Powering Postgres

The world's most popular database

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EDB

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Ex Oracle, Capgemini, Scott/Tiger, ..

Ex Contractor, Developer (since 1987)

Joined EDB 2019 as a Solution Engineer

Agenda

1. What is new in Postgres 16
2. How EDB is bringing active/active to Postgres
3. How EDB enables risk-free, low-cost migrations from Oracle to Pg
4. How EDB enhances security in Postgres
5. Questions

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Postgres

Fastest growing database platform

Most loved database by developers

Built by EDB

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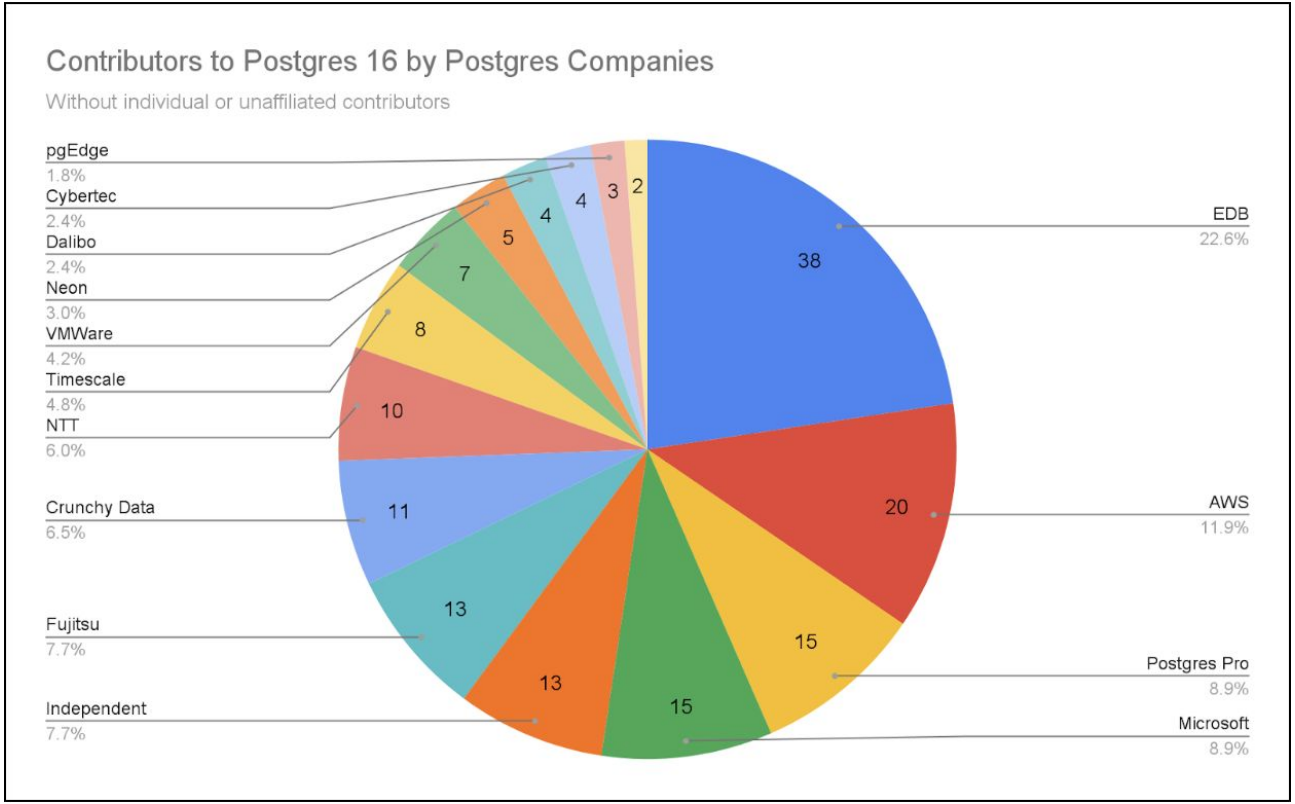
Leading contributor to Postgres

