Building a RESTful API with ASP.NET Core

INTRODUCING REST

Kevin Dockx
ARCHITECT

@KevinDockx https://www.kevindockx.com

Coming Up

- Course prerequisites & tooling
- Introducing REST
- Learning what the REST constraints are about
- The Richardson Maturity Model
- Positioning ASP.NET Core for building RESTful APIs

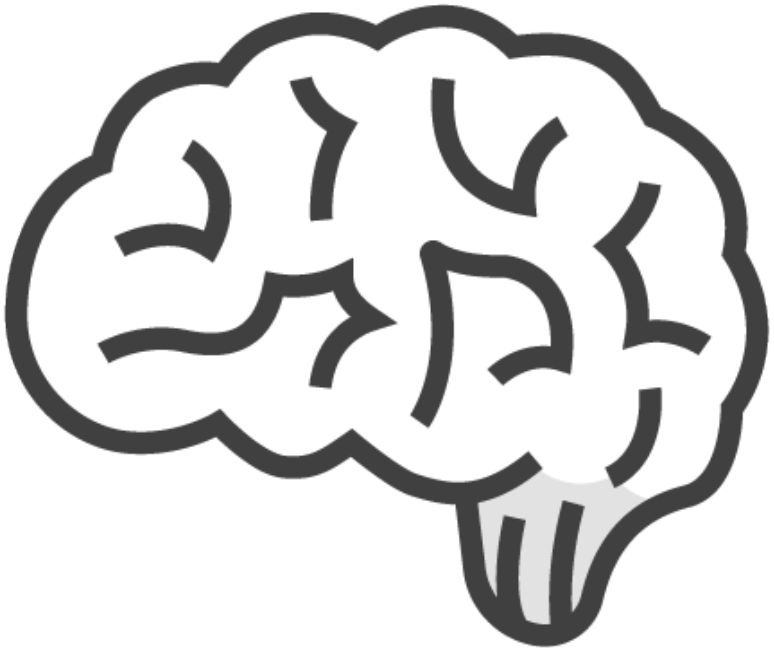
Course Prerequisites

Three focus points:
REST, REST and REST

Good knowledge of C#

Some knowledge of ASP.NET Core

Course Prerequisites



ASP.NET Core Fundamentals (Scott Allen)

- http://bit.ly/2gg9WSH

Building Your First API with ASP.NET Core (yours truly)

- http://bit.ly/2gmeTdO

Tooling

Visual Studio 2015 Update 3 or Community Edition

project.json

http://bit.ly/2g0JDmh

Visual Studio 2017

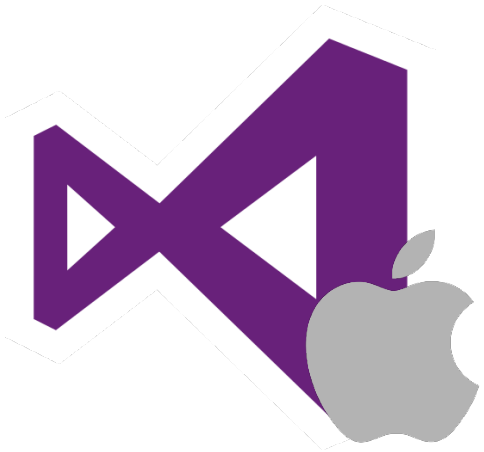
.csproj/MSBuild

http://bit.ly/2dSGoN5

Visual Studio Code

.csproj/MSBuild

http://bit.ly/1J6QrU6



Visual Studio for Mac

.csproj/MSBuild

http://bit.ly/2fXmQpH

Tooling

Postman

https://www.getpostman.com/

A browser of choice

REST is...

