M2P Fintech Solutions

Postgres Database Failover / Failback

Version 1.0



**M2P Solutions Private Limited**

India’s largest Program Management platform

**Disclaimer**

The information transmitted is intended only for the person or entity to which it is addressed and may contain confidential and/or privileged material. Any review, retransmission, dissemination, or other use of, or taking of any action in reliance upon this information by persons or entities other than the intended recipient is prohibited. This document contains confidential information of M2P Solutions Private Limited and is communicated solely for the intended recipient’s use. Circulation of this document, either internally or externally, is strictly restricted.

**Document Version**

|  |  |  |  |
| --- | --- | --- | --- |
| **Version - 1.0** | | | |
|  | **Version Maker** | **Reviewer** | **Approver** |
| **Name** | Mohan Rao NK | Sharath Sankar |  |
| **Date** |  |  |  |
| **Comments** |  |  |  |
| **Summary of Changes in this Version:**   * SOP for Postgres DB failover / failback during DR | | | |

Contents

[1. Scope: 5](#_Toc128491779)

[2. Failover & Failback of Postgres DB 5](#_Toc128491780)

[3. Steps for failover / Failback test 5](#_Toc128491781)

[3.1. Servers used: 5](#_Toc128491782)

[3.2. Verifying the Status of server : 5](#_Toc128491783)

[3.3. Verifying the Replication status from Primary 5](#_Toc128491784)

[3.4. Trying to insert record into Standby server 6](#_Toc128491785)

[3.5. Bringing down service on primary server 6](#_Toc128491786)

[3.6. Capturing log in Standby server 6](#_Toc128491787)

[3.7. Making standby as primary by using pg\_promote 7](#_Toc128491788)

[3.8. Trying to insert new rows in new Primary server 7](#_Toc128491789)

[3.9. Verifying the logs on New Primary 7](#_Toc128491790)

[4. Making Old Primary as Standby 7](#_Toc128491791)

[4.1. -- Verify the logs in new Standby 8](#_Toc128491792)

# Scope:

This Document covers the scope of support and tasks performed by the Database admin as part of M2P fintech solutions.

We support Databases like MySQL PostgreSQL & MongoDB on various platforms like Linux and database as a service in AWS and Azure. The steps being followed during DR scenario is for Postgres Database is explained here with clear steps

# Failover & Failback of Postgres DB

* Unlike other cluster DBs, for Postgres, we need to manually failover the Postgres services.
* Automatic failback of disconnected server is not possible however we need to perform complete backup and recovery process.
* The steps mentioned below are tested in our lower environment.

# Steps for failover / Failback test

## Servers used:

Server 1: xxx-xxx1-m2p-tst-db02.xxxxxxxxxx.com - xxx.xxx.x.42 (Primary)

Server 2: xxx-xxx1-m2p-tst-db03.xxxxxxxxxx.com - xxx.xxx.x.208 (Standby)

## Verifying the Status of server :

-- Primary

postgres=# SELECT CURRENT\_USER usr, :'HOST' host, inet\_server\_port() port;

usr | host | port

--------+--------------------------------------+------

db2dba | xxx-xxx1-m2p-tst-db02.xxxxxxxxxx.com | 4554

(1 row)

postgres=# SELECT pg\_is\_in\_recovery();

pg\_is\_in\_recovery

-------------------

f

(1 row)

-- Standby

postgres=# SELECT CURRENT\_USER usr, :'HOST' host, inet\_server\_port() port;

usr | host | port

--------+--------------------------------------+------

db2dba | xxx-xxx1-m2p-tst-db03.xxxxxxxxxx.com | 4554

(1 row)

postgres=# SELECT pg\_is\_in\_recovery();

pg\_is\_in\_recovery

-------------------

t

(1 row)

## Verifying the Replication status from Primary

postgres=# select \* from pg\_stat\_replication;

