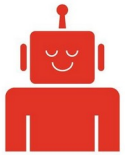
What is JSON:API and how can I use it well?

Hi!

I am Mateu

I am here because I am a decoupling nerd

You can find me at @e0ipso



Lullabot

You will learn about...

JSON API

What is it?

Why use it?

Drupal module

What's the status?

What are the limitations?

Extend it

Solutions to hard problems


Stop deciding
unimportant things.
Start working

```
// ...
{
  "type": "articles",
  "id": "1",
  "attributes": {
    "title": "Rails is Omakase"
  },
  "relationships": {
    "author": {
      "links": {
        "self": "/articles/1/relationships/author",
        "related": "/articles/1/author"
      },
      "data": { "type": "people", "id": "9" }
    }
  }
  ...
```

Defines: Transport Interaction

```
GET /articles/1/relationships/comments HTTP/1.1
Accept: application/vnd.api+json
```

Creative Commons specification

Strongly driven by FE & UX experts

Steve Klabnik, Yehuda Katz, Dan Gebhardt, Tyler Kellen, Ethan

Why this one?

Since there are others, and there is GraphQL as well.

141 repos

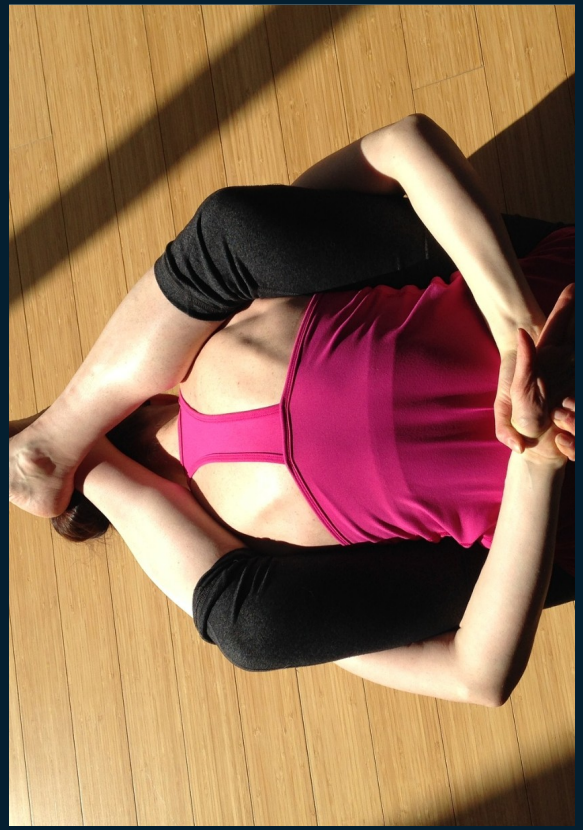
That’s a lot of traction

18 languages

And a lot of range

Client & Server

Total success!



With a highlight on its flexibility

Stays neutral on implementation details and gives you space. Also provides extension system.


