



Xamarin

The future of apps



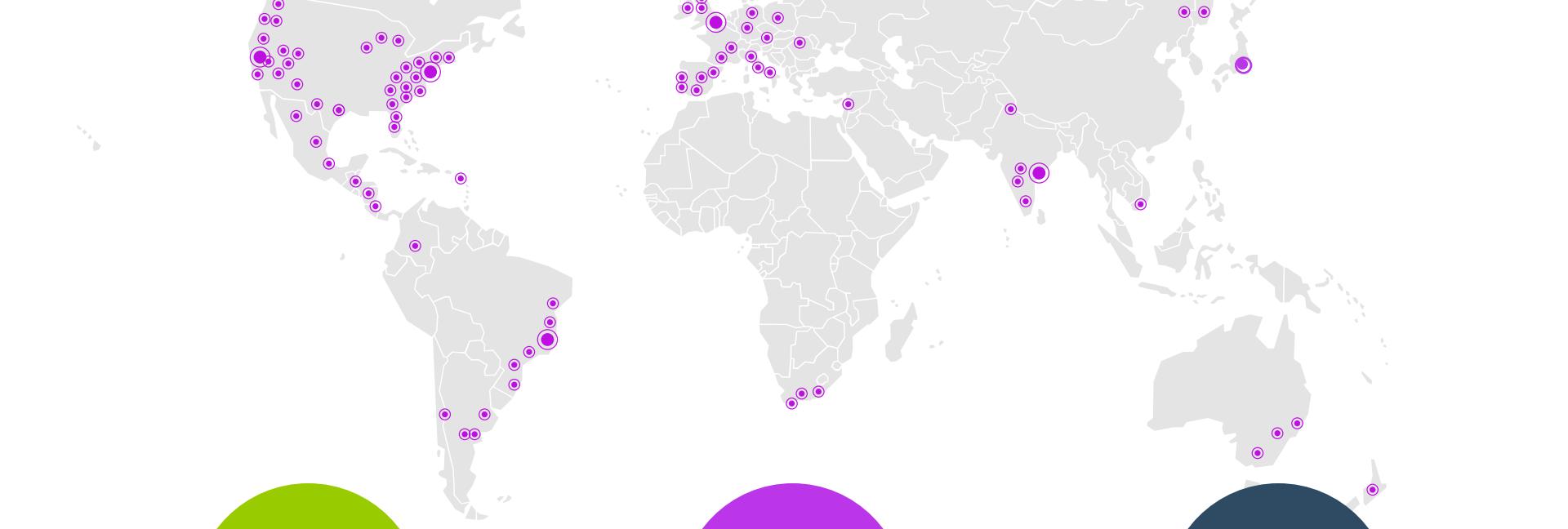
Rui Marinho
Software Engineer

Global Overview

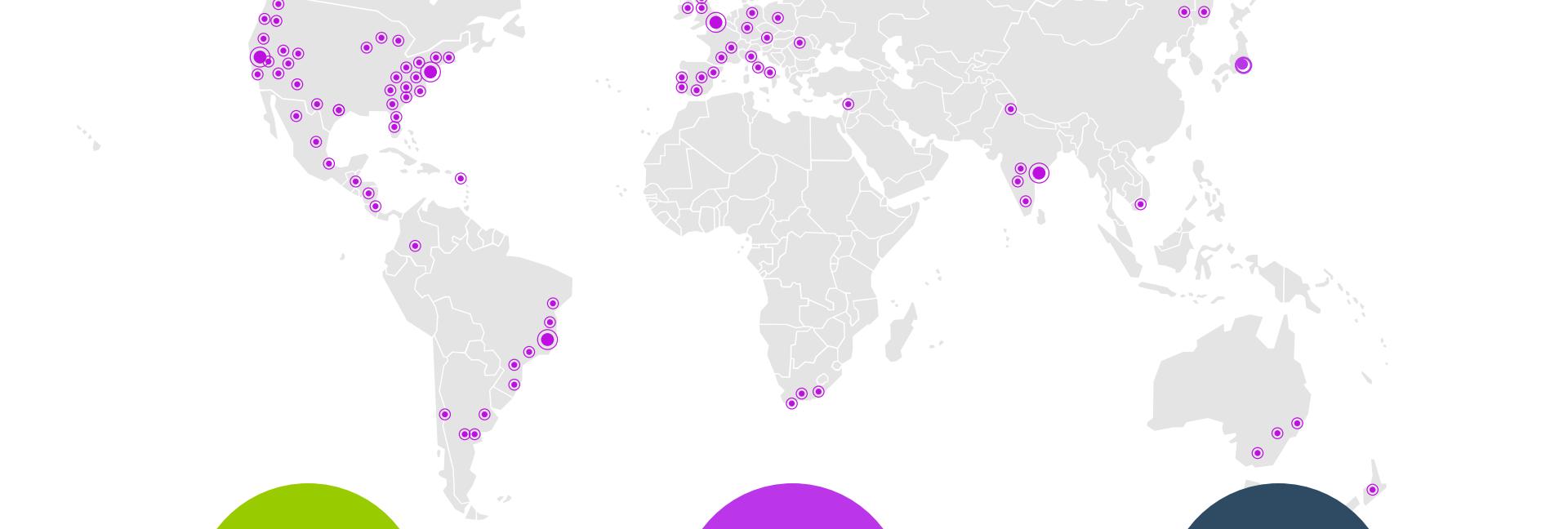
MODULES	
1	INTRO TO XAMARIN
2	IOS DEVELOPMENT USING XAMARIN
3	ANDROID DEVELOPMENT USING XAMARIN
4	SHARING MORE CODE – XAMARIN FORMS
5	UI TESTS
6	INSIGHTS

1 - Intro to Xamarin

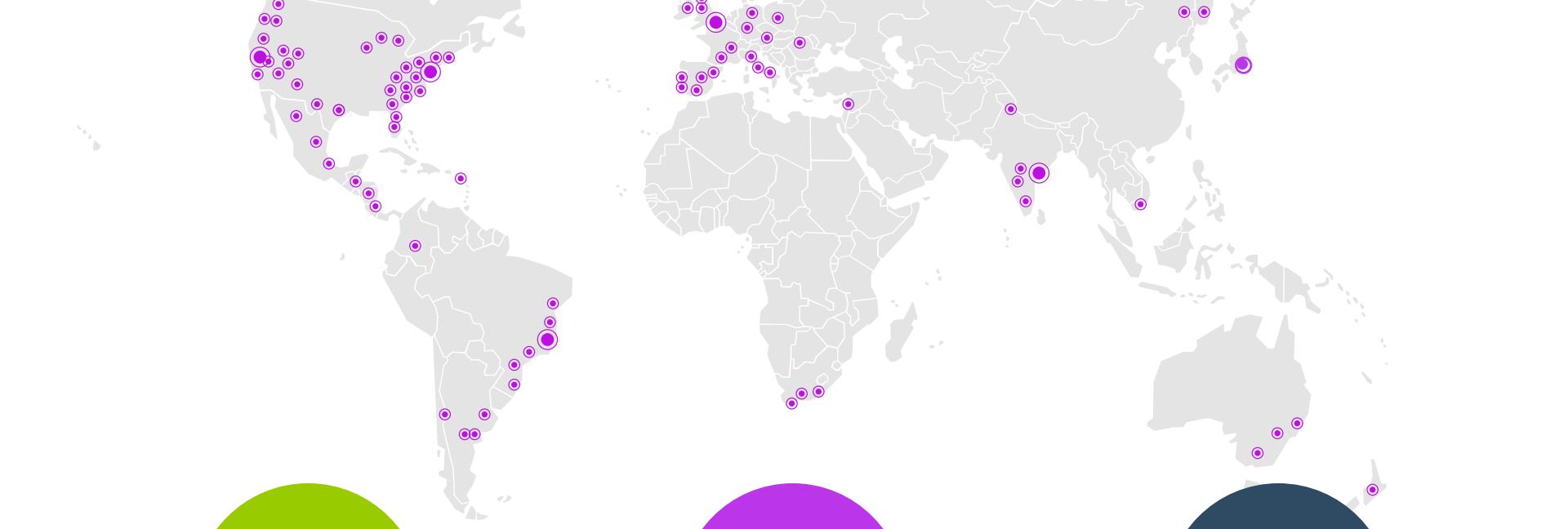
- What's is Xamarin
- Xamarin with Visual Studio
- What you require to get started
- Demo – Hello Xamarin iOS & Android



10,000+
customers



500+
partners



1.2M
downloads

10,000+ customers, 100+ of the Fortune 500



Dutch Tax Office



Businesses are rapidly appifying

“The number of enterprise applications optimized for mobility will quadruple by 2016.”



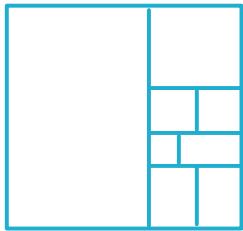
Our mission

Make it **fast**, **easy**, and **fun** to
create great mobile apps.

