



API PLATFORM

Semantic web for the masses

Kévin Dunglas

- Founder of **Les-Tilleuls.coop**
- **Symfony** Core Team
- **API Platform** creator



@dunglas





Les-Tilleuls.coop

Dev, consulting and training

- 👊 **Self-managed** since 2011
- ↑ 97% in 2016, 25 nice people
- 👷 → jobs@les-tilleuls.coop



React

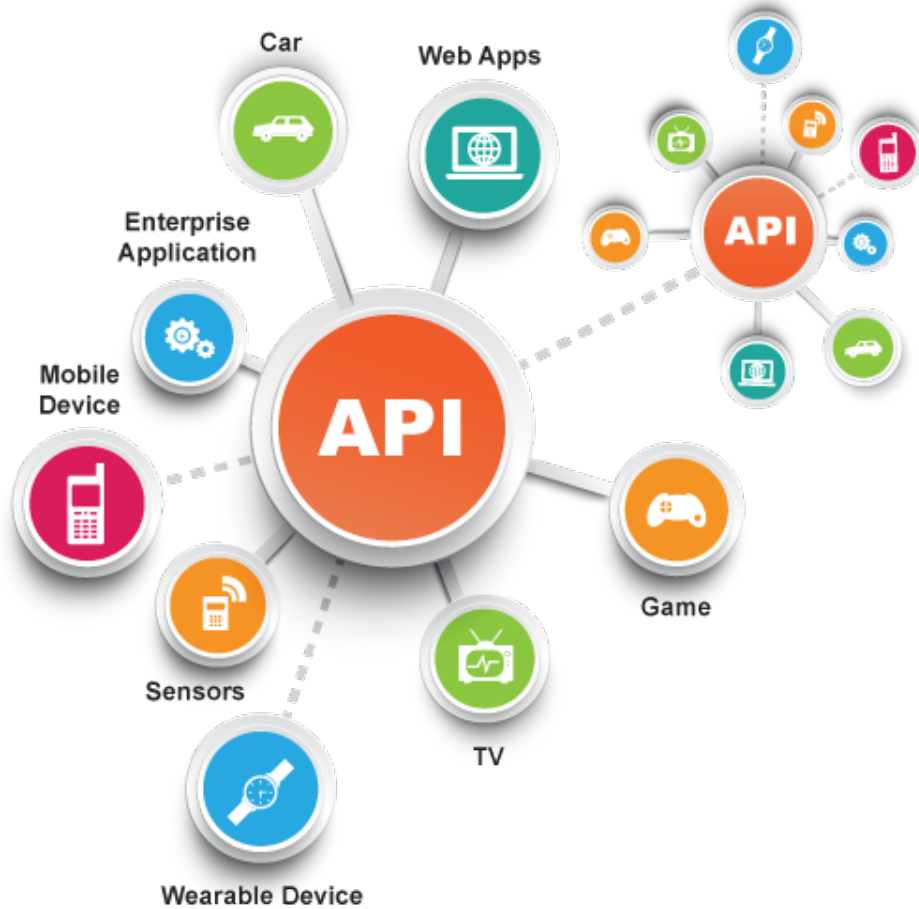


mongoDB.



elastic

APIs: the Heart of the New Web



SemWeb.Pro



Progressive Web Apps

- > Holds the presentation logic
- > Static « website »: JS, HTML and CSS
- > Downloaded only 1 time, **works offline!**
- > Sends async HTTP requests to the API
- > Huge ecosystem: React, Angular, Vue...



Native Mobile Apps

- Downloaded from stores (App Store, Google Play)
- Look'n'Feel consistent with the platform (iOS or Android)
- Sync data by sending HTTP requests to the API
- JS stack:
React Native, NativeScript



The SemWeb in 2017



Data Interop at Web-scale

- > Common format
- > Common vocabularies / ontologies / taxonomies
- > Machine-readable
- > Queryable
- > Ability to aggregate data from different sources
- > **Top priority topic for APIs**





Real-life benefits

- > Complex queries, data aggregation:

Find all congressmen

-> elected in France

-> not involved in a corruption case

using the french gov's Open Data API and Wikipedia as data source

- > Generic apps and libraries
 - > Accounting software compatible with all e-commerce platforms
 - > Admin interface able to deal with any data sources

XMLSCHEMA

FOAF

JSON-LD

SPARQL

SESAME

RIF

OWL

SIREN

HAL

SKOS

JENA

RDF

TURTLE

SWRL

JSON

HYDRA

JSONAPI

DUBLINCORE

TRIPLEFRAGMENTS

LINKED PLATFORM

MICRODATA

Most APIs have no
SemWeb support at all.

The avg Dev about SemWeb

- > Exotic academic techs, elitist community
- > Hard to learn and understand (specs proliferation)
- > No dev-friendly tooling for popular languages (JS, PHP, Go...)
- > Too much XML (hard to learn, slow on mobile devices)
- > Prefer using industry-leading alternatives (Facebook's GraphQL...)



No massive adoption
means **very**
limited benefits.

No Fatality




JSON-LD


JSON for Linked Data

- > Standardized hypermedia format: **W3C recommendation** (2014)
- > Easy to use: a **standard JSON** document with some special keys (starting with @) and mapped with a context
- > **100% compatible** with the way the AVG dev create APIs and apps
- > Backed by Google, BBC, Microsoft, US & UK govts...
- > Compliant with technologies of the **semantic web**: RDF, SPARQL, triple store...



