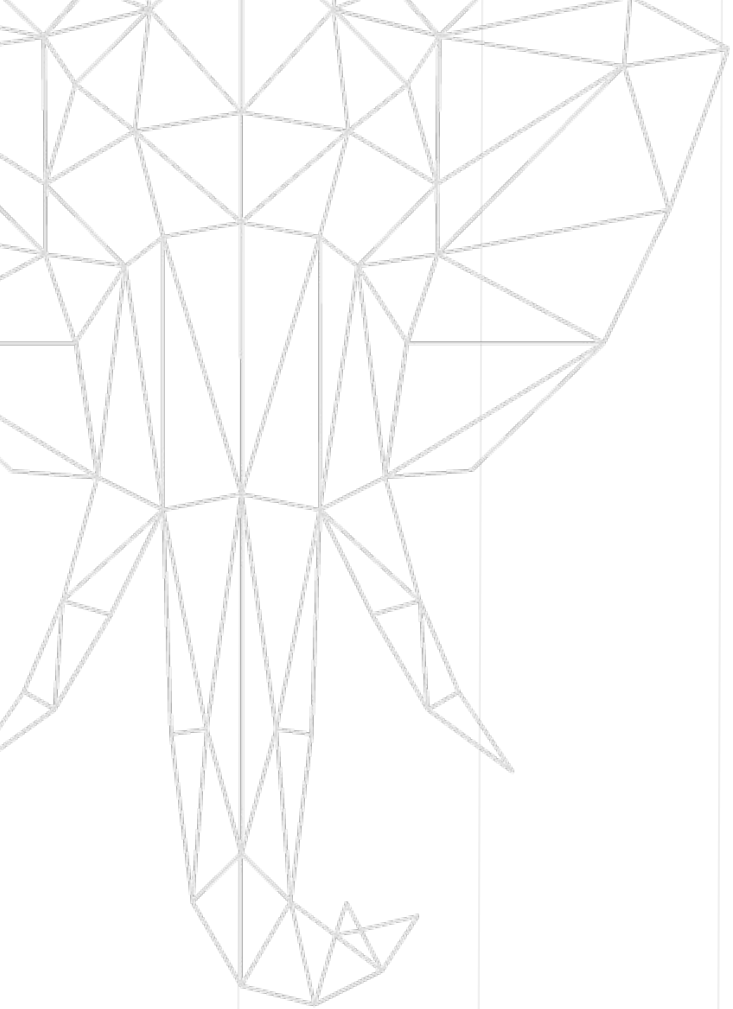

Pooling Performance

PgIBZ 2019

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About the speaker

- Emanuel Calvo, currently as a member of the Professional Services team.

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Core concepts

- Database workers architecture vary from engine to engine.
- PostgreSQL has a one worker per connection, which suits very well for parallelize, although not for concurrency mostly.
- A connection forks a postgres, and it is assigned to its corresponding CPU by the OS.
- Connections in Postgres do need to reserve shared space and, increasing max_connections can affect (event tho, not significantly), the available memory.

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Find the sweet spot for max_connections

- Max_connectoins should be around:
  - *(cores / % effective usage) * scale_factor*
    - *Credits to Álvaro Hernandez (ahachete)*
  - Scale_factor is between 2 and 4
  - Effective usage depends on CPU utilization per connection.
- Once all cores saturate (considering the asynchronicity), performance decays.

Current market solutions for PostgreSQL

- Pgpool
- Pgbouncer
- Odyssey

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Pooling vs. direct connection

- Pooling helps significantly when:
  - The amount of simultaneous and concurrent connections overpass CPU and disk capacities.
  - Connections are ephemeral.
- Otherwise, sometimes using pooling won't help considerably.
  - Specially for OLAP, where the effective usage is near 100%.

