App Frameworks #WWDC15

Getting Started with Multitasking on iPad in iOS 9

Session 205

Peter Hajas UlKit Engineer Jacob Xiao UlKit Engineer Kurt Revis UlKit Engineer

Multitasking Sessions

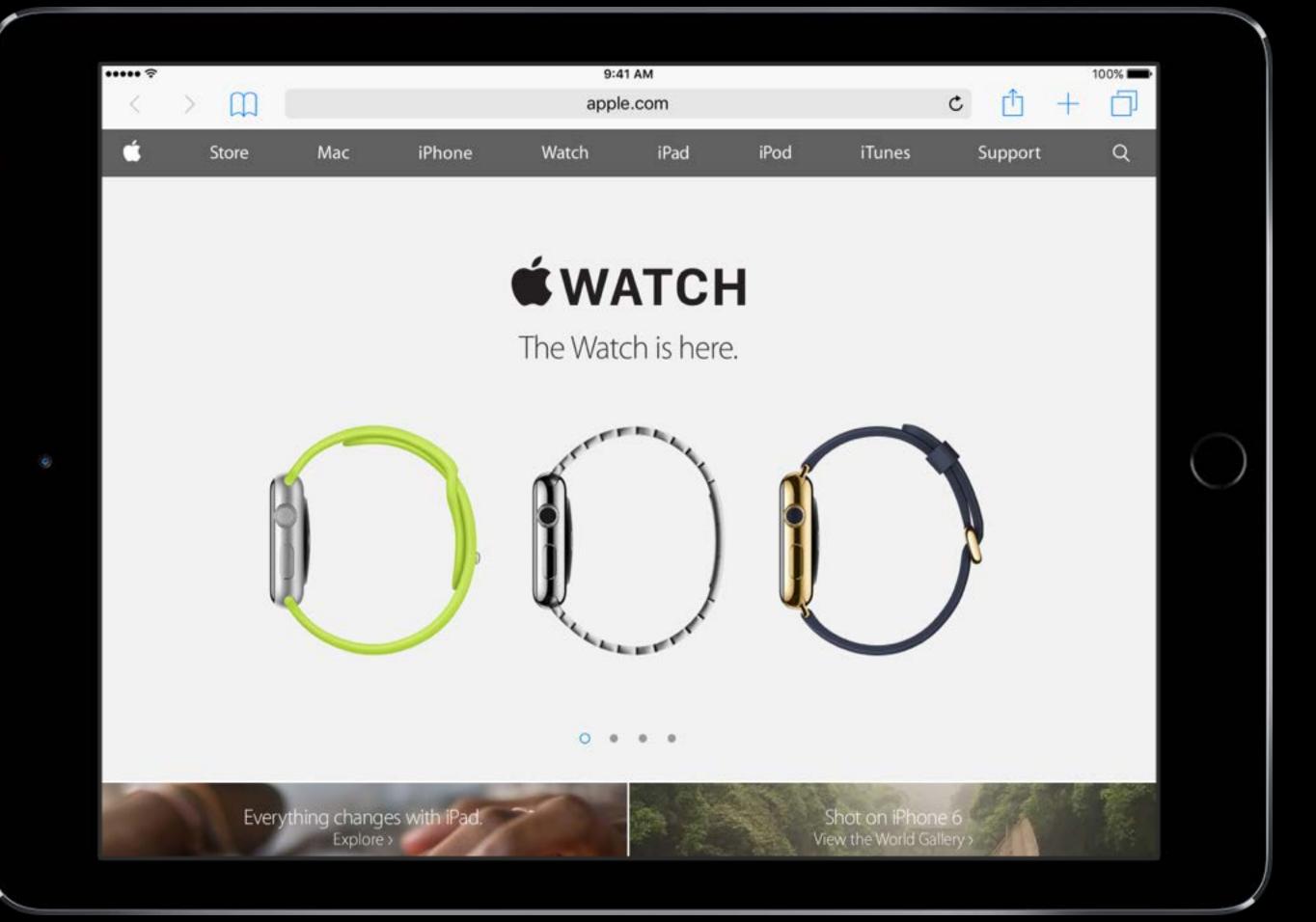
Getting Started with Multitasking on iPad in iOS 9	Presidio	Tuesday 4:30PM
Multitasking Essentials for Media-Based Apps on iPad in iOS 9	Pacific Heights	Wednesday 2:30PM
Optimizing Your App for Multitasking in iOS	Presidio	Wednesday 3:30PM

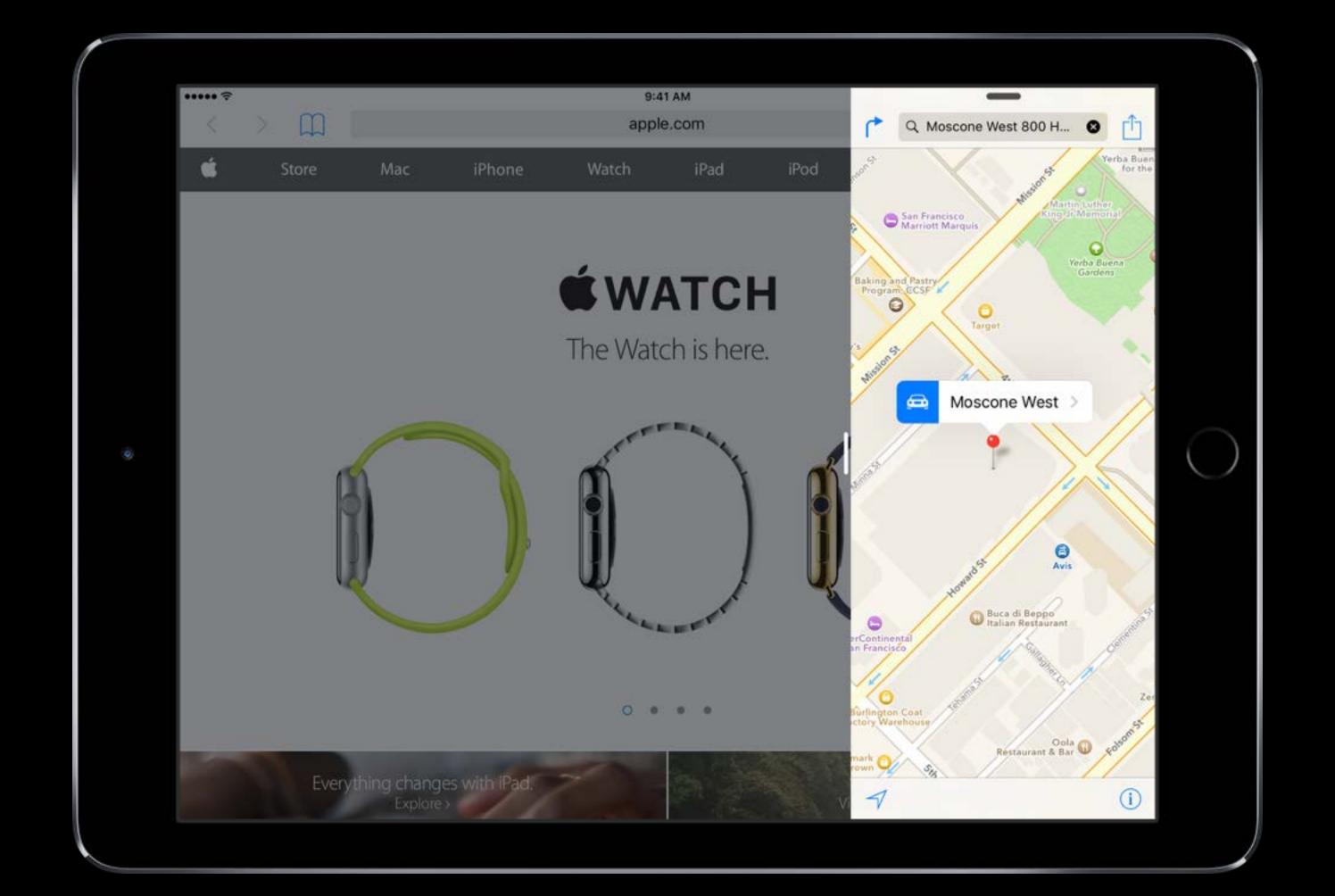
Multitasking Sessions

Getting Started with Multitasking on iPad in iOS 9	Presidio	Tuesday 4:30PM
Multitasking Essentials for Media-Based Apps on iPad in iOS 9	Pacific Heights	Wednesday 2:30PM
Optimizing Your App for Multitasking in iOS	Presidio	Wednesday 3:30PM

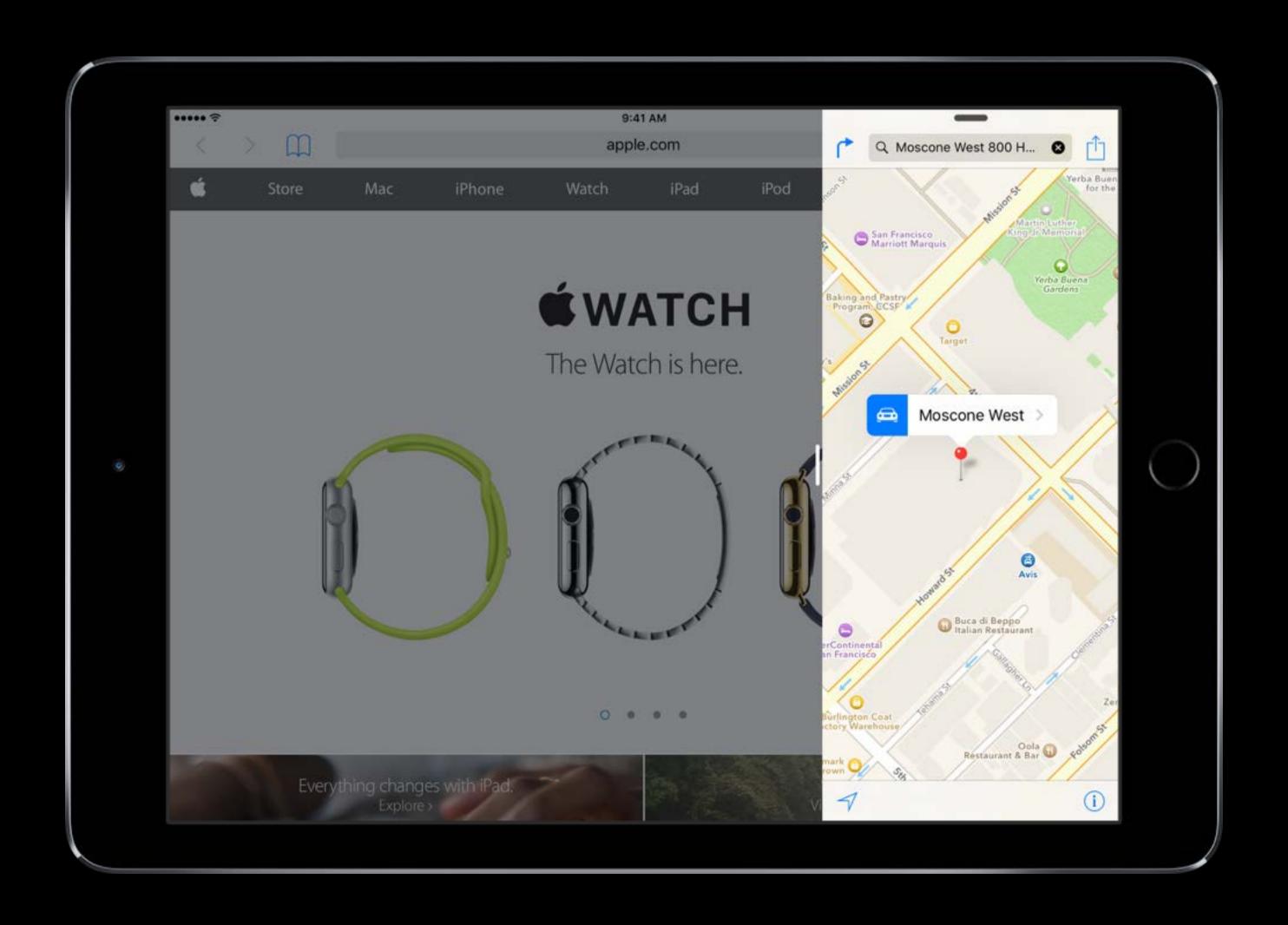
Agenda

Multitasking in your app
Changes to UlKit for Multitasking
Making the Most of Multitasking



