EDB :
The New Paradigm Shift in Database

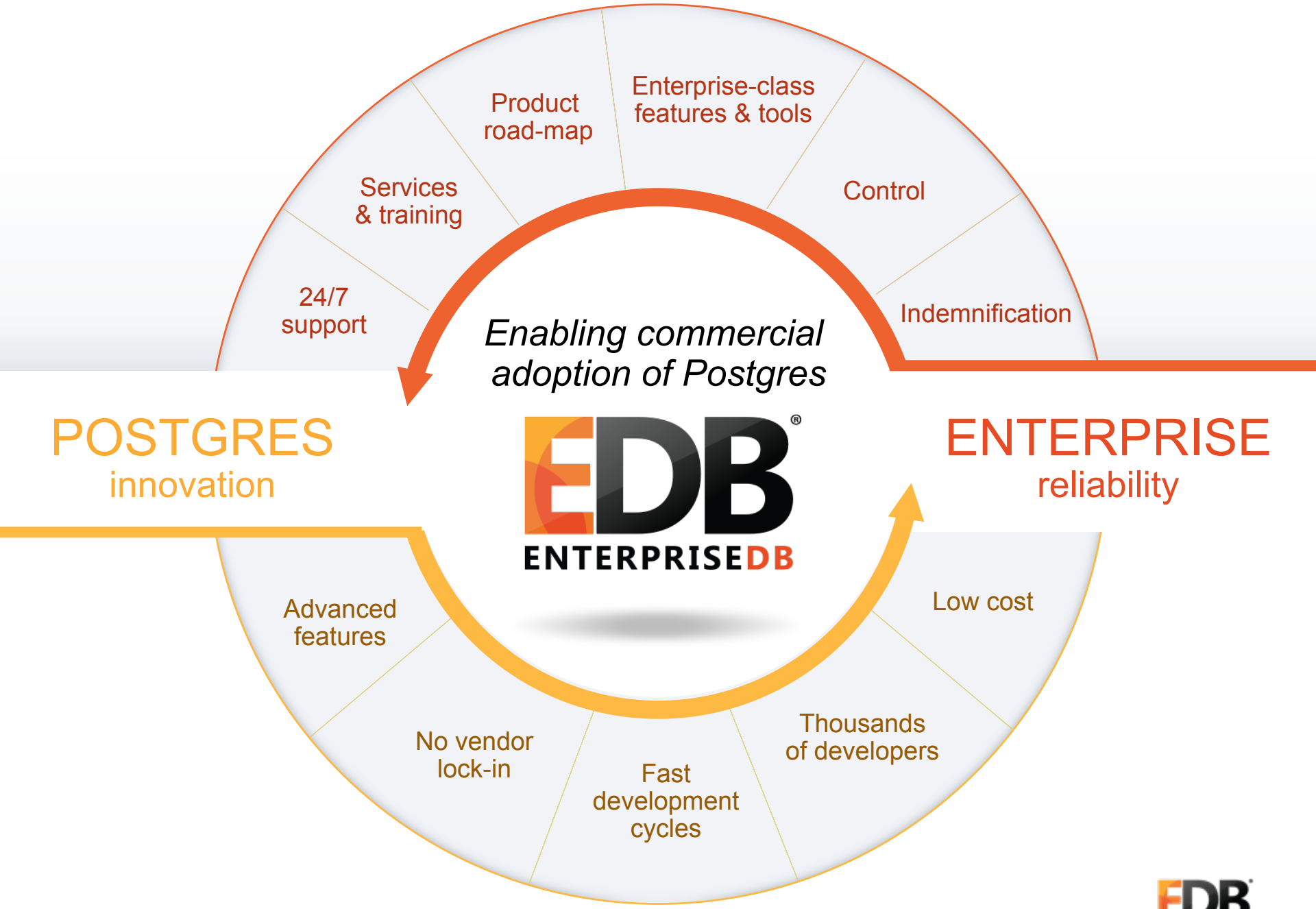
Sean Doherty, Senior Vice President, EnterpriseDB

2014-05-21

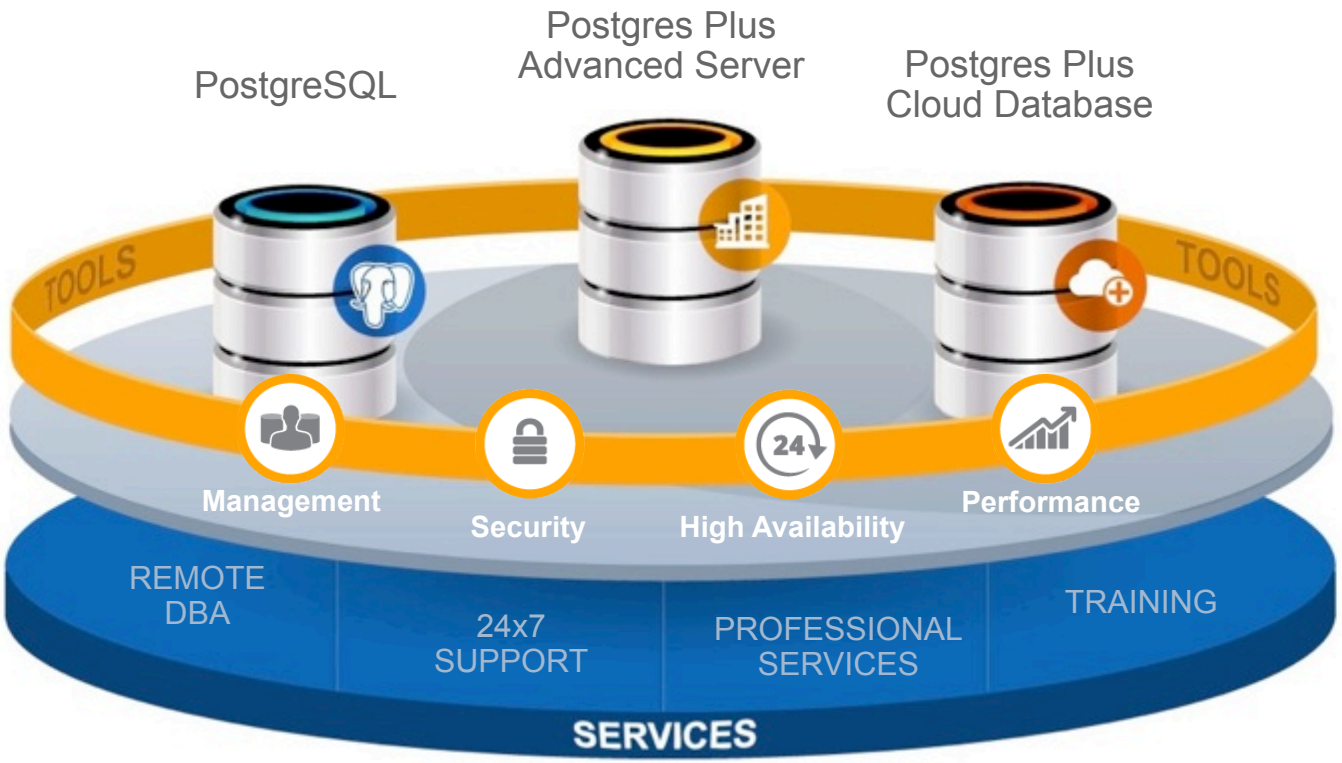
Agenda

- Introduction to EDB
- Postgres & Postgres Plus Advanced Server capabilities
- Postgres Plus Advanced Server performance, security, and tools
- EDB services, support and training
- Cost containment strategies
- Enterprise case studies

Introduction to EDB



EDB Serves
All Your Postgres Needs

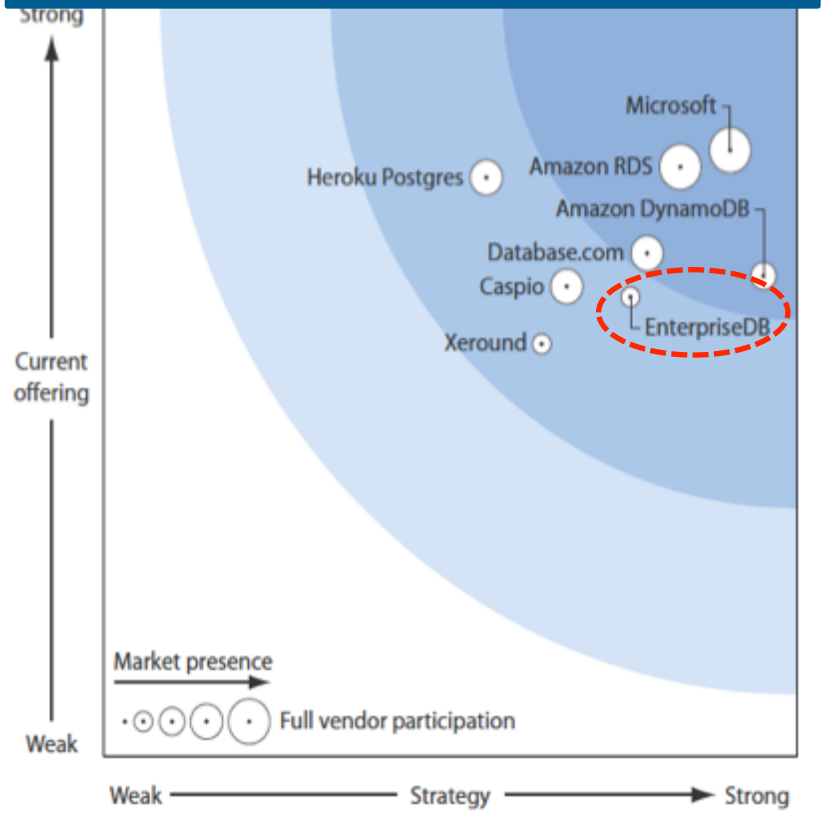


EDB is a Proven Performer

Magic Quadrant for Operational DBMS, Q4 '13

- **Gartner Comments**
  - *"Postgres is growing rapidly, due to EnterpriseDB*
  - *"We continue to see an increase in usage in mission-critical applications, especially given the added functionality and stability of new releases of Postgres Plus Advanced Server from EnterpriseDB*
  - *"In addition, EnterpriseDB has easy to install versions of PostgreSQL, along with tools to manage installation and the environment."*

