

Flavors of Postgres

An examination of the sociotechnical and community impacts of Postgres-like systems

Celeste Horgan, Sr. OSS Advocate @ Snowflake October 2025, PGCon EU

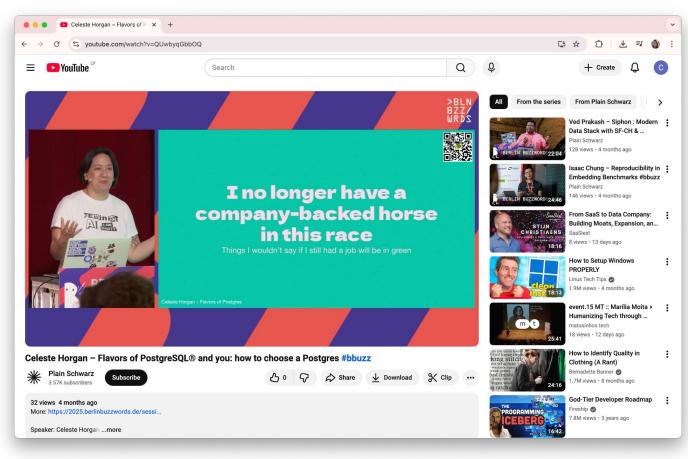
This is v3 of this talk.

And it matters

v1: for the customer, by the company



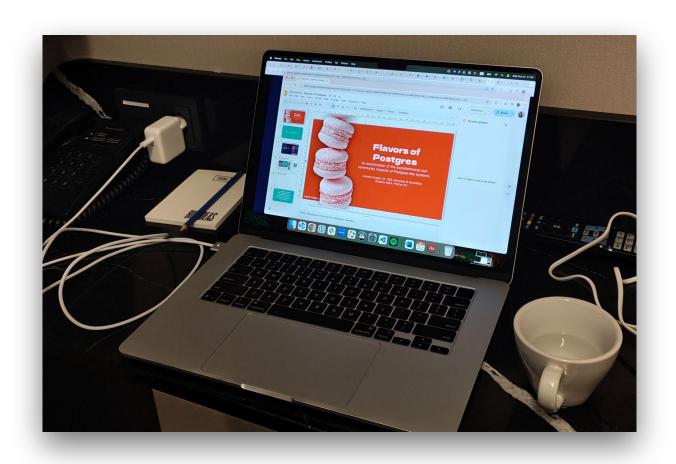
v2: The loose cannon





Watch it here

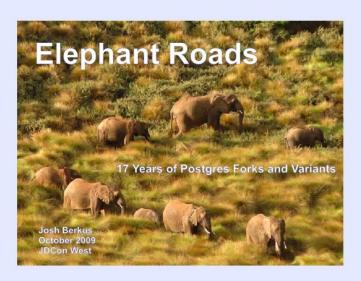
v3: About last night...



But is it really a v3?

A shoutout to 2009

https://www.slideshare.net/slideshow/elephant-roads-a-tour-of-postgres-forks/5376286#19



Flavors of Postgres v3: a socio-technical take on Postgres compatibility, corporate open source, and what that means for the Postgres project community

Wish me luck, lol



v3 of this talk – 🔽

A survey of closed-source database services that claim Postgres compatibility: but are they Postgres-y? (the technical bit)

The elephant-shaped clouds in the room (the socio bit)

Community compatibility conversations (the community bit)

