CompTIA DataSys+ Certification Exam Objectives

EXAM NUMBER: DS0-001

About the Exam

The CompTIA DataSys+ certification exam will certify the successful candidate has the knowledge and skills required to deploy, manage, and maintain databases, including employing the fundamentals of scripting and programming in a database environment while using security and business continuity best practices.

ANSI ACCREDITATION

The CompTIA DataSys+ exam is accredited by ANSI to show compliance with the ISO 17024 standard and, as such, undergoes regular reviews and updates to the exam objectives.

EXAM DEVELOPMENT

CompTIA exams result from subject matter expert workshops and industry-wide survey results regarding the skills and knowledge required of an IT professional.

COMPTIA AUTHORIZED MATERIALS USE POLICY

CompTIA Certifications, LLC is not affiliated with and does not authorize, endorse, or condone utilizing any content provided by unauthorized third-party training sites (aka "brain dumps"). Individuals who utilize such materials in preparation for any CompTIA examination will have their certifications revoked and be suspended from future testing in accordance with the CompTIA Candidate Agreement. In an effort to more clearly communicate CompTIA's exam policies on use of unauthorized study materials, CompTIA directs all certification candidates to the CompTIA Certification Exam Policies. Please review all CompTIA policies before beginning the study process for any CompTIA exam. Candidates will be required to abide by the CompTIA Candidate Agreement. If a candidate has a question as to whether study materials are considered unauthorized (aka "brain dumps"), they should contact CompTIA at examsecurity@comptia.org to confirm.

PLEASE NOTE

The lists of examples provided in bulleted format are not exhaustive lists. Other examples of technologies, processes, or tasks pertaining to each objective may also be included on the exam, although not listed or covered in this objectives document. CompTIA is constantly reviewing the content of our exams and updating test questions to be sure our exams are current, and the security of the questions is protected. When necessary, we will publish updated exams based on existing exam objectives. Please know that all related exam preparation materials will still be valid.

CompTIA.

TEST DETAILS

Required exam	DS0-001
Number of questions	Maximum of 90
Types of questions	Multiple-choice and performance-based
Length of test	90 minutes
Recommended experience	2–3 years of hands-on experience as a database administrator

EXAM OBJECTIVES (DOMAINS)

The table below lists the domains measured by this examination and the extent to which they are represented.

DOMAIN		PERCENTAGE OF EXAMINATION
1.0	Database Fundamentals	24%
2.0	Database Deployment	16%
3.0	Database Management and Maintenance	25%
4.0	Data and Database Security	23%
5.0	Business Continuity	12%
Total		**100%**

1.0 Database Fundamentals

1.1 Compare and contrast database structure types.

- Relational vs. non-relational databases
- Linear vs. non-linear format
- NoSQL types
  - Document databases
  - Key-value stores
  - Column-oriented databases
  - Graph databases
- Tools
  - Cassandra
  - MongoDB
  - Neo4j
  - Amazon DynamoDB
  - Cosmos

1.2 Given a scenario, develop, modify, and run SQL code.

- Data definition language (DDL)
- Data manipulation language (DML)
- Set-based logic
- Transaction control languages (TCLs)
- Atomicity, consistency, isolation, durability (ACID) principles
- American National Standards Institute (ANSI) Structured Query Language (SQL)
- Programming with SQL
  - Triggers
  - Stored procedures
  - Functions
  - Views

1.3 Compare and contrast scripting methods and scripting environments.

- Script purpose and runtime location
  - Server side
  - Client side

- Languages
  - PowerShell
  - Python

- Command-line scripting
  - Linux
  - Windows

1.4 Explain the impact of programming on database operations.

- Object-relational mapping (ORM)
  - Hibernate
  - Entity Framework
  - Ebean

- Process to gauge impact
  - Review SQL code generated by ORM
  - Confirm validity of code
  - Determine impact to database server
  - Provide solutions/alternate approach, as needed

CompTIA®

2.0 Database Deployment

Compare and contrast aspects of database planning and design.

