

The Democratization of Databases

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Democratic governments have a long history of success, with some setbacks. This talk explains how democratic principles underpin the success of the open source relational database Postgres.

<https://momjian.us/presentations>



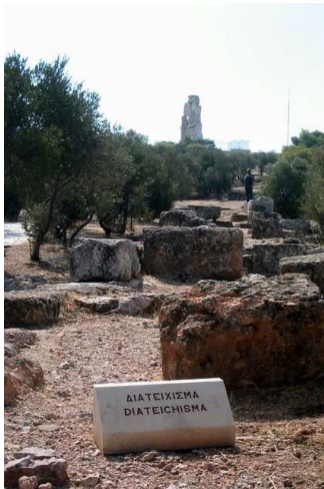
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Outline

1. History of governance structures
2. Strengths of each structure
3. Efficiency and messiness of democracy
4. Ultimate success of democracy
5. Software governance history
6. Where does this leave Postgres?
7. Democracy in action

1. History of Governance Structures



Pnyx Hill, Athens

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

Autocracy

- Single person or small group in power
- Examples
 - dictatorship, e.g., Belarus
 - absolute monarchy, e.g., Saudi Arabia
 - communist, e.g., North Korea
- First governing structure

Representative Democracy

- First established in ancient Athens
- Historically only a small group of the population could vote
- Elect representatives to vote on issues

2. Strengths of Each Structure



Chepstow Castle, Wales

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

Autocracy Strengths

- Good for focusing a fixed amount of resources on a clear goal
- Examples
 - space exploration
 - military

Democracy Strengths

- Allows rapid adjustment for unclear goals
- Emboldens talent to act near the problem
- Expands the pool of talent
- Examples
 - consumer goods
 - software

3. Efficiency and Messiness of Democracy



Madison, Wisconsin

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

Efficiency of Democracy

- Unleashes a flurry of activity based on agency, i.e., personal power
- Fluidity of solutions

Messiness of Democracy

- Hard to predict behavior
- Problems can get stuck
- Difficulty with large projects that span multiple elections
- Direct democracy rarely tried, yielded mixed results

4. Ultimate Success of Democracy



Moscow

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

Democracy's Checkered History

- First democracy in Athens, suspended during wars
- Roman democracy ended in dictatorship
- Middle Ages, Magna Carta, Renaissance
- American Revolution, black and women's voting rights
- French Revolution leads to monarchy

Democracy Today

- Democracy continues to make steady progress
- There are still setbacks

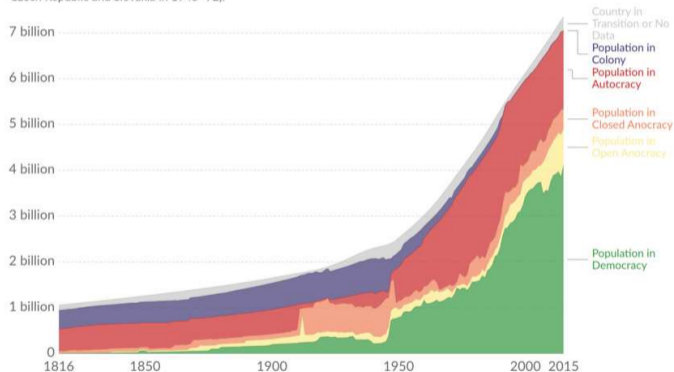
Democracy in the Past 200 Years

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

Number of world citizens living under different political regimes

The scale goes from -10 (full autocracy) to 10 (full democracy). Anocracies are those scoring between -5 and 5. "Colony" (coded as -20) includes not only colonies, but also countries that were not yet sovereign states (e.g. the Czech Republic and Slovakia in 1945-92).

Our World
in Data



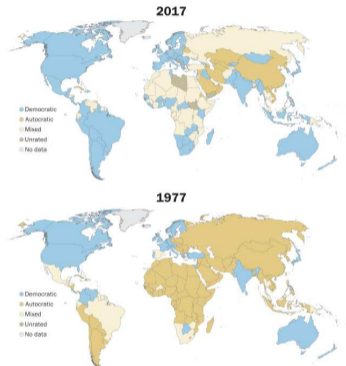
Source: World Population by Political Regime they live in (OWID (2016))
OurWorldInData.org/a-history-of-global-living-conditions-in-5-charts/ • CC BY

<https://ourworldindata.org/democracy>

Democracy in the Past 40 Years

Democracy has grown across the world over the past four decades

Regime types in each country, 1977 and 2017



Note: Map depicts data for the 167 countries included in the Polity IV database. Countries labeled "mixed" have a blend of democratic and autocratic regime characteristics. "Unrated" countries are those whose central government has or had completely collapsed, which are or were subject to foreign intervention or occupation, or which are or were in the midst of a regime transition. "No data" refers to states or entities that either have fewer than 500,000 people or are not internationally recognized as fully sovereign.

