

# The Democratization of Databases

BRUCE MOMJIAN



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., 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

- 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

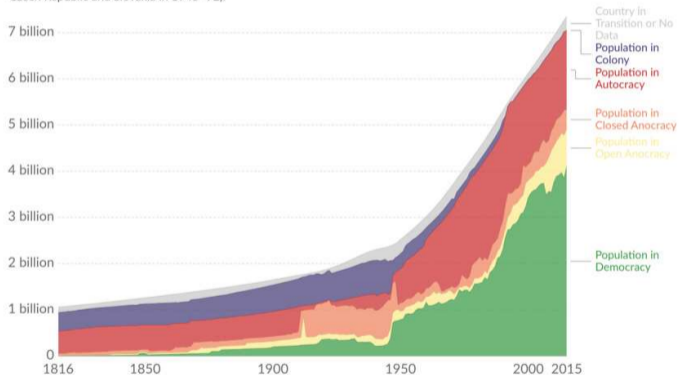
- Democracy continues to make steady progress
- There are still setbacks

# 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).



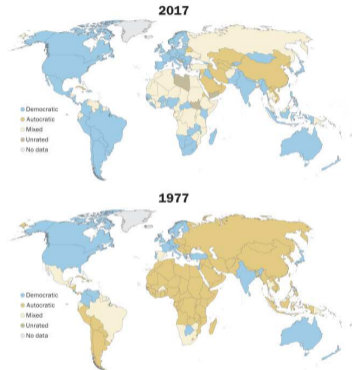
Source: World Population by Political Regime they live in (OWID (2016))  
[OurWorldInData.org/a-history-of-global-living-conditions-in-5-charts/](https://ourworldindata.org/a-history-of-global-living-conditions-in-5-charts/) • CC BY

<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?”

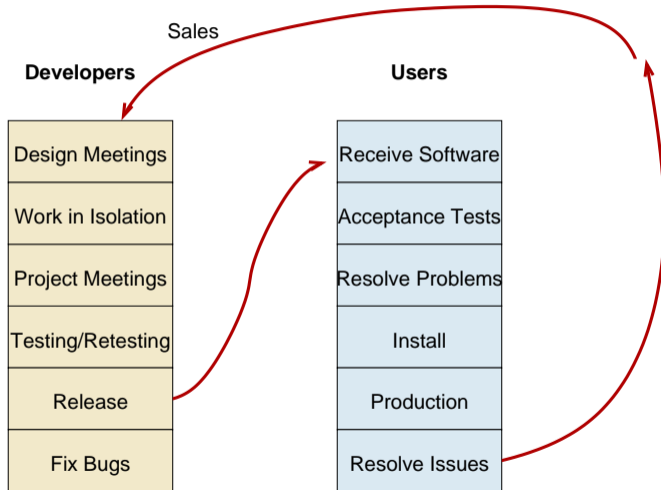
# Open Source Democracy

- 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

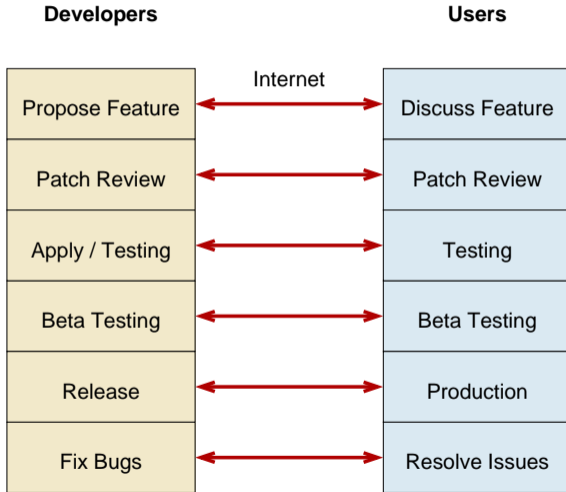
# Internet Makes Direct Democracy Possible

- 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?