- **Requirements gathering**
  - Number of users
  - Storage capacity
    - Size
    - Speed
    - Type
  - Database objectives
    - Use cases/purposes

- **Database architecture factors**
  - Inventory of needed assets
    - Gap analysis

- Cloud-based vs. on-premises
- Types of cloud-hosted environments:
  - Platform as a service (PaaS)
  - Software as a service (SaaS)
  - Infrastructure as a service (IaaS)
- Database schema
  - Logical
  - Physical
  - View
- Data sources
- System specifications

- **Design documentation**
  - Data dictionary
  - Entity relationships
  - Data cardinality
  - System requirements documentation

Explain database implementation, testing, and deployment phases.

- **Acquisition of assets**
- **Phases of deployment**
  - Installation and configuration
    - Database prerequisites
    - Provisioning
    - Upgrading
    - Modifying
    - Importing

- **Database connectivity**
  - Database server location
  - Networking concepts
    - Domain name service (DNS)
    - Client/server architecture
      - Firewall and perimeter network considerations
      - Static and dynamic internet protocol (IP) addressing
    - Ports/protocols

- **Testing**
  - Database quality check (columns, tables, fields)

- Code execution
- Schema meets original requirements
- Syntax errors
- Stress testing
  - Stored procedures stress test
  - Application stress test
- Notification triggers and alerts
- Version control testing
- Regression testing
- Negative testing

- **Validate**
  - Index analysis
  - Data mapping
  - Data values
  - Queries
  - Referential integrity/ integrity validation
  - Scalability validation

3.0 Database Management and Maintenance

3.1 Explain the purpose of monitoring and reporting for database management and performance.

- System alerts/notifications
  - Growth in size/storage limits
  - Daily usage
  - Throughput
  - Resource utilization
    - Central processing unit (CPU) usage
    - Memory
    - Disk space
    - Operating system (OS) performance
  - Baseline configuration/trending
  - Monitoring job completion/failure
  - Replication
  - Database backup alerts

- Transaction log files
- System log files
- Deadlock monitoring
- Connections and sessions
  - Concurrent connections
  - Failed/attempted connections

3.2 Explain common database maintenance processes.

- Query optimization
- Index optimization
- Patch management
  - Updates
  - Security and maintenance patches

- Database integrity checks
  - Table locking techniques

- Data corruption checks
- Periodic review of audit logs
- Performance tuning
  - Transaction volumes

- Load balancing
- Change management
  - Release schedules
  - Capacity planning

  - Upgrades
  - Vulnerability remediation
  - Change approval
  - Communication
  - Database refresh

3.3 Given a scenario, produce documentation and use relevant tools.

- Data dictionaries
- Entity relationship diagram (ERD)
- Maintenance documentation
- Standard operating procedure (SOP) documentation
  - Organizational compliance documentation
  - Third-party compliance documentation

- Tools
  - Unified modeling language (UML) editors
  - Word processors
  - Spreadsheet tools

CompTIA.

3.4 Given a scenario, implement data management tasks.

- Data management
  – Modify data
  – Define data
  – Append columns
  – Create new data sets
  – Views/materialized views
  – Index creation
  – Create data tables
  – Create data relationships

- Data redundancy
- Data sharing

4.0 Data and Database Security

4.1 Explain data security concepts.

- Encryption
  - Data in transit
    - Client-side encryption
    - In-transit encryption
    - Server-side encryption
  - Data at rest

- Data masking
  - Data discovery

- Data destruction techniques
- Data security audit
  - Expired accounts
  - Connection requests

- Code auditing
  - SQL code
  - Credential storage checks

4.2 Explain the purpose of governance and regulatory compliance.

- Data loss prevention
- Data retention policies
- Data classification
  - Personally identifiable information (PII)/personal health information (PHI)
  - Payment Card Industry Data Security Standard (PCI DSS)

- Global regulations
  - General Data Protection Regulation (GDPR)

- Regional regulations

4.3 Given a scenario, implement policies and best practices related to authentication and authorization.

- Access controls
  - Rights and privileges
  - Least privilege

- Password policies
- Service accounts
- Identity and access management

4.4 Explain the purpose of database infrastructure security.

- Physical
  - Access control
    - Biometrics
  - Surveillance
  - Fire suppression
  - Cooling system

- Logical
  - Firewall
  - Perimeter network
  - Port security

CompTIA.