Pooling level

- Local pool
- Middleware pool
- Local application pool
- Integrated application pool

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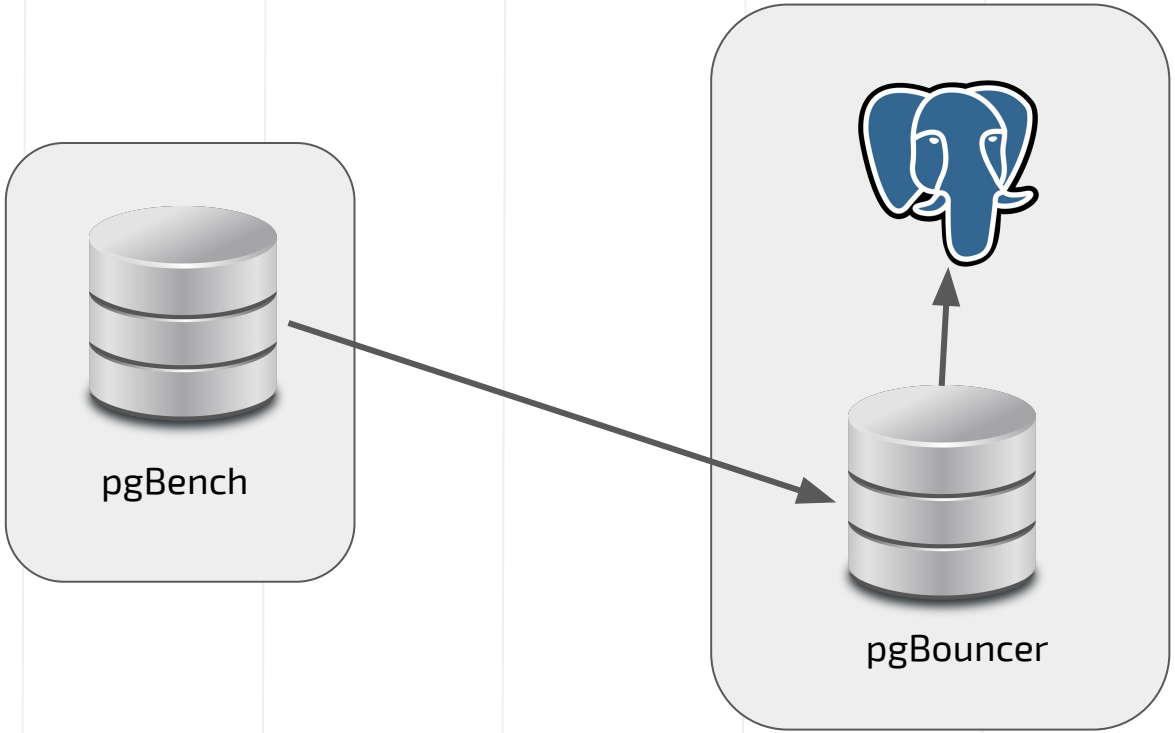
Local Pool



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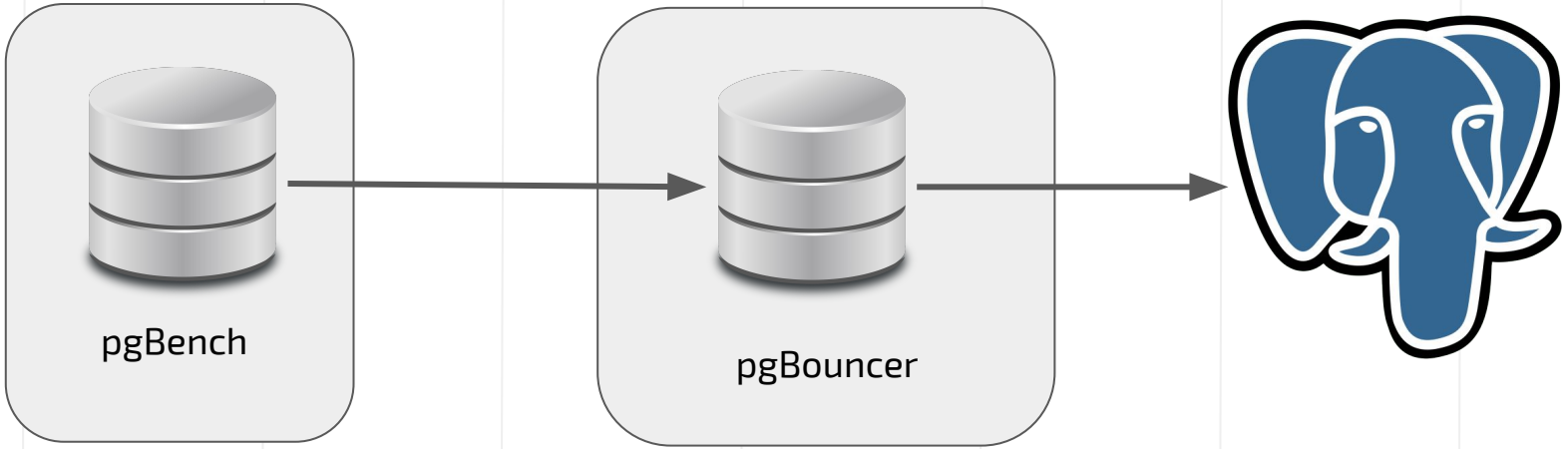
Middleware