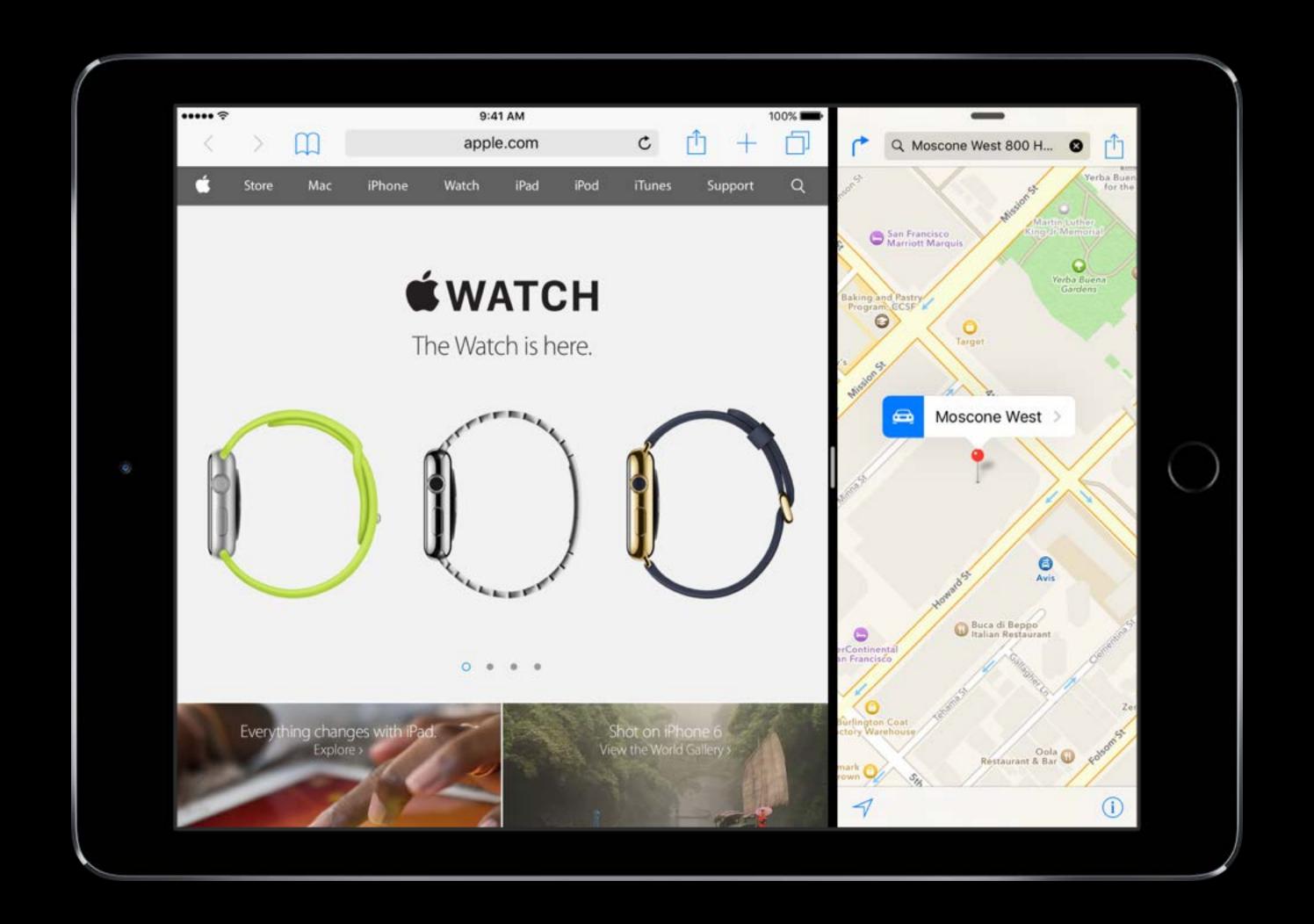


Slide Over

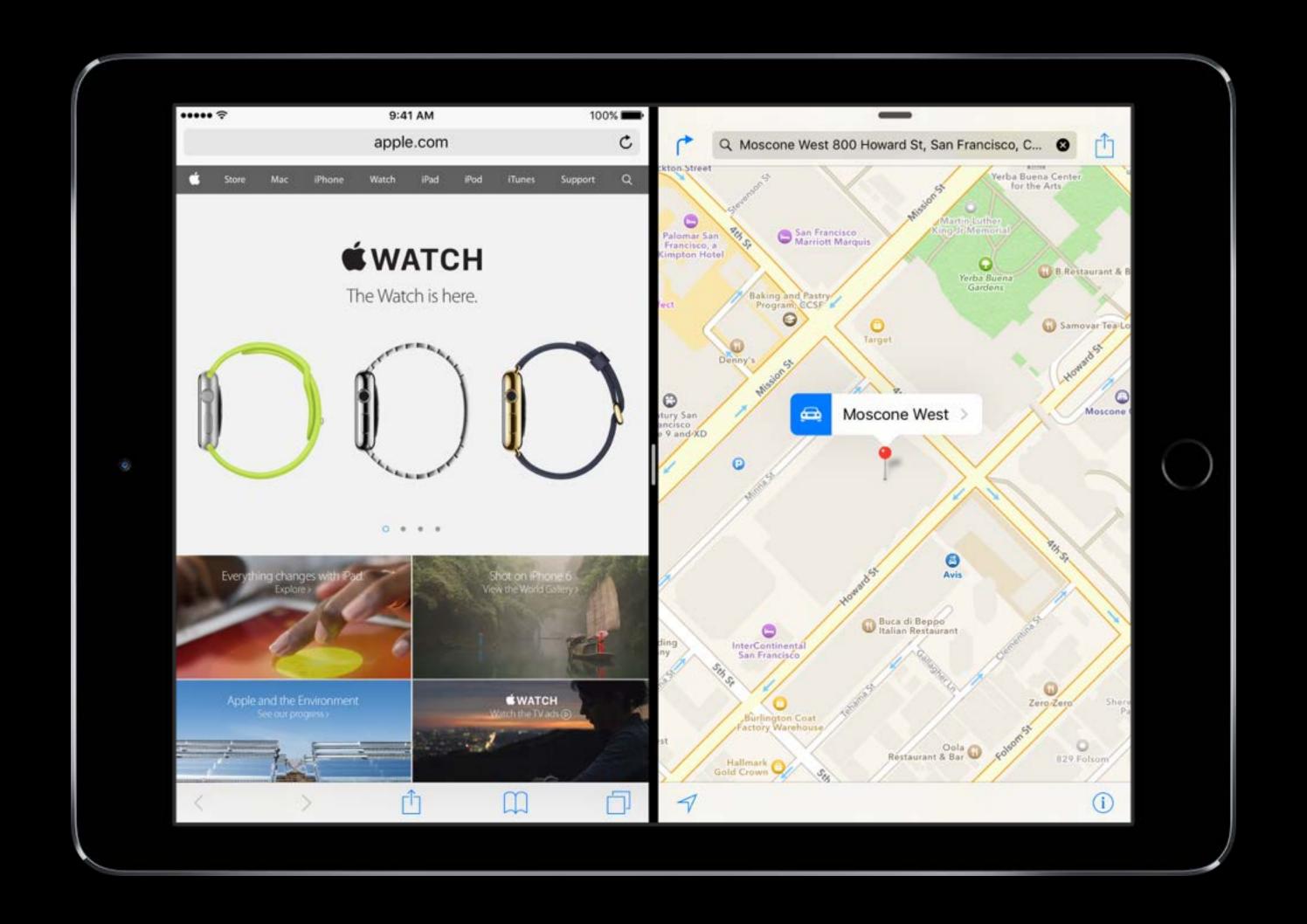


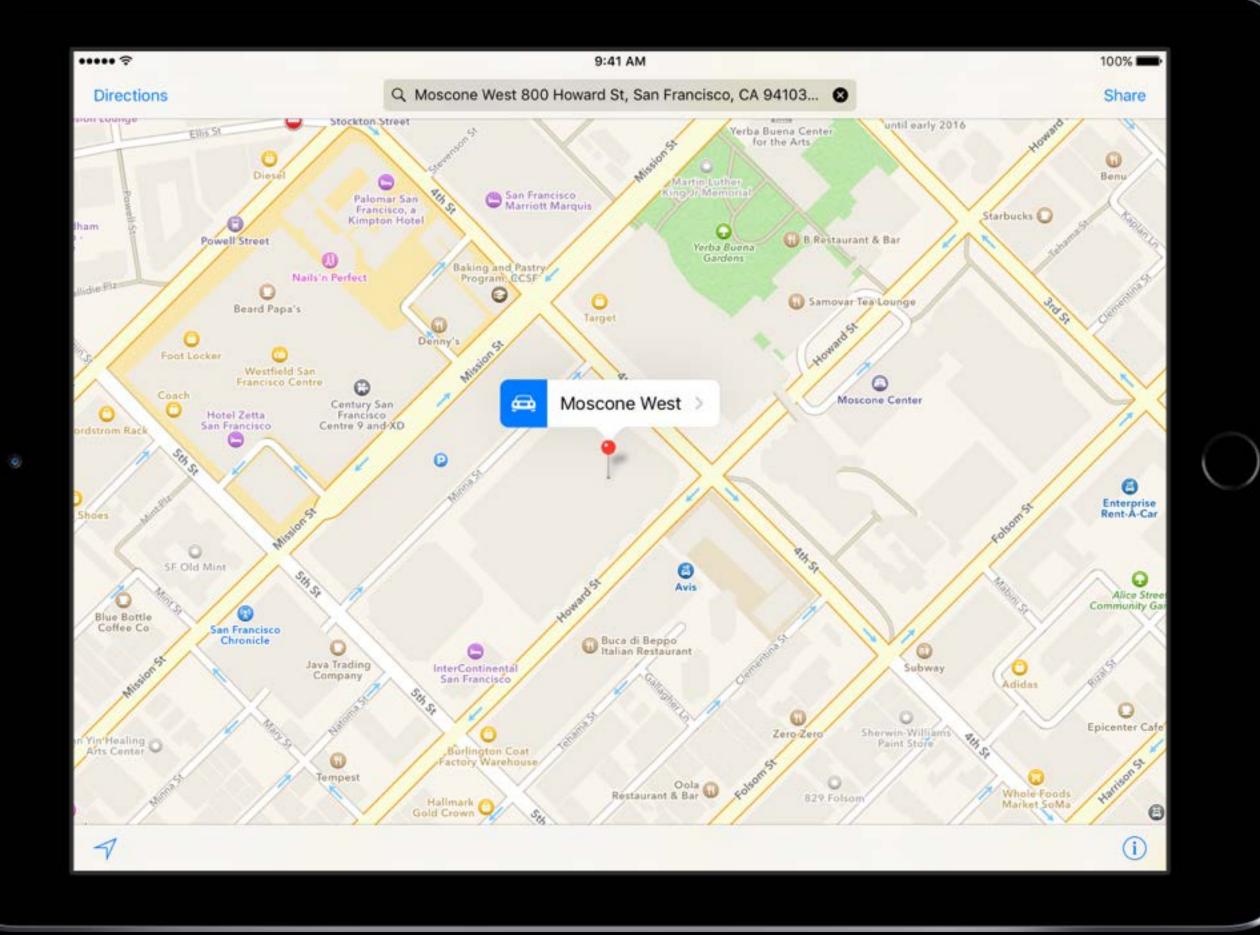


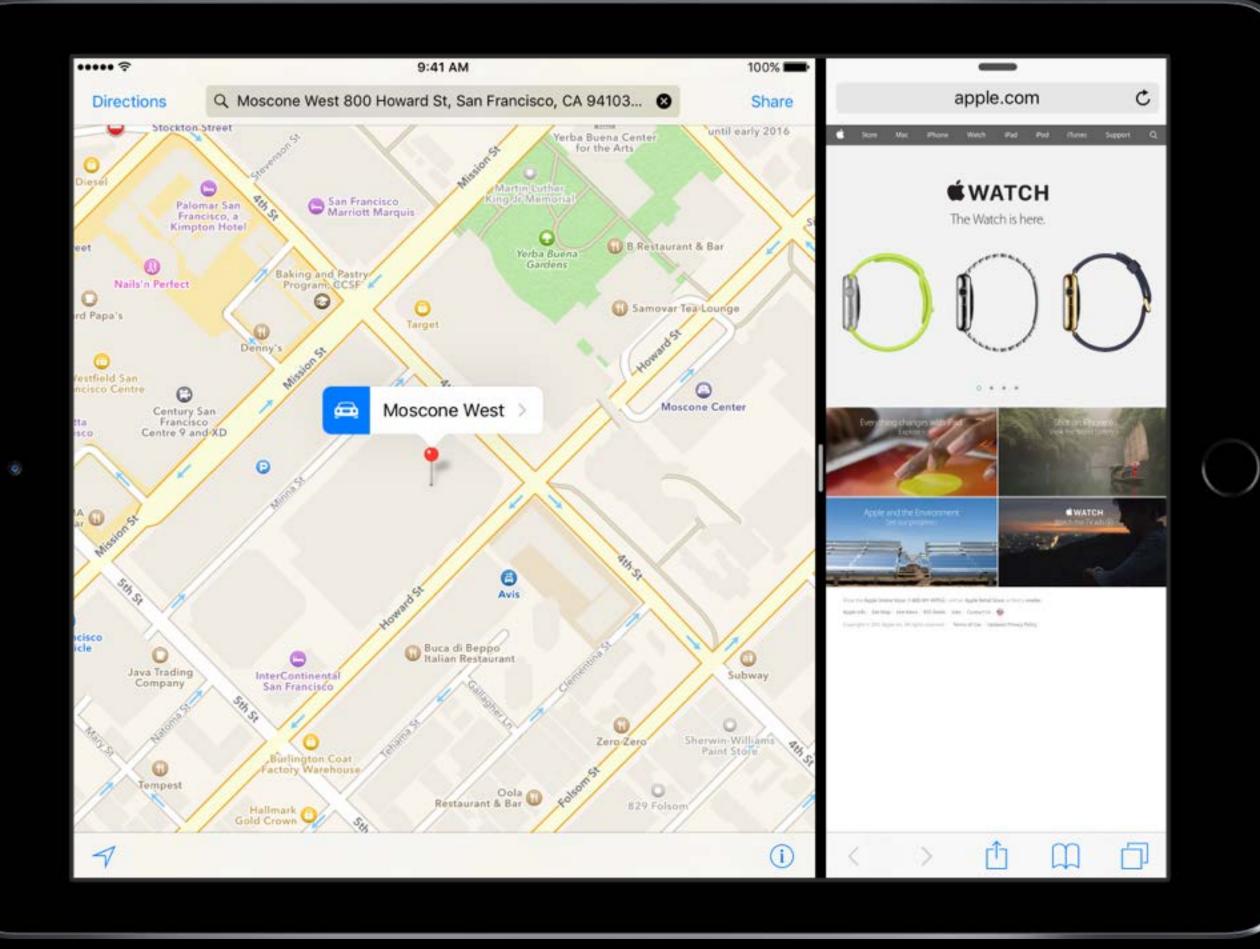
Split View

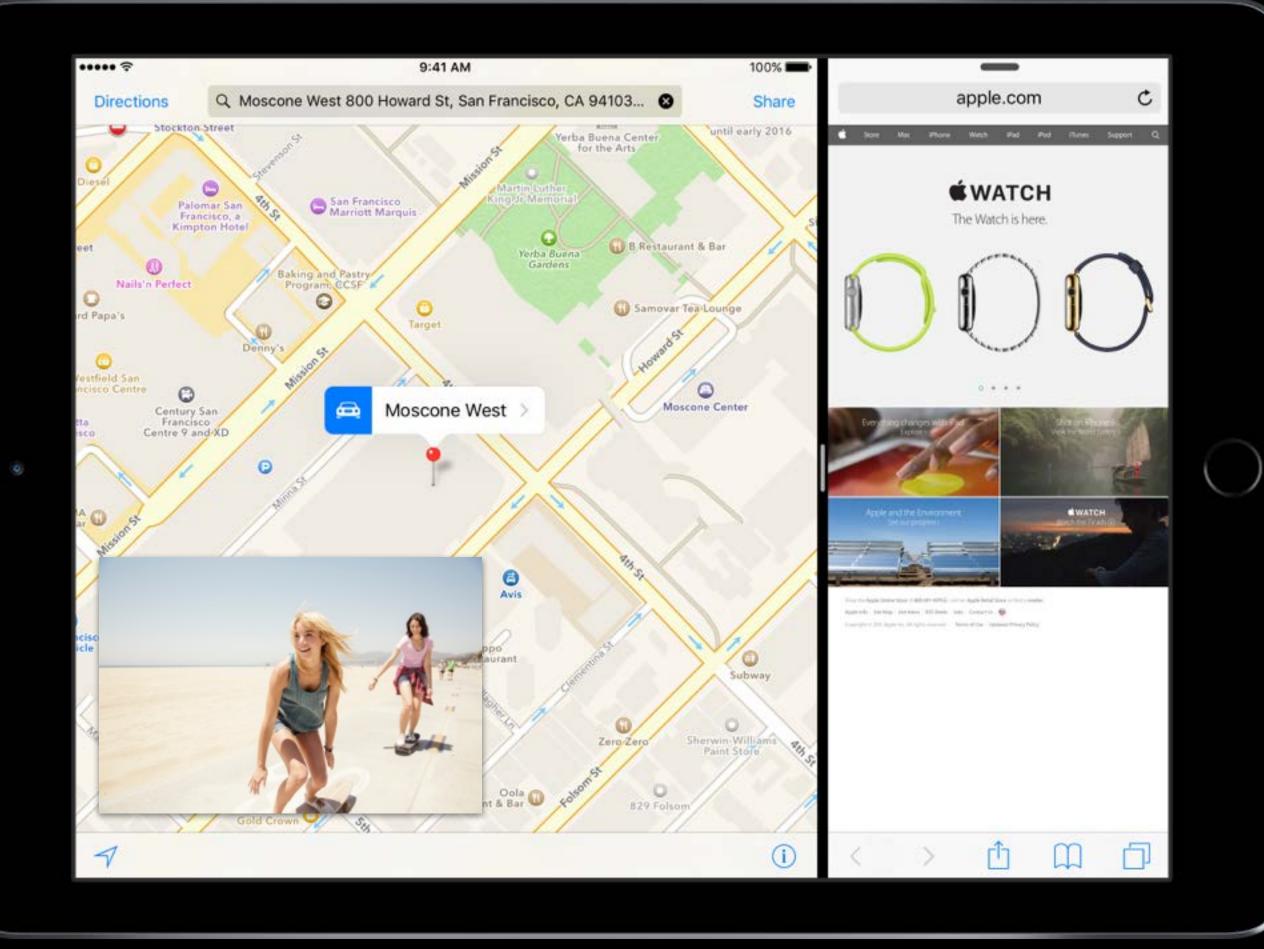


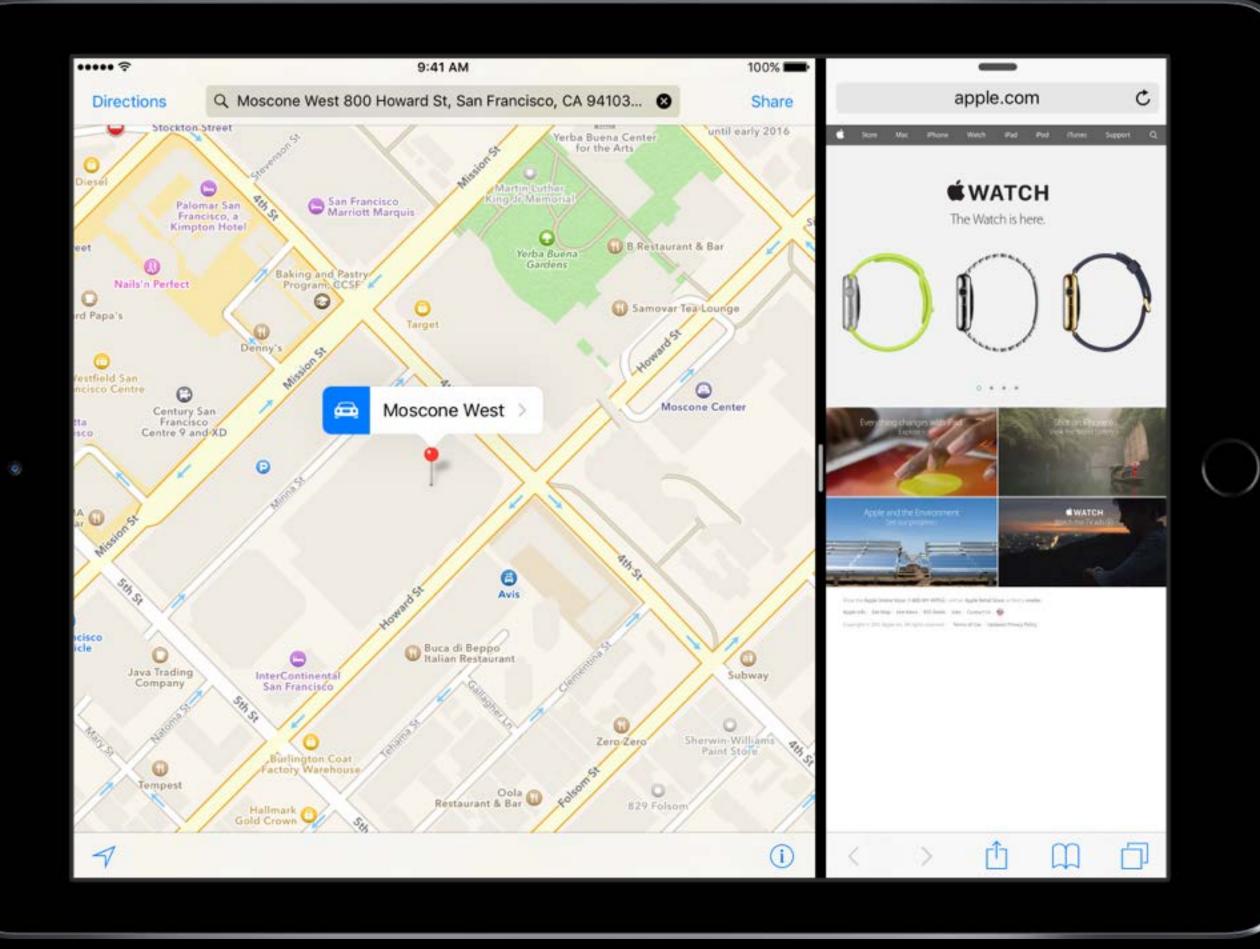
Split View







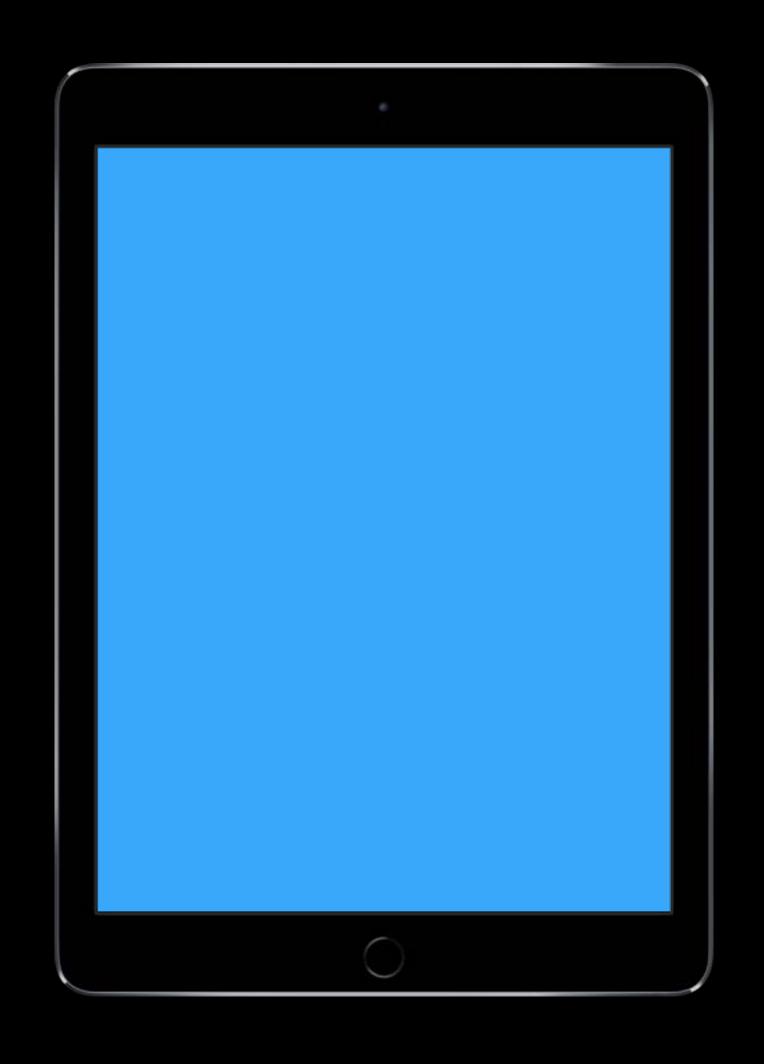




Adaptivity

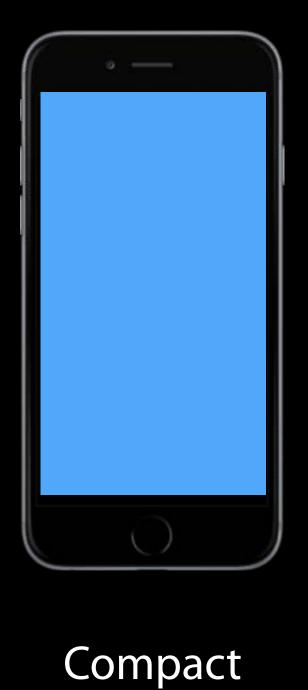
Universal apps

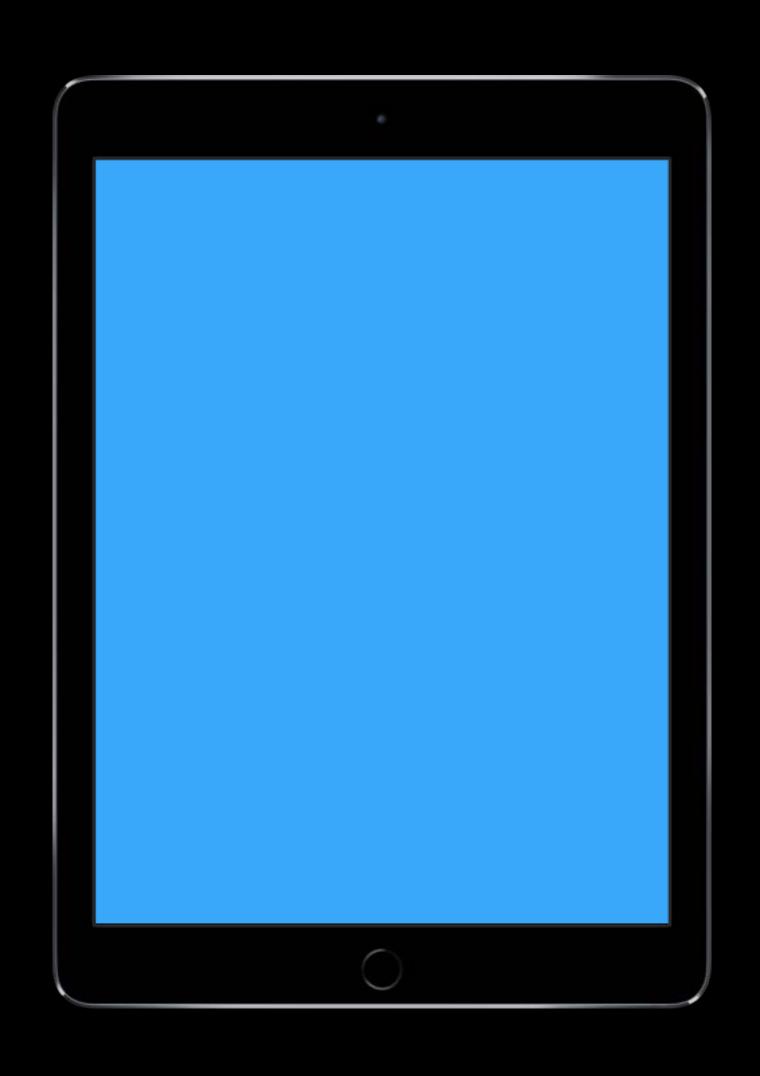




iPhone iPad

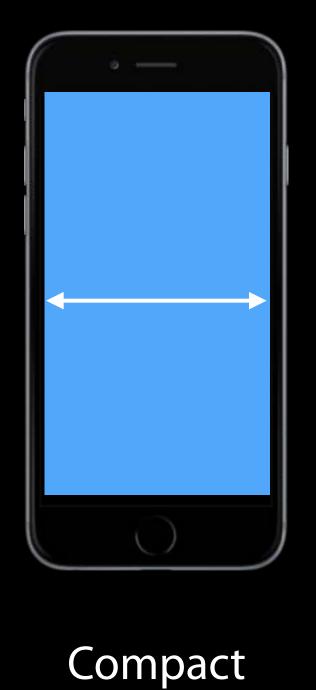


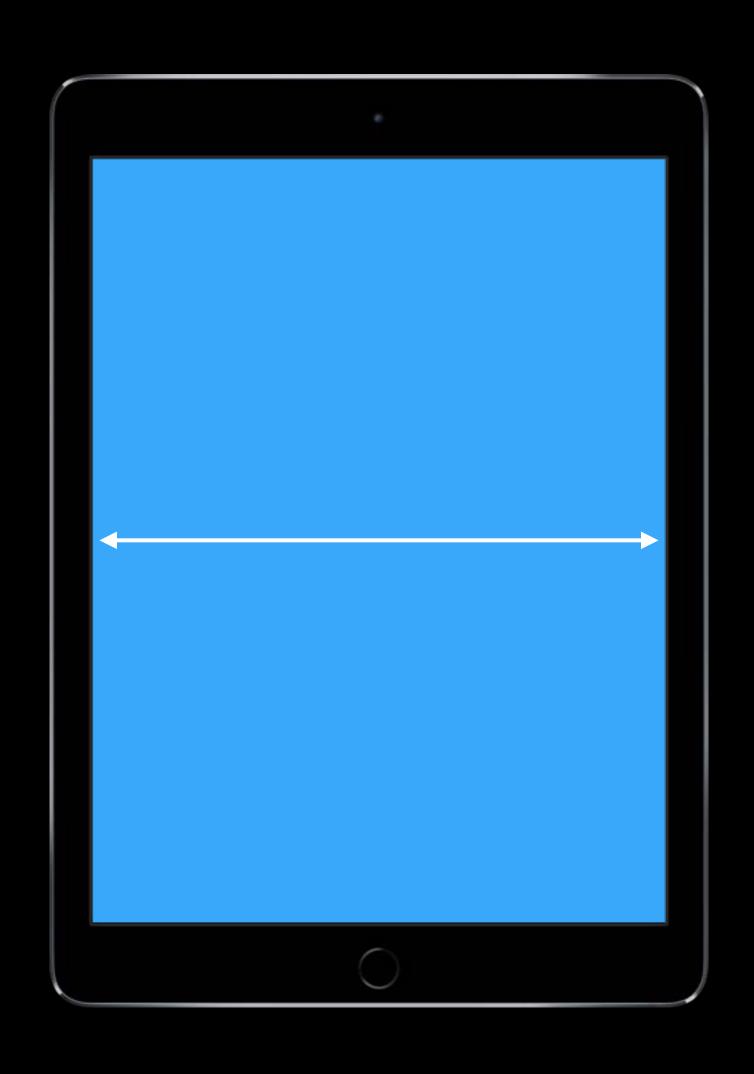




Regular

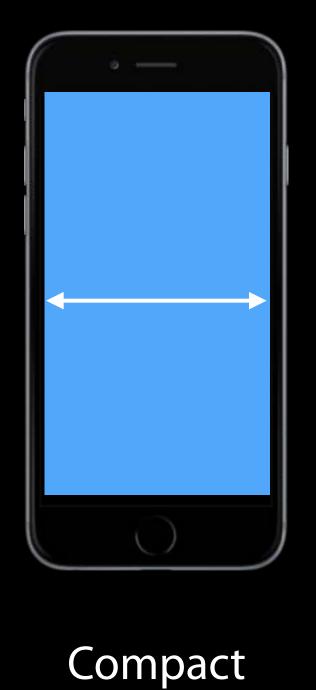


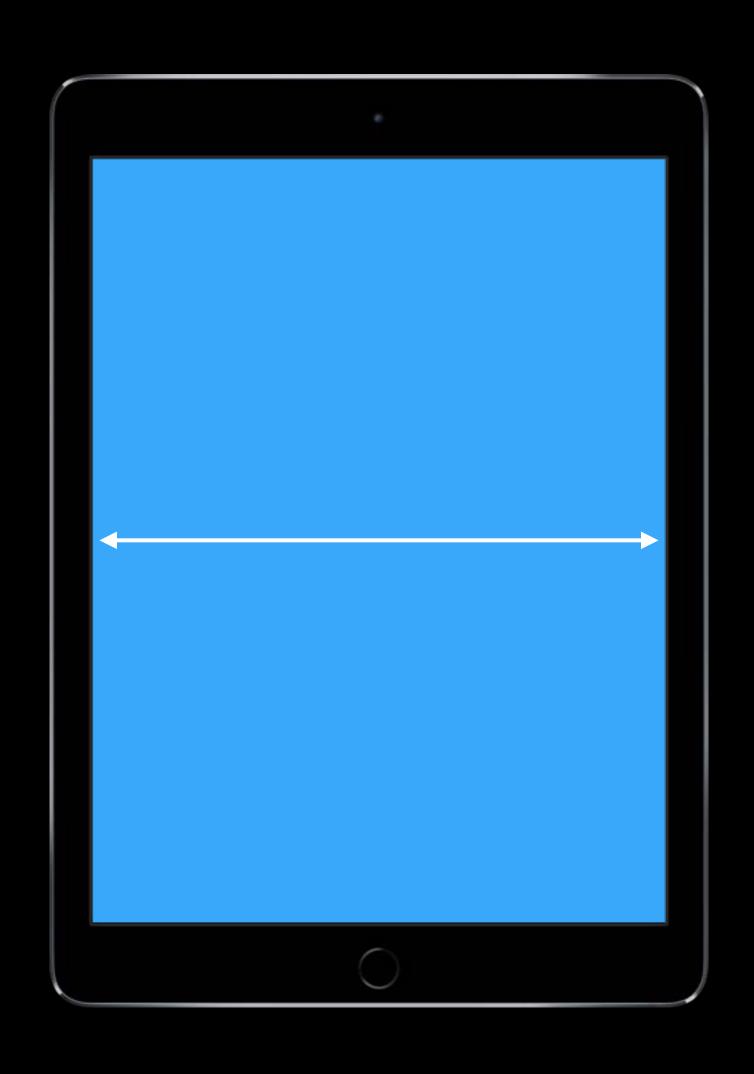




Regular



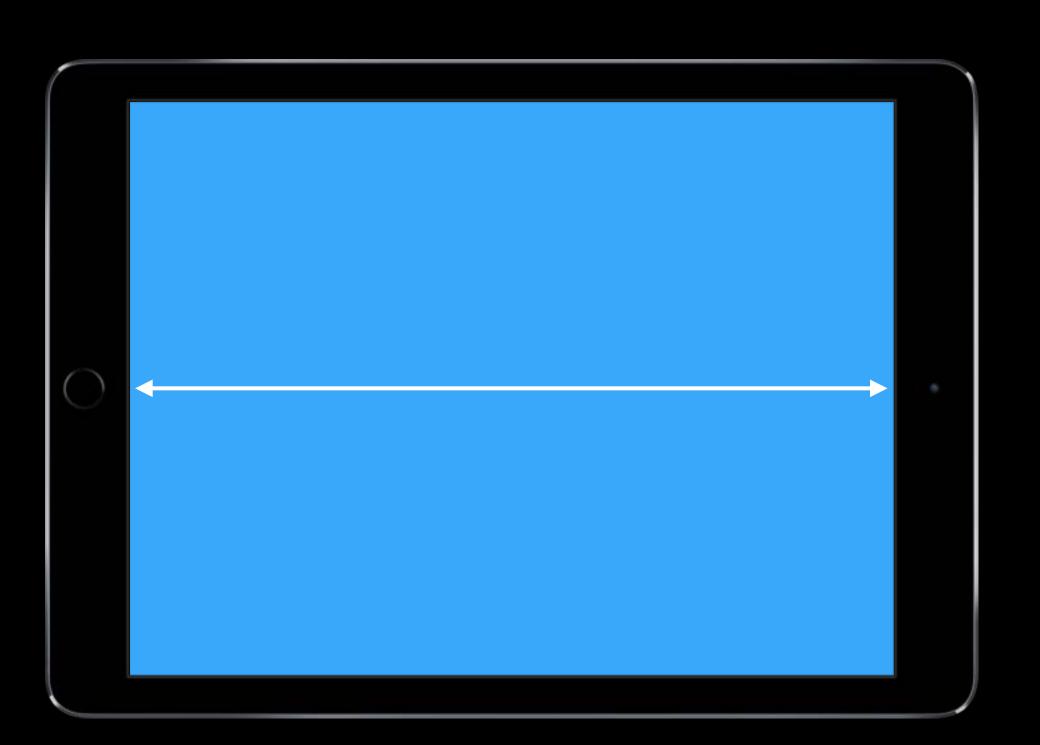




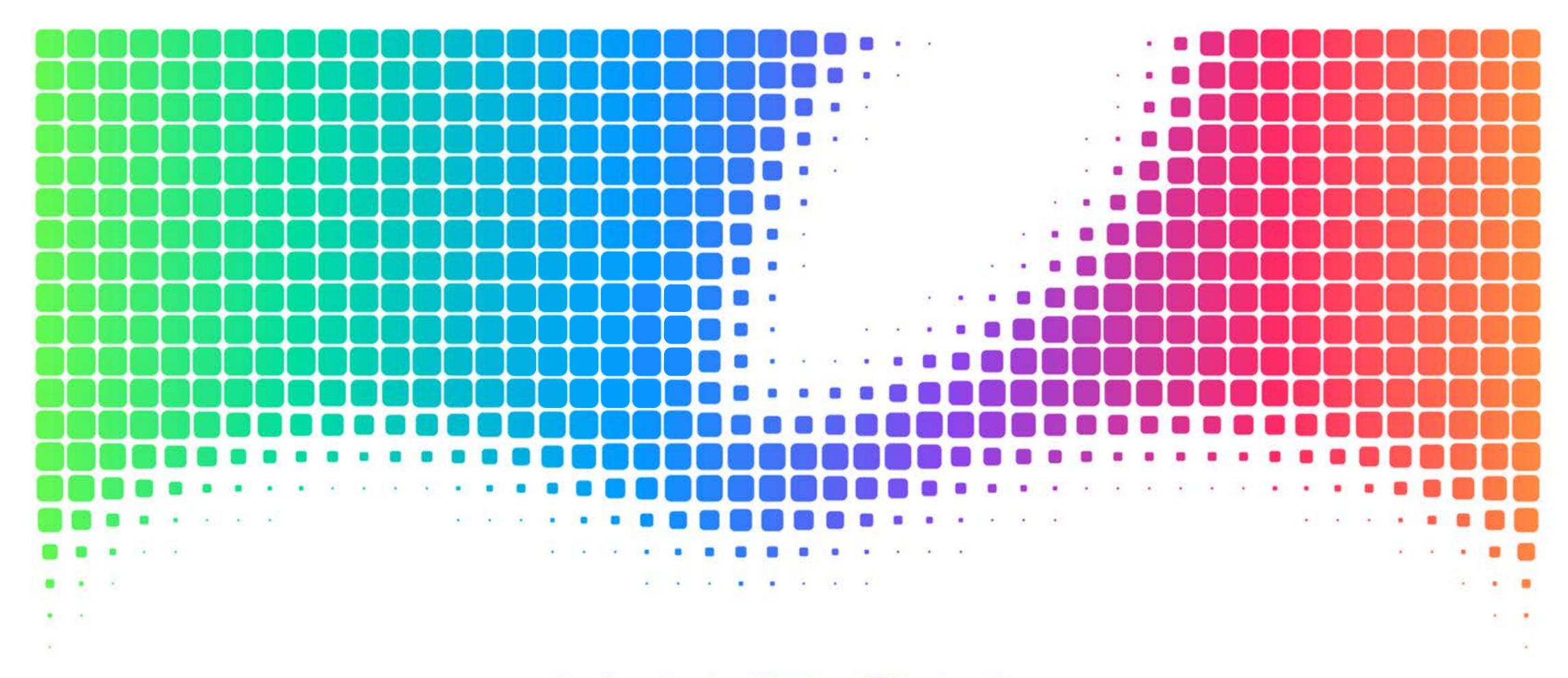
Regular







Compact Regular



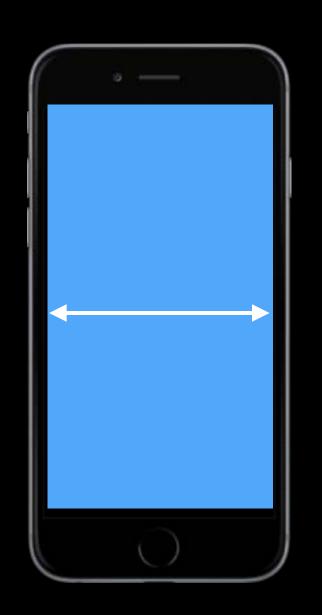
VVVDC14



iPhone 6 Plus

iPhone 6 Plus





Compact

iPhone 6 Plus





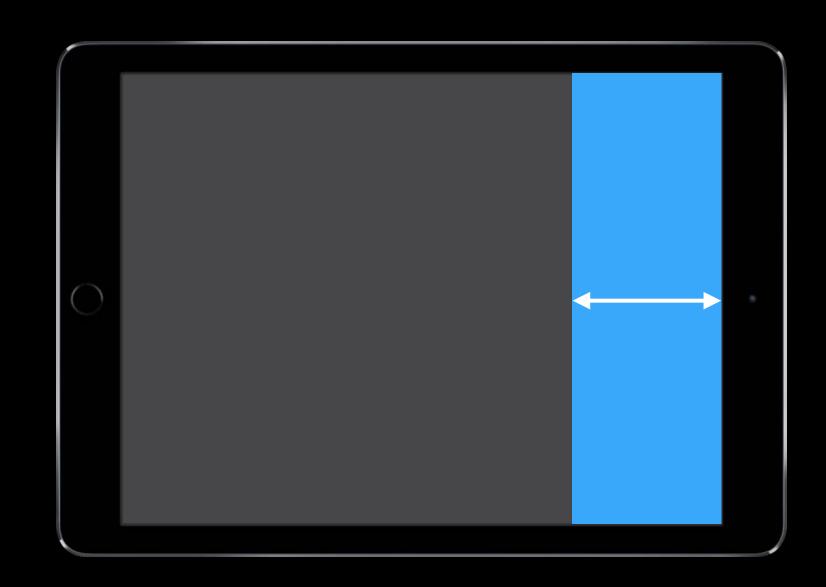
Regular





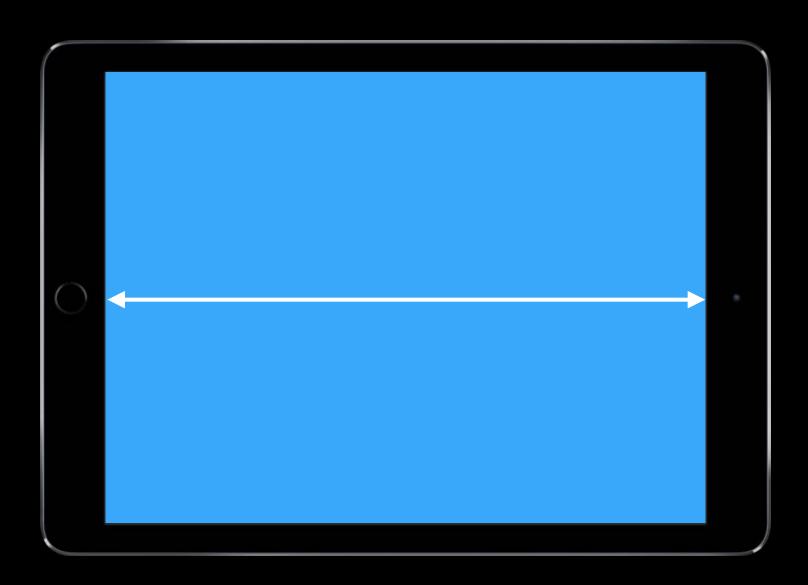






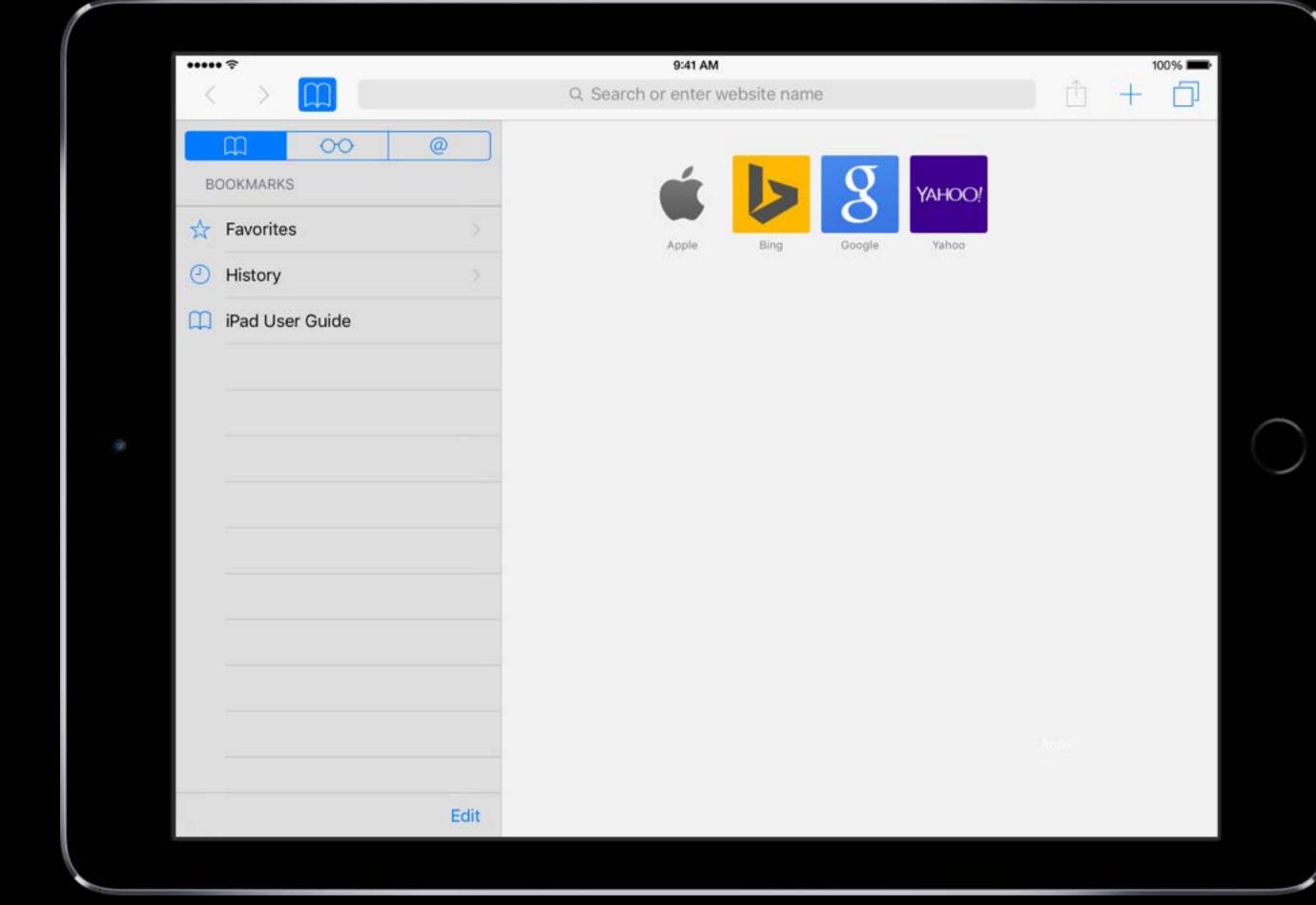
Compact





Regular







Why adopt Multitasking?

Let users get into your app and spend more time in new ways

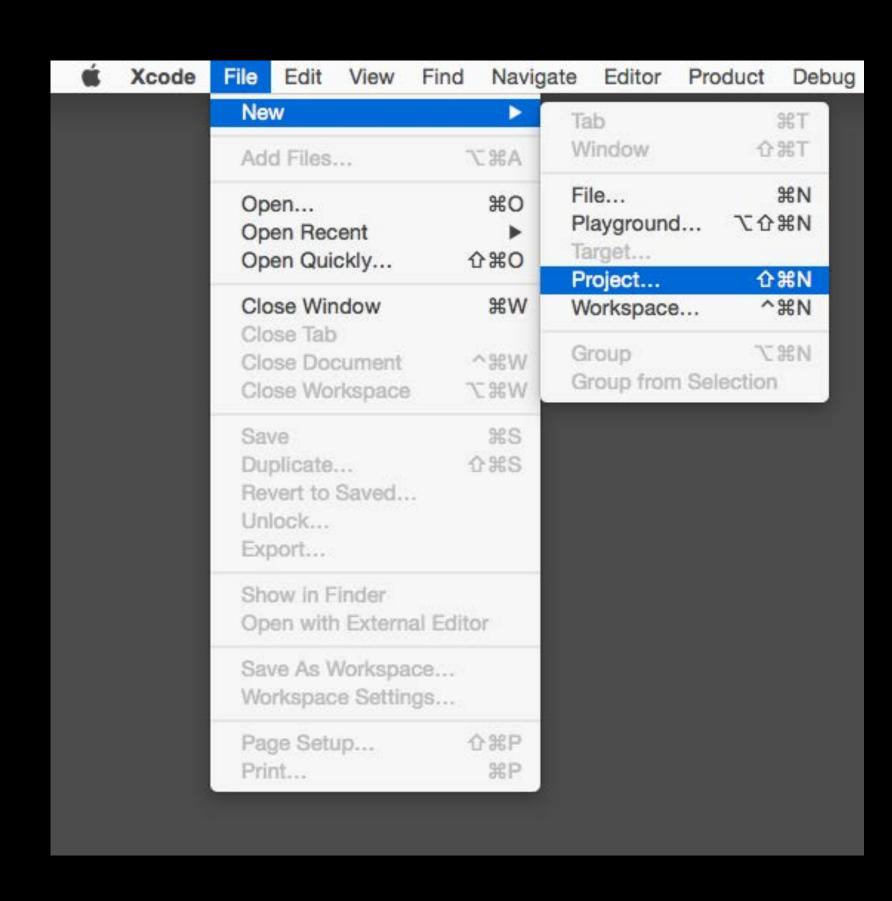


Adding iPad Multitasking to Your App

Adding Multitasking to Your App

New iOS 9 apps

iPad Multitasking is enabled by default in new projects



Adding Multitasking to Your App

Existing iOS apps

Build your app with the iOS 9 SDK

Support all orientations

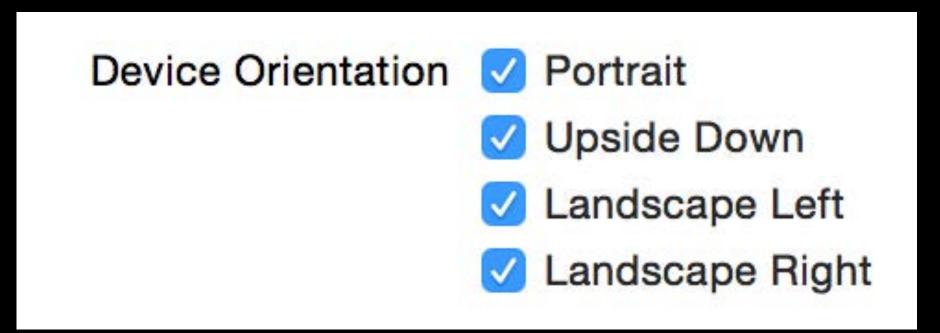
Build your app with the iOS 9 SDK

Support all orientations

Setting	MyCoolApp
Additional SDKs	
Architectures	Standard architectures
▶ Base SDK	Latest iOS (iOS 9.0) 🗘
▼ Build Active Architecture Only	<multiple values=""> \$</multiple>
Debug	Yes \$
Release	No ≎
Supported Platforms	iOS 🗘
Valid Architectures	arm64 armv4t armv5 arm

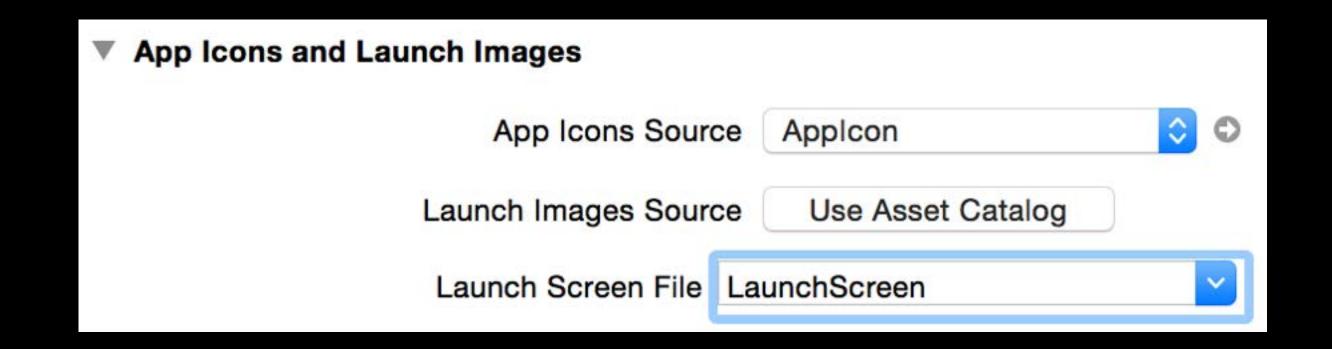
Build your app with the iOS 9 SDK

Support all orientations



Build your app with the iOS 9 SDK

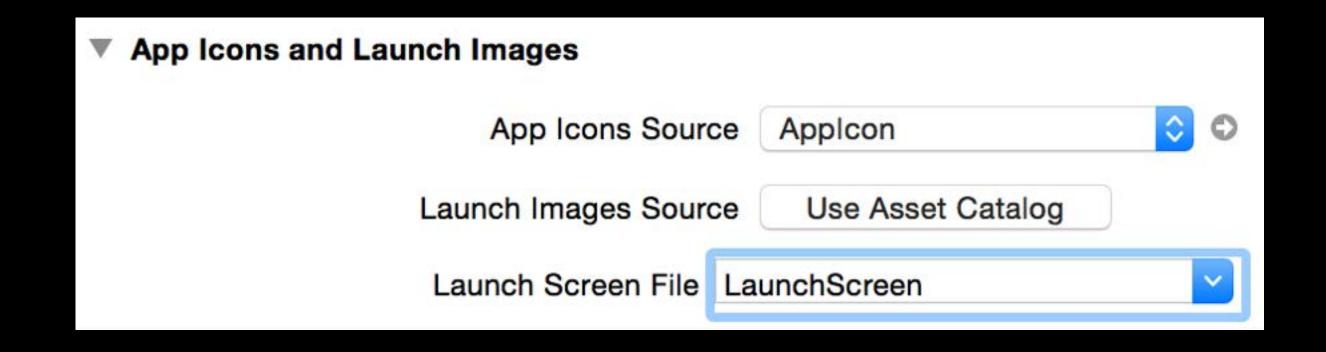
Support all orientations



Build your app with the iOS 9 SDK

Support all orientations

Use Launch Storyboards

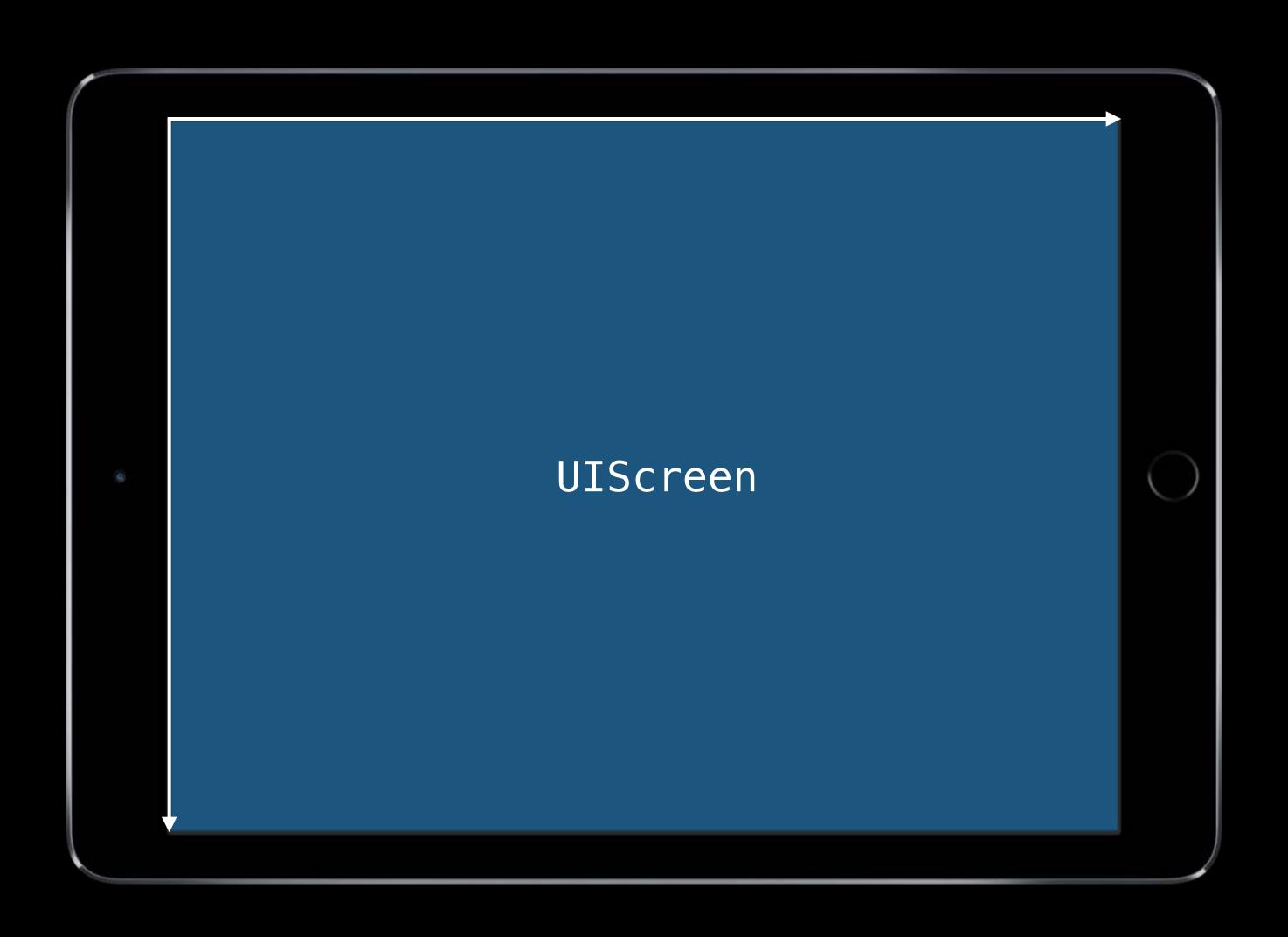


Opt out with the **UIRequiresFullscreen** key

iPad Multitasking in Your App

Multitasking, how does it work?

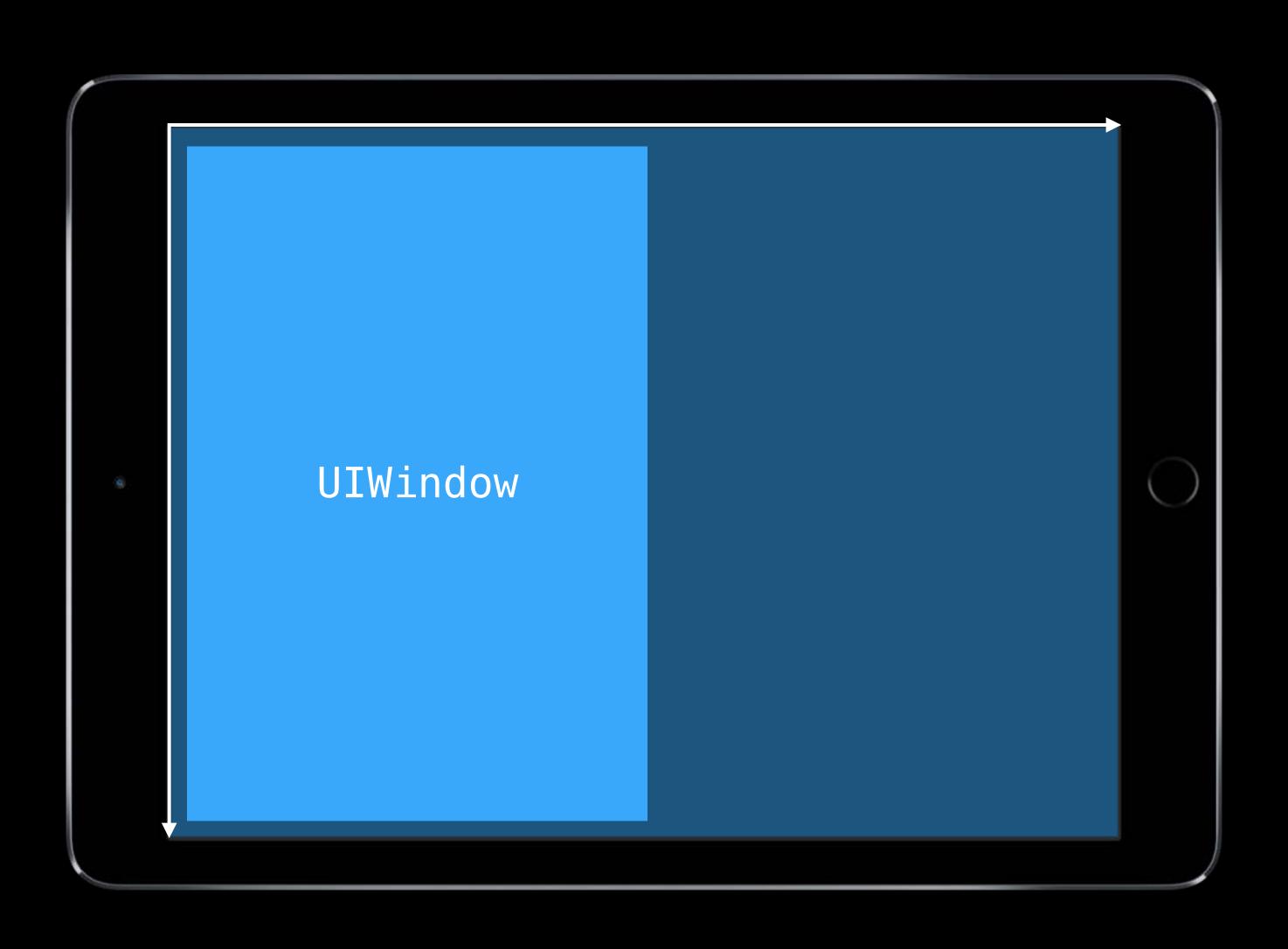
UIScreen.bounds Returns the Screen Bounds



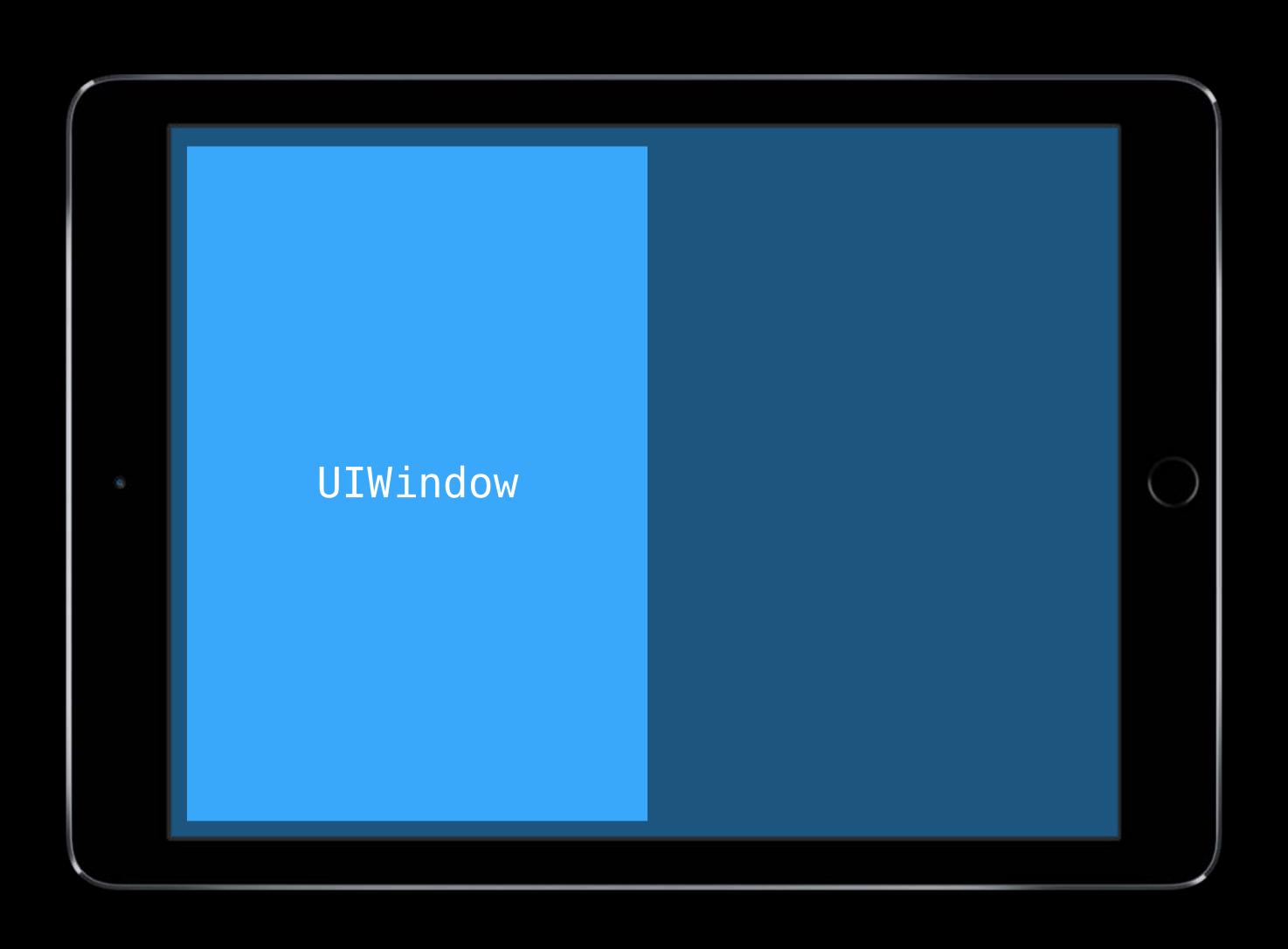
UIScreen.bounds Returns the Screen Bounds



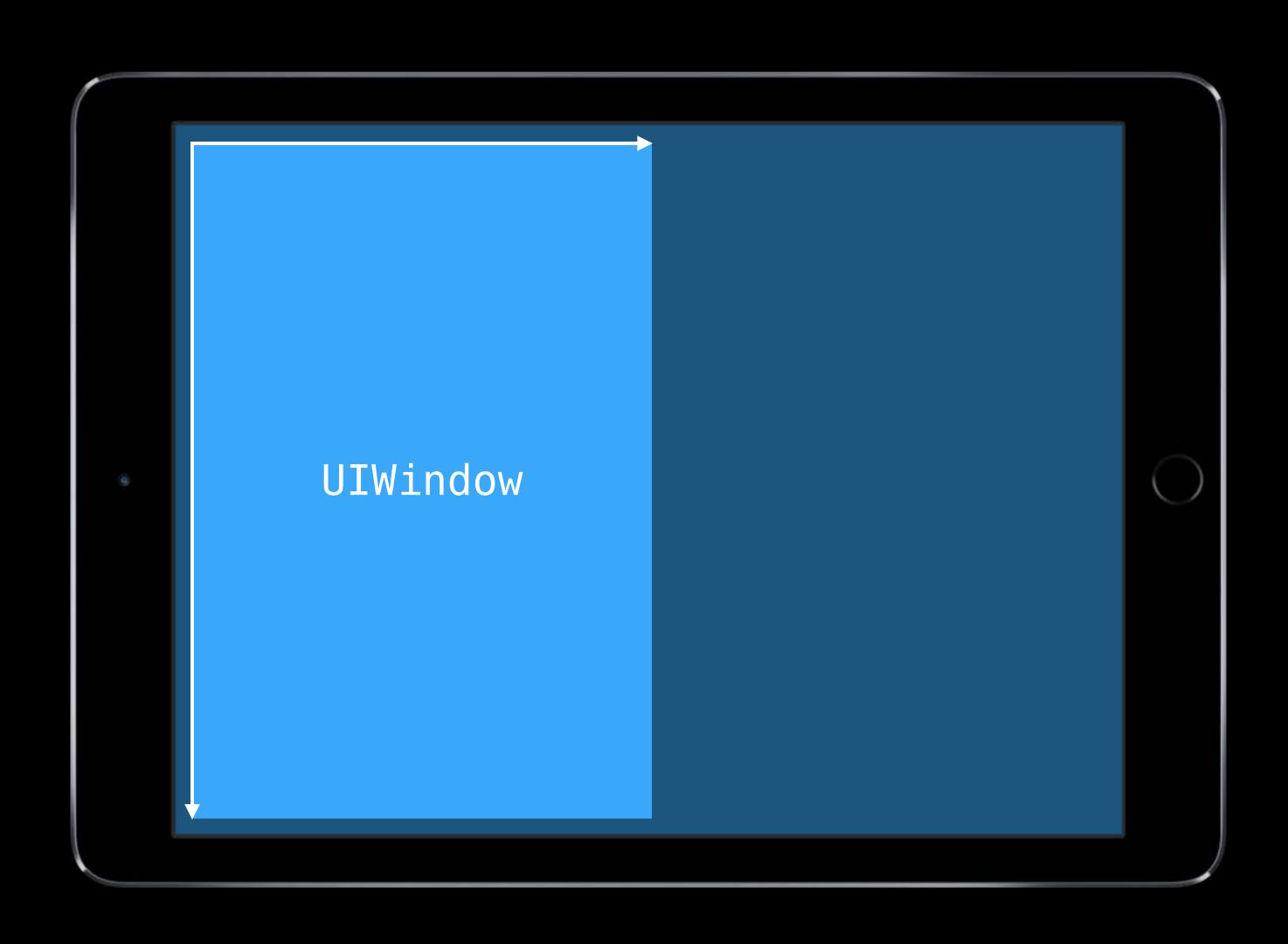
UIScreen.bounds Returns the Screen Bounds



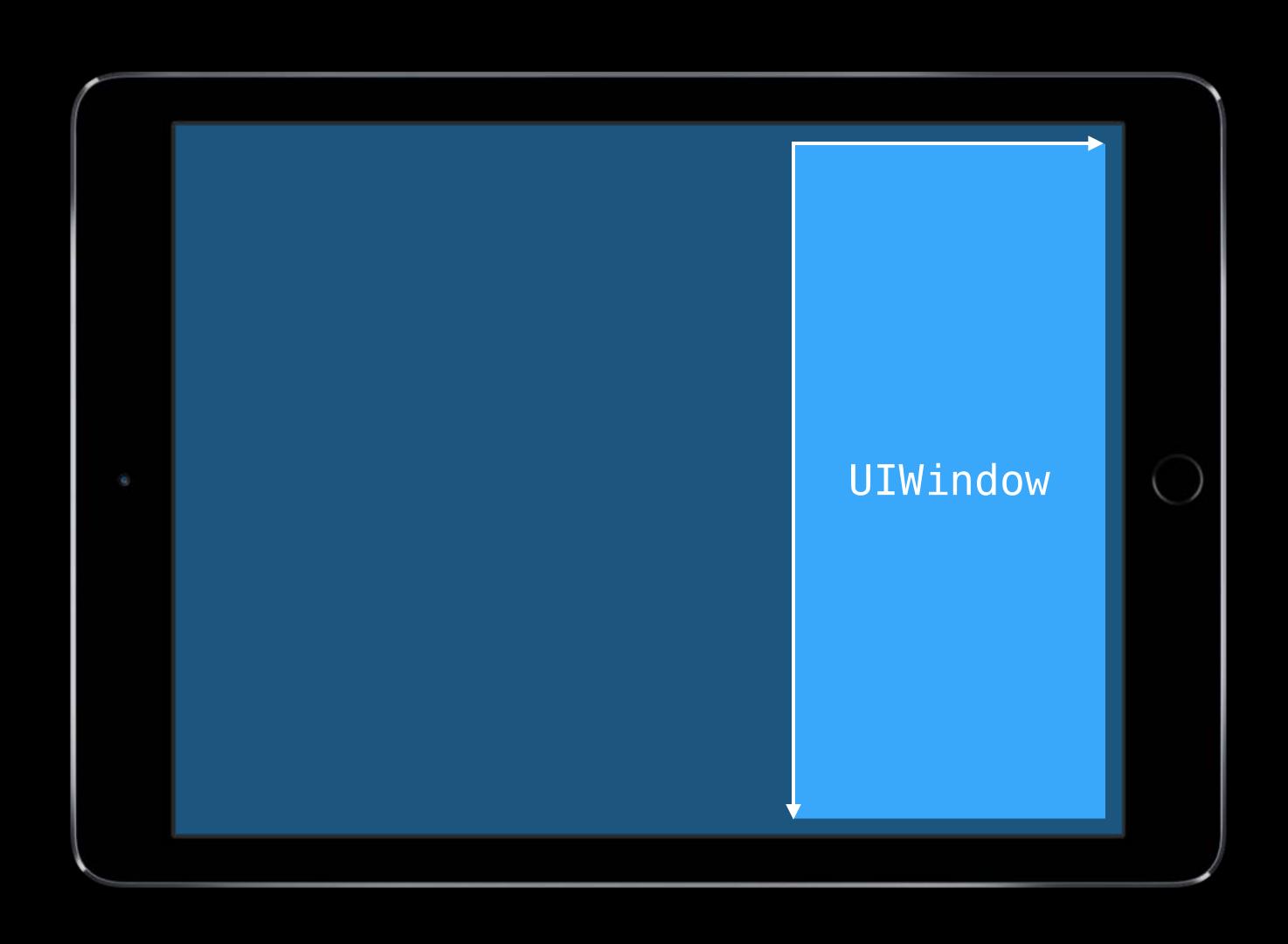
UIWindow.bounds Returns the Window Bounds



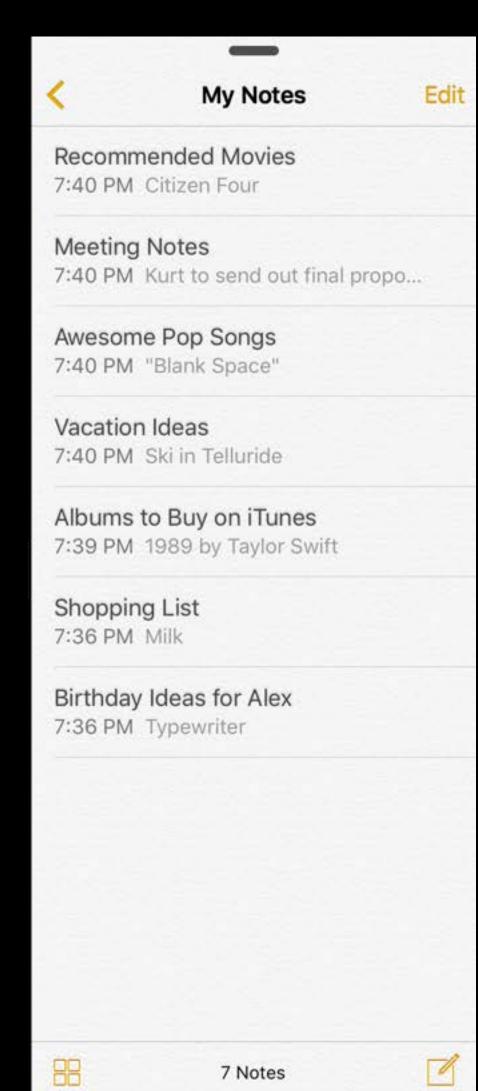
UIWindow.bounds Returns the Window Bounds

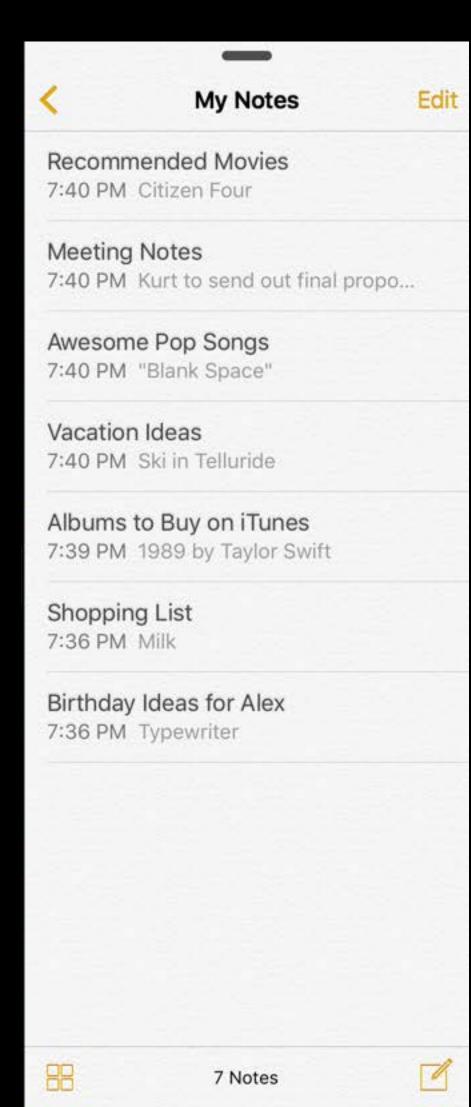


UIWindow.bounds Origin Always at (0,0)

