

Featured

#WWDC15

Building Watch Apps

Session 108

Neil Desai watchOS Engineer

Agenda

Agenda

Architecture

Agenda

Architecture

Interface elements

Agenda

Architecture

Interface elements

Debugging

Agenda

Architecture

Interface elements

Debugging

watchOS 2 Features











Architecture





Architecture

iPhone

Apple Watch

Architecture



iPhone

A large blue rectangle representing the iPhone architecture.



Apple Watch

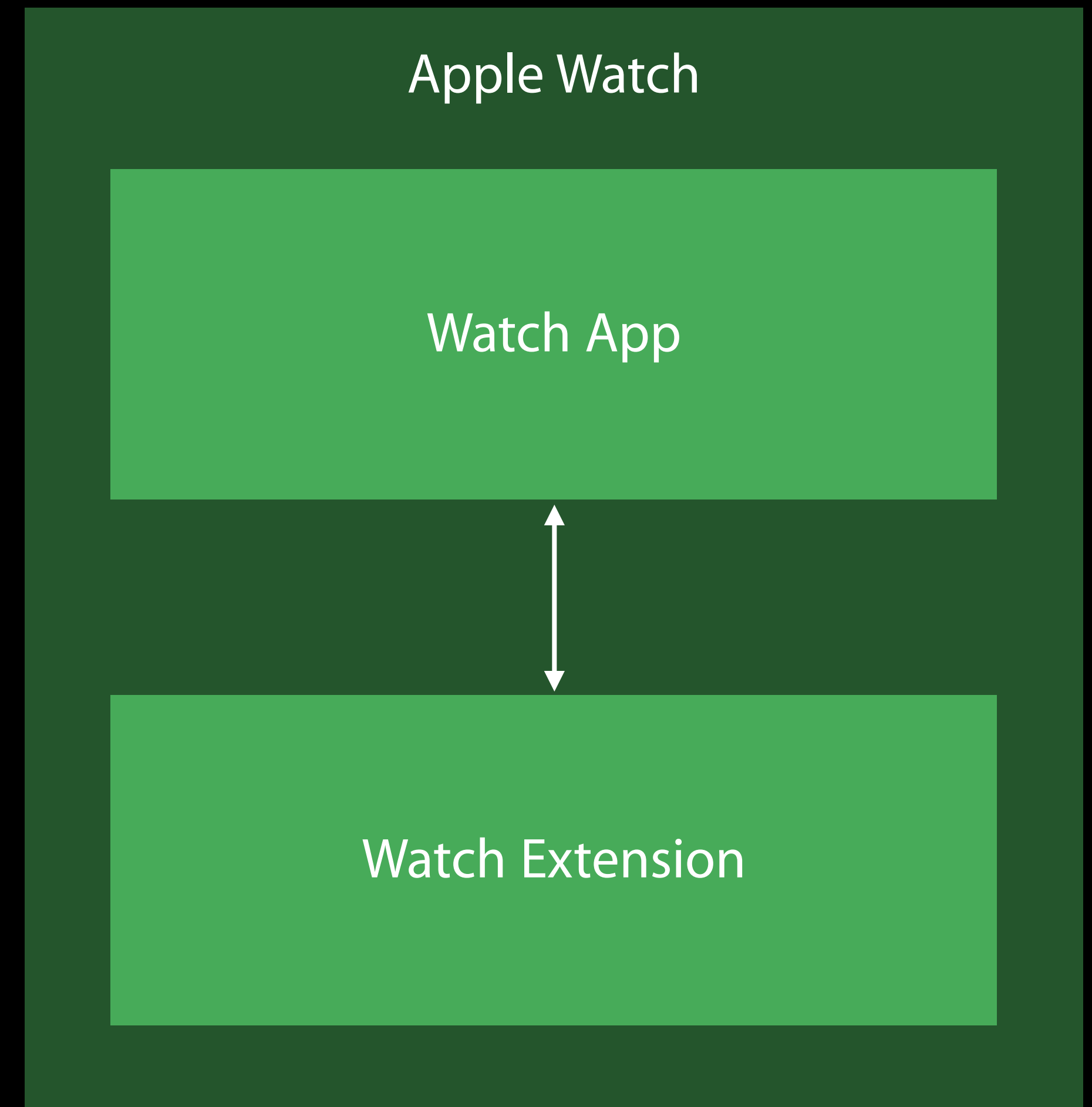
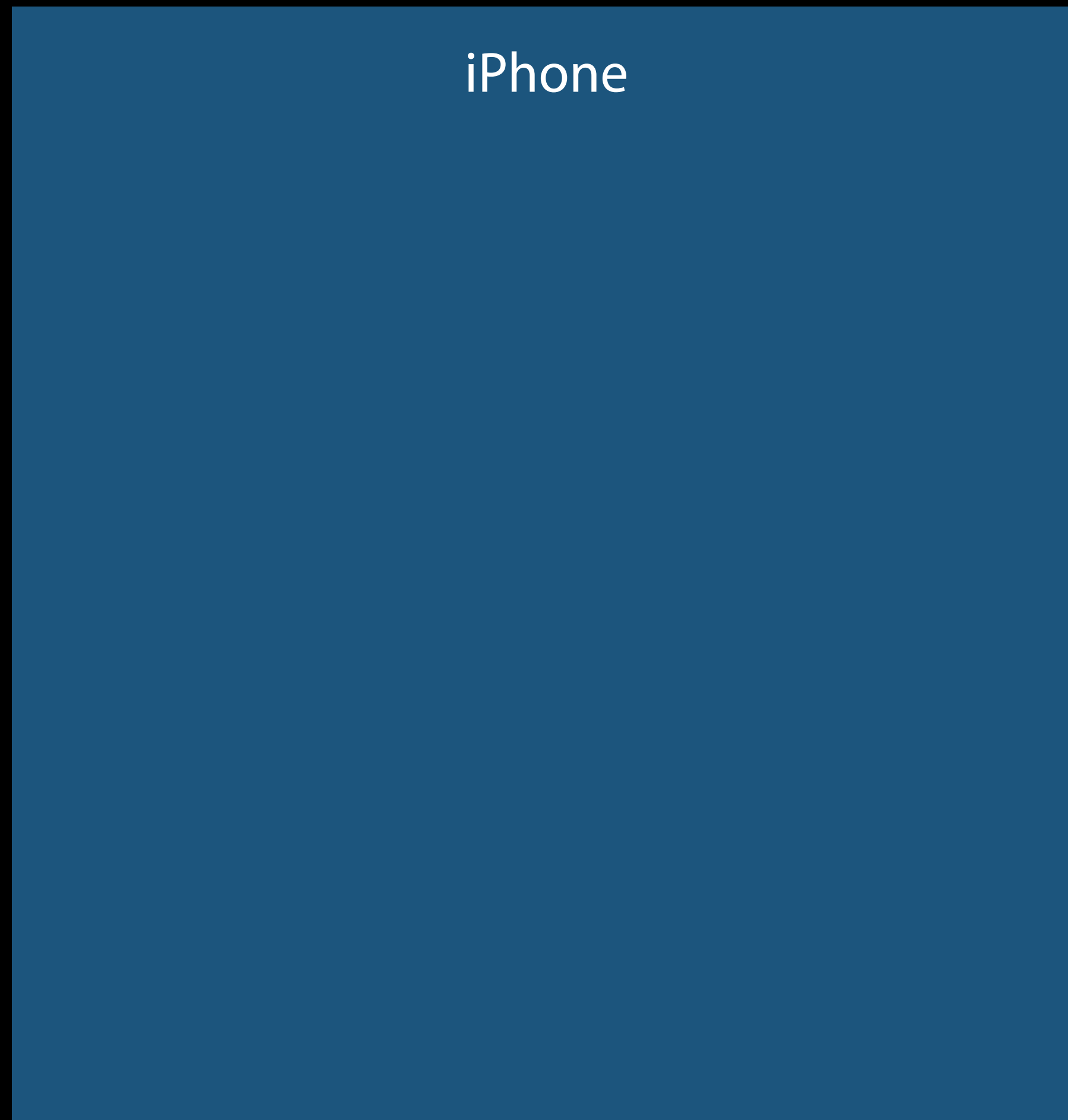
A large dark green rectangle representing the Apple Watch architecture.



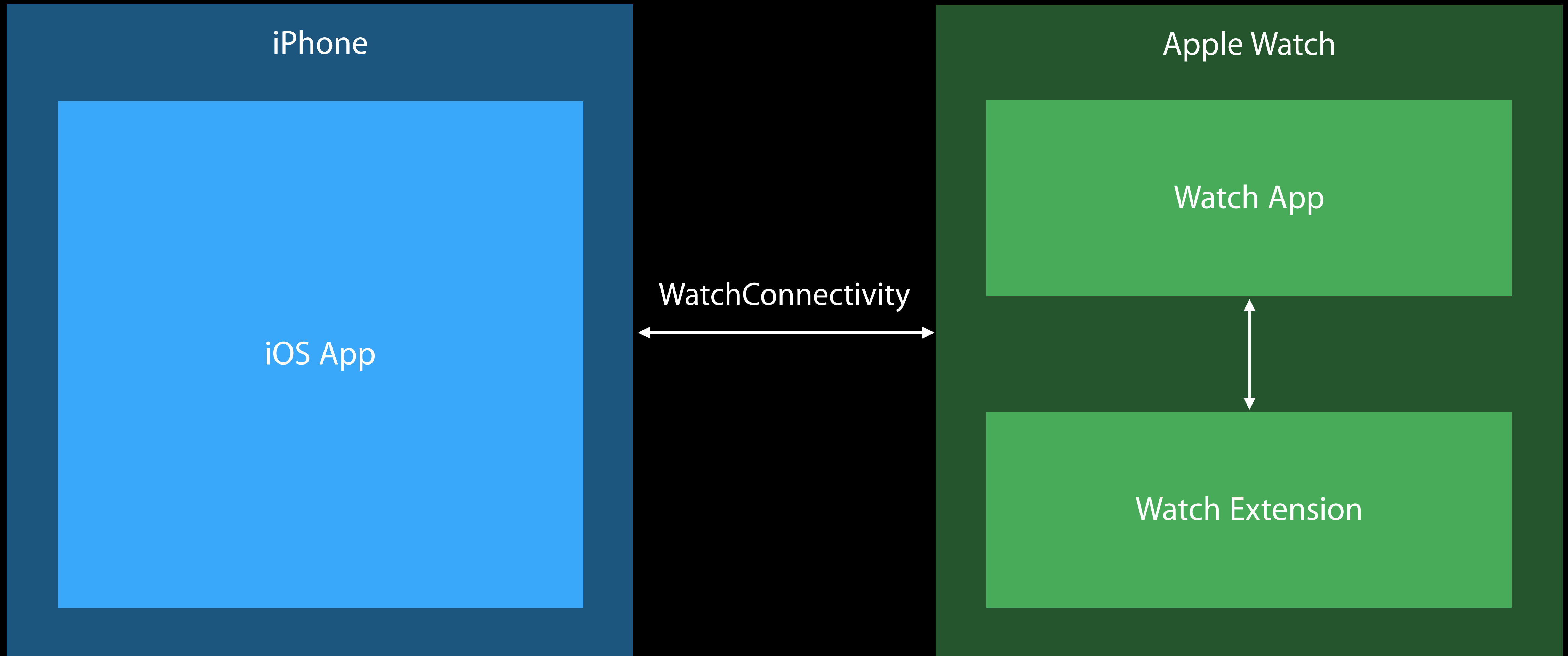
Watch App

A smaller light green rectangle nested inside the Apple Watch rectangle, representing the Watch App.

