



To discuss this course and customizations:
Call: 434-509-5680 or Email: sales@cloudcontraptions.com

PostgreSQL for Administrators

Class Duration

21 hours of live training delivered over 3-5 days to accommodate your scheduling needs

Student Prerequisites

- No prior experience with PostgreSQL is necessary
- Students should have a basic understanding of SQL and relational databases

Target Audience

DBAs, DevOps/SREs, sysadmins, and data engineers aiming to own PostgreSQL in production—install and configure clusters, harden security, tune performance, automate backups and PITR, implement replication and high availability, and operate on Docker/Kubernetes and AWS, GCP, or Azure with monitoring.

Description

The course is a comprehensive, hands-on course designed for programming professionals who want to master the administration of PostgreSQL databases. Covering a full spectrum of topics—from foundational PostgreSQL architecture to advanced areas such as replication, high availability, and cloud deployment—this course equips participants with the skills necessary to install, configure, secure, and maintain PostgreSQL in real-world environments. Learners will engage in practical exercises involving performance tuning, routine maintenance, and containerization strategies, as well as explore deployment scenarios on major cloud platforms. By the end of the course, participants will be fully prepared to manage PostgreSQL effectively across diverse infrastructures.

Learning Outcomes

- Install PostgreSQL from binaries or source, perform post-install setup, and create/manage database clusters.
- Configure core settings and files (`postgresql.conf`, `pg_hba.conf`), including connections, authentication, WAL, and planner options.



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- Implement robust security with roles/privileges, MD5/SCRAM/GSSAPI, SSL/SSH, encryption, and row-level security.
- Diagnose and optimize performance using EXPLAIN/ANALYZE, effective indexing, AutoVacuum, bloat control, and memory/disk I/O tuning.
- Design and execute backup strategies with pg_dump, filesystem snapshots, pg_basebackup, and PITR; restore confidently.
- Build high availability with streaming (sync/async) and logical replication, hot standby, and clean failover/switchover.
- Monitor and log effectively using built-in views, pg_stat_statements, log analysis, alerts, and external monitoring tools.
- Operate at scale with partitioning, storage parameters, FDWs, extensions, routine maintenance, troubleshooting, and container/cloud deployments.

Training Materials

All students receive comprehensive courseware covering all topics in the course. Courseware is distributed via GitHub in the form of documentation and extensive code samples. Students practice the topics covered through challenging hands-on lab exercises. Students will need a free, personal GitHub account to access the courseware. Students are provided a cloud-based environment for all demonstrations and lab exercises.

Software Requirements

Students will need a free, personal GitHub account to access the courseware. Students are provided a cloud-based environment for all demonstrations and lab exercises.

Training Topics

Introduction to PostgreSQL Administration

- Overview of PostgreSQL
- PostgreSQL Architecture
- Key Features of PostgreSQL

Installation and Setup

- Installing PostgreSQL from Binaries
- Installing PostgreSQL from Source
- Post-Installation Setup



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- Creating and Managing Database Clusters

Configuration

- Understanding Configuration Files (postgresql.conf, pg_hba.conf)
- Setting Parameters
- File Locations
- Connection and Authentication Configuration
- Resource Consumption Settings
- Write-Ahead Log (WAL) Configuration
- Query Planning and Execution Configuration

Security

- User Authentication Methods (MD5, SCRAM, GSSAPI, etc.)
- Role Management
- Granting and Revoking Privileges
- Secure TCP/IP Connections with SSL and SSH
- Data Encryption
- Implementing Row-Level Security

Performance Tuning

- Monitoring and Optimizing Queries with EXPLAIN
- Using Indexes Effectively
- Understanding and Managing Bloat
- Configuring and Using AutoVacuum
- Managing Resource Consumption
- Tuning Memory and Disk I/O

Backup and Restore

- SQL Dump
- File System Level Backup
- Continuous Archiving and Point-in-Time Recovery (PITR)
- Using pg_basebackup
- Restoring from Backup

Replication and High Availability

- Introduction to Replication
- Configuring Streaming Replication
- Synchronous vs. Asynchronous Replication



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- Configuring Hot Standby
- Using Logical Replication
- Failover and Switchover Procedures

Routine Maintenance

- Regular Vacuuming and Analyzing
- Reindexing
- Log File Management
- Monitoring Disk Usage
- Managing Long-Running Queries

Monitoring and Logging

- Using Built-in Monitoring Tools
- Configuring and Using `pg_stat_statements`
- Viewing and Analyzing Logs
- Setting up Alerts and Notifications
- Using External Monitoring Tools

Advanced Topics

- Using Partitioning for Large Tables
- Full-Text Search Configuration
- Understanding and Using Table and Index Storage Parameters
- Configuring and Using Foreign Data Wrappers
- Extending PostgreSQL with Extensions and Plugins

Troubleshooting and Best Practices

- Common Issues and Solutions
- Best Practices for Database Administration
- Regular Health Checks
- Disaster Recovery Planning
- Keeping PostgreSQL Updated

Containerizing PostgreSQL

- Running PostgreSQL in Docker Containers
- Managing PostgreSQL in Kubernetes
- Using Helm Charts for PostgreSQL Deployment
- Monitoring PostgreSQL in Containerized Environments



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PostgreSQL in the Cloud

- Deploying PostgreSQL on AWS RDS
- Deploying PostgreSQL on Google Cloud SQL
- Deploying PostgreSQL on Azure Database for PostgreSQL
- Managing PostgreSQL in Cloud Environments