

Leveraging API Specification Languages

Lorna Mitchell, Nexmo



Describing APIs

- Describe RESTful HTTP APIs in a machine-readable way

Then the machine can read it and write:

- API reference documentation
- Code SDKs
- Postman collections
- Mock servers



API Spec Languages

- **OpenAPI** is an open standard, and is used in this talk
- **RAML** from Mulesoft (who also now support OpenAPI)
- **API Blueprint** from Apiary



Spec-First API Design



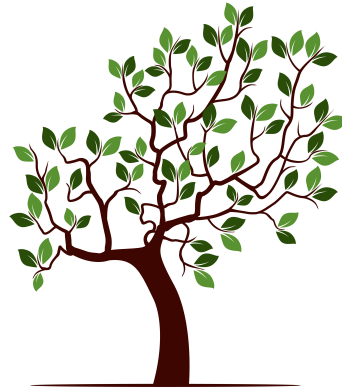
New APIs or Existing Ones?

New APIs or Existing Ones?

Yes!



Anatomy of OpenAPI Spec



Anatomy of OpenAPI Spec

Top-level elements:

- openapi
- info
- servers
- paths
- components
- security
- tags



OpenAPI Spec Examples

A JSON or YAML file holds the description (this is YAML)

```
openapi: 3.0.0
servers:
- url: 'https://api.nexmo.com/ni'
info:
title: Number Insight API
version: 1.0.3
description: >-
    Nexmo's Number Insight API delivers real-time intelligence about the validity
    ... a few hundred more lines here
```



Documenting an Endpoint

```
paths:
  '/basic/{format}':
    parameters:
      - $ref: '#/components/parameters/format'
    get:
      operationId: getNumberInsightBasic
      parameters:
        - $ref: '#/components/parameters/number'
        - $ref: '#/components/parameters/country'
      responses:
        '200':
          description: OK
          content:
            application/json:
              schema:
                $ref: '#/components/schemas/niResponseJsonBasic'
```

Reference Parameters

```
components:
  parameters:
    number:
      name: number
      in: query
      description: 'A single phone number that you need insight about in national'
      example: '447700900000'
      required: true
    country:
      name: country
      in: query
      example: 'GB'
      description: 'If a number does not have a country code or is uncertain, set'
      schema:
        type: string
        pattern: '[A-Z]{2}'
```

That looks complicated!



Editing Tools

There are editors with helpful tools

- Stoplight is highly recommended if you like a web interface <https://stoplight.io>
- I like Atom with linter-swagger <https://atom.io>
- Try SwaggerUI, SwaggerHub, etc <https://swagger.io/tools/>
- APICurio Studio gets good reviews <https://www.apicur.io/>



Please use Source Control



See also: <https://gitworkbook.com>

Validation Tools

Tools that check or "lint" your file.

- Speccy is a CLI tool with configurable rules <http://speccy.io/>
- Spectral is a newer CLI tool, also with rules <https://github.com/stoplighio/spectral>
- Open API Spec Validator <https://github.com/p1c2u/openapi-spec-validator>

