Untangling the PostgreSQL upgrade

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2ndQuadrant

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Upgrades

- Point release upgrades
- Major version upgrade

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A note on versions

- Point releases:
  - 8.4.x, 9.1.x or 9.6.x (before version 10)
  - 10.x

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A note on versions

- Point releases:
  - 8.4.x, 9.1.x or 9.6.x (before version 10)
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- Major version upgrade
  - 8.2, 9.3, 9.6, 10, 11

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Upgrades

- Point release upgrades
  - 9.6.6 → 9.6.9
  - 10.3 → 10.4

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Upgrades

- Point release upgrades
  - 9.6.6 → 9.6.9
  - 10.3 → 10.4
- Major version upgrade
  - 9.2.20 → 9.6.9
  - 9.4.18 → 10.4

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Upgrades for Point Releases

- Why?
- How?

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Upgrades for Point Releases

- Why?
- How?
  - Upgrade standbys 1 by 1
  - Switchover master/standby
  - Upgrade remaining node
  - Failback

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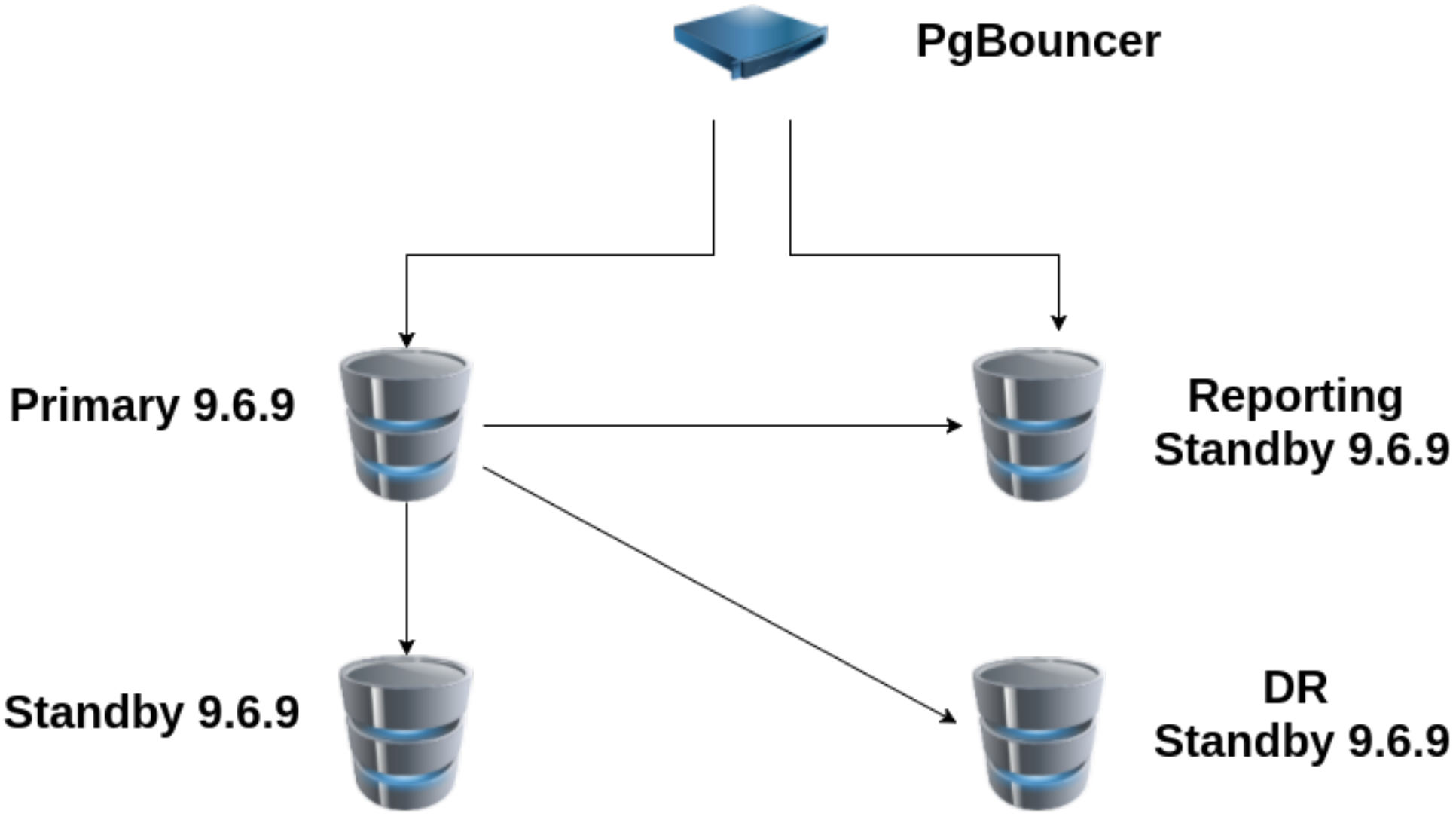
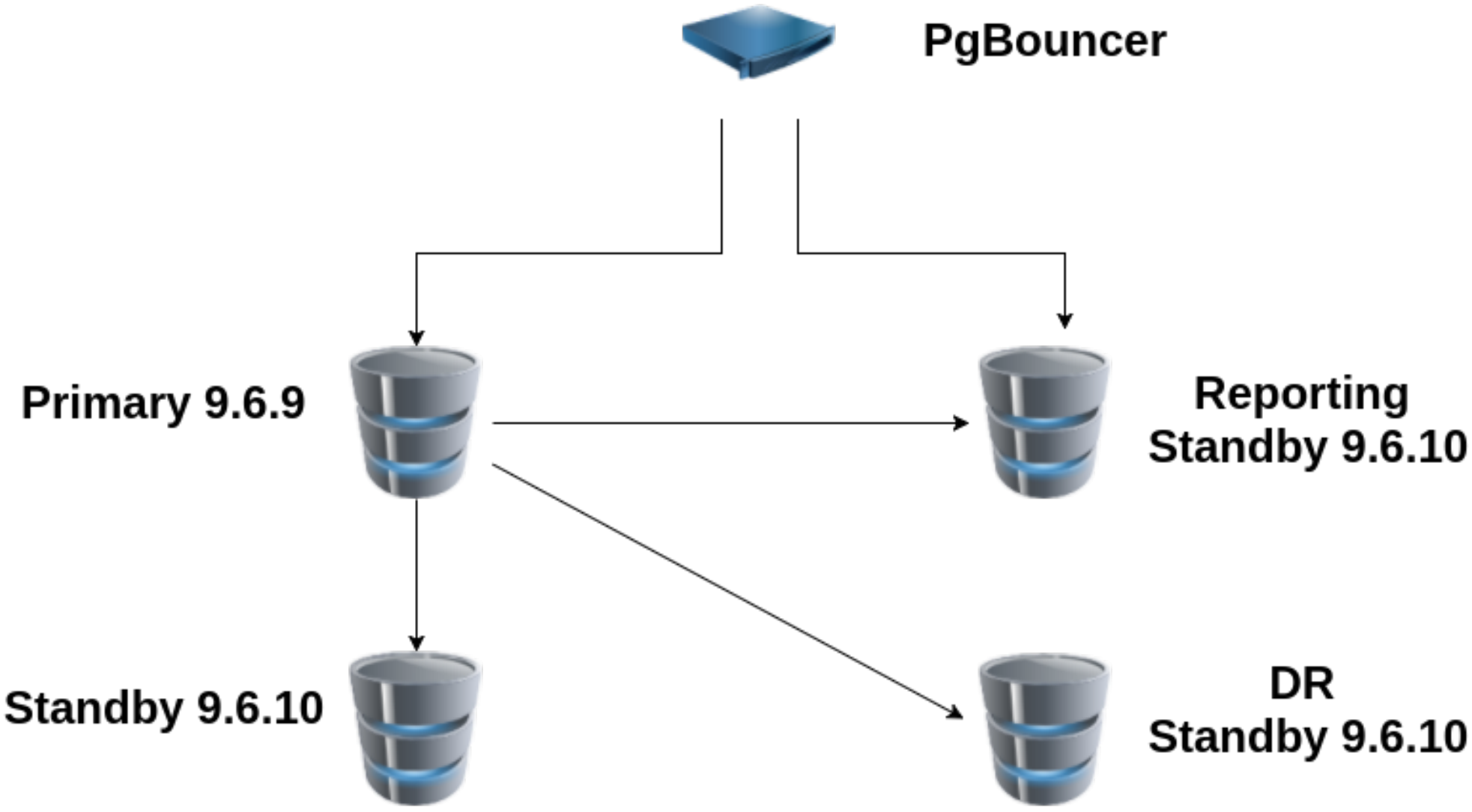
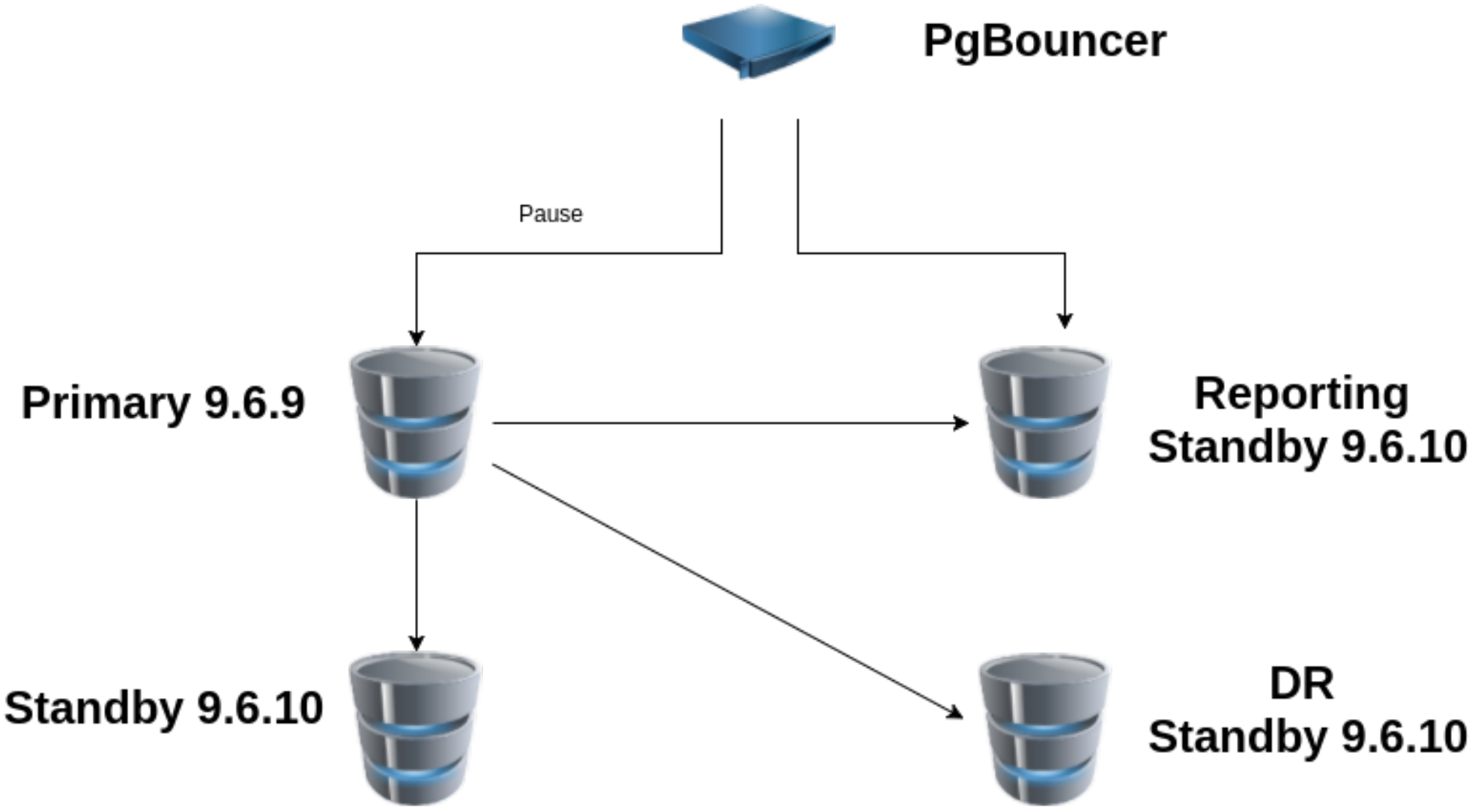
Initial setup of the cluster



