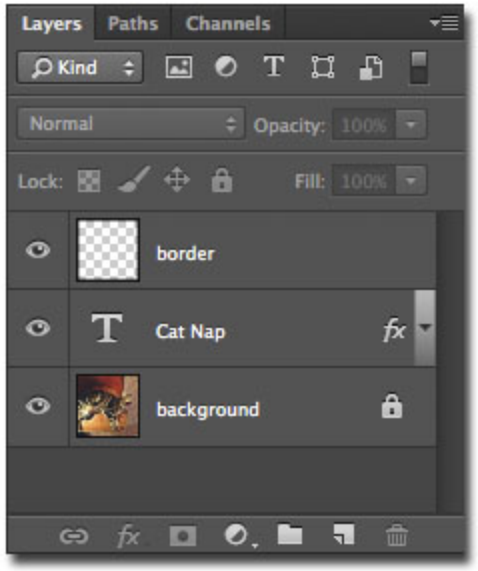
APIs are getting larger

How do Overlays help?

The billion dollar feature

Layers



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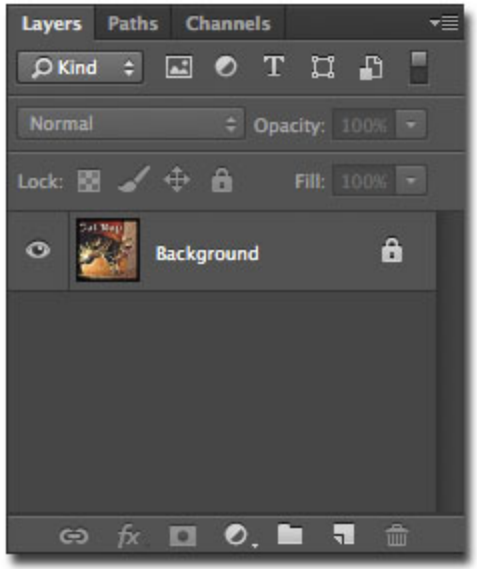

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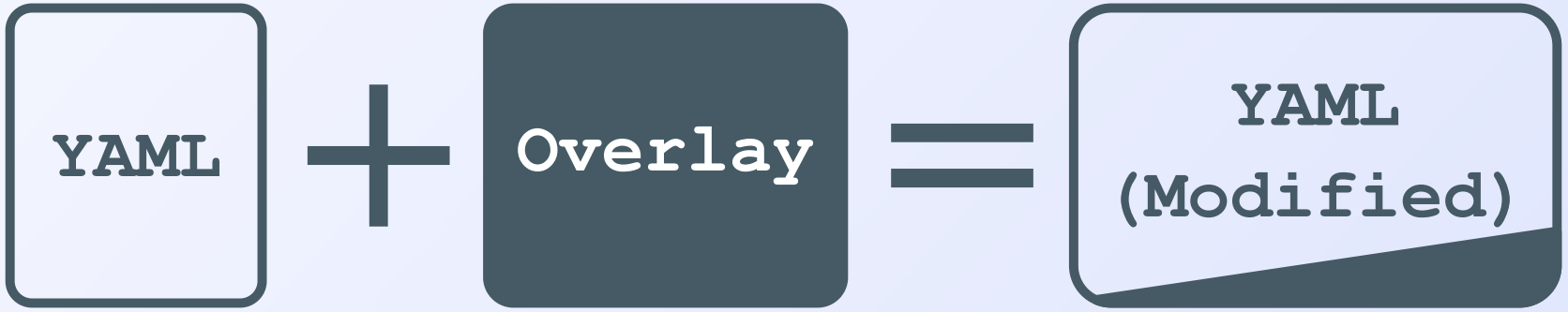
Overlays - tl;dr

They're YAML files that take a YAML document as input and produce a modifed document as output.



I'm Josh Ponelat

(Pah-neh-lat)

- Swagger and SwaggerHub at SmartBear.
- Wrote a book.
- Easy to google, no one else has this name.
- Love to talk, come say hi!

