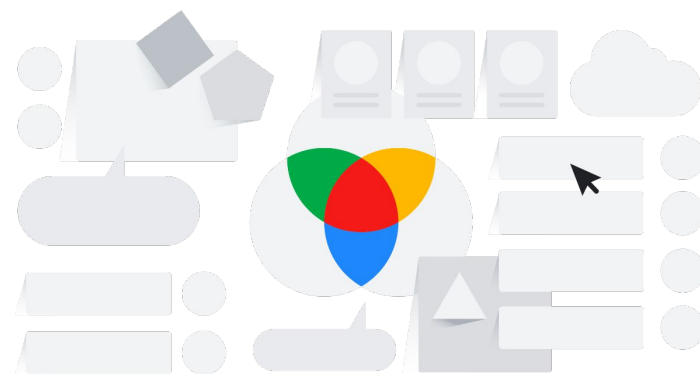Google Cloud

Database Performance Management for PostgreSQL and AlloyDB

Karan Thapar

Product Manager, Google

Agenda

Setting The Stage
Industry Trends
Evolution of the Personas

Managing Database Health and Performance
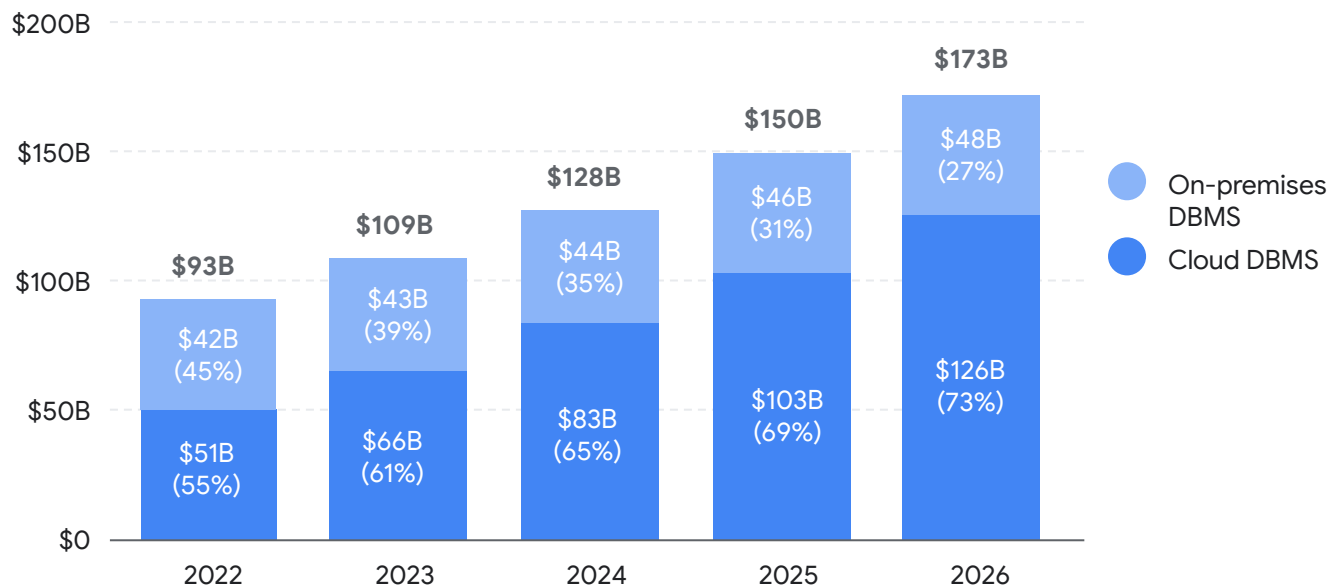Query Insights
System Insights
Workload Advisors
Ecosystem Integration

The Road Ahead
Performance Insights

Google Cloud

Setting The Stage

Overall DBMS market is projected to surpass $170B by 2026 – 73% in the Cloud

Highlights:

DBMS market projected to reach nearly $200B by 2026

DBMS market projected to grow 17% CAGR for the next 5 years

Cloud services account for more than 50% of market since 2022

On-premises DBMS

Cloud DBMS

$93B
$42B (45%)
$51B (55%)

$109B
$43B (39%)
$66B (61%)

$128B
$44B (35%)
$83B (65%)

$150B
$46B (31%)
$103B (69%)