Cluster with Standbys upgraded



Switchover


PgBouncer
Pause
Primary 9.6.9
Reporting
Standby 9.6.10
Standby 9.6.10
DR
Standby 9.6.10

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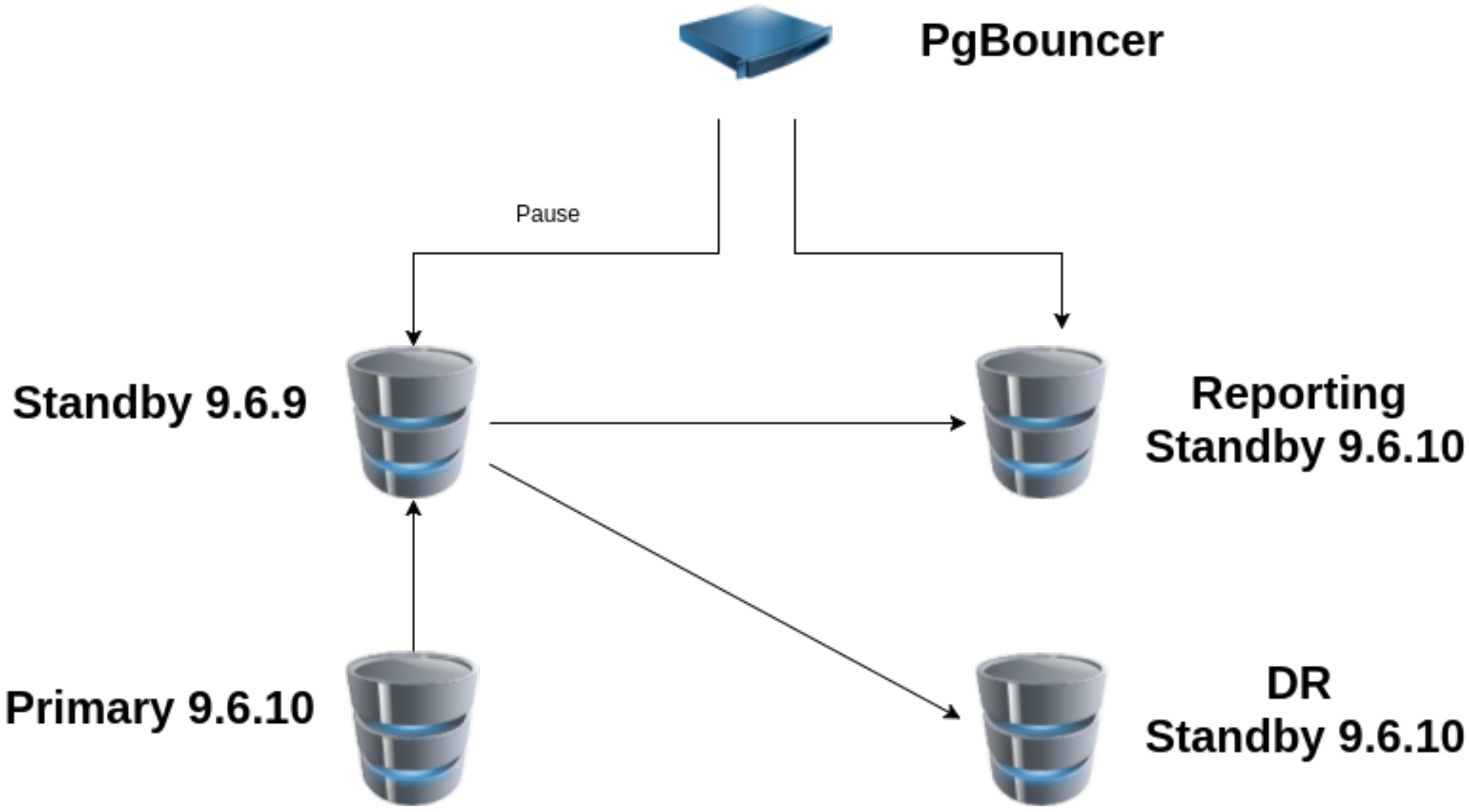
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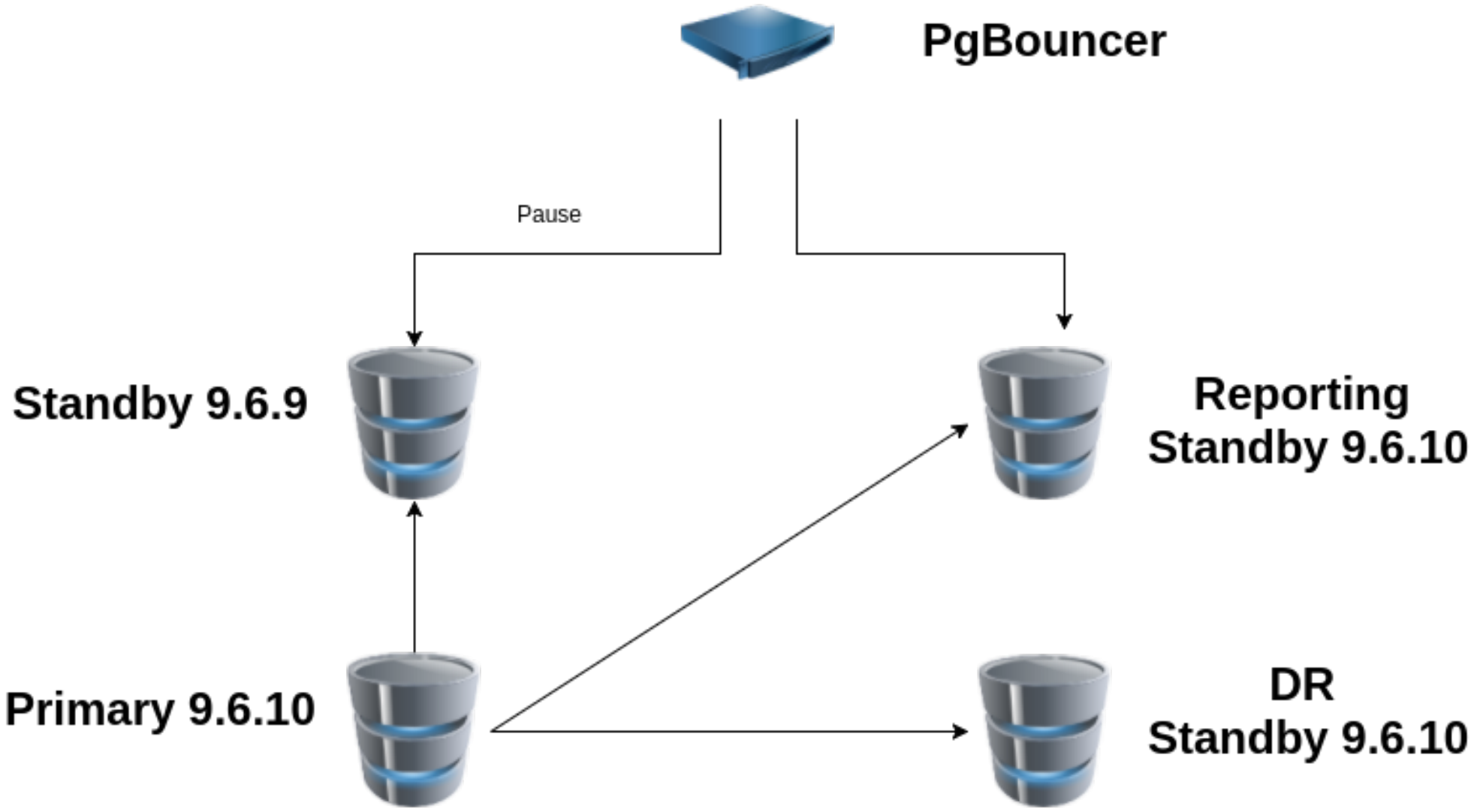
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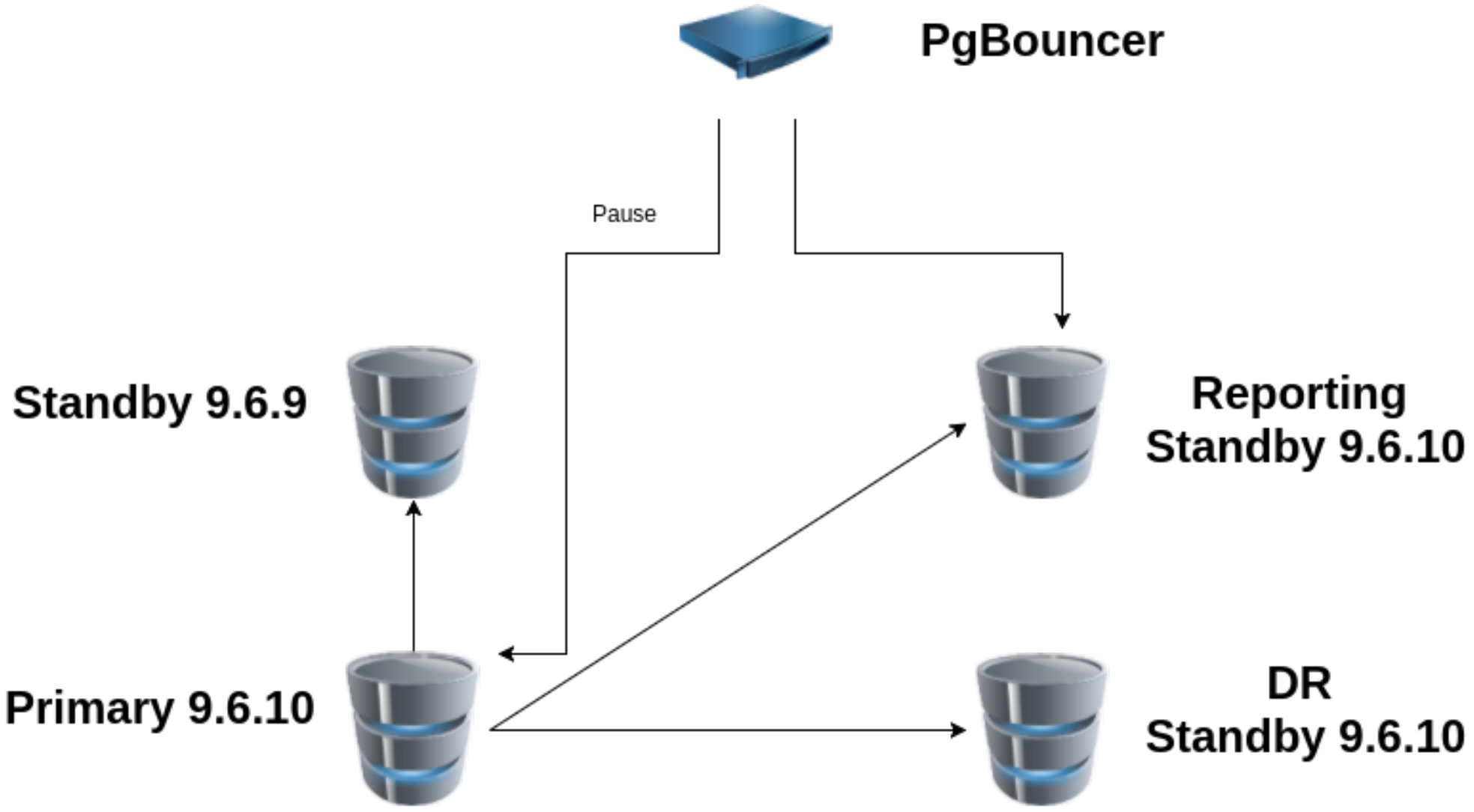