RTFM

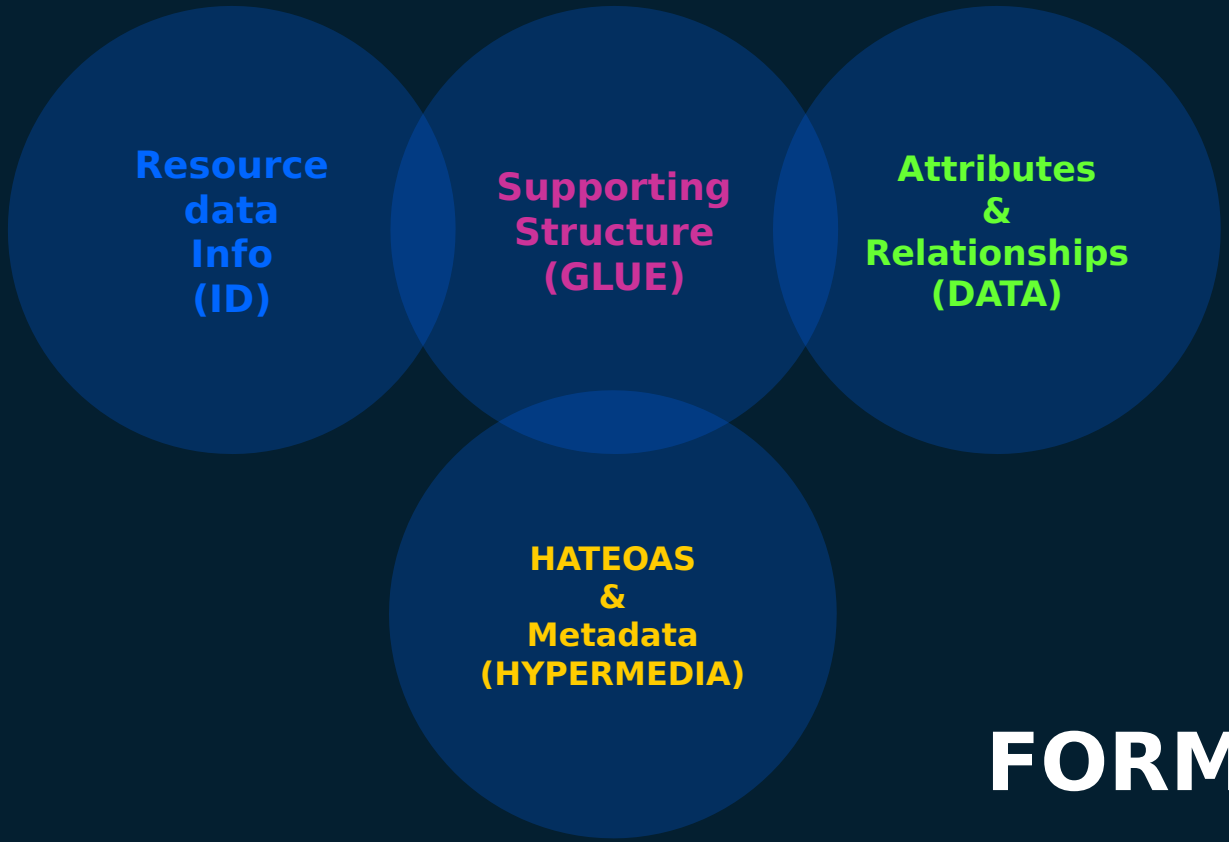
Response to the typical problems

- Multiple round trip requests
- Bloated responses
- Content discovery

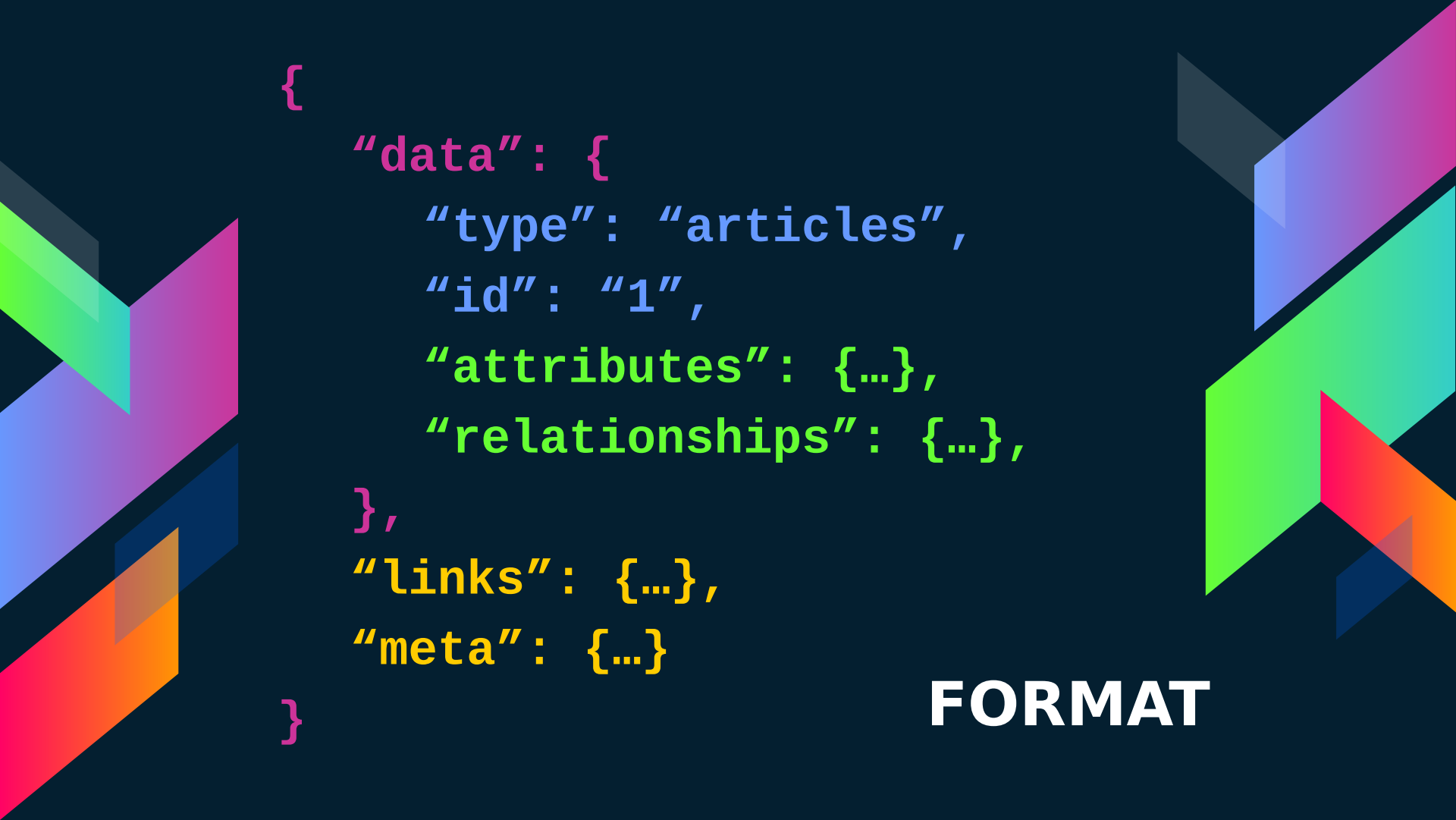
They all have known solid solutions!

1. TRANSPORT FORMAT

The shape of the JSON object


Resource
data
Info
(ID)
Supporting
Structure
(GLUE)
Attributes
&
Relationships
(DATA)
HATEOAS
&
Metadata
(HYPERMEDIA)

FORMAT


{
"data": {
"type": "articles",
"id": "1",
"attributes": {…},
"relationships": {…},
},
"links": {…},
"meta": {…}
}
FORMAT

```
{
  …
    “attributes”: {
      “title”: “Drupal 8!”,
      “body”: “Lorem ipsum”
      …
    },
  …
}
```

FORMAT

```
…
  “relationships”: {
     “links”: {
        “self”: “articles/1/relationships”
     },
     “tags”: {
        “data”: [{
           “type”: “tags”,
           “id”: “2”
        }]
     }
…
```

FORMAT

2. RESOURCE INTERACTION

How do we *get* and *update* data

Uses REST

GET, POST, PUT, PATCH, DELETE, …

Typical request

```
GET /articles HTTP/1.1
Accept: application/vnd.api+json
```

RESPONSE

/jsonapi/node/article

Response to the typical problems

- Multiple round trip requests
- Bloated responses
- Content discovery

They all have known solid solutions!

The typical solutions

- ⚠ Multiple round trip requests
- ✓ Resource embedding

- ⚠ Bloated responses
- ✓ Sparse fieldsets

- ⚠ Content discovery
- ✓ Collections and filters

EXTREMELY
SIMPLE

Your project will have way more stuff than this!

