Implementing High Availability
with PostgreSQL

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PostgreSQL Major Contributor

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- `CREATE EXTENSION`
- `CREATE EVENT TRIGGER`
- *Bi-Directional Replication*
- *Partitioning*

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Hi-Media (turnover scale: 200 millions €)

3 different activities to get money from the web

- Allopass, HiPay: internet (micro) payment
- Telecom Service
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PostgreSQL is the heart of the technical platform

- Business needs compliance
- Capacity to adapt to changes

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How to ensure *both duralibity* and *availability* of your data?

Usual needs:

- Reliability
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- Growth capacity (think commercial success)
- Continuity and Innovation

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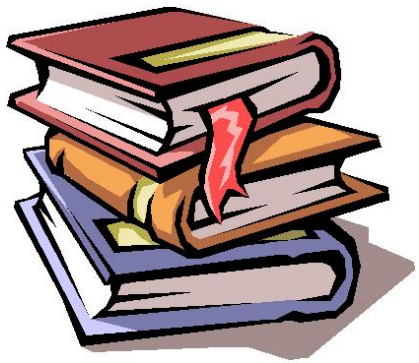
Glossary

Some vocabulary

- Availability
- Duralibity (ACID)
- Architectures
- Replications



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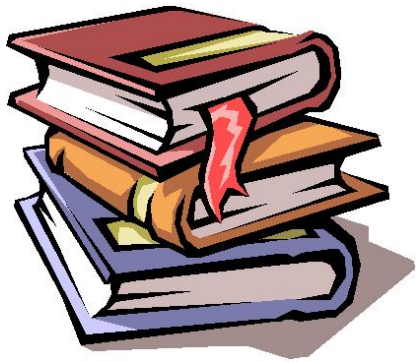

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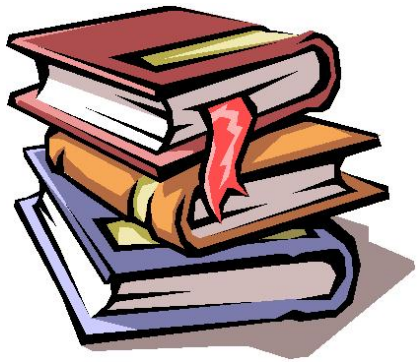

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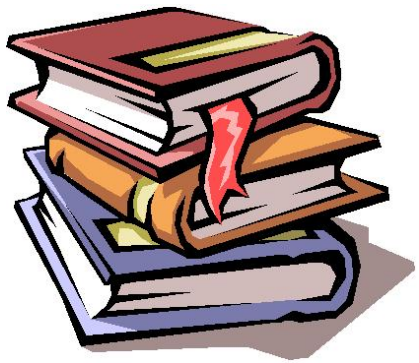

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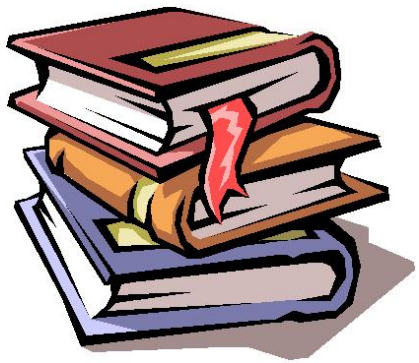

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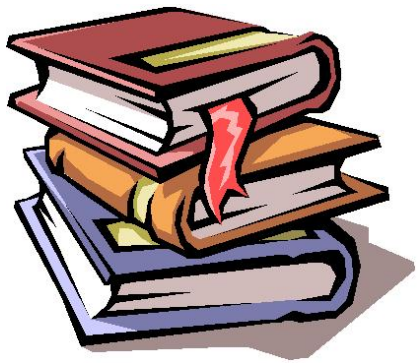
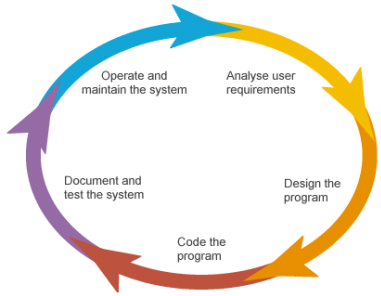


