



OpenAPI Extensibility

The Good, The Bad, The YAMLy

Oleg Nenashev,
Baruch Sadogursky,
Laura Kassovic



Gradle

#ApiWorld

<https://speaking.jbaru.ch>



The Bad

The Good

The YAMLy

Baruch Sadogursky



Developer Productivity Advocate

DevRel Advisor @Gradle

Java Champion

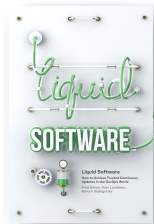
CNCF Ambassador Alumni



@jbaruch



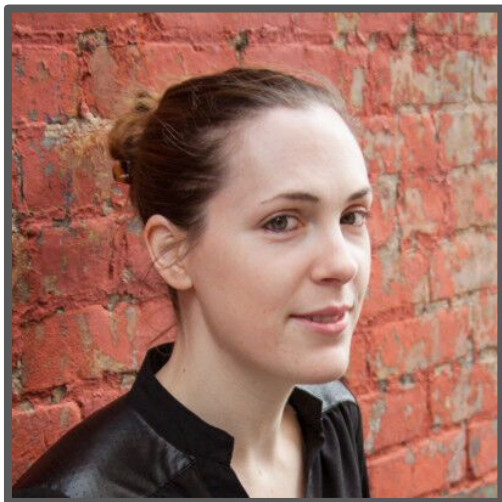
jbaruch



#ApiWorld

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Laura Kassovic



Technical Writer

Community Builder

Open Source Advocate



lkasso

#ApiWorld



<https://speaking.jbaru.ch>

Oleg Nenashev - Online Edition



Dr. Nenashev / Mr. Jenkins

Community builder

Developer Tools Hacker



@oleg_nenashev



oleg-nenashev



Gradle



#ApiWorld



Open
Feature



Testcontainers

WIREFMOCK

#RussiansAgainstPutin #StandWithUkraine

<https://speaking.jbaru.ch>

Shownotes

- speaking.jbaru.ch
- Slides
- All the links!
- Video

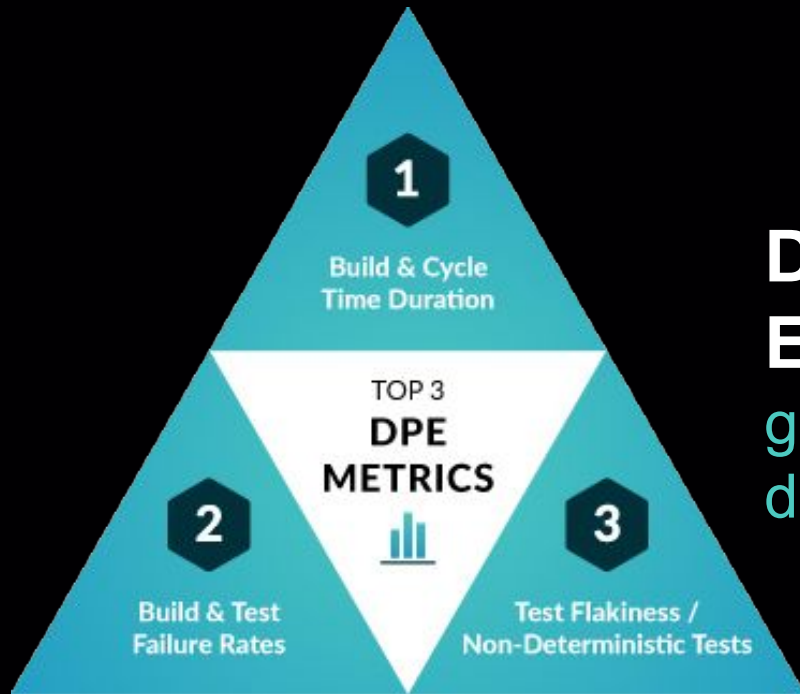


Gradle

BUILD  TOOL

 DEVELOLOCITY

Developer Productivity
Engineering (**DPE**)



Developer Productivity Engineering (DPE)

[gradle.com/
developer-productivity-engineering](https://gradle.com/developer-productivity-engineering)

MODERN TECH LANDSCAPE



x.com/dastbe/status/1303858170155081728

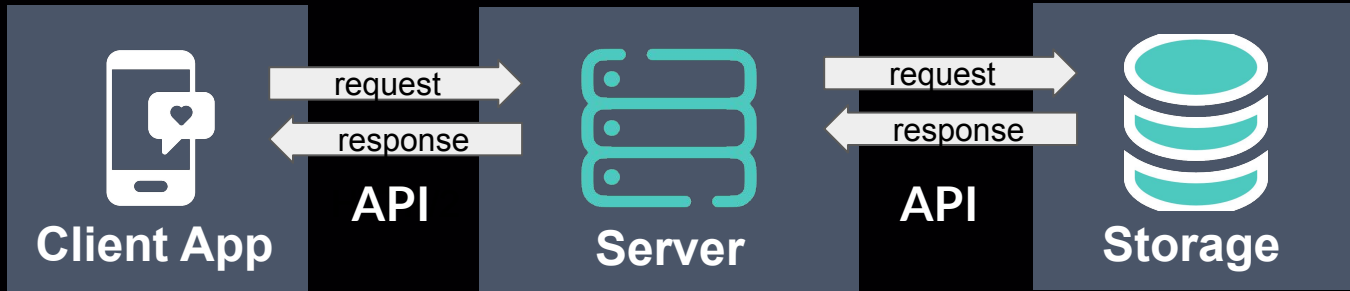
The UNIX way

- Write programs that **DO ONE THING** and **DO IT WELL**
- Write programs to **WORK TOGETHER**
- Write programs to handle text streams, because that is a **UNIVERSAL INTERFACE**

Peter H. Salus, A Quarter-Century of Unix (1994)