Representational State Transfer is intended to evoke an image of how a well-designed web application behaves:

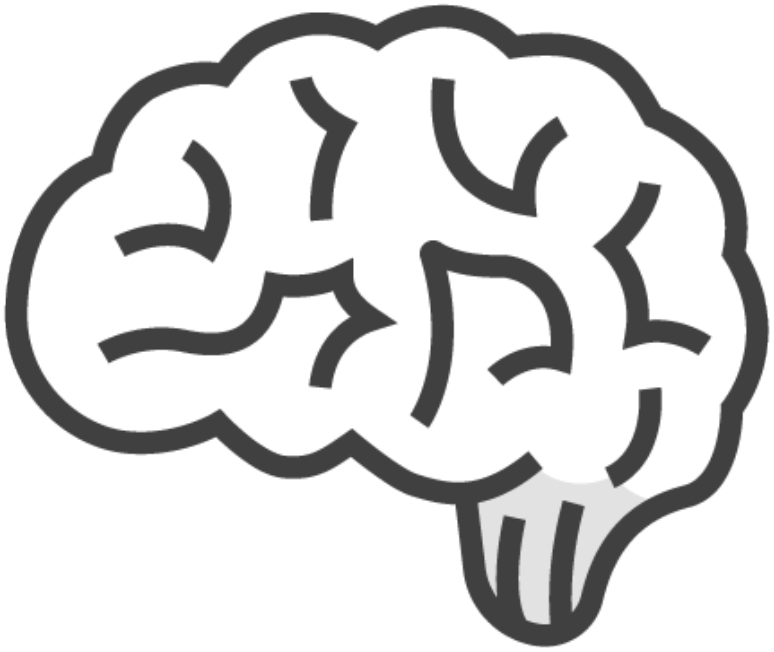
a network of web pages (a virtual state-machine)...

... where the user progresses through an application by selecting links (state transitions)...

... resulting in the next page (representing the next state of the application) being transferred to the user and rendered for their use

