

Future Postgres Challenges

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

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Outline

1. Current status
2. Non-technical challenges
3. Technical challenges

1. Current Status



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

Consistent Development

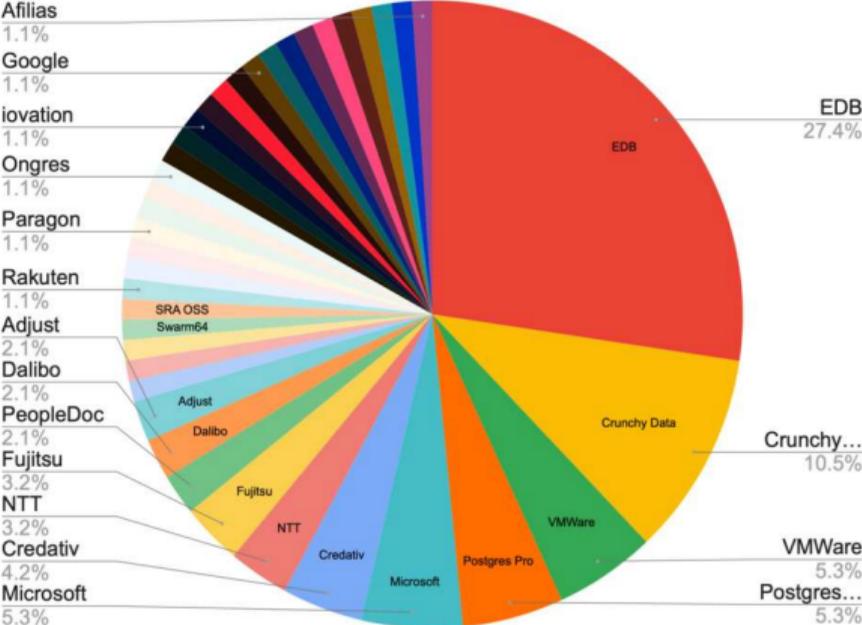
- 35+ years of development
- 25+ years of annual major releases
- ~180 features per major release
- Quarterly minor releases

Healthy Community Structure

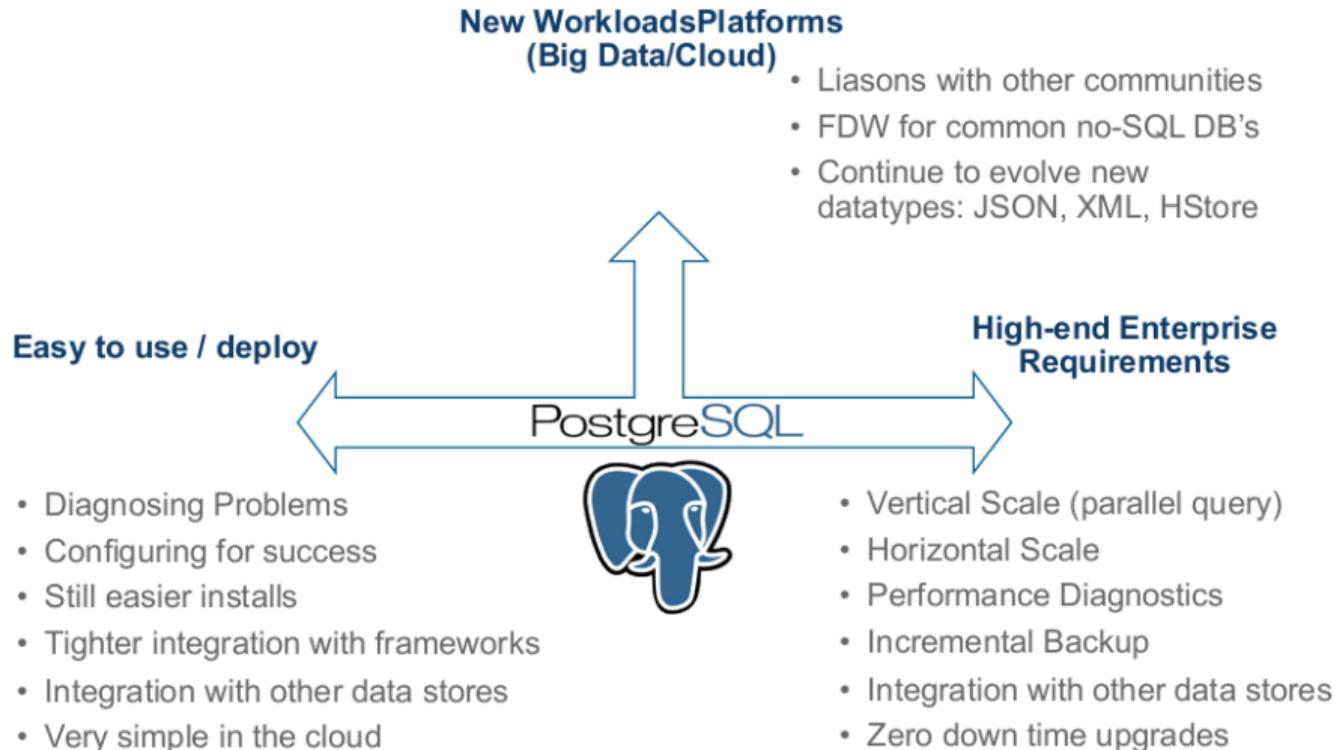
- BSD license guarantees software will be available forever, including for proprietary use.
- Development and leadership is diversified geographically, culturally, and is multi-company.