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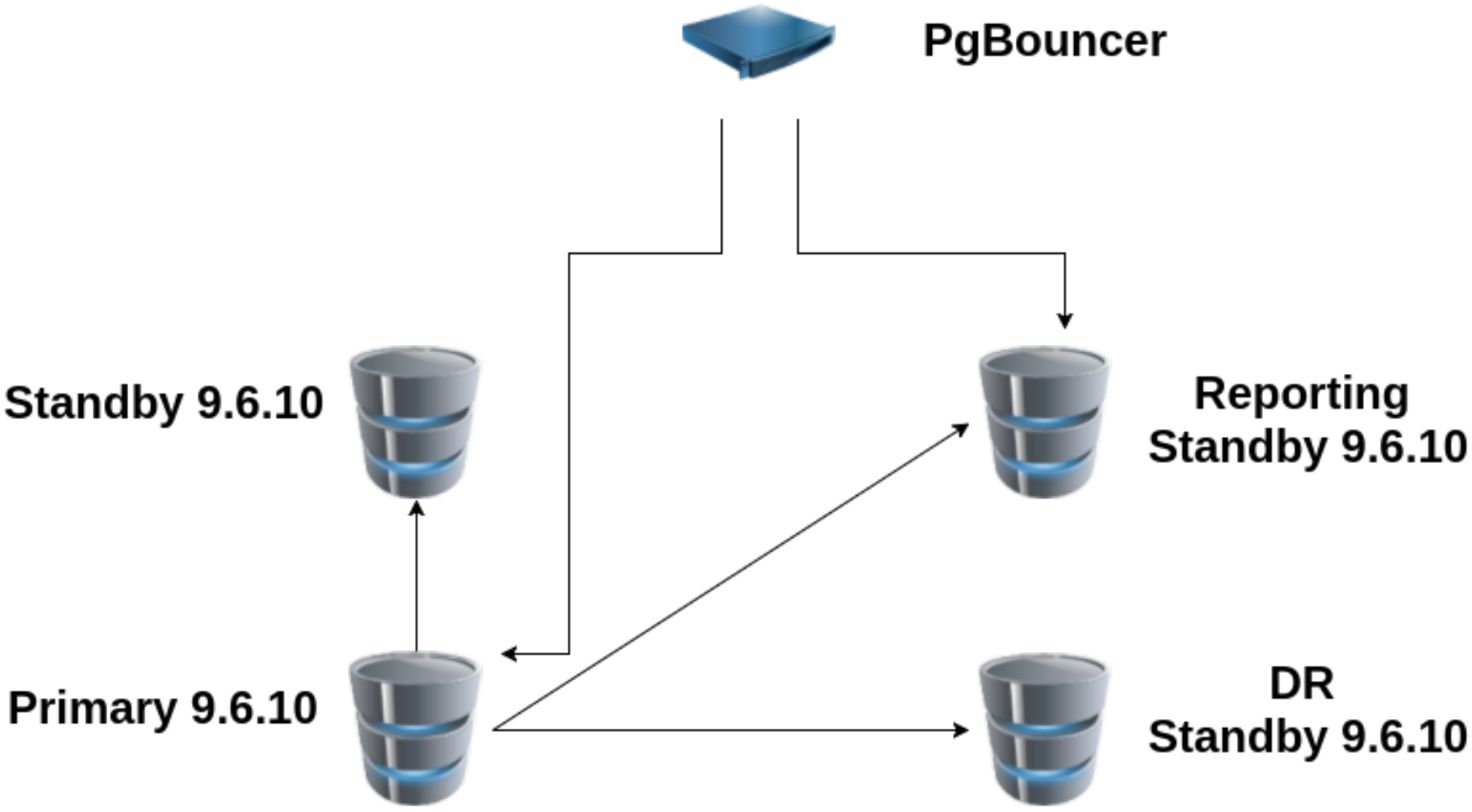
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Point release upgrade homework

