

# An introduction to pgpool-II Version 3

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## About me

- PostgreSQL & pgpool-II developer
- Working as a PostgreSQL evangelist(16 talks in 2010)
- Working for SRA OSS, Inc. Japan



# More PostgreSQL books written by my colleagues



“PostgreSQL complete guide  
Third edition”

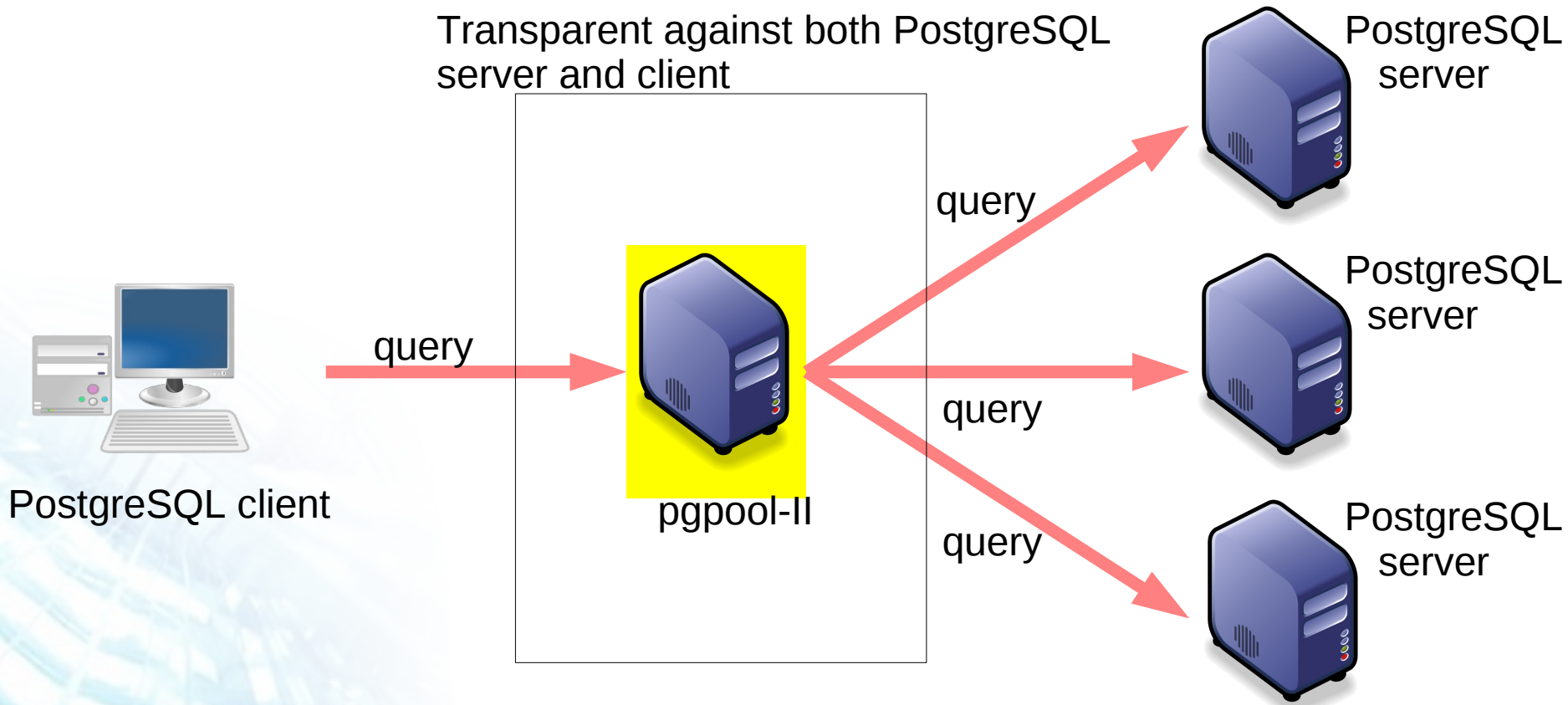


“Road to the database expert”

