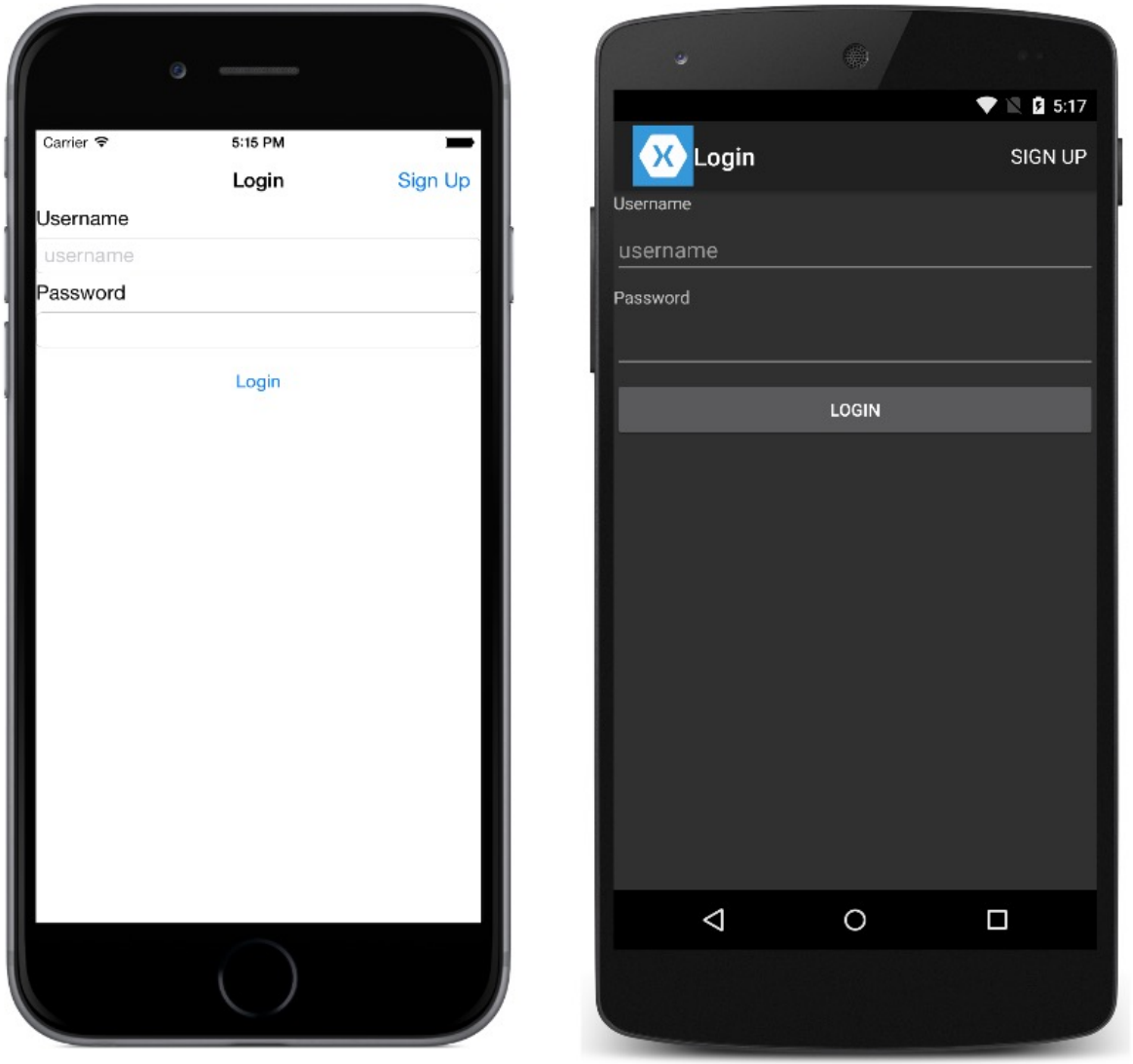
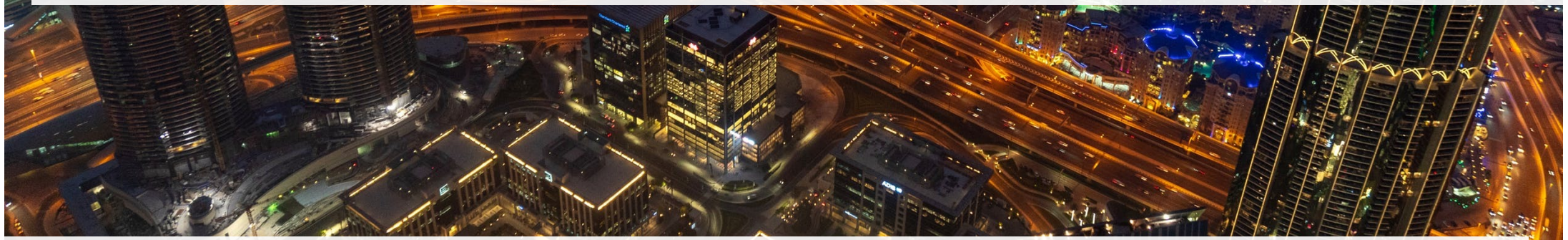

Adding authentication to your mobile app
Mark Allibone
Rey Technology
@mallibone



https://docs.microsoft.com/en-gb/samples/xamarin/xamarin-forms-samples/navigation-loginflow/

Why do we even need authentication?



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Business Service
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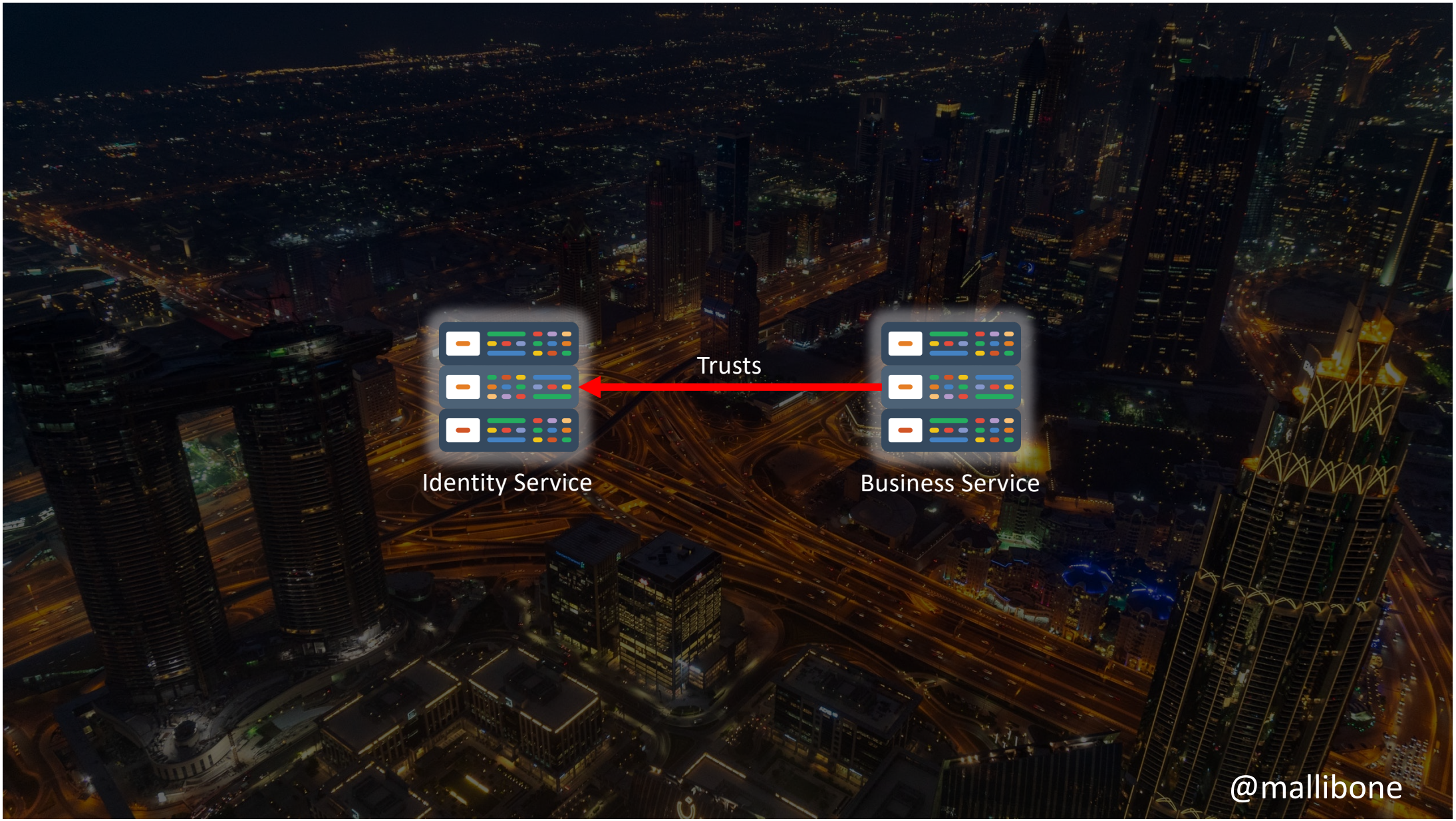
Trusts
Identity Service
Business Service
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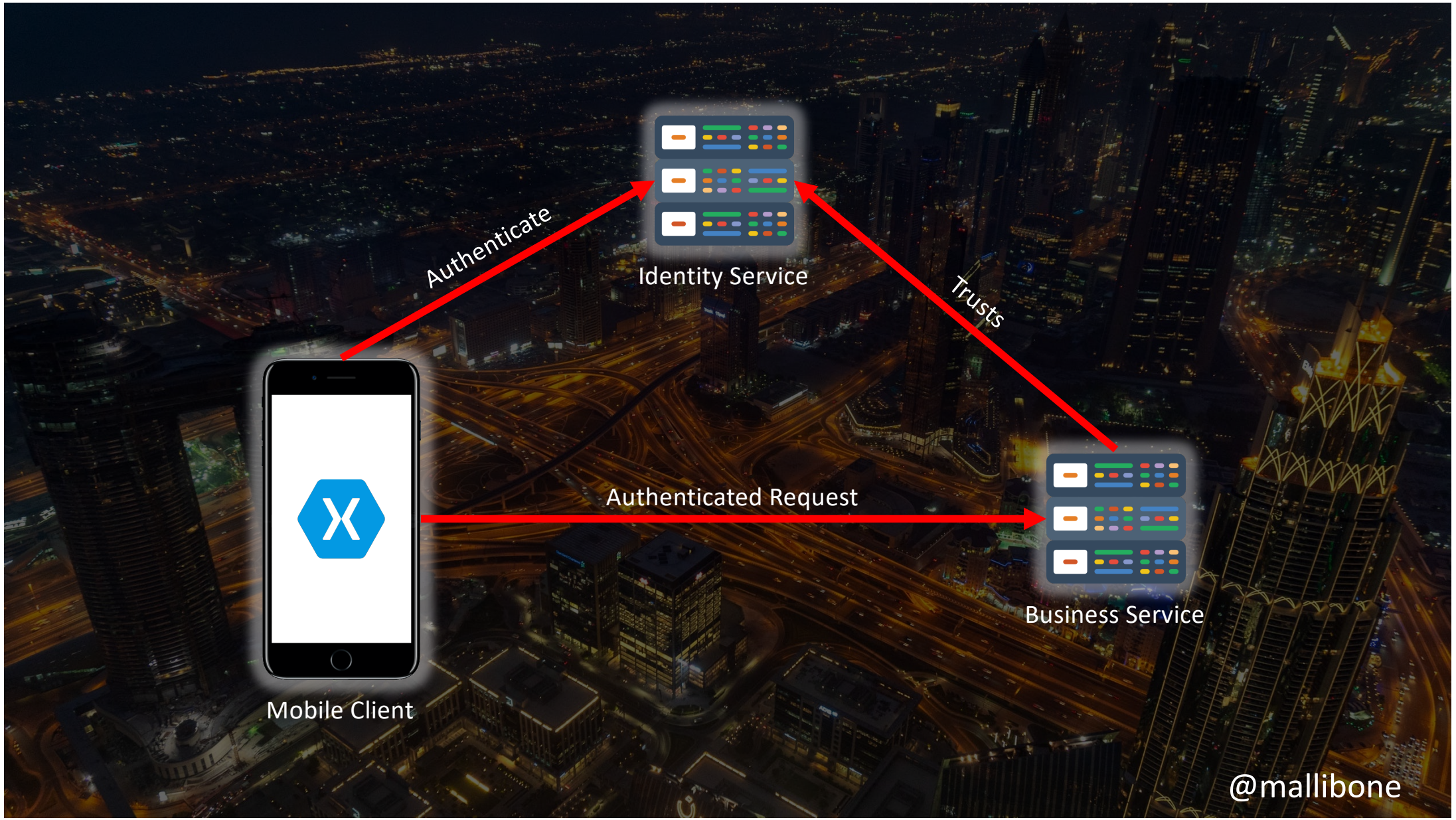
Authenticate
Identity Service
Trusts
Authenticated Request
Business Service
Mobile Client
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Having the right mindset


Choosing an Authentication Standard
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OAUTH
OAUTH
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WHO AM I????
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OpenID
Connect
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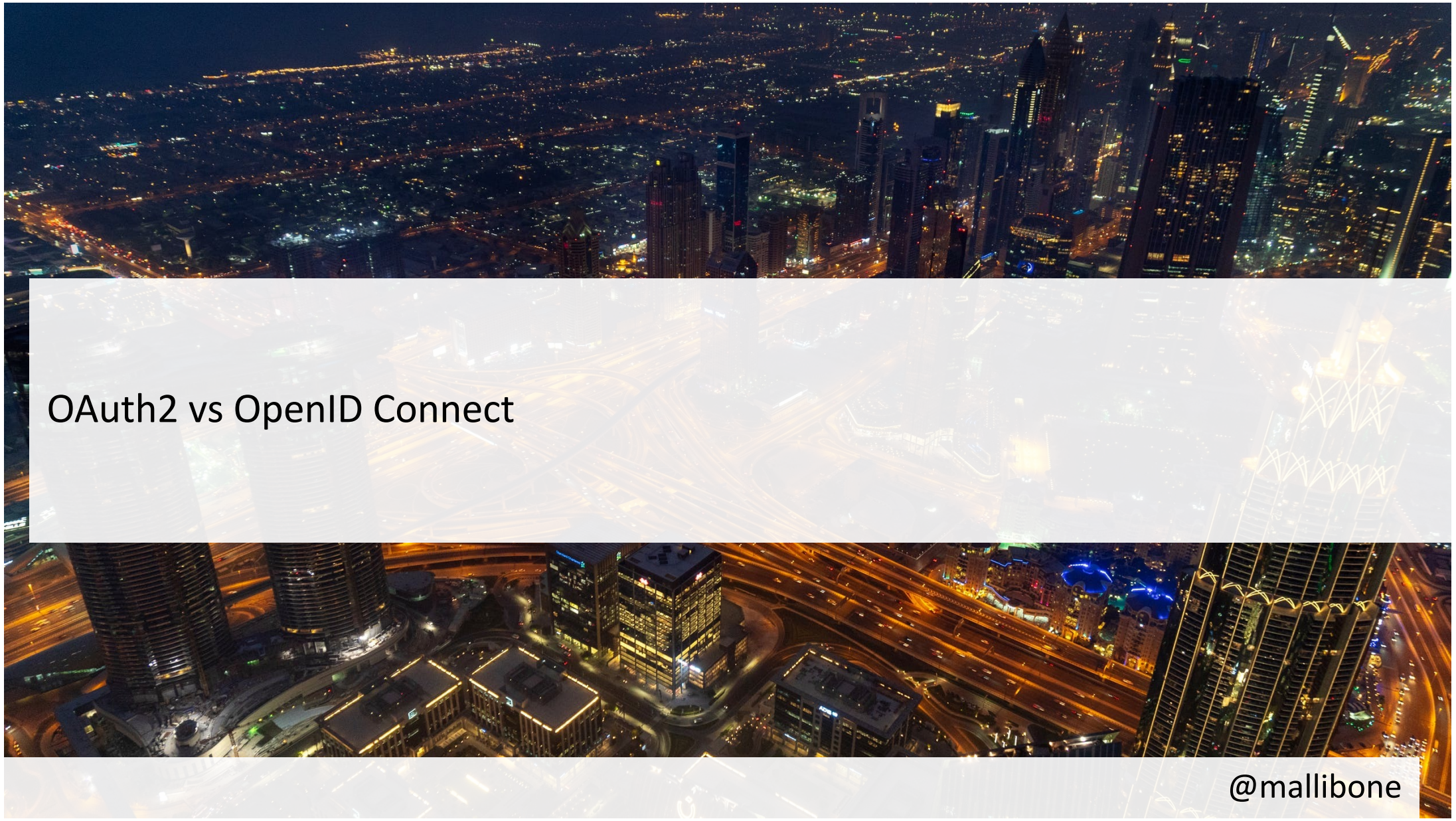

OAuth2 vs OpenID Connect

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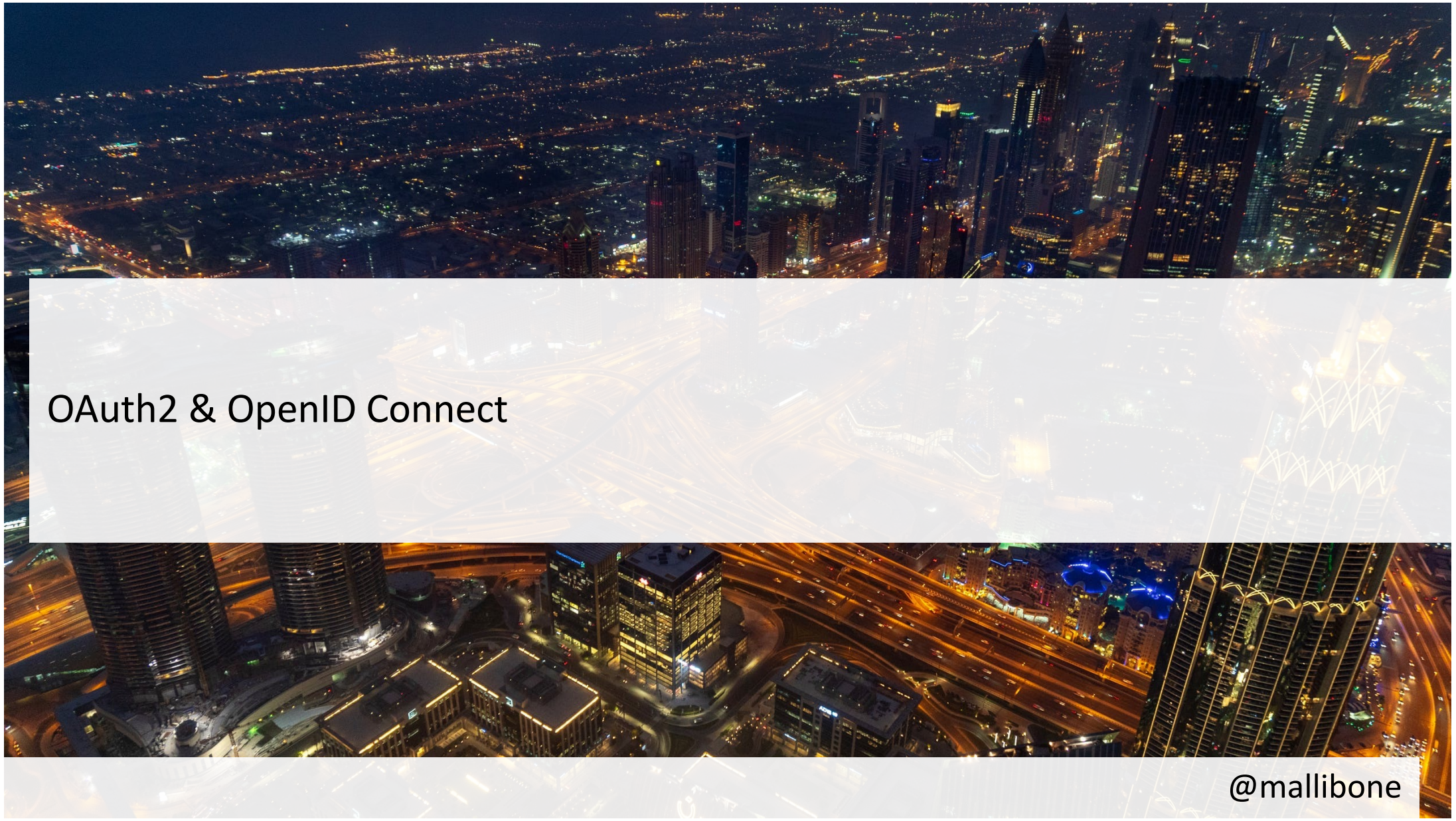

OAuth2 & OpenID Connect

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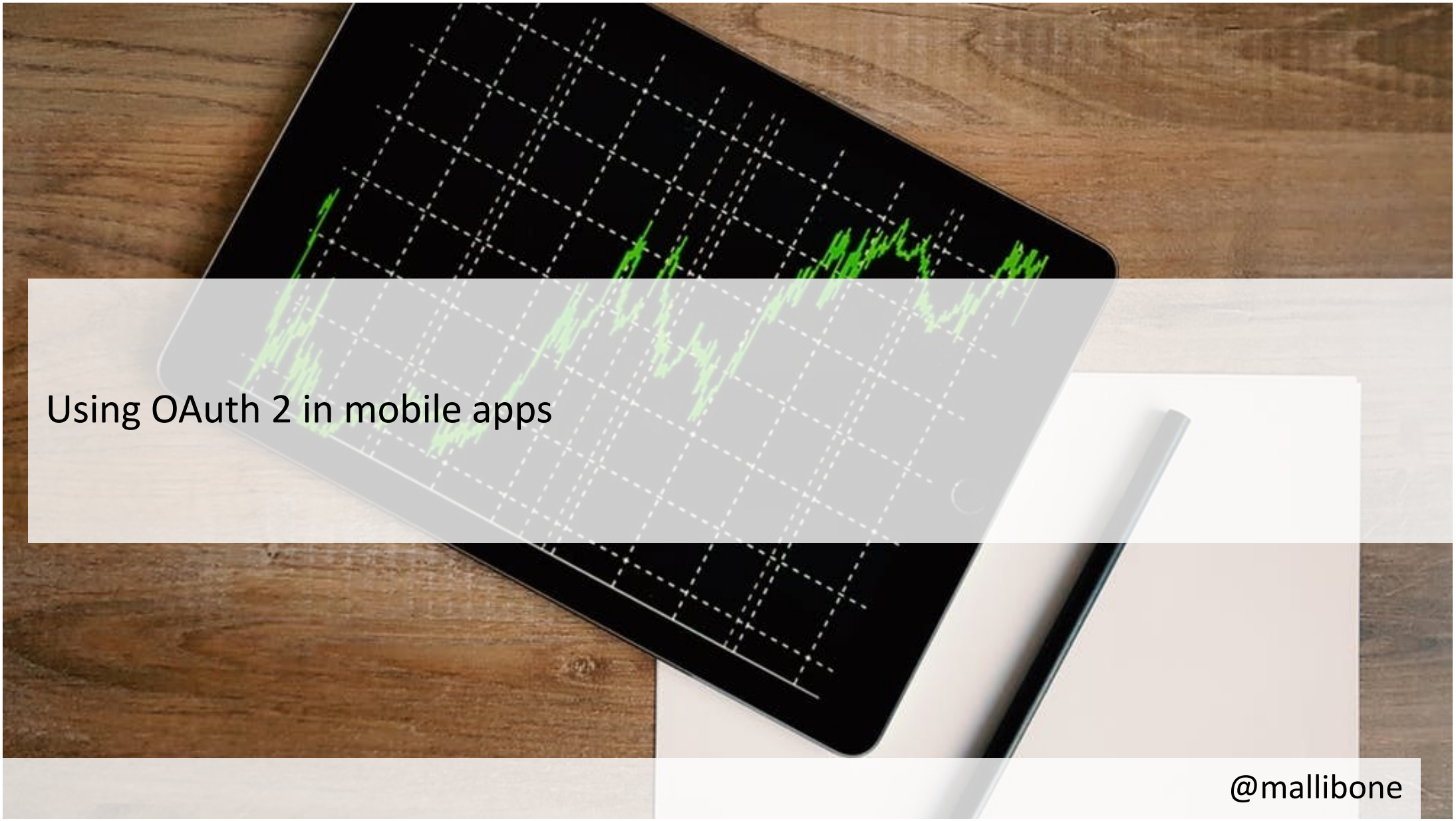

Using OAuth 2 in mobile apps

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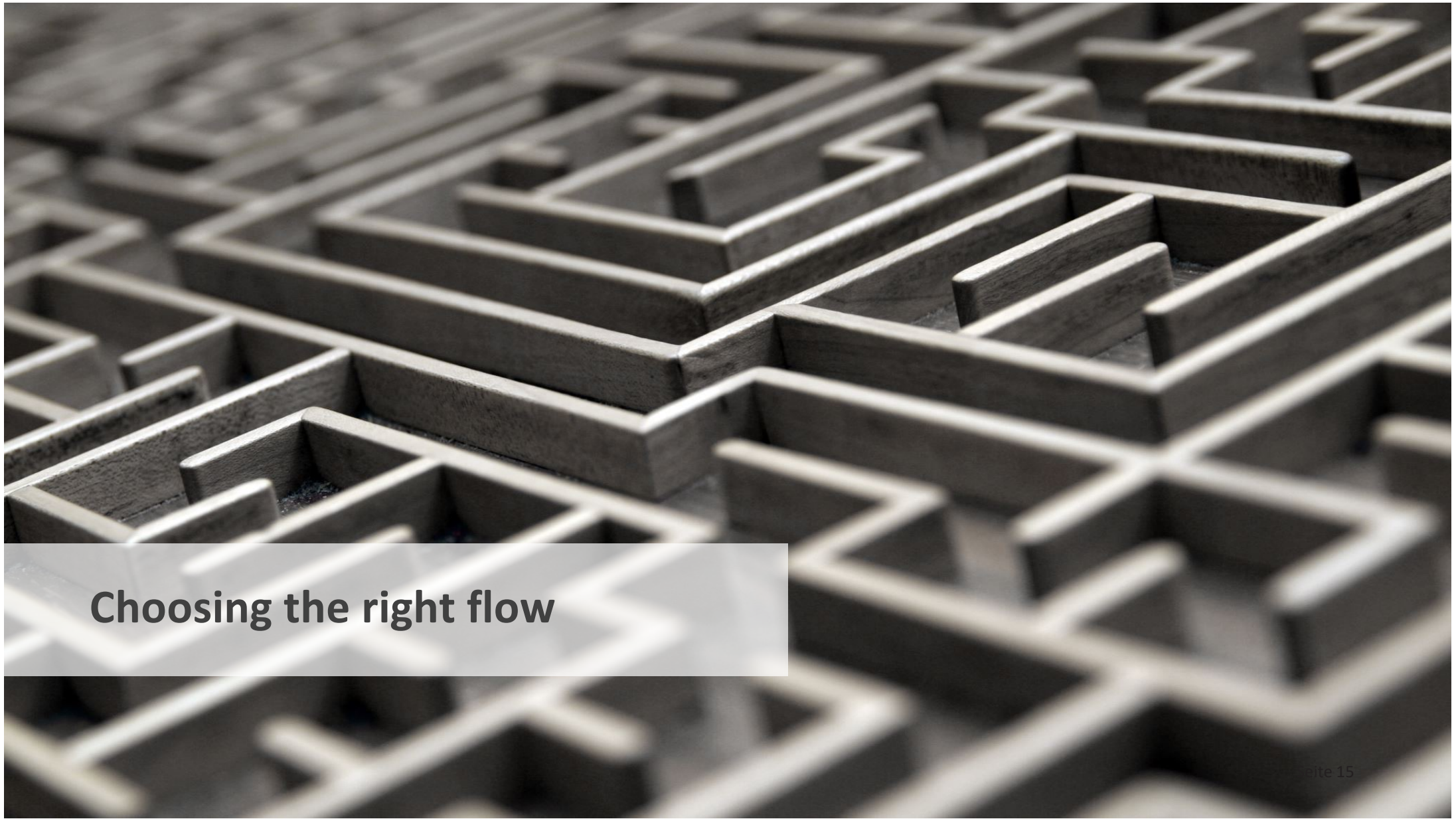
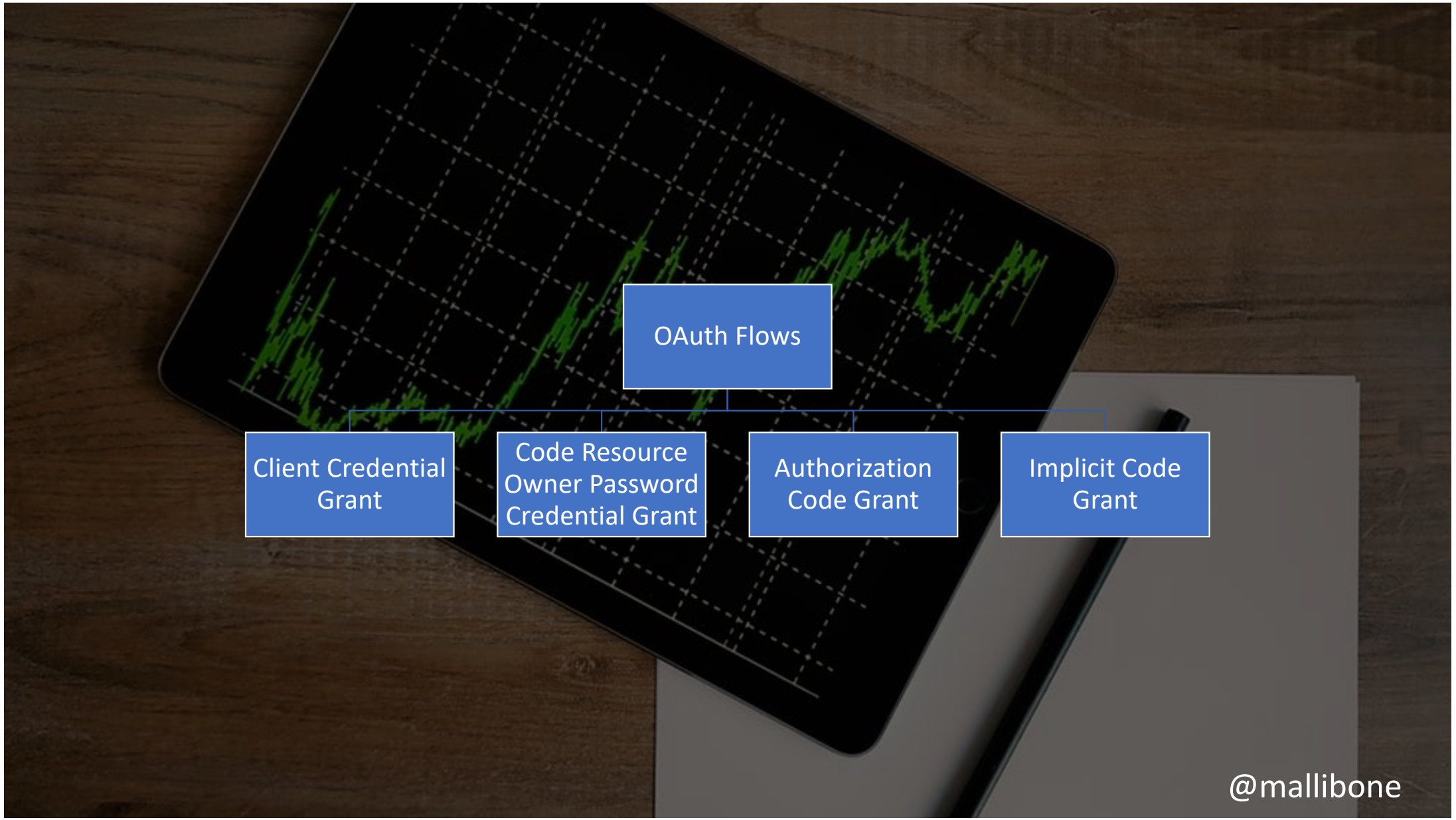


