

Course Name

PostgreSQL Performance Tuning

Sector Name

Information Technology

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PostgreSQL Performance Tuning

Course Introduction

The PostgreSQL Performance Tuning course is an in-depth program designed to equip learners with the skills necessary to optimize the performance of PostgreSQL databases. This comprehensive course covers various aspects of tuning and monitoring PostgreSQL instances to ensure they operate efficiently and handle high loads effectively.

Starting with an introduction to PostgreSQL and its architecture, the course proceeds to cover installation, configuration, security, and the basics of performance tuning. Learners will delve into advanced topics such as Indexing strategies, Query optimization, Configuration tweaks, and the use of Performance monitoring tools. Understanding and implementing Database partitioning, Replication, and devising robust Backup and recovery strategies are also key components of the curriculum. By the end of the course, participants will be well-versed in PostgreSQL performance tuning, enabling them to identify bottlenecks, optimize queries, configure databases for high performance, and ensure Reliability and high availability of PostgreSQL systems.

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Target Audience

- ✓ Database Administrators (DBAs)
- ✓ Data Architects
- ✓ System Administrators managing database servers
- ✓ Database Analysts
- ✓ IT Professionals responsible for maintaining PostgreSQL databases
- ✓ DevOps Engineers involved in the deployment and scaling of database systems
- ✓ Software Developers who need to understand database performance for better application integration
- ✓ Data Scientists requiring knowledge of database optimization for large datasets
- ✓ Technical Team Leads overseeing database-centric projects
- ✓ Database Consultants providing performance tuning services
- ✓ Cloud Database Engineers working with PostgreSQL on cloud platforms

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Learning Objectives

- ✓ Understand the internal architecture of PostgreSQL for better performance tuning.
- ✓ Install, configure, and secure PostgreSQL for optimal operation.
- ✓ Apply best practices in indexing and query optimization to enhance database efficiency.
- ✓ Monitor database performance using PostgreSQL's built-in statistics and diagnostic tools.
- ✓ Implement effective backup and recovery strategies to ensure data integrity.
- ✓ Configure PostgreSQL settings for high availability and read/write performance optimization.
- ✓ Troubleshoot and resolve common performance issues in PostgreSQL.
- ✓ Use partitioning and replication to scale PostgreSQL and improve load management.
- ✓ Automate and manage PostgreSQL configuration for consistent performance across environments.
- ✓ Leverage advanced performance tuning techniques for complex scenarios and cloud deployments.

PostgreSQL Performance Tuning

Course Outline

✓ DAY 01

Foundations of PostgreSQL Performance

- ✓ PostgreSQL Overview and Use Cases in Modern Environments
- ✓ Understanding PostgreSQL Internal Architecture
- ✓ Process-based model
- ✓ Memory structure (Shared Buffers, Work Memory, WAL Buffers)
- ✓ Background writer and checkpointer
- ✓ PostgreSQL Installation and Configuration Best Practices
- ✓ Securing PostgreSQL: Roles, Permissions, and Encryption

Hands-On Labs

- ✓ Installing and configuring PostgreSQL on Linux
- ✓ Exploring system catalogs and performance views
- ✓ Hardening a PostgreSQL installation (basic security setup)

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Course Outline

✓ Day 02

Indexing, Query Optimization, and Statistics

- ✓ Query Execution Lifecycle in PostgreSQL
- ✓ EXPLAIN, EXPLAIN ANALYZE, and Query Plans
- ✓ Using pg_stat_statements for query performance insight
- ✓ Indexing Techniques:
 - ✓ B-Tree, Hash, GIN, GiST, BRIN
 - ✓ Covering Indexes and Partial Indexes
 - ✓ Index Maintenance and Vacuuming
 - ✓ Common Query Tuning Techniques

Hands-On Labs

- ✓ Analyzing and tuning sample queries with EXPLAIN ANALYZE
- ✓ Creating and evaluating different index types
- ✓ Using auto_explain and pg_stat_statements to find slow queries



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Course Outline

✓ Day 03

Monitoring, Scaling, and High Availability

- ✓ Monitoring Tools and Techniques
- ✓ pg_stat_activity, pg_stat_io, pg_stat_user_tables
- ✓ Integration with Prometheus, Grafana
- ✓ Managing Workloads and Configuration Parameters:
- ✓ work_mem, maintenance_work_mem, effective_cache_size, shared_buffers

Replication and Partitioning:

- ✓ Streaming Replication and Logical Replication
- ✓ Table Partitioning (Declarative & Inherited)

Backup and Recovery:

- ✓ Point-in-Time Recovery (PITR)
- ✓ WAL Archiving and Retention Strategies

Hands-On Labs

- ✓ Setting up streaming replication

- ✓ Partitioning a large dataset for performance
- ✓ Running PostgreSQL with Prometheus and analyzing metrics
- ✓ Performing PITR using pg_basebackup

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Course Outline

✓ Day 04

Advanced Tuning and Real-World Scenarios

- ✓ Troubleshooting Performance Bottlenecks
- ✓ Lock contention
- ✓ I/O wait issues
- ✓ Connection pooling strategies (PgBouncer, Pgpool-II)
- ✓ PostgreSQL in the Cloud:
- ✓ Tuning PostgreSQL on AWS RDS, Azure Database for PostgreSQL
- ✓ Automation with Ansible, configuration management
- ✓ Performance Tuning Case Studies and Review

Hands-On Labs

- ✓ Tuning PostgreSQL under simulated load
- ✓ Implementing connection pooling with PgBouncer
- ✓ Simulating and resolving locking and blocking issues
- ✓ Final lab: Full performance review of a misconfigured PostgreSQL system

PostgreSQL Performance Tuning

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
May 24, 2027	May 27, 2027	4 days	4250.00 \$	UAE , Dubai
Dec. 6, 2026	Dec. 9, 2026	4 days	4250.00 \$	Qatar , Doha
Aug. 30, 2027	Sept. 2, 2027	4 days	5950.00 \$	switzerland , Geneva
March 29, 2027	April 1, 2027	4 days	4250.00 \$	UAE , Abu Dhabi

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