DB2 – Ultimate Database for Cloud, Analytics and Mobile

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IBM

Looking to upgrade to DB2 11? Get a head start and brush-up your skills, knowledge, experience and GET Certified for DB2 11:

Kurt Struyf
Lone-star Consulting

Introduction

Objective

This presentation will focus on the specifics of DB2 11 for z/OS and the skills needed to certify as DB2 professional .

Kurt Struyf
IBM Gold Consultant
Lone Star Owner

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Agenda

- **Why getting certified**
  - business reasons
  - personal reasons
- **How to get certified**
  - where can you take the exams
  - which exams exists
  - how to prepare
- **What to expect when taking a DB2 for z/OS exam**
  - how the different tests are made up
  - what type of questions (not) to expect
  - Sample questions
- **Questions**

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Why getting certified ?

- **Business reasons**
    - Service companies sometimes <u>need</u> certifications to get the contract.
    - Certification might be a KPI for your company
    - Partnerships with IBM or other vendors.
    - Consultants with certificate are more likely to get a job.

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Why Getting certified?

- **Personal reasons**
  - At the end of a training,
    check how well you understood everything
  - Without perparing to test your current skill level/find areas to improve
  - Receive a bonus/compensation/promotion
  - Looks good an a resume
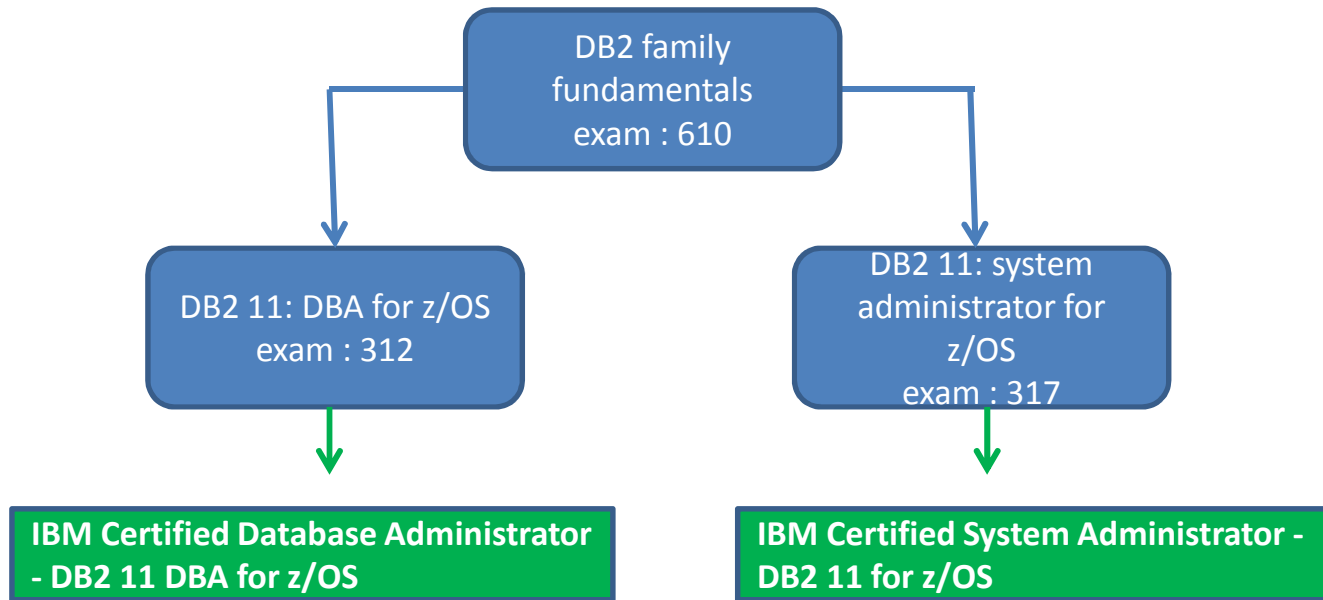
How to get certified

- **Where can I take the certification exams ?**
  - At any IDUG (North America, EMEA or Australasia) find out more about dates and venues www.idug.org
  - At Insight (previously IOD) in Las Vegas http://www-01.ibm.com/software/events/insight/
  - On request, register and contact http://www.pearsonvue.com/ibm/

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- Always need photo ID
- Same test can only be taken twice in 30 days