Choosing the right flow


OAuth Flows
Client Credential Grant
Code Resource Owner Password Credential Grant
Authorization Code Grant
Implicit Code Grant
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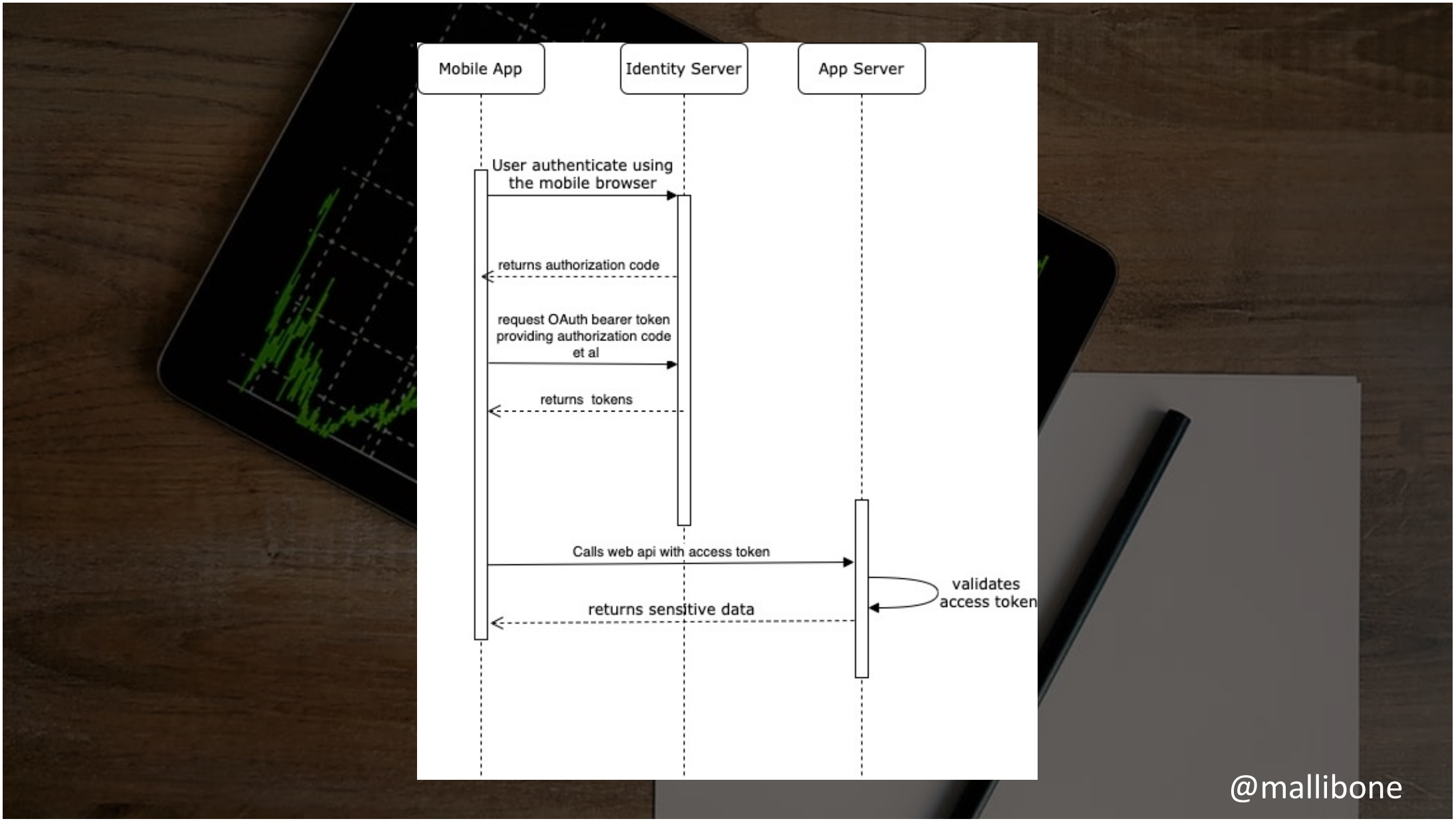
Mobile App
Identity Server
App Server
User authenticate using the mobile browser
returns authorization code
request OAuth bearer token providing authorization code et al
returns tokens
Calls web api with access token
validates access token
returns sensitive data
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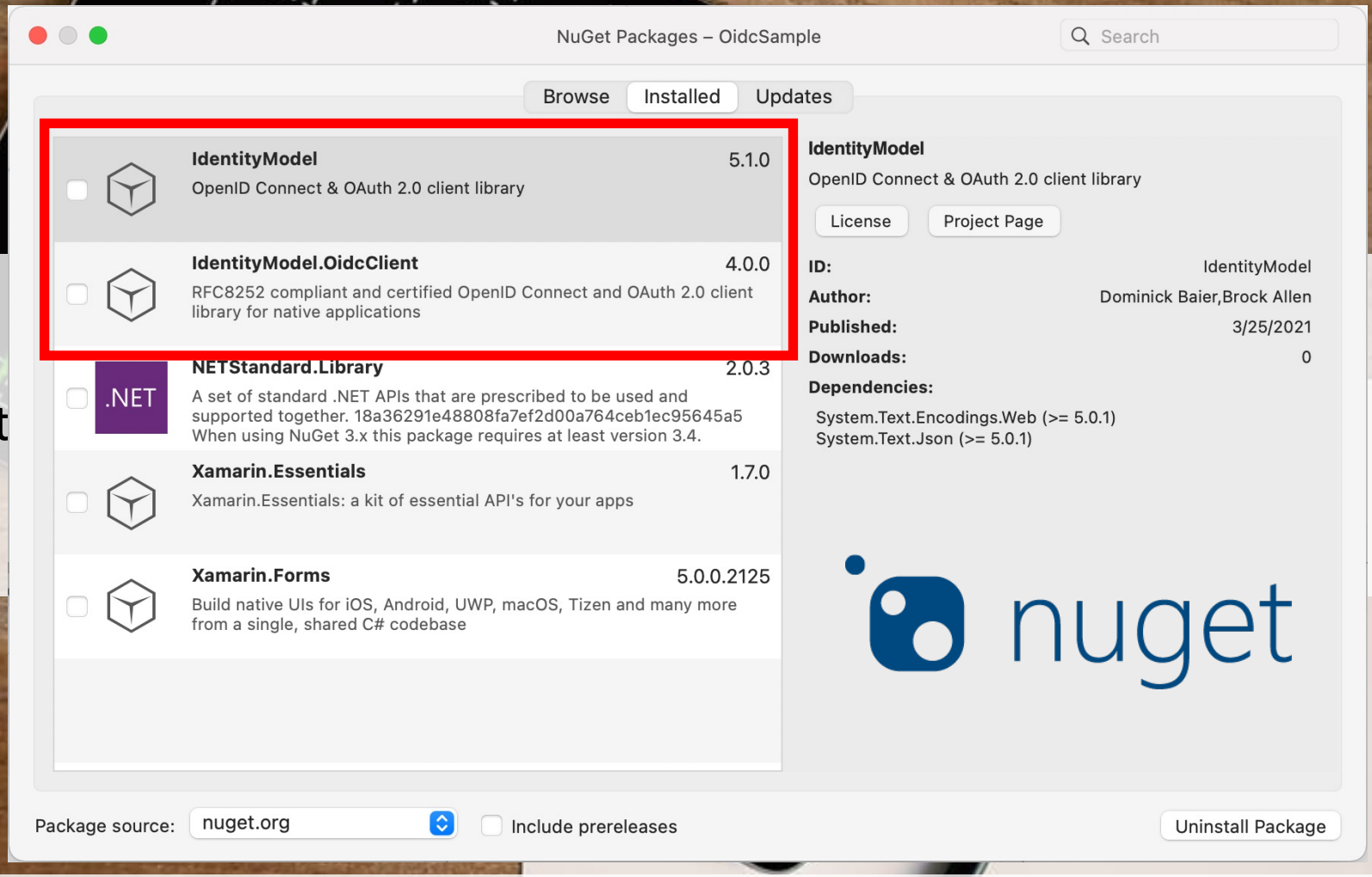
Getting start



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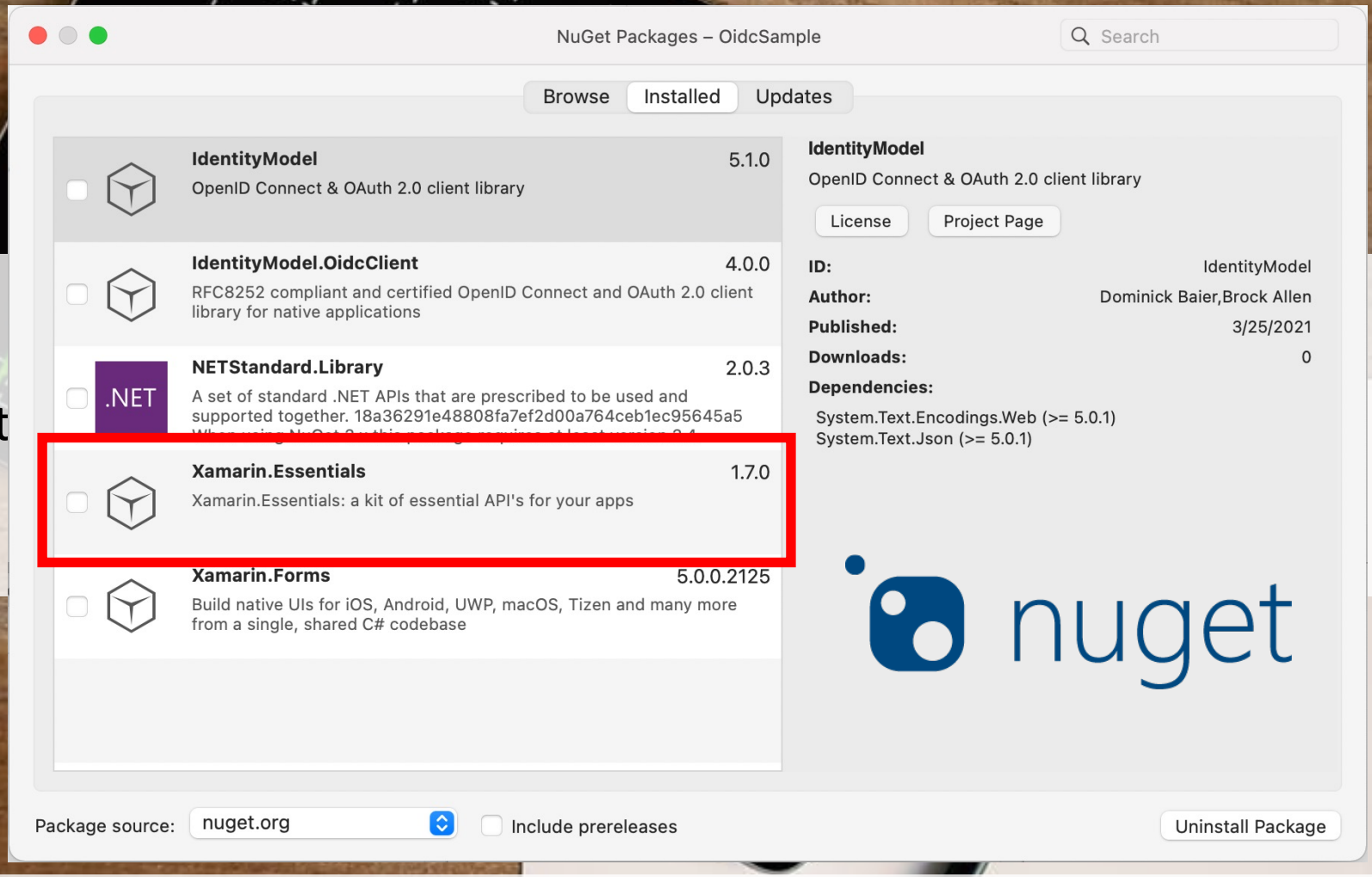

nuget

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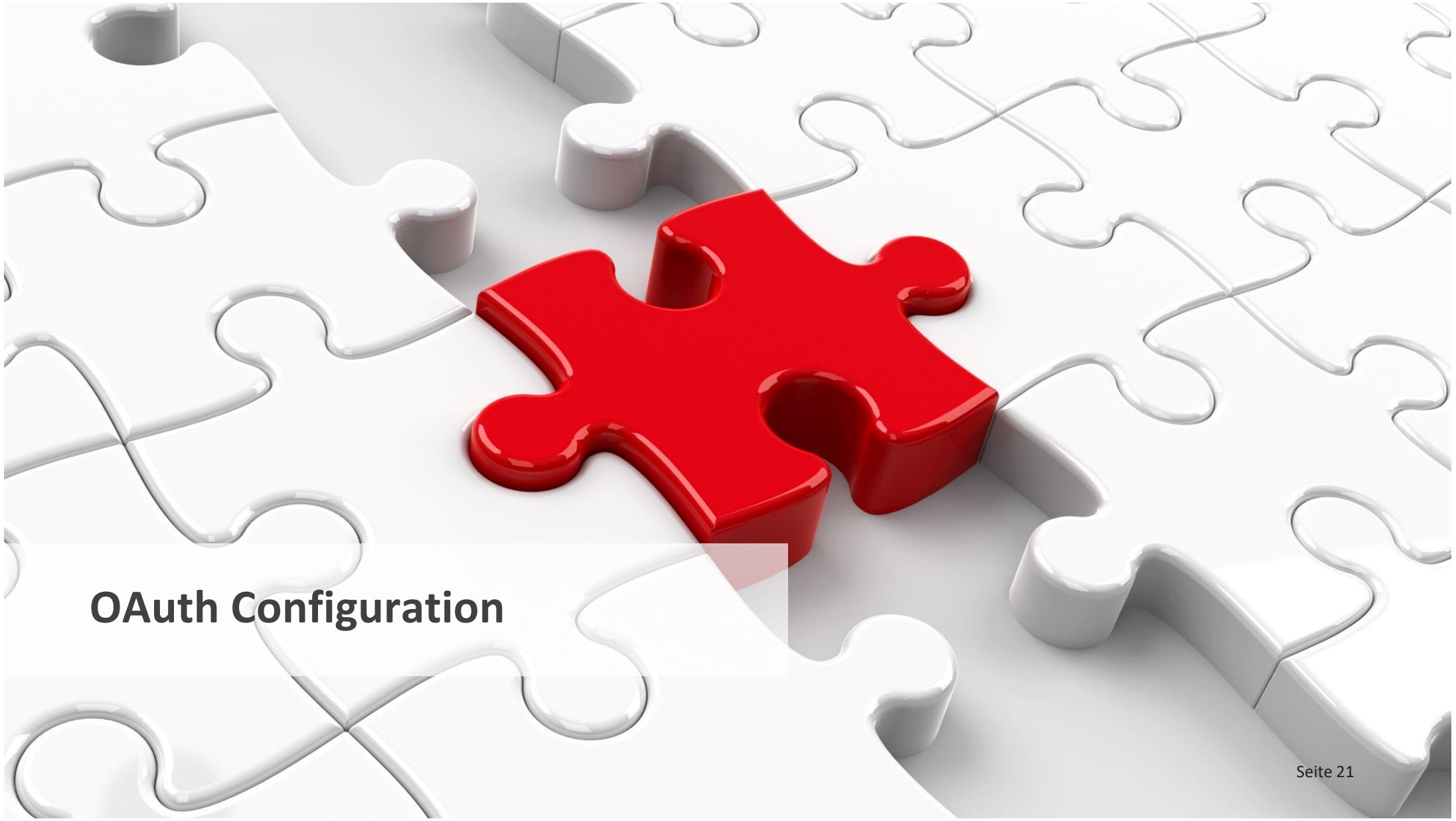
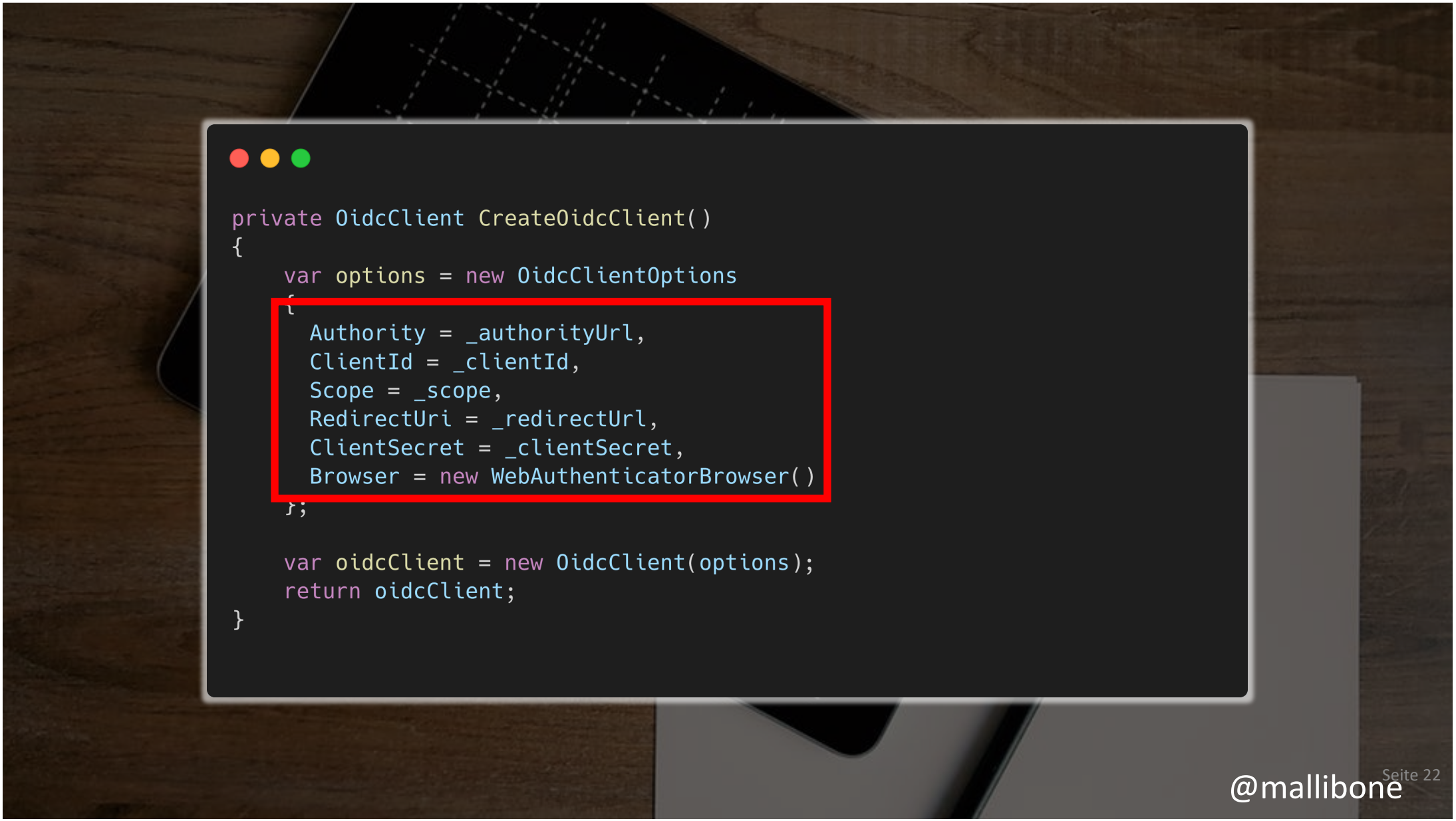


OAuth Configuration


private OidcClient CreateOidcClient()
{
var options = new OidcClientOptions
{
Authority = _authorityUrl,
ClientId = _clientId,
Scope = _scope,
RedirectUri = _redirectUrl,
ClientSecret = _clientSecret,
Browser = new WebAuthenticatorBrowser()
};
var oidcClient = new OidcClient(options);
return oidcClient;
}
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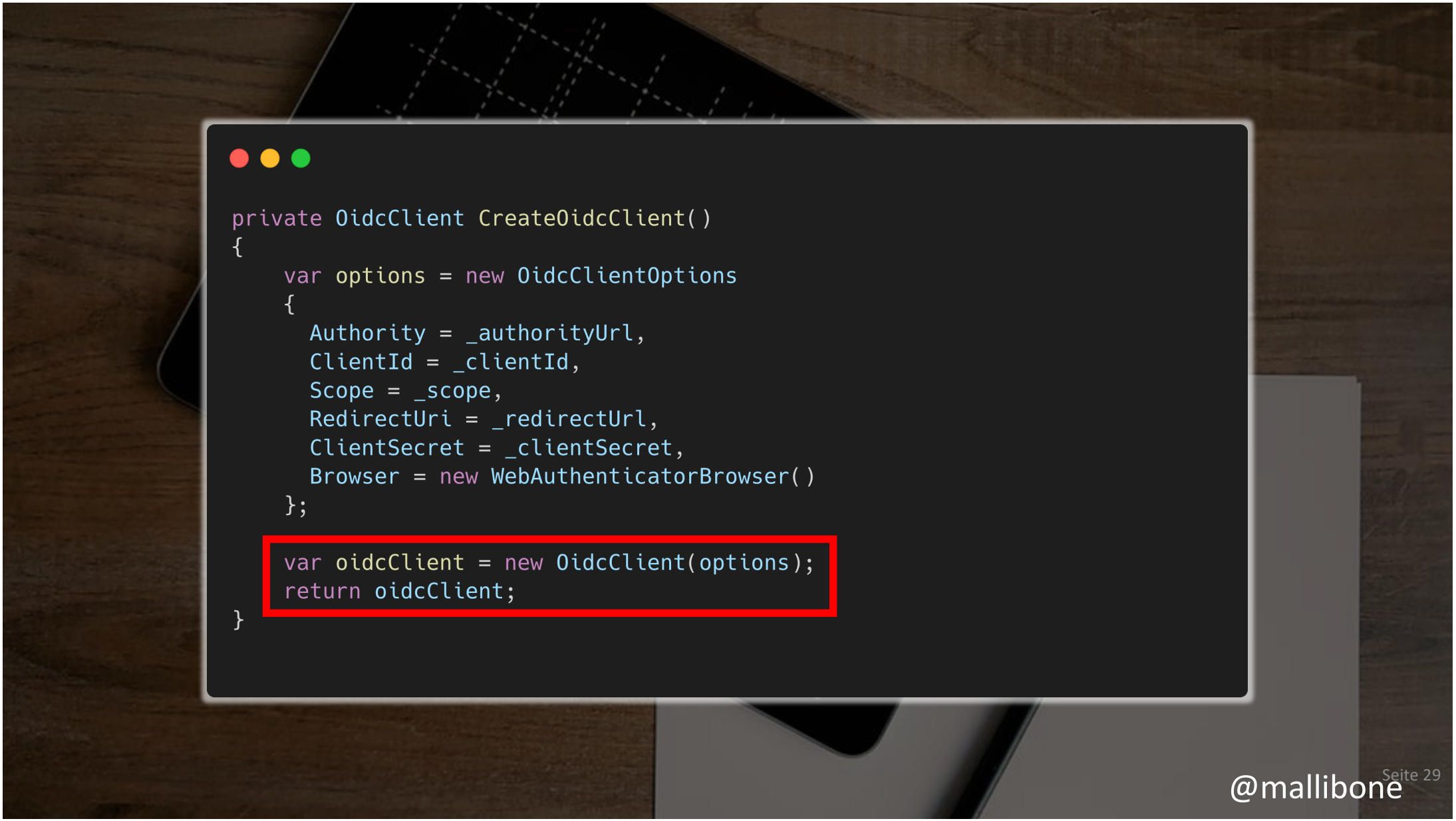
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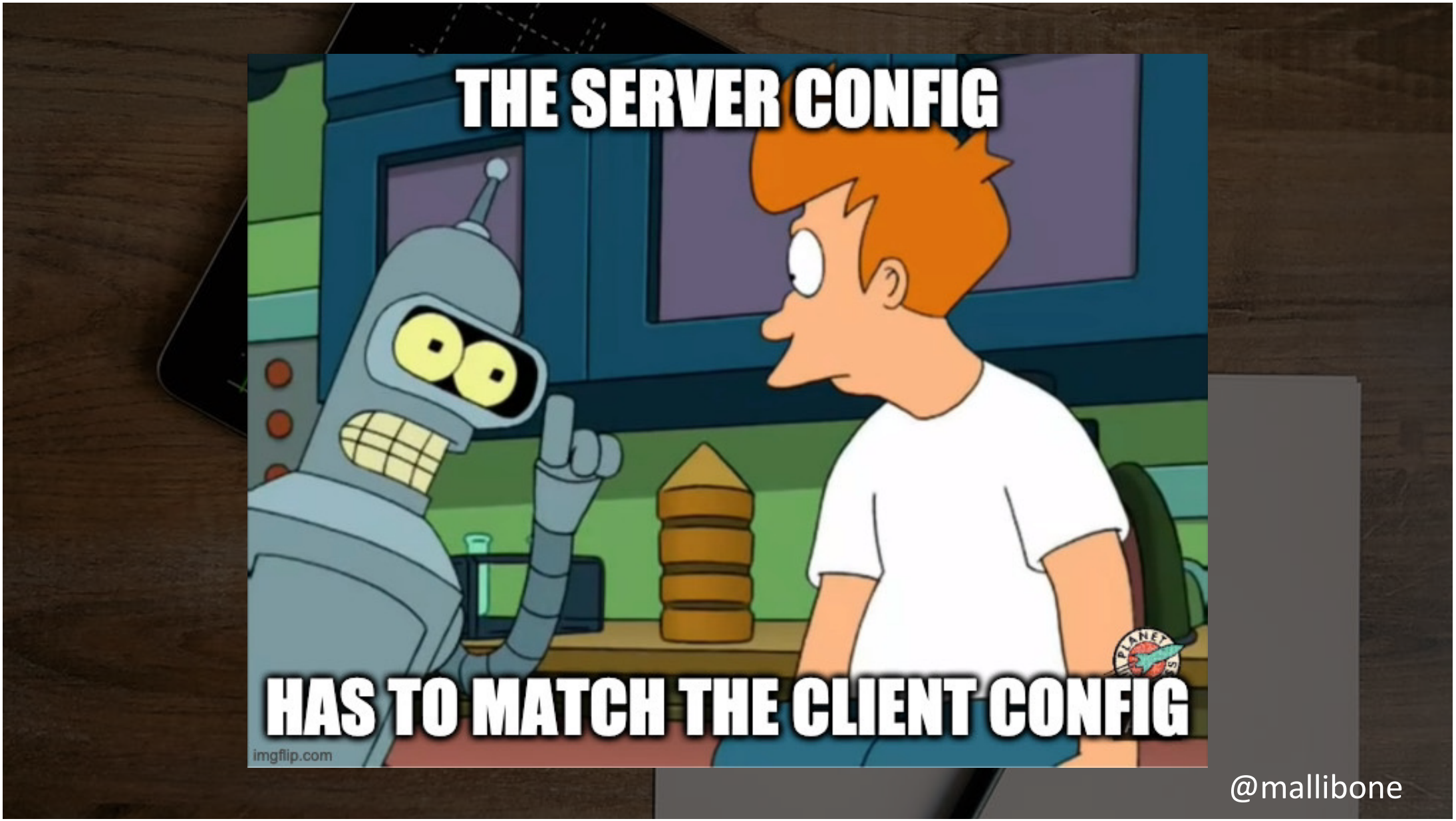
THE SERVER CONFIG
HAS TO MATCH THE CLIENT CONFIG
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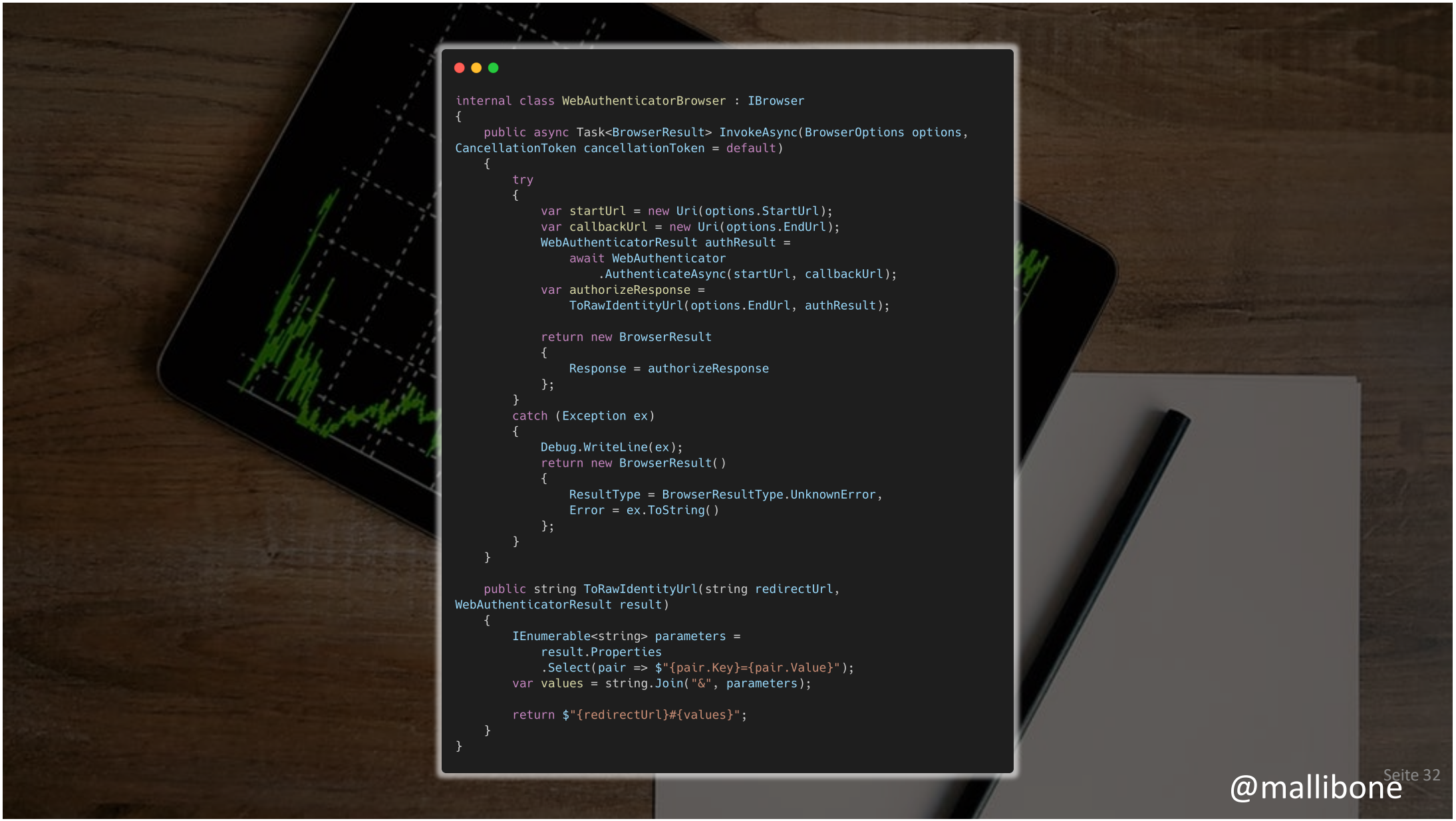
Implementing the Browser

