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.
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

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
Democratic Development Flow

Developers

- Propose Feature
- Patch Review
- Apply / Testing
- Beta Testing
- Release
- Fix Bugs

Users

- Discuss Feature
- Patch Review
- Testing
- Beta Testing
- Production
- Resolve Issues

Internet
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/
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/
Postgres Extendability

Diagram showing relationships between various PostgreSQL extension classes and types, including:
- `pg_database`
- `pg_language`
- `pg_rewrite`
- `pg_conversion`
- `pg_cast`
- `pg_type`
- `pg_operational`
- `pg_operator`
- `pg_aggregate`
- `pg_constraint`
- `pg_aggregate`
- `pg_am`
- `pg_amop`
- `pg_attribute`
- `pg_attrdef`
- `pg_statistic`
- `pg_shadow`
- `pg_group`
- `pg_description`

Key fields and attributes include:
- `datlastsysoid`
- `tgrrelid`
- `tgftoid`
- `agtfnoid`
- `aggtransfn`
- `aggfinalfn`
- `prolang`
- `prorettype`
- `pg_rewrite`
- `ev_class`
- `datlastsysoid`
- `pg_aggregate`
- `pg_operational`
- `pg_operator`
- `pg_consistent`
- `pg_constraint`
- `pg_aggregate`
- `pg_am`
- `pg_amop`
- `pg_attribute`
- `pg_attrdef`
- `pg_statistic`
- `pg_shadow`
- `pg_group`
- `pg_description`
Many Focuses

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

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, EnterpriseDB
Foreign Data Wrappers

- Postgres
  - ora_tab
  - mon_tab
  - tw_tab

- MongoDB

- Oracle

- Twitter
Foreign Data Wrappers

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

• 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
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
• Individuals and political parties have roadmaps
• Democratic governments don’t
• Developers and companies have roadmaps
• Postgres doesn’t
PgLife

Users
- General
  - Re: Code of Conduct: Russian Translation for Review
- Other
  - BUG #16911: "permission denied" error deleting rows as superuser from a table owned by a non-superuser
- Announce
  - Parquet S3 FDW 0.1 was newly released

Developers
- Hackers
  - Re: proposal - psql - use pager for \watch command
- Commit
  - pg_upgrade: Check version of target cluster binaries
- Versions
  - Stable: 13.2+, 12.6+, 11.11+, 10.16+, 9.6.21+ | Development: 14 devel, in commitfest

External
- Blogs
  - Dmitry Dolgov: How many engineers does it take to make subscribing work?
- News
  - Parquet S3 FDW 0.1 was newly released
- Media
  - New Monitoring Features in PostgreSQL 13 - DevOps.com
- Events
  - PGCon 2021

IRC (also Slack)
dale: (PL/Python too.)
Berger: dale: yeah, that’s kind of what I ended up with (-:
reptar_2: does anyone know what sql query would be equivalent to this one? https://i.postimg.cc/N0VhB1Xg/image.png
ilmari: ilmari has no idea what that notation means, but wild-ass guess would be `select r.c from r join s on r.a = s.a;`
xocolatl: ilmari: yes
xocolatl: https://en.wikipedia.org/wiki/Relational_algebra
reptar_2: yes, it’s relational algebra
reptar_2: do any of you know of a resource where equivalent simple queries are listed?

http://pglife.momjian.us
8. Conclusion

https://momjian.us/presentations

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