How to get certified

- **DB2 for z/OS certificates**

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   │      z/OS        │                    │  administrator for   │
   │   exam : 312     │                    │       z/OS           │
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| **IBM Certified Database Administrator - DB2 11 DBA for z/OS** | **IBM Certified System Administrator - DB2 11 for z/OS** |

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How to get certified

- **How to prepare ?**
  - General DB2 education (IBM, education partners, independent trainers)
  - Information at IDUG/Insight and other conferences
  - Regional user groups
  - Hands on experience
  - Specific certification crammer courses at IDUG Conferences

What to expect when taking a DB2 for z/OS certification exam

- http://www-03.ibm.com/certify/certs/08002305.shtml

- http://www-03.ibm.com/certify/tests/objC2090-317.shtml

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What to expect when taking a DB2 for z/OS certification exam

- General questions ,not exception on exception
- Use questions, not syntax questions
  (note certain syntax knowledge will be required but won't be used to trip you up)
- Mostly positive phrased questions, but always read questions carefully
- Features of latest release get some extra attention
- When unsure mark question for review

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DB2 family fundamentals (exam 610)

- **Family fundamentals**
  - DB2 for LUW
  - DB2 for z/OS
  - General relational data base questions
- **Start to any DB2 certification**
  - Number of questions: 69
  - Devided in 6 sections
  - Time allowed in minutes: 90
  - Required passing score: 66% (46 questions)
  - Languages: English, Japanese

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DB2 family fundamentals (exam 610)

- Section 1 - Planning (10%)

- Section 2 - Security (15%)

- Section 3 - Working with Databases and Database Objects (20%)

- Section 4 - Working with DB2 Data using SQL (20%)

- Section 5 - Working with DB2 Tables, Views and Indexes (22%)

- Section 6 - Data Concurrency (13%)

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DB2 family fundamentals (exam 610)

- **Section 1 - Planning (10%)**
  - Knowledge of DB2 products (z/OS vs LUW vs pureScale - at a high-level; different products and what they do)
  - Knowledge of database workloads (appropriate DB2 product to use - OLTP vs warehousing)
  - Knowledge of non-relational data concepts (XML data, LOB data)

- **Section 2 - Security (15%)**
  - Knowledge of restricting data access
  - Knowledge of different privileges and authorities
  - Given a DCL SQL statement, knowledge to identify results (grant/revoke/connect statements)
  - Knowledge of Row and Column Access Control (RCAC)
  - Knowledge of Roles and Trusted Contexts

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DB2 family fundamentals (exam 610)

- **Section 3 - Working with Databases and Database Objects (20%)**
  - Ability to create and connect to DB2 servers and databases (requirements to give ability to connect)
  - Ability to identify DB2 objects
  - Knowledge of basic characteristics and properties of DB2 objects
  - Given a DDL SQL statement, knowledge to identify results (ability to create objects)
  - Knowledge of Temporal (Time Travel) Tables - System-period, Application-period, and Bi-temporal - ability to create (Greater precision time stamps)

- **Section 4 - Working with DB2 Data using SQL (20%)**
  - Ability to use SQL to SELECT data from tables
  - Ability to use SQL to SORT or GROUP data
  - Ability to use SQL to UPDATE, DELETE, or INSERT data
  - Knowledge of transactions (i.e., commit/rollback and transaction boundaries)
  - Ability to create and call an SQL supported procedure or a user defined function (understanding of passing parameters and results)
  - Given an XQuery statement, knowledge to identify results
  - Knowledge of Temporal (Time Travel) Tables - System-period, Application-period, and Bi-temporal - ability to query

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DB2 family fundamentals (exam 610)

- **Section 5 - Working with DB2 Tables, Views and Indexes (22%)**
  - Ability to demonstrate usage of DB2 data types (XML data types, Oracle compatibility data types)
  - Given a situation, ability to create a temporary table
  - Knowledge to identify when referential integrity should be used
  - Knowledge to identify methods of data constraint
  - Knowledge to identify characteristics of a table, view or index
  - Knowledge to identify when triggers should be used
  - Knowledge of schemas
- **Section 6 - Data Concurrency (13%)**
  - Knowledge to identify factors that influence locking
  - Ability to list objects on which locks can be obtained (lock table)
  - Knowledge to identify characteristics of DB2 locks (common locks shared across platforms)
  - Given a situation, knowledge to identify the isolation levels that should be used (currently committed)

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DB2 Family Fundamentals (exam 610)

- Sample questions

Which of the following is true about XML columns?