Needs first

Needs evolve, solutions must adapt

- Start simple
- Some first classic steps
- High Availability of Data
- High Availability of Services
- Read Only Load Balancing
- Read Write Load Balancing



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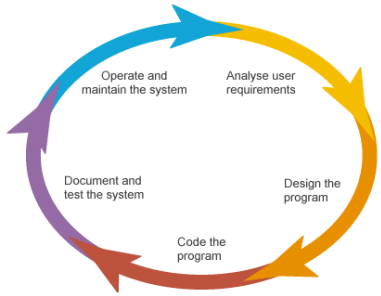

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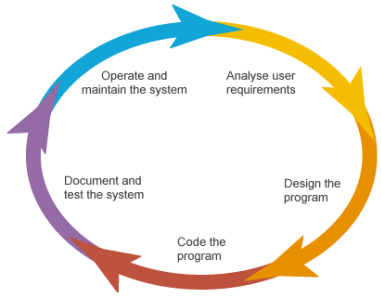
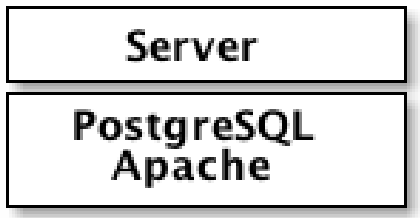
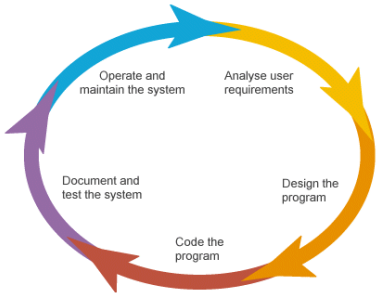


Let's start simple

Our projet life cycle

Let's start with the example of a quite simple project released as a web application seeing its needs evolve with its success.

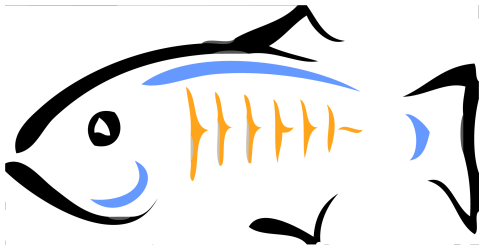




Scaling out 101

Services Availability

- Front servers are *stateless*
- Watch out for `max_connections`
- Don't you use persistent connections!
- `pgbouncer`



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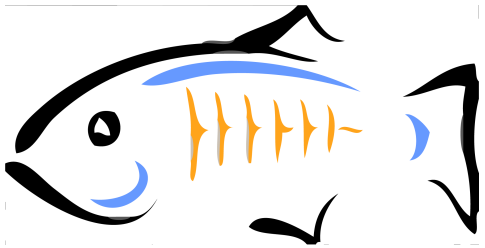