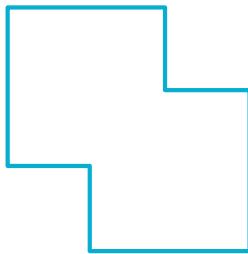
Your priorities when building apps



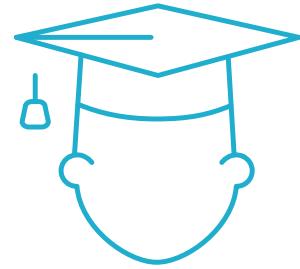
Native 5-Star App



Works Everywhere

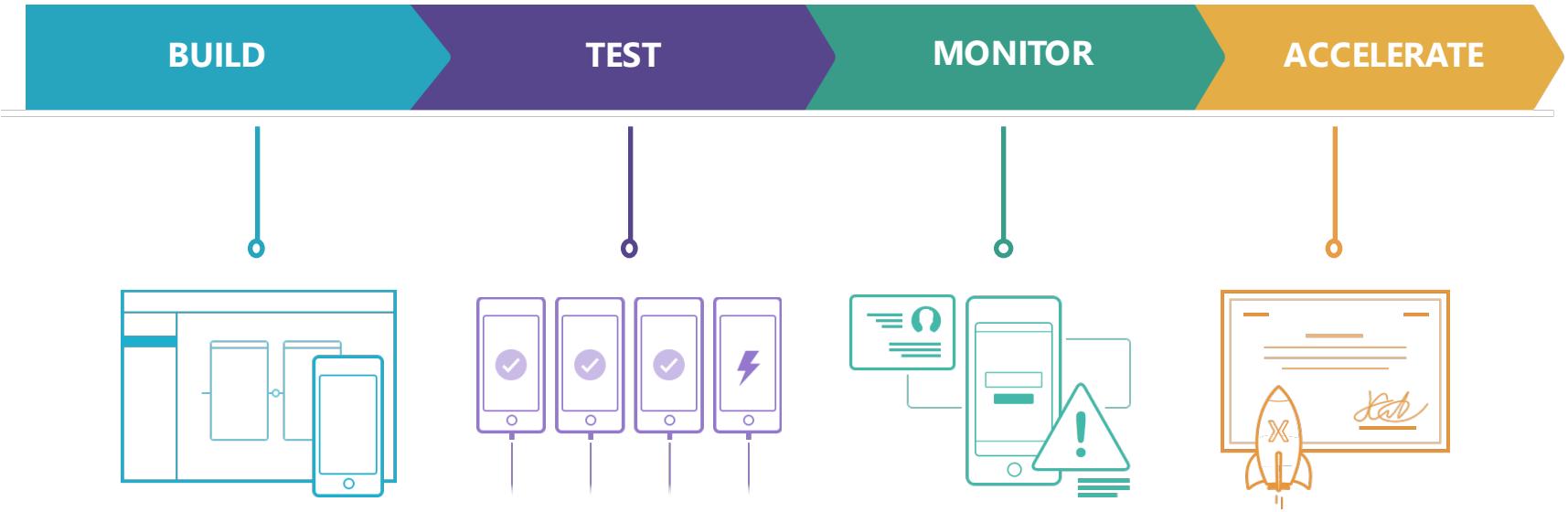


Integration

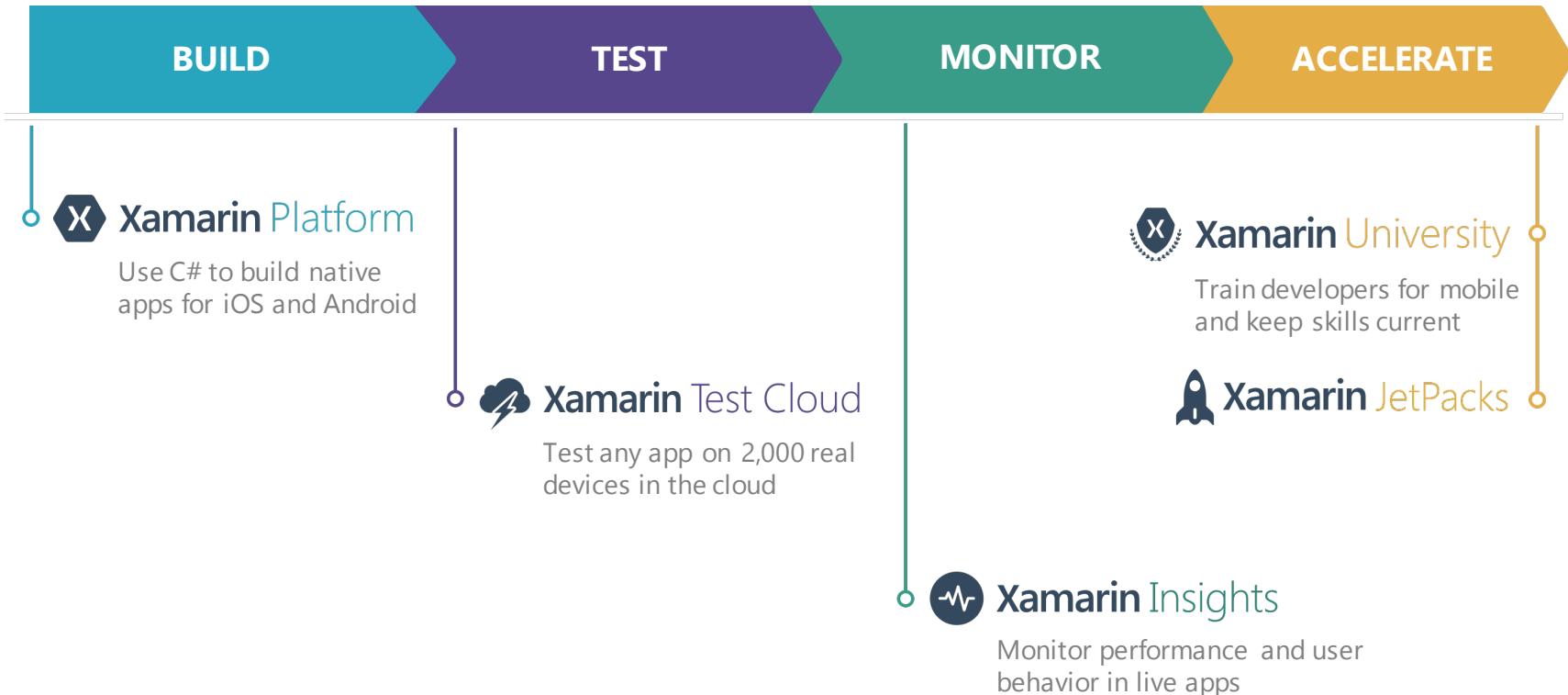


Stay current

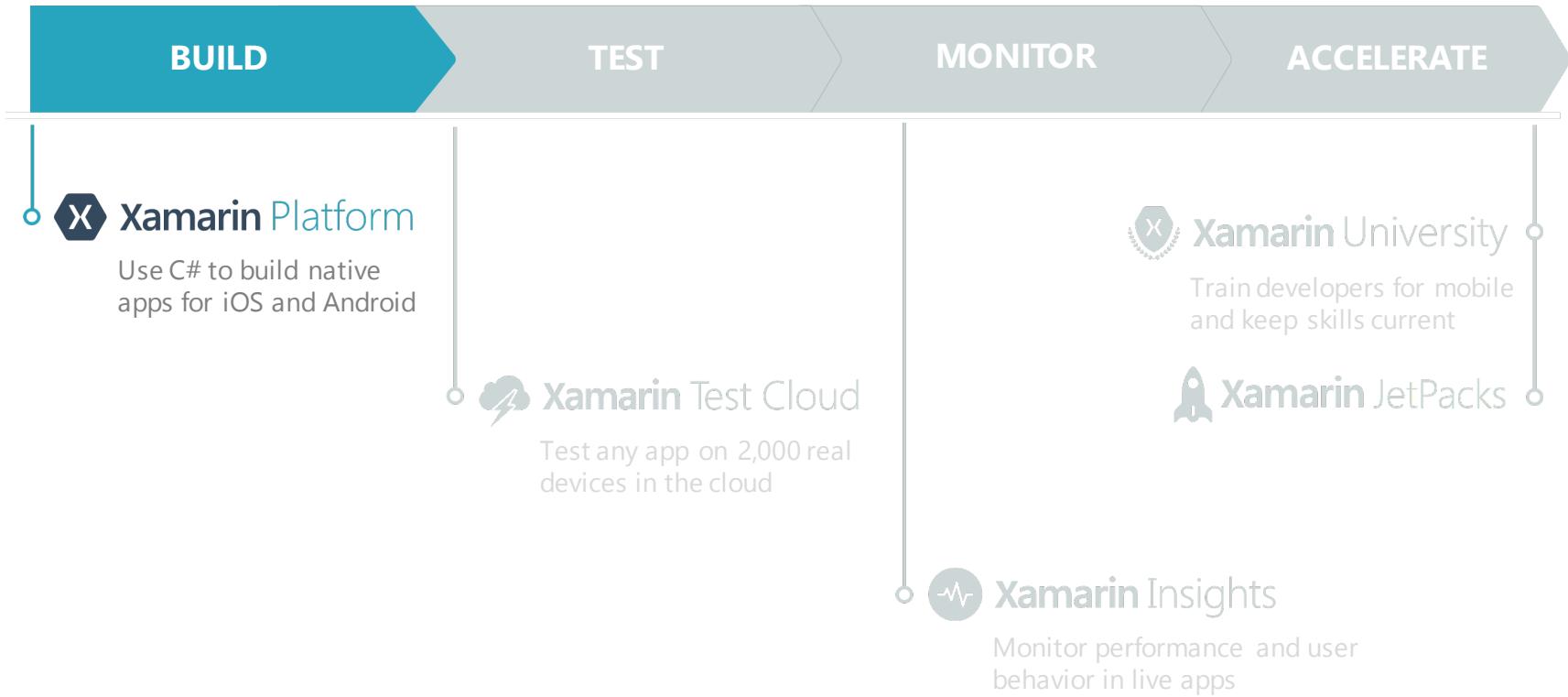
Xamarin : the complete mobile lifecycle



Xamarin: the complete mobile lifecycle

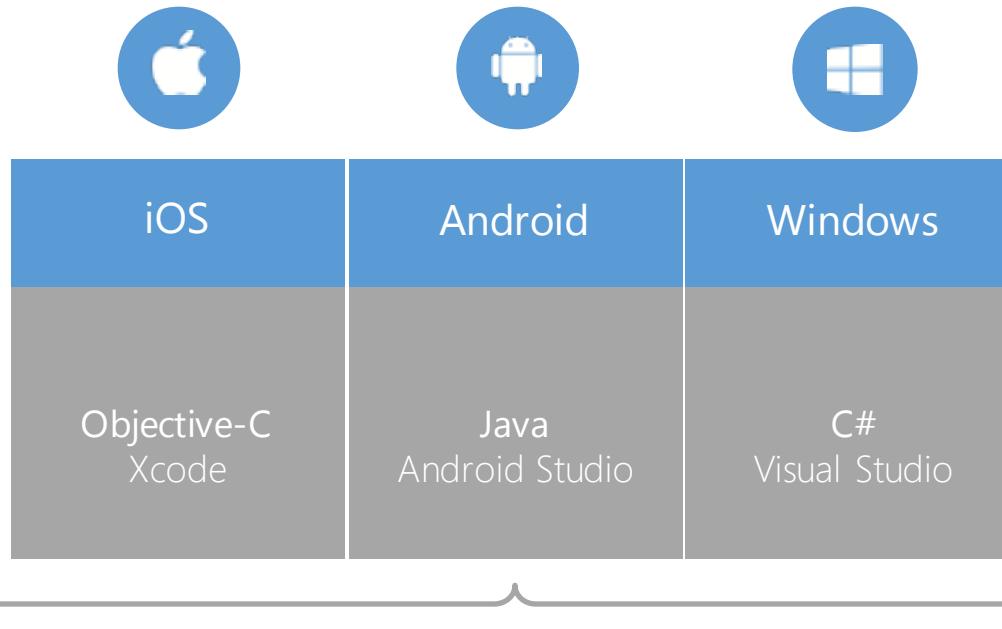


Xamarin 4: the complete mobile lifecycle



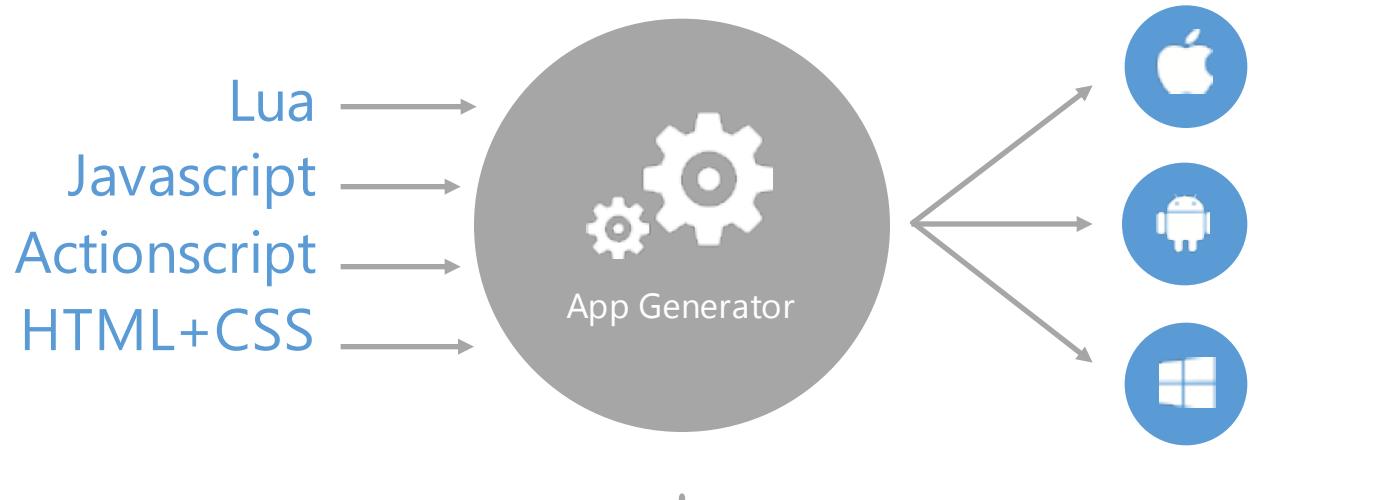
BUILD — **TEST** — **MONITOR** — **ACCELERATE**

Silo Approach



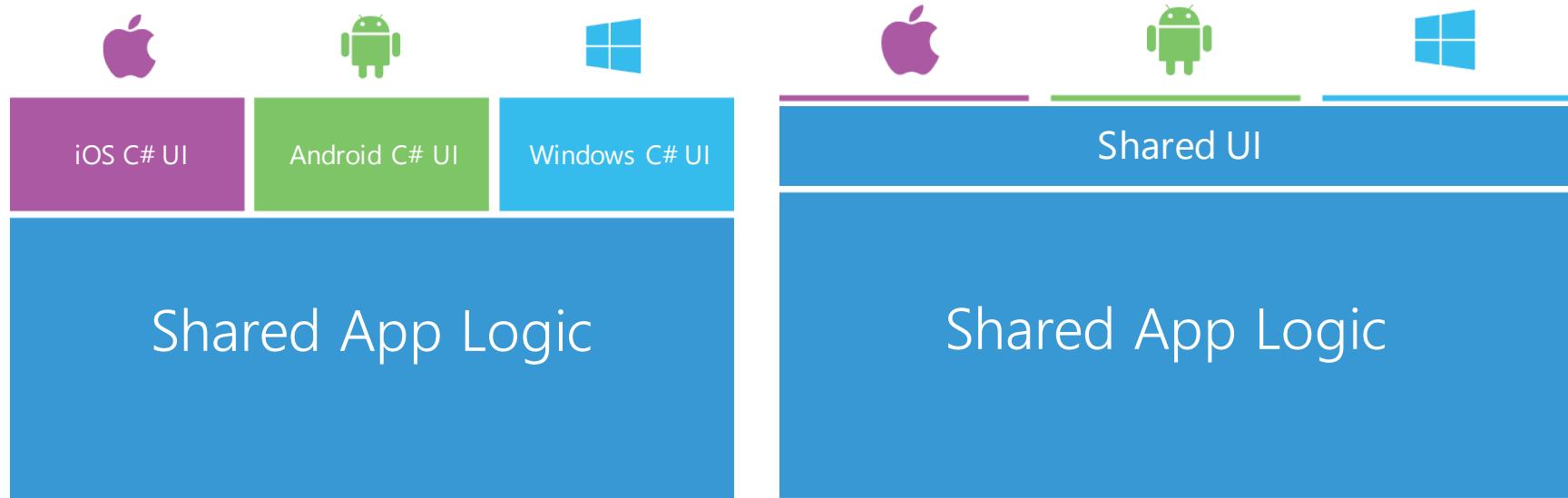
No shared code • Many languages & development environments • Multiple teams