Postgres optimized for the enterprise

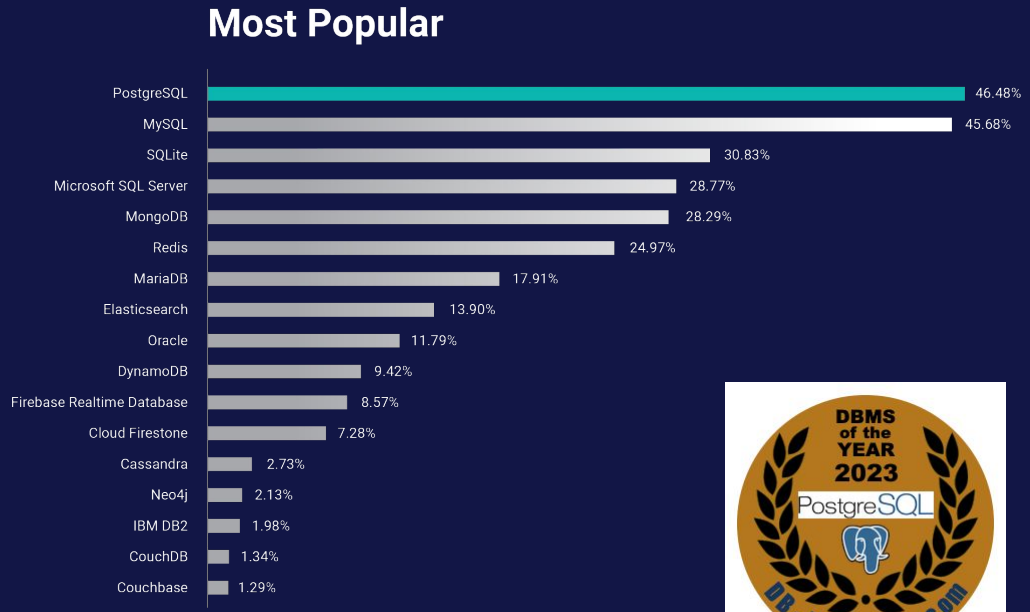
24/7 Global support and operations

Contributers to Postgres 16



DEVELOPERS' MOST "ADMIRED & DESIRED" DATABASE

#1 everywhere



Developers choose Postgres.

Source: Stack Overflow 2023 Developer Survey; Stack Overflow 2022 Developer Survey

Postgres 16

What is new in Postgres 16

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Postgres 16

What's new (highlights only)

- Performance
  - Allow parallelization of **FULL** and internal right **OUTER** hash joins
  - Allow logical replication subscribers to apply large transactions in parallel
  - Allow monitoring of I/O statistics using the new **pg_stat_io** view
  - Add SQL/JSON constructors and identity functions
  - Improve performance of vacuum freezing
- Security
  - Add support for regular expression matching of user and database names in pg_hba.conf, and user names in pg_ident.conf

Full Release Notes here: https://www.postgresql.org/docs/release/16.0/

SQL/JSON https://vibhorkumar.wordpress.com/2024/02/12/exploiting-sql-json-enhancements-for-modern-workloads-in-postgresql-16/

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EDB Advanced Server

What's new (highlights only)

- Security
  - Added support for Oracle-compatible DBMS_PRIVILEGE_CAPTURE package
- Oracle compatibility
  - Added support for the Oracle-compatible functions:
    - `NANVL`
    - `LNNVL()`
    - `DUMP`
    - `NLS_CHARSET`
    - …

