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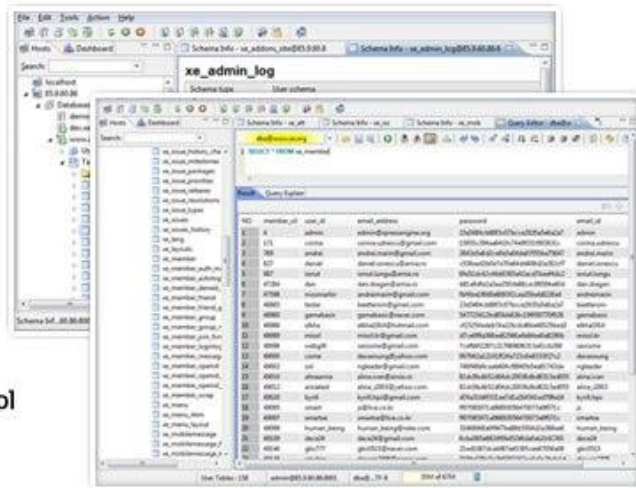
Annotation

IT departments work with a meager budget. Therefore, reducing costs will allow the company not only to stay afloat, but also to direct the saved funds to development. In order to use the available budget more efficiently, we will be acquainted with seven free systems that allow the development and management of databases and open source DBM solutions.

Keywords: CUBRID, Firebird, Software for working with MariaDB database, MongoDB, MySQL, PostgreSQL, SQLite.

INTRODUCTION

1. CUBRID



A free program for creating an open source database, optimized specifically for web applications. This service is designed to process large amounts of data and generate numerous parallel requests. This solution is implemented in the C programming language.

Dignities

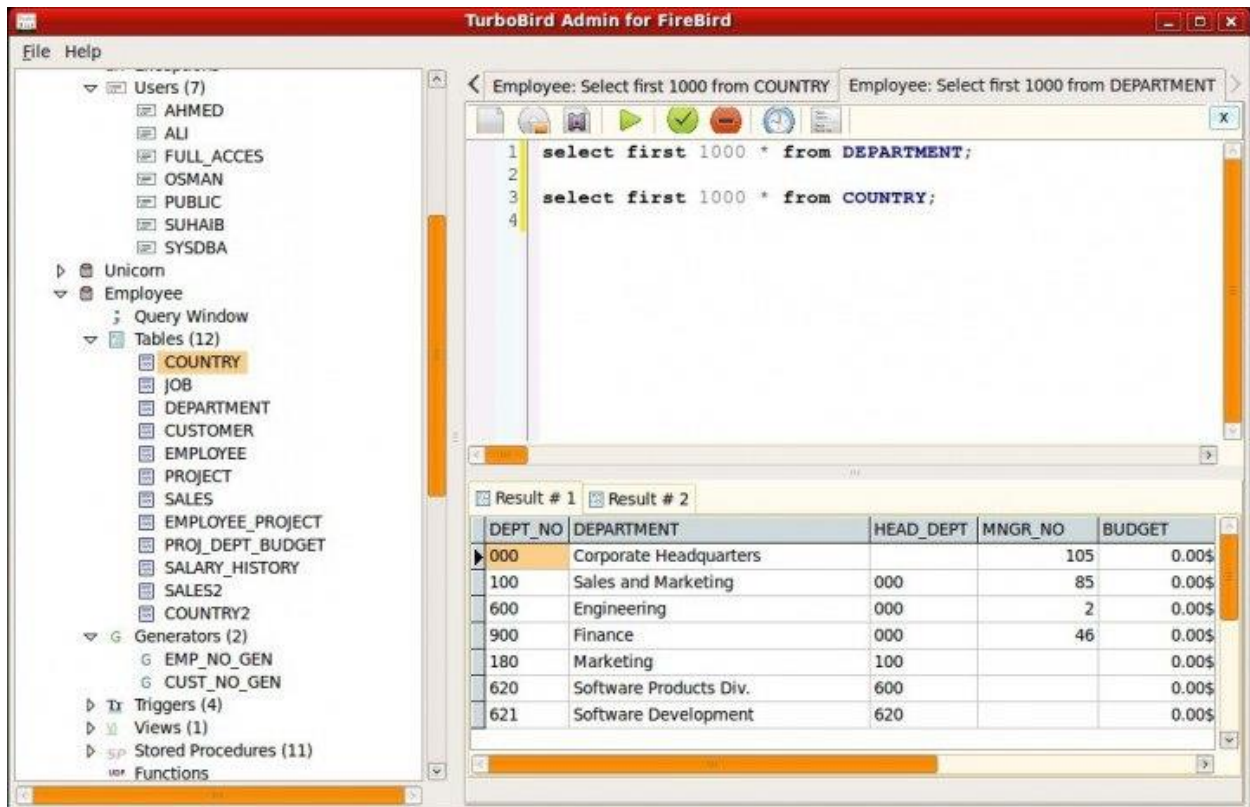
- Multiple degree of crushing of locks;
- Create online backups;
- GUI tools and drivers for JDBC, PHP, Python, Perl and Ruby;