Forrester Wave: Enterprise Cloud DB, Q4 '12



- **Forrester Comments:**
  - *"EnterpriseDB has strong support for data access, integration with on-premise data, database lifecycle management and third party tools"*

Key Strategic Partners

Only multi-platform DBMS partner;
2013 AllianceOne Partner of the Year

LEAD OSS DBMS for Power Linux
(EDB Investor)

Global sales & technology partner
(EDB Investor)

EDB Global 2000 Customers

Accenture
Advanced Auto
Aetna
Airgas
AOL
AT&T
Atos Worldwide
BAE Systems
Banco do Brasil
Barclays
Bayer Healthcare
Boeing
Bouygues Telecom
CGI Federal
Check Point Software
Cisco Systems
Citigroup
Citrix
CME-Commodities
CMS
Cognizant Technology
Community Health
CSC
Deere & Company
Dell
Deutsche Börse AG
Direccion General del
Dongfeng Honda
eBay
Eisai
EMC Corporation
Emerson Electric
ENSCO
Ericsson
Expedia
Fujitsu
G4S Deposita
General Electric (GE)
Google
HCL Infosystems
Hitachi
HP
HTC Global Services
Huwaei Technologies
IBM
ICICI Lombard
Infosys
InTouch Technology
Intuit
JPMorgan Chase
KDDI
KT
Kubota
Kyocera
LG Electronics
Lockheed Martin
Malaysia Telecom
MasterCard
McKesson
Michelin
Mitsubishi
Moodys
Mosaic ATM
Motorola
NEC
NetApp Systems
NTT
Nokia
Northrop Grumman
Nucor
ONGEI
Panasonic
PDVSA
Phillips Electronics
Phoenix Sage
QUALCOMM
Raytheon
Rite Aid
RSA
Schneider Electric
Science Applications
Serco-NA
SGS SA
Shinsei Financial
Siemens
Softbank
Sony
St Jude Healthcare
State Farm
Swisscom
Syngenta Crop Protection
Tata Consultancy Services
TD Ameritrade
Telefonica
Telstra
Teradata
The GAP
Tokio Marine
Toyota
Union Pacific Railroad
Vattenfall AB
Vivendi Mobile
VMWare
Volvo
Walt Disney
Wipro
Xerox
Yahoo
Yamaha
Zeejiand Bafang
Zions Bancorp

Postgres & Postgres Plus

Postgres' Growth

Postgres is widely recognized for its long history of proven success and future promise

DB-Engines Ranking

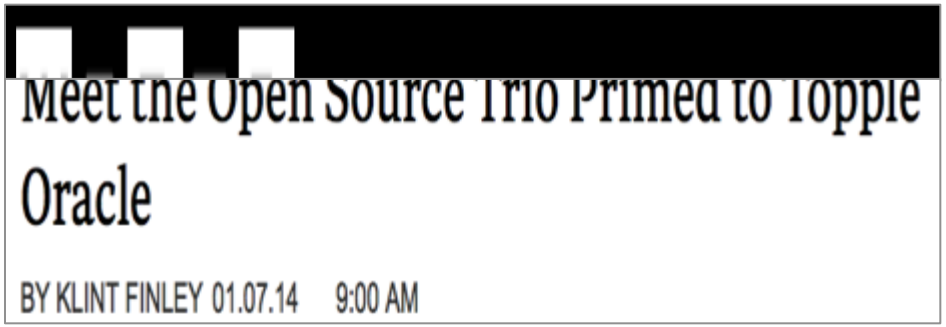
The DB-Engines Ranking ranks database management systems according to their popularity. The ranking is updated monthly.

Read more about the method of calculating the scores.

trend chart

216 systems in ranking, March 2014

Rank	Last Month	DBMS	Database Model	Score	Changes
1.	1.	Oracle	Relational DBMS	1491.80	-8.43
2.	2.	MySQL	Relational DBMS	1290.21	+1.83
3.	3.	Microsoft SQL Server	Relational DBMS	1205.28	-8.99
4.	4.	PostgreSQL	Relational DBMS	235.06	+4.61
5.	5.	MongoDB	Document store	199.99	+4.81
6.	6.	DB2	Relational DBMS	187.32	-1.14
7.	7.	Microsoft Access	Relational DBMS	146.48	-6.40
8.	8.	SQLite	Relational DBMS	92.98	-0.03
9.	9.	Sybase ASE	Relational DBMS	81.55	-6.33
10.	10.	Cassandra	Wide column store	78.09	-2.23



Meet the Open Source Trio Primed to Topple Oracle

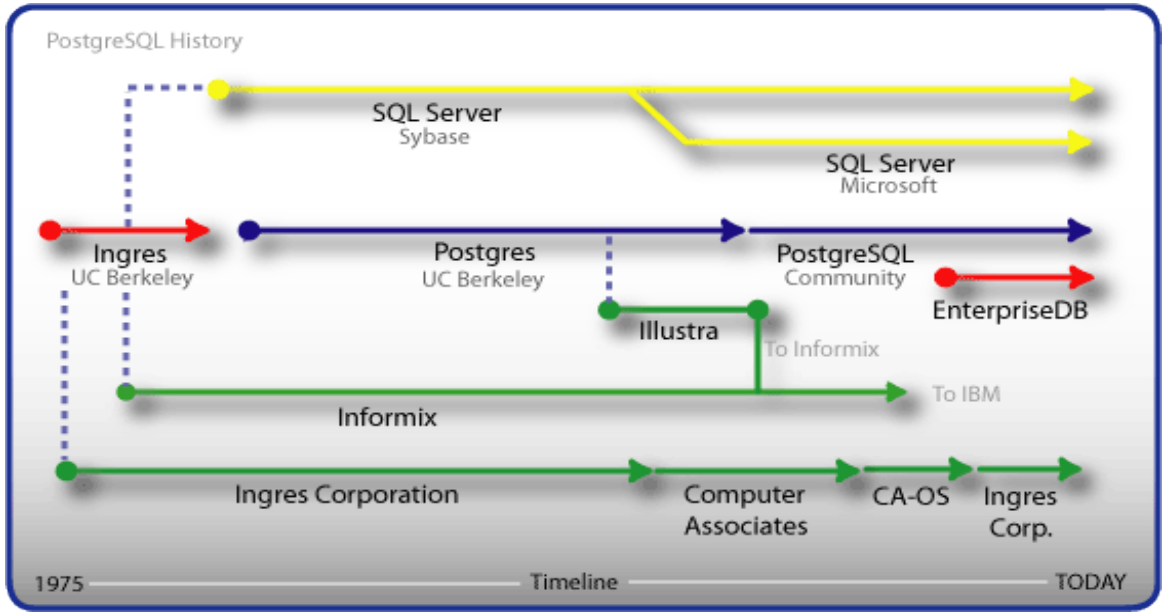
BY KLINT FINLEY 01.07.14 9:00 AM

"We congratulate MongoDB, PostgreSQL and Cassandra for their extraordinary achievements in 2013….The fact that we have three open source tools and two NoSQL systems amongst the winners may be an indication of what 2014 has in store for us."