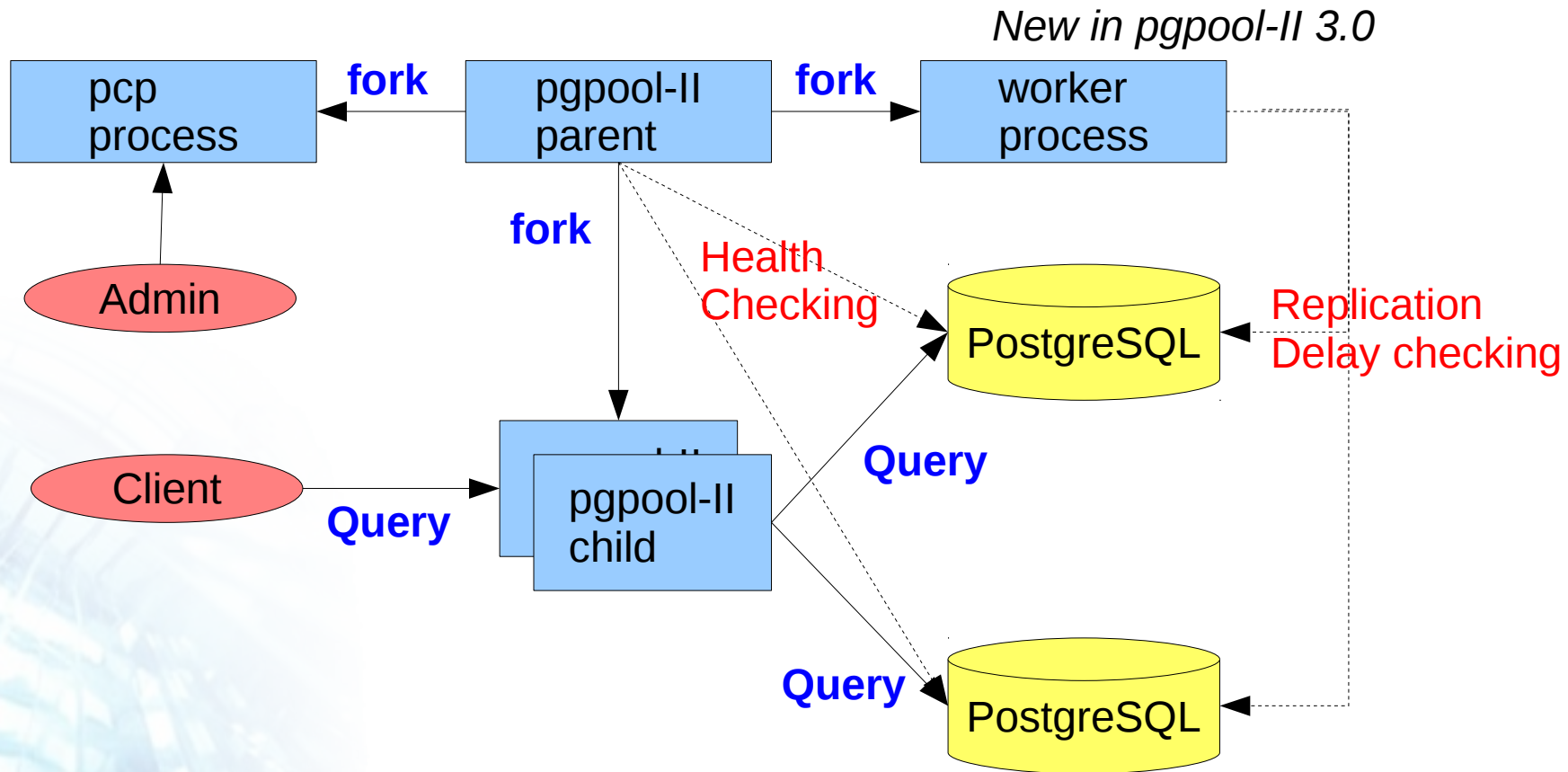
# What is pgpool-II?

