Nurturing
REST API References

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How can we make Open API specifications useful?

- Identify the roles of Open API in the REST API ecosystem.
- Identify how Open API descriptions address different developer decisions.
- Visualize relationships within the API.
- Recognize incomplete specifications.

Or, the subtle art
of answering questions
before they are asked.

PART 1:

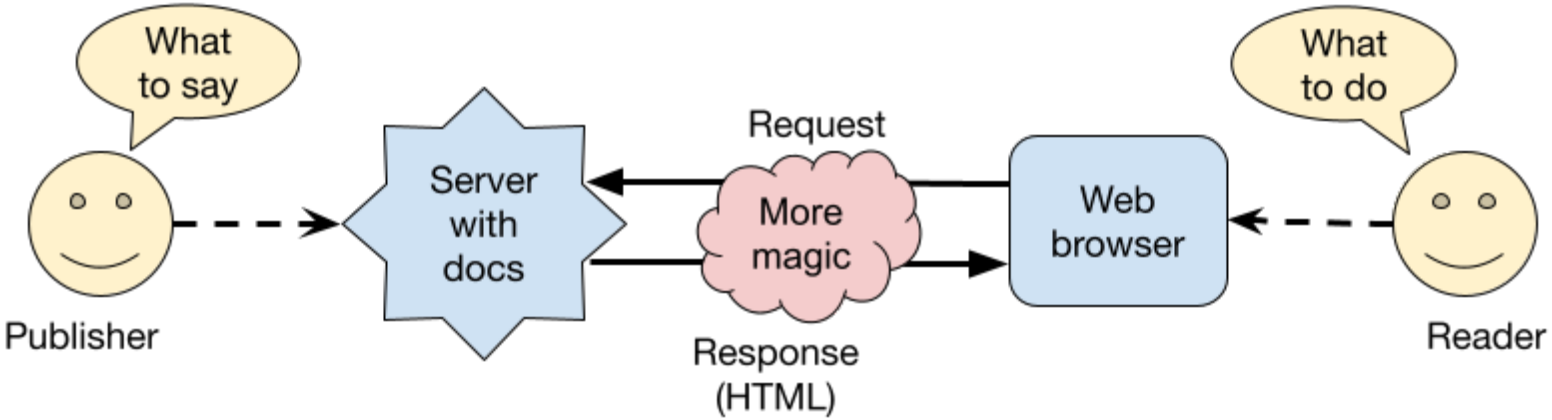
WHAT IS REST AND OPEN API

PhD by Roy Fielding (2000):
Architectural Styles and the Design of Network-based Software Architectures.

