



EDB Postgres
Distributed:
“Always On”

**High Availability: How to achieve up to five 9s and
optimize your database**

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POLL:

What does high availability mean to you?

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

What is “always on”?

In the past, high availability used to refer to technology protecting users from hardware failures, network glitches, and software faults.

Today, high availability technology makes sure that software services are always on—365 days a year, 24 hours a day. High availability products still protect users from failures, but as hardware, networks, power supplies, and storage devices have become much more reliable, near-zero downtime maintenance and management have moved to the forefront of the debate.

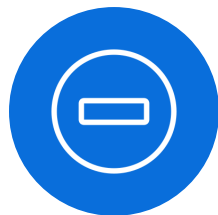
Why do you
need to be
“always on”

Does your business need to be always on ?

Things to consider



What's the reputation cost of downtime 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?

Industries that can't afford major downtime



Finance

Payments
Bank account access
Trading



Telecom

Video conferencing
Texting/alerting



Transportation

Travel
Rideshare
GPS



Network & Cyber Security

Data protection
Auditing

Always on is important because...



Your application represents a promise to your customers



The availability of your applications ties directly to how you generate revenue



Your application must perform well for a good user experience



Your application data must always be current and available or your users lose trust

A real world scenario

Imagine a brand that may have
1,000s of locations and
eCommerce with payment
processing

Processing 100 business
transactions per second

And the average transaction is \$85

If there is an outage/unplanned
downtime of 5 minutes...

The business will miss out on 30,000
transactions ...

And be out **\$2.5M** in revenue.

**This disappoints 30,000 customers
directly, plus the friends and family
they talk to.**

How downtime impacts your business

Immediate Impact

- How much does downtime cost your business per second/minute/hour?
- Will users go elsewhere as soon as you're down?
- Will there be regulatory consequences?

Aftermath

- Lost customers: can you win them back?
- Will competitors go after your remaining users?
- Reputation: will bad word-of-mouth slow down new user acquisition?

How downtime impact operation staff?

Immediate Impact

- Resources diverted from priority business initiatives?
- Pressure to determine root cause and recovery?
- Ensuring complete recovery of interrupted business transactions?

Aftermath

- Post mortem triage?
- Delayed projects?
- Loss of confidence?
- More process?

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

Use Cases

You've chosen Postgres

Your application needs
to be always on

Any downtime = Loss of
business continuity =
Revenue loss

You need:

- A replication solution
- Geographically distributed database clusters
- Extreme high availability
- Optimal performance at all times
- Advanced monitoring

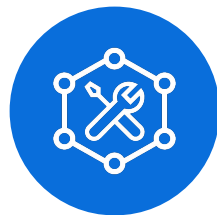
Enter EDB Postgres Distributed

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

Extreme High Availability

A decorative graphic consisting of numerous thin, curved lines that sweep from the left side of the slide towards the right, creating a sense of motion and depth. The lines are light blue and become more densely packed as they curve.

Challenge: Uptime

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

telegra switches to primary-primary

Use case

telegra is a next-generation telecom provider that handles 90 million minutes of call time a month. One of telegra's successful products is a Web-based automatic call distribution (ACD) solution for call centers.

Need

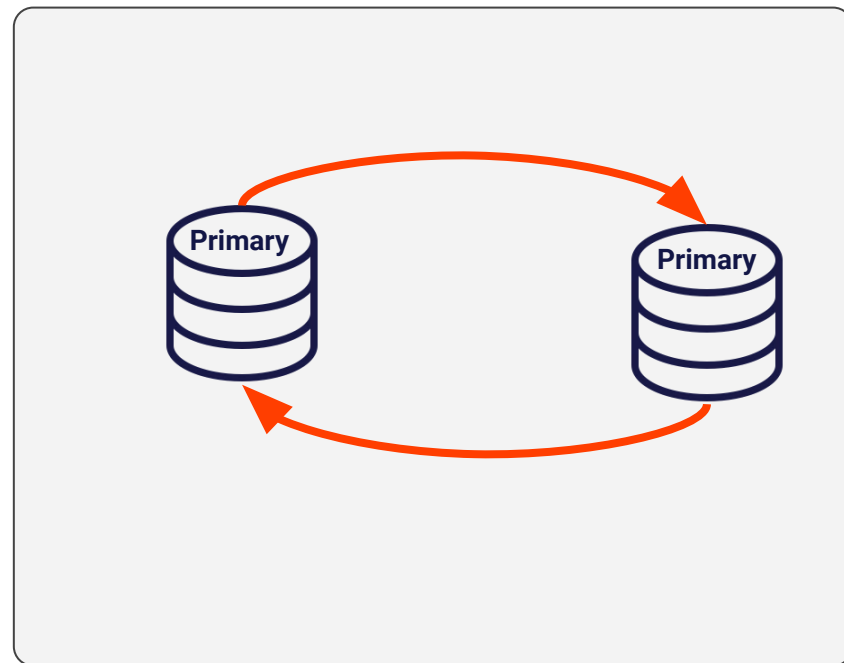
telegra's web applications used a binary primary-failover datacenter model, which did not allow them to respond quickly enough to changing customer demand and ensure 24/7 availability at the same time.