Roy Fielding
http://bit.ly/1rbtZik

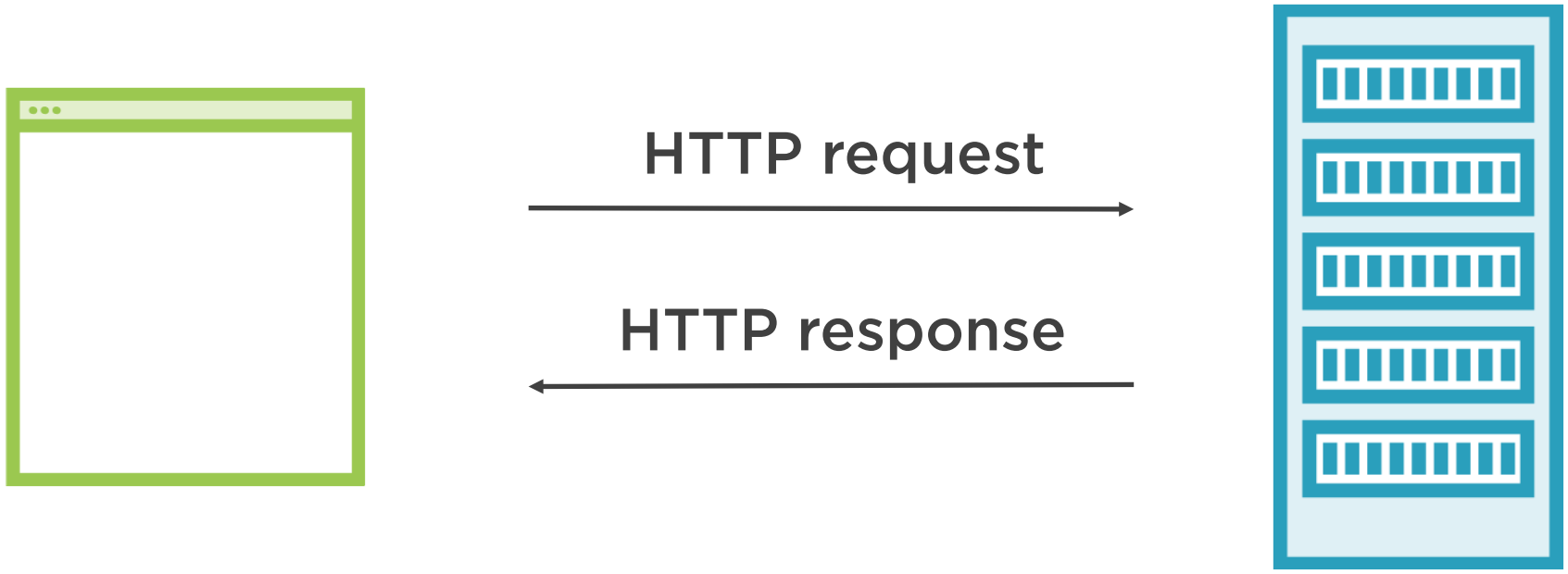
Introducing REST



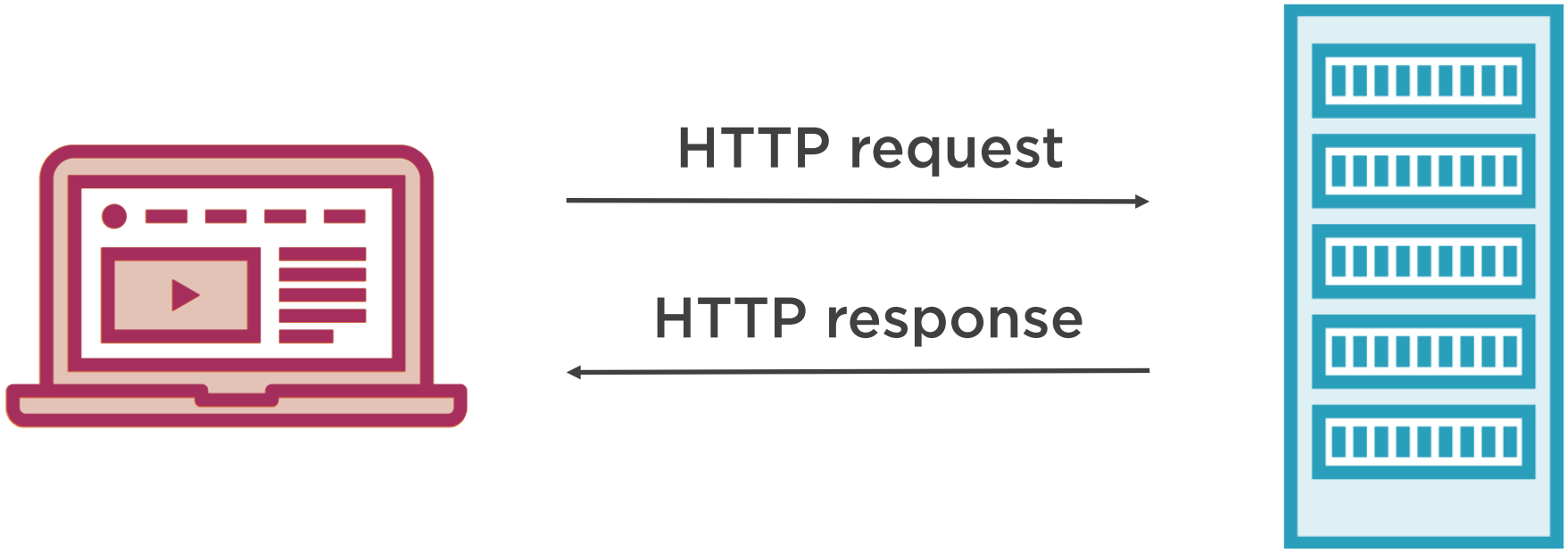
REST is an architectural style, not a standard - we use standards to implement it

