Session 2

Date: September 10, 2025.

Practical API Integration & Workflow Automation

> **Topics:** API Authentication (Keys & OAuth), Docker Concepts, Cloud Platform Integration (Google Cloud), and Hands-on Workflow Automation with n8n.

Understanding Core Integration Concepts

This part of the session focused on the foundational concepts required to securely connect different applications and services across the web.

1. Authentication vs. Authorization

Before connecting services, we need to manage permissions. This involves two key ideas:

- **Authentication:** This is the process of **verifying who you are**. When you log in with a username and password, you are authenticating yourself. In the world of APIs, an **API Key** often serves this purpose.
- **Authorization:** This is the process of **determining what you are allowed to do** after you've been authenticated. Just because you are a valid user doesn't mean you can access everything. OAuth handles secure delegated access (authorization), and with OpenID Connect, it can also handle authentication.

2. API Keys & OAuth

- **API Keys:** Think of an API Key as the **key to your house**. It's a single, simple secret that you give to an application to grant it access. It's straightforward but less flexible. If the key is stolen, someone has full access.
- **OAuth (Open Authorization):** Think of OAuth as a **hotel key card or a valet key**. It grants specific, limited permissions for a certain amount of time without you having to share your actual password (the master key). When an app asks, "Can this application post to your Twitter feed?", and you click "Allow," you are likely using OAuth. It's more secure because you can revoke access for a single app without changing your main password, and you control exactly what it's allowed to do.

3. Docker and Containerization

- **The Problem:** A common issue in development is the "it works on my machine" problem, where code runs perfectly for one developer but fails for another due to differences in operating systems, software versions, or other settings.
- **The Solution: Docker Containers.** A Docker container includes **application + dependencies**, but not a full OS kernel. That’s why they’re lightweight compared to VMs.
    - **Analogy:** A Docker container is like a standardized shipping container for software. It doesn't matter if you're moving it by truck, train, or ship; the contents inside are protected and work the same way everywhere.

- **In this session,** understanding Docker helped the team collaboratively resolve setup and integration challenges.

Hands-On Automation with n8n

The session then moved to practical, hands-on work building and testing automated workflows using n8n, a visual automation tool.

What is n8n?

n8n is a workflow automation tool that allows you to connect different applications and automate tasks without deep coding knowledge. You connect "nodes" (which represent apps or functions) to create a sequence of actions. For example: "When I receive a new email in **Gmail** (Node 1), get the attachment and send a message to **Telegram** (Node 2)."

Google Cloud & Gmail API Integration

This lab focused on connecting a cloud service to an n8n workflow.

- **Step 1: Project Setup in Google Cloud.** Each participant created a new project within the Google Cloud Platform. This acts as a central place to manage resources and permissions.
- **Step 2: Enable the Gmail API.** Within the project, the Gmail API was located and enabled. This is the explicit step of giving permission for external tools to interact with Gmail data.
- **Step 3: Connect to n8n.** The credentials from the Google Cloud project were used to configure the Gmail node in n8n, establishing a successful connection.

Telegram Bot and API Integration

This lab demonstrated how to integrate a messaging service.

- **Step 1: Create a Telegram Bot.** Participants created a new Telegram bot using Telegram's "BotFather".
- **Step 2: Generate an API Key.** The BotFather provides a unique API key (token) for the new bot. This key is used to authenticate and control the bot.
- **Step 3: Integrate with n8n.** The Telegram API key was used to set up the Telegram node in n8n, allowing the workflow to send and receive messages through the bot.