This talk

- The *other* people involved in APIs
  - Docs, DevOps and PMs
- **Overlays:** How they work
- APIs as Pets or Toys?
- A tool or a standard?
- Anti-patterns and pitfalls

Level setting.

- **YAML**
- **OpenAPI**, **AsyncAPI** and **JSON Schema**

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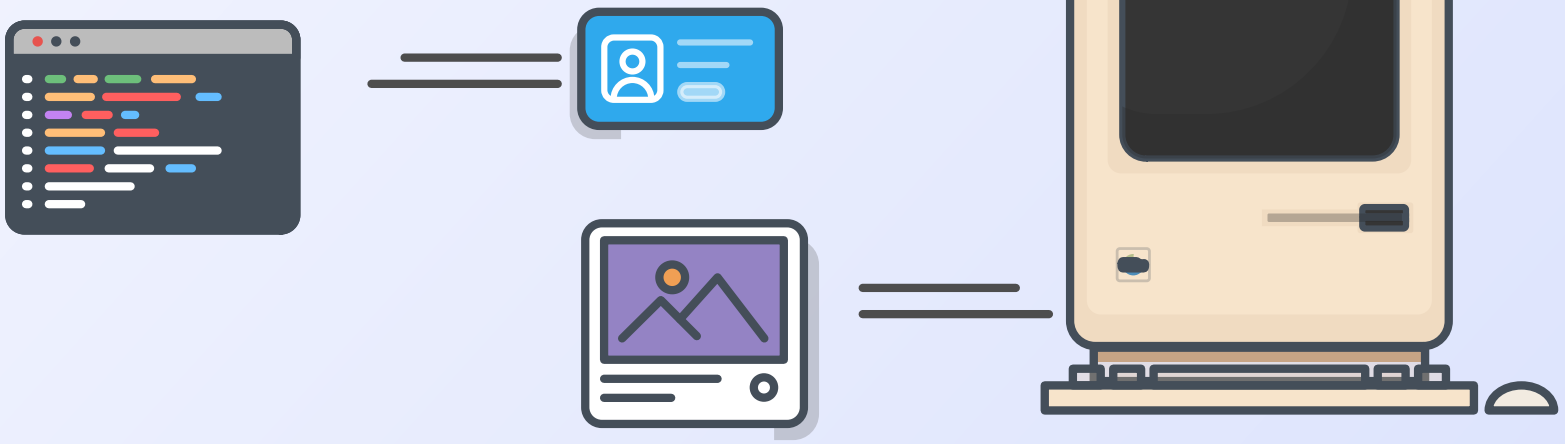
> API design is no longer the concern of a single person, it has outgrown that.

