# Discover the power and versatility of PostgreSQL

Marc Linster; CTO
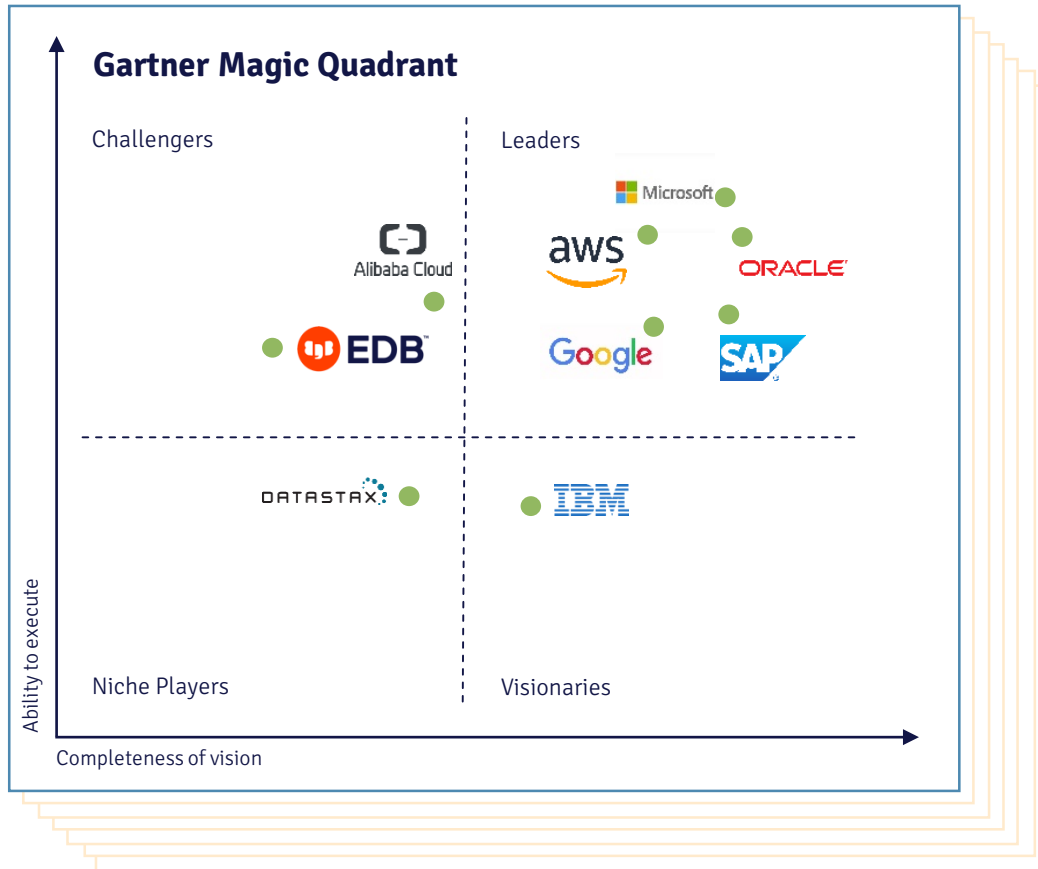
August 2021

EDB™

# Agenda

- **EDB - the Postgres company**

- Postgres - more than just another relational database

- Postgres and the multi-cloud strategy
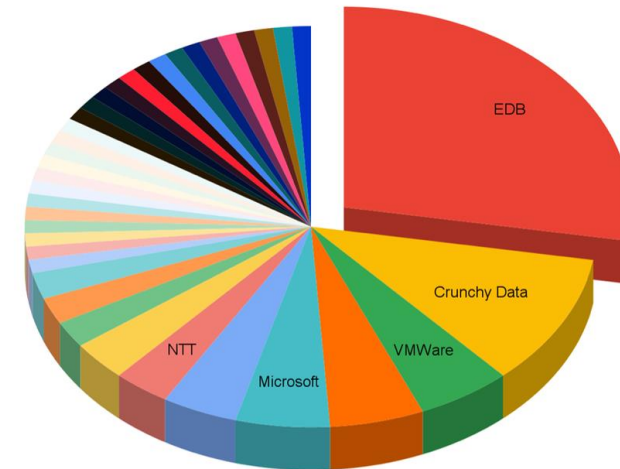
- How our customers are using Postgres

# EDB: Database fanatics who care deeply about Postgres

## Market leadership

### Gartner Magic Quadrant

Challengers | Leaders

Microsoft
aws
ORACLE
Alibaba Cloud
EDB
Google
SAP

DATASTAX
IBM

Niche Players | Visionaries

Ability to execute

Completeness of vision

## PostgreSQL leadership & vision

**Postgres V13 contributors by company**



Legend:
- EDB
- Crunchy Data
- VMWare
- Postgres Pro
- Microsoft
- Credativ
- NTT
- Fujitsu
- PeopleDoc
- Dalibo
- Adjust
- Yandex
- University of Cambridge
- True Software
- Swarm64
- SRA OSS
- Rakuten
- Postgres Experts
- Playtech
- Paragon
- Open Standards Promotion Center, Japan
- Ongres
- MongoDB
- Minsait
- iovation
- ILande
- Huawei
- HeteroDB
- Google
- Facebook
- Deriv.com
- Cybertec
- conova communications GmbH
- Brandwatch
- Basefarm AS
- Appen
- Amazon
- Afilias

# The Largest PostgreSQL Company

**5,300+**

lifetime customers

**Over 300**

dedicated PostgreSQL technologists

**91%**

customer satisfaction rating

**28%**

of Fortune 500 companies are customers

**40%**

of customers deploying in cloud

**2**

Founders of Postgres Community

# Global market success

# Market success in Australia and New Zealand

**A Government Department**

- is using PostgreSQL to more quickly implement policy changes for the benefit of its citizens without disrupting services and delivering operational cost savings. PostgreSQL helps the government department calculate entitlements for citizens needing government support.