EDB ENTERPRISEDB

Postgres: A Proven Track Record

- Most mature open source DBMS technology
- Enterprise-class features (built like Oracle, DB2, SQL Server)
- Strong, independent community driving rapid innovation



PostgreSQL

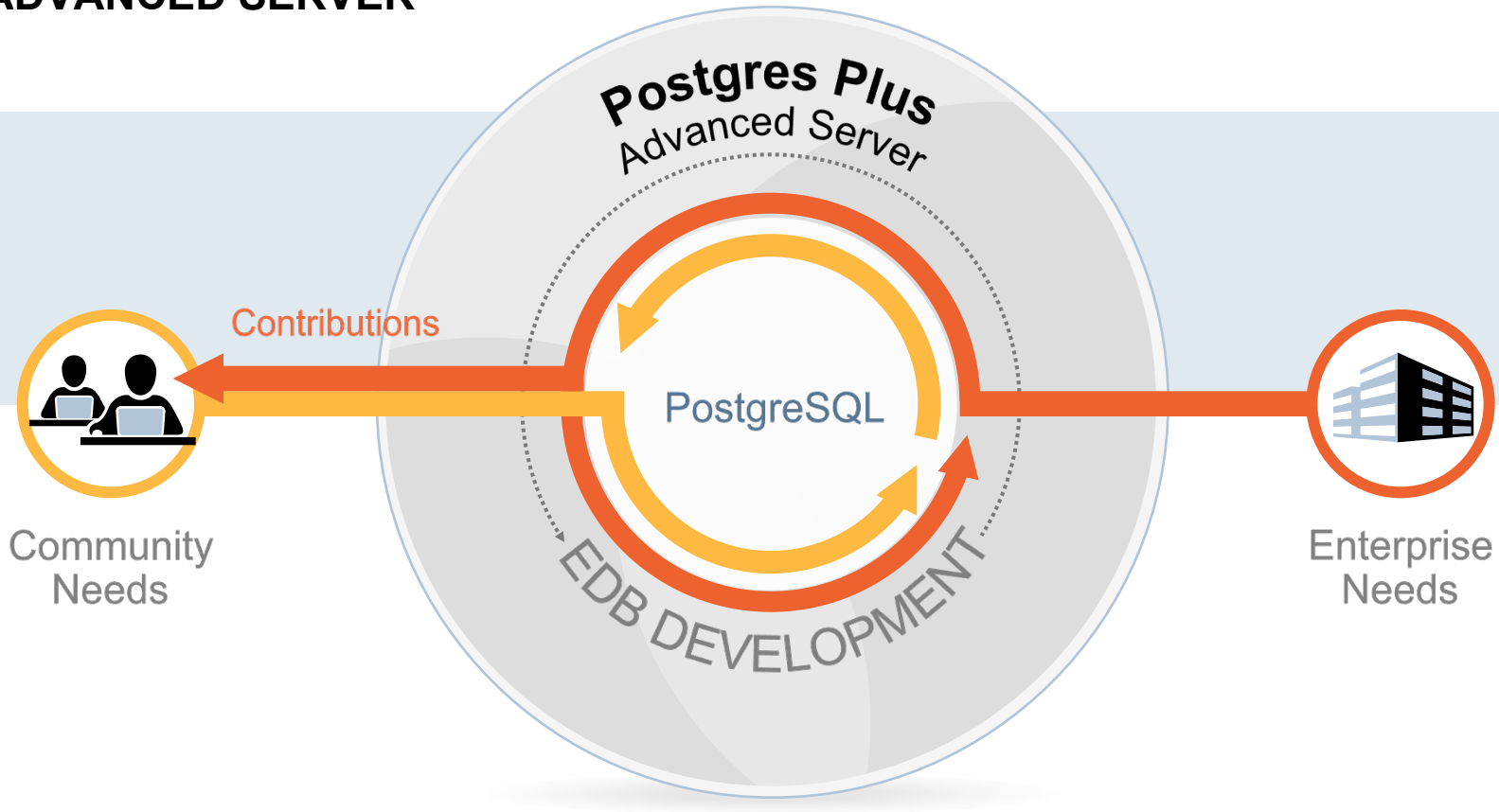
Fully ACID Compliant
MVCC
Point in Time Recovery (PITR)
Data and Index Partitioning
Bitmap Indexes
ANSI Constraints
Triggers & Stored Functions
Views & Data Types
Nested Transactions
Online Backup
Online Reorganization
Foreign Keys
Streaming Replication
Multi-Core Support
JSON Support
HStore

EDB ENTERPRISEDB

POSTGRES PLUS

ADVANCED SERVER

Continuously synchronized with PostgreSQL for a super-set of community PLUS enterprise features



EDB ENTERPRISEDB

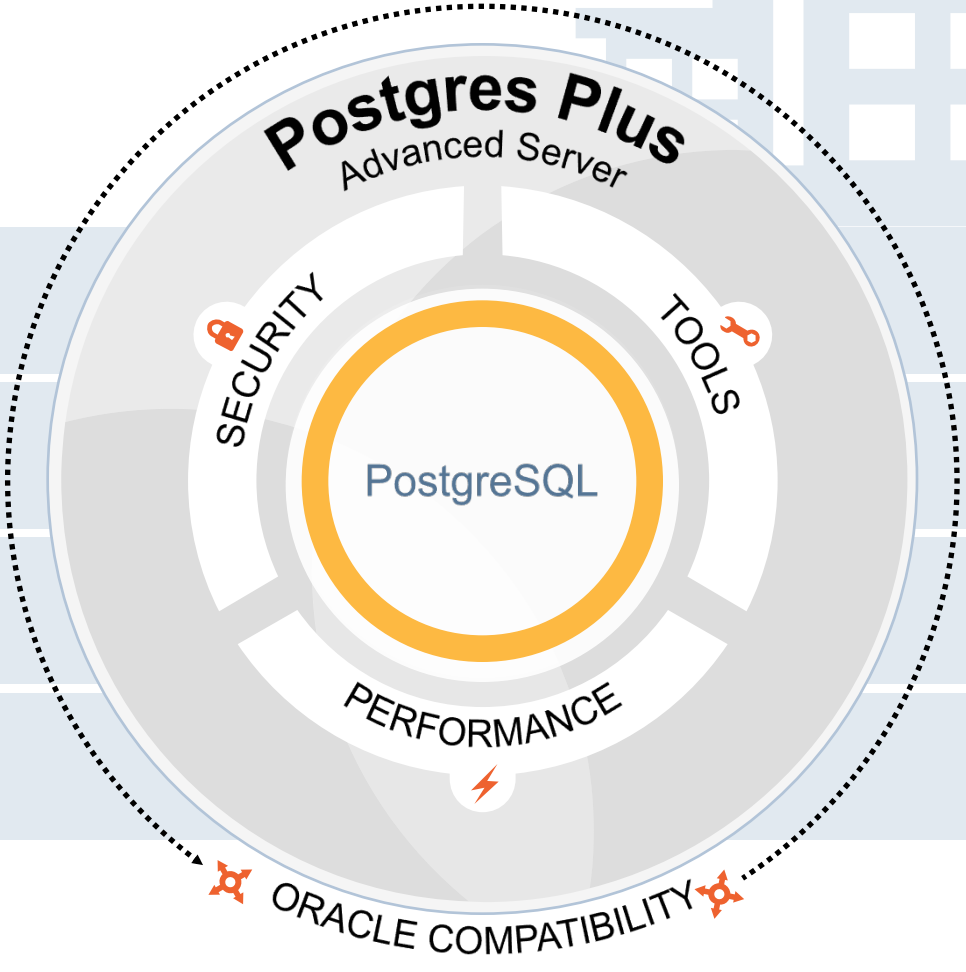
Postgres Plus Advanced Server Key Feature Development

from PostgreSQL core	EDB contributions to PostgreSQL core	*from EDB Development*
• 64 bit LOBs up to 4TB in size • Custom background workers • Writable Foreign Data Wrappers	**v9.3** • **Materialized Views**	• Partition Read Improvements over 75x • Support for 1000s of Partitions • Partition write improvements over 400x
• Cascaded streaming replication • JSON support, Range Types	**v9.2** • **MySQL Foreign Data Wrappers for SQL/MED**	• Table() function support for nested tables • INSERT APPEND hint • xDB Multi-master replication • Expanded Object Type support
• Synchronous replication • Serializable Snapshot Isolation • In-memory (unlogged) tables • Writeable Common Table Expressions (WITH)	**v9.1** • **Index-only scans (covering indexes)** • **Linear read scalability to 64 cores**	• Row Level Security • Declarative Partitioning syntax
• Deferrable unique constraints and Exclusion constraints • Streaming replication • Windows 64 bit Support • Hot standby	**v9.0** • **No restore In-place version upgrades**	• VARRAY support • SQL Profiler • Index Advisor • Parallel Bulk Data Load
• Native Support for MS Windows • Replication, Warm standby • Warm Standby • Two-phase commit • Table spaces, Partitioning • Column Level Permissions • Autovacuum • Window functions • Savepoints, Point-in-time recovery	**v8.0 - v8.4** • **Full Text Search** • **Heap Only Tuples (HOT)**	• Explicit Commit / Rollback Control • SQL/Protect against SQL injection attacks • Hierarchical Queries • SQL Optimizer Hints • Predefined reusable Function Packages • Bulk collection and Bulk bind • High speed bulk data loads with error handling • Dynamic runtime instrumenting of SQL wait states • User defined object types

