EDB Postgres Distributed: "Always On"

IT Leaders: How to lower business risk and database downtime with extreme high availability

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1

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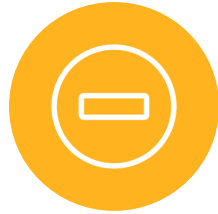Gianni Ciolli, VP of Solutions Architecture, EDB

POLL:
What do you care about most for your data?

1. Protected from loss and corruption
2. Accessible for you and your customers
3. Maintained with little to no downtime
4. Optimized for growth

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Things to consider as a key decision maker

What's the risk of downtime or data loss to your business?

Are there times when it's okay for your application to be inaccessible?

Is access to your data tied directly to your revenue?

Are your customers globally distributed?

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Industries that can't afford downtime or data loss

Finance
Payments
Bank account access
Trading

Telecom
Video conferencing
Texting/alerting

Transportation
Travel
Rideshare
GPS

Network & Cyber Security
Data protection
Auditing

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What can cause downtime or even data loss?

- upgrades
- hardware failures
- software failures
- data center outages
- operational errors

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What's the risk?
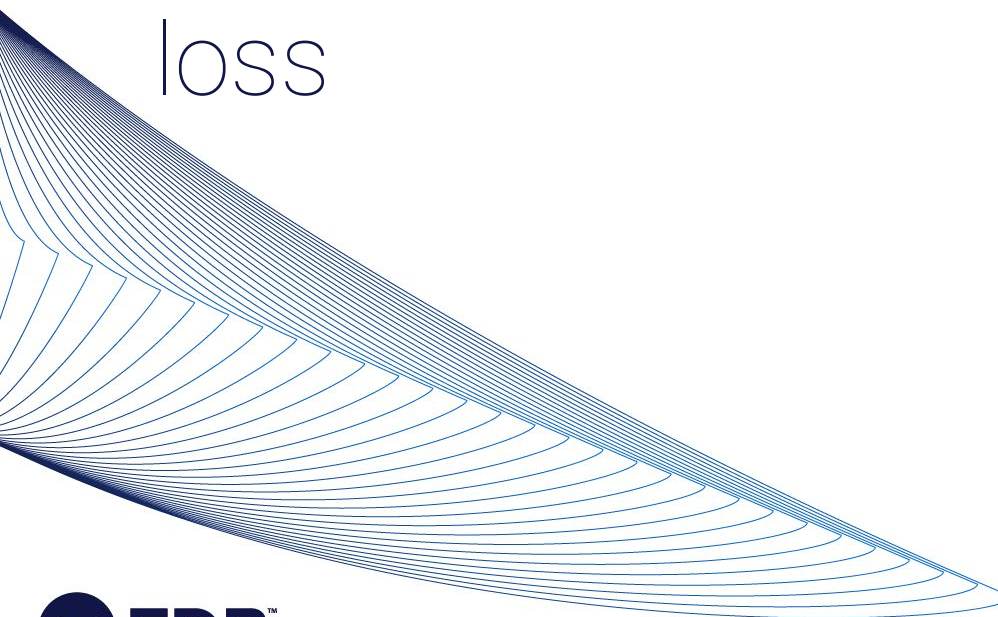
A real-world scenario: **Data loss**

Bank of XYZ holds millions of customer accounts with monetary and personal information.

Their data is not synchronously streamed to at least one other database node, thus not guaranteeing zero data loss.

They have a hardware failure.

They lose critical customer data.

A real-world scenario: Data loss

Outcome

Bank of XYZ could face:

- Customer lawsuits
- Regulatory compliance penalties
- Lost customer trust reputational damage
- Increased operational costs in the short term correcting issues

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A real-world scenario: **Unexpected downtime**

XBrand has 1,000s of locations and eCommerce with payment processing.

They process 100 business transactions per second with an average value of $85.

They have a primary-standby structure.

They have a data center outage. They experience an outage for five minutes.

They are unable to process **30,000 transactions.**

A real-world scenario: Downtime

Outcome

XBrand lost approximately $2.5M in just 5 minutes

Plus:

- Upset customers
- Possible bad word-of-mouth could slow new acquisition

POLL:
What does high availability mean to you?

