Training: CompTIA
CompTIA DataSys+ Prep Course

TRAINING GOALS:

This course can benefit you in two ways. If you intend to pass the CompTIA DataSys+ (ExamDS0-001) certification examination, this course can be a significant part of your preparation. But certification is not the only key to professional success in the field of database administration. Today's job market demands individuals with demonstrable skills, and the information and activities in this course can help you build your database administration skill set so that you can confidently perform your duties in any DBA role.

On course completion, you will be able to achieve the following:

- Understand database types and structures.
- Recognize standards and commands.
- Run scripts for data and data systems.
- Explain the impact of programming on database operations.
- Understand database planning and design.
- Implement, test, and deploy databases.
- Monitor and report on database performance.
- Understand common data maintenance processes.
- Understand governance and regulatory compliance.
- Secure data.
- Secure data access.
- Secure the database and server.
- Classify types of attacks.
- Plan for disaster recovery.
- Implement backup and restore best practices.

Skills you'll learn

- Understand database structure types and develop, modify, and run SQL code to gather, store, and manage data assets across various operating systems.

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- Plan and design databases, implement and test systems, and optimize data deployment processes for effective database deployment.
- Monitor and report on database performance, perform maintenance tasks and create critical documentation to support database management and maintenance.
- Secure databases, protect against attacks, manage authorization, and ensure governance and regulatory compliance to enhance data and database security.
- Prepare for and recover from incidents by implementing disaster recovery, backup, and restoration best practices for database management systems.

Job roles that benefit from DataSys+ skills

- Database Administrator (DBA)
- Database Engineer
- Data Systems Manager
- Data Security Analyst
- Back-end Developer
- Cloud Database Specialist
- IT Operations Manager

This is an ideal course for those responsible for the data "engine" within a company. While Data+ focuses on analyzing what's inside, DataSys+ teaches you how to build and maintain a secure, efficient "box" (database) where this information is stored.

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CONSPECT:

- Understanding Database Types and Structures
  - Identify Relational and Non-Relational Databases
    - Relational Databases
    - Non-Relational Databases
    - Key Differences Between Database Structure Types
    - Assisted Live Lab: Exploring the Lab Environment
  - Understand Different Types of NoSQL Databases and Tools
    - Document-Oriented Databases

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- Key-Value Stores
- Column-Oriented Databases
- Graph Databases
- Non-Relational Data Systems

- Understand Relational Database Design
  - Normalization
  - Referential Integrity
  - Entity Relationship Diagrams
  - Relationships and Key Fields
  - Types of Relationships
  - PBQ: Establish Relationships Using Keys
  - Assisted Live Lab: Exploring a Database Environment
- Identify Other Data Systems
  - Data Warehouses
  - Data Marts
  - Data Lakes

- Recognizing Standards and Commands
  - Understand Standards and Principles
    - ANSI and ISO Standards
    - ACID Principles
  - Examine Operating Systems and Command Line Scripting
    - Command Line Scripting
    - PowerShell
    - Other Languages
    - Assisted Live Lab: Using Command Prompt and PowerShell
- Running Scripts for Data and Data Systems
  - Create and Alter Objects Using Data Definition Language
    - Data Definition Language (DDL)
    - Creating and Altering Databases
    - Creating Tables
    - Altering Tables
    - Deleting Fields and Tables
    - PBQ: Use DDL to Alter and Delete Fields
    - Assisted Live Lab: Using Data Definition Language DDL
  - Manipulate Data Using Data Manipulation Language
    - Data Manipulation Language (DML)

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        - Selecting Data
        - Updating Data
        - Selecting Data from Multiple Tables
        - Inserting Data
        - Deleting Data
        - Grouping and Aggregating Data
        - PBQ: Use DML to Create Joins
        - Assisted Live Lab: Using Data Manipulation Language DML
    - Work with Transactions
        - Transaction Control Language (TCL)
        - Committing Data
        - Rolling Back Data
        - PBQ: Use Transactions to Update a Database
        - Assisted Live Lab: Using Transaction Control Language TCL
        - Applied Live Lab: Create and Manipulate Data and Databases
    - Perform Data Management Tasks
        - Converting Data Types
        - Appending Data
        - Creating Indexes
        - Sharing Data Exports
- Explaining the Impact of Programming on Database Operations
    - Work with Views
        - Creating Views
        - Snapshots
        - PBQ: Create Views
    - Understand Object-Relational Mapping
        - Mapping Objects
        - Performing Database Operations Using Frameworks
        - Impact of Programming on Database Operations
    - Program with SQL
        - Set-Based Logic
        - Stored Procedures
        - Creating Stored Procedures
        - Types of Triggers
        - Setting Triggers
        - Assisted Live Lab: Using Stored Procedures and Triggers

