Securing ASP.NET Core 3 with OAuth2 and OpenID Connect

GETTING STARTED WITH ASP.NET CORE SECURITY

Kevin Dockx
ARCHITECT

@KevinDockx https://www.kevindockx.com

Knowing how to secure applications is important...

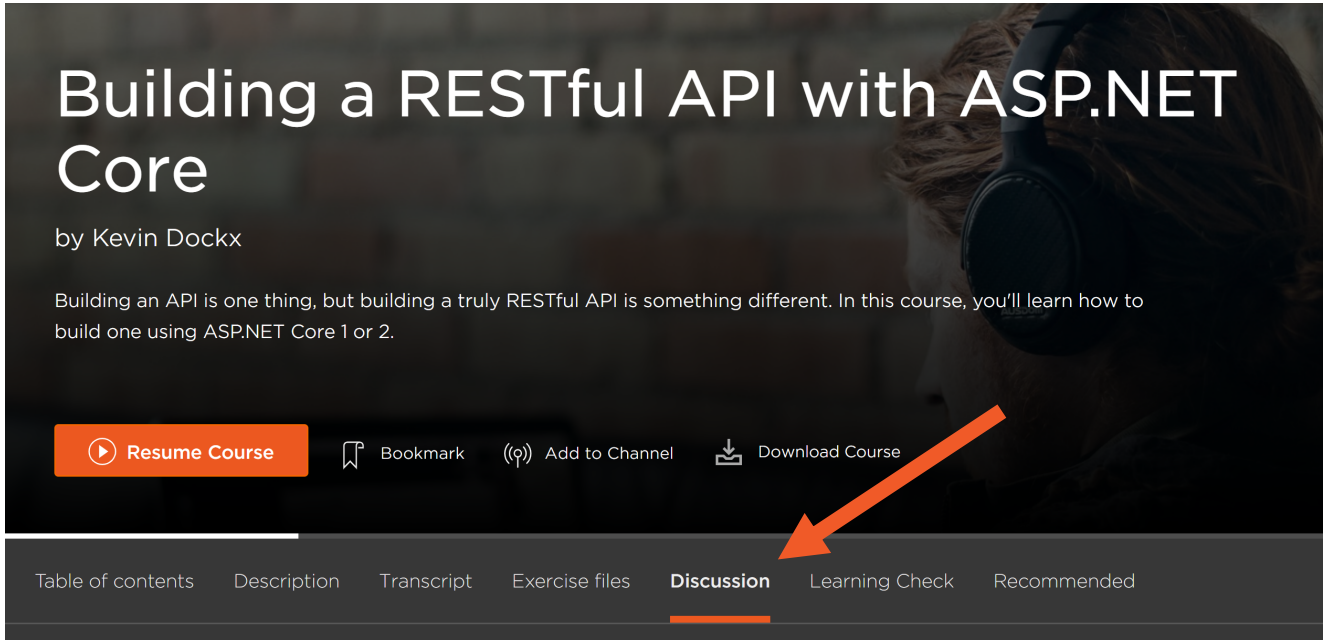
... but knowing why we make certain decisions is, arguably, even more important

Coming Up

- Course prerequisites and tooling
- Application architectures and security
- The importance of a central identity provider
- Introducing OAuth2 and OpenID Connect

Discussion tab on the course page

Twitter: @KevinDockx



(course shown is one of my other courses, not this one)

Course Prerequisites

Good knowledge of C#

Some knowledge of ASP.NET Core 3

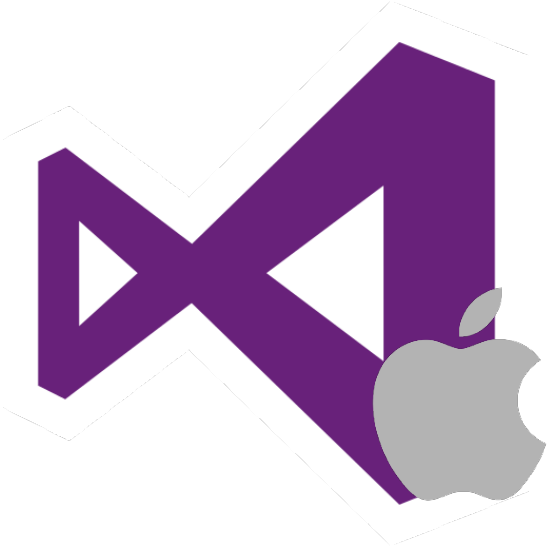
Building Web Applications with ASP.NET Core MVC (Gill Cleeren)