$173B
$48B (27%)
$126B (73%)

$200B
$150B
$100B
$50B
$0

2022 2023 2024 2025 2026

Source: Gartner Software Marketshare

Google Cloud

Industry trends resulting in many new **challenges** and new **opportunities**

1
Changing **platform**

Google Cloud

Cloud Managed Databases

More Apps
More Instances

2
Changing **application** patterns

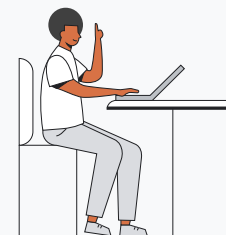| Service C	Service D	Service E
Document	Graph	Relational
Content	Customer relationship data	Legacy, low volume data
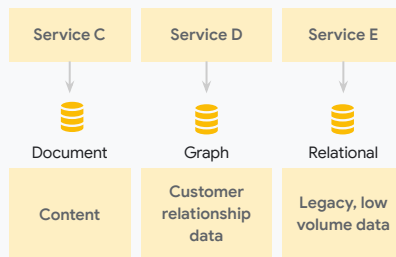
New workload types

More velocity
More engine types

3
Changing **personas**
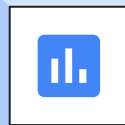

Generalists and Specialists

Nuanced requirements
Speed v/s Depth

Managing Database Health and Performance

Our Mission

Empower users to quickly understand, troubleshoot, and optimize their databases with a simple, easy to use experience.

**Three pillars
to our approach**

Simple

Intelligent

Integrated

Query Insights

Simple

Provides developer-friendly dashboards to troubleshoot query performance.

Tags queries with business logic for tracking and application management.
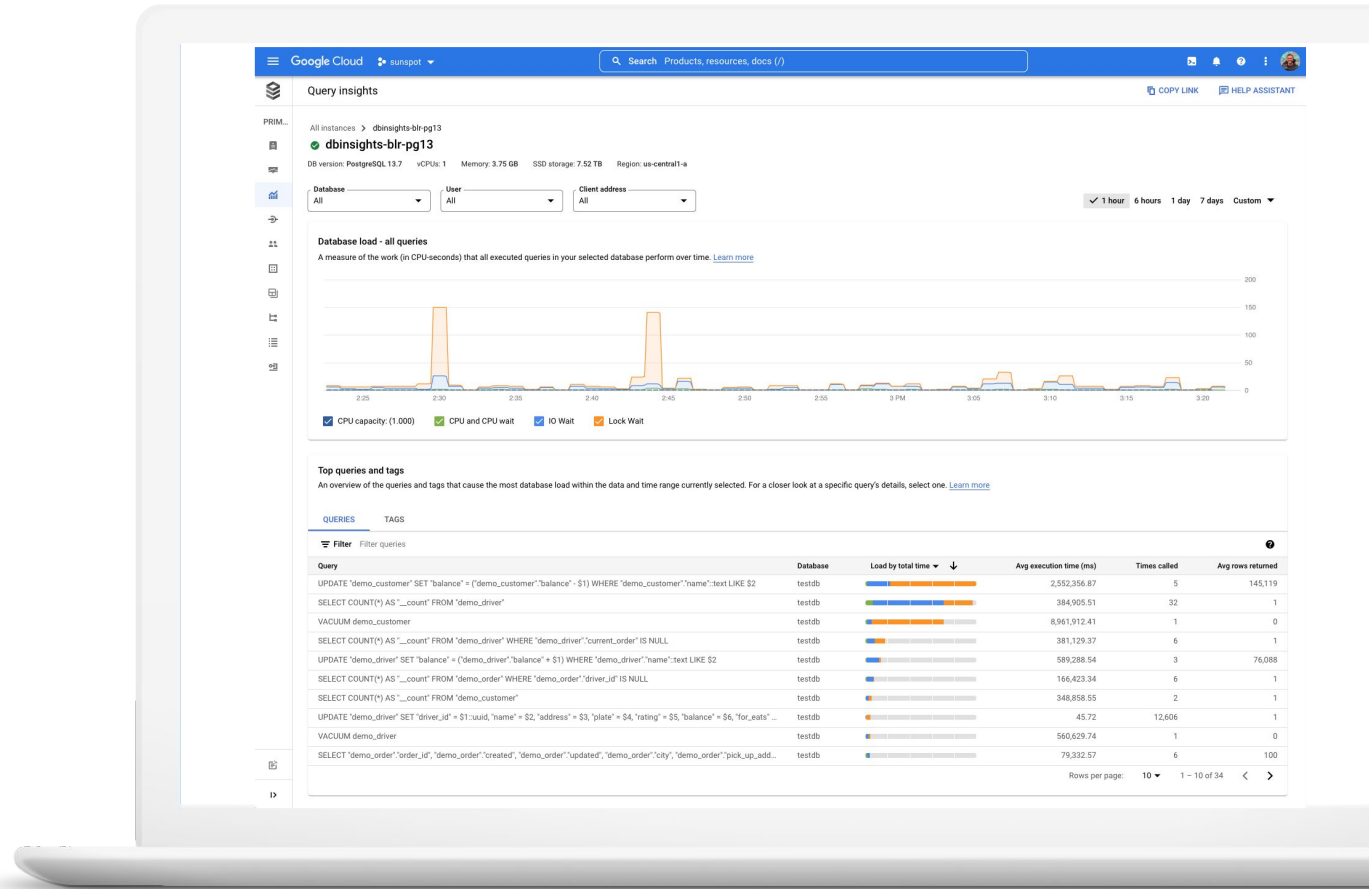
PostgreSQL (GA)