Source: Center for Systemic Peace's Polity IV Project.

PEW RESEARCH CENTER

<https://www.pewresearch.org/fact-tank/2019/05/14/more-than-half-of-countries-are-democratic/>

5. Software Governance History



Redwood City, California

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

Proprietary Autocracy

- Executives make decisions
 - input from sales and marketing
 - indirectly from customers
- Decision matrix
 - “If we do this, what percentage of customers will we gain?”
 - “If we don’t, what percentage of customers will we lose?”
 - gains are more sensitive to the decision than losses
 - “Do gains or avoided losses justify the implementation costs?”

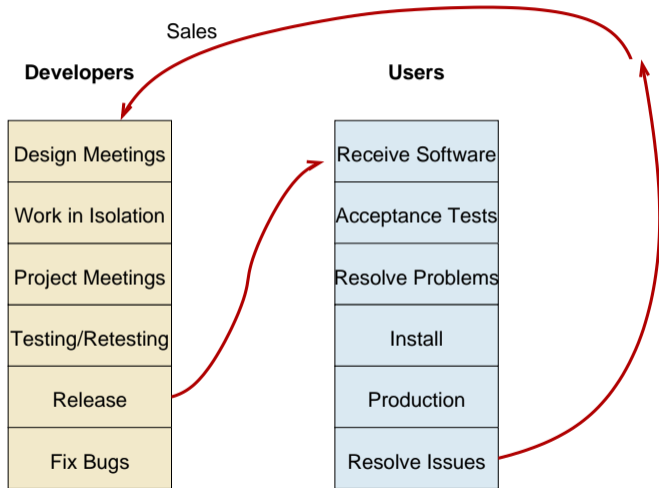
Open Source Democracy

- Mix of direct democracy and meritocracy
- Voting can be problematic
- Sometimes too much feedback
 - bike shedding
- Bad decisions can be quickly corrected, i.e., easy to revert
- No reliable road map

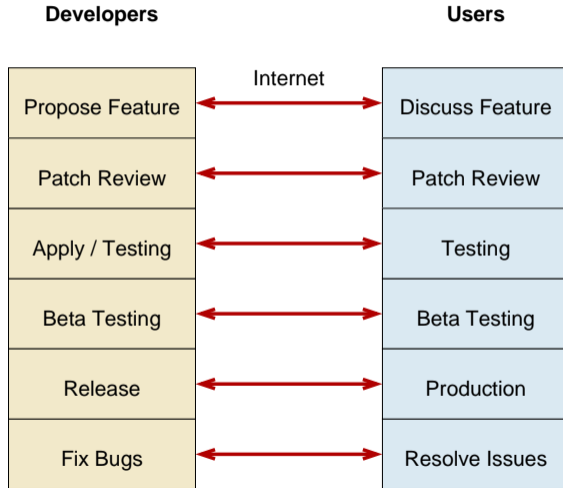
Internet Makes Direct Democracy Possible

- Easy to share ideas and iterate new solutions
- Rapid global communication

Autocratic Development Flow



Democratic Development Flow



Hybrid Development Models

- Single company controls development
- Open source distribution
- Uses autocratic decision matrix
- Lacks democratic feedback
- More comfortable for users transitioning from proprietary since there is a single company to contact
- Examples
 - MySQL, MariaDB
 - MongoDB

