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API Design for REST

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Topics for today

API design

- Consumer—producer model

Swagger

- Describing the functionality of a REST service

IRIS 2018.1

- API Management

IRIS 2019.1

- Spec-first development
- API Management v2

Q & A

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https://github.com/intersystems

api-design-for-rest

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API Design

At a glance

Spec — What the thing does

Code — How it does it

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Consumer—producer model

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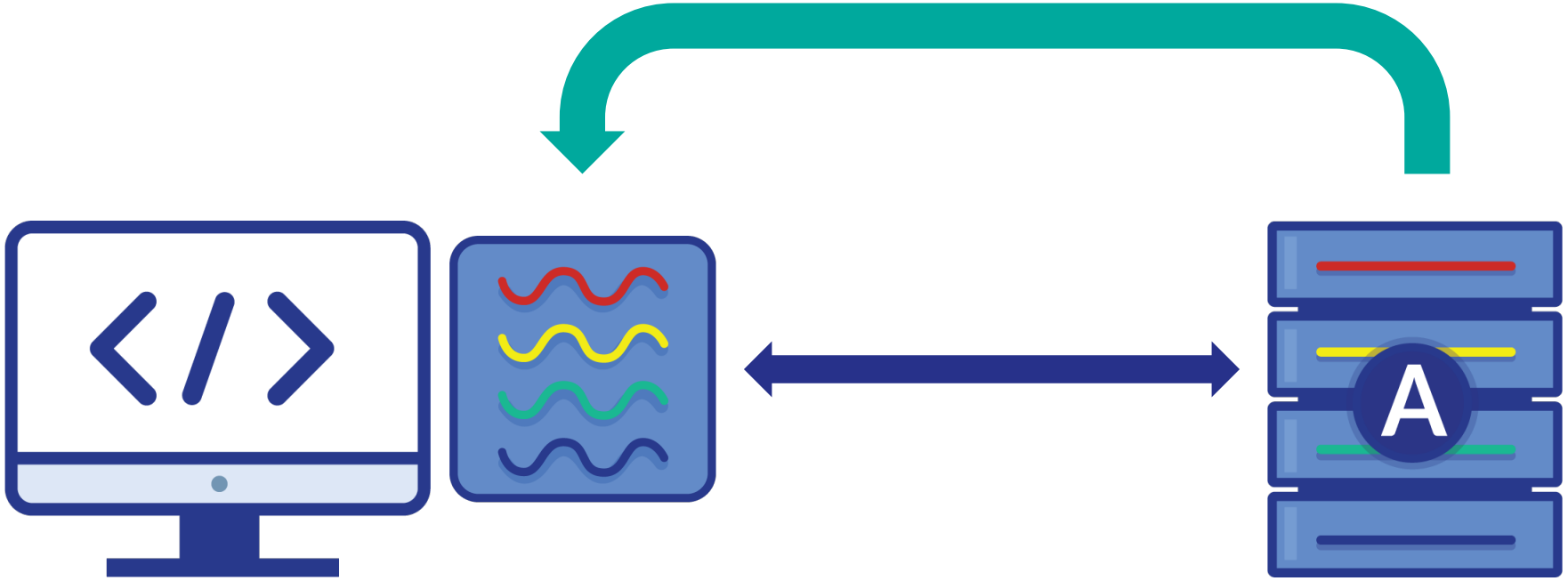
Interface