**An Immigration Department**

- uses EDB Postgres Advanced Server for its border control system

**An Energy Industry Leader**

- is using EDB Postgres Advanced Server for real-time data processing and Data Warehouse and archiving capabilities to help in planning and monitoring purposes, helping operations to act proactively, prevention of failures in distribution, etc.

# The most PostgreSQL experts

## EDB team includes:

300+ PostgreSQL technologists

29 PostgreSQL community contributors and committers

Including founders and leaders like

**Michael Stonebraker**
"Father of Postgres"
and EDB Advisor

**Bruce Momjian**
Co-founder, PostgreSQL
Development Corp and
PostgreSQL Core Team

**Peter Eisentraut**
PostgreSQL
Core Team member

**Robert Haas**
PostgreSQL Major
Contributor and Committer

**Simon Riggs**
PostgreSQL Major
Contributor, Founder
of 2ndQuadrant

# EDB Postgres - technology for the enterprise

## Technology

### PostgreSQL
ACID compliant; MVCC; object relational; extensible; scalable; reliable

### EDB Postgres Advanced Server
Oracle compatibility: PL/SQL, 26 native packages, hints, password profiles, OCI/JDBC/ODBC/.NET drivers; Security; Manageability

### High Availability
Streaming replication, logical replication, near-zero downtime operation

### Management
Database development, monitoring, alerting, management by exception

### Integration
Replication from/to 3rd party; FDW/SQL MED; geo-distributed replication

### Migration
Schemas, stored procedures, data, snapshot migration, change data capture

## Platforms

### Self-managed

#### Virtualized
aws
Microsoft Azure
Google Cloud
vmware

#### Bare Metal
Linux
Windows

#### Containerized
RED HAT OPENSHIFT
docker
Amazon EKS
Azure Kubernetes Service (AKS)
Google Kubernetes Engine

### Managed

**EDB DBaaS (preview)**

IBM Cloud

POLARDB
Alibaba DBaaS

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- Postgres and the multi-cloud strategy

- How our customers are using Postgres

**First Poll**

POWER TO POSTGRES

# Postgres is the most transformative open source tech since Linux

# PostgreSQL wins!



DBMS of the YEAR 2017 — DB-Engines.com

DBMS of the YEAR 2018 — DB-Engines.com

DBMS of the YEAR 2020 — DB-Engines.com

## Most Commonly Used Database



Most used database

- MySQL
- PostgreSQL
- Microsoft SQL Ser...
- SQLite
- MongoDB
- Redis
- MariaDB
- Oracle
- Firebase
- Elasticsearch
- DynamoDB
- Cassandra
- IBM DB2
- Couchbase

0%   20%   40%   60%

1/13 ▼

## Most Loved Database



Most loved database

- Redis
- PostgreSQL
- Elasticsearch
- MongoDB
- Firebase
- MariaDB
- Microsoft SQL Ser...
- DynamoDB
- SQLite
- MySQL
- Cassandra
- Couchbase
- Oracle
- IBM DB2

0%   20%   40%   60%   80%

## Postgres Popularity



DB–Engines Ranking

Oracle
MySQL
Microsoft SQL Server
PostgreSQL
MongoDB
IBM Db2
Redis
Elasticsearch
SQLite
Microsoft Access
Cassandra
MariaDB
Splunk
Hive
Microsoft Azure SQL Database
Amazon DynamoDB
Teradata
SAP HANA
Neo4j
Solr
SAP Adaptive Server
FileMaker
HBase
Google BigQuery
Microsoft Azure Cosmos DB
Couchbase
Snowflake
PostGIS
InfluxDB
Memcached
Firebird
Amazon Redshift
Informix
Vertica
Spark SQL

Score (logarithmic scale)

