

macOS

iOS

watchOS

tvOS









Contacts Interactive notifications Cache Delete Smart Card API Window Tabs SiriKit Payments SiriKit VoIP calling
Camera sensor data Live information Recent addresses SiriKit SceneKit physically based rendering SiriKit Messaging
iMessage extensions Xcode thread sanitizer Xcode source editor extensions ReplayKit Live
Book-a-ride extension Live Photos editing Apple Pay on the web Xcode FPS gauge
iMessage apps Smaller Xcode download Xcode editor extensions Maps extensions
Spam alert extension HomeKit Air Purifier Native VoIP experience SiriKit photo search
Live Photos capture iCloud for Developer ID SiriKit ride booking Speech Recognition
HomeKit Doorbell Reservations Maps extension HomeKit accessories HomeKit Air Conditioning
User notifications VoIP extensions Wide color CarPlay Maps instrument cluster Stickers Grid View HomeKit Camera
CloudKit sharing RAW photo editing SiriKit Workouts Memory debugger Pixar USD model support Metal Tessellation







Secure

Short-lived

Out-of-process

Sandboxed

On demand

Remote views







iMessage Apps



Extensions



App Store



iMessage App Store





iMessage App Store


- Featured
- Categories
- Manage (3)




New iMessage Apps We Love [See All >](#)

- 


JibJab – Send Funny Stuff
Entertainment
- 


DoorDash – Food Delivery
Food & Drink
- 


Square Cash – Send Money fo...
Finance
- 


Fa...
Movie
Ente...

New Sticker Packs We Love [See All >](#)

- 

Finding Dory Flicks
- 

Star Wars: The Force Awakens Flicks
- 

Inside Out Flicks
- 

Top Free [See All >](#)



7:00 PM 2 people

Get [Open Table](#) >



7:00 PM

2 people

Get [Open Table](#) >

iMessage

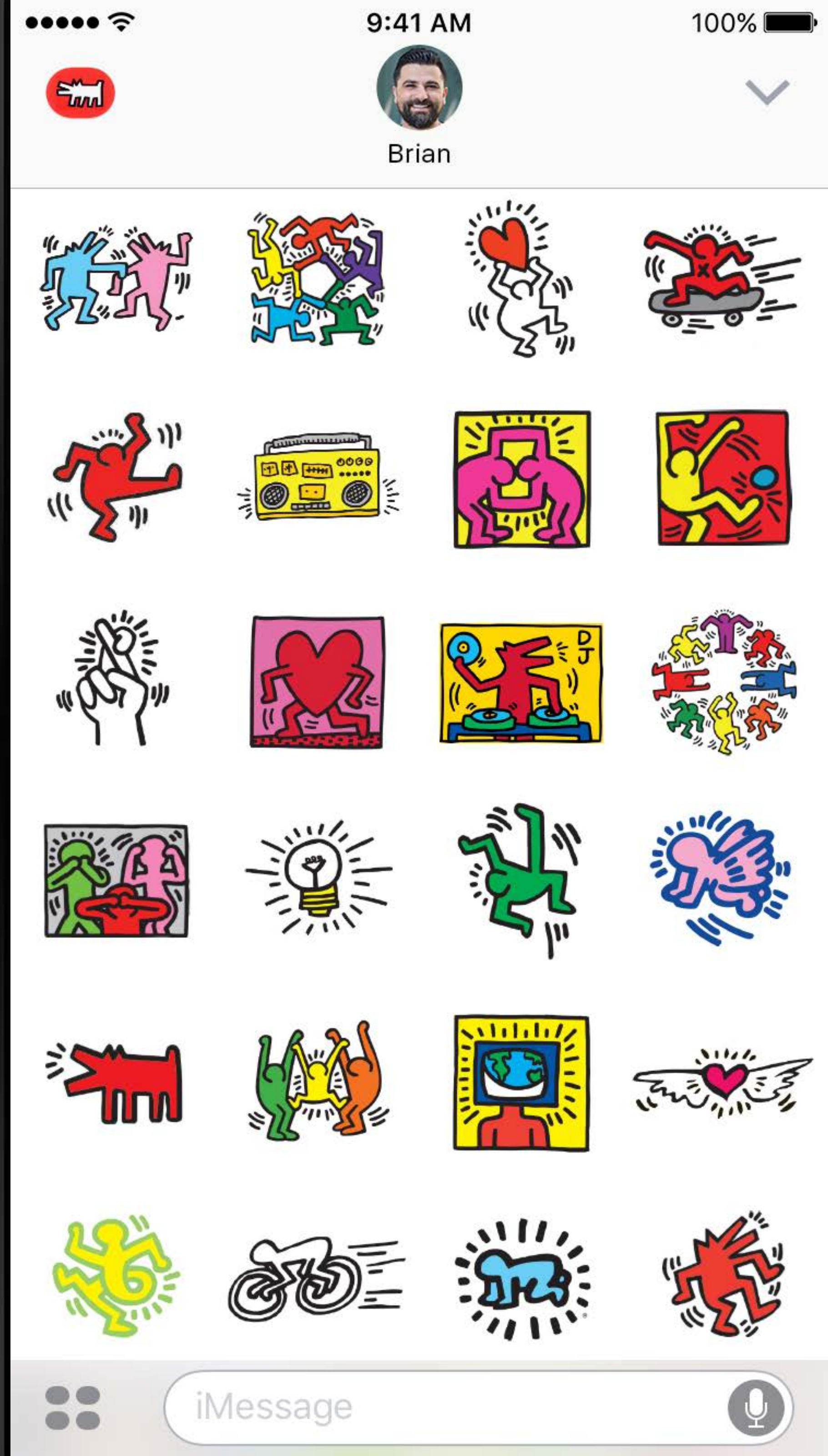
The I I'm

Q W E R T Y U I O P

A S D F G H J K L

↑ Z X C V B N M ↵

123 😊 🗣️ space return

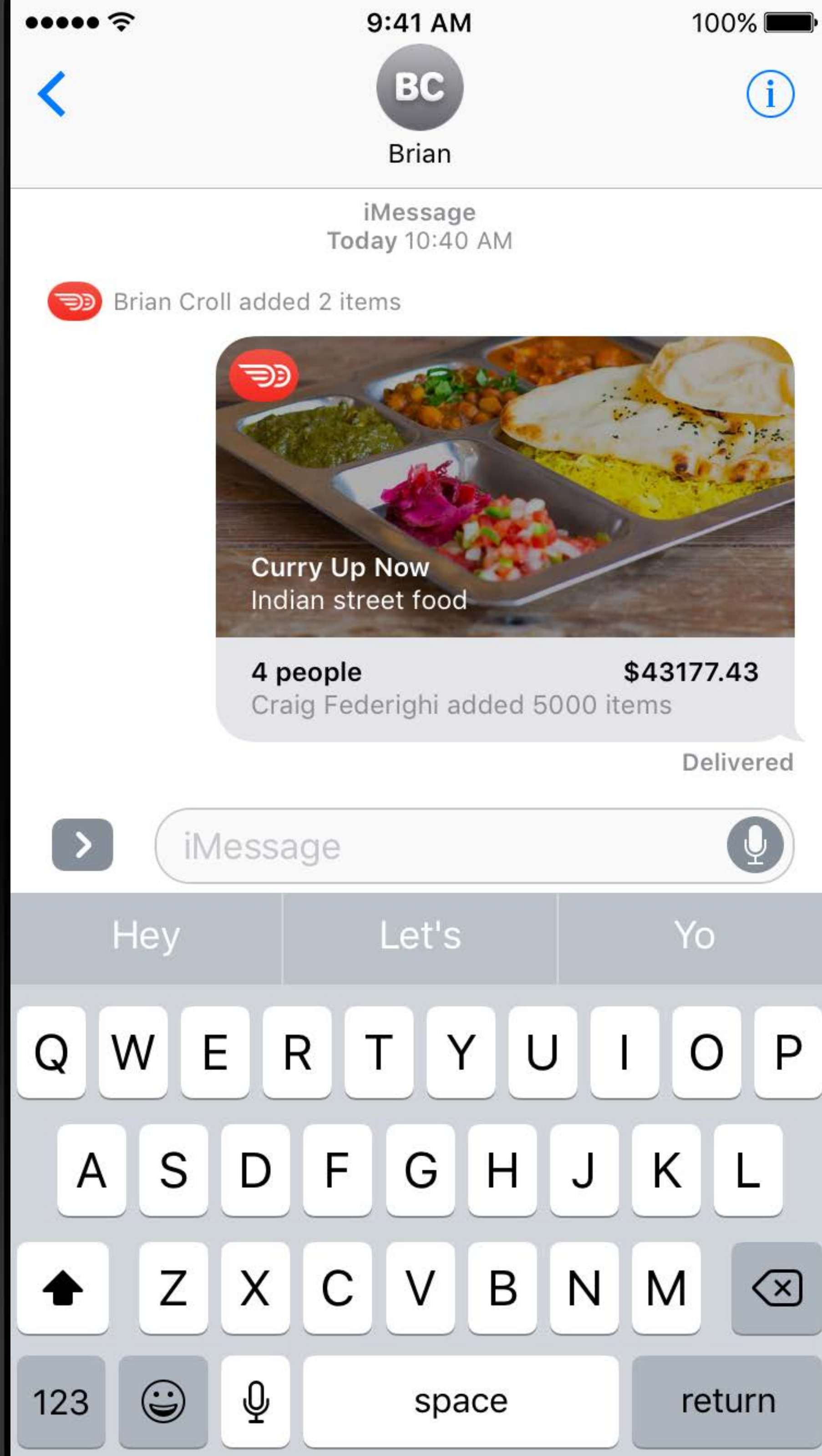


No coding required

Use familiar image editing tools

Build with Xcode

Submit to iTunes Connect



UIKit

Messages extension point

Build with Xcode

Submit to iTunes Connect

iMessage
Today 10:40 AM

Brian Croll added 2 items



Curry Up Now
Indian street food

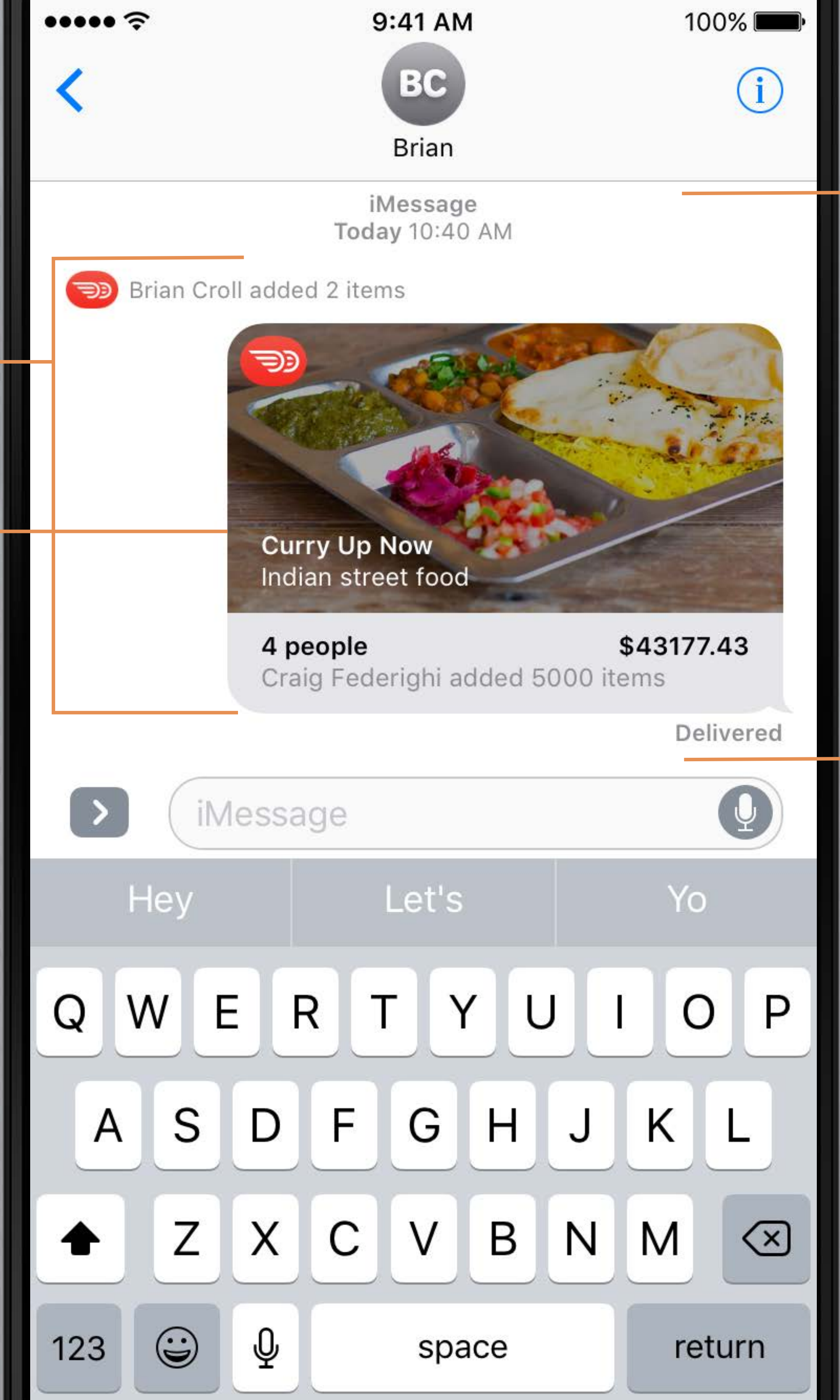
4 people \$43177.43
Craig Federighi added 5000 items

Delivered

iMessage

Hey Let's Yo

Q W E R T Y U I O P
A S D F G H J K L
↑ Z X C V B N M
123 😊 🗣️ space return



MSSession

MSMessage

MSConversation



Privacy

Wanna go see Finding Dory?

Delivered



Let's See Finding Dory

Add comment or Send



TAP THE MOVIE YOU WANT TO SEE





Marcos



Wanna go see Finding Dory?

Delivered



Let's See Finding Dory



Add comment or Send



TAP THE MOVIE YOU WANT TO SEE



Start Now



SDK



Simulator

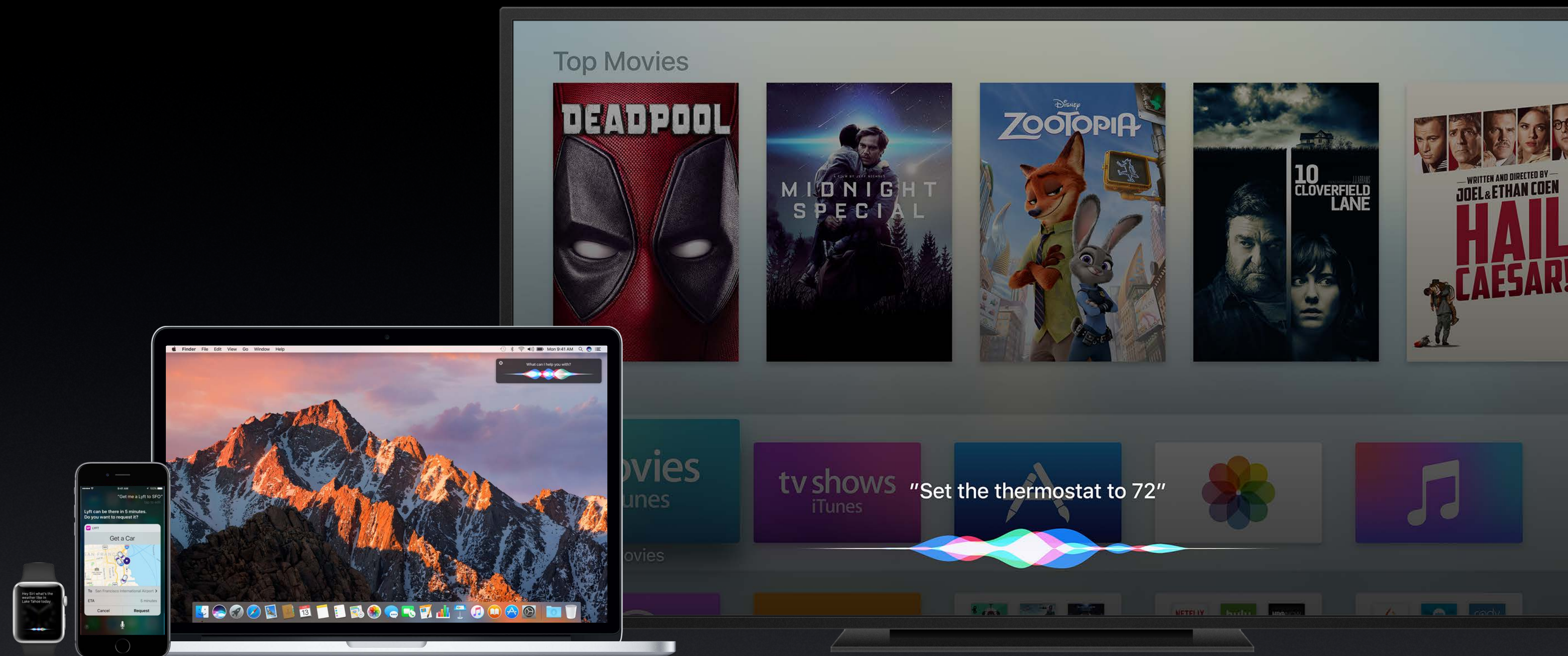
Demo



Siri



2011



WWDC 2016



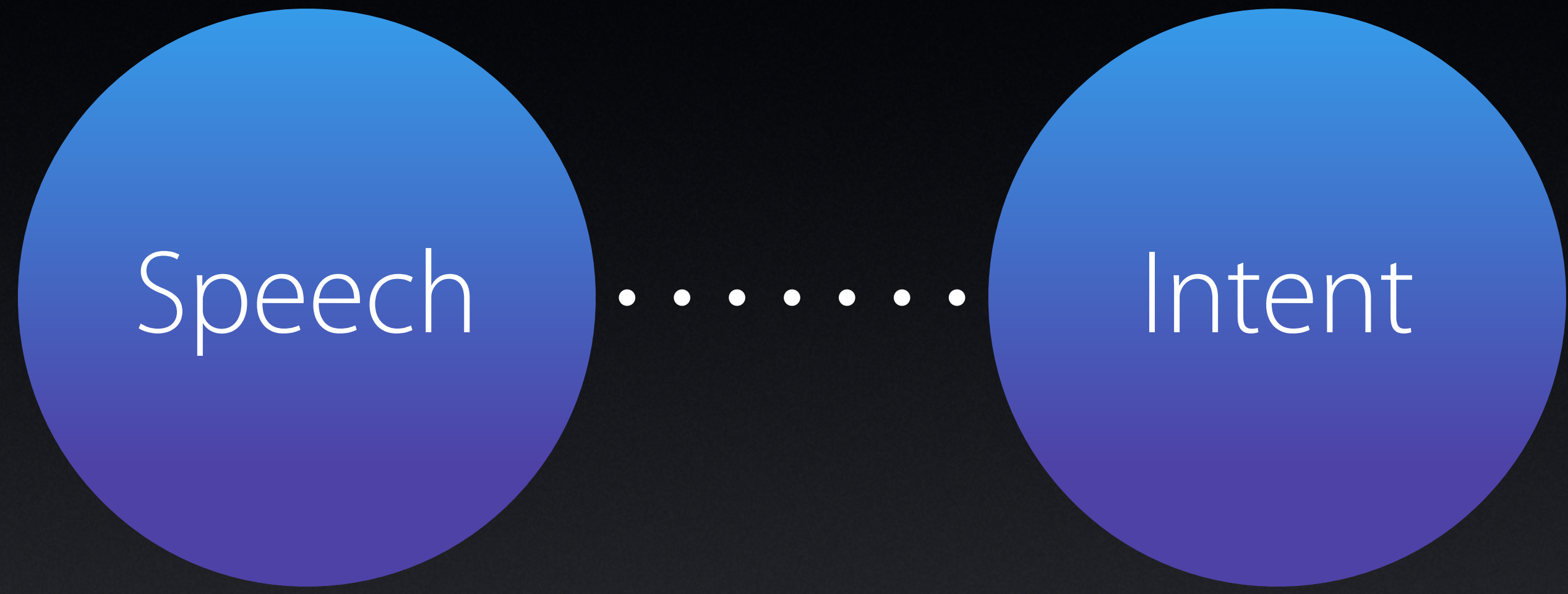
Instant

Launch on latest hardware



SiriKit







Speech

Intent

Action



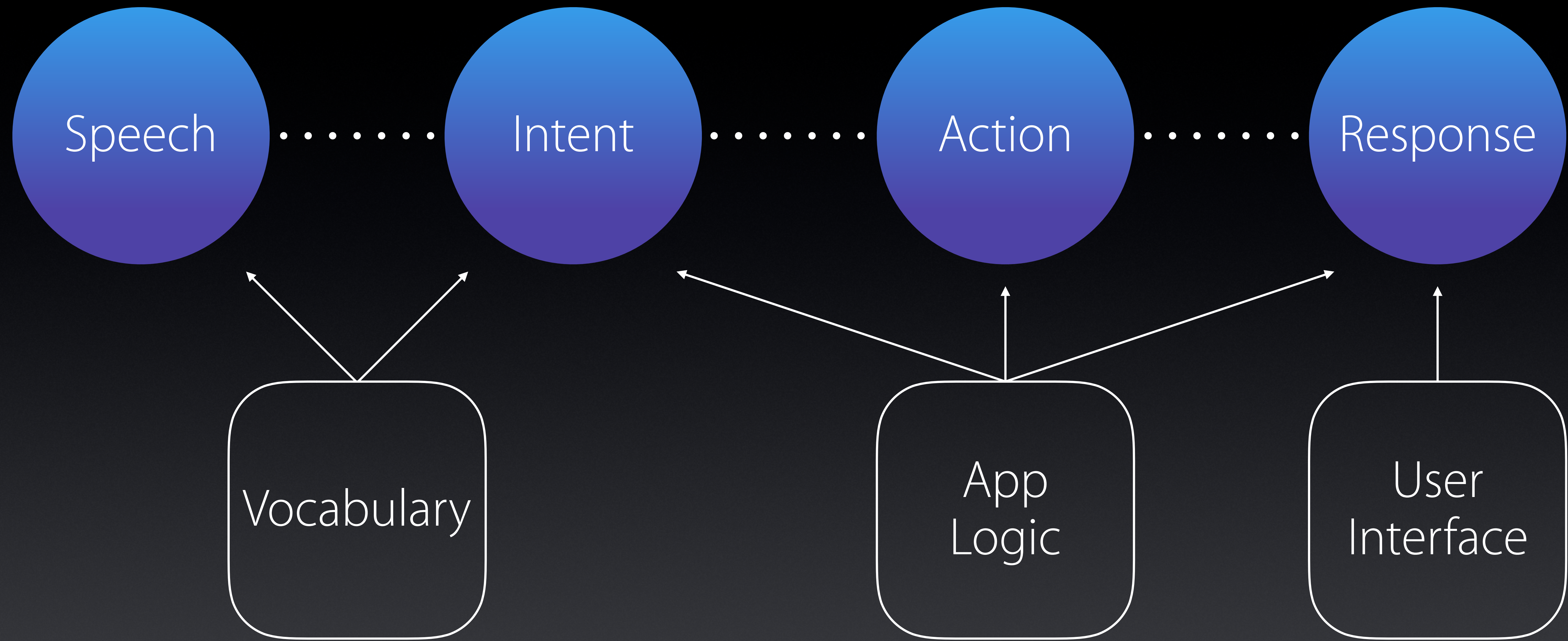
Speech

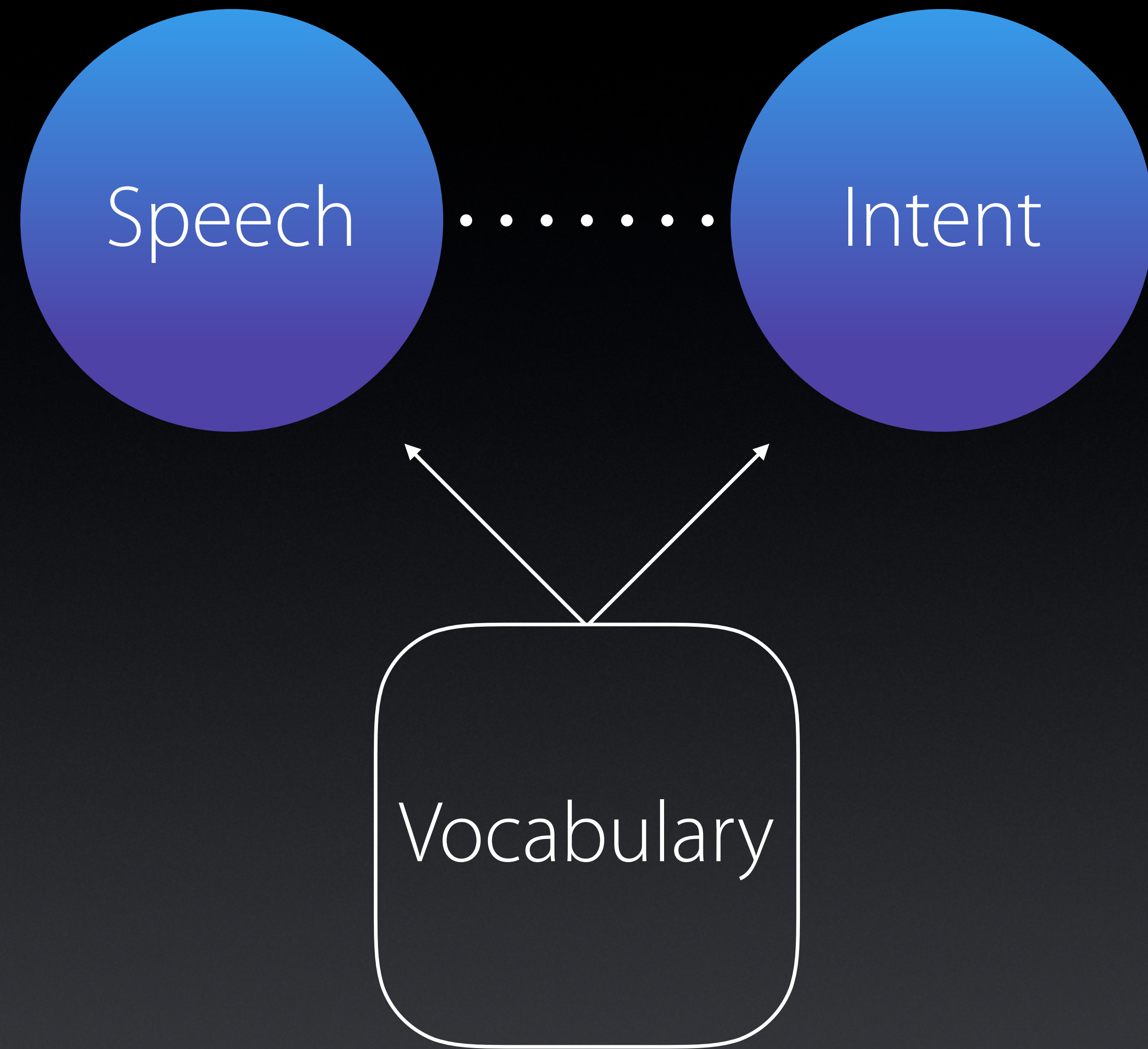
Intent

Action

Response

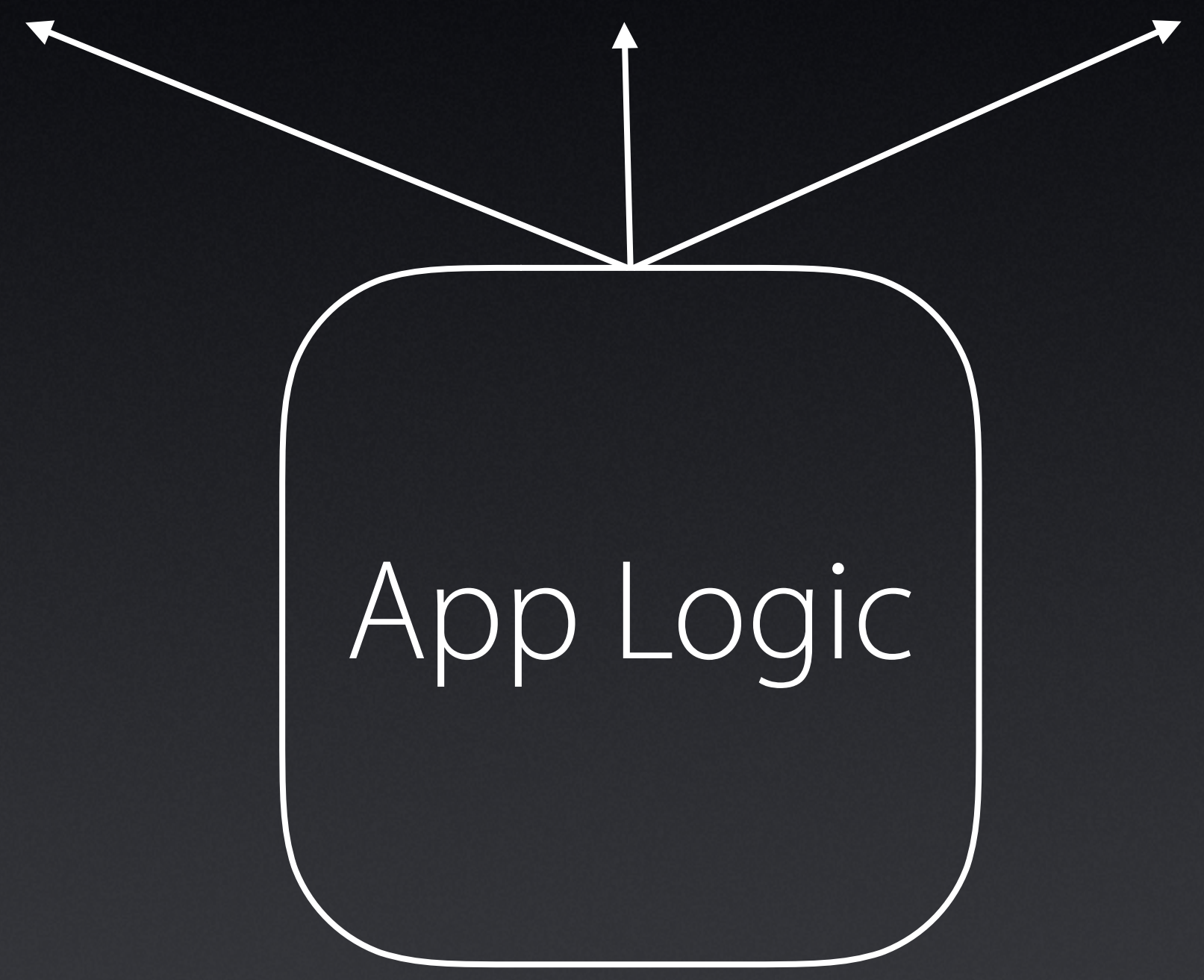




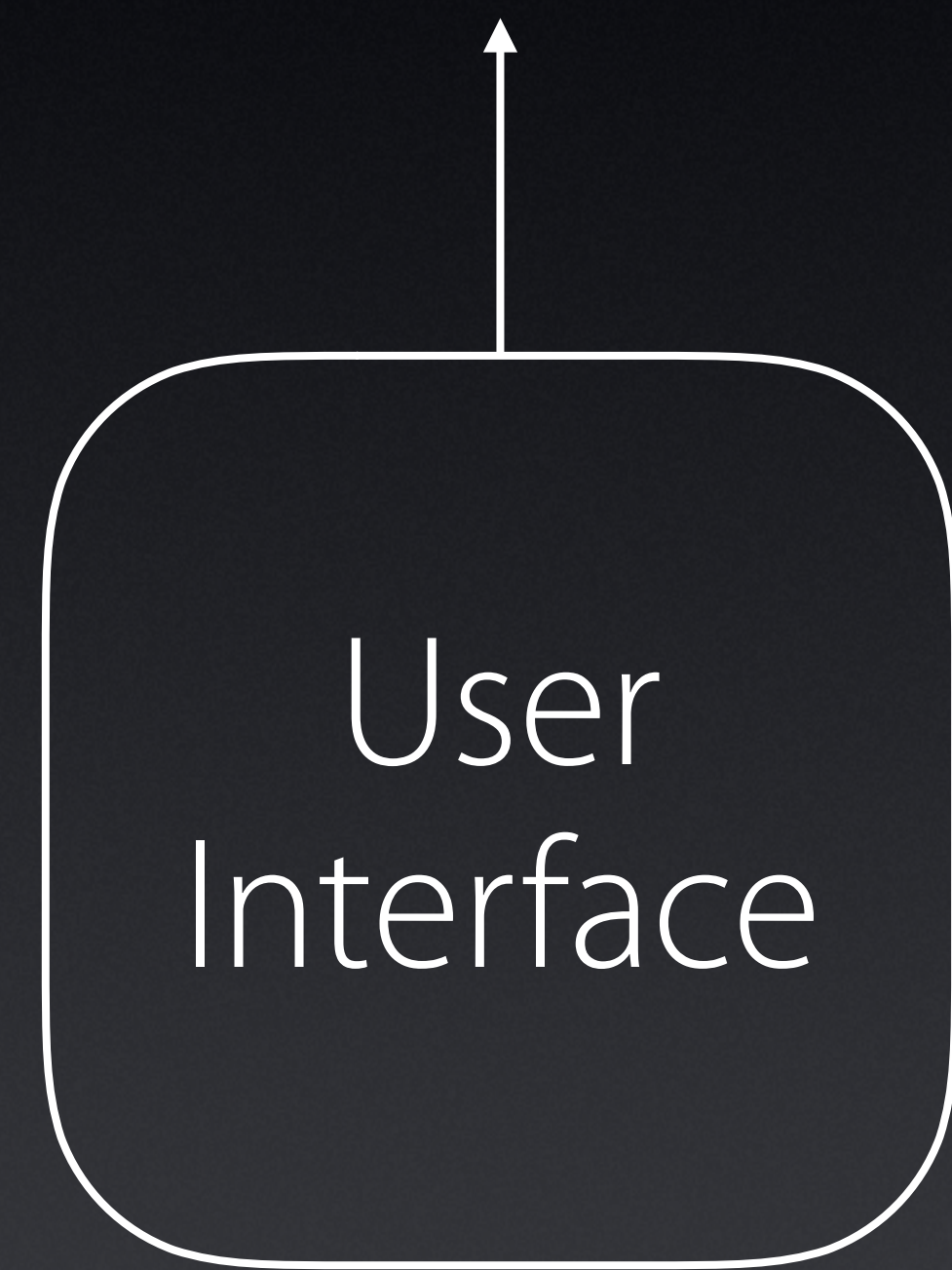


App vocabulary: plist

User vocabulary: code



- Extension
- Resolve parameters
- Confirm intent
- Handle intent



Extension

Custom user interface

UIKit

Example: Hologram



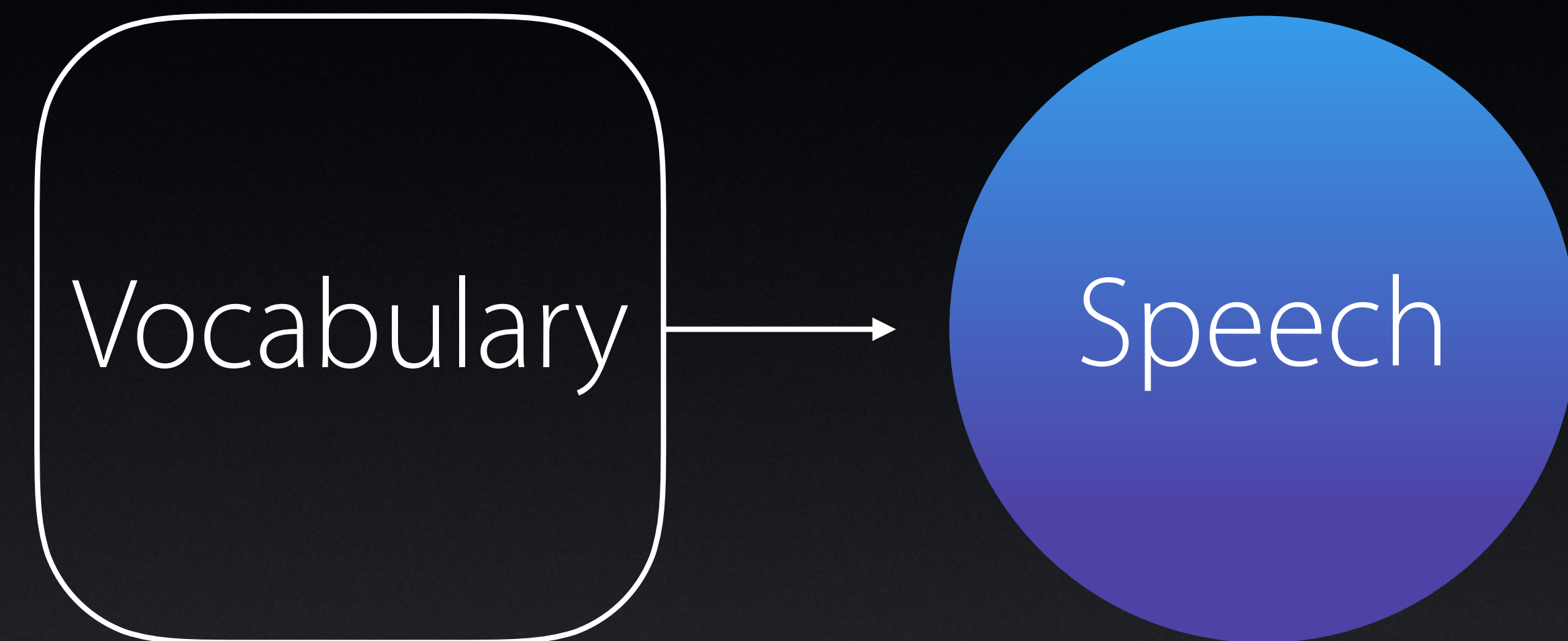
Speech



“Send a Hologram to Obi-Wan
saying you’re my only hope”



“Send a Hologram to **Obi-Wan**
saying you’re my only hope”



“Send a Hologram to **Obi-Wan** saying you’re my only hope”



“Send a Hologram to Obi-Wan
saying you’re my only hope”

Domain: Messages

Intent: sendMessage



“Send a Hologram to Obi-Wan
saying you’re my only hope”

Domain: Messages

Intent: sendMessage



“Send a Hologram to Obi-Wan
saying you’re my only hope”

Domain: Messages

Intent: sendMessage



Recipient
|
"Send a Hologram to Obi-Wan
saying you're my only hope" ————— Content

Domain: Messages

Intent: sendMessage



Recipient
|
"Send a Hologram to Obi-Wan
saying you're my only hope" ————— Content

Domain: Messages

Intent: sendMessage

Recipient: Obi-Wan

Content: You're my only hope

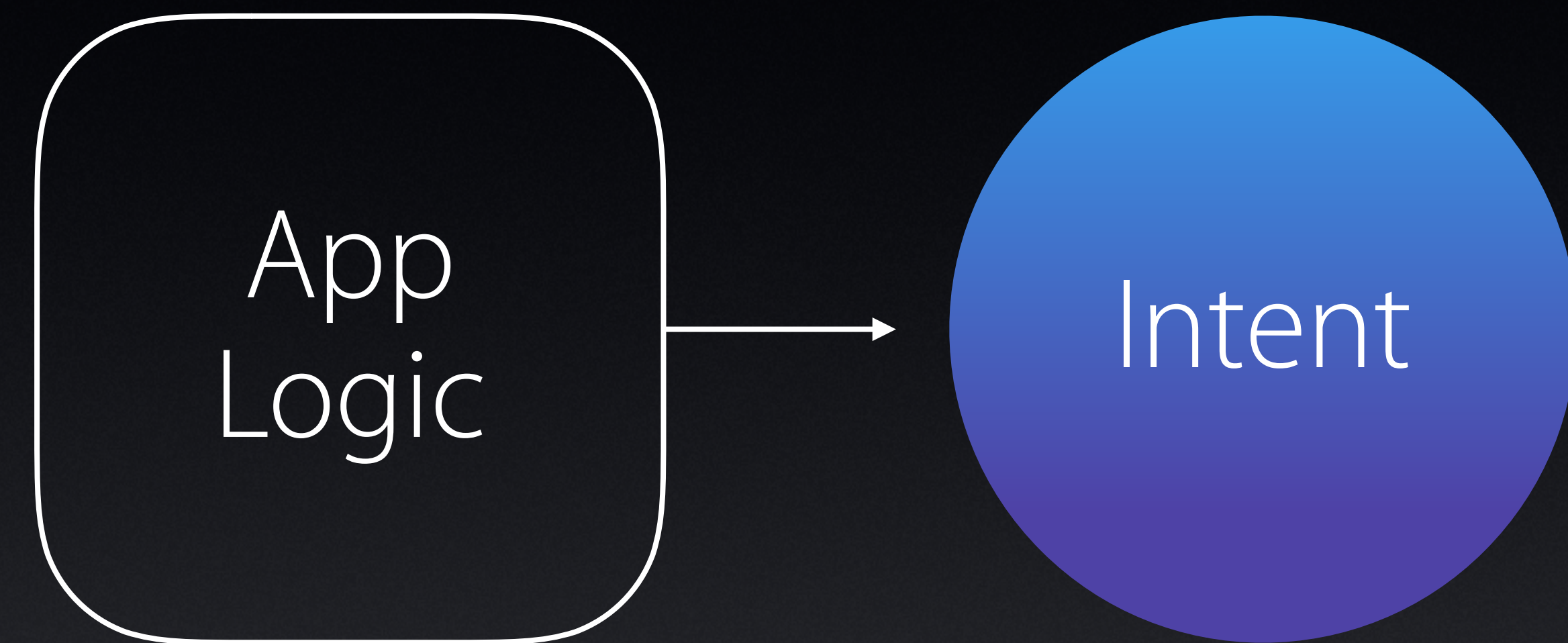


Domain: Messages

Intent: sendMessage

Recipient: Obi-Wan

Content: You're my only hope



Domain: Messages

Intent: sendMessage

Recipient: Obi-Wan → Old Ben Kenobi

Content: You're my only hope



Domain: Messages

Intent: sendMessage

Recipient: Old Ben Kenobi

Content: You're my only hope

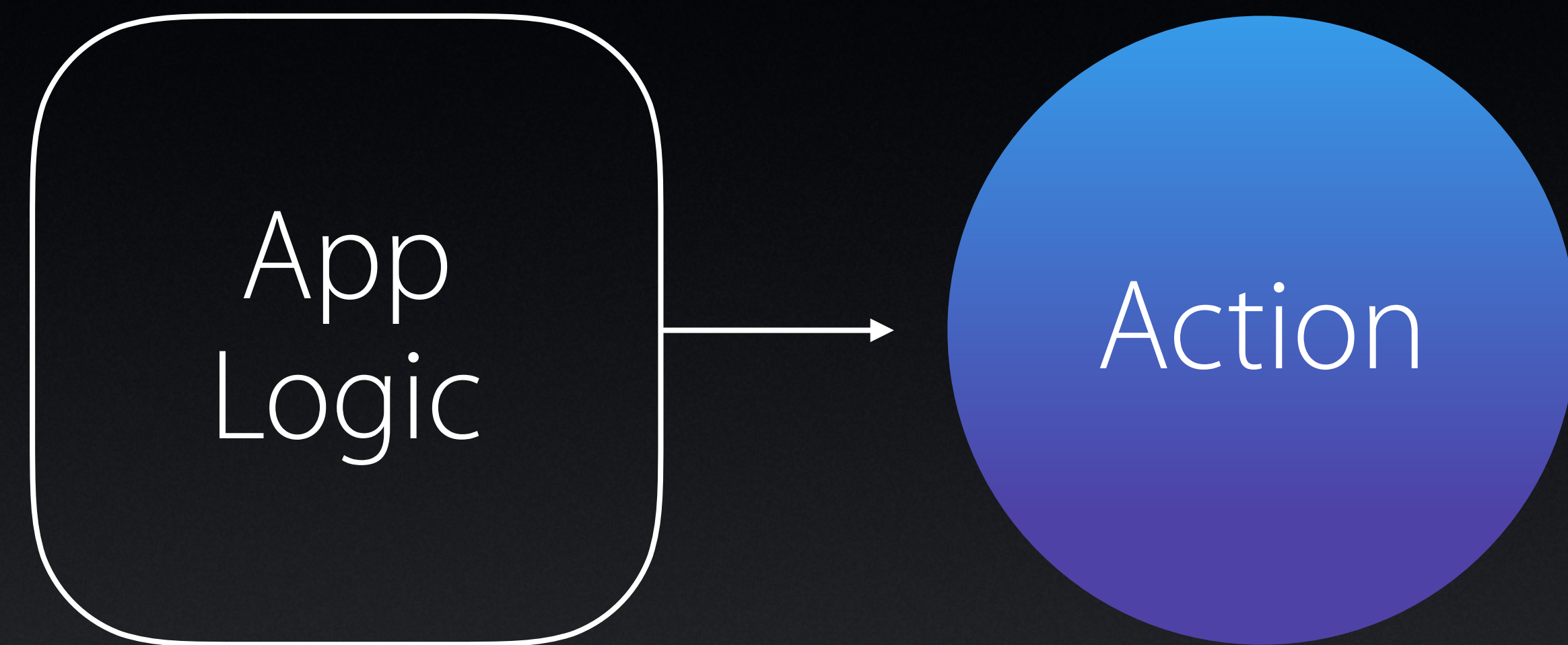


Domain: Messages

Intent: sendMessage

Recipient: Old Ben Kenobi

Content: You're my only hope



Domain: Messages

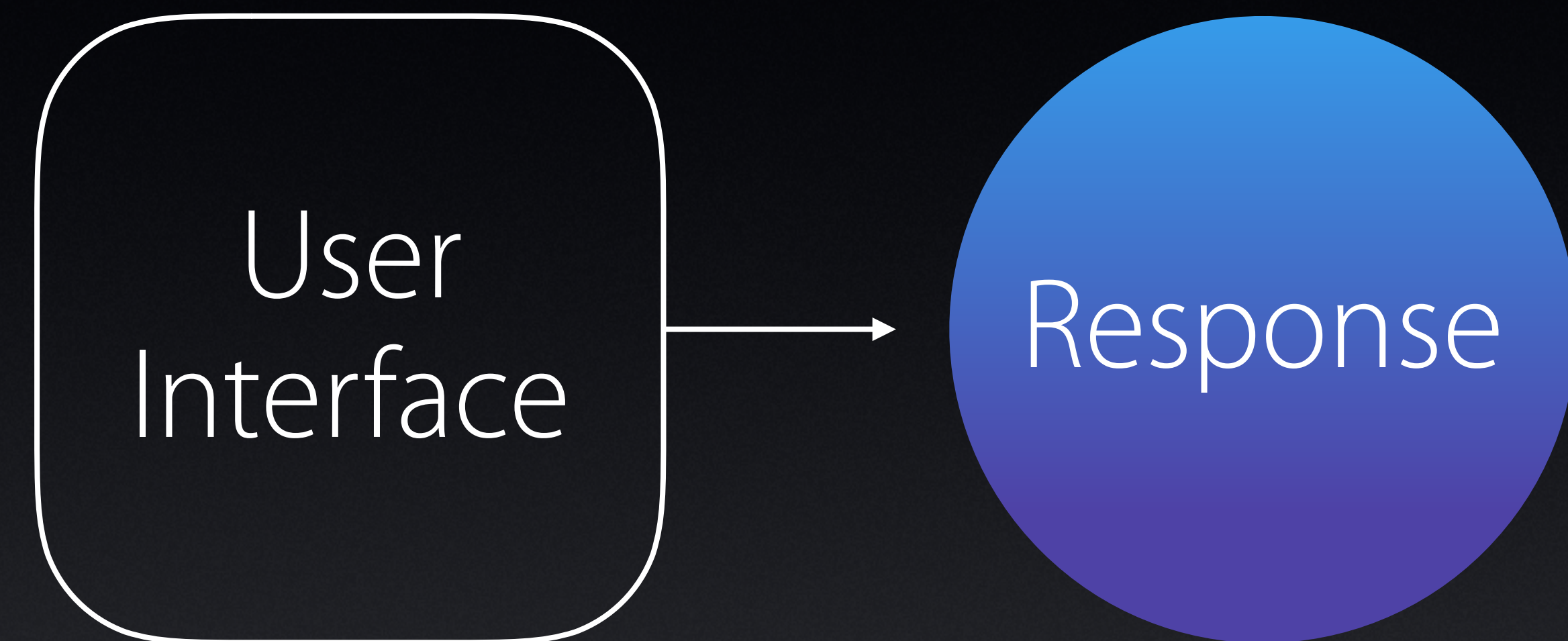
Intent: sendMessage

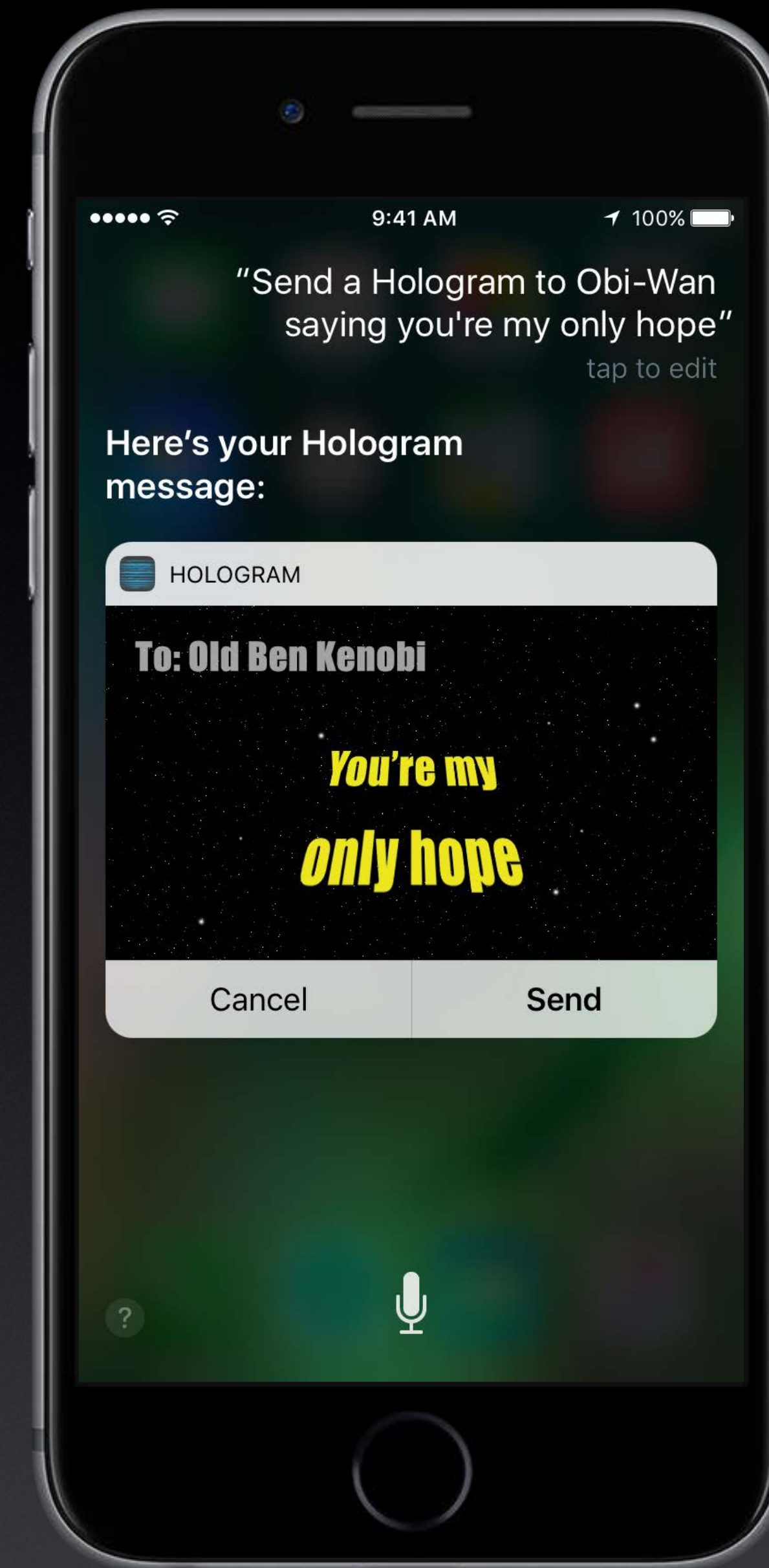
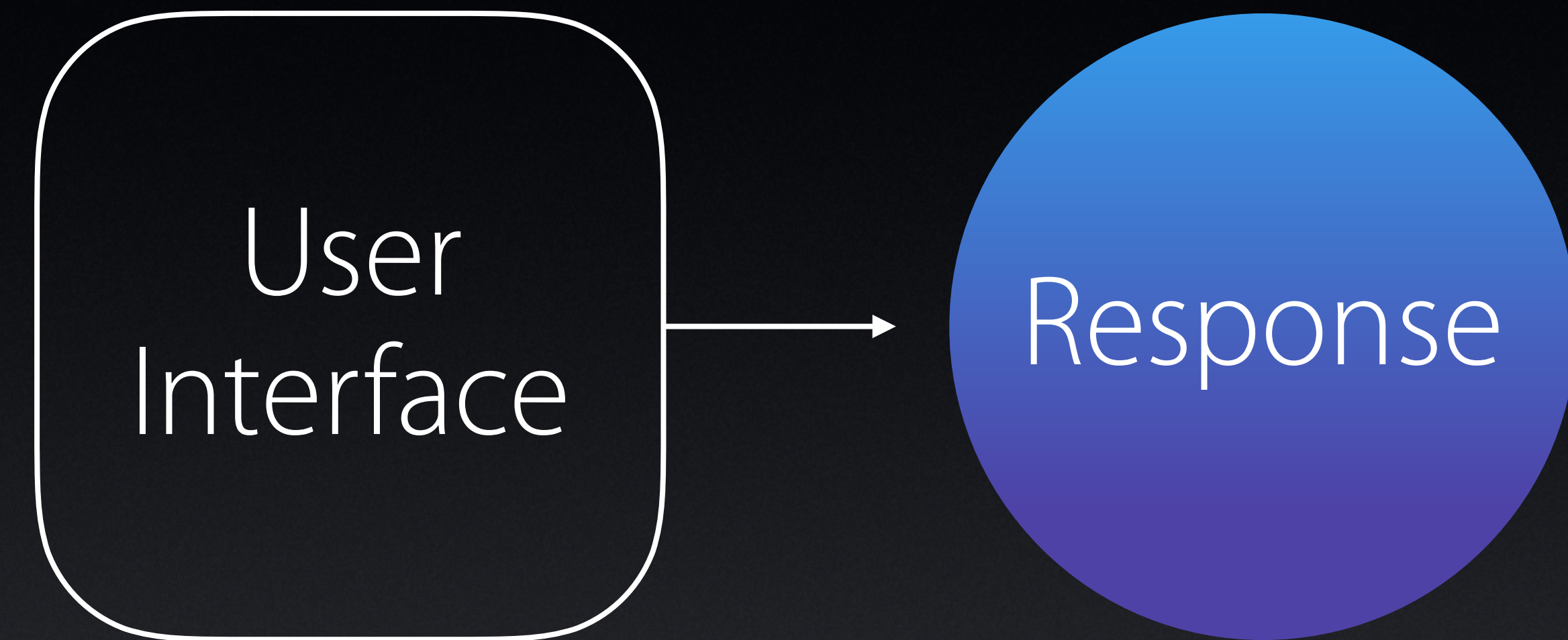
Recipient: Old Ben Kenobi

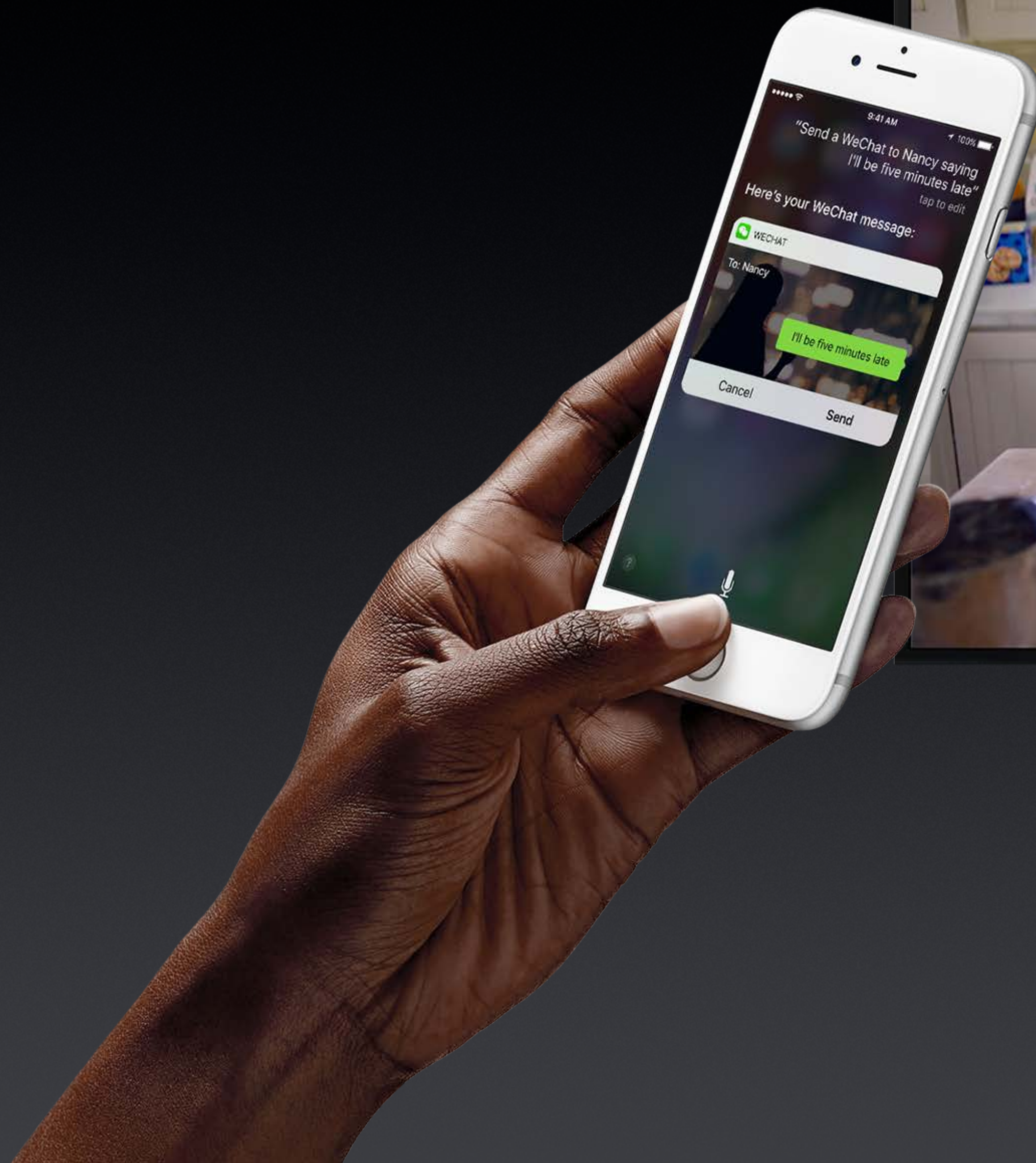
Content: You're my only hope

Response











Extensions

NSUserActivity



Messaging

VoIP calling

Payments

Ride booking

Photo search

Workouts




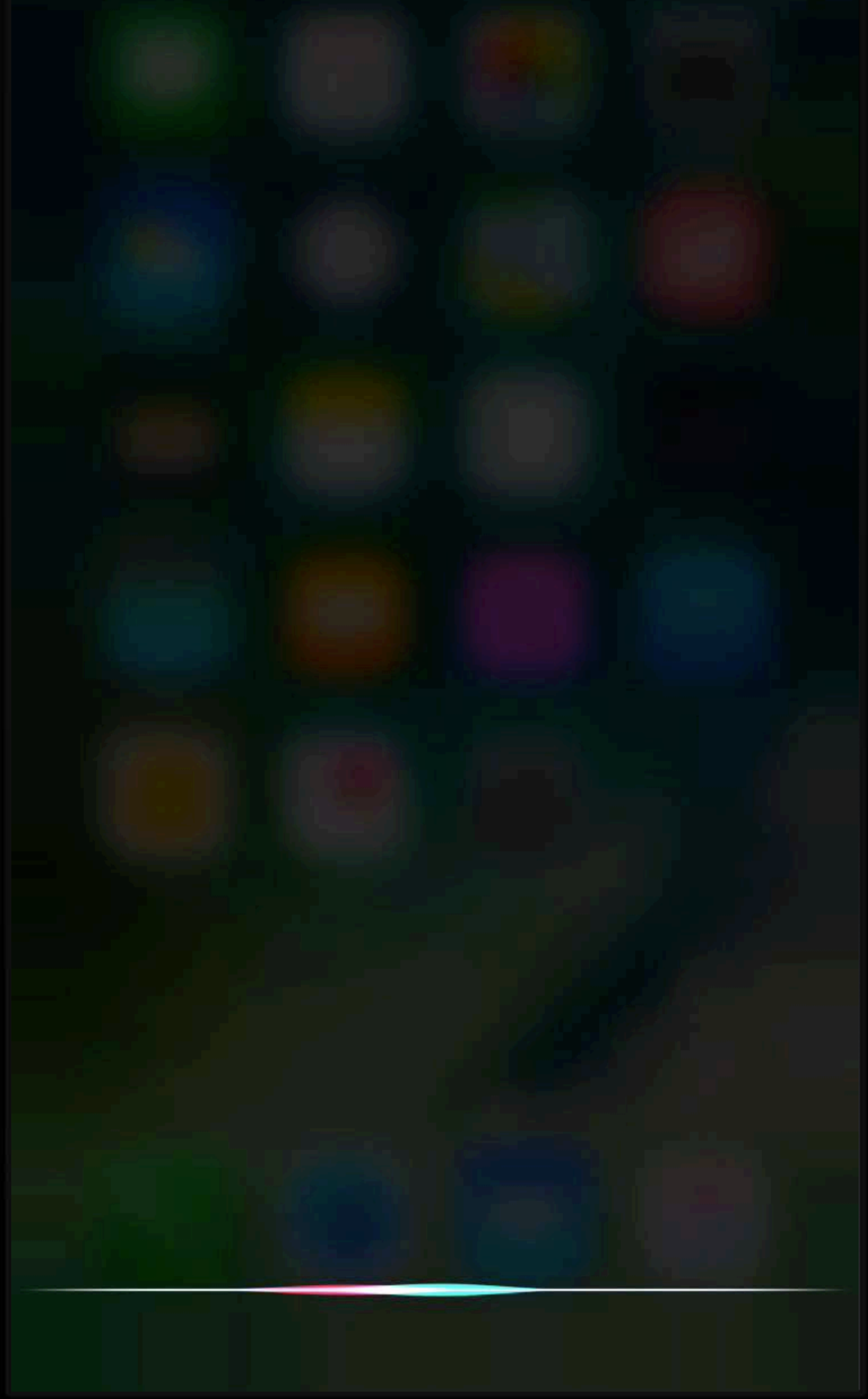
All Siri languages






9:41 AM

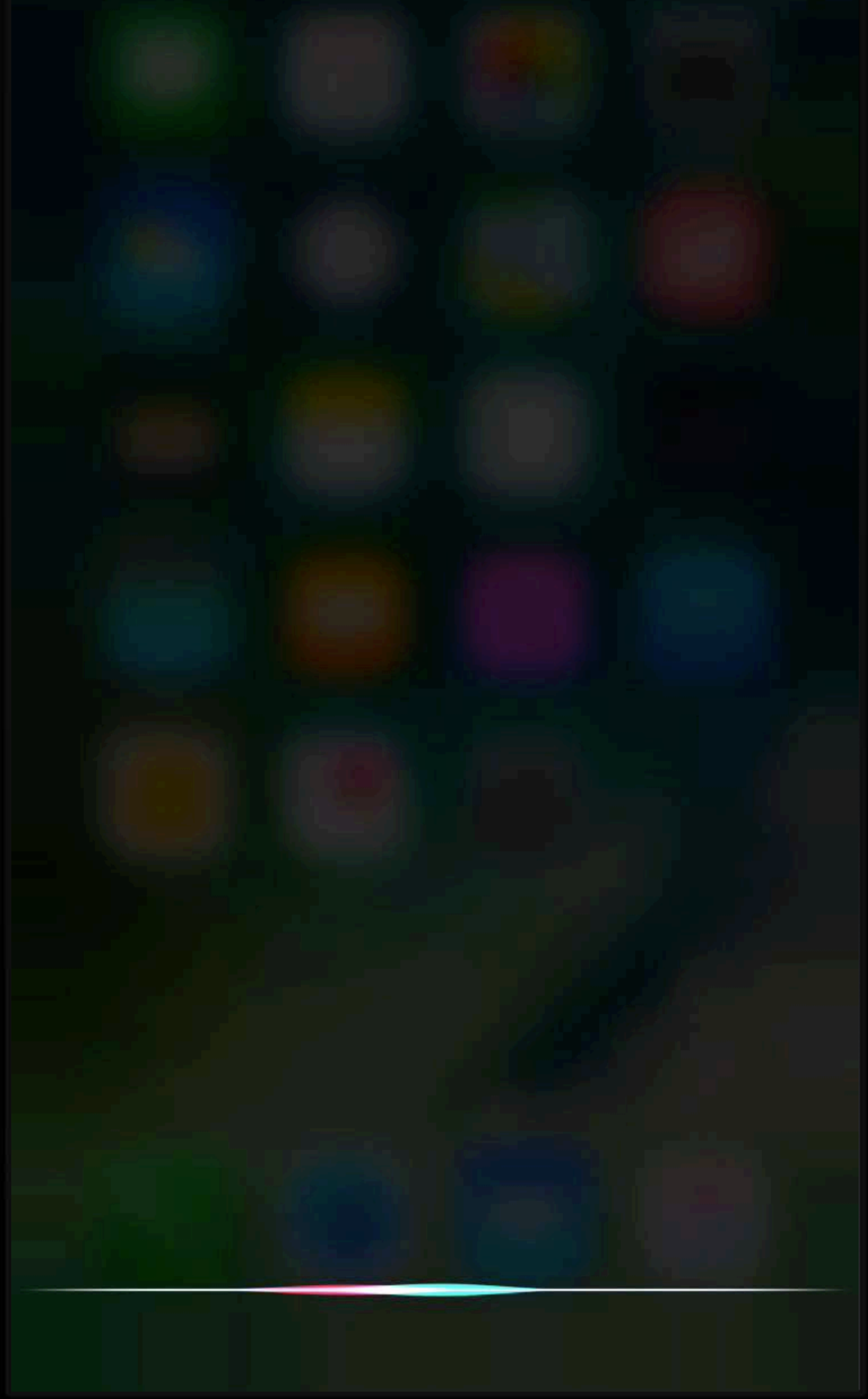
100% 





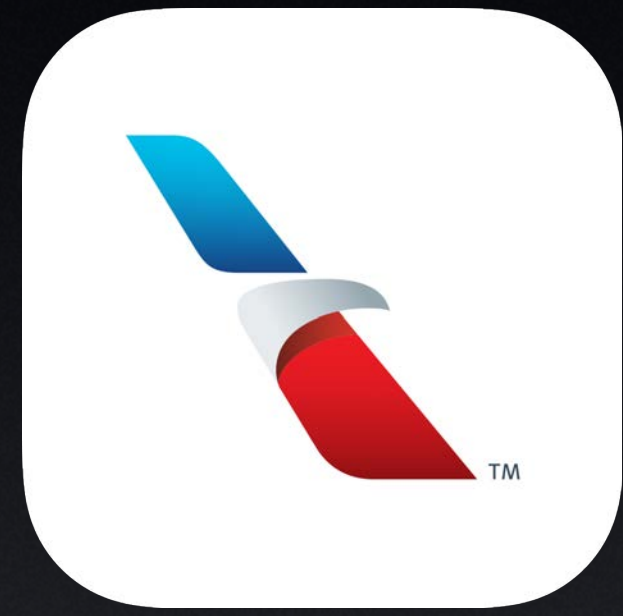
9:41 AM

100% 

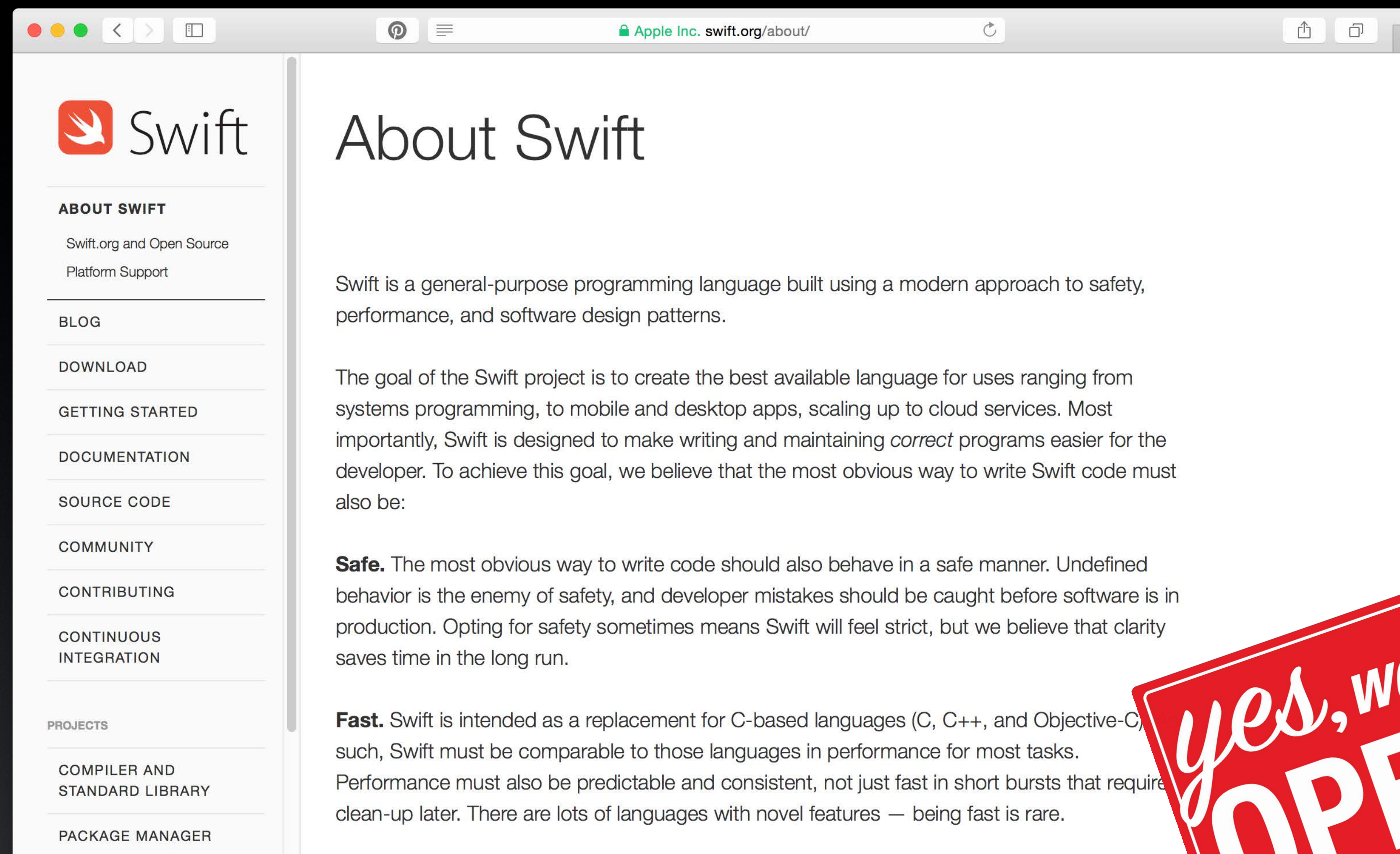




Swift







yes, we're
OPEN!

