

INTRODUCTION

IBM DB2 11 DBA for z/OS Certification Review Guide—Exam 312

The purpose of this book is to assist you with preparing for the *IBM DB2 11 DBA for z/OS* exam (Exam 312), one of the two required tests for *IBM Certified Database Administrator* certification. This book will cover all topics on the exam and is written by a team member who participated as a subject matter expert (SME) in the actual writing of the exam.

While it does address all topics on the test, this book also provides much more than that. It covers the new features of DB2 11 for both database and application development. Following are the chapters in the book and some high-level information about the topics each chapter covers:

- Chapter 1—DB2 for z/OS Introduction
 - » z/OS architecture, DB2 address spaces, attachment facilities, data sharing, system objects, Structured Query Language (SQL) usage, structures, memory, environment management
- Chapter 2—Database Design and Implementation
 - » Logical design, physical design, structure creation, structure alteration
- Chapter 3—Applications and Database Functionality
 - » Application process, SQL, pureXML, routines, variables, database construct usage, program preparation, binding, concurrency, locking, distributed applications
- Chapter 4—Environment Management
 - » Installation, methods of interaction, commands, utilities, thread management, restart, recovery, security, auditing, data sharing operations

- Chapter 5—Data Management
 - » Utilities for data movement, organization, copying, and loading/unloading, as well as statistics for maintenance
- Chapter 6—Performance and Tuning
 - » Subsystem tuning, traces, I/O management, statistics, query tuning

Each section of this book presents the topics that are identified in the exam objectives. At the end of each chapter are questions that also cover the exam objectives and topics. These questions are very much in line with the questions that will appear on the 312 exam (as well as the 320 exam).

IBM Certified Database Administrator—DB2 11 for z/OS

The IBM Certified Database Administrator is the lead database administrator (DBA) for the DB2 product on the z/OS operating system. This individual has significant experience as a DBA and extensive knowledge of DB2, specifically the new features and functionality related to version 11. This person can perform the intermediate to advanced tasks related to database design and implementation, operation and recovery, security and auditing, performance, and installation and migration/upgrades specific to the z/OS operating system.

To become an IBM Certified Database Administrator - DB2 11 DBA for z/OS, you must pass two exams: either *320 DB2 11 Fundamentals for z/OS* or *610 DB2 10.1 Fundamentals*, and the *312 IBM DB2 11 DBA for z/OS* exam. For additional information about these tests and the certification, refer to www-03.ibm.com/certify/certs/08002305.shtml.

312 Exam—IBM DB2 11 DBA for z/OS

The following sections describe the objectives of the *312 IBM DB2 11 DBA for z/OS* certification exam and the topics that it will cover, along with the percentage each topic represents in the exam.

Section 1: Database Design and Implementation (26%)

- Design tables and views
- Explain the different performance implications of identity columns, row IDs, and hash access
- Design indexes and table spaces
- Perform partitioning
- Normalize data and translate data model into a physical model
- Implement user-defined integrity rules

- Use the appropriate method to alter DB2 objects
- Understand the impacts of different encoding schemes

Section 2: Operation and Recovery (22%)

- Possess knowledge of commands for normal operational conditions
- Possess knowledge of commands and utility control statements for use in abnormal conditions
- Load and unload data into and from the created tables
- Reorganize objects when necessary
- Monitor the object by collecting statistics
- Monitor and manage threads and utilities
- Identify and respond to advisory/restrictive statuses on objects
- Identify and perform problem determination
- Perform health checks
- Identify and perform the required actions to protect databases from planned and unplanned outages

Section 3: Security and Auditing (6%)

- Understand privileges and authorities
- Protect access to DB2 and its objects
- Audit DB2 activity and resources, and identify primary audit techniques
- Identify and respond appropriately to symptoms from trace output or error messages that signify security problems

Section 4: Performance (22%)

- Plan for performance monitoring by setting up and running monitoring procedures
- Analyze performance
- Analyze and respond to RUNSTATS statistics analysis
- Determine when and how to perform REBIND
- Describe DB2 interaction with the Workload Manager (WLM)
- Interpret traces and explain the performance impact of different DB2 traces
- Identify and respond to critical performance metrics
- Review and tune SQL
- Understand dynamic SQL performance
- Understand design features for performance
- Possess knowledge of controlling access paths

Section 5: Installation and Migration/Upgrade (7%)

- Possess knowledge and understanding of the critical DSNZPARMS
- Identify and explain data sharing components and commands
- Possess knowledge of pre-migration checklists
- Possess knowledge of catalog and directory

Section 6: Additional Database Functionality (10%)

- Possess knowledge of SQL constructs
- Possess knowledge of SQL Procedural Language (SQL/PL) functions and procedures
- Possess knowledge of SQL and Extensible Markup Language (XML)
- Possess knowledge of stored procedures
- Possess knowledge of user-defined functions
- Possess knowledge of global variables