Write Once, Run Anywhere

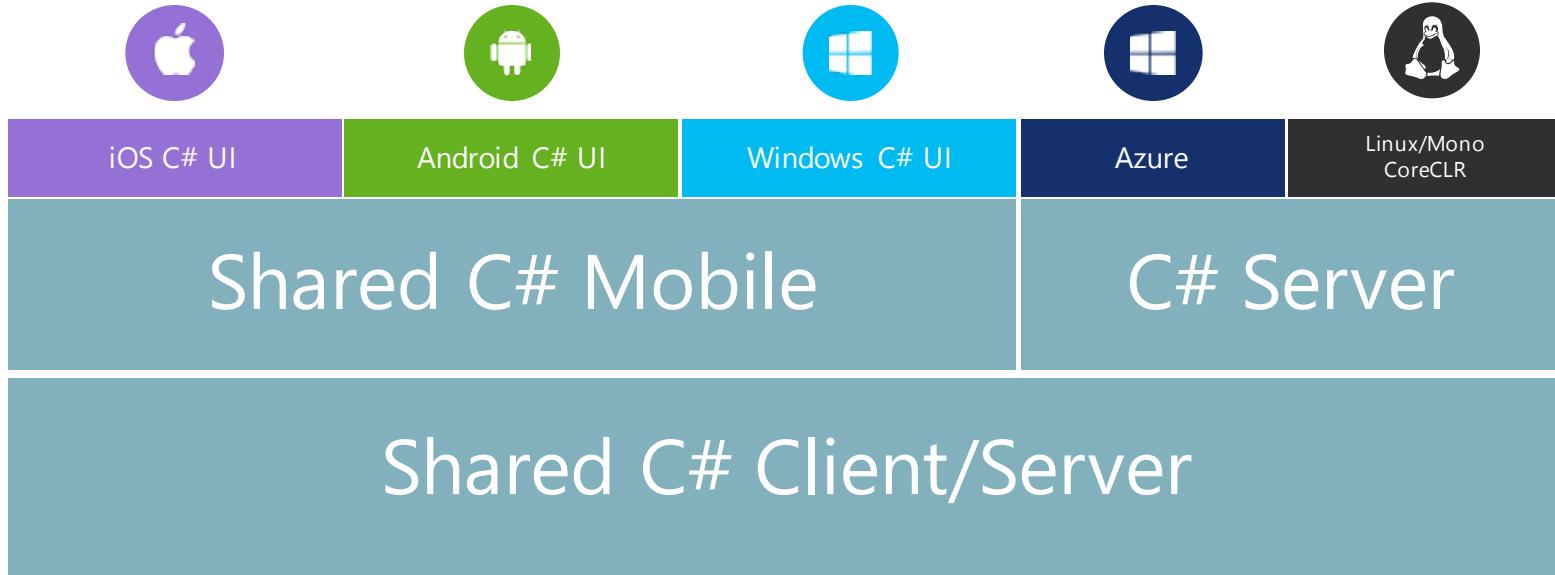


Limited native API access • Slow performance • Poor user experience

Xamarin Platform: native UX and shared code



Xamarin's Unique Approach



Shared C# codebase • 100% native API access • High performance

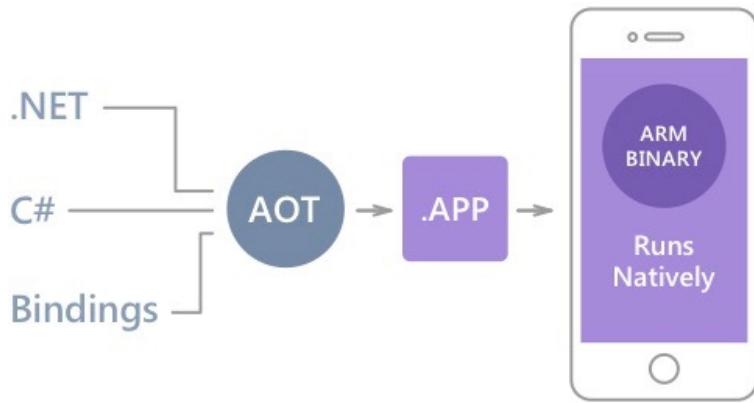
Anything you can do in Objective-C, Swift, or Java
can be done in C# and Visual Studio with Xamarin.

The screenshot shows the Xamarin Store application interface across three platforms. The central focus is a ProductDetailPage showing a woman's C# t-shirt. The page includes a large image of the product, a title ('Women's C# t-shirt'), a brief description ('Flaunt your C# pride in this svelte American Apparel t-shirt, and everyone around you will think LINQ stands for "Easy to Rock Clothing."'), size and color selection dropdowns ('SIZE: Small', 'COLOR: Heather Lake Blue'), and an 'Add to Basket' button. To the left is the Xamarin Studio IDE with the code for ProductDetailViewController.cs visible. On the right is the Solution Explorer showing the project structure with files like MainActivity.cs, MainActivity.cs, and various XAML files for the Android and iOS projects.

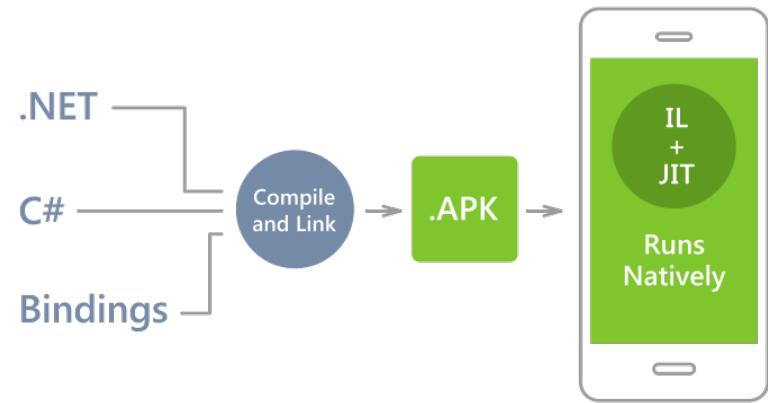
Xamarin

The future of apps

Native Performance



Xamarin.iOS does full Ahead Of Time (AOT) compilation to produce an ARM binary for Apple's App Store.



Xamarin.Android takes advantage of Just In Time (JIT) compilation on the Android device.



Always Up-to-Date

Same-day support:

- iOS 5
- iOS 6
- iOS 7
- iOS 7.1
- iOS 8
- iOS 9

Full support for:

- Apple Watch
- Google Glass
- Android Wear
- Amazon Fire TV
- and much more

Xamarin Platform: native apps across platforms

The image illustrates the Xamarin Platform, showing the development environment and the resulting native mobile applications.

Microsoft Visual Studio Environment:

- Solution Explorer:** Shows the project structure for "Rdio.Xamarin".
- Code Editor:** Displays the C# code for the `AssignmentDetailsController.cs` file. The code handles view loading, UI setup, events like `StatusChanged`, and child controllers.
- Output Window:** Shows the message "Ready".

Native Mobile Applications:

- iOS Application:** A financial management app showing a pie chart of expenses (\$2,450), a breakdown of income and savings, and a spending trend graph.
- Android Application:** A social media or news feed app displaying posts from Lauren P., including a photo of people at a protest, a scenic path, and a video thumbnail of a person playing guitar.

Demo

BUILD — TEST — MONITOR — LEARN

2 - IOS DEVELOPMENT USING XAMARIN

- How Xamarin.iOS works
- Demo – iOS simple app – UITableView and MapKit

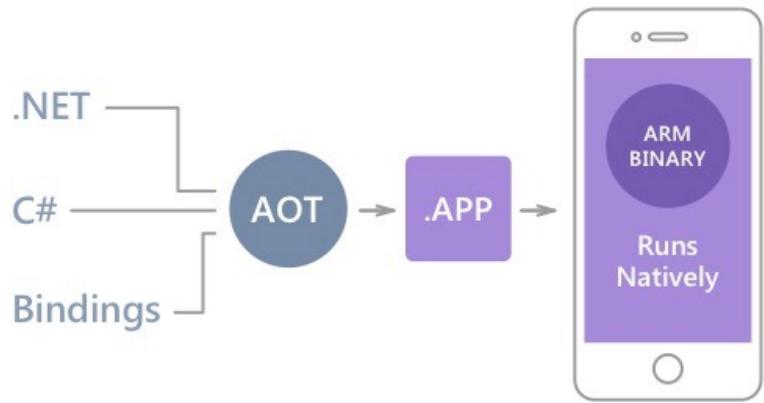
iOS – 100% API Coverage

MapKit	UIKit	iBeacon	CoreGraphics	CoreMotion
System.Net	System	System.IO	System.Linq	System.Xml
System.Data	System.Windows	System.Numerics	System.Core	System.ServiceModel



C#

Xamarin.iOS Execution Model



Xamarin.iOS does full Ahead Of Time (AOT) compilation to produce an ARM binary for Apple's App Store.

Demo

BUILD — TEST — MONITOR — ACCELERATE

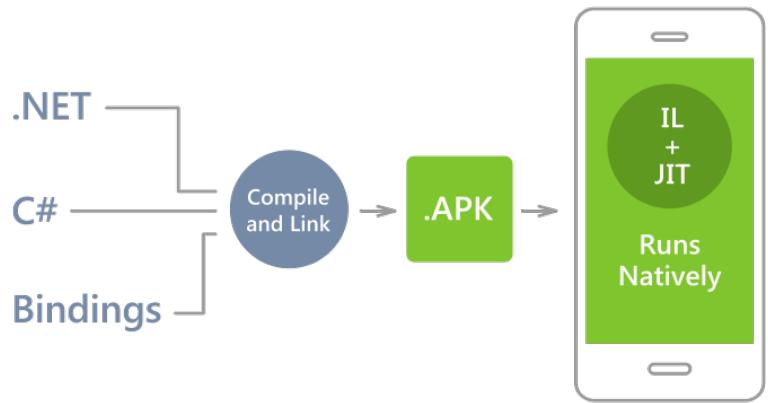
2 – Recap

- How Xamarin.IOS works
- IOS App Lifecycle
- Using UITableView
- Using Storyboards
- Using MapKit
- Using Segues

3 – ANDROID DEVELOPMENT USING XAMARIN

- How Xamarin.Android works
- Demo – Android simple app – Listview and Maps
- Start with code sharing techniques

Xamarin.Android Execution Model



Xamarin.Android takes advantage of Just In Time (JIT) compilation on the Android device.

Android – 100% API Coverage

Text-to-speech	ActionBar	Printing Framework	Renderscript	NFC
System.Net	System	System.IO	System.Linq	System.Xml
System.Data	System.Windows	System.Numerics	System.Core	System.ServiceModel

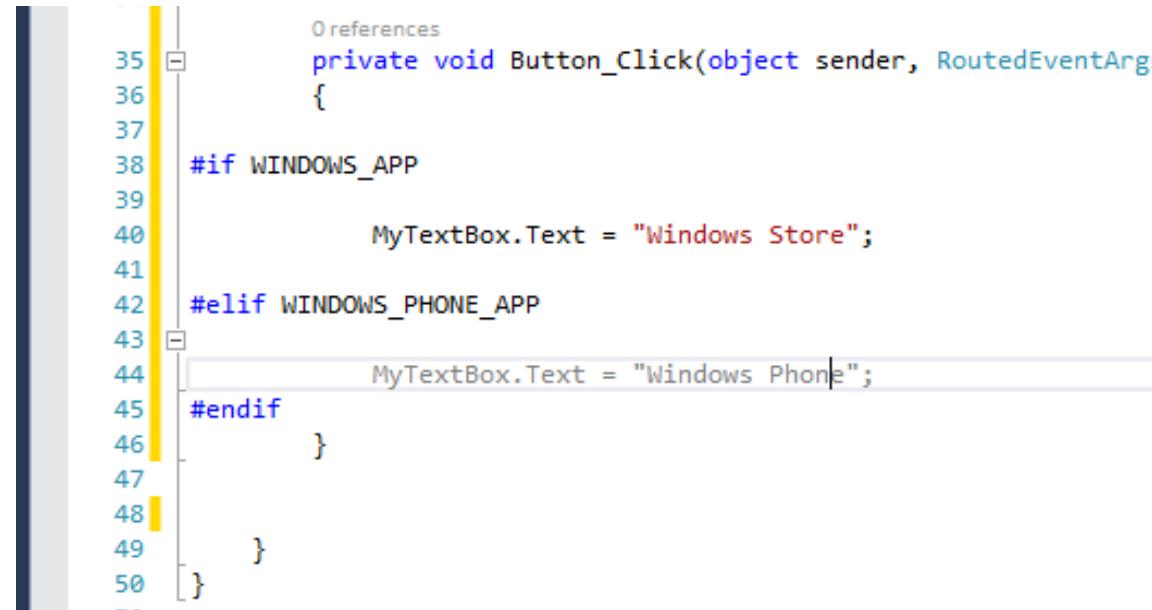


C#

#if Conditional Blocks

- Enable / Disable code based on the target platform
- Platform specific compilations constants :
 - _IOS_
 - _ANDROID_
 - NETFX_CORE
- For subtle differences in the API's

#if Conditional Blocks



A screenshot of a Xamarin code editor showing C# code with conditional compilation blocks. The code is for a Windows Phone application, demonstrating how to handle different UI logic based on the platform.