- Yet another cluster management tool dedicated for PostgreSQL
- OSS project(pgfoundry, BSD License)
- Rich features
  - Synchronous replication
  - Load balancing, automatic failover, connection pooling etc.
  - Collaborating with other replication tools
    - Streaming replication, Slony-I

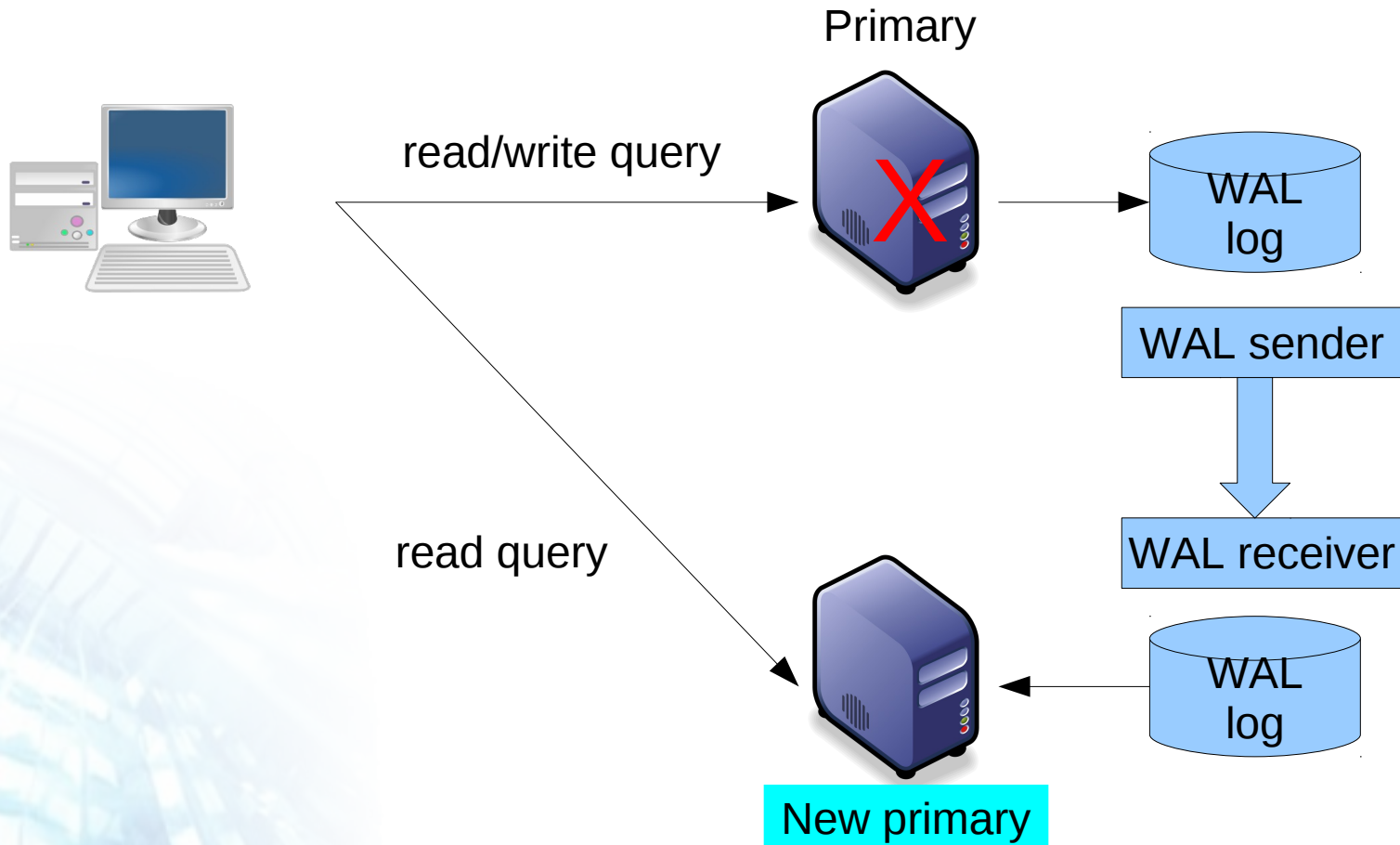