1k
800
600
400
200
100

2013  2014  2015  2016  2017  2018  2019  2020  2021

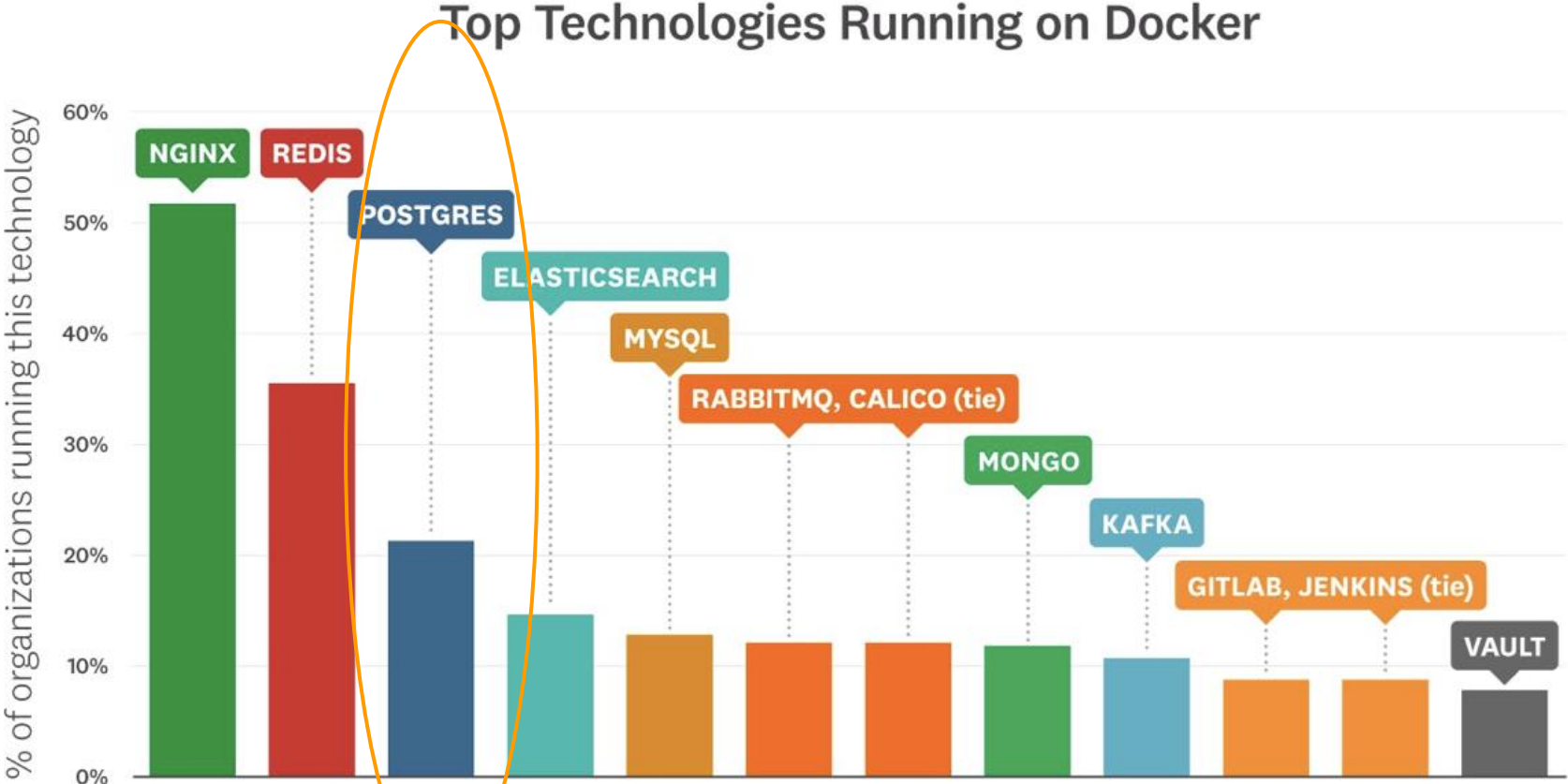© May 2021, DB-Engines.com

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Source: Stack Overflow Developer Survey, 2020 (65,000 developers)

Source: DB-Engines.com, 2020

# Datadog November 2020



## Top Technologies Running on Docker

% of organizations running this technology

- NGINX
- REDIS
- POSTGRES
- ELASTICSEARCH
- MYSQL
- RABBITMQ, CALICO (tie)
- MONGO
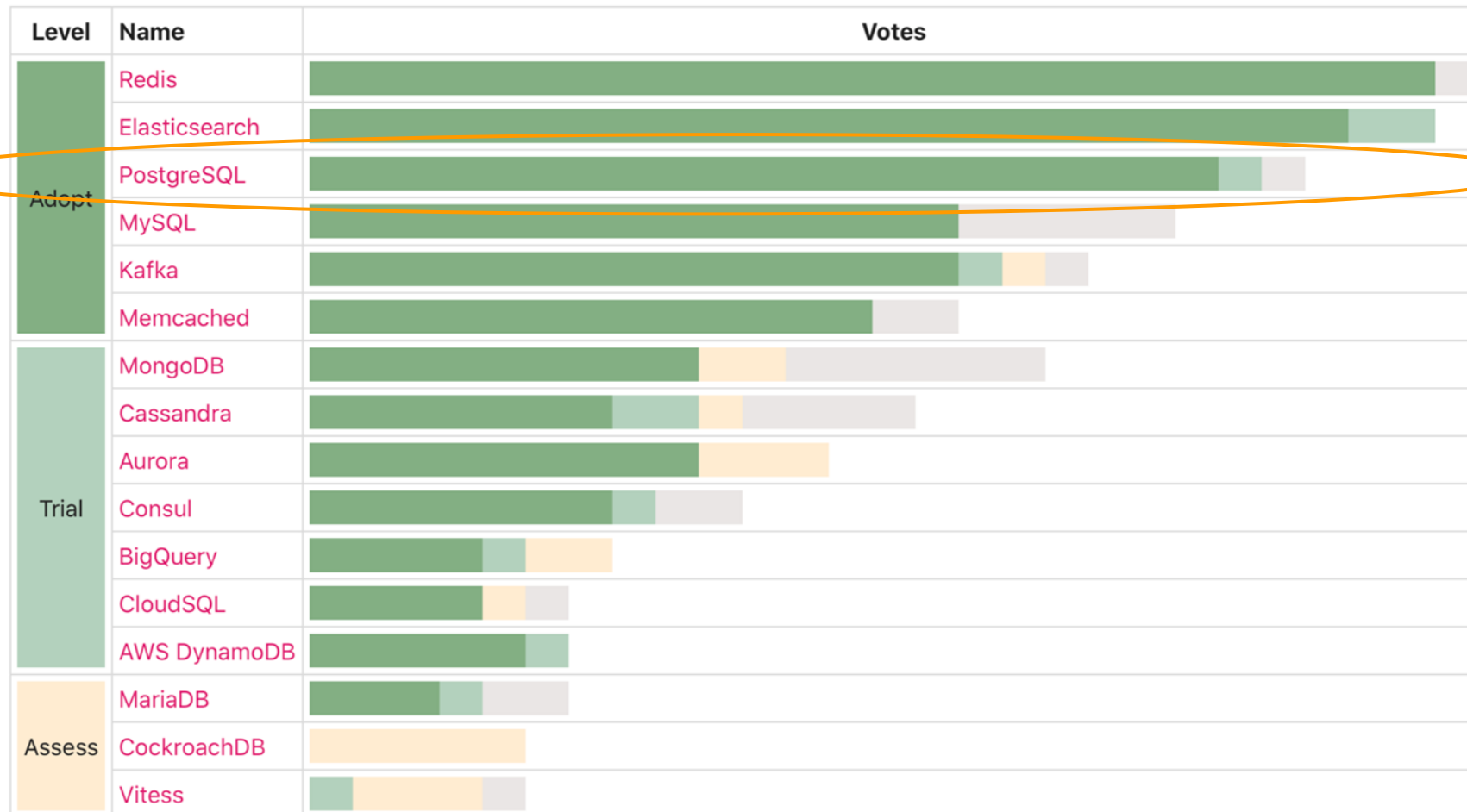- KAFKA
- GITLAB, JENKINS (tie)
- VAULT