Solution

telegra adopted EDB Postgres Advanced Server (EPAS) with EDB Postgres Distributed across its Dusseldorf and Cologne data centers, enabling the company to a primary-primary setup.

Value

EDB Postgres Distributed synchronized data configuration, routing plans, and call detail records, which has helped telegra keep its customer data highly available and synchronized at all times. They report no major downtime and were able to reinvested the freed-up support time into application innovation.



Upgrade with near zero downtime

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Challenge: Upgrades

You need to be able to proactively keep your software secure and leverage of new features. Upgrades are the single largest source of downtime:

- Security/Maintenance releases - 4 times/year
- Unscheduled bugs ~1/year
- Parameter changes, hardware changes also

Solution: EDB Postgres Distributed

- Automatic rolling upgrades: start from least used node and roll across all nodes slowly
 - Can be manually controlled, if desired
- Resolves one of the main sources of unavailability in modern systems
- Works across major software releases of OS, Postgres, and/or PGD

Sample upgrade



Geographically Distributed Workloads

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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

ClickUp solves performance & scalability issues

Use case

ClickUp, a SaaS project management and collaboration company experienced massive growth with customers spanning individuals to large enterprises supporting over 100,000 teams globally.

Need

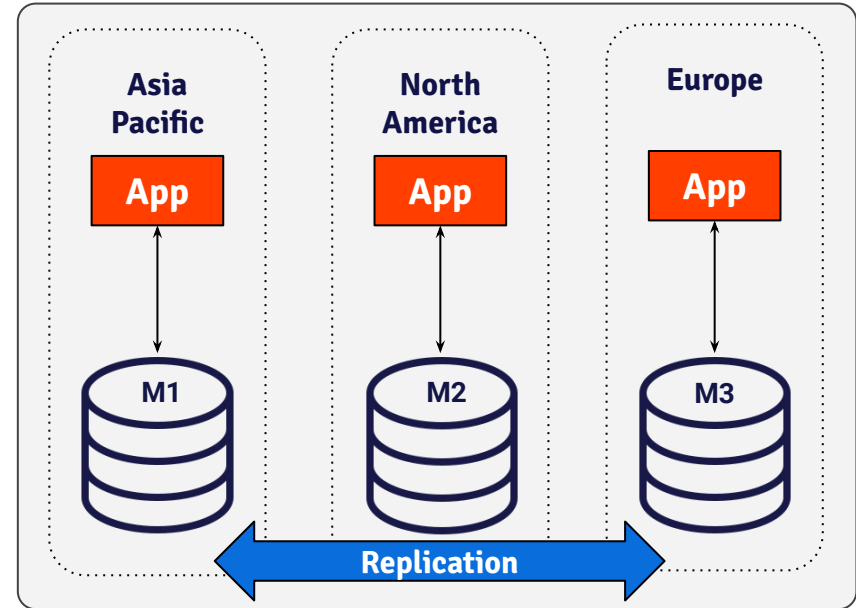
Provide consistent performance to their international customer base while scaling up their business in multiple regions.

Solution

ClickUp selected EDB Postgres Distributed to address geo-distributed needs of their customer base, and later upgraded to gain improved performance, rolling upgrades, and high availability.

Value

EDB Postgres Distributed has contributed to the 99.99% uptime for 12 consecutive months of ClickUp's 7 node global deployment.