Archimedes, 250 BCE

What are APIs

GET /pets



{ "name": "Fido" }

It's not just about Barry

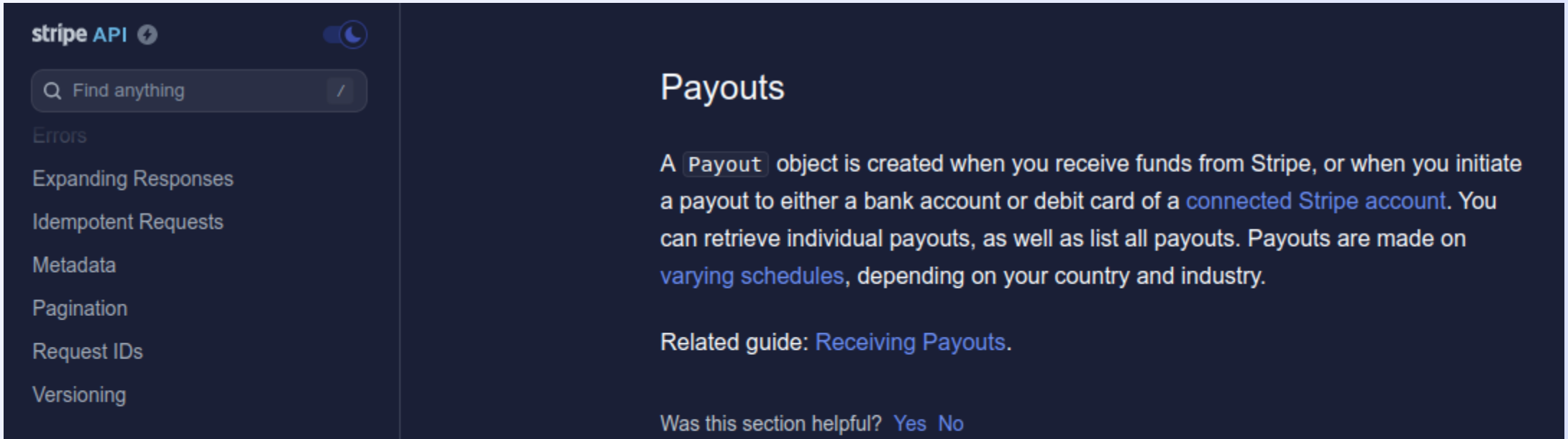
Barry is a back-end engineer.

API design is now more than the shape of the API.

The *other* people

Documentation fields

- Markdown `description`, `summary`, `examples`, etc
- Variations of the above for i18n
- Anything that makes it more "Stripe" like.



Let's call her, Ellen

Documentation writer

Responsible for
Documentation and translations.

Cares about
Written word, developer experience and accuracy.

Pains (related)
Access to source files, copying changes to curated files.

DevOps and annotating

Annotating APIs to include infrastructure details, possibly via bespoke scripting.

```
x-amazon-apigateway-cors: ...
x-ms-parameter-grouping: ...
x-google-audiences: ...
x-kusk: ...
```

```
security:
- ...Gateway specific
servers:
- ...Different envs
```

Let's call him, Nathan

DevOps engineer

Responsible for

Deployments, gateways and infrastructure

Cares about

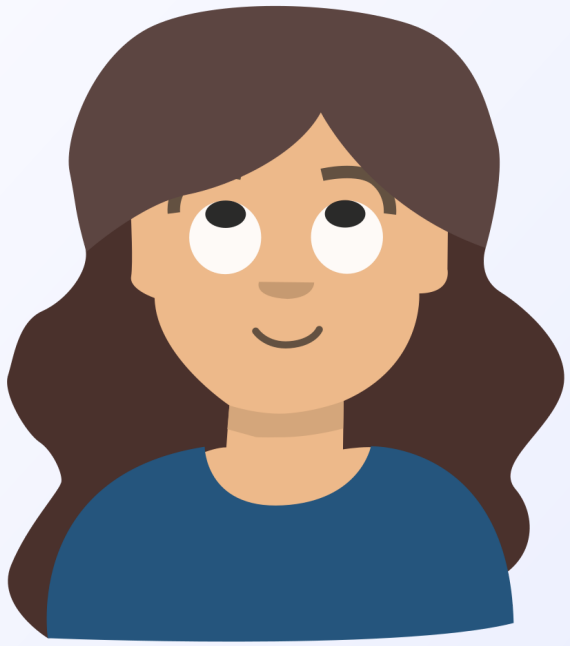
API Security, URLs and server names

Pains (related)

Custom scripting to inject annotations

Different audiences

```yaml
openapi: 3.1.0
paths:
  /foo:
    x-internal: true
  /bar: {}
  /baz: {}
```