*Source: Datadog*

# CNCF's Technology Radar for Database Storage (Nov 2020)

The CNCF End User Community was asked to describe what their companies recommend for different solutions: Adopt, Trial, Assess or Hold. This table shows how the End User companies rated each technology.



*26 companies contributed 217 data points*

Screenshot

# What is at the heart of Postgres' success

## Key decisions taken by Stonebraker et al and the PostgreSQL community

- Object relational model
  - Object-relational databases like Postgres support classes and inheritance, but most importantly, they define database functionality as objects that can be easily manipulated
    - JSONB, PostGIS, range types, key-value pairs, ISBN, IP V4, ....
    - Includes data types, indexes, and operators
- POSIX interface
  - Abstracts form OS specifics
  - Uses commodity hardware
  - Runs on every cloud, every OS, and all key hardware
- True open source community
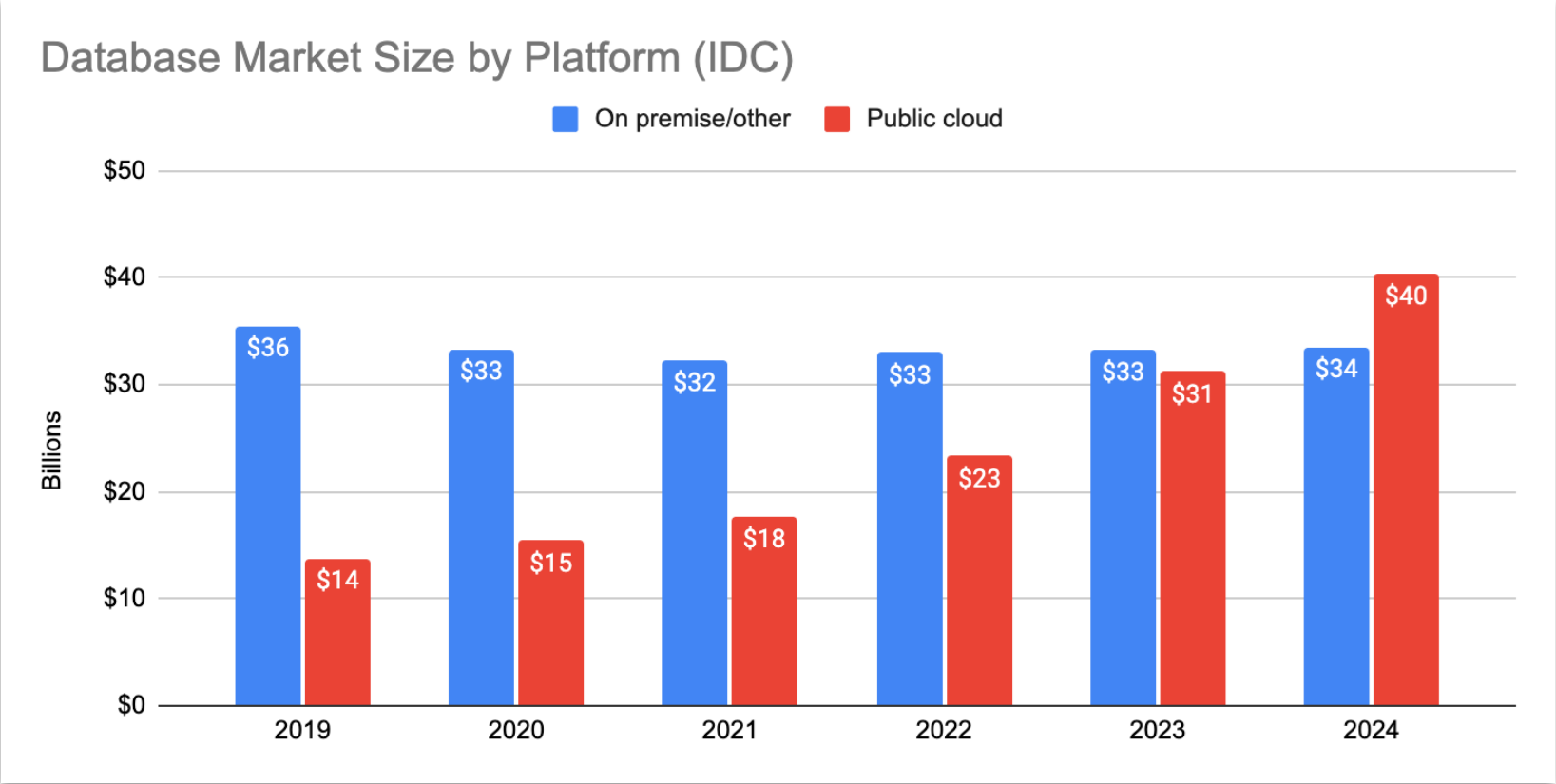  - Not beholden to one company
  - Open, user driven model
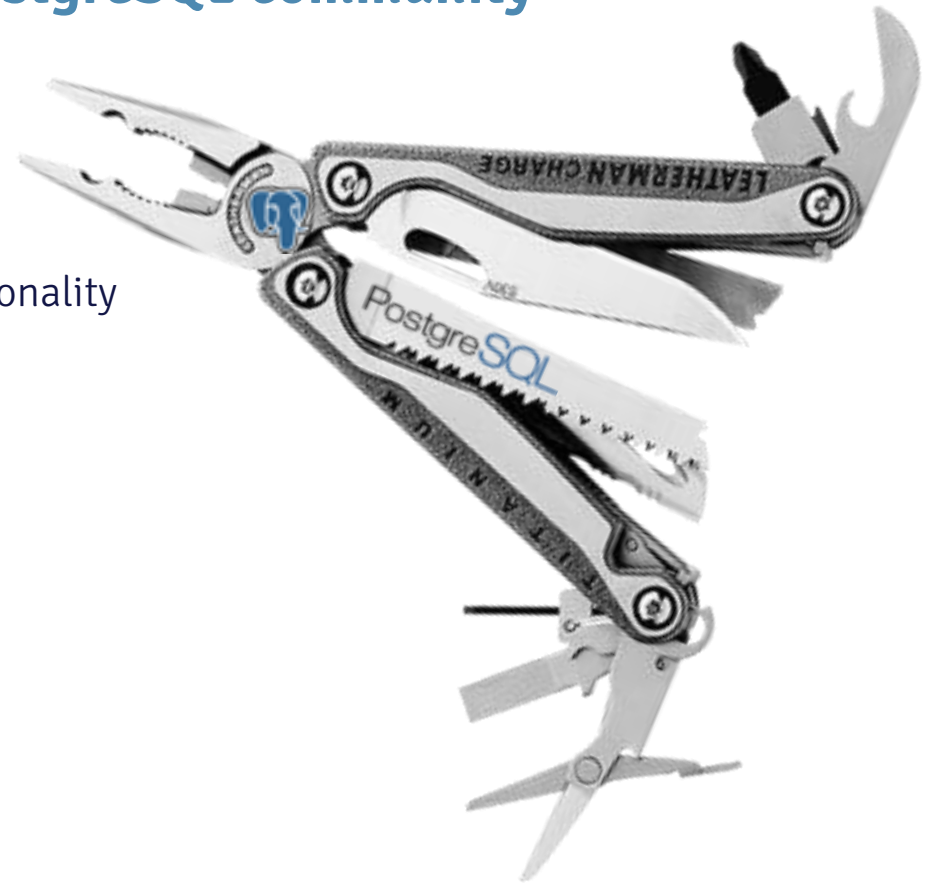
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- How our customers are using Postgres

