

Advanced PostgreSQL

Mastering Performance, Security, and High Availability

10

MODULES

30

TOPICS

COURSE OVERVIEW

This Advanced PostgreSQL course is designed for database professionals who wish to deepen their understanding and mastery of PostgreSQL, one of the most powerful and widely used open-source database systems. This course will provide you with an in-depth exploration of advanced features, performance tuning, and complex data handling techniques that are essential for building robust and efficient database applications. By the end of the course, participants will be equipped with the skills necessary to tackle complex database challenges and optimize PostgreSQL environments.

WHO THIS COURSE IS FOR

Database Administrators

Database Developers

Database Architects

Performance Engineers

Backend Developers

LEARNING OBJECTIVES

- Explain PostgreSQL architecture, system catalogs and configuration
- Analyse query execution plans to optimise indexing, joins and subqueries
- Apply partitioning and sharding strategies to manage large datasets
- Implement advanced data types, extensions and custom domains
- Configure role-based access control, authentication and data encryption
- Plan replication, failover and backup for high availability
- Identify performance bottlenecks and tune memory and disk usage
- Develop advanced PL/pgSQL procedures with structured error handling

10 Modules, 30 Topics

01

PostgreSQL Architecture and System Configuration

TOPICS

- **Understanding PostgreSQL Components:** Dive into the core architecture of PostgreSQL, including its components and their interactions
- **System Catalogs and Configuration Files:** Explore the role of system catalogs and essential configuration files in PostgreSQL
- **Advanced Configuration Parameters:** Learn about fine-tuning PostgreSQL with advanced configuration parameters for optimal performance

02

Advanced Query Optimization

TOPICS

- **Query Planner and Execution Plans:** Analyze the PostgreSQL query planner and execution plans to optimize query performance
- **Indexing Strategies:** Discover advanced indexing techniques, including partial and expression indexes, for efficient data retrieval
- **Optimizing Joins and Subqueries:** Learn strategies for optimizing complex joins and subqueries to enhance query performance

03

Data Partitioning and Sharding

TOPICS

- **Partitioning Strategies:** Understand the benefits and implementation of table partitioning to manage large datasets effectively
- **Sharding Techniques:** Explore sharding approaches for distributing data across multiple databases or servers
- **Managing Partitions and Shards:** Learn best practices for managing and maintaining partitions and shards in a PostgreSQL environment

04

Advanced Data Types and Extensions

TOPICS

- **Utilizing Advanced Data Types:** Gain insights into leveraging advanced data types like JSONB, HSTORE, and ARRAY for complex data handling
- **PostgreSQL Extensions:** Explore the use of extensions to extend PostgreSQL functionality, including popular extensions like PostGIS and PL/pgSQL
- **Custom Data Types and Domains:** Learn how to create custom data types and domains to enforce data integrity and constraints

05

Security and Access Control

TOPICS

- **Advanced Authentication Mechanisms:** Understand advanced authentication options and best practices for securing PostgreSQL databases
- **Role Management and Privileges:** Explore role-based access control and privilege management to secure data access
- **Data Encryption and Auditing:** Implement data encryption techniques and auditing mechanisms to protect sensitive data

06

High Availability and Replication

TOPICS

- **Understanding Replication Concepts:** Delve into replication strategies, including streaming replication and logical replication, for high availability
- **Implementing Failover and Backup Solutions:** Learn how to configure failover mechanisms and backup solutions for disaster recovery
- **Monitoring and Managing Replication:** Explore tools and techniques for monitoring and managing replication environments effectively

07

Performance Tuning and Monitoring

TOPICS

- **Identifying Performance Bottlenecks:** Learn how to identify and address performance bottlenecks in PostgreSQL environments
- **Tuning Memory and Disk Usage:** Explore memory and disk usage tuning techniques to optimize database performance
- **Monitoring Tools and Techniques:** Discover tools and methods for continuous performance monitoring and troubleshooting

08

Advanced PL/pgSQL Programming

TOPICS

- **Advanced PL/pgSQL Features:** Master advanced features of PL/pgSQL for creating robust and efficient stored procedures
- **Error Handling and Exception Management:** Implement sophisticated error handling and exception management in PL/pgSQL code
- **Performance Optimization in PL/pgSQL:** Learn techniques to optimize the performance of PL/pgSQL functions and procedures

09

Troubleshooting and Debugging

TOPICS

- **Diagnosing Common PostgreSQL Issues:** Gain insights into diagnosing and resolving common PostgreSQL problems
- **Advanced Logging and Debugging Techniques:** Explore advanced logging and debugging techniques for effective problem resolution
- **Case Studies and Real-world Scenarios:** Analyze real-world scenarios and case studies to apply troubleshooting skills in practical situations

Course Conclusion and Final Assessment

TOPICS

- **Review of Key Concepts:** Recap the key concepts covered throughout the course to reinforce learning
- **Final Assessment and Certification:** Complete a comprehensive final assessment to evaluate your understanding and receive certification
- **Future Learning Pathways:** Explore opportunities for further learning and specialization in PostgreSQL and related technologies

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

FLEXIBLE DELIVERY

Learn the Way That Suits You

Classroom Training

Live Online Classes (ILO)

Fly-Me-A-Trainer (FMAT)

Flexi (Self-Paced)

1-on-1 Training

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