Interoperability and Interfaces are the Key

Most Apps and Dev Tools Work with APIs



API specs



Open API
Specification



AsyncAPI



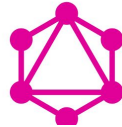
Gradle

#DPE

API tech

{ **REST:API** }

ASN.1



GraphQL



WebSockets



webhooks



gRPC



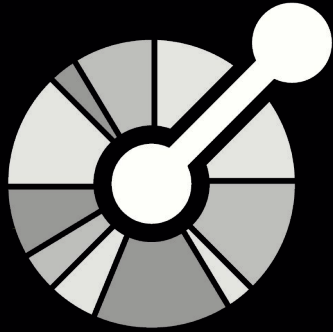
kafka

#apiWorld



cloudevents

<https://speaking.jbaru.ch>



OPENAPI



The Bad

The Good

The YAMLy



The Bad



The Good



The YAMLy

OpenAPI 101

Request-Response
definitions

Parameters

Response samples

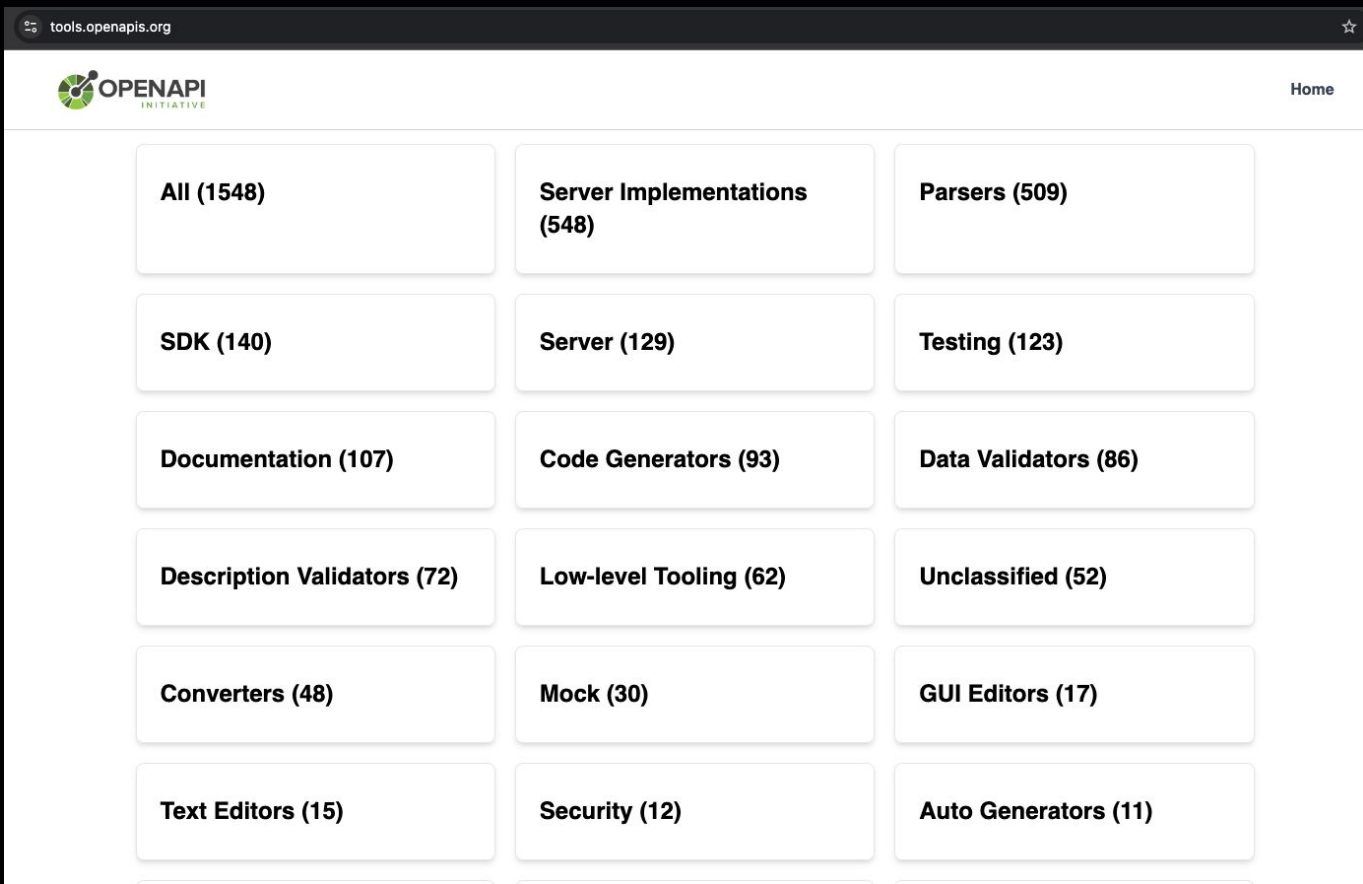
Extensions

The image shows the Swagger Editor interface. On the left, a code editor displays an OpenAPI 3.0.0 specification for the Swagger Petstore. The code includes information about the API (version 1.0.0, MIT license), the server URL (http://petstore.swagger.io/v1), and a GET endpoint for listing pets with a query parameter 'limit'. On the right, the visual API overview shows the Swagger Petstore logo, the MIT license, the server URL, and a list of API endpoints: GET /pets (List all pets), POST /pets (Create a pet), and GET /pets/{petId} (Info for a specific pet). The 'Models' section is also visible but empty.

```
1 openapi: "3.0.0"
2 info:
3   version: 1.0.0
4   title: Swagger Petstore
5   license:
6     name: MIT
7 servers:
8   - url: http://petstore.swagger.io/v1
9 paths:
10  /pets:
11    get:
12      summary: List all pets
13      operationId: listPets
14      tags:
15        - pets
16      parameters:
17        - name: limit
18          in: query
19          description: How many items to return at one
20            time (max 100)
21          required: false
22          schema:
23            type: integer
24            format: int32
25      responses:
26        '200':
27          description: A paged array of pets
28          headers:
29            x-next:
30              description: A link to the next page of
31                responses
32              schema:
33                type: string
34          content:
```

Huge Tools Ecosystem

<https://tools.openapis.org>



The screenshot shows the OpenAPI Initiative Tools Ecosystem website. The page features a grid of 21 tool categories, each with a count in parentheses. The categories are arranged in a 7x3 grid. The top left corner of the page displays the OpenAPI Initiative logo and the text "Home". The browser address bar shows "tools.openapis.org".

All (1548)	Server Implementations (548)	Parsers (509)
SDK (140)	Server (129)	Testing (123)
Documentation (107)	Code Generators (93)	Data Validators (86)
Description Validators (72)	Low-level Tooling (62)	Unclassified (52)
Converters (48)	Mock (30)	GUI Editors (17)
Text Editors (15)	Security (12)	Auto Generators (11)

Example: OpenAPI plugins for Gradle

100+ related Gradle plugins

Libraries and integrations in any [modern] framework

(!) OpenAPI Generator



#DPE

#ApiW



Search Gradle plugins

OpenAPI

Want to include your Gradle plugin here?

Plugin

Latest Version

[com.x3t.gradle.plugins.openapi.openapi_diff](#)

1.0.1

(19 December 2023)

OpenAPI Diff Plugin allows the comparison of API Specification files in OpenAPI Spec (v2, v3) format.

[#openapi](#) [#openapi-3.0](#) [#openapi-2.0](#) [#diff](#) [#kotlin](#)

[org.openapi.generator](#)

7.9.0

(08 October 2024)

OpenAPI Generator allows generation of API client libraries (SDK generation), server stubs, documentation and configuration automatically given an OpenAPI Spec (v2, v3)

[#openapi-3.0](#) [#openapi-2.0](#) [#openapi](#) [#swagger](#) [#codegen](#) [#sdk](#)

[io.github.mmalygin.openapi-generator](#)

6.2.0

(02 October 2022)

This plugin allows you to generate client and server SDKs for different languages, documentation and new generators from OpenAPI 2.0 and 3.x specifications. It does mostly the same things as openapi generator plugin but has a set of additional parameters: 1. Java client retrofit2 generator: add "interfaceOnly" additional property. If it's true, only API interfaces are generated. 2. Java client retrofit2 generator: allow to select serialization library when interfaceOnly = true. It's possible to use jackson instead of gson. 3. Possibility to configure useOneOfInterfaces via additional properties. Generation oneOf interfaces for Java Spring generator.

[#openapi-3.0](#) [#openapi-2.0](#) [#openapi](#) [#swagger](#) [#codegen](#) [#sdk](#)

[io.github.klahap.coam](#)

1.0.0

(09 August 2024)

The OpenAPI Spec Merger Checker (coam) is a Gradle plugin that verifies whether all paths of one OpenAPI specification file are fully included, through \$ref, in another OpenAPI specification file.

[#openapi](#) [#api validation](#) [#openapi merge](#)

[io.openapiprocessor.openapi-processor](#)

2023.2

(19 December 2023)

plugin to run openapi-processor-*, e.g. openapi-processor-spring (requires gradle 5.5+)

[#openapi](#) [#openapi-processor](#)

[com.kroegerama.openapi-kgen.gradle-plugin](#)

0.16.0

(15 July 2024)

Generate modern API Clients in Kotlin from OpenAPI specifications. Supports OpenAPI >= 3.0.0.

