PostgreSQL Administration

Duration: 5 Days   Course Code: PSQLADM   Delivery Method: Company Event

Overview:

This PostgreSQL Administration course covers administration,maintenance,security and performance tuning of PostgreSQL version 10,11 and 12 databases.
Exercises and examples are used throughout the course to give practical hands-on experience with the techniques covered.

Company Events

These events can be delivered exclusively for your company at our locations or yours, specifically for your delegates and your needs. The Company Events can be tailored or standard course deliveries.

Target Audience:

This PostgreSQL Administration course is designed for professional database administrators who need to gain an understanding of the features and functionality that can be used to manage PostgreSQL 10,11 and 12 databases. This course is also suitable for users of PostgreSQL 9 databases.

Objectives:

- This course aims to provide the delegate with the knowledge to be able to install,administer,maintain,backup,recover and tune a PostgreSQL database.

Prerequisites:

This course assumes a good working knowledge of SQL and specifically of the SELECT,INSERT,UPDATE and CREATE TABLE statements. This knowledge can be obtained by attendance on the pre-requisite SQL for PostgreSQL course.

This course is run on a Linux operating system,therefore a good working knowledge of UNIX/Linux is required. This knowledge can be gained by attendance on the pre-requisite Linux Introduction course

Follow-on-Courses:
- PostgreSQL Advanced Administration (PSQLADVADM)
- PostgreSQL for Developers (PSQLDEV)
- Python Programming 1 (PYP1)
- PHP Programming (PHP)

Content:

PostgreSQL Administration Training Course
Course Contents - DAY 1

Course Introduction

- Administration and Course Materials
- Course Structure and Agenda
- Delegate and Trainer Introductions

Session 1: INSTALLATION AND CONFIGURATION OF POSTGRESQL

- PostgreSQL Version Numbers
- PostgreSQL Configuration Recommendations
- Single Cluster and Database per Server
- File System Layouts
- Install PostgreSQL
- Install PostgreSQL on Linux/UNIX
- Post-Installation Setup
- Create a Database Cluster
- Basic Server Configuration
- Account Management

Session 2: POSTGRESQL ARCHITECTURE

- Overview of PostgreSQL Architecture
- The PostgreSQL Instance
- PostgreSQL Processes
- How Data is Processed by PostgreSQL
- PostgreSQL Directory Structure
- Manage a PostgreSQL Instance
- Automate the Startup of PostgreSQL at Boot Time
- The PostgreSQL Configuration Files
- Multiversion Concurrency Control
- The Vacuum utility
- PostgreSQL WAL

Session 3: POSTGRESQL CLIENT APPLICATIONS

- Overview of PostgreSQL Client Applications
- The PostgreSQL Interactive Client Terminal - psql
- The pgAdmin Tool
- The pgAgent Tool
- Client and host based access control
- Client Connection Problems
- Authentication Failures
- Server Startup Failures

Session 4: CREATE AND CONFIGURE A DATABASE

- Create a New Database using the CREATE DATABASE Command
- Create a New Database using pgAdmin
- Start and Stop the Database Server
- Drop a Database
- Copy a Database
- List Databases

Session 6: ROLE MANAGEMENT

- Overview of PostgreSQL Roles and Privileges
- Create a User Defined Role
- Role Attributes
- Role Membership
- Assigning Users to Roles
- Group and User Role Inheritance
- Removing Roles
- Troubleshooting and Understanding Role Access PostgreSQL Administration Training Course Course Contents - DAY 2

Session 7: FINE GRAINED ACCESS CONTROL USING GRANT

- Control Database Level Permissions
- Control Schema Level Permissions
- Grant Table Level Permissions
- Define Access Privileges with the GRANT Command
- Remove Access Privileges with the REVOKE Command
- Manage Column Rights

Session 8: INDEX CREATION AND MANAGEMENT

- Index Overview
- The CREATE INDEX Command
- Index Types
- Efficient Usage of PostgreSQL Indexes
- Index creation
- B-tree and Hash Indexes
- Single Column Indexes
- Multicolumn Indexes
- Index Based Expressions
- Partial Indexes
- List Indexes
- Manage and Maintain Indexes
- When Indexes Should be Avoided