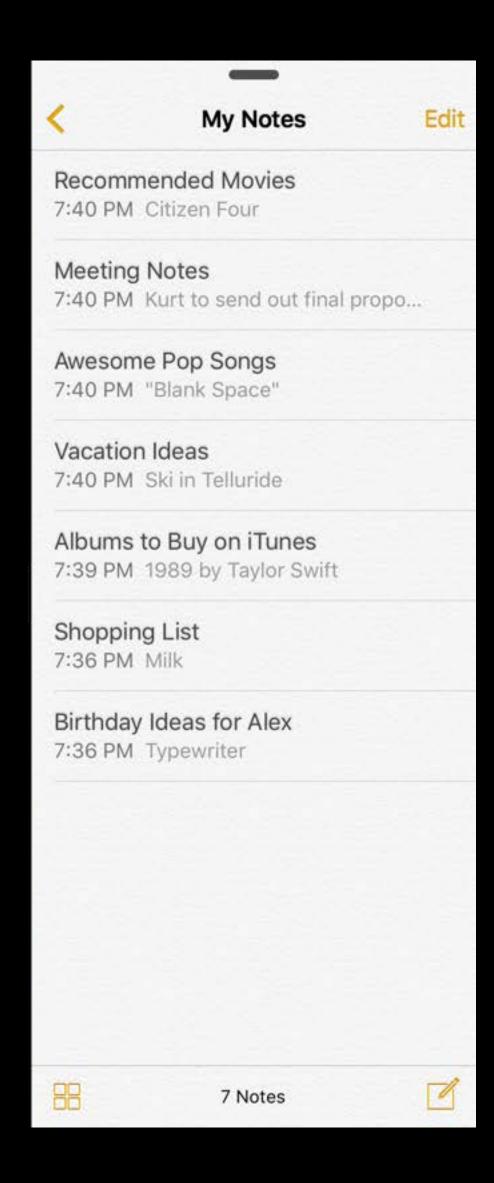


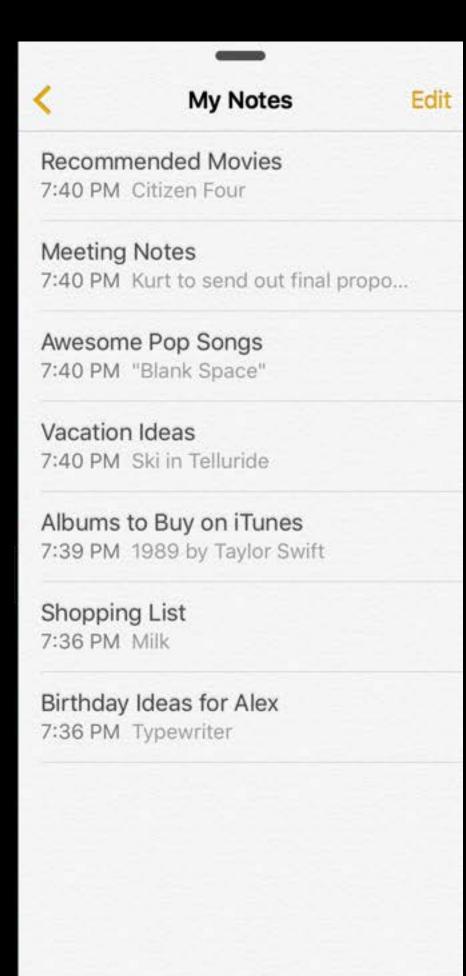
UIWindow

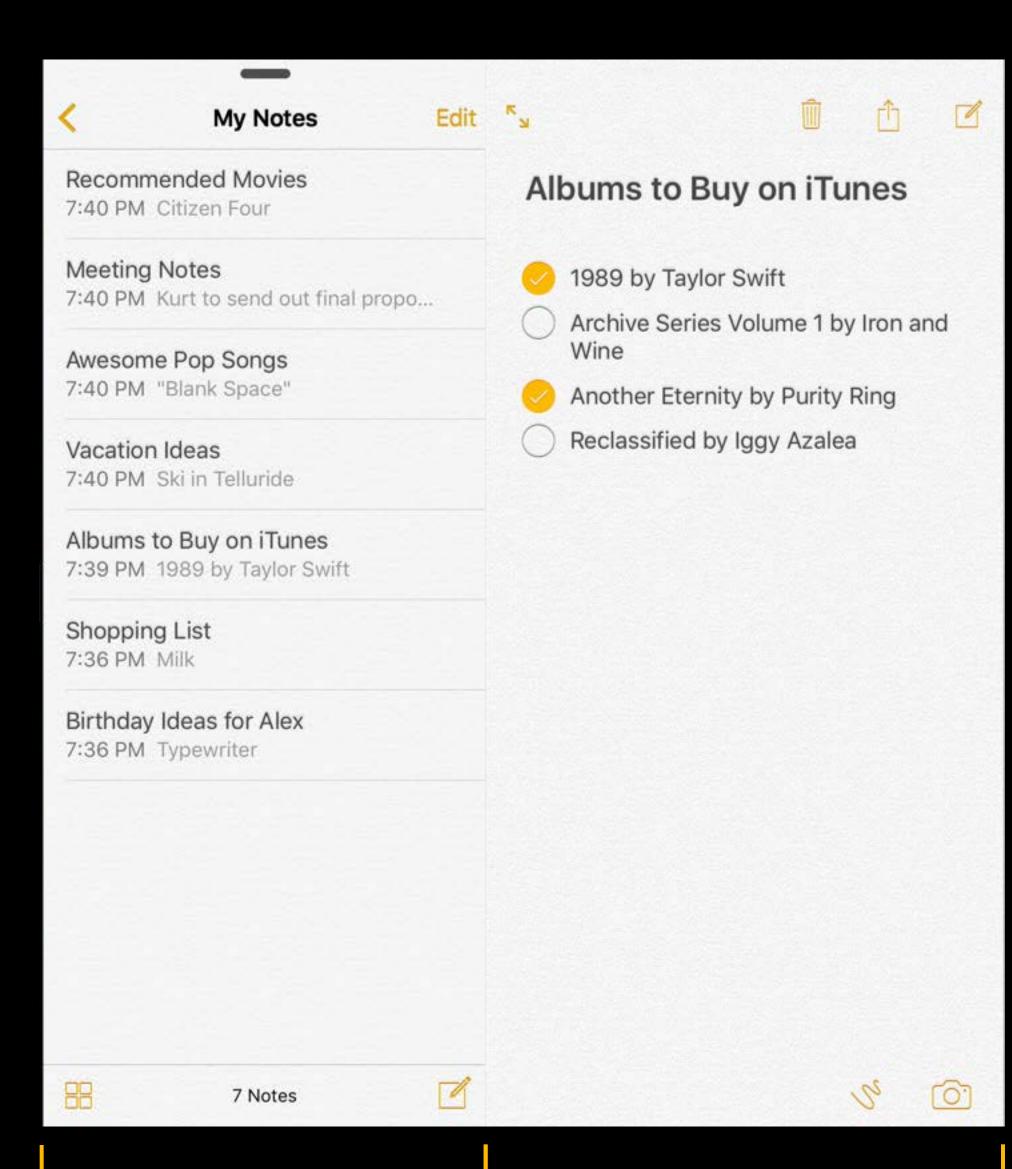




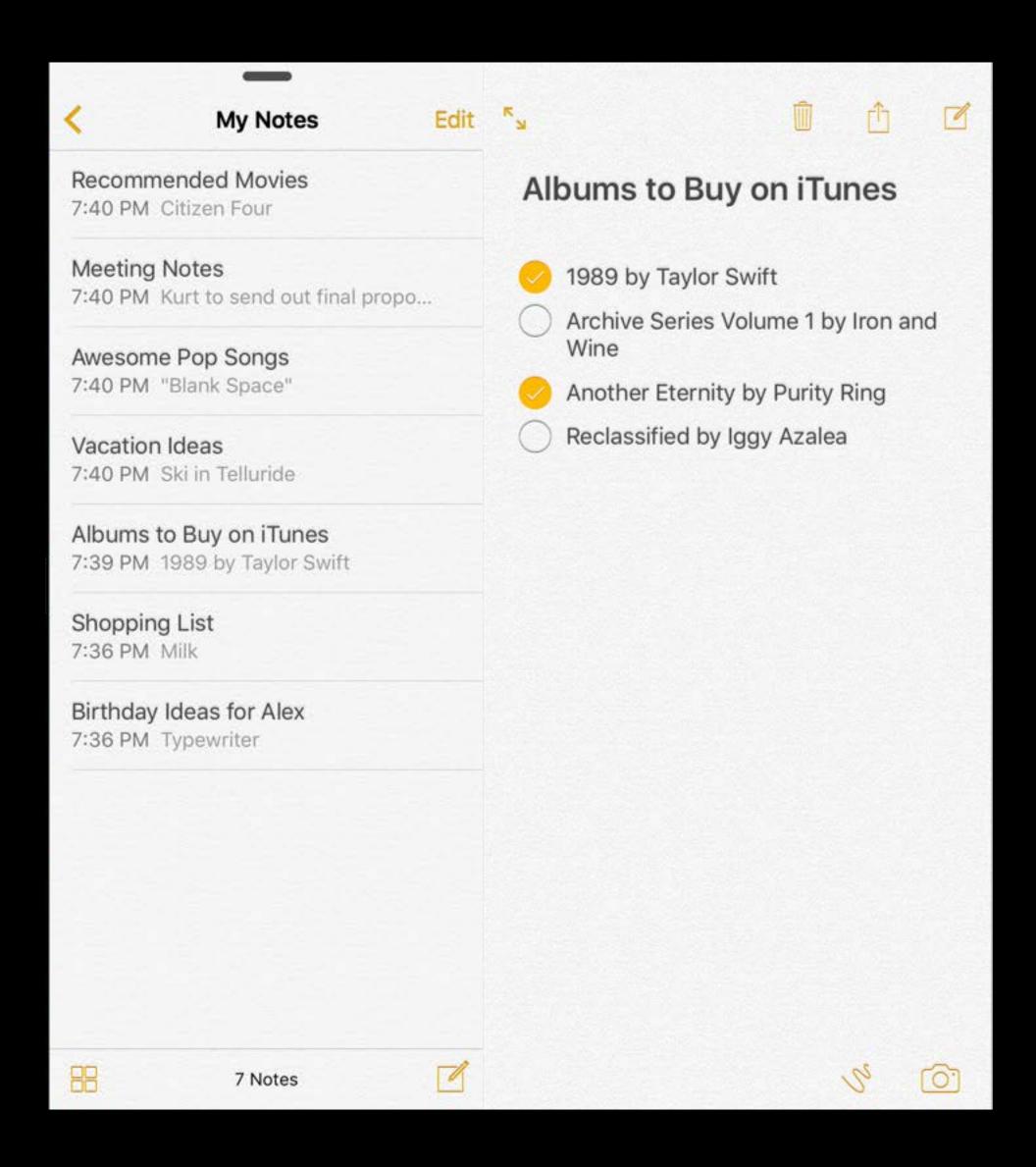
Horizontally Compact

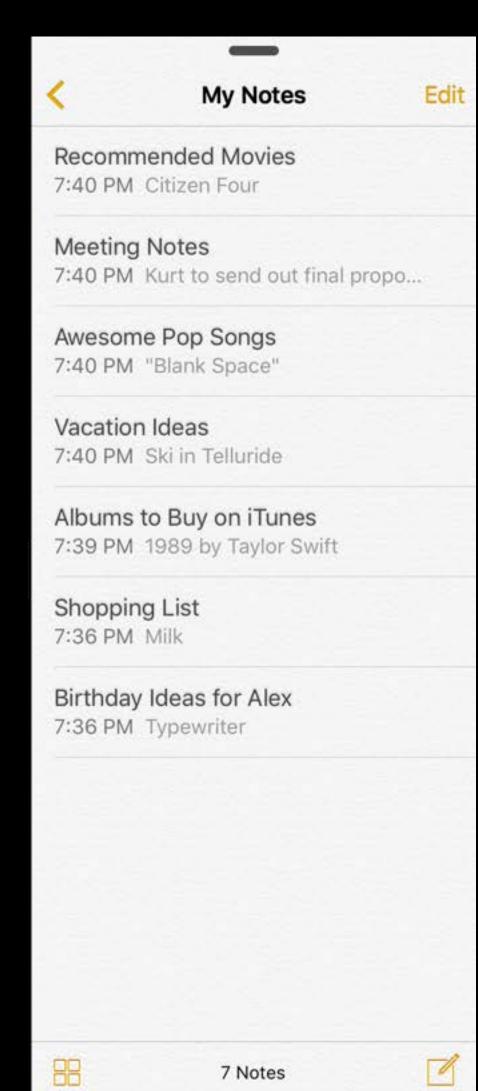


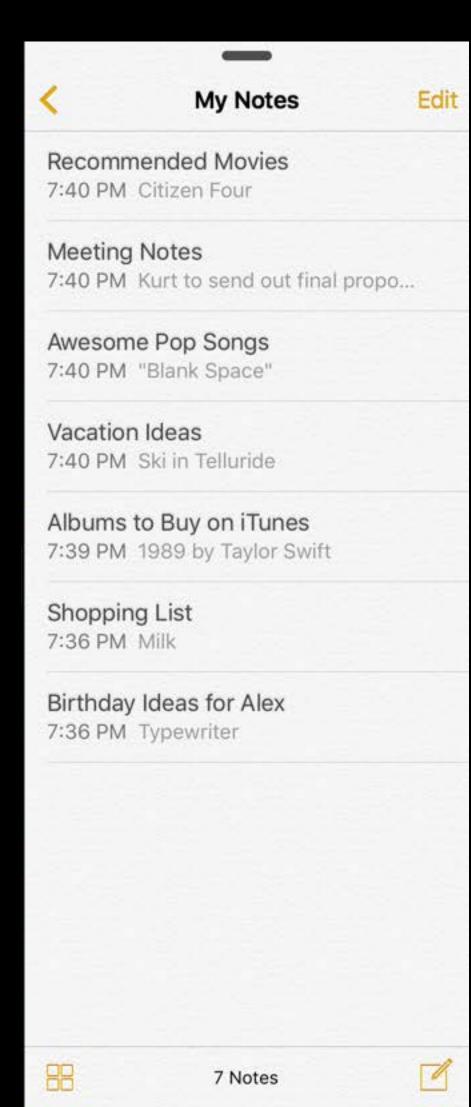


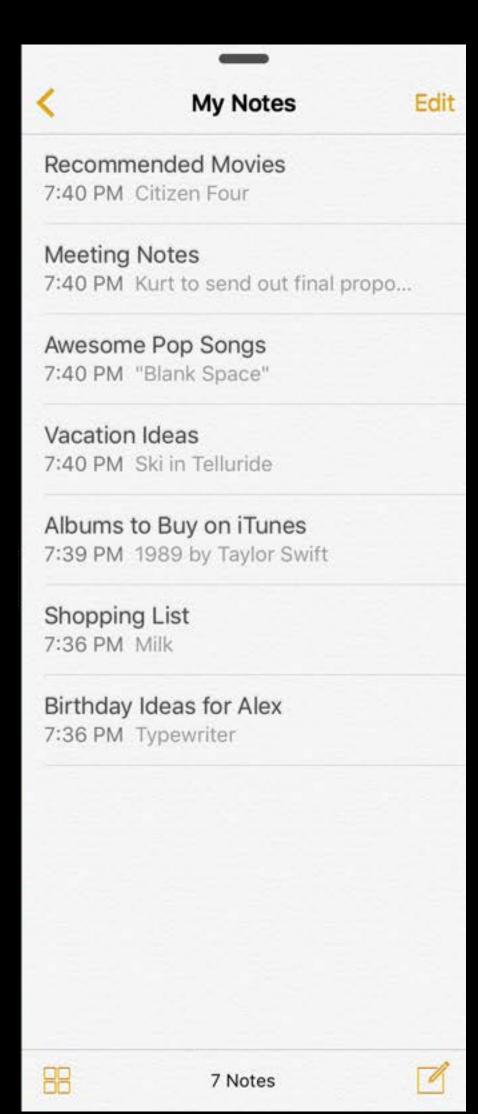


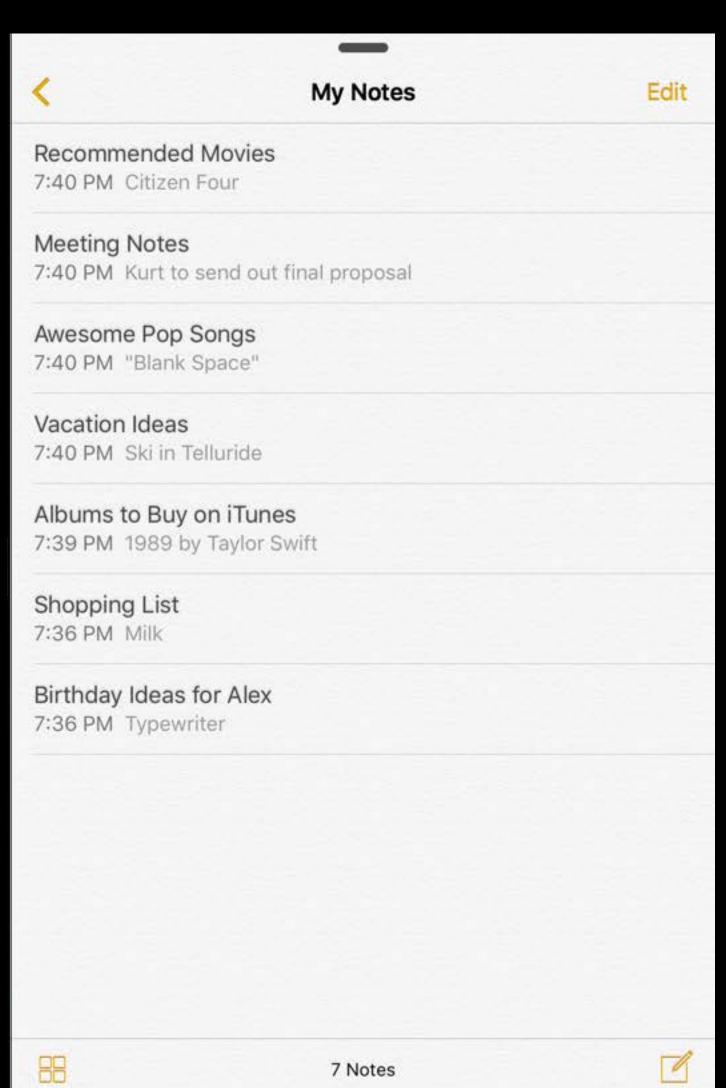
Horizontally Regular

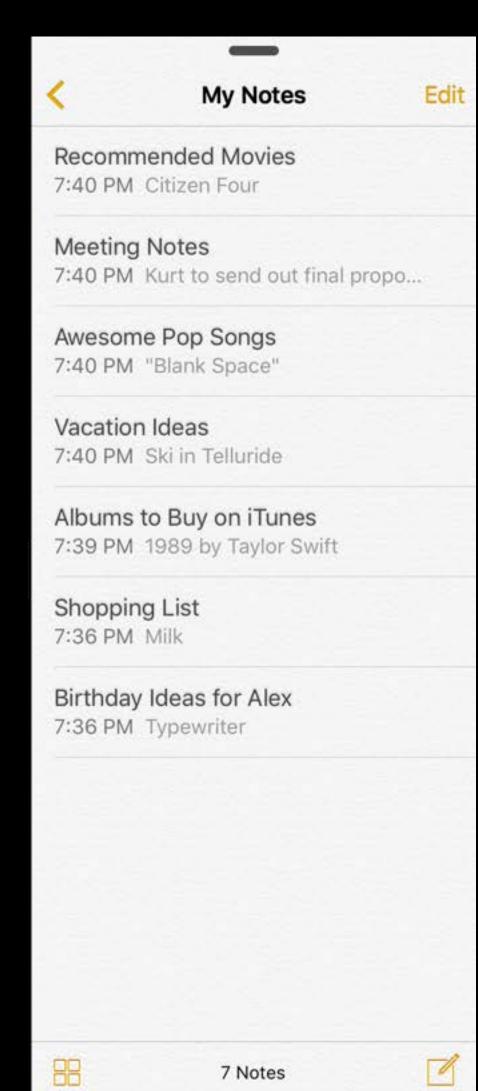


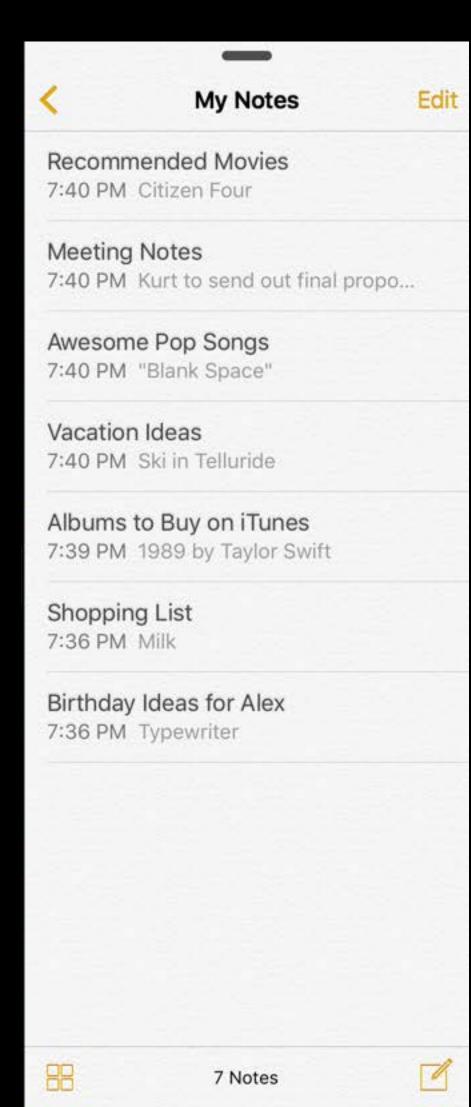












Auto Layout

Makes resizing much easier for your app to handle Right-to-left language support

Legibility Improvements



UIView readableContentGuide

UILayoutGuide for legible region in a UIView

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Regular Width

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Legibility Improvements



UITableView.cellLayoutMarginsFollowReadableWidth

Adds margins to cells for legibility

NEW

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What's Changed

Best Practices

Jacob Xiao iOS Frameworks Engineer

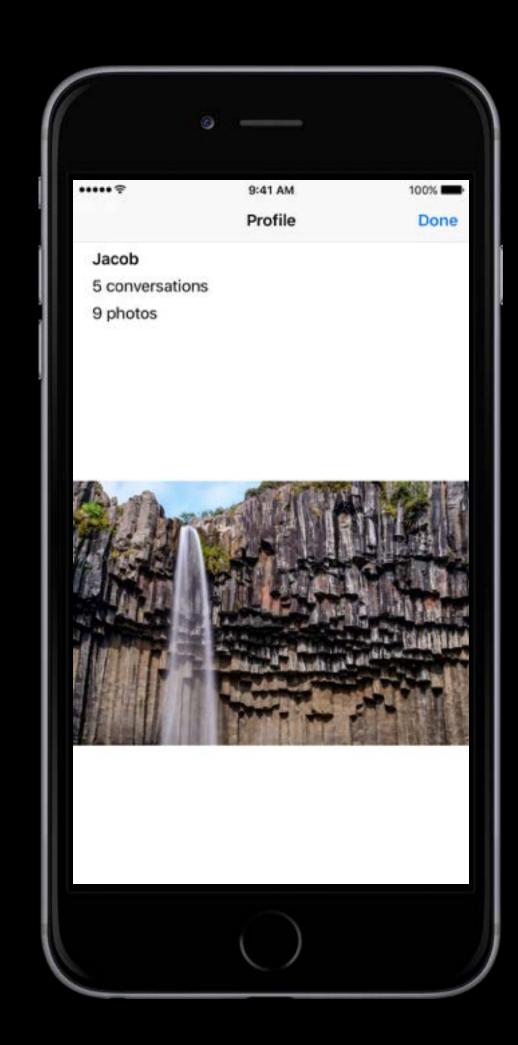
What's Changed?

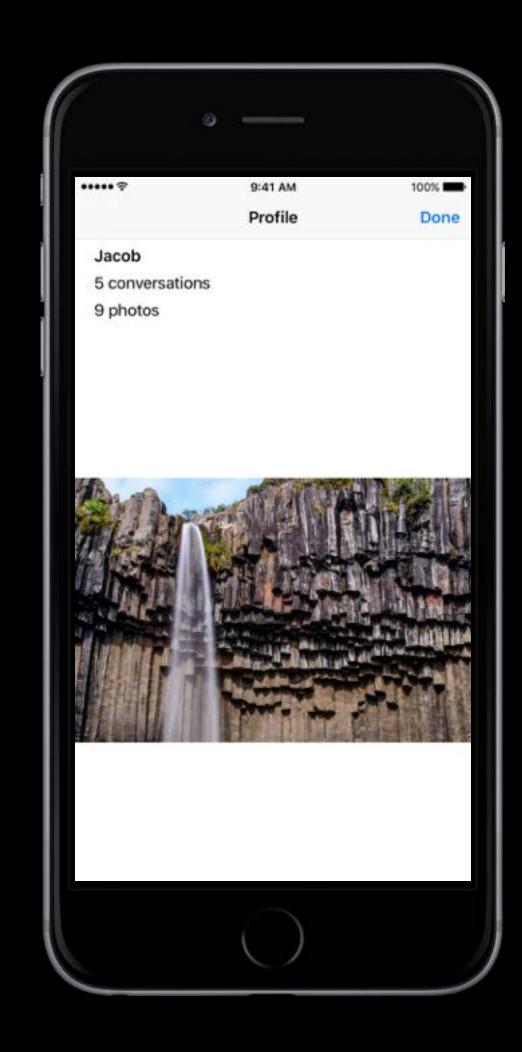
What's Changed?

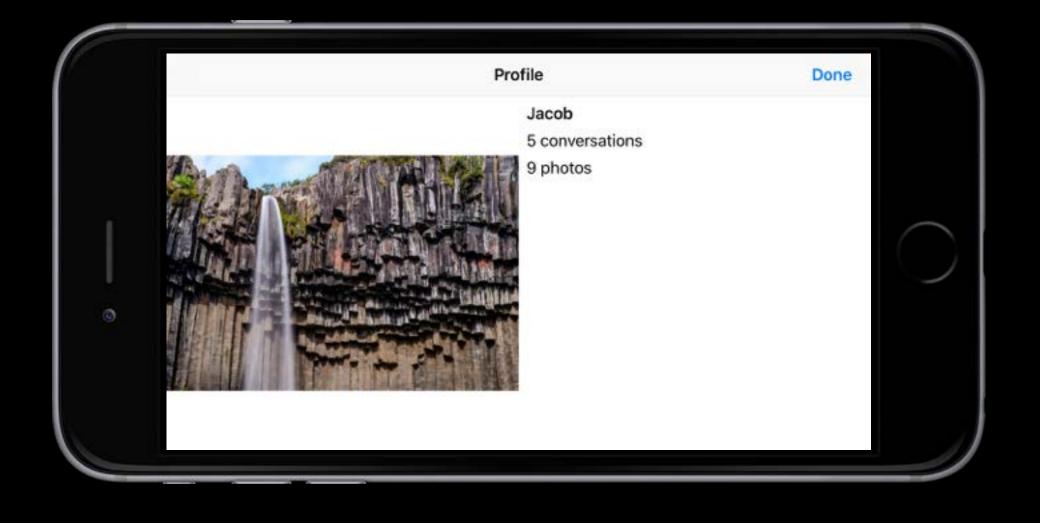
Not much!

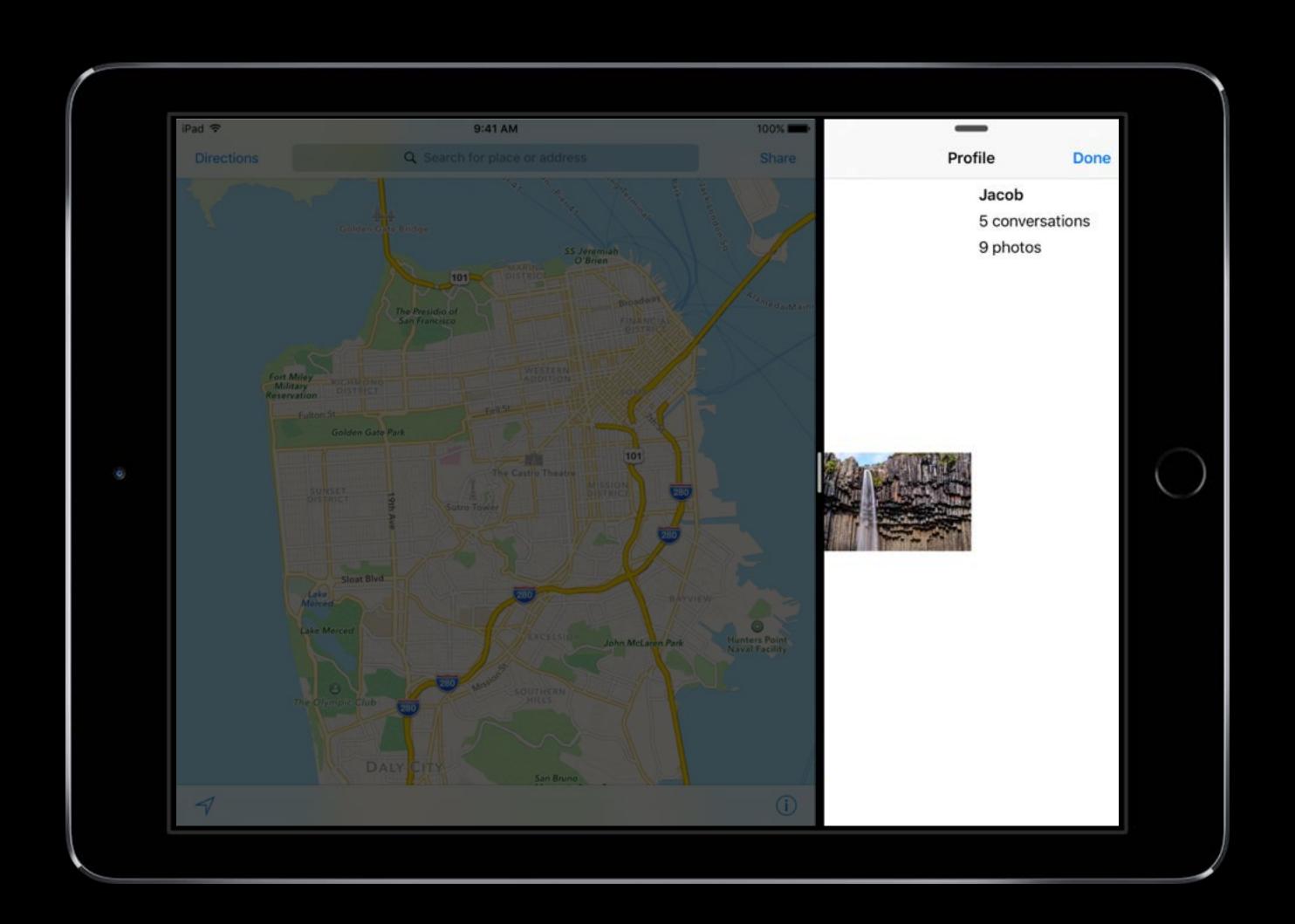
Orientation

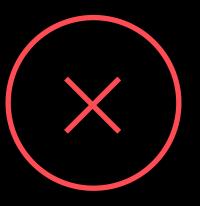
```
if UIInterfaceOrientationIsLandscape(interfaceOrientation) {
    // ...
}
```

