

# 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.

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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
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

- 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

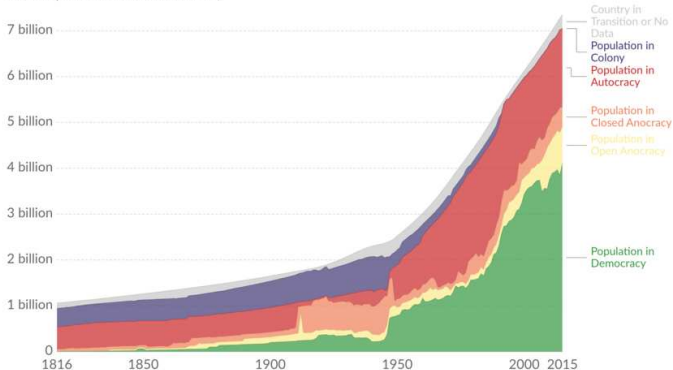
# Democracy Today

- 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).



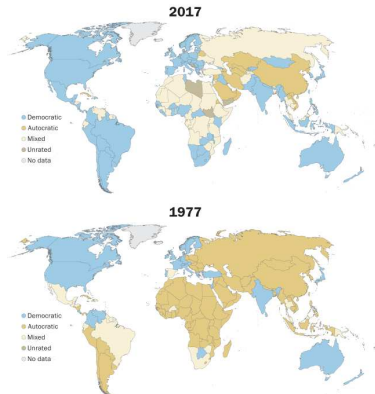
Source: World Population by Political Regime they live in (OWID (2016))  
OurWorldInData.org/a-history-of-global-living-conditions-in-5-charts/ • CC BY

<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?

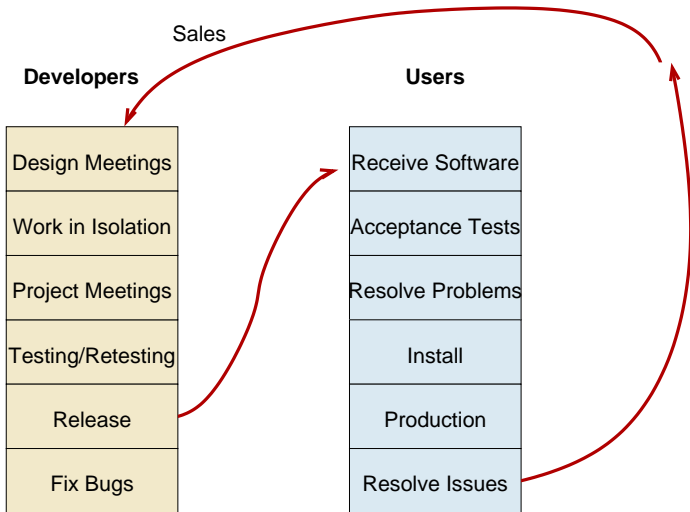
# Open Source Democracy

- 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

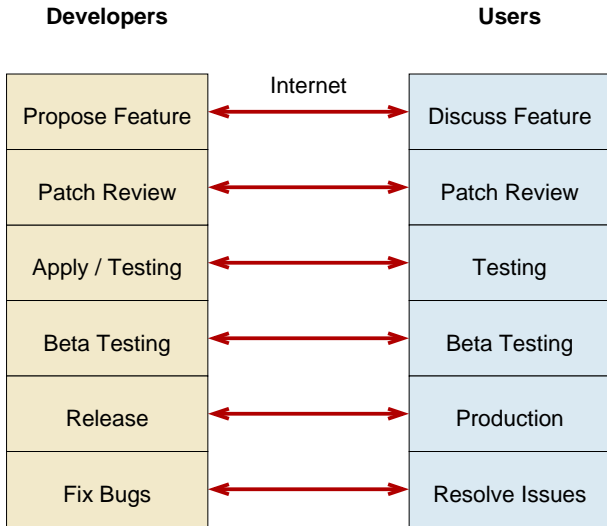
# Internet Makes Direct Democracy Possible

- 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

<https://www.techrepublic.com/article/mongodb-ceo-tells-hard-truths-about-commercial-open-source/>

## 6. Where Does This Leave Postgres?



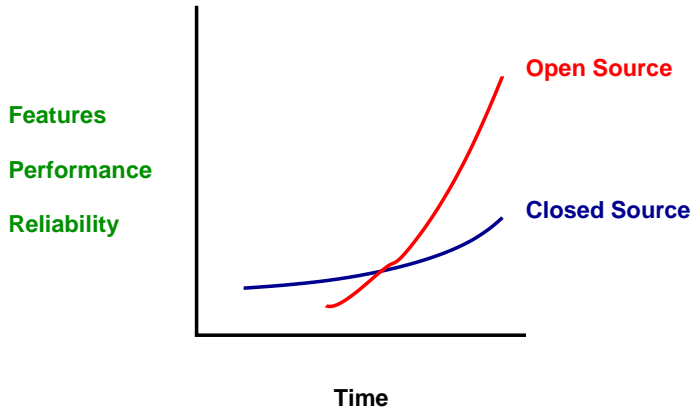
[https://www.flickr.com/photos/tomas\\_vondra/](https://www.flickr.com/photos/tomas_vondra/)