MySQL (GA)

AlloyDB (GA)

Spanner (GA)

Google Cloud

System Insights

Provides all database
monitoring metrics
in a single dashboard.

Clearly highlights health
and performance issues with
visual indicators.

Simple

PostgreSQL (GA)
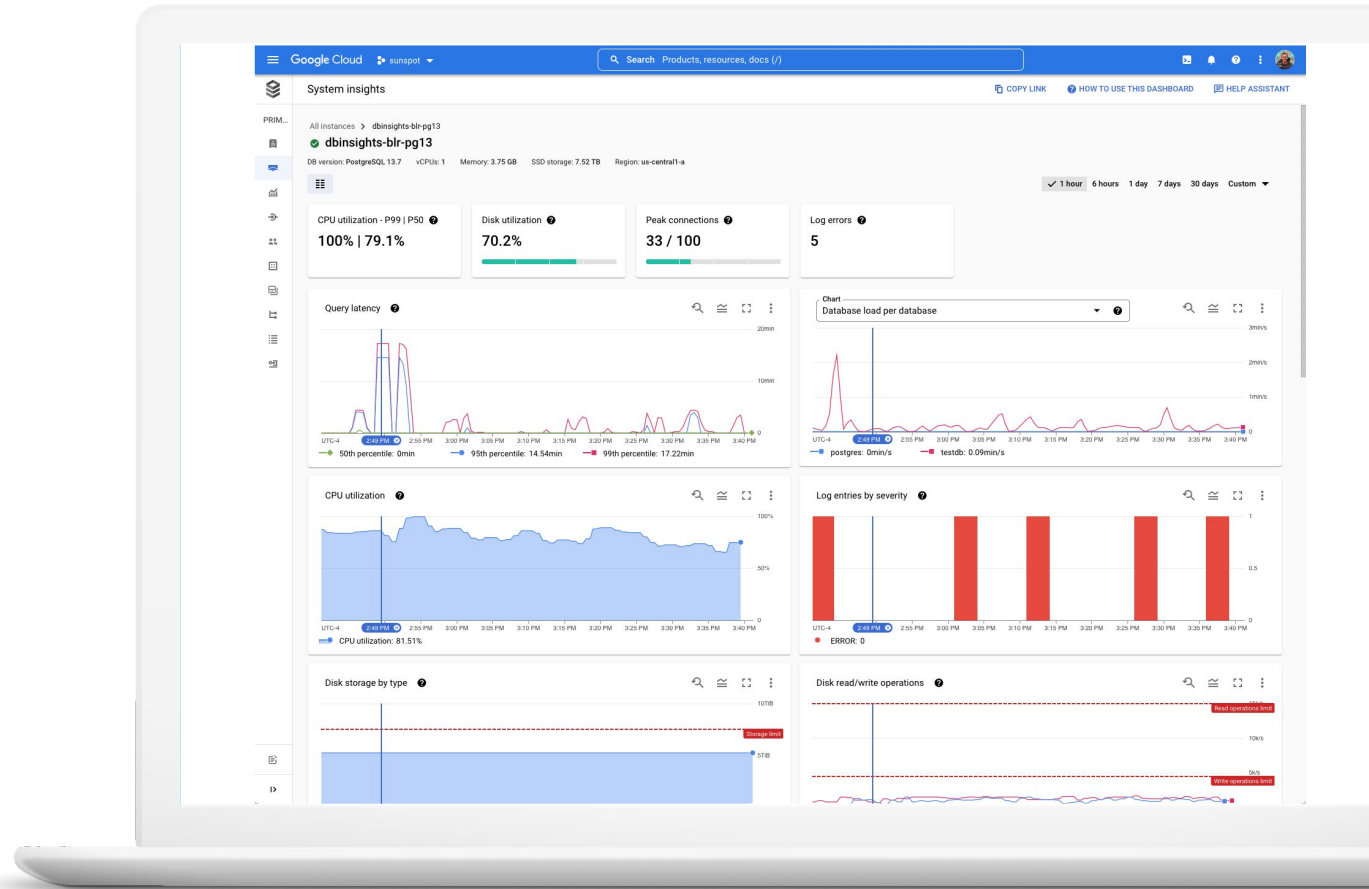
MySQL (Preview)