- Support for built-in database segmentation for scaling;
- In large systems, data is split across multiple database instances;
- Full-text database replication and transaction consistency.

Disadvantages

- Does not work on Apple systems;
- No script debugger;
- The manual is only available in English and Korean;
- Discussions on the official forum are usually outdated (most of them are several years old).

2. Firebird



This database designer has been used in production systems (under various names) since 1981 and implements many ANSI SQL standards. Firebird can run on Linux, Windows and various UNIX platforms.

Dignities

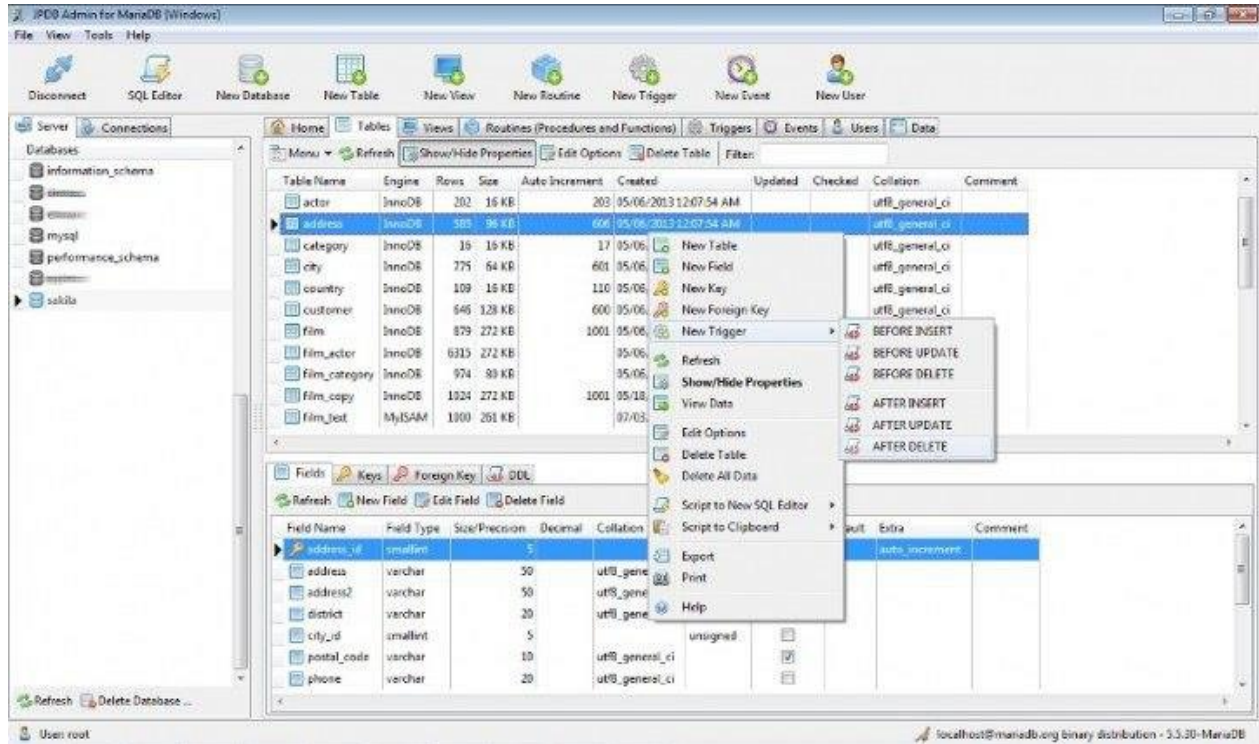
- Trace API for real-time monitoring;
- Authentication with Windows authentication;
- Four supported architectures: SuperClassic, Classic, SuperServer and Embedded;
- Various development tools: commercial tools – FIBPlus and IBOjects;
- The ability to automatically deploy to clean up the database;
- Event notifications from database triggers and stored procedures;
- Free support for the global Firebird community. What is important when developing database requirements.

