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# EPAS Technical Deep Dive: Architecting for Portability, Performance, and Resiliency

January 2026

# Speaker Introduction



Nick Ivanov

Resident Architect

Nick is a seasoned solutions architect at EDB. Since April 2022 he has brought extensive expertise in database architecture and analytics from a notable tenure at IBM from May 2010 to March 2022.

He holds a Dipl.-Ing. degree in computing systems and networks from Bauman Moscow State Technical University.



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# Speaker Introduction



Matthew Chaddock

Snr Lead Software Engineer

Matt is a Senior Lead Software Engineer on the Infrastructure Platforms – Cloud Relational Databases team. He currently leads the Gaia Postgres Service software engineering team, based in Bournemouth, UK.

Matt joined JPMC in 2006 through the Graduate Programme after graduating from Bournemouth University. Over his tenure, he has worked extensively with a variety of database technologies, including Sybase, Oracle, MS SQL, and—most notably—Postgres, which remains his favorite.

# Speaker Introduction



Sunita Behera

Lead Software Engineer

Sunita is a Lead Software Engineer with nearly 10 years of experience, specializing in Python, Django, and database platforms. She leads the Gaia Postgres Service within JPMorgan Chase's Infrastructure Platforms – Cloud Relational Databases team in Bournemouth, UK.

Since joining JPMC in 2019, Sunita has worked across the bank's database products—including Dbaasnow, Moonraker, DBPortal, and now Gaia Postgres—delivering scalable, secure, high-performance services that enable teams across the firm.

# Agenda

- Gaia Postgres Service Details
- PostgreSQL vs. EDB Postgres Advanced Server
- Extensions
- EPAS vs. AWS Aurora
- GPS and EPAS Roadmap for 2026

# Gaia Postgres Service



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# Gaia Postgres Service – Data Center Locations

Region	Zone	Data centers	Environments	Info
APAC	AP-HK	AP-HK-C01 / AP-HK-C02 (Hong Kong)	PROD,UAT,DEV	Available Feb 2026
APAC	AP-IN	AP-IN-C01 / AP-IN-C02 (Mumbai)	PROD,UAT,DEV	Available Feb 2026
APAC	AP-SG	AP-SG-C01 / AP-SG-C02 (Singapore)	PROD,UAT,DEV	
EMEA	EM-UK	EM-UK-C01,EM-UK-C02 (Basingstoke, Farnborough)	PROD,UAT,DEV	
NA	NA-NE	NA-NE-C01/NA-NE-C02 (Totowa, Orangetown)	PROD,UAT	
NA	NA-NW	NA-NW-C01/NA-NW-C02 (Aurora, Broomfield)	PROD,UAT	
NA	NA-MW	NGNP: NA-MW-C01 (Belleville)	UAT,DEV	

Further information; <https://engineers.jpmchase.net/docs/databases/gaia-postgres/concepts/capacity/>