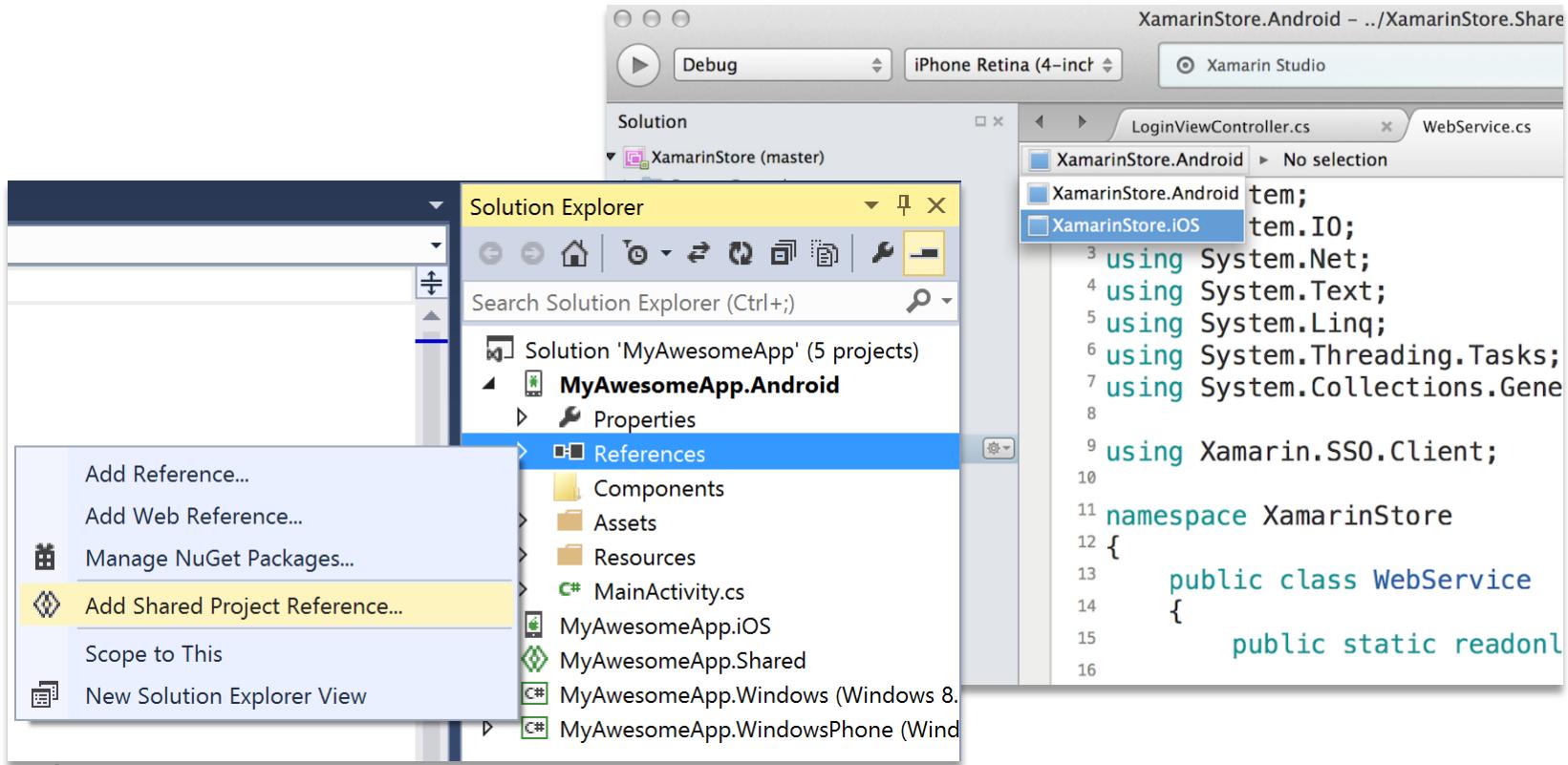
```
0 references
private void Button_Click(object sender, RoutedEventArgs e)
{
    #if WINDOWS_APP
        MyTextBox.Text = "Windows Store";
    #elif WINDOWS_PHONE_APP
        MyTextBox.Text = "Windows Phone";
    #endif
}
```

The code uses the `#if`, `#elif`, and `#endif` directives to conditionally execute code blocks. The `WINDOWS_APP` and `WINDOWS_PHONE_APP` symbols are defined by the Xamarin build system to indicate the target platform.

Partial Classes

- Shared Functionality in one code file
Ex: DataModel
- Platform specific code in another code file
Ex: DataModel.iOS
- Partial classes are compiled into a single class

Shared Projects



Demo

BUILD — TEST — MONITOR — ACCELERATE

3 – Recap

- How Xamarin.Android works
- Android App Lifecycle
- Using Listview
- Using Intents
- Using Maps

4 – SHARE MORE CODE – XAMARIN FORMS

- What's Xamarin.Forms
- Xamarin.Forms Controls
- Rebuild App using Xamarin Forms
- More code sharing

PCL

MVVM

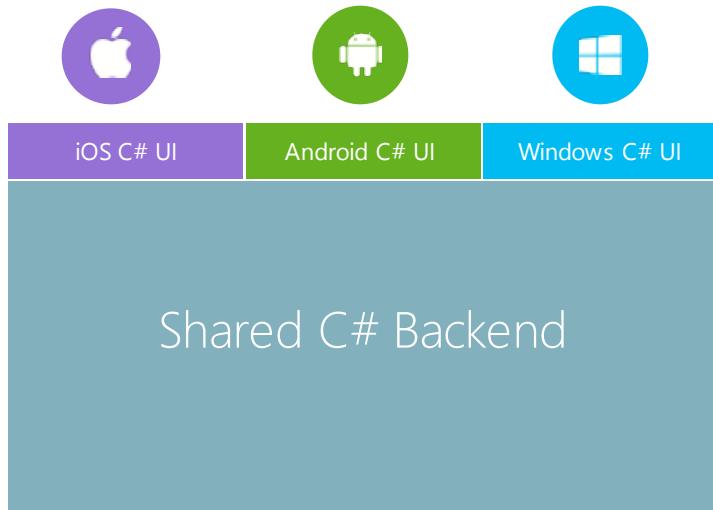
DI

Meet Xamarin.Forms



Build native UIs for iOS, Android, and Windows Phone from a single, shared C# codebase.

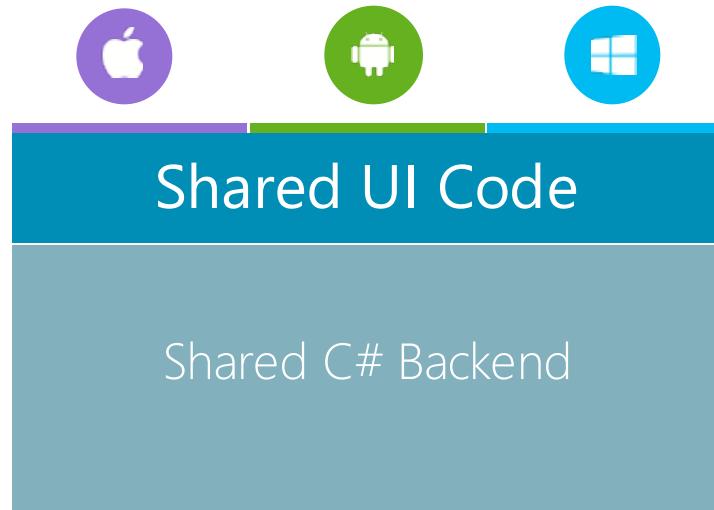
Xamarin + Xamarin.Forms



Traditional
Xamarin
Approach

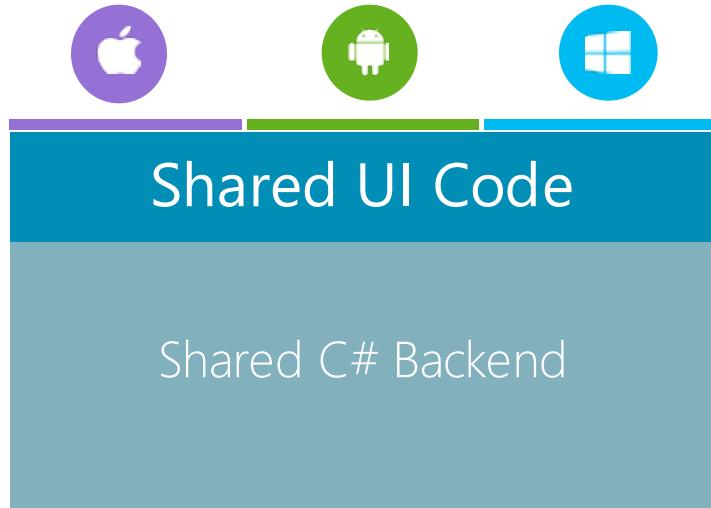
Xamarin

The future of apps



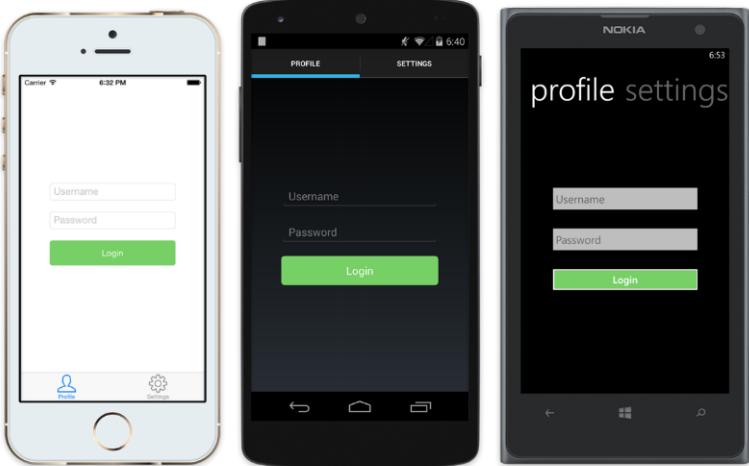
With Xamarin.Forms:
More code-sharing, all
native

What's included



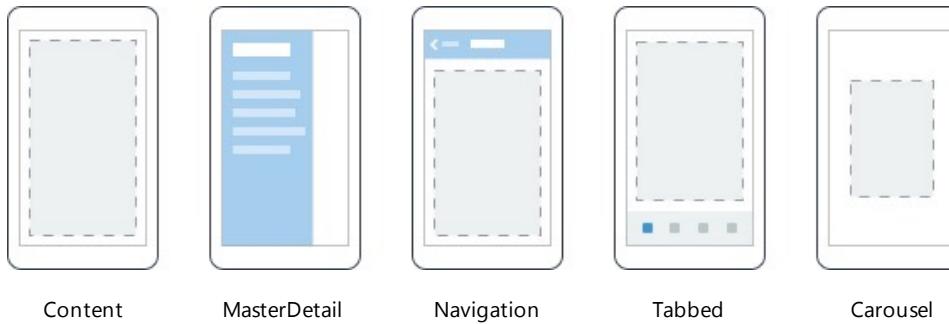
- ✓ 40+ Pages, layouts, and controls
(Build from code behind or XAML)
- ✓ Two-way data binding
- ✓ Navigation
- ✓ Animation API
- ✓ Dependency Service
- ✓ Messaging Center