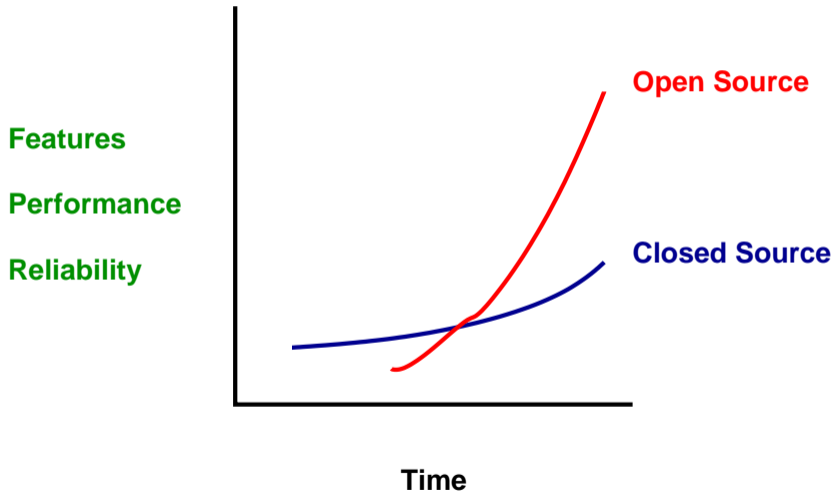
[https://www.flickr.com/photos/tomas\\_vondra/](https://www.flickr.com/photos/tomas_vondra/)



# 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

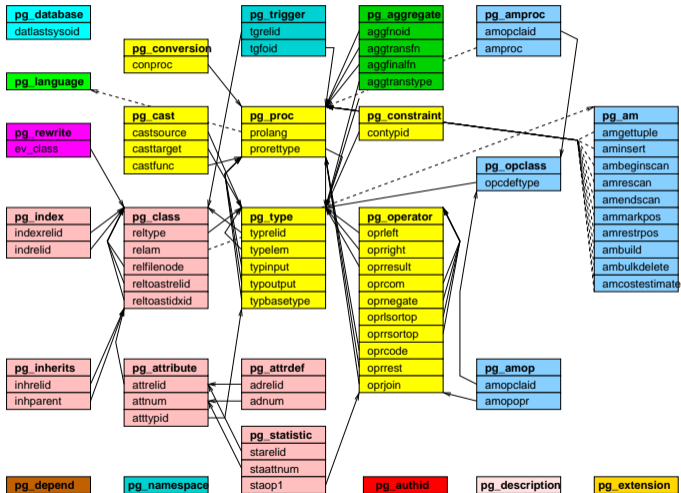


## 7. Democracy in Action

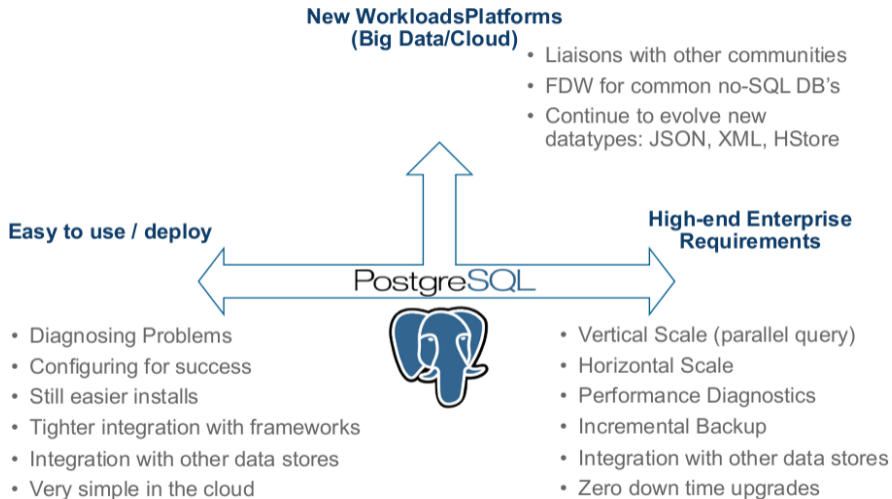


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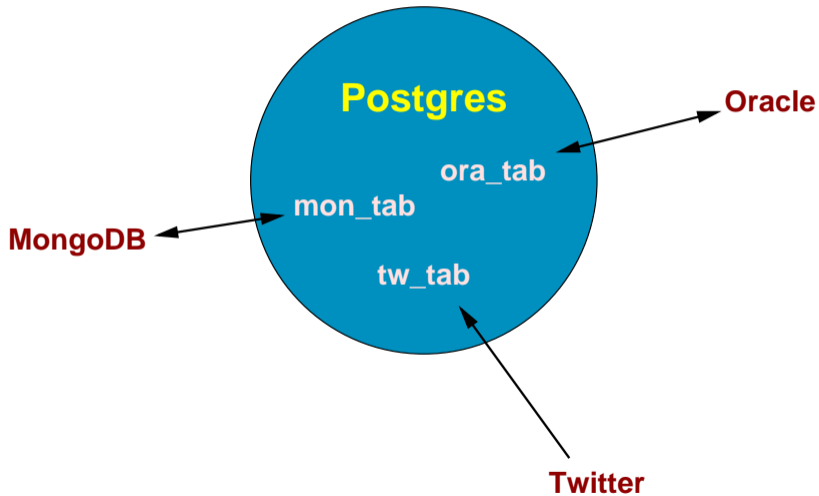
# Postgres Extensibility