How
to achieve
extreme high
availability

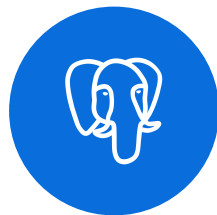
EDB Postgres Distributed

The most advanced replication solution for Postgres



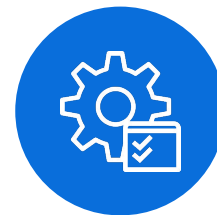
Choice of architecture

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



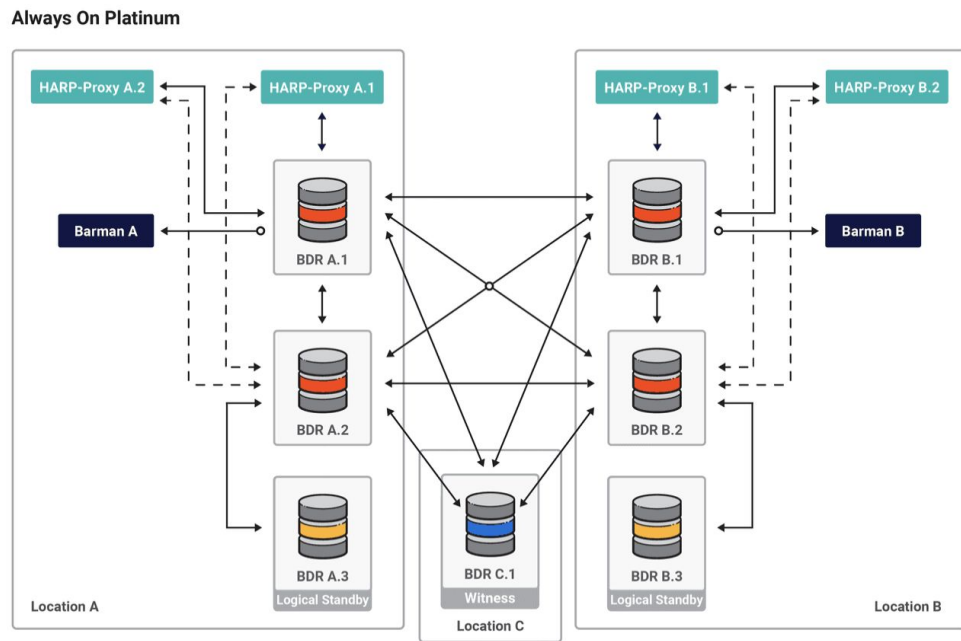
Choice of consistency

Robust capabilities provide flexibility to meet application data loss requirements

Choice of Architecture

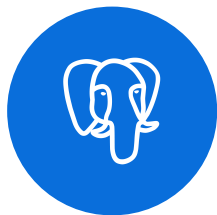
Allowing you to choose the architecture that matches your goals

- 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



Choice of Postgres

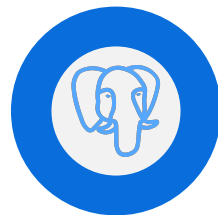
Allowing you to choose the database for your needs



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

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

A full-featured multi-master replication solution for Postgres clusters

Essentials

Provides the essential multi-master capabilities for Postgres clusters

- Enables application and database upgrades without requiring downtime
- Provides clusters row level eventual consistency by default
- Concurrent streaming of large transactions smooths replication and reduces lag
- Tools to monitor operation and verify data consistency

Advanced

Includes advanced conflict management, data-loss protection, and up to 5X throughput

- Guards applications from committing transactions more than once
- Conflict-free synchronous replication with two phase commit
- Concurrent updates using conflict-free replicated data types (CRDTs)
- Configurable column level conflict resolution along with customizable conflict handling and transformation

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
- Improved security model with geo-fencing, allowing selectively replicate data for security compliance and jurisdiction control

New in EDB Postgres Distributed 4.1



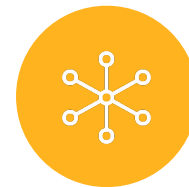
Reliability and Operability

Faster, fully online major version upgrades



Performance and Scalability

Replication lag control with asynchronous replication



High Availability and Recovery

More flexibility for durable replication with Group Commit



User Experience

Greater control with command line interface



User Experience

Simplified synchronous replication configuration with SQL level interface



User Experience

Automatic management of distributed sequences

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

Multi-master replication enabling highly available and geographically distributed Postgres clusters



- 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, allowing selectively replicate data for security compliance and jurisdiction control.

Ready to start
your journey to
five 9s?

Discover the power of
EDB Postgres Distributed

Request a demo with our team
enterprisedb.com/contact



Questions