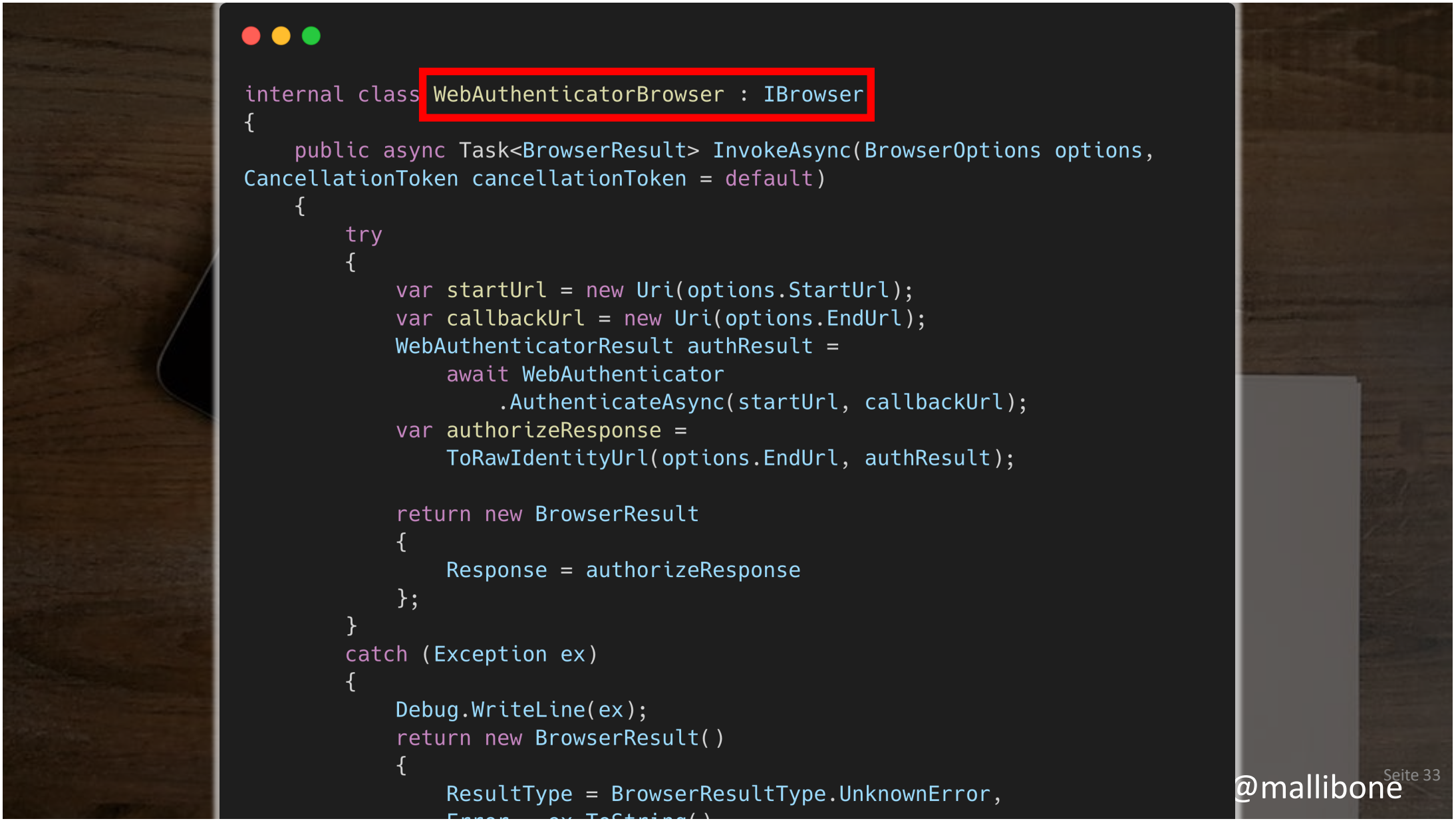


```
internal class WebAuthenticatorBrowser : IBrowser
{
    public async Task<BrowserResult> InvokeAsync(BrowserOptions options,
CancellationToken cancellationToken = default)
    {
        try
        {
            var startUrl = new Uri(options.StartUrl);
            var callbackUrl = new Uri(options.EndUrl);
            WebAuthenticatorResult authResult =
                await WebAuthenticator
                    .AuthenticateAsync(startUrl, callbackUrl);
            var authorizeResponse =
                ToRawIdentityUrl(options.EndUrl, authResult);

            return new BrowserResult
            {
                Response = authorizeResponse
            };
        }
        catch (Exception ex)
        {
            Debug.WriteLine(ex);
            return new BrowserResult()
            {
                ResultType = BrowserResultType.UnknownError,
                Error = ex.ToString()
            };
        }
    }

    public string ToRawIdentityUrl(string redirectUrl,
WebAuthenticatorResult result)
    {
        IEnumerable<string> parameters =
            result.Properties
            .Select(pair => $"{pair.Key}={pair.Value}");
        var values = string.Join("&", parameters);

        return $"{redirectUrl}#{values}";
    }
}
```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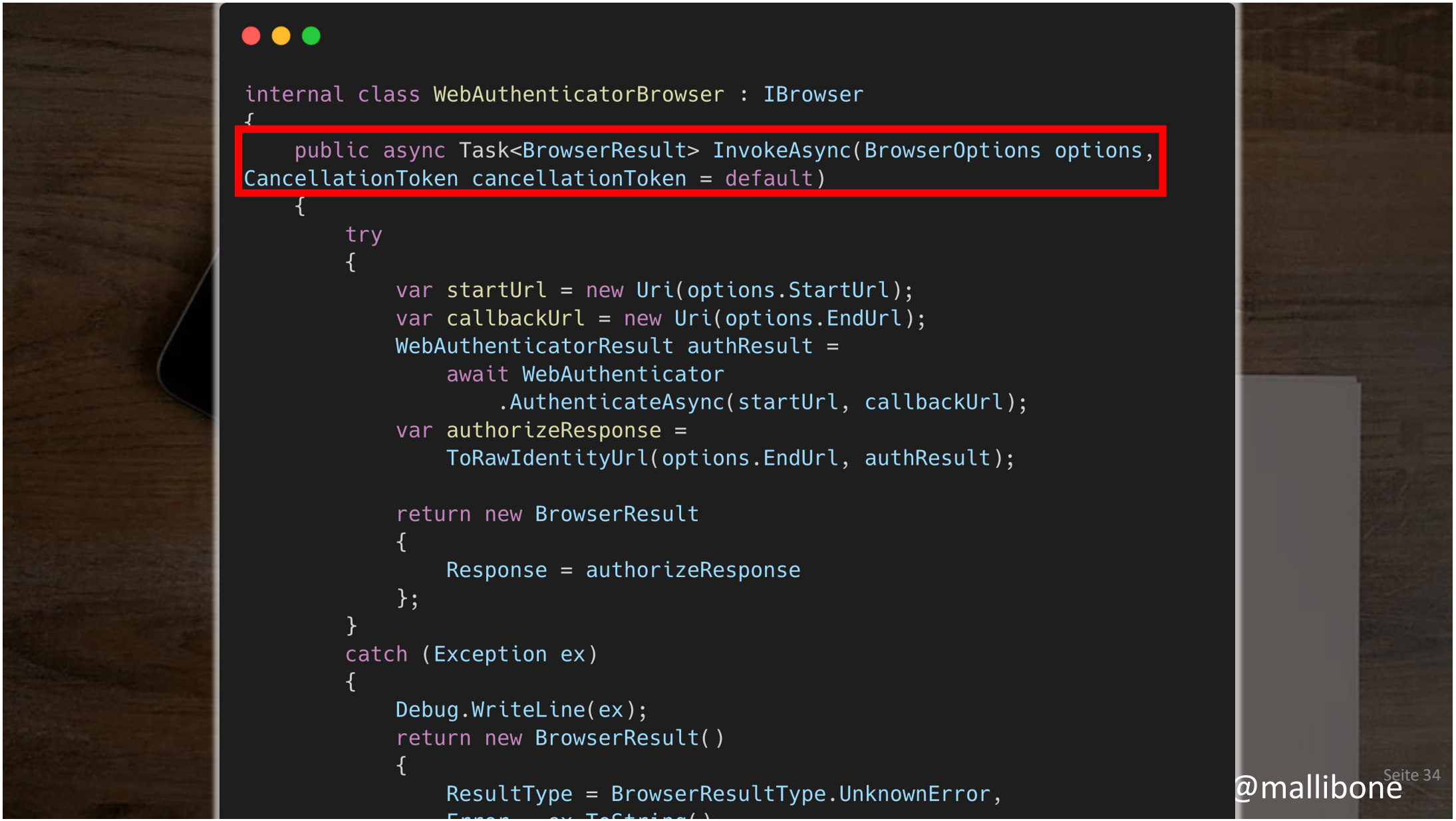
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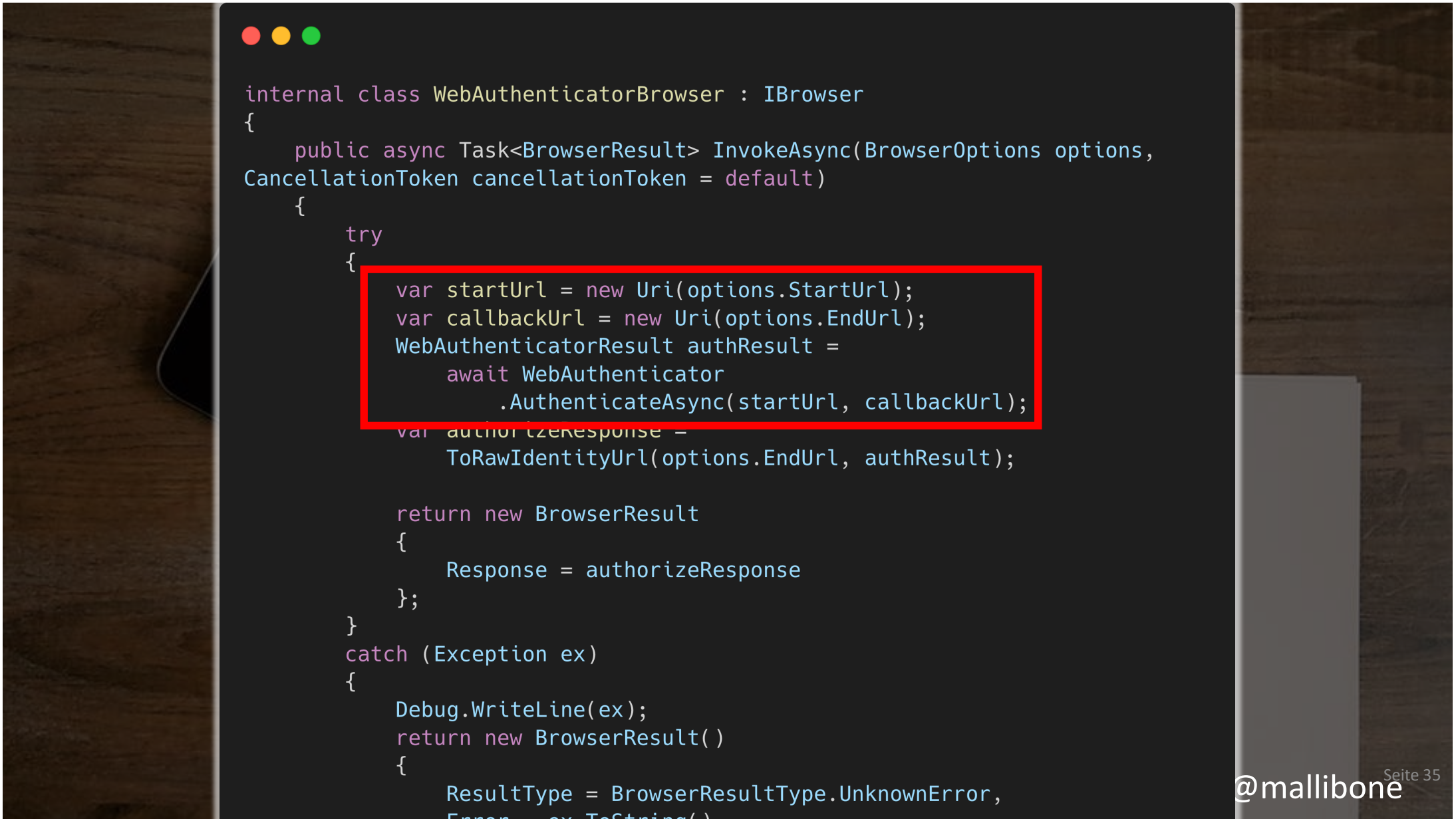
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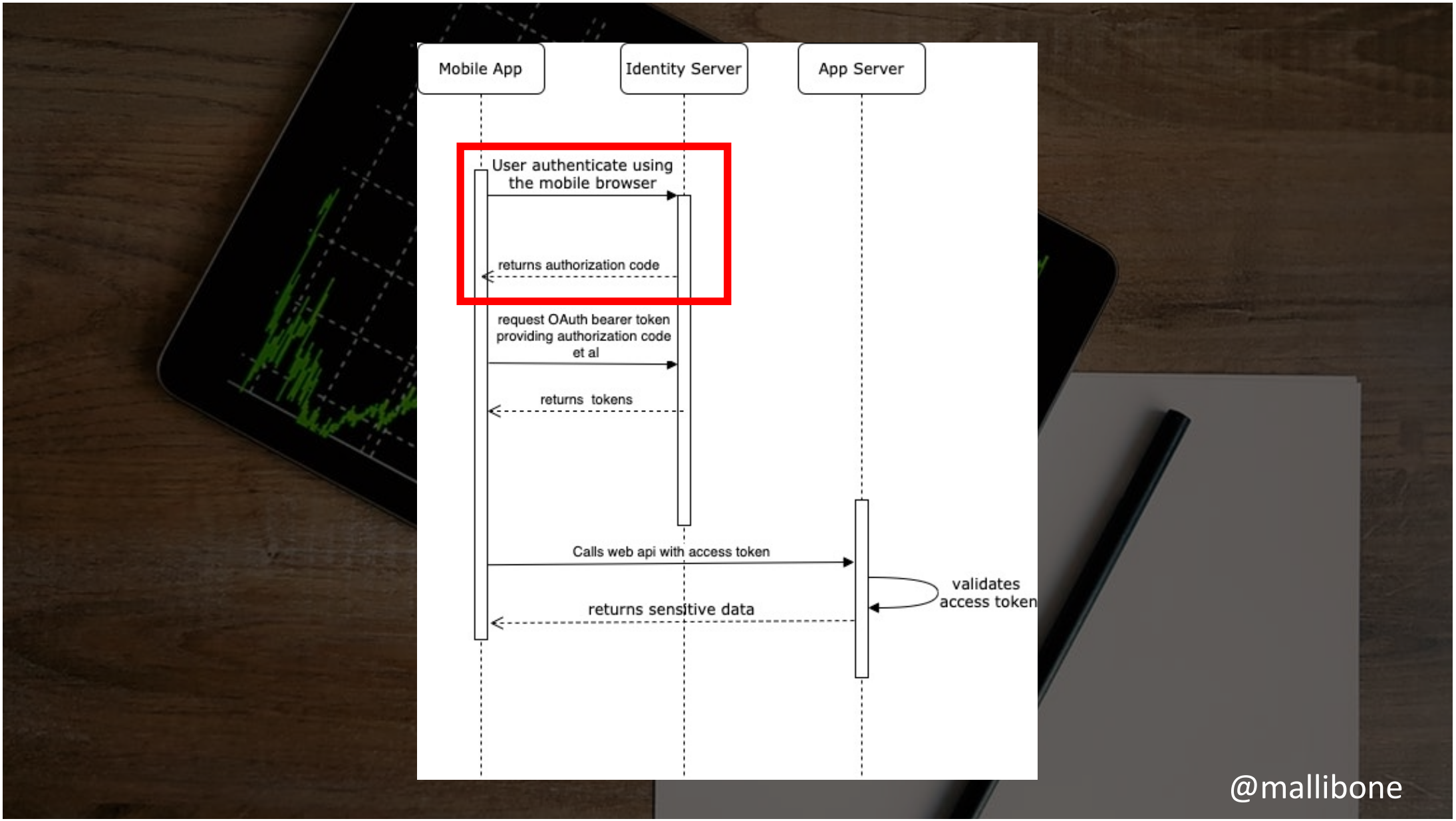
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request OAuth bearer token providing authorization code et al
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Calls web api with access token
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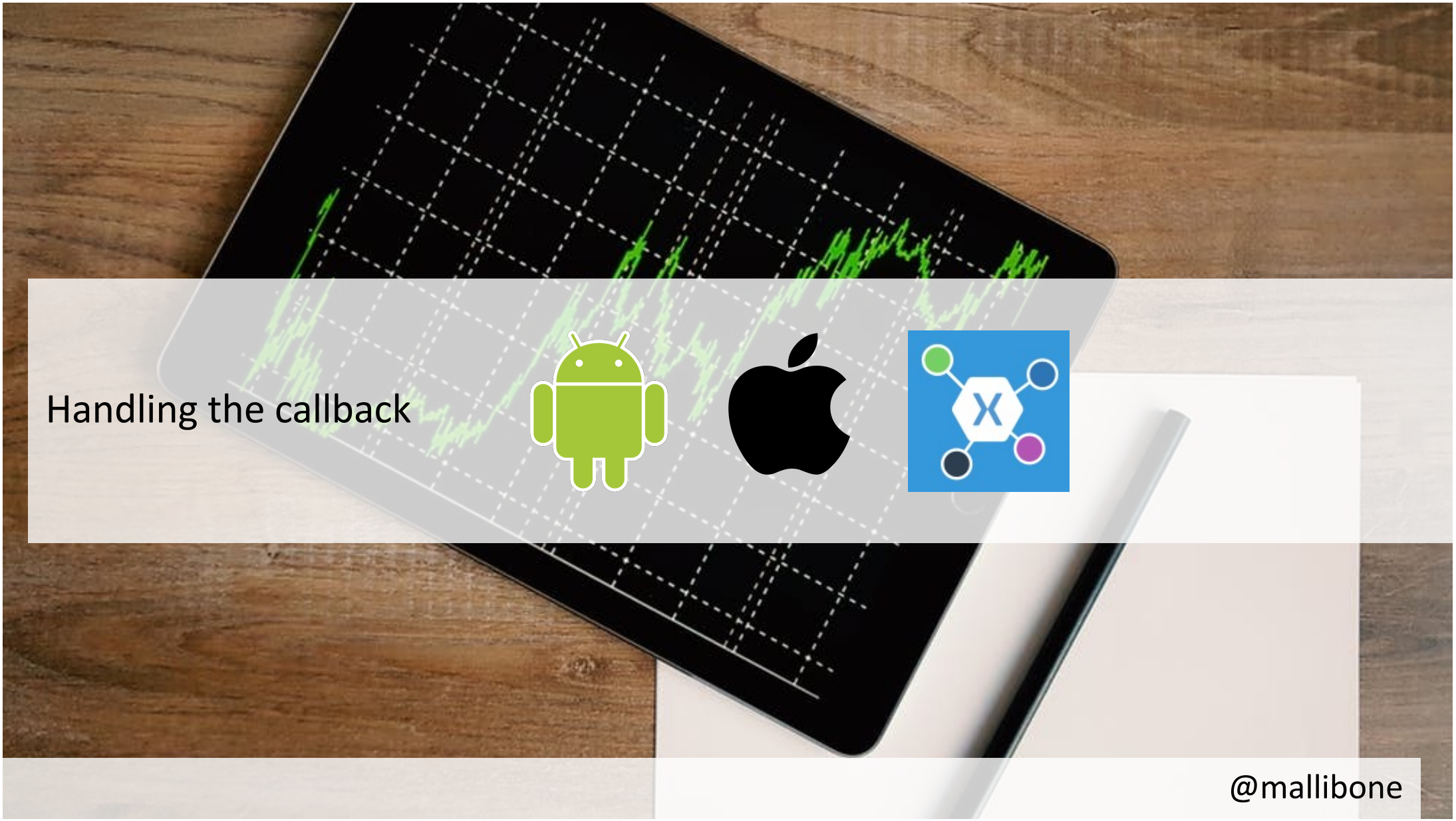
Handling the callback
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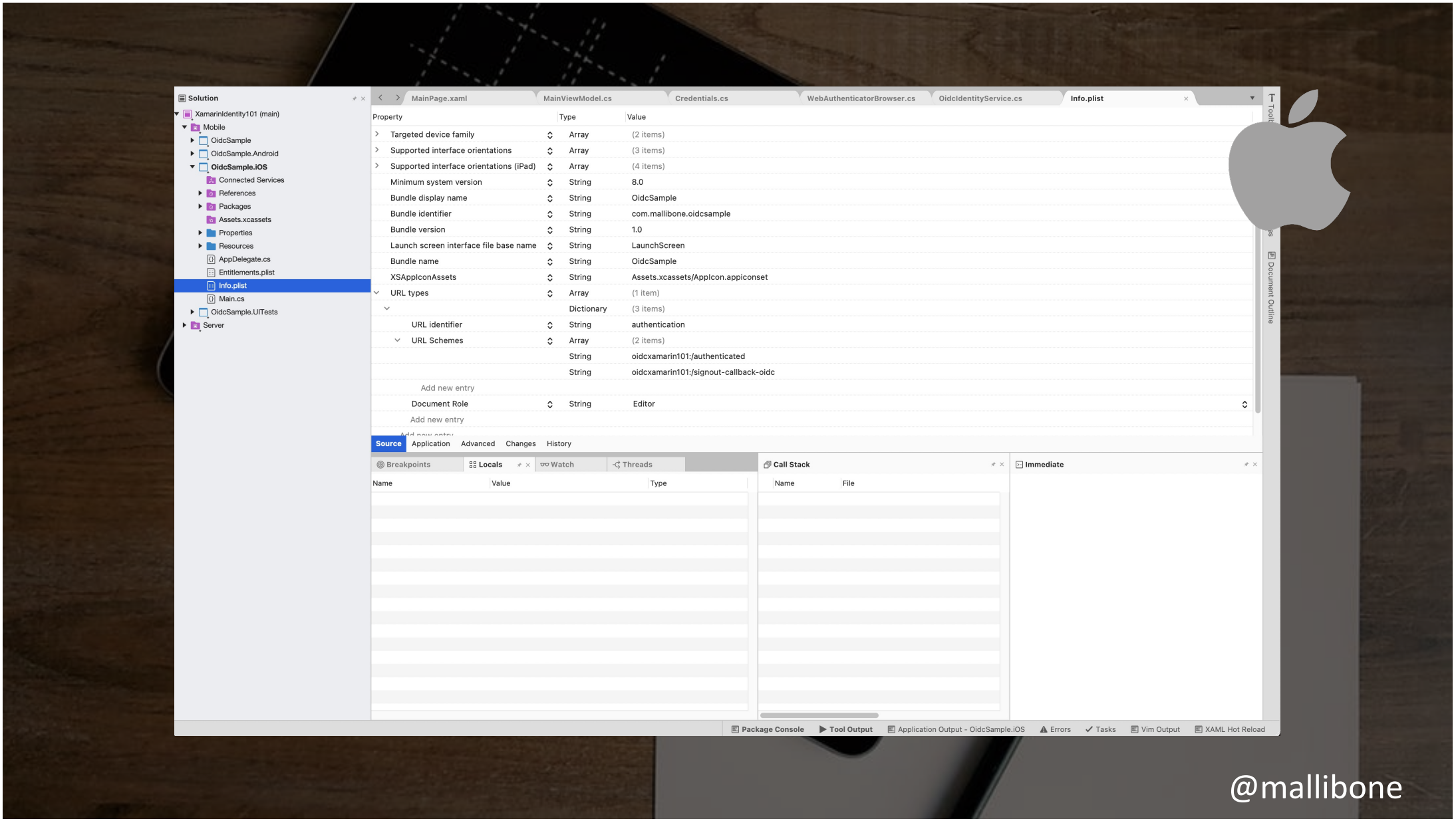
Solution
XamarinIdentity101 (main)
Mobile
OidcSample
OidcSample.Android
OidcSample.iOS
Connected Services
References
Packages
Assets.xcassets
Properties
Resources
AppDelegate.cs
Entitlements.plist
Info.plist
Main.cs
OidcSample.UITests
Server
MainPage.xaml
MainViewModel.cs
Credentials.cs
WebAuthenticatorBrowser.cs
OidcIdentityService.cs
Info.plist
Property
Type
Value
Targeted device family
Array
(2 items)
Supported interface orientations
Array
(3 items)
Supported interface orientations (iPad)
Array
(4 items)
Minimum system version
String
8.0
Bundle display name
String
OidcSample
Bundle identifier
String
com.mallibone.oidcsample
Bundle version
String
1.0
Launch screen interface file base name
String
LaunchScreen
Bundle name
String
OidcSample
XSAppIconAssets
String
Assets.xcassets/AppIcon.appiconset
URL types
Array
(1 item)
Dictionary
(3 items)
URL identifier
String
authentication
URL Schemes
Array
(2 items)
String
oidcxamarin101:/authenticated
String
oidcxamarin101:/signout-callback-oidc
Add new entry
Document Role
String
Editor
Add new entry
Source
Application
Advanced
Changes
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Value
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Call Stack
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File
Immediate
Package Console
Tool Output
Application Output - OidcSample.iOS
Errors
Tasks
Vim Output
XAML Hot Reload
Document Outline