Native UI from shared code

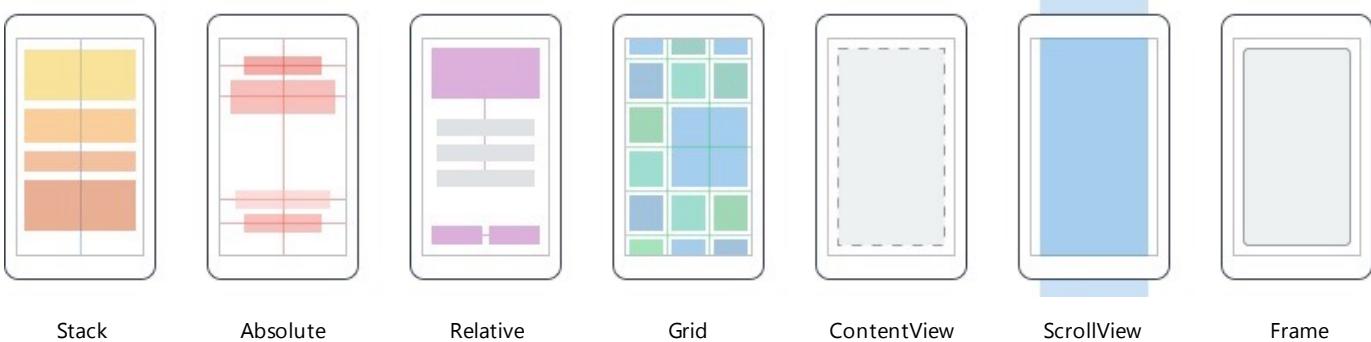


```
• <?xml version="1.0" encoding="UTF-8"?>
• <TabbedPage xmlns="http://xamarin.com/schemas/2014/forms"
•           xmlns:x="http://schemas.microsoft.com/winfx/2009/xaml"
•           x:Class="MyApp.MainPage">
•   <TabbedPage.Children>
•     <ContentPage Title="Profile" Icon="Profile.png">
•       <StackLayout Spacing="20" Padding="20"
•                 VerticalOptions="Center">
•         <Entry Placeholder="Username"
•               Text="{Binding Username}"/>
•         <Entry Placeholder="Password"
•               Text="{Binding Password}"
•               IsPassword="true"/>
•         <Button Text="Login" TextColor="White"
•                 BackgroundColor="#77D065"
•                 Command="{Binding LoginCommand}"/>
•       </StackLayout>
•     </ContentPage>
•     <ContentPage Title="Settings" Icon="Settings.png">
•       <!-- Settings -->
•     </ContentPage>
•   </TabbedPage.Children>
```

Pages



Layouts



Controls

ActivityIndicator

BoxView

Button

DatePicker

Editor

Entry

Image

Label

ListView

Map

OpenGLView

Picker

ProgressBar

SearchBar

Slider

Stepper

TableView

TimePicker

WebView

EntryCell

ImageCell

SwitchCell

TextCell

ViewCell

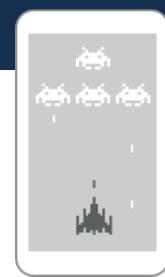
Which **Xamarin** approach is best for your app?



Xamarin.Forms is best for:

- Data entry apps
- Prototypes and proofs-of-concept
- Apps that require little platform-specific functionality
- Apps where code sharing is more important than custom UI

→ Learn more: xamarin.com/forms



Xamarin.iOS / Xamarin.Android is best for:

- Apps that require specialized interaction
- Apps with highly polished design
- Apps that use many platform-specific APIs
- Apps where custom UI is more important than code sharing