 1.jsonld
/books

```
▼ {@context: "/contexts/Book", @id: "/books/1", @type: "Book", id: 1, title: "My first book"}  
  @context: "/contexts/Book"  
  @id: "/books/1"  
  @type: "Book"  
  id: 1  
  title: "My first book"
```

Name
 Book
/contexts

× Headers Preview Response Cookies Timing

```
▼ {@context: {@vocab: "http://localhost/docs.jsonld#", hydra: "http://www.w3.org/ns/hydra/core#",...}}  
  ▼ @context: {@vocab: "http://localhost/docs.jsonld#", hydra: "http://www.w3.org/ns/hydra/core#",...}  
    @vocab: "http://localhost/docs.jsonld#"  
    hydra: "http://www.w3.org/ns/hydra/core#"  
    title: "#Book/title"
```



```
{
  "@id": "http://localhost/books/1",
  "@type": "http://localhost/docs.jsonld#Book",
  "http://localhost/docs.jsonld#Book/title": "My first book",
  "http://localhost/docs.jsonld#id": 1
}
```

Expanded Compacted Flattened Framed N-Quads Normalized Visualized Signed with RSA Signed v

```
<http://localhost/books/1> <http://localhost/docs.jsonld#Book/title> "My first book" .  
<http://localhost/books/1> <http://localhost/docs.jsonld#id> "1"^^<http://www.w3.org/2001/XMLSchema#integer> .  
<http://localhost/books/1> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://localhost/docs.jsonld#Book> .
```

Expanded

Compacted

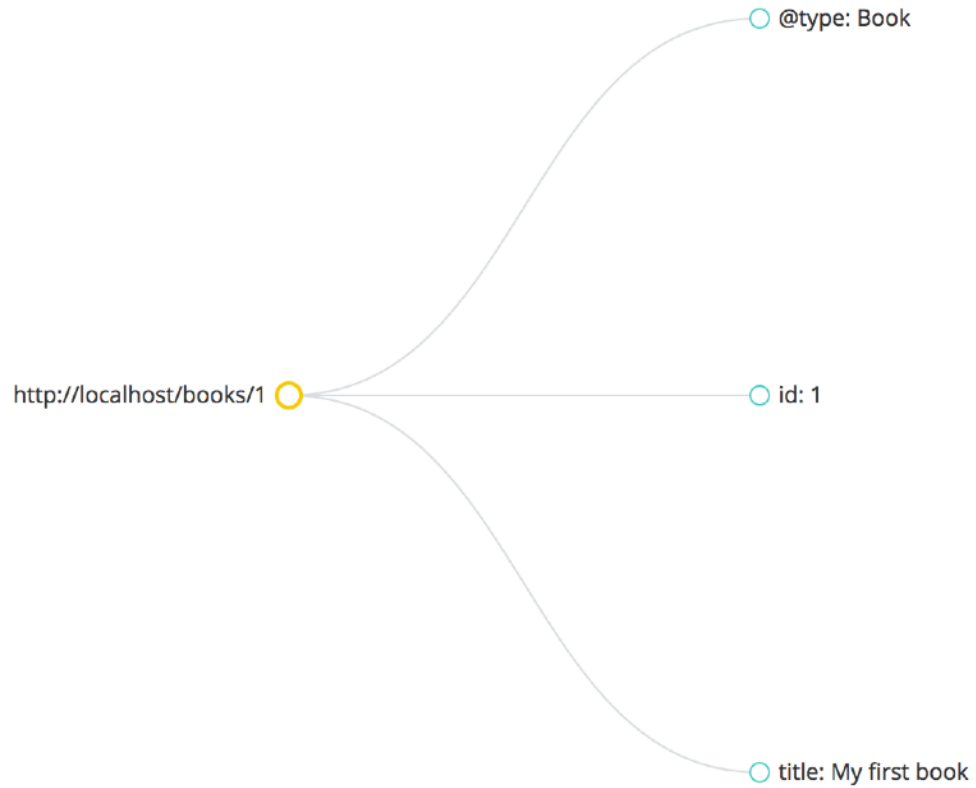
Flattened

Framed

N-Quads

Normalized

Visualized





```
1 <script type="application/ld+json">
2 {
3   "@context": "http://schema.org",
4   "@type": "Product",
5   "image": "macbook.jpg",
6   "name": "Apple Macbook",
7   "offers": {
8     "@type": "AggregateOffer",
9     "priceCurrency": "EUR",
10    "highPrice": "1449",
11    "lowPrice": "1799"
12  }
13 }
14 </script>
```

Product

All (1) ▾

Product		0 ERRORS	0 WARNINGS	^
@type	Product			
image	macbook.jpg			
name	Apple Macbook			
offers				
@type	AggregateOffer			
priceCurrency	EUR			
highPrice	1449			
lowPrice	1799			

Acheter MacBook - Apple (FR)

www.apple.com › [Mac](#) › [MacBook](#) ▼

1 449,00 € à 1 799,00 €

Personnalisez votre **MacBook** : choisissez une finition or rose, argent, or ou gris sidéral, et configurez-le à votre idée. Examinez le **MacBook** sous toutes les ...