6. Where Does This Leave Postgres?

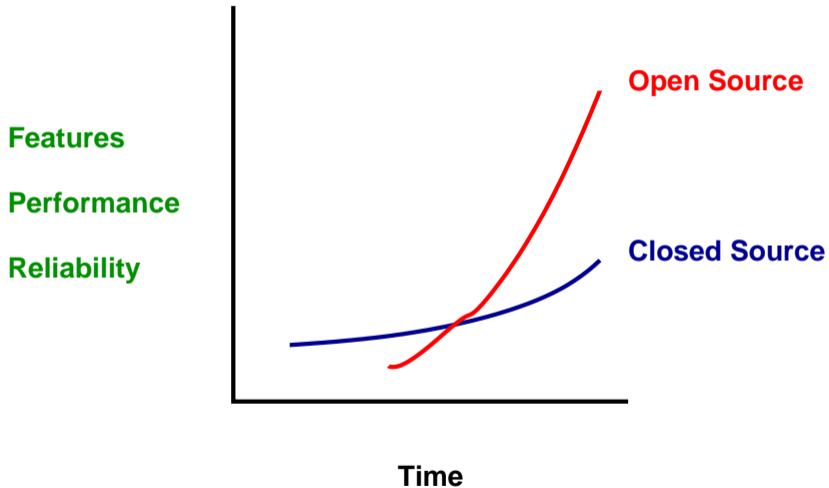


https://www.flickr.com/photos/tomas_vondra/

Postgres Wins Because Democracy Wins

- Uses democracy to attract talent
 - talent pool can easily compete with proprietary staff
- Superior feedback and decision matrix lead to success
- This is a challenge for niche software
- Setbacks still possible

Rise of Open Source

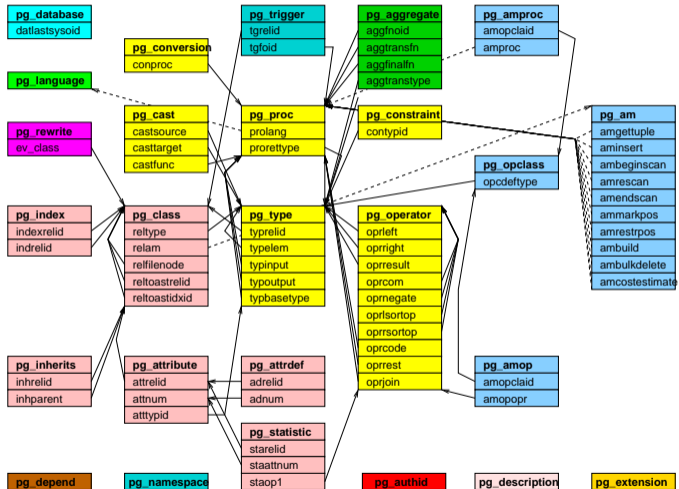


7. Democracy in Action

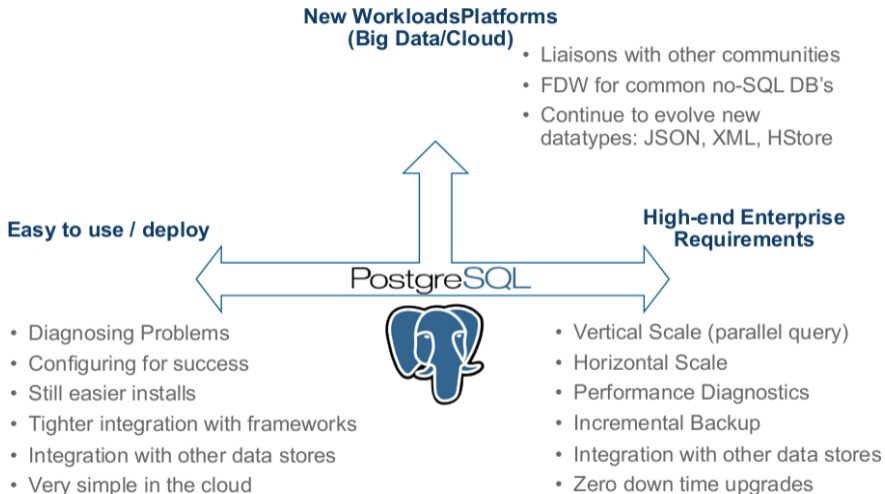


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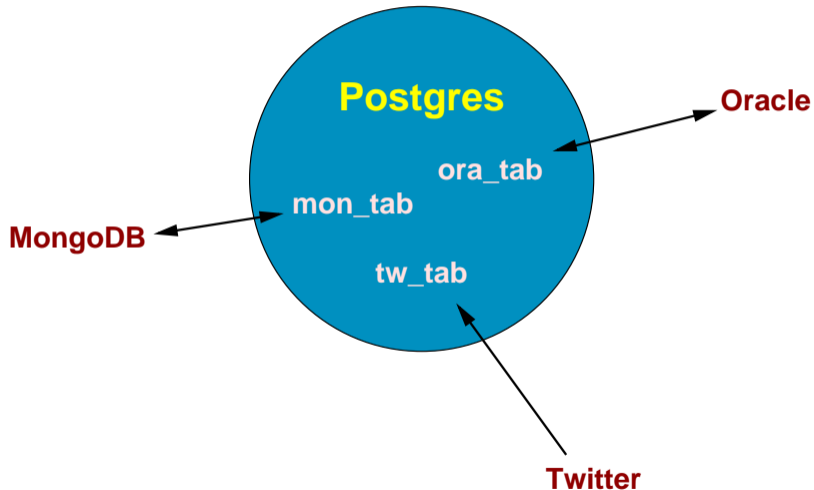
Postgres Extensibility