AlloyDB (GA)

Spanner (GA)

Google Cloud

Index Advisor

Intelligent

Recommends indexing opportunities to boost query performance.

Proven performance enhancement with minimal storage and cost overheads.

AlloyDB (Preview)
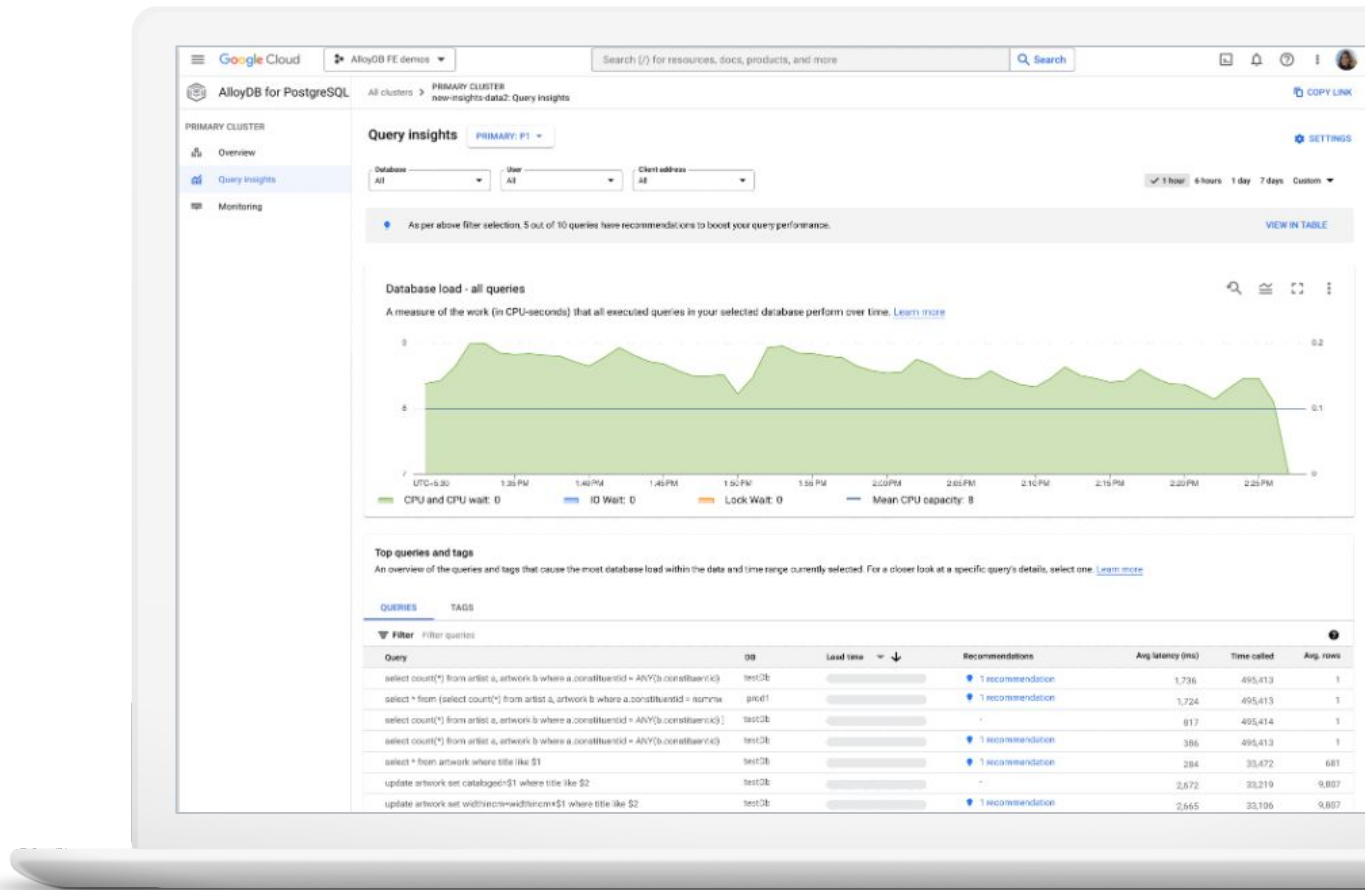
Ecosystem Integration

Integrated

Integrates APM tools via Sqlcommenter, an OpenTelemetry standard and library

Provides monitoring and alerting tools with Cloud Ops

Python, ruby, node.js, Java, GO (GA)

In-context recommended alerts

Grafana integration via OpenTelemetry (GA)

Google Cloud

The Road Ahead

Performance Insights

