/dev/asm/vol1-11	19G	115M	19G	1%	/vol1

```
[root@rac1-12c /]#
```

```
[root@rac1-12c /]# mount | grep acfs
```

```
/dev/asm/vol1-11 on /vol1 type acfs (rw)
```



Check an Oracle ACFS File System – Source cluster

Check the volume from second node (rac2-12c)

```
[root@rac2-12c ~]# df -h
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/mapper/vg_rac1-lv_root	35G	18G	16G	54%	/
tmpfs	3.9G	631M	3.3G	16%	/dev/shm
/dev/sda1	477M	55M	397M	13%	/boot
/dev/asm/vol1-11	19G	115M	19G	1%	/vol1

```
[root@rac2-12c ~]#
```

Place the entry in `/etc/fstab` in rac1-12c and rac2-12c nodes

```
[root@rac1-12c /]# cat /etc/fstab
```

/dev/mapper/vg_rac1-lv_root /	ext4	defaults	1 1
UUID=7a3d2b88-72a1-487b-90e0-8e0415ea454f /boot	ext4	defaults	1 2
/dev/mapper/vg_rac1-lv_swap swap	swap	defaults	0 0
tmpfs /dev/shm	tmpfs	defaults	0 0
devpts /dev/pts	devpts	gid=5,mode=620	0 0
sysfs /sys	sysfs	defaults	0 0
proc /proc	proc	defaults	0 0
/dev/asm/vol1-11 /vol1	acfs	defaults	0 0



Create the application VIP, login as root user

```
[root@rac2-12c ~]# cat /etc/fstab
```

```
/dev/mapper/vg_rac1-lv_root / ext4 defaults 1 1
UUID=7a3d2b88-72a1-487b-90e0-8e0415ea454f/boot ext4 defaults 1 2
/dev/mapper/vg_rac1-lv_swap swap swap defaults 0 0
tmpfs /dev/shm tmpfs defaults 0 0
devpts /dev/pts devpts gid=5,mode=620 0 0
sysfs /sys sysfs defaults 0 0
proc /proc proc defaults 0 0
/dev/asm/vol1-11 /vol1 acfs defaults 0 0
```

Login as 'root' user. Create the application VIP using 'appvipcfg'

```
[root@rac1-12c ~]# . oraenv
ORACLE_SID = [+ASM1] ? +ASM1
The Oracle base remains unchanged with value /u01/app/oracle
```

```
[root@rac1-12c ~]# appvipcfg create
```

```
-network=1 \  
-ip=192.168.2.150 \  
-vipname=xag.gg_1-vip.vip \  
-user=oracle
```

```
[root@rac1-12c ~]# crsctl start resource xag.gg_1-vip.vip
```



Register GoldenGate with Bundled Agent (XAG)



To validate whether the VIP is running and on which node it is running, execute:

```
[oracle@rac1-12c ~]$ su - root
Password:
[root@rac1-12c ~]# . oraenv
ORACLE_SID = [root] ? +ASM1
The Oracle base has been set to /u01/app/oracle
[root@rac1-12c ~]# crsctl status resource xag.gg_1-vip.vip
NAME=xag.gg_1-vip.vip
TYPE=app.appvipx.type
TARGET=ONLINE
STATE=ONLINE on rac1-12c
```



Register GoldenGate with Bundled Agent (XAG)

Register with XAG at the primary creating the VIP agctl control command. Start Extract using Agent Control.

```
[oracle@rac1-12c bin]$ ./agctl add goldengate gg_1 \  
--gg_home /vol1/app/gggate \  
--instance_type source \  
--nodes rac1-12c,rac2-12c \  
--vip_name xag.gg_1-vip.vip \  
--filesystems ora.acfs_dg.vol1.acfs \  
--databases ora.primdb.db \  
--oracle_home /u01/app/oracle/product/12.1.0.2/db_1
```



Check XAG setup



Oracle GRID Infrastructure – Bundled Agents (XAG)

