databricks

Databricks Exam Guide

Databricks Certified Data Engineer Professional

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Purpose of this Exam Guide

The purpose of this exam guide is to give you an overview of the exam and what is covered on the exam to help you determine your exam readiness. This document will get updated anytime there are any changes to an exam (and when those changes will take effect on an exam) so that you can be prepared. **This version covers the currently live version as of December 1, 2023. Please check back two weeks before you take your exam to make sure you have the most current version.**

Audience Description

The Databricks Certified Data Engineer Professional certification exam assesses an individual's ability to use Databricks to perform advanced data engineering tasks. This includes an understanding of the Databricks platform and developer tools like Apache Spark, Delta Lake, MLflow, and the Databricks CLI and REST API. It also assesses the ability to build optimized and cleaned ETL pipelines. Additionally, modeling data into a Lakehouse using knowledge of general data modeling concepts will also be assessed. Finally, ensuring that data pipelines are secure, reliable, monitored, and tested before deployment will also be included in this exam. Individuals who pass this certification exam can be expected to complete advanced data engineering tasks using Databricks and its associated tools.

About the Exam

- Number of items: 60 multiple-choice questions
- Time limit: 120 minutes
- Registration fee: USD 200, plus applicable taxes as required per local law
- Delivery method: Online Proctored
- Test aides: none allowed.
- Prerequisite: None required; course attendance and 1 year of hands-on experience in Databricks is highly recommended
- Validity: 2 years
- Unscored Content: Exams may include unscored items to gather statistical information for future use. These items are not identified on the form and do not impact your score, and additional time is factored into account for this content.

Recommended Training

- Self-paced (available in Databricks Academy): Advanced Data Engineering With Databricks

Exam outline

Section 1: Databricks Tooling

- Explain how Delta Lake uses the transaction log and cloud object storage to guarantee atomicity and durability
- Describe how Delta Lake's Optimistic Concurrency Control provides isolation, and which transactions might conflict
- Describe basic functionality of Delta clone.
- Apply common Delta Lake indexing optimizations including partitioning, zorder, bloom filters, and file sizes
- Implement Delta tables optimized for Databricks SQL service
- Contrast different strategies for partitioning data (e.g. identify proper partitioning columns to use)

Section 2: Data Processing (Batch processing, Incremental processing, and Optimization)

- Describe and distinguish partition hints: coalesce, repartition, repartition by range, and rebalance
- Contrast different strategies for partitioning data (e.g. identify proper partitioning columns to use)
- Articulate how to write Pyspark dataframes to disk while manually controlling the size of individual part-files.
- Articulate multiple strategies for updating 1+ records in a spark table (Type 1)
- Implement common design patterns unlocked by Structured Streaming and Delta Lake.
- Explore and tune state information using stream-static joins and Delta Lake
- Implement stream-static joins
- Implement necessary logic for deduplication using Spark Structured Streaming
- Enable CDF on Delta Lake tables and re-design data processing steps to process CDC output instead of incremental feed from normal Structured Streaming read
- Leverage CDF to easily propagate deletes
- Demonstrate how proper partitioning of data allows for simple archiving or deletion of data
- Articulate, how "smalls" (tiny files, scanning overhead, over partitioning, etc) induce performance problems into Spark queries

Section 3: Data Modeling

- Describe the objective of data transformations during promotion from bronze to silver
- Discuss how Change Data Feed (CDF) addresses past difficulties propagating updates and deletes within Lakehouse architecture

- Apply Delta Lake clone to learn how shallow and deep clone interact with source/target tables.
- Design a multiplex bronze table to avoid common pitfalls when trying to productionalize streaming workloads.
- Implement best practices when streaming data from multiplex bronze tables.
- Apply incremental processing, quality enforcement, and deduplication to process data from bronze to silver
- Make informed decisions about how to enforce data quality based on strengths and limitations of various approaches in Delta Lake
- Implement tables avoiding issues caused by lack of foreign key constraints
- Add constraints to Delta Lake tables to prevent bad data from being written
- Implement lookup tables and describe the trade-offs for normalized data models
- Diagram architectures and operations necessary to implement various Slowly Changing Dimension tables using Delta Lake with streaming and batch workloads.
- Implement SCD Type 0, 1, and 2 tables

Section 4: Security & Governance

- Create Dynamic views to perform data masking
- Use dynamic views to control access to rows and columns

