

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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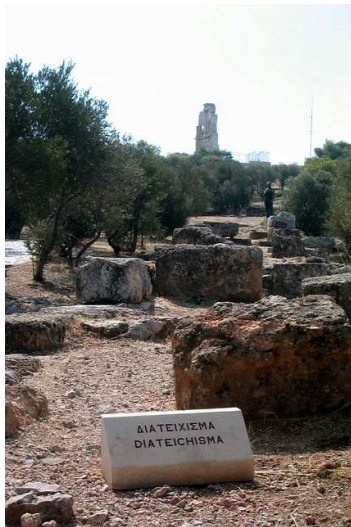


Last updated: September, 2020

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
8. Conclusion

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., Syria
 - 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

Mad

- 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

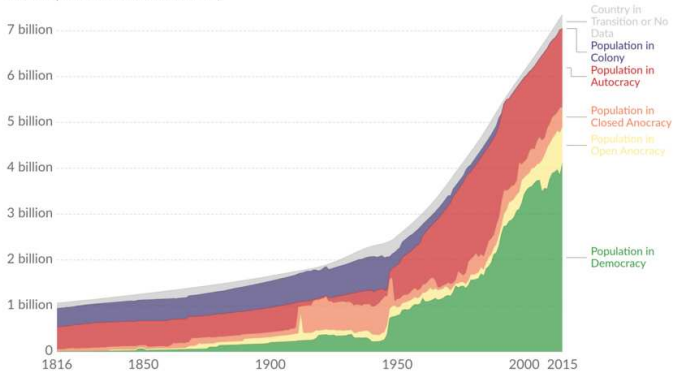
Democracy Today

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

Democracy in the Past 200 Years

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).



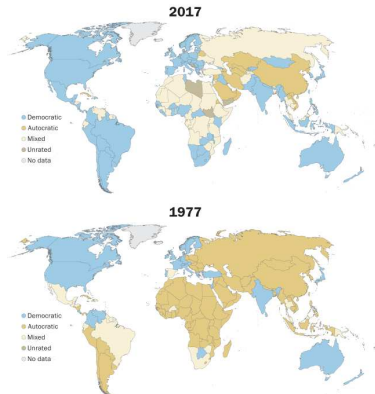
Source: World Population by Political Regime they live in (OWID (2016))
OurWorldInData.org/a-history-of-global-living-conditions-in-5-charts/ • CC BY

<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?

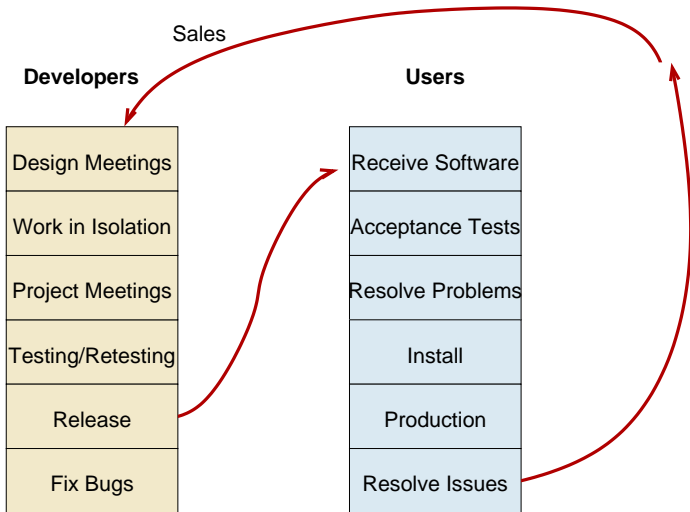
Open Source Democracy

- 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

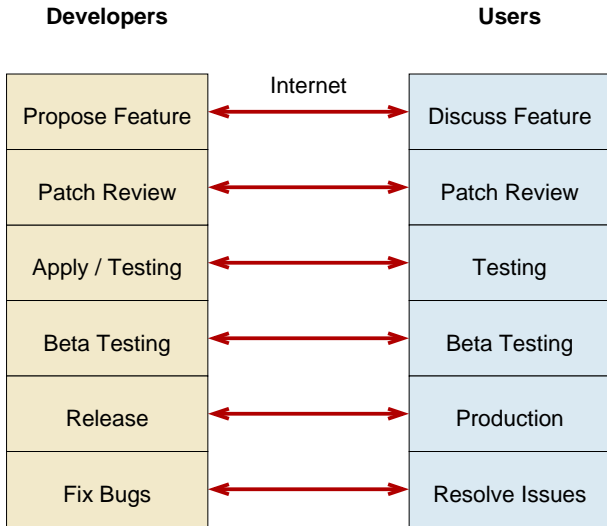
Internet Makes Direct Democracy Possible

- 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?