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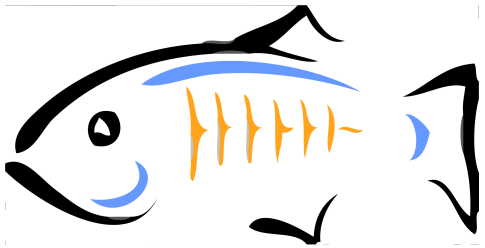
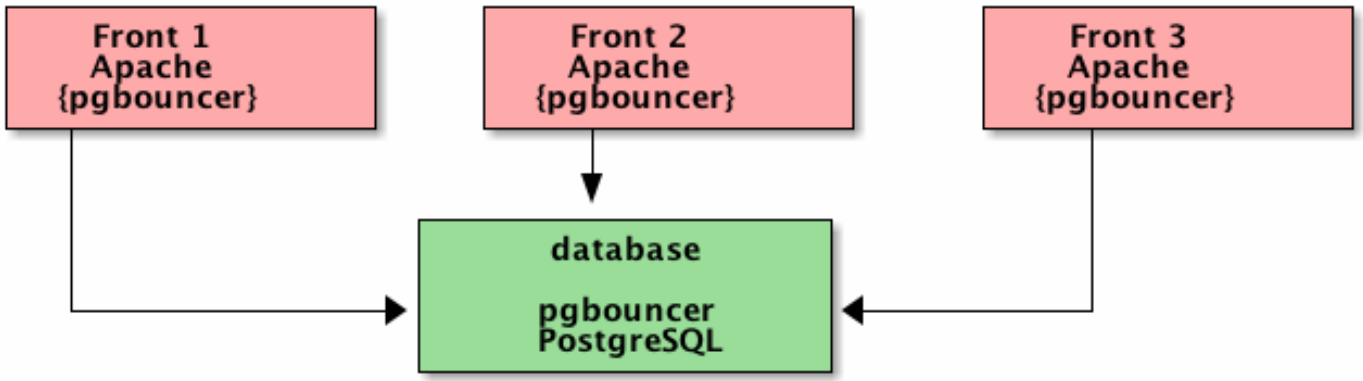


