

MCD1 Exam Objectives Prep - Summary - (Session Two)

Instructor: Diane Kesler (“DigitalDee”)

What You’ll Learn in Session Two

- **Understand the API lifecycle stages** – from initial spec design to deployment and monitoring
- **Design-first approach using RAML** – build specs before coding
- **Mock and test APIs early** using example data and the API Console
- **Publish APIs to Exchange** and gather feedback for iteration
- **Generate Mule flows from specs** in Anypoint Studio using APIkit
- **Recognize how APIkit Router automates routing and flow creation**
- **Connect flows to live data** using Flow References and Global Configs
- **Test APIs locally** with tools like Postman and Advanced REST Client
- **Export deployable JAR archives** and understand full vs. LITE versions
- **Know the difference between Runtime Manager vs. API Manager**
- **Use Monitoring, Analytics & Visualizer** to support post-deployment lifecycle
- **Grasp RESTful API principles and HTTP methods** (GET, POST, PUT, PATCH, DELETE)
- **Define and use URI vs. query parameters** in RAML and Studio flows
- **Work with RAML fragments and reusable examples**

- **Capture and preserve URI/query parameters** to avoid losing them
- **Handle POST request bodies and map payloads in flows**
- **Structure Mule apps by separating interface and implementation XMLs**
- **Use environment config files (dev/test/prod)** with `${env}` variable for dynamic deployment
- **Organize project files cleanly** for maintainability and exam readiness

✓ **Section: API Lifecycle & Design Fundamentals** **(00:00–07:32)**

📌 **Exam Objective Focus**

Covers the early stage of the API lifecycle, including specification design, mocking, feedback, and exchange publishing.

🔧 **API Lifecycle – Key Steps & Tools**

- **Search First:** Try to find reusable APIs on **Exchange** or internal repositories.
 - **If Not Found:** Start a **new API specification** using RAML (preferred for this course/exam) or OAS (OpenAPI Spec, formerly Swagger).
 - **Design Tools:**
 - Use **API Designer** in Design Center
 - Or use **Anypoint Code Builder** (*not on the exam yet*)
 - **MuleSoft Studio** is still the primary tool expected on the exam.
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Mocking Service & Example Data

- When designing your API, **example data** is key.
 - This data powers the **mocking service** seen in the **API Console** (on the right-hand side of Design Center).
 - API Console = where you test methods/resources with mocked responses.
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Terminology Watch

- **API Console:** Where methods and responses are tested using example data.
 - **API Portal:** The full documentation site in Exchange, where others can read about your API.
 - **Mocking Service:** Simulates live responses using your example data.
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Publishing & Sharing

- Once the design is approved:
 - **Publish to Exchange** for feedback or internal sharing.
 - The initial share is to **Private Exchange** (within your team).
 - To share beyond that, use the **Public Portal** (you control what's visible).
 - Stakeholders not on Anypoint Platform? You can still **share the design endpoint** from Design Center for external feedback.
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Feedback & Iteration

- Share your design early to **get stakeholder feedback** on data types, formats, etc.
- Avoid wasting effort by validating the structure **before** building the full app.

- Key Motto: “**Design First**”
 - Design before you code.
 - Gather requirements → Create design → Share → Adjust.
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Side Note: API Notebook

- Tool for testing code snippets directly within the API portal.
- Still present, but may be deprecated soon.
- **Unlikely to be on the exam**, but worth being aware of just in case.

Section: API Implementation & Studio Flows (07:32–12:55)

Exam Objective Focus

Covers how specifications are used in Studio to generate Mule application flows, including APIkit Router behavior and terminology review.

API Lifecycle – Iteration Two

- After designing and publishing your spec to **Exchange**, the next step is building the actual **Mule application** (web service).
 - This is done in **Anypoint Studio** using the previously created API spec.
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Import Spec → Generate Flows

- The **RAML or OAS specification** is imported into Studio.
- This action auto-generates:
 - A **main flow** that handles all incoming requests.

- **Private flows** for each **method/resource pair**.
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Method/Resource Pair → Flow Mapping

- Each endpoint like:
 - GET /patients
 - POST /patients
 - GET /patients/{id}
 - PATCH /patients/{id}
 - DELETE /patients/{id}
- Will produce its own **private flow** in Studio.

Critical Exam Point

 **For every method-resource pair, APIkit Router auto-generates a private flow.**

These flows **do not contain a source component** (e.g., no HTTP Listener), because the **APIkit Router handles the routing** behind the scenes.

