The Advantages of PostgreSQL

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POSTGRESQL offers companies many advantages that can help their businesses thrive.

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Introduction

- Why use databases?
- Why use open-source?
- PostgreSQL history
- PostgreSQL in the real world
Why use databases?
Non-SQL Database Applications
SQL Database Applications

Application

SQL Server

Customer
Order
Order
Order
Customer

Order
Order
Order

Part
Part
Part
Part
Part
Database Transaction Protection (ACID)

- Multiple changes either all take place, or none of them
- Data always in a consistent state
- In-process changes invisible to outside users
- Data reliably stored

- High level of concurrency and reliability
Why use Open Source Software?
Closed-Source Software

Black Box

Func(...)  987234
Data ...   VWOJVC
Open-Source Software

Clear Box

Func(...) 987234
Data ... VWOJVC

https://www.flickr.com/photos/ajc1/
Support of Close-Source Software

Support → Database Company
Support of Open-Source Software

Support → Source Code

Support → EDB

Support → Mailing Lists
The Future of Open Source

Features
Performance
Reliability

Time

Open Source
Closed Source
Use for any purpose, including sale of customized versions with your closed-source modifications. PostgreSQL supports custom:

- Functions
- Operators
- Data Types
PostgreSQL History
The University of California at Berkeley
Michael Stonebraker

Jolly Chen and Andrew Yu
Ingres — research prototype, spawned Relational Technologies, purchased by Computer Associates
Postgres — research prototype, spawned Illustra, purchased by Informix
Postgres95 — added SQL, spawned PostgreSQL
PostgreSQL Through the Years

1977–1985 Ingres
1986–1994 Postgres
1994–1995 Postgres95
1996– PostgreSQL
Developer’s Globe
PostgreSQL Core Team

Top row: Thomas Lockhart, Jan Wieck, Tom Lane, Marc Fournier
Bottom row: Vadim Mikheev, Bruce Momjian
## Release Dates and Sizes

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Release 1.02
Date: 1996-08-01

- Initial release by PostgreSQL Global Development Team
- Apply all outstanding email patches.
Release 1.09
Date: 1996-11-04

- Fixes for server and command failures.
Release 6.0
Date: 1997-01-29

- Unique indexes
- GIST added
- Improved authentication
- IN/BETWEEN added
Release 6.1
Date: 1997-06-08

- New data types: DATETIME, TIMESPAN, CIRCLE
- GEQO
- Improved optimizer statistics
- Libpq++ overhauled
- Multi-column btree indexes
- new SET/SHOW/RESET commands
- New SEQUENCE feature
PostgreSQL Releases (Continued)

Release 6.2
Date: 1997-10-02

- New Java JDBC driver
- Triggers added
- Server Programming Interface (SPI) added
- NOT NULL constraint
- DEFAULT and CONSTRAINT added
- ANSI functions added for DATE/TIME and PRECISION
PostgreSQL Releases (Continued)

Release 6.3
Date: 1998-03-01

• Subselects
• Unix domain socket support for performance
• Improved user password configuration
• Much improved documentation
• Separate permissions for VIEWS
• PRIMARY KEY support
• PL/TCL procedural language added
• UNION added
• Python added
• ECPG added
• New ODBC driver
• Pgaccess added
Release 6.4
Date: 1998-10-30

- Improved RULEs and VIEWs
- PL/PgSQL added
- Multi-byte character support
- Internet address data types
- HAVING added
PostgreSQL Releases (Continued)

Release 6.5
Date: 1999-06-09

• MVCC
• Live backups
• NUMERIC data type
• Temporary tables
• CASE
• INTERSECT
• EXCEPT
• LIMIT/OFFSET
• SELECT…FOR UPDATE
• Optimizer overhaul
PostgreSQL Releases (Continued)

Release 7.0
Date: 2000-05-08

- Foreign keys
- More optimizer improvements
- ANSI JOIN syntax
- PL/Perl
- Oracle compatibility functions
Release 7.1
Date: 2001-04-13

- Write-ahead Log (WAL)
- TOAST
- Outer Joins
- Overhauled function manager
Release 7.2
Date: 2001-12-??

- Non-locking VACUUM
- Fix for Transaction id / OID wraparound
- Security fixes
- Optimizer improvements
- Error message internationalization
Internals Flowchart

Main
- Postmaster
- Postgres
- Utility

Postmaster
- Optimal Path
- Plan
- Generate Plan
- Execute Plan
- Parse Statement
  - Traffic Cop
    - Query
    - Rewrite Query
    - Optimal Path
    - Generate Paths
    - Utility Command

Utility Command
- CREATE TABLE
- CREATE INDEX
- SELECT
- INSERT
- UPDATE
- DELETE

Utility
- Libpq

Postgres
- Libpq

Storage Managers
- Catalog
- Utilities
- Access Methods
- Nodes / Lists
Performance - AS3AP
Performance - TPC-C
PostgreSQL in the Real World
Database Migration

- Oracle
- IBM’s DB2
- Microsoft-SQL
- Microsoft Access
- Informix
- Interbase
- Dbase/FoxPro
- MySQL
Database Languages

- C
- C++
- Embedded C
- Java
- Perl
- Python
- Tcl/Tk
- Php
- Odbc
PostgreSQL Platforms

AIX
BeOS
BSD/OS
FreeBSD
HP-UX
IRIX
Linux
MacOS

NetBSD
OpenBSD
SCO UnixWare
Solaris
SunOS
Tru64
Windows NT/2000
PostgreSQL Usage

- Order Entry, Inventory, Billing
- Customer Relations Management (CRM)
- Data warehouse, data analysis
- Medical/Hospital Records Storage
- Genetics
- Financial Accounting, Banking, Payroll
- Military
- Government, Social services, Elections
- Education
- Publishing
- Geography (GIS)
- Hotel Reservations, Restaurants
- Telephone billing, call tracking
- Helpdesk problem report tracking
- Sales Tracking
- Business to business commerce
PostgreSQL Web Site Usage

- Product purchase
- User preferences
- Job listings
- Auctions
- Real Estate listings
- Community building
- Dynamic content
- Text indexing
Future Directions

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Conclusion

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