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- Assisted Live Lab: Using GROUP BY to Group and Aggregate Data
- Write Functions
  - Types of Functions
  - Text Functions
  - Date Functions
  - Logical Functions
  - Aggregate Functions
  - PBQ: Create Functions
  - Assisted Live Lab: Creating Views with Functions
  - Applied Live Lab: Create Views and Build Functions
- Understanding Database Planning and Design
  - Understand Types of Architecture
    - Cloud vs. On-Premise
    - Platform as a Service (PaaS)
    - Software as a Service (SaaS)
    - Infrastructure as a Service (IaaS)
  - Gather Data System Requirements
    - Understanding the Objective of the Database
    - Identifying User-Related Information
    - Gathering Storage and Size Requirements
    - Gathering Data Sources
  - Review Documentation Requirements
    - Standard Operating Procedures
    - Data Dictionary
    - System Specifications and Requirements
    - Maintenance Documentation
    - Leveraging Tools for Documentation
    - Assisted Live Lab: Diagramming Databases
- Implementing, Testing, and Deploying Databases
  - Prepare for Deployment
    - Acquiring Assets for Deployment
    - Types of Deployment
    - Considerations for Installation and Configuration
    - Authentication Modes
    - Restoring a Database from Backup
    - Configuring a Database

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- Assisted Live Lab: Install and Configure Database Connectivity
- Conduct Testing and Other Quality Measures
  - Database Quality Checks
  - Addressing Code and Syntax
  - Negative Testing
  - Stress Testing Applications
  - Regression Testing
  - Version Control
- Understand Validation Techniques and Methods
  - Validating Data Integrity
  - Validating Data Values
  - Automated Validation
  - Data Verification Methods
  - Data Mapping
  - PBQ: Perform Data Mapping
  - Assisted Live Lab: Validating Data

- Monitoring and Reporting on Database Performance
  - Consider Database Connectivity Needs
    - Client-Server Architecture
    - Database Server Location
    - Domain Name Service (DNS)
  - Monitor the Database
    - Monitoring Connections and Sessions
    - Different Types of Connections
    - Growth and Storage Limits
    - Resource Utilization
    - Reviewing Log Files and Alerts
    - Job Completion and Failures
    - Assisted Live Lab: Monitoring Databases
    - Applied Live Lab: Configure and Monitor Databases
  - Understand and Address Deadlocks
    - How Deadlocks Occur
    - Identifying the Cause of a Deadlock
    - Addressing a Deadlock
- Understanding Common Data Maintenance Processes
  - Explain Patch Management

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        - Patch Management
        - Types of Patches
    - Ensure Database Performance
        - Performance Tuning
        - Index Analysis and Optimization
        - Query Optimization
        - Query Execution Plan
        - Load Balancing
        - Validating Scalability
        - PBQ: Analyze Queries to Increase Performance
        - PBQ: Create Indexes to Increase Performance
        - Assisted Live Lab: Optimizing Queries
    - Ensure Database Integrity
        - Designing for Data Integrity
        - Locking Order
        - Data Corruption Checks
        - Assisted Live Lab: Ensuring Data Integrity with Constraints
- Understanding Governance and Regulatory Compliance
    - Understand the Importance of Protecting Data and Preventing Data Loss
        - Why We Protect Data
        - Identifying Private Data
        - Data at Rest
        - Data in Transit
        - Data Endpoints
        - Data Leakage
        - Data Exfiltration
    - Understand Data Retention Policies
        - The Purpose of Data Retention Policies
        - Elements of Data Retention Policies
    - Classify Data
        - Confidential Data
        - Personally Identifiable Information
        - Personal Health Information
        - Payment Card Industry Data
    - Consider Global Jurisdiction and Regional Regulations
        - Global Jurisdiction

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- Regional Regulations
- Understand Third-Party Agreements and Release Approvals
  - Data Sharing and Usage
  - Release Approvals

