PostgreSQL overview

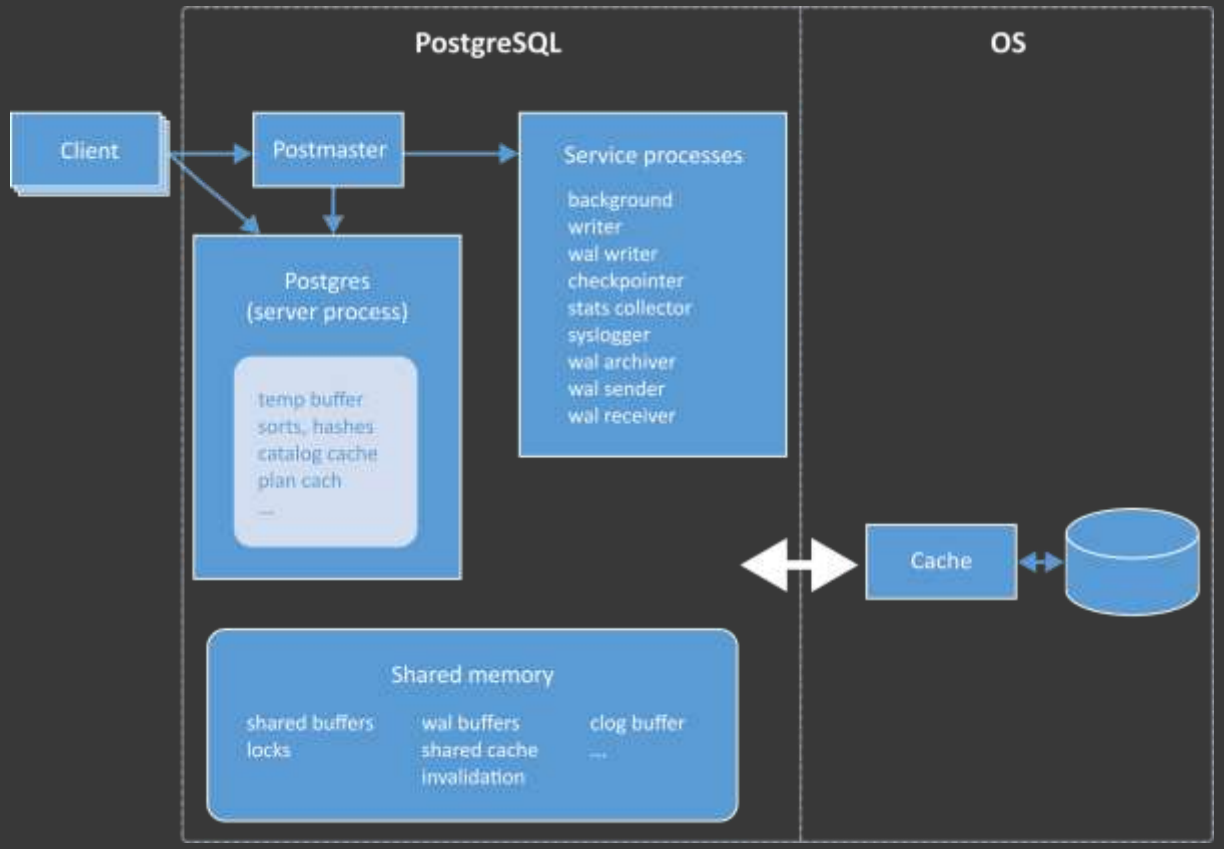
PostgreSQL

PostgreSQL is an open source relational database management system developed by a worldwide team of volunteers.

PostgreSQL supports a large part of the SQL standard and offers many modern features including the following –