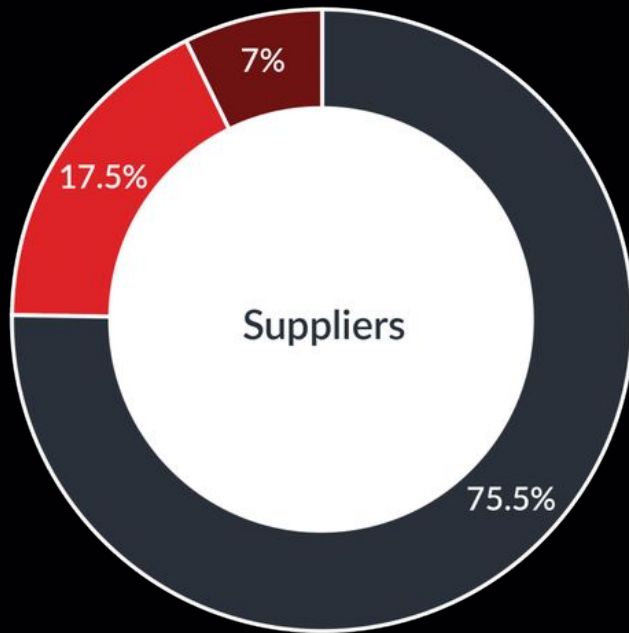
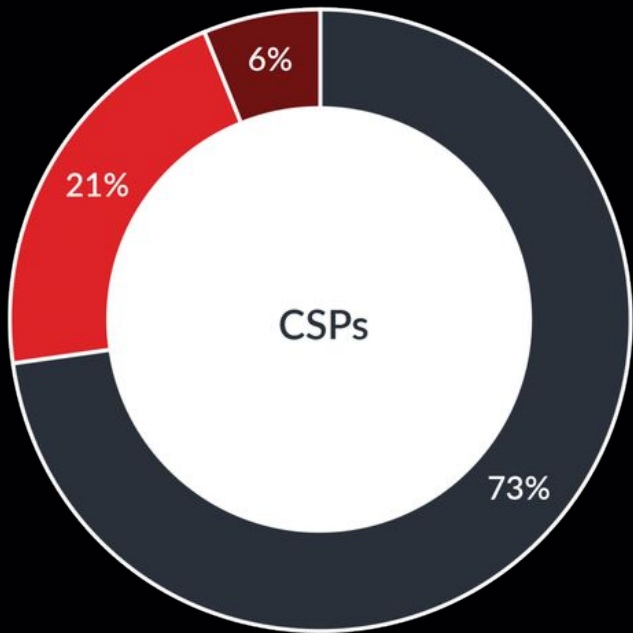
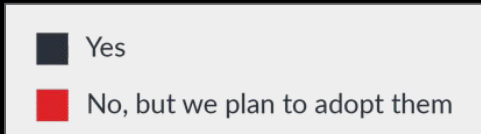
[#openapi](#) [#generator](#) [#codegen](#) [#swagger](#)

Who uses OpenAPI?



EVERYOOOONE!!!

The industry uses OpenAPI, too



We leverage OpenAPI in Develocity, too

The screenshot shows the Develocity API documentation page for the endpoint `GET /api/builds/{id}`. The page title is "Get the common attributes of a build." The documentation includes the following sections:

- Method:** GET
- Path:** `/api/builds/{id}`
- Description:** "The contained attributes are build tool agnostic."
- AUTHORIZATIONS:** `DevelocityAccessKeyOrToken`
- PATH PARAMETERS:**
 - `id` (required, string): "The Build Scan ID."
- QUERY PARAMETERS:**
 - `BuildQuery` (object): "The query parameters used to retrieve the common attributes of a build."
- Responses:**
 - `200`: "The common attributes of a build." (Success)
 - `400`: "The request cannot be fulfilled due to a problem." (Client Error)
 - `404`: "The referenced resource either does not exist or the permissions to know about it are missing." (Client Error)
- Response samples:** A JSON response sample for status code 200, showing fields like `id`, `availableAt`, `buildToolType`, `buildToolVersion`, `buildAgentVersion`, and `models`.

Example: Develocity

- Not just OpenAPI, but an API Manual
 - <https://docs.gradle.com/develocity/api-manual>
- Versioning and Depreciation policy via OpenAPI annotations
- User-friendly changelogs

2024.2	Documentation	Specification (SHA-256 checksum,
2024.1	Documentation	Specification (SHA-256 checksum,
2023.4	Documentation	Specification (SHA-256 checksum,
2023.3	Documentation	Specification (SHA-256 checksum,
2023.2	Documentation	Specification (SHA-256 checksum,

DEVELOCITY

Develocity API User Manual

The Develocity API allows programmatic interaction with various aspects of Develocity, from configuration to inspecting build data.

Fundamentals

The Develocity API is a REST-style API using JSON as the data format.

OpenAPI

The API is defined using the [OpenAPI standard](#), which is a declarative specification that allows [tools and libraries](#) to generate client code. The specification can be found in the [Reference](#) section.

Example: OpenAPI Generator

- Automates the creation of
 - client libraries,
 - server stubs,
 - API documentation,
 - and configuration files
- from an OpenAPI Spec

Input:

```
OpenAPI.yaml - Editor
1 paths:
2   /frobs:
3     get:
4       operationId: GetFrobs
5       parameters:
6         - name: size
7           in: query
8           schema:
9             type: string
10      responses:
11        200:
12          description: List of frobs.
```

Output:

```
Terminal
$ my-cli get-frobs --size=small
{
  "frobs": [
    {
      "id": 123,
      "description": "Small frob"
    },
    {
      "id": 456,
      "description": "Another small frob"
    }
  ]
}
```

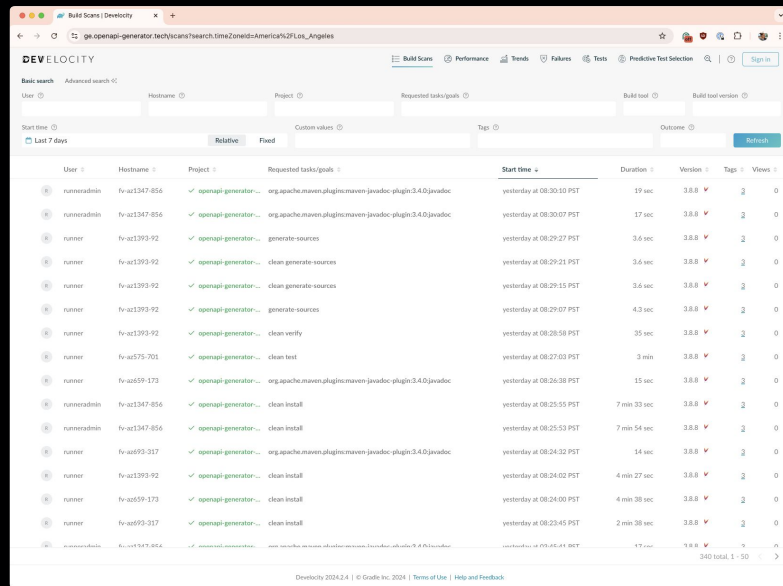
<https://openapi-generator.tech/>

We support OpenAPI Generator



-  DEVELOCITY

- Build Scan and Troubleshooting
- Local and Distributed build caching
- Predictive Test Selection
- CI/CD observability and Insights
- Local build observability



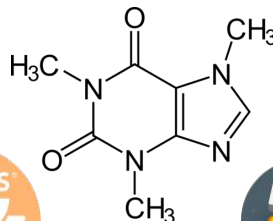
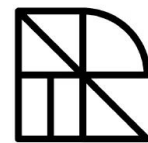
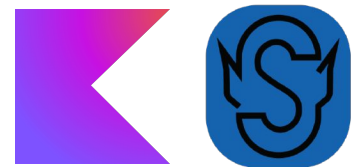
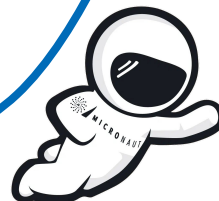
User	Hostname	Project	Requested tasks/goals	Start time	Duration	Version	Tags	Views
runradmin	fr-ac1347-856	openapi-generator...	org.apache.maven.plugins:maven-javadoc-plugin:3.4.0:javadoc	yesterday at 08:30:10 PST	19 sec	3.8.8	2	0
runradmin	fr-ac1347-856	openapi-generator...	org.apache.maven.plugins:maven-javadoc-plugin:3.4.0:javadoc	yesterday at 08:30:07 PST	17 sec	3.8.8	2	0
runner	fr-ac1393-92	openapi-generator...	generate-sources	yesterday at 08:29:27 PST	3.6 sec	3.8.8	2	0
runner	fr-ac1393-92	openapi-generator...	clean generate-sources	yesterday at 08:29:21 PST	3.6 sec	3.8.8	2	0
runner	fr-ac1393-92	openapi-generator...	clean generate-sources	yesterday at 08:29:15 PST	3.6 sec	3.8.8	2	0
runner	fr-ac1393-92	openapi-generator...	generate-sources	yesterday at 08:29:07 PST	4.3 sec	3.8.8	2	0
runner	fr-ac1393-92	openapi-generator...	clean verify	yesterday at 08:28:58 PST	35 sec	3.8.8	2	0
runner	fr-ac575-701	openapi-generator...	clean test	yesterday at 08:27:03 PST	3 min	3.8.8	2	0
runner	fr-ac659-173	openapi-generator...	org.apache.maven.plugins:maven-javadoc-plugin:3.4.0:javadoc	yesterday at 08:26:38 PST	15 sec	3.8.8	2	0
runradmin	fr-ac1347-856	openapi-generator...	clean install	yesterday at 08:25:55 PST	7 min 33 sec	3.8.8	2	0
runradmin	fr-ac1347-856	openapi-generator...	clean install	yesterday at 08:25:53 PST	7 min 54 sec	3.8.8	2	0
runner	fr-ac693-317	openapi-generator...	org.apache.maven.plugins:maven-javadoc-plugin:3.4.0:javadoc	yesterday at 08:24:32 PST	14 sec	3.8.8	2	0
runner	fr-ac1393-92	openapi-generator...	clean install	yesterday at 08:24:02 PST	4 min 27 sec	3.8.8	2	0
runner	fr-ac659-173	openapi-generator...	clean install	yesterday at 08:24:00 PST	4 min 38 sec	3.8.8	2	0
runner	fr-ac693-317	openapi-generator...	clean install	yesterday at 08:23:45 PST	2 min 38 sec	3.8.8	2	0
runradmin	fr-ac1347-856	openapi-generator...