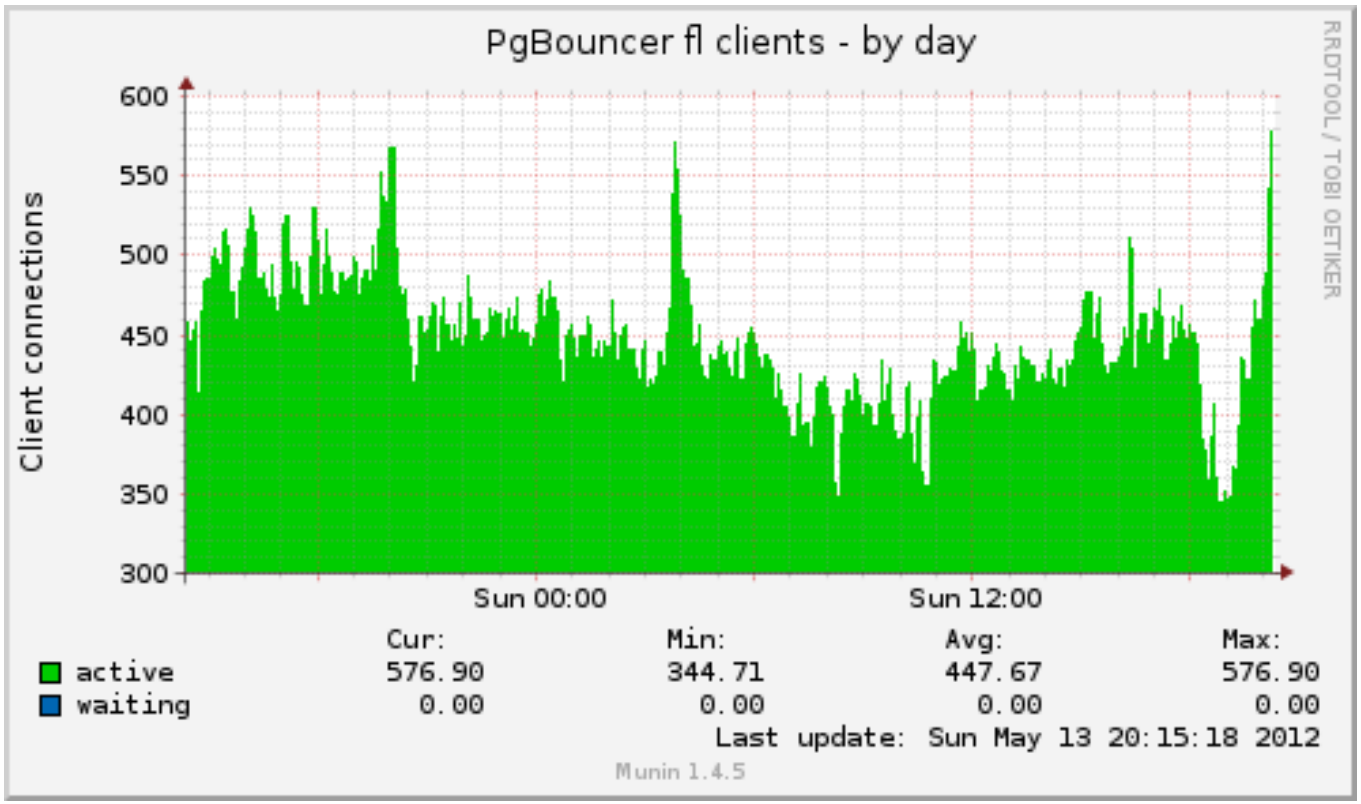
Scaling out 101

Using more than a single server and a connection pool



pgbouncer

pgbouncer is able to reuse client **and** server side connections.



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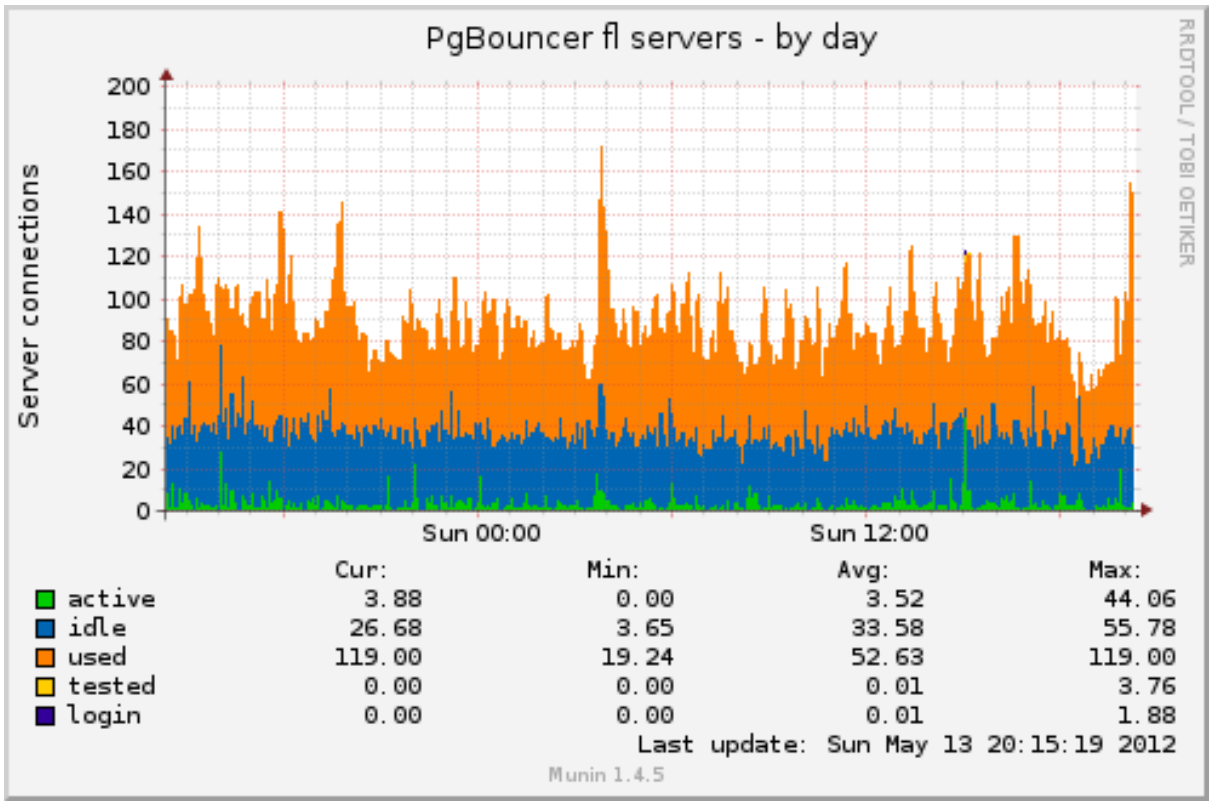