1. Elimination of single points of failure
2. Reliable failover/switchover
3. Detection of failures as they occur
4. All of the above

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How to lower your **risk**

- Implement a multi-master replication structure
- Distribute your database: local or global

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EDB Postgres
Distributed

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EDB Postgres Distributed

The most advanced replication solution for Postgres

Maintain extreme high availability

Postgres clusters deployed with EDB Postgres Distributed keep top tier enterprise applications running

Upgrade with near zero downtime

Rolling upgrades of application and database software eliminate the largest source of downtime

Geographically Distributed Workloads

Global enterprise applications can address data sovereignty and stay in sync with EDB Postgres Distributed

15

Extreme High Availability

Challenge: Downtime

Your application needs five 9s availability to maintain and grow revenue. Those 9s can be stolen by:
- upgrades
- hardware failures
- software failures
- data center outages
- operational errors

Solution: EDB Postgres Distributed

- EDB Postgres Distributed protects against the number one enemy of five 9s: **upgrades**

- Multi-master architecture provides **~2 second failover**

- Designed for **conflict handling**

- **Distributed transaction handling** to protect against data loss

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How can multi-master replication reduce your data loss or downtime risk?

Create an architecture that can achieve 99.999% availability.

1. Each member of an HA cluster can accept transactions at any time, so that in the case of a failure of the current primary, the application can immediately start transacting on another server without first waiting for the cluster infrastructure to ascertain the failure and promote a replica

2. Logical replication supports Postgres servers of different major versions, which means rolling upgrades are possible without ever shutting down the service.

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Geographically Distributed Workloads

Challenge: Conflicts

Read/write transactions for a wide area user base means challenges with latency, performance, and replication

- Need to resolve multi-location data conflicts
- Requires design considerations
- Likely requires application changes
- Different paradigm than many existing applications

Solution: EDB Postgres Distributed

- Advanced column-level conflict handling and conflict-free replicated types (CRDTs)

- Keep regional data local for data sovereignty

- Designed for conflict handling

What's different about **EDB Postgres Distributed?**

- Automatic DDL and DML replication in an active-active mesh network

- Failover and switchover infrastructure to re-route traffic in case of failures or during maintenance operation

- Advanced conflict detection and conflict management

- Differentiated replication sets to control which data gets replicated and to which downstream databases

- Cluster expansion/consolidation

- Rolling database upgrades

- Rolling schema change/migration using cross-schema replication

- Recovery from user error through solid integration with backup and recovery tools

Success Story

ACI Worldwide reduces risk and lowers costs

ACI Worldwide processes more than $14 trillion in payments and securities transactions every day. That intense volume of real-time transactions comes with many technical requirements and associated costs.

The challenge:

As part of a multi-year modernization effort, ACI Worldwide sought to reevaluate its database investments. The goal was three-fold:

1. Identify a strong technical partner responsive to ACI's evolving requirements.
2. Eliminate the architectural compromises often dictated by proprietary databases without sacrificing functionality needed by ACI's real-time solutions.
3. Reduce and simplify database licensing costs.

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ACI Worldwide reduces risk and lowers costs

The need:

A solution that could support multi-master replication in a true active-active deployment with elegant conflict resolution capabilities.

Enter EDB Postgres Distributed.

ACI Worldwide reduces risk and lowers costs

The Results:

- Improvements in performance, application flexibility, and features, thereby reducing risk
- Streamlined licensing and lower costs
- A harmonized database architecture suitable for adoption by ACI's entire portfolio
- A drive towards open-source adoption
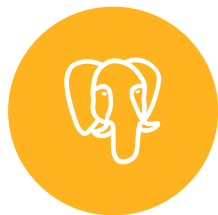- An active, collaborative, long-term partner

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Achieve extreme high availability