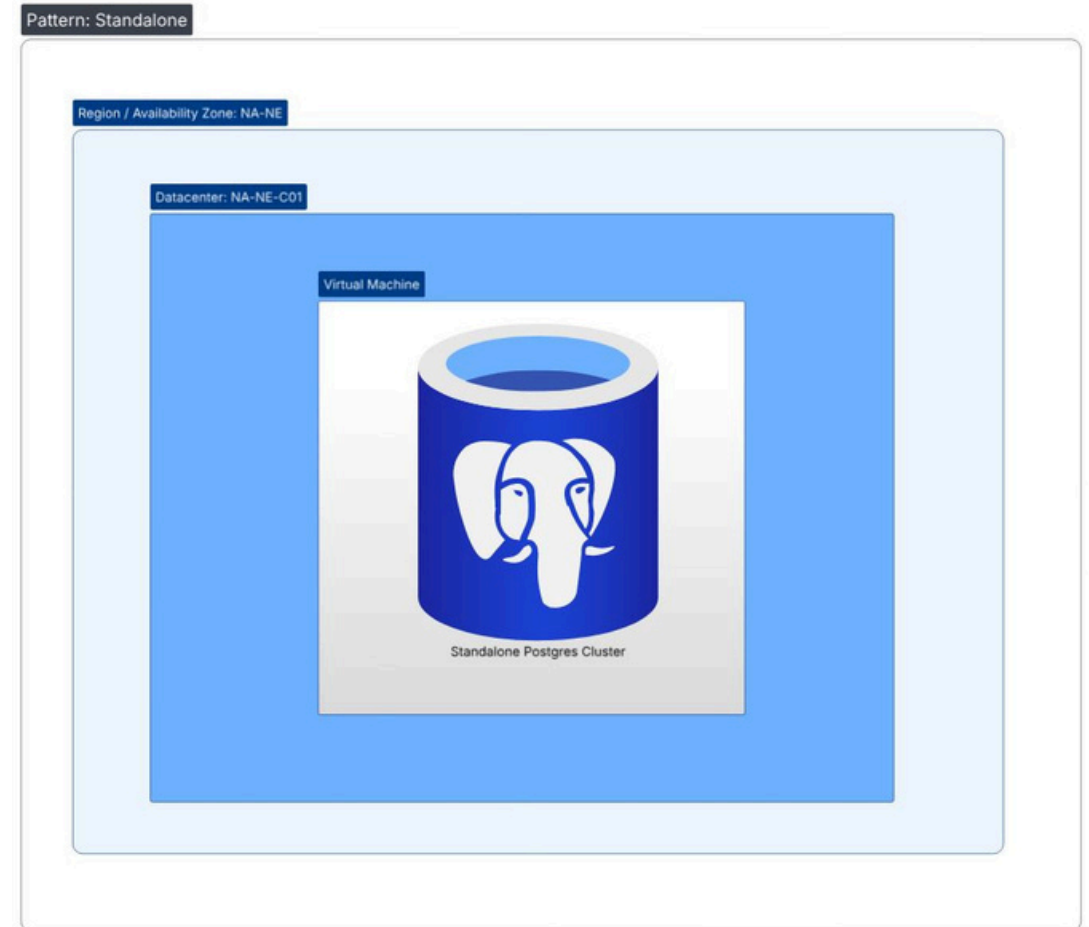
# Gaia Postgres Service – Resiliency Patterns

<b>Resiliency Pattern</b>	<b>Environments</b>
Standalone (SA)	DEV / UAT
Standalone with Disaster Recovery (SA-DR)	UAT / PROD
High Availability with Disaster Recovery (HA-DR)	UAT / PROD (Available 2nd Half 2026)

Further information; <https://engineers.jpmchase.net/docs/databases/gaia-postgres/concepts/resiliency/>

