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## PostgreSQL Administration Training

### Hands-on Training on PostgreSQL

**Duration: 40Hrs**

#### **Part 1: Introduction**

- History of PostgreSQL
- Major Features
- New Features of PostgreSQL
- Multi Version Concurrency Control
- Write-Ahead Logging
- Architectural Overview
- Limits

#### **Part 2: PostgreSQL System Architecture**

- Architectural Summary
- Shared Memory
- Statement Processing
- Utility Processes
- Disk Read Buffering
- Write Buffering
- Background Writer Cleaning Scan
- Commit & Checkpoint
- Physical Database Architecture
- Data Directory Layout
- Installation Directory Layout
- Page Layout

#### **Part 3: Installation**

- OS User & Permissions
- Installation
- Setting environment variables
- Clusters
- Creating a database cluster
- Starting and Stopping the Server
- (pg\_ctl)
- Connect to the server using psql



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- Connect to the server using PGAdmin

## Part 4: Configuration

- Setting PostgreSQL Parameters
- Access Control
- Connection Settings
- Security and Authentication
- Settings
- Memory Settings
- Query Planner Settings
- WAL Settings
- Log Management
- Background Writer Settings
- Statement Behavior
- Vacuum Cost Settings
- Autovacuum Settings

## Part 5: Creating and Managing Databases, Schemas, Users, Tablespaces

- Object Hierarchy
- Creating Databases
- Creating Schemas
- Schema Search Path
- Roles, Users & Groups
- Access Control

## Part 6: Postgres Data Dictionary

- The System Catalog Schema
- System Information views/tables
- System Information Functions

## Part 7:

- Registering a server
- Query Tool
- Databases
- Schemas
- Indexes

## Part 8: Security Basics



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- Authentication
- Authorization
- Levels of security
- pg\_hba.conf file
- Users
- Object ownership
- Access control
- Application access parameters

## Part 9: Backup and Recovery & Point-in Time Recovery

- Backup Types
- pg\_dump
- pg\_dumpall
- pg\_restore
- Cluster Dump
- Offline Copy Backup
- Continuous Archiving
- **pgbackrest**
- **pg\_basebackup**
- Point-In Time Recovery
- **BARMAN**

## Part 10: Routine Maintenance

- Explain and Explain Analyze
- Table Statistics
- Updating Planner Statistics
- Vacuuming
- Scheduling Auto Vacuum
- Preventing Transaction ID Wraparound Failures
- The Visibility Map
- Routine Reindexing

## Part 11: Moving Data

- The COPY Command
- Examples

## Part 12: Transactions and Concurrency

- Transaction Definition



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- Effects of Concurrency on
- Transactions
- Transaction Isolation Levels
- Multi-Version Concurrency Control
- Overview (MVCC)
- MVCC Example
- Internal Identifiers
- Transaction Wraparound
- MVCC Maintenance
- MVCC Demo

## Part 13: Performance Tuning

- Hardware Configuration
- OS Configuration
- Server Parameter Tuning
- Connection Settings
- Memory Parameters
- Memory settings for Planner
- WAL Parameters
- Explain Plan
- Explain Example
- Statistics Collection
- Indexes
- Examining Index Usage
- Tips for Inserting Large Amount of Data
- Some Notes About pg\_dump Non-Durable Settings

## Part 14: Replication & Failover

- Database High Availability
- Causes of Data Loss
- Plan for Common Errors
- Selection Criteria
- **High Availability Options**
- Hot Streaming Replication, Architecture and Setup
- Streaming Replication Example
- **repmgr Installation and Configuration**
- **Switchover Using repmgr**
- **Promote using repmgr**



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- Automatic Failover using repmgrd
- High Availability Setup using patroni
- Troubleshooting Replication Lag

## Part 15: Table Partitioning

- Partitioning
- Partitioning Methods
- When to Partition
- Partitioning Setup
- Partitioning Example
- Partitioning and Constraint
- Exclusion
- Caveats

## Part 16: Different Upgrade Methods

- pg\_dump/pg\_restore
- Upgrading PostgreSQL Database
- Migration from Oracle to Postgres

## Part 17: Database Monitoring

- Database Statistics
- The Statistics Collector
- Database Statistic Tables
- Operating System Process Monitoring
- Current Sessions and Locks
- Log Slow Running Queries
- Disk Usage

## Part 18: Other Tools – All Tools and Topics covered with Practical's

- pgbadger
- pgadmin
- pgbouncer
- pgpool
- repmgr
- ora2pg
- BARMAN
- pg\_backrest
- patroni
- pgcollector



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**For Any Clarification please feel free to contact @ +91 9867328291.**

Cheers,

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