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

Tooling

Visual Studio 2019
v16.4 or better

Visual Studio
Code



Visual Studio for
Mac

JetBrains Rider

Application Architectures and Security

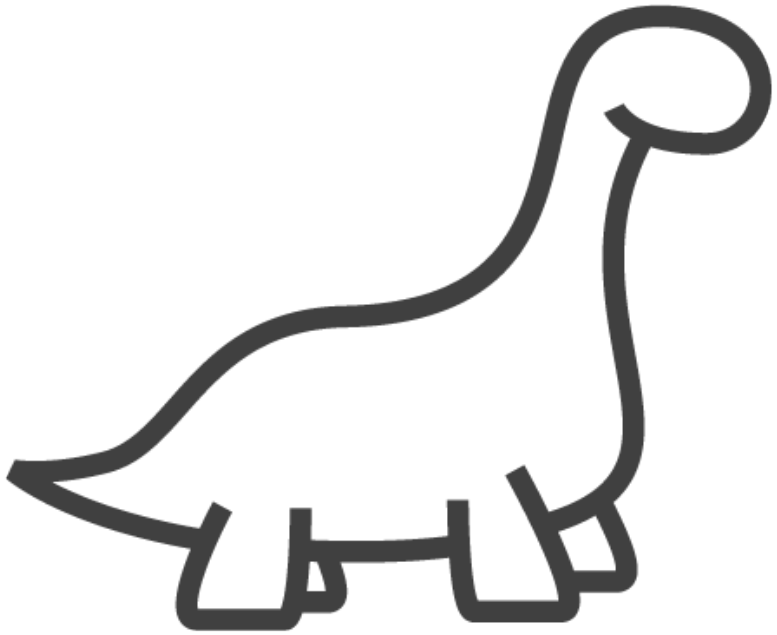
Thick client applications

- Windows authentication

Server-side web applications