- **1**: GET articles/12
- **2**: GET articles/12 => tags/34
- **3**: GET articles/12 => tags/88
- **4**: GET articles/12 => users/88
- **5**: GET articles/12 => users/88 => images/5
- **6**: GET articles/12/comments
- **7**: GET articles/12 => comment/2
- **8**: GET articles/12 => comment/2 => user/8
- **9**: GET articles/12 => comment/2 => user/8 => image/9
- **10**: GET articles/12 => comment/7 [...]
- **11**: GET articles/12 => comment/7 [...]
- **12**: GET articles/12 => comment/7 [...]
- **MORE!**

```
GET /articles/12?
include=
  author,author.pic,
  tags,
  comment,comment.author,
  comment.author.pic
```

Resource embedding

```
GET /articles/12?
fields[articles]=
  title,
  created
```

Sparse fieldsets

```
…
“attributes”: {
  “title”: “My article”,
  “uuid”: “12345-1234-34”,
  “created”: “10-05-2012”,
  “status”: “1”,
  “body”: {…},
  “langcode”: “en”
}
…
```

“Give me the cover image and the publication year of all the albums of all the bands having one of the members under 35 currently living in Murcia.

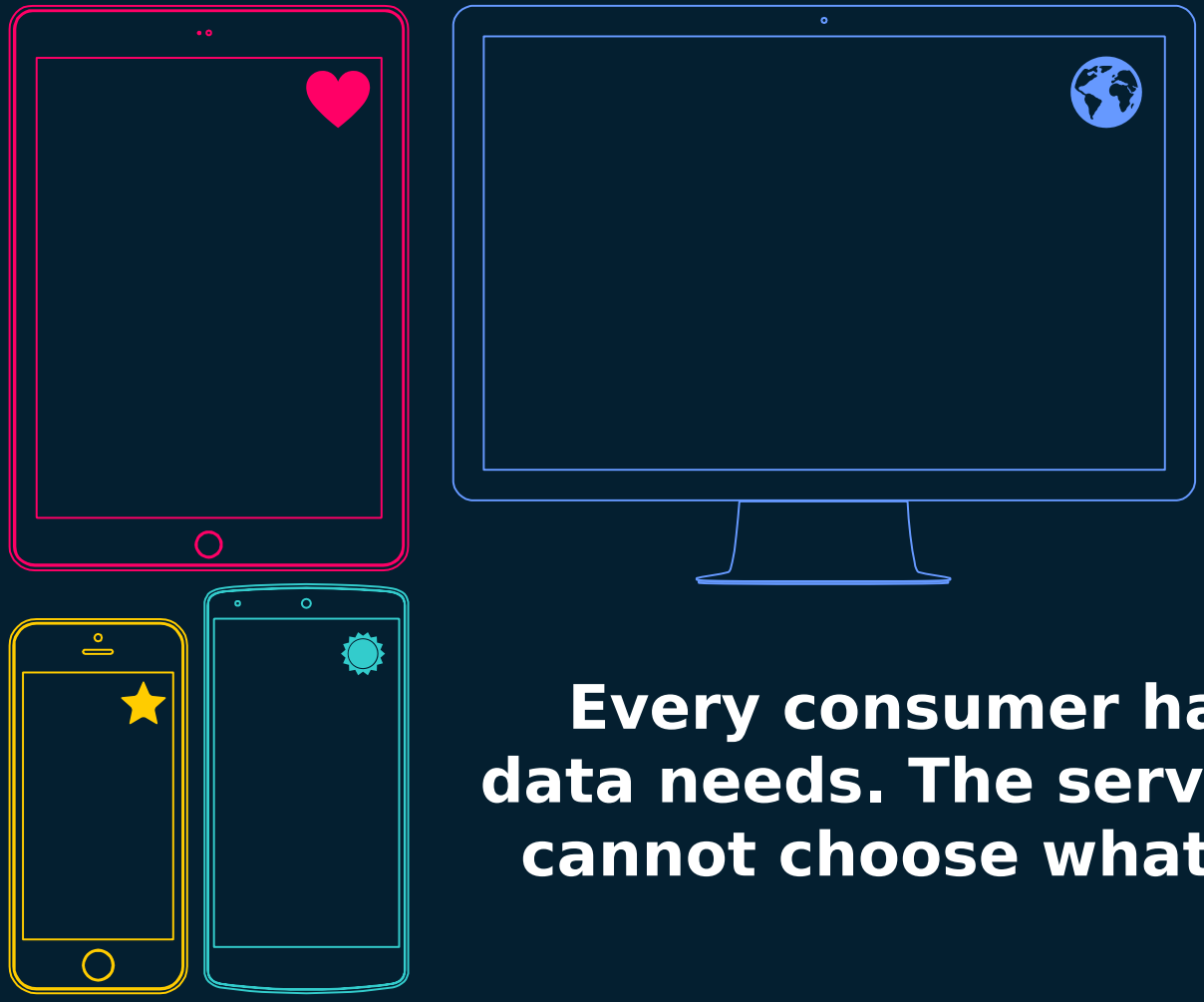
Oh! And while you're at it, output the name of the band and that member as well.”

```
GET /bands?
filter[members.city][value]=Murcia&
filter[members.age][value]=35&
filter[members.age][operator]=”<=”&
include=albums,albums.cover,members&
fields[bands]=name,albums,members&
fields[members]=name&
fields[albums]=publication&
fields[images]=uri
```