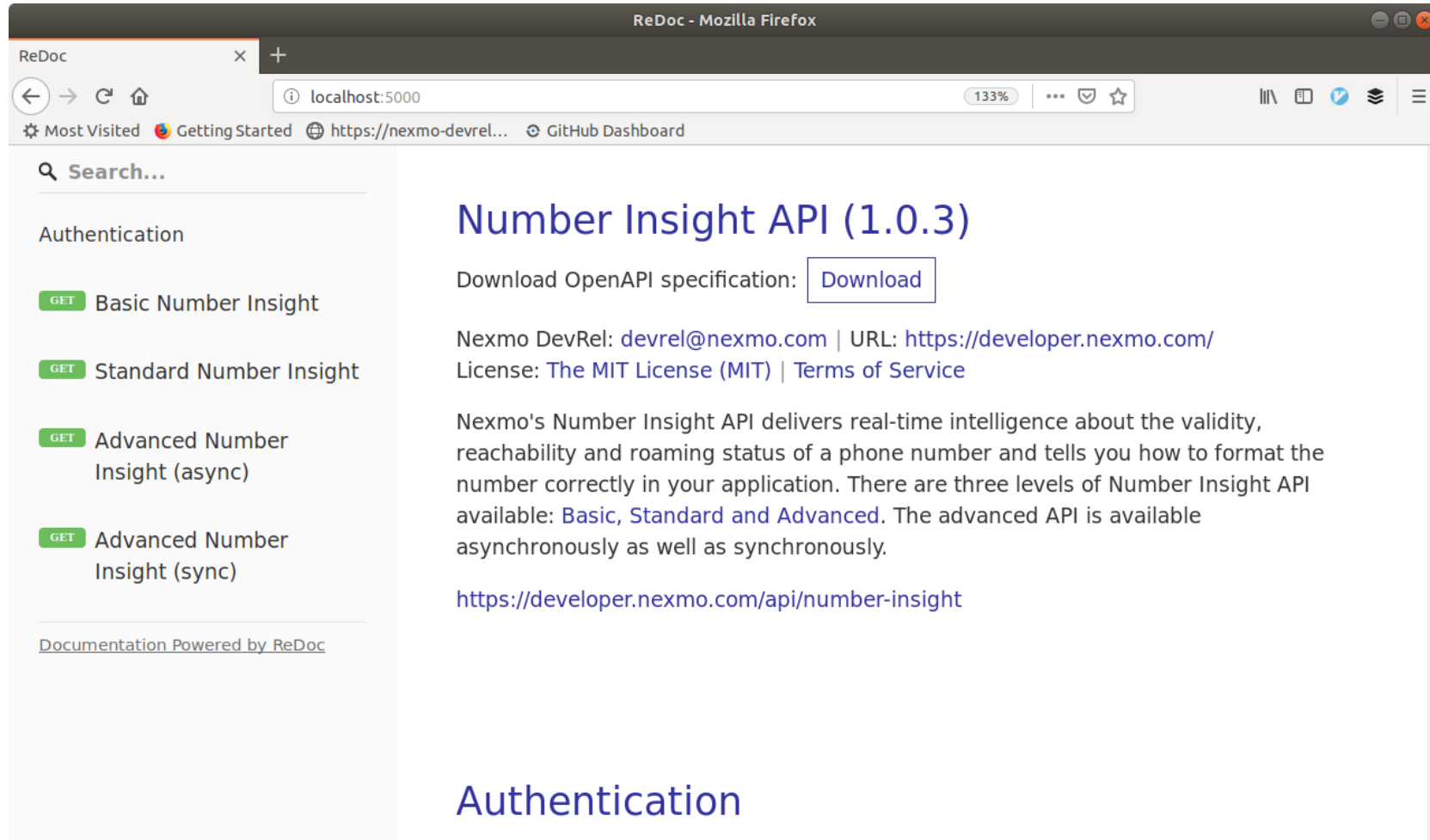


Preview Tools

OAS is a standard! So any preview should do:

- ReDoc is great <https://github.com/Rebilly/ReDoc>
- You can run OpenApi-GUI locally
<https://github.com/mermade/openapi-gui>
- Nexmo uses a custom renderer
<https://developer.nexmo.com/api>
- Stoplight shows documentation as you go (more on this later)
<https://stoplight.io>

Docs Example: ReDoc



Docs Example: Nexmo

The screenshot shows a web browser window titled "Nexmo Developer - Mozilla Firefox" displaying the Nexmo Developer API documentation. The browser's address bar shows the URL `https://developer.nexmo.com/api/number-insight`. The page features a dark blue header with the Nexmo logo, the word "Developer", a "We're hiring" button, and links for "Nexmo.com", "Support", "Sign In", and a "Try It free" button. Below the header is a navigation bar with links for "Documentation", "Tutorials", "API Reference" (which is underlined), "SDKs & Tools", "Community", and "Extend". A search bar is located on the right side of the navigation bar.

The main content area is divided into two columns. The left column contains a sidebar for the "NUMBER INSIGHT API" with an "Overview" section. It lists four API endpoints, each with a code icon, a description, and a "GET" button: "Basic Number Insight", "Standard Number Insight", "Advanced Number Insight (async)", and "Advanced Number Insight (sync)". The right column displays the "Number Insight API" title and a description: "Nexmo's Number Insight API delivers real-time intelligence about the validity, reachability and roaming status of a phone number and tells you how to format the number correctly in your application. There are three levels of Number Insight API available: Basic, Standard and Advanced. The advanced API is available asynchronously as well as synchronously." Below this description are two buttons: "Download OpenAPI 3 Definition" and "Improve this specification".