Hydra

Hydra

- > Draft W3C
- > In-band API doc
- > auto-discoverable API:
resources, properties, types, operations
- > Standardize **common API structures**:
collections, paginations, filters, errors...



```
@context: "/contexts/Book"
```

```
@id: "/books"
```

```
@type: "hydra:Collection"
```

```
▼ hydra:member: [{@id: "/books/2", @type: "http://schema.org/Book", id: 2, isbn: "9792828761393",...},...]
```

```
▼ 0: {@id: "/books/2", @type: "http://schema.org/Book", id: 2, isbn: "9792828761393",...}
```

```
  @id: "/books/2"
```

```
  @type: "http://schema.org/Book"
```

```
  author: "Harry Potter"
```

```
  dateCreated: "2016-09-04T00:00:00+00:00"
```

```
  description: "test"
```

```
  id: 2
```

```
  isbn: "9792828761393"
```

```
  name: "very good platforms edit"
```

```
▶ 1: {@id: "/books/3", @type: "http://schema.org/Book", id: 3, isbn: "9783431563108", name: "book3",...}
```

```
▶ 2: {@id: "/books/4", @type: "http://schema.org/Book", id: 4, isbn: "9783899289190",...}
```

```
▶ 3: {@id: "/books/5", @type: "http://schema.org/Book", id: 5, isbn: "9782877335010",...}
```

```
▶ 28: {@id: "/books/30", @type: "http://schema.org/Book", id: 30, isbn: "9793256070637",...}
```

```
▶ 29: {@id: "/books/31", @type: "http://schema.org/Book", id: 31, isbn: "9782919230952",...}
```

```
hydra:totalItems: 162
```

```
▼ hydra:view: {@id: "/books?page=1", @type: "hydra:PartialCollectionView", hydra:first: "/books?page=1",...}
```

```
  @id: "/books?page=1"
```

```
  @type: "hydra:PartialCollectionView"
```

```
  hydra:first: "/books?page=1"
```

```
  hydra:last: "/books?page=6"
```

```
  hydra:next: "/books?page=2"
```




```
▼ {@context: {@vocab: "http://localhost/docs/docs.jsonld#", hydra: "http://www.w3.org/ns/hydra/core#", ...}, ...}
  ▶ @context: {@vocab: "http://localhost/docs/docs.jsonld#", hydra: "http://www.w3.org/ns/hydra/core#", ...}
    @id: "/docs.jsonld"
    hydra:entrypoint: "/"
  ▼ hydra:supportedClass: [{@id: "#Book", @type: "hydra:Class", rdfs:label: "Book", hydra:title: "Book", ...}, ...]
    ▼ 0: {@id: "#Book", @type: "hydra:Class", rdfs:label: "Book", hydra:title: "Book", ...}
      @id: "#Book"
      @type: "hydra:Class"
      hydra:description: "A book."
    ▼ hydra:supportedOperation: [{@type: "hydra:Operation", hydra:method: "GET", hydra:title: "Retrieves Book resource.", ...}, ...]
      ▼ 0: {@type: "hydra:Operation", hydra:method: "GET", hydra:title: "Retrieves Book resource.", ...}
        @type: "hydra:Operation"
        hydra:method: "GET"
        hydra:title: "Retrieves Book resource."
        rdfs:label: "Retrieves Book resource."
        returns: "#Book"
      ▶ 1: {@type: "hydra:ReplaceResourceOperation", expects: "#Book", hydra:method: "PUT", ...}
      ▶ 2: {@type: "hydra:Operation", hydra:method: "DELETE", hydra:title: "Deletes the Book resource.", ...}
    ▼ hydra:supportedProperty: [{@type: "hydra:SupportedProperty", ...}]
      ▼ 0: {@type: "hydra:SupportedProperty", ...}
        @type: "hydra:SupportedProperty"
        hydra:description: "The title of this book."
      ▼ hydra:property: {@id: "#Book/title", @type: "rdf:Property", rdfs:label: "title", domain: "#Book", range: "xmls:string"}
        @id: "#Book/title"
        @type: "rdf:Property"
        domain: "#Book"
        range: "xmls:string"
        rdfs:label: "title"
        hydra:readable: true
        hydra:required: false
        hydra:title: "title"
        hydra:writable: true
      hydra:title: "Book"
      rdfs:label: "Book"
    ▶ 1: {@id: "#Entrypoint", @type: "hydra:Class", hydra:title: "The API entrypoint", ...}
    ▶ 2: {@id: "#ConstraintViolation", @type: "hydra:Class", hydra:title: "A constraint violation", ...}
    ▶ 3: {@id: "#ConstraintViolationList", @type: "hydra:Class", subclassOf: "hydra:Error", ...}
```



Schema.org

Schema.org

- > Open vocabulary
- > Large set of elements: people, events, products, chemicals...
- > Understood by Google, Bing, Yahoo! and Yandex
- > Massively used, W3C-backed (Web Schemas Group)
- > Official support for RDFa, microdata and JSON-LD
- > Can be extended (custom vocabularies)