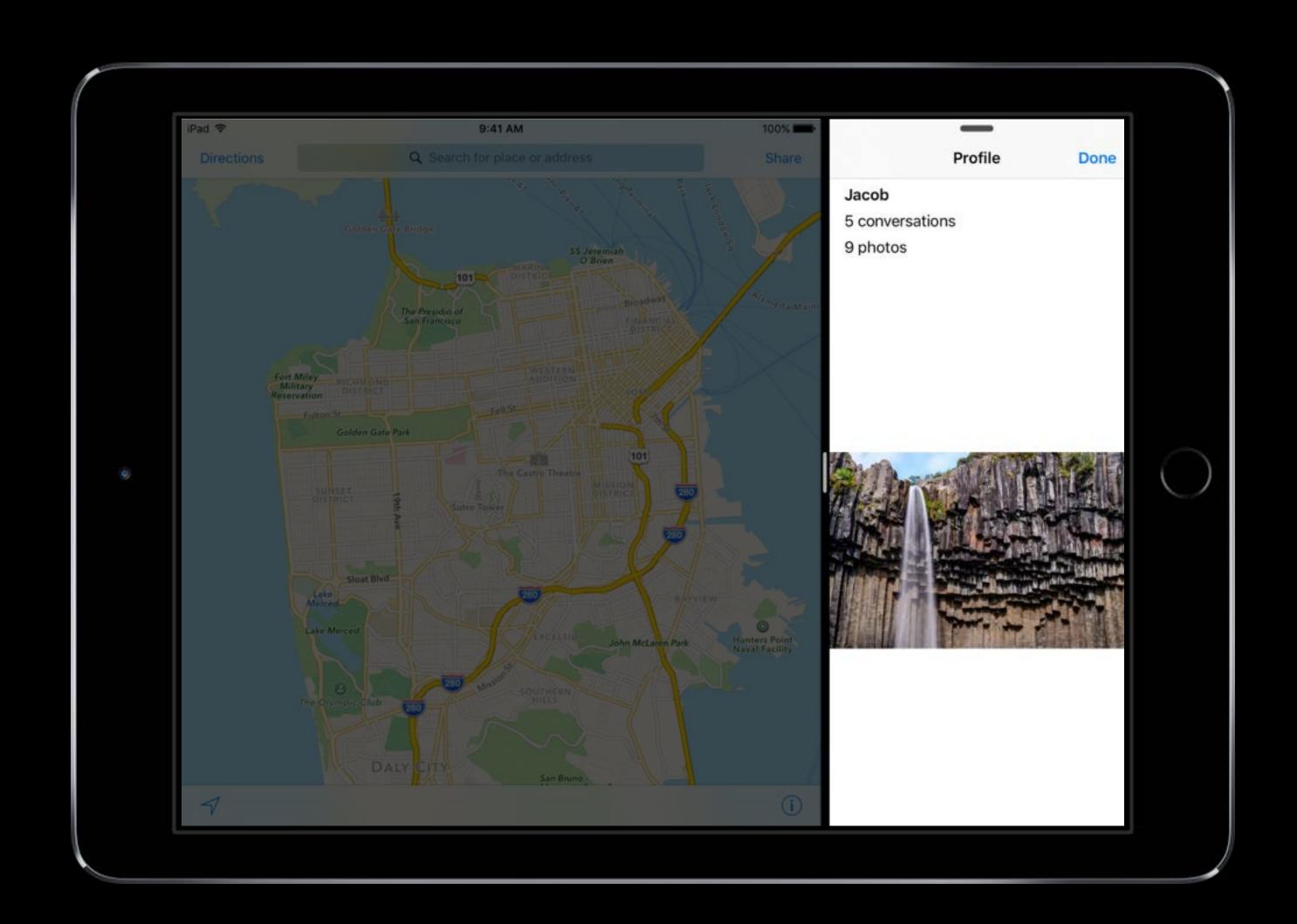














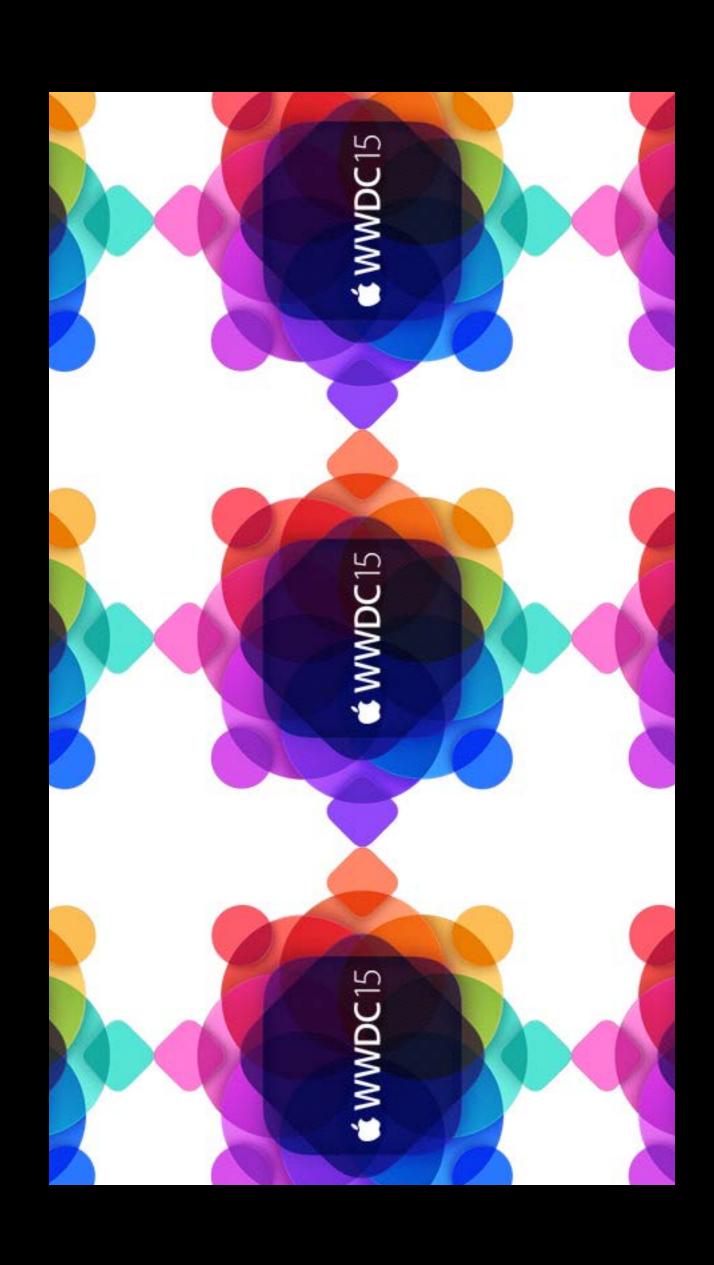


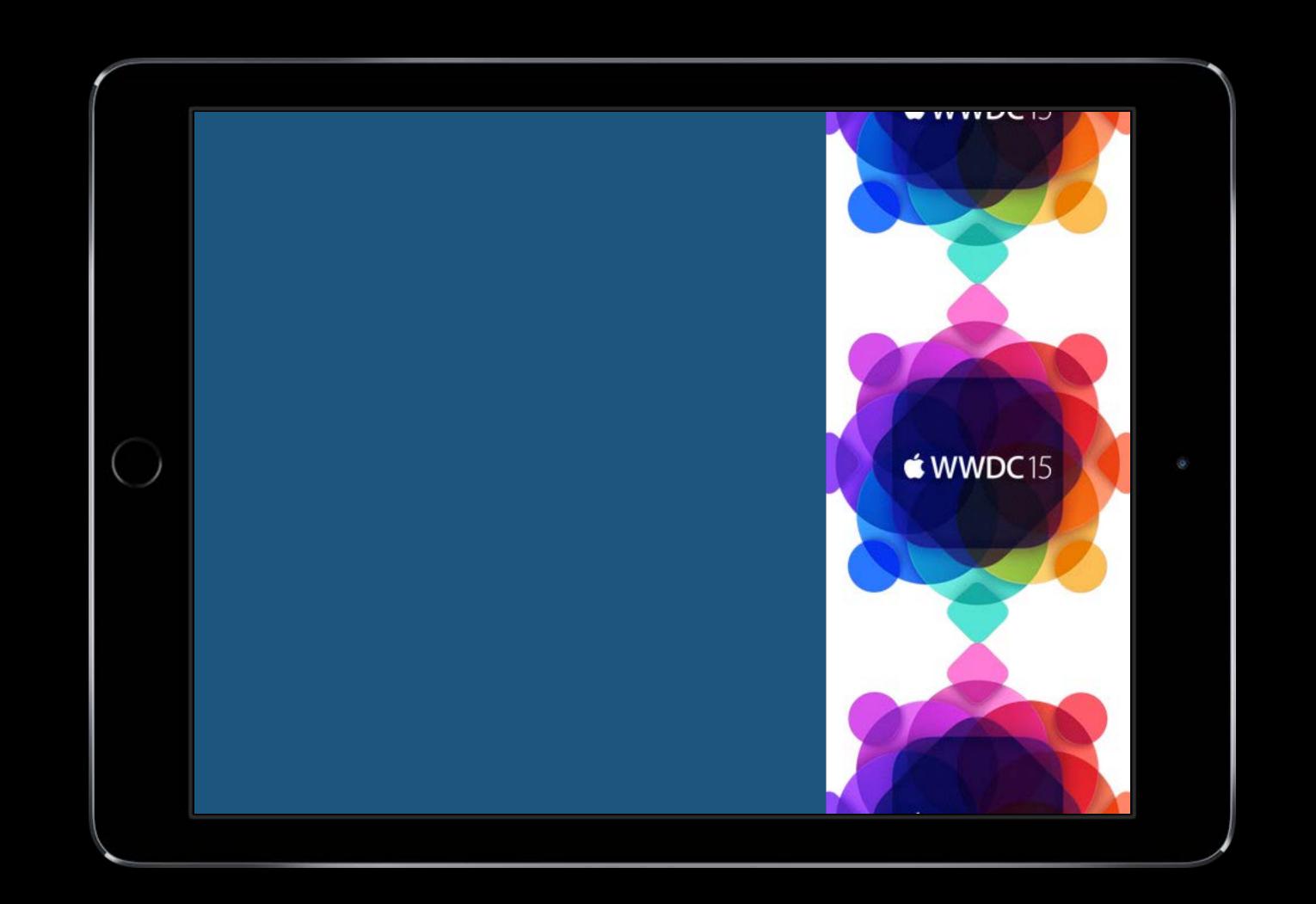


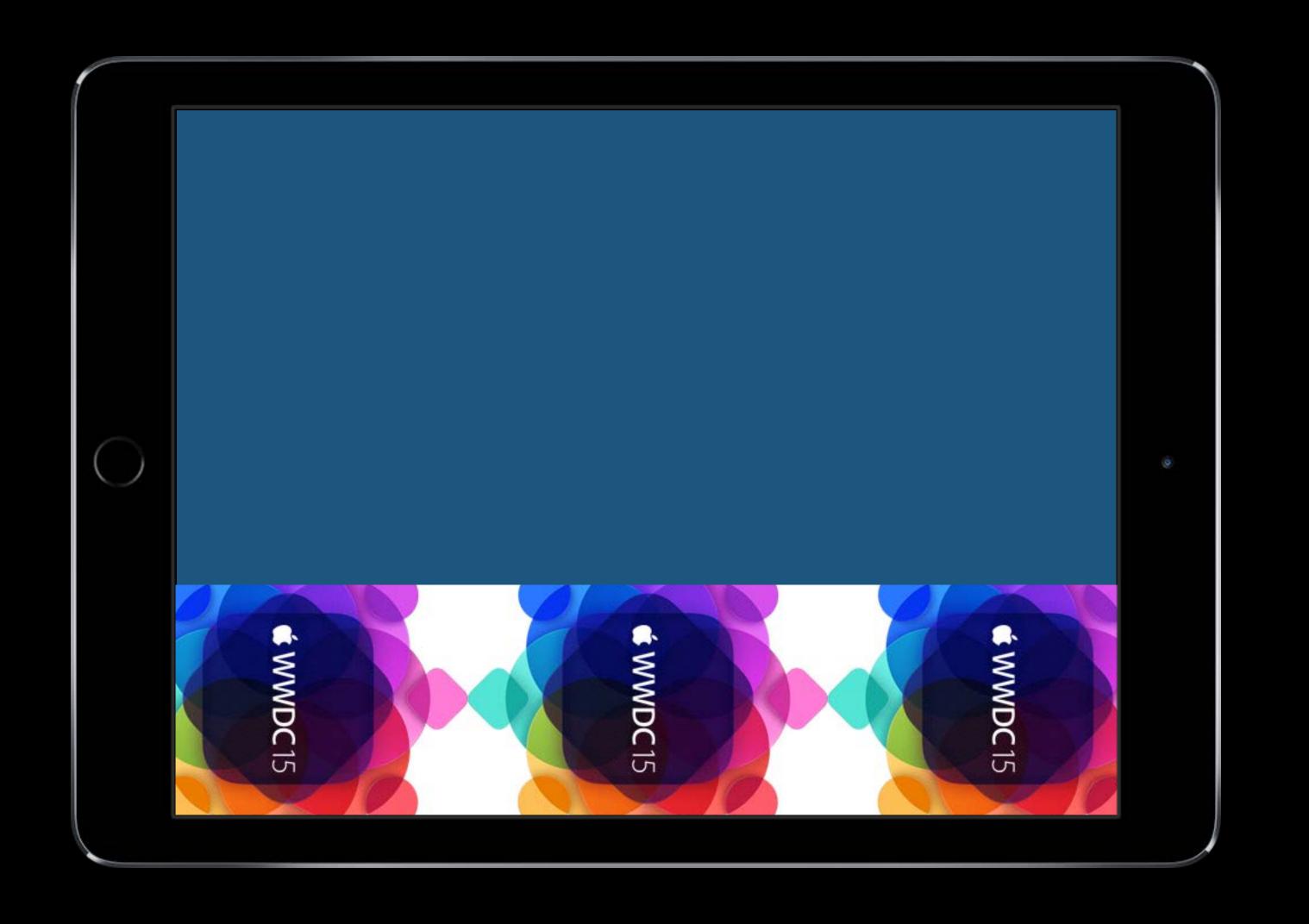




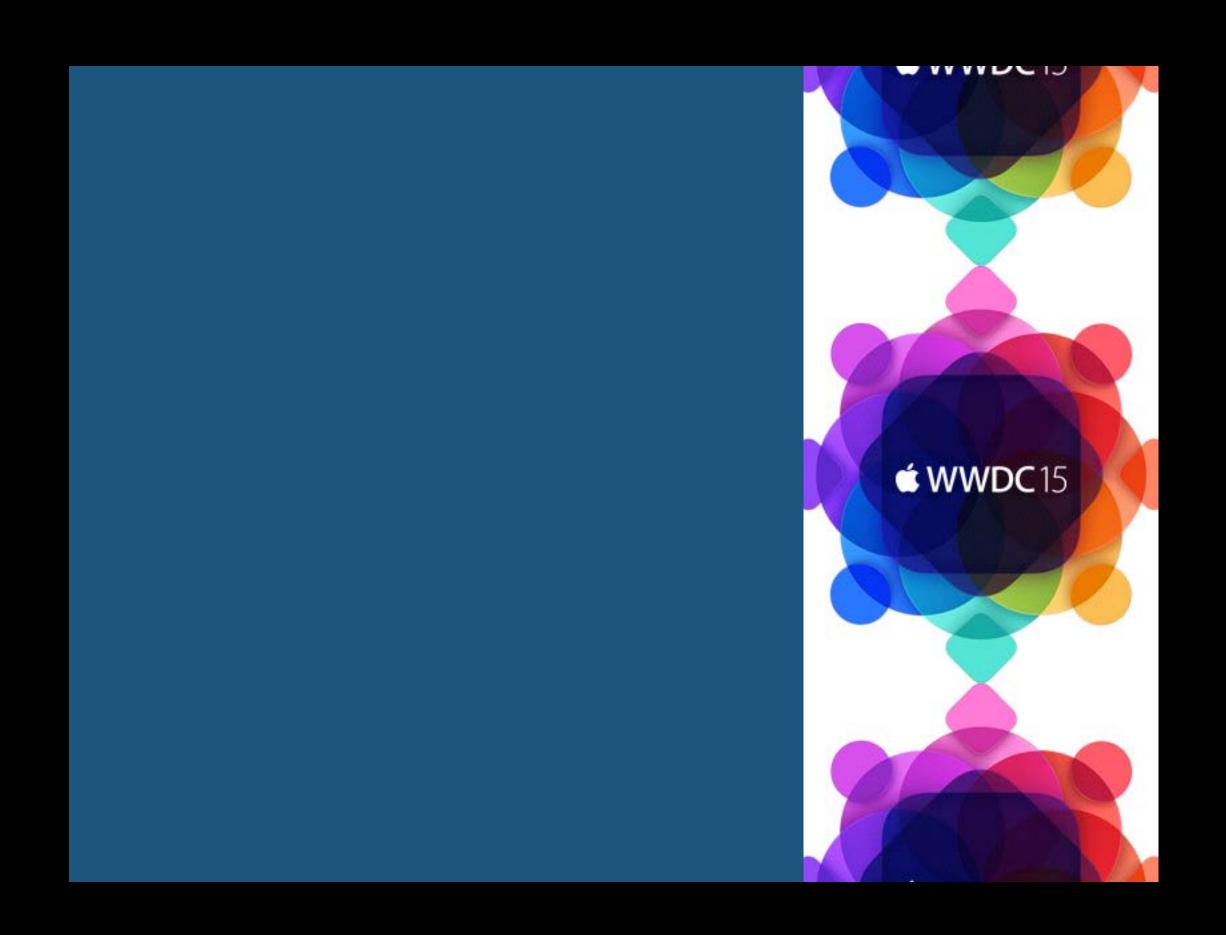








iPad Rotation



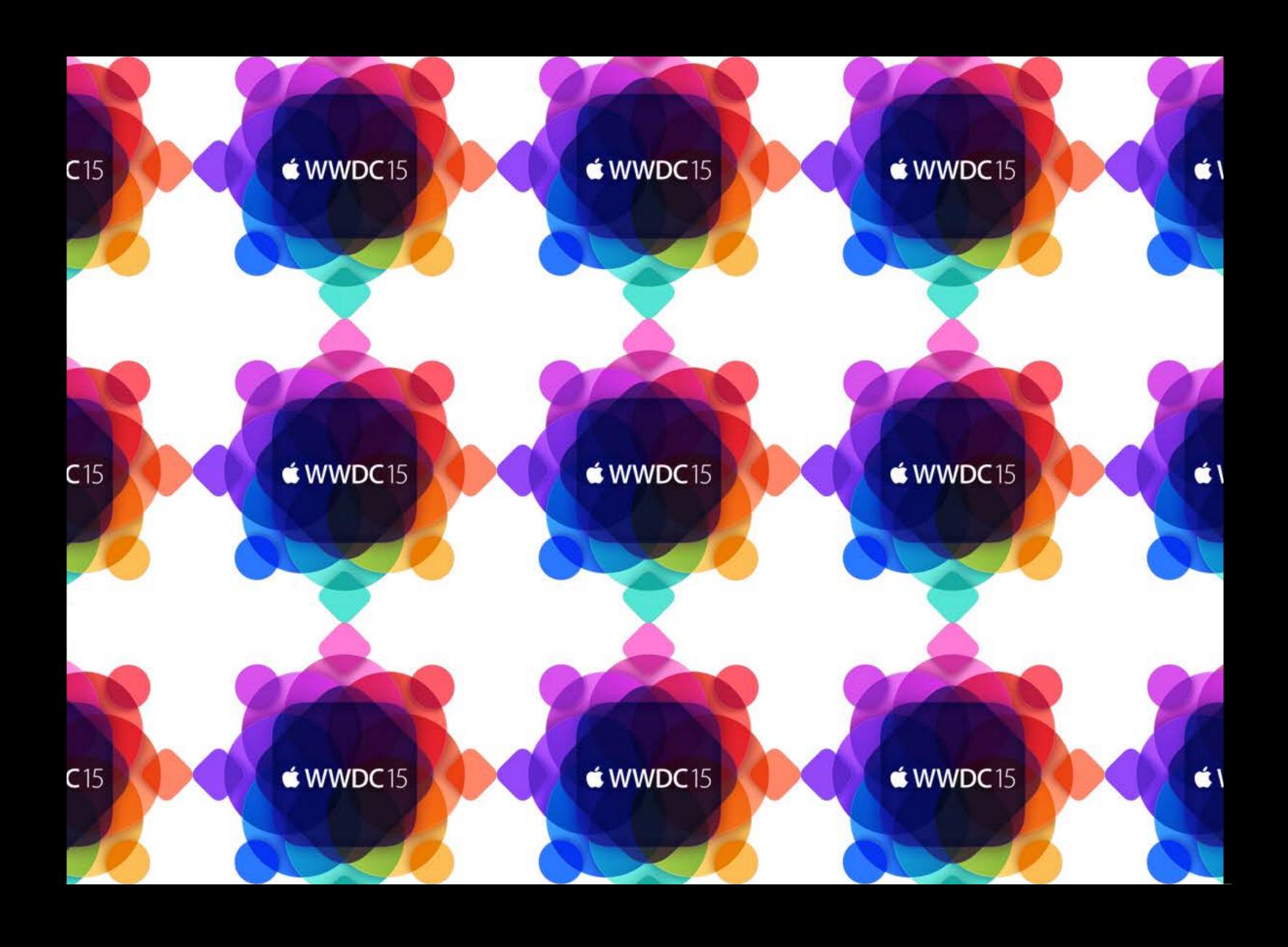
iPad Rotation



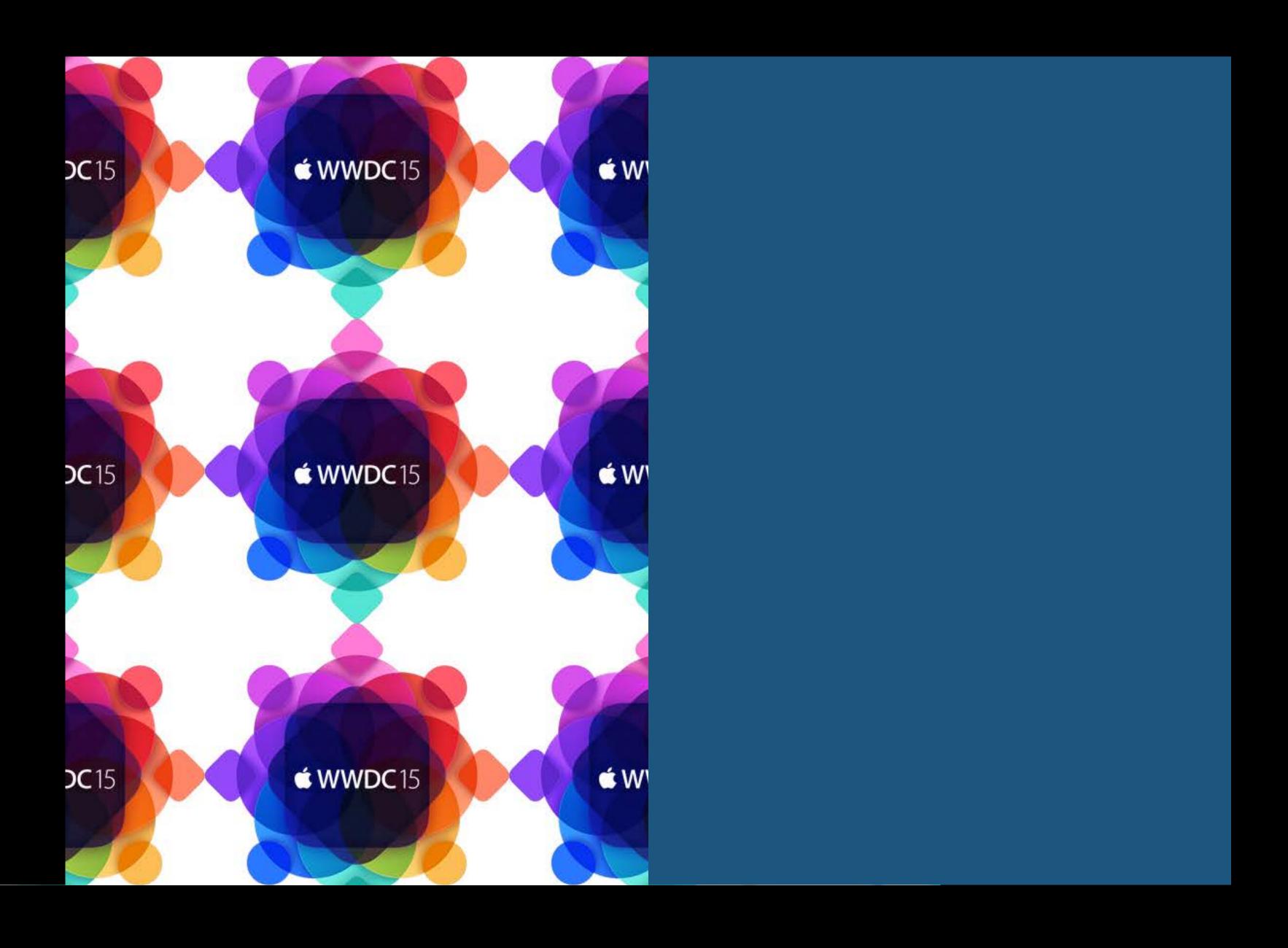
iPad Rotation



Multitasking Resize



Multitasking Resize



```
if UIInterfaceOrientationIsLandscape(interfaceOrientation) {
    // ...
}
```

Bounds

```
if view.bounds.size.width > view.bounds.size.height {
    // ...
}
```

Size Classes

```
if traitCollection.horizontalSizeClass == .Regular {
    // ...
}
```

Transitions

Responding to Rotation

willRotateToInterfaceOrientation
didRotateFromInterfaceOrientation
willAnimateRotationToInterfaceOrientation



Responding to Rotation and Resizing

willTransitionToTraitCollection
viewWillTransitionToSize



Setup

Setup

Create Animations

Setup

Create Animations

Run Animations

Setup

Create Animations

Run Animations

Setup

Sizes Change →

Create Animations

Run Animations

Setup

Sizes Change →

Create Animations

Run Animations

- → willTransitionToTraitCollection
- → viewWillTransitionToSize

→ willTransitionToTraitCollection Setup → viewWillTransitionToSize Sizes Change → traitCollectionDidChange **Create Animations** Run Animations Cleanup

Setup

Sizes Change → viewWillTransitionToSize
→ traitCollectionDidChange
→ animateAlongsideTransition

Run Animations

→ willTransitionToTraitCollection Setup → viewWillTransitionToSize Sizes Change → traitCollectionDidChange **Create Animations** → animateAlongsideTransition Run Animations Cleanup → completion

Multitasking Resize

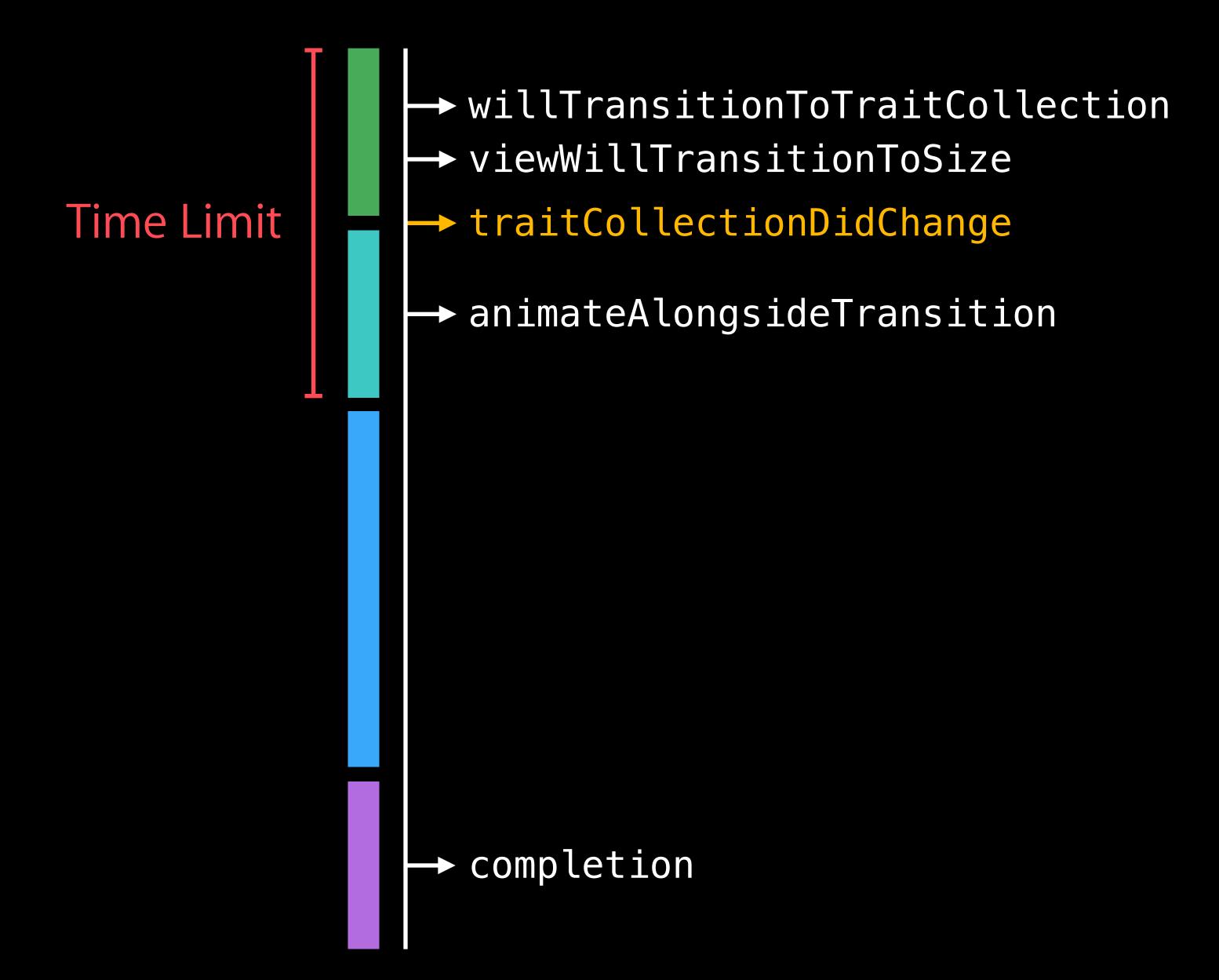
Setup

Setup

Create Animations

→ willTransitionToTraitCollection Setup → viewWillTransitionToSize Sizes Change → → traitCollectionDidChange **Create Animations** → animateAlongsideTransition Run Animations Cleanup → completion

```
→ willTransitionToTraitCollection
→ viewWillTransitionToSize
traitCollectionDidChange
animateAlongsideTransition
→ completion
```

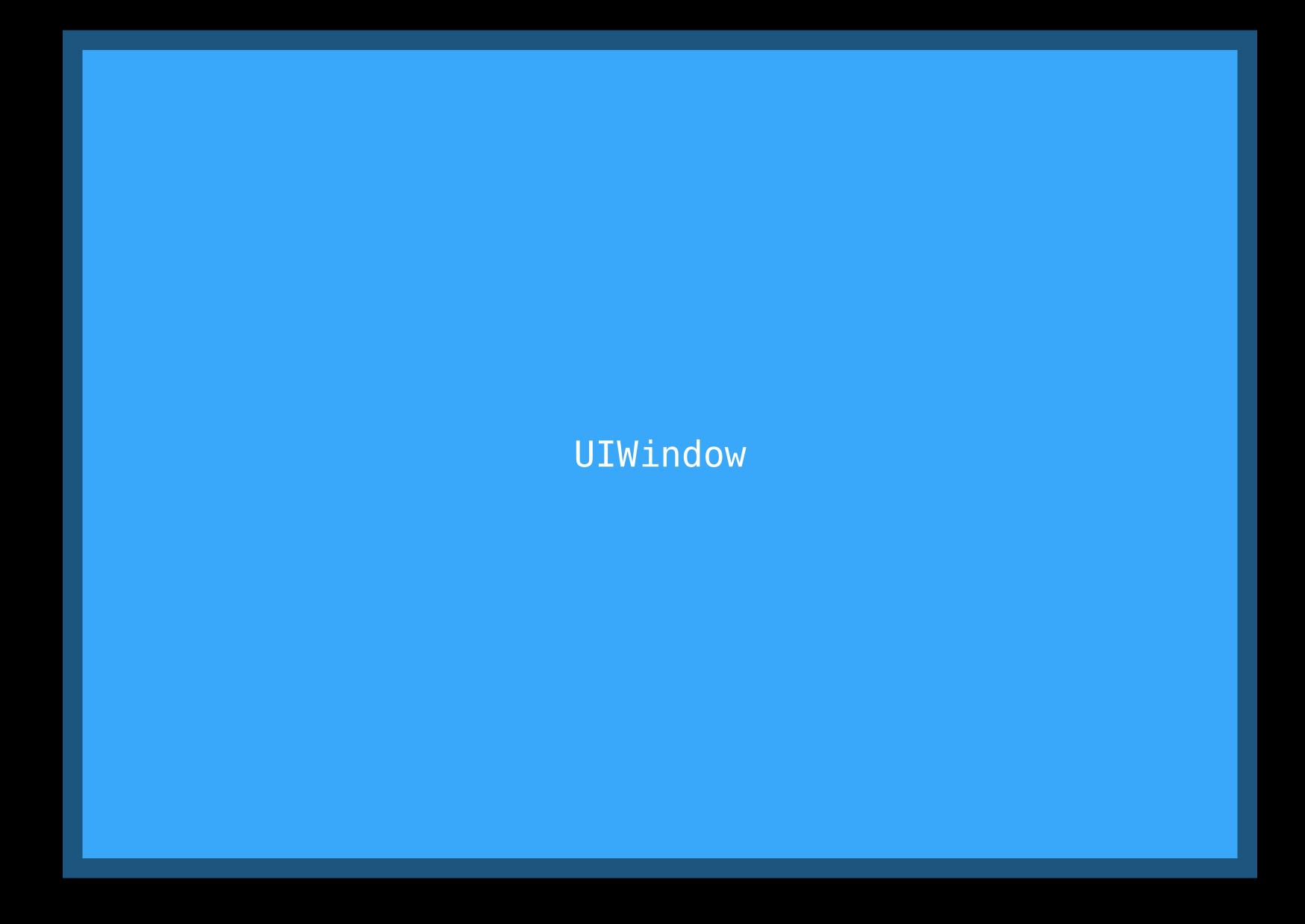


→ willTransitionToTraitCollection Setup → viewWillTransitionToSize Sizes Change → → traitCollectionDidChange Create Animations → animateAlongsideTransition Run Animations Cleanup → completion

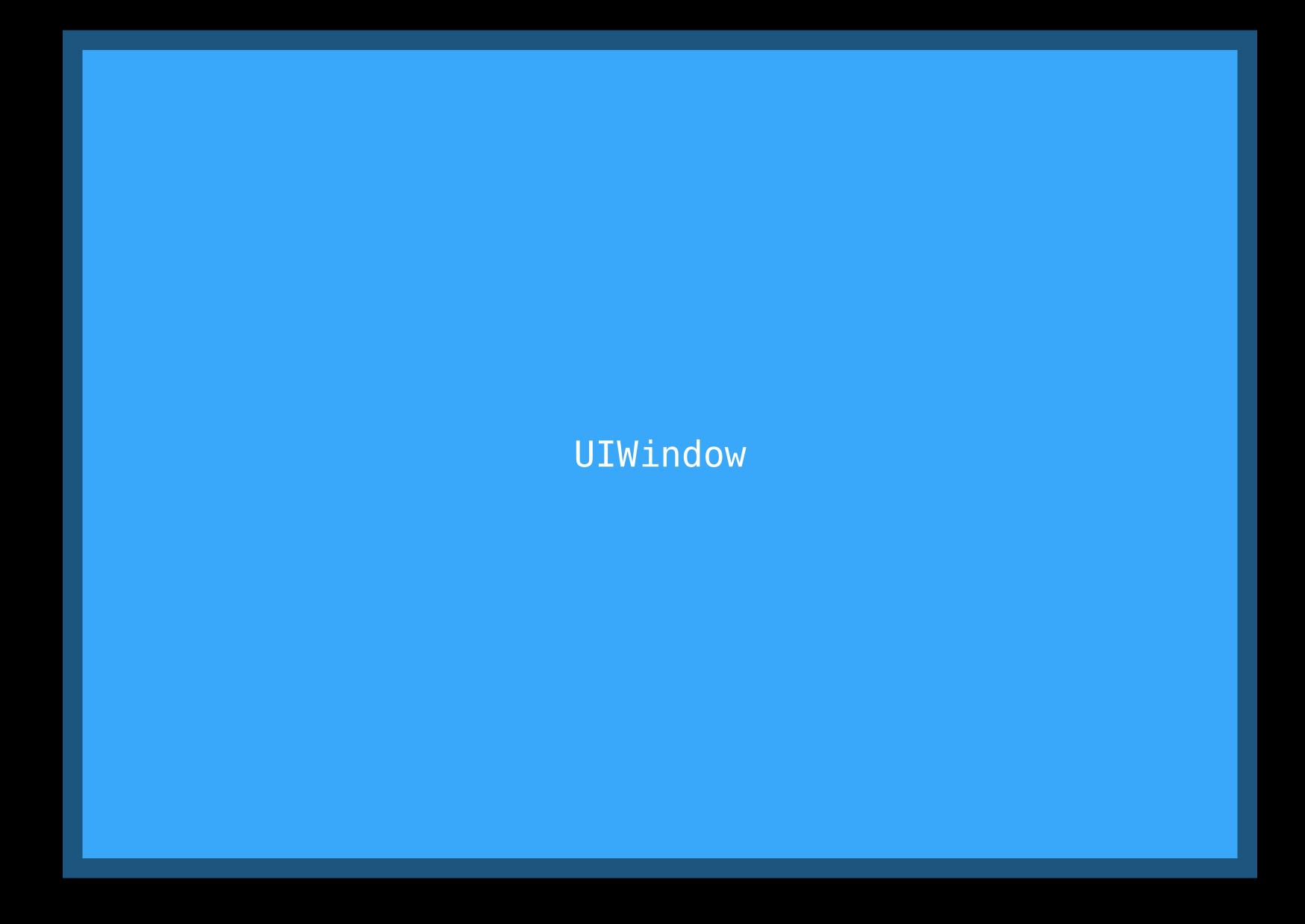
Setup → viewWillTransitionToSize Sizes Change → **Create Animations** → animateAlongsideTransition Run Animations Cleanup → completion

→ willTransitionToTraitCollection Setup Sizes Change → traitCollectionDidChange **Create Animations** → animateAlongsideTransition Run Animations Cleanup → completion

→ willTransitionToTraitCollection Setup → viewWillTransitionToSize Sizes Change → → traitCollectionDidChange Create Animations → animateAlongsideTransition Run Animations Cleanup → completion

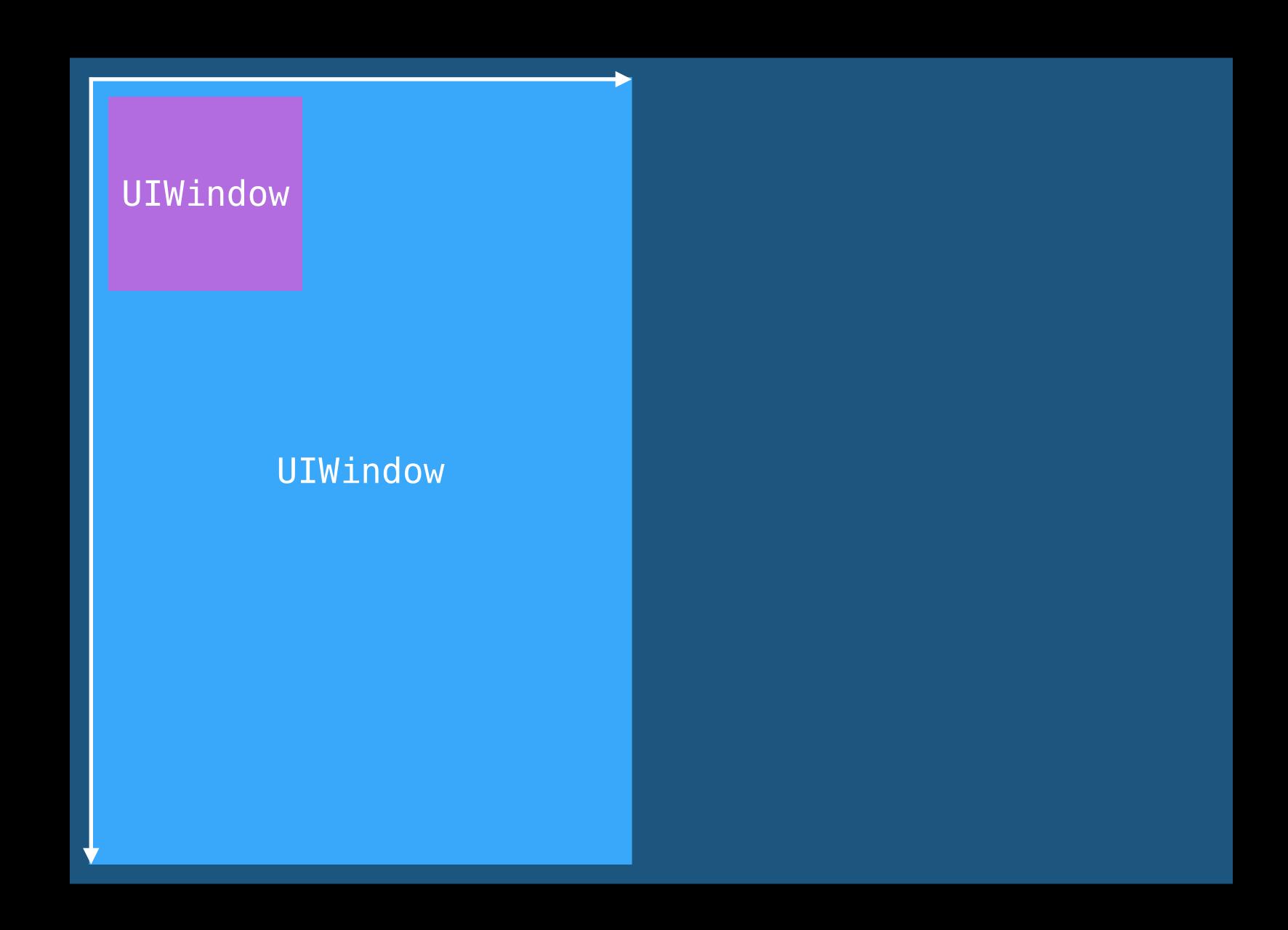


UIWindow



UIWindow UIWindow

UIWindow UIWindow



UIWindow UIWindow

```
SWIFT:
UIWindow(frame: UIScreen.mainScreen.bounds())

OBJECTIVE-C:
[[UIWindow alloc] initWithFrame:[[UIScreen mainScreen]
bounds]
```



```
SWIFT:
UIWindow()

OBJECTIVE-C:
[[UIWindow alloc] init]
```

