

Future Postgres Challenges

BRUCE MOMJIAN



This presentation explores possible challenges to Postgres's success in the coming years.

<https://momjian.us/presentations>



Creative Commons Attribution License

Last updated: January 2026

Outline

1. Current status
2. Project challenges
3. Competitive challenges
4. Technical challenges

1. Current Status



<https://www.flickr.com/photos/snikologiannis/>

Consistent Development

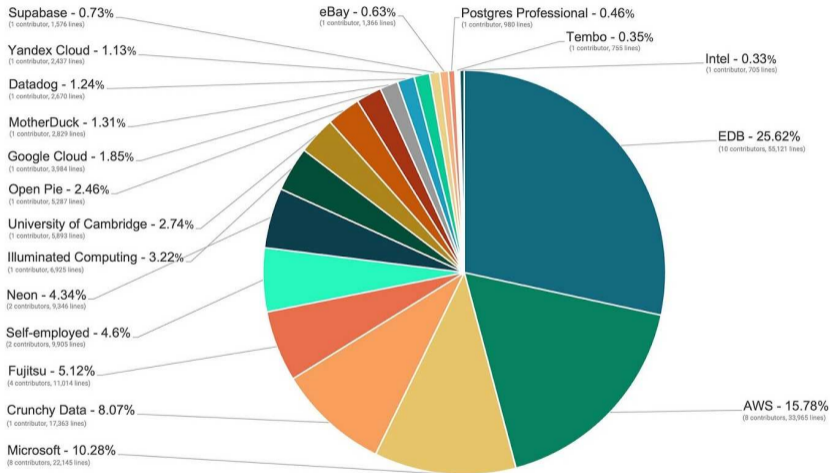
- 35+ years of development
- 25+ years of annual major releases
- ~180 features per major release
- Quarterly minor releases

Healthy Community Structure

- BSD license guarantees software will be available forever, including for proprietary use.
- Development and leadership is diversified geographically, culturally, and is multi-company.
 - servant leadership, https://en.wikipedia.org/wiki/Servant_leadership
- Immune from sanction and tariff impacts*

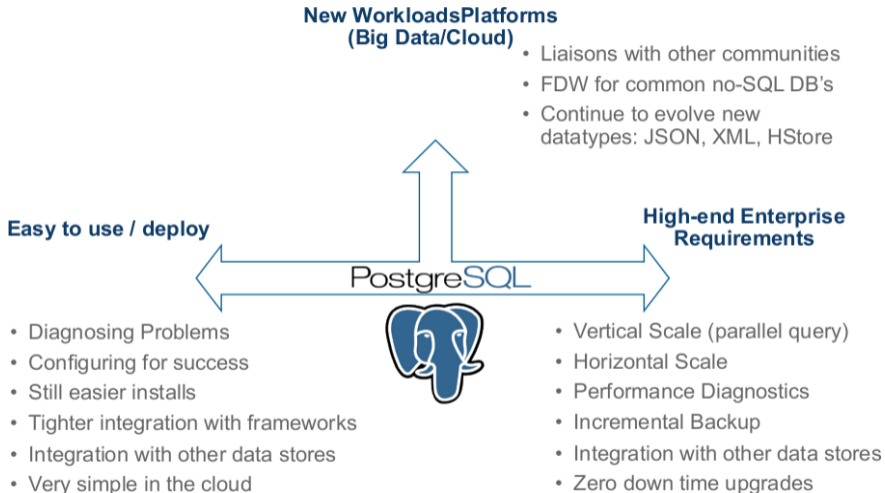
*https://momjian.us/main/blogs/pgblog/2025.html#April_9_2025

Strong Diversified Assistance

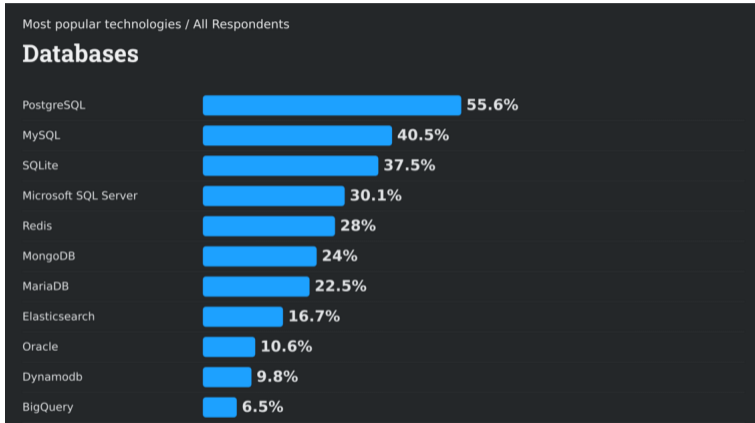


<https://www.enterprisedb.com/blog/who-contributed-postgresql-development-2024>

Innovative Features



Most Loved Relational Database in 2025



<https://survey.stackoverflow.co/2025/technology/#1-databases>

<https://www.data-bene.io/en/blog/most-desired-database-three-years-running-postgresqls-developer-appeal/>
<https://www.enterprisedb.com/blog/part-3-postgres-journey-top-developers>