a. XML columns are used to store XML documents as a hierarchical set of entities.

b. Only Xquery can be used to retrieve an XML document from an XML column.

c. XML columns must be altered to accommodate additional parent/child relationships if they are used in referential constraints.

d. In order to access any portion of an XML document stored in an XML column, the entire document must be retrieved

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DB2 Family Fundamentals (exam 610)

- Sample questions

> Which product must be installed on z/OS to allow a COBOL
> program running on that machine to access data on a
> remote DB2 for z/OS server?

a. DB2 for z/OS

b. DB2 Run-Time Client for z/OS.

c. DB2 Connect Enterprise Edition for z/OS.

d. z/OS Application Connectivity to DB2 for z/OS

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DB2 Family Fundamentals (exam 610)

- Sample questions

Which of the following tools can be used to schedule a backup operation that is to run every Sunday night?

a. Journal

b. Task Center

c. Activity Monitor

d. Command Line Processor

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DB2 Family Fundamentals (exam 610)

- Sample questions

<div style="background-color:#9ACD32">

Which of the following will DELETE all the rows from table T03?

</div>

a. DELETE * FROM TABLE T03

b. DELETE ALL FROM T03

c. DELETE * FROM T03

d. DELETE FROM T03

DB2 Family Fundamentals (exam 610)

- Sample questions

When does a view get populated ?

a. When it is created

b. When it is referenced in an INSERT statement

c. The first time any executable SQL statement references it

d. Any time an executable SQL statement references it

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DB2 family fundamentals (exam 610)

- Find all the official information on
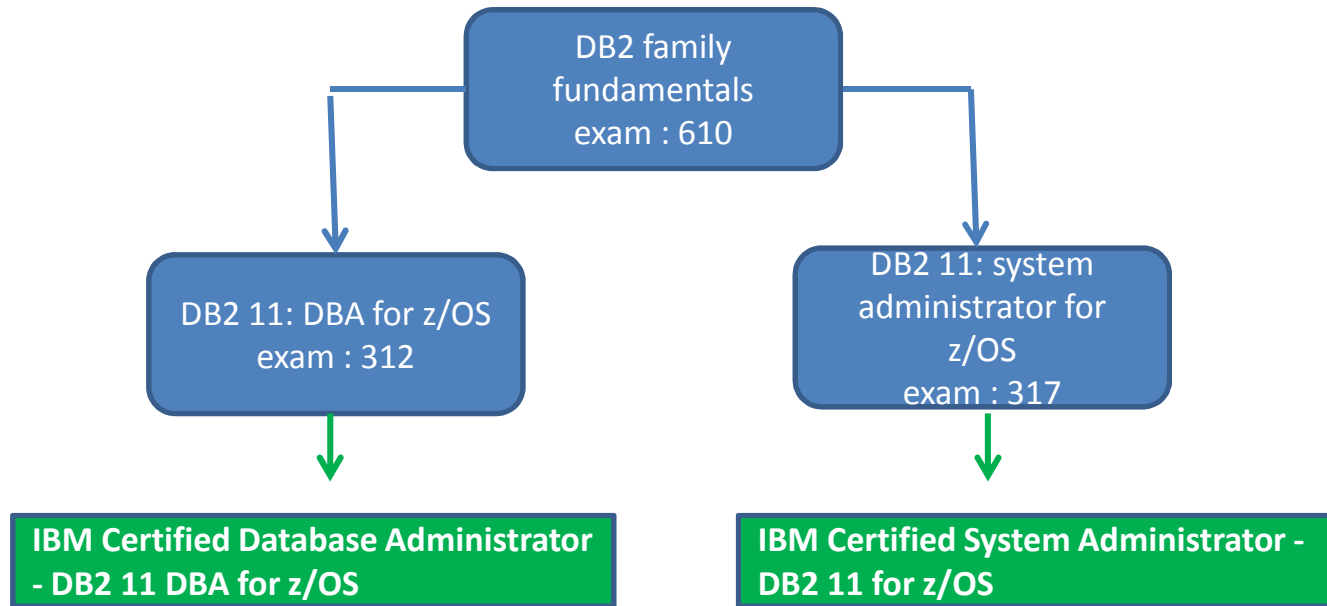 http://www-03.ibm.com/certify/tests/ovrC2090-610.shtml