Architecture



Architecture



Architecture

Interface

UI is stored in Watch app

Architecture

Interface

UI is stored in Watch app

Plan your UI in advance

Architecture

Interface

UI is stored in Watch app

Plan your UI in advance

Code updates UI from the extension

Architecture

WatchKit Framework

One controller per screen of content

Architecture

UIKit Framework

One controller per screen of content

Manages UI elements through outlets

Architecture

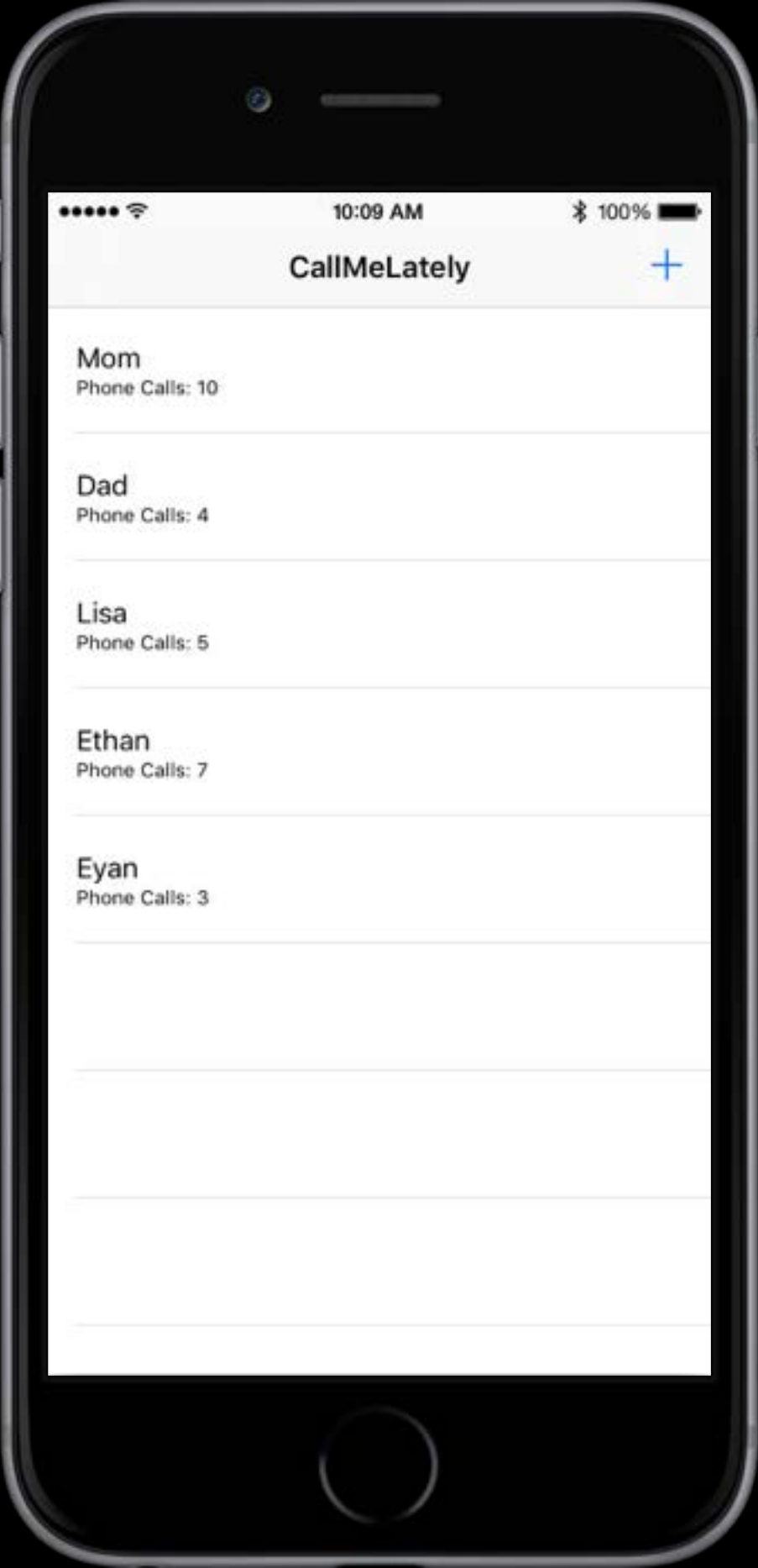
UIKit Framework

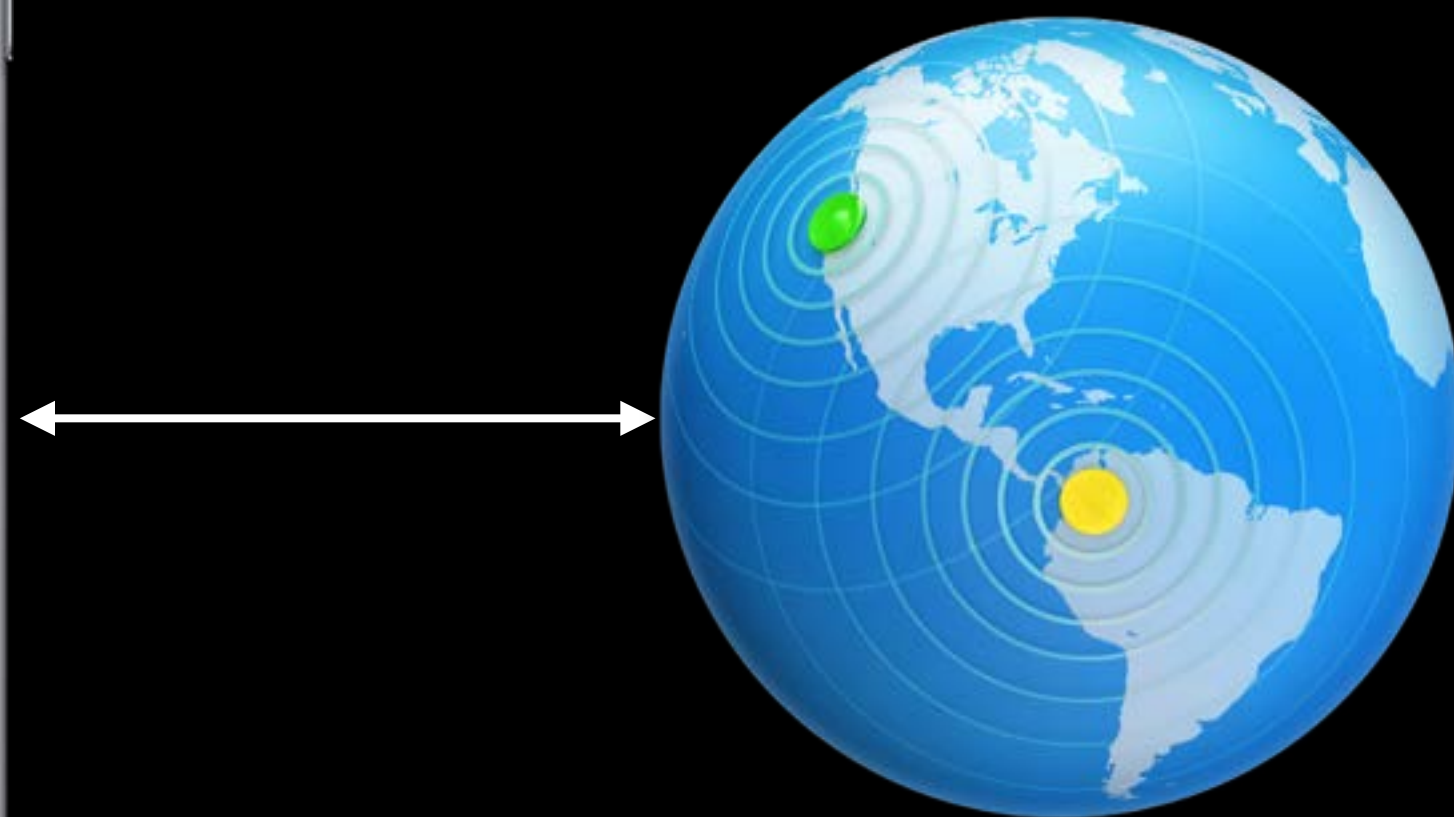
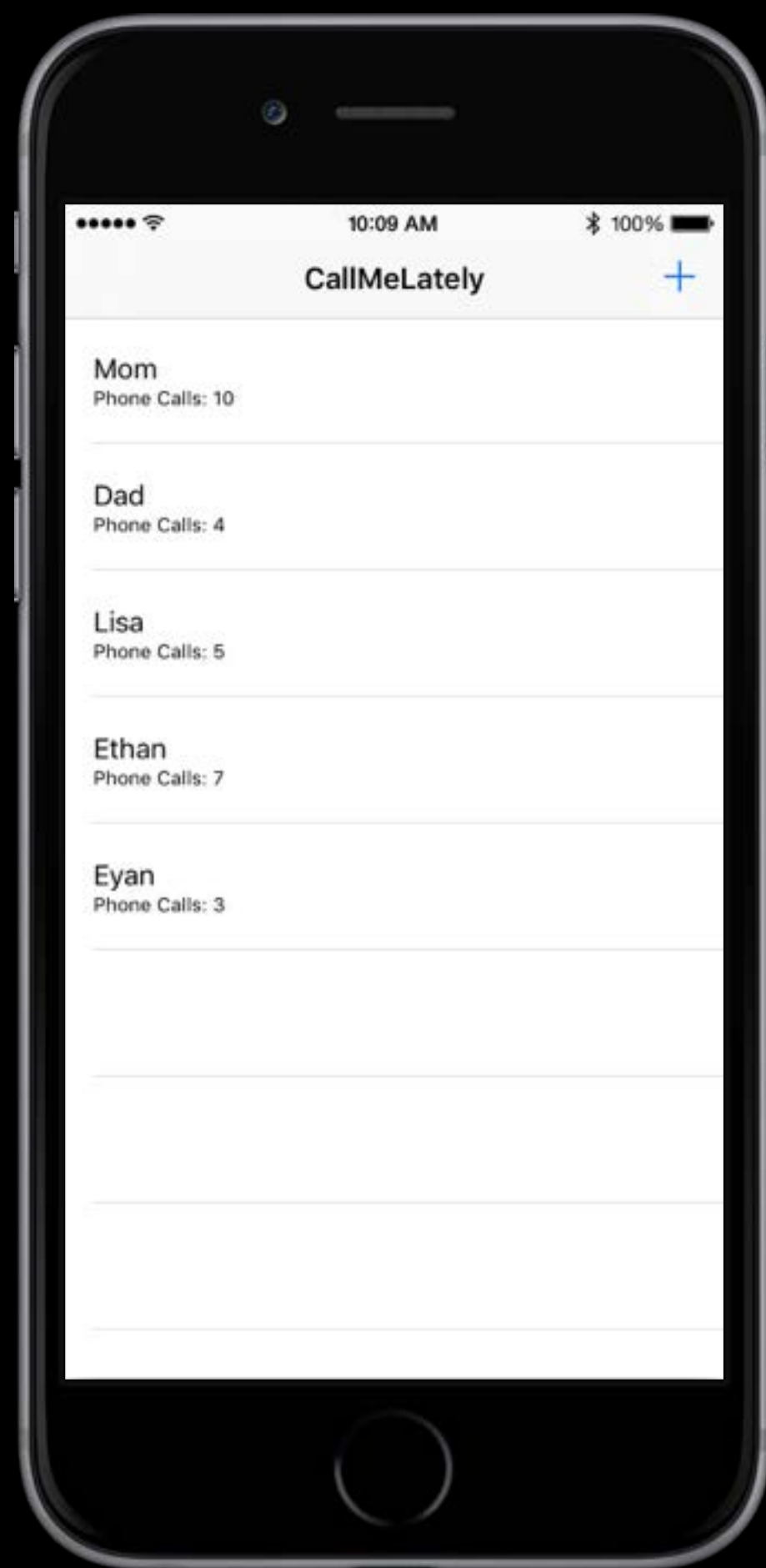
One controller per screen of content