#1

Language project downloads on GitHub

#1

Watched language project on GitHub

#1

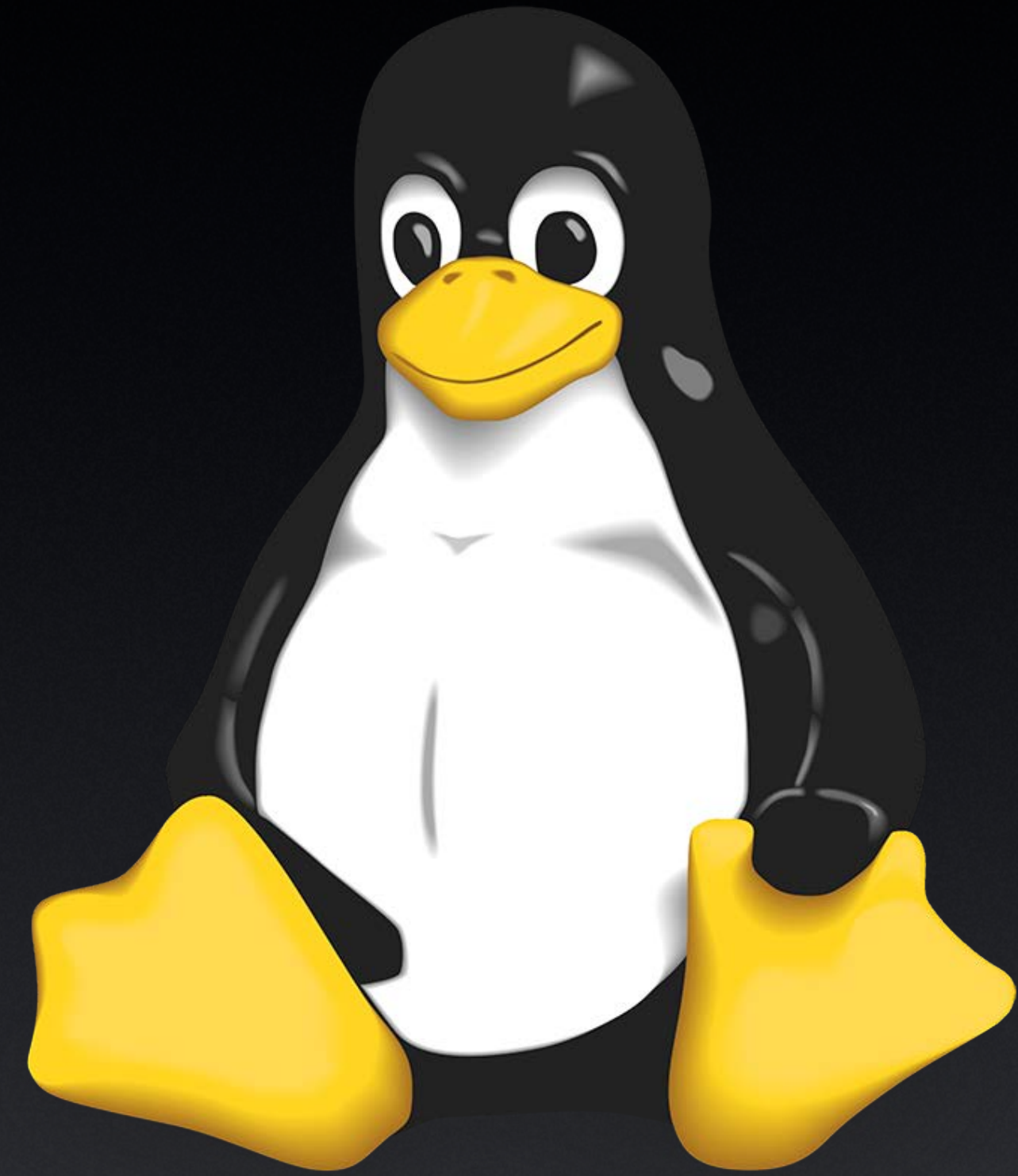
Favorited language project on GitHub

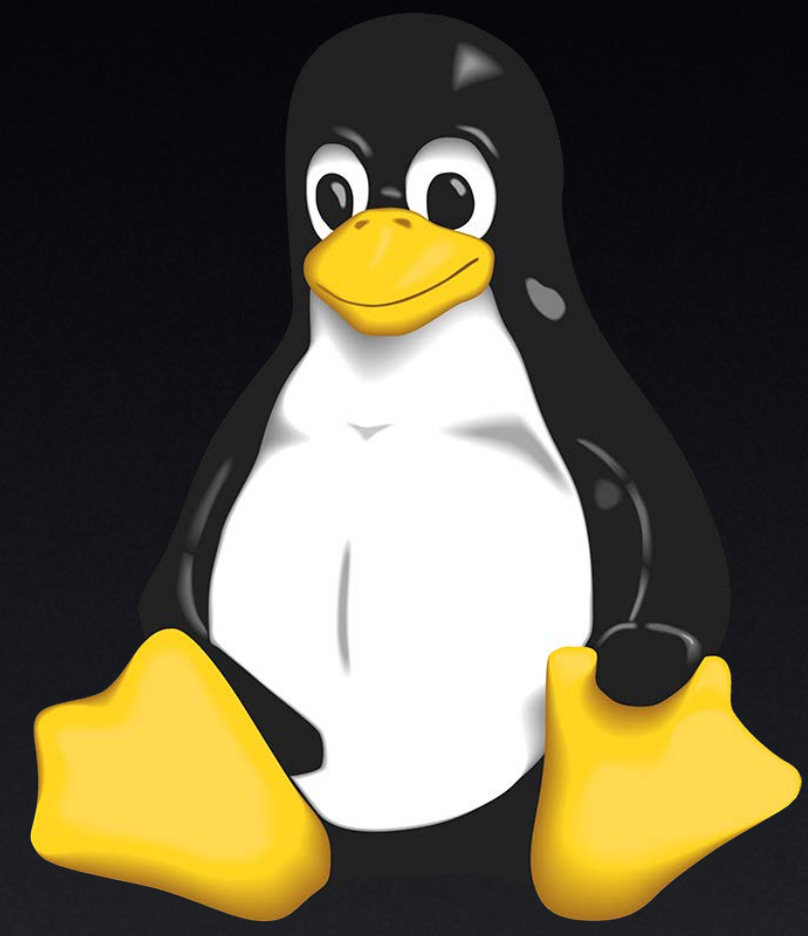
> 350

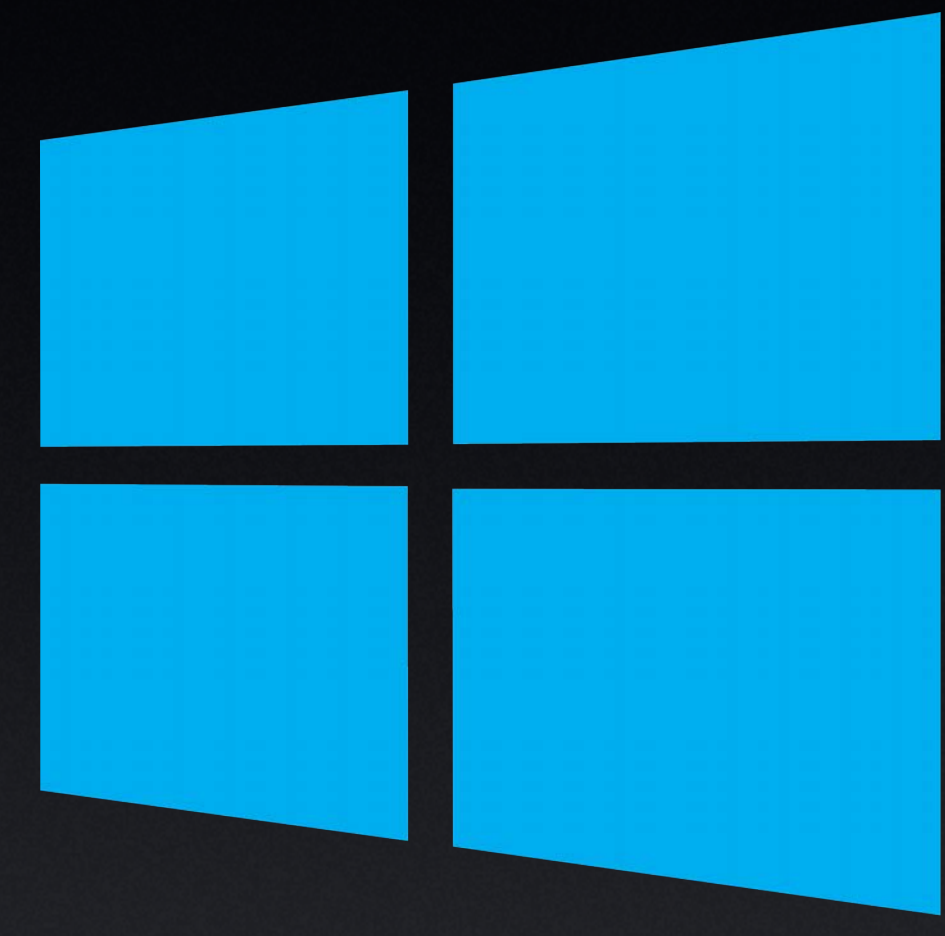
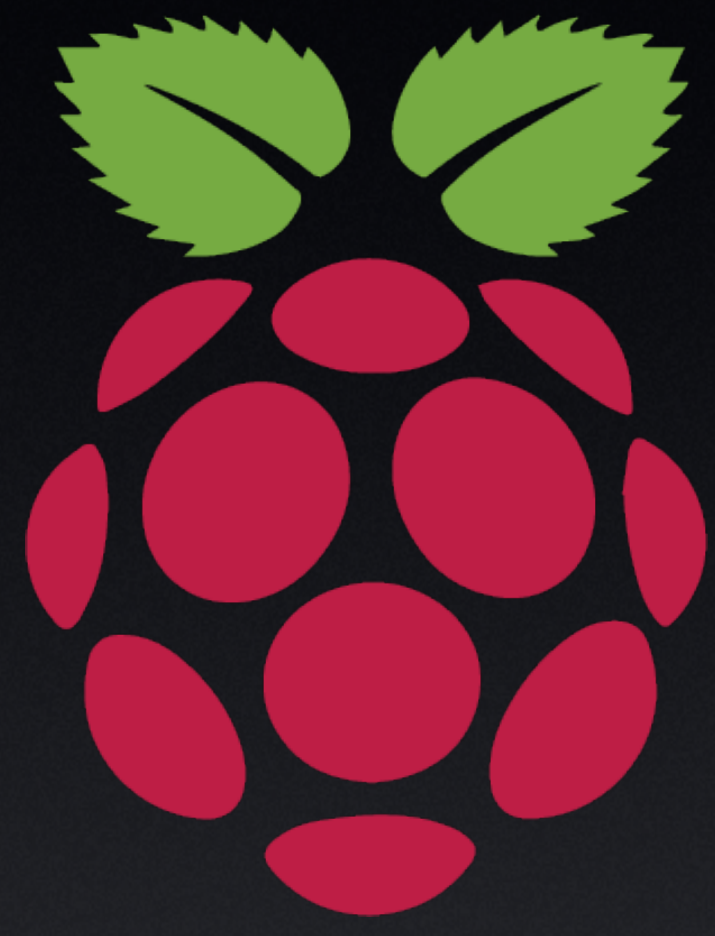
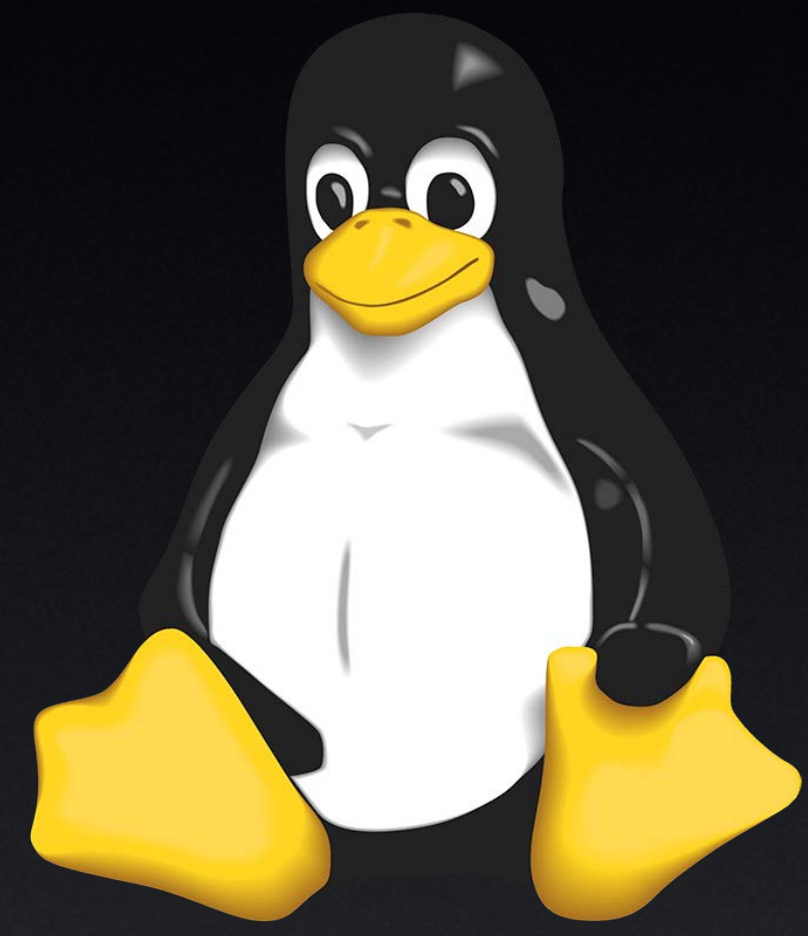
Contributors

> 3500

Pull Requests









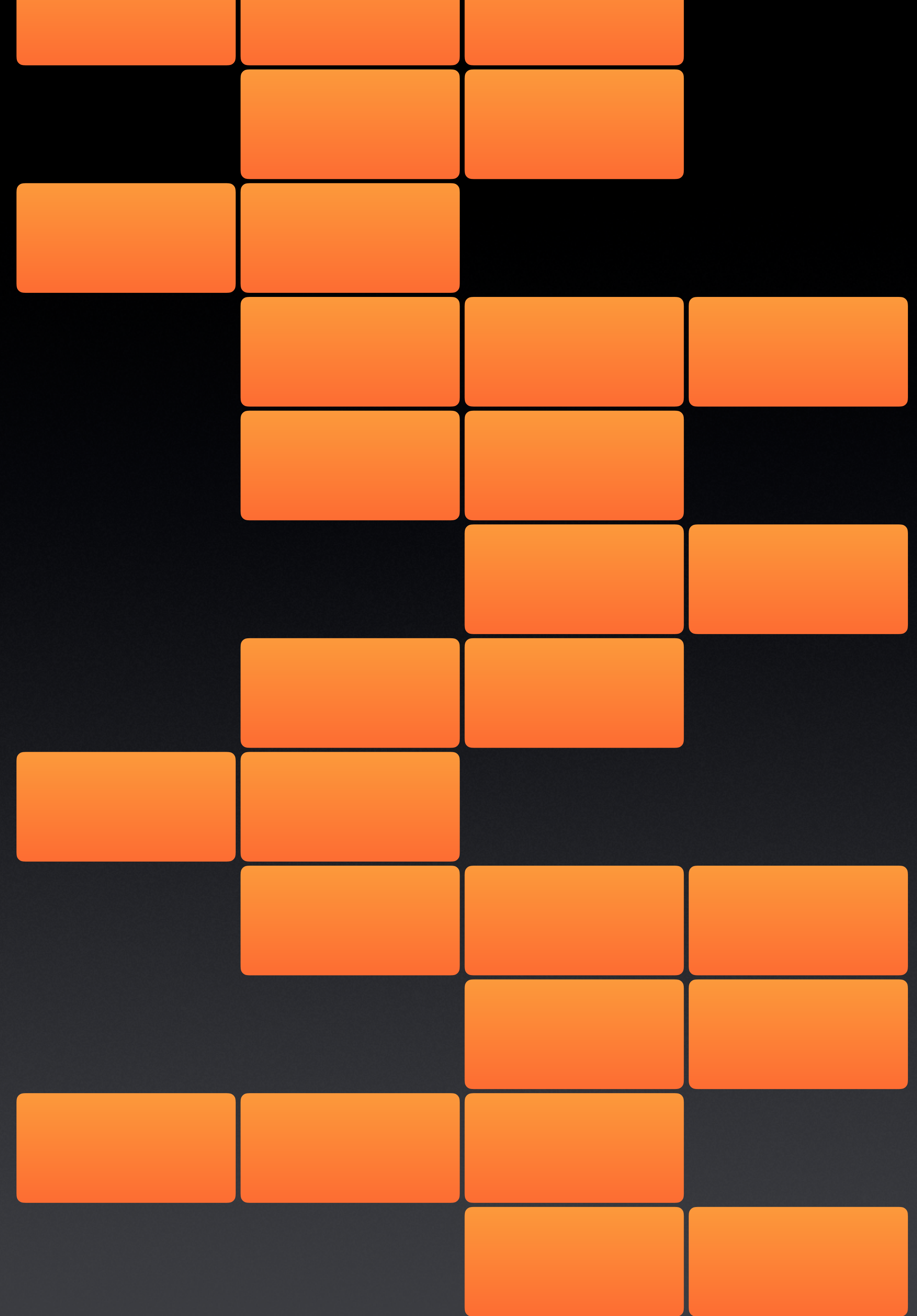
Open
evolution

Open
swift-evolution

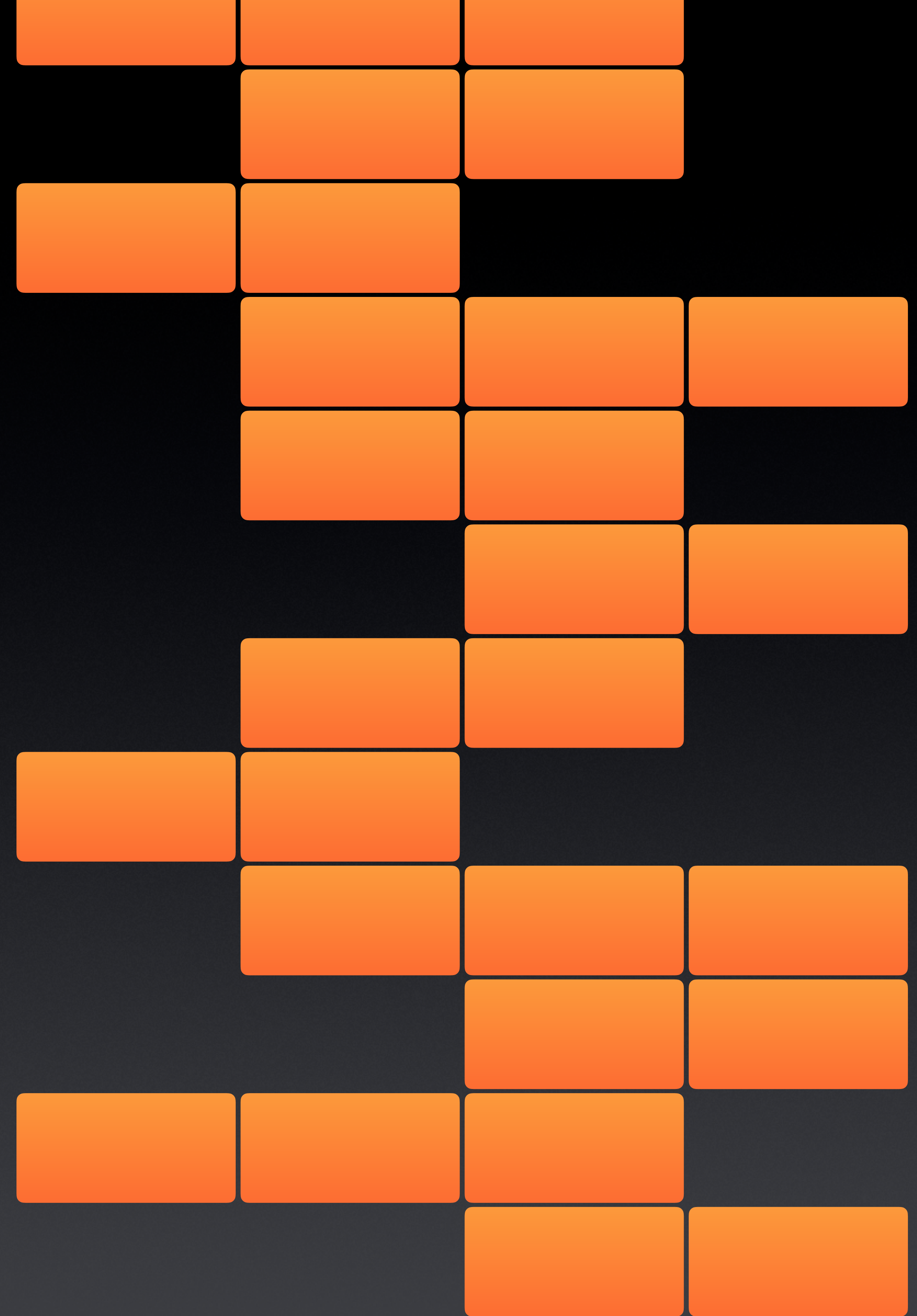
Open
roadmap

100

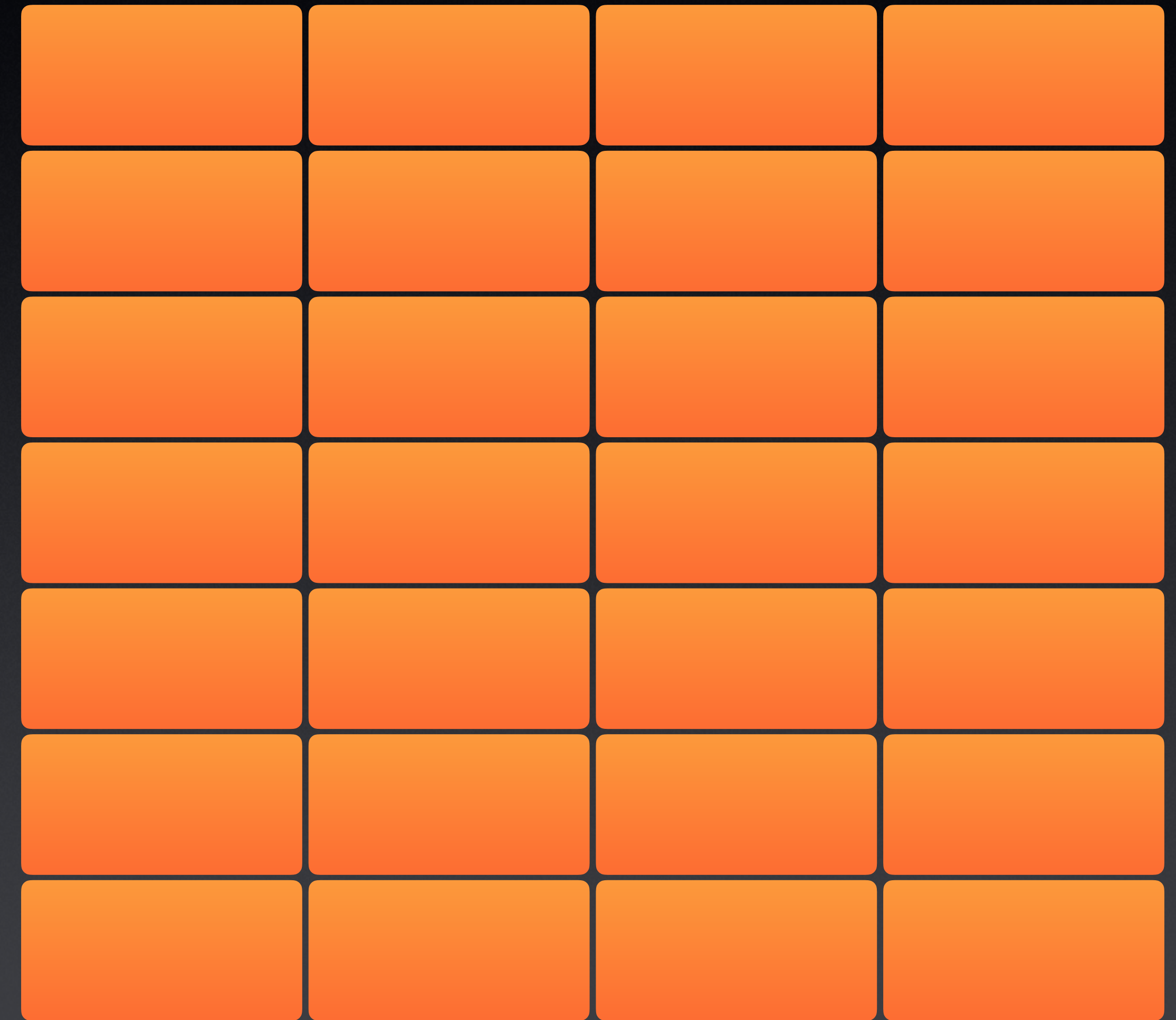
Evolution proposals



Move Fast and Fix Things



Move Fast and Fix Things

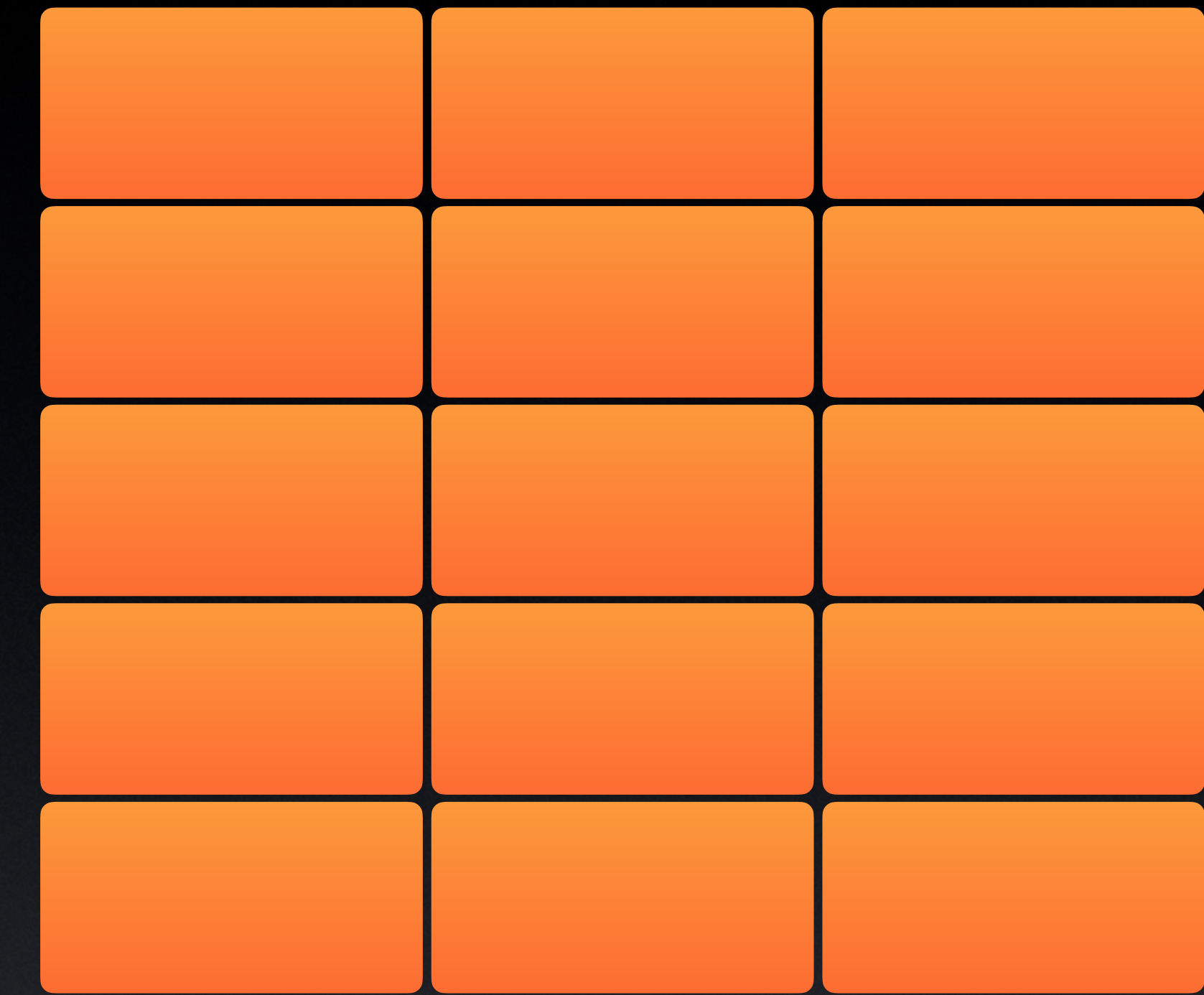




Swift 3



Swift 3

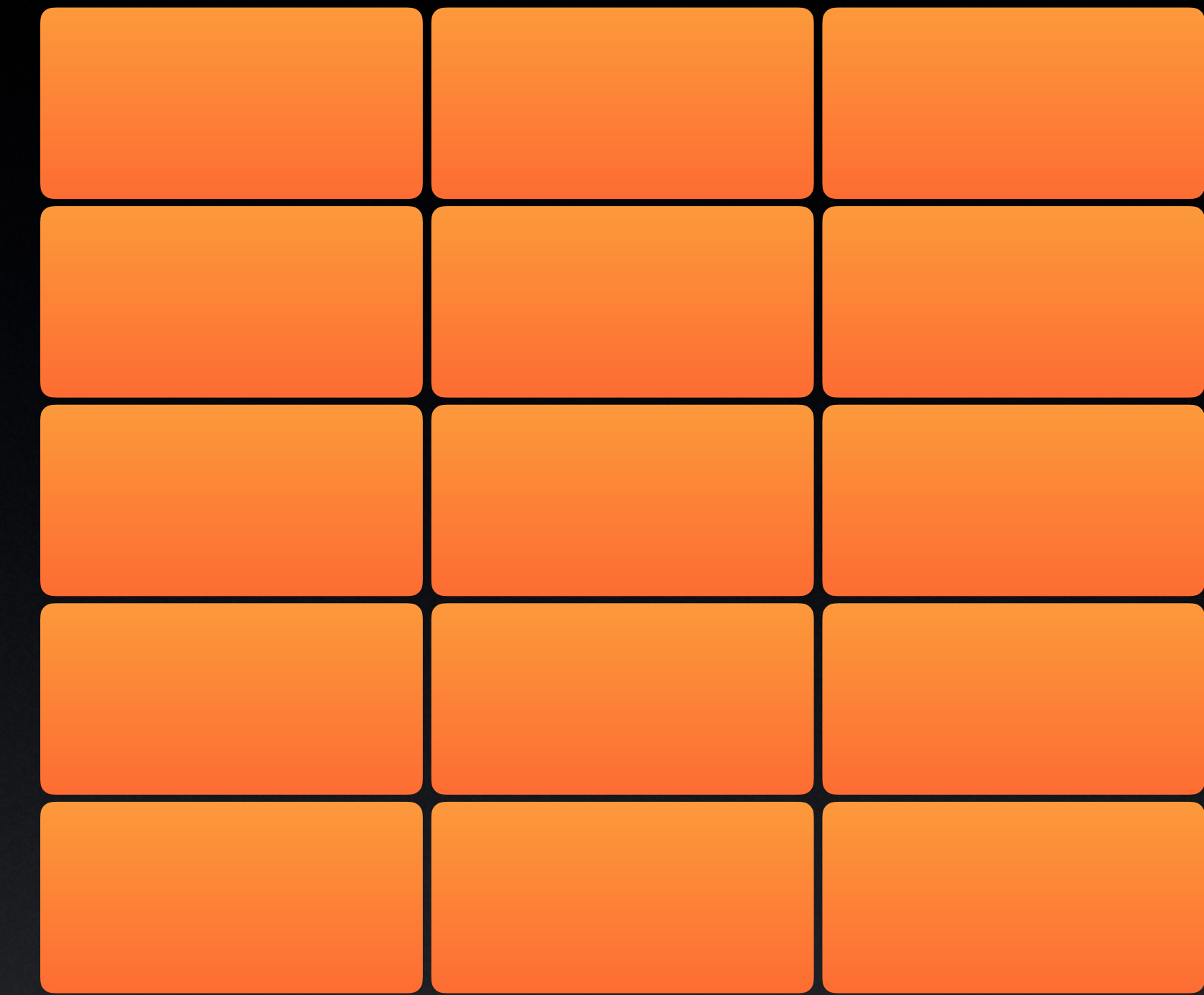


Source Stability



Swift 3

← Harmony →



Source Stability

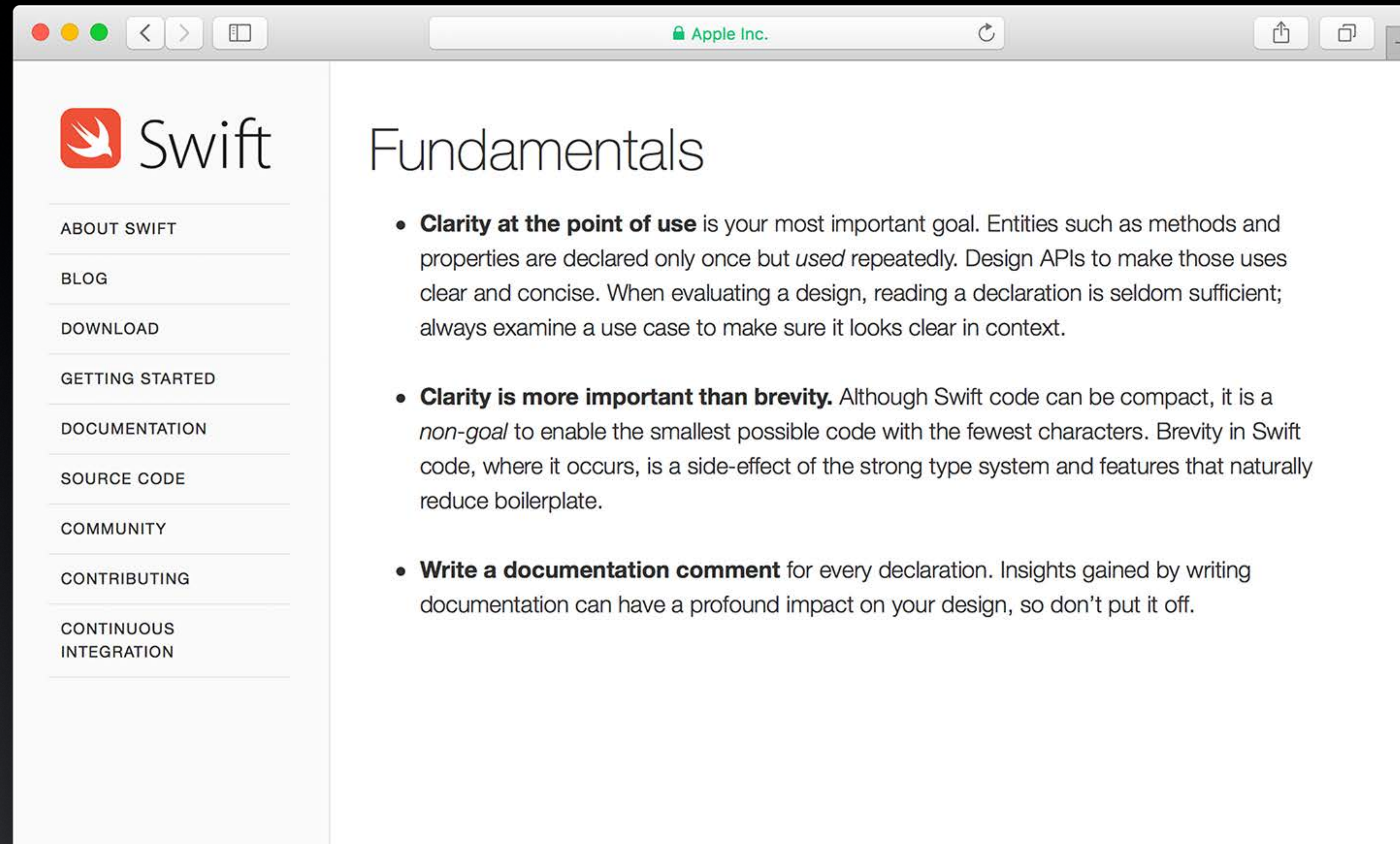
```
content = text stringByTrimmingCharactersInSet(  
    NSMutableCharacterSet.newlineCharacterSet())
```

```
content = text.trimmingCharacters(  
    .newlines)
```

```
content = text.trimmingCharacters( .newlines)
```



```
content = text.trimmingCharacters(in: .newlines)
```



The image shows a browser window displaying the Swift website. The browser's address bar shows "Apple Inc." and the page title is "Fundamentals". The page layout includes a sidebar on the left with the Swift logo and a list of navigation links: ABOUT SWIFT, BLOG, DOWNLOAD, GETTING STARTED, DOCUMENTATION, SOURCE CODE, COMMUNITY, CONTRIBUTING, and CONTINUOUS INTEGRATION. The main content area features the heading "Fundamentals" and a list of three bullet points.

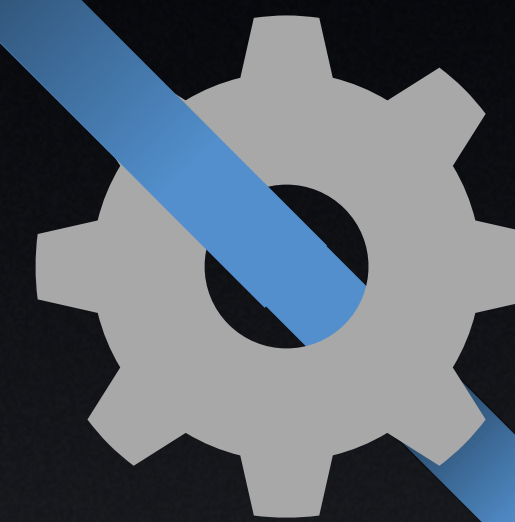
Swift

- ABOUT SWIFT
- BLOG
- DOWNLOAD
- GETTING STARTED
- DOCUMENTATION
- SOURCE CODE
- COMMUNITY
- CONTRIBUTING
- CONTINUOUS INTEGRATION

Fundamentals

- **Clarity at the point of use** is your most important goal. Entities such as methods and properties are declared only once but *used* repeatedly. Design APIs to make those uses clear and concise. When evaluating a design, reading a declaration is seldom sufficient; always examine a use case to make sure it looks clear in context.
- **Clarity is more important than brevity.** Although Swift code can be compact, it is a *non-goal* to enable the smallest possible code with the fewest characters. Brevity in Swift code, where it occurs, is a side-effect of the strong type system and features that naturally reduce boilerplate.
- **Write a documentation comment** for every declaration. Insights gained by writing documentation can have a profound impact on your design, so don't put it off.

```
@interface NSDate
-(NSDate*)dateByAddingTimeInterval:(NSTimeInterval)ti;
@end
```



swiftc

```
class NSDate {
    func addingTimeInterval(_ : NSTimeInterval) -> NSDate
}
```

```
@interface NSDate
-(NSDate*)dateByAddingTimeInterval:(NSTimeInterval)ti;
@end
```



swiftc

```
class NSDate {
    func addingTimeInterval(_ : NSTimeInterval) -> NSDate
}
```

Swift 2

```
let myDate = NSDate()
```

Swift 3

```
var myDate = Date()
```

Swift 2

```
let myDate = NSDate()  
let myDate2 = myDate.dateByAddingTimeInterval(60)
```

Swift 3

```
var myDate = Date()  
myDate.addTimeInterval(60)
```

Swift 2

```
let myDate = NSDate()  
let myDate2 = myDate.dateByAddingTimeInterval(60)
```

Swift 3

```
var myDate = Date()  
myDate.addTimeInterval(60)
```



Swift 2

```
let cal = NSCalendar(calendarIdentifier: NSCalendarIdentifierChinese)
```

Swift 3

```
let cal = Calendar(identifier: .chinese)
```


Swift 2

```
let cal = NSCalendar(calendarIdentifier: NSCalendarIdentifierChinese)
let components = NSDateComponents()
components.day = 1
```

Swift 3

```
let cal = Calendar(identifier: .chinese)
let components = DateComponents(day: 1)
```

Swift 2

```
let cal = NSCalendar(calendarIdentifier: NSCalendarIdentifierChinese)
let components = NSDateComponents()
components.day = 1
tomorrow = cal?.dateByAddingComponents(components, toDate: myDate, options: [])
```

Swift 3

```
let cal = Calendar(identifier: .chinese)
let components = DateComponents(day: 1)
tomorrow = cal?.date(byAdding: components, to: myDate)
```

```
let queue = dispatch_queue_create("com.xyzcorp.myqueue", nil)

dispatch_async(queue) {
    print("Hello World")
}
```

```
let queue = dispatch_queue_create("com.xyzcorp.myqueue", nil)

queue.async {
    print("Hello World")
}
```

```
let queue = DispatchQueue(label: "com.xyzcorp.myqueue" )

queue.async {
    print("Hello World")
}
```

```
transform = CGAffineTransformTranslate(transform, toCenter.x, toCenter.y)
transform = CGAffineTransformRotate(transform, angle)

CGContextSetGrayStrokeColor(context, 0.5, 1.0)

CGContextDrawPath(context, .Stroke)
```

```
transform =          translate(transform, toCenter.x, toCenter.y)
                    rotate(          angle)

                    setgrayStrokeColor(context, 0.5, 1.0)

                    drawPath(context, .stroke)
```

```
transform = transform.translateBy( toCenter.x, toCenter.y)
                        .rotate(angle)

context.setStrokeColor(gray: 0.5, 1.0)

context.drawPath(      .stroke)
```



```
transform = transform.translateBy(x: toCenter.x, y: toCenter.y)
                        .rotate(angle)

context.setStrokeColor(gray: 0.5, alpha: 1.0)

context.drawPath(using: .stroke)
```

Omit needless words Consistent parameter labels Predictable type system Better error and warnings

Generic type aliases Better performance

Swift on Linux Unused value warnings

Stringly typed enums swift.org

Swiftly Cocoa API Design Guidelines

Import ObjC Lightweight Generics

Package manager WMO on by default

New collection index model `#selector`

Faster compile times Improved Numerics

Playgrounds in downloadable toolchains Standard Library View in Xcode `#keypath` Tuple comparisons





Xcode 8



Swift 3



Xcode 8



Swift 3



Swift 2.3



Swift

Running NewtonsCradle

Newton's Cradle and UIKit Dynamics

This playground uses **UIKit Dynamics** to create a [Newton's Cradle](#). Commonly seen on desks around the world, Newton's Cradle is a device that illustrates conservation of momentum and energy.

Let's create an instance of our UIKit Dynamics based Newton's Cradle. Try adding more colors to the array to increase the number of balls in the device.

```
let newtonsCradle = NewtonsCradle(colors: [0, 0, 0, 0, 0])
```

Size and spacing

Try changing the size and spacing of the balls and see how that changes the device. What happens if you make `ballPadding` a negative number?

```
newtonsCradle.ballSize = CGSize(width: 60, height: 60)
newtonsCradle.ballPadding = 2.0
```

Behavior

Adjust elasticity and resistance to change how the balls react to each other.

```
newtonsCradle.itemBehavior.elasticity = 0.5
newtonsCradle.itemBehavior.resistance = 0.2
```

Shape and rotation

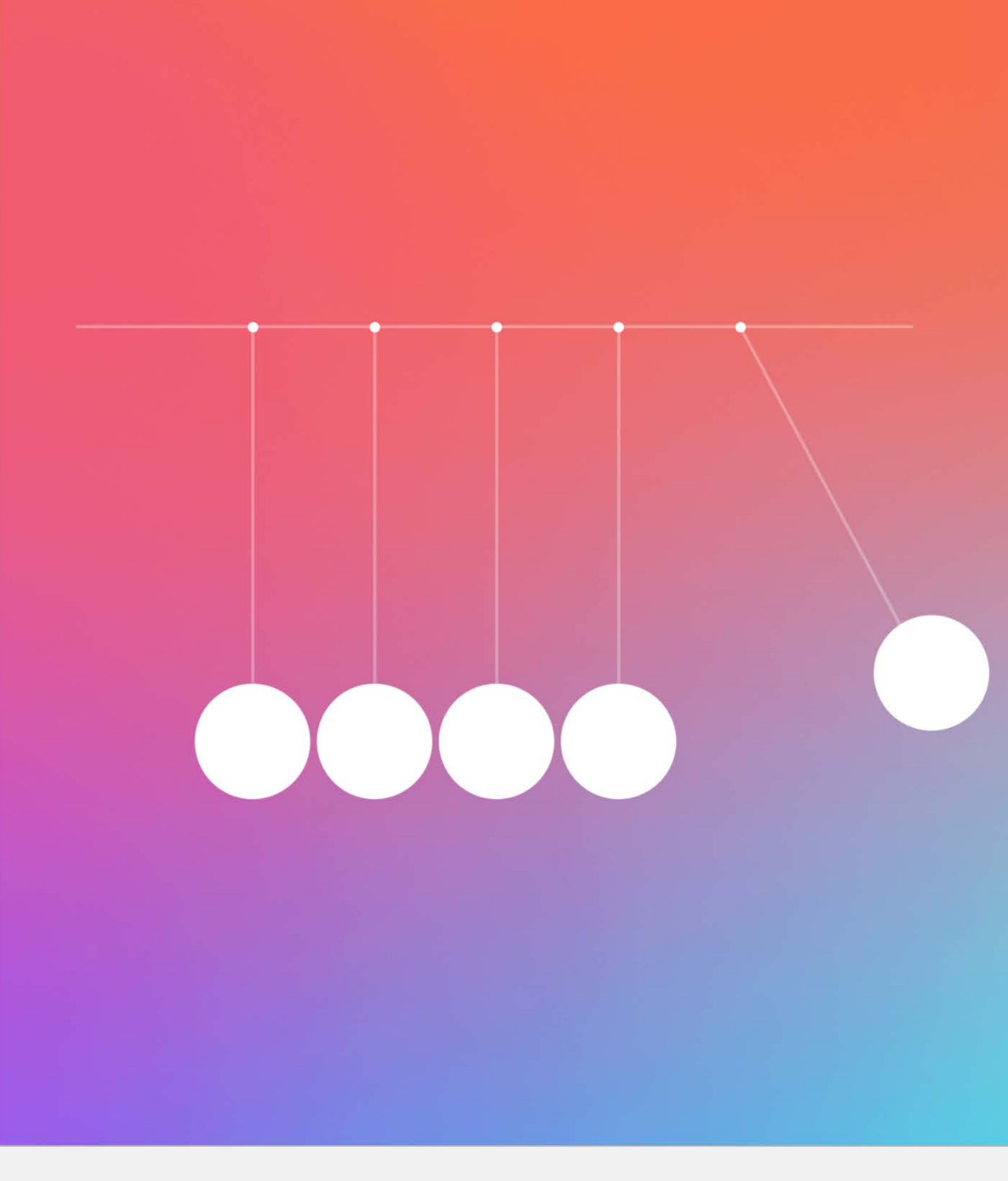
How does Newton's Cradle look if we use squares instead of circles and allow them to rotate?

```
newtonsCradle.useSquaresInsteadOfBalls = false
newtonsCradle.itemBehavior.allowsRotation = false
```

Gravity

Change the angle and/or magnitude of gravity to see what Newton's Device might look like in another world.

```
newtonsCradle.gravityBehavior.angle = CGFloat(M_PI_2)
newtonsCradle.gravityBehavior.magnitude = 1.0
```



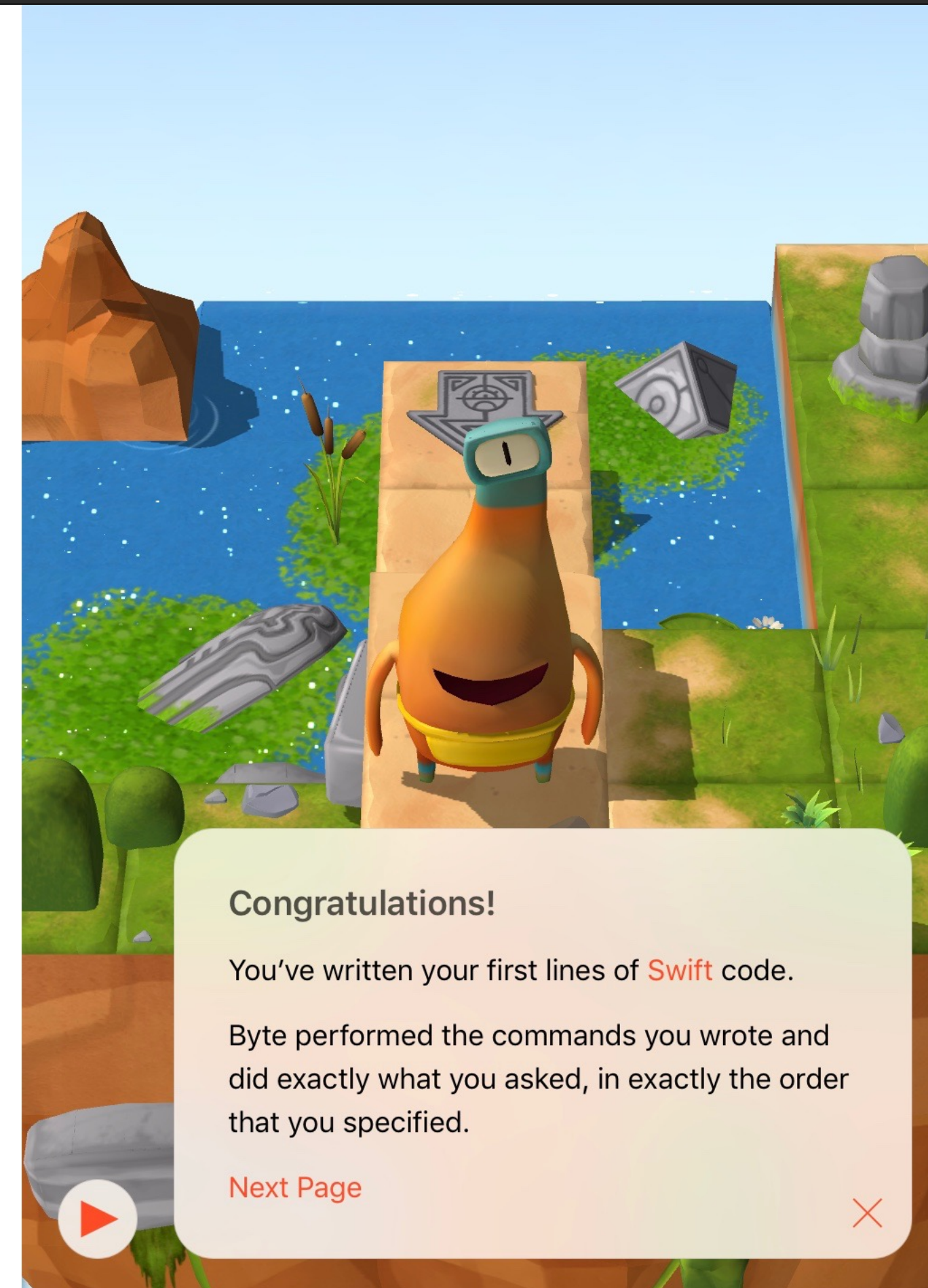


Swift Playgrounds

Your character, Byte, loves to collect gems, but can't do it alone. In this first puzzle, you need to write Swift **commands** to move Byte across the world and collect the gem.

- ① Look for the gem in the puzzle world.
- ② Enter the correct combination of the `moveForward()` and `collectGem()` commands.
- ③ Tap Run My Code.

```
moveForward()  
moveForward()  
moveForward()  
collectGem()  
|
```



collectGem()

moveForward()



Designed for Touch

Goal: Use a for loop to repeat a sequence of commands.

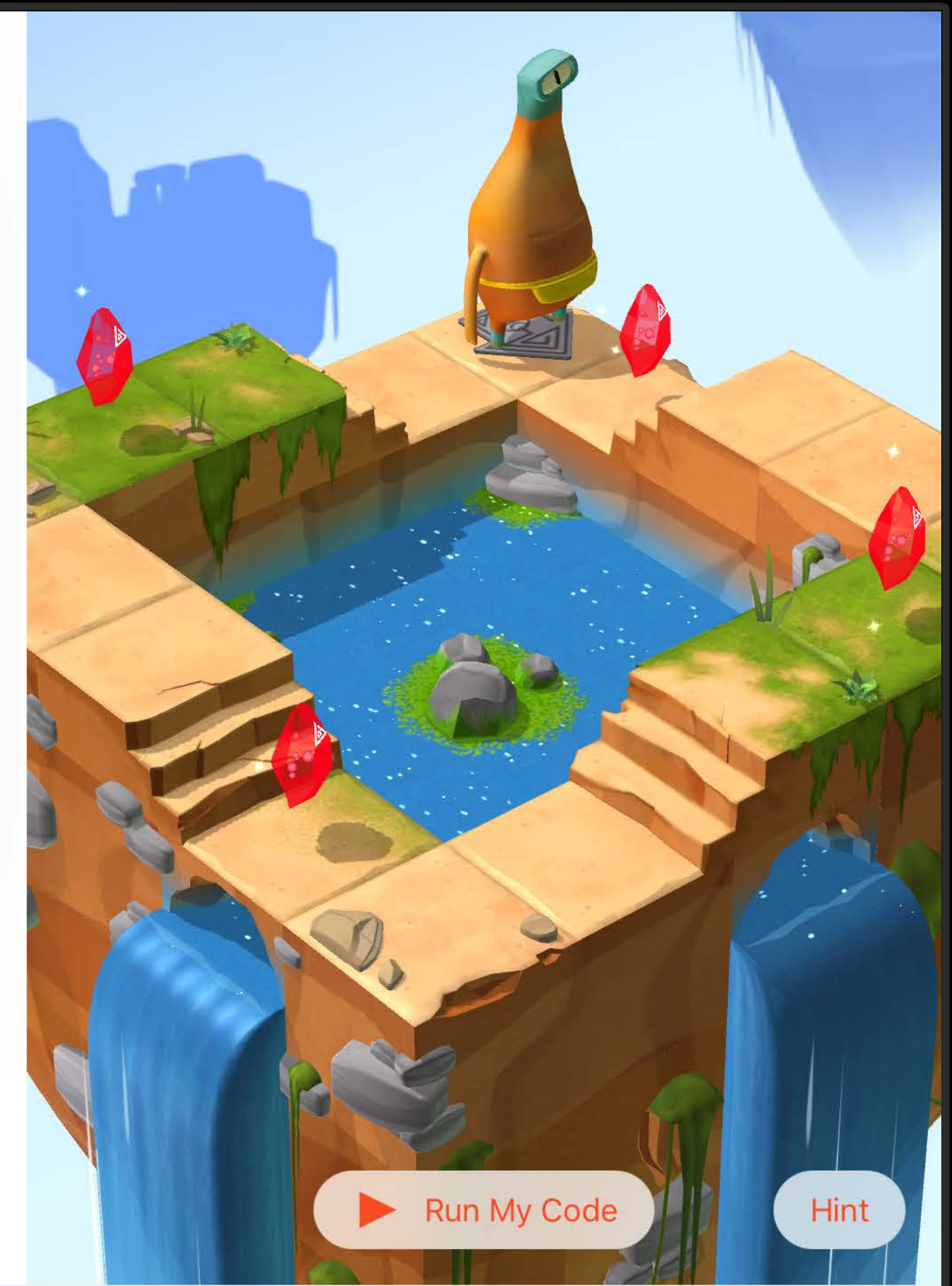
In this puzzle, you'll collect gems that are located around a square. You'll create a loop below for each of the sides.