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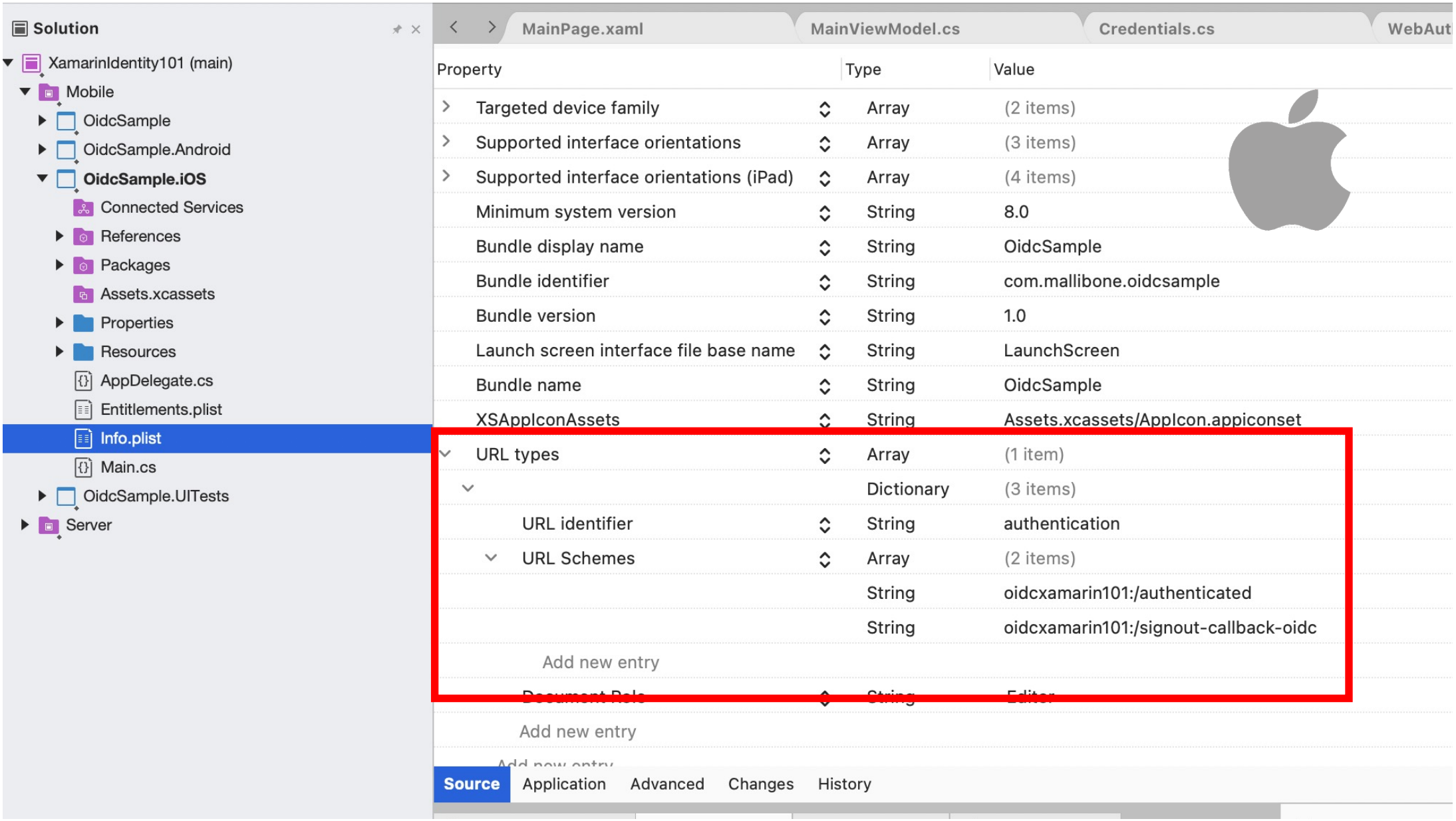
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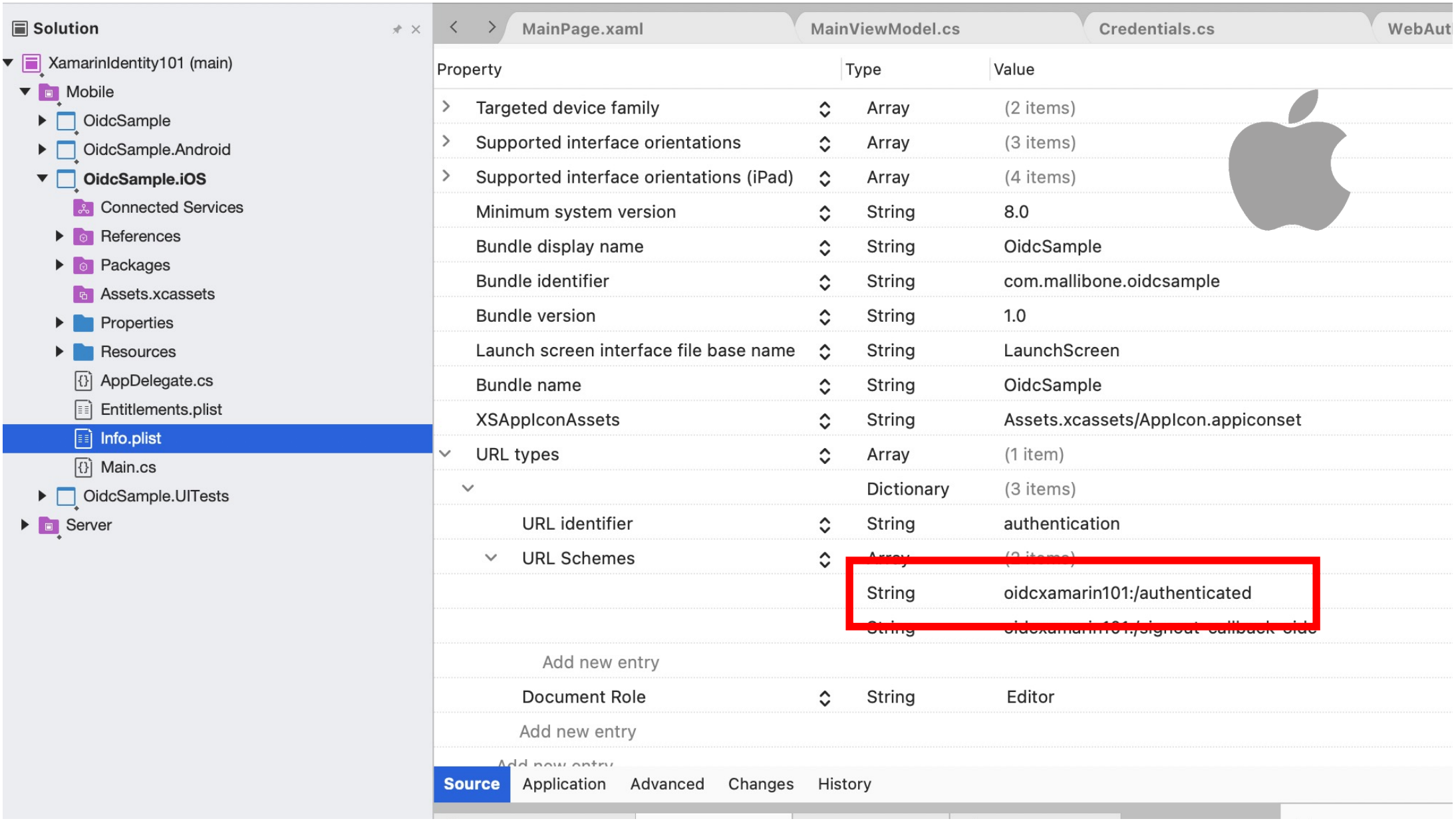
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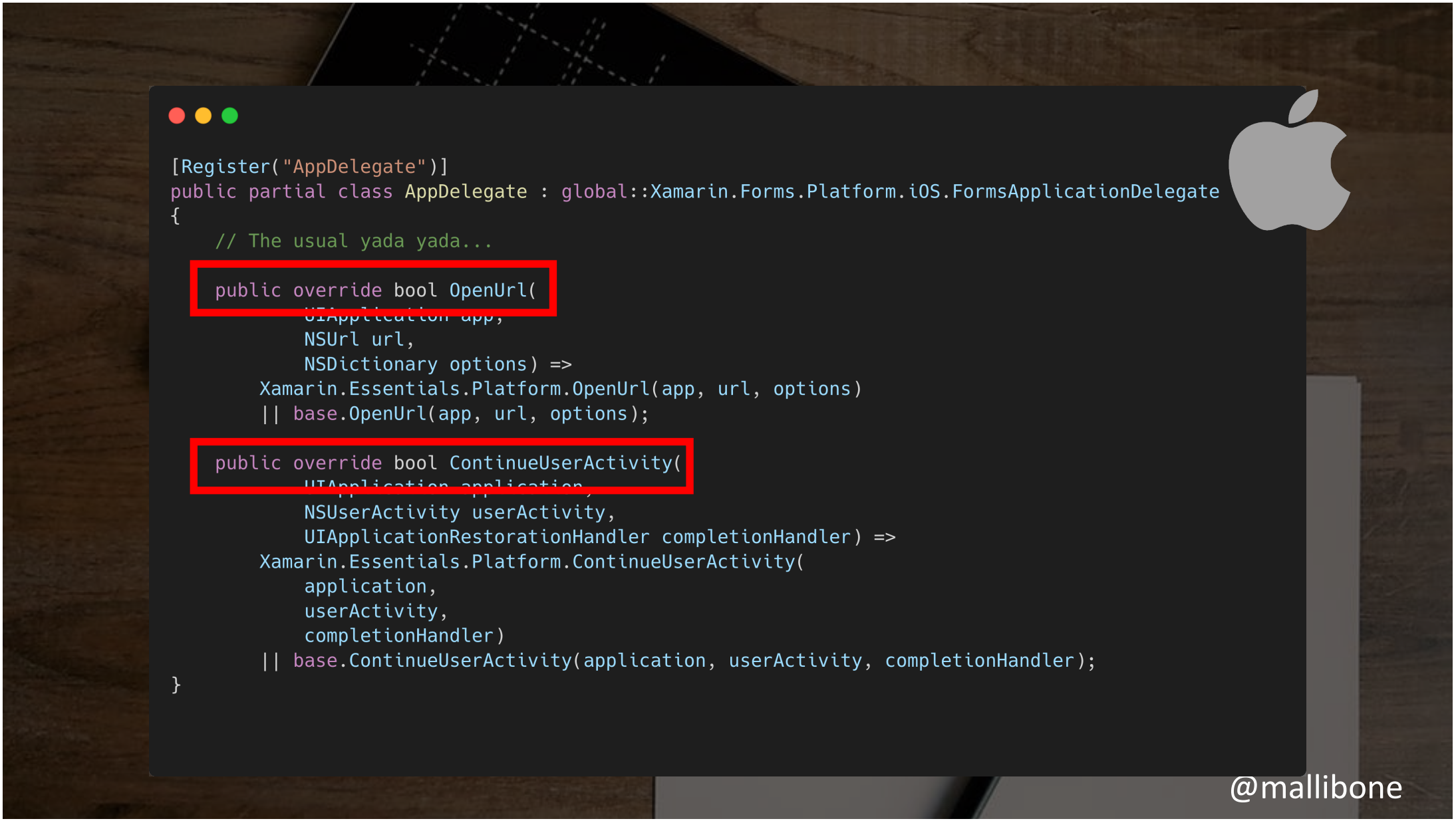
[Register("AppDelegate")]
public partial class AppDelegate : global::Xamarin.Forms.Platform.iOS.FormsApplicationDelegate
{
// The usual yada yada...
public override bool OpenUrl(
UIApplication app,
NSUrl url,
NSDictionary options) =>
Xamarin.Essentials.Platform.OpenUrl(app, url, options)
|| base.OpenUrl(app, url, options);
public override bool ContinueUserActivity(
UIApplication application,
NSUserActivity userActivity,
UIApplicationRestorationHandler completionHandler) =>
Xamarin.Essentials.Platform.ContinueUserActivity(
application,
userActivity,
completionHandler)
|| base.ContinueUserActivity(application, userActivity, completionHandler);
}
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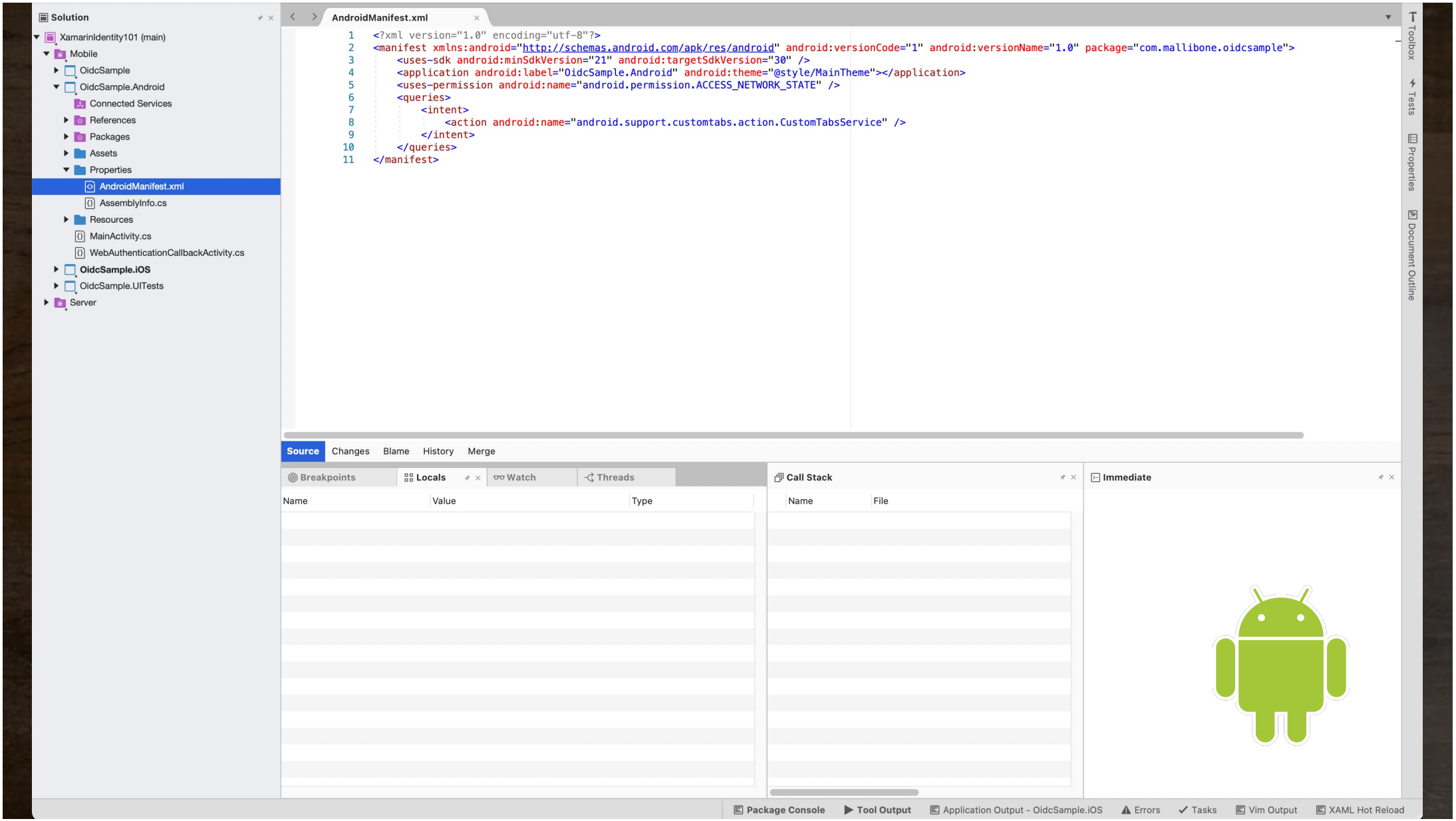
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WebAuthenticationCallbackActivity.cs
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OidcSample.UITests
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AndroidManifest.xml
1 <?xml version="1.0" encoding="utf-8"?>
2 <manifest xmlns:android="http://schemas.android.com/apk/res/android" android:versionCode="1" android:versionName="1.0" package="com.mallibone.oidcsample">
3 <uses-sdk android:minSdkVersion="21" android:targetSdkVersion="30" />
4 <application android:label="OidcSample.Android" android:theme="@style/MainTheme"></application>
5 <uses-permission android:name="android.permission.ACCESS_NETWORK_STATE" />
6 <queries>
7 <intent>
8 <action android:name="android.support.customtabs.action.CustomTabsService" />
9 </intent>
10 </queries>
11 </manifest>
Source
Changes
Blame
History
Merge
Breakpoints
Locals
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Value
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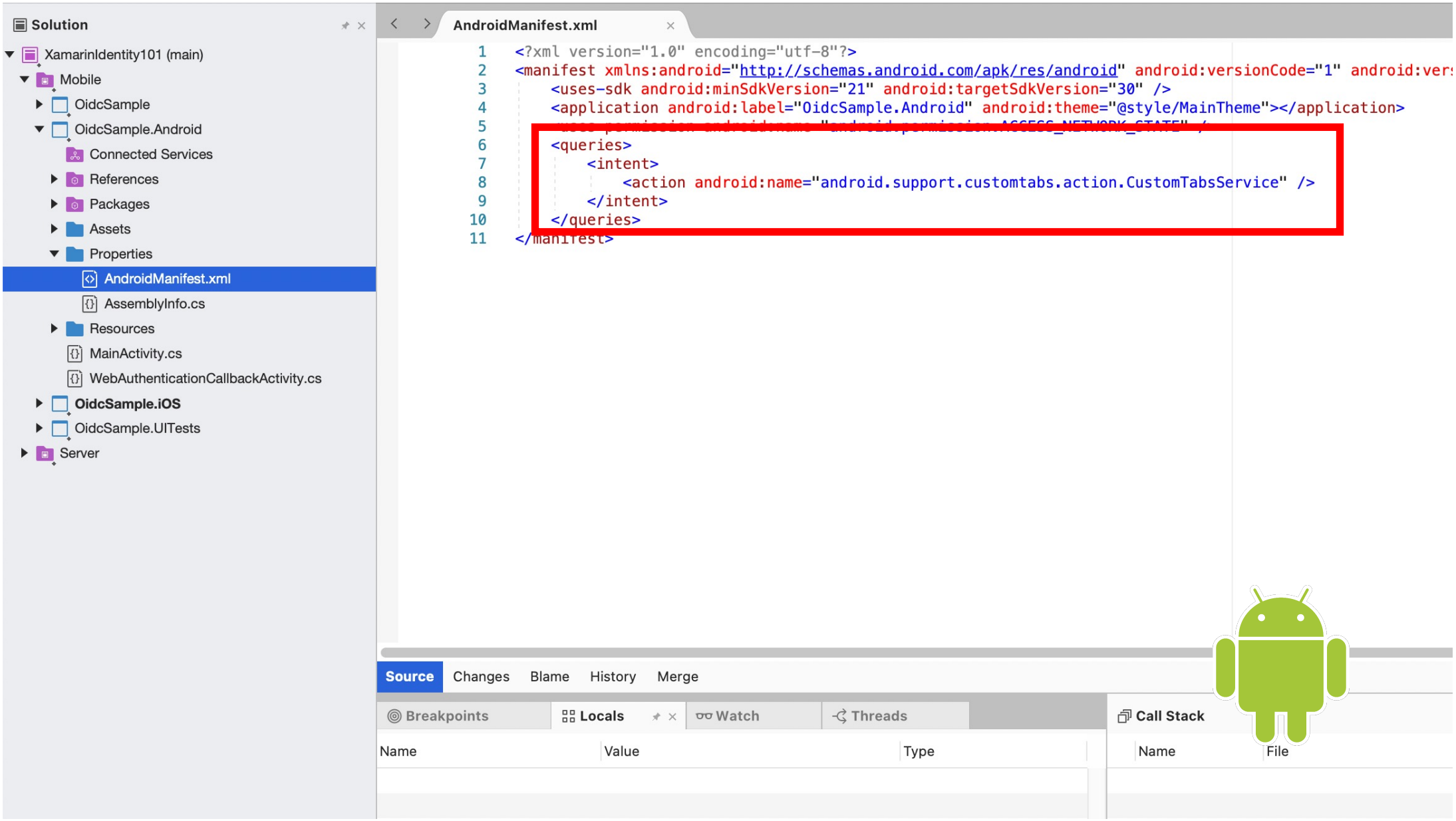
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2 <manifest xmlns:android="http://schemas.android.com/apk/res/android" android:versionCode="1" android:vers
3 <uses-sdk android:minSdkVersion="21" android:targetSdkVersion="30" />
4 <application android:label="OidcSample.Android" android:theme="@style/MainTheme"></application>
6 <queries>
7 <intent>
8 <action android:name="android.support.customtabs.action.CustomTabsService" />
9 </intent>
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11 </manifest>
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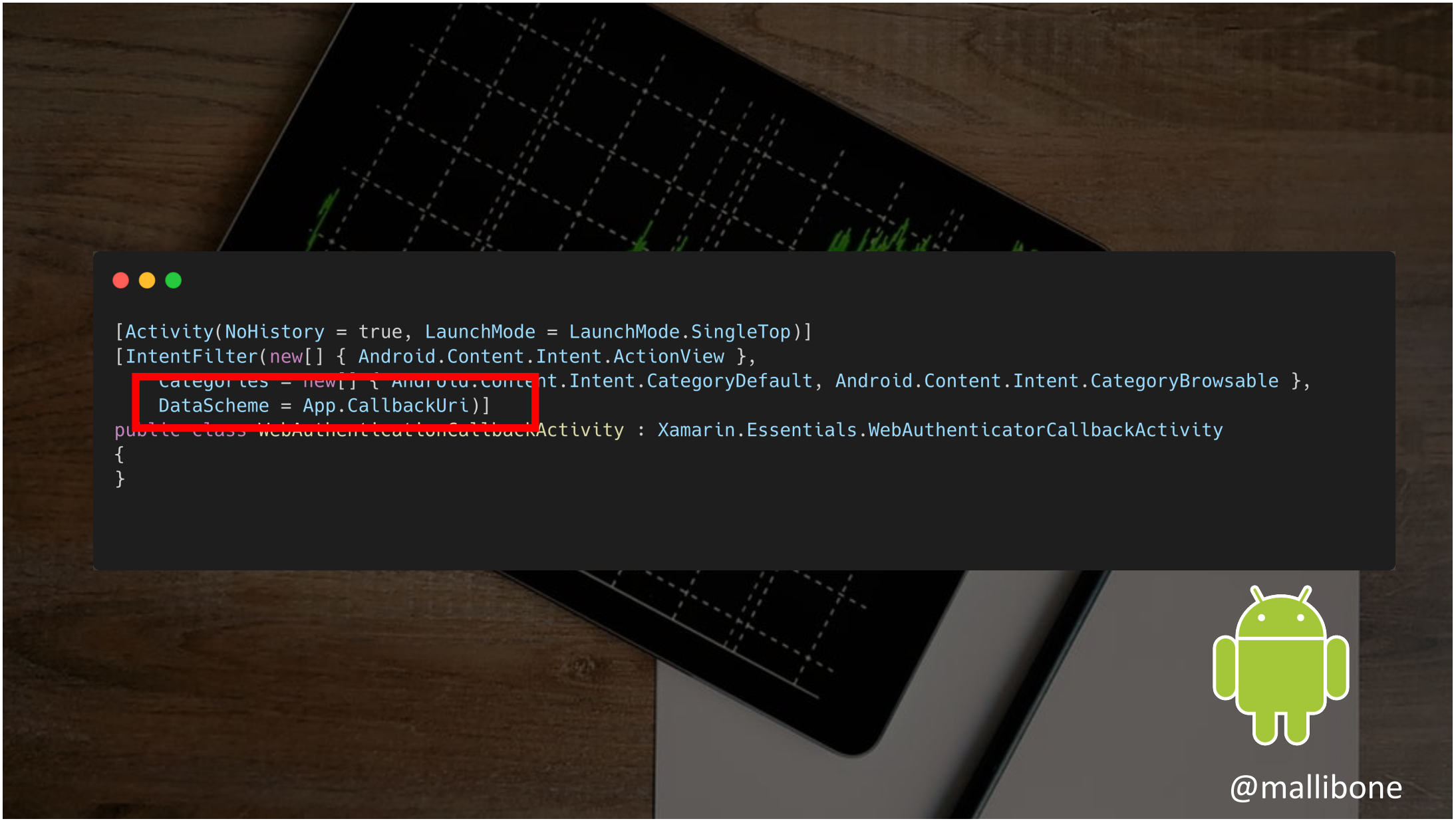
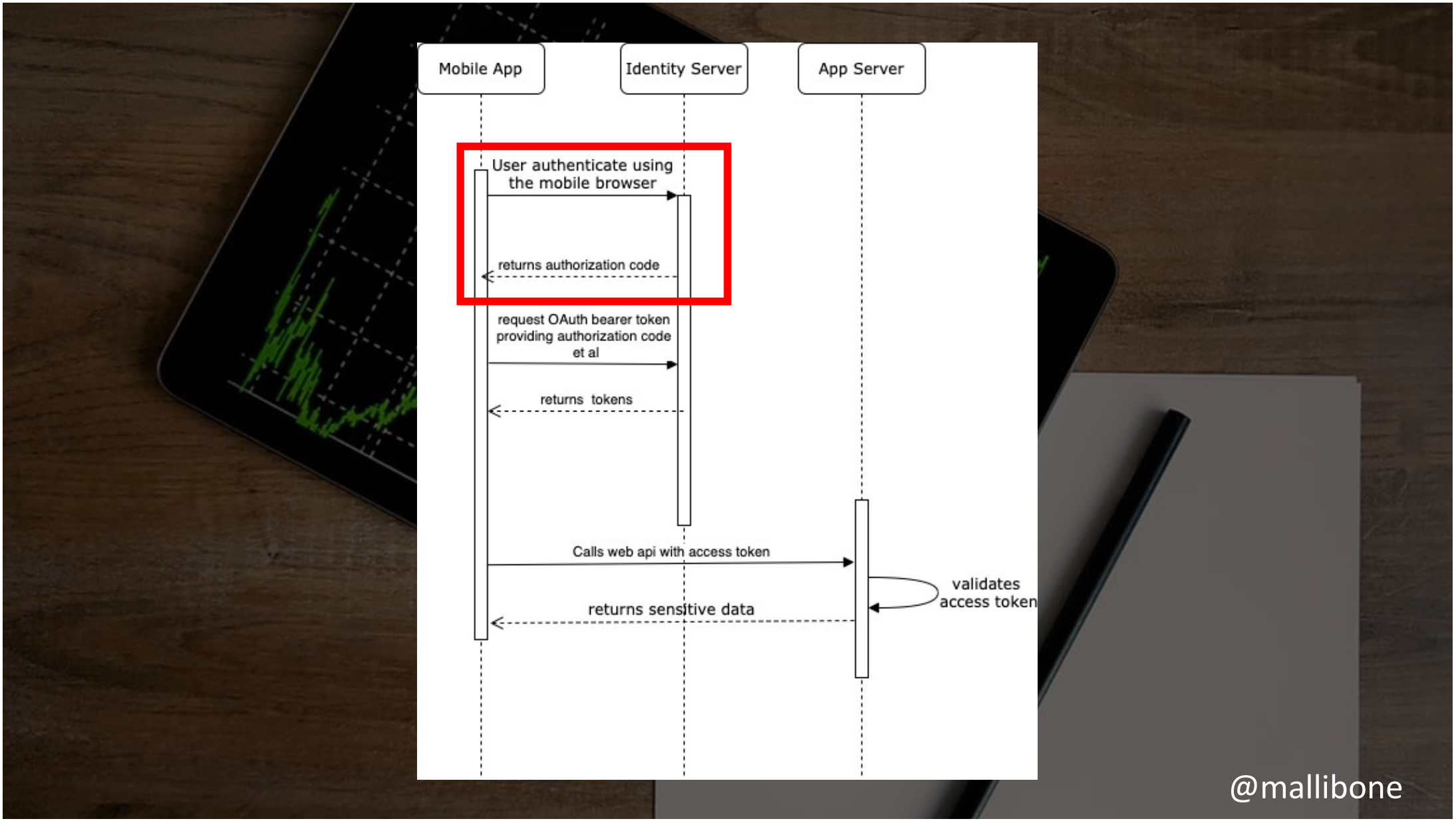
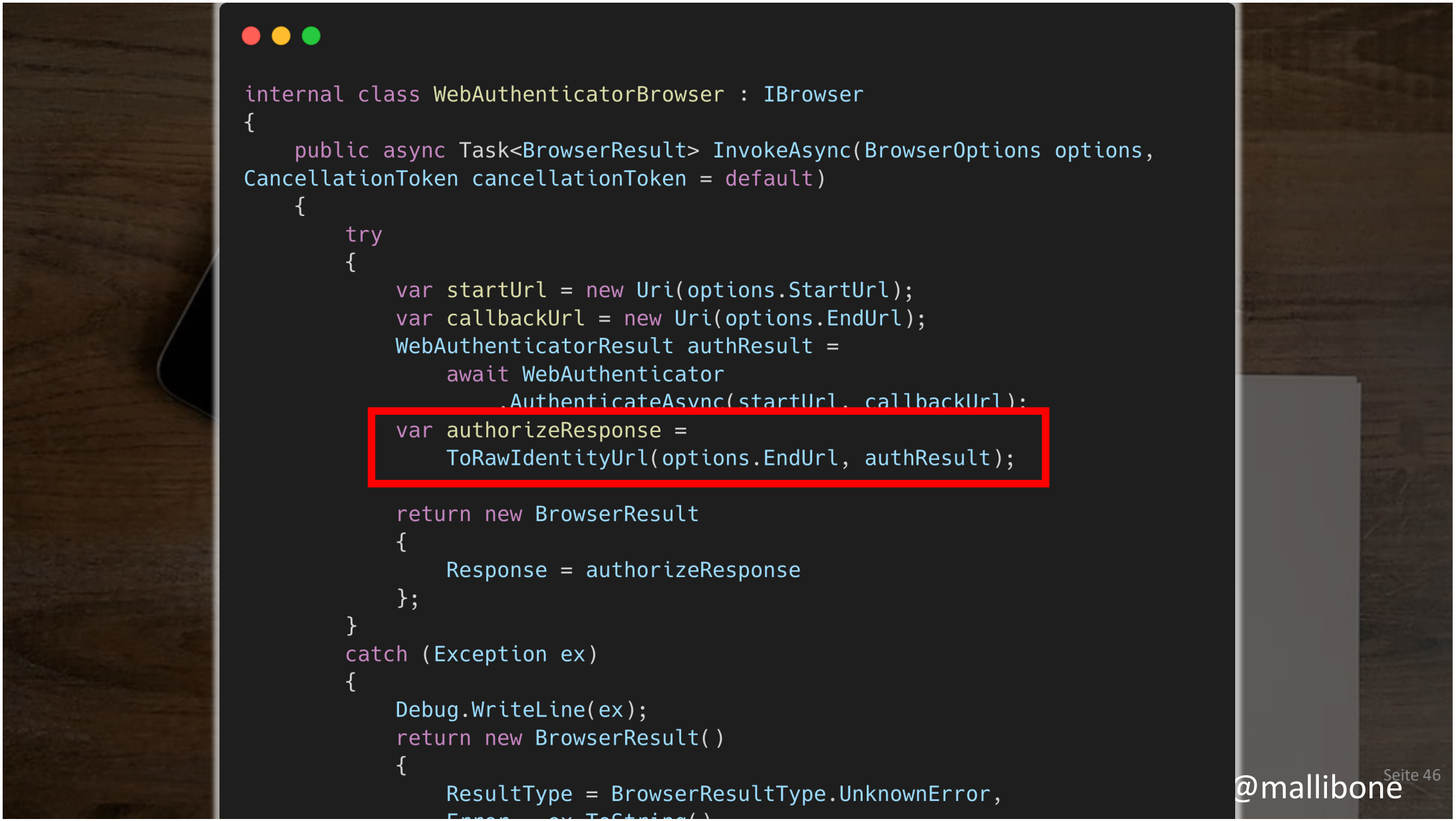
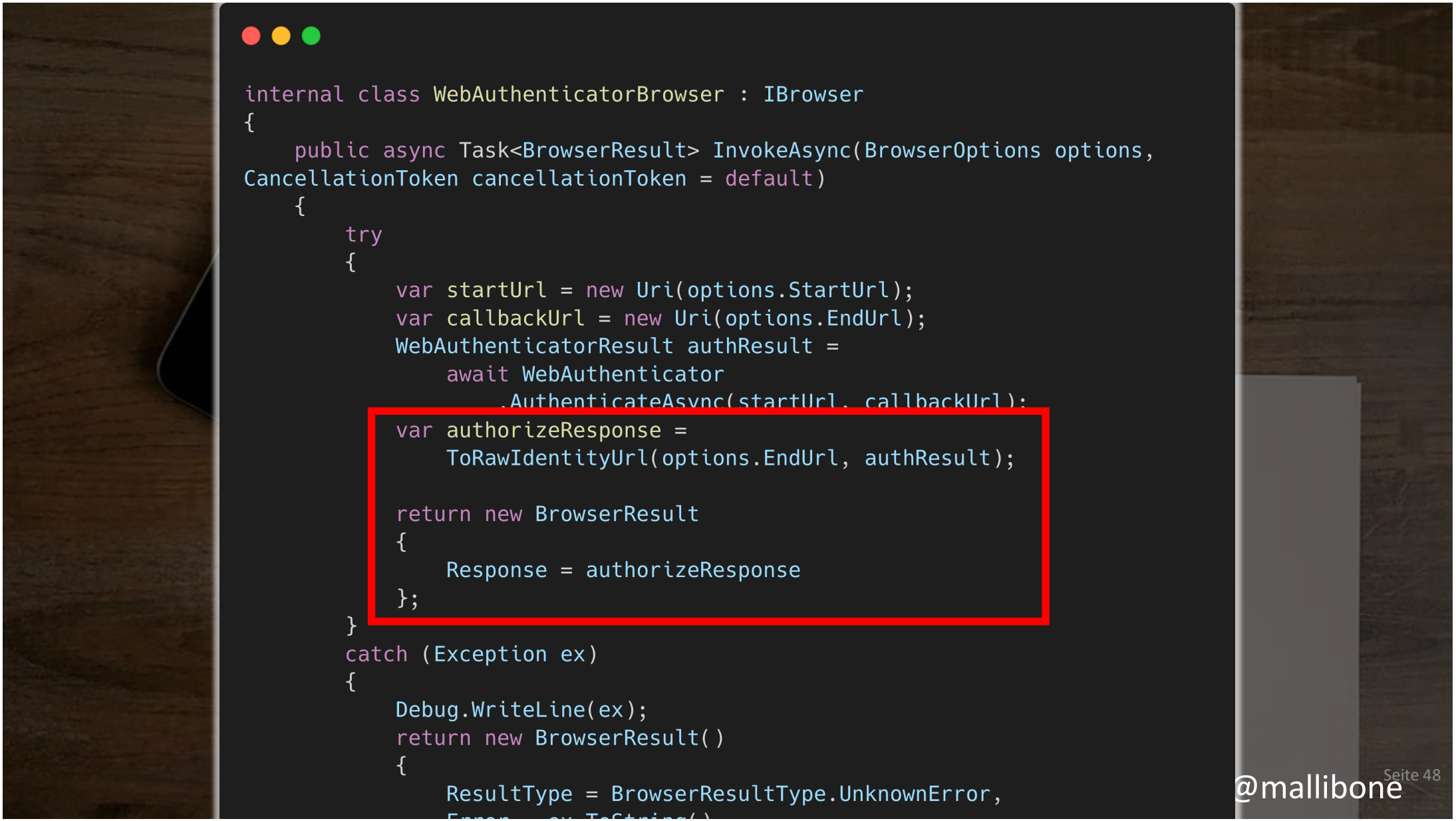
Name
File


[Activity(NoHistory = true, LaunchMode = LaunchMode.SingleTop)]
[IntentFilter(new[] { Android.Content.Intent.ActionView },
Android.Content.Intent.CategoryDefault, Android.Content.Intent.CategoryBrowsable },
DataScheme = App.CallbackUri)]
Activity : Xamarin.Essentials.WebAuthenticatorCallbackActivity
{
}
@mallibone


Mobile App
Identity Server
App Server
User authenticate using the mobile browser
returns authorization code
request OAuth bearer token providing authorization code et al
returns tokens
Calls web api with access token
validates access token
returns sensitive data
@mallibone


internal class WebAuthenticatorBrowser : IBrowser
{
public async Task<BrowserResult> InvokeAsync(BrowserOptions options,
CancellationToken cancellationToken = default)
{
try
{
var startUrl = new Uri(options.StartUrl);
var callbackUrl = new Uri(options.EndUrl);
WebAuthenticatorResult authResult =
await WebAuthenticator
.AuthenticateAsync(startUrl, callbackUrl);
var authorizeResponse =
ToRawIdentityUrl(options.EndUrl, authResult);
return new BrowserResult
{
Response = authorizeResponse
};
}
catch (Exception ex)
{
Debug.WriteLine(ex);
return new BrowserResult()
{
ResultType = BrowserResultType.UnknownError,


