

Advanced PostgreSQL Server Administration and Performance

Explore Next-Level PostgreSQL Administrative Tasks, Performance Tuning, Monitoring, Security, Replication and More



Course Snapshot

- **Course: Advanced PostgreSQL Administration and Performance (TTDB7023)**
- **Duration:** 3 days
- **Audience & Skill-Level:** This intermediate and beyond course is designed for experienced Database Administrators who are managing a PostgreSQL installation.
- **Hands-on Learning:** This course is approximately 50% hands-on lab to lecture ratio, combining engaging expert lessons, demos and group discussions with real-world, skills-focused machine-based labs and exercises. Student machines are required.
- **Delivery Options:** This course is available for **onsite private classroom presentation, live online virtual presentation**, or can be presented in a **blended learning format**. Please also ask about our **Self-Paced / Video / QuickSkills** or **Mini-Camp / Short Course** flexible delivery options.
- **Customizable:** This course agenda, topics and labs can be further adjusted to target your specific training skills objectives, tools and learning goals. Please ask for details.

Overview

Geared for experienced database administrators and system administrators, **Advanced PostgreSQL Administration and Performance** is a comprehensive, hands-on course that explores core administrative tasks, performance tuning, monitoring, replication and other advanced topics. This course builds on the Foundations of Postgres Administration course prepares DBAs to manage large, highly available databases and their related security requirements with confidence.

Learning Objectives

This “skills-centric” course is about **50% hands-on lab and 50% lecture**. Working within in a hands-on learning environment, guided by our expert team, attendees will explore:

- The PostgreSQL architecture
- PostgreSQL indexing and performance
- Transactions and locking
- Storage management
- WAL: The PostgreSQL transaction log
- Memory management
- PostgreSQL replication
- Database backups
- PostgreSQL security
- PostgreSQL monitoring and logging

Need different skills or topics? If your team requires different topics or tools, additional skills or custom approach, this course may be further adjusted to accommodate. We offer additional PostgreSQL, database / DBA, scripting, SQL, programming, sysadmin, design and security courses which may be blended with this course for a track that best suits your needs.

Audience & Pre-Requisites

This course is geared for experienced database administrators and sysadmins and IT Professionals who want to enhance their Postgres administration skills. Attendees should have proficiency in fundamental Postgres DBA functions

Take Before:

- TTDB7020 PostgreSQL Server Administration Fundamentals – 3 days

Course Topics

1. The PostgreSQL architecture

- Overview of PostgreSQL
- Postmaster and its child processes
- Backend connections
- Using shared memory
- Stats collector
- Checkpoint subprocesses

2. PostgreSQL indexing and performance

- Types of PostgreSQL indexes
- Understanding the PostgreSQL optimizer
- EXPLAIN and EXPLAIN ANALYZE
- Reading execution plans
- Detecting slow queries
- Find missing indexes
- Full text search
- GIS indexing and geospatial search

3. Transactions and locking

- The PostgreSQL transactional model
- Understanding MVCC (MultiVersion Concurrency Control)
- FOR UPDATE vs. FOR SHARE vs. LOCK TABLE
- Managing transactional integrity
- Using advisory locks
- Understanding deadlocks
- Making use of transaction isolation levels
- Detecting locking problems

4. Storage management

- Using tablespaces
- VACUUM and VACUUM FULL
- Understanding pg_squeeze
- Preventing table bloat
- Improving UPDATE performance
- HOT-UPDATE and FILLFACTOR
- PostgreSQL partitioning

5. WAL: The PostgreSQL transaction log

- How PostgreSQL writes data to disk
- Improving checkpoint performance (postgresql.conf)
- Speeding up bulk loads
- Asynchronous COMMIT
- Unlogged tables

6. Memory management

- Adjusting shared_buffers
- Improving work_mem and maintenance_work_mem
- Understanding additional memory parameters

7. PostgreSQL replication

- Setting up streaming replication
- Synchronous vs. asynchronous replication
- Automated failover (Patroni)
- Managing service IPs
- Handling replication conflicts
- Using pg_rewind manually
- Logical replication

8. Database backups

- Utilizing pg_dump and pg_restore
- Binary backups (pg_basebackups)
- Point-In-Time-Recovery (PITR)
- Backup tools (pgbackrest)

9. PostgreSQL security

- TCP vs. UNIX sockets
- Managing pg_hba.conf
- Central authentication
- Encrypted database connections
- Creating users / roles
- Access permissions (GRANT / REVOKE)
- Defining default privileges
- PostgreSQL on disk encryption
- Row Level Security (RLS)
- Security barrier, leakproof functions, etc

10. PostgreSQL monitoring and logging

- Managing log files
- Handling log rotation
- Understanding PostgreSQL system tables
- Using pg_stat_statements
- Inspecting performance vitals
- Checking stored procedure performance
- Making use of pgwatch2 monitoring

Student Materials & Lab Environment

All course software (limited versions, for course use only), digital courseware files or course notes, labs / data sets and solutions (as applicable) are provided for you in our “easy access / no install required” high-speed remote lab environment. Our tech team works with every student to ensure everyone is set up with working access and ready to go prior to every course start date, ensuring a smooth delivery and great hands-on experience. Please ask for details.

For More Information

For more information about our dedicated training services, collaborative coaching services, courseware licensing options, public course schedule, training management services, partner programs, or to see our complete list of course offerings and special offers please visit us at www.triveratech.com, email Info@triveratech.com or call us toll free at **844-475-4559**. Our pricing and services are always satisfaction guaranteed.