Your host

Sr. OSS Advocate & OSPO @ Snowflake

Open source true believer

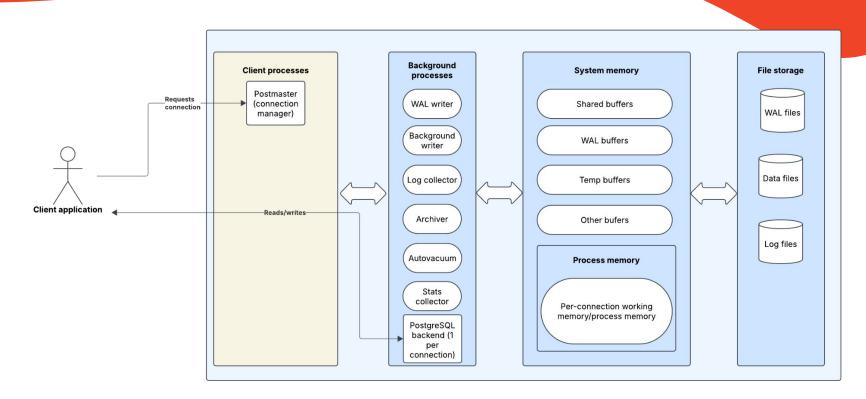
Previous experience includes Aiven, Stripe, The Linux Foundation, commercetools & more



What makes Postgres Postgres-y?

- ACID adherent and transactional: Database transactions are Atomic, Consistent, Isolated and Durable
- Typed: Data in the database must have a type. You can define your own data type if needed.
- SQL standardization: Postgres adheres closely to the SQL standard
- Relational: Data in the database must have and describe its relationship to other data in the database.
- Lightweight: Due to extension framework, the core code is relatively lightweight
- Extensible and forkable: The database has built-in support for user-created packages (extensions), and the entire project can be forked for any purpose.

How Postgres works, generally



What do we mean by 'flavors'?

- Forked from PostgreSQL (Redistributions)
 - Either under open source or closed/BSL licensing
- Extensions
 - o i.e. PostGIS, Timescale and pgvector
- Patches or add-ons
 - Additional code or patched functionality that is compatible with PostgreSQL project code
- Architecture compatibility projects
 - I.e Patroni or CloudNativePG

Flavors of the week



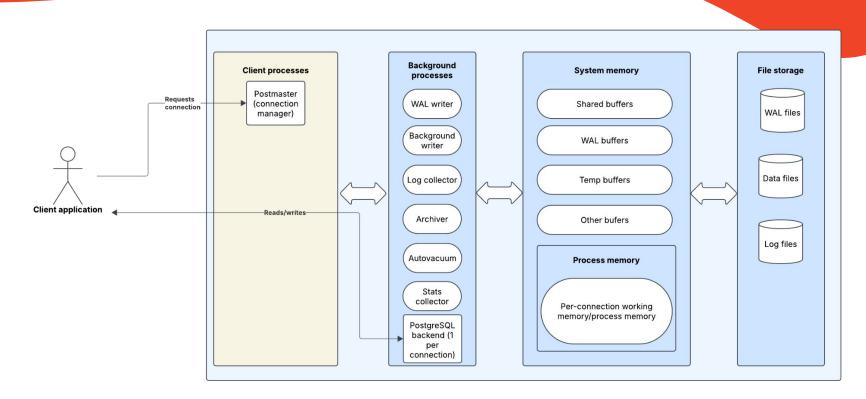


AlloyDB Omni

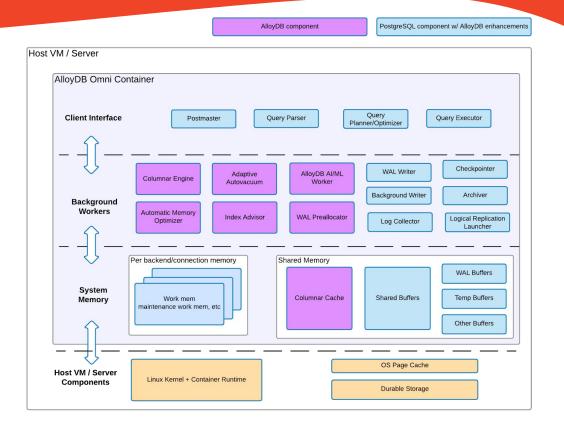
AlloyDB Omni in a nutshell

- What it is: "AlloyDB is a fully-managed, PostgreSQL-compatible database for demanding transactional workloads. It provides enterprise-grade performance and availability while maintaining 100% compatibility with open-source PostgreSQL."
- PostgreSQL compatibility: A PostgreSQL fork with additional functionality in the shared processes and buffering layers, and a rewrite of some existing PostgreSQL processes
- Licence: Proprietary
- AlloyDB Omni availability:
 - **Direct from cloud providers:** AlloyDB on Google Cloud only
 - **Multicloud via service providers:** Like my former employer, Aiven!
 - Via Docker: as a container image.