POSTGRES PLUS

ADVANCED SERVER

- Security
- Tools
- Performance
- Compatibility

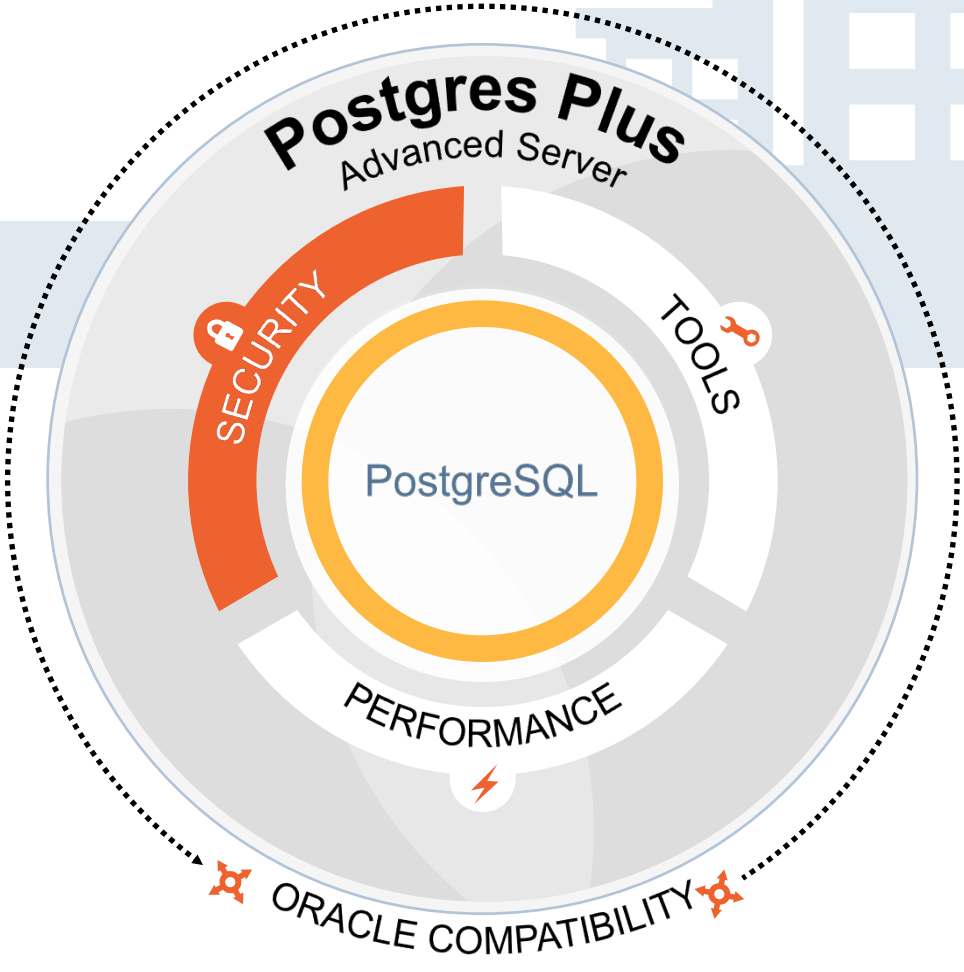


POSTGRES PLUS

ADVANCED SERVER

Security

- Enhanced Auditing
- Row Level Security (VPD)
- SQL Injection attack guard
- Server-side code protection
- Multiple US Gov't certifications including EAL2

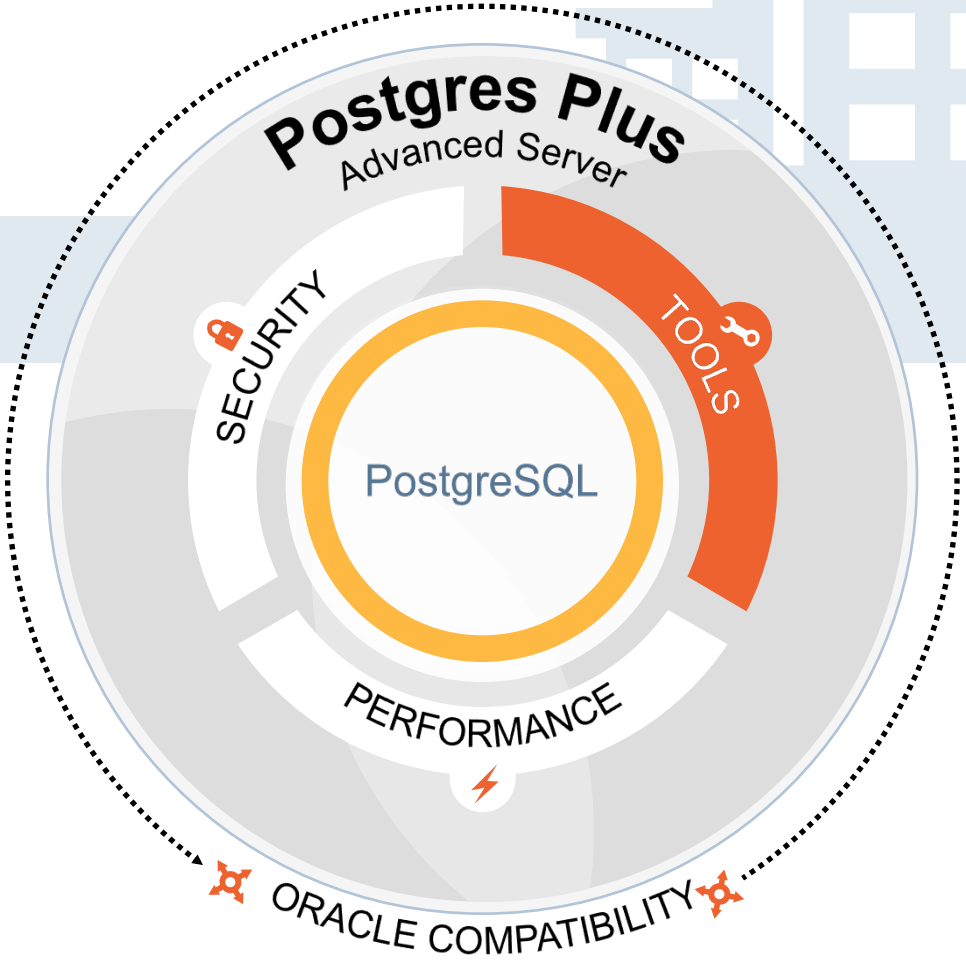


POSTGRES PLUS

ADVANCED SERVER

Bundled Tools

- Oracle, SQL Server & PostgreSQL to Postgres Plus replication
- Enterprise management, monitoring, and tuning
- Multi-master replication
- HA failover protection
- Oracle, SQL Server & MySQL to Postgres Plus migration
- Update monitoring

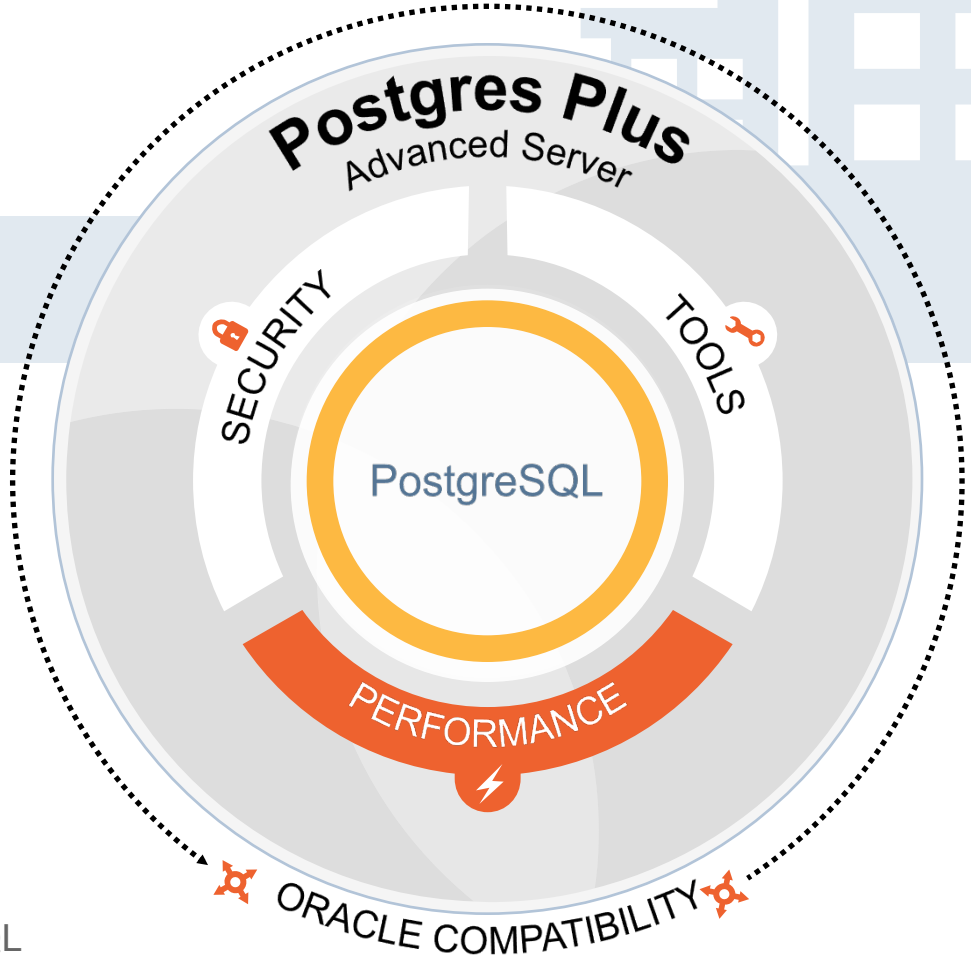


POSTGRES PLUS

ADVANCED SERVER

Performance

- Faster Partitioning
  - 400x faster writes & 76x faster selects
- SQL Profiler – *fix slow workloads*
- Bulk Data Loader - *2x faster*
- Index Advisor - *speeds up inquiries*
- Query Hints - *optimizer control*
- DynaTune - *memory upgrades*
- Bulk Collect/Fetch/Binding of arrays
- Dynamic runtime statistics reveals SQL wait bottlenecks