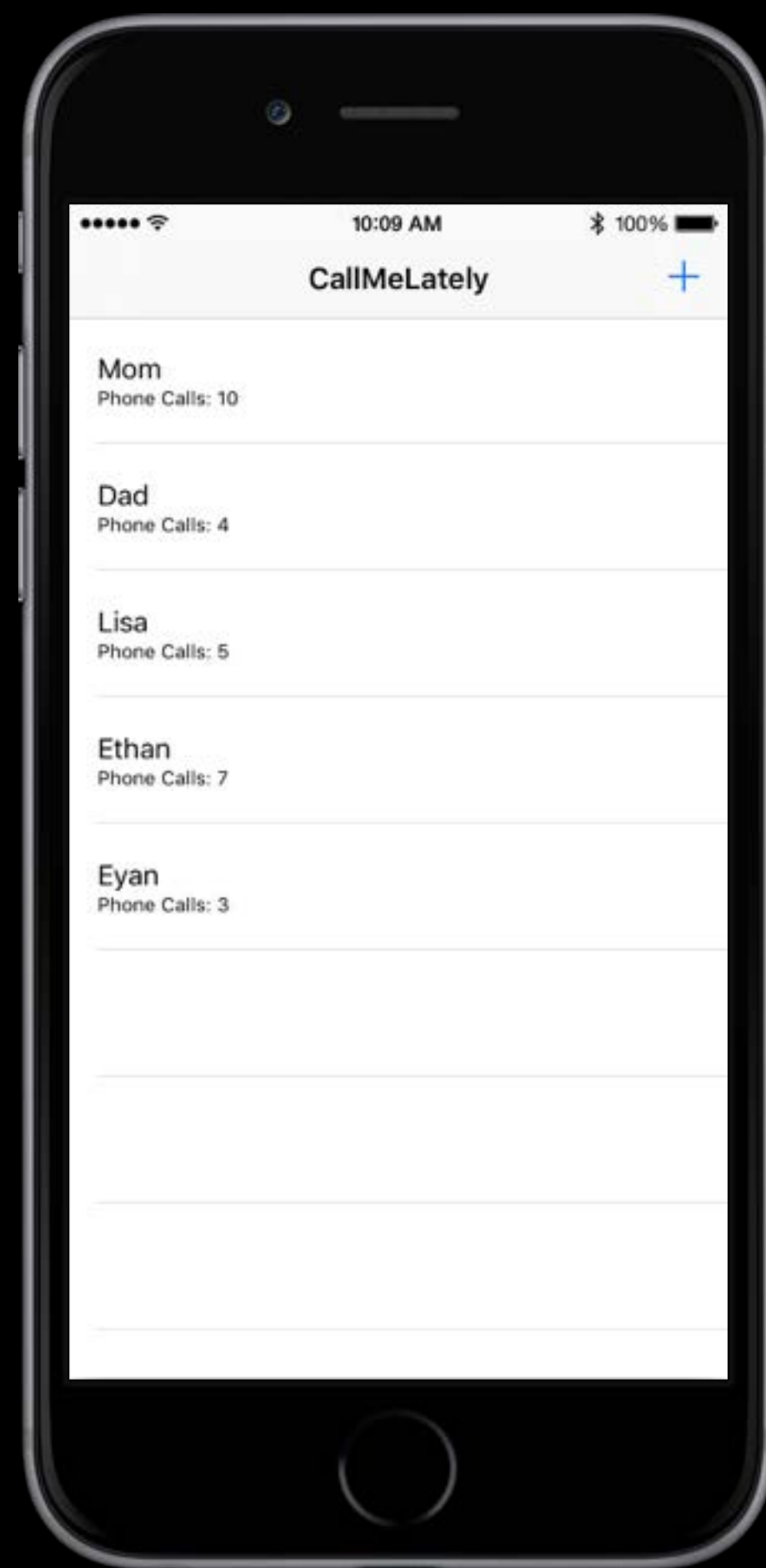
Manages UI elements through outlets

Uses target-action design pattern









Adding a Watch App

Adding a Watch App

Add Watch App target

Adding a Watch App

Add Watch App target

Configure interface elements

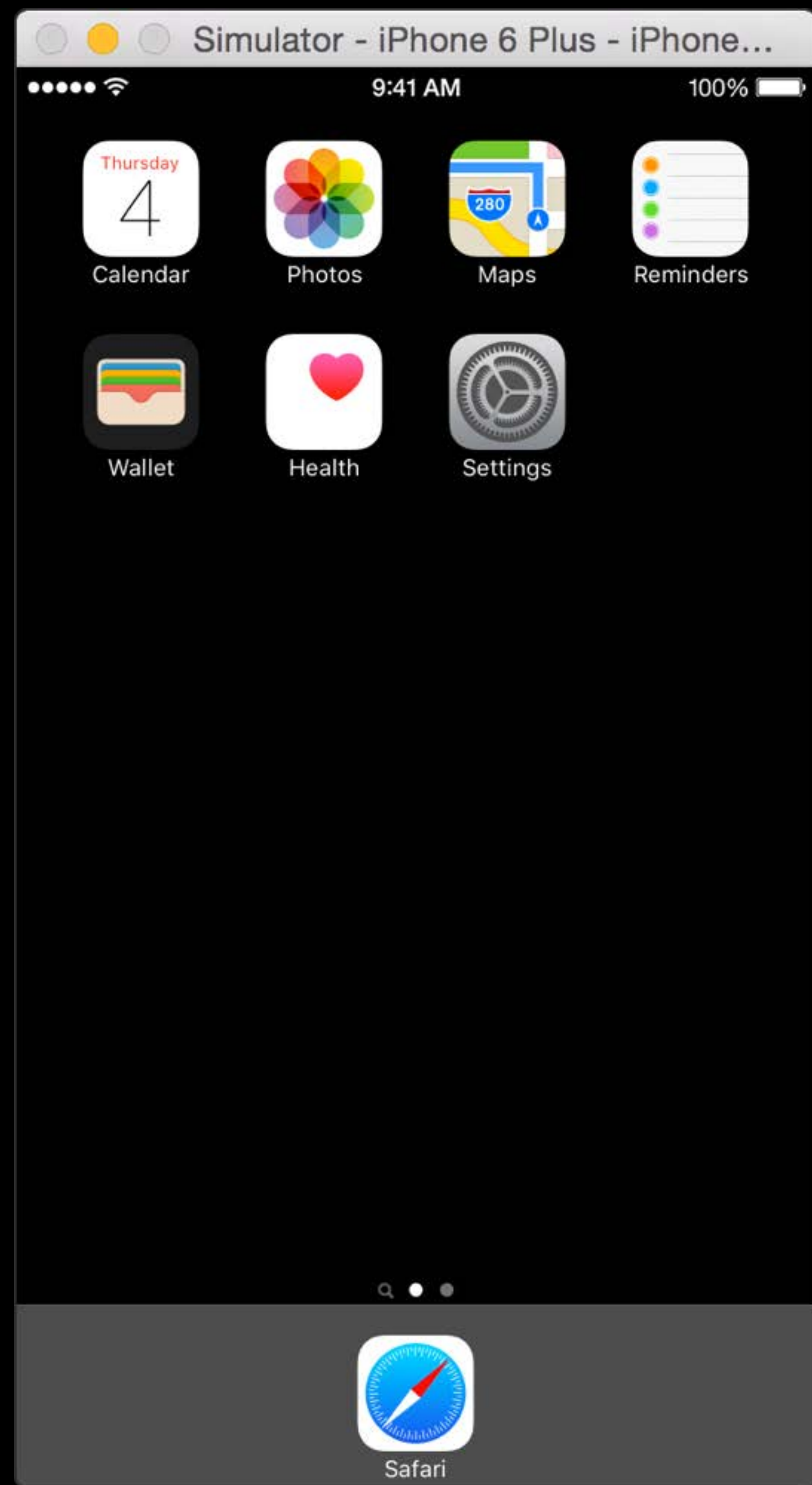
Adding a Watch App

Add Watch App target

Configure interface elements

Build and run

Simulator





Simulator

Overview

Simulator

Overview

Full simulator

Simulator

Overview

Full simulator

38mm and 42mm

Simulator

Overview

Full simulator

38mm and 42mm

Simulate Touch Pressure

Simulator

Overview

Full simulator

38mm and 42mm

Simulate Touch Pressure

Clock faces

Simulator

Overview

Full simulator

38mm and 42mm

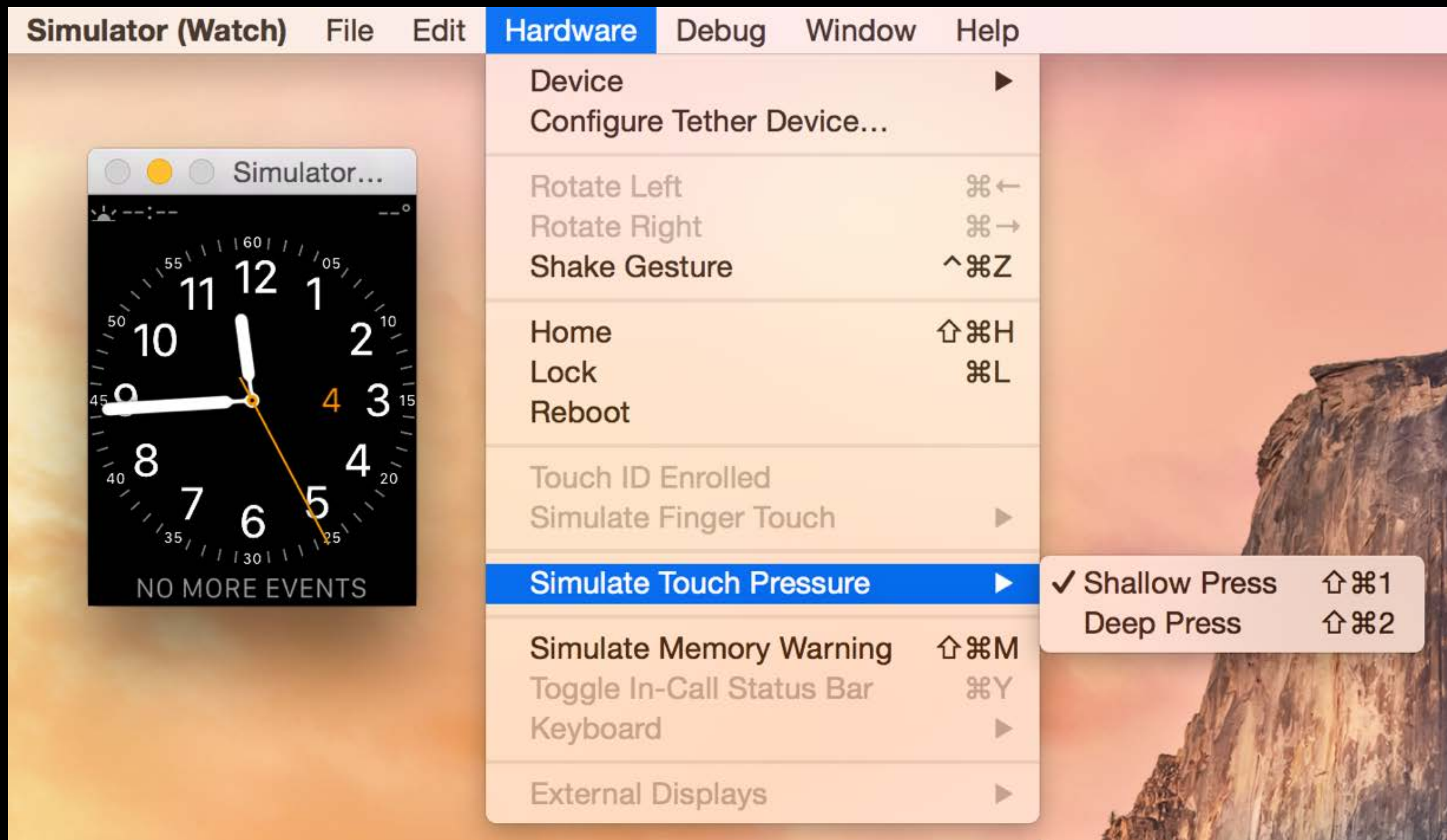
Simulate Touch Pressure

Clock faces

Multiple apps

Simulator

Touch Pressure



Simulator

Touch Pressure

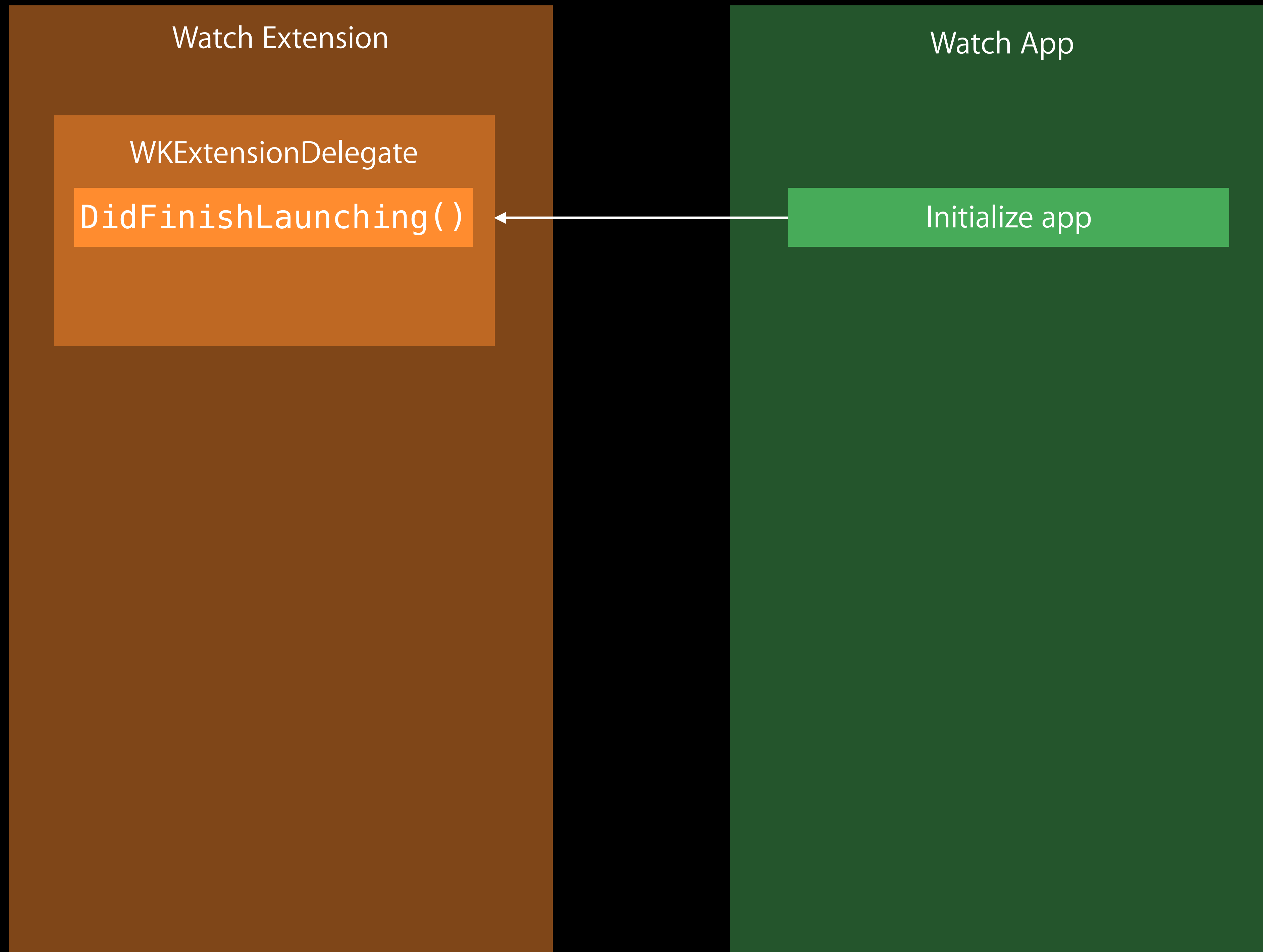


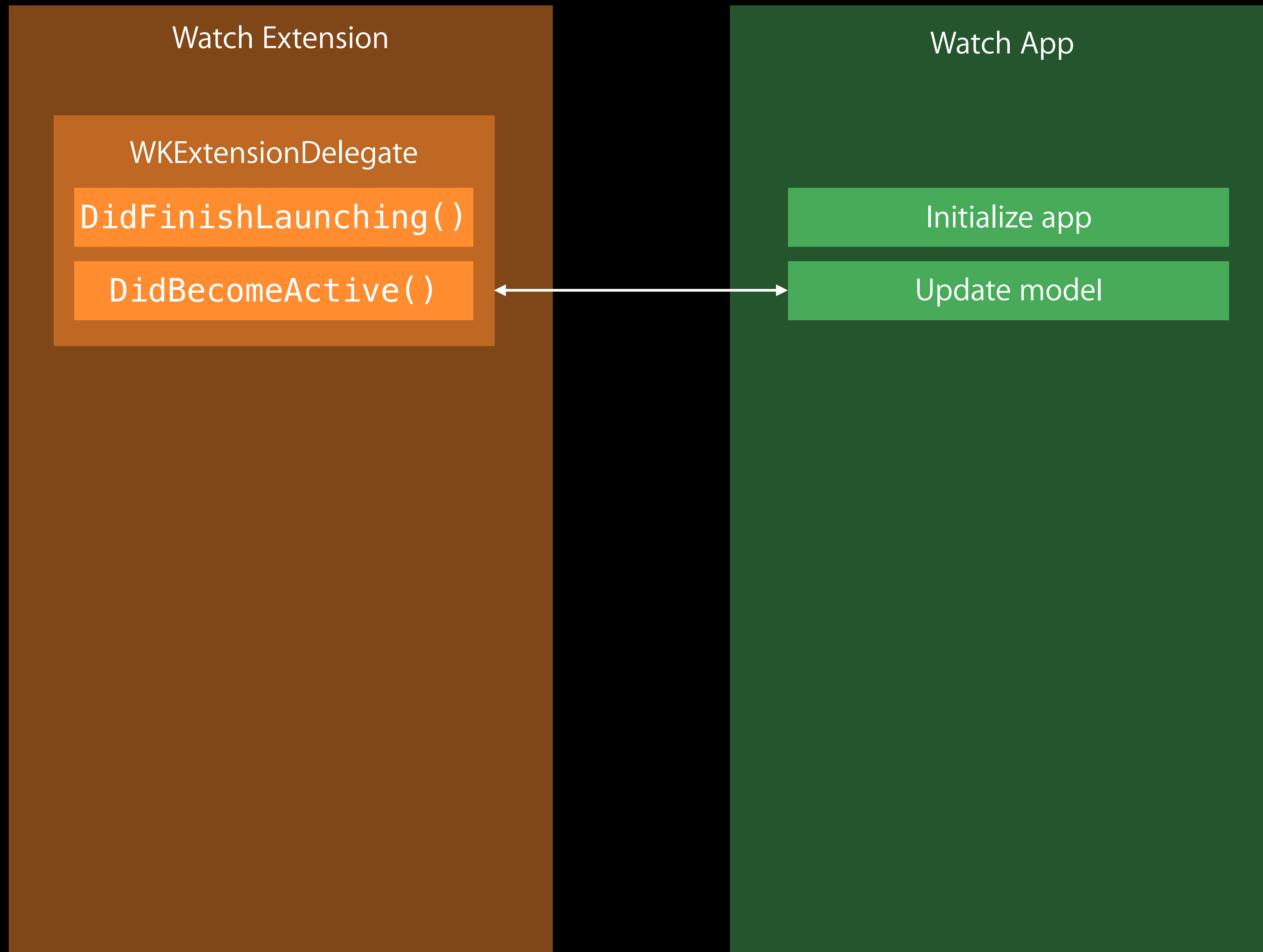
Demo

App Lifecycle

Watch Extension

Watch App





Watch Extension

WKExtensionDelegate

DidFinishLaunching()

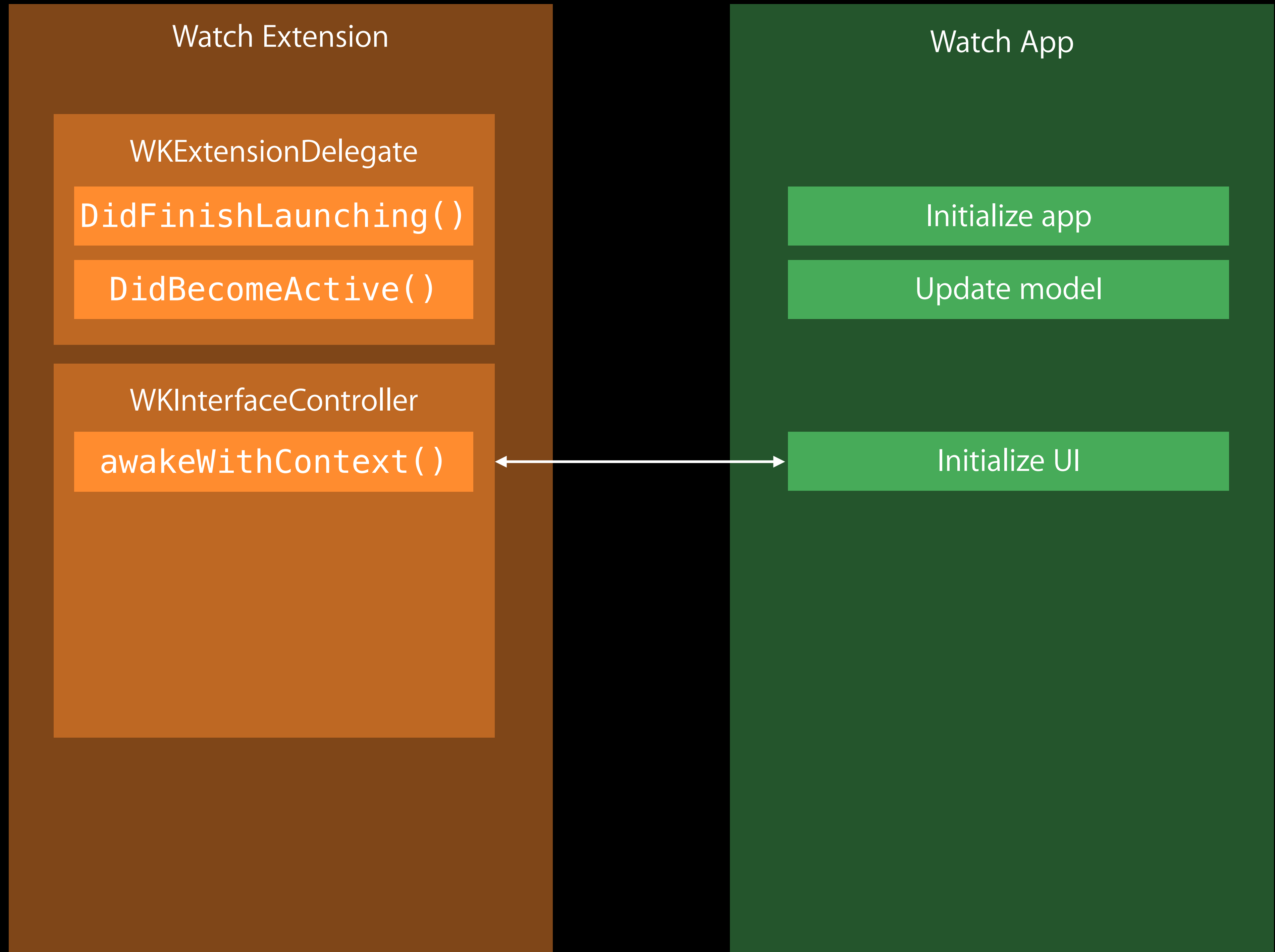
DidBecomeActive()