Second Poll

# Exodus to public cloud is on

## Database Market Size by Platform (IDC)

**Legend:** ■ On premise/other  ■ Public cloud

| Year | On premise/other | Public cloud |
|------|------------------|--------------|
| 2019 | $36 | $14 |
| 2020 | $33 | $15 |
| 2021 | $32 | $18 |
| 2022 | $33 | $23 |
| 2023 | $33 | $31 |
| 2024 | $34 | $40 |

(Y-axis: Billions, $0–$50)

- Companies are rapidly expanding databases to public clouds
- Trend has accelerated across all industries and sectors
- By 2022, 75% of all databases will be deployed or migrated to a cloud platform, with only 5% ever considered for repatriation to on-premises (Gartner 2019)
- 40% of EDB customers are deploying EDB Postgres in the public cloud

# Postgres is the Lingua Franca of databases in the cloud

## DBaaS

- AWS RDS
- AWS Aurora
- Azure Database
- Google Cloud SQL
- EDB Cloud

## Kubernetes

- AWS Elastic Kubernetes Service
- Azure Kubernetes Service
- Google Kubernetes Engine

## Virtual Machines

- AWS EC2
- Azure Virtual Machines
- Google Cloud Platform Compute Engine

- Level of control vs. agility?
- Cloud lock-in vs. hybrid/multi cloud?
- Which PostgreSQL?
- Cost and performance requirements/implications?
- Support requirements?

# You have picked a cloud. Now...

| DBaaS | Kubernetes | Virtual Machines |
|---|---|---|
| ●AWS RDS<br>●AWS Aurora<br>●Azure Database<br>●Google Cloud SQL<br>●EDB Cloud | ●AWS Elastic Kubernetes Service<br>●Azure Kubernetes Service<br>●Google Kubernetes Engine | ●AWS EC2<br>●Azure Virtual Machines<br>●Google Cloud Platform Compute Engine |

**Fast deployment, preconfigured, developer gratification**

- Limited tuning, configuration, hardware, and architecture
- Higher $/TPS (20-50%)
- CSP Platform support ≠Postgres support

**Efficiency, automation, microservices and DevOps**

- Medium flexibility and configuration; automating best practices through operator
- Allows both application and DB to be orchestrated with Kubernetes
- Platform support from CSP, Postgres support from EDB

**Greater control over tuning, configuration, and architecture**

- Ideal for legacy to cloud migrations or new apps in conventional architectures
- Applications and DBs in VMs, infrastructure as code
- Infrastructure support from CSP, Postgres support from EDB

# EDB has answers

## DBaaS

- AWS RDS
- AWS Aurora
- Azure Database
- Google Cloud SQL
- EDB Cloud

## Kubernetes

- AWS Elastic Kubernetes Service
- Azure Kubernetes Service
- Google Kubernetes Engine

## Virtual Machines

- AWS EC2
- Azure Virtual Machines
- Google Cloud Platform Compute Engine

### EDB Cloud

- DBaaS from the Postgres experts
- Runs inside your cloud account
- Oracle compatibility