- 1) Drag a loop block above the code, then drop it into the loop.
- 2) Tap the loop block to edit the loop.
- 3) Tap the code block, then drag it into the loop.

```

for i in 1 ... number {
  code
}
moveForward()
collectGem()
moveForward()
moveForward()
moveForward()
turnRight()

```



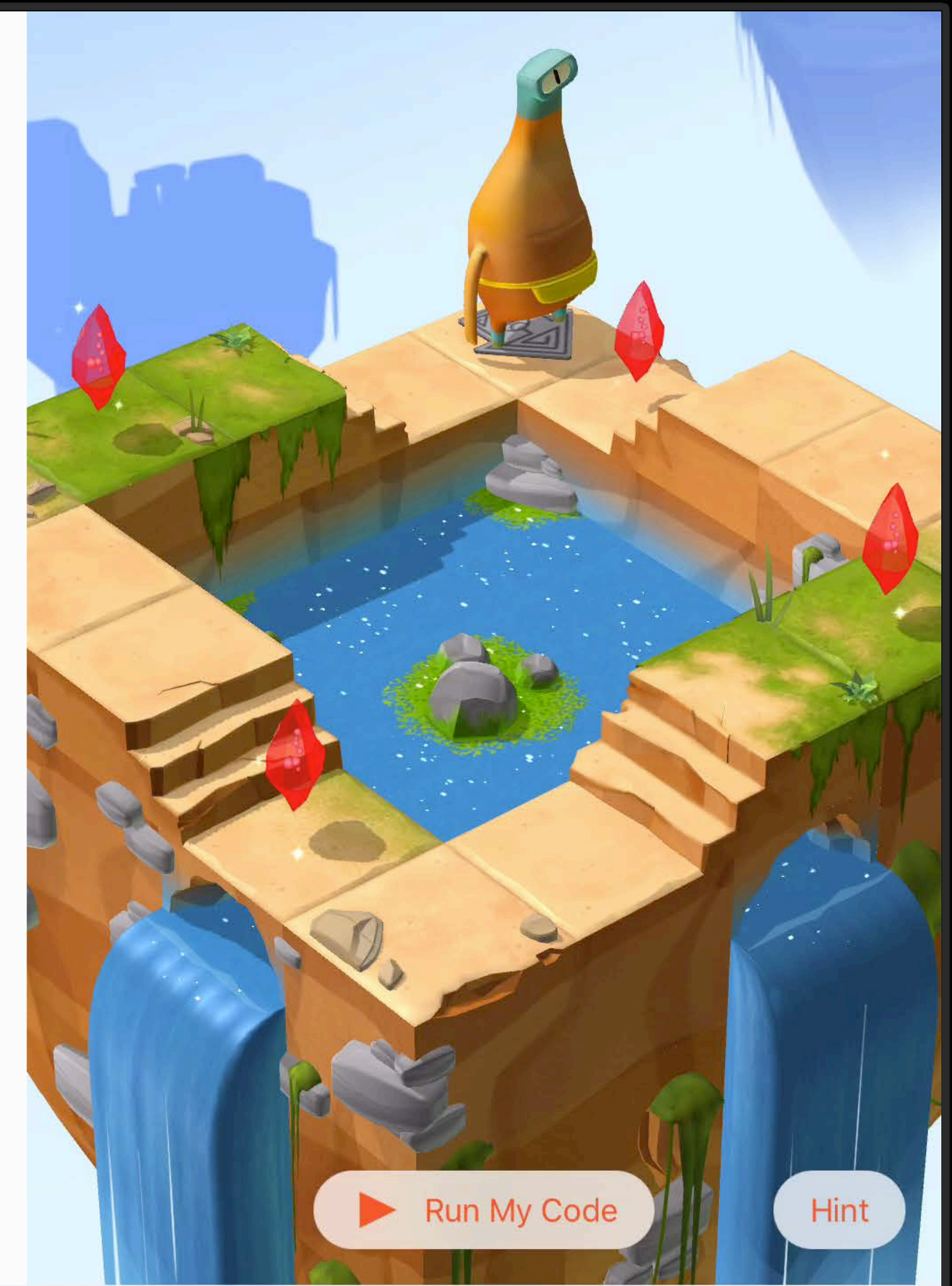
Run My Code Hint

Goal: Use a for loop to repeat a sequence of commands.

In this puzzle, Byte must collect four gems that are located in the same relative locations around a square. You'll create a **loop** that repeats the code below for each of the sides to solve the entire puzzle.

- ① Drag a `for` loop from the code library, then drop it above the existing code.
- ② Tap the bottom curly brace to select the loop.
- ③ Tap and hold that curly brace, then drag it downward to pull the existing code into the loop.

```
for i in 1 .. 4 {  
  code  
}  
moveForward()  
collectGem()  
moveForward()  
moveForward()  
moveForward()  
turnRight()
```

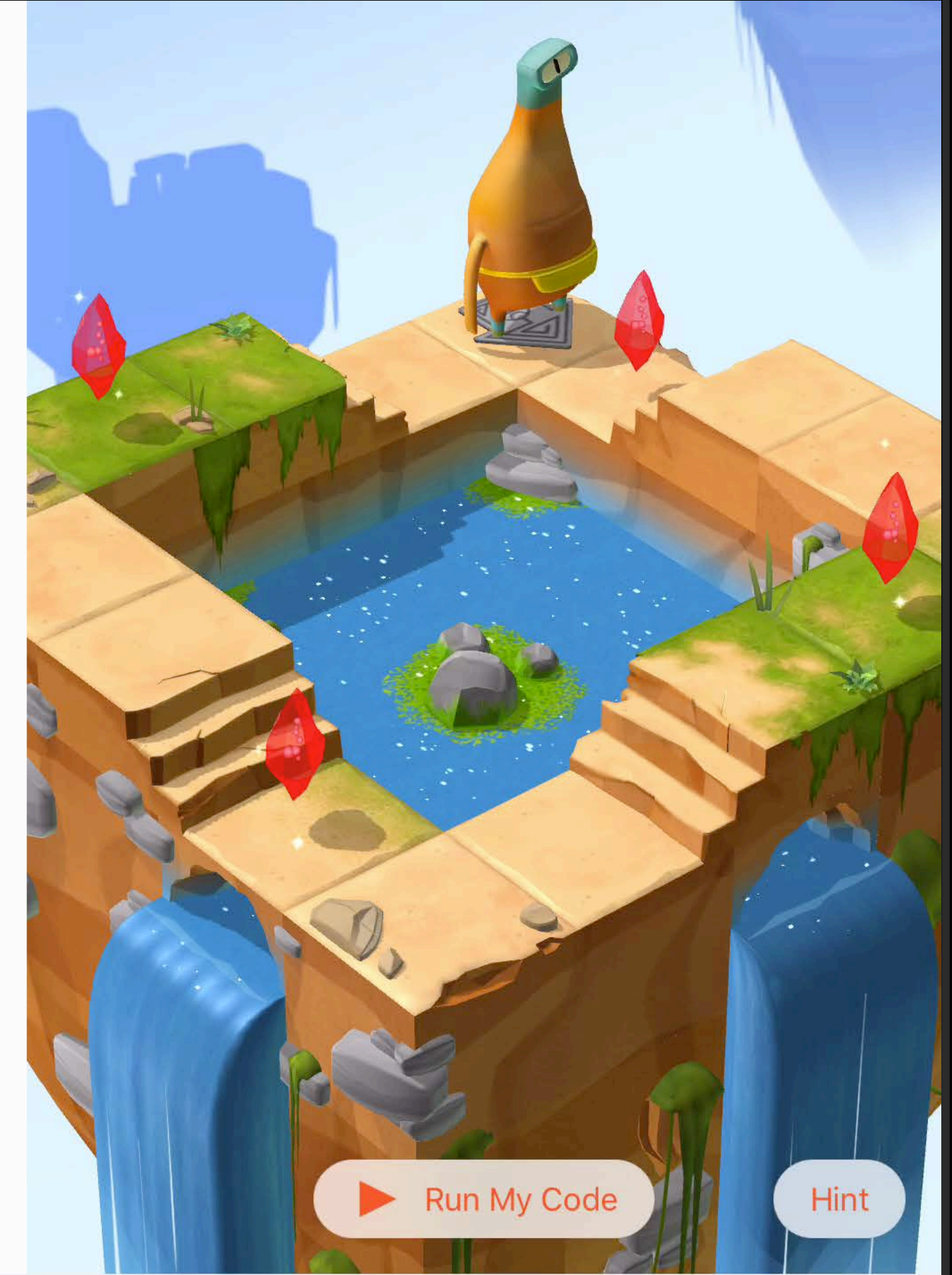


Goal: Use a for loop to repeat a sequence of commands.

In this puzzle, Byte must collect four gems that are located in the same relative locations around a square. You'll create a **loop** that repeats the code below for each of the sides to solve the entire puzzle.

- ① Drag a `for` loop from the code library, then drop it above the existing code.
- ② Tap the bottom curly brace to select the loop.
- ③ Tap and hold that curly brace, then drag it downward to pull the existing code into the loop.

```
for i in 1 .. 4 {  
  code  
}  
moveForward()  
collectGem()  
moveForward()  
moveForward()  
moveForward()  
turnRight()
```



▶ Run My Code Hint

Goal: Use a for loop to re

In this puzzle, Byte m
located in the same rel
You'll create a loop that
of the sides to solve the e

- ① Drag a for loop fr
above the existing c
- ② Tap the bottom curl
- ③ Tap and hold the
downward to pull th

```
for i in 1 ... 4 {
  moveForward()
  collectGem()
  moveForward()
  moveForward()
  turnRight()
}
```

☰ ☰ ☰
☰ ☰ ☰

{ }

let

Creates a constant, which can't be changed

{ }

var

Creates a variable, which can be changed

↻

for

Repeats code a given number of times

↻

while

Repeats code while condition is true

↻

repeat

Repeats code while condition is true

↻

if

Changes which path your code takes

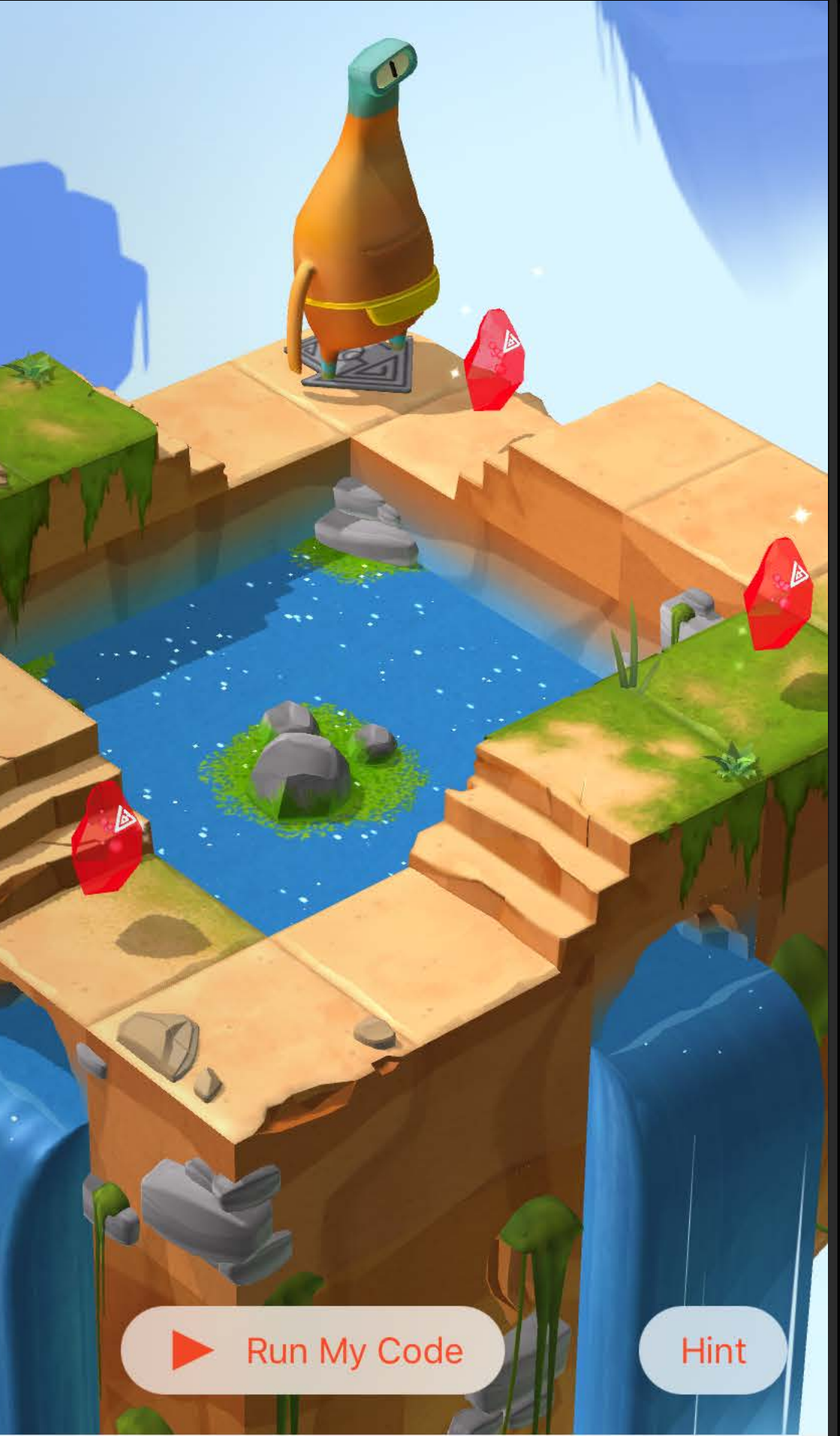
↻

switch

Chooses a code path based on value

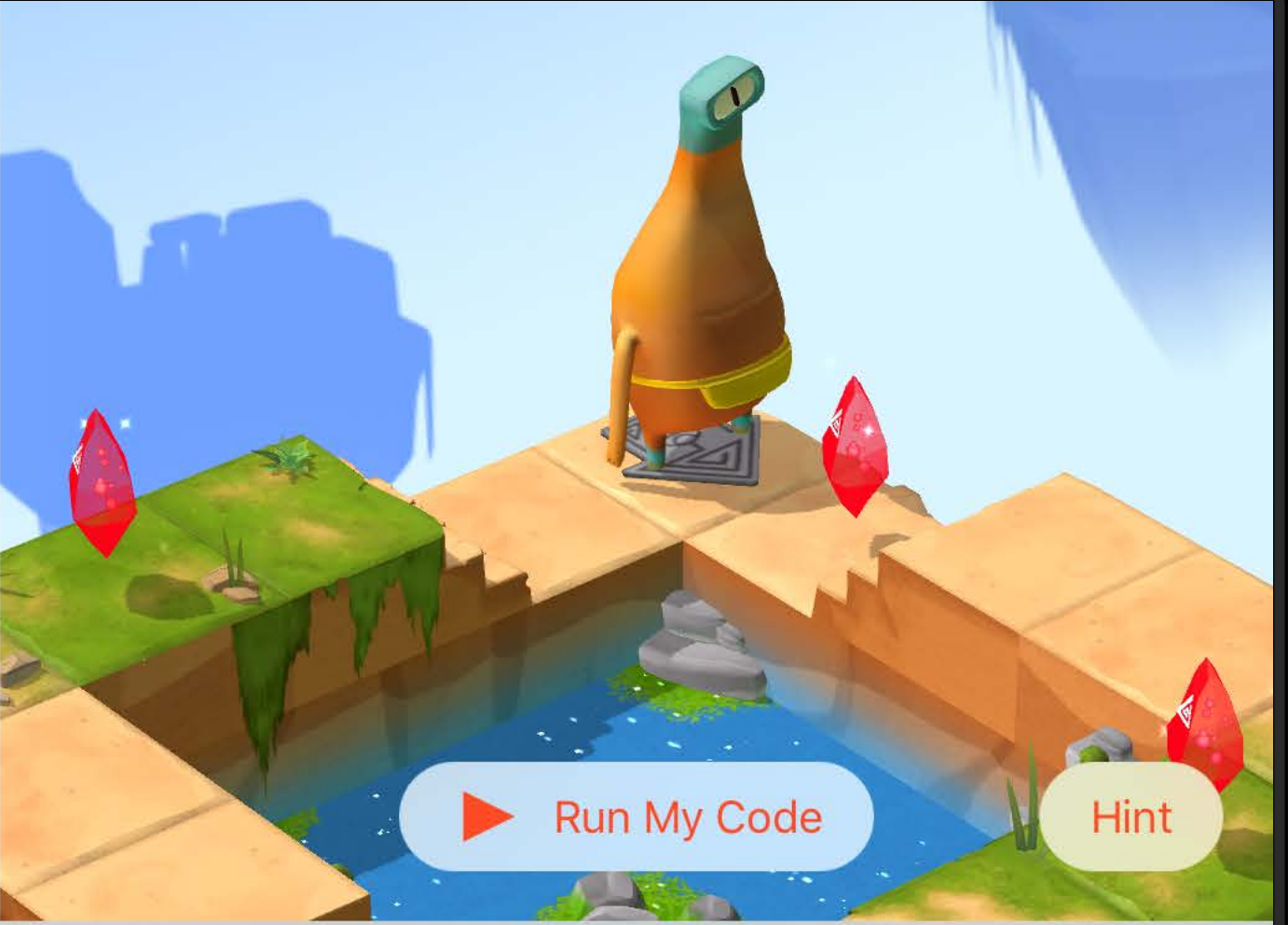
{ }

func



▶ Run My Code Hint

```
for i in 1 ... 4 {  
  moveForward()  
  collectGem()  
  moveForward()  
  moveForward()  
  move  
  turnRight()  
}
```



▶ Run My Code

Hint

↶ ↷ "move" moveForward()

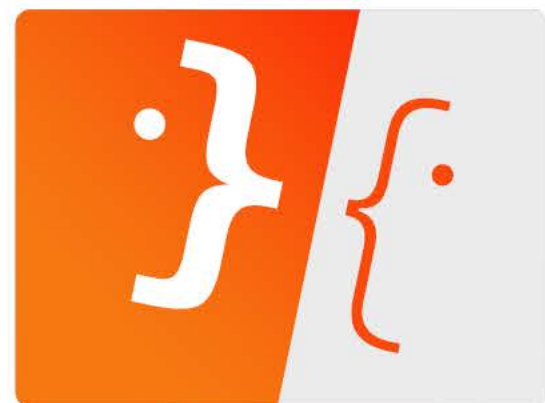
1	2	3	4	5	6	7	8	9	0	⌫
q	w	e	r	t	y	u	i	o	p	
	&	=	{ }	< >	[]	()	:	"	return	
↵	%	-	/	*	+	\	_	!	?	↵
.?123	😊	🎤						.?123	📄	⌵

Lessons and Templates

Featured



More Challenges



Mimic Me



Drawing Sounds



Lunar Voyager



Maze Run



Ace of Cards



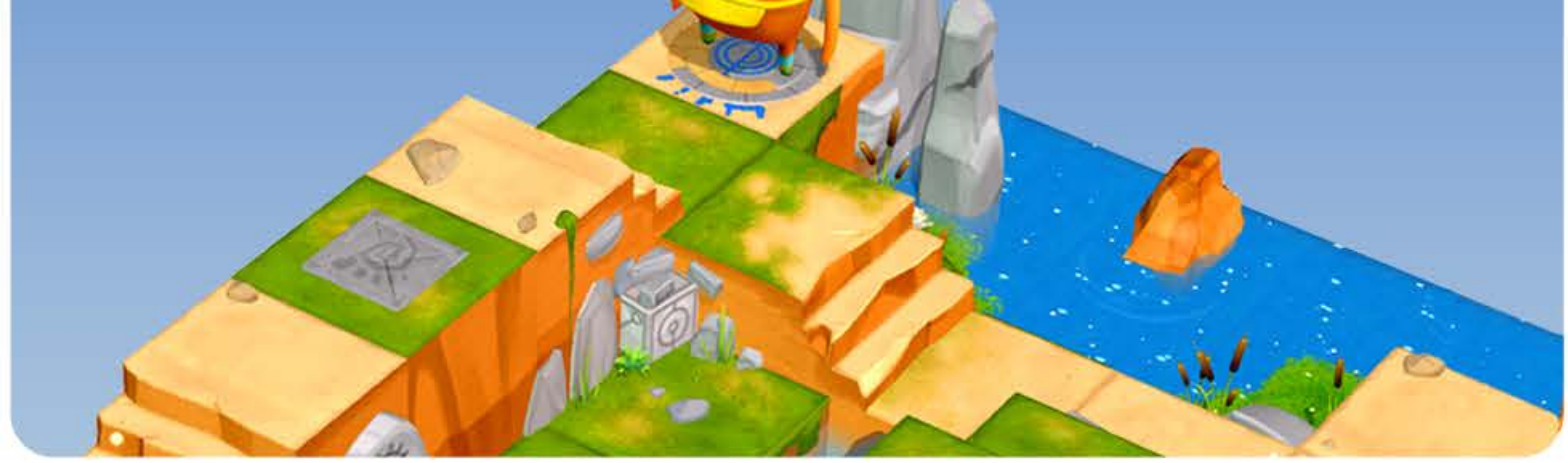
Featured

LEARN TO CODE 1
Fundamentals of Swift



LEARN TO CODE 2
Beyond the Basics





More Challenges



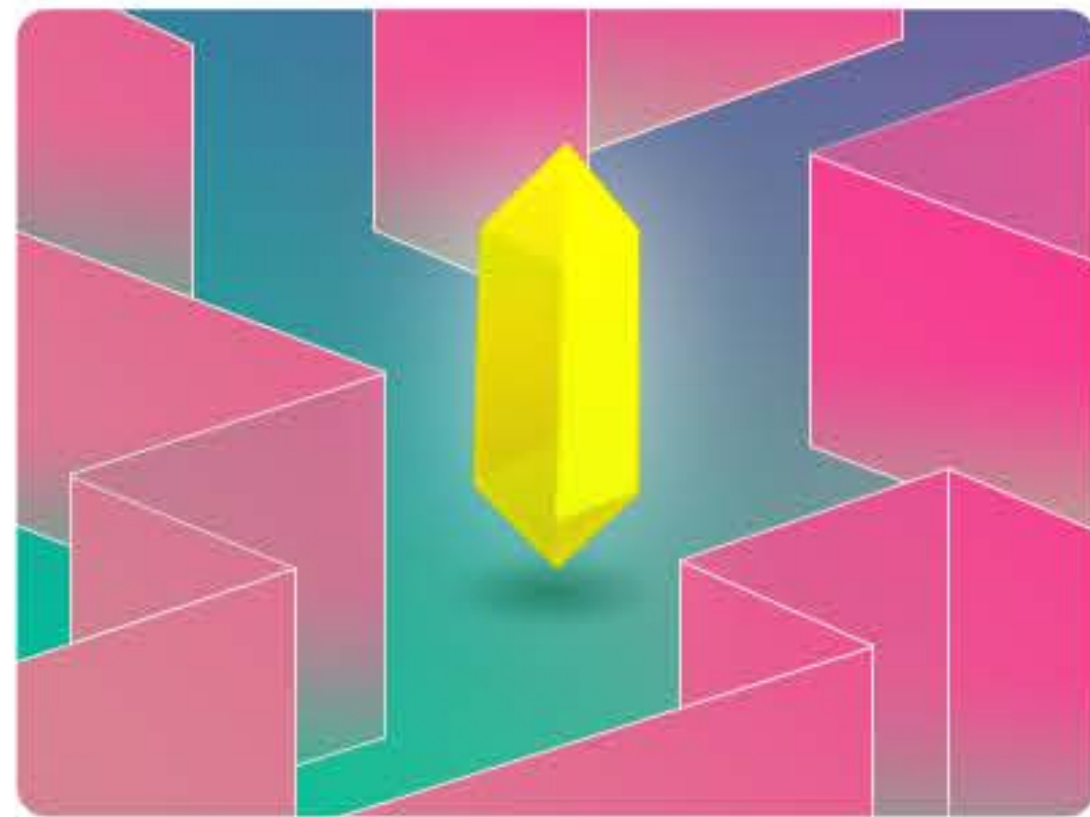
Mimic Me



Drawing Sounds



Lunar Voyager



Maze Run



Ace of Cards





Answers



```
show("Enter a number!")
```

```
let response = ask("Number")
```

abc

```
func isPrime(_ number: Int) ->
```

```
Bool {
```

```
    let root =
```

```
        sqrt(Double(number))
```

123

```
    for i in 2 ... Int(root) {
```

```
        if number % i == 0 {
```

```
            return false
```

```
        }
```

```
    }
```

```
    return true
```

T

```
guard let number = Int(response)
```

```
else {
```

```
    show("You must enter a
```

```
    number!")
```

```
    exit(0)
```

```
}
```

Enter a number!

7

7 is prime!

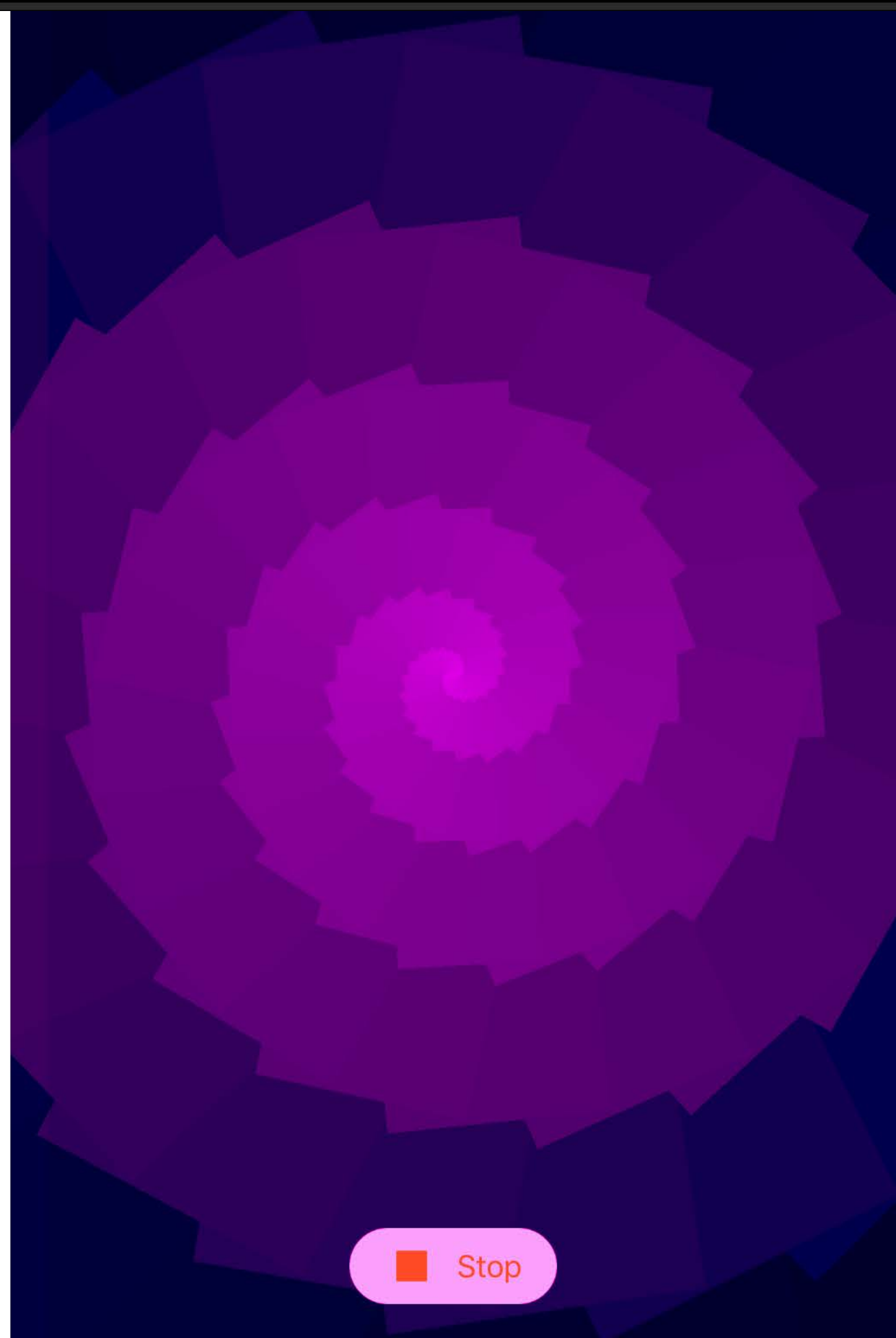
Enter a number!

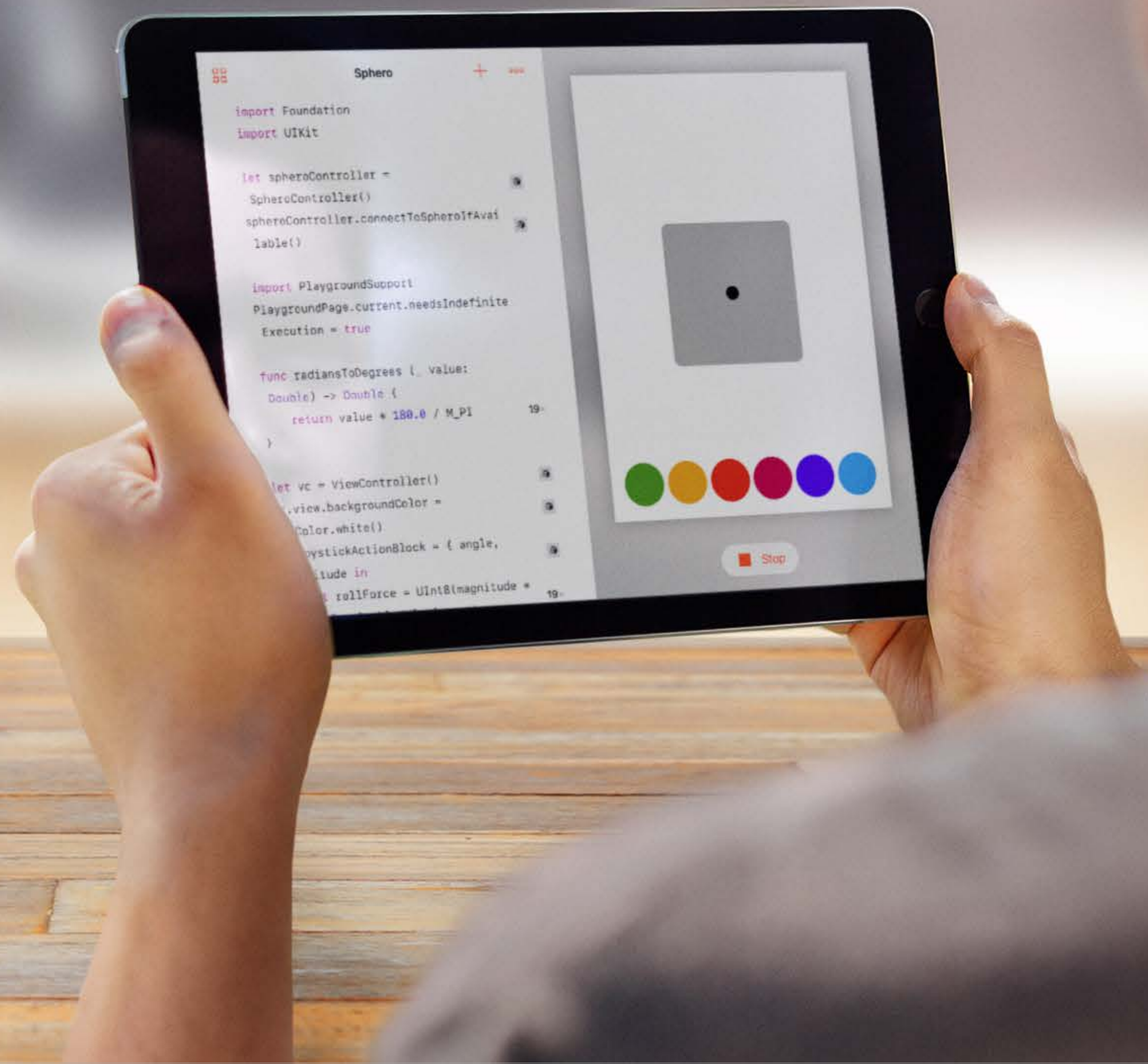
Number

Stop

☐ ☰ < Tessellate 2 > + ○○○

```
let nShapes = 100
for i in 0...nShapes {
  let di = Double(i)
  let dn = Double(nShapes)
  let size = Double(nShapes - i)
  let square = Rectangle(width: size
    / 2, height: size * 2)
  square.scale = 0
  animate(duration: 3, delay: 3 /
    di, {
    square.rotation = di / 3.14
    square.scale = 1 - (di / dn)
    square.color =
      Color(colorLiteralRed:
        Float(i) / Float(nShapes),
        green: Float(i) / 1.0 -
        Float(nShapes), blue:
        Float(i) / Float(nShapes),
        alpha: 1)
  })
}
```

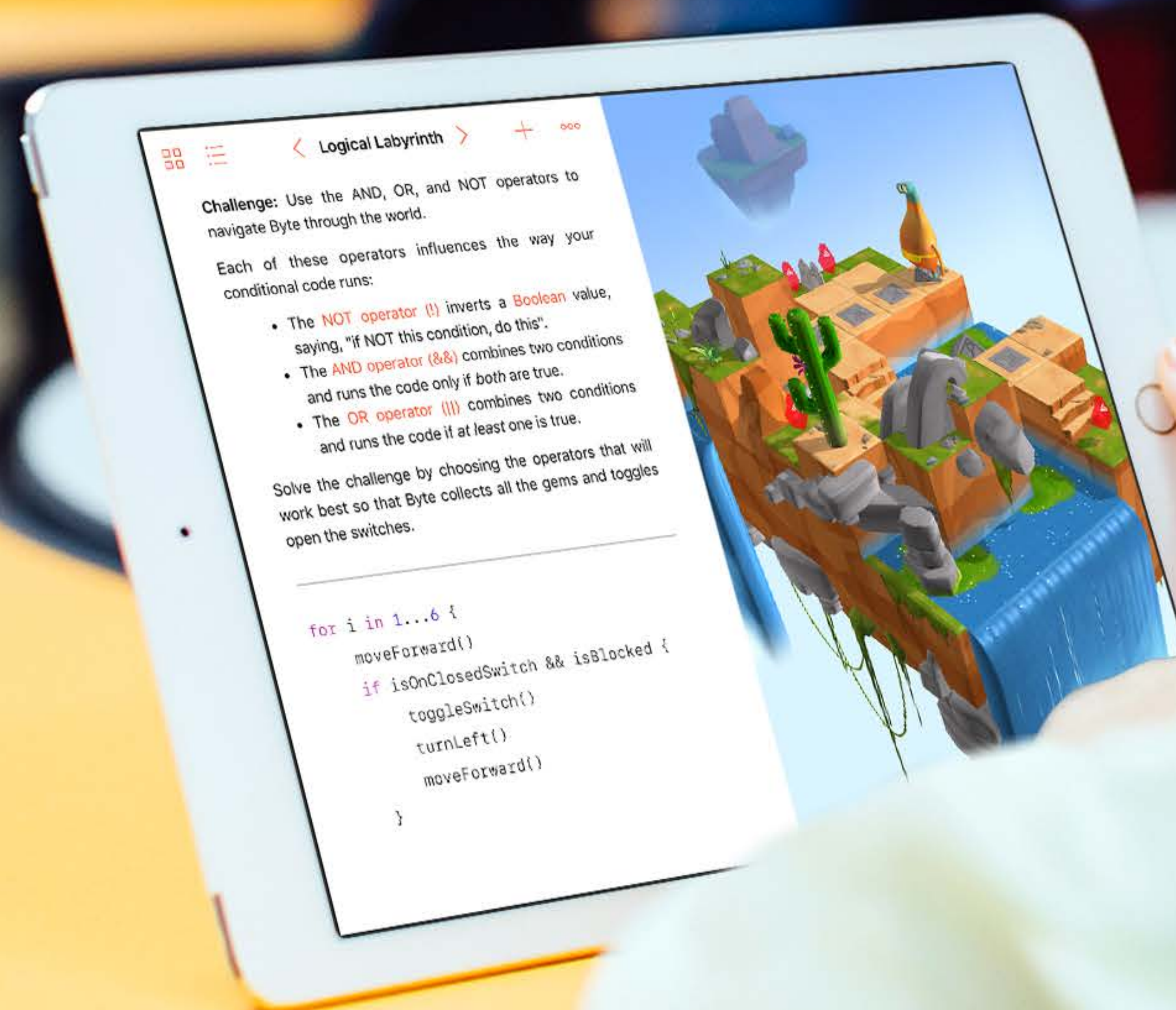




Demo

Real iOS APIs

Real Swift Code



< Logical Labyrinth >

Challenge: Use the AND, OR, and NOT operators to navigate Byte through the world.
Each of these operators influences the way your conditional code runs:

- The **NOT operator (!)** inverts a **Boolean** value, saying, "if NOT this condition, do this".
- The **AND operator (&&)** combines two conditions and runs the code only if both are true.
- The **OR operator (||)** combines two conditions and runs the code if at least one is true.

Solve the challenge by choosing the operators that will work best so that Byte collects all the gems and toggles open the switches.

```
for i in 1..6 {  
  moveForward()  
  if isOnClosedSwitch && isBlocked {  
    toggleSwitch()  
    turnLeft()  
    moveForward()  
  }  
}
```

File Format Documentation

Lesson Materials



Share





Challenge: Teleport through the gem.

For your first challenge, there's a r world. A **portal** teleports Byte from with Byte facing the same direction

You'll need to use all the **comman** far, in the right order, to toggle o through the portal, and collect the g

Don't worry if you don't get it right your chance to experiment!

```
moveForward()  
moveForward()  
moveForward()  
turnLeft()  
moveForward()  
moveForward()  
toggleSwitch()  
moveForward()  
moveForward()  
turnLeft()  
moveForward()  
moveForward()
```

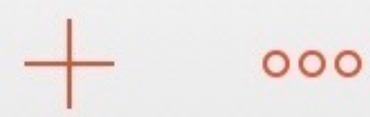
Tools

- Help
- Glossary of Terms
- Record Movie
- Take Picture
- Reset Page...



Run My Code





Challenge: Teleport through the gem.

For your first challenge, there's a r world. A **portal** teleports Byte from with Byte facing the same direction

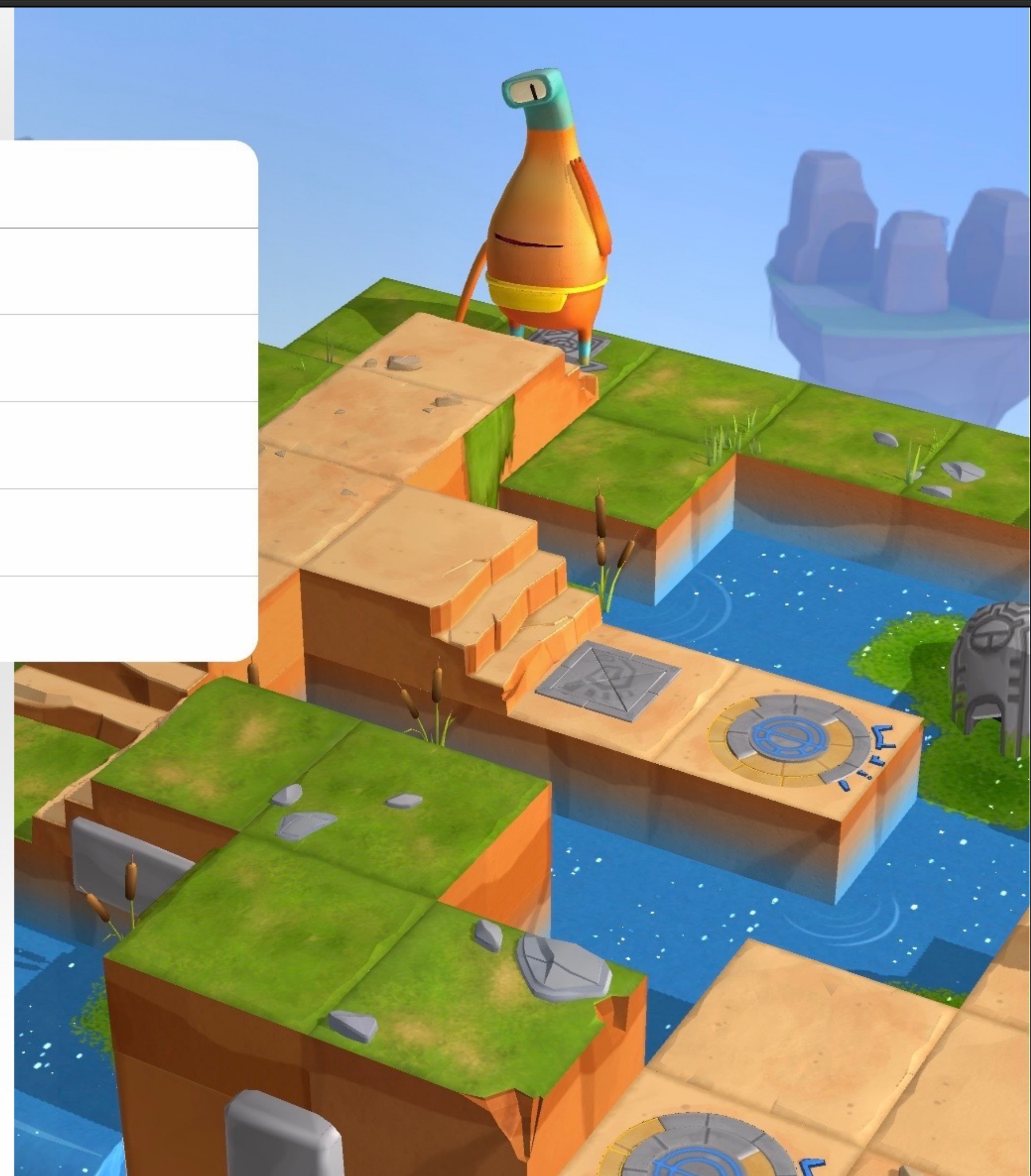
You'll need to use all the **command** far, in the right order, to toggle op through the portal, and collect the g

Don't worry if you don't get it right your chance to experiment!

```
moveForward()  
moveForward()  
moveForward()  
turnLeft()  
moveForward()  
moveForward()
```

Tools

- Help
- Glossary of Terms
- Record Movie
- Take Picture
- Reset Page...





Swift Playgrounds



Xcode





Xcode



Source Editor




Active Line Highlight

```
/// the new coding font  
let message = "Hello #WWDC!"  
let font = ["SF Mono", 12]  
let awesomeLevel1 = 11
```

Active Line Highlight

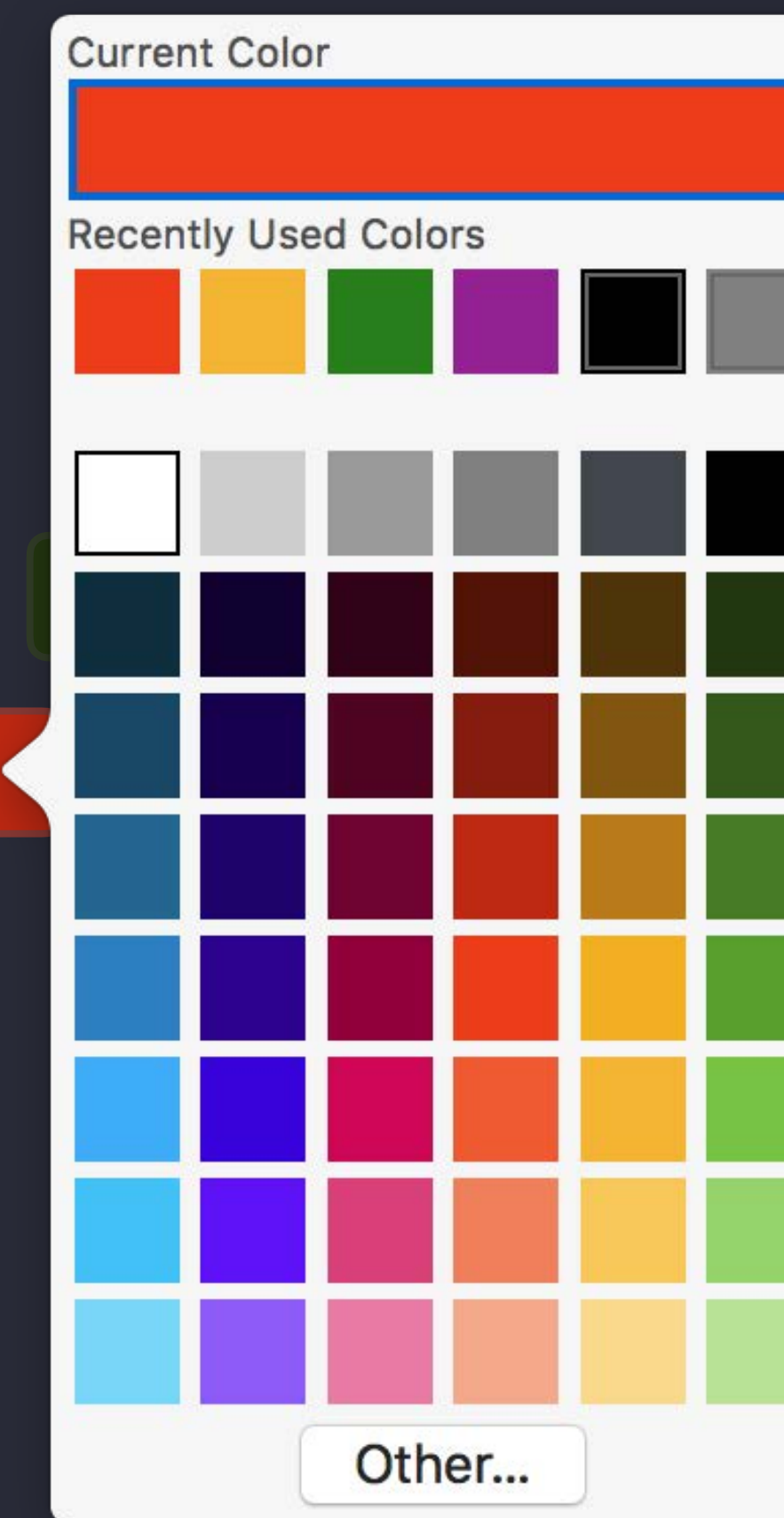
```
/// the new coding font  
let message = "Hello #WWDC!"  
let font = ["SF Mono", 12]  
let awesomeLevel1 = 11
```

Swift Color Literals

```
let backgroundColor =   
let highlightColor =   
let tintColor = 
```

Swift Color Literals

```
let backgroundColor =  
let highlightColor =  
let tintColor =
```



Swift Image Literals

```
let icon = 🌞 sticker_sun  
let fav = 🌳 sticker_tree
```

Swift Image Literals

```
let icon = sticker_s
```

```
let fav  sticker_sun  
 sticker_star  
 sticker_sierra
```

Documentation Generation

```
func createSession(username: String) -> Bool {  
    // implementation forthcoming  
}
```

Documentation Generation

```
/// Description
///
/// - parameter username: username description
///
/// - returns: return value description

func createSession(username: String) -> Bool {
    // implementation forthcoming
}
```



Source Editor



Xcode App Extensions



Source Editing

Content addition and deletion

Content transformation

Content selection

Pasteboard modification

In-file navigation

- Syntax Coloring ▶
- Show Invisibles
- Show Blame for Line
- Hide Code Coverage

Acme Editor Tools ▶

- Reformat Using Spaces ⌘ /
- No No No, Reformat Using Tabs
- Obfuscate Variable Names ⌘ E
- Remove Sleep Statements
- Add "Fix Before We Ship" ToDo
- Remove All Comments ⌘ ⌥ ⌘ T

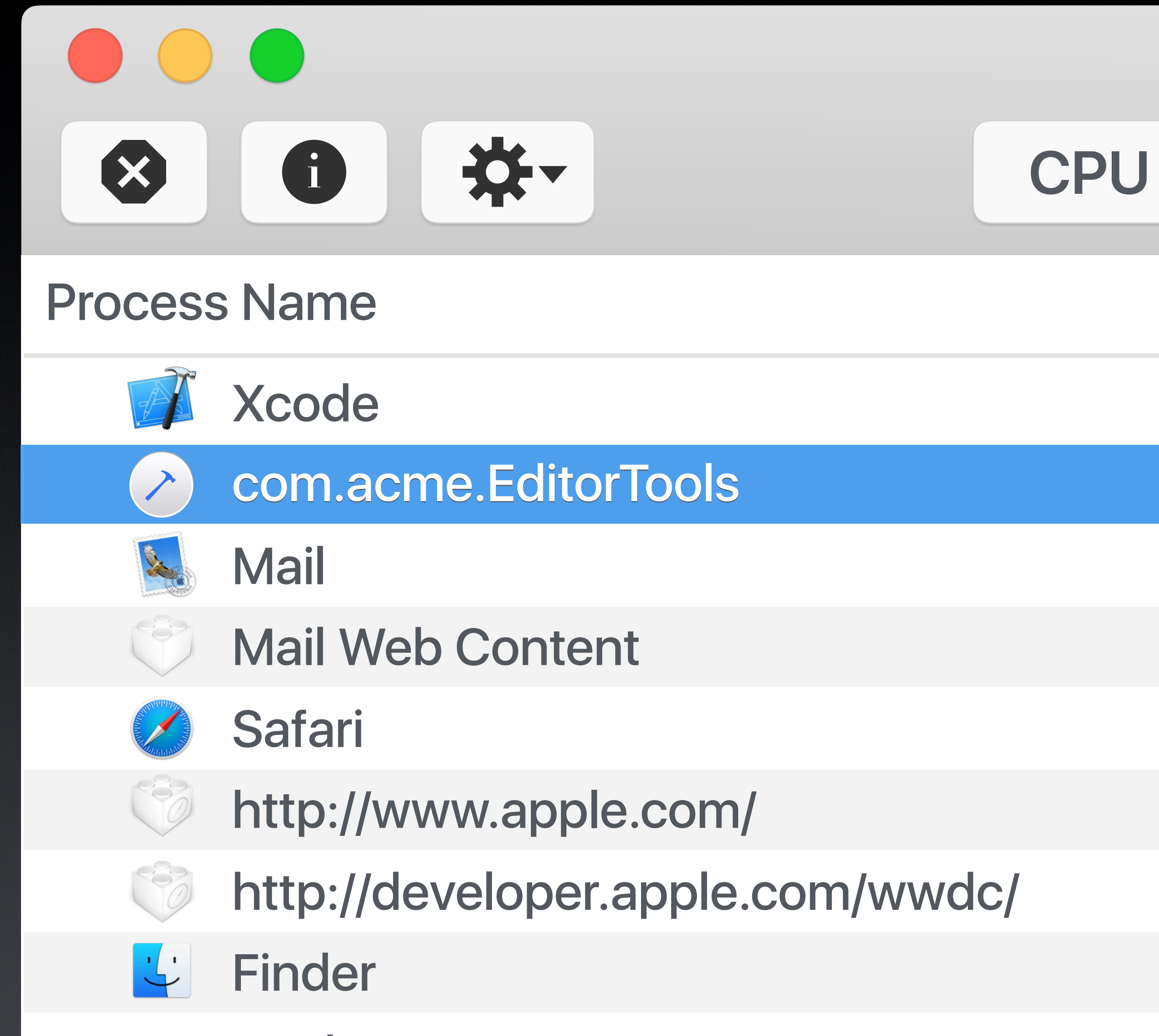


App Store

Developer ID

Sierra and El Capitan

Separate process from Xcode
Xcode 8 runtime secured by
System Integrity Protection





Source Editing Extension



API Reference

UISearchBar UISearchBar UISearchBar UISearchBar

SCNBox SCNLevelOfDetail UIStackView DispatchQueue willChangeValue(forKey:)

Photos PhotosUI ReplayKit SceneKit

Classes

- SCNAction
- SCNAnimationEvent
- SCNAudioPlayer
- SCNAudioSource
- SCNBillboardConstraint
- SCNBox
- SCNCamera
- SCNCapsule
- SCNCone
- SCNConstraint
- SCNCylinder
- SCNFloor
- SCNGeometry
- SCNGeometryElement
- SCNGeometrySource
- SCNHitTestResult
- SCNIKConstraint
- SCNLayer
- SCNLevelOfDetail

Creating a Box

- `init(width: CGFloat, height: CGFloat, length: CGFloat)`

Adjusting a Box's Dimensions

- `width`: CGFloat
- `height`: CGFloat
- `length`: CGFloat

Configuring Box Properties

- `widthSegmentCount`: Int
- `heightSegmentCount`: Int
- `lengthSegmentCount`: Int

Adding Rounded Edges and Corners

- `chamferRadius`: CGFloat
- `chamferSegmentCount`: Int

Class

SCNBox

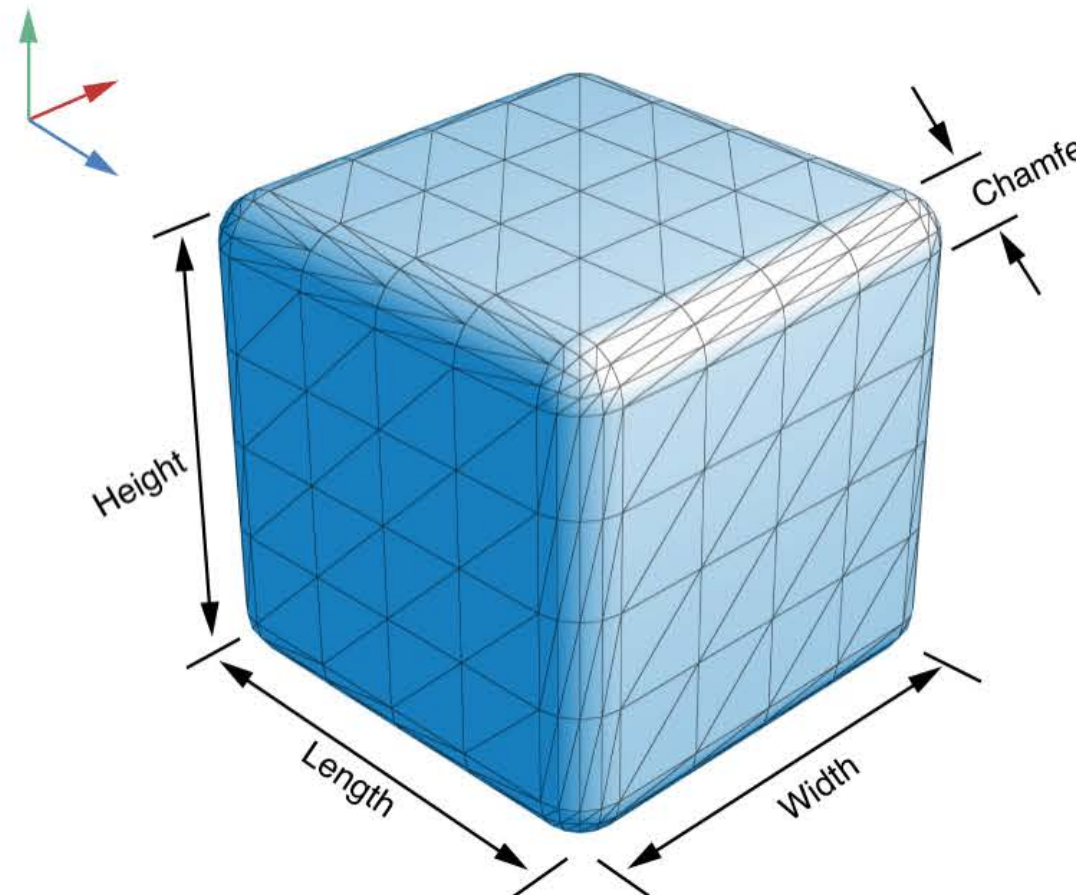
An SCNBox geometry models a six-sided polyhedron whose faces are all rectangles. The edges and corners of a box may be square or rounded.

Language
Swift | [Objective-C](#)

SDKs
iOS 8.0+
OS X 10.8+
tvOS 9.0+
watchOS 2.0+

Overview

Figure 1 A box and its properties



Define the shape of the box in the x-, y-, and z-axis dimensions of its local coordinate space by setting its `width`, `height`, and `length` properties. Add rounded edges and corners to a box with its `chamferRadius` property. To position and orient a box in a scene, attach it to the `geometry` property of an `SCNNode` object.

On This Page
[Overview](#)
[Symbols](#)
[Relationships](#)

Unified API Reference
Symbol Browsing
Swift and Objective-C

The image shows a screenshot of the Xcode Unified API Reference. The left pane displays a symbol browser for the 'SCNBox' class, with 'SCNBox' selected under the 'SceneKit' framework. The right pane shows the class documentation for 'SCNBox', including a description: 'An SCNBox geometry model with rounded edges and corners of a box'. Below the description, the 'Overview' section is visible, starting with the caption 'Figure 1 A box and its properties'. The interface includes standard macOS window controls and a search bar in the top right corner.

SCNBox

SCNLevelOfDetail

Class

SCNBox

An SCNBox geometry model with rounded edges and corners of a box.

Overview

Figure 1 A box and its properties

Q UIStackView



SCNLevelOfDetail

UIStackView

DispatchQueue

Class



SCNBox

An `SCNBox` geometry models a six-sided polyhedron whose faces are all rectangles. The edges and corners of a box may be square or rounded.

Language

Swift | [Objective-C](#)

SDKs

iOS 8.0+

OS X 10.8+



tvOS 9.0+

watchOS 2.0+






UISearchBar





API Reference

-  [UISearchBar](#) UIKit
-  [UISearchBarAlignment](#) UIKit
-  [UISearchBarDistribution](#) UIKit

Tools Guides

-  [UIKit Changes for Objective-C](#) iOS 9.0 API Diffs
-  [Auto Layout Guide: Auto Layout Without Constraints](#) Auto Layout Guide
-  [Xcode Overview: Building for Multiple Screen Sizes](#) Xcode Overview
-  [Auto Layout Guide: Stack Views](#) Auto Layout Guide
-  [UIKit Changes for Swift](#) iOS 9.0 API Diffs

Sample Code

-  [UIKit Catalog \(iOS\): Creating and Customizing UIKit Controls](#) User Experience
-  [Using AVAudioEngine for Playback, Mixing and Recording](#) Audio

SCNLevelC

Clas

SC



An S

edge

patchQueue

s. The

Language

Swift | [Objective-C](#)

SDKs

iOS 8.0+
OS X 10.8+
tvOS 9.0+



SDK Availability

Swift and Objective-C Syntax

Full Offline API Reference

Language

Swift | Objective-C

SDKs

iOS 8.0+

OS X 10.8+

tvOS 9.0+

watchOS 2.0+

SDK Availability

Swift and Objective-C Syntax

Full Offline API Reference

Language

Swift | Objective-C

SDKs

iOS 8.0+

OS X 10.8+

tvOS 9.0+

watchOS 2.0+



Interface Builder

Demo

Trailblazer | Build Trailblazer: **Succeeded** | 6/7/16 at 5:04 PM

Trailblazer > Trailblazer > Main.storyboard > Main.storyboard (Base) > Trail Details View Controller Scene > Trail Details View Controller > View > Visual Effect View

Matt Davis Trail
Mt Tamalpais State Park, CA

Regional Information
Mount Tamalpais (known locally as Mount Tam) is a peak in Marin County, California, United States, often considered symbolic of Marin County. Much of Mount Tamalpais is protected within public lands such as Mount Tamalpais State Park, the Marin Municipal Water District watershed, and National Park Service land, such as Muir Woods.

Highlights
Mount Tamalpais is the highest peak in the Marin Hills, which are part of the Northern California Coast Ranges. The elevation at the West Peak, its highest point, where a radar dome currently stands, is at about 2,576 feet (785 m). It stood over 2,600 feet (792 m) before the summit was flattened for the radar dome construction. The East Peak, the mountain's second highest peak, is 2,572 feet (784 m). The mountain is clearly visible from the city of San Francisco and the East Bay region.

Reviews **Photos**

Prototype Cells

Amazing! ★★★★★

This is one of the most amazing places my family and I have hiked in and we can highly recommend spending a vacation here.

Prototype Content

Visual Effect View

Blur Style: Light

Vibrancy

View

Mode: Scale To Fill

Semantic: Unspecified

Tag: 0

Interaction: User Interaction Enabled
 Multiple Touch

Alpha: 1

+ Background: [Color Picker]

+ Tint: [Color Picker] Default

Drawing: Opaque
 Hidden
 Clears Graphics Context
 Clip Subviews
 Autorelease Subviews

Stretching: X: 0, Y: 0
Width: 1, Height: 1

+ Installed

View Controller - A controller that manages a view.

Storyboard Reference - Provides a placeholder for a view controller in an external storyboard.

Navigation Controller - A controller that manages navigation through a hierarchy of views.