Response = authorizeResponse
};
}
catch (Exception ex)
{
Debug.WriteLine(ex);
return new BrowserResult()
{
ResultType = BrowserResultType.UnknownError,
Error = ex.ToString()
};
}
}
public string ToRawIdentityUrl(string redirectUrl,
WebAuthenticatorResult result)
{
IEnumerable<string> parameters =
result.Properties
.Select(pair => $"{pair.Key}={pair.Value}");
var values = string.Join("&", parameters);
return $"{redirectUrl}#{values}";
}
}
@mallibone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{
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try
{
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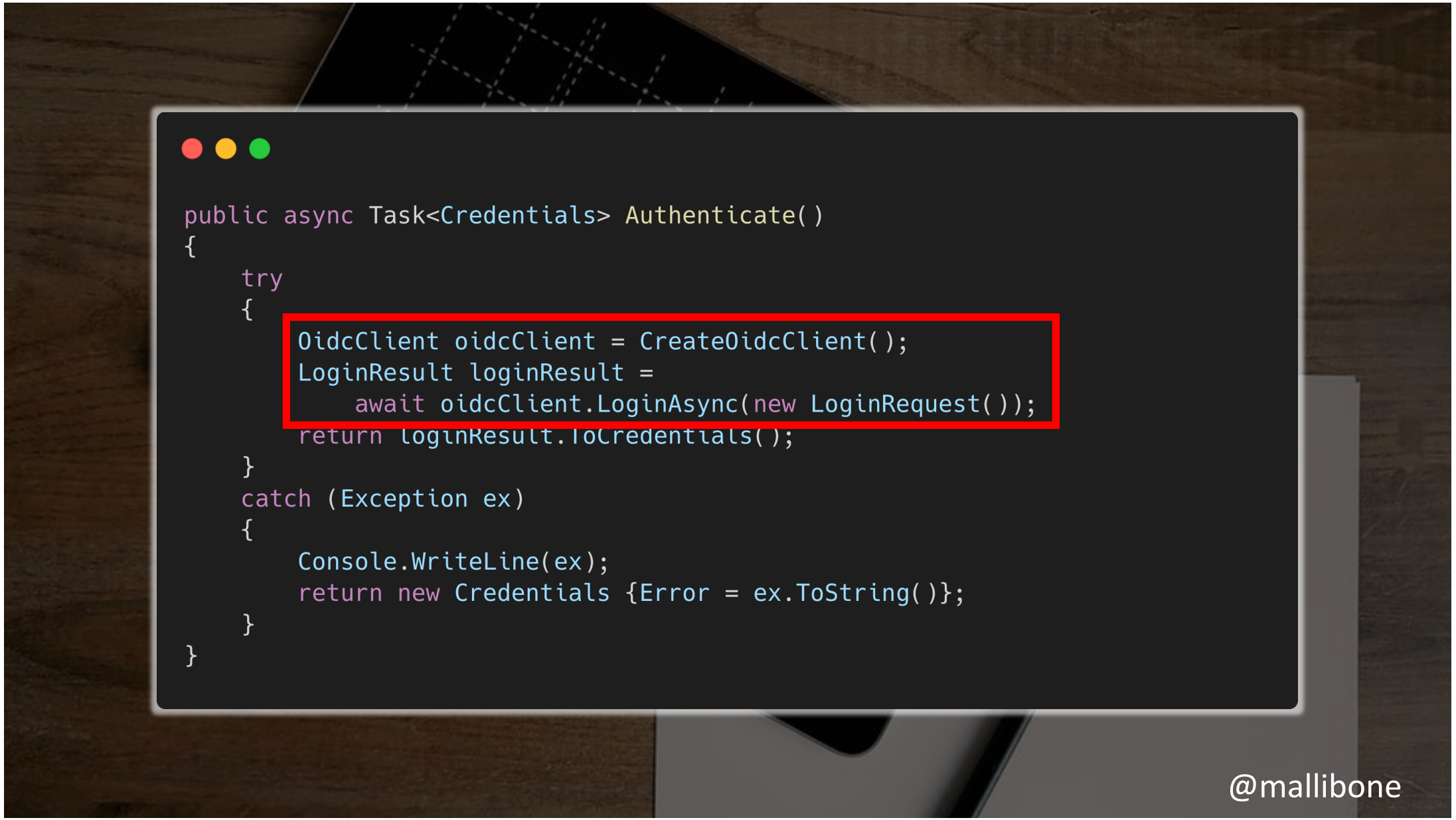
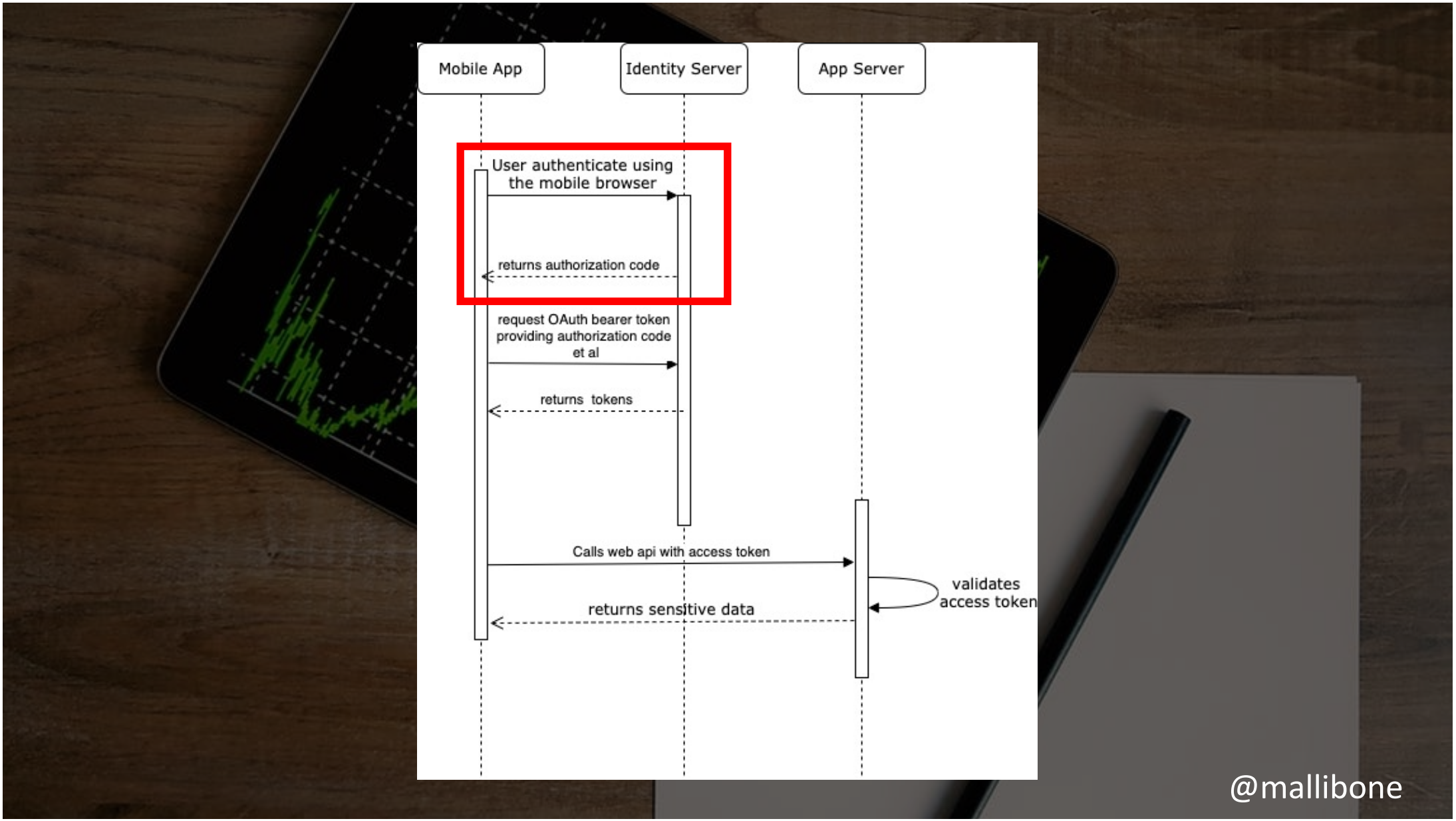
var callbackUrl = new Uri(options.EndUrl);
WebAuthenticatorResult authResult =
await WebAuthenticator
.AuthenticateAsync(startUrl, callbackUrl);
var authorizeResponse =
ToRawIdentityUrl(options.EndUrl, authResult);
return new BrowserResult
{
Response = authorizeResponse
};
}
catch (Exception ex)
{
Debug.WriteLine(ex);
return new BrowserResult()
{
ResultType = BrowserResultType.UnknownError,


public async Task<Credentials> Authenticate()
{
try
{
OidcClient oidcClient = CreateOidcClient();
LoginResult loginResult =
await oidcClient.LoginAsync(new LoginRequest());
return loginResult.ToCredentials();
}
catch (Exception ex)
{
Console.WriteLine(ex);
return new Credentials {Error = ex.ToString()};
}
}
@mallibone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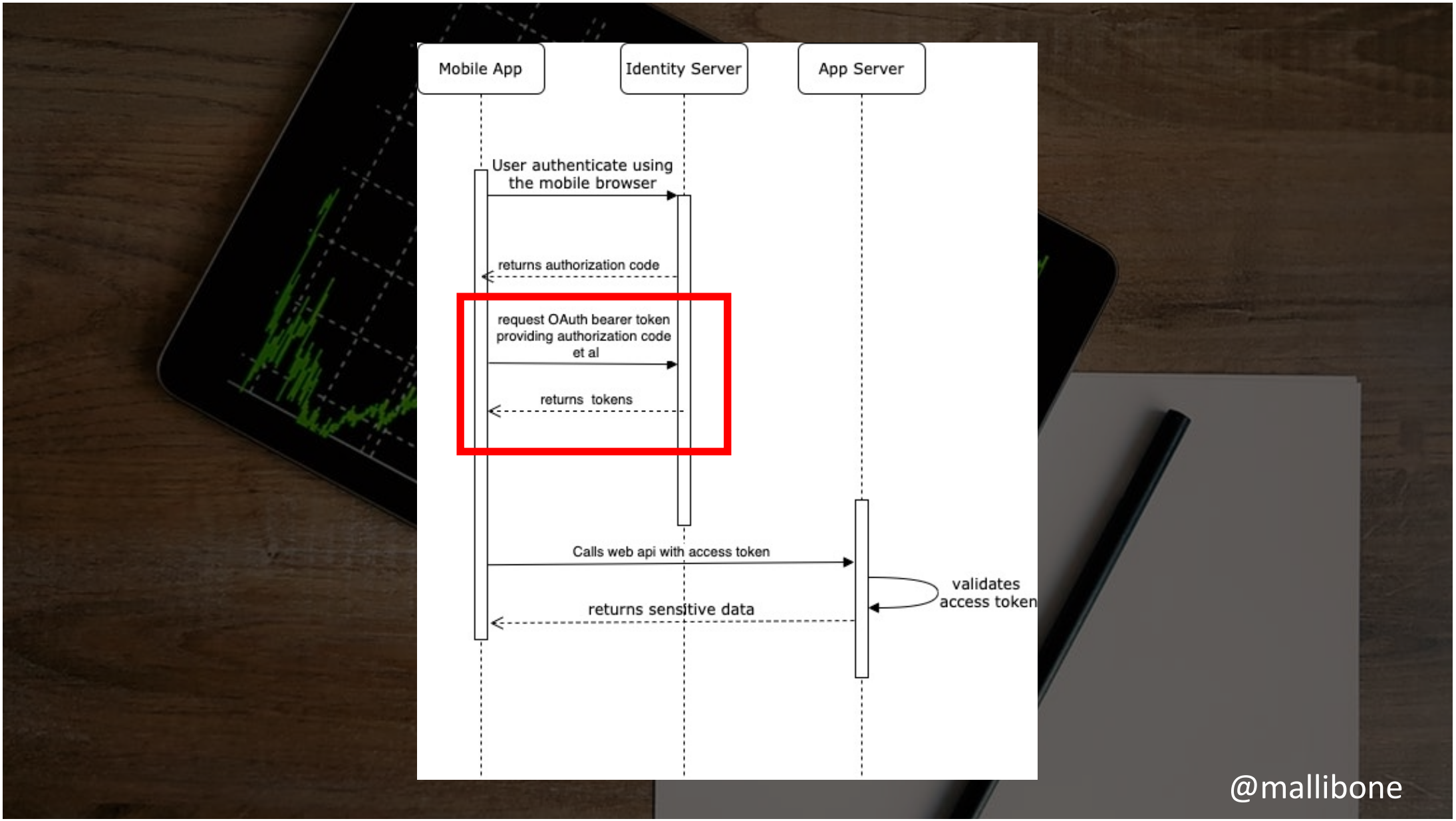
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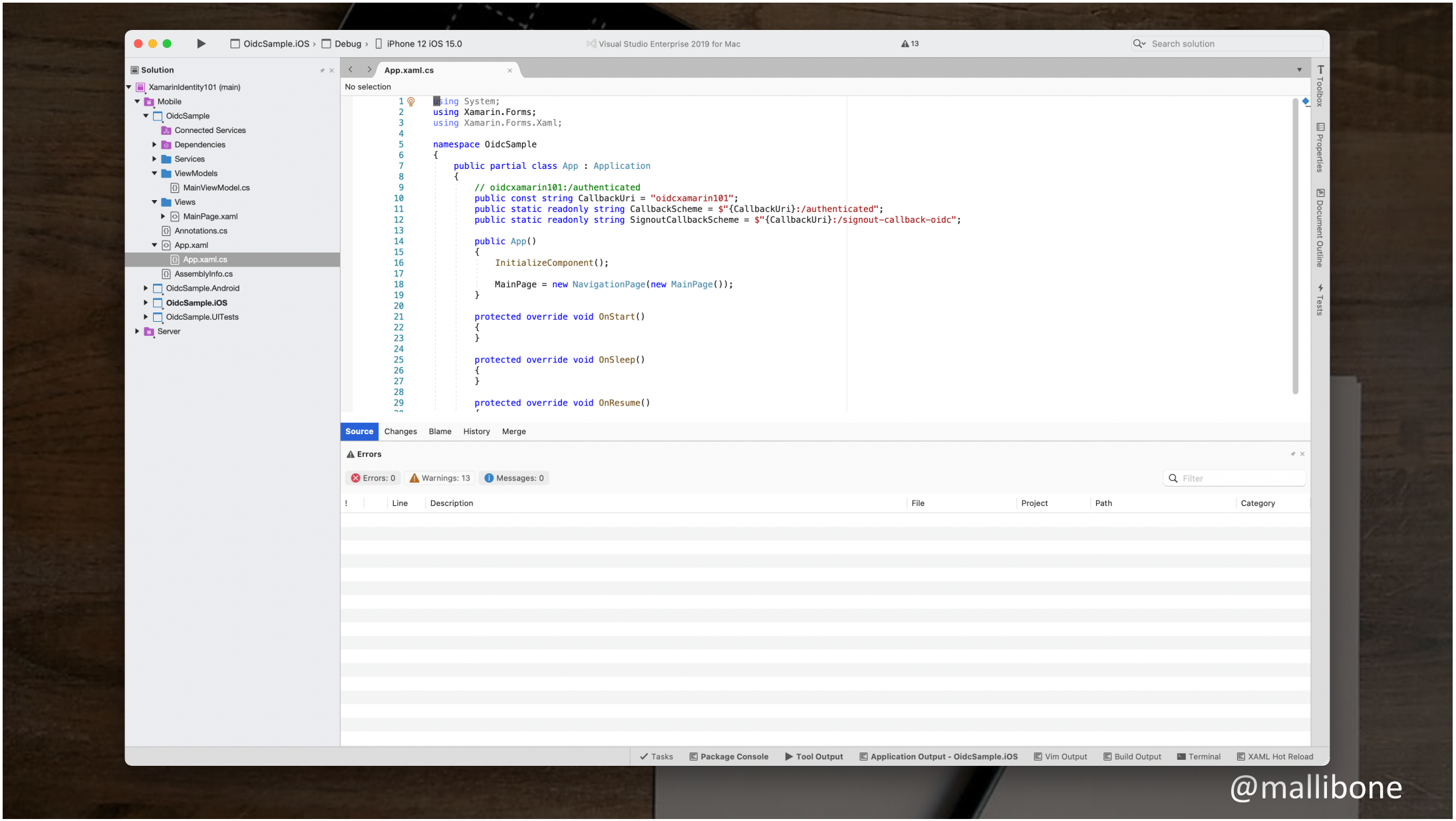
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No selection
using System;
using Xamarin.Forms;
using Xamarin.Forms.Xaml;
namespace OidcSample
{
public partial class App : Application
{
// oidcxamarin101:/authenticated
public const string CallbackUri = "oidcxamarin101";
public static readonly string CallbackScheme = $"{CallbackUri}:/authenticated";
public static readonly string SignoutCallbackScheme = $"{CallbackUri}:/signout-callback-oidc";
public App()
{
InitializeComponent();
MainPage = new NavigationPage(new MainPage());
}
protected override void OnStart()
{
}
protected override void OnSleep()
{
}
protected override void OnResume()
Source
Changes
Blame
History
Merge
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Errors: 0
Warnings: 13
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Filter
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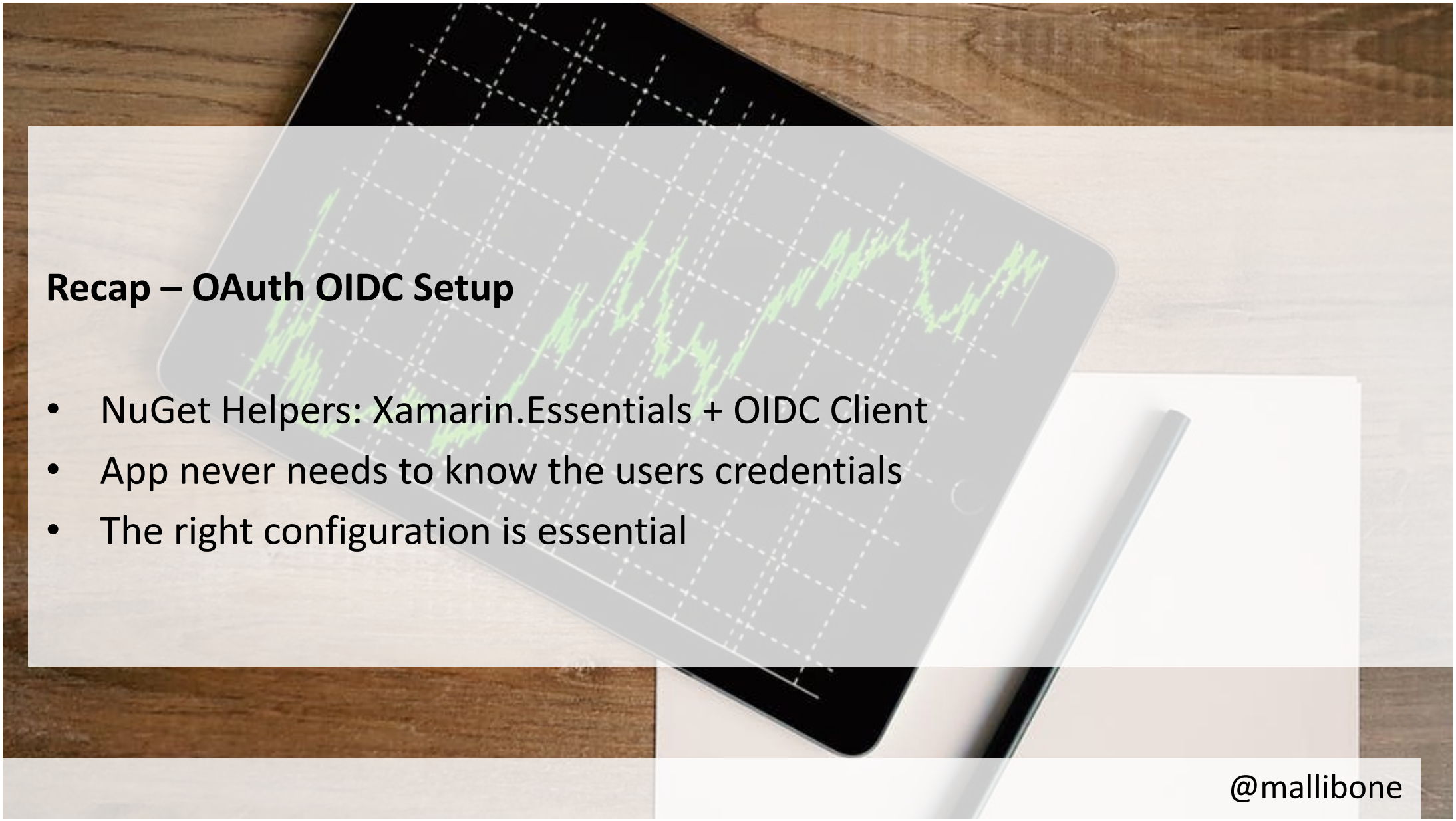
@mallibone



Recap – OAuth OIDC Setup

- NuGet Helpers: Xamarin.Essentials + OIDC Client
- App never needs to know the users credentials
- The right configuration is essential


Me thinking the config was correct
The Identity Service
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SO WE GOT THE TOKENS USING A CODE
NOW WHAT?
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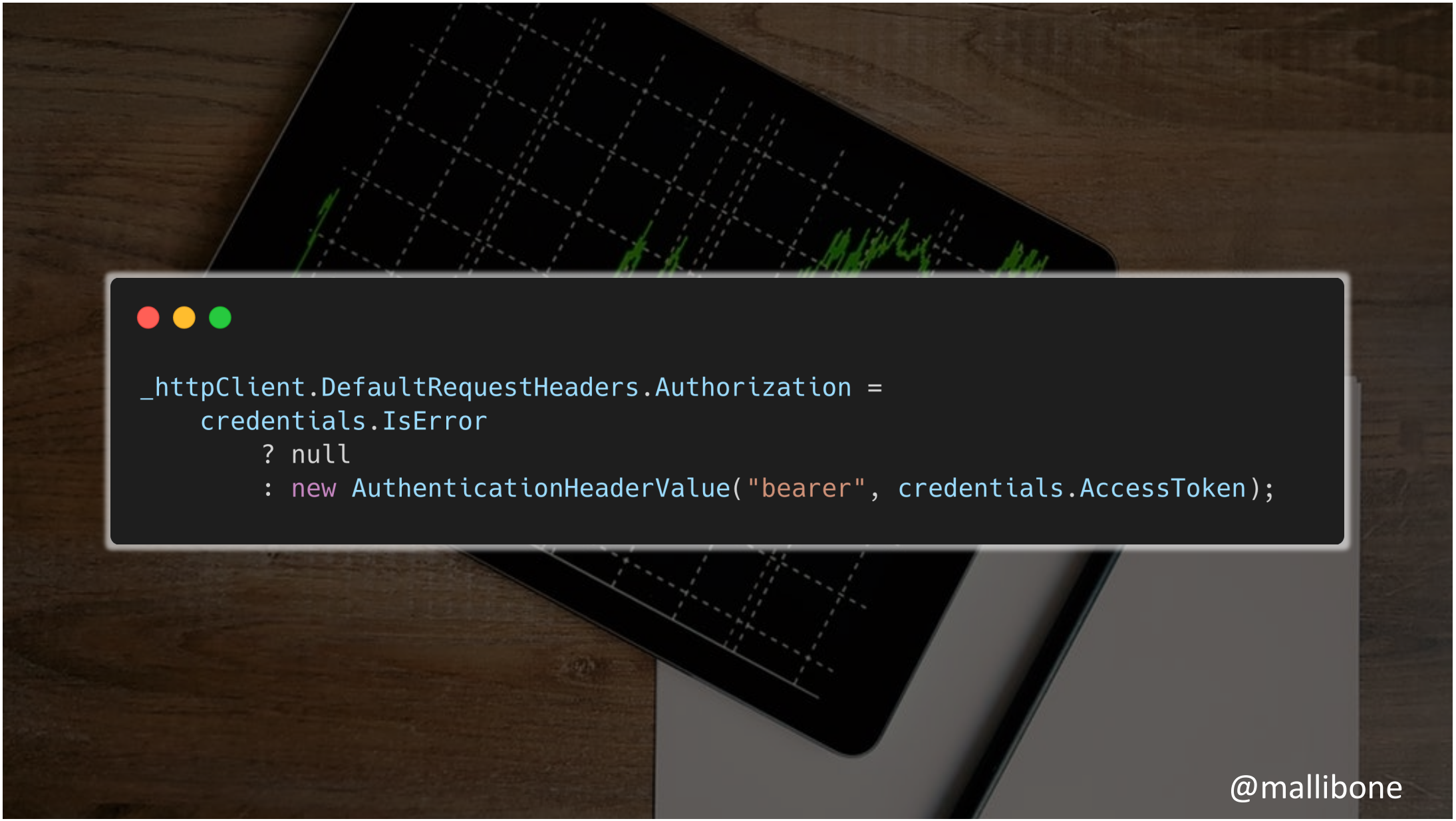
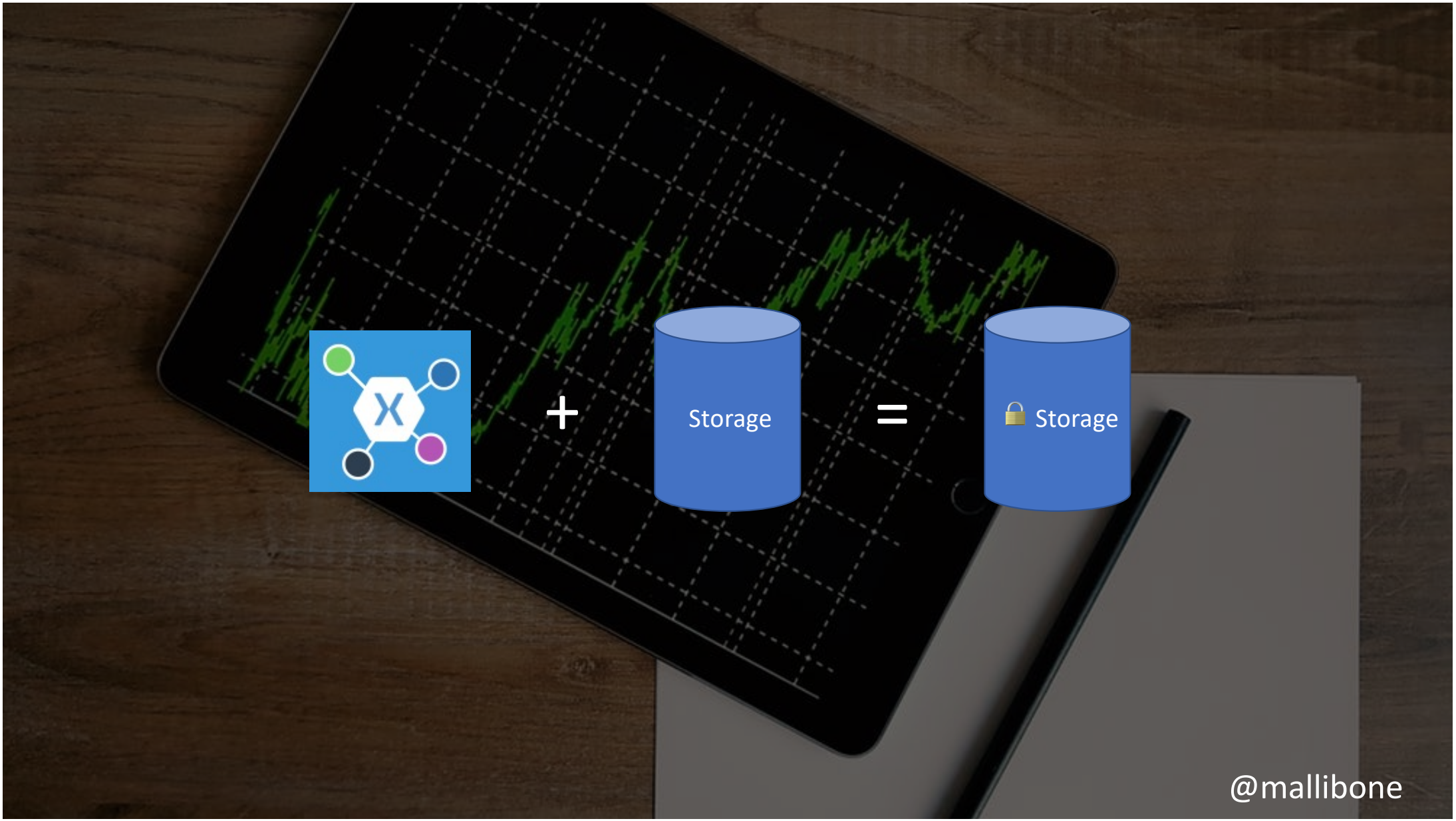
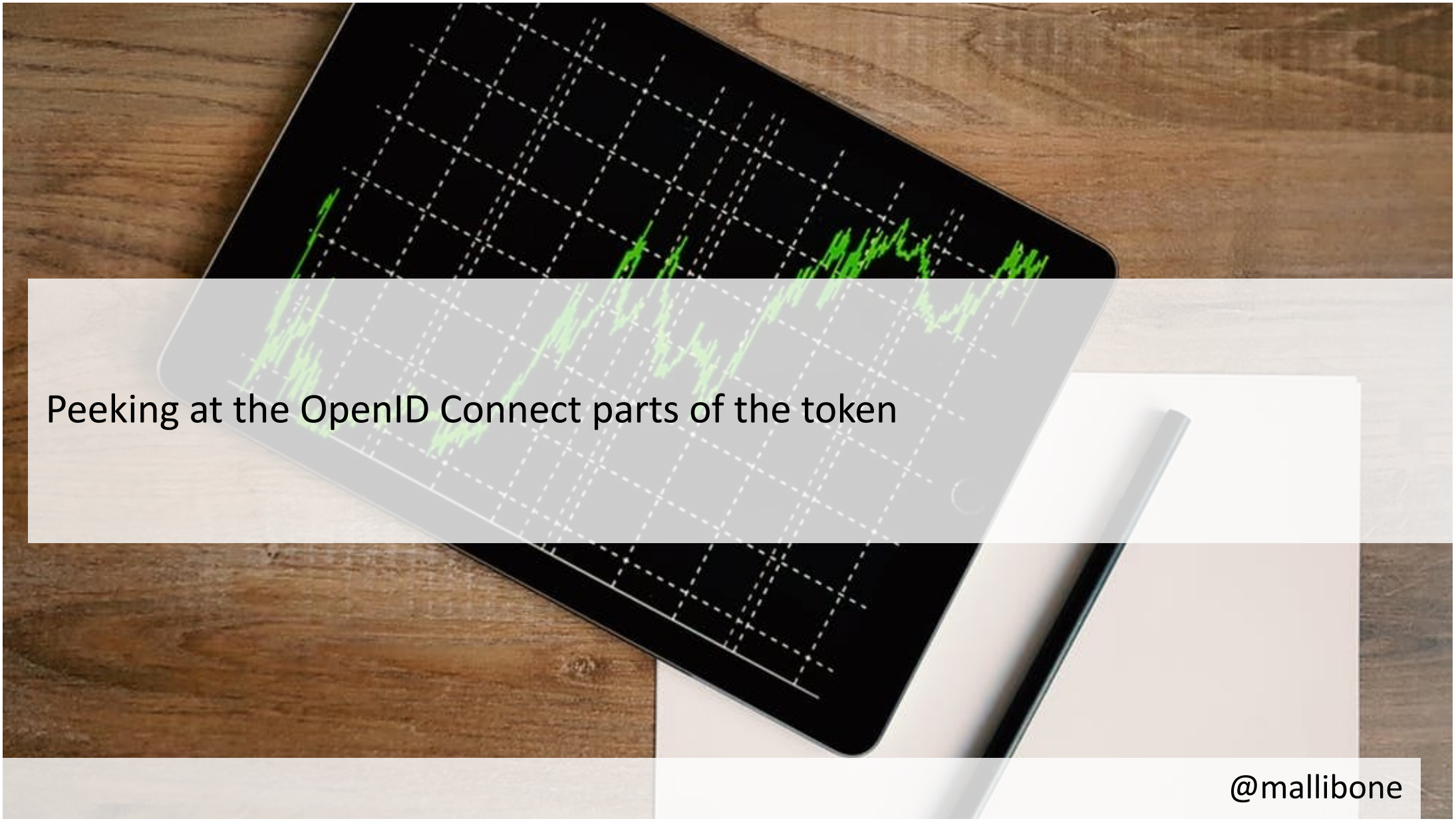

