

# MuleSoft Certified Developer – Level 1 (Mule 4) Certification Exam

## Summary

A *MuleSoft Certified Developer – Level 1* should be able to successfully work on basic Mule 4 projects with guidance and supervision. The *MCD – Level 1 (Mule 4)* exam validates that a developer has the required knowledge and skills to design, build, test and debug, deploy, and manage basic APIs and integrations: moving from Anypoint Platform to Anypoint Studio and back. S/he should be able to:

- Use MuleSoft-hosted Anypoint Platform to take a basic API through all the steps of its lifecycle: design, build, deploy, manage, and govern.
- Use Anypoint Studio to build, test, and debug basic integrations and API implementations.
- Connect to a range of resources including databases, files, web services, SaaS applications, and JMS queues.
- Perform basic data transformations using DataWeave 2.
- Control event flow and handle errors.
- Process batch records.

## Format

- Format: Multiple-choice, closed book, proctored online or in a testing center
- Length: 60 questions
- Duration: 120 minutes (2 hours)
- Pass score: 70%
- Language: English

The exam can be taken a maximum of 5 times, with a 24 hour wait between each attempt.

## Cost

The exam can be purchased with one of the following. Each includes a coupon for one free retake.

- \$250
- 1 Flexible Training Credit
- A voucher obtained by attending the instructor-led *Anypoint Platform Development: Fundamentals (Mule 4)* or *Anypoint Platform Development: Mule 4 for Mule 3 Users* course

Additional retakes (attempts 3 to 5) are 50% off and do not come with a free retake.

## Validity

The certification expires two years from the date of passing.

## Preparation

The best preparation for the exam is to take the instructor-led *Anypoint Platform Development: Fundamentals (Mule 4)* course and to complete the accompanying Do-It-Yourself (DIY) exercises. **Candidates should be familiar with all of the content in the course and be able to apply the concepts in actual projects.**

The following resources are available to assist in a candidate's preparation:

- **Instructor-led training: *Anypoint Platform Development: Fundamentals (Mule 4)***
  - Recommended as the most effective and efficient method of preparation
  - 5-day class
  - Private and public classes available
  - Onsite and online classes available
  - Includes a certification voucher for this exam
- **Self-study training: *MuleSoft.U Development Fundamentals (Mule 4)***
  - 60+ step-by-step exercises to teach you the basics
  - All content available instantly to be completed at any time and pace
  - Supported by the peer-to-peer MuleSoft training forum
  - Does NOT include a voucher for this exam
- **Self-assessment quiz**
  - 5+ multiple-choice questions for each course module
  - Identifies strengths and weaknesses
  - Comparable difficulty to the proctored exam
- **Do-it-yourself exercises**
  - 10+ DIY exercises to get experience with and apply the knowledge gained in class
  - Starting code and solutions provided
  - Can be completed in any order

## Topics

The exam validates that the candidate can perform the following tasks.

*Note: DEV:FUN4 is the acronym for the instructor-led or self-study version of the Anypoint Platform Development: Fundamentals (Mule 4) course. DEV:DIY4 is the acronym for the MCD - Level 1 / Development Fundamentals (Mule 4) Self-Assessment Quiz & DIY Exercises materials.*

Explaining Application Network Basics	Resources
<ul style="list-style-type: none"> <li>• Explain MuleSoft’s proposal for closing the IT delivery gap</li> <li>• Describe the role and characteristics of the “modern API”</li> <li>• Describe the purpose and roles of a C4E</li> <li>• Define and describe the benefits of API-led connectivity and application networks</li> <li>• Define and correctly use the terms API, API implementation, API interface, API consumer, and API invocation</li> <li>• Describe the basics of the HTTP protocol and characteristics of requests and responses</li> <li>• Describe the capabilities and high-level components of Anypoint Platform for the API lifecycle</li> </ul>	<ul style="list-style-type: none"> <li>• DEV:FUN4 Module 1</li> <li>• DEV:FUN4 Module 2</li> </ul>
Designing and Consuming APIs	
<ul style="list-style-type: none"> <li>• Describe the lifecycle of the “modern API”</li> <li>• Use RAML to define API resources, nested resources, and methods</li> <li>• Identify when and how to define query parameters vs URI parameters</li> <li>• Use RAML to define API parameters, requests, and responses</li> <li>• Use RAML to define reusable data types and format independent examples</li> <li>• Read a RAML spec and formulate RESTful requests with query parameters and/or headers as appropriate</li> </ul>	<ul style="list-style-type: none"> <li>• DEV:FUN4 Module 3</li> <li>• DEV:DIY4 Exercise 3-1 and 4-1</li> </ul>
Accessing and Modifying Mule Events	
<ul style="list-style-type: none"> <li>• Describe the Mule event data structure</li> <li>• Use transformers to set event payloads, attributes, and variables</li> <li>• Write DataWeave expressions to access and modify event payloads, attributes, and variables</li> <li>• Enrich Mule events using target parameters</li> </ul>	<ul style="list-style-type: none"> <li>• DEV:FUN4 Module 6</li> <li>• DEV:DIY4 Exercise 6-1, 7-1, and 7-2</li> <li>• <a href="#">Enriching Data with Target Parameters</a></li> </ul>