4.5 Describe types of attacks and their effects on data systems.

- SQL injection
- Denial of service (DoS) attacks
- On-path attacks
- Brute-force attacks
- Phishing
- Malware
  – Ransomware

5.0 Business Continuity

5.1 Explain the importance of disaster recovery and relevant techniques.

- Disaster recovery (DR) planning
  - DR documentation
    - Manuals
    - System security plan
    - Continuity of operations plan
    - Build documentation
  - DR techniques
    - Replication
    - Log shipping
    - High availability
    - Mirroring

- DR plan testing
  - Recovery point objective (RPO)
  - Recovery time objective (RTO)

- Transition/failback to normal operations

5.2 Explain backup and restore best practices and processes.

- Full backup vs. incremental
  - Differential

- Database dumping
- Schedule and automate backups
- Test backups
- Validate backup hash
- Storage location
  - On-site vs. off-site

- Retention policy
  - Purge vs. archive cycles

CompTIA.

CompTIA DataSys+ DS0-001 Acronym List

The following is a list of acronyms that appears on the CompTIA DataSys+ DS0-001 exam. Candidates are encouraged to review the complete list and attain a working knowledge of all listed acronyms as part of a comprehensive exam preparation program.

ACRONYM	DEFINITION
ACID	Atomicity Consistency Isolation and Durability
ANSI	American National Standards Institute
CPU	Central Processing Unit
CRUD	Create Read Update Delete
DAS	Direct-attached Storage
DB	Database
DBaaS	Database as a Service
DBMS	Database Management Service
DCL	Data Control Language
DDL	Data Definition Language
DHCP	Dynamic Host Configuration Protocol
DLP	Data Loss Prevention
DML	Data Manipulation Language
DNS	Domain Name Service
DoS	Denial of Service
DR	Disaster Recovery
ERD	Entity Relationship Diagram
FTP	File Transfer Protocol
GDPR	General Data Protection Regulation
IaaS	Infrastructure as a Service
IOPS	Input/Output Per Second
IP	Internet Protocol
LDAP	Lightweight Directory Access Protocol
MySQL	My Structured Query Language
NAS	Network-attached Storage
NoSQL	Not Only Structured Query Language
ORM	Object-relational Mapping
OS	Operating System
PaaS	Platform as a Service
PCI DSS	Payment Card Industry Data Security Standard
PHI	Personal Health Information
PHP	Hypertext Preprocessor
PII	Personally Identifiable Information
RAM	Random Access Memory
REST	Representational Transfer State
RPO	Recovery Point Objective
RTO	Recovery Time Objective
SaaS	Software as a Service
SAN	Storage Area Network
SOP	Standard Operating Procedure
SQL	Structured Query Language
SSD	Solid State Drive
SSH	Secure Shell

CompTIA.

TCL	Transaction Control Language
TCP/IP	Transmission Control Protocol/Internet Protocol
UML	Unified Modeling Language
VLAN	Virtual Local Area Network
VPC	Virtual Private Cloud
VXLAN	Virtural Extensible LAN

CompTIA.

CompTIA DataSys+ DS0-001 Hardware and Software List

CompTIA has included this sample list of hardware and software to assist candidates as they prepare for the DataSys+ DS0-001 certification exam. This list may also be helpful for training companies that wish to create a lab component for their training offering. The bulleted lists below each topic are sample lists and are not exhaustive.

EQUIPMENT
- Desktop/laptop

SOFTWARE
- Free software/SQL environment to run scripts (e.g. MariaDB, DBeaver, SSMS)
- Programming languages to practice connecting to a database (e.g., SQL, Python, PowerShell)
- Text editing software (e.g., Notepad++, Visual Studio code)
- UML modeling tools

OTHER
- Sample database (e.g., .csv files, Northwind) to practice imports
- Samples of technical (procedural or descriptive) documentation (e.g., data dictionary, ERD)