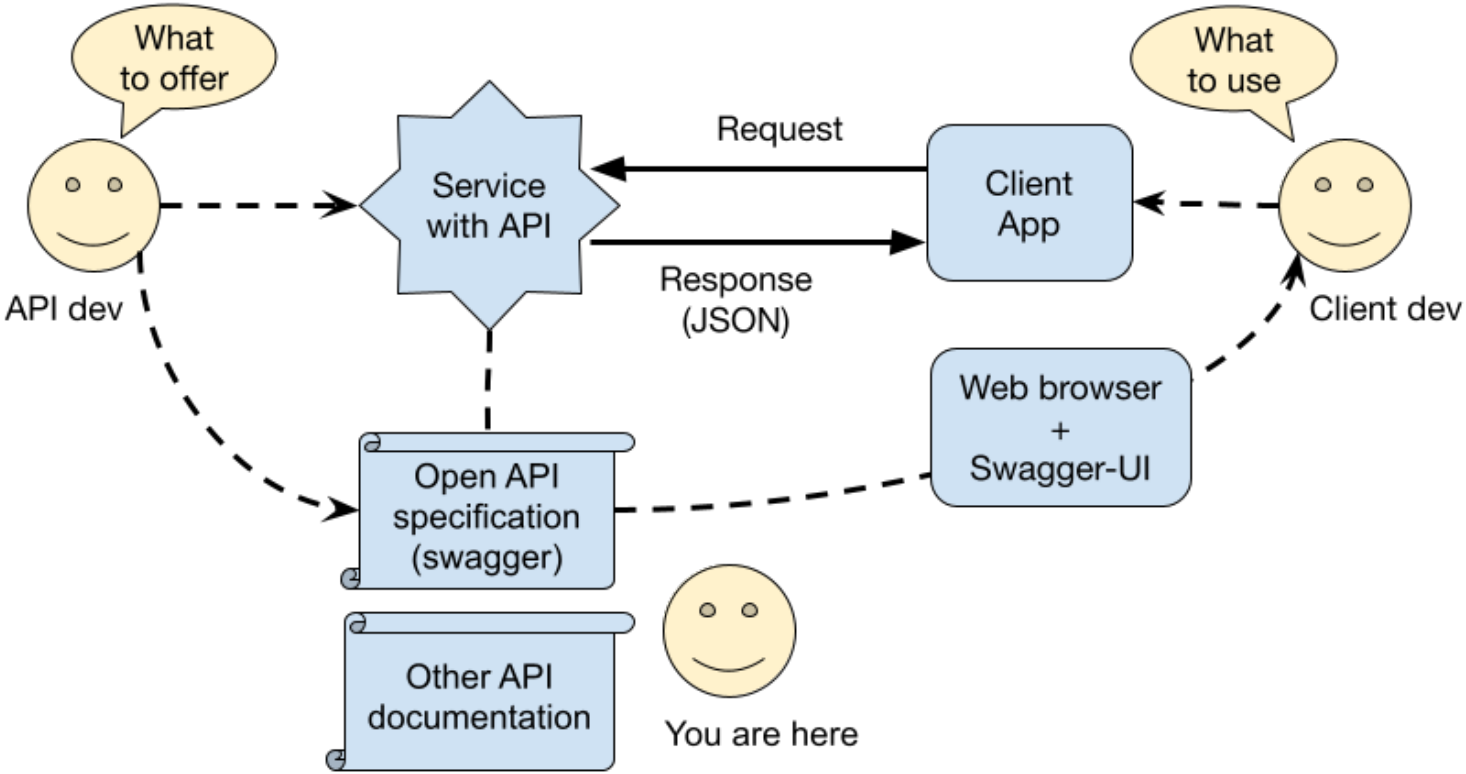
Distributed hypermedia system, enables further sophistication.

- Representational State Transfer (REST).
- Resource (has a name aka URL).
- Representation of resource (data with media-type and more metadata).
- Stateless operations (each request contains all of the information necessary for a connector to understand the request, independent of any requests that may have preceded it).
- Proxies and cache servers (for large sites).

Large-scale Web browsing?



REST APIs are like the Web for machines



API Economy

The API economy refers to the controlled exchange of digital data and services through APIs.

- API producers expose services to extend reach, market share, and monetization opportunities.
- API consumers use best-of-breed technology without the investment.

Well-known examples:

- Amazon Web Services, 2002 — Infrastructure as a service, aka Cloud computing.
- Google Maps, 2006 — Maps, routes, and places.
- Twilio, 2007 — Messaging and contact centers.
- Stripe, 2011 — Payment processing.

Open API tool ecosystem

Explore and interact

Given a specification, use tools (such as “Swagger UI” or Postman) to explore and interact with the API.

Generate code

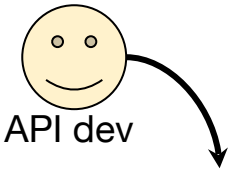
Given a specification, use “codegen” tools to automatically generate client and server code in multiple programming languages.

Generate a specification

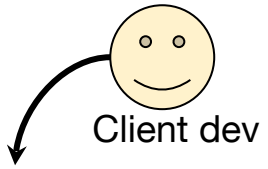
Given code with comments, automatically generate a specification (introspection). Code and comments must follow conventions.