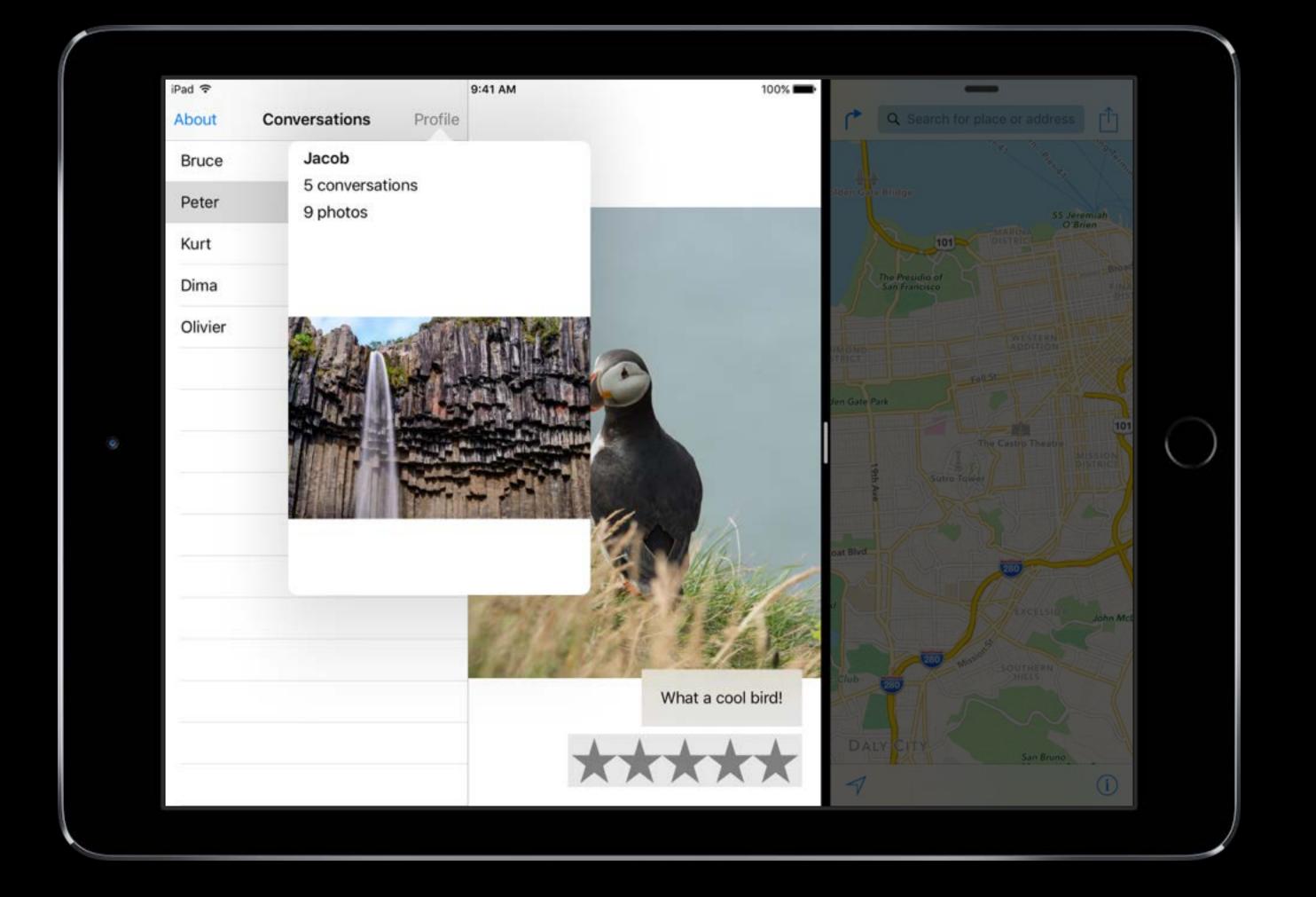
Presentation

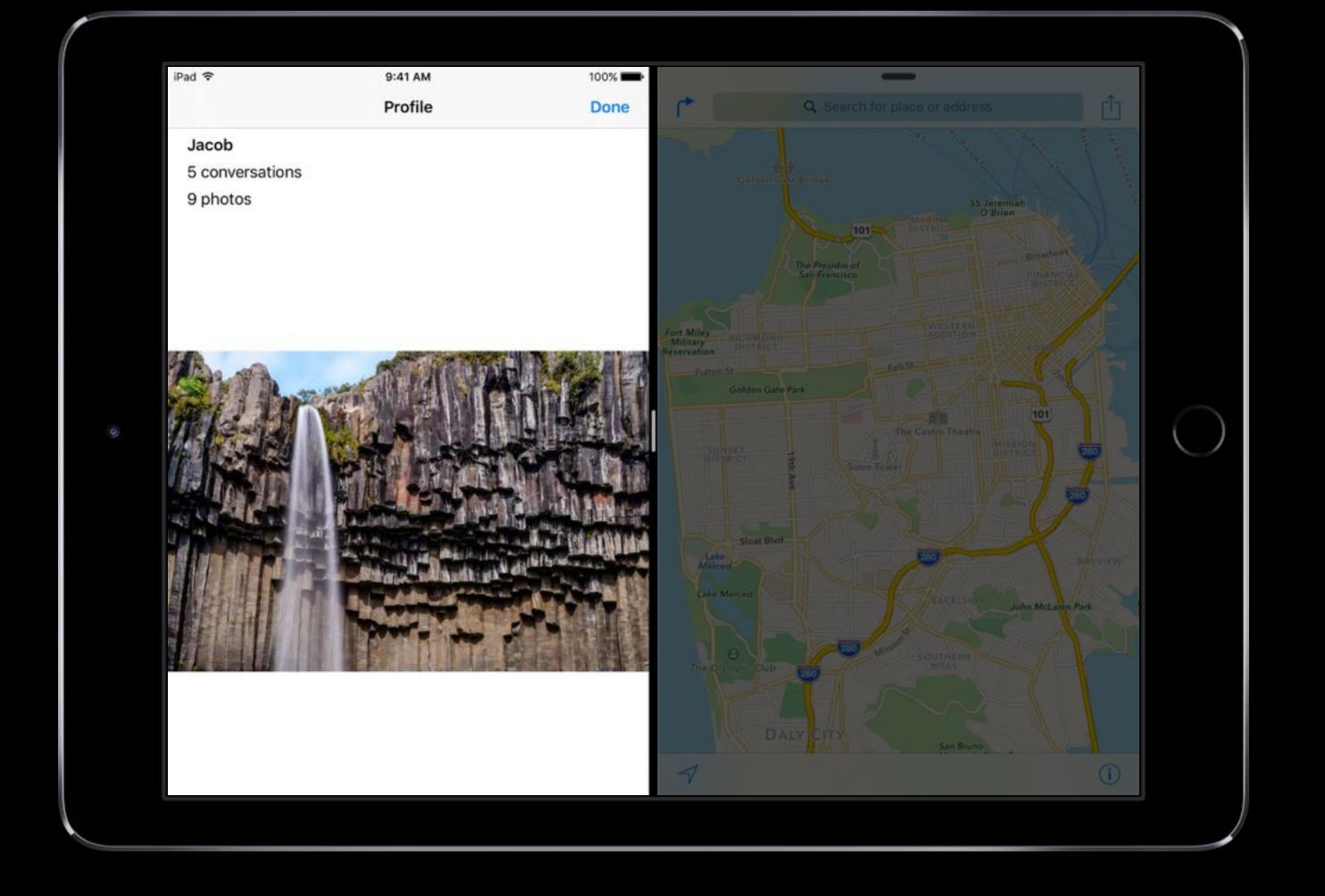
Presentation

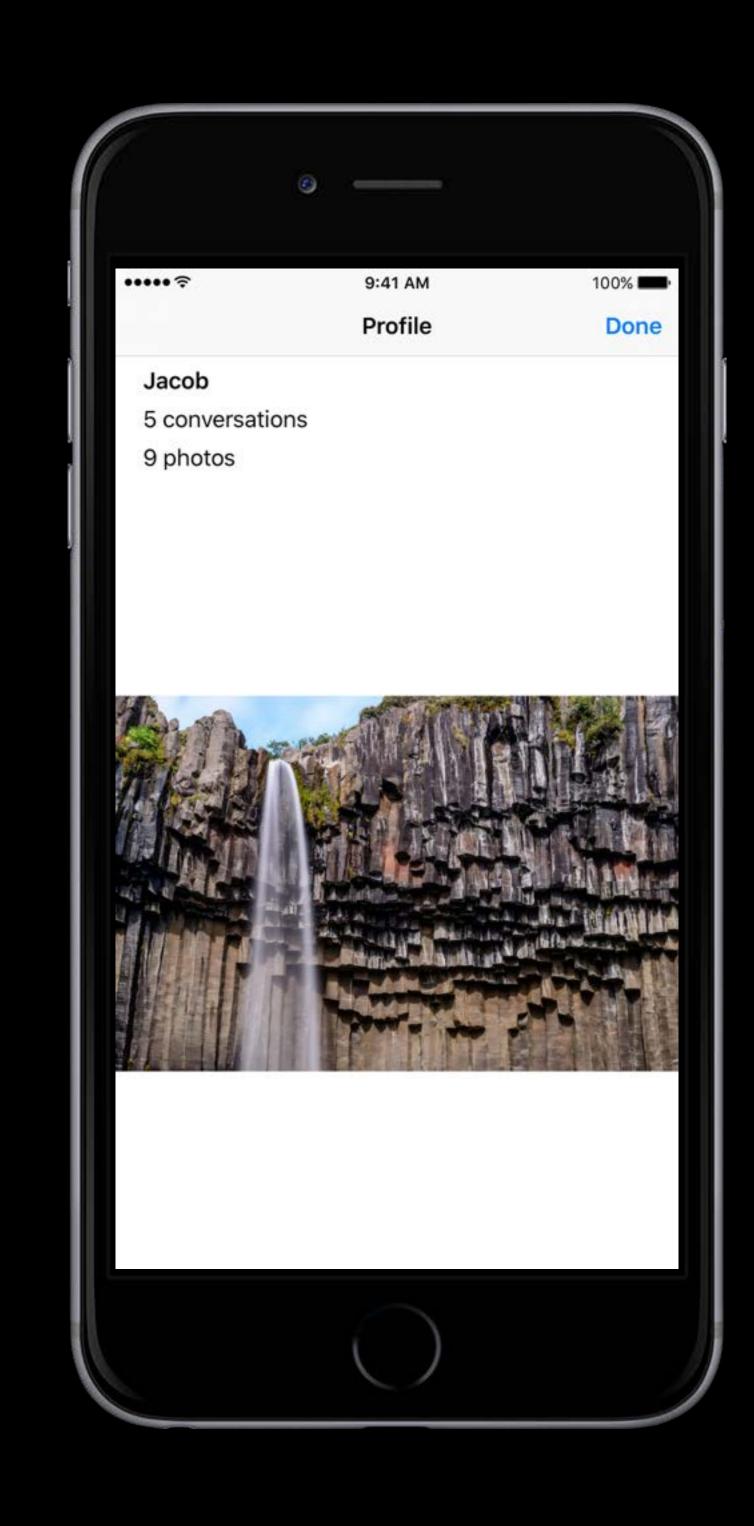
UIPresentationController

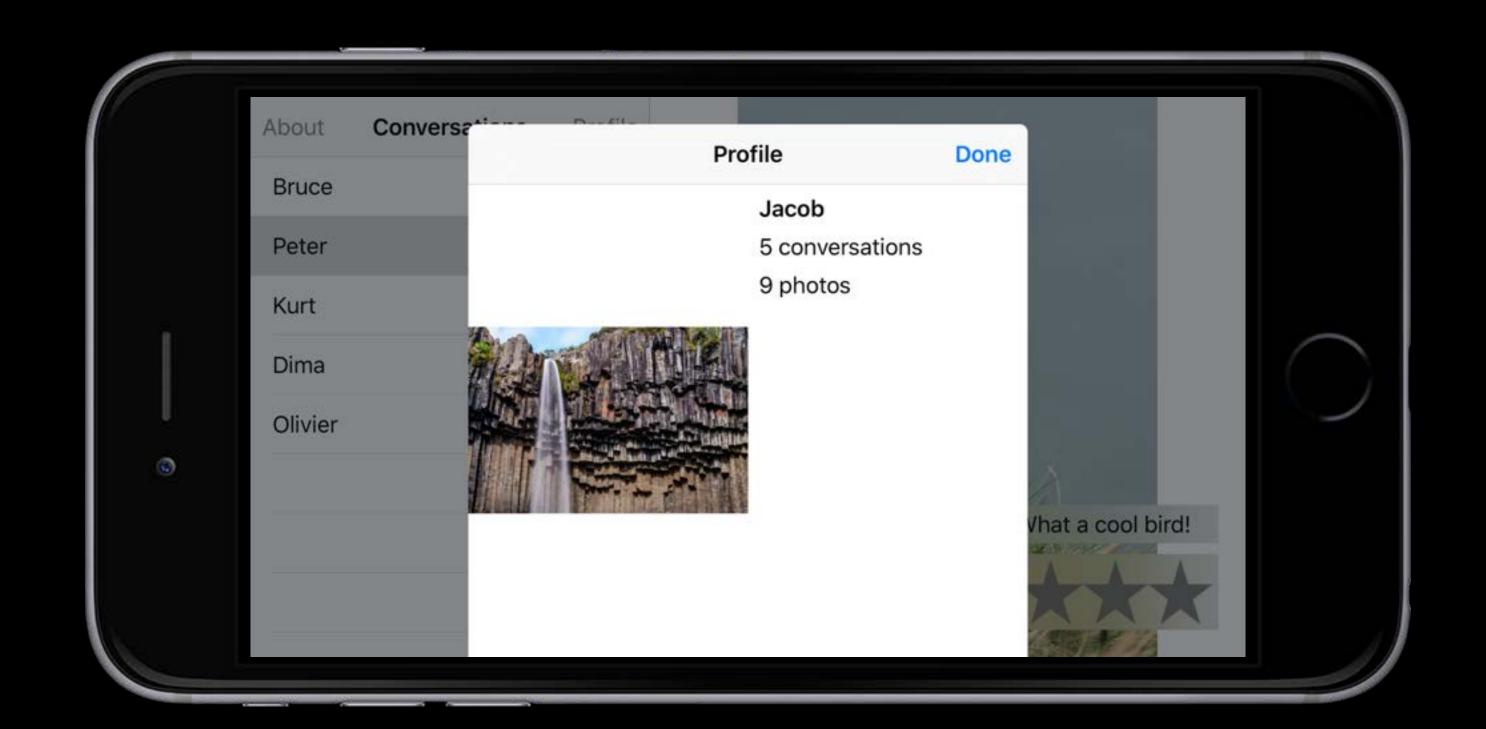
Presentation

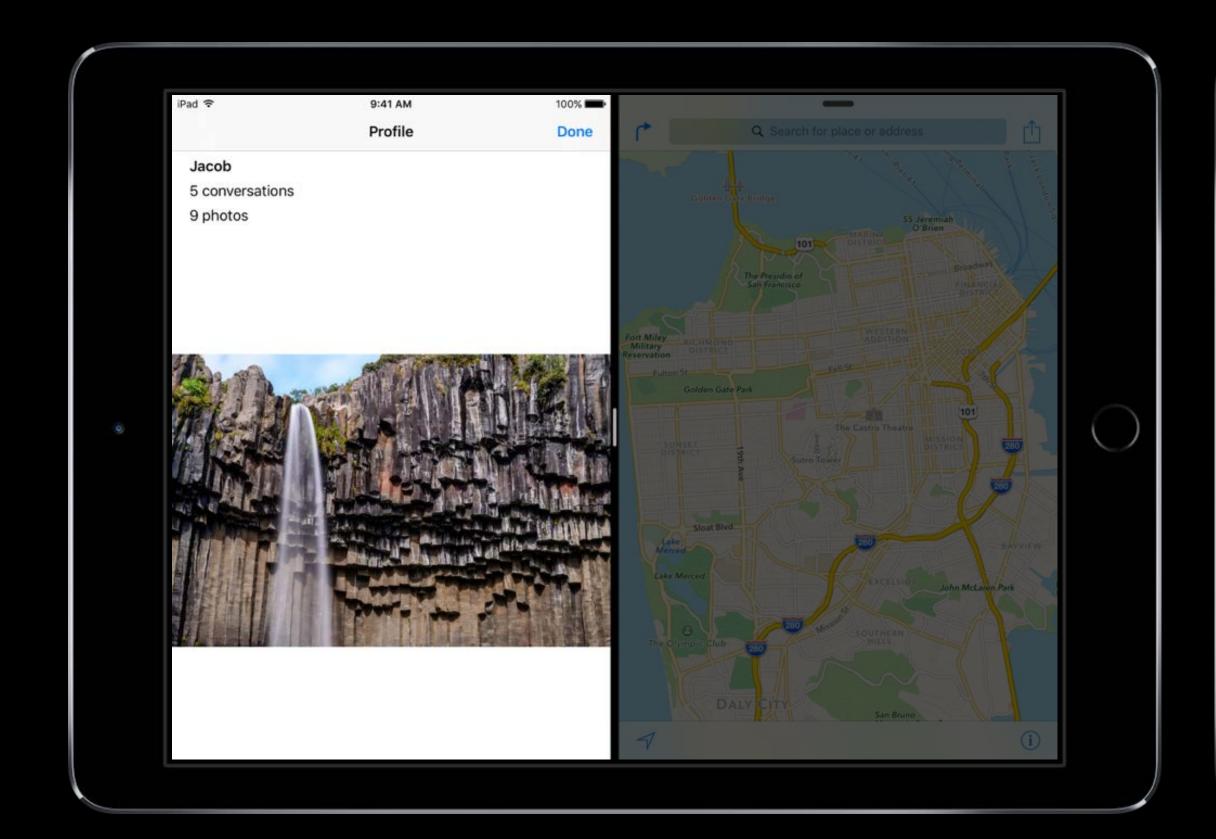
UIPresentationController

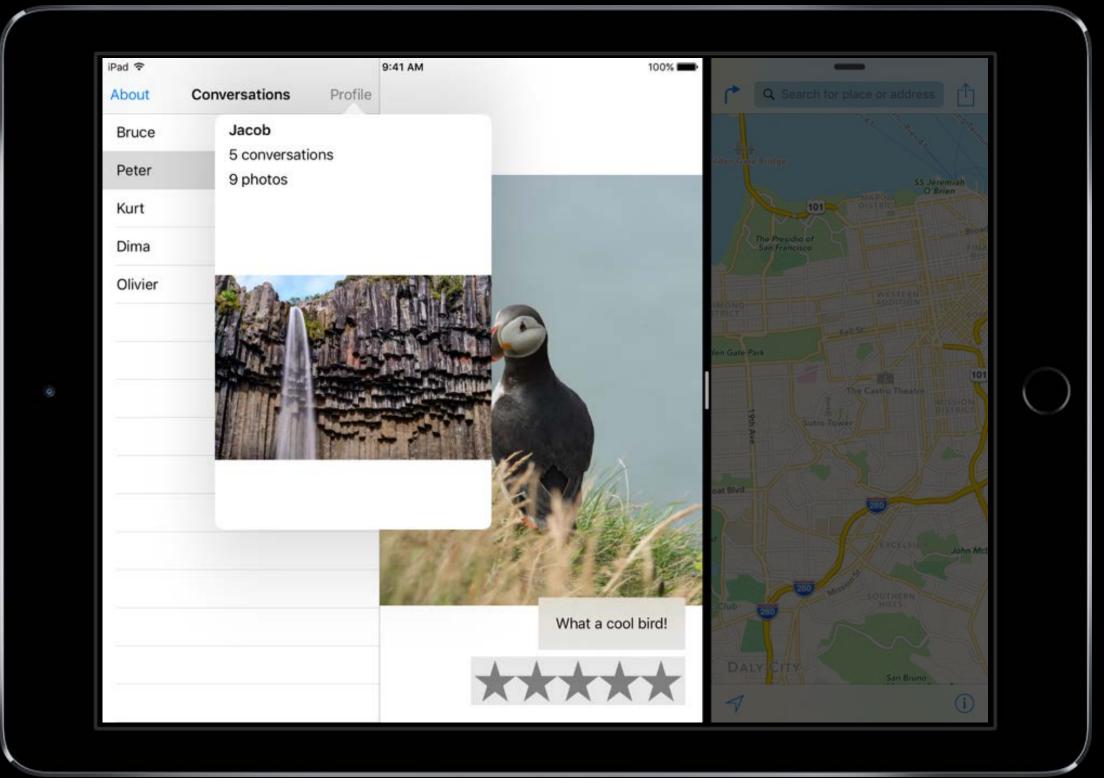


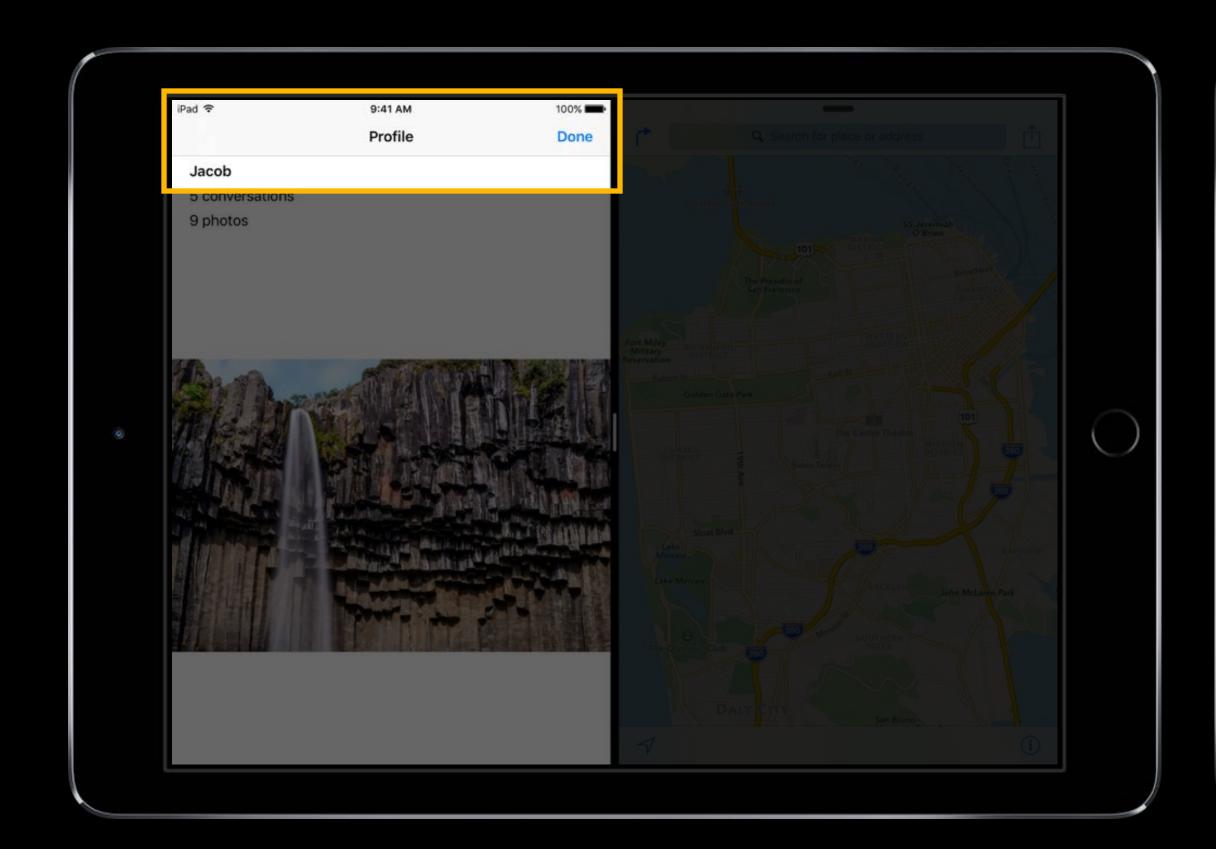


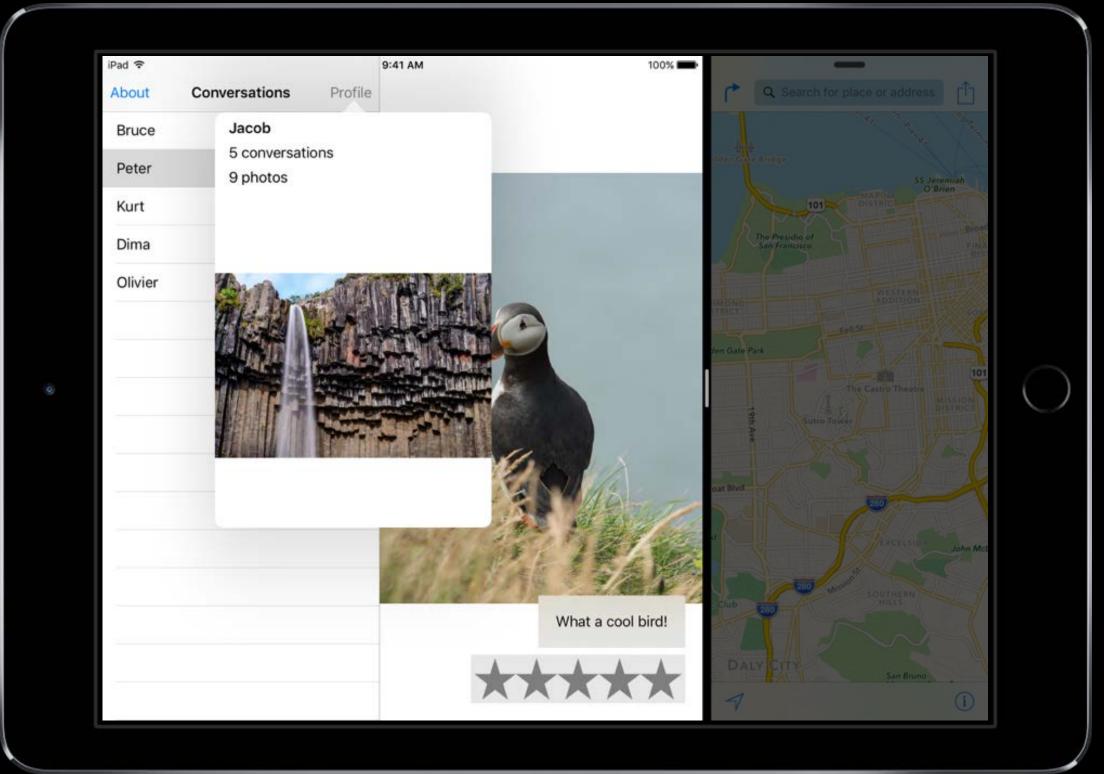


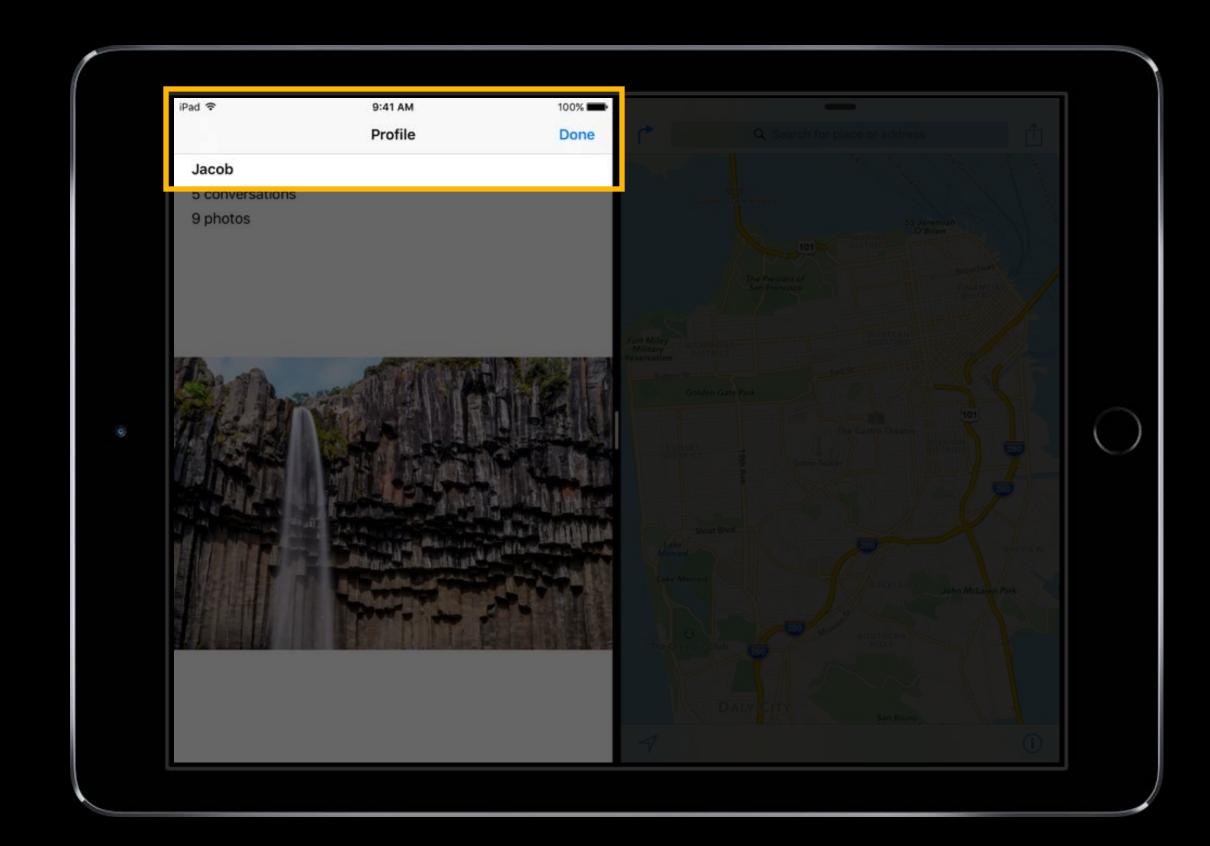


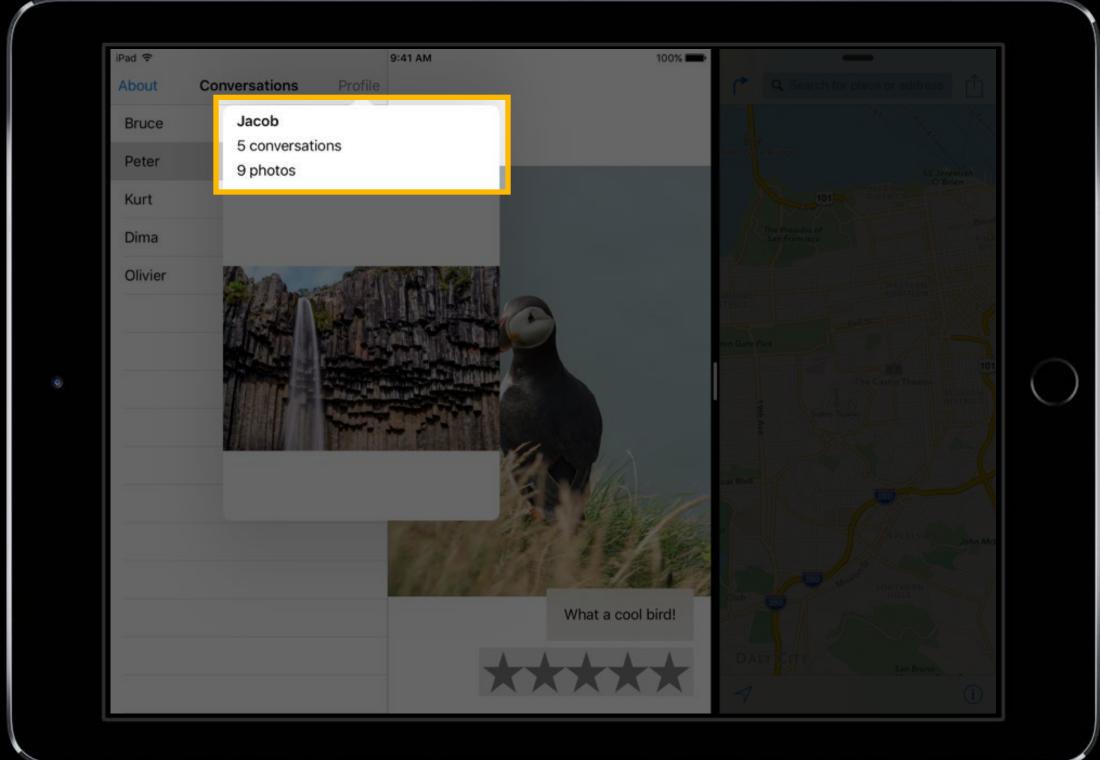










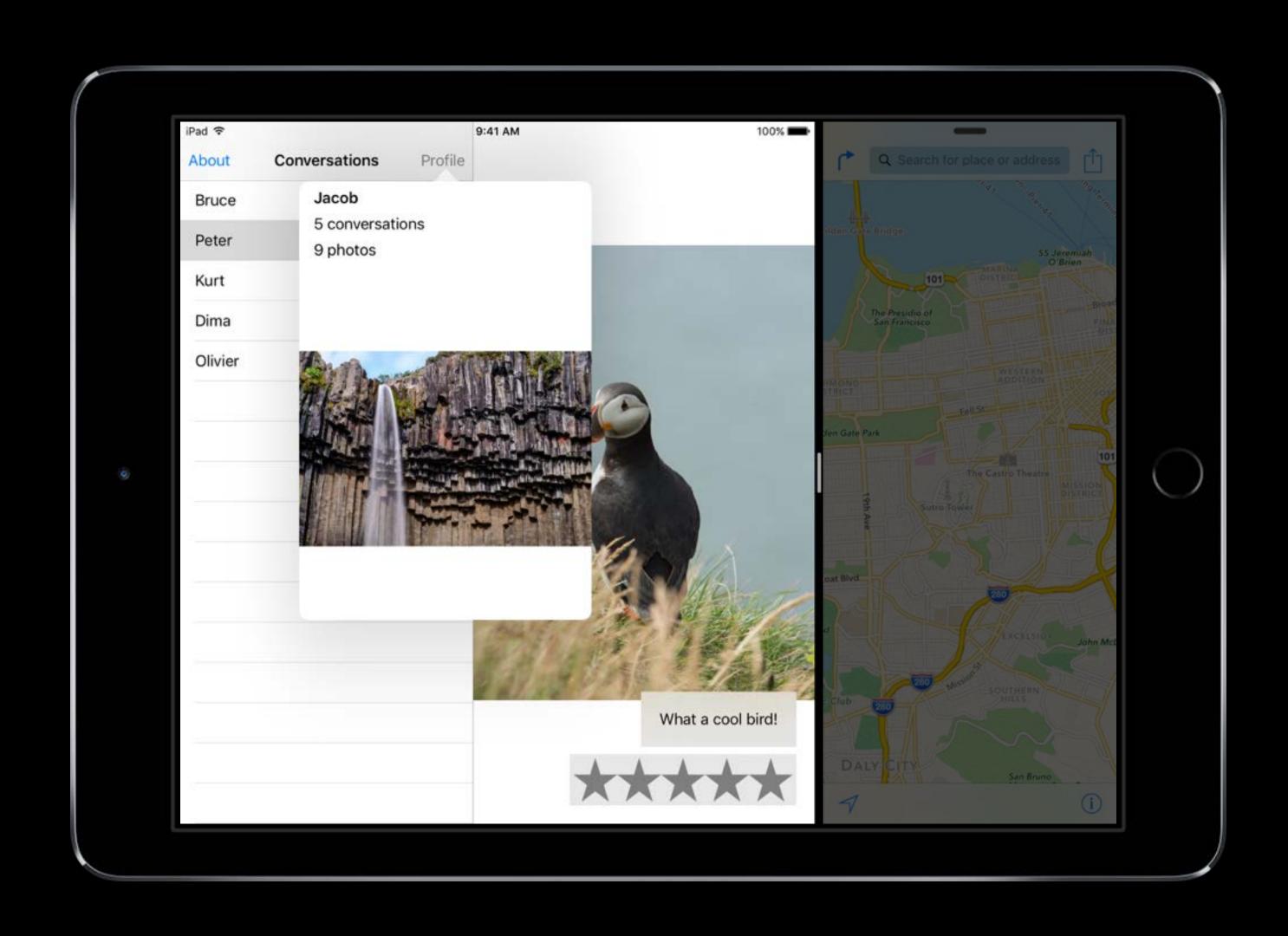


UIAdaptivePresentationControllerDelegate

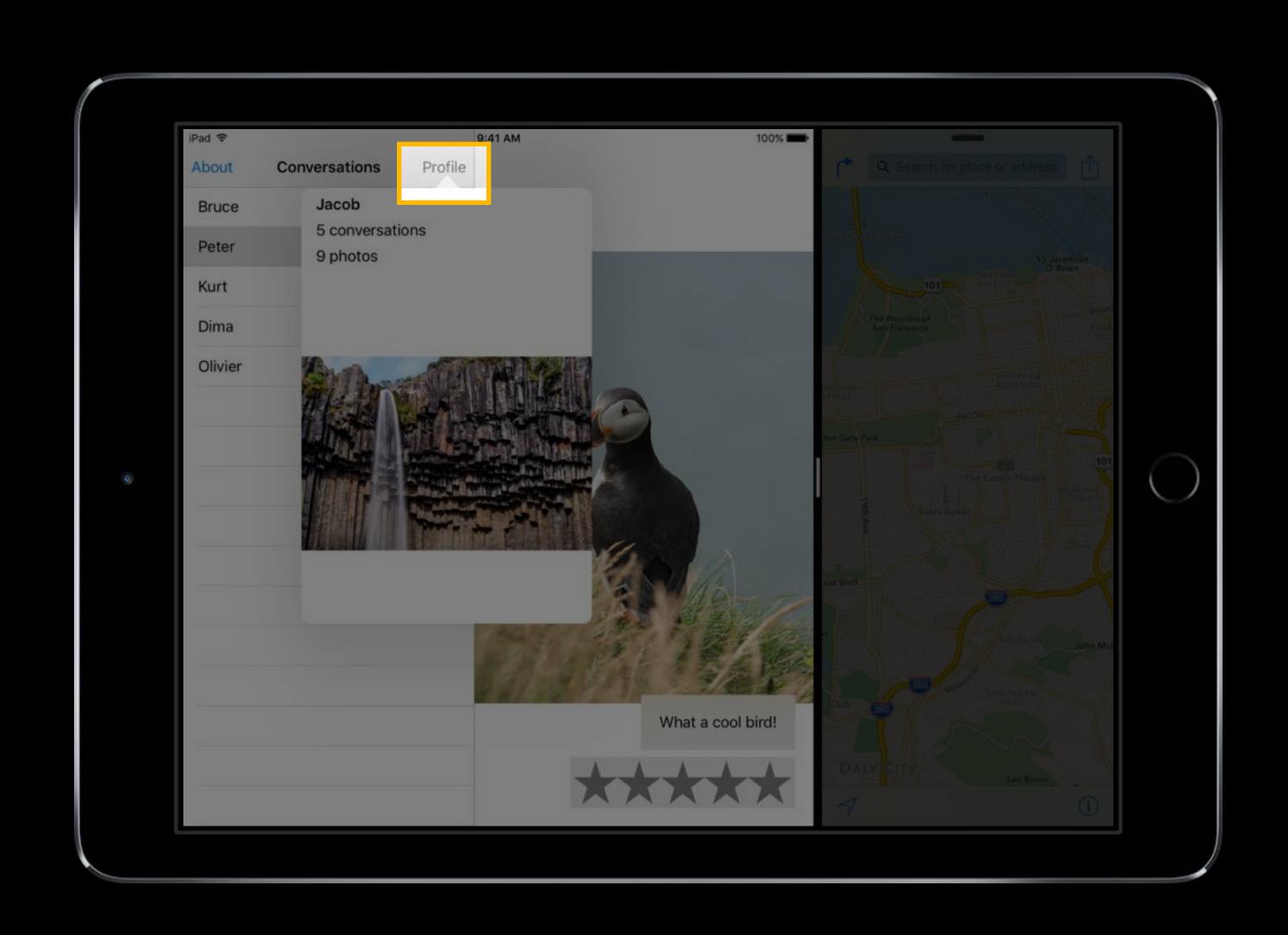


UIAdaptivePresentationControllerDelegate
 adaptivePresentationStyleForPresentationController
 willPresentWithAdaptiveStyle

Popover



Popover



Popover Source

popoverPresentationController.barButtonItem = sender

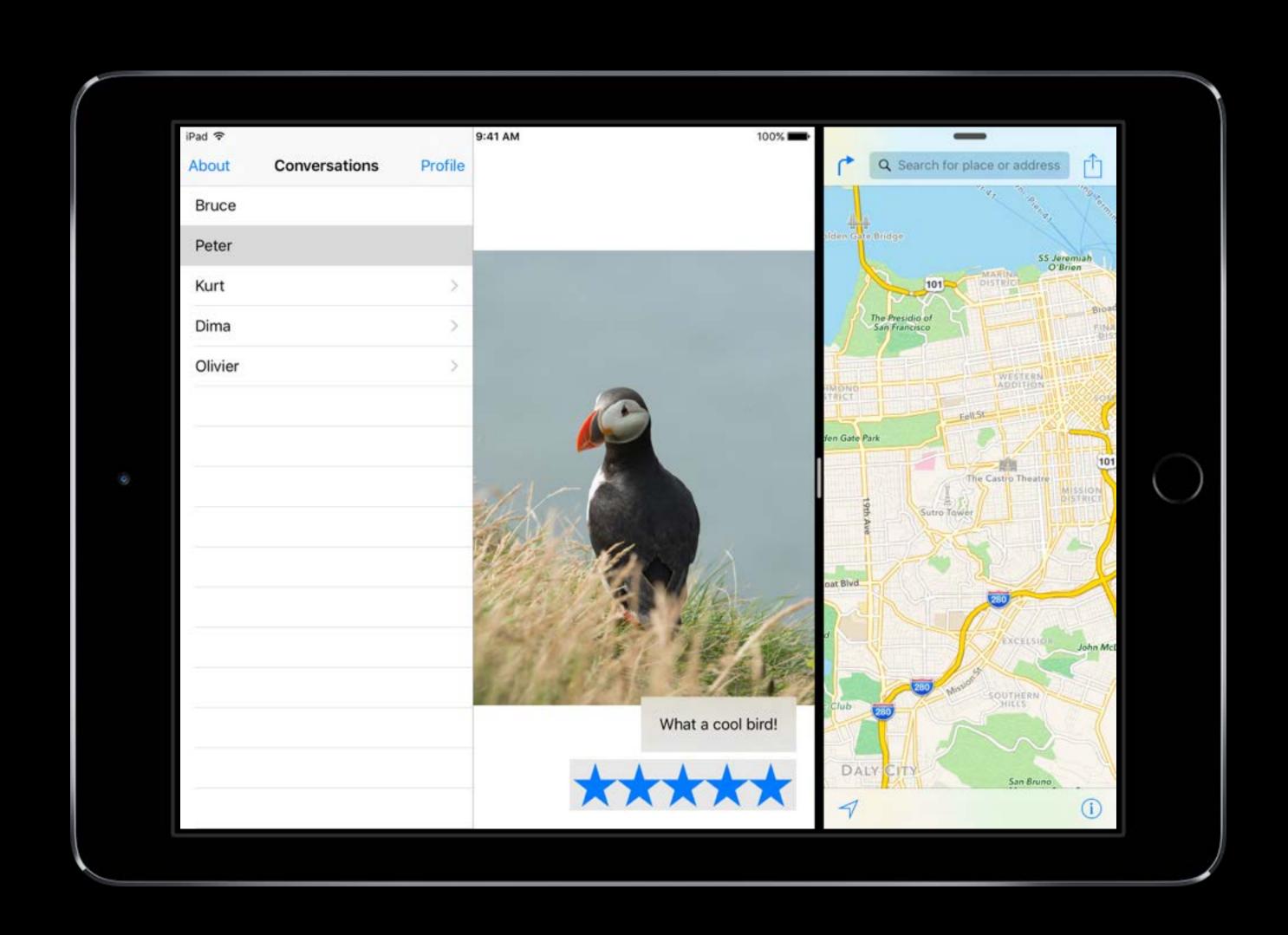
Popover Source

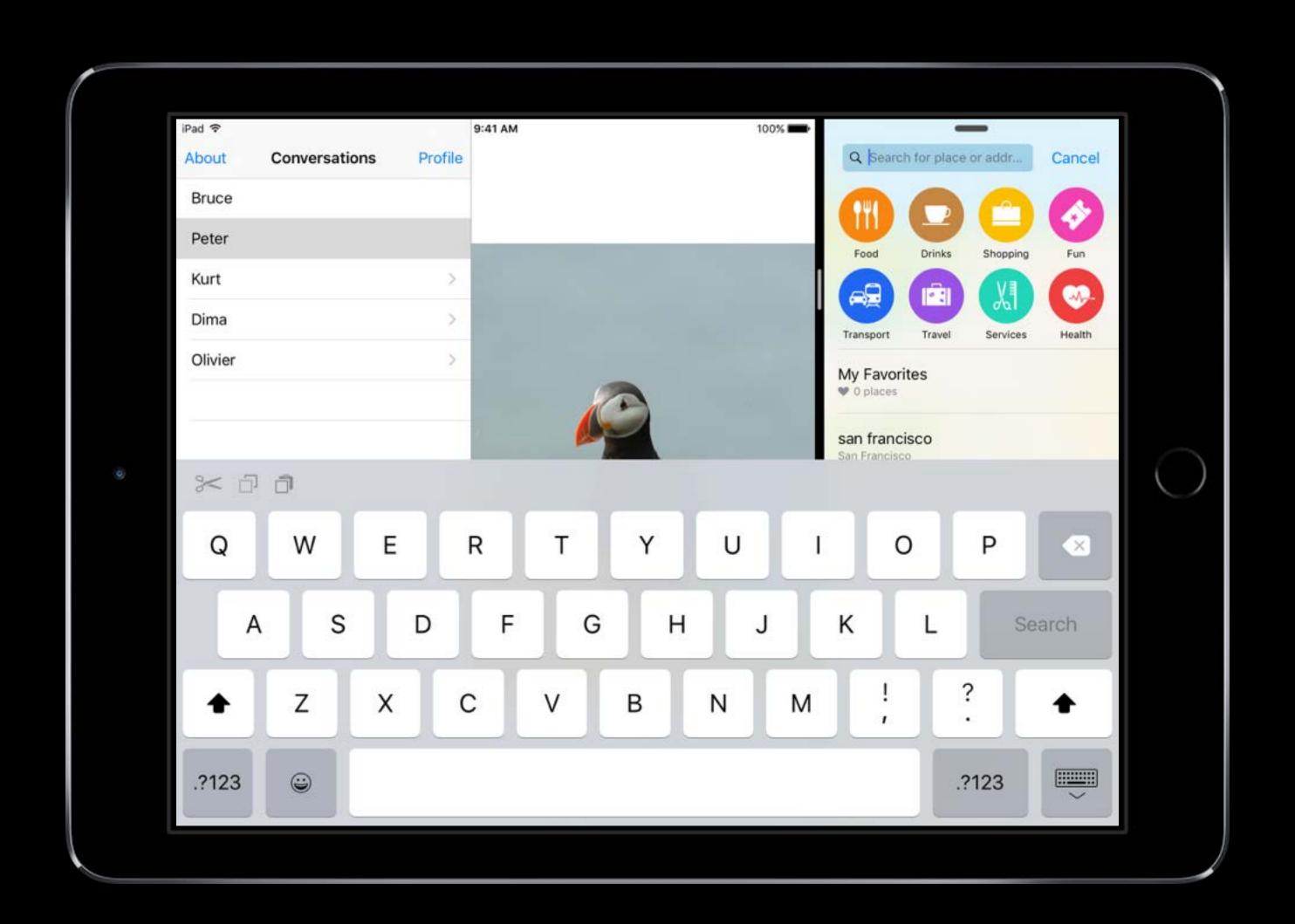
popoverPresentationController.barButtonItem = sender

OR

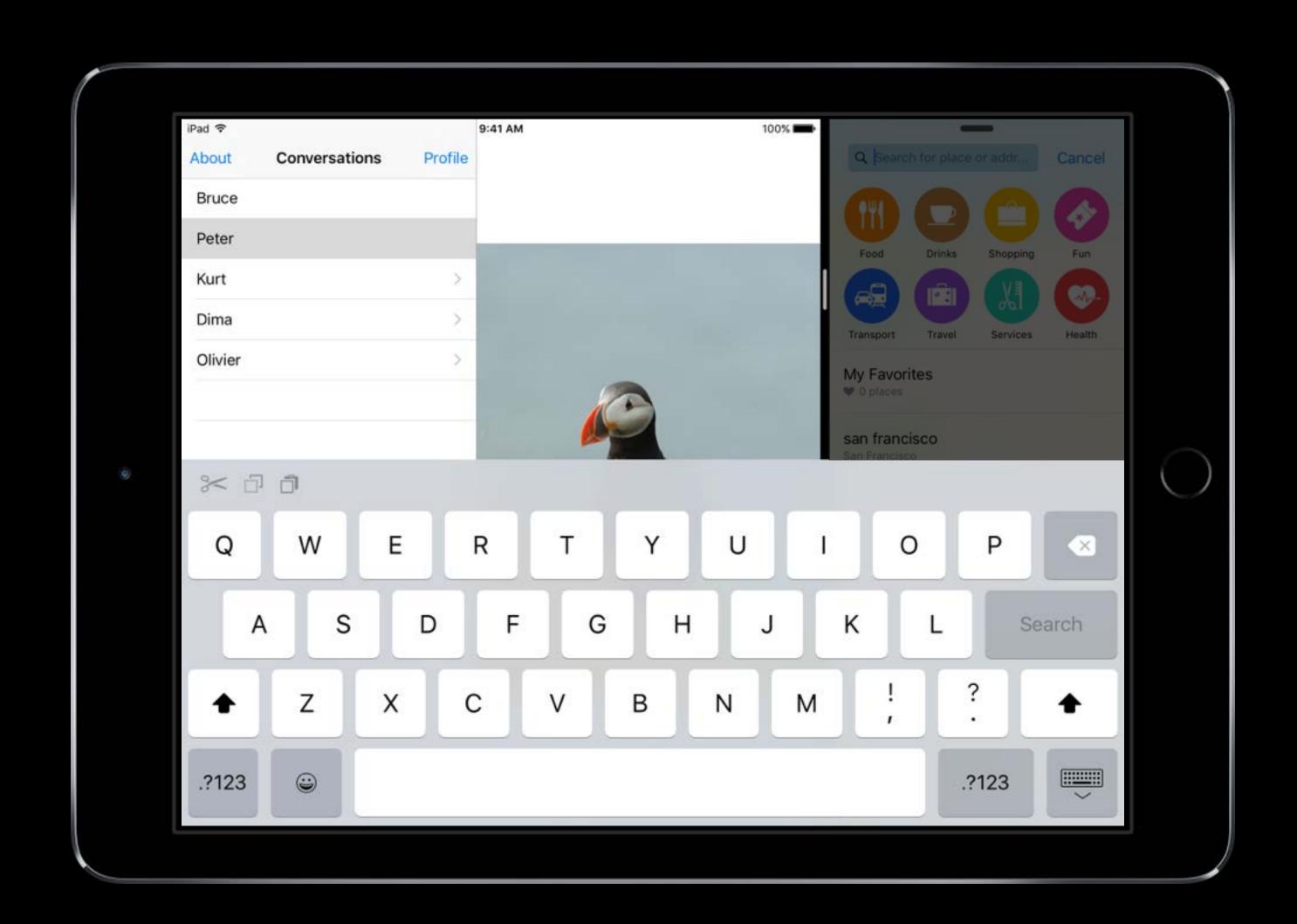
popoverPresentationController.sourceView = button
popoverPresentationController.sourceRect = button.bounds

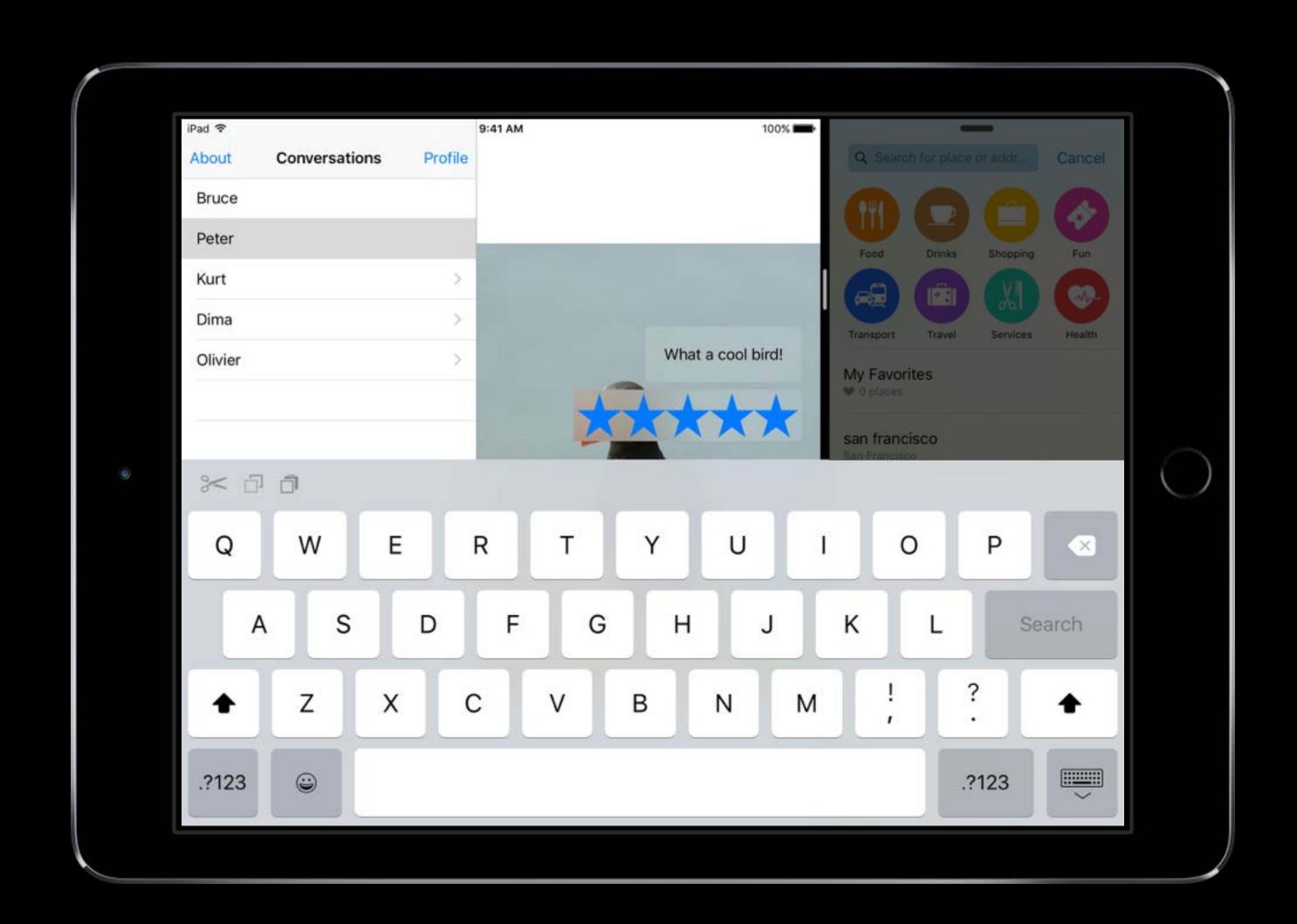
Keyboard





UIKeyboardWillShowNotification
UIKeyboardWillHideNotification
UIKeyboardWillHideNotification
UIKeyboardDidHideNotification
UIKeyboardWillChangeFrameNotification
UIKeyboardDidChangeFrameNotification





Consider size and Size Class instead of orientation

Consider size and Size Class instead of orientation

Think about how to respond to transition

Consider size and Size Class instead of orientation

Think about how to respond to transition

Use adaptive presentations

Making the Most of Multitasking

Deliver a great user experience

Kurt Revis iOS Frameworks Engineer

Multitasking

Design for Adaptivity



Multitasking Design for Adaptivity

Make your app Universal — iPhone and iPad



Multitasking Design for Adaptivity

NEW

Make your app Universal — iPhone and iPad

Design user experiences for Compact and Regular widths

Multitasking Design for Adaptivity

NEW

Make your app Universal — iPhone and iPad

Design user experiences for Compact and Regular widths

Use Adaptivity to change between them

Multitasking

Adapting to dynamic size changes

Strategies

Guidelines

1: Be flexible



1: Be flexible

Try all the Multitasking cases



1: Be flexible

Try all the Multitasking cases
Watch your app's UI carefully



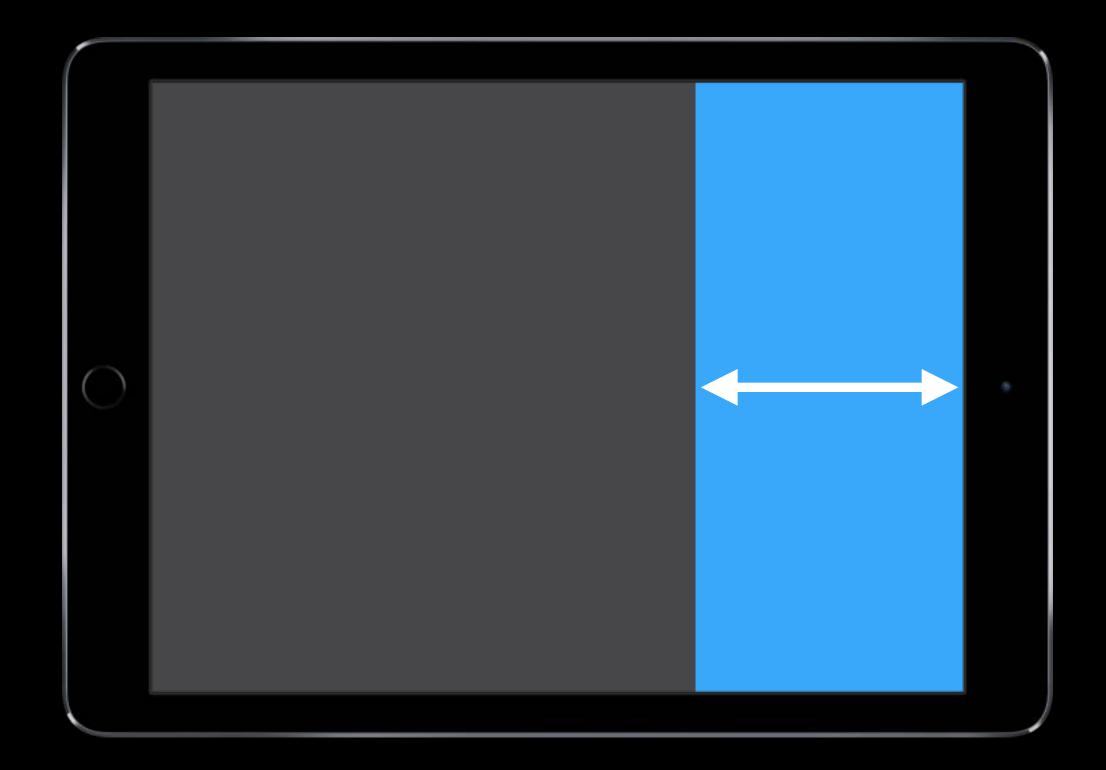
1: Be flexible

Try all the Multitasking cases
Watch your app's UI carefully
Concentrate on layout