Structuring Mule Applications	
<ul style="list-style-type: none"> <li>Parameterize an application using property placeholders</li> <li>Define and reuse global configurations in an application</li> <li>Break an application into multiple flows using private flows, subflows, and the Flow Reference component</li> <li>Specify what data (payload, attributes, variables) is persisted between flows when a Flow Reference is used</li> <li>Specify what data (payload, attributes, variables) is persisted between flows when a Mule event crosses a connection boundary</li> <li>Specify what data (payload, attributes, variables) exists in a flow before and after a call in the middle of a flow to an external resource</li> </ul>	<ul style="list-style-type: none"> <li>DEV:FUN4 Module 7</li> <li>DEV:DIY4 Exercise 7-1 and 7-2</li> </ul>
Building API Implementation Interfaces	
<ul style="list-style-type: none"> <li>Manually create a RESTful interface for a Mule application</li> <li>Generate a REST Connector from a RAML specification</li> <li>Describe the features and benefits of APIkit</li> <li>Use APIkit to create implementation flows from a RAML file</li> <li>Describe how requests are routed through flows generated by APIkit</li> </ul>	<ul style="list-style-type: none"> <li>DEV:FUN4 Module 4</li> <li>DEV:FUN4 Module 8</li> <li>DEV:DIY4 Exercise 4-1</li> </ul>
Routing Events	
<ul style="list-style-type: none"> <li>Use the Choice router to route events based on conditional logic</li> <li>Use the Scatter-Gather router to multicast events</li> <li>Validate data using the Validation module</li> </ul>	<ul style="list-style-type: none"> <li>DEV:FUN4 Module 9</li> <li>DEV:DIY4 Exercise 9-1</li> </ul>
Handling Errors	
<ul style="list-style-type: none"> <li>Describe the default error handling in a Mule application</li> <li>Define a custom global default error handler for an application and identify in what situations it will be used</li> <li>Compare and contrast how the On Error Continue and On Error Propagate scopes work</li> <li>Create one or more error handlers for a flow</li> <li>Use the Try scope to specify error handlers for one or more event processors</li> <li>Describe the data structure of the Mule Error object</li> <li>Map errors to custom application errors</li> </ul>	<ul style="list-style-type: none"> <li>DEV:FUN4 Module 10</li> <li>DEV:DIY4 Exercise 10-1</li> </ul>