Validate implementations

Given a specification, validate HTTP requests and responses, or server implementations (introspection).



Open API and Swagger-UI



Swagger Editor — File ▾ Edit ▾ Insert ▾ Generate Server ▾ Generate Client ▾ About ▾ — Try our new Editor ↗

```
116              - write:pets
117              - read:pets
118    /pet/findByStatus:
119      get:
120        tags:
121          - pet
122        summary: Finds Pets by status
123        description: Multiple status values can be provided with comma separated strings
124        operationId: findPetsByStatus
125        parameters:
126          - name: status
127            in: query
128            description: Status values that need to be considered for filter
129            required: false
130            explode: true
131            schema:
132              type: string
133              default: available
134              enum:
135                - available
136                - pending
137                - sold
138        responses:
139          '200':
140            description: successful operation
141            content:
142              application/json:
143                schema:
144                  type: array
145                  items:
146                    $ref: '#/components/schemas/Pet'
147              application/xml:
148                schema:
149                  type: array
150                  items:
151                    $ref: '#/components/schemas/Pet'
152          '400':
153            description: Invalid status value
154        security:
155          - petstore_auth:
156              - write:pets
```

You are here

pet Everything about your Pets — Find out more

PUT `/pet` Update an existing pet

POST `/pet` Add a new pet to the store

GET `/pet/findByStatus` Finds Pets by status

Multiple status values can be provided with comma separated strings

Parameters — Try it out

Name	Description
status string (query)	Status values that need to be considered for filter *Available values* : available, pending, sold *Default value* : available available

Responses

Code	Description	Links

PART 2:

SUBSTANTIVE EDIT OF DESCRIPTIONS

Flow of decisions of the client developer

Using Swagger-UI to explore an API while coding a client application:

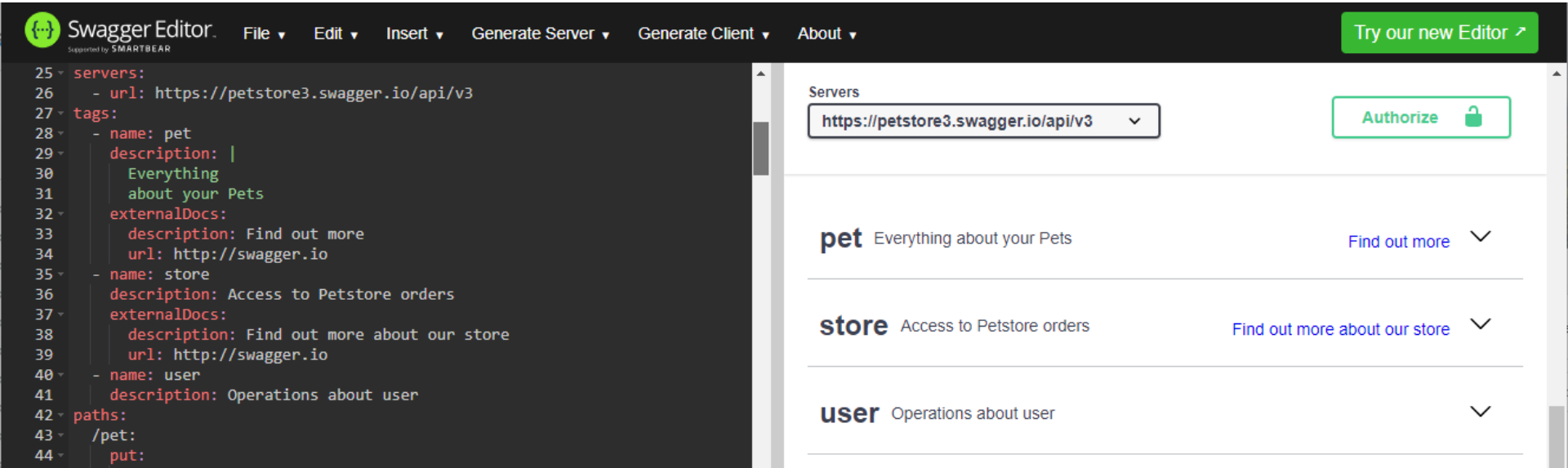
1. Choose the correct tag.
2. Select the correct operation to call.
3. Choose, collect or create the parameters for calling the operation.
4. Understand the operation response.