# Basic idea of pgpool-II



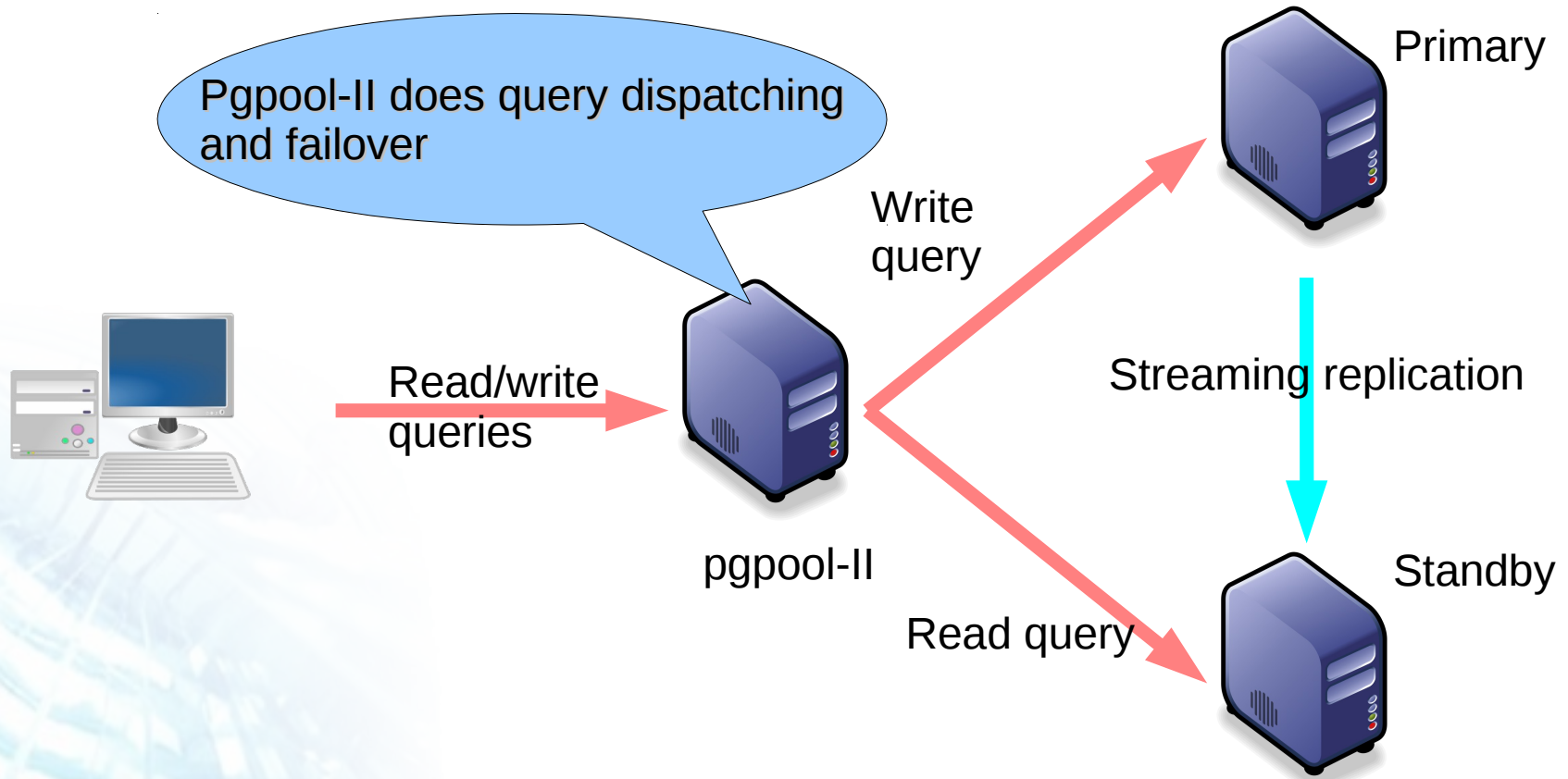
# The architecture of pgpool-II



# Streaming replication+Hot Standby



# Pgpool-II helps Streaming replication





# Pgpool-II V3 helps PostgreSQL

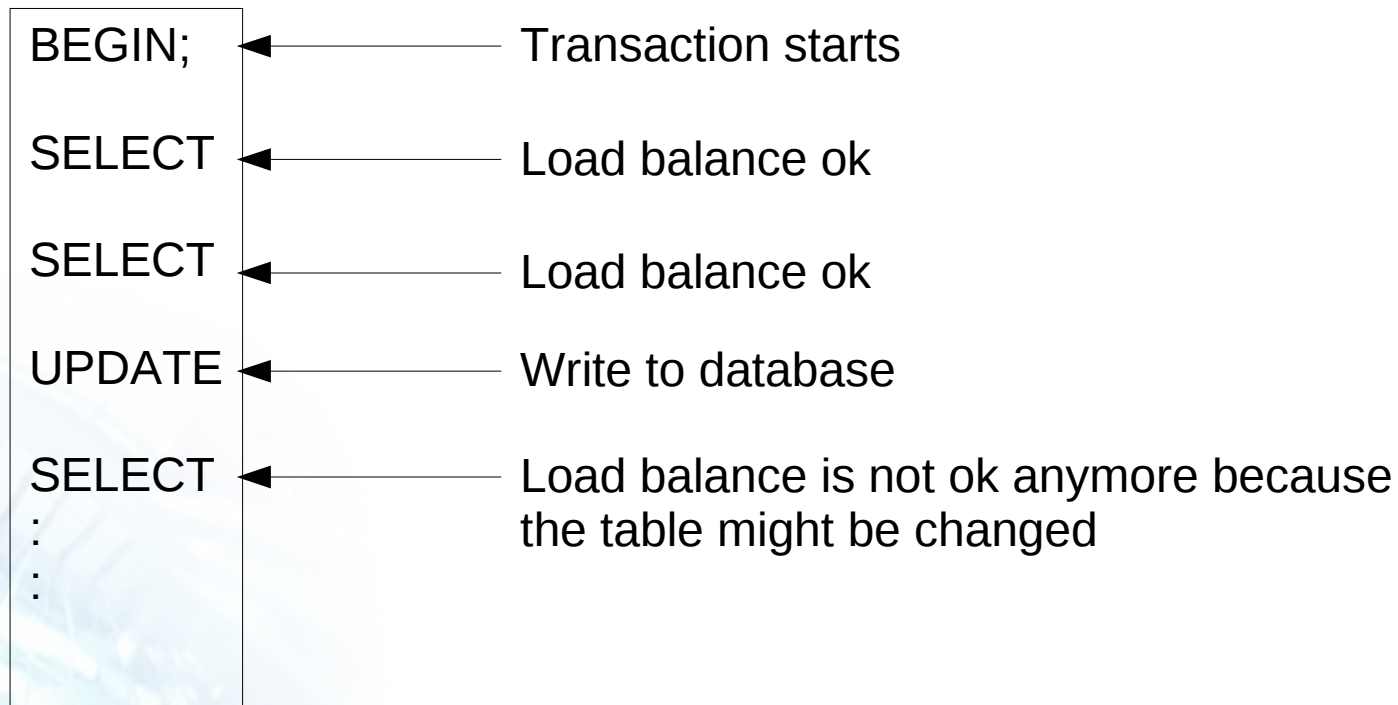
- New “stream” mode dedicated to SR/HS
- Automatic query dispatching
- Allow to load balance SELECTs in an explicit transaction
- Allow to specify functions which are writing to DB(they need to be executed on the primary)
- Adding standby servers without stopping pgpool-II

# Comparison between various replication systems

	pgpool-II native replication	pgpool-II+SR+HS	pgpool-II+Slony-I
Query restriction	△	◎	△
Replication delay	◎	○	△
Replication overhead	△	◎	○