- Windows or Forms authentication

Not service-based



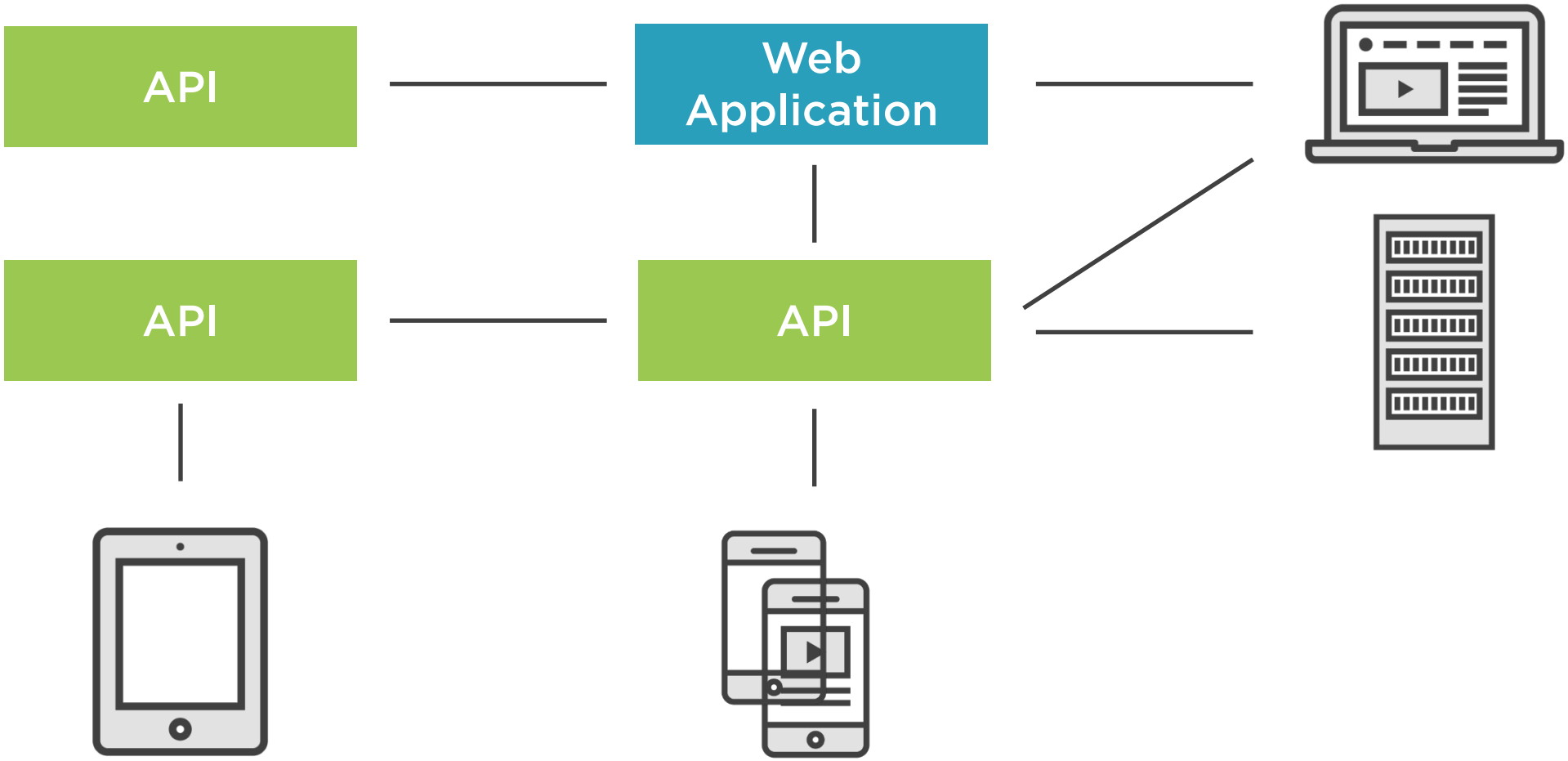
Service-based applications

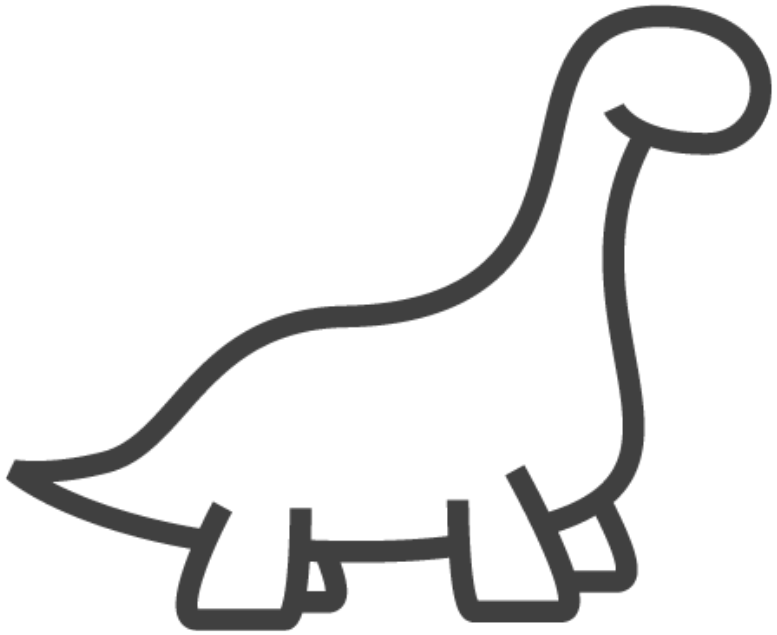
- WS-Security (WCF)
- IP-level configuration (firewall)

SAML 2.0

- Standard for exchanging authentication and authorization data between security domains