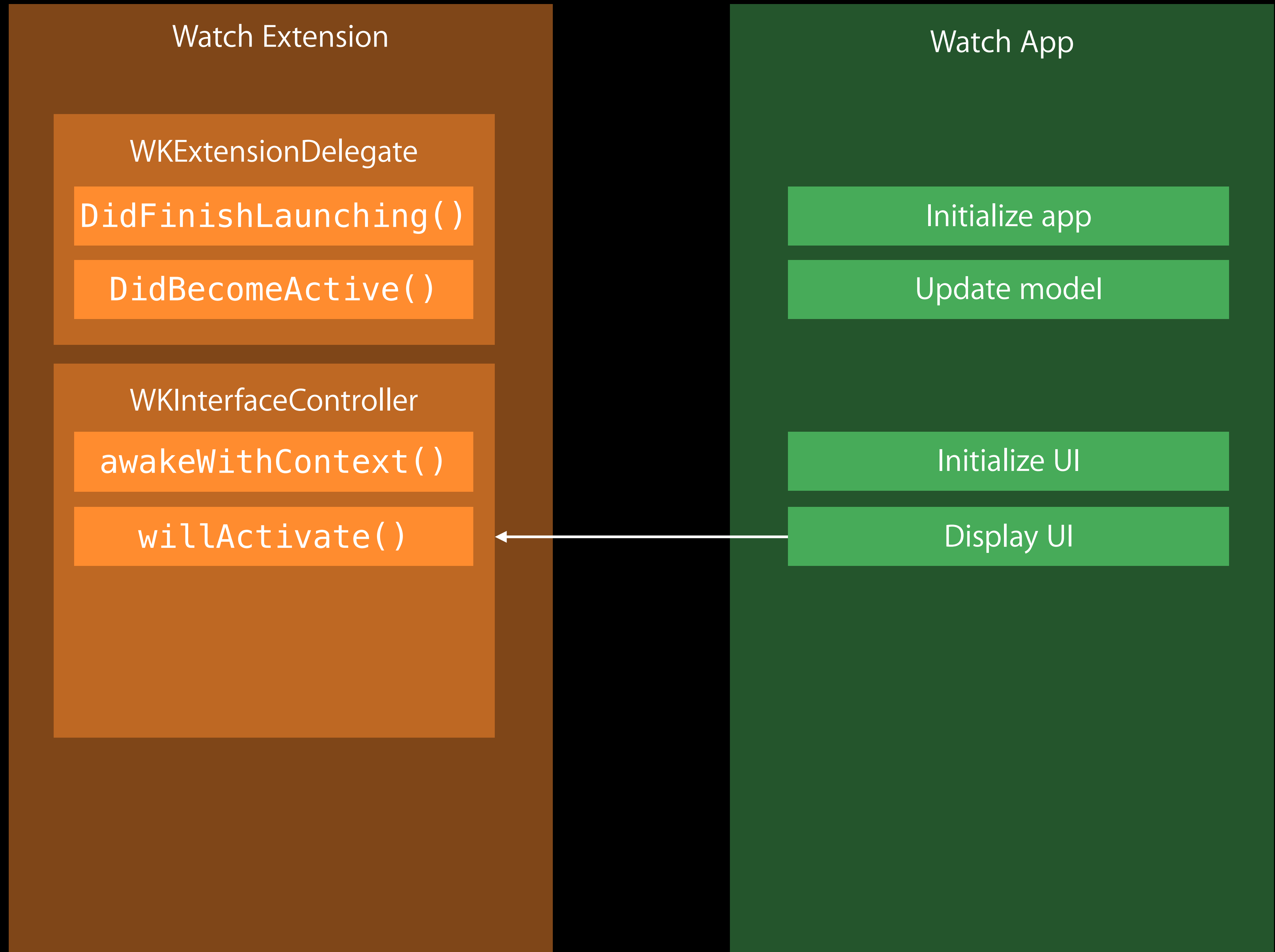
WKInterfaceController

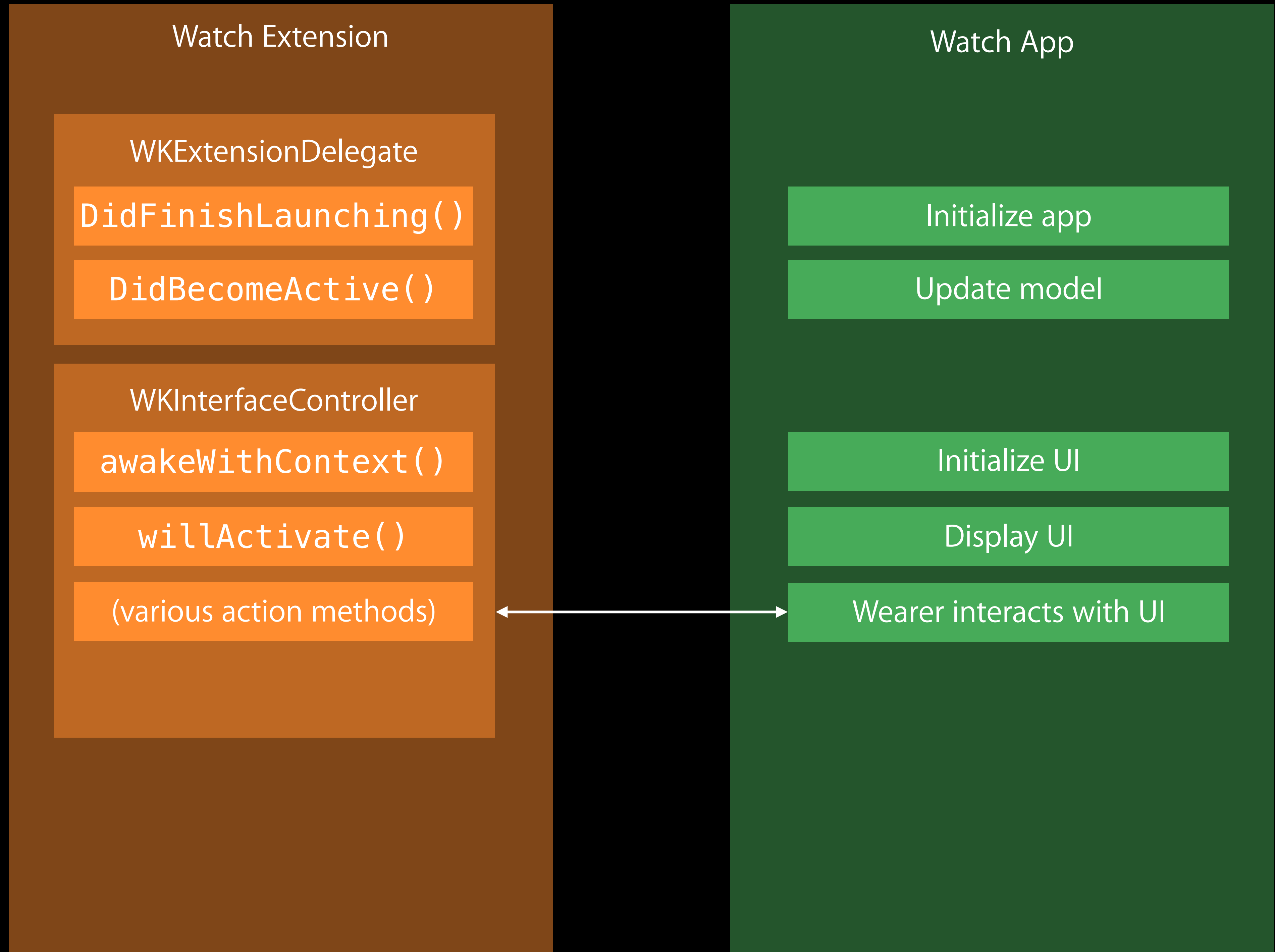
Watch App

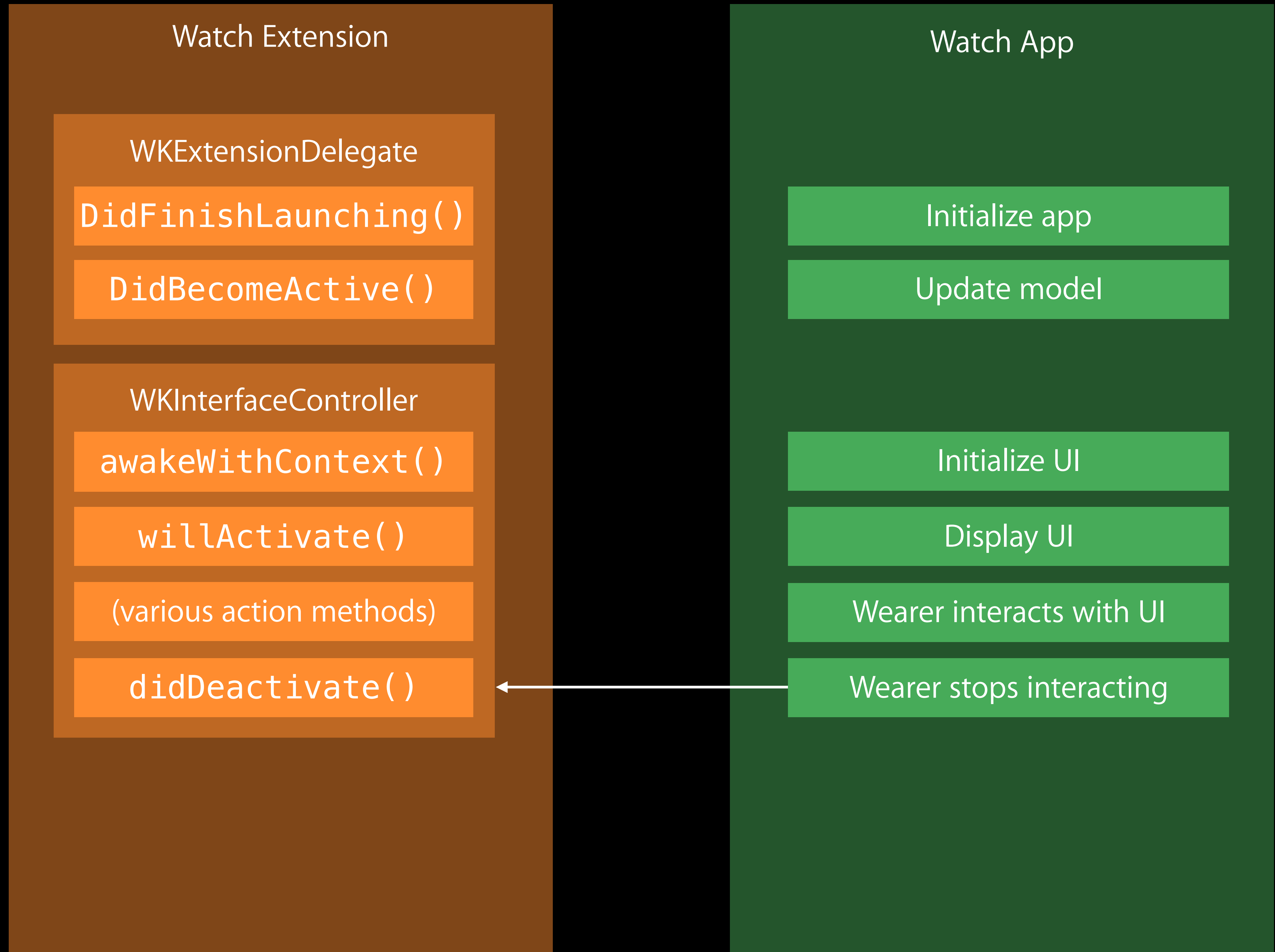
Initialize app

Update model









Watch Extension

WKExtensionDelegate

DidFinishLaunching()

DidBecomeActive()

WKInterfaceController

awakeWithContext()

willActivate()

(various action methods)

didDeactivate()