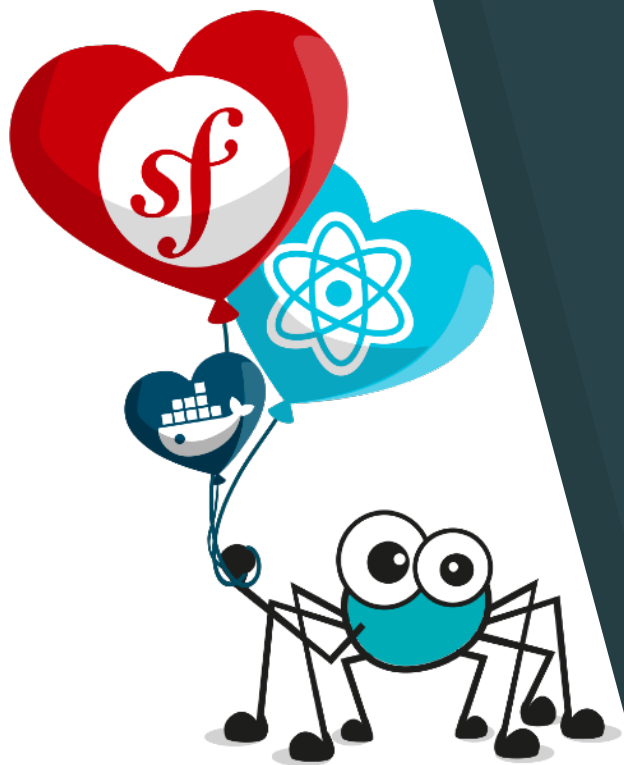


API Platform: Linked Data Framework for the Masses

Goals

- > Rock-solid API **in minutes**
- > High grade Linked Data support
- > Create, consume, test and deploy
- > Customizable, extensible, modular
- > Built with popular battle-tested techs:
PHP (**Symfony**) and JavaScript (**React**)





Getting Started



Install

- > Grab a release on GitHub
- > `$ docker-compose up`

Browse <https://localhost>



Hello API Platform 1.0.0

Greeting

GET /greetings Retrieves the collection of Greeting resources.

POST /greetings Creates a Greeting resource.

GET /greetings/{id} Retrieves a Greeting resource.

PUT /greetings/{id} Replaces the Greeting resource.

DELETE /greetings/{id} Removes the Greeting resource.



Elements Console Sources **Network** Performance Memory Application Security Audits Adblock Plus React

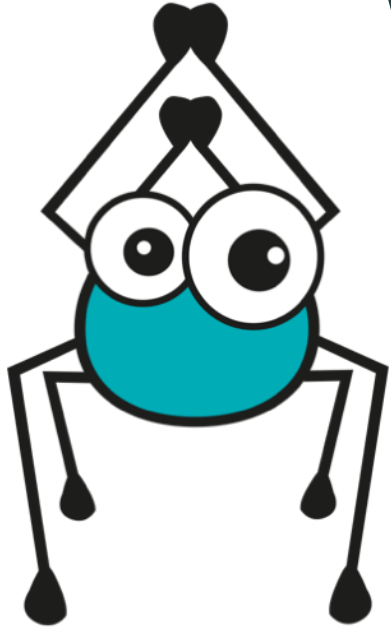
2

View: Group by frame Preserve log Disable cache Offline No throttling

Filter Regexp Hide data URLs **All** XHR JS CSS Img Media Font Doc WS Manifest Other

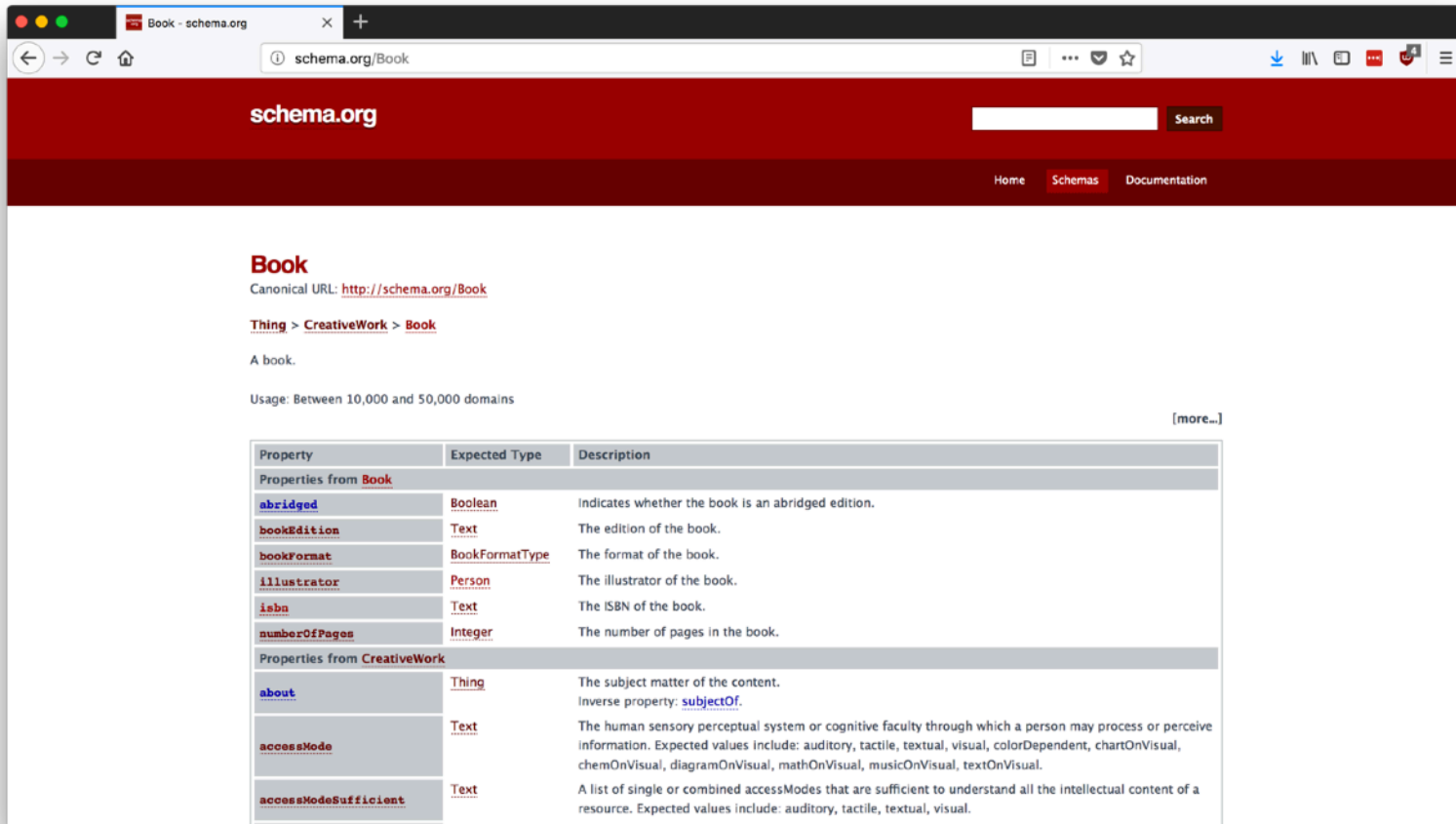
Name	Status	Protocol	Type	Initiator	Size	Time	Waterfall	
<input type="checkbox"/> greetings	200	h2	fetch	swagger-ui-bundle.js:52 Script	446 B 121 B	807 ms 806 ms		44.0