```
[oracle@rac1-12c ~]$ agctl start goldengate gg_1 --node rac1-12c
```

```
[oracle@rac1-12c ~]$ crsctl stat res -t
```

```
-----  
Name          Target State   Server          State details  
-----  
ora.ACFS_DG.VOL1.advm  
    ONLINE ONLINE   rac1-12c        Volume device /dev/asm/vol1-11 is online,STABLE  
    ONLINE ONLINE   rac2-12c        Volume device /dev/asm/vol1-11 is online,STABLE  
ora.ACFS_DG.dg  
    ONLINE ONLINE   rac1-12c        STABLE  
    ONLINE ONLINE   rac2-12c        STABLE  
ora.acfs_dg.vol1.acfs  
    ONLINE ONLINE   rac1-12c        mounted on /vol1,STABLE  
    ONLINE ONLINE   rac2-12c        mounted on /vol1,STABLE  
xag.gg_1-vip.vip  
  1    ONLINE ONLINE   rac1-12c        STABLE  
xag.gg_1.goldengate  
  1    ONLINE ONLINE   rac1-12c        STABLE  
-----
```

```
[oracle@rac1-12c ~]$
```



Check the Status and Config of gg_1 Resource

```
[oracle@rac1-12c bin]$ agctl status goldengate gg_1
```

```
Goldengate instance 'gg_1' is not running
```

```
[oracle@rac1-12c bin]$ agctl config goldengate gg_1
```

```
GoldenGate location is: /vol1/app/gggate
```

```
GoldenGate instance type is: source
```

```
Configured to run on Nodes: rac1-12c rac2-12c
```

```
ORACLE_HOME location is: /u01/app/oracle/product/12.1.0.2/db_1
```

```
Databases needed: ora.primdb.db
```

```
File System resources needed: ora.acfs_dg.vol1.acfs
```

```
VIP name: xag.gg_1-vip.vip
```

```
EXTRACT groups to monitor:
```

```
REPLICAT groups to monitor:
```

```
Autostart on DataGuard role transition to PRIMARY: no
```

```
Autostart JAgent: no
```

```
[oracle@rac1-12c bin]$
```



XAG Setup – Target Cluster

```
[oracle@rac3-12c xag]$ unzip xagpack_72.zip
```

Login as 'root' user and create directory in rac3-12c and rac4-12c nodes for XAG

```
[root@rac3-12c app]# mkdir -p /u01/app/xag
```

```
[root@rac3-12c app]# chown -R oracle:oinstall /u01/app/xag/
```

```
[root@rac3-12c app]# chmod -R 777 /u01/app/xag/
```

```
[root@rac4-12c app]# mkdir -p /u01/app/xag
```

```
[root@rac3-12c app]# chown -R oracle:oinstall /u01/app/xag/
```

```
[root@rac4-12c app]# chmod -R 777 /u01/app/xag/
```

```
[oracle@rac3-12c xag]$ ./xagsetup.sh --install --directory /u01/app/xag --all_nodes
```

Installing Oracle Grid Infrastructure Agents on: rac3-12c

Installing Oracle Grid Infrastructure Agents on: rac4-12c

Done.



XAG Setup – Target Cluster

```
[root@rac3-12c ~]# cat /etc/hosts
```

```
192.168.2.201      rac3-12c.localdomain      rac3-12c
192.168.2.202      rac4-12c.localdomain      rac4-12c
10.1.4.146         rac3-12c-priv.localdomain rac3-12c-priv
10.1.4.147         rac4-12c-priv.localdomain rac4-12c-priv
192.168.2.203      rac3-12c-vip.localdomain  rac3-12c-vip
192.168.2.204      rac4-12c-vip.localdomain  rac4-12c-vip
192.168.2.205      rac-scan1.localdomain     rac-scan1
192.168.2.206      rac-scan1.localdomain     rac-scan1
192.168.2.207      rac-scan1.localdomain     rac-scan1
192.168.2.160      gg_2-vip.localdomain      gg_2-vip
```

```
[root@rac4-12c ~]# cat /etc/hosts
```

```
192.168.2.201      rac3-12c.localdomain      rac3-12c
192.168.2.202      rac4-12c.localdomain      rac4-12c
10.1.4.146         rac3-12c-priv.localdomain rac3-12c-priv
10.1.4.147         rac4-12c-priv.localdomain rac4-12c-priv
192.168.2.203      rac3-12c-vip.localdomain  rac3-12c-vip
192.168.2.204      rac4-12c-vip.localdomain  rac4-12c-vip
192.168.2.205      rac-scan1.localdomain     rac-scan1
192.168.2.206      rac-scan1.localdomain     rac-scan1
192.168.2.207      rac-scan1.localdomain     rac-scan1
192.168.2.160      gg_2-vip.localdomain      gg_2-vip
```



Creating an Oracle ACFS File System – Target Cluster