REST is protocol agnostic

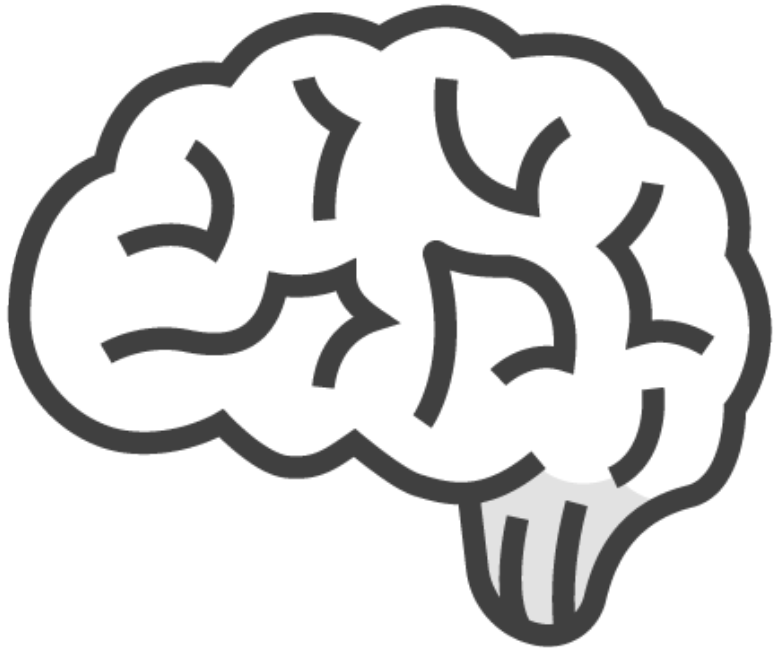
Representational State Transfer



Representational State Transfer



Learning what the REST Constraints are About



REST is defined by 6 constraints (one optional)

A constraint is a design decision that can have positive and negative impacts

Learning what the REST Constraints are About

Client-Server

client and server are separated

(client and server can evolve separately)

Statelessness

state is contained within the request

Cacheable

each response message must explicitly state if it can be cached or not

Learning what the REST Constraints are About

Layered System

client cannot tell what layer it's connected to

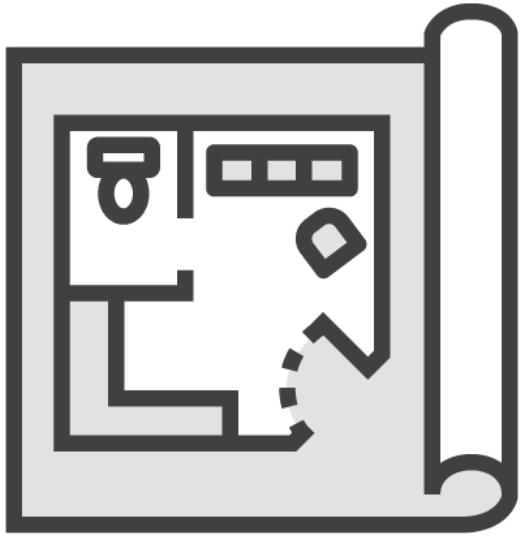
Code on Demand (optional)

server can extend client functionality

Uniform Interface

API and consumers share one single, technical interface: URI, Method, Media Type

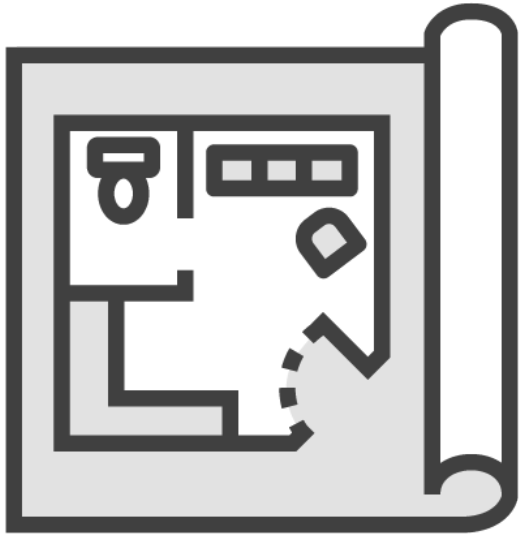
The Uniform Interface Subconstraints



Identification of resources

- A resource is conceptually separate from its representation
- Representation media types: application/json, application/xml, custom, ...

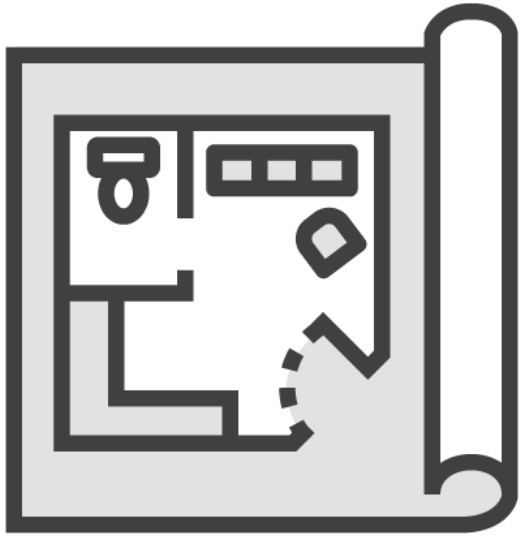
The Uniform Interface Subconstraints



Manipulation of resources through representations

- Representation + metadata should be sufficient to modify or delete the resource