Section 7: Distributed Access (7%)

- Implement distributed data access
- Possess knowledge of DSNZPARMs
- Possess knowledge of distributed data facility (DDF) setup
- Understand and know how to implement distributed data access

320 Exam—IBM DB2 11 Fundamentals for z/OS

This Database Associate certification is an entry-level exam for a user of any of the DB2 for z/OS family of products. This individual is knowledgeable about the fundamental concepts of DB2 11 for z/OS through either hands-on experience or formal and informal education. The database associate should have an in-depth knowledge of the basic to intermediate tasks required in day-to-day administration, know basic SQL, understand which additional products are available with DB2 11, understand how to create databases and database objects, and have a basic knowledge of database security and transaction isolation.

Section 1: Working with SQL and XML (14%)

- Ability to write a DML SQL statement
- Ability to access and process XML data (XQuery, Xpath)
- Knowledge of most commonly used special registers
- Knowledge of built-in functions

Section 2: Security (8%)

- Knowledge of restricting data access
- Ability to write a Data Control Language (DCL) SQL statement

Section 3: Planning (17%)

- Ability to connect to DB2 servers
- Knowledge of different types of tables and table spaces
- Knowledge of subsystem parameters
- Knowledge of DB2 architecture
- Knowledge of data sharing concepts
- Knowledge of database workloads (transactional processing vs. analytics)

- Knowledge of encoding scheme concepts

Section 4: Operations (14%)

- Basic knowledge of DB2 commands and DSN commands
- Basic knowledge of DB2 utilities
- Basic knowledge of troubleshooting (Explain, SQL Codes)

Section 5: Data Concurrency (10%)

- Knowledge of transaction management (COMMIT, ROLLBACK, SAVEPOINT)
- Knowledge of locking
- Identify the isolation levels that should be used

Section 6: Application Design (19%)

- Ability to create and call a stored procedure or a user-defined function
- Knowledge of temporary tables (creation and usage)
- Knowledge of triggers (function and usage)
- Knowledge of program preparation and BIND options
- Knowledge of referential integrity and constraints
- Knowledge of non-relational data concepts (XML data, LOB data)
- Knowledge of temporal (time-travel) tables

Section 7: Working with Database Objects (17%)

- Ability to demonstrate usage of IBM-supplied and user-defined data types
- Ability to write a DDL SQL statement
- Ability to identify characteristics and properties of DB2 objects
- Ability to look up information in the DB2 catalog

610 Exam—DB2 10.1 Fundamentals

After successful completion of the 610 exam, you will be a certified Database Associate. The **Database Associate** certification is an entry-level exam for a user of any of the DB2 family of products. This individual is knowledgeable about the fundamental concepts of DB2 10.1 through either hands-on experience or formal and informal education. The database associate should have an in-depth knowledge of the basic to intermediate tasks required in daily administration, as well as basic SQL. He or she should also understand which additional products are available with DB2 10.1, know how to create databases and database objects, and have a basic knowledge of database security and transaction isolation.

Section 1: Planning (14%)

- Know how to restrict data access
- Possess knowledge of the features or functions available in DB2

- Possess knowledge of database workloads
- Understand nonrelational data concepts
- Understand XML data implications

Section 2: Security (11%)

- Possess knowledge of DB2 products
- Possess knowledge of different privileges and authorities
- Possess knowledge of encryption options
- Given a Data Definition Language (DDL) SQL statement, know how to identify results

Section 3: Databases and Database Objects (17%)

- Know how to identify and connect to DB2 servers and databases
- Know how to identify DB2 objects
- Understand basic characteristics and properties of DB2 objects
- Given a DDL SQL statement, know how to identify results

Section 4: Using SQL (23.5%)

- Given a Data Manipulation Language (DML) SQL statement, know how to identify results
- Use SQL to SELECT data from tables
- Use SQL to SORT or GROUP data
- Use SQL to UPDATE, DELETE, or INSERT data
- Possess knowledge of transactions
- Call a procedure or invoke a user-defined function
- Given an XQuery statement, know how to identify results

Section 5: Tables, Views, and Indexes (23.5%)

- Demonstrate usage of DB2 data types
- Given a situation, know how to create a table
- Identify when to use referential integrity
- Identify methods of data constraint
- Identify the characteristics of a table, view, or index
- Identify when to use triggers
- Possess knowledge of schemas
- Possess knowledge of data type options for storing XML data

Section 6: Data Concurrency (11%)

- Identify factors that influence locking
- List objects on which locks can be obtained
- Identify the characteristics of DB2 locks
- Given a situation, know how to identify the isolation levels to use