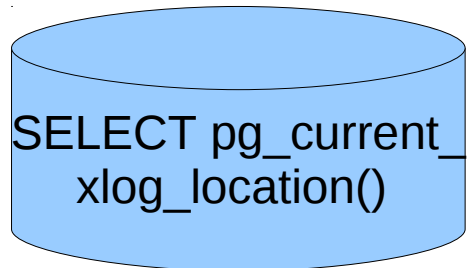
# Load balance SELECTs in an explicit transaction

transaction

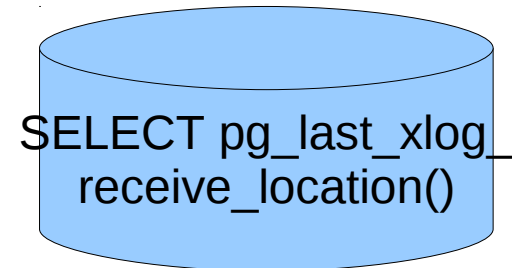


# Replication delay detection: how it works

Primary PostgreSQL



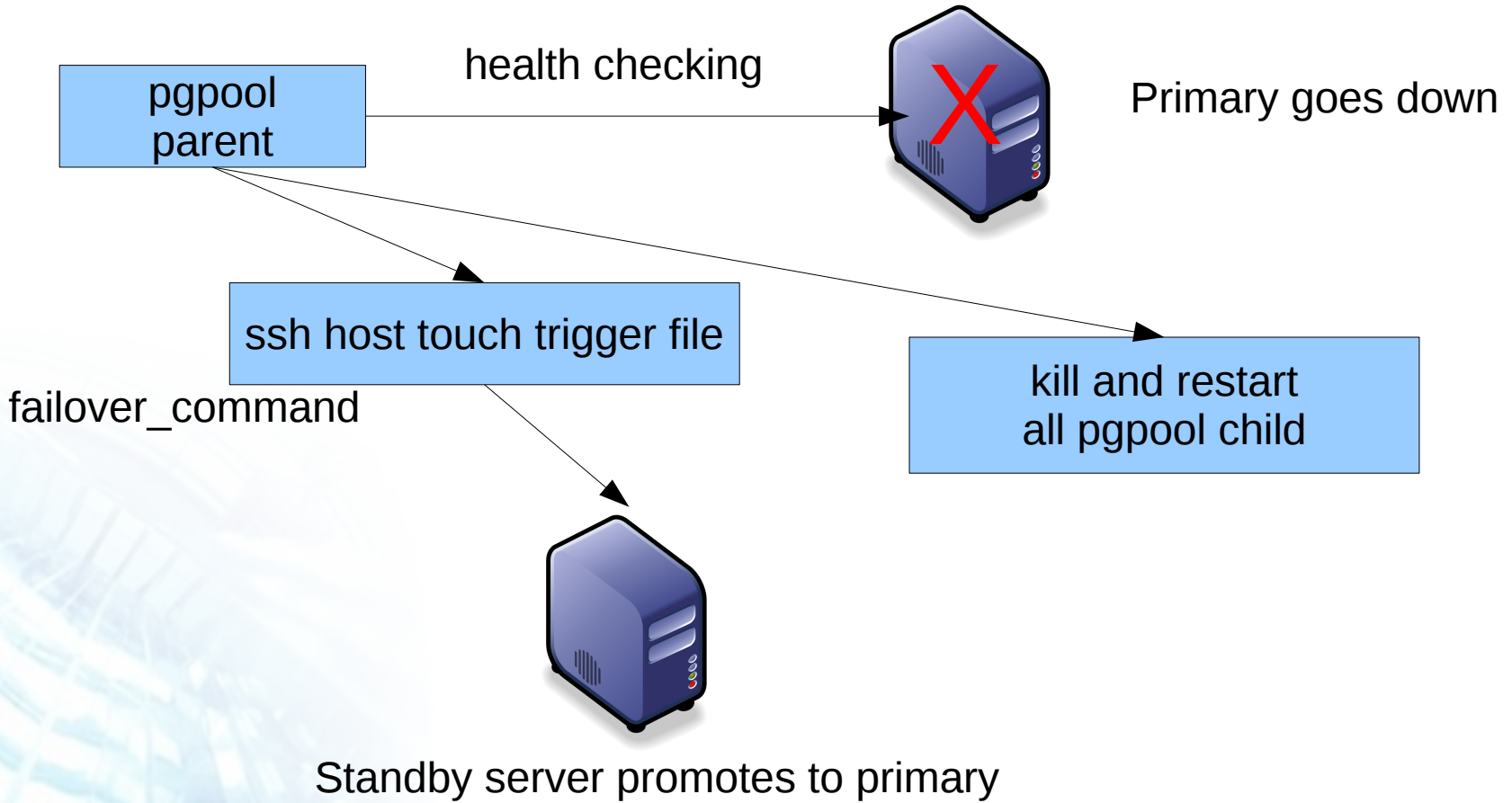
Standby PostgreSQL



call the functions during each “health check period” second and calculate the difference.  
if it exceeds the delay threshold, sends read queries to the primary sever only.

worker process

# Automatic promoting standby



# Logging replication delay

- `log_standby_delay`
  - 'none': no logging delay
  - 'if\_over\_threshold': log only when delay exceeds `delay_threshold`
  - 'always': always log delay

```
2010-06-28 15:51:32 LOG: pid 13223: Replication of node:1 is behind 1228800 bytes from the primary server (node:0)
2010-06-28 15:51:42 LOG: pid 13223: Replication of node:1 is behind 3325952 bytes from the primary server (node:0)
2010-06-28 15:51:52 LOG: pid 13223: Replication of node:1 is behind 974848 bytes from the primary server (node:0)
2010-06-28 15:52:02 LOG: pid 13223: Replication of node:1 is behind 2990080 bytes from the primary server (node:0)
2010-06-28 15:52:12 LOG: pid 13223: Replication of node:1 is behind 901120 bytes from the primary server (node:0)
