PostgreSQL

PostgreSQL

What makes this database so powerful?

GoOpen2008
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PostgreSQL

Center for Information Technology Services, University of Oslo

- 200 employees
- A turnover of over 210 million kroner.
- 2/3 - Infrastructure and IT-services for the University of Oslo
- 1/3 - IT-services for other norwegian universities and the education sector

DBA department:

- 186 Oracle databases, several TB of data
- 126 PostgreSQL databases / 235 GB of data
- PostgreSQL -> Average of almost 18,000,000 transactions /day

http://www.usit.uio.no/

PostgreSQL

History

PostgreSQL

Ingres 1977-1985 – *The beginning*

- Proof of concept for relational databases.
- Michael Stonebraker, professor at Berkeley, California.
- Ingres -> NonStop SQL, Sybase -> Microsoft SQL server

Postgres 1986-1994 – *As in "after Ingres"*

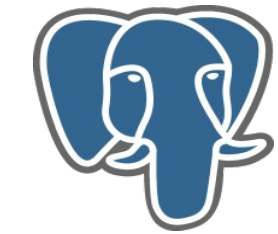
- A project meant to break new ground in database concepts.
- “Objects relational” technologies.
- Commercialized to become Illustra.

PostgreSQL

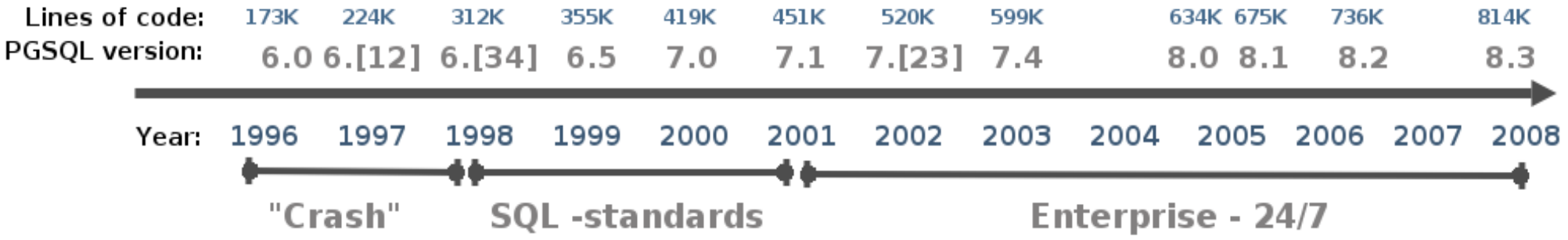
Postgres95 1994-1995 – *New life in the OpenSource world*

- Two Ph.D. students from Stonebraker's lab, Andrew Yu and Jolly Chen started Postgres95.
- Departed from academia to a new life in the open source world with a group of dedicated developers outside of Berkeley.
- Establishment of the *PostgreSQL Global Development Team*.
- Released as PostgreSQL 6.0 in 1996.