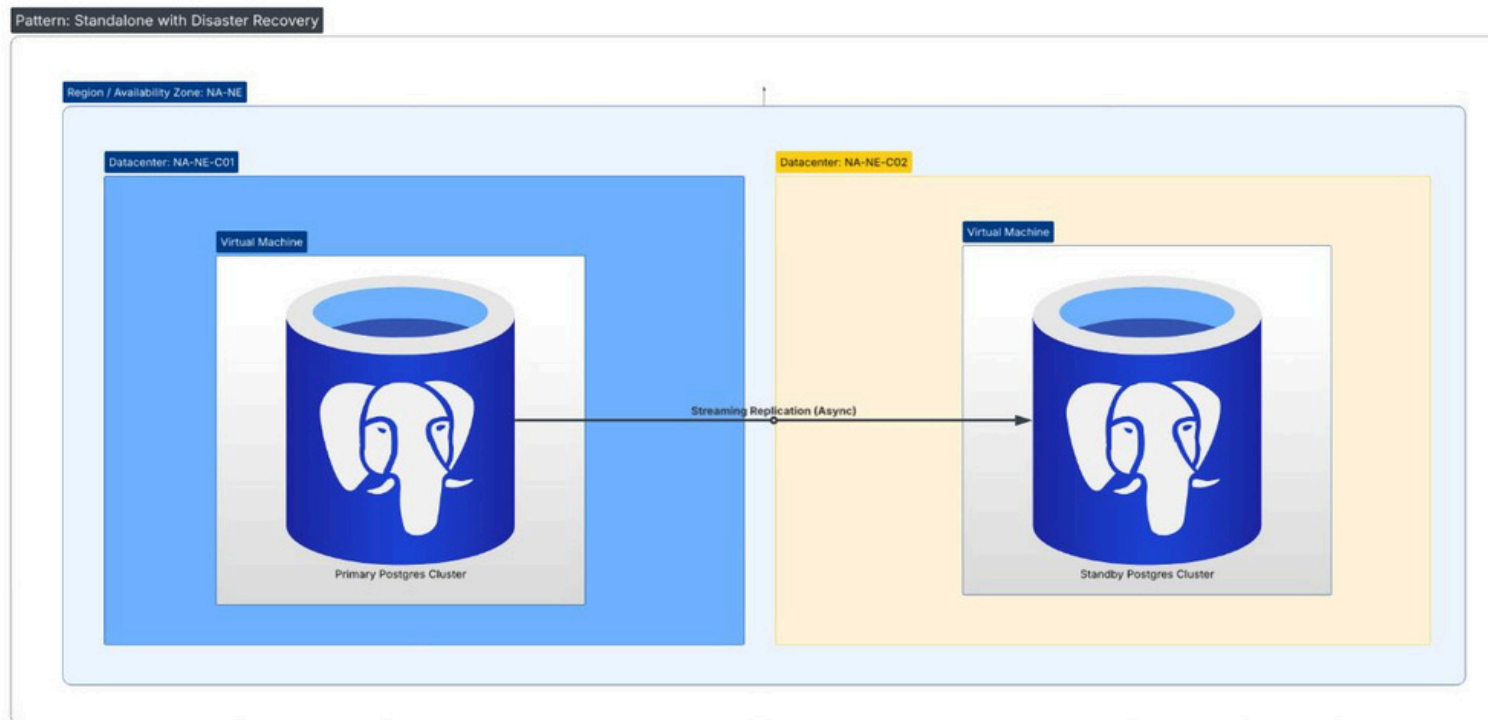
# Resiliency Patterns – Standalone (SA)

- Available in DEV/UAT environments
- Single Data Centre deployment
- No resiliency required, for non-prod workload
- Perfect for spinning up a development environment with minimal footprint

