REST APIs – Designing, Specifying (OpenAPI) and Generating (OpenAPI-Generator)

Design API, Write Spec, Autogen client/server code

A REST API is the most practical way of connecting clients and servers in a distributed heterogeneous world.

We start by discovering what is involved in creating high-quality REST APIs and how to best go about designing them, in a contract-first manner. Later in the course we also explore advanced API design topics.

Then we need to specify the API. OpenAPI is essentially a well-written standard for a messaging schema, describing the messages and their headers and body contents. "The OpenAPI Initiative (OAI) was created by a consortium of forward-looking industry experts who recognize the immense value of standardizing on how REST APIs are described."

Once we have written our OpenAPI schema, the final task is to generate code to produce and consume messages that comply with that schema. For this, we use the OpenAPI Generator open source project. "OpenAPI Generator allows generation of API client libraries (SDK generation), server stubs, documentation and configuration automatically given an OpenAPI Spec". It supports dozens of languages/frameworks.

Target Audience

Software architects and senior developers tasked with efficiently creating and/or consuming REST APIs

Prerequisites

Sound understanding of at least one client programming environment and one server environment (from the OpenAPI Generator list of supported languages)

Some previous experience of network programming would be useful.

Contents of One-Day Training Course

Need for REST APIs

Representational state transfer
Principles of REST architecture
Reliably connecting distributed pieces of functionality

Review of JSON and YAML

How we represent information on the wire
JavaScript Object Notation (advanced)
"YAML Ain't Markup Language"
What enhancements YAML brings

Tasks To Build REST APIs

Need to consider design of API
Need to specify API
Need to generate client library to call API
Need to integrate client library with UX
Need to generate server stubs to host API
Need to integrate server stubs with DB, etc
Need to comprehensively test everything

Designing a REST API

What to take into consideration
Functionality discoverability
Identifying resources and selecting verbs
Integration with HTTP methods

OpenAPI Overview

OpenAPI Initiative (Linux Foundation)
The OpenAPI specification (https://github.com/OAI/OpenAPI-Specification/tree/master/versions)

OpenAPI Usage

Contract Driven API (create contract first)
Handling paths
Defining components
Creating API documentation

OpenAPI In Detail

Detailed look at important constructs in spec file and how best to use them
Boilerplate layout and sections

OpenAPI Generator Overview

A modern open source community API Generator toolset for building REST APIs
Compliant with OpenAPI Spec v3 (fork of Swagger Codegen)
A set of useful tools for code generation for client libraries and server stubs
e.g.: OpenAPI Generator, from version v.3.3.2 onward, generates Angular 7 code

OpenAPI Generator Features

Setup and tooling
Integrate with build
Useful command line arguments
List of options and their uses
Exploring OpenAPI Generator source tree

Practical REST API Creation

Security (avoiding code injection)
Testing
Working with CI/CD
Error handling
Documentation generation

Style Guide

How best to structure OpenAPI files
Naming conventions
Preparing for future API version evolution

Project

Building an end-to-end application involving all steps in REST API design, specification, implementation and usage