Public Develocity Instance:
[ge.openapi-generator.tech](https://speaking.jbaru.ch/ge.openapi-generator.tech)

DEVELOLOCITY

- We support open source
- Many projects run with Develocity
- Maven, Bazel, sbt..., and Gradle

[gradle/develocity-oss-projects](https://gradle.com/develocity-oss-projects)



Armeria

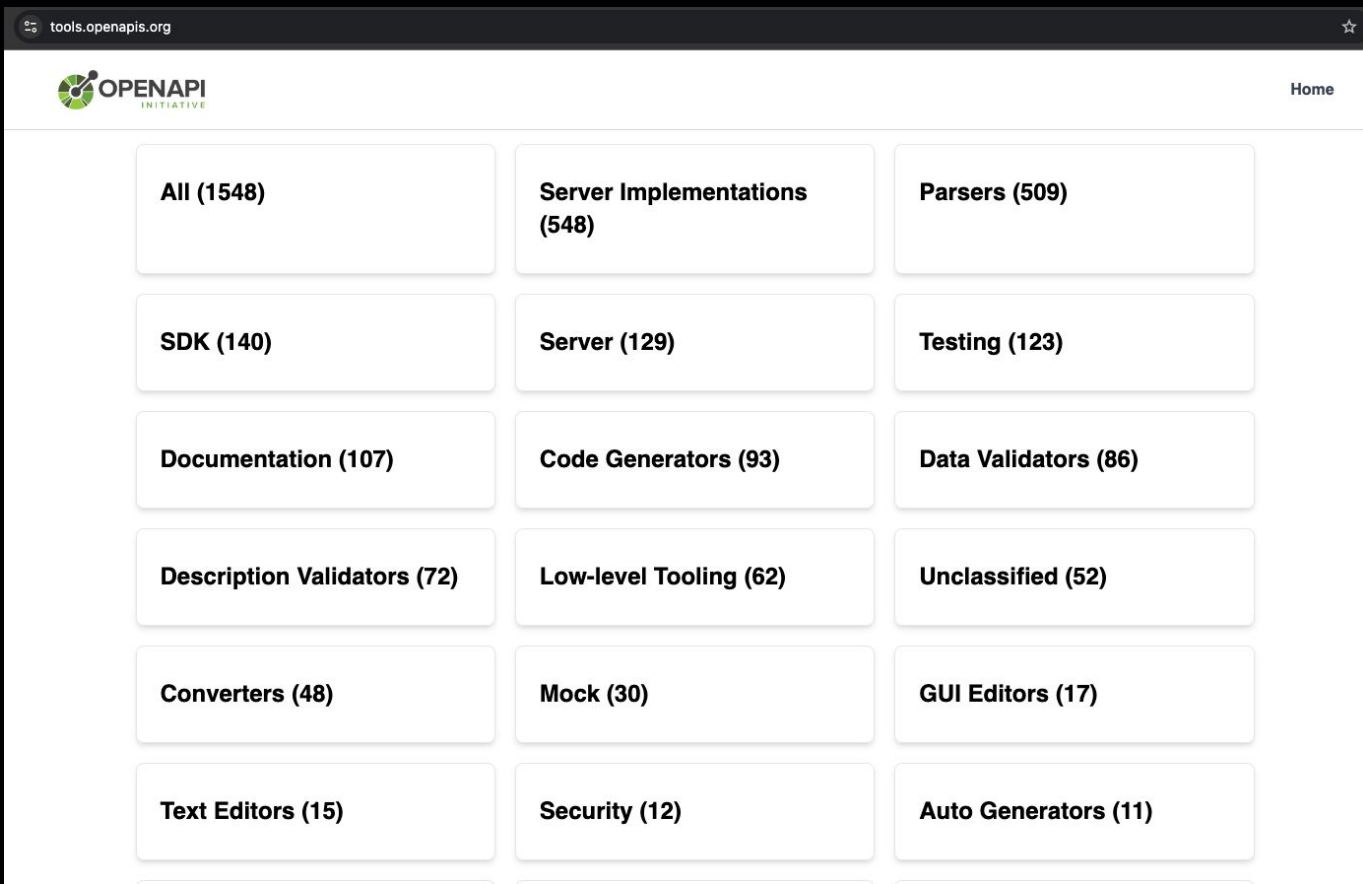


#World

<https://speaking.jbaru.ch>

Huge Tools Ecosystem (RECAP)

<https://tools.openapis.org>



The screenshot shows the OpenAPI Initiative tools website. The page features a grid of 18 tool categories, each with a count in parentheses. The categories are arranged in a 6x3 grid. The OpenAPI Initiative logo is in the top left, and a 'Home' link is in the top right.

Category	Count
All	1548
Server Implementations	548
Parsers	509
SDK	140
Server	129
Testing	123
Documentation	107
Code Generators	93
Data Validators	86
Description Validators	72
Low-level Tooling	62
Unclassified	52
Converters	48
Mock	30
GUI Editors	17
Text Editors	15
Security	12
Auto Generators	11



They're the same picture.



They're the same picture.

Interoperability && Extensibility

at scale...

<https://speaking.jbaru.ch>

OpenAPI 101

Request-Response
definitions

Parameters

Response samples

Extensions

The image shows the Swagger Editor interface. On the left, a code editor displays the OpenAPI 3.0.0 specification for the Swagger Petstore. The code includes the following details:

- OpenAPI version: 3.0.0
- Info: version 1.0.0, title Swagger Petstore, license MIT
- Servers: http://petstore.swagger.io/v1
- Paths: /pets (GET), /pets/{petId} (GET)
- Operations: listPets (summary: List all pets, tags: pets, parameters: limit (query, integer, max 100)), createPet (summary: Create a pet)
- Responses: 200 (description: A paged array of pets, headers: x-next (description: A link to the next page of responses, type: string))

On the right, the visual API overview shows the Swagger Petstore logo (version 1.0.0, OAS3), the MIT license, the server URL dropdown, and a list of API endpoints with their methods and descriptions:

- GET /pets: List all pets
- POST /pets: Create a pet
- GET /pets/{petId}: Info for a specific pet

Below the endpoints, there is a section for Models.

OpenAPI Extensions 101

```
{
  "swagger": "2.0",
  "info": {
    "version": "1.0",
    "title": "Analysis",
    "description": "Provides access to blog posts and analysis across the API Evangelist network.",
    "x-apis-json" : {
      "image": "https://s3.amazonaws.com/kinlane-productions/api-evangelist/t-shirts/KL_InApiWeTrust-1000.png",
      "humanURL": "http://developer.apievangelist.com",
      "baseURL": "http://api.apievangelist.com/definitions/Analysis",
      "tags": [
        "blog",
        "industry",
        "analysis",
        "new",
        "API",
        "Application Programming Interface"
      ],
      "properties": [
        {
          "type": "X-signup",
          "url": "https://apievangelist.3scale.net/"
        }
      ]
    }
  }
}
```

<https://github.com/OAI/OpenAPI-Specification/blob/main/guidelines/v2.0/EXTENSIONS.md>

OpenAPI Extensions

github.com/OAI/OpenAPI-Specification/blob/main/guidelines/v2.0/EXTENSIONS.md

OpenAPI Extensions

The OpenAPI Specification version 2.0 allows for custom properties to be added at several places within an OpenAPI document., allowing API providers to extend the meta-data provided for their REST APIs as needed. Extension properties are always prefixed by "x-" and can have any valid JSON format value.