Below the description, the "Basic Number Insight" section is shown, stating it "Provides basic number insight information about a number." and "Note that this endpoint also supports POST requests." A "GET" button is followed by the endpoint URL `https://api.nexmo.com/ni/basic/:format`. On the right side of the page, there is a "JSON" dropdown menu and an "HTTP response 200" section showing a sample JSON response:

```
{  "status": 0,  "status_message": "S"}
```

Docs Example: Stoplight

The screenshot shows a web browser window displaying the Stoplight documentation for the Number Insight API. The browser's address bar shows the URL `https://next.stoplight.io/lornajane/number-insight/version%2F1.0/number-insight.oas3.yml`. The page has a dark sidebar on the left with a 'Number Insight API' header and a search bar. The main content area is titled 'Number Insight API' and includes a 'REFERENCE' section with endpoints like `/advanced/async/{format}`, `/advanced/{format}`, `/basic/{format}`, and `/standard/{format}`. Below this is a 'MODELS' section listing various data models. A 'More Info' section provides additional details: Version 1.0.3, Servers (including `https://api.nexmo.com/ni`), Contact Us by Email, Contact URL (`https://developer.nexmo.com/`), Terms Of Service (`https://www.nexmo.com/terms-of-use`), and License (The MIT License (MIT)). The footer mentions 'Powered by Stoplight'.

number-insight.oas3.yml · Number Insight · Stoplight - Mozilla Firefox

number-insight.oas3.yml × +

← → ↻ 🏠 <https://next.stoplight.io/lornajane/number-insight/version%2F1.0/number-insight.oas3.yml> ... 🛡️ ☆

⚙️ Most Visited 🌐 Getting Started 🌐 [https://nexmo-devrel...](https://nexmo-devrel.com) 🌐 GitHub Dashboard

🏠 📄 ⌚ 🌐 ⚙️

Read Code 18 Warnings Default v1.0

Number Insight API Search...

REFERENCE

- `/advanced/async/{format}` >
- `/advanced/{format}` >
- `/basic/{format}` >
- `/standard/{format}` >

MODELS

- niBasicStatus
- niCallerIdentity
- niCurrentCarrierProperties
- niIP
- niInitialCarrierProperties
- niResponseAsync
- niResponseJsonAdvanced