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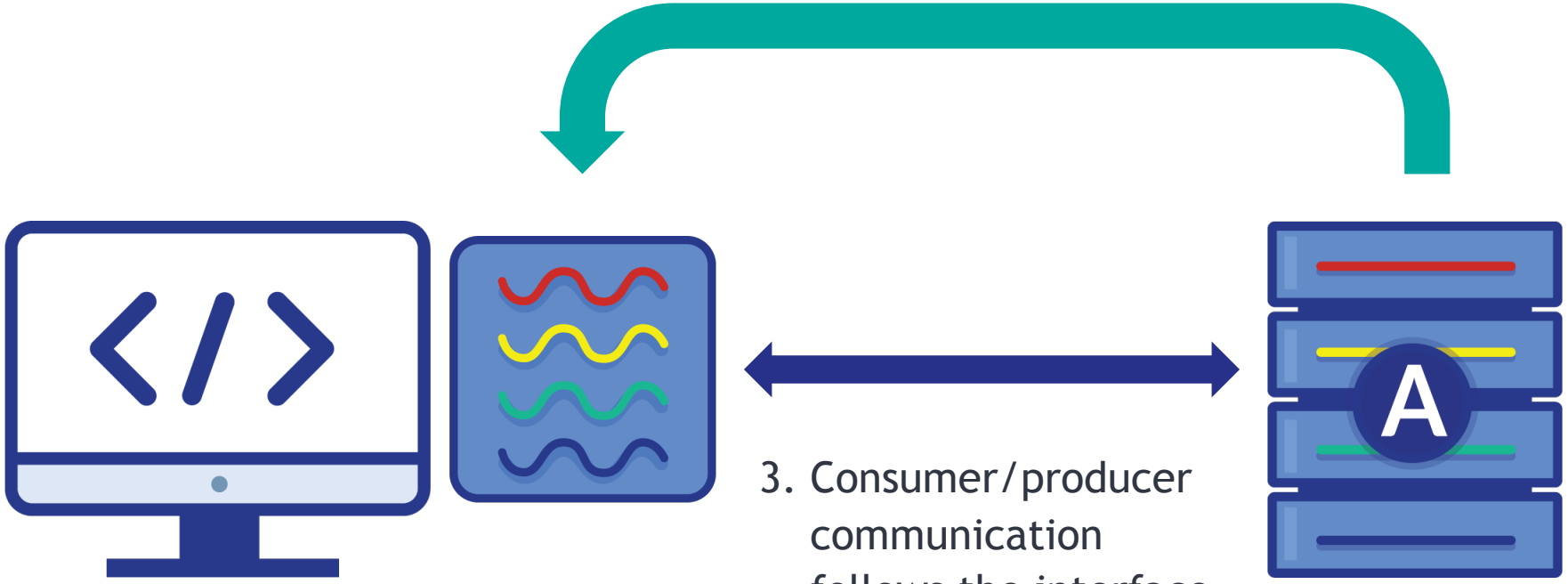
Interface