- Write an Ansible playbook

~~Point release upgrade homework~~

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Major upgrades

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  - in-place upgrade
  - logical upgrade with near-zero downtime

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  - logical upgrade with near-zero downtime → Stay tuned

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pg_dump

- Pros:
  - End with cluster clean from bloat
  - Well tested
  - Can dump in parallel and restore in parallel
  - Easy to deploy with hardware upgrade

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  - Well tested
  - Can dump in parallel and restore in parallel
  - Easy to deploy with hardware upgrade
- Cons:
  - Doesn't scale well

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pg_dump Tips

- Use directory format and as much jobs as CPUs
- Turn off any unneeded parameter in postgresql.conf
  - archive_command='/bin/true'
  - autovacuum = off
  - synchronous_commit = off
- Increase read-ahead on source, and test with various scheduler settings

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pg_upgrade in link mode

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  - May have problems if skipping versions
  - No going back after starting up with new version

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  - No going back after starting up with new version
- Gotcha:
  - PG <= 9.5 → PG >= 9.6 takes longer

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Logical Replication

- Before **9.4**
  - Trigger based → performance impact
  - All tables replicated need a *Primary Key*
- After **9.4**
  - Logical decoding → Uses WALs → No overhead
  - Doesn't need *Primary Key* on all tables

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Logical Replication

- Trigger based
  - Londiste
  - Slony-I
  - Bucardo
- Logical decoding (9.4+)
  - pglogical
  - PG 10 Logical replication

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  - PG 10 Logical replication → pglogical

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Logical Replication in 9.4+

pglogical

Logical Replication in 9.4+

pglogical

- Pros:
  - Uses logical decoding of WALs (small overhead)
  - Can upgrade the whole infrastructure
  - Can test the new cluster while replicating
- Cons:
  - Setup overhead
  - Continous monitoring