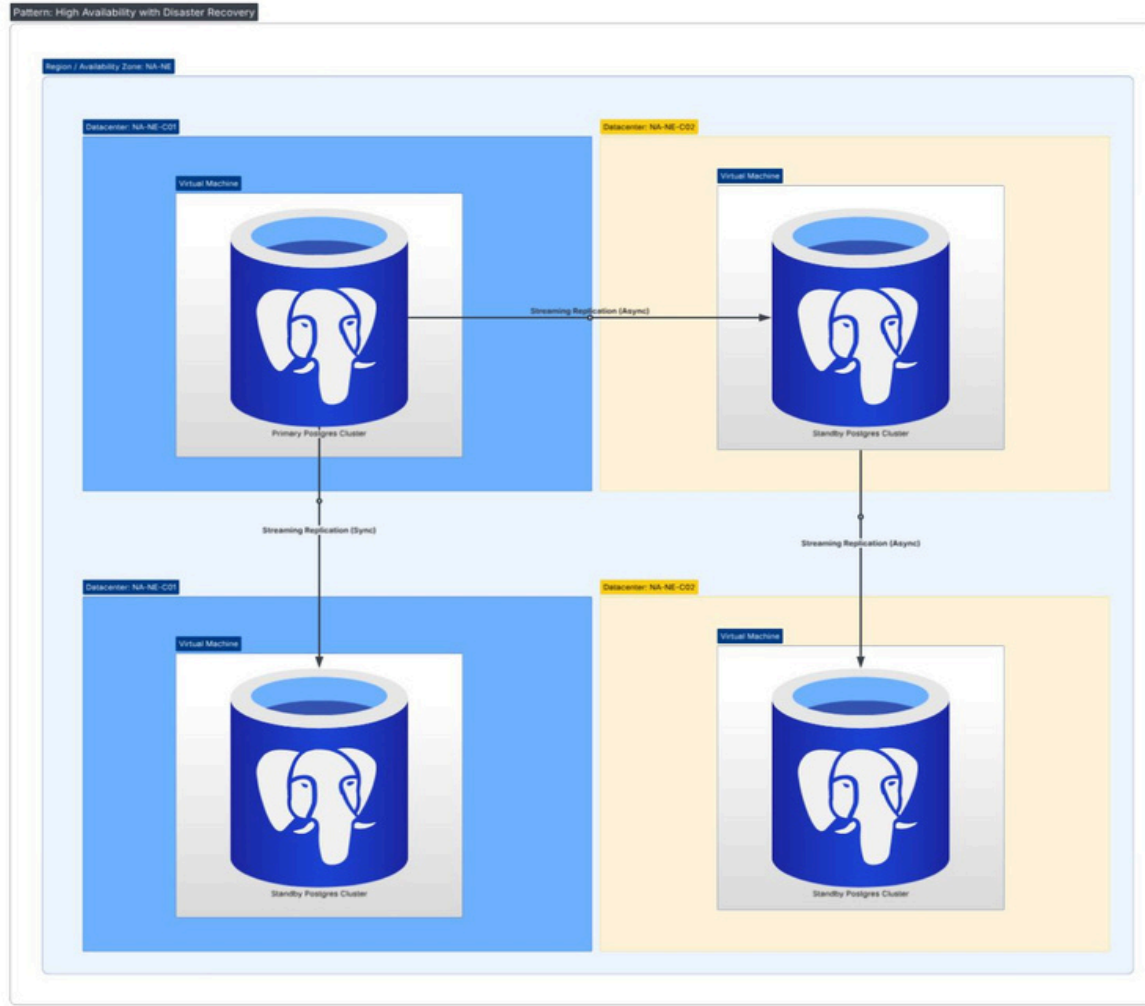


# Resiliency Patterns – Standalone with Disaster Recovery (SA-DR)

- Available in UAT and PROD environments (Mandatory in PROD environment)
- Self-service switchover utility allows on demand data center site switch
- Two data center deployment utilizing JPMC regional DC's pairs to minimize replication latency