Disadvantages



- Integrated replication support is not included and is only available as an add-on;
- Lack of temporary tables and integration with other database management systems;
- Windows authentication is insufficient compared to solutions available on other operating systems.

3. Software for working with the Maria DB database



Created by MySQL developers, Maria DB is used by such tech giants as Wikipedia, Facebook and even Google. Maria DB is a database server that offers an embedded replacement for MySQL functionality. Security is the main principle and priority of DBMS developers. In each release, they add all MySQL security patches and improve them if necessary.

Dignities

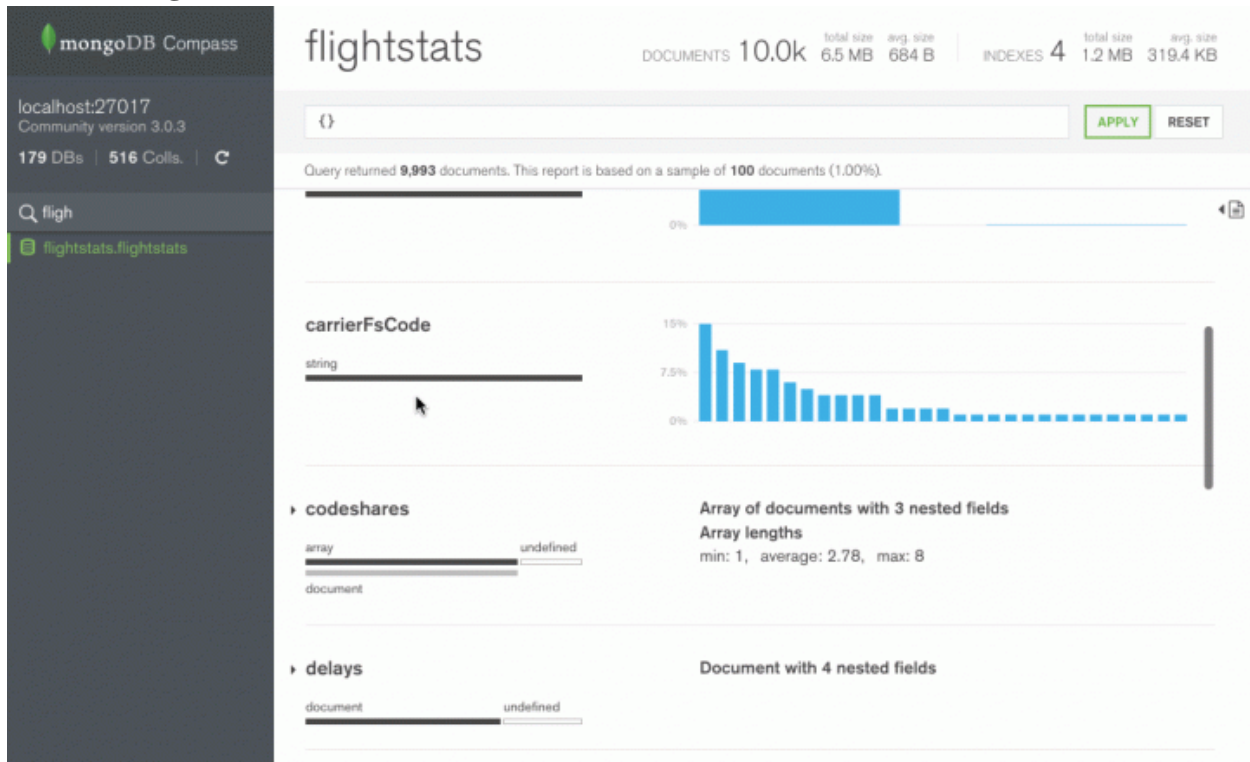
- Scalability with easy integration;
- Real-time access;
- Basic MySQL functions (Maria DB is an alternative to MySQL);
- Alternative storage mechanisms, server optimization and patches;
- Extensive knowledge base on SQL database development accumulated over 20 years of Maria DB operation.

Disadvantages

- There is no plugin for checking password complexity;
- There is no memcached interface (distributed in-memory caching system);
- There is no optimizer trace.