### EDB Cloud Native Postgres

- Second generation Kubernetes architecture for Postgres
- DevOps and microservices friendly
- Kubernetes-native high availability
- Embrace hybrid/multicloud strategies

### EDB Postgres on VMs

- Extreme HA 99.999% availability
- Superior monitoring and management
- Lower $/TPS, improved performance
- Fast migration from legacy to cloud
- Complete Postgres control

# EDB Cloud - Preview started August 16

Database as a service from the Postgres experts

## Postgres Expertise

EDB's expertise goes above the infrastructure; we steer the database roadmap and patch its bugs

## Oracle Compatibility

Leave Oracle and further your cloud journey with a fully managed Postgres service

## Continuous availability

High availability of your PostgreSQL clusters so you're always on, always available

*Single pane of glass for Postgres, everywhere*

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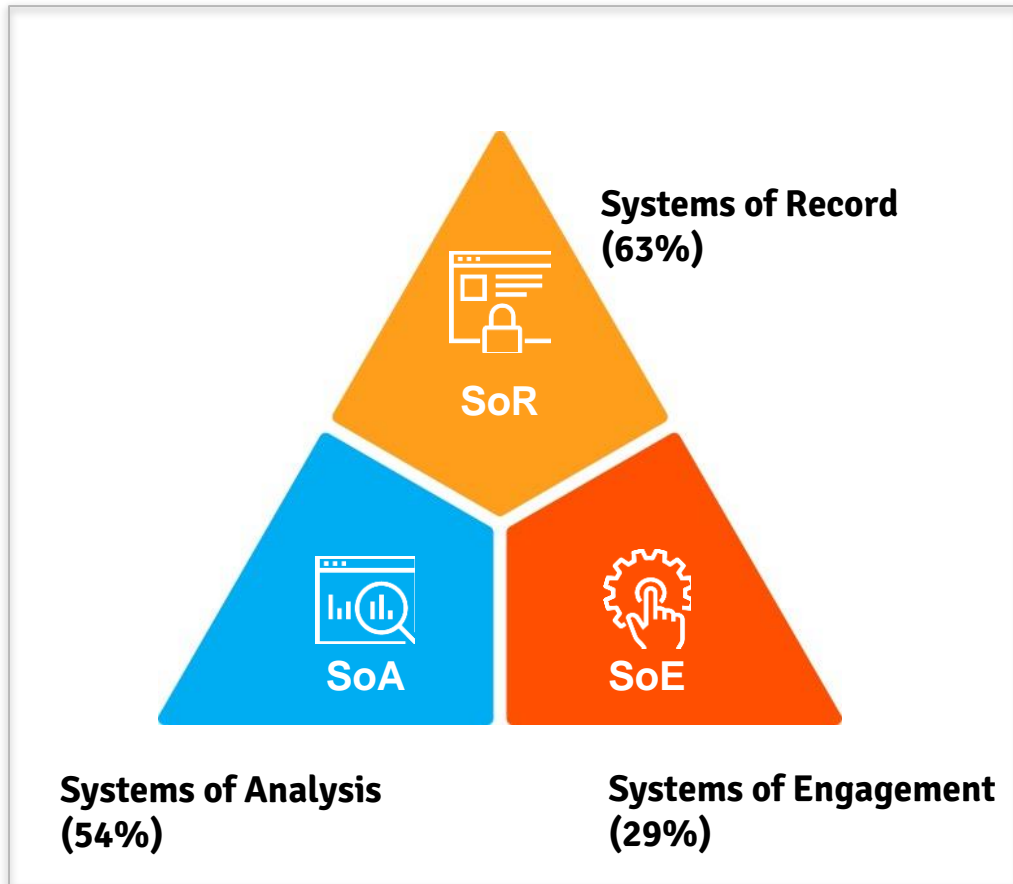- **How our customers are using Postgres**

Third
Poll

POWER TO POSTGRES

# Where Postgres Shines

| | Data Lake | Data Warehouse | Data Mart | ODS | System of Record | System of Engagement | Edge Computing | Mobile Computing |
|---|---|---|---|---|---|---|---|---|
| **Description** | 100 TB+; read-only; relational +; multiple topics; rel. Integrity not relevant ; data scientist focus | 50TB+; read only; relational; star/cube/mat. view; automatic refresh; multiple topics; analyst focused | 10TB+; read only; relational; star/cube/mat. view; periodic refresh; single topic; citizen analyst focus | 10TB+; read only; relational only; normalized data model; concurrent refresh; citizen analyst focused | 1-20TB; read/write; 90% relational; ACID; ERP/CRM, Line of business focused | < 2TB; read/write; relational + doc + GIS; ACID or BASE; micro services; website and social media focus | < 2TB; read/write; relational + doc + GIS; ACID or BASE; micro services; M2M, IoT focus | < 1GB; read/write; relational + doc + GIS; single user; micro services IoT, mobile app focus |
| **Key players** | Hadoop, Cassandra | Redshift, Snowflake, Teradata, Exadata, BigQuery | Exadata, Oracle DB, SQL Server, **Postgres** | Oracle, SQL Server, **Postgres** | Oracle, SQL Server, **Postgres** | MongoDB, MySQL, Redis, **Postgres**, | MySQL, **Postgres** | SQLite, Realm |
| **PostgreSQL Strengths** | | | Analytics capab.; compatibility; ease of integration. | Analytics capab.; compatibility; heterogeneous rep. | Innovation; cost; compatibility; no vendor lock in; | Multi-model; innovation; cost; Available Evrywhr | Multi-model; innovation; cost; Available Evrywhr | |
| **PostgreSQL Limitations** | Data volume and velocity | Hardware acceleration; MPP; S3 integration | | | Hardware failover | Native write scalability | | No single user footprint; no replication from/to mobile |

# What are the customer workloads?

**Systems of Record (63%)**

**SoR**

**Systems of Analysis (54%)**

**SoA**

**Systems of Engagement (29%)**

**SoE**

- Systems of Record: CRM, ERP, Supply Chain, Order Management, ...