1: Be flexible

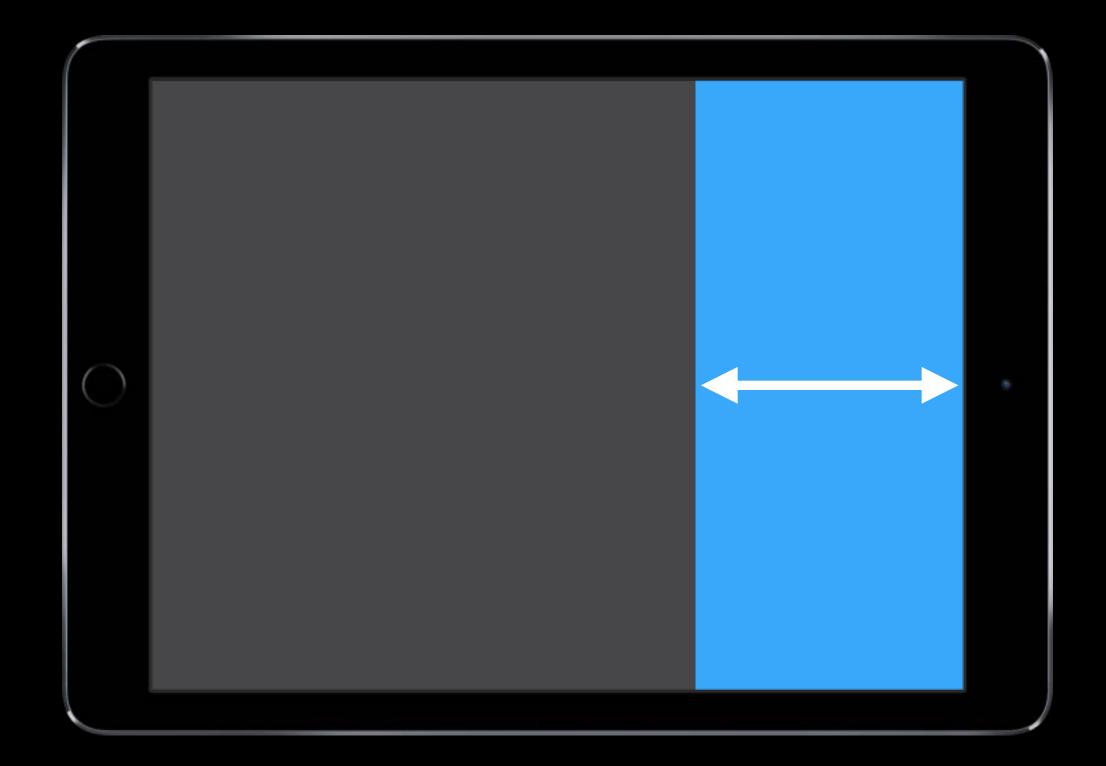
Slide Over



1: Be flexible

Slide Over

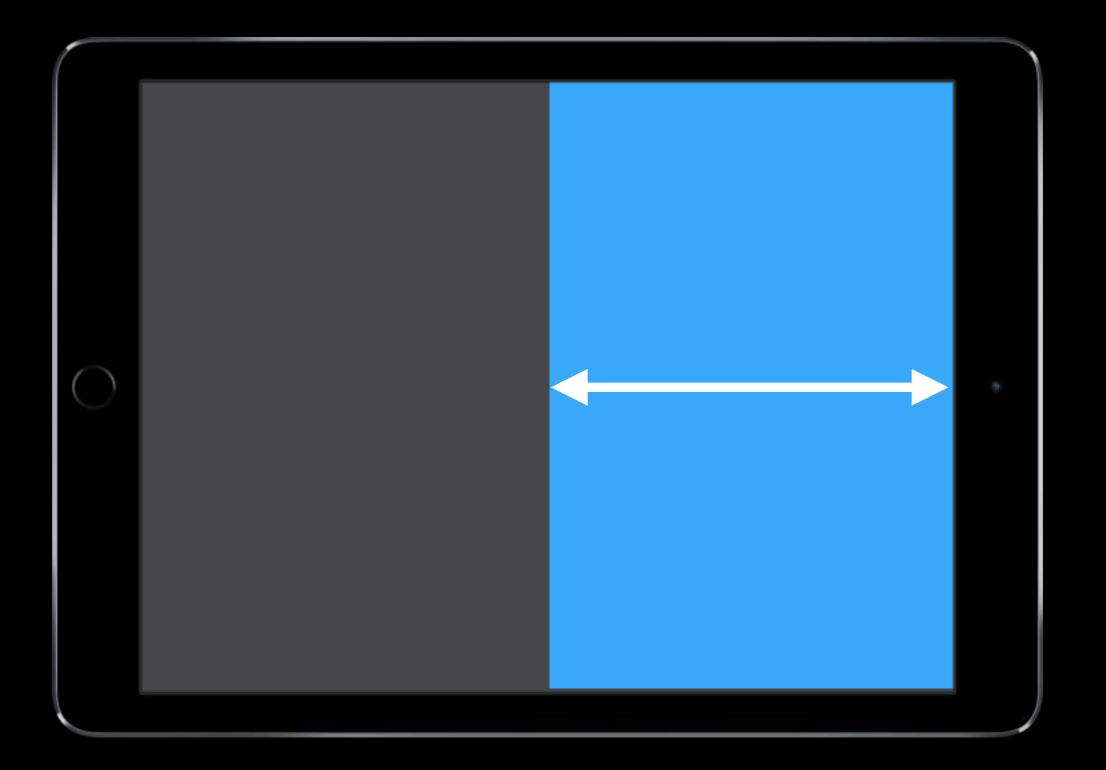
Make it bigger



1: Be flexible

Slide Over

Make it bigger

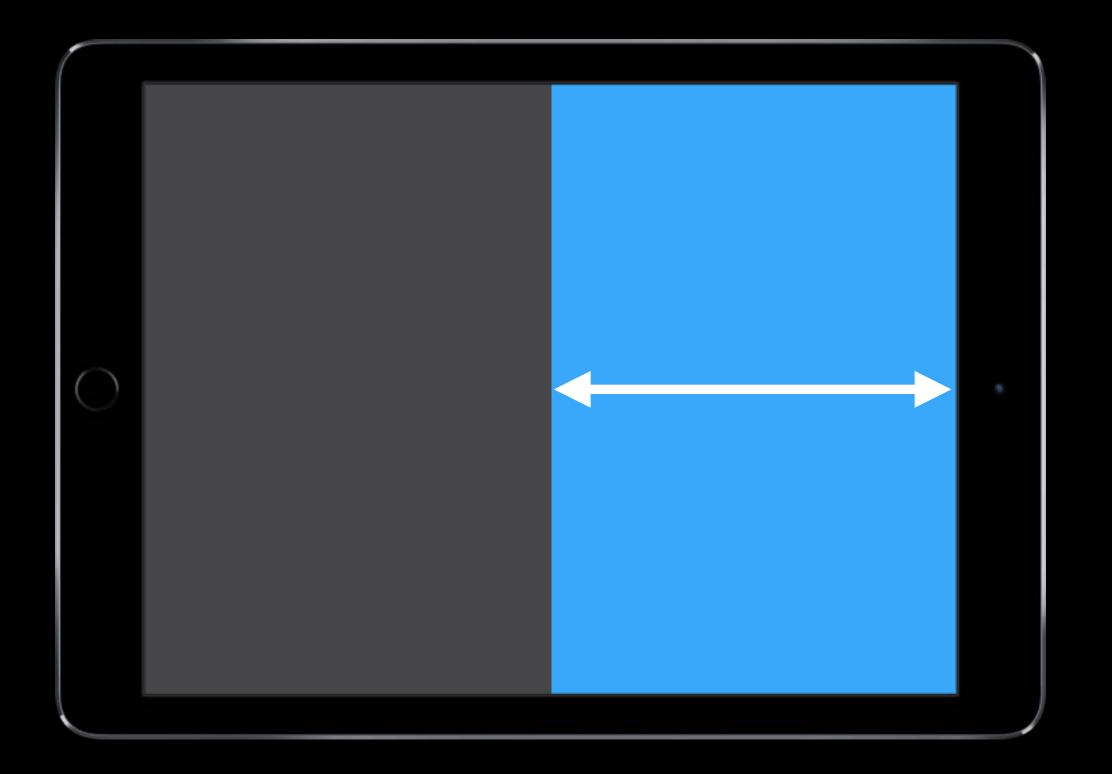


1: Be flexible

Slide Over

Make it bigger

Full screen

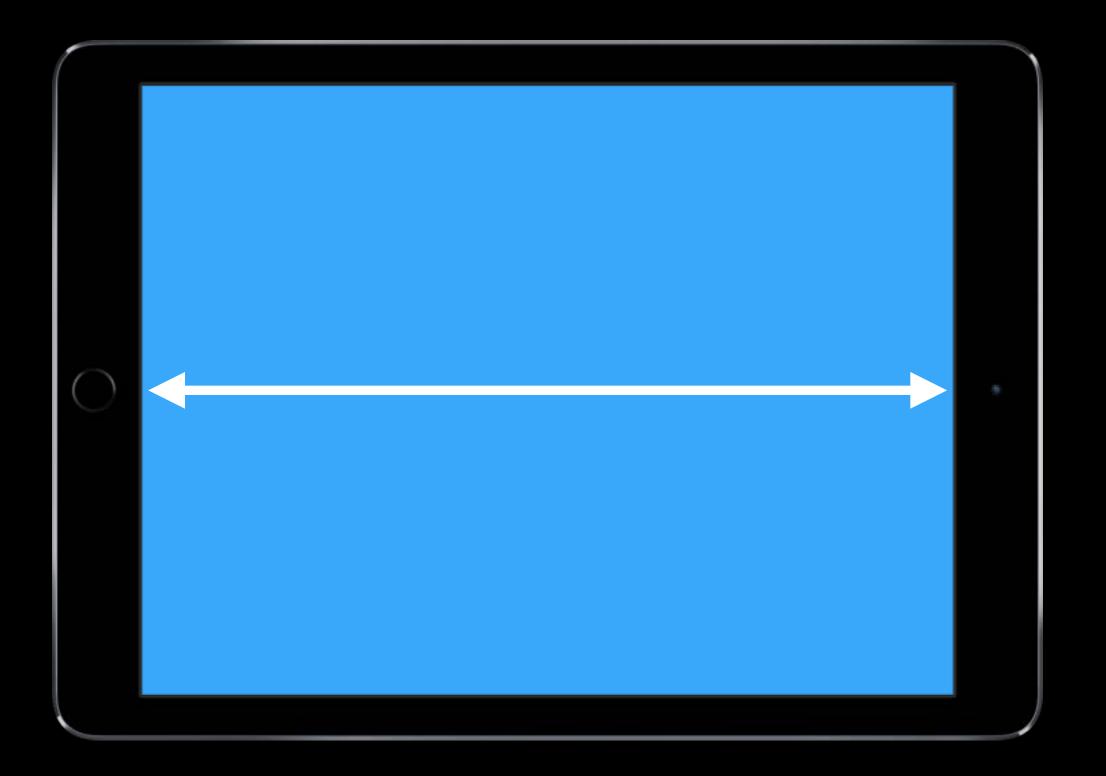


1: Be flexible

Slide Over

Make it bigger

Full screen



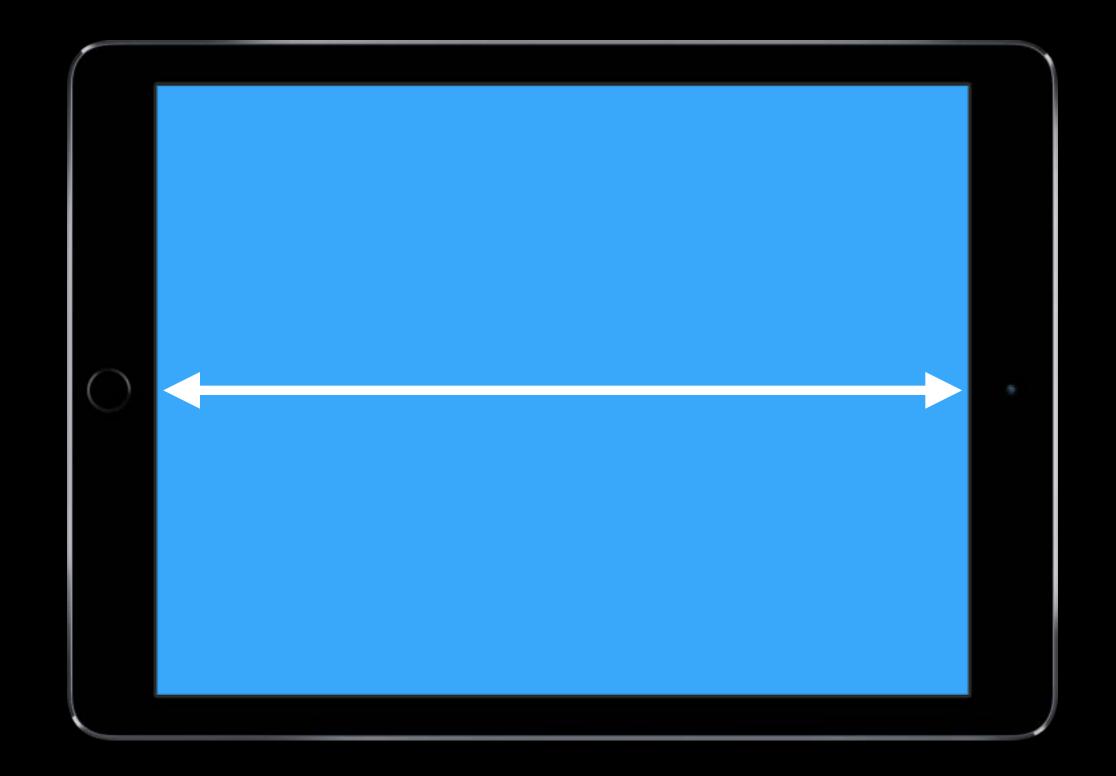
1: Be flexible

Slide Over

Make it bigger

Full screen

Slide Over another app, and use Split View



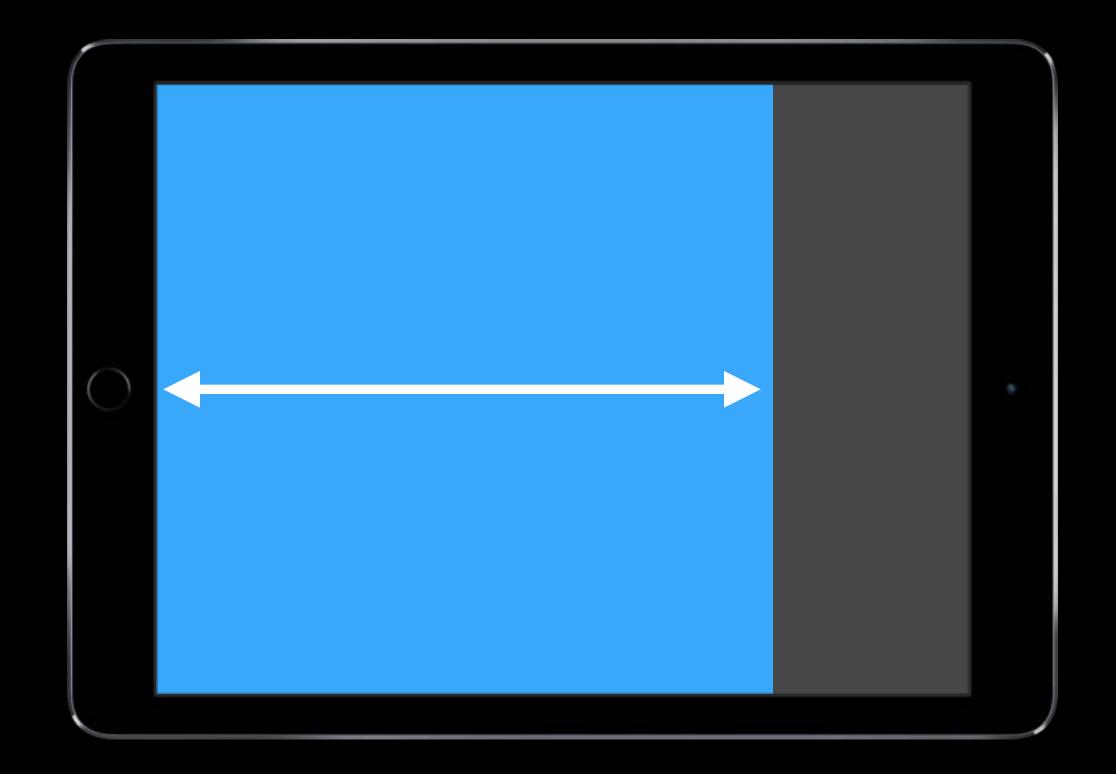
1: Be flexible

Slide Over

Make it bigger

Full screen

Slide Over another app, and use Split View



1: Be flexible

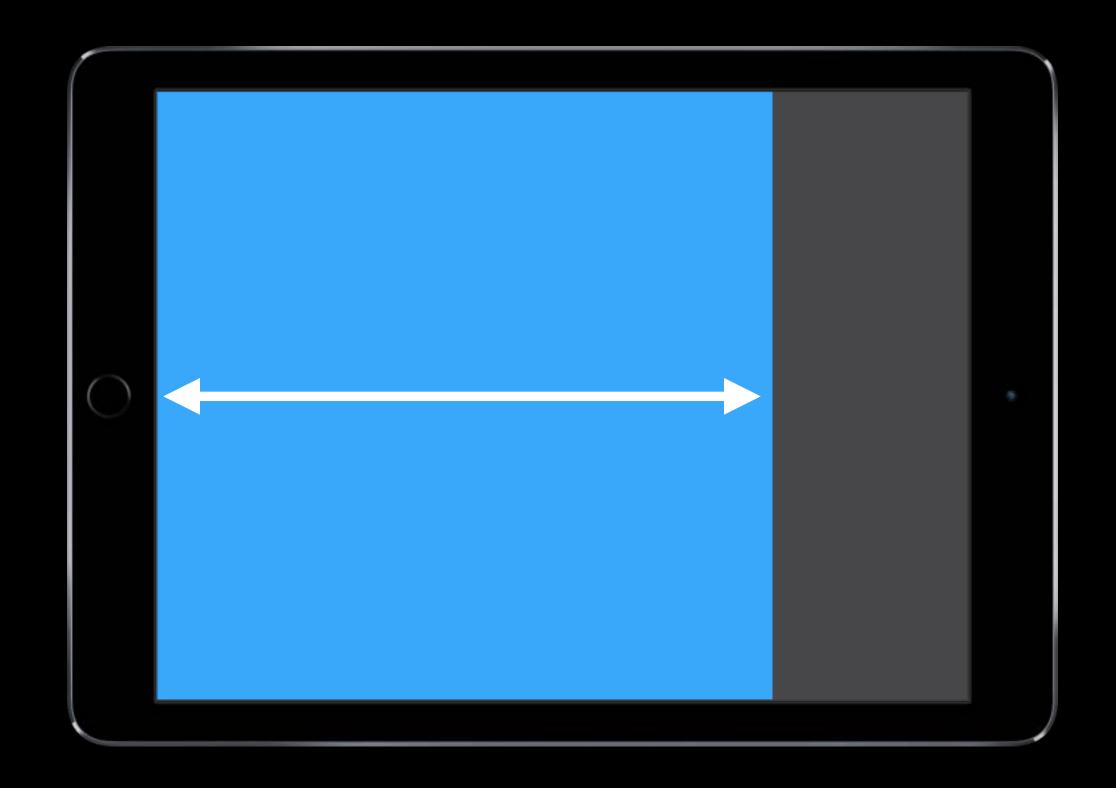
Slide Over

Make it bigger

Full screen

Slide Over another app, and use Split View

Rotate



1: Be flexible

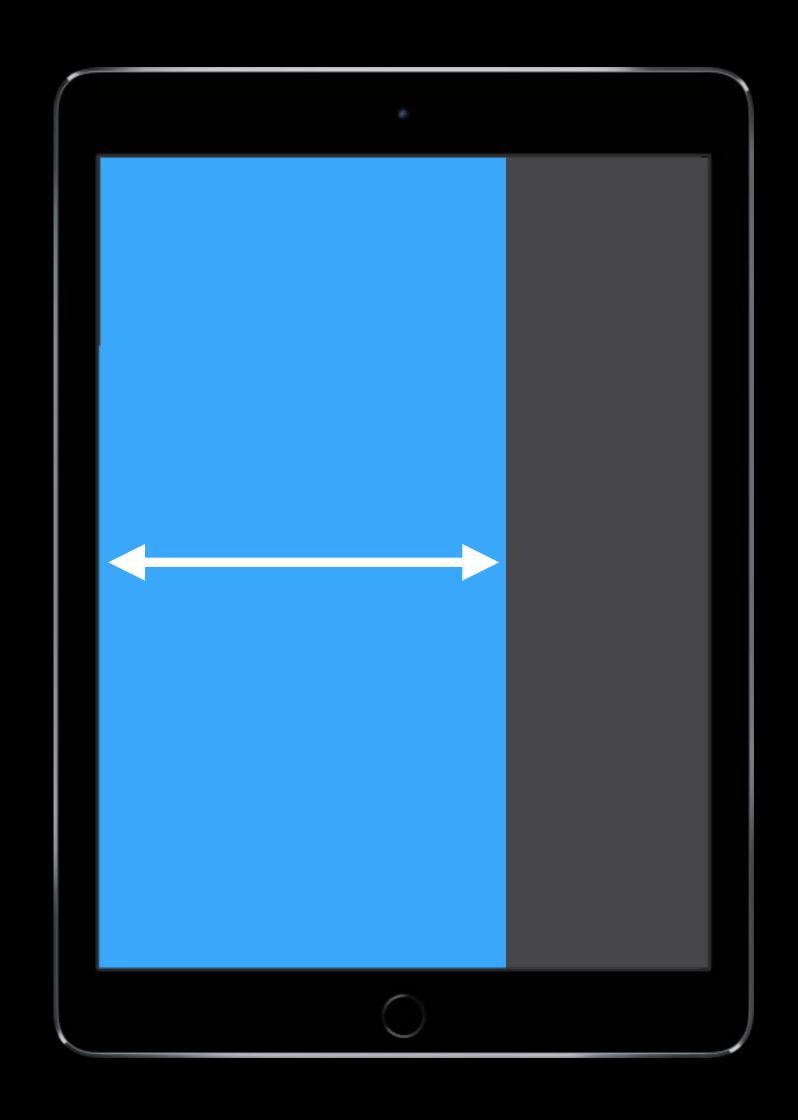
Slide Over

Make it bigger

Full screen

Slide Over another app, and use Split View

Rotate



2: Auto Layout

2: Auto Layout

The way to make your UI flexible

2: Auto Layout

The way to make your UI flexible

You provide views and constraints

2: Auto Layout

The way to make your UI flexible
You provide views and constraints
Auto Layout sets your views' frames

2: Auto Layout

The way to make your UI flexible
You provide views and constraints
Auto Layout sets your views' frames
Margins and guides

2: Auto Layout

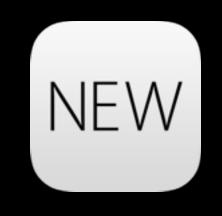
The way to make your UI flexible

You provide views and constraints

Auto Layout sets your views' frames

Margins and guides

Convenience APIs



2: Auto Layout



The way to make your UI flexible

You provide views and constraints

Auto Layout sets your views' frames

Margins and guides

Convenience APIs

Mysteries of Auto Layout, Part 1	Presidio	Thursday 11 AM
Mysteries of Auto Layout, Part 2	Presidio	Thursday 1:30PM

Regular Width

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Regular Width

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iPad ❤ 9:41 AM 100% ■ Done

Regular Width

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```
let label = UILabel()
```

```
let label = UILabel()
let readableContentGuide = self.view.readableContentGuide
```

```
NEW
```

```
let label = UILabel()
let readableContentGuide = self.view.readableContentGuide
```

```
let label = UILabel()
let readableContentGuide = self.view.readableContentGuide
```

```
let constraints = [
    label.leadingAnchor.constraintEqualToAnchor(
        readableContentGuide.leadingAnchor),
```



```
let label = UILabel()
let readableContentGuide = self.view.readableContentGuide

let constraints = [
    label.leadingAnchor.constraintEqualToAnchor(
        readableContentGuide.leadingAnchor),

    label.trailingAnchor.constraintEqualToAnchor(
        readableContentGuide.trailingAnchor)
]
```



2: Auto Layout

```
let label = UILabel()
let readableContentGuide = self.view.readableContentGuide

let constraints = [
    label.leadingAnchor.constraintEqualToAnchor(
        readableContentGuide.leadingAnchor),
    label.trailingAnchor.constraintEqualToAnchor(
        readableContentGuide.trailingAnchor)
]
```

NSLayoutConstraint.activateConstraints(constraints)

3: Size Classes in Xcode

Interface Builder (Storyboards and XIBs)

3: Size Classes in Xcode

Interface Builder (Storyboards and XIBs)

Add or remove views and constraints

3: Size Classes in Xcode

Interface Builder (Storyboards and XIBs)

- Add or remove views and constraints
- Change attributes of views

3: Size Classes in Xcode

Interface Builder (Storyboards and XIBs)

- Add or remove views and constraints
- Change attributes of views

Asset Catalogs

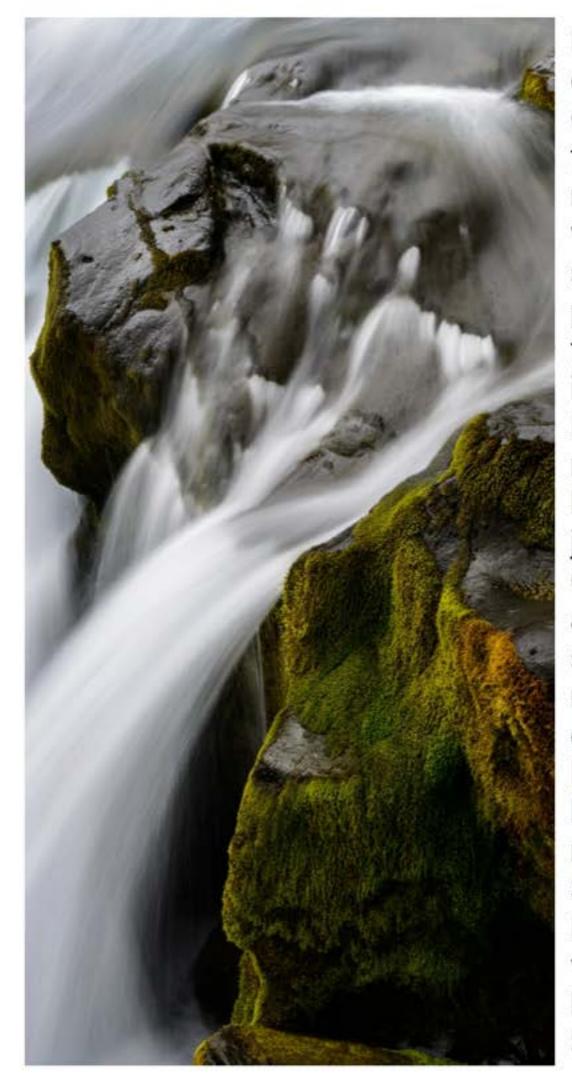
3: Size Classes in Xcode

Interface Builder (Storyboards and XIBs)

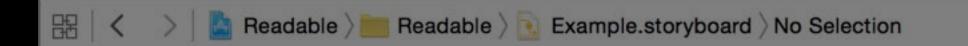
- Add or remove views and constraints
- Change attributes of views

Asset Catalogs

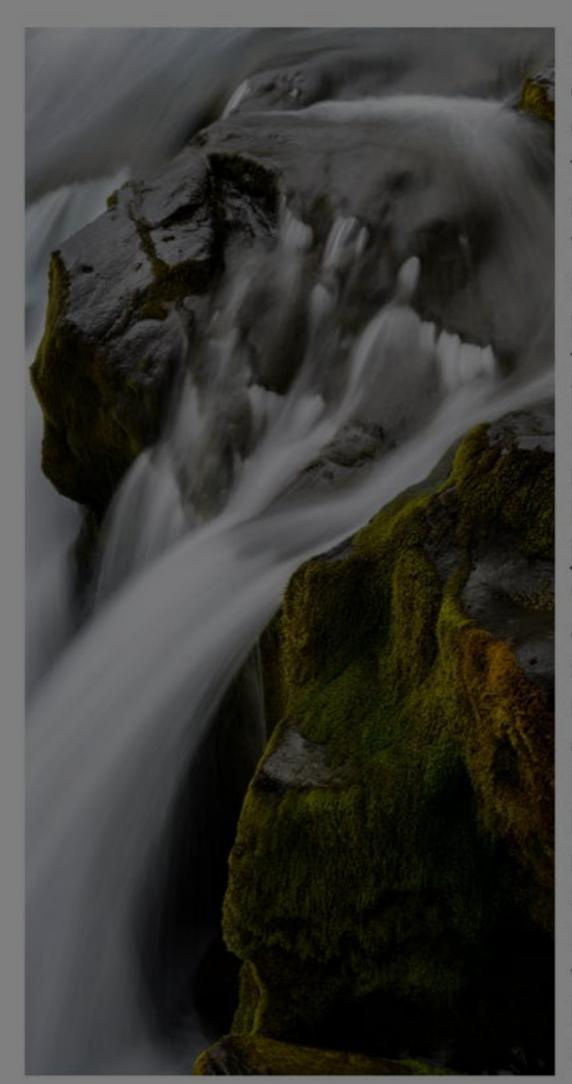
Use different versions of images



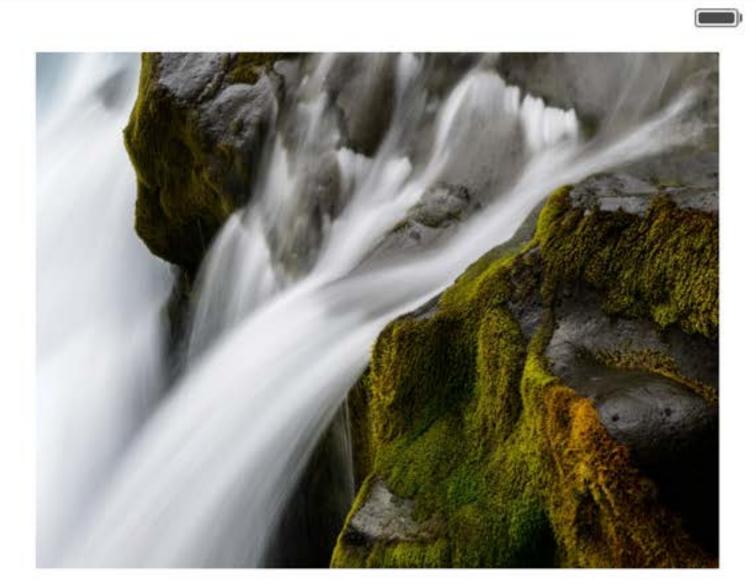
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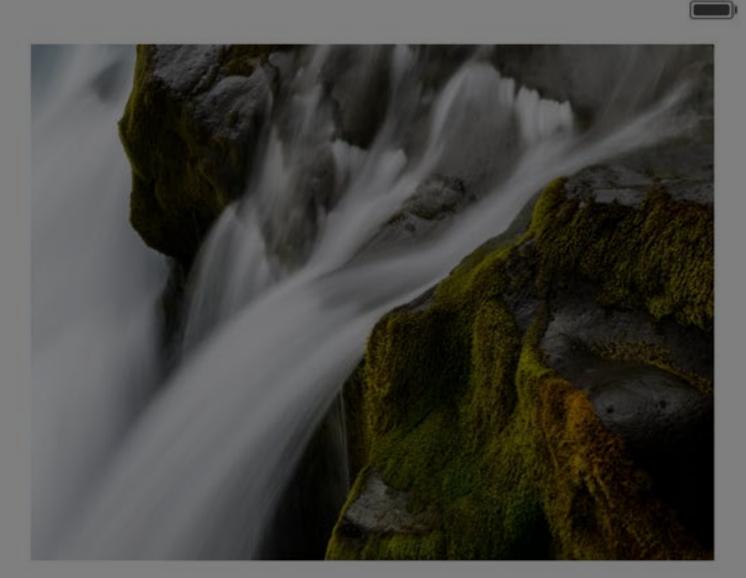


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절임명



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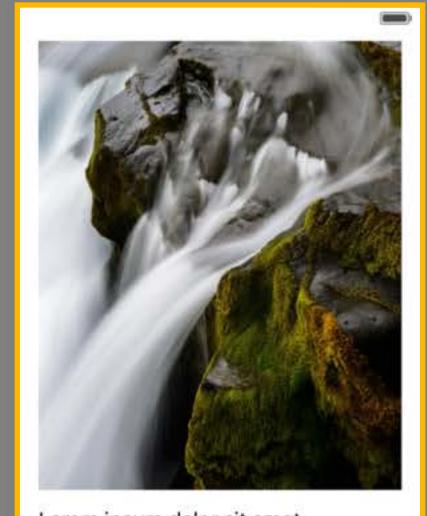
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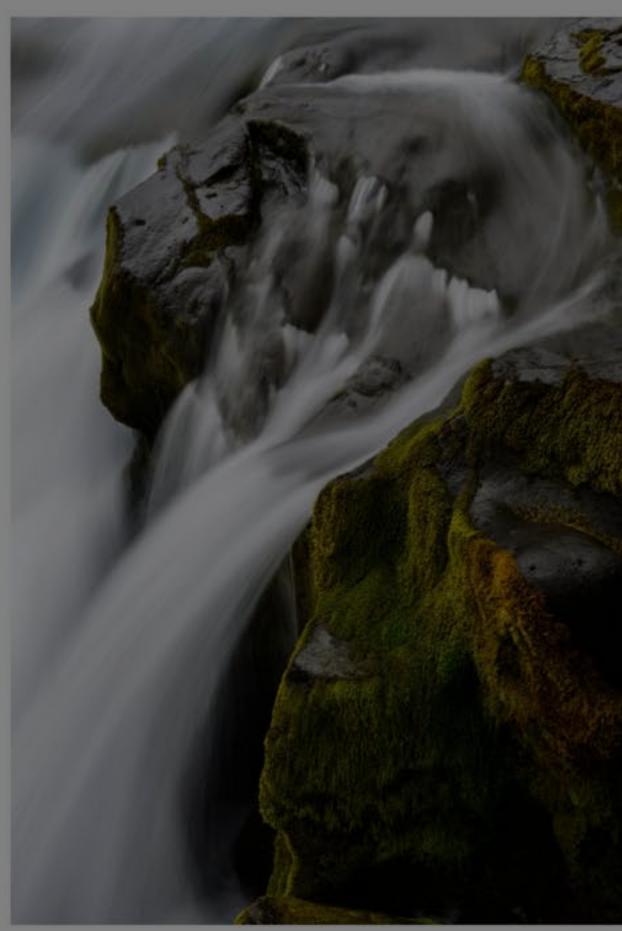
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iPad 1/3 Width

IPad



iPad 1/3 Width

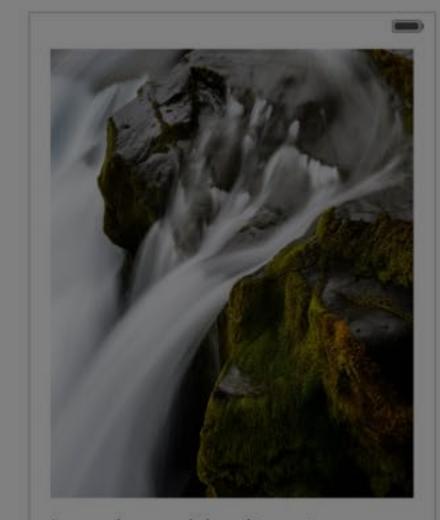


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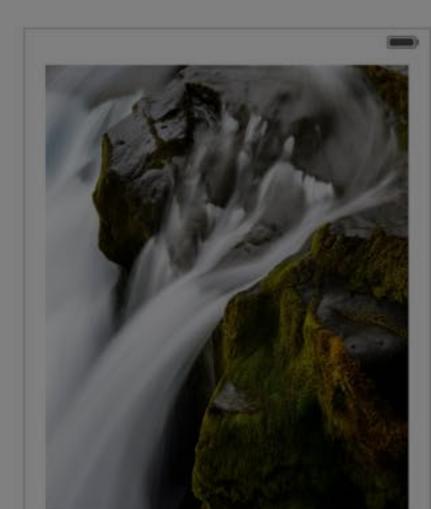


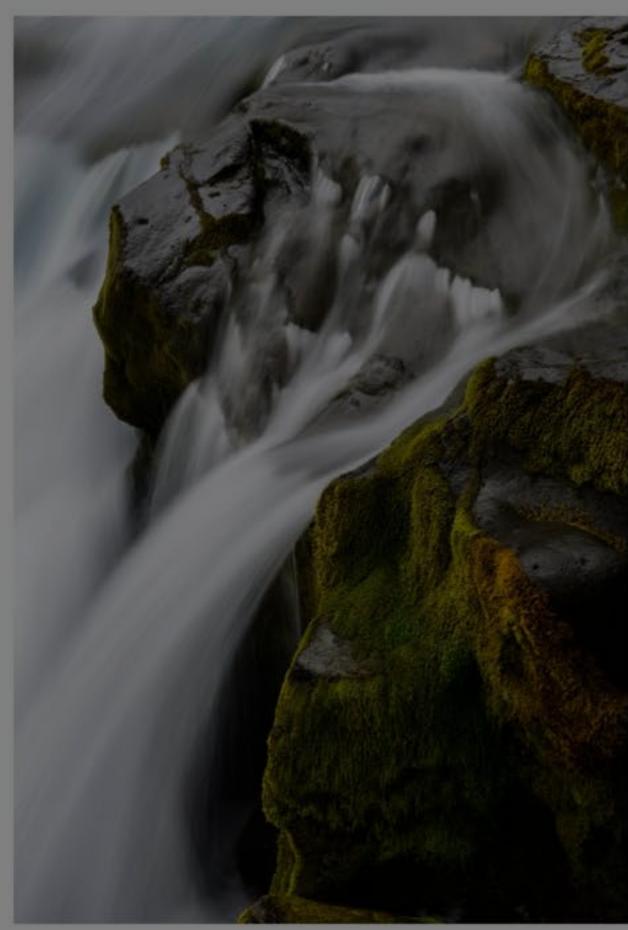
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iPad 1/3 Width





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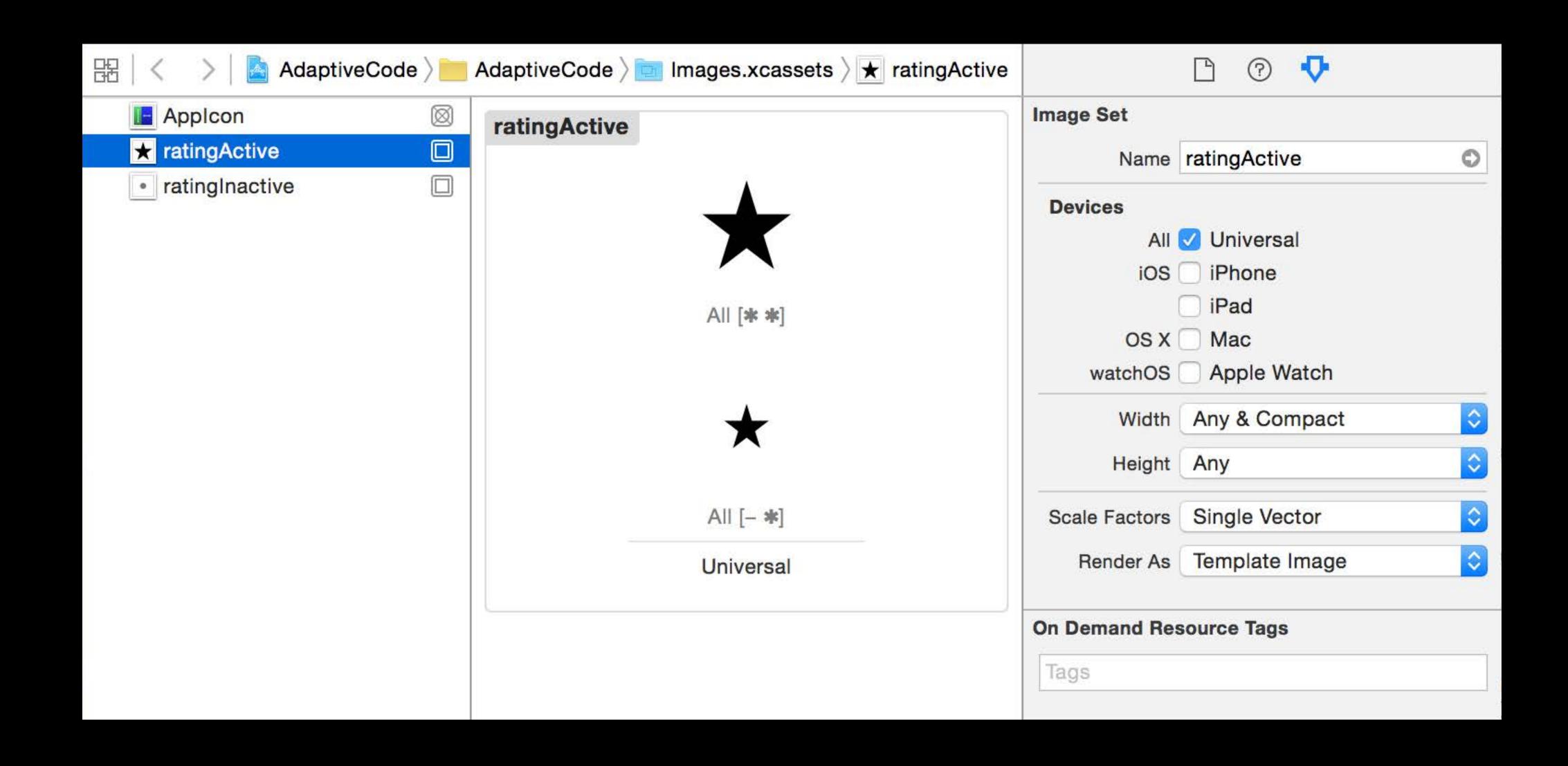
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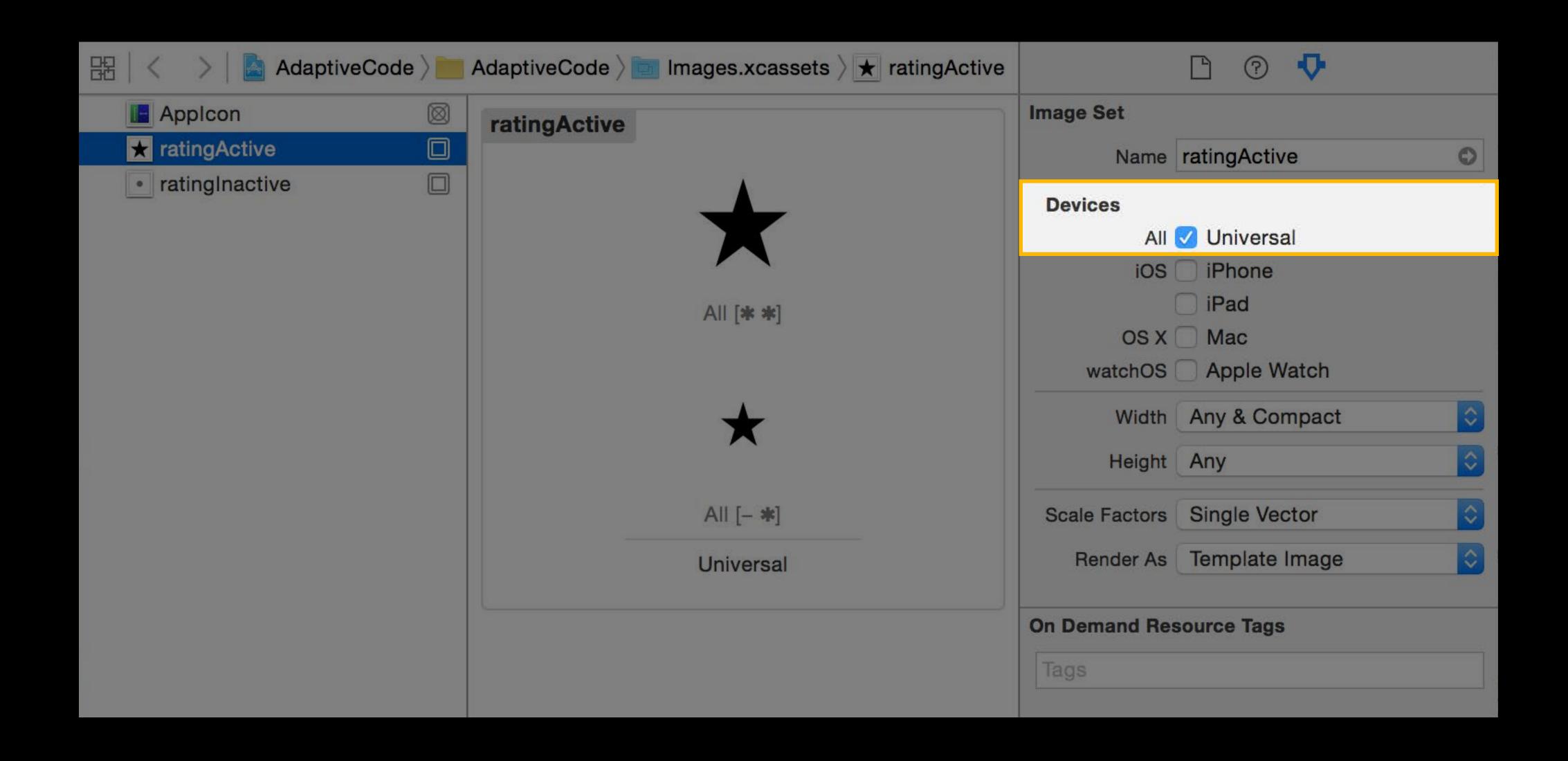
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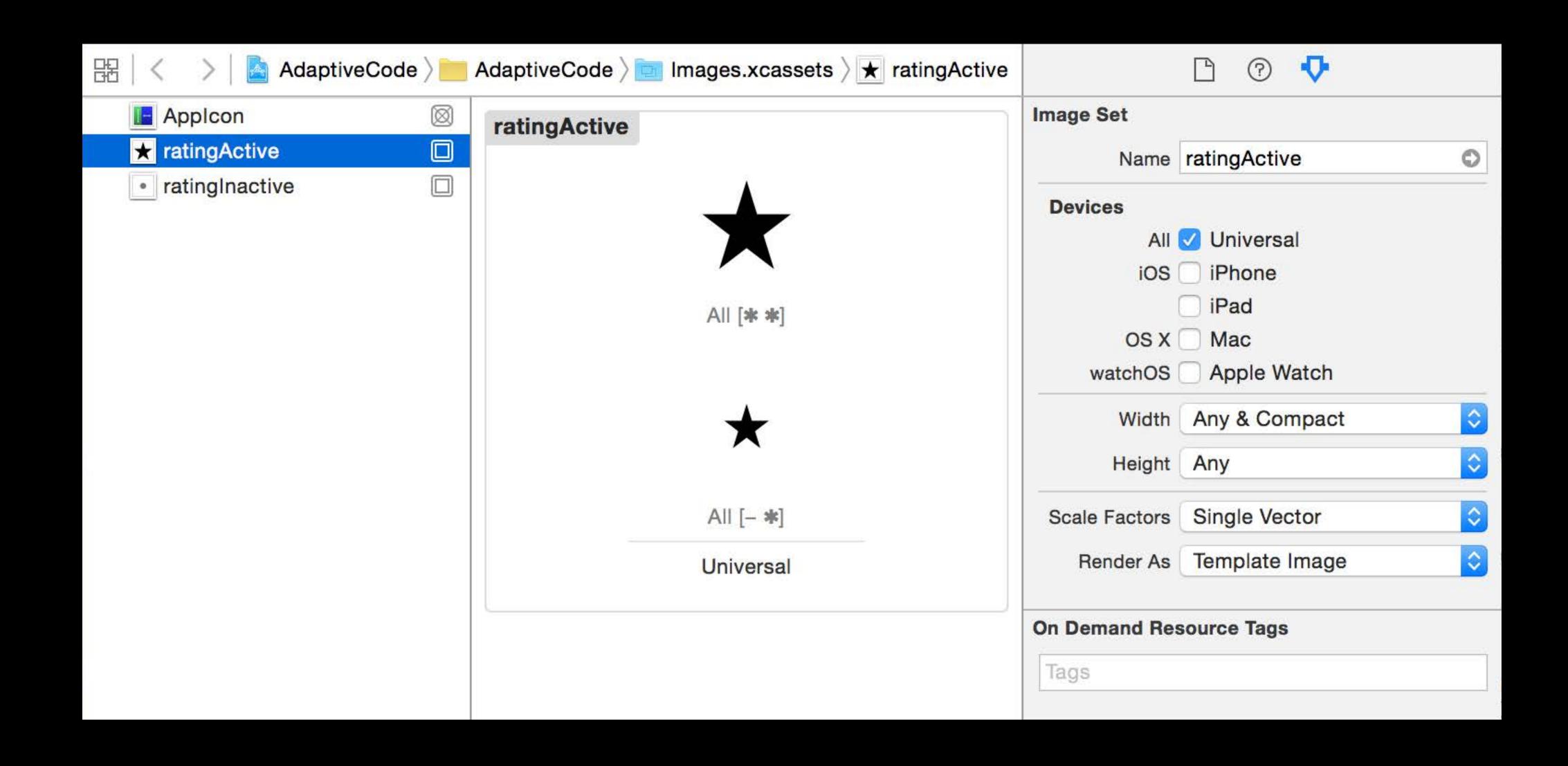
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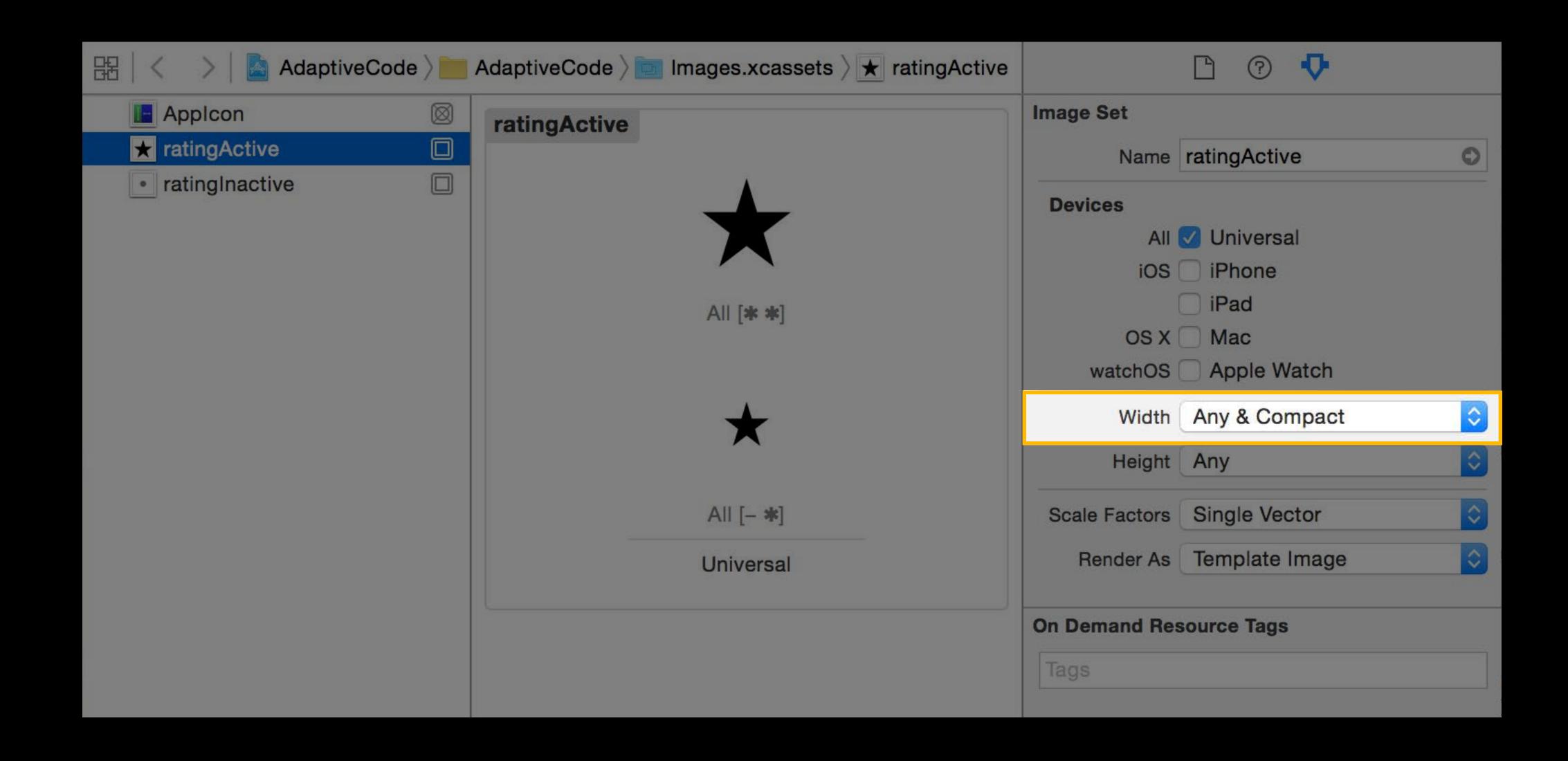
iPad 1/3 Width

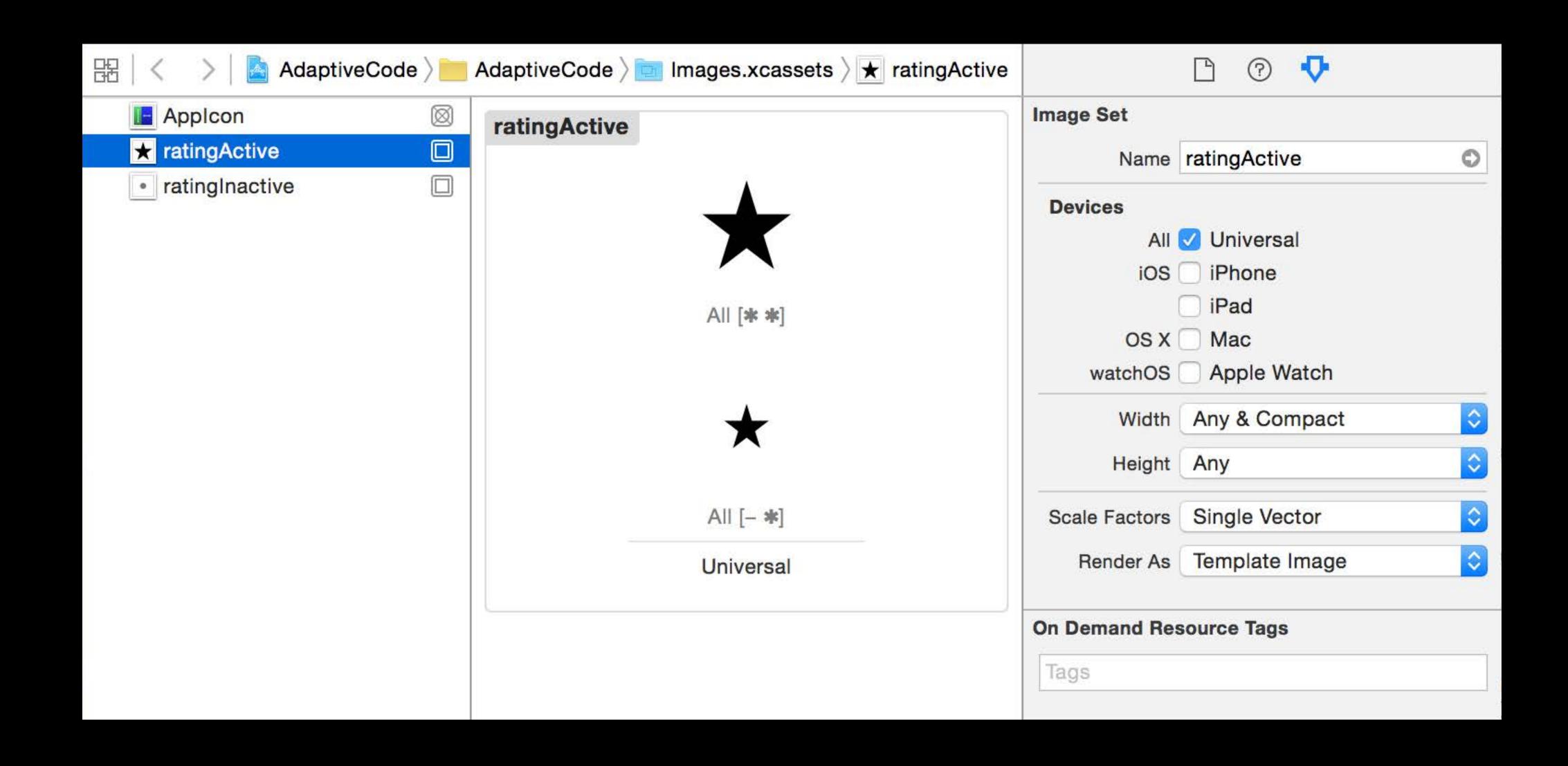
IPad

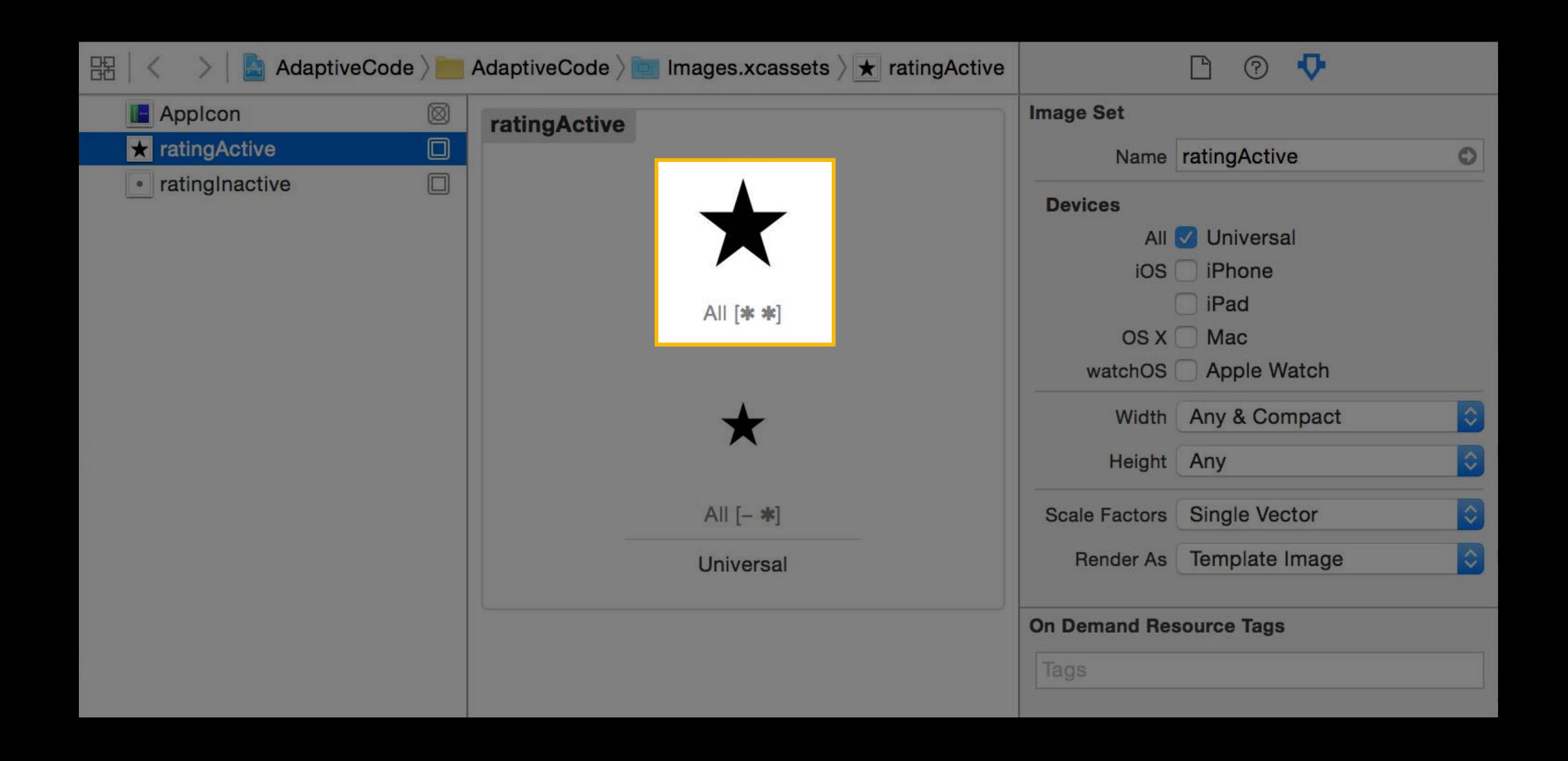


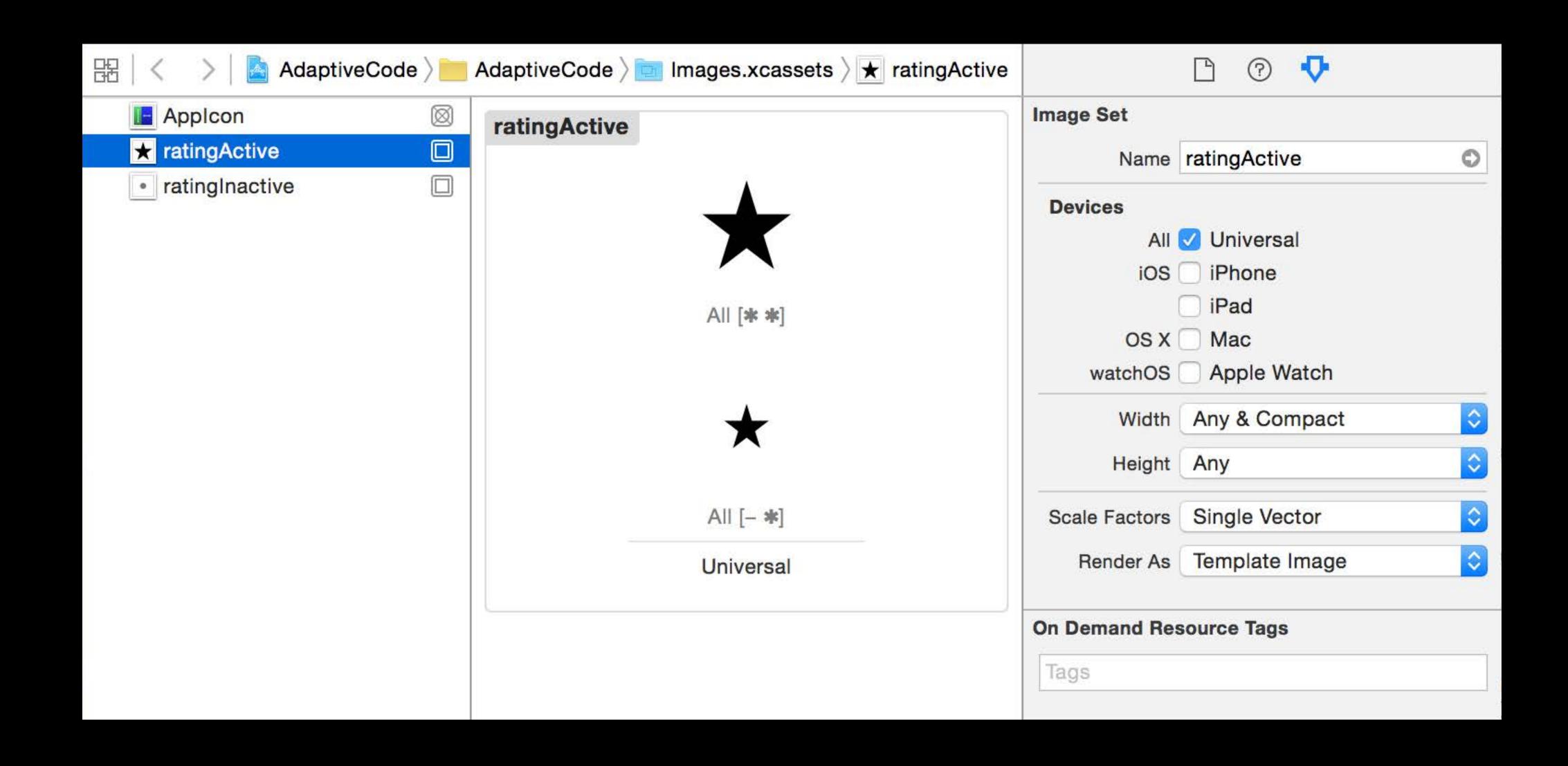


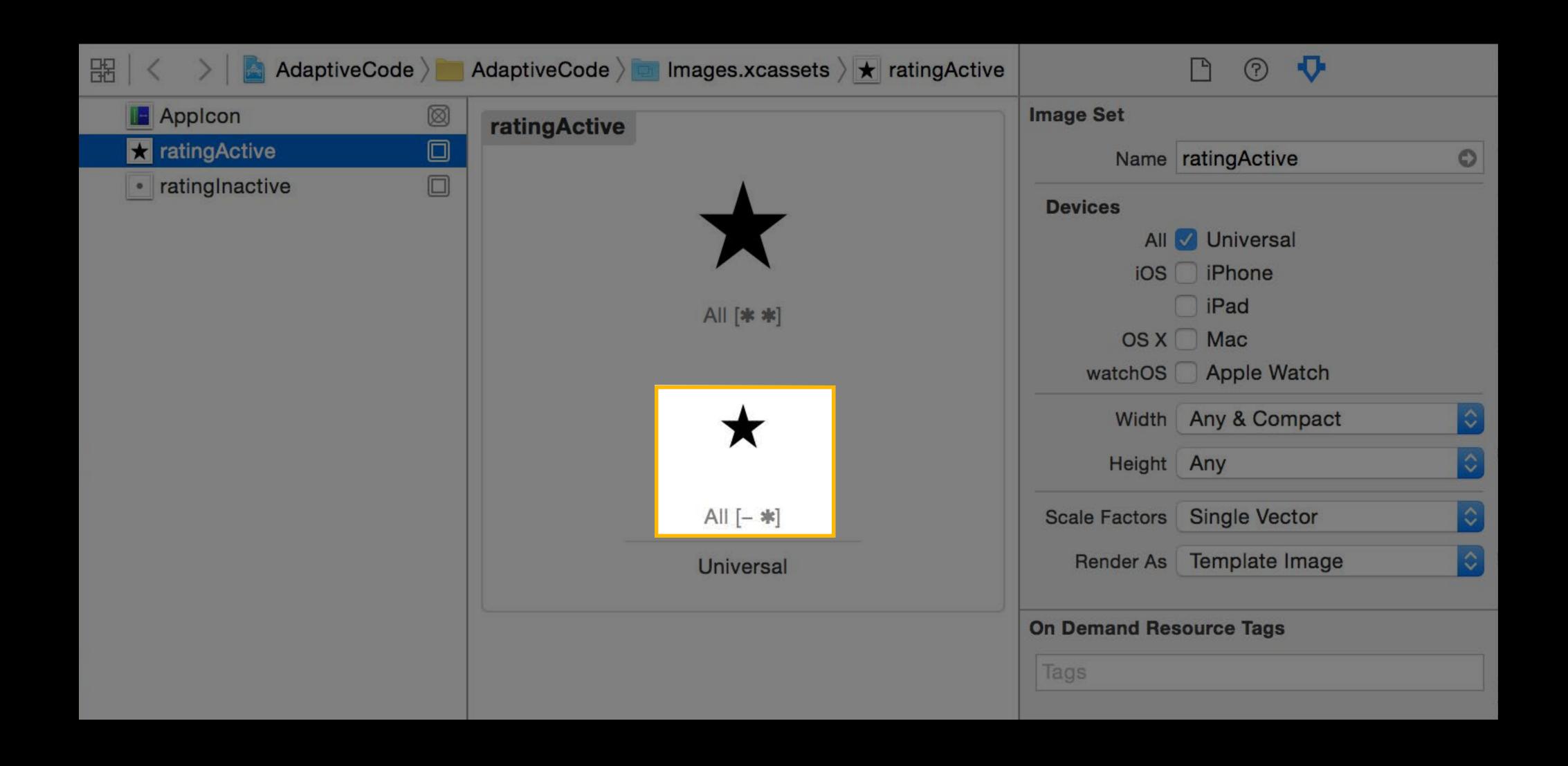












