

PERCONA TRAINING FOR POSTGRESQL

Take your professional growth to the next level—deepen your understanding and practical knowledge of PostgreSQL

Why Take PostgreSQL Training?

Postgres is the most loved AND most wanted database*, but it can be hard to keep up with its new features. Knowing when to use those features is also a struggle—one that prevents you from elevating your databases to the highest standard.

Percona has you covered. In our Postgres training, we offer an in-depth look at the features and caveats of the latest version of PostgreSQL and show you current industry best practices. Our modules contain exercises to reinforce each topic, so you can leave the course prepared to apply those practices that work best for your workplace.

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Percona for
PostgreSQL

Learn more at percona.com/postgresql

PostgreSQL Operations

Duration: Three days

What you get: This 3-day course is geared for the “operations” role – the person who is responsible for standing up new PostgreSQL instances, performing backups and recovery, monitoring and troubleshooting.

About PostgreSQL

- History of PostgreSQL
- Features
- Advanced Features (Security, High Availability, Additional Features)

PostgreSQL Internals & Architecture

- PostgreSQL Server
- Background Utility processes
- Process Components
- Utility Processes
- Memory Components
- Disk Components
- Configuration Files
- View and Modify Parameters
- Base Directory & Datafiles on Disk
- Write Ahead Logs
- About WAL Log Archiving

Administration

- Installation, Configuration
- MVCC
- ROLES, and access Control
- pgadmin IV

Troubleshooting

- Command line utilities (Operating system, PostgreSQL)
- Mitigation

Tools and Monitoring

- System catalogs
- Statistics monitoring of relations
- Replication
- Postgres logging
- Postgres extensions

HA PostgreSQL

- WAL log shipping
- Streaming replication, logical replication
- Connection pooling, pgbouncer

Backups, Redundancy and Availability

- pg_dumpall, pg_dump, pg_restore, pg_basebackup, psql
- Point In Time Replication (PITR)

Automation, Patroni

- About, installation
- Configuration, administration

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PostgreSQL Developers

Duration: Three days

What you get: This 3-day course is targeted for the developer role – the person who designs and builds applications using PostgreSQL.

About PostgreSQL

- History of PostgreSQL
- Features
- Advanced Features (Security, High Availability, Additional Features)

Application Architecture

- Databases
 - Locales and collations
 - Schemas
- Tables: Columns, datatypes; Triggers, Functions, Procedures; Indexes; Sequences; Views, materialized views; Partitions

PostgreSQL Connectivity

- Clients (psql, pgadmin4)
- libpq
- PGPASS file

Procedural Languages

- plpgsql
- Decision making
- Loops, cursors, functions & procedures

Querying, Optimization & Security

- PostgreSQL Default Roles
- Query Optimization
 - When to address query performance
 - Loads and monitoring: Metrics, CPU, IOWait; Using PMM
 - Monitoring database usage: Statistics Views; pg_stat_statements; pgbadger
 - Understanding EXPLAIN
 - Tables: Constraints, datatypes; Fill factor, autovacuum
 - Indexes: Overview, Single vs multi-column; Create index INCLUDE...
 - Session runtime parameters
- Security
 - SQL injection mitigation
 - SSL: encrypted sessions; certificate authentication

Partitioning

- About partitioning
- Declaration
- Types: RANGE, LIST, HASH, KEY
- Ranges: Datatypes, Bounds, Indexes (btree, hash, GiST, SP-GiST); Constraints
- Administration: Adding, removing multiple parents; Adding, removing children

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PostgreSQL Advanced Training: Course Overview

Duration: Three days

What you get: After completing this three-day training course, participants will be able to build and manage a PostgreSQL HA solution using etcd, Patroni, PgBouncer, and HAProxy, and implement a backup and recovery strategy based on pgBackRest.

Understanding Patroni

- About Patroni
- Architecture of Patroni

Etcd

- Configuring etcd
- Connecting and using etcd
- Leases
- More etcdctl

Patroni

- Patroni configuration
- DCS and local configuration
- Leadership election
- Cluster bootstrap
- Parameters
- Booting Patroni
- patronictl
- Manage the configuration
- Query data
- Manage the cluster
- Switchover and failover

pgBackrest

- pgBackrest architecture
- Configure pgBackrest
- Stanzas and repositories
- Archiving
- Making backups
- Make Patroni and pgBackrest BFF
- Restore full, partial, and point-in-time

PgBouncer

- Basics of connection pooling
- Installing and configuring
- Pooling strategies
- Logs and metrics

HAProxy

- HAProxy Fundamentals
- Health-checks and role-based routing.
- Failover

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Percona Operator for PostgreSQL Training: Course Overview

Duration: One day

What you get: This one-day training provides a comprehensive introduction to deploying and managing PostgreSQL on Kubernetes using Percona Operator for PostgreSQL. Participants will learn the fundamentals of the Kubernetes architecture, operators, and cluster management, along with hands-on labs covering deployment, backups, scaling, monitoring, and more.

Kubernetes Fundamentals

- Understanding virtual machines vs. containers
- Introduction to Docker (images, containers, and management)
- What is Kubernetes?
- How Kubernetes orchestrates containers
- Different Kubernetes distributions

Kubernetes Operators and Percona Operator for PostgreSQL

- What are Kubernetes Operators, and why are they important?
- Installing and managing Percona Operator for PostgreSQL
- Automating PostgreSQL cluster creation and maintenance

Hands-On Labs

- **Installation and Customization:** Deploying PostgreSQL on an existing Kubernetes cluster, changing PostgreSQL settings, exposing a cluster, and managing certificates.
- **Cluster Management:** Implementing backup strategies, horizontal and vertical scaling, upgrading process, pausing, and deleting clusters.
- **How-to:** Monitor a cluster, deploy a standby cluster for Disaster Recovery, switch over the primary database node, and add custom PostgreSQL extensions.
- **Troubleshooting:** accessing the logs, inspecting, and debugging a faulty pod.

By the end of this course, participants will learn how to run and manage PostgreSQL on Kubernetes with the help of Percona Operator for PostgreSQL, following best practices in this area.

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