CDB for PostgreSQL

Product Intro

Product Introduction
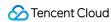
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Product Overview

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1. Introduction to PostgreSQL

PostgreSQL is the world's most powerful open source database, supporting mainstream programming languages, including C, C++, Perl, Python, Java, TCL, PHP, etc. It can fully implement SQL specifications and support a wide range of data types, such as JSON data, IP data, and geometry data, which are not fully supported by most commercial databases. PostgreSQL has been developing rapidly in the past few years. It is now widely used in various industries including geospace, mobile applications and data analysis, and has become the first choice for many enterprise developers and innovative companies.

2. Introduction to TencentDB for PostgreSQL

TencentDB for PostgreSQL allows you to easily configure, work with and expand the PostgreSQL, one of the most powerful open-source databases, on the cloud. Tencent Cloud handles most complicated and time-consuming management works for you, such as installation of PostgreSQL software, storage management, high-availability replication, and data backup for disaster recovery. Therefore, you can focus on the development of business applications.

Tencent Cloud has provided PostgreSQL 9.3.5, 9.5.4 (Optimized based on kernel) and 10.4.

Product Advantages

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1. More Powerful

> **Over the past few years, PostgreSQL has become the preferred open source relational database for businesses**

- Follows the BSD protocol, which means there are no restrictions on using PostgreSQL.
- Supports most of the programming languages such as C, C++, Java, PHP, Python and Perl, thus making the development of your business applications easier and faster.
- PostgreSQL is the closest open source database to Oracle in terms of architecture, syntax and data types.
- It is compatible with SQL standard "SQL 2003", and supports the main features of SQL 2011.
- In addition to the traditional SQL LIKE operator, it also supports the new SIMILAR TO operator of SQL 99 and POSIX-style regular expressions.
- Rich data types: geometry, network address, XML, JSON, RANGE, Array, etc.
- Supports complex types (custom data types).
- Supports complex multi-table join SQL query, and join algorithms are supported such as hash join, merge join, etc.
- Supports window functions or complex analytic functions as the latter ones include window functions.
- Supports function index, partial (row) index, custom index and full-text index.
- Thanks to its multi-process architecture, it is more stable, and a high-throughput database can be implemented on a single machine.
- Includes powerful, high-performance built-in plug-ins, such as PostGIS, which is a database extension for geo-spatial data and provides additional support for geography location objects, allowing you to run location queries with SQL.
- Has strong data consistency required for commercial use. With synchronous replication, PostgreSQL guarantees zero data loss, and even suitable for financial trading systems.

2. High Performance

> **High-performance database for use cases of OLAP and OLTP**

- Provides query optimizers comparable to commercial databases. It also supports common multi-table join query (such as nested loop, hash join, sort merge join, etc.). For example, the performance of joining two tables, each with 100,000 rows, is 100 times faster than that of MySQL. With the capability of obtaining query results faster from more tables, you can make your analysis more accurate.
- Built on PCI-E SSD storage, with QPS as high as 230,000. You can support more concurrent business requests with fewer databases.
- Supports a large number of performance profiles. You can view performance data such as the running SQL queries, current lock waits, table scan and index scan to help you quickly and accurately locate the performance problems.

3. Easy to Administer

- Tencent Cloud allows you to start and connect to a PostgreSQL instance in just few minutes without further configuration. It is configured with common parameters by default which can be modified in real time in the console. This helps you eliminate the hassle of complicated installation and configuration tasks and improve your OPS efficiency.

4. Easy Monitoring

Tencent Cloud provides key operation metrics for PostgreSQL, including CPU utilization, storage utilization, I/O activity, and other performance monitoring data. You can view them in the console free of charge to quickly locate and solve problems. You can customize alarm thresholds for these metrics, which keeps you updated on any exceptions by email or SMS, without you having to monitor them all the time.

5. Superior Performance

Tencent Cloud improves the performance of built-in operators by optimizing the PostgreSQL kernel, and provides QPS configuration at least three times higher than SATA through the disk configured with super high performance PCI-E SSD. TencentDB for PostgreSQL uses "One Master and One Slave" architecture for deployment by default. Synchronous replication is enabled by default, protecting your business from being interrupted and prevent problems such as data corruption and data loss.