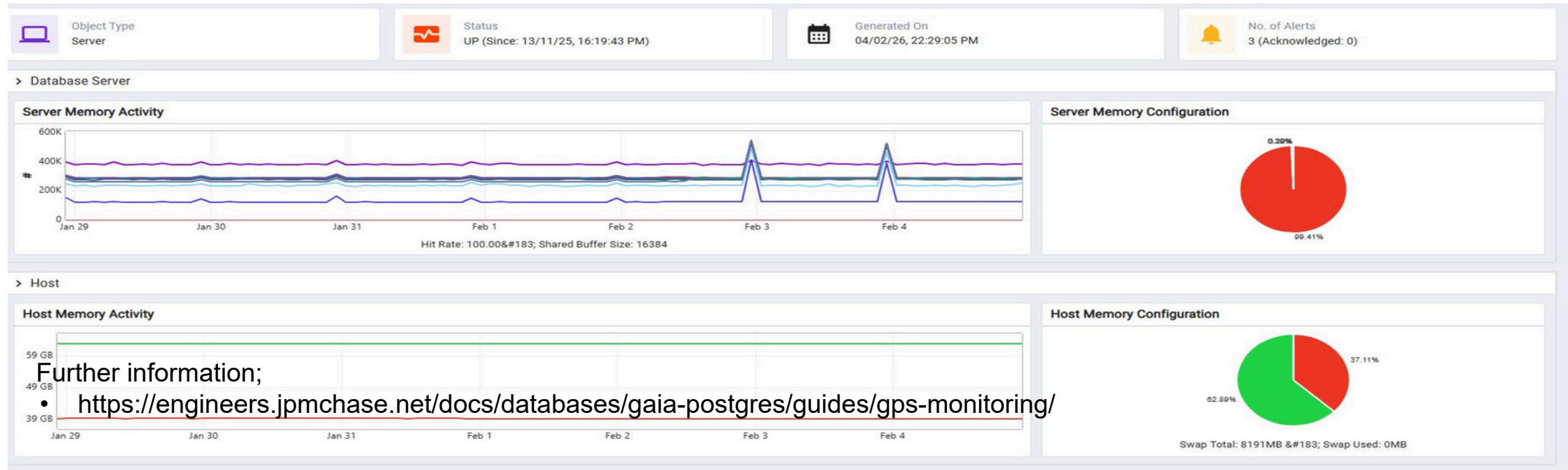
# Resiliency Patterns – High Availability with Disaster Recovery (HA-DR)



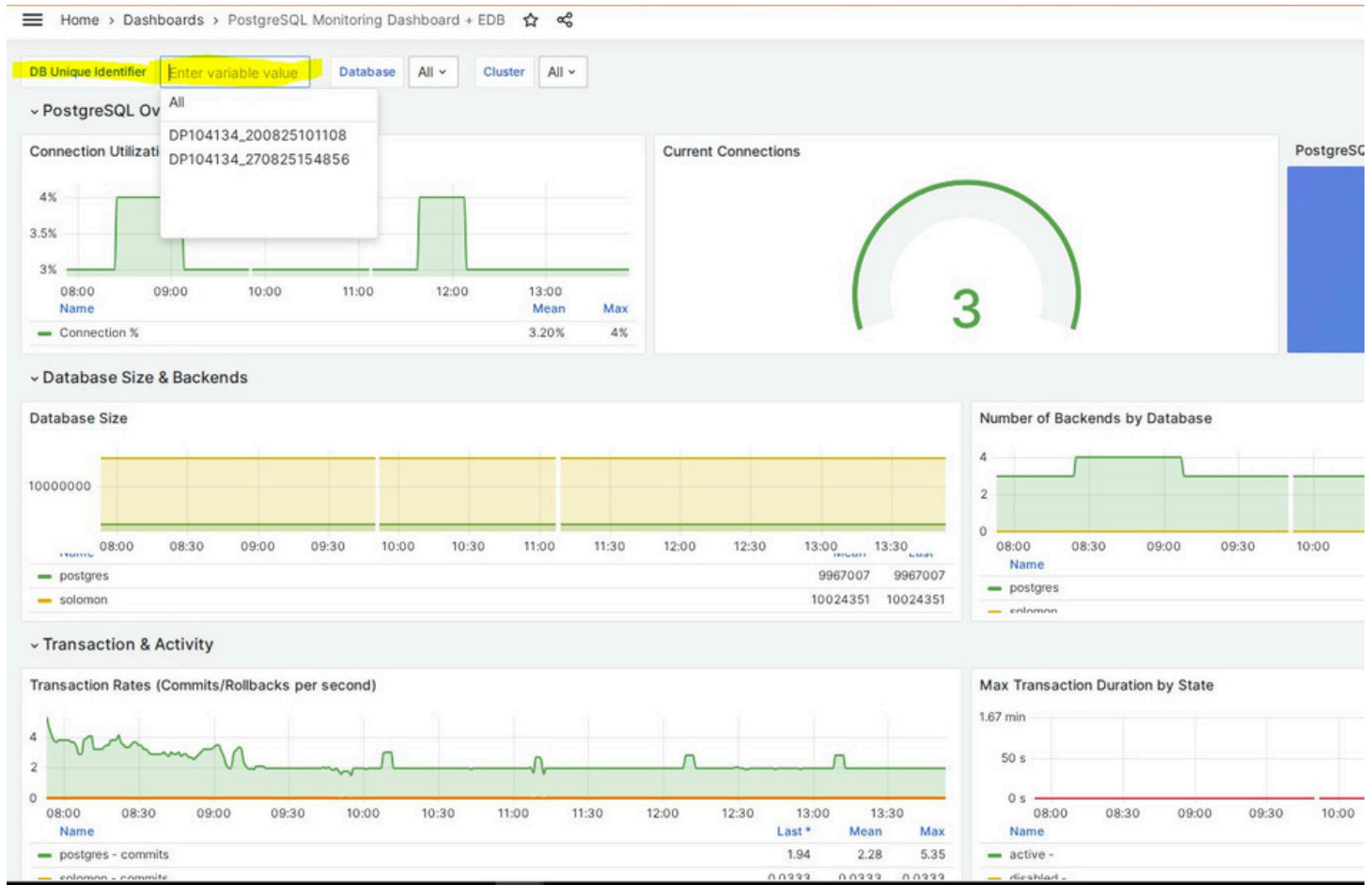
- Available 2nd Half 2026
- Available in UAT and PROD environments
- Two nodes in each data center provides a higher level of resiliency with additional replicas of the database
- Automated switchover within data center location
- Self-service switchover utility allows on demand data center site switch