-[ RECORD 1 ]----+---------------------------------

pid | 1917227

usesysid | 24576

usename | replusr

application\_name | walreceiver

client\_addr | xxx.xxx.x.208

client\_hostname |

client\_port | 52774

backend\_start | 2023-02-24 16:27:02.997096+05:30

backend\_xmin | 904

state | streaming

sent\_lsn | 0/30000148

write\_lsn | 0/30000148

flush\_lsn | 0/30000148

replay\_lsn | 0/30000148

write\_lag |

flush\_lag |

replay\_lag |

sync\_priority | 0

sync\_state | async

reply\_time | 2023-02-27 12:01:09.324797+05:30

## Trying to insert record into Standby server

postgres=# SELECT CURRENT\_USER usr, :'HOST' host, inet\_server\_port() port;

usr | host | port

--------+--------------------------------------+------

db2dba | xxx-xxx1-m2p-tst-db03.xxxxxxxxxx.com | 4554

(1 row)

postgres=# \c testdb

You are now connected to database "testdb" as user "db2dba".

testdb=# set search\_path to test123;

SET

testdb=# insert into sample2 values (555);

ERROR: cannot execute INSERT in a read-only transaction

## Bringing down service on primary server

[root@xxx-xxx1-m2p-tst-db02 ~]# hostname

xxx-xxx1-m2p-tst-db02.xxxxxxxxxx.com

[root@xxx-xxx1-m2p-tst-db02 ~]# service postgresql-15 stop

Redirecting to /bin/systemctl stop postgresql-15.service

## Capturing log in Standby server

2023-02-27 12:06:24.133 IST [3942937] LOG: replication terminated by primary server

2023-02-27 12:06:24.133 IST [3942937] DETAIL: End of WAL reached on timeline 2 at 0/310000A0.

2023-02-27 12:06:24.133 IST [3942937] FATAL: could not send end-of-streaming message to primary: server closed the connection unexpectedly

This probably means the server terminated abnormally

before or while processing the request.

no COPY in progress

2023-02-27 12:06:24.134 IST [3942936] LOG: invalid record length at 0/310000A0: wanted 24, got 0

2023-02-27 12:06:24.158 IST [101261] FATAL: could not connect to the primary server: connection to server at "xxx.xxx.x.42", port 4554 failed: FATAL: the database system is shutting down

2023-02-27 12:06:24.159 IST [3942936] LOG: waiting for WAL to become available at 0/310000B8

2023-02-27 12:06:29.139 IST [101270] FATAL: could not connect to the primary server: connection to server at "xxx.xxx.x.42", port 4554 failed: Connection refused

Is the server running on that host and accepting TCP/IP connections?

2023-02-27 12:06:29.140 IST [3942936] LOG: waiting for WAL to become available at 0/310000B8

2023-02-27 12:06:33.627 IST [3942934] LOG: restartpoint starting: time

2023-02-27 12:06:33.634 IST [3942934] LOG: restartpoint complete: wrote 0 buffers (0.0%); 0 WAL file(s) added, 1 removed, 0 recycled; write=0.001 s, sync=0.001 s, total=0.008 s; sync files=0, longest=0.000 s, average=0.000 s; distance=16383 kB, estimate=29655 kB

2023-02-27 12:06:33.634 IST [3942934] LOG: recovery restart point at 0/31000028

2023-02-27 12:06:34.141 IST [101282] FATAL: could not connect to the primary server: connection to server at "xxx.xxx.x.42", port 4554 failed: Connection refused

Is the server running on that host and accepting TCP/IP connections?

2023-02-27 12:06:34.141 IST [3942936] LOG: waiting for WAL to become available at 0/310000B8

2023-02-27 12:06:39.145 IST [101283] FATAL: could not connect to the primary server: connection to server at "xxx.xxx.x.42", port 4554 failed: Connection refused

Is the server running on that host and accepting TCP/IP connections?

