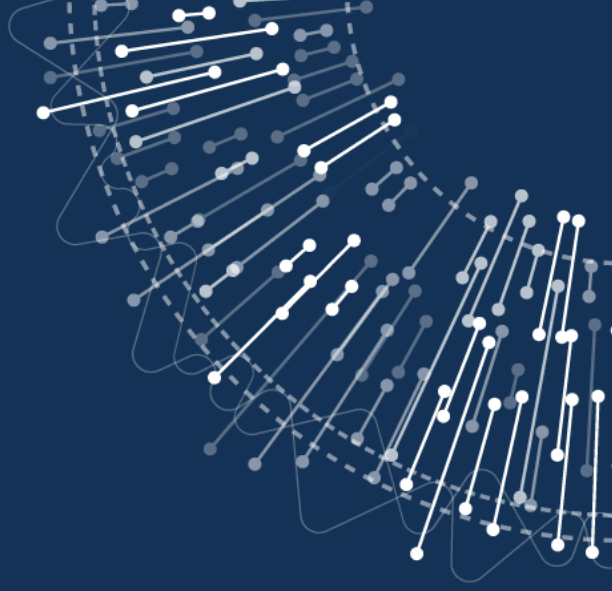

CYBERTEC POSTGRESQL

HEALTH CHECK SERVICES

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HEALTH CHECKS FOR POSTGRESQL

The overall state of your database matters. Therefore, CYBERTEC offers comprehensive Health Check Services designed to ensure the overall efficiency, security, and maintainability of PostgreSQL / PGEE database deployments.

This document describes our services in great detail, and outlines the results as well as the necessary steps to achieve them.

All important steps will be outlined and discussed in great detail:

- Preparing the target system
- Basic health checks
- Operating system and environment configuration
- PostgreSQL configuration
- VACUUM and bloat
- Backup and recovery setup
- Security and database hardening
- Replication and High-Availability
- Data model inspection
- Performance and throughput

In general, two Health Check packages are available:

Basic Health Check
Basic inspection to detect the most common pitfalls

Enterprise Health Check
In-depth Enterprise grade inspection and analysis

The following sections will showcase which steps are performed in detail.

PREPARING THE TARGET SYSTEM

The first step is to ensure that the systems that have to be inspected are accessible and prepared for the work to come.

Check routine	Basic Health Check	Enterprise Health Check
Identify target systems	✓	✓
Verify logins and credentials	✓	✓
Ensure existence of pg_stat_statements	✓	✓

BASIC HEALTH CHECKS

A variety of basic checks have to be performed to quickly identify some important issues related to stability, security, and general issues.

Check routine	Basic Health Check	Enterprise Health Check
Check PostgreSQL version in use • Identify minor release • Identify major release	✓	✓
Inspecting I/O and CPU subsystem	✓	✓
Check open database connections • Active connections • “Idle in transaction” connections • Idle connections	✓	✓
Basic inspection of the PostgreSQL log	✓	✓
Check kernel logs (for overcommit issues)	✓*	✓*
Check for existing CVEs	-	✓

(*): If applicable

OPERATING SYSTEM AND ENVIRONMENT CONFIGURATION

Depending on the type of deployment, one can determine various issues on the operating system level. The type of check depends on the operating system in use, as well as on other factors, such as “plain metal” vs. “VM”, “VM” vs. “Kubernetes”, etc.

Check routine	Basic Health Check	Enterprise Health Check
Make sure a reliable filesystem is used	✓	✓
Check for Transparent Huge Pages	✓*	✓*
Check memory overcommit	✓*	✓*
Inspect CPU scaling governor	-	✓*
Test if there is more than one NUMA node	-	✓*
Determine kernel swappiness	-	✓*
Inspect mount options	-	✓*
Investigate I/O Scheduler	-	✓*
Check OS level resource limit	-	✓*

(*): If applicable

POSTGRESQL CONFIGURATION

Running a good and well thought-out database configuration is essential to achieve and maintain good performance. As part of the PostgreSQL health check, parameters are to be inspected to detect potential bottlenecks.