 That's the beauty of APIkit—it organizes your flows automatically and cleanly.

APIkit Router Role

- Sits in the main flow.
 - Routes requests to the correct **private flow** based on HTTP method and resource path.
 - Great for keeping logic modular and scalable.
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Terminology Recap

- **API Console:**
 - Seen in both Design Center and Exchange.
 - Where requests are tested and mocked.
 - **API Portal:**
 - Found in Exchange.
 - Includes documentation, console, and extras like **API Notebook**.
 - **API Notebook:** Optional code testing tool (not likely on the exam, but still exists).
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Exam Tip

- ✓ Expect questions about how many flows are generated from an imported spec.
- ✓ Know the difference between the **main flow (with source)** and the **private flows (no source)**.
- ✓ Recognize that this automation is powered by **APIkit Router**.

✓ Section: Building Functional Mule Applications (12:56–16:08)

Exam Objective Focus

Highlights how the API spec and APIkit Router are used in Studio to create a fully functional Mule application, including flow routing, error handling, and connecting to live data.

From Design to Function

- Once the spec is published and imported into Studio, you begin building the actual **functionality** of the application.
- The design defines *how* the API should behave. Now you implement *what* it should **do**.

APIkit Router – Built-in Benefits

-  **Big Advantage:** The APIkit Router **automatically generates built-in error handling** for you.
- You also get flows that **auto-handle routing**, keeping your application clean and modular.
- Incoming requests hit a **Listener** with a **wildcard prefix**, like `/api/*`, and route based on method + path.

Routing Example

- A request to `GET /api/patients`:
 - Hits the Listener.
 - Routes through the **APIkit Router**.
 - Lands in the correct private flow: `GET /patients`.

Next Step – Connecting to Live Data

- By default, if nothing is implemented, the flow will return **mock/example data**.
- You must implement logic to **fetch real data** from your **database or system of record**.
- Done by using a **Flow Reference** inside the private flow to point to a component (like a Database connector).

 This is configured using:

- A **Global Element** (e.g., Database config)
- Proper credentials and connection setup in your **configuration files**

Core Concept

- Your **specification defines the contract**.
- Your **Studio flows implement the behavior**.

Clients must follow your spec (method + path + expected data), and your Mule app must fulfill it.

Terminology Reminder

- **Interface = API Specification**
 - This is how your application "talks" with clients.
 - It defines the contract: allowed **operations, paths, methods, and formats**.
 - Created in **Design Center** using **RAML** or **OAS**.
 - **Implementation = Mule Application Logic**
 - This is the part where you **build the actual behavior** your API promises.
 - It includes flow logic, system connectors, transformations, and error handling.
 - Built in **Anypoint Studio** using the **imported spec**.
 - **Mule Application = Web Service**
 - It's the **combination of interface + implementation**.
 - The full solution that listens for API requests, follows the defined spec, and fulfills them using real systems (like databases, CRMs, etc.).
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Exam Tip

- Understand that **APIkit Router provides error handling out of the box**.
- Be familiar with how **flow references** are used to keep logic modular and readable.
- Know the importance of **prefix paths** (e.g., `/api`) for routing via the Listener.

✓ Section: Local Testing & Endpoint Validation (16:08–18:00)

📌 Exam Objective Focus

Demonstrates how to test Mule applications locally using tools like Advanced REST Client or Postman, and emphasizes the APIkit Router's role in endpoint structure and behavior.

🔧 Testing the Mule Application Locally

- Use **Advanced REST Client (ARC)** or **Postman** to test your API endpoints.
 - While developing, the Mule application runs **locally** on your system inside a **Mule Runtime** launched via **Anypoint Studio**.
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⚙️ What Happens During Deployment in Studio?

- Step 1: Application is **built**.
 - Step 2: A **JVM is launched**, and Mule Runtime is initialized.
 - Step 3: Your app is **deployed** into that runtime.
 - You can now test locally with real or mocked behavior.
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🌐 Localhost URL Structure

- Base URL: `http://localhost:8081`
(8081 is the default port in Studio)
- Since you're using **APIkit Router**, you must include the **prefix** (e.g., `/api`).