1 / 2 requests | 446 B / 446 B transferred



Your Turn!

Browse Schema.org



The screenshot shows a web browser window with the URL `schema.org/Book`. The page features a dark red header with the `schema.org` logo and a search bar. Below the header, there are navigation links for `Home`, `Schemas`, and `Documentation`. The main content area displays the `Book` schema details, including its canonical URL, breadcrumb navigation, a brief description, and usage statistics. A table lists the properties of the `Book` schema, categorized into those from `Book` and those from `CreativeWork`.

Book
Canonical URL: <http://schema.org/Book>

Thing > **CreativeWork** > **Book**

A book.

Usage: Between 10,000 and 50,000 domains [\[more...\]](#)

Property	Expected Type	Description
Properties from Book		
abridged	Boolean	Indicates whether the book is an abridged edition.
bookEdition	Text	The edition of the book.
bookFormat	BookFormatType	The format of the book.
illustrator	Person	The illustrator of the book.
isbn	Text	The ISBN of the book.
numberOfPages	Integer	The number of pages in the book.
Properties from CreativeWork		
about	Thing	The subject matter of the content. Inverse property: subjectOf .
accessMode	Text	The human sensory perceptual system or cognitive faculty through which a person may process or perceive information. Expected values include: auditory, tactile, textual, visual, colorDependent, chartOnVisual, chemOnVisual, diagramOnVisual, mathOnVisual, musicOnVisual, textOnVisual.
accessModeSufficient	Text	A list of single or combined accessModes that are sufficient to understand all the intellectual content of a resource. Expected values include: auditory, tactile, textual, visual.

Pick the types you want...

```
schema.yaml x
1  types:
2     Book:
3         properties:
4             name: ~
5             isbn: ~
6             numberOfPages: ~
```

```
$ bin/schema generate-types src
```

```
1 <?php
2
3 declare(strict_types=1);
4
5 namespace App\Entity;
6
7 use ...
8
9
10
11 /**
12  * A book.
13  *
14  * @see http://schema.org/Book Documentation on Schema.org
15  *
16  * @ORM\Entity
17  * @ApiResource(iri="http://schema.org/Book")
18  */
19 class Book
20 {
21     /** @var int|null ...*/
22     private $id;
23
24
25
26     /** @var string|null the name of the item ...*/
27     private $name;
28
29
30
31     /** @var string|null the ISBN of the book ...*/
32     private $isbn;
33
34
35
36     /**
37      * @var int|null the number of pages in the book
38      *
39      * @ORM\Column(type="integer", nullable=true)
40      * @ApiProperty(iri="http://schema.org/numberOfPages")
41      */
42     private $numberOfPage;
```

... to Generate a Class

```
54 public function getId(): ?int
55 {
56     return $this->id;
57 }
58
59 public function setName(?string $name): void{.
60
61
62
63 public function getName(): ?string{...}
64
65
66 public function setIsbn(?string $isbn): void{.
67
68
69 public function getIsbn(): ?string{...}
70
71
72 public function setNumberOfPage(?int $numberOfPage): void{.
73
74
75 public function getNumberOfPage(): ?int{...}
76
77
78
79
80
81
82
83
84
85
86
87
88 }
```

Guessed from OWL

- > PHP classes, properties, getters and setters
- > ORM mapping (Doctrine)
- > Validation constraints (Symfony)
- > PHPDoc from vocab's human-readable descriptions
- > JSON-LD context mapping
- > **Work with any vocal defined in OWL or RDFa!**