2023-02-27 12:06:39.146 IST [3942936] LOG: waiting for WAL to become available at 0/310000B8

## Making standby as primary by using pg\_promote

postgres=# SELECT CURRENT\_USER usr, :'HOST' host, inet\_server\_port() port;

usr | host | port

--------+--------------------------------------+------

db2dba | xxx-xxx1-m2p-tst-db03.xxxxxxxxxx.com | 4554

(1 row)

testdb=# select pg\_promote();

pg\_promote

------------

t

(1 row)

## Trying to insert new rows in new Primary server

postgres=# \c testdb

You are now connected to database "testdb" as user "db2dba".

testdb=# set search\_path to test123;

SET

testdb=# insert into sample2 values (555);

INSERT 0 1

testdb=# insert into sample2 values (666);

INSERT 0 1

testdb=# insert into sample2 values (777);

INSERT 0 1

## Verifying the logs on New Primary

2023-02-27 12:08:52.882 IST [3942936] LOG: received promote request

2023-02-27 12:08:52.884 IST [3942936] LOG: redo done at 0/31000028 system usage: CPU: user: 0.68 s, system: 1.72 s, elapsed: 243709.89 s

2023-02-27 12:08:52.894 IST [3942936] LOG: selected new timeline ID: 3

2023-02-27 12:08:52.939 IST [3942936] LOG: archive recovery complete

2023-02-27 12:08:52.946 IST [3942934] LOG: checkpoint starting: force

2023-02-27 12:08:52.959 IST [3942928] LOG: database system is ready to accept connections

2023-02-27 12:08:52.965 IST [3942934] LOG: checkpoint complete: wrote 2 buffers (0.0%); 0 WAL file(s) added, 0 removed, 0 recycled; write=0.001 s, sync=0.012 s, total=0.019 s; sync files=2, longest=0.012 s, average=0.006 s; distance=0 kB, estimate=26689 kB

# Making Old Primary as Standby

To make Old Primary as standby, clear the data directory, perform PG base backup, Start the service

[root@xxx-xxx1-m2p-tst-db02 ~]# cd /data01/postgresql

[root@xxx-xxx1-m2p-tst-db02 postgresql]# rm -rvf \*

[root@xxx-xxx1-m2p-tst-db02 postgresql]# sudo -u postgres pg\_basebackup --pgdata /data01/postgresql/ --format=p --write-recovery-conf --checkpoint=fast --label=mffb --progress --host=xxx.xxx.x.42 --port=4554 --username=replusr

642630/642630 kB (100%), 1/1 tablespace

testdb=# SELECT pg\_is\_in\_recovery();

pg\_is\_in\_recovery

-------------------

t

(1 row)

## -- Verify the logs in new Standby

2023-02-28 14:20:40.994 IST [247953] LOG: starting PostgreSQL 15.1 - Percona Distribution on x86\_64-pc-linux-gnu, compiled by gcc (GCC) 8.5.0 20210514 (Red Hat 8.5.0-4), 64-bit

2023-02-28 14:20:41.004 IST [247953] LOG: listening on IPv4 address "0.0.0.0", port 4554

2023-02-28 14:20:41.006 IST [247953] LOG: could not create IPv6 socket for address "::": Address family not supported by protocol

2023-02-28 14:20:41.012 IST [247953] LOG: listening on Unix socket "/var/run/postgresql/.s.PGSQL.4554"

2023-02-28 14:20:41.015 IST [247953] LOG: listening on Unix socket "/tmp/.s.PGSQL.4554"

2023-02-28 14:20:41.035 IST [247959] LOG: database system was interrupted; last known up at 2023-02-28 14:18:18 IST

2023-02-28 14:20:41.066 IST [247959] LOG: entering standby mode

2023-02-28 14:20:41.072 IST [247959] LOG: redo starts at 0/40000028

2023-02-28 14:20:41.073 IST [247959] LOG: consistent recovery state reached at 0/40000138

2023-02-28 14:20:41.073 IST [247953] LOG: database system is ready to accept read-only connections

2023-02-28 14:20:41.093 IST [247960] LOG: started streaming WAL from primary at 0/41000000 on timeline 4