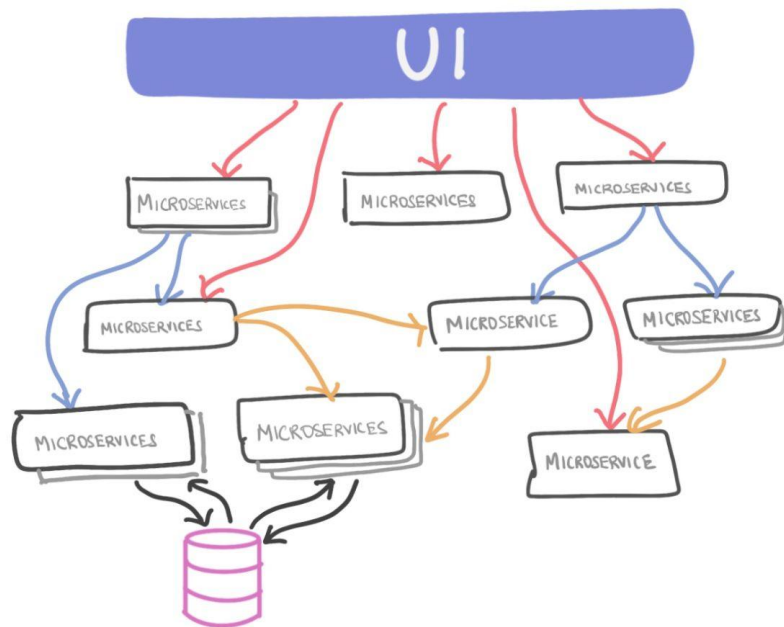The new and enhanced Performance Insights empowers **DBAs, application developers, and IT generalists** to **detect and troubleshoot database performance problems** by leveraging intelligent and assistive experiences.

With the new Performance Insights, you can:

- **Perform ad hoc analysis** to root cause hard-to-diagnose problems.

- **Get complete visibility into query execution** with granular query plan views.

- **Troubleshoot complex performance issues** by analyzing deeper telemetry.

- **Benefit from ready-to-consume recommendations** to improve query performance by creating indexes, tuning plans, etc.

With these enhancements, Performance Insights will enable you and your teams to save time and focus on business priorities.