# 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

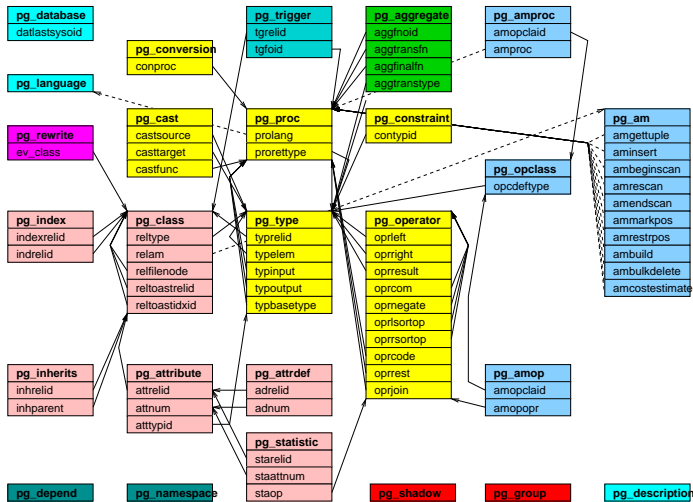


## 7. Democracy in Action

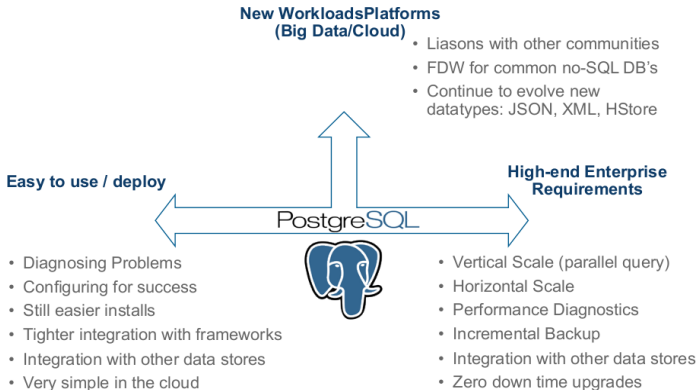


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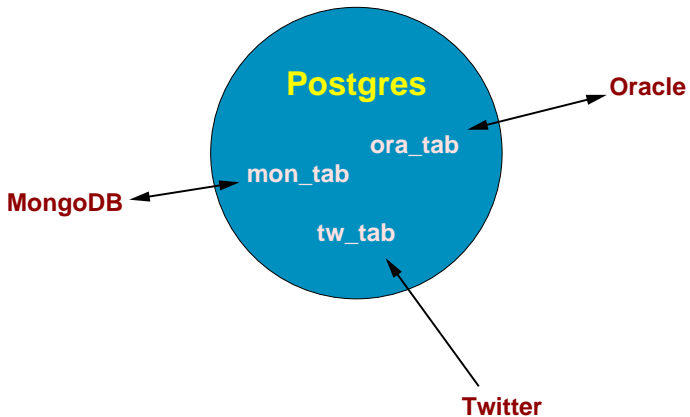
# Postgres Extensibility



# Many Focuses



# Foreign Data Wrappers



# Foreign Data Wrappers

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

<https://momjian.us/main/writings/pgsql/central.pdf>



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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

**lmcx 0.1.7**  
In-Memory Columnar Store

**lsm3 0.1.3**  
LSM tree implemented using standard Postgres B-Tree indexes

**oracle 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



<https://postgis.net/>

# 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: Obvious data mismatch in View2 which basically SELECT \* from View1  
**Other** Re: Policy on cross-posting to multiple lists  
**Announce** PostgreSQL 13 RC 1 Released!

### Developers

**Hackers** Re: Planner, check if can use consider HASH for groupings (src/backend/optimizer/plan/planner.c)  
**Commit** Re: Add support for building GiST index by sorting.  
**Versions** **Stable:** 12.4+, 11.9+, 10.14+, 9.6.19+, 9.5.23+ | **Development:** 13 rc1+, 14 devel, in commitfest

### External

**Blogs** Marco Slot: Talking about Citus & Postgres at any scale  
**News** PostgreSQL 13 RC 1 Released!  
**Tweets** RT by @PostgreSQL: The @PostgreSQL yum repository repository now includes ...  
**Media** Crunchy Data Announces Fully Managed Cloud Postgres Database Service - PRNewswire  
**Events** PGDay Austria 2020 - CANCELLED

### IRC (also Slack)

**Myon:** arrays are only good if you never want to search for a tag (which is unlikely to be the case)

**Myon:** make a table (noteid, tag)

**xocolatl:** ??tags

**pg\_dochot:** <http://www.databasesoup.com/2015/01/tag-all-things.html>

**dysfigured:** fwiw it's a personal note-taking system, and I doubt I'll ever make it a multi-user system, so it's unlikely there will be more than a few thousand entries

**xocolatl:** in that case, don't worry about anything

**dysfigured:** just trying to come up with the table structure for now, and debating whether it makes more sense if links between notes would be directed or undirected

**RhodiumToad:** Myon: arrays are very good for searching on tags

London 21:15 Berlin 22:15 Moscow 23:15 Mumbai 01:45 Beijing 04:15 Tokyo 05:15 Los Angeles 13:15 New York 16:15 São Paulo 17:15

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## 8. Conclusion



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