_httpClient.DefaultRequestHeaders.Authorization =
credentials.IsError
? null
: new AuthenticationHeaderValue("bearer", credentials.AccessToken);
@mallibone


Storage
Storage
@mallibone



Peeking at the OpenID Connect parts of the token

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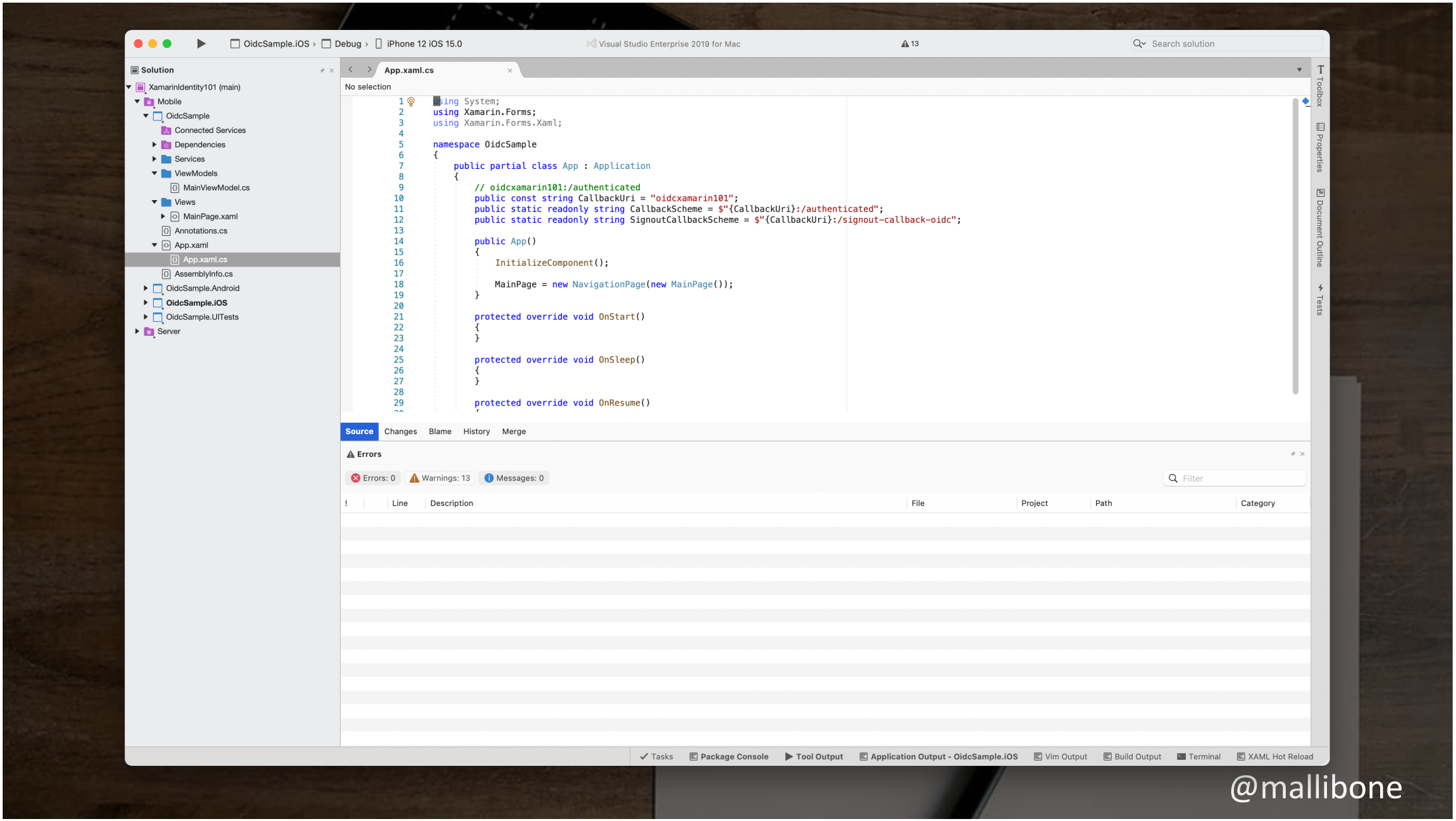
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public static readonly string CallbackScheme = $"{CallbackUri}:/authenticated";
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{
InitializeComponent();
MainPage = new NavigationPage(new MainPage());
}
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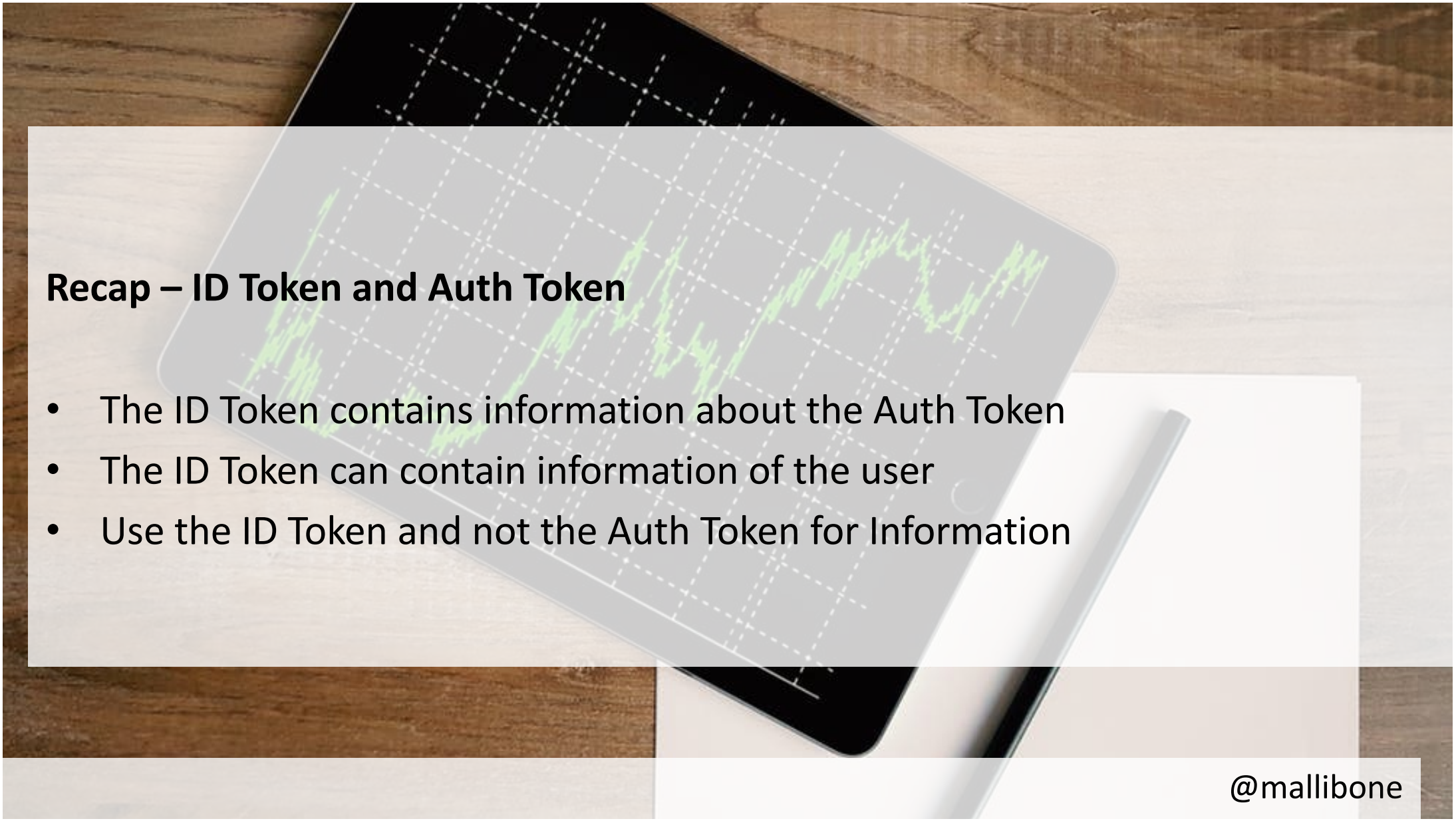
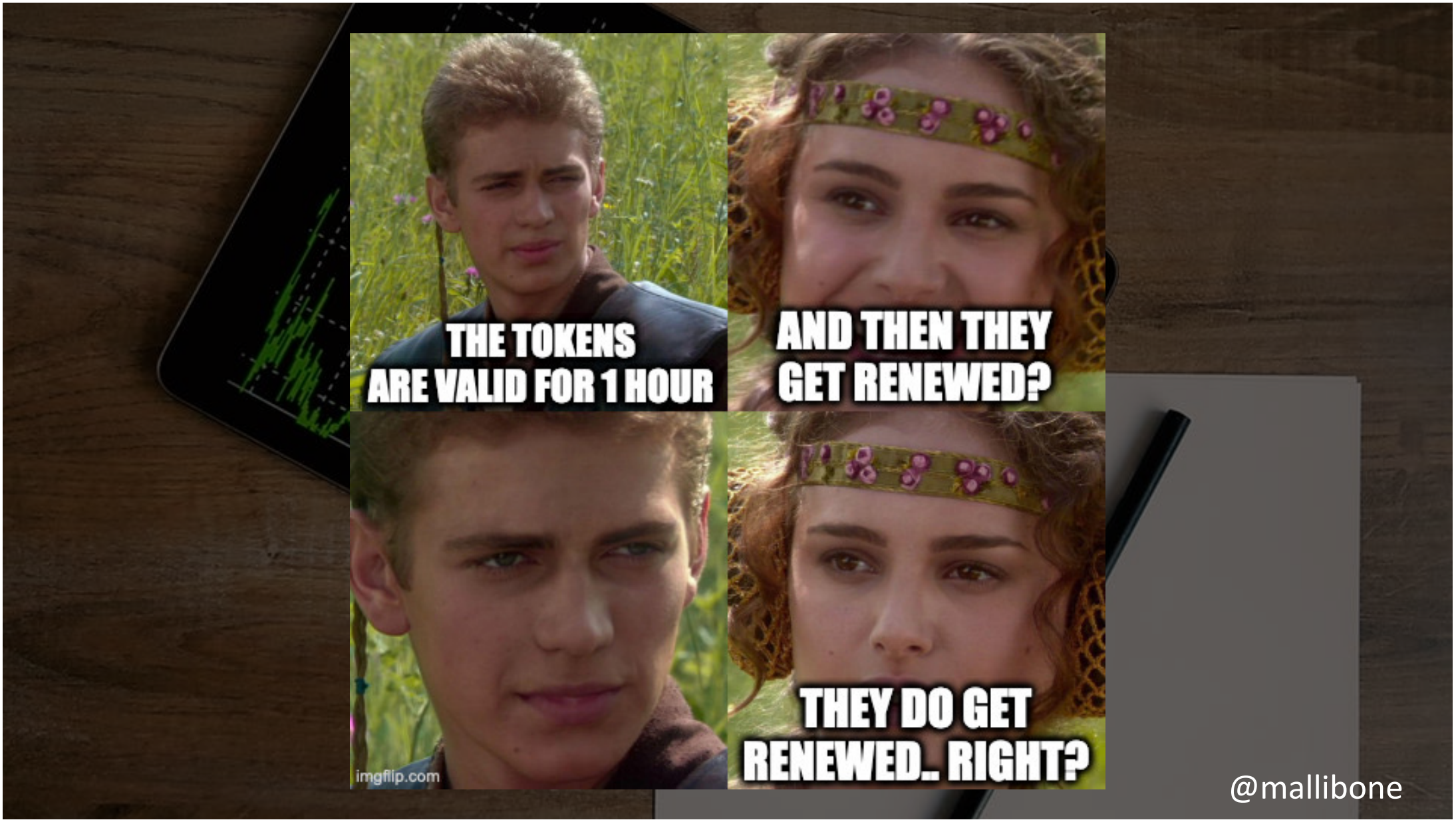


Recap – ID Token and Auth Token

- The ID Token contains information about the Auth Token
- The ID Token can contain information of the user
- Use the ID Token and not the Auth Token for Information


THE TOKENS ARE VALID FOR 1 HOUR
AND THEN THEY GET RENEWED?
THEY DO GET RENEWED.. RIGHT?
imgflip.com
@mallibone

Refreshing your tokens

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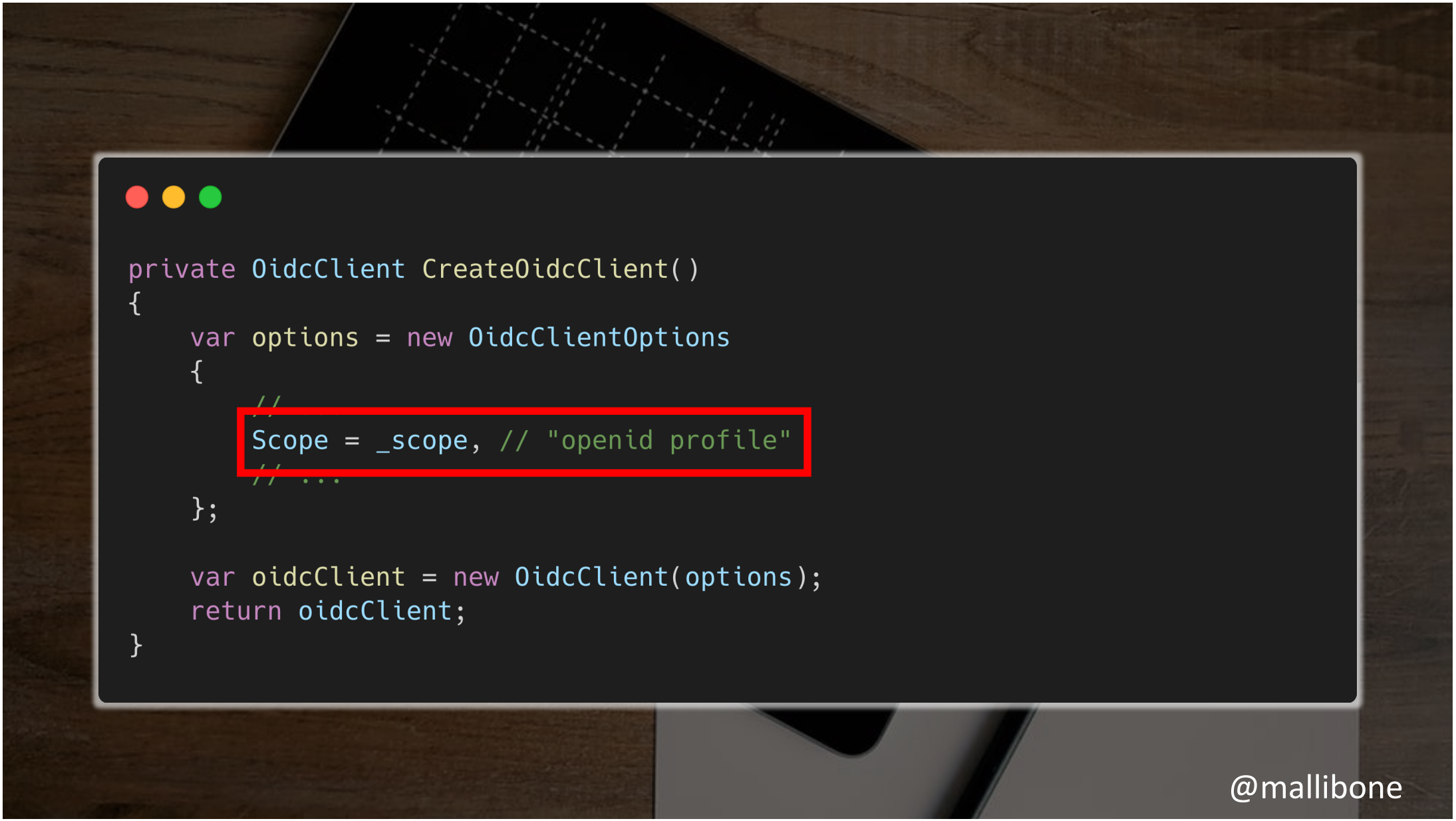
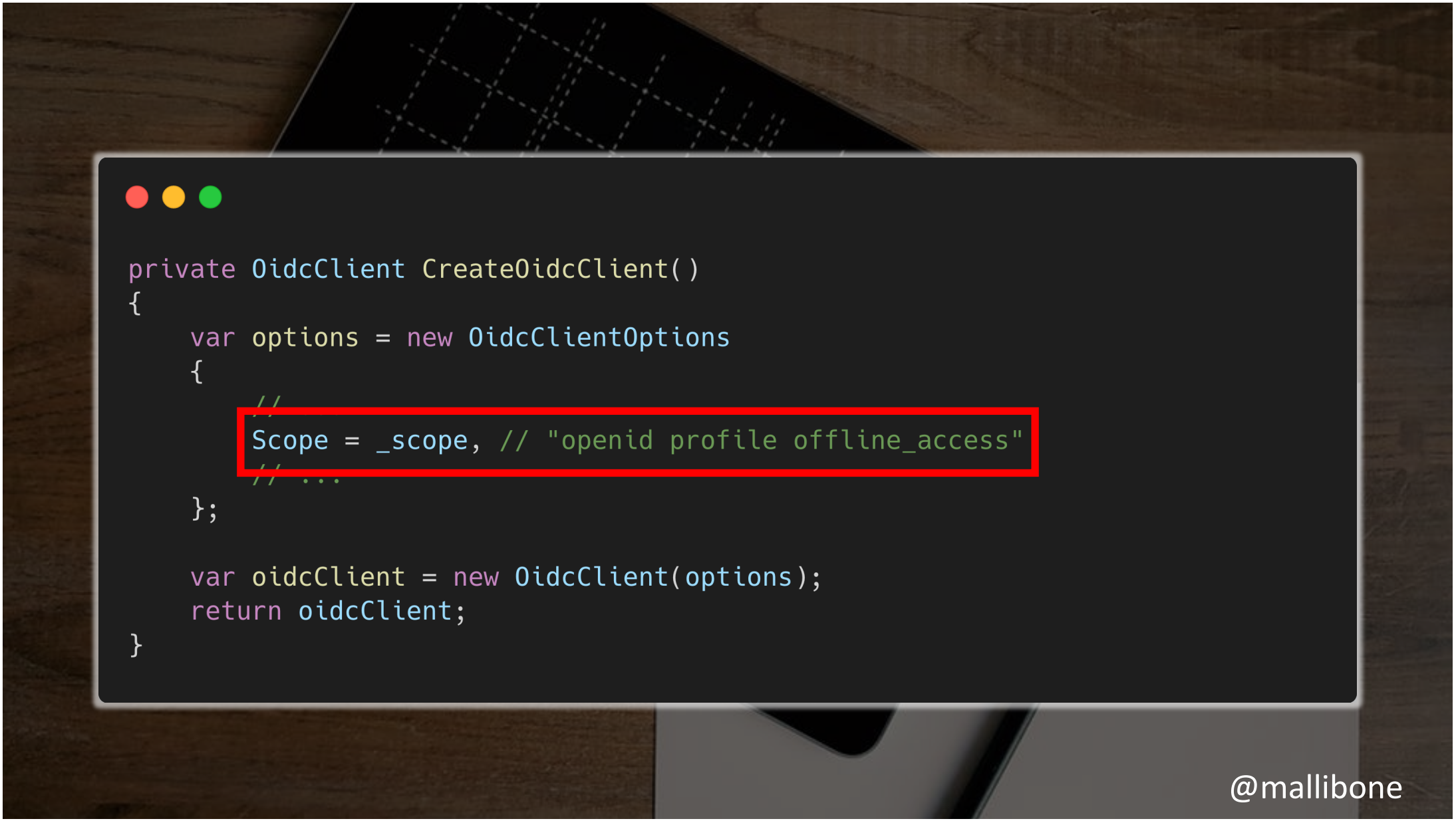

private OidcClient CreateOidcClient()
{
var options = new OidcClientOptions
{
//
Scope = _scope, // "openid profile"
// ...
};
var oidcClient = new OidcClient(options);
return oidcClient;
}
@mallibone


private OidcClient CreateOidcClient()
{
var options = new OidcClientOptions
{
//
Scope = _scope, // "openid profile offline_access"
// ...
};
var oidcClient = new OidcClient(options);
return oidcClient;
}
@mallibone


IT IS IMPORTANT
THAT THE SERVER IS
CONFIGURED TO ALLOW REFRESH TOKENS
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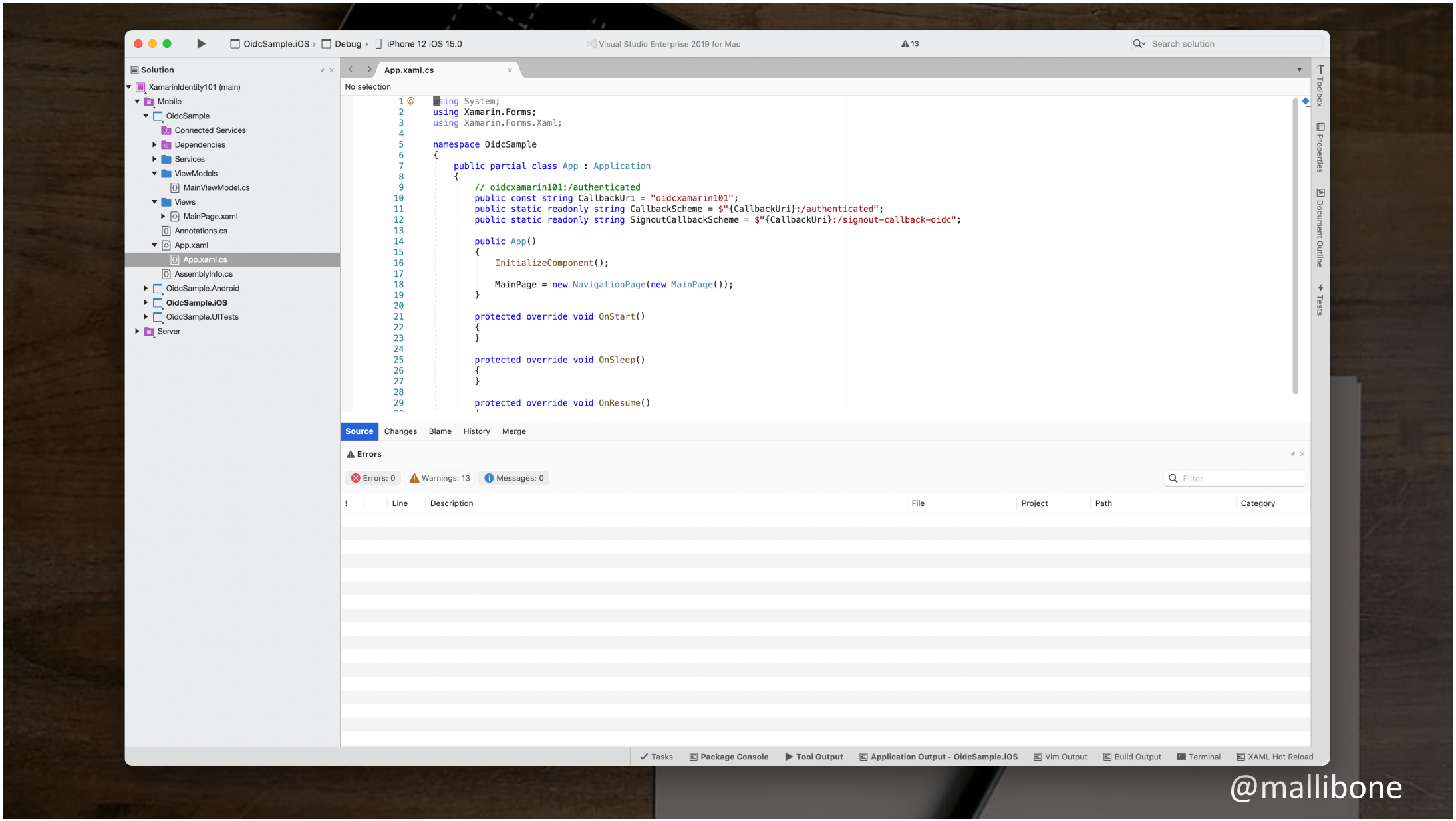
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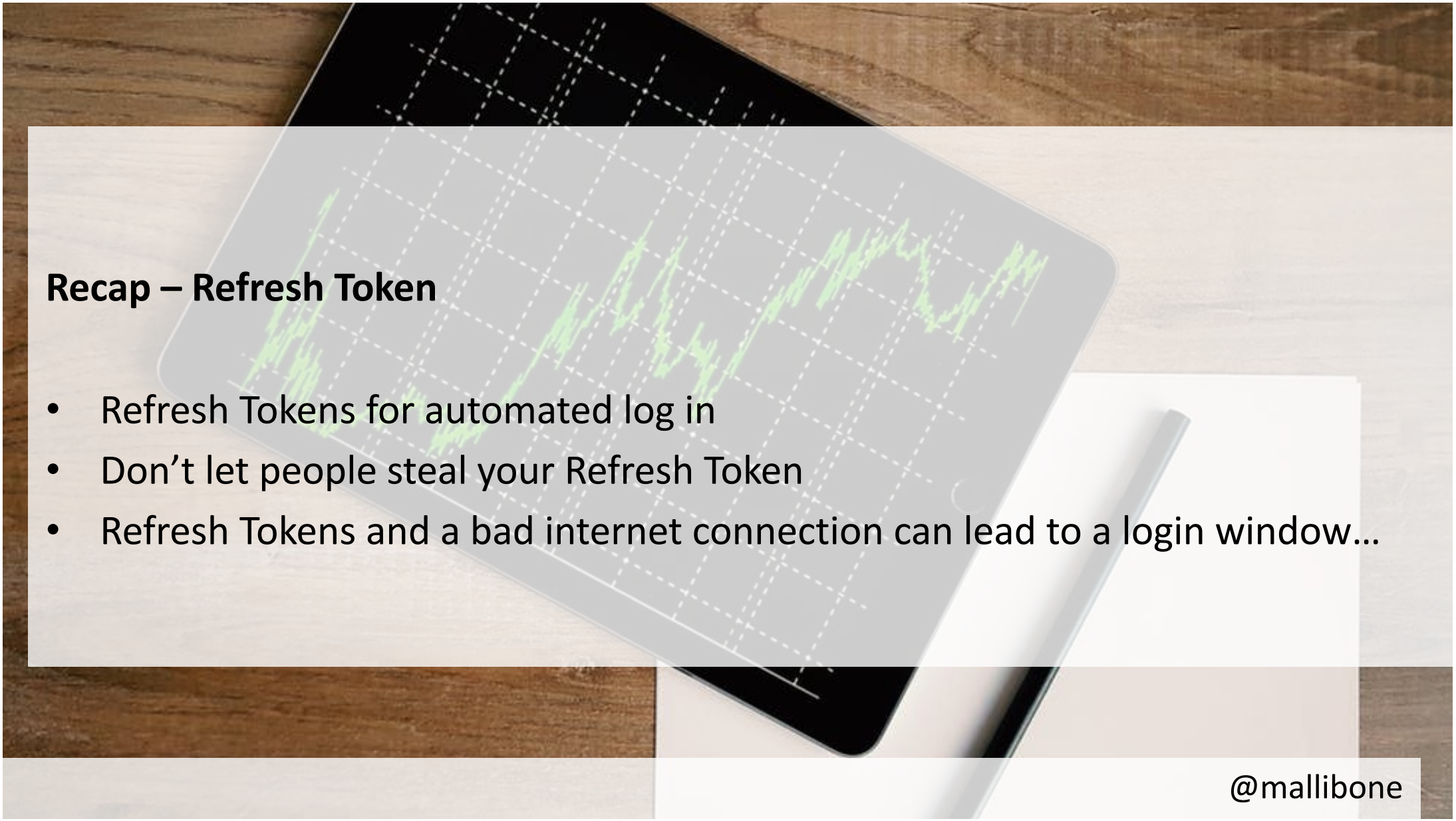
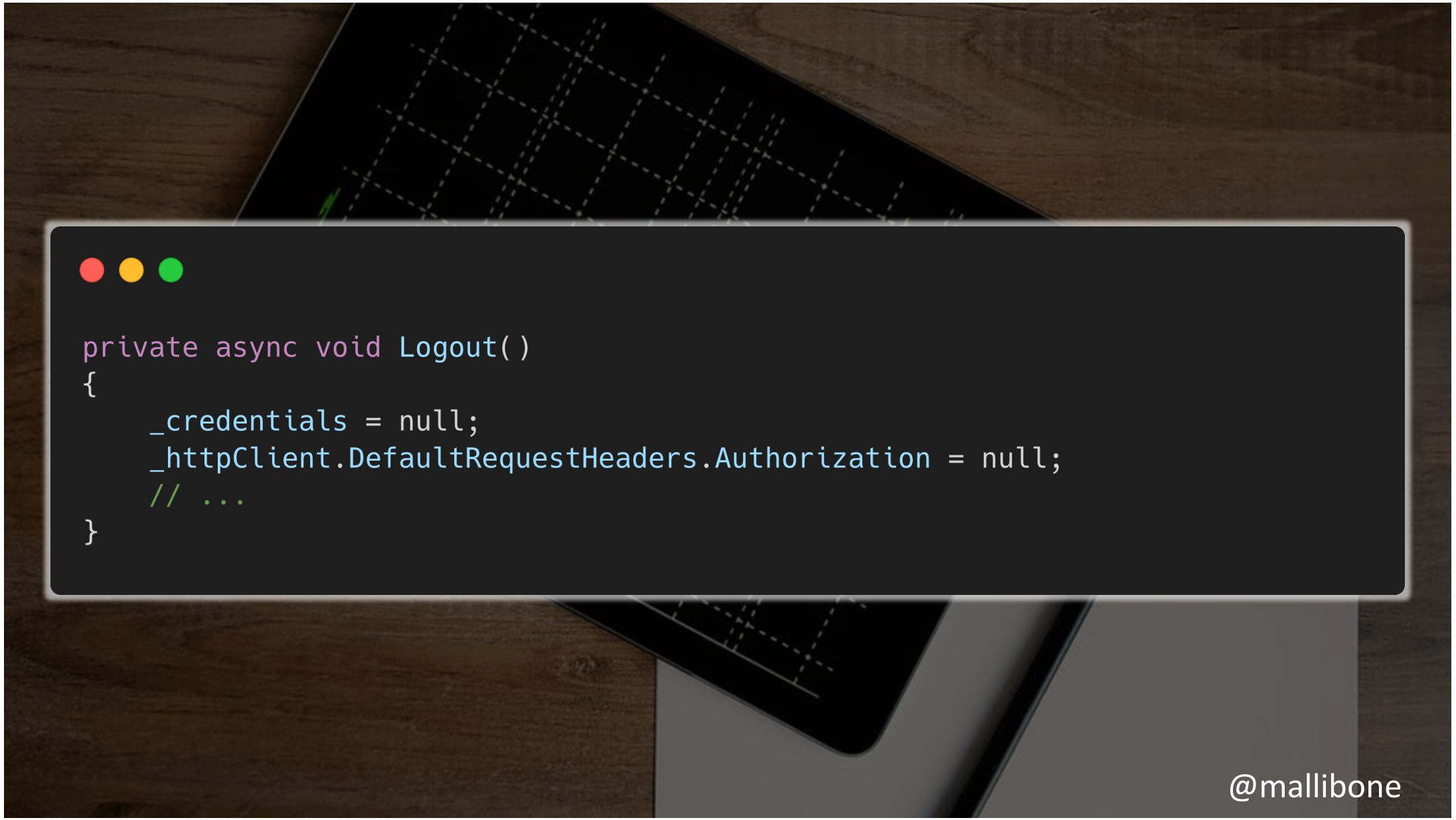
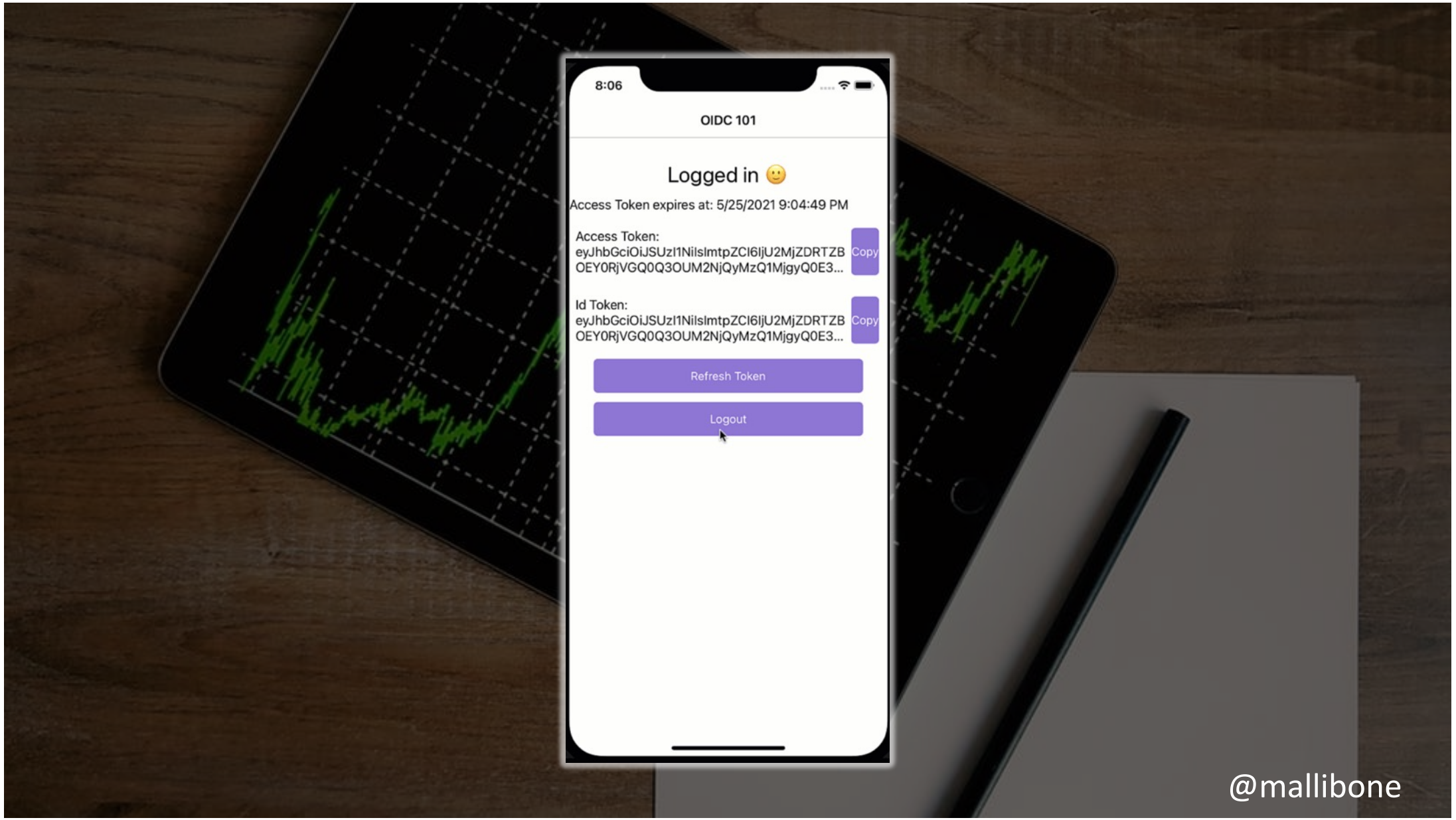