Transforming Data with DataWeave	
<ul style="list-style-type: none"> <li>• Write DataWeave scripts to convert JSON, XML, and Java data structures to different data structures and data types</li> <li>• Use DataWeave functions</li> <li>• Define and use DataWeave variables, functions, and modules</li> <li>• Define and use custom data types</li> <li>• Apply correct DataWeave syntax to coerce data types</li> <li>• Apply correct DataWeave syntax to format strings, numbers, and dates</li> <li>• Call Mule flows from a DataWeave script</li> </ul>	<ul style="list-style-type: none"> <li>• DEV:FUN4 Module 11</li> <li>• DEV:DIY4 Exercise 11-1</li> </ul>
Using Connectors	
<ul style="list-style-type: none"> <li>• Retrieve data from a Database using the Database connector</li> <li>• Create parameterized SQL queries for the Database connector</li> <li>• Retrieve data from a REST service using the HTTP Request operation or a REST Connector</li> <li>• Use a Web Service Consumer connector to consume a SOAP web service</li> <li>• Use the Transform Message component to pass arguments to a SOAP web service</li> <li>• List, read, and write local files using the File connector</li> <li>• List, read, and write remote files using the FTP connector</li> <li>• Use the JMS connector to publish and listen for JMS messages</li> </ul>	<ul style="list-style-type: none"> <li>• DEV:FUN4 Module 4</li> <li>• DEV:FUN4 Module 8</li> <li>• DEV:FUN4 Module 12</li> <li>• DEV:DIY4 Exercise 4-1, 8-1, 12-1, and 12-2</li> </ul>
Processing Records	
<ul style="list-style-type: none"> <li>• List and compare and contrast the methods for processing individual records in a collection</li> <li>• Explain how Mule events are processed by the For Each scope</li> <li>• Use the For Each scope to process records</li> <li>• Explain how Mule events are processed by the Batch Job scope</li> <li>• Use a Batch Job with Batch Steps and a Batch Aggregator to process records</li> <li>• Use the Scheduler component to trigger a flow</li> <li>• Use connector listeners to trigger flows</li> <li>• Describe the features, benefits, and process to use automatic watermarking vs. manual watermarking</li> <li>• Use connectors with automatic watermarking capabilities</li> <li>• Persist data between flow executions using the Object Store</li> </ul>	<ul style="list-style-type: none"> <li>• DEV:FUN4 Module 12</li> <li>• DEV:FUN4 Module 13</li> <li>• DEV:DIY4 Exercise 13-1</li> </ul>

Debugging and Troubleshooting Mule Applications	
<ul style="list-style-type: none"> <li>• Use breakpoints to inspect a Mule event during runtime</li> <li>• Install missing Maven dependencies</li> <li>• Read and decipher Mule log error messages</li> </ul>	<ul style="list-style-type: none"> <li>• DEV:FUN4 Module 6</li> <li>• DEV:FUN4 all WTs</li> <li>• DEV:DIY4 Exercise 6-1 and Walkthrough</li> <li>• DEV:DIY4 all exercises</li> </ul>
Deploying and Managing APIs and Integrations	
<ul style="list-style-type: none"> <li>• Package Mule applications for deployment</li> <li>• Deploy applications to CloudHub</li> <li>• Use CloudHub properties to ensure deployment success</li> <li>• Create and deploy API proxies</li> <li>• Connect an API implementation to API Manager using autodiscovery</li> <li>• Use policies, including client ID enforcement, to secure an API</li> <li>• Create SLA tiers and apply SLA based policies</li> </ul>	<ul style="list-style-type: none"> <li>• DEV:FUN4 Module 5</li> <li>• DEV:DIY4 Exercise 5-1 and 5-2</li> <li>• <a href="#">Configuring API Autodiscovery in a Mule 4 Application</a></li> </ul>

## Delivery methods

The exam is administered via the Kryterion Webassessor testing platform. The exam can be taken in-person at a testing center or online using a web camera.

In-person at a Kryterion Testing Center:

- [Over 1000 locations worldwide](#)
- [Onsite instructions](#)
- [Test-taker guide](#)

Online using the Kryterion Webassessor testing platform:

- Requires a webcam - a laptop webcam can be used, an external camera is not required
- Requires internet connectivity with 1 Mbps upload, 1 Mbps download, jitter <50ms, ping <200ms
- [Check internet speed and reliability](#)
  - Note: Some candidates are expelled from the exam for an unstable connection even after checking reliability with the tool. If you think your connection could potentially be unreliable, we **strongly** recommend scheduling your exam at a test center.
- [Online instructions](#)
- [Test-taker guide](#)

## Registration

To register for the exam:

- Go to <https://training.mulesoft.com/webassessor>.
- Create a user profile.
- Log in.
- Select Register for an Exam.
- Select the **MuleSoft Certified Developer – Level 1 (Mule 4)** exam.
- Select either the Online Proctoring Option or the Kryterion Test Center option.
- On the payment screen, select to pay by credit card or enter a voucher/coupon code.

*Note: A fee applies if an exam is cancelled or rescheduled within 72 hours of its scheduled time, even if the exam was purchased with a voucher.*

## More information

For more information, visit <http://help.learn.mulesoft.com>.