Section 5: Monitoring & Logging

- Describe the elements in the Spark UI to aid in performance analysis, application debugging, and tuning of Spark applications.
- Inspect event timelines and metrics for stages and jobs performed on a cluster
- Draw conclusions from information presented in the Spark UI, Ganglia UI, and the Cluster UI to assess performance problems and debug failing applications.
- Design systems that control for cost and latency SLAs for production streaming jobs.
- Deploy and monitor streaming and batch jobs

Section 6: Testing & Deployment

- Adapt a notebook dependency pattern to use Python file dependencies
- Adapt Python code maintained as Wheels to direct imports using relative paths
- Repair and rerun failed jobs
- Create Jobs based on common use cases and patterns
- Create a multi-task job with multiple dependencies
- Design systems that control for cost and latency SLAs for production streaming jobs.
- Configure the Databricks CLI and execute basic commands to interact with the workspace and clusters.
- Execute commands from the CLI to deploy and monitor Databricks jobs.
- Use REST API to clone a job, trigger a run, and export the run output

Sample Questions

These questions are retired from a previous version of the exam. The purpose is to show you objectives as they are stated on the exam guide, and give you a sample question that aligns to the objective. The exam guide lists the objectives that could be covered on an exam. The best way to prepare for a certification exam is to review the exam outline in the exam guide.

Question 1

Objective: Identify the results of running a command on a Delta Lake table created with a query

A Delta Lake table was created with the query:

```
CREATE TABLE dev.my_table
USING DELTA
LOCATION "/mnt/dev/my_table"
```

Realizing that the table needs to be used by other and its name is misleading, the below code was executed:

```
ALTER TABLE dev.my_table RENAME TO dev.our_table
```

Which result will occur after running the second command?

A. The table name change is recorded in the Delta transaction log.
B. The table reference in the metastore is updated and all data files are moved.
C. The table reference in the metastore is updated and no data is changed.
D. A new Delta transaction log is created for the renamed table.
E. All related files and metadata are dropped and recreated in a single ACID transaction.

Question 2

Objective: Deduplicate data against previously processed records as it is inserted into Delta table.

A data engineer is developing an ETL workflow that could see late-arriving, duplicate records from its single source. The data engineer knows that they can deduplicate the records within the batch, but they are looking for another solution.

Which approach allows the data engineer to deduplicate data against previously processed records as it is inserted into a Delta table?

A. **`VACUUM`** the Delta table after each batch completes.
B. Rely on Delta Lake schema enforcement to prevent duplicate records.
C. Set the configuration **`delta.deduplicate = true`**.

D. Perform a full outer join on a unique key and overwrite existing data.
E. Perform an insert-only merge with a matching condition on a unique key.

Question 3

Objective: Identify how to configure all tables in the Lakehouse as external, unmanaged Delta Lake tables

The data architect has mandated that all tables in the Lakehouse should be configured as external, unmanaged Delta Lake tables.

Which approach will ensure that this requirement is met?

A. Whenever a table is being created, make sure that the **`LOCATION`** keyword is used.
B. When tables are created, make sure that the **`EXTERNAL`** keyword is used in the **`CREATE TABLE`** statement.
C. When the workspace is being configured, make sure that external cloud object storage has been mounted.
D. Whenever a database is being created, make sure that the **`LOCATION`** keyword is used.
E. Whenever a table is being created, make sure that the **`LOCATION`** and **`UNMANAGED`** keywords are used.

Question 4

Objective: Describe permission controls for Databricks jobs

A data engineering team is trying to transfer ownership from its Databricks Workflows away from an individual that has switched teams. However, they are unsure how permission controls specifically for Databricks Jobs work.

Which statement correctly describes permission controls for Databricks Jobs?

A. The creator of a Databricks Job will always have "Owner" privileges; this configuration cannot be changed.
B. Databricks Jobs must have exactly one owner; "Owner" privileges cannot be assigned to a group.
C. Other than the default "admins" group, only individual users can be granted privileges on Jobs.
D. Only workspace administrators can grant "Owner" privileges to a group.
E. A user can only transfer Job ownership to a group if they are also a member of that group.

Question 5

Objective: Identify methods for installing python packages...

A data engineer needs to use a Python package to process data. As a result, they need to install the Python package on all of the nodes in the currently active cluster.

What describes a method of installing a Python package scoped at the notebook level to all nodes in the currently active cluster?

A. Use **`%pip install`** in a notebook cell
B. Use **`%sh pip install`** in a notebook cell
C. Run **`source env/bin/activate`** in a notebook setup script
D. Install libraries from PyPI using the cluster UI
E. Use **`b`** in a notebook cell

Answers
Question 1: C
Question 2: E
Question 3: A
Question 4: B
Question 5: A