Currently extension properties are supported in the following definition objects:

- within the [info object](#)
- within the [paths object](#)
- within the [path-item object](#)
- within the [operation object](#)
- within the [parameter object](#)
- within the [responses object](#)
- within the [tag object](#)
- within the [security-scheme object](#)

4.9 Specification Extensions §

While the OpenAPI Specification tries to accommodate most use cases, additional data can be added to extend the specification at certain points.

The extensions properties are implemented as patterned fields that are always prefixed by "x-".

Field Pattern	Type	Description
^x-	Any	Allows extensions to the OpenAPI Schema. The field name <i>MUST</i> begin with x-, for example, x-internal-id. Field names beginning x-oai- and x-oas- are reserved for uses defined by the OpenAPI Initiative . The value can be null, a primitive, an array or an object.

The extensions may or may not be supported by the available tooling, but those may be extended as well to add requested support (if tools are internal or open-sourced).

Example: Develocity API

[docs.gradle.com/develocity/api-manual/
#reference_documentation](https://docs.gradle.com/develocity/api-manual/#reference_documentation)

openapi: 3.0.3

info:

title: Develocity API

description: >

Allows programmatic interaction with Develocity,
from config to build data

version: "2024.2"

license:

name: Develocity License

url: <https://gradle.com/legal-gradle-software-license-agreement>

termsOfService: <https://gradle.com/help/legal-terms-of-use>

x-logo:

url: <https://assets.gradle.com/logo/develocity-logo.svg>

altText: Develocity

Example: Develocity API

[docs.gradle.com/develocity/api-manual/
#reference_documentation](https://docs.gradle.com/develocity/api-manual/#reference_documentation)

...

tags:

- **name:** BuildCache
x-displayName: Build Cache
description: |
Endpoints related to configuring the Build Cache nodes of the Develocity instance. To access these endpoints the user requires the `Configure build caches` permission.
- **name:** Projects
x-displayName: Projects (Beta)
description: |
Endpoints related to the management of projects in Develocity. To access these endpoints the user requires the `Administer Projects` permission.

A panda is sitting on a mossy rock in the rain, holding a yellow umbrella. The panda is looking to the right with a sad expression. The background is a dark, rainy forest.

Sad Panda

x-logo or x-displayName need an extension?!



The Bad



The Good

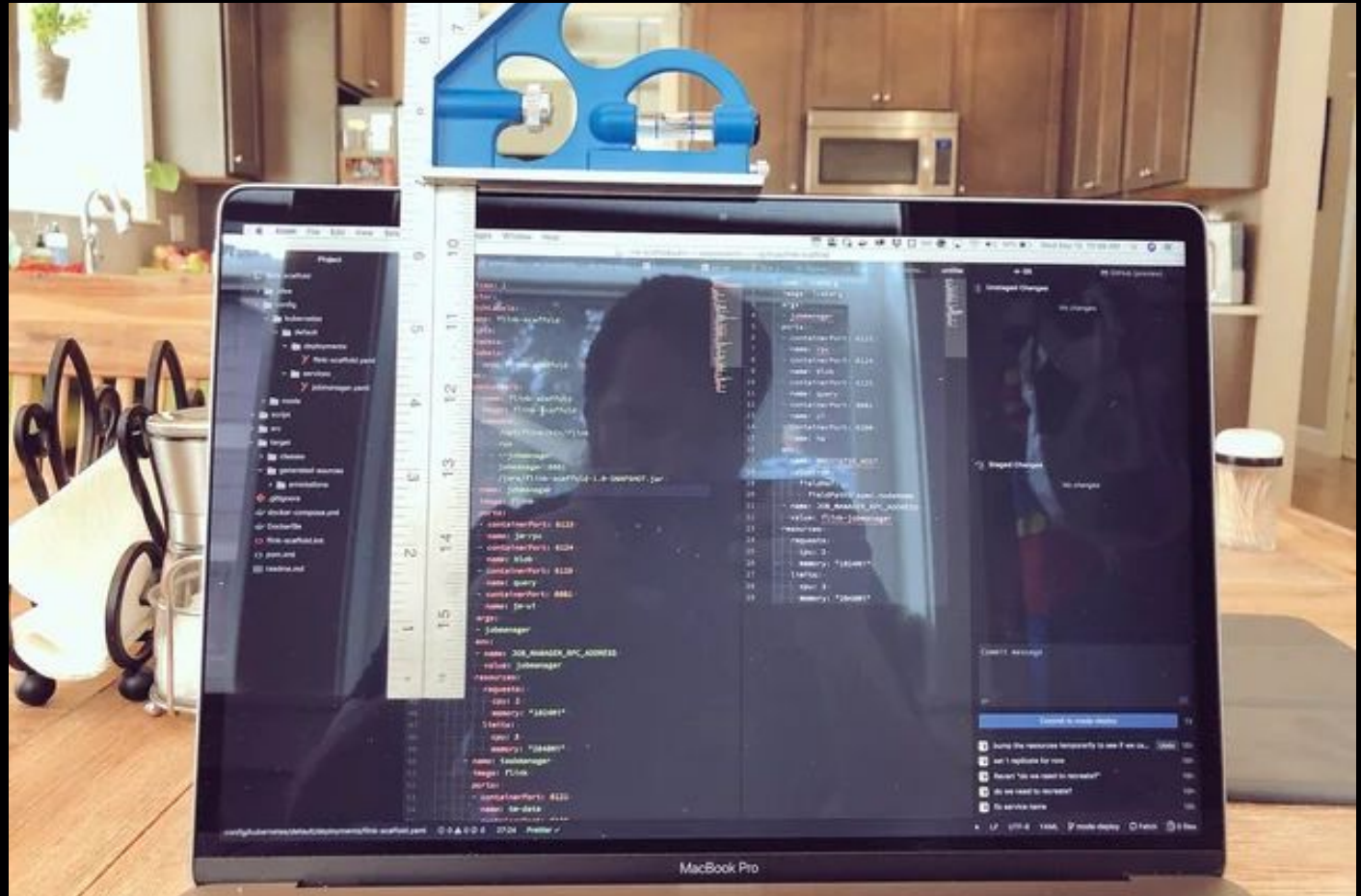


The YAMLY

Example: AWS API Gateway

```
1  components:
2    securitySchemes:
3      APIGatewayAuthorizer:
4        type: apiKey
5        name: Authorization
6        in: header
7        x-amazon-apigateway-authtype: oauth2
8        x-amazon-apigateway-authorizer:
9          type: token
10         authorizerUri: arn:aws:apigateway:us-east-1:lambda:path/2015-03-
11         31/functions/arn:aws:lambda:us-east-1:account-id:function:function-
12         name/invocations
13         authorizerCredentials: arn:aws:iam::account-id:role
14         identityValidationExpression: "^x-[a-z]+"
15         authorizerResultTtlInSeconds: 60
```

YAML DevX



OpenAPI is not DRY



Bruno Borges @brunoborges · Sep 4, 2023

I declare victory against #YAML as it is no longer used by anyone.



Satan @s8n · Sep 4, 2023

You wake up and you are the last person on Earth. What is the first thing you do? Crying isn't an option.