Introduce Variations Based On:

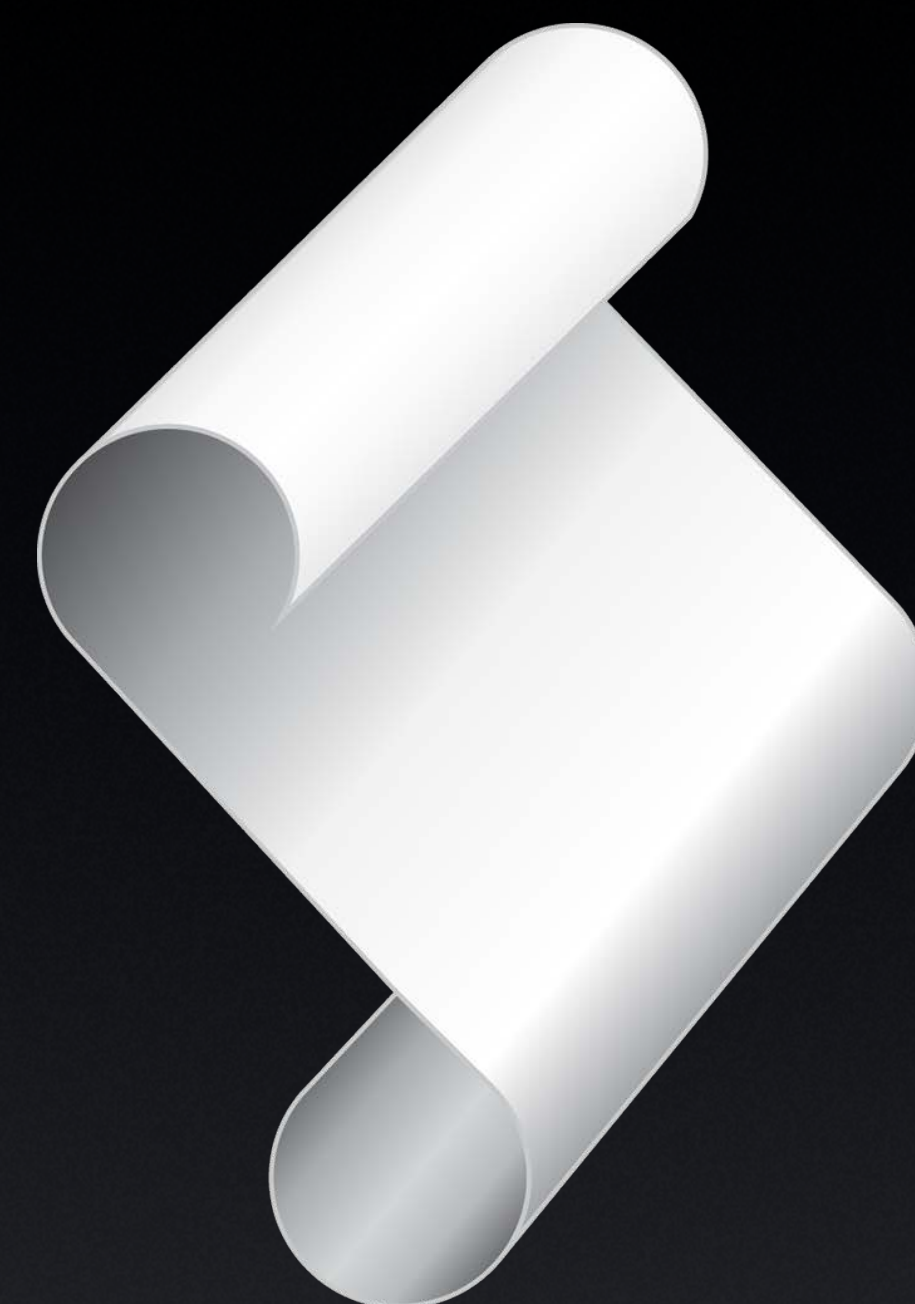
Width

Height

Vary for Traits

View as: iPad 9.7" (wR hR) 78%

Varying 8 Regular Width Devices



Accessibility + Scriptability



Development Issues



135 New Diagnostics



Three New Analyzers



New Testing Options



Captured Crash Logs


```
> xcodebuild test
```

Test Without Building





Runtime Issues

 iPhone 6s

Running Trailblazer on iPhone 6s 





Trailblazer > iPhone 6s

Running Trailblazer on



Buildtime

Runtime



Trailblazer > iPhone 6s

Running Trailblazer on



Buildtime

Runtime



UI



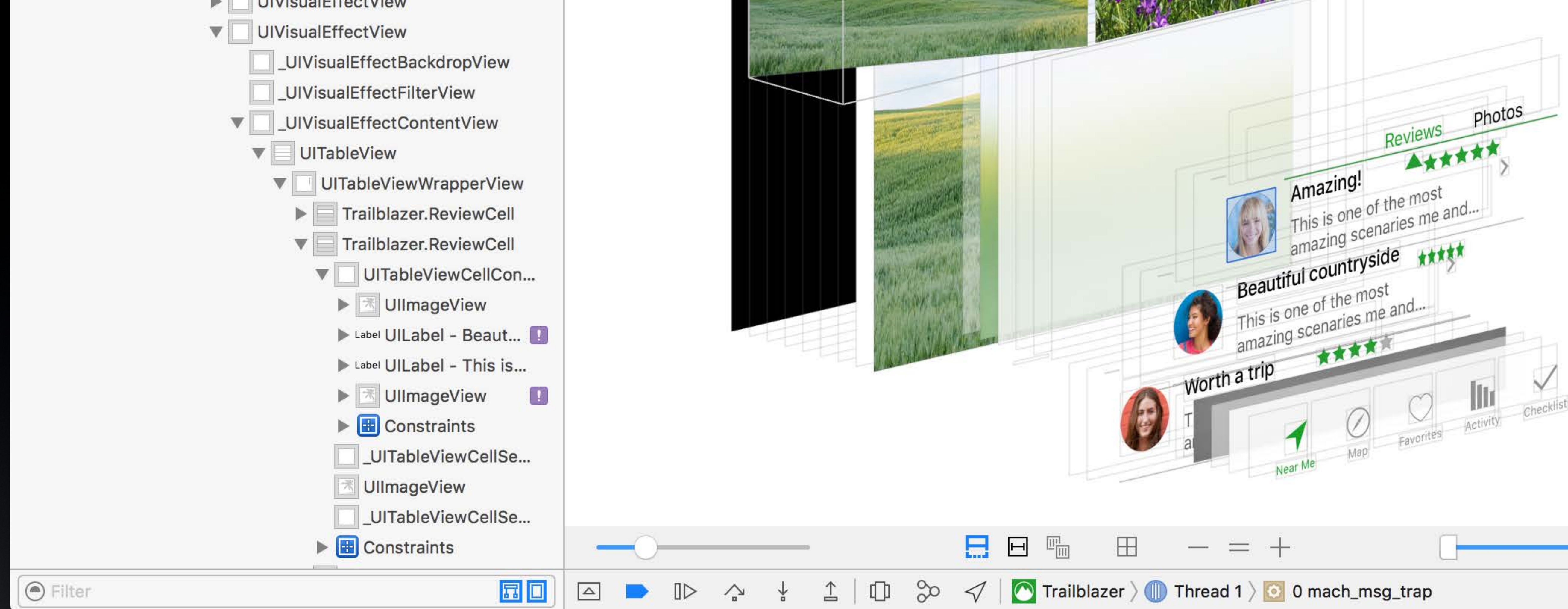
Threads



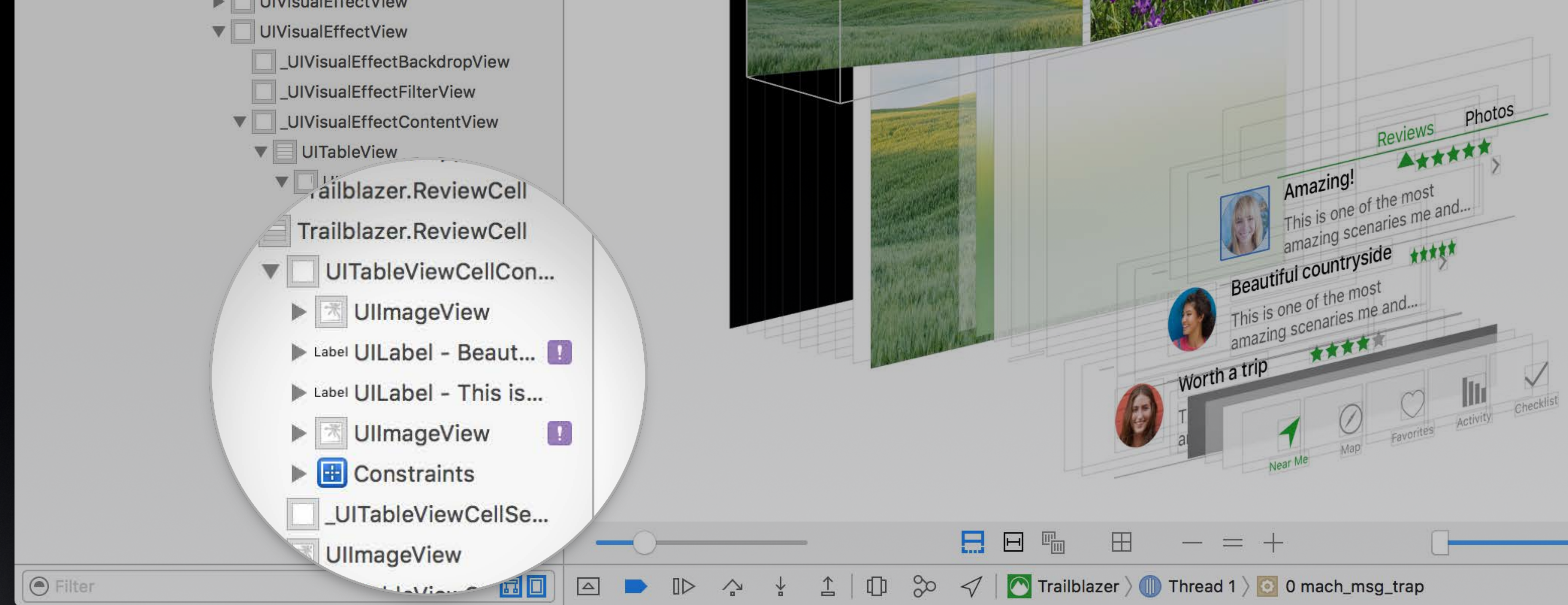
Memory



UI



Ambiguous Layouts



Ambiguous Layouts



Threads



Data Races

Unlock from Wrong Thread

Thread Leaks

Uninitialized Mutexes

Unsafe Calls in Signal Handlers

Thread Sanitizer

The screenshot displays the Xcode interface with a Thread Sanitizer warning. The left pane shows the issue details for a data race in `Trailblazer.TrailDetailsViewController.resetUpdateState () -> ()` at `updateFinished`. The right pane shows the Swift code for `TrailDetailsViewController`.

Issue Details (Left Pane):

- Trailblazer - 40710 2 issues
- Threading Issues
 - Use of an uninitialized or destroyed mutex in `CommitChange`
 - Data race in `Trailblazer.TrailDetailsViewController.resetUpdateState () -> ()` at `updateFinished`**
 - 'updateFinished' is a global variable (0x1031d8b68)
 - Write of size 1 by thread 15
 - 0 `TrailDetailsViewController.resetUpdateSta...`
 - 1 `TrailDetailsViewController.notify() -> ()`
 - 2 `TrailDetailsViewController.updateDidFinis...`
 - 3 `TrailDetailsViewController.(viewDidLoad()...`
 - 4 partial apply for `TrailDetailsViewController...`
 - 7 thunk
 - Write of size 1 by thread 16
 - 0 `writeResultAndReset`
 - 1 `notifyWithResult`
 - 2 `UpdateDidFinish`

Code (Right Pane):

```
fillDescriptionTextView()
updateUIForTraitCollection(self.navigationController!.traitCollection)

loadInitialData()

routeEstimator?.requestUpdate(completion: { success in
    self.updateDidFinish(withSuccess: success)
})
}

func resetUpdateState() {
    updateFinished = true
}

override func viewDidLoad(_ animated: Bool) {
    super.viewDidLoad(animated)

    // Scroll to middle image
    scrollView.scrollRectToVisible(CGRect(x: scrollView.bounds.size.width, y: 0, width:
        scrollView.bounds.size.width, height: 20), animated: true)
}

override func willTransition(to newCollection: UITraitCollection, with coordinator:
    UINavigationControllerTransitionCoordinator) {
    updateUIForTraitCollection(newCollection)
}
```


Trailblazer > iPhone SE Running Trailblazer on iPhone SE 2

Trailblazer > Trailblazer > TrailDetailsViewController.swift

Buildtime Runtime

Trailblazer - 40710 2 issues

- Threading Issues
 - Use of an uninitialized or destroyed mutex in CommitChange
 - Data race in Trailblazer.TrailDetailsViewController.resetUpdateState () -> () at updateFinished**
 - 'updateFinished' is a global variable (0x1031d8b68)
 - Write of size 1 by thread 15
 - 0 TrailDetailsViewController.resetUpdateSta...
 - 1 TrailDetailsViewController.notify() -> ()
 - 2 TrailDetailsViewController.updateDidFinis...
 - 3 TrailDetailsViewController.(viewDidLoad())...
 - 4 partial apply for TrailDetailsViewController...

```
fillDescriptionTextView()
updateUIForTraitCollection(self.navigationController)

loadInitialData()

routeEstimator?.requestUpdate(completion: { s
    self.updateDidFinish(withSuccess: success
})
})

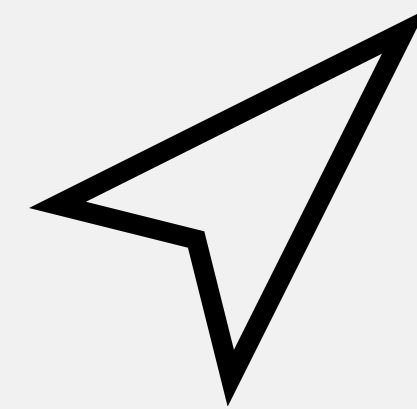
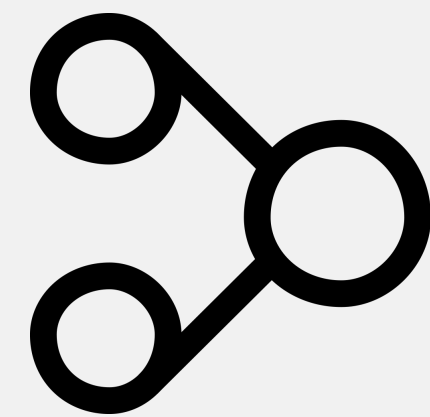
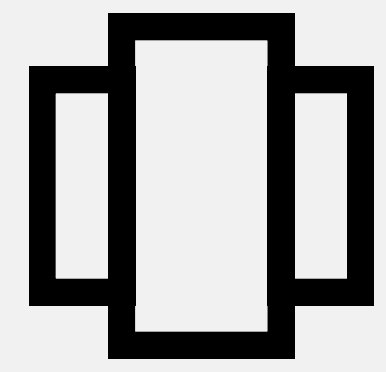
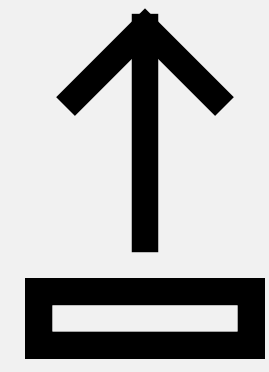
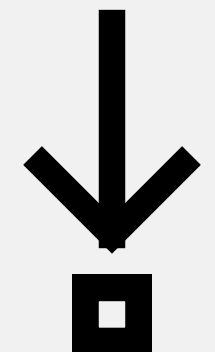
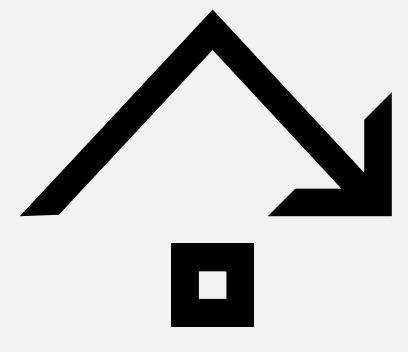
func resetUpdateState() {
    updateFinished = true
}

override func viewWillAppear(_ animated: Bool) {
    super.viewWillAppear(animated)

    // Scroll to middle image
    scrollView.scrollRectToVisible(CGRect(x: scro
        scrollView.bounds.size.width, height: 20)
```

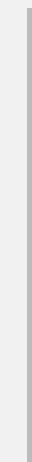
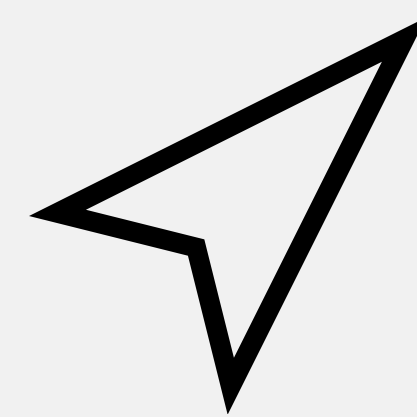
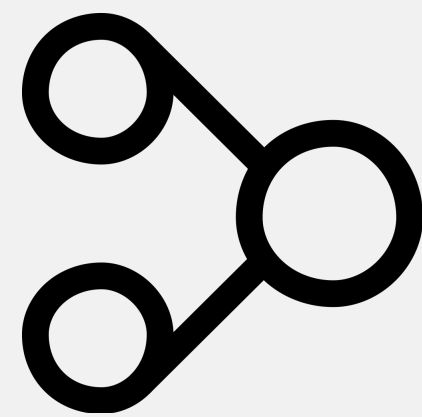
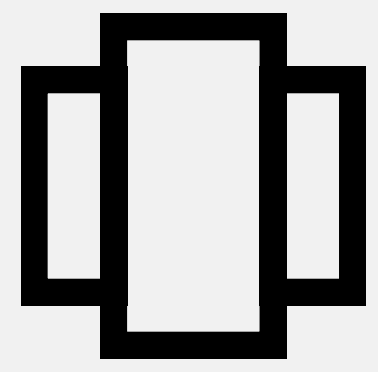
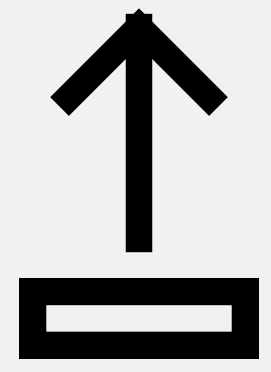
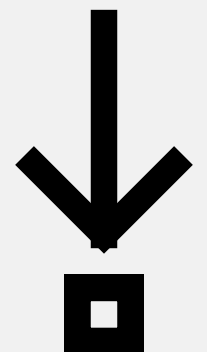
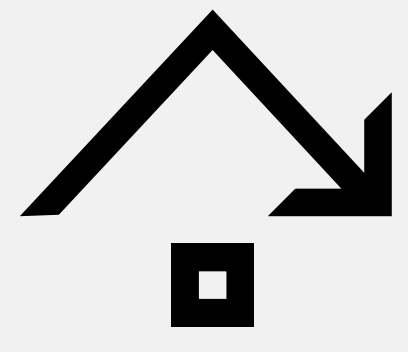


Memory



Trailblazer





Trailblazer



Memory Debugger

The screenshot displays the Trailblazer memory debugger interface on an iPhone 6. The main window shows a memory graph with various objects and their relationships. The left-hand pane shows the application's memory structure, including the AppDelegate, CommentViewController, ReviewBodyText, ReviewCell, Trail, TrailCell, TrailDetailsViewController, TrailsTableViewController, User, and UserReview. The right-hand pane shows the details for the selected TrailsTableViewController object, including its class, kind, address, and size, as well as a backtrace of the call stack.

Trailblazer PID 1485

- CPU: 0%
- Memory: 133 MB
- Disk: Zero KB/s
- Network: Zero KB/s

Trailblazer (64)

- AppDelegate (1)
 - 0x7fdad750fd30
- CommentViewController (4)
 - 0x7fdad7306b40
 - 0x7fdad7f3490
 - 0x7fdadf0e6d90
 - 0x7fdadf323b90
- ReviewBodyText (4)
 - 0x7fdad73066a0
 - 0x7fdad7e6cb0
 - 0x7fdadf0e54e0
 - 0x7fdadf321bb0
- ReviewCell (5)
- Trail (8)
- TrailCell (4)
- TrailDetailsViewController (1)
 - 0x7fdad7519f60
- TrailsTableViewController (1)
 - 0x7fdad702a290
- User (18)
- UserReview (18)
 - 0x7fdad5f6c2d0
 - 0x7fdad75f0ea0

Running Trailblazer on iPhone 6

Trailblazer > TrailsTableViewController > 0x7fdad702a290 > 0x7fdad702a290

Memory Details

- Class: TrailsTableViewController
- Kind: Swift
- Address: 0x7fdad702a290
- Size: 816 bytes

Hierarchy

- TrailsTableViewController
- UITableViewController
- UIViewController
- UIResponder
- NSObject

Backtrace

- 0 malloc_zone_malloc
- 1 calloc
- 2 class_createInstance
- 3 objc_rootAlloc
- 4 -[UIClassSwapper initWithCoder:]
- 5 UINavigationControllerDecodeObjectForVal...
- 6 UINavigationControllerDecodeObjectForVal...
- 7 -[UINavigationController decodeObjectFor...
- 8 -[UIViewController initWithCoder:]
- 9 -[UINavigationController initWithCod...
- 10 UINavigationControllerDecodeObjectForV...
- 11 UINavigationControllerDecodeObjectForVa...
- 12 -[UINavigationController decodeObjectFor...
- 13 -[UIViewController initWithCoder:]
- 14 -[UITableViewController initWithCod...
- 15 UINavigationControllerDecodeObjectForV...
- 16 -[UINavigationController decodeObjectFor...
- 17 -[UINavigationController initWithCod...
- 18 UINavigationControllerDecodeObjectForV...
- 19 UINavigationControllerDecodeObjectForV...

Demo



Provisioning





Fix Issue



Fix Issue





New Signing Actions

Configuration and Issue Details

Actionable Messages

Provisioning Report



Automatic Code Signing



Automatic Code Signing



Customized Code Signing



Profile



Certificate



Per Build Configuration



Per Build Configuration



Development Certificates



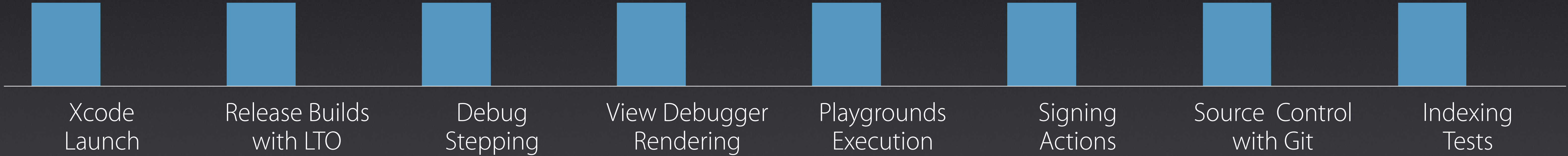
Multiple Development Certificates



Provisioning



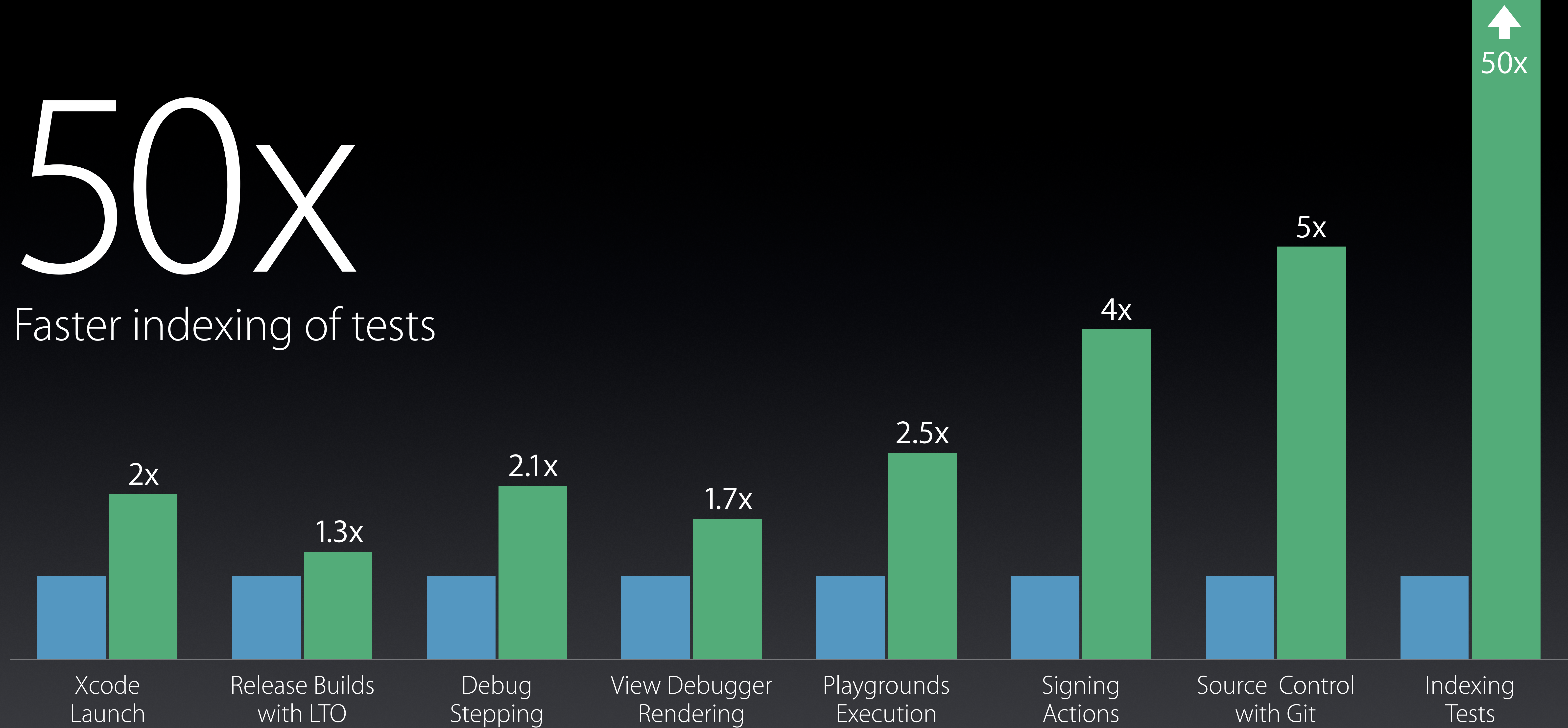
Performance





50x

Faster indexing of tests







Xcode



Platforms



Compression

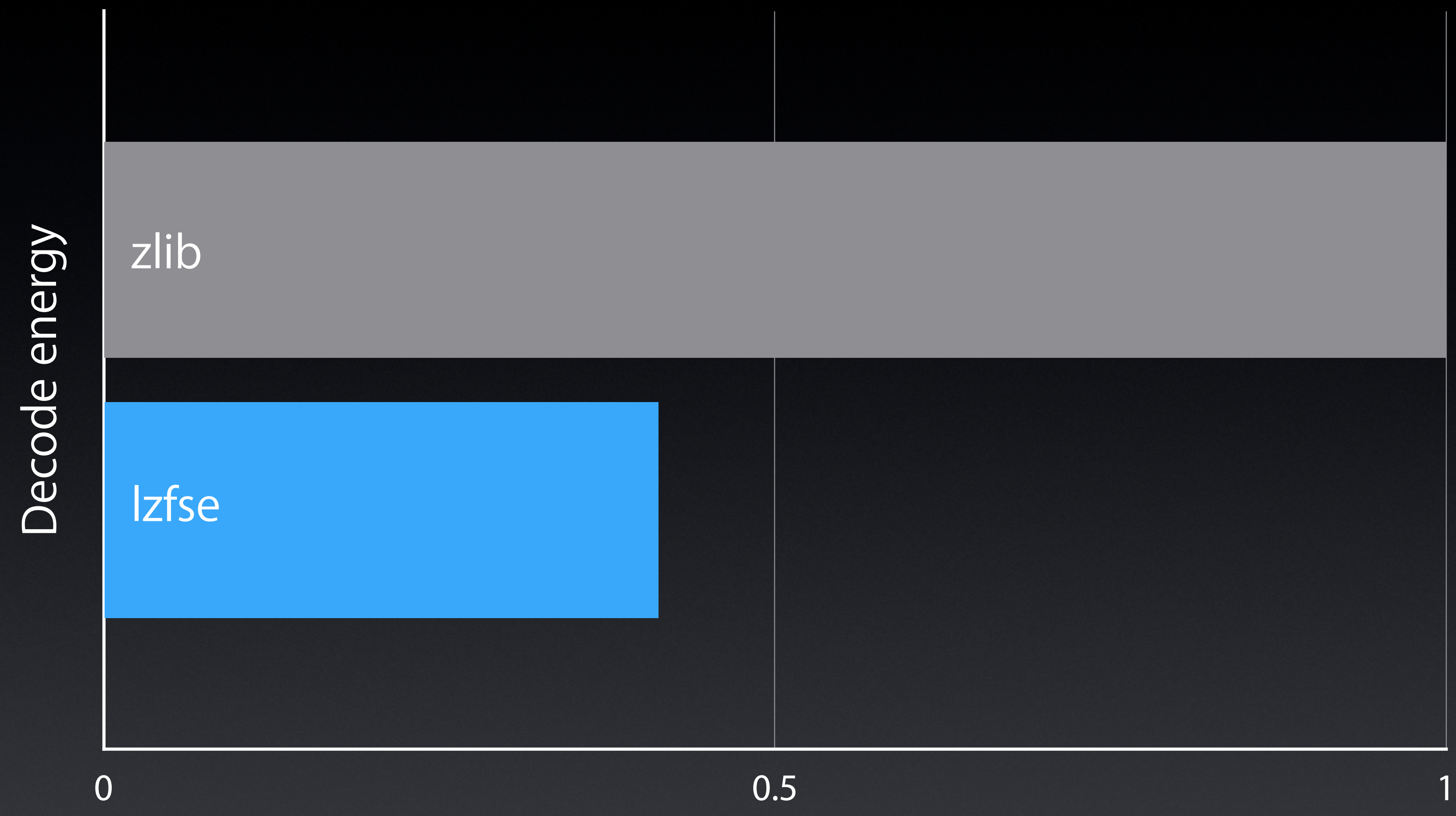


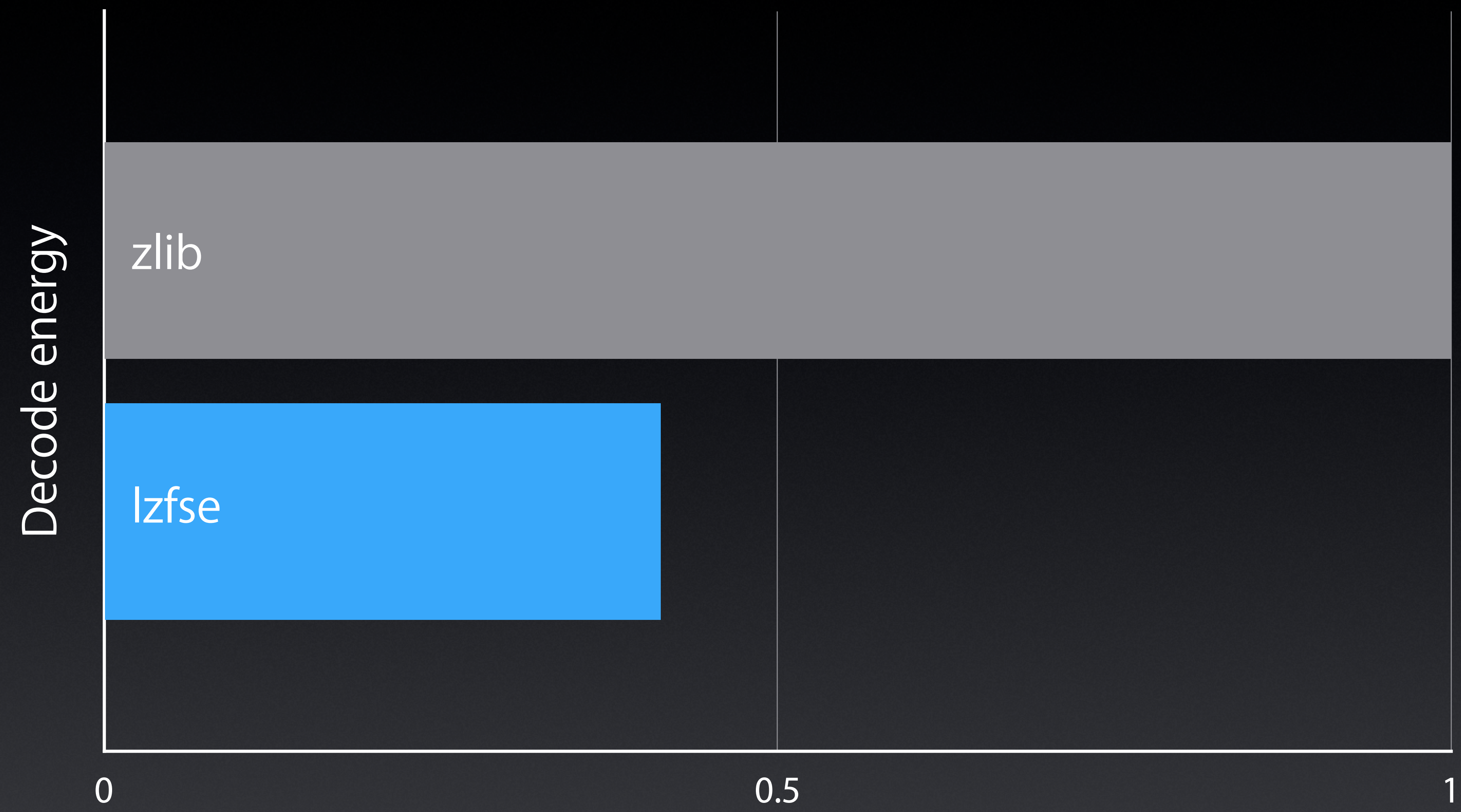
● lzfse

● zlib

3x
Speed
Improvement





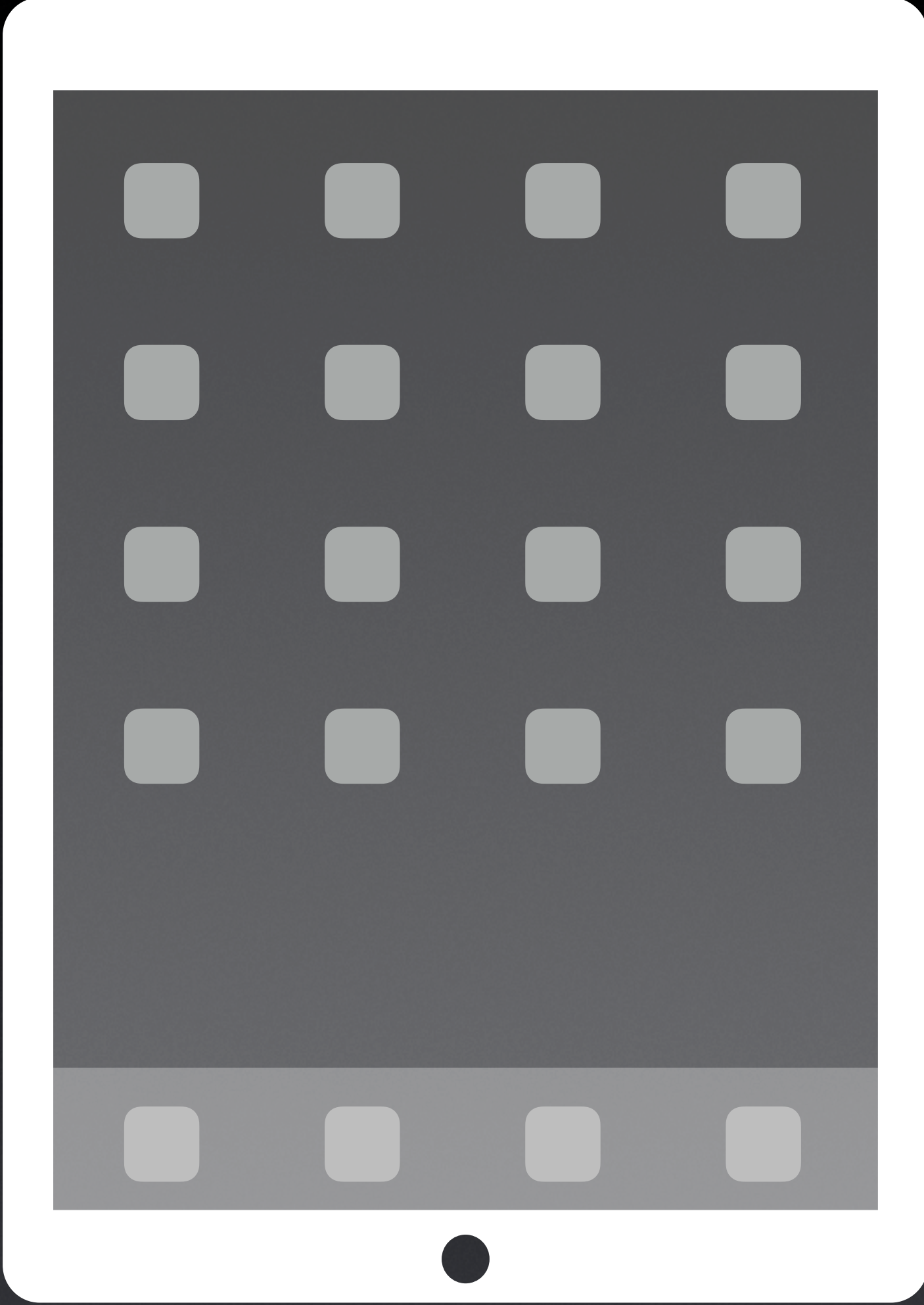


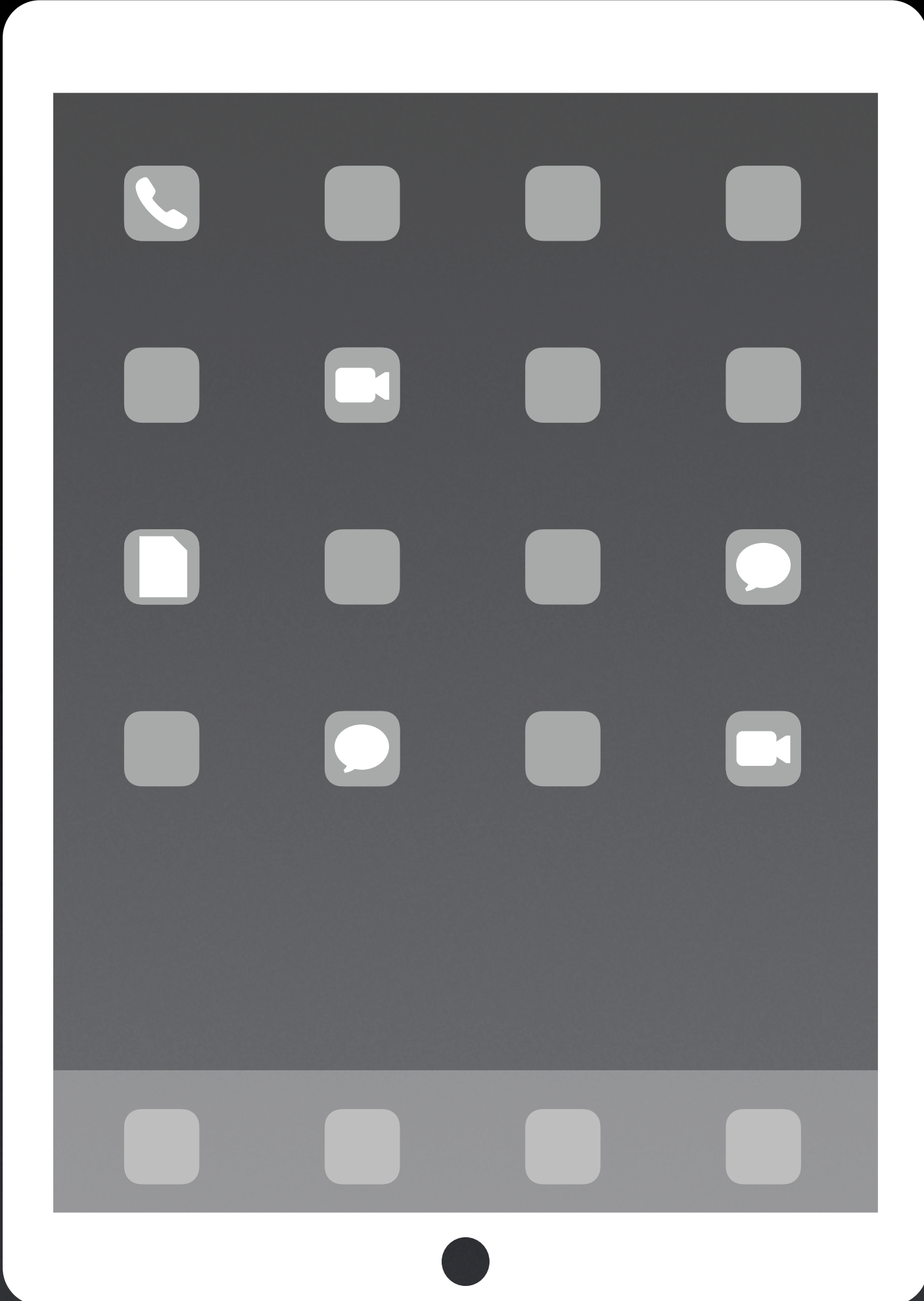
2x
Energy
Reduction

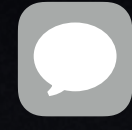
yes, we're
OPEN!

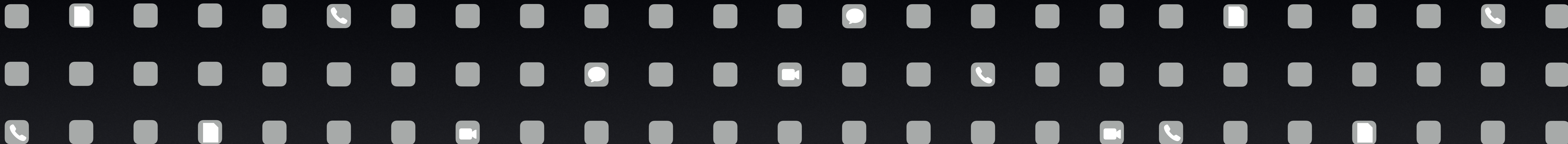


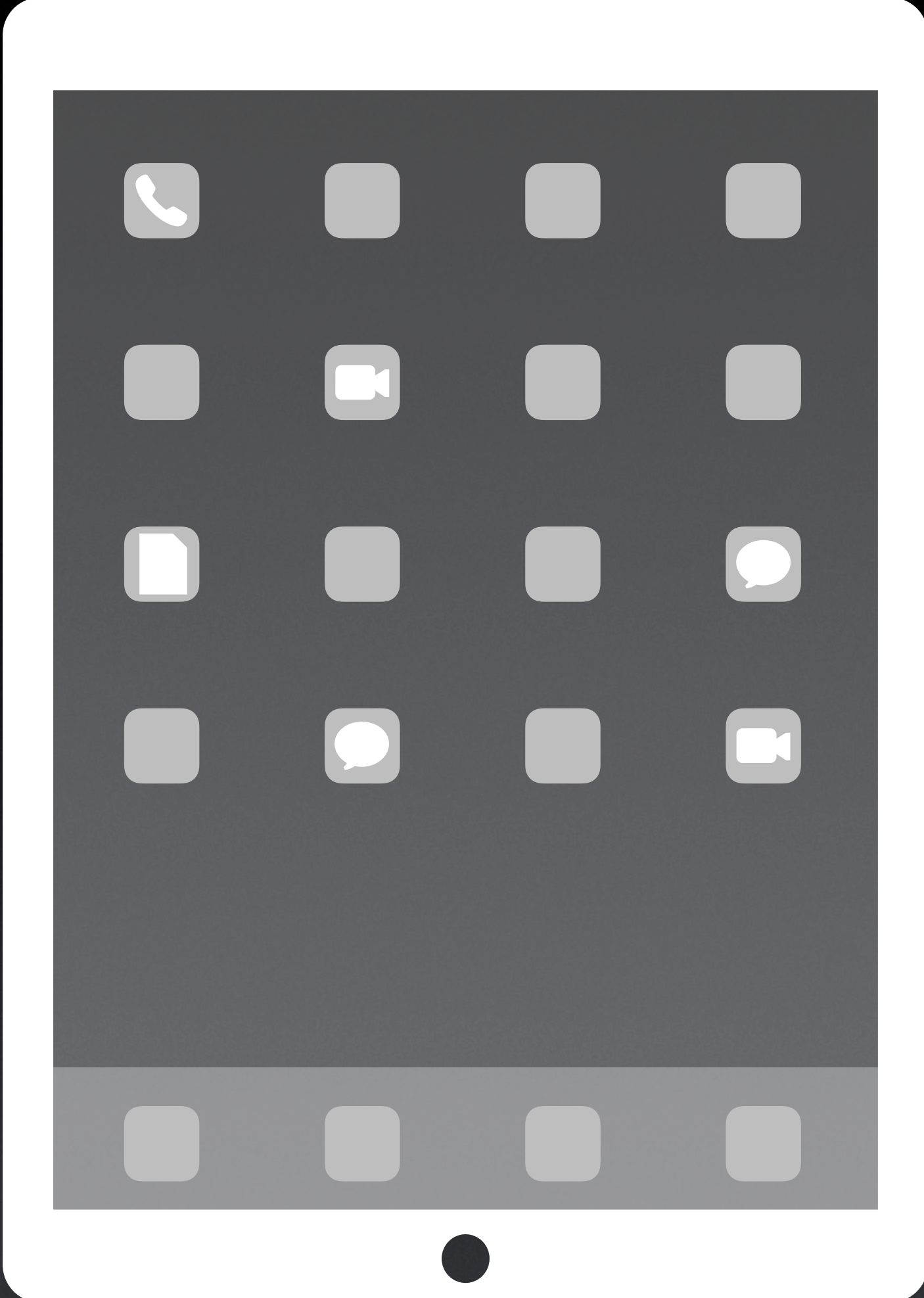
Networking

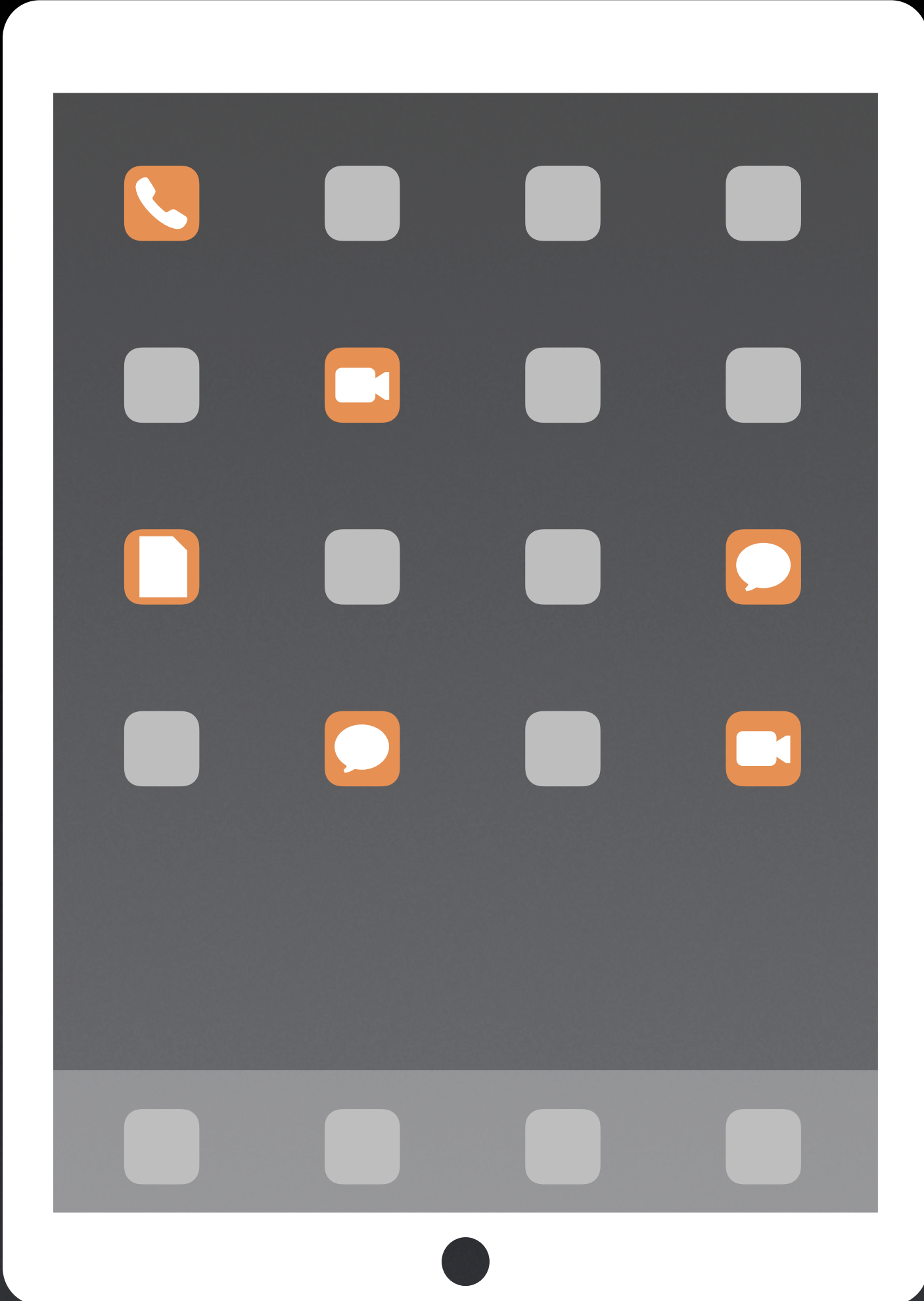


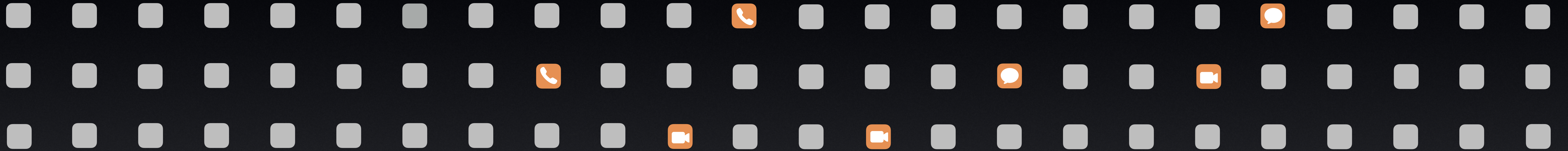








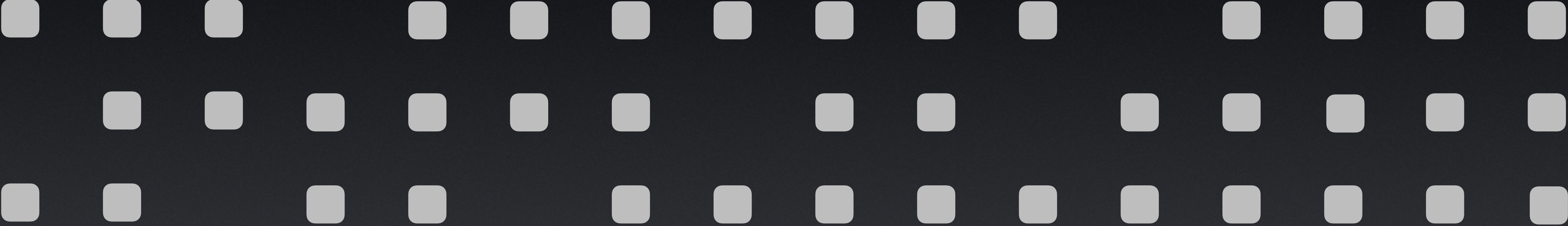




High-Priority Apps

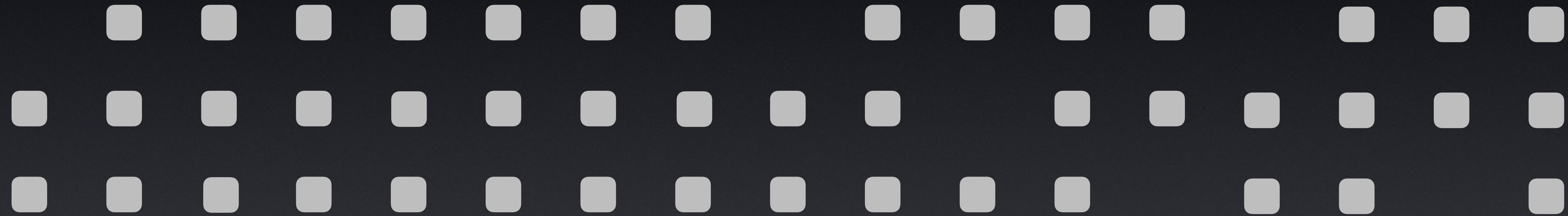


Low-Priority Apps



High-Priority Apps

Low-Priority Apps





Logging

Traditional Logging

Fragmented approaches

Inflexible

Inefficient

Limited system-wide visibility

Traditional Logging

Fragmented approaches

Inflexible

Inefficient

Limited system-wide visibility

Traditional Logging

Fragmented approaches

Inflexible

Inefficient

Limited system-wide visibility

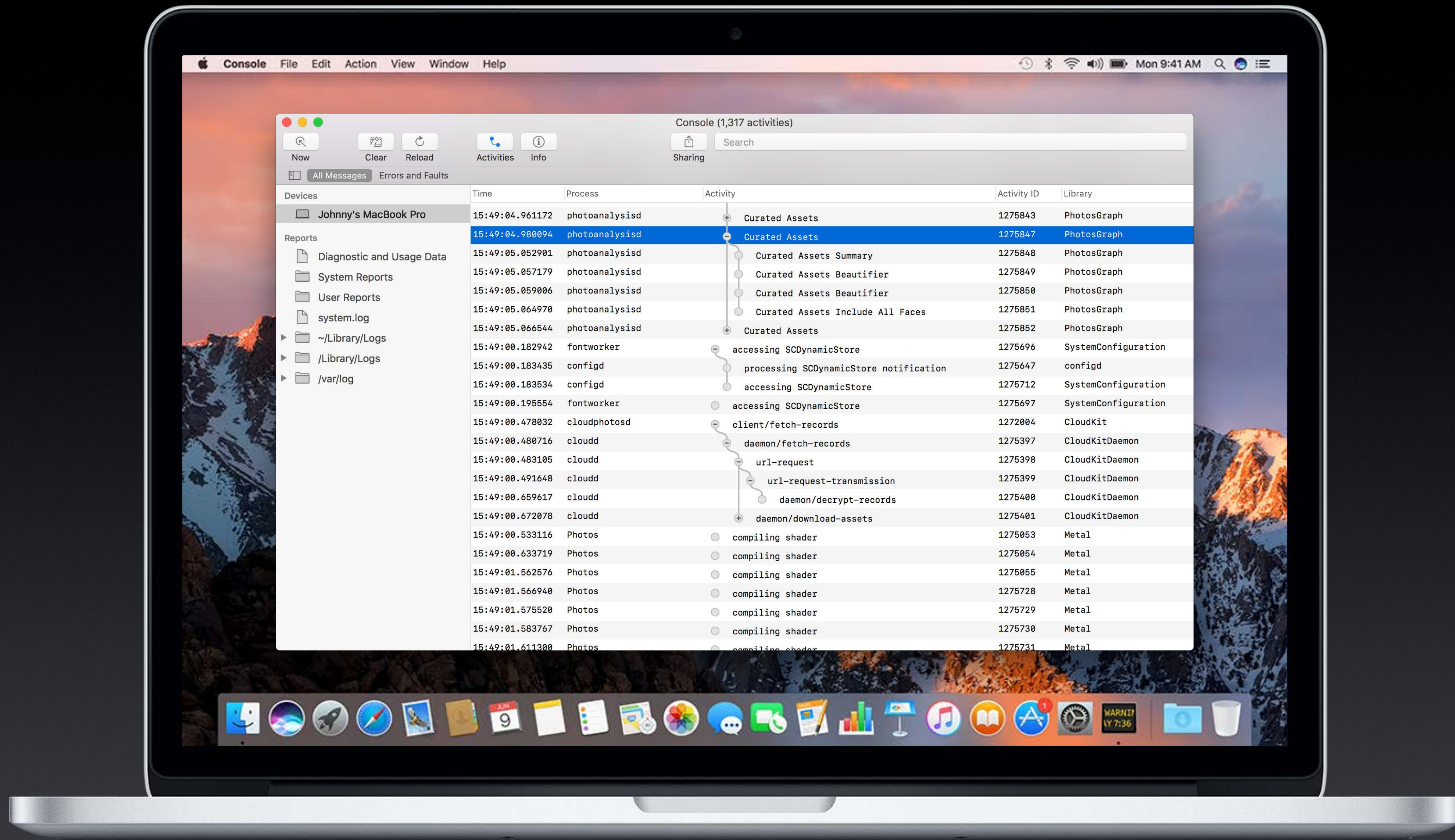
New Logging

Unified and highly efficient

Fine-grained logging levels

In-memory tracing

Support privacy requirement



Live Streaming
Advanced Filtering
Activity View



File Systems

HFS+







Over a Billion Devices



Over a Billion Devices



18+ Years

Apple File System



Scalable

Modern

Flash/SSD

Resilient

64 bit

Encryption

Cloning

Fast

Zero space

Files and directories

Snapshots

Full volume

Mountable

Support reverting

Developer preview at
WWDC on macOS

Coming to all Apple Devices



Privacy

$\forall D, D', S \in \mathbf{Range}(\mathcal{A}), d_H(D, D') = 1 :$

$$\ln \left| \frac{\Pr[\mathcal{A}(D) \in S]}{\Pr[\mathcal{A}(D') \in S]} \right| \leq \epsilon$$

$$f(x; \lambda) = \frac{1}{2\lambda} e^{-|x|/\lambda}$$

$$\sup_{S \in \sigma(\mathcal{Z})} \sup_{x, x' \in \mathcal{X}} \frac{\Pr[Z_i \in S | X_i = x]}{\Pr[Z_i \in S | X_i = x']} \leq e^\epsilon$$

$$H_p = \begin{bmatrix} H_{p/2} & H_{p/2} \\ H_{p/2} & -H_{p/2} \end{bmatrix}$$

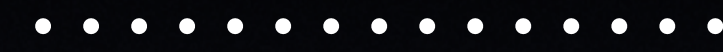
$$\forall i \in [n], d \in \mathcal{S}, \left| \ln \frac{\Pr[T_i \in T | d_i = d]}{\Pr[T_i \in T | d_i = \text{NULL}]} \right| \leq \epsilon$$

What proportion of our developers
prefer Tabs over Spaces?