https://www.enterprisedb.com/docs/epas/latest/epas_rel_notes/epas16_rel_notes/

Advanced Server

How EDB enables risk-free, low-cost migration from Oracle to Postgres

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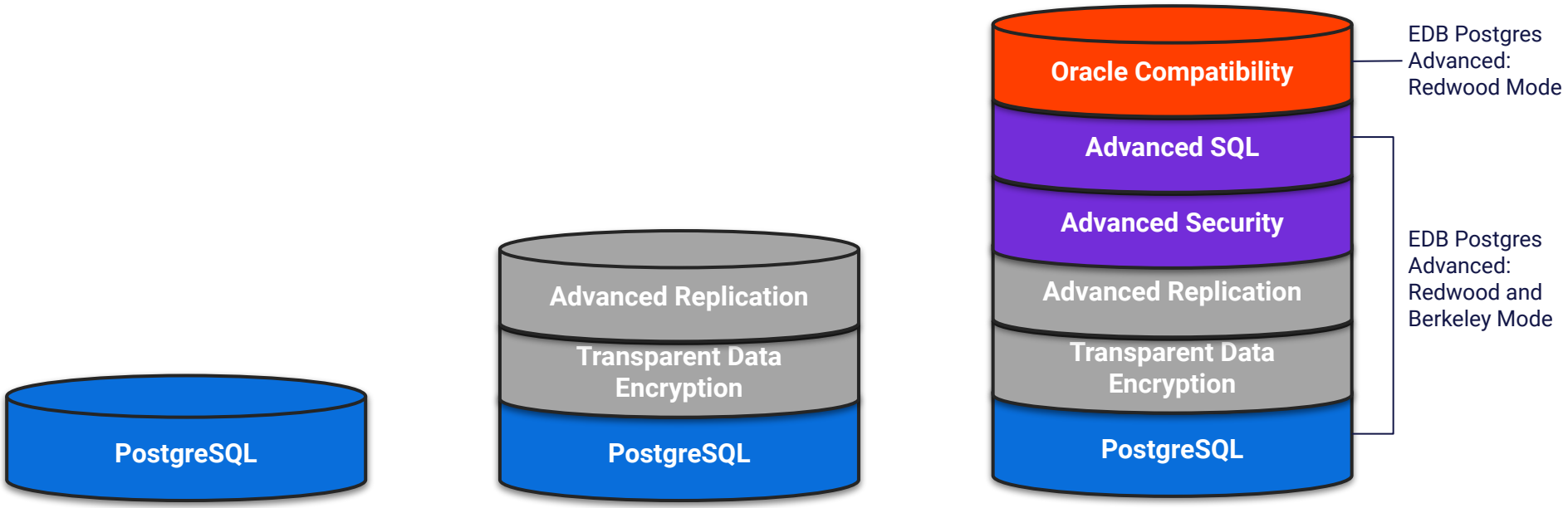
EDB Databases & Subscription Plans

EDB offers **3** horizontal subscription plans and **1** vertical plan



EDB POSTGRES ADVANCED SERVER

EDB Postgres Advanced Server

- **Oracle Compatibility -** Compatibility for schemas, data types, indexes, users, roles, partitioning, packages, views, PL/SQL triggers, stored procedures, functions, and utilities
- **Additional Security -** Password policy management, session tag auditing, data redaction, SQL injection protection, and procedural language code obfuscation
- **Developer Productivity -** Over 200 pre-packaged utility functions, user-defined object types, autonomous transactions, nested tables, synonyms, advanced queueing
- **DBA Productivity** - Throttle CPU and I/O at the process level, over 55 extended catalog views to profile all the objects and processing that occurs in the database
- **Performance -** Query optimizer hints, SQL session/system wait diagnostics
- **Replication Enhancements** - Enables EDB Postgres Distributed functionality such as Group Commit, Commit at Most Once and Eager all-node synchronous replication, timestamp-based snapshots, estimates for replication catch-up times, selective backup of a single database, hold back freezing to assist resolution of UPDATE/DELETE conflicts, multi-node PITR

