What makes this database so powerful?
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/
History

When I started programming, we didn't have any of these sissy "icons" and "windows."

All we had were zeros and ones -- and sometimes we didn't even have ones.

I wrote an entire database program using only zeros.

You had zeros? We had to use the letter "O."
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.
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.
Multiversion
Concurrency Control (MVCC)
Important SQL features
Improved build-in types
Speed

Improved performance
Improved administration & maintenance
24/7 ready
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 (COstructive COst MOdel for software cost estimation model)
Features

http://www.postgresql.org/about/featurematrix
It uses a multi-process model
It does not use multi-threading.
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.
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.
SQL features

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

[1] PostgreSQL documentation, 8.0.x online manual - http://www.postgresql.org/docs/


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