Session 9: TRANSACTIONS AND CONCURRENCY

- Overview of Transaction Processing in PostgreSQL
- Transaction Properties
- Locking Concepts
- Levels of Transaction Isolation
- Atomic Changes
- Explicit and Implicit Table Locking
- Transaction Control
- Lock Management Parameters
- Locking and Indexes

Session 10: POSTGRESQL DATABASES STRUCTURE

- The PostgreSQL Configuration Files
- Relocate the Configuration Files

Session 13: POSTGRESQL EXTENSIONS

- Install the PostgreSQL Contrib Module
- List the Available Extensions
- Add an Extension to the postgresql.conf File
- Create an Extension in a Database
- Drop an Extension in a Database PostgreSQL Administration Training Course Course Contents - DAY 4

Session 14: BACKUP AND RECOVERY OF DATABASES

- Overview of Backup Methods
- Export and Import Operations with COPY
- Backup a Database with Operating System Commands
- Backup a Database with pg_dump
- Backup User Credentials
- Backup All Databases with pg_dumpall
- Backup Database Object Definitions
- Backup databases with pg_Admin
- Overview of Database Restore
- Restore using psql
- Restore using pg_restore
- Restore a Database with pgAdmin
- Filesystem Backup

Session 15: POINT-IN-TIME RECOVERY (PITR)

- Overview of PITR
- Continuous Archiving
- Overview of PostgreSQL Write-ahead Logs
- List the Transaction Logs
- Checkpoints
- Transaction Log Optimisation
- Setup PITR
- Creat an Initial Base Backup
- Exclusive and Non-Exclusive Low Level Backups
- Test Transaction Log Archiving
- Replay Transaction Logs
- Archive Recovery Settings
- Timelines
- Archive Target Settings Parameters
- Locating the Correct Timestamp
- Clean up the Transaction Logs PostgreSQL Administration Training Course Course Contents - DAY 5

Session 16: THE POSTGRESQL QUERY OPTIMIZER

- Query Optimization
- Optimization Operations
- Optimization Decisions
- Join Methods
- Statement Transformation
- Use EXPLAIN to optimize Queries and Indexes

- Obtain Database Object Sizes
- Initialise a Cluster

Session 5: POSTGRESQL SCHEMAS

- Overview of the Key Concepts of PostgreSQL Schemas
- Create and Drop a Schema
- The Public Schema
- The Schema Search Path
- Schemas and Privileges
- The System Catalog Schema
- Overview of the Information Schema

- Physical Storage and File Layout
- Overview of Tablespace Usage
- Table and Row Storage
- Column Limitations
- Free Space Map
- The Visability Map
- Index Storage   PostgreSQL Administration Training Course   Course Contents - DAY 3

Session 11: MANAGE TABLESPACES

- Overview of PostgreSQL Tablespaces
- Default PostgreSQL Tablespaces
- Create a Tablespace using SQL Commands and pgAdmin
- Create a Tablespace in the UNIX Operating System
- Alter a Tablespace
- Delete a Tablespace

Session 12: POSTGRESQL LOGGING

- The Principles and Usages of Logging
- PostgreSQL Log Destinations
- Logging Parameters
- Error Reporting and Logging
- What Should be Logged and When
- CSV Format Log Output

- Execution Plans
- The Statistics used by the Planner and the ANALYZE Command
- Query Planner Statistics
- Control the Planner with Explicit Join Clauses
- Detect Slow Queries
- Parameters Affecting Optimization

Session 17: POPULATE A DATABASE EFFICIENTLY

- DISABLE autocommit
- Configure Variables for Increased PerformanceUse the COPY Command to Bulk Load Data
- Drop Indexes and Foreign Keys Temporarily
- Use the COPY command to Bulk Load Data
- Temporarily drop indexes and Foreign Key Constraints before a Bulk Load
- Configure Variables for Increased Performance
- Temporarily Disable WAL Archival and Streaming Replication
- Use pg_dump Efficiently

Session 18: SERVER PERFORMANCE TUNING AND MONITORING

- Optimize Storage and Manage Cleanup with VACUUM
- Monitor Database Activities
- Statistics Collection
- Set postgres.conf Cache Parameters

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

www.globalknowledge.com/en-gb/

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