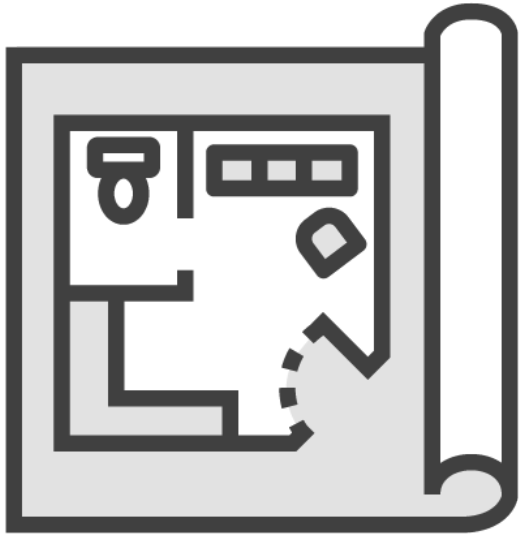
The Uniform Interface Subconstraints



Self-descriptive message

- Each message must include enough info to describe how to process the message

The Uniform Interface Subconstraints



Hypermedia as the Engine of Application State (HATEOAS)

- Hypermedia is a generalization of Hypertext (links)
- Drives how to consume and use the API

- Allows for a self-documenting API

A system is only considered RESTful when it adheres to all the required constraints

Most “RESTful” APIs aren’t really RESTful...

... but that doesn’t make them bad APIs, as long as you understand the potential trade-offs

The Richardson Maturity Model

Level 0 (The Swamp of POX)

HTTP protocol is used for remote interaction

... the rest of the protocol isn't used as it should be

RPC-style implementations (SOAP, often seen when using WCF)

```
POST (info on data)
http://host/myapi


POST (author to create)
http://host/myapi
```

The Richardson Maturity Model

Level 1 (Resources)

Each resource is mapped to a URI

HTTP methods aren't used as they should be

Results in reduced complexity

```
POST
http://host/api/authors

POST
http://host/api/authors/{id}
```

The Richardson Maturity Model

Level 2 (Verbs)

Correct HTTP verbs are used

Correct status codes are used

Removes unnecessary variation

```
GET
http://host/api/authors
200 Ok (authors)


POST (author representation)
http://host/api/authors
201 Created (author)
```

The Richardson Maturity Model

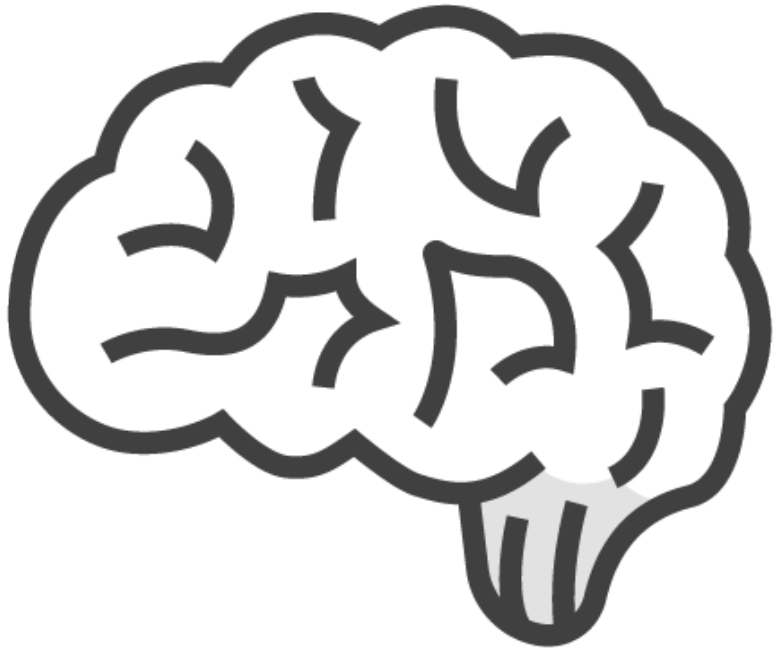
Level 3 (Hypermedia)

