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## PostgreSQL Database Administration-DBA

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### PostgreSQL Database Administration-DBA online training curriculum

#### Introduction and Architectural Overview

- History of PostgreSQL
- Major Features
- Architectural Overview
- Common Database Object Name

#### PostgreSQL System Architecture

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

#### Installation

- OS User & Permissions
- Installation Options
- Installation of PostgreSQL

#### Database Clusters

- Database Cluster
- Creating a Database Cluster
- Starting and Stopping the Server (pg\_ctl)
- Connect to the Server Using psql

#### Configuration

- Setting PostgreSQL Parameters
- Access Control

- Connection Settings
- Security and Authentication Settings
- Memory Settings
- Query Planner Settings
- WAL Settings

### **Creating and Managing Databases**

- Object Hierarchy
- Creating Databases
- Users
- Access Control
- Creating Schemas
- Schema Search Path

### **Security**

- Authentication and Authorization
- Levels of Security
- pg\_hba.conf File
- Object Ownership
- Application Access Parameters

### **SQL:**

- Data Types
- Structured Query Language (SQL)
- Tables and Constraints
- Manipulating Data using INSERT, UPDATE and DELETE
- Creating Other Database Objects: Sequences, Views and Domains
- Overview of Table Partitioning

### **Backup and Recovery & Point-in Time Recovery**

- Backup Types
- SQL Dump Backups
- SQL Dump Options
- Handling Large Databases
- Restoring SQL Dumps
- Cluster Dump
- Offline Backups
- Recovering a Database using Offline

### **Routine Maintenance**

- Database Maintenance
- Maintenance Tools
- Optimizer Statistics
- Data Fragmentation
- Routine Vacuuming

- Vacuuming Commands

### **Data Dictionary**

- The System Catalog Schema
- System Information Tables
- System Information Functions
- System Administration Functions
- System Information Views

### **Moving Data**

- Loading flat files
- Import and export data using COPY
- Examples of COPY Command

### **SQL Tuning**

- Statement Processing
- Common Query Performance Issues
- SQL Tuning Goals
- SQL Tuning Steps
- Identify slow queries
- Review the query execution plan
- Optimizer statistics and behavior
- Restructure SQL statements
- Indexes
- Review Final Execution Plan

### **Performance Tuning**

- Performance Tuning - Overview
- Performance Monitoring using PEM
- A Tuning Technique
- Operating System Considerations
- Server Parameter Tuning
- Memory Parameters
- Temporary File Parameters
- WAL Parameters

### **Streaming Replication**

- Data Replication
- Data Replication in PostgreSQL
  
- Sync or Async
- Log-Shipping Standby Servers
- Log-Shipping Architecture

- Streaming Replication
- Hot Streaming Architecture
- Cascading Replication
- Setup Replication Using Archive
- Setup Streaming Replication
- Prepare the Primary Server
- Synchronous Streaming Replication Setup
- Configure Authentication
- Take a Full Backup of Primary Server
- Setting up the Standby Server
- Adding Cascading Replicated Standby Server
- Monitoring Hot Standby

### **Upgrade**

- Version Change and Upgrade
- Need to Upgrade
- Upgrade Plan
- Upgrade Using pg\_upgrade
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### **GUI Tools:**

- Overview of ORAp2G Tool
- PGADMIN4
- PgBouncer for Connection Pooler
- PgBackRest for Backups