Google Cloud

AlloyDB for PostgreSQL

All clusters ❯ PRIMARY CLUSTER
test: Query insights   🔗 COPY LINK

PRIMARY CLUSTER

🔲 Overview

📈 Query insights

🖥 Monitoring

Query insights   PRIMARY: P ▾

Database
All ▾

User
All ▾

Client address
All ▾

✓ 1 hour   6 hours   1 day   7 days   Custom ▾

Database load distribution by   Wait events ▾   🔍 ≊ ⛶ ⋮

The measure of work done (in CPU seconds) by all executed queries in your database, sliced by the selected dimension. Learn more

(Chart with y-axis labeled "CPU cores" on left and "CPU seconds" on right, x-axis times: 1:30 PM, 1:35 PM, 1:40 PM, 1:45 PM, 1:50 PM, 1:55 PM, 2:00 PM, 2:05 PM, 2:10 PM, 2:15 PM, 2:20 PM, 2:25 PM, 2:30 PM)

🟩 CPU time   🟧 wal_sender_wait_for_wal   🟫 buffer_read_ahead   🟨 Changeset_latch_contention   🟪 Latch_contention

Top dimensions by database load

An overview of the top dimensions that contribute the most to database load for the chosen time range and dimension selected in the chart above. Learn more

QUERIES   WAIT EVENT TYPES   WAIT EVENTS   DATABASES   USERS   CLIENTS   TAGS

≡ Filter   Filter queries

Queries	Load by execution time ↓		Database	Times called	Query ID	Avg execution time (ms)	Avg rows returned
UTILITY COMMAND		More details	postgres	51	22634851	0.235362	1
VACUUM demo_driver		More details	postgres	16	32564851	0.225362	1
SELECT COUNT(*) AS "__count" FROM ...		More details	postgres	1	11634810	0.125362	152
VACUUM demo_customer		More details	postgres	1	55634851	0.025362	21

AlloyDB for PostgreSQL

All clusters > PRIMARY CLUSTER
test: Query insights

📋 COPY LINK

PRIMARY CLUSTER

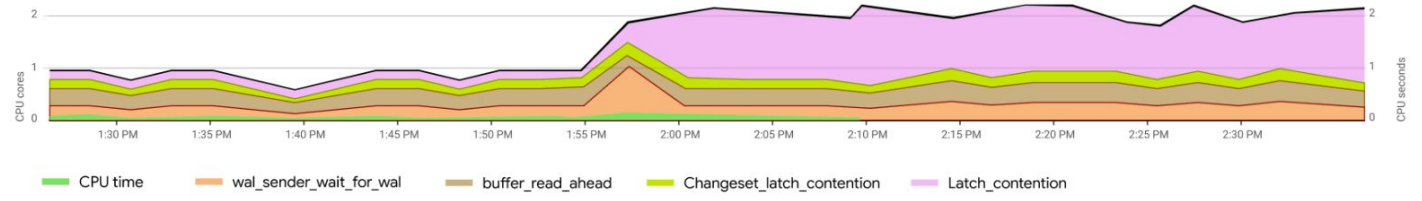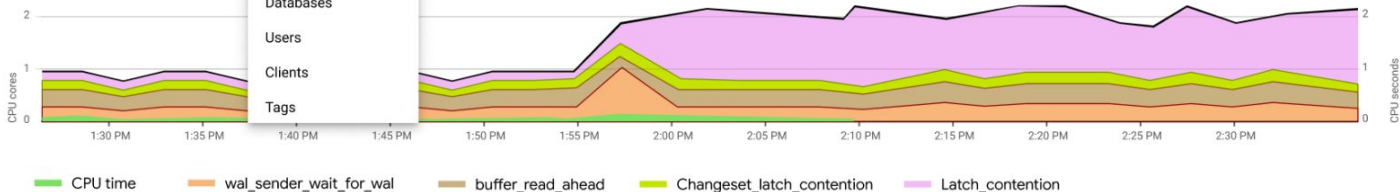- 🔧 Overview
- 📈 Query insights
- 🌄 Monitoring

Query insights   [PRIMARY: P ▼]

Database
All ▼

User
All ▼

Client address
All ▼

✓ 1 hour   6 hours   1 day   7 days   Custom ▼

Database load distribution by   [Wait events ▼]

The measure of work done (in CP...   ...ed queries in your database, sliced by the selected dimension. Learn more

Queries
Wait event types
Wait events
Databases
Users
Clients
Tags

CPU cores — 2, 1, 0
CPU seconds — 2, 0

Time axis: 1:30 PM, 1:35 PM, 1:40 PM, 1:45 PM, 1:50 PM, 1:55 PM, 2:00 PM, 2:05 PM, 2:10 PM, 2:15 PM, 2:20 PM, 2:25 PM, 2:30 PM

Legend:
- 🟩 CPU time
- 🟧 wal_sender_wait_for_wal
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- 🟪 Latch_contention

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Thank You!!!