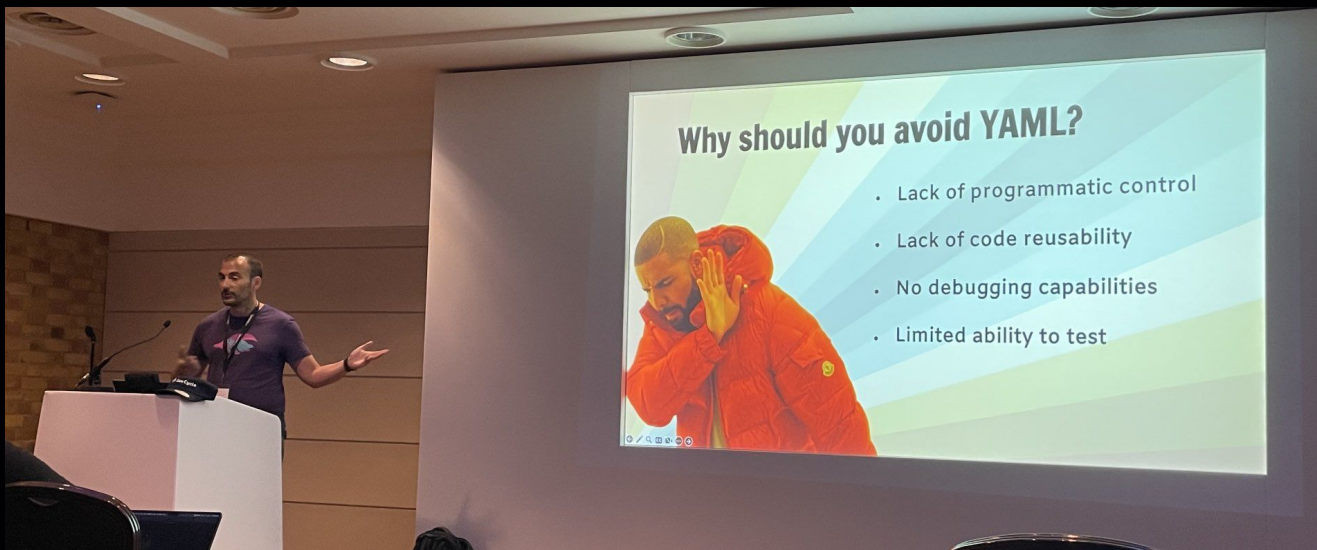
And more constructive!



Ramiro Berrelleza 

@rberrelleza

. @_ediri lists very interesting reasons on why you shouldn't use YAML when interacting to Kubernetes





The Bad

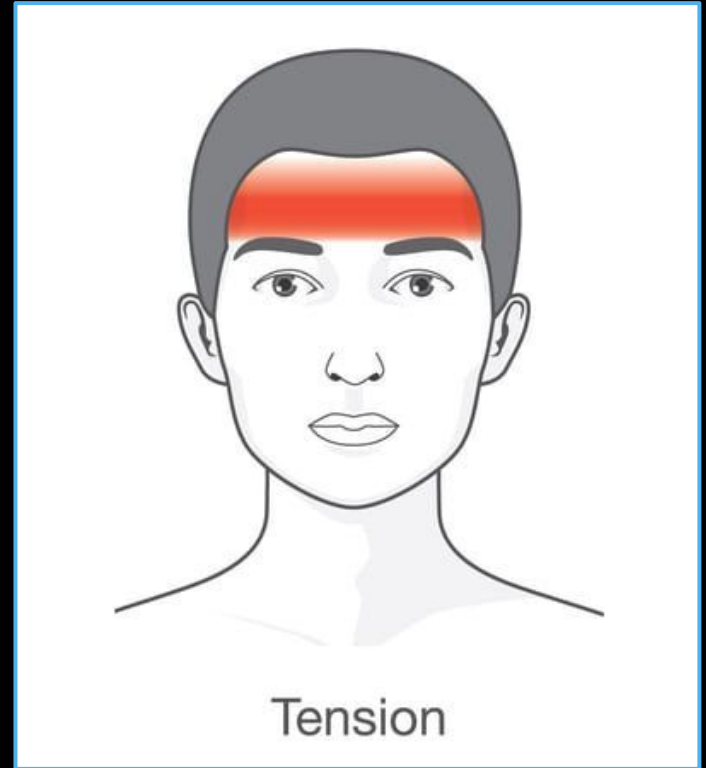


The Good



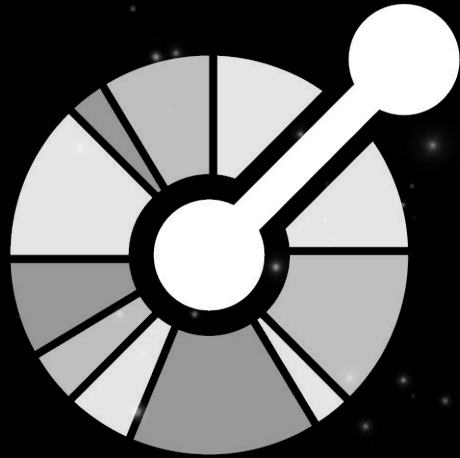
The YAMLy

X-tensions?



Always has been

Wait, it's all just
Swagger?

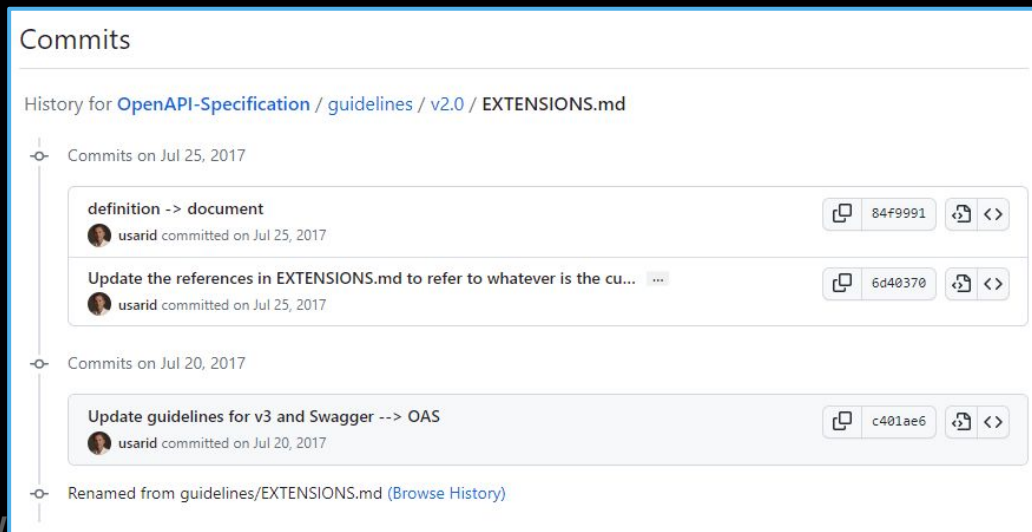


OpenAPI 3
Extensions



So, but what's ugly?

- Limited v3 Documentation, mostly inherited from Swagger
- Little updates and docs before late 2023
- Little “extension specs”



The screenshot shows a Git commit history for the file `OpenAPI-Specification / guidelines / v2.0 / EXTENSIONS.md`. The history is filtered by date, showing commits from July 25, 2017, and July 20, 2017. The commits are as follows:

- Commits on Jul 25, 2017**
 - Commit `84f9991`: `definition -> document` by `usarid` committed on Jul 25, 2017.
 - Commit `6d40370`: `Update the references in EXTENSIONS.md to refer to whatever is the cu...` by `usarid` committed on Jul 25, 2017.
- Commits on Jul 20, 2017**
 - Commit `c401ae6`: `Update guidelines for v3 and Swagger --> OAS` by `usarid` committed on Jul 20, 2017.

At the bottom, there is a note: `Renamed from guidelines/EXTENSIONS.md (Browse History)`.