4. Mongo DB



Mongo DB was founded in 2007 and is known as the "database for great ideas". Such well-known investors as Fidelity Investments, Goldman Sachs Group, Inc., and Intel Capital fund the project. Since its inception, Mongo DB has been downloaded 20 million times and is supported by more than 1,000 partners. These partners adhere to the principle of a free and open source solution.

Dignities

- Document verification;
- Encrypted storage mechanism.

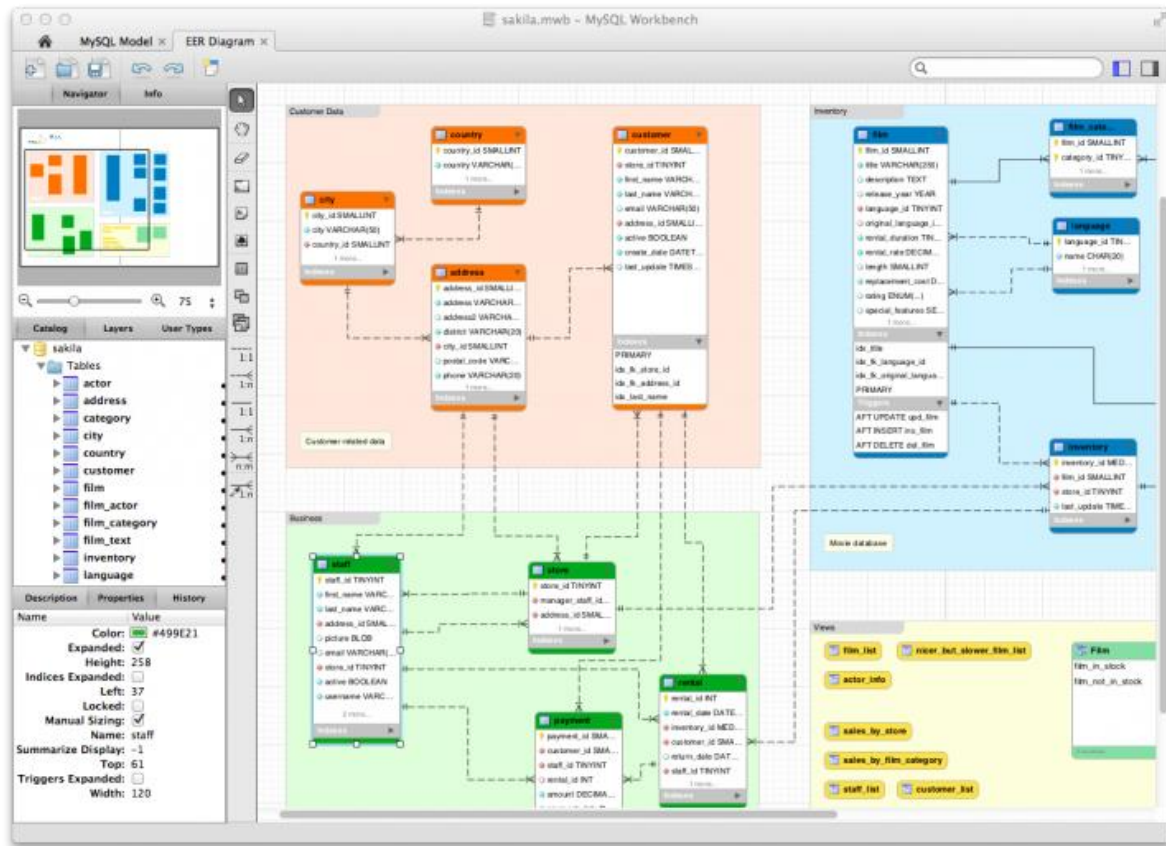
Popular use cases:

- Mobile applications;
- product catalogs;
- content management;
- Real-time applications with in-memory storage mechanism (beta version);
- reduces the time between initial failure and recovery.

Disadvantages

- Not suitable for applications requiring complex transactions;
- Not suitable for legacy applications;
- Young solution: the software is changing and developing rapidly.

5. MySQL



The most eminent representative of our review of database development programs. The free MySQL database has been around since 1995 and is now owned by Oracle. The DBMS has an open source code. There are also several paid versions that offer additional features, such as geo-replication of the cluster and automatic scaling.

Since MySQL is an industry standard, it is compatible with almost all operating systems and is written in C and C++ languages. This solution is a great option for international users. The DBMS server can output error messages to clients in several languages.