Many questions, many doubts…
to be clarified in Markdown descriptions.

Step 1 (tag): Where is the functionality that I need?

Answer in the tag descriptions:

- Distinguish between what can be done in each tag.
- Overview of can be done in the tag.



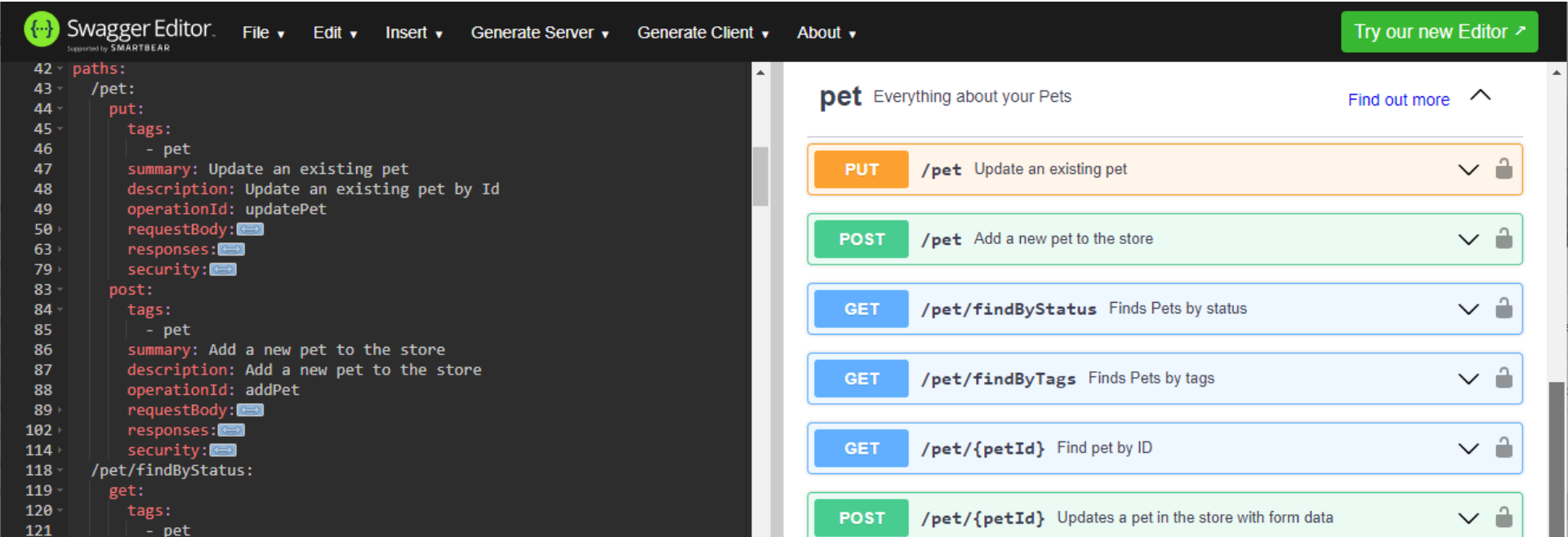
Step 2 (operations): Which of these operations should I use?

Answer in the operation summaries:

- Distinguish between operations in each tag.
- Short sentence to fit space in Swagger-UI.