Specification is an inspiration

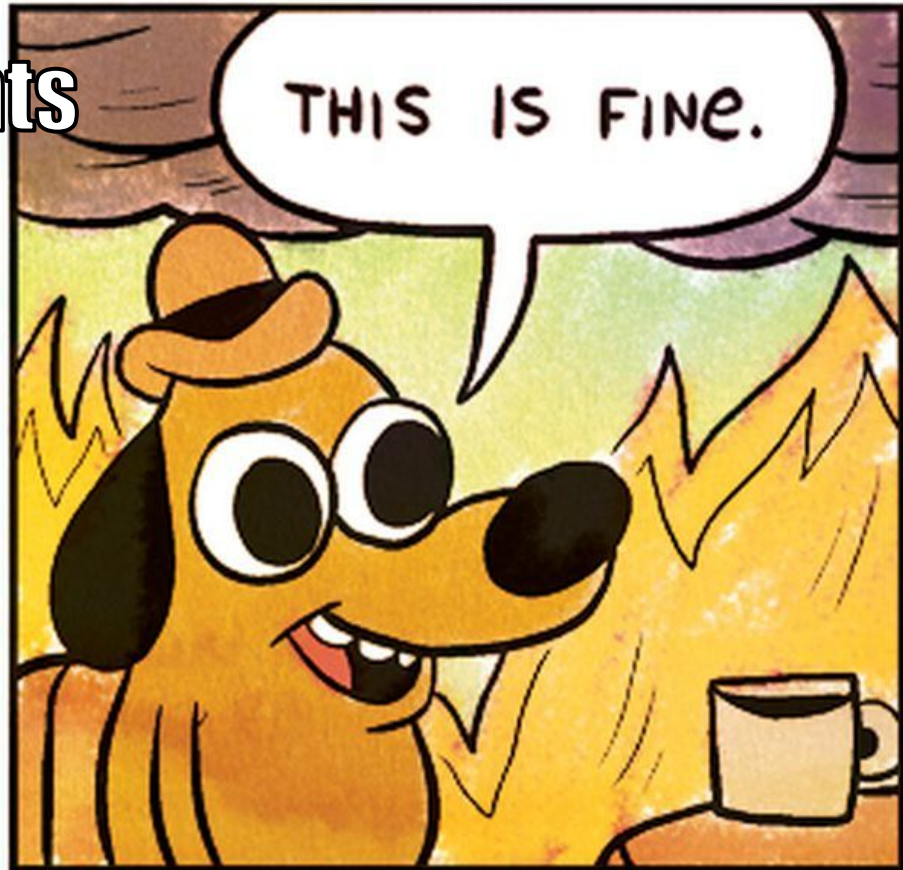
- Nobody cares where “x-” fields are supported or not
- Almost everything in “x-” fields? Why not
- Encrypted data in spec? Data blobs? Why not?
- Contribute back? Why?



Every vendor implements

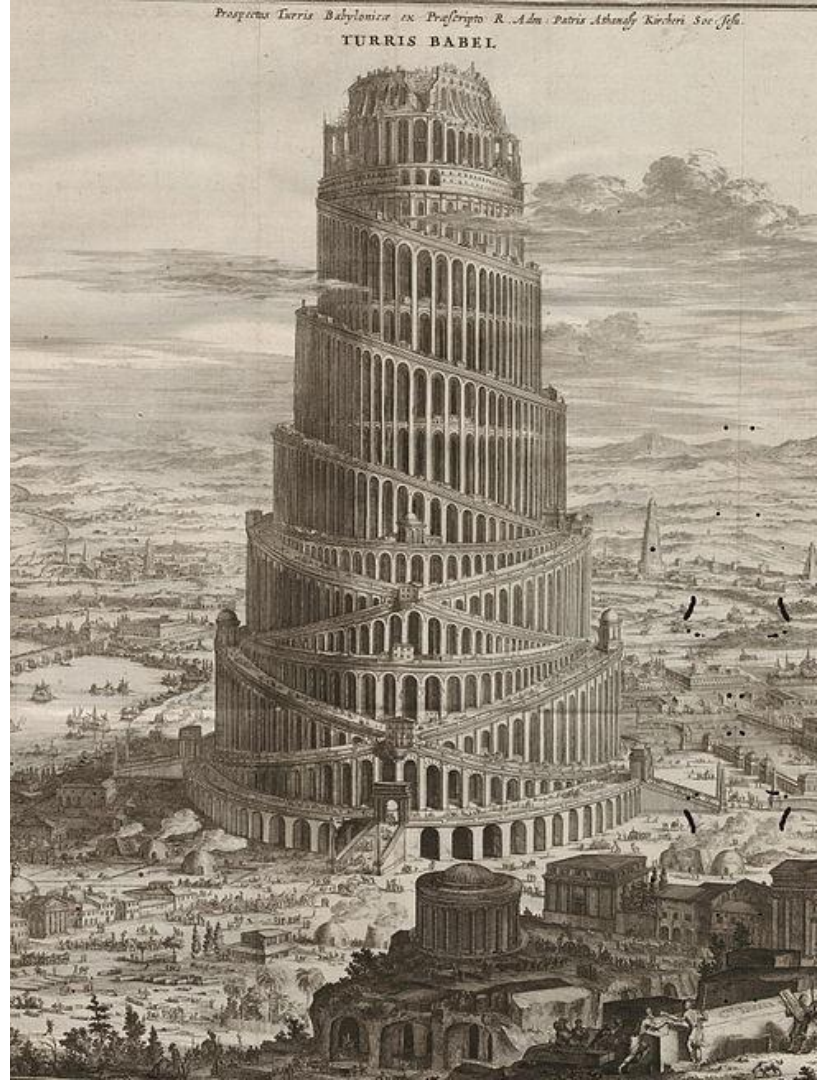


the same extensions



Extensions are for lock-in

- Most specs are generated by tools, they leverage extensions
- JSON/YAML extensions are not great to manage
- OpenAPI specifications are huge and not sustainable as is
- OpenAPI but with SDKs



Where did we see “x-”tensions?

- Authorization model
- Parameter values for samples
- Feature flags
- Conditions
- Stateful behavior
- ...

Handwritten notes and diagrams illustrating mathematical concepts and programming logic:

- Integration:** $\int \frac{x^3 + x^2 - 3 - 3x}{3x^2} dx$
- Calculus:** $(\sin 3x)' = (\sin)' 3x + (3x)' \sin x$; $\lim_{n \rightarrow \infty} \int_0^1 2n^2 x e^{-n^2 x^2} dx$
- Algebra:** $\begin{vmatrix} 2 & -5 \\ 7 & 15 \end{vmatrix} = 11$; $\begin{vmatrix} 11 & 12 & -15 \\ 18 & -3 & -16 \\ 9 & 5 & 20 \end{vmatrix} = 11$
- Geometry:** A diagram of a circle with center O and points A, B, C, D, P on its circumference. A radius OA is shown, and a point P is marked on the circle. A dashed line OP is drawn. The angle $\angle AOP$ is labeled θ . The radius is labeled $r = ae^{i\theta}$.
- Trigonometry:** $2 \cos^2 x \cdot \sin$; $3 \cos 3x$
- Integration:** $\int \frac{dx}{x^2} = -\frac{1}{x}$; $\int \frac{dx}{x^2} = \frac{1}{3} \cdot \frac{x^2}{2} = \frac{x^2}{6} + \frac{1}{6} x^2$; $y = \frac{\ln x}{(x^2)^2} = \frac{\ln x}{x^4}$; $4 \int x^{1/2} \Rightarrow \frac{4}{2} \cdot \frac{1}{2} y = \frac{\ln x}{x^{1/2}}$
- Calculus:** $\int \sum_{n=1}^{\infty} u_n(x) dx = \sum_{n=1}^{\infty} \int u_n(x) dx$
- Complex Numbers:** $\cos^2 a + \sin^2 a = 1$; $\cos^2 a + \sin^2 a = 1$
- Programming Logic:**
 - `Readln(n);`
 - `A[1] := 0;`
 - `Write('n:', '');`
 - `eps` (epsilon)
 - `alpha = 1`
 - `Readln(n);`
 - `S := alpha`
 - `for i := 1 to n do`
 - `WriteLn;`
 - `if |alpha| = eps then`
 - `alpha := alpha + 1 - S / 11;`
 - `S := S + alpha`
 - `end;`
 - `end;`
- Diagram:** A flowchart showing a loop structure with a decision diamond `|alpha| = eps`. The loop body contains `alpha := alpha + 1 - S / 11;` and `S := S + alpha`. The loop ends with `end;`.
- Diagram:** A diagram showing a sequence of operations: `x := item[i];`, `A := array[l] of real;`, `A[x[i]] := A[x[i]] + 1;`, `WriteLn;`, `lim_{n to infinity} \int 2n^2 x e^{-ln 2x}`, `A[0] := 0;`, `x := array[1..m] of real;`, `Record`, `cos^2 a + sin^2 a = 1`, `For i := 1 to n do`, `Complex := Record`, `For i := 1 to n do`.