PostgreSQL 1996-today – *PostgreSQL project*



PostgreSQL

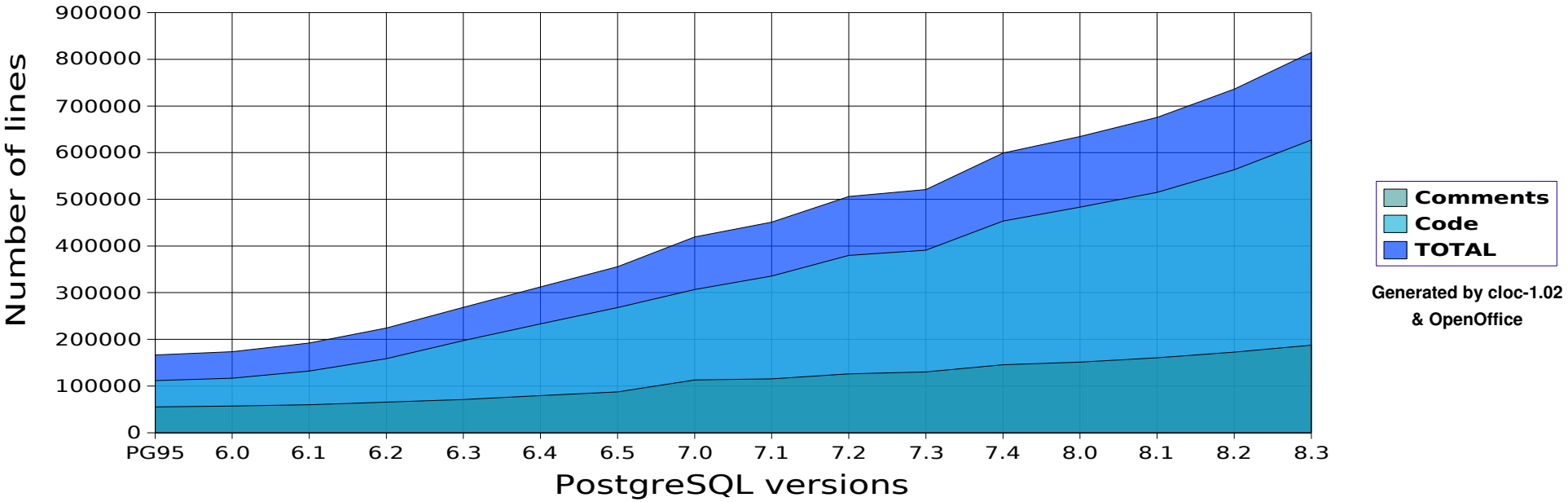


- Multiversion Concurrency Control (MVCC)
- Important SQL features
- Improved build-in types
- Speed

- Improved performance
- Improved administration & maintenance
- 24/7 ready

PostgreSQL

PostgreSQL Source code



- Total Physical Source **Lines of Code** PG-8.3.0 (SLOC) = **814,787**
- Development Effort Estimate, **Person-Years** (Person-Months) = **227.83** (2,734.05)
- Schedule Estimate, **Years** (Months) = **4.21** (50.57)
- Estimated Average Number of **Developers** (Effort/Schedule) = **54.06**
- Total Estimated **Cost** to Develop (Avg.salary: $70,000/year, overhead: 2.40) = **$38,238,854**

REF: Basic COCOMO (COnstructive COst MOdel for software cost estimation model)

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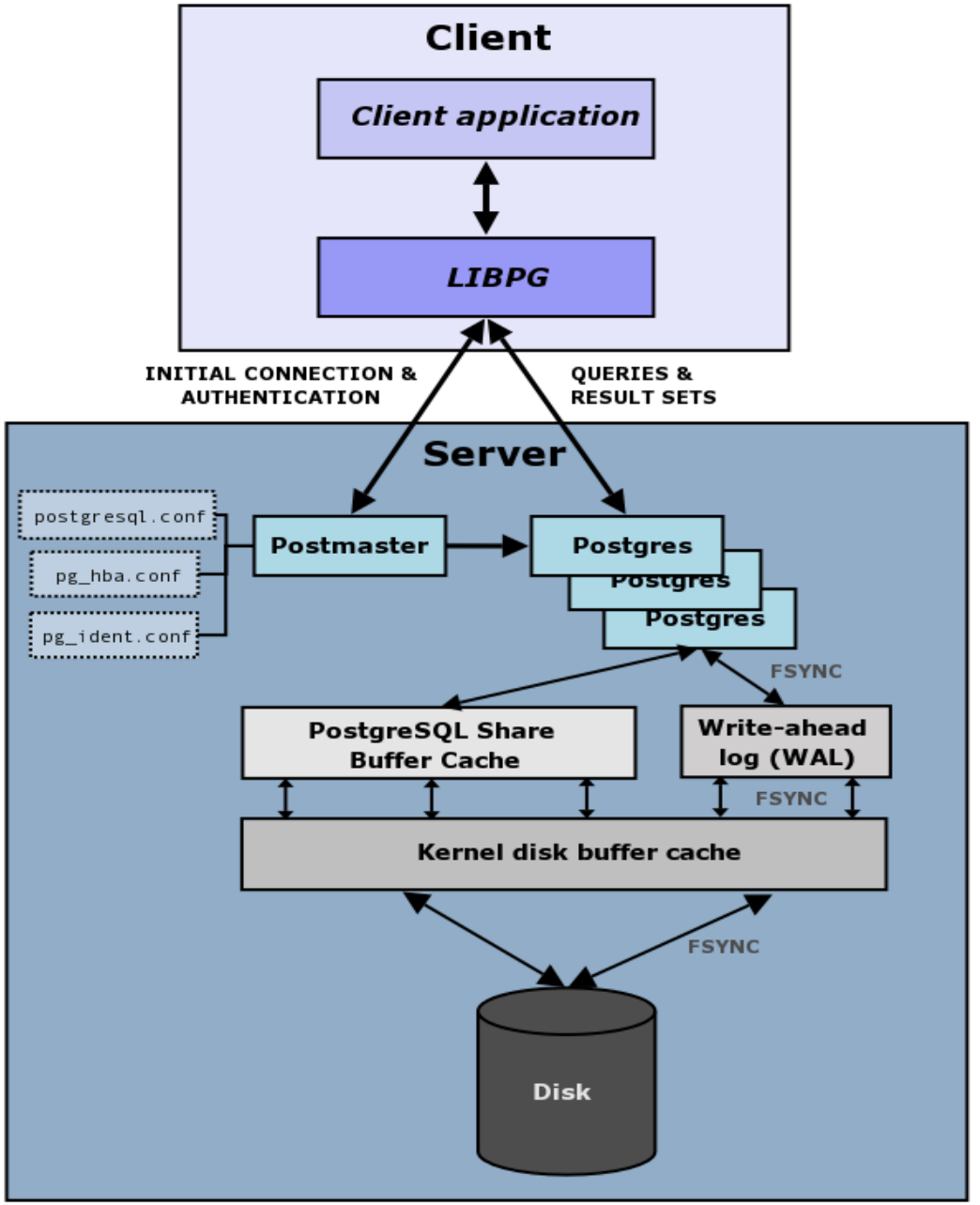
Features