# Gaia Postgres – Monitoring / Observability

## ■ Postgres Enterprise Manager (PEM)

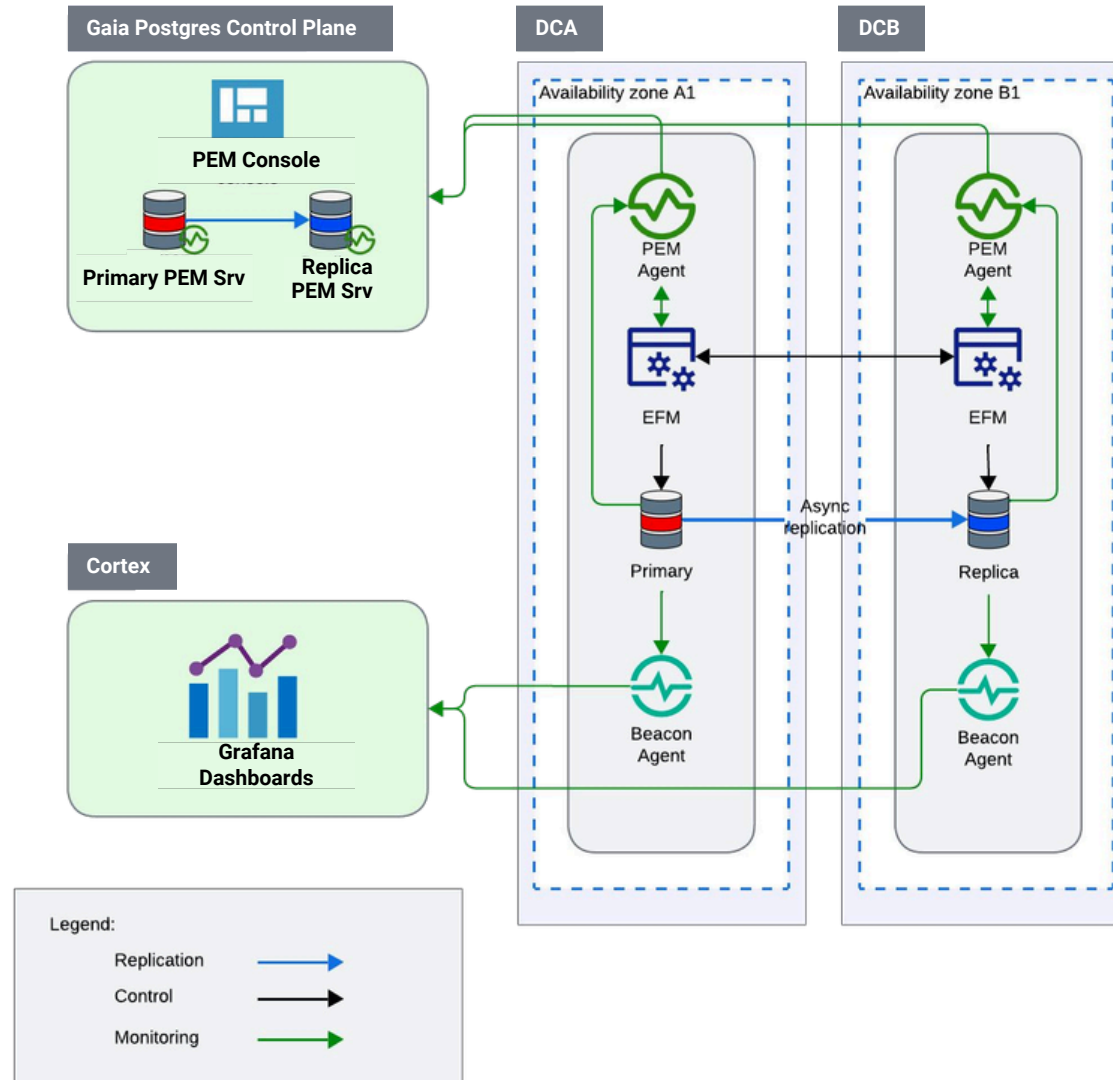


# Performance Monitoring – Grafana Dashboards



- Time series metrics published to Cortex
- Dashboard provided to download/import into Grafana to visualize key performance metrics

# Gaia Postgres Service: Under the Hood/Bonnet



# EDB Postgres Advanced Server vs. PostgreSQL



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# Enterprise Postgres



- **Oracle compatibility:** Compatibility for schemas, data types, indexes, users, roles, partitioning, packages, views, PL/SQL triggers, stored procedures, functions, and utilities
- **Enterprise security:** Transparent Data Encryption, virtual private databases, password policy management, built-in auditing, data redaction, SQL injection protection, and procedural language code obfuscation
- **Developer productivity:** More than 200 prepackaged utility functions, user-defined object types, autonomous transactions, SPL debugger
- **DBA productivity:** Resource Manager (throttle CPU and I/O at the session level), instance and session wait event history, declarative policy management, automatic table partitioning
- **Performance:** Query optimizer hints, SQL Profiler, Query Advisor, dynamic resource tuning
- **Replication enhancements:** Enables EDB Postgres Distributed functionality such as Group Commit, Commit at Most Once, Eager replication, etc.

# Extending Postgres Functionality



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# Postgres Extensions: Modern Functionality

Apache AGE	Graph database inside Postgres, fully ACID-compliant; use SQL and Cypher queries simultaneously
pgvector	Popular mechanism for storing vectors, such as ML model embeddings, for in-database similarity search
VectorChord	An alternative to pgvector with more dimensions, more efficient storage, and better indexing and search performance
EDB Analytics Accelerator	Query both Postgres and lakehouse data simultaneously; transparent tiered storage; extreme scalability with Spark
pg_search	Text search, loosely based on Apache Lucene
PostgreSQL Anonymizer	Declarative static and dynamic data redaction, data generalization

# Postgres Extensions: Observability

EDB Wait States	Collect historical wait state statistics per session, per query.
EDB Query Advisor	Recommend indexes and multicolumn statistics based on the current workload.
EDB Stat Monitor, SQL Profiler	Collect and compare historical query execution statistics, detect execution plan drift.