- Systems of Engagement: Websites, Social Media

- Systems of Analysis: Data marts, operational data stores, tactical analytics

- SoE went from 18% to 29% in three years

# Mission critical? Departmental?

**Departmental**

RPO: 24 hours
RTO: 24 hours
GRO: NA
DB Failover time: NA
An. maint. window: 24 hours
SLA: 99.5%

**Departmental Mission Critical**

RPO: 1 min
RTO: <1 min
(Failover)
6 hours
(PITR)
GRO: NA
DB Failover time: <1 min
An. maint. window: 6 hours
SLA: 99.99%

**Enterprise Mission Critical**

RPO: No data loss
RTO: <1 min
(Failover)
< 3 hours
(PITR)
GRO: 1 min
DB Failover time: <1 min
An. maint. window: 4 hours
SLA: 99.999%

**Enterprise Mission Critical High Volume**

RPO: No data loss
RTO: <1 min
(Failover)
< 3 hours
(PITR)
GRO: 1 min
DB Failover time: <1 min
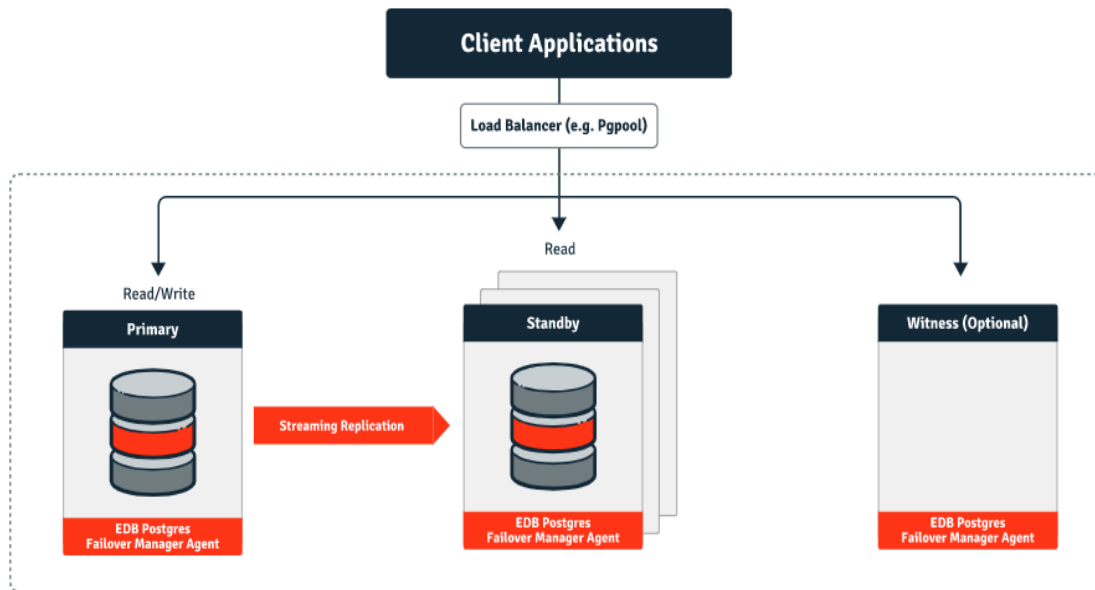An. maint. window: 4 hours
SLA: 99.999%

**Enterprise Mission Critical High Volume & High Scale**

RPO: No data loss
RTO: <1 min
(Failover)
< 3 hours
(PITR)
GRO: 1 min
DB Failover time: <1 min
An. maint. window: 4 hours
SLA: 99.999%

**Streaming Replication**      **Logical Replication**

# Streaming Replication: EDB Failover Manager



- Monitors database health - detects failures and takes action

- Automatically fails over to the most current standby, reconfigures others

- Reconfigures load balancers on failover - integrates with pgPool and others

- Avoids "split brain" scenarios - Prevents two nodes from thinking that each is primary