```
override func willTransitionToTraitCollection(
  newCollection: UITraitCollection,
  withTransitionCoordinator coordinator: UIViewControllerTransitionCoordinator)
{
}
```

```
override func willTransitionToTraitCollection(
   newCollection: UITraitCollection,
   withTransitionCoordinator coordinator: UIViewControllerTransitionCoordinator)
{
}
```

```
override func willTransitionToTraitCollection(
  newCollection: UITraitCollection,
  withTransitionCoordinator coordinator: UIViewControllerTransitionCoordinator)
override func viewWillTransitionToSize(
  size: CGSize,
  withTransitionCoordinator coordinator: UIViewControllerTransitionCoordinator)
```

```
override func willTransitionToTraitCollection(
  newCollection: UITraitCollection,
  withTransitionCoordinator coordinator: UIViewControllerTransitionCoordinator)
{
}
```

```
override func viewWillTransitionToSize(
    size: CGSize,
    withTransitionCoordinator coordinator: UIViewControllerTransitionCoordinator)
{
}
```

```
override func willTransitionToTraitCollection(
  newCollection: UITraitCollection,
  withTransitionCoordinator coordinator: UIViewControllerTransitionCoordinator)
{
```

```
override func willTransitionToTraitCollection(
   newCollection: UITraitCollection,
   withTransitionCoordinator coordinator: UIViewControllerTransitionCoordinator)
{
```

```
override func willTransitionToTraitCollection(
  newCollection: UITraitCollection,
  withTransitionCoordinator coordinator: UIViewControllerTransitionCoordinator)
{
    super.willTransitionToTraitCollection(newCollection,
        withTransitionCoordinator:coordinator)
```

```
override func willTransitionToTraitCollection(
   newCollection: UITraitCollection,
   withTransitionCoordinator coordinator: UIViewControllerTransitionCoordinator)
{
    super.willTransitionToTraitCollection(newCollection,
        withTransitionCoordinator:coordinator)
```

```
override func willTransitionToTraitCollection(
   newCollection: UITraitCollection,
   withTransitionCoordinator coordinator: UIViewControllerTransitionCoordinator)
{
    super.willTransitionToTraitCollection(newCollection,
        withTransitionCoordinator:coordinator)
    switch newCollection.horizontalSizeClass {
```

```
override func willTransitionToTraitCollection(
  newCollection: UITraitCollection,
  withTransitionCoordinator coordinator: UIViewControllerTransitionCoordinator)
    super will Transition To Trait Collection (new Collection,
        withTransitionCoordinator:coordinator)
    switch newCollection.horizontalSizeClass {
    case .Compact:
        // Change your UI for a compact width
    case Regular:
        // Change your UI for a regular width
    case **Unspecified:
        break // Do nothing
```

```
override func willTransitionToTraitCollection(
  newCollection: UITraitCollection,
  withTransitionCoordinator coordinator: UIViewControllerTransitionCoordinator)
    super will Transition To Trait Collection (new Collection,
        withTransitionCoordinator:coordinator)
    switch newCollection.horizontalSizeClass {
    case .Compact:
        // Change your UI for a compact width
    case Regular:
        // Change your UI for a regular width
    case .Unspecified:
              // Do nothing
        break
```

```
override func willTransitionToTraitCollection(
  newCollection: UITraitCollection,
  withTransitionCoordinator coordinator: UIViewControllerTransitionCoordinator)
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    super.willTransitionToTraitCollection(newCollection,
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```

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override func willTransitionToTraitCollection(
   newCollection: UITraitCollection,
   withTransitionCoordinator coordinator: UIViewControllerTransitionCoordinator)
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        withTransitionCoordinator:coordinator)
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```
override func willTransitionToTraitCollection(
   newCollection: UITraitCollection,
   withTransitionCoordinator coordinator: UIViewControllerTransitionCoordinator)
{
    super.willTransitionToTraitCollection(newCollection,
        withTransitionCoordinator:coordinator)
```

```
let animation = {
    (context: UIViewControllerTransitionCoordinatorContext) -> Void in
    // Change your UI here. It will animate from the old to the new.
}
```

```
override func willTransitionToTraitCollection(
  newCollection: UITraitCollection,
  withTransitionCoordinator coordinator: UIViewControllerTransitionCoordinator)
    super will Transition To Trait Collection (new Collection,
        withTransitionCoordinator:coordinator)
    let animation = {
        (context: UIViewControllerTransitionCoordinatorContext) -> Void in
           Change your UI here. It will animate from the old to the new.
    coordinator animateAlongsideTransition(animation, completion: nil)
```