POSTGRESQL.CONF INSPECTION:

Check routine	Basic Health Check	Enterprise Health Check
Handle connection related settings	✓	✓
Handle memory related settings	✓	✓
Inspect temporary I/O settings	✓	✓
Working with WAL and checkpoint settings	✓	✓
Checking the VACUUM configuration	✓	✓
Determine logging related configuration	✓	✓
Verifying backup / restore related settings	✓	✓
Security and user related parameters	✓	✓
Replication and HA settings	-	✓
Investigate optimizer parameters	-	✓
Other parameters	-	✓

PG_HBA.CONF AND OTHER CONFIG FILES:

Check routine	Basic Health Check	Enterprise Health Check
Verify additional configuration sources	✓	✓
Avoid “trust” and “md5” in pg_hba.conf	✓	✓
Inspect SSL configuration	✓*	✓*
Inspect SSO configuration (Single Sign On)	-	✓*

(*): If applicable

VACUUM AND BLOAT

Bloat and bad VACUUM configuration are key sources for problems when running PostgreSQL. Therefore, it is important to focus on those topics to fix and prevent potential pitfalls.

Check routine	Basic Health Check	Enterprise Health Check
Detect bloated tables	✓	✓
Check for potential transaction wraparound	✓	✓
Look for database / table specific autovacuum configuration	-	✓
Inspect pg_squeeze	-	✓*

(*): If applicable

BACKUP AND RECOVERY SETUP

Every production system requires a solid backup and recovery strategy which has been tested, verified, and optimized for specific needs.

Check routine	Basic Health Check	Enterprise Health Check
Check storage availability Type of storage Available capacity Throughput considerations Reliability inspections	✓	✓
Examine backup strategy	✓	✓
Review disaster recovery strategy	✓	✓

(*): If applicable

SECURITY AND DATABASE HARDENING

Security is a key consideration, which equally applies to small as well as large deployments. As part of a comprehensive check, we will take a detailed look at security to improve the overall safety of the system.

Check routine	Basic Health Check	Enterprise Health Check
Check the privileges of the application user	✓	✓
Public schema permissions	✓	✓
Check excessive use of superuser	✓	✓
Safety of `SECURITY DEFINER` functions	-	✓
Check `security_barrier` on views	-	✓
Investigate use of untrusted languages for functions and stored procedures	-	✓

REPLICATION AND HIGH-AVAILABILITY

In case of high-availability systems, various checks are needed to validate the quality of the configuration and setup.

Check routine	Basic Health Check	Enterprise Health Check
Check usage of replication tool Patroni, etc.	✓	✓
Validate replication configuration	✓	✓
Check if WAL is successfully recycled	✓	✓
Confirm use of replication slots	-	✓
Confirm existence of replication monitoring	-	✓
Inspect handling of replication conflicts	-	✓
Check fsync() rates (pg_test_fsync)	-	✓
Determine `COMMIT` guarantees in replicated setups	-	✓

DATA MODEL INSPECTION

The physical data model used to store the data can easily cause issues in various situations. Therefore, it is important to inspect the fundamental design to uncover potential shortfalls and hidden flaws.

Check routine	Basic Health Check	Enterprise Health Check
Missing primary keys	✓	✓
Unnecessary / unused indexes	✓	✓
Foreign keys without index	✓	✓
`UNLOGGED` tables	-	✓
Excessive use of column or over-normalization	-	✓

PERFORMANCE AND THROUGHPUT

Every health check has an important performance aspect. Without good database performance, the user experience is definitely going to suffer. Consequently, it is necessary to remove the largest roadblock that can hinder performance.

Check routine	Basic Health Check	Enterprise Health Check
Detect missing indexes	✓	✓
Search for suboptimal fuzzy search handling (LIKE, etc.)	-	✓
Inspect temporary files I/O behavior	-	✓
Inspect top consuming queries	-	✓
Investigate partitioning scheme	-	✓*

(*): If applicable

EXTENSIONS AND POSTGRESQL ECOSYSTEM

The PostgreSQL database system has an outstanding ecosystem that allows the addition of various extensions to a setup, which can greatly enhance the capability of a database deployment. As part of a comprehensive approach, an eye has to be kept on the entire setup, including extensions.

Check routine	Basic Health Check	Enterprise Health Check
Find outdated supported extensions	-	✓
Check for outdated client drivers	-	✓*
Check for outdated operating systems	-	✓

(*): If applicable

If you need further information

For more information, or if you have any questions about our range of products, tools and services, contact us. There's no obligation—send us an inquiry via email or give us a call.

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VERSION HISTORY

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1.0	2025-03-06	Service specification	Laurenz Albe	Sarah Gruber	Hans-Jürgen Schönig
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