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How to get certified

- DB2 for z/OS certificates

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│                     │       │        z/OS         │
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│ Administrator       │       │ DB2 11 for z/OS     │
│ - DB2 11 DBA for    │       │                     │
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DB2 11: DBA for z/OS (exam 312)

- Together with family fundamentals will earn you the certificate of
  IBM Certified Database Administrator
  - DB2 11 DBA for z/OS

- **Only on DB2 for z/OS**
  - Number of questions: 67
  - Divided in 7 sections
  - Time allowed in minutes: 90
  - Required passing score: 59%
  - Test languages: English

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DB2 11: DBA for z/OS (exam 312)

- Section 1 - Database Design and Implementation (24%)

- Section 2 - Operation and Recovery (22%)

- Section 3 - Security and Auditing (6%)

- Section 4 - Performance (22%)

- Section 6 - Additional Database Functionality (10%)

- Section 7 - Distributed Access (7%)

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DB2 11: DBA for z/OS (exam 312)

- **Section 1 - Database Design and Implementation (24%)**
  - Design tables and views
  - Explain the different performance implications of identity column, row ID, and sequence column definitions (applications, utilities), hash access
  - Design indexes
  - Design table spaces
  - Perform partitioning
  - Normalize data (E-R model, process model) and translate data model into physical model (denormalize tables)
  - Implement user-defined integrity rules
  - Use the appropriate method to alter DB2 objects
  - Understand impacts of different encoding schemes

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DB2 11: DBA for z/OS (exam 312)

- **Section 2 - Operation and Recovery (22%)**

  - Knowledge of commands for normal operational conditions (START, STOP, DISPLAY)
  - Knowledge of commands and utility control statements for use in abnormal conditions (RECOVER, RESTART)
  - 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 (distributed, local, MODIFY DDF)
  - Identify and respond to advisory/restrictive statuses on objects
  - Identify and perform problem determination (traces and other utilities, plans and packages)
  - Perform health checks (check utilities, offline utilities, catalog queries)
  - Identify and perform actions that are needed to protect databases from planned and unplanned outages
  - recovery scenarios

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DB2 11: DBA for z/OS (exam 312)

- **Section 3 - Security and Auditing (6%)**
  - Understanding 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

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DB2 11: DBA for z/OS (exam 312)

- **Section 4 - Performance (22%)**
  - Plan for performance monitoring by setting up and running monitoring procedures (continuous, detailed, periodic, exception)
  - Analyze performance (manage and tune CPU requirements, memory, I/O, locks, response time, index and table compression)
  - Analyze and respond to RUNSTATS statistics analysis (real-time, batch, catalog queries, reports, histograms)
  - Determine when and how to perform REBIND (APCOMPARE and APREUSE)
  - Describe DB2 interaction with WLM (distributed, stored procedures, user-defined functions, RRS)
  - Interpret traces (statistics, accounting, performance) & explain the performance impact of different DB2 traces
  - Identify and respond to critical performance metrics (excessive I/O wait times, lock-latch waits and CPU waits; deadlocks, timeouts, RID failures)
  - Review and tune SQL (access paths, EXPLAIN tables, awareness of query transformation and predicate processing, use of Virtual Indexes)
  - Dynamic SQL Performance (DSN_STATEMENT_CACHE_TABLE, parameter markers, literal replacement, REOPT)
  - Design features for performance (hash row access, inline LOBs)
  - Knowledge of controlling access paths (SYSSTATSFEEDBACK table, SYSQUERY)

DB2 11: DBA for z/OS (exam 312)

- **Section 5 - Installation and Migration / Upgrade (7%)**
  - Knowledge and understanding of the critical ZPARMs (database-, object- and application-oriented, application compatibility - no DDF
  - Identify and explain Datasharing components and commands
  - Knowledge of pre-migration checklists
  - Knowledge of catalog and directory (new tables, change tables, new objects)

- **Section 6 - Additional Database Functionality (10%)**
  - Knowledge of SQL constructs (temporal, archive, table functions, built-in scalar functions, recursive, common table expressions)
  - Knowledge of SQL/PL (Array data type, new array data type functions, functions and procedures)
  - Knowledge of SQL/XML (results database, XML functions, cross loader with XML, xpath expressions, FLWOR, pattern matching and regular expressions)
  - Knowledge of Stored Procedures (native, external, autonomous, ziip considerations)
  - Knowledge of User-defined functions (scalar functions, table functions, SQL/external functions)
  - Knowledge of global variables (in stored procedures, in SQL/PL, distributed considerations)