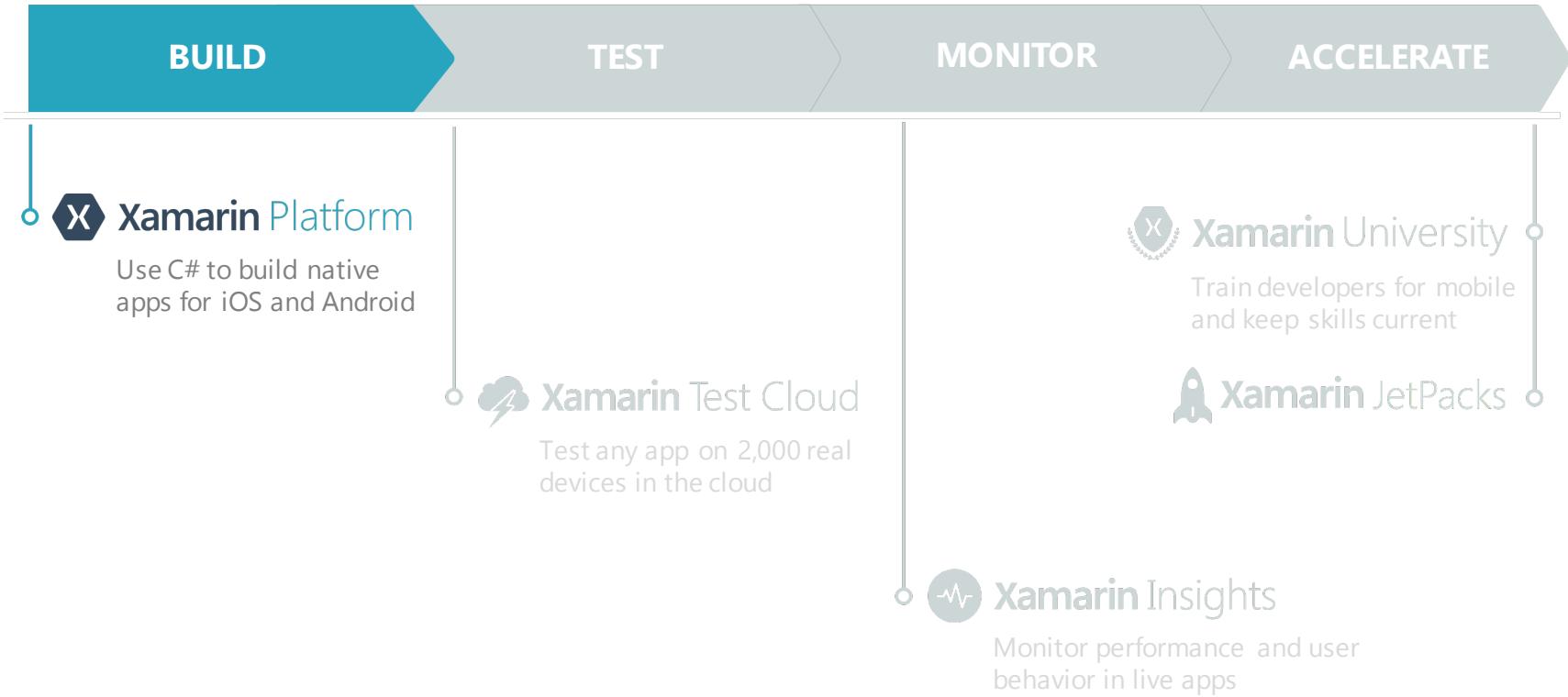
→ Learn more: xamarin.com/platform

Demo

BUILD — TEST — MONITOR — ACCELERATE

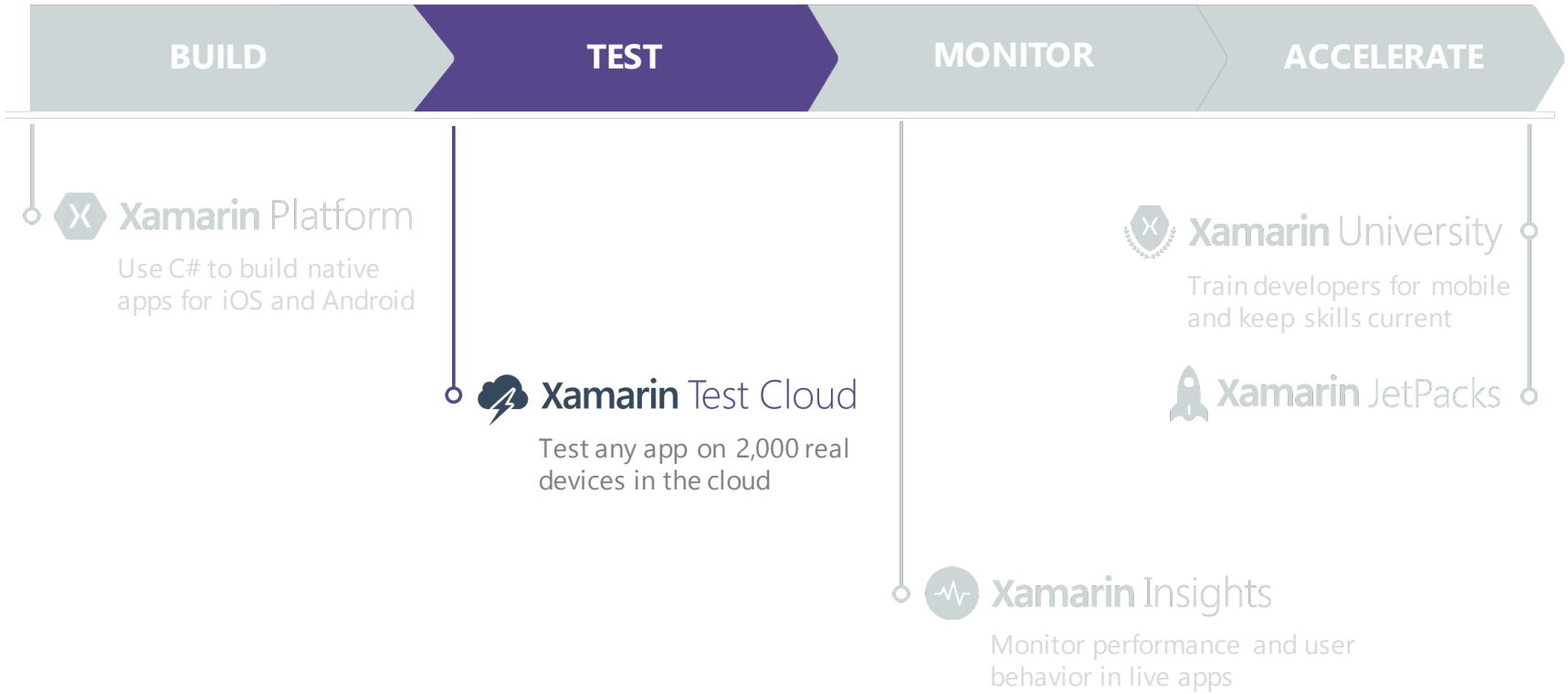
5 – UI Tests

Xamarin: the complete mobile lifecycle

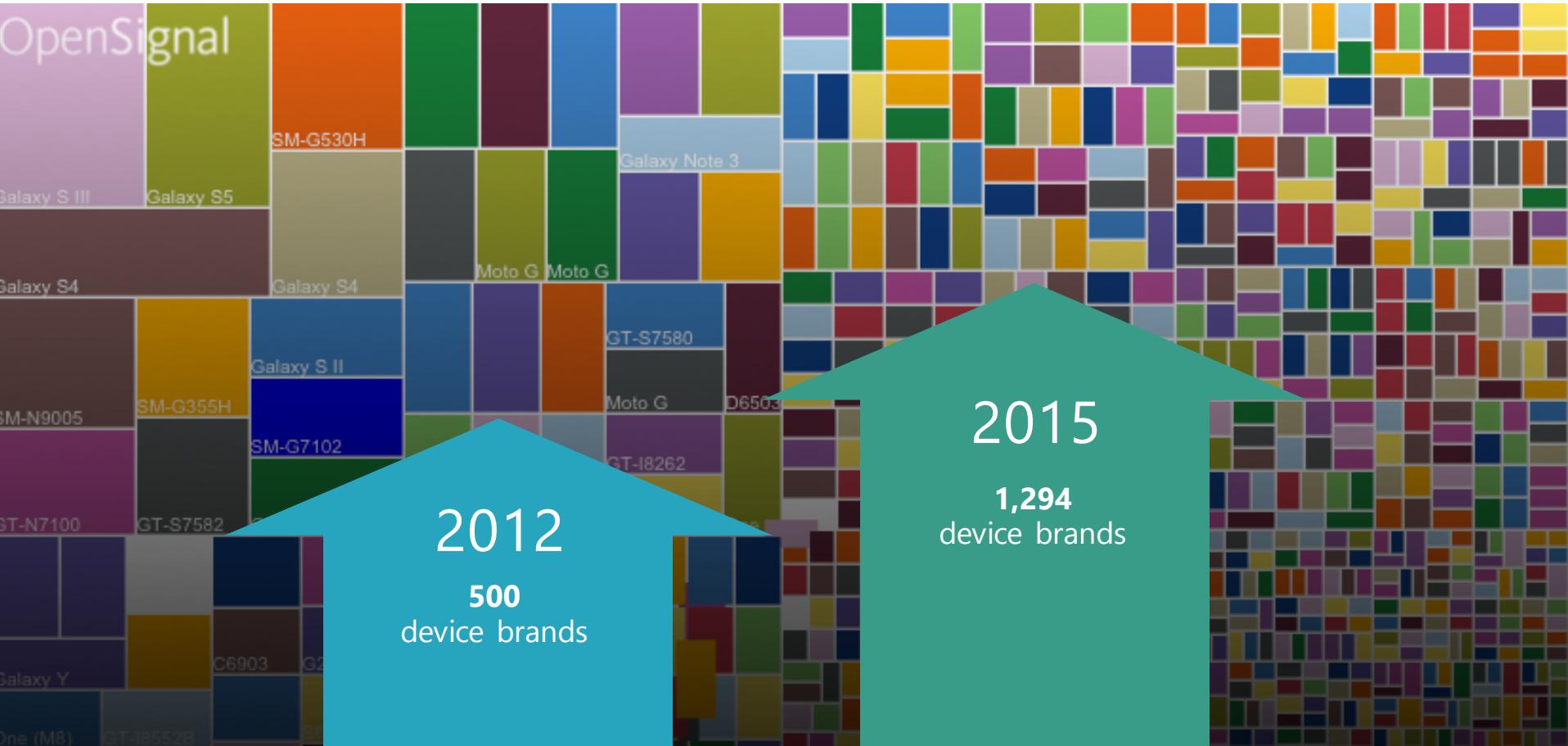


BUILD — **TEST** — **MONITOR** — **ACCELERATE**

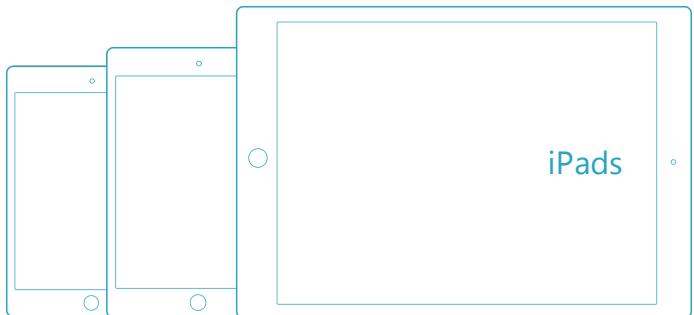
Xamarin: the complete mobile lifecycle



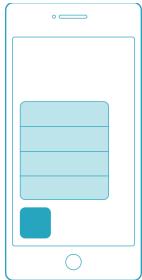
Android fragmentation



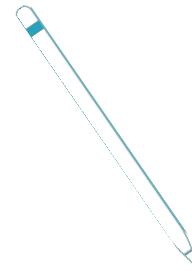
iOS diversification



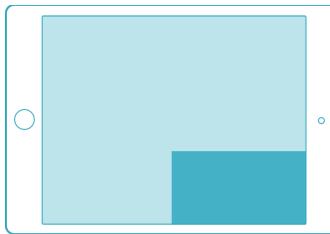
Form factors



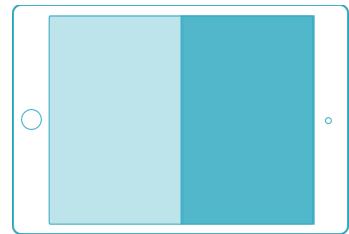
3D Touch
iPhone 6s series only



Apple pencil
iPad Pro only



Multi Tasking
Only select iPads



iOS 9 features

Xamarin Test Cloud: automated testing on thousands of devices

Xamarin test cloud > Xamarin CRM > master > Aug 23, 2015 10:03:59 PM

New Test Run | Vinicius

Overview

ALL RESULTS ▾

Customers tests

- Check Customer Details ✓
- Check Customer Navigation ✓
- Check Customer Phone ✓
- Investigate Customer Page ✓

Sales tests

Add an item

First I launch the app 1

Then I tap 'Sales'

- Then I tap 'Add'
- Then I choose the first result
- Then I set the title and description
- Then I tap 'Save'
- Then I go back

Inspect an item ✓

Remove an item ✓

Order tests

Add New Order ✓

Add New Order And Deliver

ADD AN ITEM
Then I tap 'Sales'

Filter devices

Apple iPhone 5C iOS 8.2 Apple iPhone 5 iOS 8.3 Apple iPhone 5C iOS 8.3 Apple iPhone 5S iOS 8.3 Apple iPhone 6 iOS 8.3 Apple iPhone 6 Plus iOS 8.3 Apple iPhone 5S iOS 8.2

Apple iPhone 6 iOS 8.2 Apple iPhone 5 iOS 8.1.3 Apple iPhone 6 iOS 8.1.3 Apple iPhone 5S iOS 7.4 Apple iPhone 5C iOS 7.4 Apple iPhone 5S iOS 7.4 Apple iPhone 6 iOS 7.4

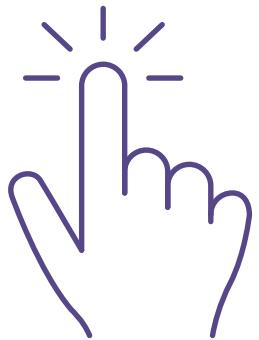
Apple iPhone 5 iOS 7.1.1 Apple iPhone 5C iOS 7.1.1 Apple iPhone 5S iOS 7.1.1 Apple iPhone 6 iOS 7.1.1 Apple iPhone 6 iOS 7.0.4 Apple iPhone 5S iOS 7.0.4 Apple iPhone 6 iOS 7.0.4

Apple iPhone 5C iOS 7.0.4 Apple iPhone 5S iOS 7.0.4 Apple iPhone 5S iOS 7.0.4 Apple iPhone 6 iOS 7.0.4 Apple iPhone 6 iOS 7.0.4 Apple iPhone 5S iOS 7.0.4 Apple iPhone 6 iOS 7.0.4

What's new in Xamarin Test Cloud?



Integrated
with Platform



UITest 1.0

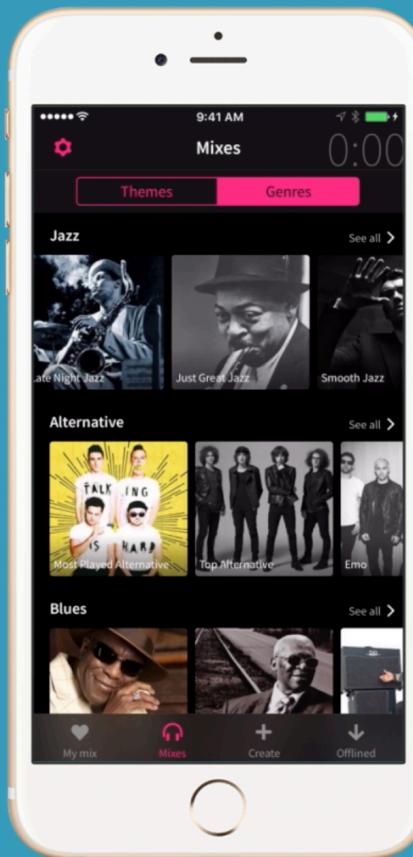
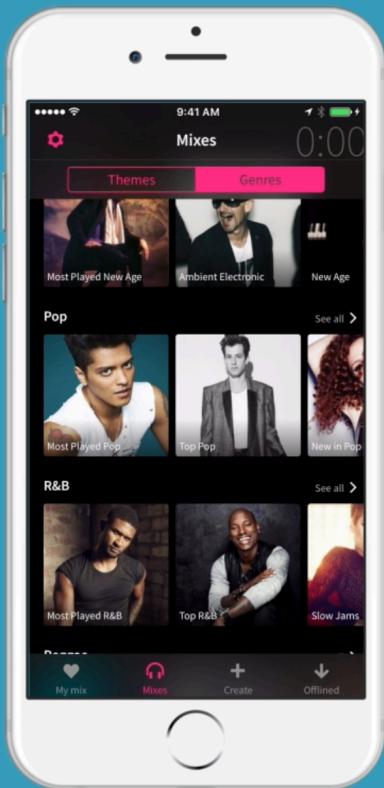
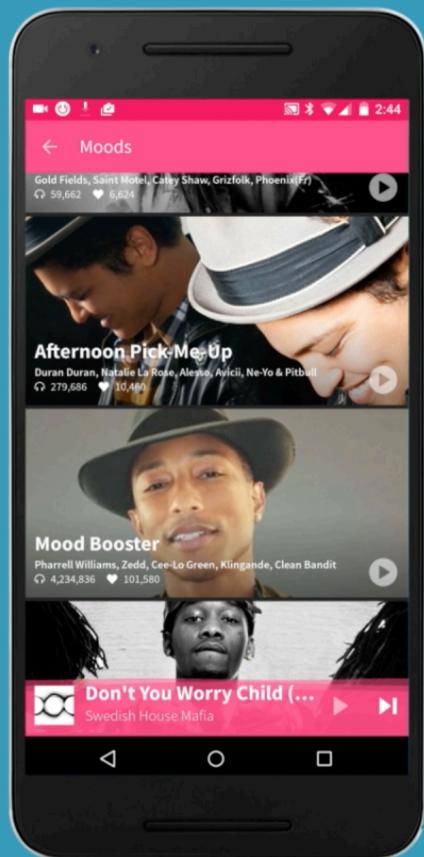


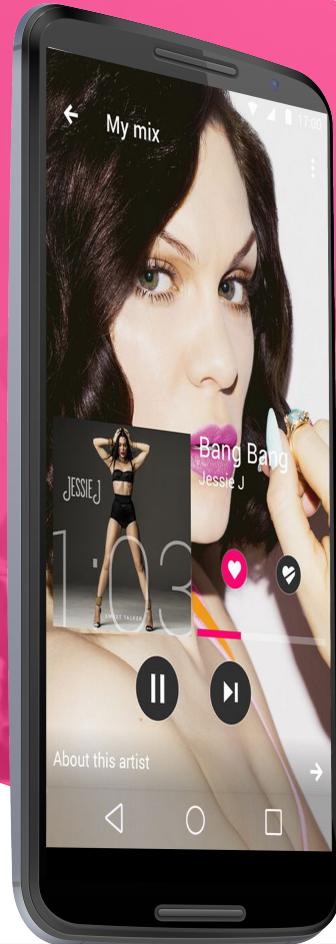
Test Recorder

Demo

BUILD — **TEST** — MONITOR — ACCELERATE

MixRadio



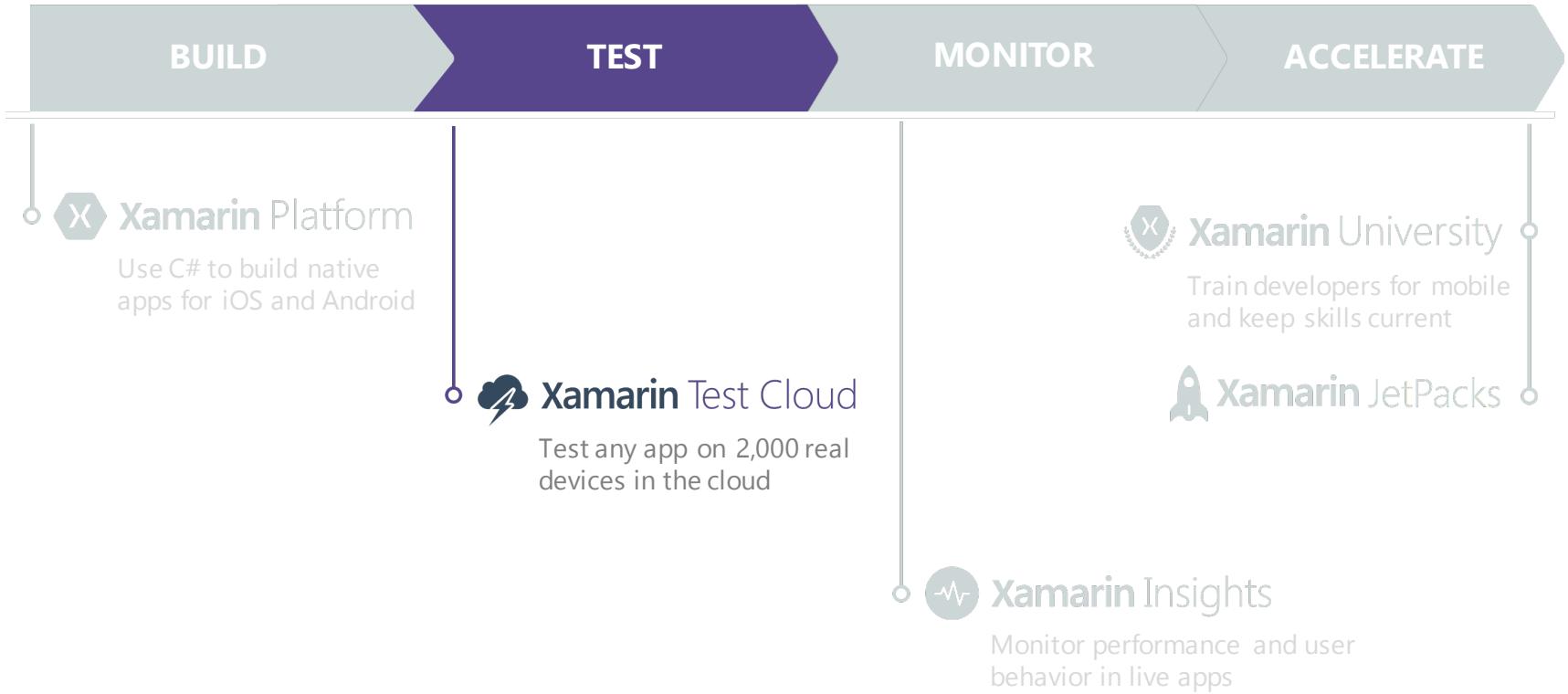


"Xamarin Test Cloud has saved us 2,000 monthly manual testing hours."