```
override func willTransitionToTraitCollection(
  newCollection: UITraitCollection,
  withTransitionCoordinator coordinator: UIViewControllerTransitionCoordinator)
    super will Transition To Trait Collection (new Collection,
        withTransitionCoordinator:coordinator)
    let animation = {
        (context: UIViewControllerTransitionCoordinatorContext) -> Void in
           Change your UI here. It will animate from the old to the new.
    coordinator animateAlongsideTransition(animation, completion: nil)
```

5: High-level API

5: High-level API

Adaptive Presentation Controllers

5: High-level API

Adaptive Presentation Controllers

UlTableView

5: High-level API

Adaptive Presentation Controllers

UlTableView

UlCollectionView

5: High-level API

Adaptive Presentation Controllers

UlTableView

UlCollectionView

UIStackView

NEW

5: High-level API

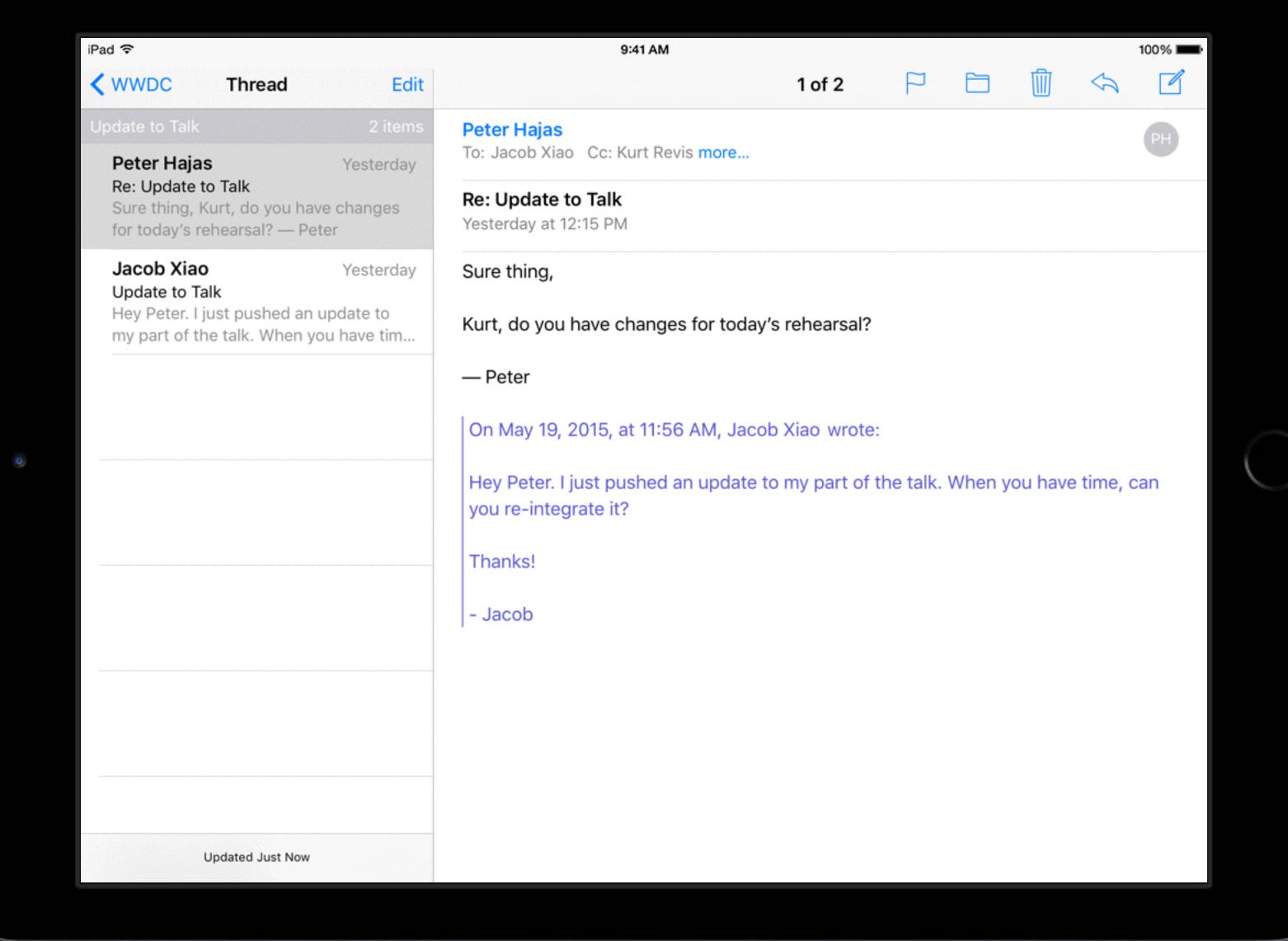
Adaptive Presentation Controllers

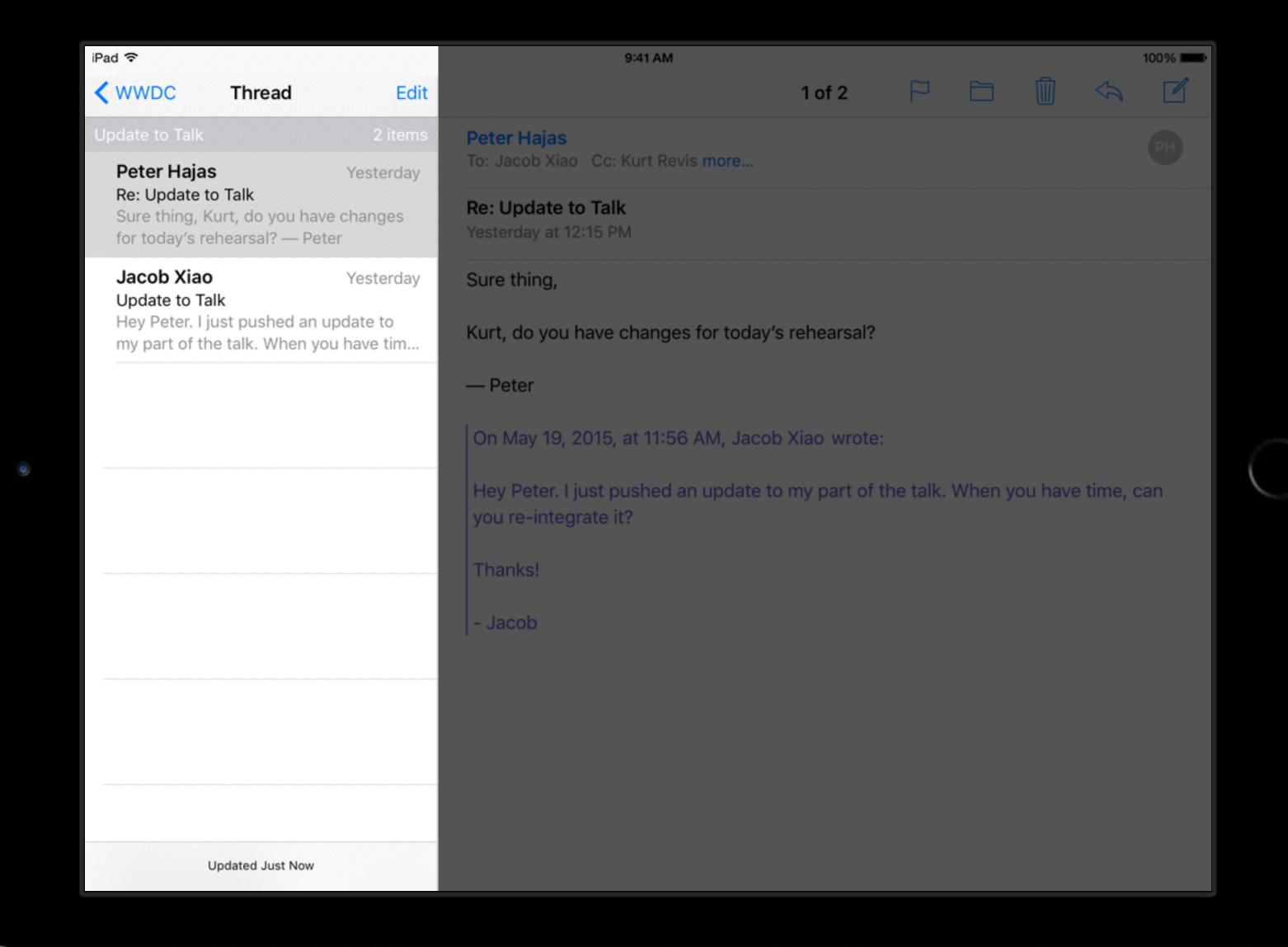
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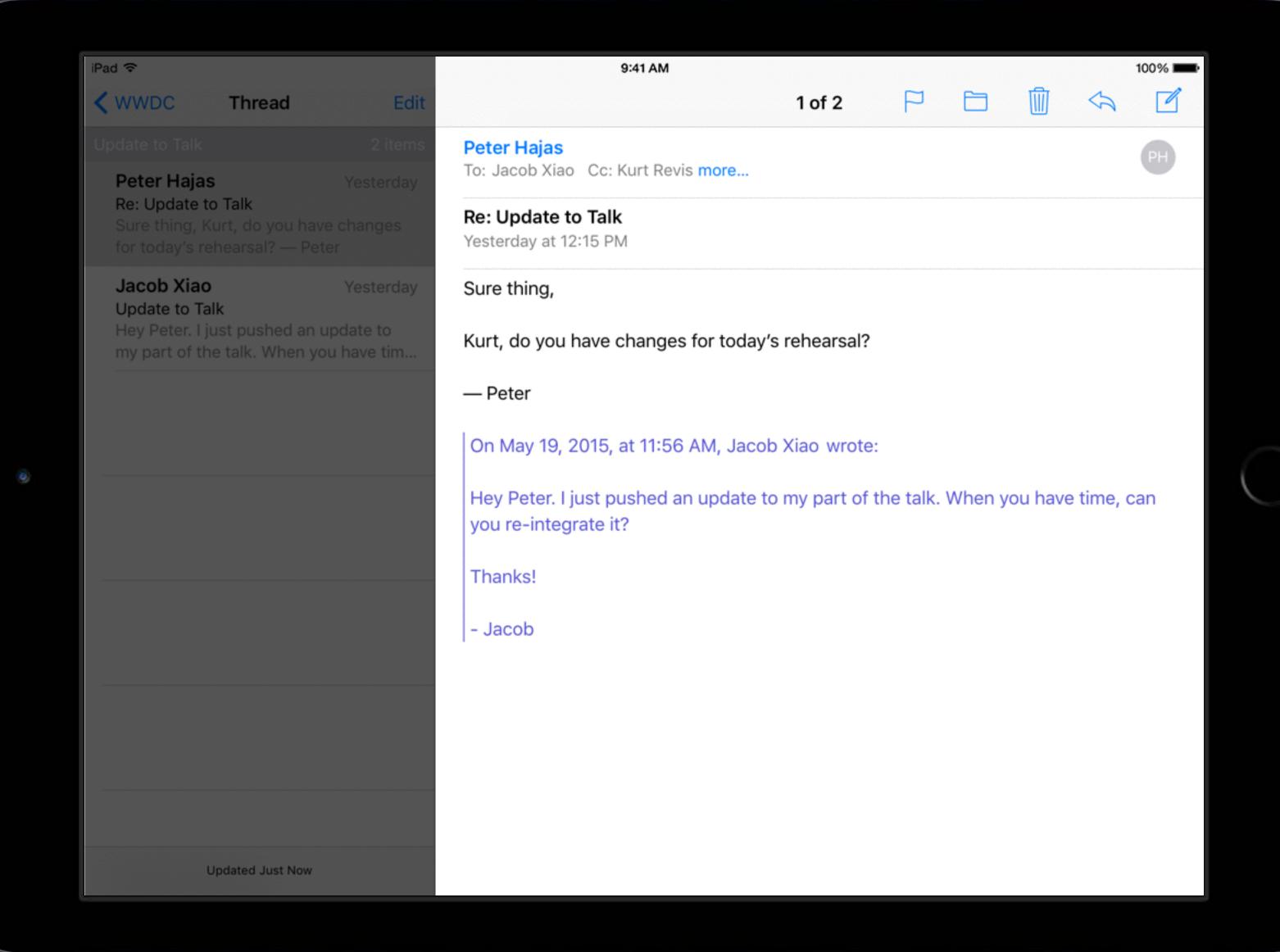
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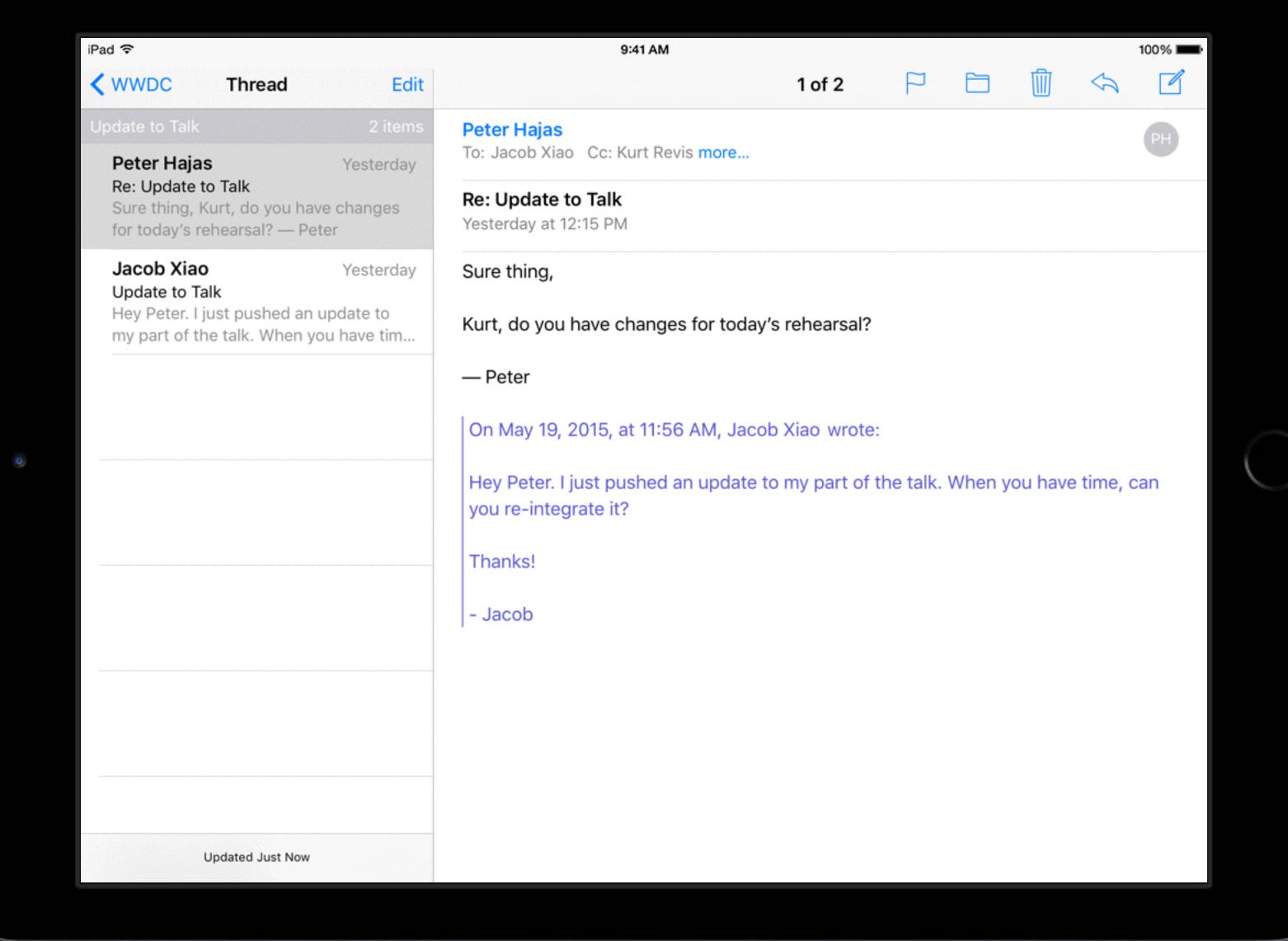
UIStackView

6: Split View Controller

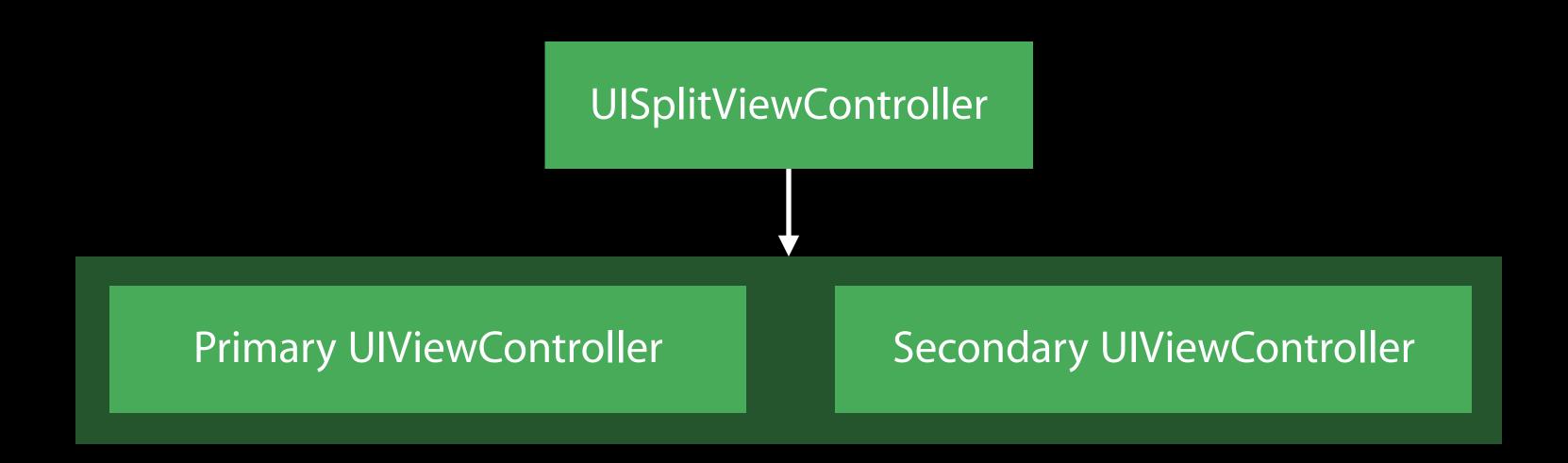








UISplitViewController



UISplitViewController

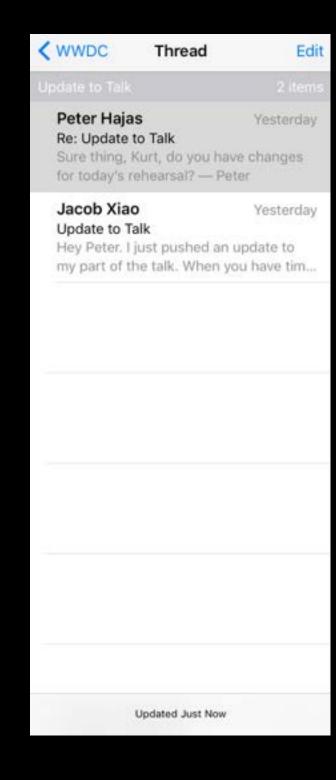
Primary UIViewController

Secondary UIViewController

UISplitViewController

Primary UIViewController

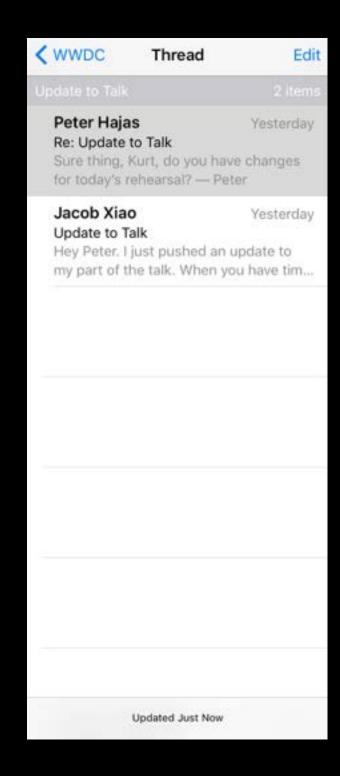
Secondary UIViewController

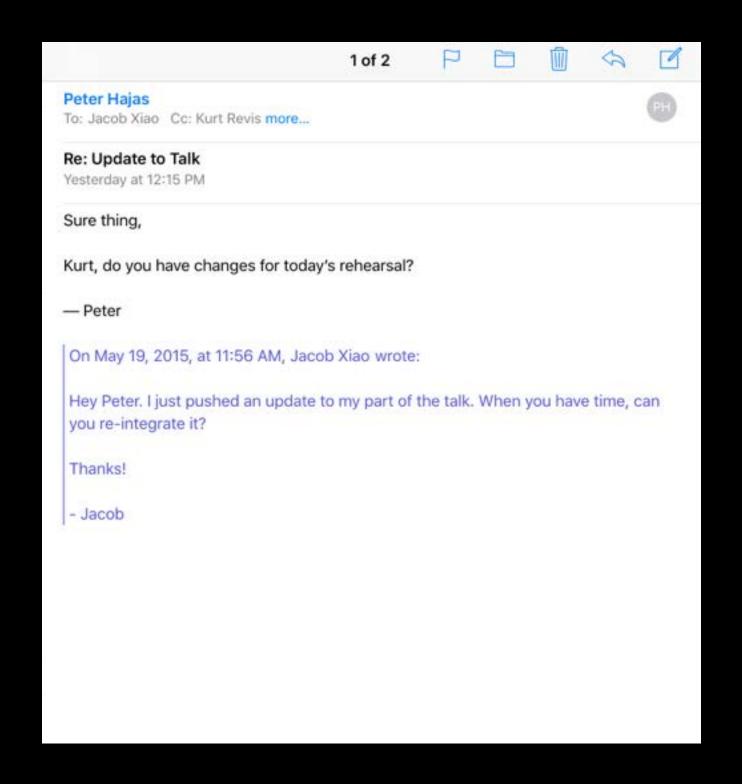


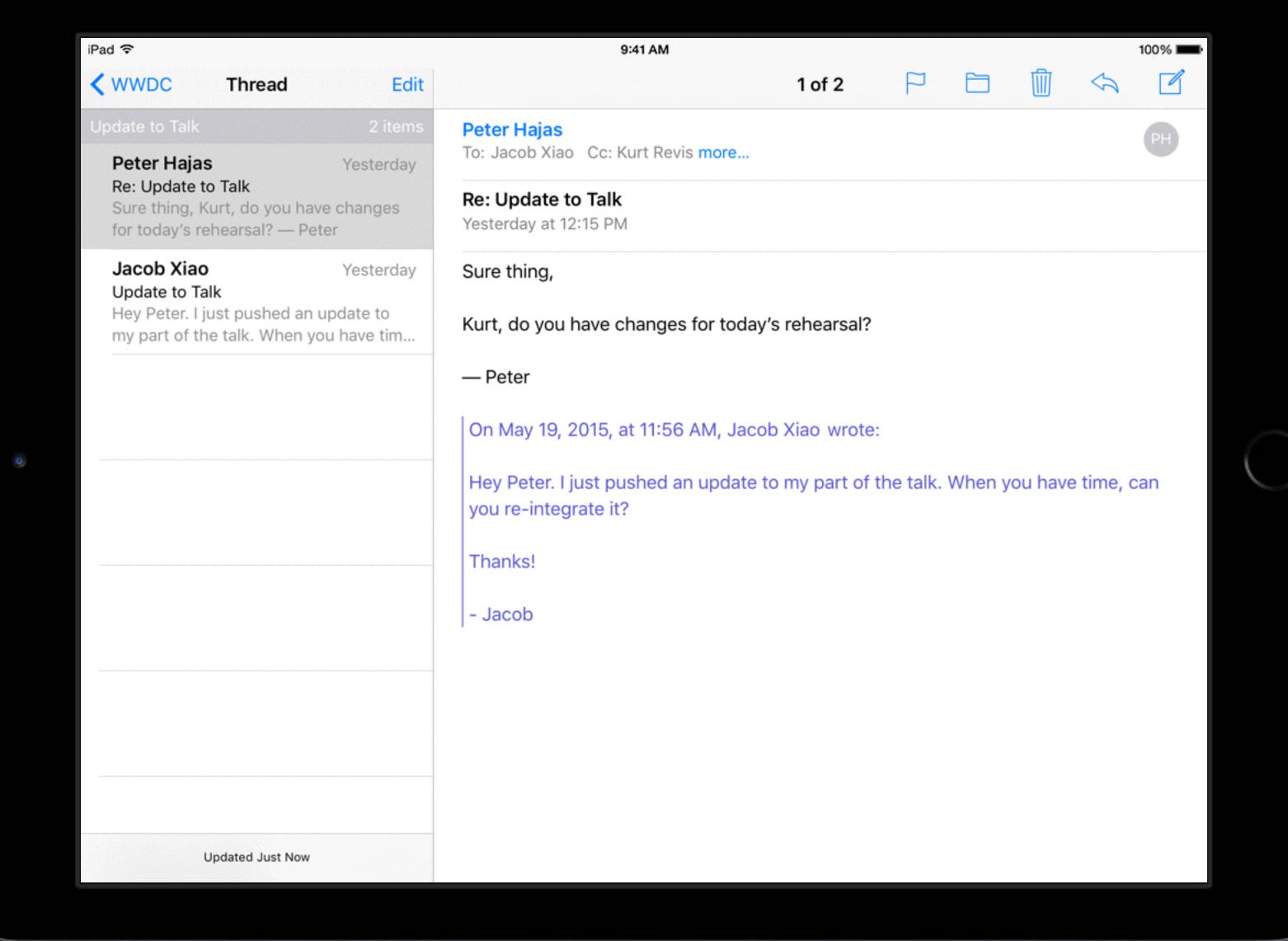
UISplitViewController

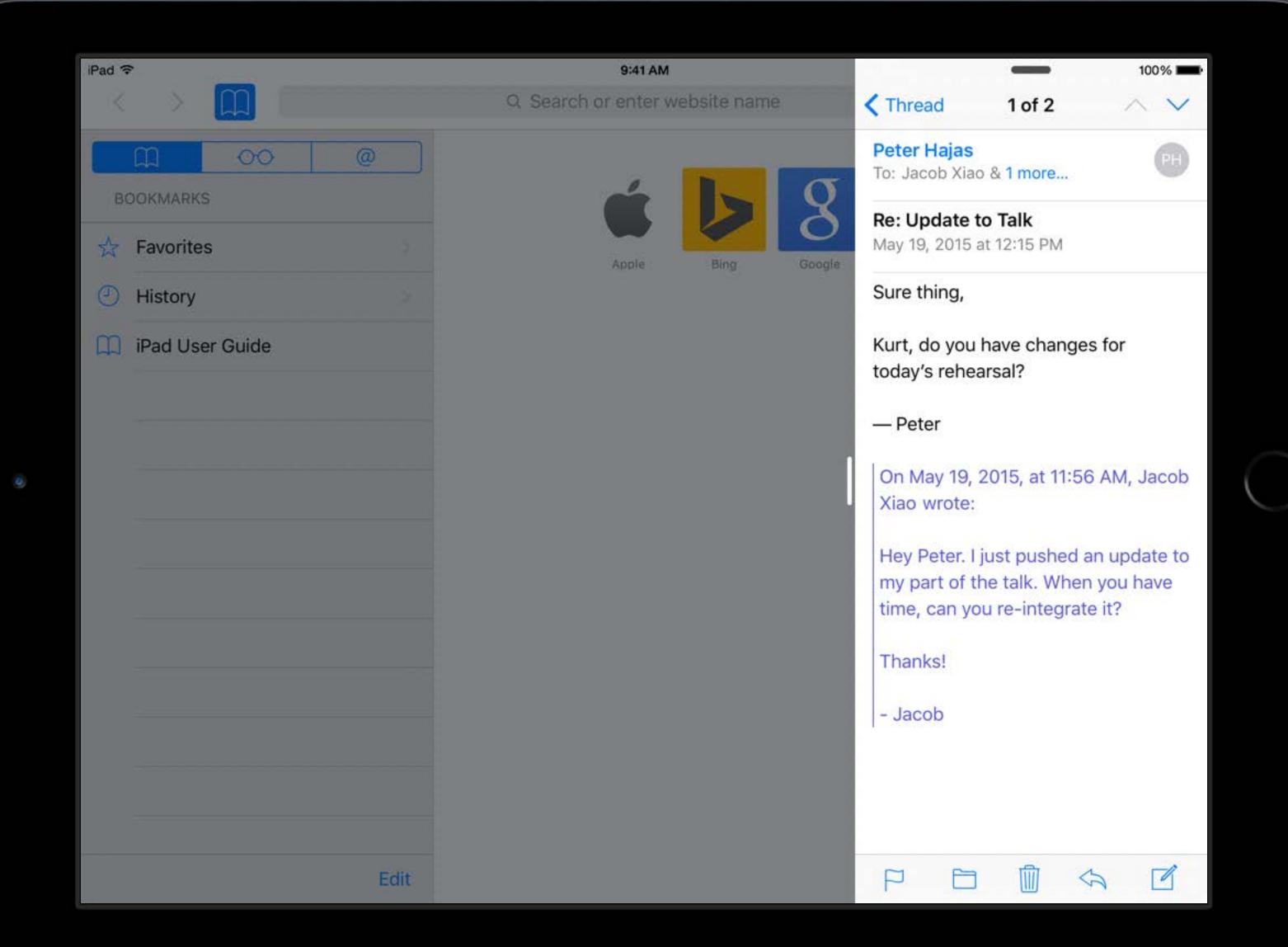
Primary UIViewController

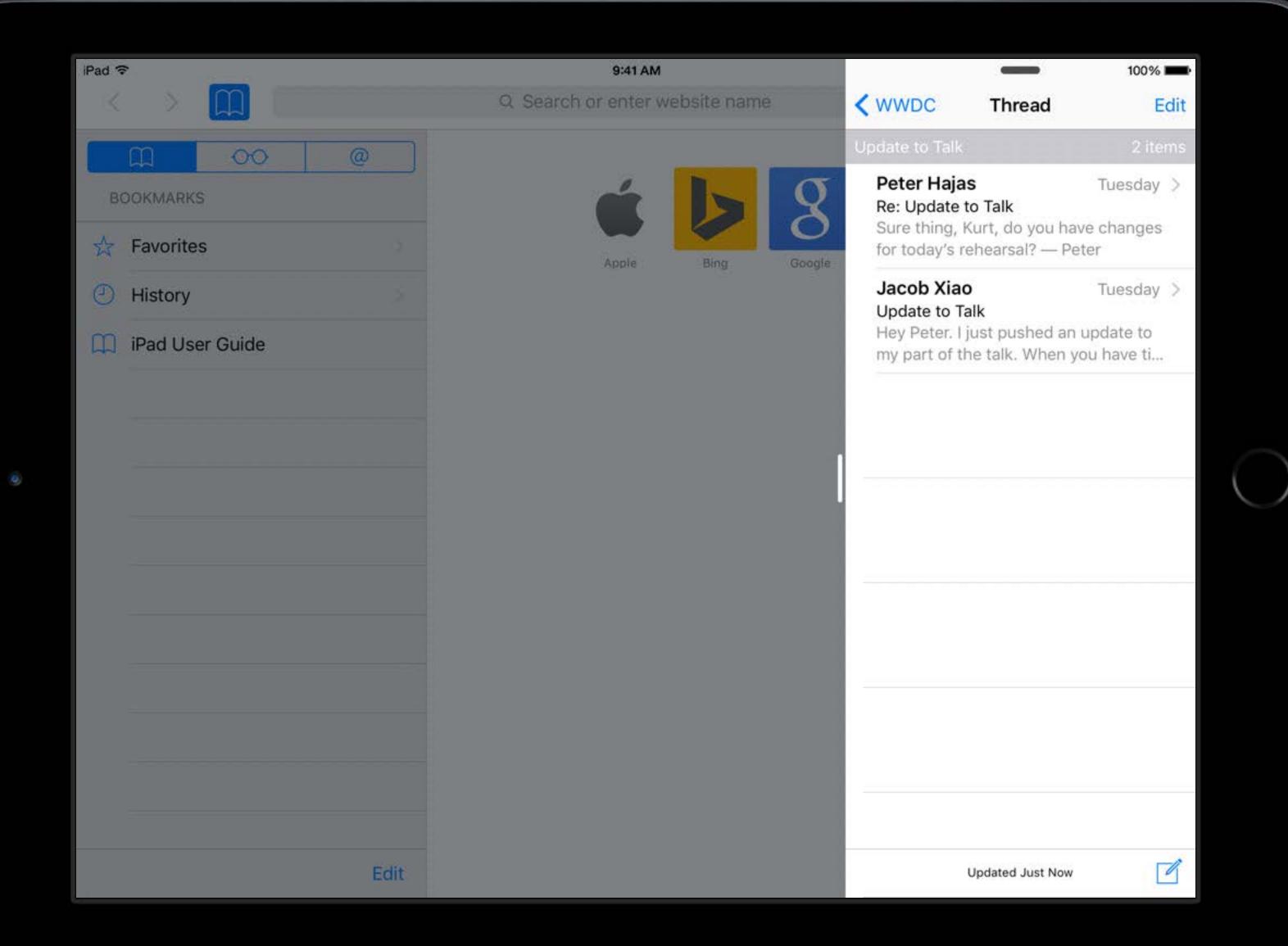
Secondary UIViewController

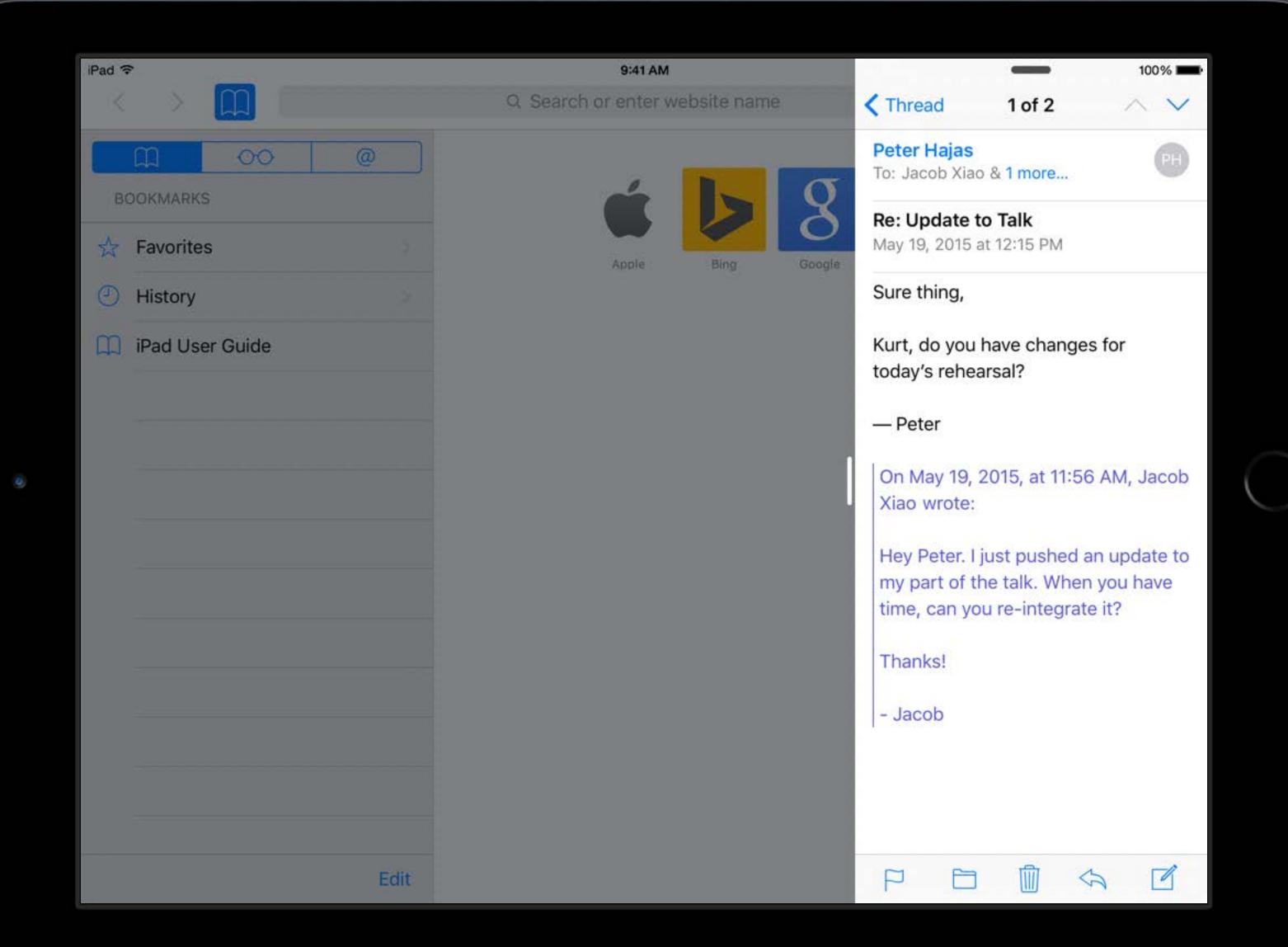




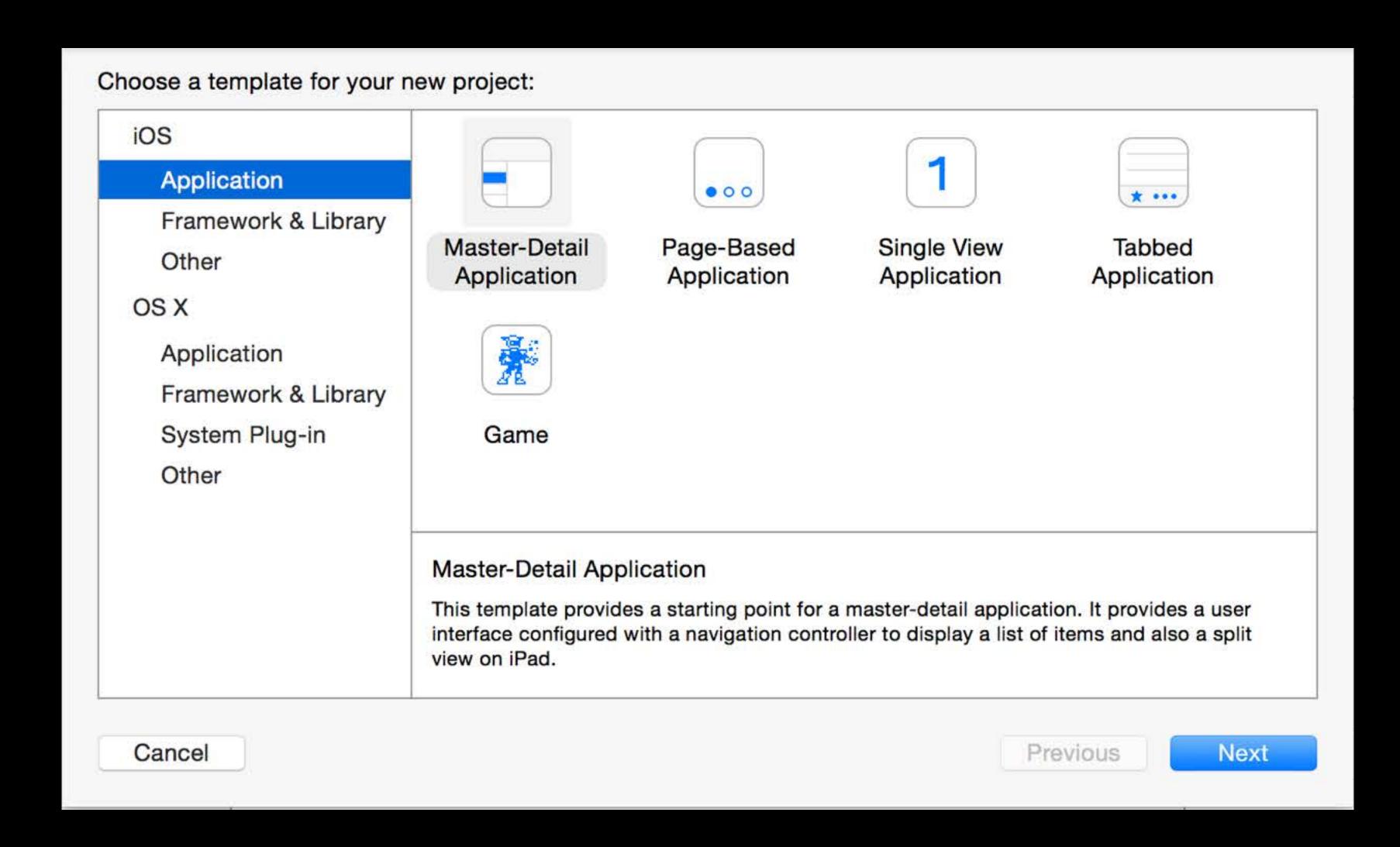








Xcode template



Be flexible

Auto Layout

Size Classes in Xcode

Adaptivity Callbacks

High-level API

Split View Controller

Strategies Sample code



AdaptivePhotos

Multitasking

Adapting to dynamic size changes

Strategies

Guidelines

The user controls your app's size

The user controls your app's size

The app cannot prevent size changes

The user controls your app's size

The app cannot prevent size changes

It cannot cause size changes either

The user controls your app's size

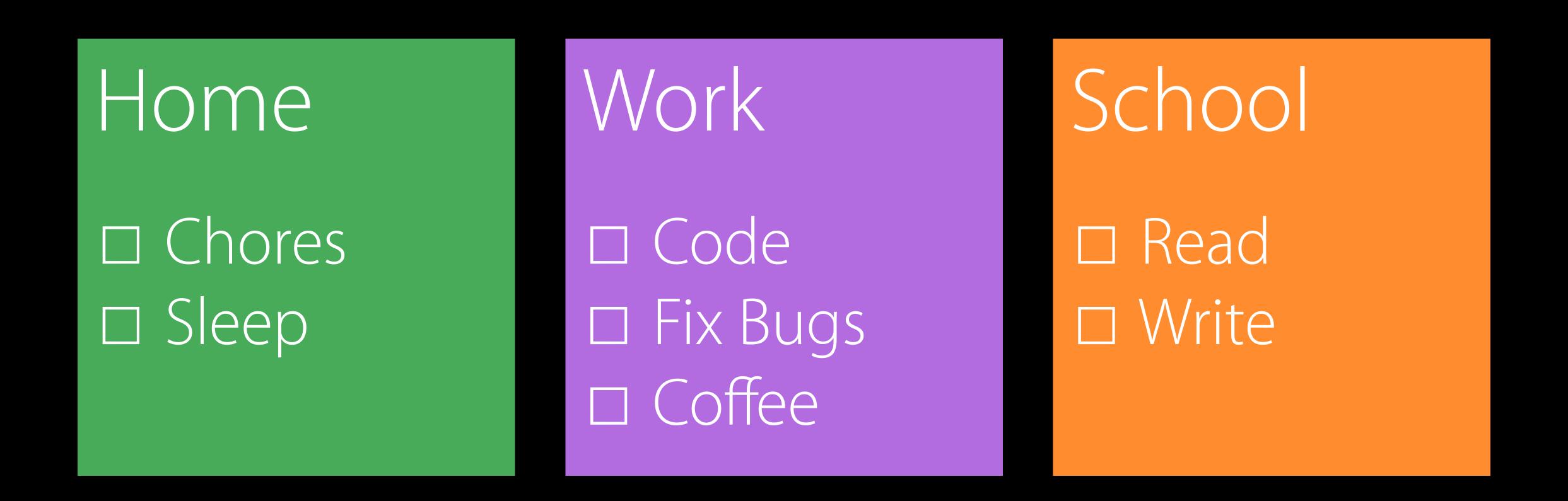
The app cannot prevent size changes

It cannot cause size changes either

Size changes can happen at any time

Keep the user oriented

Keep the user oriented



Regular Width

Home Chores □ Sleep Work Code ☐ Fix Bugs Coffee

Regular Width

Work Code ☐ Fix Bugs Coffee School □ Write

Compact Width

Home

- Chores
- Sleep

Compact Width

School

- □ Read
- □ Write

- Chores
- □ Sleep

- Code
- ☐ Fix Bugs
- Coffee



- Chores
- □ Sleep

- Code
- ☐ Fix Bugs
- Coffee



Work

- Code
- ☐ Fix Bugs
- □ Coffee

School

- □ Reac
- □ Write



Work Code ☐ Fix Bugs □ Coffee School □ Write

Chores Sleep Work ☐ Fix Bugs □ Coffee School

Chores □ Sleep Work Code □ Fix Bugs □ Coffee

School

- Code
- ☐ Fix Bugs
- □ Coffee

Keep the user oriented

Keep the user oriented

Don't make abrupt jumps

Keep the user oriented

Don't make abrupt jumps

Be smart in new ways

Keep the user oriented

Don't make abrupt jumps

Be smart in new ways

Especially going from large to small

After becoming inactive

After becoming inactive

Your app's size may change

After becoming inactive

Your app's size may change

Adaptivity methods are still called, but nothing is visible

After becoming inactive

Your app's size may change

Adaptivity methods are still called, but nothing is visible

The system restores the original size

1. App is active and Compact

- Code
- ☐ Fix Bugs
- □ Coffee

- 1. App is active and Compact
- 2. User presses Home button

- Code
- ☐ Fix Bugs
- □ Coffee

- 1. App is active and Compact
- 2. User presses Home button
- 3. System takes snapshot

- Code
- ☐ Fix Bugs
- □ Coffee

- 1. App is active and Compact
- 2. User presses Home button
- 3. System takes snapshot
- 4. System resizes app to Regular

- Chores
- Sleep

- ☐ Fix Bugs
- Coffee

- 1. App is active and Compact
- 2. User presses Home button
- 3. System takes snapshot
- 4. System resizes app to Regular
- 5. System takes another snapshot

- Chores
- Sleep

- Code
- ☐ Fix Bugs
- Coffee

- 1. App is active and Compact
- 2. User presses Home button
- 3. System takes snapshot
- 4. System resizes app to Regular
- 5. System takes another snapshot
- 6. System resizes app to Compact



- Chores
- □ Sleep

- 1. App is active and Compact
- 2. User presses Home button
- 3. System takes snapshot
- 4. System resizes app to Regular
- 5. System takes another snapshot
- 6. System resizes app to Compact
- 7. User activates app



- Chores
- □ Sleep

- 1. App is active and Compact
- 2. User presses Home button
- 3. System takes snapshot
- 4. System resizes app to Regular
- 5. System takes another snapshot
- 6. System resizes app to Compact
- 7. User activates app
- 8. System shows snapshot from step 3



Work



☐ Fix Bugs

Coffee

- 1. App is active and Compact
- 2. User presses Home button
- 3. System takes snapshot
- 4. System resizes app to Regular
- 5. System takes another snapshot
- 6. System resizes app to Compact
- 7. User activates app
- 8. System shows snapshot from step 3
- 9. Fades into live app



- Chores
- Sleep

- 1. App is active and Compact
- 2. User presses Home button
- 3. System takes snapshot
- 4. System resizes app to Regular
- 5. System takes another snapshot

Home

- Chores
- Sleep

- Code
- ☐ Fix Bugs
- Coffee

- 1. App is active and Compact
- 2. User presses Home button
- 3. System takes snapshot
- 4. System resizes app to Regular
- 5. System takes another snapshot
- 6. System resizes app to Compact



- Code
- ☐ Fix Bugs
- Coffee

- 1. App is active and Compact
- 2. User presses Home button
- 3. System takes snapshot
- 4. System resizes app to Regular
- 5. System takes another snapshot
- 6. System resizes app to Compact
- 7. User activates app



- Code
- ☐ Fix Bugs
- □ Coffee

- 1. App is active and Compact
- 2. User presses Home button
- 3. System takes snapshot
- 4. System resizes app to Regular
- 5. System takes another snapshot
- 6. System resizes app to Compact
- 7. User activates app
- 8. System shows snapshot from step 3



- Code
- ☐ Fix Bugs
- □ Coffee

- 1. App is active and Compact
- 2. User presses Home button
- 3. System takes snapshot
- 4. System resizes app to Regular
- 5. System takes another snapshot
- 6. System resizes app to Compact
- 7. User activates app
- 8. System shows snapshot from step 3
- 9. Fades into live app



- Code
- ☐ Fix Bugs
- □ Coffee

After becoming inactive

Maintain the same appearance

After becoming inactive

Maintain the same appearance

On deactivation:

Remember your size and state

After becoming inactive

Maintain the same appearance

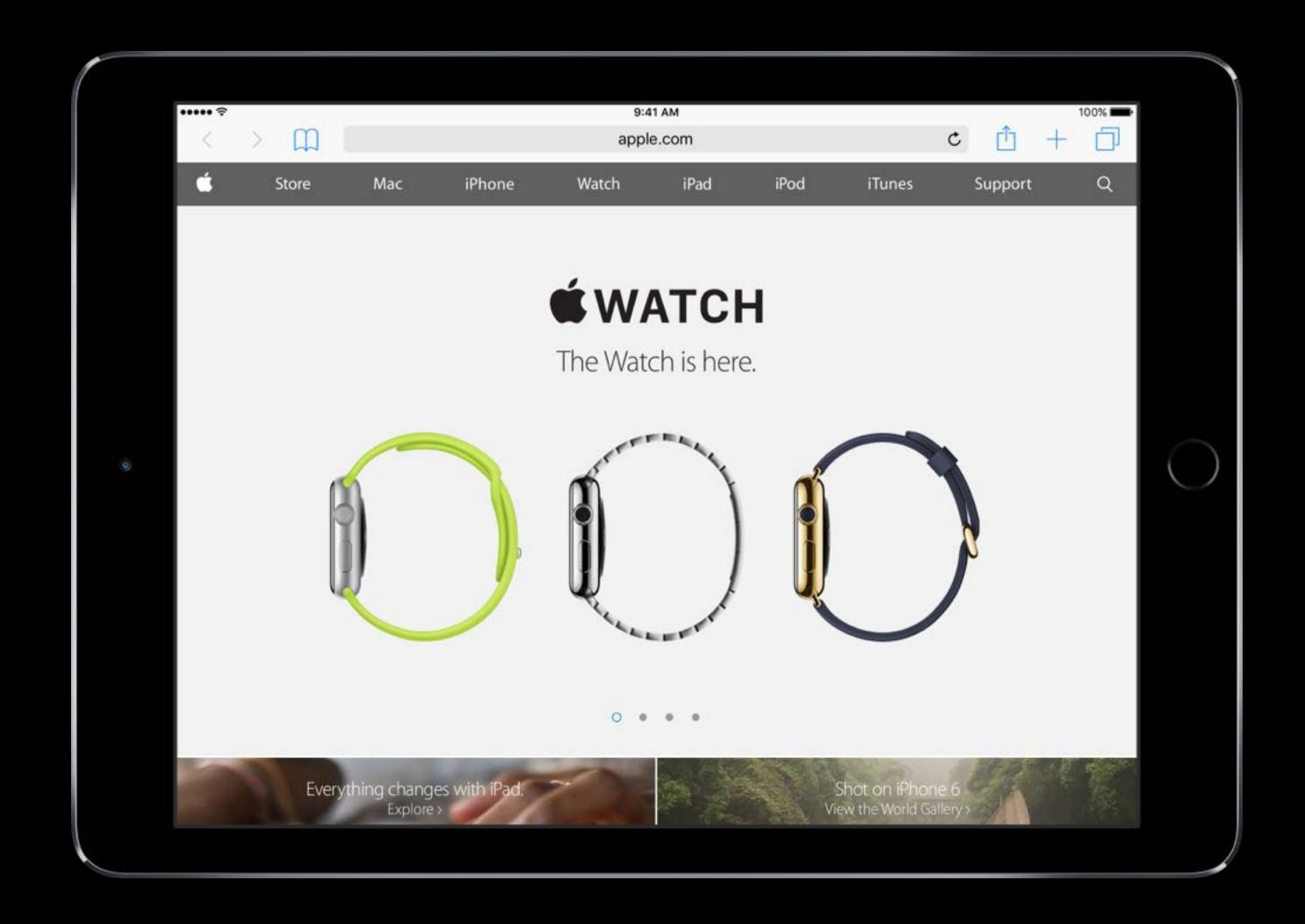
On deactivation:

Remember your size and state

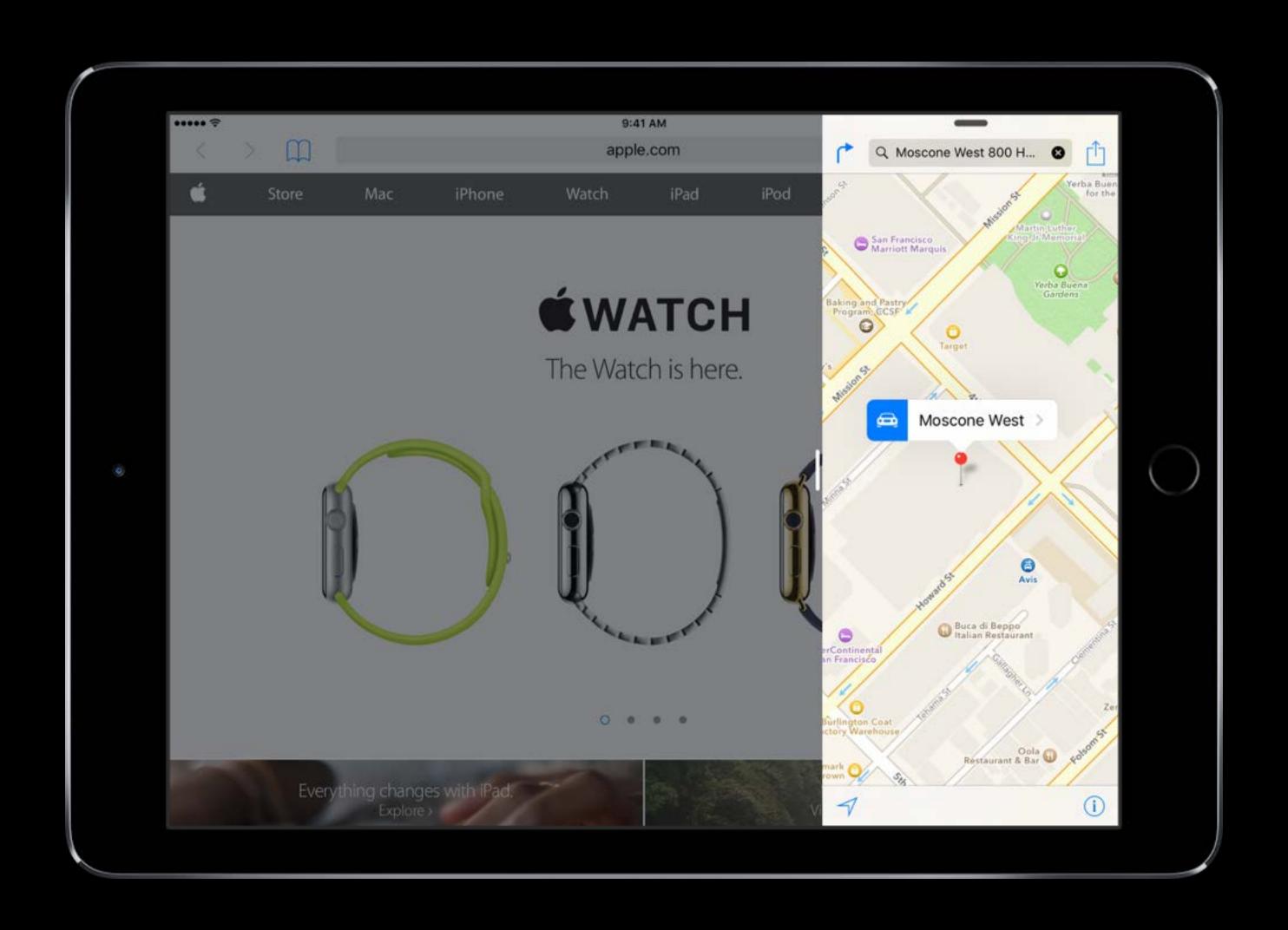
On size change:

- if inactive && newSize == originalSize
 - Then apply the remembered state

Primary App



Secondary App



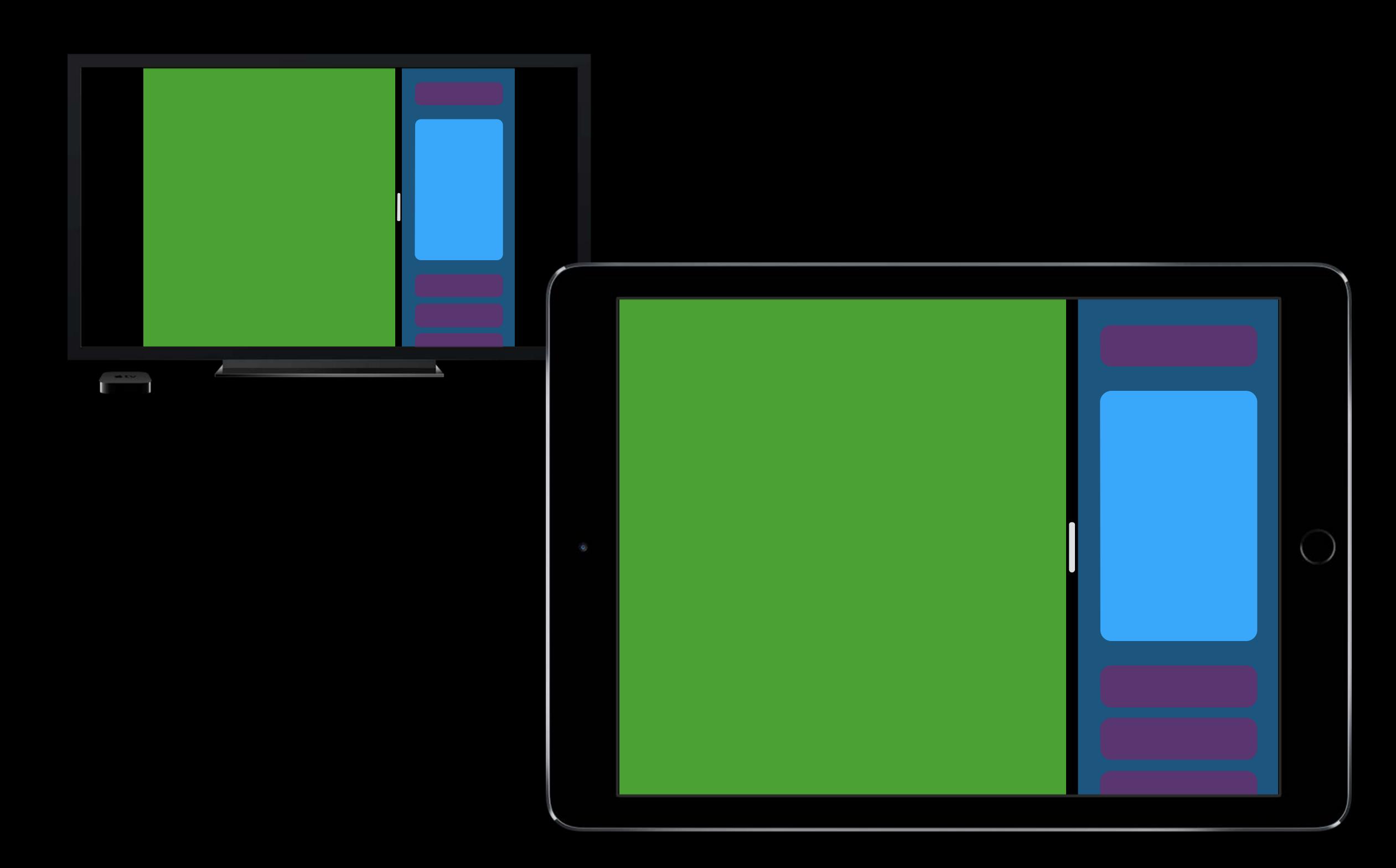
Guidelines External display

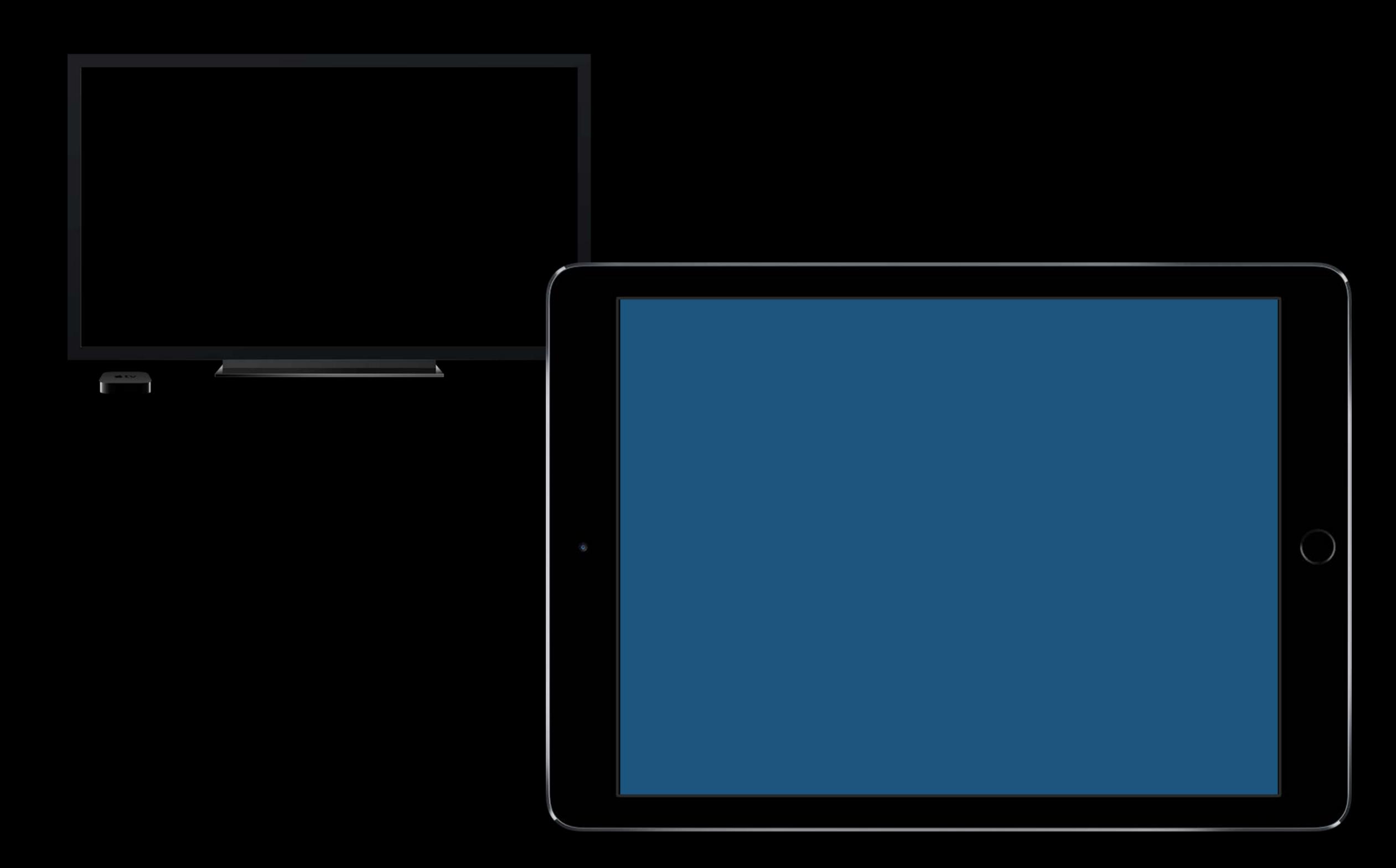


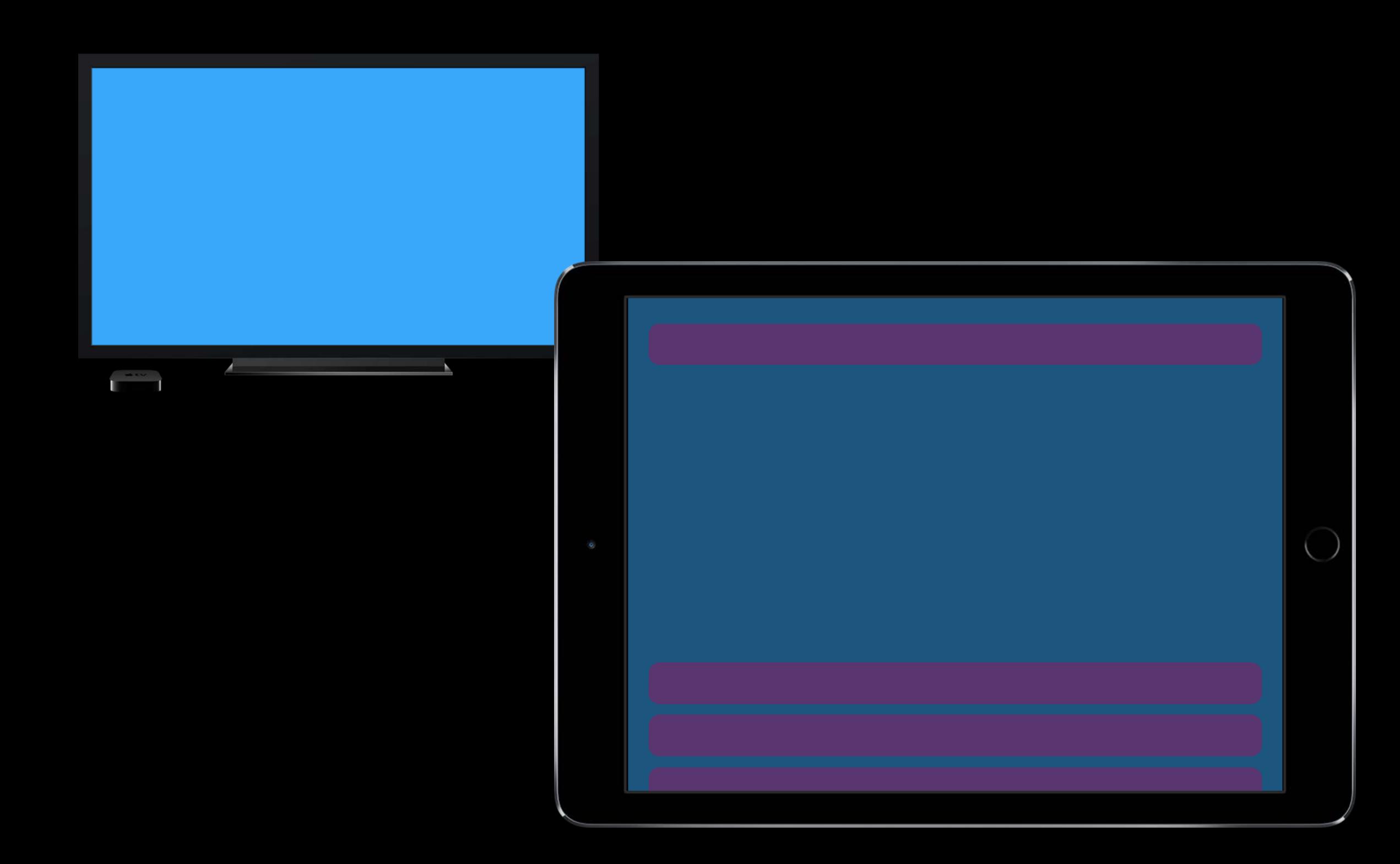
Guidelines External display

Only seen by the primary app









Performance

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When the size changes, do as little work as possible

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When the size changes, do as little work as possible

Use completion blocks for slow work

In animation blocks, don't call layoutIfNeeded

Performance

When the size changes, do as little work as possible Use completion blocks for slow work In animation blocks, don't call layoutIfNeeded Use setNeedsLayout

Multitasking

Adapting to dynamic size changes

Strategies

Guidelines

Adopting Multitasking in iOS 9 Summary

Adopt Multitasking in your app

Use Adaptivity

You can deliver a great user experience

More Information

Documentation

What's New in iOS iOS App Programming Guide Adopting Multitasking Enhancements on iPad

Sample Code

AdaptivePhotos

Lister

http://developer.apple.com/ios

Technical Support

Apple Developer Forums

Developer Technical Support

General Inquiries

Curt Rothert, App Frameworks Evangelist rothert@apple.com

Related Sessions

Multitasking Essentials for Media-Based Apps on iPad in iOS 9	Mission	Wednesday 2:30PM
Optimizing Your App for Multitasking in iOS	Presidio	Wednesday 3:30PM
Cocoa Touch and Multitasking Lab	Frameworks Lab B	Wednesday 9:00AM, 3:30PM

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