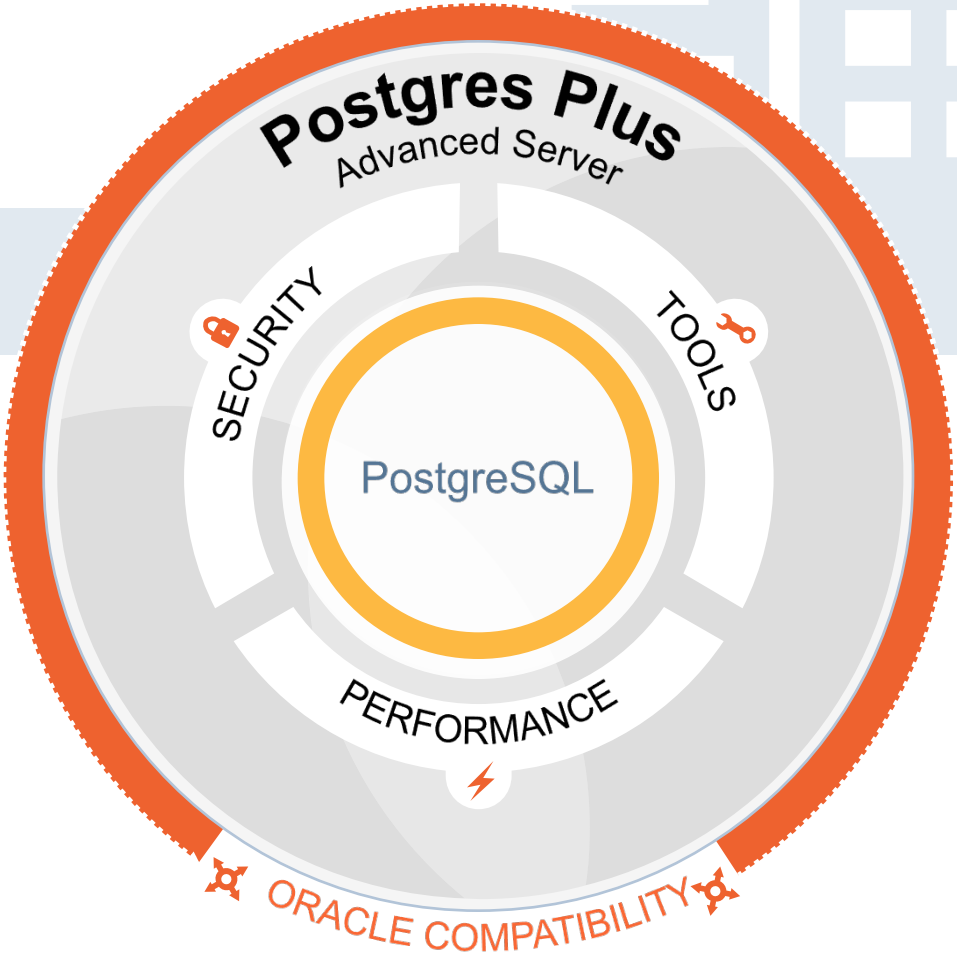


POSTGRES PLUS

ADVANCED SERVER

Oracle Compatibility

- Faster, easier migrations
- PL/SQL, OCI support
- Oracle SQL extensions
- User defined objects
- Function packages
- Database links
- Oracle-like tools:
  *EDB*Loader, EDB*Plus, EDB*Wrap*



Oracle Compatibility Includes:

- SQL extension support
  - Decode, NVL, Substr, NVL2
  - Date/time functions: add_months, extract, next_day
- PL/SQL support
  - REF Cursors, Implicit and explicit cursors
  - Looping, variable declarations, conditional statements
  - Collections: Associative Arrays, Varrays, Nested tables
  - Bulk binding
  - Named parameters
  - User Defined Exceptions
  - Explicit Transaction Control
    - within a stored procedure
- Tools
  - EDB*Plus – SQL*Plus look-a-like
  - EDB*Loader – SQL*Loader equivalent
  - EDB*Wrap – similar to the PL/SQL wrapper
- Features
  - Packages
  - Stored procedures
  - Functions
  - Triggers
  - Hints
  - Database Links
  - Hierarchical Queries
  - Synonyms – Public and Private
  - Sequences
  - Rownum
  - Object types
    - Create type … as object
    - Create type … as table
    - Create type …as varray
    - Constructor and collection methods
  - Users/Roles
  - Dynamic SQL

Oracle Compatibility (cont.)

- Data Types
  - Integer, number, char, double precision, float, varchar2, blob, clob, xmltype, rowid
- Oracle-like Data Dictionary
  - ALL_, DBA_, USER_ views
  - Most commonly accessed views
- Diagnostics - DRITA
  - System and session waits
    - Not exposed in PostgreSQL
    - Part of Advanced Server
  - Statspack-like reporting
- Support for Functions:
  - REGEXP_INSTR
  - REGEXP_COUNT
  - REGEXP_SUBSTR
- Custom constructor methods for Objects
- Oracle compatible Materialized Views

- Package Support for:
  - DBMS_ALERT
  - DBMS_CRYPTO
  - DBMS_JOB
  - DBMS_LOB
  - DBMS_LOCK.sleep
  - DBMS_MVIEW
  - DBMS_OUTPUT
  - DBMS_PIPE
  - DBMS_PROFILER
  - DBMS_RANDOM
  - DBMS_RLS
  - DBMS_SCHEDULER
  - DBMS_SQL
  - DBMS_UTILITY
- Package Support for:
  - UTL_HTTP
  - UTL_URL
  - UTL_TCP
  - UTL_FILE
  - UTL_MAIL
  - UTL_SMTP
  - UTL_ENCODE

Postgres for Big Data

Postgres enables you to support a wider range of workloads with your relational database:

- Object-relational capabilities and decades of proven reliability make Postgres the most flexible, extensible and performant database available
- Document store capabilities: XML, JSON, PLV8; HStore (key-value store); non-durable storage; full text indexing
- Foreign Data Wrappers enable read/write integration with other database technologies
  - Postgres sees the data source as a table that can be queried and written to
- Postgres Plus Advanced Server connector for Hadoop

Why Choose When You Can Have Both?

- Document store with ACID and relational capabilities
- Decades-long track record of quality and stability
- TCO cost avoidance from new systems:
  - Operational support
  - Duplicated storage
  - Software upgrades
  - Monitoring & management
  - Hardware
  - Training
  - Additional staffing

Expand the role of your workhorse relational DBMS—specialized technologies only required for edge cases

Tools: Monitoring & Management

EDB Postgres Enterprise Manager (PEM)

MONITOR **MANAGE** **TUNE**

Only solution available that combines all three tasks into one tool

- Single management console allows easy visual control
- Works with both PostgreSQL and Postgres Plus
- Start/stop, configure, define and manage storage, security and database objects via single graphical console

EDB ENTERPRISEDB

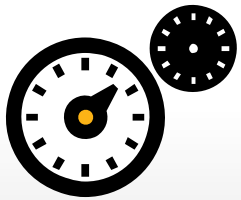
PEM Core Features

MONITOR

- Mission critical OS and database statistics collection
- Predefined (175+) and custom alerts via SMTP or SNMP
- Predefined & custom at-a-glance global dashboards
- Replication monitoring

MANAGE

- CRUD operations on all database objects
- Bulk operations across multiple servers
- Capacity Manager for planning & forecasting
- Customizable GUI charts, tables & graphs



TUNE

- SQL/Profiler to speed up large workloads
- Index Advisor to suggest and create indexes
- Postgres Expert for best practice enforcement
- Tuning Wizard for machine utilization and load profiles

Services, Support & Training

Technical Support

- 7 x 24 customer support
- Global ‘follow the sun’ team
- Team includes highly visible PostgreSQL community members (including committers)
- Staff members in US, Europe and India
- Constant customer satisfaction feedback loop

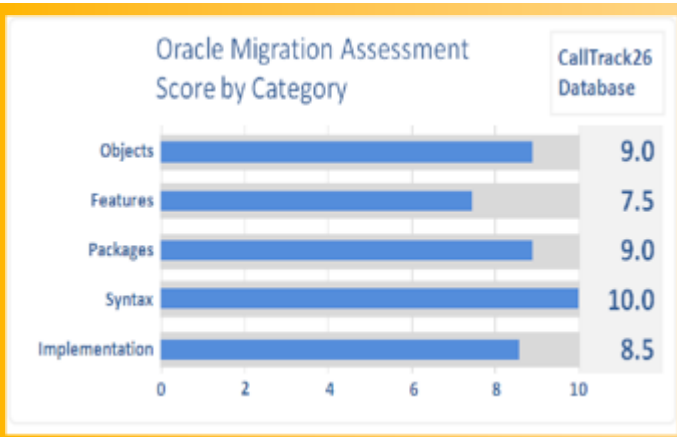
Global Training Services

- **Onsite**
  - Delivered at the customer site by EDB trained personnel
  - Marketed and sold by EDB or EDB Partner (licenses EDB materials)
  - 1-4 days scheduled as needed
- **Online**
  - Live and interactive training delivered to remote participants by trained EDB personnel (or a contractor)
  - 1-4 days
  - Scheduled in advance; schedules are published at EnterpriseDB.com
- **On-Demand**
  - Pre-recorded training sessions
  - 2.5 – 14 hours
  - Available at EnterpriseDB.com
- **Off-site Open Enrollment**
  - Marketed, sold and delivered by EDB Certified Training Partner
  - Currently available in EMEA only