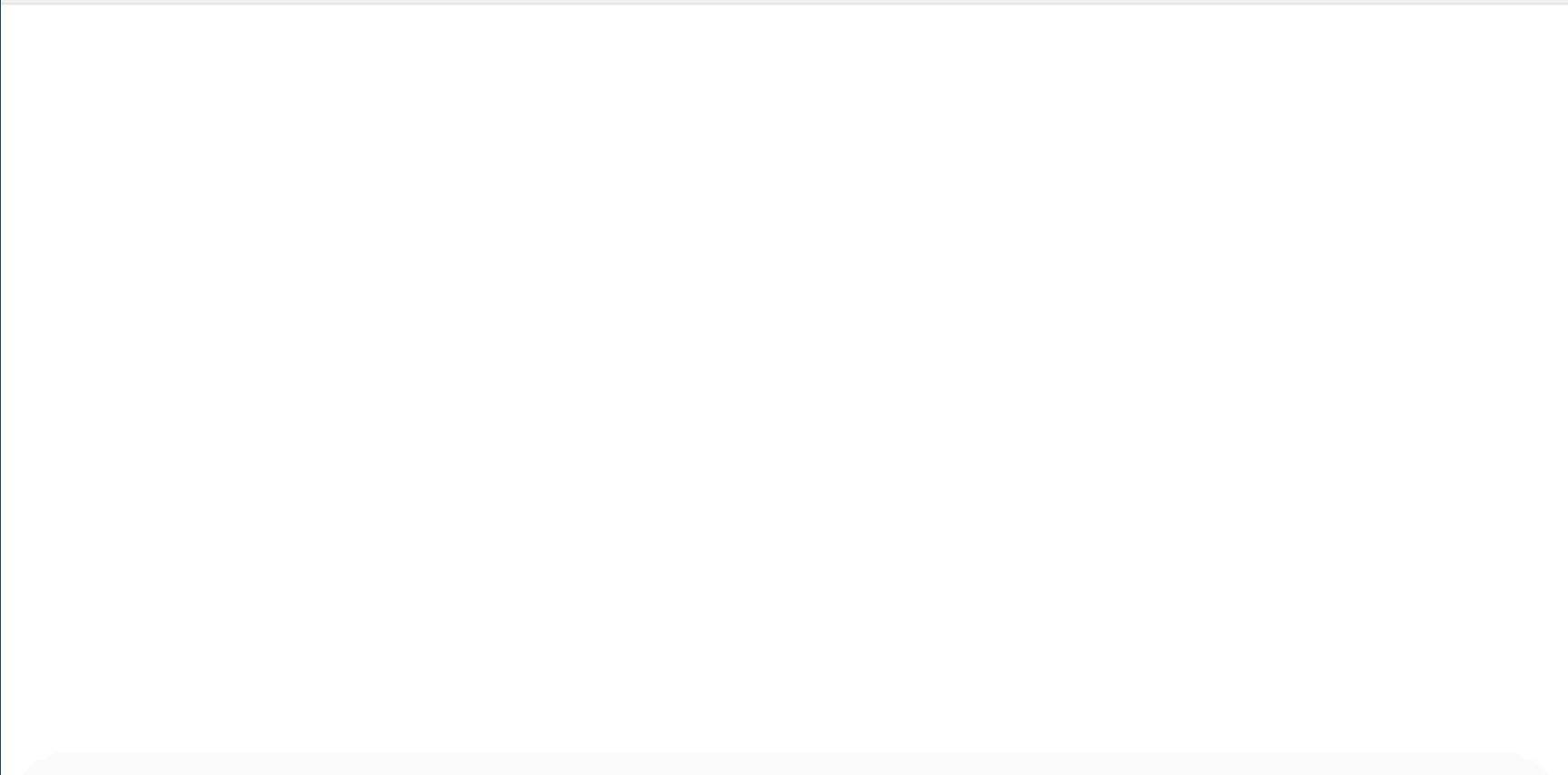


Or Create your own Class

- Plain Old PHP Object
- Doctrine integration (**optional**)
- PHPDoc extraction (**optional**)
- The hook: `@ApiResponse`
XML and YAML also supported

```
$ docker-compose exec php bin/console \  
doctrine:schema:update --force
```

```
namespace App\Entity;  
  
use ApiPlatform\Core\Annotation\ApiResource;  
use Doctrine\ORM\Mapping as ORM;  
  
/**  
 * A book.  
 *  
 * @ApiResponse  
 * @ORM\Entity  
 */  
class Book  
{  
    /**  
     * @var int The id of this book.  
     *  
     * @ORM\Id  
     * @ORM\GeneratedValue  
     * @ORM\Column(type="integer")  
     */  
    public $id;  
  
    /**  
     * @var string The title of this book.  
     *  
     * @ORM\Column(type="text")  
     */  
    public $title;  
}
```



En attente de localhost...





**Your 1st API
is ready!**



Other Features



Create a **CRUD** API in minutes



JSON-LD, Hydra, HAL native support



Automatic **Swagger** documentation



Built with **Symfony** and **Doctrine**



Docker integration



Data validation and error management



Pagination



Filtering and sorting



Generate the data model using **Schema.org**



FOSUser integration



JWT and **OAuth** support



Implements **OWASP's recos**



Easily customizable (events, DI) and configurable



Modular



Designed for speed and caching



Behat, PHPUnit and **Postman** spec & testing



Works with all JS frameworks (**React, Angular...**)

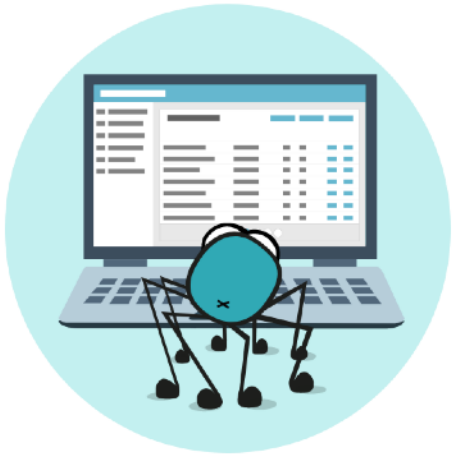


100% open source (MIT)