2010-06-28 15:52:22 LOG: pid 13223: Replication of node:1 is behind 2433024 bytes from the primary server (node:0)
```

# New show commands

- show pool\_nodes
  - show DB node information
- show pool\_processes
  - show pgpool child process information
- show pool\_pools
  - show connection pool information
- show pool\_version
  - show pgpool-II version

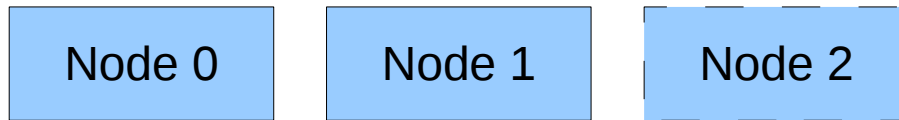
## Plans for pgpool-II 3.1

- Import PostgreSQL 9.0 SQL parser 😊
- Allow to switch back/force primary node and standby node without restarting pgpool-II 😊
- Allow to use regular expression in black/white\_function\_list 😊
- Allow to use syslog 😊
- Better handling for more than 1 standby
- French translation



# Switch back/force failover

Pgpool-II 3.0



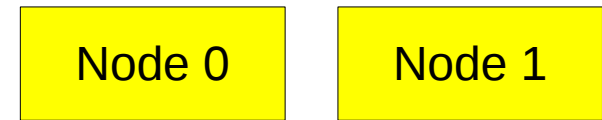
Primary  
Down

Standby  
Primary  
Primary

Standby

Cannot make node 0 as primary.  
Because primary needs to be  
"younger" than standby node.

Pgpool-II 3.1



Primary  
Down  
Standby  
Primary  
Primary

Standby  
Primary  
Primary  
Down  
Standby

**Switch back/force failover!**

# More than 1 standby servers. What's the problem anyway?

~~Primary~~

Standby A

Standby B

Which standby should be promoted?  
Current rule is “the least position in the config file”. This is not too intelligent.