6. More Reliable

After a node failure, the recovery of the node will be immediately retried by cluster scheduling. When there is a serious problem with your data, you can quickly recover the node to a normal point in time to deal with upgrade failures, disaster recovery, etc. By default, TencentDB comes with multiple security protections for each database.

7. Scalable

You can upgrade your instance to a desired specification with just one click in Tencent Cloud's console without extra operations. The upgraded instance inherits the IPs and all the configurations from the original instance, and there is only a 1-second disconnection during the upgrade process instead of long downtime, to meet your business needs at any time in a flexible way. When the existing PostgreSQL cannot support your business development, you can support massive customer again with only a few changes or even no changes to your business, without capacity limitation and performance bottleneck.

Functions

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1. Easy to Host and Deploy

Tencent Cloud allows you to enable a PostgreSQL instance and connect it to your applications within minutes without further configuration. It is configured with common parameters by default which can be modified in real time in the console. This helps you eliminate the hassle of complicated installation and configuration tasks and improve your OPS efficiency.

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With PCI-E SSD, Tencent Cloud provides QPS at least three times higher than SATA disks. TencentDB for PostgreSQL uses "One Master and One Slave" architecture for deployment by default. Synchronous replication is enabled by default, protecting your business from being interrupted and prevent problems such as data corruption and data loss.

4. More Reliable

After a node failure, the recovery of the node will be immediately retried by cluster scheduling. When there is a serious problem with your data, you can quickly recover the node to a normal point in time to deal with upgrade failures, disaster recovery, etc. You can also perform autonomous data recovery through the backup feature provided by the console. For more information, see Security Management - Description of Information Security - Backup and Recovery. By default, TencentDB comes with multiple security protections for each database.

5. Scalable

You can upgrade your instance to a desired specification with just one click in Tencent Cloud's console without extra operations. The upgraded instance inherits the IPs and all the configurations from the original instance, and there is only a 1-second disconnection during the upgrade process instead of long downtime, to meet your business needs at any time in a flexible way. When the existing PostgreSQL cannot support your business development, you can support massive customer again with only a few changes or even no changes to your business, without capacity limitation and performance bottleneck.

Typical Scenarios

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1. Enterprise Databases

Applications such as ERP, trading systems and financial systems need to handle sensitive data such as fund and customer information. Therefore, they require no data loss and complex business logics. With PostgreSQL as the underlying storage system, you can achieve high availability with data consistency, and implement complex business logics with simple programming languages.

2. Applications with LBS

Large games, O2O and other applications need to support such capabilities as world map, nearby stores, distance between two points, etc. PostGIS provides additional support for geographic objects, allowing you to run location queries with SQL without the need of complex programming languages, so that you can simplify your business logics, easily implement LBS, and increase the user stickiness.

3. Data Warehouse and Big Data

With more data types and powerful computing capability, PostgreSQL makes it easier for you to build a data warehouse or a big data analytics platform, so as to maximize your business operation value.

4. Website or App Development

Featuring good performance and powerful capabilities, PostgreSQL can effectively improve website performance and reduce development difficulty.

Information Security

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The following statement is hereby made for this document.

1. This document is designed to provide an overview of security features of TencentDB for PostgreSQL products and services. The security features of some products and services may be subject to adjustment. Any of your mandatory requirements for the security of TencentDB for PostgreSQL can be agreed on with Tencent Cloud by entering into a written Service Level Agreement (SLA). Tencent Cloud does not make any express or implied representation or warranty concerning the contents of this document.

2. This document only involves "part of" the technical security features among the wide range of security features.

3. This document is not intended as the reference document for national or industry information security standards or requirements.

4. This document has been refined for readability. In the event of any ambiguity or inaccuracy, refer to Item 1.

5. Tencent Cloud reserves the right of interpretation of this document.

1. Overview

TencentDB for PostgreSQL has been certified by the following standards and complies with the related security requirements:

- ISO 22301
- ISO 27001
- ISO 20000
- ISO 9001
- Trusted cloud services certification
- Classified protection of information security (Class 3)
- STAR certification

Some features of PostgreSQL are designed by referring to:

- GBT 20273-2006 Information Security Technology - Security Techniques Requirement for Database Management System (Class 2 or above)

- JRT 0072-2012 Testing and Evaluation Guide for Classified Protection of Information System of Financial Industry (Class 4)

2. TencentDB for PostgreSQL Service Security Protection (OPS Security)

2.1 Overview

PostgreSQL complies with the requirements of National Classified Protection of Information Security (Class 3). Some of the product features meet the standards for Financial Industry Information Security (Class 4).