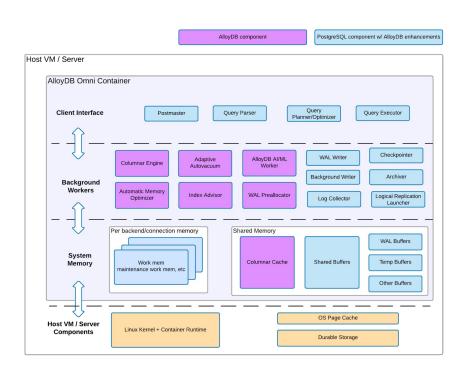
Revisiting this...

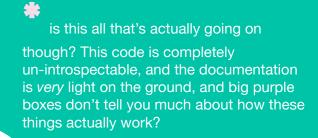


AlloyDB Omni architecture



AlloyDB Omni architecture*





Vector support

- Main support is through vector, a proprietary version of pgvector
- Query remote models and use to Vertex AI and the Vertex AI model garden
 - Al/ML models are remotely hosted by Google and you can query them using an API -> Provides access to many specialized models without the overhead of maintaining the infra yourself
- One of AlloyDB Omni's greatest strengths is its ability to work with generative Al/ML workloads, and to leverage Google's expertise in this space
 - You can (of course) use other AL/ML models provided by HuggingFace etc. however, as under the hood it's mostly PostgreSQL
- Do all of this from SQL no need to do these operations in a runtime lang

Columnar engine

 Enables a second key use case for AlloyDB Omni: analytical queries and complex SQL actions

Operation Query patterns Table scan Selective filters, such as WHERE clauses. A small number of columns from a larger table or materialized view. Expressions such as LIKE, SUBSTR, or TRIM. Aggregation functions Only expressions such as SUM, MIN, MAX, AVG, and COUNT. At the beginning of the query of a columnar scan. Ungrouped or grouped by columns. ORDER-BY Only if the operator is at the beginning of the query of a columnar scan. SORT Only if the operator is at the beginning of the query of a columnar scan and sorts only on the bathe table or the materialized view. LIMIT Only if the operator is at the beginning of the query of a columnar scan and is before any SORT operators. INNER HASH Only if the keys used are columns and no join qualifiers are used.	
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JOIN	
Selective joins Only if the joins are at the beginning of the query of a columnar scan.	

 But AlloyDB isn't a dedicated columnar database - it is fundamentally transactional, being based on PostgreSQL!

AlloyDB Omni: is it Postgres-y?

- ACID adherent and transactional
- Typed: 🔽
- SQL standardization:
- Relational:
- Lightweight: ?
- Extensible:
- Forkable: (

Conclusion: More Postgres-shaped than most

Why you'd want to use AlloyDB Omni

- You're already on Google Cloud: most of the benefits you'll see, particularly the Al related ones, need a Google Cloud account
- You're noncommittal about AI/ML: and don't want to invest in a dedicated vector store
- You're columnar curious: The columnar engine is a great way to explore whether this data storage is right for you!
- You value the continued portability of your data: AlloyDB Omni is more Postgres-shaped than many others

.. & why not

- The documentation sucks: and reads more like marketing copy than documentation
- The Docker container is a black box: And the docs only give us a very high level architecture diagram
- No edge compute story: If you need high performance reads globally, probably not the service for you