Example Endpoints to Test:

- `GET /api/patients` – Returns full patient list
 - `GET /api/patients/{id}` – Returns one patient by ID
 - `DELETE /api/patients/{id}` – Deletes a record
 - `PATCH /api/patients/{id}` – Updates partial fields (requires a request body)
 - `POST /api/patients` – Adds a new record (also requires a body)
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Testing Tips

- For `POST`, `PATCH`, and `DELETE`, be sure to **include appropriate headers** (like `Content-Type: application/json`) and **request bodies**.
 - Use **example data** for testing if live data isn't fully wired yet.
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Core Concept Recap

- All endpoints you're testing locally were **auto-generated** based on the **specification's method-resource pairs**.
- APIkit Router gave you:
 - The **flows**
 - The **routing**
 - The **prefix path requirements**
- You provided the **backend logic** (e.g., connecting to a database).

Section: Deployment & Exporting Deployable Archives (18:44–26:00)

Exam Objective Focus

Explains how to deploy Mule applications to different runtimes, how to export deployable archives, and the difference between full vs. lightweight (LITE) versions—**very exam relevant**.

Deployment Targets Overview

- After local testing, the next step is to **deploy the Mule application** to a production-ready runtime.
 - Runtimes used for deployment:
 - **CloudHub (CloudHub 1 & CloudHub 2)**
 - **Customer-hosted servers**
 - **Runtime Fabric** (Kubernetes-based)
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CloudHub Environments

- **CloudHub 1:**
 - Runs inside an **EC2 instance on AWS**
 - Application and runtime are packaged in a **container**
 - **CloudHub 2:**
 - Built on **Kubernetes**
 - Deploys to a **pod** that contains both the Mule Runtime and the application
 - More scalable and isolated
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Exam Tip

You may be asked what deployment target uses EC2 vs. Kubernetes—**know the difference between CloudHub 1 and CloudHub 2**.

Deployment Methods

- **Deploy from Studio directly**
 - Quick and easy during development
- **CI/CD pipeline deployments**
 - Uses **Maven** to build a **deployable archive (JAR)**
 - Deployed via **Runtime Manager** or automation tools

Exporting a Deployable Archive

To deploy via Runtime Manager or CI/CD pipeline:

- Go to **Studio** → **Export**
- Choose: **Anypoint Studio Project to Mule Deployable Archive (.jar)**

 **Be sure to select:**

- “Include project modules and dependencies”**

Light Version vs. Full Archive

Type	Use Case	Size	Can Deploy?
Full Archive	For deployment to CloudHub / pipelines	~69 MB	<input checked="" type="checkbox"/> Yes
LITE Version	For sharing or importing into Studio	~43 KB	<input checked="" type="checkbox"/> No

- The **LITE version**:
 - Excludes modules/dependencies
 - Cannot be deployed to Anypoint Platform
 - Can be **shared/imported into Studio**, which will re-fetch dependencies

Exam Tip

“If a JAR doesn’t include modules and dependencies, can it be deployed to CloudHub?”

 **No. It must be a full deployable archive.**

Deployment Key Reminder

- Runtime Manager **requires a full archive**.
- LITE version =  Deployment will **fail**.

Section: Runtime Manager vs API Manager (26:00–31:13)

Exam Objective Focus

Clarifies the roles of **Runtime Manager** and **API Manager**, their distinct purposes, and how they work together to deploy and secure APIs.

Runtime Manager = Deployment Tool

- Used to **deploy and manage your Mule applications**.
- Supports deployment to:

- CloudHub 1 (EC2-based container)
 - CloudHub 2 (Kubernetes pod)
 - Runtime Fabric
 - Customer-hosted servers
- Once deployed, the app is **publicly accessible by default** via a generated **application URL** (e.g., <https://your-app.cloudhub.io>).
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API Manager = Governance & Security Layer

- Used to **secure and manage the behavior** of your API.
 - It wraps around your already deployed API to **enforce policies**, such as:
 - Client ID enforcement
 - Rate limiting
 - SLA tiers
 - OAuth 2.0
 - Without API Manager, your deployed app is **wide open—anyone** can hit it.
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Key Differences

Feature	Runtime Manager	API Manager
Main Role	Deploy & manage Mule apps	Secure & govern published APIs

Scope	Infrastructure-level	Contract & policy-level
Used For	Running your app	Enforcing rules on how clients can access your API
When It's Used	After development is complete	After deployment, before production exposure

Management Options in API Manager

When adding a new API to be managed:

- Focus for MCD-Level 1 = **Mule Gateway**
- You'll be asked to choose:
 - **Basic Endpoint** – simpler, used often
 - **Proxy Application** – wraps traffic and forwards to backend

 *You don't need to know how to configure both—just understand they exist and when you might choose one.*

Exam Tip: When is the API secured?