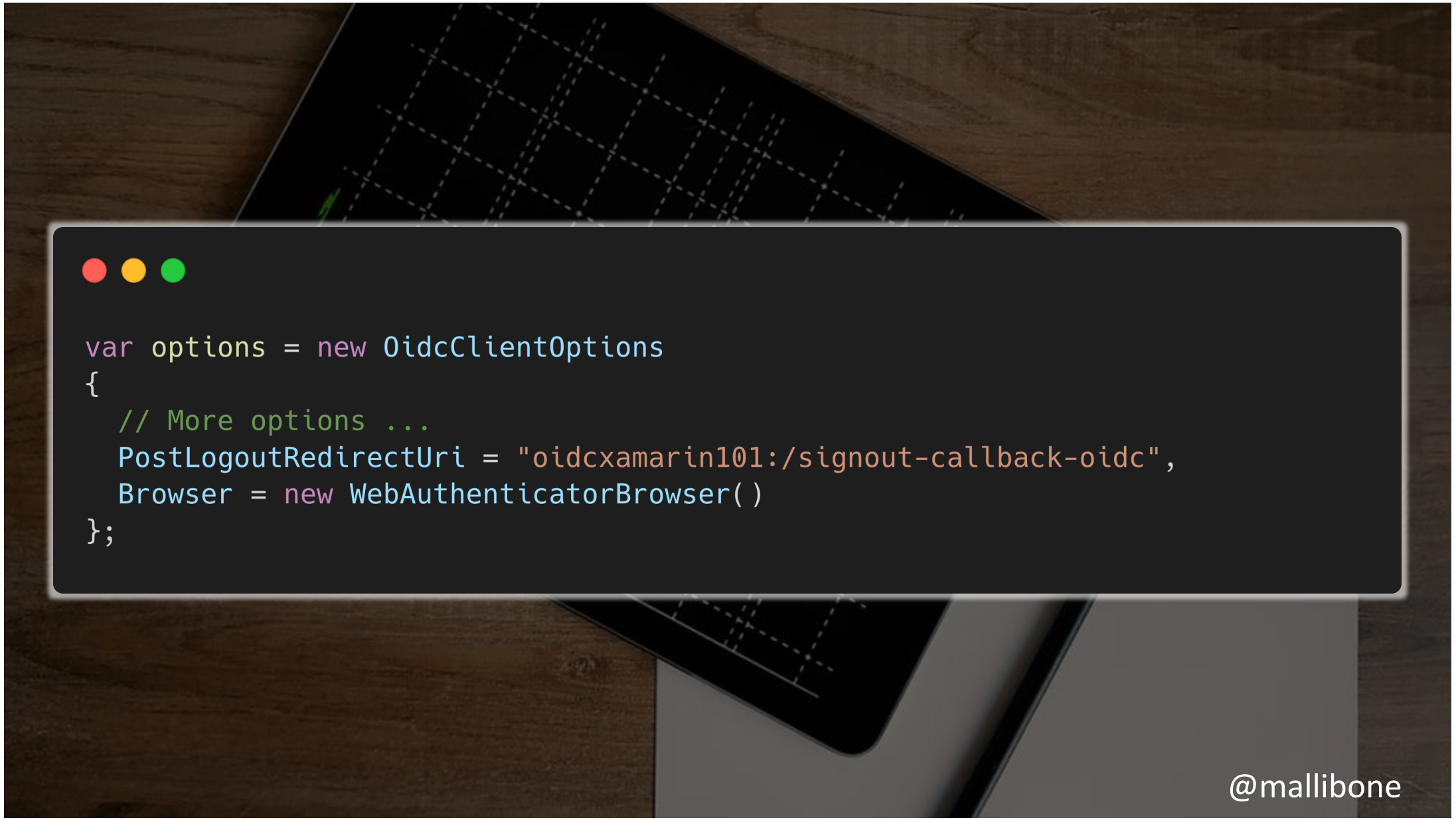
Recap – Refresh Token

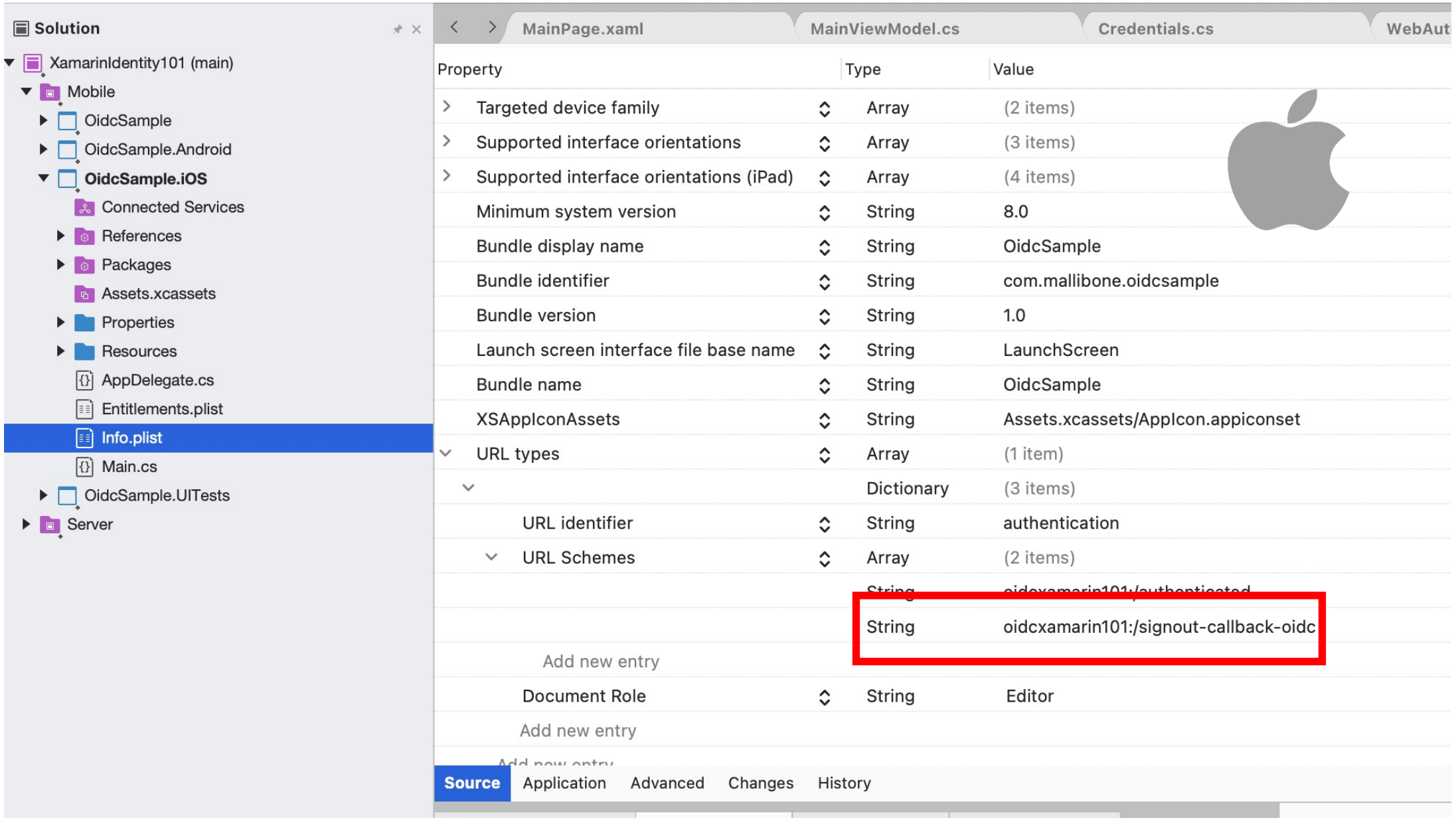
- Refresh Tokens for automated log in
- Don’t let people steal your Refresh Token
- Refresh Tokens and a bad internet connection can lead to a login window…


Logging out


private async void Logout()
{
_credentials = null;
_httpClient.DefaultRequestHeaders.Authorization = null;
// ...
}
@mallibone


8:06
OIDC 101
Logged in 🙂
Access Token expires at: 5/25/2021 9:04:49 PM
Access Token:
eyJhbGciOiJSUzI1NiIsImtpZCI6IjU2MjZDRTZB
OEY0RjVGQ0Q3OUM2NjQyMzQ1MjgyQ0E3...
Copy
Id Token:
eyJhbGciOiJSUzI1NiIsImtpZCI6IjU2MjZDRTZB
OEY0RjVGQ0Q3OUM2NjQyMzQ1MjgyQ0E3...
Copy
Refresh Token
Logout
@mallibone


var options = new OidcClientOptions
{
// More options ...
PostLogoutRedirectUri = "oidcxamarin101:/signout-callback-oidc",
Browser = new WebAuthenticatorBrowser()
};
@mallibone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Credentials.cs
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Value
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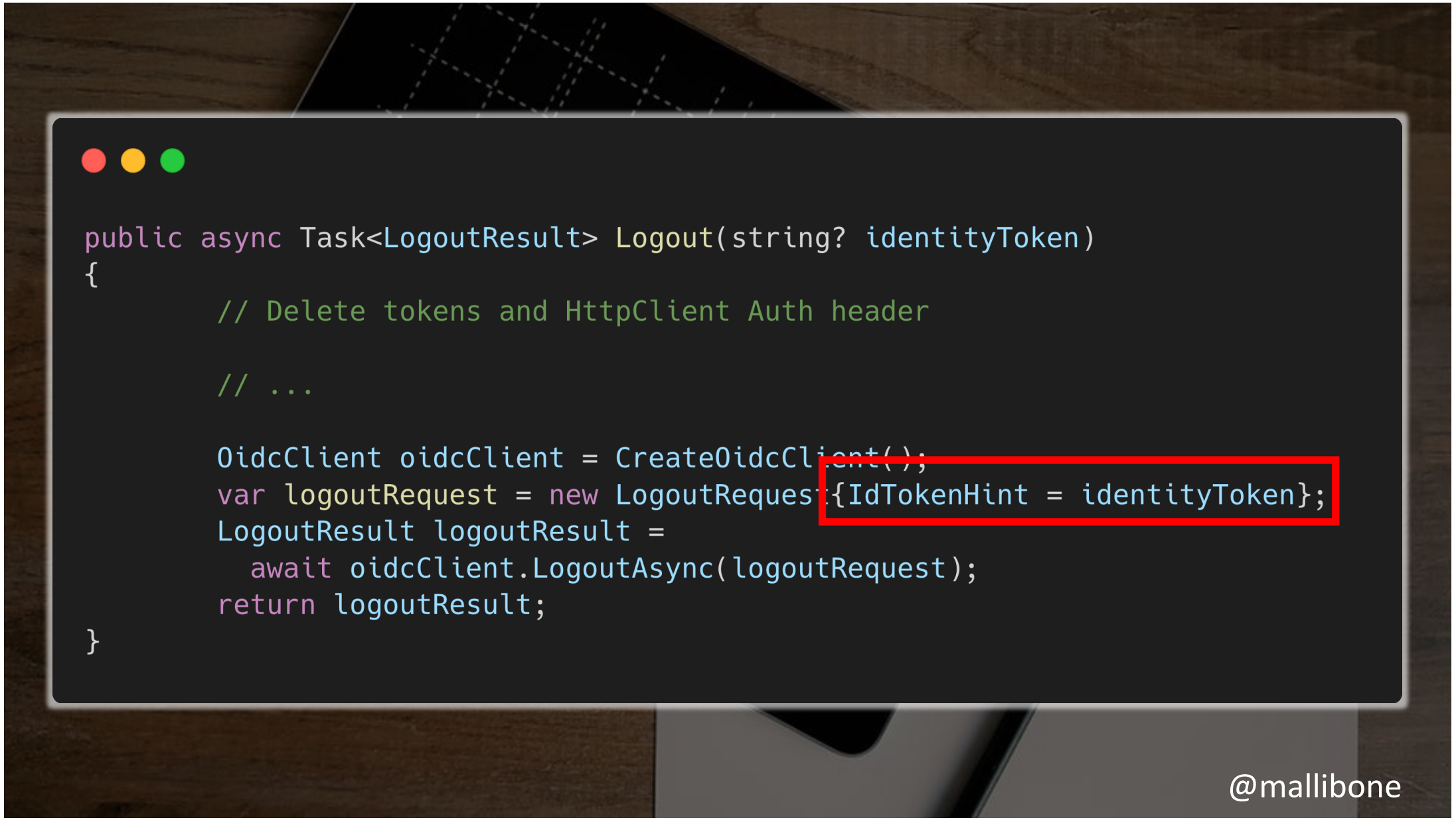
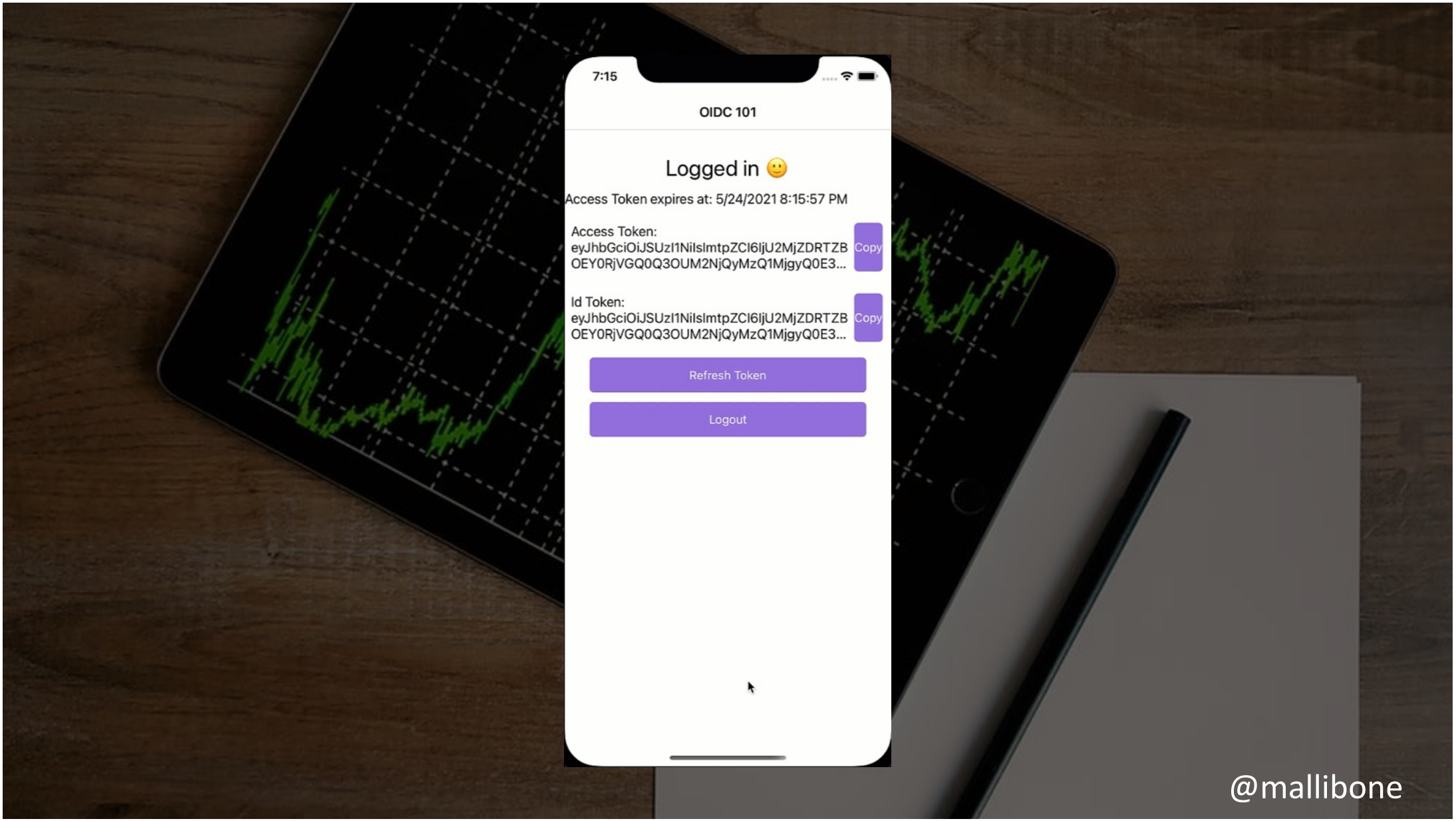
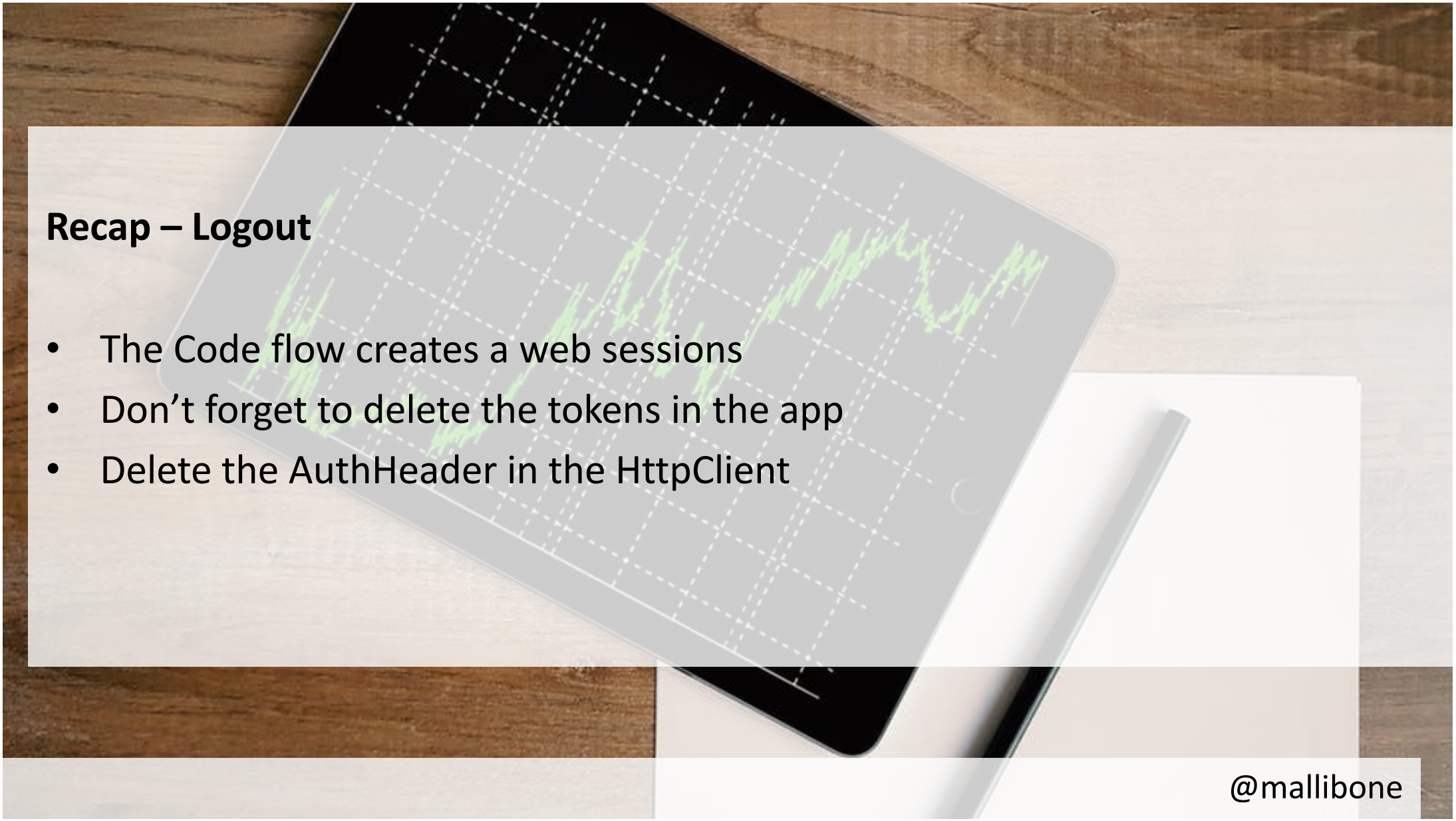
Array
(2 items)
Supported interface orientations
Array
(3 items)
Supported interface orientations (iPad)
Array
(4 items)
Minimum system version
String
8.0
Bundle display name
String
OidcSample
Bundle identifier
String
com.mallibone.oidcsample
Bundle version
String
1.0
Launch screen interface file base name
String
LaunchScreen
Bundle name
String
OidcSample
XSAppIconAssets
String
Assets.xcassets/AppIcon.appiconset
URL types
Array
(1 item)
Dictionary
(3 items)
URL identifier
String
authentication
URL Schemes
Array
(2 items)
String
oidcxamarin101:/signout-callback-oidc
Add new entry
Document Role
String
Editor
Add new entry
Source
Application
Advanced
Changes
History

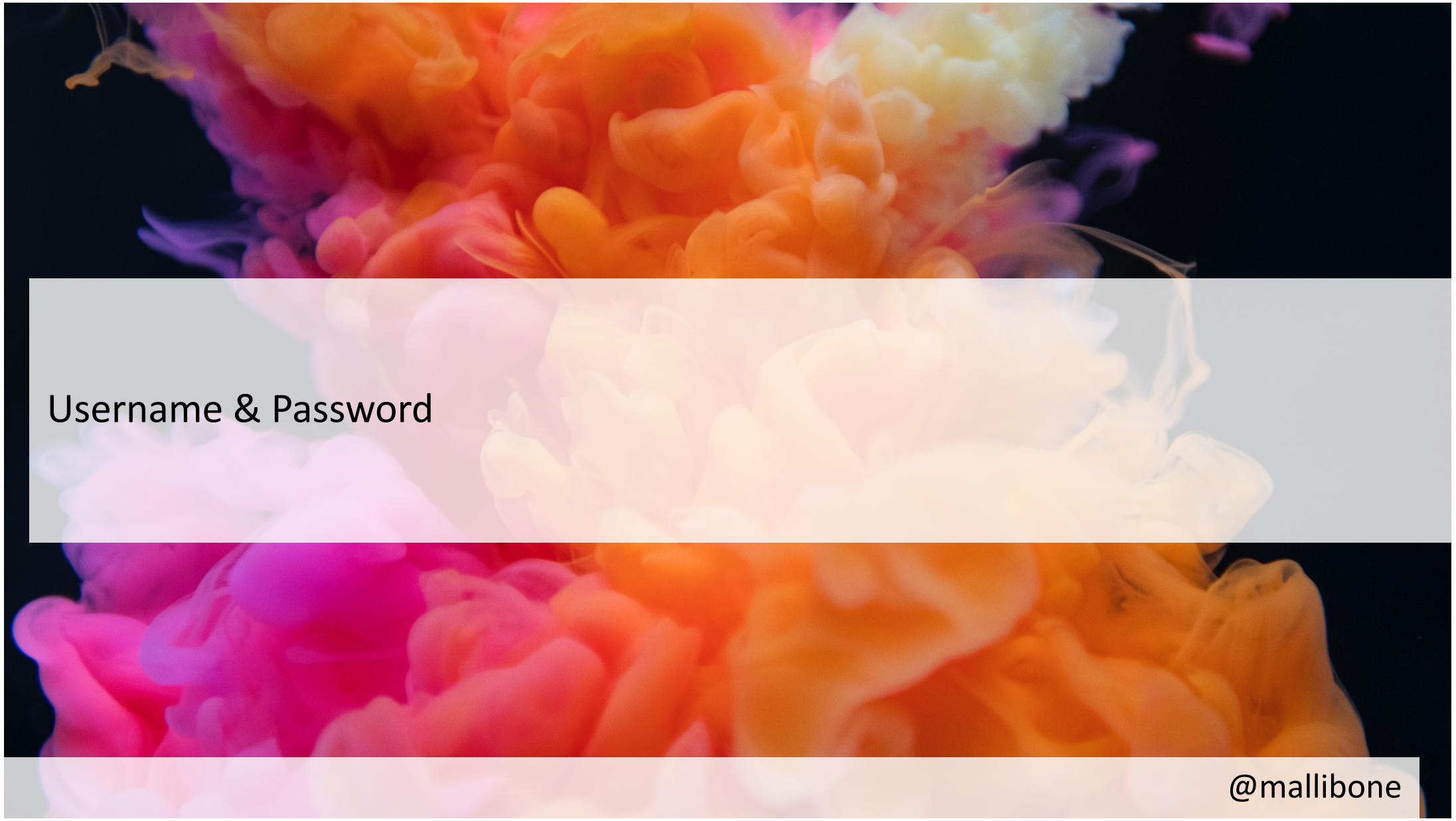

public async Task<LogoutResult> Logout(string? identityToken)
{
// Delete tokens and HttpClient Auth header
// ...
OidcClient oidcClient = CreateOidcClient();
var logoutRequest = new LogoutRequest{IdTokenHint = identityToken};
LogoutResult logoutResult =
await oidcClient.LogoutAsync(logoutRequest);
return logoutResult;
}
@mallibone


7:15
OIDC 101
Logged in 🙂
Access Token expires at: 5/24/2021 8:15:57 PM
Access Token:
eyJhbGciOiJSUzI1NiIsImtpZCI6IjU2MjZDRTZB
OEY0RjVGQ0Q3OUM2NjQyMzQ1MjgyQ0E3...
Copy
Id Token:
eyJhbGciOiJSUzI1NiIsImtpZCI6IjU2MjZDRTZB
OEY0RjVGQ0Q3OUM2NjQyMzQ1MjgyQ0E3...
Copy
Refresh Token
Logout
@mallibone



Recap – Logout

- The Code flow creates a web sessions
- Don’t forget to delete the tokens in the app
- Delete the AuthHeader in the HttpClient


Username & Password
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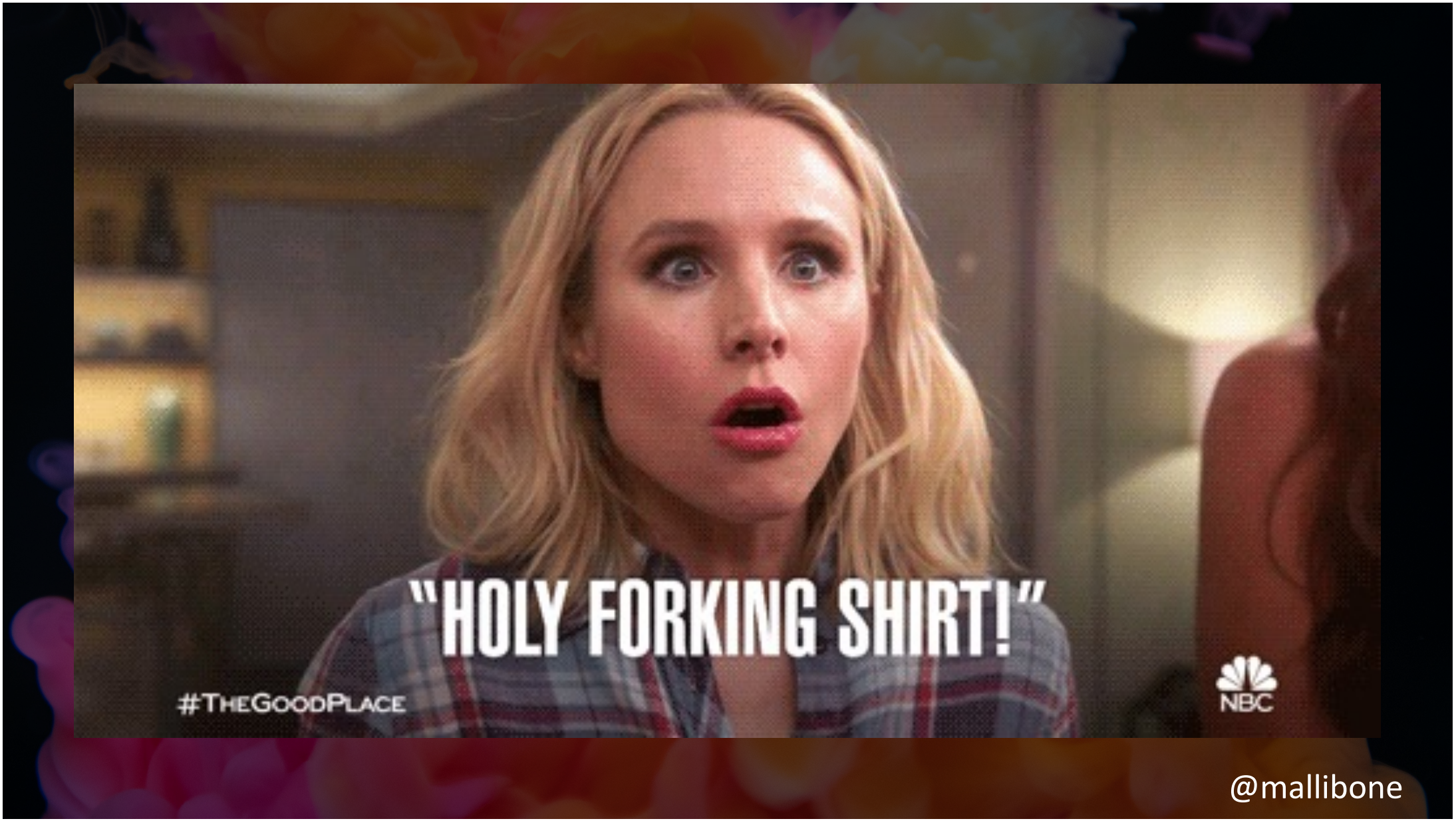