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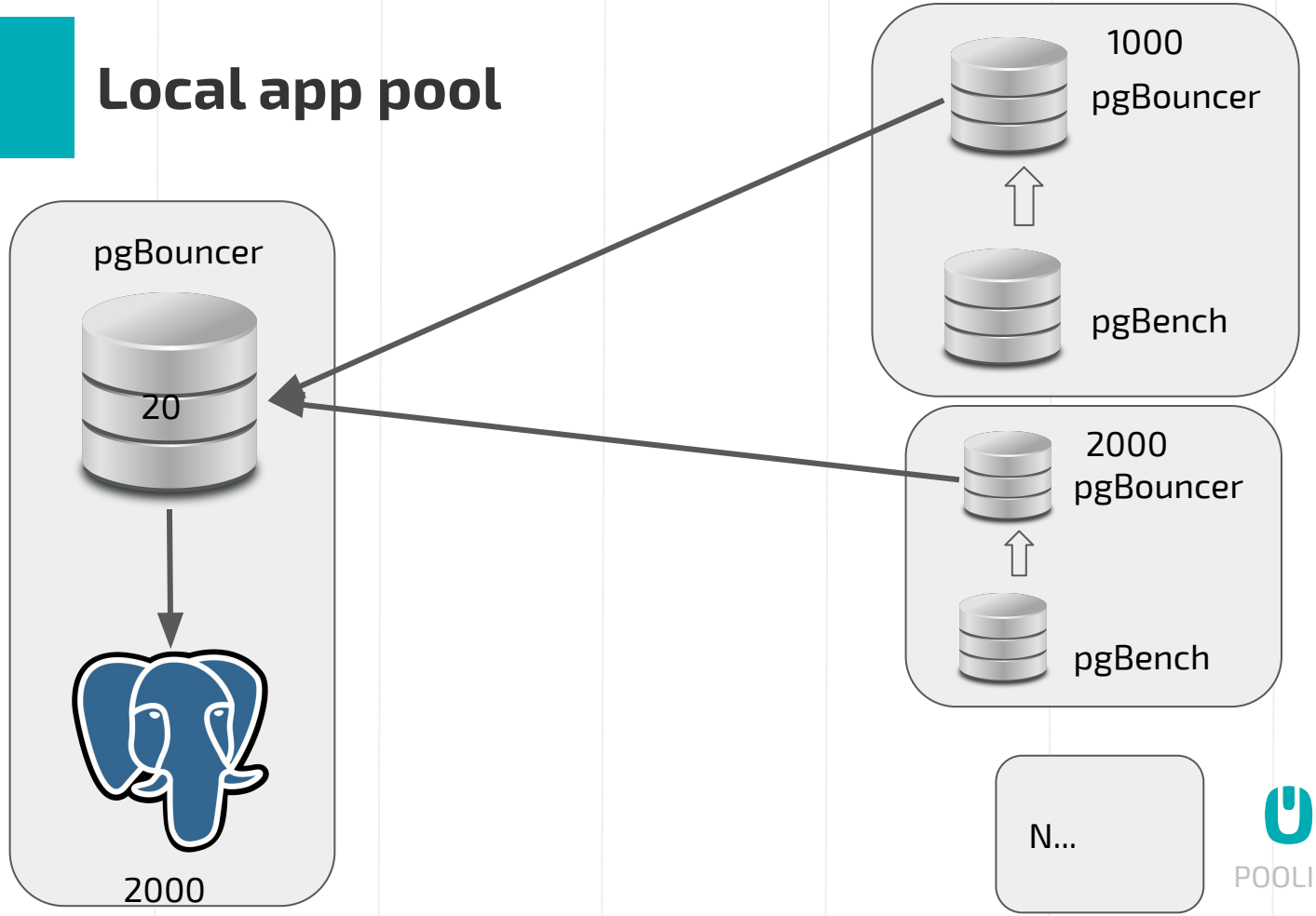
Local app pool