- Securing Data
  - Understand Data Encryption
    - Encrypting Data in Transit
    - Encrypting Data at Rest
  - Understand Data Masking
    - Pseudonymization
    - Anonymization
    - The Challenges of Data Discovery
    - PBQ: Use Anonymization to Mask Sensitive Data
    - Assisted Live Lab: Masking Data Using Pseudonymization and Anonymization
  - Describe Data Destruction Techniques
    - Logical Destruction
    - Physical Destruction
    - Regulatory Impact on Data Destruction
  - Audit Data Access
    - Account Authorization
    - Connection Requests
    - Expired Accounts
    - Assisted Live Lab: Using Queries to Conduct Security Audits
  - Audit Code and Changes
    - Structured Query Language (SQL) Code
    - Credential Storage Checks
    - Change Management
    - Change Management Process
    - Change Management Considerations
    - Assisted Live Lab: Using Queries for Code Review and Code Auditing

- Securing Data Access
  - Understand Identity and Access Management
    - Authentication
    - Identity and Access Management
  - Understand Access Controls
    - Permissions and Roles

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- Schemas
- The Principle of Least Privilege
- Assisted Live Lab: Implementing Role-Based Access
- Assisted Live Lab: Reducing Privileges for Users

- Understand Password Policies
  - Common Password Policies
  - Enforcement of Password Policies
- Work with Service Accounts
  - Service Accounts
  - Best Practices for Service Accounts
  - Service Account Abuse
  - PBQ: Set Up a Service Account

- Securing the Database and Server
  - Utilize Physical Security
    - Physical Access Controls
    - Surveillance
    - Fire Suppression
    - Cooling Systems
  - Utilize Logical Security
    - Firewalls
    - Perimeter Network
    - Port Security

- Classifying Types of Attacks
  - Mitigate the SQL Injection Attack
    - Identifying a SQL Injection Attack
    - Mitigating SQL Injection Attacks
    - Assisted Live Lab: Rewriting Queries to Prevent SQL Injection
  - Mitigate the Denial of Service (DoS) Attack
    - Identifying a DoS Attack
    - Mitigating DoS Attacks
  - Mitigate the On-Path Attack
    - Identifying an On-Path Attack
    - Mitigating On-Path Attacks
  - Mitigate the Brute Force Attack
    - Identifying a Brute Force Attack
    - Mitigating Brute Force Attacks

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- Mitigate Social Engineering Attacks
  - Describing Social Engineering Principles
  - Identifying Phishing Attacks
  - Mitigating Social Engineering Attacks
  - PBQ: Recognize Social Engineering Attacks
- Mitigate Malware
  - Identifying Types of Malware
  - Mitigating Malware Attacks

- Planning for Disaster Recovery
  - Plan for Disaster Recovery
    - Disaster Recovery Documentation
    - Elements of a Disaster Recovery Plan
    - Business Continuity and System Security
    - Replication
    - Log Shipping
    - High Availability
    - Mirroring
    - PBQ: Build a DR Plan
  - Conduct DR Plan Testing
    - DR Plan Testing Methods
    - Recovery Time Objective (RTO)
    - Recovery Point Objective (RPO)
  - Transition/Failback to Normal Operations
    - Disaster Recovery Failback
    - Disaster Recovery Retrospective

- Implementing Backup and Restore Best Practices
  - Identify Types of Backups
    - Full Backup
    - Incremental Backup
    - Differential Backup
    - Synthetic Full Backup
    - Database Dumping
  - Implement a Backup Strategy
    - Scheduling Backups
    - Testing Backups
    - Validating Backup Hash

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- PBQ: Create a Backup Strategy
- Assisted Live Lab: Backing Up and Restoring Databases with Backup Validation
- Applied Live Lab: Create Roles and Establish a Backup Plan

- Store and Purge Backups
  - On-Site Storage
  - Off-Site Storage
  - Rotating Both On-Site and Off-Site
  - Purging and Archiving Data
  - Applied Live Lab: Create Roles And Establish A Backup Plan

REQUIREMENTS:

Recommended experience: no prerequisites, with 2–3 years of experience in a database administrator role recommended.

Difficulty level



CERTIFICATE:

The participants will obtain certificates signed by CompTIA (course completion). This course will help prepare you for the CompTIA DataSys+ certification exam, which is available through the Pearson VUE test centers.

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TRAINER:

Authorized CompTIA Trainer

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