The Maze of Postgres Options

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EDB

This presentation explains the many decisions needed to deploy Postgres successfully.
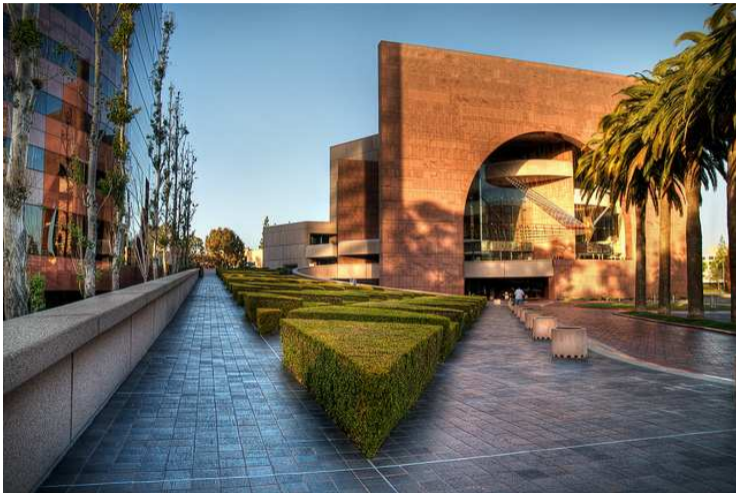
Last updated: April 2023

Outline
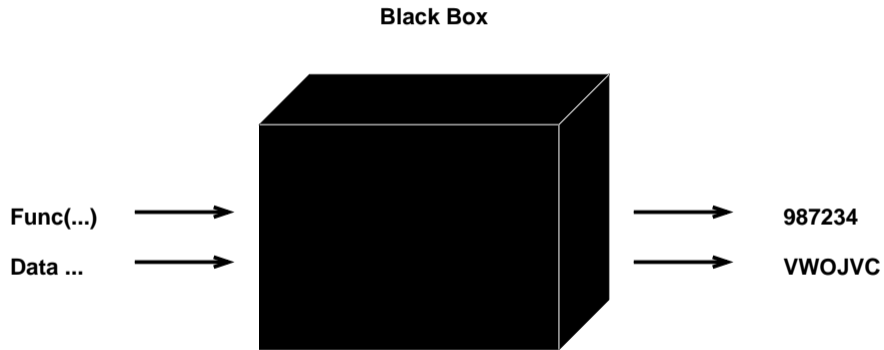
1. Open source's many options
2. Database server
3. Extensions
4. Deployment utilities
5. Monitoring options
6. Do you need a vendor?

https://www.flickr.com/photos/zoso_tc/

Closed-Source Software

Black Box

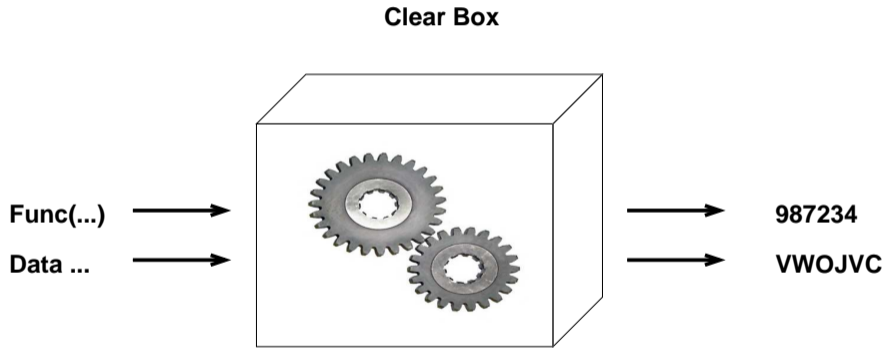Func(...) → → 987234

Data ... → → VWOJVC

Support

Database
Company

Open-Source Software

Clear Box

Func(...) → **987234**

Data ... → **VWOJVC**
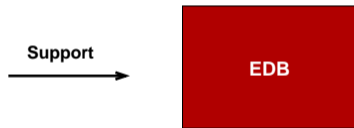
Support of Open-Source Software
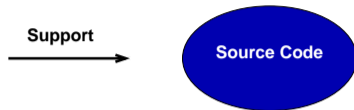
2. Database server

- Community server, www.postgresql.org
- Company-enhanced (closed-source) servers
  - EnterpriseDB (EDB Postgres Advanced Server)
  - Postgres Professional (Postgres Pro Enterprise)
  - 2nd Quadrant (purchased by EDB)
  - FUJITSU (FUJITSU Enterprise Postgres)
  - Amazon Web Services (RDS Postgres)

These products closely track Postgres community versions.

https://wiki.postgresql.org/wiki/PostgreSQL_derived_databases

3. Extensions

As an object-relational open-source database, extensions are a rich source of features in Postgres. These include:

- Extensions shipped with Postgres, e.g., *pgcrypto, postgres_fdw*
- Extension repositories, e.g., PGXN
- Independent extensions, e.g., PostGIS, Citus extensions

https://www.postgresql.org/docs/current/index.html

Server-Side Languages

- Included in the Postgres distribution
  - PL/Perl
  - PL/pgSQL
  - PL/Python
  - PL/Tcl
  - SPI
- Github
  - PL/Java
  - PL/PHP
  - PL/Ruby
  - PL/Scheme
  - PL/sh
- PGXN
  - PL/v8
- External
  - PL/R

http://www.postgresql.org/docs/current/external-pl.html

4. Deployment Utilities

- Deployment utilities shipped with Postgres, e.g., *vacuumlo*
- Tool repositories, e.g., PGXN
- Company produced

https://www.postgresql.org/docs/current/contrib-prog.html

Backup Utilities

- Shipped with Postgres: *pg_dump, pg_restore, pg_basebackup*
- pgBackRest
- Barman
- EDB Backup and Recovery Tool (BART)