Client-side tools



Admin



API Platform Admin

- > Automatic admin interface
- > Built on top of Admin On Rest (by Marmelab)
- > Material Design
- > **Automatically generates the admin by parsing the Hydra API doc**

Browse <https://localhost:8001>



API Platform

- Books
- Reviews

Books List

+ CREATE
↻ REFRESH

ID	TITLE	ISBN	PUBLISHEDAT		
/books/1	Dolor et optio rerum quaerat ut.	9796303117590	18/02/2002	SHOW	EDIT
/books/2	Ut quia at quia quibusdam.	9780181097211	03/02/1996	SHOW	EDIT
/books/3	Occaecati nihil quam quaerat ipsum earum vel.	9781176288294	29/06/1995	SHOW	EDIT
/books/4	Numquam dicta accusamus non laboriosam ad eius tempore error.	9790750699296	18/04/2007	SHOW	EDIT
/books/5	Laboriosam et aut ipsum possimus consequuntur aliquam fugiat.	9785631193208	26/04/1975	SHOW	EDIT
/books/6	Aut necessitatibus adipisci nihil enim dolorem aliquid.	9781141042135	20/10/1978	SHOW	EDIT
/books/7	Fuga libero cupiditate laudantium itaque non enim.	9787718408489	28/06/1972	SHOW	EDIT
/books/8	Impedit porro ab adipisci vitae alias.	9799161330903	08/12/1982	SHOW	EDIT
/books/9	Excepturi quo dolor et officis minima et consequatur earum.	9795584684524	08/03/1994	SHOW	EDIT
/books/10	Ut sit illo facilis accusamus.	9782838950504	29/08/1989	SHOW	EDIT



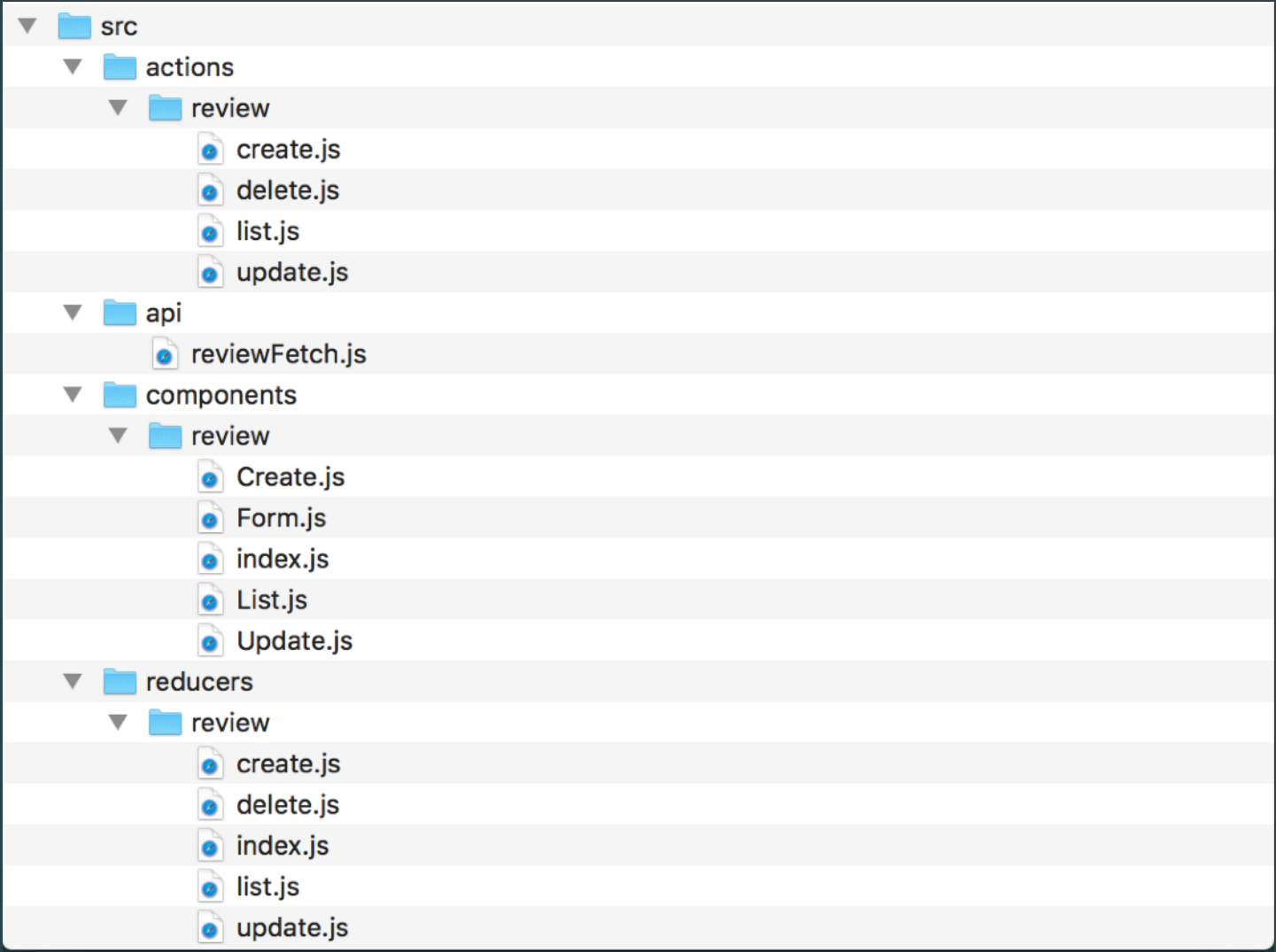


Clients Generator

React PWA Generator (default)