1. Producer provides a spec to consumers that describes the interface.



2. Consumer writes code based on provided spec.

3. Consumer/producer communication follows the interface.

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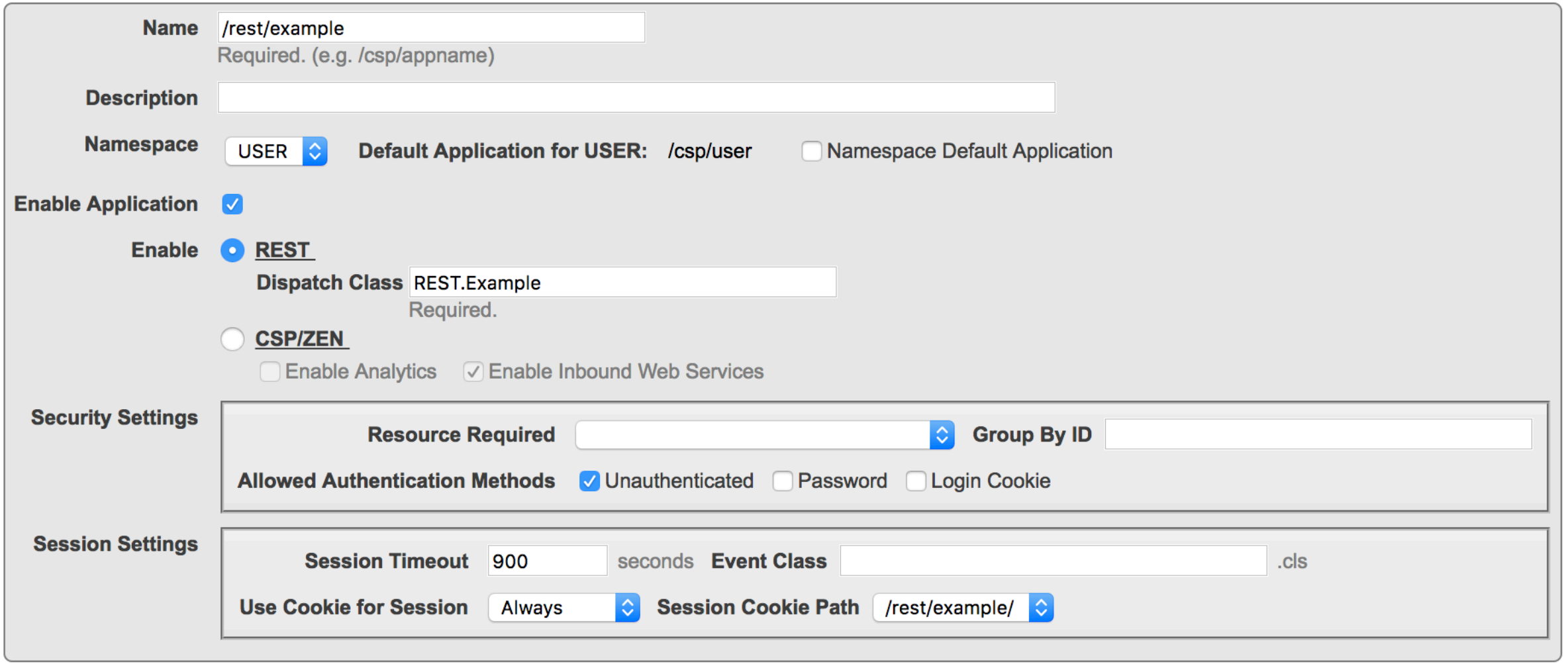
Creating a REST Service

IRIS 2018.1

Web application configuration



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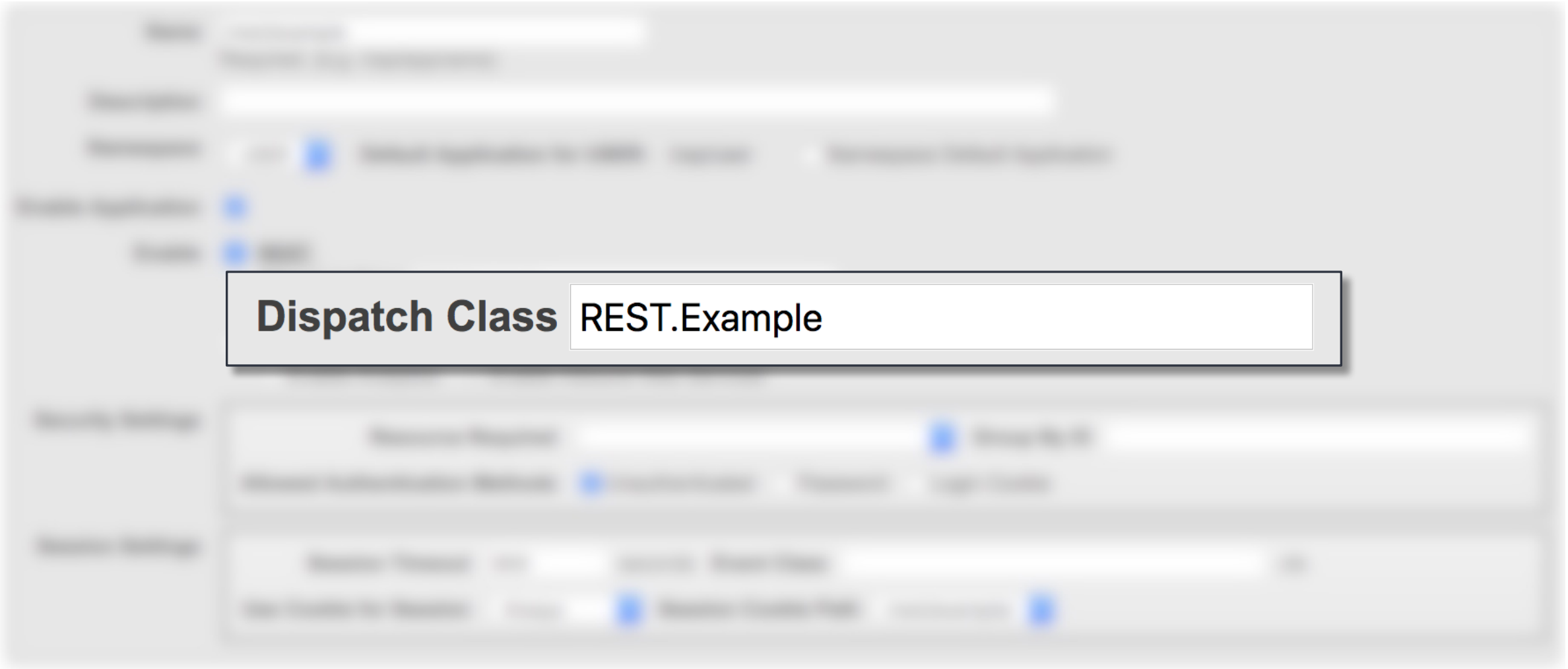
Web application configuration