Strong Diversified Assistance

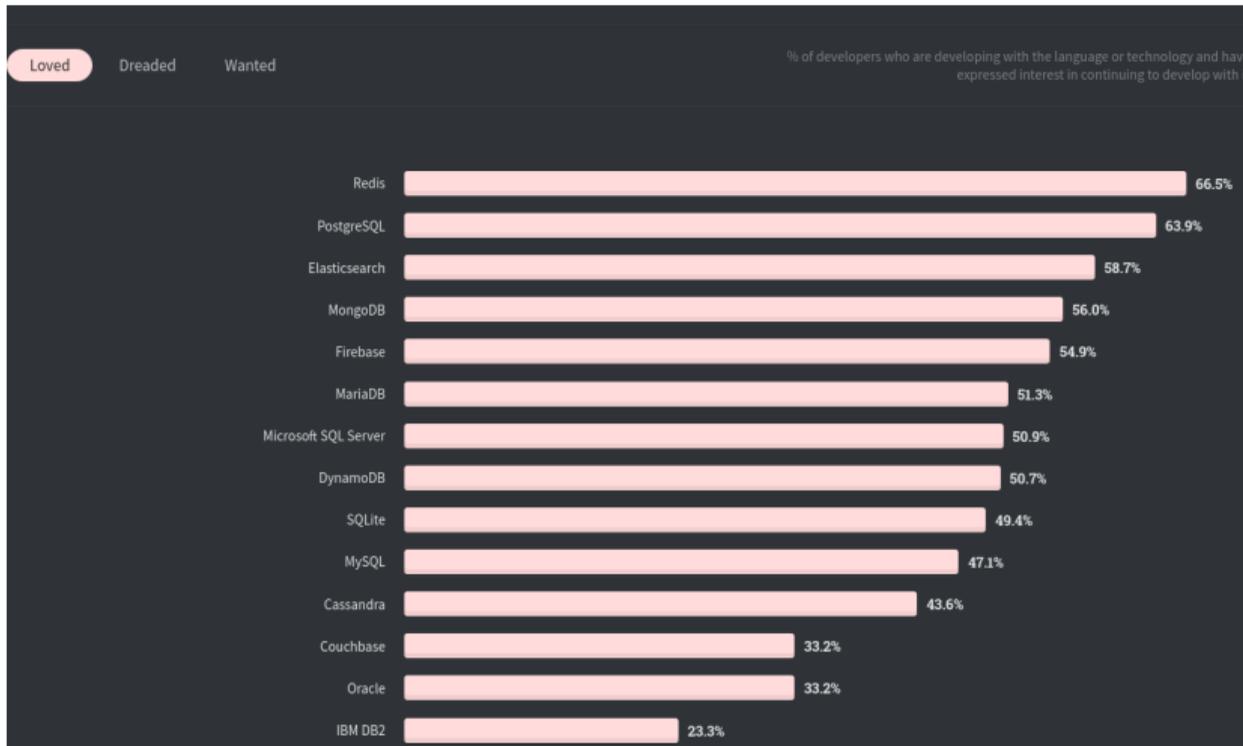
Postgres contributors (PostgreSQL.org + PG 13 Release Notes) w.o. personal or freelancers