Getting serious: backups

Backup Strategy is the single most important step towards data availability

- Nightly `pg_dump -Fc`
- Don't forget `pg_dumpall -globals-only`
- Data Retention
- 7 days of nightly backups
- 7 weeks of weekly backups
- 12 months of monthly backups
- 30 years of yearly backups?

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Failover, 101

`pg_dump`, `pg_restore`

- protection against *errors and omissions*
- beware of restoring time
- still a must have for data **durability**
- what about data **availability**?

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Failover, 201

Using physical backups and *Point In Time Recovery*

- Point In Time Recovery, 8.1
- *warm standby*, 8.2
- Archiving and *crash recovery*
- `archive_command`
- `restore_command`
- `walmgr.py`, `WAL-E`

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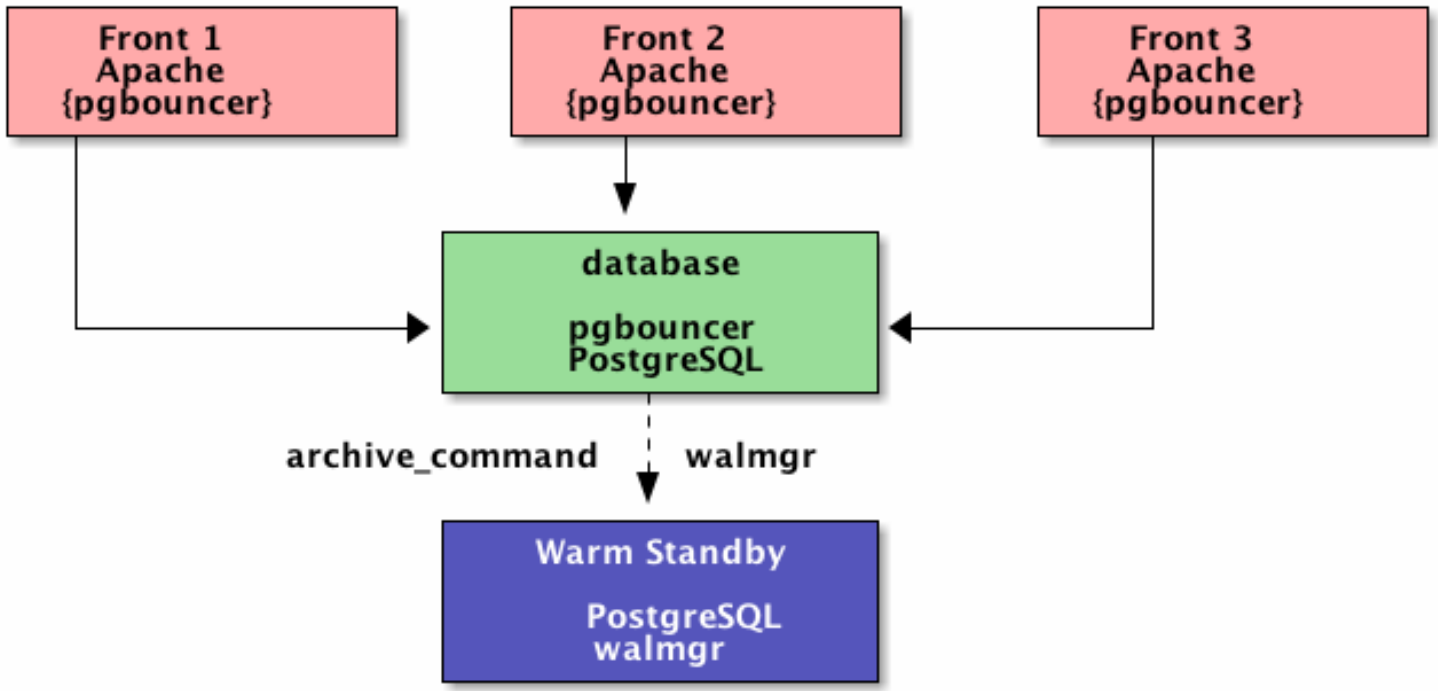
Warm Standby