# More from EDB

## EDB Postgres Distributed

- Extreme highavailability (99.999% uptime)
- Globally distributed active-active clusters
- Advanced consistency controls

## WarehousePG

- Drop-in open source replacement for Greenplum
- MPP for analytics
- Streaming ingestion from MQ systems
- Access external data

# Private and Public Cloud Integration



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# Postgres

- Applies to most Postgres-based DBaaSes
- Data migration
  - Dump/restore
  - Native logical replication (no downtime)
- Data synchronization
  - Native logical replication
  - Third-party CDC

# Non-Postgres

- Oracle, MySQL, SQL Server
- Data migration
  - EDB Migration Toolkit
  - EDB Replication Server (CDC)
- Data synchronization
  - EDB Replication Server (CDC)
  - Third-party CDC

# PostgreSQL, EPAS, and Amazon Aurora Compared

	PostgreSQL	EDBPostgresAI:AdvancedServer	Amazon Aurora PostgreSQL
<b>Deployment Flexibility and Portability</b>	<b>The most flexibility:</b> Public and private cloud, bare metal, k8s		<b>Platform lock-in, no self-managed deployments</b>
<b>TCO</b>	\$ – Open source software, support by EDB	\$\$ – Up to 5x lower TCO than Aurora	\$\$\$ – High cost for enterprise features
<b>High Availability</b>	Standard HA – 99.99% uptime	<b>Extreme HA with 99.999% uptime and 90+% PostgreSQL feature support using EDB Postgres Distributed</b>	Standard HA – 99.99% uptime; 99.999% uptime possible with Aurora DSQL at the price of limited PostgreSQL compatibility
<b>Security</b>	<b>Requires additional security tools and integrations</b>	<b>Enterprise security built in:</b> Transparent Data Encryption (TDE) support, SQL injection protection, data redaction, password policies, etc. <b>Fastest on-ramp to Postgres from legacy databases</b>	<b>Requires additional security tools and integrations</b>
<b>Database Modernization</b>	<b>EDB Migration Toolkit with limited compatibility</b>	Oracle Compatibility Mode Migration Portal with SQL conversion tooling and AI-assisted chat interface	<b>Self-service migration tooling with limited compatibility</b> No Oracle compatibility mode; limited compatibility is available via open source extensions AWS Database Migration Service (DMS) and Schema Conversion Tool (SCT)
<b>Postgres Support</b>	<b>True Postgres IQ</b> 24/7 production-level break-fix Postgres support that differentiates database issues from cloud concerns		<b>Support for service levels, not the database</b> No break/fix support for the underlying database; support is only for the managed service itself

# PostgreSQL, EPAS, and Amazon Aurora Compared

	PostgreSQL	EDB Postgres Advanced Server	Amazon Aurora PostgreSQL
<b>Architecture</b>	Tightly coupled compute and storage resources		Distributed, shared storage architecture, decoupled compute and storage resources
<b>High Availability</b>	Physical and logical replication (sync and async), limited bidirectional replication, open source failover automation Open source tools must be scripted	Physical and logical replication (sync and async), full-featured bidirectional replication (PGD), open source and EDB failover automation	Shared storage with physical replication (sync), logical replication (async), limited bidirectional replication, built-in failover automation
<b>Maintenance</b>		Open source tools, Ansible-based automation platform (TPA)	Managed service provides software and OS patching and upgrades, backups, blue-green deployment, etc. Limited list of supported open source extensions
<b>Extensibility</b>	Open source extensions	Open source and EDB extensions	

# GPS and EPAS Roadmap for 2026



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# Roadmap: Postgres 18

- Asynchronous read I/O support
  - Twotothreetimes(2x–3x)better read performance
- OAuth
  - Clientprotocolsupport andserver-side validators (Keycloak, Okta, etc.)
- SQL compatibility
  - Temporalprimary keys, unique constraints, and foreign keys
  - Virtual generated (computed) columns
- Performance enhancements
  - B-tree indexskip scan,new optimizer tricks
- Oracle compatibility enhancements
  - ExtendedSQLand built-in packages support

# Thank You



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