If needed, continue in the operation descriptions:

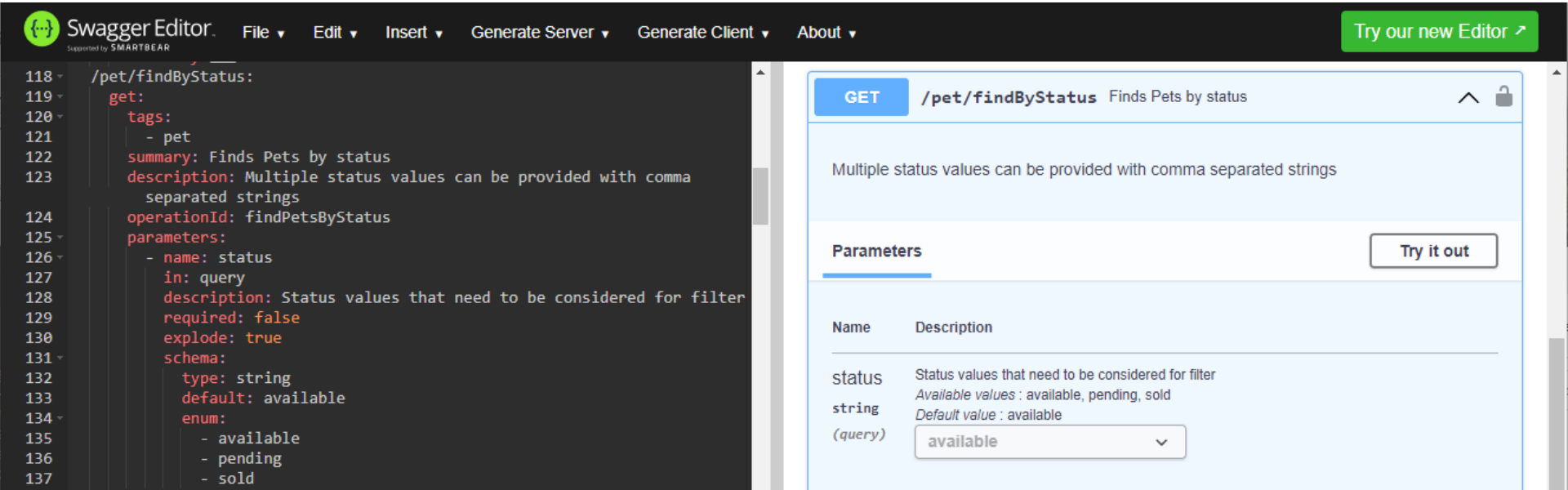
- Further detail of overall purpose if needed.
- Issues that may surprise the developer.



Step 3 (parameters): What parameters do I need?

Questions:

- Is a parameter value needed? Default value? Default behavior?
- Where do I get a valid value? Or, how do I create a valid value?
- For enumerations, how do I choose? What are the consequences of each choice?



