

## PostgreSQL for Developers

**Duration: 3 Days    Course Code: PSQLDEV    Delivery Method: Virtual Learning**

---

### Overview:

#### PostgreSQL for Developers Course Overview

This course covers important basic and intermediate level details for developers interacting with PostgreSQL. Delegates will learn techniques, syntax and structures needed to develop quality applications using the PostgreSQL backend. This course also covers SQL Tuning best practices for writing efficient SQL.

The target audience includes developers and programmers who want to extend their knowledge of PostgreSQL to encompass advanced SQL techniques and the usage of Stored Program Units such as triggers, procedures and functions.

Exercises and examples are used throughout the course to give practical hands-on experience with the techniques covered.

#### Virtual Learning

This interactive training can be taken from any location, your office or home and is delivered by a trainer. This training does not have any delegates in the class with the instructor, since all delegates are virtually connected. Virtual delegates do not travel to this course, Global Knowledge will send you all the information needed before the start of the course and you can test the logins.

---

### Target Audience:

#### Who will the Course Benefit?

Anyone who has a working knowledge of PostgreSQL but needs to enhance this to include PL/pgSQL, additional functions, and techniques to monitor and optimise query performance.

---

### Objectives:

- Course Objectives
    - To provide a broader set of PostgreSQL skills for someone who currently has a good working knowledge of PostgreSQL.
- 

### Prerequisites:

- This course assumes a good working knowledge of PostgreSQL SQL. This can be obtained by attendance on the pre-requisite SQL for PostgreSQL course.
- 

### Follow-on-Courses:

#### Further Learning

- PostgreSQL Administration
-

## Content:

### PostgreSQL for Developers Training Course Course Contents - DAY 1

#### Course Introduction

- Administration and course materials
- Course structure and agenda
- Delegate and trainer introductions

#### Session 1: ADVANCED SQL LANGUAGE

- Advanced Datatypes
- Data Type Conversion

#### Session 2: ENHANCED GROUPING FEATURES

- Revision of aggregate functions and basic GROUP BY and HAVING clauses
- ROLLUP extension
- CUBE extension
- GROUPING function
- GROUPING SETS function

#### Session 3: ANALYTICAL QUERIES

- Ranking functions
- NTILE and WIDTH\_BUCKET functions
- Analytic aggregates
- Windowing functions
- Row and Range specifications
- FIRST\_VALUE and LAST\_VALUE
- LAG and LEAD functions

#### Session 4: RECURSIVE QUERIES

- The WITH clause
- Recursive Common Table Expressions

#### Session 5: REGULAR EXPRESSION SUPPORT

- Match operators and notation
- Repetition operators
- Regular Expression functions
- Sub-expression grouping
- SQL Regular Expressions

#### Session 6: SERVER PROGRAMMING BASICS

- Extending SQL with Procedural Code
- Basic Elements
- Variables and Constants
- Data Types
- Initialising Variables and Assigning Values
- Using DML Statements in Code
- Generating Output PostgreSQL for Developers Training Course Course Contents - DAY 2

#### Session 7: PROGRAM LOGIC

- IF THEN ELIF ELSE Statements
- CASE Statements
- The Basic Loop Construct
- WHILE and FOR Loops
- Nested and Labelled Loops
- The CONTINUE Statement

#### Session 8: CURSORS

- What is a Cursor?
- Implicit and Explicit Cursors
- Cursor Operations
- Declaring, Opening and Closing Cursors
- Fetching Rows
- Status Checking
- Where current of clause
- Unbound cursors (refcursors)
- The Cursor FOR Loop
- Parameterised Cursors

#### Session 9: EXCEPTION HANDLING

- Errors and Messages
- The EXCEPTION clause
- System Raised Exceptions
- The RAISE statement
- STRICT option in a SELECT ..INTO
- Programmer Raised Exceptions
- The GET STACKED DIAGNOSTICS command
- Nested and Labelled Blocks
- Scope of Variables and Cursors

#### Session 10: USER-DEFINED FUNCTIONS

- CREATE FUNCTION statement
- Function parameters
- Functions Returning Void

#### Session 11: USER-DEFINED PROCEDURES

- CREATE PROCEDURE statement
- Procedure parameters
- Invoke a procedure using CALL
- Definer's and Invoker's rights execution
- ALTER and DROP PROCEDURE statements PostgreSQL for Developers Training Course Course Contents - DAY 3

#### Session 12: TRIGGERS

- DML Triggers
- The Trigger Function
- The CREATE TRIGGER Statement
- BEFORE, AFTER and INSTEAD OF Triggers
- The OLD and NEW qualifiers
- Errors in Triggers
- DDL and Database Event Triggers
- Managing Triggers
- Privileges to create Triggers

#### Session 13: TRANSACTIONS AND CONCURRENCY

- Overview of Transaction Processing in PostgreSQL
- Transaction Control
- COMMIT, ROLLBACK and SAVEPOINT statements
- AUTOCOMMIT
- Multi-version Concurrency Control (MVCC)
- Transaction Isolation Levels
- Locking Concepts
- Implicit and Explicit Locking of Tables and Rows
- Possible Causes of Contention
- Deadlocks
- Advisory Locks
- Lock Management Parameters

#### Session 14: SQL TUNING

- Query Optimization
- Scan Methods
- Join Methods
- Join Order
- Statement Transformation
- Detect Slow Queries
- View Execution Plans using EXPLAIN
- Gather Optimizer Statistics with ANALYZE
- Gather Extended Statistics with CREATE STATISTICS
- Parameters that affect Optimization
- Memory Settings that affect Query Performance
- Overview of declarative Table Partitioning

#### Session 15: LOADING AND UNLOADING DATA

- Import and Export Operations with COPY

- Execute a function using PERFORM
- Listing Functions
- ALTER and DROP FUNCTION statements

- Export using the COPY Command
- Import using the COPY Command

---

### Further Information:

For More information, or to book your course, please call us on Head Office 01189 123456 / Northern Office 0113 242 5931

[info@globalknowledge.co.uk](mailto:info@globalknowledge.co.uk)

[www.globalknowledge.com/en-gb/](http://www.globalknowledge.com/en-gb/)

Global Knowledge, Mulberry Business Park, Fishponds Road, Wokingham Berkshire RG41 2GY UK