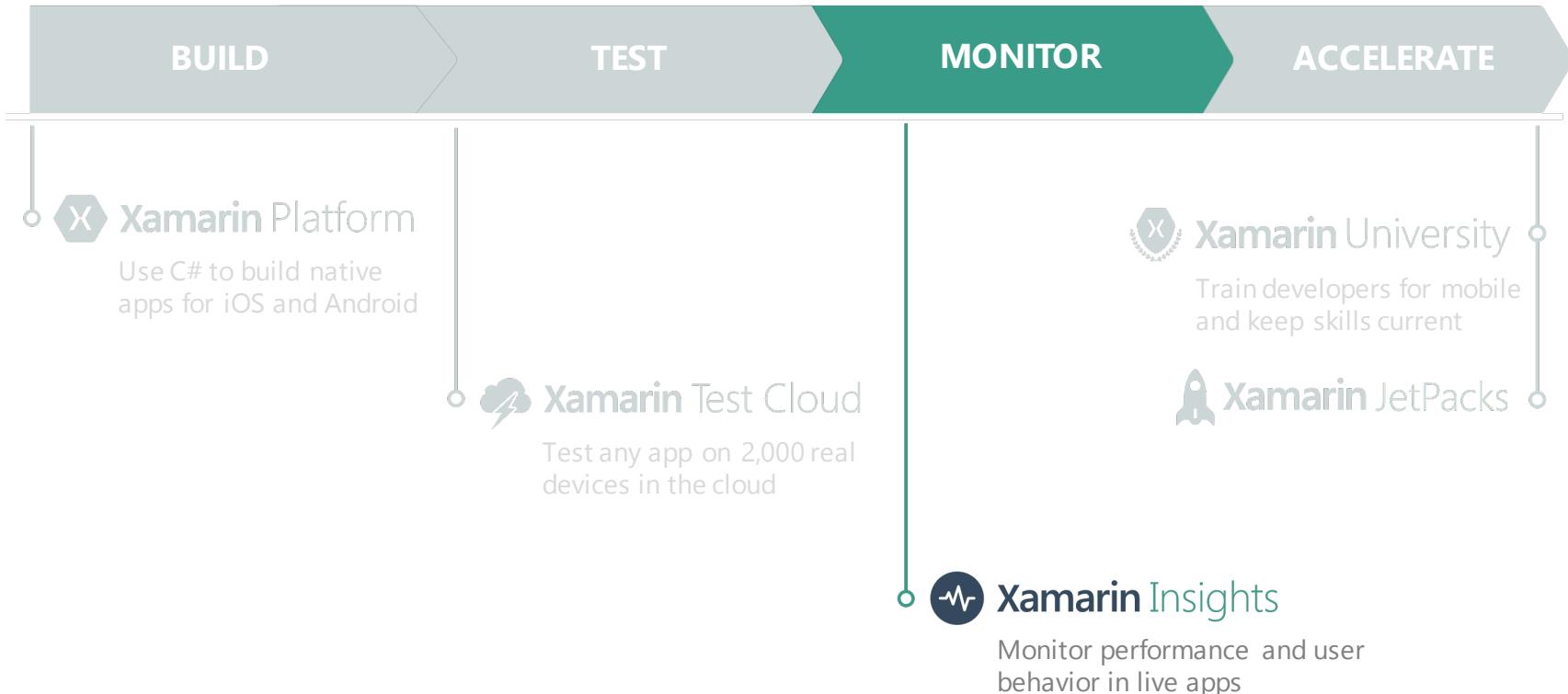
Steve Robbins, CTO

6 – Insights

Xamarin: the complete mobile lifecycle



Xamarin: the complete mobile lifecycle



BUILD — **TEST** — **MONITOR** — **ACCELERATE**

Monitoring your app in real time



Is my app crashing?



What features are popular?



Does it perform well?



What devices are they using?



Do users stick with the app?

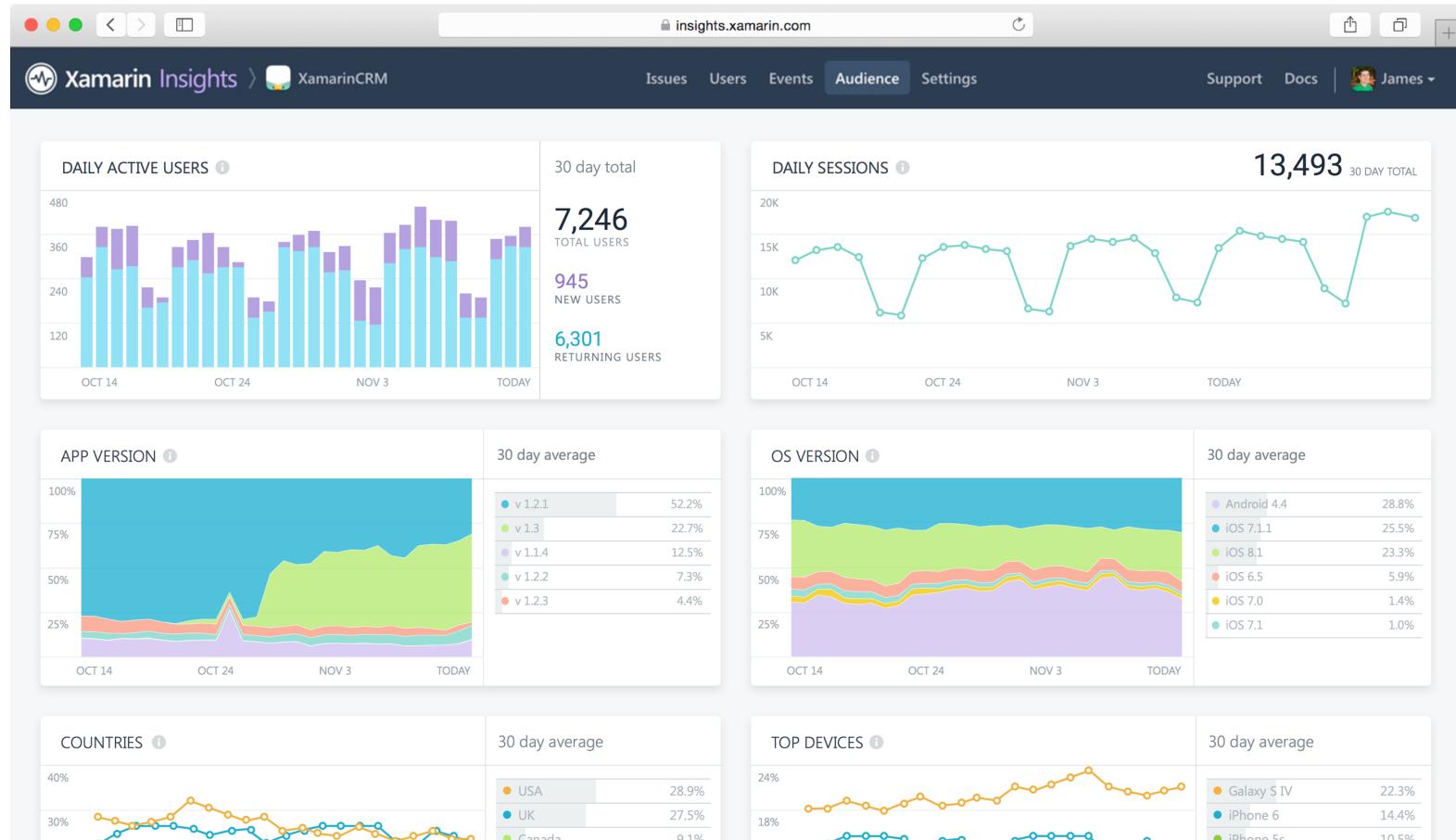


What countries are users in?



How many people are using it?

Introducing Xamarin Insights



```

//Crash Report
Insights.Report(exception);

//Feature Usage
Insights.Track("Splash Page");

//Timed Events
Insights.TrackTime("TimeToSync");

//User Sessions
Insights.Identify("Steve", user_traits);

```

Xamarin Insights +

<https://insights.xamarin.com>

Jacqueline Keller ● jacqueline.keller@xamarin.com

STACKTRACE

249 of 2,104 < | < > > I

iPhone 6 1.1

Exception Invalid parameters to context creation

Raw

November 4, 2015 10:45 am Expand all

Crash 2s

ViewController.ViewSpecialDay 1s

occasion Birthday

AppDelegate.FinishedLaunching 0s

SpecialDayStore.Create 0s

Started 0s

at CoreGraphics.CGContext.set_Handle(IntPtr value) CGContext.cs:162
 at CoreGraphics.CGContext(CGContext handle, bool owns) CGContext.cs:141
 at CoreGraphics.CGBitmapContext.CGBitmapContext(CGImageAlphaInfo bitmapInfo) CGBitmapContext.cs:62
 at NGraphics.ApplePlatform.CreateImageCanvas(Size size, double scale, bool transparency) ApplePlatform.cs:34
 at Xamarin.Images.ImageLoader.ImageFromGraphic(Graphic graphic, Nullable<_> maxSize) ImageLoader.cs:101
 at Xamarin.Images.ImageLoader.LoadImage<T>(T value, Nullable<_> maxSize) ImageLoader.cs:45
 at Confetti.GiftIdeaTableViewCell.GetDefaultGiftImage()
 at UIKit.UIImageViewExtensions.LoadImageAsync() UIImageViewExtensions.cs:42
 at Confetti.GiftIdeaTableViewCell.LayoutSubviews() GiftIdeaTableViewCell.cs:99
 at UIKit.UikitSynchronizationContext.<Post>c__AnonStorey0.<>m_0()
 at Foundation.NSAsyncActionDispatcher.Apply()
 at UIKit.UIApplication.UIApplicationMain(int, string[], IntPtr, IntPtr) (wrapper managed-to-native)
 at UIKit.UIApplication.Main(string[] args, IntPtr principal, IntPtr delegate)
 at UIKit.UIApplication.Main(string[] args, string principalClassName, string delegateClassName)
 at Confetti.Application.Main(string[] args)

Properties & Custom Values

HResult -2146233088

Demo

BUILD — TEST — **MONITOR** — ACCELERATE

```

//Crash Report
Insights.Report(exception);

//Feature Usage
Insights.Track("Splash Page");

//Timed Events
Insights.TrackTime("TimeToSync");

//User Sessions
Insights.Identify("Steve", user_traits);