Implementing *Warm Standby*



Application Split

When you have separate *backoffice* and *production* requirements

- Cross replication
- Slony, **Londiste**, Bucardo
- Specific processing, *batches*
- Off-line processing
- Still *Transactional* processing
- Skytools comes with PGQ

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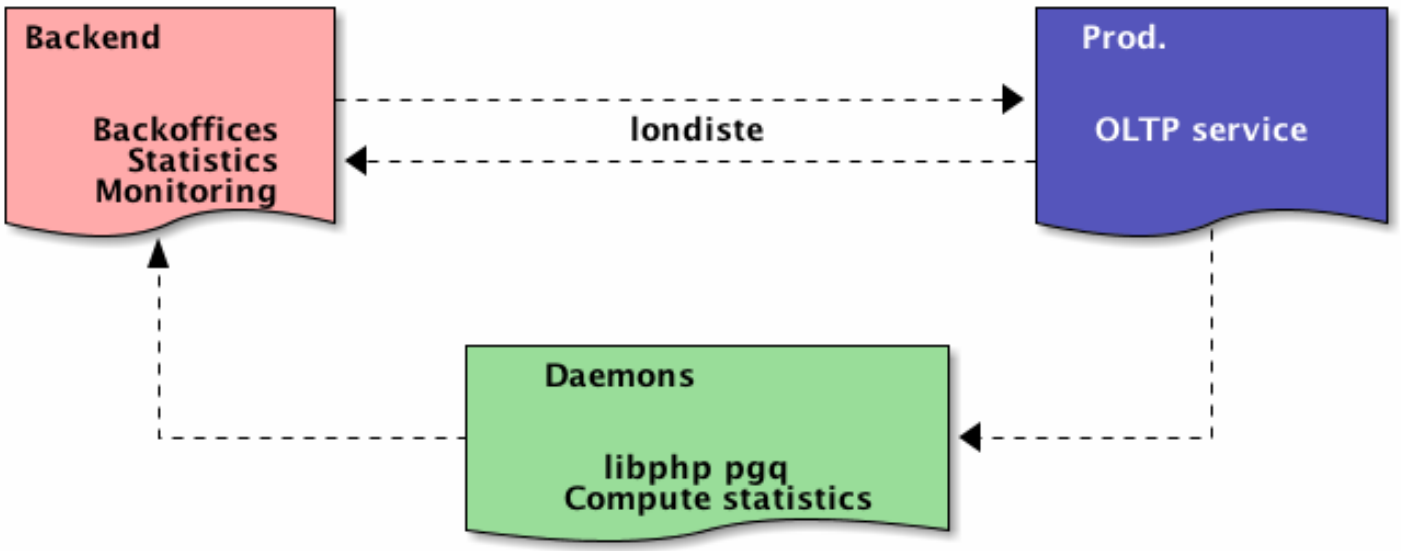
Implementing *londiste* and *PGQ*



Queueing with *PGQ*

Off-line processing is better done with PGQ

- Mainly written in PLpgSQL (and C)
- Client *API* for python
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PostgreSQL 9.1 offers *Synchronous Replication* and *Hot Standby*

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- *(A)*Synchronous Replication
- Standby connects with `libpq`
- `recovery.conf`
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- Switchabe **per transaction**
- Good performance level