 Not when it's deployed in Runtime Manager.

 Only **after it's registered and policies are applied in API Manager.**

Policies: Know the Categories

- You'll be expected to know the **categories of policies**, not deep configuration.
- Example policy categories:
 - **Security Policies**

-  Rate Limiting Policies
 -  SLA Tier Policies
 - Depth is required in the **Architect Exam**, but for **MCD-Level 1**, a high-level understanding is enough.
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Quick Summary

- **Runtime Manager = Gets your app running**
- **API Manager = Keeps it protected and controlled**
- Policies in API Manager define **who can access, how often, and under what rules**

Section: Full API Lifecycle Support – Monitoring, Analytics & Visualizer (32:39–34:09)

Exam Objective Focus

Introduces the full API lifecycle picture by highlighting post-deployment tools: **Monitoring**, **Analytics**, and **Visualizer** in Anypoint Platform.

Supporting Tools for API Lifecycle Management

After an API is deployed and secured, MuleSoft offers **visibility and observability** tools to support its ongoing performance and health.

Anypoint Monitoring

- Tracks system metrics like:
 - CPU usage

- Memory consumption
 - Throughput and latency
 - Lets you set **threshold-based alerts**
 - E.g., Get notified when CPU spikes or memory usage exceeds safe limits
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Anypoint Analytics

- Gathers detailed insights on:
 - API usage patterns
 - Consumer behavior
 - Policy violations (e.g., rate limits exceeded)
 - Useful for reviewing performance trends and identifying bottlenecks
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Anypoint Visualizer

- Visual tool for mapping:
 - App-to-app communication
 - Dependencies between APIs and systems
 - Real-time topology of flows
 - Helps **understand and optimize architecture**
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Lifecycle Recap

These tools support the **post-deployment** phase of the API lifecycle:

1. **Deploy** – Runtime Manager

2. **Secure & Manage** – API Manager
 3. **Monitor & Improve** – Monitoring, Analytics, Visualizer
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Exam Tip

You don't need to know deep configuration for these tools—just know:

- What each one is used for
 - That they are part of the full API lifecycle
 - You can set **alerts** based on **policy violations** or **resource thresholds**
-

Summary

- Monitoring = Watch performance
- Analytics = Understand usage
- Visualizer = Map and optimize architecture

Section: RAML, RESTful APIs & HTTP Methods **(34:10–36:48)**

Exam Objective Focus

Introduces RAML and RESTful API standards, and emphasizes the importance of understanding HTTP methods and how they relate to API operations in MuleSoft.

What is RAML?

- **RAML = RESTful API Modeling Language**

- It's the **specification format** used to define how a RESTful API behaves.
 - RAML is used in **Design Center** to describe:
 - Resources and paths (e.g., `/patients`)
 - HTTP methods (GET, POST, etc.)
 - Parameters, request/response bodies, and examples
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RESTful APIs Follow HTTP Standards

- RAML-based APIs follow **REST principles**, which align with **HTTP verbs** for their operations.
 - Every action your API performs (read, update, delete, etc.) is tied to an **HTTP method**.
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Key HTTP Methods to Know (for the Exam)

Diane recommends becoming familiar with **all the standard methods**, especially:

Method	Description
GET	Retrieves data from the server
POST	Creates new resources
PUT	Replaces an existing resource entirely
PATCH	Updates part of a resource
DELETE	Removes a resource

Helpful Resource (Recommended Reading)

Diane refers to this Medium article as an excellent HTTP methods review:

👉 [HTTP Methods in MuleSoft by Cristian Garcia](#)

Includes:

- How to test using **cURL**, **Postman**, and **Advanced REST Client**
 - Examples of using methods in **Anypoint Studio**
 - Clear distinction between **PUT** vs. **PATCH**, and when to use each
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🧠 Exam Tip

- Know the difference between:
 - **PUT** = full replacement
 - **PATCH** = partial update
 - GET, POST, and DELETE are most commonly tested
 - You may be asked which method is best for a specific scenario (e.g., "update a record's phone number")
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💬 Diane's Advice:

"Be familiar with the HTTP methods—not just what they are, but **how and when** to use each one. It's foundational for working with RESTful APIs."

✅ Section: RAML Parameters, Fragments & Query Logic (36:49–47:00)

📌 Exam Objective Focus

Covers the differences between **URI and query parameters**, how to manage **data types and examples using RAML fragments**, and how query parameters interact with flows and responses.

