daml

Daml Certification Syllabus

Daml Applications Engineer

April 2023

Digital Asset

Introduction

Daml Applications Engineer Exam

The Daml Applications Engineer exam covers all that a developer needs to know to produce an application that depends on a Daml back-end for business logic and data persistence.

In the certification exam, you will be tested on understanding API queries, general understanding of the operations of a Daml application (e.g., creating and consuming contracts and choices), managing data types, and handling error messages.

This certification exam does not cover how to create Daml contracts (i.e., business logic; covered in “Daml Contracts”) or operate a Daml back-end (i.e., Daml Runtime + ledger; not yet covered in a certification exam).

The Daml Applications Engineer exam tests you on the technical knowhow to develop applications that depend on a Daml back-end for business logic and data persistence. APIs, general Daml contract operation, data types, development stack, and error handling are covered in this track.

Prerequisites

Minimum

- Working knowledge of the Daml JSON API, Ledger API, data types, and common tool chains
- Experience using at least one of these: JSON API, gRPC, Websocket, or related technologies
- Familiarity with asynchronous workflows

Helpful but Not Necessary

- Working knowledge of at least one of the following languages: Java, Scala, Javascript, or Typescript
- Some knowledge of how distributed ledgers operate
- Some knowledge of functional programming languages

Exam Outline

The exam takes approximately 90 minutes to complete and will be conducted online at the time of your choosing. Questions will be a combination of multiple choice and matching exercises.

The 34 exam questions will be separated into 4 main topics. The total score on each topic counts as a percentage of your final score as shown below. Each topic will be scored separately, with all questions for a topic having the same weight.

The exam score will be the total of the topic scores. To be Daml-certified, you must have a total exam score of 70%.

Exam Topics

You will be tested on your knowledge and proficiency in the following:

JSON API [1] (45%)

- Creating contracts
    - How to pass a JSON-encoded request to the JSON API
    - Uniquely identifying commands for later use

- Exercising choices on contracts
- Performing a Create and Exercise command in the same transaction
- Retrieving contracts
    - How to construct queries to retrieve the currently active set (or a subset) of contracts visible or usable by a specific party
    - Fetching a contract by its Contract ID or Contract Key
- Handling parties
    - How to construct queries to retrieve all known parties visible on ledger
    - Fetching parties by Identifiers
- Handling responses and error codes from JSON API queries
- Creating and using JWT authentication token to authenticate with the JSON API
    - Pass the authentication token over HTTP and Websockets

Ledger API [1] [2] (45%)

- Sending commands to the ledger
    - How to send commands to the ledger that may change its state
    - How to get the status of commands submitted to the ledger
    - When and how to choose between services
    - Understanding the command deduplication functionality of Daml ledgers
- Receiving streams of data (transactions and events) from the ledger
    - Listening to changes in the ledger state
    - Resuming a connection from an arbitrary starting point to ensure your application can resume from any interruption
    - Understanding the types of subscriptions for transactions
    - What data is included in responses and how to get more data (Record IDs, Field Labels, Variant IDs) when you need it
    - Getting a view of all contracts currently visible to your party
- Daml type translation to Protobuf and Daml LF

Data Types [1] [2] (5%)

- General Daml and Daml-LF data types and how Daml datatypes translate to Daml LF
- Passing data to and from Daml applications via the JSON API (via JSON formatted messages)

Common Toolchains [1] (5%)

- Toolchains that have Ledger API bindings
- Generating classes from Daml templates
- Daml's codegen tool

Example Questions

Correct answers are marked in **bold**

Tracking Contracts

What are the TWO unique ids you can use to exercise a choice on a contract using the JSON API?

- Command ID
- Record Key
- **Contract ID**
- **Contract Key**

Auth

What is the JWT used for with the JSON API?

- The JSON API uses it to authenticate with the Daml Ledger
- **It authorizes actions on behalf of a party**
- It's not used with the JSON API

Tracking Submissions

Which TWO services can you use to get the status of commands via the Ledger API?

- **Command Submission Service**
- Command Orchestration Service
- Status Service
- **Command Service**

Tracking Contracts

When would you use the Command Completion Service instead of the Transaction Service?

- When you want to know the completion status of all commands
- **When you want to know the status of specific commands you have submitted**
- When you need to know if another party's command was complete

Data Types

Do you need to include the UTC time zone designator in a Timestamp sent to the JSON API?

- No, the JSON API will assume all times are UTC
- **Yes, you must include the UTC ("Z") designation**