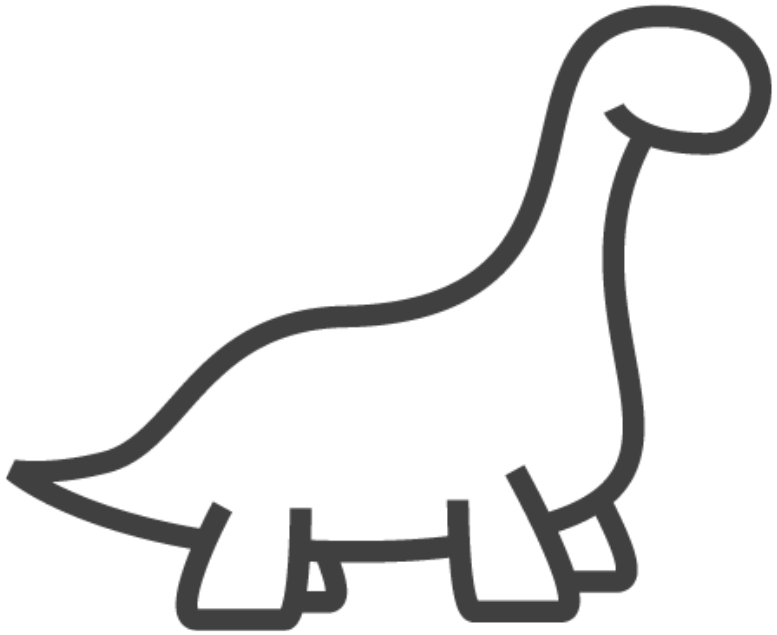
Application Architectures and Security



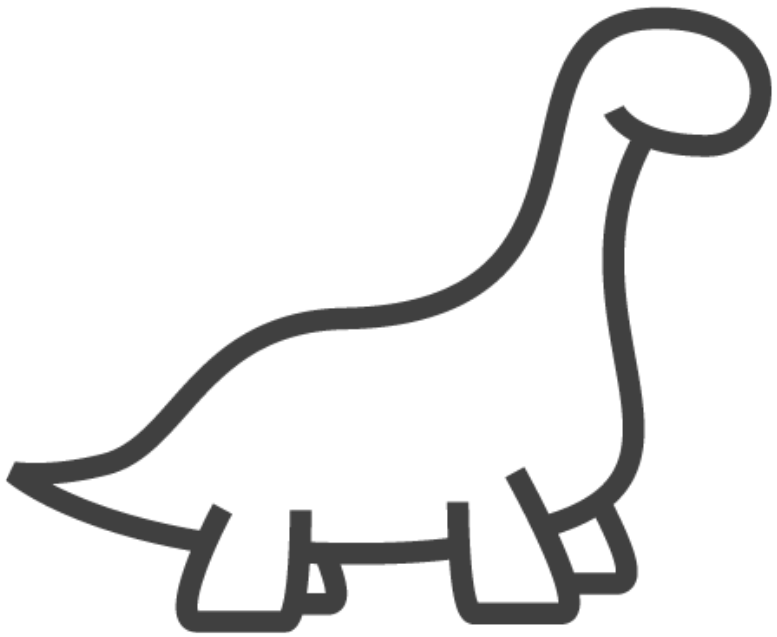


Client applications (often) require public APIs

Applications that live on the client can't be (decently) secured with means designed for use at the server



Sending username/password on each request proved to be a bad idea



Token-based security

- Client applications send tokens, representing consent, to API

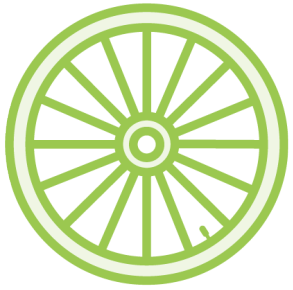
Home-grown token services emerged...

- The application still has access to username/password

Expiration

Token signing and validation

Token format



Authentication and authorization

Securely delivering tokens to different application types

...

Application Architectures and Security

A central identity provider

A protocol that's safe for authentication and authorization

Working Towards a Central Identity Provider

It's the responsibility of an Identity Provider (IDP) to authenticate the user and, if needed, safely provide proof of identity to an application

Identity and Access Management-related Tasks

- User registration & management
- Locking out users
- Password policies, strength & resets

... are tedious tasks, prone to change

Handle them in a central location and reuse them across applications

Early-days encryption mechanism can easily be brute forced

Key stretching algorithms discourage this...

... but the amount of stretching and the algorithms themselves are prone to change

Some systems might require certificates

Other systems might require a second or third factor of authentication

User accounts are reused across applications

Identity and access management-related tasks are common concerns

Safely storing account-related information is prone to change

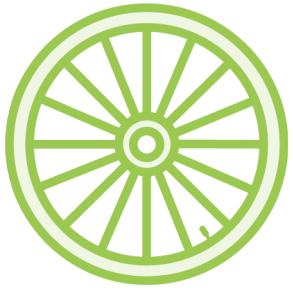
Means of authentication are added or changed

A central Identity Provider (IDP) for Identity and Access Management (IAM) system solves these issues

Expiration

Token signing and validation

Token format



Authentication and authorization

Securely delivering tokens to different application types

...

OAuth2

OAuth2 is an open protocol to allow secure authorization in a simple and standard method from web, mobile and desktop applications

Introducing OAuth2

A client application can request an access token to gain access to an API

OAuth2 defines how a client application can securely achieve authorization

Introducing OAuth2

Homegrown endpoints are replaced by endpoints from the OAuth2 standard

The standard defines how to use these endpoints for different types of client applications

Introducing OAuth2

IdentityServer and Azure AD implement the OAuth2 standard

- Others include Ping, WSO2 IdentityServer, TrustBuilder, ...

OpenID Connect

OpenID Connect is a simple identity layer on top of the OAuth2 protocol

Introducing OpenID Connect

A client application can request an identity token (next to an access token)

That identity token is used to sign in to the client application

Introducing OpenID Connect

The UserInfo endpoint allows a client application to get additional information on the user

Introducing OpenID Connect

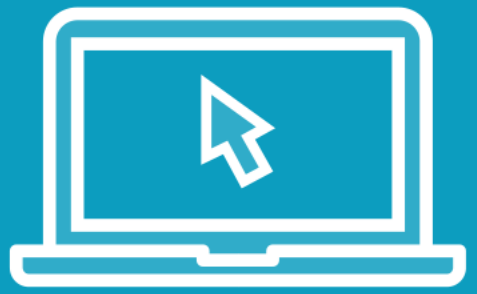
OpenID Connect is the superior protocol: it extends and supersedes OAuth2

- Even if the client application only requires authorization to access an API, we should use OIDC instead of plain OAuth2

Introducing OpenID Connect

OIDC isn't just for new or API-based applications

Demo



Introducing the demo application

Summary

Identity and Access Management (IAM) belongs at a central location: an Identity Provider (IDP)

That IDP should implement protocols that safely allow authentication and authorization: OpenID Connect (and OAuth2)