Extensions are not bad
The spec is not enough

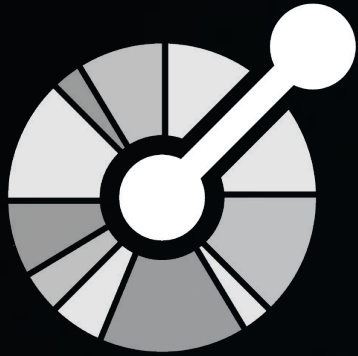


The Bad

The Good

The YAMLy

PROJECT MOONWALK



OpenAPI 4

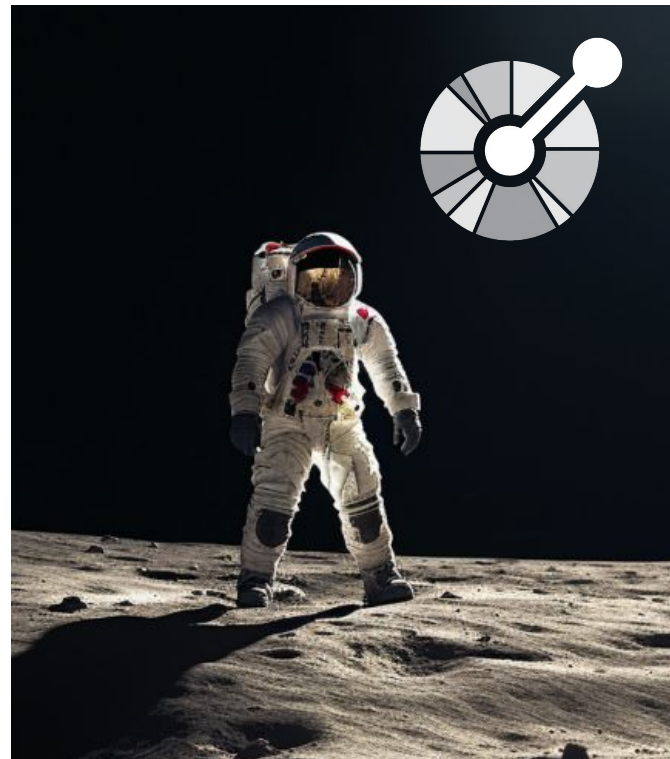


github.com/OAI/moonwalk

OpenAPI 4 “Moonwalk” Project

Evolve the OpenAPI Specification to:

1. **Address limitations** in the existing OpenAPI 3.x versions
2. **Introduce features** that allow for more expressive API definitions, including support for advanced use cases
3. **Improve user experience**
4. **Encourage contributions** and community feedback



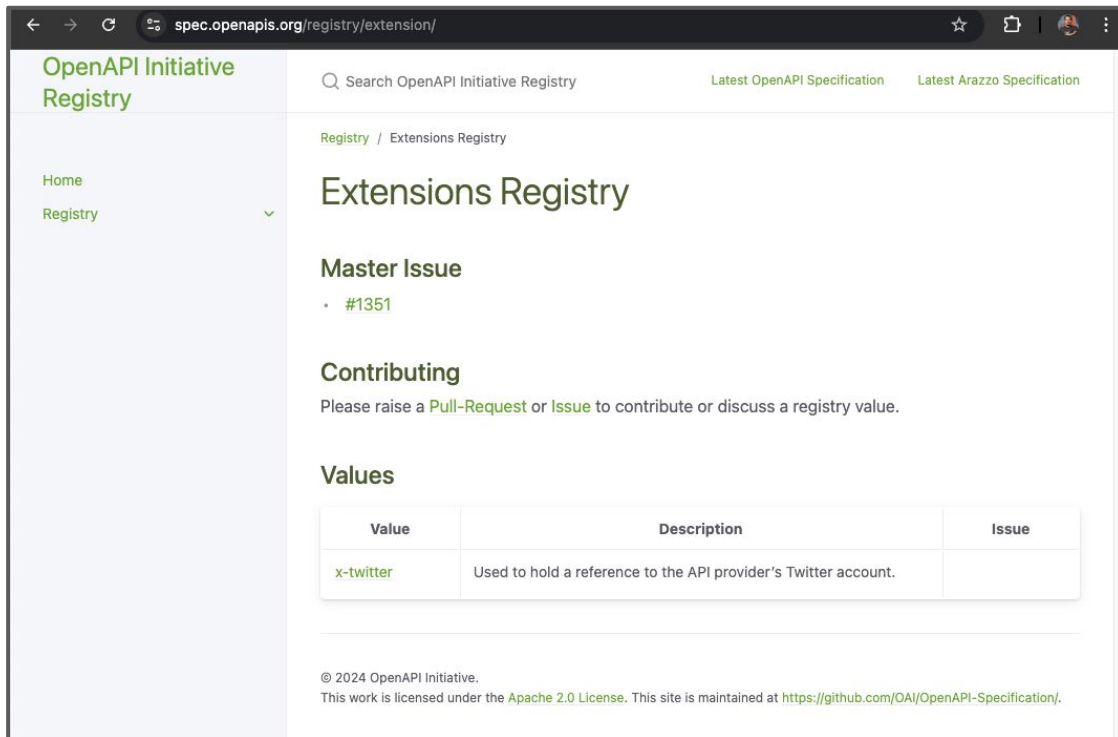
OpenAPI 4 “Moonwalk” Features

- Support APIs that have different responses based on query parameters, headers and request bodies.
- Broader range of URL design patterns
- Reduce nested structures to improve readability and editability
- Improve reusability of request and response patterns



OpenAPI 4 “Moonwalk” Wishlist: Extensions Registry

- OpenAPI 4 should include standard spec extensions
- From x-logo to x-auth



The screenshot shows the OpenAPI Initiative Registry website. The page title is "Extensions Registry". It features a search bar, a navigation menu with "Home" and "Registry", and a "Master Issue" section with a link to "#1351". Below this is a "Contributing" section with instructions to raise a Pull-Request or Issue. A table titled "Values" lists the extension "x-twitter" with a description: "Used to hold a reference to the API provider's Twitter account." The footer contains copyright information for the OpenAPI Initiative and a license link.

Value	Description	Issue
x-twitter	Used to hold a reference to the API provider's Twitter account.	

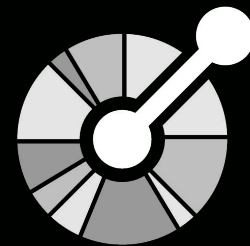
OpenAPI 4 “Moonwalk” Wishlist: Overlay Specifications to become a part of the standard

aka “openapi-patch” -
injecting duplicated
content into the specs

spec.openapis.org/overlay/v1.0.0.html

```
! overlays.yaml
1  # overlays.yaml
2  overlay: 1.0.0
3  info:
4    title: Improve the API's main description
5    version: 0.0.1
6  actions:
7    - target: '$.info'
8      update:
9        description: >
10         The Todos API helps you organize tasks, set reminders, and manage project
11         Use it to track your progress, set due dates, and prioritize your to-dos.
12         Ready to get started? [Request access here](https://example.com.com/acces
13         and [explore the full documentation](https://example.com.com/docs).
14
```

Source: <https://www.youtube.com/watch?app=desktop&v=liyqg3r1QPs>



Good Luck to Moonwalk!

PLEASE MAKE IT HAPPEN

If you develop OpenAPI Specs

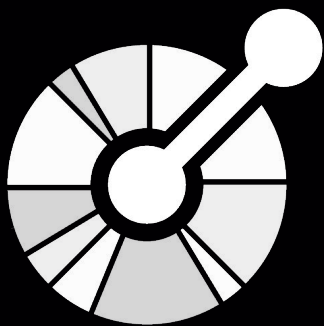
- Need more? OpenAPI Extensions are an engine to consider
- Extensions help where the specification does not
- Try out Moonwalk, share feedback



If you consume OpenAPI Specs

- Productize API - documentation, tools, versioning and maintenance
- Keep your OpenAPI version up to date
- Document / Share your extensions





OPENQuestions?



OpenAPI Initiative Slack



Gradle Slack, #developer-productivity