The API supports Hypermedia as the Engine of Application State (HATEOAS)

Introduces discoverability

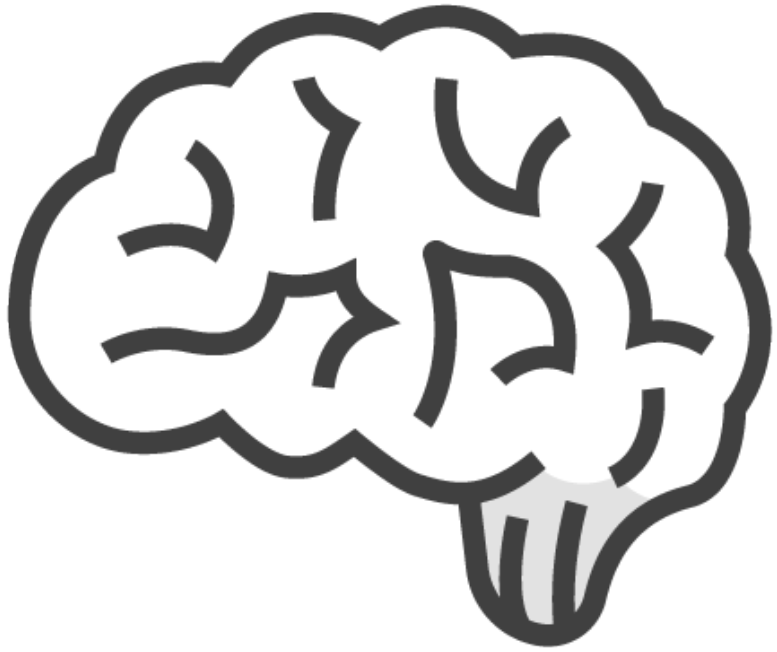
```
GET
http://host/api/authors
200 Ok (authors + links that
drive application state)
```

Positioning ASP.NET Core for Building RESTful APIs



Open-source, cross-platform framework for building modern internet connected applications

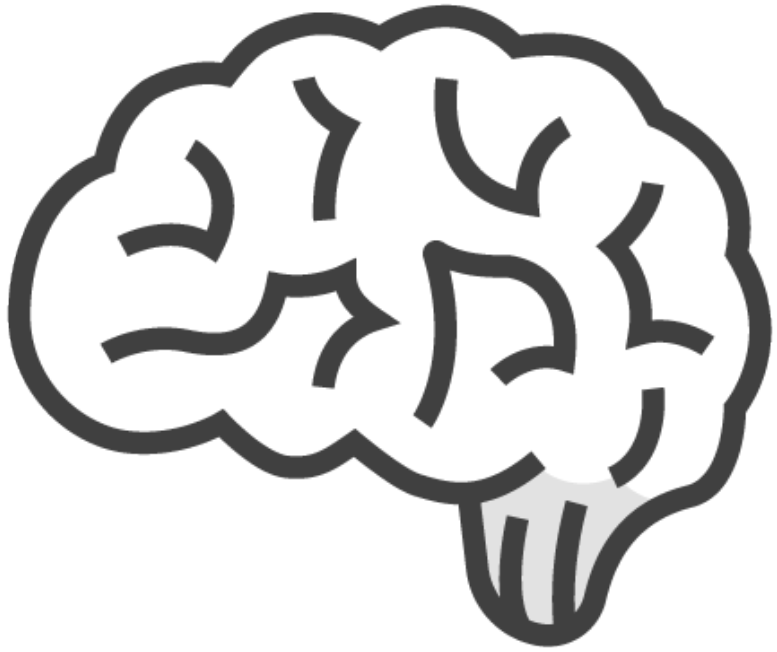
Positioning ASP.NET Core for Building RESTful APIs



ASP.NET Core MVC middleware provides a framework for building APIs and web applications using the Model-View-Controller pattern

...but we don't get a RESTful API out of the box!