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- **Section 7 - Distributed Access (7%)**
  - Implementing distributed data access (communications database)
  - Knowledge of ZPARMs (for DDF)
  - Knowledge of DDF setup (DB2 Connect, Client, Drivers, profile tables, RLMT)
  - Understanding and implementing distributed data access (performance settings for DDF access)

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DB2 11: DBA for z/OS (exam 312)

- **Sample questions**

What is the least disruptive way of externalizing real time statistics for table space DB1.TS1?

a. -SET LOG LOGLOAD(0)

b. -DISPLAY DB(DB1) SPACENAM(TS1)

c. RUNSTATS TABLESPACE DB1.TS1

d. -ACCESS DB(DB1) SPACENAM(TS1) MODE(STATS)

DB2 11: DBA for z/OS (exam 312)

Given these statements:

       RUNSTATS TABLESPACE DB1.TS1 RESET ACCESSPATH
       HISTORY ACCESSPATH

Which statement is FALSE ?

a. It resets all real-time statistics (RTS) for DB1.TS1

b. It resets all access path statistics for DB1.TS1 in catalog.

c. It invalidates the dynamic statement cache for table space DB1.TS1

d. It externalizes current access paths statistics for DB1.TS1 to HIST catalog tables

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DB2 11: DBA for z/OS (exam 312)

Which SQL statement would create a valid INCLUDE index ?

a.   CREATE UNIQUE INDEX IXA
        ON TESTTAB(COL1)
        INCLUDE(COL5)

b.   CREATE INDEX IXB
        ON TESTTAB(COL3+COL4)
        INCLUDE(COL5)

c.   CREATE INDEX IXC
        ON TESTTAB(COL6) CLUSTER
        INCLUDE(COL5)

d.   CREATE INDEX IXD

DB2 11: DBA for z/OS (exam 312)

- Find all the official information on
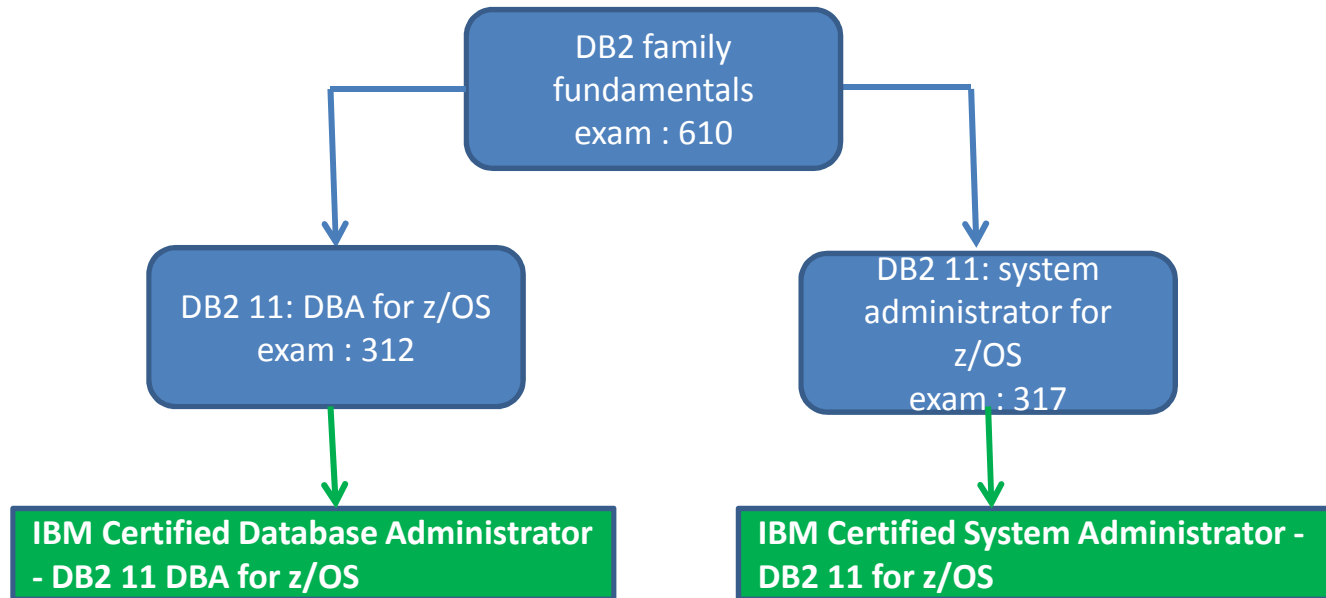 http://www-03.ibm.com/certify/tests/ovrC2090-312.shtml