URI vs. Query Parameters

- **URI Parameter:** Part of the resource path
`GET /patients/{id}`
 - **Query Parameter:** Appended to the URL after a ?
`GET /patients?lastName=Smith`
 - Both are used to filter or fetch data—but query params are **more dynamic** and optional.
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Design Center View

- **Left:** RAML structure
 - **Center:** Editor canvas
 - **Right:** API Console (testable, interactive)
 - You can toggle a **public endpoint** to let external stakeholders preview it.
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Fragments for Reusability

- RAML **fragments** allow reuse of types, examples, libraries, etc.
- Example:
 - Patient data type defined in a fragment
 - Published to **Exchange**
 - Referenced in the spec using `uses:` and a local alias

Important Concept

- Fragments are **read-only once published**
- Only the **owner** can edit a fragment in Exchange

- Encourages **standardization across teams**
-

Inline vs. Referenced Examples

- **Inline examples:** defined right where they're used (good for simple cases)
 - **Referenced examples:** stored as fragments and pulled into the spec (better for reuse)
 - Both are useful, but referencing supports DRY (Don't Repeat Yourself) principles.
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Defining Query Parameters in RAML

Example for `GET /patients`:

```
queryParameters:  
  lastName:  
    type: string  
    example: "Doe"
```

- This allows requests like:
`GET /patients?lastName=Doe`
-

How Query Parameters Work in Flows

- When a query param is received, it's picked up in the flow like this:

```
#[attributes.queryParams.lastName]
```

- You can set it to a variable and use it in your logic (e.g., to query a DB).
-

Defining the Response

- On a **GET**, the **response body** is often an **array** of records.
- RAML Syntax:

responses:

```
200:  
  body:  
    application/json:  
      type: Patient[]
```

- The square brackets `[]` mean **an array of Patient objects**
-

Exam Tip

- Know how to define both URI and query parameters in RAML
 - Understand how fragments support **modular, scalable API design**
 - Be able to recognize when to use inline vs. reusable types/examples
 - Understand how `[]` affects a response type (array vs. single object)
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Quick Recap

- Use fragments to promote reuse and enforce consistency
- Query parameters go after `?` and can be defined in RAML specs
- Pick them up in Studio using `attributes.queryParams.key`
- Use square brackets in RAML to define arrays in responses

✓ Section: URI Parameters, POST Requests & Response Structure (47:00–56:38)

📌 Exam Objective Focus

Clarifies how to work with **URI parameters** in RAML and Studio, and explains how **POST requests** require request bodies and response handling. Also touches on Mule app implementation and the importance of saving attributes early.

🔗 URI Parameters (a.k.a. Path Parameters)

- Used for targeting a **specific resource**, e.g.:
 - `GET /patients/{id}`

Defined in RAML using **curly braces**:

```
/patients/{id}:  
  get:  
    description: Get a patient by ID
```

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🍷 How It Works

- The value (e.g. `123`) is **in the URL path**.
<http://localhost:8081/api/patients/123>

In the Mule flow, retrieve it using:

```
#[attributes.uriParams.id]
```

⚠️ Important Exam Tip

➡ **Save URI params (attributes) as variables early** in your flow!

If your logic crosses a **transport boundary** (e.g., DB call, flow reference), attributes like `uriParams` are **lost**.

How to Save the URI Param

Use a **Transform Message** to capture the value:

```
%dw 2.0

var patientId = attributes.uriParams.id

---

patientId
```

or with a **Set Variable** component:

```
Name: patientId

Value: #[attributes.uriParams.id]
```

How to Use It Later

Anywhere downstream in the flow (Logger, DB query, another transform), reference it like this:

```
#[vars.patientId]
```

Example in a Logger

```
Logger Message: "Looking up patient with ID #[vars.patientId]"
```

Example in a WHERE clause (SQL connector)

```
SELECT * FROM patients WHERE id = :patientId
```

(Then map `:patientId` to `#[vars.patientId]` in the connector config)

POST Requests – Payloads & Responses

- POST is used to **send new data**, such as creating a patient record.