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Postgres Distributed

How EDB is bringing active/active to Postgres

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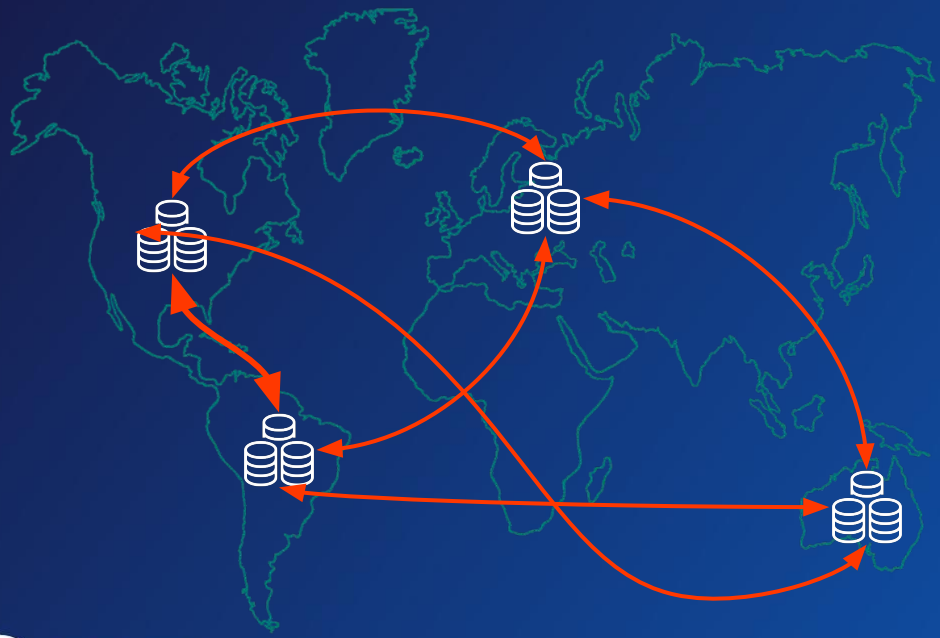
Highly Available and Geographically Distributed



Multi-Master Replication Enables

- Logical replication of data and schema enabled via standard Postgres extension
- Data consistency options that span from immediate to eventual consistency
- Robust tooling to manage conflicts, monitor performance, and validate consistency
- Deploy natively to cloud, virtual, or bare metal environments
- Geo-fencing, selectively replicating data for security compliance and jurisdiction control.

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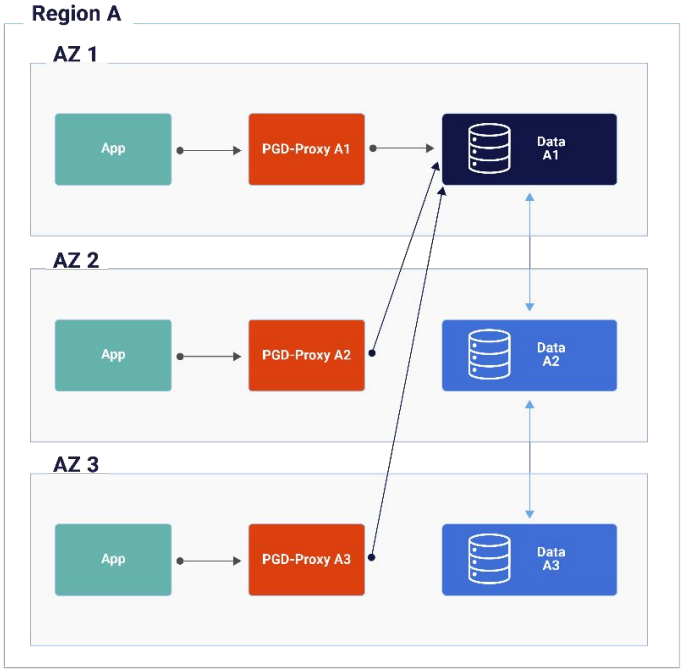
Always On Single Location

- Redundant hardware to quickly restore from local failures
  - 3 PGD nodes
    - could be 3 data nodes (recommended), or 2 data nodes and 1 witness which does not hold data (depicted)
  - A PGD-Proxy for each data node with affinity to the applications
    - can be co-located with data node
- Barman for backup and recovery (not depicted)
  - Offsite is optional, but recommended
  - Can be shared by multiple clusters
- Postgres Enterprise Manager (PEM) for monitoring (not depicted)
  - Can be shared by multiple clusters