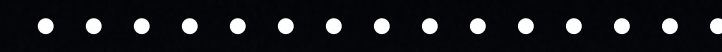
Tabs vs Spaces



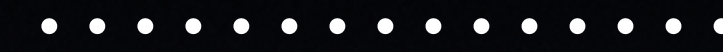
tab



tab

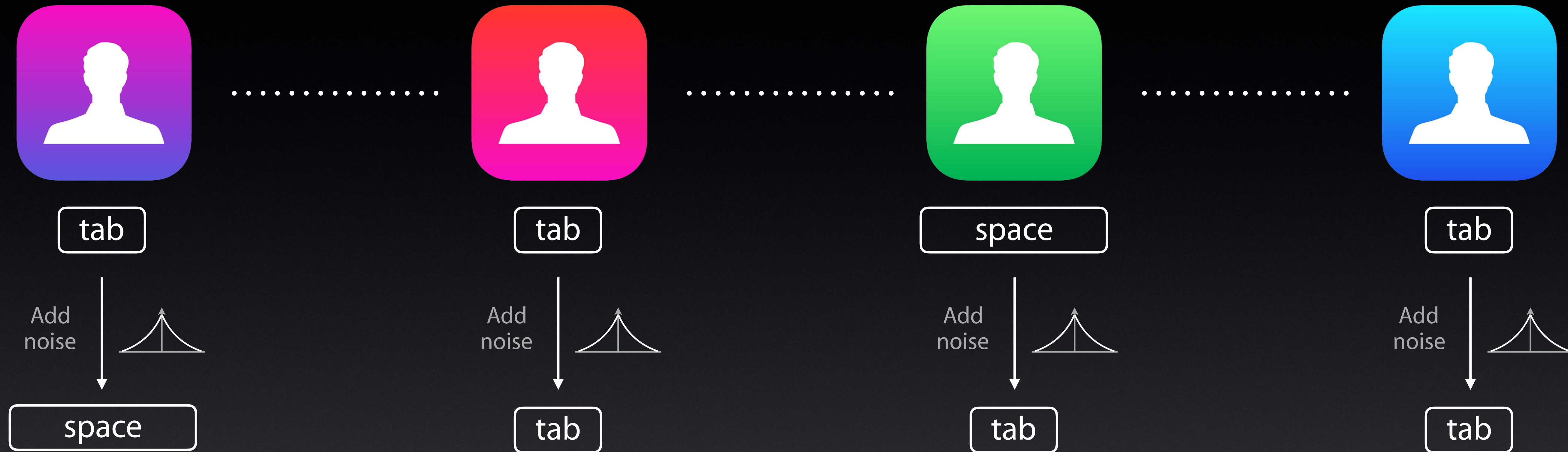


space

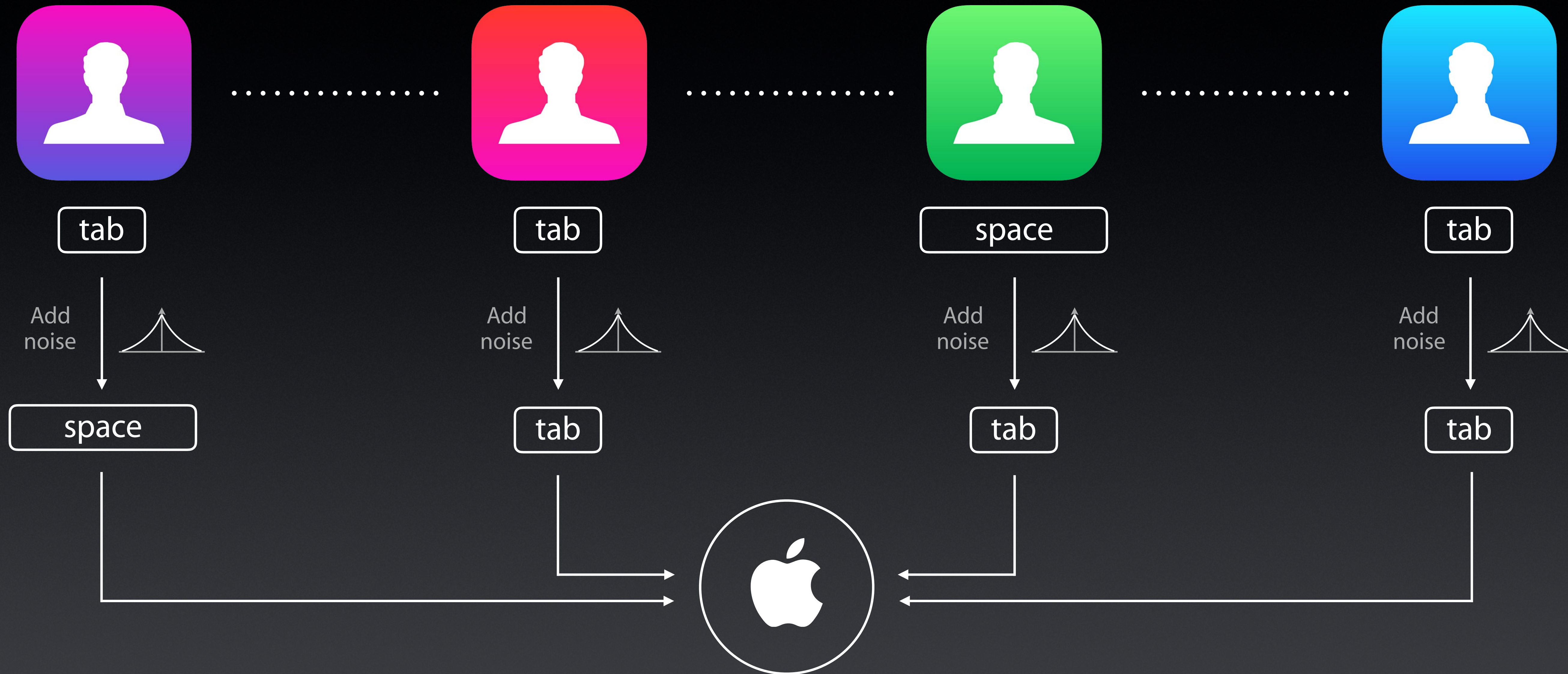


tab

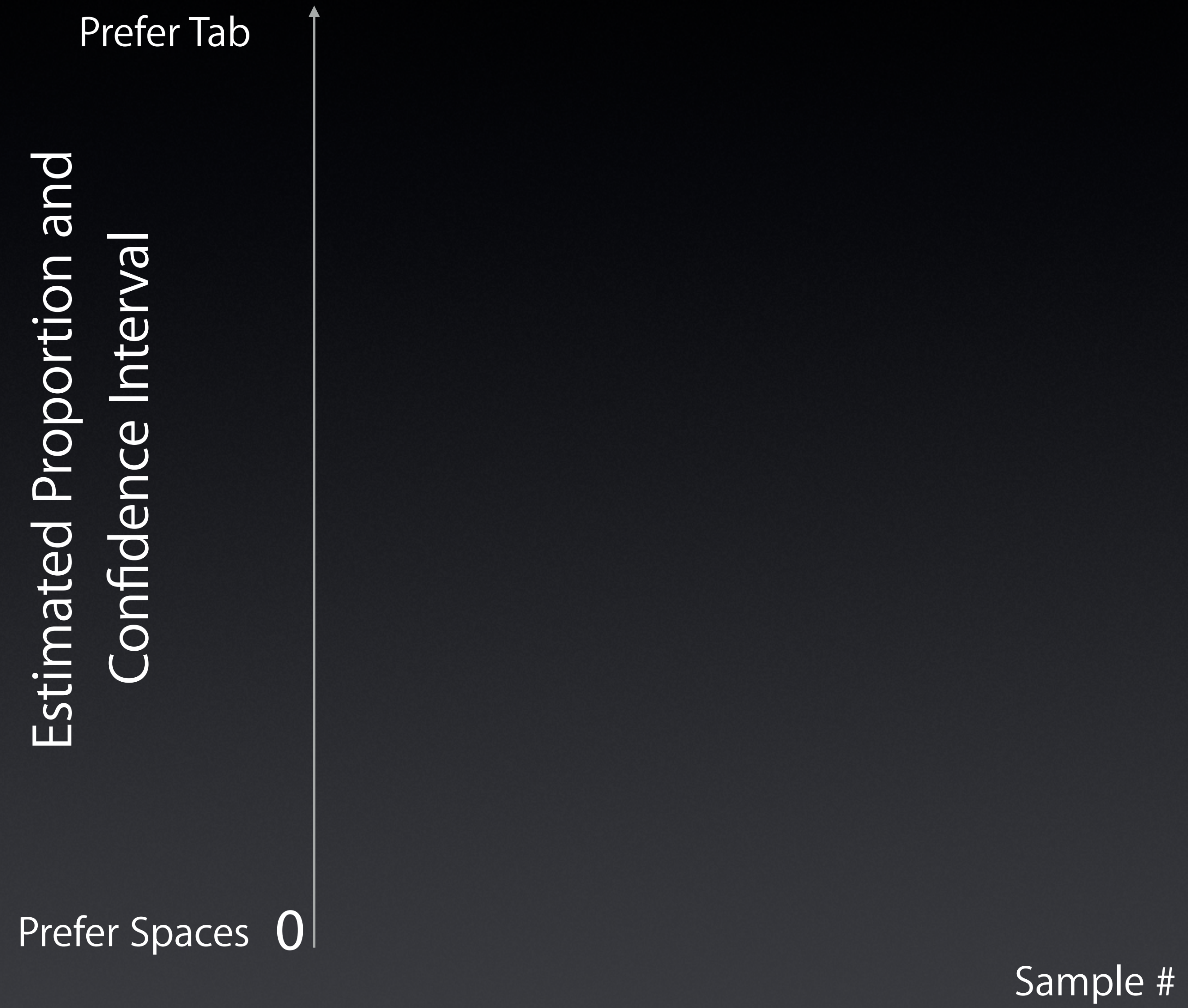
Tabs vs Spaces



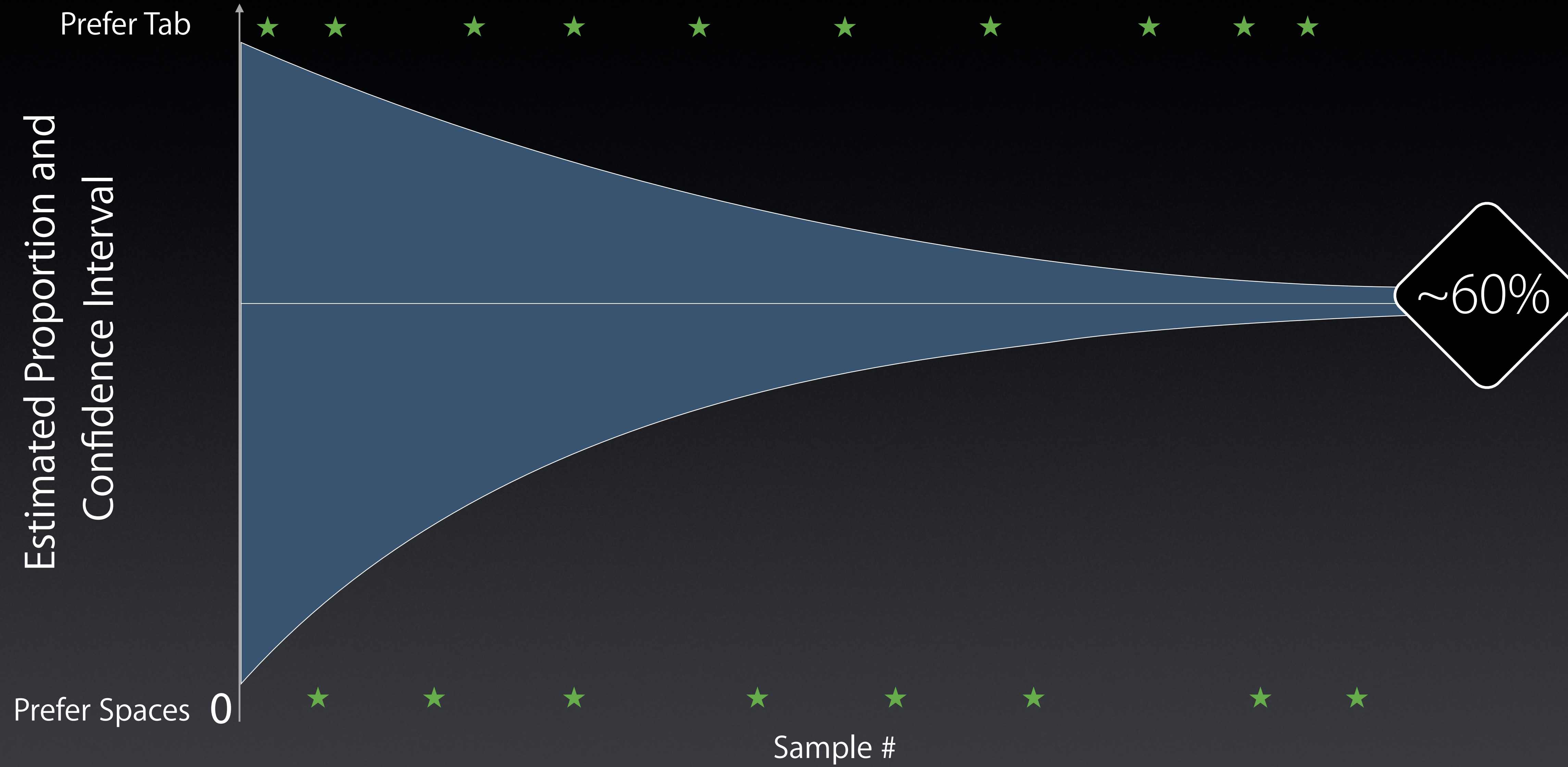
Tabs vs Spaces



Tabs vs Spaces

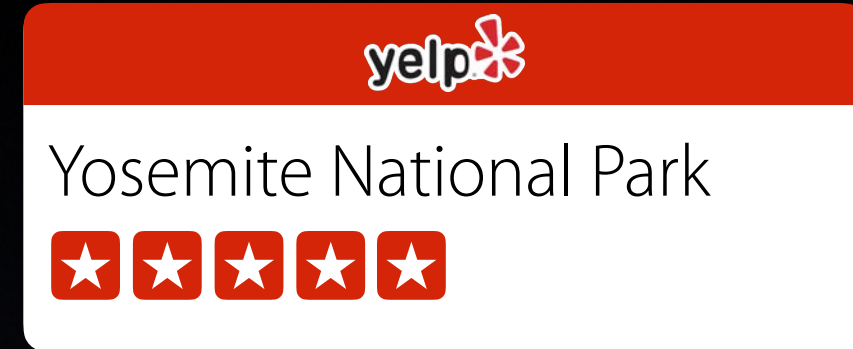


Tabs vs Spaces



Deep Link Suggestions

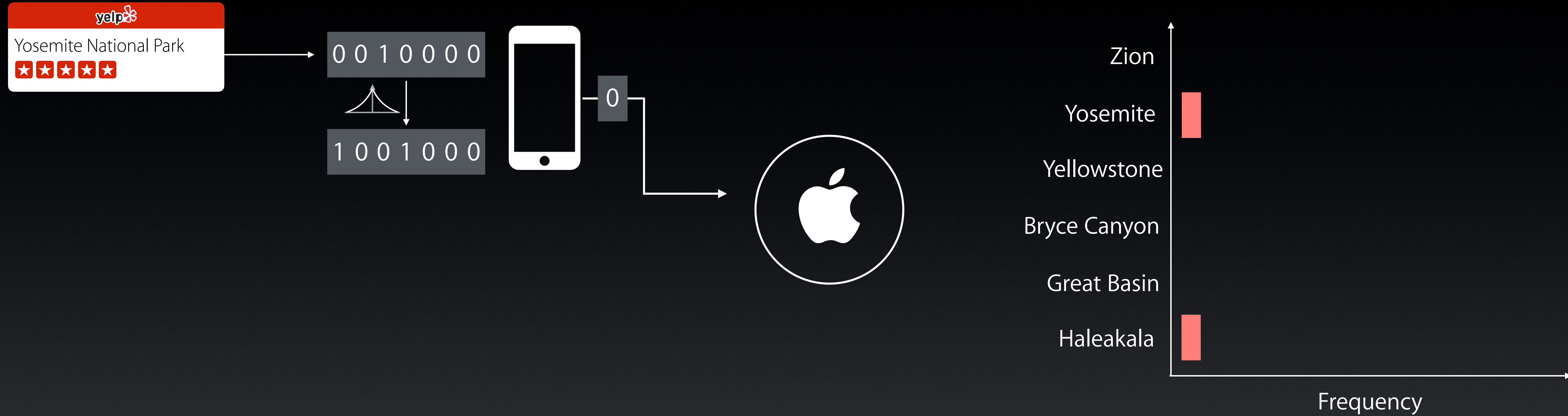
Deep Link Suggestions



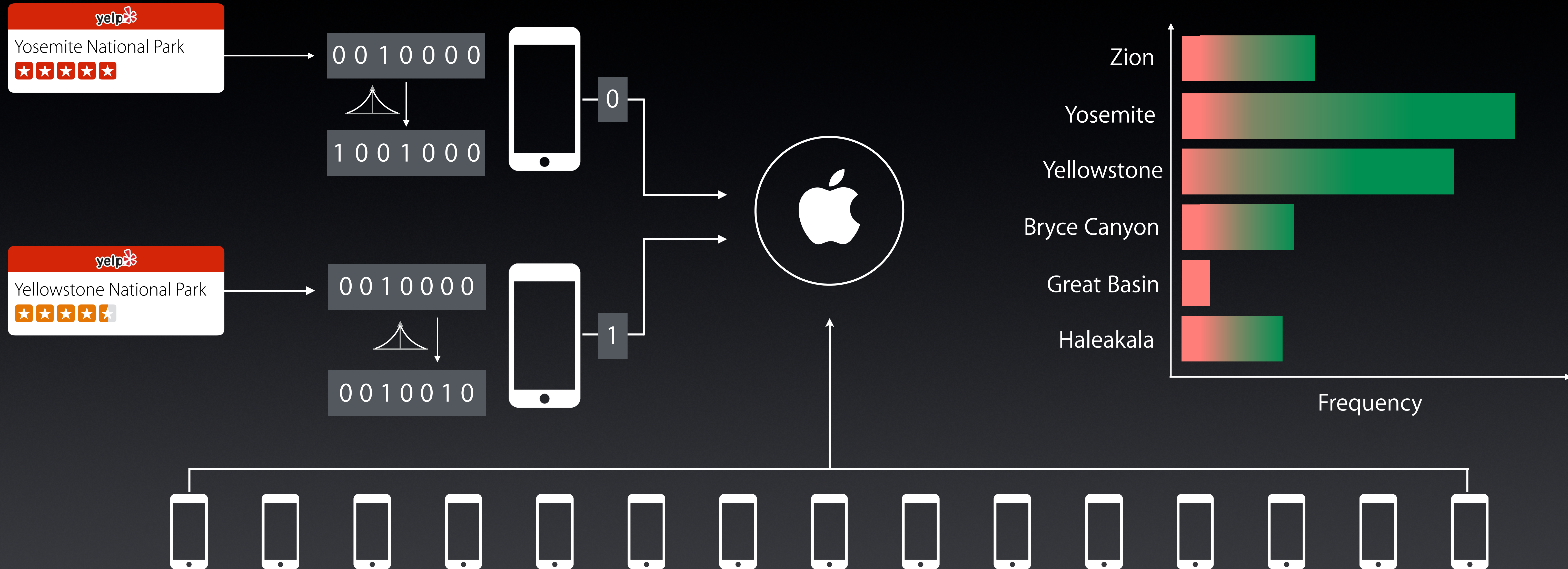
Deep Link Suggestions



Deep Link Suggestions



Deep Link Suggestions





Privacy Budget

Limit submissions per period

Anonymous pipeline

Periodically delete donations from server

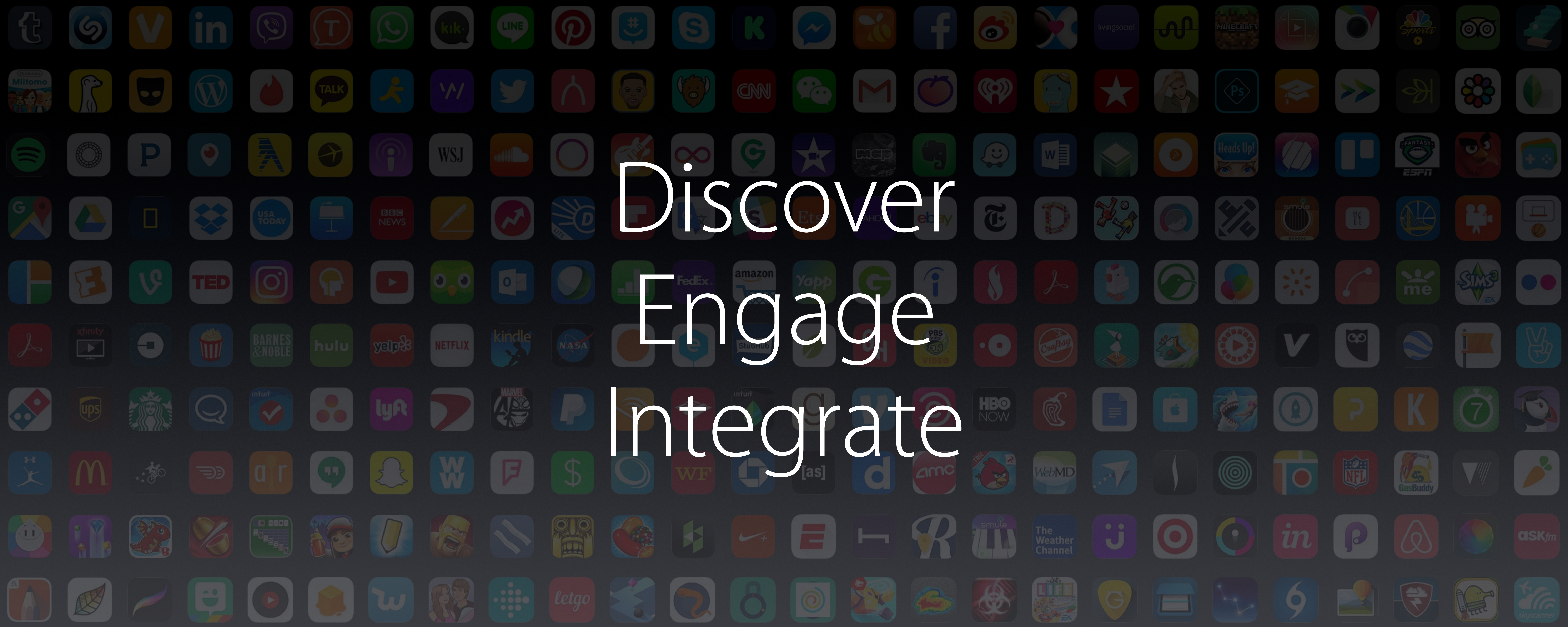




iOS



Discover
Engage
Integrate





Izakaya Rintaro
Japanese Fusion

7:00 PM 2 people

Get [Open Table](#) >



2 people

7:00 PM

Get [Open Table](#) >

iMessage

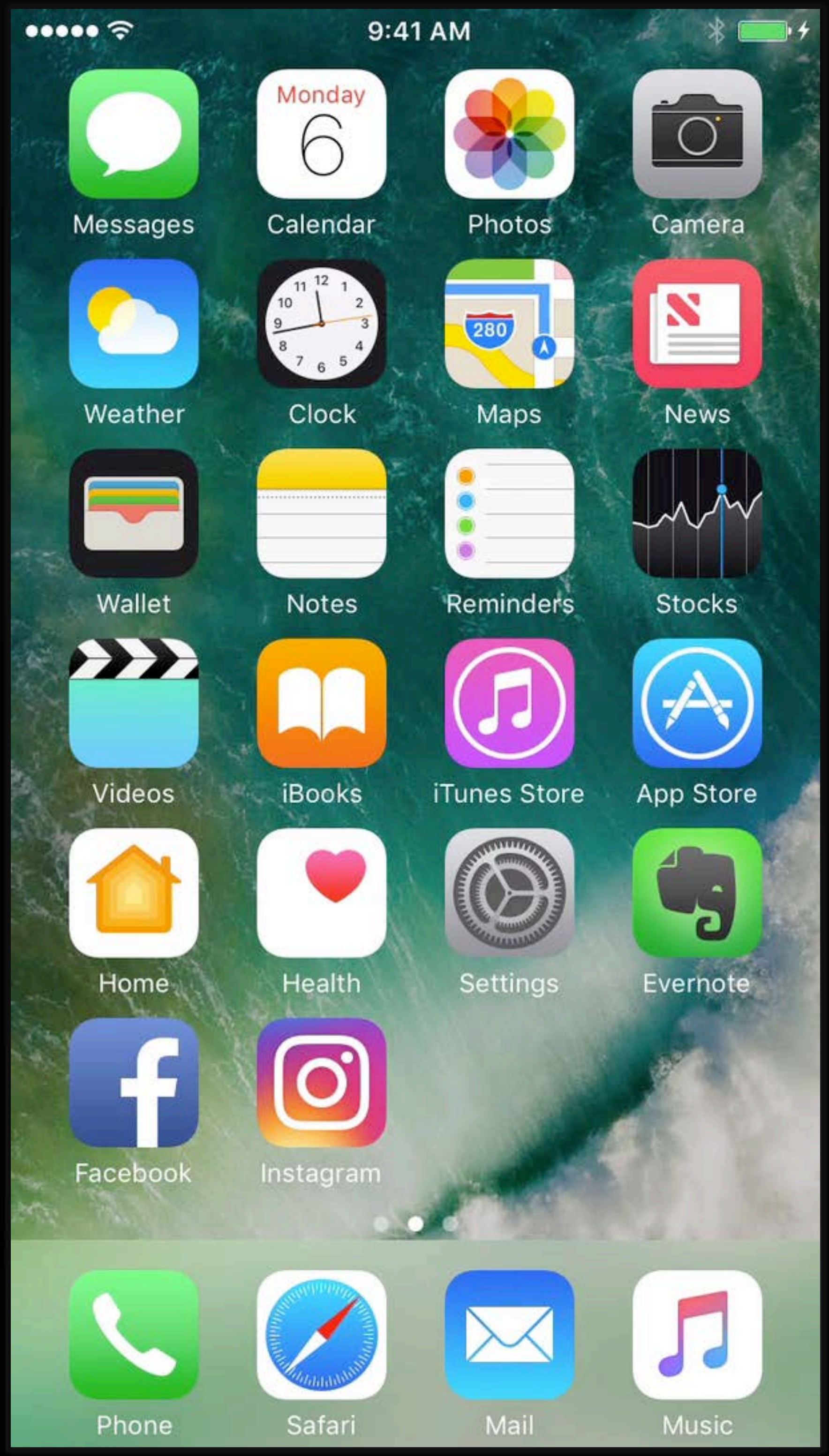
The I I'm

Q W E R T Y U I O P

A S D F G H J K L

↑ Z X C V B N M ↵

123 😊 🗣️ space return



Messages



Calendar



Photos



Camera



Weather



Clock



Maps



News



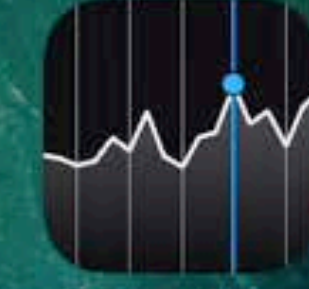
Wallet



Notes



Reminders



Stocks



Videos



iBooks



iTunes Store



App Store



Home



Health



Settings



Evernote



Facebook



Instagram



Phone



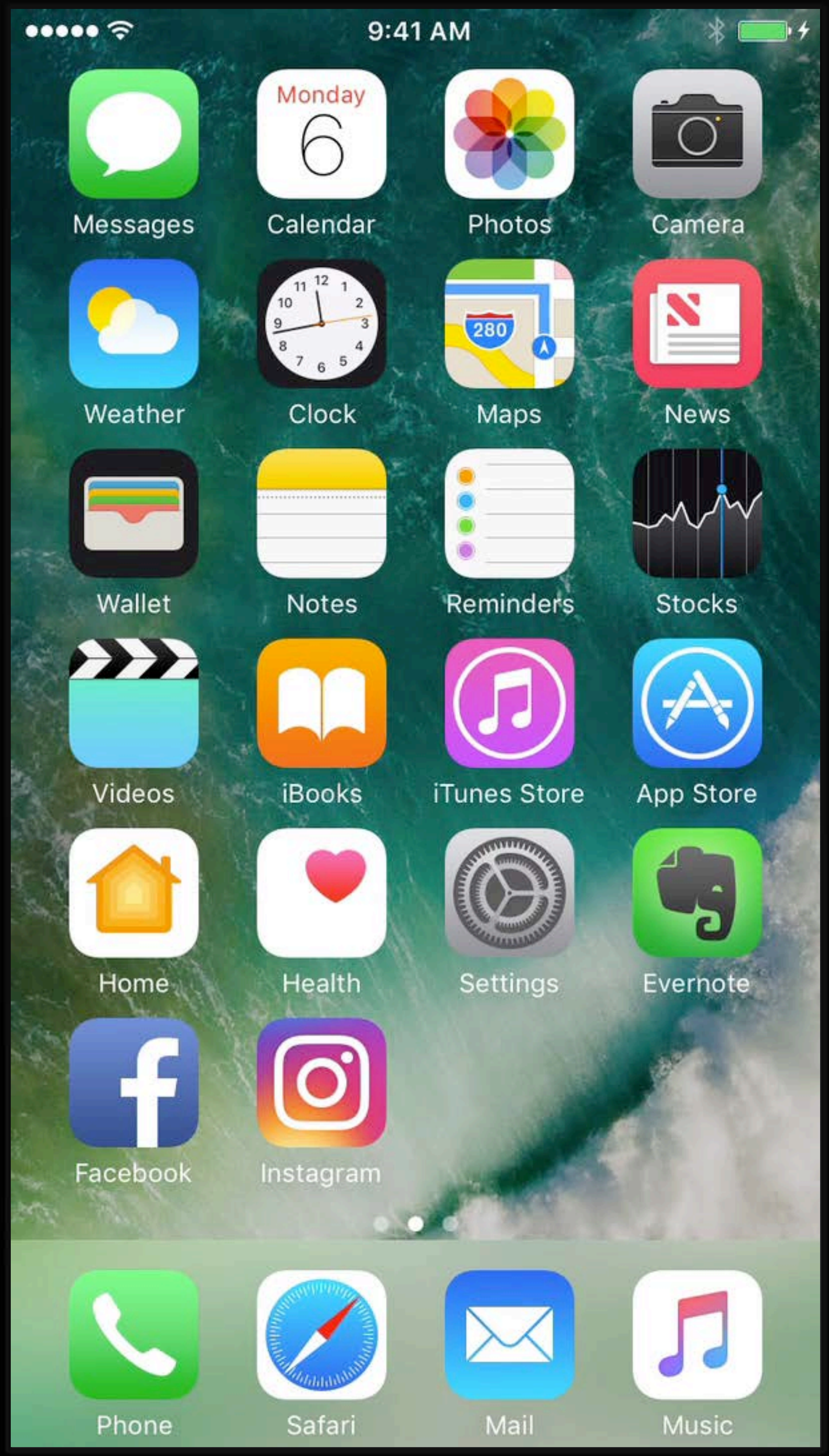
Safari



Mail



Music



Messages



Calendar



Photos



Camera



Weather



Clock



Maps



News



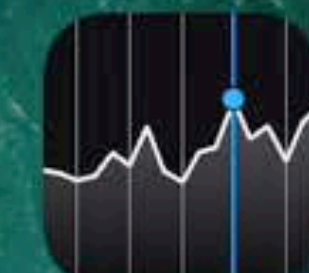
Wallet



Notes



Reminders



Stocks



Videos



iBooks



iTunes Store



App Store



Home



Health



Settings



Evernote



Facebook



Instagram



Phone



Safari

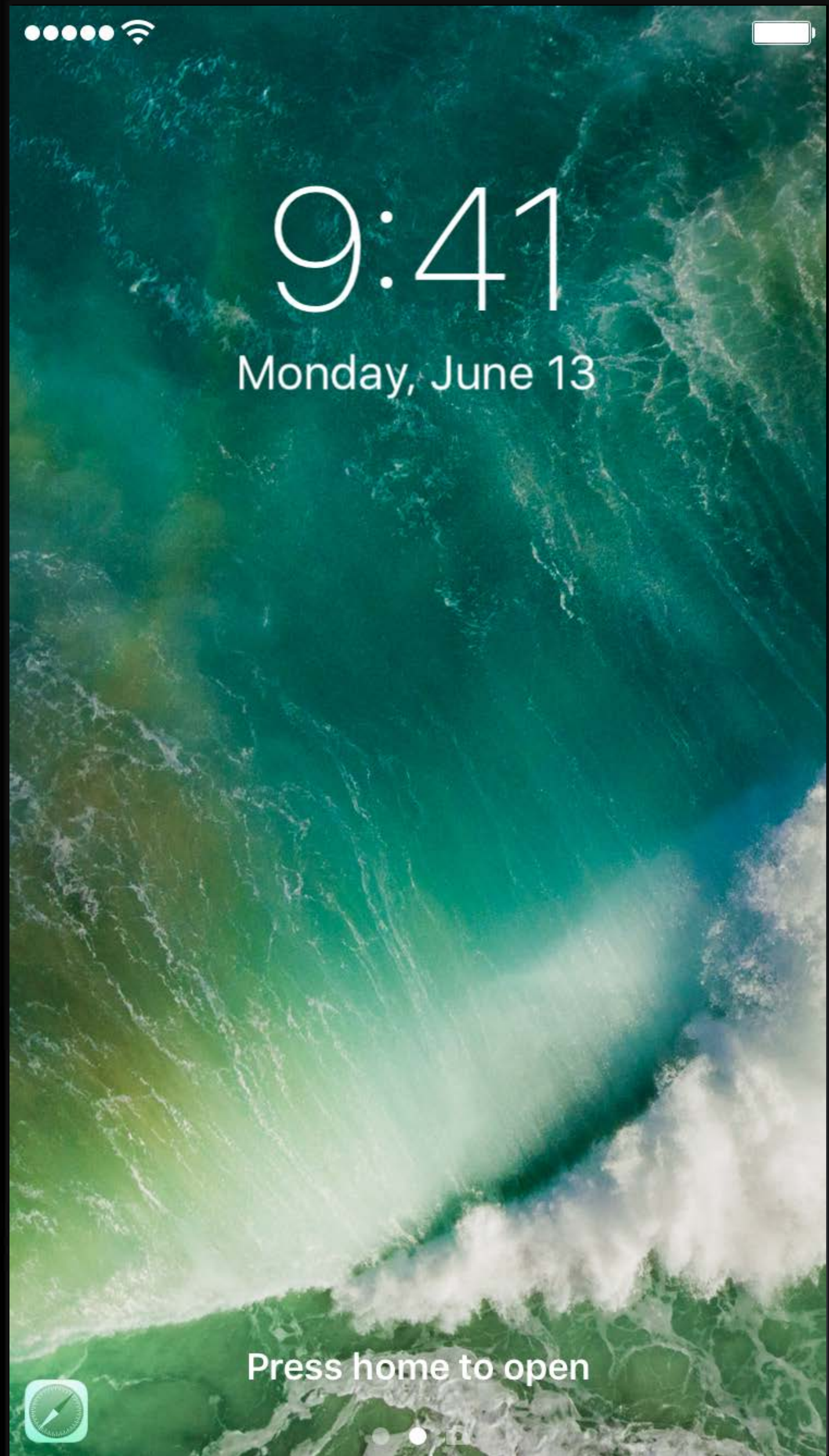


Mail

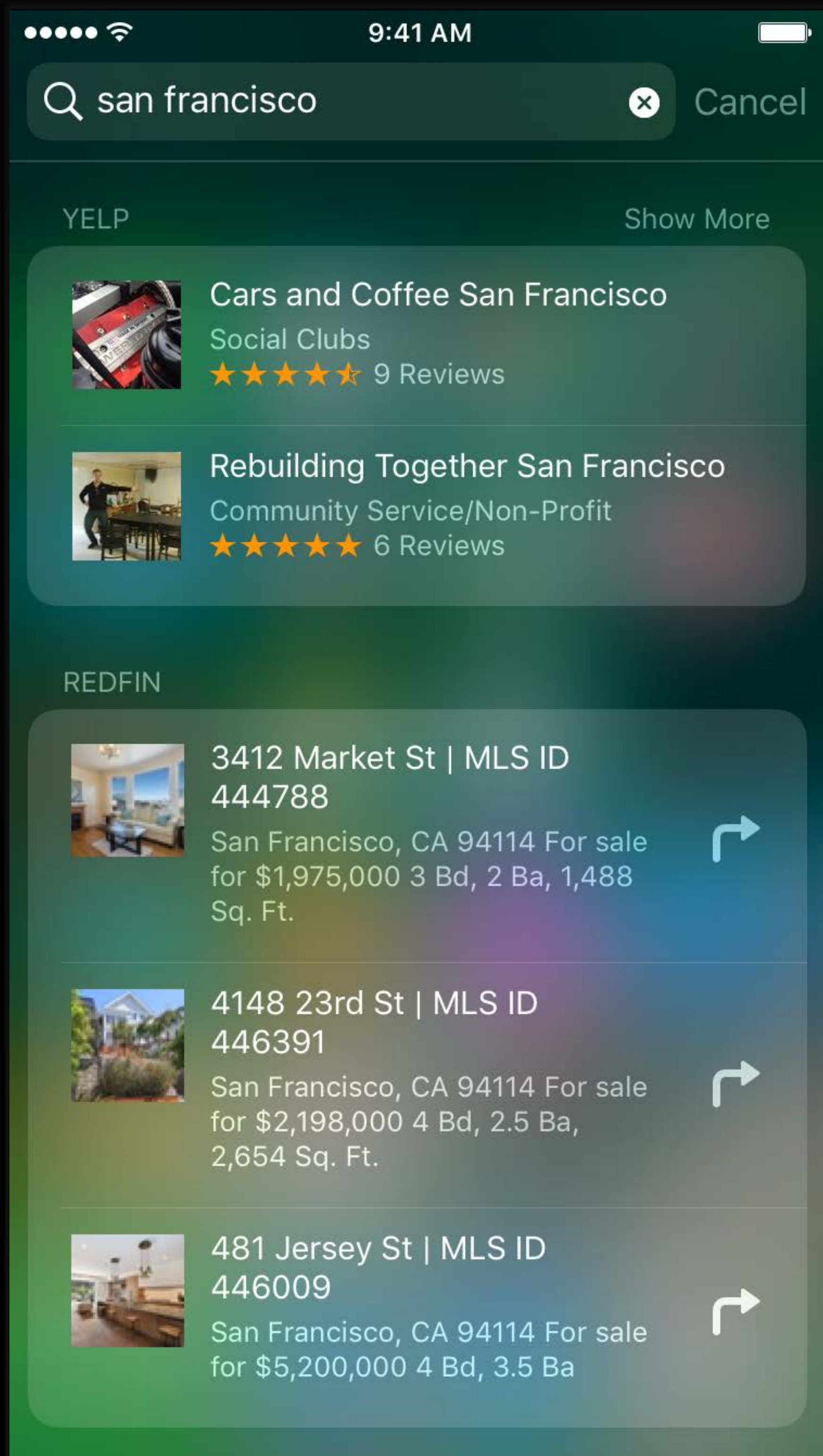


Music

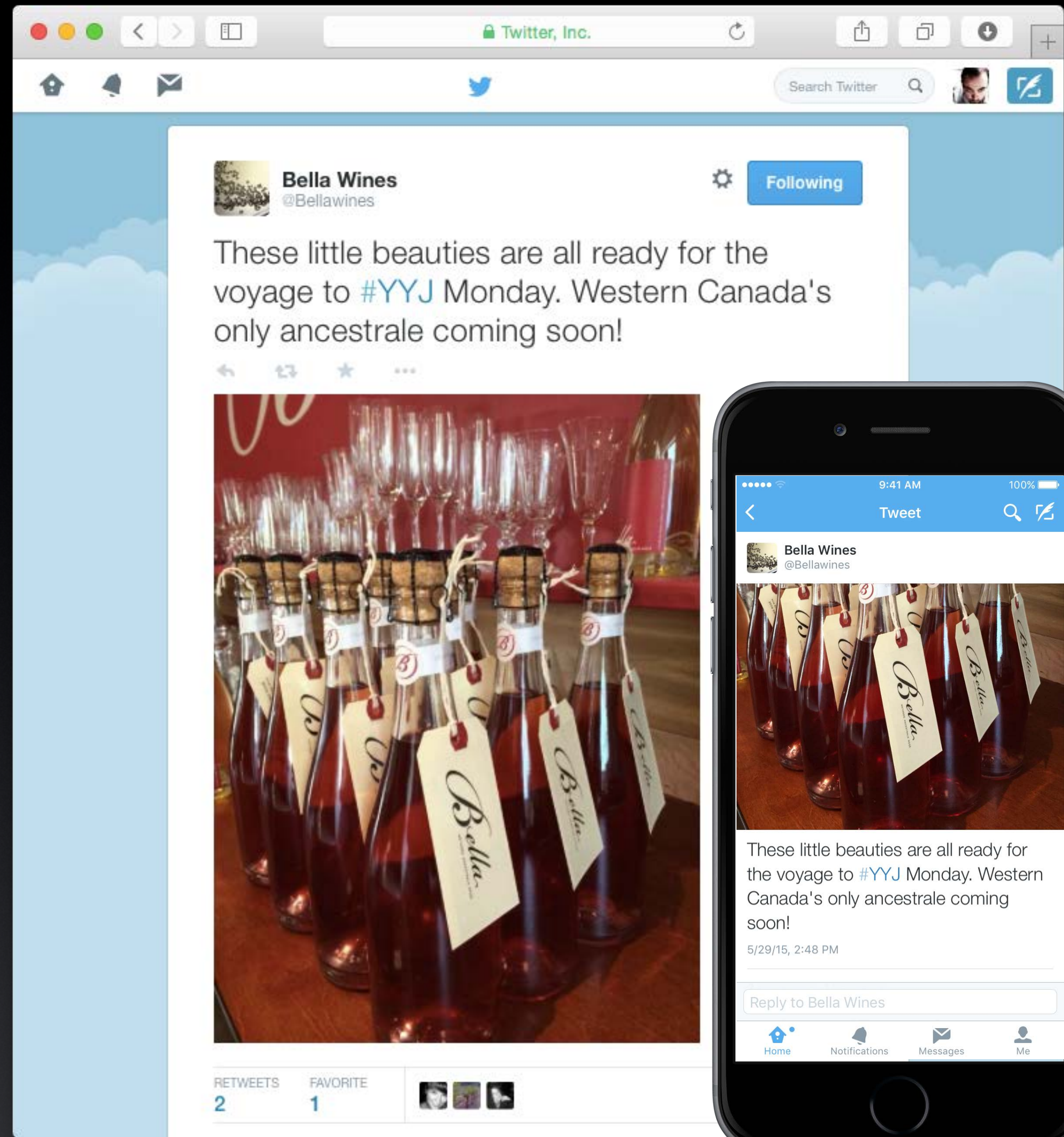
Engaging With Your App



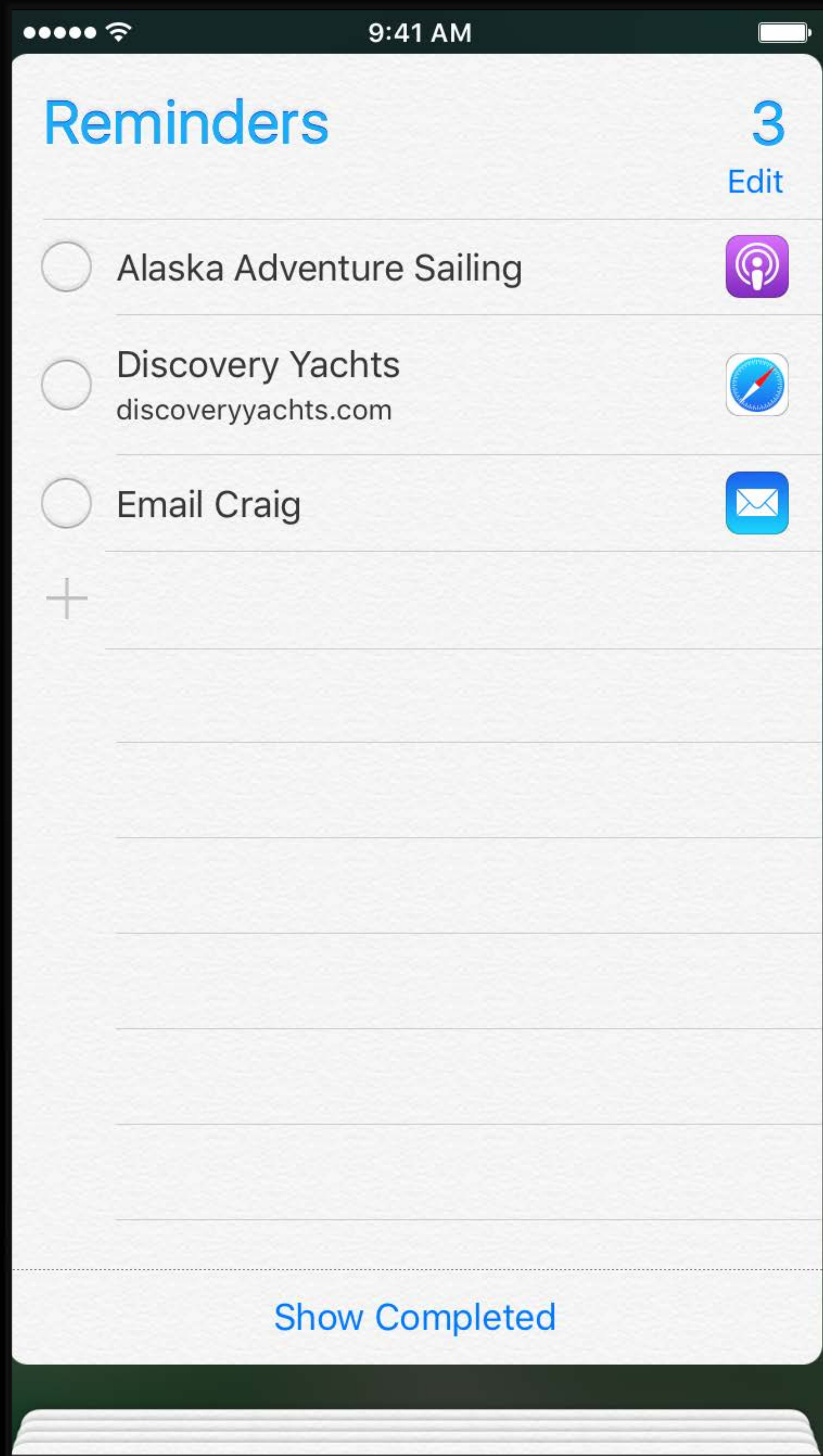
Handoff



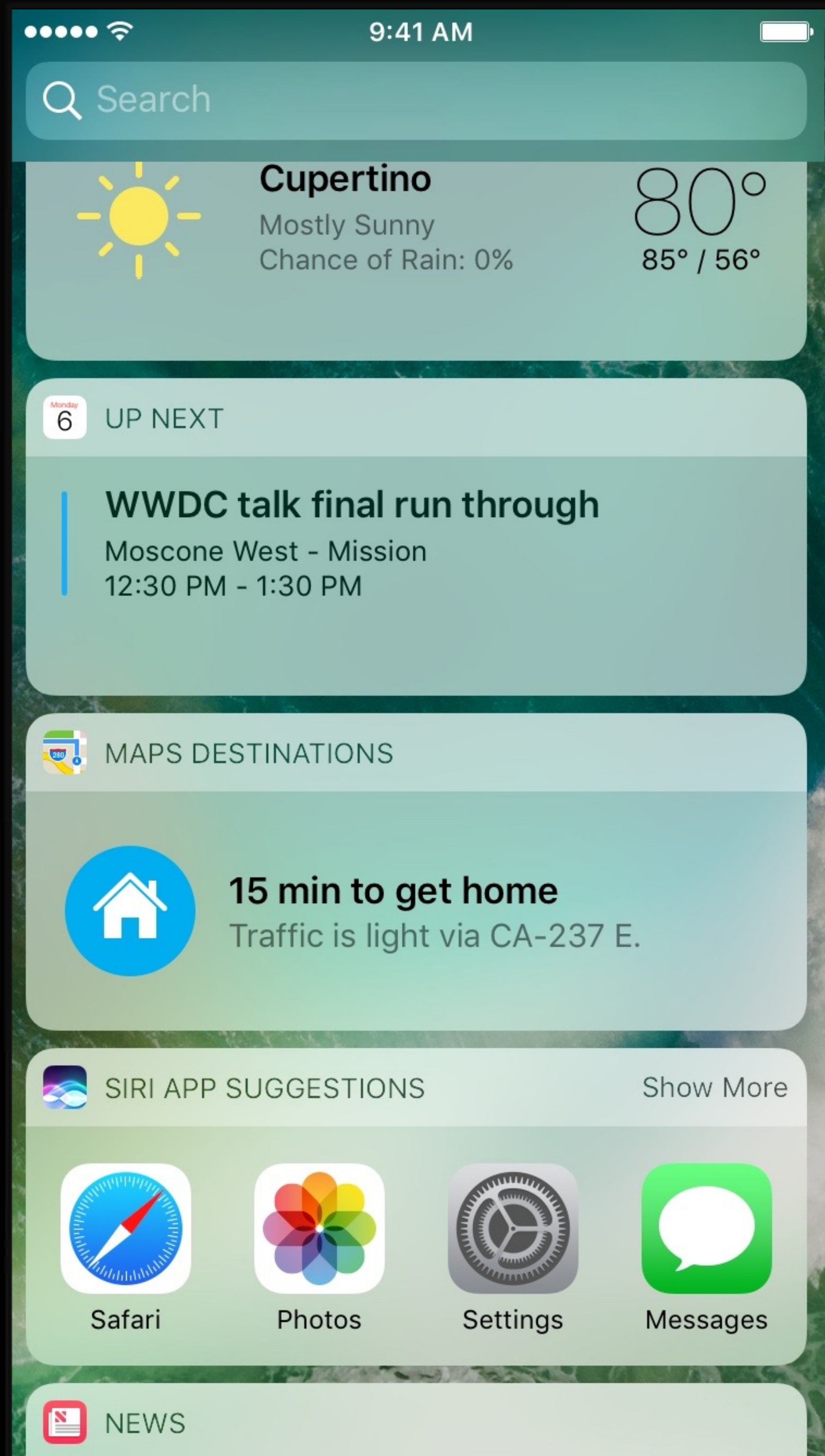
Spotlight



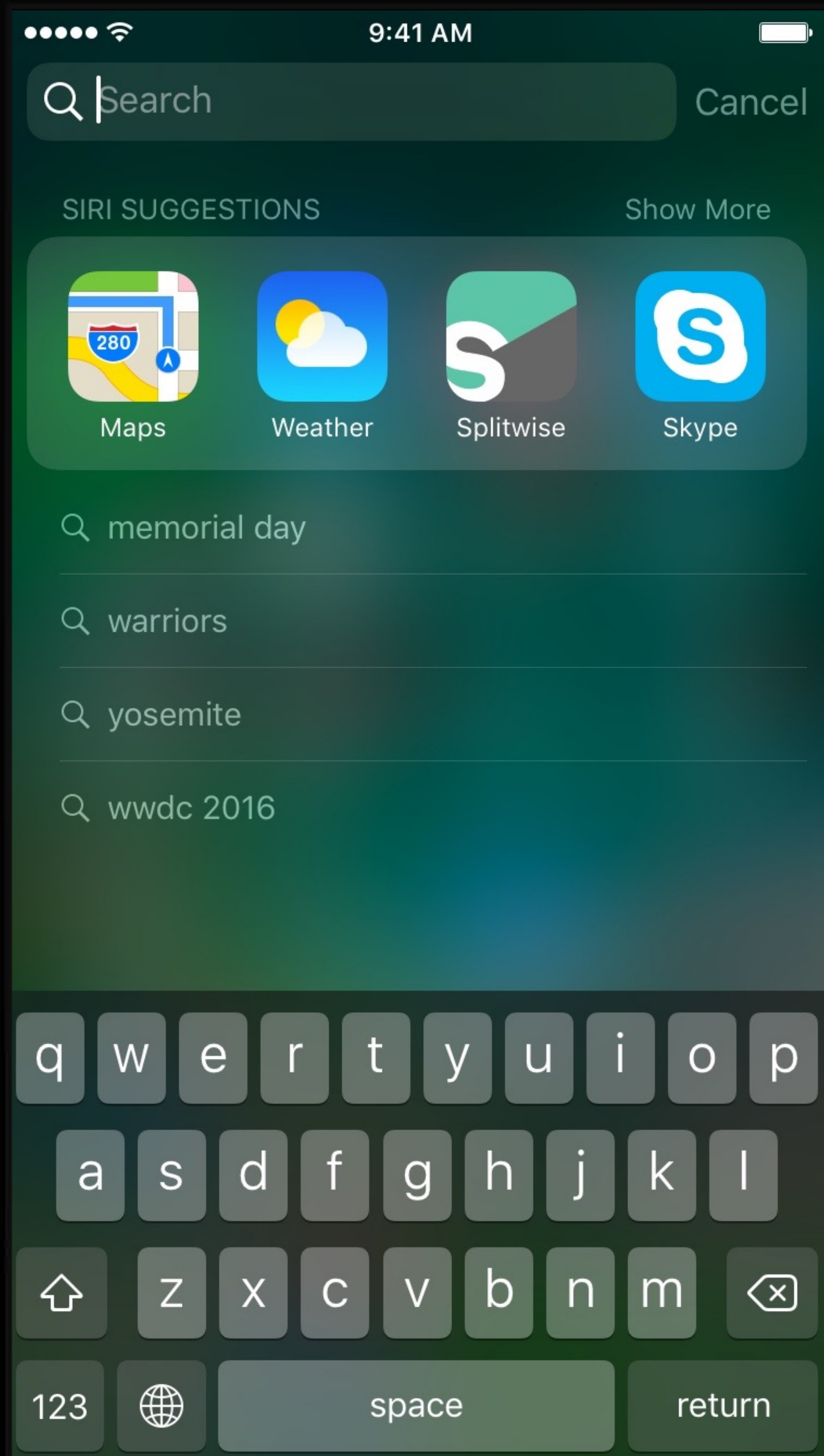
Universal Links



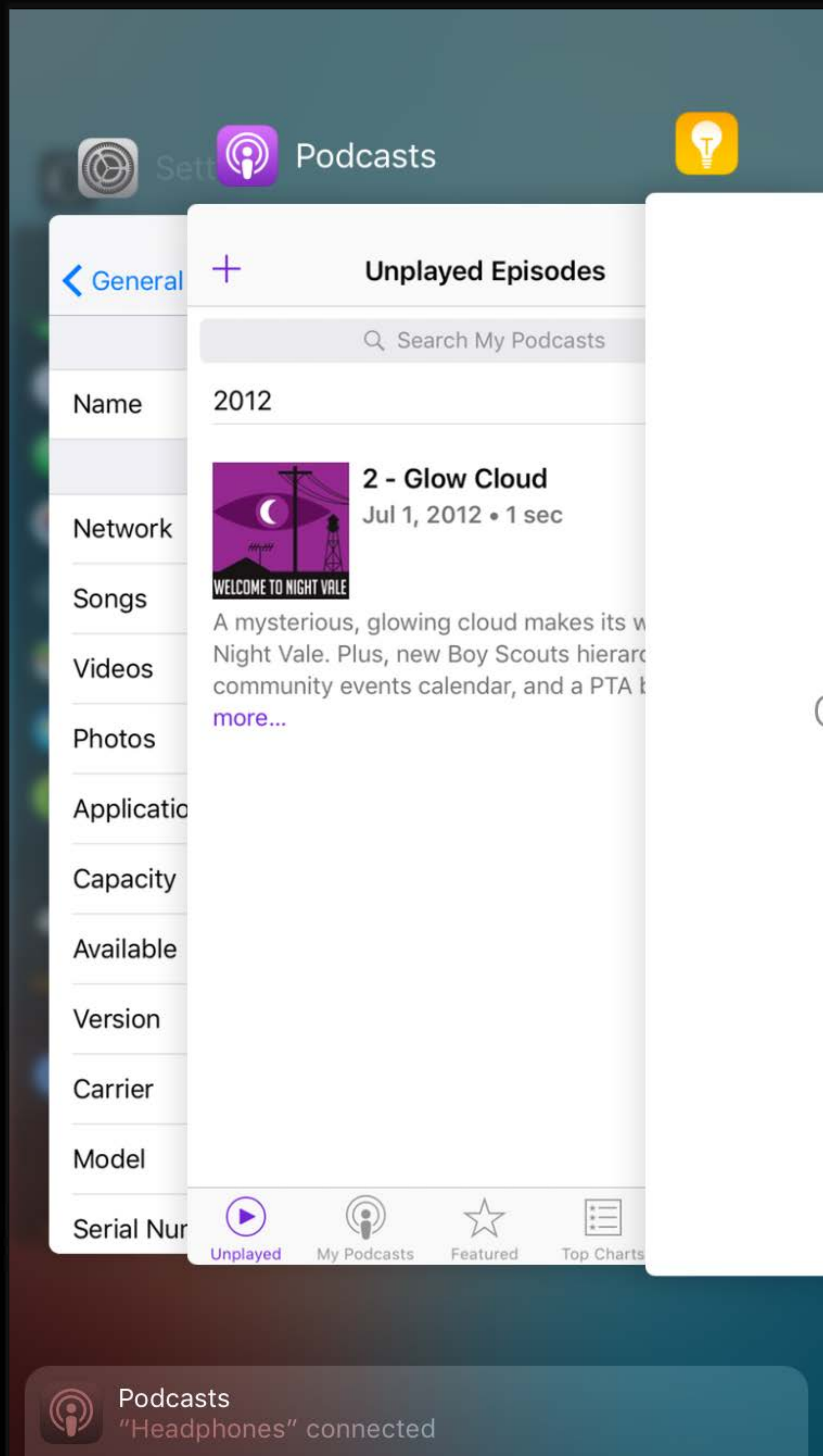
Deep Links



App Suggestions



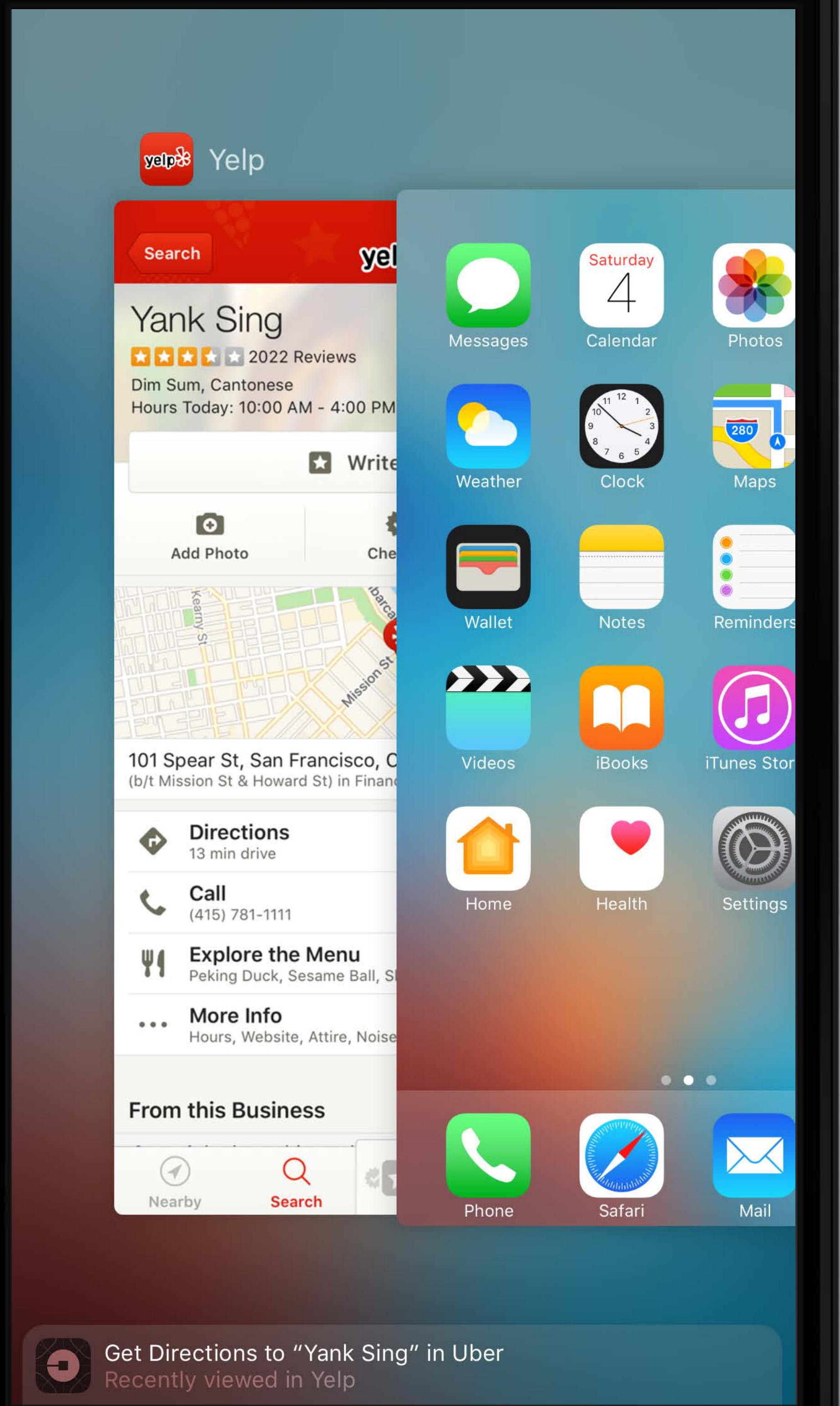
App Suggestions



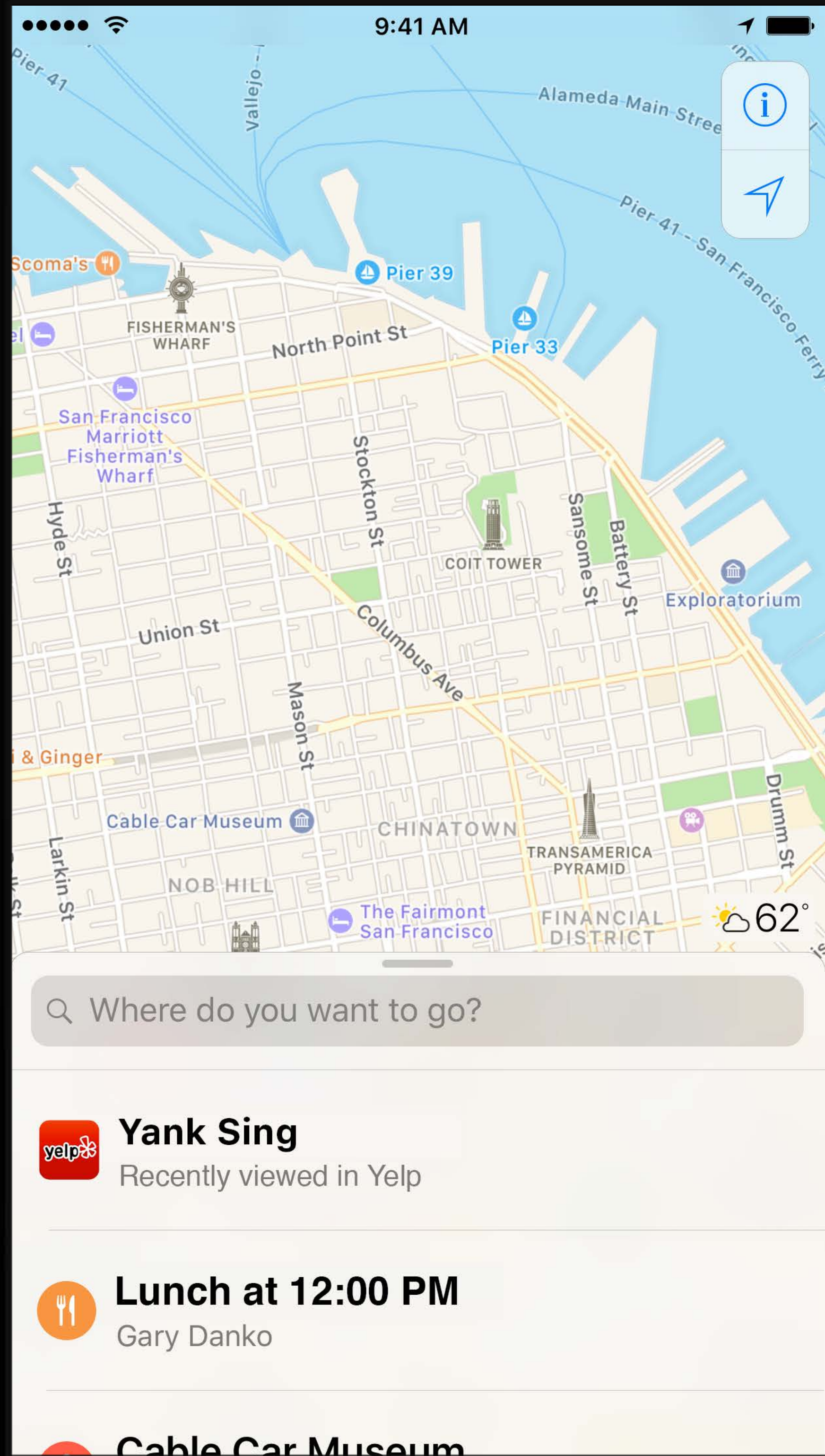
Magical Moments



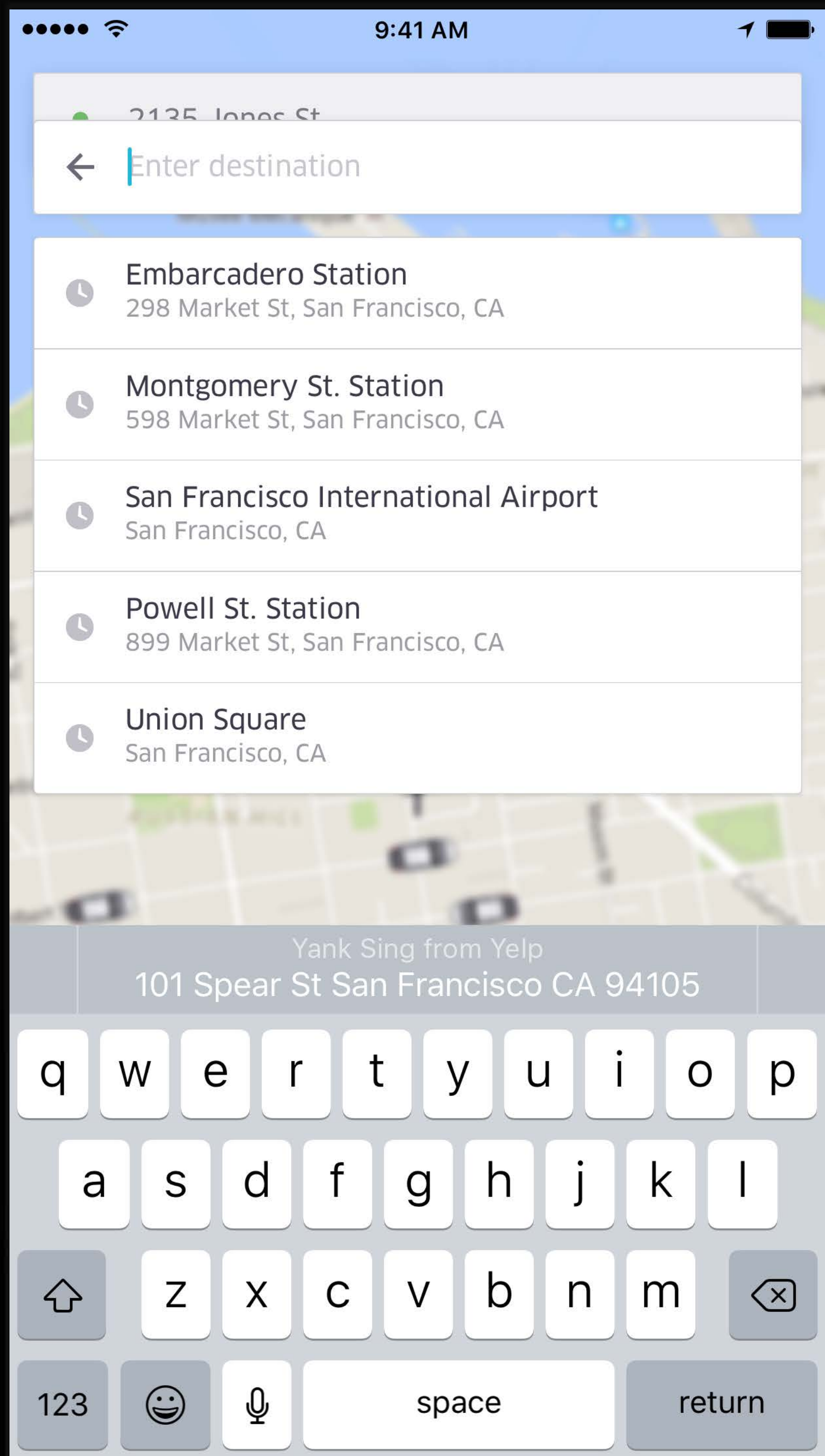
Magical Moments



App Connections



App Connections



App Connections

NSUserActivity

NSUserActivity

People and Places

Places

१९वीं मंजिल, काँकॉर्ड टावर सी
यू॰बी॰ सिटी
न॰ २४ विट्टल माल्या मार्ग
बेंगलूरु ५६०-००१

1 Infinite Loop
Cupertino, CA
95014 USA

Apple M E FZCO فرع دبي
مكتب 302، الطابق 3، مبنى رقم 4، إعمار سكوير
ص.ب.: 116977
وسط مدينة دبي، دبي
الإمارات العربية المتحدة

苹果电脑公司
北京朝阳区建国门外大街 1 号
国贸大厦 3 座 12 层
邮编: 100004

Places

Российская национальная библиотека
пл.Островского, д.1/3, см. карту

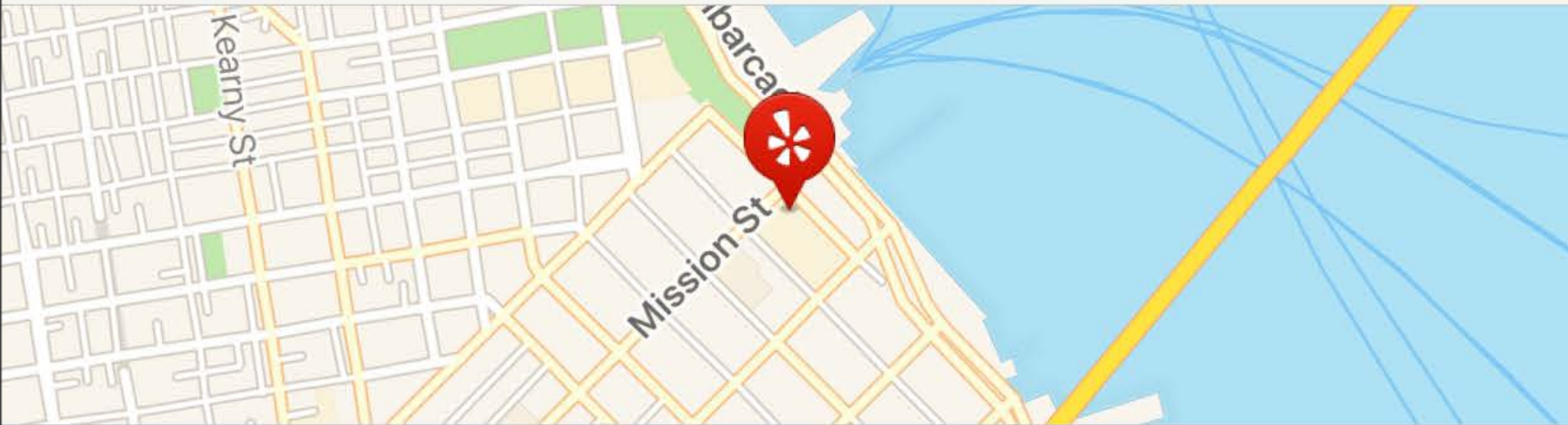
〒106-6140
東京都港区六本木6丁目10番1号
六本木ヒルズ

7, rue Crozatier
75012 PARIS
France

Yank Sing 1.3 mi
\$\$\$
★ ★ ★ ★ ☆ 2024 Reviews
Dim Sum, Cantonese
Hours Today: 11:00 AM - 3:00 PM **Open**

★ Write a Review

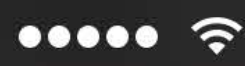
Add Photo **Check In** **Bookmark**



101 Spear St, San Francisco, CA 94105
(b/t Mission St & Howard St) in Financial District

- Directions** 11 min drive
- Call** (415) 781-1111
- Explore the Menu** Peking Duck, Sesame Ball, Shanghai Dumpling
- More Info** Hours, Website, Attire, Noise Level, Ambience

From this Business



9:41 AM



"Hey Siri take me there"

Getting directions...