Collections and filters

WRITE URL QUERIES

Every **API consumer** requests the resource data it needs. It can be different every time.



Every consumer has different data needs. The server (Drupal) cannot choose what those are.

Every resource 4 *“endpoints”*

1. /bands/1234
    - GET, PUT, PATCH, DELETE
2. /bands
    - GET, POST
3. /bands/1234/albums
    - GET
4. /bands/1234/relationships/albums
    - GET, PATCH

3. PERFORMANCE

How fast is the Drupal module?

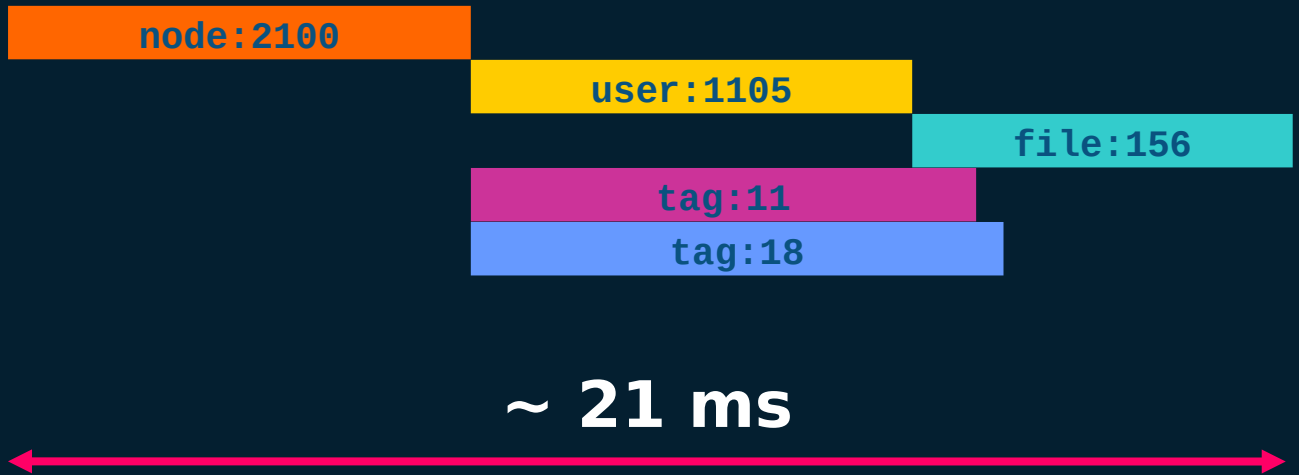
Benchmarking JSON API

- `ab -v4 -k -c8 -n10 -A u:p node:2100`
- `include`
  - Author
    - Author image
  - Tags (2 tags)

