

**Introduction to PostgreSQL for Developers and Administrators**

**Course Number:** PSQL-100  
**Duration:** 5 days

**Overview**

Accelebrate's Introduction to PostgreSQL for Developers and Administrators training teaches attendees how to build, query, program stored procedures in PL/pgSQL, and administer the popular, open source PostgreSQL database platform.

**Prerequisites**

All PostgreSQL training students must have a solid understanding of basic relational database principles and SQL SELECT statements prior to this training.

**Materials**

All students receive comprehensive courseware.

**Software Needed on Each Student PC**

* Operating system of your choice
* An ssh terminal or client (such as PuTTY) for connection to lab servers provided by Accelebrate
* Optional: pgAdmin 4
* Sample databases and lab files that Accelebrate provides

**Objectives**

* Find PostgreSQL documentation and resources
* Work with PostgreSQL functions
* Create your own functions
* Program with PL/pgSQL
* Install and setup PostgreSQL securely
* Work with basic administration tasks such as user creation, cataloging, and backing up
* Use Advanced replication mechanisms and implement Connection Pooling
* Work with inheritance in PostgreSQL
* Partition tables
* Use Tablespaces
* Monitor the database
* Use the EXPLAIN Statement
* Use PITR
* Tune the PostgreSQL Server
* Get a detailed understanding of MVCC and Autovacuum in PostgreSQL

**Outline**

* Introduction and Architecture
  + History and Overview
  + PostgreSQL Major Features
  + PostgreSQL Limits
  + PostgreSQL Architecture
  + MVCC
  + Write Ahead Logs
  + The Background Writer
  + PostgreSQL Data Types
* Installation
  + Overview
  + Binary Installation
  + Source Installation
  + Initializing a PostgreSQL cluster
  + Starting and stopping a PostgreSQL cluster
  + Automatic startup/shutdown
* Configuration
  + Access Control
  + Connection settings
  + Security and Authentication settings
  + Memory settings
  + Kernel resource settings
  + Log management
  + Background writer settings
  + Vacuum cost settings
  + Autovacuum settings
* Intro to psql
  + Command line parameters
  + Meta commands
  + Security
* Managing PostgreSQL Databases
  + PostgreSQL Clusters
  + PostgreSQL Databases
  + Tables, Joins and Aggregates
  + PostgreSQL Indexes and Foreign Keys
* Roles and Security
  + Schemas
  + Tables, Views and Rules
  + Users, Groups and Roles
  + Tables and Sequences
  + Object Security
* Tablespaces, Partitioning, and Advanced Features
  + Vacuum
  + Tablespaces
  + Inheritance
  + Table Partitioning
  + Windowing Functions
  + Transactions
  + Concurrency Control
  + Functions and Operators
  + Type conversion
  + Full text search
* Moving Data with PostgreSQL
  + Basic DML
  + COPY
  + Other Tools
* Routine DBA Tasks and Best Practices
  + Log Management
  + Query analysis
  + Routine Vacuuming
  + Recovering disk space
  + Managing Planner statistics
  + REINDEX
* Monitoring and Statistics
  + Database Logs
  + OS Process monitoring
  + The PostgreSQL Statistics Collector
  + Statistics Views
  + Statistics Functions
* Performance Tuning
  + OS Tuning
  + Hardware configuration
  + Transaction logs
  + Tablespaces and Partitioning
  + Checkpoint tuning
  + Query tuning
* Backup and Recovery
  + The pg\_dump utility
  + The pg\_dumpall utility
  + Restore using pg\_restore and psql
  + The pg\_basebackup utility
  + Restoring a physical backup.
  + Point In Time Recovery
* PostgreSQL Upgrades
  + Major Version Upgrades
    - Using pg\_upgrade
    - Using logical backup/restore
    - Using logical backup/restore
  + Minor Version Upgrades
    - Upgrading PostgreSQL packages
    - Source based upgrades
  + Rolling back
* Replication and HA
  + Streaming Replication
  + Synchronous Replication
  + Replication Slots
  + Failover management
  + Connection Poolers
  + HA configurations
  + Cascaded Streaming Replication
  + Logical Replication
* Triggers
  + Overview
  + Triggers
* Event Triggers
  + Overview
  + Event Triggers
* RULEs
  + Overview
  + SELECT Views
  + Updating a View
  + Materialized Views
  + Rules and privileges
* The PL/pgSQL Language
  + Structure
  + Declarations
  + Expressions
  + Statements
  + Control Structures
  + Cursors
  + Errors and Messages
  + Trigger Procedures
* Other Procedural Languages
  + PL/Perl
  + PL/Python
  + More...
* PostgreSQL Contribs
  + Overview of additionally supplied modules
* Conclusion