Yank Sing
 ★★★★★ 2022 Reviews
 Dim Sum, Cantonese
 Hours Today: 10:00 AM - 4:00 PM

Write a Review

Add Photo

101 Spear St, San Francisco, CA
 (b/t Mission St & Howard St) in Financial District

Directions
 13 min drive

Call
 (415) 781-1111

Explore the Menu
 Peking Duck, Sesame Ball, S...

More Info
 Hours, Website, Attire, Noise...

From this Business

Nearby Search

 Messages
 Saturday 4
 Calendar
 Photos
 Weather
 Clock
 Maps
 Wallet
 Notes
 Reminders
 Videos
 iBooks
 iTunes Store
 Home
 Health
 Settings
 Phone
 Safari
 Mail

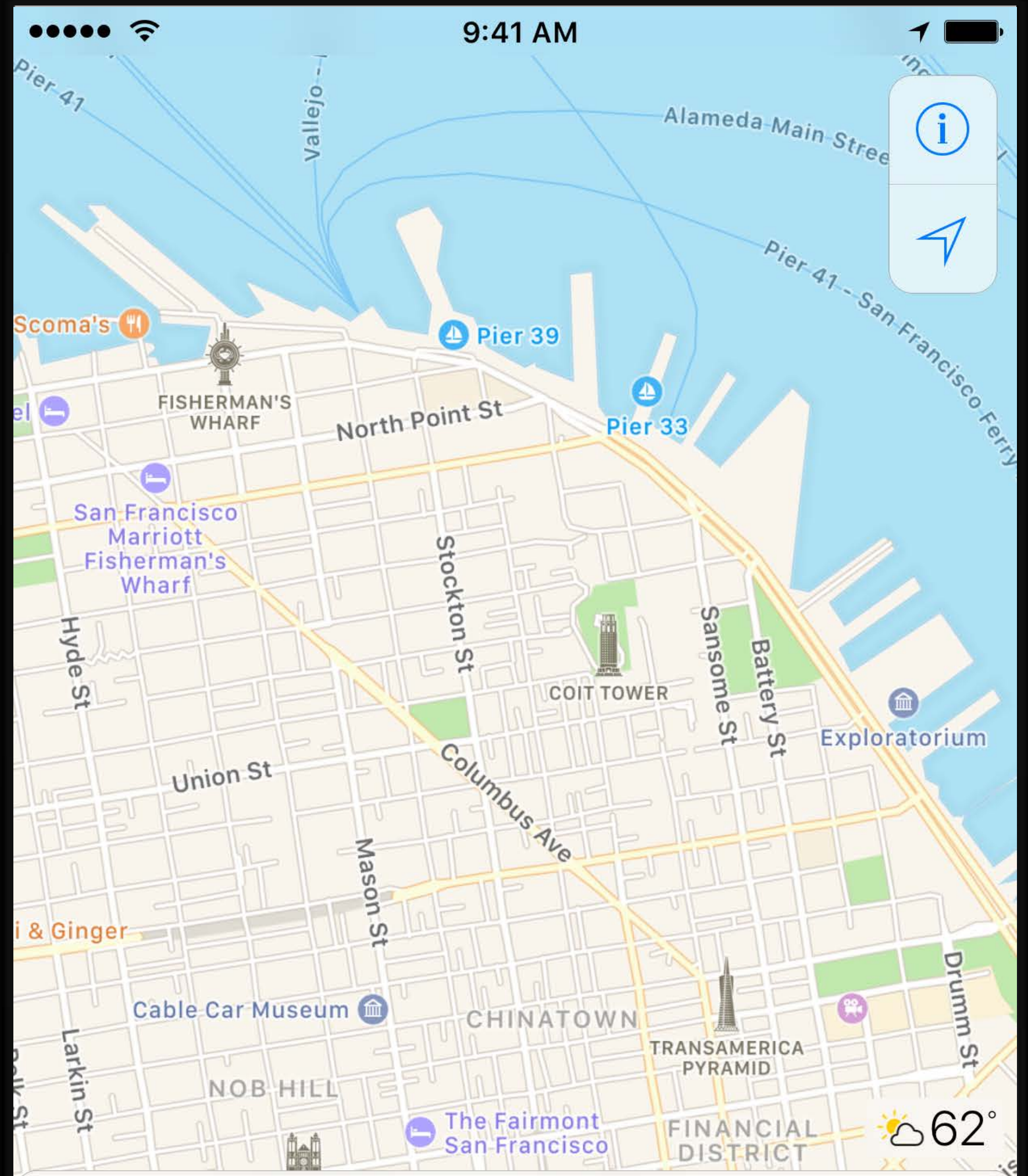
Get Directions to "Yank Sing" in Uber
 Recently viewed in Yelp

2125 Jones St
← Enter destination

- Embarcadero Station
298 Market St, San Francisco, CA
- Montgomery St. Station
598 Market St, San Francisco, CA
- San Francisco International Airport
San Francisco, CA
- Powell St. Station
899 Market St, San Francisco, CA
- Union Square
San Francisco, CA

Yank Sing from Yelp
101 Spear St San Francisco CA 94105

q w e r t y u i o p
 a s d f g h j k l
 ↵ z x c v b n m ⌫
 123 😊 🗣️ space return



Where do you want to go?



Yank Sing
Recently viewed in Yelp



Lunch at 12:00 PM
Gary Danko



Cable Car Museum



People



Person Details

Service Type

Handle



John Appleseed



message



call



video



mail

iPhone ★

(408) 555-0621

work

j.appleseed@icloud.com

social profile (found in WhatsApp)

j.appleseed



Notes

Send Message

Share Contact

Add to Favorites



Favorites



Recents



Contacts



Keypad



Voicemail



John Appleseed



message



call



video



mail

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social profile (found in WhatsApp)

j.appleseed



Notes

Send Message

Share Contact

Add to Favorites



John Appleseed



message



call



video



mail

iPhone ★

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social profile (found in WhatsApp)

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Notes

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Share Contact

Add to Favorites



Favorites



Recents



Contacts



Keypad



Voicemail



John Appleseed



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call



video



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j.appleseed@icloud.com



Message work

work

j.appleseed@icloud.com

iPhone

(408) 555-0621

WhatsApp

j.appleseed

Add to Favorites

Cancel



John Appleseed



WhatsApp



call



video



mail

iPhone ★

(408) 555-0621

work

j.appleseed@icloud.com

WhatsApp

j.appleseed

Notes

Send Message

Share Contact

Add to Favorites



Favorites



Recents



Contacts



Keypad



Voicemail



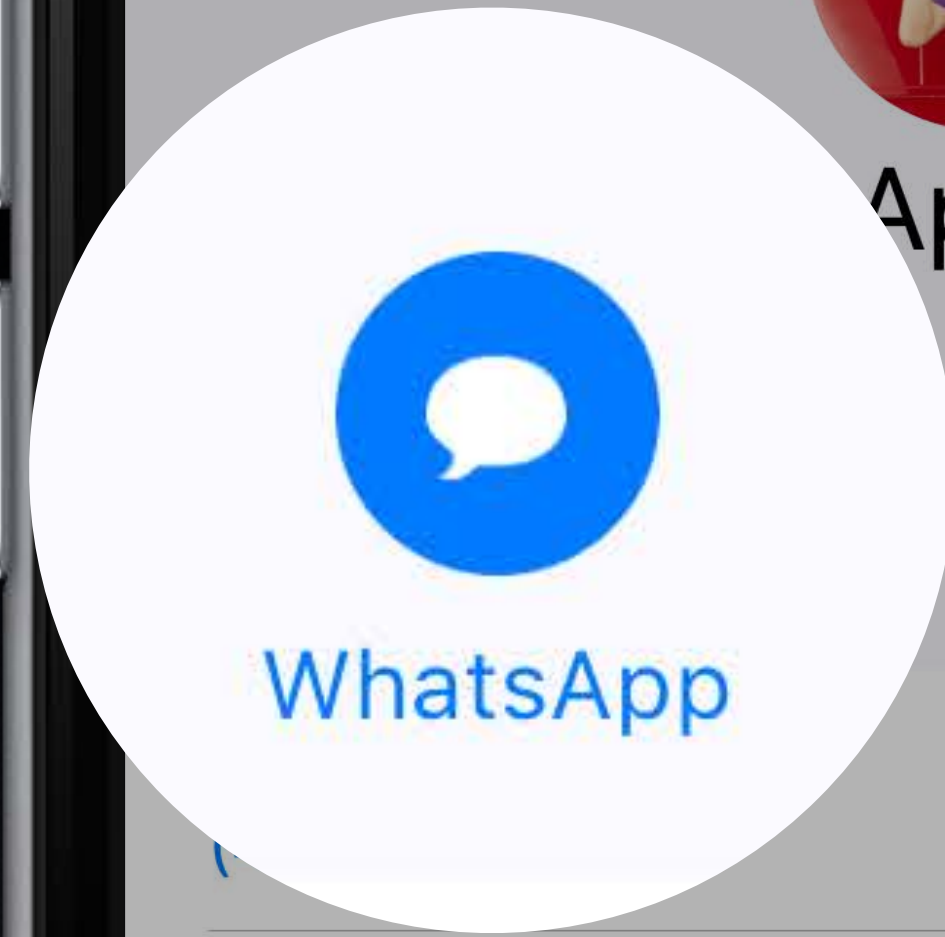
Appleseed



video



mail



work

j.appleseed@icloud.com

WhatsApp

[j.appleseed](https://wa.me/j.appleseed)

Notes

Send Message

Share Contact

Add to Favorites



Favorites



Recents



Contacts



Keypad



Voicemail

Integrating with iOS



Sharing

CallKit

iMessage Apps

Spotlight

Keyboards

Photo Editing

Widgets

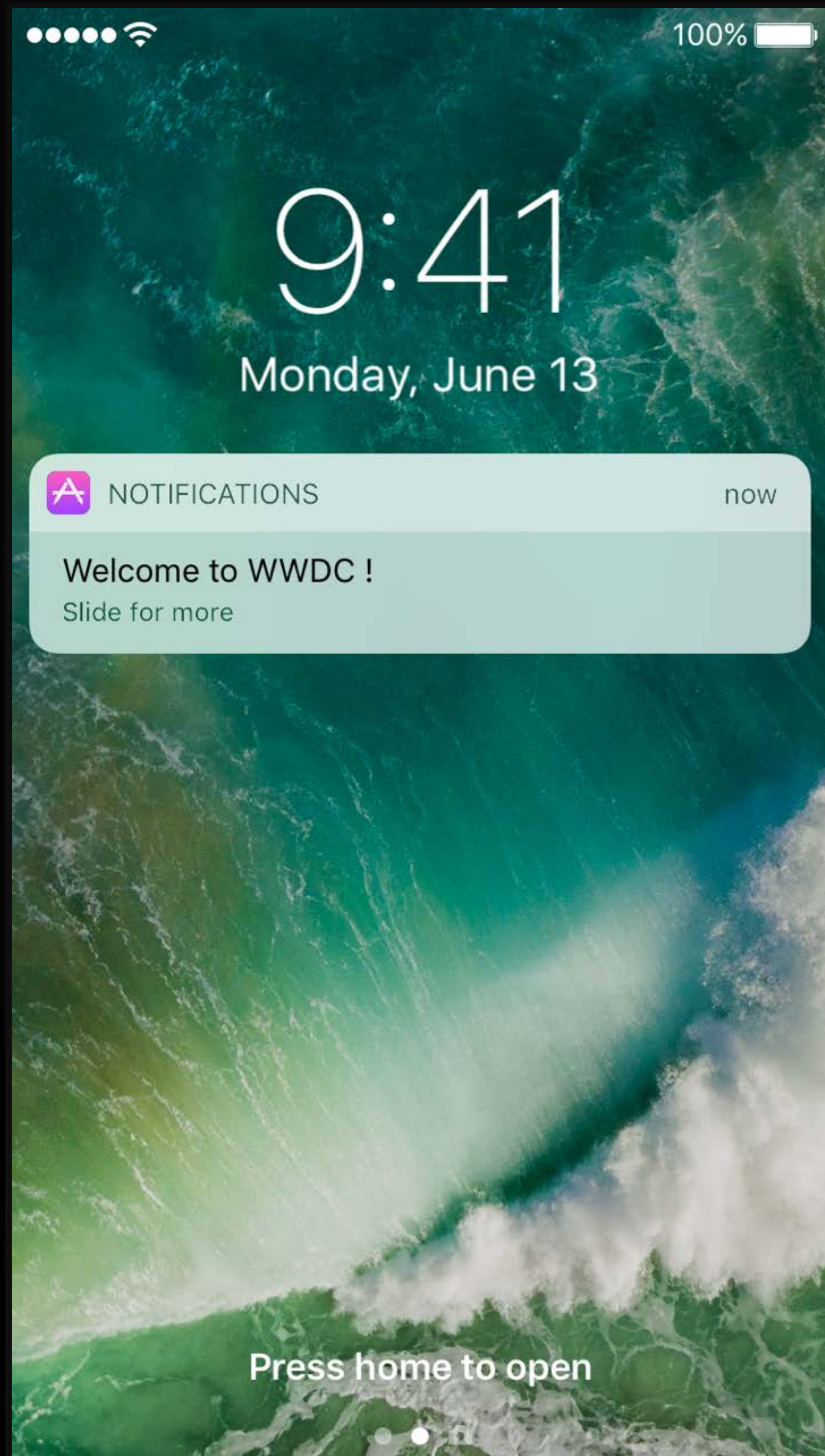
Siri

Maps Ride Sharing

Notifications

Document Providers

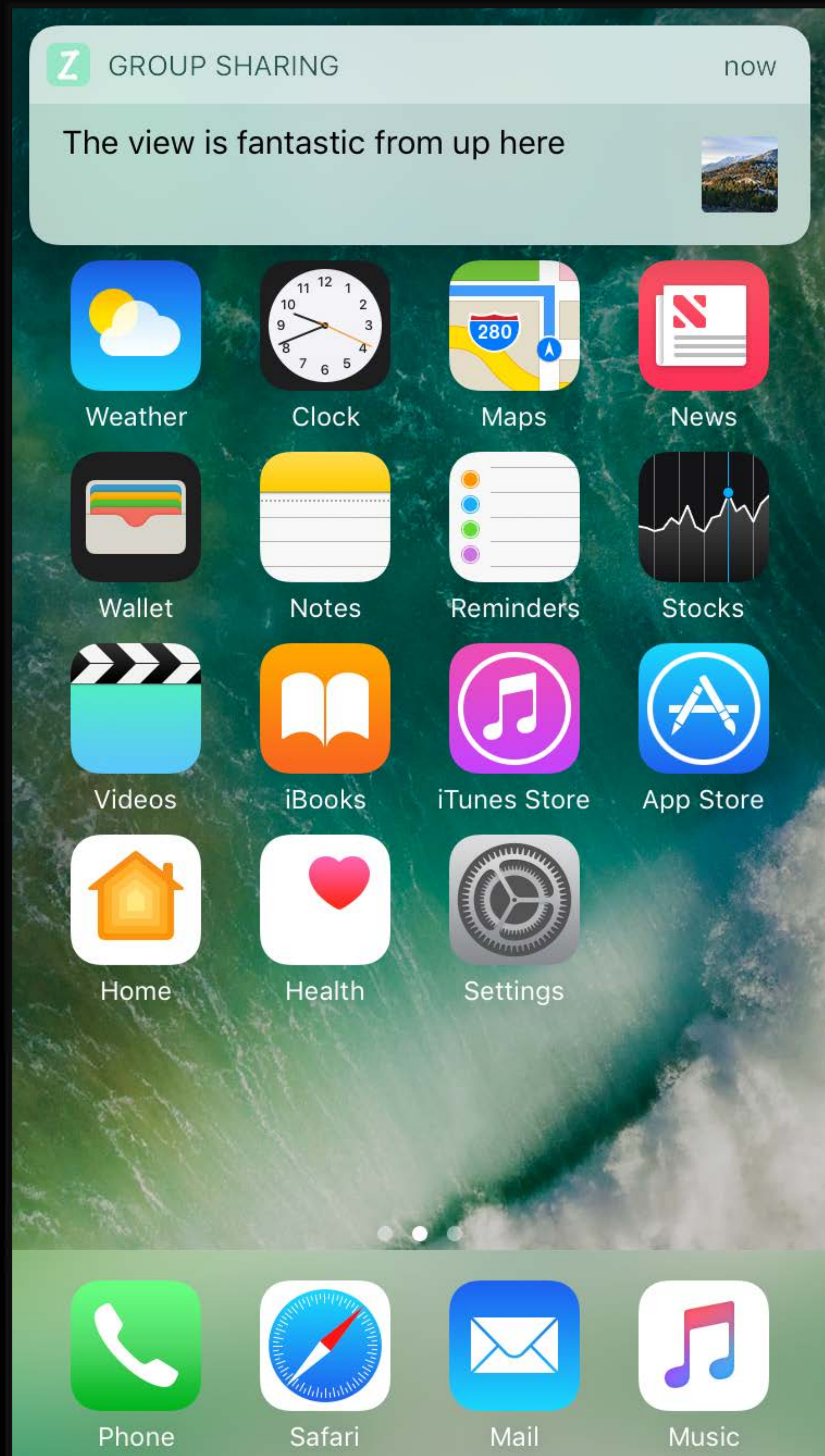




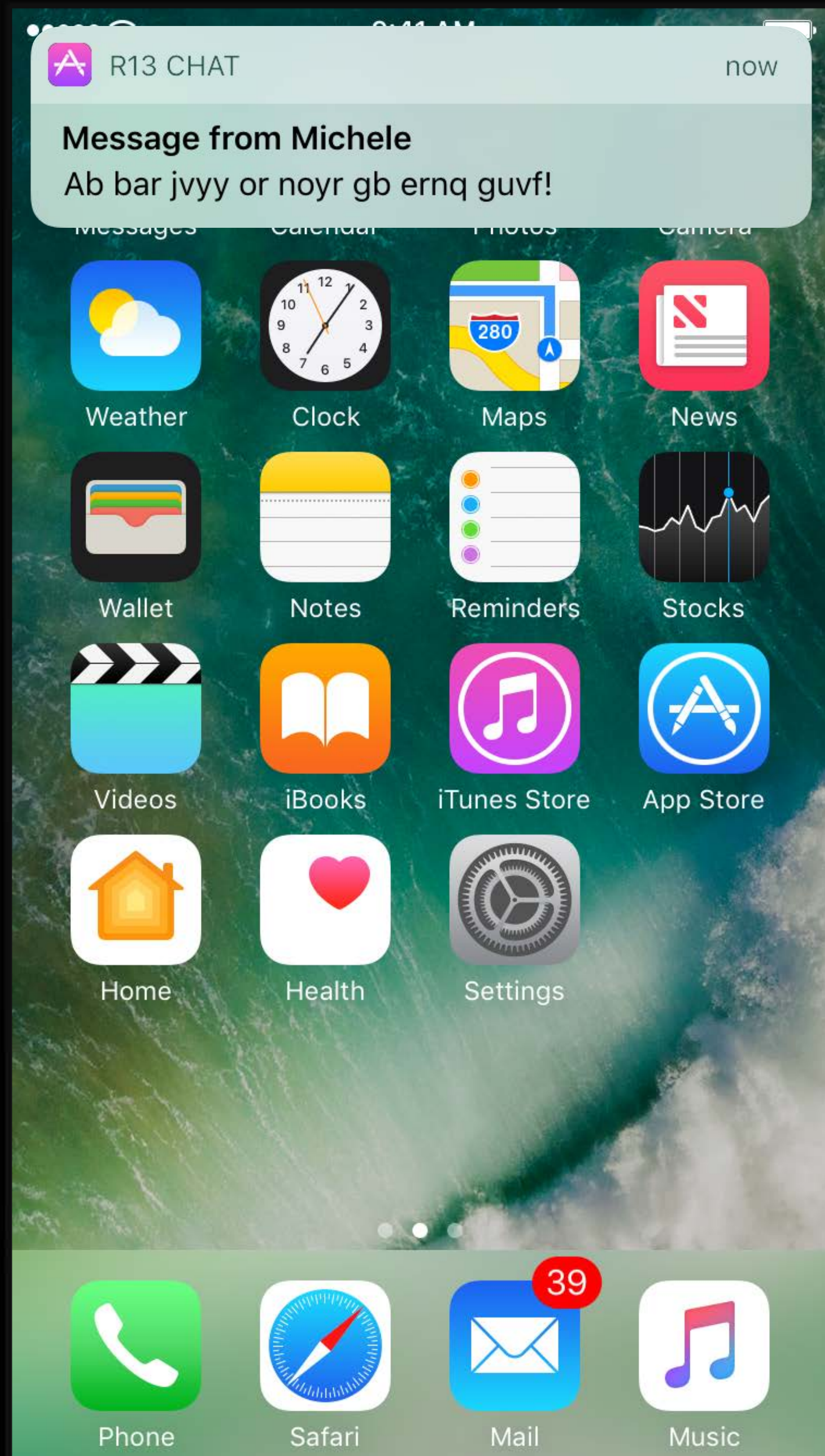
Notifications

Service Extensions

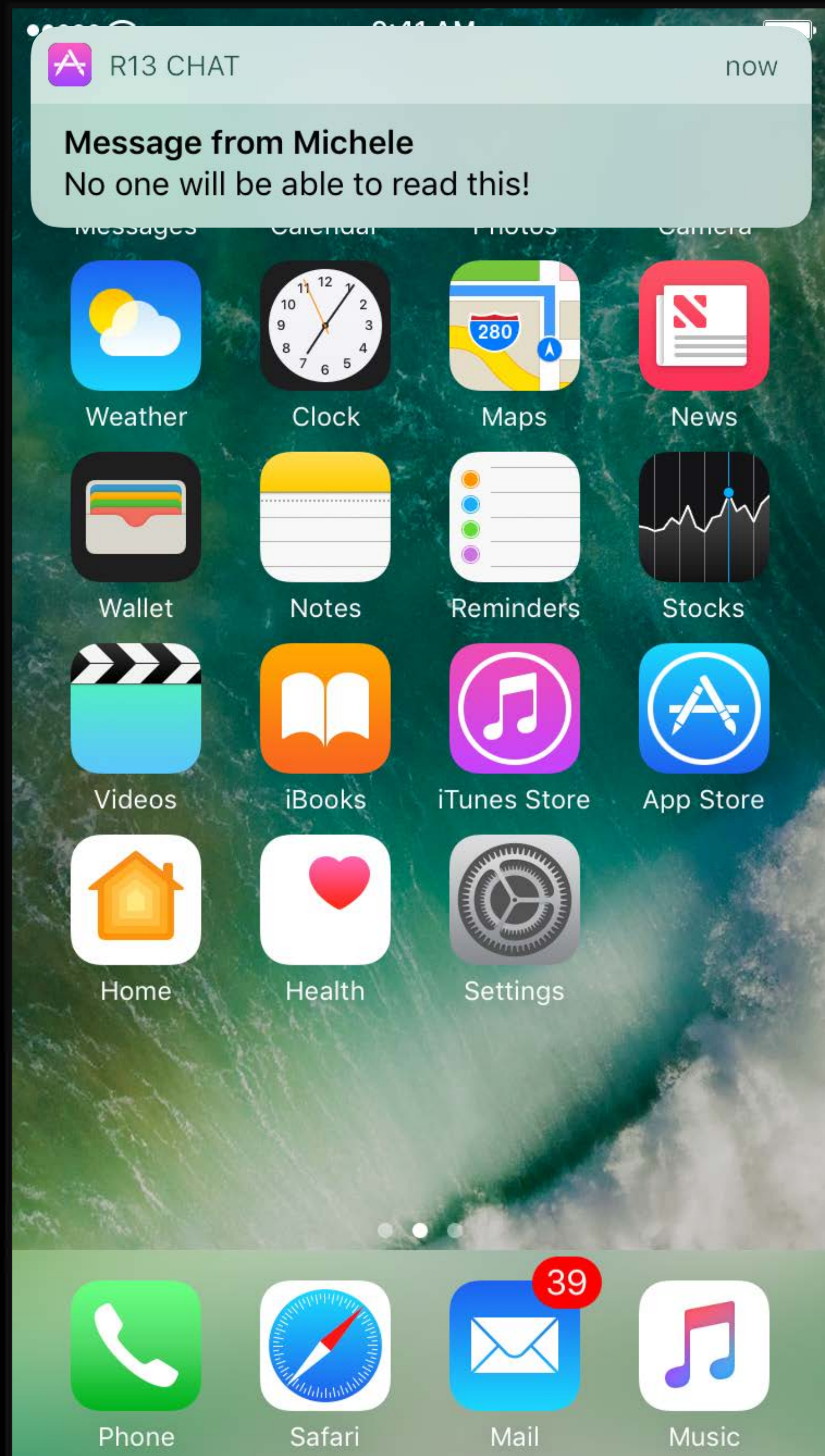




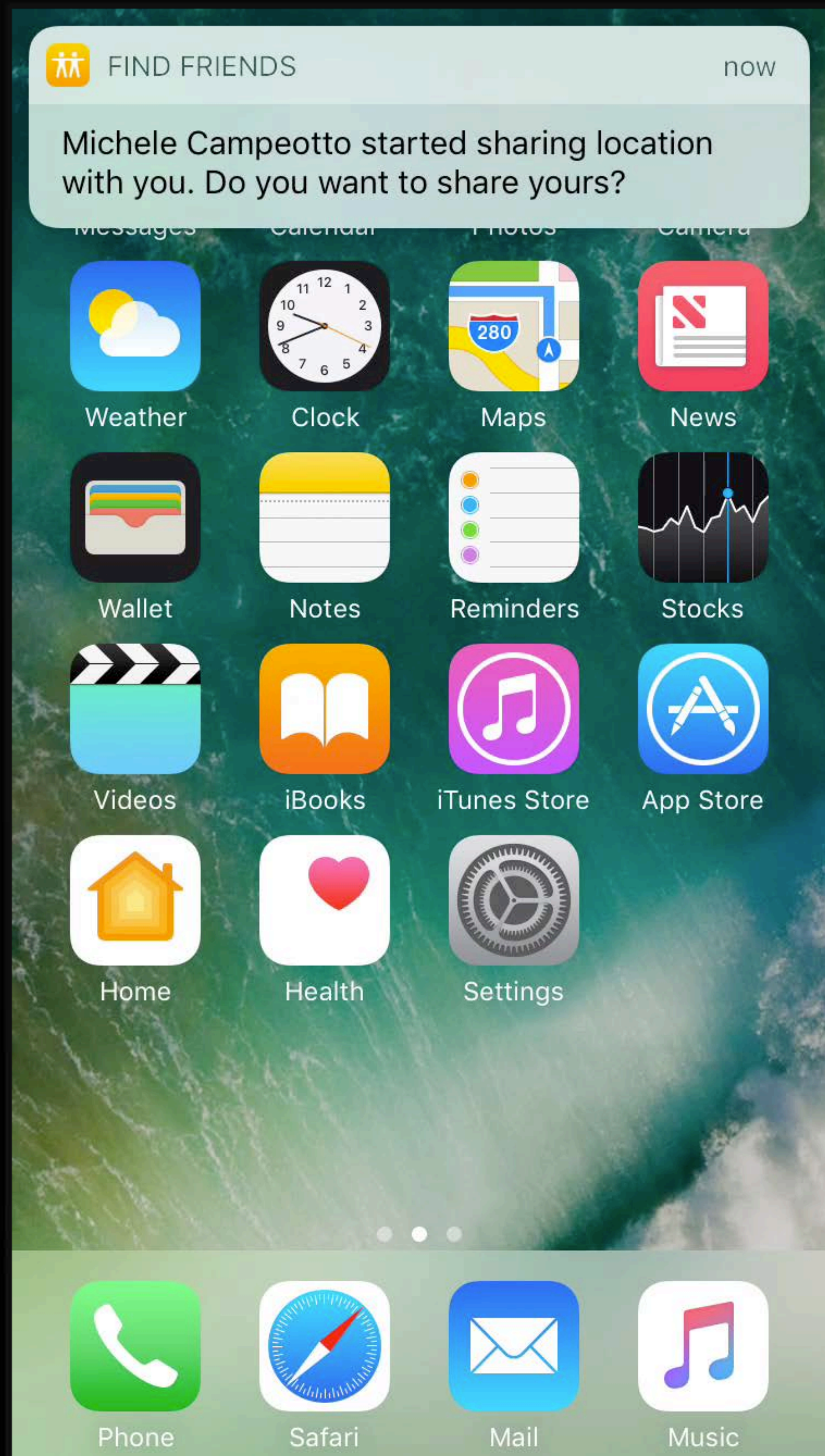
Embedded Attachments



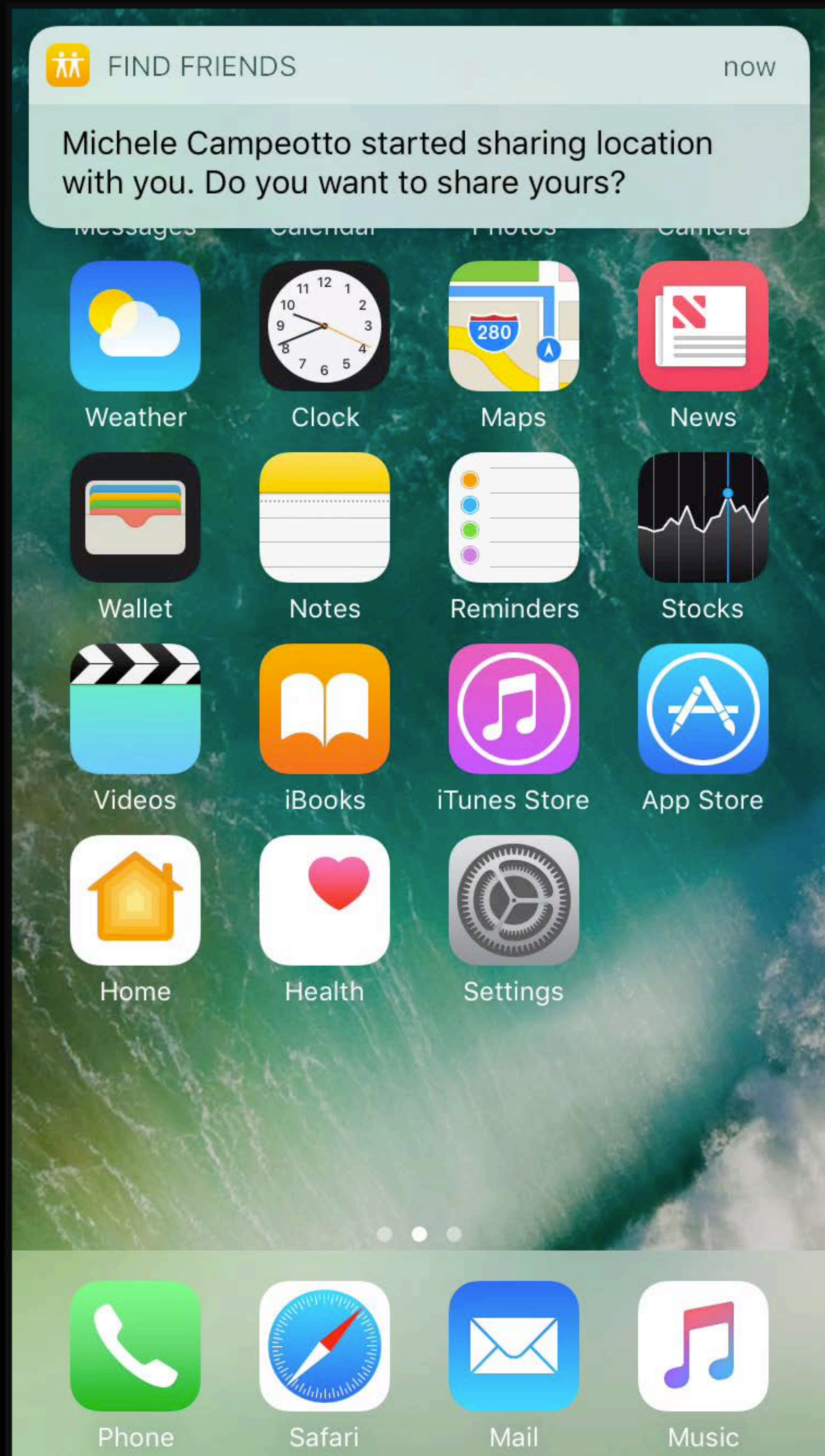
End-to-End Encryption



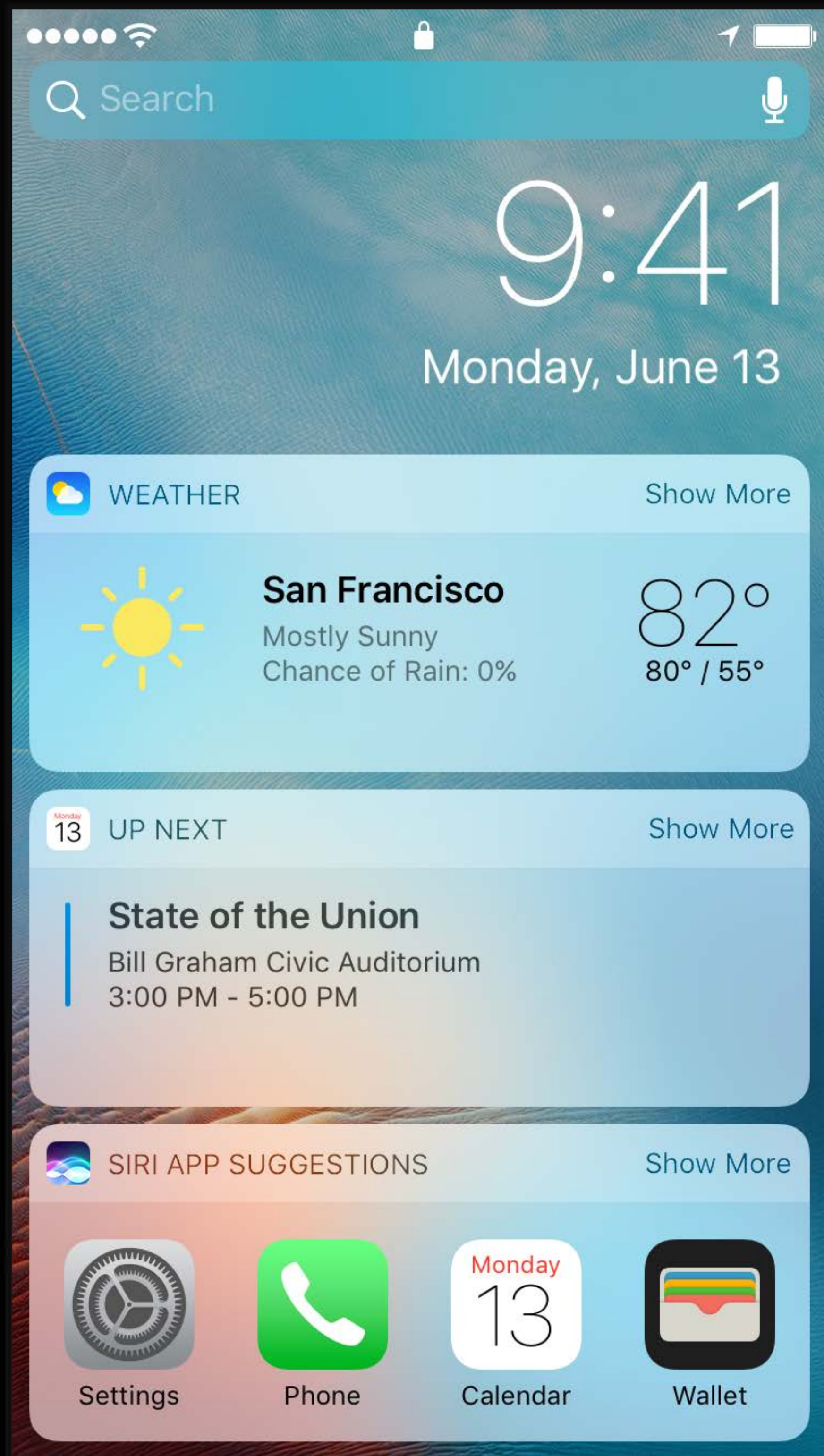
End-to-End Encryption



Content Extensions



Content Extensions



Widgets

Search

WEATHER Show Less

 **San Francisco**
 Mostly Cloudy
 Chance of Rain: 0% 16°
16° / 12°

Now	6PM	7PM	8PM	8PM	9PM
					
16	15	14	13	Sunset	13

NEWS Show Less

TOP STORIES

FOX NEWS
Obama endorses Clinton for president, on heels of Sanders meeting
 1h 

The New York Times
Bernie Sanders Meets President Obama and Pledges to Work to Defeat Donald Tru...
 1h 

FOR YOU

9to5Mac

Search

WEATHER Show More



San Francisco
Mostly Cloudy
Chance of Rain: 0%

16°
16° / 12°

NEWS Show More

FOX NEWS
Obama endorses Clinton for president, on heels of Sanders meeting

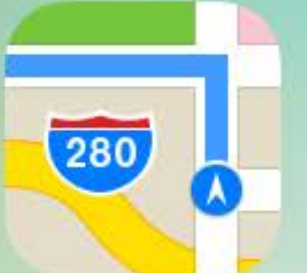


1h

SIRI APP SUGGESTIONS Show More



Calendar



Maps



YouTube

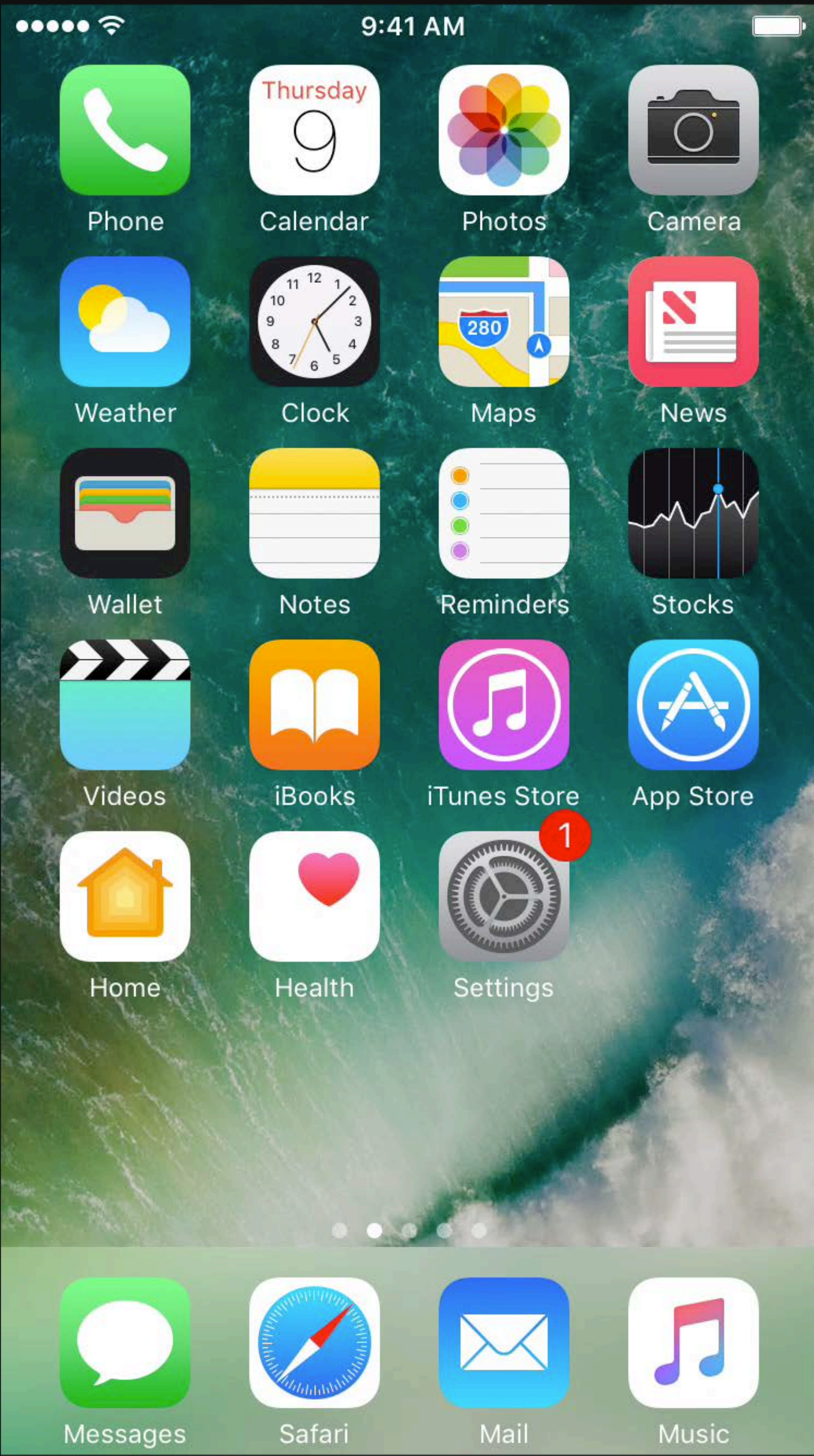


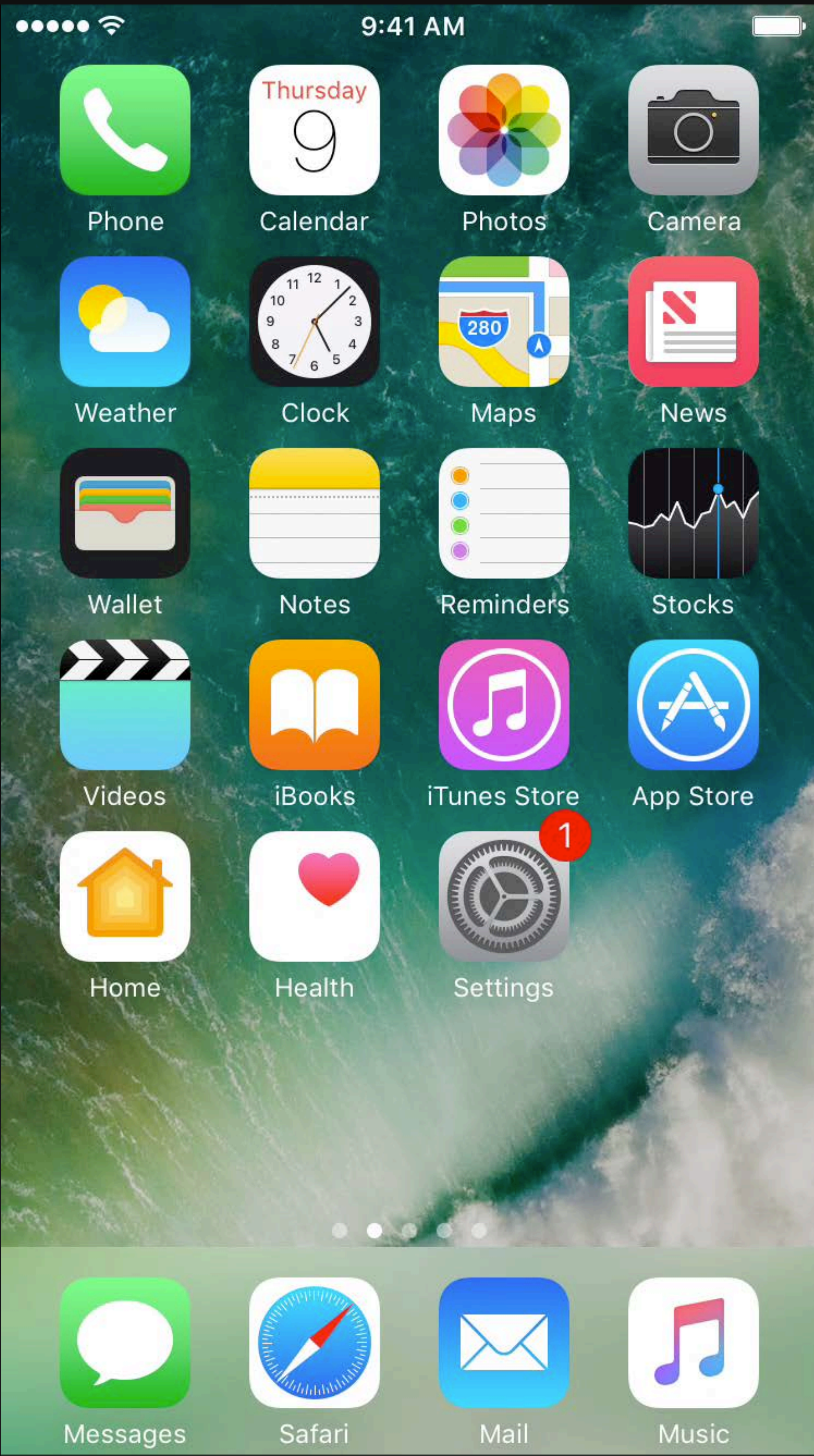
Watch

STOCKS Show More

DOW J 17,985.19 - 19.86

SPY 212.08 - 0.29





Phone



Calendar



Photos



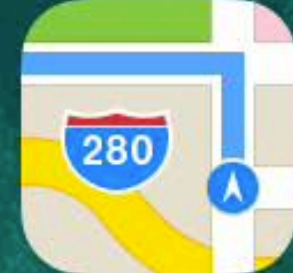
Camera



Weather



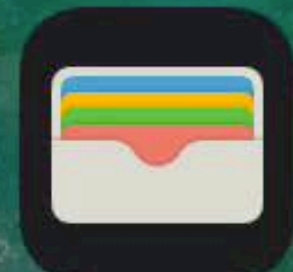
Clock



Maps



News



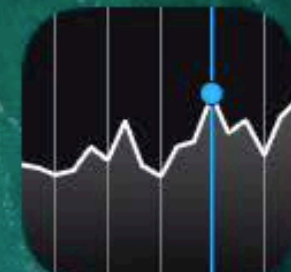
Wallet



Notes



Reminders



Stocks



Videos



iBooks



iTunes Store



App Store



Home



Health



Settings



Messages



Safari



Mail



Music



NEWS

FOX NEWS

Obama endorses Clinton for president, on heels of Sanders meeting



1h



For You



Serious Eats



The New York Times



Yachting World

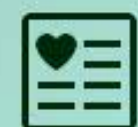


NEWS

FOX NEWS

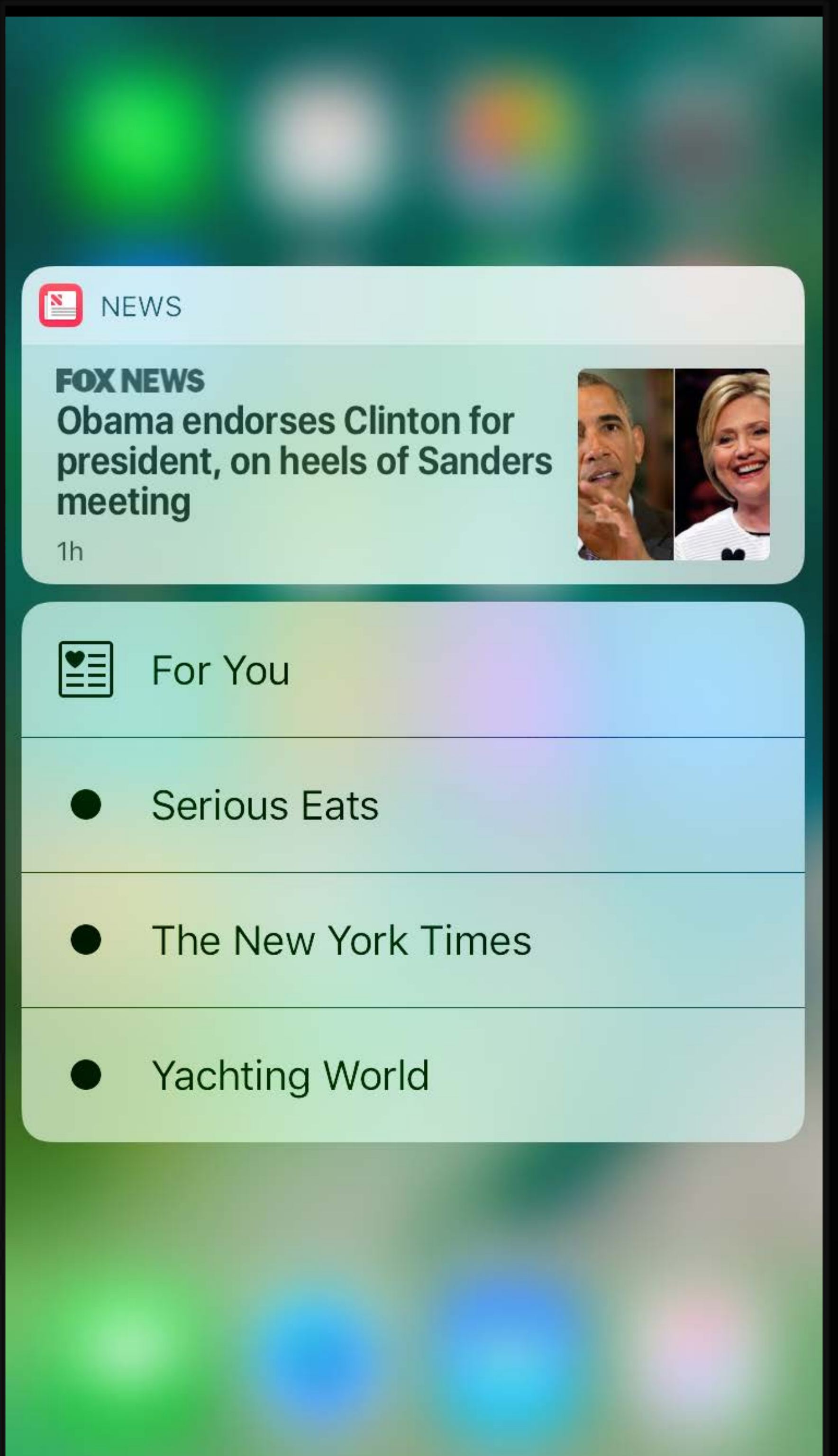
Obama endorses Clinton for president, on heels of Sanders meeting

1h

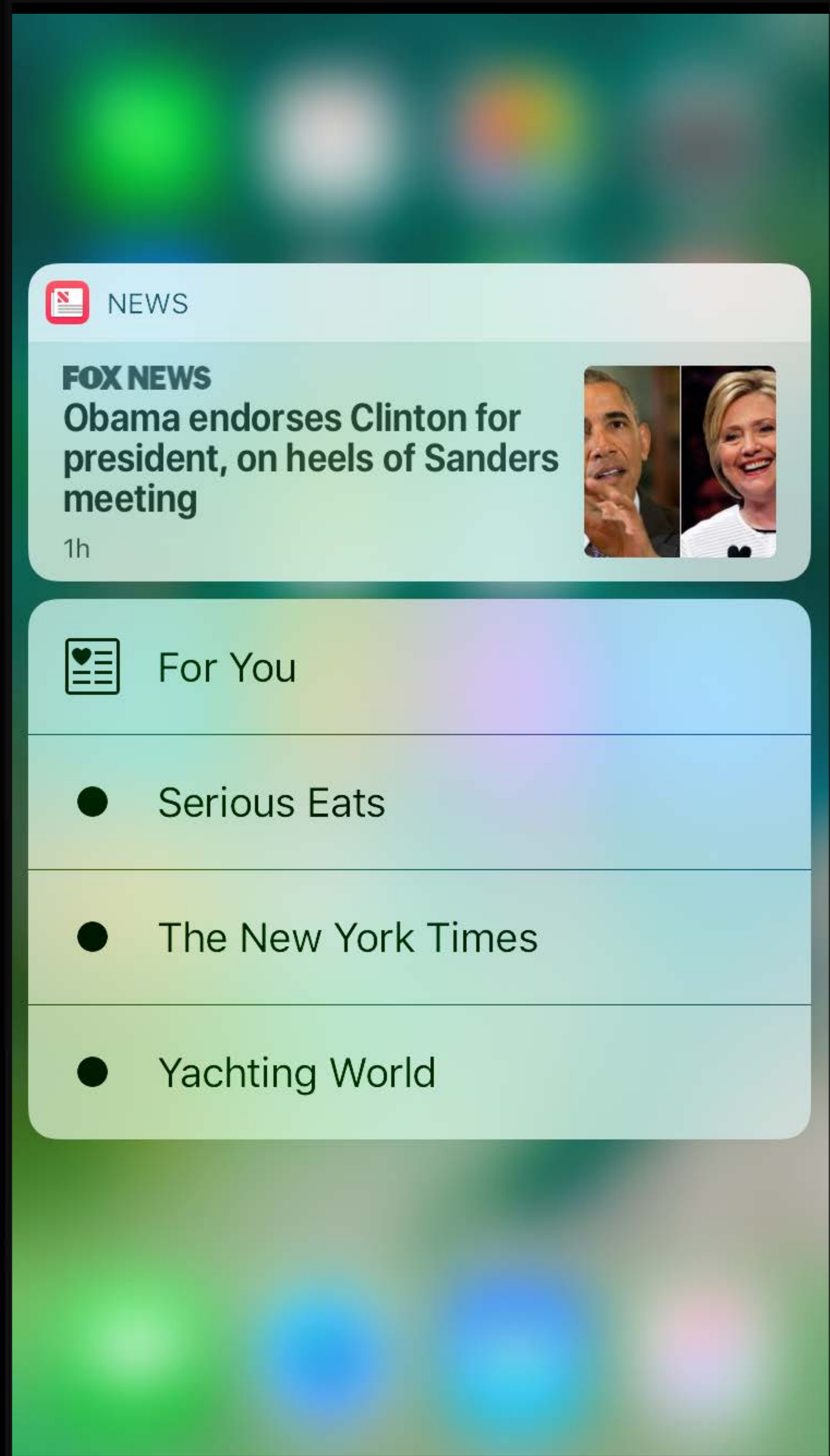


For You

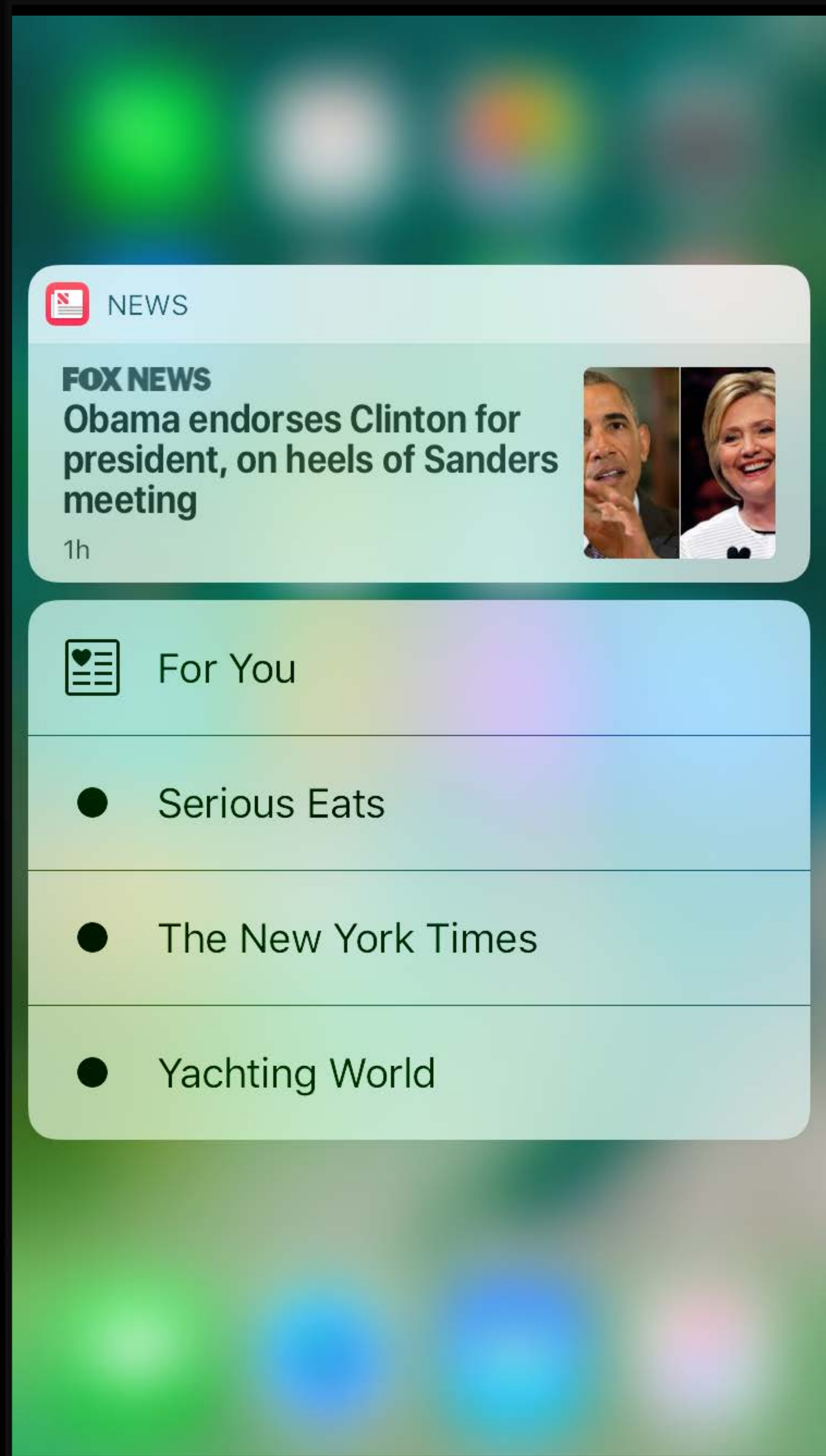
- Serious Eats
- The New York Times
- Yachting World



Update your look



Update your look
Build with iOS 10 SDK

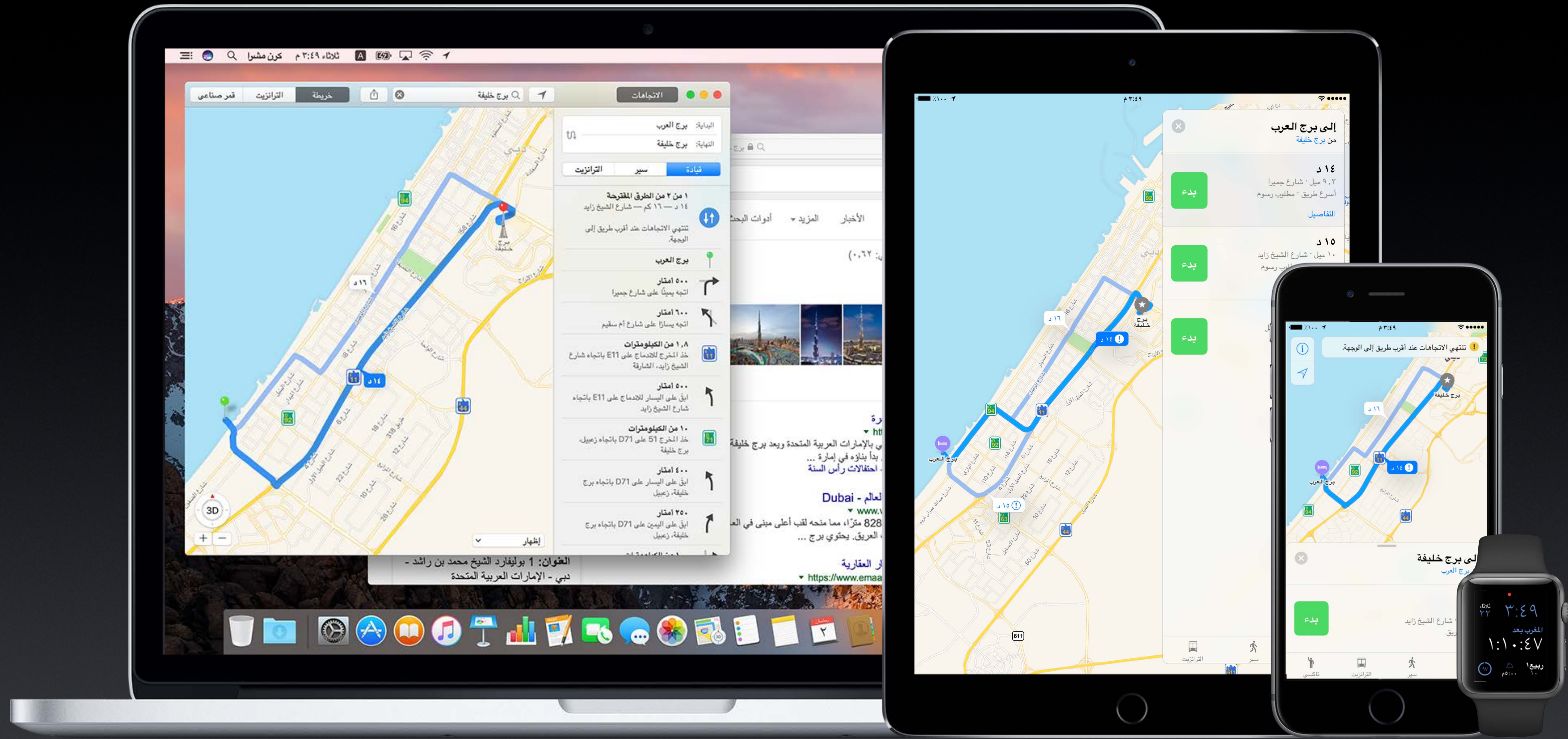


Update your look
Build with iOS 10 SDK
There is no step 3

macOS



Right-to-Left



الاتجاهات

البدء: برج العرب
النهاية: برج خليفة

قيادة

1 من 2 من الطرق المقترحة
14 د - 16 كم - شارع الشيخ زايد
تنتهي الاتجاهات عند أقرب طريق إلى الوجهة.

برج العرب
500 متر
اتجه يمينا على شارع جميرا

600 متر
اتجه يسارا على شارع أم سقيم

1,8 من الكيلومترات
خذ المخرج للاندماج على E11 باتجاه شارع الشيخ زايد، الشارقة.