24

Customize to your needs

Choice of architecture

Flexible architectures based on the data redundancy and number of data centers

Choice of Postgres

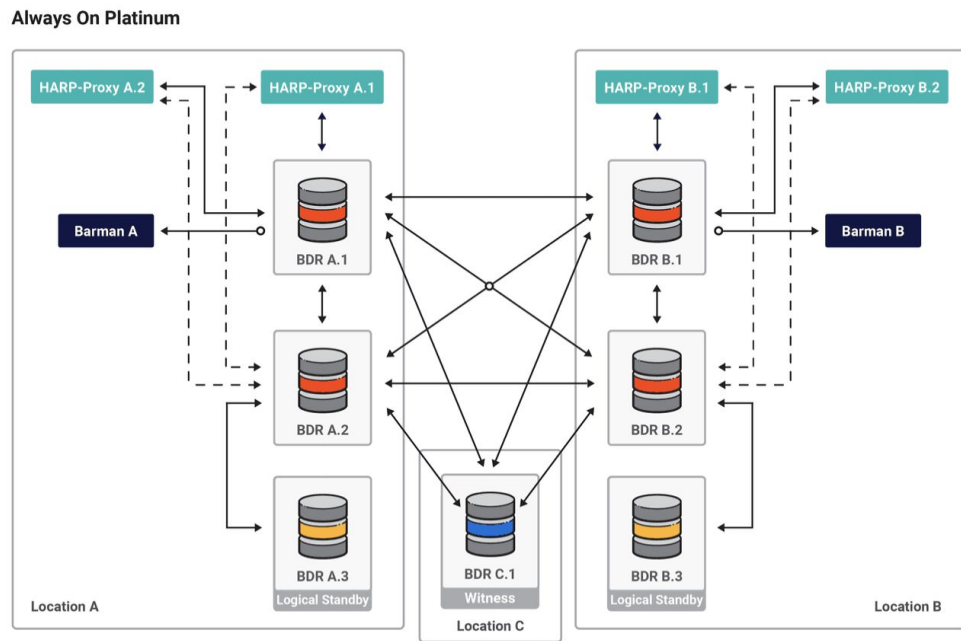Clusters deployed with PostgreSQL, EDB Postgres Advanced Server or EDB Postgres Extended Server

Choice of consistency

Robust capabilities provide flexibility to meet application data loss requirements

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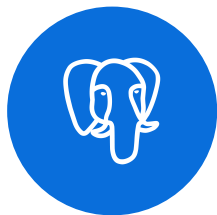
25

Choice of Architecture

Allowing you to choose the architecture that matches your goals

- Multi-master cluster
- Mesh architecture to minimize latency between nodes
- Raft consensus layer
- Integrated with other services
- Pooling, backup, proxy
- Multiple possible architectures
- Logical standbys
- Subscriber-only nodes
- Witness nodes
- Cloud, on-premises, or hybrid
- Self managed or managed service

Always On Platinum

HARP-Proxy A.2 | HARP-Proxy A.1 | HARP-Proxy B.1 | HARP-Proxy B.2

Barman A | BDR A.1 | BDR B.1 | Barman B

BDR A.2 | BDR B.2

BDR A.3 Logical Standby | BDR C.1 Witness | BDR B.3 Logical Standby

Location A | Location C | Location B
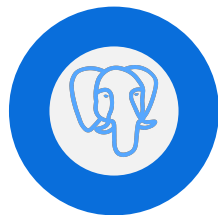
Choice of Postgres

Allowing you to choose the database for your needs

PostgreSQL

Community open source

EDB continues to be committed to advancing features in collaboration with the broader community

Postgres Compatible

EDB distributions

Postgres, extended for stringent availability and advanced replication needs

Oracle Compatible

EDB distribution

Postgres compatible with Oracle reducing the effort to migrate applications and data

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Choice of Consistency

Allowing you to choose the durability for your needs

Asynchronous
Default and eventually consistent

Synchronous
Same synchronous replication used by Postgres natively

Commit at Most Once
Synchronous replication with inflight transaction tracking between a pair of nodes for additional consistency check options during failover

Group Commit
Quorum-based synchronous replication - changes are committed if a quorum of nodes respond

Eager All Node
Transactions are applied on all nodes simultaneously and committed only if no conflicts are detected

Least Consistent → Most Consistent

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Who's a good fit?

Requirement / Characteristic	Good fit for EDB Postgres Distributed	Fit for another EDB solution
Availability Requirements	99.99 - 99.999% Four to Five 9s	99.9 - 99.99% Three to Four 9s
Data Centers & Geographic Regions	Globally distributed	Not globally distributed
Upgrade downtime	Rolling upgrades with near-zero downtime	Appetite for maintenance windows
Application tier	"Tier 1"	"Tier 2" & "Tier 3"
Application types	Payment gateways, telecommunications call routing, global collaboration	HR, Expense Reporting, CRM

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Discover the power of EDB Postgres Distributed

Request a demo with our team

enterprisedb.com/contact

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