Oracle Migration Assessment

1. Analyze Oracle schema layout for supported features in PPAS

2. Review features used in Oracle client application

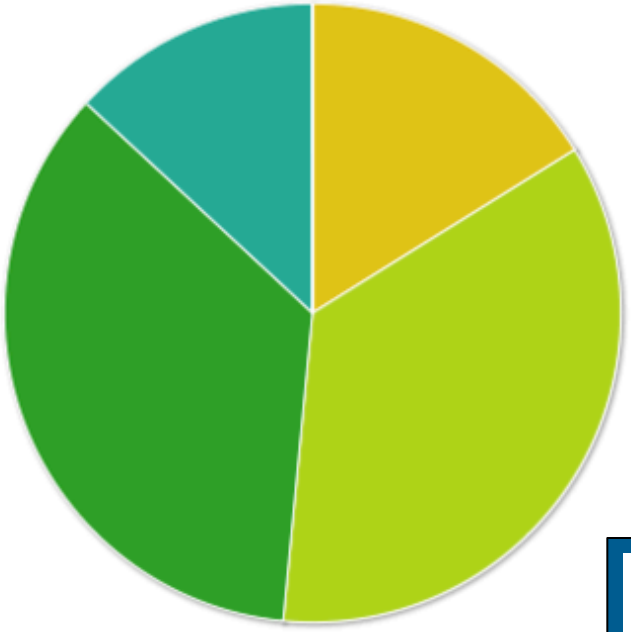


3. Supported features and recommended fixes

4. Overall composite score and migration plan with workarounds and time estimates

Survey: Ease of Migration

Organizations that migrated Oracle-based applications to Postgres Plus Advanced Server stated the degree to which they had to modify these applications:



Research by TechValidate

- Not at all: **16%**
- Slightly 1-19%: **35%**
- Moderately 20-49%: **35%**
- Substantially 50-89%: **13%**
- Extensively 90-99%: **0%**
- Completely 100%: **0%**

51% had slight to no modifications

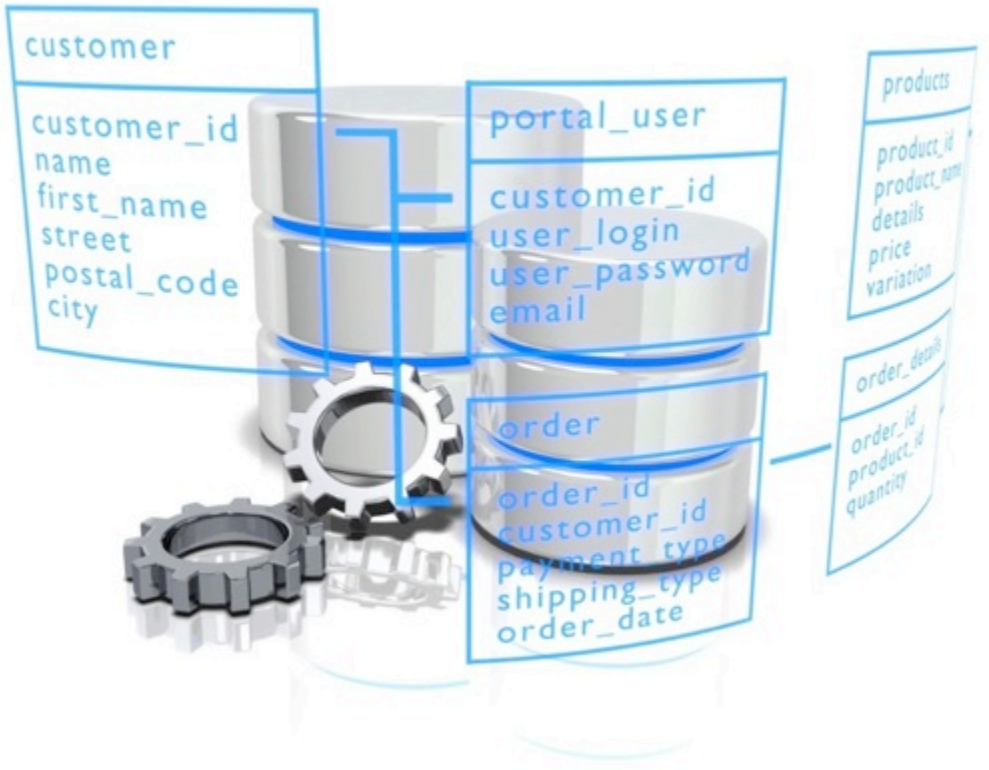
Migrating from Oracle

"We were able to migrate all of our apps from Oracle to PPAS with little to no modifications. Besides saving on annual licensing fees, Oracle compatibility was our number one priority."

Source: Application Manager, Large Enterprise Aerospace & Defense Company

EDB ENTERPRISEDB

World-Class Remote DBA Services

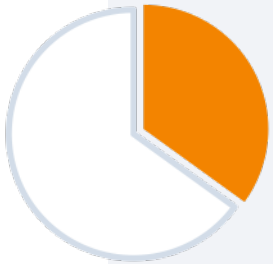


- Optimize in-house resources for mission-critical activities
- Lower total management costs
- Leverage EDB state-of-the art expertise
- Accountability for results
- Around-the-clock assurance
- Best practice technology & procedures
- Lead technicians manage & coordinate your support
- No hiring or training costs

EDB Postgres leadership provides best practices for you!

Cost Containment

Strategic IT Budget Problem



UP TO

35%

of software budgets are spent on Database Management Systems:

DBMS Maintenance and Fees

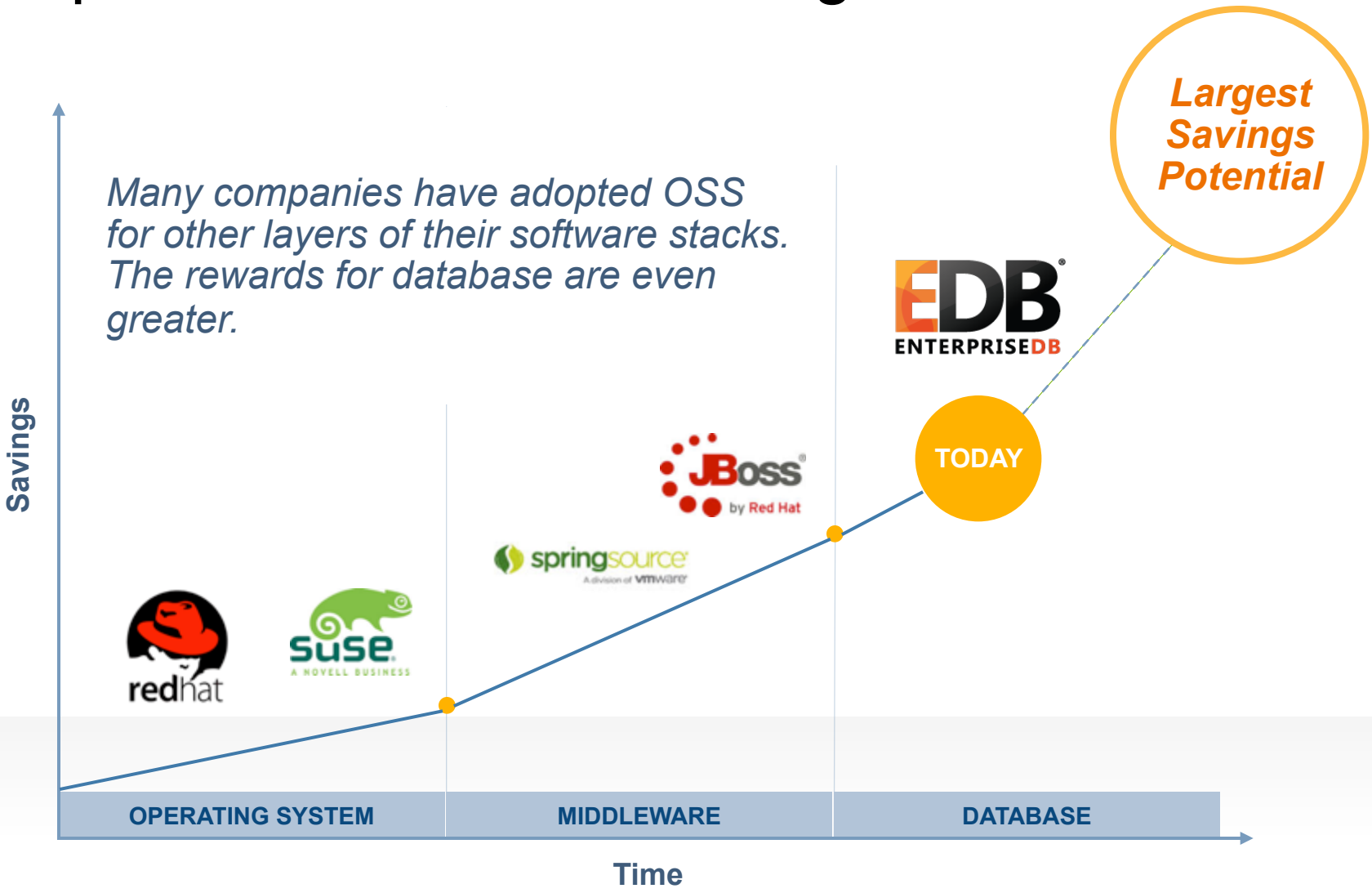
EDB reduces your DBMS costs 80% or more enabling you to invest in emerging technologies