500 متر
ابق على اليسار للاندماج على E11 باتجاه شارع الشيخ زايد

10 من الكيلومترات
خذ المخرج 51 على D71 باتجاه زعبيل، برج خليفة

400 متر
ابق على اليسار على D71 باتجاه برج خليفة، زعبيل

350 متر
ابق على اليمين على D71 باتجاه برج خليفة، زعبيل

إظهار

العنوان: 1 بوليفارد الشيخ محمد بن راشد - دبي - الإمارات العربية المتحدة
<https://www.emaa>

إلى برج العرب
من برج خليفة

14 د
9,3 ميل - شارع جميرا
أسرع طريق - مطلوب رسوم
التفاصيل

بدء

15 د
10 ميل - شارع الشيخ زايد
الطاب رسوم
بدء

بدء

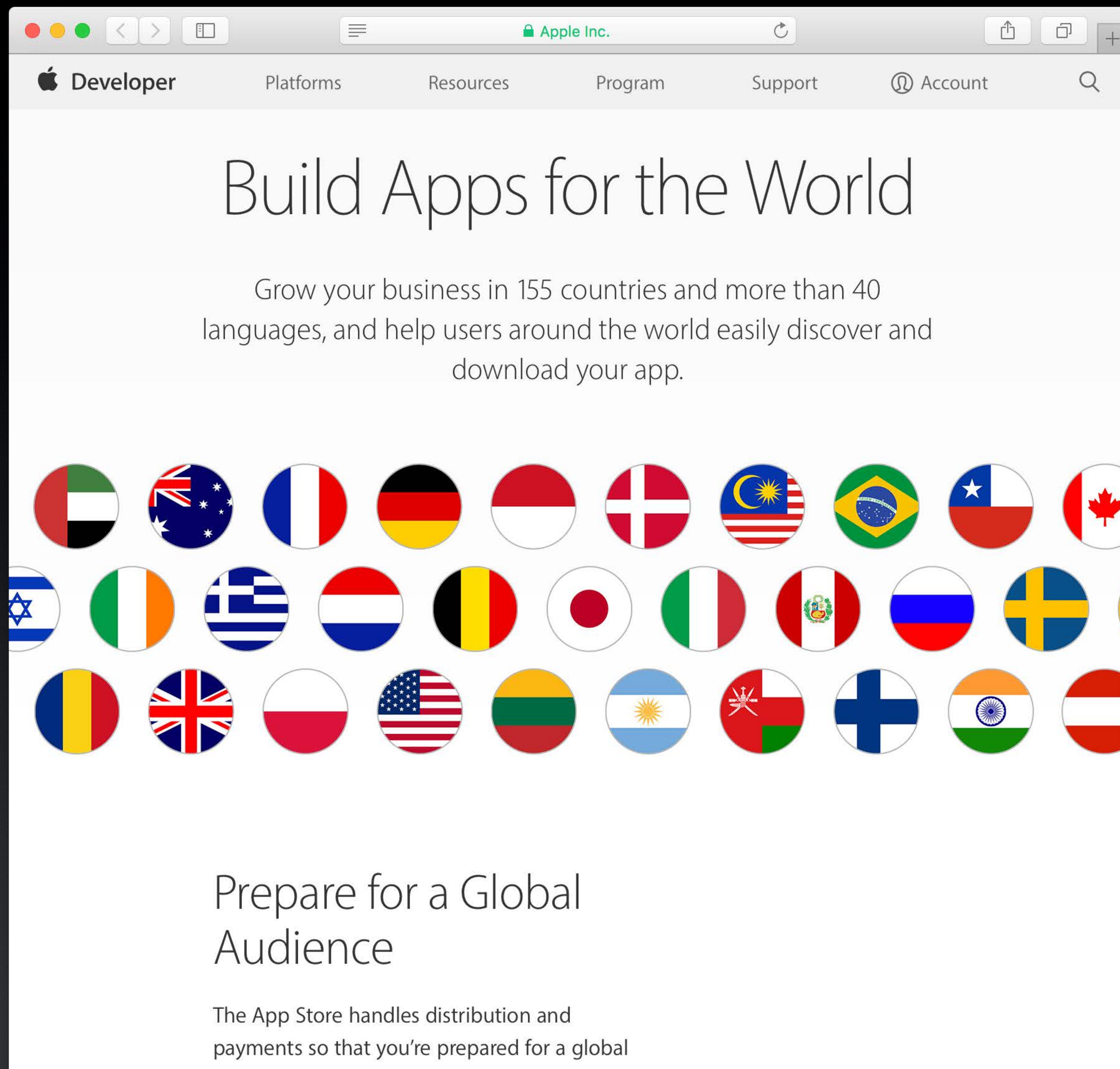
تنتهي الاتجاهات عند أقرب طريق إلى الوجهة

بدء

إلى برج خليفة
من برج العرب

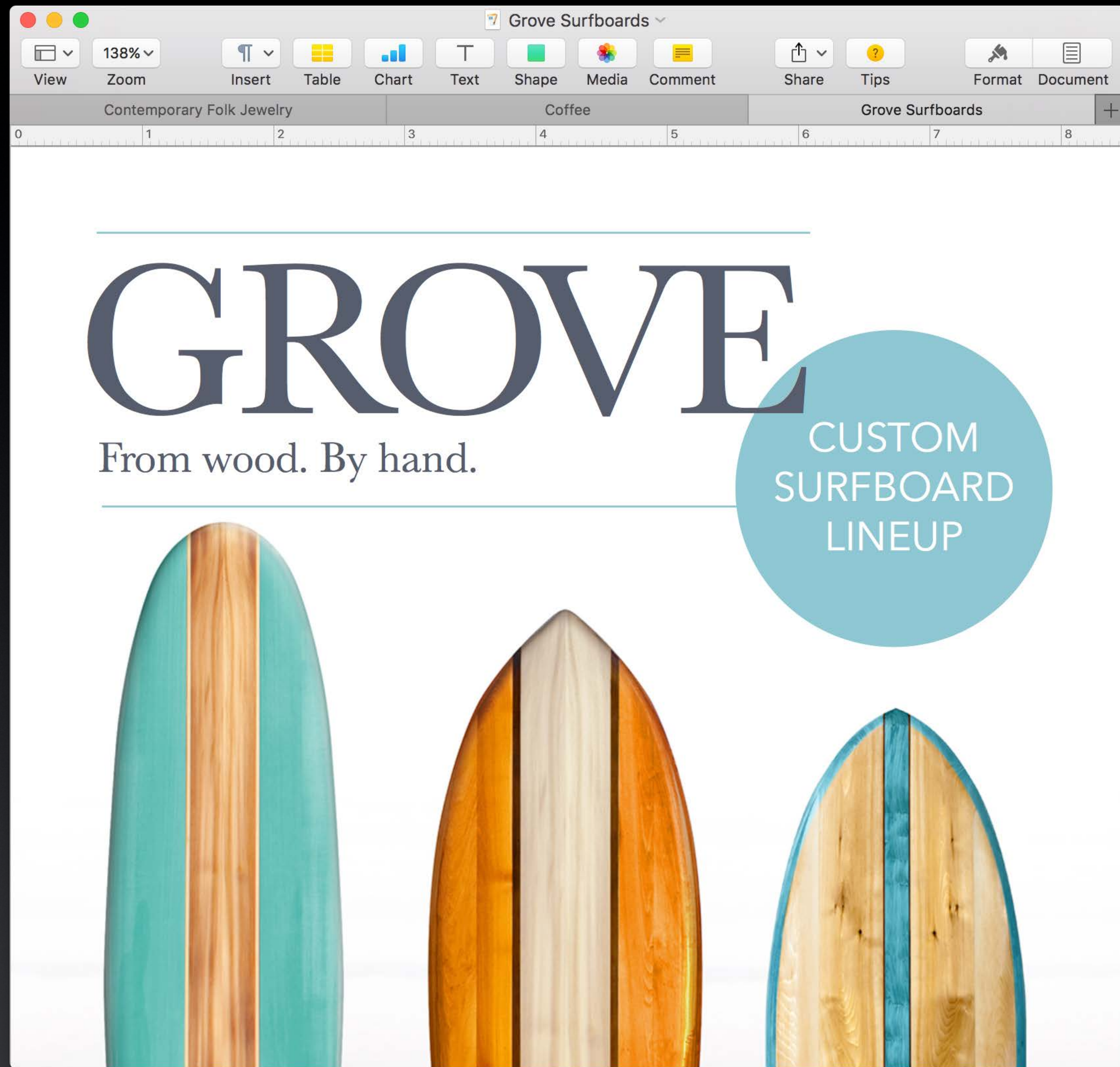
بدء

٣:٤٩
١٠:٤٧
الغروب بعد
٣٣
ربيع ١٠



Localization Guide

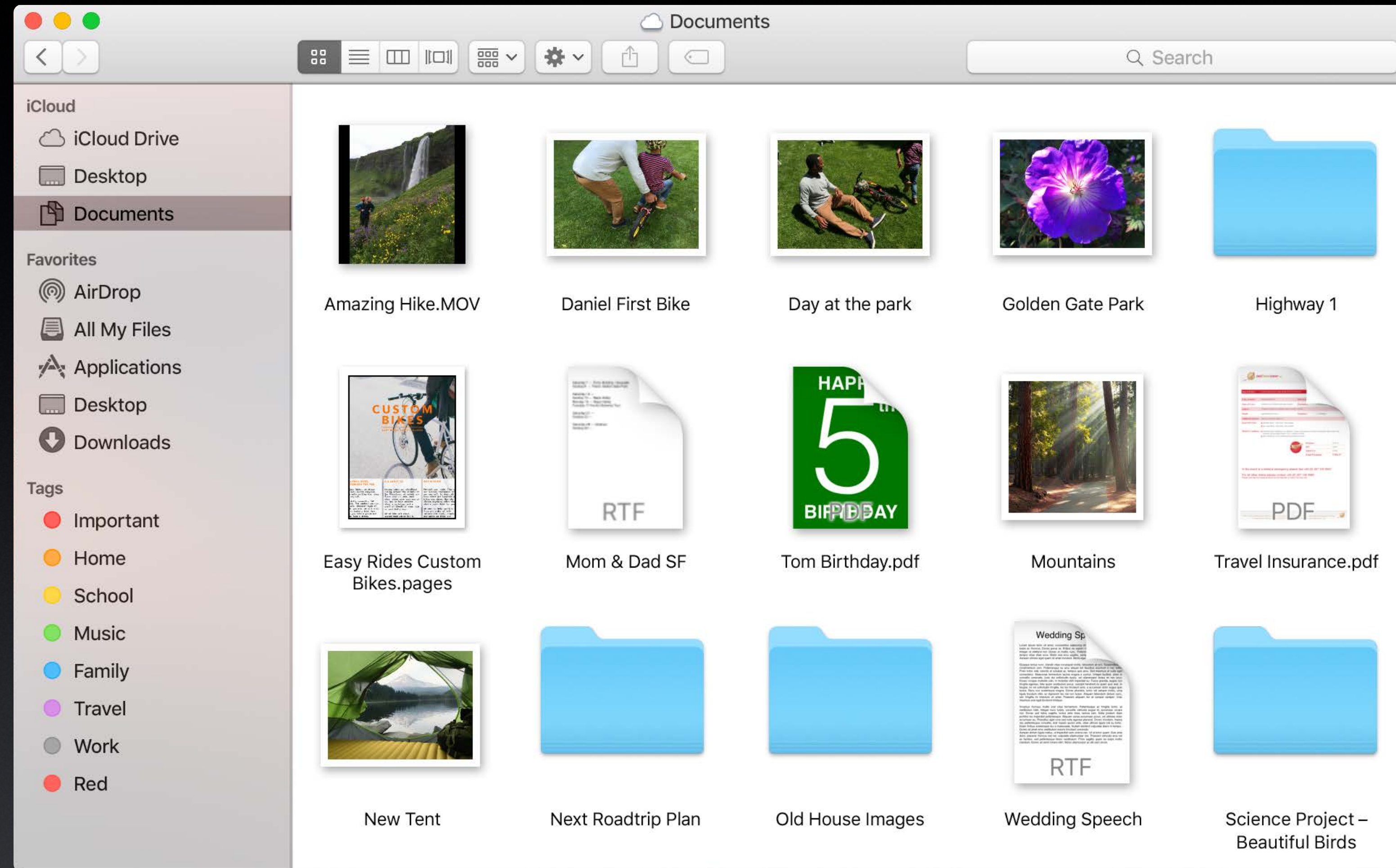
<https://developer.apple.com/internationalization>



Window Tabs



No adoption needed
Paired by type
NSDocument



iCloud Documents and Desktop

Documents

Search

iCloud

- iCloud Drive
- Desktop
- Documents

Favorites

- AirDrop
- All My Files
- Applications
- Desktop
- Downloads

Tags

- Important
- Home
- School
- Music
- Family
- Travel
- Work
- Red

Amazing Hike.MOV

Daniel First Bike

Day at the park

Golden Gate Park

Highway 1

Easy Rides Custom Bikes.pages

Mom & Dad SF

Tom Birthday.pdf

Mountains

Travel Insurance.pdf

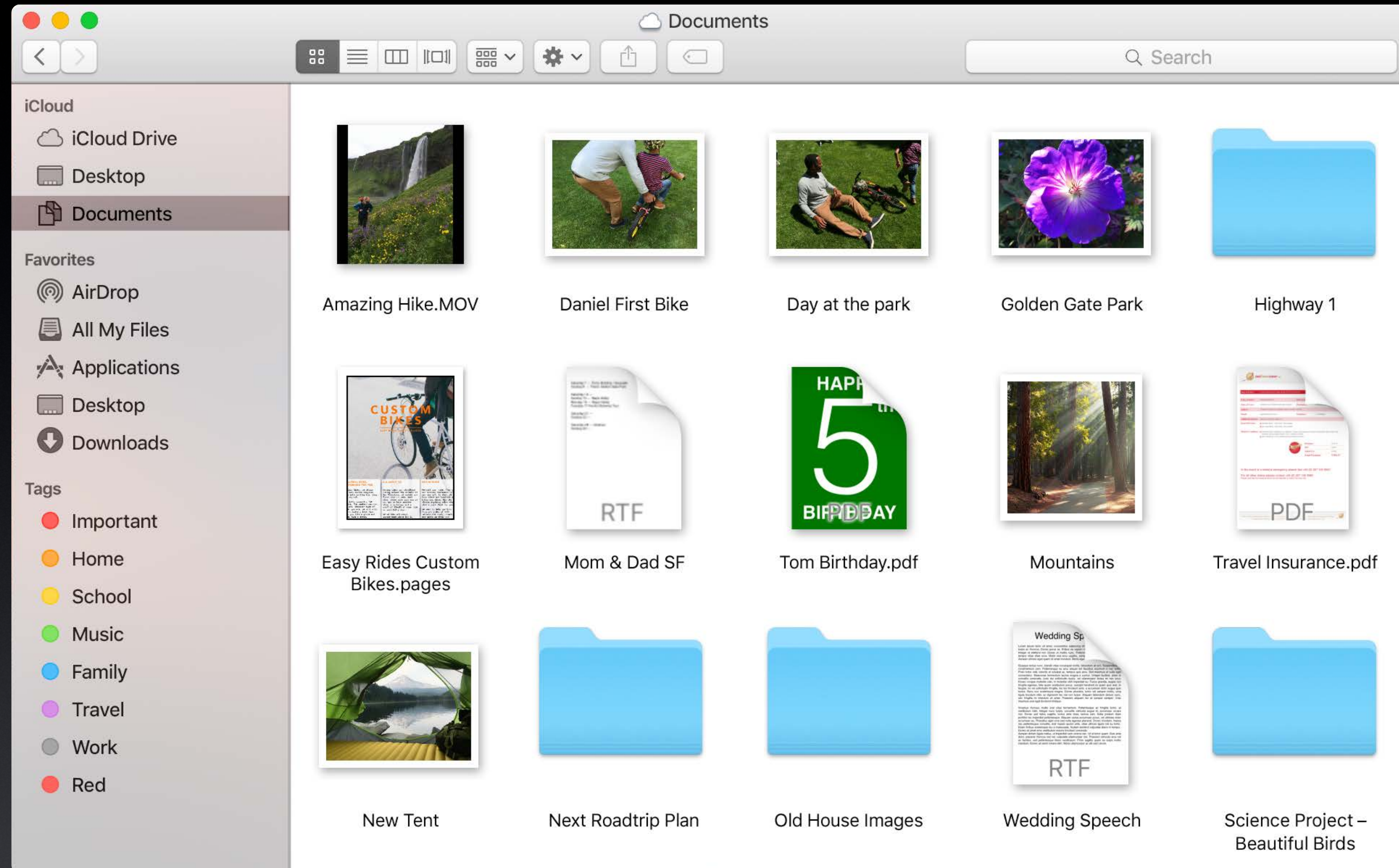
New Tent

Next Roadtrip Plan

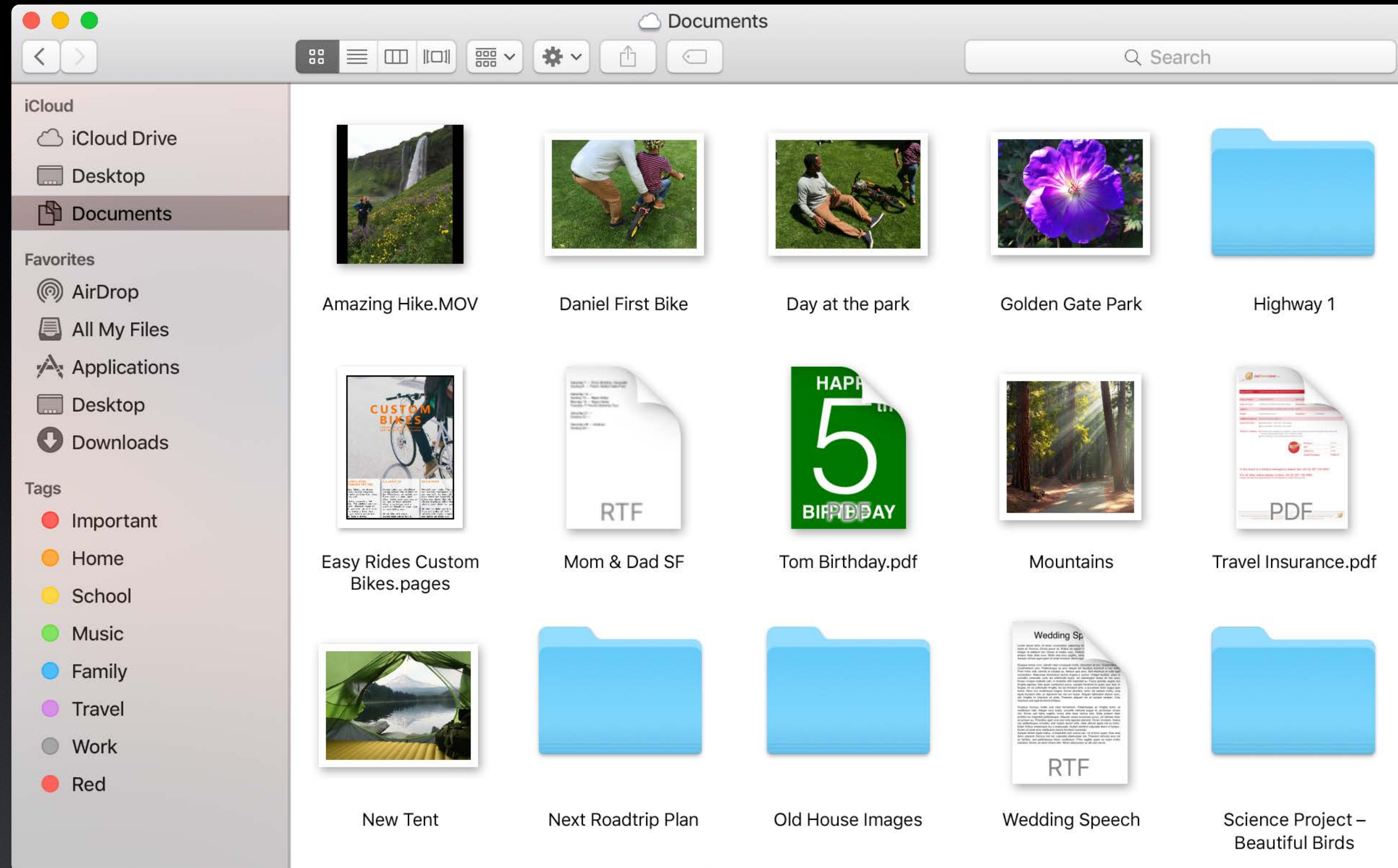
Old House Images

Wedding Speech

Science Project – Beautiful Birds



NSFileCoordinator
NSMetadataQuery



NSDocument
UIDocument



iCloud



iOS

macOS

tvOS

watchOS



macOS



macOS



macOS



CloudKit

iCloud Drive

iCloud Key-Value Storage

MapKit

Push



CloudKit

Public Data



Public Data



Private Data



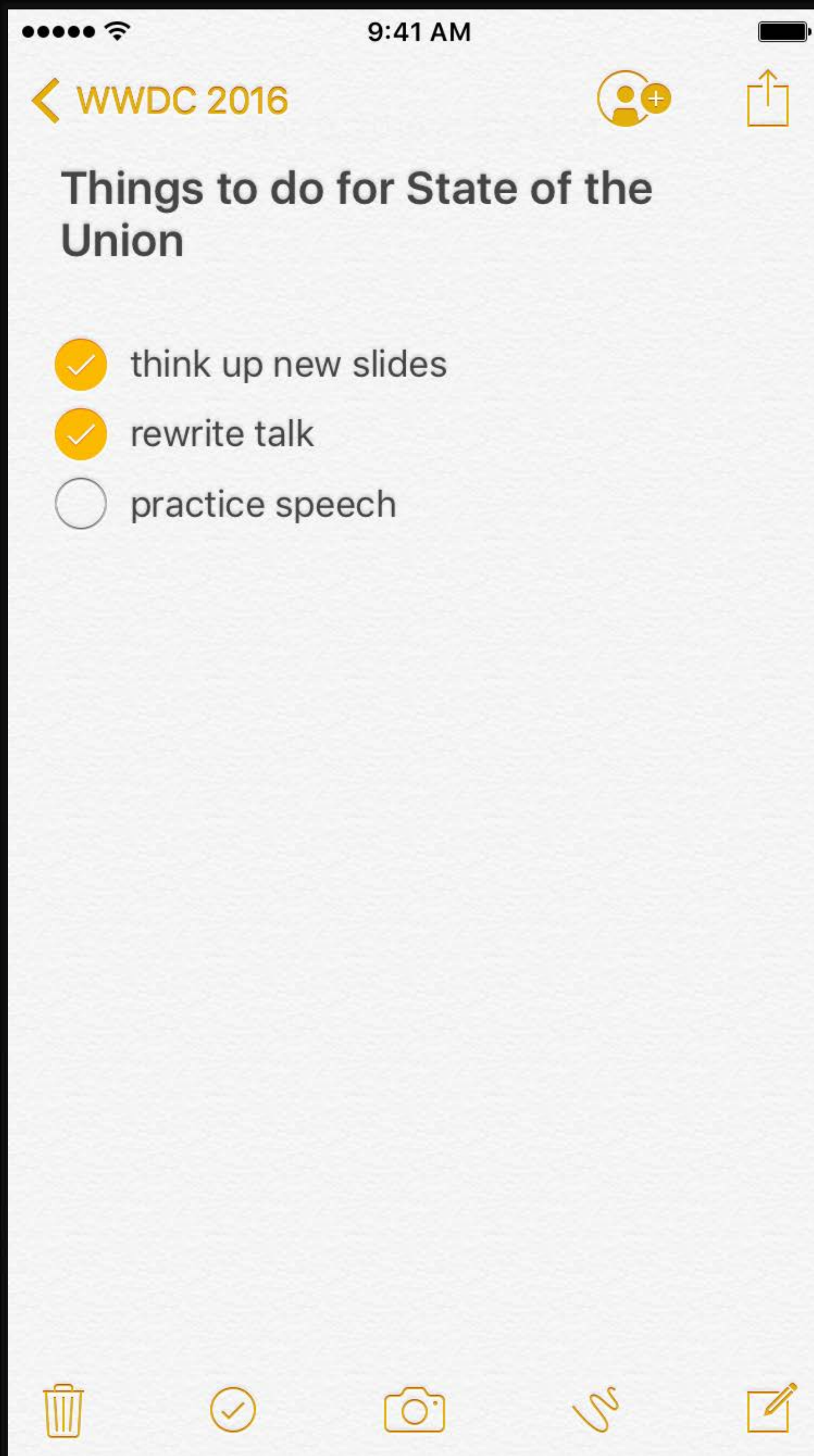
CloudKit Sharing



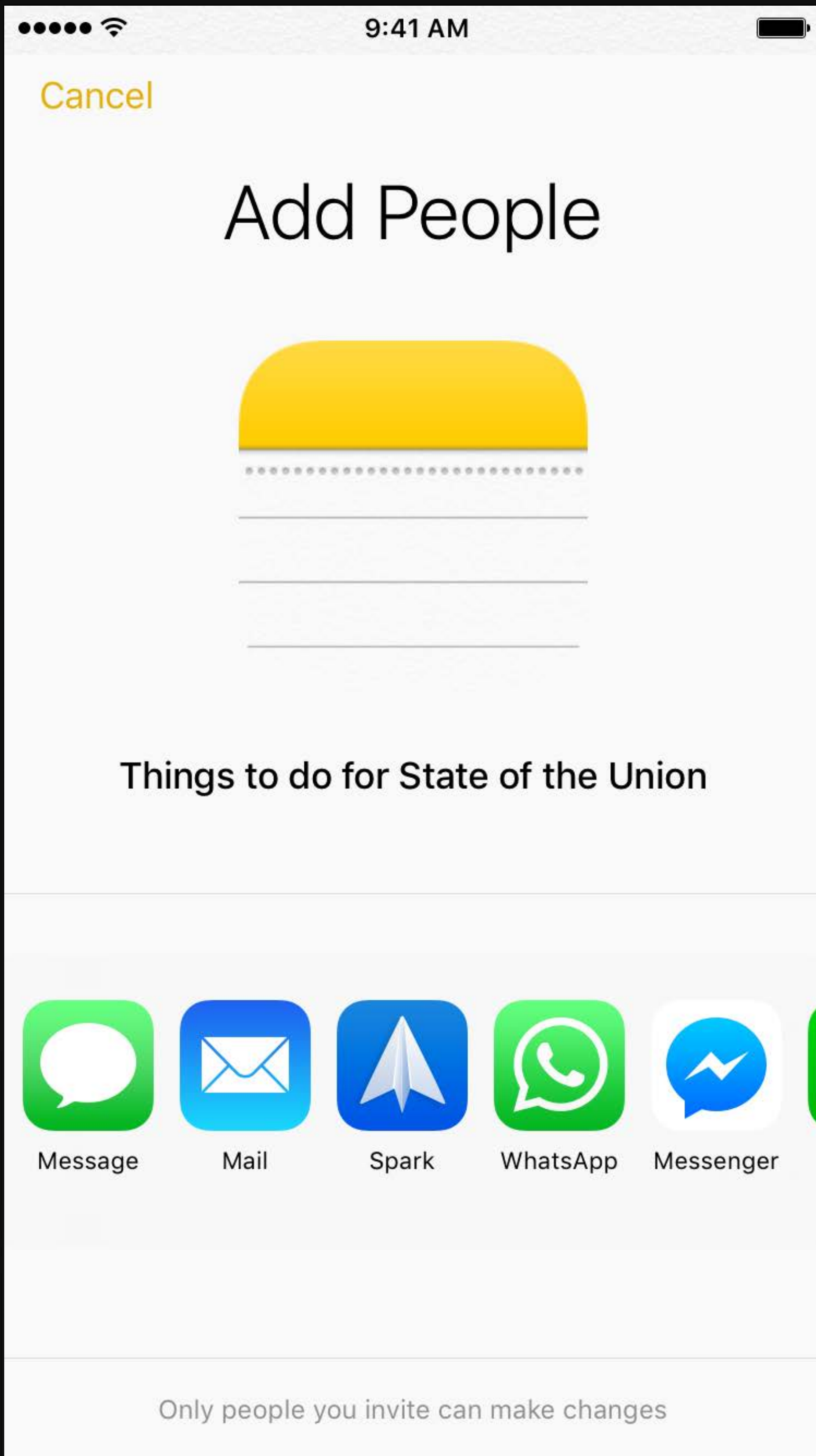
CloudKit Sharing



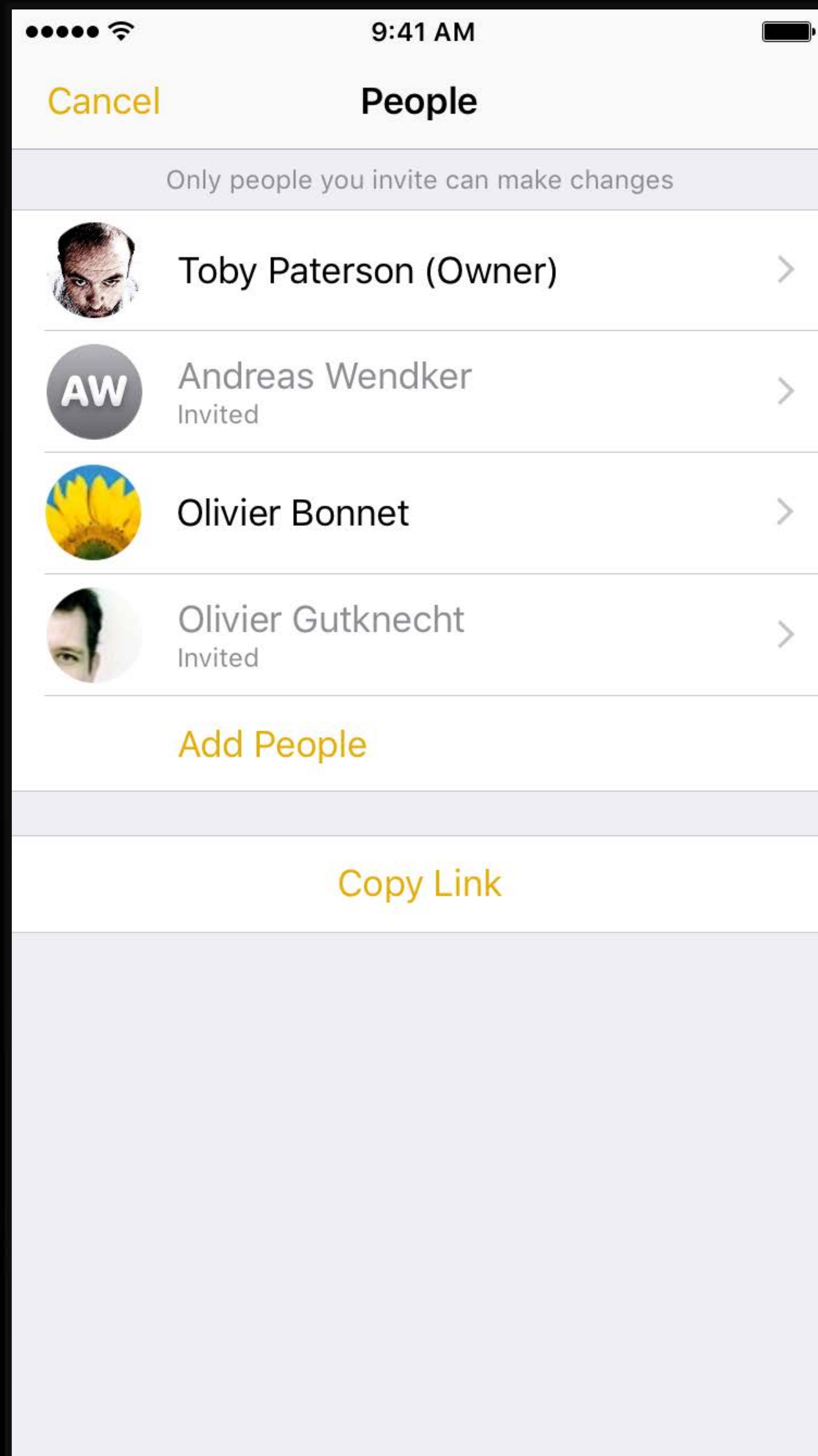
CKShare



Invite People



Invite People



Manage People



iCloud

- All iCloud
- Unsorted
- Home
- Planned Trips
- School
- Vacations
- Websites

Apple

- All Apple
- Unsorted
- Design Sync
- iBooks
- iWork
- Scripts
- Terminal Tips

Chicken Recipes
9:21 AM Julia Child's Roasted Chicken recipe is a fa...

Mono Lake Weekend
10:24 AM Make sure Tioga Pass is open be...

655-867-5309
Yesterday Call Palo Alto Plumbing Office number.

TV Series
06/06/14 Game of Thrones, Mad Men, She...

LA Trip
06/05/14 San Francisco to Los Angeles flight VA23...

Soccer Practice
05/28/14 Defense Weak. Rotation for Ram...

tomsmith@me.com
05/22/14 test account login for auditing and filing...

Big Sur
05/14/14 Bring D700 with 14-24mm lens and tripo...

Weekly Design Sync
05/08/14 Update deck to include list view comps 2...

Tracked bugs
05/01/14 <rdar://problem/00719028> Magical Uni...

Useful Terminal Commands
04/24/14 \$ defaults write com.apple.finder Apple...

Shopping List

Mono Lake Weekend
Make sure Tioga Pass is open bec...
just go to the beer garden and rela...

Mono Lake Tufa State Reserve
Test Station Rd
Lee Vining, CA 93541
United States

iCloud Sharing
Only people you invite can edit

- Chris M (Me)**
Last Edited 5:38 PM
- Gustaf E (Owner)**
Last Edited 10:32 PM
- Allison S**
Last Edited 10:32 PM
- Parthiban M**
Invited

Show Contact Card

Search

9:41 AM

Cancel People

Only people you invite can make changes

- Toby Paterson (Owner)**
- Andreas Wendker**
Invited
- Olivier Bonnet**
- Olivier Gutknecht**
Invited

Add People

Copy Link

watchOS



Glanceable



Glanceable



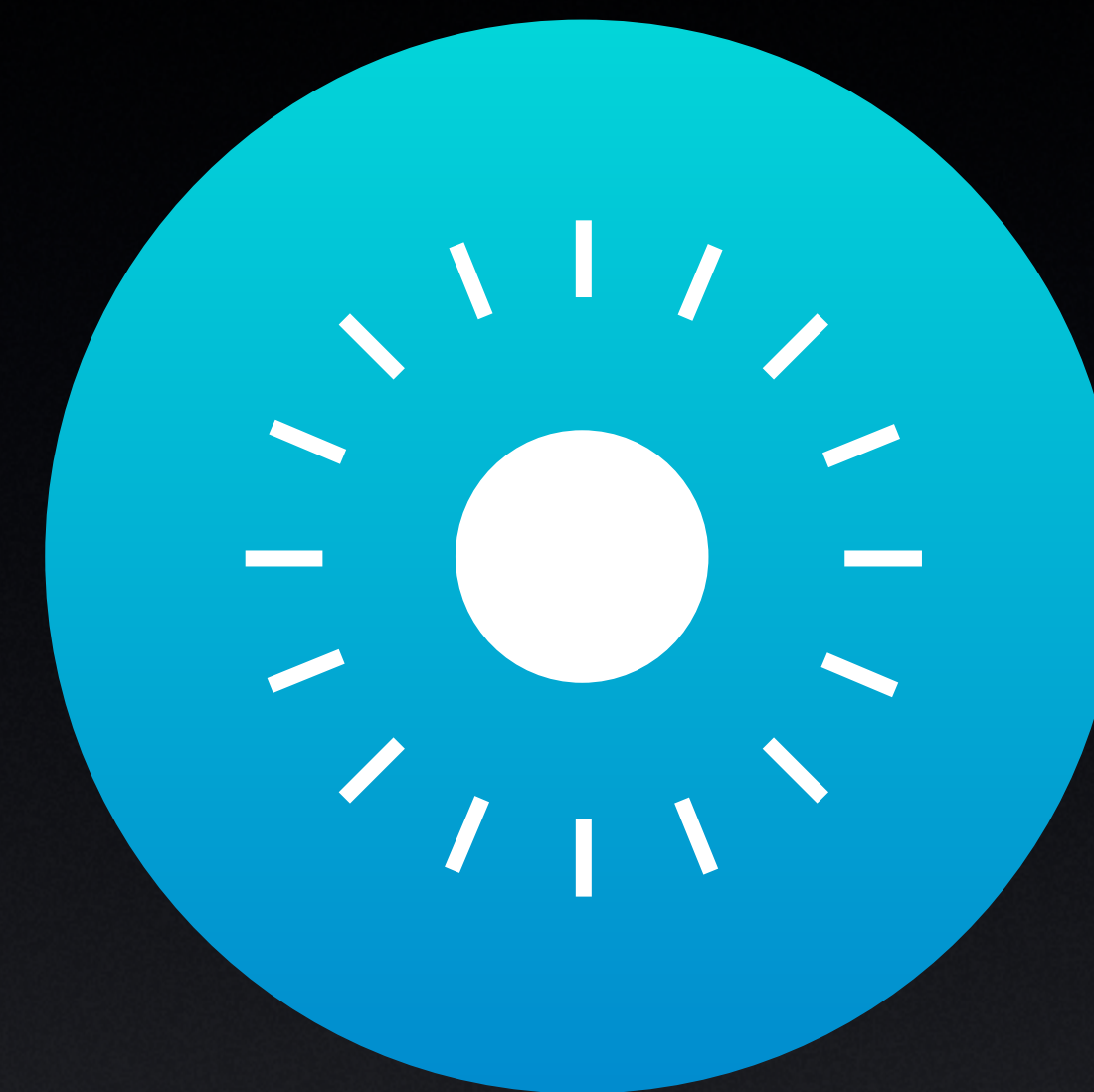
Actionable



Glanceable



Actionable



Responsive



< Reminders 10:09

Pick up Megan
Today, 11:00 AM

Call Mom

Book hotel

Book flight















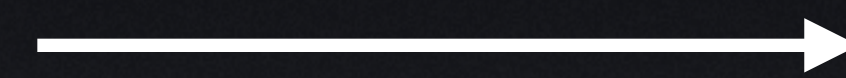






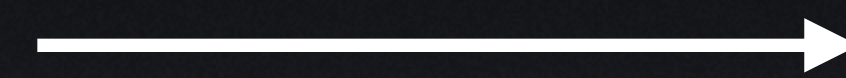


8 minutes





8 minutes





MON
13

10:09

11:00AM
Pick up Megan
San Francisco Int.

68°



LON
6:09



Background App Refresh



Background runtime

Frontmost during workout

Continuous sensor access



Crown Events

Gesture Recognizers

Gyroscope



SpriteKit and SceneKit

Speaker access

Inline Video



CloudKit



Face Gallery Featured Complications

Dexcom



Activity Digital

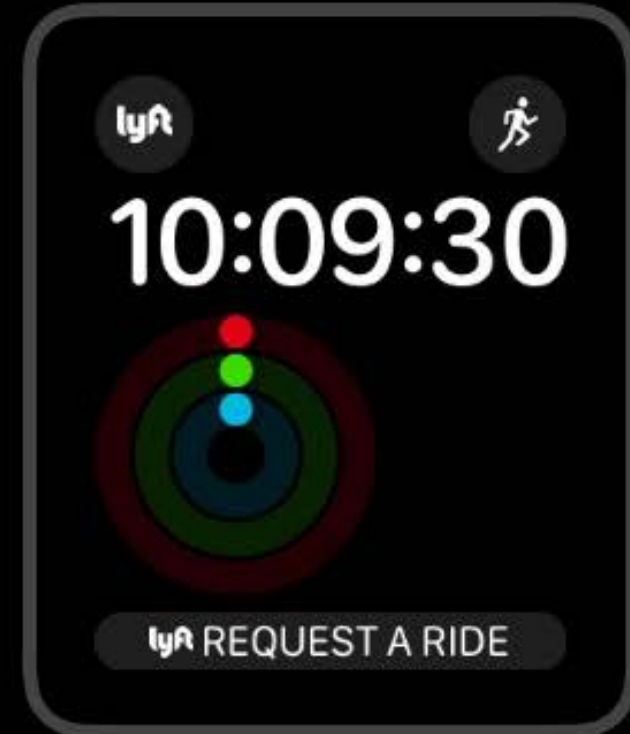


Activity Analog

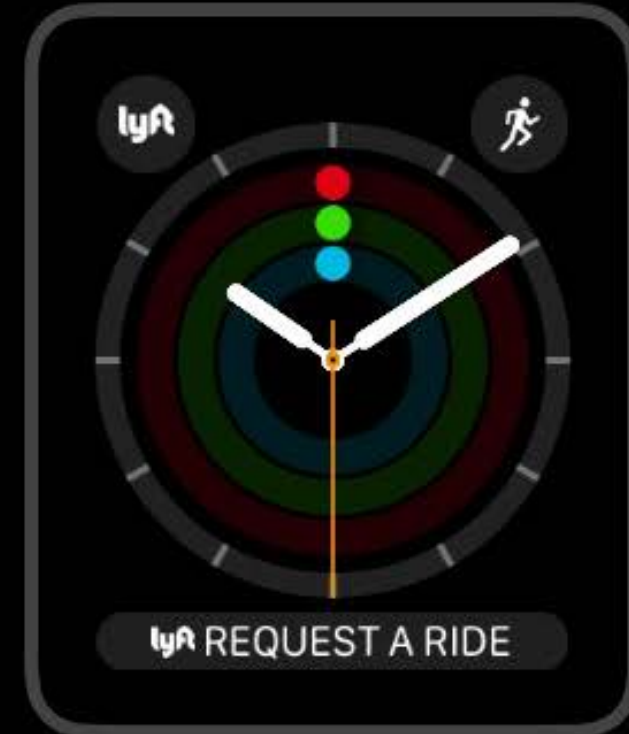


U

Lyft



Activity Digital



Activity Analog



U

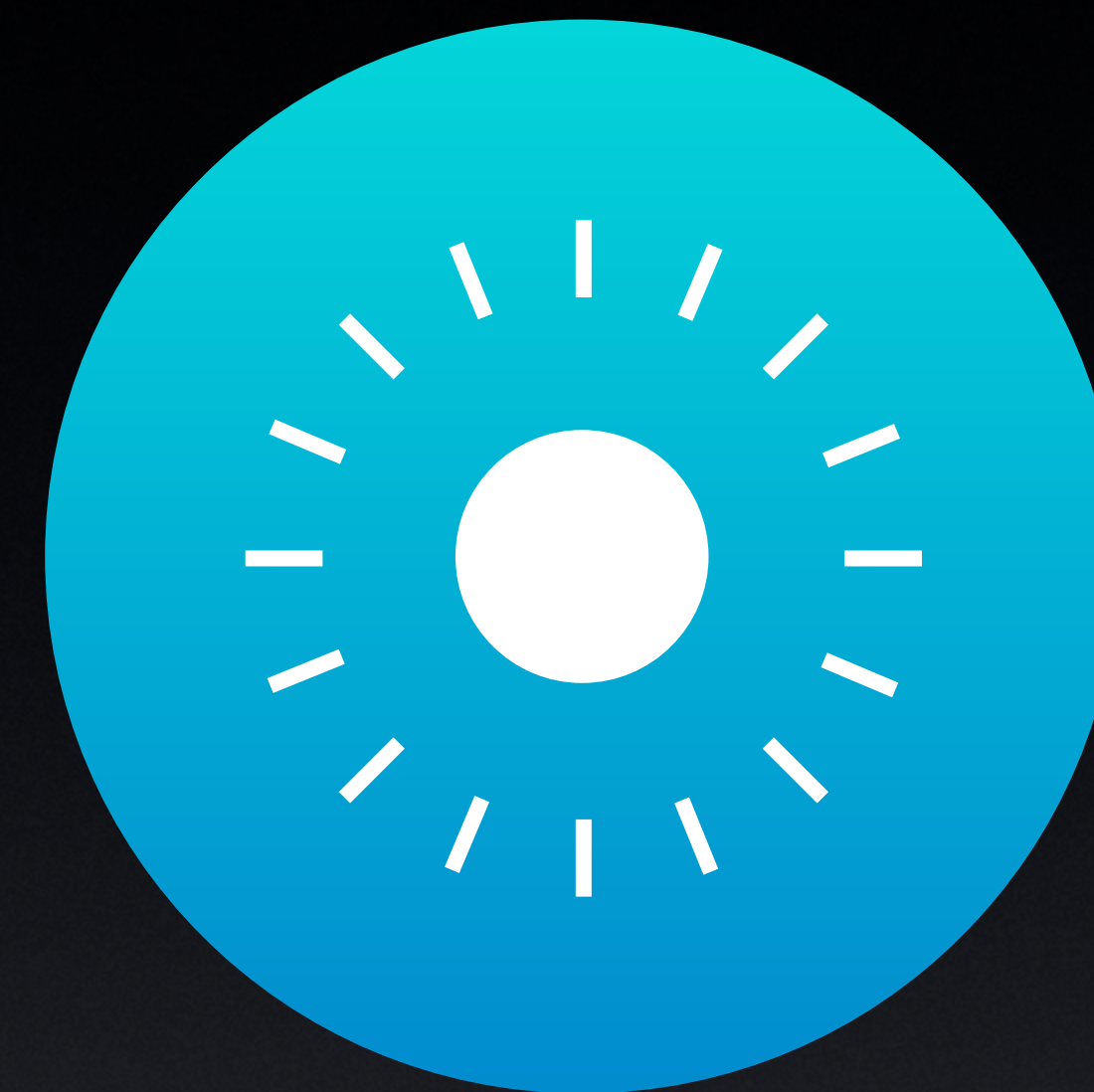
Acorns



Glanceable



Actionable

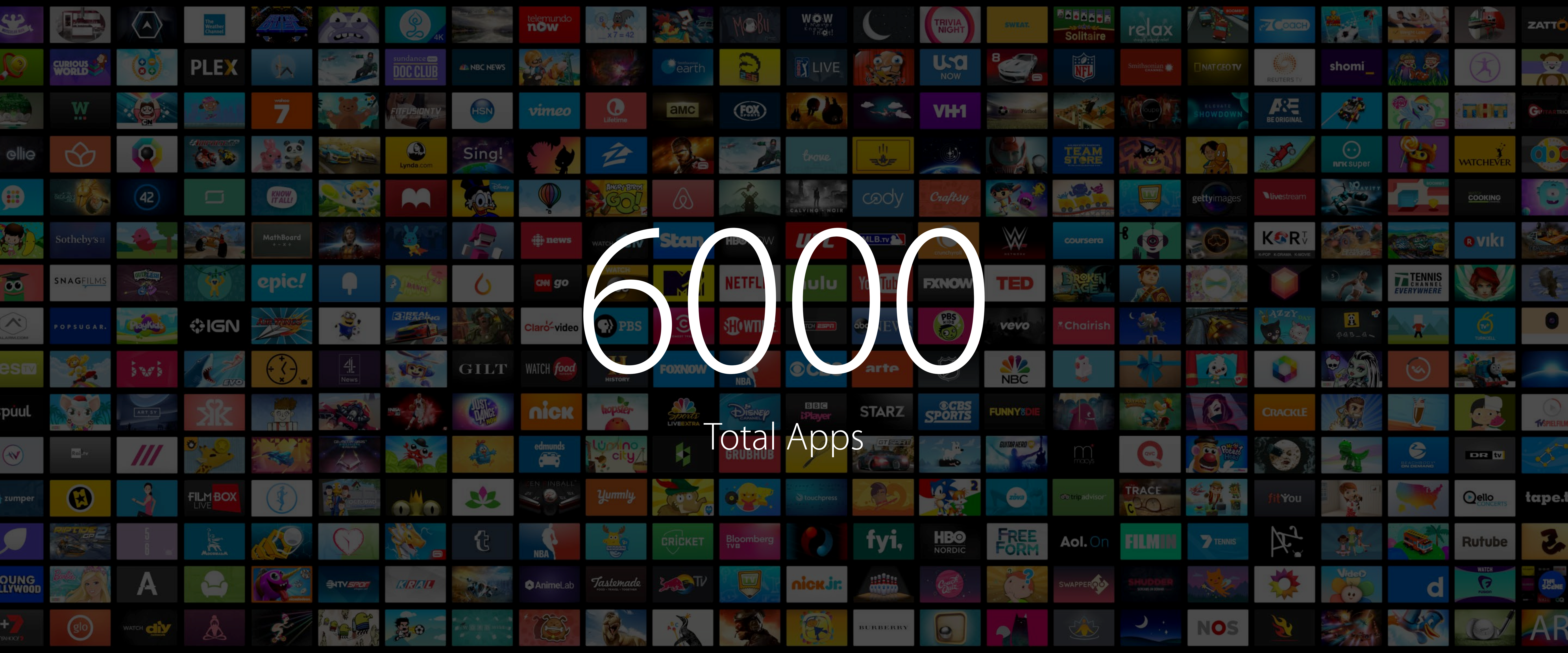


Responsive

Demo

tvOS

The future of TV is apps.



6000

Total Apps

6000

Total Apps



AVKit GameKit QuartzCore SpriteKit GameplayKit OpenGL ES CoreMedia

GameController AudioToolbox StoreKit AVFoundation MapKit

Metal SceneKit CloudKit UIKit Foundation MediaToolbox

JavascriptCore Accessibility CoreAudio MediaPlayer CoreGraphics TVMLKit



AVKit GameKit QuartzCore SpriteKit GameplayKit OpenGL ES CoreMedia

GameController AudioToolbox StoreKit AVFoundation MapKit

Metal SceneKit CloudKit UIKit Foundation MediaToolbox

JavascriptCore Accessibility CoreAudio MediaPlayer CoreGraphics TVMLKit



AVKit GameKit QuartzCore SpriteKit GameplayKit OpenGL ES CoreMedia

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AVKit GameKit QuartzCore SpriteKit GameplayKit OpenGL ES CoreMedia

GameController AudioToolbox StoreKit AVFoundation MapKit

Dark Appearance ReplayKit PhotoKit App Badging HomeKit

Up Next ExternalAccessory Universal Links SpriteKit Focus

Metal SceneKit CloudKit UIKit Foundation MediaToolbox

JavascriptCore Accessibility CoreAudio MediaPlayer CoreGraphics TVMLKit



AVKit GameKit QuartzCore SpriteKit GameplayKit OpenGL ES CoreMedia

GameController AudioToolbox StoreKit AVFoundation MapKit

Dark Appearance ReplayKit PhotoKit App Badging HomeKit

Up Next ExternalAccessory Universal Links SpriteKit Focus

Metal SceneKit CloudKit UIKit Foundation MediaToolbox

JavascriptCore Accessibility CoreAudio MediaPlayer CoreGraphics TVMLKit





THE AMERICANS

Season 4

Drama 2016 TV-MA HD CC

Watch The Americans Wednesdays at 10 p.m. / 9c on FX

The Americans is a period drama about the complex marriage of two KGB spies posing as Americans in suburban Washington D.C.

\$2.99

Episode 1

\$34.99

Buy
Season Pass

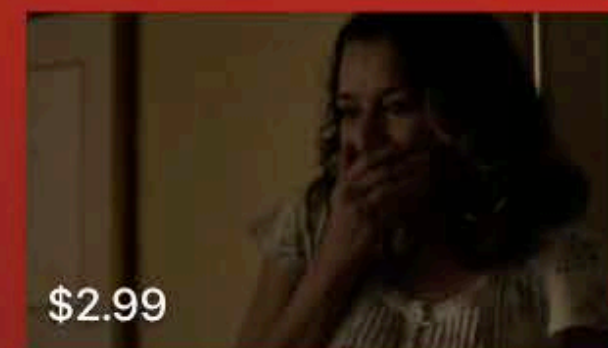


5 Seasons



Favorites

13 Episodes



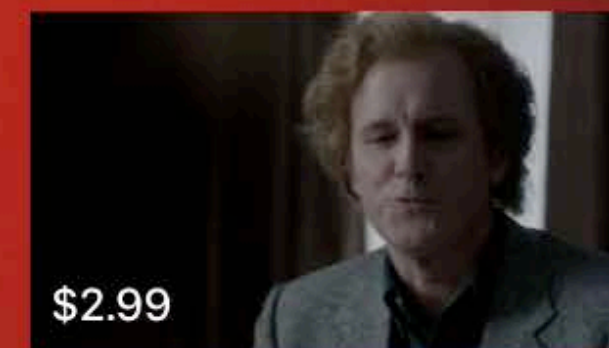
\$2.99

1. Glanders



\$2.99

2. Pastor Tim



\$2.99

3. Experimental Prototype Cii



\$2.99

4. Chloramphenicol

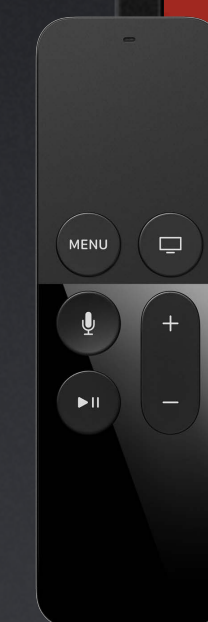


\$2.99

5. Clark's Place



\$2



THE AMERICANS

Season 4

Drama 2016 **TV-MA** **HD** **CC**

Watch The Americans Wednesdays at 10 p.m. / 9c on FX

The Americans is a period drama about the complex marriage of two KGB spies posing as Americans in suburban Washington D.C.

\$2.99

Episode 1

\$34.99

Buy
Season Pass

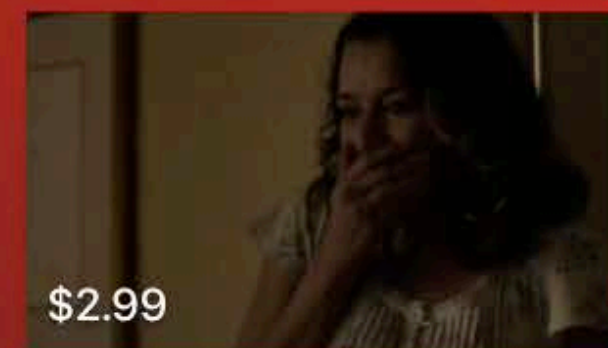


5 Seasons



Favorites

13 Episodes



\$2.99

1. Glanders



\$2.99

2. Pastor Tim



\$2.99

3. Experimental Prototype Cii



\$2.99

4. Chloramphenicol

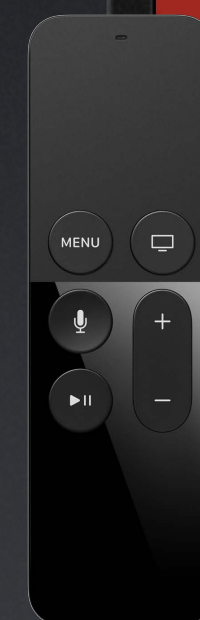


\$2.99

5. Clark's Place



\$2



SHOWTIME

RAY DONOVAN

Catch Up Now

Featured Series



THE AFFAIR

The Affair



RAY DONOVAN

Ray Donovan



PENNY DREADFUL

Penny Dreadful

Featured Movies





SUSPECTS

SERIES THREE & FOUR

EXCLUSIVELY ON ACORN tv

New Releases



ON NOW:

Expedition Unknown

Lost Mexican City (60m)

Host Josh Gates searches Mexico for answers about the lost Teotihuacano civilization.

UP NEXT:

Expedition Unknown

True Cross of Christ
10/9c

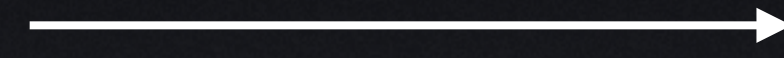
[WATCH LIVE TV](#)



• LIVE TV









Essential Rock

Round 2 of 5



Born To Be Wild



Radioactive

Love Shack



I Don't Want to Miss a Thing



Natalia
197



Dean
333



Donna
240



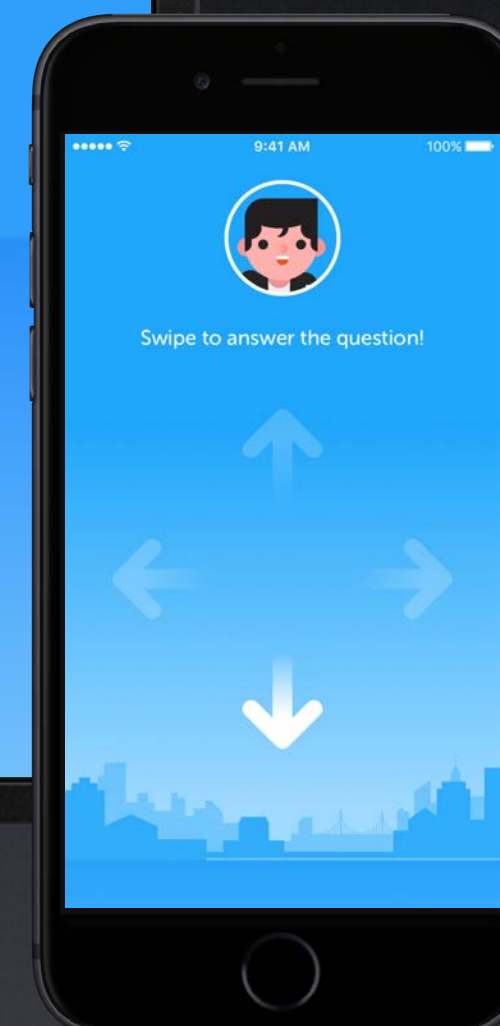
Harvey
193



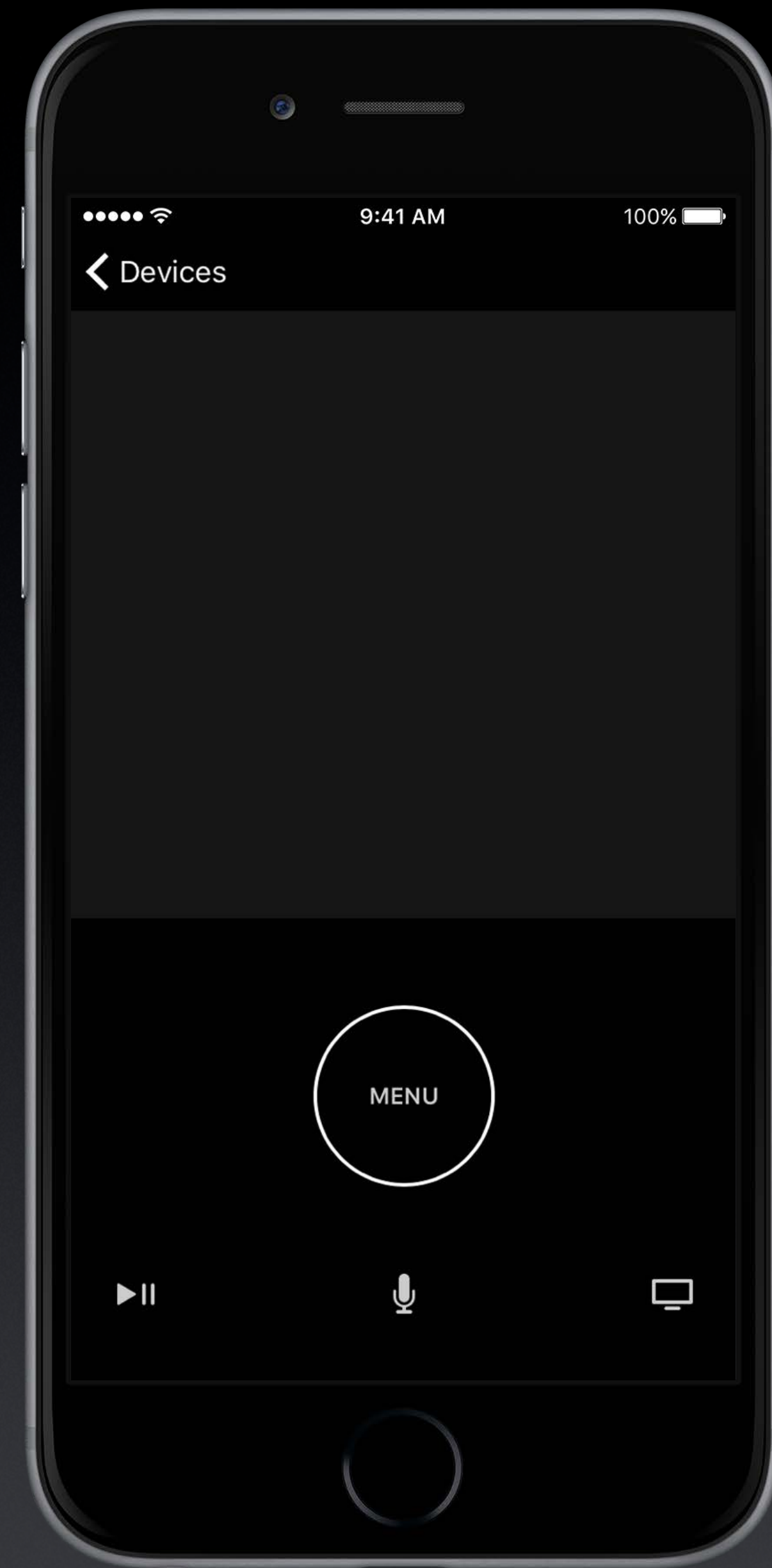
Jamal
187

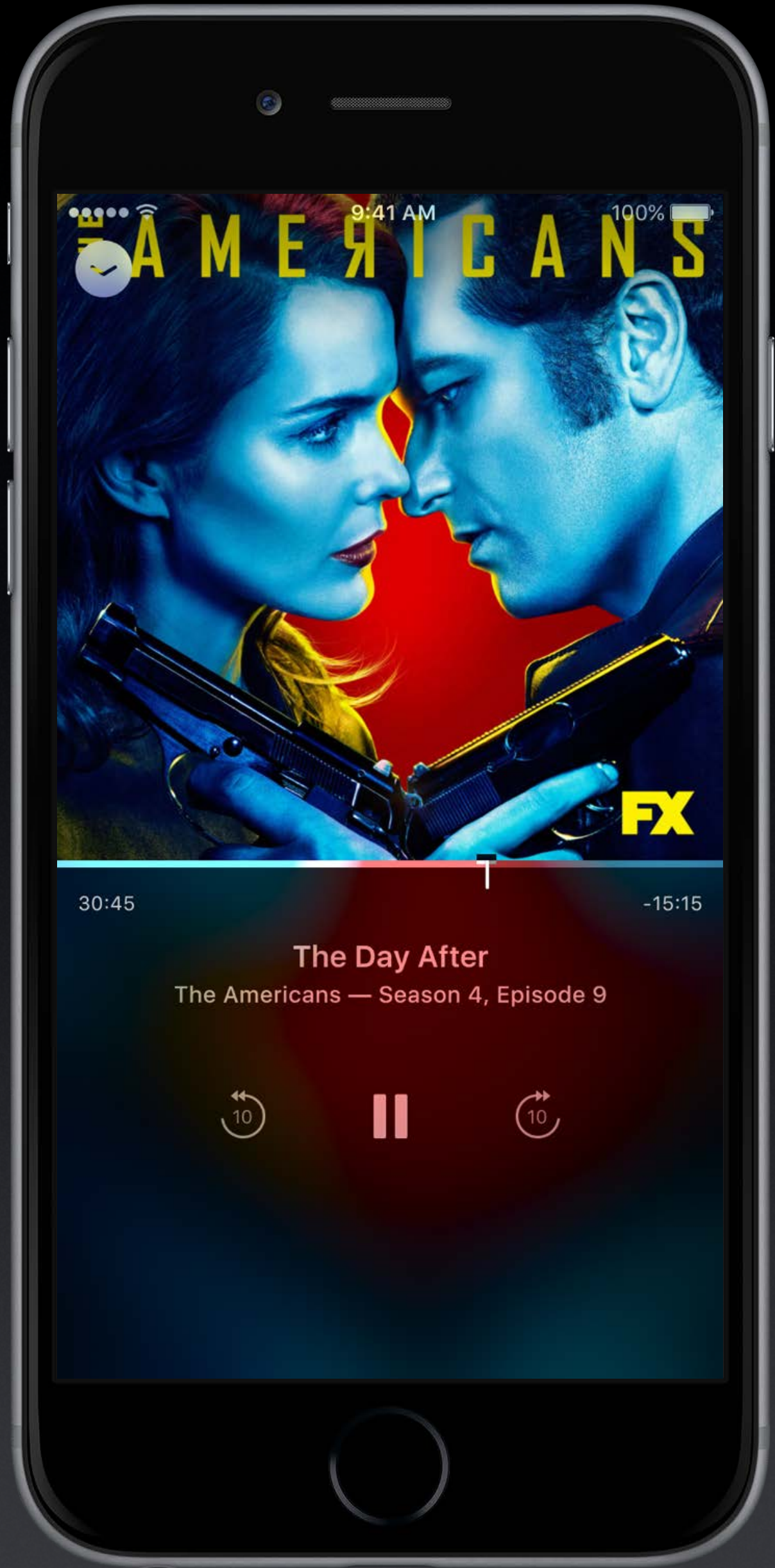


Jacob
114



Multipeer Connectivity













Four simultaneous controllers



Updated controller policy

tvOS



Graphics



Color



Metal



Color





“Color accuracy that is visually indistinguishable from perfect.”