AWS Aurora & Databricks Neon

AWS Aurora in a nutshell

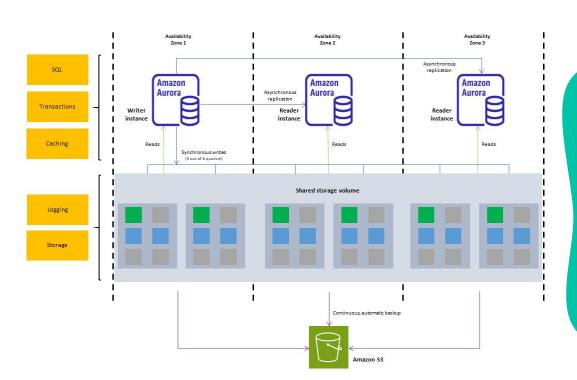
- What it is: Aurora is Amazon's distributed relational database service. Offers
 Aurora for PostgreSQL as one of many SQL offerings.
- PostgreSQL compatibility: Amazon promises end result compatibility with PostgreSQL: the same query should return the same result in both Amazon Aurora and an equivalent PostgreSQL database. Amazon has no language around Postgres version compatibility.
- Licence: Proprietary
- Availability: only AWS at this time

Differentiating Amazon RDS PostgreSQL, Amazon Aurora PostgreSQL and Amazon Aurora PostgreSQL DSQL, very briefly because it's very complicated and confusing

And an article that does a far better job of explaining it than I can in ~2 slides: https://dev.to/aws-heroes/amazon-aurora-dsql-which-postgresql-service-should-i-use-on-aws--1598

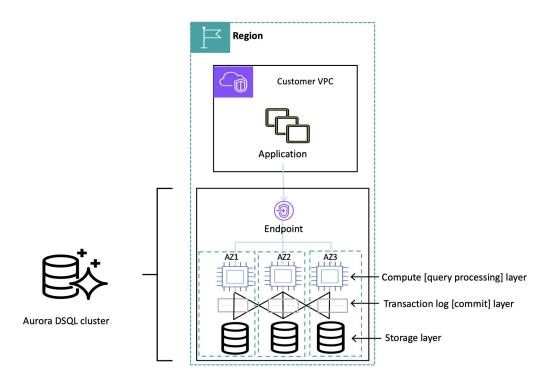
Amazon RDS PostgreSQL	Amazon Aurora PostgreSQL	Amazon Aurora PostgreSQL DSQL
"A Postgres in the Cloud"	"An Aurora (serverless) database in the Cloud that can act as a drop-in replacement to Postgres"	"An Aurora (serverless) distributed in the Cloud with 'Postgres compatibility'"

AWS Aurora* architecturally



as usual there's a caveat to this,
which is that this is a general architecture
for an AWS Aurora *cluster* rather than a
specific implementation for Postgres,
which, as previously mentioned... there are
at least three. However, we can glean from
this *cluster* that things look Very Different
under the hood from a Postgres
perspective, because how else would you
accomplish this?