BIG DATA

CLOUD COMPUTING

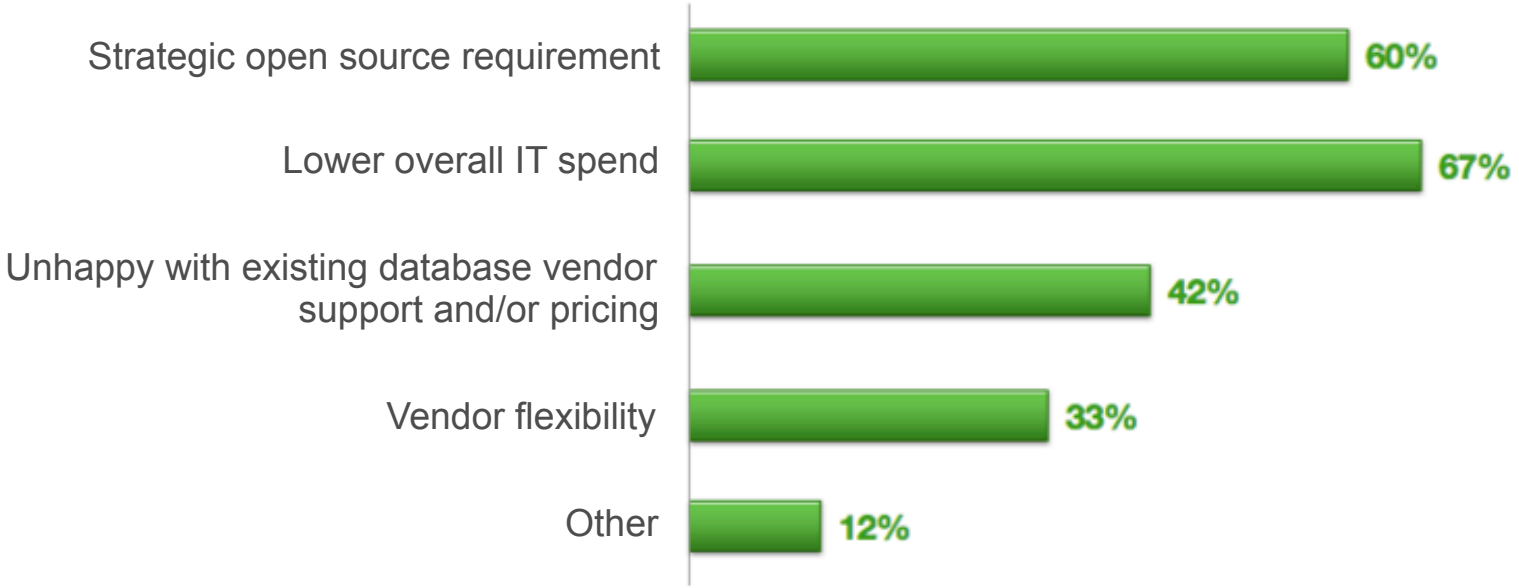
EDB ENTERPRISEDB

Open Source Use Evolving



Survey: Adoption Drivers for Postgres

Reasons behind IT decision to select Postgres Plus Advanced Server as their database management system:



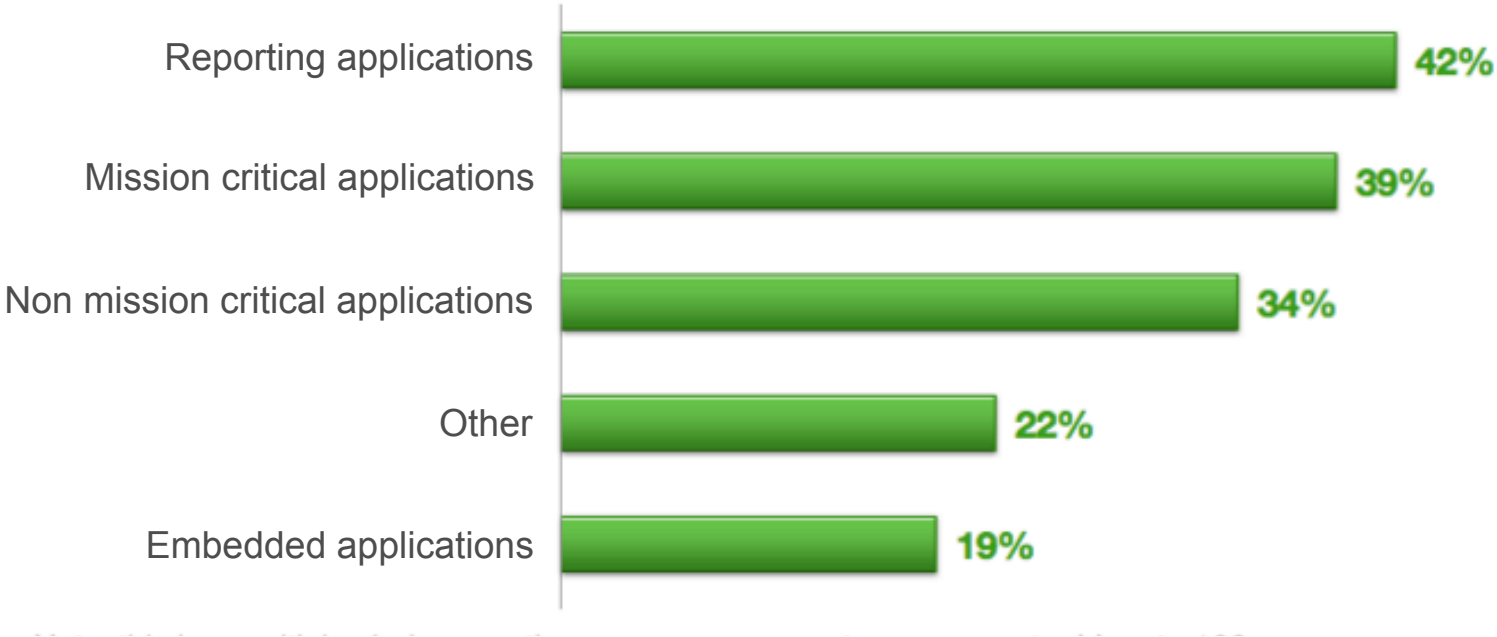
Note: this is a multiple choice question—response percentages may not add up to 100.

Research by TechValidate

Postgres Plus Deployment Strategies

Strategy	Benefits
New LOB Applications	• Significant cost savings for non mission critical systems • Leverages all existing Oracle skills • Very low risk
Oracle Replication Server	• Significant cost savings • Leverages Postgres Plus Replication Server • Leverages all existing Oracle skills • Improves transaction and query performance
Migrate/Rewrite non Mission Critical Apps	• Significant cost savings • Leverages all existing Oracle skills • Very low risk
Migrate/Rewrite Mission Critical Apps	• Biggest cost savings • Leverages all existing Oracle skills • Greatest deployment flexibility

Applications Built on Postgres



Note: this is a multiple choice question—response percentages may not add up to 100.

Research by TechValidate

Oracle vs. EDB TCO Comparison on x86

License Fee Per Core	Oracle Enterprise Edition *(2 sockets/8 cores)* *(x86 processor)*	EDB Postgres Plus Enterprise Edition *(2 sockets/8 cores)* *(x86 processor)*
Database	$47,500	included in subscription
Partitioning	$11,500	Included
Data Guard	$11,500	Included
Diagnostics	$5,000	Included
Total License Fee per Core	$75,500	included in subscription
Total License Fee per Server (CapEx) (0.5 core factor)	**$302,000**	**$0**
Annual support/subscription cost	22% of License Fee	$6,900 per socket
Annual Support/Maintenance per Server (OpEx)	**$66,440**	**$13,800**
Total 3 Year License and Support Cost	**$501,320**	**$41,400**