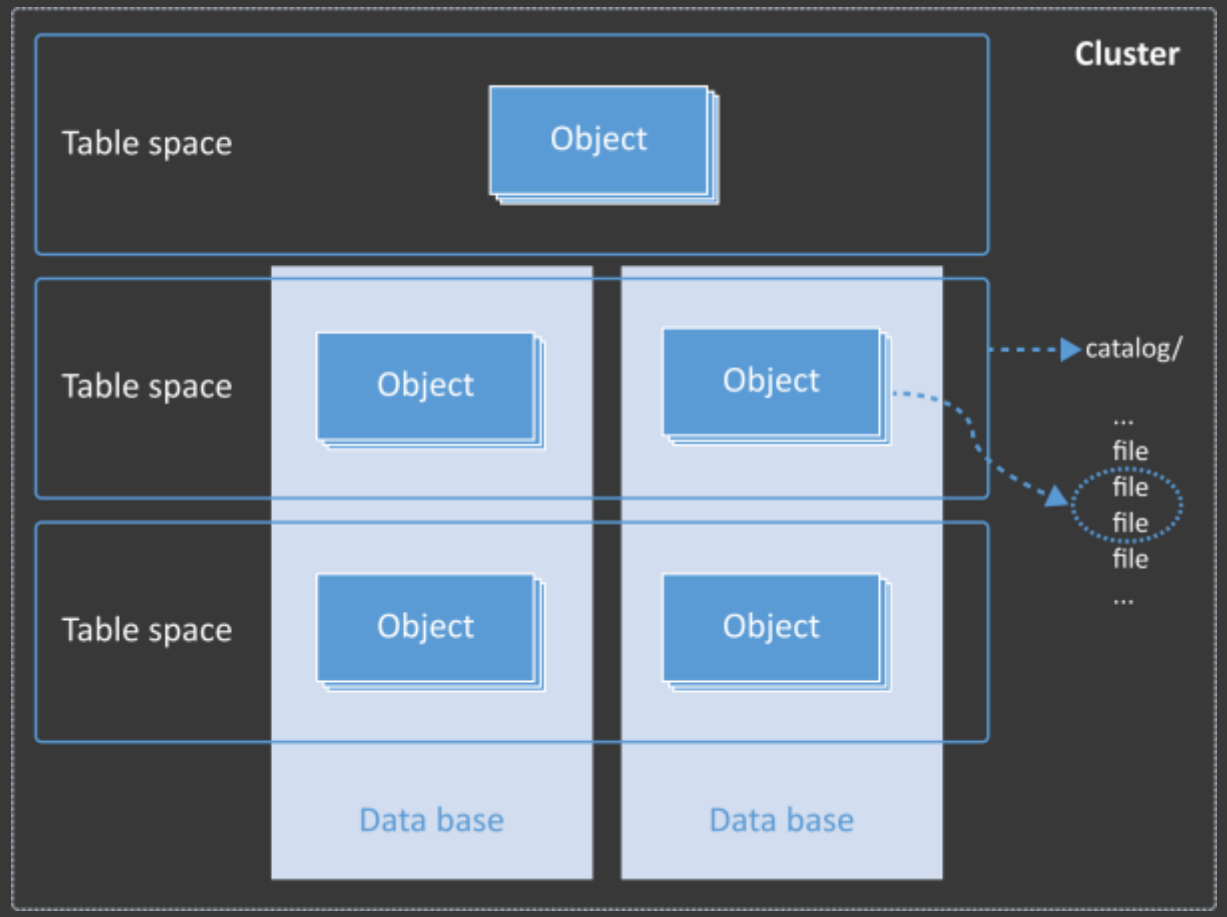
- Complex SQL queries
- SQL Sub-selects
- Foreign keys
- Trigger
- Views
- Transactions
- Multiversion concurrency control (MVCC)
- Streaming Replication (as of 9.0)
- Hot Standby (as of 9.0)

PostgreSQL Architecture



When connecting to the server, the client connects to the postmaster process. *Postmaster* generates a server process.
The DBMS instance has shared memory for all server processes. Most of it is taken up by the buffer cache, which is necessary for acceleration working with data on disk. Disks are accessed via the *operating system*. Each server process has its own local memory. It contains the directory cache, query plans, and workspace for query execution.

Data organization. PostgreSQL



The *DBMS instance* works with multiple databases. These databases are called a cluster. A cluster is a group of processes that manage a shared data directory containing one or more databases. Data storage on disk is organized using table spaces. The table space specifies the location of the data. It can be used by multiple databases. Objects are stored in files. Each item takes up one or multiple files inside the table space directory.

Transactions. PostgreSQL

A PostgreSQL transaction is atomic, consistent, isolated, and durable. These properties are often referred to as ACID:

- Atomicity guarantees that the transaction completes in an all-or-nothing manner.
- Consistency ensures the change to data written to the database must be valid and follow predefined rules.
- Isolation determines how transaction integrity is visible to other transactions.
- Durability makes sure that transactions that have been committed will be stored in the database permanently.