AWS Aurora DSQL architecturally

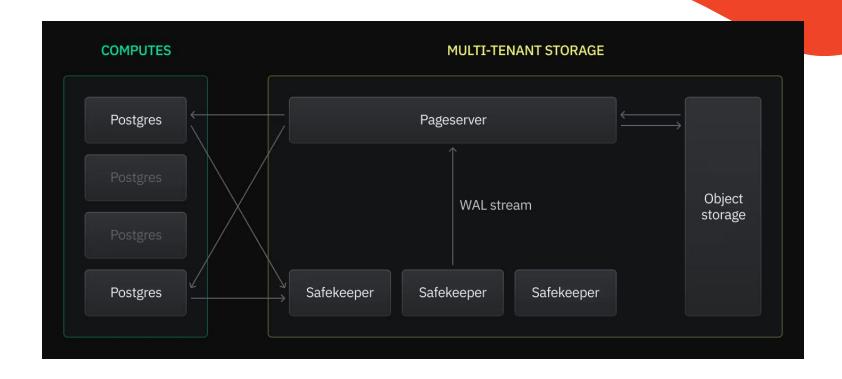


Neon in a nutshell

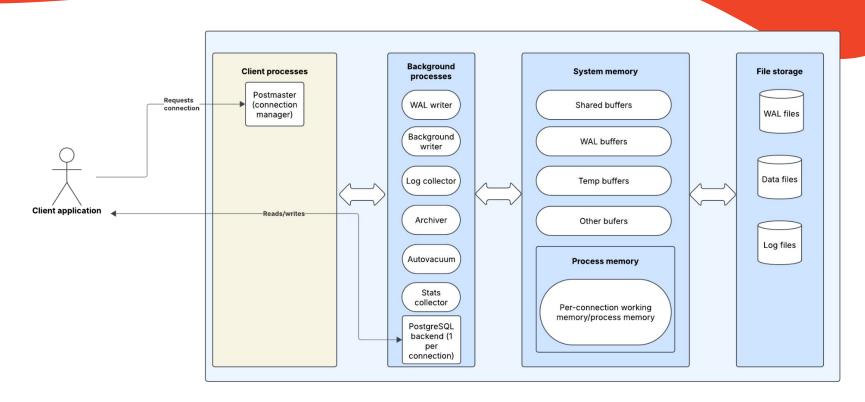
- What it is: Serverless, distributed PostgreSQL
 - Users interact with a Neon PostgreSQL server using psql and familiar tooling, but the back end is radically different
 - Architecturally, Neon is heavily based on the <u>Amazon Aurora</u> whitepaper
- PostgreSQL compatibility: Neon supports the five latest PostgreSQL versions, per the PostgreSQL projet maintenance policy
- Licence: Apache 2.0
- Availability: Only direct through Neon at this time



Neon architecturally (look similar?)



Revisiting this again..



... But are they Postgres-y?

- ACID adherent and transactional
- Typed: 🔽
- SQL standardization: ~ with caveats
- Relational:
- Lightweight:
- Extensible: ~ limited
- Forkable: 🚫

Conclusion: not really Postgres-y

The big idea: decoupling storage from compute

- The key issue most traditional databases have in cloud computing environments is the tight coupling of storage and compute (or processes)
- Cloud environments are based on the idea that at some point, some part
 of a system will fail. Therefore, in separating the system into as many
 individual nodes as possible, the failure can be isolated, and the system can
 create replicants of those nodes for failover purposes
- Per the whitepaper: "Instance lifetime does not correlate well with storage lifetime. Instances fail. Customers shut them down. They resize them up and down based on load. For these reasons, it helps to decouple the storage tier from the compute tier."
- Both Amazon Aurora and Neon might be PostgreSQL-compatible on some level, but to satisfy the above requirements they are not PostgreSQL from an architectural perspective.

The elephant in the room

A joke I'm sure has never been made in this community before





Created by Google



Acquired by Snowflake



Created by Amazon



Acquired by Microsoft



Acquired by Databricks

Someone's first experience with Postgres might not *be* Postgres

Postgres is forkable by design

Core Team

For more information on the purpose of the core team, plea

Contributor

Peter Eisentraut (peter.eisentraut at enterprisedb.com)

EDB

Dresden, Germany

Andres Freund (andres at anarazel.de)

Microsoft

San Francisco, USA

Magnus Hagander (magnus at hagander.net)

Redpill Linpro

Stockholm, Sweden

Jonathan Katz (jonathan.katz at excoventures.com)

Amazon Web Services

New York, NY

Tom Lane (tgl at sss.pgh.pa.us)

Snowflake Inc

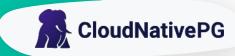
Pittsburgh, Pennsylvania, USA

Bruce Momjian (bruce at momjian.us)

Newtown Square, Pennsylvania, USA

Dave Page (dpage at pgadmin.org) pgEdge

Oxfordshire, United Kingdom



Ecosystem expansion

microsoft / documentdb Public

DocumentDB is the open-source engine powering vCore-based Azure Cosmos DB for MongoDB. It offers a native implementation of document-oriented NoSQL database, enabling seamless CRUD operations on BSON data types within a PostgreSQL framework.