WKExtensionDelegate

Watch App

Initialize app

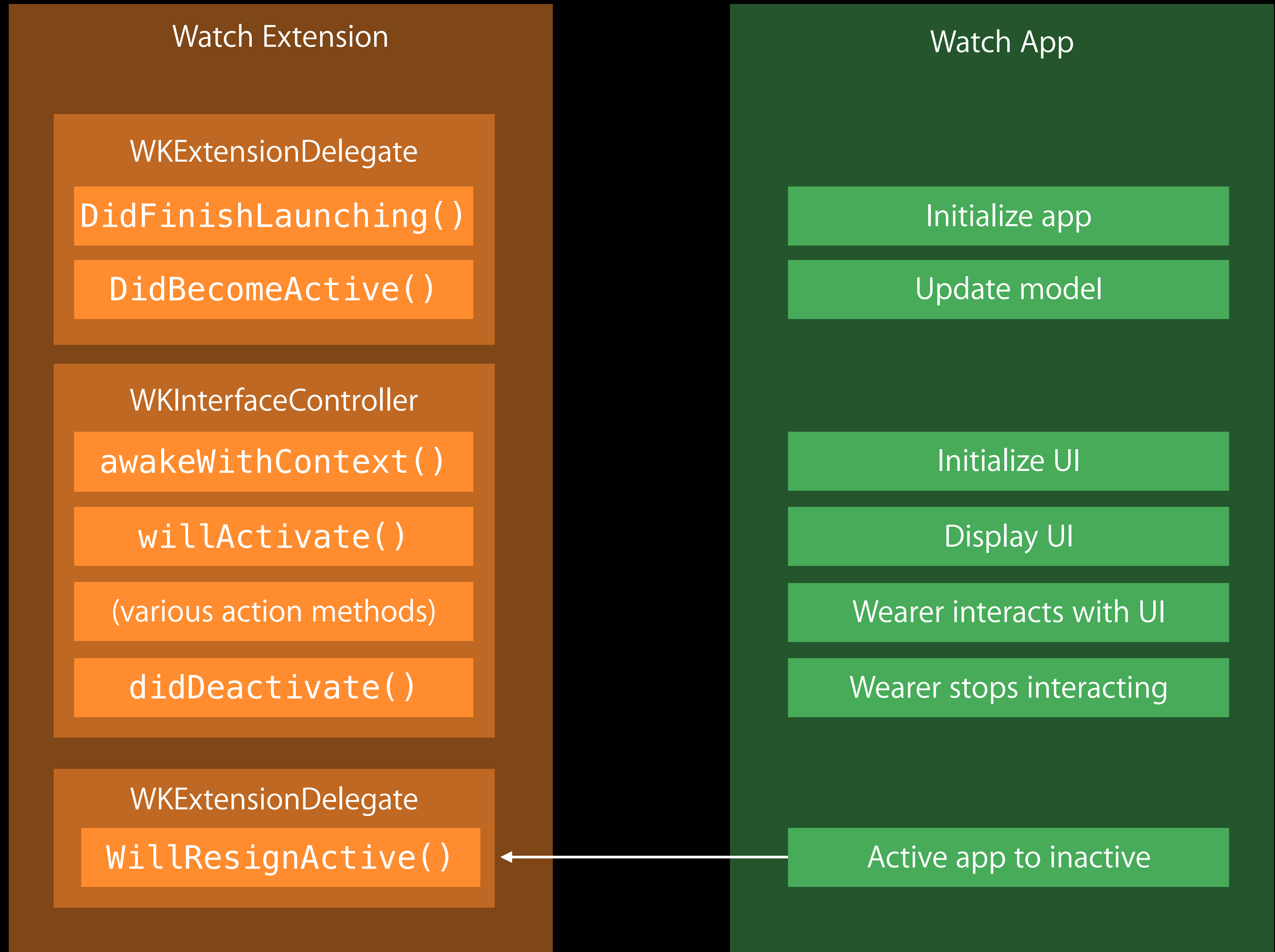
Update model

Initialize UI

Display UI

Wearer interacts with UI

Wearer stops interacting



WatchKit Layout

WatchKit Layout

Model

WatchKit Layout

Model

Different from UIKit and AppKit

WatchKit Layout

Model

Different from UIKit and AppKit

Flow-based layout

WatchKit Layout Model

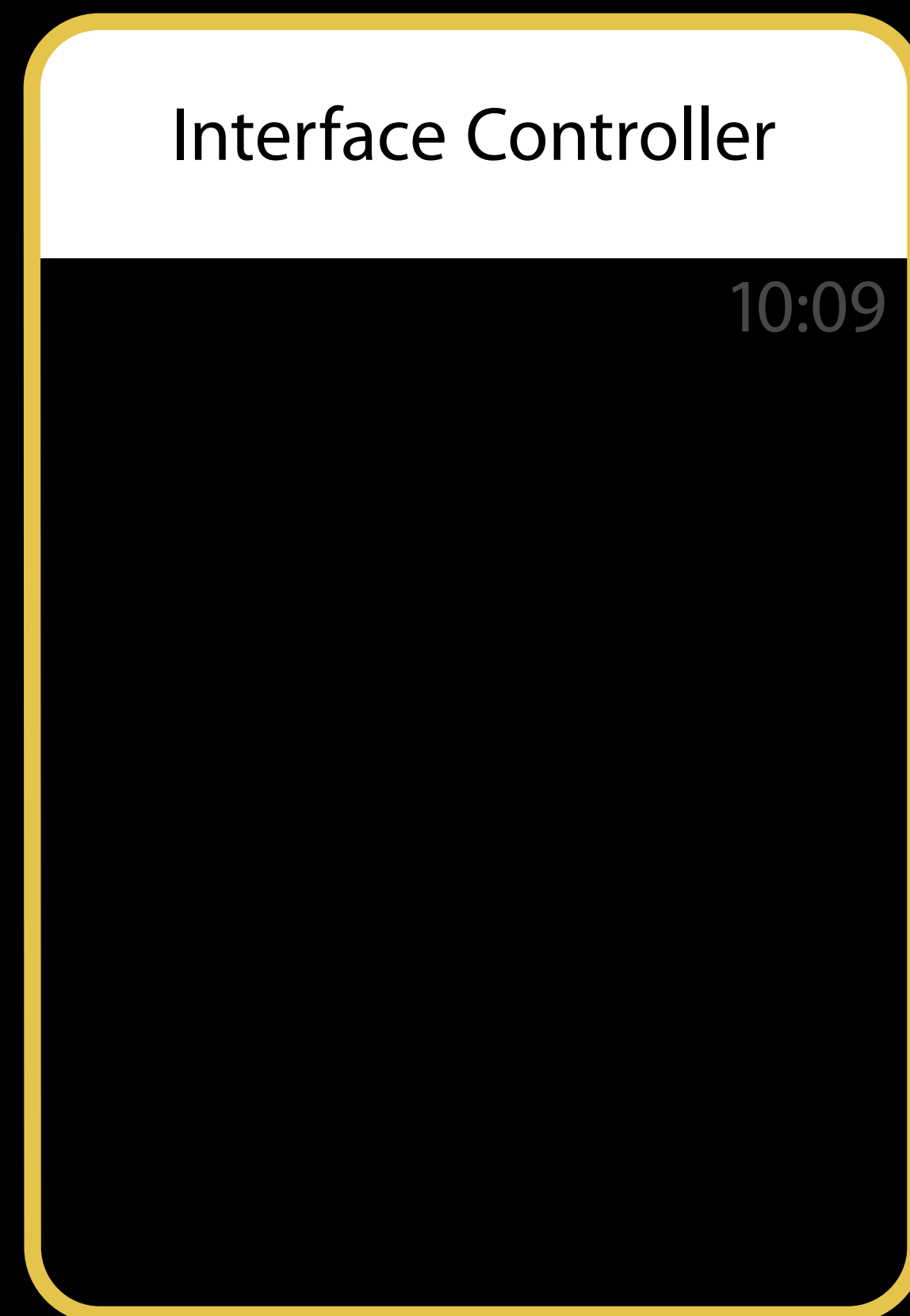
Different from UIKit and AppKit










Flow-based layout

UI created in Interface Builder

WatchKit Layout Model

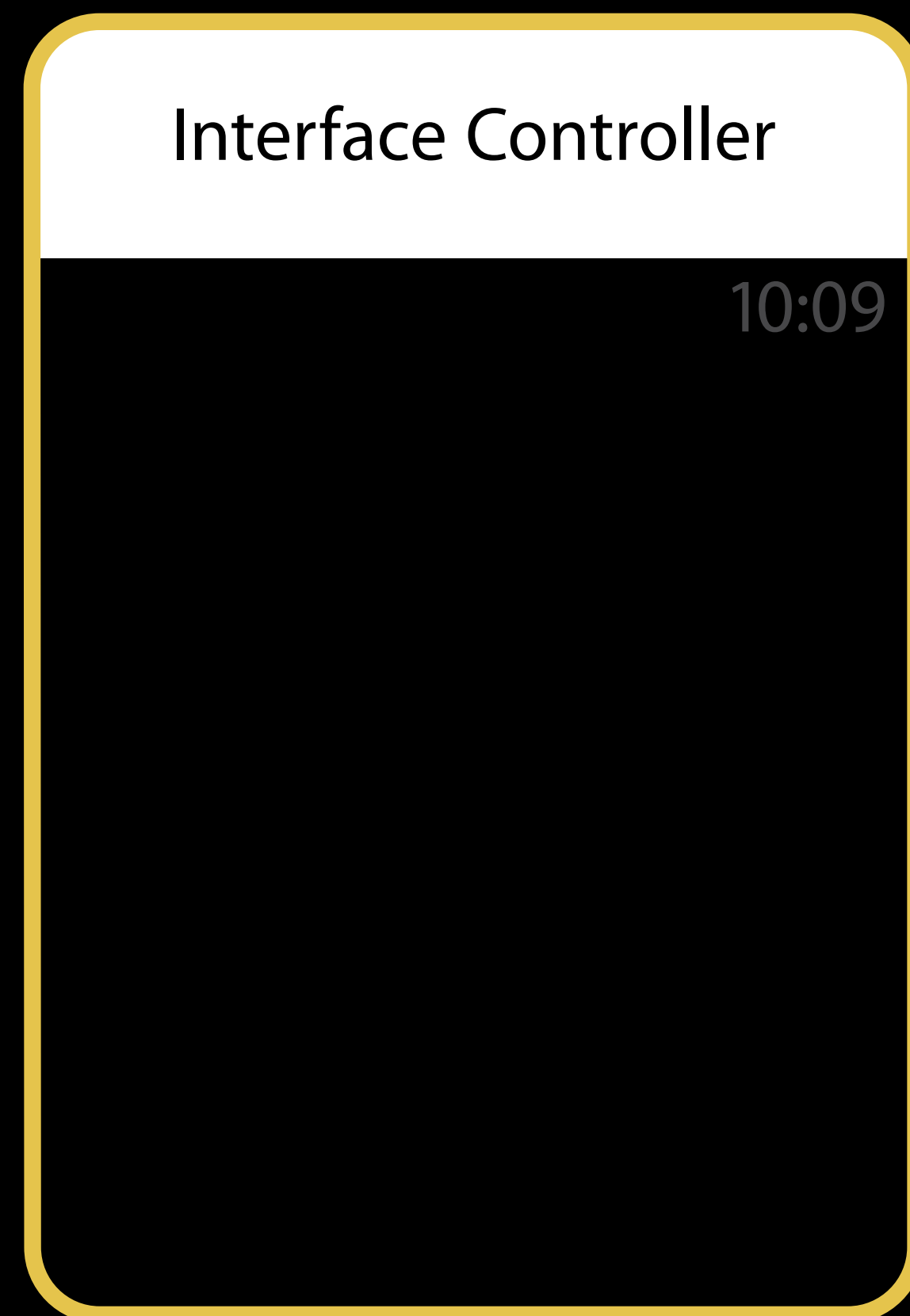
Flow-based layout












	Group - A container that manages the layout of other items.
	Table - Displays one or more rows of data.
	Image - Displays a static or animated image.
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WatchKit Layout Model

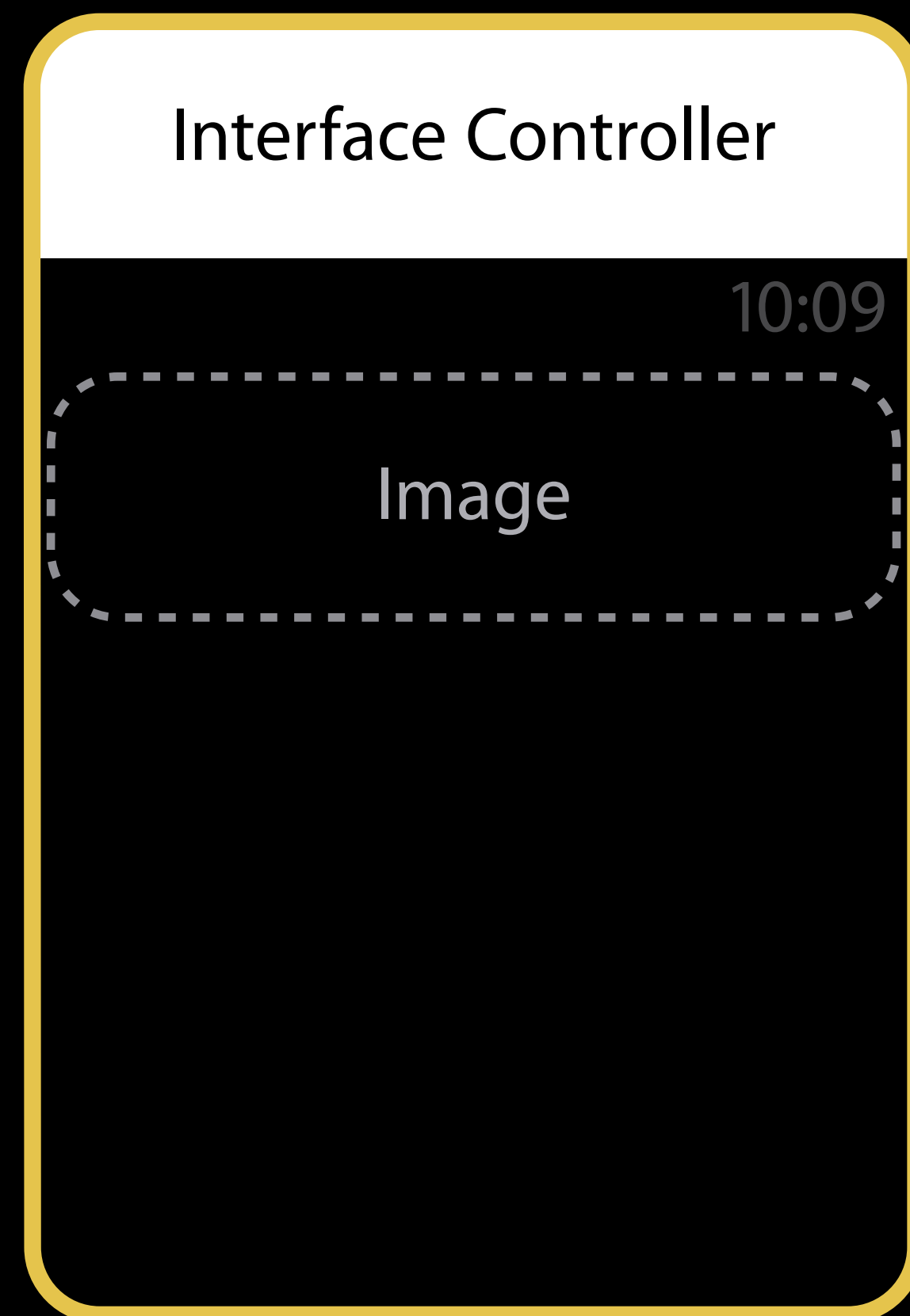
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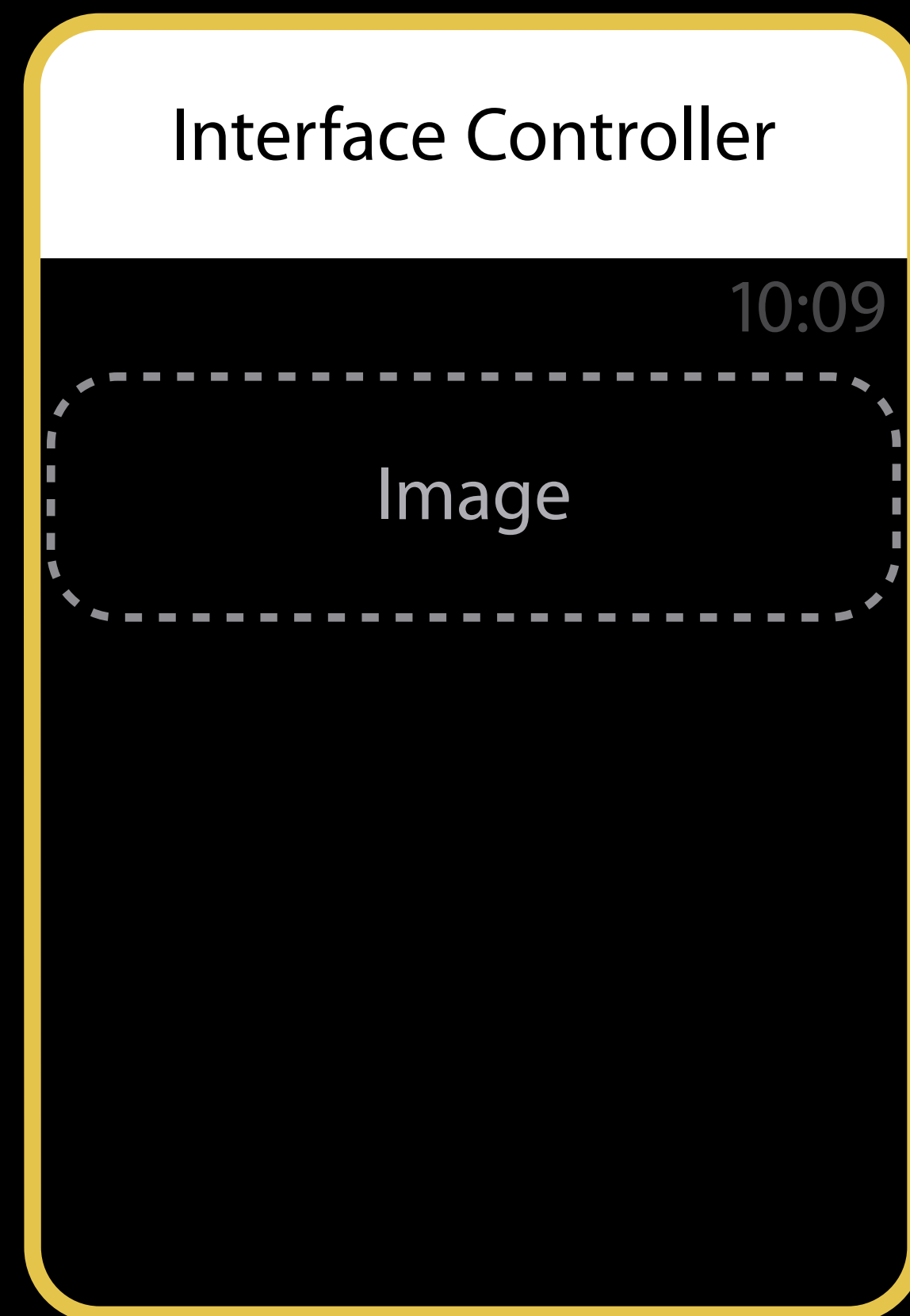
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WatchKit Layout Model