http://www.postgresql.org/about/featurematrix

PostgreSQL

- It uses a multi-process model
- It does not use multi-threading.



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General features

- Fully ACID compliance (Atomic, Consistent, Isolated, Durable)
- ANSI-SQL 92/99/2003 compliance
- Referential integrity
- Multi-version concurrency control (MVCC)
- Write-Ahead logging (WAL), REDO recovery
- Point-in-time recovery PITR / Online backups
- Replication
- Tablespaces
- Savepoints, two-phase commits
- Functional and partial indexes
- B-tree, R-tree, Hash, GiST and GIN index types
- Full text search
- Native SSL, Kerberos, GSSAPI and SSPI support
- Linux, UNIX (AIX, BSD, HP-UX, SGI, IRIX, Mac OS X, Solaris,Tru64), Windows.

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Development features

- Stored procedures, PL/pgSQL, PL/Perl, PL/Python, PL/Tcl, PL/php, PL/java, PL/R, PL/Ruby, PL/sh, ...
- Native interfaces for ODBC, JDBC, C, C++, PHP, Perl, TCL, ECPG, Python, Ruby, Lisp, Scheme, Qt, .Net, OpenOffice SDBC, ...
- User defined data types, functions and operators, SPI
- Open and documented API.

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SQL features

- Rules
- Views
- Triggers
- Cursors
- Sequences
- Inheritance
- Outer joins
- Sub-selects
- Unicode
- SQL/XML standard

PostgreSQL

Some upcoming features

- Auto-tuning / auto-configuration
- Easy upgrade-in-place - 'pgmigrator'
- More SQL99 and SQL2003 features
- More OLTP performance enhancements
- Auto partitioning / Dynamic partitioning
- External tables interfaces (SQL/MED compliant)
- More exotic datatypes
- More query optimizer improvements
- Faster vacuum with reduced impact
- Improved XML support

Support / sponsors

EnterpriseDB

Sun microsystems

credativ

OmniTI

redhat

UNISYS

FUJITSU

PostgreSQL

Greenplum

GMO

skype

Afilias GLOBAL REGISTRY SERVICES

hub.org

2ndQuadrant

SRA

800 POUND GORILLA HTTP://EHPG.NET

conova.com THE IT COMPANY

NTT Group

PostgreSQL

So why is this database so powerful?

- Open source project and quality source code
- Immunity to over-deployment – BSD license
- Professional support
- Low maintenance and tuning requirements
- Reliability and stability
- Excellent performance
- Designed for high volume environments
- Extensible
- Cross platform
- Command line & GUI database design and administration tools

http://www.postgresql.org/

PostgreSQL

References

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[4] PostgreSQL mailing lists, `http://www.postgresql.org/community/lists/`

[5] History of PostgreSQL – presentation, *Bruce Momjian* - *`http://candle.pha.pa.us/`*

[6] PostgreSQL Performance tunning – presentation, *Bruce Momjian* - `http://candle.pha.pa.us/`

[7] Mastering PostgreSQL administration – presentation, *Bruce Momjian* - `http://candle.pha.pa.us/`

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[10] PostgreSQL replication solutions – presentation, *Bruce Momjian* - `http://candle.pha.pa.us/`

[11] PostgreSQL: Past, Present, and Future – presentation, *Bruce Momjian* - `http://candle.pha.pa.us/`

[12] PostgreSQL hardware performance tunning – article, *Bruce Momjian* - `http://candle.pha.pa.us/`

[13] Get to know PostgreSQL – presentation, *Oddbjørn Steffensen* - `http://www.tricknology.org/foilware/`

[14] Power PostgreSQL - `http://www.powerpostgresql.com/`