Failover Utilities

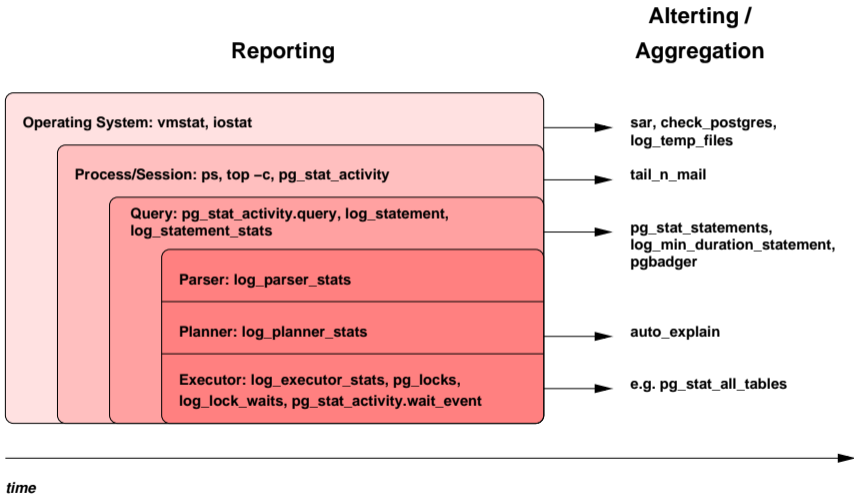- Patroni
- repmgr
- EDB Postgres Failover Manager (EFM)

Cloud/Container/VM Deployment

- Single-vendor cloud, e.g., Aws, Azure
- Multi-vendor cloud
- Docker deployment
- Kubernetes tools

5. Monitoring Options

- Shipped with Postgres, e.g., pg_stat_activity, pg_locks, statistic views, pg_stat_statements
- Independent, e.g., pgbadger, Nagios, Prometheus, Grafana
- Postgres Enterprise Manager (PEM)

Monitoring Capabilities

Reporting

Operating System: vmstat, iostat → sar, check_postgres,
log_temp_files

Process/Session: ps, top –c, pg_stat_activity → tail_n_mail

**Query: pg_stat_activity.query, log_statement,
log_statement_stats** → pg_stat_statements,
log_min_duration_statement,
pgbadger

Parser: log_parser_stats

Planner: log_planner_stats → auto_explain

**Executor: log_executor_stats, pg_locks,
log_lock_waits, pg_stat_activity.wait_event** → e.g. pg_stat_all_tables

time

6. Do You Need a Vendor?

- The database server and many extensions and tools are available for free
- Adding the missing parts is "a simple matter of programming"
- You can build your own Postgres open source support team

This is only possible because open source gives everyone the ability to become an expert.

Becoming an Expert Has Costs

- Payroll, management
- Testing, risk
- Delayed deployment
- Increased dependency on staff skills
- Deployment rigidity, but easy customization

Make or Buy Decision

Cook for yourself or go to a restaurant?

- Cook yourself
  - Ingredients
  - Cooking skills
  - Single dish
  - Less cost, more time
- Restaurant
  - Variety
  - Simplicity, flexibility
  - More cost, less time

Costs

Internal cost

Vendor cost

% of Work Done by Vendor
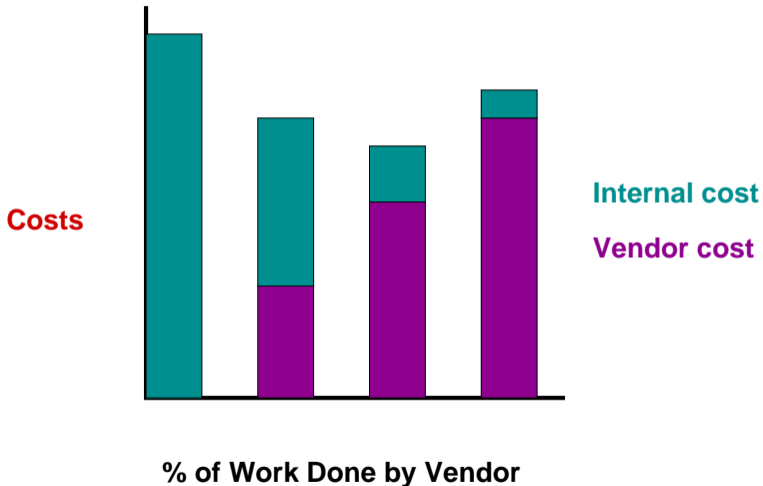
Choosing a Postgres Vendor (or Restaurant)

- A broad range of vendor-cost options are available, more than in proprietary software
- Are vendor expenses less than the value of increased efficiency and reduced in-house costs?
  - Paid vendor $400k but increased efficiency and reduced in-house costs by $700k
- More expensive vendors can sometimes increase efficiency and reduce in-house costs more than inexpensive vendors

Postgres Vendor Specialties

- Support
- Consulting
- Open-source products
- Closed-source products
- Cloud hosting
- Training
- Migration assistance
- System health check

Conclusion