The Model-View-Controller Pattern

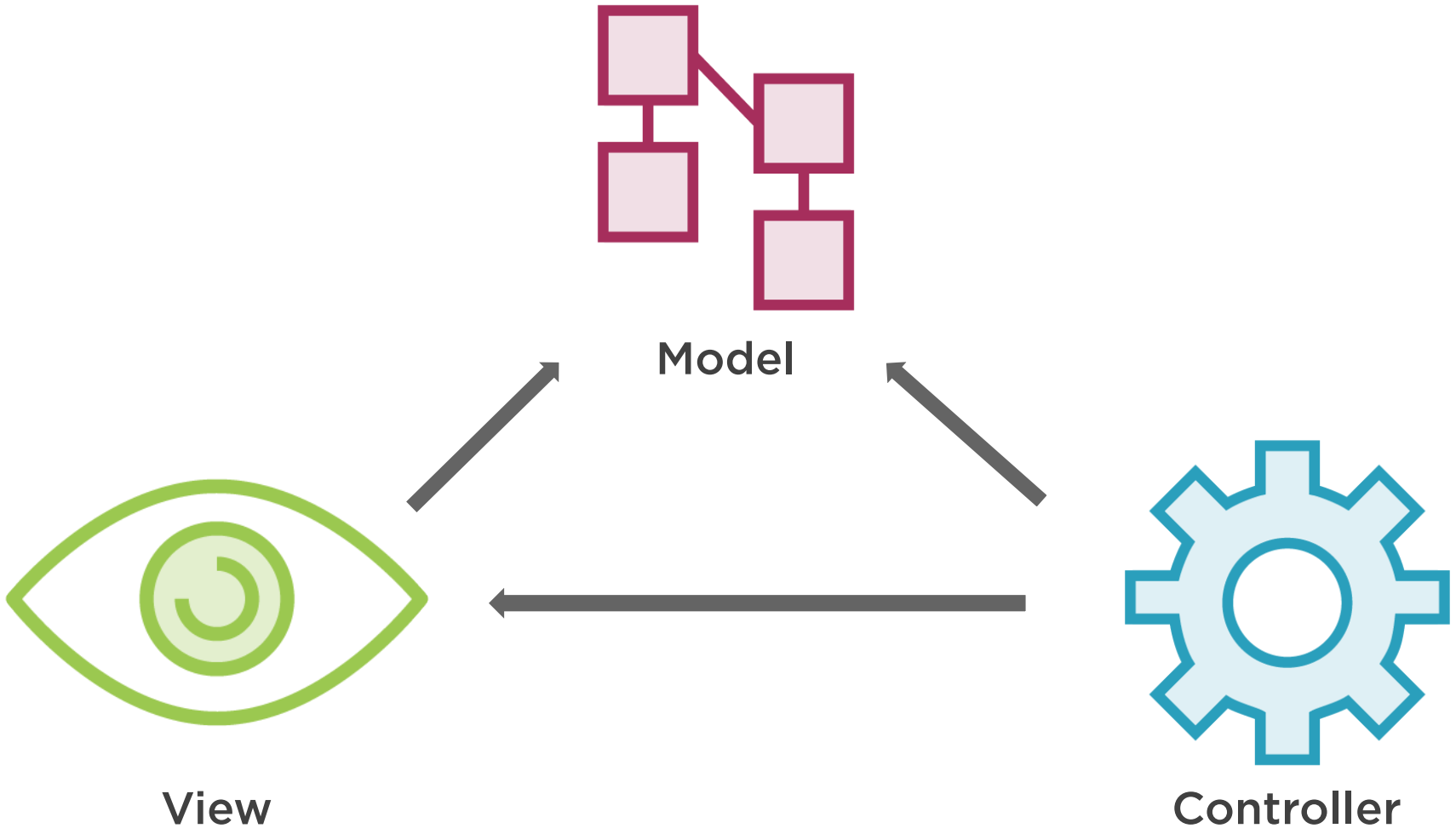


Architectural pattern for implementing user interfaces

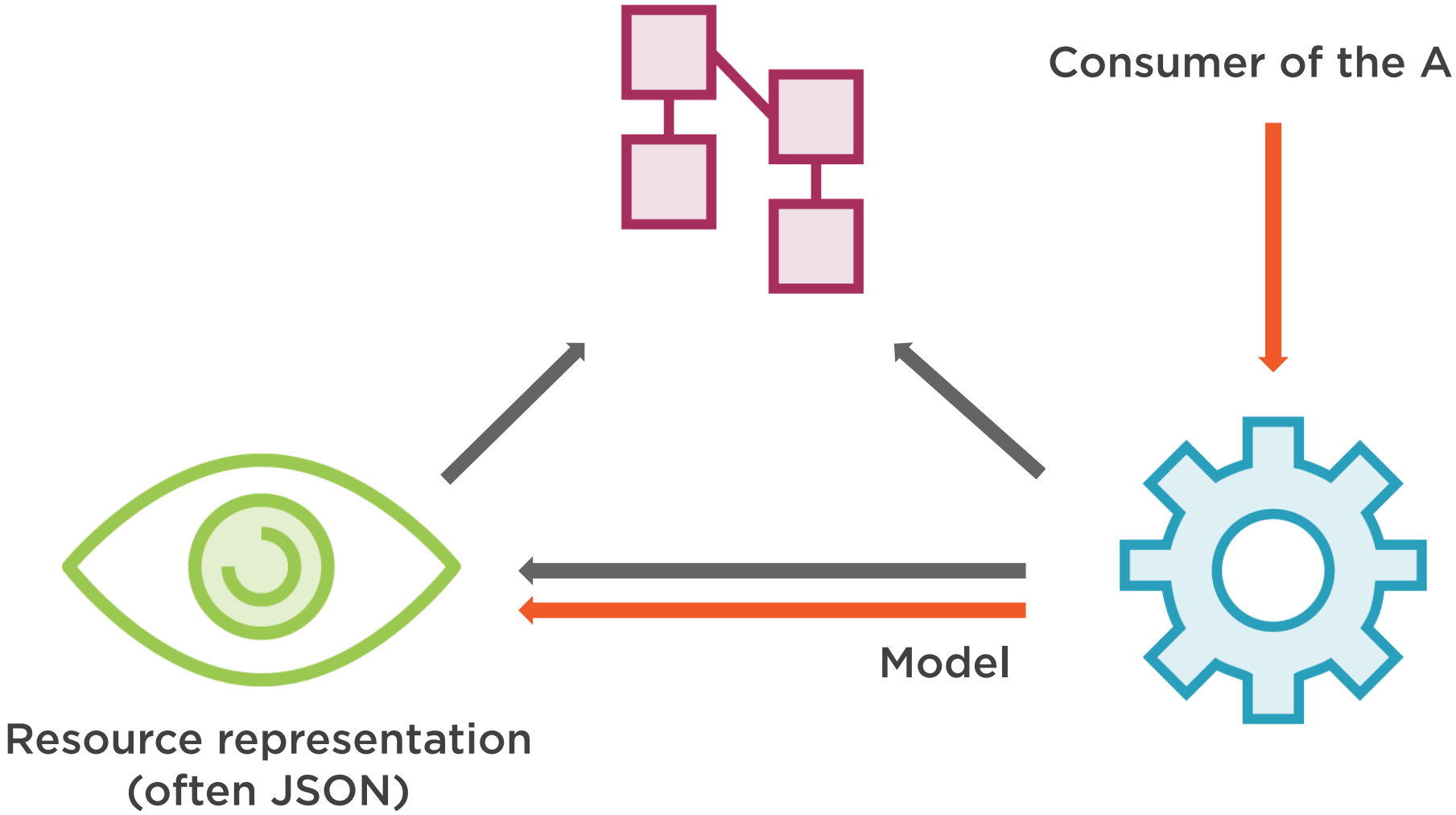
Encourages loose coupling and separation of concerns

Not the full application architecture!

The Model-View-Controller Pattern (API)



The Model-View-Controller Pattern (API)



Demo

Inspecting the Starter Solution

Summary

REST is an architectural style, evoking an image of how a well-designed web application should behave

Six constraints

- Client-Server
- Statelessness
- Cacheable
- Layered System
- (Code on Demand)
- Uniform Interface

Summary

The Richardson Maturity Model grades APIs by their RESTful maturity

ASP.NET Core is an open-source, cross-platform framework for building modern internet connected applications

The ASP.NET Core MVC middleware provides a framework for building APIs and web applications using the Model-View-Controller pattern