- **99.99%** availability for Postgres on prem and in the cloud

# Logical Replication: Postgres-BDR™ Always On

- Logical replication

- Multi-master cluster

- Mesh architecture

- Raft consensus layer

- Integrated with other services

- Pooling, backup, proxy

- **99.999%** availability for Postgres on prem and in the cloud
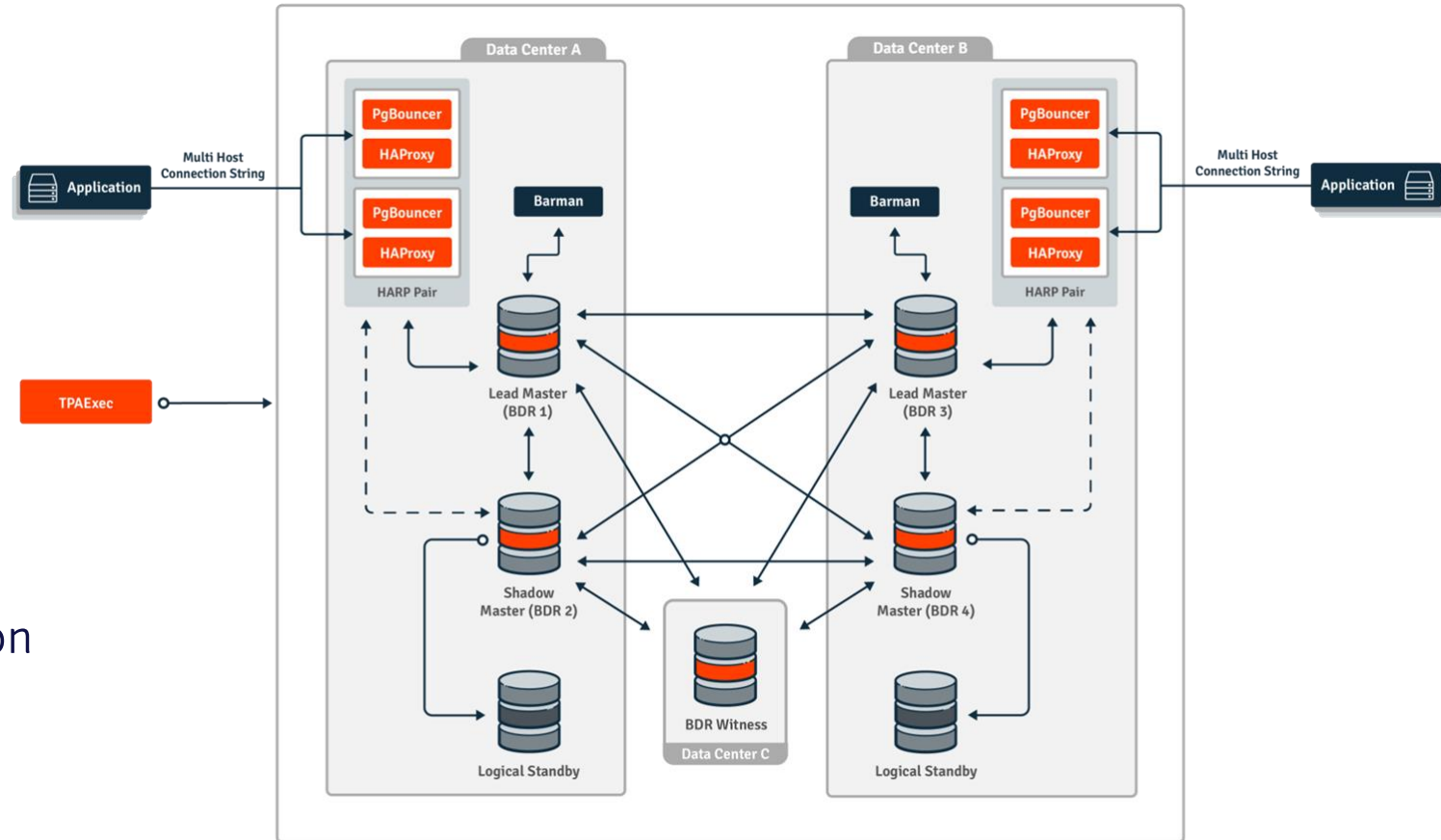
# EDB Postgres Advanced Server

**Enterprise-ready, Oracle-compatible PostgreSQL**

## Migrate from Oracle faster

Compatibility with Oracle database schemas, data types, indexes, functions, and utilities

## Reduce risk and support compliance

Meet HIPAA, GDPR, and PCI regulations with enhanced security features

## Improve developer and DBA productivity

Over 200 pre-packaged utility functions, user-defined object types, and more

# EDB Postgres Advanced Server

Additional Security

Developer Features

Database Admin Features

Performance Features

Oracle Compatibility
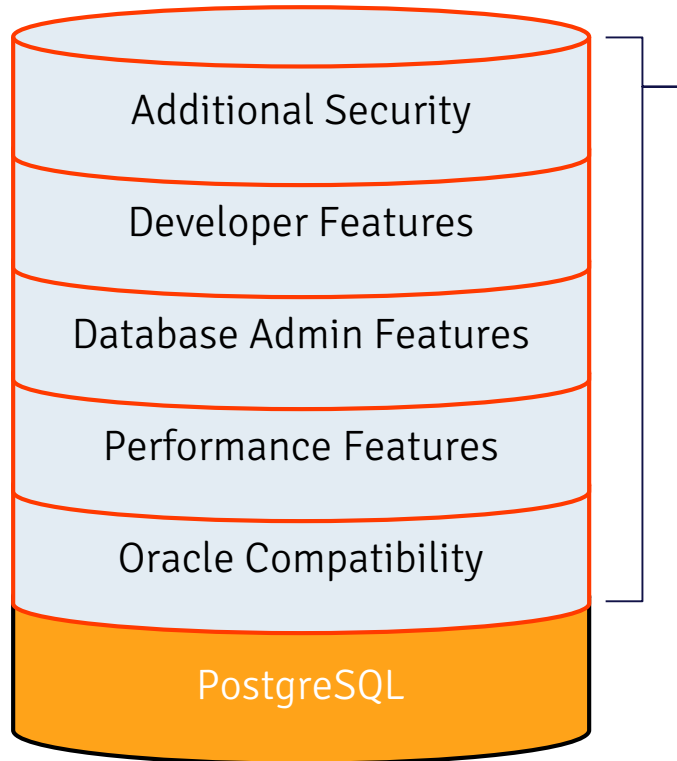
PostgreSQL

## EDB Postgres Advanced

- **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

- **Oracle Compatibility -** Compatibility for schemas, data types, indexes, users, roles, partitioning, packages, views, PL/SQL triggers, stored procedures, functions, and utilities

# Postgres is the most transformative open source tech since Linux

# EDB makes it enterprise-ready

# Conclusion

- Most transformative technology since Linux

- Runs in every cloud, public or private

- Won the battle for the hearts and minds of DBAs and developers

- Covers 90%+ of all database use cases

- Choose the right partner

# Use Postgres
# Get stuff done!