Always On Multi-Location

- Application can be Active/Active in each location, or Active/Passive or Active DR with only one location taking writes
- Additional replication between all nodes in Region A and Region B is not shown but occurs as part of the replication mesh
- Redundant hardware to quickly restore from local failures
  - 6 PGD nodes total, 3 in each location
    - could be 3 data nodes (recommended)
    - could be 2 data nodes and 1 witness which does not hold data (not depicted)
  - A PGD-Proxy for each data node with affinity to the applications
    - can be co-located with data node
- Barman for backup and recovery (not depicted)
  - Can be shared by multiple clusters
- Postgres Enterprise Manager (PEM) for monitoring (not depicted)
  - Can be shared by multiple clusters
- An optional witness node should be placed in a third region to increase tolerance for location failure
  - Otherwise, when a location fails, actions requiring global consensus will be blocked such as adding new nodes, distributed DDL, etc.

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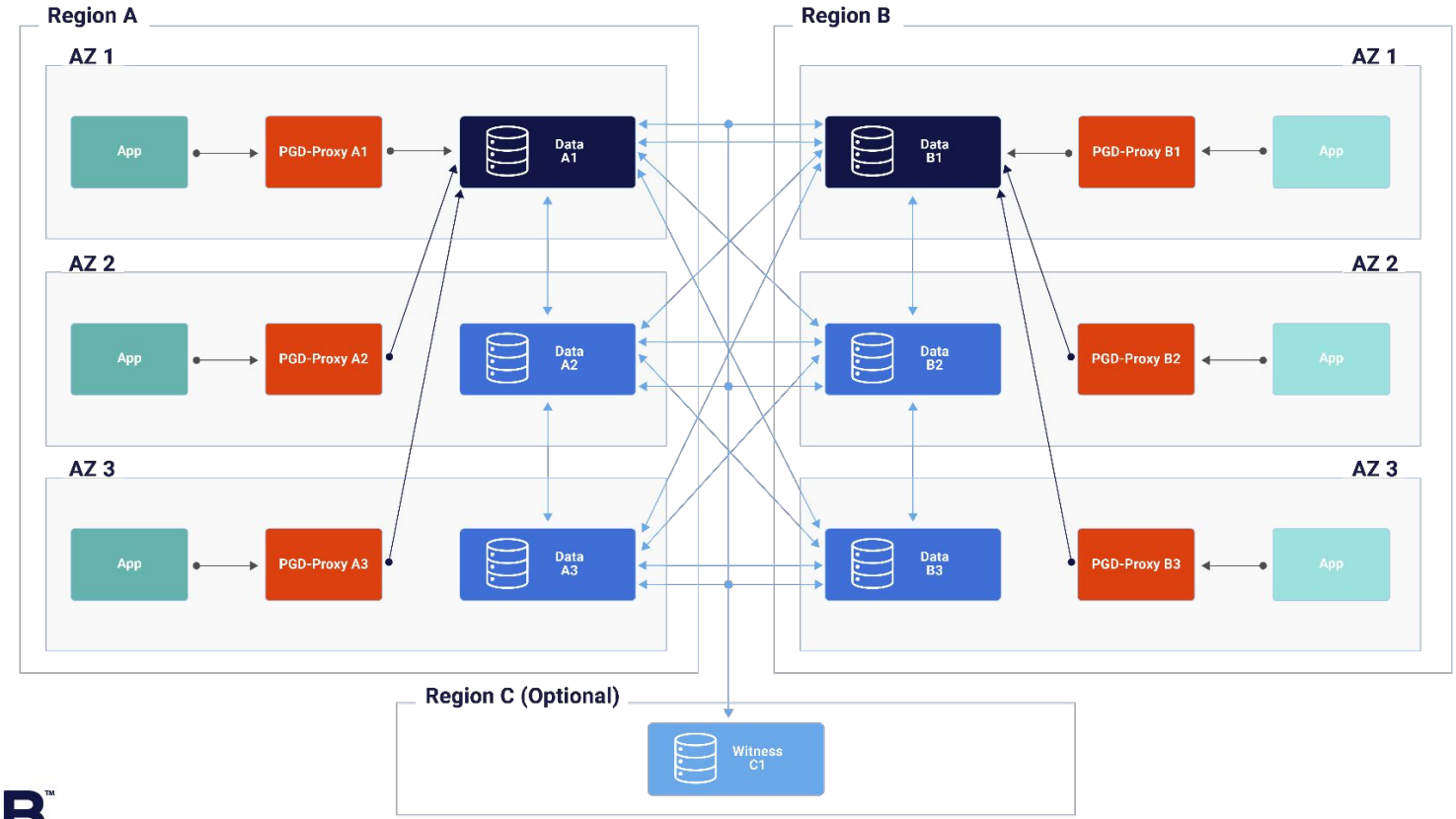
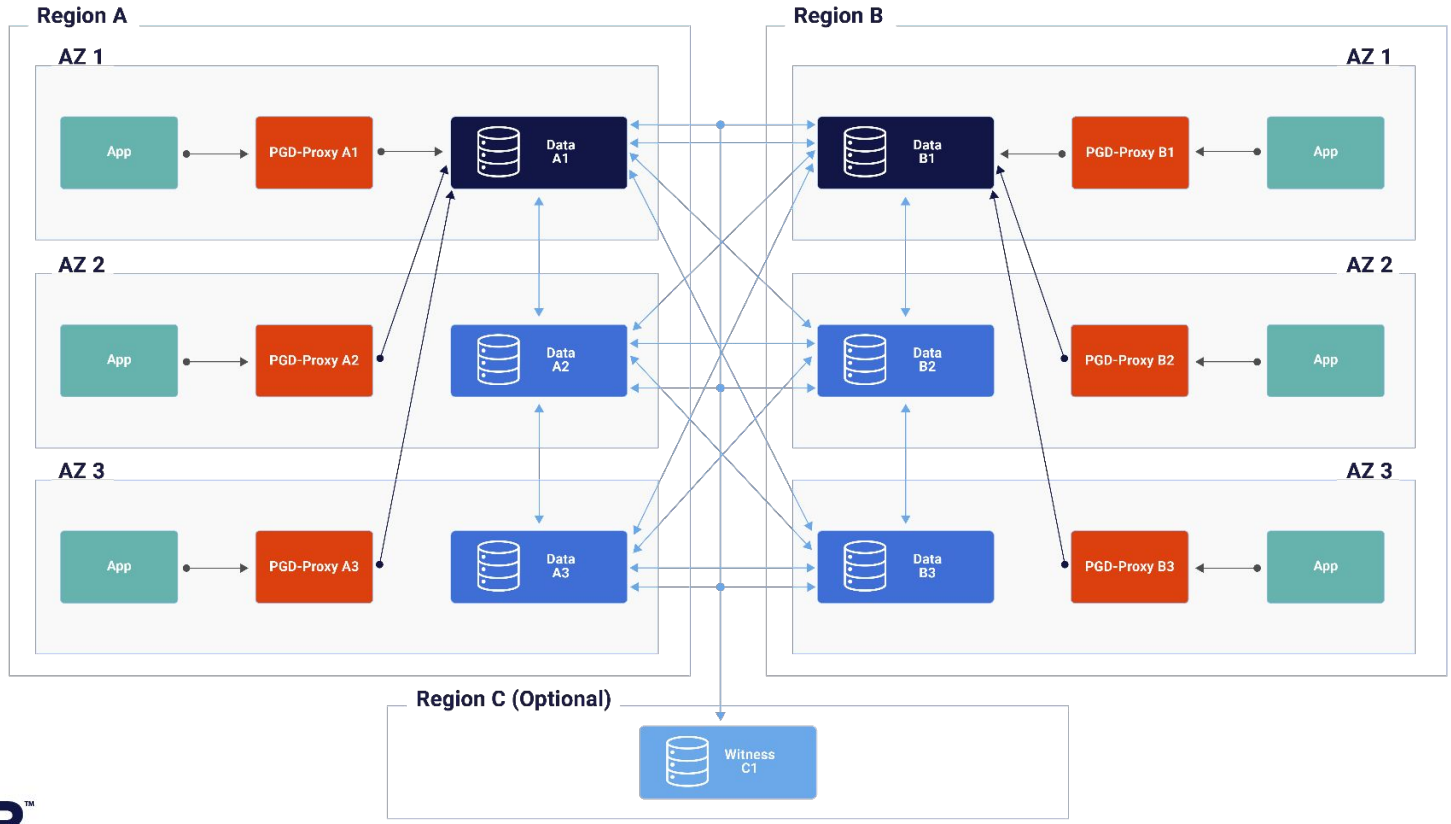
Always On Multi-Location: Active/Passive or Active DR