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REST dispatch class

```
XData UrlMap [ XMLNamespace = "http://www.intersystems.com/urlmap" ]
{
<Routes>
<!-- Return the list of all contacts -->
<Route Url="/contacts" Method="GET" Call="GetAllContacts" />
<!-- Add a new contact -->
<Route Url="/contacts" Method="POST" Call="AddContact" />
<!-- Return the details for a single contact -->
<Route Url="/contacts/:id" Method="GET" Call="GetOneContact" />
<!-- Update the details for the specified contact -->
<Route Url="/contacts/:id" Method="PUT" Call="UpdateContact" />
<!-- Delete the specified contact -->
<Route Url="/contacts/:id" Method="DELETE" Call="DeleteContact" />
</Routes>
}
```

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API Management

GET /api/mgmnt/

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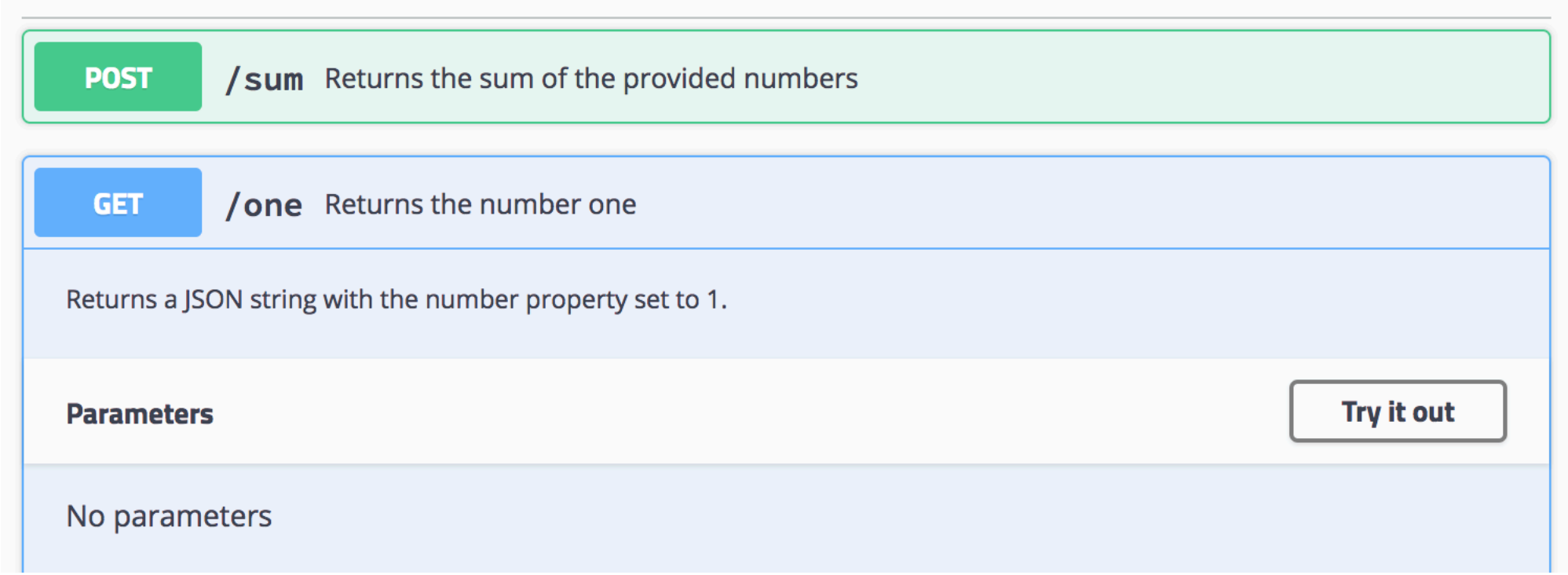
What can we do with a Swagger spec?