2.2 Internal personnel and system authentication

To improve the security of database server system and ensure the security of various OPS activities, Tencent Cloud has implemented a series of security reinforcement measures, including but not limited to:

- Carry out identification and authentication for the users who log in to the operating system and database system, and guarantee the username uniqueness.
- Configure username/password as required. The password must be a combination of at least 3 types of characters with a length of not less than 8 digits, and should be changed regularly.
- Enable login failure mechanism where actions such as ending session, limit on the number of unauthorized logins and automatic exit are taken in case of login failures.
- Access the system under Tencent enterprise IT monitoring in remote management to provide internal risk control and audit, with all the sensitive operations encrypted.
- Two-factor authentication (dynamic token + password) is performed on the database server administrators who log in to the OPS system.

2.3 Internal personnel and system access control

For Tencent Cloud database management systems and administrators, discretionary access control scheme is implemented, including but not limited to:

- Internal OPS staff and systems are controlled based on Tencent Cloud security policies (audit requirements are met).
- The granularity of a subject is down to user level, and that of an object to database table level.
- Implement strict code management and access control.
- High-risk systems can only be accessed by Tencent private network (development network), which is physically isolated from the Internet.

2.4 Internal security audit

Provide comprehensive security audit and risk control mechanism: audit features include but not limited to database operation audit, management system operation audit, document operation audit, plug-in device operation audit, unauthorized external connection audit, IP address change audit, service and process audit, etc. The audit covers every operating system user and database user on the server, for example, Tencent Cloud administrator behaviors, abnormal use of system resources, use of important system commands and other security-related events. The audit logs, which contain the date, time, type, subject IDs, object IDs and results of the events, are retained for more than one year at a location with a higher-level security to prevent from being accidentally deleted, modified or overwritten.

- Database security audit: all the operations on database server and database will go through database security audit system. [Currently unavailable]
- Management system operation audit: Tencent Cloud keeps detailed logs of all the operations on both internal and external management systems for an effective risk traceability.
- Regular risk evaluation: Tencent Cloud security team performs security evaluation on database OPS management on a regular basis.

2.5 Internal intrusion prevention

Tencent Cloud takes multi-dimensional approaches to intrusion prevention for database servers:

- Intrusion detection system can defend against intrusions into database servers.
- Deploy vulnerability scanning and perform system security inspection regularly.
- Deploy terminal security management system and enable patch distributing module to update system with patches timely.
- Operating system is installed on a minimal installation basis, with only required components and applications installed and unwanted services disabled.
- Implement enhancements on other security configurations based on system type.

2.6 Backup and recovery

TencentDB provides data backup and recovery features by default. By default, full backup files are backed up at 00:00 in the morning each day and kept for 7 days (automatic backup, optional backup duration, COS backup service and other features will be available soon). XLOG files are automatically backed up when you work with them, and also kept for 7 days. Backup files can be downloaded from **Instance Management** -> **Backup Management** on the console, as shown in the following figure (full backup files are under Backup List in the red box, and XLOG files required for incremental backup are under XLOG List in the green box). Data can be recovered through full backup files and XLOG files. For more information,

see [Recover PostgreSQL Data on CVM](#).

实例详情	系统监控	帐号管理	**备份管理**	性能优化

备份列表　　xlog 列表

备份文件名	备份时间	备份大小	操作
20180824010116.tar.gz	2018-08-24 01:17:29	2.86M	下载
20180823010116.tar.gz	2018-08-23 01:17:13	2.86M	下载

2.7 Secure reuse of objects

For returned or replaced devices, Tencent Cloud will clear the residual information timely to ensure the previous user's sensitive information such as authentication information, files, directories and database records are released in time or completely cleared before reassigning the devices to other users.

2.8 Non-repudiation

Tencent Cloud's internal OPS staff are required to go through a two-factor authentication and non-repudiation scheme before logging in to the system. All the personnel involved have signed a confidentiality agreement.

2.9 More security features

More details will be provided later.