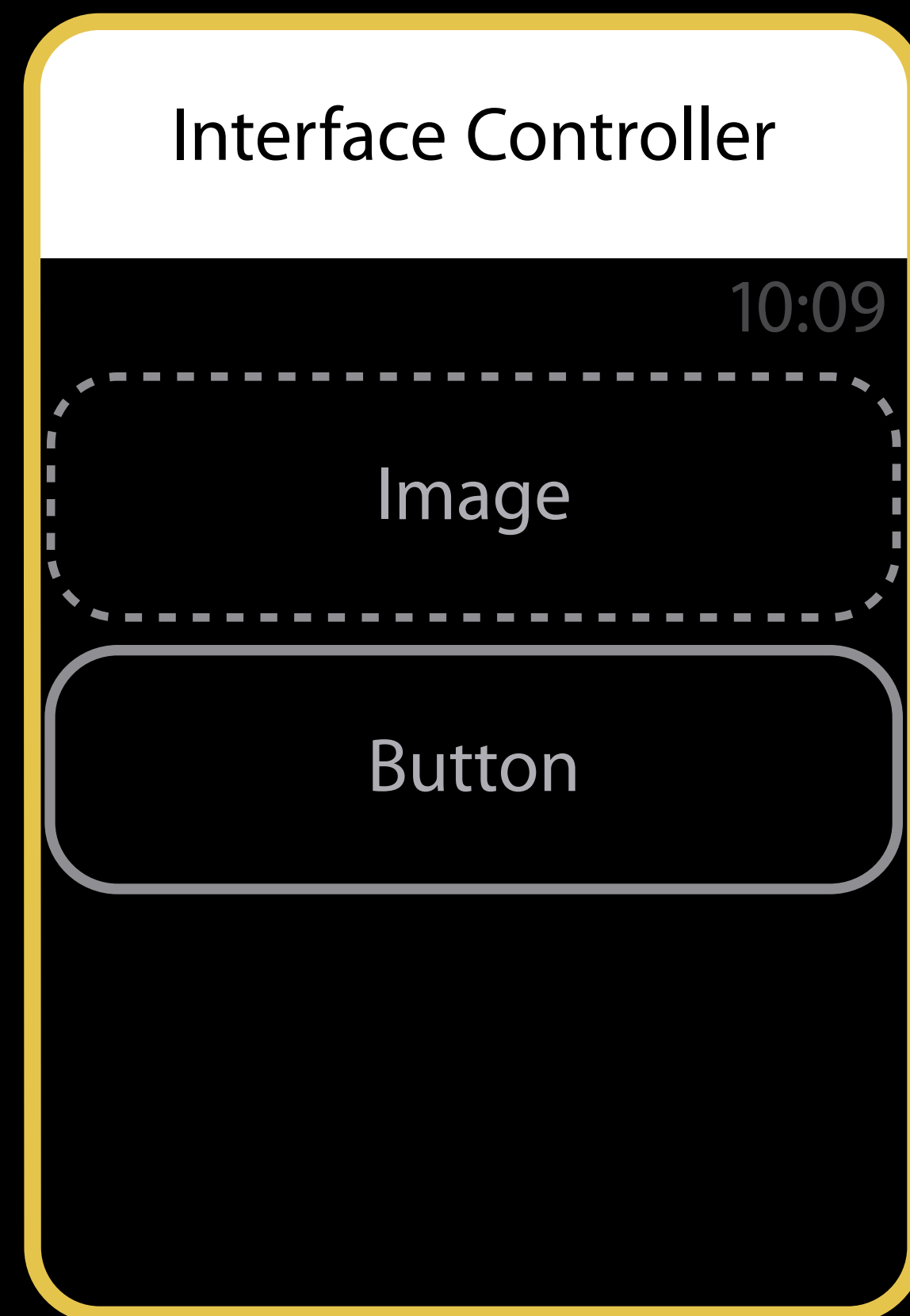
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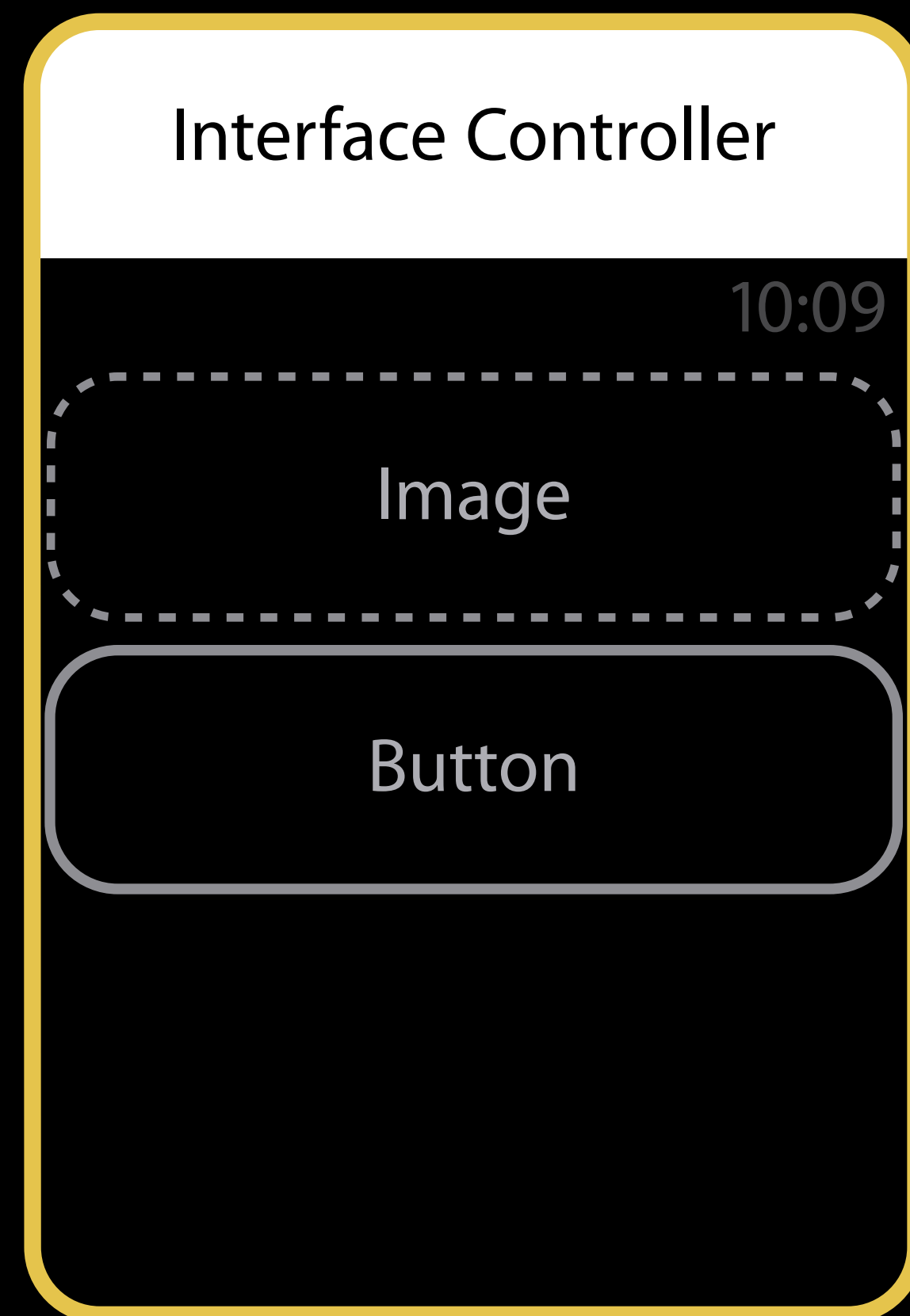
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WatchKit Layout Model

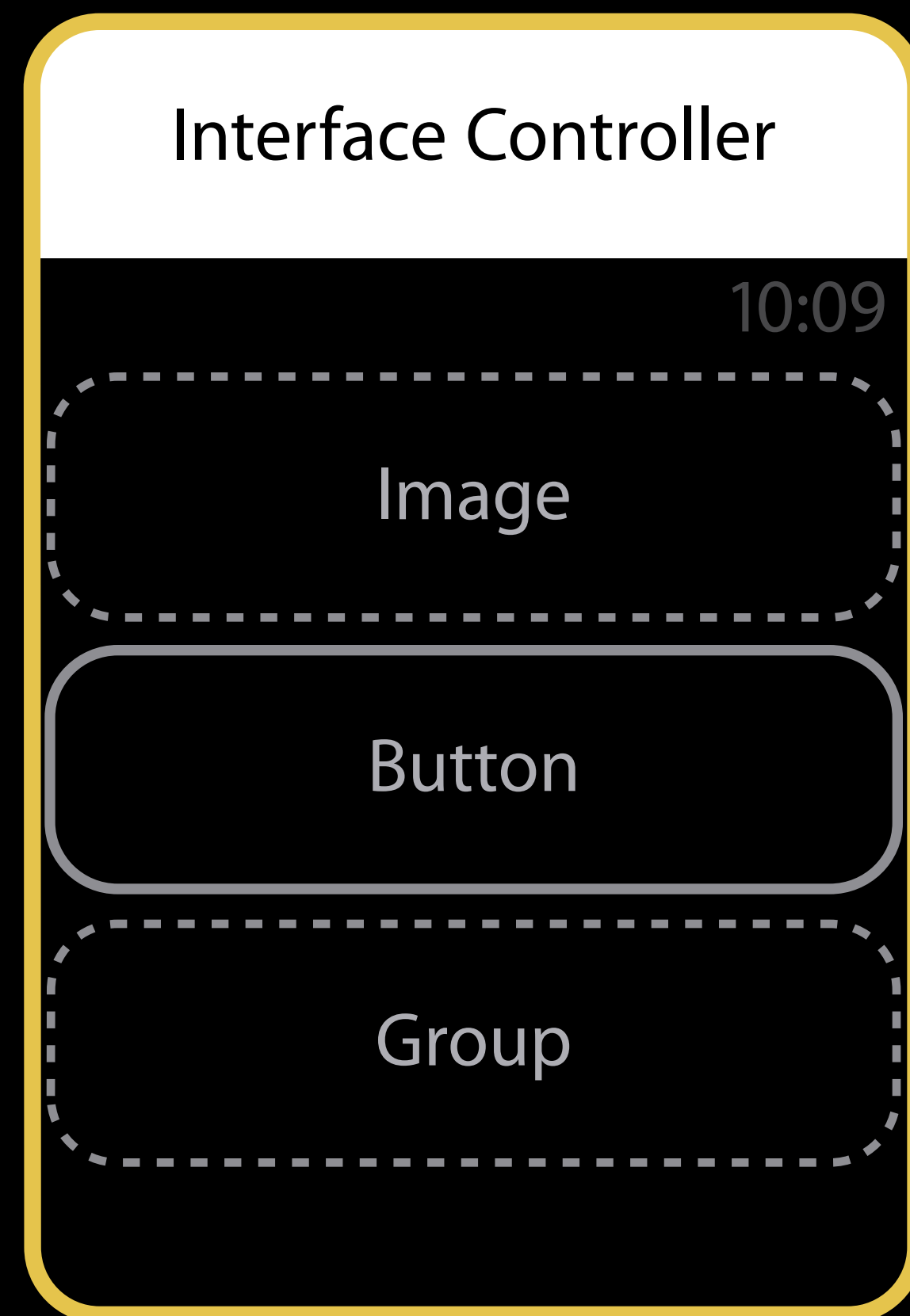
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UIKit Layout Model

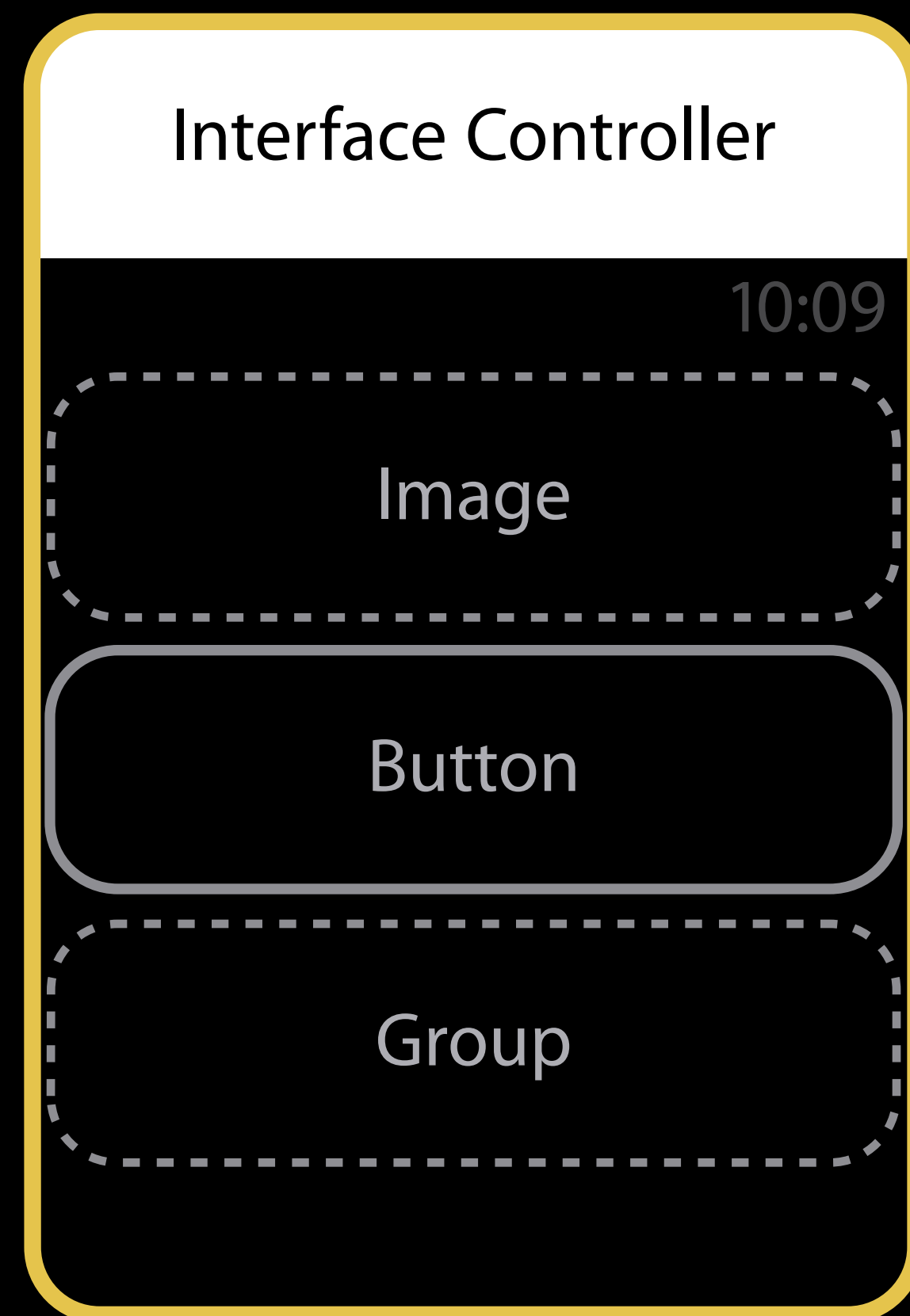
Groups are containers of elements












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WatchKit Layout Model

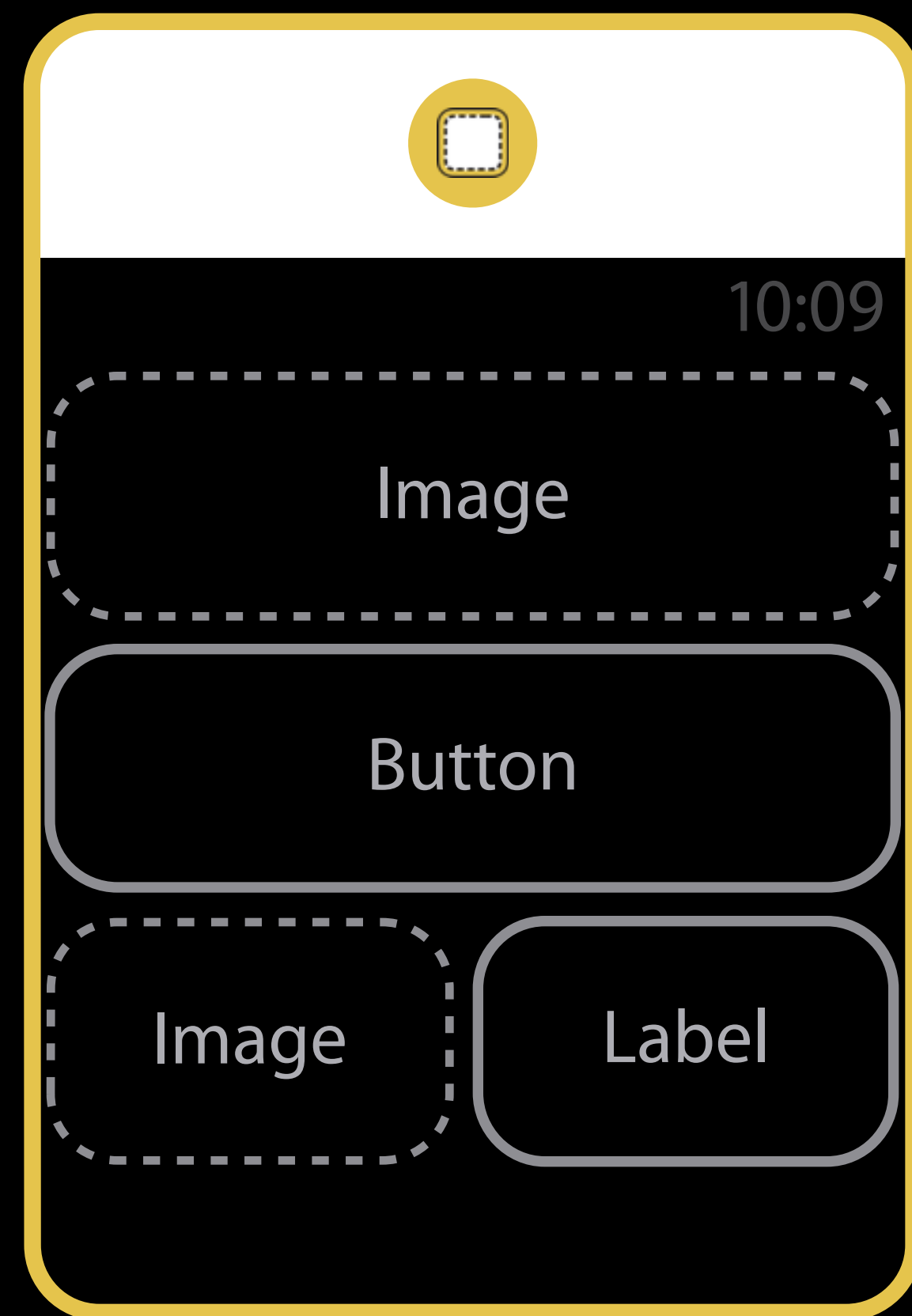
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WatchKit Layout Model