Documentation (Swagger UI)



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What can we do with a Swagger spec?

Scaffolding (Swagger Codegen)

```
public com.squareup.okhttp.Call updateContactCall(String id,
        String payloadBody,
        final ProgressResponseBody.ProgressListener progressListener,
        final ProgressRequestBody.ProgressRequestListener progressRequestListener) throws ApiException {
    Object localVarPostBody = payloadBody;

    // create path and map variables
    String localVarPath = "/contacts/{id}"
        .replaceAll("\\{" + "id" + "\\}", apiClient.escapeString(id.toString()));

    List<Pair> localVarQueryParams = new ArrayList<Pair>();
    List<Pair> localVarCollectionQueryParams = new ArrayList<Pair>();
```

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Code-first development

IRIS 2018.1

Code-first development

Code is the single source of truth

Ideal for small services or services with only one consumer

Spec generated on demand as needed

- Support for existing codebases
- No added benefit to editing spec independently of code

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Spec-first development

IRIS 2019.1

Spec-first development

Spec is the single source of truth

Treat your spec like code

- Revisions are tracked using source control

Spec is a **contract** between consumer and producer

- Build the right thing

Encourage Test-driven Development (TDD)

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Anatomy of a Swagger Spec
Metadata

swagger

- Version of the OpenAPI specification implemented by the spec

host

- The address where the service is hosted

basePath

- The URL prefix for the service

info

- Contains the **title** of the service, the **version** of the document, the software **license**, **contact** information for service administrators

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Anatomy of a Swagger Spec

Paths

Each endpoint of the service is listed in the **paths** section. The endpoints are indexed by resource name, then HTTP method.

```
"paths": {
    "/names": {
        "get":    { ... },
        "post":   { ... },
        "delete": { ... }
    }
}
```

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Anatomy of a Swagger Spec

Paths

description / summary

- Descriptive text

operationId

- Unique identifier for this endpoint

responses

- Each HTTP response code that can be returned for this endpoint, and its meaning

parameters

- User input located in the request path or request body

produces

- A list of MIME types that can be returned for this endpoint

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Anatomy of a Swagger Spec
Definitions

A list of schemas used by this endpoint. The **parameter** or **response** properties of an endpoint can refer to a definition using **$ref**.

```
"definitions": {
  "Item": {
    "type": "object",
    "properties": {
      "name": {"type": "string"},
      "amount": {"type": "integer"}
    }
  }
}
```

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Scaffolding in IRIS

Application name chosen in **^%REST** is used as class package name.