– DisplayMate



Limited Color
sRGB



Wide Color (P3)

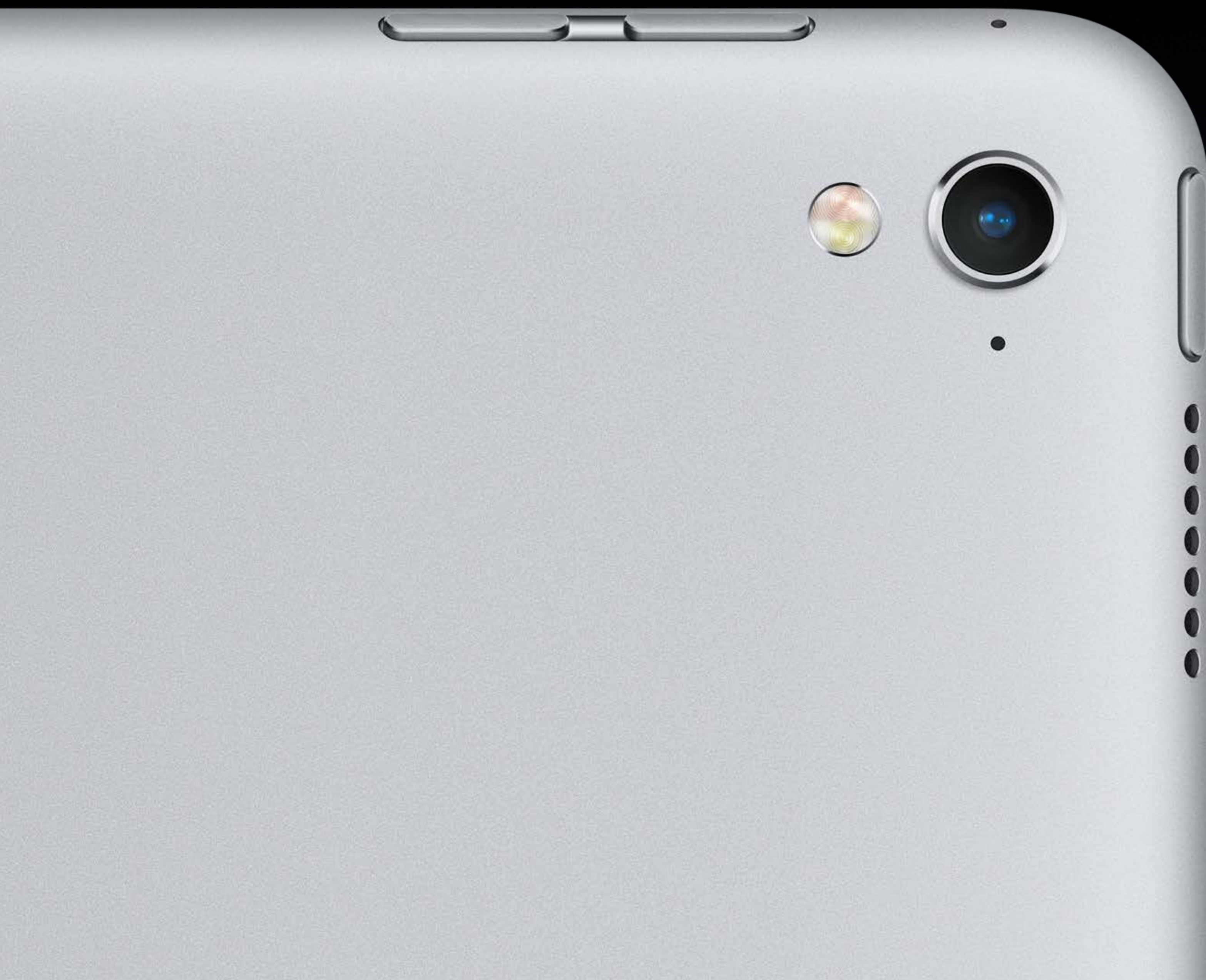


APIs

Sharing

PDF and printing

System Apps



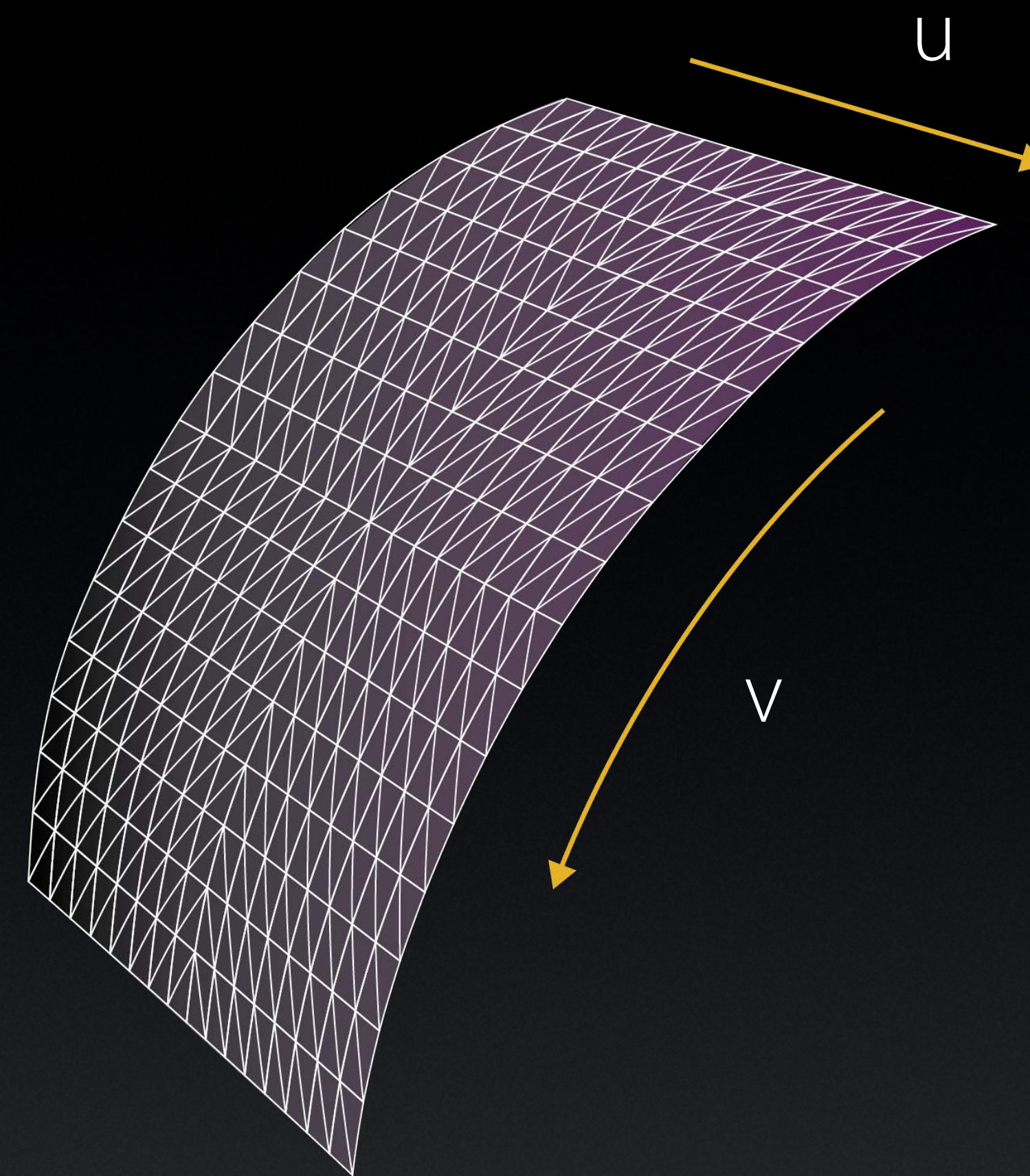
Capture Deep and Wide Color Images

API to Access DNG (RAW) camera images

API to capture LivePhotos

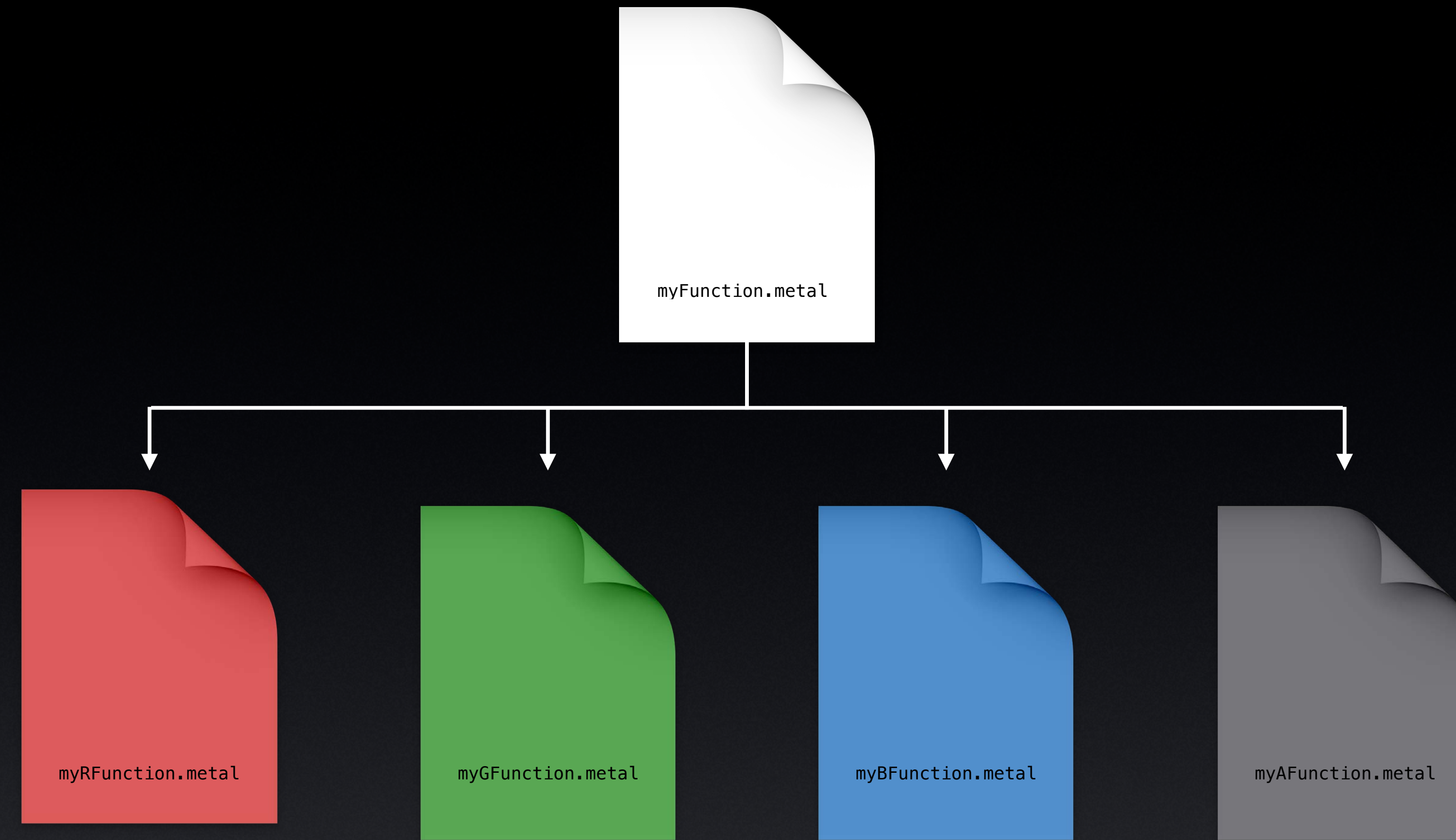


Metal



Metal Tessellation

Metal Function Specialization



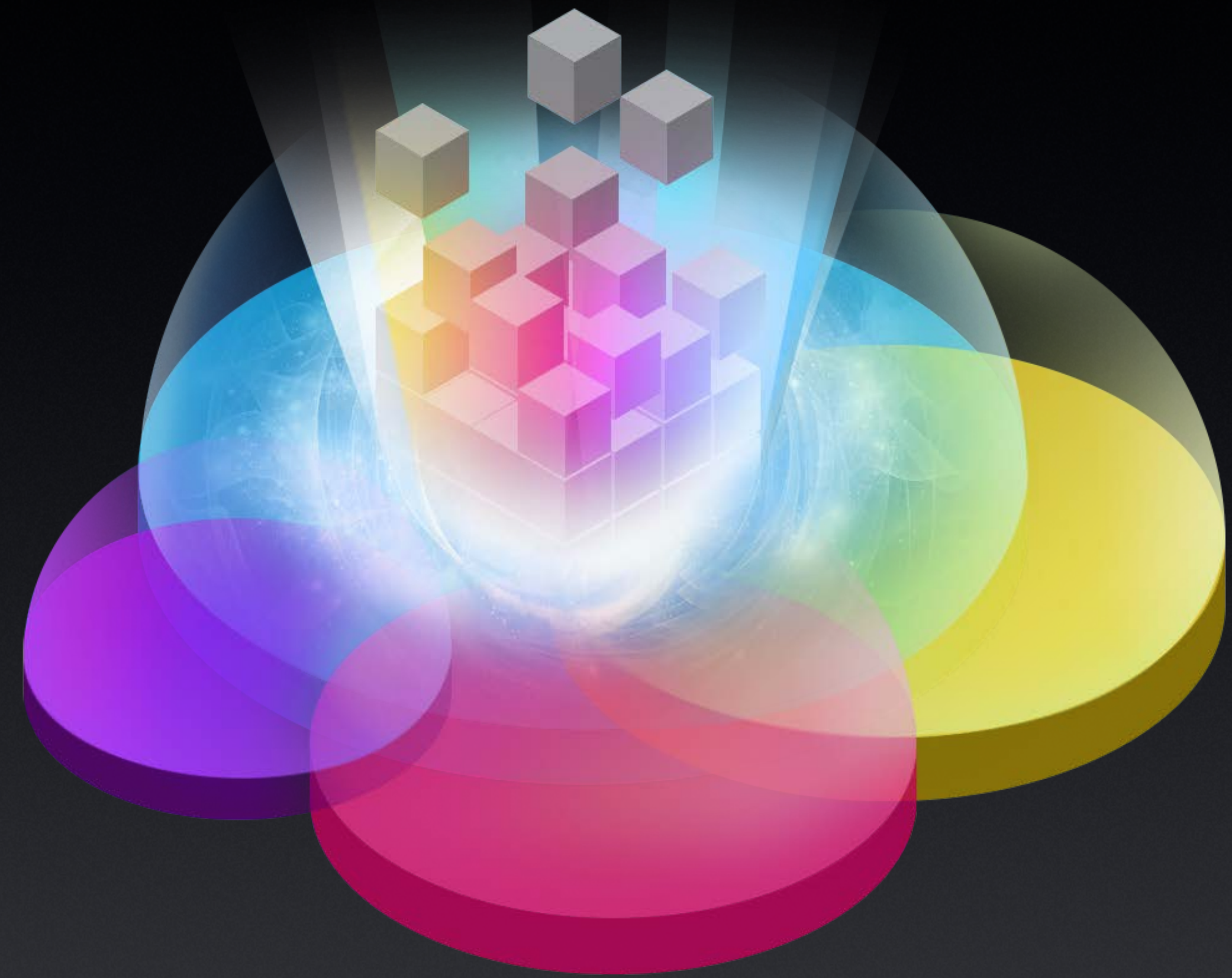
Metal Function Specialization

Memoryless Render Targets

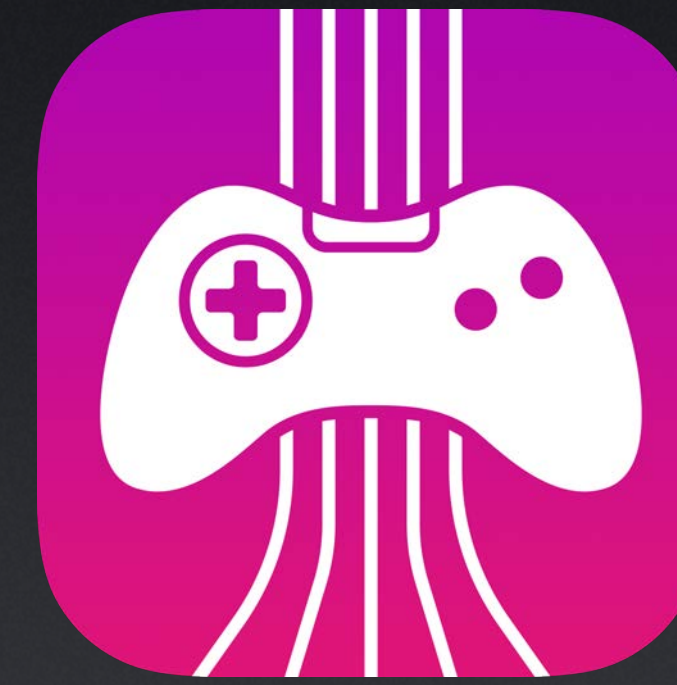
Resource Heaps



Hundreds of millions of devices
Every iOS device and Mac we ship
All our key graphics frameworks
Major game engines



Games





Replay Kit

 **Audi R8 e-tron**
RANK 527 / 847

ACCELERATION 4.20 s
TOP SPEED 200.1 km/h
HANDLING 1.200 Gs
NITRO 37.2 km/h

← →

COLLECTIONS 3/136 MASTERY

D C B A S





2 / 6 POS.

209 km/h

1 / 1 LAP

01:43:317

AIR TIME
0.96 s
PERFECT NITRO
KNOCKDOWN
x1

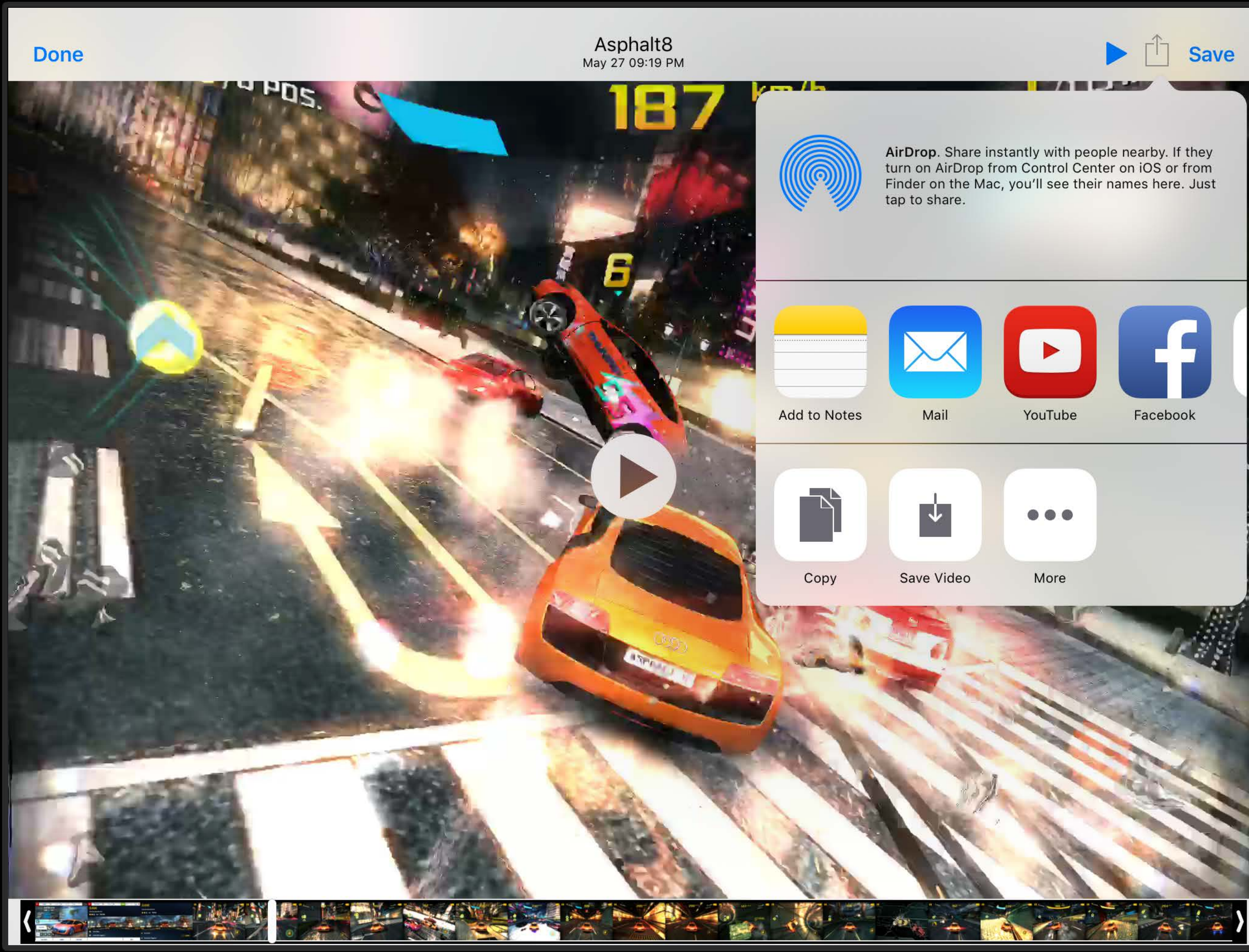


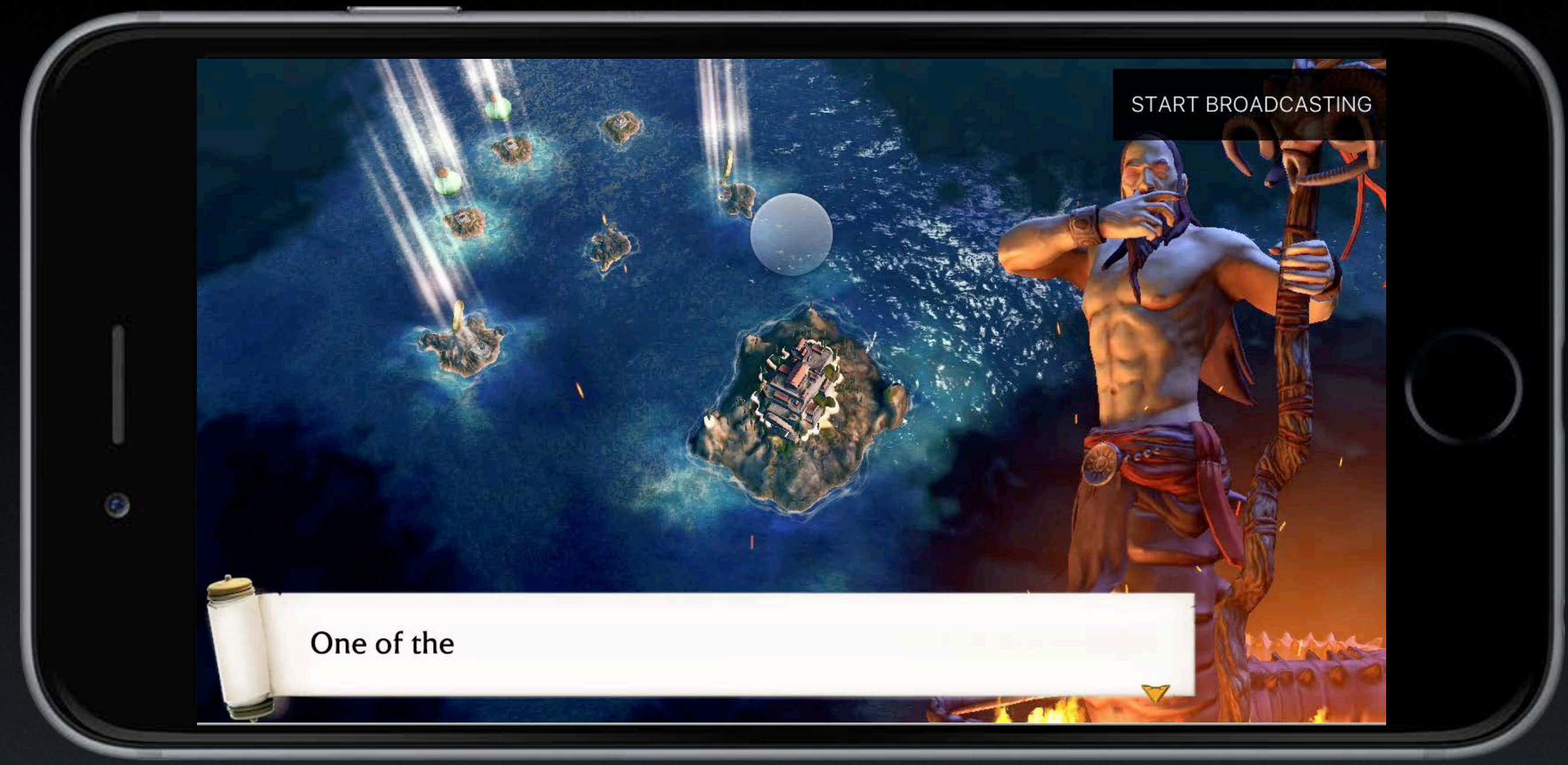
Cancel

Asphalt8
May 27 09:19 PM

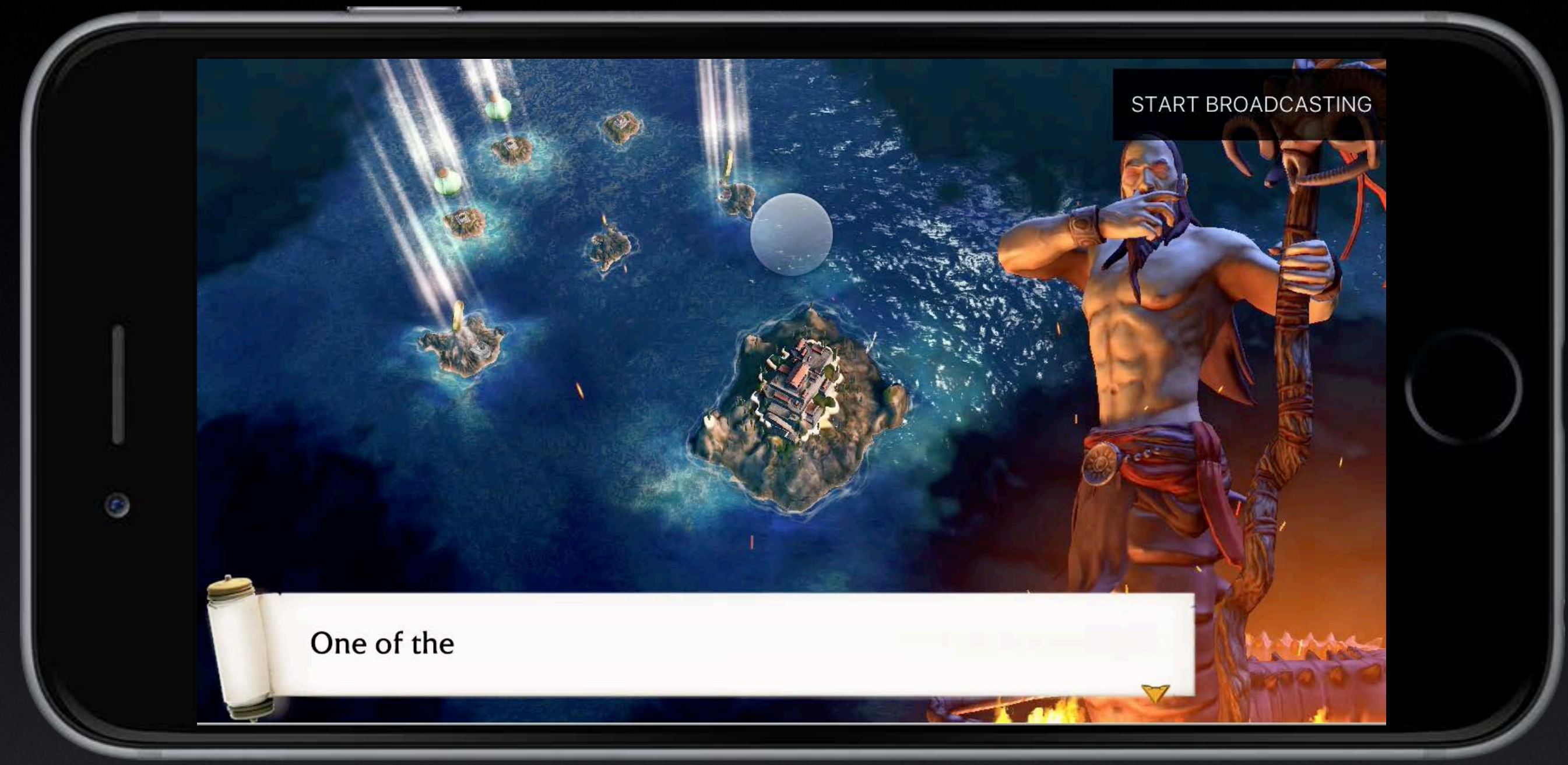
Save



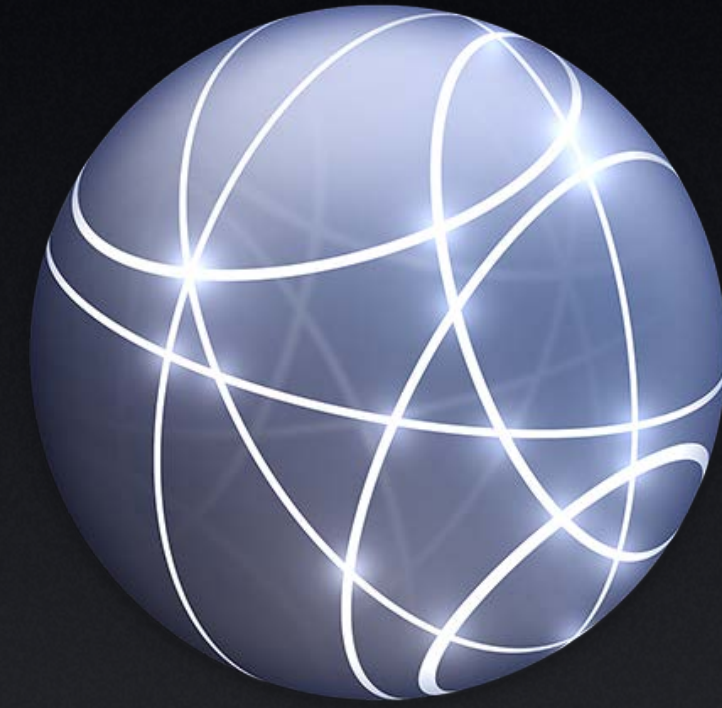
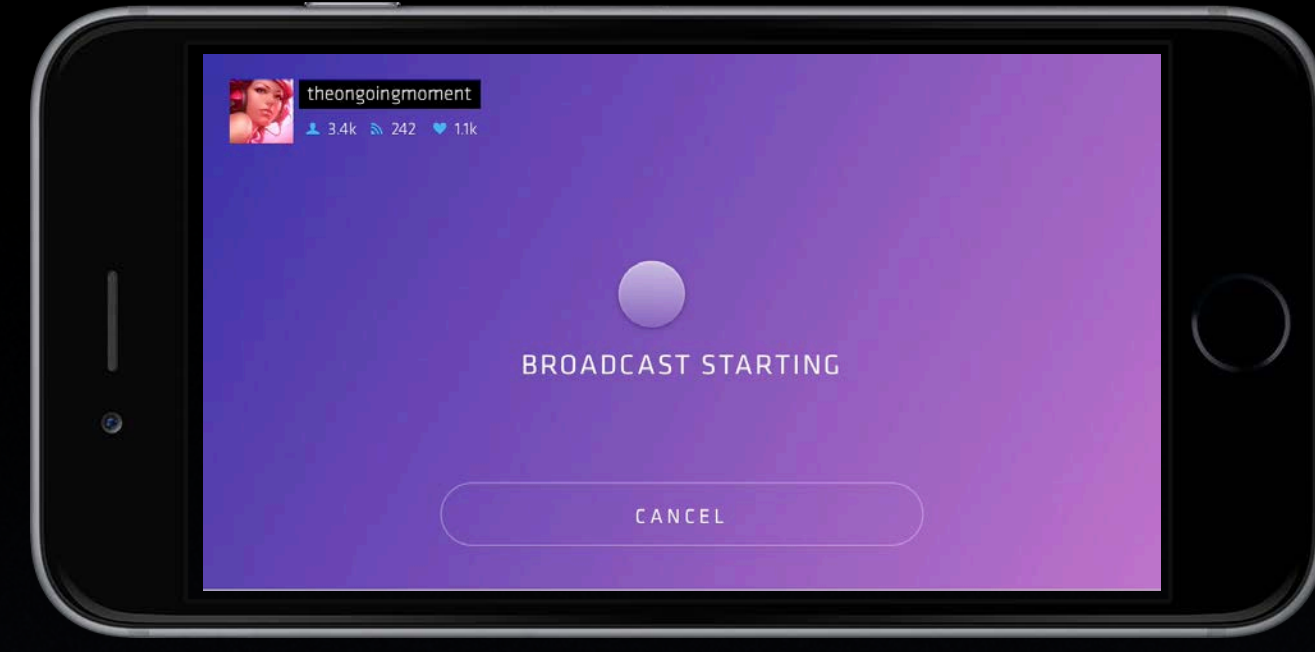


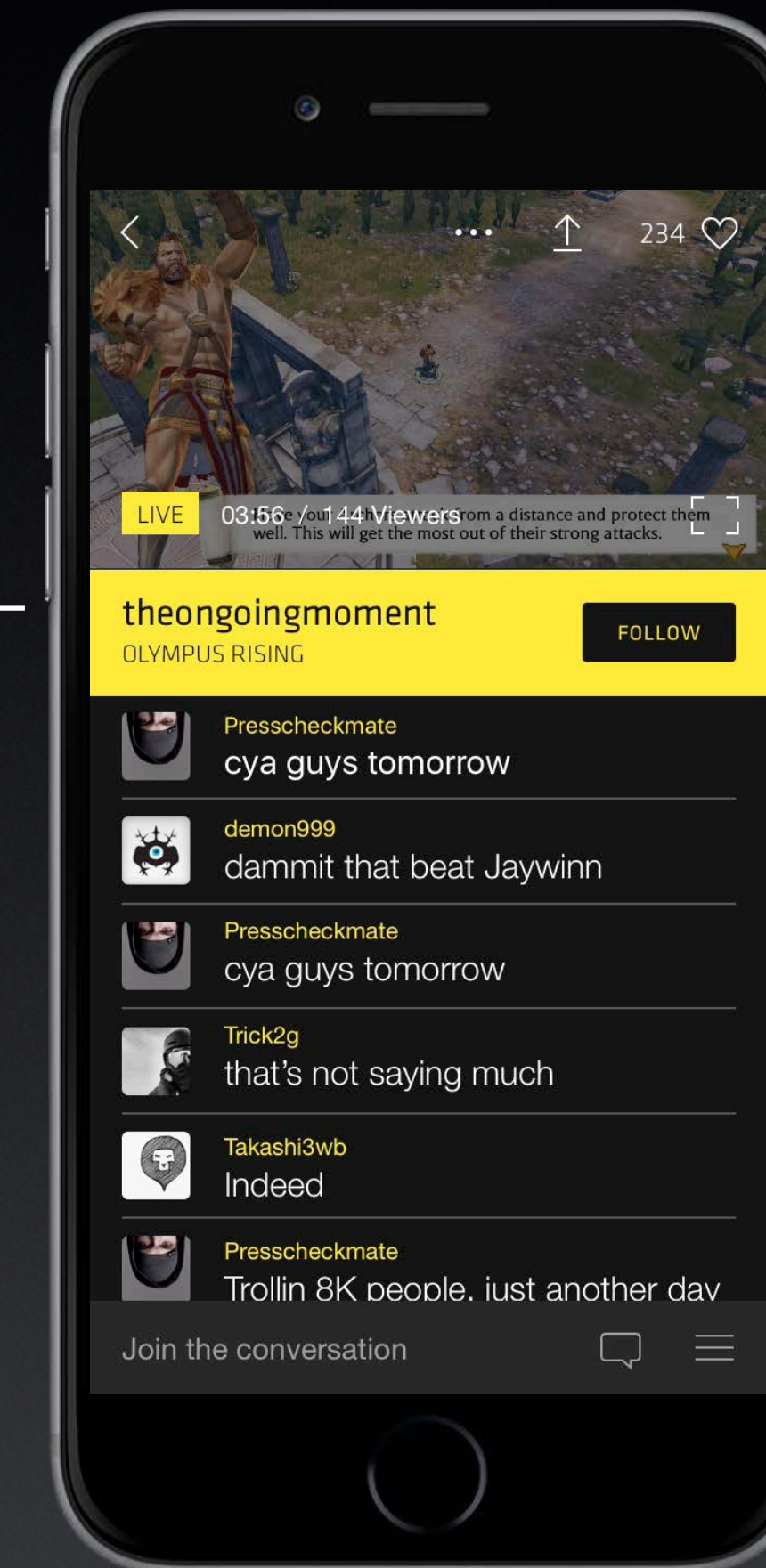
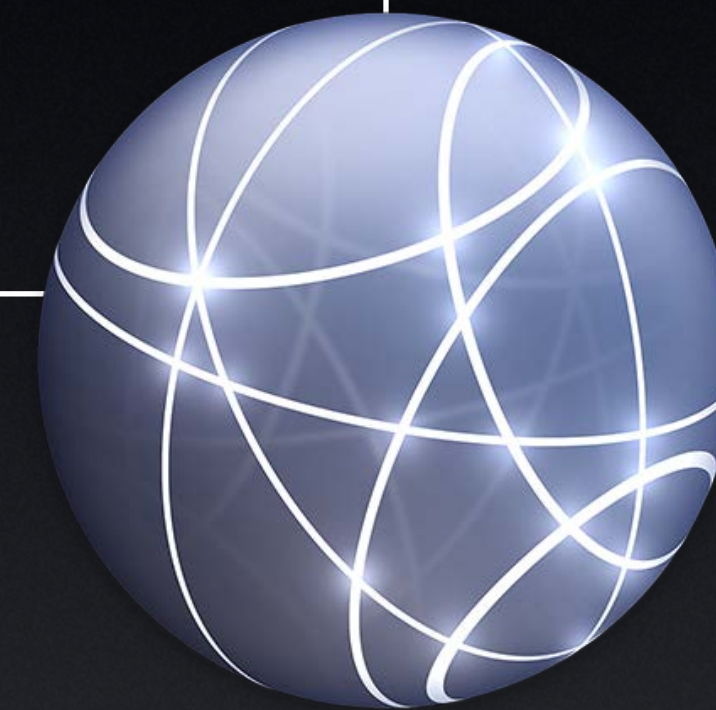
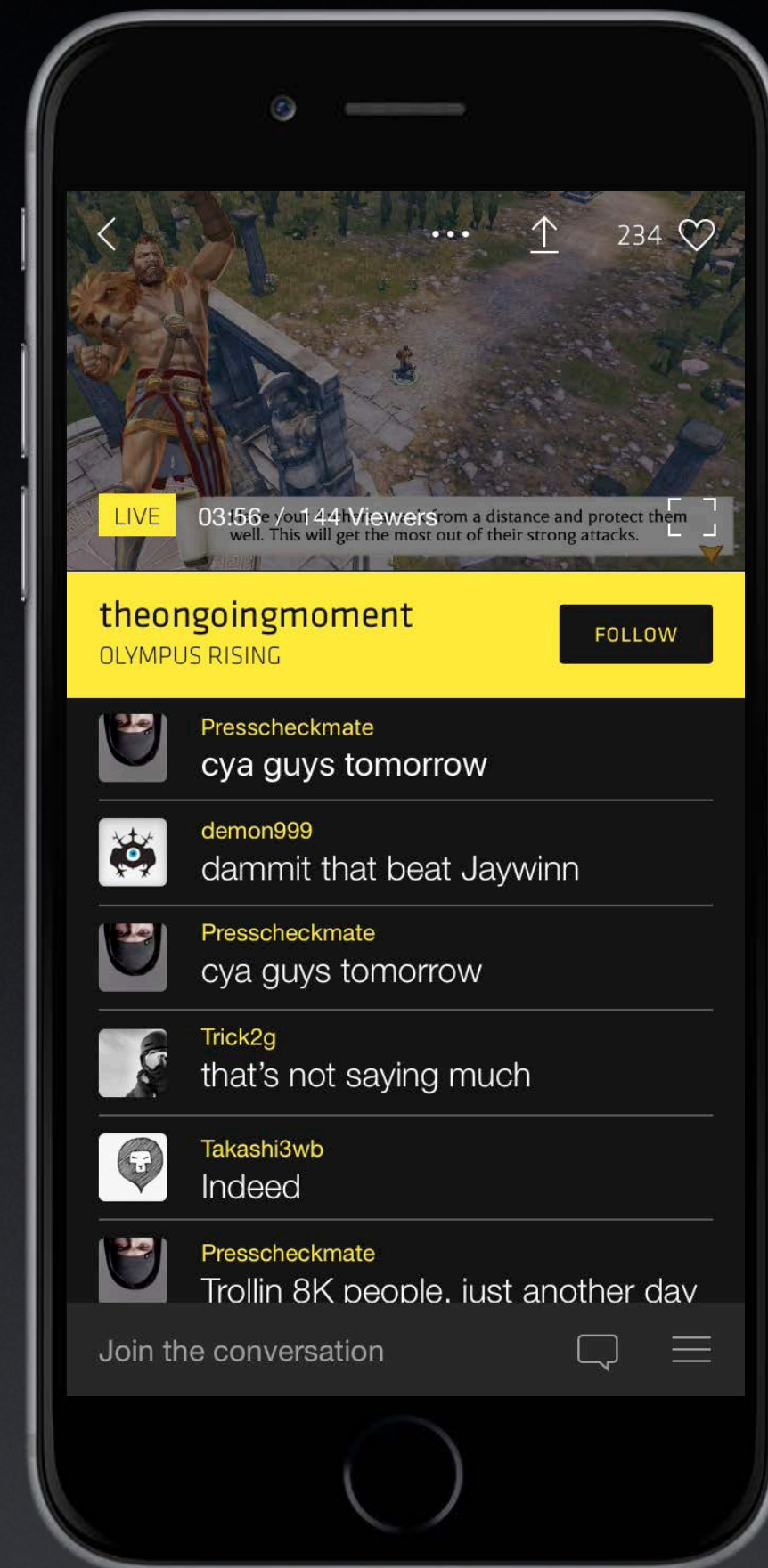


ReplayKit Streaming



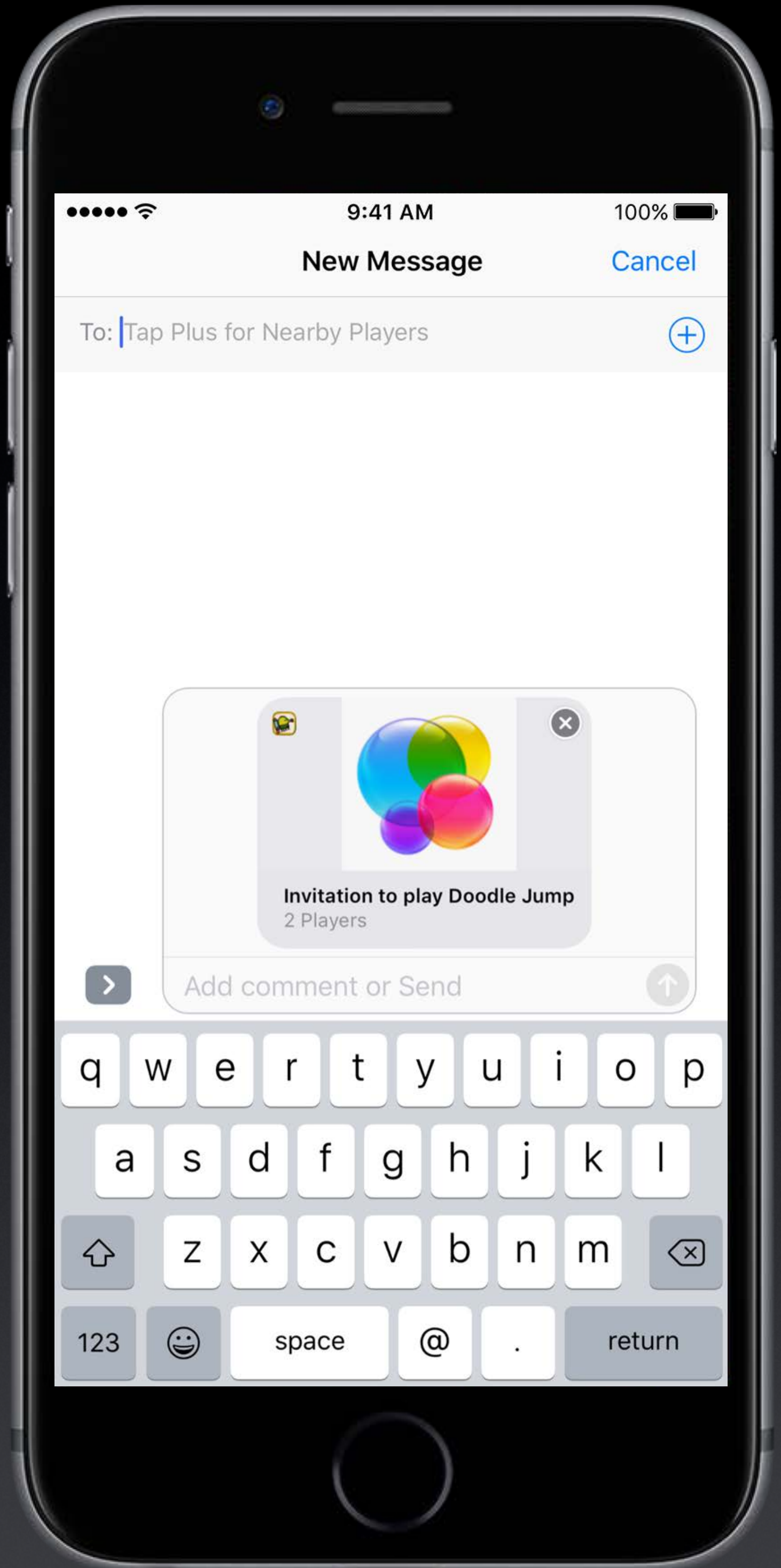
ReplayKit Streaming

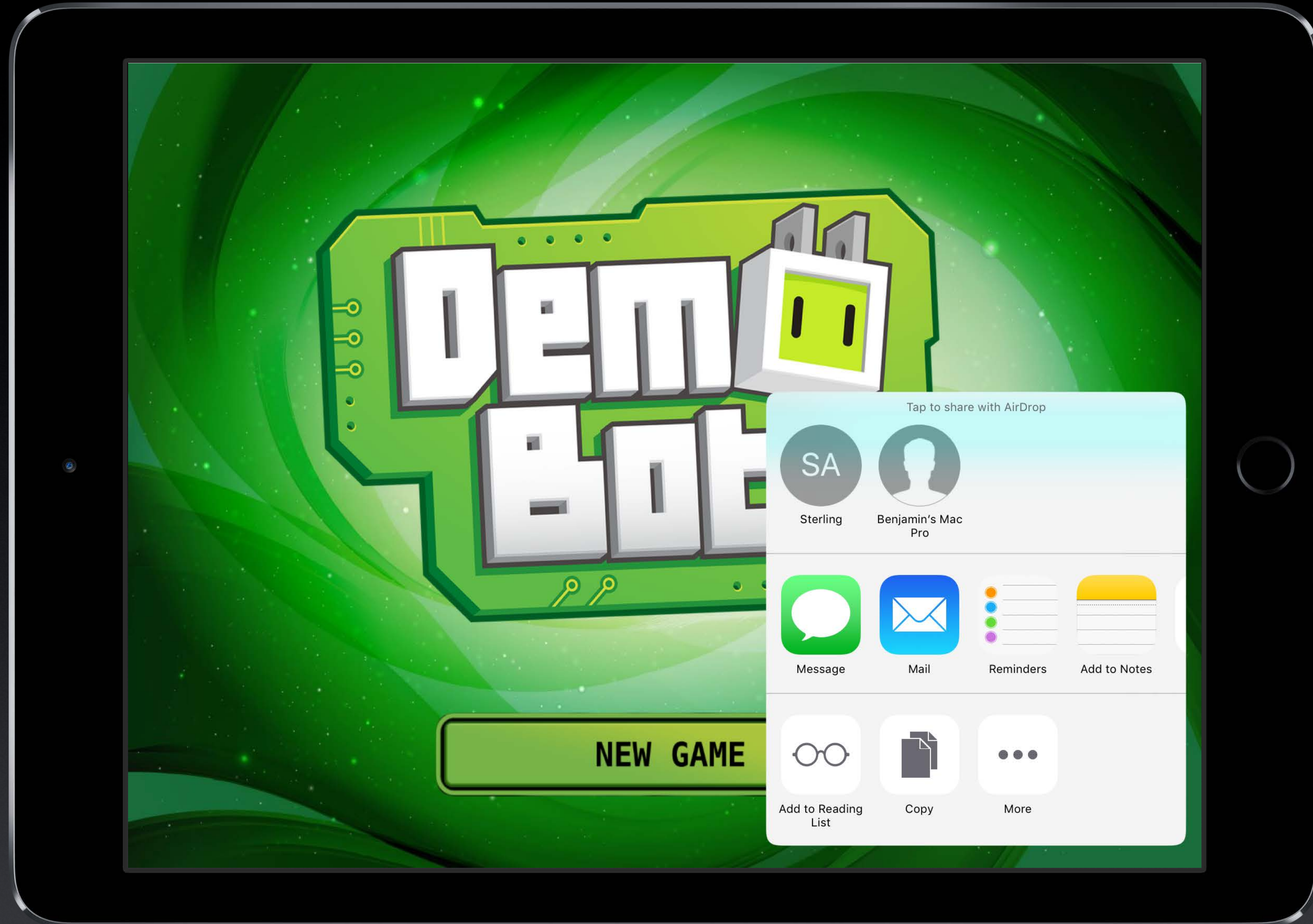






Game Center





Demobot

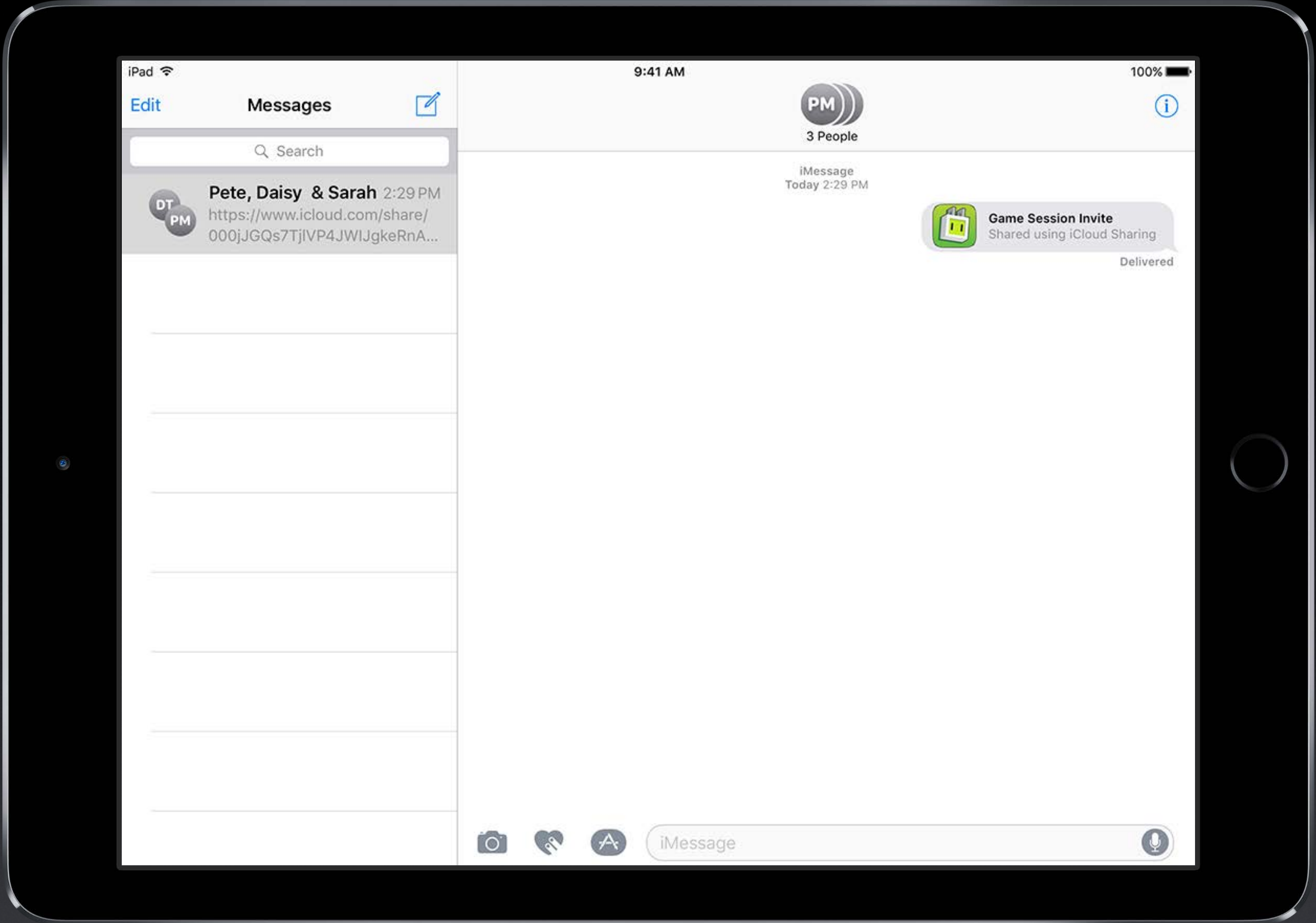
NEW GAME

Tap to share with AirDrop

SA Sterling Benjamin's Mac Pro

Message Mail Reminders Add to Notes

Add to Reading List Copy More



iPad

9:41 AM

100%

Edit

Messages



Search



Pete, Daisy & Sarah 2:29 PM

<https://www.icloud.com/share/000jJGQs7TjIvP4JWlJgkeRnA...>



3 People



iMessage
Today 2:29 PM



Game Session Invite
Shared using iCloud Sharing

Delivered

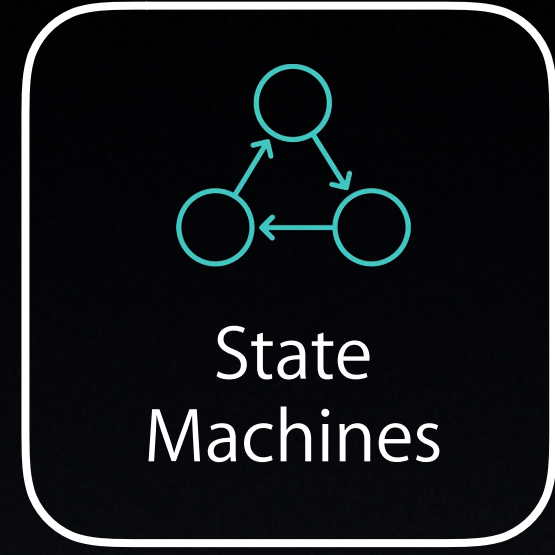
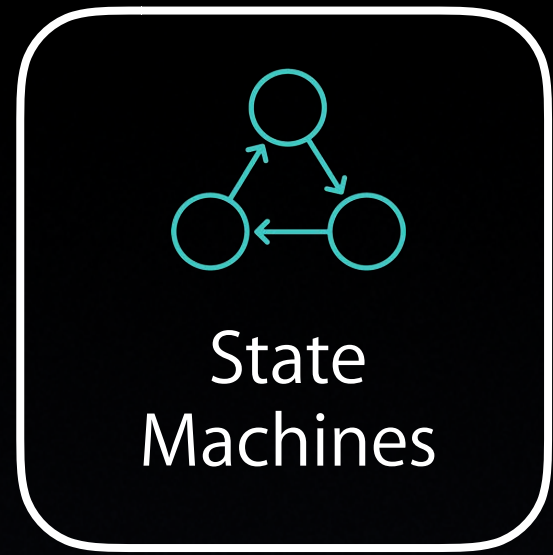


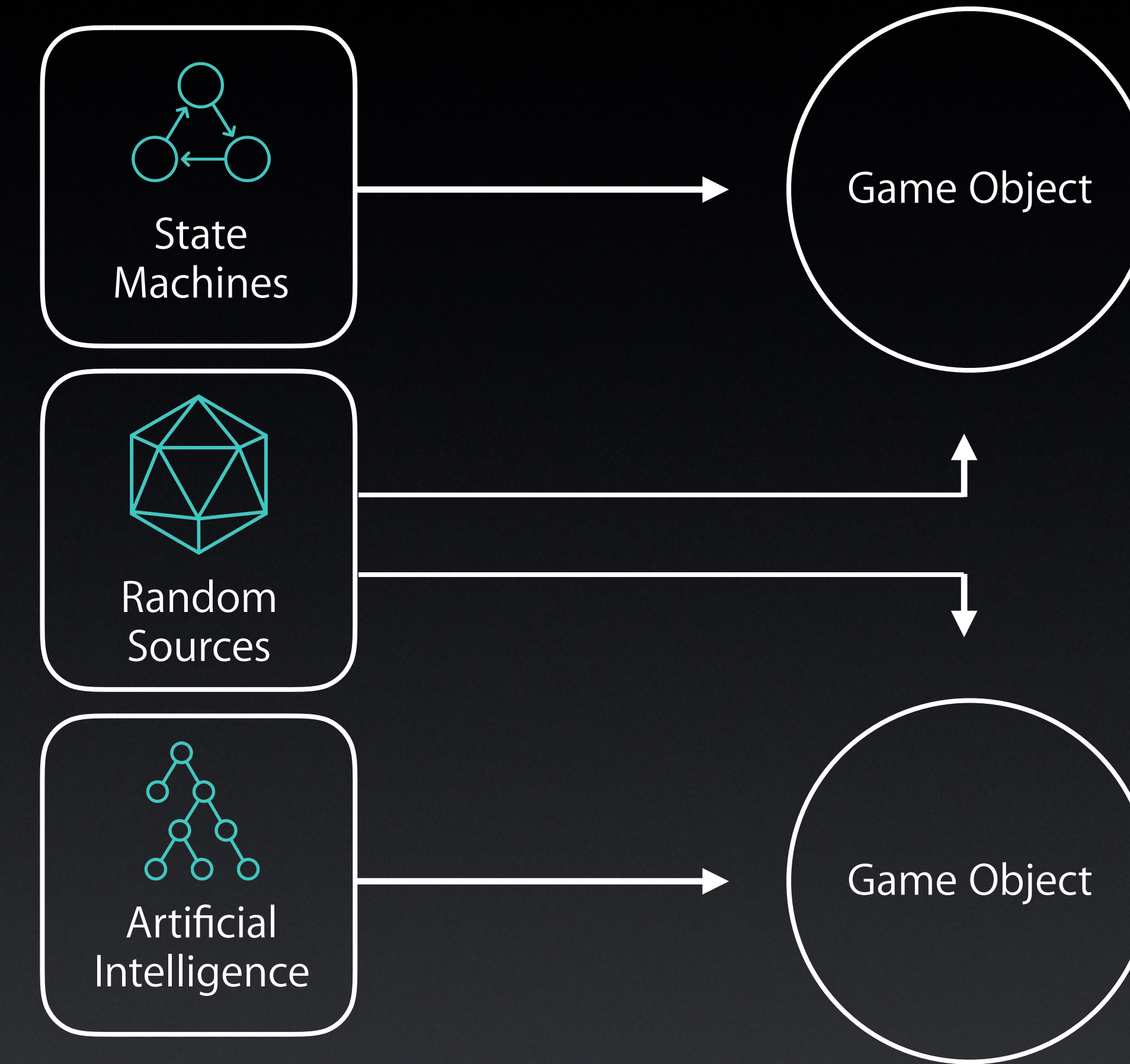
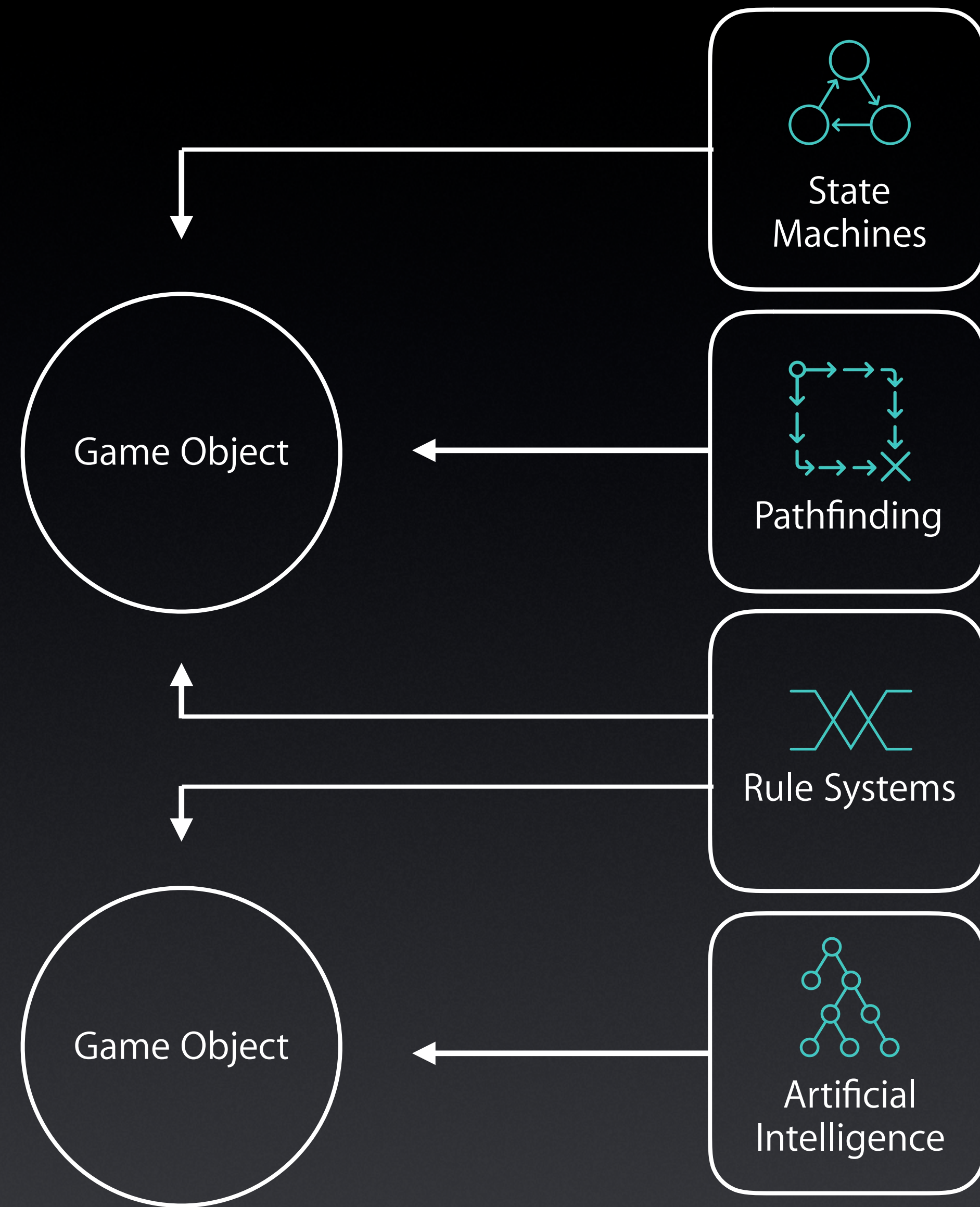
iMessage











Demo

macOS

iOS

watchOS

tvOS







Contacts Interactive notifications Cache Delete Smart Card API Window Tabs SiriKit Payments SiriKit VoIP calling
Camera sensor data Live information Recent addresses SiriKit SceneKit physically based rendering SiriKit Messaging
iMessage extensions Xcode thread sanitizer Xcode source editor extensions ReplayKit Live
Book-a-ride extension Live Photos editing Apple Pay on the web Xcode FPS gauge
iMessage apps Smaller Xcode download Xcode editor extensions Maps extensions
Spam alert extension HomeKit Air Purifier Native VoIP experience SiriKit photo search
Live Photos capture iCloud for Developer ID SiriKit ride booking Speech Recognition
HomeKit Doorbell Reservations Maps extension HomeKit accessories HomeKit Air Conditioning
User notifications VoIP extensions Wide color CarPlay Maps instrument cluster Stickers Grid View HomeKit Camera
CloudKit sharing RAW photo editing SiriKit Workouts Memory debugger Pixar USD model support Metal Tessellation









iOS 10

macOS Sierra

watchOS 3

tvOS 10

Xcode 8

developer.apple.com/wwdc/resources/





Over 100 sessions

Over 150 labs

Over 1000 Apple engineers

Apple WWDC 16