Let's call them, Jim

Product Manager

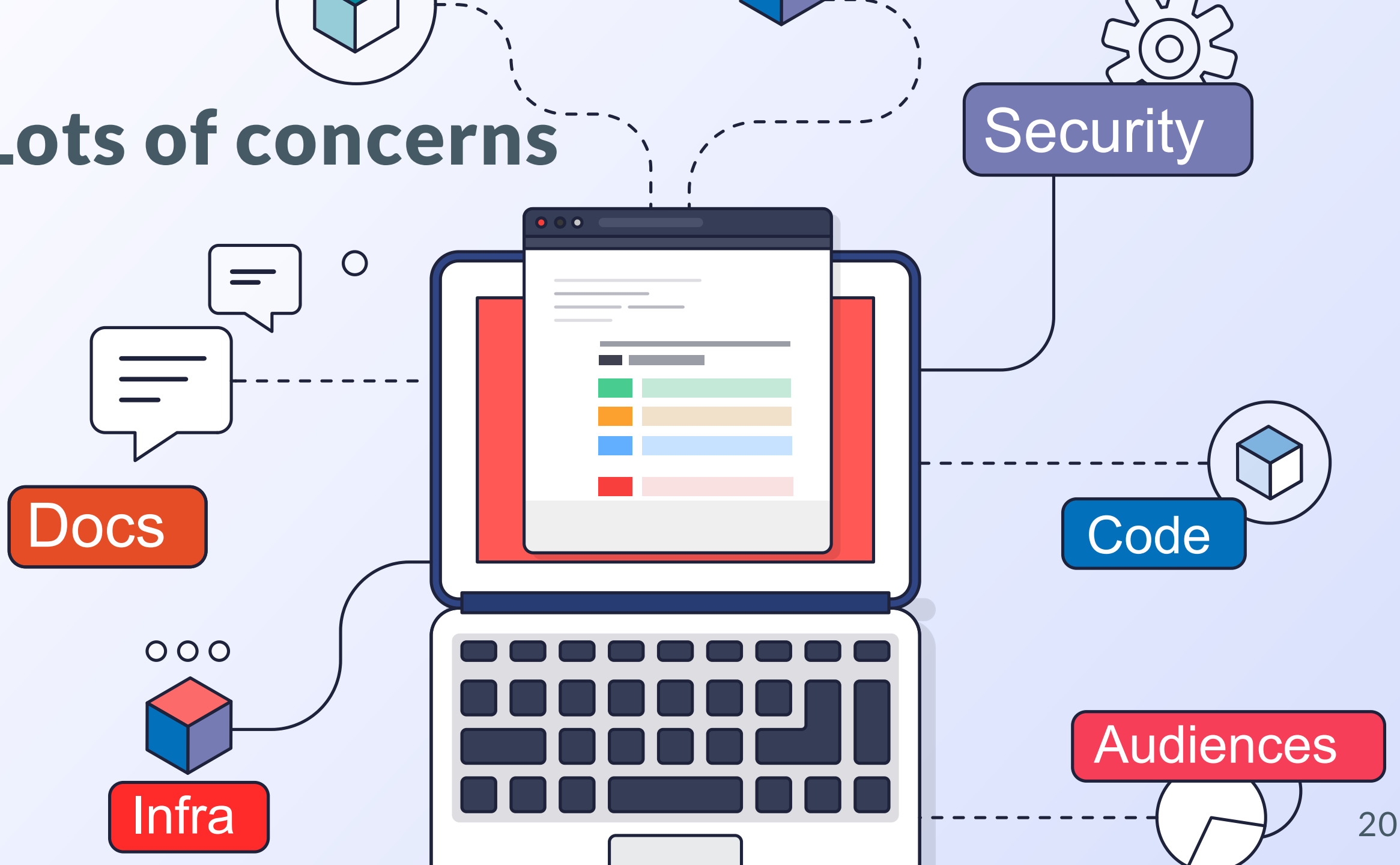
Responsible for
Customers, "The Market"

Cares about
Visibility curation

Pains (related)
Juggling commitments

Conclusion?

Lots of concerns



Drum roll... 

Overlays. 

The answer to everything

Overlays - An Example

```yaml
overlays: 1.0.0
info:
  title: Add an emoji
  version: 1.0.0
extends: https://petstore3.swagger.io/api/v3/openapi.json
actions:
- target: '$.paths."/pet".post'
  update:
    summary: Add a new pet to the store 🐕!
```

How do Overlays work?