- > scaffolding tool, **100% client-side**
- > Rock solid stack
- > Twitter Bootstrap support + **accessibility** (ARIA roles)
- > Use ES2015's *fetch()*
- > **Parse Hydra API doc to generate files**



Review List

Id book body createdAt

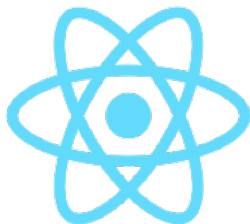
Create





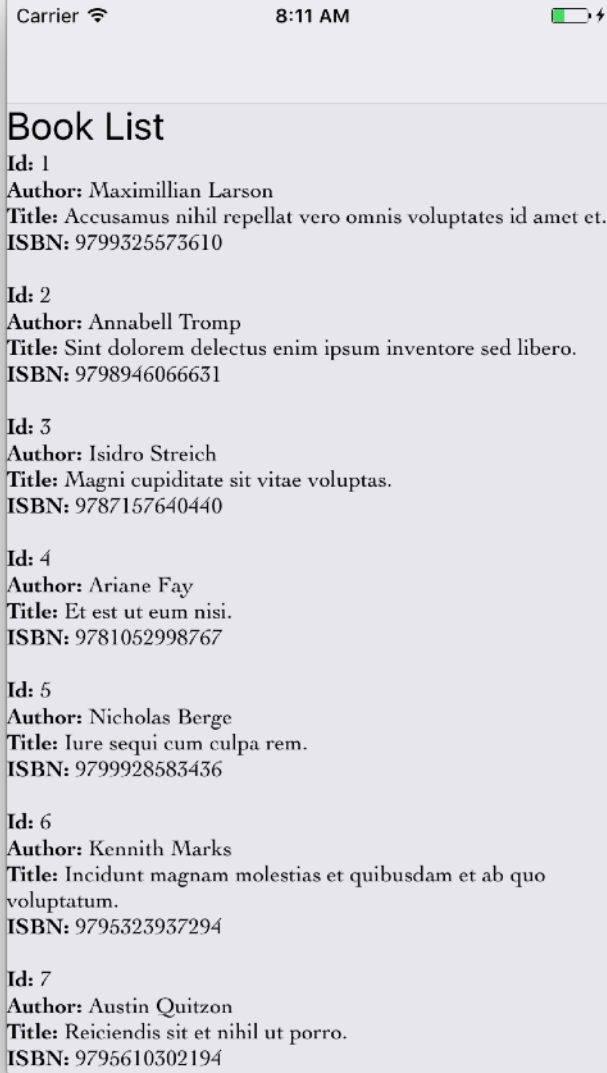
Other Skeletons

- > **React Native**
- > **TypeScript definitions**
- > **Vue.js**
- > **Angular**
- > **Your preferred technology:** Pull Requests very appreciated!



React Native

```
$ generate-api-platform-client \
http://localhost src/ \
-g react-native
```



SemWeb.Pro



Deploy in Clouds



Kubernetes & Helm

- > K8S: « Production-Grade Container Orchestration », by **Google**
- > Powers **Google Kubernetes Engine** and **Azure Container Service**
- > **Helm**: official K8S package manager (like APT or Homebrew), by **Microsoft**
- > Free software





Deploy in the Cloud

- A Helm chart is provided with API Platform

```
# ...Build and push the Docker images...  
# ...Connect to your Kubernetes cluster...
```

```
$ helm install ./api/helm/api --name api
```

**The project is deployed,
managed, and scale!**

A Growing Community

- > Best 2017 Symfony Bundle
- > 2k stars on GitHub
- > 1k followers on Twitter
- > 200+ contributors



They already Use API Platform

SemWeb.Pro



ALSTOM



eVaali.fi



microD€N



VILLE DE ROUBAIX



SensioLabs

Smile
OPEN SOURCE SOLUTIONS





Hypermedia driven REST API for linked bibliographic resources. -- at the moment in test mode

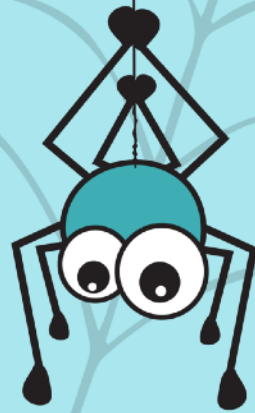
Response

@context: <http://data.swissbib.ch/contexts/Entrypoint>
@id: <http://data.swissbib.ch/>
@type: "Entrypoint"
work: <http://data.swissbib.ch/work>
document: <http://data.swissbib.ch/document>
bibliographicResource: <http://data.swissbib.ch/bibliographicResource>
organisation: <http://data.swissbib.ch/organisation>
item: <http://data.swissbib.ch/item>
person: <http://data.swissbib.ch/person>

Thanks!

Any questions?

<https://api-platform.com>



[api-platform/api-platform](https://github.com/api-platform/api-platform)



[@ApiPlatform](https://twitter.com/ApiPlatform)