Many Focuses



Foreign Data Wrappers



Foreign Data Wrappers

- 100+ interfaces to foreign data
- Read/write
- Sophisticated push down of joins, sorts, and aggregates

The screenshot shows the PGXN website interface. At the top right, the PGXN logo and 'PostgreSQL Extension Network' are visible. Below the navigation bar, there is a search bar with 'PGXN Search' and a dropdown menu for 'Distributions'. The main content area features a word cloud of extension categories, with 'foreign data wrapper' and 'fdw' being the most prominent. To the right, a 'Recent Releases' section lists several extensions with their versions and brief descriptions.

Word Cloud Categories:

- administration
- aggregate
- analytics
- arrays
- audit
- autovacuum
- bitmap
- compatibility
- count
- data type
- datatype
- dictionary
- distinct
- estimate
- extension
- external data
- fdw
- foreign data wrapper
- function
- functions
- hash
- hint
- index
- json
- jsonb
- log
- logging
- maintenance
- math
- meta
- multibyte
- monitoring
- os
- performance
- pgx
- plan
- planner
- plpgsql
- postgresql
- replication
- rust
- search
- security
- sql
- sqlmed
- statistics
- table
- template
- testing
- trigger
- type
- utility
- vectors

Recent Releases:

- pg_stat_ext 0.2.11**
PostgreSQL Query Subentry Expertise to Cockroach
- pg_graph 1.1.0**
High performance native graph traversal engine for PostgreSQL with 100x+ speedup over recursive CTEs
- pg_extra_time 2.1.4**
Some date-time functions and operators that, according to the extension authors, ought to be part of the PostgreSQL standard distribution.
- pgsodium 3.1.11**
Postgres extension for libodium functions
- pg_replica 0.6.0**
Connector-driven automatic failover for PostgreSQL (unbundled with covered plans)

More Releases -

- PostGIS is a full-featured Geographical Information System (GIS)
- Implemented as an extension
- Independent development team and community



PostgreSQL Tenth Anniversary in 2006



https://www.postgresql.org/files/community/conference06/conference_group.html

My Postgres Activities



Voting

- Committers nominate new committers
- Core team nominates new core members
- Development is open to all, even occasional visitors
 - “Let the best idea win!”
 - “Where did that guy come from?”
 - Focus talent like a lens on every task

Roadmap

- Individuals and political parties have roadmaps
- Democratic governments don't
- Developers and companies have roadmaps
- Postgres doesn't

Users

- General Re: Can't install Postgres version 18
- Other Re: BUG #19518: Path resolution for loading a function fails, if postgres is somewhere in the path.
- Announce Pgpool-II 4.7.2, 4.6.7, 4.5.12, 4.4.17 and 4.3.20 released.

Developers

- Hackers Re: Fix SET EXPRESSION for virtual columns with whole-row dependencies
- Commit Adjust cross-version upgrade tests for seg_out() fix
- Versions **Stable:** 18.4+, 17.10+, 16.14+, 15.18+, 14.23- | **Development:** 19 beta1-, in commitfest

External

- Blogs Christophe Pettus: All Your GUCs in a Row: default_table_access_method
- News Pgpool-II 4.7.2, 4.6.7, 4.5.12, 4.4.17 and 4.3.20 released.
- Media Microsoft Open-Sources PostgreSQL Extension for In-Database Durable Execution - infoq.com
- Events POSETTE: An Event for Postgres 2026

IRC (also Slack)

- StuckMojo:** "
- Myon:** physical or logical slot
- StuckMojo:** physical
- StuckMojo:** logical shouldn't do that, right?
- thrylos:** hello
- btiikana:** Hello
- btiikana:** are people active on here?
- sobel:** if there's something interesting

Conclusion



<https://momjian.us/presentations>

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