

# Overview

PostgreSQL is an open-source relational database management system. It supports SQL language and offers features like transactions, referential integrity, and user-defined types and functions. PostgreSQL can handle complex queries, supports various data types, and is extensible, allowing users to add custom functions and data types. It runs on multiple operating systems, including Windows, Linux, and macOS.

## Key Features of PostgreSQL:

- **Extensibility:** Users can define custom data types, operators, and index methods, tailoring the database to specific application needs.
- **Standards Compliance:** PostgreSQL conforms to at least 170 of the 177 mandatory features for SQL:2023 Core conformance, ensuring compatibility with SQL standards.
- **Advanced Data Types:** Supports a wide array of data types, including JSON for unstructured data, arrays, hstore (key-value pairs), and geometric types, enhancing its versatility.
- **Concurrency and Performance:** Utilizes Multi-Version Concurrency Control (MVCC) to handle multiple transactions simultaneously without conflicts, ensuring data integrity and performance.
- **Replication and High Availability:** Offers asynchronous replication, allowing data to be copied to standby servers for load balancing and failover support, enhancing reliability.
- **ACID Compliance:** Ensures transactions are processed reliably through Atomicity, Consistency, Isolation, and Durability properties, which are crucial for applications requiring data integrity.
- **Security Features:** Provides robust security mechanisms, including role-based access control, data encryption, and connection security, safeguarding data against unauthorized access.
- **Cross-Platform Support:** Runs on all major operating systems, including Windows, Linux, macOS, FreeBSD, and OpenBSD, offering flexibility in deployment environments.

These features make PostgreSQL a preferred choice for developers and enterprises seeking a reliable, feature-rich, and scalable database solution.

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