Requires a **body definition** in the RAML spec:

```
post:
  body:
    application/json:
      type: PatientNoId
```

- The **payload** is sent in the request body and mapped in Studio using **payload**.
-

Responses in RAML

For **GET** with multiple results:

```
responses:
  200:
    body:
      application/json:
        type: Patient[]
```

-

For **GET /patients/{id}** or successful **POST**:

```
responses:
  200:
    body:
      application/json:
        type: Patient
```

- - **Square brackets ([])** indicate an **array** (multiple records)
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RAML vs. Mule App Responsibilities

- RAML: Defines **what** your API expects and returns (contract)
 - Mule App: Implements **how** it fulfills that contract
 - DB queries, logic, transformations, etc.
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Summary

-  URI Params = Path values (e.g. `/patients/123`)
-  Save them early or risk losing them at transport boundaries
-  POST, PUT, PATCH = Require body definition in RAML
-  Transform payloads to match DB schemas in Studio
-  Responses should match expectations (single vs. array)

Section: Environments & Lifecycle (00:59:58–01:10:32)

Design First

- Use RAML to model the API before building it.
- RAML defines endpoints, methods, and data formats.

Mule Project Structure

- You can build a simple app, but a **proper structure** supports multiple environments like Dev, Test, and Prod.
- Use externalized config files (e.g., `config-dev.yaml`) to isolate environment-specific settings like DB credentials and hostnames.

Environments in Anypoint Platform

- Each **Line of Business (LoB)** can have multiple environments.
- Three environment types:
 - **Sandbox** – for Dev, Test, QA (lower environments, slower support SLAs).
 - **Production** – used in real business processes (faster SLA, monitored closely).
 - **Design** – no longer used.

Deployment Promotion Flow

1. Develop in **Dev**
2. Test in **Test** (or QA, Stage)
3. Deploy to **Prod**

Key Notes:

- Each environment uses **different credentials and endpoints**.
- Never **hard-code credentials**—they should be encrypted (covered in MCD-Level 2).
- Real APIs like Athena provide sandbox environments for testing fake data.

Why this matters:

Apps must be able to adapt to their environment without being rewritten—this supports the **API lifecycle** and **secure, stable deployments**.

Section: XML Structure & Global Elements (01:10:33–01:13:43)

Split Interface and Implementation

- Interface XML (e.g., APIkit Router) defines how requests are routed.
- Implementation XML handles actual processing (like DB access).
- Helps organize large apps—some real-world Mule apps use 10+ XML files.

Global Configuration Best Practices

- All shared global elements (HTTP Listener, DB Configs, etc.) should go into a dedicated `global.xml`.
- This makes changes easy—**one place to update**, no hunting through multiple XMLs.
- **Only Exception:** APIkit Router config stays in the interface XML because it's unique to that flow.

Why It Matters

- Supports **clean architecture** and **maintainability**.
- Makes apps easier to debug and modify.
- Reinforces best practice structure expected in production-ready MuleSoft apps.

Section: Project Structure & Environment Configs (01:13:44–01:21:05)

Where to Find Things

- All XML flow files go under `src/main/mule`.
- Global configurations (connectors, error handlers, etc.) belong in `global.xml`.
- This setup keeps your Mule app clean and easy to maintain.

Why Structure Matters

- Easier to locate and manage global elements.
- Helps isolate errors and simplify updates.
- Exam-relevant! MuleSoft expects organized structure.

Environment Configurations

- Environment-specific values (e.g., port numbers, DB creds) go into `env.yaml` files under `src/main/resources`.
- The app uses `${env}` (e.g., `${env}.yaml`) to dynamically load the correct file.
- Example values: `dev`, `test`, `prod`, `local` (used when Studio requires different configs).

How It Works

- `env` is a global property—initially set to `dev`.
- Changing `env` to `test` or `prod` points your app to the matching `test.yaml` or `prod.yaml`.
- This is controlled in Runtime Manager when deploying.

MCD-Level 2 Preview

- In advanced levels, you'll learn how to:
 - Encrypt sensitive properties
 - Use secure keystores
 - Externalize configuration securely

Extra Best Practice

- Don't cram all logic into the same XML as the APIkit Router.

- Keep processors (like DB calls) in separate implementation XMLs.
- Keeps the spec clean and makes rescoping easier if the spec changes.

✓ That's All for Session Two!

You've now completed the second leg of your MCD-Level 1 journey! In this session, we drilled into **environments**, **project structure**, **API lifecycle**, and **the importance of clean, modular XML files**. You learned how environment variables like `${env}` help control your configuration files, and why keeping things organized isn't just nice—it's **critical** for scaling and maintaining your APIs.

Keep practicing your flow setups, test locally with confidence, and remember—clarity and structure now will save you headaches later. 🙌

Onward to Session Three... you've got this!