Benchmarking core HAL JSON

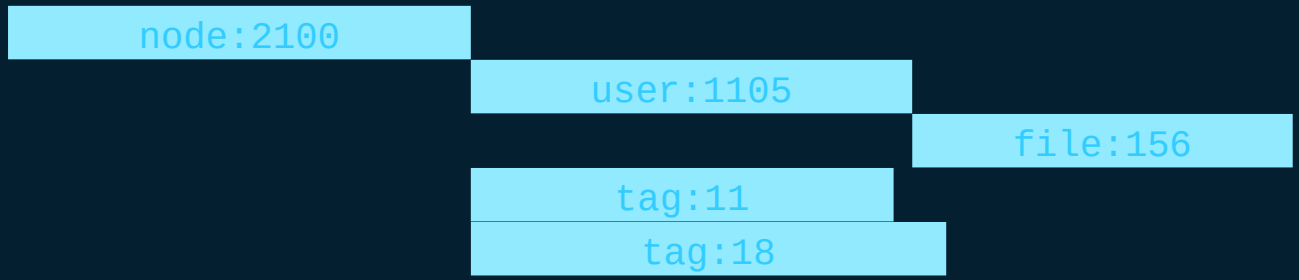
- `ab -v4 -k -c8 -n10 -A u:p`
- `node:2100`
  - `user:1105`
    - `file:156 (slow path)`
  - ~~`tag:11`~~
  - ~~`tag:18`~~

Results (core): anonymous



Using Keep Alive

Results (jsonapi): anonymous

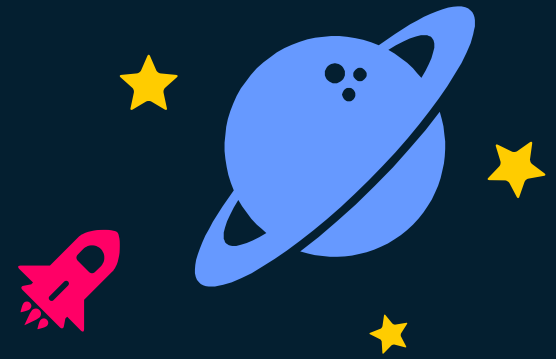


node:2100 `include:author,author.pic,tags`

~ 7 ms

	Core (ms)	{json:api} (ms)
Anonymous	21	7
Auth	320	115
Uncached	392	182

https://gist.github.com/e0ipso/4b1b346b296fbf0c918450fef5b0b3d7



AVOID BOOTSTRAPS

And unnecessary HTTP round trips.

4.
DRUPAL MODULE

Our implementation of the standard.

It is in Drupal core!

Oriented to entity bundles

- Each resource is a bundle (content type)
- **/jsonapi/node/page**
- Automatically enabled (can be disabled)
- You can do **any** entity query as filter

Customize your API with JSON:API Extras

- **/node/page /pages**
- **field_text text**
- Disable fields
- Disable resources
- Fields enhancers (preprocessors)

JSON:API cross bundles

- Separate contrib
- Allows you to have bundles per entity type:
  - https://.../jsonapi/node
  - https://.../jsonapi/media