# Many Focuses



# Foreign Data Wrappers



# Foreign Data Wrappers

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



users tags recent

in Distributions PGXN Search

acl **administration** **aggregate** aggregate function  
 analytics arithmetic array arrays **audit** auditing **count**  
 custom background worker data type **datatype** dictionary  
**distinct** **estimate** example **extension** external data  
**fdw**  
**foreign data wrapper**  
**function** **functions** hash hint index  
**json** **jsonb** log logging maintenance math  
 md5 **meta** mongodb **monitoring** parallel  
 partitioning **performance** plan **plpgsql**  
 postgresql python range **replication** search **sql**  
 sql med statistics **table** **template** testing **trigger**  
 type vectors

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

#### Recent Releases

##### **vectorize 0.13.0**

The simplest way to do vector search on Postgres

##### **PostgreSQL\_Anonymizer 1.3.2**

Data Anonymization for Postgres

##### **plpgsql\_check 2.7.5**

Additional tools for plpgsql functions validation

##### **db2\_fdw 6.0.1**

PostgreSQL Data Wrapper to DB2 databases

##### **pg\_uuidv7 1.5.0**

Create UUIDv7 values in Postgres

[More Releases →](#)



# PostGIS

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

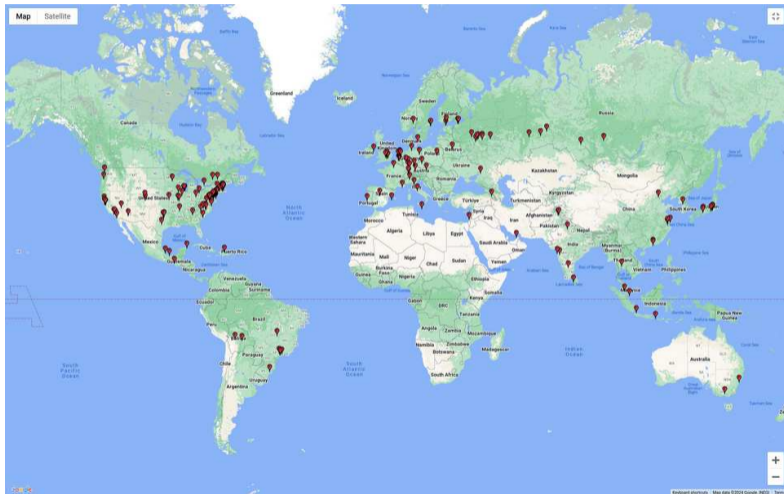


# PostgreSQL Tenth Anniversary in 2006



[https://www.postgresql.org/files/community/conference06/conference\\_group.html](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: Getting wrong datetime in database using insert into table query.

**Other** Re: Deadlock

**Announce** pgmoneta 0.10

### Developers

**Hackers** Re: Cutting support for OpenSSL 1.0.1 and 1.0.2 in 17~?

**Commit** Avoid function call overhead of `pg_popcount()` in `syslogger.c`.

**Versions** **Stable:** 16.2+, 15.6+, 14.11+, 13.14+, 12.18+ | **Development:** 17 devel, in commitfest

### External

**Blogs** Álvaro Hernández: Why Postgres Extensions should be packaged and distributed as OCI images

**News** Ora2Pg 24.3 have been released

**Media** Index Creation in PostgreSQL Large Tables: Essential Checklist for Developers - Medium

**Events** PGDay at FOSSASIA Summit

### IRC (also Slack)

**buu:** but with treeparser it should be possible to pull out the sql bits

**buu:** \*treesitter

**pnorman:** I try to keep my coding making sense if you looked at any jinja2 part in isolation or took them out. so if I open up a ( in a conditional I also close it as well

**buu:** yeah those old school types are obnoxious

**buu:** I'm so happy I never have to read `< * if 1 { * > ... < * } * >`

**pnorman:** so WHERE (foo {% if bar %}AND baz){% else %}){% endif %} would always generate valid SQL, I avoid it

**buu:** augh

**pnorman:** actually, the worst things are commas. if you have a condition like `foo IN (1,2,3,4)` where depending on some other variable you keep on adding on to the list of 1,2,3,4 and 1 is always present you need to really tie the comma with the item \*after\* it, not before

London 19:59 Berlin 20:59 Moscow 21:59 Mumbai 00:29 Beijing 02:59 Tokyo 03:59 Los Angeles 11:59 New York 14:59 São Paulo 15:59

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# Conclusion



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