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.
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://www.flickr.com/photos/dennisdeery/

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

2017

1977

Note: Map reports data for the 387 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 not had a completely legible, which are or were subject to foreign intervention or occupations, or which are or were in the midst of a regime transition. “No data” refers to states or entities that either have fewer than 100,000 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

Developers
- Design Meetings
- Work in Isolation
- Project Meetings
- Testing/Retesting
- Release
- Fix Bugs

Users
- Receive Software
- Acceptance Tests
- Resolve Problems
- Install
- Production
- Resolve Issues

Sales
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

Features
Performance
Reliability

Time

Open Source
Closed Source
7. Democracy in Action

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

New WorkloadsPlatforms (Big Data/Cloud)
- Liaisons with other communities
- FDW for common no-SQL DB’s
- Continue to evolve new datatypes: JSON, XML, HStore

PostgreSQL

Easy to use / deploy
- Diagnosing Problems
- Configuring for success
- Still easier installs
- Tighter integration with frameworks
- Integration with other data stores
- Very simple in the cloud

High-end Enterprise Requirements
- Vertical Scale (parallel query)
- Horizontal Scale
- Performance Diagnostics
- Incremental Backup
- Integration with other data stores
- Zero down time upgrades

Keith Alsheimer, EDB, 2013
Foreign Data Wrappers

Postgres
  ora_tab
  mon_tab
  tw_tab

Oracle

MongoDB

Twitter
Foreign Data Wrappers

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

PGXN

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

Recent Releases

**psl 1.0.0**
Canonicalize domain names using the public suffix list

**h3 4.0.0**
PostgreSQL bindings for H3

**oracle 3.24.4**
Oracle's compatibility functions and packages

**citus 11.0.6**
Scalable PostgreSQL for real-time workloads

**psodium 3.0.4**
Postgres extension for libodium functions

**pgsql tweaks 0.10.0**
Contains PostgreSQL functions which I regularly needed.
PostGIS is a full-featured Geographical Information System (GIS)
Implemented as a extension
Independent development team and community

https://postgis.net/
My Postgres Activities
• 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
<table>
<thead>
<tr>
<th>Users</th>
<th>General: Re: View definition changes after reloading pg dump export</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Other: Re: CREATE STATISTICS and partitinos/inheritance</td>
</tr>
<tr>
<td></td>
<td>Announce: Psycopg 3.1 released</td>
</tr>
<tr>
<td>Developers</td>
<td>Re: [PATCH] Query Jumbling for CALL and SET utility statements</td>
</tr>
<tr>
<td>Hackers</td>
<td>Fix some possibly latent bugs in slab.c</td>
</tr>
<tr>
<td>Commit</td>
<td>Stable: 14.5+, 13.8+, 12.12+, 11.17+, 10.22+</td>
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<tr>
<td>Versions</td>
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<tr>
<td>External</td>
<td>Blogs: Hubert 'depesz' Lubaczewski: New SQL pretty printer – based on parsing, and not regexps</td>
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<td>News: Psycopg 3.1 released</td>
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<td>Media: PostgreSQL Optimizes Performance &amp; Lower Memory Management Overhead - Phoronix</td>
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<td>Events: PGDay Austria 2022</td>
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<tr>
<td>IRC (also Slack)</td>
<td>vesix: I don't know why, but even on huge queries, the index isn't used. I'll fetch some fish burgers and release plans</td>
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<td>vesix: I guess the problem is, I'm using the &amp; &amp; operator (overlap).</td>
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<td>vesix: it didn't give the correct result with @&gt; or @@</td>
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<td>vesix: Can't &amp; &amp; use a gin(text[]) index? <a href="https://dbfiddle.uk/?dbms=postgres_14&amp;fiddle=a0aad79291c3f8e0773b579006b5114">https://dbfiddle.uk/?dbms=postgres_14&amp;fiddle=a0aad79291c3f8e0773b579006b5114</a></td>
</tr>
<tr>
<td></td>
<td>ilmari: vesix: it should, according to <a href="https://www.postgresql.org/docs/current/indexes-types.html#INDEXES-TYPES-GIN">https://www.postgresql.org/docs/current/indexes-types.html#INDEXES-TYPES-GIN</a></td>
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<td>ilmari: define &quot;huge queries&quot;. how many rows total, and how many of them are you selecting?</td>
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<td>ysch: vesix: Just curious: why so complicated queries, what's the point of the then thing (looked only at the provided link)?</td>
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<tr>
<td></td>
<td>ilmari: vesix: this uses a bitmap index scan: <a href="https://dbfiddle.uk/?dbms=postgres_14&amp;fiddle=70c4eb3082af976a96de2ba4690046ad">https://dbfiddle.uk/?dbms=postgres_14&amp;fiddle=70c4eb3082af976a96de2ba4690046ad</a></td>
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http://pglife.momjian.us
8. Conclusion

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https://momjian.us/presentations

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