JSON:API hypermedia

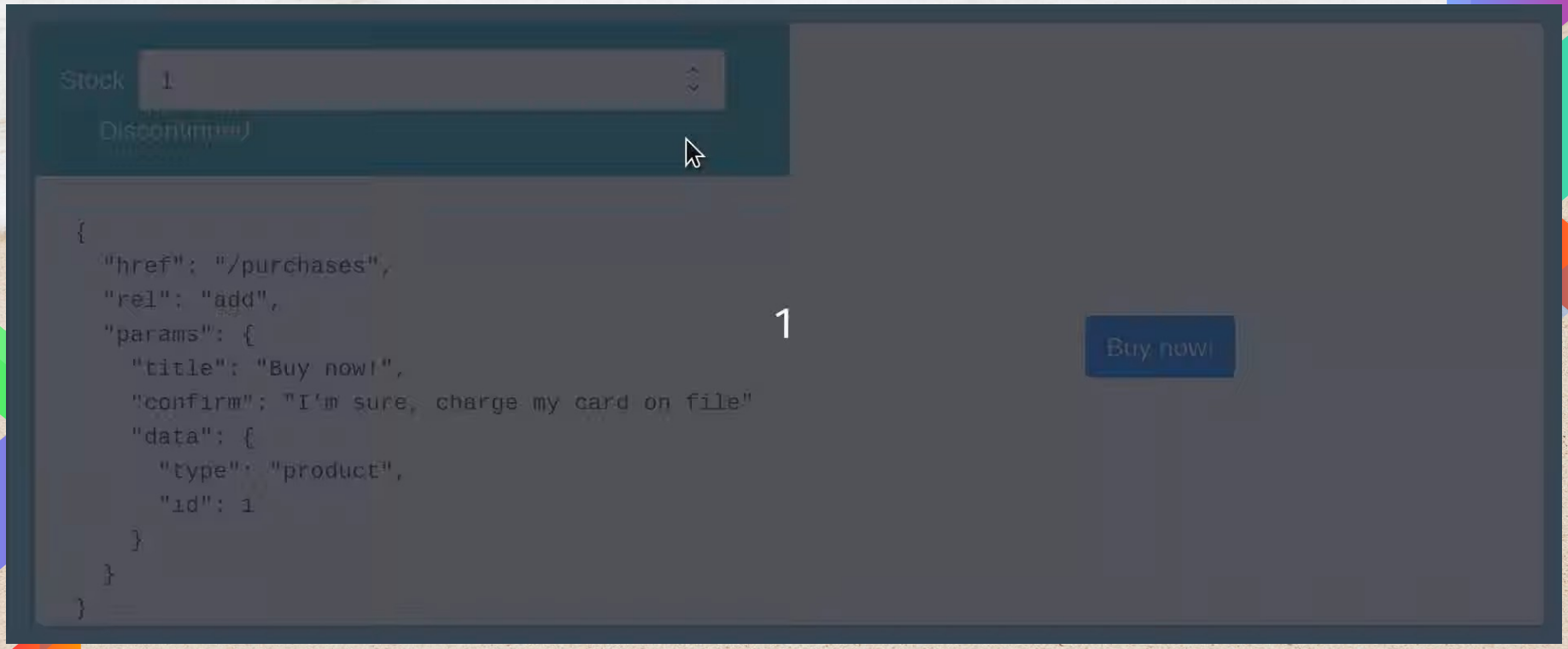
- Enhances support for *links*
- Enables HATEOAS
  - Let’s you define custom behaviors about the returned data.


{
"data": {
"type": "product",
"id": "1234-…-abcd",
},
"links": {
"add-to-cart": {
"href": "/purchases",
"rel": "add"
…
HYPERMEDIA


{
"href": "/purchases",
"rel": "add",
"params": {
"title": "Buy now!",
"confirm": "Yes, I am sure.",
"data": {
"type": "product",
"id": 1
}
}
}
Buy now!


{
"href": "/wishlist/items",
"rel": "add",
"params": {
"title": "Save for later",
"confirm": false,
"data": {
"type": "product",
"id": 1
}
}
}
Save for later

Do not have the client app check the product stock API


Stock
1
{
"href": "/purchases",
"rel": "add",
"params": {
"title": "Buy now!",
"confirm": "I'm sure, charge my card on file"
"data": {
"type": "product",
"id": 1
}
}
}
1
Buy now!


Stock
1
{
"href": "/purchases",
"rel": "add",
"params": {
"title": "Buy now!",
"confirm": "I'm sure, charge my card on file"
"data": {
"type": "product",
"id": 1
}
}
}
1
Buy now!


Stock
0
Discontinued
{
"href": "/wishlist/items",
"rel": "add",
"params": {
"title": "Save for later",
"confirm": false,
"data": {
"type": "product",
"id": 1
}
}
}
1
Save for later

JSON:API Resources

- It doesn’t do anything by itself.
- It handles non-entity resources .
- For custom `routes` and `data`.
  - `/jsonapi/me`
  - `/jsonapi/user/{id}/reminders`
  - `/jsonapi/node/posts/{id}/retweet`

OpenAPI

- The leading standard to describe APIs
- There is a whole talk about it!

Credits

Special thanks to all the people who made and released these awesome resources for free:

- Presentation template by SlidesCarnival
- Photographs by Startupstockphotos
- Creative Commons images