- HelloWorld.**spec** — Container for the Swagger spec
- HelloWorld.**disp** — Dispatch class
- HelloWorld.**impl** — Business logic

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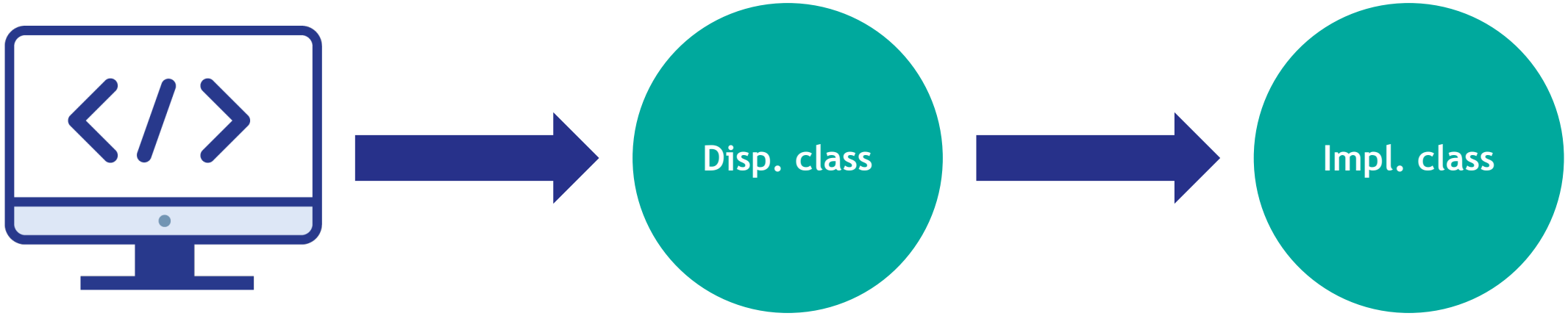
What happens when a request comes in?



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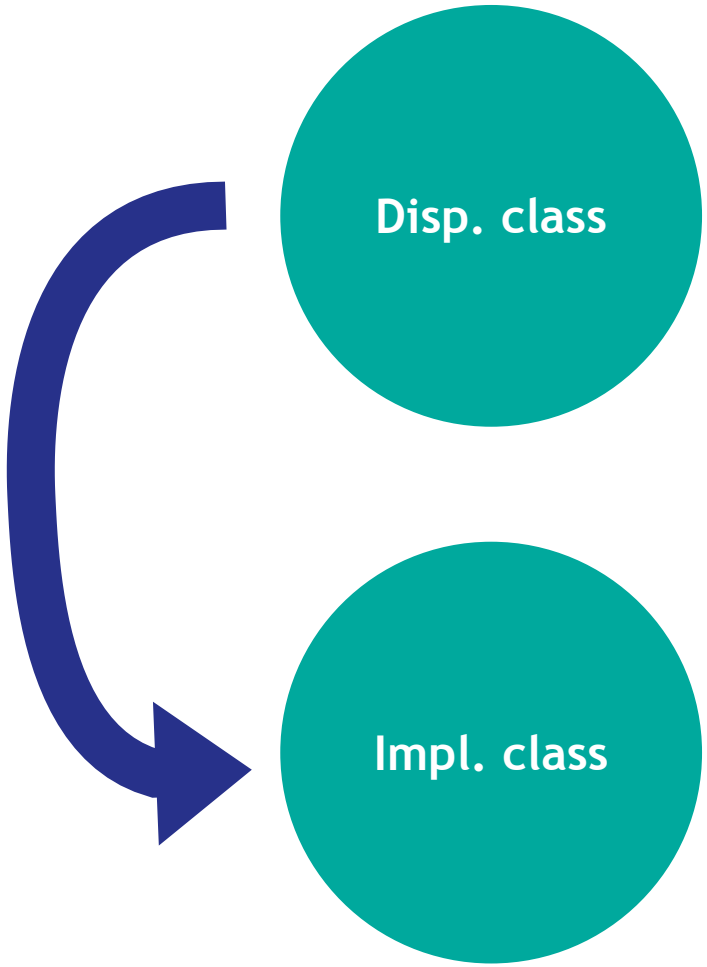
Separation of concerns