Forking keeps the sommunity strong

Service & support





Amazon Aurora: Design Considera Throughput Cloud-Native Relation

Alexandre Verbitski, Anurag Gupta, Debanjan Saha, Murali B Raman Mittal, Sailesh Krishnamurthy, Sandor Maurice, Tengi

Innovation

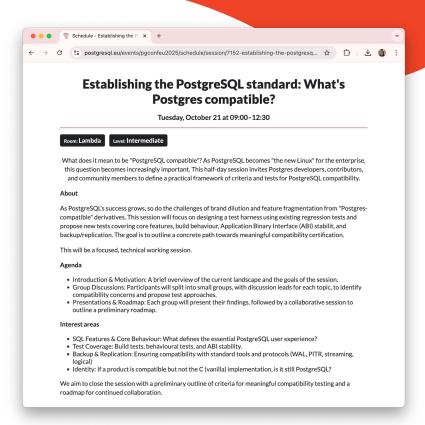
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... but companies are trading on "compatibility" at the project's expense



Community initiatives on compatibility





Community initiatives on compatibility



Read the notes



Join the telegram chat

Thank you!

https://bsky.app/profile/celestehorgan.bsky.social https://www.linkedin.com/in/celeste-horgan/



Feedback?



Watch v2?



Why you'd want to use AWS Aurora or Neon

- You're serving data globally and need the performance boost of edge
 compute: Really evaluate your global needs before committing, though.
- You're comfortable with the relative data lock-in: due to the architecture choices driven by the edge compute model
- You need high reliability but cannot sacrifice read speed
- You have a dedicated DevOps/SRE team who can self-serve
 Using AWS' excellent documentation

.. & why not

- You want more hand-held support: AWS is a big company, and you are a small fish in that sea. Neon might be a better bet for you in this regard
- You have other means of storing data for portability purposes: and the Aurora/Neon layer is just a serving layer

To err is human, to fork is Postgres

The big idea: decoupling storage from compute

- The key issue most traditional databases have in cloud computing environments is the tight coupling of storage and compute (or processes)
- Cloud environments are based on the idea that at some point, some part
 of a system will fail. Therefore, in separating the system into as many
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Postgres 17

Sorry folks, I got asked to give this talk yesterday at ~noon and I didn't have time to update this section

PG18 looks cool tho



New in PG17: Incremental backups

What versions: PG 17

- What it is:
 - Introduces the WAL summarizer background process (turn on using the summerizer_wal config option) which lets you take incremental backups in addition to full backups.
 - First you take a pg_basebackup, then you can use
 pg_basebackup -i=<Previous Backup> to backup changes made
 since then as an incremental backup.
- Why you should care: This is a more efficient way to generate database backups if PITR isn't a hard requirement, and provides a bit more flexibility to the backup story in Postgres.

New in PG17: JSON tables

- What versions: PG 17
- What it is: Postgres implements the SQL/JSON data model, allowing for JSON transformations to Postgres tables and back again.
- Why you should care: JSON is the de-facto standard for sending and receiving data from most APIs and web applications: if data is being moved, at some point you can transform it safely into JSON. Native JSON support.
 - Native JSON support to the level that Postgres now provides means that you can directly ingest data from an API or other data source without having to write looping application code to do so. Once the data is in Postgres, you can then bulk apply transformations to (for example) reformat timestamps into Postgres' timestamp format.

The world beyond Postgres core



Patroni

- What it is: A (confusingly named) extension. Time series data storage and processing on PostgreSQL
 - Specifically implements **hypertables** which partition data by time.