Always On Multi-Location: Active/Active



Choosing your architecture

	Single Data Location	Two Data Locations	Two Data Locations + Witness	Three or More Data Locations
Locations Needed	1	2	3	3
Fast restoration of local HA in case of Data node failure	Yes - if 3 PGD data nodes No - if 2 PGD data nodes	Yes - if 3 PGD data nodes No - if 2 PGD data nodes	Yes - if 3 PGD data nodes No - if 2 PGD data nodes	Yes - if 3 PGD data nodes No - if 2 PGD data nodes
Location failure protection for Data	No - unless offsite backup	Yes	Yes	Yes
Global consensus in case of location failure	N/A	No	Yes	Yes
Data restore required after location failure	Yes	No	No	No
Immediate failover in case of location failure	No - requires data restore from backup	Yes - alternate Location	Yes - alternate Location	Yes - alternate Location
Cross location network traffic	Only if offsite backup	Full replication traffic	Full replication traffic	Full replication traffic
License cost	2 or 3 PGD data nodes	4 or 6 PGD data nodes	4 or 6 PGD data nodes	6+ PGD data nodes

Security

How EDB bring security to Postgres

Transparent Data Encryption

EDB Standard Plan

- Available in Standard Plan (via EDB Postgres Extended Server) and Enterprise Plan (via EDB Postgres Advanced Server)
    - Not technically possible to be delivered as an extension
- Does not require changes to application code
    - The transparent part increases adoption but in the case of customers who prefer community PostgreSQL, their application could migrate from Extended to PostgreSQL just fine, they would just lose TDE
- Required in certain regulated industries
    - More likely that prospects ask EDB if TDE is available
- Helps in strategic expansions where EDB is not currently used for sensitive applications

EDB Advanced Server

Security Enhancements

Password policy management

DBA managed password profiles, compatible with Oracle profiles

Audit compliance

Track and analyze database activities and user connections

Virtual private databases

Fine grained access control limits user views

EDB/SQL protect

SQL firewall, screens queries for common attack profiles

Data redaction

Protect sensitive information for GDPR, PCI and HIPAA compliance

Code protection

Protects sensitive IP, algorithms or financial policies

New in EDB Advanced Server 16

- Support for **DBMS_PRIVILEGE_CAPTURE**
- Tables
  - **DBA_USED_PRIVS**
  - **DBA_UNUSED_PRIVS**

Function/procedure	Function or procedure	Return type	Description
`CREATE_CAPTURE`	Procedure	n/a	Creates a policy that specifies the conditions for analyzing privilege use.
`ENABLE_CAPTURE`	Procedure	n/a	Starts capturing the privilege usage for a specific privilege analysis policy.
`DISABLE_CAPTURE`	Procedure	n/a	Stops capturing the privilege use for a specific privilege analysis policy.
`DROP_CAPTURE`	Procedure	n/a	Removes a privilege analysis policy along with the data captured.
`GENERATE_RESULT`	Procedure	n/a	Populates the data dictionary views with the privilege analysis data
`DELETE_RUN`	Procedure	n/a	Deletes a privilege analysis capture run.