```

Xamarin Insights +

<https://insights.xamarin.com>

Jacqueline Keller ● jacqueline.keller@xamarin.com

STACKTRACE

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 at CoreGraphics.CGBitmapContext.CGBitmapContext(CGImageAlphaInfo bitmapInfo) CGBitmapContext.cs:62
 at NGraphics.ApplePlatform.CreateImageCanvas(Size size, double scale, bool transparency) ApplePlatform.cs:34
 at Xamarin.Images.ImageLoader.ImageFromGraphic(Graphic graphic, Nullable<_> maxSize) ImageLoader.cs:101
 at Xamarin.Images.ImageLoader.LoadImage<T>(T value, Nullable<_> maxSize) ImageLoader.cs:45
 at Confetti.GiftIdeaTableViewCell.GetDefaultGiftImage()
 at UIKit.UIImageViewExtensions.LoadImageAsync() UIImageViewExtensions.cs:42
 at Confetti.GiftIdeaTableViewCell.LayoutSubviews() GiftIdeaTableViewCell.cs:99
 at UIKit.UikitSynchronizationContext.<Post>c__AnonStorey0.<>m_0()
 at Foundation.NSAsyncActionDispatcher.Apply()
 at UIKit.UIApplication.UIApplicationMain(int, string[], IntPtr, IntPtr) (wrapper managed-to-native)
 at UIKit.UIApplication.Main(string[] args, IntPtr principal, IntPtr delegate)
 at UIKit.UIApplication.Main(string[] args, string principalClassName, string delegateClassName)
 at Confetti.Application.Main(string[] args)

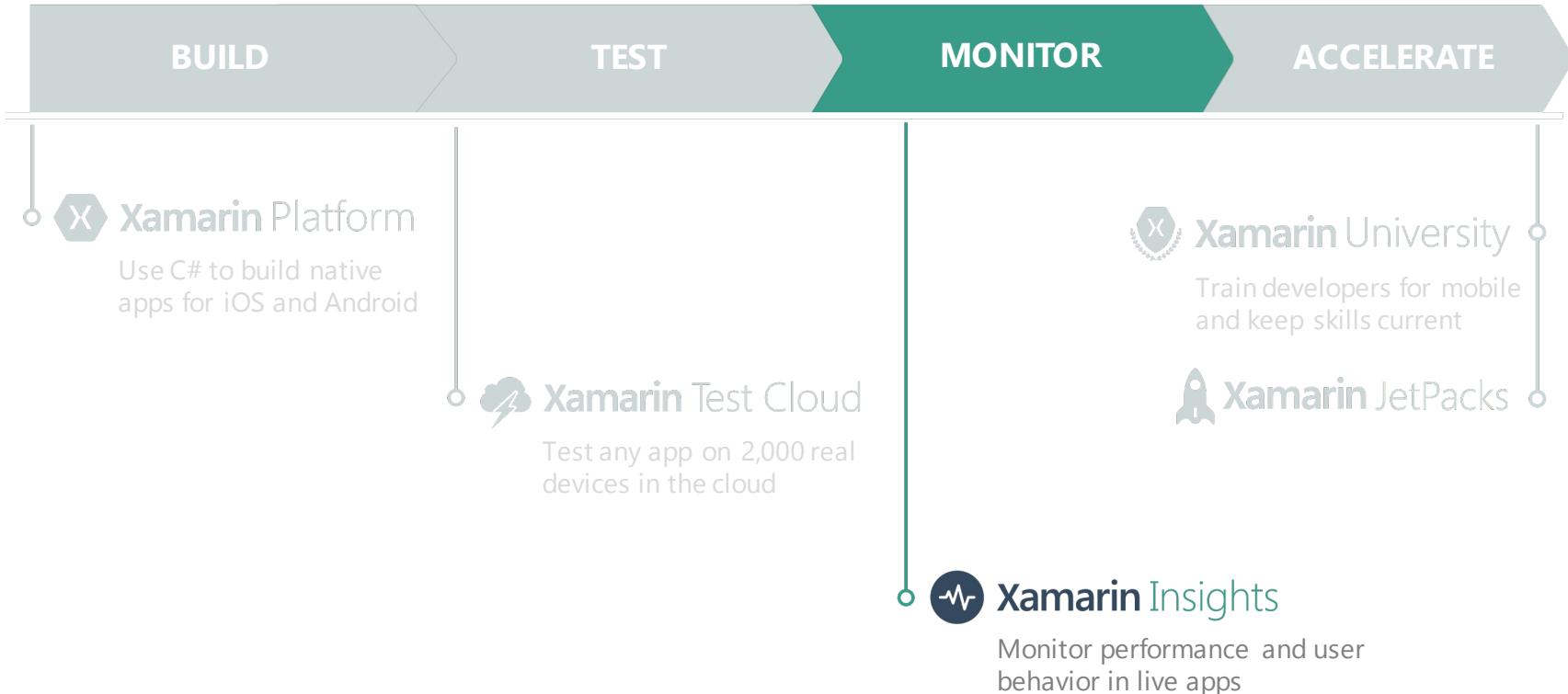
Properties & Custom Values

HResult -2146233088

“ We wouldn’t have caught the bugs as early as we did without Xamarin Insights. No other suppliers offered the kinds of benefits we’ve seen from Xamarin. The ability to trace a user journey so we can see exactly what led up to an issue and receive detailed information about crashes has been tremendously helpful.”

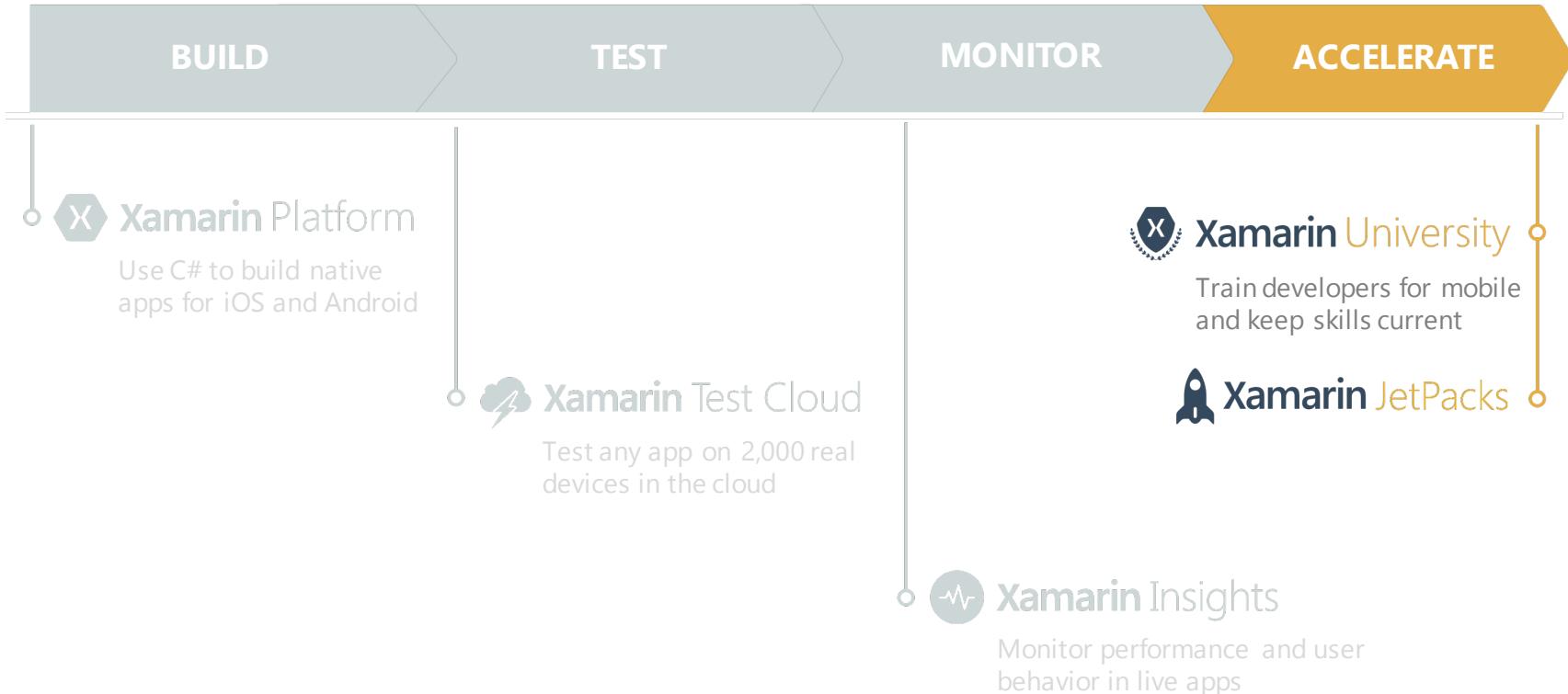
Yos Noor
Head of Research and Innovation
reed.co.uk

Xamarin: the complete mobile lifecycle



BUILD — **TEST** — **MONITOR** — **ACCELERATE**

Xamarin: the complete mobile lifecycle

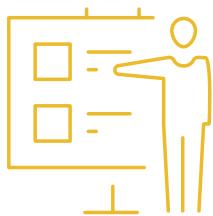


BUILD — TEST — MONITOR — ACCELERATE

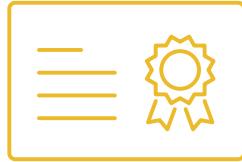
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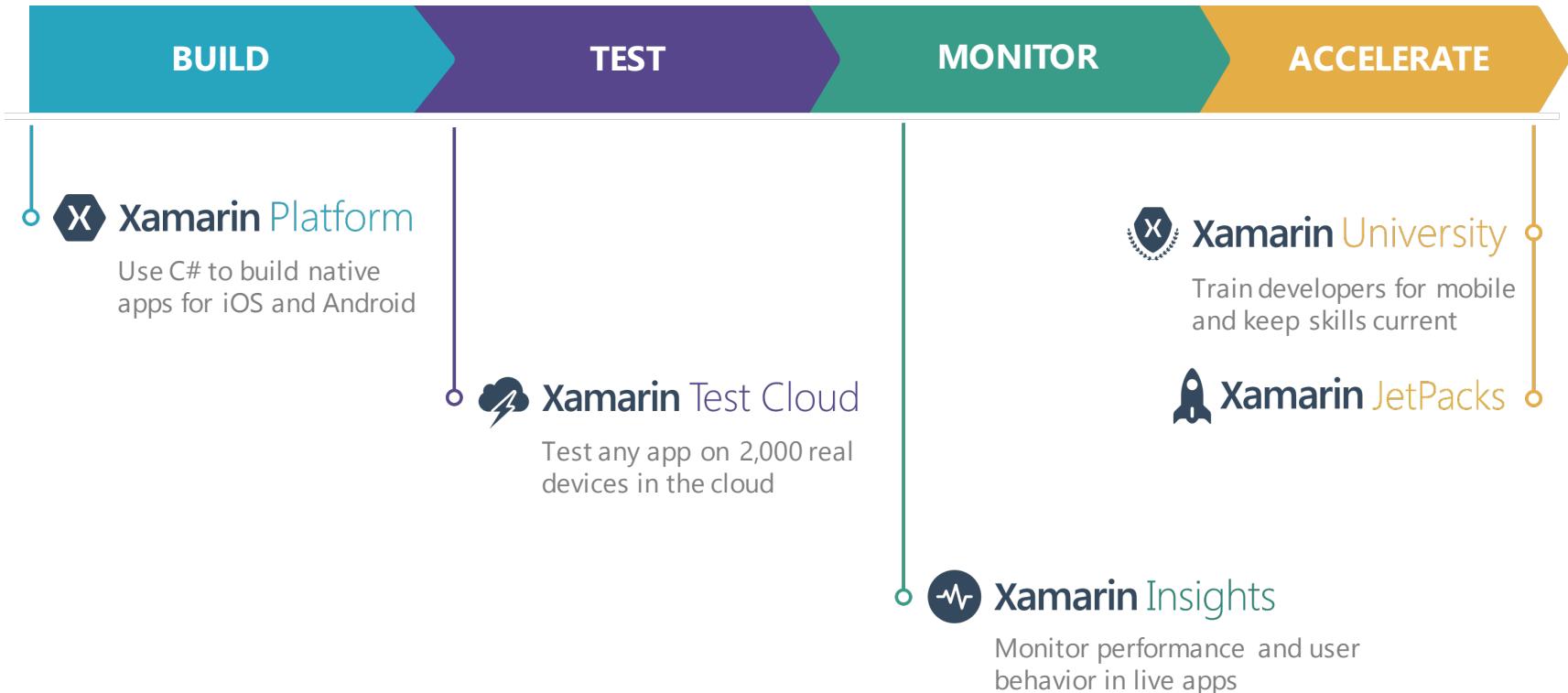


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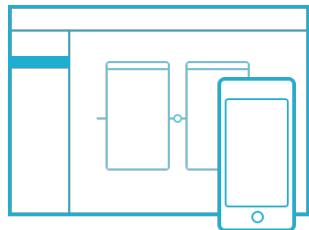
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Xamarin : the complete mobile lifecycle

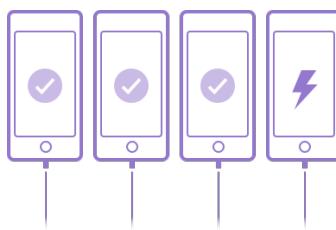


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