Dignities

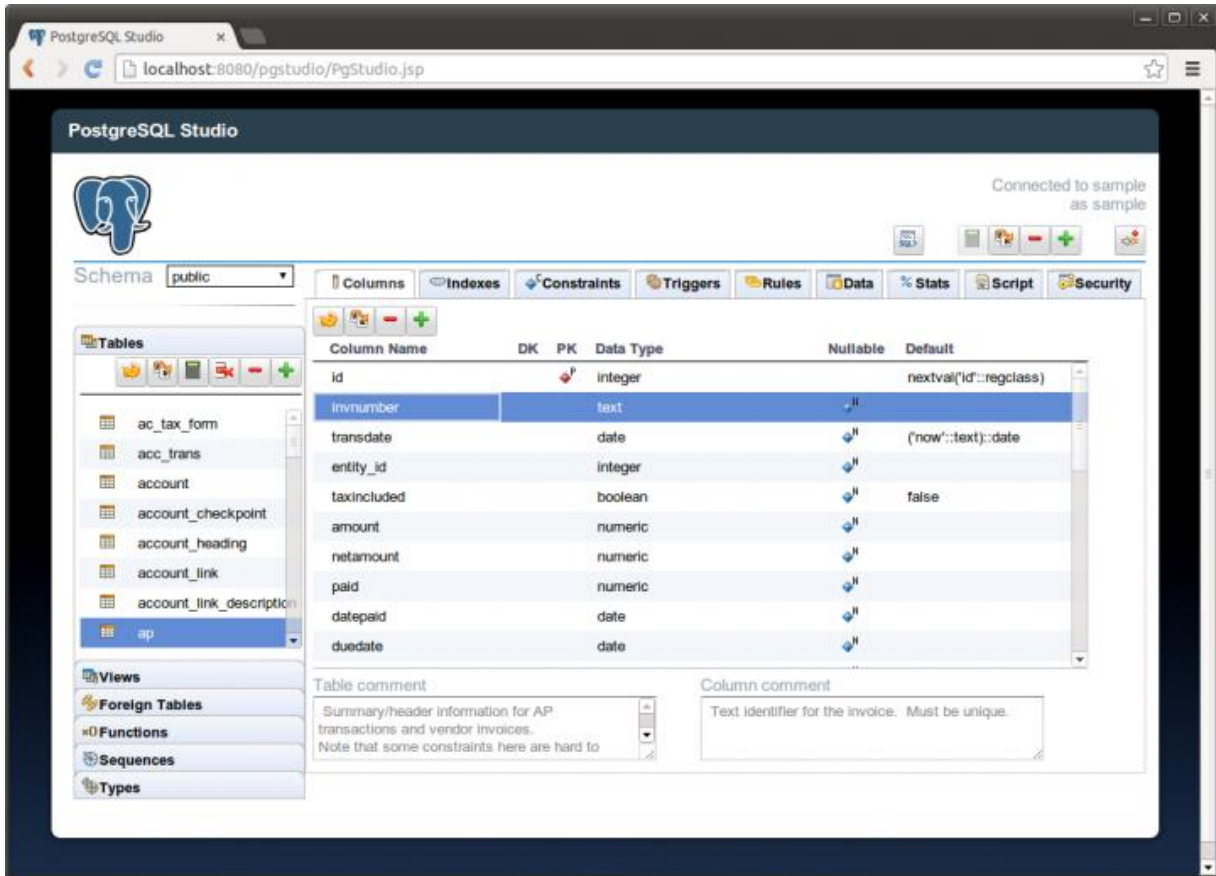
- Server-side verification;
- Can be used as a local database;
- Flexible system of privileges and passwords;
- Secure encryption of all password traffic;
- A library that can be embedded in standalone applications;
- Provides the server as a separate program for the client/server network environment.

Disadvantages of practical development and administration of MySQL databases Acquired by Oracle:

- Users believe that mysql no longer falls under the category of free and open source software;
- No longer supported by the community;
- Users cannot fix bugs and patches;
- Loses to other solutions due to slow updates.



6. PostgreSQL



PostgreSQL is another outstanding open source solution running on all major operating systems, including Linux, UNIX (AIX, BSD, HP-UX, SGI IRIX, Mac OS X, Solaris, Tru64) and Windows. PostgreSQL fully complies with ACID principles (atomicity, consistency, isolation, stability).