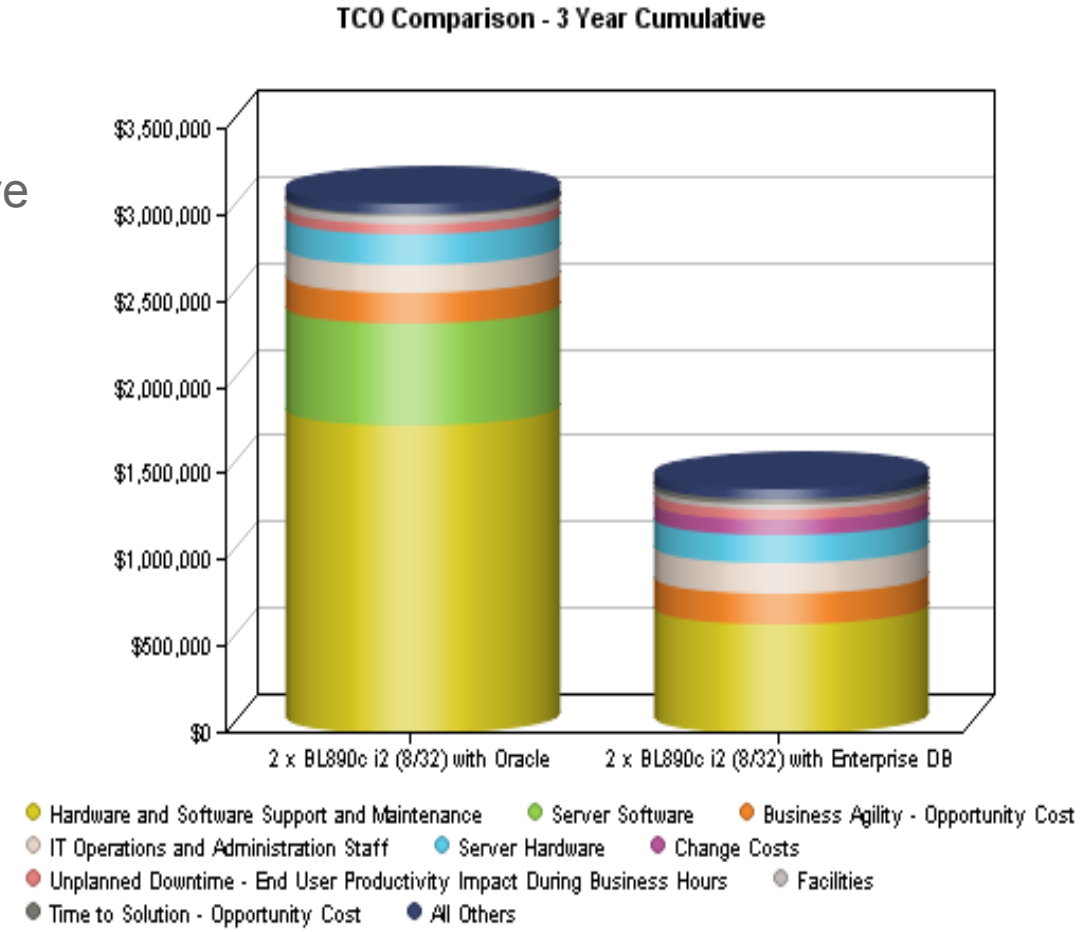
No CAPEX • Annual OPEX reduction 79% • 3 YR TCO cost savings 92%

HP Case Study: Staggering Cost Savings

Oracle vs. EDB Enterprise Edition

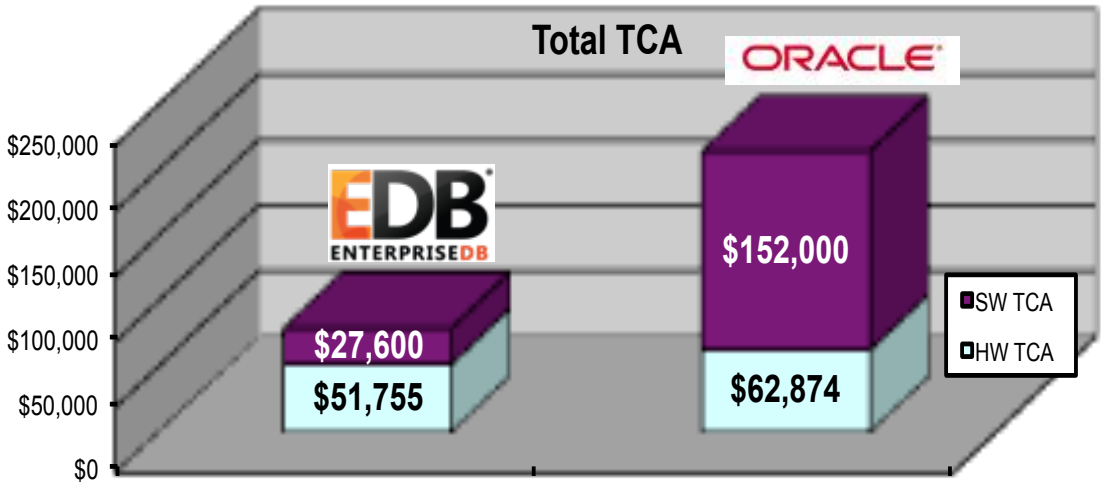
- $1,706,673 of 3-year cumulative benefits by moving to EnterpriseDB PPAS on HP Integrity BL890c server blades
- Return on investment of 271%
- Internal rate of return of 101%
- Payback period of 12 months

Source: TCO/ROI Analysis with ROI Analyst from Alinean, Inc.



IBM Case Study with EDB on PowerLinux 7R4

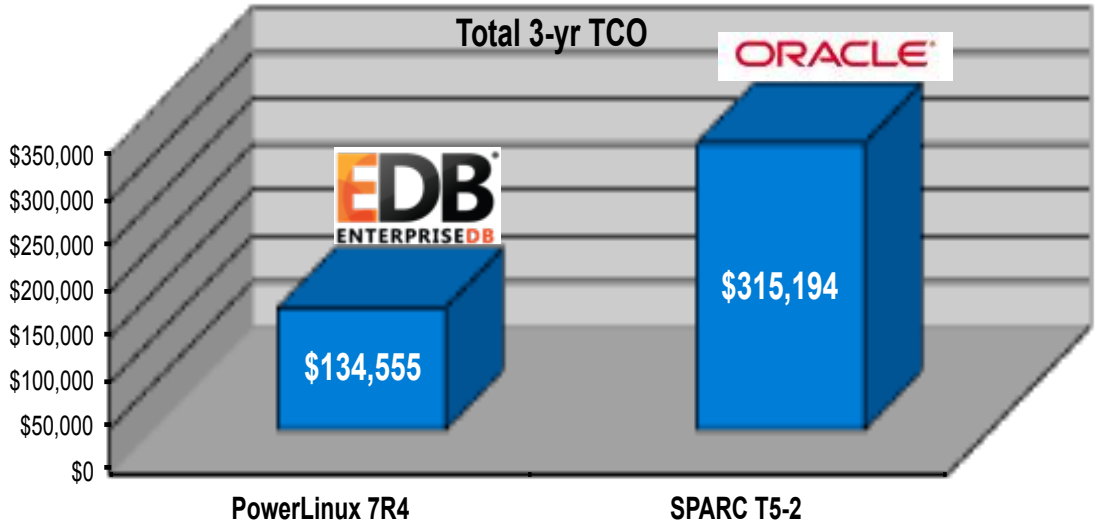
171%
lower total TCA
vs.
SPARC w/ Oracle



IBM

EDB Enterprise Edition:
$6,900/socket
4 sockets
Annual subscription
(No discount)

134%
lower 3-year TCO
vs.
SPARC w/ Oracle



Oracle EE:
$47,500/core
32 cores
22%/yr SWMA
(90% discount)

451%
higher software TCO

EDB ENTERPRISEDB

Case Studies

Top Telco in South Korea: Mission critical database supporting

mobile phone pre-order system

Moving to standards-based hardware

and Postgres Plus Advanced Server from Oracle

PRODUCTS PURCHASED

- PPEE Subscriptions
- On-site consulting services
- Training

KEY CUSTOMER REQUIREMENTS

- PostgreSQL expertise
- Oracle compatibility
- Best-in-class support capabilities
- Enterprise-class tooling and performance

OTHER KEYS TO SUCCESS

- Executive to executive alignment early in process
- Enhanced Postgres training
- On-site professional services for architecture, optimization and migration support

EDB ENTERPRISEDB

Premier science & technology Institute

of Government of India

National and state applications with data

on over 1 billion citizens (vehicle ID's, postal information, visa tracking)

PRODUCTS PURCHASED

- PPSE subscriptions
- On-site Staffing

KEY CUSTOMER REQUIREMENTS

- Price/Performance
- Product support options
- EDB monitoring and Management Tools
- Comprehensive product roadmap and scalable product support

OTHER KEYS TO SUCCESS

- Our ability to provide specific architecture recommendations for all existing and upcoming Postgres deployments
- Ability to influence EDB product roadmap
- EDB ability to help identify, architect, develop and support their open source stack

EDB ENTERPRISEDB

DBMS for U.S. Missile Defense Agency mission critical system storing missile launching data

Migrated over 140 Oracle DB's to Postgres Plus Advanced Server

PRODUCTS PURCHASED

- PPEE Subscriptions
- Architectural Health Check Service
- Training

KEY CUSTOMER REQUIREMENTS

- Price/Performance
- Advanced security, availability & reliability
- Oracle Compatibility/ ease of migration
- EAL2 Certification
- Open source technology strategy & DB roadmap

OTHER KEYS TO SUCCESS

- Exhaustive POC comparing Oracle features to PPAS, and PPAS met all requirements
- Compatibility was VERY high and migration was measured in weeks
- Using PPAS to lower TCO for portfolio of government customers while delivering the same level of service

Summary: EDB Provides Best of Both Worlds

Fast development cycles

Thousands of developers

Advanced features

No vendor lock-in

Low cost

24/7 support

Services and training

Enterprise-class features & tools

Indemnification

Product road-map

Responsiveness, dependability & control

EDB Enables Postgres Innovation AND Enterprise Reliability

EDB ENTERPRISEDB