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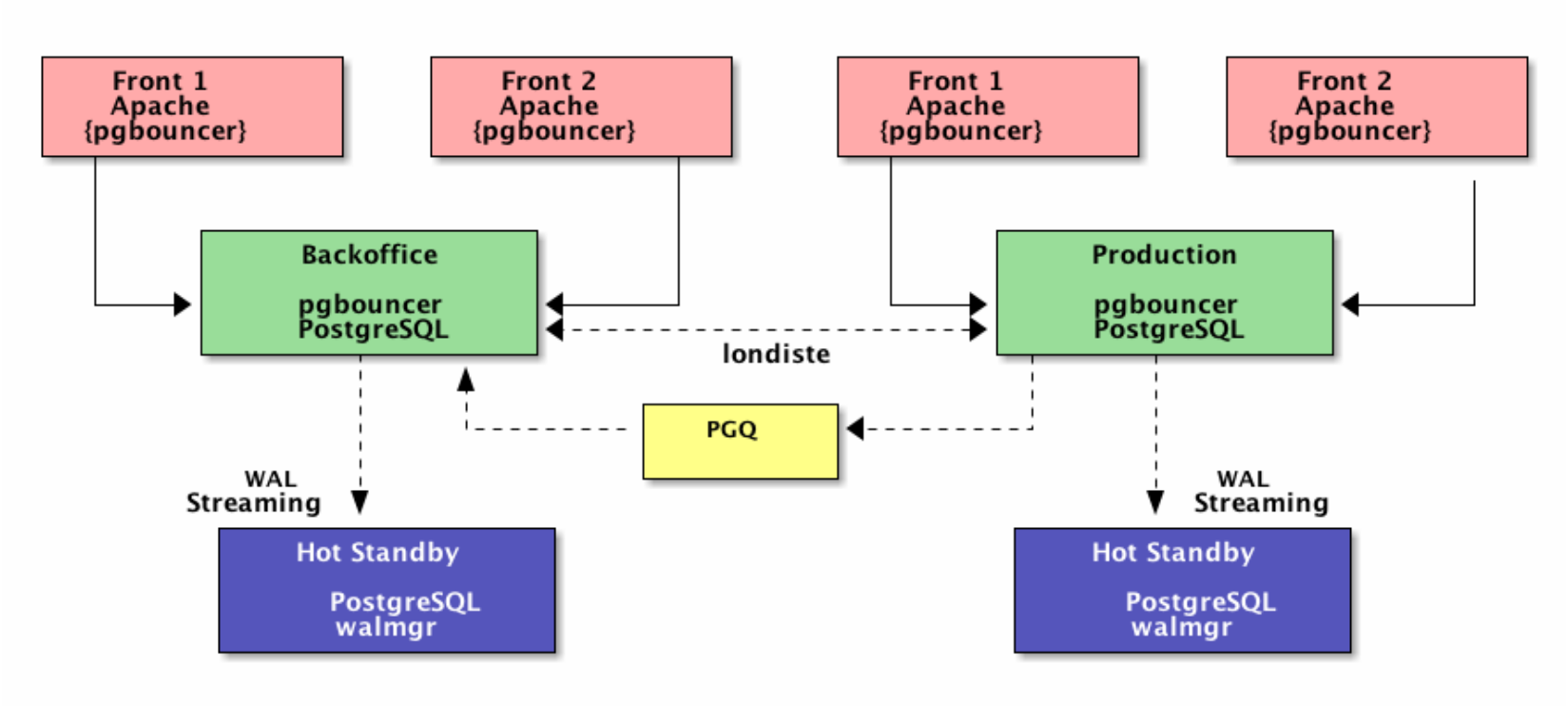

Distributed High Availability

Retrospective and Future of PostgreSQL Replication

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- 8.2, Warm Standby
- 8.3, pg_standby
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