```
[oracle@rac4-12c ~]$ . oraenv
ORACLE_SID = [+ASM2] ? +ASM2
The Oracle base remains unchanged with value /u01/app/oracle
[oracle@rac4-12c ~]$ asmcmd
ASMCMD> lsdg
```

State	Type	Rebal	Sector	Block	AU	Total_MB	Free_MB	Req_mir_free_MB	Usable_file_MB	Offline_disks	Voting_files	Name
MOUNTED	EXTERN	N	512	4096	1048576	15342	901	0	901	0	N	ACFS_DG/
MOUNTED	EXTERN	N	512	4096	1048576	16370	7446	0	7446	0	Y	DATA/

```
ASMCMD>
```

```
ASMCMD> volinfo --all
```

```
ASMCMD> volcreate -G acfs_dg -s 14G vol1
```

```
[oracle@rac3-12c ~]$ asmcmd
ASMCMD> volinfo --all
Diskgroup Name: ACFS_DG

Volume Name: VOL1
Volume Device: /dev/asm/vol1-320
State: ENABLED
Size (MB): 14336
Resize Unit (MB): 64
Redundancy: UNPROT
Stripe Columns: 8
Stripe Width (K): 1024
Usage: ACFS
Mountpath: /vol1
```



XAG Setup – Target Cluster

```
[oracle@rac3-12c ~]$ . oraenv
ORACLE_SID = [orclpdb] ? +ASM1
The Oracle base remains unchanged with value /u01/app/oracle
[oracle@rac3-12c ~]$ sqlplus / as sysasm

SQL*Plus: Release 12.1.0.2.0 Production on Wed Jun 28 09:28:36 2017
Copyright (c) 1982, 2014, Oracle. All rights reserved.

Connected to:
Oracle Database 12c Enterprise Edition Release 12.1.0.2.0 - 64bit Production
With the Real Application Clusters and Automatic Storage Management options

SQL> col volume_name format a10
SQL> col volume_device format a40
SQL> select volume_name,volume_device from v$asm_volume;

VOLUME_NAM VOLUME_DEVICE
-----
VOL1        /dev/asm/vol1-320

SQL> █
```

Login as 'root' user and check the following:

```
[root@rac3-12c ~]# modprobe oracleacfs
[root@rac3-12c ~]# modprobe oracleadvn
[root@rac3-12c ~]# modprobe oracleoks
[root@rac3-12c ~]# lsmod | grep oracle
```

ACFS file system needs the following drivers:

- oracleacfs** - ASM file system module
- oracleadvn** - ASM dynamic volume manager module
- oracleoks** - kernel services module



XAG Setup – Target Cluster

```
[root@rac3-12c ~]# appvipcfg create -network=1 -ip=192.168.2.160 -vipname=xag.gg_2-vip.vip -user=oracle
```

```
[oracle@rac3-12c bin]$ ./agctl add goldengate gg_2 \  
--gg_home /vol1/app/ggate \  
--instance_type source \  
--nodes rac3-12c,rac4-12c \  
--vip_name xag.gg_2-vip.vip \  
--filesystems ora.acfs_dg.vol1.acfs \  
--databases ora.orcldb.db \  
--oracle_home /u01/app/oracle/product/12.1.0.2/db_1
```

```
[oracle@rac3-12c bin]$ ./agctl config goldengate gg_2
```

```
GoldenGate location is: /vol1/app/ggate
```

```
GoldenGate instance type is: source
```

```
Configured to run on Nodes: rac3-12c rac4-12c
```

```
ORACLE_HOME location is: /u01/app/oracle/product/12.1.0.2/db_1
```

```
Databases needed: ora.orcldb.db
```

```
File System resources needed: ora.acfs_dg.vol1.acfs
```

```
VIP name: xag.gg_2-vip.vip
```

```
EXTRACT groups to monitor:
```

```
REPLICAT groups to monitor:
```

```
Autostart on DataGuard role transition to PRIMARY: no
```

```
Autostart JAgent: no
```

```
[oracle@rac3-12c bin]$
```



OGG Agent Status and VIP Status - Source & Target Cluster

```
[oracle@rac3-12c bin]$ ./agctl status goldengate
```

```
Goldengate instance 'gg_2' is running on rac3-12c
```

```
[oracle@rac3-12c bin]$ ./agctl start goldengate gg_2
```

(OR)