- Target some parts of the document and mutate them.
- Layer in these changes together to form an Overlay document

The parts of an Overlay document

1. Some boilerplate
2. Extend some (URL of an) API.
3. List of actions
   a). Each action: Target then mutate things.

Boilerplate

```
overlays: 1.0.0
```

Next → Info

Boilerplate - Info

```
overlays: 1.0.0
info:
  title: Add an emoji
  version: 1.0.0
```

Next → Extends

Extend some API

```yaml
overlays: 1.0.0
info:
  title: Add an emoji
  version: 1.0.0
extends: https://petstore3.swagger.io/api/v3/openapi.json
```

Next → Actions

List of Actions

```yaml
overlays: 1.0.0
info:
  title: Add an emoji
  version: 1.0.0
extends: https://petstore3.swagger.io/api/v3/openapi.json
actions:
- # Your action...
```

Next → An Action

An action

A **Target** and a **Mutation**

```
# Target
target: ...

# Mutations
update: ...
remove: ...
```

JP: Let's look at targetting things

Targeting with JSONPath

- Gaining traction as the defacto standard for querying JSON/YAML.
- Mostly because it's being standardized and because it aims to do one thing, target nodes.

JSONPath Examples

Examples: 🎯

- `$.paths."/pet".post'` — One specific thing
- `$.paths.*.*.` — Wildcards
- `$.tags[?(@.name == "pet")]` — Filters/Expressions
- `$..description` — All decendants

Mutating things

- `update` merges in a value
- `remove` it uh... removes it.

```
update:
  summary: Add a new pet to the store 🐕!
  description: Something descriptive
```

```
remove: true
```

Putting them together into an action

```yaml
target: '$.paths."/pet".post'
update:
  summary: Add a new pet to the store 🐐!
```

All together now!

```yaml
overlays: 1.0.0
info:
  title: Add an emoji
  version: 1.0.0
extends: https://petstore3.swagger.io/api/v3/openapi.json
actions:
- target: '$.paths."/pet".post'
  update:
    summary: Add a new pet to the store 🐕!
```

We can now Overlay

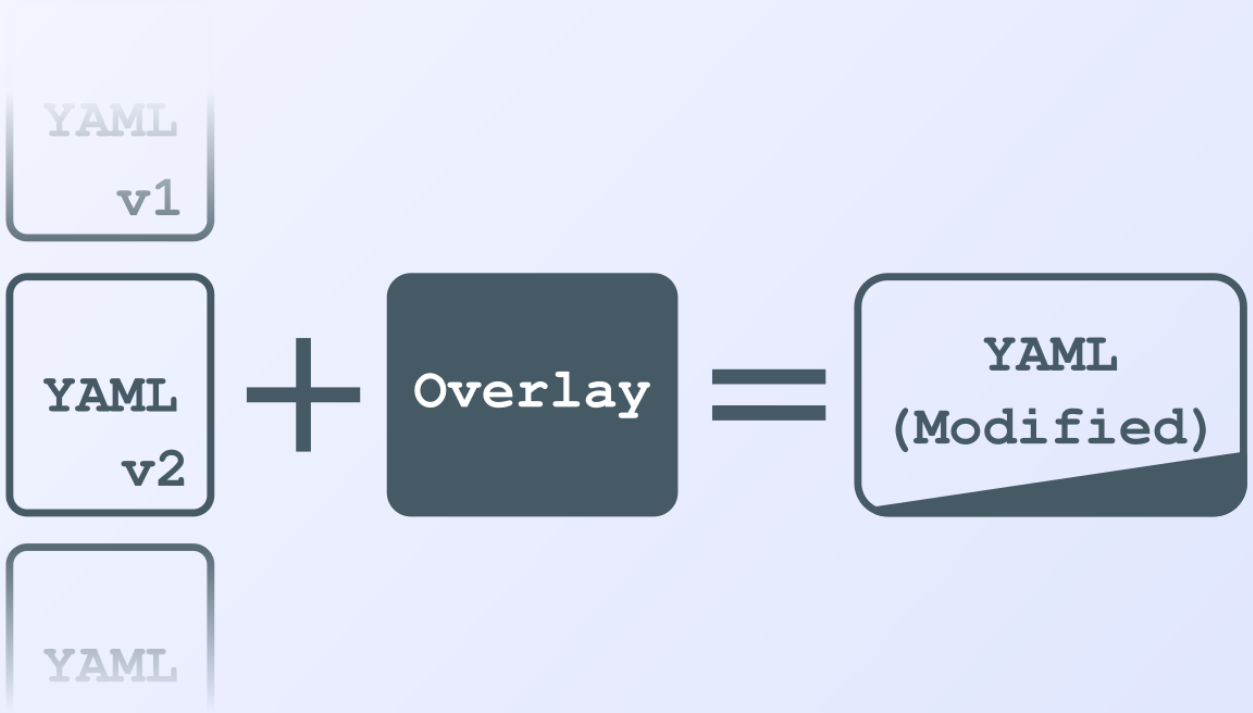
- Patch APIs broadly or specifically
- Using this to separate concerns