2. Project Challenges



<https://www.flickr.com/photos/croydonclicker/>

Leadership Disruption

- Gimp was abandoned by its lead developers, later resurrected
- Red Hat took over CentOS, changed stability

Poor Reputation

- Security flaws
- Buggy releases
- Instability
- Poor performance
- Data corruption

These all have to be good, based on the “Wooden Barrel Theory”.

<https://www.pvisoftware.com/blog/wooden-barrel-theory/>



Patent Attacks

- Developer with patents, Rambus
- Competitor with patents, Microsoft
- MongoDB sued FerretDB over patents in May 2025, https://blocksandfiles.com/wp-content/uploads/2025/04/Letter-from-MongoDB-to-FerretDB_3-Nov-2023-signed.pdf
- Patent trolls, Rothschild Patent Imaging LLC
- Good news
 - Open Invention Network
 - PostgreSQL is part of the Linux System Definition
 - <https://www.openinventionnetwork.com/linux-system-definition/table-12/postgresql/>
 - Unified Patents
 - Project Jengo at Cloudflare

Identity Challenges

- Domain name
- Website
- Trademark

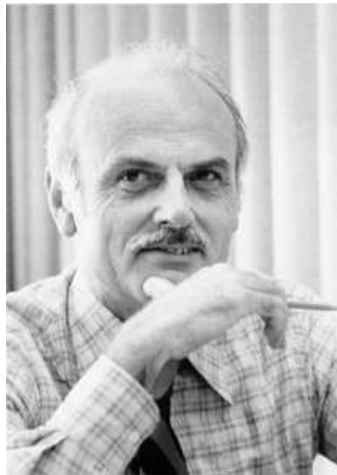
3. Competitive Challenges



<https://www.flickr.com/photos/oui-ennui/>

Decline of Relational

- Relational storage was proposed by E. F. Codd in 1970
- 50+ years still in use
- Very flexible
- Resisted challenges
 - XML databases
 - Object databases
 - NoSQL



https://en.wikipedia.org/wiki/Edgar_F._Codd

<https://www.youtube.com/watch?v=zSn8il5Mo5s>

Other Solutions

- Relational (e.g., MariaDB)
- Embedded (SQLite)
- Document (MongoDB)
- Columnar (ClickHouse)
- Data warehouse (Hadoop)
- Full text search (Elasticsearch)
- Time series (InfluxDB)

4. Technical Challenges



<https://www.flickr.com/photos/afc16/>

Write Amplification

- Non-HOT updates can cause massive index updates
- Dead and old row version cleanup can become expensive for certain workloads
- Writes cause full page image and hint WAL writes
- Freezing of old transaction ids
- Incremental improvements
 - Are radical improvements needed?

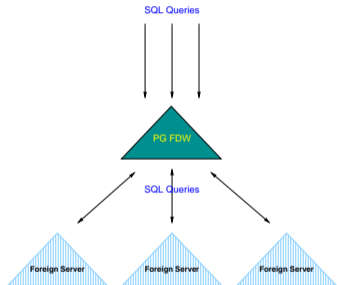
Cluster File Encryption, TDE

- Newer versions of the PCI DSS specification make storage-only encryption less acceptable
- This is a check-box/regulatory requirement for many financial deployments

https://momjian.us/main/blogs/pgblog/2025.html#February_22_2025
https://wiki.postgresql.org/wiki/Transparent_Data_Encryption

Horizontal Scaling

- Allows data storage larger than possible on a single server
- Allows write scaling
- Enables large CPU and memory scaling
- Development is in progress



Obsolete Toolchain

Difficulty replacing obsolete or abandoned

- Programming languages
- Support libraries, e.g., *libxml2* (<https://lwn.net/Articles/1025971/>)
- Testing frameworks
- Contributor workflow, e.g., C, email, patches

Drastic Technology Changes

- New language, architecture, or storage that are difficult for Postgres to adopt
- Technology changes have happened before
 - SSDs, added `random_page_cost` to tablespaces
 - virtual machines, containers, cloud

Conclusion



<https://momjian.us/presentations>

<https://www.flickr.com/photos/91451979@N00/>