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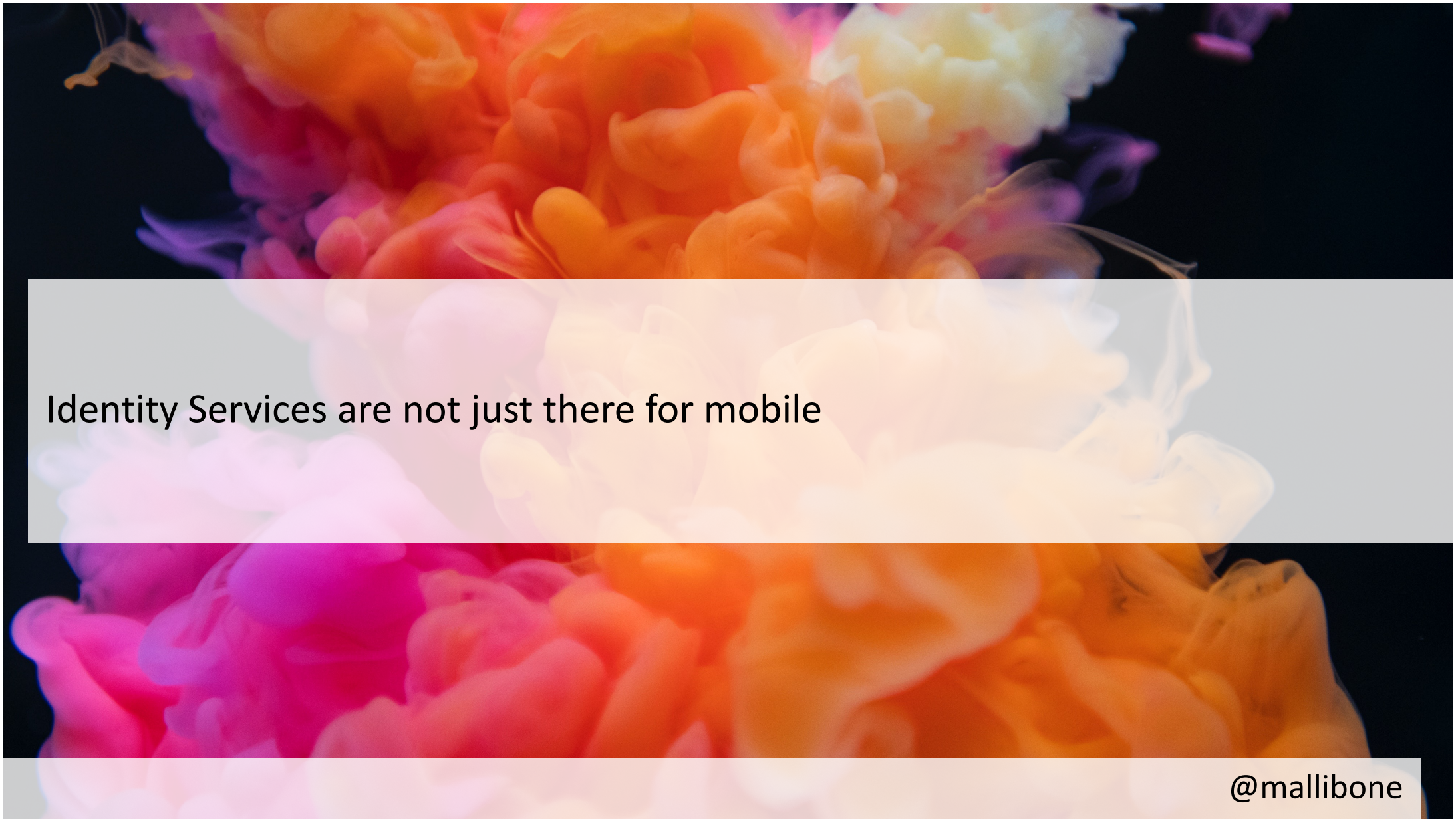
Is it worth it?


Identity Services are not just there for mobile
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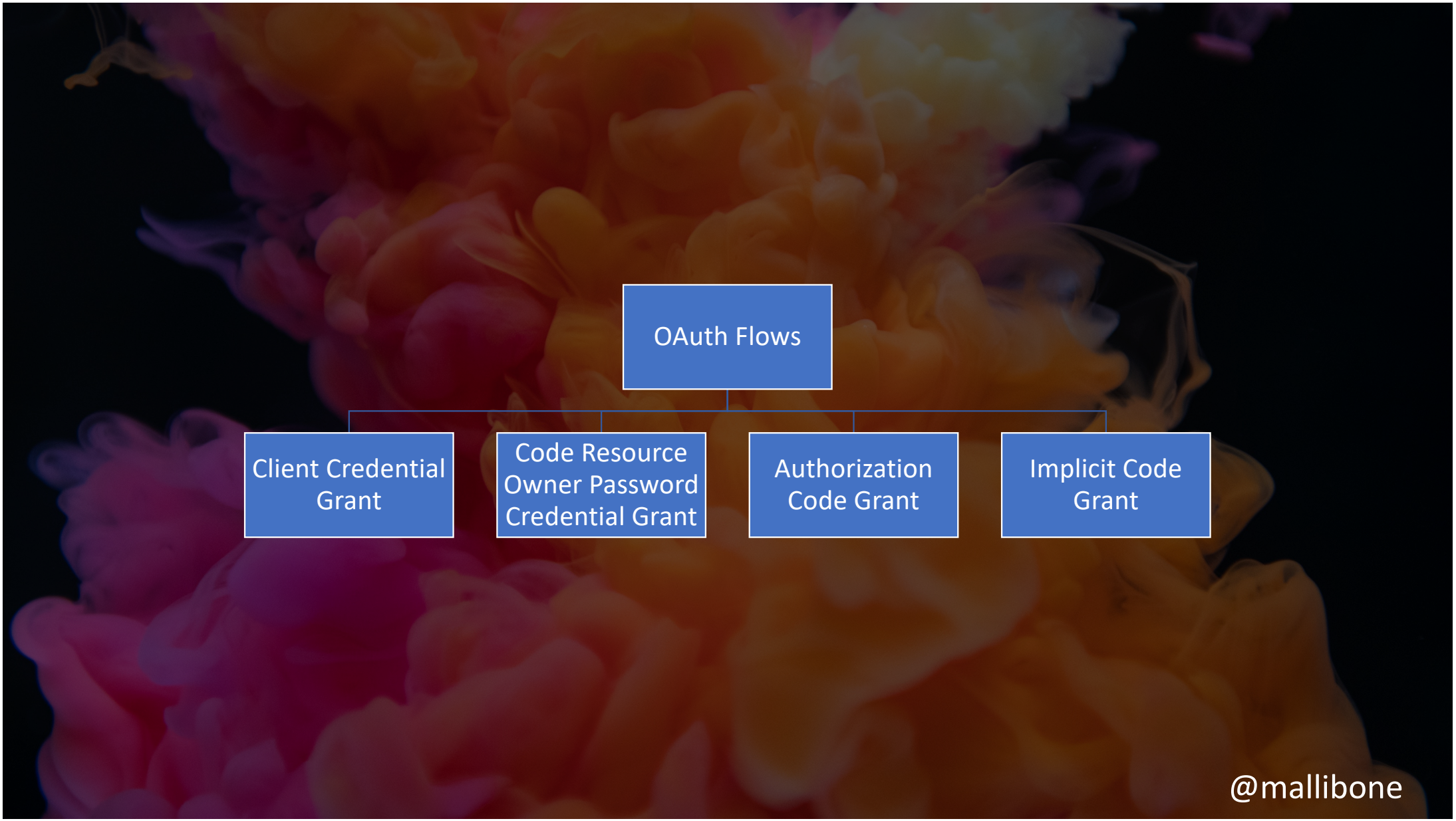
OAuth Flows
Client Credential Grant
Code Resource Owner Password Credential Grant
Authorization Code Grant
Implicit Code Grant
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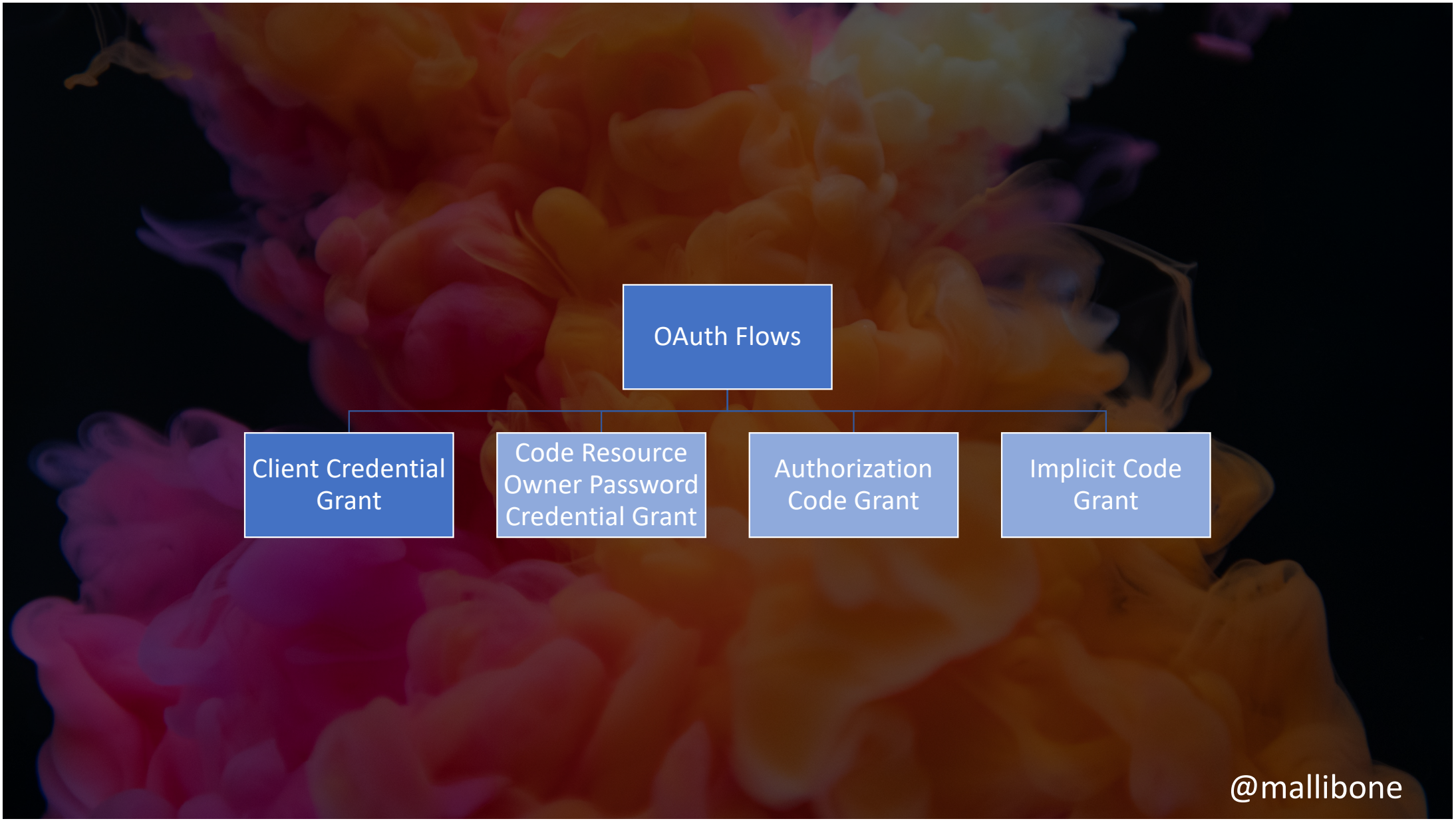
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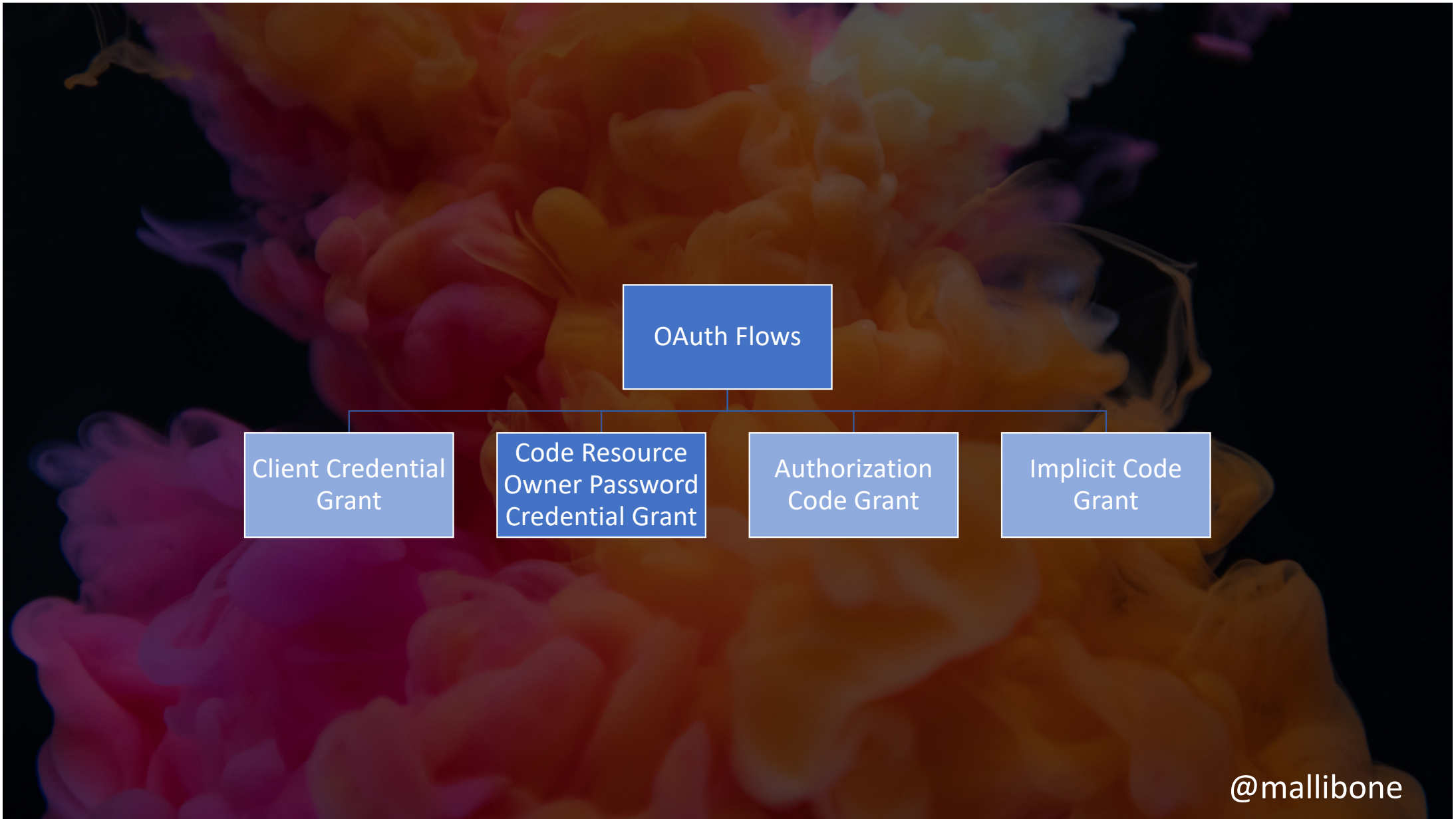
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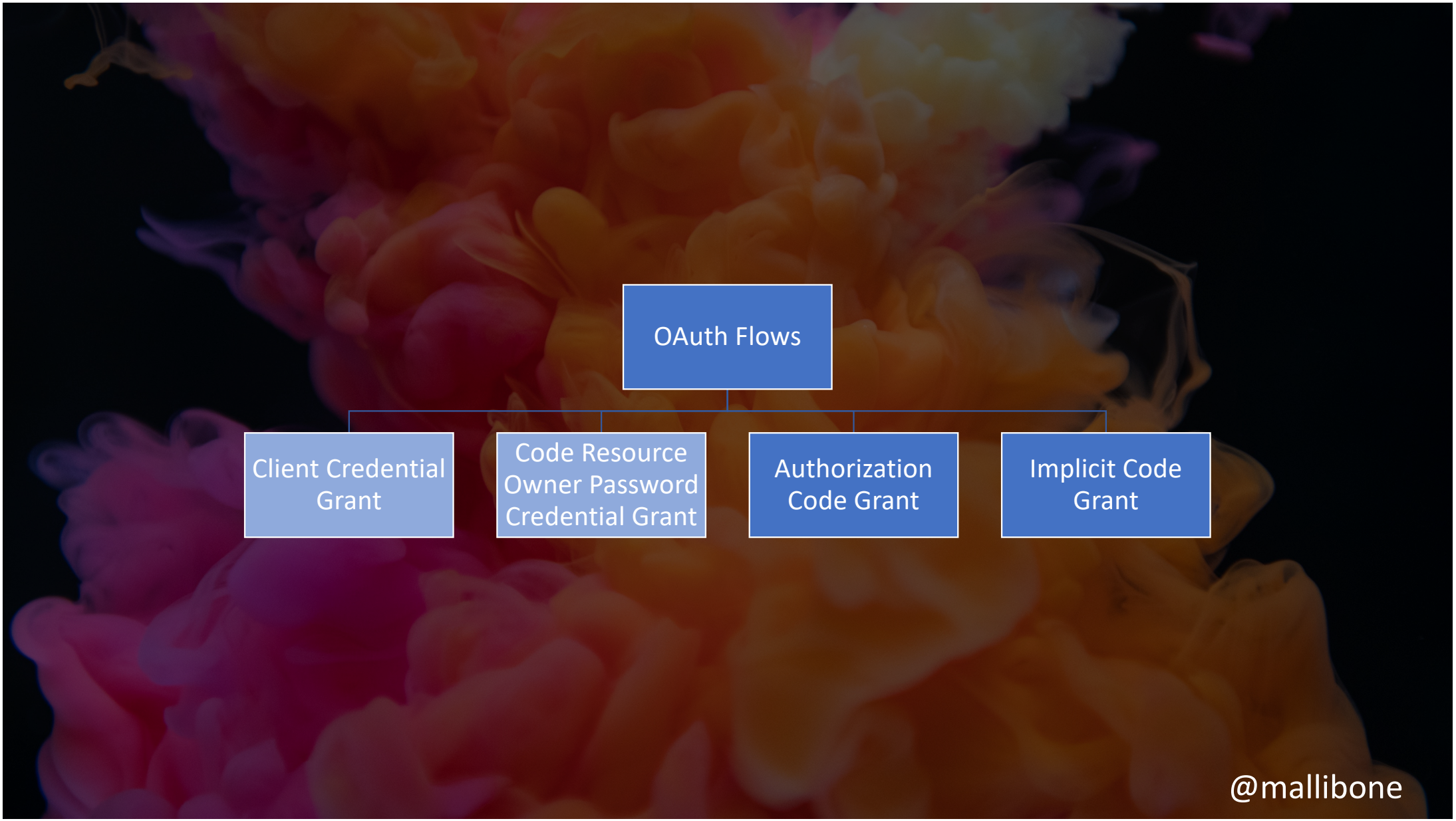
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DEVELOPER
CODE RESOURCE OWNER
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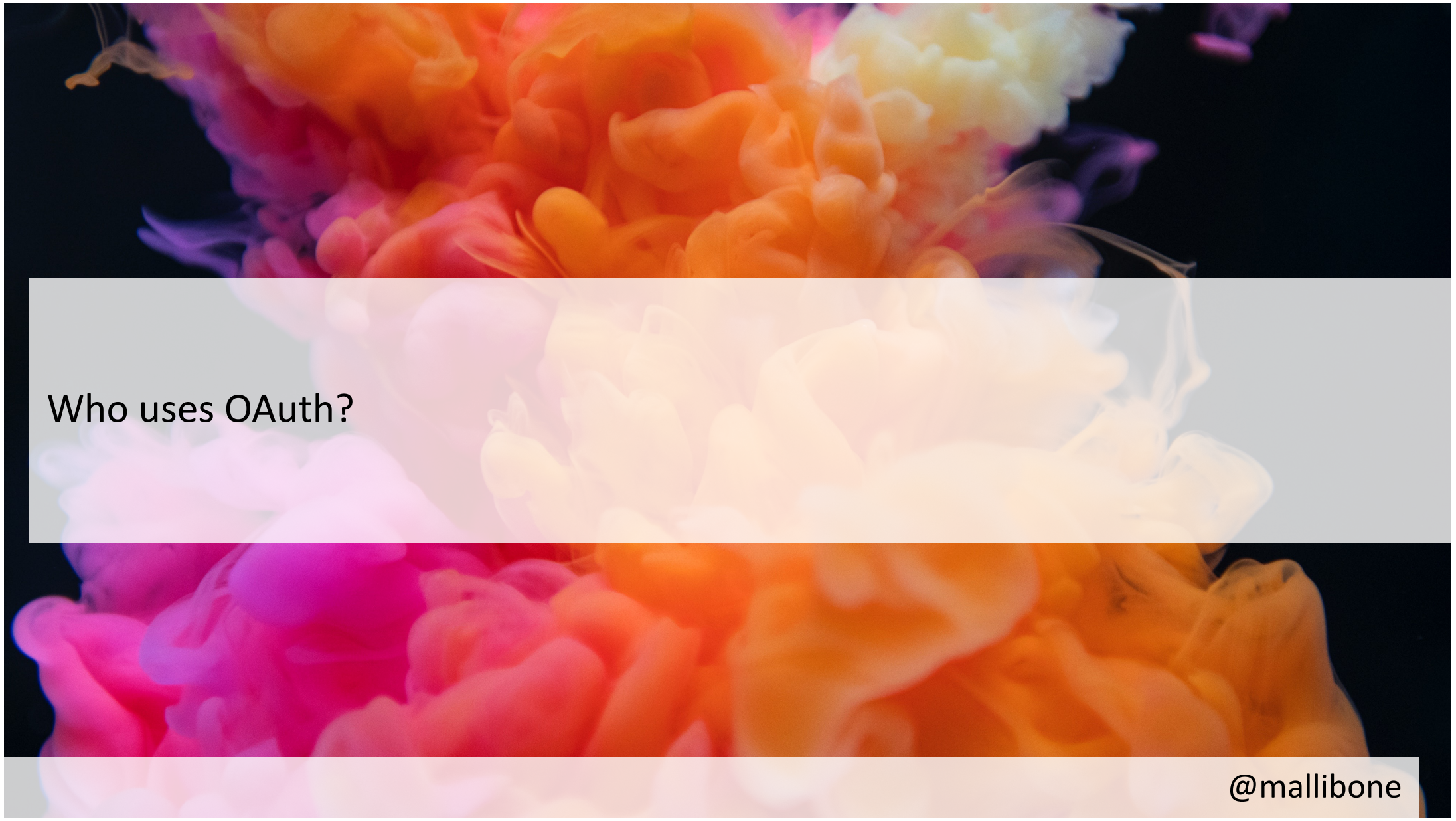
Who uses OAuth?
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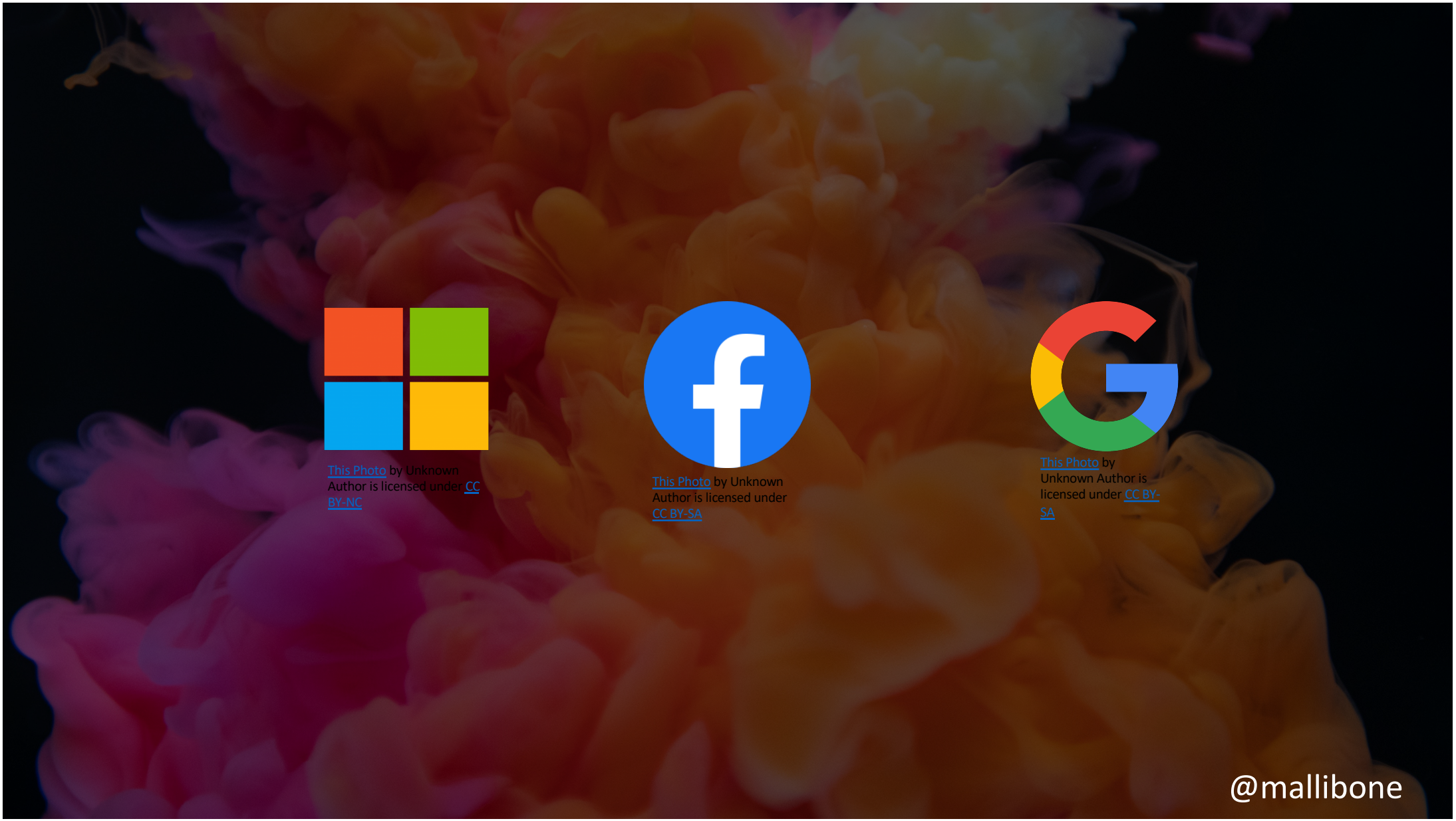
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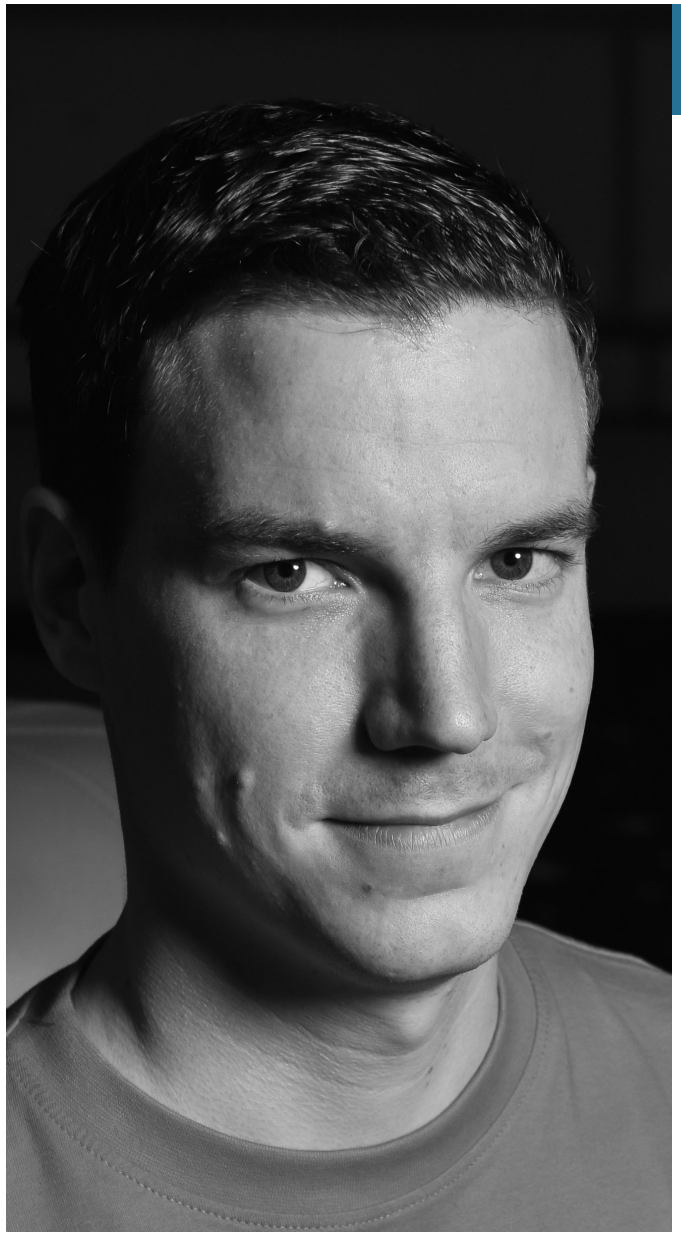
And what about MAUI?

Takeaways

Takeaways

- OAuth 2 and OpenId Connect are a wide spread industry standard
- If you don’t know the password, you can’t be blamed for loosing it.
- With Xamarin Essentials and OIDC Client NuGet packages the basic building blocks are there.



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Thank you for your time!

Mark Allibone @mallibone

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