DataGuard

In what protection modes can you use DataGuard?

Maximum protection :
zero data loss (sync)
Maximum availability :
zero data loss - assuming that prior to failure there was no disruption of synchronous communication
Maximum performance :
minimal data loss - as little as a few seconds, depending on network bandwidth (async)

In failover modes can you use in DataGuard?

Fast-Start failover with maximum availability protection (sync) - 10gR2
Fast-Start failover with maximum performance (async) - since 11g

How do you check the network configuration?

```
$ ifconfig -a
$ ifconfig -a | grep eth
```

How do you check the kernel parameters?

```
$ cat /etc/sysctl.conf
```

What parameters to you need to set in a standby environment?

Production server:

```
log_archive_start         = true   # Not required on 10G
log_archive_dest_1        = 'LOCATION=/oracle/ProdDB/archive/ MANDATORY REOPEN=5'
log_archive_dest_2        = SERVICE=SdbyDB REOPEN=60
log_archive_dest_state_1  = enable
log_archive_dest_state_2  = enable
standby_archive_dest      = '/oracle/Sdby/archive/'
standby_file_management   = auto
remote_archive_enable     = true  # not needed for 10gr2

# Used by ARCH process, ( on Prod), and MRP Process ( Media Recovery Proc on standby )
# to handle Gap Resolution, ( Missing / Corrupt Archives ).

fal_client                = SdbyDB
fal_server                = ProdDB
```

Standby server:

```
log_archive_start         = true

log_archive_dest_1        = 'LOCATION=/oracle/SdbyDB/archive/ MANDATORY REOPEN=5'
log_archive_dest_2        = SERVICE= SdbyDB_prd REOPEN=60
```

```
log_archive_dest_state_1  = enable
log_archive_dest_state_2  = enable
standby_archive_dest      = '/oracle/SdbyDB/archive/'
standby_file_management   = auto

fal_client                = SdbyDB
fal_server                = ProdDB
```

Which views to you use to monitor the standby database?

V$ARCHIVE_GAP

This view will show if there is a gap in the sequence of logs that need to be applied, e.g:

```
SELECT * FROM v$archive_gap;

THREAD#     LOW_SEQUENCE#    HIGH_SEQUENCE#
----------- ---------------- ---------------
1           443              446
```

This shows that logs 443 to 446 are missing.

V$ARCHIVED_LOG

This view is possibly the most useful view, it shows which archive logs have been applied and which have not. e.g.:

```
SELECT name, archived,applied, status
      ,to_char(COMPLETION_TIME,'dd-mon-yyyy hh24:mi:ss')”Completed”
FROM v$ARCHIVED_LOG
WHERE applied = 'NO';


NAME                                          ARC APP S Completed
--------------------------------------------- --- --- - --------------------
/oracle/INVENT/archive/T0001S0000085083.ARC   YES NO  A 19-may-2005 11:25:01
/oracle/INVENT/archive/T0001S0000085082.ARC   YES NO  A 19-may-2005 11:25:01
/oracle/INVENT/archive/T0001S0000085081.ARC   YES NO  A 19-may-2005 11:25:01
/oracle/INVENT/archive/T0001S0000085080.ARC   YES NO  A 19-may-2005 11:25:01
```

This will show the latest log that has been applied to the standby Database.

Lag in archive logs applied is the difference between the below values

```
SELECT max(sequence#) FROM v$archived_log;
SELECT max(sequence#) FROM v$archived_log WHEER applied='Y';
```

V$MANAGED_STANDBY

This view shows generic information about the Standby Database, i.e. processes running , status of processes etc.

```
SELECT process, status, thread#, sequence#, block#, blocks
FROM v$managed_standby;
```

```
PROCESS STATUS          THREAD#  SEQUENCE#     BLOCK#     BLOCKS
------- ------------ ---------- ---------- ---------- ---------
ARCH    CONNECTED             0          0          0         0
ARCH    CONNECTED             0          0          0         0
MRP0    WAIT_FOR_GAP          1      83794          0         0
RFS     ATTACHED              1      83798        356       356
RFS     ATTACHED              1      83797          1         1
```

block# shows which block it is on and blocks = no. of blks to be done.

Name some DataGuard services?

Data guard redo transport services
Data guard apply services
Data guard role management services

What apply services exist for standby databases?

```
Redo apply
      Used for physical standby databases .
      Uses the managed recovery process (MRP). MRP reads redo logs and applies
      them to the standby database.
SQL apply
      Used for logical standby databases.
      Redo data received gets converted into SQL statements.
```

How do you activate a standby database?

Standby:

```
  ALTER DATABASE RECOVER MANAGED STANDBY DATABASE CANCEL;
  ALTER DATABASE ACTIVATE STANDBY DATABASE;
```

Bounce the standby database and back it up

How do you switch over to the standby database?

On original primary db:

- Initialize the switchover operation (on primary db).

```
      alter database commit to switchover to physical standby ...
```

- Shutdown and restart the primary db.

```
      shutdown normal
      startup nomount
      alter database mount standby database;
```

On original standby db:

- Switch the standby role to primary role:

```
      alter database commit to switchover to primary
```

- Shutdown and restart the new primary db:

```
      shutdown
      startup
```

On the new standby db:
- Put the standby database in managed recovery mode:

```
alter database recover managed standby database
```

How do you create a standby database?

Primary:

```
1. Backup prod db
2. Copy backup to standby host
3. Create a standby control file
      ALTER DATABASE CREATE STANDBY CONTROLFILE AS '/tmp/STANDBY.ctl';
```

Standby:

```
1. Restore backup
2. Copy standby controlfile to controlfile location specified in init.ora
3. Startup "standby" db in nomount
4. Mount the database
      ALTER DATABASE MOUNT STANDBY DATABASE;
5. Start managed recover
      RECOVER MANAGED STANDBY DATABASE DISCONNECT FROM SESSION;
```

You now have a Physical Standby Database running.

How do you troubleshoot a DataGuard system?

```
- Archive area on the standby server filling up.

==> ???


- Archive files on the prod server being archived before being copied to the
  standby server.

==> Restore the archive logs and copy then to the standby host


- Archive logs on host but not applied to standby database

==> The most likely cause is that the logfiles have not been register with
    the Standby Database

ALTER DATABASE REGISTER LOGFILE '< full path of archive logfile >;


- Prod alert.log: ORA-16032: parameter destination string cannot be translated.

==> Ensure that the parameter STANDBY_ARCHIVE_DEST is set correctly with
    the full path of the archive area on the Sdby server.
```

How do you add a datafile to a standby database?

(A new file won't be created in standby db if prod path of new file doesn't exist on standby)

```
1. Take Database out of managed recovery.
2. Set standby file management to manual.
3. Add the datafile on standby host.
4. Set standby file management back to auto.
5. Put Database back into managed recovery.
```

How do check the time lag of a standby database?

Standby:
Get the current SCN
```
SELECT current_scn FROM v$database;
```

Primary:
Get the current SCN
```
SELECT current_scn FROM v$database;
```

Get the timestamp for the current SCN
```
SELECT scn_to_timestamp(current_scn) FROM v$database;
```

Get the timestamp for the current standby SCN
(get it here because this query will fail in the standby DB)
```
SELECT scn_to_timestamp(&current_standby_scn) FROM v$database;
```

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