⚡ Powered by Stoplight

Number Insight API

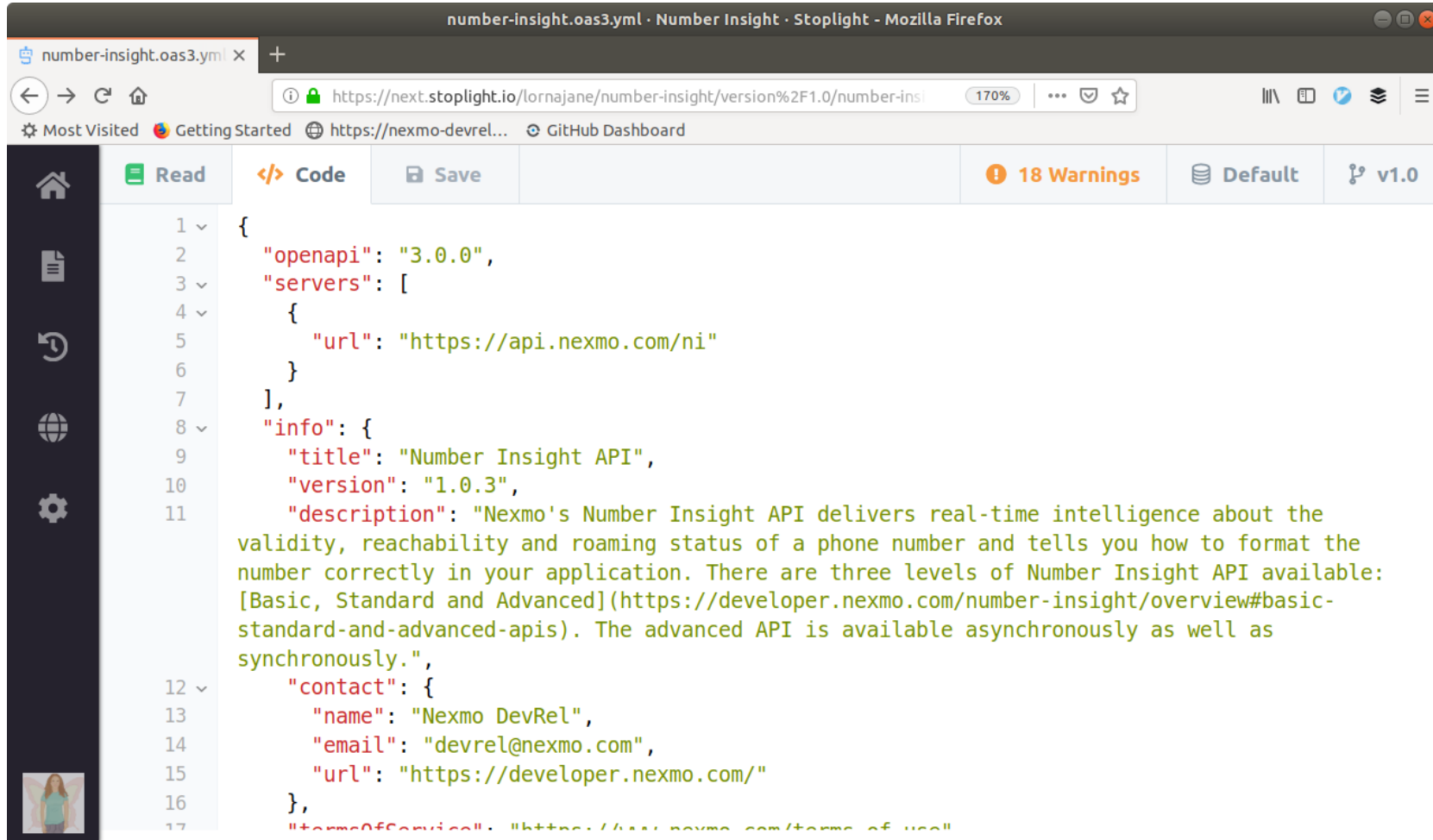
- **Version:** 1.0.3
- **Servers:**
 - `https://api.nexmo.com/ni`

▼ More Info

- **Contact Us by Email**
- **Contact URL:** <https://developer.nexmo.com/>
- **Terms Of Service:** <https://www.nexmo.com/terms-of-use>
- **License:** The MIT License (MIT)

Nexmo's Number Insight API delivers real-time intelligence about the validity, reachability and roaming status of a phone number and tells you how to format the number correctly in your application. There are three levels of

Stoplight Online Editor



The screenshot displays the Stoplight Online Editor interface in a Mozilla Firefox browser. The browser's address bar shows the URL `https://next.stoplight.io/lornajane/number-insight/version%2F1.0/number-insi`. The editor's top navigation bar includes tabs for 'Read', 'Code', and 'Save', along with a status bar indicating '18 Warnings', 'Default' theme, and 'v1.0' version. The left sidebar contains icons for home, document, undo, globe, and settings. The main editor area shows a YAML file named 'number-insight.oas3.yml' with the following content:

```
1 {
2   "openapi": "3.0.0",
3   "servers": [
4     {
5       "url": "https://api.nexmo.com/ni"
6     }
7   ],
8   "info": {
9     "title": "Number Insight API",
10    "version": "1.0.3",
11    "description": "Nexmo's Number Insight API delivers real-time intelligence about the
    validity, reachability and roaming status of a phone number and tells you how to format the
    number correctly in your application. There are three levels of Number Insight API available:
    [Basic, Standard and Advanced](https://developer.nexmo.com/number-insight/overview#basic-
    standard-and-advanced-apis). The advanced API is available asynchronously as well as
    synchronously.",
12    "contact": {
13      "name": "Nexmo DevRel",
14      "email": "devrel@nexmo.com",
15      "url": "https://developer.nexmo.com/"
16    },
17    "termsOfService": "https://api.nexmo.com/terms-of-use"
```


Stoplight Design View

NumberInsightsDemo.oas2.yml - numberinsights OAS2 - Stoplight - Mozilla Firefox

NumberInsightsDemo.oas2.yml +

https://next.stoplight.io/lornajane/numberinsights-oas2/version%2F1.0/Numb 110% ... ☆

Most Visited Getting Started https://nexmo-devrel... GitHub Dashboard

Read Design Code HTTP Save CRUD Path Model Tag Valid Default v1.0

Filter contents...