 Querying a hypertable addresses only the partition which contains the timestamp, speeding up queries to time series data
 - Also provides improved compression and performance for operations on large amounts of data
- PostgreSQL compatibility: "Apache edition" is an open source extension usable with Aiven for PostgreSQL or any other PostgreSQL.
- License:
 - Apache edition: Apache 2.0
 - Community edition: business source licensed
- Availability: any PostgreSQL instance with permission to use the CREATE EXTENSION command

CloudNativePG

- What it is: A Kubernetes operator for a highly available Postgres cluster.
 - The killer feature of CloudNativePG is the ability to manage a Postgres cluster in a cloud native way for anyone
 - Some cloud providers and managed service providers have k8s operator functionality, but this gives you full control over the deployment.
 - Best suited for people with a dedicated SRE team heavily invested in k8s infrastructure and companies experienced with managing the full lifecycle of a Postgres database independently
- PostgreSQL compatibility: It's Postgres, baby!
- License: Apache 2.0
- Availability: Any Kubernetes cluster where you have full permissions

Timescale (Apache edition)

- What it is: A (confusingly named) extension. Time series data storage and processing on PostgreSQL
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Documentdb

- What it is: A Postgres extension that allows for document database models.
 - Often called a MongoDB clone, this is a bit incorrect: it provides document database models on top of Postgres, which is fundamentally different than MongoDB
 - Useful for those who might have a specific use case for document data stores, but who otherwise want or need a relational database
- PostgreSQL compatibility: An extension
- **License:** Apache 2.0
- Availability: any PostgreSQL instance with permission to use the CREATE EXTENSION command
- Special shoutout to the FerretDB team, who are implementing a more fully featured document data store based on documentdb.

Why 'vanilla' Postgres or an extension?

- Maximum forward compatibility: It's Postgres, no bells and whistles, and you know your data will be safe, portable and compatible with almost anything as a result
- The power of the extensions ecosystem: With far better compatibility guarantees than some of the closed source solutions
- Full control: Do what you want!
- Community support: service providers, architects & more,
 built up over years of community work

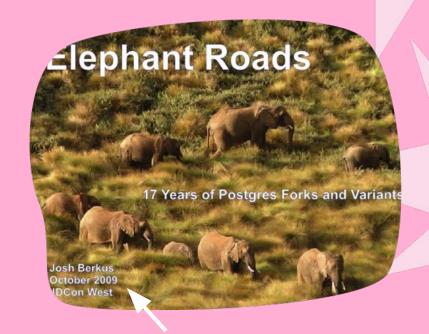


- You don't have headcount/interest in managing a database: And not everyone does!
- You're trying to hit committed cloud spend with a major provider: fair enough I guess
- You're heavily invested into Al, high performance analytics, or edge computing use cases



We've been here before

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Contributor

Peter Eisentraut (peter.eisentraut at enterprisedb.com)

EDB

Dresden, Germany

Andres Freund (andres at anarazel.de)

Microsoft

San Francisco, USA

Magnus Hagander (magnus at hagander.net)

Redpill Linpro

Stockholm, Sweden

Jonathan Katz (jonathan.katz at excoventures.com)

Amazon Web Services

New York, NY

Tom Lane (tgl at sss.pgh.pa.us)

Snowflake Inc

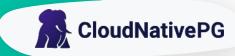
Pittsburgh, Pennsylvania, USA

Bruce Momjian (bruce at momjian.us)

Newtown Square, Pennsylvania, USA

Dave Page (dpage at pgadmin.org) pgEdge

Oxfordshire, United Kingdom



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Amazon Aurora: Design Considera Throughput Cloud-Native Relation

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My biggest personal opinion (the tea)

Thank you!

https://bsky.app/profile/celestehorgan.bsky.social







LinkedIn (let's chat about freelance or full time technical writing/DevRel!)





Contents

Introduction

History of Baking

Bread & Pastry

Baking Techniques & Ingredients

Baking Tools

Conclusion



Introduction

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History of Baking

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You may add historical details about your topic.



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You may add historical details about your topic.



You may add historical details about your topic.

Bread

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Pastry

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Types of Bread & Pastries

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Baking Technique Baking Technique Baking Technique Baking Technique

"THIS IS A QUOTE WORDS FULL OF



123.456 Big numbers catch your audience's attention

Baking Techniques

BAKING TECHNIQUE

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Baking Ingredients







Conclusion

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