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OS tweaks

```
sysctl  -w  fs.file-max=2500000

ulimit -n 64000

echo  never  >/sys/kernel/mm/transparent_hugepage/enabled

echo  never  >/sys/kernel/mm/transparent_hugepage/defrag

sysctl  -w  net.ipv4.tcp_fin_timeout=1

sysctl  -w  net.ipv4.tcp_tw_reuse=1
```

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Laboratory

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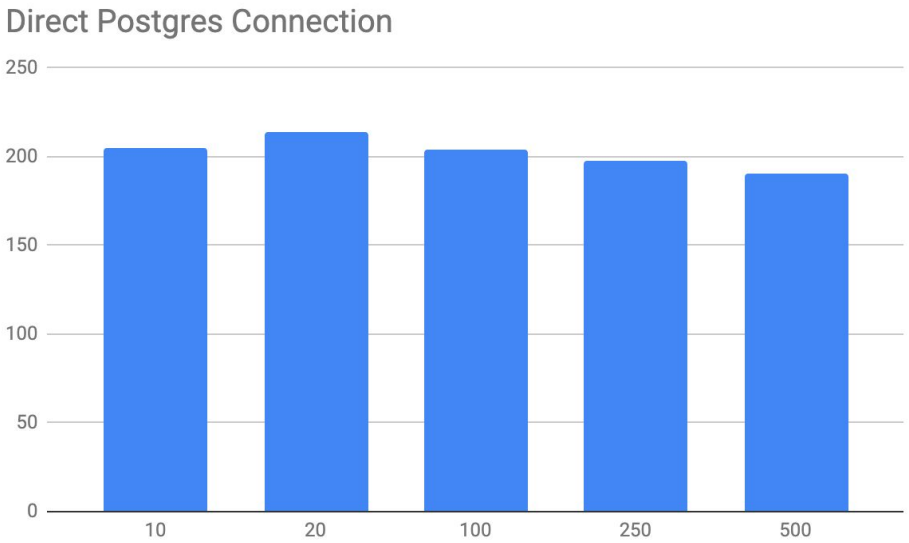
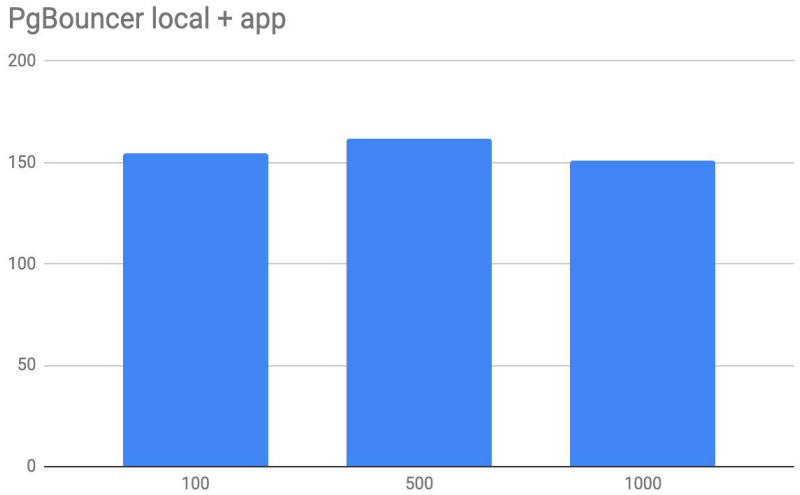
Synthetic test