Examples of Overlays

Specific changes vs broad changes

- Maintaining a translated version of an API
- Adding server details to an API
- Adding alternative security
- Filtering out components

The input can be different



Shower thoughts

...and design considerations

Pets vs Toys

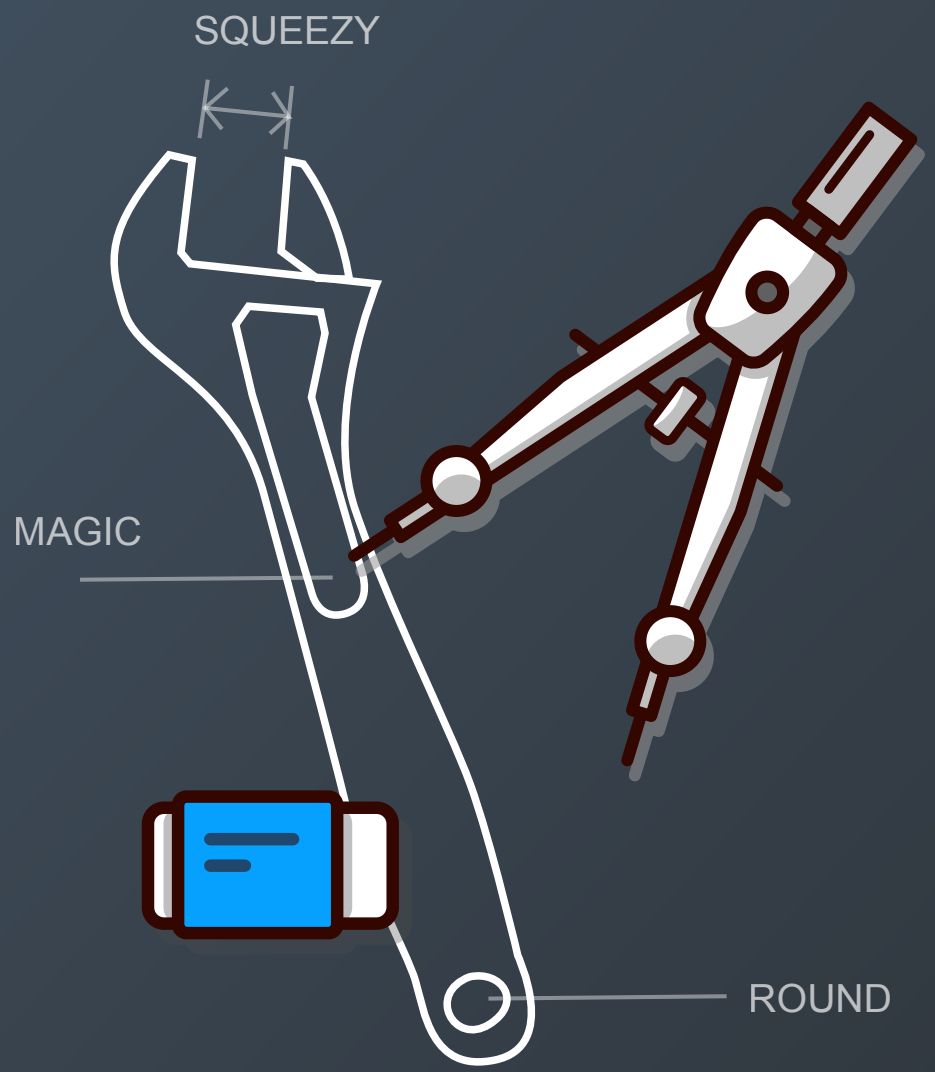
Pet: Lovingly represent a single service, every detail?