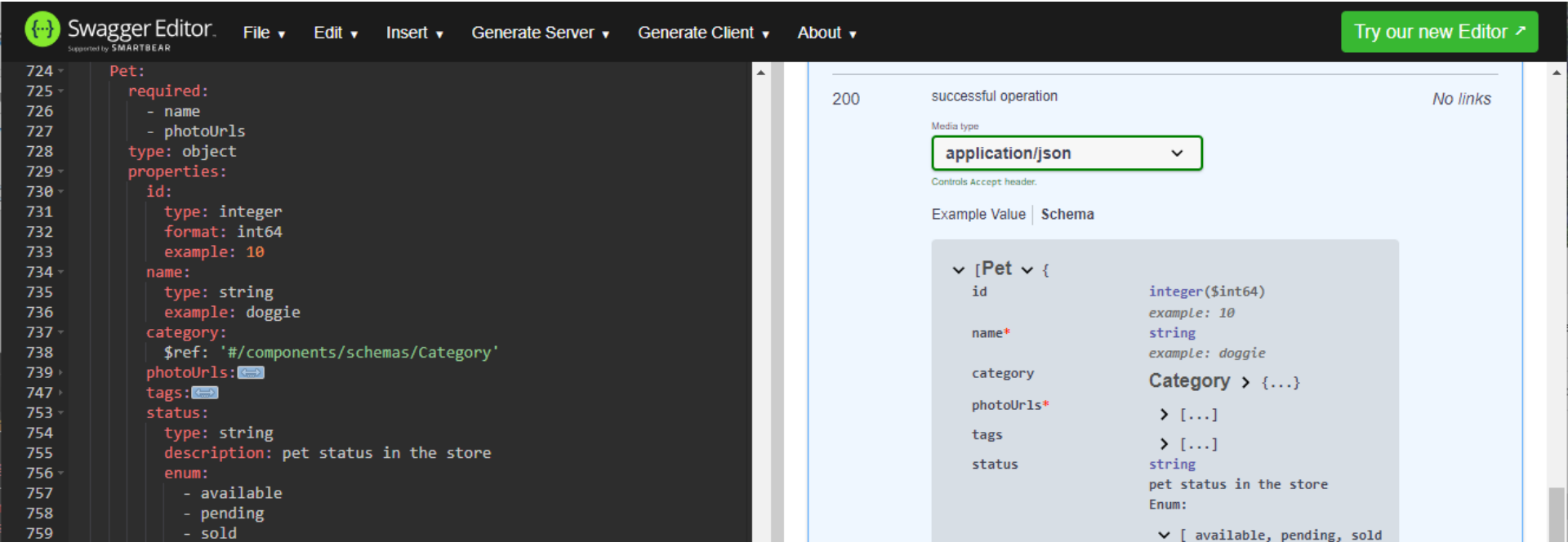
Step 4 (schemas): What does the response mean?

Answer in the the object descriptions:

- What does the object represent?

Answer in the property descriptions:

- How to understand the value in a response.
- How to use the value in a response.
- If a property is absent or null, what does it mean?



Also: Examples in descriptions

Open API 3 and JSON Schema have confusing variations on example and examples.

- Put examples in descriptions.
- Explain the meaning of the example values.

```yaml
currency:
  description: |
    ISO 4217 currency code of the amount.
    For example,
    'USD' for United States Dollar.
```

Also: Describe enums in descriptions

Values of enumerations do not have their own descriptions. Consider a Markdown list.

```yaml
plan:
  type: string
  enum:
    - silver
    - priority
    - monthly
  description: |
    Promotional plan contracted with store.

    * `silver` - Frequent pet care,
including washing.
    * `priority` - Priority service.
    * `monthly` - Schedule day each month
for pet care.
```

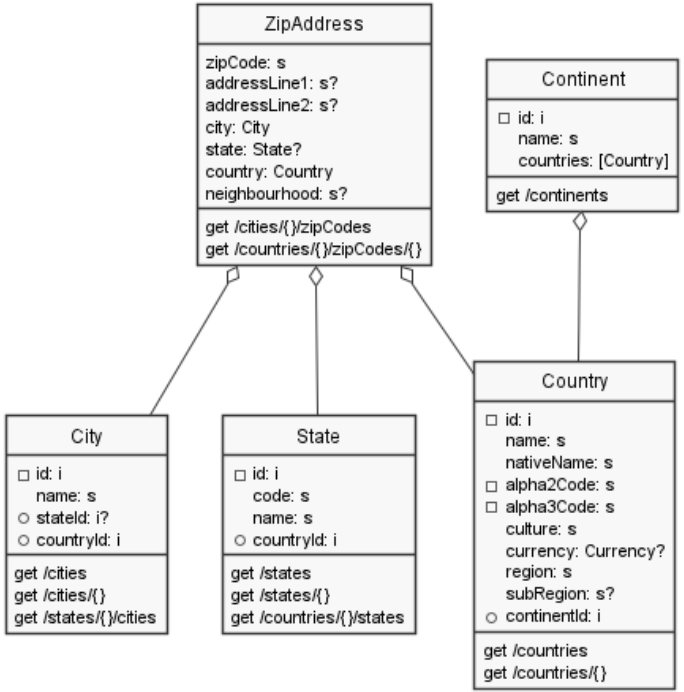
PART 3:

MAKE A MAP

Tags as UMLish diagrams


```
@startuml
object Pet {
  id: n
  name: s
  petType: s
  color: s
  gender: s
  breed: s
---
  post /pets
  get /pets
  get /pets/{}
  put /pets/{}
  delete /pets/{}
}
@enduml
```

Example: Geography at FARFETCH

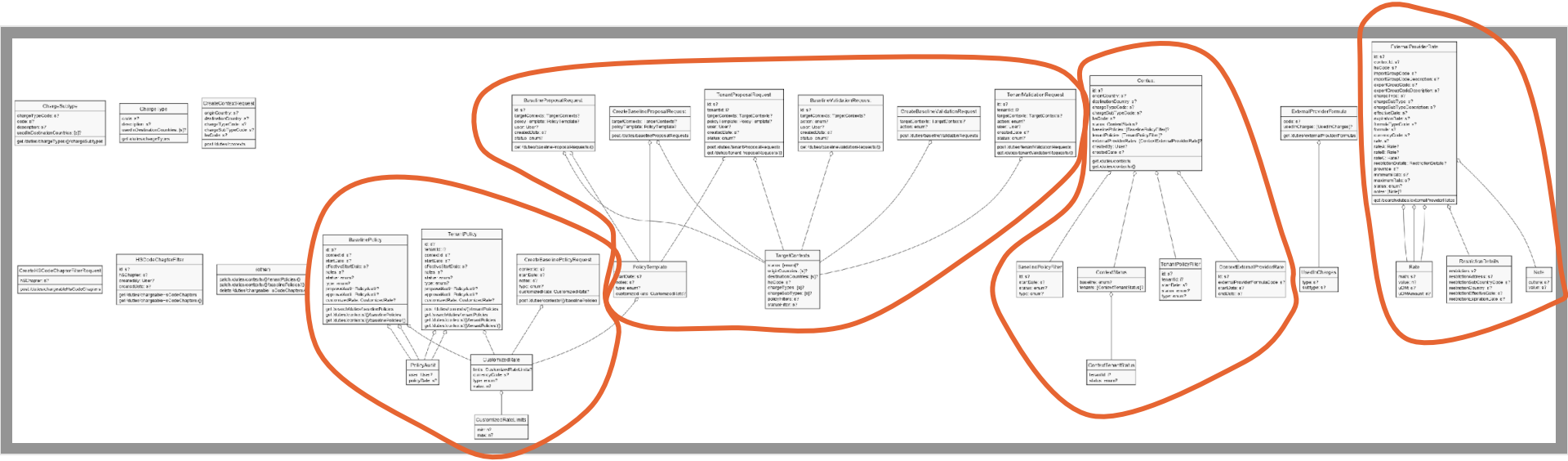


Arrows denote a sub-object.

```
@startuml
. . .
ZipAddress o-- City
ZipAddress o-- State
ZipAddress o-- Country
Continent  o-- Country
@enduml
```

How to chunk tags

1. Create PlantUML diagram for API or obvious parts of it.
2. Refine diagram to make structure more obvious.
3. Partition diagram in parts, minimizing the number of lines cut.



PART 4:

STRUCTURE AND POLITICS

Breaking changes

If we don't document clearly, we are not accountable for the changes.
— Developer myth

Managing API change:

- Add new, improve old features.
- Minimal impact on existing clients.

A breaking change is any change that can break a client application, usually:

- Deleting part of an API.
- Modify part of existing API.

Structural issues:

- Properties and some parameters are optional by default.
- Optional properties and parameters need default value or behavior.
- Enumerations are absent.
- Objects are not defined.
- Objects have no name.

Making a specification tighter
is a breaking change.

But are we changing the API
or the description of the API?

USE REFERENCES TO CAPTURE DETAIL

Walk in the shoes of client developers
to write useful descriptions.

If the API is large enough, everyone needs a map.

You may find yourself to be the guardian of the standard.

BE A PART OF THE ECOSYSTEM!