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How to get certified

- DB2 for z/OS certificates


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    │      z/OS        │    │ administrator for    │
    │   exam : 312     │    │       z/OS           │
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IBM Certified Database Administrator - DB2 11 DBA for z/OS

IBM Certified System Administrator - DB2 11 for z/OS

DB2 11: system administrator for z/OS (exam 317)

- Together with family fundamentals will earn you the certificate of

  IBM Certified System Administrator - DB2 11 for z/OS

- Only on DB2 for z/OS
  - Number of questions: 58
  - Divided into 6 sections
  - Time allowed in minutes: 90
  - Required passing score: 65%
  - Languages: English

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DB2 11: system administrator for z/OS (exam 317)

- Section 1 - Installation and Migration (20%)
- Section 2 - Security and Auditing (12%)
- Section 3 - System Operation and Maintenance (17%)
- Section 4 - Backup and Recovery (17%)
- Section 5 - Performance and Tuning (21%)
- Section 6 - Troubleshooting (13%)

DB2 11: system administrator for z/OS (exam 317)

- **Section 1 - Installation and Migration (20%)**
  - Given a scenario, demonstrate knowledge of the installation/migration plan process
  - Ability to identify additional environments necessary (WLM, Unix system services, XML schema support, RACF or equivalent, SMS)
  - Given a scenario, describe how to execute the installation/migration plan
  - Evaluate appropriate subsystem parameter (DSNZPARM) settings
  - Evaluate appropriate migration to extended RBA/LRSN tasks

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DB2 11: system administrator for z/OS (exam 317)

- **Section 2 - Security and Auditing (12%)**
  - Given a scenario, demonstrate knowledge of how to protect DB2 subsystem and resources
    - Knowledge of various System authorities
    - Support for distributed identities, connection level security enforcement
    - Program authorization and masking including enhancements
  - Describe auditing techniques (policies)
  - Describe role-based security and the advantage of deploying it (trusted context)

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DB2 11: system administrator for z/OS (exam 317)

- **Section 3 - System Operation and Maintenance (17%)**
  - Describe how to use and manage DB2 components and processes (administrative task scheduler) (REPAIR, STOSPACE, DSNJU003, DSN1COMP)
  - Demonstrate knowledge of DB2 commands
  - Given a scenario, describe how to monitor and control DB2 threads
  - Knowledge of DB2 data sharing system operation and maintenance
  - Knowledge of distributed functionality

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DB2 11: system administrator for z/OS (exam 317)

- **Section 4 - Backup and Recovery (17%)**
    - Demonstrate knowledge of advanced backup and recovery (system level, data set level, undo, redo, backup, flash copy, DSS, HSM, DSNJU004, DSN1COPY, DSN1LOGP, DSN1PRNT, Extended RBA, etc.)
    - Given a scenario, describe how to recover from system failures (restart, conditional restart)
    - Describe the process for disaster recovery
    - Describe DB2 data sharing recovery scenarios
    - Knowledge of consideration/impact of extended and non-extended RBA/LRSN tasks

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DB2 11: system administrator for z/OS (exam 317)

- **Section 5 - Performance and Tuning (22%)**
  - Given a scenario, analyse performance
  - Demonstrate knowledge of how buffer pools and system parameters (DSNZPARMs) can affect performance - concurrency
  - Demonstrate knowledge of persistence threads (bind parameters, reallocate, protected threads)
  - Demonstrate knowledge of statistics, tools, and traces used for monitoring (trace definitions)
  - Given a scenario, describe techniques to achieve efficient use of memory (flash memory, large buffer pools) Statement Cache (Dynamic, Static, EDM Pool)
  - Demonstrate knowledge of workload manager (WLM) settings for DB2
  - Knowledge of RUNSTATS (autonomic, manual, RTS, and feedback)
  - Knowledge of Reorg in the context of system tuning and performance (system level settings, subsystem parameters, reduction of indirect references)
  - Knowledge of specialty engines and how they affect performance (ziips)

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DB2 11: system administrator for z/OS (exam 317)

