

**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