~~Primary~~

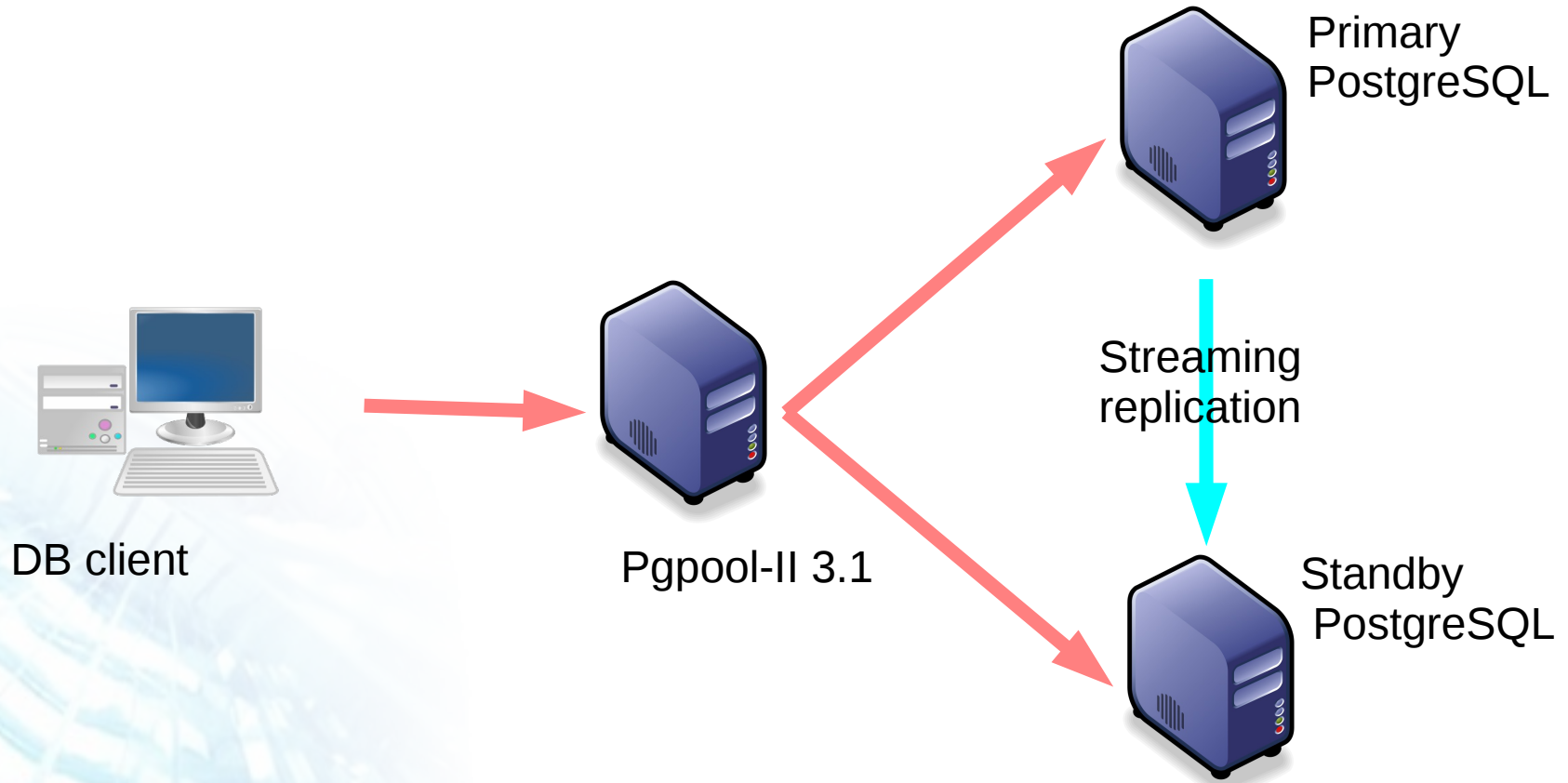
Standby A

New primary



The old standby cannot connect to new primary. So there's no standby server which can backup the system. Moreover, if the client connects to the old standby, it will read outdated data.

# Demonstration



## URL etc.

- Pgpool-II can be downloaded here:
  - <http://pgfoundry.org/projects/pgpool/>
- Twitter
  - @pgpool2
- SRA OSS's website
  - [http://www.srasoss.co.jp/index\\_en.php](http://www.srasoss.co.jp/index_en.php)