Toy: Cater to consumers, showing only what is needed?

API variation proliferation

One API (service) could have many API (definitions), depending on consumers.

Assumption: There will be a lot more API variations in the future.



A tool or a standard?

Why make yet-another-standard (the 15th one!)?

- It starts with a tool
- A standard is meant to have many tools

Assumption: Overlays are first-class citizens. Should be consumed as such.

More the merrier

- There are more concerns being lumped into API documents
- There is a need for more API variations

Overlays help shift those concerns into independent layers

Anti-patterns and pitfalls

Dodgy practices that can cause you to trip.

Invalid definitions

We can move a lot of stuff out of APIs and into Overlays.
Possibly leaving our APIs invalid.

An invalid OpenAPI definition

```yaml
# Requires the overlay to be valid, missing 'info'
openapi: 3.1.0
paths: {}
```

```yaml
overlays: 1.0.0
actions:
- target: '$'
  update:
    info:
      title: Why am I here?
      version: 1.0.0
```

Bad: Limits the amount of tooling you can use.

Incomplete APIs

Describing *necessary parts* of an API with Overlays.

Consider: **Traits for OpenAPI**

Bad: Instead of enriching, it becomes structural.

Semantic whack-a-mole

JSONPath is awesome,
but it doesn't consider the semantics of the underlying specifications.

It is possible to miss targets using JSONPath.

Whack-a-parameter in OpenAPI

```yaml
paths:
 /foo:
   parameters:
   - name: bob

   get:
     parameters:
         - name: frank
   post:
     parameters: []
```

1. `$.paths.*.*.parameters` — usual
2. `$.paths.*.parameters` — not usually considered

Do you need Overlays?

Start with **no**.

Then ponder the following.

- Do you need variations of an API?
- Are you concerned about the different API concerns
- Is the source inaccessable? Code annotations, traffic inference.

Alternatives

- Redocly-CLI https://github.com/Redocly/redocly-cli
- JSONette https://jsonnet.org/
- Geneva https://github.com/smizell/geneva

example1.jsonnet

```
// Edit me!
{
  person1: {
    name: "Alice",
    welcome: "Hello " + self.name + "!",
  },
  person2: self.person1 { name: "Bob" },
}
```

output.json

```
{
  "person1": {
    "name": "Alice",
    "welcome": "Hello Alice!"
  },
  "person2": {
    "name": "Bob",
    "welcome": "Hello Bob!"
  }
}
```

The folks behind this

- The OpenAPI SIG, bi-weekly meet.
- We're made up of tooling vendors
- We need your help
- Prototype: https://github.com/ponelat/overlays-cli (npm: `overlays-cli`)
- Specification: https://github.com/OAI/Overlay-Specification
- Discussion: https://github.com/OAI/Overlay-Specification/discussions

Closing remarks

Thanks to the folks who helped hone this talk.

- Hezzie @Hezzieponelat
- Fabrizio Ferri-Benedetti @remoquete
- Adam Altman @adamaltman
- Frank Kilcommins @fkilcommins
- Borrowed some img from illustrations.co

Fin

Go have fun with your APIs!