Boilerplate code

- Parse incoming request
- Set HTTP response headers
- Send response to client

Application logic

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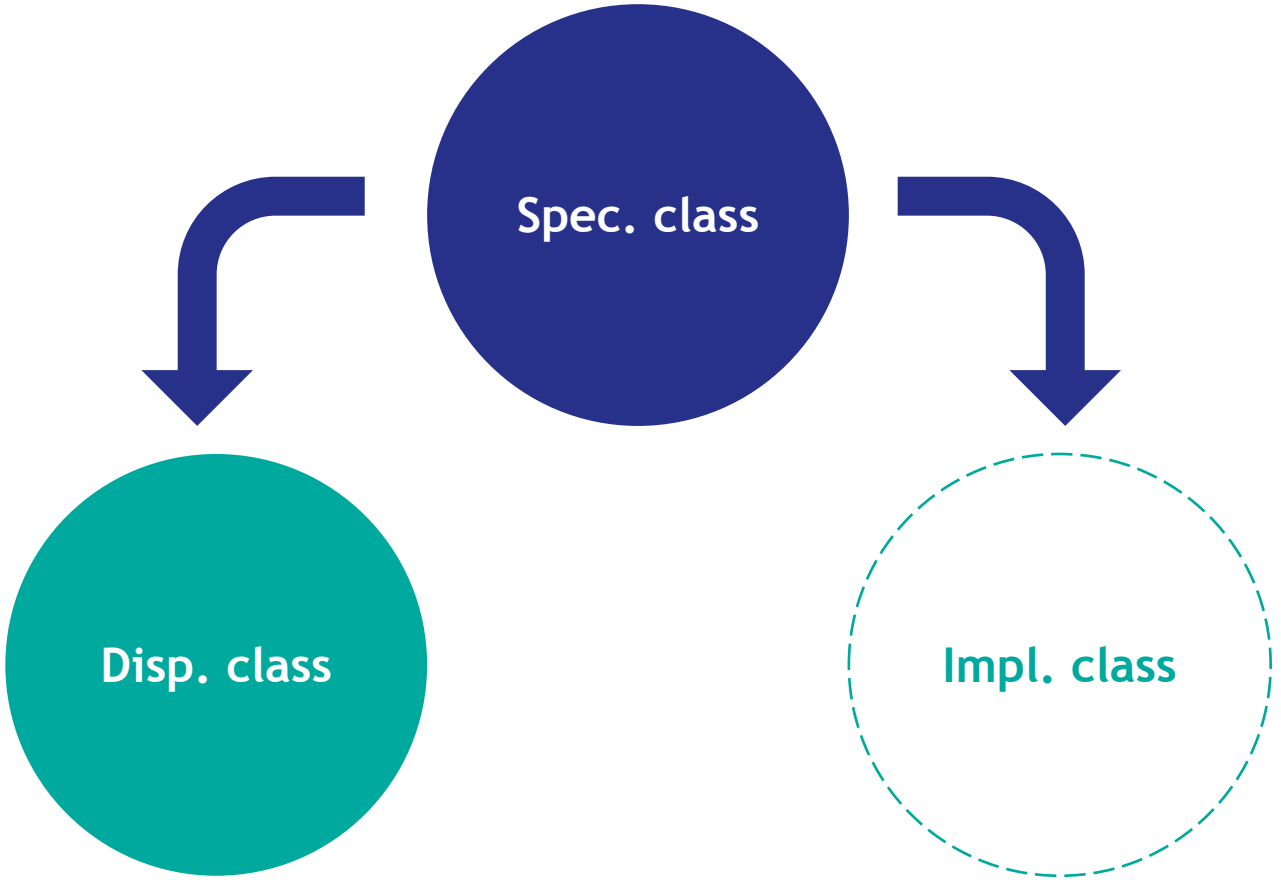
What happens when the spec is updated?