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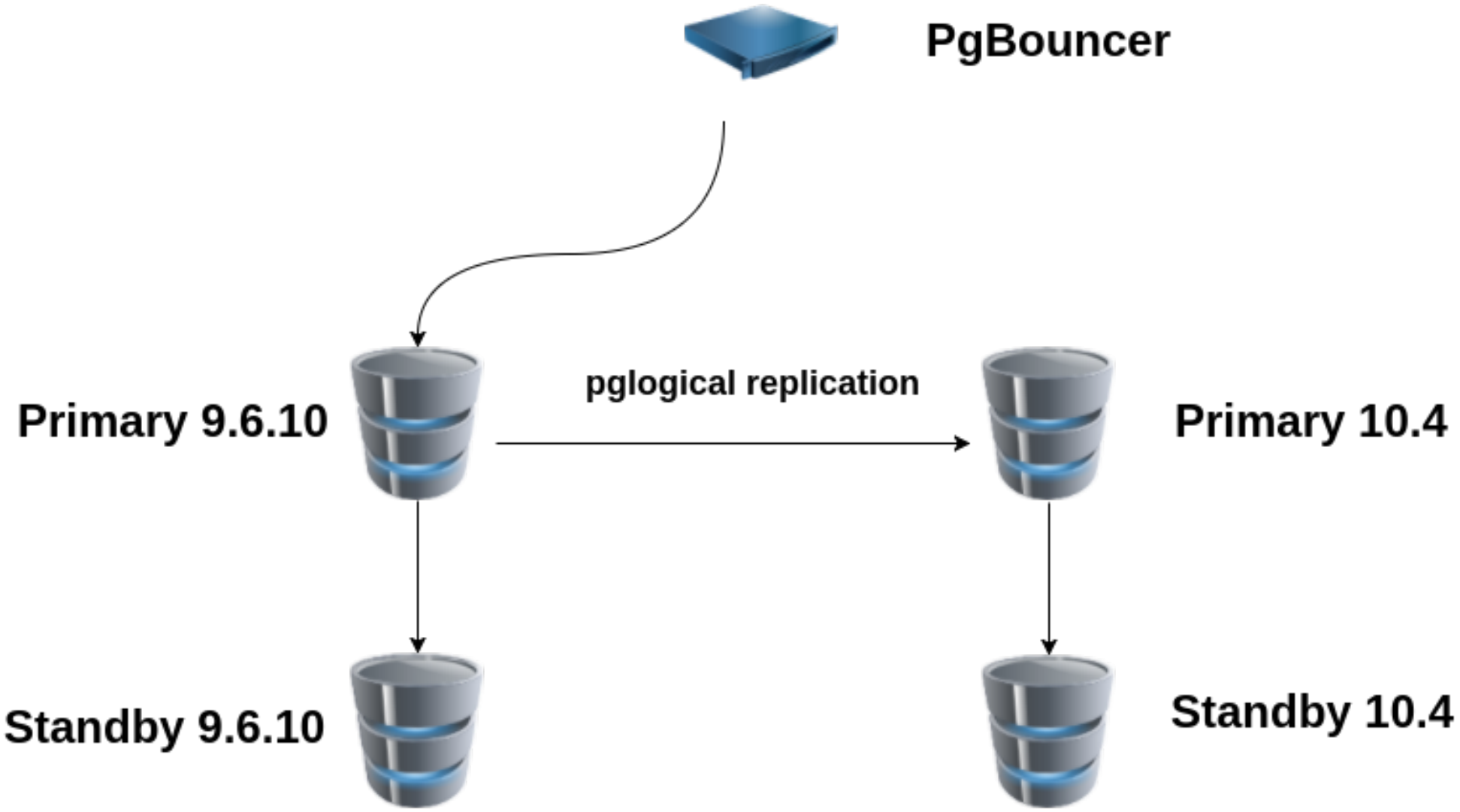
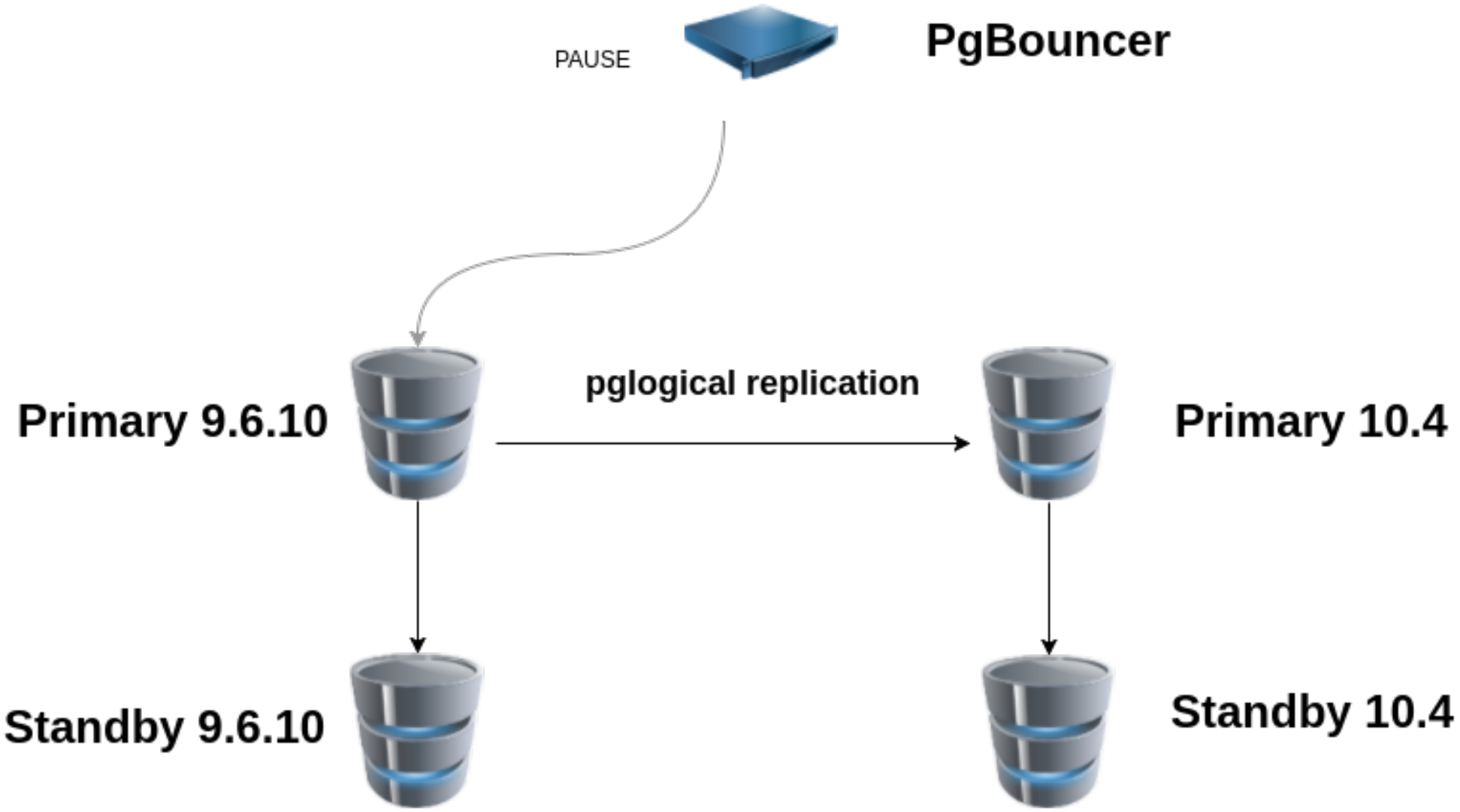
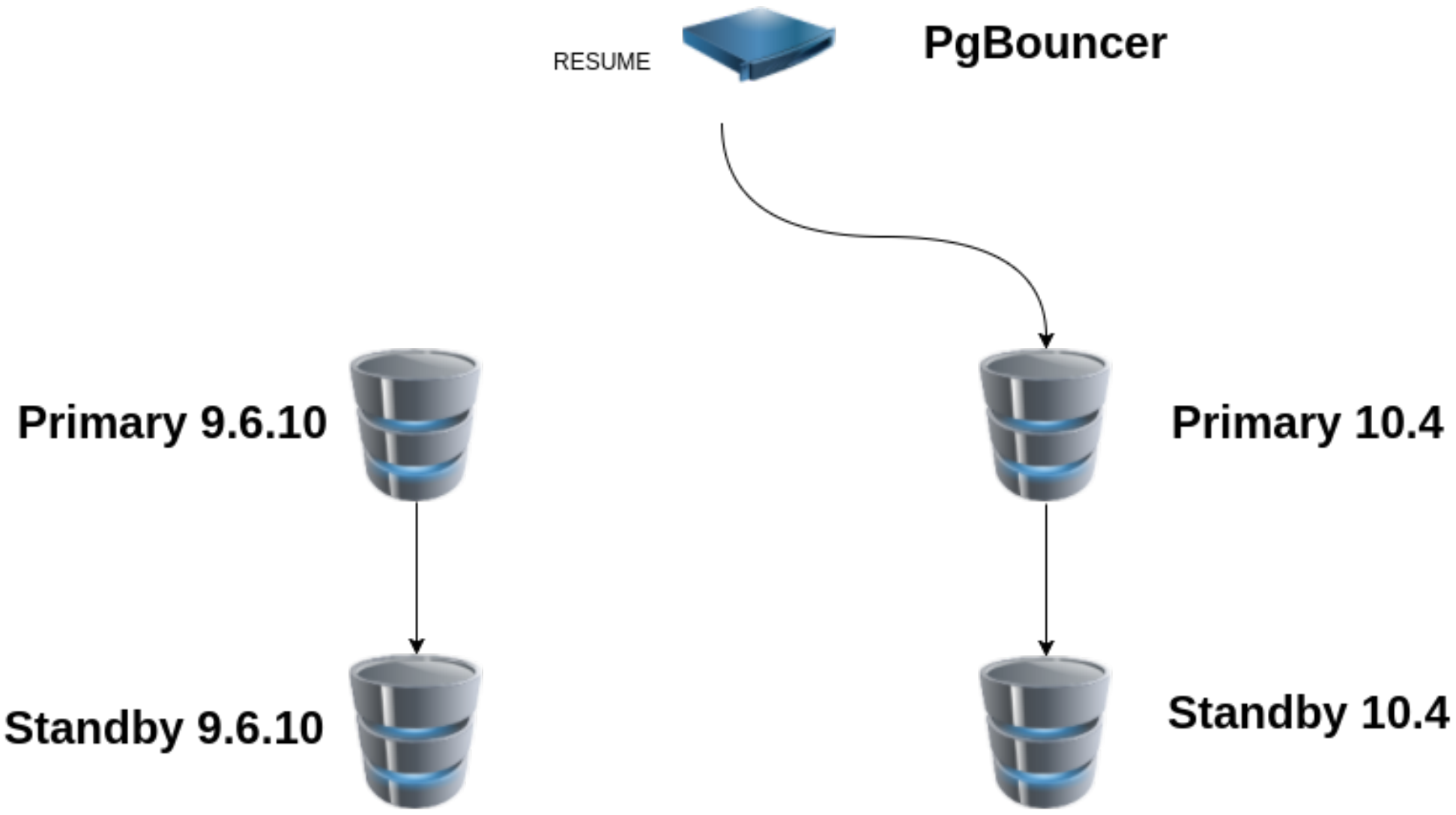
Initial setup of the cluster



Pasue pgbouncer



Switchover pgbouncer



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Conclusion

- Plan point release upgrades as soon as available
- Stay on a community supported version
- Test your application against the upgraded version
- If enough downtime is affordable, use pg_dump
- It's possible to have near-zero downtime upgrade, but expensive

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Questions

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