- home
- tags
- SECURITY
- None.
- PATHS
- /basic/{format}**
- MODELS
- None.
- SHARED
- parameters
- responses

GET /basic/{format}

BASICS

summary ? deprecated ? private ?

Get basic insights

description

B I H₁ H₂ H₃ | **“ </> ≡ ≡** | **🔗 🖼️ 👁️**

Provides `[basic number insight] (/number-insight/overview#basic-standard-and-advanced-apis)` information about a number. Note that this endpoint also supports `POST` requests.

*operation ID ? tags ?

getNumberInsightBasic Insight

consumes ? produces ?

VALID FILE

No errors found in this file.

Imported into Postman

The screenshot displays the Postman application window. The top bar includes a menu (File, Edit, View, Help), a toolbar with 'New', 'Import', and 'Runner' buttons, and a workspace selector set to 'My Workspace'. The left sidebar shows a 'Collections' view with a search filter. Under the 'Number Insight API' collection, the 'advanced' sub-collection is expanded, listing four requests: 'Advanced Number Insight (sync)', 'Advanced Number Insight (async)', 'Basic Number Insight', and 'Standard Number Insight'. The main panel shows the details of the 'Basic Number Insight' request, which is a GET request to the endpoint `{{baseUrl}}/basic/:format?api_key=&number=<string>&country=<string>`. The 'Params' tab is active, showing a table of query parameters.

KEY	VALUE	DESCRIPTION
format	<string>	The format of the response
api_key		You can find your API key in your [accou...]
number	<string>	A single phone number that you need in...
country	<string>	If a number does not have a country co...
Key	Value	Description

Generated Code Libraries

This example is from OpenAPI Generator

<https://github.com/OpenAPITools/openapi-generator>

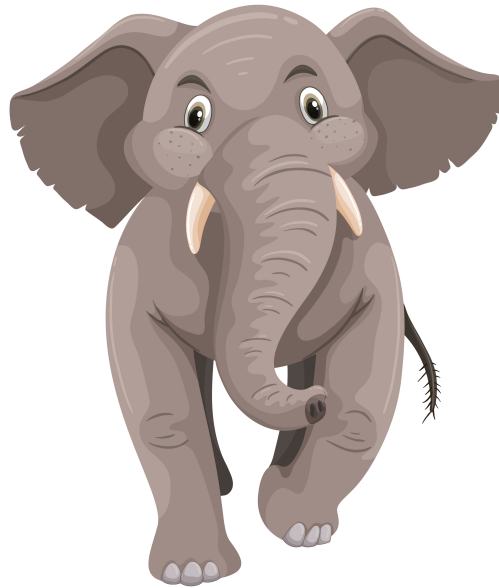
```
docker run --rm -v ${PWD}:/local \
openapitools/openapi-generator-cli generate
-i number-insight.yml -g php -o /local/out/php
```

Generated Code Libraries

To use it:

```
1 require_once('out/php/vendor/autoload.php');
2 // copy code from README, set API key and secret
3
4 $apiInstance = new OpenAPI\Client\Api\DefaultApi(
5     new GuzzleHttp\Client(), $config);
6 $format = "json";
7 $number = "447700900000";
8 try {
9     $result = $apiInstance->getNumberInsightBasic($format, $number);
10    print_r($result);
11 } catch (Exception $e) {
12     echo 'Exception when calling DefaultApi->getNumberInsightBasic';
13 }
```

Creating OpenAPI Specs is like
eating an elephant



Uses for OpenAPI Spec



Resources

- <https://www.openapis.org>
- <https://openapi.tools>
- <https://apievangelist.com>
- <https://stoplight.io>
- <https://speccy.io>
- <https://github.com/Rebilly/ReDoc>
- <https://github.com/openapitools/openapi-generator>