```
[oracle@rac3-12c bin]$ ./agctl start goldengate gg_2 --node rac3-12c
```

```
[oracle@rac1-12c ~]$ crsctl stat res xag.gg_1-vip.vip
```

```
NAME=xag.gg_1-vip.vip
```

```
TYPE=app.appvipx.type
```

```
TARGET=ONLINE
```

```
STATE=ONLINE on rac1-12c
```

```
[oracle@rac1-12c ~]$ crsctl stat res xag.gg_1.goldengate
```

```
NAME=xag.gg_1.goldengate
```

```
TYPE=xag.goldengate.type
```

```
TARGET=ONLINE
```

```
STATE=ONLINE on rac1-12c
```

```
[oracle@rac1-12c ~]$ cd /u01/app/xag/bin/
```

```
[oracle@rac1-12c bin]$ ./agctl status goldengate gg_1
```

```
Goldengate instance 'gg_1' is running on rac1-12c
```

```
[oracle@rac3-12c ~]$ . oraenv
```

```
ORACLE_SID = [+ASM1] ? +ASM1
```

```
The Oracle base remains unchanged with value /u01/app/oracle
```

```
[oracle@rac3-12c ~]$ crsctl stat res xag.gg_2-vip.vip
```

```
NAME=xag.gg_2-vip.vip
```

```
TYPE=app.appvipx.type
```

```
TARGET=ONLINE
```

```
STATE=ONLINE on rac3-12c
```

```
[oracle@rac3-12c ~]$ crsctl stat res xag.gg_2.goldengate
```

```
NAME=xag.gg_2.goldengate
```

```
TYPE=xag.goldengate.type
```

```
TARGET=ONLINE
```

```
STATE=ONLINE on rac3-12c
```

```
[oracle@rac3-12c ~]$ cd /u01/app/xag/bin/
```

```
[oracle@rac3-12c bin]$ ./agctl status goldengate gg_2
```

```
Goldengate instance 'gg_2' is running on rac3-12c
```

```
[oracle@rac3-12c bin]$ █
```



Relocating OGG Process – Source cluster



Relocate the OGG Processes to another node to test failover (Login as Oracle)

```
[oracle@rac1-12c bin]$ ./agctl status goldengate gg_1
Goldengate instance 'gg_1' is running on rac1-12c
[oracle@rac1-12c bin]$ ./agctl relocate goldengate gg_1 --node rac2-12c
[oracle@rac1-12c bin]$ ./agctl status goldengate gg_1
Goldengate instance 'gg_1' is running on rac2-12c
[oracle@rac1-12c bin]$ crsctl stat res xag.gg_1-vip.vip
NAME=xag.gg_1-vip.vip
TYPE=app.appvipx.type
TARGET=ONLINE
STATE=ONLINE on rac2-12c

[oracle@rac1-12c bin]$ crsctl stat res xag.gg_1.goldengate
NAME=xag.gg_1.goldengate
TYPE=xag.goldengate.type
TARGET=ONLINE
STATE=ONLINE on rac2-12c

[oracle@rac1-12c bin]$ █
```



Relocating OGG Process – Target cluster



Relocate the OGG Processes to another node to test failover (Login as Oracle)

```
[oracle@rac3-12c bin]$ ./agctl status goldengate gg_2
Goldengate instance 'gg_2' is running on rac3-12c
[oracle@rac3-12c bin]$ ./agctl relocate goldengate gg_2 --node rac4-12c
[oracle@rac3-12c bin]$
[oracle@rac3-12c bin]$ ./agctl status goldengate gg_2
Goldengate instance 'gg_2' is running on rac4-12c
[oracle@rac3-12c bin]$ crsctl stat res xag.gg_2-vip.vip
NAME=xag.gg_2-vip.vip
TYPE=app.appvipx.type
TARGET=ONLINE
STATE=ONLINE on rac4-12c

[oracle@rac3-12c bin]$ crsctl stat res xag.gg_2.goldengate
NAME=xag.gg_2.goldengate
TYPE=xag.goldengate.type
TARGET=ONLINE
STATE=ONLINE on rac4-12c
```




Automatic failover from Primary to Secondary Node

```
xag.gg_1-vip.vip
  1      ONLINE  ONLINE      rac2-12c      STABLE
xag.gg_1.goldengate
  1      ONLINE  ONLINE      rac2-12c      STABLE
-----
```

```
[oracle@rac2-12c ~]$
[oracle@rac2-12c ~]$
[oracle@rac2-12c ~]$
[oracle@rac2-12c ~]$ su - root
Password:
[root@rac2-12c ~]# init 0
[root@rac2-12c ~]# █
```