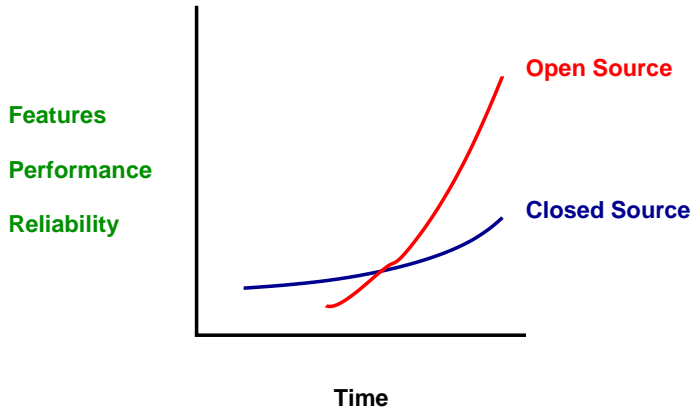


https://www.flickr.com/photos/tomas_vondra/

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

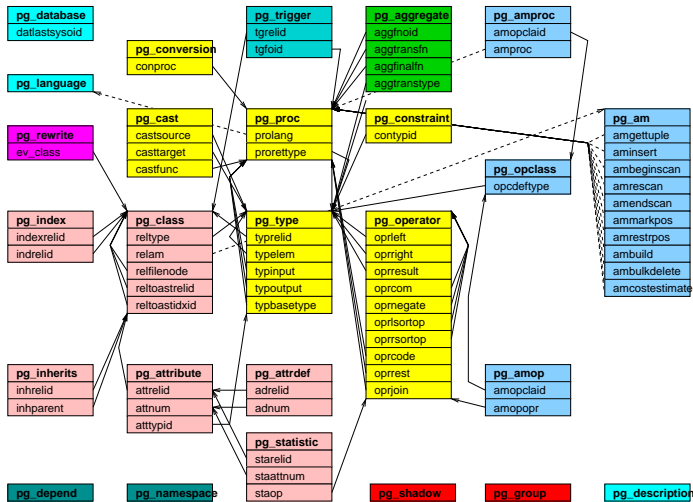


7. Democracy in Action

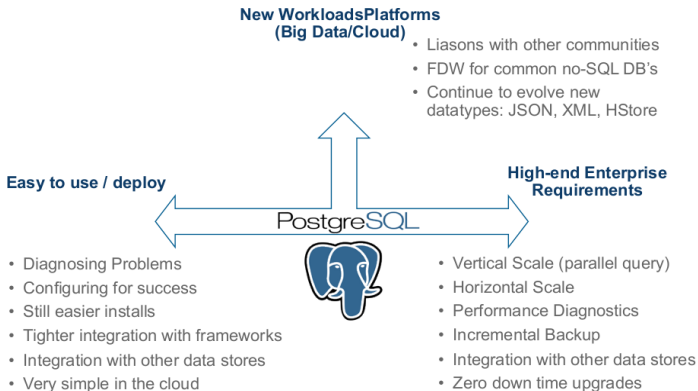


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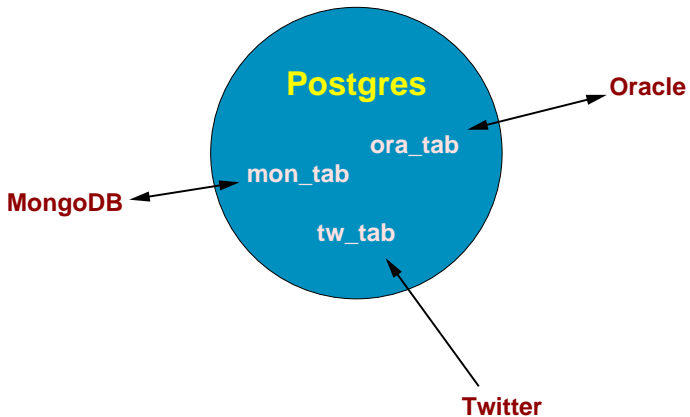
Postgres Extensibility



Many Focuses



Foreign Data Wrappers



Foreign Data Wrappers

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


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PGXN, the PostgreSQL Extension network, is a central distribution system for open-source PostgreSQL extension libraries.

Recent Releases

db2_fdw 3.0.4
 PostgreSQL, Data Wrapper to DB2 databases

VOPS 2.0.1
 Vectorized Operations

imcs 0.1.7
 In-Memory Columnar Store

lsm3 0.1.3
 LSM tree implemented using standard PostgreSQL B-Tree indexes

orafce 3.13.4
 Oracle's compatibility functions and packages

[More Releases -](#)

PostGIS

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



PostgreSQL Tenth Anniversary in 2006



My Postgres Activities



Voting

- Committers nominate new committers
- Core nominates new core
- 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

PgLife

PgLife Postgres Community Life

Users

General

Re: CRL reloading info - is it refreshed?

Other

Re: BUG #16622: pg_dump produces erroneous ALTER TABLE statement for a table with an inherited generated column

Announce

ORC Foreign Data Wrapper Update Version 1.1.0 is Released!

Developers

Hackers

Re: Load TIME fields - proposed performance improvement

Commit

Stamp 13.0.

Versions

Stable: 12.4+, 11.9+, 10.14+, 9.6.19+, 9.5.23+ | Development: 13 rc1+, 14 devel, in commitfest

External

Blogs

Bruce Momjian: The Berkeley 39

News

Pgpool-II 4.1.4, 4.0.11, 3.7.16, 3.6.23 and 3.5.27 are now officially released.

Tweets

RT by @PostgreSQL: The @PostgreSQL yum repository repository now includes ...

Media

EDB Postgres Advanced Server Achieves Good Software Certification - Business Wire

Events

PGConf.EU 2020 - CANCELLED!

IRC (also Slack)

RhodiumToad: no

schinckel: Yeah, that's what I thought. Thank you.

xocolatl: schinckel: it doesn't actually matter if postgres does that or not. if you don't have an ORDER BY at the query level where you want an ordering, you ain't got it

ilmari: schinckel: the easiest way to guarantee that is an ordering column with a different constant in each unioned select, i.e. select 1 as ordering, ... union all select 2, ... order by ordering, ...:

kvda: How would you approach migrating a large jsonb field? I'm having an issue with a slow migration by just removing 2 keys from jsonb.

perce: so you're doing an UPDATE thats removing two keys from a JSONB field in every row of a table? yeah, thats going to be expensive.

kvda: perce: yep that was the initial version, what other approaches are there?

kvda: JSONB turned out to be a lot larger than what I thought too

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8. Conclusion



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