Groups are containers of elements



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WatchKit Layout

Programming Model

UIKit Layout

Programming Model

You don't write object creation code

UIKit Layout

Programming Model

You don't write object creation code

Fine tuned control of

UIKit Layout

Programming Model

You don't write object creation code

Fine tuned control of

- Positioning and Sizing

UIKit Layout

Programming Model

You don't write object creation code

Fine tuned control of

- Positioning and Sizing
- Layout hierarchy

UIKit Layout

Programming Model

You don't write object creation code

Fine tuned control of

- Positioning and Sizing
- Layout hierarchy
- Animation

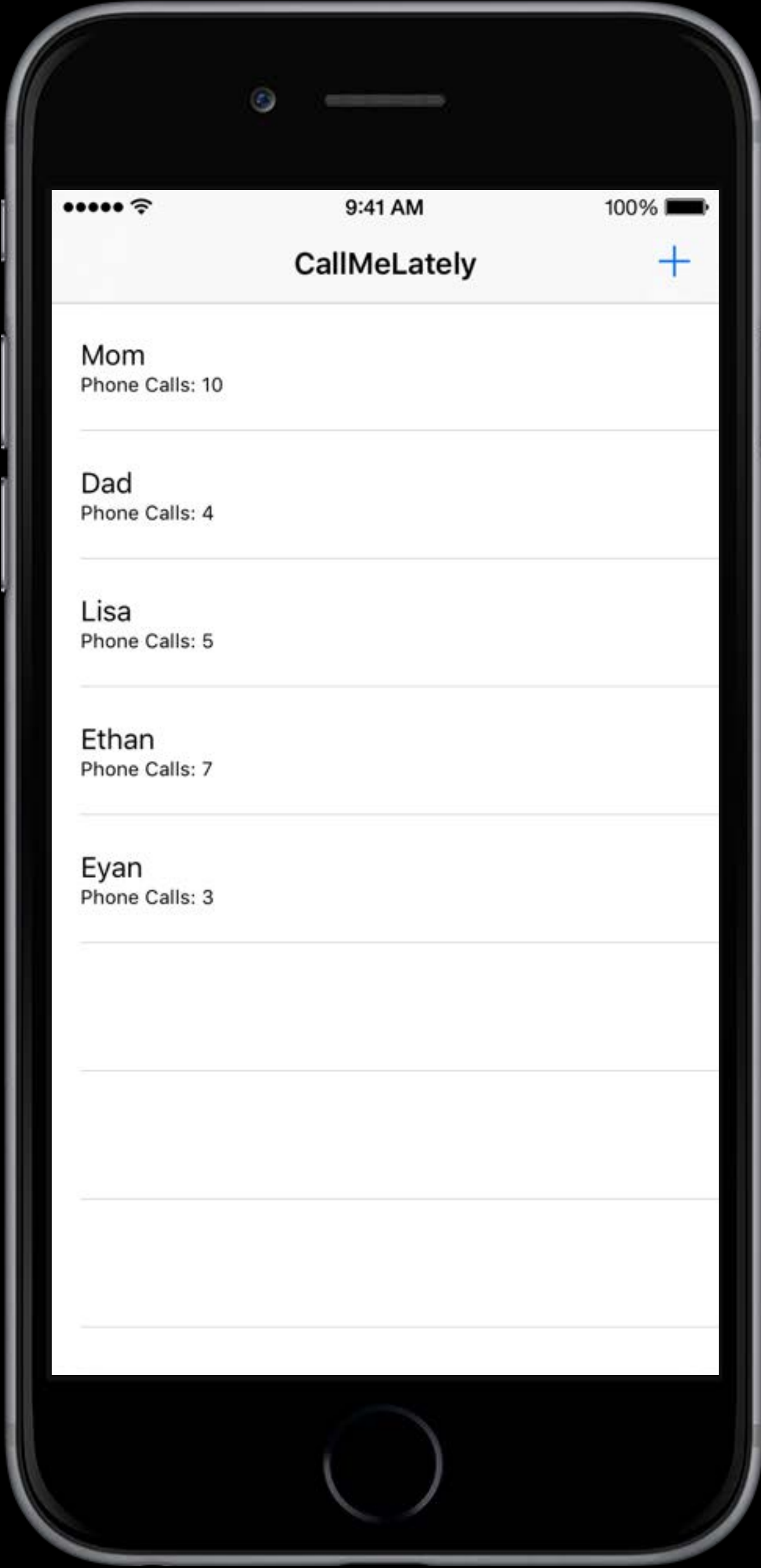
WatchKit Layout

Programming Model

You don't write object creation code

Fine tuned control of

- Positioning and Sizing
- Layout hierarchy
- Animation



CallMeLately	
Mom	Phone Calls: 10
Dad	Phone Calls: 4
Lisa	Phone Calls: 5
Ethan	Phone Calls: 7
Eyan	Phone Calls: 3





Creating My UI

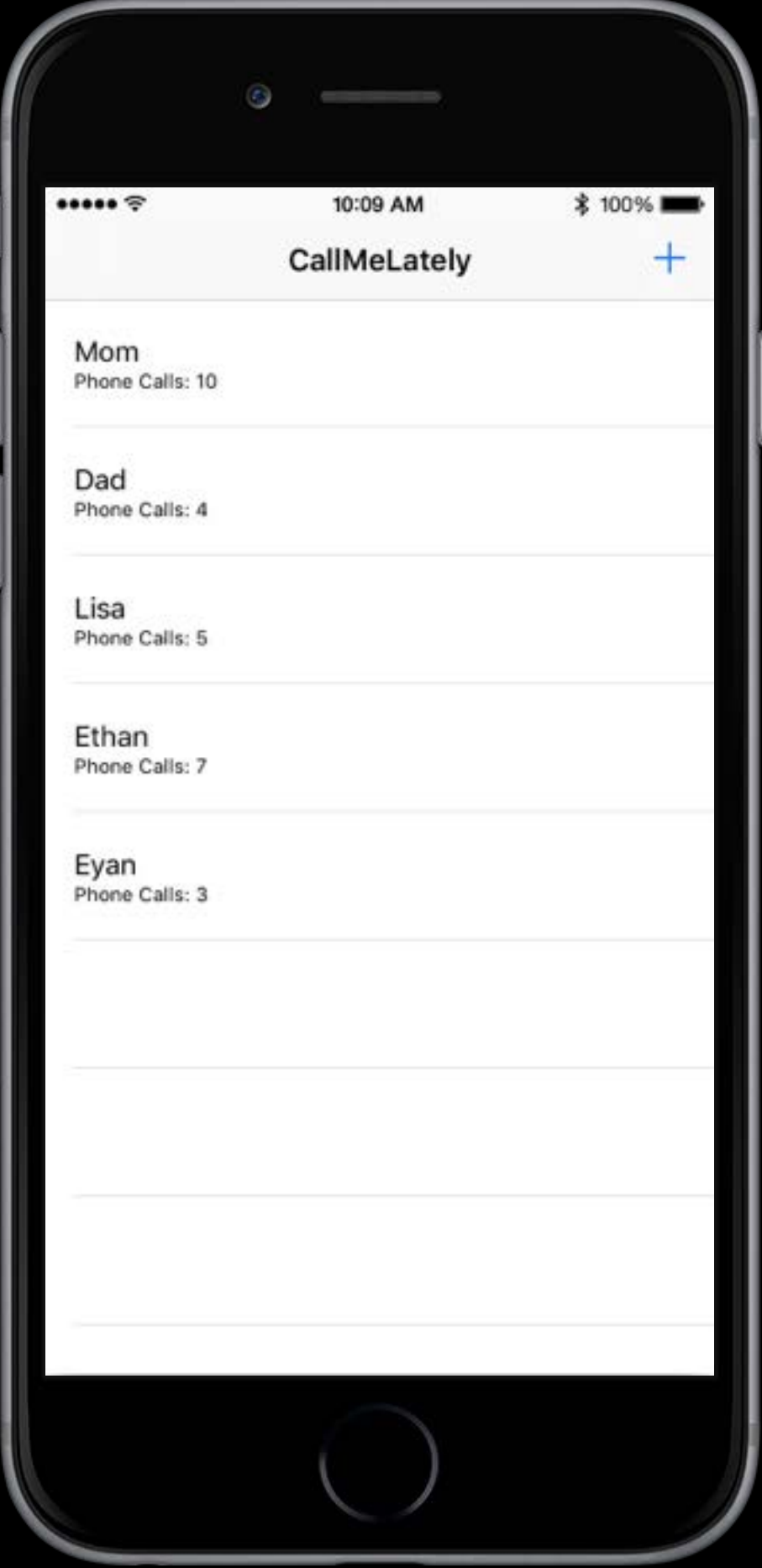
Creating My UI

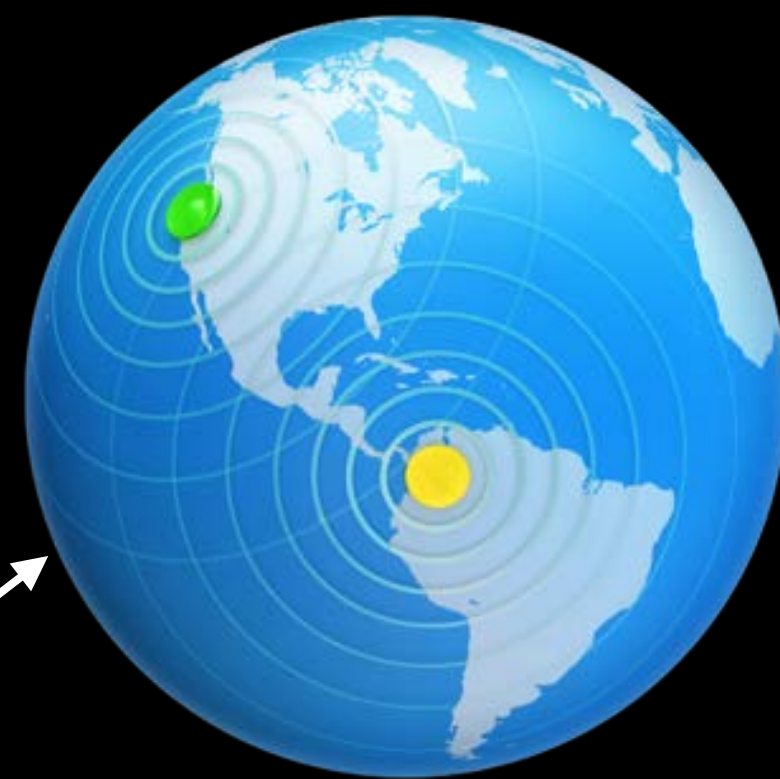
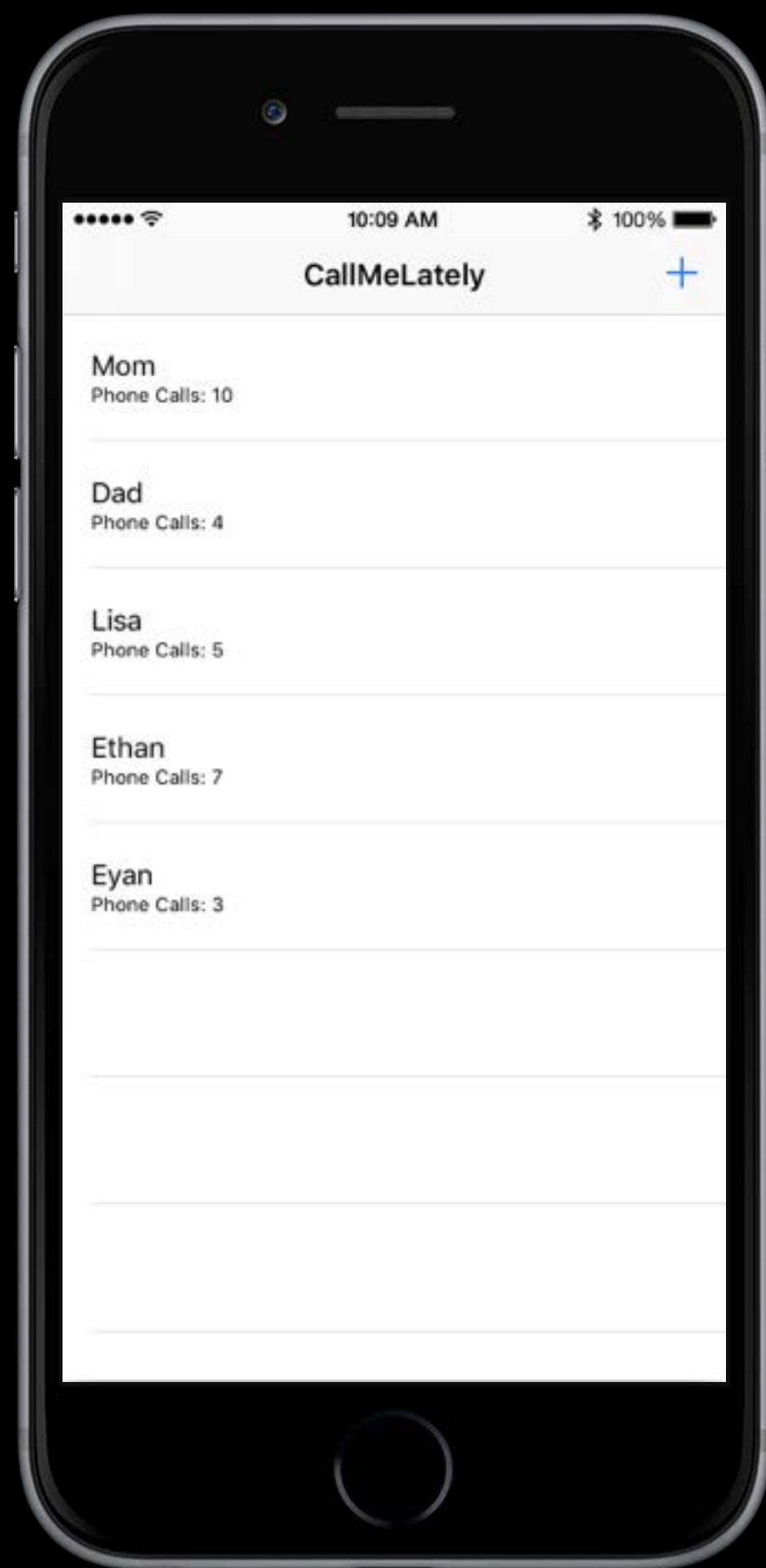
Main App UI