Dignities

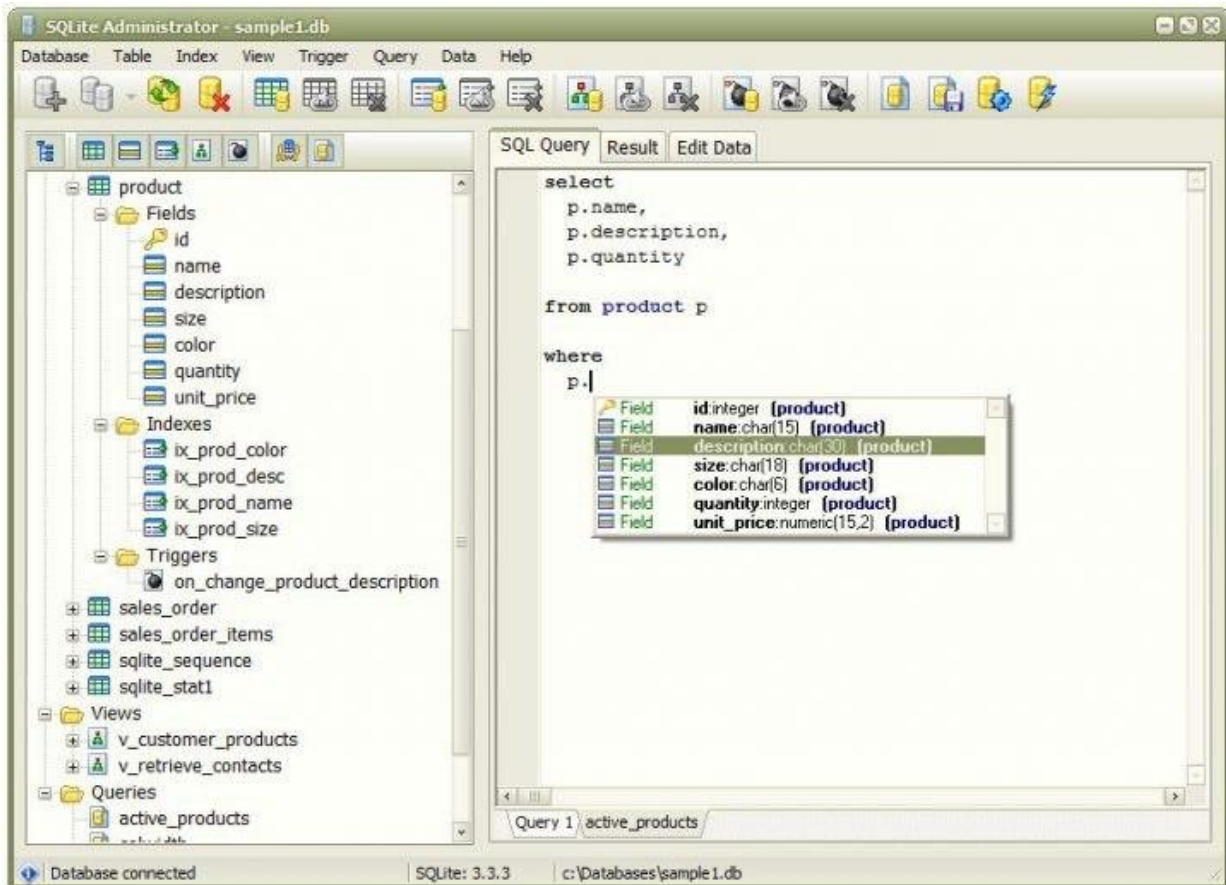
- Ability to create custom data types and query methods;
- The database development environment performs stored procedures in more than a dozen programming languages: Java, Perl, Python, Ruby, Tcl, C/C++ and native PL/pgSQL;
- GiST (Generalized Search System): combines various sorting and search algorithms: B-tree, B+-tree, R-tree, partial sum trees and ranked B+-trees;
- The ability to create for greater parallelism without changing the Postgres code, for example, CitusDB.

Disadvantages

- MVCC system requires regular "cleaning": problems in environments with high transaction speed;
- Development is carried out by an extensive community: too much effort for improvements.



7. SQLite



Proclaiming itself the most widespread DBMS in the world, SQLite was born in 2000 and is used by Apple, Facebook, Microsoft and Google. Each release is thoroughly tested. SQLite developers provide users with lists of errors, as well as a chronology of code changes for each version.

Dignities

- There is no separate server process;
- File format – cross-platform;
- Transactions meet ACID requirements;
- Professional support is available.

Disadvantages

Not recommended for:

- client-server applications;
- large-scale sites;
- large data sets;
- programs with a high degree of multithreading.



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