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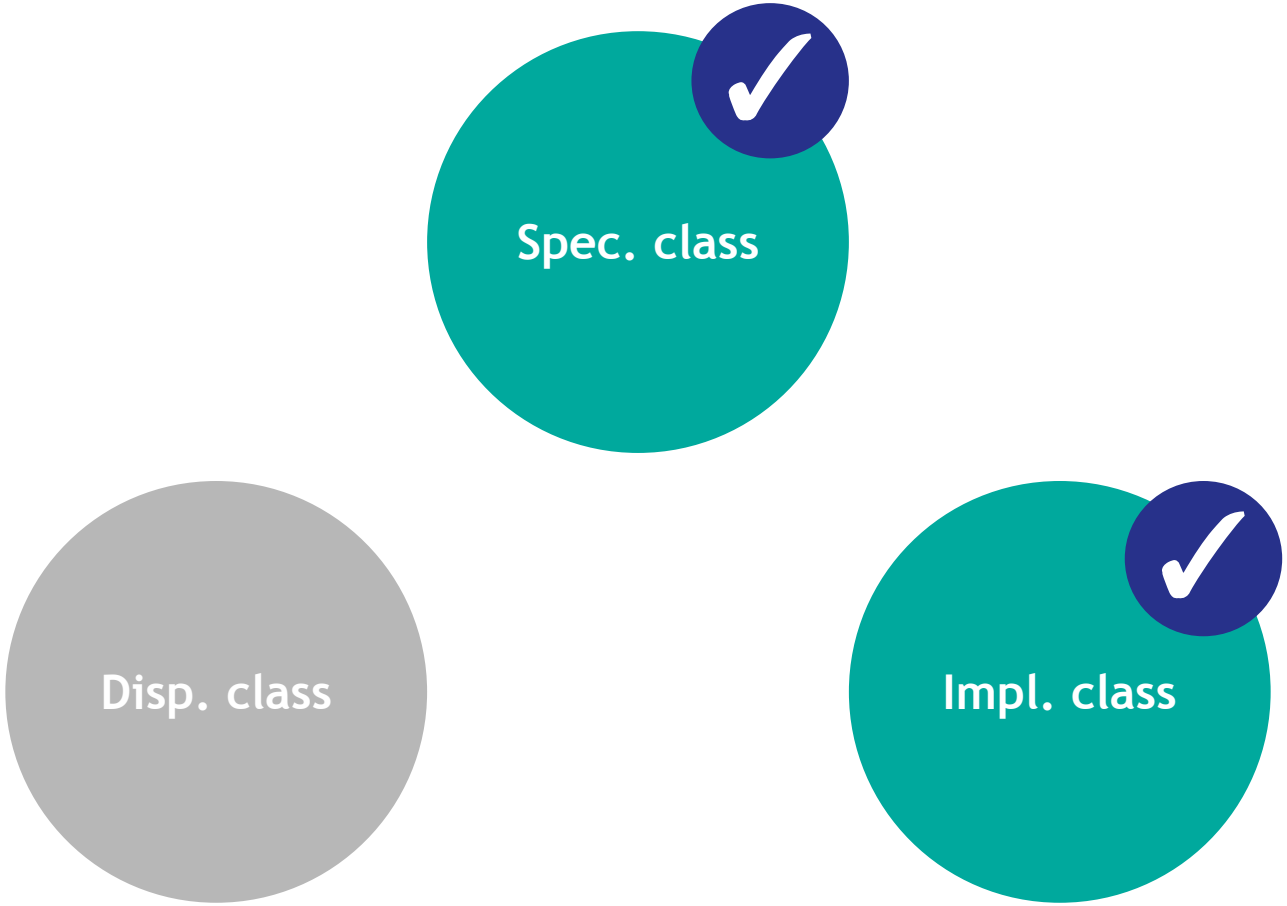
Which classes should be checked into source control?



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Spec-first, programmatically

```
##class(%REST.API).CreateApplication()
```

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Additional resources

Building Modern Web Applications (Global Summit 2017)

- https://learning.intersystems.com/course/view.php?id=681

Setting Up RESTful Services (Online learning course)

- https://learning.intersystems.com/course/view.php?id=776

InterSystems Developer Community

- https://community.intersystems.com/

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Thank you.