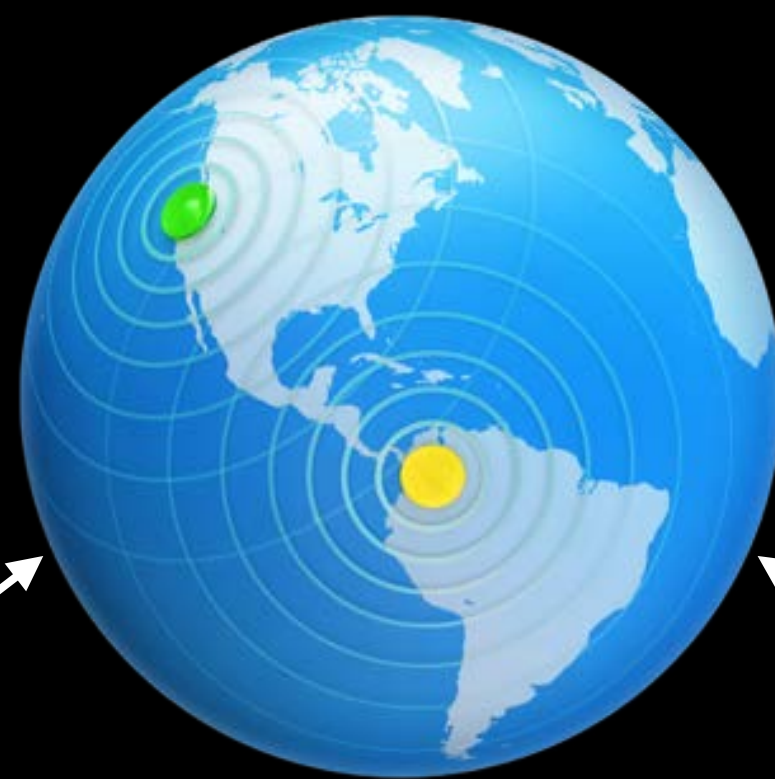
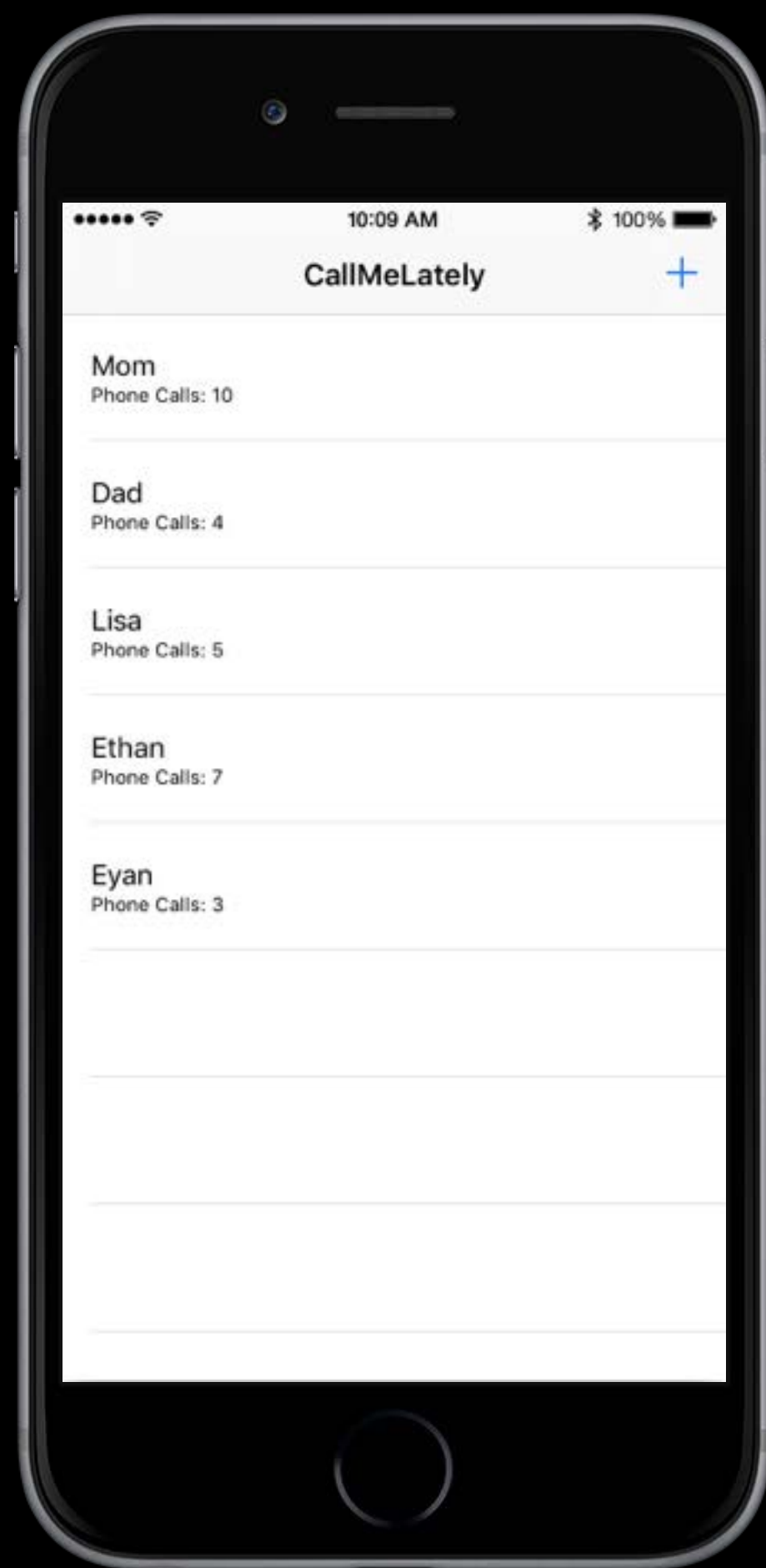
Glance

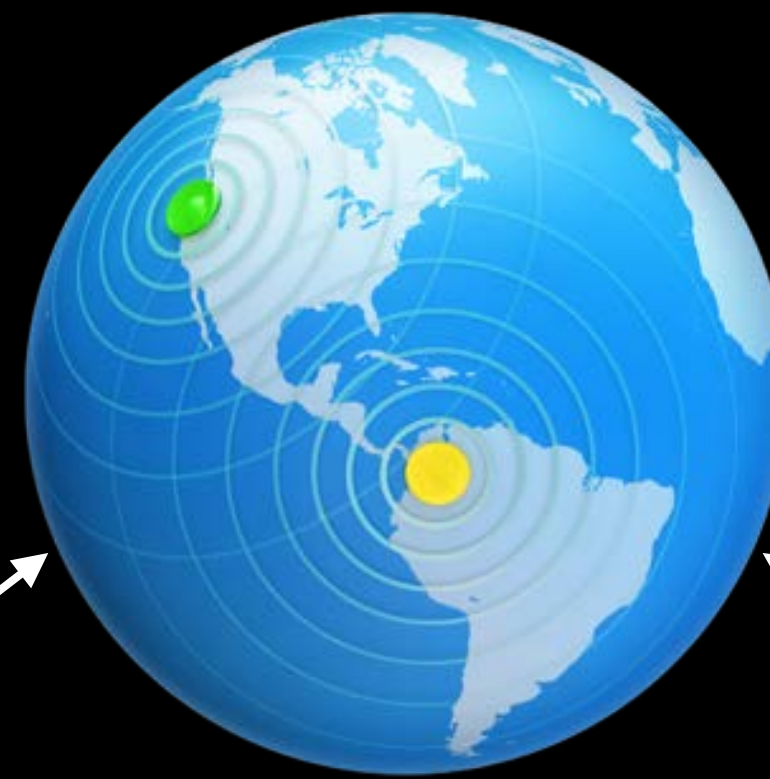
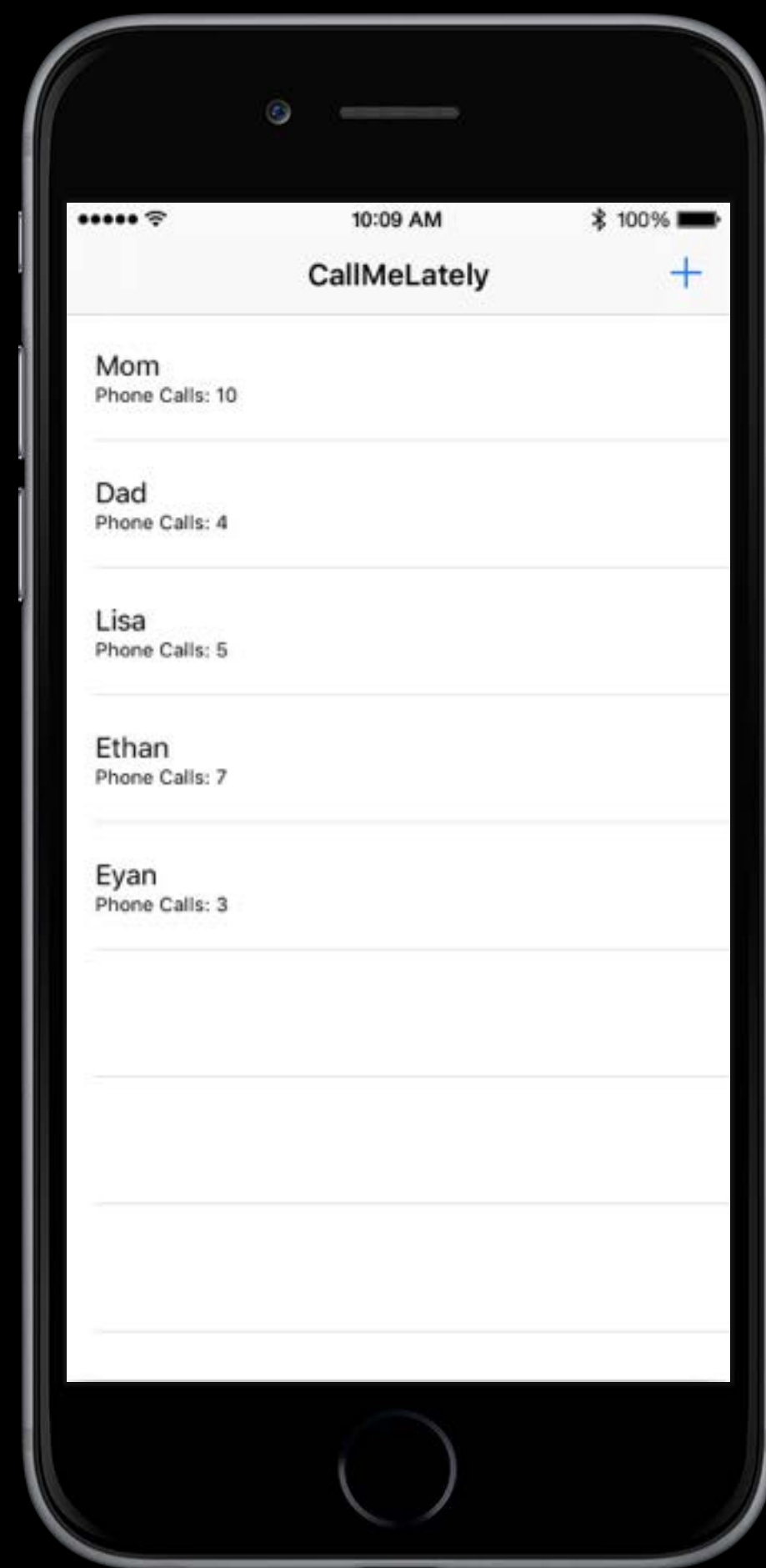
Notification

Demo









WatchConnectivity

WatchConnectivity Framework

WatchConnectivity Framework

WatchConnectivity Framework

Application Context

WatchConnectivity Framework

Application Context

Send Message

WatchConnectivity Framework

Application Context

Send Message

File Transfer

WatchConnectivity Framework

Application Context

Send Message

File Transfer

Transfer User info

WatchConnectivity Framework

Application Context

Send Message

File Transfer

Transfer User info

WatchConnectivity Framework

WatchConnectivity Framework

Add WatchConnectivity

WatchConnectivity Framework

Add WatchConnectivity

Debug my app

WatchConnectivity Framework

Add WatchConnectivity

Debug my app

Profile with Instruments

Instruments

Choose a profiling template for:  Apple Watch - 38mm (2.0 Simulator) >  CallMeLately Extension.appex

Standard

Custom

Recent



Blank



Activity Monitor



Allocations



Automation



Cocoa Layout



Core Animation



Core Data



Counters



Energy
Diagnostics



File Activity



GPU Driver



Leaks



Time Profiler

Performs low-overhead time-based sampling of processes running on the system's CPUs.



Cancel

Choose

Instruments

Apple Watch - 38mm (2.0 Simul... > CallMeLately Extension.appex

Run 0 of 00:00:00

+

All CoresAll Processes / Threads

00:00.00000:10.00000:20.00000:30.00000:40.00000:50.00001:00.00001:10.00001:20.00001:30.00001:40.000

▶ Time Profiler

Details>Call Tree>Call Tree

Involves Symbol

Running TimeSelf (ms)Symbol Name

Sample Interval

1ms

Time Profiling

Record Waiting Threads

Callstacks

User

Kernel

User & Kernel

Instruments

Instruments

Engagement times are short

Instruments

Engagement times are short

Performance is critical

Instruments

Engagement times are short

Performance is critical

Device

Instruments

Engagement times are short

Performance is critical

Device

Simulator

Demo

WWDC CallMeLateLy

WWDC CallMeLateLy

Added a Watch app

WWDC CallMeLately

Added a Watch app

Created an interface for our app and glance

WWDC CallMeLately

Added a Watch app

Created an interface for our app and glance

WatchConnectivity

WWDC CallMeLately

Added a Watch app

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WatchConnectivity

Debugged our iOS and watchOS apps

WWDC CallMeLately

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Profiled in Instruments

watchOS 2 Features

Complications



Complications



Digital Crown



Digital Crown



Animations



Animations



Heart Rate Sensors



Haptics



Haptics



Media Playback



Media Playback



Media Playback



Audio Recording



Audio Recording



Security



Recap

Recap

Architecture

Recap

Architecture

Adding a Watch app

Recap

Architecture

Adding a Watch app

App Lifecycle

Recap

Architecture

Adding a Watch app

App Lifecycle

Use interface elements

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Build and run

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Use interface elements

Build and run

Debugging

Recap

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App Lifecycle

Use interface elements

Build and run

Debugging

Use watchOS capabilities

More Information

Documentation

watchOS 2 Transition Guide

WatchKit Programming Guide

Sample Code

Lister

WatchKit Catalog

<http://developer.apple.com/watchOS>

Technical Support

Apple Developer Forums

Developer Technical Support

General Inquiries

Jake Behrens, watchOS Frameworks Evangelist

behrens@apple.com

Related Sessions

Apple Watch Accessibility	Pacific Heights	Tuesday 1:30PM
WatchKit In-Depth, Part 1	Pacific Heights	Wednesday 9:00AM
WatchKit In-Depth, Part 2	Pacific Heights	Wednesday 10:00AM
Creating Complications with ClockKit	Pacific Heights	Wednesday 11:00AM
Layout and Animation Techniques for WatchKit	Pacific Heights	Thursday 10:00AM
WatchKit Tips and Tricks	Presidio	Friday 10:00AM
Introducing Watch Connectivity	Pacific Heights	Thursday 11:00AM
Designing for Apple Watch	Presidio	Wednesday 4:30PM
Apple Watch Design Tips and Tricks	Presidio	Friday 3:30PM

Labs

ClockKit Complications Lab	Frameworks Lab D	Wednesday 1:30PM
WatchKit Lab	Frameworks Lab D	Wednesday 3:30PM
Watch Connectivity Lab	Frameworks Lab B	Thursday 1:30PM
WatchKit Layout and Animation Lab	Frameworks Lab A	Thursday 3:30PM
WatchKit and ClockKit Complications Lab	Frameworks Lab A	Friday 1:30PM