Thank You!

Questions…

Please contact me for more information

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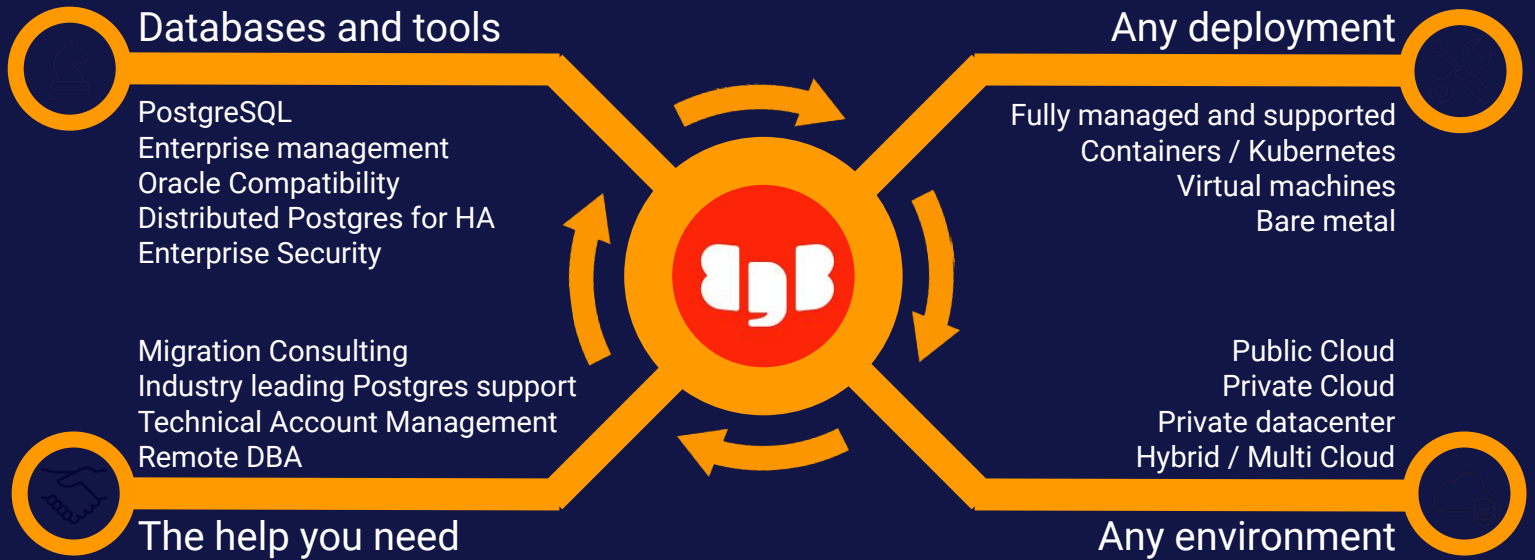
EDB: Transformational technology and expertise in Postgres



Wherever you are on your journey, and however you want to take part – we have what you need. No one else does.

Client Examples

Toyota North America

- 500 Oracle platforms representing ~100TBs of data
- 18 month effort – and on schedule
- Mix of manufacturing and dealer/finance/client platforms

Alight - $3B Insurance firm

- On-premise DB2 and Oracle landscape migration to AWS/EDB
- Implemented COE and ‘migration factory’

UnitedHealth Group-Fortune #5

- Very Large application: >200TB On-premise/Oracle -> Azure/EDB migration
- Very sensitive PHI/PII data in complex formats
- Cross-region cloud architecture for zero downtime.

Mastercard Credit Card

- 100% available system architectures
- Integral to their credit card processing – zero lost data
- EDB is their database standard for all new development - 18,000 cores in operation

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