```
[oracle@rac1-12c ~]$ cd /u01/app/xag/bin/
[oracle@rac1-12c bin]$ ./agctl status goldengate gg_1
Goldengate instance 'gg_1' is running on rac2-12c
[oracle@rac1-12c bin]$ ./agctl status goldengate gg_1
Goldengate instance 'gg_1' is running on rac2-12c
[oracle@rac1-12c bin]$ ./agctl status goldengate gg_1
Goldengate instance 'gg_1' is running on rac2-12c
[oracle@rac1-12c bin]$ ./agctl status goldengate gg_1
Goldengate instance 'gg_1' is running on rac2-12c
[oracle@rac1-12c bin]$ ./agctl status goldengate gg_1
Goldengate instance 'gg_1' is running on rac2-12c
[oracle@rac1-12c bin]$ ./agctl status goldengate gg_1
Goldengate instance 'gg_1' is not running
[oracle@rac1-12c bin]$ ./agctl status goldengate gg_1
Goldengate instance 'gg_1' is not running
[oracle@rac1-12c bin]$ ./agctl status goldengate gg_1
Goldengate instance 'gg_1' is not running
[oracle@rac1-12c bin]$ ./agctl status goldengate gg_1
Goldengate instance 'gg_1' is not running
[oracle@rac1-12c bin]$ ./agctl status goldengate gg_1
Goldengate instance 'gg_1' is running on rac1-12c
[oracle@rac1-12c bin]$ ./agctl status goldengate gg_1
Goldengate instance 'gg_1' is running on rac1-12c
[oracle@rac1-12c bin]$ ./agctl status goldengate gg_1
Goldengate instance 'gg_1' is running on rac1-12c
[oracle@rac1-12c bin]$ █
```




Stop OGG Agent & Deleting OGG Agent

How to Remove gg_1 and XAG component:

```
[oracle@rac3-12c bin]$ agctl stop goldengate gg_1  
Goldengate instance 'gg_1' is not running
```

```
[oracle@rac3-12c bin]$ agctl status goldengate  
Goldengate instance 'gg_1' is not running
```

```
[oracle@rac3-12c bin]$ agctl remove goldengate gg_1
```

```
[root@rac3-12c ~]# . oraenv  
ORACLE_SID = [root] ? +ASM1  
The Oracle base has been set to /u01/app/oracle
```

```
[root@rac3-12c ~]# appvipcfg delete -vipname=xag.gg_1-vip.vip -force
```



Testing OGG between Source Cluster and Target Cluster

Test the Oracle GoldenGate functionality with XAG from Source System (rac1-12c, rac2-12c) to Target System (rac3-12c, rac4-12c)

```
SQL> connect scott/oracle@primdb
Connected.
SQL> insert into dept values (77,'NYOUG','NY');

1 row created.

SQL> commit;

Commit complete.
```

Check the Oracle GoldenGate processes at Source System

```
GGSCI (rac2-12c.localdomain as ogguser@primdb2) 4> info all

Program          Status          Group           Lag at Chkpt   Time Since Chkpt
-----          -
MANAGER          RUNNING
EXTRACT          RUNNING         EPRIMDB         00:00:10       00:00:09
EXTRACT          RUNNING         PPRIMDB         00:00:00       00:00:00
```



Check the transactions at Target Cluster

Check the transaction in Target System and Check the Replicat Process status

```
SQL> connect scott/oracle@orclpdb
Connected.
SQL> select * from dept where deptno=77;
```

DEPTNO	DNAME	LOC
77	NYOUG	NY

```
GGSCI (rac4-12c.localdomain as ogguser@orclpdb2) 3> info all
```

Program	Status	Group	Lag at Chkpt	Time Since Chkpt
MANAGER	RUNNING			
JAGENT	STOPPED			
REPLICAT	RUNNING	RPRIMDB	00:00:00	00:00:01



- Oracle Clusterware XAG will address Oracle GoldenGate failover in cluster environment.
- Oracle GoldenGate processes registered with XAG to handle automatic failover between RAC nodes.
- XAG seamlessly relocates Oracle GoldenGate processes to any node in the cluster.
- XAG automatically fails over Oracle GoldenGate processes in the event of instance failure.

Please refer MOS Note for more details:

- ✓ **Oracle GoldenGate Best Practices: Configuring Oracle GoldenGate with Oracle Grid Infrastructure Bundled Agents (XAG) (Doc ID 1527310.1)**
- ✓ **Oracle GoldenGate Best Practices: Oracle GoldenGate High Availability Using Oracle Clusterware (Doc ID 1313703.1)**



Thanks for your TIME



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