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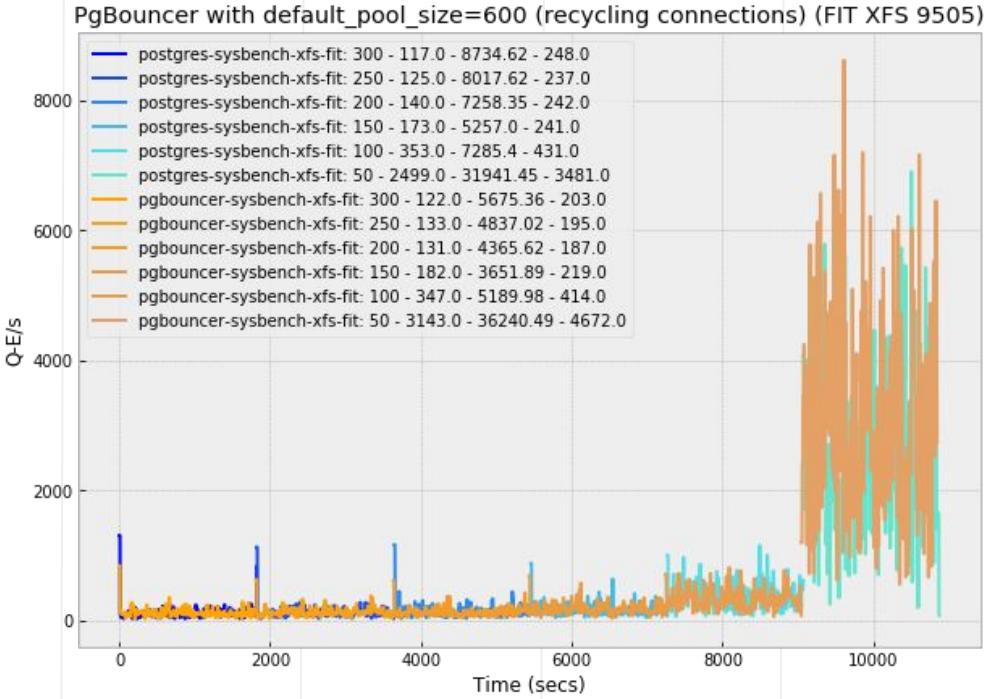

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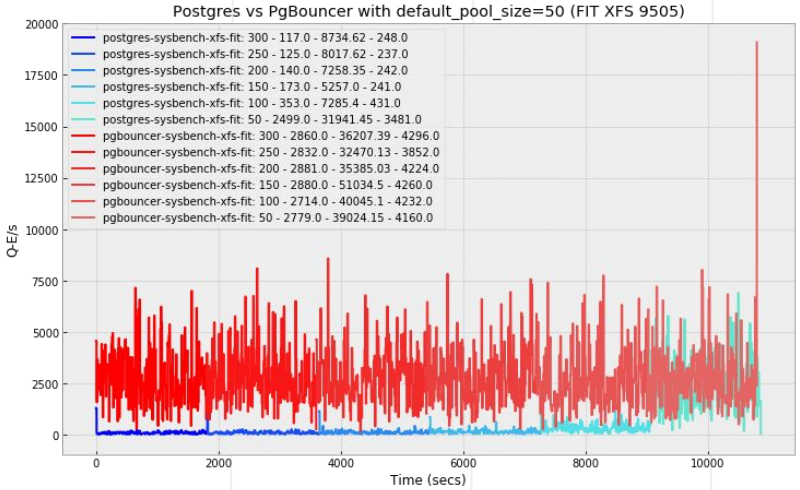

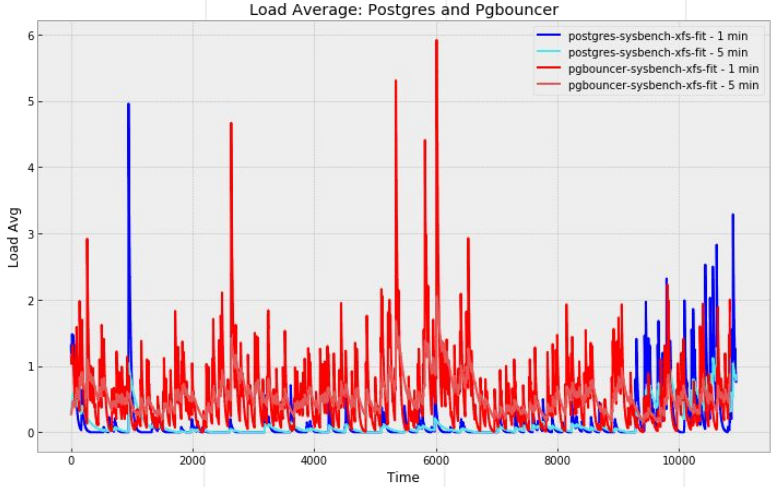

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References and other material

- https://speakerdeck.com/ongres/postgresql-configuration-for-humans?slide=18
- https://gitlab.com/gitlab-com/gl-infra/infrastructure/issues/6981

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