- **Section 6 - Troubleshooting (13%)**
  - Given a scenario, describe which documentation can be used to solve a problem
  - Demonstrate knowledge of DB2 commands and traces for troubleshooting
  - Describe how to identify distributed threads
  - Demonstrate knowledge of diagnostic utilities (REPAIR, DSNJU003, DSN1CHKR)
  - Given a scenario, identify and resolve DB2 data sharing problems

DB2 11: system administrator for z/OS (exam 317)

- Sample questions

> Which statement regarding migration from DB2 10 for z/OS to DB2 11 for z/OS is true?

a. The DB2 catalog and directory must be changed to reside on SMS managed DASD

b. All packages must be rebound with application compatibility set to V10R1

c. All packages last bound in DB2 9 for z/OS or earlier must be rebound in DB2 10 or DB2 11

d. The size of the DB2 bootstrap datasets must be increased to accommodate a larger LRSN and RBA length

DB2 11: system administrator for z/OS (exam 317)

- Sample questions

Which statement is true regarding DB2 definitions for SMF collection ?

a. SMF collection is not required for DB2

b. At the minimum a DB2 statistics class 1 trace is required.

c. By default, DB2 is set to record accounting classes 1,2,3 to SMF

d. The SMF subsystem does not have to be active for DB2 to write SMF trace records.

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DB2 11: system administrator for z/OS (exam 317)

- Sample questions

<div style="background-color:#92d050; border:1px solid #000; padding:4px;">
Which two features are the motivation behind the conversion to be extended RBA/LRSN format? (Choose two)
</div>

a. Greater RECOVER utility concurrency.

b. Reduction of the potential for an RBA rollover.

c. More precise PIT recovery of the DB2 system catalog and directory.

d. Potentially faster UPDATE performance due to greater LRSN granularity

e. Reduced p-lock contention in the coupling facility due to greater LRSN granularity

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Summary

- Certification can be important for you and your organization
- Certification exists both for DB2 on LUW and DB2 for z/OS
- Get training at IDUG, Insight, education centers, specialized certification classes.
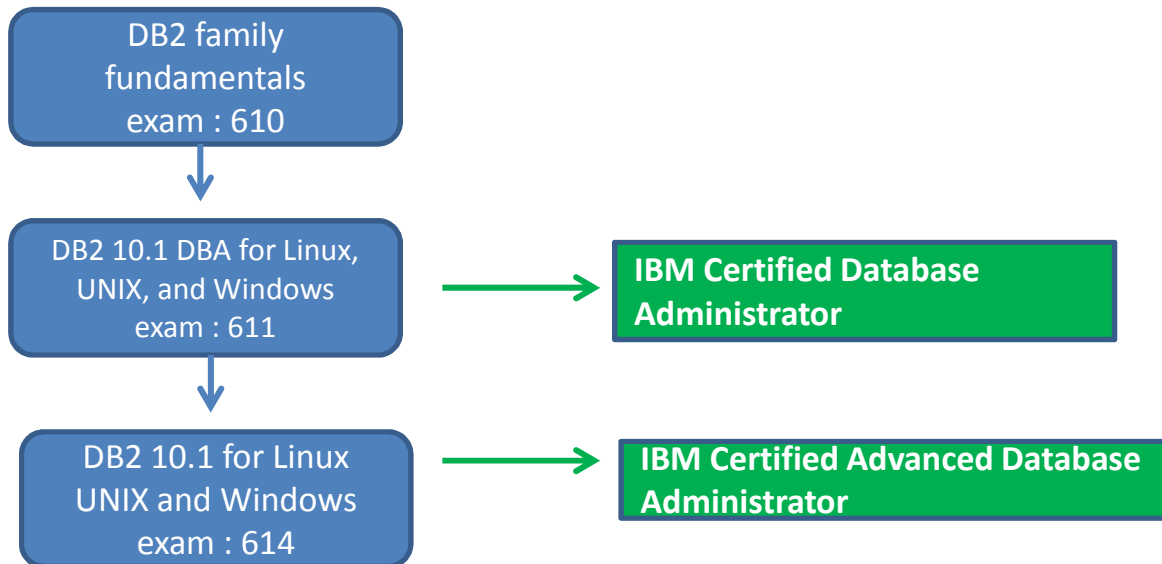
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How to get certified

- DB2 for LUW certificates

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│ UNIX and Windows    │        │ Database Administrator       │
│ exam : 614          │        └──────────────────────────────┘
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Questions ?

- Should you be interested in DB2 education in general or certification training in specific.
  Send a mail to :

  Kurt.Struyf@lone-star.be

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