Innovative Features



Most Loved Relational Database in 2020



<https://insights.stackoverflow.com/survey/2020#technology-most-loved-dreaded-and-wanted-databases-loved4>

2. Non-Technical 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
- Data corruption

Patent Attacks

- Developer with patents, Rambus
- Competitor with patents, Microsoft
- Patent trolls, Rothschild Patent Imaging LLC
- Open invention network

Cloud Vendor Starvation

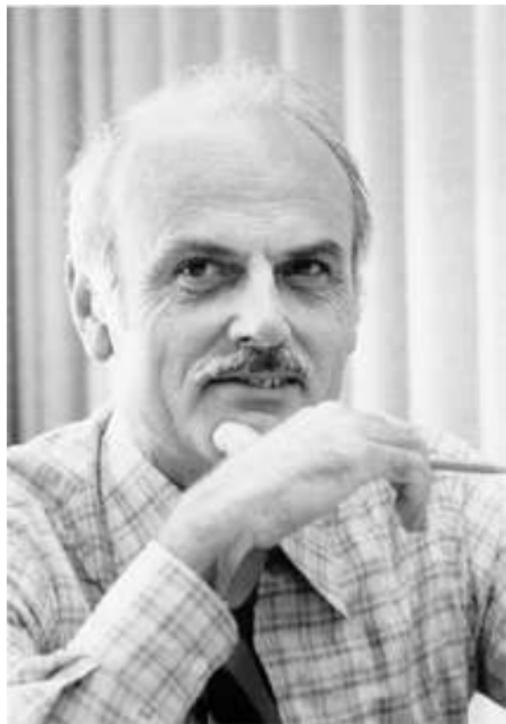
- Cloud vendors use open source as upsell
- Already have infrastructure-as-a-service relationship with customers
- Company-controlled open source already impacted, changed licenses
- Red Hat challenged by cloud vendors

https://momjian.us/main/blogs/pgblog/2020.html#September_25_2020

https://momjian.us/main/blogs/pgblog/2020.html#September_28_2020

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

3. Technical Challenges



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

Write Amplification

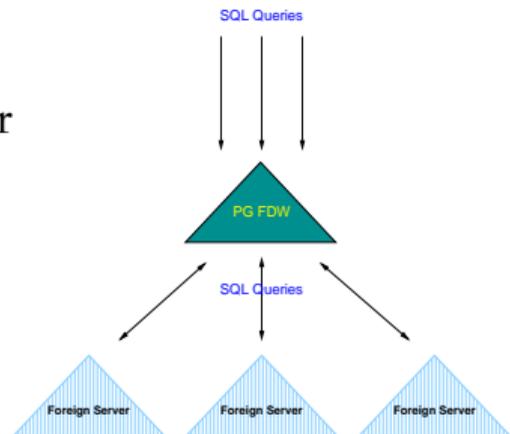
- Non-HOT updates can cause massive index updates
- Dead and old row version cleanup can become expensive for certain workloads
- Writes cause full page image and hint WAL writes

Cluster File Encryption, TDE

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

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



Drastic Technology Changes

- New languages or architectures that are difficult for Postgres to adopt
- Technology changes have happened before
 - SSDs, added `random_page_cost` to tablespaces
 - cloud

Conclusion



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