

PostgreSQL is a flexible open-source object relational database management system with features meant to meet changes in workloads, from single machines to data warehouses to web services with many concurrent users. PostgreSQL uses and extends SQL (hence the name), and is broadly extensible to a range of use cases beyond mere transactional data. PostgreSQL is strongly supported by its global development group of companies and individual contributors.

PostgreSQL is a relational database. As such, it's a store of relations between tuples representing entities (such as documents and people) and relationships (such as authorship). Relations hold fixed-type attributes representing entity properties (such as a title) along with a primary key. Attribute types can be either atomic (such as integer, floating point, or boolean) or structured (such as an array or a procedure).

PostgreSQL supports transactions with ACID properties. This means transactions must support four attributes:

Atomicity — transactions are considered complete units; a transaction can either completely succeed or completely fail - in the case of failure, the database state is left unchanged.

Consistency — a database, between transactions, can only exist in a valid state; all data written to the database must adhere to extant constraints, triggers, cascades and related combinations.

Isolation, — a function of *concurrency control*, ensures that data is not corrupted by illegal or concurrent transactions — as transactions are treated as if they happened sequentially.

Durability — ensures that a transaction remains committed even when the system fails — typically, completed transactions are recorded, for example, in a write-ahead log.

For more information about the types of features that PostgreSQL supports, there's a great breakdown at PostgreSQL , so we'll look at just a few of the main ones here.

In addition to SQL support, PostgreSQL features automatically updatable views, meaning that a view resulting from a query will automatically update when a transaction updates the data serving that view. A materialized view is a data object containing a given query's results: it's possible to query a materialized view just as you would a database table directly.

Triggers execute code in response to transactional or other changes to a table or view: when a new item is entered to an inventory table, a similar item could be entered automatically to each of the prices, reviews, and orders tables.

Foreign keys exist to ensure inclusion dependencies or members shared between parent and child tables; for example, a member of the managers table might share the employee\_name column with an employees table.

Stored procedures, maintained in the data dictionary of a database, may contain several combined SQL procedures to provide applications access to commonly-used data validation, access control, or other methods.

PostgreSQL offers a means for publish/subscribe logical replication; essentially allowing a PostgreSQL instance to serve as an event cache between applications and event consumers. There is also a means for change data capture, meaning that prior database changes can be *rewound* and *replayed*, a capability essential for disaster recovery.

And that's just the beginning. The PostgreSQL home page lists features including supported data types, more in-depth data integrity features, features supporting concurrency, disaster recovery features, security features, extensibility and text search, including international character support.

Individual records in WALs are checksummed by a CRC-32 check to validate correctness of record contents (upon restore operations), although there are a few items that bypass the checks, including data pages, and internal data structures.

Superuser rights to objects are one option to be able to perform a lot of different operations in PostgreSQL. For example, DB files themselves are only readable by the PostgreSQL superuser account. These privileges can be implemented to copy table data, create publications that publish data automatically, or create subscriptions. They are also important privileges for use in logical replication.